Original operating instructions
Truck-mounted concrete pump

S 24 X

- EN-

Dear Customer,

These operating instructions describe all series and special equipment of your machine available at the time of publication.

Country-specific differences are possible.

Please note that your machine cannot be equipped with all described functions. This also applies to safety-relevant systems and functions.

The operating instructions are an integral part of the machine.

Always keep the operating instructions readily available on to machine so they can be viewed at all times.

Please ensure prompt replacement of the operating instructions if they should become lost.

Specify the machine type and the machine number stamped on the type plate of your machine when placing an order.

Pass on these operating instructions when leaving the machine to someone else.

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2 Introduction

This chapter contains the most important information about your machine/system, in addition to:

- Layout
- Conventions
- Handling

of these operating instructions.

2.1 Preface

These operating instructions are intended to help you use your SCHWING machine safely and properly, and are an integral part of the machine.

Carefully read this manual before using your SCHWING machine for the first time and observe all corresponding provisions and instructions contained therein.

These operating instructions are intended for all persons who are entrusted with operating or servicing the SCHWING machine described below, as well as the owners and operators of the machine.

The machine is constructed according to state-of-the-art technology and recognised safety-related rules. Nevertheless, they can cause danger to persons and material goods in the event of incorrect use, operation, maintenance or repair.

Any use of the machine requires knowledge and careful observance of these operating instructions.

These operating instructions must always be available on the SCHWING machine.

Please be aware that the figures in these instructions may differ slightly from the actual design of your SCHWING machine.

In addition to the operating instructions, the general relevant legal and other rules on accident prevention of the country of operation should be observed.

SCHWING GmbH is not liable for damages caused by a failure to observe these provisions and/or these operating instructions or by improper use of the machine!

In the event of faults, any questions and to order spare parts, please contact your local representative or:

Address	SCHWING GmbH Heerstraße 9-27 44653 Herne GERMANY
Telephone	+ 49 (0) 2325 / 987-0
Fax	+ 49 (0) 2325 / 72922
Email	info@schwing.de

Our customer service department can be reached at:

Telephone	+ 49 (0) 2325 / 987-231 / 232
Fax	+ 49 (0) 2325 / 74674
Email	service@schwing.de

For all inquiries, always indicate the machine type and machine number. of your machine.

2.1.1 Supplier documentation

SCHWING builds truck-mounted concrete pumps on chassis frames from various manufacturers.

These manufactures provide their own operating instructions about their products.

The same also applies for the manufacturer of integrated motors used in our stationary concrete pumps and trailer pumps.

Other special pieces of equipment on your SCHWING machine may also have their own operating instructions.

Please observe these documents, in addition to the SCHWING operating instructions, in order to service and maintain these components properly.

Should you encounter any problems with your vehicle or integrated motor, please contact the addresses listed in the manufacturer's operating instructions directly.

2.2 Structure of the operating instructions

The present operating instructions consist of several different chapters.

The operating instructions are structured logically in accordance with the applications and must be read and understood completely before the initial commissioning.

If you still have any questions or doubts after reading the operating instructions, please do not hesitate to contact the customer service department at Schwing GmbH. If necessary, you can also organise individual training seminars.

These operating instructions are also intended as reference work. The clear table of contents and the headers in the document were designed with that purpose in mind.

The safety chapter was prepared together with the VDMA and other concrete pump manufacturers and can also be ordered separately for training purposes, for example.

2.2.1 Typographic conventions

- This symbol marks a list or a hierarchical series, such as required materials, tools or a reminder list.

➤ This symbol indicates individual instructions.
Follow these instructions carefully.
Each instruction is a self-contained task.

1. Numerical lists indicate sub-steps of instructions.
Only after all sub-steps of the instructions have been completed is the complete instruction concluded.

a) Alphabetical lists indicate different variants of designs.

CAPITALIZATION:

Words written completely in upper case are proper nouns. Proper nouns are not translated.

Examples:

SCHWING

EASy

VECTOR

2.2.2 Contents of the individual chapters in these operating instructions

Introduction

This chapter is intended to familiarise you with your machine.

It contains, for example, the technical specifications, a short description and an overview of the machine.

Operation

In this chapter, you will find descriptions of all machine operating procedures, from commissioning to working operation and cleaning to decommissioning.

Maintenance

This chapter contains essential information on when and how the machine should be serviced, as well as information on filling quantities and the lubricants and operating materials used.

Radio remote control

Your machine's radio control system is described in a separate chapter. If alternative remote controls are available for your machine, all up-to-date variants are shown here. This chapter is empty in the case of machines for which no radio remote control is offered.

Special equipment

This chapter provides information on all types of special equipment.

Each machine is tailored to the customer's requirements. Please note that your particular machine might not include all of the special equipment described here.

Appendix

In the appendix chapter, you all of the contact information, along with topics such as organisation and administration.

Safety

The safety manual is located in the appendix of these operating instructions and contains basic safety instructions regarding the operation of pumping, spraying and spreading machinery for concrete.

The safety manual is prepared jointly by leading manufacturers of concrete pumping and spreading machines under the auspices of the VDMA (Verband Deutscher Maschinen- und Anlagenbau/Mechanical Engineering Industry Association). It is applicable to our machines in full.

For this reason, the safety manual has a chapter of its own and separate page numbers.

Specific warnings can be found directly before descriptions of dangerous activities.

2.2.3 Page layout of the operating instructions

Header

A dynamic column title is contained in the header on the outer edge of the page.

The column title shows the corresponding sub-chapter currently being read, along with the chapter number and title.

The column title helps to maintain an overview and to find a desired topic quickly.

Footer

The outside edge of the footer contains the page number and an ID.

The ID is used to organise the documents internally; it is of no relevance for you.

If you have any questions regarding specific pages in your operating instructions, please provide us with:

- The title of your operating instructions (the exact designation of your machine and the print date)
- The page number
- The chapter in the column title

Margin column

The margin column provides a better orientation on the pages.

Using the margin column, you can find headers more quickly perceive any indications more easily.

2.2.4 Structure of the warnings

In these operating instructions, warnings are placed in front of certain sections to warn readers of dangers that could cause potential personal injury or material damage.

The measures described to avert these dangers must be adhered to.

Warnings are structured as follows:

	**Signal word**
	Type of danger and its source
	Possible consequence(s) if disregarded
	Measure(s) for averting the danger

2.2.5 Warning of personal injury

The following warnings describe the grading and meaning of signal words for personal injuries.

Danger!

High risk!

Used to indicate an imminently dangerous situation that will result in serious injury or death if it not avoided.

Describes how the danger can be avoided.

Warning!

Medium risk!

Used to indicate a potentially dangerous situation that may result in serious injury or death if it not avoided.

Describes how the danger can be avoided.

Caution!

Risk!

Used to indicate a potentially dangerous situation that may result in minor or moderate injury if it not avoided.

Describes how the danger can be avoided.

2.2.6 Warning of material damage

The following warning describes the meaning of the signal word for material damage.

Attention!

Material damage!

Damage to your own machine or other objects.

Describes how the material damage can be avoided.

2.2.7 Additional information

The following symbol indicates useful tips and recommendations, as well as information for ensuring smooth and efficient operation.

Information

Text box for additional information.

2.3 Declaration of conformity and conformity markings

Depending on the economic area, conformity markings and declarations of conformity are required for products. For example, the CE marking and the declaration of conformity according to the Machinery Directive for machines in the European Single Market.

With the marking and the respective declaration of conformity, SCHWING declares that the product complies with the relevant legislation in the economic area, especially any safety and health protection requirements.

The original of each declaration of conformity is archived at SCHWING. The customer receives a copy of the declaration in their national language, together with the delivery note and invoice.

Refer to the drawing in the spare part catalogue for the position of the conformity marking. For SCHWING machines, the conformity markings are usually located near the type plate.

The markings currently being used by SCHWING include:

		
CE marking European Single Market	**EAC marking** Eurasian Economic Union	**UKCA marking** The United Kingdom

Table 1 Conformity marking

2.3.1 Change to SCHWING machines

When a SCHWING machine is brought onto into circulation by SCHWING or by an authorised dealer, it always complies with the legal regulations of the economic area applicable at that point in time.

In the case of subsequent technical modifications that are not made by SCHWING, compliance with the applicable regulations may be affected.

Information

Therefore, do not make any unauthorised modifications to SCHWING machines.

If you do, the machine may no longer comply with the legal requirements and a new conformity assessment procedure must be carried out. If any modifications are required, please contact SCHWING's customer service.

2.3.2 Special requirements for import and export

SCHWING machines always comply with the legal regulations of the economic area in which they were first brought into circulation by SCHWING or by a dealer. This is indicated by the conformity marking. The legal requirements for the products are different in each economic area. For this reason, please note that the machine may not comply with the required regulations if it is imported from a different economic area into your economic area (especially used machines).

For example, a complete conformity assessment procedure is required for new and used machines that are imported from outside the European Single Market and that do not have a CE marking and declaration of conformity. Other economic areas have similar rules.

Information

For imported machines and machines from third-party suppliers, verify that the machines have the markings and declarations of conformity required for your economic area.

This applies in particular to used machines that are brought into circulation for the first time in your economic area.

In general, the same product requirements apply everywhere within an economic area. It is possible to import and export products within that economic area without any technical modifications.

2.4 Theoretical service life of a machine

Our concrete pumps and placing booms are designed, under normal use, for a theoretical life of up to 15 years.

The following reference and empirical values are used as a basis:

Truck-mounted concrete pump S 17 - S 43 SX, S 47 SX	**Reference value** [1]
Delivery rate [m³] / per year	30 000
Construction jobs per year [2]	850

Truck-mounted concrete pump S 45 SX - S 65 SXF	**Reference value** [1]
Delivery rate [m³] / per year	30 000
Construction jobs per year [2]	500

Truck mixer pumps	**Reference value** [1]
Delivery rate [m³] / per year	15 000
Construction jobs per year [2]	250

Stationary concrete pump / Separate placing booms	**Reference value** [1]
Delivery rate [m³] / per year	20 000
Construction jobs per year [2]	280

Trailer pump	**Reference value** [1]
Delivery rate [m³] / per year	6000
Construction jobs per year [2]	1000

Please note that, in addition to the number of construction jobs and the delivery rate (volume of pumped material), other operating factors can also significantly reduce the service life of a machine under certain conditions, such as:

- Not operating the machine in accordance with its intended purpose
- Misuse (e.g. using the boom as a lifting device)
- Improper extension of the end hoses
- Failure to follow the maintenance guidelines
- Operating a machine under extreme conditions, e.g. under excessive heat or excessive cold
- Improper operation by machine operators without adequate training or instruction
- Using concrete pipelines that are not approved by SCHWING
- Not performing the boom inspections and corresponding repairs on time

[1] See “Maintenance” chapter for restrictions
[2] One construction job is generally defined as one extension and retraction cycle.

Any discrepancies can affect the service life accordingly. The information specified with regard to the theoretical life does not constitute any commitment or guarantee, nor does it represent any other assurance as to a machine's quality and durability.

Furthermore, timely compliance with the prescribed maintenance work and technical safety inspections is also considered part of the intended use. See the "Maintenance" chapter and the safety manual in the appendix of these operating instructions.

In the event of damages of any kind, the entire machine must be inspected.

Contact SCHWING in the event of operations outside of the indicated reference values

The following applies to all SCHWING machines:

Fresh concrete temperature:	+15 °C
Operating site:	Outdoors / in rooms with sufficient ventilation
Operating temperature:	-15 °C / +45 °C
Maximum operating altitude:	2000 MASL (depending on the type of machine)

If exceedances of individual values or the simultaneous exceedance of several values can be expected, also see the "**Difficult operating conditions**" chapter.

2.4.1 Final decommissioning and disposal of the machine

The machines contain valuable raw materials that should be reused, but also materials and substances (for example: oils, greases, plastics, electronic components, rechargeable batteries, etc.) that should be disposed of properly due to their properties hazardous to life or -environmentally damaging.

Make sure that the decommissioned machine can no longer be put into operation.

Machines should be dismantled and disposed of in accordance with any regional accident prevention regulations, as well as any provisions regarding health and environmental protection.

Hand the machine over to a certified disposal company in order to ensure that it is disposed of properly.

In the event that certified disposal companies are not available in your region, for example, the authorities responsible for the environmental protection provide appropriate information.

2.5 Labelling SCHWING machines

The most common abbreviations and their meanings are listed and explained here.

2.5.1 Truck-mounted concrete pump

S 20 Hybrid				
S				SCHWING
	20			approx. vertical reach in m
		Hybrid		Drive via vehicle or electric motor

S 24 X				
S				SCHWING
	24			approx. vertical reach in m
		X		X-outrigger

S 31 XT				
S				SCHWING
	31			approx. vertical reach in m
		X		X-outrigger
			T	Telescoping

S 43 SX				
S				SCHWING
	43			approx. vertical reach in m
		SX		Super-X-outrigger

S 65 SXF				
S				SCHWING
	65			approx. vertical reach in m
		SX		Super-X-outrigger
			F	Foldable outrigger

2.5.2 Truck mixer concrete pump

FBP 21				
FBP				Truck mixer concrete pump
	21			approx. vertical reach of the placing boom in m

FBP 26^4				
FBP				Truck mixer concrete pump
	26^4			approx. vertical reach of the placing boom in m, placing boom with 4 boom sections

2.5.3 Placing booms

20 ZR				
20				approx. vertical reach in m
	Z			Z-folding +
		R		Roll-folding

31 ZRT				
31				approx. vertical reach in m
	Z			Z-folding +
		R		Roll-folding +
			T	Telescoping

36 R				
36				approx. vertical reach in m
	R			Roll-folding

43 RZ				
43				approx. vertical reach in m
	R			Roll-folding +
		Z		Z-folding

S PB 30				
S				Separate
	PB			Placing Boom
		30		range from centre of axis of rotation in m

S PB 27 T				
S				Separate
	PB			Placing Boom
		27		range from centre of axis of rotation in m
			T	Telescopic arm

2.5.4 Marking of concrete pumps

P 2020 - 120 / 80					
P					(Concrete) Pump
	20				2,000 mm stroke of the pumping cylinders
		20			∅ 200 mm of the pumping cylinders
			120		∅ 120 mm of the pistons for the hydraulic cylinders
				80	∅ 80 mm of the piston rods for the hydraulic cylinders

P 2525 - 120 / 85					
P					(Concrete) Pump
	25				2500 mm stroke of the pumping cylinders
		25			∅ 250 mm of the pumping cylinders
			120		∅ 120 mm of the pistons for the hydraulic cylinders
				85	∅ 85 mm of the piston rods for the hydraulic cylinders

2.5.5 Type plates

2.5.6 Type plates for truck-mounted concrete pumps

The type plate of the concrete pump is located at the front left side of the base frame in the direction of travel **(Fig. 1)**.

The type plate of the placing boom is located at the front left side of the first boom section in direction of travel **(Fig. 2)**.

The type plate for the pumping line is located next to the placing boom type plate **(Fig. 3)**.

Example **(Fig. 2)** applies to 5-part placing booms; the plate for 4-part placing booms has a similar design.

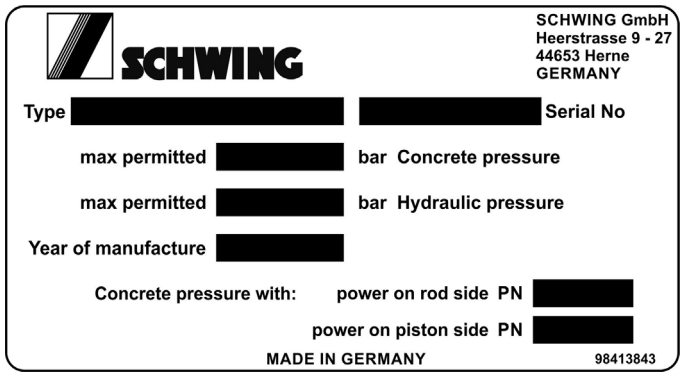


Fig. 1 Concrete pump type plate

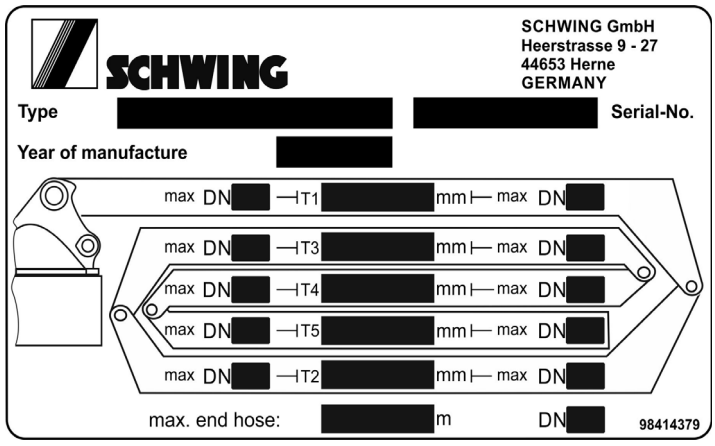


Fig. 2 5-part placing boom type plate

Caption for (Fig. 2)	
Designation	**Meaning**
max. DN	max. nominal size for inlet side
T	Length of the pipe on the corresponding boom
max. DN	max. nominal size for outlet side

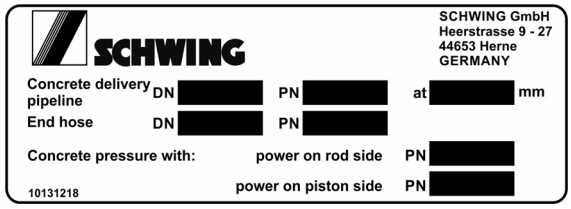


Fig. 3 Pumping line type plate

2.5.7 Type plates for separate placing booms SPB

The type plate of the placing boom is located on the right side of the first boom section in the pumping direction **(Fig. 4)**.
The information sign for the pumping line is located next to the placing boom type plate **(Fig. 7)**.

Fig. 4 Type plate 10016792

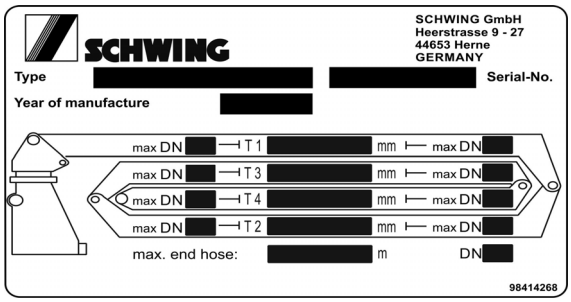


Fig. 5 Type plate 98414268 for 4-part placing boom SPB

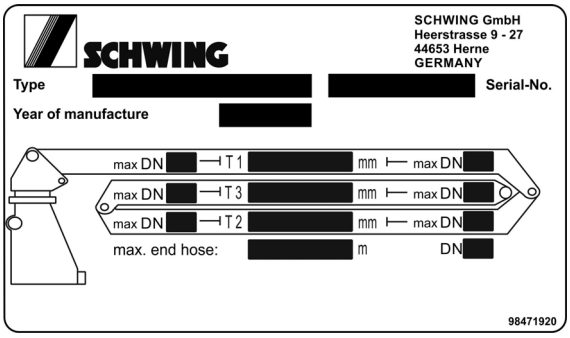


Fig. 6 Type plate 98471920 for 3-part placing boom SPB

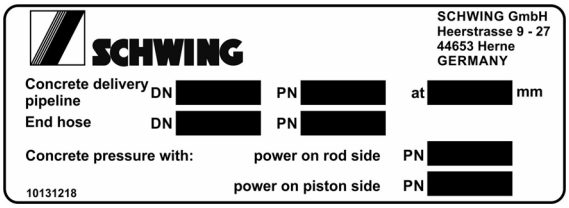


Fig. 7 Pumping line information sign 10131218

2.5.8 SCHWING pump kits

P = **P**iston side = piston-side pressure

R = **R**od side = rod-side pressure

R/P = **R**od and **P**iston side (delivery is **R**)

TC = **T**win **C**ircuit (twin-circuit hydraulics)

SC = **S**ingle **C**ircuit (single-circuit hydraulics)

RM = **R**ock **M**iddle

RMA = **R**ock **M**iddle, axially reinforced version

RB = **R**ock **B**ig

RS = **R**ock **S**hort

RXL = **R**ock **XL** (only for truck-mounted concrete pumps)

RL = **R**ock **L**ong (for stationary concrete pumps only)

RHP = **R**ock **H**igh **P**ressure (for stationary pumps only)

2.5.8.1 Non-reversible pump kits

			piston-side			rod-side		
1	2	3	4	5	6	4	5	6
Concrete pump type	l/min	bar	m³/h	bar	s/min	m³/h	bar	s/min
P 1020-2-90/50 SC RS P	225	330	61	67	32	/	/	/
P 2023-3-110/75 TC RM/RB P	380	330	98	75	20	/	/	/
P 2023-5-110/75 TC RM/RB P	535	330	136	75	27	/	/	/
P 2023-6-110/75 TC RM/RB P	636	330	161	75	32	/	/	/
P 2023-5-130/80 TG RB R	535	330	/	/	/	157	66	31
P 2025-5-120/80 TC RB P	535	300	136	69	23	/	/	/
P 2525-6-120/85 TC RB P	636	330	162	76	22	/	/	/

Table 2 Non-reversible pump kits

2.5.8.2 Reversible pump kits

			piston-side			rod-side		
1	2	3	4	5	6	4	5	6
Concrete pump type	l/min	bar	m³/h	bar	s/min	m³/h	bar	s/min
P 2020-3-120/80 TC RM R/P	380	300	60	108	17	111	60	29
P 2023-5-130/80 TC RM/RMA R/P	535	300	98	96	20	/	/	/
	535	330	/	/	/	157	66	31

Table 3 Reversible pump kits

Column 1: Concrete pump type
Column 2: maximum delivery rate of the hydraulic pump(s) in l/min
Column 3: configured pressure cut-off
Column 4: maximum theoretical concrete delivery rate in m³/h
Column 5: maximum achievable pumping pressure
Column 6: maximum achievable stroke rate for concrete pump (strokes/min)

Information

Installation of a new/different concrete pump only after technical clarification.

Maximum values can only be reached with sufficient motorisation.

2.5.9 Your machine's identification data

The most important data for identifying your machine and the installed concrete pump can be displayed in the control system.

Record the data here:

SCHWING - machine technical data		Vehicle data	
Mach. no.:		Manufacturer:	
Mach. type:		Type:	
Con. pump type:		Chassis frame no.:	
Hyd. type:			

Always have the machine's technical data available for enquiries.

2.6 Technical data

This chapter contains the following data related to your machine:

- Dimensions
- Supporting forces
- Ranges of the placing boom (working area)
- Positions of the most important components on your machine

2.6.1 Dimensions of vehicle body / work area

Information

The supporting forces specified are maximum values.
The supporting forces of each machine are dependent on the overall design and indicated on signs on the machine.

Some of the following values may also vary slightly depending on the truck used.

2.6.2 Vehicle body:

24 X		
Length of end hose	:	4 m
Vertical reach	:	23.46 m
Range	:	19.45 m
Minimum unfolding height	:	4.89 m
Number of arms	:	4
Nominal size of pumping line	:	125 mm
Support width in front	:	4.69 m / 5.96 m depending on the total weight
Support width rear	:	2.24 m / 3.60 m depending on the total weight
Supporting force in front	:	140 kN
Supporting force rear	:	90 kN

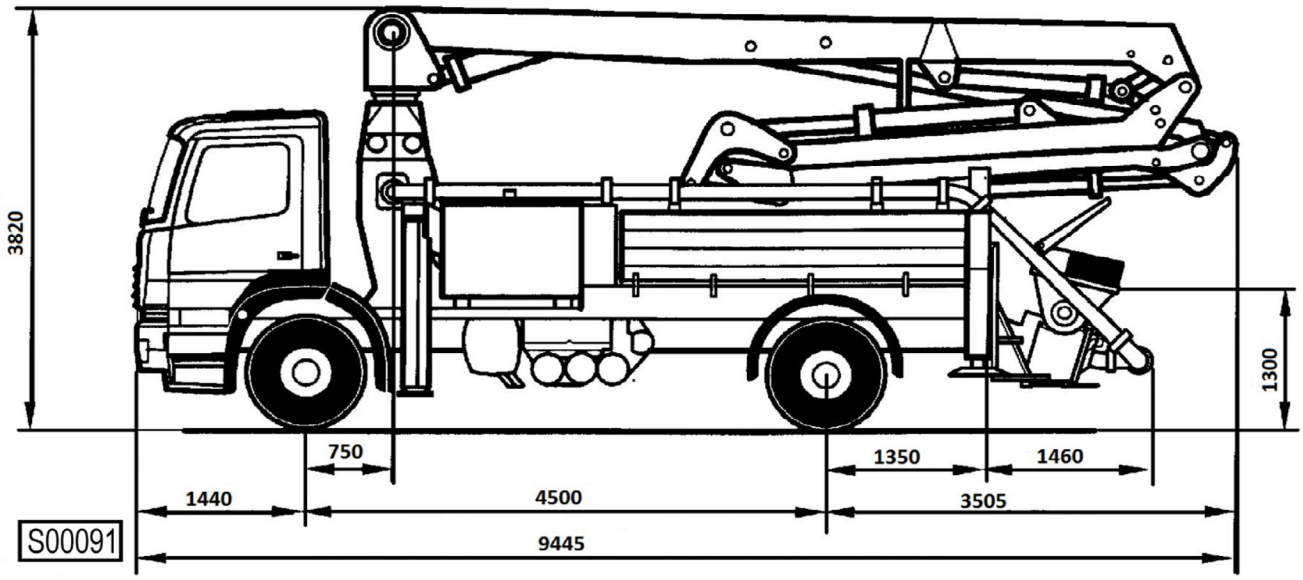


Fig. 8 Main mass S24X

2.6.3 The main components of the machine

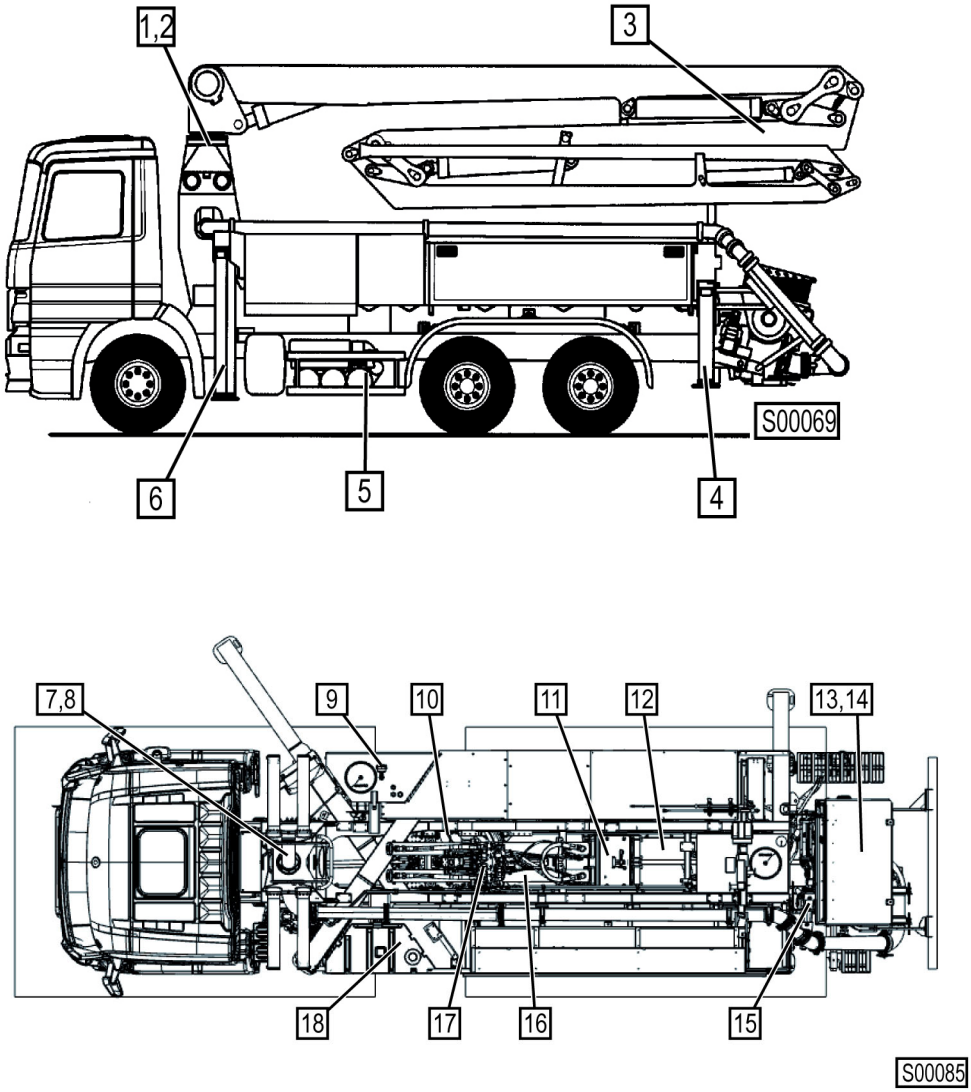


Fig. 9 Components of the machine

Caption for (Fig. 9 Components of the machine)			
Pos.	**Description**	**Pos.**	**Description**
1	Turret	10	Pump drive
2	Rack and pinion drive	11	Water box
3	Placing boom with pumping line see **(chap. 2.6.5)**	12	Pumping cylinder
4	Rear outrigger	13	Rock valve
5	Chassis frame with SCHWING pump drive	14	Concrete feeding hopper

Caption for (Fig. 9 Components of the machine)			
Pos.	**Description**	**Pos.**	**Description**
6	Front X - outrigger	15	Slewing cylinder
7	Turret	16	Differential cylinder
8	Rotary drive	17	Control block
9	Oil box	18	Water case

2.6.4 Placing boom: Working range S 24 X

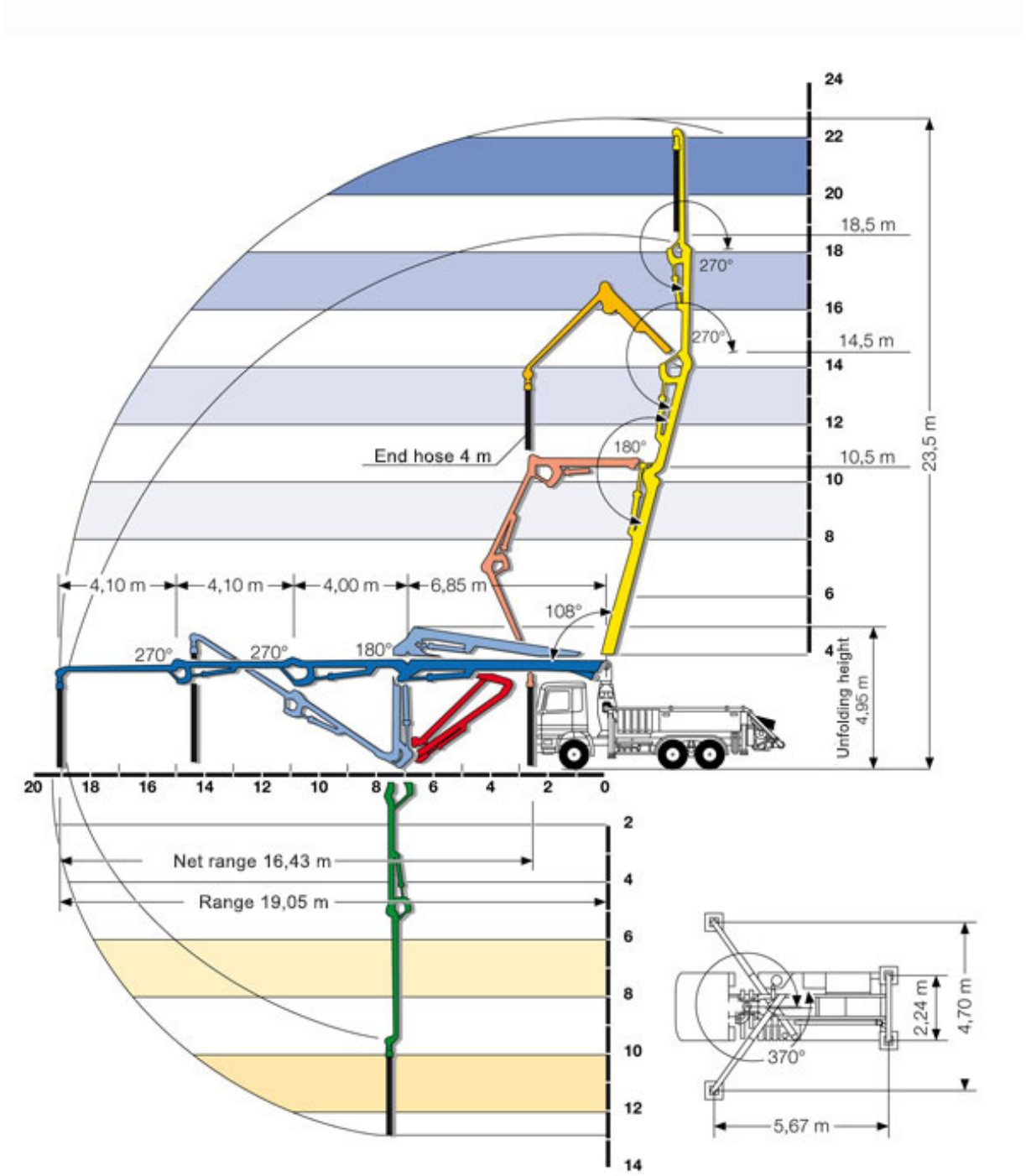


Fig. 10 Working range S 24 X

2.6.5 Placing boom

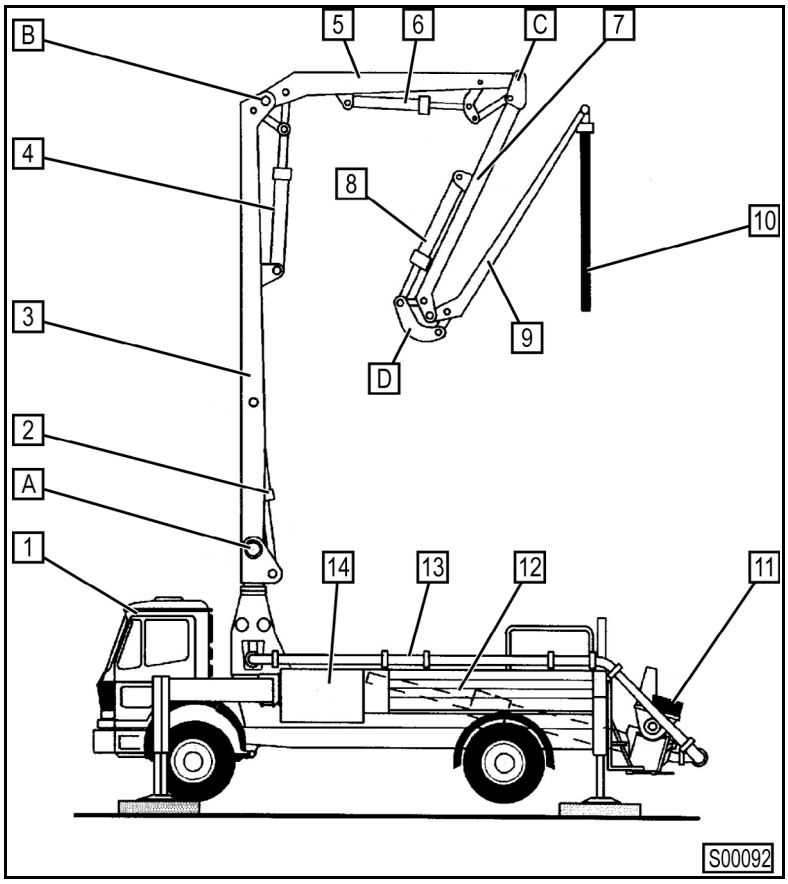


Fig. 11 Placing boom

Caption (Fig. 11 Placing boom)			
Pos.	**Description**	**Pos.**	**Description**
1	Driver's cab	10	End hose
2	Cylinder A	11	Rock valve
3	Boom section 1	12	Concrete pump kit
4	Cylinder B	13	Pumping line
5	Boom section 2	14	Water case
6	Cylinder C	A	Joint “A”
7	Boom section 3	B	Joint "B"
8	Cylinder D	C	Joint "C"
9	Boom section 4	D	Joint “D”

2.7 Reversing the pump kits

The pump kits on SCHWING machines can be reversed in part. Reversing means changing from rod-side to piston-side application or vice versa.

SCHWING delivers concrete pumps with rod-side application by default.

Contact SCHWING's customer service for more information!

Warning!

Risk of bursting due to improper reconnection of pump kits!

Hydraulic and pumping line components can burst due to overloading.

Only have your pump kit reconnected by authorised SCHWING workshops.

Reconnecting to piston-side pressure generates more pumping pressure. This in turn causes:

- The bursting pressure of the machine's pumping lines to be exceeded
- Any built-in special equipment, such as the chamber valve, to become overloaded
- The pump kit to become potentially overloaded
  (The pressure relief of the hydraulic system has to be set lower accordingly).

You can see whether or not the pump kit installed in your machine can be retooled on the type plate **(Fig. 12)**.

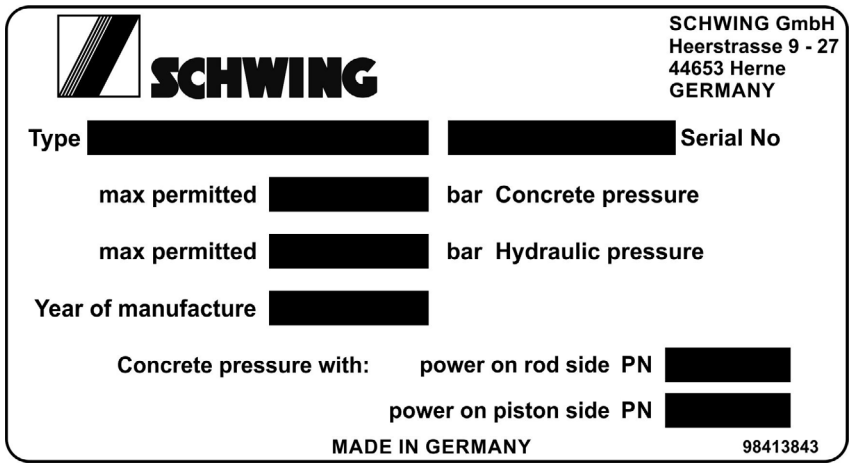


Fig. 12 Concrete pump type plate

The “Max. bar delivery pressure” field on the type plate can contain one or two values.

See following examples:

2.7.1 Piston-side only

This is a concrete pump that can **only** be driven by the piston side.

Pump kits marked in such a way cannot be retooled!		
max	**- / 85**	bar delivery pressure

2.7.2 Rod-side only

This is a concrete pump that can **only** be powered by the rod side.

Pump kits marked in such a way cannot be retooled!		
max	**70 / -**	bar delivery pressure

2.7.3 Rod- and piston-side

This is a concrete pump that may be driven by the rod side or the piston side.

The lower value refers to the maximum possible pumping pressure for rod-sided application.

The upper value refers to the maximum possible pumping pressure for piston-sided application.

Pump kits marked in such a way can be retooled		
max	**60/108**	bar delivery pressure

2.8 Assembly groups and designations

This chapter contains an overview of the main assembly groups for your machine and their respective positions.

2.8.1 Base frame

The base frame carries the concrete pump and the placing boom of the truck-mounted concrete pump.

The base frame can be mounted onto chassis frames from different manufacturers.

2.8.2 Drive

Concrete pumps, placing booms and most auxiliary units are hydraulically driven.

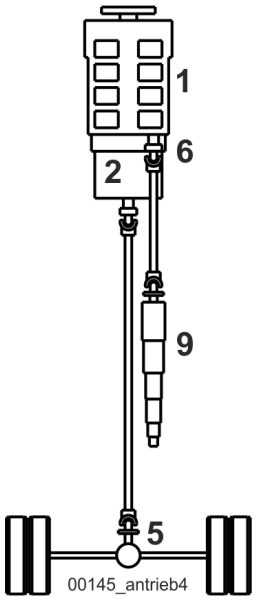
The vehicle engine serves as the power source.

The machine is installed on vehicles with a functional power take-off or with a distribution manual transmission gear.

In the case of machines with power take off, all hydraulic pumps are arranged in a drive train and equipped with "through drives" (Power take-off).

Drive takes place via a drive line. A pump gear is not required.

The variant with a Distribution manual transmission gear is built into the vehicle's cardan shaft train. It can be switched between driving operation and pump operation.



1 - Drive motor

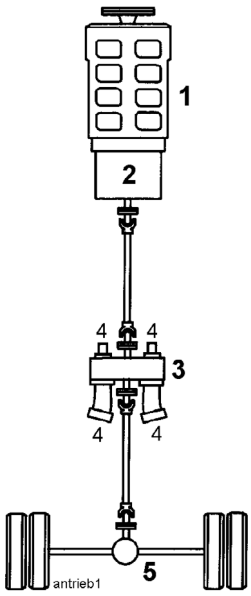
2 - Vehicle gearbox

5 - Rear axle

6 - Vehicle power take off

9 - Hydraulic pumps with through drive

Fig. 13 Power take-off



1 - Drive motor

2 - Vehicle gearbox

3 - Distribution manual transmission gear

4 - Hydraulic pumps

5 - Rear axle

Fig. 14 Distribution manual transmission gear

2.8.3 Concrete pump

The concrete pump is a two-cylinder piston pump with a rock valve.

The most important assembly groups **(Fig. 15)** include:

1 Rock valve

2 Pumping cylinder and piston

3 Water box

4 Hydraulic drive cylinder

Two power-controlled axial piston pumps supply the hydraulic cylinder of the concrete pump and rock valve. Control is fully hydraulic.

The concrete pump is equipped with an MPS system

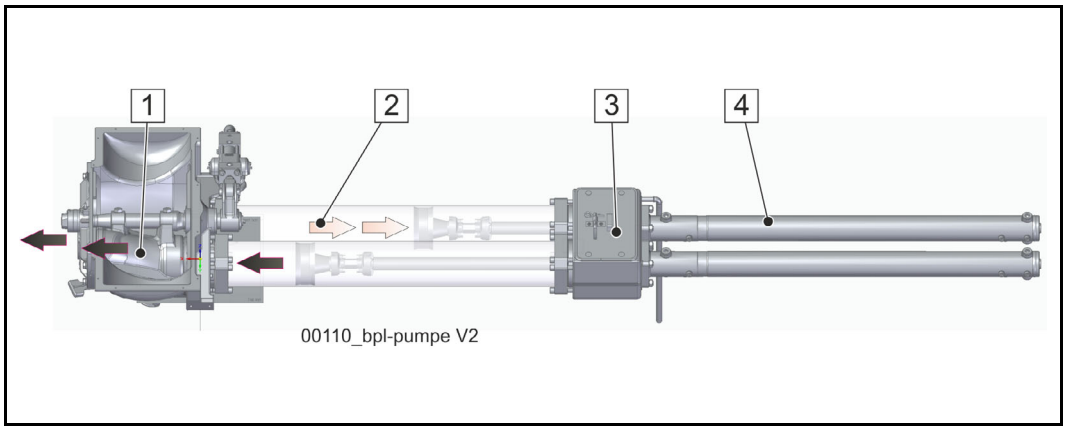


Fig. 15 Concrete pump

2.8.4 Mini pause switch (MPS)

Concrete pumps with a **M**ini **P**ause **S**witch (MPS) work with a dual-circuit hydraulic system.

The dual-circuit hydraulic system can be recognised by the pressure accumulator at the rear of the machine.

This function prevents the differential cylinders from hitting your concrete pump kit too hard. This reduces wear and increases the service life of your concrete pump, among other things.

Function:

The MPS is a momentary drop in pressure.

The hydraulic oil pressure in the concrete pump system is reduced at the same moment as the differential cylinders switch from suction stroke to pressure stroke.

The hydraulic accumulator required for the MPS control is charged via an individually adjustable hydraulic pump.

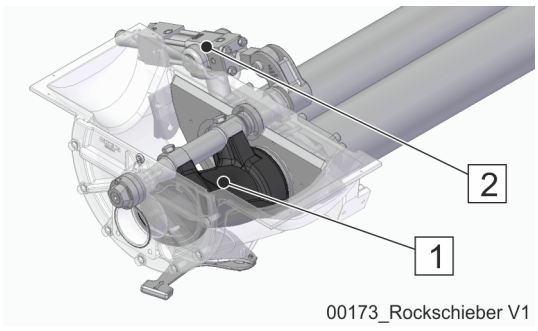
2.8.5 Rock valve

Like in a reciprocating piston engine, the pumping pistons in the two-cylinder piston pump are constantly changing their direction of motion.

The two pistons run counter to one another.

As the receding piston draws concrete out of the feeding hopper, the advancing piston pushes the previously drawn-in concrete into the pumping line.

At the same time, the rock valve swivels so that the "drawing" cylinder is connected to the feeding hopper and the "pushing" cylinder to the pumping line.



Pos.	Designation
1	Rock valve
2	Slewing cylinder

Fig. 16 Rock valve

By switching to “SUCTION” (reverse running), the concrete can be drawn from the pumping line and back into the feeding hopper.

At the end positions, the hydraulic cylinders of the concrete pump and of the rock valve control hydraulic control valves, which coordinate the cylinder movements.

A hydraulic accumulator supports the rapid switching of the rock valve.

2.8.6 Control

The placing boom is controlled using “proportional valves”. Its pilot control is electro-hydraulic.

Concrete pumps and agitators are electro-pneumatically pilot controlled.

The electrical system is supplied by the vehicle electronics, and the compressed air for the electro-pneumatic pilot control is extracted from the vehicle air reservoir.

The directional valves on the consumers are combined with control blocks and feature control lever slots for emergency operation.

In addition to the outrigger, the control levers can be used to operate the machine in “emergency operation” mode.

The machine is equipped as standard with a radio remote control.

A cable remote control is available.

Emergency operation is ensured for various machines via cable remote controls.

2.8.7 Placing boom

Placing booms are classified according to the number of boom sections and the folding type. The folding types are described with two characteristics. One characteristic describes how the placing boom is folded in:

- Roll-folding
- Z-folding

A mixed form is also possible on a placing boom (RZ-folding).

The other characteristic distinguishes the position of the placing boom in:

- Overhead roll-folding
- Normal folding

With the overhead roll-folding system, the placing boom is partially above the driver's cabin. With the normal folding system, the placing boom is behind the driver's cabin.

The mobility and folding sequence of the placing boom varies according to the folding type.

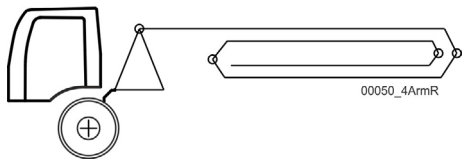
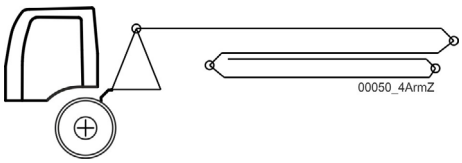
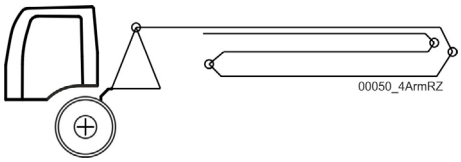
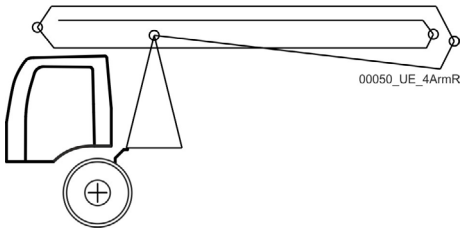
	
4-boom, normal folding system, roll-folding	4-boom, normal folding system, Z-folding
	
4-boom, normal folding system, RZ-folding	4-boom, overhead roll-folding system, roll-folding

Fig. 17 Example: Folding types for placing booms with 4 boom sections

2.8.8 Outrigger

The front outriggers either extend in a circular arc to the side and front, or diagonally to the front like an X.

The front outriggers of the SXF model have folding segments, which must always be folded out **first** in order to support the machine. If the folding elements are not extended, then the bow outriggers are not “mobile” and the machine cannot be placed into operation.

The rear outriggers are designed as folding outriggers or telescopic outriggers.

This design facilitates:

- Large support widths
- A lower machine construction height
- The installation of extremely long-stroke concrete pumps.

An adjustable axial piston pump supplies the boom, outrigger and various special equipment with the required hydraulic oil pressure.

2.8.9 Auxiliary units

The machine is equipped as standard with an agitator in the concrete feeding hopper and a water pump.

The “agitator pump” feeds the concrete pump pilot control, while the “placing boom pump” also powers the water pump.

The concrete pump’s oil cooler and oil filters are located in a common housing.

A fixed displacement pump delivers hydraulic oil through this filter/cooler combination in a separate circuit.

The system is activated immediately after switching on the drive and independent of the activation of other functions.

Additional systems, such as compressors, concrete shut-off assemblies, high-pressure cleaners, etc., can be supplied as accessories.

2.8.10 EASy (special equipment)

The machine can be equipped with the EASy one-sided support system.

The "EASy" outrigger system is described in the chapter **“Special equipment”** on page 585.

2.8.11 Active (special equipment)

The Active system includes:

- An active vibration damper to silence the boom.

The active vibration damper on the placing boom makes it possible for the boom to operate with precision and virtually without vibrations.

The end hose also remains calmer while pumping, even with high delivery rates.

2.8.12 Diractive (special equipment)

The Diractive system includes:

- An active vibration damper to subdue the boom
- A single-lever control

The single-lever control can be used to move the end hose horizontally and vertically directly with one joystick.

This makes it considerably easier to guide the hose.

2.8.13 DirectDrive

“DirectDrive” designates machines whose placing boom joints have a certain design.

With this design, various placing boom joints are equipped with rotary actuators.

This replaces traditional hydraulic cylinders.

This makes it possible to control the placing boom more flexibly.

As a result, some joints can be rotated 360°.

2.8.14 VarioPressure (special equipment)

The “VarioPressure” accessory makes it possible to adjust the pumping pressure of the SCHWING pump at any time based on the situation at the jobsite.

“VarioPressure” can also be used to protect equipment connected to the pump, such as concrete pumping hoses.

2.9 Noise information for truck-mounted concrete pumps

Noise information according to EC Machinery Directive 2006/42/EC and Noise Emissions Directive 2000/14/EC

Warning!

Damage to hearing due to noise!

Increased noise levels can cause permanent damage to hearing.

Close the maintenance flaps and move away from the machine, taking the remote control with you. Wear hearing protection.

2.9.1 The guaranteed sound power level (L_{WA})

The sound power level is a measure of the total sound emitted by a machine in all directions. It is a measured value for technical comparison and is used in the calculation of the total noise level produced by a construction site.

The sound power level does not allow any conclusions to be drawn regarding the noise level at the workplace (of the pump operator).

In the European Economic Area, a sign must be affixed to machines, providing information about the sound power level of the respective machine. See example figure "Fig. 18 Noise level".

Fig. 18 Noise level

The indicated value represents an average value for the respective series, plus a safety margin.

SCHWING guarantees that this value will not be exceeded by newly delivered, ex works machines.

Information

Regarding noise emissions, please observe the regionally applicable reductions in operating time!

2.9.2 The highest sound pressure level (L_{pA})

The sound pressure level is a measure of the sound emissions in the workplace.

In this case, the Machine Directive prescribes that the highest sound pressure level be measured at a distance of 1 m from the machine surface and 1.6 m across the ground, which must be indicated in the operating instructions.

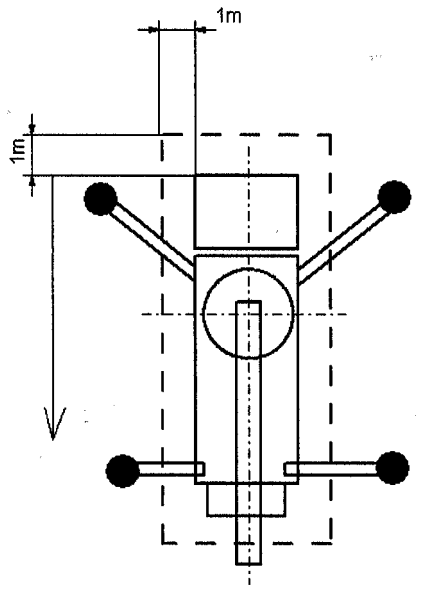


Fig. 19 Measuring point (L_{pAmax}) measured from the front

Ground clearance:	1.6 m
Taking the measurement:	Operate the machine at maximum hydraulic power

Information

The measured sound pressure level (L_{pA}) is also influenced by the installed drive power and the type of truck used.

For this reason, we have indicated the highest measured value for each of our truck-mounted concrete pumps.

Machine type	Highest measured sound pressure level (L_{pAmax})	Measuring point L_{pAmax} (see "Fig. 19 Measuring point (LpAmax) measured from the front")	Guaranteed sound power level (L_{WA})
S 20	90dB(A)	4 m from the front, on the left in the driving direction	117dB(A)
S 20 Hybrid E	90dB(A)	2.8 m from the front, on the left in the driving direction	117dB(A)
S 20 Hybrid D	90dB(A)	2.8 m from the front, on the right in the driving direction	117dB(A)
S 24 X	93dB(A)	2 m from the front, on the left in the driving direction	117dB(A)
S 28 X			117dB(A)
S 31 XT	91dB(A)	at the front of the vehicle	117dB(A)
S 32 X			117dB(A)
S 34 X	89dB(A)	2.5 m from the front, on both sides	117dB(A)
S 34 XG	91dB(A)	in the middle, on the right in the driving direction	117dB(A)
S 36 X	97dB(A)	2 m from the front, on the right in the driving direction	117dB(A)
S 36 X RaZor	97dB(A)	2 m from the front, on the right in the driving direction	117dB(A)
DirectDrive S36X	97dB(A)	2 m from the front, on the right in the driving direction	117dB(A)
S 38 SX	91dB(A)	4 m from the front, on the left in the driving direction	117dB(A)
S 39 SX	90dB(A)	2 m from the front, on the left in the driving direction	117dB(A)
S 42 SX	96dB(A)	5 m from the front, on the left in the driving direction	117dB(A)
S 43 SX	91dB(A)	4 m from the front, on the left in the driving direction	117dB(A)
S 46 SX			117dB(A)
S 47 SX	96dB(A)	3 m from the front, on the right in the driving direction	117dB(A)
S 52 SX	90dB(A)	2.5 m from the front, on the right in the driving direction	117dB(A)
S 51 SX	95dB(A)	5.8 m from the front, on the right in the driving direction	117dB(A)
S 55 SX	90dB(A)	2.5 m from the front, on the right in the driving direction	117dB(A)
S 56 SXF	96dB(A)	5.8 m from the front, on the right in the driving direction	117dB(A)
S 58 SX	97dB(A)	5 m from the front, on the right in the driving direction	117dB(A)
S 61 SX	97dB(A)	5 m from the front, on the right in the driving direction	117dB(A)
S 65 SXF	97dB(A)	5 m from the front, on the right in the driving direction	117dB(A)
FBP 21	93dB(A)	2.5 m from the front, on the right in the driving direction	117dB(A)
FBP 24	93dB(A)	2.5 m from the front, on the right in the driving direction	117dB(A)
FBP 26	93dB(A)	2.5 m from the front, on the right in the driving direction	117dB(A)
FBP 26[4]	93dB(A)	2.5 m from the front, on the right in the driving direction	117dB(A)
FBP 29[4]	93dB(A)	2.5 m from the front, on the right in the driving direction	117dB(A)

Table 4 Sound values for truck-mounted concrete pumps and truck mixer concrete pumps (FBP)

2.10 Pictographs without text

Different warning and information signs in the national language are located on your SCHWING concrete pump, in addition to textless pictographs.

An overview of all signs without text can be found below. Furthermore, all signs are kept in our spare parts lists.

Pictographs without text are situated on various control elements on the machine.

Information

All signs and pictographs are important components of your machine!

Should the machine be used in a region with a different language than initially planned, the signs and labels must be exchanged for a version in the national language.

Always ensure that the signs are clearly legible and replace any damaged or illegible signs immediately. To do this, refer to the material number on the sign (Fig. 20 Material numbers for signs).

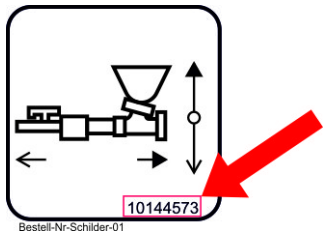
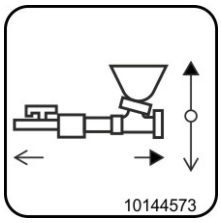
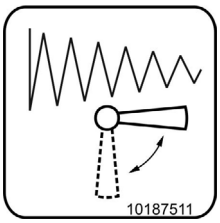
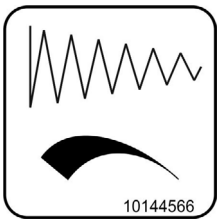
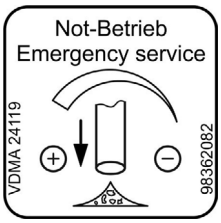
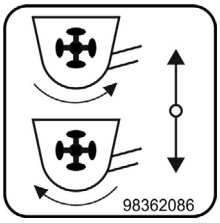
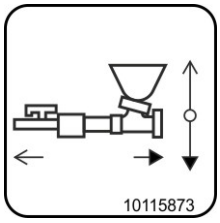
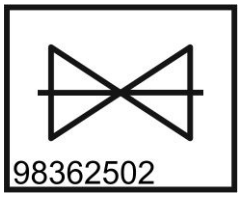
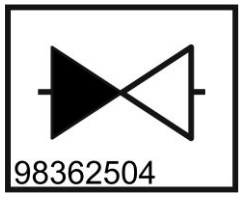
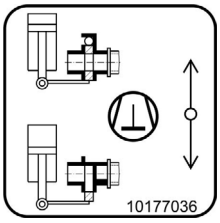
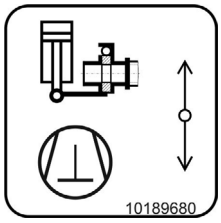
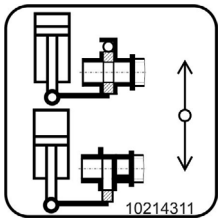
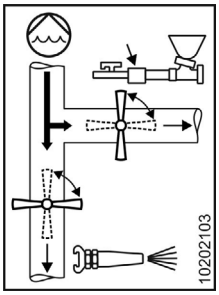


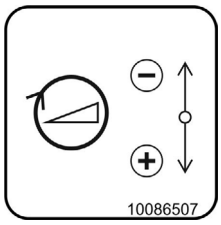
Fig. 20 Material numbers for signs

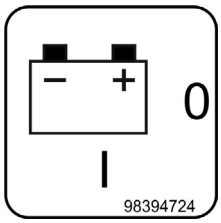
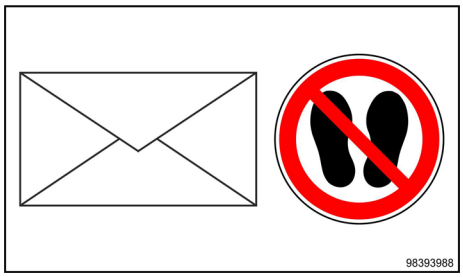
Information

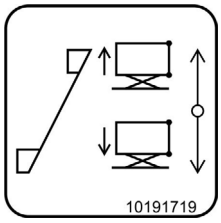
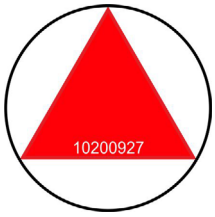
Some of the signs indicated are not available on each machine. The scope of the signs and labels depends on the type and design of your machine.

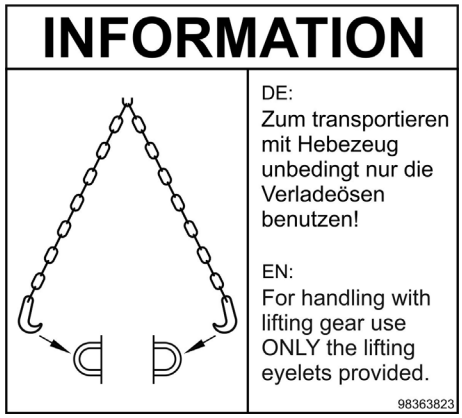
2.10.1 Pictographs

Concrete pump Pumping - 0 - Sucking	Start-up damping on / off	Start-up damping	Delivery rate adjustment
			
10144573	10187511	10144566	98362082
Agitator Pump operation (P) - 0 - Suction operation (R)	Concrete pump Suck - 0 - Pump	Isolation valve open	Isolation valve close
			
98362086	10115873	98362502	98362504
Chamber valve open Compressor Chamber valve closed	Chamber valve - 0 - Compressor	Chamber valve Open - 0 - Closed	Switching water box/ spray hose
			
10177036	10189680	10214311	10202103

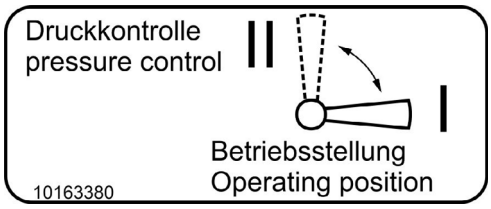
Speed adjuster	Water pump	Compressor	CE signs
			
10086507	10158389	10144568	10148919

Main switch battery on - off	Delivery note box - No tread surface
	
98394724	98393988

Stowing box Up - 0 - Down	EASy display	Underride protection device
		
10191719	10200927	98475429



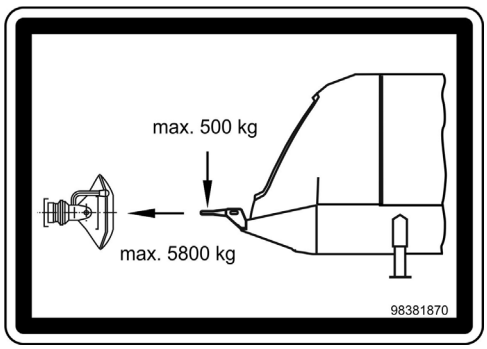
Lifting eye; 98363823



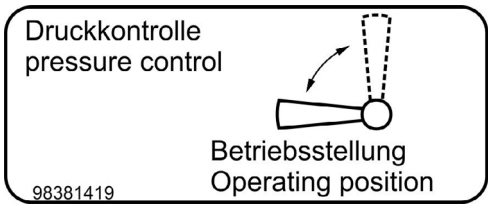
10163380

Attention! Example values for:

- Horizontal trailer load
- Vertical trailer load



98381870*



98381419*

Warning of hot surfaces

98380738*

2.11 Individual pictographs

These signs are only used for specific machine types. The following signs are sorted according to machine types.

2.11.1 Signs and labels for the supporting forces on the machine outriggers

S 24 X	
Sign on the front Outrigger	Sign on the rear Outrigger

2.11.2 Operation plate for emergency operation on the placing boom control station

- 1-6: Placing boom control
- 7: Switching: Boom -0- Outrigger
- 8: Switching: Compressor -0- water pump

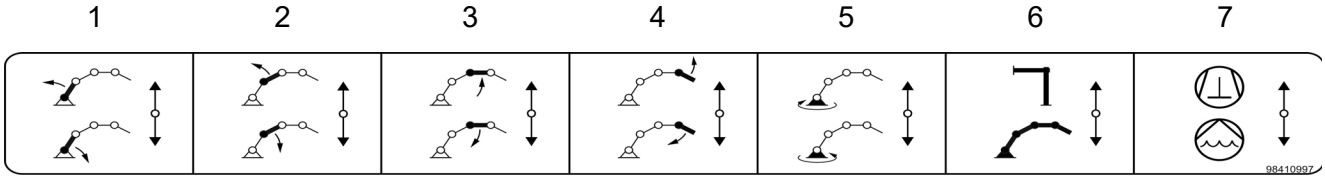


Fig. 21: 98407569

2.11.3 Operation plate on the outrigger control block

Direction right: Outriggers on -0- off

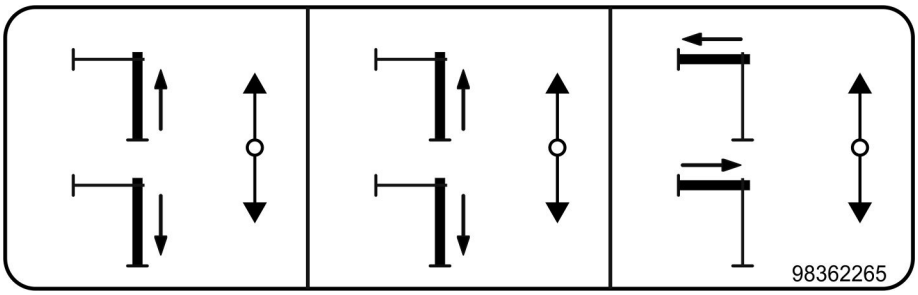


Fig. 22 98362265

2.11.4 Operation plate on the outrigger control block

On the left in the driving direction: Outriggers on -0- off

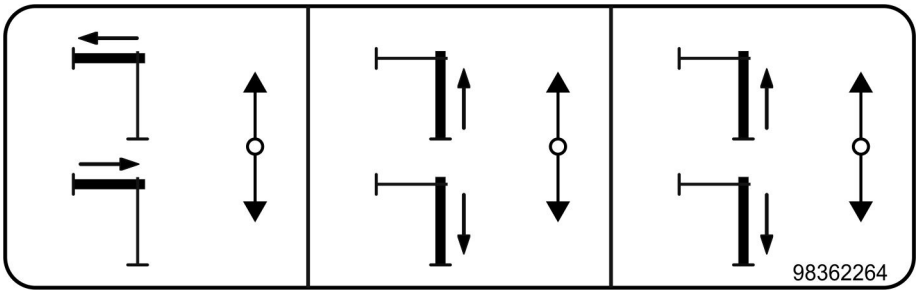


Fig. 23 98362264

2.12 Control, warning, and steering elements

This chapter clearly describes the positions of the control, warning and steering elements on your machine.

2.12.1 Overview

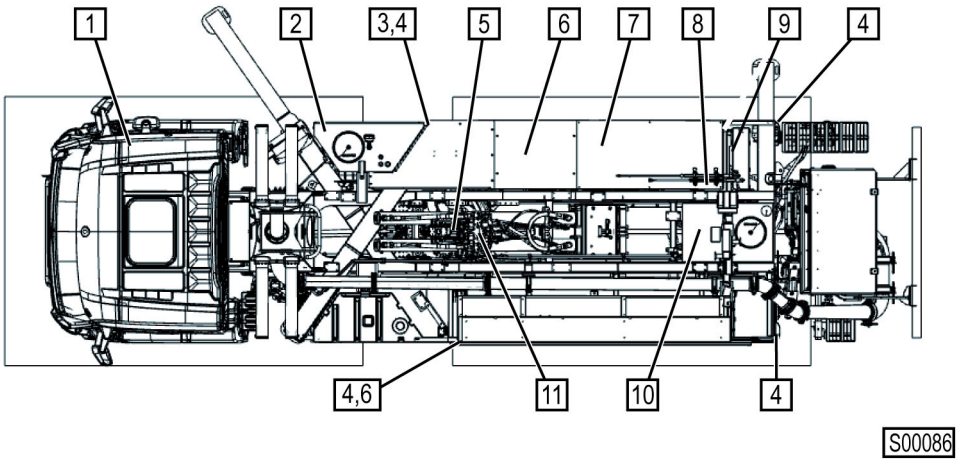


Fig. 24 Overview

Caption (Fig. 24 Overview)			
Pos.	**Description**		
1	• Key-operated switch for SCHWING control • Gearshift lever for distributor gearbox (special equipment)	7	Switch cabinet of the control
2	Inspection glass for hydraulic oil level control	8	Accumulator safety block
3	Emergency operation control station	9	Control station for local control Ledge cpl.: Air, water
4	Emergency-stop button	10	Terminal box of the special control: Pumping piston change
5	Ball valve: CP pressure test	11	Ball valve: MPS
6	Outrigger control		

Information

Depending on the equipment variant of the machine, other (additional) controls, warning- and control elements can be present.

All elements are marked accordingly with symbols, (see **“Pictographs without text”** on page 63).

2.12.2 Control station for operating mode: Emergency operation

The terminal box of the VECTOR control **(Fig. 27)** and the control station for the hydraulic emergency operation **(Fig. 25)** are located in lockable housings on the right side of the machine **(Fig. 26)**.

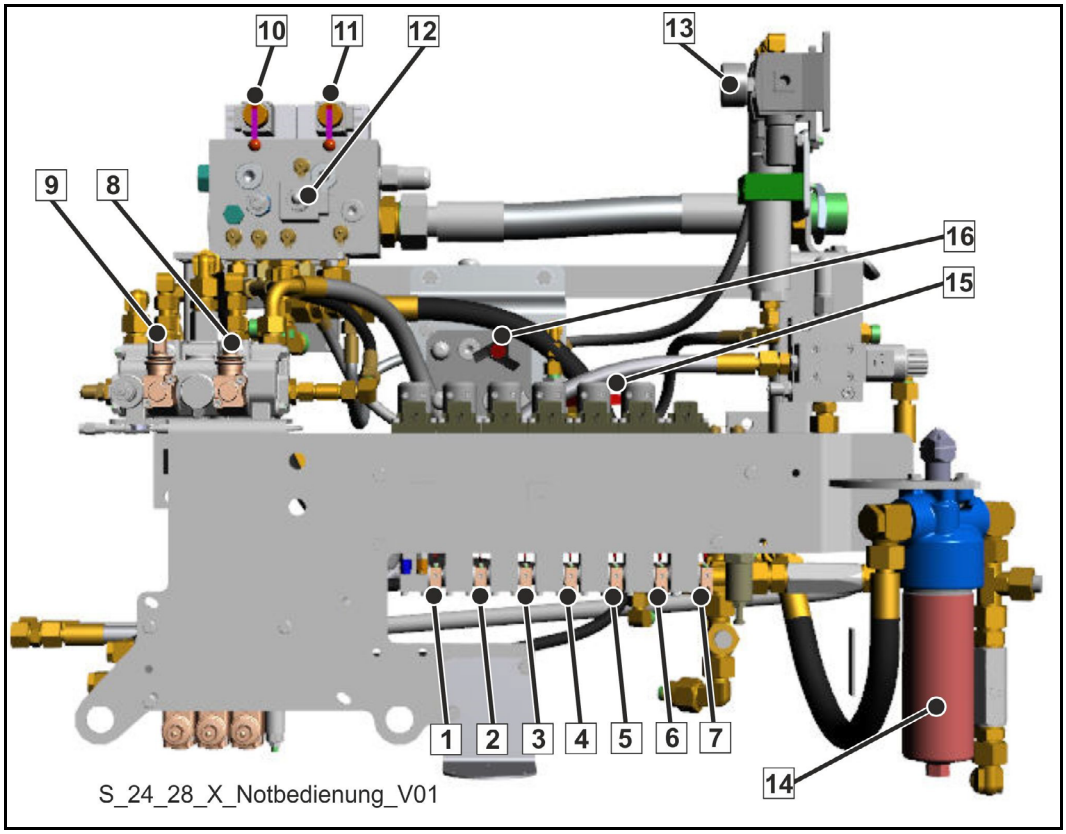


Fig. 25 Control station

Caption (Fig. 25 Control station)			
Pos.	**Description**		
1	Control lever slot boom section 1: UP - 0 - DOWN	9	Control lever receiver agitator: FORWARD - 0 - BACKWARD
2	Control lever slot boom section 2: UP - 0 - DOWN	10	Emergency manual actuation: CP
3	Control lever slot boom section 3: UP - 0 - DOWN	11	Emergency manual actuation: Placing boom
4	Control lever slot boom section 4: UP - 0 - DOWN	12	Pressure reducing valve: Emergency output regulation for the concrete pump
5	Control lever receiver rotate boom column: RIGHT - 0 - LEFT	13	Compressed air release valve with pressure gauge
6	Control lever receiver: BOOM - 0 - OUTRIGGER CONTROL	14	Boom filter
7	Control lever receiver: WATER PUMP - 0 - SPECIAL EQUIPMENT	15	Ball valve for start-up damping
8	Control lever receiver concrete pump: PUMPING - 0 - SUCKING	16	Pressure adjustment start-up damping
* = Special equipment			

2.12.3 Control

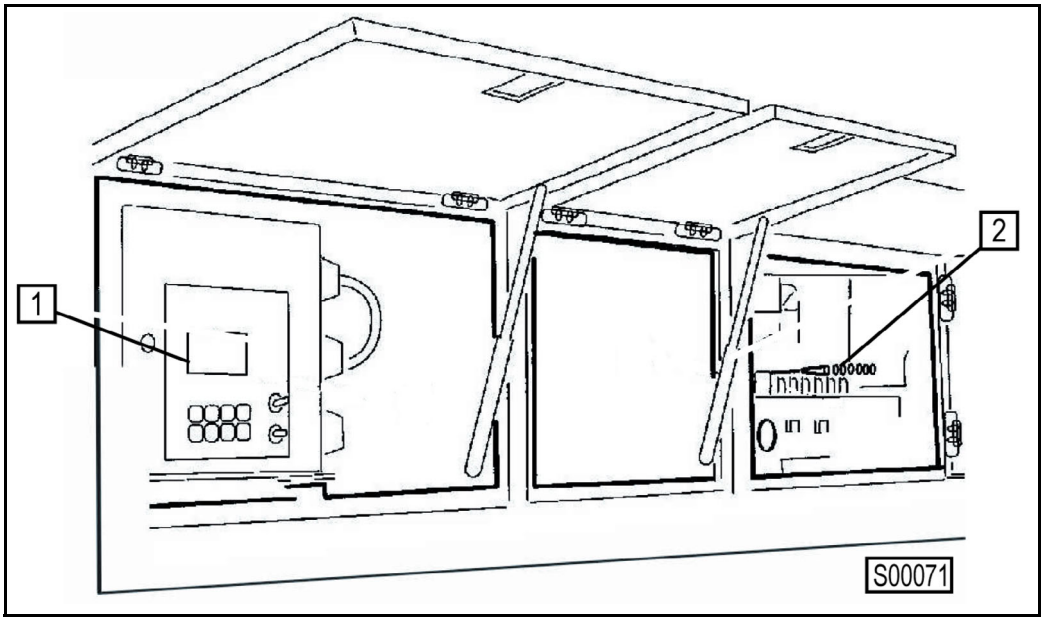


Fig. 26 Control

The hydraulic emergency control (2) and the terminal box of the electrical control (1) are located on the right side of the machine **(Fig. 26)** in lockable housings.

Caption (Fig. 26 Control)	
Pos.	**Description**
1	VECTOR control
2	Emergency control

2.12.4 Switch cabinet

Always keep the switch cabinet locked.

The key switch may only be actuated in case of emergency.

The acoustic signal transducer in the switch cabinet makes the operator aware of certain machine statuses or errors.

2.12.4.1 Switch cabinet of the VECTOR control system

(also see control system chapter)

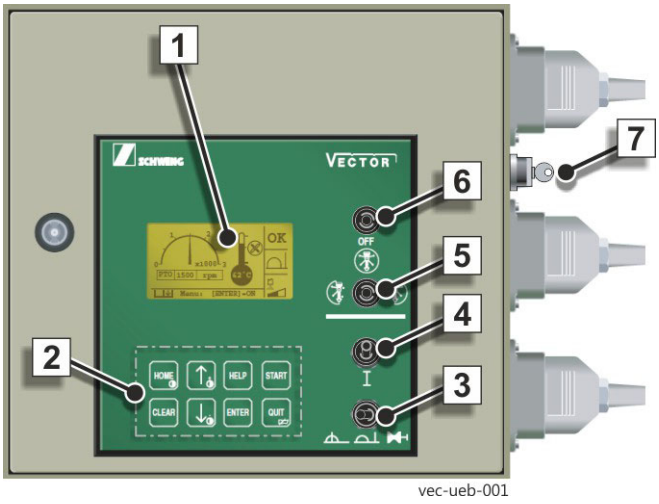


Fig. 27 VECTOR switch cabinet

Caption (Fig. 27 VECTOR switch cabinet)	
Pos.	**Description**
1	Display
2	Keypad
3	Switch control release: LOCAL / REMOTE / PISTON CHANGE
4	Release button for control system
5	Switch EASy working range
6	EASy OFF button
7	Key-operated switch: Emergency operation

2.12.4.2 Switch cabinet of the VECTOR II control system

(also see control system chapter)

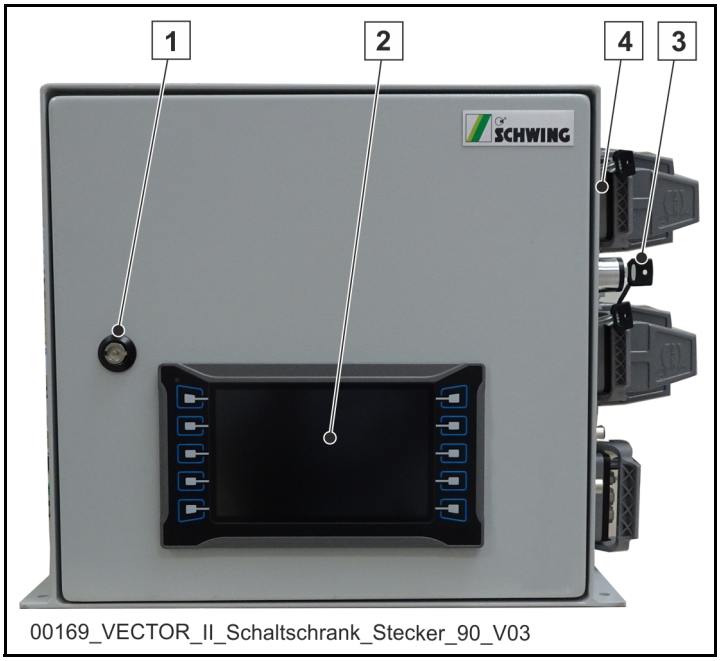
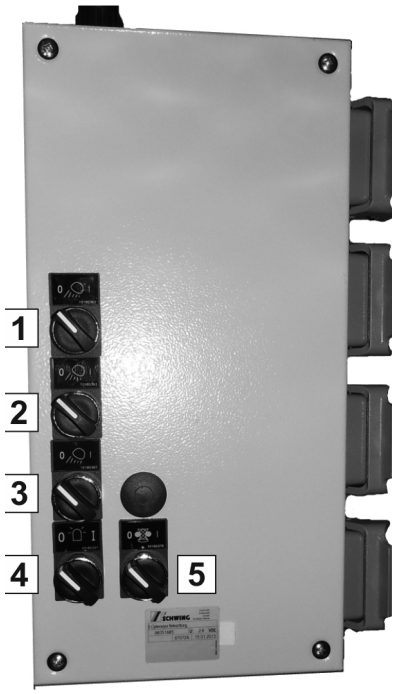


Fig. 28 VECTOR II switch cabinet

Illustration legend (Fig. 28)			
Pos.	**Description**	**Pos.**	
1	Lock	3	Key-operated switch
2	HMI (display)	4	Signal transducer (buzzer)

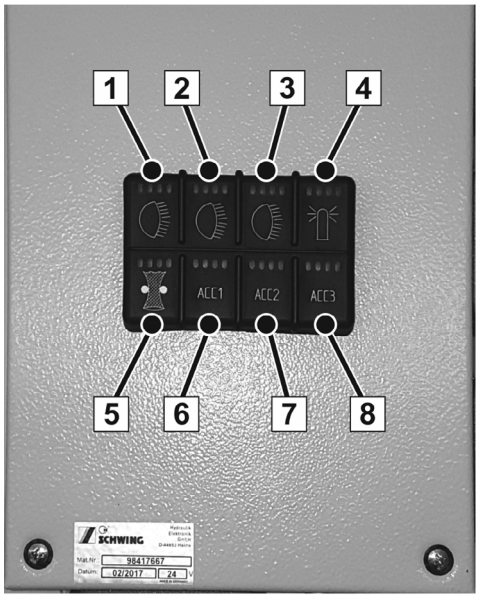
2.12.5 Option box for special equipment

The option box is located in one of the tool cabinets near the VECTOR control switch cabinet.



00063_optio-alt_01

Fig. 29 Old option box



00063_opbox-neu-01

Fig. 30 New option box

Caption (Fig. 29) / (Fig. 30)		
Pos.	**Description**	**Function**
1	Switch lighting boom tip:	ON/OFF
2	Switch floodlight B-joint (hopper lighting):	ON/OFF
3	Switch floodlight boom support (deck lighting):	ON/OFF
4	Switch Flashing lights at the outriggers	ON/OFF
5	Switch End hose stop valve	ON/OFF

2.12.6 Local control

The local control unit is integrated into the upper section of the supply control.

Pay attention to its built-in version with three or four LEDs on the function buttons.

In “REMOTE” operating mode, you can perform a functional test. To do this, press a button. As long as the button is pressed, the left LED of the corresponding button lights up.

To switch the direction of movement of the concrete pump or agitator directly, press the button for the desired direction twice.

Functional overview of local control variant with 4 LEDs

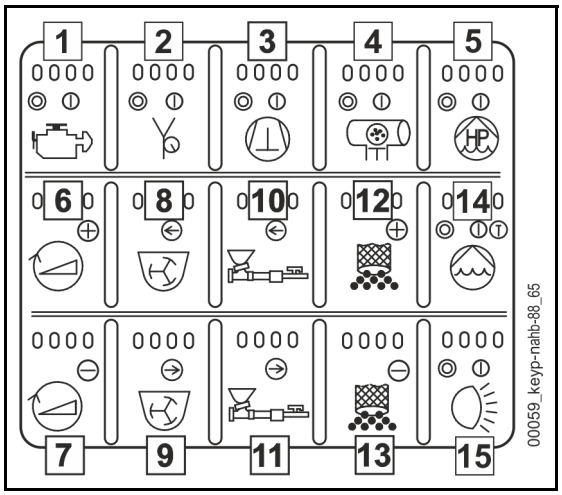


Fig. 31 Local control 4 LEDs

Illustration legend (Fig. 31)				
Pos.	Description	Function	Function	Function
1	Drive motor	OFF	ON	
2	Concrete vibrator[1]	OFF	ON	
3	Compressor	OFF	ON	
4	Chamber valve[1]	OFF	ON	
5	High-pressure cleaner	OFF	ON	
6	Rotational speed adjustment to pos.1		Plus (+)	
7	Rotational speed adjustment to pos.1		Minus (-)	
8	Agitator pumping direction	OFF	ON	
9	Agitator suction direction	OFF	ON	
10	Concrete pump pumping direction	OFF	ON	
11	Concrete pump suction direction	OFF	ON	
12	Concrete pump delivery rate		Plus (+)	
13	Concrete pump delivery rate		Minus (-)	
14	Water pump	OFF	ON	Knee switch active
15	Floodlight at the hopper	OFF	ON	

1.Special equipment

Functional overview of local control variant with 3 LEDs

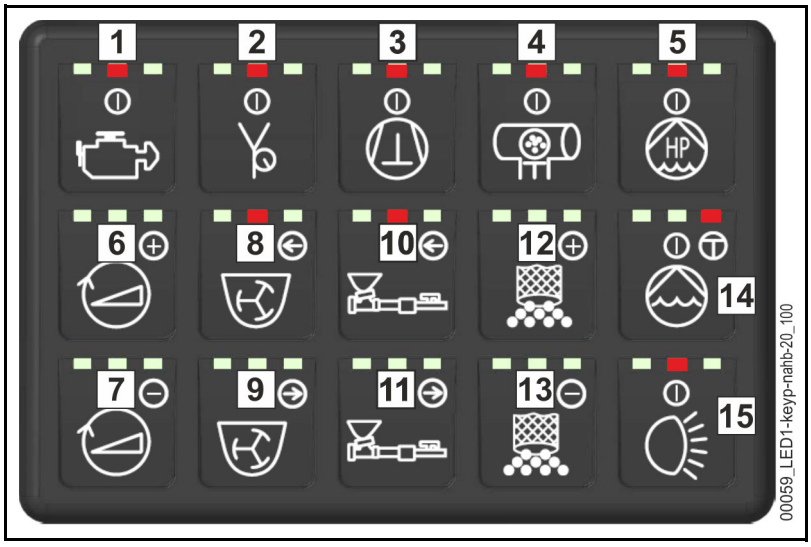


Fig. 32 Local control 3 LEDs

Illustration legend (Fig. 32)				
Pos.	Function			
1	Drive motor	OFF	ON[1]	
2	Concrete vibrator[2]	OFF	ON[1]	
3	Compressor	OFF	ON[1]	
4	Chamber valve[2]	OFF	ON[1]	
5	High-pressure cleaner	OFF	ON[1]	
6	Rotational speed adjustment to pos.1		Plus (+)[3]	
7	Rotational speed adjustment to pos.1		Minus (-)[3]	
8	Agitator pumping direction	OFF	ON[1]	
9	Agitator suction direction	OFF[1]	ON	
10	Concrete pump pumping direction	OFF	ON[1]	
11	Concrete pump suction direction	OFF[1]	ON	
12	Concrete pump delivery rate	See next page		
13	Concrete pump delivery rate	See next page		
14	Water pump	OFF	ON	Knee switch active[1]
15	Floodlight at the hopper	OFF	ON[1]	

1.as illustrated
2.Special equipment
3.LED turns on only when actuated

Concrete pump delivery volume indicators for local control with 3 LEDs

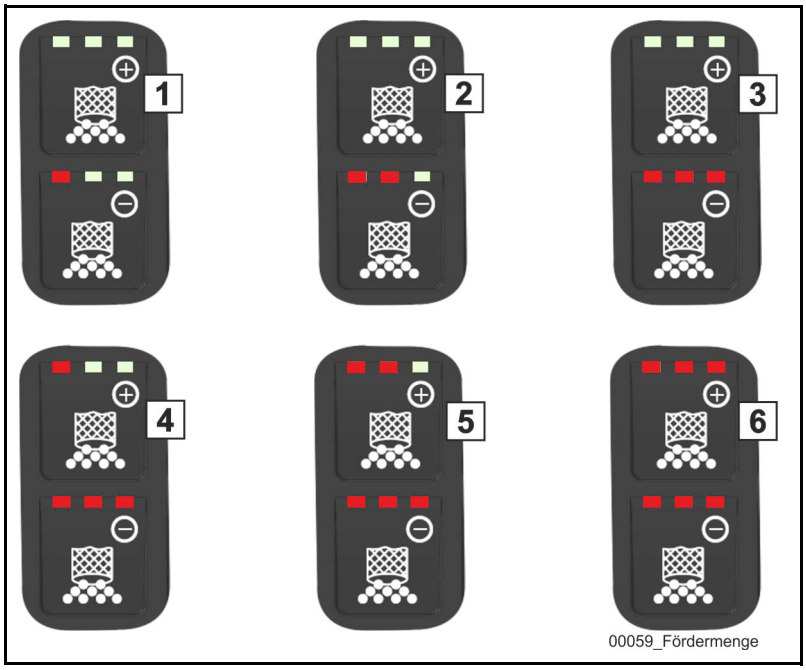


Fig. 33 Indicators for concrete pump delivery rate adjustment

Illustration legend (Fig. 33)		
Pos.	**Function**	**Value**
1	Delivery rate	10%
2	Delivery rate	20%
3	Delivery rate	30%
4	Delivery rate	50%
5	Delivery rate	75%
6	Delivery rate	100%

(deviations are possible, depending on the version of the machine)

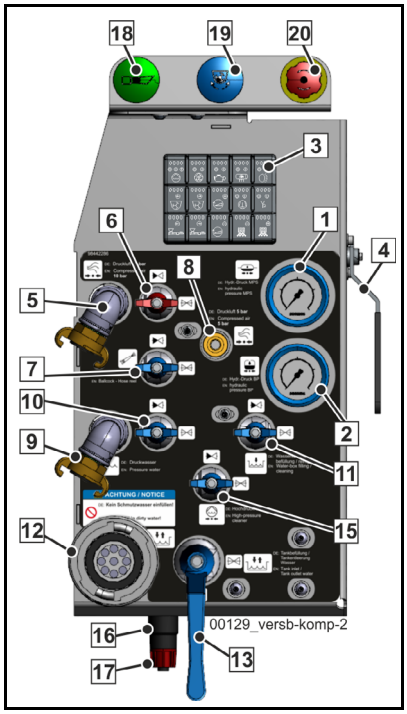


Fig. 34 Supply control

Illustration legend (Fig. 34)			
Pos.	**Description**	**Pos.**	**Description**
1	Pressure control MPS: Mini pauses switch	11	Fill water box/empty water box pipe
2	Pressure control for concrete pump	12	Water connection: Fill and empty water case
3	Local control	13	Ball valve to pos. 12
4	Provision of boom for the ball valve:[1] • Water to boom • Provision from Pos.5 and 9 • Compressed air to boom	14	not illustrated
5	Output compressor	15	High-pressure cleaner (HDR)
6	Ball valve to pos. 5	16	Water filter (HDR)
7	Ball valve hose reel	17	Emptying (HDR)
8	Air connection of vehicle air (5 bar)	18	Horn
9	Output of water pump (spray hose)	19	Agitator: Change rotational direction
10	Ball valve to pos. 9	20	EMERGENCY-STOP button
Ball valve position: — = open, I = closed			

1.Not for S 47 SX III, S 51 SX, S 56 SXF, S 65 SXF

2.12.7 Right tail end of vehicle: Back of supply control

(deviations are possible, depending on the version of the machine)

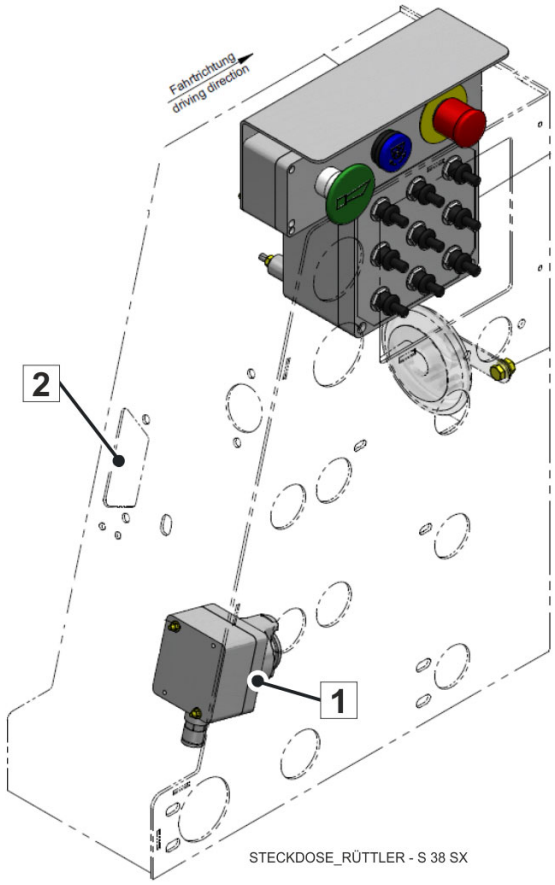


Fig. 35

Caption (Fig. 35)	
Pos.	**Description**
1	Power outlet for vibrator
2	Lubrication point of rock and agitator

2.12.8 Right tail end of vehicle, chamber valve[1] and water box emptying

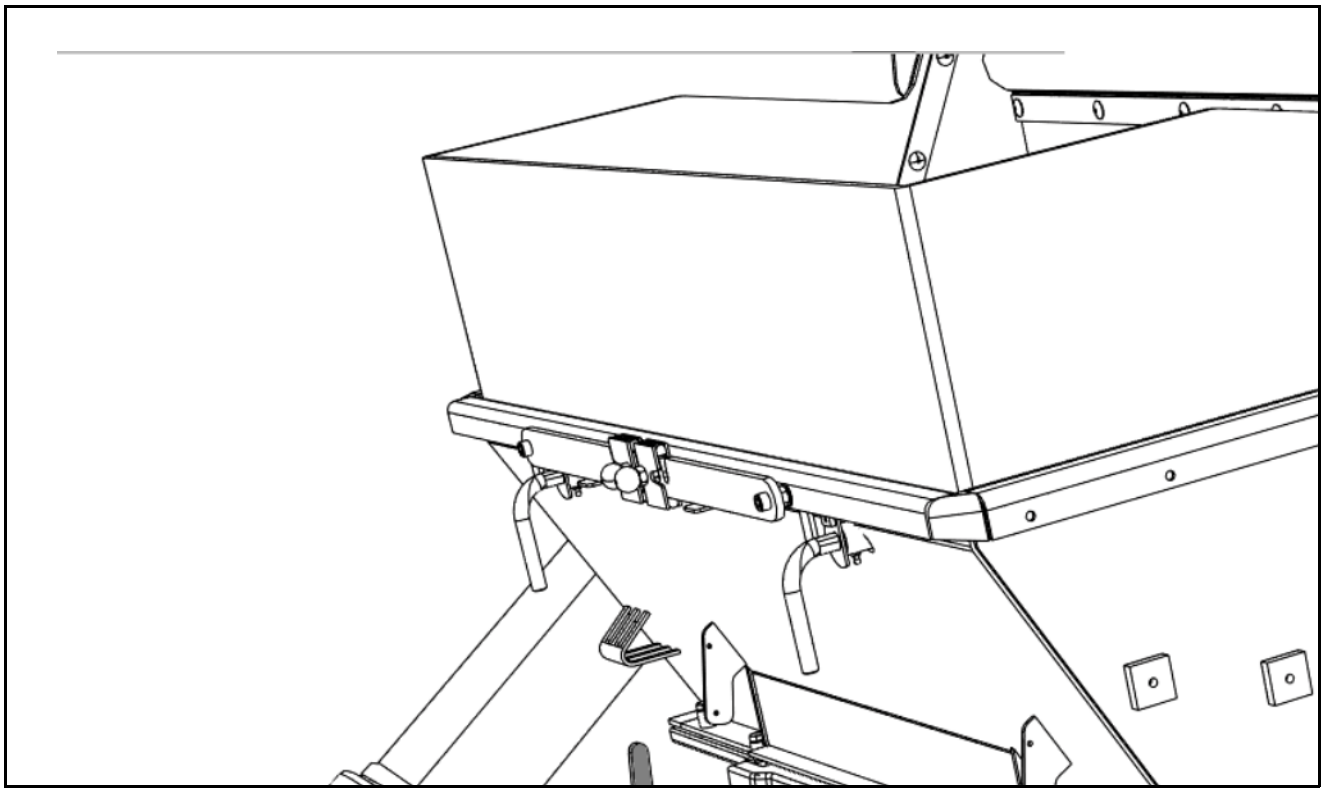


Fig. 36:

Caption (Fig. 36:)			
Pos.	**Description**	**Pos.**	**Description**
1	Control lever chamber valve: ON - 0 - OFF	6	Drain cock chamber valve
2	Pressure setting chamber valve	7	Ball valve water box emptying
3	Ball valve to pos. 4	8	Chamber valve pressure gauge
4	Output compressor	9	Chamber valve supply: Air/water
5	Hose coupling for chamber valve supply: a) Compressed air: Connect pos. 4 + 9 b) Water: Connect pos. 5 + 9		

1. Special equipment

2.12.9 Right tail end of vehicle

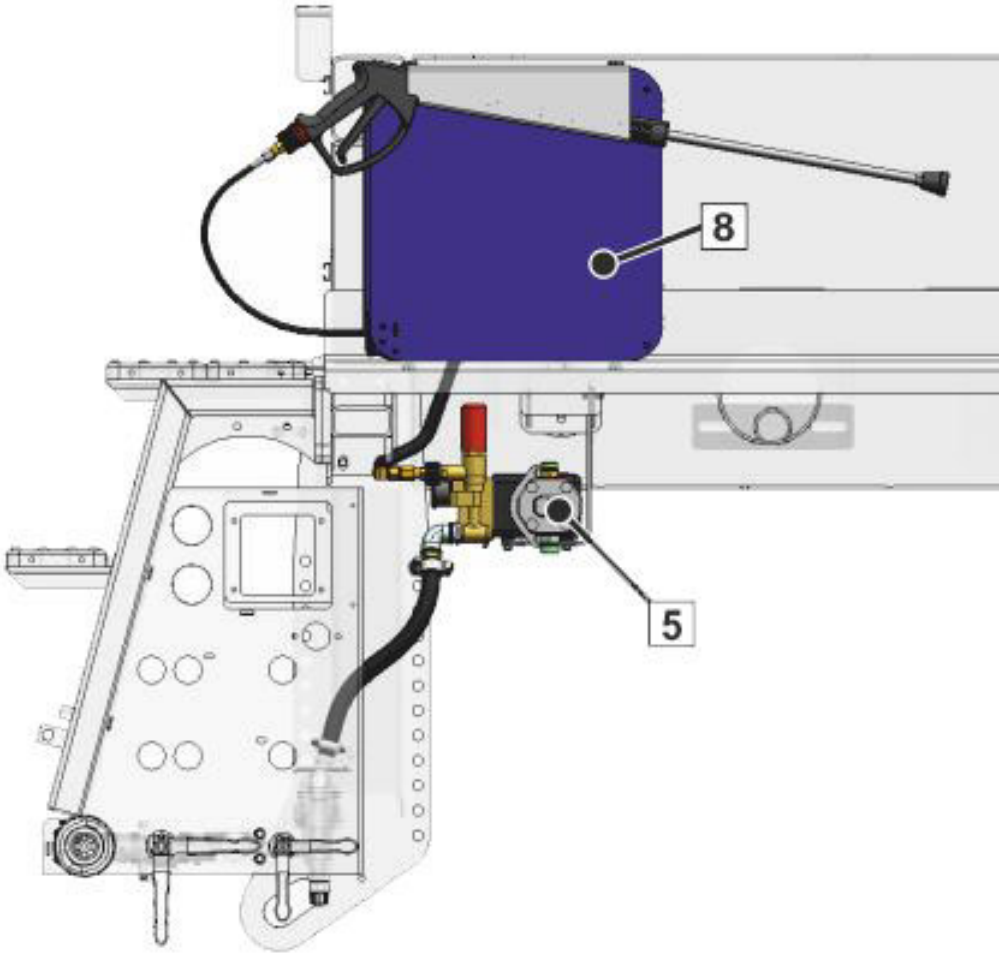


Fig. 37

Caption (Fig. 37)	
Pos.	**Description**
5	High-pressure water pump
8	Rolling equipment for high-pressure hose

2.12.10 Special control: Pumping piston change

This control station is located at the rear of the truck-mounted concrete pump, above the concrete feeding hopper.

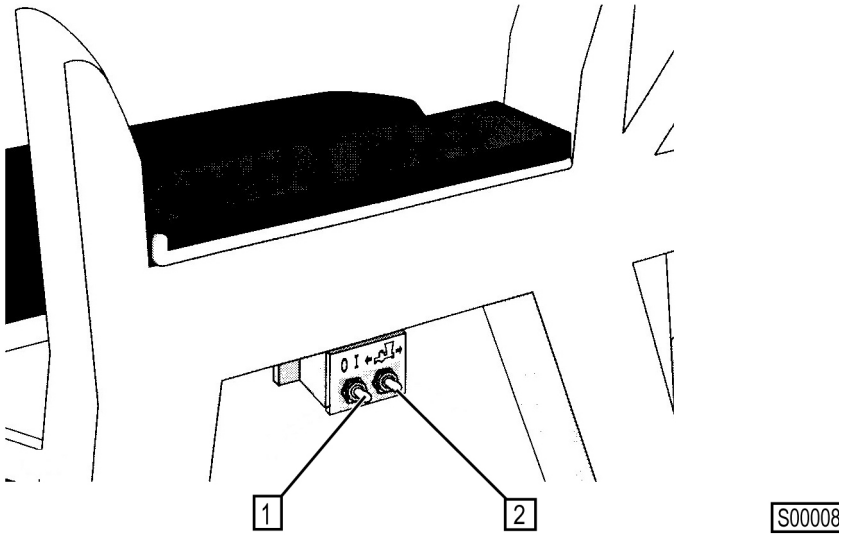
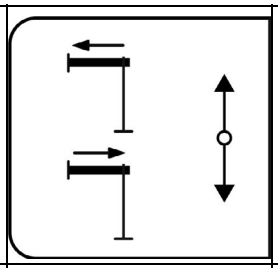
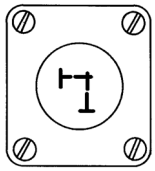
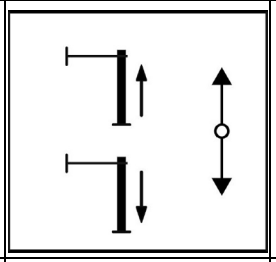
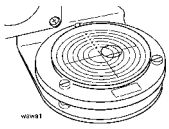
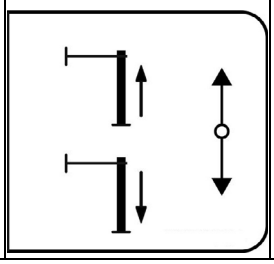


Fig. 38 Changing pumping pistons on the rear boom support.

Caption (Fig. 38 Changing pumping pistons on the rear boom support.)	
Pos.	**Description**
1	Selector push-button: Motor on/off
2	Selector push-button: Drive concrete pump in "jog mode"

2.12.11 Outrigger

Description of the control levers at both sides of the vehicle. For configuration, see symbols on the machine, e.g.:

1	Outrigger front horizontal: RETRACT - 0 - EXTEND		4	Button outrigger release	
2	Supporting leg front vertical: RETRACT - 0 - EXTEND		5	Spirit level	
3	Supporting leg rear vertical: RETRACT - 0 - EXTEND		6	EMERGENCY-STOP button	

2.12.11.1 On the left in the direction of travel

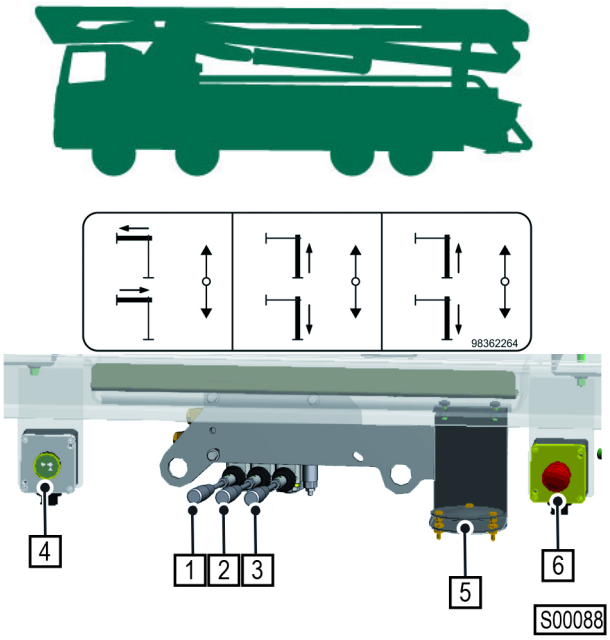


Fig. 39 On the left in the direction of travel

2.12.11.2 On the right in the direction of travel

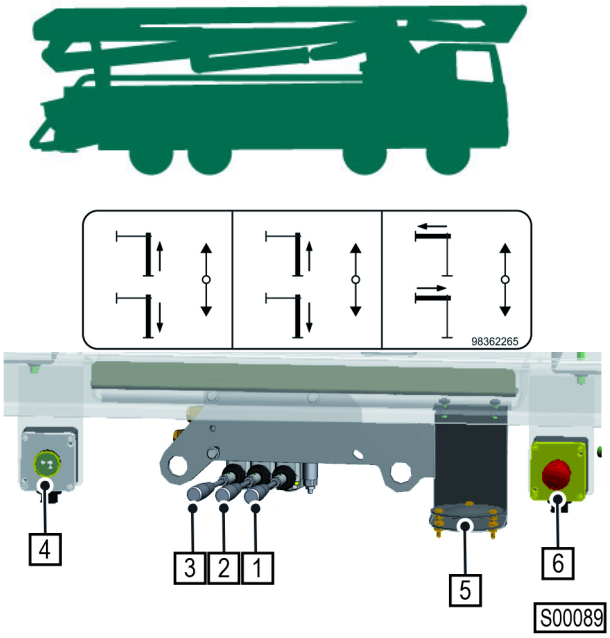


Fig. 40 On the right in the direction of travel

2.12.12 Remote control

Information

A separate description of the remote control used is provided in chapter **(chap. 5)** of these operating instructions.

2.13 Switches on the instrument panel

This chapter describes the switches in the driver's cab, which are required for controlling the SCHWING machine.

The information is sorted according to vehicle manufacturer.

Information

The machine has control devices already provided for various special equipment. If the machine is not equipped accordingly, these control functions become functionless.

The positions and arrangements of the switches are shown as examples and vary according to the vehicle's equipment.

2.13.1 Mercedes

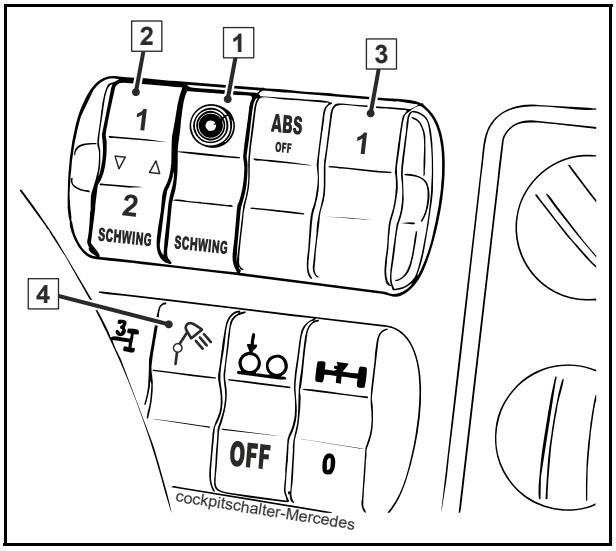


Fig. 41 Mercedes fittings

Caption (Fig. 41 Mercedes fittings)		
Pos.	**Description**	**Function**
1	Pilot light[1] for control system	ON / OFF
2	Position 1: Control system Neutral position Position 2: Turn the mixer drum	ON OFF ON
3	Outrigger lighting	ON/OFF
4	Rear floodlight (manoeuvring system)	ON/OFF

1. Vehicle-dependent differences are possible

2.13.2 MAN

Fig. 42 MAN fittings

Caption for (Fig. 42)		
Pos.	**Description**	**Function**
1	Switch position I = control system Switch position 0 = control system Switch position II = Turn drum (truck mixer concrete pump only)	ON OFF ON
2	Pilot light for control system	ON/OFF
3	rotating warning light	ON/OFF

2.13.3 Scania

Fig. 43 SCANIA fittings

Caption (Fig. 43 SCANIA fittings)		
Pos.	**Description**	**Function**
1	Control system	ON
2	Control system pilot light	ON/OFF
3	Distribution manual transmission gear:	
	Switch position 0	Machine in drive mode
	Switch position 1	Machine pumping mode
4	Outrigger lighting	ON/OFF

2.13.4 Iveco

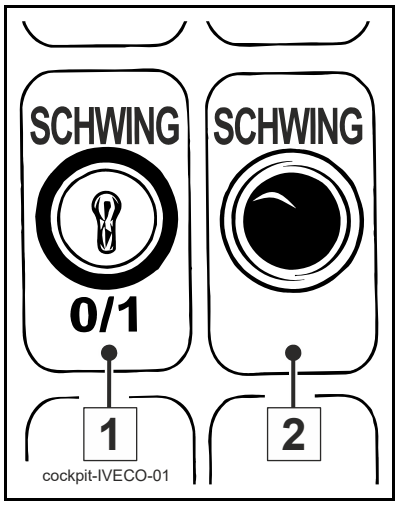


Fig. 44 IVECO fitting

Caption for (Fig. 44)		
Pos.	**Description**	**Function**
1	Control system	ON/OFF
2	Control system pilot light	ON/OFF

2.13.5 Renault

00139_Armaturenträger_Renault

Fig. 45 Renault fitting

Caption for (Fig. 45)		
Pos.	**Description**	**Function**
1	Control system	ON/OFF
2	Control system pilot light	ON/OFF

2.13.6 Explanation of the “EXT” switch on SCANIA vehicles

Before you can control the machine using a remote control, you must press the “EXT” button (4) in the cab of your SCANIA vehicle.

Only then is it possible to start the vehicle's engine, for example, using the remote control unit.

The “EXT” button enables the vehicle's computer for external control commands.

Check the vehicle’s operating instructions for the correct switch!

Steps to take:

➤ Press the “EXT” button (5).

A corresponding acknowledgement message appears on the display panel of the vehicle.

➤ Switch on the control system using the switch (5) (Fig. 46 SCANIA “EXT” switch).

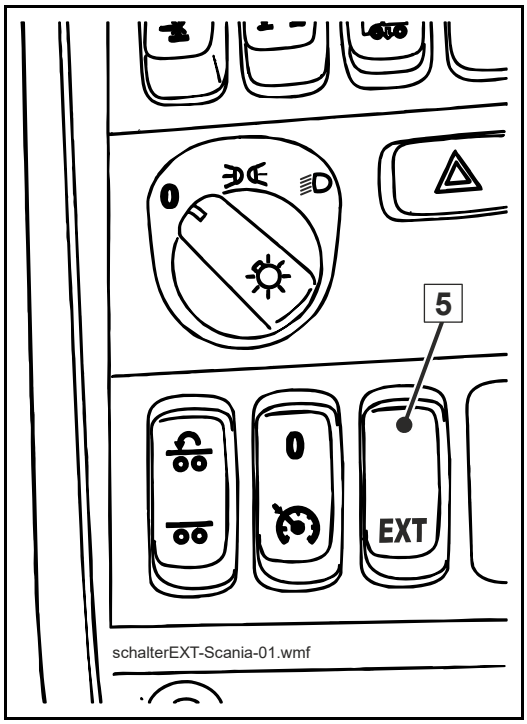


Fig. 46 SCANIA “EXT” switch

Caption (Fig. 46 SCANIA “EXT” switch)		
Pos.	**Description**	**Function**
5	Switch (EXT)	Activating the vehicle electronics for the control system

3 Operation

This chapter describes:

- All of your machine's operating modes
- Safe and proper handing
- Safe and economical operation

3.1 Readying the machine for operation

Some of the figures in this chapter are examples. Also observe the machine-specific chapter “Water system operation” and “Hydraulic fluid and filters”.

Information

Before the work assignment!

Perform preparatory work at the depot.

1. Perform maintenance according to the maintenance schedule.
2. Check the following, top up if necessary:

- Fuel supply
- Water level in water case
- Hydraulic oil level

3. Make sure the hopper grate is locked.

3.1.1 Topping up the fuel supply

Danger!

Risk of fire and explosion when refuelling the vehicle!

Sparks, open flames and hot surfaces can lead to serious injury or even death from explosion and fire.

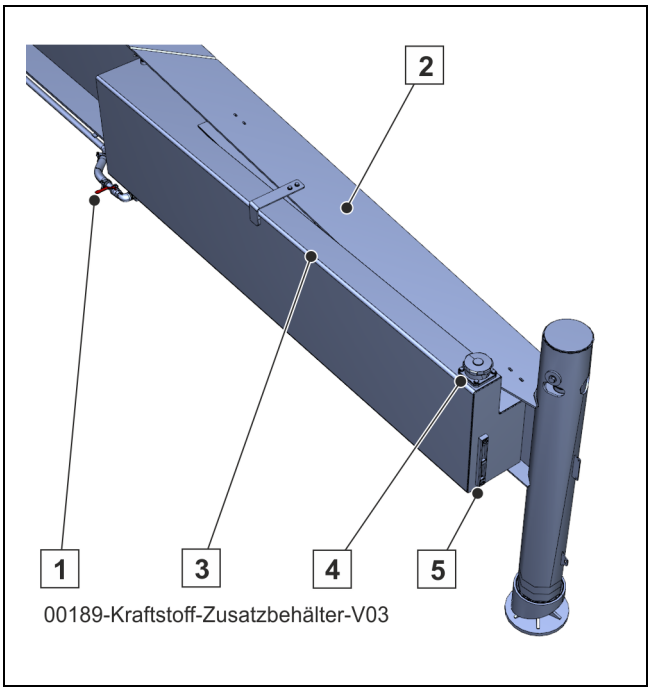
Observe the safety regulations for handling fuel.

1. Check the fuel supply in the vehicle fuel tank.
2. Check the fuel supply of the optional auxiliary fuel reservoir on the level indicator e.g. (5) **(Fig. 47)**.
3. If necessary, refill all fuel tanks. Ensure absolute cleanliness.

Information

The connection between the auxiliary fuel reservoir and the vehicle fuel tank must be permanently separated by the ball valve (1) **(Fig. 47)**.

The ball valve must only be opened to refill the vehicle fuel tank. Close the ball valve again after refilling!



Pos.	Designation
1	Ball valve: Auxiliary fuel reservoir for Vehicle fuel tank
2	Folding outrigger On the right in the direction of travel
3	Auxiliary fuel reservoir
4	Filling neck
5	Level indicator

Fig. 47 Example: Auxiliary fuel reservoir (3)

3.1.2 Filling the water case

Attention!

Material damage to the water system possible due to dirty water!

Dirty water leads to accelerated wear of the water pump and can cause further damage to the water system.

Only use clean water to fill the water system.

Attention!

Material damage when filling due to overpressure in the water case!

The oil box can be damaged due to overpressure.

When filling, make sure the oil box is adequately ventilated in order to prevent overpressure.

1. Check the filling level of the water case on the level indicator, e.g., (1) **(Fig. 48)** at the rear of the machine.

2. Fill clean water through the filling neck, e.g., (2) **(Fig. 48)** on the top of the reservoir.
3. Observe the level gauge while filling and reduce or stop the inflow in due time.

If the machine is equipped with a “C” water connection (12) **(Fig. 49)**, exercise appropriate care when using it to fill the water case!

When filling using the water connection, a high internal pressure may occur in the water case, which may cause damage.

The existing ventilation openings are not overflow devices.

1. Remove the filling cap (2) **(Fig. 48)** on the top of the water case.
2. Connect the water supply to the water connection (12) **(Fig. 49)** and open the gate valve (13).

Fill the water case **(Fig. 48)** using a water hose via the above filler cap if safe filling via the water connection (12) is not possible.

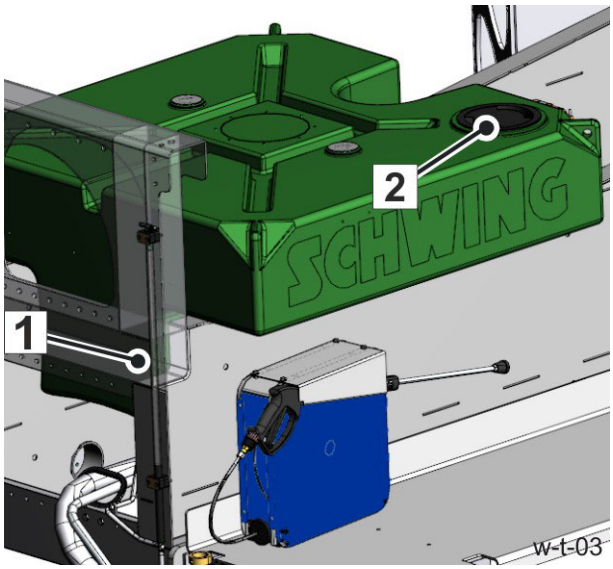


Fig. 48 Example: Water case

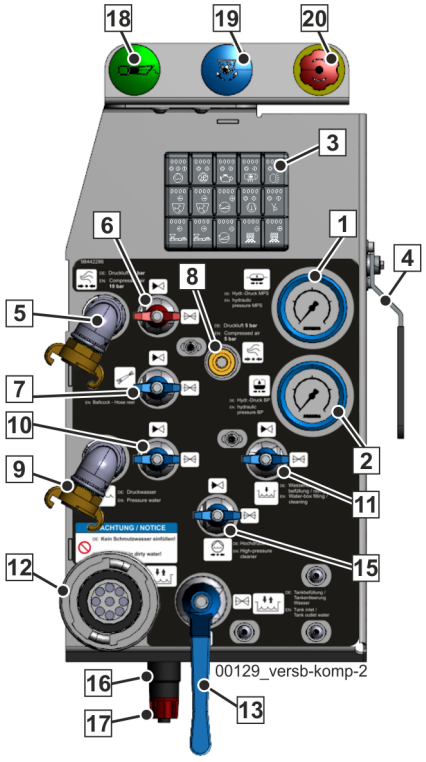


Fig. 49 Supply control

3.1.3 Checking the hydraulic oil level

➤ Check the oil level of the hydraulic oil box on the inspection glass (1) **(Fig. 50)**.

Check the oil level only when the oil is cold, before you start the hydraulic pump drive for the first time prior to daily use.

To do this, the ready-to-start machine must be positioned horizontally.

Ready to start means that the placing boom and outrigger are in the transport position.

When the oil is cold, the fill level indicator (1) of the hydraulic oil tank **(Fig. 50)** must be located between the "Min." and "Max." marking.

As the hydraulic oil expands when heated, correspondingly different oil levels would be shown otherwise.

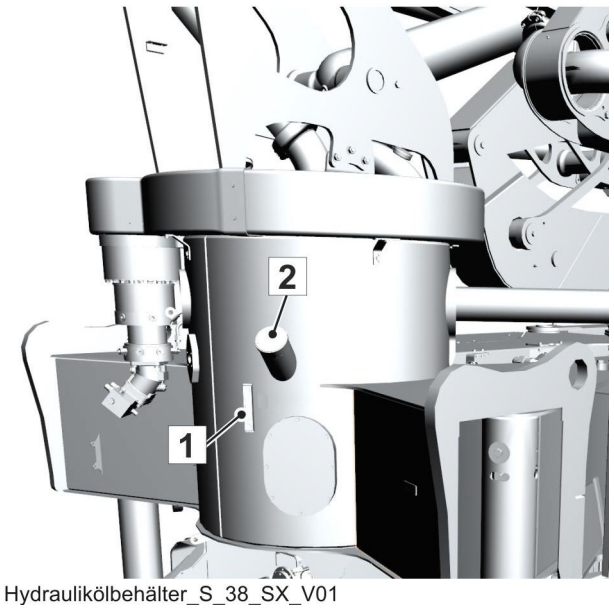
Information

Folding element on front elbow outrigger!

We recommend folding up the folding element on the front-left elbow outrigger in the direction of travel to quickly check the oil level for machines of type S65SXF.

➤ Top up with the same oil type, if required.

Refer to the chapter “Hydraulic fluid and filters” for topping up the hydraulic oil.



Hydraulikölbehälter_S_38_SX_V01

Fig. 50 Example: Hydraulic tank level indicator

Caption (Fig. 50)	
Pos.	**Designation**
1	Level indicator
2	Filling neck

3.1.4 Preparing underride protection for pumping

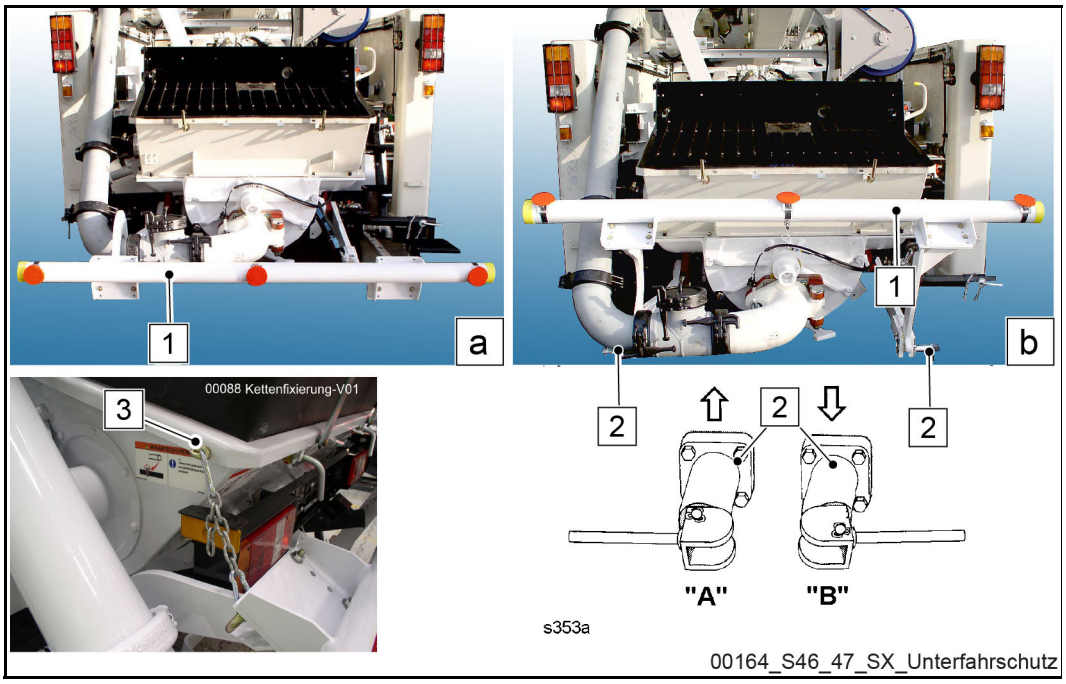


Fig. 51 Underride protection

Caption (Fig. 51)	
Pos.	**Description**
a	Transport position
b	Operating position
1	Underride protection
2	Locks
3	Chain fastener

The underride protection (1) is initially in the drive position (a).

Release both locks (2) **(Fig. 51)** on the underride protection (position **A = secured,** position **B = released**).

➤ Lift the spring-activated underride protection until it reaches the limit stop.

➤ Secure the underride protection using the chain fastener (3) **(Fig. 51)** on the left-hand side of the hopper.

The underride protection is now in the operating position (b).

3.1.5 Hopper grate for concrete feeding hopper

➤ Check the lock (5) of the hopper gate in the concrete feeding hopper **(Fig. 52)**.

If the hopper gate is not locked during operation, it can be pushed up by the concrete.

This would cause an end limit switch to switch off the concrete pump.

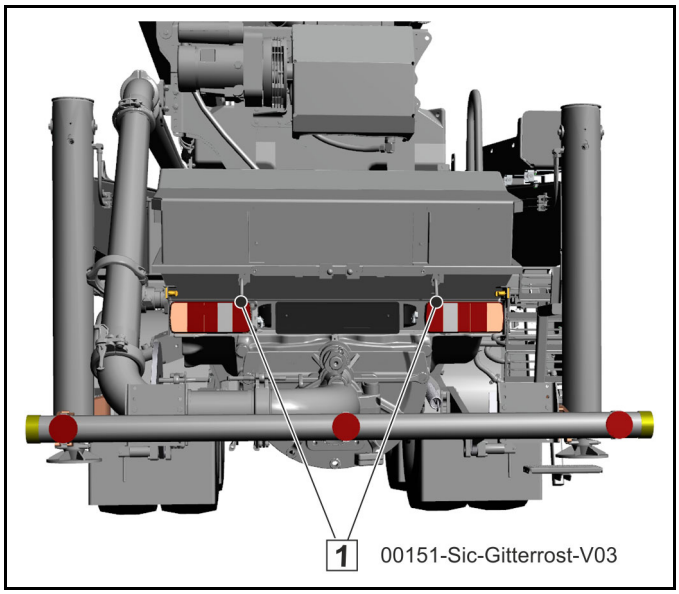


Fig. 52 Hopper grate safety device

3.2 Driving operation

This chapter only describes measures for making the SCHWING machine ready to drive.

Follow all preparatory measures for driving on public roads.

Danger!

Danger to life when driving with placing boom folded out!

Serious injury or death due to, e.g., loss of stability or collisions while driving with the placing boom folded out.

Driving with the placing mast folded out is expressly prohibited!

3.2.1 Preparatory measures

Please observe the following points in particular before driving with the truck-mounted concrete pump in traffic:

- ➤ Clean the pumping line and concrete pump **(chap. 3.22)**
- ➤ Move the placing boom into the transport position **(chap. 3.23)**
- ➤ Ready the machine to drive **(chap. 3.24)**
- Truck-mounted concrete pumps may only be driven in open road traffic with the relevant permit.
- Observe the regulation in the country of use.
- Before projects on unfamiliar jobsites, determine the precise route to be taken, as not all bridges, underpasses, etc. can be traversed by the machine.

Attention!

Damage to the gearbox!

Avoid high rotational speeds in low gears.

When installing machines with distributor gearboxes onto a truck with drives producing especially high torque, the distributor gearbox can potentially be overloaded while driving in lower gears.

Observe the driving rules on an information sign in the driver's cab, if necessary.

Caution!

Injuries due to unsecured additional parts!

Risk of accident due to additional parts slipping or falling.

Always secure additional parts so that they are roadworthy.

- ➤ Store equipment and accessories securely.
- ➤ Securely lock toolboxes and drawers.
- ➤ Close locks and remove keys.
- ➤ Move all foldable equipment (e.g. steps, (Fig. 53 Folding steps)) into the transport position.
- ➤ Check the position of the rear reflector (1) (Fig. 54 Reflector).

Caution!

Danger to road traffic due to contamination of the roadway!

Increased risk of skidding for following traffic.

Empty the funnel, pipeline and concrete pump fully and clean the machine.

- Make sure that you are not leaking any fluids before the journey.
- Clean the vehicle as thoroughly as possible before leaving the jobsite (e.g. tyre profiles, hopper, lines, exterior walls).

Warning!

Risk of traffic accidents due to unsecured outriggers while driving!

Serious injury or death possible as a result of failing to observe the preparatory measures.

Lock horizontal outriggers with transport safety devices before driving.

Warning!

Risk of accidents due to sinking outriggers!

Retracted vertical supports can slowly lower through their own weight.

Therefore, check the supports before every drive and always retract the supports up to the limit stop.

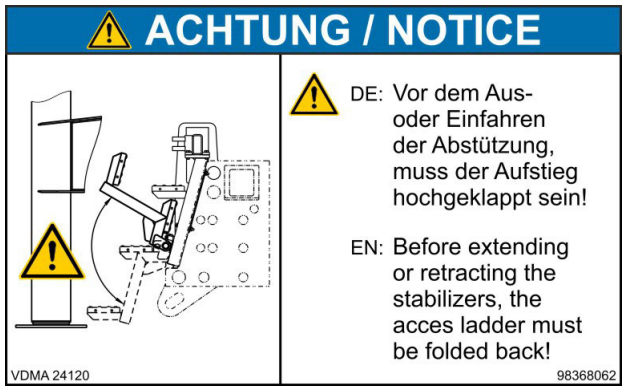


Fig. 53 Folding steps

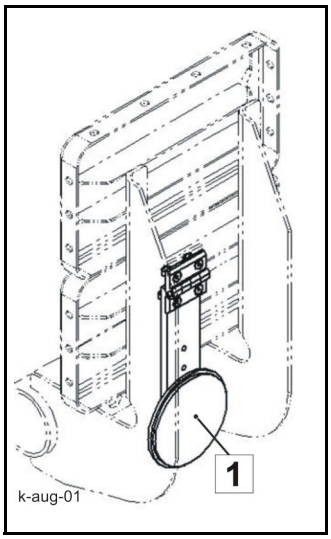


Fig. 54 Reflector

3.2.2 Trailing axle

Information

External documentation for the supplier component is available!

For built-in supplier components, SCHWING only provides the essential information in the operating instructions, which is required for proper operation and maintenance of the SCHWING machine.

Further information can be found in the documentation for the respective supplier component.

Observe the operating instructions of the vehicle or axle manufacturer.

Depending on the vehicle, the machine can be equipped with trailing axles from various manufacturers.

To guarantee stability during pumping, the bellows of this axle can be vented, see **“Pneumatic suspension / Levelling”** on page 182.

Warning!

Risk of serious accident due to inadequately filled bellows!

If the bellows are not filled, the driving properties of the vehicle are not guaranteed.

The driving operation is only permitted when the bellows are filled.

As a rule, venting and ventilation are carried out automatically when switching on and off the power take off.

Depending on the axle or vehicle manufacturer, the condition of the bellows can be displayed in the driver's cab.

If the vehicle is parked and the vehicle motor turned off, the bellows lose air.

In this case, the axle drops in the rear, thus exceeding the total permissible height in the front.

Thus, make sure that all air systems are filled sufficiently prior to each driving operation.

3.2.3 Transporting people and goods

Mobile concrete pumps and placing booms are self-propelled machines.

Self-propelled machines are motor vehicles which, according to their design and the special equipment firmly attached to the vehicle, are intended and suitable for carrying out work, but not for transporting people or goods.

Warning!

Risk of accident due to residual concrete in the machine!

Accidents can occur due to change of the machine's centre of gravity.

Before driving, the pumping line, pump and hopper must be emptied.

Unfavourable weight distribution worsens vehicle handling and can lead to damage to the chassis frame and structure.

Accessories essential to the work application are excluded from the prohibition. The accessory must be stowed in a roadworthy manner. The permissible total weight and the maximum permissible axle load must not be exceeded.

3.3 Your machine's EMERGENCY STOP system

Danger!

Danger due to inoperative EMERGENCY STOP button!

Operating the machine with a defective EMERGENCY STOP system is prohibited and can lead to serious injuries and fatal accidents.

Prior to any working operation, check the function of all EMERGENCY STOP buttons.

Information

Inform any relevant persons of the positions of the EMERGENCY STOP buttons so that they can also react in emergency situations.

Your machine's EMERGENCY STOP system is intended to allow you to shut off dangerous machine functions as quickly as possible when other protective measures that have already been taken do not suffice.

Thus, you can prevent a dangerous situation from turning into an accident, minimise the severity of an accident or stop a machine malfunction before it causes any damage to the machine.

The EMERGENCY STOP buttons **(Fig. 55)** on the machine are always effective when the control system is active.

An EMERGENCY STOP button is located on the transmitters for your cable remote control and radio remote units.

This EMERGENCY STOP button is only effective when the remote control unit is active.

Fig. 55 EMERGENCY-STOP button

3.3.1 How to test the EMERGENCY-STOP buttons

- Switch on the control system.
- Select the "REMOTE" operating mode.
- Use the radio remote control to diagnose and activate the control system after interrupting the EMERGENCY STOP.
- Press an EMERGENCY STOP button.

You can read the results of the test on the display of the radio remote control unit.

- Unlock the EMERGENCY STOP button that was tested.
- Reactivate the control system using the remote control.
- Proceed to the next EMERGENCY STOP button and follow the same testing procedure as with the first button.
- Use this procedure to test all of the EMERGENCY STOP buttons on your machine.

Make sure to test the EMERGENCY STOP buttons on the cable and radio remote control units as well.

3.3.2 Using the EMERGENCY STOP buttons

Only press the EMERGENCY STOP buttons in the event of an emergency or malfunction.

Actuating an EMERGENCY STOP button immediately stops all dangerous machine functions.

- If your machine starts to carry out unwanted movements, first let go of all control levers.
- If this does not cause the movements to cease or if the machine does not react or reacts incorrectly to the control commands, you must actuate the nearest EMERGENCY STOP button.

3.3.3 Restarting the machine after an EMERGENCY STOP

- Remedy the fault.
- Set all engaged selector switches for the active control unit to the "0 or centre position" and unlock all EMERGENCY STOP buttons. Otherwise, it will not be possible to start up the machine!
- Restart the previously active control unit (remote or local).

The restart protection is a function in the control system that prevents the machine functions from being restarted immediately after unlocking the EMERGENCY STOP buttons.

The control system monitors the positions of the EMERGENCY STOP buttons and the selector switch for the selected operating mode.

You can see the current "Restart protection" status on the display of the control system. The "No zero position for operating switch" symbol is displayed when the restart protection is active.

Information

Option: "Shut down the drive motor"

Optionally, the drive motor (vehicle engine) can also be switched off when an EMERGENCY STOP button is actuated.

Whether or not this function is available for your machine depends on the respective vehicle manufacturer.

Always switch off machine functions and motor by means of the appropriate control devices under normal operating conditions.

3.4 VECTOR II control system

The VECTOR II control system is responsible for the entire electrical control of the SCHWING truck-mounted concrete pump.

Hereinafter, VECTOR II will be referred to as the control system for the purpose of simplification.

All automatic safety functions are monitored and controlled by the control system.

00169_VECTOR_II_Schaltschrank_Boot_80_V04

Fig. 56 Switch cabinet of the VECTOR II control system

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3.4.1.1 Introduction / Overview

The control system includes a remote control system **(chap. 5)** and an integrated diagnostic system.

The diagnosis system monitors the machine and controls for faults and improper operating states.

Events are reported acoustically and indicated on the display (2) **(Fig. 57)**.

In addition to the monitoring function, the diagnostic system can display data important to operation.

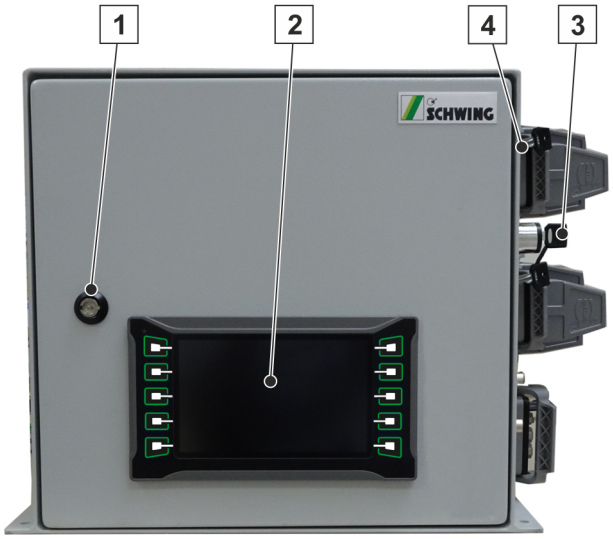
The following operating instructions are intended to help you obtain a quick overview of the control system.

For detailed descriptions of the various functions, refer to the corresponding chapters in the operating instructions. References are made to these chapters accordingly.

3.4.2 Control and check devices

This chapter describes all control and check devices (operating and reading options) of the control system.

3.4.2.1 Switch cabinet for the control system



00169_VECTOR_II_Schaltschrank_80_V04

Fig. 57 VECTOR II switch cabinet

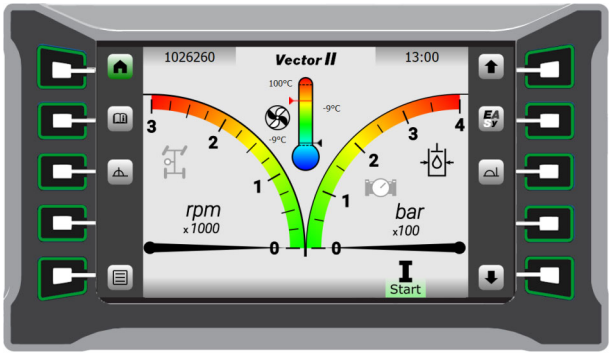
Pos.	Designation
1	Lock
2	HMI (display)
3	Key-operated switch
4	Signal transducer (buzzer)

Always keep the switch cabinet locked. The key switch may only be actuated in case of emergency. The acoustic signal transducer in the switch cabinet makes the operator aware of certain machine statuses or events.

3.4.2.2 The HMI

HMI stands for Human Machine Interface. The German translation for this is Mensch Maschine Schnittstelle (MMS).

The HMI **(Fig. 58)** is used for local operation and to display current machine data. It thus makes important functions and information available from the control system directly to the operator standing on the machine.

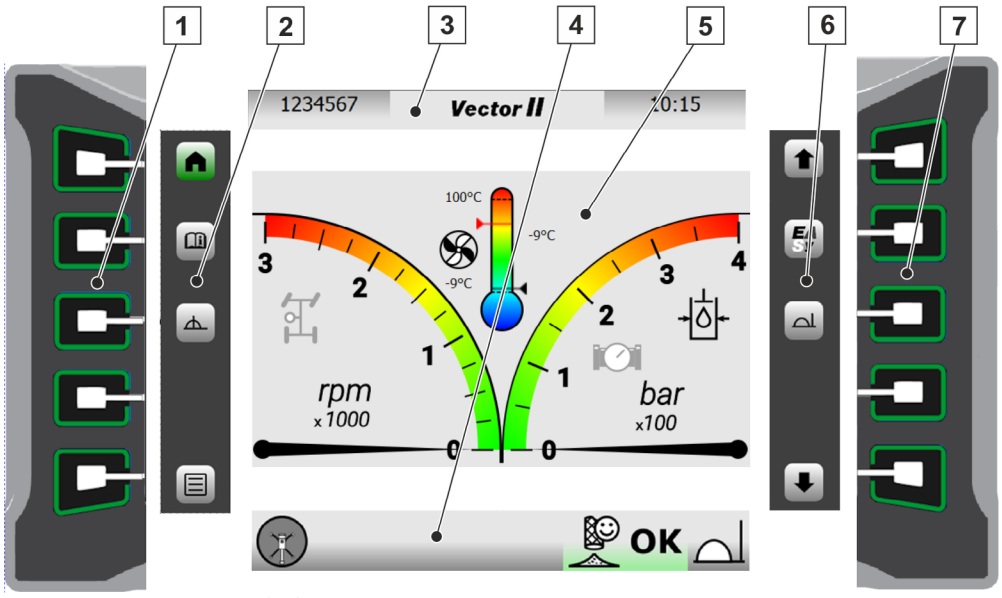


00169_VECTOR_II_Hauptbildschirm_80_V03

Fig. 58 HMI

3.4.2.3 The sections of the HMI as an exploded view

The HMI display is not a touch-sensitive display. The operating buttons pos. 1 and 7 carry out the functions displayed in the partially fixed and variable toolbars pos. 2 and 6.



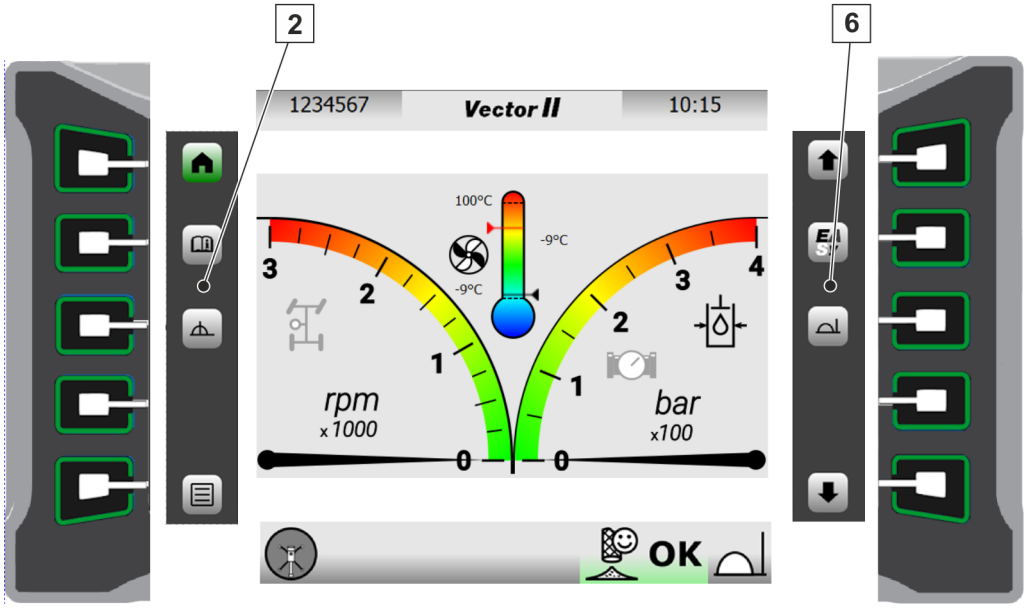
00169_VECTOR_II_Elemente_Explosion_V02

Fig. 59 HMI sections

Illustration legend (Fig. 59)			
Pos.	**Description**	**Pos.**	**Description**
1	Operating buttons (soft keys) for the toolbar pos. 2	5	Main screen **(3.4.4.1)**
2	Toolbar, left **(3.4.2.4)**	6	Toolbar, right **(3.4.2.4)**
3	Status bar, top **(3.4.2.5)**	7	Operating buttons (soft keys) for the toolbar pos. 6
4	Bottom status bar **(3.4.2.6)**		

3.4.2.4 Overview of symbols in variable display

The following table contains all possible symbols that can be displayed in the left- and right-hand variable displays 2 and 6 **(Fig. 60)**.



00169_VECTOR_II_Bedientasten_V04

Fig. 60 Variable toolbars

Symbol	Function	Symbol	Function
	Main screen		Cursor one step up
	Help		**One-touch button** Menu: EASyflex II
	One-touch button: Operating modes: LOCAL		**One-touch button:** Operating modes: REMOTE
	Move back		Execute (Return)
	Menu		Cursor one step down
	Increase value		Complete cursor Up
	Reduce value		Complete cursor Down
	Move cursor left for selection		Settings
	Move cursor right for selection		DELETE
			Button: CONFIRMATION

Table 5 Symbols

3.4.2.5 Status bar, top

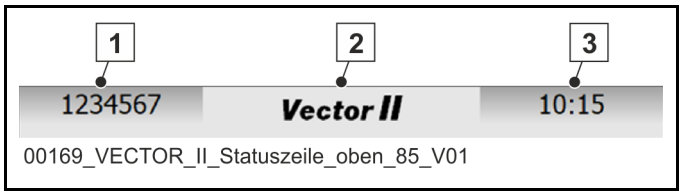


Fig. 61 Status bar, top

Illustration legend (Fig. 61)			
Pos.	**Description**	**Pos.**	**Description**
1	Machine number		
2	Screen title: • VECTOR II • EASyflex II		• Vario Pressure • Diractive
3	Time		

3.4.2.6 Bottom status bar

The various statuses of the functions are displayed in the status bar. An overview of the possible signals can be found below.

3.4.2.6.1 Status information

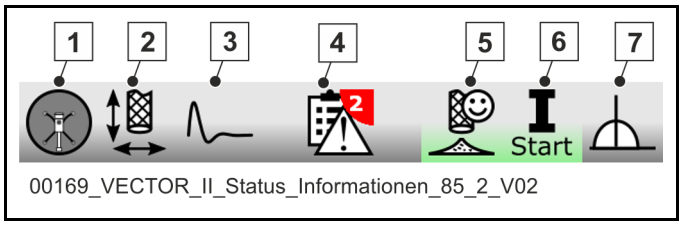


Fig. 62 Bottom status bar with full support (1)

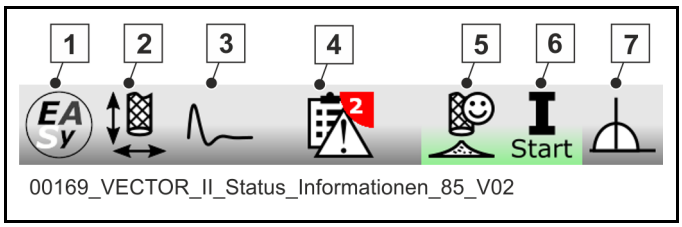


Fig. 63 Bottom status bar with partial support (1)

Illustration legend (Fig. 63)/(Fig. 63)			
Pos.	**Description**	**Pos.**	**Description**
1	Selected support variant: • Full support, see (1) **(Fig. 62)** • Partial support EASyflex II, see (1) **(Fig. 63)** and details **(chap. 6.1)**	5	Status of concrete pump see **(3.4.2.6.5)**
2	Status of single-lever control, see **(3.4.2.6.2)**	6	Control status see **(3.4.2.6.6)**
3	Status of vibration damper see **(3.4.2.6.3)**	7	Currently selected operating mode see **(3.4.2.6.7)**
4	New message list entries see **(3.4.2.6.4)**		

3.4.2.6.2 Status of single-lever control

Status	Description	Symbol	Colour
OFF	Single-lever control switched off	None	
READY	Single-lever control ready for activation		Grey
ACTIVE	Single-lever control active		Green
WARNING	Single-lever control Warning		Yellow
ERROR	Single-lever control check		Red

3.4.2.6.3 Status of vibration damper

Vibration damper indicators Switching on and then activating the function reduces the vibrations of the entire placing boom to a minimum.

Status	Description	Symbol	Colour
OFF	Vibration damper switched off	None	
READY	Vibration damper ready for activation		Grey
ACTIVE	Vibration damper active		Green
WARNING	Vibration damper warning		Yellow
ERROR	Check vibration damper		Red

3.4.2.6.4 Status of event messages

Status	Description	Symbol	Colour
Event messages	Indicator/Number of accumulated event messages		Grey

3.4.2.6.5 Status of concrete pump

Status	Description	Symbol	Colour
OFF	Concrete pump switched off	None	
DEACTIVATED	Concrete switched on, but not running		Grey
ACTIVE	Concrete pump is pumping economically		Green
ECONOMY	Concrete pump is pumping not very economically		Yellow
ECONOMY	Concrete pump is not pumping economically		Red

3.4.2.6.6 Status of control system

The symbols listed below will prompt you to make an entry.

Function	Description	Fig.	Colour
OK	Release confirmed		Green
Start flashing	Operating mode ready for release		Green
Command element not in neutral position	At least one command element actuated		Yellow
EMERGENCY STOP symbol flashing	EMERGENCY STOP actuated		Red
DIALOG	User input required		Yellow

3.4.2.6.7 Operating modes

Mode	Symbol	Mode	Symbol
Local		Load limitation system	
Remote		Rotatable stowing box	
Cleaning operation		Pump separately	
Teach mode		Piston exchange operation	

3.4.3 The display structure

The display structure consists of various screens and menus.

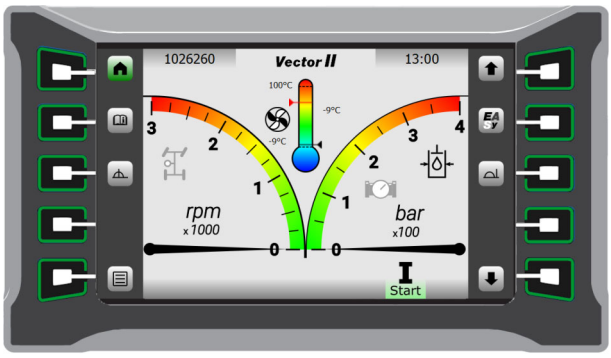
After pressing a cursor button in the main menu, other screens display the operating data.

Open the menu using the “MENU” button.

Open the following functions via the corresponding one-touch buttons.

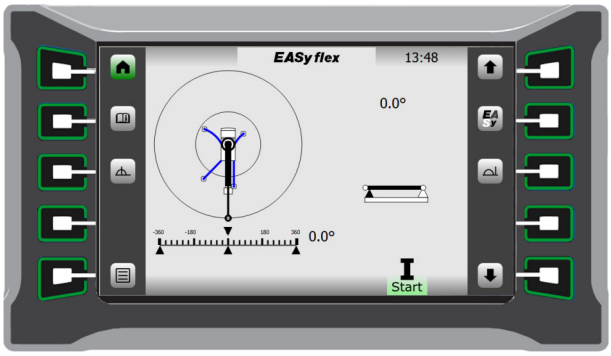
- Operating modes: LOCAL
- Operating modes: REMOTE
- EASyflex II

3.4.4 Overview of screens



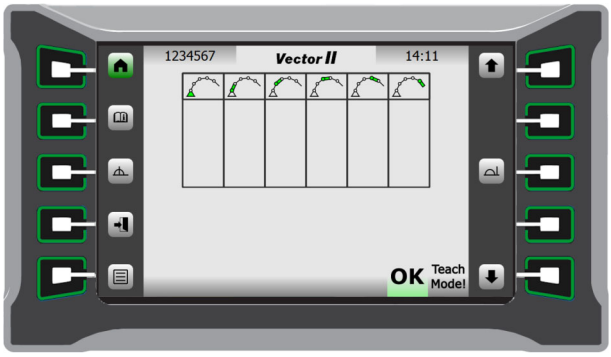
00169_VECTOR_II_Hauptbildschirm_80_V03

“Main screen” details, see **(chap. 3.4.4.1)**.



00169_VECTOR_II_Bildschirm-EASy_80_V01

“EASyflex II, VECTOR II” screen details, see **(chap. 3.4.4.2)**.

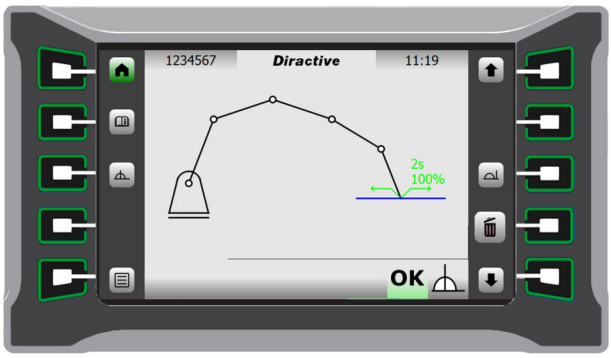


00169_VECTOR_II_Bildschirm-Teach Mode_80_V01

“Teach mode” screen details, see **(chap. 3.5)**.

00169_VECTOR_II_Bildschirm-VarioPressure_80_V02

“Vario Pressure” screen details, see **(chap. 3.4.4.3)**.

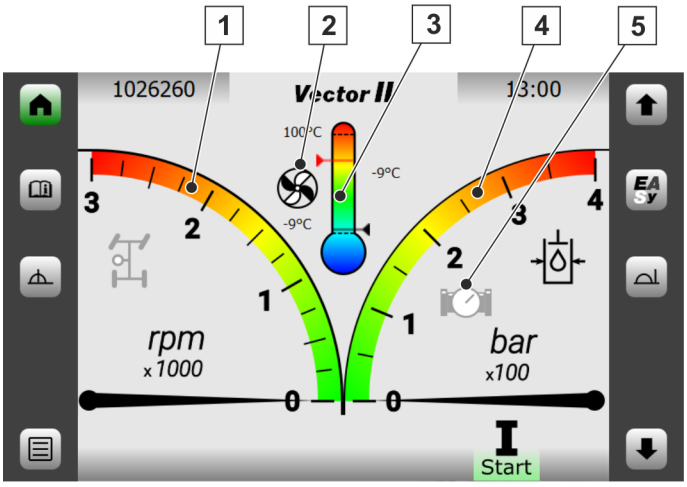


00169_VECTOR_II_Bildschirm-Diractive_80_V01

“Diractive” screen details, see **(chap. 3.4.4.4)**.

3.4.4.1 Screen: Main screen

Pressing the “Main screen” button always takes you directly to the main screen.



00169_VECTOR_II_Displaybereiche_Hauptbildschirm-90-V04

Fig. 64 Main screen

Pos.	Designation
1	Rotational speed Power take off/Distribution manual transmission gear
2	Oil-air cooler activated/ deactivated
3	Hydraulic oil temperature
4	Hydraulic oil pressure

3.4.4.2 Screen: EASyflex II, VECTOR II

Depending on the machine’s equipment, the corresponding screen title is displayed in the top status bar (6) **(Fig. 65)** on this screen:

- VECTOR II = full support
- EASyflex II = one-sided support left/right, EASy Front, EASy Extend

The “EASyflex II, VECTOR II” screen shows the optical and graphical position of the placing boom and outrigger in various axes.

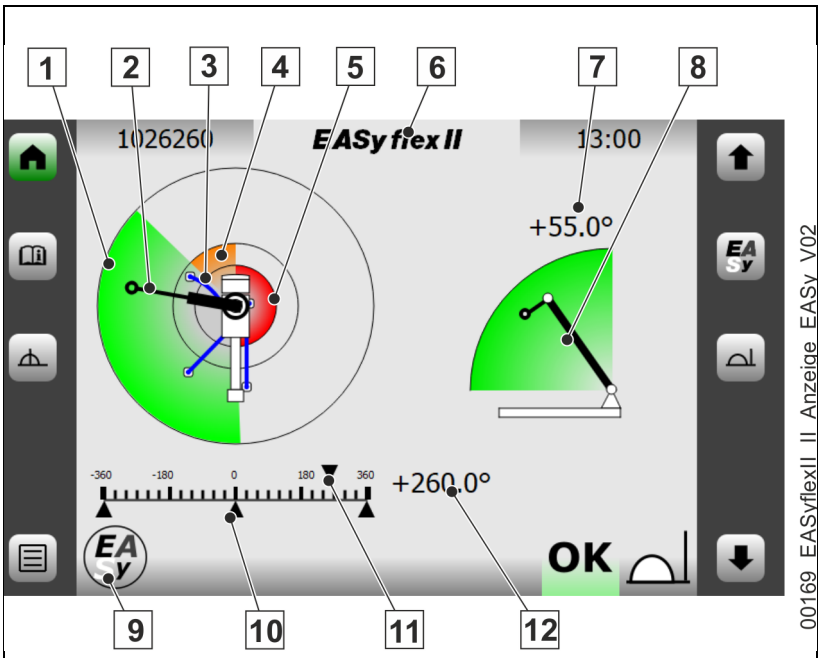


Fig. 65 Example: EASyflex II

Pos.	Designation
1	Released work area[1] (green)
2	Graphical presentation: Placing boom
3	Example: Support status Fully horizontally and vertically[2]
4	Restricted range of rotation[1] (orange)
5	Locked range of rotation[1] (red)
6	Screen title (according to equipment variant)
7	Numerical display: Inclination angle of boom section 1
8	Graphic display: Inclination angle of boom section 1
9	Selected support type[1] • Full support • Partial support (EASy)
10	Position of boom support
11	Graphic display: Placing boom angle of rotation
12	Numerical display: Placing boom angle of rotation

1. Only with EASyflex II
2. If the supporting dish is pictured, this indicates that the vertical outrigger has been extended and released correctly.

3.4.4.3 Screen: Vario Pressure (special equipment)

The status of all settings that have been made and the current values of the function are displayed on the “VARIOPRESSURE” screen.

Refer to Chapter **(chap. 6)** for how to use the function.

Warning!

Risk of pumping lines bursting due to excessive delivery pressure!

Pumping lines can burst due to overloading.

Make sure that the delivery pressure is always below the maximum permitted operating pressure (PN) for the pumping line/pumping line components.

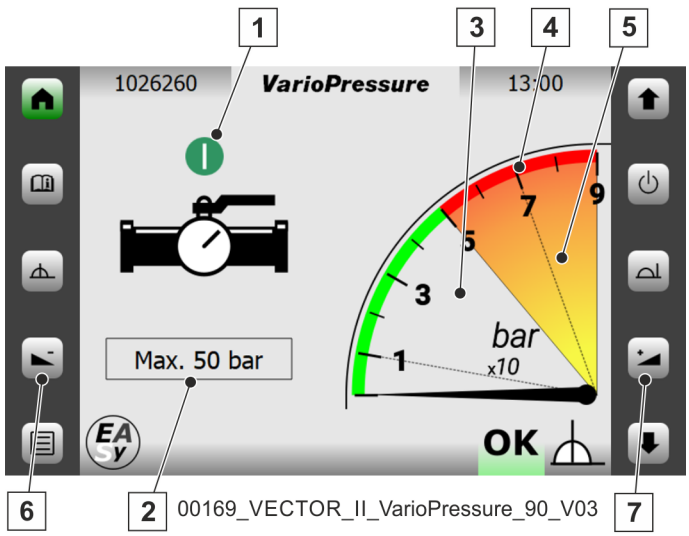


Fig. 66 VarioPressure

Pos.	Designation
1	Graphical symbol: Pumping pressure
2	Configured max. delivery pressure
3	Graphic display: Current delivery pressure
4	Graphic display (red): Target value for pressure limit
5	Graphic display (orange): Pressure limit active
6	Value for max. delivery pressure: Reduce
7	Value for max. delivery pressure: Increase

3.4.4.4 Screen: Diractive (special equipment)

Diractive helps you operate the machine more effectively.

The function is described in Chapter **(chap. 6)**.

An overview of the “Diractive” screen can be found below.

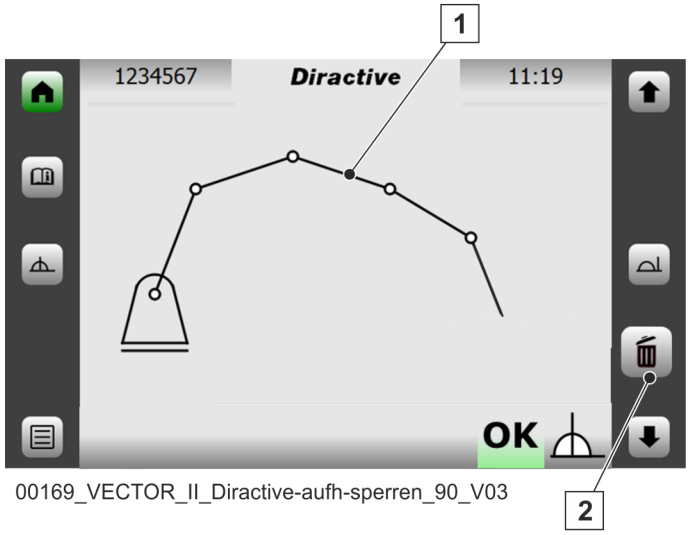


Fig. 67 Diractive

Pos.	Designation
1	Status of the placing boom limits with the Diractive function
2	Delete all Diractive settings

3.4.5 Menu overview

System information

- Machine data
- Vehicle data
- Controller software versions
- Controller serial numbers

Daily delivery rate

Event list

Operating data

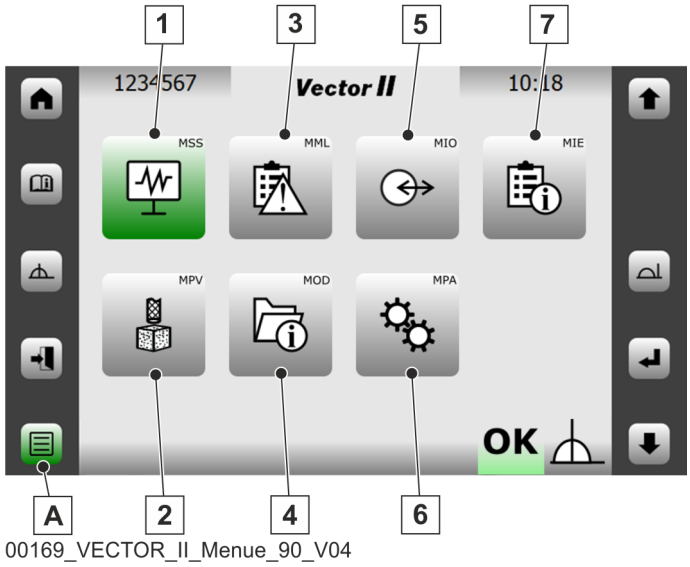
- I/O status:
- Digital input
- Analogue input
- Digital output
- Analogue output
- Input status, remote
- Input status, local

Settings

- Silent diagnosis
- Language settings
- Unit for delivery volume
- Unit for temperature
- Unit for pressure
- Display brightness
- Access to password-protected area

3.4.6 The individual menus

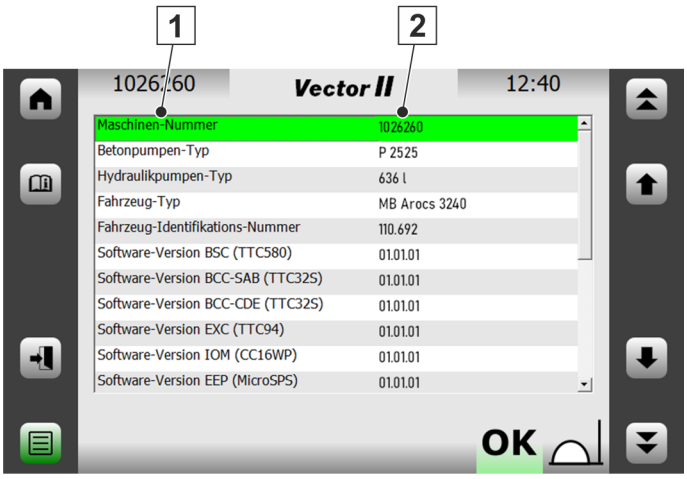
The menu can be opened using the (A) “MENU” button.



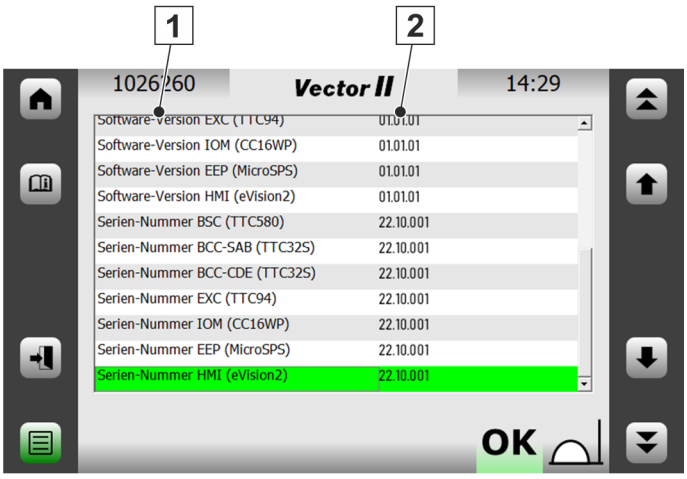
Pos.	Designation
1	System information **(chap. 3.4.6.1)**
2	Daily delivery rate **(chap. 3.4.6.2)**
3	Events and event list **(chap. 3.4.6.3)**
4	Operating data **(chap. 3.4.6.4)**
5	I/O status **(chap. 3.4.6.5)**
6	Settings **(chap. 3.4.6.6)**
7	Internal events **(chap. 3.4.6.7)**

3.4.6.1 System information (abbreviation: MSS)

Under the “System information” menu item, you will find information on the following areas, see (Fig. 68):



00169_VECTOR_II_Funktionsübersicht_01_90_V02



00169_VECTOR_II_Funktionsübersicht_02_90_V02

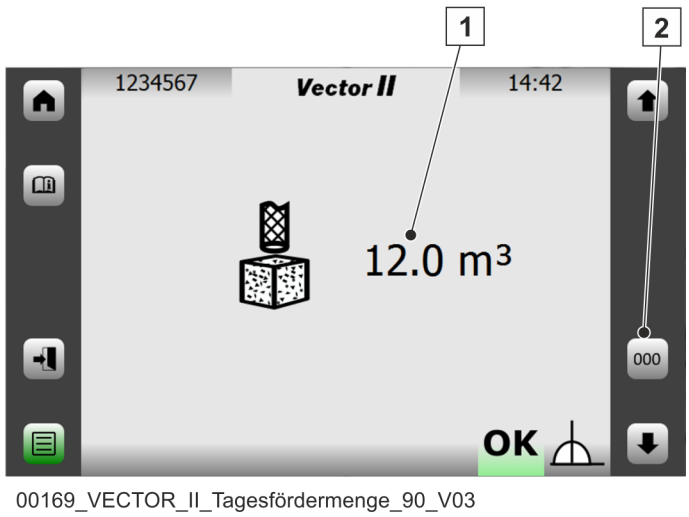
Fig. 68 System information

Pos.	Designation
1	• Machine data • Vehicle data • Controller software versions • Controller serial numbers
2	Value/information

3.4.6.2 Daily delivery rate (abbreviation: MPV)

The delivery rate is calculated until it is reset manually.

To determine the daily delivery rate, reset the daily delivery rate before the work assignment.



00169_VECTOR_II_Tagesfördermenge_90_V03

Fig. 69 Daily delivery rate

Pos.	Designation
1	Display of daily delivery rate
2	Reset the daily delivery rate to zero

3.4.6.2.1 Reset daily delivery rate

Actuate the associated button (2) **(Fig. 69)** to set the daily delivery rate to zero.

3.4.6.3 Events and event list (abbreviation: MML)

The integrated diagnosis system informs the machine operator of certain operating statuses, indicates events and provides specific information on possible causes.

The events are shown in the “Event list” (MML) submenu.

Low-level events and messages are first displayed successively in the “Event list” menu and must be confirmed. They are then saved in the event list and can be displayed repeatedly one at a time, see **(Fig. 70)**. When the cause of a message is resolved, e.g. water level was too low and was topped up, the message is then removed automatically.

High-level events are always displayed immediately on any current screen and require user input.

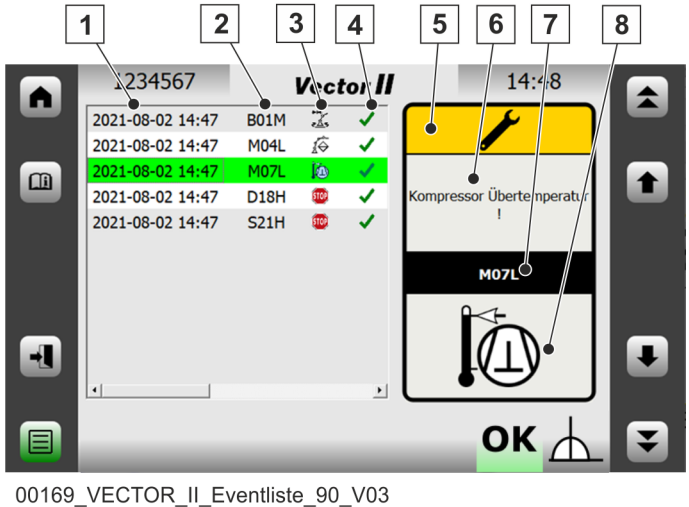
An overview of the events can be found in chapter **(3.4.15)**.

Warning!

Serious injury may occur due to non-observance of event messages!

Serious accidents are possible if event messages are ignored.

Read every event message and resolve the problem.



00169_VECTOR_II_Eventliste_90_V03

Fig. 70 Event list

Pos.	Designation
1	Date and time the event occurred
2	Event code
3	International graphical presentation as pictograph
4	Status
5	Identification: Type of event message
6	Text format Event code
7	Code
8	International graphical presentation as pictograph

3.4.6.3.1 Explanation of line format for event code

The four-column event code is set up as follows:

X xx X			
X			Message area (sources of interference)
	xx		Number of event code
		X	Type of event code

Example:

P01M			
P			Pump (concrete pump)
	01		Number of event code
		M	Message (notification)

3.4.6.3.2 Possible message areas (sources of interference)

B = Boom	Placing boom control
D = Diesel engine	Vehicle diesel engine
M = Machine	General machine control
O = Optional	Optional control functions
P = Pump	Concrete pump
R = Remote	Remote control system
S = System	System
E = Expansion	Expansions

3.4.6.3.3 Possible types of messages

M = Message	Message
L = Low-level event	Low-level event
H = High-level event	High-level event

Event messages are primarily related to the operational safety of the machine.

When reading the event texts, the machine operator must decide the extent to which the events indicated influence the operating safety.

With a "low-level event", the work assignment can be completed, with possible restrictions.

"High-level events" may result in imminent damage or dangerous impairment of the machine’s operating safety.

The company SCHWING is not liable for damage caused by unresolved events!

The display of a "low-level event" does not mean that the event can be completely ignored but only that the work assignment can be completed, with possible restrictions.

The machine operator is responsible for ensuring that any event displayed is resolved immediately so as to prevent the possibility of serious material damage and personal injury.

If an event message is deleted but the event is not resolved, the event message will not be shown again during operation!

Messages are shown directly and require user input.

3.4.6.3.4 Explanation of graphical presentation of event code

The graphical presentation of the event code is based on the warnings in the operating instructions. The specific messages from the control system are shown below.

3.4.6.3.5 The “High-level event” message type (H)

	
Individual event symbol	**High-level event!** People can be instantly killed or severely injured. The event must be resolved immediately. The notification on the display must be confirmed.

	
Individual event symbol	**High-level event!!** Failure to observe can result in serious material damage to the machine. The event must be resolved immediately. The notification on the display must be confirmed.

3.4.6.3.6 The “Low-level event” message type (L)

	
Individual event symbol	**Low-level event!** Possible material damage. The event must be checked/resolved quickly. The number of low-level events is displayed on the main screen and can be viewed in the event list.

	
Individual event symbol	**Low-level event!** Possible material damage. The event must be resolved in the medium term. The number of low-level events is displayed on the main screen and can be viewed in the event list.

3.4.6.3.7 The “Message” message type (M)

	
Individual message symbol	**Message!** Messages for operating requirements Messages are shown temporarily. After complying with the operating requirement, the message(s) is hidden automatically.

3.4.6.4 Operating data (abbreviation: MOD)

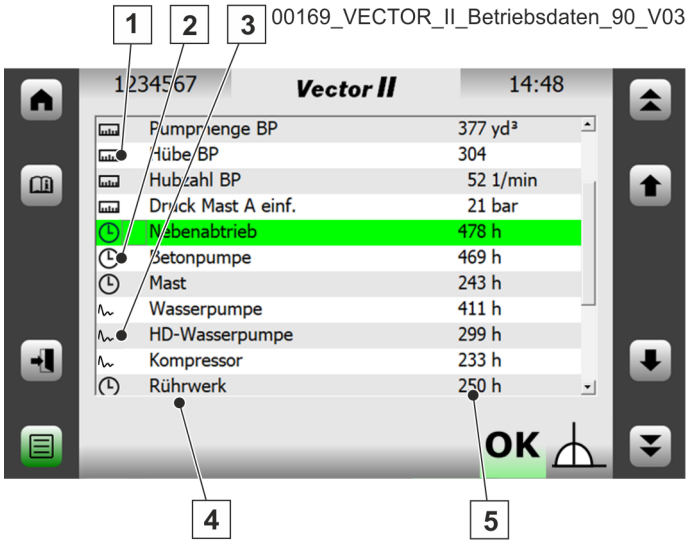


Fig. 71 Operating data

Pos.	Designation
1	Graphical identification: Measured value
2	Graphical identification: Operating hours
3	Graphical identification: Movement hours
4	Designation of operating data
5	Display: • Measured value • Operating hours • Movement hours

3.4.6.4.1 Operating data list

- Oil pressure[1]
- Oil temperature[1]
- Tank oil level[1]
- Daily amount CP[1]
- Pumping rate CP[1]
- Strokes CP[1]
- Stroke count CP[1]
- Retract pressure boom A[1]
- Power take-off[2]
- Concrete pump[2]
- Boom[2]
- Water pump[2]
- HP water pump[2]
- Compressor[2]
- Agitator[2]
- Oil cooler[2]
- Concrete vibrator[2]
- Boom[3]
- Slewing gear[3]
- Outriggers[3]

1. Measured value
2. Operating hours
3. Movement hours

3.4.6.5 Overview of I/O status (abbreviation: MIO)

The I/O status is used for diagnostic and troubleshooting purposes.

Information

The input controller is described below as an example.

The descriptions for the output controller can be inferred from that.

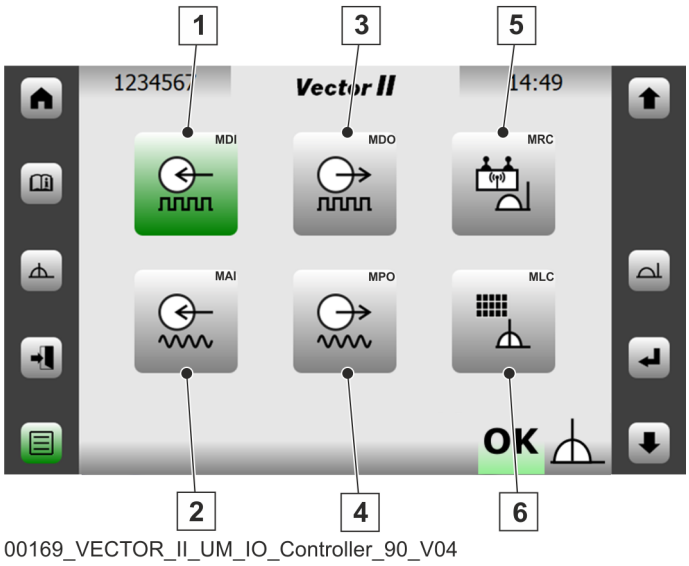
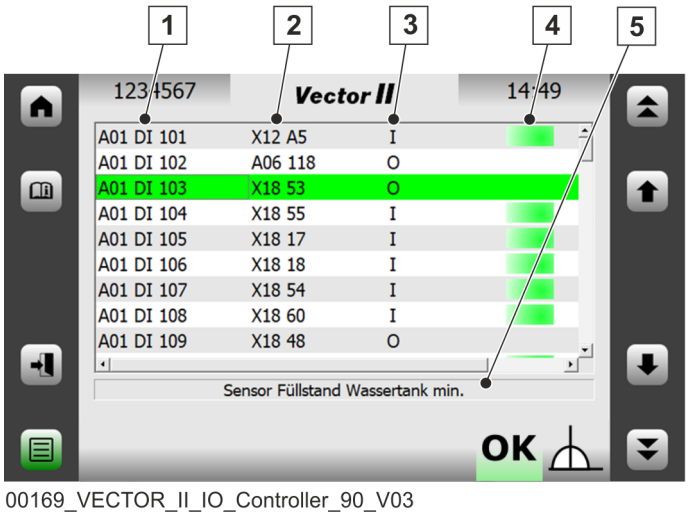


Fig. 72 Overview of I/O status

Pos.	Designation
1	Digital input controller
2	Analogue input controller
3	Digital output controller
4	Proportional output controller
5	Input status, REMOTE
6	Input status, LOCAL

3.4.6.5.1 Digital input controller

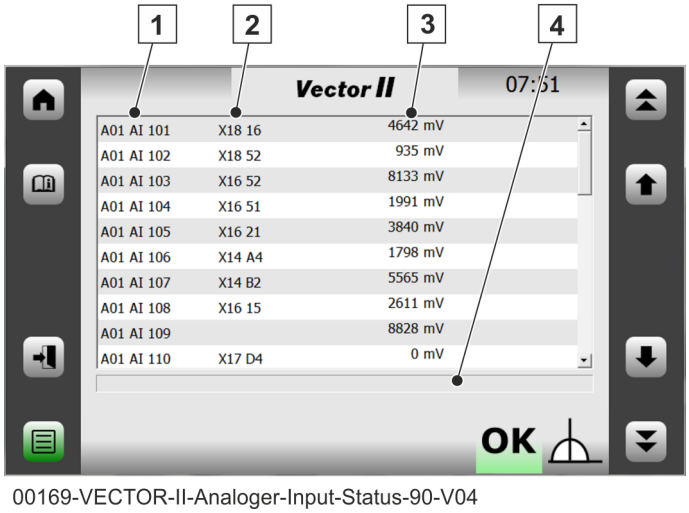


00169_VECTOR_II_IO_Controller_90_V03

Fig. 73 Digital input

Pos.	Designation
1	Digital input • 0 = signal not available • I = signal available
2	Designation of plug contact
3	Status of digital input signal
4	Status of input signal graphical
5	Description of marked input signal

3.4.6.5.2 Analogue input controller



00169-VECTOR-II-Analoger-Input-Status-90-V04

Fig. 74 Analogue input

Pos.	Designation
1	Analogue input signal
2	Designation of plug contact
3	Analogue value for input signal
4	Description of marked input signal

3.4.6.5.3 Input status, REMOTE

Display of statuses on remote control for checking the incoming signals for diagnostic purposes. The symbols highlighted in green are active.

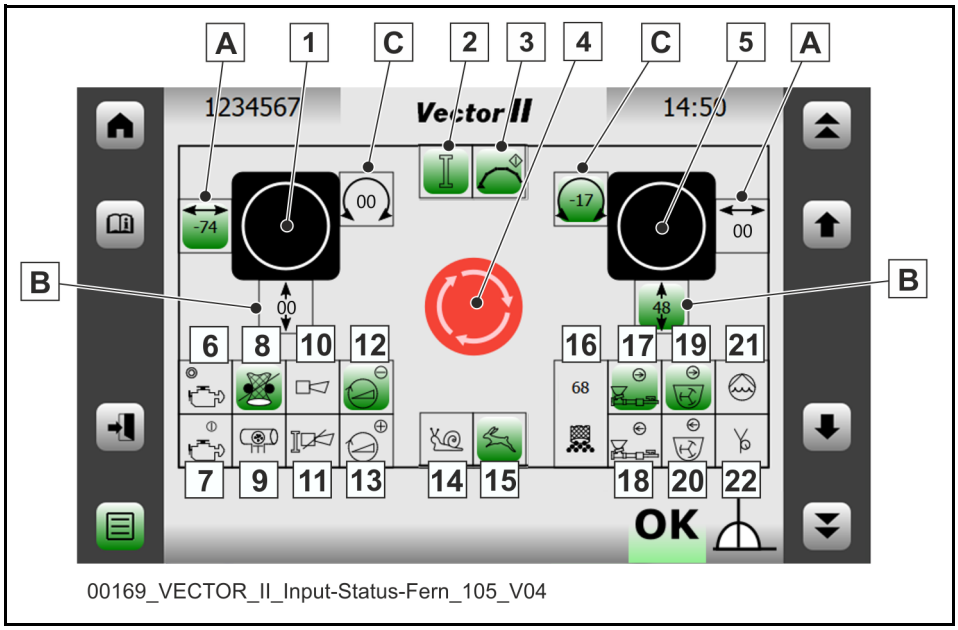


Fig. 75 Input remote

Illustration legend (Fig. 75)				
Pos.	Description	Function	Function	Function
1	Left joystick with values for	Deflection X-axis (A)	Deflection Y-axis (B)	Deflection Z-axis (C)
2	Remote control	ON (green)	OFF (grey)	
3	Release of placing boom	YES (green)	NO (grey)	
4	EMERGENCY STOP			
5	Right joystick with values for	Deflection X-axis (A)	Deflection Y-axis (B)	Deflection Z-axis (C)
6	Drive motor		switch off	
7	Drive motor	switch on		
8	End hose stop valve	open		
9	Chamber valve			activate
10	Horn	ON		

Illustration legend (Fig. 75)				
Pos.	Description	Function	Function	Function
11	Control release	ON		
12	Motor speed adjuster	Reduce (-)		
13	Motor speed adjuster		Increase (+)	
14	Snail	ON		
15	Hare	ON		
16	Setting for delivery rate adjustment	Pot value		
17	Concrete pump suction direction	ON		
18	Concrete pump pumping direction	ON		
19	Compressor	ON		
20	Agitator			AUTO
21	Water pump	ON		
22	Concrete vibrator	ON		

3.4.6.5.4 Input status, LOCAL

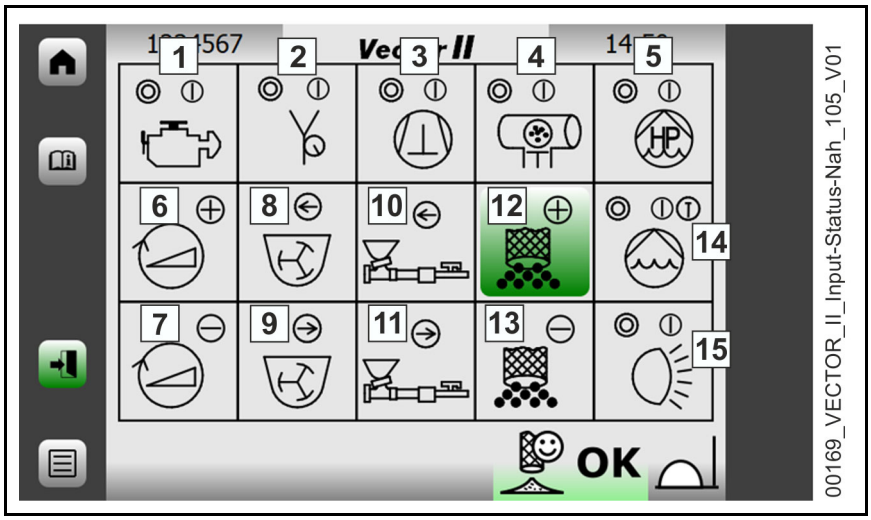


Fig. 76 Input local

Illustration legend (Fig. 76)				
Pos.	Description	Function	Function	Function
1	Drive motor	OFF	ON	
2	Concrete vibrator	OFF	ON	
3	Compressor	OFF	ON	
4	Chamber valve	OFF	ON	
5	High-pressure cleaner	OFF	ON	
6	Speed adjuster for pos. 1		Increase (+)	
7	Speed adjuster for pos. 1		Reduce (-)	
8	Agitator pumping direction	OFF	ON	
9	Agitator suction direction	OFF	ON	
10	Concrete pump pumping direction	OFF	ON	
11	Concrete pump suction direction	OFF	ON	
12	Concrete pump delivery rate	Increase (+)		
13	Concrete pump delivery rate	Reduce (-)		

Illustration legend (Fig. 76)				
Pos.	Description	Function	Function	Function
14	Water pump	OFF	ON	Knee switch ACTIVE
15	Floodlight at the hopper	OFF	ON	

3.4.6.6 Overview of settings submenu (abbreviation: MPA)

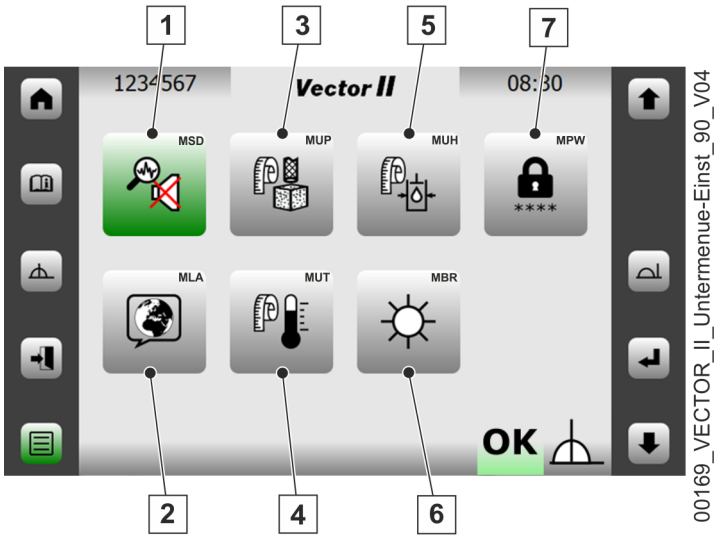


Fig. 77 Overview of settings

Pos.	Designation
1	Silent diagnosis
2	Language settings
3	Unit for delivery volume
4	Unit for temperature
5	Unit for pressure
6	Display brightness
7	Access to password-protected area

3.4.6.6.1 Silent diagnosis

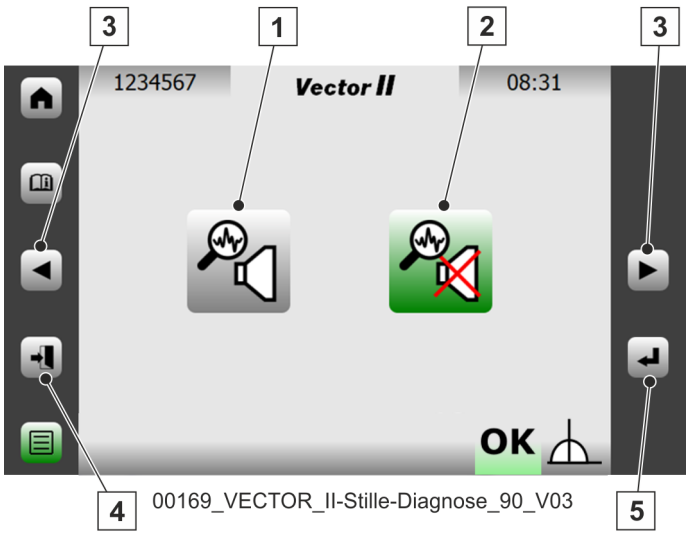


Fig. 78 Silent diagnosis

Pos.	Designation
1	Silent diagnosis OFF
2	Silent diagnosis ON
3	Cursor for selection
4	Leave submenu without saving the settings
5	Save settings

Under "Silent diagnosis", you can choose to have events reported by means of a recurring horn signal or a buzzer (control system or remote control).

The following configurations are possible for the “REMOTE” operating mode:

Silent diagnosis: Yes

- Event message is shown on the display of the control system and the remote control unit
- Acoustic signal by means of buzzer on the remote control unit

Silent diagnosis: No

- Event message is shown on the display of the control system and the remote control unit
- Recurring horn signal

The following configurations are possible for the “LOCAL” operating mode:

Silent diagnosis: Yes

- Event message is shown on the display of the control system and the remote control unit
- Acoustic signal by means of buzzer on control system

Silent diagnosis: No

- Event message is shown on the display of the control system and the remote control unit
- Acoustic signal by means of buzzer on control system

Information

While in the “LOCAL” operating mode, the acoustic alert is always sent by the buzzer on the control system.

3.4.6.6.2 Language settings

Set the desired display language based on the country flags. The changed display language will only be implemented/displayed after restarting the control.

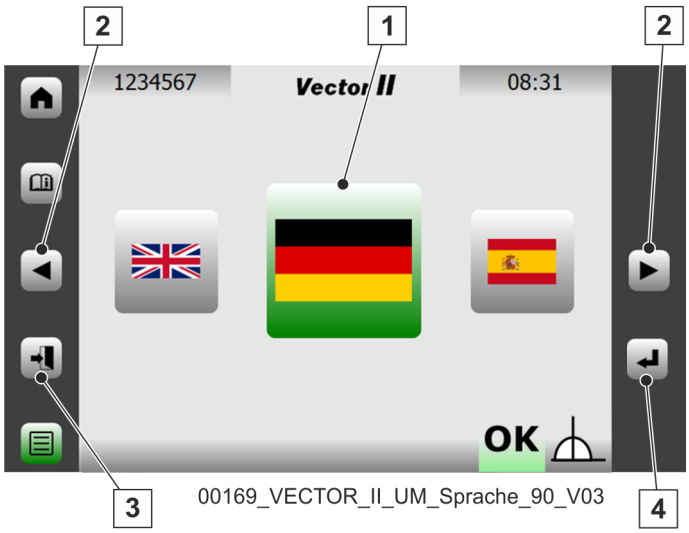


Fig. 79 Language settings

Pos.	Designation
1	Current selection (highlighted in green)
2	Cursor for selection
3	Leave submenu without saving the settings
4	Save settings

3.4.6.6.3 Unit for delivery volume

Set the desired unit for the delivery volume.

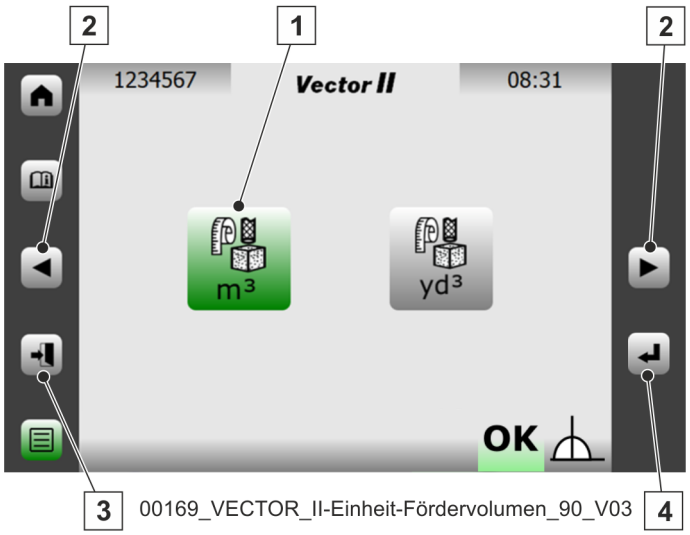


Fig. 80 Delivery volume

Pos.	Designation
1	Current selection (highlighted in green)
2	Cursor for selection
3	Leave submenu without saving the settings
4	Save settings

3.4.6.6.4 Unit for temperature

Set the desired unit for the temperature.

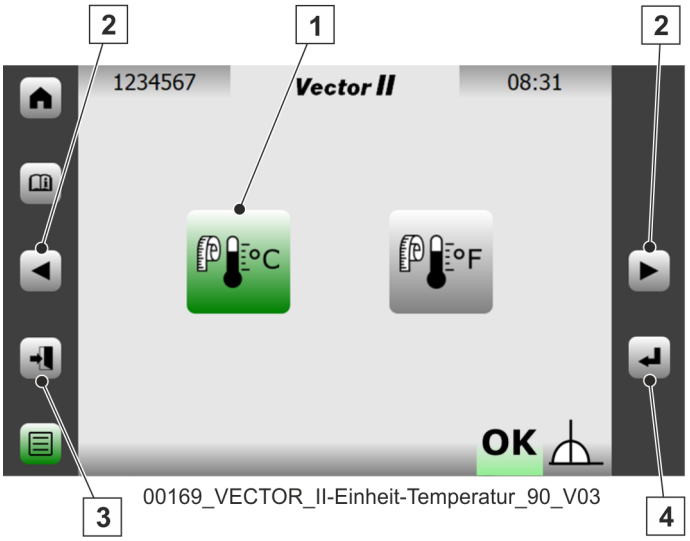


Fig. 81 Unit for temperature

Pos.	Designation
1	Current selection (highlighted in green)
2	Cursor for selection
3	Leave submenu without saving the settings
4	Save settings

3.4.6.6.5 Unit for pressure

Set the desired unit for the pressure.

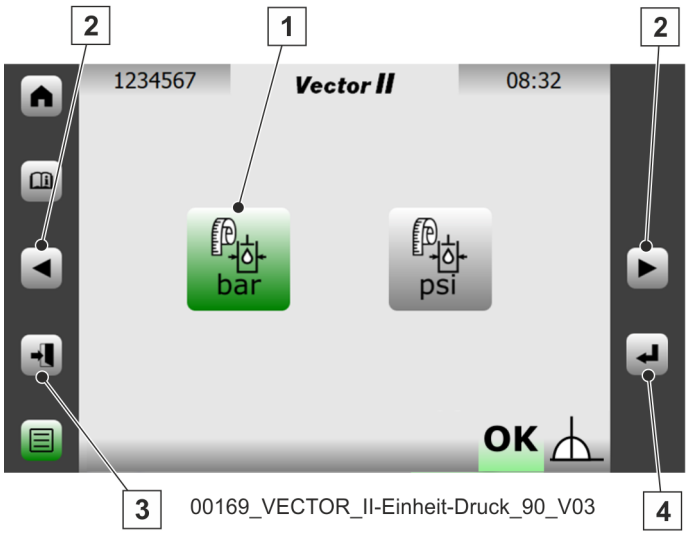


Fig. 82 Unit for pressure

Pos.	Designation
1	Current selection (highlighted in green)
2	Cursor for selection
3	Leave submenu without saving the settings
4	Save settings

3.4.6.6.6 Display brightness

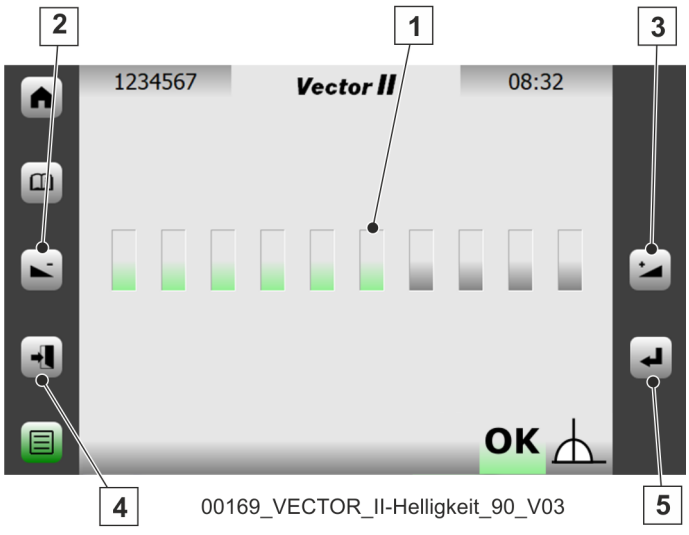


Fig. 83 Display brightness

Pos.	Designation
1	Current selection (highlighted in green)
2	Reduce brightness
3	Increase brightness
4	Leave submenu without saving the settings
5	Save settings

3.4.6.6.7 Password-protected area

The protected area may only be used by authorised users and is therefore password-protected.

In the protected area, teach mode is enabled or the system time is set, for example.

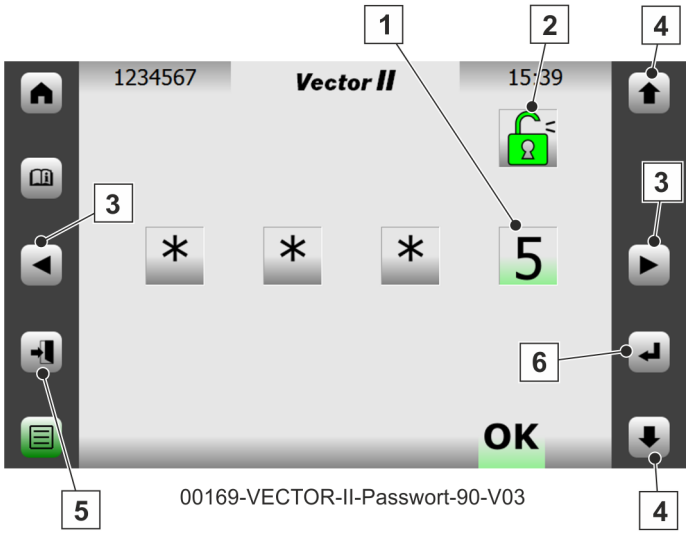


Fig. 84 Password-protected area

Pos.	Designation
1	Current selection (highlighted in green)
2	Green open padlock if password entered correctly (red closed padlock if password entered incorrectly)
3	Cursor for selecting field
4	Cursor for changing value higher/lower
5	Leave submenu without saving the settings
6	Exit submenu and save settings

3.4.6.6.8 Date and time settings

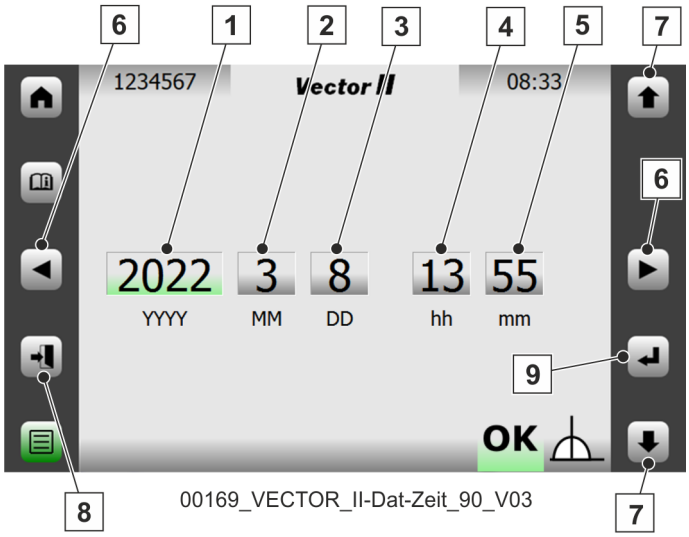


Fig. 85 Date/time

Pos.	Designation
1	Year setting
2	Month setting
3	Day setting
4	Hour setting
5	Minute setting
6	Cursor for selecting field
7	Cursor for changing value higher/lower
8	Leave submenu without saving the settings
9	Save settings

3.4.6.7 Internal events (MIE)

The internal events menu is only designed for internal purposes. For communication with customer service, you can share the events. For a better understanding of the characters, please see the table below.

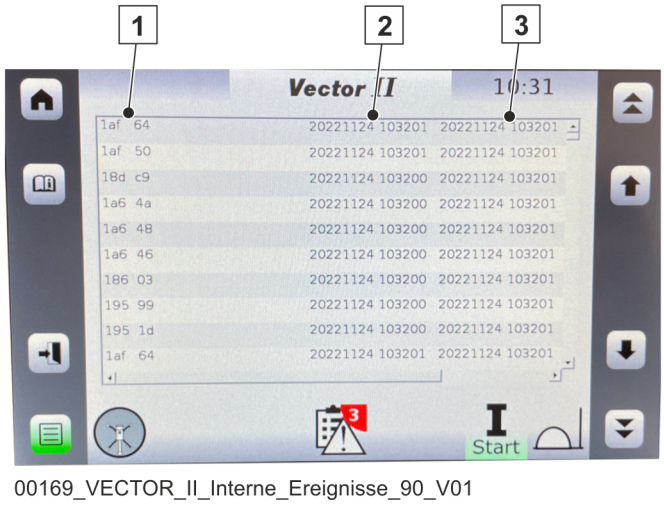
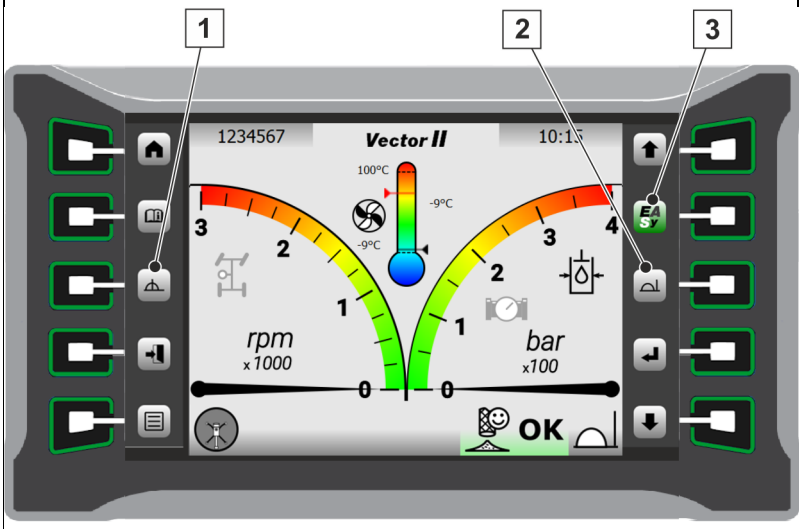


Fig. 86 Internal events

Pos.	Designation
1	Event message code
2	Timestamp: first occurrence of the event Year/month/day hour/ minute/second
3	Timestamp: last occurrence of the event Year/month/day hour/ minute/second

3.4.7 Overview of one-touch buttons



00169_VECTOR_II_Direktwahltasten_105_V04

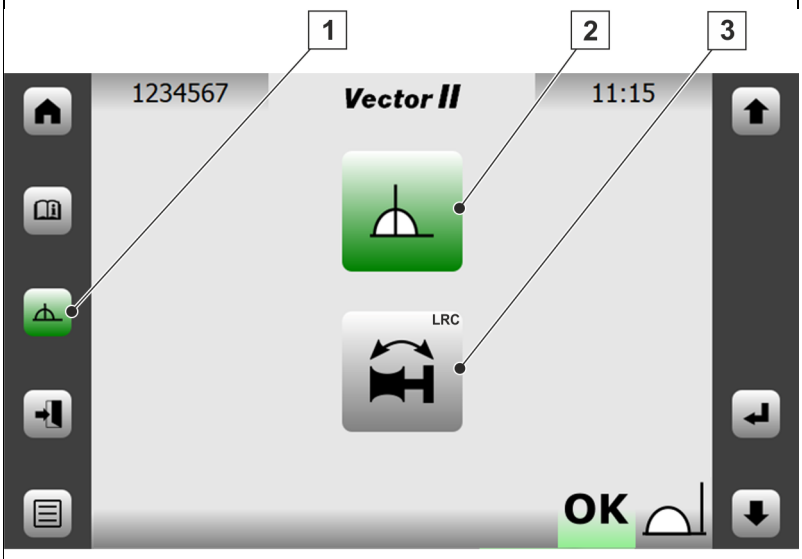
Fig. 87 One-touch buttons

Pos.	Designation
1	Operating modes: LOCAL
2	Operating modes: REMOTE
3	EASYflex II

3.4.8 Operating modes

3.4.8.1 Overview of LOCAL operating modes

Select an operating mode. Selecting an operating mode releases or locks various control elements.



00169_VECTOR_II_Betriebsart-Nah_105_V05

Fig. 88 LOCAL operating modes

Pos.	Designation
1	Selection of operating mode type: Select the desired LOCAL operating mode.
2	LOCAL operating mode: Control is transferred to the controls on the machine.
3	Pumping piston change operating mode: Control is reduced to the functions for changing pumping pistons and transferred.

3.4.8.1.1 Activate LOCAL operating mode

➤ After the selection, release “LOCAL” operating mode by actuating the button (6) **(Fig. 89)**.

After the release, the control elements on the machine are unlocked.

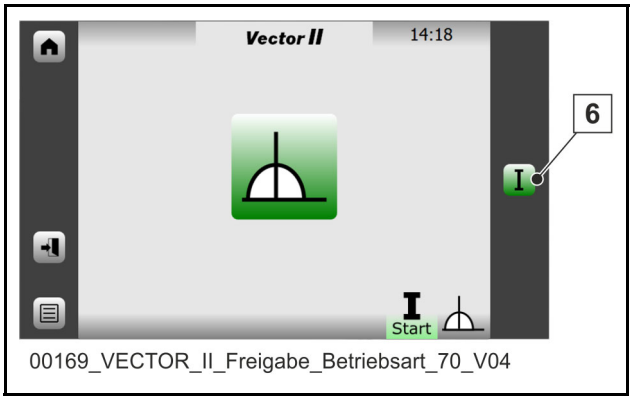


Fig. 89 Release operating mode: Local

The selected operating mode is displayed in the status bar below the operating modes on the main screen.

The following messages **(Table 6)** can be displayed while activating “LOCAL” operating mode.

Symbol	Message	Solution
	Symbol flashing! EMERGENCY STOP button actuated on the machine.	Unlock all EMERGENCY STOP buttons.
	Symbol flashing! Command element not in neutral position.	Move all control elements on the machine to neutral.

Table 6 Possible messages while changing operating modes

3.4.8.1.2 Activate pumping piston change operating mode

➤ After the selection, release “Pumping piston change” operating mode by actuating the button (6) **(Fig. 90)**.

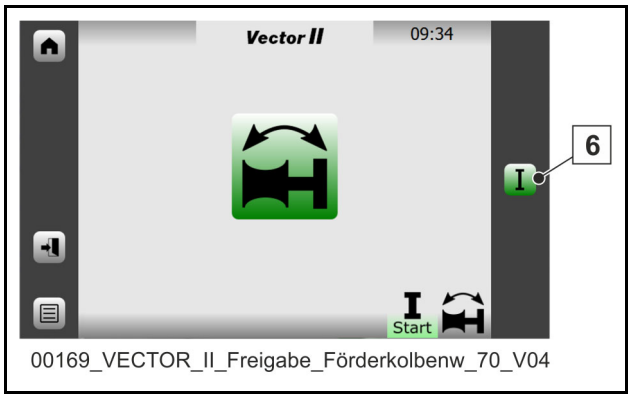


Fig. 90 Release pumping piston change

The selected operating mode is displayed on the main screen, e.g., (11) **(Fig. 97)**.

The following messages can be displayed while activating “Pumping piston change” operating mode.

Symbol	Message	Solution
Stop!	Symbol flashing! EMERGENCY STOP button actuated on the machine.	Unlock all EMERGENCY STOP buttons.

Activating the “Pumping piston change” operating mode automatically reduces the rotational speed of the drive motor to the minimum working speed while activating the minimum movement speed of the pumping pistons.

Control of the concrete pump and the drive motor is transferred to the terminal box for "Pumping piston change" operating mode, e.g., (1) **(Fig. 91)**, see **“Maintenance of pumping and differential cylinders, pumping piston change”** on page 475.

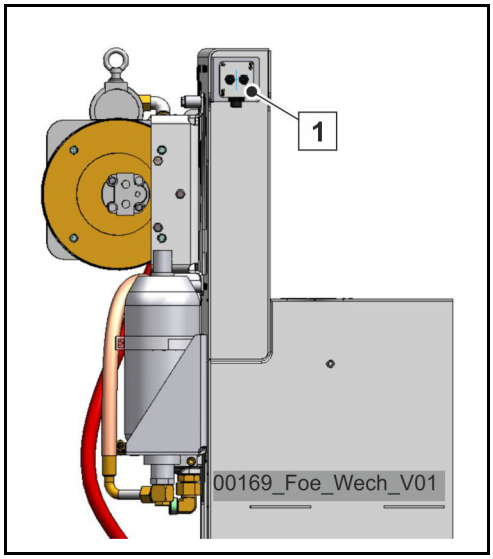
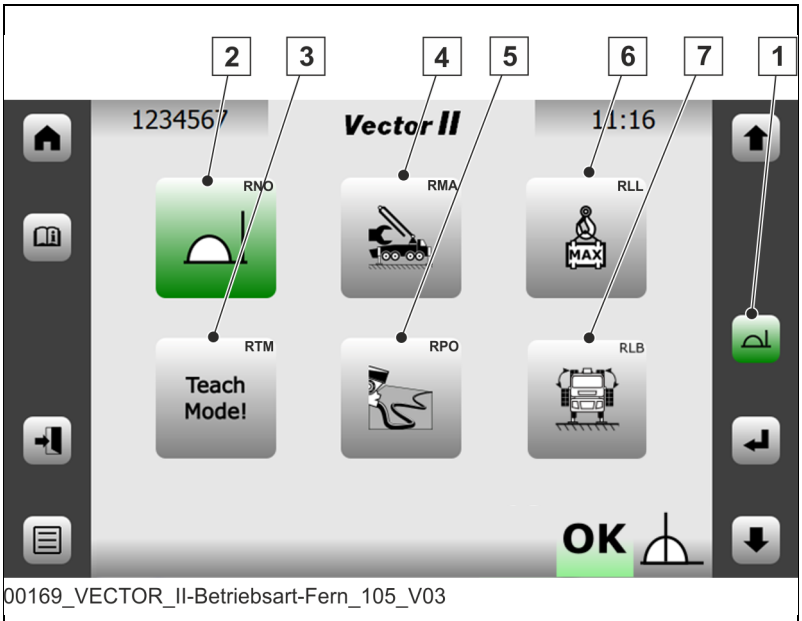


Fig. 91 Example: Control station (1) for changing pumping pistons

3.4.8.2 Overview of REMOTE operating modes

Select the desired REMOTE operating mode. Control is transferred to the remote control unit.



00169_VECTOR_II-Betriebsart-Fern_105_V03

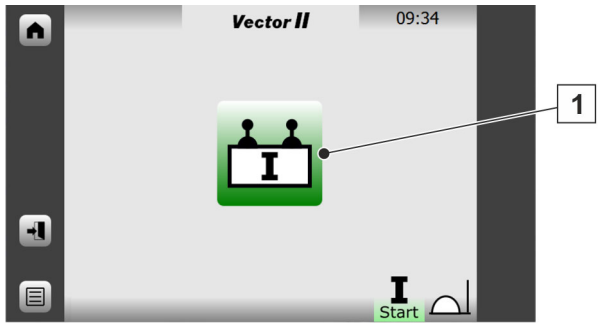
Fig. 92 REMOTE operating modes

Pos.	Designation
1	Selection Operating mode type
2	Operating mode: REMOTE See **(3.4.8.2.1)**
3	Operating mode: Teach mode See **(3.4.8.2.2)**
4	Operating mode: Cleaning operation See **(3.4.8.2.3)**
5	Operating mode:pump separately See **(3.4.8.2.4)**
6	Optional: Removable stowing box See **(3.4.8.2.5)**
7	Optional: Rotatable stowing box See **(3.4.8.2.6)**

3.4.8.2.1 Activate remote operating mode

The symbol (1) **(Fig. 93)** indicates that the operating mode must be released on the remote control unit.

Control is transferred to one of the two remote control units **(Fig. 94)**/**(Fig. 95)**, other operating options are locked.



00169_VECTOR_II_Freigabe_Fern-Betriebsarten_70_V04

Fig. 93 Releasing an operating mode: Remote

The selected operating mode is displayed on the main screen, e.g., (11) **(Fig. 97)**.

The following messages can be displayed while activating “Remote” operating mode.

Symbol	Message	Solution
	Symbol flashing! EMERGENCY STOP button actuated This symbol also flashes when the remote control unit is switched off.	Unlock all EMERGENCY STOP buttons or switch on remote control.
	Symbol flashing! Command element not in neutral position.	Move all control elements on the remote control to neutral.

00169-SC50-II-65-V01

Fig. 94 SC50

00169-SC30-65-V01

Fig. 95 SC30

3.4.8.2.2 Activating teach mode

After selecting the “Teach mode” operating mode, control is transferred to the remote control, where the release can occur.

Description of function, see **“Placing boom teaching - VECTOR II control system”** on page 169.

3.4.8.2.3 Activate clean operating mode

After selecting and releasing the “Clean mode” operating mode, control is transferred to the remote control, see **(Fig. 93)**.

Description of function, see **“Cleaning mode (maintenance mode)”** on page 321.

3.4.8.2.4 The “Pump separately” operating mode

After selecting and releasing the “Pump separately” operating mode, control is transferred to the remote control, see **(Fig. 93)**.

Description of function, see **“Separate pumping line”** on page 244.

3.4.8.2.5 The “Removable stowing box” operating mode

After selecting and releasing the “Removable stowing box” operating mode, control is transferred to the remote control, see **(Fig. 93)**.

Description of function, see **“Special equipment”**.

3.4.8.2.6 The “Rotatable stowing box” operating mode

After selecting and releasing the “Rotatable stowing box” operating mode, control is transferred to the remote control, see **(Fig. 93)**.

Description of function, see **“Special equipment”**.

3.4.9 Switching operating modes

If the operating mode needs to be changed during operation (e.g., from “LOCAL” to “REMOTE”), all engaged selector switches must be moved into the neutral position.

Otherwise, it will not be possible to start the machine.

If not all of the switches are in the neutral position, the control system display outputs a corresponding message and it is not possible to release the new operating mode.

Switching to an inactive transmitter when changing from LOCAL to REMOTE operating mode triggers an EMERGENCY STOP.

3.4.10 Commissioning the control system

This chapter explains how to operate the control system in the generally suggested order.

In order to prevent any functions from being triggered inadvertently, the vehicle motor can only be started when all control elements (except lighting) on the local and remote control units are in the neutral position.

It is possible to switch off the vehicle motor while a function is active, however, this should be avoided in order to prevent potential material damage.

3.4.11 Switching on the control system

The electrical control system can only be switched on after properly activating the drive circuit:

- Switch on vehicle ignition
- Disengage the vehicle's drive gear (neutral position)[1]
- Engage parking brake
- Switching on the power take-off[1]
- Switch on the control system in the driver's cab

The electrical control system starts up and is indicated by a start screen on the display, see **(Fig. 96)**.

00169_VECTOR_II_Startbildschirm_80_V02

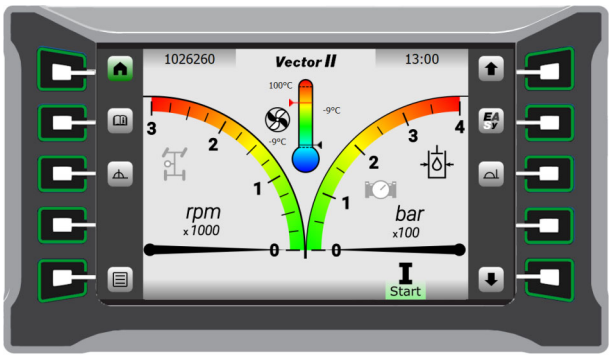
Fig. 96 Control system start screen

Then the main screen appears **(Fig. 97)**.

The following functions are ready for operation without releasing an operating mode:

- Signal horn on
- Motor off
- Reduce rotational speed
- Lighting

1. Distribution manual transmission gears (VSG) are operated differently! Please see the relevant chapters for more information **(3.6.3)**!



00169_VECTOR_II_Hauptbildschirm_80_V03

Fig. 97 Main screen

3.4.11.1 Switching off the vehicle motor

Carry out the following regular procedure to switch the vehicle motor off:

1. Switch off all machine function(s)
2. Reduce the rotational speed to the minimum working speed

Switch the vehicle motor off.

3.4.12 Deactivating the placing boom limit (optional)

Danger!

Danger due to deactivation of the automatic placing boom monitoring or during emergency operation!

Serious injury and death very likely.

Monitor the placing boom at all times to prevent the machine from tipping over and collisions. Use a signaller if the danger zone is not completely visible.

The option of temporarily deactivating the automatic placing boom limit is available as of software version V1.47c of your control system.

The automatic placing boom limit is a safety function that prevents certain placing boom movements, in order to:

- Prevent the placing boom colliding with itself
- Prevent collisions with the driver's cab
- Prevent collisions with the machine frame

In certain situations, the placing boom limit can be a hindrance:

- With limited space requirements, the placing boom can be awkward to position
- In exceptional cases, sensor faults can cause the boom to come to a standstill

3.4.12.1 Deactivating the automatic placing boom limit

Prerequisite:

For deactivation, you must already be in the placing boom limit.

You will recognise this by the (B02M) symbol in the display of the remote control **(Fig. 98)**.

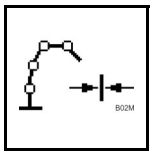


Fig. 98

➤ Keep the joystick deflected whilst you press and hold button S3 **(Fig. 99)**.

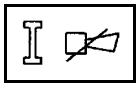


Fig. 99

You must hold this switch combination until you are back in the normal work area of the placing boom.

Information

Observe the following circumstances:

- Each time the placing boom limit is deactivated, it is recorded in the internal error memory of the control system.
- The deactivation of the placing boom limit does not work when a placing boom limit is activated simultaneously for several placing boom sections.

3.4.13 Protection of the hydraulic hoses

In order to avoid tearing the hydraulic hoses, the slewing movements of the placing boom are electrically switched off at the end positions.

Actuating the control lever on the remote control again causes an acoustic signal to sound. The display in the control system shows the shutdown.

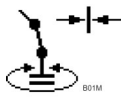


Fig. 100 B01M - Slewing gear limitation active

Steering in the opposite direction makes it possible to leave the shutdown area.

3.4.14 EMERGENCY STOP

In case of a fault or an emergency, the most important machine functions are immediately interrupted by pressing one of the EMERGENCY STOP buttons.

The vehicle motor continues running.

While the EMERGENCY STOP function is active, the vehicle motor cannot be switched off with the operating controls at the local or remote control.

Information

The drive motor can also be switched off by actuating an EMERGENCY STOP button.

Whether or not this option can be selected depends on the vehicle electronics and the approval of the motor manufacturer.

Under normal operating conditions, always switch off machine functions and vehicle motor by using the control devices intended for the purpose.

3.4.14.1 EMERGENCY STOP bypass

It may be necessary to bypass the EMERGENCY STOP system in the event of a fault in the control system that cannot be remedied in the short-term, in order to move the machine into the transport position or to clean it.

3.4.14.1.1 Necessary measures

The EMERGENCY STOP valves must be bypassed only in an extreme emergency!

Working operation must be stopped immediately!

This "emergency operation" is permitted only to fold the placing boom and establish safe driving operation.

Danger!

Danger to life due to loss of stability!

Serious injuries or death can be caused by the machine tipping over.

Observe the instructions in the operating instructions and the safety manual on how to set up machines.

Clean the machine prior to transport if this is required for safety reasons.

The machine operator must inform maintenance staff of his intervention and initiate appropriate repair work!

EMERGENCY STOP devices and any existing safety end limit switches will not function.

Incorrect behaviour of the machine operator without active safety end limit switches (e.g. in EASy mode) may cause the machine to fall over.

Order a second person to safeguard the working area.

In this situation, the machine can be operated only from the emergency operation control platform.

For machines with “Diractive”, additionally with the “cable remote control for Diractive emergency operation”.

Due to the location of the emergency operation control platform, the view of the working area is severely restricted. As in addition the safety functions are inactive, the slightest inattention may cause severe injury and damage to property when the placing boom is moved.

Information

The EMERGENCY STOP valves of the machine are open if not energised, meaning that:

These valves will open in case of a defect in the EMERGENCY STOP system. The hydraulic fluid reaches the hydraulic tank without pressure. Initiated working movements are not carried out.

3.4.14.1.2 Carrying out an EMERGENCY-STOP bypass

Warning!

Serious accidents or death is possible if EMERGENCY STOP is bypassed.

Safety functions are out switched off during an EMERGENCY STOP bypass.

Carefully move the machine into the transport position immediately.

- To do this, insert the key into the key-operated switch (3) **(Fig. 101)** and switch on the EMERGENCY STOP bypass function.
  The key cannot be removed in this position.
- Carry out the machine movements using the operating controls at the emergency operation control platform (for Diractive additionally using the “cable remote control - Diractive emergency operation”).
- Return the key-operated switch (3) **(Fig. 101)** to the neutral position and remove the key before leaving the jobsite.
- Have the machine repaired immediately.

Fig. 101

3.4.15 Event messages

Information

Event messages and messages are intended to help the operator resolve any malfunctions.

The number of characters per text message that can be displayed is limited.

For this reason, some event messages and messages are abbreviated and may not always be completely identical to the event messages and messages shown in these operating instructions.

Warning!

Serious injury may occur due to non-observance of event messages!

Serious accidents are possible if event messages are ignored.

Read every event message and resolve the problem.

Contact SCHWING's customer service if no qualified personnel are available. Always inform customer service of the reported event code.

The display of a "low-level event" does not mean that the event can be completely ignored but only that the work assignment can be completed, with possible restrictions!

If an event message is deleted but the event is not resolved, the event message will not be shown again during operation!

3.4.15.1 Abbreviations / terms used

AB	Work area
CP	Concrete pump
CAN	Controller Area Network (serial bus system)
CBO	Housing for the serial bus system of the horizontal outriggers
CAN-FST	CAN interface for the remote control unit
cbm	cubic meters (m^3)
cby	cubic yard (cubic yard - cyd.)
ECO	Economic engine speed
EEC	Economic engine control (EEC)
ETA-Vol CP	Volumetric efficiency of the concrete pump (Degree of filling of the pumping cylinder)
EPB	Expansion board
FBP	Truck mixer concrete pump
REMOTE	Remote control
DR	Delivery rate
HD	High-pressure
Boom jt.	Boom joint
MAX	maximum engine speed adjustable with SCHWING control
MIN	minimum engine speed adjustable with SCHWING control
HMI	Human machine interface
OPT	Optional
Poti	Potentiometer
Prop	Proportional hydraulic system with arbitrary intermediate positions between open and closed.
CG	Central greasing
absolute encoder	CAN sensor: Sensor that indicates the angle of the boom joint/slewing gear.

Table 7 Abbreviations/Terms

3.4.16 List of event messages

For details on events and the event list, see **(3.4.6.3)**.

3.4.16.1 B = Boom (placing boom control)

Code	International output	Text output (national)
B01M		Slewing gear limitation active!
B02M		Boom limitation active!
B05H		No zero position slewing gear valve!
B06H		No zero position joint A valve!
B07H		No zero position joint B valve!
B08H		No zero position joint C valve!
B09H		No zero position joint D valve!
B10H		No zero position joint E valve!
B11H		No zero position joint F valve!
B18L		Boom in support sensor defective!
B19H		Slewing gear limitation not operationally ready!
B20H		Boom limitation not operationally ready
B21H		No zero position boom/outrigger valve

3.4.16.2 C = Control

Code	International output	Text output (national)
C01M		Board temperature too high!

3.4.16.2.1 D = Diesel engine (vehicle diesel engine)

Code	International output	Text output (national)
D01M		No diesel start release!
D03L		Power take-off faulty or power take-off rotational speed sensor defective!
D04L		Power-take off rotational speed limit exceeded!
D05L		Inserted power take-off signal absent!
D17H		Safety circuit! Hydraulic oil MIN filling level!
D19L		Safety circuit! Alternator D+ signal missing!

3.4.16.3 E = Expansion (expansion)

Code	International output	Text output (national)
E21L		Electrical connection to slewing gear sensor faulty!
E32H		Attention! Driver's cab protection impaired by internal fault!
E43H		!Safety shutdown! Sensor failure on the lifting device!
E44M		Outriggers not fully extended!
E45H		!Safety shutdown! Machine is not correctly supported!
E48L		Slewing gear angle detection not ready for operation!
E49H		!Safety shutdown! Slewing gear limit reached!
E50H		!Safety shutdown! Slewing gear external control!
E51H		!Safety shutdown! External control boom joint A!
E55M		Check outriggers!
E57M		Check sensor system for slewing gear reference!

3.4.16.4 M = Machine (general machine control)

Code	International output	Text output (national)
M01M		Chamber valve has been switched on!
M02M		Concrete discharge barrier end hose active!
M03L		Oil temperature sensor defective!
M04L		Boom circuit oil filter dirty! Change filter!
M05L		Concrete pump circuit oil filter dirty! Change filter!
M06L		Top up hydraulic oil!
M07L		Compressor temperature too high!
M08L		Hydraulic oil tank sensor defective!
M09L		Retract boom A pressure sensor defective!
M11L		Oil cooler power output cable break!
M36H		!Safety shutdown! Temperature of hydraulic oil too high
M37L		Boom circuit oil filter sensor fault!

3.4.16.5 O = Optional (optional components)

Code	International output	Text output (national)
O01L		Concrete pump power output active or ZS pump cable break!
O03L		ZS boom output active cable break!

3.4.16.6 P = Pump (concrete pump)

Code	International output	Text output (national)
P01M		Pressure relief for the concrete pump is active!
P02M		Delivery rate limitation for the concrete pump is active!
P03M		Hopper grid opened!
P04M		Top up water tank!
P05L		Oil temperature too high, concrete pump power limitation active!
P06L		Concrete pump oil pressure sensor defective!
P07L		Concrete pump stroke count sensor defective or concrete pump blocked!
P16H		!Safety shutdown! Vario Pressure system failure!
P17L		Vario Pressure cannot be switched off!

Code	International output	Text output (national)
P19L		Concrete pump oil filter sensor fault!
P20L		Hopper filling level sensor fault!
P21L		Oil tank ventilation sensor fault!

3.4.16.7 R = Remote (remote control system)

Code	International output	Text output (national)
R01M		Emergency off on radio push-button actuated!
R02M		!Safety shutdown! Hydraulic enable disrupted!

3.4.16.8 S = System (memory, multi-fuse, interfaces)

Code	International output	Text output (national)
S21H		!Safety shutdown! Boom not in support during outrigger operation!
S22M		Please use an up-to-date WinTermina version!
S23M		Please update the main board software
S27M		Emergency stop on the machine
S28M		Emergency stop on the machine
S29M		Emergency stop on the machine

Code	International output	Text output (national)
S30M		Emergency stop on the machine
S31M		Emergency stop on the machine
S32M		Emergency stop on the machine
S33M		No applicable parameters available!

3.5 Placing boom teaching - VECTOR II control system

The response behaviour of the joysticks for operating the placing boom speeds is set by default. This goes for all movements of the placing boom.

The response behaviour of the joysticks and hence the minimum and maximum moving speeds of the placing boom can be adjusted to your personal taste by means of teaching. Example:

The speed of the placing boom movements at minimum and maximum joystick deflection can be adjusted.

Caution!

Danger due to improper settings (teaching)!

Operational safety may be impaired or lost due to improper settings (teaching).

The activities described in this chapter must be carried out only be expert personnel. Inform the operators of the placing boom's changed response behaviour.

Warning!

Risk of collision during the teaching process!

The placing boom moves during the teaching process and can collide with other objects!

Monitor the placing boom during the teaching process. If necessary, have auxiliary personnel support you.

Information

Direct Drive!

The response behaviour of placing boom joints with rotary actuators (DirectDrive) cannot be modified at the moment.

3.5.1 Teach mode description

Concrete pumps and auxiliary functions are blocked in teach mode. Auxiliary functions include the high-pressure cleaner, water pump, vibrator, etc. The placing boom and vehicle motor functions can be controlled without limitation.

Take into account that during the teaching process, only one placing boom movement can be made and adjusted. After the teaching process, several simultaneous placing boom movements can be made again for checking the adjustment.

Fields (1-6) **(Fig. 102)** are empty at the start of teach mode.

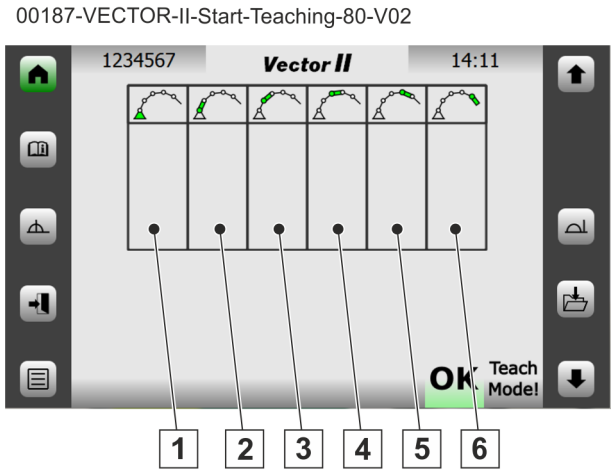


Fig. 102 Teach mode start screen

Pos.	Function
1	Min/max value Rotate
2	Min/max value Placing boom
3	Min/max value Placing boom
4	Min/max value Placing boom
5	Min/max value Placing boom
6	Min/max value Placing boom

1.Only with 5-part placing booms

The currently selected function is indicated with a green marking.

The settings made are indicated by arrows in the respective fields (example and explanations **(Fig. 103)** and **(Fig. 104)**).

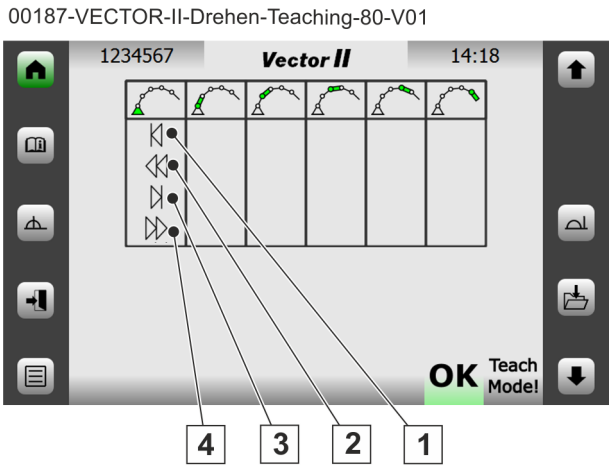


Fig. 103 Rotate teaching

Pos.	Function
1	Min value Rotate left
2	Max value Rotate left
3	Min value Rotate right
4	Max value Rotate right

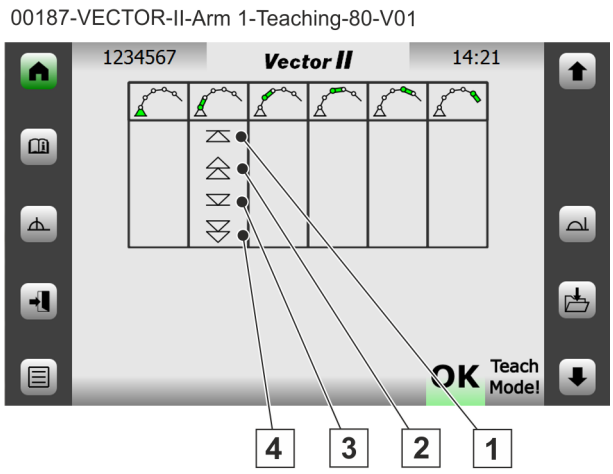


Fig. 104 Boom section 1 teaching

Pos.	Function
1	Min value Lift placing boom section 1
2	Max value Lift placing boom section 1
3	Min value Lower placing boom section 1
4	Max value Lower placing boom section 1

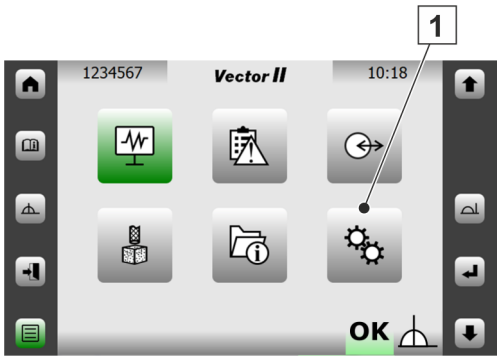
3.5.2 Prepare teach mode

Teach mode can only be carried out by certain people and is therefore password-protected.

Carry out the following steps in order to activate teach mode.

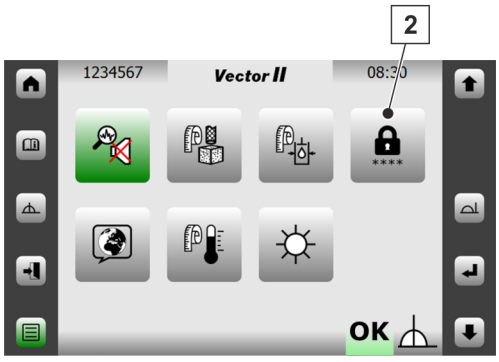
1. Open the “Settings” menu (1) **(Fig. 105)**.
2. Select entry (2) **(Fig. 106)** and enter the password in order to activate “Teach mode”.

The “Settings” menu can now be exited. Teach mode is displayed in the “REMOTE” operating mode selection window and can be started there.



00187-VECTOR-II-Menue-65-V01

Fig. 105 Settings



00187-VECTOR-II-Kennwortschutz-65-V01

Fig. 106 Password-protected area

3.5.2.1 Required buttons on the remote control (transmitter)

Before you start teach mode, internalise the required buttons on the remote control.

Please note that two control elements must be actuated simultaneously during the teaching process, releasing one operating control while still holding the other.

Pos.	Designation
1	S3 - Control release
2	S4 - Decrease/increase value
3	S11 - Hare/snail
4	S12 - Transmitter on

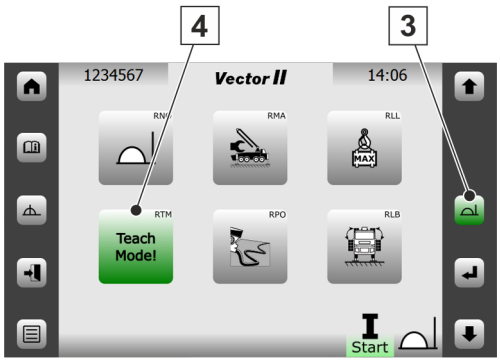
Fig. 107 Buttons when teaching

3.5.3 Start teach mode

As long as teach mode is not ended by changing an operating mode or password protection, it can be accessed via the main screen and scrolling through the screen displays, otherwise carry out the following steps:

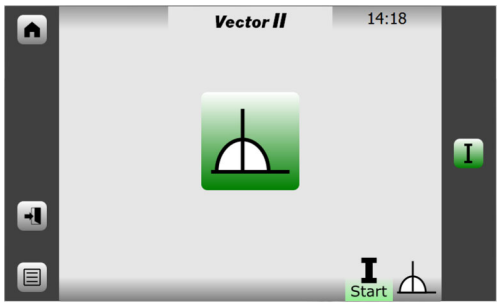
1. Prepare the machine and set it up with full support.
2. Move the placing boom into the working position.
3. Open the selection window for the “REMOTE” operating modes (3) **(Fig. 108)**.
4. Select the “Teach mode” menu item (4) **(Fig. 108)** and press “Execute”.
5. Optional: Activate remote control (unlock EMERGENCY STOP and press button (S12), LEDs must light up green continuously).
6. Optional: Start vehicle motor and set maximum rotational speed.

7. The release prompt **(Fig. 109)** appears and prompts the release by flashing “Start”.
8. Press button (S3) on the remote control down to start teach mode.
9. The “Teach mode” start window **(Fig. 110)** appears and the “OK” display appears.
   A short acoustic signal can optionally be emitted.



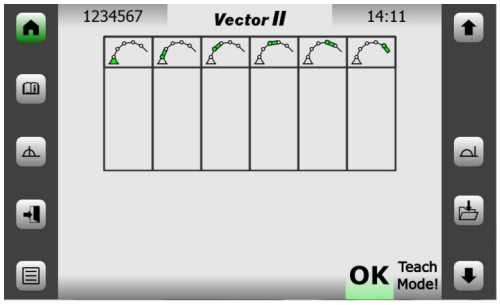
00187-VECTOR-II-Menü-Teachmode-65-V01

Fig. 108 Teach mode menu



00169_VECTOR_II_Freigabe_Betriebsart_65_V03

Fig. 109 Release prompt



00187-VECTOR-II-Start-Teaching-65-V01

Fig. 110 Teach mode operating mode

3.5.4 Execute teach mode

3.5.4.1 Preparation - required button combinations

Select teach function:	S3 	+	Deflect joystick
Change value:	Hold joystick	+	S4 
Save value:	Hold joystick	+	S3 

3.5.4.2 Step-by-step instructions

1. Select the value range to be set with button (S11), for

- Min value = snail
- Max value = hare

2. Press and hold **down** button **(S3)** control release/diagnostic horn on the remote control.
3. Select the placing boom movement to be adjusted by maximally **deflecting** the respective **joystick**. An arrow highlighted in green appears in the corresponding field.
4. **Release** button **(S3)** control release/diagnostic horn, keep joystick actuated.

Information

Change values will be transmitted while the joystick is being actuated.

If the joystick is moved to neutral position or the "Snail / Hare" switch is actuated, the new value is discarded.

5. By actuating button **(S4)**, **change** the value within the specified limits:

- (+) = Increase value
- (-) = Reduce value

The (pos. 3+5) **(Fig. 111)** show the changed value.

6. Press button **(S3) up** to cache. The display uses an arrow to indicate that the corresponding function has been set. After caching, the next joystick (next placing boom movement) can be adjusted in the same way and the new value cached.

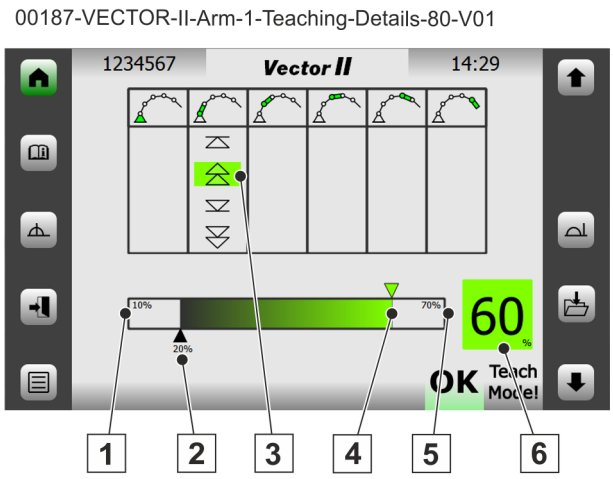


Fig. 111 Example: Teaching settings

Pos.	Function
1	Minimum possible value
2	Value currently saved
3	Function currently active
4	Cached value (graphical presentation)
5	Maximum possible value
6	Cached value (numerical presentation)

3.5.5 Checking settings

After caching, all placing boom movements are automatically activated again. Several placing boom movements can again be carried out simultaneously. You can check your settings.

3.5.6 Saving the settings

1. Once all of the settings are configured, the saving process can begin by pressing the save symbol (1) **(Fig. 112)**.
2. Then select the menu item (2) **(Fig. 113)** and press “Execute” (5) **(Fig. 113)**.

The new cached values are now stored permanently in the machine parameter set of the control system.

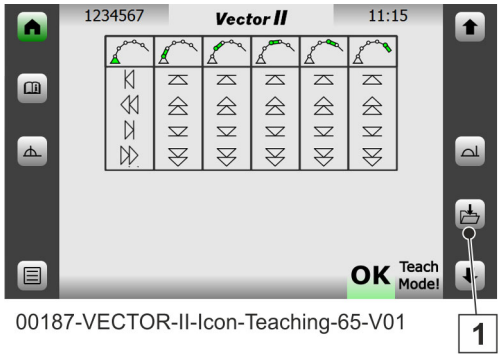


Fig. 112 Save icon

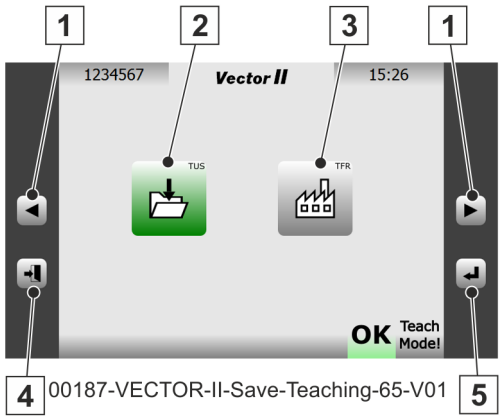


Fig. 113 Save settings

3.5.6.1 Restoring factory settings

If menu item (3) **(Fig. 113)** is selected after pressing the save symbol (1) **(Fig. 112)** and confirmed with “Execute”, all newly set cached values and settings that are already configured and stored are deleted and overwritten by the factory settings.

3.5.7 Deactivating teach mode

Teach mode is deactivated by changing the password again in the “Access to password-protected area” menu or by restarting the control system. This hides the “Teach mode” menu item in the “REMOTE” operating mode.

3.6 Activating pump operation

In order to pump the pumping medium at the jobsite, you must switch from “Drive mode” to “Pump mode”.

Information on the proper drive circuit and required minimum rotational speed can be found in the manual of the vehicle manufacturer.

Attention!

Material damage due to incorrect operation of the drive circuit!

Incorrect operation of the drive circuit can damage the gear.

Observe the following indications and also the operating instructions of the vehicle manufacturer.

- The motor-dependent power take-offs of various vehicles are equipped with a hydraulically actuated clutch.
- Preventing the coupling from slipping requires a certain hydraulic pressure, which only becomes available when the vehicle engine reaches an appropriate rotational speed.
- It is for this reason that SCHWING uses the opportunity for automatic speed increase, if provided by the vehicle manufacturer.
- The speed increase becomes active after switching on the power take off.
- Should such an option not be available, the machinist has to raise the rotational speed manually, if necessary.

Depending on your vehicle, two different pump drives are possible:

1 Power take-off

2 Distribution manual transmission gear (VSG)

The respective pump drives are switched on in different ways.

1 Switch on the vehicle's ignition.

2 Switch the vehicle drive gear to neutral position.

3 Engage the parking brake.

4 Switch the pump drive on:

a) for power take-offs, see **(chap. 3.6.2)** or

b) for distribution manual transmission gear, see **(chap. 3.6.3)**.

Information

Although the switch for the distribution manual transmission gear is located in the driver's cab, it does not depend on the vehicle.

Most other switches on the instrument panel are described in your vehicle's manual.

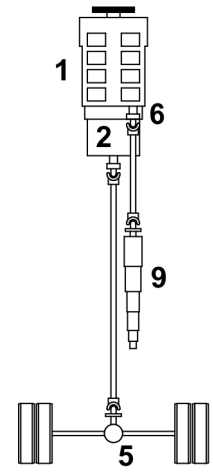
3.6.1 Vehicles with a clutch pedal

It is essential to wait 10 seconds after disengaging the clutch before switching the power take-off on or off.

This avoids consequential damage.

Auxiliary units can be driven by the power take off, e.g. hydraulic pumps. Depending on the usage ratio, the motor and the power take off must be operated at a specified speed (operating speed).

3.6.2 Start-up procedure for the power take off



00090_Nebenantrieb-V02

1 - Vehicle engine
2 - Vehicle drive gear
5 - Rear axle of the vehicle
6 - Vehicle power take-off
9 - Hydraulic pumps with through drive

Fig. 114 Power take-off

In the cab of your vehicle, there is a switch with a symbol like in position (2) **(Fig. 115)**.

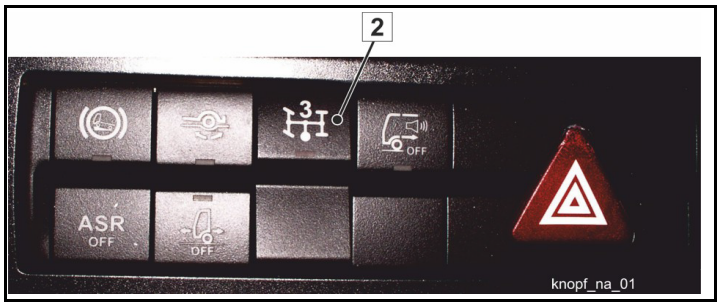


Fig. 115 Cab switch

Information

How the power take-off is switched on depends on the type of vehicle.

This procedure is described in your vehicle's manual.

Observe the information signs in the driver's cab and chapter **(chap. 3.6.6)**.

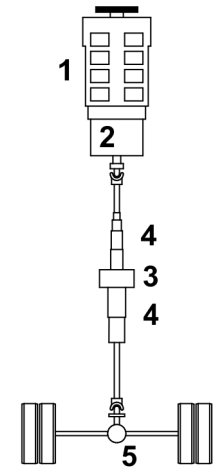
3.6.2.1 Switching on the power take-off

- Stop vehicle.
- Engage parking brake.
- Put gear into neutral.
- Allow the engine to idle.
- For vehicles with manual transmission:
  Press and hold the clutch.
- Switch on power take-off on the instrument panel.

3.6.2.2 Switching off power take-off

- Allow the engine to idle.
- For vehicles with manual transmission: Press and hold the clutch.
- Switch off power take-off on the instrument panel.

3.6.3 Switch-on procedure for the distribution manual transmission gear



1 - Drive motor
2 - Vehicle gearbox
3 - Distribution manual transmission gear
4 - Hydraulic pumps
5 - Rear axle

Fig. 116 VSG

Information

Depending on the vehicle, the VSG is activated using an e-box or by means of a switch on the instrument panel in the driver's cab.

- Stop vehicle.
- Engage parking brake.
- Put gear into neutral.
- Switch off motor.
- Wait for approx. 5 seconds.
- Then set the switch (1) on the e-box **(Fig. 117)** from position "D" for "Drive" to "P" for "Pump".

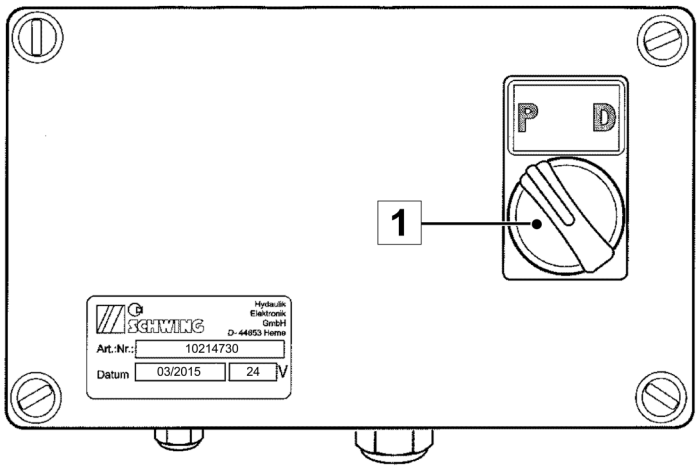


Fig. 117 E-box

Pos.	Designation	Local language designation
P	pump mode	Pump operation
D	drive mode	Driving operation

Attention!

Risk of damage to the hydraulic pumps!

An excessively high motor speed can damage the hydraulic pumps.

Only use the specified pump gear.

- Start the motor and run at idle.
- Press the clutch and engage the "pump gear".
- The coupling action is indicated on a sign in the driver's cab.
- Slowly engage the clutch.

The switching procedure from “P” to “D” may also only take place in reverse order under the conditions described above.

3.6.4 Pneumatic suspension / Levelling

Danger!

Loss of stability due to incorrect operation of the pneumatic suspension!

A supported machine can be lifted with the pneumatic suspension activated.

Deactivate the pneumatic suspension during the supporting process.

The wheels are pressed against the bottom when venting the bellows with supported machine. The machine is "lifted" and can topple over.

In order to ensure that the truck-mounted concrete pump operates safely, it is essential that the pneumatic suspension be prevented from activating during operation.

To achieve the required machine stability, it may be necessary to vent the bellows of air-sprung (trailing) axles, depending on the vehicle.

In most cases, the bellows are automatically de-aired down to a residual pressure when the power take off is switched on.

Air is also supplied automatically when the power take off is switched off.

In doing so, the bellows are vented in a short time according to the axle load.

Some vehicles display the condition of the bellows in the driver's cab.

Information

Refer to the operating instructions of the vehicle- or axle manufacturer.

If the vehicle is equipped with a chassis frame levelling, it must be switched off prior to the support of the machine, since levelling endangers the stability of the supported machine.

In connection with pneumatic suspension and levelling, additional vehicle-specific measures may be to set up the machine safely.

We will provide you with special customer information, if needed.

3.6.5 Switching on the control system

Caution!

Danger due to unattended machine!

A ready-for-use machine can be operated intentionally or unintentionally by unauthorised persons at any time.

Secure the machine against unauthorised operation at all times.

- Switch on the supply voltage for the control system in the driver's cab.
  Example:
  Toggle switch (2) **(Fig. 118)** or key-operated switch (1) **(Fig. 119)**.
- If necessary, switch on the support lighting, e.g., by using the toggle switch (3) **(Fig. 118)**.
- Leave the driver's cab.

Information

The rear folding supports are automatically unlocked after starting the control system.

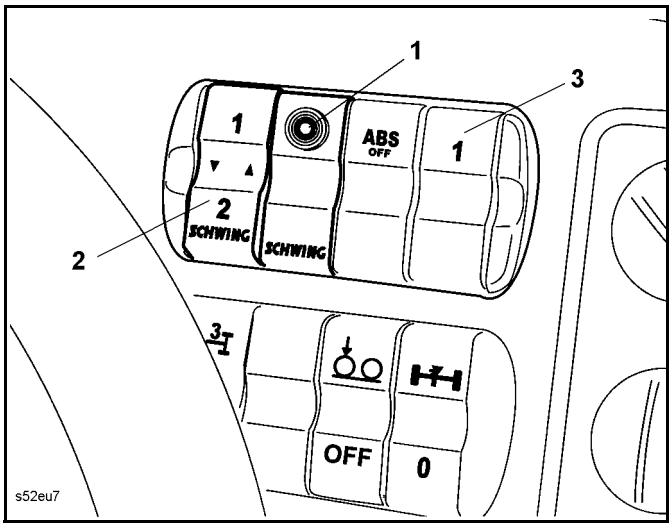


Fig. 118 Cab toggle switch

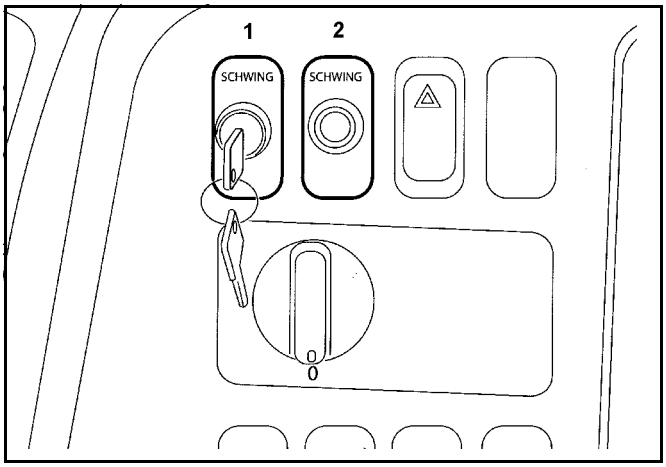


Fig. 119 Cab key-operated switch

Attention!

Risk of damage due to incorrect operation of the engine speed!

The hydraulic pumps can be over-revved and damaged when the engine speed is operated by the accelerator pedal or the cruise control in the driver's cab.

Only increase the engine speed using the remote control or local control of the SCHWING machine.

If the instructions are not followed, the factory-set overspeed trip unit is inactive.

Information

The control system display shows the rotational speed of the power take-off and the drive speed of the distribution manual transmission gear.

The rotational speed is not identical to the engine speed!

The permissible rotational speed for the engine and gear is stamped onto a sign in the driver's cab.

When exceeding the maximum rotational speed, immediately reduce the engine speed and check the drive circuit and motor speed adjuster.

3.6.6 Vehicles with special features

This chapter describes special start-up procedures for the power take-off.

See also **“Explanation of the “EXT” switch on SCANIA vehicles”** on page 94.

3.6.6.1 Renault and Volvo with automatic transmission

Switching on the power take-off

- Stop vehicle.
- Engage parking brake.
- Move gear selector switch into the “N” position.
- Start vehicle engine.
- Switch on SCHWING control using the key-operated switch (1). The green signal lamp (2) **(Fig. 120)** for “Control ON” turns on and the SCHWING control starts up.
- The electronic instrument cluster (3) **(Fig. 121)** indicates that the engine control unit regulates the activation of the power take-off.
- The transmission engages the power take-off and reverts to the speed of 850 rpm (4) **(Fig. 122)**.
- If the engaging operation and the speed adjustment have been completed, then the actuation takes place by lighting up the power take-off button (5) **(Fig. 123)**.
- As soon as the power take-off is engaged, an electronic gear lock (6) **(Fig. 124)** is activated immediately. When the gear selector switch is actuated, the electronic instrument cluster signals the gear selection and responds that the transmission is in “Automatic” mode. The gear is not changed!

Switching off power take-off

- Allow the engine to run.
- Switch off the SCHWING control using the key-operated switch; the green signal lamp remains on for “Control ON” and the SCHWING control remains on.
- Press the power take-off button **(Fig. 123)** until it turns off; the speed is reduced further, the power take-off is disengaged, and the control system is switched off.
- Switch off the engine and ignition.

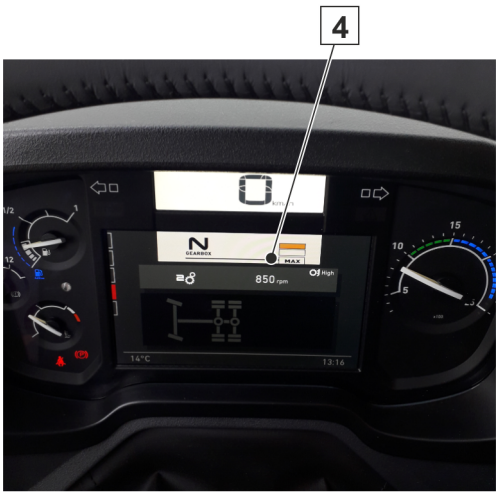
While working with the machine, the engine can be switched on and off at any time via the control platforms; the transmission automatically engages and disengages the power take-off.

00139_SCHWING Steuerung EIN

Fig. 120 SCHWING control

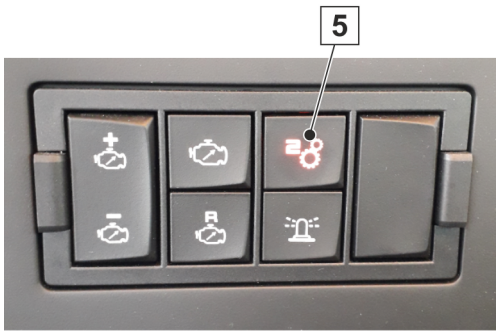
00139_Motorsteuerung-kontrolliert-Getriebe

Fig. 121 Renault electronic instrument cluster



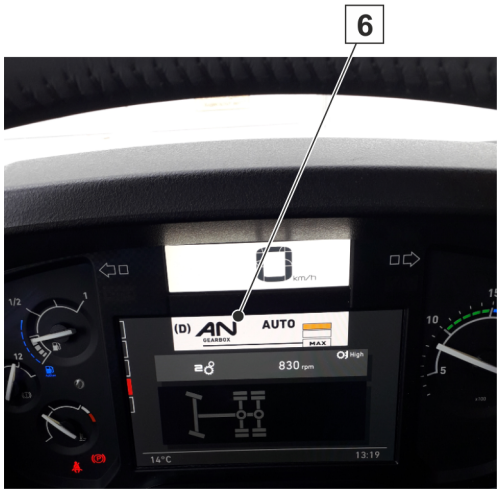
00139_Getriebe-rückt-ein_Drehzahlregelung

Fig. 122 Transmission engages



00139_Anzeige-Aktivierung

Fig. 123 Activation display



00139_Anzeige-Getriebesperre

Fig. 124 Gear lock display

3.6.6.2 MAN with automatic transmission

Switching on the power take-off

- Stop vehicle.
- Engage parking brake.
- Move gear selector switch into the “N” position.
- Vehicle engine must be switched on.
- Switch on the Interpump Hydraulics control (1) **(Fig. 125)** using the button (2) **(Fig. 126)**.
- Switch the release for the power take-off using the button (3) **(Fig. 127)**.
- Confirm the switch (4) **(Fig. 128)** for switching on the power take-off.
- If the engaging operation and the speed adjustment have been completed, then the actuation takes place by lighting up the power take-off button (4) **(Fig. 128)**.
- As soon as the power take-off is engaged, an electronic gear lock is activated immediately. When the gear selector switch is actuated, the electronic instrument cluster signals the gear selection and responds that the transmission is in “Automatic” mode. The gear is not changed!

Switching off power take-off

- Allow the engine to run.
- Actuate the power take-off switch (4) **(Fig. 128)**, the button no longer lights up, the speed is reduced again, the power take-off disengaged.
- Switch off the engine and ignition.

While working with the machine, the engine can be switched on and off at any time via the control platforms; the transmission automatically engages and disengages the power take-off.

Fig. 125 Interpump Hydraulics control

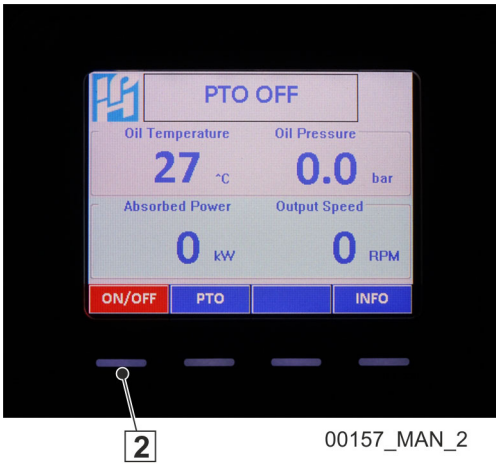


Fig. 126 Interpump Hydraulics Display

Fig. 127 Interpump Hydraulics Display

Fig. 128 Power take-off switch

3.7 Preheating the hydraulic system

The correct operating temperature is important in order to ensure proper functioning of and low wear on the hydraulic system and hydraulic oil.

For our machines, this is between 40 °C and 60 °C.

The hydraulic system has been designed so that with:

- proper use,
- correct function of all components,
- and the selection of an appropriate hydraulic oil,

an operating temperature of 80 °C is not exceeded.

Conversely, it is advantageous to warm up the cold system before beginning operations.

This is carried out as follows:

➤ Switch on the pump drive and operate the hydraulic system without a load at medium speed.

The hydraulic oil warms up, during which it is circulated "without pressure" by the pump.

3.7.1 Cold start limit

If the cold start limit of an oil is exceeded (oil is too viscous), the required lubricating film could fail to establish. "Cold start wear" occurs due to friction. Hydraulic pumps cannot correctly draw in oil that is too viscous. They suck in air (oil foams) and are damaged.

The cold start limit is dependent on the viscosity of the oil, see table:

ISO viscosity class	Cold start limit
VG 32	approx. - 18 °C
VG 46	approx. - 10°C
VG 68	approx. - 3 °C
VG 100	approx. 3 °C

The supplied multi-purpose oil has a cold start limit of -10 °C.

If low temperatures are expected, the machine should be parked in a locked hall if it is to be used the next morning.

3.7.2 Preheating the outrigger control blocks

Attention!

Damage to outrigger control block!

Valves in the control block may be damaged.

Do not force jammed control levers. Preheat the hydraulic oil, until all levers/valves move smoothly.

During working operations, the outrigger hydraulics are separated from the remainder of the hydraulic system.

Depending on the ambient temperature, all outrigger components cool off, including the enclosed oil.

Should the outriggers now be retracted (after finishing the work assignment), the hot hydraulic oil will shoot to the control blocks for the outrigger hydraulics.

Due to this "temperature shock", the control blocks can jam.

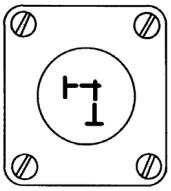
At low ambient temperatures we recommend:

For machines with type S56SXF/S65SXF:

➤ Press the each of the four release buttons on the outrigger for approx. 20 to 30 seconds before actuating any of the outrigger control levers.

For all other machines:

➤ Press the release button on the outrigger to be moved for approx. 20 to 30 seconds before actuating any of the control levers.



The inside of the outrigger control block is flooded with warm hydraulic oil in pressureless circulation.

➤ Repeat the procedure if you detect sluggishness in the control levers after the "preheating phase".

3.8 Setting up machines

In this chapter, you will learn about how to prepare the installation site so that machines can be set up safely. It will cover the ground conditions that are necessary, the supporting forces that must be observed and how to correctly channel the supporting forces into the ground.

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3.8.2 Warnings for setting up machines

Danger!

Loss of stability due to machine being at a prohibited inclination!

Serious injuries or death can be caused by the machine tipping over.

Do not tilt the machine more than 3° on any axis when setting it up.

To check the incline of your machine, spirit levels are attached near the outrigger control blocks.

Danger!

Loss of stability due to installing the machine on an unsuitable surface!

Serious injuries or death can be caused by the machine tipping over.

Set up the machine only on a suitable surface. If necessary, the support surface must be extended using suitable means until the permissible ground pressure is reached.

For machines with the SXF outrigger system, always extend the foldable support leg as well.

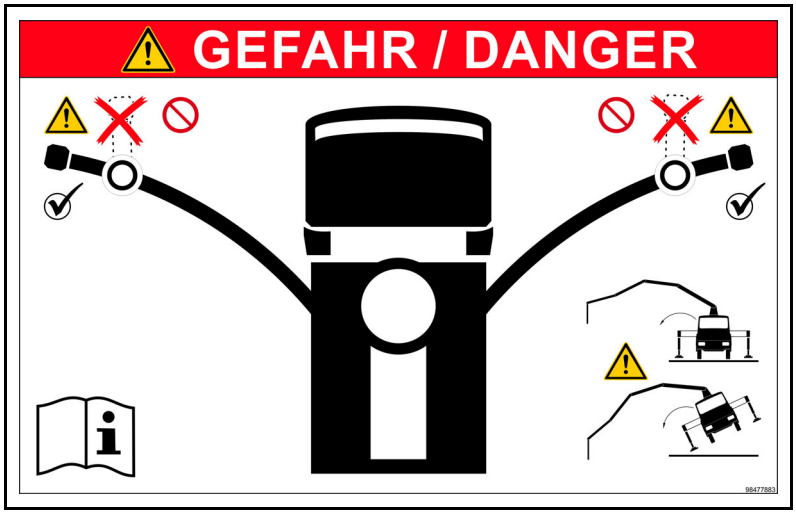


Fig. 129 Always extend foldable support leg

3.8.2.1 Beware of high voltage

Danger!

Danger to life due to lightning strikes!

Death by electric shock cannot be prevented by grounding the machine.

Operating the machine during a storm is prohibited.

Danger!

Danger to life due to insufficient distance from high-voltage lines!

Death due to electric shock.

Observe the distances from the safety manual.

3.8.2.2 Beware of pits and slopes

- Maintain the prescribed safety distance from excavation pits (Fig. 130 Distances from excavation pits).

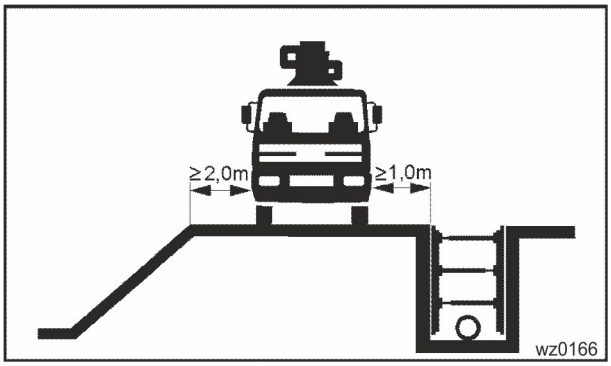


Fig. 130 Distances from excavation pits

- Under no circumstances must the jobsite or public road be obstructed.
- Secure the installation site in accordance with regulations.
- If the machine protrudes into traffic, a permit must be obtained.

Make sure there is a certain amount of “run-up track” with horizontally laid tubes, in order to ensure proper up-pumping or down-pumping (line pump).

3.8.2.3 Exhaust fumes on jobsites

Warning!

Danger to life from toxic gases!

Exhaust fumes from internal combustion engines are toxic.

Ensure an appropriate fresh air supply and wear personal protective equipment.

Wear your personal protective equipment for all work where exhaust fumes or building material particles can enter the body via the respiratory tract.

Ensure sufficient ventilation, particularly in enclosed spaces (exhaust fumes, overheating, fire hazards). It is best to route exhaust fumes away from the workplace (see the “Air emissions” chapter in the safety manual).

3.8.3 Types of outrigger

Danger!

Danger to life due to loss of stability!

Serious injuries or death can be caused by the machine tipping over.

Observe the instructions in the operating instructions and the safety manual on how to set up machines.

3.8.3.1 Full support

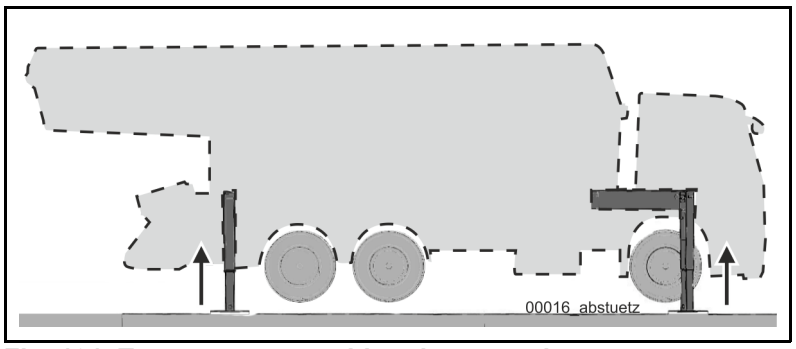


Fig. 131 Tyres are not touching the ground

Full support is always preferred and should be used as standard.

All outriggers must be extended or retracted horizontally to the end position!

Raise the machine vertically until all wheels are at a sufficient distance from the ground. The tyres must not be touching the ground **(Fig. 131)**.

3.8.3.2 With EASyflex

Only use the EASyflex special equipment in exceptional cases (see the chapter on special equipment "**6.1 EASyflex II outrigger system**").

Partial support of machines is only permitted under the conditions there described.

Information

If your machine was retrofitted with EASyflex later on, ensure that the associated, up-to-date guide was issued.

Make sure to use these free instructions!

3.8.4 General information about the installation site

SCHWING recommends not driving onto the jobsite until you have been briefed by an "instructor" authorised by the site management.

The responsibility for safe operation of the machine lies solely with the machine operator.

➤ Have the installation site prepared in case of safety-related concerns.

➤ In an emergency, you must refuse to use the truck-mounted concrete pump.

The machine operator's duties also include going along the approach and departure route in order to identify and eliminate potential danger spots.

- The approach and departure route must also be prepared by the site management.

Important information on towing and recovering your machine is provided in chapter **(3.18)**

- Together with the instructor, make sure that the allocated location can readily bear the supporting force of your machine.
  (Your machine's stability must always be guaranteed!)
- Refuse to commence operations if the stability cannot be 100% guaranteed by the site management.
- Clear the allocated location of any disturbing unevenness before driving onto the site.
- Never place the machine on backfill, obvious or known voids or uneven ground. Asphalt, ground slabs, etc. can be undermined.
- Make sure that the truck mixer can reach the concrete feeding hopper of your machine without any difficulties.
- Make sure that the placing boom's range is used optimally.
- Avoid relocating the machine.

3.8.5 Supporting surface extension

In order to be able to set up your machine safely, you need to know the load-bearing capacity of the ground.

To optimally distribute the supporting forces of your machine on the ground, it is necessary to extend the supporting surface.

Proceed as follows:

- if you are unsure about the load-bearing capacity of the ground, in general, base your considerations on the worst case scenario.
- The machine must not be set up if the ground cannot absorb the maximum supporting force of the machine.
- Make sure that the ground is even and obstacle-free.
- The ground for the supporting legs of your machine must be even.
- Only use the standard support pads or support pads approved by SCHWING.
- Always place the support pads centrally under the supporting legs in order to distribute the load evenly and prevent the supporting legs from slipping.
- The support pads must always be free of ice, oil and grease.
- If necessary, the supporting surface can be extended further using support bars.
- SCHWING recommends multiplex plates in order to improve the adhesion to the supporting legs.
- As an alternative, plates designed for the intended application can be used (e.g. crane support plates), in order to extend the supporting surface.
- Consult the tables below for the supporting surface extension required for your application.

3.8.5.1 Possible supporting surface extension

Possible supporting surface extensions are listed below, each with an example.

(Table 8) refers to SCHWING support pads.

(Table 9) contains examples using support bars (original SCHWING parts) or crane support plates[1] (external purchased parts).

SCHWING GmbH recommends always using support pads for the supporting legs.

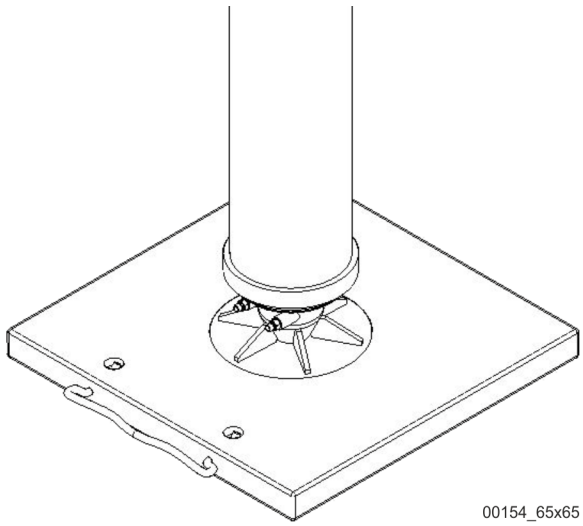
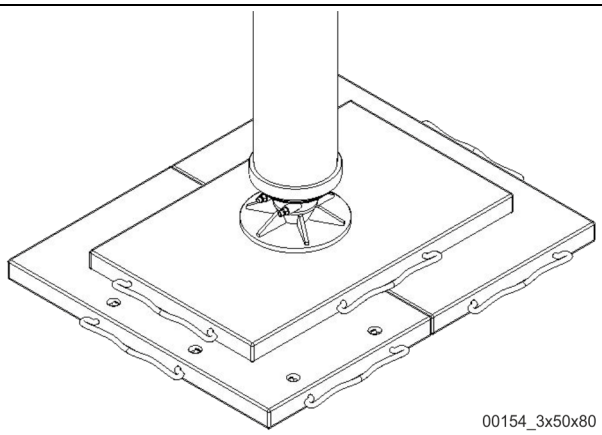
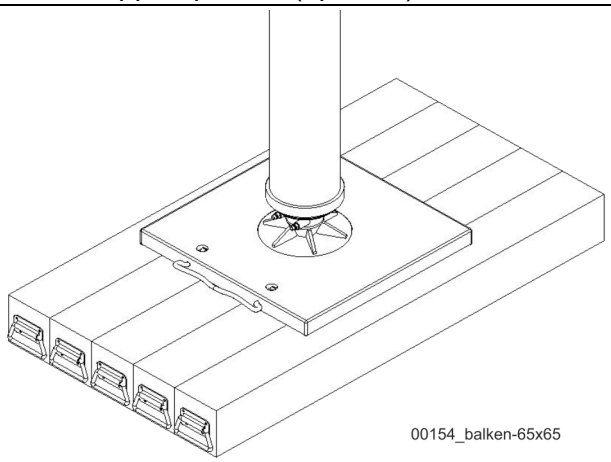
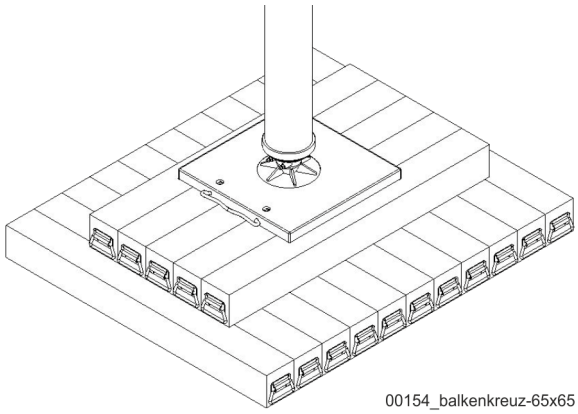
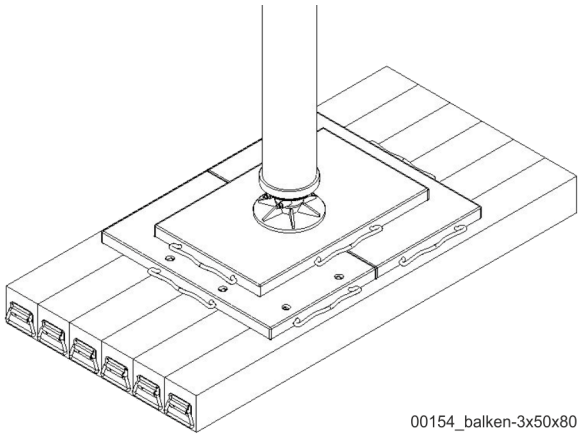
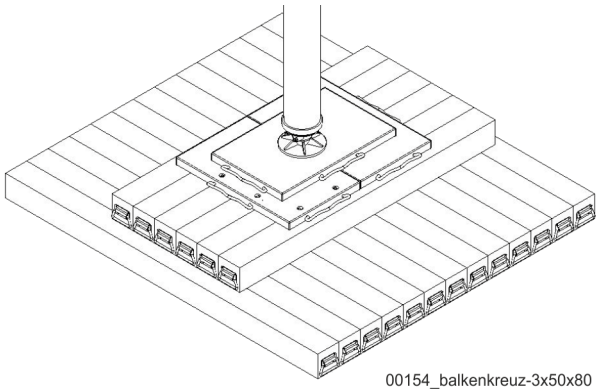
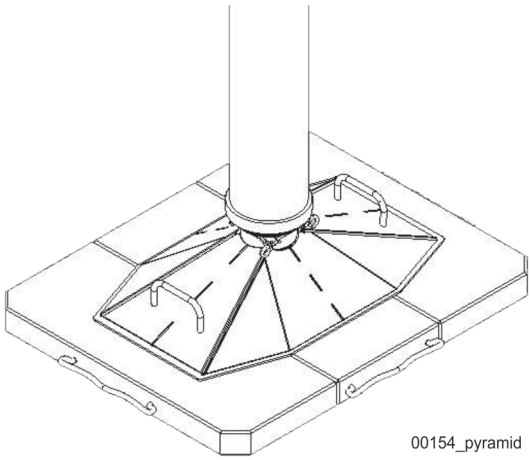
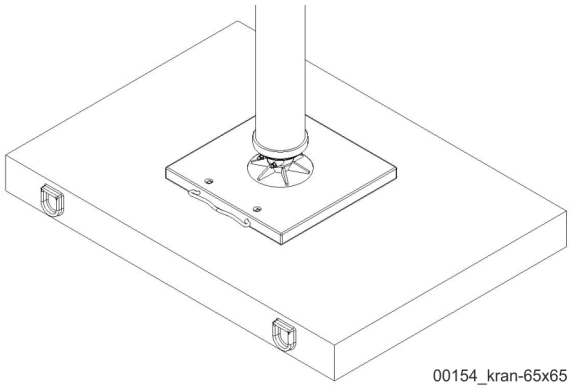
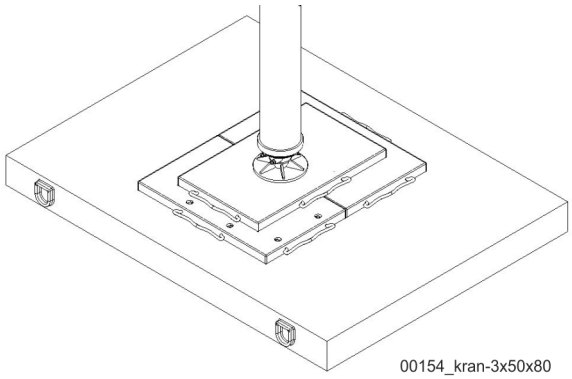
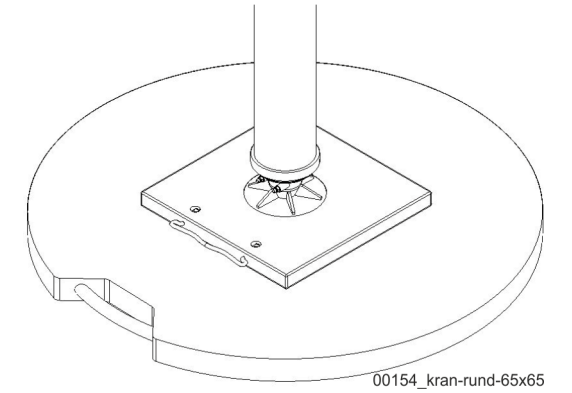
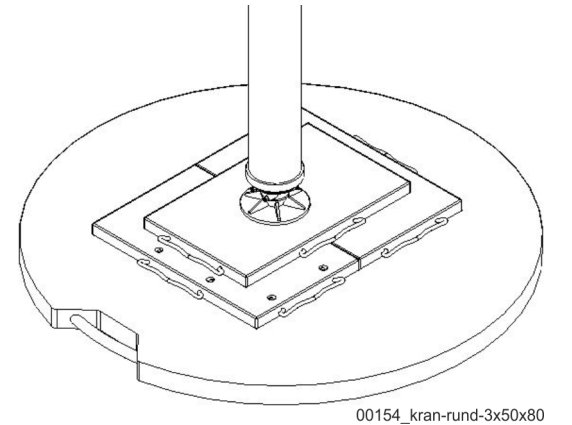
Support surfaces using support pads	Dimensions
	1 x PE plate 600 x 600 x 50 mm 1 x multiplex plate 650 x 650 x 70 mm
	3 x PE plates 800 x 500 x 50 mm 3 x multiplex plates 800 x 500 x 70 mm

Table 8 SCHWING support pads

1.Crane support plates are not sold by SCHWING GmbH and must be provided on site.

Extension of the support surface using support bars or crane support plates[1] (optional)	Explanation of the extension
	Square PE or simple multiplex plate + simple support bars
	Square PE or simple multiplex plate + support bars in a cross brace
	Rectangular PE or multiplex plates as a pyramid + simple support bars.

	Rectangular PE or multiplex plates as a pyramid + support bars in a cross brace.
	Extended supporting leg in combination with three multiplex plates placed next to each other (option for large machines in the case of special requirements).
	Square PE or simple multiplex plate + square crane plate (external purchased part in different sizes).

	Rectangular PE or multiplex plates as a pyramid + square crane plate (external purchased part in different sizes)
	Square PE or simple multiplex plate + round crane plate (external purchased part in different sizes)
	Rectangular PE or multiplex plates as a pyramid + round crane plate (external purchased part in different sizes)

1.Schwing GmbH does not sell crane support plates.

Table 9 Bars and crane support plates as supporting surface extension

3.8.5.1.1 Specification of crane support plates

The crane support plates provided must have a sufficiently large area, so that the permissible ground pressure is not exceeded during the supporting process. Furthermore, the crane support plates must have sufficient dimensions and strength so that the supporting forces can be safely absorbed and introduced into the ground. The surface of the crane support plates must be non-slip.

In order to ensure that you select the correct crane support plate, you can calculate the required supporting force.

See sub-chapter (3.8.5.4 Calculate the maximum ground pressure of an outrigger).

For converting kN to t = 1 kN = 0.1 t (e.g.: 240 kN = 24.0 t).

Calculation example (S 43 SX): 240 kN / 0.8m² = 300 kN/m² = 30.0 t/m²

3.8.5.2 Rough estimation of the required supporting surface extension

The tables below are exemplary and only provide an approximate guide value.

You must find out the type of ground and permissible ground pressure from the site management!

1. Ask the site management for the maximum permissible ground pressure of the ground at the installation site.
2. Select a table (see **"Supporting surface extension according to machine type and ground pressure"**) with a supporting surface extension variant (illustration in the left column) for your machine, which does not exceed the permissible ground pressure.

Finally, compare the ground type value with the value you must calculate in the tables below.

(Fig. 132) shows an example of how to use the tables.

In the text below, the positions of **(Fig. 132)** from (1) to (4) are given in the required order.

3. Find the table column in which your machine appears (1).
   You will find them in the first rows of each table.
4. Look down the column in which your machine appears.
   In the "*Ground pressure*" row (2), you will find the value that your machine passes to the ground with the chosen supporting surface extension. This is the relevant value that the ground must be able to carry.
5. Now check whether your machine can be supported with the chosen supporting surface extension type.
   To do so, look under "*Permissible ground pressure*" (3) in the table for a value that is greater than or equal to the calculated "Ground pressure".
6. If the intersection (4) shows a white table cell, this means that you can set up your machine.
7. If you are taken to a red cell, you must not use this supporting surface extension type and must select another one.

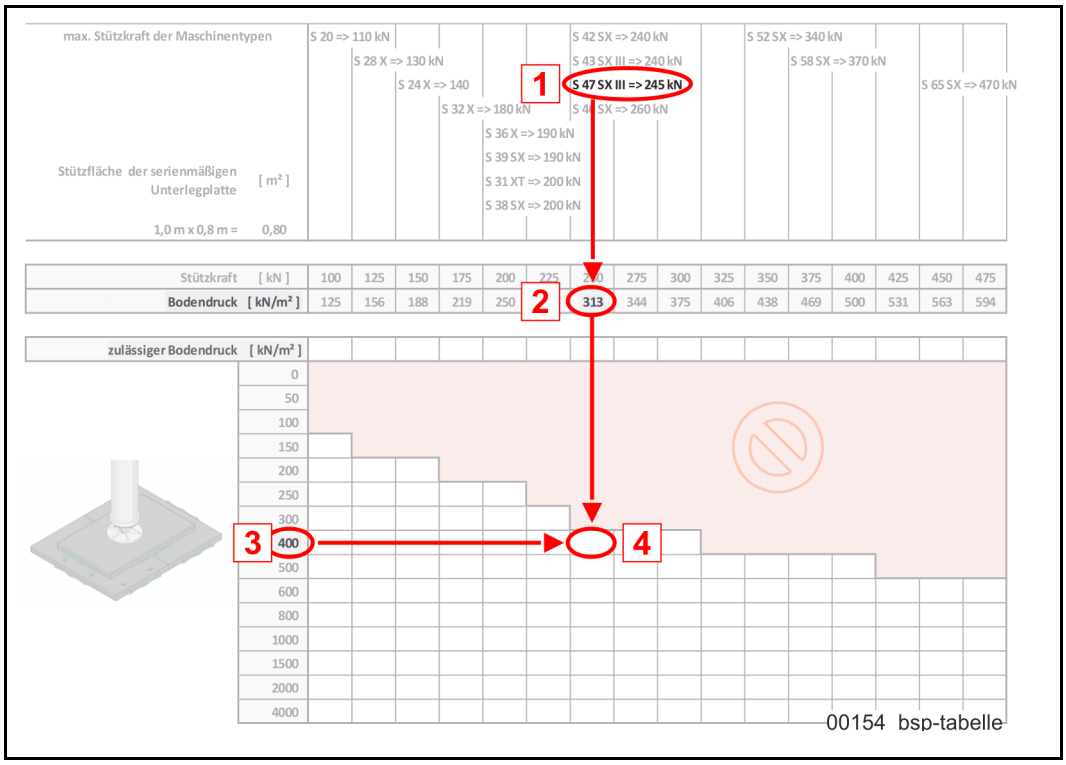


Fig. 132 Example table for an S47SX

Legend for (Fig. 132)			
1	Machine used	3	Permissible ground pressure of the ground at the installation site.
2	Ground pressure	4	Intersection of “ground pressure” and “permissible ground pressure”

3.8.5.3 Supporting surface extension according to machine type and ground pressure

Using the table below, you can now visually determine whether and how you can set up your machine with the existing ground conditions.

For information on the supporting forces of your machine, also see the “Technical data” chapter.

max. supporting force of the machine types	S20	S28X	S24X	S32X	S36X S39SX S31XT S38SX		S42SX S43SX III S47SX III S46SX		S51SX		S56SXF	S52SX S58SX			S65SXF	
Supporting surface of the standard support pad [m²]																
0,6 m x 0,6 m = 0,36																

Supporting force [kN]	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475
Resulting ground pressure [kN/m²]	278	347	417	486	556	625	694	764	833	903	972	1042	1111	1181	1250	1319

Permissible ground pressure [kN/m²]																
0																
50																
100																
150																
200																
250																
300																
400																
500																
600																
800																
1000																
1500																
2000																
4000																

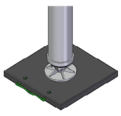


Table 10 Supporting surface extension with a 60 x 60 cm support pad

max. supporting force of the machine types	S20	S28X	S24X	S32X	S36X S39SX S31XT S38SX		S42SX S43SX III S47SX III S46SX		S51SX		S56SXF	S52SX S58SX			S65SXF	
Supporting surface of the standard support pad [m²]																
1,0 m x 0,8 m = 0,80																
Supporting force [kN]	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475
Resulting ground pressure [kN/m²]	125	156	188	219	250	281	313	344	375	406	438	469	500	531	563	594
Permissible ground pressure [kN/m²]																
0																
50																
100																
150																
200																
250																
300																
400																
500																
600																
800																
1000																
1500																
2000																
4000																

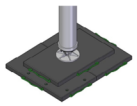


Table 11 Supporting surface extension with 100 x 80 cm support pads

max. supporting force of the machine types	S20	S28X	S24X	S32X	S36X S39SX S31XT S38SX		S42SX S43SX III S47SX III S46SX		S51SX		S56SXF	S52SX S58SX			S65SXF	
Supporting surface extended with bars (40 cm protrusion on the right and left) [m²]																
1,4 m x 0,6 m = 0,84																
Supporting force [kN]	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475
Resulting ground pressure [kN/m²]	119	149	179	208	238	268	298	327	357	387	417	446	476	506	536	565
Permissible ground pressure [kN/m²]																
0																
50																
100																
150																
200																
250																
300																
400																
500																
600																
800																
1000																
1500																
2000																
4000																

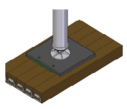


Table 12 Supporting surface extension with a 60 x 60 cm support pad and single-layer support bars

max. supporting force of the machine types		S20	S28X	S24X	S32X	S36X S395X S31XT S385X		S425X S435X III S475X III S466X		S515X		S565XF	S525X S585X			S655XF	
Supporting surface extended with bars (20 cm protrusion on the right and left)	[m²]																
1,4 m x 0,8 m =	1,12																
Supporting force	[kN]	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475
Resulting ground pressure	[kN/m²]	89	112	134	156	179	201	223	246	268	290	313	335	357	379	402	424

Permissible ground pressure [kN/m²]	
0	
50	
100	
150	
200	
250	
300	
400	
500	
600	
800	
1000	
1500	
2000	
4000	

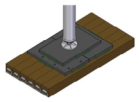


Table 13 Supporting surface extension with 100 x 80 cm support pads and single-layer support bars

max. supporting force of the machine types		S20	S28X	S24X	S32X	S36X S395X S31XT S385X		S425X S435X III S475X III S466X		S515X		S565XF	S525X S585X			S655XF	
Supporting surface extended with bars (40 cm protrusion on the right and left)	[m²]																
1,8 m x 0,8 m =	1,44																
Supporting force	[kN]	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475
Resulting ground pressure	[kN/m²]	69	87	104	122	139	156	174	191	208	226	243	260	278	295	313	330

Permissible ground pressure [kN/m²]	
0	
50	
100	
150	
200	
250	
300	
400	
500	
600	
800	
1000	
1500	
2000	
4000	

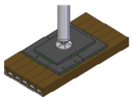


Table 14 Supporting surface extension with 80 x 100 cm support pads and single-layer support bars

max. supporting force of the machine types	S20	S28X	S24X	S32X	S36X S39SX S31XT S38SX		S42SX S43SX III S47SX III S46SX		S51SX		S56SXF	S52SX S58SX			S65SXF	
Supporting surface extended with bars (70 cm protrusion on the right and left) [m²] 2,4 m x 0,8 m = 1,92																

Supporting force [kN]	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475
Resulting ground pressure [kN/m²]	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247

Permissible ground pressure [kN/m²]																
0																
50																
100																
150																
200																
250																
300																
400																
500																
600																
800																
1000																
1500																
2000																
4000																

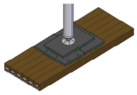


Table 15 Supporting surface extension with 80 x 100 cm support pads and long single-layer support bars

max. supporting force of the machine types	S20	S28X	S24X	S32X	S36X S39SX S31XT S38SX		S42SX S43SX III S47SX III S46SX		S51SX		S56SXF	S52SX S58SX			S65SXF	
Supporting surface extended with cross brace (40 cm protrusion on the right and left) [m²] 1,8 m x 1,6 m = 2,88																

Supporting force [kN]	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475
Resulting ground pressure [kN/m²]	35	43	52	61	69	78	87	95	104	113	122	130	139	148	156	165

Permissible ground pressure [kN/m²]																
0																
50																
100																
150																
200																
250																
300																
400																
500																
600																
800																
1000																
1500																
2000																
4000																

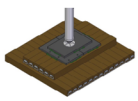


Table 16 Supporting surface extension with a 60 x 60 cm support pad and two-layer support bars

max. supporting force of the machine types	S20	S28X	S24X	S32X	S36X S39SX S31XT S38SX		S42SX S43SX III S47SX III S46SX		S51SX		S56SXF	S52SX S58SX			S65SXF	
Supporting surface extended with cross brace (40 cm protrusion on the right and left) [m²]																
1,8 m x 1,6 m = 2,88																

Supporting force [kN]	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475
Resulting ground pressure [kN/m²]	35	43	52	61	69	78	87	95	104	113	122	130	139	148	156	165

Permissible ground pressure [kN/m²]																
0																
50																
100																
150																
200																
250																
300																
400																
500																
600																
800																
1000																
1500																
2000																
4000																

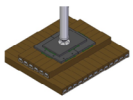


Table 17 Supporting surface extension with 80 x 100 cm support pads and short two-layer support bars

max. Stützkraft der Maschinentypen	S20	S28X	S24X	S32X	S36X S39SX S31XT S38SX		S42SX S43SX III S47SX III S46SX		S51SX		S56SXF	S52SX S58SX			S65SXF	
Stützfläche durch Kreuzverband vergrößert (Überstand rechts und links jeweils 70 cm) [m²]																
2,4 m x 2,2 m = 5,28																

Stützkraft [kN]	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475
resultierender Bodendruck [kN/m²]	19	24	28	33	38	43	47	52	57	62	66	71	76	80	85	90

zulässiger Bodendruck [kN/m²]																
0																
50																
100																
150																
200																
250																
300																
400																
500																
600																
800																
1000																
1500																
2000																
4000																

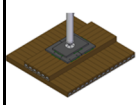


Table 18 Supporting surface extension with 80 x 100 cm support pads and long two-layer support bars

max. supporting force of the machine types	S20	S28X	S24X	S32X	S36X S39SX S31XT S38SX		S425X S435X III S475X III S465X		S51SX		S565XF	S525X S585X			S655XF	
Supporting surface of the crane support plate [m²]																
2 m x 1,5 m = 3,00																

Supporting force [kN]	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475
Resulting ground pressure [kN/m²]	33	42	50	58	67	75	83	92	100	108	117	125	133	142	150	158

Permissible ground pressure [kN/m²]																
0																
50																
100																
150																
200																
250																
300																
400																
500																
600																
800																
1000																
1500																
2000																
4000																

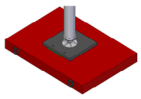


Table 19 Supporting surface extension with crane support plates

3.8.5.4 Calculate the maximum ground pressure of an outrigger

You can also calculate the ground pressure for each individual outrigger.

First read the maximum supporting force on the signs on the outriggers.

In the following calculation example, the supporting force on the outrigger is (these values are hypothetical):
front **240 kN** and
rear **240 kN**.

Ensure that all signs are present and legible!

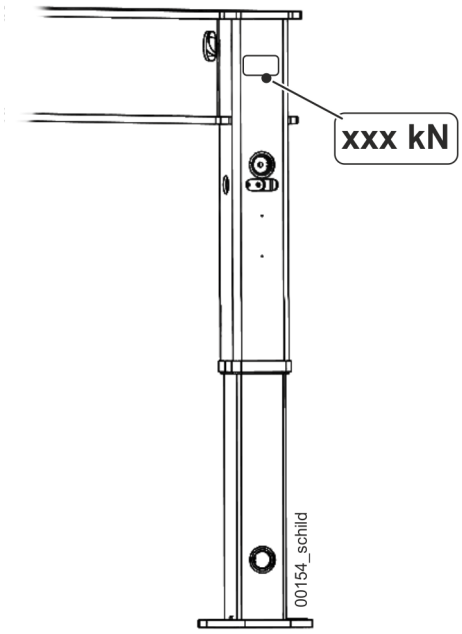


Fig. 133 Outrigger sign example: Supporting force

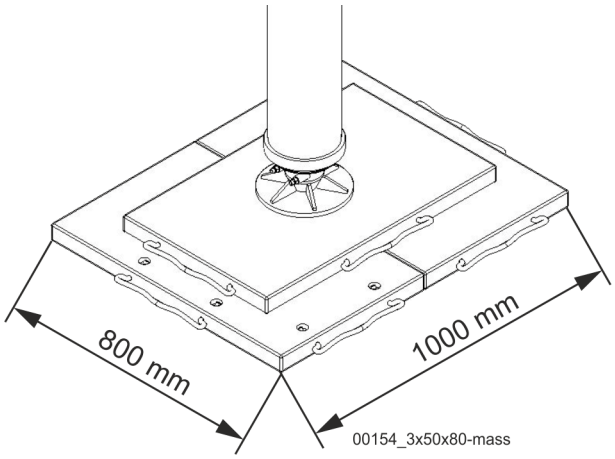
The maximum ground pressure of an outrigger is calculated as follows:

$$\frac{\textbf{max. supporting force}}{\textbf{Supporting surface}^{1}} = \frac{\textbf{kN}}{\textbf{m}^2}$$

1.refers to the lowest supporting surface touching the ground.

Front supporting force: max. 240 kN (24.0 t)

Rear supporting force: max. 240 kN (24.0 t).



Calculation example with rectangular plates:

The supporting surface measures
1 m x 0.8 m = 0.8 m².

This results in a ground pressure of:

front: 240 kN / 0.8 m² = 300 kN/m²

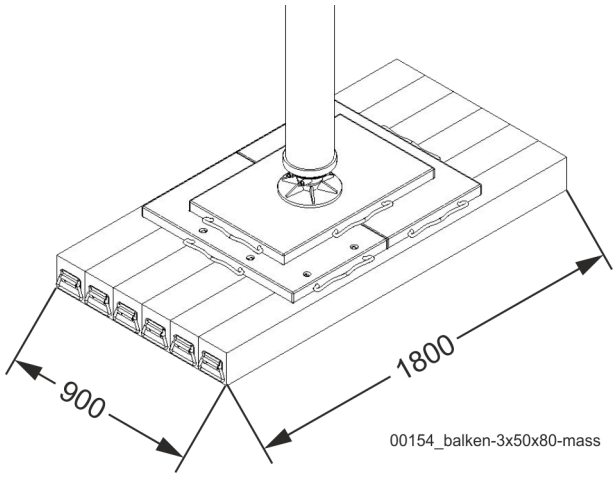
rear: 240 kN / 0.8 m² = 300 kN/m².

By extending the supporting surface of the support pads with support bars, the supporting surface can be enlarged and the ground pressure can thus be reduced.

A maximum protrusion of the bars of 40 cm on each side is advisable.

If the lateral protrusion is greater, the deflection of the bars increases and the calculated value is not reached.

The ground conditions must also be taken into account.



Calculation example with rectangular plates and 150 mm x 150 mm support bars:

The supporting surface measures
0.9 m x 1.8 m = 1.6 m².

This results in a ground pressure of:

front: 240 kN/1.6 m² = 150 kN/m²

rear: 240 kN/1.6 m² = 150 kN/m².

3.8.6 Transporting the supporting surface extension

3.8.6.1 Support pads

Support pads are stored and transported in support pad holders. They are located on the vehicle frame **(Fig. 134)**.

The exact positioning, as well as the number of support pad holders, depend on the vehicle and the number of support pads, with at least one and a maximum of four support pad holders being mounted on the machine.

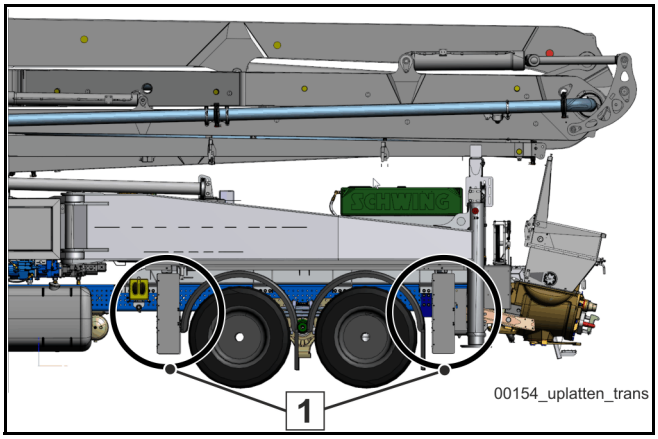


Fig. 134 Example of a support pad holder on the vehicle

3.8.6.1.1 Number of support pads per machine type

Support pad	S 20	S 24 X	S 28 X	S 31 XT	S 32 X	S 36 X	S 36 DD	S 38 SX	S39 SX(D)	S 43 SX	S 46 SX	S 47 SX	S 51 SX	S 52 SX	S 55 SX	S 56 SXF	S 58 SX	S 61 SX	S 65 SXF
Multiplex 650x650	4	4	4	4	4	4	4	4	4	4		4	4			4			
PE 600x600	4	4	4	4	4	4	4	4	4	4		4	4			4			
Multiplex 500x800										12	12	12	12	12	12	12	12	12	12
PE 500x800										12	12	12	12	12	12	12	12	12	12

Table 20 Number of support pads per machine type

When ordering your SCHWING machine, you can choose between PE or wooden support pads.

The number of standard support pads can be 4 or 12 and depends on the size of your machine.

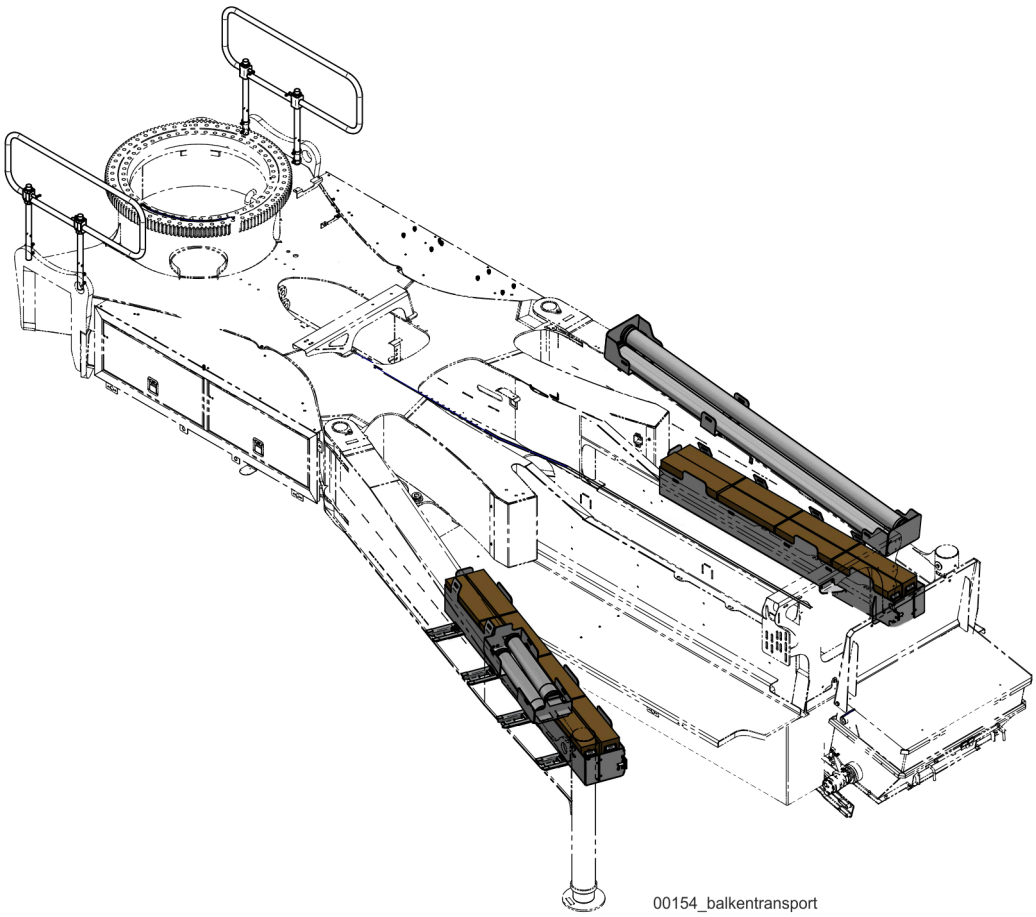
With certain machine types, you can decide yourself whether you wish to have 4 or 12 pads.

3.8.6.2 Support bars

Support bars can be included in the storage options offered as special equipment.

There are different variants for the storage options, which may vary depending on the machine type.

Ask your SCHWING representative about the right solution for your machine.



Example: Transport options for support bars

Wooden support bars are available with the dimensions 150 mm x 150 mm and, as of 2022, glued-laminated support bars are available with the dimensions 160 mm x 120 mm.

The different types of support bars must not be combined.

The wide side (160 mm) of the glued-laminated variant is placed on the ground.

Support bars (Dimensions in mm)	**Description**	**Material**
150 x 150 x 600	Support bar with handle	Solid wood
150 x 150 x 1000	Support bar with handle	Solid wood
150 x 150 x 1200	Support bar with handle	Solid wood
160 x 120 x 600	Support bar with handle	Glued-laminated
160 x 120 x 950	Support bar with handle	Glued-laminated
160 x 120 x 1200	Support bar with handle	Glued-laminated

3.8.7 Securing vehicle axles

Information

SCHWING truck-mounted concrete pumps on two-axle chassis frames can be equipped with an axle safety catch that must be activated.

This safety catch prevents the rear axle from touching the ground when the machine is supported.

The stability of your machine is only achieved when all axles are raised and secured. The total weight of the machine is the stability moment.

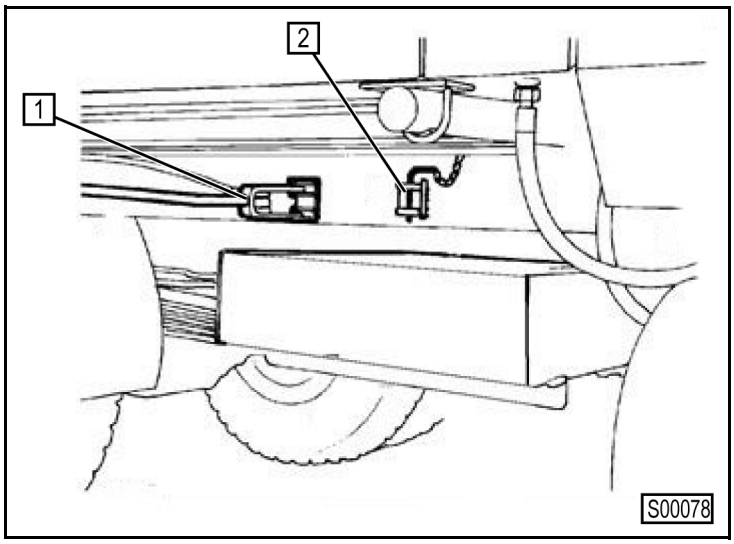


Fig. 135 Axle safety catch

Caption (Fig. 135)	
Pos.	**Description**
1	Lever
2	Safety bolt

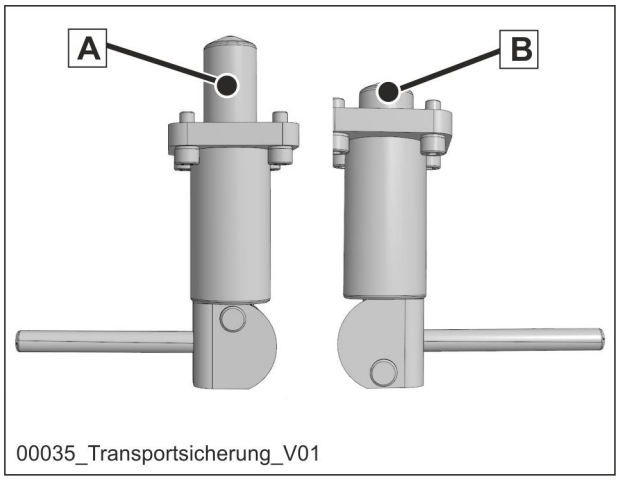
- For two-axle vehicles, "catch" the rear axle using the axle safety catch.
- Swing the levers (1) **(Fig. 135)** forward on each side of the vehicle and secure with the safety bolt (2) **(Fig. 135)**.
- Make sure that all vehicle wheels do not touch the ground while operating the boom! Otherwise the machine can tip over.

It is necessary to release the axle again for the driving operation.

Machine built onto vehicles with pneumatic suspension require special measures, if necessary, during the installation. Please refer to the operating instructions for the vehicle.

3.8.8 Loosen the transport safety devices

➤ Loosen the transport safety devices **(Fig. 136)** on all outriggers before moving the outriggers, if this is provided for in the design.



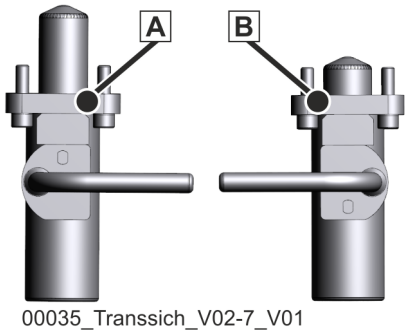


Fig. 136 Transport safety devices

Caption (Fig. 136)	
Pos.	**Description**
A	Secured
B	Not secured

The transport safety devices are always located near the mechanical drawers.

Attention!

Material damage due to locked transport safety device while extended the outrigger horizontally!

Transport safety devices and outriggers can be seriously damaged.

All transport safety devices must be released (unlocked) before extending the outrigger horizontally.

Even when using EASy, the transport safety devices for all outriggers must be released before setting up the machine.

3.8.8.1 Transport safety devices for 20-metre class

Before moving the outriggers, you must loosen all existing outrigger transport safety devices.

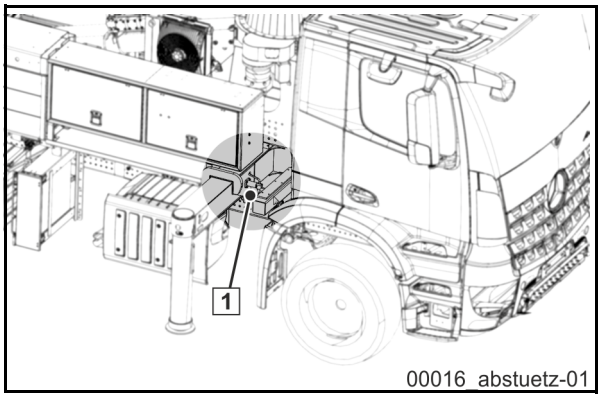


Fig. 137 Front transport safety device outrigger

Caption (Fig. 137)	
Pos.	**Description**
1	Outrigger transport safety device

3.8.8.2 Transport safety devices for 30-metre class

Before moving the outriggers, you must loosen all existing outrigger transport safety devices.

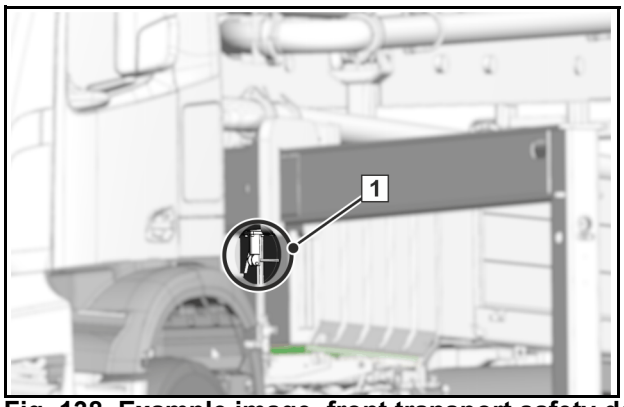


Fig. 138 Example image, front transport safety device; S36X

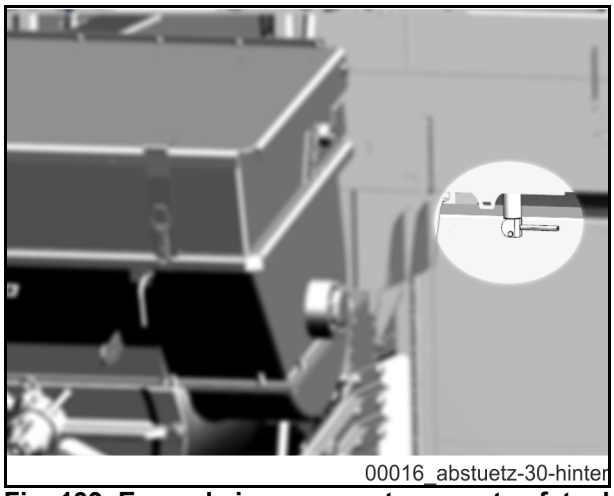


Fig. 139 Example image, rear transport safety device; S36X

3.8.8.3 Transport safety devices for 40- to 50-metre class

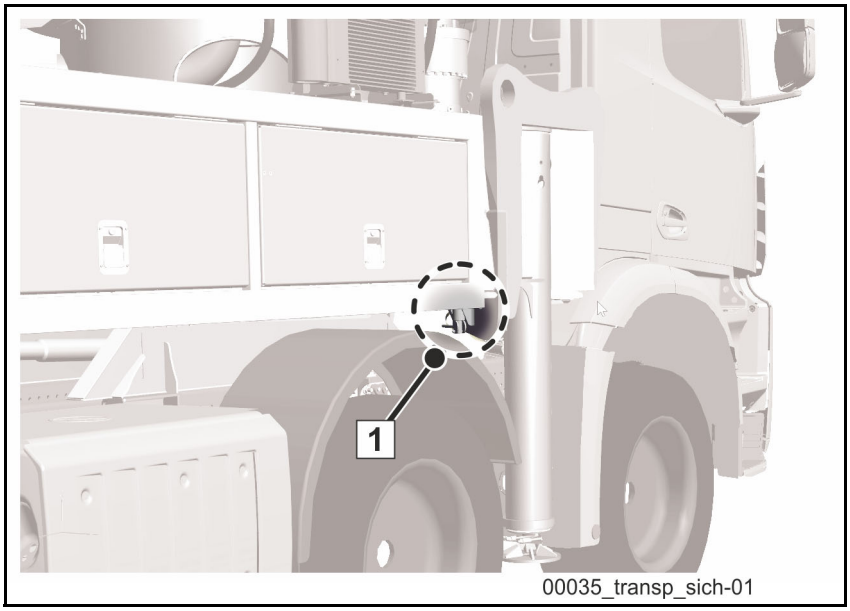


Fig. 140 Example illustration of the transport safety device (40-metre class); front outrigger

Caption (Fig. 140) / (Fig. 141)	
Pos.	**Description**
1	Outrigger transport safety device

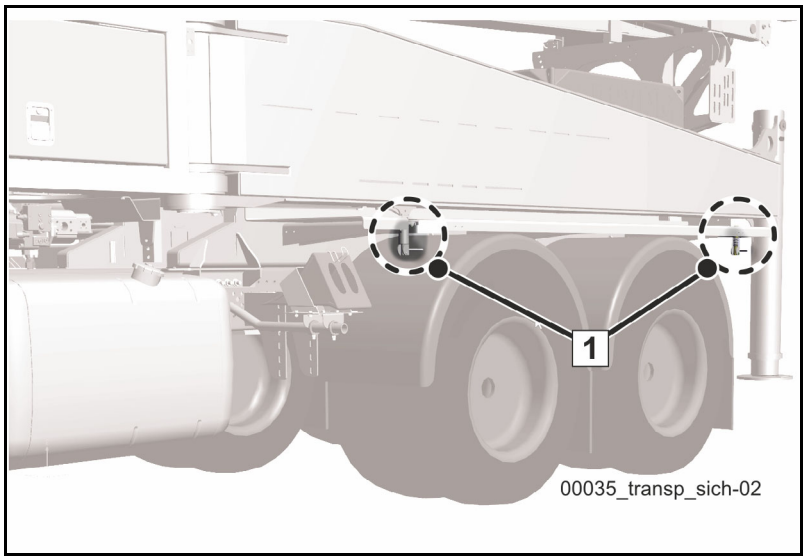


Fig. 141 Example illustration of the transport safety device (40/50-metre class); rear outrigger

3.8.8.3.1 Positions of transport safety devices for S56SXF and S65SXF outriggers

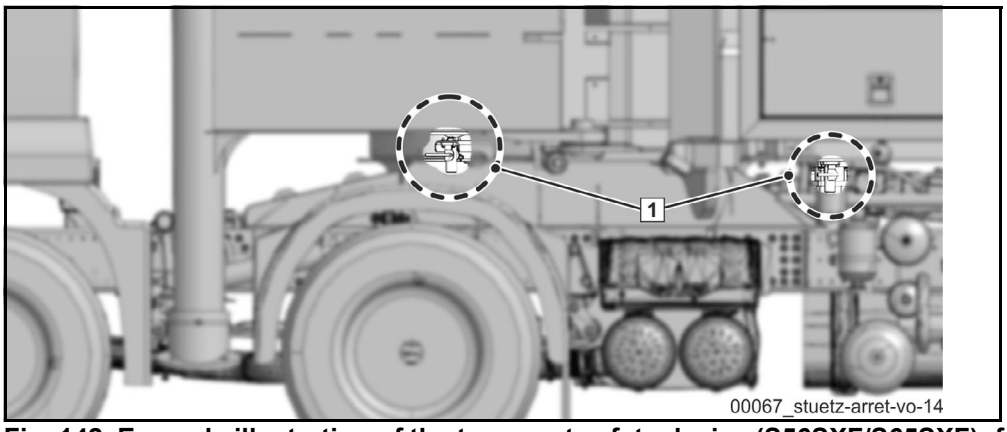


Fig. 142 Example illustration of the transport safety device (S56SXF/S65SXF); front outrigger

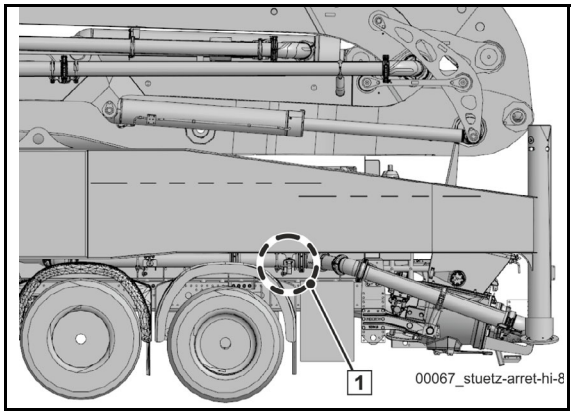


Fig. 143 Example illustration of the transport safety device (S56SXF/S65SXF); rear outrigger

3.8.9 Switch on “LOCAL” operating mode

Hydraulically powered outriggers may only be operated in “LOCAL” mode!

If necessary, switch to “LOCAL” mode and activate the function.

Select an outrigger system.

For detailed information, read the “Control system” chapter.

3.8.10 Outrigger control

In order to operate the outrigger, the release button **(Fig. 144)** must be held down while the control levers are actuated.

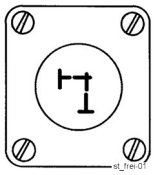


Fig. 144 Release button

If only one control element is actuated, or an element is released during control, then no movement is possible.

The outrigger can only be controlled from the control blocks on the corresponding side of the machine.

3.8.10.1 Outrigger control for 20-metre class

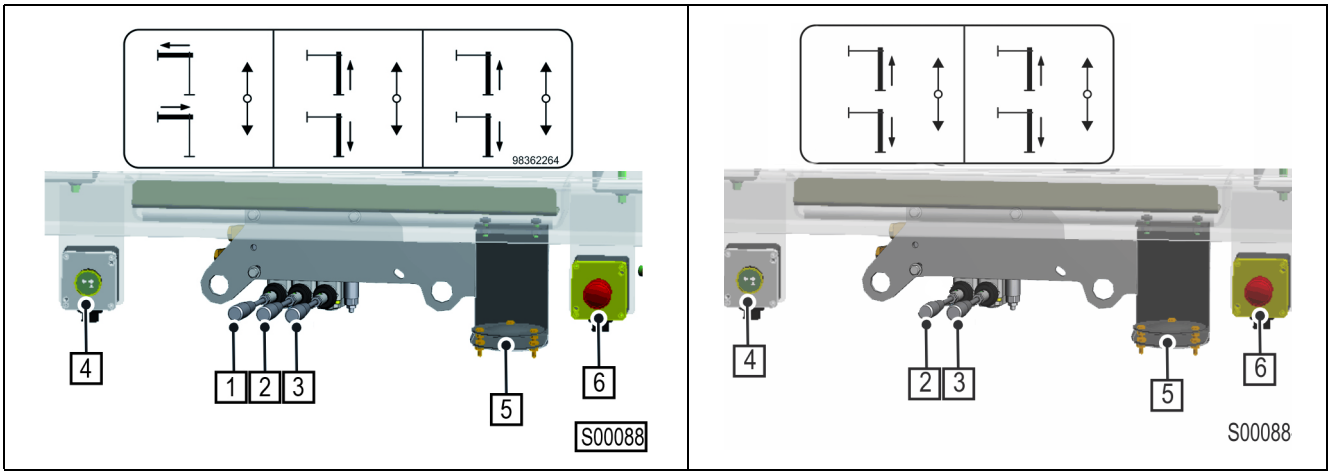


Fig. 145: Example: Outrigger control

Caption (Fig. 145:)			
Pos.	**Description**	**Pos.**	**Description**
1	Control lever 1	4	Release button
2	Control lever 2	5	Spirit level
3	Control lever 3	6	EMERGENCY-STOP button

Some machines have a number of outriggers that are mechanically-actuated.

Only pull the outriggers out horizontally using the handles provided for this **(Fig. 146)**.

Vertically, the outriggers are moved hydraulically.

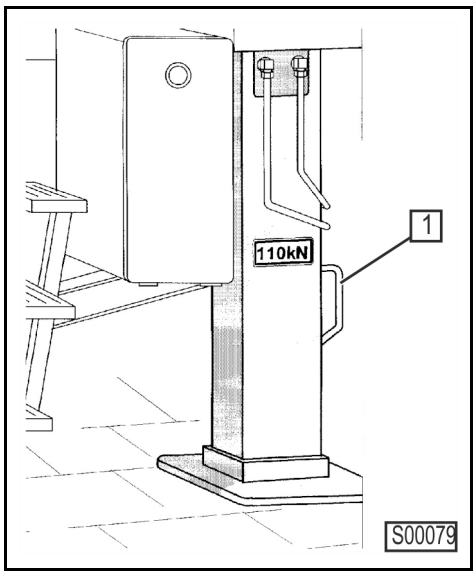


Fig. 146 Example of handles (1) on mechanical drawers

3.8.10.2 Outrigger control for 30-metre class

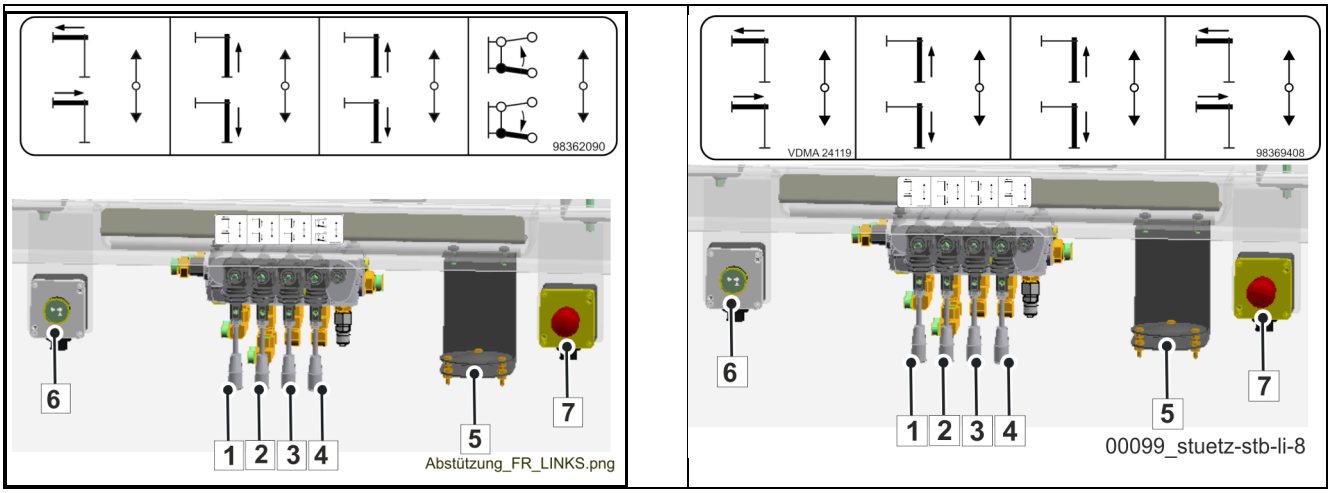


Fig. 147 Example: Outrigger control

Caption (Fig. 147)			
Pos.	**Description**	**Pos.**	**Description**
1	Outrigger front horizontal: Retract - 0 - Extend	5	Spirit level
2	Supporting leg front vertical: Retract - 0 - Extend	6	Release button
3	Supporting leg rear vertical: Retract - 0 - Extend	7	EMERGENCY-STOP button
4	Outrigger rear horizontal: Retract - 0 - Extend		

3.8.10.3 Outrigger control for 40- to 60-metre class

When extending folding outriggers (SX**F**), a specific order must be adhered to.

First, the folding element on the front bow outrigger has to be extended completely using the control lever (2) and the release button (1) **(Fig. 149)**. Only then can the bow outrigger be extended horizontally.

On machines with active sensors[1], this process is monitored.

On machines without (active) sensors[1], the operator is responsible for the correct order.

1. depending on machine equipment

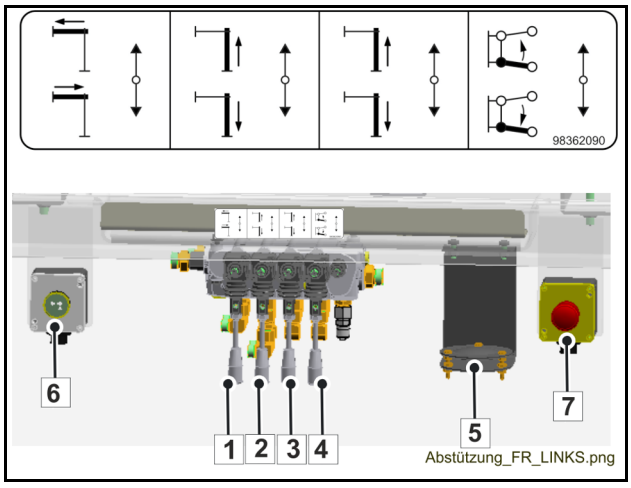


Fig. 148 Example: Outrigger control (40/50-metre class)

Caption (Fig. 148)			
Pos.	**Description**	**Pos.**	**Description**
1	Outrigger front horizontal: Retract - 0 - Extend	5	Spirit level
2	Supporting leg front vertical: Retract - 0 - Extend	6	Release button
3	Supporting leg rear vertical: Retract - 0 - Extend	7	EMERGENCY-STOP button
4	Outrigger rear horizontal: Retract - 0 - Extend		

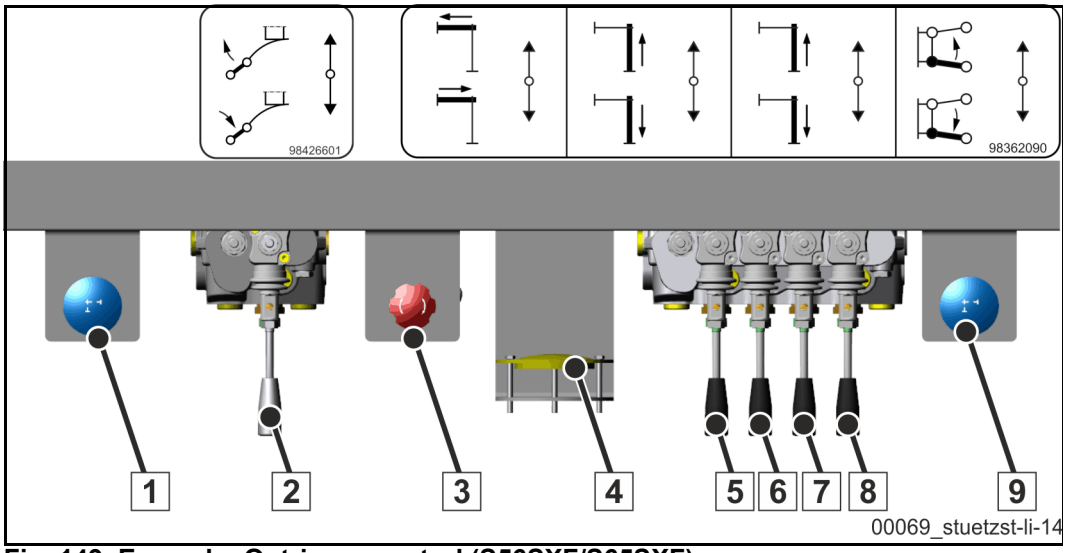


Fig. 149 Example: Outrigger control (S56SXF/S65SXF)

Caption (Fig. 149)			
Pos.	**Description**	**Pos.**	**Description**
1	Release button for front folding outrigger	6	Control lever, move front outrigger vertically.
2	Control lever for front folding outrigger	7	Control lever, move rear outrigger vertically
3	EMERGENCY STOP	8	Control lever, fold rear outrigger horizontally
4	Spirit level	9	Release button for large control block
5	Control lever, move front outrigger horizontally.		

3.8.11 Extend outriggers and position support pads

Danger!

Risk of being crushed in the danger zone of the outrigger!

Serious injury or death due to crushing.

Do NOT remain in the danger area while actuating the outriggers!

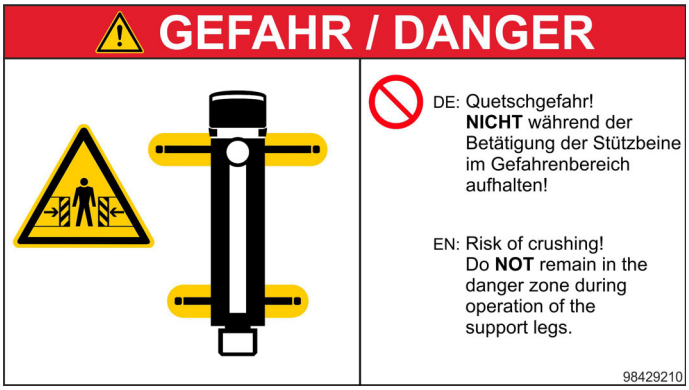


Fig. 150 Outrigger danger area (S20)

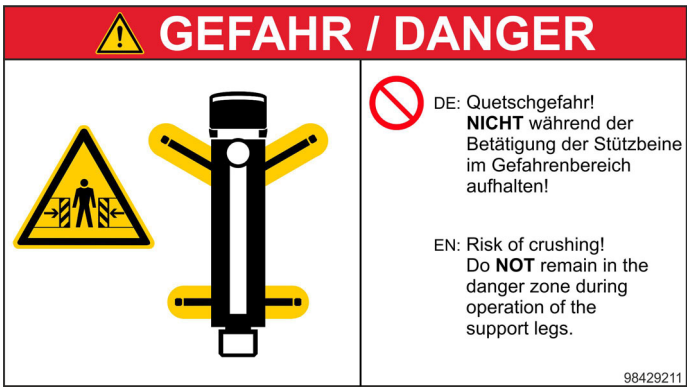


Fig. 151 Outrigger danger area (S24X / S28X / S31XT / S36X)

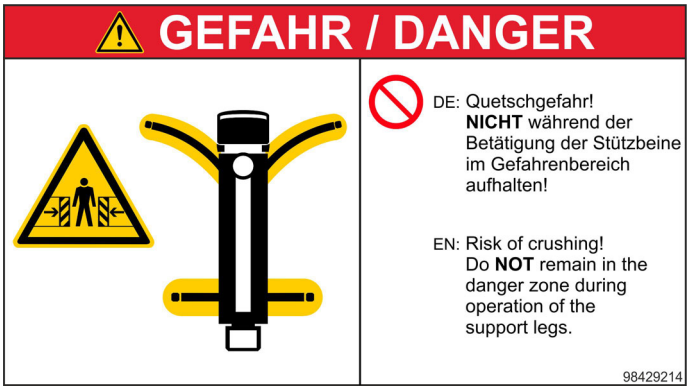


Fig. 152 Outrigger danger area (S39SX)

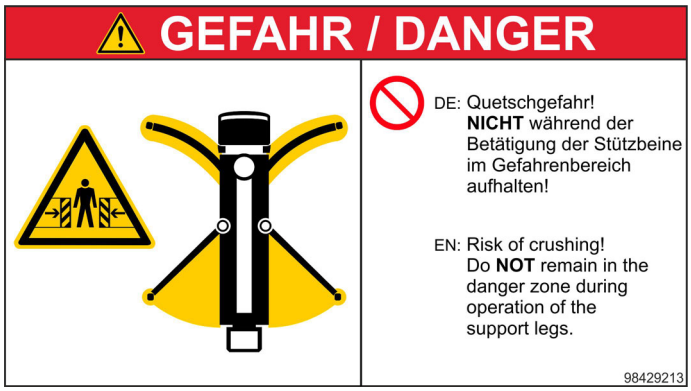


Fig. 153 Danger area of the outriggers for the 40/50-metre class

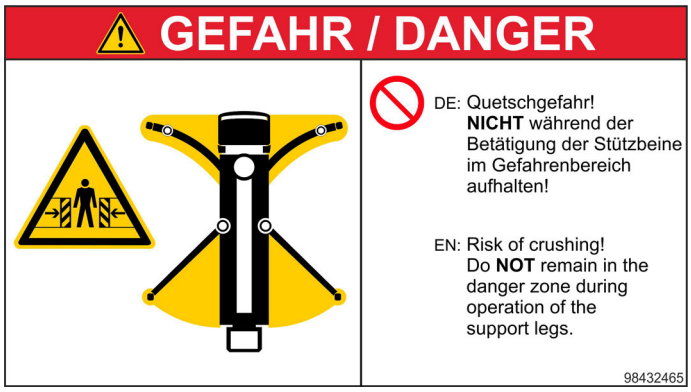


Fig. 154 Danger area of the outriggers of the S56SXF/S65SXF

- Always use the standard, load-distributing support pads, consisting of PE or multiplex support pads.

They are housed on the vehicle frame or in the outriggers by default **“Supporting surface extension”** on page 196.

- Make sure that all transport safety devices have been released.
- In full support, completely extend the front and rear outriggers horizontally. When using EASyflex (see **“EASyflex II outrigger system”** on page 587.), carefully extend the outriggers into the end positions in order to avoid hitting them against anything. For some machines, you may have to lower the front supporting leg slightly first in order to avoid colliding with the fender. For front folding outriggers, the folding parts must be extended first.
- Check the space beneath the supporting legs. The surfaces must be even and firm.
- Place the support pads centrally underneath each supporting leg. If necessary, only improve the positions of the support pads; do not move the outrigger.
- The load-distributing support pads must be undamaged and free of ice, oil, grease, etc.
- Raise the machine gradually by alternately actuating the control levers on both sides of the machine.
- Lock the transport safety devices again, if provided for in the design.

This prevents unnecessary stress on the outriggers and base frame, to which they would otherwise be subjected if only one supporting leg were extended, and prevents the machine from potentially slipping off of the support pads.

3.8.12 Align the machine horizontally

To be able to set up your machine horizontally, so-called "spirit levels" are installed on each outrigger control. **(Fig. 155)**.

The maximum permissible incline of all SCHWING machines is 3°.

The aim is always to be absolutely horizontal. 0° in all directions.

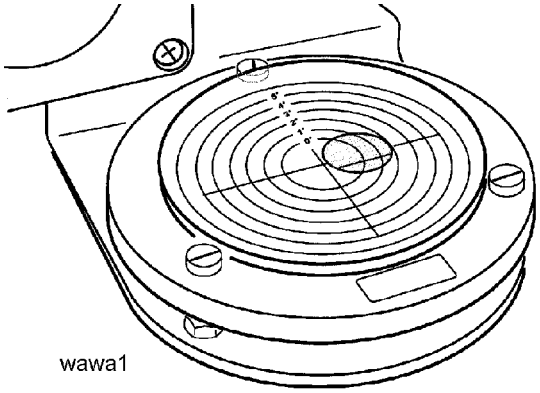


Fig. 155 Spirit levels

As soon as the outer edge of the bubble touches a circle of the scale from the inside, the displayed number of degrees is reached.

(Fig. 156) = The machine is positioned in the scales.

(Fig. 157) = The machine is inclined by 2°.

(Fig. 158) = The machine is inclined by 3°.

The maximum permissible incline is reached at 3° **(Fig. 158)**.

Fig. 156 Spirit level in scales

Fig. 157 2° incline

Fig. 158 Maximum permissible incline of 3°

3.8.13 Check outriggers after extension

- Note that there is no space between the outriggers (1) and base frames (2) after being raised (none of the vehicle wheels are touching the ground), see **(Fig. 159)** and **(Fig. 160)**. Should one of the outrigger stands not be in contact with the base frame, extend the supporting leg further until the outrigger stand is in contact with the base frame.
- Once the machine is positioned and aligned, reinsert the transport safety devices.

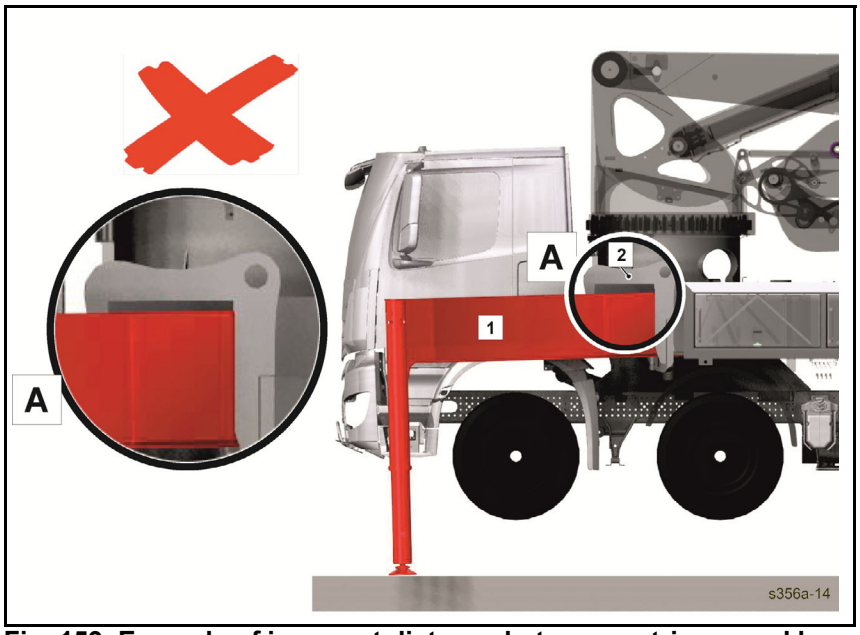


Fig. 159 Example of incorrect distance between outrigger and base frame

Caption (Fig. 159)	
Pos.	**Description**
1	Outrigger
2	Base frame

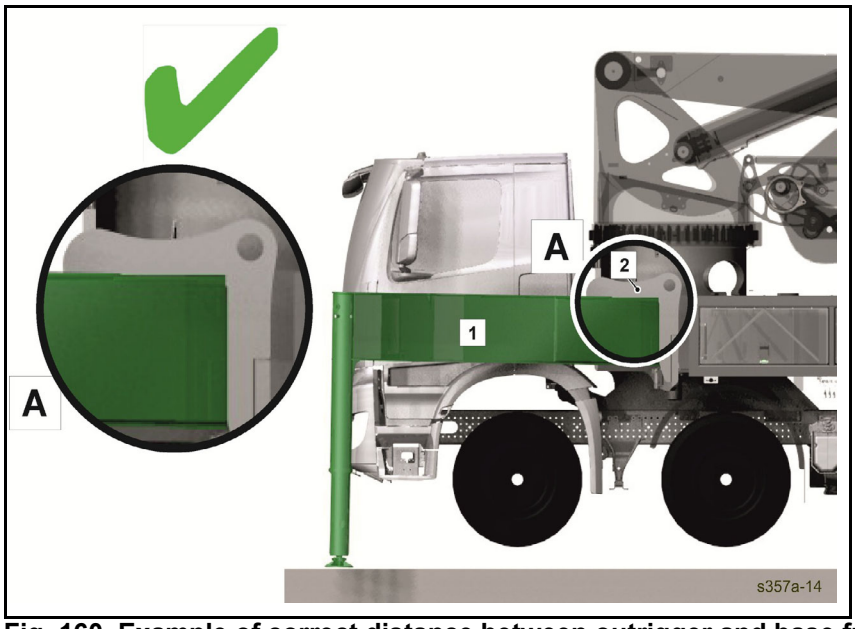


Fig. 160 Example of correct distance between outrigger and base frame

Caption (Fig. 160)	
Pos.	**Description**
1	Outrigger
2	Base frame

3.8.14 Protection against static charges

The equipotential bonding of machines to the ground may only be performed by electricians!

After connecting an earthing cable, measure the resistance.

If necessary, this test can be repeated during prolonged use.

Connecting the machine to the ground does not ensure protection against direct contact with a transmission line or in the event of a lightning strike!

Information

As of May 2012, SCHWING concrete pumps are equipped with a connection option for an earthing cable.

Before connecting the earthing cable, the supporting surfaces must be bare metal!

The earthing cable and conductive metal rod are not included in the scope of delivery of your SCHWING machine.

A stainless steel screw M12 with nut is pre-installed for the earthing connection on one of the two vertical spars (1) **(Fig. 161)** on the rock valve support (screw inside, nut outside).

For thick-walled plates, a stainless-steel M 12 screw is screwed in from the outside at this position.

As the threads are located on both spars (1), the earthing connection can be relocated as needed.

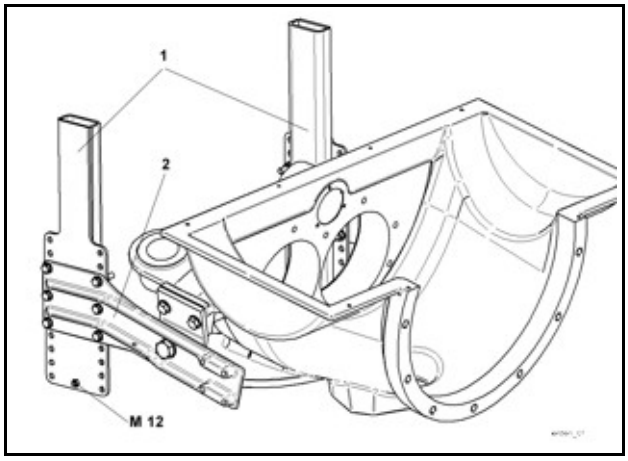


Fig. 161 Rock valve support

3.8.15 Prepare the underride protection (special equipment)

The underride protection (1) is in the drive position **(Fig. 162)**.

- Release both locks (2) **(Fig. 162)** on the underride protection **(Fig. 163)**.
- Lift the spring-activated underride protection until it reaches the limit stop.
- Secure the underride protection using the chain fastener on the left-hand side of the hopper (3) **(Fig. 164)**.

The underride protection is now in the operating position **(Fig. 165)**.

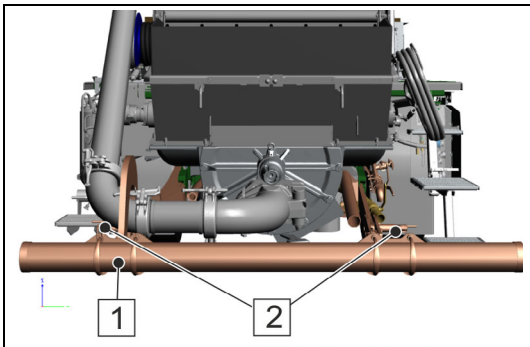


Fig. 162 Underride protection in transport position

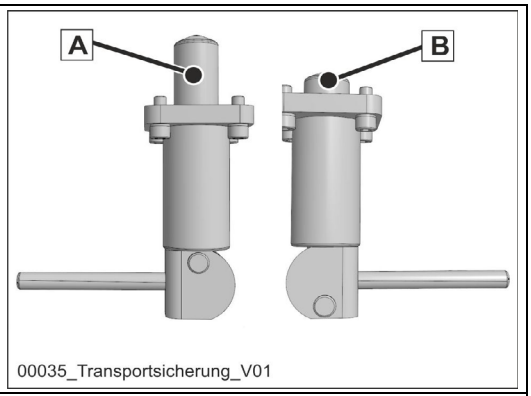


Fig. 163 “A” = secured / “B” = released

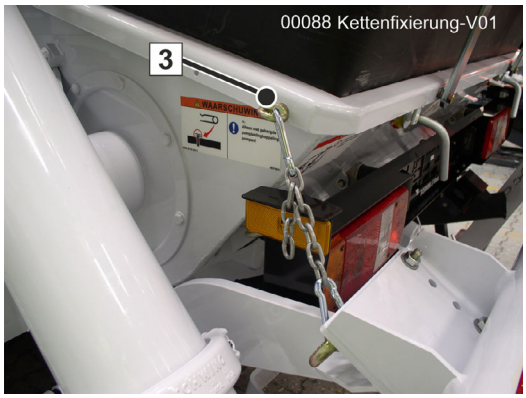


Fig. 164 Chain fastener

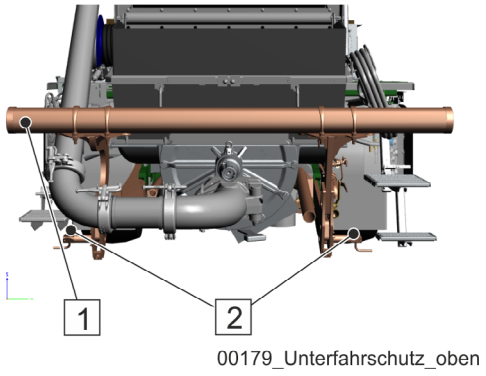


Fig. 165 Underride protection in operating position

3.8.16 Loading and lashing

Note that each machine must be individually loaded and transported. Accessories, operating materials such as plastic, hydraulic oil or water can change the weight of the machine when delivered. Prior to loading, determine the actual weight of the machine by weighing it.

Using the machine number, ask SCHWING for the machine-specific loading plans and loading box.

The machine-specific loading plan and the loading box allow precise information regarding, for e.g. dimensions and centre of gravity positions, to be obtained in advance. Only use suitable means of transport and lifting gear with sufficient load-bearing capacity, marking and valid testing. Make sure to read the safety manual.

Many attachment points on the machine are for assembly purposes only. They are not suitable for lifting the complete machine. Attachment points for lifting the complete machine are specially marked, see **(Fig. 166)**.

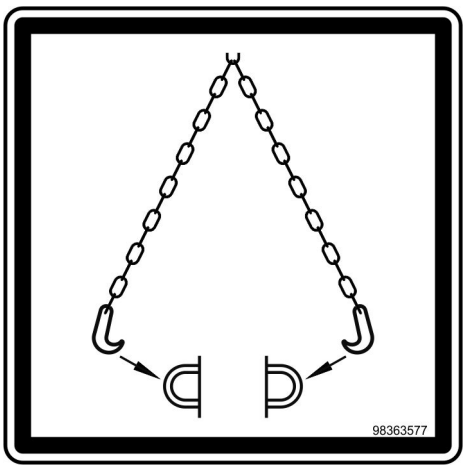


Fig. 166 Lifting eye marking

3.9 Operating the pumping line

This chapter describes how to operate the pumping line on various SCHWING products. The principle remains the same in each case.

Before each pumping operation, make sure that the pumping line system is in good working order.

3.9.1 Observation during operation

Prior to operation, make sure that the pumping line is in perfect condition.

Danger!

Pumping line under high pressure!

Serious injury or death.

Do NOT open the pumping line couplings under pressure!

Check the safety devices of the pumping line.

Warning!

Injury caused by the cocking lever springing open!

When mounting split couplings, injuries can be caused by the cocking lever springing open unexpectedly. Injuries such as bone fractures to concussions are possible.

Secure the cocking lever of the split coupling immediately after closing the cocking lever.

Secure the cup expansion couplings with the "Safety for cup expansion couplings" (clip pin).

A single inappropriate coupling can cause failure of the pumping line and accidents.

The laying and operation of pumping and hose lines may only be carried out by appropriately trained personnel!

During operation, the pumping line must be observed for leaks.

A leaking pumping line induces clogging due to drying up "bleeding" of the concrete.

In the event of leaks, stop operation immediately and remedy the leak.

Warning!

Risk of the pumping line bursting if the minimum wall thickness is not met!

The pumping line can burst without any external signs or if liquid escapes and seriously injure or kill people.

Check the wall thickness of the pumping line according to the operating instructions. Replace worn pumping line components.

Check the pumping line frequently with a suitable wall thickness measurement device according to the operating conditions, see chapter **(4.19)**.

SCHWING's customer service can recommend suitable measurement devices depending on the pumping line material being used.

We strongly recommend setting up the pumping line exclusively with appropriate SCHWING material.

3.9.2 Marking pumping pipes and elbows

All SCHWING pumping pipes and elbows are marked as follows, example **(Fig. 167)** - **(Fig. 170)**.

The marking for pumping pipes is stamped / engraved on the top side of a flange **(Fig. 167)**.

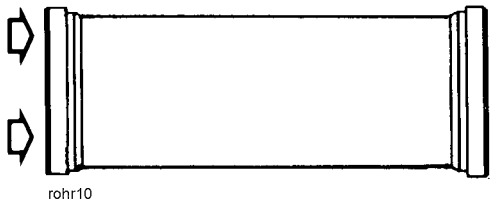
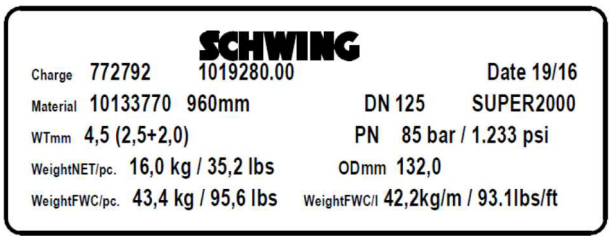


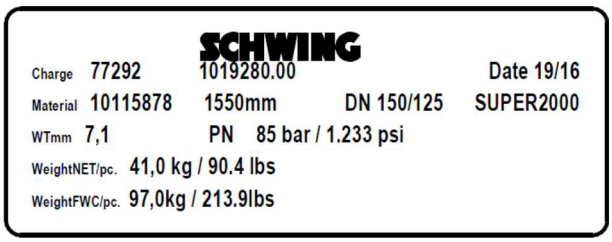
Fig. 167 Position of the tube marking until approx. 2017

Caption for (Fig. 167)	
Designation	**Meaning**
SH	Manufacturer SCHWING Herne
DN	Nominal size in mm (inner)
PN	permissible operating pressure in bar
s	Wall thickness



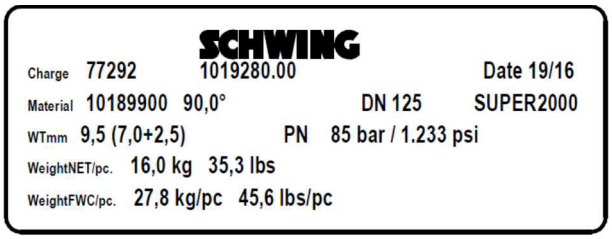
00065_Förderrohr_V01

Fig. 168 Pumping pipe marking as of approx. 2017



00065_Reduzierrohr_V01

Fig. 169 Tapered tube marking as of approx. 2017



00065_Rohrbogen_V01

Fig. 170 Elbow marking as of approx. 2017

Caption for (Fig. 168) - (Fig. 170)	
Designation	**Meaning**
Charge	Order no., customer no.
Date	Production week (MM/YY)
Material	SCHWING item no.
--	Dimensions mm/degree
DN	Nominal size in mm (inner diameter)
SUPER 1000	SCHWING quality label
WTmm	Total thickness (inside wall + outside wall)
PN	permissible operating pressure in bar
WeightNET/pc.	Net unit weight

Caption for (Fig. 168) - (Fig. 170)	
Designation	**Meaning**
OD	Outer diameter mm
Weight-FWC/pc.	Tube, elbow and tapered tube weight per unit, filled with concrete
WeightFWC/l	Tube weight per metre without flange, filled with concrete

3.9.3 Marking the pumping line on the placing boom

A distinctive type plate is located on the placing boom for the placing boom pumping line **(Fig. 171)**. The nominal sizes (DN) specified on this type plate are the maximum allowable.

The nominal sizes and the wall thicknesses of the pumping line and the gross density of the pumped concrete must not exceed the specified limits.

The maximum operating pressures (PN) specified on the components and type plates are the maximum permissible operating pressures for components in new condition. If the minimum wall thickness is not met, then replace the tubes and elbows.

With truck-mounted concrete pumps, the pumping pressure for rod and piston-side application is also indicated on the type plate of the concrete pump **(Fig. 172)**.

If no value is given for the rod side, it refers to a piston-sided pressurised concrete pump.

This concrete pump may not be interchanged!

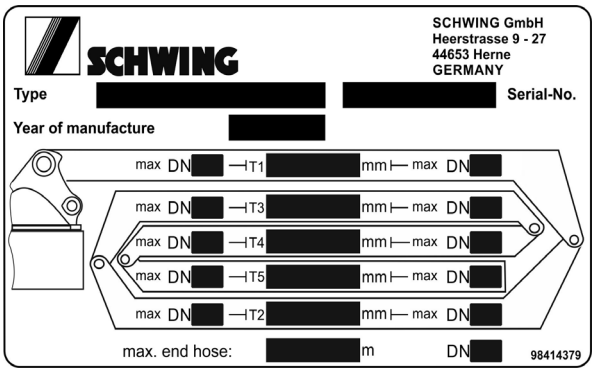


Fig. 171 Example: Type plate on 5-part boom

Caption for (Fig. 171)	
Designation	**Meaning**
max. DN	max. nominal size for inlet side
T	Length of the pipe on the corresponding boom
max. DN	max. nominal size for outlet side

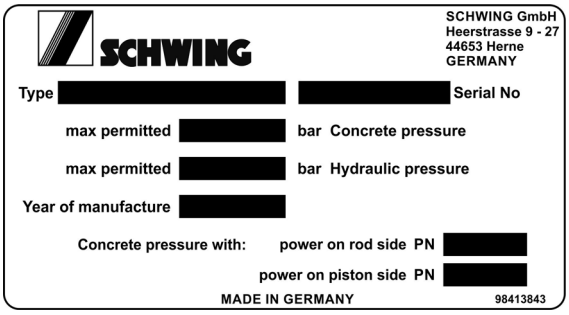


Fig. 172 Concrete pump type plate

3.9.4 Pumping line on the placing boom

Normally, a truck-mounted concrete pump delivers the concrete directly via the pumping line of the assembled placing boom.

A separate placing boom is supplied by a separate concrete pump.

Danger!

Loss of stability due to excessively heavy pumping lines on the placing boom!

The machine can topple over and cause severe or even fatal injuries as a result.

The concrete pumping line installed on the placing boom is an integral part of the machine and must not be changed.

In extreme cases, the machine may topple over due to the increased tipping force caused by a pumping line that is too heavy.

Pumping pipes with an excessive tare weight (thicker walls) and pumping pipes with larger diameters can overload the placing boom.

Unsuitable pumping lines cause damage (especially broken tube holders, cracks in boom profiles, etc.).

Due to changes to the pumping line, other safety-relevant adjustments of the machine may be mandatory.

After major changes that are not carried out by SCHWING, placing booms must be inspected by an expert before being recommissioned, see **(3.9.5)**.

3.9.5 Disclaimer

Independent modifications to the machine and using spare parts and accessories that have not been approved by SCHWING fall under the definition of “improper use”.

This also applies to the use of individual parts, such as: Tubes, couplings, elbows, etc.

We would like to draw attention once again to the fact that SCHWING is not liable for damages caused by improper or negligent operation, maintenance and repair or improper use.

This also applies to expansions and conversions, as well as other changes to the machine not approved by SCHWING.

For mounting and operation of separate pumping lines (tubes or hoses), the operator bears sole responsibility!

3.9.6 Reconnectable concrete pumps

In the interest of a high concrete delivery rate, reconnectable concrete pumps are usually supplied with rod-side pressure.

Warning!

Risk of pumping lines bursting due to excessive delivery pressure!

Pumping lines can burst due to overloading.

Make sure that the delivery pressure is always below the maximum permitted operating pressure (PN) for the pumping line/pumping line components.

With piston-side pressure, only use suitable pumping line material.

These concrete pumps must not pump through the end hose and boom pumping line with piston-side pressure.

Reconnectable concrete pumps can produce concrete pressures with piston-sided pressure exceeding the maximum permissible operating pressures of the boom pumping line and other components.

The concrete pressures for rod and piston-side pressure are indicated on the type plate of the concrete pump, see **(Fig. 173)**.

Separately installed pumping lines are an exception.

The pumping pressure that can be reached by the hydraulic pressure must not exceed the maximum permissible pumping pressure of the pumping line components in use.

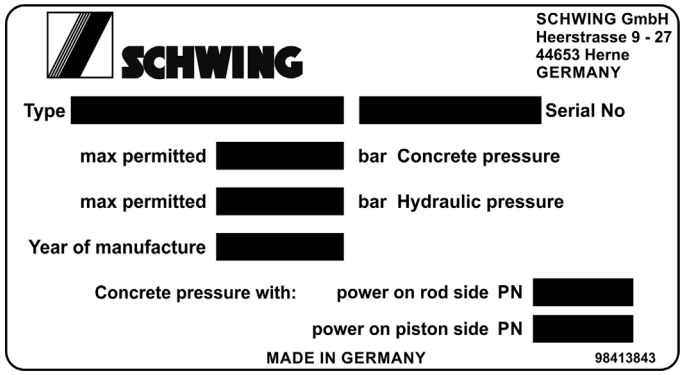


Fig. 173 Concrete pump type plate

Danger!

Risk of being crushed and sheared by moving machine parts in the pumping line!

Serious injury or death.

Do NOT reach into pumping line valves when the machine is running. Before opening the pumping line system, turn the machine off.

Danger!

3.9.7 Short outlet (foldable)

The foldable pipeline outlet can make the connection flange of the rock valve accessible and cleaned trough the foldable pipeline outlet.

In order to make the connection flange freely accessible:

1 Pull the clip pin (1) **(Fig. 174)**

2 Loosen the wedge (2)

3 Remove the coupling (3)

4 Pull the clip pin (4) out of the wedge (5)

5 Remove the wedge (5) **(Fig. 174)** and keep it ready to use as a chock for the hinge (7)

6 Fold open the outlet (6) to the right

7 At an opening angle of approx. 100°, the wedge (5) **(Fig. 174)** can be wedged into the notch on the hinge, as illustrated in **(Fig. 175)**.

The connection flange of the rock valve is now freely accessible and can be cleaned.

Once all the work on the flange of the rock valve has been completed, proceed in reverse order to fold back the pipeline outlet and mount to the pumping line of the truck-mounted concrete pump.

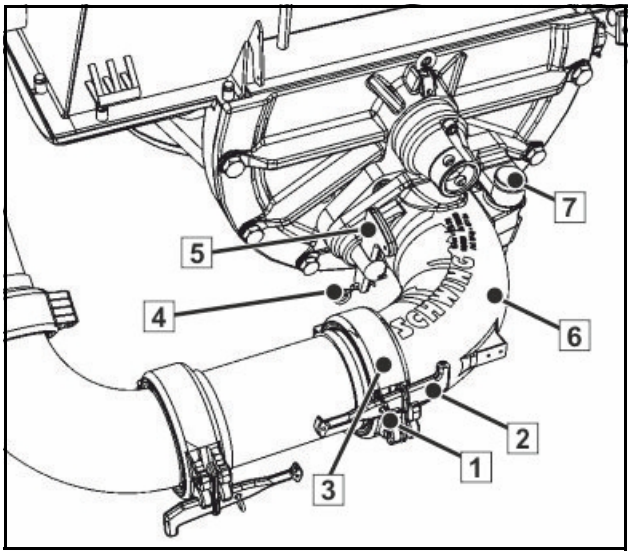


Fig. 174 Foldable outlet

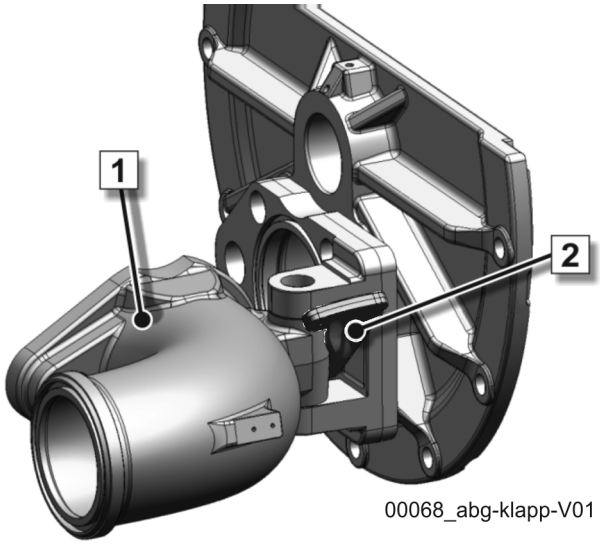


Fig. 175 Wedge lock

3.9.8 Short outlet (foldable and rotatable)[1]

In order to connect a separate pumping line more easily, certain SCHWING truck-mounted concrete pumps can be optionally equipped with a foldable and rotatable outlet (6; **(Fig. 176)**).

The short, foldable outlet (standard) can be fully replaced by the foldable and rotatable outlet.

In order to rotate the foldable and rotatable outlet:

1 Pull the clip pin and remove the wedge (1) and coupling (5) first

2 Pull the clip pin and remove the wedge (2)

1. Optional, only for truck-mounted concrete pumps

3 Open the foldable and rotatable outlet

4 Loosen both the safety screw (4) and the second safety screw offset by 180° by approx. half a rotation

5 Rotate the foldable and rotatable outlet into the required position (e.g. 6; **(Fig. 176)**) and fold it back

6 Reinsert the wedge (2), but do not hammer it in place yet

7 If necessary, correct the position of the foldable and rotatable outlet and then hammer the wedge (2) down. Secure the wedge using the clip pin.

8 Reattach the upper and lower safety screws (4) Connect a separate pumping line.

In order to reconnect the foldable and rotatable outlet with the pumping line of the machine, proceed in reverse order.

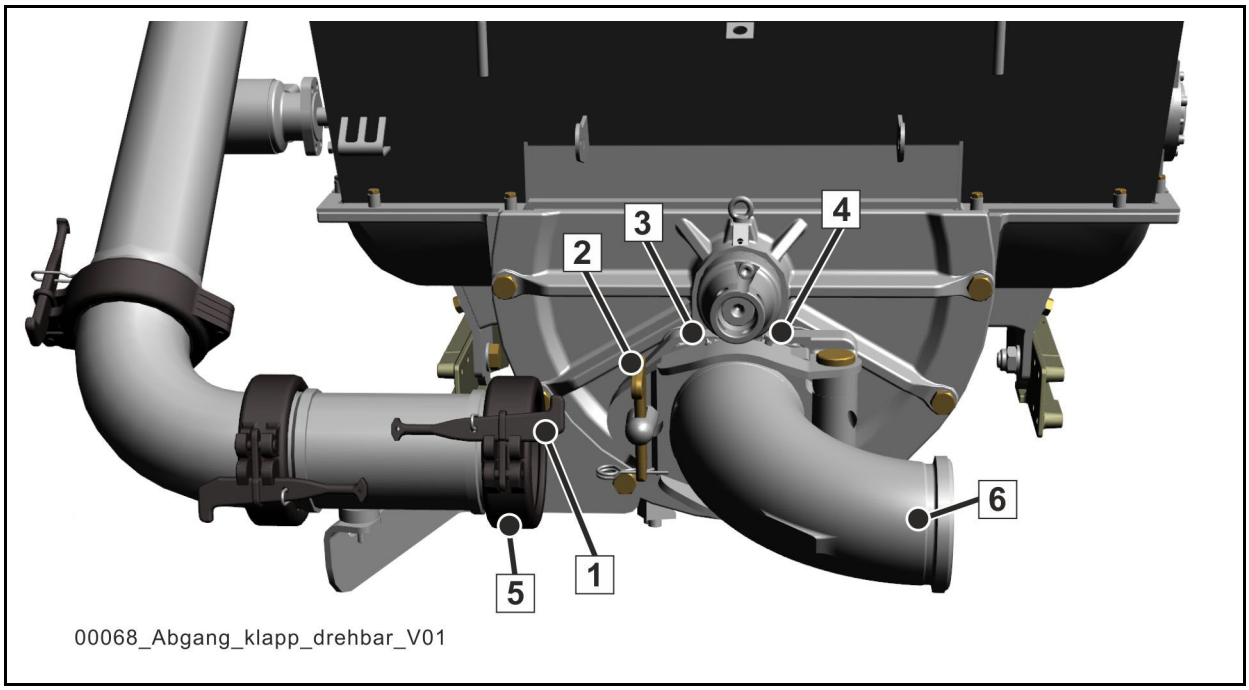


Fig. 176 Outlet, foldable and rotatable

3.9.9 Large outlet DN 180/180/150 (foldable)

The folding function is the same as for the short outlet. The larger outlet 180/180/150 has the advantage of having less concrete resistance.

Use the “large outlet” when pumping concrete that is difficult to pump.

The larger outlet 180/180/150 also has a 14-degree elbow mounted on the rock valve, see (1) **(Fig. 177)**.

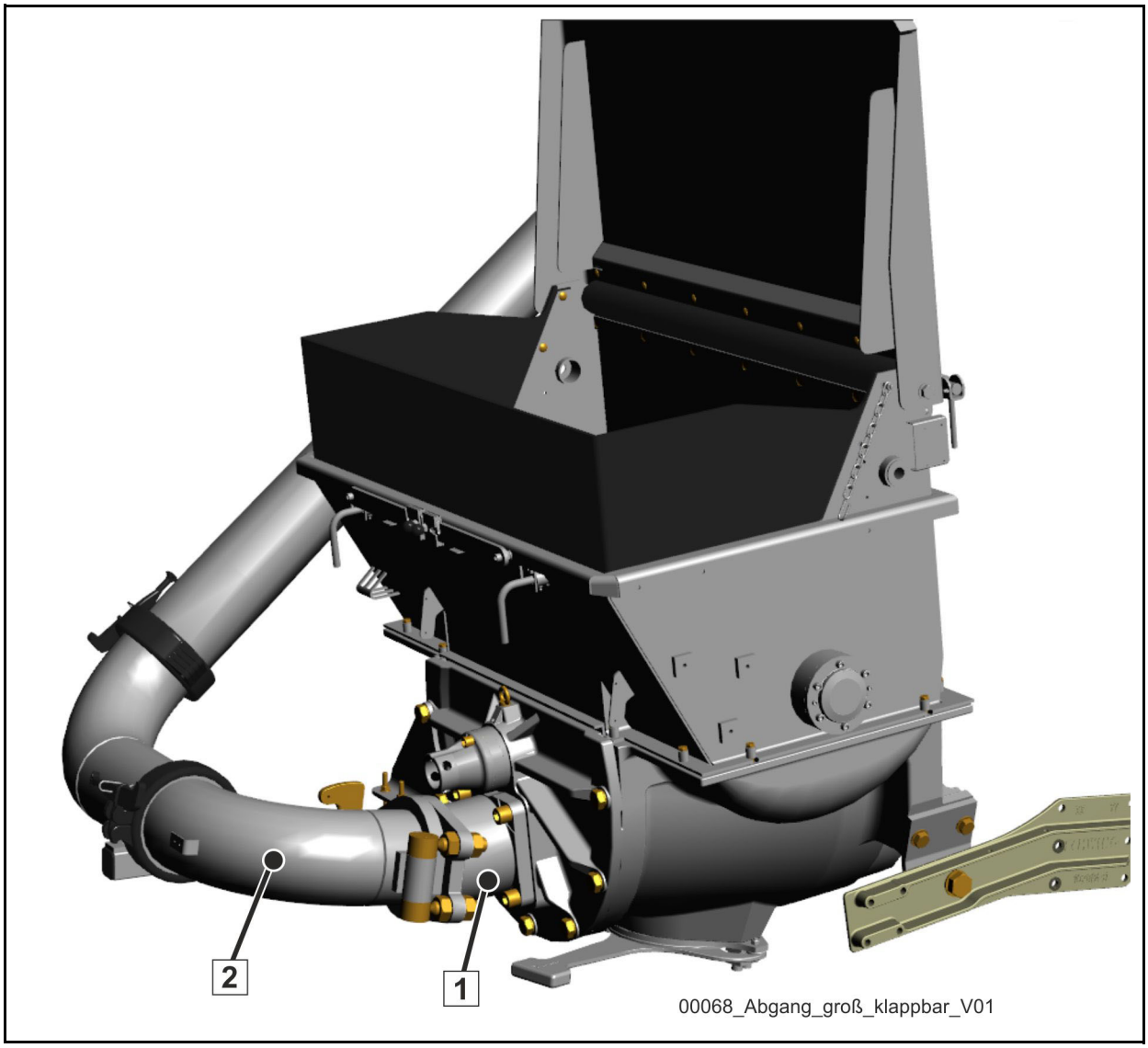


Fig. 177 Large outlet, foldable

3.9.10 Servicing the foldable and rotatable outlet

Lubricate the foldable and rotatable outlet according to the maintenance schedule **(chap. 4)**.

Actuate the grease gun until the grease visibly emerges.

Lubricate the seal of the split coupling with lubricating grease prior to mounting.

Clean used seals and check them for damage prior to mounting.

3.9.11 Separate pumping line

The use of a stationary concrete pump / trailer pump must always be planned carefully.

In addition to the selection of the right pump, the selection and installation of the pumping line is of great significance.

Both must be done with great care and expertise.

SCHWING offers an extensive range of pumping lines and accessories.

Should you have any questions regarding the pumping line, please contact SCHWING Customer Service.

When selecting the pumping lines, observe the maximum possible pumping pressure of the concrete pump, depending on the:

- Drive power of the concrete pump
- installed pump kit
- Application of the differential cylinder

Certain stationary concrete pumps can, for example, generate a pumping pressure of over 200 bar, see type plate.

These maximum values are rarely achieved during the normal operation.

However, given that, in the event of clogging, the complete pipeline between the concrete pump and the clog is under maximum pressure, the entire pumping line must be able to tolerate these values.

Separate pumping lines are available in different versions:

1 Pumping pipes for split couplings **(Fig. 178)**

These correspond to the system used for placing booms. They can be used with a pressure of up to 85 bar depending on the nominal sizes (DN). Separately installed pumping lines are suitable up to 110 bar.

Due to the external seal (3), which must be removed and cleaned with each modification, this solution as a separate pumping line is not as economical as the following ones:

2 Pumping pipes with a male and female flange for cup-tension couplings **(Fig. 179)**.

The following versions are available:

a) Standard tubes up to 4.5 mm thick walls (depending on the nominal size) are suitable for up to max. 110 bar.

b) Thick-walled tubes with walls that are 7.1 mm thick are suitable for up to max. 160 bar.

c) Ultra high pressure tubes with a wall thickness of 7.1 to 10 mm (depending on the nominal size) are suitable for up to 200 bar of pumping pressure.

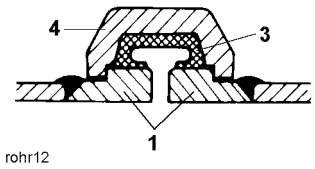
Ultra high pressure tubes are fitted with special high-pressure nozzles **(Fig. 180)**.

They are indispensable for using our concrete pumps SP 3800 - 9500 HDR.

Cup expansion couplings are also used for our extreme pressure tubes.

Information

The figures show typical characteristics of the flange. The exact design is slightly different depending on the nominal size.



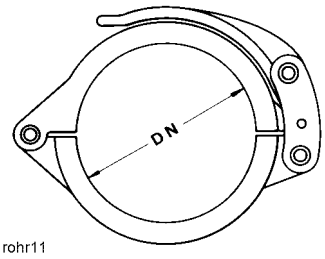
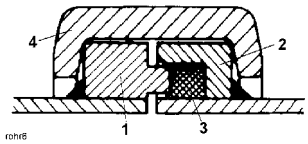


Fig. 178

1 - Flange
3 - Seal
4 - Split coupling



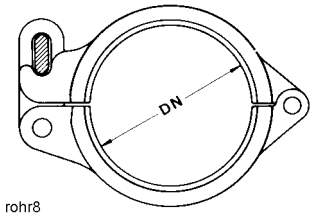
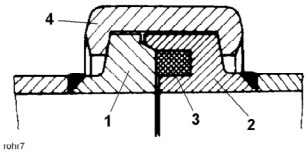


Fig. 179



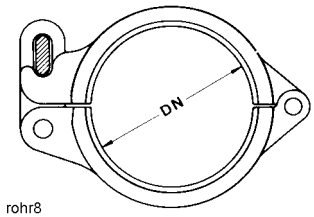


Fig. 180

1 - Flange with male face
2 - Flange with female face
3 - Seal
4 - Cup expansion coupling

3.9.12 Concrete pumping hoses

3.9.12.1 End hoses

An end hose is connected at the end of the pumping line for the distribution of the concrete.

Danger!

Danger to life due to uncontrollable movements of the end hose!

Serious injuries or death due to flapping end hose, spraying concrete and stones shooting out during pumping, after removing a blockage or when cleaning.

Remaining in the danger zone during these tasks is prohibited.

Observe the following points in particular:

- The hose must hang freely when commencing pumping, when starting to pump again, and after blockages. No-one may remain in the danger zone of the end hose. The diameter of the danger zone is double the length of the end hose. It is prohibited to guide the end hose during pumping.
- Do **NOT** use fixed end pieces, reductions or extensions on the end hose! Connecting hoses with double-sided fixing are not permitted for use as end hoses!
- Do **NOT** use a longer end hose!
  The maximum lengths and nominal sizes of the end hose are given for placing booms.

In exceptional cases, modifications and extensions are only permitted in strict accordance with the manufacturer's instructions, see the "End hose modification options" table in the ET catalogue. When using a longer end hose, the diameter of the danger zone also increases!

3.9.13 Connecting hoses

Connecting hoses with double-sided fixing can be used as flexible intermediate pieces in rigid pumping lines based on their permissible pumping pressure.

3.9.14 Hose pipes

Multiple connecting hoses are often connected to hose pipes in mobile restoration operations.

The hoses are usually carried on a specially equipped truck-mounted concrete pump, installed before use and removed again after use.

3.9.14.1 Installing and operating a hose pipe

The installation of the hose line, as well as its operation, requires special care and expertise.

Danger!

Danger to life due to flapping hoses!

Hose lines can move in an uncontrolled way during operation and seriously or fatally injure people.

Block off the danger zone, fix the hose lines and cover in a suitable manner if required!

In order to avoid a premature failure and possible accidents, ensure the following:

- Only use functional, clean hoses, couplings, seals, etc. of the same system to set up a hose pipe.
- The maximum possible pumping pressure of the concrete pump must not exceed the permissible pumping pressure of all pumping line parts.
- The concreting personnel at the placement site must be aware of any potential dangers and be familiar with all necessary work.
- Install hoses in widest possible radius - do not bend
  (Radii that are too narrow cause abrasion on one side, thus allowing any bends to quickly destroy the hose. Narrow radii and bends encourage clogging and cause the hose to pulsate).
- Do not pull hoses, especially not over sharp edges.
- Do not twist hoses.
- Do not allow hoses to hang loose.
- Do not strike the hoses.
- Place hoses and fasten securely with belts. Do not use incising fixing parts.
- Do not drive over hoses. Place hose pipe in a protected manner.
- No unauthorised persons may remain near the hose pipe during pumping operations.

- Moisten hose with water, then pump with flow mixture.
- Always observe the maximum grain size, depending on the diameter of the hose.
- Pump at a low delivery rate, hose must remain still.

3.9.14.2 Cleaning the hose pipe

Danger!

Danger to life due to flapping hoses!

When cleaning with compressed air, the hose lines may make uncontrolled movements and seriously or fatally injure people.

Cleaning hose lines with compressed air is prohibited, see safety manual.

Hoses must be carefully cleaned after each use.

A thorough internal cleaning is especially important for this.

Dirty hoses wear out faster and cause clogging.

Suck back the cleaning ball, then knock off individual hoses and rinse thoroughly with water.

If it cannot be sucked back, knock off individual hoses, tip out and rinse thoroughly with water.

- Always make sure that the hose system is perfectly clean.

A clean hose helps prevent clogging.

Dried-up concrete can coalesce with rubber.

This means that not only the remaining concrete, but possibly a piece of rubber, will be pulled out during the next pumping.

3.10 Operation with local control

The local control is primarily used for cleaning the machine.

Both hands are needed to clean the rear section of the machine, which would make a remote control more of a hindrance here.

All of the functions needed for cleaning are located on the local control unit, see the “Control, warning and steering elements” chapter.

In “REMOTE” operating mode, the local control unit’s functions are all locked except for the floodlights.

In “LOCAL” operating mode, all of the local control unit’s functions are available.

Information

The agitator and vibrator work automatically in “REMOTE” operating mode.

The local control is locked in “REMOTE” operating mode.

Operating data and malfunctions that occur while using the local control unit are output on the display of the control system.

3.10.1 Enabling local control

The local control is activated during running operations in the control system by selecting and activating “LOCAL” operating mode.

3.10.2 Position of the local control unit

The local control unit (3) is in supply mode **(Fig. 181)**.

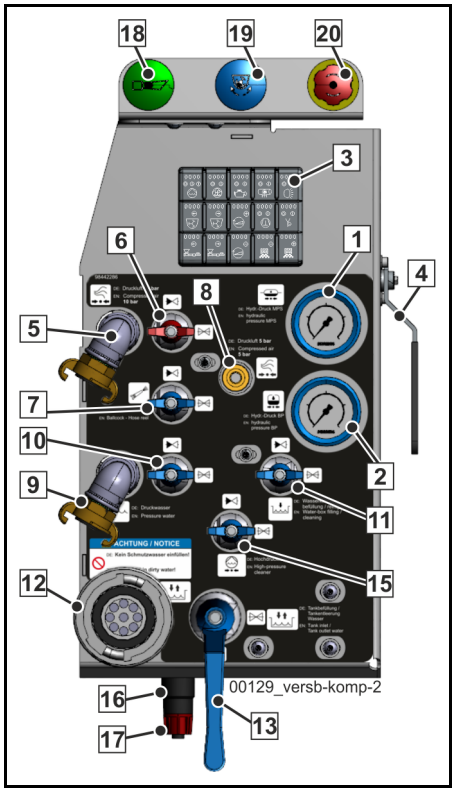


Fig. 181 Supply control

3.11 Remote control

No stationary control platform is defined for our truck-mounted concrete pumps.

Normal working operation is only permitted using the remote control unit.

Control devices (controls) directly on the machine may only be used for:

- Supporting the machine
- Maintenance (repairs, servicing, cleaning)
- Emergency operation.

In this manual, “working operation” refers to pumping medium as well as every placing boom movement.

Select your location so that you can easily see the site where the medium is being pumped and communicate with the mixer driver.

If this is not possible, guides are absolutely mandatory.

Operating instructions for the remote control used can be found in chapter **“Remote control”** on page 529.

Caution!

Danger due to unattended machine!

A ready-for-use machine can be operated intentionally or unintentionally by unauthorised persons at any time.

Secure the machine against unauthorised operation at all times.

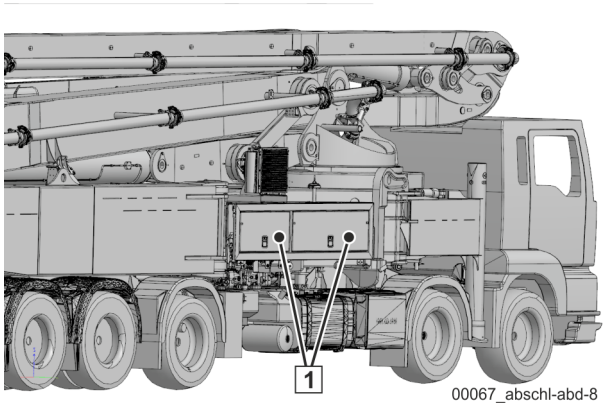


Fig. 182 Example: lockable covers (1)

3.12 Safety and warning notices: Placing boom

This section contains the safety and warning notices for working with the placing boom and represents an extension of the safety manual.

The placing boom is designed for concrete with a maximum specific weight of 2400 kg/m³.

- Control of the placing boom during work operations is principally carried out using the remote control.
- Always choose your position for operating the machine so that you can see the entire working range. If this is not possible due to the jobsite, an instructor must be consulted.

Caution!

Danger due to unattended machine!

A ready-for-use machine can be operated intentionally or unintentionally by unauthorised persons at any time.

Secure the machine against unauthorised operation at all times.

Before operating the placing boom, the following warning notices must be observed:

Danger!

Danger to life due to insufficient distance from high-voltage lines!

Death due to electric shock.

Observe the distances from the safety manual.

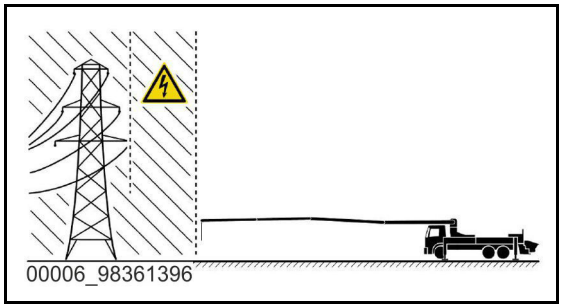


Fig. 183 Warning sign on the machine: Observe the minimum distance between the machine and the electrical transmission lines!

Warning!

Damage to the placing boom due to prohibited placing boom configuration during emergency operation or if there is a fault in the control system!

If the joint is hyperextended past the vertical position of the placing boom while in backwards position, the placing boom may be overloaded or damaged.

Placing boom sections must NEVER be driven in backwards position. Please observe the control system instructions.

Warning!

Loss of stability due to prohibited placing boom configuration!

Serious injuries or death can be caused by the machine tipping over.

The end hose must NOT be extended past the vertical position of the placing boom while in the backwards position.

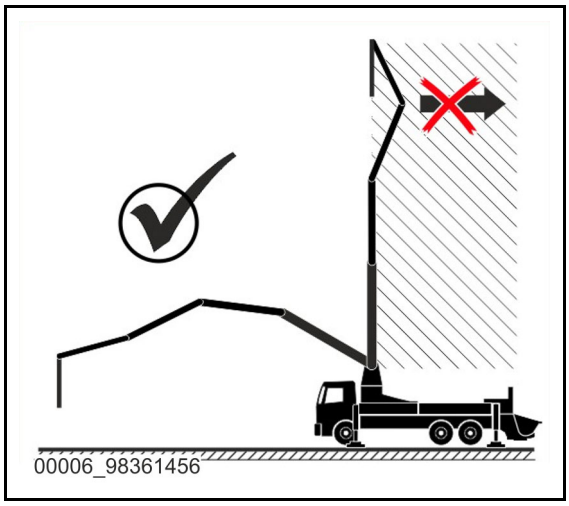


Fig. 184 Warning sign on the machine: Do NOT place the end hose in backwards position!

Warning!

Loss of stability due to using placing boom as lifting gear!

Serious injuries or death can be caused by the machine tipping over.

The placing boom must **NOT** be used to lift loads.

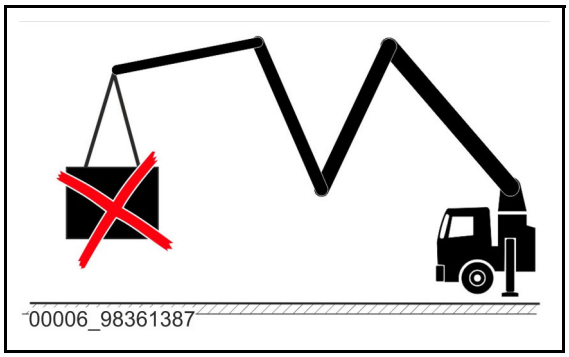


Fig. 185 Warning sign on the machine: DO NOT use the concrete placing boom as a crane!

Warning!

Risk of injury due to unauthorised presence under the placing boom!

Serious head injuries or death possible.

Remaining beneath the placing boom is prohibited.

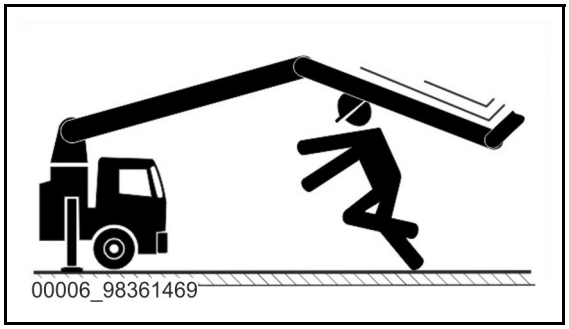


Fig. 186 Warning sign on the machine: Do NOT remain under the placing boom!

Warning!

Risk of falling when climbing onto the placing boom!

Serious injury or death possible.

It is prohibited to mount the placing boom, climb up it or misuse it as a work platform or climbing aid.

3.12.1 Driver's cab protection

Collisions with the driver's cab, without mounting parts (e.g.: rotating beacons), are prevented by the VECTOR control system.

The placing boom can only be completely rotated if boom section 1 can no longer collide with the driver’s cab.

The automatic driver’s cab protection can cause large vertical distances between the placing boom and the driver’s cab.

When updating your “VECTOR” control system, please make sure that the driver’s cab protection is configured as it was before the update.

Attention!

Collisions between placing boom and components attached to the driver’s cab subsequently!

Components that have been attached to the drive’s cab subsequently (e.g., rotating beacons) are not taken into account by the control system. The placing boom can collide with these attachments.

Always monitor the placing boom while it is moving.

Attention!

Collisions between the placing boom and the machine or other objects due to insufficient monitoring of the placing boom!

Possible machine damage or material damage to objects.

Always monitor the placing boom while it is moving in order to prevent collisions.

3.12.2 Preventing boom collisions

Due to their flexibility and compact, space-saving design, SCHWING placing booms must be folded in and out in a specific manner.

Follow these guidelines as carefully as possible to avoid damage to your placing boom.

Observe the placing boom constantly and avoid contact with machine parts and obstacles.

Be careful when operating several movements simultaneously.

Attention!

Damage due to not following the order when folding the placing boom in and out!

Serious damage, including complete failure of the entire placing boom.

When folding the placing boom in and out, the order must be followed.

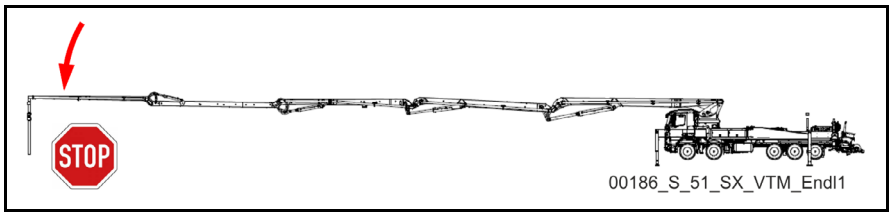


Fig. 187 Placing boom extended, movement stopped

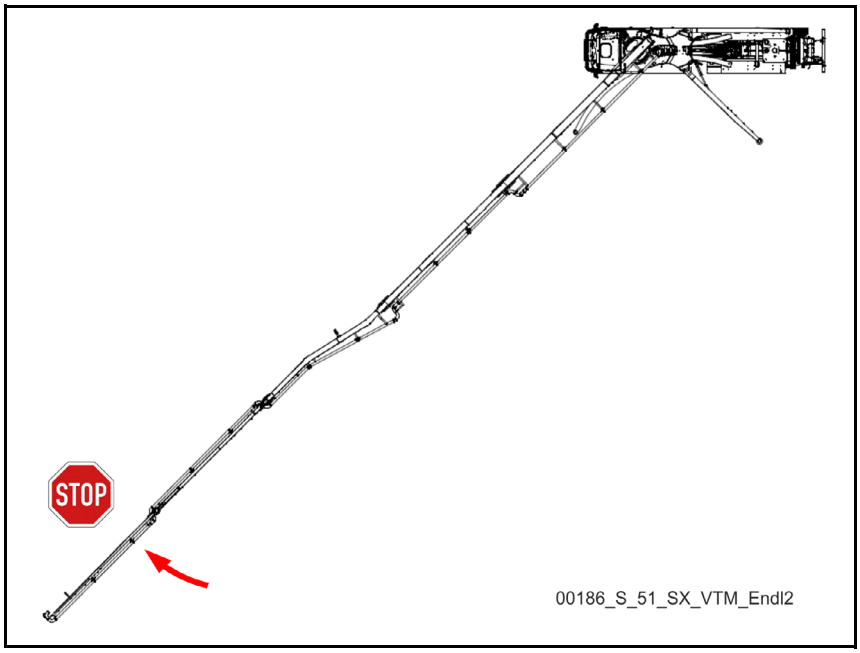


Fig. 188 Placing boom extended, turning movement with EASy

3.12.3 End positions

In order to avoid tearing the hydraulic hoses, the slewing movements of the placing boom are electrically switched off at the end positions. The control will reduce the maximum possible movement speed shortly before reaching the end position (danger zone).

Actuating the control lever on the remote control again causes an acoustic signal to sound. The display in the VECTOR control shows the shutdown.

By controlling in the opposite direction, it is possible to leave the shutdown areas.

Move the placing boom carefully and at a reduced speed when approaching the end positions, e.g. **(Fig. 187)/(Fig. 188)**, of the placing boom.

Attention!

Material damage to the placing boom due to excessive speeds!

Moving into the end positions at excessive speeds can damage the placing boom.

Always move carefully into the end positions at a reduced speed.

3.12.4 Storm and bad weather operation

During storms and bad weather, move the placing boom into the rest position. When using an outrigger on one side with EASy, the same maximum permissible wind speeds apply to the placing boom as they do to fully supported machines.

The work position of the placing boom does not play a role here. When wind speeds reach the permissible thresholds, the placing boom must be moved into the transport or rest position.

The wind speed at the height of the boom tip is decisive for this. The wind speeds according to the Beaufort scale are average speeds over a measurement period of 10 minutes. Within the measurement period, short-term gusts with higher wind speeds may occur.

Wind gauges are usually installed on jobsites so that you can find out the wind speed from the site management. If there is no wind gauge, find out about the current weather and wind situation from a reliable source.

- Placing booms with a vertical reach of 42 m or more may only be operated during winds of up to and including force 7 (51 km/h = 14 m/s).
- Placing booms with a vertical reach of less than 42 m may only be operated during winds with a force of up to 8 (72 km/h = 20 m/s).

Higher wind speeds endanger the stability and safety of the components.

During bad weather, there is a risk of lightning strikes!

Danger to life during lightning strikes. The machine and its surrounding area are charged with electricity. Earthing the machine does not decrease this risk. For this reason, please also retract the placing boom if there is a risk of lightning strikes.

3.12.5 Placing boom emergency operation

Danger!

Danger due to deactivation of the automatic placing boom monitoring or during emergency operation!

Serious injury and death very likely.

Monitor the placing boom at all times to prevent the machine from tipping over and collisions. Use a signaller if the danger zone is not completely visible.

Attention!

Machine damage due to moving the placing boom into prohibited areas during emergency operation!

The movement limits of the placing boom are not active during emergency operation. The placing boom can be moved into prohibited areas and cause material damage.

Emergency operation is only intended for folding together the placing boom if the control system is defective.

Using emergency operation to operate the machine is only permitted in emergency situations in order to move the placing boom into the transport or rest position.

When operating the placing boom using emergency operation, all electronic safety devices for the boom movements are inoperable.

A higher level of attention is therefore required of the operator in this operating mode!

Screw the emergency operation control levers into the control lever slots prior to use.

Remove the control levers from the control lever slots after use.

To prevent unauthorised persons from accessing the machine, the emergency operation control station must be locked along with all control levers.

During working operation, the covers on the emergency control devices must be locked.

3.12.6 Pumping

Danger!

Danger to life due to uncontrollable movements of the end hose!

Serious injuries or death due to flapping end hose, spraying concrete and stones shooting out during pumping, after removing a blockage or when cleaning.

Remaining in the danger zone during these tasks is prohibited.

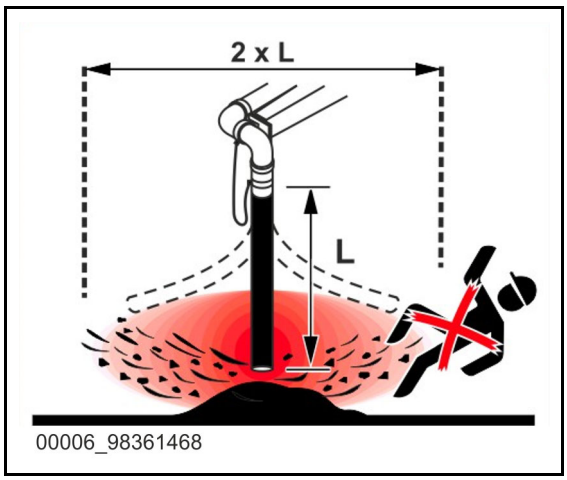


Fig. 189 Warning sign on the machine: Do NOT remain in the danger zone of the end hose during pumping!

- Hold the last placing boom section (1) close to the ground in a horizontal position and release the end hose (2) with the lever (3) **(Fig. 190)**. There may be several end hose locks, depending on the equipment.

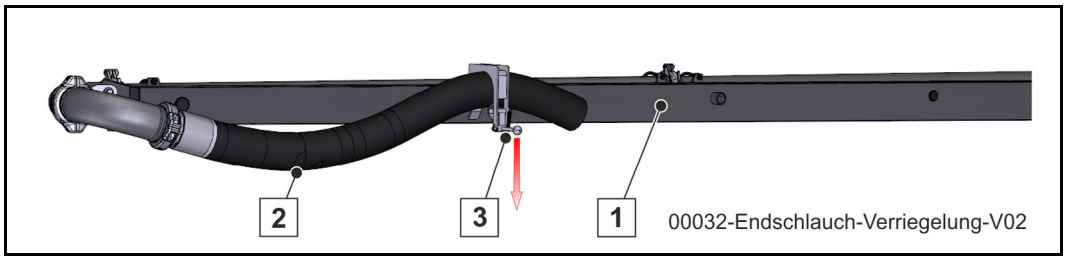


Fig. 190 End hose lock

Make sure the end hose safety lock(s) (1, 2) **(Fig. 191)** is attached and in order.

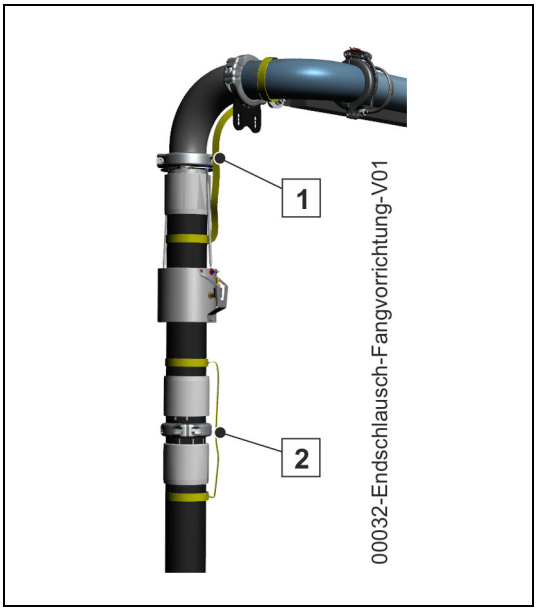


Fig. 191 End hose safety

Illustration legend (Fig. 191)	
Pos.	**Designation**
1	End hose safety lock: End hose
2	End hose safety lock: End hose extension

3.13 Folding out the placing boom

This chapter describes:the special measures you must observe in order to safely unfold the placing boom.

Make sure to read the previous chapter.

The movements of the placing boom are proportional to the deflection of the respective control lever. As such, the movement speeds of the placing boom depend on the degree of the displacements.

Information

ACTIVE and DIRACTIVE!

For the special equipment ACTIVE or DIRACTIVE, please also observe chapter (chap. 6.11)!

3.13.1 Moving the placing boom into the working position

Attention!

Material damage due to incorrect order during the folding out process!

When folding boom section 2 out completely, there is a risk of collision with boom section 1.

Always follow the correct order when folding out the placing boom sections.

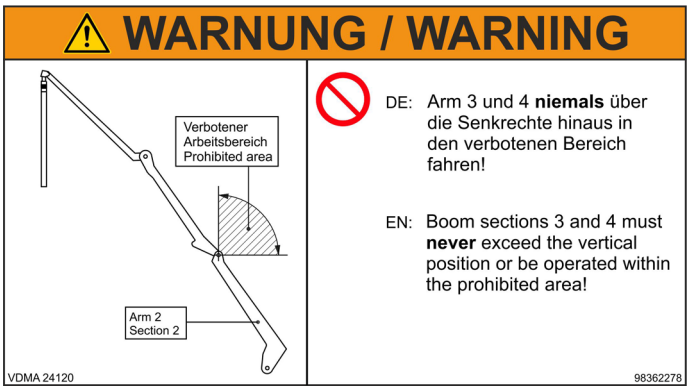


Fig. 192 98362278

The S 24 X can be folded out in halls with a ceiling height of approx. 5 m.

- Raise placing boom section 1 as far as possible.
- Slew placing boom section 1 into the working position.
- Folding out placing boom section 4 **(Fig. 194)**.
- Folding out placing boom section 3 **(Fig. 195)**.
- Folding out placing boom section 2 **(Fig. 196)**.

In the following position, it is possible to place concrete near the vehicle **(Fig. 194)**.

All other positions are achieved by moving the boom extensions up to the maximum range.

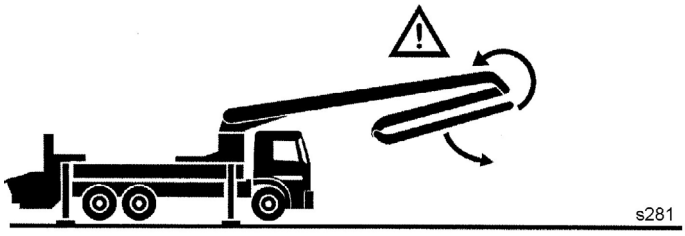


Fig. 193 Risk of collision of placing boom section 4 with placing boom section 1

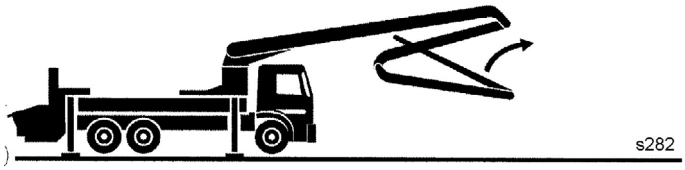


Fig. 194 Placing boom section 4

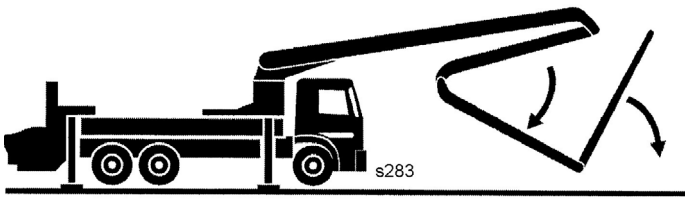


Fig. 195 Placing boom section 3

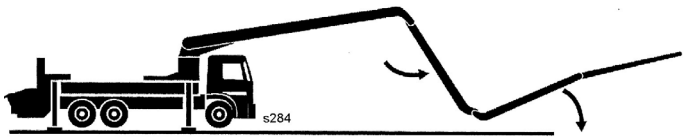


Fig. 196 Placing boom section 2

3.14 Concrete pump operation

Warning!

Risk of severe injuries or even death due to moving parts!

Moving parts can draw people in and crush them.

When the hopper grate is raised, the agitator shaft and the concrete pump are immediately switched off by a limit switch.

If the agitator shaft/concrete pump continues to move after lifting, stop work immediately and have the control system repaired.

Warning!

Risk of accident due to compressed air in the pumping line!

Intake air is compressed in the pumping line and escapes abruptly at the end hose. Persons in the danger zone may be injured through pulsating of the end hose and flying stones.

The hopper must be always filled with concrete at least up to the agitator shaft so that air is not sucked.

1. Fill the water box of the concrete pump.
2. Lightly spray the concrete feeding hopper with mould oil from the outside before pumping for the first time. This facilitates subsequent cleaning.

Information

Rubber compatibility!

Use only rubber-compatible media.

3. Switch on the agitator and (or) vibrator.
4. Fill the lubrication mixture into the concrete feeding hopper.

The lubrication mixture consists of two parts cement, and one part sand and water.

The amount is determined by the length and diameter of the pumping line.

If you have a short pumping line or are pumping ready-mix concrete, the lubrication mixture may consist solely of cement and water.

5. Never switch on the concrete pump with an empty feeding hopper. Dry running wears out the pumping piston and kidney seal faster.
   Fill water into the feeding hopper for maintenance and cleaning work.
6. Fill concrete into the feeding hopper before the lubrication mixture has been completely pumped out.
7. Never pump at full speed; instead, set the required pumping power after concrete starts to exit the end of the pumping line.
8. In case of wait times, especially in hot weather, keep the concrete flexible by pumping and sucking alternately from time to time.
9. Spray off the machine occasionally with water during operation to prevent concrete from setting.
10. Pump concrete with slowly increasing power.

3.14.1 Covering for hopper

The folding covering for hopper serves as splash guard in unfolded condition.

3.14.1.1 Opening the covering for the hopper

1. Unlock the safety bolt (1) **(Fig. 197)**.
2. Lift the cover (3) until the bolt can be slid into one of the holes on the locking bar (2).
3. Make sure that the bolt is latched securely.

3.14.1.2 Closing the covering for the hopper

1. Lift the cover slightly until the safety bolt can be unlocked easily.
2. Slowly lower the cover, do not drop it!

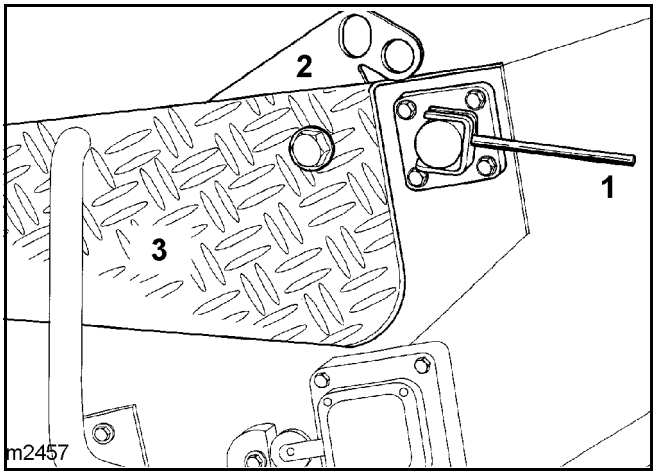


Fig. 197 Covering for hopper

3.14.2 Operation settings

(see active control)

VIBRATOR (special equipment)

➤ Switches the vibrator on.

The concrete vibrator only starts after switching on the concrete pump and stops automatically after switching off the concrete pump.

3.14.3 Agitator

➤ Switches the agitator on.

Information

The agitator may also have to be switched on so that pilot pressure is available to switch on the concrete pump.

The agitator starts in normal direction (pump operation). By switching the concrete pump from pumping to sucking and vice versa, the movement direction of the agitator is adjusted automatically.

By pressing the button:

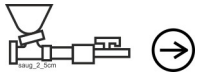
at the rear of the machine, the movement direction of the agitator (for example, during faults) can be switched.

After releasing the button, the agitator rotates back into its original direction.

3.14.4 Concrete pump

➤ Switch on the concrete pump:

forwards (pump operation)



backwards (suction operation)

➤ Adjust the delivery rate of the concrete pump:

(+) = Increase delivery rate
(-) = Decrease delivery rate

3.14.5 Operating data for the concrete pump

A wide range of concrete pump data can be shown on the display of the control system.

It is possible to record the concrete delivery volume and reset it to “0”, see control system.

An LED display (1+2) **(Fig. 198)/(Fig. 199)** for the status of the concrete pump is available as special equipment.

CP ON	LED = GREEN (1)
CP OFF	LED = RED (2)

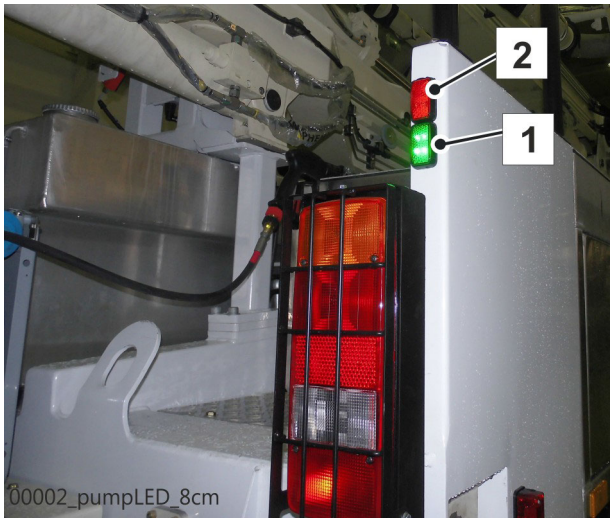


Fig. 198 Example 1: CP status LED displays

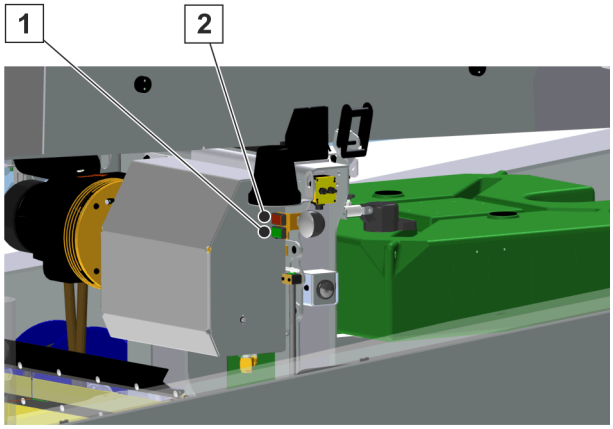


Fig. 199 Example 2: CP status LED displays

3.15 Operation: Water system

Depending on the order, the water case or water pump variant may vary.

The hydraulically driven water pump (4) **(Fig. 200)**/**(Fig. 201)**/**(Fig. 202)**/**(Fig. 204)** supplies the water required for machine cleaning, filling the water box and preparing a lubrication mixture and can be taken or diverted from the supply control **(Fig. 206)**.

The water system can be operated via the local control or the remote control.

3.15.1 Water system: Rear reservoir

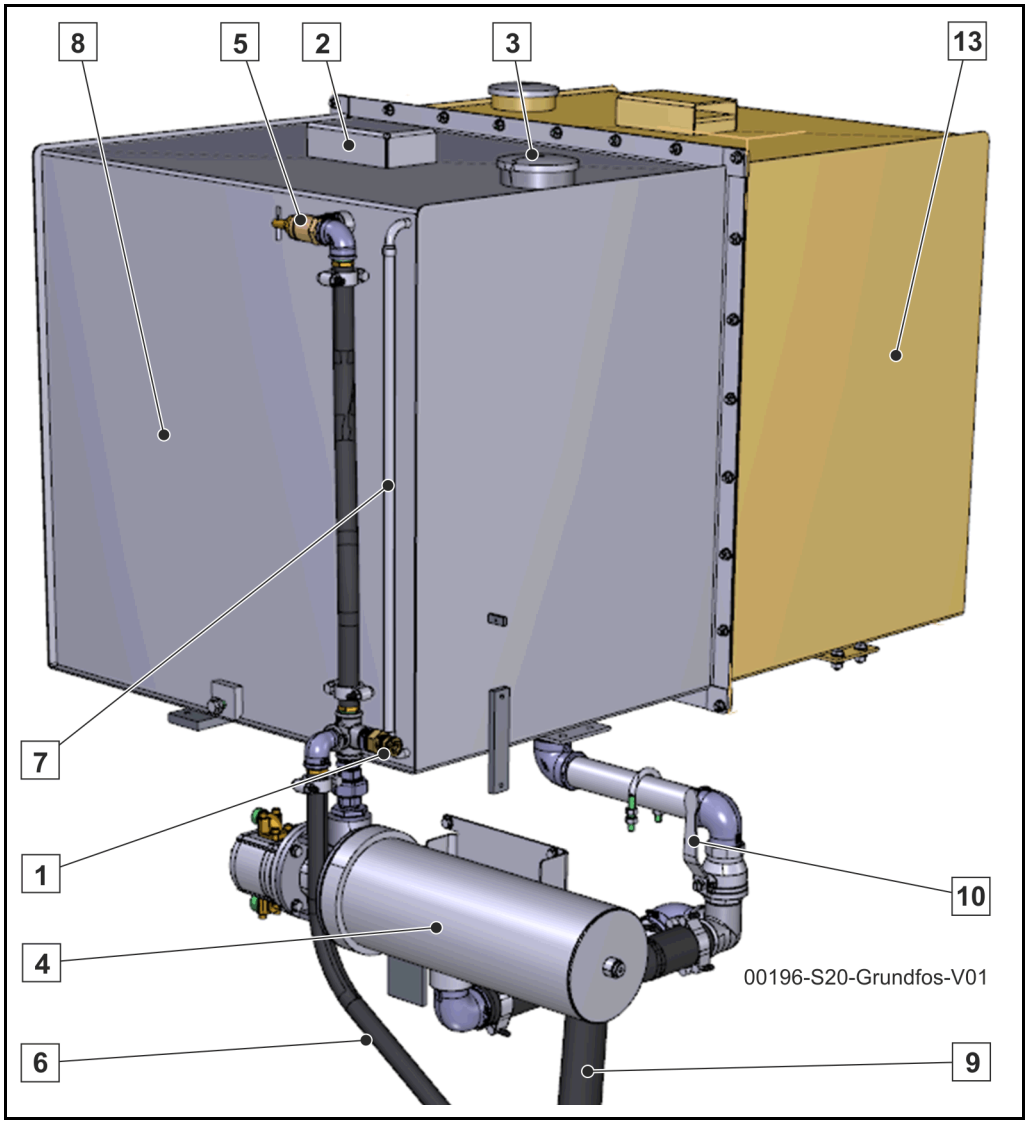


Fig. 200 Water system with auxiliary reservoir (13) with “Grundfos” water pump

3.15.2 Water system: Container on the left in the direction of travel

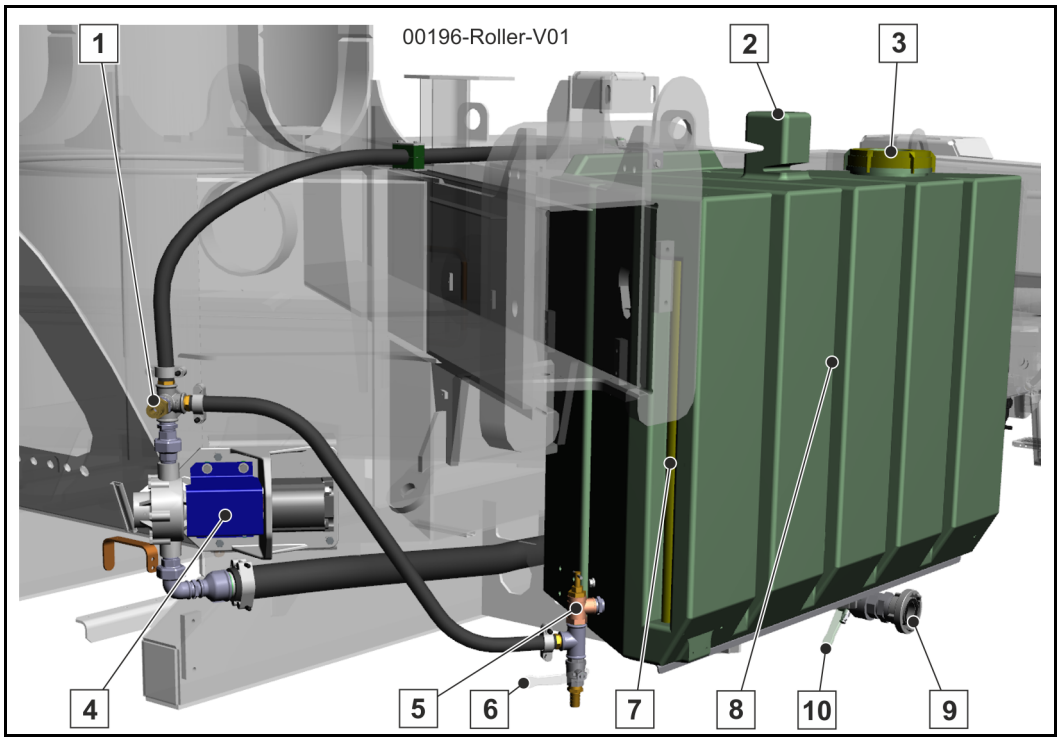


Fig. 201 Water system with the “Roller” water pump

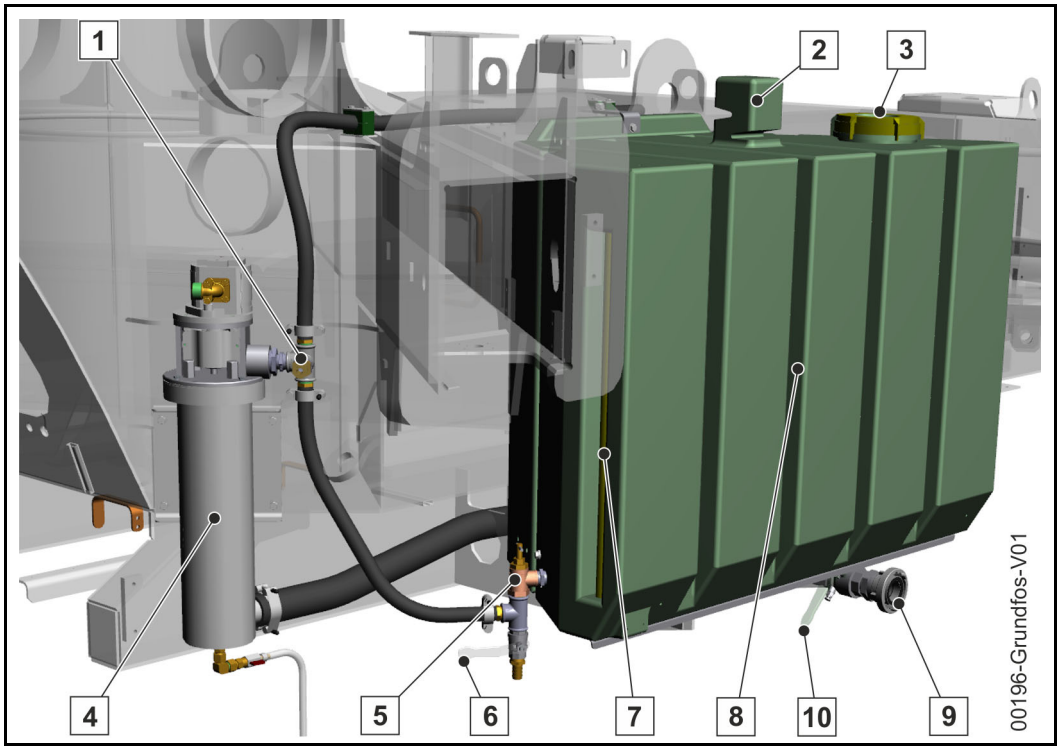


Fig. 202 Water system with the “Grundfos” water pump

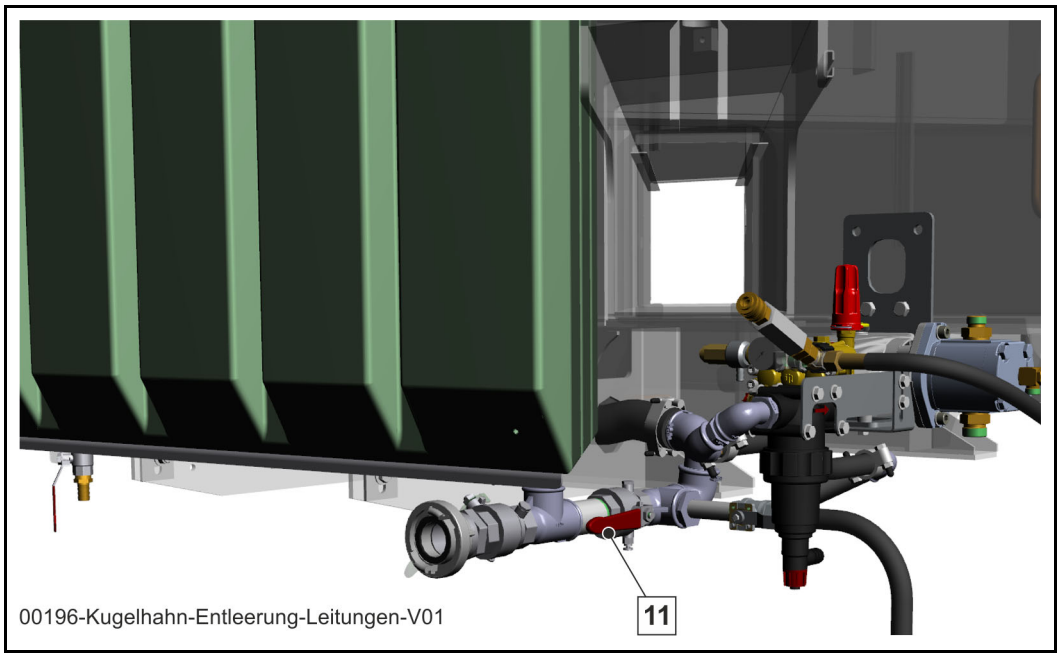


Fig. 203 Ball valve: Emptying of lines - enlarged view

3.15.3 Water system: T-container on the base frame

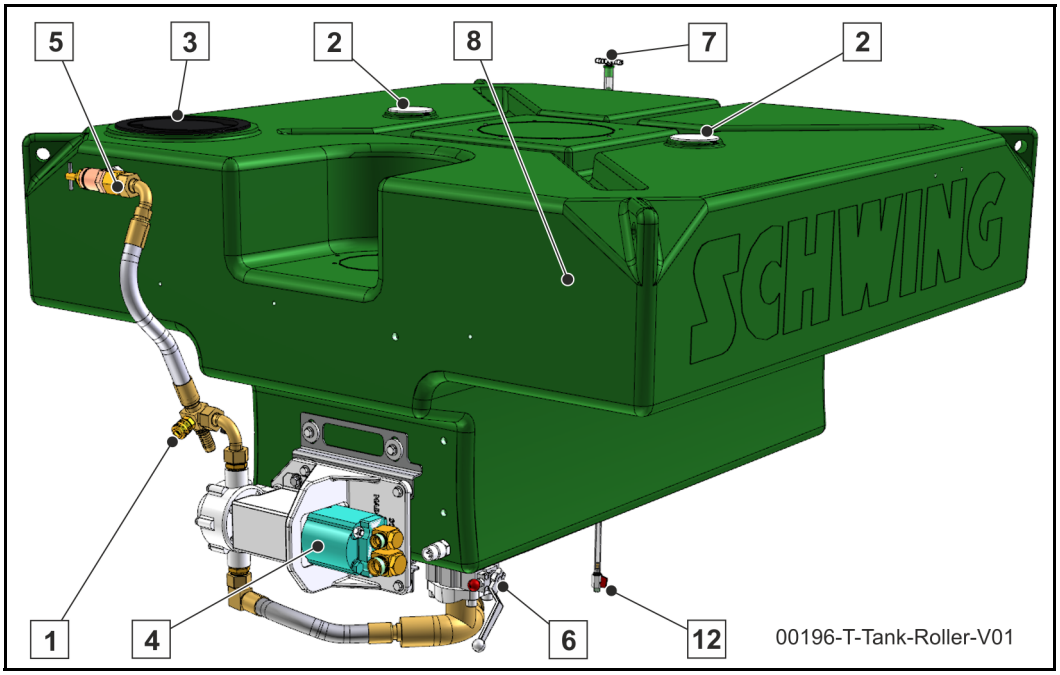


Fig. 204 T-container with the “Roller” water pump

Illustration legend (Fig. 200)/(Fig. 201)/(Fig. 202)/(Fig. 203)/(Fig. 204)			
Pos.	**Description**	**Pos.**	
1	Compressed air connection for blowing out the lines	7	Level indicator
2	Container vent and overflow	8	Water case
3	Filling inspection cover	9	Filling and emptying of the container [1]
4	Water pump: • **(Fig. 201)/(Fig. 204)** Roller • **(Fig. 200)/(Fig. 202)** Grundfos	10	Ball valve to pos. 9 [1]
5	Pressure relief valve [2]	11	Ball valve: Emptying of lines [1]
6	Ball valve: Emptying of lines	12	Ball valve: Emptying of the level indicator [3]

1. not with T-container
2. Only to be set by SCHWING's customer service
3. only with T-container

3.15.4 Auxiliary water case

Machines can be equipped with an auxiliary water case (13) **(Fig. 205)**.

A ball valve (14) **(Fig. 205)** disconnects the connection between the two reservoirs, when necessary. The auxiliary case is usually higher than the front water case due to the installation position of the pump battery. Since there is the same water level in interconnected reservoirs, the closed ball valve prevents the lower reservoir from overflowing.

Even with an inclined position of the vehicle or in driving mode, this ball valve must be closed. We recommend emptying the front reservoir first in order to refill it by opening the isolating ball valve.

To drain the system completely, open both C-connections and the supply control and reservoir connections, so that the connecting line and all lines are also drained.

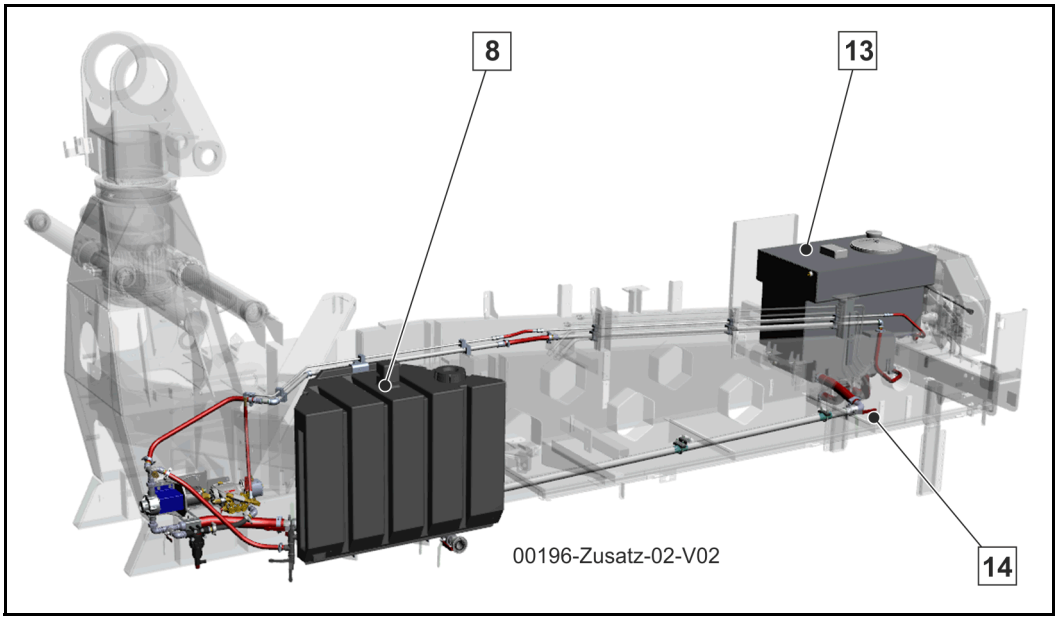


Fig. 205 Example: Auxiliary water case

3.15.5 Supply control

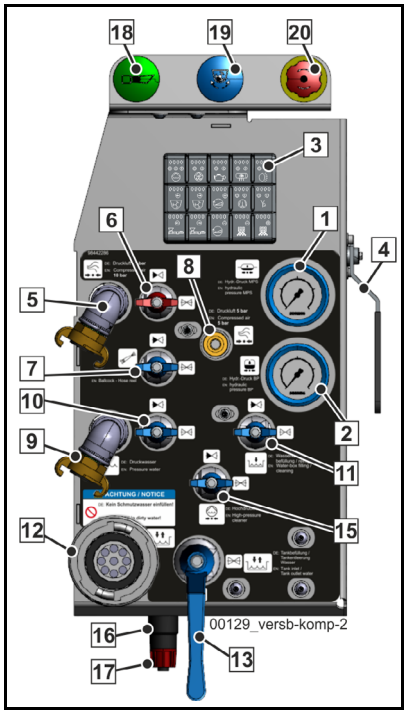


Fig. 206 Supply control

(deviations are possible, depending on the version of the machine)

Illustration legend (Fig. 206)			
Pos.	**Description**	**Pos.**	**Description**
1	Pressure control MPS: Mini pauses switch	11	Fill water box/empty water box pipe
2	Pressure control for concrete pump	12	Water connection: Fill and empty water case
3	Local control	13	Ball valve to pos. 12
4	Provision of boom for the ball valve:[1] • Water to boom • Provision from Pos.5 and 9 • Compressed air to boom	14	not illustrated
5	Output compressor	15	High-pressure cleaner (HDR)
6	Ball valve to pos. 5	16	Water filter (HDR)
7	Ball valve hose reel	17	Emptying (HDR)
8	Air connection of vehicle air (5 bar)	18	Horn
9	Output of water pump (spray hose)	19	Agitator: Change rotational direction
10	Ball valve to pos. 9	20	EMERGENCY-STOP button
Ball valve position: — = open, I = closed			

1. Not for S 47 SX III, S 51 SX, S 56 SXF, S 65 SXF

3.15.6 Filling the water case

Attention!

Material damage when filling due to overpressure in the water case!

The oil box can be damaged due to overpressure.

When filling, make sure the oil box is adequately ventilated in order to prevent overpressure.

Filling through a hydrant is prohibited!

1. Remove the appropriate filling cap (3) **(Fig. 200)**/**(Fig. 201)**/**(Fig. 202)**/**(Fig. 204)** on the top of the water case.
2. Connect a pressure hose to the water connection (9) **(Fig. 200)**/**(Fig. 201)**/**(Fig. 202)**, or in the case of the T-container variant, to the water connection (12) **(Fig. 206)**.
3. Open the ball valve (10) **(Fig. 200)**/**(Fig. 201)**/**(Fig. 202)** or (13) **(Fig. 206)**, so that fresh water can flow into the water case.
4. Open the external fresh water supply.
5. Close the external water supply before the water case overflows.
6. Close the ball valve (10) **(Fig. 200)**/**(Fig. 201)**/**(Fig. 202)** or (13) **(Fig. 206)**.

The water system is now operational.

Attention!

Material damage to the water system possible due to dirty water!

Dirty water leads to accelerated wear of the water pump and can cause further damage to the water system.

Only use clean water to fill the water system.

3.15.7 Operate water system

Check the water level of the water case on the corresponding level indicator (7) **(Fig. 200)**/**(Fig. 201)**/**(Fig. 202)**/**(Fig. 204)**.

The water level is indicated by a float.

1. Check whether the ball valve (11) **(Fig. 203)** or with the T-container (6) **(Fig. 204)** is open and open it if necessary. With the T-container, observe the loosening of the safety device.
2. Switch the water pump on using the local control or remote control or select the mushroom-head push-button mode.

A sensor in the water case stops the water pump in case of too low water level or disables switch on to prevent the pump from dry running.

Attention!

Damage due to dry running of the water pump!

The water pump can get damaged due to dry running.

Ensure that the water case is filled and the ball valve is opened for the water intake.

3.15.8 Empty the water system completely

The entire water system must be emptied due to:

- Danger of frost
- Extended machine downtimes

Attention!

Damages to machines due to freezing water!

Water expands at the time of freezing, due to which there is danger of frost wedging of containers and pipelines.

If there is a risk of frost, fill with water immediately before concreting or use the optional water heater. After the work is completed, all containers and pipelines must be emptied.

Proceed as follows to empty the system completely:

1. Disable the water pump with the local control or the remote control.
2. Remove the spray hose on the supply control (9) **(Fig. 206)** and empty it.
3. Open the ball valve (10) **(Fig. 200)**/**(Fig. 201)**/**(Fig. 202)** or with the T-container (13) **(Fig. 206)** in order to empty the **water case** via the water connection.
4. Open the ball valve (6) **(Fig. 200)**/**(Fig. 201)**/**(Fig. 202)** and (10) **(Fig. 206)** to

empty the **water pipes** and **water pumps**.

5. Connect the compressed air hose with a quick coupling (1) **(Fig. 200)**/**(Fig. 201)**/**(Fig. 202)**/**(Fig. 204)** and blow out the lines.
6. Open the ball valve (25) **(Fig. 207)** to drain the water box.
7. Start up the concrete pump briefly with lower stroke count to pump the water from the pumping cylinder.

Attention!

Risk of damage due to the concrete pump running dry!

Due to dry running, moving parts of the concrete pump (e.g. pumping pistons, pumping cylinder, rock valve components) can wear quickly.

Do not allow the concrete pump to run dry.

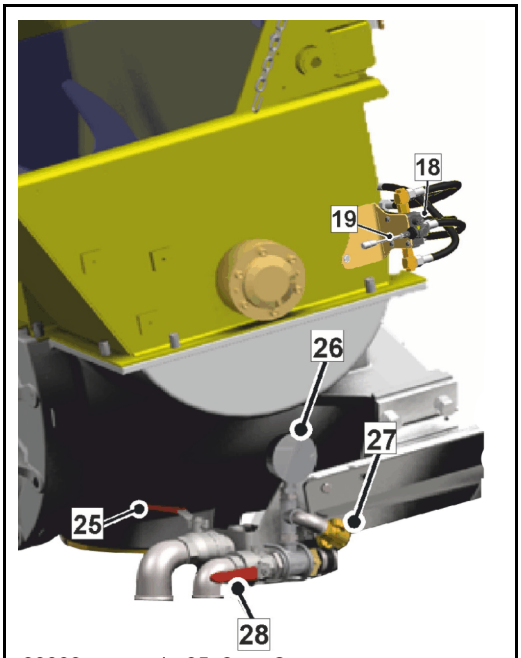


Fig. 207

3.15.9 Only empty lines of the water system

Reason:

- Relocation due to danger of frost (short routes).
- When there is a danger of frost, after each pumping operation:

1. Close the ball valve (11) **(Fig. 203)** or with the T-container ball valve (6) **(Fig. 204)** so that the water case is not emptied.
2. Then open the ball valve (6) **(Fig. 200)**/**(Fig. 201)**/**(Fig. 202)** or with the T-container (10, 13) **(Fig. 206)** in order to only drain the water from the lines. The water case remains full.

3.15.10 Emptying the level gauge of the T-container

The level indicator must be emptied if there is a danger of frost and prolonged rest periods/downtimes.

1. First close the valve at position (6) **(Fig. 204)**.
2. Open the ball valve (12) **(Fig. 204)** at the lower end of the level indicator.

A float displayed in the level indicator indicates the filling level.

If your vehicle is outfitted with any special equipment, further measures might be necessary.

For more information, read the instructions for your special equipment.

3.15.11 Hose reel for spray hose (special equipment)

A hose reel (1) for the spray hose is available as an option. In this variant, the connection (9) **(Fig. 206)** is no longer required.

➤ Switch the ball valve (10) for the spray hose or (11) to fill or flush the water box **(Fig. 206)** on the water pipe to the desired position.

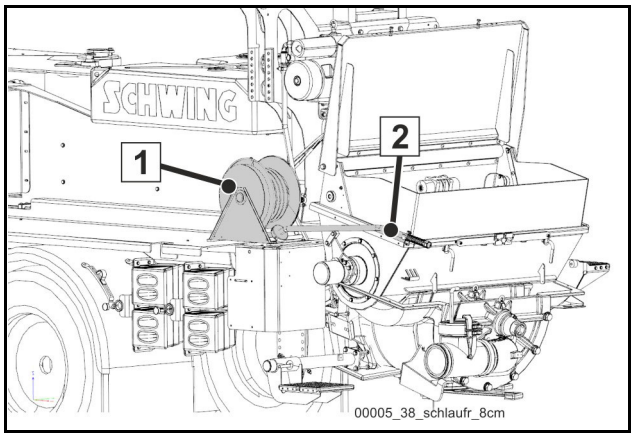


Fig. 208 Example: Hose reel

3.15.12 Release: Push-button for water pump

If the selector switch (4) **(Fig. 209)** is flipped to position “T” in “LOCAL” operating mode, the water pump can be switched on and off using the mushroom-head push-button (special equipment) (1) **(Fig. 210)**.

The mushroom-head push-button (1) is located on or near the concrete feeding hopper, examples **(Fig. 210)**.

1. Select “LOCAL” mode in the control system.
2. Switch the selector switch (4) **(Fig. 209)** to the “T” position. This activates the following two functions of the mushroom-head push-button.

Function 1:

- Switch the water pump on by tapping the mushroom-head push-button.
- Switch the water pump off by repeatedly tapping the mushroom-head push-button.

Function 2:

- Switch the water pump on by pressing and holding the mushroom-head push-button (1) **(Fig. 210)**.
  The water pump will be on as long as you hold the button pressed.
  When you release the button, the water pump is automatically switched off.

3. Return the selector switch (4) **(Fig. 209)** to the centre position when the water pump is no longer needed.

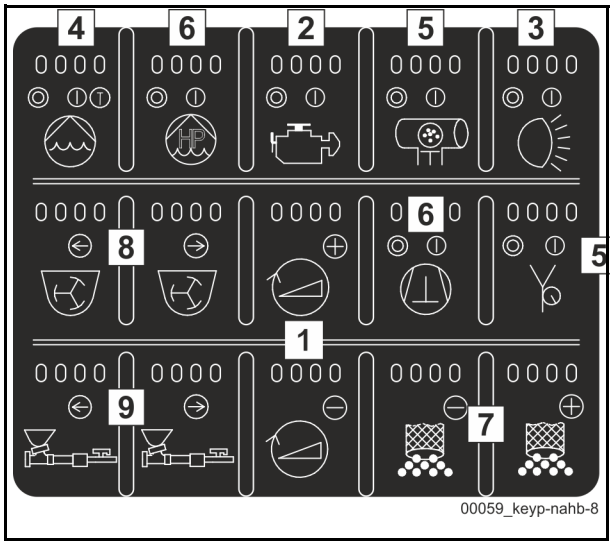
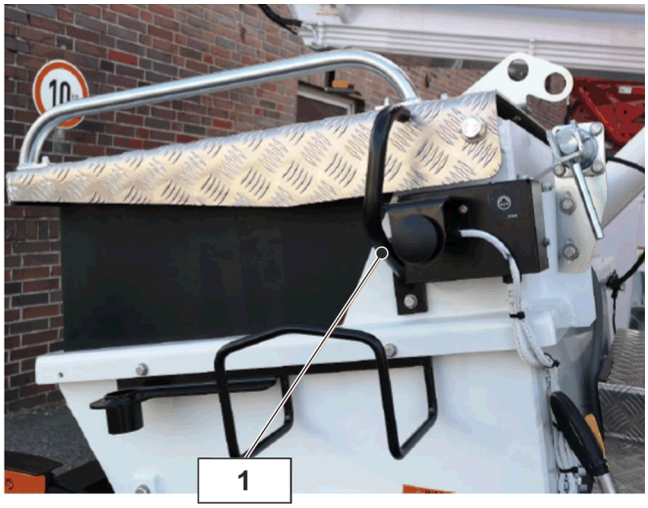


Fig. 209 Local control



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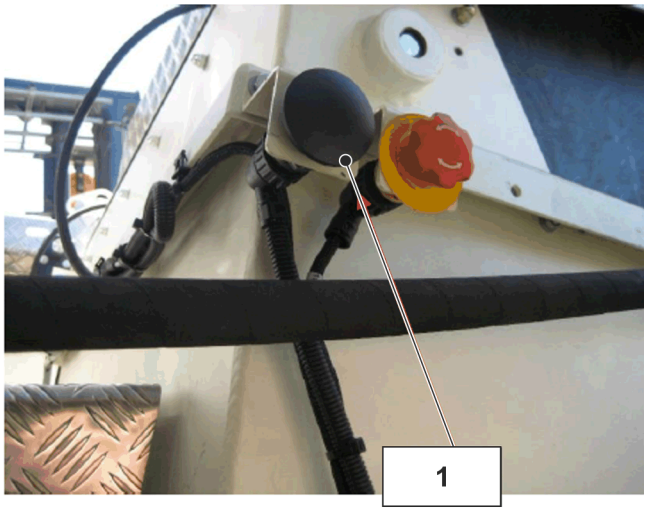

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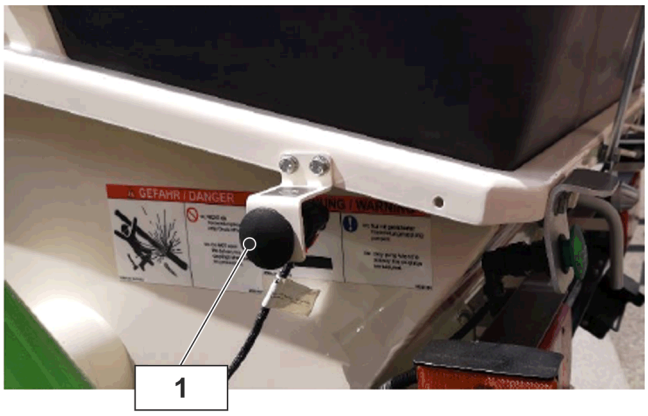

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Fig. 210 Example positions: Mushroom-head push-button

3.16 Working operation: Compressed air system (special equipment)

The machine can be equipped with an extensive air system as special equipment.

The elements mentioned below can be ordered separately.

Caution!

Compressed air can be very dangerous!

Please observe the appropriate operating information on cleaning, as well as the operating instructions of the chamber valve in the appendix.

Only use accessories in perfect condition approved by SCHWING for your compressed air system!

3.16.1 Compressed air 5.5 bar

The machine can be equipped with plug connections for a compressed air hose. This makes it possible, for example, to connect a spray gun for release agents.

The air is extracted from the vehicle air system.

3.16.2 Compressor

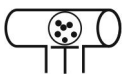
The compressor **(Fig. 211)** supplies up to 10 bar compressed air to the stopcocks on the machine.

- Open these stopcocks to prevent pressure peaks when switching on the device.

➤ Switch on the compressor via the selector switch on the active control unit.

3.16.3 Chamber valve

Chamber valves **(Fig. 212)** are usually used in connection with a compressor for cleaning the concrete pumping line.



➤ Use the selector switch on the active control unit to switch the appropriate directional valve of the control system. The chamber is extended and retracted using another control lever on the machine.

See operating instructions in the appendix.

Fig. 211 Compressor

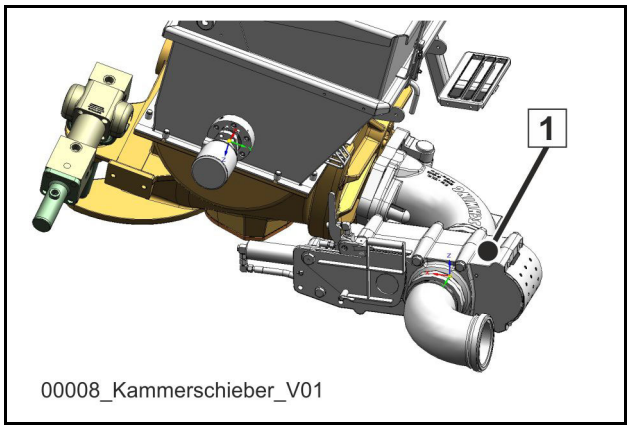


Fig. 212 Chamber valve

3.16.4 Corrosion

The intake air of a compressor always contains - depending on the humidity - a certain amount of water.

This water is evaporated in the hot compressor as determined by the system, and discharged with the compressed air.

With the use (cleaning of the pumping line) typical for the concrete pump operation, the short duty cycle is often not sufficient to bring the compressor up to operating temperature.

Water can collect in the compressor and cause damage.

Attention!

Corrosion due to condensation!

Switching on the compressor once a week for at least 30 minutes continuously.

- Adhering to the maintenance intervals for the compressor.
- Only use original spare parts and the prescribed compressor oil when servicing your compressor.

Our maintenance packages:

10197336 (standard maintenance) and

10170388 (oil separator cartridge)

contain all of the spare parts needed to service your compressor, including the compressor oil.

3.16.5 End hose stop valve

The end hose stop valve prevents the pumping line from leaking while pumping.

Separate operating instructions can be found for this in the appendix.

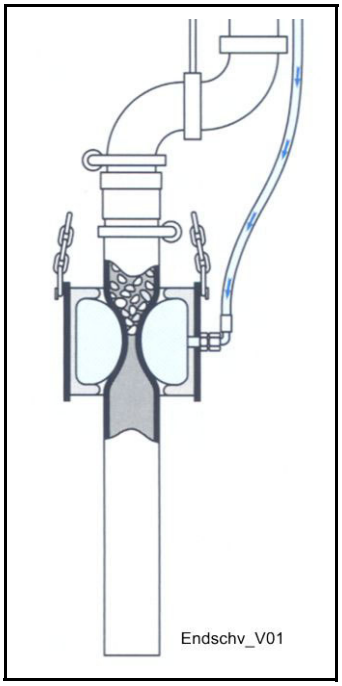


Fig. 213 End hose stop valve

3.17 Control of operations

The main machine functions can be interrupted by pressing an EMERGENCY STOP button, see **“Your machine’s EMERGENCY STOP system”** on page 109.

The control system monitors the machine during operation and displays any detected errors, see **“Troubleshooting (error handling)”** on page 295.

Error messages and damages can be prevented through careful observation:

Pay attention to unusual noises, vibrations, etc. caused by the machine.

There may be a damage that could be localised through timely repair.

Warning!

Risk of accident due to compressed air in the pumping line!

Intake air is compressed in the pumping line and escapes abruptly at the end hose. Persons in the danger zone may be injured through pulsating of the end hose and flying stones.

The hopper must be always filled with concrete at least up to the agitator shaft so that air is not sucked.

- Inform the mixer driver when removing the remote control.
- Agree on clear communication signals (horn!) and inform the mixer driver about the purpose, function and position of the EMERGENCY STOP buttons.

3.17.1 Water box - European version

Check the water level before and after each pumping operation.

To top up and rinse out the water box, simply open the ball valve (11) **(3.17.3)** on the supply line until the water box is full.

- Flush the water box on a regular basis in conjunction with the state of wear of the pumping pistons and cylinders.
- Check the water box weekly for deposits that could not be removed by the normal flushing process, see **“Cleaning”** on page 323.

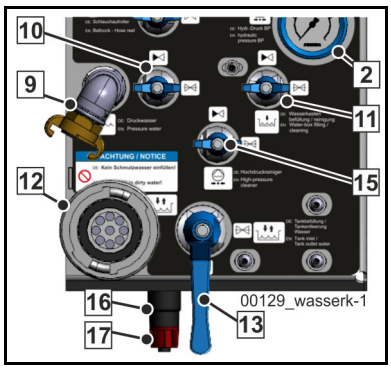


Fig. 214 (11) Fill / Rinse water box

3.17.2 Water box - USA version

To fill the water box, there is a 3/4 inch connection near the stepladder on the right in the direction of travel.

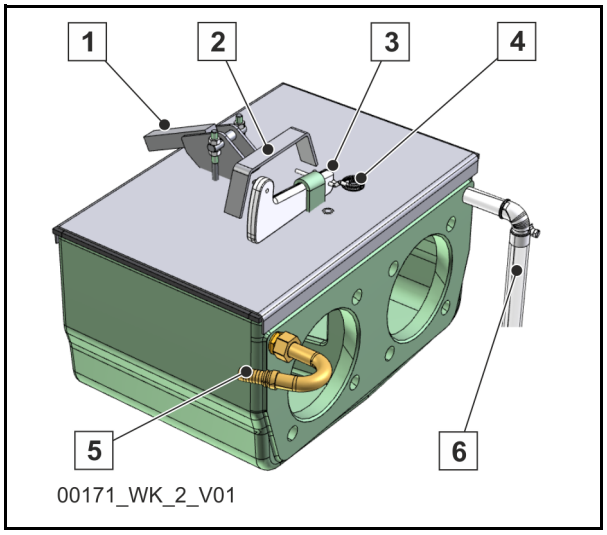


Fig. 215 Water box - USA version

Caption for (Fig. 215 Water box - USA version)			
Pos.	**Description**	**Pos.**	**Description**
1	Water box emptying	4	Clip pin (secures pos. 3)
2	Handle of cover for water box	5	Water box filling
3	Locking wedge	6	Overflow

3.17.3 Proper sealing of pumping line

- Repair leaks as quickly as possible, as this can cause concrete to “bleed”.
- "Bleeding" of the concrete results in clogging.
- Immediately prevent clogging at the outset.
- In the event of clogging, stop pumping immediately and reverse pump the concrete!

Should the clogging not be resolved thereby, switch off concrete pump and fix the problem.

Danger!

Pumping line under high pressure!

Serious injury or death.

Do NOT open the pumping line couplings under pressure!

3.17.4 Monitoring the agitator

If the agitator jams, change its rotational direction briefly using the agitator button **(Fig. 216)**.

Fig. 216 Agitator button

3.17.5 Monitor any potential loss of fluids

- Check the filling levels of all reservoirs.

3.17.6 Checking the machine’s stability

- Adjust the position of the machine, if necessary.
- At least three of the supporting dishes must be firmly on the ground at all times.
- Spirit levels are located on the outrigger control stations to check whether the machine is level.

Danger!

Loss of stability due to machine being at a prohibited inclination!

Serious injuries or death can be caused by the machine tipping over.

Do not tilt the machine more than 3° on any axis when setting it up.

Danger!

Loss of stability due to outriggers sinking in!

If an outrigger sinks into the ground, there is a risk of the machine tipping over!

- If possible, warn people in the danger zone and ask them to leave the danger zone.
- Stop pump operation.
- Release the outrigger immediately by rotating or folding in the placing boom, and move the boom into the transport position.
- Install the machine in a location that is suitable for the supporting force.

Prevent the placing boom from striking against obstacles.

Attention!

Collisions between the placing boom and the machine or other objects due to insufficient monitoring of the placing boom!

Possible machine damage or material damage to objects.

Always monitor the placing boom while it is moving in order to prevent collisions.

The boom components with links allowing large angles of rotation are especially at risk of damage.

The necessary bell crank of the boom kinematics increase the forces acting on the boom component inadmissibly even with low hydraulic oil pressure when the boom component is driven against an obstacle.

Warning!

Loss of stability due to prohibited placing boom configuration!

Serious injuries or death can be caused by the machine tipping over.

The end hose must NOT be extended past the vertical position of the placing boom while in the backwards position.

3.17.7 Operating data display

The control system displays operating data.

There, the daily delivery rate of the concrete pump can be reset, for example.

We recommend that you retrieve important operating data on a regular basis, such as

- Hydraulic oil pressure and
- Hydraulic oil temperature

The supporting conditions must be improved under increased pressure, by reducing the stroke rate for example.

Check the oil level and cooling at elevated temperature.

This prevents the output of fault messages and possible interventions of the diagnostic system in the control system.

3.17.8 Faults

The diagnostic system monitors the main machine functions automatically.

A horn sounds to indicate an error messages.

Proceed as described in chapter **(chap. 3.18)**.

3.18 Troubleshooting (error handling)

The control system is equipped with a comprehensive diagnostic system. This diagnostic system shows:

- Information about operating states
- Information about malfunctions
- Information about the reasons of malfunction

The messages are displayed in the control system.

Errors are reported optically on the display and acoustically by an interval signal.

Different languages can be selected for the optical display.

There is also an "international" language available as symbols.

Information

Further information!

The diagnostic system and event handling are described in detail in chapter **(3.4)**.

3.18.1 Release of blockages

Warning!

Risk of severe injuries due to hydraulic fluid escaping under pressure!

Explosive pressure relief in the event of improper work on the hydraulic system.

➤ Before working on the hydraulic system, switch off the drive motor.

➤ Relieve all pressure accumulators via the relief valves.

➤ Check the relief of the hydraulic system on the pressure gauges.

Before opening the hydraulic system, secure hydraulically moving parts that are subject to external forces, e.g. raised placing boom.

Warning!

Risk of injury due to unauthorised presence under the placing boom!

Serious head injuries or death possible.

Remaining beneath the placing boom is prohibited.

If interventions are required in the machine technology to release blockages, which go beyond the measures described below, these may only be carried out by qualified personnel.

Uncontrolled blockage of the machine is a serious fault.

If the energy stored during the blockage is suddenly released, it can cause serious accidents due to autonomous movements of the machine or the failure of components.

Even the use of inappropriate measures to clear such blockages can suddenly release the stored energy and cause serious accidents.

Proceed as follows during an uncontrolled blockage:

- ➤ In case of danger, press an EMERGENCY STOP button immediately.
- ➤ Keep calm under all circumstances.
- ➤ Locate the blockage.

3.18.1.1 Blockage in the pumping line

Danger!

Danger to life due to uncontrollable movements of the end hose!

Serious injuries or death due to flapping end hose, spraying concrete and stones shooting out during pumping, after removing a blockage or when cleaning.

Remaining in the danger zone during these tasks is prohibited.

Danger!

Pumping line under high pressure!

Serious injury or death.

Do NOT open the pumping line couplings under pressure!

In the event of clogging (blockage) of the pumping line, the pressure in the hydraulic system of the concrete pump will rise until the pressure relief valve (hereafter: PRV) opens.

- The concrete pump stops,
- The drive motor works under high load.
- The hydraulic oil passing through the PRV produces a loud noise.

Information

Increase in pressure!

- Rapid increase in pressure = blockage directly behind the concrete pump.
- Slow increase in pressure = at the end of the pumping line.

The best way to prevent blockages is by keeping the pumping lines clean and free of leaks and by conveying standardised quality concrete see **“Technical preconditions for concreting”** on page 367.

➤ Remove the blockage by reverse pumping the concrete with the concrete pump.

➤ After that, cautiously start pumping again.

➤ If necessary, repeat the procedure until the blockage is removed.

If the blockage cannot be removed in this way, the pumping line must be discharged and the section affected must be dismantled.

3.18.1.2 Mechanical blockage

Mechanical blockages may occur in all of the machine’s systems, usually as a result of damage.

If no blockage exists as described above, locate the blockage.

3.18.1.3 Blockages in the motor, gear, drive shaft

In most cases, blockages in the drive system cannot be eliminated on site.

If necessary, the machine has to be placed into transport stand and towed.

In order to move the placing boom into the transport position in the event of damage, we recommend keeping an emergency unit on hand, see **“Emergency oil supply for the placing boom hydraulics”** on page 315.

3.18.1.4 Blockages in the control system

Blockages in the hydraulic pilot control system are often caused by dirt in the hydraulic oil.

This dirt causes the control piston to jam and in turn to not execute control commands or to execute them incorrectly.

A clogging of the oil is prevented through careful oil maintenance (filter change). Metallic abrasion in the oil points to damage.

Control blocks may also jam due to high temperature differences, for example, when feeding hot hydraulic oil to a cold control block in winter.

This can be avoided by heating the hydraulic system, see **“Preheating the hydraulic system”** on page 189.

Warning!

Danger due to unexpected movements of the machine!

Unexpected movements may be made due to errors in the control.

Immediately press an EMERGENCY STOP button if the machine makes unexpected movements. Shut down the machine and have it repaired.

3.18.2 Towing truck-mounted concrete pumps

Towing refers to pulling an inoperable motor vehicle with the help of a second motor vehicle as a short-term emergency measure.

Due to the inoperability of the vehicle, the following things must be taken into account before towing.

Only use slinging means, chains or ropes which are suitable for this load case and are in perfect condition.

The permissible total weight of the machine can be found in the vehicle registration document.

No points on the structure may be selected for towing purposes, but rather points on the vehicle itself must be used.

Information

External documentation for the supplier component is available!

For built-in supplier components, SCHWING only provides the essential information in the operating instructions, which is required for proper operation and maintenance of the SCHWING machine.

Further information can be found in the documentation for the respective supplier component.

Observe the operating instructions of the vehicle or axle manufacturer.

3.18.3 Salvaging truck-mounted concrete pumps

Attention!

Damage due to improper salvaging!

Improper salvaging can result in more major damage.

If your machine needs to be salvaged, please contact SCHWING's customer service.

Salvaging refers to bringing a vehicle and its passengers to safety after an accident. The vehicle is removed for a potentially dangerous area.

SCHWING's customer service helps determine the technical data of your machine and helps find specialised salvaging companies along with the respective professionals.

Please have all of the relevant information at hand, such as:

- Machine model (type plate)
- Machine weight including load
- Location information
- Substrate
- Accessibility

In the case of trapped vehicles, on muddy construction sites for example, placing material underneath the drive wheels can help free the machine with its own power.

In addition, the machine can be lifted using its own outriggers. The supporting legs must be underpinned correctly using the standard load-distributing support pads.

Fill any pits that were made by the wheels when trying to free the machine.

3.19 Emergency operation

Emergency operation is only intended to move the machines into the “transport position” in the event of a control failure, in order to drive them to a repair shop.

In order to take away the machine, all necessary functions can be operated manually via hydraulic valves. However, any other monitoring systems that would otherwise be available are out of service in this case. You have to move the machine with utmost caution. This requires a great deal of practice and oversight. Do not move the machine in emergency operation without the assistance of a second person.

This chapter also describes temporary solutions to overcome disturbances.

Danger!

Danger due to deactivation of the automatic placing boom monitoring or during emergency operation!

Serious injury and death very likely.

Monitor the placing boom at all times to prevent the machine from tipping over and collisions. Use a signaller if the danger zone is not completely visible.

Warning!

High risk of injury during emergency operation!

Safety functions are **not** active during emergency operation. People can be injured due to **ineffective** safety functions.

Take extra care when operating the machine in emergency operation. Emergency operation is only permitted in order to bring the machine into a safe state.

Attention!

Machine damage due to moving the placing boom into prohibited areas during emergency operation!

The movement limits of the placing boom are not active during emergency operation. The placing boom can be moved into prohibited areas and cause material damage.

Emergency operation is only intended for folding together the placing boom if the control system is defective.

3.19.1 Valve emergency actuation

During emergency operation, the power supply of the electrical control must be switched on because otherwise all EMERGENCY STOP valves will be open.

1. Activate "Local" operating mode in the control system.

The emergency operation control platform **(Fig. 220)** is located on the right in the direction of travel, behind a lockable flap (1) **(Fig. 217)**.

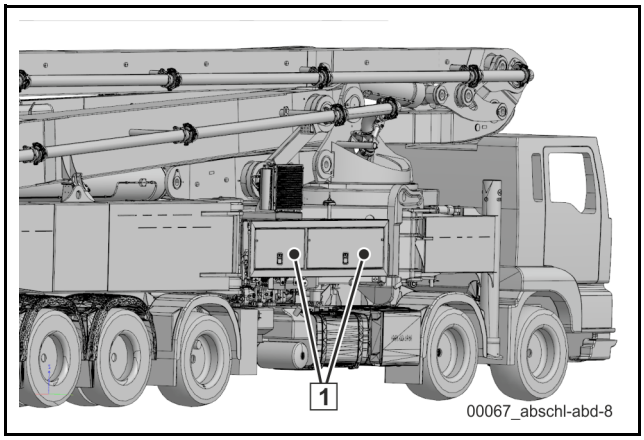


Fig. 217 Position, “emergency operation” control platform (example illustration)

The emergency operation control lever receivers are spring-centred and return to "0" position when released.

The boom movements can be driven proportionally through appropriate deflection of the control lever.

The necessary control levers from the standard accessories box must be installed (screwed in) first.

For reasons of safety, the control levers must be removed from the control lever receivers after operation and stowed in the standard accessories box.

Diractive

For machines with the “Diractive” special equipment, additionally carry out the following points, see also **(chap. 6)**:

a) Connect the “cable remote control for Diractive emergency operation”, then connect the plug (2) **(Fig. 218)** to the connection (9) on the option box **(Fig. 219)**.

b) Switch on the EMERGENCY STOP bypass with the key-operated switch, see **(chap. 3.4)**.

The cable remote control requires two-handed operation. Press a release button (lift or lower) and a desired function at the same time.

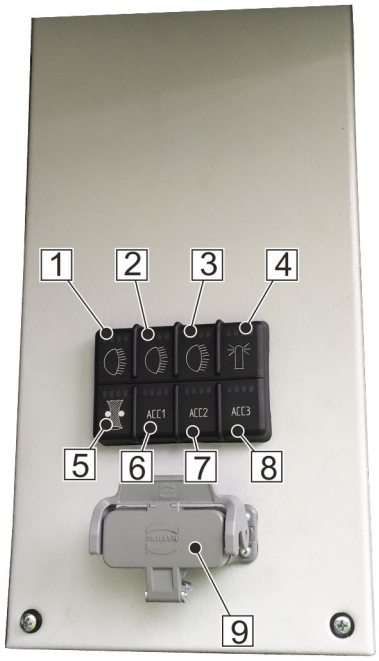
Information

Our indications for lifting and lowering the placing boom always refer to the movements when a placing boom is extended.

During emergency operation, the placing boom moves at a constant speed. The speed cannot be adjusted.

00124_Kabelfernsteuerung

Fig. 218 Cable remote control



00124_Optionsbox_Diractive_V2

Fig. 219 Diractive option box

3.19.2 Operating the placing boom in emergencies

In order to move the placing boom into the “transport position” after a power outage, for example, the boom has to be moved using the “emergency operation” function.

To do this, the control lever (7) **(Fig. 220)** has to be moved into the “Placing boom” position and held there. In addition, the respective control lever for boom function 1 - 6 must be actuated.

If necessary, instruct a helper to hold the control lever in the “Placing boom” position until the placing boom has reached the “Transport position”.

If the control levers are released, then the spring centring device automatically moves them into the neutral position and the placing boom stops abruptly.

With the “Diractive” special equipment, the release button and **(Fig. 218)** the respective button for the corresponding boom function must be actuated on the cable remote control.

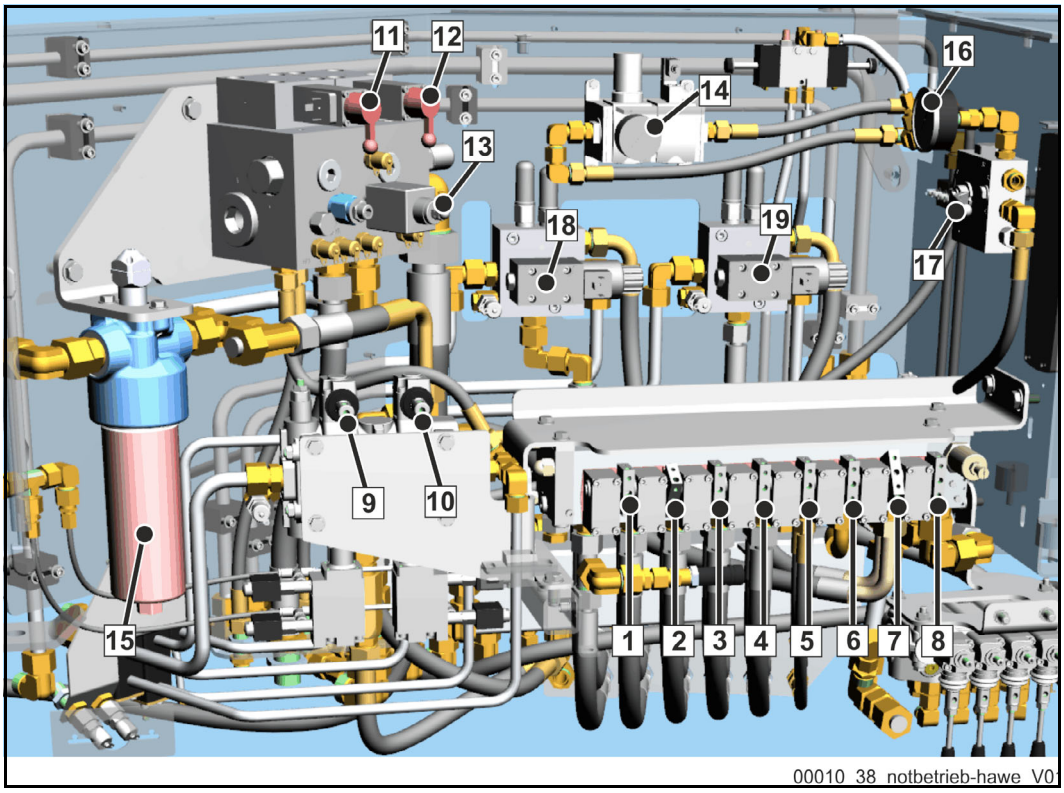


Fig. 220 Control station for operating mode: Emergency operation (example illustration)

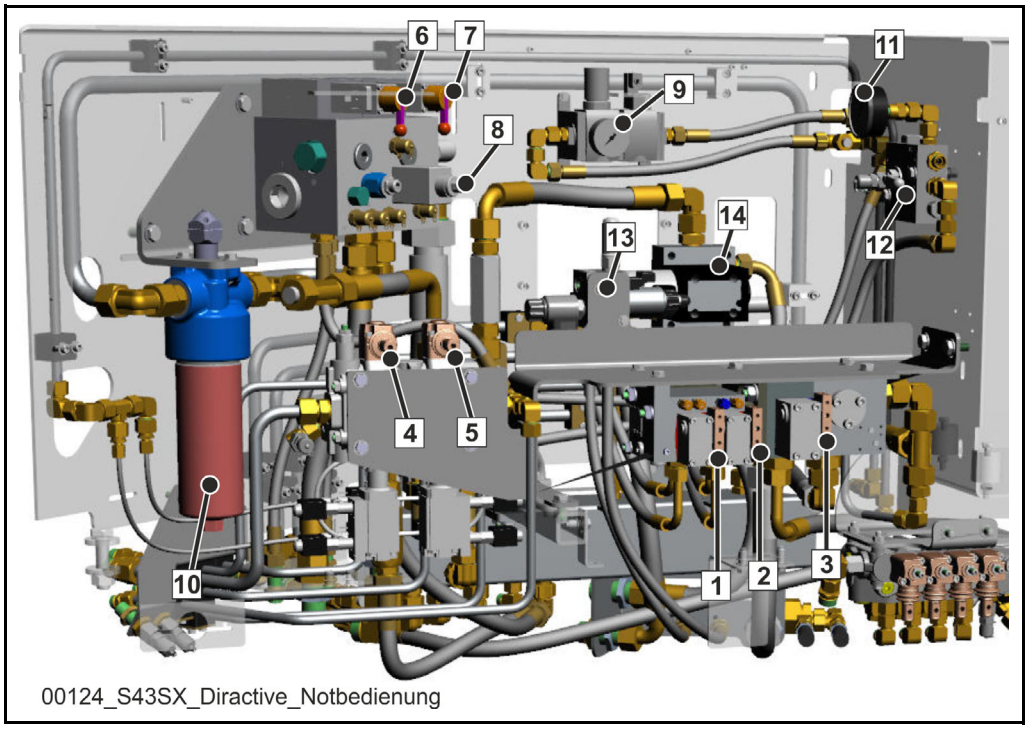


Fig. 221 Control station for operating mode: Diractive emergency operation (example illustration)

3.19.3 Emergency operation - boom section 1 overhead roll-folding system

Due to the construction, for machines with overhead roll-folding there exists a risk of damage for the boom and cab if section 1 of the placing boom is moved with in transport position.

For this reason, this function is electrically locked during normal remote operation.

During emergency control (direct actuation of the control levers on the control block), this lock is not active. All control commands are carried out and can lead to damage in the event of an operating error.

Follow the order for folding the placing boom in.

A warning sign **(Fig. 222)** on the control block shows the risk of damage due to operating error.

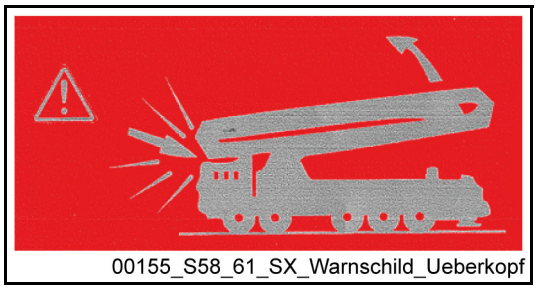


Fig. 222 Warning sign

3.19.4 Operating the outriggers in emergencies

During normal operation, the “Release button” is pressed while actuating the outrigger control block in order to operate the corresponding outrigger.

In emergency operation, the release button may not work and the control lever (7) **(Fig. 220)**/**(Fig. 221)** has to be actuated manually.

If this is not possible, instruct an assistant to switch the control lever (7)/**(Fig. 220)**/**(Fig. 221)** into the "Outrigger" position and to hold it in place.

Information

For machine models with type S 56/65 SXF, the valve on each release button has to be actuated manually (1) **(Fig. 223)** in addition to the control lever (7).

Additional helpers may be required for this purpose in order to retract the outriggers.

The valve has to be pulled out for the duration of the time in which the outriggers are in emergency operation so that the hydraulic oil can flow **(Fig. 224)**.

Information

ATTENTION!

The valve **(Fig. 224)** is stiff!

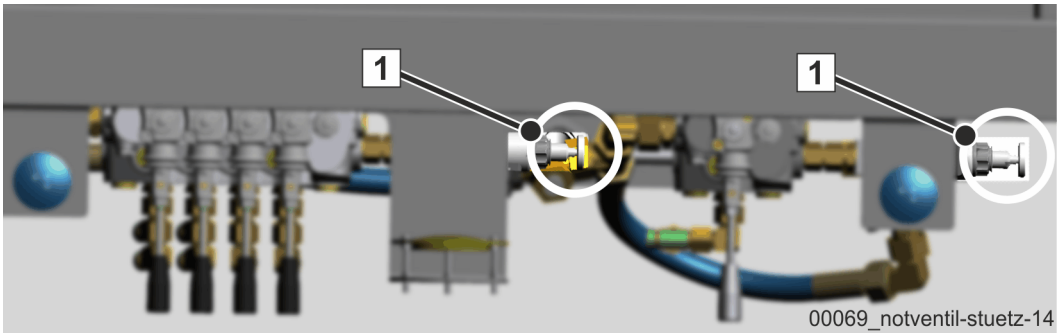


Fig. 223 Emergency valve for release button (S 56/65 SXF)

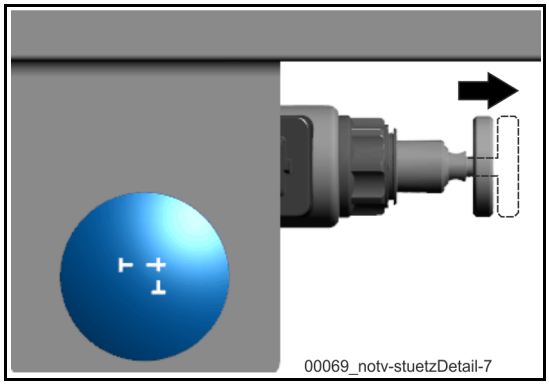


Fig. 224 Emergency valve for release button in detail (S 56/65 SXF)

Then, retract the outriggers by actuating the appropriate control levers.

3.19.5 Emergency adjustment of the concrete pump delivery rate

If the electrical system fails, the concrete pump delivers at the maximum delivery rate (stroke rate).

If the electrical system fails, however, it may be necessary to manually change the delivery rate (stroke rate) of your concrete pump on the hydraulic valve **(Fig. 225)**, **(Fig. 226)**.

The hydraulic valve is set by default and generally cannot be adjusted.

In both operating modes (LOCAL and REMOTE), the delivery rate (stroke rate) of your concrete pump is regulated via this electrically adjustable valve.

Design and position of the valve may vary.

Attention!

Risk of damage to the hydraulic pumps!

An incorrect delivery rate (stroke rate) adjustment can damage the hydraulic pumps.

Only trained personnel may adjust the delivery rate (stroke rate) on the valve.

Reduce the delivery rate (stroke rate) as follows:

1. Remove the cap nut (1) **(Fig. 225)**,**(Fig. 226)**.
2. Hold the screw spindle (3) with an Allen key and loosen the lock nut (2).
3. Check that the screw spindle is fully unscrewed.
4. Set the desired delivery rate (stroke rate) for the concrete pump by slowly screwing it in.

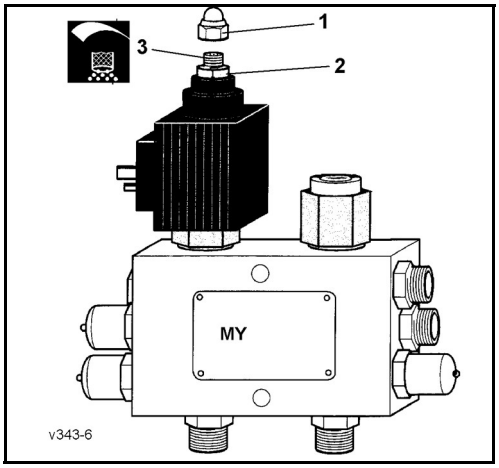


Fig. 225 Valve design 1

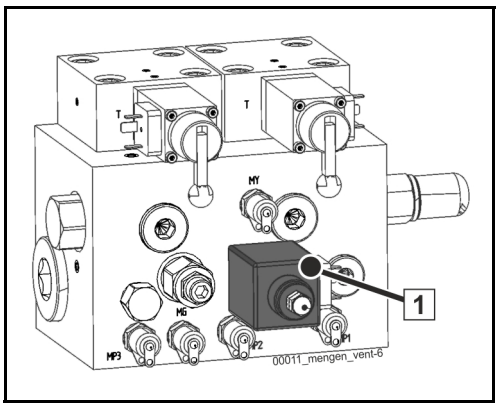


Fig. 226 Valve design 2

3.19.6 Mini Pause Switch (MPS)

Concrete pumps with a **M**ini **P**ause **S**witch (MPS) work with a dual-circuit hydraulic system.

The dual-circuit hydraulic system can be recognised by the pressure accumulator at the rear of the machine.

This function prevents the differential cylinders from hitting your concrete pump kit too hard. This reduces wear and increases the service life of your concrete pump, among other things.

Function:

The MPS is a momentary drop in pressure.

The hydraulic oil pressure in the concrete pump system is reduced at the same moment as the differential cylinders switch from suction stroke to pressure stroke.

Defective valves, dirt, defective hoses, etc. can cause malfunctions.

Errors may be noticeable as follows:

a. Malfunction 1: The pressure is not reduced when switching the cylinders:

- The switching of the concrete pump becomes audibly louder.
- While switching, the pointer on the concrete pump pressure gauge shoots up instead of dropping in supply mode.

Suggested solution - malfunction 1:

You can complete the work assignment by observing the following:

Attention!

Damage due to pressure peaks if the electrical system fails!

The hydraulic system can be damaged by pressure peaks.

If the electrical system fails, reduce the delivery rate (stroke rate) of the concrete pump hydraulically to approx. 60% of the maximum value.

Note that without reducing the pressure the differential cylinders will strike harder and the machine will become louder.

b. Malfunction 2: The “MPS function” remains active permanently:

1. Depending on the required delivery pressure, the concrete pump’s output drops considerably (adjusting the delivery rate on the remote control no longer prompts a reaction).
2. The concrete pump pressure gauge does not indicate more than approx. 50 bar in supply mode.

3. The hydraulic oil becomes very hot because a large portion of the oil constantly flows through the pressure relief valve (PR2; 50 bar reduction **(Fig. 228)**).

Suggested solution - malfunction 2:

First check the maximum operating pressure as follows:

Attention!

Damage due to pressure peaks if the electrical system fails!

The hydraulic system can be damaged by pressure peaks.

If the electrical system fails, reduce the delivery rate (stroke rate) of the concrete pump hydraulically to approx. 60% of the maximum value.

1. Switch off concrete pump.
2. Close ball valve (1) **(Fig. 228)** (position “Pressure control”).
3. Move ball valve (2) **(Fig. 228)** / **(Fig. 229)** into position (II) “Pressure control”.

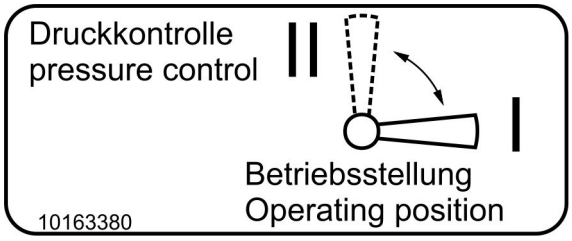


Fig. 227 Sign on pump kit control block

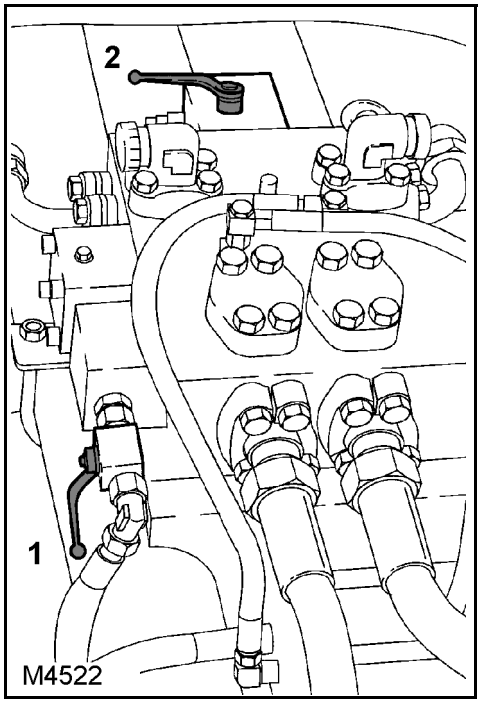


Fig. 228 Ball valves on pump kit control block

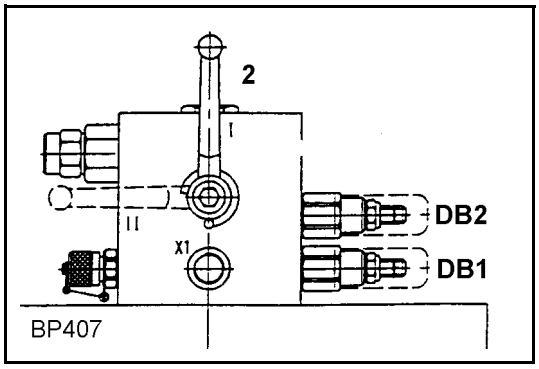


Fig. 229 In detail: Ball valve 2

This bypasses the pressure relief valve (PR2 - max. 50 bar).

4. Configure the max. delivery rate (stroke rate) for the concrete pump on the “emergency-off block” for adjusting the delivery rate **(Fig. 225)**/**(Fig. 226)**.
5. Switch concrete pump back on.

The pumping pistons are moved into the end position and remain there.

The indicator on the concrete pump pressure gauge must rise to the set safety pressure in supply mode.

The configured safety pressure varies depending on the type of machine.

For hydraulic pumps with a pressure cut-off, the indicated value must be approx. 20 bar below the setting for the pressure relief valve DB 1.

If this is the case, you can terminate the work assignment as follows:

6. Leave the ball valve (2) **(Fig. 228)** in position (II) “Pressure control”.
7. Reopen the ball valve (1).

Note that without reducing the pressure the differential cylinders will strike harder and the machine will become louder.

Wear and tear increase.

Information

Emergency operation!

The measures described above represent an **EMERGENCY OPERATION** and are not a permanent solution.

8. Contact your SCHWING representative as soon as possible for repair.
9. After the repairs, switch the ball valve (2) back to the "Operating position" (I).

3.19.7 Operating the folding bow outrigger in emergencies

The folding elements on the front bow outrigger (SX**F**) are monitored by your machine's control system[1].

During normal operation, the folding elements on the front bow outrigger have to be extended completely before the rear section of the bow outrigger can be extended horizontally.

In the following situations, it may be necessary to operate the outriggers in a different order during emergency operation:

- If the folding element leaves its fully extended position during pumping operations.
- If transport safety devices jam as a result of dirt or temperature effects.
- If sensors fail.

By simultaneously pressing both release buttons for 5 seconds, all functions are enabled. If there is no input for 5 seconds, the mode is exited again. The mode requires increased attention as there is no sensor monitoring.

3.19.8 EMERGENCY STOP bypass

When actuating an EMERGENCY STOP button, the voltage on the EMERGENCY STOP valves drops. The valves open and the hydraulic movements stop.

If the voltage drops due to a defective valve, these movements also stop.

If it is not possible to repair the equipment immediately, the valves can be energised manually via the EMERGENCY STOP bypass:

For detailed descriptions, refer to the chapter on the control system.

1. depending on machine equipment

3.19.9 Using the concrete pump and agitator in emergency operation in the event of a power outage

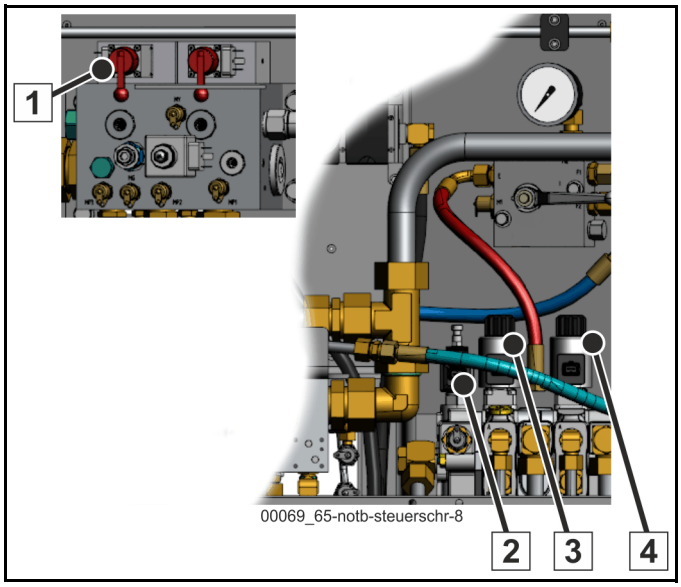


Fig. 230 Example of emergency operation - concrete pump, agitator - S65SXF

The following measures must be taken in order to operate the concrete pump during power outages:

- In both cases, press valve (1) continuously so that the hydraulic oil does not flow directly back into the hydraulic tank.
- Press valve (2) continuously.
- Press valve (3) if the agitator needs to be actuated.
- Press valve (4) in order to actuate the concrete pump.

Pressing valves (2) and (3) moves the respective machine functions in the direction of normal operation.

In order to reverse the direction of movement of the machine function, valves (2) and (3) have to be pushed in from “below”.

This task is more difficult and requires practice.

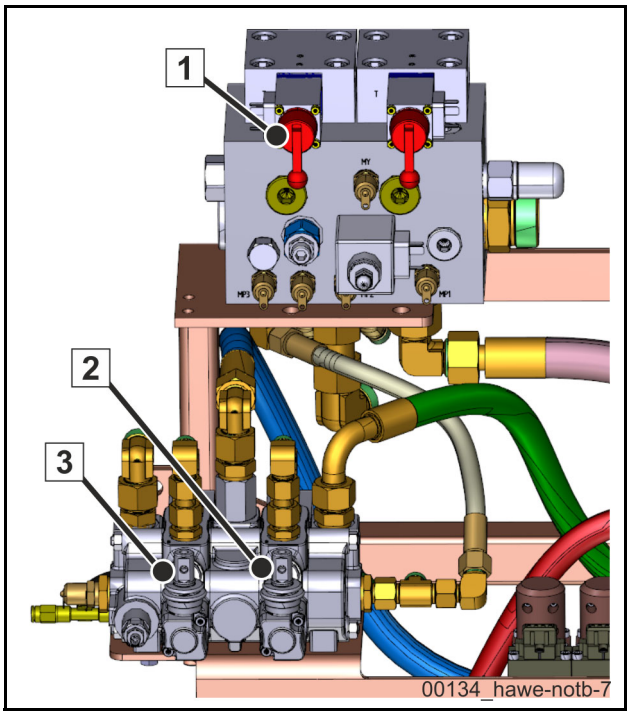


Fig. 231 Example of emergency operation - concrete pump, agitator - S36X DirectDrive

Caption	
Pos.	**Description**
1	Emergency manual actuation: CP
2	Control lever receiver concrete pump: PUMPING - 0 - SUCKING
3	Control lever receiver agitator: FORWARD - 0 - BACKWARD

The following measures must be taken in order to operate the concrete pump during power outages:

- Lift valve (1) on the emergency control block continuously so that the hydraulic oil does not flow directly back into the hydraulic tank.
- Using the screw-in lever, actuate valve (2) if the agitator needs to be rotated.
- Using the screw-in lever, actuate valve (3) to operate the concrete pump.

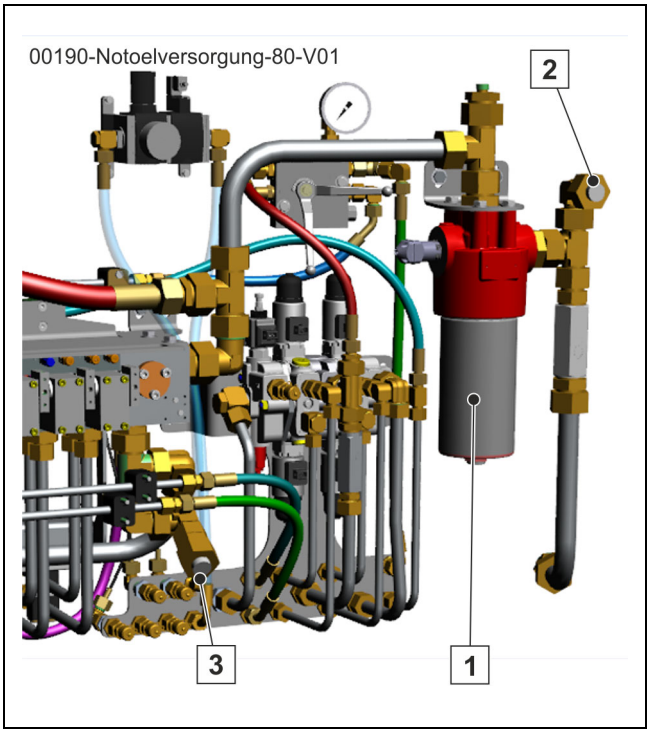
The direction of the movements depends on whether the lever is lifted or lowered.

3.20 Emergency oil supply for the placing boom hydraulics

In order to move the machine into the transport position using an emergency unit in the event of a drive or control failure, the hydraulic system is equipped with a (P) connection for an external emergency oil supply.

The (P) connection of the emergency oil supply (2) is located near the pressure filter (1) **(Fig. 232)**. The pressure filter is installed in the control cabinet next to the boom control block on the right side of the machine.

The position of the connection varies according to the machine model. The procedure and operation of the emergency oil supply are identical.



Pos.	Designation
1	Pressure filter
2	Delivery connection (P) Marking: Red
3	Return flow (T)[1] Marking: Blue

Fig. 232 Example: Emergency oil supply connections

1. Required for rinsing the boom hydraulics.

For an emergency oil supply, please note:

- Max. power of the emergency unit: 18 l/min at 280 bar.
- Hydraulic oil quality and viscosity according to the type being used.
- Required pressure hose: 20/4 x 5700 (DKOS/DKOS).

When using an emergency unit with a low delivery rate, a thinner pressure hose can be connected to (P) through a reduction.

- The screw joints necessary for the connection are included in the tool set.

Attention!

Damage to the hydraulic system due to dirt!

Dirt causes damage to the hydraulic components.

Always ensure cleanliness.

Attention!

Machine damage due to moving the placing boom into prohibited areas during emergency operation!

The movement limits of the placing boom are not active during emergency operation. The placing boom can be moved into prohibited areas and cause material damage.

Emergency operation is only intended for folding together the placing boom if the control system is defective.

Attention!

Environmental damage possible due to escaping hydraulic fluid!

Leaks when opening the hydraulic line can lead to environmental damage.

Collect any hydraulic fluid that leaks out and do not let it get into the environment.

Warning!

Risk of severe injuries due to hydraulic fluid escaping under pressure!

Explosive pressure relief in the event of improper work on the hydraulic system.

- ➤ Before working on the hydraulic system, switch off the drive motor.
- ➤ Relieve all pressure accumulators via the relief valves.
- ➤ Check the relief of the hydraulic system on the pressure gauges.

Before opening the hydraulic system, secure hydraulically moving parts that are subject to external forces, e.g. raised placing boom.

The work described below may only be carried out:

- By suitably trained personnel
- In accordance with the operational safety regulations.
- In the event of an emergency.

3.20.1 Connecting the emergency unit

1. Switch the machine off.
2. Position the emergency unit ((example) **(Fig. 233)**) in a suitable place above the oil level of the hydraulic oil box.
3. Open the hydraulic oil filling cap.
4. Insert the suction hose through the opening to below the oil level.
5. Connect the (P) connection of the emergency unit to the connection (2) **(Fig. 232)** on the machine.

Fig. 233 Example: Portable emergency unit

3.20.1.1 Operating the machine with the emergency unit

Information

Dynamic pressure!

In order to start the drive motor of the emergency unit against the dynamic pressure, an EMERGENCY STOP button must be actuated (pressed).

- Actuate an EMERGENCY STOP button on the machine.
- Start the emergency unit's drive motor.
- Unlock the EMERGENCY STOP button again and start the control system (possibly actuate the key-operated switch of the control system or only operate with emergency operation).
- Move the placing boom and outrigger into the transport position.

When work is interrupted, always actuate an EMERGENCY STOP button to relieve the emergency unit.

3.20.2 Emergency hand pump for lifting placing boom section 2

(only for overhead folding)

Information

In order to carry out emergency operations with the emergency hand pump, the assistance of an additional person is required.

As an alternative, the truck-mounted concrete pump can be equipped with an emergency hand pump. The emergency hand pump is only intended to lift boom section 2, so that the cab can then be folded down in order to repair the vehicle engine.

The emergency hand pump (3) is preferably located near the placing boom control block **(Fig. 234)**.

For machines with model S65SXF, the emergency hand pump (1) is located outside of the control cabinet near the rear outrigger **(Fig. 235)**.

3.20.2.1 Commissioning the emergency hand pump

In order to put the emergency hydraulics into operation, the control system must be switched on, as otherwise all EMERGENCY STOP valves are open.

1. Switch on the control system.
2. Close the emergency operation ball valve (2) **(Fig. 234)** on the underside of the boom control block in the control cabinet, as otherwise the pumped oil will escape to the tank via a nozzle built into the control block.
3. Place the pump lever (4) onto the emergency hand pump (3) **(Fig. 234)**.
4. Switch the control lever for the boom/outrigger control to the "Boom" position on the control block and hold it in place.
5. Switch the "Section 2" control lever to the "Section 2 up" position on the control block and hold it in place.
6. The second person can now actuate the emergency hand pump, in order to raise boom section 2 until the cab can be folded down.

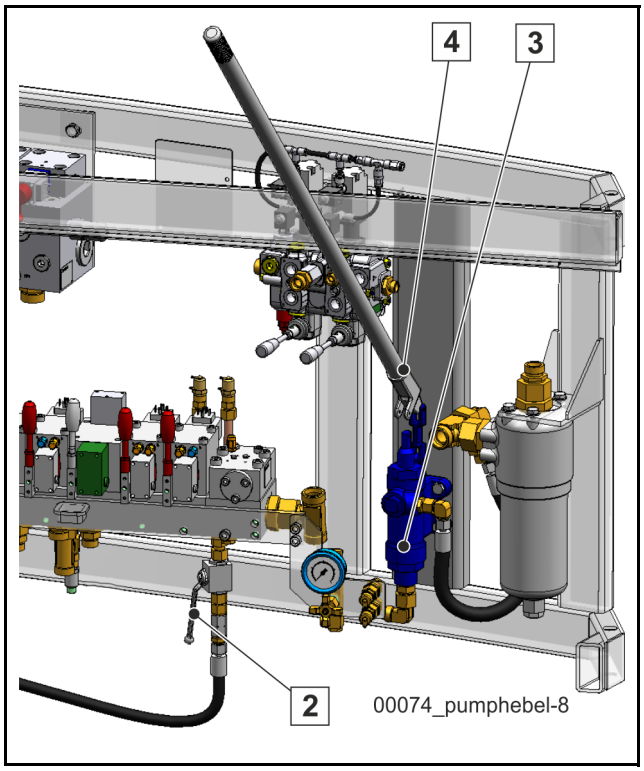


Fig. 234 Ball valve (2), emergency hand pump (3) and pump lever (4) in the control cabinet

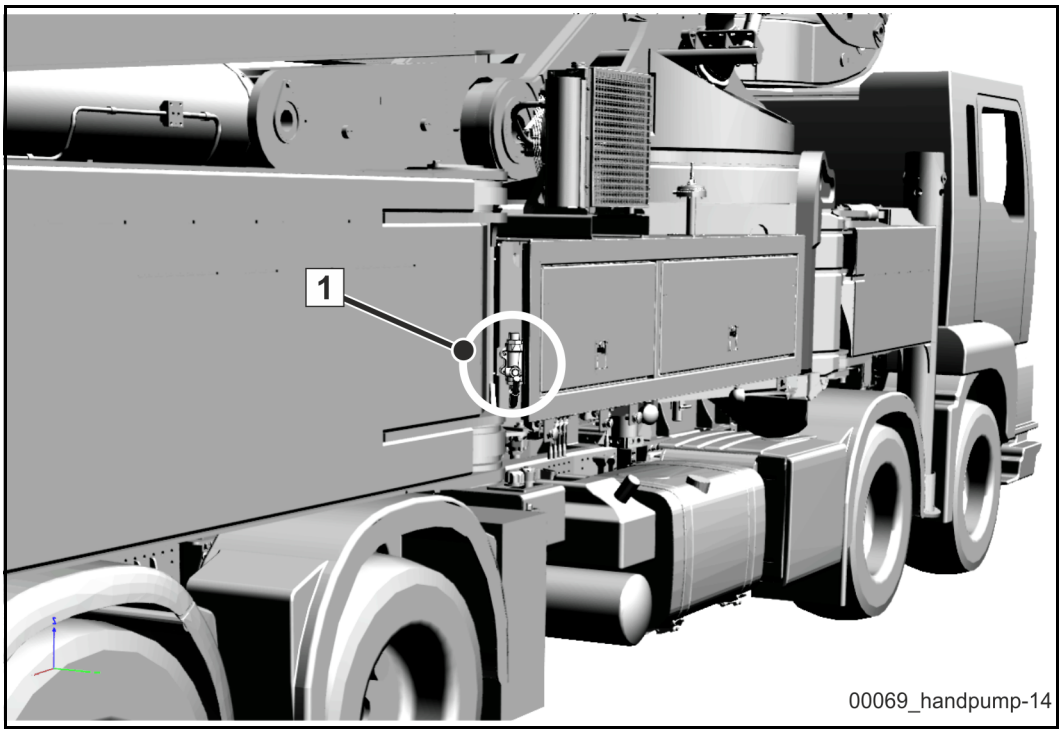


Fig. 235 Emergency hand pump (1) S 65 SXF

3.21 Cleaning mode (maintenance mode)

To facilitate cleaning in the feeding hopper, it is helpful to lift the placing boom slightly without having fully braced the machine beforehand.

For this reason, the “Cleaning mode” operating mode has been integrated into the control system.

In cleaning mode, it is possible to lift the placing boom slightly out of the transport position (transport position means: all supports are retracted, secured, and the placing boom is in the tray) and lower it again without having to brace the machine as required for work assignments.

To what extent this additional operating mode can be used depends on the individual features of each machine.

Warning!

Risk of crushing due to unintended lowering of the placing boom!

Persons can be crushed due to an unintended lowering (in case of defects and malfunctions) of the placing boom.

Always work with extreme caution under the placing boom.

Since 28 February 2013, truck-mounted concrete pumps that are brought into circulation for the first time in the European Economic Area must have a system that ensures that the outrigger is positioned correctly before the placing boom control is released.

Information

The front folding elements have to be fully supported for machines from model series S56SXF/S65SXF in order to move the rear folding outriggers. Spread the rear folding supports until a confirmation appears in the control system.

Always support type the specified machines if the placing boom is to be raised.

The control system display contains a confirmation of how far the rear folding supports must be extended.

3.21.1 Activating maintenance mode

In order to lift the placing boom out of transport position, proceed as follows:

1. Select “LOCAL” mode.
2. Lower all vertical outriggers until they are touching the ground.

A horizontal extension of the outriggers is not required.

Exception S56SXF / S65SXF

For the specified models, the folding elements in the front bow outrigger must be completely extended before the rear folding supports can be extended partially (see control system display) and braced vertically.

3. Switch to the “REMOTE” operating mode (VECTOR I)
   Switch to the “CLEANING MODE” operating mode (VECTOR II).
4. The display then changes automatically to "Cleaning mode". This is indicated by a short animation

The placing boom can then be moved to a limited extent using the remote control.

For machines with a roll-folding design, boom section 1 is released.

For machines with overhead folding, section 2 is also released up to an angle of >20°, as this is a prerequisite for erecting section 1.

Furthermore, it is possible to draw the boom package together in case a section drops while lifting.

Turning the placing boom at a low speed is possible if this is necessary to safely position it when lowering the boom package into the tray.

The “Turn” function serves to protect against unintentional boom movements. Therefore, actuate the “Turn” joystick and the “S3 control release” at the same time.

3.22 Cleaning

After concreting, the pumping line and concrete pump must be cleaned thoroughly. Valuable practical advice in video format can be easily obtained by scanning a QR code or directly on YouTube.

Poorly or not cleaned pumping lines lead to deposits and subsequent clogging, as well as damage to the agitator.

This chapter describes how to clean various SCHWING products. But the principle remains the same in each case.

- Finish the concrete feeding in good time so that the content of the hopper and pumping line can still be introduced at the jobsite.
- We recommend hosing down the equipment occasionally with a water hose during concrete breaks to prevent the concrete from setting.

Caution!

Risk of injury while handling poisonous and corrosive operating materials!

Construction materials containing cement are strongly alkaline with water (including sweat). Admixtures are poisonous and corrosive.

While working with poisonous and corrosive operating materials or operating materials which are hazardous to health, always wear personal protective equipment and follow the safety data sheet of the manufacturer.

3.22.1 Cleaning devices

Suitable devices can be ordered from SCHWING, e.g.:

- cleaning head **(Fig. 236)** and trap basket (2) **(Fig. 237)**.
- Compressor **(Fig. 238)**.
- Water pump (1) and/or high-pressure pump (2) **(Fig. 239)**.

Attention!

Material damage due to unsuitable material or accessories!

Materials or accessories of inferior quality wear quicker and can damage other components.

Only use materials and accessories approved by SCHWING.

Information

Special equipment!

Descriptions of special equipment are provided in chapter **(6)**.

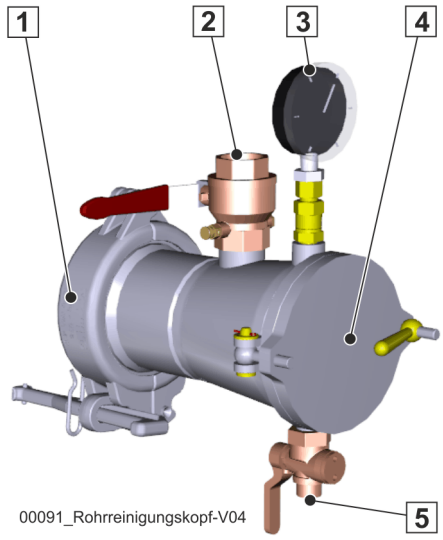


Fig. 236 Cleaning head

1 Connection flange
2 Drain cock
3 Pressure gauge
4 Access flap
5 Water connection

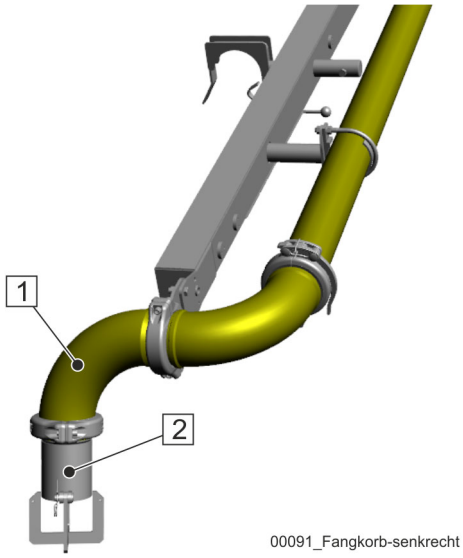


Fig. 237 Trap basket vertical at the end of the pumping line

1 End of the pumping line
2 Trap basket

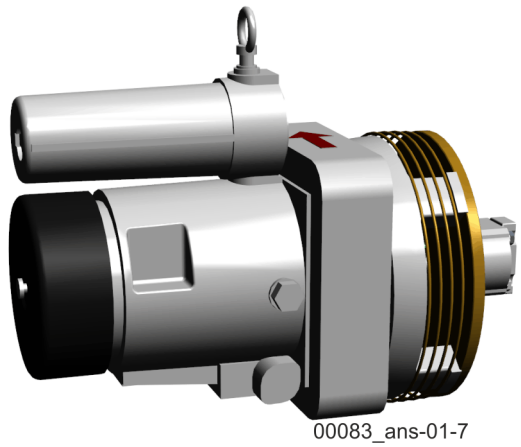


Fig. 238 Compressor

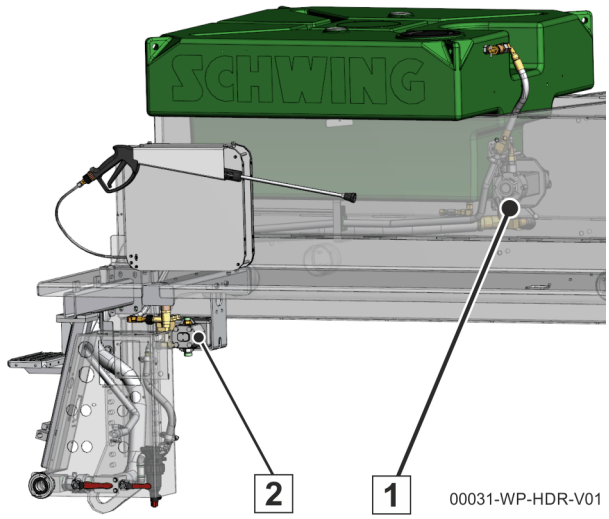


Fig. 239 Water pump (1), high-pressure pump (2)

3.22.2 Cleaning the pumping line

After work, clean the pumping line first since this is where the concrete sets quicker.

The total quantity of concrete located in the pumping line is calculated as follows:

DN	50	=	2.0 l/m
DN	65	=	3.3 l/m
DN	75	=	4.4 l/m
DN	100	=	7.8 l/m
DN	112	=	9.8 l/m
DN	125	=	12.3 l/m

Danger!

Pumping line under high pressure!

Serious injury or death.

Do NOT open the pumping line couplings under pressure!

Before opening the pumping line, the concrete column must be released by pumping backwards.

Various methods can be applied to clean a pumping line.

3.22.2.1 Reverse pumping of concrete using a soft sponge rubber ball (standard cleaning)

Reverse pumping of concrete using a sponge rubber ball represents the normal cleaning of a placing boom pipeline.

Attention!

Risk of damage to the pumping line due to tapping with metal objects!

The hardened layer of highly wear-resistant tubes can be damaged. Dents in the pumping line lead to increased wear.

Only use the handle of the hammer to carefully tap the pumping line.

Information

Bear in mind that the content of the pumping line can exceed the volume of the concrete feeding hopper during back siphonage.

In such cases, it is necessary to interrupt the process and empty the feeding hopper.

It depends on several factors whether the concrete feeding hopper can completely receive the flowing back concrete or how quick the hopper is full:

1. Volume of the feeding hopper
2. Volume of the pumping line
3. Volume of the pumping cylinder
4. Degree of filling of the pumping cylinder

Example:

S 58 SX with pump kit 2525

for 1. = approx. 600 l

for 2. = approx. 850 l

for 3. = approx. 125 l (one cylinder)

for 4. = unknown

A theoretical degree of filling of the pumping cylinder of 100% would require approx. 7 strokes to empty the pumping line.

850 l/125 l = approx. 7 strokes

Which would cause the feeding hopper to overflow.

In this case, we recommend interrupting the back-siphonage process after 4 strokes at the latest and emptying the hopper:

4x 125 l = 500 l

A certain degree of experience is helpful here.

The basic principles are:

The longer the pumping line, the sooner an overflow of the feeding hopper during back siphonage can be anticipated.

The larger the volume of the pumping cylinder, the fewer strokes are required to empty the pumping line.

We recommend our chamber valve for cleaning the pumping line, especially for larger machines, see the chapter on special equipment.

Proceed as follows when reverse pumping concrete using a soft sponge rubber ball:

1. Preparation: Machine is supported, boom is folded out.
2. Close the foldable covering for the hopper, e.g. (1) **(Fig. 240)** / **(Fig. 241)**.
3. Secure the covering for the hopper to prevent it from popping up due to overpressure in the feeding hopper.
4. Slowly pump hopper as empty as possible.
5. Position the placing boom as shown in **(Fig. 242)**.

A pumping pipe with a cleaning cover (1) **(Fig. 243)** is available as special equipment. If the top cover is installed reversed, it retains the cleaning ball during reverse pumping.

6. Switch agitator to reverse if the machine is not equipped with an automatic adjustment of the agitator rotational direction to pumping or suction operation. Do not forget to switch. Machines with a VECTOR (II) control system switch automatically.
7. Push the damp sponge rubber ball into the end hose **(Fig. 244)**, then switch the concrete pump to "Suction" (reverse running) with a lower stroke rate.
8. Briefly tap on the pumping pipe with the handle of a hammer just in front of the cleaning aperture.
   - If there is still concrete in the line at this point, the tapping will produce a deep, dull sound **(Fig. 245)**.
   - If the concrete and sponge rubber ball have passed the tapping point, the tapping will produce a high-pitched sound **(Fig. 246)**.
9. Remove the cleaning cover (1) **(Fig. 243)** and take out the cleaning ball.
10. Reinstall the cleaning cover (2) **(Fig. 243)** in "pumping position".

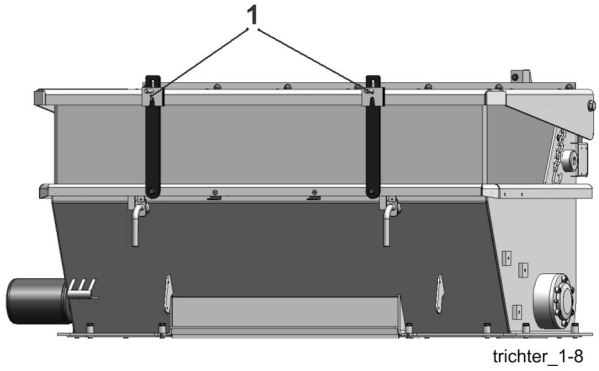


Fig. 240 Example: Cover for PLC feeding hopper

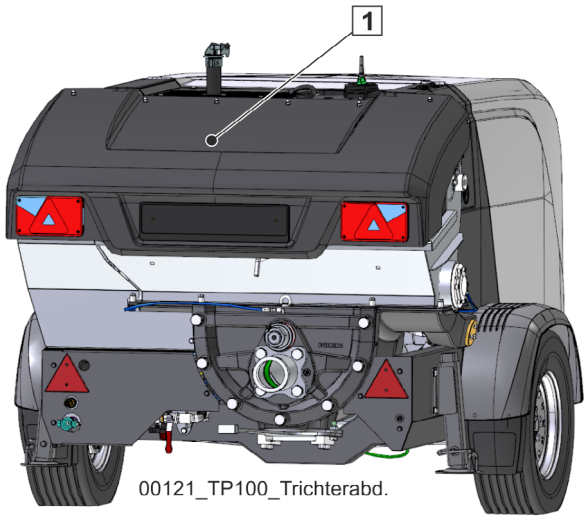


Fig. 241 Cover for TP100 feeding hopper

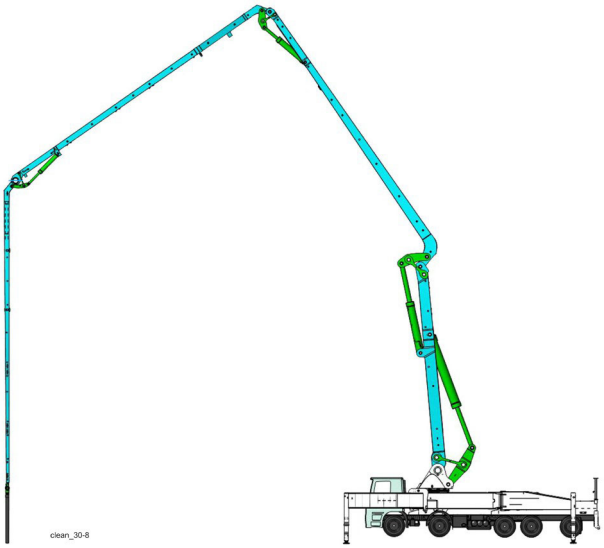


Fig. 242 Placing boom cleaning position

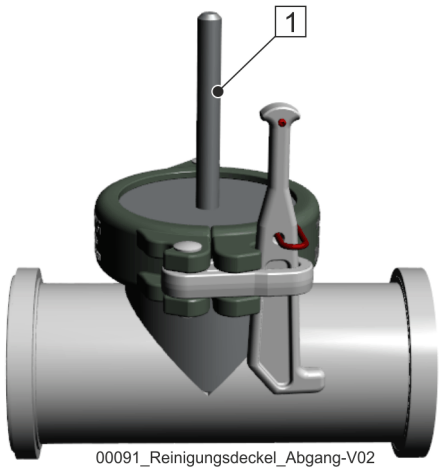


Fig. 243 Cleaning cover “pumping position”

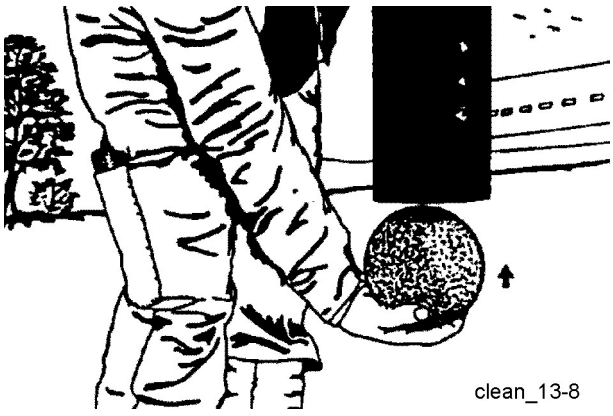


Fig. 244 Sponge rubber ball

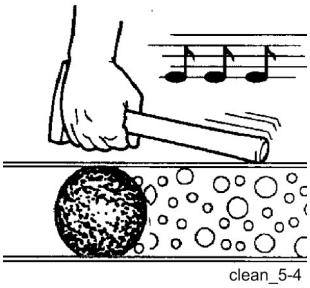


Fig. 245 Dull sounds

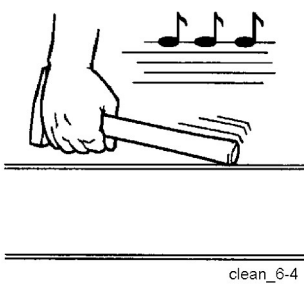


Fig. 246 High-pitched sounds

3.22.2.2 Clearing the pumping line with water

This method is ideal for separately laid, long pipelines, vertical lines and lines with a downstream placing boom.

For stiff, rough, fine-grained or sand-poor concretes, this method can also be recommended for the boom pipeline of truck-mounted concrete pumps.

The following is required in addition to a powerful water pump:

- Cleaning head with water connection **(Fig. 236)**.
- Soft sponge rubber ball
- Paper plug

The paper plug is made of soaked, double-folded, tightly rolled-up, empty cement bags.

Information

Concrete properties!

The paper plug must be completely sealed to prevent the concrete from leaching.

3.22.2.3 Rinsing the pumping line

Cement residues are removed from the tube walls by rinsing the emptied pumping line, for this:

➤ Press a soft sponge rubber ball about 1 m into the pumping pipe.

➤ Mount the cleaning head with a soft sponge rubber ball attached to it onto the pipeline.

➤ Fill with water between both soft sponge rubber balls.

➤ Use water cushion to press both soft sponge rubber balls through the line, as in blow out with air **(chap. 3.22.2.4)**.

3.22.2.4 Blowing out the pumping line with compressed air

Warning!

Risk of accident due to compressed air in the pumping line!

Intake air is compressed in the pumping line and escapes abruptly at the end hose. Persons in the danger zone may be injured through pulsating of the end hose and flying stones.

The hopper must be always filled with concrete at least up to the agitator shaft so that air is not sucked.

The following points must be observed when blowing out the pipeline with compressed air.

1. The blowing out must be carried out under expert guidance.
2. Elbows or hoses may not be mounted at the end of the pipeline.
3. No-one may remain in the area of the concrete output.
4. Empty and rinse tapered tubes manually. Only blow out pumping lines of the same nominal size.
5. A trap basket (2) must be connected to the concrete output at the end of the pumping line **(Fig. 237)**.
6. Set the concrete output high so that the concrete can escape freely.
7. The cleaning head must be equipped with a functioning pressure gauge (3) and a large-dimensioned blow-out cock (2) **(Fig. 236)**.
8. The length of the plug must be such that it seals the pipeline hermetically on the trap basket upon completion of the blowing out.
9. The plug must be sealed in order to prevent the compressed air from penetrating past it into the concrete.
10. Only work on unpressurised pipelines. Open blow-out cock (2) **(Fig. 236)**. Concrete emerging under pressure can injure persons.
11. Individual tubes and short 10 m-long tube strings may not be blown out. High risk of accident caused by recoil due to low mass!

In addition to the prepared paper plug, as described above, a hard sponge rubber ball can be used to blow out tubes.

3.22.3 Cleaning the concrete pump

Secure the machine against unauthorised operation before opening the cleaning flaps:

- ➤ Remove the remote control cable.
- ➤ Connect the radio remote control transmitter.
- ➤ Discharge the pressure accumulator (if applicable) or check the automatic discharge.
- ➤ Use the local control.

Danger!

Danger to life due to electric shock!

High-pressure water jet can damage protected electrical components.

Never hold the high-pressure water jet directly on electrical components.

Danger!

Risk of being pulled in, crushed and sheared by moving machine parts in the hopper!

Serious injuries or death possible.

Do NOT reach into the hopper and do not hold ANY objects in it!

Danger!

Risk of being crushed and sheared by moving machine parts in the water box!

Serious injuries or death due to crushing.

Do NOT reach into the water box when the machine is running. Before working in the water box, always switch off drive motor and release pressure accumulator in order to prevent unwanted working movements of the concrete pump.

Warning!

Risk of severe injuries or even death due to moving parts!

Moving parts can draw people in and crush them.

When the hopper grate is raised, the agitator shaft and the concrete pump are immediately switched off by a limit switch.

If the agitator shaft/concrete pump continues to move after lifting, stop work immediately and have the control system repaired.

Before lifting the hopper grate, switch the machine off!

If this is not possible, the concrete pump and the agitator stop once the hopper grate in the concrete feeding hopper is opened.

The hopper grate must only be opened in exceptional cases. Lock the raised hopper grate with the hooks (1) **(Fig. 247)**.

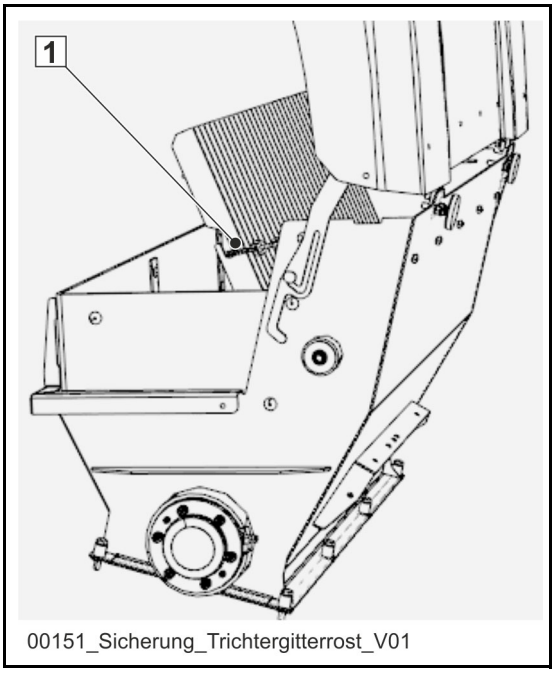


Fig. 247 Example: Securing the raised hopper grate

3.22.3.1 Behaviour of truck-mounted concrete pumps after closing the hopper grate

After closing the hopper grate:

- The agitator turns back on.
- The concrete pump must be switched back on (restart protection for end hose).

3.22.3.2 Behaviour of stationary concrete pumps / trailer pumps after closing the hopper grate

After closing the hopper grate:

- An EMERGENCY STOP notification must be acknowledged on the control unit.
- The agitator must be switched back on.
- The concrete pump must be switched back on (restart protection).

3.22.4 Interior cleaning

Attention!

Risk of damage due to the concrete pump running dry!

Due to dry running, moving parts of the concrete pump (e.g. pumping pistons, pumping cylinder, rock valve components) can wear quickly.

Do not allow the concrete pump to run dry.

1. Have a drip pan ready for residual concrete before beginning with the cleaning.
2. Fold the folding outlet bend to the side and lock it with the wedge (2) **(Fig. 248)**.
3. Start up the concrete pump at the lowest stroke rate, in order to pump any residual concrete out of the hopper.
4. Discard the residual concrete if you are no longer able to use it at the jobsite.
5. Connect the water hose and hose out the feeding hopper **(Fig. 249)**. The concrete pump sucks in water and rinses out the pumping cylinders.
6. Switch off the concrete pump and the vehicle engine.
7. Open the cleaning flap (2) **(Fig. 250)** under the rock valve housing using a hammer.
8. Clean the agitator, rock valve housing, outlet, etc. with a strong water jet. Only hold the water jet and not the hose nozzle inside the opening of the gate valve housing **(Fig. 251)**.
9. Clean the water box by switching on the concrete pump briefly at the lowest stroke rate while the drain valve is open.
10. Hose out the water box with pressure water **(Fig. 252)**. Do not remove the grid from the water box!
11. Fill water box with fresh water.
12. Check the water box weekly for deposits that could not be removed by normal flushing process. Increasing deposits may indicate wear on the pumping piston.
13. Close the cleaning flap of the rock valve **(Fig. 250)**.
14. Secure the slewing lever on the cleaning flap by hitting it with a hammer in the axial direction.

Information

The hammer blows jam the cleaning flap in the wedge-shaped guides.

Vibrations can cause the cleaning flap to open.

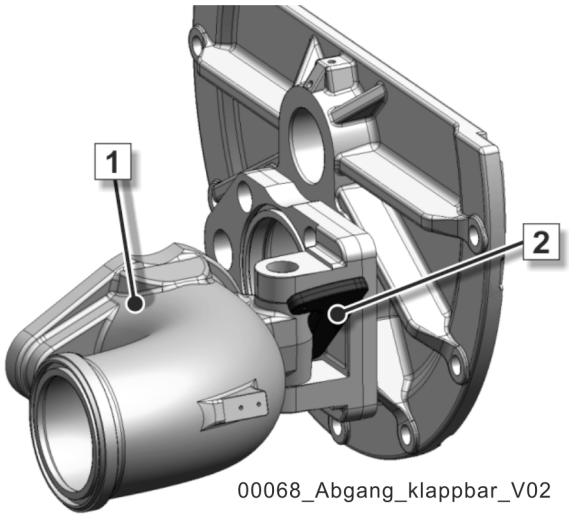


Fig. 248 Folding outlet bend (1)

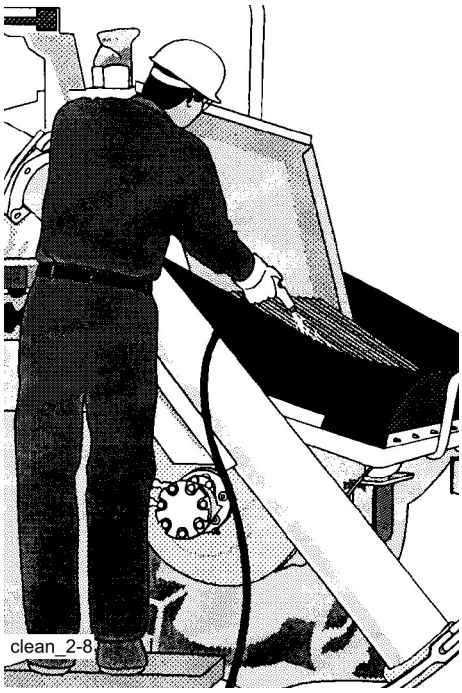
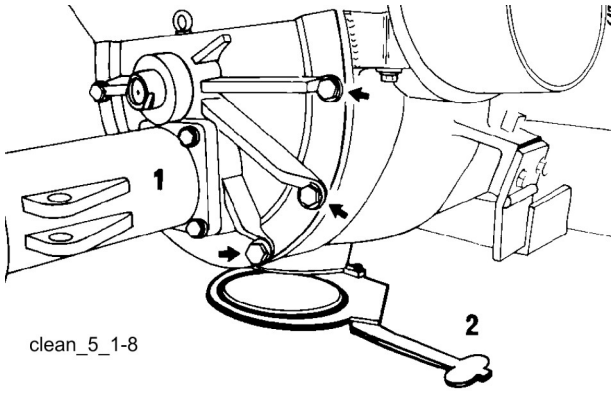


Fig. 249 Cleaning the feeding hopper



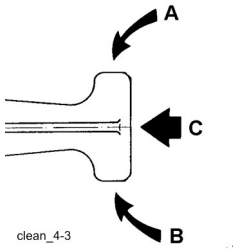


Fig. 250 Cleaning flap (2)

a) close

b) open

c) secure

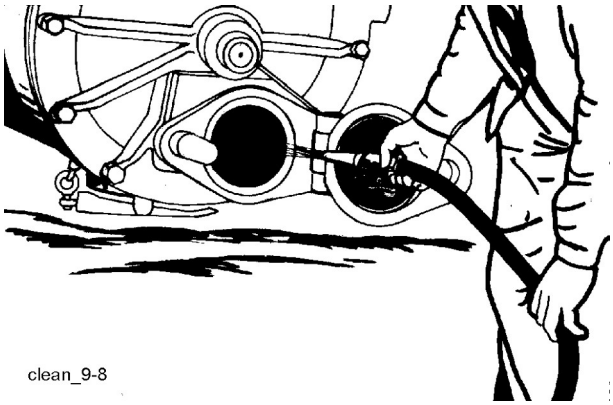


Fig. 251 Clean rock valve

Fig. 252 Clean water box

3.22.5 Exterior cleaning

We recommend the occasional hosing down with a water hose during breaks to prevent the concrete setting.

Lightly spray the outside of the concrete pump feeding hopper with formwork oil.

Information

Only use environmentally-friendly oils.

Make sure that no oil enters the feeding hopper.

3.22.6 Using high-pressure cleaners (HP cleaners)

Information

New paints are only properly dry after approx. 3 months.

Do not clean the machine with an HP cleaner during this time.
This also applies to repainted sub-areas.

Newly painted surfaces may only be cleaned with a spray hose and cold water during the first 3 months. Use a soft brush, if necessary.

No HP cleaner should be used in areas with mechanical paint damage, because this can cause painted areas to separate even more.

Damaged painted surfaces should be repaired as soon as possible and in a professional manner.

3.22.7 Using cleaning agents

Warning!

Risk of fire due to highly flammable agents!

Hot components can ignite highly flammable agents.

Do not use highly flammable agents.

- Do not use aggressive cleaning agents. They can corrode different materials (e.g. rubber) and painted surfaces.

- Commercially available paint cleaner and care products can be used, provided they do not exceed a pH value of 9 or fall below a pH value of 4.

Information

Ask the manufacturer of the cleaning agent to confirm its suitability. Observe his directives on the application and health protection.

SCHWING's customer service can help you choose a cleaning agent that is suitable for your needs.

➤ Always rinse off the cleaning agents thoroughly with clean water. Do not leave puddles.

3.22.8 After cleaning

In dry condition.

Information

Ask the manufacturer of the anti-corrosive agent to confirm that it is suitable. Observe his directives on the application and health protection.

SCHWING's customer service can help you choose a cleaning agent that is suitable for your needs.

1. Lubricate all lubrication points after cleaning.
2. At regular intervals, apply a transparent synthetic-resin-based anti-corrosive agent to the joints and connection points of moving components and cable plug connections.

3.22.9 Water box flushing (special equipment)

Our concrete pumps can be equipped with a pressure flush function for the water box as a special accessory.

With this device, the usual manual cleaning of the water box is omitted to a large extent.

Four spraying nozzles in the top cover of the water box rinse the inside of the water box and piston rods of the differential cylinder.

Application:

1. Open the drain cock (25) **(Fig. 253)** on the water box at the rear of the machine.

2. Start the water pump and route pressurised water into the spraying nozzles (3, 4) **(Fig. 254)** on the water box by switching the corresponding ball valves (11) **(Fig. 253)** on the rear of the machine and (2) **(Fig. 254)**.
3. Start the concrete pump at a lower stroke rate.
4. Finish the cleaning process when clean water emerges from the drain cock.
5. Close the drain cock and fill the water box with clean water.

This can also be done with the spraying nozzles or, as usual, through the drain hose. Always rinse the water box immediately after each use of the concrete pump and visually inspect it once a week to make sure that it is clean.

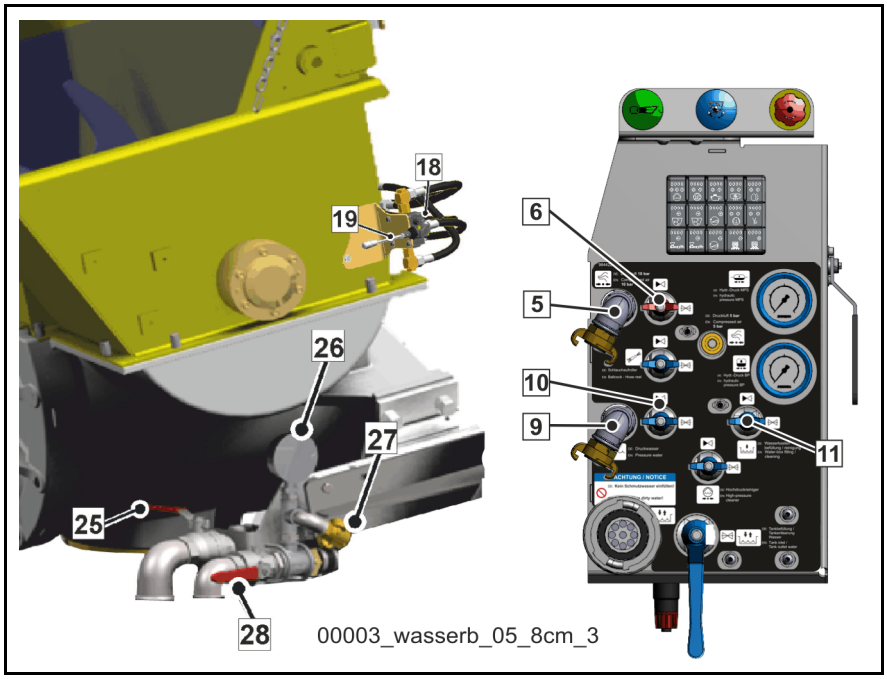


Fig. 253 Rear of the machine

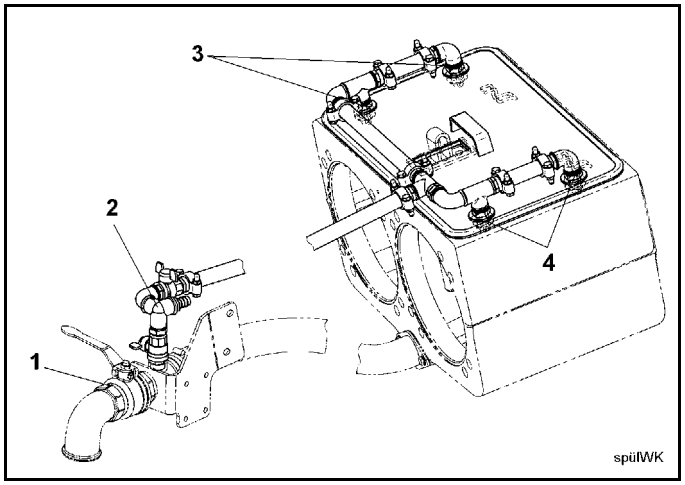


Fig. 254 Flushing the water box

3.23 Assembling the placing boom

Attention!

Risk of damage and accident!

Observe the boom constantly and avoid contact with machine parts and obstacles.
Be careful when operating several movements simultaneously.

Maintain the correct order. Failure to comply can possibly cause damages.

Warning!

In order to avoid overloading the placing boom hydraulics, the end hose must not be extended in the "backwards position" beyond the vertical line into the prohibited area **(Fig. 255)**.

Fig. 255

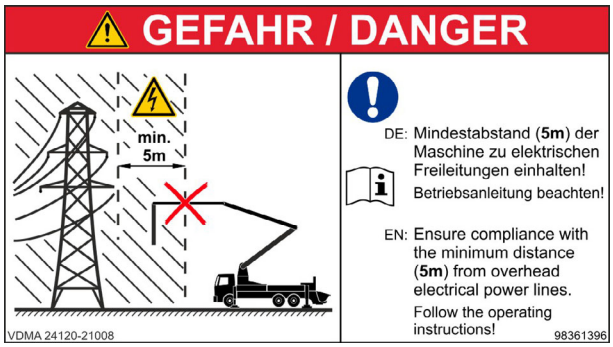


Fig. 256

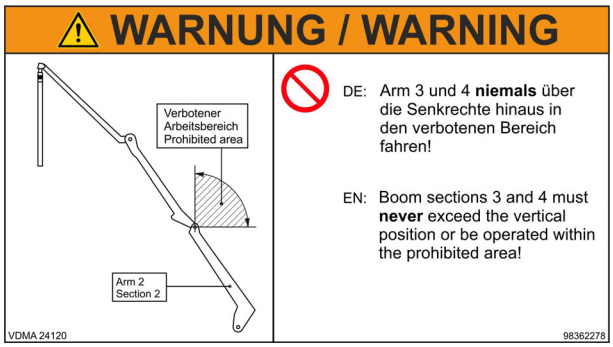


Fig. 257

The correct method for assembling the placing boom depends on the starting position and could be as follows:

➤ Raise boom section 1 as far as possible.

Fig. 258

➤ Retract boom section 2 while holding boom sections 3 and 4 level **(Fig. 258)**.

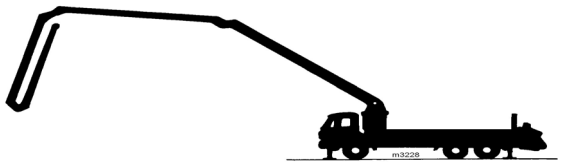


Fig. 259

➤ Retract boom section 4 until it reaches the system at 3. **(Fig. 259)**.

Make sure that the transport safety devices take up the end hose.

➤ Fold in boom section 3 until it reaches the system at 2.

➤ Align placing boom with the vehicle.

➤ Lower boom package.

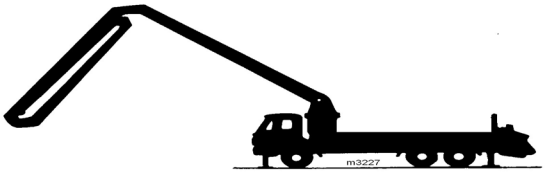


Fig. 260

Ensure that

- The transport securing devices take up the end hose.

- The boom sections are fixed below one another by the respective limit stops, e.g. (1 and 2) **(Fig. 261)**.
- The boom column is aligned correctly **(Fig. 260)**.
- The supports on the machine frame hold the boom package **without pressure**, e.g. **(Fig. 262)**.

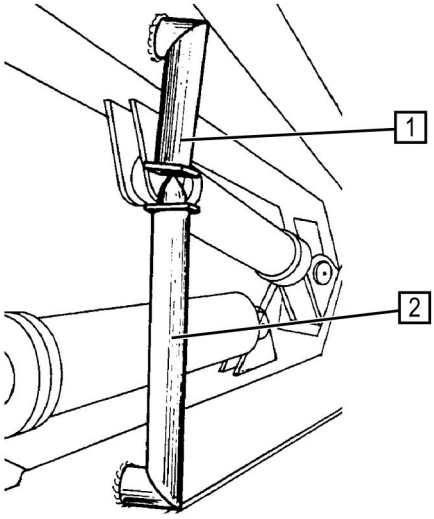


Fig. 261 Limit stops for boom sections

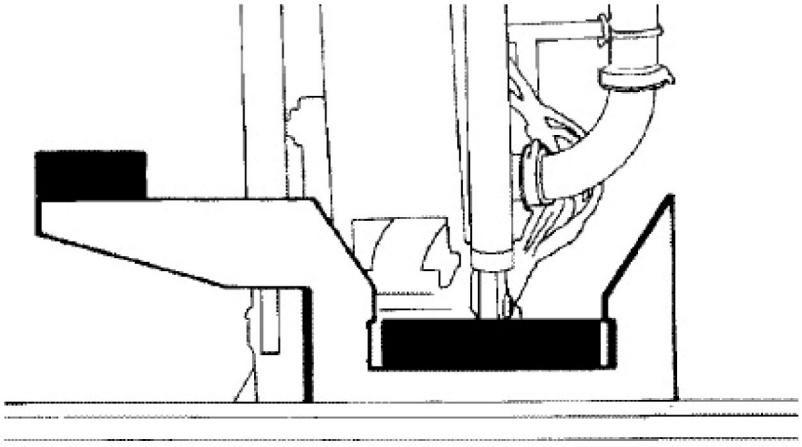


Fig. 262 Machine frame

3.24 Preparing the machine for driving

This chapter describes how to prepare your machine for driving in traffic after the work assignment.

If the machines for transport must be loaded or lashed, observe the safety manual and “Setting up machines” chapter.

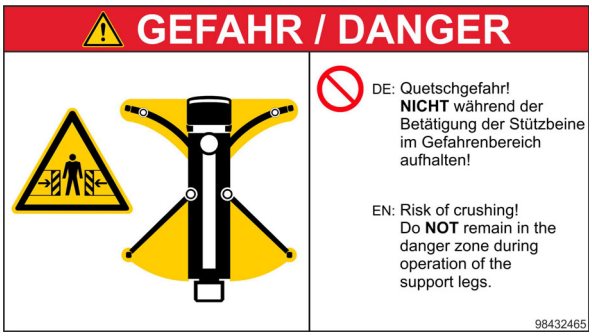
Initial situation:

You have already completed the pumping operation and moved the placing boom into the transport position (see previous chapter).

In order to prepare the machine for driving, all outriggers first need to be retracted.

3.24.1 Warning notice

The outriggers can only be moved while the local control unit is active!



For safety reasons, the machine is equipped with a "fixed-position outrigger control".

In order to move the outrigger cylinders, the release button **(Fig. 263)**; (6) **(Fig. 265)** next to the outrigger control block must be held down while the control lever is actuated.

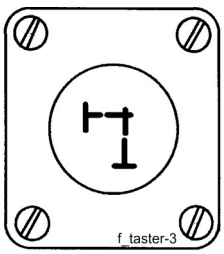


Fig. 263 Release button

If only one control element is actuated, or an element is released during control, then no movement is possible.

The hydraulic cylinders for the outriggers can only be controlled from the control blocks on the respective side of the machine.

3.24.2 Retracting the vertical outriggers

➤ First, gradually lower the machine by actuating the control levers on both sides of the machine alternately.

This prevents unnecessary loads on the outriggers, as would be the case if only one outrigger cylinder were retracted completely.

➤ Retract vertical outrigger cylinders up to the end position (only for S 47 SX / S 56 SXF: only retract the front vertical outrigger cylinders until the supporting leg is almost in contact with the rubber sleeve).

➤ Store support pads.

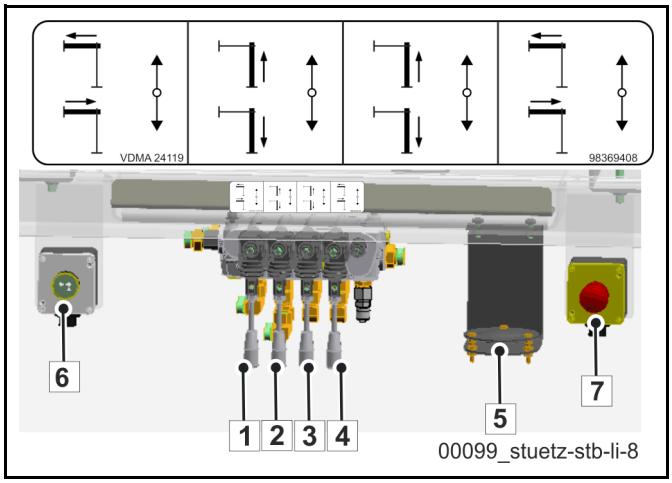


Fig. 264 Example illustration: Outrigger control block for model S36X, on the left in the direction of travel

Caption (Fig. 264)			
Pos.	**Description**	**Pos.**	**Description**
1	Control lever, move front outrigger horizontally	5	Spirit level for aligning the machine
2	Control lever, move front outrigger vertically	6	Release button for outrigger hydraulics
3	Control lever, move rear outrigger vertically	7	Emergency stop
4	Control lever, move rear outrigger horizontally		

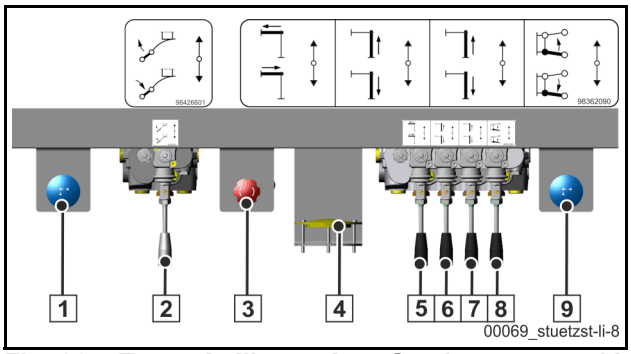


Fig. 265 Example illustration: Outrigger control block for models S56SXF/S65SXF, on the left in the direction of travel

Caption (Fig. 265)			
Pos.	**Description**	**Pos.**	**Description**
1	Release button for front folding outrigger	6	Control lever, move front outrigger vertically
2	Control lever for front folding outrigger	7	Control lever, move rear outrigger vertically
3	Emergency stop	8	Control lever, fold rear outrigger horizontally
4	Spirit level for aligning the machine	9	Release button for large control block
5	Control lever, move front outrigger horizontally.		

Attention!

Attention: Material damage caused by active power take-off!

The power take off may NOT be switched on during driving operation!

Observe the following warning before folding in the horizontal outriggers **(chap. 3.24.4)**!

Attention!

Material damage due to rear underride protection!

When folding in the rear outriggers, they can collide with the underride protection in the “operating position”.

For machines models S56SXF/S65SXF, the rear underride protection has to be moved into the “transport position” before the rear folding outriggers can be completely retracted.

3.24.3 Retracting the horizontal outriggers

Information

When disassembling machines with folding outriggers (SX**F**), please note that the folding element on the front bow outrigger has to be folded in at the very end.

If the folding element is retracted first on machines with active sensors, the control system switches off the outrigger control in order to prevent material damage to the driver's cab.

Items 1 and 2 only apply for machines of model S 46 and 47 SX.

1. Move the toggle (2) **(Fig. 266)** on the rear folding outriggers into a vertical position.
2. Fold in the outriggers up to the end position.
3. Secure the folding outriggers by moving the toggles (2) **(Fig. 266)** into a horizontal position.

➤ Fold in the rear outriggers up to the end position.

➤ Lock the outriggers with the transport safety device (1) **(Fig. 267)**.

This prevents the rear outriggers from folding out on their own while driving.

➤ Remove the transport safety devices (1) **(Fig. 268)** from the front outriggers (if available).

➤ Retract the front drawers to their end position and reinsert the transport safety device.

➤ Retract the front supporting leg against the rubber sleeve (only for S 47 SX / S 56 SXF).

➤ Fold in the rear outriggers up to the end position.

➤ Move the outriggers by carefully actuating the control levers!

Avoid hitting the outriggers against anything!

Warning!

Risk of severe injury or death!

Outriggers can independently extend while driving, leading to deaths or severe injuries!

- Only drive the machine with the outriggers secured!
- Stow away all accessories securely to prevent them from getting lost during the ride.
- Walk around the machine again and make sure you have not forgotten anything.

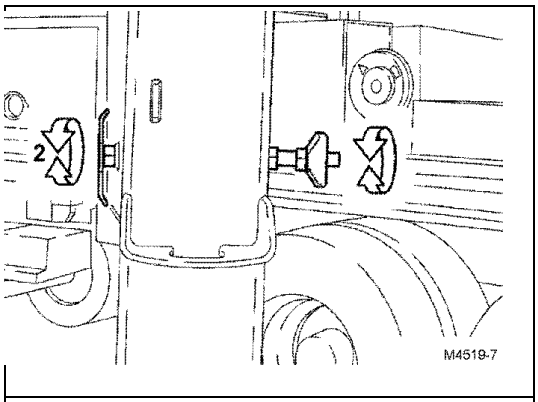


Fig. 266 Only for machine models S46SX and S47SX

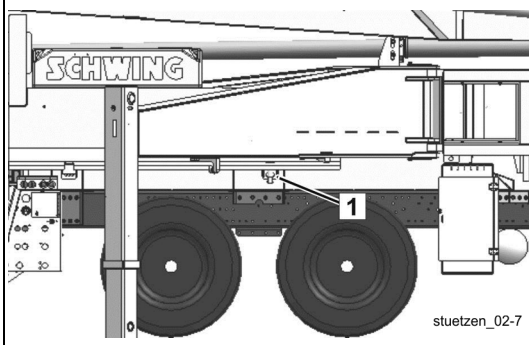


Fig. 267 Transport safety device (example illustration)

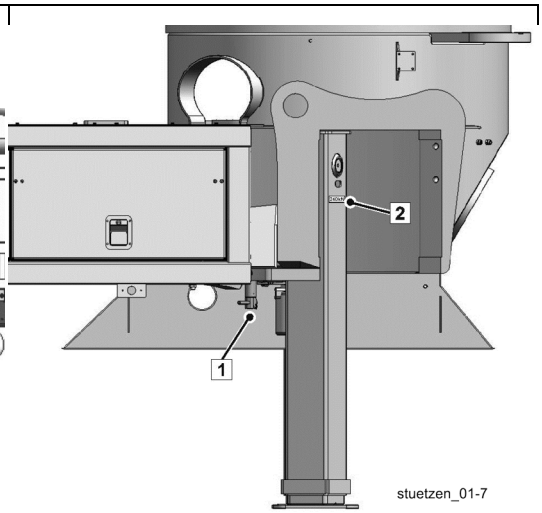
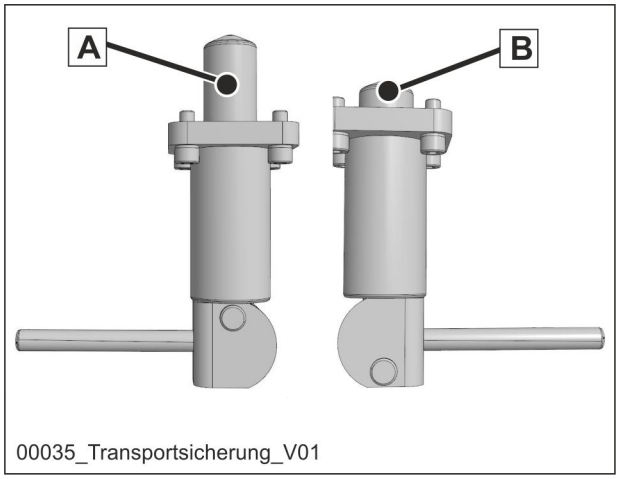


Fig. 268 Transport safety device (1)



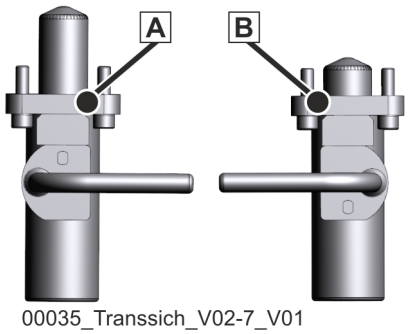


Fig. 269 Example: Transport safety device in detail

Caption (Fig. 269)	
Pos.	**Description**
A	Secured
B	Not secured

3.24.4 Preparing the underride protection (special equipment) for driving operation

Warning!

Severe injuries or even death due to rear-end collisions!

In case of rear-end collisions, other vehicles can reach under the truck-mounted concrete pump.

Before driving, the underride protection must be moved into the transport position.

The underride protection (1) is in the operating position **(Fig. 270)**.

- Loosen the chain fastener (3) **(Fig. 271)** for the underride protection on the left-hand side of the hopper.
- Move the underride protection downwards into the transport position and secure the underride protection using the two locks (2) **(Fig. 272)**.

The underride protection is now in the transport position **(Fig. 273)**.

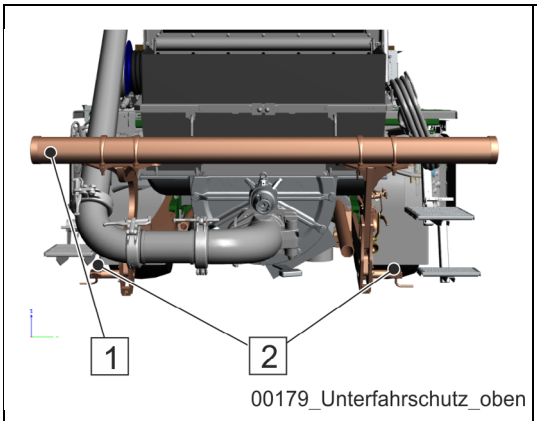


Fig. 270 Underride protection in operating position

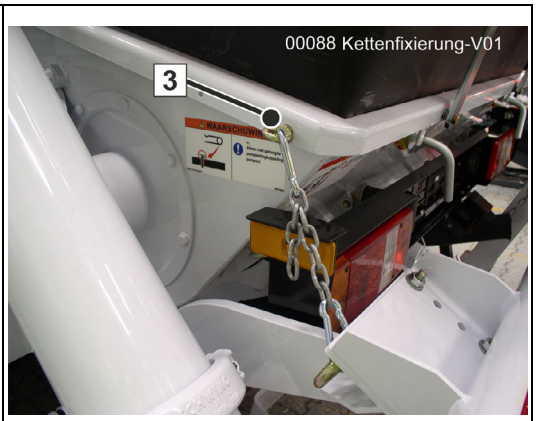


Fig. 271 Chain fastener for underride protection in operating position

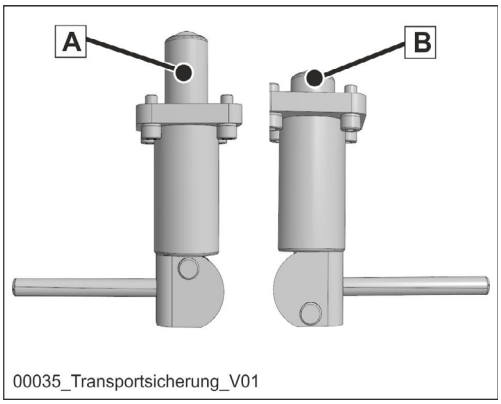


Fig. 272 "A" = secured / "B" = unlocked

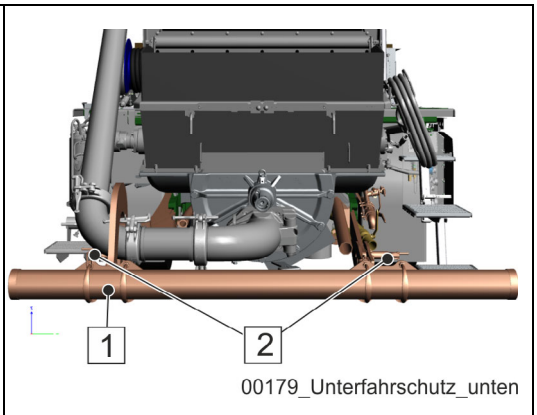


Fig. 273 Underride protection in transport position

3.24.5 Shutting down special equipment

Your machine can be equipped with special equipment, which must be shut down before starting the drive (for example, the end hose non-return valve).

The operating instructions for special equipment are summarised in **(chap. 6)** of these operating instructions.

- Observe the instructions for shutting down special equipment before starting the journey.

3.24.5.1 Switching off the control unit

➤ Set the motor to idle.

➤ Lock all flaps on the machine.

➤ Switch off the power supply of the control system using the key-operated switch (1) **(Fig. 274)** in the driver's cab.

➤ Do not forget, if necessary, to switch off all floodlights with the switch (3) **(Fig. 274)**.

The pilot light in the switch must be off.

3.24.6 Switching off the pump drive

a) Switch off the power take-off:

How the power take off is switched off depends on the type of vehicle.

Closely observe the operating instructions from the vehicle manufacturer.

b) Switch distribution manual transmission gear to driving operation:

➤ Bring the motor to idling speed.

➤ Disengage the coupling and switch the drive gear to neutral.

- Switch off motor.
- Wait for approx. 5 seconds before flipping the switch from "P" (pump) to "D" (drive) **(Fig. 275)**.

Attention!

Material damage is possible to gears!

The distribution manual transmission gear may only be switched when at a standstill.

The machine is now ready to drive.

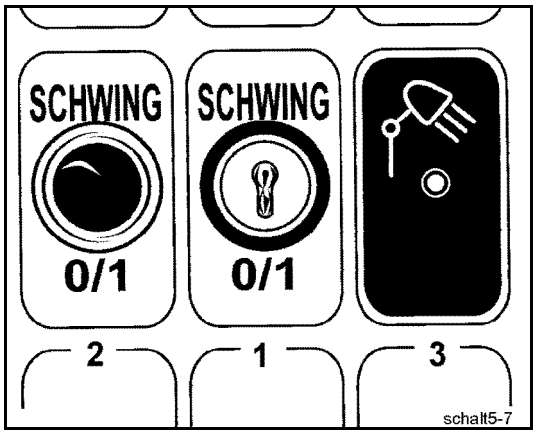


Fig. 274 Switch in the driver's cab

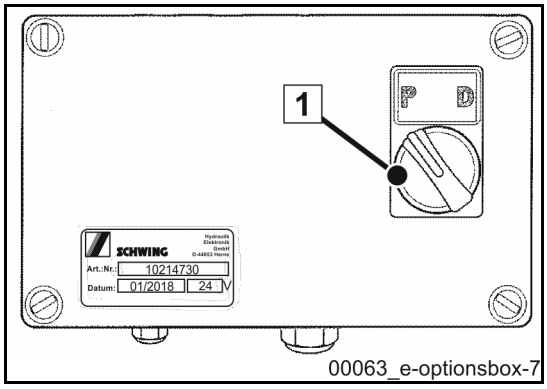


Fig. 275 Switching on distribution manual transmission gear (VSG)

3.24.7 Monitoring the placing boom tray (special equipment)

The machine can be equipped with a "boom support" switch, monitoring the position of the placing boom in the boom support.

After switching off the pump drive or by releasing the handbrake, this "boom support" switch causes a buzzer to sound in the driver's cab or the pilot light of the control on the instrument panel to flash, according to the equipment variant, if the boom is not situated in the tray properly.

This warns the driver and prompts him to drive the placing boom properly into the transport stand.

No message is displayed if the placing boom is situated correctly.

3.25 Difficult operating conditions

Heat, cold, dust, dirt, high humidity, sea water, continuous operation, etc. complicate the working conditions of your SCHWING machine.

Under certain circumstances, these working conditions exceed the "limits of the machine". Refer to chapter **(2.4)**.

Our machines can be used by default at ambient temperatures of -15°C to +45°C when operating materials are used according to our recommendations.

Danger!

Brittle fractures on the placing boom and machine components!

In the case of extremely cold ambient temperatures of less than -15°C, there is a risk of breakage for steel components, rubber and plastic parts.

Operating the machine, and in particular the placing boom, is only permitted within the specified operating temperatures.

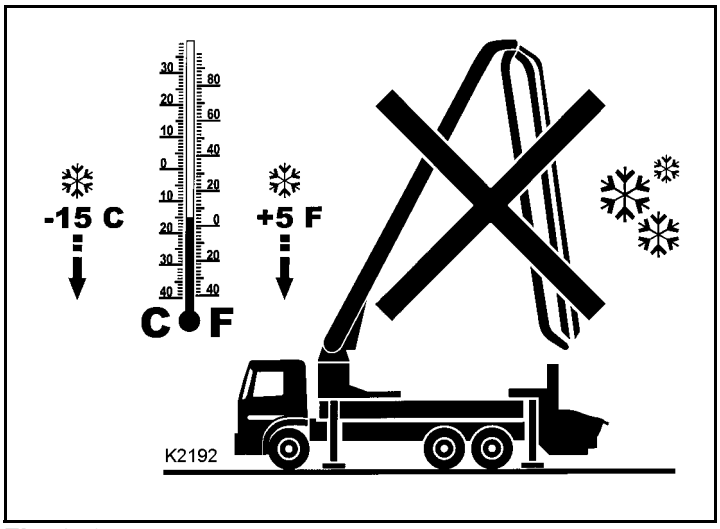


Fig. 276

In case of frost, danger of frost, and in extreme heat, special measures are required, as summarised in the following chapters:

- (3.25.1 Low ambient temperatures (up to -15 °C))
- (3.25.2 High ambient temperatures (up to + 45 °C))

3.25.1 Low ambient temperatures (up to -15 °C)

3.25.1.1 General information

- Move the machine into an enclosed building overnight, if possible.

3.25.1.2 Vehicle motor and integrated motor

Observe the manufacturer's operating instructions. Experience has shown that at least the following measures are required:

- Change oil and filter, unless a suitable multi-purpose oil is being used
- Check frost protection
- Adapt frost protector for air system
- Refuel with winter diesel fuel
- Ensure that the electrical system is in good condition, see **(3.25.1.9)**.

3.25.1.3 Water system

Attention!

Damages to machines due to freezing water!

Water expands at the time of freezing, due to which there is danger of frost wedging of containers and pipelines.

If there is a risk of frost, fill with water immediately before concreting or use the optional water heater. After the work is completed, all containers and pipelines must be emptied.

Attention!

Damage due to dry running of the water pump!

The water pump can get damaged due to dry running.

Ensure that the water case is filled and the ball valve is opened for the water intake.

Defrost machine fluids in an enclosed, heated building.

A layer of ice must not form on the inside walls of the water box and pumping cylinders! Seals and pumping pistons will be destroyed.

Possibly fill with warmed (not hot!) water.

The water in the water box does not freeze as long as it is moving and all aggregates produce sufficient heat.

It is possible to add antifreeze to the water in the water case of the truck-mounted concrete pump.

Information

Concrete quality!

Water offset with antifreeze may not come into contact with concrete!

3.25.1.4 Hydraulic system

SCHWING recommends appropriate hydraulic fluids for different climates and applications, see **“Recommended lubricants and fuels”** on page 381.

The multi-purpose hydraulic oil filled in at the Herne factory can remain in the system, as long as the starting temperature does not drop below -10 °C.

Should work be performed at temperatures ranging between -10 °C and -15 °C, switching over to winter oil (VG 32) is required.

Otherwise, the great oil viscosity can cause a risk of damage during a cold start. The hydraulic pumps suck in air (oil foams) and will be damaged.

When changing the oil, also replace the filters.

Make sure that the optimum operating viscosity (16 to 36 mm²/s) is also at an oil temperature between approx. 35 and 65 °C for hydraulic oil with viscosity class* VG 32.

Information

The system may only be fully loaded in the area of the optimum operating viscosity.

However, the highest permissible temperature for VG 32 is below that of VG 46 or VG 68.

See diagram in (Table 21 Comparison of viscosity classes).

a) Cold-start limit in °C

b) Oil temperature in °C

c) Viscosity in mm²/s

d) Operating temperature and viscosity

* Viscosity = Resistance to flow

Viscosity-temperature diagram:

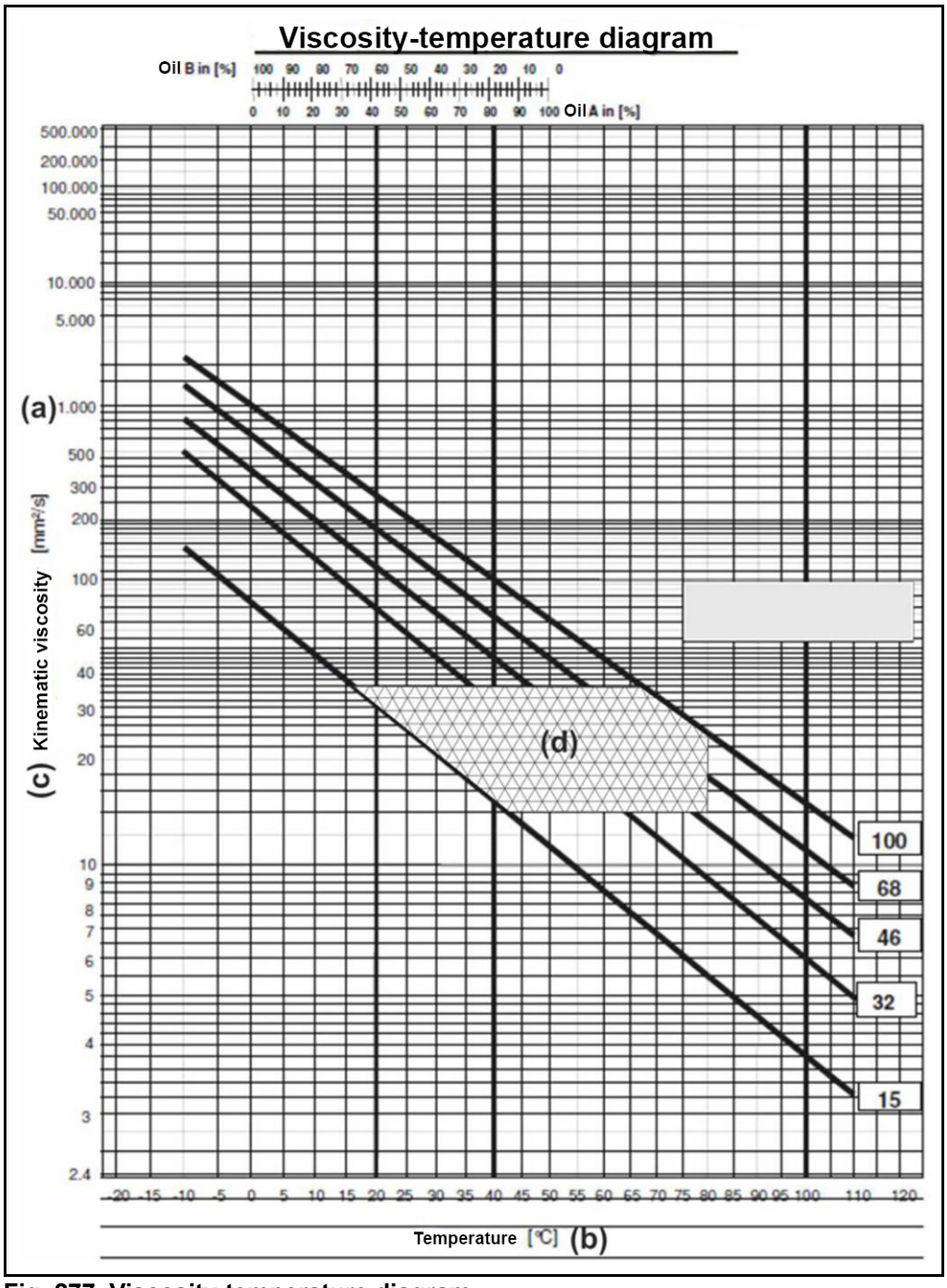


Fig. 277 Viscosity-temperature diagram

Concessions must also be made for various winter oils regarding the pressure load and wear protection.

Please ask your supplier about the measures required when using its oil.

We recommend using a hydraulic oil from the same supplier and same series, as was the case for "summer operation". In these cases, lower quality losses are generally to be expected. However, residual oil in the system causes the viscosity range to shift.

Should series or manufacturer be changed, flushing with the new type of oil is required. Thereby switching all valves several times. Fully extend and retract all cylinders.

At temperatures below freezing, it is possible to warm the hydraulic oil in truck-mounted concrete pumps using the sturdier gear pump of the agitator circuit.

- To do this, close the ball valve (1) **(Fig. 278)** on the agitator motor.

The hydraulic oil is then routed to the tank via the pressure relief valve and thereby warms up faster.

The temperature of the hydraulic oil (optimal operating viscosity) can be found in the control system.

If the optimum hydraulic oil temperature has been reached according to diagram **(Fig. 277)**, reopen the ball valve.

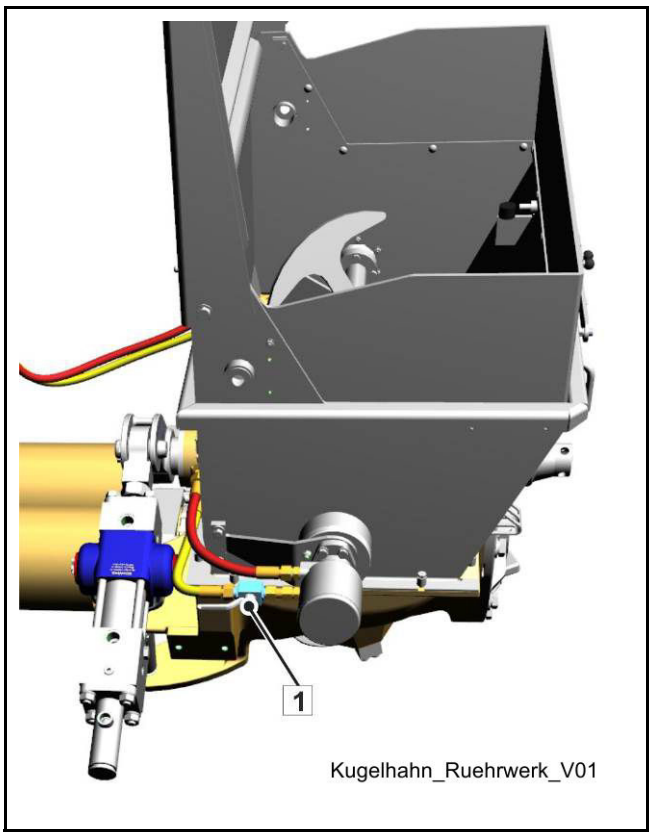


Fig. 278

3.25.1.5 Air system

Rotation compressors can be used at up to -15 °C, with appropriate maintenance.

Since the vehicle air system supplies the electro-pneumatic pilot control for some truck-mounted concrete pumps, it is also important to set the vehicle air system to winter operation.

Vehicle air systems are equipped with air dryers or frost guards to prevent condensation water or to keep water from freezing.

3.25.1.6 Gear

A gear oil change is only required at continuous temperatures below -10 °C.

It is also possible to use a multi-purpose oil.

Should such oil not be available, use an oil with a viscosity level "thinner" than the recommended gear oil (see gear type plate).

VG 150 instead of VG 220 (industrial gear oil) or

SAE 80 instead of SAE 90 (vehicle gear oil)

3.25.1.7 Comparison of viscosity classes

Industry standard	**Vehicle standard**		
e.g. hydraulic oil	**Motor oil**	**Gear oil**	
ISO-VG	**SAE**	**SAE**	
22	5 W		"thin"
32	10 W	75	
46	15 W		
68	20 W / 20		
100	30	80	
150	40		
220	50	90	
320			
460		140	
680		140	
1000		250	"thick"

Table 21 Comparison of viscosity classes

3.25.1.8 Grease lubrication points

The KP2K lubricating greases listed in **(chap. 4.3)** are suitable for temperatures up to - 20 °C.

3.25.1.9 Electrical system

The initial capacity of the batteries depends on the charging status and ambient temperature.

- Always ensure the batteries are well charged. Remove batteries when machine is not used.
- Store batteries in a warm and dry place, recharge, if necessary.
- Ensure good contact of the terminal connections.
- Check the V-belt tension and charging status of the generator.

3.25.1.10 Radio remote control

The radio control can be used at up to -20 °C.

Please heat the driver's cab or use a separate charger, if possible, at a room temperature of +20 °C.

Information

Battery!

Charging the battery becomes problematic at temperatures below +10 °C.

3.25.1.11 Setting up the machine

Frost, thaw, rain, etc. can significantly change the load-bearing capacity of the ground.

- Before starting to work, check the ground conditions and monitor them during operation.

3.25.1.12 Cold start

- Move the machine into an enclosed building overnight, if possible.
- After a cold start, operate the hydraulic system without a load at a low speed for several minutes.

This will cause aggregates and oil to heat and build up a stable lubricating film.

- Extend the outriggers at a low pump speed.
- Raise the placing boom at a low pump speed and run through all boom cylinders.

- Run the concrete pump with a reduced stroke count until the hydraulic system reaches the operating temperature.

3.25.1.13 Pump operation

In general, heated concrete is used at ambient temperatures below freezing. Expect short setting times.

In order to prevent "bleeding", the heated concrete must be mixed thoroughly.

- Keep pumping breaks as short as possible.
- Clean the pumping line and concrete pump immediately after pumping.
- Be sure to remove residual water immediately and completely after cleaning.

3.25.1.14 Decommissioning

- Clean the machine after the work assignment.
- Clean steps, platforms, etc. from ice and dirt.
- Position the machine on firm, dry ground.
- Secure the machine properly from rolling away.
- Only release the parking brake (can freeze) if the machine can be otherwise secured effectively from rolling away.

3.25.2 High ambient temperatures (up to + 45 °C)

Attention!

Environmental or material damage possible due to incorrect hydraulic oil level!

An incorrect hydraulic oil level can lead to pollution or damage to the hydraulic system.

Check the hydraulic oil level before commissioning the machine.

Hydraulic fluid expands when heated. Damage due to overflowing fluids!

Overflowing fluids can cause serious damage and even fires.

Always make sure that containers are filled according to regulations and keep the containers closed during operation.

Attention!

Damage due to condensation!

Incorrect cooling of hydraulic oil causes condensation.

Only cool hydraulic oil via the oil cooler or a lower machine load.

3.25.2.1 General information

In principle, it is useful to keep an eye on the temperatures of the pumping line, individual aggregates and fluids at high ambient temperatures.

If possible, set up the machine so that it is protected from direct sunlight.

Machine and pumping line should be painted brightly.

Relocate separate pumping lines preferably in the shade, cover, if necessary.

Please note that the control system in our truck-mounted concrete pumps monitors the hydraulic oil temperature and reduces the power of the concrete pump starting at approx. +85 °C. The concrete pump switches off at +95 °C.

Furthermore, the temperatures of the motor coolant and compressors can also be monitored.

This monitoring can also be combined with a switch off function.

It is, therefore, useful to ensure optimum cooling:

- Fill all the oils and the coolant up to the max. mark.
- Prevent fluids from overflowing. This can damage the machine.
- Keep the blades of the motor radiator and hydraulic cooler clean.
- Clean more frequently in the event of high dust accumulation.
- Replace the insert of the motor air filter, if necessary.
- Do not open the maintenance flaps in order to augment the cooling effect. This could interfere with the air circulation and have the opposite effect.
- Ensure that the hydraulic system is configured correctly. For example, a pressure relief valve that is set too low will cause the oil temperature to increase because oil is continuously discharged under high pressure through a small cross section.
- Replace the water in the water box with fresh water if it becomes too warm.
- Sprinkle the differential cylinders of the concrete pump with a water hose.
- Do not pump with maximum stroke rate.
  High stroke rates increase the temperature of the hydraulic system and are extremely pointless for stiff concrete, as they are then sucked in poorly.
- Prevent air from being sucked in. Air in the pumping pipes can cause the boom to move and the end hose to flail about! Always make sure that the agitator shaft is in the concrete so that no air can be sucked in.

- Run the system in idle during pumping breaks.
  This will continue pumping the hydraulic oil through the radiator, and the motor oil transporting the heat away from the hot turbo charger.

3.25.2.2 Vehicle motor and integrated motor

Observe the manufacturer's operating instructions. Experience has shown that at least the following measures are required:

- Change oil and filter, unless a suitable multi-purpose oil is being used.
- Adapt frost protector for air system.

3.25.2.3 Water system

- Also make sure that the water case is well filled because water may be required to cool the concrete pump.

3.25.2.4 Hydraulic system

The multi-purpose hydraulic oil filled in at the Herne plant covers the viscosity class VG 46 and the viscosity class VG 68, intended for tropical applications, see **“Recommended lubricants and fuels”** on page 381.

If a single-purpose oil VG 46 is used, the oil must be changed to VG 68. When changing the oil, also exchange the filters.

Should these oils be insufficient despite having configured the hydraulic system properly and despite optimum cooling, see **(chap. 3.25.2.1)**, please contact us.

Please note that a "thicker" hydraulic oil with viscosity class VG 100 has a cold-start limit of +3 °C, and the optimum operating viscosity is significantly higher.

This can cause difficulties in areas with highly variable temperatures (night/day), see (Fig. 277 Viscosity-temperature diagram).

3.25.2.5 Air system

The synthetic oil prescribed for our rotation compressors is suitable for temperatures up to +45 °C.

This is sufficient for the normal concrete pump application (no continuous operation).

Should the control system shut down the machine nevertheless due to overheating, please contact us.

3.25.2.6 Gear

The gear oils recommended in **(chap. 4.3)** are suitable for continuous ambient temperatures of approx. -10 °C to approx. +45 °C.

Information

Gear oil!

A gear oil change is only required at continuous temperatures below +45 °C.

It is also possible to use a multi-purpose oil.

If such an oil is not available, please use an oil with a higher viscosity level than the recommended gear oil (see gear type plate), i.e. VG 320 instead of VG 220 (industrial gear oil) or SAE 140 instead of SAE 90 (vehicle gear oil), see (Table 21 Comparison of viscosity classes).

3.25.2.7 Grease lubrication points

The KP2K lubricating greases listed in **(chap. 4.3)** are suitable for temperatures of -20 °C to +140 °C.

3.25.2.8 Electrical system

Check the acid level of the battery cells more frequently at high ambient temperatures.

Only refill with distilled water!

3.25.2.9 Radio remote control

The radio control can be used at up to +60 °C.

3.25.2.10 Setting up the machine

The load-bearing capacity of heat-sensitive subsoils, such as asphalt, decreases as the ambient temperature rises.

- Make sure the ground is firm.

3.25.2.11 Cold start

Make sure in particular to start the system gently when the machine is equipped with special lubrications for high temperatures.

Lubricants of high viscosity (viscous) only reach their maximum optimum operating viscosity later on.

The hydraulic pumps can be damaged, as described under in **(chap. 3.25.1.12)**.

3.25.2.12 Pump operation

The concrete is frequently prepared in hot areas with cooled aggregates or cooled water.

The placement of the concrete should take place preferably during cooler periods of the time, such as in the morning or evening.

- Rinse a heated pumping line with water before pumping.
- Use a somewhat mushier start-up mixture for long lines.
- Make sure that the concrete can be pumped easily.
- Avoid extended breaks.
  Cover the concrete in the feeding hopper of the concrete pump with wet bags, for example.
- Start cleaning immediately after pumping.

3.25.2.13 Decommissioning

- Let the machine idle for some minutes with the pump drive active.

  This way, the turbo charger transports the heat away from the diesel engine and cools the hydraulic oil by continuing to pump it through the radiator.

3.26 Decommissioning

If the machine is to be decommissioned for an extended period of time, please observe the following list.

3.26.1 Tasks prior to decommissioning

1. Clean and lubricate the machine thoroughly.
2. Check the concentration of antifreeze for liquid-cooled motors and top up if necessary.
3. Drain condensation water from fuel, hydraulic and air system reservoirs.
4. Fill fuel tank and oil box to the brim.
   Change the oil if it is in poor condition.
5. Fill all gearboxes with the prescribed amount of oil.
   Change the oil if it is in poor condition.
6. Apply acid-free grease to bare machine parts or spray them with preserving oil.
7. Preserve concrete pumping pipes by pushing a cotton waste plug soaked in preserving oil through the pumping line.
8. Retract all hydraulic cylinders.
9. Set all control elements to position 0.
10. Discharge the pressure accumulator (if present).
11. Preserve the motor as described in the motor's operating instructions.
12. Drain water from the reservoir, water box and water pump.
13. Spray water box with a rust-protective agent.
14. Close all openings and waterproof.
15. Jack up the vehicle in order to let down the tyres.
16. Check tyre air pressure.
17. Release parking brake.
18. Remove starter batteries (lead-acid batteries) and store in a cool (5-15 °C), clean and dry location.
19. Permanently connect batteries to a charger with trickle charging, or charge at monthly intervals (no quick charging). Then check the fluid level.
20. In order to prevent damage as a result of downtime/storage, run the machine to operating temperature and run through its full range of operation every 6 months. Afterwards, store it again as described.

Attention!

Never allow batteries to remain discharged!

Deep discharge will destroy them!

Frost can cause the housing of discharged batteries to rupture due to freezing of the contents!

In order to prevent premature ageing, up to destruction, the above instructions must be observed!

Observe further instructions in chapter 4.60, in addition to the operating instructions from the motor or chassis manufacturer.

3.26.2 Recommissioning

1. Remove preservation.
2. Check all oil levels.
3. Empty hydraulic oil box to inspection glass level, when full to the brim.
4. Check and install batteries.
5. Check tyre air pressure.
6. Completely lubricate machine.
7. Carry out functional testing.

Information

For storage of the machine under difficult conditions, special regulations apply.

Difficult conditions include, for example:

- Storage periods of over 6 months.
- High air humidity.
- Sea air, etc.

Contact SCHWING customer service.

3.27 Technical preconditions for concreting

Information

Concrete quality!

Pumped concrete is not a special concrete, but a standardised quality concrete.

3.27.1 Properties of pumped concrete

- Minimum fine grain content (grain size < 0.125 mm) of approx. 400 kg/m³ with a maximum grain size of 32 mm (+ 10% when using maximum grain size of 16 mm),
- Minimum cement content of 250 kg/m³ when using maximum grain size of 32 mm (+ 10% for maximum grain size of 16 mm),
- Water/Cement ratio of 0.42 w/c - 0.65 w/c.
- Grain composition according to grading curve AB as per DIN 1045-2,
- Consistency of K 2 to K 3.
- When using plasticisers, the flow spread is not an indicator for the pumpability of the concrete.

We are happy to give advise for varying concrete formulas and to provide you with recommendations for an application-specific solution.

3.27.2 Errors that inhibit pumping

- Incorrect concrete composition (see above).
- Poor upkeep of the machine and pumping line (cleaning!).
- Inadequate mixing quality.
- Separation caused by improper transport.
- Incorrect maximum grain size selected based on diameter of pumping line.
- “Bleeding” of fresh concrete.
- Incorrect use of admixtures.

4 Maintenance

This chapter describes the maintenance instructions.

Further measures should be implemented by SCHWING's customer service department or by trained and qualified personnel. Otherwise, the warranty and liability shall become void for this product.

4.1 General maintenance instructions

Carry out the maintenance on time and with care.

We recommend copying the maintenance report **(chap. 4.7)**.

The maintenance personnel can then acknowledge the work carried out on the copies.

SCHWING expressly prohibits any maintenance work carried out by personnel who are not specially trained and authorised.

Warning!

Serious or fatal accidents possible due to improper operation, maintenance and repair work!

Improper operation, maintenance and repair work, as well as defective spare parts, can result in serious injury or death.

Only have operation, maintenance and repair work carried out by qualified personnel using original SCHWING spare parts.

4.1.1 Maintenance work on special equipment

Maintenance work on special equipment is described in chapter **“Special equipment”** on page 585.

4.1.2 Cleanliness

- Clean all units located within the work area before starting to work.

Warning!

Risk of serious injury due to high-pressure jet!

The high-pressure jet can injure living beings. The spray lance/nozzle can cause an impact due to the high-pressure jet.

Never leave the spray lance/nozzle unattended under operating pressure! Always hold the spray lance/nozzle securely and never hold the high-pressure jet facing living beings.

- As a rule, prevent dirt from entering - especially in the hydraulic system.
- Lubricate your entire machine after a high-pressure cleaning.

4.1.3 Corrosion protection

Heavy rust weakens the material and may cause fractures and cracks.

- Repair damaged painted surfaces within due time and grease bare machine parts.

4.1.4 Checking the oil level

In general, take the following points into account when checking the oil:

- Make sure that the machine is level
- Switch off the drive approx. 10 min. before performing an oil check
- Move mobile machines into the transport position and brace them (outrigger in transport position).

4.1.5 Oil change

- Drain the oil while it is still at operating temperature in order to flush out contaminants better.

Caution!

Risk of injury due to hydraulic fluid!

Hydraulic fluid can cause irritation to the skin and eyes.

Avoid direct contact with hydraulic fluid. Observe the instructions from the safety data sheet and wear suitable protective equipment.

- Always fill hydraulic fluid from clean vessels through the filling hole on the tank provided for the purpose.
- If possible, use flushing or filtration units to add the new oil.

Attention!

Material damage when filling due to overpressure in the oil box!

The oil box can be damaged due to overpressure.

When filling, make sure the oil box is adequately ventilated in order to prevent overpressure.

➤ Always prevent containers from overflowing.

➤ Check the oil level after each test run.

➤ Do not store hydraulic oil barrels outdoors.

- Do not store hydraulic oil barrels horizontally.
- Prior to removal, the barrel must remain stationary for an extended period of time.
  Contaminants can deposit easily.
- Never roll hydraulic oil barrels to the filling site.
- Make sure not to insert the suction hose too deep into the hydraulic oil barrel in order to avoid sucking in contaminants from the barrel floor.

Information

Before each oil change, we recommend taking an oil sample and examining it for discolouration and solid materials (suspended particles).

This makes it possible to determine early on whether preventive maintenance measures need to be initiated.

4.1.6 Draining condensation water

Humidity and fluctuating temperatures form condensation in hydraulic oil boxes, which mixes with the oil.

As the ratio of water increases, the lubricating power of the mixture decreases rapidly.

Solution:

After several days of not using the machine, the water separates from the oil and collects at the bottom of the box.

By opening the drain screw on the hydraulic oil box, you can then drain the water from the bottom of the box.

Information

Best downtime!

The hydraulic oil used at SCHWING requires a downtime period of at least 2 days in order to achieve good results.

4.1.7 Seals and fuse elements

- Make sure that no seals, spring washers, etc. are lost when removing top covers, closing screw plugs, and the like.
- Before closing them again, clean the sealing surfaces of the screws and covers, etc. and make sure not to damage them.
- Replace the seals, split pins, spring washers, etc. immediately if they are worn or damaged.

4.1.8 Lubrication

➤ Clean grease nipples before and after lubrication.

➤ Remove any excess grease from the lubrication points.

4.1.9 Leaks

➤ Check all containers, hoses, screw connections, etc. regularly for leaks.

Attention!

Environmental damage possible due to escaping hydraulic fluid!

Leaks can lead to environmental damage.

Check the system regularly for leaks and hydraulic fluid losses and eliminate their causes.

Warning!

Injuries possible due to hydraulic oil under high pressure!

Leaks on hydraulic components, pipelines and hoses can lead to serious injury or even death due to leaking hydraulic oil and unintentional movements of components.

Eliminate leaks immediately and replace defective or leaking hydraulic components.

4.1.10 Replacement of the hydraulic hoses/hose pipes

Even with proper storage and permissible loads, hydraulic hoses and hose pipes are subject to natural ageing. This therefore limits their storage time and use.

The manufacturers indicate the quarter and last two digits of the year of manufacture, e.g. 2Q19.

The period of use of the hydr. hoses/hose pipes should not exceed 6 years, including a storage time of 2 years.

The machine operator must ensure that hydr. hoses/hose pipes are replaced at appropriate intervals, even when no safety-related defects, e. g. external damage, can be detected.

Deviating from this, the period of use can be redefined taking the operating conditions into account. For this, the corresponding test and empirical data in the individual areas of application must be available, which permit safe further use that goes beyond the recommended maximum period of use.

These instructions must be included in the operating instructions.

SCHWING GmbH is not liable for damage resulting from the use of worn or defective components.

Warning!

Risk of death or serious injury due to hydraulic hoses bursting!

Hydraulic hoses are subject to ageing. Sudden defects on outdated hydraulic hoses can lead to serious injury or even death due to leaking hydraulic oil and unintentional movements of components.

Replace hydraulic hoses on time, before they reach the maximum period of use.

Repairs on hydraulic systems may only be carried out by specially trained, expert personnel.

Wear the prescribed safety equipment.

Only use original SCHWING spare parts.

Summary:

- The machinist must constantly observe the condition of the plant.
- Hydraulic hoses must be checked and replaced regularly.
- Immediately replace leaking hydraulic hoses.
- Even if no external damage can be detected, hydraulic hoses/hose pipes must be replaced every 6 years (including a maximum storage time of 2 years).

Examples of possible damage (defects) on hydr. hoses/hose pipes:

- Damage of the outer layer to the inlay (abrasion points, cuts, cracks, etc.).
- Embrittlement of the outer layer (formation of cracks in the hose material).
- Escape of the hose from the fitting
- Storage time and duration of use exceeded.
- Deformation that does not correspond with the natural shape of the hose pipe.

Typical deformations on hydr. hoses/hose pipes include the following:

- Layer separation, formation of bubbles, crushing points, bending points
- Leaky points
- Damage, deformation or corrosion of the fitting that reduces the function or strength of the hose pipe.

4.1.11 Repairs, exchange

Information

It may be less expensive to exchange complete units instead of repairing them.

Contact SCHWING's customer service for an individual consultation.

➤ Only use original SCHWING spare parts for repairs or replacements.

SCHWING will not be held liable for damage caused by use of third-party products or improper equipment.

➤ Only use mineral oil-based greases for installation work on the hydraulic system.

➤ If a unit (pump motor, etc.) fails, flush out the entire hydraulic system and replace the filters in order to prevent consequential damages caused by metallic dust.

Contact SCHWING's customer service for non-binding informational material on available flushing/filtration units .

➤ After such procedures, always perform a test run with the machine and then check the oil level afterwards.
During the test run, watch for unusual sounds, temperatures and leaks.

➤ Perform maintenance work on repaired or exchanged units as per usual.

4.1.12 Welding

Welding work may only be carried out by trained professionals according to manufacturer regulations, see **"Repair welding"** on page 527.

4.1.13 Mechanical processes

Cover devices, cables etc. when drilling or grinding work etc. is to be carried out on the machine.

4.1.14 Painting and working with aggressive substances

Cover devices, cables etc. to protect them against paint mist and aggressive substances.

4.1.15 High-pressure cleaning

Cover any electrical and electronic components. Never direct a water or steam jet to these components. Any penetrating moisture leads to malfunctions and can destroy electronics and electrical components completely.

4.1.16 Electrically powered machines

- Have an electrician disconnect the power supply to such machines prior to carrying out repair work on the respective machine.

Danger!

Danger to life due to electric shock!

When working on electrical systems, there is a risk of serious or fatal injuries due to electric shock.

Work on electrical systems may only be carried out by qualified electrical specialists.

Danger!

4.2 Quantities of operating supplies

Machines	Water case (litres)	Additional Water case (litres)	Hydraulic oil box (litres)	Hydraulic oil volume $V_{machine}$ (litres)	Weight of the Hydraulic oil volume $m_{machine}$ (kg)	Additional Fuel tank (litres)
S 20	400/800[1]	/	400	480	420	/
S 24 X	420	385[2]	385	540	472	/
S 28 X	420	385[2]	385	560	489	/
S 31 XT	420	610[2]	385	630	551	/
S 32/36 X	420	610[3]	385	570	498	/
S 36 X DirDR	420	610[3]	385	550	481	/
S 36 X RaZor	420	610[3]	385	610	533	/
S 38 SX	610	/	420	680	594	/
S 39 SX (BR02)	610	/	650	860	752	/
S 43 SX	610	/	460	760	664	[4]
S 46 SX	690	/	520	930	813	680
S 47 SX	610	/	460	800	699	[4]
S 51 SX	610	/	500	880	769	[4]
S 52/55 SX (BR02)	610	/	690	1250	1093	470
S 56 SXF	610	/	510	1000	874	[4]
S 58/61 SX (BR02)	610	/	690	1370	1197	470
S 65 SXF	610	/	725	1600	1398	/

1. Depending on the chosen pump kit
2. Auxiliary reservoir (420 or 610) litres
3. Optional (420 or 610) litres
4. Depending on the vehicle manufacturer

Examples of types, see **“Recommended lubricants and fuels”** on page 381.

4.3 Recommended lubricants and fuels

Attention!

Environmental damage due to operating and auxiliary materials!

Improper disposal of operating and auxiliary materials causes serious environmental damage.

Ensure that operating and auxiliary materials and replaced parts are disposed of in a safe and environmentally friendly way.

Warning!

Danger due to hydraulic oil jet!

Hydraulic oil escaping under pressure can penetrate the skin and cause severe tissue damage. This is an acute medical emergency.

Even a minor injury caused by a hydraulic oil jet requires immediate medical attention.

The following points must be observed:

- Only qualified personnel may work on hydraulic systems.
- Personal protective equipment must be worn during work (safety glasses, suitable gloves and clothing).
- Only work on depressurised systems. The trapped oil can also be under pressure when the drive is at a standstill and the pressure accumulator (if available) is depressurised.
- If, for example, systems under pressure need to be opened when venting, mount a breather line first while the system is depressurised or use the existing mini-measurement connections.
- If this is not possible due to a lack of space, for example, make sure that nobody can be hit by escaping oil.
- Open the breather screw very carefully until oil emerges. By no means open further or remove the junction.

4.3.1 Behaviour in case of injuries

Immediately seek a doctor familiar with such injuries.

Seek a doctor even if the wound seems harmless.

Hydraulic fluid sprayed under the skin must be removed immediately. This could result in serious circulatory disorders and tissue damage (gangrene).

These could require significant surgical procedures.

Penetration of bacteria could also accelerate tissue destruction.

The bacteria entering the bloodstream causes danger to life.

On the following pages you will find a limited number of suitable lubricants and equipment. If these products are not available, other materials can be used in accordance with the specified standard marks. Selection and sequence of the products listed do not include qualitative assessment.

4.3.2 Explanation of the abbreviations used

4.3.2.1 General information	
BI	Central Federation of the German Construction Industry. As an alternative to the lubricants and fuel recommended, the normal lubricants specified in column "BI" can be used.
DIN	German National Standard.
ISO	International Organisation for Standardisation.
MIL-L	American Military Standard for Lubricants.
API	American Institute for Lubricants.
SAE	Merger of American Automotive Engineers.
VL	Viscosity grade in mm²/s at 40 °C.

4.3.2.2 Hydraulic oil	
API-CD	Motor oil for heavy-duty diesel engines with and without supercharging.
EO	BI normal lubricant, a quality motor oil.
HLP	A hydraulic oil according to DIN 51524 with agents designed to improve anti-corrosion, durability and wear protection within the mixed friction range.
HVLP	A hydraulic oil according to DIN 51524 with low viscosity temperature dependence, otherwise HLP.

4.3.2.3	Industrial gear oil
CLP	A circulating lubricating oil according to DIN 51517 with agents designed to improve anti-corrosion, durability and wear protection in the mixed friction range, and to increase the gear capacity.
PG	Synthetic lubricating oil for extreme load on polyglycol base suitable as long-term lubricant.
PAO	Synthetic gear oil with excellent high-pressure properties and excellent temperature behaviour based on poly alpha olefin.

4.3.2.4	Vehicle gear oil
G0 90	BI standard lubricant, a gear oil according to API-GL 5.
MIL-L 2105 B	Hypoid gear oil for severe stress in gears and axles, roughly corresponds to API-GL 5.

4.3.2.5	Compressor oil
VDL	Mineral oil for air compressor with agents designed to improve anti-corrosion and durability. Carbon residue after ageing max. 3 % according to DIN 51352.
Rotor oil 8000 F2	Synthetic, all-season oil for rotary compressors.

4.3.2.6	Lubricating grease
KP 2 K	A lubricating grease according to DIN 51502 for high pressure stress in the service temperature range of -20 °C to +140 °C, worked penetration 265 to 295, no changes or minor changes caused by water.
MPG-A	BI standard lubricant, a lubricating grease according to KP2N, covering KP2K and K2K.
MLE2N-40	Special lubricant for material pairing: Plastic / metal for prolonged lubrication of the slider in the telescopic arms.
Art. no.: 10197297	SCHWING drive line grease. Only use this grease to lubricate the SCHWING drive lines.

4.3.3 Recommended hydraulic oil

Attention!

Damage to the machine due to incorrect handling of oil!

A purity classification that is too low, the wrong type of oil or dirty oil can damage the machine.

When filling or topping up with oil, always ensure the correct purity classification, the right type of oil and cleanliness when working. Do not mix different types of oil.

Viscosity (ISO)	**VG 32**		**VG 46**		**VG 68**	
Type (DIN)	**HLP**	**HVLP**	**HLP**	**HVLP**	**HLP**	**HVLP**
BP Energol	HM 32		HM 46		HM 68	
FUCHS Renolin		B 32 HVI		B 46 HVI		B 68 HVI
FUCHS Renolin		Xtreme Temp 32		Xtreme Temp 46		
Klüber Lamora	HLP 32		HLP 46		HLP 68	
Liqui Moly				HVLP 46		
Mobil DTE	24		25		26	
Mobil Nuto	H 32		H 46		H 68	
Mobil Univis		N 32		N 46		N 68
Q8 HVLP Hydraulik Oil				46		
SCHWING Classico				HVLP 46[1]	High Temp	
Shell Tellus	S2 MX 32	S2 VX 32	S2 MX 46	S2 VX 46	S2 MX 68	S2 VX 68
SRS Wiolan	HS 32	HV 32	HS 46	HV 46	HS 68	HV 68
Veedol				HV 46		
Petronas Hydraulik			46	HV 46		
Petronas Hydraulik			Plus 46			

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VG 32 = Winter operating conditions in Central Europe

VG 46 = Summer operating conditions in Central Europe

VG 68 = Rooms with high heat build-up or tropics

4.3.4 Recommended gear oil (see gear type plate)

Attention!

Material damage due to incorrect use of lubricating oil!

The wrong lubricating oil, the wrong lubricating oil quality or dirty lubricating oil can cause damage to the machine.

When filling or topping up with lubricating oil, always ensure the right type of lubricating oil, the right lubricating oil quality and cleanliness when working. Do not mix lubricating oils from different manufacturers.

Information

The gear oils described below are suitable for continuous ambient temperatures of approx. -10 °C to approx. +45 °C.

For extreme operating conditions, please contact us. The viscosity class ISO VG 220 roughly corresponds to SAE 90.

4.3.4.1 Industrial gear oil

Viscosity according to ISO:	VG 220
Quality according to DIN:	CLP
ARAL	Degol BG 220/Degol BMB 220
CP	Energol GR-XP 220
KLÜBER	Klüberoil GEM 1-220
MOBIL	Mobilgear 600 XP 220
SHELL	Omala oil 220
SUNOCO	Sunep 1220
TEXACO	Meropa 220
WINTERSHALL	Wiolan IT 220
BI	/

4.3.4.2 Vehicle gear oil	
Viscosity according to SAE:	90 (85w-90)
Quality according to MIL-L:	2105 B
ARAL	Gear oil HYP
CP	Energear HYPO 90/Hypogear 90 EP
MOBIL	Mobilube HD-A 85w-90
SHELL	Spirax HD/Spirax MB 90
SUNOCO	GL-5
TEXACO	Geartex EP-C
WINTERSHALL	Wiolan Hypoid gear oil 90
BI	GO 90

4.3.4.3 Industrial gear oil (polyglycol base)	
Viscosity according to ISO:	VG 220
Quality according to DIN:	PG
ARAL	Degol GS 220
AVIA	Avilub VSG 220
CP	Energol SG - XP 220
ELF	Syntherma P 270
FUCHS	Renodiol PGP 220
MOBIL	Glygoyle 30
SHELL	Tivela WB
TEXACO	Synlube CLP 220
BI	/

4.3.4.4 Industrial gear oil (poly alpha olefin base)	
Viscosity according to ISO:	VG 220
Quality according to DIN:	PAO
ADDINOL	CKT 220
TOTAL	CARTER SH 220
CP	Enersyn HTX 220
AVIA	Syntogear PE 220
CASTROL	Alphasyn EP 220
MOBIL	Mobilgear SHC XMP 220
FUCHS	RENOLIN UNISYN CLP 220
FUNKE	Finkol PA 220

4.3.5 Recommended compressor oil

4.3.5.1 Rotary compressor
Only the following synthetic oil may be used for our rotary compressors.
ROTOR OIL 8000 F2

4.3.6 Recommended grease

4.3.6.1 SCHWING drive line grease	
Only use this grease to lubricate the SCHWING drive lines.	
KLÜBER	Staburags NBU 12-300 KP

4.3.6.2 Lithium-saponified high-pressure grease KP 2 K according to DIN 51502 without solid lubricant	
ARAL	Aralub LS-EP 2
KLÜBER	Centoplex 2 EP
TEXACO	Multifak EP 2
MOBIL	Mobilux EP 2
ZELLER+GMELIN	Divinol Lithogrease G421[1]

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4.3.6.3 Special lubricants for severe operating conditions	
Under severe operating conditions and when mounting the following components, we recommend a particularly **adhesive** and **pressure-resistant** grease. Sliding bearing of the boom column Sliding pieces of the rotary drive Severe applications are, for example: High exposure to dust, dirt, heat, humidity and sea water. Strong impact load and vibrations. Shutdowns lasting several weeks.	
CASTROL	Tribol GR 1350-2.5 PD

4.3.6.4 Recommended spray-on grease	
Sprayable EP lubricating grease for open gears with MOS2 and graphite additive	
ARAL	Sinit FZ 2
CP	Energol WR P
KLÜBER	Grafloscon C-SG 0 ULTRA Grafloscon CA 901 ULTRA-SPRAY
SHELL	Cardium Fluid D
TEXACO	Crater XX Fluid
MOBIL	Mobilgear OGL 007
BI	LUB-A

4.3.6.5 Special lubricants for the plastic sliders in the telescopic arm	
Designation according to DIN: MLE2N-40	
SCHWING item no.: 10194658	10 kg tin

4.3.6.6 Special lubricants for couplings and seals in pumping lines	
OPTIMOL OLIT CLS SCHWING item no.: 10149905	10 kg tin
Optimol Olit CLS is a rubber-friendly, water-resistant, high-performance grease on lithium/calcium base.	
As an alternative to Optimol Olit CLS, the high-pressure grease listed in table Lithium-saponified high-pressure grease SHELL Alvania EP grease 2 can also be used. When switching between these two types, remove old grease residues carefully.	

4.3.7 Excerpt from the safety data sheet for hydraulic oil

This is an excerpt from the manufacturer's safety data sheet according to regulation 1907/2006/EU.

Please request the complete safety data sheet from your oil supplier in your country of operation.

TRADE NAME:
(Product name of oil)

USAGE:
Hydraulic oil

PREPARATION:

Mixture of highly-refined mineral oils and additives

POTENTIAL DANGERS:

Prolonged and repeated skin contact may cause drying of the skin, irritation and dermatitis.

Avoid formation of oil mist.

Avoid uncontrolled release into the environment. Not fully biodegradable.

FIRST-AID MEASURES:

After inhalation:

Take the affected person into fresh air and place in a resting position. Seek medical advice.

After skin contact:

Remove contaminated clothing and wash skin with water and soap.

If the skin was penetrated by high pressure, consult a doctor immediately.

After eye contact:

Immediately rinse thoroughly for 15 minutes under running water with the eyelids open and consult a doctor.

After ingestion:

Do not induce vomiting. Seek medical advice.

Note to the doctor:

Symptomatic treatment.

FIRE PREVENTION AND -FIGHTING:

Do not smoke when handling the product, no open flame or other exposure to heat.

Fire class according to DIN EN2: B

Suitable extinguishing agent:

Foam, powder, carbon dioxide, sand or earth.

Do not use strong water jet!

ACCIDENTAL RELEASE MEASURES:

Person-related measures:

Ventilate affected rooms thoroughly. Avoid skin contact.

Environmental protection:

Prevent further leakage and flow into drains.

Erect sand or earth barriers or other suitable blocking measures.

In case of leakage into water, canalisation or soil, contact competent authorities.

CLEANING AND ABSORPTION:

Absorb or contain with sand, earth or absorbent material.

Shovel into a marked reservoir and dispose of according to local regulations.

HANDLING AND STORAGE:

Do not eat, drink, smoke or sniff during work. Avoid spilling.

Avoid sun, direct exposure to heat and strong oxidants during storage. Store dry and do not expose to large temperature switches.

PERSONAL PROTECTIVE EQUIPMENT:

Respiratory protection:

Use oil mist protective mask with filter for organic vapours and particles.

Hand protection:

Protective gloves made of PVC or nitrile rubber, provided they meet safety standards

Eye protection:

Wear protective glasses in case of risk of splashing

Body protection:

Avoid skin contact, wear overalls.

GENERAL PROTECTIVE- AND HYGIENIC MEASURES:

Do not carry oil-soaked cleaning rags within the clothing. Do not eat, drink, smoke, sniff during work.

SAFETY-RELEVANT DATA:

See safety data sheet from the manufacturer.

DISPOSAL:

Product:

By approved waste disposal company. EU waste code no.: 130110

Packaging:

Completely emptied by approved waste disposal company.

MARKING:

Not subject to marking regulations according to EU directives. Observe national regulations!

4.4 Spare parts and accessories

Information

Please observe the special instructions on safety components in chapter **“Safety inspections”** on page 519.

Spare parts and accessories must comply with the requirements defined by SCHWING.

This is guaranteed by the use of original SCHWING spare parts and accessories.

Use the article numbers of the machine-specific spare part catalogue in order to clearly identify the spare parts.

Spare parts with the same name can differ from one another slightly with regard to their shape and appearance, or in some cases not at all. However, the material quality, weight, function, etc. can be extremely different. Therefore, only use spare parts that comply with the specifications in the spare part catalogue.

SCHWING can also provide - beyond the legal provisions - original spare parts for older machines.

A wide range of accessories is also available.

SCHWING is not liable for damages resulting from the use of spare parts and accessories that do not comply with the above requirements.

It is possible that, by using unsuitable or unauthorised accessories, the definition of "improper use" is met.

We recommend using our customer service for installing our original spare parts and accessories, as well as for all maintenance and repair work on your SCHWING machine.

Please note that SCHWING must rule out all warranties in the event that you or a third party commissioned by you carry out improper work.

SCHWING is also not liable in such cases for any consequences thereof.

Also see our "Delivery, service and payment terms and conditions".

The machine’s accessories should also be checked during safety-related inspections, regardless of whether they can be installed securely or carried along loosely.

Make sure that, in addition to being in sound operating condition, this accessory is suitable and approved by SCHWING.

4.4.1 Wear parts - Signs of wear

All components of a machine are subject to natural ageing. In addition, the wear of moving parts varies greatly depending on their load.

Careful maintenance and upkeep, as well as proper use of the machine can delay, but not entirely prevent, this so-called wear.

Since the wear and tear on various components of your SCHWING machine can vary greatly depending on their operating conditions, there are no universal rules to be applied for inspecting and replacing these parts.

However, there are signs indicating the need for an early review.

4.4.1.1 Case examples

Sand in the water box of the concrete pump

If, while conducting your regular cleaning of the water box, you notice that the water is becoming increasingly contaminated with concrete particulate matter, this means that the pumping pistons are worn.

If the same incident occurs again in the short term, the pumping cylinders also need to be replaced.

Hydraulic oil in the water box of the concrete pump

If you notice oil streaks on the water surface or a milky emulsion in the water box when the concrete pump is upright, the seal on the differential cylinders could be worn.

Water in the hydraulic oil

Small amounts of condensation in the hydraulic oil box are normal and should be drained regularly according to maintenance schedule.

A strong increase of the water content suggests water ingress from the outside.

It can also be assumed in this case that the seal in the differential cylinder is worn.

Dirt in the hydraulic oil

If clogging from an outside source can be excluded (e.g. refilling from an unclean reservoir), an oil analysis should be carried out first, see the **“Hydraulic fluid and filters”** chapter.

The oil analysis determines the type of clogging.

In consequence thereof, e.g. the condition of the hydraulic pumps (metal particles) can be concluded.

If you determine that the clogging is caused by concrete particulate matter, the seals on the differential cylinders should be checked as well.

Information

Our machines are constantly optimised in the course of improving the specification. In doing so, a critical focus is on the improvement of the wear and tear.

Special components are also available for special applications.

If necessary, please ask our customer service for the optimal solution to your wear problem.

4.5 Explanation of maintenance schedule

Fig. 279: Similar to illustration

Symbols used in the following maintenance schedule:

❶ = CHECK ❷= LUBRICATE ❸ = CLEAN ❹= REPLACE

① ② ③ ④ = ditto, after the initial commissioning

Time interval in the following maintenance schedule:

A = daily or 10 operating hours

B = weekly or 50 operating hours

C = monthly or 200 operating hours

D = quarter-annually or 500 operating hours

E = semi-annually or 1000 operating hours

F = annually or 2000 operating hours

G = every 2 years

whichever comes first!

Information

The control system records the operating hours of various aggregates.

The movement hours for the boom, slewing gear and outrigger are recorded.

Operating and movement hours performed can be seen in the menu "Operating data".

Regular querying of this data enables the performance of maintenance according to the exact operating times of the individual aggregates.

Information

Record all maintenance procedures that have been performed in the maintenance report **(chap. 4.7)**.

A copy template can be found in the appendix of your operating instructions.

4.6 Maintenance schedule S 24/28 X

Maintenance intervals and maintenance work related to the vehicle are not covered in these operating instructions.

All information on this topic can be found in the vehicle's operating manual.

Information

External documentation for the supplier component is available!

For built-in supplier components, SCHWING only provides the essential information in the operating instructions, which is required for proper operation and maintenance of the SCHWING machine.

Further information can be found in the documentation for the respective supplier component.

External documentation may be available for the chassis frame, motor and special equipment, for example!

For FBP only:

Regular maintenance work for the mixer, see truck mixer

operating instructions!

4.6.1 General information

Description		A	B	C	D	E	F	G	Chap.
A1	Technical safety inspection by experts. Intervals according to time or operating hours, whichever occurs first.								**(chap. 7.5) (chap. 4.22)**
A2	Visual and functional test by machine operators	❶							**(chap. 4.22)**
A3	Check hydraulic oil level (before every commissioning)	❶							**(chap. 4.8)**
A4	Hydraulic oil (after successfully passing an oil inspection, the hydraulic oil can be used for more than 2 years)						❶	❹	**(chap. 4.8)**
A5	Draining condensation from the hydraulic oil box		❸						**(chap. 4.8)**
A6	Clean cooling vanes of the hydraulic oil cooler, as well as those of the radiator		❸						**(chap. 4.10)**
A7	Pressure checks			❶					**(chap. 4.9)**
A8	Grease joints of the operating levers			❷					- -
A9	Check the hydraulic and water systems, aggregates, reservoirs, pumping lines, etc. for leaks		①	❶					**(chap. 4.19)**
A10	Check that the base frame, outrigger, pumping line, reservoirs, aggregates, pump kit, drive lines, hinge pin retainer, etc. are fastened correctly		①	❶					**(chap. 4.17)**
A11	Checking the filling level of the reservoir	❶							**(chap. 3.15)**
A12	Check + lubricate the drive lines of the pump drive (normal operation)		❶	❷					**(chap. 4.12)**
A13	Check + lubricate the drive lines of the pump drive (heavy operation)	❶	❷**						**(chap. 4.12)**
A14	Check oil level of the distributor gearbox (special equipment)			❶		❹			
A15	Ventilation filter for hydraulic oil box			④		❹			**(chap. 4.8)**

(** = lubricate every 100 operating hours)

Interval:		Explanation of the symbols						
After the first commissioning:	①	= inspect	②	= lubricate	③	= clean	④	= replace
After time interval:	❶	= inspect	❷	= lubricate	❸	= clean	❹	= replace

Time interval after operating hours:					
A =	daily or every 10 operating hours	B =	weekly or every 50 operating hours	C =	monthly or every 200 operating hours
D =	¼ annually or every 500 operating hours	E =	semi-annually or every 1000 operating hours	F =	annually or every 2000 operating hours
G =	every 2 years		whichever comes first!		

4.6.2 Placing boom

Description		A	B	C	D	E	F	G	CHAP.
V1	Replace hydraulic oil boom filter after maintenance interval or in the event of an error message					❹			**(chap. 4.8)**
V2	Grease the grease nipples on the boom and outrigger			❷					- -
V3	Check fixing and condition of the end hose	❶							**(chap. 4.19)**
V4	Lubricate foot and collar brushing of the boom column		❷						**(chap. 4.18)**
V5	Check and lubricate ropes and rollers of axle safety catch			❷					- -
V6	Inspection of the piston rods on the boom cylinders								Appendix

(** = lubricate every 100 operating hours)

Interval:		Explanation of the symbols						
After the first commissioning:	①	= inspect	②	= lubricate	③	= clean	④	= replace
After time interval:	❶	= inspect	❷	= lubricate	❸	= clean	❹	= replace

Time interval after operating hours:					
A =	daily or every 10 operating hours	B =	weekly or every 50 operating hours	C =	monthly or every 200 operating hours
D =	¼ annually or every 500 operating hours	E =	semi-annually or every 1000 operating hours	F =	annually or every 2000 operating hours
G =	every 2 years		whichever comes first!		

4.6.3 Concrete pump (pump kit)

Description		A	B	C	D	E	F	G	CHAP:
B1	Flush water box	❸							**(chap. 3.17)**
B2	Check water box for deposits, clean as required		❸						**(chap. 3.17)**
B3	Replace main hydraulic oil filter after maintenance interval or in the event of an error message					❹			**(chap. 4.8)**
B4	Check fixing of pumping pistons	①		❶					**(chap. 4.17)**
B5	Lubricate the grease nipples on the rock valve, slewing cylinder, agitator, feeding hopper and rotatable outlet	❷							**(chap. 4.16) (chap. 3.9)**
B6	Check clamping screws of the rock valve swivel head for tightness		❶						**(chap. 4.16)**
B7	Make sure screws on the rock valve cover are fit tightly		❶						**(chap. 4.16)**
B8	Check axial play of the rock valve slewing shaft		❶						**(chap. 4.16)**
B9	Check seal of the rock valve slewing shaft			①			❶		**(chap. 4.16)**
B10	Check cutting ring of the rock valve		❶						**(chap. 4.16)**
B11	Check pressure accumulator (only in case of MPS)		①	①	❶				**(chap. 4.11)**
B12	Technical safety inspection of the pressure accumulator (only in case of MPS)						❶		**(chap. 4.11)**

Interval:		Explanation of the symbols						
After the first commissioning:	①	= inspect	②	= lubricate	③	= clean	④	= replace
After time interval:	❶	= inspect	❷	= lubricate	❸	= clean	❹	= replace

Time interval after operating hours:					
A=	daily or every 10 operating hours	B =	weekly or every 50 operating hours	C =	monthly or every 200 operating hours
D=	¼ annually or every 500 operating hours	E =	semi-annually or every 1000 operating hours	F =	annually or every 2000 operating hours
G=	every 2 years		whichever comes first!		

4.6.4 Special equipment

Description		A	B	C	D	E	F	G	CHAP.
S1	Check grease supply and function of the central greasing	❶							**(chap. 6.5)**
S2	Clean suction filter on high-pressure cleaner	❸							**(chap. 6.2)**
S3	Check water case heater heating device according to manufacturer's instructions								**(chap. 6.8)**
S4	Check fluid level in heating equalising reservoirs (before every commissioning)	❶							**(chap. 6.8)**
S5	Change the ultra-fine filter insert (special equipment) according to the maintenance indication, but at least annually.						❹		**(chap. 4.8)**
	Rotary compressor:								
S10	Check oil level (before every commissioning)	❶							**(chap. 4.20)**
S11	Oil change with ROTORÖL 8000 F2			④			❹		**(chap. 4.20)**
S12	Replacing the oil filter			④			❹		**(chap. 4.20)**
S13	Replacing oil return valves			④			❹		**(chap. 4.20)**
S14	Clean / Replace air intake filter			❸		❹			**(chap. 4.20)**
S15	Cleaning the oil cooler			❸					**(chap. 4.20)**
S16	Replacing the oil separator cartridge							❹	**(chap. 4.20)**
	Chamber valve:								
S17	Clean, lubricate	❸		❷					**(chap. 6.4)**

Interval:		Explanation of the symbols						
After the first commissioning:	①	= inspect	②	= lubricate	③	= clean	④	= replace
After time interval:	❶	= inspect	❷	= lubricate	❸	= clean	❹	= replace

Time interval after operating hours:					
A=	daily or every 10 operating hours	B =	weekly or every 50 operating hours	C =	monthly or every 200 operating hours
D=	¼ annually or every 500 operating hours	E =	semi-annually or every 1000 operating hours	F =	annually or every 2000 operating hours
G=	every 2 years		whichever comes first!		

4.6.5 Test intervals according to concrete delivery rate

The amount of wear on your machine's parts depends on the operating conditions (e.g.: concrete type, concrete pump stroke rate, etc.).

We therefore recommend testing new components after having pumped a specified amount of concrete.

This allows you to determine the wear behaviour of the components and define the necessary test intervals:

		First test after m³	Further tests after	Further information chapter
P1	Concrete pumping line	5000	Demand	SHB + **(chap. 7.5)**
P2	"Rock" swivel head	5000	Demand	**(chap. 4.16)**

4.7 Maintenance report

(Copy template)

Type of maintenance A, V, B, S, P (please enter)	**Date**	**Signature**	**Comments**

G: General information
C: Concrete pump (pump kit)
T: Test intervals
P: Placing boom (only S/SPB)
S: Special equipment

Type of maintenance A, V, B, S, P (please enter)	**Date**	**Signature**	**Comments**

G: General information

C: Concrete pump (pump kit)

T: Test intervals

P: Placing boom (only S/SPB)

S: Special equipment

4.8 Hydraulic fluid and filters

If the oil level is too high, the tank can overflow and cause pollution. If the oil level is too low, air can be sucked in and the hydraulic pumps can be damaged.

Check the oil level only when the oil is cold, before you start the hydraulic pump drive for the first time prior to daily use. If your machine has the necessary special equipment, the control system monitors the oil level and warns you of low hydraulic oil levels.

Do not mix different types of oil. Additive reactions can occur which lead to silting, deposits and clogging.

We recommend that you use our SCHWING flushing and filtration units when refilling. Request informational material from SCHWING customer service.

4.8.1 Checking the fill level of the reservoir

Attention!

Environmental or material damage possible due to incorrect hydraulic oil level!

An incorrect hydraulic oil level can lead to pollution or damage to the hydraulic system.

Check the hydraulic oil level before commissioning the machine.

Attention!

Damage to the machine due to incorrect handling of oil!

A purity classification that is too low, the wrong type of oil or dirty oil can damage the machine.

When filling or topping up with oil, always ensure the correct purity classification, the right type of oil and cleanliness when working. Do not mix different types of oil.

The reservoir for the hydraulic oil is equipped with a level indicator e.g. (1) **(Fig. 280)**/**(Fig. 282)**.

If necessary, top up the hydraulic oil via the filler cap (2) **(Fig. 280)**/**(Fig. 283)**.

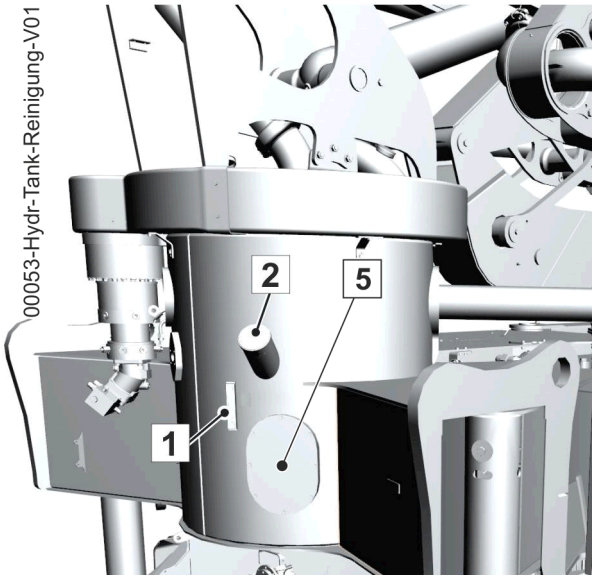


Fig. 280 Example 1.1: Hydraulic oil box

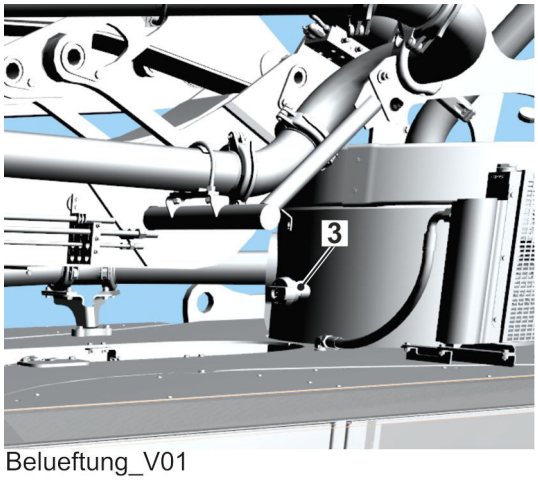


Fig. 281 Example 1.2: Hydraulic oil box

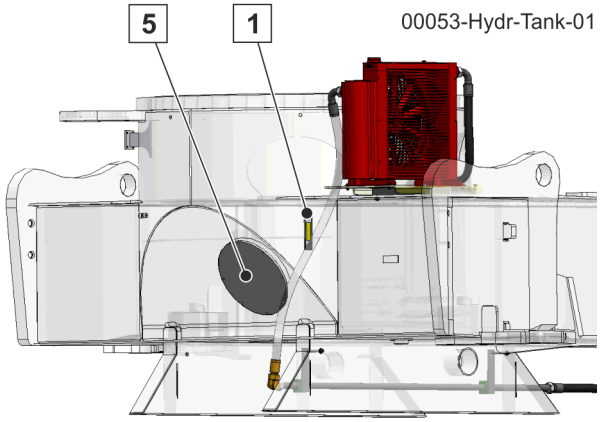


Fig. 282 Example 2.1: Hydraulic oil box

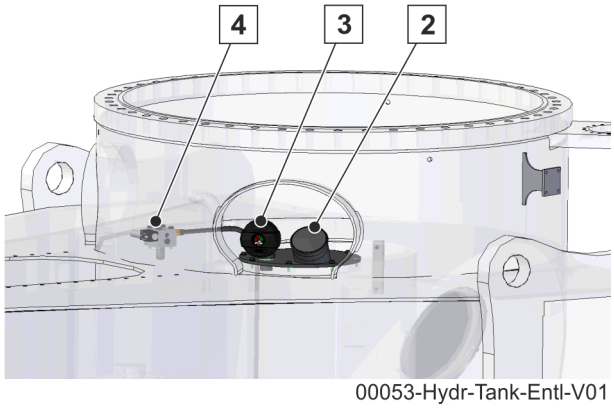


Fig. 283 Example 2.2: Hydraulic oil box

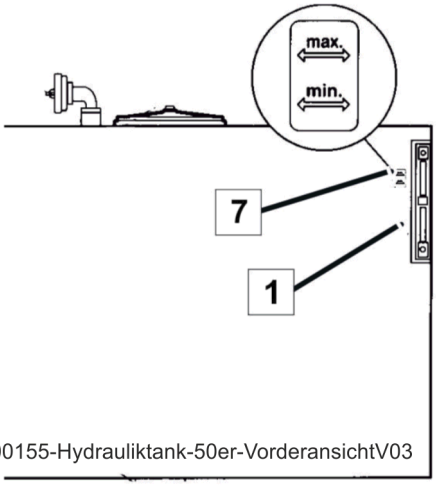


Fig. 284 Example 3.1: Hydraulic oil box

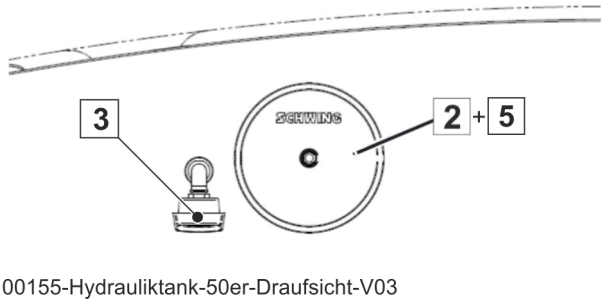


Fig. 285 Example 3.2: Hydraulic oil box

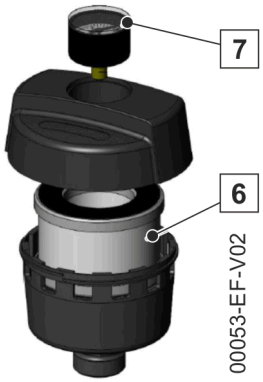


Fig. 286 Ventilation filter

Positions **(Fig. 280)** - **(Fig. 285)**:

1. Level indicator
2. Filler cap
3. Ventilation filter installation positions
4. Valve for the venting function
5. Cleaning cover

Ventilation filter **(Fig. 286)**:

6. Filter element of the ventilation filter
7. Ventilation filter pressure gauge

4.8.2 Special features when filling an empty hydraulic oil box

1. Top up the hydraulic oil box as described previously.
2. Wait approx. 10 minutes until the oil is free of air bubbles and top up with more oil if necessary.
3. Run all functions.
4. Check the oil level again when the oil is cold and the machine is positioned horizontally and ready to start.
5. Top up hydraulic oil if necessary.

4.8.3 Special features when changing the hydraulic oil

1. Warm the hydraulic system up.
2. Provide a waste oil receptacle.
3. Due to the large quantity to be changed, you should first pump out as much hydraulic oil as possible via the upper cleaning opening.
4. Drain the residual oil with the drain valve, see **(4.8.6)**.
5. Clean the box and replace the filter inserts whenever you change the oil.

4.8.4 Cleaning the reservoir

In particular during long periods at standstill, the hydraulic oil excretes dirt particles which are deposited onto the bottom of the container.

Therefore, during each oil change, check the inner walls and the inner floor.

Danger!

Risk of fire and explosion when working on the hydraulic oil tank!

Serious injury or even death from explosion and fire.

Open flames, welding and sparking activities on and in the hydraulic tank are prohibited.

Attention!

Damage to the hydraulic system due to dirt!

Dirt causes damage to the hydraulic components.

Always ensure cleanliness.

Attention!

Environmental damage possible due to escaping hydraulic fluid!

Leaks when opening the hydraulic line can lead to environmental damage.

Collect any hydraulic fluid that leaks out and do not let it get into the environment.

Clean the oil box as needed.

1. Clean the area around the cleaning cover and remove the cleaning cover.
2. Remove the suction and hydraulic hoses of the hydraulic pumps from the reservoir so that no dirt gets into the pumps.
3. Clean the inside of the reservoir of the hydraulic oil tank with circulating oil and a fibre-free cloth.
4. Wipe the inside of the container dry.
5. Reinstall the suction and hydraulic hoses.
6. Inspect the seal of the cleaning cover and reinstall it.

Attention!

Damage to the hydraulic pumps!

After cleaning and reinstalling the suction hoses, air in the hoses can damage the hydraulic pumps.

Operate the machine for the first few minutes with no load and at minimum speed.

4.8.5 Dehumidifying the hydraulic oil box

All SCHWING truck-mounted concrete pumps with VECTOR control are equipped with an automatic dehumidification system for the hydraulic oil box.

Thus, cool, dry air is directed from the vehicle air system into the container via the oil surface. It warms the air and removes the humidity from the environment. The warmed, damp air leaves the oil tank via the housing of the vent filter **(Fig. 286)**.

The completely automatic dehumidification of the hydraulic oil box reduces the risk of corrosion on the inside of the container, as well as the absorption of water into the hydraulic oil.

4.8.5.1 Control of operations of the ventilation filter

A pressure gauge (7) **(Fig. 286)**, is located in the housing of the vent filter, which can help to check the functioning of the dehumidification system.

When the dehumidification system is active, the pressure gauge must display a value between 0 and less than +0.2 bar.

A safety valve in the dehumidification system opens at 0.2 bar overpressure.

If the display of the pressure gauge is in the minus area, it means that with a decreasing oil level ambient air is sucked through the vent filter in the container. The oil level decreases when, for example, the outrigger or placing boom is extended.

4.8.5.2 Start-up conditions

- VECTOR control ON
- Pressure in the vehicle air reservoirs higher than 5.5 bar
- Hydraulic oil temperature at least 60°C

If the above conditions are fulfilled, start the system for 15 minutes. Then there is a pause of 45 minutes, which is followed by a venting phase as long as the above conditions are fulfilled.

4.8.5.3 Maintenance and testing of the ventilation filter

The filter insert (6) **(Fig. 286)** cannot be cleaned but rather has to be replaced according to the maintenance schedule. If an overpressure of 0.2 bar appears continuously on the display when the dehumidification system is switched on, the vent filter insert is dirty and must be replaced ahead of schedule. It is not possible to clean it.

It should be inspected for perfect function from time to time. In so doing, observe the described start-up conditions.

When replacing the air filter in the dehumidification system, also observe the maintenance interval of the air filter in the vehicle air system.

4.8.6 Draining condensation water

After an extended period of downtime, drain any water from the hydraulic oil box. To do this, use the drain valve (1) **(Fig. 287)** on the bottom of the box.

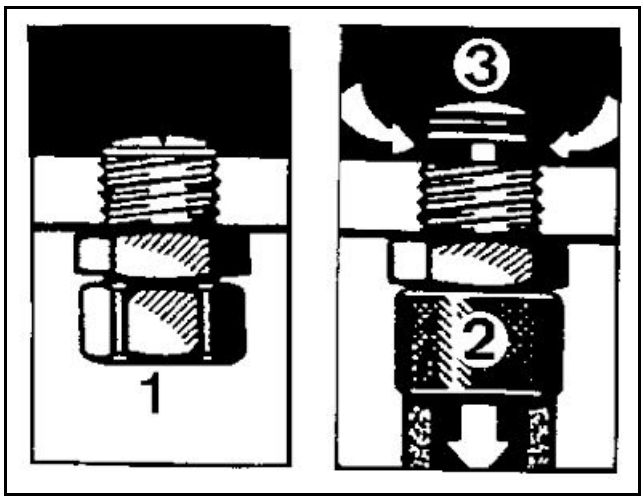


Fig. 287 Drain valve

1. Remove the lock nut from the drain valve (1) **(Fig. 287)**.
2. Screw the drain hose (2) onto the drain valve.

The drain valve opens automatically.

If pure hydraulic fluid flows out, remove the drain hose immediately and reattach the lock nut.

Attention!

Pollution possible when draining condensation!

The unsupervised drainage of condensation can lead to drainage of the hydraulic oil tank and thus to pollution.

Always monitor the drainage of condensation.

After draining, check the level of the hydraulic oil.

4.8.7 Purity of the hydraulic oil

The purer the hydraulic oil is, the smoother the hydraulic systems and greasing units function. 75 percent of all system failures are due to damage to the inserted components - caused by impure hydraulic oil.

In complex hydraulic systems, the most sensitive component determines the required purity in the entire system.

For components used in SCHWING GmbH hydraulic systems, a purity classification as set out in the manufacturer's specifications is required, which should at least be compliant with or better than classification 20/18/15 according to ISO 4406.

SCHWING GmbH supplies its machines with purity classification 18/16/13 according to ISO 4406.

4.8.7.1 What does the purity classification mean?

Contaminations cannot be convincingly detected through a visual inspection.

The classification of solid contamination in lubricants and hydraulic fluids is determined according to ISO 4406.

To determine the oil purity classification, solid particles are counted in 100 ml of fluid, arranged according to size and quantity and divided into particle areas.

Depending on the procedure for the particle counting, there will be 2 or 3 areas.

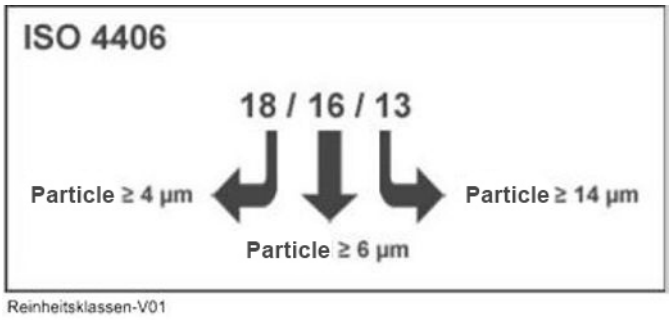


Fig. 288 Purity classifications

Information

The smaller the values, the purer the hydraulic oil!

Further information on purity classifications and contaminations of operating materials can be obtained from the manufacturer information on filter systems as well as lubrication and operating materials.

4.8.7.2 What advantages are there in observing the purity classification?

Adherence to the purity classification contributes significantly to the reduction of costs due to the extension of the oil change interval and to the prevention of damage due to contamination.

As such, machine availability and productivity increase.

Information

Purity classification!

Failure to comply with the purity classification results in the loss of warranty!

4.8.7.3 Extended changing intervals for hydraulic oil

Through diligent oil care and regular changing of the oil filter, the oil changing interval can be extended, in order to initiate appropriate measures for preventive maintenance.

The oil quality must be monitored through regular laboratory tests.

The laboratory report contains the analysis values of your sample, comments from expert technicians on the state of the oil and machine, as well as recommendations on how to proceed.

For an oil analysis, the oil must be removed from the system and sent to a laboratory for analysis.

To keep your personal costs as low as possible, we recommend analysis sets.

The samples can thus be taken cleanly, quickly and easily and sent.

4.8.7.4 Description of the oil sampling procedure

Take the sample:

- During operation or shortly after shut-down – because dirt and wear particles are floating, potentially present water has not been removed.
- At a normal operating temperature (max. 80°C), warm oil can be removed more quickly.
- Always following the same method and at the same point.
- Wherever possible before the filter, never out of the filter.
- Not shortly after an oil change or after a large quantity of oil has been refilled.
- Only in a clean and dry sample cup – at best directly into the "original" from the analysis set.

You can obtain suitable measuring and flushing devices via SCHWING GmbH customer service.

4.8.8 Replacing the filter inserts

Warning!

Risk of severe injuries due to hydraulic fluid escaping under pressure!

Explosive pressure relief in the event of improper work on the hydraulic system.

➤ Before working on the hydraulic system, switch off the drive motor.

➤ Relieve all pressure accumulators via the relief valves.

➤ Check the relief of the hydraulic system on the pressure gauges.

Before opening the hydraulic system, secure hydraulically moving parts that are subject to external forces, e.g. raised placing boom.

Replace the filter inserts after an error message from the diagnosis system and/or at each oil change.

In order to prevent error messages, the filter monitoring first becomes active at an oil temperature of more than 30 °C.

Clean and check all individual parts. Watch out for rubbed-off metallic particles in the filters (indication of damage!).

Attention!

Material damage to the hydraulic system due to dirty filters!

Dirty filters cause damage to the hydraulic components.

Replace and dispose of filters on schedule. Never operate the machine with defects, dirty filters or with no filters.

Document the oil and filter changes using the appropriate SCHWING tags, see **(Fig. 289)** and **(Fig. 290)**.

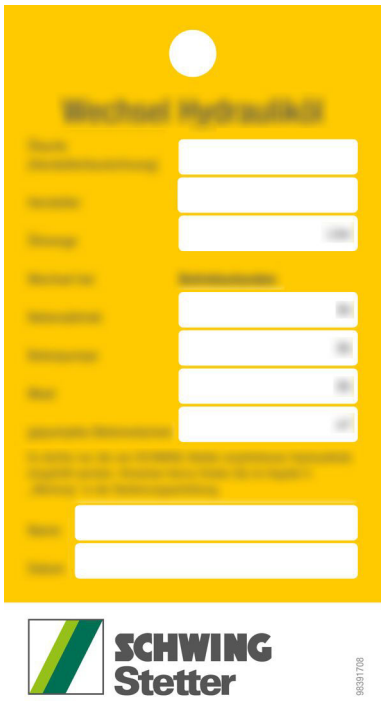


Fig. 289 Boom filter oil change tag

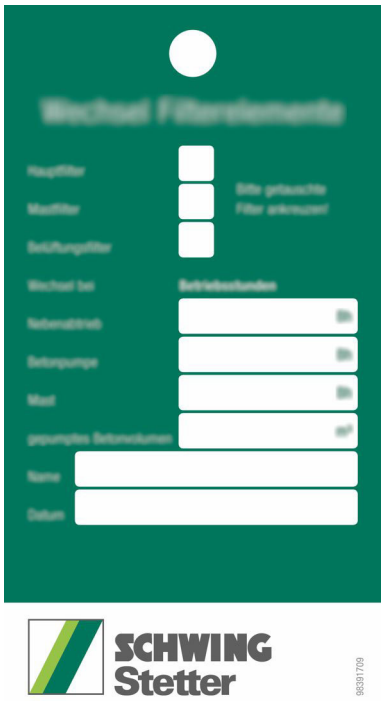


Fig. 290 Main filter oil change tag

4.8.8.1 Boom filter

The boom filter **(Fig. 291)** for the placing boom hydraulic system is a built-in tube filter located in the emergency control switch cabinet, near the placing boom control block.

8.1.0.0.1 Dismantling

1. Unscrew the filter bowl (3) **(Fig. 291)** at the bottom hexagon (4) using a ring spanner.
2. Collect the fluid in a suitable receptacle and clean it or dispose of it in an environmentally responsible way.
3. Screw (pre-2011 models: "pull") the old filter insert (2) off of the filter head.
4. Clean the filter bowl and the filter head, ensuring that the thread in particular is clean.
5. Inspect the O-rings and back-up rings, replace if necessary.

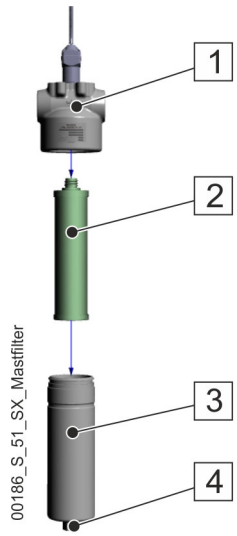


Fig. 291 Boom filter

Caption (Fig. 291)	
Pos.	**Designation**
1	Filter head
2	Filter insert
3	Filter bowl
4	Hexagon

8.1.0.0.2 Installation

1. Apply clean operating fluid to the thread and sealing surfaces of the filter bowl, filter head and O-ring.
2. Screw (pre-2011 models: "insert") the new filter insert (2) into the filter head.
3. Screw in the filter bowl (3) until it reaches the limit stop and then loosen it by one quarter turn.
4. Bleed the hydraulic system

Information

Tightening torques!

The sealing effect is not improved by tightening!

4.8.8.2 Replacing the insert in the main filter

The main filter is integrated into the oil cooler circuit. When the pump drive is switched on, a separate pump keeps the hydraulic oil in constant circulation. Cooler, filter and ventilator form a compact unit **(Fig. 292)**.

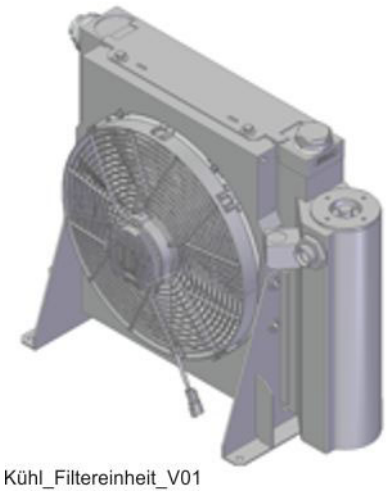


Fig. 292 Cooler unit

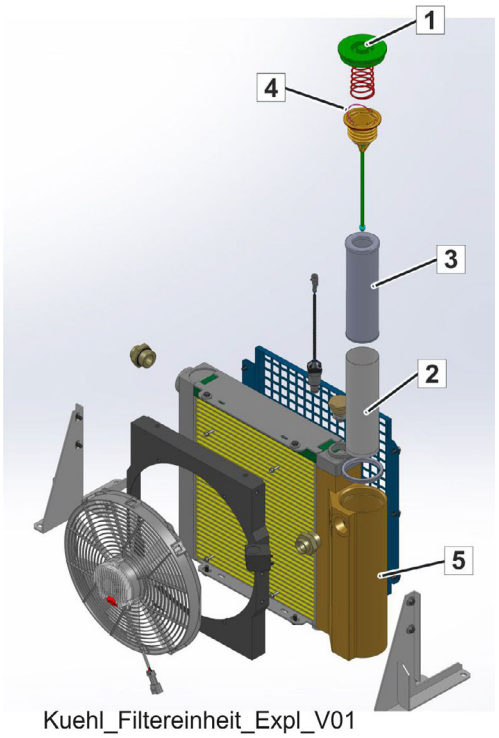


Fig. 293 Cooler unit exp.

Caption (Fig. 293)			
Pos.	**Designation**	**Pos.**	**Designation**
1	Filter cover	4	Stirrup
2	Filter housing	5	Filter chamber
3	Filter insert		

1. Remove the filter cover (1) **(Fig. 293)** using the 24 mm socket wrench insert.
2. Collect the liquid in a clean container and dispose of the liquid in an environmentally friendly manner.
3. Pull the filter housing (2) out of the filter chamber (5) by its stirrup (4).
4. Remove the filter insert (3) from the filter housing (2).
5. Rinse out the filter screen of the filter housing and wash dirt off with a soft brush.
6. Dry the filter screen and inspect it for damage.

7. Inspect the sealing rings at the filter cover and the underside of the filter housing and replace them if necessary.
8. Grease threads and sealing surfaces and cautiously insert the new filter insert into the filter housing.
9. Insert the filter housing into the filter chamber.
10. Cautiously mount the filter cover and tighten the cover to approx. 35 Nm, socket wrench insert 24 mm.

4.8.9 Ultra-fine filtration (special equipment)

SCHWING truck-mounted concrete pumps can be equipped with an additional ultra-fine filtration **(Fig. 294)**.

The ultra-fine filter is integrated into the agitator circuit and constantly passed through when the pump drive is switched on (bypass flow).

The filtration also occurs when the agitator is switched off.

The pressure relief valve, ball valve and pressure gauge **(Fig. 295)** form a single unit that is located near the filter housing or in the control cabinet of the emergency control unit.

4.8.9.1 Maintaining the ultra-fine filter

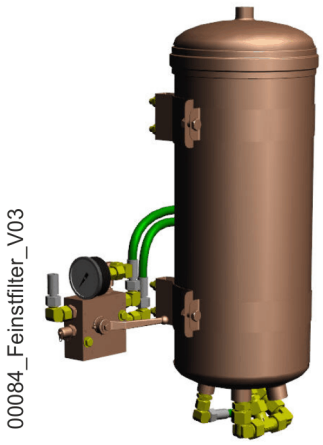


Fig. 294 Ultra-fine filter

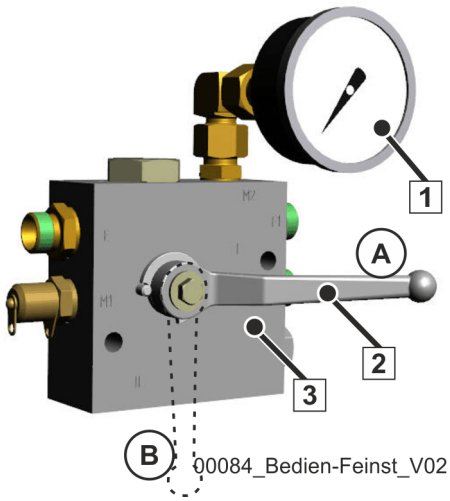


Fig. 295 Pressure gauge (1), ball valve (2), pressure relief valve (3)

The best filter performance is achieved when the pressure gauge (1) **(Fig. 295)** displays a pressure between 2.0 bar and 4.0 bar.

Catching particles of dirt and water causes the pressure indicator to increase and the return flow volume to decrease.

We recommend replacing a filter element at the latest after:

- 2000 operating hours
- 6 months of use
- In the event of frequent downtimes
- Pressure indicator is above 4.0 bar

Attention!

Damage to the ultra-fine filter due to excessive pressure!

A pressure of more than 5.5 bar will damage the ultra-fine filter.

Change the filter element on time and make sure the pressure relief valve is working and set correctly.

4.8.9.2 Design of the ultra-fine filter

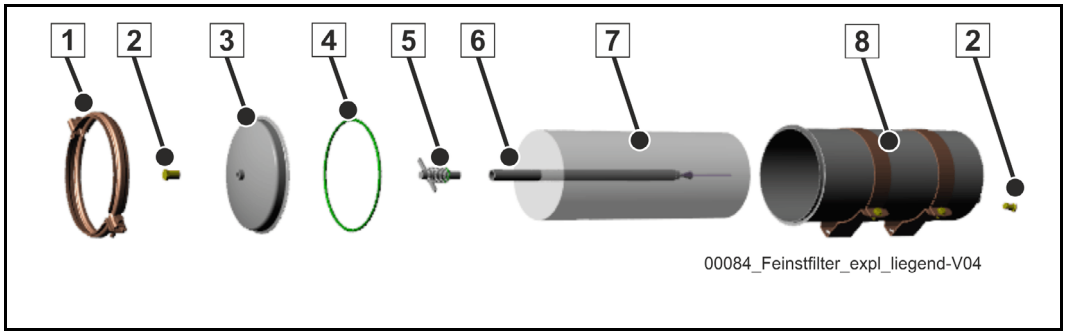


Fig. 296 Design of the ultra-fine filter (filter shown horizontally)

Caption (Fig. 296)			
Pos.	**Designation**	**Pos.**	**Designation**
1	Cover retaining clamp	5	Retaining bolts with seal
2	Stopper	6	Drain pipe
3	Filter cover	7	Drain pipe
4	Filter cover seal	8	Filter housing

4.8.9.3 Replacing the ultra-fine filter element

1. Switch the pump drive off and secure the machine against being started by uninformed persons.
2. Close the ball valve (2) **(Fig. 295)**.

Information

Closing the ball valve allows the filter to be separated from the system in the event of malfunctions.

This prevents the agitator's functions from being impaired.

3. Open the drain screw (1) **(Fig. 296)** and drain the filter housing completely into a container placed below it.
4. Carefully remove the screw connection on the cover retaining clamp (1) **(Fig. 296)**. Only remove the cover (3) if the oil level has gone down as the oil will overflow otherwise.
5. Remove the cover retaining clamp (1) and the filter cover (3) **(Fig. 296)**.
6. Loosen and remove the retaining bolt (5) for the filter element (7). Replacing the retaining bolt seal is part of replacing the filter!
7. Pull the filter element (7) off of the drain pipe (6) using the stirrups provided for that purpose.
8. Allow the filter element to drip dry, placing it in a separate container so as to prevent contamination caused by leaking oil. The disused filter element must be properly disposed of later (special waste).
9. Remove the course contamination in the filter housing (8) **(Fig. 296)**.
10. Reattach the drain screw to the filter housing with Teflon tape.
11. Mount the new filter element in a straight and vertical position above the drain pipe.
12. Screw the retaining bolt into the drain pipe and ensure that the filter element is secured tightly.
13. Inspect the cover seal (4) for damage and replace it if necessary.
14. Seal the filter housing with the filter cover. The pivot of the retaining bolt must sit in the guide in the filter cover provided for the purpose.
15. Fasten the filter cover with the cover retaining clamp and tighten the screw connection.

Information

The ends of the cover retaining clamp are U-shaped and must interlock **(Fig. 297)**.

Ensure the correct installation without fail.

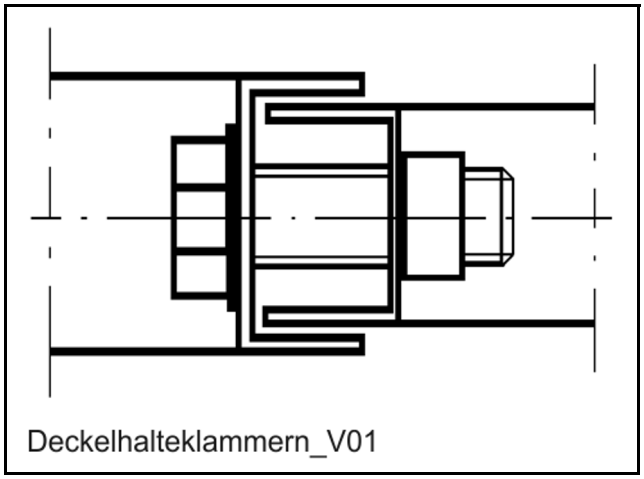


Fig. 297 Cover retaining clamps

The ultra-fine filtration is operational once more.

4.9 Pressure checks

All hydraulic consumers are secured by pressure relief valves.

These valves are set at the factory. Readjustment is as a rule only necessary after replacement or repair of the hydraulic systems.

Regular pressure checks serve to detect errors early on. Carry out the checks while the machine is running at operating temperature and speed.

Attention!

Material damage due to incorrect pressure settings!

Incorrect pressure settings can lead to damage and malfunctions on the machine.

Only have pressure settings carried out by qualified personnel!

- Only loosen hydraulic system connections if the drive is not running and the pressure accumulator (if present) is relieved. This also applies to the assembly and disassembly of test pressure gauges.
- When checking the pressure of the concrete pump hydraulic system, be sure to set the direction to “Pump”. In the direction "Sucking", the seals of the concrete pump control block may be pushed out.

4.9.1 Concrete pump system

A11 hydraulic pumps power the concrete pump.

Different pump combinations can achieve different power densities. See examples, **(Fig. 298)** and **(Fig. 299)**.

A11 pumps are equipped with a “pressure cut-off” function. This swivels the pump back before the maximum operating pressure set on the pressure relief valve (PRV) is reached.

The pressure cut-off prevents a loss of performance and oil from being heated, which occurs when hydraulic oil is diverted through the pressure relief valve.

During a pressure check, the value displayed on the pressure gauge should be approx. 20 bar lower than the setting on the pressure relief valve DB 1.

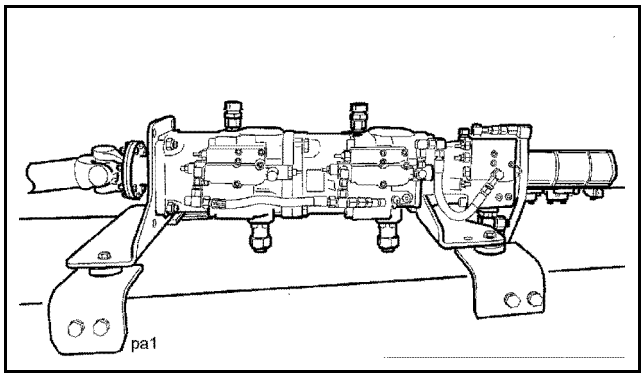


Fig. 298

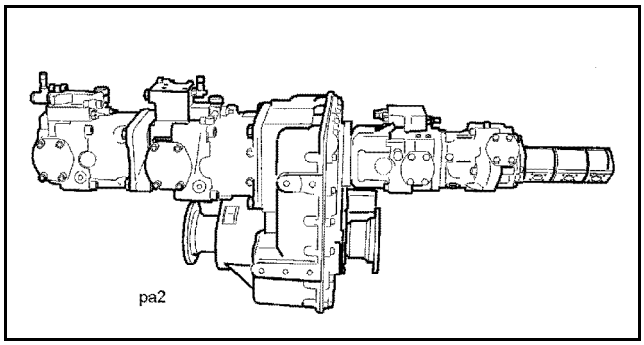


Fig. 299

Appropriate settings are configured on the hydraulic pumps and the pressure relief valve.

If during the checks the result is clearly above or below the prescribed values, leave the required adjustment work to SCHWING's customer service.

Shut down the machine and submit the measured values to customer service.

4.9.2 Performing a pressure check

- Close the ball valve (1) **(Fig. 301)**.
- For machines with MPS, set the ball valve (2) **(Fig. 301)** to position (II): Pressure check **(Fig. 300)**.
- Configure the max. delivery rate (stroke rate) of the concrete pump.
- Switch on the concrete pump.

The pumping pistons are moved into the end position and remain there.

The indicator on the concrete pump pressure gauge (2) on the rear of the machine **(Fig. 302)** must increase to the value set for the pressure cut-off.

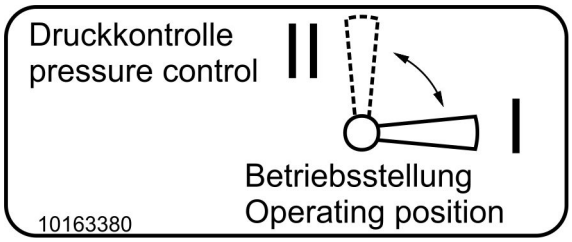


Fig. 300

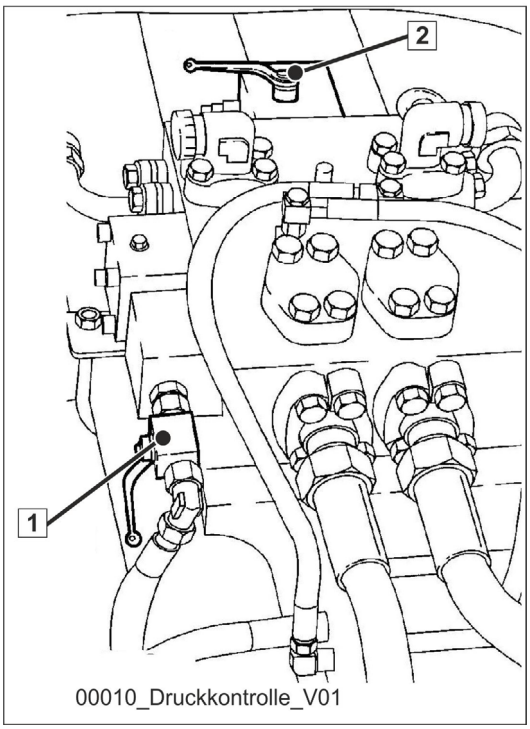


Fig. 301

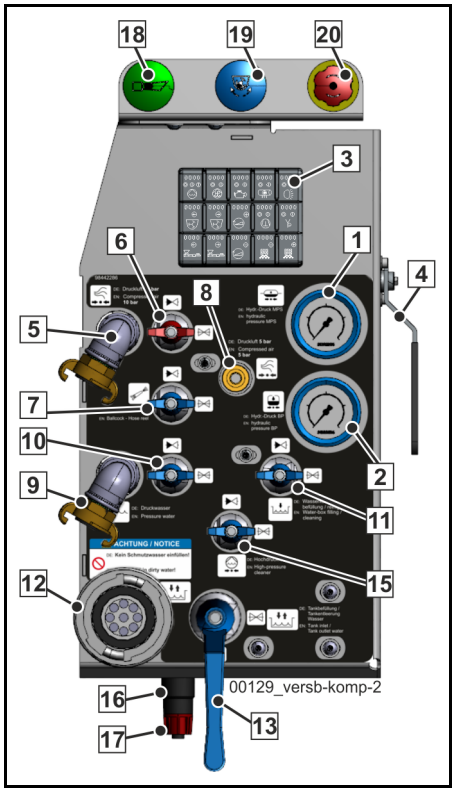


Fig. 302 Pressure gauge for concrete pump

➤ After the pressure check, first switch off the concrete pump, then switch the ball valves back to their operating position. In this way, you prevent uncontrolled running of the concrete pump after turning the ball valve.

Working operation is only possible while ball valve (2) **(Fig. 301)** is in the operating position (I)!

If the concrete pump in switched on after more than 120 seconds of being blocked (ball valve 1 closed), the control system issues an error message.

4.9.3 Placing boom, auxiliary units

Placing boom hydraulics are likewise powered by an A11 pump.

The pressure check is performed by installing test pressure gauges.

The pump operates with a pressure limit, which is similar to the pressure cut-off described above.

In the event of a malfunction, let the SCHWING customer service take care of inspecting and configuring this system.

4.9.4 Hydraulic pilot control

When testing hydraulic pilot pressures, always connect a test pressure gauge capable of up to 600 bar.

Excessive pressure can destroy the "40 bar pressure gauge".

4.9.4.1 S1 valve

The hydraulic pilot control unit for the "S1" valve on the concrete pump is powered by the agitator hydraulics.

In order to ensure sufficient pressure also when the agitator is not running, a precharging valve is installed in the agitator control unit.

4.9.4.2 Placing boom

The pilot control pressure is enabled via a pressure relief valve in the "pilot control plate" of the placing boom control block.

4.9.5 Pneumatic system

The machine's compressed air supply is supplied by the vehicle air system on an interface defined by the vehicle manufacturer.

The directional valves for concrete pump and agitator pilot control systems can optionally be pneumatically piloted.

Various types of special equipment also require compressed air.

The pressure is displayed and set for this consumers via the pressure release valve in the switch cabinet.

4.10 Radiator

Warning!

Serious injuries due to rotating components!

Crushing and pulling in due to touching rotating components.

Switch the machine off before removing protective devices and working on the rotating parts. Only put the machine back into operation when all protective devices are properly reinstalled.

Caution!

Risk of burns due to hot surfaces!

Components such as hydraulic components and components from the drive motor can be hot during operation.

Let these components cool down before starting any maintenance work. Wear protective gloves.

4.10.1 Hydraulic oil cooler

The oil cooler and oil filter are located in the same housing **(Fig. 303)**.

A fixed displacement pump delivers hydraulic oil through this filter/cooler combination in a separate circuit.

The ventilator is powered electrically or hydraulically (optional).

The system is activated immediately after switching on the drive and independent of the activation of other functions.

Dusty precipitation on the cooling vanes of the oil cooler reduces the cooling capacity.

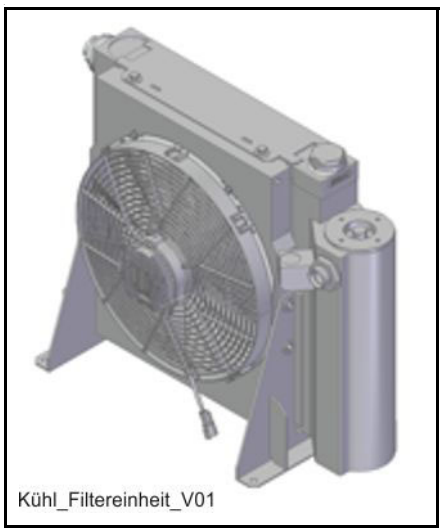


Fig. 303

4.10.2 Cleaning the exterior of the hydraulic oil cooler

Soiling on the radiator fins of the oil cooler reduces the cooling capacity.

Carefully clean the radiator with compressed air. To do this, bring the air flow parallel to the cooler fins and against the normal flow direction.

Cleaning with water or steam jet is possible for heavy soiling.

Observe:

- Disassemble fan motor.
- Only use cleaning agents that do not corrode aluminium.
- Use water and steam jets carefully.

4.10.3 Cleaning the interior of the hydraulic oil cooler

- Remove the cooler.
- Connect cooler to a flushing system with filters.
- Flush for at least 30 minutes.
- After cleaning, remove the flushing medium completely.

Then, flush the cooler with the appropriate type of oil for the hydraulic system.

4.10.4 Motor cooler

Liquid-cooled motors have an appropriate cooler.

Depending on the type, the drive motor can be additionally equipped with a motor oil cooler.

The motor cooler vanes must be cleaned from time to time in order to avoid impairing the cooling performance.

Otherwise, this can result in damage due to the motor overheating.

Instructions on how to clean the cooler can be found in the respective motor or vehicle operating instructions.

4.11 Pressure accumulator (bladder accumulator)

These components only control the switching of the rock valve so that it can be switched with sufficient force.

Pressure accumulators **(Fig. 304)** are pressure vessels in the sense of the EU Pressure Equipment Directive (PED).

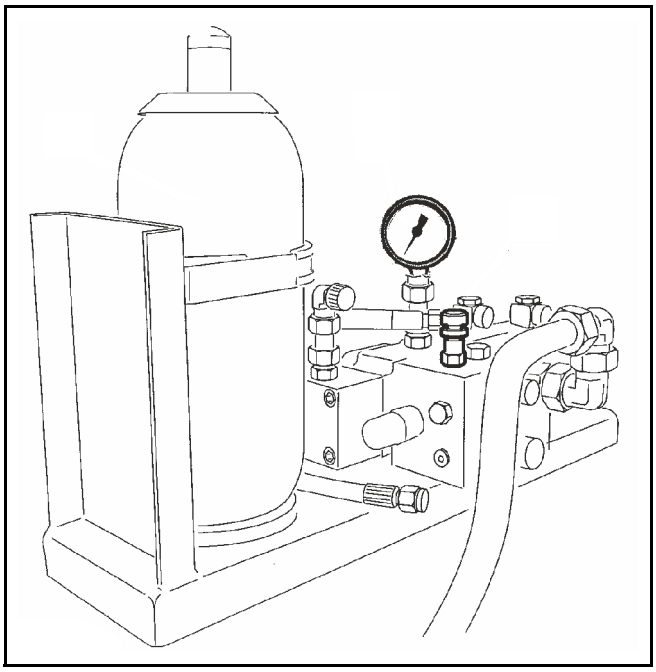


Fig. 304 Example figure: Pressure accumulator

Warning!

Risk of severe injuries due to hydraulic fluid escaping under pressure!

Explosive pressure relief in the event of improper work on the hydraulic system.

- Before working on the hydraulic system, switch off the drive motor.
- Relieve all pressure accumulators via the relief valves.
- Check the relief of the hydraulic system on the pressure gauges.

Before opening the hydraulic system, secure hydraulically moving parts that are subject to external forces, e.g. raised placing boom.

Before commissioning and during operation, the applicable local regulations in the country of use must be observed.

The machine operator is responsible for adhering to these regulations.

It is essential to observe the documentation provided by the manufacturer of the accumulator. This must be kept with the machine's papers.

In Germany, an inspection by an approved inspection body is prescribed upon commissioning and then at least every 10 years thereafter.

As part of the regular technical safety inspection, a competent person must inspect the bladder accumulator externally.

4.11.1 Maintenance and testing of the pressure accumulator

Regularly carry out the following work:

- Check nitrogen filling pressure.
- Make sure connections are tight and check for leaks.
- Check that fittings and safety devices are in proper working condition.
- Check fixing elements.

4.11.2 Test intervals

Carry out the work listed above in accordance with the maintenance schedule:

If no noticeable loss of gas has occurred, carry out the regular work every three months.

4.11.3 Checking the nitrogen filling level of the pressure accumulator

- Start the motor and fill the accumulator.
- Switch off the motor.

The accumulator is automatically discharged (hydraulic fluid drains off).

- Monitor the pressure gauge (1) **(Fig. 305)** / **(Fig. 306)**.

At first, the pressure decreases slowly. Only when the accumulator is completely empty, then the pressure drops abruptly.

- The last pressure value indicated before the pressure gauge pointer abruptly drops to "0" corresponds to the nitrogen filling pressure.

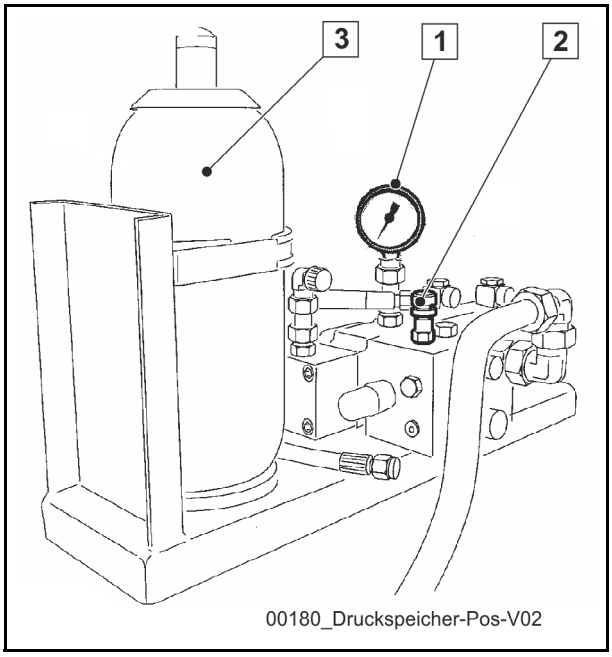


Fig. 305

Information

Depending on machine type, the pressure gauge (1) is located either directly on the accumulator safety block **(Fig. 305)** or at another location easily visible to the operator, e.g. (1) **(Fig. 306)**.

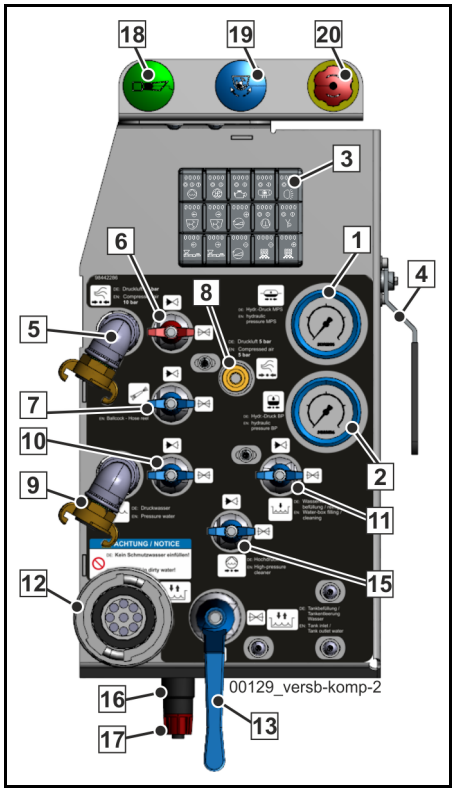


Fig. 306 (1) Pressure gauge of the pressure accumulator (MPS)

Danger!

Risk of explosion due to incorrect filling of the pressure accumulator!

If the pressure accumulator is filled with the wrong gases, there is a risk of explosion.

- Only fill the pressure accumulator with nitrogen.
- Do not exceed the specified max. filling pressure.

Should the filling pressure not be correct, fill the pressure accumulator using the original filling device from the pressure accumulator manufacturer in accordance with the manufacturer's instructions.

The filling pressure "P0" is specified in the switching diagram or on an adhesive sign attached to the pressure accumulator.

4.11.4 Working on machines with pressure accumulators

Danger!

Risk of crushing due to the rock valve switching independently!

In the case of pressurised hydraulic systems, the rock valve can also move independently when the hydraulic system is switched off.

Before working on the hydraulic system, only carry out work with the drive motor switched off and the hydraulic system depressurised.

The breather valve of the accumulator safety block opens automatically under certain operating conditions and discharges the pressure accumulator.

For reasons of occupational safety, before working on the machine (e.g.: cleaning, connecting pressure gauges, repair work, replacement of wearing parts etc.):

- Switch off control system.
- Switch off the drive motor and secure it against switching back on (e.g. remove the "ignition key").
- Open the manual accumulator breather valve (2) **(Fig. 305)**.
- Read the pressure gauge (1) **(Fig. 305)** / **(Fig. 306)**; it should be pointing to 0 bar.

4.11.5 Safety inspection for pressure accumulator

Pressure tanks must be inspected regularly in accordance with the regulations in the country of use.

In Germany, an inspection by an approved inspection body is prescribed upon commissioning and then at the latest every 10 years thereafter.

As part of the regular technical safety inspection, a competent person must inspect the bladder accumulator externally.

4.12 Drive lines of the pump drive

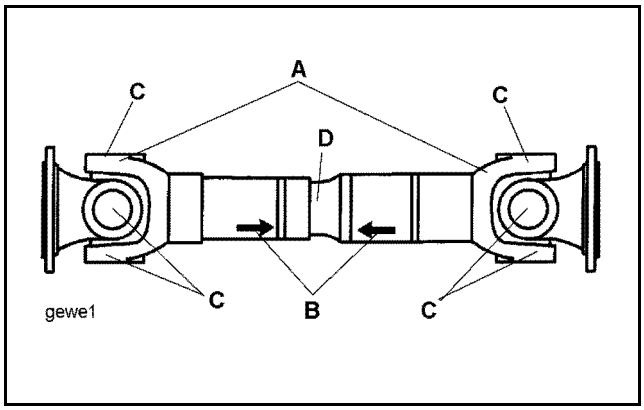


Fig. 307

For the safe and trouble-free operation of drive lines, control and lubrication work is necessary.

Before lubricating, check the play of the articulated bearing “C” and the length compensation “D”. Replace drive line in case of noticeable play.

Also be alert to abnormal running noises and vibrations during operation of the machine. If required, determine the cause and remedy the error.

Timely action on signs of wear keeps the machine operationally ready.

Downtimes are reduced and damage avoided.

4.12.1 Lubrication

Information

Drive line grease.

For the relubrication of drive lines, please only use our SCHWING drive line grease, art. no.: 10197297.

Relubrication with other greases is absolutely to be avoided.

Before relubricating, clean the high-pressure lubrication heads.

The maximum permissible lubrication pressure is 15 bar. Avoid strong surges of pressure so as not to damage the seals.

If a lubrication point is positioned opposite to a link, lubricating one lubrication head is sufficient.

The grease reaches all four articulated bearings via the central lubrication head in the journal cross.

Lubricate the lubrication points of the links until the new lubricant emerges from all sealing lips. Dirt is ejected from the bearings along with the old grease. Do not allow all bearings to be lubricated, remove the shaft.

"Over-lubrication" is not possible. Wipe away excess grease.

As a rule, the length compensation of the drive lines is coated in Rilsan and as such requires no maintenance. If a lubrication head is located in this position, then this should be sparingly greased, as it collects some of the grease in the shaft.

If drive lines are cleaned with pressure water or steam jet, re-lubricate after each cleaning. Under no circumstances should the drive lines be cleaned using chemical cleaning agents. These can attack the seals of the articulated bearings, for example.

4.12.2 Relubrication intervals

The respective operating conditions determine the relubrication intervals.

The intervals specified in the maintenance schedule are reference values. Under certain circumstances, shorter intervals are necessary.

Regular visual inspections of the universal joints must be carried out at least once every 50 operating hours. The joints must also be checked for zero play.

4.12.3 Transport and storage

Drive lines manufactured by SCHWING are delivered as installation-ready drive elements, see example **(Fig. 307)**.

They must always be transported and stored in a horizontal position. Also secure them to prevent them falling apart.

Protect exposed parts, e.g. flange surfaces, from corrosion and store drive lines in a dry space.

In order to maintain the factory-set balance, avoid strikes and impacts to the drive lines. Do not remove balance compensation parts.

4.13 Distribution manual transmission gear

4.13.1 Checking the oil level

- Place machine in a horizontal position.
- Unscrew the inspection plug (1) **(Fig. 308)**.
- If necessary, top up oil through the filling and breather screw (2) until it overflows at (1).
- Wash screw (2) with fuel and blow out with compressed air.

4.13.2 Changing the oil

- Unscrew drain plug (3); close after emptying.
- Top up oil as described above.

Information

We recommend:

During each oil change, examine an oil sample for discolouration and solid particles in order to initiate appropriate measures for preventive maintenance.

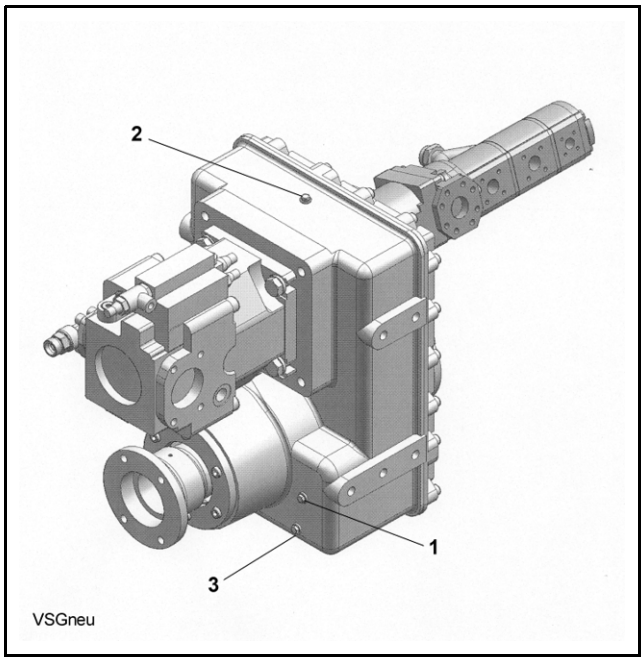


Fig. 308 Distribution manual transmission gear

4.14 Maintenance for slewing gear

During operation, pay attention to vibrations and unusual noises in the gear.

After performing maintenance, replace the sealing rings and change the lubricating oil.

SCHWING automatic concrete pumps can be equipped with two types of slewing gears. The two types can be identified via the filling pipe. The type 1 gear does not have a filling pipe. The type 2 gear has a filling pipe attached.

First observe the general maintenance work and then the individual maintenance tasks for the installed gear.

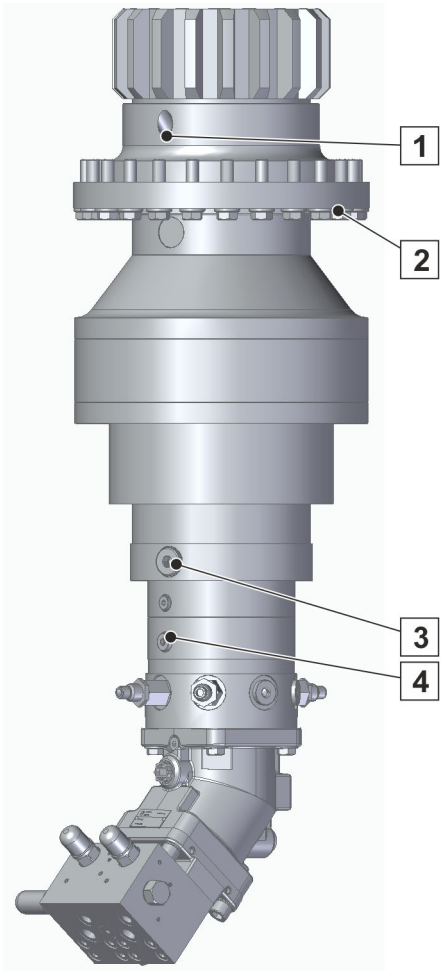
- **(chap. 4.14.6)** for type 1.
- **(chap. 4.14.8)** for type 2.

Warning!

Serious injuries due to rotating components!

Crushing and pulling in due to touching rotating components.

Switch the machine off before removing protective devices and working on the rotating parts. Only put the machine back into operation when all protective devices are properly reinstalled.



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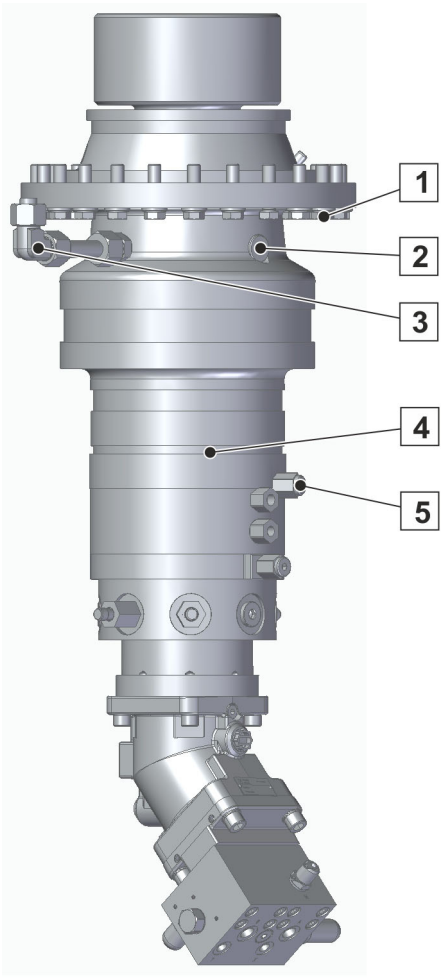

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Fig. 309 Gear type 1

Pos.	Description
1	Filling opening with dipstick
2	Fastening screws
3	Magnetic closing screw plug
4	Drain plug

Fig. 310 Gear type 2

Pos.	Description
1	Fastening screws
2	Control opening
3	Filling pipe
4	Drain plug (on the back)
5	Magnetic closing screw plug

4.14.1 Attention - Long-term lubrication!

Slewing gears can be filled with a long-term polyglycol-based lubricant.

Observe the information on the gear type plate.

CLP = Mineral oil

PG = Polyglycol

Polyglycols must not be mixed with fluids of a different composition (loss of lubricating ability).

Only a lubricant in compliance with the information on the gear type plate may be used. Otherwise, the sealing elements risk being damaged.

When filling with the above long-term lubricant, we recommend taking a test sample every two years and changing the lubricant only in the case of a poor evaluation.

4.14.2 Vent filters

Attention!

Damage to the gear due to lack of maintenance!

Blocked vent filters can affect the function of the slewing gear and lead to damage to the gear.

Keep the vent filters completely clean and accessible.

In the event a layer of dust has been deposited, vent filters must be cleaned, even before the minimum period of three months has passed.

- ➤ Remove vent filters.
- ➤ Clean vent filters with a cleaning agent.
- ➤ Dry or blow on vent filters with compressed air.

4.14.3 Toothing play

Warning!

Danger of crushing due to worn toothed wheels on the rotary connection!

Serious injuries due to increased trailing movements of the placing boom.

Observe the placing boom for changed stopping and trailing behaviour. Arrange for SCHWING's customer service to replace worn toothed wheels immediately.

The placing boom is rotated horizontally with the slewing gear.

A certain degree of "toothing play" must not be exceeded between the toothed wheel of the slewing gear and the toothed wheel of the placing boom.

You notice too much "toothing play" in the slewing movements of the placing boom after completing a rotation.

If the boom swings out farther than usual, contact SCHWING's customer service immediately.

In order to prevent this change of the toothing play, lubricate the toothing of the rotary connection according to the maintenance plan and pay attention to any potential abrasions of the toothed wheels.

4.14.4 Slewing gear brakes

Warning!

Danger of crushing due to faulty effect of the slewing gear brakes!

Serious injuries due to uncontrollable movements of the placing boom.

Observe the placing boom for changed stopping and braking behaviour. Arrange for SCHWING's customer service to repair any damage immediately.

The slewing gear is equipped with two different brakes:

- The "multi-disc brake" keeps the boom still while the machine is out of operation.
- Hydraulic brake valves stop the placing boom from rotating while in operation.

As such, the boom is not stopped abruptly but is rather stopped or started up slowly.

Malfunctions in the slewing gear brakes can be detected based on the following placing boom behaviour:

- The placing boom no longer remains in its last position.
- After completing a rotation, the braking distance of the placing boom is longer than normal.

If a malfunction is detected in the slewing gear brake(s), contact SCHWING's customer service immediately for the purpose of an inspection and repairs.

4.14.5 Checking the gear fixing

Regularly check to make sure the screws are tight in accordance with the maintenance schedule (3) **(Fig. 311)**.

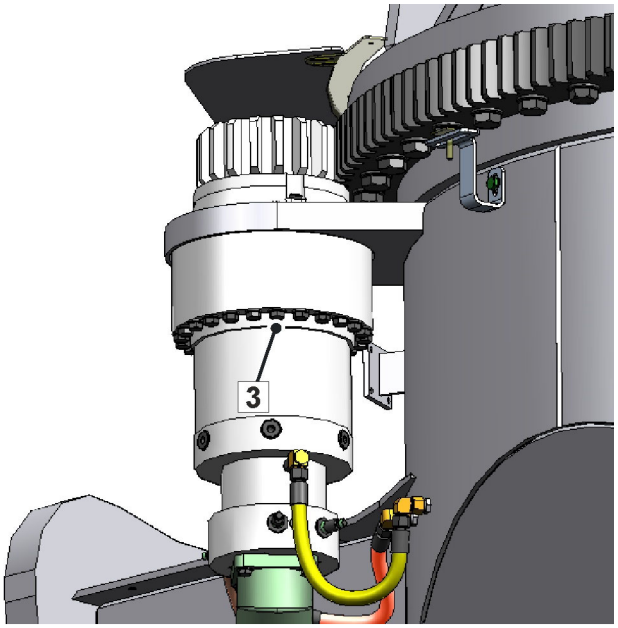


Fig. 311 Checking the fastening

4.14.6 Slewing gear type 1 maintenance interval

4.14.6.1 After the first 150 operating hours

1. Check the magnetic closing screw plug on the gear for metal residue (3) **(Fig. 309)**. In the event of large amounts of metal residue on the magnetic closing screw plug, contact Schwing's customer service
2. Clean the surface of the gear and the vent openings.
3. Change the gear oil the first time, see Chapter **(4.14.7.2)**.
4. Check to make sure that all of the screws are tight and tighten them if necessary.

4.14.6.2 ¼ annually or every 500 operating hours

1. Check the oil level on the lock (1) **(Fig. 309)**.
2. Check all of the seals for possible leaks.

- If any inexplicable leaks are discovered, report them to SCHWING's customer service.

3. Check to make sure that all of the screws are tight and tighten them if necessary.

4.14.6.3 Every 2000 operating hours or at least once per year

1. Clean the surface of the gear and the vent openings.
2. Check to make sure that all of the screws are tight and tighten them if necessary.
3. Change the gear oil (only for mineral oil).

4.14.7 Slewing gear type 1 maintenance tasks

4.14.7.1 Checking the oil level

Check the gear oil level monthly or before recommissioning.

Check oil level while the gear is cold, in addition:

1. Place machine in a horizontal position.
2. If applicable, open the maintenance flap above the gear.
3. Remove the oil dipstick along with the vent filters (1) **(Fig. 309)** and wipe off with a cloth.
4. Screw in the dipstick by hand, then remove again and read the oil level.

5. If necessary, top up gear oil via the dipstick opening up to the upper mark on the dipstick.
6. Clean the vent filters with a cleaning agent, mount the oil dipstick and close the maintenance flap.

4.14.7.2 Changing the oil

1. Drain the oil while the gear is still warm immediately after shutting down the machine.
2. If the ambient temperature is low, flush the gear with a little bit of new oil in order to rinse out any dirt and dust.
3. To eliminate negative pressure, remove the oil dipstick with vent filters (1) **(Fig. 309)**.
4. Place a sufficiently large receptacle under the oil drain screw to catch the old oil.
5. Remove one of the oil drain screws (4) **(Fig. 309)** in order to drain the oil. The old oil drains off into the receptacle.
6. Thoroughly clean the oil drain screw.
7. Control the condition of the sealing ring.
8. Replace the sealing ring if it is worn out.
9. Screw in the oil drain screw (4) **(Fig. 309)**.
10. Fill with oil up to the middle of the mark "MIN/MAX".
11. Screw the oil dipstick with vent filters (1) **(Fig. 309)** back in.

Information

During each oil change, we recommend examining an oil sample for discolouration and solid particles in order to initiate appropriate measures for preventive maintenance.

4.14.8 Slewing gear type 2 maintenance interval

4.14.8.1 After the first 150 operating hours

1. Check the magnetic closing screw plug on the gear for metal residue (1) **(Fig. 312)**. In the event of large amounts of metal residue on the closing screw plug, contact Schwing's customer service
2. Clean the surface of the gear and the vent openings.
3. Change the gear oil the first time, see Chapter **(4.14.9.1)**.
4. Check to make sure that all of the screws are tight and tighten them if necessary.

4.14.8.2 ¼ annually or every 500 operating hours

1. Check the oil level on the lock (3) **(Fig. 310)**.
2. Check all of the seals for possible leaks.

- If any inexplicable leaks are discovered, report them to Schwing's customer service.

3. Check to make sure that all of the screws are tight and tighten them if necessary.

4.14.8.3 Every 2000 operating hours or at least once per year

1. Clean the surface of the gear and the vent openings.
2. Check to make sure that all of the screws are tight and tighten them if necessary.
3. Change the gear oil (only for mineral oil).

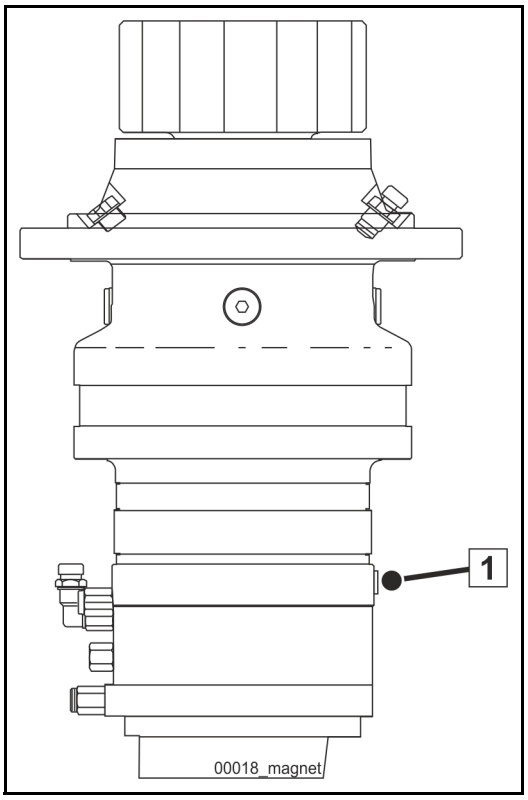


Fig. 312 Magnetic closing screw plug (1)

4.14.9 Slewing gear type 2 maintenance tasks

4.14.9.1 Checking the oil level

Check the gear oil level monthly or before recommissioning.

Check oil level while the gear is cold, in addition:

1. Place machine in a horizontal position.
2. If applicable, open the maintenance flap above the gear.
3. Open the filling pipe (3) **(Fig. 310)**
4. Open the control opening (2) **(Fig. 310)**
5. Fill up with gear oil until oil comes out of the control opening.
6. Close the filling and control opening again.

Clean the vent filters with a cleaning agent, mount the oil dipstick and close the maintenance flap.

4.14.9.2 Changing the oil

It is recommended to change the gear oil while it is still warm. In other words, shortly after operation.

After each oil change, check the oil level the first time the gear is operated. Top up the oil if necessary.

Information

Mixing old oil with other waste is prohibited by law.

Dispose of old oil properly in accordance with applicable legal requirements.

1. Place the machine in a horizontal position.

We recommend:

- Unfold the driver's cab to provide for better accessibility
- Have two people remove the cover to avoid possible damage.

2. Remove the slewing ring cover so that the toothed wheels are easily accessible (1) **(Fig. 313)**.
3. Place a sufficiently large receptacle under the oil drain screw to catch the old oil (4) **(Fig. 310)**.
4. Unscrew the lock of the side 90° elbow and clean it (3) **(Fig. 310)**.
5. Unscrew the filler plug using a suitable Allen wrench **(Fig. 314)** + **(Fig. 315)**.
6. Remove the oil drain screw (4) **(Fig. 310)** to drain the oil.
7. Let the oil drain completely (takes approx. 2 hours when oil is cold)
8. Thoroughly clean the oil drain screw.
9. Replace the sealing rings on the screws.
10. Reattach the oil drain screw (4) **(Fig. 310)**.
11. Fill with new gear oil until it is visible on the upper edge of the side 90° elbow (approx. 2.6 litres)

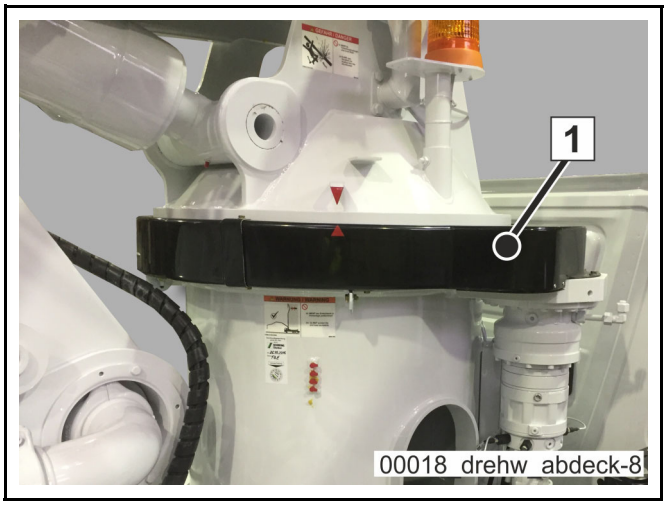


Fig. 313 Slewing ring cover (1)

Fig. 314 Closing screw plug with sealing ring

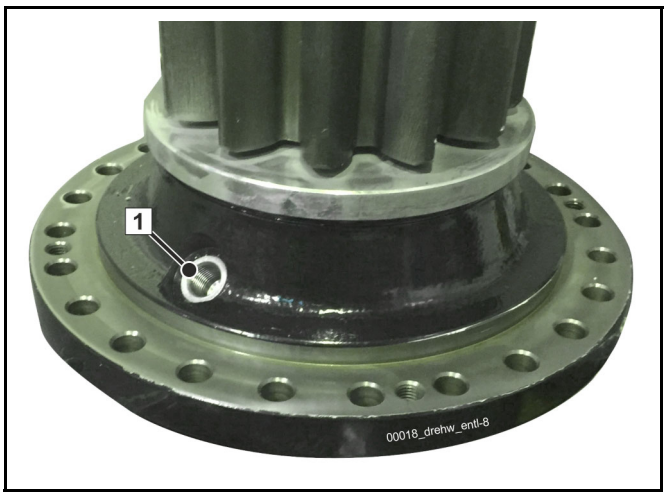


Fig. 315 Oil fill opening (1)

4.15 Support drive of the SX-outrigger (only SX-machines)

This chapter only applies to machines with an SX outrigger.

The bow-shaped drawers of the SX outrigger are moved by a steel cable connected to a wire rope hoist motor (hydraulic motor).

From mid-2019, self-braking wire rope hoist motors will also be installed. For these motors, observe the special procedure for tensioning the rope **(4.15.2)** and the manual release of the brake in the event of hydraulic problems **(4.15.3)**.

The steel cable is self-lubricating. In order to achieve the necessary friction between the cable and rope pulley, no additional lubricants should be applied.

Observe the extension and retraction of the outriggers during operation.

Adjust the tension of the cable if a outrigger does not drive or only drives hesitantly (rope pulley slips).

This may be more common in newer cables than in older (worn or elongated) cables.

a) The cable should be taut on the outside of the drawer **(Fig. 316)**.

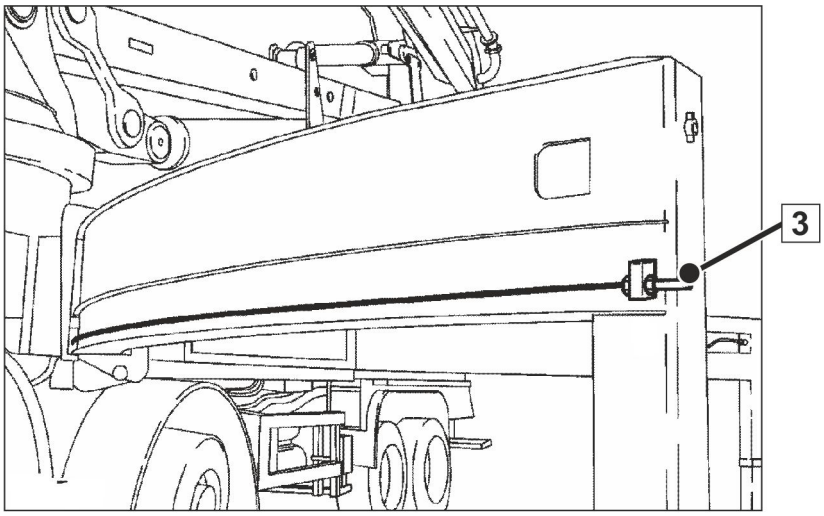
4.15.1 Tensioning the steel cable (wire rope hoist motor without brake)

- Completely extend the bow outrigger
- Retract the bow outrigger halfway in order to move the rope into the neutral position
- Loosen the lock nut on the outrigger head (3) **(Fig. 316)**
- Tighten the adjustment nut (3) as follows:
  (for 8mm ropes = 40-45 Nm,
  for 9mm ropes = 45-50 Nm)
- Tighten the lock nut again
- Retract the outrigger
- Test the outrigger with a test run
- Repeat the procedure until the outrigger retracts correctly again

Applying the torque to one side of the rope is sufficient as the rope tension is distributed evenly onto both ends.

Information

Immediately replace damaged or overly stretched cables.



00019-SX-Abstützung-V01-außen

Fig. 316 SX exterior (similar to illustration)

4.15.2 Tensioning the steel cable (wire rope hoist motor with brake)

- Loosen the locking screw (1) **(Fig. 317)** on the one-way restrictor
- Close the one-way restrictor (2) **(Fig. 318)**
- Completely extend the bow outrigger
- Retract the bow outrigger halfway in order to move the rope into the neutral position

Information

By extending the outrigger, the brake of the wire rope hoist motor remains released for approx. 30 min.

Due to internal leaks, the outrigger must be retracted again after 30 min., so that the brake of the wire rope hoist motor remains released and the steel cable can be adjusted.

- Loosen the lock nut on the outrigger head (3) **(Fig. 316)**
- Tighten the adjustment nut (3) as follows:
  (for 8mm ropes = 40-45 Nm,
  for 9mm ropes = 45-50 Nm)
- Tighten the lock nut again
- Release the one-way restrictor (2) **(Fig. 318)** (brake closes and releases again)
- Tighten the locking screw (1) **(Fig. 317)** on the one-way restrictor
- Retract the outrigger
- Test the outrigger with a test run
- Repeat the procedure until the outrigger retracts correctly again

Applying the torque to one side of the rope is sufficient as the rope tension is distributed evenly onto both ends.

Information

Immediately replace damaged or overly stretched cables.

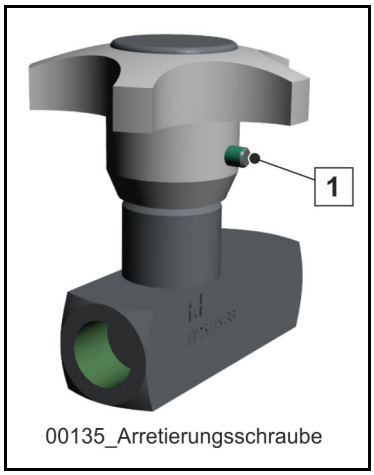


Fig. 317

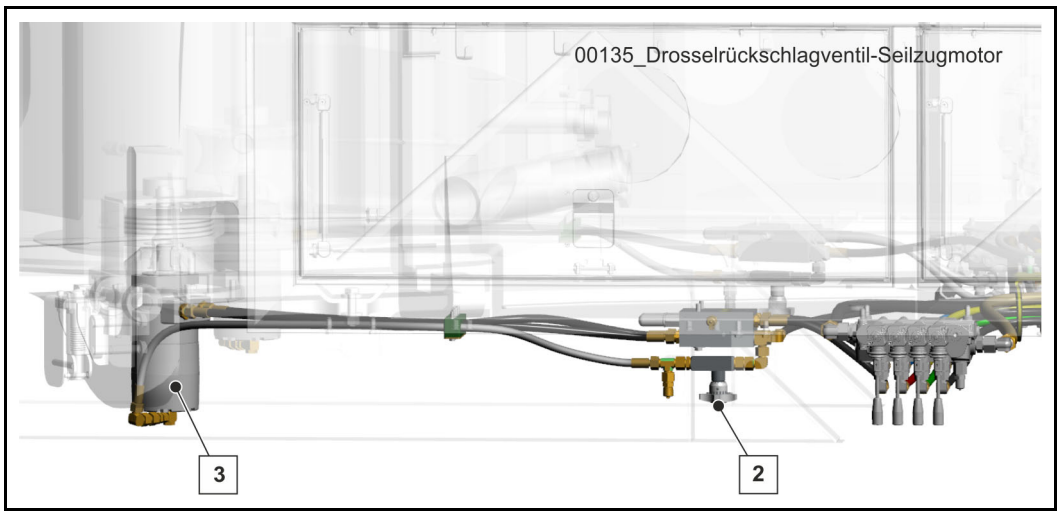


Fig. 318 Wire rope hoist motor (3) with one-way restrictor (2)

4.15.3 Manually loosen the brake of the wire rope hoist motor

The brake of the wire rope hoist motor is spring-centred. If there is a defect in the hydraulics, the brake will be applied automatically. The brake can be released manually. Perform the following steps to release the brake.

➤ Remove the blanking plugs from the openings (1) **(Fig. 320)** to manually release the brake.

Information

Hydraulic oil can leak from the openings of the wire rope hoist motor.

Put an oil drain pan under the wire rope hoist motor.

- Tightly screw screws 10-24 UNC 2B (1) **(Fig. 319)** from the tool set into the openings.
- Mount washers (2) and nuts (3) **(Fig. 320)** on the screws.
- Tighten the nuts alternately (no more than one turn respectively) to release the brake.
- Remove the screws again after troubleshooting!

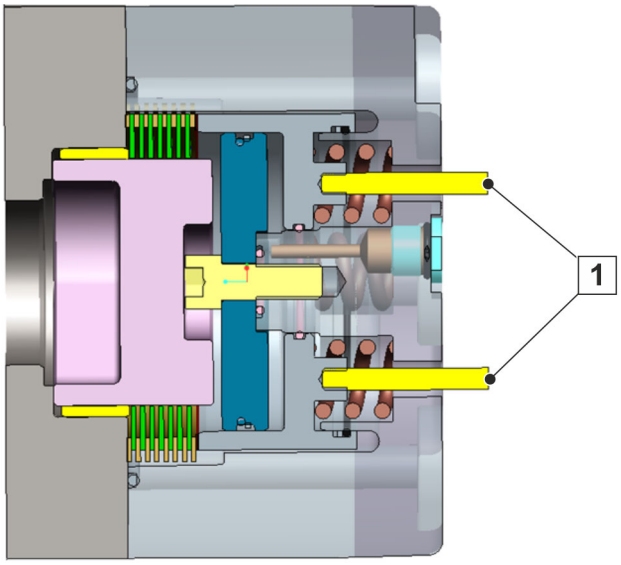


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Fig. 319 Screw assembly (1) after releasing the brake

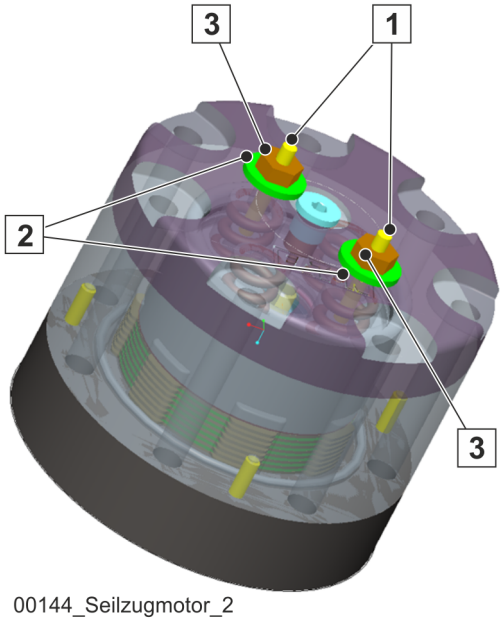

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Fig. 320 Nuts (3) and washers (2) for releasing the brake

4.16 Rock valve maintenance

Danger!

Risk of being crushed and sheared!

To prevent unwanted working movements prior to working on the rock valve, always follow the points below!

- Switch off the drive motor and prevent it from starting up.
- Switch off concrete pump and agitator.
- Do not reach into the gate valve while the drive motor is running.
- Discharge the pressure accumulator, if applicable.

4.16.1 Lubricating the bearing points

Concrete pumps without central greasing have a central greasing strip, see examples **(Fig. 321:)** and **(Fig. 322:)**.

The grease nipples on this strip are connected to the bearing points of the rock valve.

Bearing points include:

- Slewing shaft
- Slewing cylinder
- Agitator

Depending on the type of rock valve, the number of grease nipples can vary. Additional grease nipples are located on the greasing strip for the mixer bearing in truck mixer concrete pumps.

Lubricate all grease nipples daily on the greasing strip. Lubricate more frequently during continuous operation, at least every 8 hours:

Lubrication procedure:

➤ Clean the lubrication point.

➤ Remove the protection caps from the grease nipples.

➤ Press grease into each grease nipple until the old grease emerges from the bearing point.

➤ Wipe off old grease with cleaning rags. Dispose of grease and cleaning rags properly.

➤ Reattach the protection caps.

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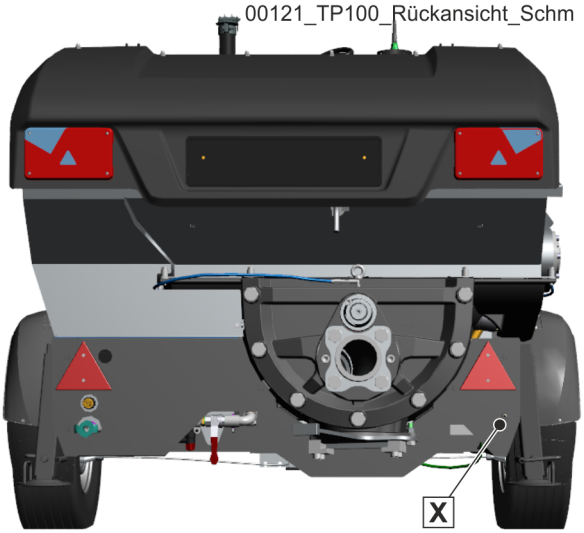

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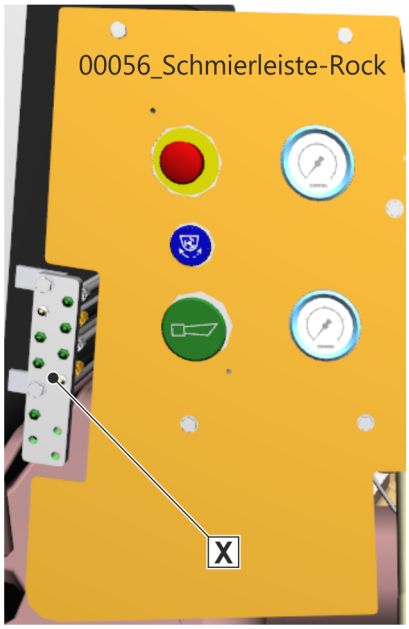

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Fig. 321: Greasing strip on stationary concrete pumps / trailer pumps (X)

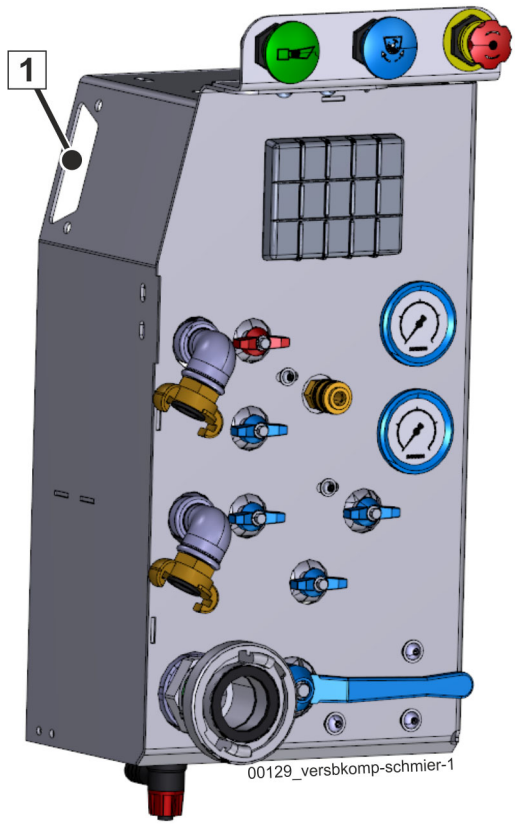


Fig. 322: Greasing strip on truck-mounted concrete pumps

Information

In various pumping units, the swivel head of the rock valve is powered by the mounted ball bearing of the hydraulic cylinder.

Cylinders with unilateral and bilateral ball bearings are allowed.

The appropriate lubrication points are connected to the lubrication point (or the central greasing) through the greasing lines.

The additional grease nipples, e.g. (1) **(Fig. 323)** do not have to be lubricated!

They are used to press out the ball socket during repair work.

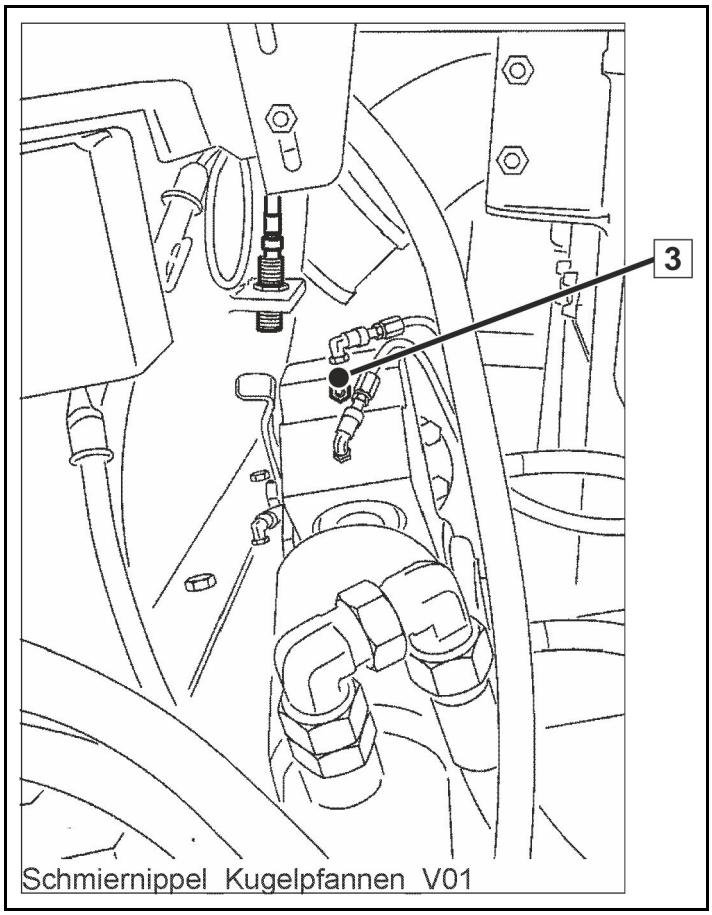


Fig. 323

4.16.2 Checking the screw-type connections

Regularly make sure that the cover screws (14) and clamping screws on the swivel head (15) are tight, in accordance with the maintenance schedule **(Fig. 324)**.

If necessary, tighten screws using a torque wrench in accordance with the torque table in the preface of the spare parts catalogue.

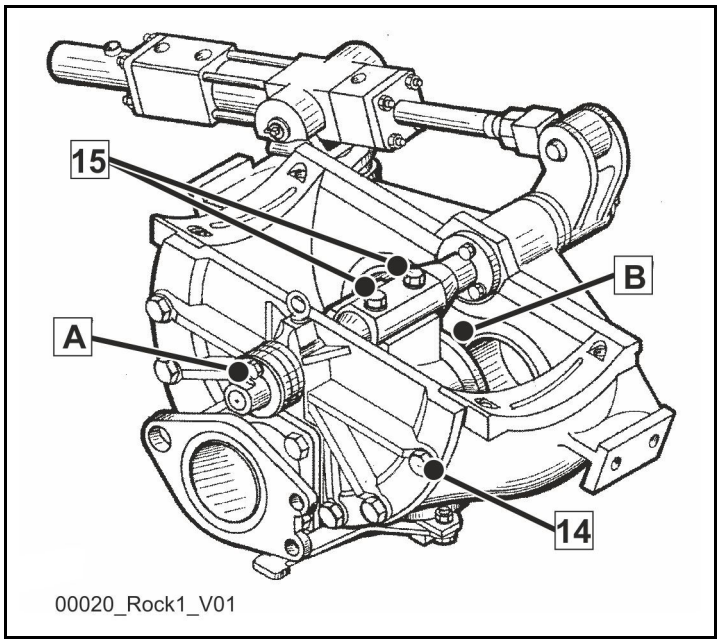


Fig. 324 Example

Caption (Fig. 324)	
Pos.	**Designation**
A	See detailed view **(Fig. 325)**
B	See detailed view **(Fig. 326)**
14	Cover screws
15	Clamping screws

4.16.3 Checking the axial play of the slewing shaft

No air gap may be visible between the bearing bushing (4), the locking wheel (2) and the adjusting nut (1) **(Fig. 325)**, even during operation.

There must be a measurable distance of distance of 1.5 to 3.0 mm between the swivel head (rock) (5) and housing lining (6) while the kidney seal (7) is in contact with the housing lining (6) **(Fig. 326)**.

Metallic contact between the swivel head (rock) and housing lining is an indication of an error, for example:

- Kidney seal (7) defective.
- Adjusting nut (1) too tight.
- Cutting ring jammed.
- Too much grease was used during assembly or parts were not cleaned carefully.

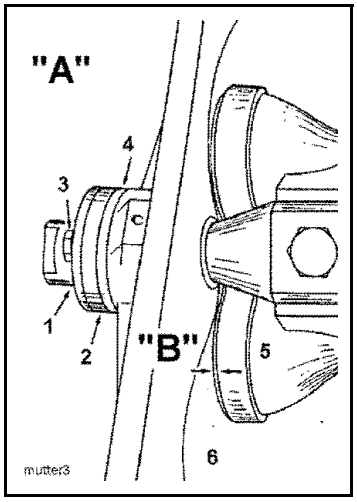


Fig. 325

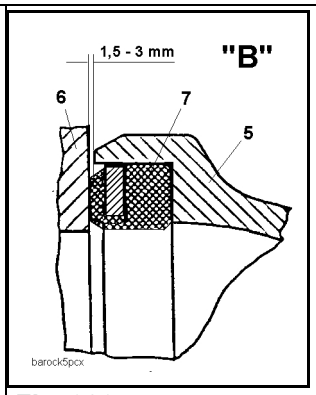


Fig. 326

Caption for (Fig. 325) and (Fig. 326)	
Pos.	**Designation**
1	Adjusting nut
2	Locking disc
3	Safety screw
4	Bearing bushing
5	Swivel head (rock)
6	Housing lining
7	Kidney seal

4.16.4 Configuring the axial play of the slewing shaft

- Remove safety screw (3) **(Fig. 325)** together with disc.
- Set distance "B" = 1.5 to 3.0 mm using the adjusting nut (1).
- Align the bore in the collar of the adjusting nut with the nearest threaded bore in the locking disc (2) (rotate the nut forward or backward).
- Attach safety screw (3) with disc.

4.16.5 Checking the cutting ring

The cutting ring and wearing insert on the housing lining are worn unevenly due to external influences (e.g. varying types of concrete) and different stresses in sub-areas (area "B", **(Fig. 324)**).

Grooves are caused primarily by friction and breaking of stones.

Information

Grooves are irrelevant as long as the wearing insert is not fully worn.

A one-piece wearing insert (9) **(Fig. 327)** made of white cast iron is used as standard.

A two-piece wearing insert (9) **(Fig. 328)** made of white cast iron with an appropriate support plate is available as special equipment.

In order to achieve an even wear pattern and thus considerably longer service lives of the parts, we recommend:

- After a thorough cleaning, bring the rock into the left and right end position and check the condition of the cutting ring and wearing insert along the entire perimeter of the cutting ring in accordance with the maintenance schedule.
- If a visible gap has formed between the cutting ring (10) and the wearing insert (9) (max. allowed 1.0 - 1.5 mm), rotate the cutting ring 90°.

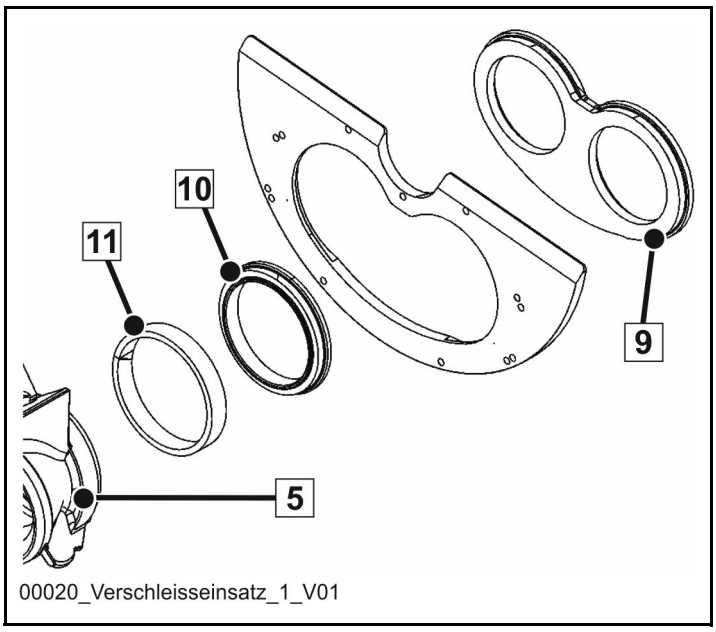


Fig. 327

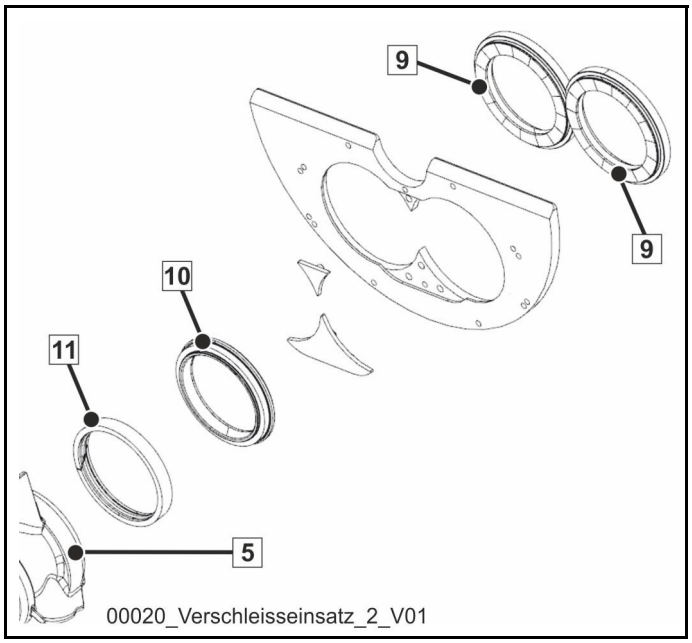


Fig. 328

4.16.6 Rotating the cutting ring

In order to be able to rotate the cutting ring, proceed as follows:

➤ Disconnect the pumping line from the outlet of the rock valve. To do this:

a) Remove the tapered tube for stationary concrete pumps.

b) Remove the wedges (1+2) and the coupling (3) for truck-mounted concrete pumps.

➤ Swivel the outlet for the boom (4) to the side and secure with a wedge (1), **(Fig. 329)**.

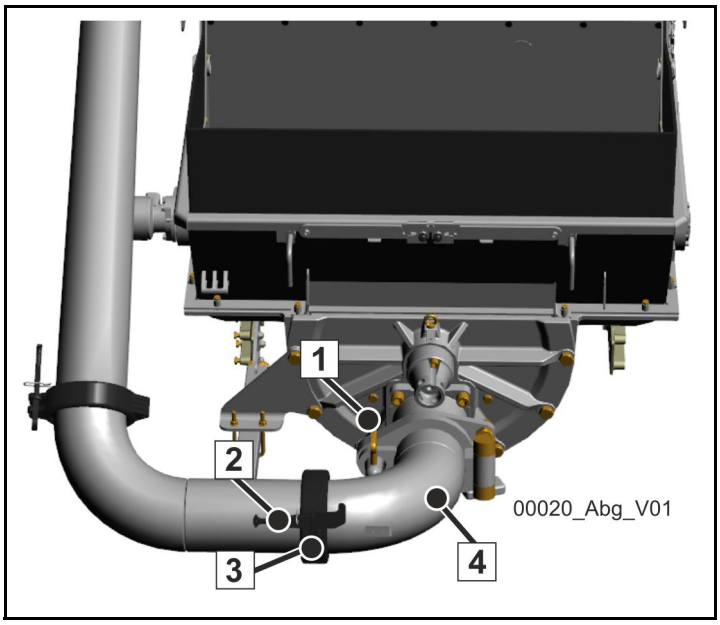


Fig. 329

- Loosen the adjusting nut (1) **(Fig. 330)** by two to three turns.
- Loosen the cover screws (14) evenly by approx. two to three turns to release the pressure spring in the cutting ring.

Caution!

Danger of crushing and breakage!

If you were to remove the cover screws completely, the heavy steel cover would fall off.

This can cause personal injury and material damage!

Do not unscrew the cover screws completely!

- Press off the cover of the housing using two assembly levers until it hits the loosened screws; there are press-off points (arrow) **(Fig. 330)** located on the top cover for this purpose.
- Retract the swivel head (rock) until the cutting ring is released. If the cutting ring is not exposed yet, then loosen the cover screws some more and repeat the process.
- Loosen the cutting ring, if necessary, by tapping on it lightly.
- Rotate the cutting ring 90°.

Information

Always rotate the cutting ring into the same direction!

- Make sure that the cutting ring is guided securely by the rock and cannot fall out or tilt.
- Also make sure that no stones etc. are trapped between the individual components when tightening the cover screws.
- Tighten the cover screws (14) evenly and carefully. Make sure that the cutting ring slides into the rock without tilting.
- Gradually tighten all cover screws (14) crosswise using a torque wrench. Observe the proper tightening torque for these screws.
- Set the axial play of the slewing shaft approximately in order to be able to switch through the rock valve for "setting" the parts. To do this, set the adjusting nut (1) into position and loosen it by a ½ turn.
- Dampen the kidney seal with water and switch through the rock valve several times in order for all parts to “set”.

Attention!

Risk of damage!

Do not switch through the rock valve when dry.

- Set the axial play of the slewing shaft as described in chapter **(4.16.4)**.

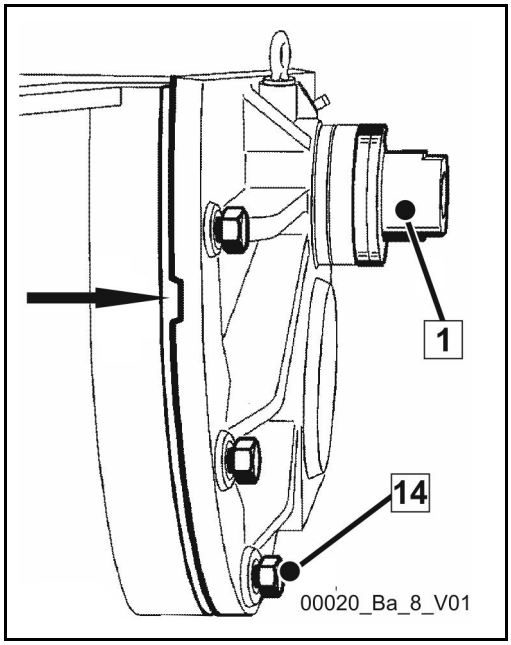


Fig. 330

- Check the distance between the cutting ring (10) and the swivel head (rock) (5) **(Fig. 331)** and **(Fig. 332)** after each rotation.
  If it is more than 8 mm, the cutting ring is no longer guided securely in the rock and must be replaced.
- When replacing the cutting ring, check the condition of the wearing insert (9) and pressure spring (11) **(Fig. 332)**.

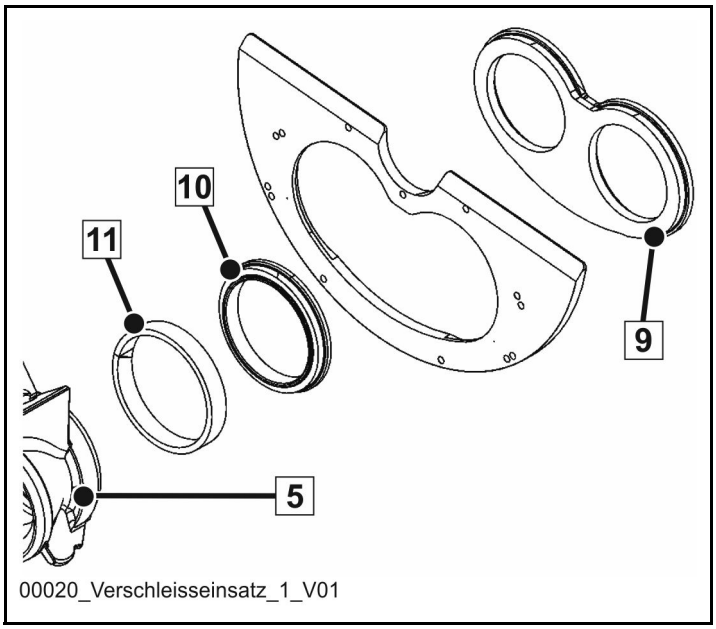


Fig. 331

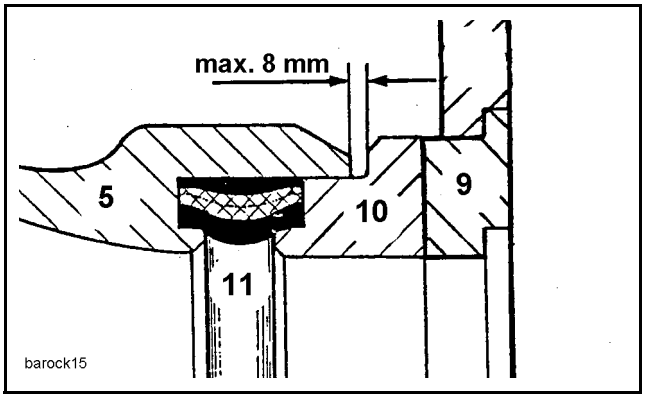


Fig. 332

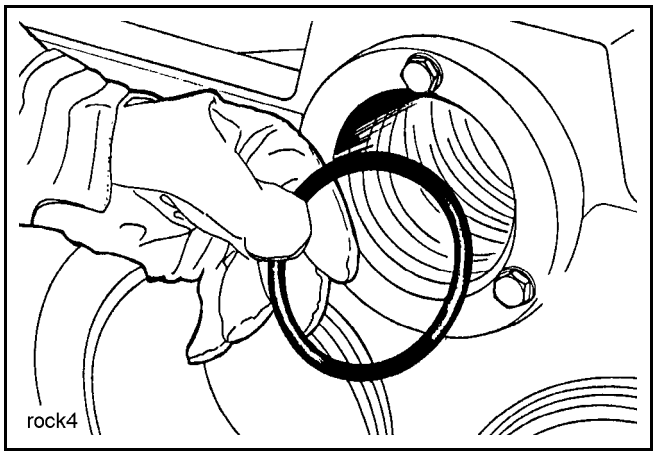


Fig. 333

4.16.7 Checking the seal of the slewing shaft

The bearings of the slewing shaft are sealed against the medium being pumped with 0-rings **(Fig. 333)**.

In the event of leaks, replace the 0-rings (super-fine concrete components penetrate outwards through the bearing) immediately before the bearing is destroyed.

To do this, the slewing shaft has to be removed, see separate rock valve repair manual.

4.16.8 Prolonged downtime

Should the rock valve not be used for an extended period of time, we recommend lubricating the kidney seal and the housing lining with a lubricating and anti-corrosive agent of specification MIL 907D (e.g. ANTI-SEIZE by LOCTITE).

This agent prevents the seal from "caking".

Attention!

Spray may affect rubber parts!

Do not use a spray.

4.16.9 Checking the wear of the swivel head (rock)

There are two types of swivel head,

- armoured swivel head, see **(Fig. 334)**,
- unarmoured swivel head, see **(Fig. 335)**.

Depending on the type of swivel head, the wear test varies.

The armoured swivel head is serviced by a visual inspection, the unarmoured swivel head is serviced by measuring the wall thickness.

The armoured swivel heads are armoured on the outside and inside by welding to reduce wear.

The way of armouring depends thereby on the rule of thumb from the main fields of application of the individual swivel head.

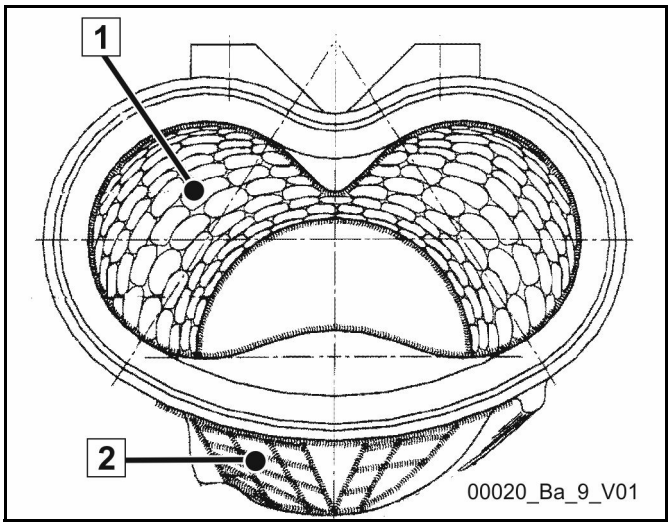


Fig. 334 Armoured swivel head (rock)

Caption (Fig. 334)	
Pos.	**Designation**
1	inner armour
2	outer armour

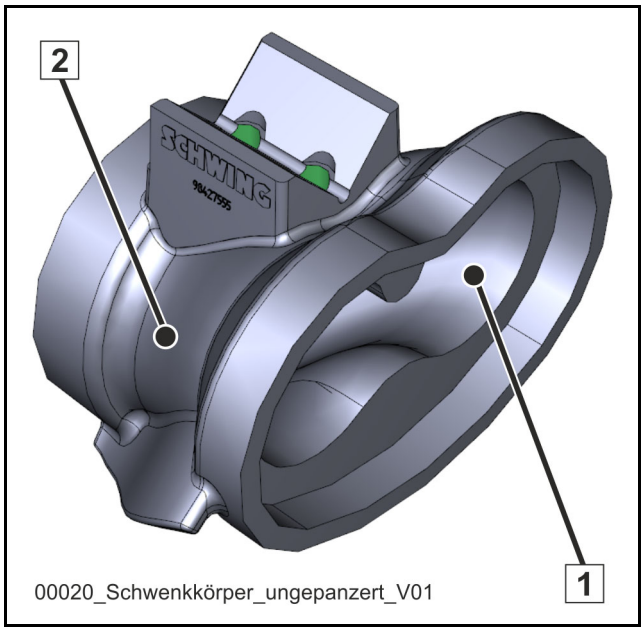


Fig. 335 Unarmoured swivel head (rock)

Caption (Fig. 335)	
Pos.	**Designation**
1	inner wall
2	outer wall

4.16.10 Preventive maintenance of the armoured swivel head (rock)

Since the wear largely depends on the operating conditions, we recommend checking a new armoured swivel head (rock) from the inside for the first time after about 5000 m³ of conveyed concrete:

- ➤ To do so, clean the concrete pump as per usual.
- ➤ Move the armoured swivel head (rock) into an end position.

Danger!

Danger of crushing and injury caused by switching rock valve!

Switch off the drive motor and empty the pressure accumulator (if available) to prevent the swivel head (rock) from moving independently.

- ➤ Loosen the outlet and inspect the inside of the armoured swivel head (rock) with a torch.
- ➤ Move the armoured swivel head (rock) into the other end position and repeat the inspection.

Further inspection intervals can now be determined depending on the condition.

The armoured swivel head (rock) must be replaced if the basic material "shows through" at certain points.

The inner armouring usually wears faster than the outer armouring.

The exterior should be checked as soon as significant wear is detected on the inside.

Information

A regeneration by means of renewed hard facing is no longer possible for the materials currently used!

We strongly advise against unqualified welding and the use of replicas.

SCHWING is not liable for damages caused by improper repair attempts or replicas.

4.16.11 Preventive maintenance of the unarmoured swivel head (rock)

Since the wear largely depends on the operating conditions, we recommend checking a new unarmoured swivel head for the first time after about 5000 m³ of conveyed concrete:

➤ To do so, first clean the concrete pump as per usual.

Danger!

Danger of crushing and injury caused by switching rock valve!

Switch off the drive motor and empty the pressure accumulator (if available) to prevent the swivel head (rock) from moving independently.

The wall thickness measurement (difference between the inner and outer wall) can be carried out with an ultrasonic measuring device or a measuring sensor.

When measuring with a measuring sensor, the cover of the housing must be removed.

Caution!

Risk of injury due to heavy loads!

Use a lifting aid for disassembly.

When removing the housing cover, a bearing of the slewing shaft is removed. Therefore, support the slewing shaft.

The wall thickness must be checked in all areas of the unarmoured swivel head. Replace the swivel head if the minimum wall thickness of 7.5 mm is reached at one point.

Further inspection intervals can now be determined depending on the condition.

4.17 Maintenance of pumping and differential cylinders, pumping piston change

The machine is equipped with a control station for the pumping piston change. For detailed descriptions of operating in “Pumping piston change” operating mode, refer to the chapter on the control system. Valuable practical advice in video format can be easily obtained by scanning a QR code or directly on YouTube.

Danger!

Risk of being crushed and sheared by moving machine parts in the water box!

Serious injuries or death due to crushing.

Do NOT reach into the water box when the machine is running. Before working in the water box, always switch off drive motor and release pressure accumulator in order to prevent unwanted working movements of the concrete pump.

4.17.1 Check fixing of pumping piston

- Take the top cover off of the water box and remove the protective grills.
- Move an intermediate piece into the water box.
- Drain the water.
- Make sure the fastening screws are tight **(Fig. 336)**.
- Move the second intermediate piece into the water box and repeat the check.

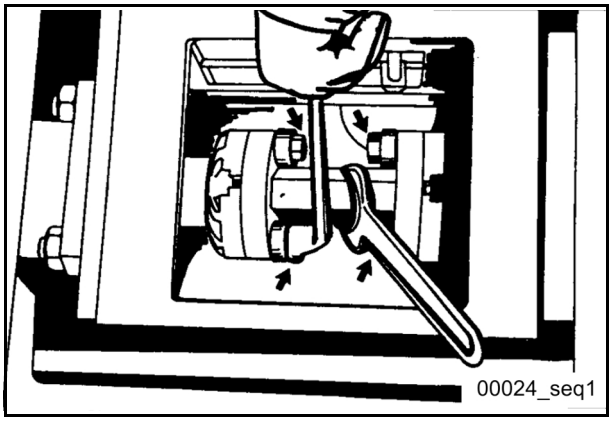


Fig. 336 Piston change

4.17.2 Changing the pumping piston

Attention!

Material damage caused by leaking pumping pistons!

Sand in the water box is a sign of worn pumping pistons. Leaking pumping pistons can damage the pumping cylinder.

Replace the pumping pistons and possibly the pumping cylinder.

Caution!

Risk of injury due to excessive component weight!

Components can cause injuries during disassembly due to excessive weight.

Only remove heavy components with a lifting aid.

4.17.2.1 Removing the pumping pistons

- Close the stopcock (1) **(Fig. 337)** on the concrete pump control block. Closing the ball valve prevents the piston rods from switching into their end positions.
- Remove the cover from the water box.
- Drain the water.
- Move the piston to just in front of the rear end position. The distance piece **(Fig. 338)** must be fully visible in the water box.
- Loosen the fastening screws on the distance piece and remove them. While doing so, hold the distance piece on the continuous hexagon **(Fig. 339)**.
- Move the piston rod into the rear end position.
- Remove the distance piece **(Fig. 340)**.
- Slowly move the piston rod onto the pumping piston.
- Connect the piston rod flange (1) to the pumping piston flange (2) using a screw and nut as shown in **(Fig. 341)** / **(Fig. 342)**.

Information

(Fig. 342) depicts the “Multi-piece” variant.

- Tighten the screws by hand.
- Slowly retract the piston rod.
- Pull the piston out of the cylinder **(Fig. 342)**.
- Loosen the screw connection.
- Remove the pumping piston from the water box.
- Clean and check all parts.

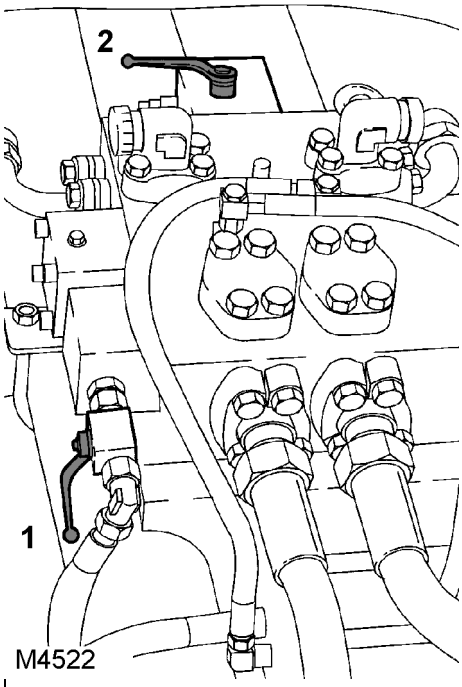


Fig. 337

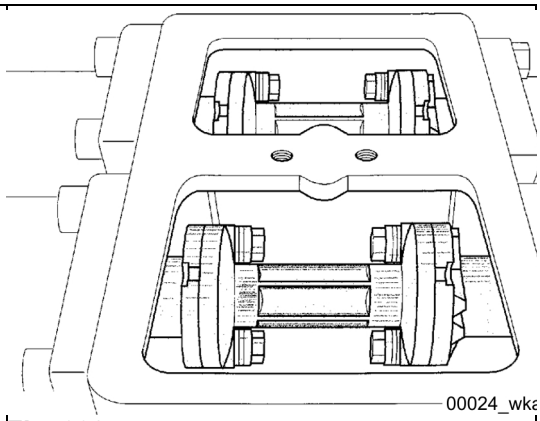


Fig. 338

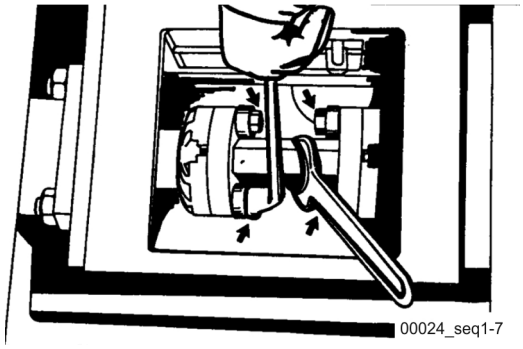


Fig. 339

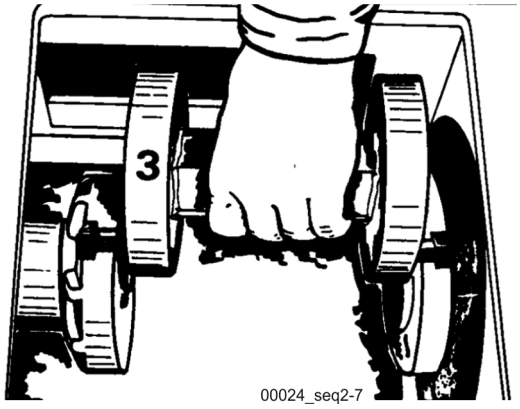


Fig. 340

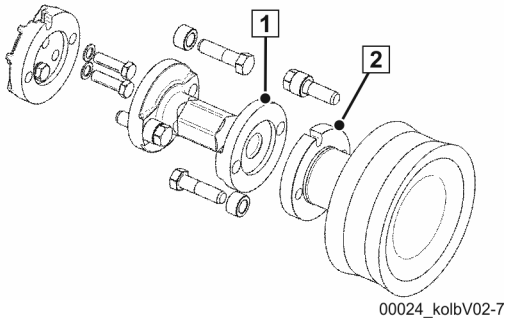


Fig. 341

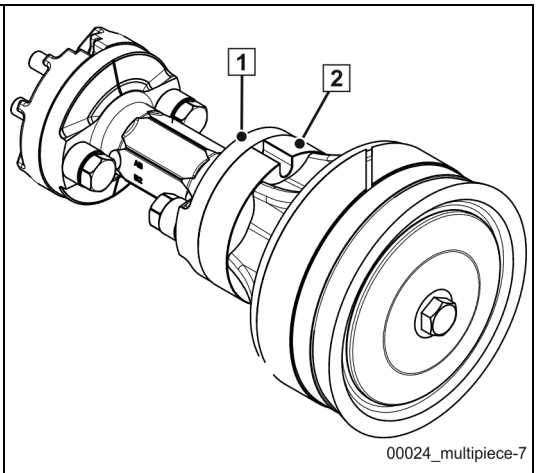


Fig. 342 Multi-piece

4.17.2.2 Wear parts for “multi-piece” piston

In the event of wear, only the following multi-piece piston parts **(Fig. 343)** have to be replaced:

Sleeve (1) / guide ring (2) / nut (3).

Please refer to your machine’s spare part catalogue for the item numbers required to place the order.

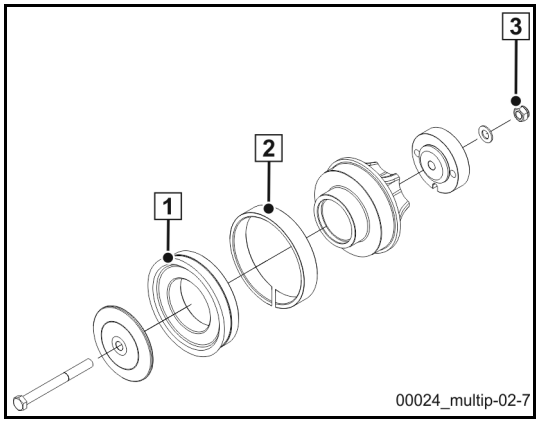


Fig. 343 Multi-piece piston

4.17.2.3 Installing the pumping pistons

- Apply a thick layer of grease to the new piston and cylinder wall.
- Attach the new pistons to the piston rod flange using a screw and nut.
- Move the pumping piston into the cylinder far enough that the screw connection can still be loosened **(Fig. 344)**.
- Remove the screw connection.
- Retract the piston rod.

- Insert the distance piece and screw it onto the pumping piston **(Fig. 345)**.
- Slowly move the piston rod onto the distance piece.
- If necessary, align the distance piece and screw it onto the piston rod.
- Add water.
- Attach the protective grill and the top cover of the water box.
- Open the stopcock **(1) (Fig. 337)** on the concrete pump control block.

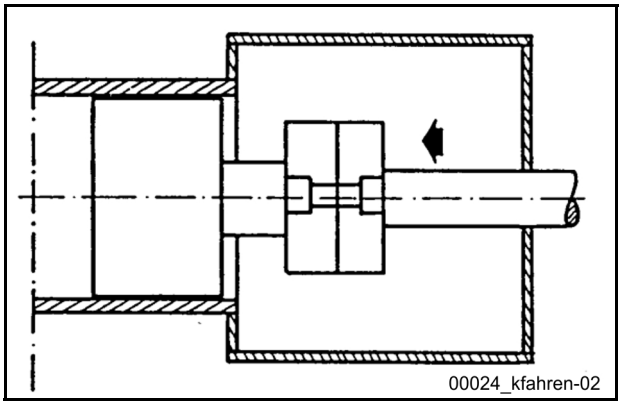


Fig. 344 Retract pumping piston

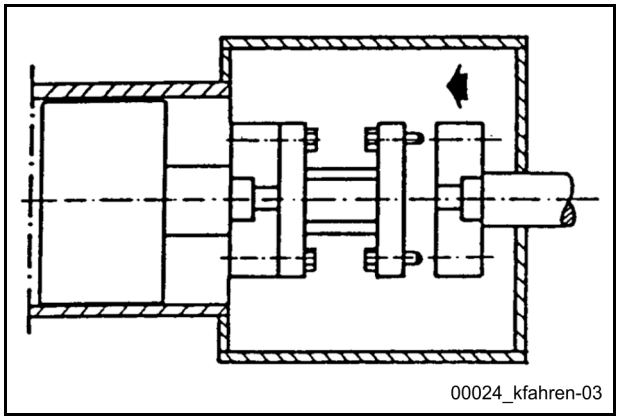


Fig. 345 Insert distance piece

4.17.3 Visual inspection of the pumping and differential cylinder fastenings

If, for example, there is damage to the paintwork on a screw-type connection, this connection must be checked. Have loose fastenings tightened by qualified personnel according to the torque table or inform customer service.

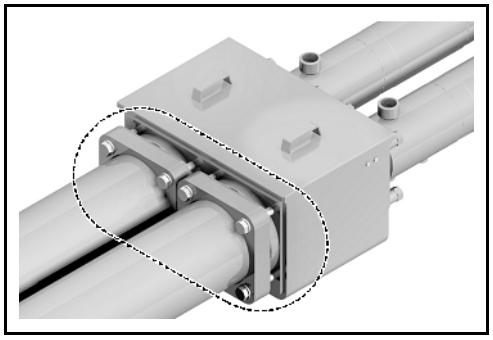


Fig. 346 Fastening screws of the pumping cylinders

➤ Carry out a visual inspection of the fastening of the pumping cylinders.

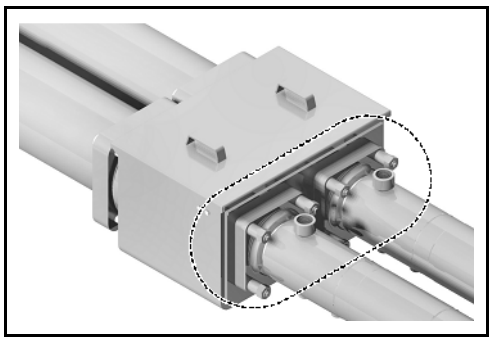


Fig. 347 Fastening screws of the differential cylinder

➤ Carry out a visual inspection of the fastening of the differential cylinders.

Information

Tightening torques!

The relevant tightening torques can be found on the associated spare parts drawing, or if not specified, in the preface of the spare part catalogue.

4.18 Boom column - pivot bearing

4.18.1 Lubricate base and collar bearings, sliding pieces on the rotary drive

Warning!

Danger of crushing!

To better distribute the lubricant:

- Lubricate the parts while the boom is rotating slowly, or
- Slew the boom after lubricating the parts and repeat the process.

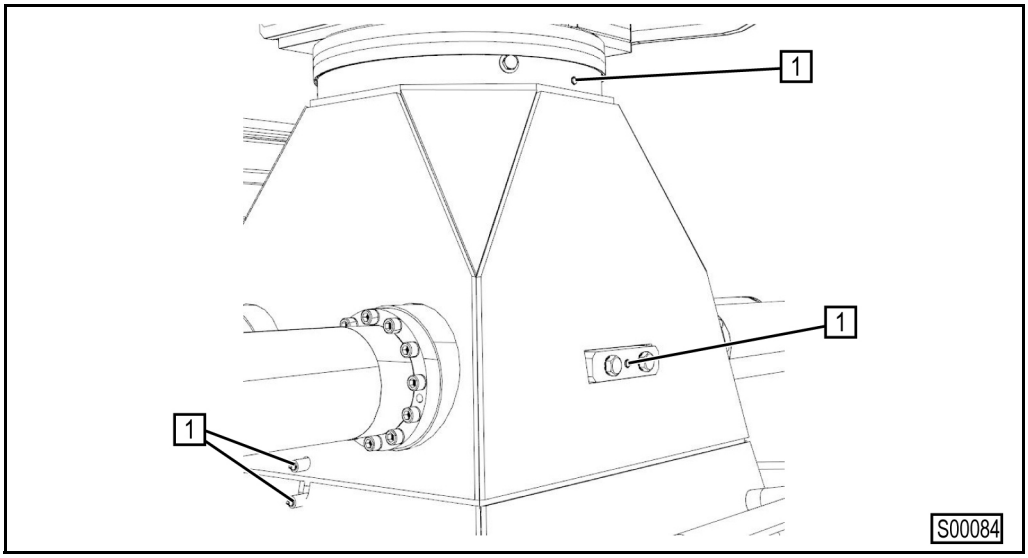


Fig. 348 Grease nipples on boom column

The respective grease nipples are located on the outside of the boom column **(Fig. 348)**.

It is especially important to lubricate the base and collar bearings designed as sliding bearings on a regular basis.

SCHWING recommends a special lubricating grease for severe applications.

In order to prevent outside forces from acting on the bearings, place the boom in a vertical position during the lubrication process.

4.19 Servicing the pumping line

This chapter describes how to service the pumping line on various SCHWING products. The principle remains the same in each case.

Warning!

Risk of the pumping line bursting if the minimum wall thickness is not met!

The pumping line can burst without any external signs or if liquid escapes and seriously injure or kill people.

Check the wall thickness of the pumping line according to the operating instructions. Replace worn pumping line components.

The minimum permissible wall thickness depends on the maximum possible pumping pressure of the concrete pump. Under extreme conditions, a daily check of the wall thickness may be necessary.

SCHWING's customer service can recommend suitable measurement devices depending on the pumping line material being used.

During operation, the operator must monitor the pumping line for leaks (water escaping). Leakages lead to blockages due to the concrete "bleeding" out. Stop operation immediately and remedy leakage.

Attention!

Risk of damage to the pumping line due to tapping with metal objects!

The hardened layer of highly wear-resistant tubes can be damaged. Dents in the pumping line lead to increased wear.

Only use the handle of the hammer to carefully tap the pumping line.

Information

Depending on the installation situation, the wear and tear on the pumping lines can vary greatly.

Check the elbows and reductions under highest strain especially carefully.

Experience has shown that the concrete pump outlet as well as the "impact elbows" on the last section of the boom (see **"Impact bend"** on page 488) wear more quickly than the rest of the pumping line.

Warning!

Injury caused by the cocking lever springing open!

When mounting split couplings, injuries can be caused by the cocking lever springing open unexpectedly. Injuries such as bone fractures to concussions are possible.

Secure the cocking lever of the split coupling immediately after closing the cocking lever.

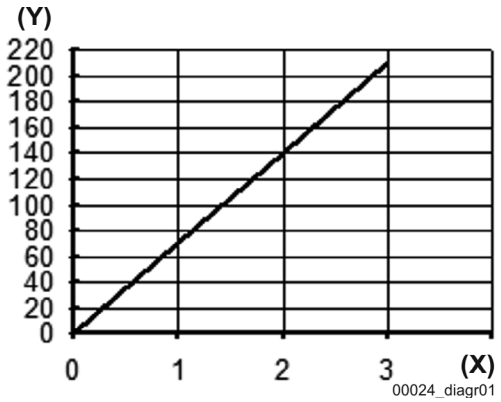
4.19.1 Diagrams

For determining the required minimum wall strengths of concrete pumping lines from P 355 (with prescribed, twofold safety):

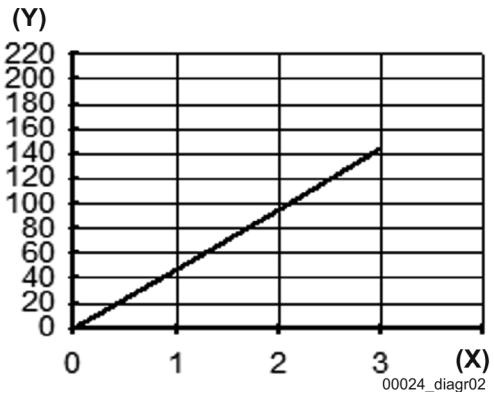
(Y) = Pumping pressure PN in bar

(X) = Minimum wall strength in mm

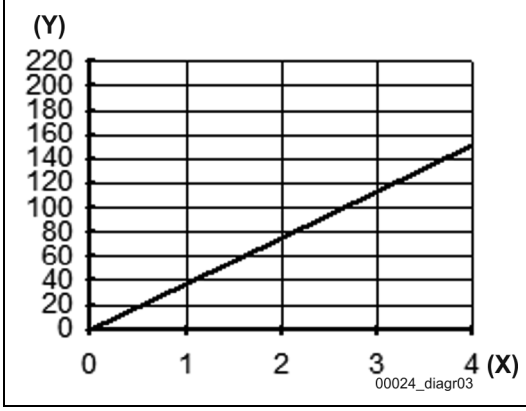
1) Tube 70x2.9



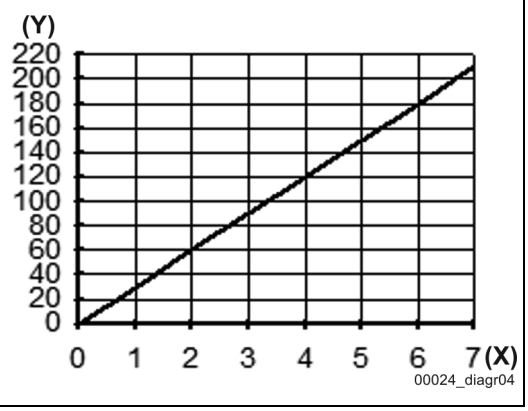
2) Tube 88.9x3.2



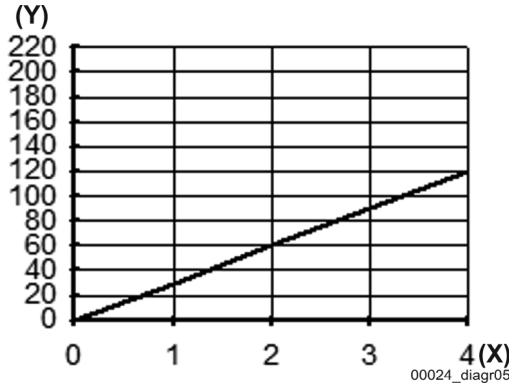
3) Tube 108x4



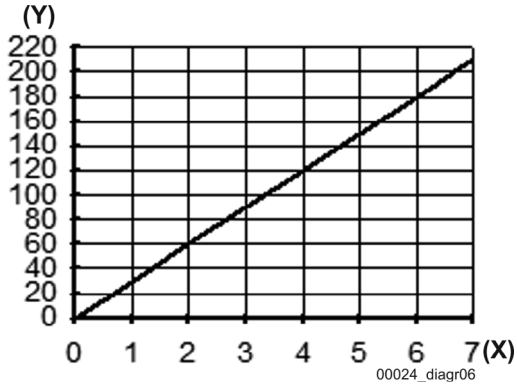
4) Tube 114.3x7.1



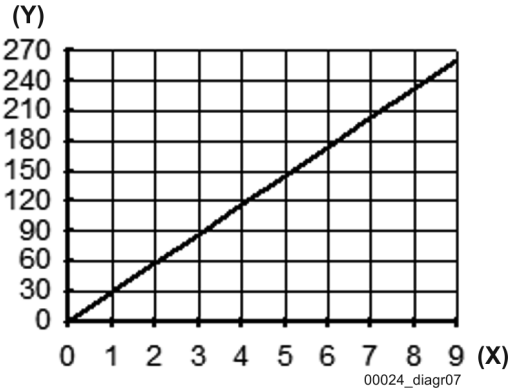
5) Tube 133x4



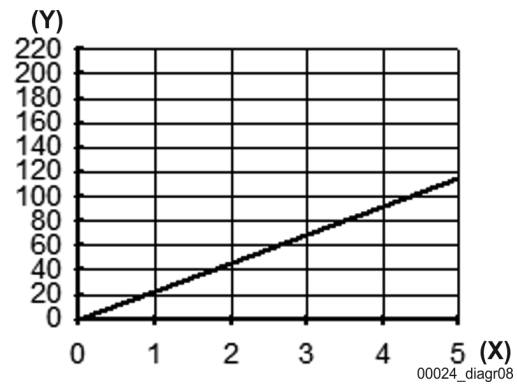
6) Tube 139.7x7.1



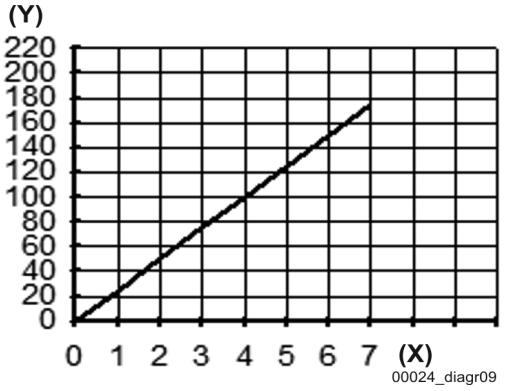
7) Tube 139.7x8.8



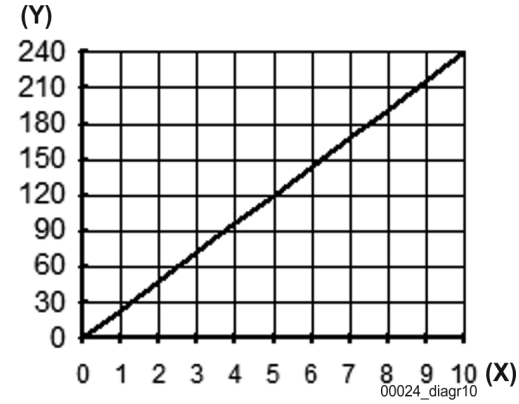
8) Tube 159x4.5



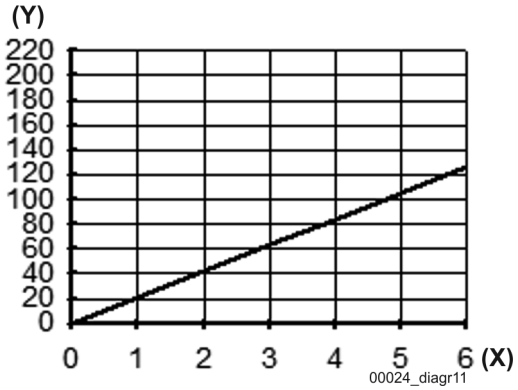
9) Tube 165.1x7.1



10) Tube 168.3x10



11) Tube 191x5.5



4.19.2 Main wear zones

(pay particular attention during inspections)

Pumping pipes

The main wear zone is located in the direction of the flowing concrete approx. 100 mm behind the flange **(Fig. 349)**.

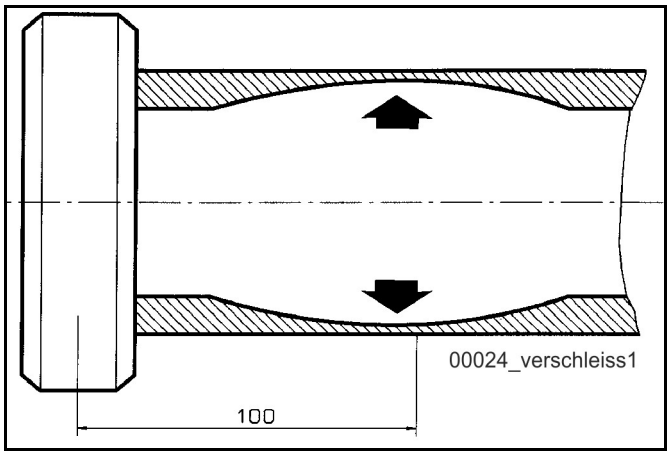


Fig. 349

Elbows

The main wear zone is located in the direction of the flowing concrete in the "inlet bend" **(Fig. 350)**.

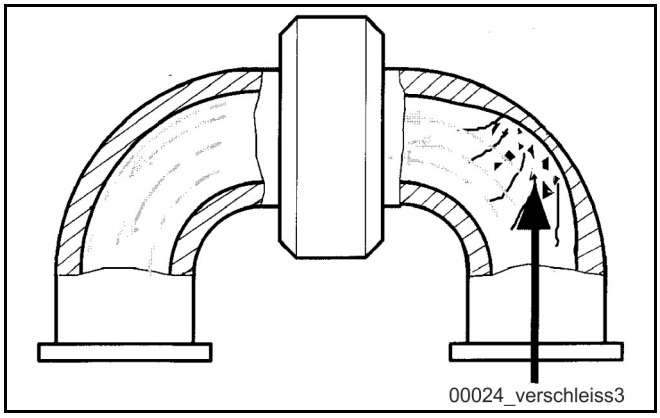


Fig. 350

Two-layer materials

Two-layer materials must be replaced, at the latest, when the inner hardened layer has worn through to the outer layer in places **(Fig. 351)**.

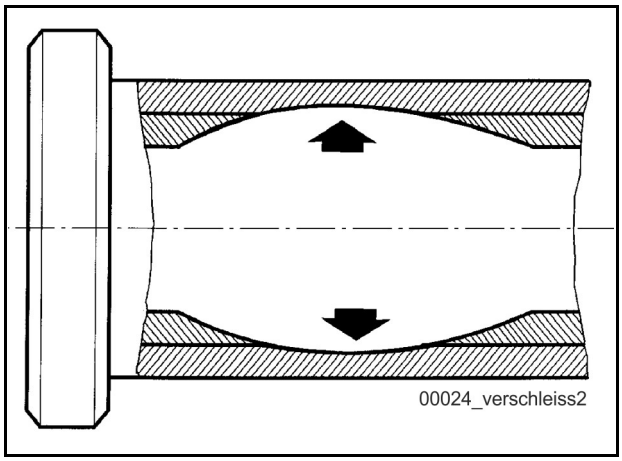


Fig. 351

4.19.3 Impact bend

The impact bend (1) **(Fig. 352)** is the penultimate bend in the boom pumping line.

The concrete frequently falls into this elbow and the impacting material causes so-called impact wear.

Impact wear can be mostly avoided if the last boom section is positioned horizontally during the pumping process **(Fig. 353)**.

Position “1” + “2” = limited impact wear

Position “3” = high impact wear

Measurement points:

Wear measurement is only possible via a regular optical inspection, as the main wear points vary greatly between concrete pumps. Empirical values can be extended individually by the indicated measurement, if necessary **(Fig. 354)**.

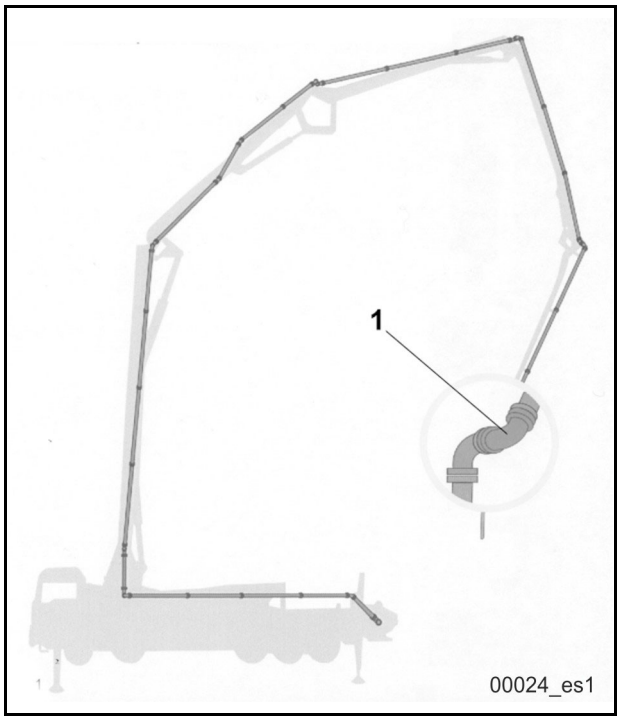


Fig. 352

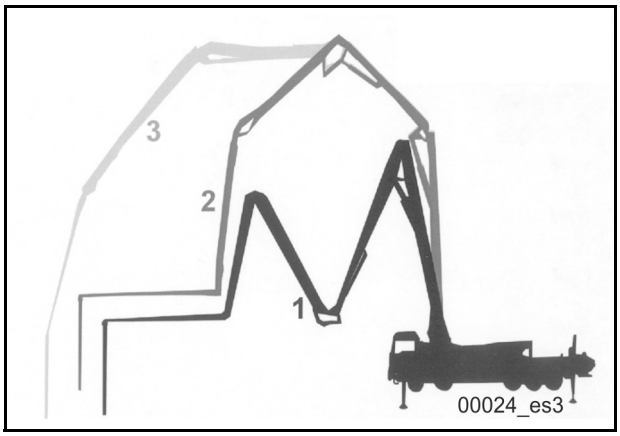


Fig. 353

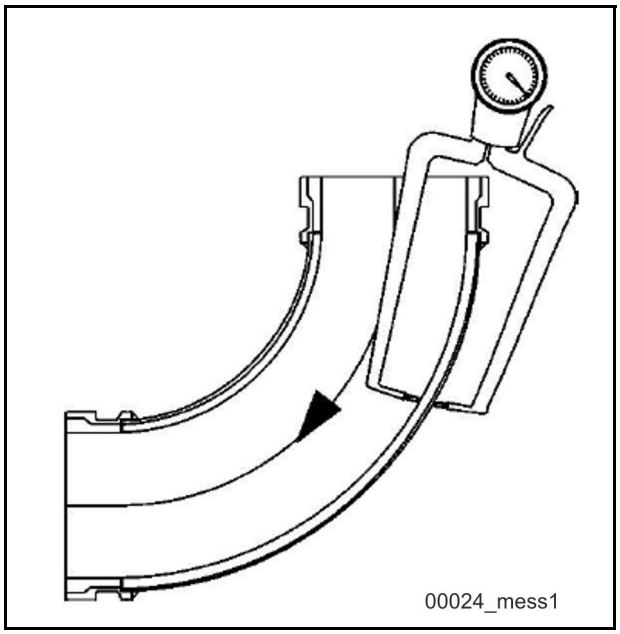


Fig. 354

4.19.4 Measuring the wall thickness

(Excerpts from Sales Booklet Esser ES4045)

The wall thickness of pumping pipes can be measured using a commercial calliper (**(Fig. 355)** company Kroeplin GmbH). Observe the operating instructions from the manufacturer of the measuring device.

Double-walled pumping pipes cannot be measured using ultrasound.

Procedure:

1. Type specification of the pipeline component

Determine which type is available in which quality.

The measurement sheet is selected based on the type. Should you have questions or be missing measurement sheets, please contact SCHWING's customer service.

2. Specification of the installation situation

The respective installation situation is specified on the measurement sheet, according to the installation present.

3. Taking the measurement

Depending on the prescribed measurement methods, the respective minimum wall strengths must be specified.

4. Comparison of indicator values

The measured minimum wall strengths must now be compared with the indicator values taken from the relevant measurement sheets.

5. Decision on further use

If one of the measured values has been reached, then at this critical point the pumping pipe has a remaining wall thickness of 0.5 mm and should be replaced as soon as possible.

Summary

1. Type specification
2. Installation situation
3. Measurement
4. Comparison
5. Decision

Fig. 355

Wall-thickness sensor C3R30 supplied by Kroeplin GmbH

4.19.5 Measurement points for different installation situations

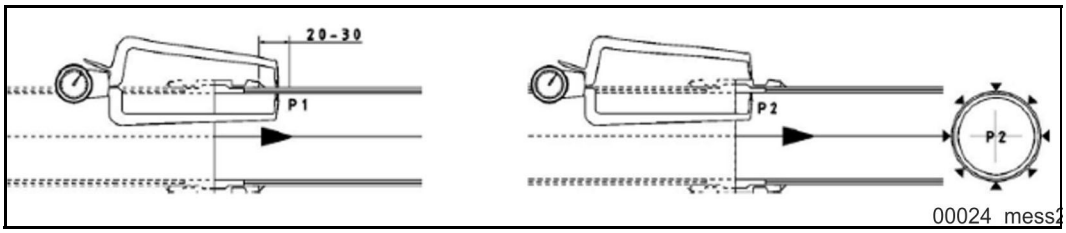
4.19.5.1 Tube after tube

Measurement points:

(P1) approx. 20-30mm behind the welding seam of the inlet flange

(P2) measurement on the shoulder of the inlet flange around the entire circumference.

Set the measuring tip as far on the end of the shoulder as possible, in the direction of the groove.



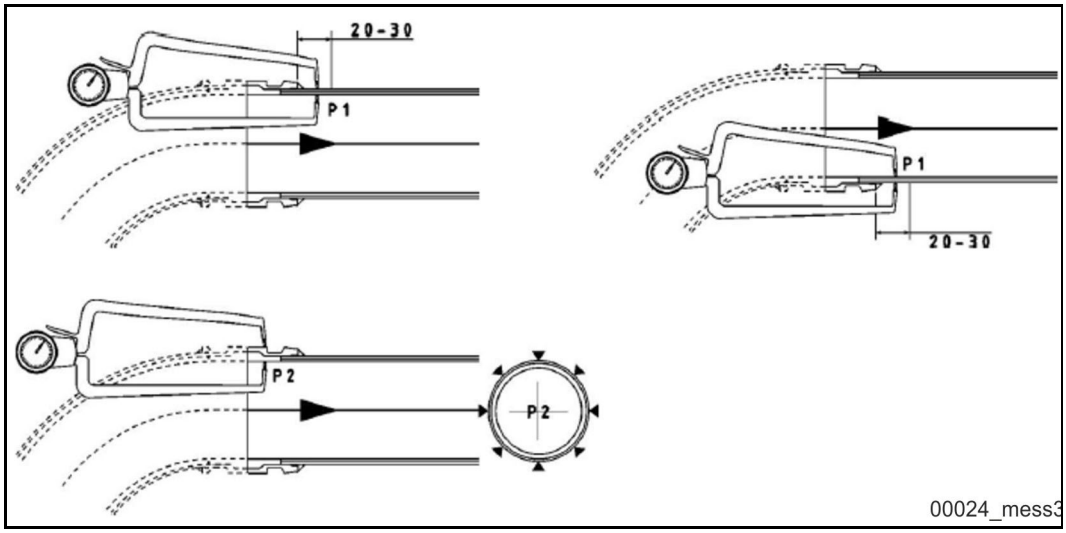
4.19.5.2 Tube after elbow

Measurement points:

(P1) approx. 20-30 mm behind the welding seam of the inlet flange in extension of the elbow inner radius and elbow outer radius.

(P2) measurement on the shoulder of the inlet flange around the entire circumference.

Set the measuring tip as far on the end of the shoulder as possible, in the direction of the groove.



4.19.6 Measurement sheet - tubes

(As of 31/10/2012, excerpt from Esser Sales Booklet EM120029 _ EM130023 DE 141208):

⚠	Removal of the pipe component must be done on reaching a measurement point (P1 or P2) at the latest!			
Type: SUPER 2000 TUBES (ESSER TWIN PIPE 700 TUBES)				
Nominal size DN [mm]	Quality type	Wall thickness [mm]	P1 [mm]	P2 [mm]
100	700	4.0 (2.0+2.0)	2.7	10.2
100	700	7.7 (4.5+3.2)	3.8	10.2
125	700	4.0 (2.0+2.0)	2.7	8.3
125	700	4.5 (2.5+2.0)	2.7	8.3
125	700	8.6 (5.6+3.0)	4.0	8.3

⚠	Removal of the pipe component must be done on reaching a measurement point (P1 or P2) at the latest!			
Type: SUPER 3000 TUBES (ESSER TWIN CAST 900 TUBES)				
Nominal size DN [mm]	Quality type	Wall thickness [mm]	P1 [mm]	P2 [mm]
112	900	2.0+2.0	2.9	15.6
125	900	2.0+2.0	2.9	9.6
125	900	3.0+1.5	2.4	8.8
125	900	5.6+3.0	4.1	8.8

4.19.6.1 Tubes without leg extension

For all elbows of 10° to 90° with standard connection, but without leg extension

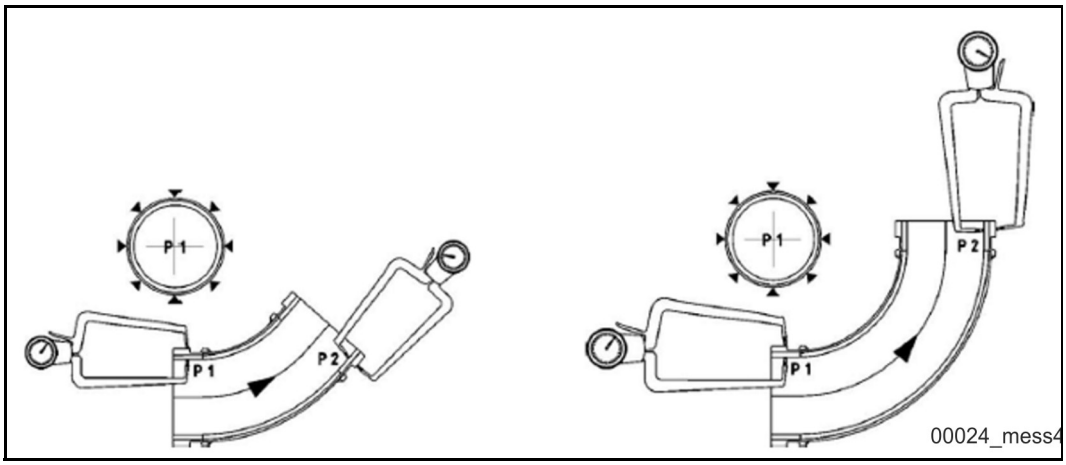
Measurement points:

(P1) measurement on the shoulder of the installation flange around the entire circumference.

Set the measuring tip as far on the end of the shoulder as possible, in the direction of the groove.

(P2) measurement on the shoulder of the outlet flange in extension of the elbow outer radius.

Set the measuring tip as far on the end of the shoulder as possible, in the direction of the groove.



4.19.7 Measurement sheet - elbows

(As of 31.10.2012, excerpt from the Esser Sales Booklet ES4045):

⚠	Removal of the pipe component must be done on reaching a measurement point (P1 or P2) at the latest!

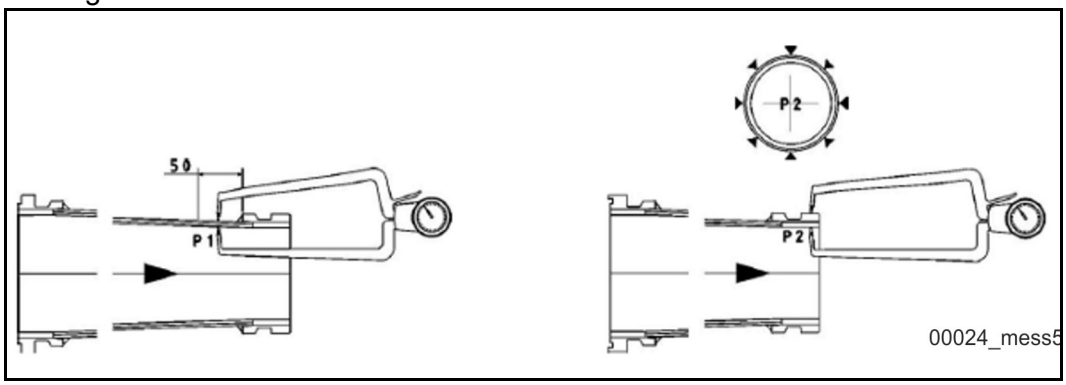
Type: SUPER 2000 ELBOWS (ESSER TWIN PIPE 700 ELBOWS)				
Nominal size DN [mm]	Quality type	Wall thickness [mm]	P1 [mm]	P2 [mm]
100	700	8.2 (5.0+3.2)	10.0	10.0
125	700	10.6 (7.0+3.6) 11.0 (7.0+4.0)	8.0	8.0

4.19.8 Tube type - tapered tubes

Measurement points:

(P1) measurement in the 50 mm area in front of the outlet flange welding seam.

(P2) measurement on the shoulder of the outlet flange around the entire circumference.
Set the measuring tip as far on the end of the shoulder as possible, in the direction of the groove.



4.19.8.1 Measurement sheet - tapered tubes

(As of 31.10.2012, excerpt from the Esser Sales Booklet ES4045):

⚠	Removal of the pipe component must be done on reaching a measurement point (P1 or P2) at the latest!

Type: SUPER 2000 TAPERED TUBES (ESSER TWIN PIPE 700 TAPERED TUBES)					
DN inlet [mm]	DN outlet [mm]	Quality type	Wall thickness [mm]	P1 [mm]	P2 [mm]
125	100	700	8.0 (4.0+4.0)	4.9	10.3
150	125	700	8.0 (4.0+4.0)	4.9	8.7

4.19.9 Extending the service life

Information

Does not apply to directional tubes and elbows!

Directional tubes and elbows may only be installed in the pumping direction. For this purpose, directional arrows are located on the material.

The service lives of conventional (non-directional) tubes and elbows can be extended if the parts are rotated regularly.

- Turn pumping pipes and elbows 180° from the inlet side to the outlet side after 50 % of their expected service life (Fig. 356).

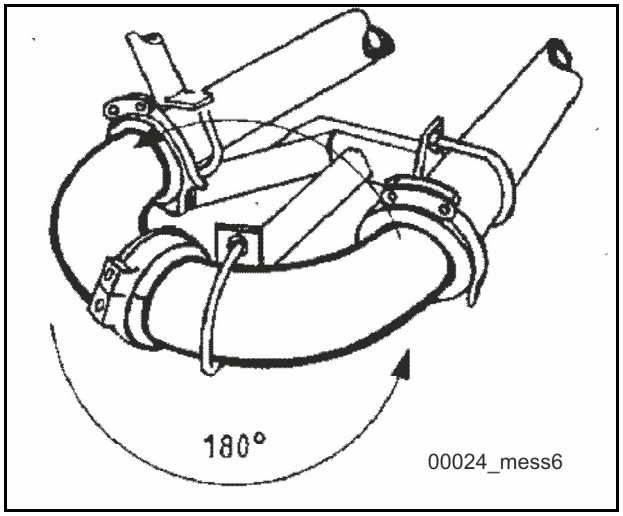


Fig. 356

4.19.10 Replacing pumping pipes end elbows

Information

Directional tubes and elbows may only be installed in the pumping direction.

For this purpose, directional arrows are located on the material.

- Pay attention to the quality and correct size of spare parts.

Only original SCHWING spare parts correspond exactly to the factory-installed parts.

- During the initial assembly at the factory, the boom pumping line is assembled without tension on a folded placing boom.

Incorrect assembly can lead to an increased load on the placing boom kinematics and damage such as broken line holders.

In order to avoid damage, likewise always exchange individual parts on a folded placing boom.

The length of the pipe installed in the pumping line outlet is specified on a sign on the machine **(Fig. 357)**.

When pumping line parts are replaced later on, a different pipe length may be required in some cases. For this reason, always give the required length when ordering.

Caution!

Risk of injury due to excessive component weight!

Components can cause injuries during disassembly due to excessive weight.

Only remove heavy components with a lifting aid.

.Use new seals and fuses for the couplings.

- Clean and check the couplings carefully.
- Lubricate the couplings and seals with a rubber-compatible lubricant, e.g. "Optimol Olit CLS".

“Optimol Olit CLS” is a water-resistant, high-performance grease with a lithium/calcium base.

Information

While being assembled at the factory, the pumping lines are fitted with special web seals. As such, the required precision is achieved when first assembling the pumping line. The centres of rotation for the pumping lines, however, are fitted with simple seals without web. When replacing worn pumping line parts later on, the seals with a web can be replaced with simple seals at all tube connection points.

If you would like to replace multiple parts of the pumping line, replace those parts individually and sequentially.

Do not disassemble the entire pumping line. In this case, the centres of rotation would have to be determined again when installing the new line.

This work should only be carried out by specially trained persons using special equipment.

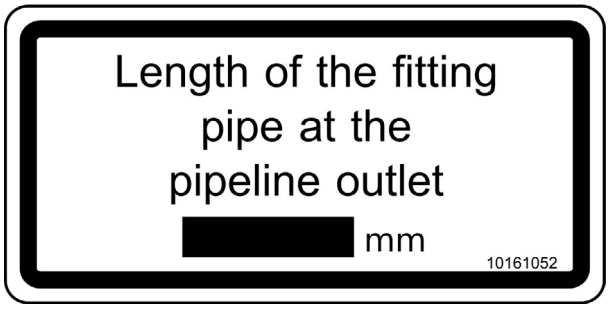


Fig. 357

4.19.11 Testing the pumping hoses

Due to natural ageing, rubber hoses may be 6 years old at most (including a storage time of 2 years).

They must be replaced every 6 years from the date of manufacture, even if they appear “alright” on the surface.

For end hoses and connecting hoses, a daily, external visual inspection is prescribed.

Loose pumping hoses must be tested before every use.

As wear strongly depends on the operating conditions (concrete, pressure, delivery rate, etc.), then the inner side of all new hoses should be tested for the first time after pumping approx. 1000 m³ of concrete:

Plan further tests on the basis of the test results.

4.19.12 Visual inspection (exterior)

- Check the safety catch on one of the placing boom end hoses to make sure it is in proper working order.
- The outlet end of an end hose must not be "frayed".
- Check all pumping hoses for dents, kinks or other deformations that might indicate displaced or destroyed armour hose casing (steel cord insert).
- Check the outer skin for cuts, ruptures or abrasions that could imply damage to the armour hose casing.

Hoses with a damaged casing must be replaced!

4.19.13 Visual inspection (internal)

- Lay the cleaned hose out horizontally and use a pocket torch.
- Pay attention to points at which the armour casing is exposed or protrudes.
- Also pay attention to areas with loose rubber coating, dents, cuts and local wear zones.
- Check the main wear zones on the inlet side of the hose in particular. The heaviest wear is located on the first 30 cm of the rubber coating (behind the fixing).

Hoses with damaged armour casing or excessive wear must be replaced!

4.19.14 Visual inspection of fixings

- Make sure the fixings are tight.

The hose and fixing must be firmly connected together.

- Check the inner sides of the fixings for wear.
- Check the sealing surfaces for damage and clean any concrete residue off of them.

Hoses with damaged or loose fixings (hose creeps out of the fixing) must be replaced!

Information

Take extra care to check end hoses equipped with a non-return valve.

Due to the greater load, check end hoses with a non-return valve **(Fig. 358)** especially carefully in the pressure area of the non-return valve.

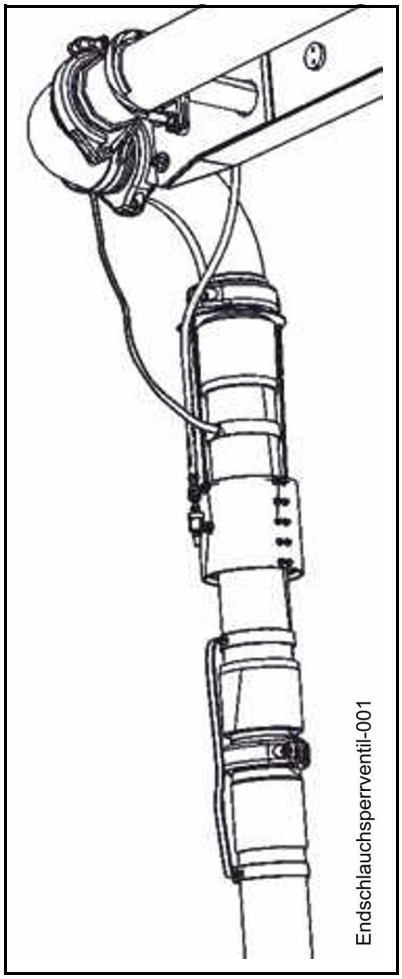


Fig. 358

4.20 Rotary compressor

Attention!

Corrosion due to condensation!

Switching on the compressor once a week for at least 30 minutes continuously.

- Adhering to the maintenance intervals for the compressor.
- Only use original spare parts and the prescribed compressor oil when servicing your compressor.

Our maintenance packages:

10197336 (standard maintenance) and

10170388 (oil separator cartridge)

contain all of the spare parts needed to service your compressor, including the compressor oil.

4.20.1 Maintenance packages

SCHWING provides two different packages with material for servicing your compressor:

4.20.1.1 Maintenance package 1

(Standard maintenance) art. no.: 10197336

This package contains all filters, seals and a reservoir with compressor oil for the maintenance work described below.

The oil quantity is sufficient for an oil change and possible refill between changes.

4.20.1.2 Maintenance package 2

(Oil separator cartridge) art. no.: 10170388

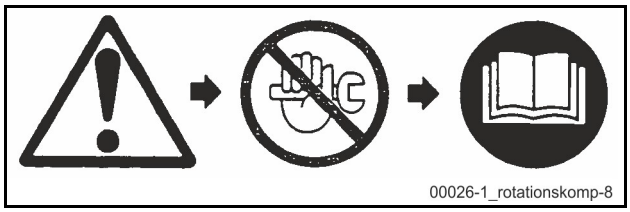
This package contains an oil separator cartridge and all of the seals necessary for replacing it.

Information

In order to ensure safe and smooth operation, please only use the material mentioned above.

SCHWING is not liable for any damages caused by improperly performed maintenance and/or unsuitable material.

* = Special equipment



Information

Read these instructions before starting with the work.

Do not use flammable substances and naked flames during cleaning work and maintenance.

4.20.2 Checking the oil level

- Check oil level when drive is at a standstill and compressor is depressurised (pressure gauge at "0").
- Place vehicle on level ground.
- The sight glass **(4)** can be used to check the oil level **(Fig. 359)**.

The oil level must exceed the upper edge of the sight glass.

The oil level should reach about the centre of the sight glass with a running compressor.

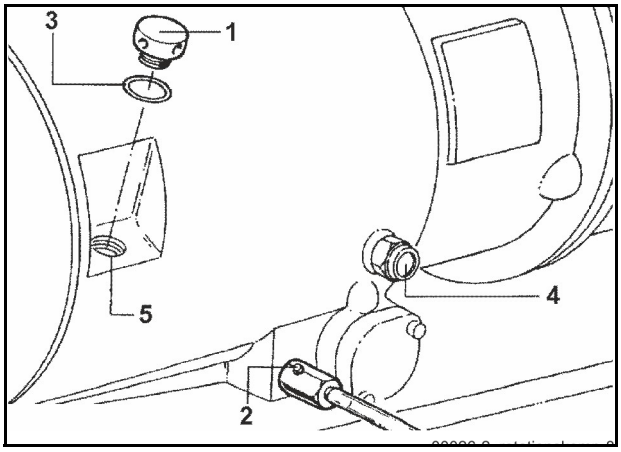


Fig. 359 Maintenance openings on compressor

Caution!

Attention, risk of burns!

The surface of the compressor can be very hot!
Contact with the skin can cause burns.
When working on and with the compressor, always wear appropriate protective clothing.

4.20.3 Topping up the oil

- Top up oil when drive is at a standstill and compressor is depressurised (pressure gauge at "0").
- Carefully open the filler plug **(1) (Fig. 359)** to equalise the pressure.
- Make sure that no oil foam emerges from the opening **(5)**.
- Wait a few minutes, if necessary, until the oil foam has reduced.
- Only use the same oil for refill as is in the compressor.

Attention!

Material damage caused by the wrong compressor oil.

Using the wrong oils or mixtures of various oil types can cause severe material damage to the compressor.

Always use the recommended oil and do not mix compressor oils of different brands and viscosities.

- Refill the oil until it overflows over the opening **(5)**.
- Replace the sealing ring **(3)** and attach the filler plug **(1)**.

4.20.4 Changing the oil

Drain the oil at operating temperature for it to drain properly.

- First loosen the filler plug **(1)** as described above.
- Open the drain cock **(2)**.
- Close the drain cock after emptying it completely.
- Fill in new oil, as described above.
- Let the compressor run for a few minutes, then check the oil level and check for leaks. Add more oil, if necessary.

Information

New compressors are filled with a run-in oil. That oil must be changed during the first oil change with a compressor oil recommended by the compressor manufacturer.

Using the correct oil is imperative for the safe function of the compressor.

Only use the Rotor Oil 8000 F2 included in maintenance package 1.

Rotor Oil 8000 F 2 is a synthetic all-season oil suitable for an ambient temperature of -25 °C to 45 °C.

It may not, under any circumstances, be mixed with other oils.

4.20.5 Cleaning / Replacing the air filter

- Loosen the knurled nuts **(1) (Fig. 360)**.
- Remove the sealing ring **(2)** and filter cover **(3)**.
- Pull out the filter insert **(4)**.
- Clean all parts with compressed air (max. 5 bar).
- Blow out the filter insert from the inside out using upward and downward movements until dust no longer emerges.
- After multiple cleanings, replace the filter insert in accordance with the maintenance schedule (see **"Maintenance schedule"** on page 399).
- Install filter in reverse order.

4.20.6 Cleaning the oil cooler

- Clean the cooling fins of the oil cooler with a compressed air gun **(Fig. 361)**.

A dirty cooler causes the oil to heat up more and can result in outages due to overheating. If oil is too hot, it ages faster and loses its lubrication properties. This increases the wear on the compressor.

- Blow the compressed air opposite the normal flow direction of the cooling air.

4.20.7 Replacing compressed air hoses

Compressed air hoses must be replaced after 3 years at the latest.

The production information is engraved on the hoses.

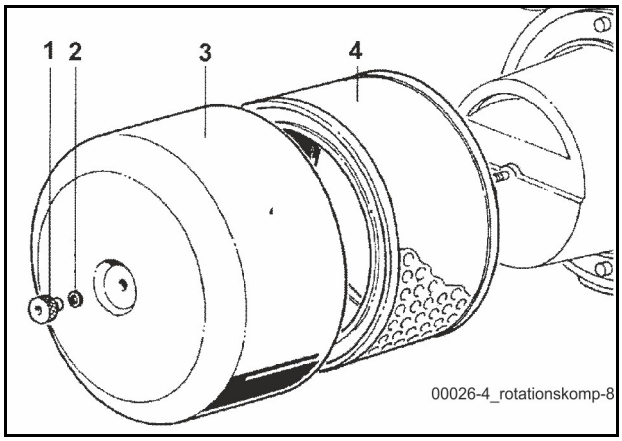


Fig. 360 Air filter

Fig. 361 Air compressor

4.20.8 Replacing the oil filter

- Drain the old oil as described above.
- Loosen the screws **(1)** on the filter cover **(2) (Fig. 363)**.
- Rotate the top cover 90° and remove the cover together with the filter.
- Remove the filter **(3)** from the top cover.
- Clean the top cover and seating surfaces of the housing.

Warning!

Do not use flammable cleaning agents!

No traces of cleaning agent may get into the compressor.

- Attach a new filter to the top cover.
- Attach the top cover with a new sealing ring **(4)**.
- Top up the compressor oil as described above.

4.20.9 Replacing oil return valves

- Loosen the hollow screws **(1) (Fig. 362)**.
- Pay attention to the sealing rings **(3)**.
- Unscrew the return valves **(4)** from the separator housing.
- Install new valves with new O-rings **(5)**.
- Attach the screw connections **(2)** with new sealing rings **(3)**.

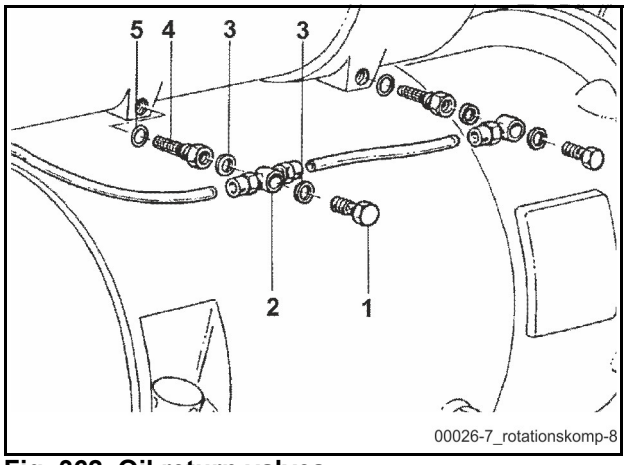


Fig. 362 Oil return valves

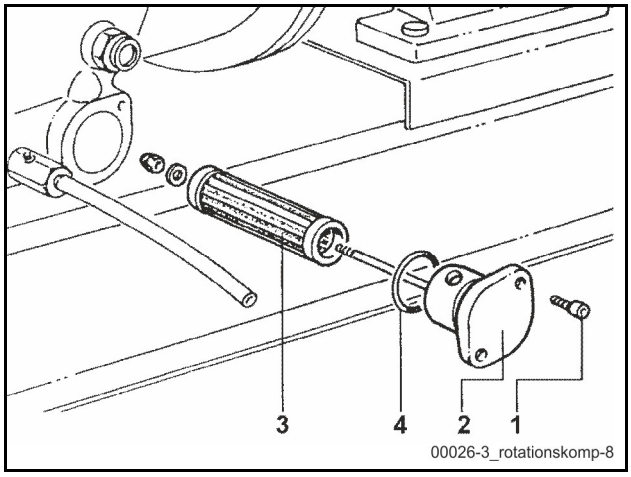


Fig. 363 Oil filter

4.20.10 Replacing the oil separator cartridge

4.20.10.1 Removing the oil separator cartridge

- Disconnect the plug for the solenoid valve **(1)** on the separator housing **(2) (Fig. 364)** and loosen the air hose **(3)**.
- Loosen the oil return valve **(4)** as described above.
- Remove the compressed air tube **(5)** from the separator housing.
- Remove the radial groove nut **(6)**.

Information

Pay attention to the mounting mark on the connection tube **(7)**.

Mark position, if necessary.

The connection tube must be remounted later in exactly the same position.

- Loosen the connection tube and lift the separator housing **(2)** out of the oil chamber.
- Remove the connection tube **(7)** from the separator housing.
- Lever the cover of the housing **(8)** with the oil separator cartridge **(12)** carefully out of the housing.
- Loosen the nuts **(9)** and remove the sealing disc **(10)** and top cover **(11)**.
- Remove the old oil separator cartridge **(12)** together with O-rings **(13)**.

4.20.10.2 Installing the oil separator cartridge

- Install the parts in reverse order.
- Always use a new oil separator cartridge and new seals **(10, 13, 14, 15, 16)**.
- Press the O-rings **(13)** with some grease into the seat pan of the oil separator cartridge.
- Make sure that:

1. The separator cover **(8)** is mounted in the indicated position (arrow)
2. The connection tube **(7)** is mounted according to its marking

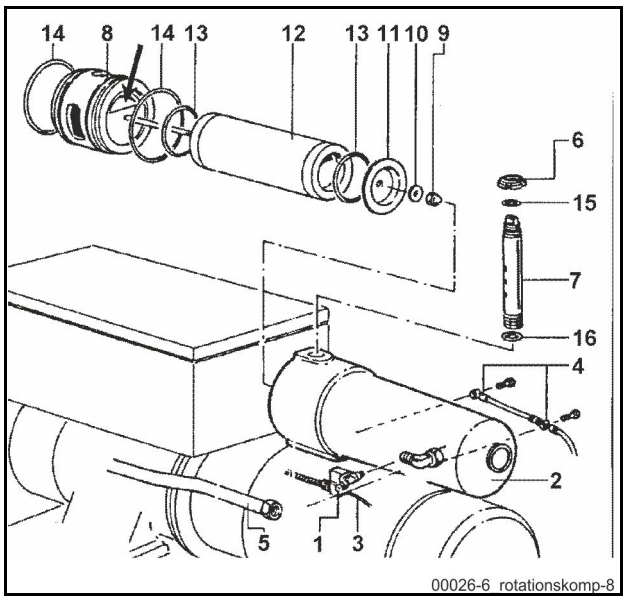


Fig. 364 Oil separator cartridge

4.21 Electrical/Electronic system and software

Danger!

Danger to life due to electric shock!

When working on electrical systems, there is a risk of serious or fatal injuries due to electric shock.

Work on electrical systems may only be carried out by qualified electrical specialists.

4.21.1 Electrical safeguarding of SCHWING components

Depending on the type of machine, the system can be secured in several places, also see electrical circuit diagram:

- A main safety fuse near the starter battery.
- Safety fuses near the vehicle fuse box (usually in the driver's cab of the truck-mounted concrete pump).
- Safety fuses in the switch cabinet or control cabinet of the concrete pump, see **(Fig. 365)**, **(Fig. 366)** and **(Fig. 367)**.

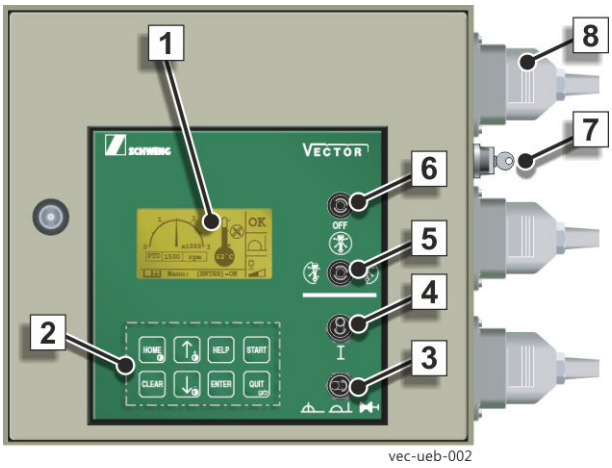


Fig. 365 Switch cabinet of the Vector control system

00169_VECTOR_II_Schaltschrank_Stecker_80_V01

Fig. 366 Switch cabinet of the VECTOR II control system

Bedienpult-SP

Fig. 367 Example: Control station of a stationary concrete pump

4.21.2 Changing the fuses of SCHWING components

- Switch off the control system and the drive motor.
- Open the top cover of the switch cabinet or control station with the special key.
- Refer to the wiring diagram on the inside of the switch cabinet cover or to the electrical circuit diagram for the allocation of the fuses.

The fuses are marked with "F". Commercial vehicle fuses are used.

- Only replace defective fuses with equivalent new ones.

If a fuse is tripped once again, there is a short circuit. Stop the machine and have an electrician inspect the system.

Attention!

Damage due to unsuitable fuses!

The electrical/electronic system can be destroyed due to incorrect fuses.

Only use fuses according to the specifications of the electric wiring diagram.

4.21.3 Working on electrical / electronic components

Attention!

Danger of short circuit due to conductive tools or objects!

Conductive tools/objects on the battery can cause a short circuit.

Do not place tools/objects on batteries.

- Before working on electrical or electronic components, disconnect:

1. first the negative lead (-),
2. then the positive lead (+)

from the drive motor's starter batteries. This is sufficient for preventing short circuits and protecting the control system.

- Connect in reverse order.

Further protective measures may be required for the electronics in the vehicle (e.g. for the anti-lock braking system ABS) or for the drive motor.

- Read the operating instructions of the engine manufacturer or vehicle manufacturer to find out about how to protect its electronics.
- Do not touch live parts.
- Never check the voltage by touching the ground.
- Replace defective control lamps immediately.
- Never disconnect a cable from the starter batteries, alternator or regulator while the motor is running.
- Earth the machine to establish equipotential bonding between the machine and the ground.

4.21.4 Software

Only representatives of SCHWING are permitted to alter the machine's software. This also applies to updates.

Warning!

Danger due to unauthorised modifications to the original software!

Unauthorised software modifications can lead to serious accidents.

Only use the manufacturer's original software and carry out update requests from the manufacturer immediately.

4.21.5 Electrically powered machines

Have an electrician disconnect the power supply to such machines prior to carrying out repair work on the respective machine.

4.21.6 The arc welding process

(see **"Repair welding"** on page 527)

4.21.7 Jump starting

Connect the jumper cable as described in the operating instructions for the vehicle or the motor.

4.21.8 Jump starting stationary pumps with batteries connected in series

Machines can be supplied with 24V by two 12V batteries connected in series.

The following should be observed when jump starting due to the spatial separation of both batteries (e.g. one on the right and one on the left side of the machine).

- First connect the positive terminal of the machine battery (the battery is located near the starter motor) to the positive terminal of the donor unit using the red jump lead,
- then, attach the black jump lead to the negative terminal of the donor unit and then to the negative terminal of the machine battery (e.g. on the opposite side of the machine).

Make sure to observe the correct order!

Under no circumstances may the terminals of the batteries be connected the other way round.

If the engine starts, then the cables can be removed again in the reverse order.

A diesel engine uses considerably more power to start than a gasoline engine, which must be taken into account when selecting the donor unit. The jump lead should be made of high-quality copper cable in accordance with DIN 72553-25 and have a cross section of 35 - 50 mm² .

4.21.9 Machining work on the machine

Cover devices, cables etc. when drilling, grinding or other types of machining work is to be carried out on the machine.

4.21.10 Painting and working with aggressive substances

Cover devices, cables etc. to protect them against paint mist and aggressive substances.

4.21.11 Cleaning

Protect the electrical/electronic components from aggressive substances.

Never spray electrical/electronic components with release agents (like formwork oil) to protect them from contamination. This leads to significant corrosion in the electrical system.

4.21.11.1 Steam jet cleaning

Cover any electrical and electronic components.

Never direct a water or steam jet onto these components.

Any penetrating moisture leads to malfunctions and can destroy electronics and electrical components completely.

4.21.12 Starter batteries

Attention!

Damage due to incorrect work sequence!

Disconnecting or connecting the battery incorrectly may cause a short circuit.

When disconnecting it, always remove the negative terminal first and then the positive terminal.

When connecting it, always install the positive terminal first and then the negative terminal.

Information

Supplier documentation!

Please refer to the operating instructions from the vehicle or engine manufacturer for further information on the starter batteries

4.21.13 Checking the open-circuit voltage

In order to achieve a correct result, the battery may have been neither connected to a load nor charged at least two hours before the measurement.

If the open-circuit voltage is to be measured with a built-in battery, first disconnect the negative terminal and then the positive terminal from the battery. Otherwise there is a danger of short circuiting!

- Measure the voltage between the terminals.

If the measuring device displays at least 12.5 volts, then the battery is in order. The battery must be charged immediately once below 12.5 volts.

4.21.14 Charging the battery

Charge battery by running the motor for several hours or with a charger.

When charging with a charger, the battery must be at a temperature of at least 10 °C.

- Disconnect both terminal posts from the battery.
- Charging current max. 10 of the battery capacity:

Example:	120 Ah battery
Charging current max.:	12 ampere

- Stop charging after reaching an acid density of 1.28 kg/l or 1.23 kg/l (in the tropics) if the charger does not have an automatic control device.
- Clean battery terminals and terminal posts.
- First connect the positive terminal and then the negative terminal. Otherwise, there is a risk of short circuiting! Only tighten terminal posts by hand.
- Apply a thin layer of acid protective grease to the terminal posts.

4.21.15 Storage and installation

Keep battery clean and dry in order to prevent discharge through leakage.

Ensure proper installation in the machine. Vibrations shorten the service life. Damage to the battery case entails high follow-up costs due to escaping acid.

4.21.16 Disposal

Turn in old batteries at a collection point. Observe regional regulations for disposal of batteries and sulphuric acid.

4.22 Safety inspections

Warning!

Loss of operational safety due to failure to test!

The loss of operational safety can lead to accidents with serious injuries or even death.

Before initial commissioning, after changes to the machine and at least once a year, the operator must have a test carried out by an authorised person or by the manufacturer according to the manufacturer's instructions.

Alongside regular maintenance work, continuous observation and technical safety inspections are essential tools in maintaining operational and work safety with the machine and accessories.

As such, the responsibilities are as follows:

4.22.1 Machine operator

The machine operator is responsible for the visual and functional inspections of "his" machine, including accessories, before and during operation.

He must discontinue use of the machine if he/she discovers defects endangering work safety.

He/she is responsible for the external condition of "his/her" machine. As such, he/she must ensure e.g. the timely repair of damage to paintwork.

Especially on placing booms, corrosion pitting can lead to tears and breaks!

As the vehicle driver, he/she is responsible for the roadworthy condition of his/her vehicle, in the sense of local regulations in the country of use.

4.22.2 Competent person (specialist)

A competent person has to carry out the necessary technical safety inspections at regular intervals and record the results in the inspection book.

The definition of a competent person is given in the SAFETY MANUAL.

We recommend only contracting SCHWING employees to carry out this inspection.

4.22.3 Expert

An expert must be consulted in case of significant changes and extensive repairs (for example, if welding is carried out on load-bearing parts).

The definition of an expert is given in the SAFETY MANUAL.

4.22.4 Additional inspections

For certain units relevant to safety, such as accumulators, the relevant inspection regulations in the country of use must be observed.

If no qualified personnel are available, we highly recommend contracting a SCHWING employee to carry out the inspection.

4.22.5 Technical safety inspection

As there is more risk of damage with older machines, the technical safety inspection interval for concrete pumps and placing booms is dependant on the age of the machine.

That means that older machines must be more frequently checked than newer ones.

The respective inspection intervals are given in the SAFETY MANUAL.

Information

Test intervals

Adhering to these inspection intervals is imperative for increasing the service life and reducing repair costs!

Due to the dynamic loads that occur on all machines, over time fatigue can occur on steel parts, leading to cracks or fractures.

Of course other components also age, for example through environmental influences, and should be checked regularly.

The older the machine, the higher the probability of damage.

Therefore the graded, regular technical safety inspection is an effective means for detecting damage at an early stage, before it leads to machine failure and (or) an accident.

Information

Case of damage!

Please be aware that in the event of damage, the question of whether the machine was checked regularly and correctly can be critical for assessing liability!

4.22.6 Safety components

If a defect is detected on a safety component during a technical safety inspection or on any other occasion, the machine must not be used until it is repaired.

As a rule, special skills are required to carry out repairs, which is why we strongly recommend contracting SCHWING's customer service to perform this inspection.

If you carry out repairs on safety components yourself or hire a third party to do this, we encourage you to notify us of the damage and the work carried out.

You help us to improve our products and if necessary, initiate appropriate urgent measures.

For your notification you can use a copy of the form found on the next page.

4.22.6.1 What are safety components?

The SCHWING factory standard distinguishes between safety components of the first (S1) and second order (S2).

The failure of S1 parts can pose a danger to life and limb. All persons inside the danger zone are in extreme danger of being killed.

S1 parts include, for example:

- Placing boom arms
- Levers and bolts on the placing boom
- Hydraulic cylinders on the boom and outrigger
- Outriggers
- EMERGENCY STOP parts and controls

Upon failure of S2 parts, primarily the main functions of the machine, such as "pumping concrete" or "distributing concrete", fail.

S2 parts include, for example:

- Hydraulic pumps
- Drives
- Gear
- Chutes
- Concrete feeding hoppers

In practice, S1 and S2 components are often installed together. This makes it difficult to clearly assess a component's individual relevance to technical safety in the event of a failure.

It also always depends on the specific situation. Ruptured concrete pumping lines or hydraulic hoses, for example, can result in machine failure and can also endanger the lives and health of people located nearby!

Please also do not hesitate to inform us of damage of which the technical relevance is not immediately apparent.

In any case, you still help us to improve our products - and you are on the safe side.

In advance, we thank you very much for your help.

Please copy the notification of damage before completing it!

4.22.7 Notification of damage for safety components

Please complete the copy of this questionnaire and send the completed copy to:

SCHWING GmbH
Service
Heerstraße 9-27
44653 Herne
GERMANY

Of course you can also fax us this page or reply by email:

Email: service@schwing.de

Customer no.:	
Address:	
Contact person:	
Tel.:	
Fax:	
Email:	
Machine type:	
Machine no.:	
Operating hours:	
Concrete delivery volume in m³:	

Short description of the damage:
The following parts were replaced (item number, if known):

Was welded?	☐ Yes	☐ No
If so, where?		
Were mechanical procedures carried out?		
☐ Drilling	☐ Sanding	☐ Other
If so, where?		
Was the work documented by photos or drawings?		
☐ Yes		☐ No
If so, is this document attached to this message?		
☐ Yes		☐ No

4.23 Repair welding

On the placing boom, on the outrigger or on other components important to work safety, welding may only be carried out by authorised representatives of the manufacturer.

In general, welding should only be carried out by personnel specially trained and qualified for this activity.

Work must comply with the maintenance instructions and with all relevant safety rules and local regulations.

Welding work must be inspected by an expert.

Observe the sign on the machine **(Fig. 368)**

Before performing electric welding, disconnect the control unit and all batteries. If necessary, carry out protective measures for the vehicle and engine electronics.

Refer to the documentation from the vehicle or engine manufacturer.

Disconnect the multi-plug of the cable remote control or the radio receiver from the machine.

Attach the negative pole of the welding machine directly to the component to be welded.

The welding current should not pass through a hydraulic cylinder, for example, as doing so will result in damage to the chrome layer of the piston rods.

Protect equipment, cables and cable connectors from the heat, slag, etc.

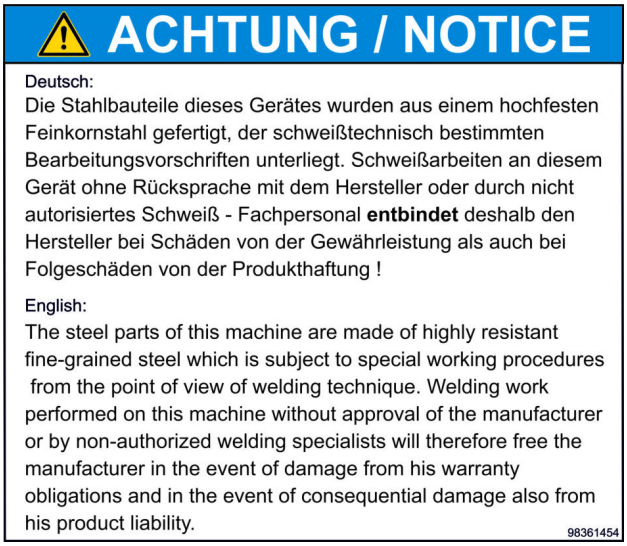


Fig. 368

5 Remote control

5.1 Radio control system SCHWING SC 30


00030_SC30-top-8


00030_SC30-ant1-8

5.1.1 Scope of the chapter

This chapter describes the SC 30* radio control system as it is intended for SCHWING truck-mounted concrete pumps with a “VECTOR (II) control system”.

(* hereinafter referred to as system or radio equipment)

5.1.2 Manufacturer

SC 30 radio equipment are manufactured for SCHWING by the company:

SCANRECO

Scanreco Industrieelektronik AB**

Box 47144

SE-100 74 Stockholm

Sweden

(** hereinafter referred to as manufacturer)

5.1.3 Declaration of conformity

Radio equipment used in countries of the European Economic Area must comply with the guidelines mutually agreed there.

The manufacturer confirms this agreement by issuing corresponding declarations of conformity.

The type plate of the receiver contains the following marking:

The notified body issues the declarations of conformity in English.

They are part of these operating instructions.

The operating instructions must be available at the installation site of the system.

Supervisors should be given inspection rights of the operating instructions with reference to the above pages.

5.1.3.1 Registration (notification)

The manufacturer of the radio equipment always registers with the States of the Community.

No further registration measures are required by these States, and operation is free of charge.

ORIGINAL

CE Declaration of Conformity

We, the undersigned, certify and declare under our sole responsibility that the following equipment that:

Type of equipment:	Remote control transceiver
Brand name:	Scanreco
Family:	G3B TR02
Model names:	PCU Maxi Joysticks, PCU Maxi Levers, PCU Mini Joysticks, PCU Mini Levers, CU CAN
Model numbers:	see Appendix
Serial numbers:	720000 or higher
Manufacturer:	Scanreco AB
Address of the manufacturer:	Stensätravägen 13, 127 39 Skärholmen, Sweden
EN/EFTA member state intended for use:	All EU and EFTA members

is in conformity with the provisions of the following **EC directives**:

2014/53/EC	Radio Equipment Directive
2006/42/EC	Machinery Directive
2011/65/EU	RoHS Directive

with the requirements of the following **harmonized standards:**

Radio equipment:	EN 301 489-1 V2.1.1, EN 301 489-3 V2.1.1, EN 300 220-2 V3.1.1
Machinery:	EN ISO 13849-1:2015, EN ISO 13849-2:2012
EMC:	EN 61000-6-2:2005+AC:2005, EN 61000-6-4:2007+A1:2011
Low voltage:	EN 60950-1:2006+AC:2011+A1:2010+A11:2009+A12:2011+A2:2013, EN 60950-22:2006+AC:2008+A11:2008
RoHS:	EN 50581:2012

The technical file as required by the conformity assessment procedures may be compiled by the following authorised person:

Name:	Pär Ljunggren
Company:	Scanreco AB
Address:	Stensätravägen 13, 127 39 Skärholmen, Sweden

Place and date of issue: Stockholm, 2019-06-03

Signature
Pär Ljunggren
Product Manager

00030_CE-01

Postal adress
Box 90304 / Stensätravägen 13
SE-120 25 Stockholm, SWEDEN

Telephone +46 8 556 32 800
Telefax +46 8 556 32 828
E-mail scanreco@scanreco.com

VAT No SE556245004801
Org No 556245-0048

Fig. 369 Example of a declaration of conformity; page 1

ORIGINAL

Appendix – Model Numbers

CU CAN:
1604, 1604_S, 1611, 1611_S, SDC0017

PCU Maxi Joysticks:
48135, 48757, 48800, 48801, 48802, 50426, 50429, 50979, SDC0006

PCU Maxi Levers:
966, 44586, 44587, 44588, 46866, 47699, 48134, 48662, 48752, 48753, 48794, 48841, 48845, 48963, 50178, 50637, 50778, SDC0005

PCU Mini Joysticks:
48133, 48355, 48670, 48709, 48803, 50259, 51504. 50414, 50641, 51500, SDC0008, 52211, 52211_S, 52212, 52212_S

PCU Mini Levers:
48132, 48261, 48669, 48724, 48962, 49249, 49294, 49985, 49989, 49991, 50180, 50777, SDC0007

PCU accessory – battery
592, 593,599

00030_CE-02

Postal adress
Box 90304 / Stensätravägen 13
SE-120 25 Stockholm, SWEDEN

Telephone +46 8 556 32 800
Telefax +46 8 556 32 828
E-mail scanreco@scanreco.com

VAT No SE556245004801
Org No 556245-0048

Fig. 370 Example of a declaration of conformity; page 2

5.1.3.2 Basic safety instructions for handling the radio equipment

- Read through these operating instructions completely before starting up your radio system!

You must have understood the operating manual fully before you begin to operate the system.

- Observe all applicable occupational safety and accident prevention regulations!
- For the operation of the machine, the corresponding machine operating manual applies!
- Only specifically assigned persons may work with the radio equipment, after being trained by an expert!

This also applies to the alternative cable control!

- During operation, you must always be able to see the entire machine and work area.
- Do not put down the operational transmitter. Always secure it against unauthorised use (switch it off and close it)!
- Always check the safety-relevant functions prior to starting up the equipment.

Do not operate the system if you detect faults.

Do not continue to use the system if faults occur during operation.

- Report all faults to your supervisor.
- The radio equipment may only be used for its intended purpose of controlling a SCHWING truck-mounted concrete pump designed for this.

Any other use is not permitted!

- Improper use, incorrect operation, poor maintenance and unauthorised access to the system can lead to serious material damage and personal injury!
- In the event of malfunctions or defects, immediately press the red EMERGENCY STOP button. Switch the transmitter off and store it safely!
- The radio equipment may only be repaired by the manufacturer or professionals authorised by the manufacturer!

Warning!

Risk of injury from falling down!

Accessing the truck-mounted concrete pump is prohibited during operation!

If it is necessary to enter the machine for repair work on the radio equipment, this must only occur when the pump drive is switched off.

Safe climbing aids and fall arresters are required for working on the machine.

- The system parameters, programming tasks and "pairs" of system may only be configured by specially trained experts.
- Failure to observe the safety instructions voids all warranty and liability claims against the manufacturer of the radio equipment and SCHWING!
- Only use original battery cassettes for the transmitter.

Attention!

Material damage due to incorrect batteries!

Unsuitable batteries can lead to malfunctions and damage to the transmitter.

Attention!

Material damage due to incorrect chargers!

The rechargeable battery could explode!

Do not use any third-party chargers.

Warning!

Severe injury due to hazardous fluids and gases!

Can result in injuries to the eyes, airways, etc.

Do not open any batteries. Hazardous substances can escape!

- Dispose of old batteries properly by dispensing of them at a waste disposal facility.

5.1.4 Technical data

5.1.4.1 Overall system

Frequency band (ISM*)	EU* and other NAFTA* Select countries	= 433.050 – 434.790 MHz = 902.000 – 928.000 MHz = 863.000 – 870.000 MHz
Channels	67	
Channel management	automatic	
Channel sequence	random	
Channel bandwidth	25 kHz	
HF - power	10 mW	
Modulation	FM / FSK*	
System address	more than 16 million unique system addresses	
Redundancy	CRC* Security algorithms	

ISM*	Systems with regional approval
EU*	European Union
NAFTA*	North American Free Trade Area (USA, Canada, Mexico)
FSK*	Frequency Shift Keying (automatic changing of different frequencies)
CRC*	Determination of a test value for fault recognition

5.1.4.2 Receiver

Current supply	via vehicle battery
Weight	1.25 kg
Protection class	IP 67, protected against the ingress of dust and water in case of temporary immersion in standardised conditions
Power consumption	80 – 140 mA (dependent on operating status)
Weight	1.25 kg
Permissible ambient temperature	approx. -25 °C to 70 °C (-13 °F to 158 °F)

5.1.4.3 Transmitter

Current supply	exchangeable battery cassette (7.2 V; NiMH) or via the on-board power supply of the machine when the control cable is connected
Weight	1.7 / 1.95 kg (with/without rechargeable battery)
Protection class	IP 65, protected against the ingress of dust and spray water in standard conditions
Operating life with battery operation	maximum 8 hours
Operating temperature range	approx. -25 °C to 70 °C (-13 °F to 158 °F)
Dimensions	290 x 160 x 190 mm
Range of radio connection	approx. 100 m in industrial areas
Length of the control cable	Standard: 20 m

5.1.4.4 Charger

Installation location	Depending on the machine type, in the driver's cab or next to the control system switch cabinet
Current supply	10 V - 35 V DC
Weight	0.25 kg
Protection class	IP 21, protected against dripping water and the ingress of foreign particles greater than 12.5 mm diameter in standard conditions
Power consumption	10 – 20 mA without a battery inserted, 320 – 560 mA during charging
Weight	0.25 kg
Operating temperature range	approx. -25 °C to 70 °C (-13 °F to 158 °F) Observe the temperature limits for battery charging! See chapter 15.

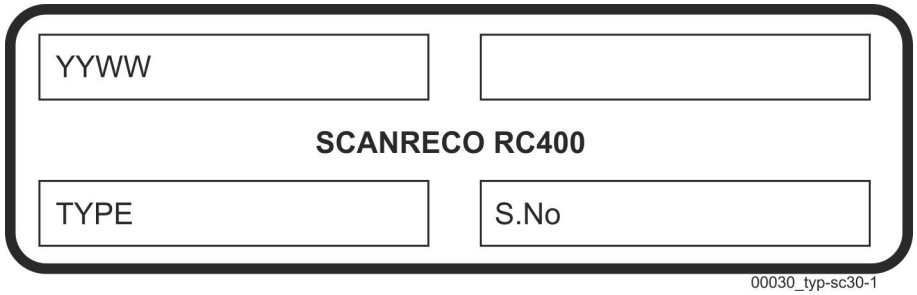
Dimensions	252 x 85 x 36 mm
Safeguard	depending on the machine type in the driver's cab, via the fuse of the vehicle power outlet (cigarette lighter), or in the switch cabinet, via the 7.5 A fuse of the power supply for the control system

5.1.5 Identifying the system, type plates

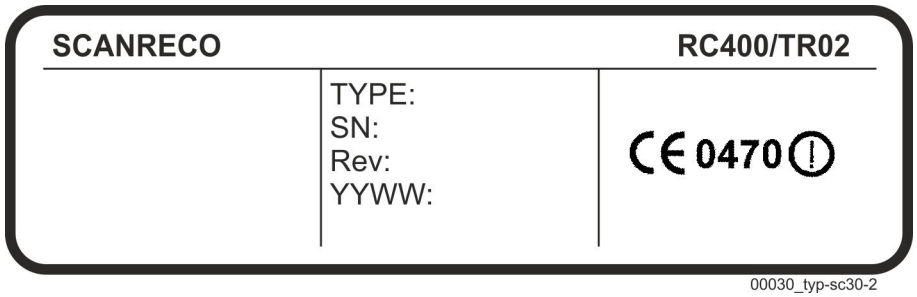
Transmitters and receivers are each provided with an individual type plate. When contacting SCHWING, please always provide the information on these type plates.

When you assign this operating manual to a particular system, you can enter the relevant data here:

5.1.5.1 Transmitter



5.1.5.2 Receiver



The following mean:

YYWW: Year of manufacture, week

TYPE: Equipment type

S.No or SN: Serial number

Rev:: Revision

5.1.6 Short description of the radio equipment

The digital radio equipment was specially developed for controlling truck-mounted concrete pumps with a placing boom. The system is protected against electromagnetic and high-frequency interference. Transmitters and receivers communicate with each other, they operate thus as transmitters and receivers. The backup procedure used protects the sent data against loss or falsification due to interference. The machine cannot be controlled by other transmitters in the near vicinity. In exceptional cases, should the communication be affected by strong interfering transmitters, the machine will enter the safe EMERGENCY STOP mode.

The current supply of the transmitter occurs via a replaceable battery cassette. A charger connected to the vehicle battery serves to charge the battery cassette. A charger for mains operation is also available on request. If the control cable is connected, the charging occurs via this cable.

The joysticks have 3 control levels. As such, the system can be used for the control of all 3-, 4- and 5-part booms, as well as the 4-part boom with telescope function from the company SCHWING. If individual control levels are not required, corresponding movements of the joystick remain ineffectual.

As the transmitter is suitable for various types of mast, the system is operationally ready for the first time when the transmitter and receiver are successfully "paired". It is always possible to refresh the "pairing" of transmitters and receivers of the same type.

The receiver is installed in a suitable position on the truck-mounted concrete pump, normally on the boom column. The receiver is connected to the control system by means of a cable. The connection sleeve for the cable control is located at an easily accessible, protected position, normally in the cabinet of the hydraulic emergency operation system. It is also connected via cable with the receiver.

The transmitter antenna is installed in the transmitter. The receiver is equipped with a removable antenna. As needed, this can be replaced by an external antenna.

The components of the radio equipment are:

- Transmitter
- Receiver with antenna
- Charger
- Battery cassette
- Control cable

(see **“Overview of the components”** on page 541)

5.1.7 Overview of the components

5.1.7.1 The transmitter

The following inspection and control elements are found on the transmitter:

Fig. 371

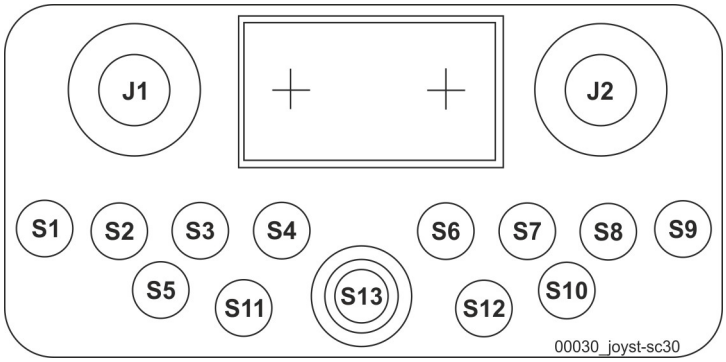


Fig. 372

5.1.7.2 General explanation of the joystick

Using the joysticks J1 (left) and J2 (right), the placing boom is controlled proportionally. As such, the movement speeds of the placing boom depend on the degree of the displacements. In contrast to machines with DirectDrive, it is only possible to drive at one speed in this case due to the design. The symbol label between the joysticks shows the possible movement directions of the placing boom. If the transmitter is used for a machine with a different boom type (configuration and pairing required!), this symbol label must be exchanged.

5.1.7.3 Possible movement directions of the joystick

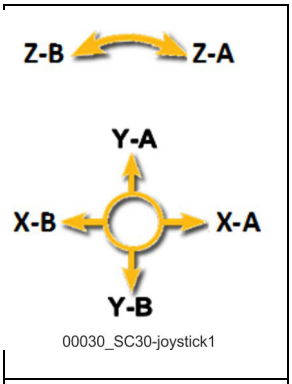
X = horizontal axle

Y = vertical axle

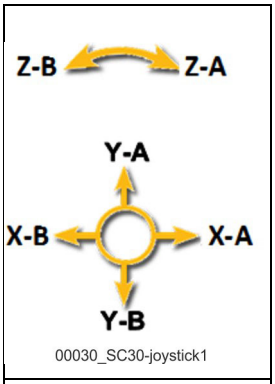
Z = turn the joystick in clockwise / anti-clockwise direction

A+B= movement direction

According to the boom type, not all control levels are required.



J1



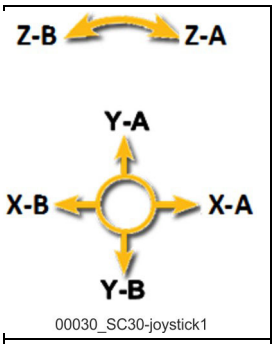
J2

3-part boom

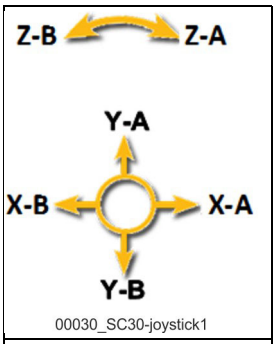
J	Axle	Direction "A"		Axle	Direction "B"
J1	X-A	Boom section 2 down		X-B	Boom section 2 up
J1	Y-A	Boom section 3 down		Y-B	Boom section 3 up
J1	Z-A	No function		Z-B	No function
J2	X-A	Turn boom to the right		X-B	Turn boom to the left
J2	Y-A	Boom section 1 down		Y-B	Boom section 1 up
J2	Z-A	No function		Z-B	No function

4-part boom

J	Axle	Direction "A"		Axle	Direction "B"
J1	X-A	Boom section 3 down		X-B	Boom section 3 up
J1	Y-A	Boom section 4 down		Y-B	Boom section 4 up
J1	Z-A	No function		Z-B	No function
J2	X-A	Turn boom to the right		X-B	Turn boom to the left
J2	Y-A	Boom section 1 down		Y-B	Boom section 1 up
J2	Z-A	Boom section 2 up		Z-B	Boom section 2 down



J1



J2

5-part boom

J	Axle	Direction "A"			Direction "B"
J1	X-A	Boom section 4 down		X-B	Boom section 4 up
J1	Y-A	Boom section 5 down		Y-B	Boom section 5 up
J1	Z-A	Boom section 3 up		Z-B	Boom section 3 down
J2	X-A	Turn boom to the right		X-B	Turn boom to the left
J2	Y-A	Boom section 1 down		Y-B	Boom section 1 up
J2	Z-A	Boom section 2 up		Z-B	Boom section 2 down

4-part boom with telescope

J	Axle	Direction "A"			Direction "B"
J1	X-A	Boom section 3 down		X-B	Boom section 3 up
J1	Y-A	Boom section 4 down		Y-B	Boom section 4 up
J1	Z-A	Boom section 2 up		Z-B	Boom section 2 down
J2	X-A	Turn boom to the right		X-B	Turn boom to the left
J2	Y-A	Boom section 1 down		Y-B	Boom section 1 up
J2	Z-A	Extend telescope		Z-B	Retract telescope

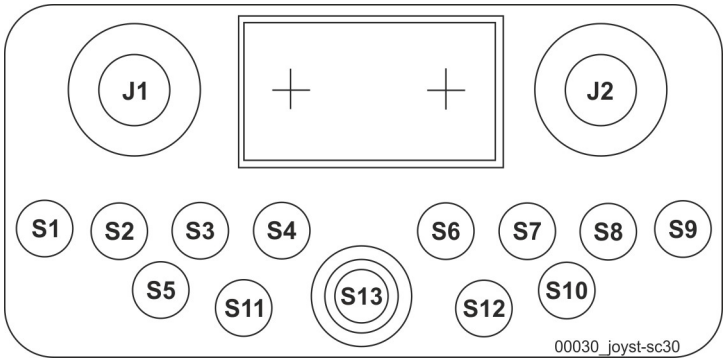


Fig. 373

5.1.7.4 Dual switch assignment

Several of the radio remote control switches have dual functions.

This provides the radio control system with a second functional level.

Dual button assignments are required for the following functions:

- EHH = open end hose holder pneumatically (press switches S3 + S1 down “Motor stop”)
- VarioPressure OFF (press switches S3 + S2 up (end hose stop))
- Operate rotatable stowing boxes (press switches S3 + S2 down (chamber valve + joysticks J1 and J2).

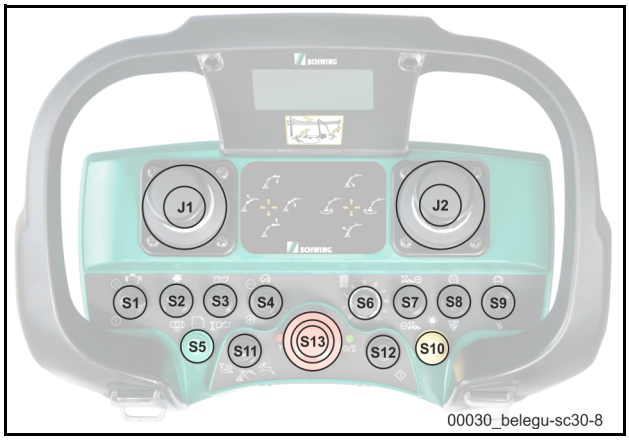


Fig. 374 Designation of SC30 buttons.

In order to activate the second functional level, button (S3) must first be held down. Now actuate the dual-function button (S1 or S2).

The second functional level remains active until the selector switch is moved into a different position.

After an emergency stop, the second functional level is disabled and must be reactivated.

5.1.7.4.1 EHH end hose holder, pneumatic

When operating this end hose holder, several safety-related aspects must be observed.

If this equipment is on your machine, read the chapter “Working operation - placing boom” of your machine.

5.1.7.4.2 VarioPressure

VarioPressure is a safety function used to prevent blockages when pumping and to adjust the pumping pressure variably to the jobsite conditions, see **“Special equipment”** on page 585.

5.1.7.4.3 Rotatable stowing boxes

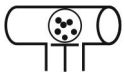
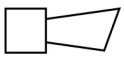
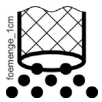
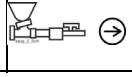
The rotatable stowing boxes are optionally available for certain machines and make it possible to load additional hoses and pumping pipes.

➤ In order to operate the stowing boxes, position yourself behind the rock valve looking towards the driver's cab.

The stowing boxes are operated using the joysticks on the radio control system.

The joysticks are used in the same manner as for the placing boom.

In order to operate the stowing boxes safely, you must read the respective chapter.

S 1	**Selector push-button: I -0- I**	**S 4**	**Selector push-button: I -0- I**
0  I	Vehicle engine (0) = off (stop) (I) = on (start) / **open EHP**	–  +	Speed of the vehicle engine (-) = reduce (+) = increase
S 2	**Selector switch: I -0- I**	**S 5**	**Push-button: I - 0**
	End hose stop: Automatic off / **VarioPressure on**		
0	End hose stop: Automatic on	2	Browse display
	Activate chamber valve / **rotate stowing boxes**		
S 3	**Selector push-button: I -0- I**	**S 6**	**Potentiometer: min - max**
	Signal horn on vehicle on		
0	Acknowledge control release or		Adjust the delivery rate of the concrete pump proportionally
	diagnosis horn (switch off)		
		S 7	**Selector switch: I -0- I**
			Concrete pump on forwards (pump operation)
		0	
			Concrete pump on backwards (suction operation)

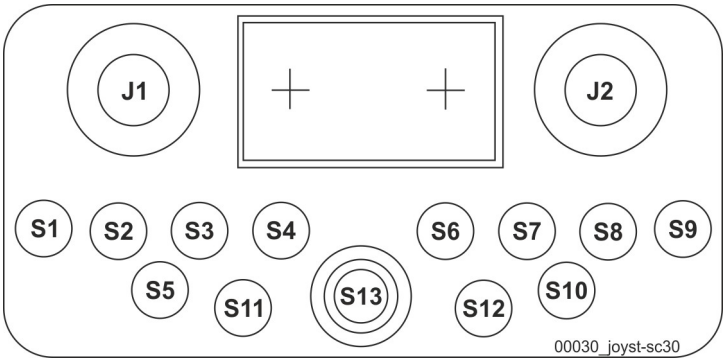


Fig. 375

S 8	Selector switch: I -0- I	S 11	Selector switch: I -0- I
nahbed_sym-09	Compressor on		Boom speed slow (concreting work)
0			Placing boom control off
	Agitator automatic operation on		Boom speed fast (installation and removal)
S 9	**Selector switch: I -0- I**	**S 12**	**Push-button: I - 0**
	Water pump on	00030_SC30-sender-ein	Transmitter on
0			
	Concrete vibrator automatic operation on		
S 10	**Push-button: I - 0**	**S 13**	**EMERGENCY STOP button: I - 0**
00030_SC30-displam	Display lighting on / off		Transmitter off / EMERGENCY STOP

5.1.8 The LCD display

The left vertical display bar **(Fig. 376)** shows the charging status of the transmitter battery and the right the signal strength on the receiver.

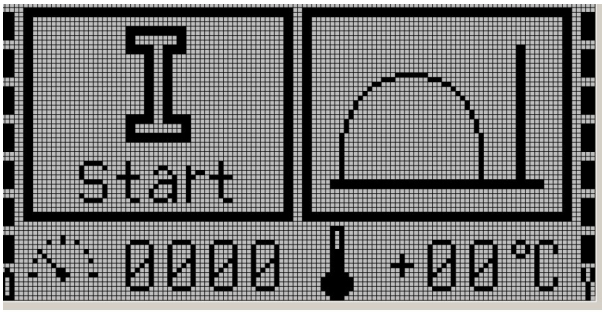
The display also shows different machine data. They are identical to the information on the display of the control system.

Further information (see **“The feedback system”** on page 550)

5.1.9 The LEDs

The LEDs **(Fig. 377)** "antenna" 1 and "voltage" 2 are multifunctional indicators.

Further information (see **“Operating status displays for transmitter”** on page 555).



00030_SC30-senderdisplay2-8

Fig. 376

00030_SC30-sender1-8

Fig. 377

5.1.10 The receiver

The receiver **(Fig. 378)** is located in a suitable position on the machine, usually on the boom column.

It is connected via cable to the control system and the external connection socket for the cable control.

The two-part display (1) shows different operating statuses for the system. As the receiver is normally located on the boom column of the machine, some messages are also shown on the control system display.

The display of the receiver serves exclusively for the functional inspection during repair work. Reading the notifications on this display during operation is not permitted and also not necessary.

Warning!

Risk of falling!

Accessing the truck-mounted concrete pump is prohibited during operation!

If it is necessary to enter the machine for repair work on the radio equipment, this must only occur when the pump drive is switched off.

Safe climbing aids and fall arresters are required for working on the machine, see **“VDMA safety manual”** on page 773.

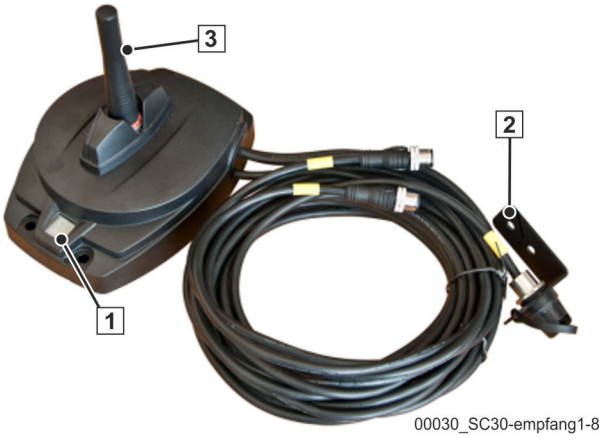


Fig. 378

5.1.11 The charger

The charger **(Fig. 379)** is connected to the vehicle battery via a safety fuse.

After inserting the battery cassette, the rechargeable battery charges quickly. Then the charger switches to conservation status.

The green LED

The green LED 1 flashes during the charging process and lights up continuously when the rechargeable battery is charged.

The red LED

The red LED 2 lights up when the current supply is connected.

5.1.12 The battery cassette

The battery cassette **(Fig. 380)** is protected against humidity and shocks. It contains a rechargeable 7.2 V NiMH* battery.

*Nickel metal hydride

The cassette is protected against short-circuits. For the correct orientation during insertion, it is mechanically coded.

Replacing or charging the battery (see **“Changing / Charging the battery”** on page 570).

5.1.13 The control cable

The transmitter and receiver can be connected to each other via the control cable (no illustration), should radio operation not be possible or desired at a given moment. It is also required for the "pairing" of the system.

The control cable transfers all control commands that are acknowledged by the radio control unit.

Furthermore, the transmitter battery is charged via the connected cable.

Fig. 379 Charger

Fig. 380

5.1.14 The feedback system

The feedback system of the G3 radio equipment serves to present current machine data on the display of the transmitter.

It thus sends important information from the control system directly to the operator, who is at a distance from the machine.

The display is located on the top side of the transmitter **(Fig. 381)**.

In addition, there is an acoustic signal transducer in the transmitter, which alerts the operator to certain machine statuses or faults. For additional information, see the description of the control system.

5.1.14.1 The display lighting

The S 10 button **(Fig. 382)** can be used to switch on the display lighting for 30 seconds.

5.1.14.2 Illustration of the feedback data

Basic display

If the transmitter is operated while the receiver is switched on, the default screen appears initially on the display **(Fig. 383)**. It is divided into several areas. See next page.

Fig. 381

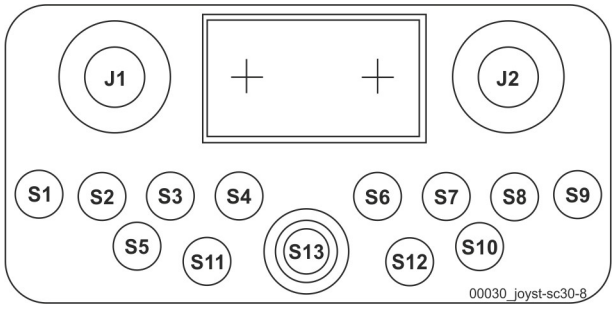


Fig. 382

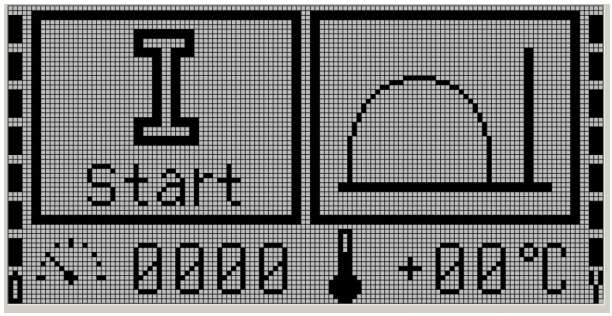
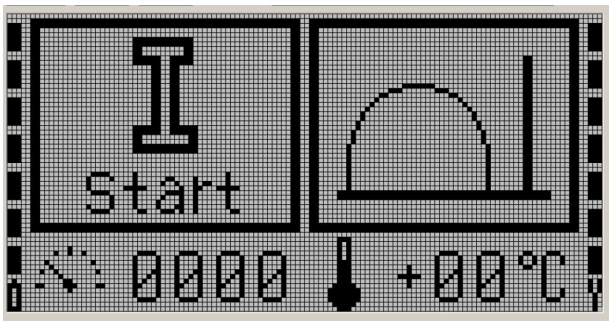


Fig. 383

I 1 S 1 S 2 I 2



D 1 D 2

Areas:	
I 1	Charging status of the transmitter battery
I 2	Signal strength on the receiver
S 1	Control status
S 2	Mode
D 1+2	Machine data with symbols

Fig. 384:

I 1:

The display bar in the I1 area on the left edge of the screen is a measure for the charging status of the transmitter battery. The shorter the bar, the less charge the battery has.

I 2:

The display bar in area I2 on the right edge of the screen is a measure for how strong the signal of the transmitter is received by the receiver. The longer the bar is, the stronger the signal (e.g., because the operator is next to the pump).

S 1:

The S1 status area shows the status of the control system. It corresponds to the information on the control system display. In the example above, it can be seen that the system is ready to start.

S 2:

The selected operating mode of the control system can be viewed in area S2. Here, the operating mode is “Remote”.

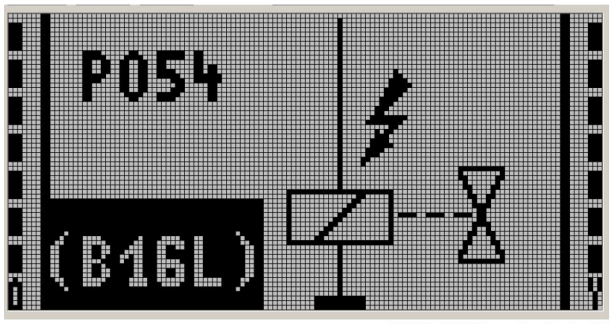
D 1 + D 2:

The data areas D1 and D2 on the lower edge of the screen contain current machine data along with the associated symbols (pictograms). In the example above, the display for the engine speed is on the left and the oil temperature on the right.

What can be seen in D1 and D2 is automatically determined by the control depending on the operation.

However, the S 5 button **(Fig. 381)** + **(Fig. 382)** can be used to make the selection yourself.

I 1 Additional text Error symbol I 2



00030_SC30-senderdisplay3-8

Error code

5.1.15 Error messages

In the event of errors, the display automatically switches from the default screen to the error screen, which always takes precedence. It is also divided into several areas:

I 1 + I 2

The meaning of both bar displays I 1 and I 2 for battery status and reception strength is the same as for the basic display.

Error symbol

The symbol (pictogram) associated with the error appears in the "Error symbol" field on the right.*

Additional text

For certain errors, additional text for a more detailed explanation is also displayed.

Error code

For each error, a corresponding code is displayed.* This code is displayed in a light font on a dark background at the bottom on the left.

For the automatically displayed error messages, too, you can switch between the error screen and the different data areas D 1 and D 2 using the S 5 button **(Fig. 385)**.

This can be useful for the further specification of the cause of the error and is effected by pushing the button once or several times.

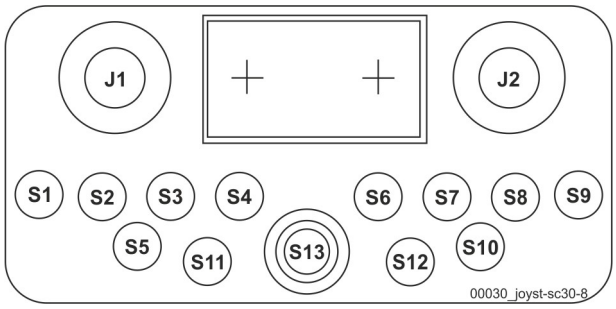
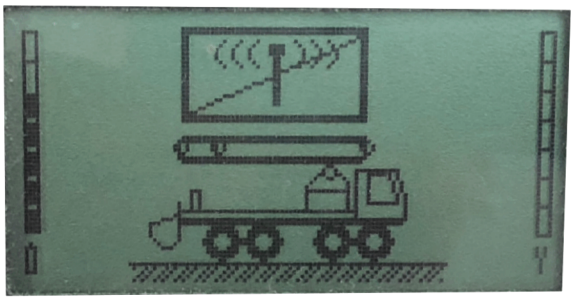
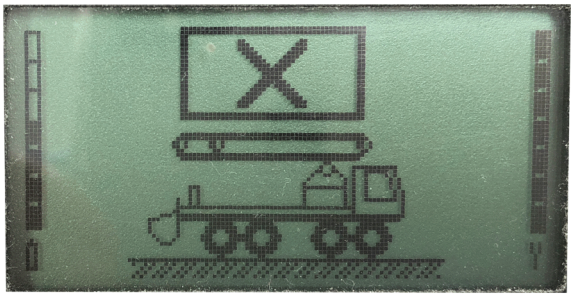


Fig. 385

* See description of control system.

5.1.16 Feedback errors

In the event of malfunctions in the SC30, the system's self-diagnosis displays the following messages.

Display	Meaning
 00030_SC30-disp-hardw-1	No radio connection available
 00030_SC30-disp-hardw-2	CAN communication failed between receiver and control system

5.1.17 Special equipment

If the machine has special equipment, such as the EASy one-sided outrigger system, errors are shown on the display of the control system as well as on the transmitter display.

5.1.18 Operating status displays for transmitter

The light-emitting diodes "antenna" 1 and "voltage" 2 are multifunctional indicators and show various operating statuses. They can light up in red or green.

<table>
<tr><td colspan="2"> 
</td><td>= ON
= OFF
= FLASHING</td></tr>
<tr><td>"Antenna" (1)</td><td>“Voltage” (2)</td><td>MEANING</td></tr>
<tr><td>OFF</td><td>OFF</td><td>Transmitter off</td></tr>
<tr><td>green, on</td><td>green, on</td><td>Transmitter is operationally ready. No function actuated (basic position).</td></tr>
<tr><td>green, flashing</td><td>green, on</td><td>One or more functions actuated. Transmitter transfers control data.</td></tr>
<tr><td>red, on</td><td>green, on</td><td>Transmitter on, but no connection to the receiver.</td></tr>
<tr><td>red, flashing</td><td>red, on</td><td>Transmitter on and active. Issue of command blocked by safety function.</td></tr>
<tr><td>red, flashing</td><td>red, on</td><td>Transmitter on and joystick actuated. No release by the selector switch S 11.</td></tr>
<tr><td>any signal possible</td><td>red, flashing</td><td>Low voltage of the transmitter battery. Replace battery within 30 min., before the transmitter is switched off.</td></tr>
</table>

Fig. 386:

5.1.18.1 The receiver

The receiver is normally located on the boom column of the machine.

The display of the receiver serves exclusively for the functional inspection during repair work. Reading the notifications on this display during operation is not permitted and also not necessary.

Warning!

Risk of falling!

Accessing the truck-mounted concrete pump is prohibited during operation!

If it is necessary to enter the machine for repair work on the radio equipment, this must only occur when the pump drive is switched off. Safe climbing aids and fall arresters are required for working on the machine, see **“VDMA safety manual”** on page 773.

Fig. 387 Receiver

LED display	Meaning
	Receiver off
	Standby mode: Transmitter search (shown through circulating bars)
	Standby mode: Connection with the transmitter
	Communication via cable: Identification (ID code) accepted
	Communication via cable: Identification (ID code) not accepted
	Radio transmission O.K. (frequency hopping*)
	ID programming active
	ID programming rejected

*Frequency hopping means the automatic transfer of control commands in small packages on different frequencies.

Information

Should other notifications be displayed, (see **“Troubleshooting”** on page 578).

5.1.19 Starting up the radio control system

5.1.19.1 Switching on the receiver

- Make sure that the cable connector X15 (8) **(Fig. 388)** or **(Fig. 389)** of the radio receiver is plugged into the switch cabinet of the machine.
- Switch the control system on and set up the machine as described in the operating instructions for the truck-mounted concrete pump.
- Switch on “REMOTE” mode.

The receiver display **(Fig. 390)** shows the message: Standby mode: Transmitter search.

There is still no connection with the transmitter.

The control system remains in EMERGENCY STOP mode.

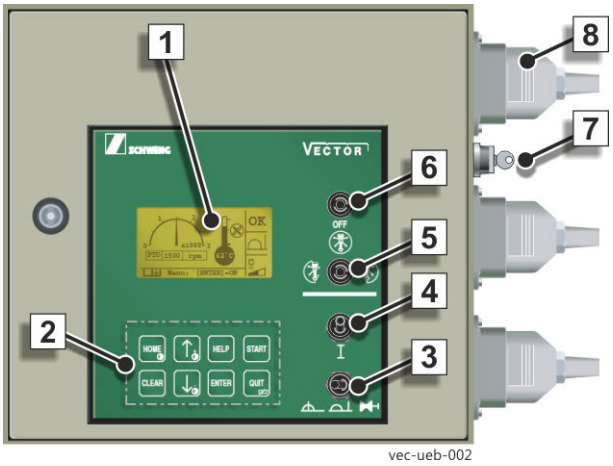


Fig. 388 Cable connector X 15 VECTOR

00169-VECTOR-II-Stecker-X15-90-V01

Fig. 389 Cable connector X15 VECTOR II

00030_SC30-ant1-8

Fig. 390

5.1.19.2 Switching on the transmitter

- Insert a battery cassette into the transmitter.
- Switch all engaged selector switches on the transmitter to the “0” position and unlock the EMERGENCY STOP button (3) **(Fig. 391)** by turning it once clockwise.
- Unlock all EMERGENCY STOP buttons on the machine as well; otherwise, it will not be possible to start the machine.
- Press and hold button (5) until LED 2 lights up continuously.

The display of the control system now changes from EMERGENCY STOP to START.

Information

If no connection to the receiver can be established, the LED (1) **(Fig. 391)** turns red.

Make sure that the receiver is switched on and the device pairing has been completed successfully.

The control system monitors the positions of all EMERGENCY STOP buttons and the selector switch of the active control.

Fig. 391

5.1.19.3 Starting the system

	When the system is ready, this symbol flashes on the display of the control system and the transmitter **(Fig. 392)**.
	Release the control by briefly actuating the S3 button **(Fig. 392)** + **(Fig. 393)**
	The start is confirmed by a short, acoustic signal and the displays show "OK".

As such, the transmitter is operationally ready. It is located in basic position.

The LEDs (1+2) **(Fig. 394)** light up green.

Fig. 392

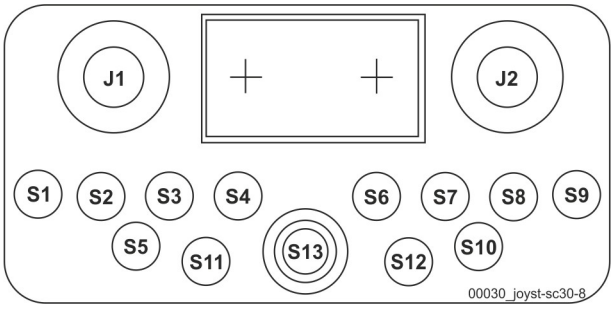


Fig. 393

Fig. 394

5.1.20 Starting up the cable control

- Use the cable to connect the transmitter to the machine.
  The connection socket of the transmitter (1) **(Fig. 395)** is located on the side of the housing.
  The connection socket of the receiver (2) is located on the machine in the switch cabinet of the hydraulic emergency control unit.
  Depending on the machine type, the connection socket is located on the left or right side in the switch cabinet (example (2), **(Fig. 396)**.
- Insert the cable into the switch cabinet from the bottom and connect it.
- Close the flap on the emergency control unit and lock it.
- Restart the system as described in **"Starting up the radio control system"** on page 558.

The identification for the cable remote control is shown in the function diagram for the remote control:

Active: Cable

Warning!

Danger due to unauthorised actuation of the emergency control!

The flap over the emergency control must be closed and locked.

Information

For the cable control it is not necessary for a battery cassette to be located in the transmitter.

The battery is however charged when the cassette remains in the transmitter.

Fig. 395

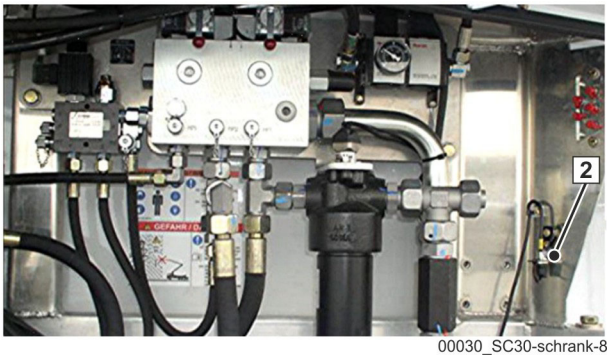


Fig. 396

5.1.21 Operation

Once the system is operationally ready, all specified functions can be remotely controlled.

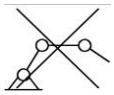
If no switch is actuated, LEDs 1+2 **(Fig. 397)** light up green, thus indicating operational readiness (default position).

During the transfer of control commands, the LED 1 flashes green. The selected functions are carried out by the machine.

After resetting all switches to the “0” position, the transmitter returns to the default position.

For further display options with LEDs 1+2, (see **“Operating status displays for transmitter”** on page 555).

5.1.21.1 Selecting the boom speed

	It is not possible to move the boom when the selector switch (4) **(Fig. 397)** is in the centre position. This is important, for example, when the boom must not be moved inadvertently.
	In the "hare" position, all boom movements can be driven proportionally up to the maximum speed of 100%. This position is intended for the installation and removal of the placing boom.
	In the "screw conveyor" position, the boom speed is reduced by 50%. This position is intended for the operation of the placing boom.

Information

For safety reasons, both joysticks must be in the neutral position when switching the S 11 switch **(Fig. 398)**.

If this is not the case, the diode (2) lights up red and the buzzer in the transmitter sounds.

Fig. 397

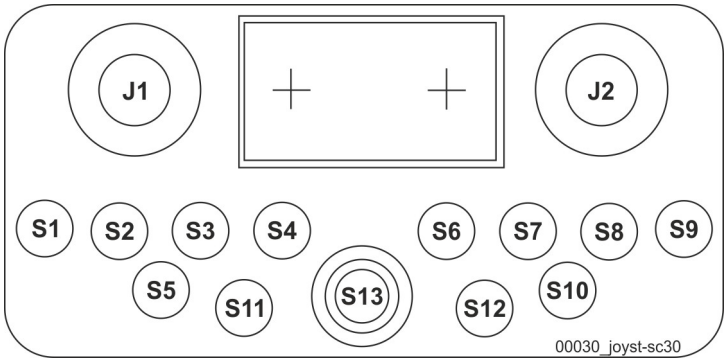


Fig. 398

5.1.22 Operating interruptions

Warning!

Danger due to unauthorised use!

Do not put down the operational transmitter.

Always switch on and off the operational transmitter.

- Turn the relevant selector switch on the transmitter to position “0” to stop individual functions.
- Press the EMERGENCY STOP button (3) **(Fig. 399)** to shut down the transmitter.

The transmitter sends the EMERGENCY STOP signal, which immediately interrupts all primary machine functions.

Then the transmitter switches off automatically.

To restart the machine, restart the transmitter as described in **“Starting up the radio control system”** on page 558.

Information

If the transmitter is switched off while “REMOTE” mode is active, then the control system automatically switches to the secure EMERGENCY STOP status.

Activate “LOCAL” operating mode if you do not want this.

Fig. 399

5.1.23 EMERGENCY STOP

By pressing an EMERGENCY-SOP button, the main machine functions are interrupted immediately.

In addition, the control system can switch off the drive motor.

It depends on the vehicle electronics and consent of the motor manufacturer whether this option is used.

Please only use the EMERGENCY STOP button on the machine in emergency situations, especially if your machine is equipped with the motor shutdown function described above.

When the remote control is active, the EMERGENCY STOP button on the transmitter also serves to shut down the transmitter.

Always switch off machine functions and motor by means of the appropriate control devices under normal operating conditions.

Recommissioning after EMERGENCY STOP

- Remedy the fault.
- Set all engaged selector switches on the transmitter to the "0 or centre position" and unlock the previously activated EMERGENCY STOP button. Otherwise, it will not be possible to start the machine.
- Start up the control system.

The restart protection prevents the machine functions from starting by simply unlocking the actuated EMERGENCY STOP button.

If one or more functions are detected as active when switching on the transmitter (no “0” position), the LED power lights up red.

After approx. 30 seconds, the LED "Power" switches from red to green. All functions having been identified as switched on are now switched off and the control can be placed into limited operation. All switches not previously identified as active, may now be used.

Joystick errors are reported by optical and acoustic signals.

Faulty functions are deactivated.

Use self-test mode to detect faults.

The control monitors the positions of the EMERGENCY STOP buttons and selector switch of the active control.

The display shows a corresponding notification.

5.1.24 Starting / Stopping the motor

In order to prevent a function from starting unintentionally, the motor can only be started when all selector switches are in the neutral (0) position.

While it is possible to switch off the motor with an activated function, this should be avoided.

If it is not an emergency, always

- Switch off function(s) first, then
- Reduce rotational speed to idle, then
- Switch off motor

Attention!

Material damage due to overheated motor!

Turbo chargers can be damaged due to overheating if the motor is suddenly switched off at a high speed.

If it is not an emergency, switch off the motor as described above.

5.1.25 Checking the reception quality

Receiver and transmitter have the ability to display the reception quality.

Receiver

When the reception quality is optimal, the receiver display **(Fig. 400)** shows the message

("H" stands for automatic frequency management)

Information

Short flashing of the notification indicates a temporary loss of quality, and is of no relevance.

Frequent flashing indicates a persistent impairment requiring an adjustment (relocate, etc.).

The reception quality is also displayed in the function diagram of the remote control in the VECTOR menu.

Transmitter

LED 1 **(Fig. 401)** indicates the reception quality.

- LED flashes red => poor signal
- LED on permanently => no signal

In addition, the right display bar shows the signal strength on the display **(Fig. 402)**.

Fig. 400

Fig. 401

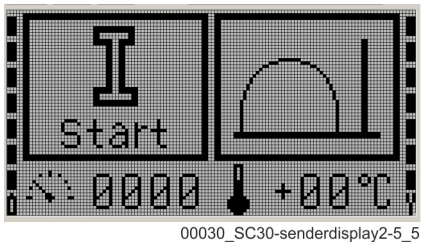


Fig. 402

5.1.26 End of operation

Information

If the transmitter is switched off while “REMOTE” mode is active, then the control system automatically switches to the secure EMERGENCY STOP status.

Activate “LOCAL” operating mode if you do not want this.

- Switch off the transmitter by pressing the EMERGENCY STOP button (3) **(Fig. 403)**.
- Store the transmitter in the driver's cab when no longer required.
- Switch off the control system using the switch in the driver's cab.
- Switch off the vehicle’s power take-off.

Fig. 403

5.1.27 Changing / Charging the battery

5.1.27.1 Changing the battery

The compartment for the battery cassette is located at the bottom of the transmitter **(Fig. 404)**.

The cassette can only be inserted in the correct position in the transmitter with mechanical encoding.

- Clean the contacts, if necessary, before inserting the cassette.

A fully recharged battery lasts for about 8 operating hours. Very cold weather can reduce the capacity.

A monitoring device switches off the transmitter when the joystick was inactive for 30 minutes (standby mode).

Information

A low charging status is indicated for the battery when the buzzer sounds 3 times and the LED (2) **(Fig. 405)** flashes red.

The left bar on the display **(Fig. 406)** also shows the charging status of the battery.

Fig. 404

Fig. 405

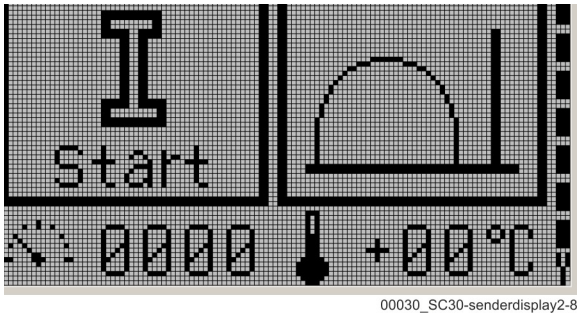


Fig. 406

5.1.27.2 Charging the battery

The battery is charged with the quick charger **(Fig. 407)** or via cable when the control cable is connected.

Warning!

Battery can explode!

Do not use any third-party chargers.

Caution!

Charging the battery becomes problematic at ambient temperatures below 10 °C (50 °F).

If possible, use the charger supplied as an original accessory for mains operation at a room temperature of 20 °C (68 °F).

The ambient temperature during charging may not exceed 45 °C (113 °F). Rechargeable battery is damaged!

5.1.27.3 Charge with the charger

After inserting the rechargeable battery into the charger, it starts with a quick charge. The charger switches to the conservation status when rechargeable battery is fully charged.

The average charging time for a depleted rechargeable battery is about 3 hours.

The charger is designed such as not to damage the rechargeable battery.

The green LED 1 flashes during the charging process and lights up continuously when the rechargeable battery is charged (conservation status).

The red LED 2 lights up when the current supply is connected.

00030_SC30-lade1-8

Fig. 407

Sign in charger (translation)

Attention!

Please read prior to use!

Only for the interior!

Do not cover charger!

Observe admissible ambient temperature when charging the battery (see links)!

5.1.27.4 Charging cycle for the charger

Charging attempt for 10 minutes:
- green LED flashes
- red LED is on

Rechargeable battery is defective →

Charger switches to sleep mode:
- green LED is off
- red LED is on

Rechargeable battery is OK

Quick charge for 2-3 hours:
- green LED flashes
- red LED is on

Rechargeable battery is not fully charged after 3 hours →

Charging stop caused by safety function:
- green LED is on
- red LED is on

Battery fully charged after 3 hours

Trickle charging:
- green LED is on
- red LED is on

Fig. 408

5.1.27.5 Charging via control cable

The connected control cable charges the transmitter battery from the vehicle battery via a receiver and cable.

00030_SC30-lade1-8

Fig. 409

5.1.28 Storage, maintenance, upkeep, disposal

5.1.28.1 Storage

- Store the system in a dry room. Avoid humidity and extreme temperatures.
- Remove the battery cassette when the transmitter is not in use for an extended period of time.

Place the cassette into an active charger or charge the rechargeable battery every 2 weeks.

Warning!

Danger due to unauthorised use!

The machine operator is responsible for the safe storage of the transmitter in order to prevent unauthorised persons from accessing it.

Enclose the transmitter!

5.1.28.2 Maintenance

- Check the system regularly or upon observing abnormal behaviour.
- Check the transmitter for damages. Pay particular attention to such damages enabling water to ingress.
- Check the cables on the receiver for damages.
- Carry out a functional check periodically before driving the machine to the job-site.
- Report damages immediately to your supervisor.

Attention!

Risk of damage:

Only carry out maintenance on the currentless radio equipment.

Disconnect all cables from the receiver before carrying out electric welding work on the machine.

5.1.28.3 Upkeep

- Use a damp cloth to clean the system on the outside only. Do not open housing! Dry with a soft cloth.

Attention!

Risk of damage!

Do not spray system, do not immerse or hold under running water.

Do not use cleaning agents such as spray oil, diesel oil, alcohol, etc. These agents damage the seals.

5.1.28.4 Disposal

- Dispose of old batteries properly by dispensing of them at a waste disposal facility.

Do not throw away rechargeable batteries!

5.1.29 Pairing the transmitter and receiver

Pairing refers to the programming of an individual identification code (ID code). This is necessary for the wireless communication between a particular transmitter and a particular receiver.

Warning!

Danger due to malfunction!

The system may only be programmed by specially-trained experts.

1. Switch control system to “LOCAL” operating mode.
2. Switch off transmitter and remove battery.
3. Connect transmitter and receiver with the control cable.
4. Unlock the EMERGENCY STOP button on the transmitter.
5. Switch off and on the receiver by unplugging cable connector X15 (8) **(Fig. 388)** or **(Fig. 389)** and plugging it back in.
6. Actuate button 5 **(Fig. 410)** on the transmitter within 45 seconds and hold for 10 seconds until the buzzer in the transmitter sounds.
7. The display of the control system shows the notification R 13 M “Pairing in progress!”
8. Release button (5) **(Fig. 410)** and wait until the buzzer produces 5 beeps in quick succession and the transmitter is switched off automatically.

9. Switch on the transmitter again with button (5).

Information

If the transmitter is being paired for the first time, observe the work sequence as of step 11!

Now, the following notification appears on the display of the control system:
R 14 M “Pairing completed successfully!”

then the pairing process was successful.

10. The basic display appears in the display of the transmitter after 30 seconds. This concludes the successful pairing of the transmitter and receiver.

Remove the control cable and insert the rechargeable battery into the transmitter.

Switch control system to “REMOTE” operating mode.

The system is now ready for radio operation.

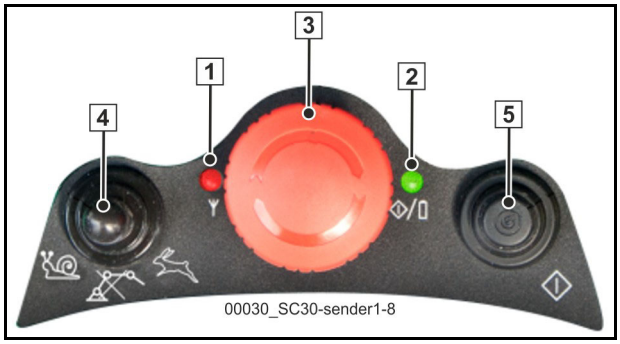


Fig. 410

11. If the transmitter is paired for the first time, data from the receiver must still be transmitted to the transmitter.

Wait until the display of the transmitter shows the message illustrated in **(Fig. 411)**.

Attention!

Potential material damage due to unauthorized shutdown!

Switch off system first when both messages are displayed with "done".

Cancelling the charging can cause the transmitter to be re-set by customer service.

12. After the transmission, switch off the transmitter and switch it on again.

If the basic display appears in the display of the transmitter after 30 seconds, the successful pairing of the transmitter and receiver is concluded.

- Remove the control cable and insert the rechargeable battery into the transmitter.

The system is now ready for radio operation.

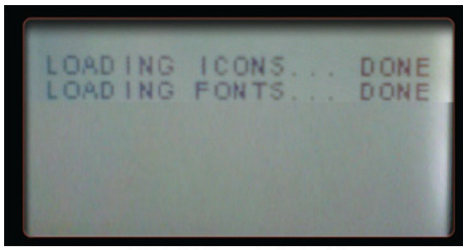


Fig. 411

If the buzzer in the transmitter produces a long sound, and the receiver display shows the notification "bL", the pairing process was interrupted.

bL	(ID programming rejected)

At the same time, the display of the control system shows the notification R 15 L “Pairing cancelled with error!”

- Repeat the pairing procedure.
- Adhere to the time limit between step **(5.)** and **(6.)**!

After repair work on the system or unusual performance, repairing the system again might be required.

5.1.30 Troubleshooting

Warning!

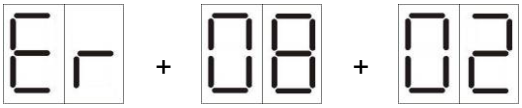
Danger caused by malfunction.

The following error table provides assistance to qualified personnel authorised by the manufacturer to carry out repair- and programming work. Should such personnel not be available, please contact the SCHWING customer service. Inform the customer service of the error code indicated on the display of the receiver or on the display of the control system.

Occurring errors are displayed in three blocks and repeated three times. The error code always starts with "Er" (Error)

Example:

Block 1 Block 2 Block 3



Error 08 02 signifies:

Block 2	Block 3	Description	Cause	Remedy
08	02	CAN notification memory overflow	CAN notification memory full, refers to both the input and output memory.	The system reboots automatically. Perform a system reboot at CAN level.

If the system recognises a minor error, it will automatically reset to standby in order to correct the error.

If the system determines a fatal error, the error code will continue to be shown in the display until the system is switched off.

5.1.30.1 Error codes (information for qualified personnel)

Block 2	Block 3	Description	Cause	Remedy
01	01	Error in EE-PROM	CRC checksum is faulty, last programmed software uses CRC	Reboot the system, should the problem persist, the operating software must be reloaded.
01	02	Error in flash memory	CRC checksum is faulty, last programmed software uses CRC	Reboot the system, should the problem persist, the operating software must be reloaded.
01	03	Error in stack memory	Incorrect data length for the CAN open protocol, error in the data flow or stack overflow	The system reboots automatically. If the problem persists, the operating software must be reloaded.
01	04	Error in RAM memory	Incorrect memory- or hardware identification	The system reboots automatically. If the problem persists, the operating software must be reloaded.
02	01	Unauthorised voltage on the boom switch outlet	Error on the boom switch outlet or external voltage source connected to the boom switch outlet	The system reboots automatically. Check the plug connector for the boom release outlet and remove the plug connector, if necessary. Restart the system.
02	02	Short-circuit on the boom switch on output	Error on the boom switch outlet or overload of the boom switch outlet	The system reboots automatically. Check the plug connector for the boom release outlet and remove the plug connector, if necessary. Restart the system.
02	03	Error on the safety switch	Safety switch output read back error or incorrect voltage (battery instead of mass)	The system reboots automatically. Remove the plug connector of the in- and outputs. Restart the system.

Block 2	Block 3	Description	Cause	Remedy
02	05	CAN error in the safety loop	Incorrect safety loop status.	The system reboots automatically. Check the CAN safety loop.
04	00	Short-circuit on the digital output	Digital outputs (1-14) are short-circuited or overloaded.	The system reboots automatically. Remove the plug connector of the in- and outputs. Restart the system.
08	01	CAN is passive	CAN Bus is in passive operating status.	The system reboots automatically. Check the CAN bus connection and ensure that all other CAN participants are functioning.
08	02	CAN notification memory overflow	CAN notification memory full, refers to both the input and output memory.	The system reboots automatically. Perform a system reboot at CAN level.
08	03	CAN hardware error	General communication error.	The system reboots automatically. Check the CAN bus connection and ensure that all other CAN participants are functioning.
08	04	CAN PDO notification is too long	CAN PDO notification exceeds maximum length.	The system reboots automatically. Perform a system reboot at CAN level.
08	05	CAN PDO notification length error	CAN PDO notification falls below minimum length.	The system reboots automatically. Perform a system reboot at CAN level.
08	06	CAN COB-ID transmitter conflict	Too many conflicts on the CAN Bus.	The system reboots automatically. Check the CAN bus connection and ensure that all other CAN participants are functioning. Perform a system reboot at CAN level.

Block 2	Block 3	Description	Cause	Remedy
10	00	Transmitter error: EMERGENCY STOP	Transmitter error sent, unauthorised status for the EMERGENCY STOP switch.	The system reboots automatically. Ensure that the EMERGENCY STOP switch on the transmitter is not activated.
11	00	Transmitter error, analogue input	Transmitter error sent, analogue inputs are active	Ensure that all proportional control elements on the transmitter are in the resting position.
12	00	Transmitter error, analogue input	Transmitter error sent, signal redundancy test of the analogue inputs are faulty.	The system reboots automatically. Diagnose the transmitter in TEST MODE.
13	n/a	Transmitter error, analogue input	Transmitter error sent, signal redundancy test of the analogue inputs are faulty.	The system reboots automatically. Diagnose the transmitter in TEST MODE.
14	01	ID programming error	ID code and/or operating parameters are faulty.	The system reboots automatically. Ensure that the ID programming sequence is successful. Restart the system.
14	02	Programming error	Parameters for the programmable logic are faulty.	The system reboots automatically. Restart the system.
17	01	Low supply voltage	Supply voltage is below 8.5 V.	The system reboots automatically. Ensure that the current supply and cabling are in proper working condition. Restart the system.
17	02	Supply voltage too high	Supply voltage exceeds 36 V DC.	The system reboots automatically. Ensure that the current supply and cabling are in proper working condition. Restart the system.
98		Undefinable error	Transmitter	Check transmitter in self-test mode.
99		Undefinable error	Receiver	Check current supply and plug connector.

5.1.31 Self-test mode

The radio transmitter features a test mode that can be used to check that all switches, buttons, potentiometers and joysticks are functioning properly.

Procedure for activating self-test mode:

1. Bring all switches and output potentiometer to zero position.
2. Release emergency switch and actuate the ON/OFF button.
3. Before accessing the start-up screen, actuate the ON/OFF switch 10 times in quick succession until the power LED starts flashing in rapidly and the buzzer emits a sound confirming the self-test mode.
4. The LCD display shows now the software version (firmware) and serial number.

Information

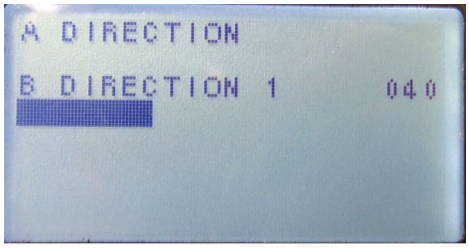
If all switches and potentiometers were not in the zero position, this display will not appear.

Bring all switches and potentiometers to zero position and repeat process!

Switches, buttons, potentiometers and joysticks can now be tested by actuating them. The functions are shown on the display and at the same time actuated acoustically by a buzzer.

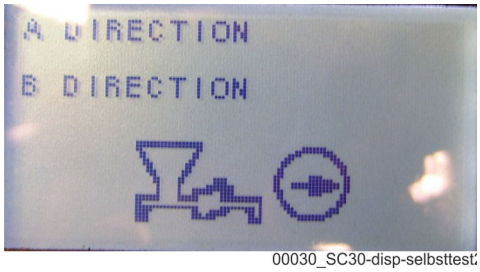
Proportional inputs (joysticks and potentiometers) are displayed as a bar chart, **(Fig. 412)**.

Digital inputs (black/white) are displayed as a function symbol, **(Fig. 413)**.



00030_SC30-disp-selbsttest1

Fig. 412



00030_SC30-disp-selbsttest2

Fig. 413

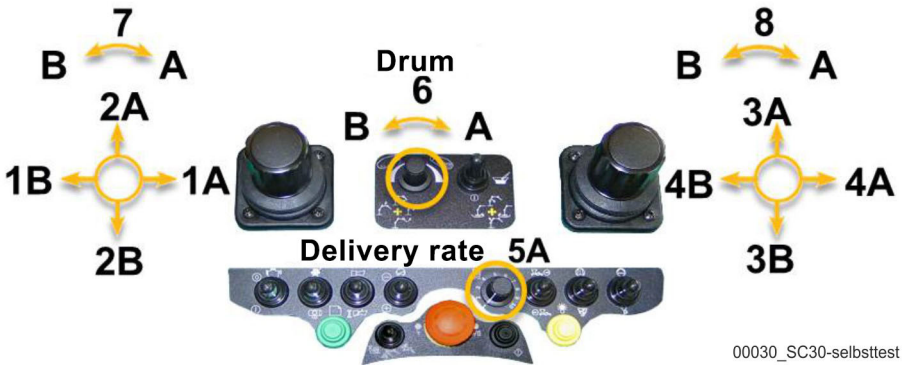

7
B
A
2A
1B
1A
2B
Drum
6
B
A
Delivery rate
5A
8
B
A
3A
4B
4A
3B
00030_SC30-selbsttest

Fig. 414

6 Special equipment

Please note that the possibility to use special equipment depends on the machine model.

6.1 EASyflex II outrigger system

This chapter describes the functions of EASyflex II and how your machine should be operated in EASyflex II mode.

Information

The performance features of the special equipment EASyflex II depend on the respective machine type.

EASyflex II is not available for all machine types.

In order to ensure stability, truck-mounted pumps are equipped with an outrigger system. SCHWING truck-mounted pumps are designed so that they can be moved freely in all directions in accordance with their degrees of freedom without jeopardising their stability when the outriggers of the placing boom are fully extended vertically and horizontally and positioned correctly.

On some jobsites, there is not enough space to extend the outriggers fully on all sides. In these situations, the continuously optimised EASy one-sided outrigger system from SCHWING can help. With EASy, depending on the outrigger configuration, the work area of the placing boom may be restricted. This means that the machine can still work stably even if not all outriggers are fully extended horizontally. EASyflex II is an advanced development of EASy. EASyflex II offers the operator more work areas in order to react more flexibly to the respective jobsite situation. With EASyflex II, the minimum requirement is that only two adjacent outriggers must be fully extended horizontally. However, it is still necessary to extend the vertical outriggers correctly. In order to ensure stability at all times, the movements of the placing boom are restricted.

Information

You must read and understand the control system chapter to understand all EASyflex II functions better.

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6.1.2 Intended use

EASyflex II offers the option of moving the placing boom when the outriggers are not or are only partially extended horizontally. However, the vertical extension of the outriggers is still required. Depending on the chosen horizontal outrigger configuration, the control automatically restricts the placing boom's range of movement so that the machine's stability is ensured at all times.

EASyflex II's performance features depend on the machine type. EASyflex II is not available for all SCHWING machines.

To prevent excessive outrigger loads, the following work areas of the overhead folding system are somewhat more restricted than the work areas of the normal folding system:

EASyFront, EASyFront with EASyLeft, EASyFront with EASyRight.

With EASyFront, placing boom section 1 is limited in its inclination angle.

In the case of EASyFront with EASyLeft or EASyRight, the swivel angle is slightly reduced.

6.1.3 Safety instructions

- Read the chapter carefully and contact Schwing's customer service should you have any questions.
- Learn how to correctly operate the system.
- Work carefully and closely follow these operating instructions.

The machine must only be operated without the outriggers extended horizontally or with the outriggers only partially extended horizontally if EASyflex II is activated.

Danger!

Danger to life due to loss of stability!

Serious injuries or death can be caused by the machine tipping over.

Observe the instructions in the operating instructions and the safety manual on how to set up machines.

6.1.4 EASyflex II working method

With EASyflex II, the working method of the placing boom is restricted by the outrigger configuration. The placing boom can then move freely within a restricted work area without jeopardising its stability. At least two adjacent outriggers must be fully extended horizontally. Through the full or partial extension of a third outrigger, the work area can be further increased.

If the placing boom approaches the limit of the restricted work area while moving, the control system first reduces the boom speed automatically and an acoustic signal sounds for the operator from the remote control.

If the placing boom continues to move towards the limit of the restricted work area, the frequency of the acoustic signal increases.

If the placing boom reaches the cut-off point at the limit of the restricted work area, the control system stops the placing boom from moving automatically and another acoustic signal sounds on the remote control (2 x short, 1 x long).

The operator has the option of swivelling the placing boom into the permitted work area at any time with a countermovement or by setting placing boom section 1 vertically to prepare for driving through a restricted area.

6.1.5 EASyflex II work areas

Information

In this chapter, only the left-hand work area is described and illustrated as an example. The information described here also applies to the work areas on the right-hand side.

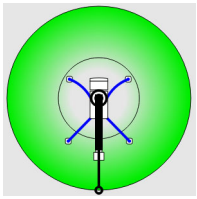
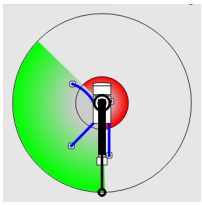
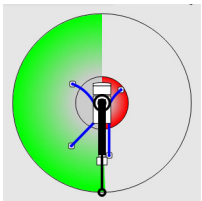
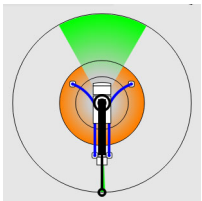
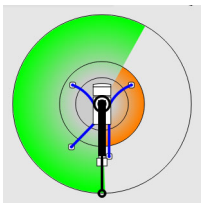
Depiction	Description
	Work area not restricted. All outriggers are fully extended horizontally.
	**EASyLeft** Work area restricted to one side. Only the outriggers on the working side are fully extended. Outriggers on the back side are retracted.
	**EASyExtend** An enlarged work area is restricted to one side across from EASy. Outriggers on the working side are fully extended and the front outrigger on the back side is also extended to the EASyExtend position.
	**EASyFront** Work area restricted to the front area. Only front outriggers are fully extended.
	**EASyFront with EASyLeft** EASy work area and also front work area. Rear outriggers on the working side and both front outriggers are fully extended.

Table 22 EASy work areas

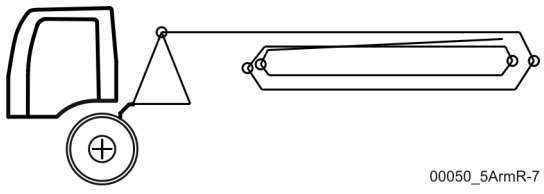
6.1.5.1 Main differences between the “normal” and “overhead” folding systems

SCHWING puts the different folding types of the placing boom into two groups:

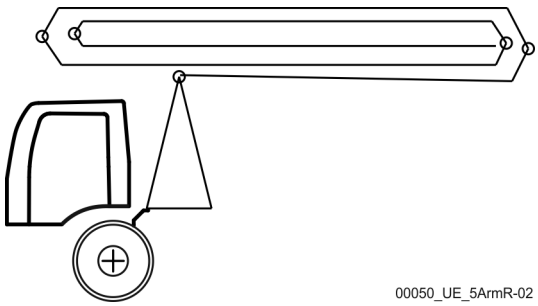
- For machines with "normal folding systems", the placing boom is folded together behind the driver’s cab.
- For machines with "overhead folding systems", the placing boom is folded together above the driver’s cab.

The procedures for folding out the boom vary depending on the folding type. In addition, the overhead folding systems feature a restricted movement function when folding out the placing boom. This restricted movement function prevents collisions between the driver’s cab and the placing boom.

The table below contains a schematic diagram of the folding types.



5-boom normal folding system: roll-folding



5-boom overhead folding system: roll-folding

Table 23 Graphical presentation of folding types

6.1.6 Increasing the restricted work area

To increase the restricted work area with a partial support, the second front outrigger is also extended horizontally with EASyExtend. For some machine types, it is sufficient when the third outrigger is only partially extended.

Note the exceptions to this. Both front outriggers have to be extended completely for model series S 31 XT; S 32 X; S 36 X; S 39 SX; S 42 SX if the EASyExtend variant is selected.

Information

To operate the machine in EASyExtend mode, the second front outrigger must be extended horizontally.

Extend the outrigger at least far enough that the 1 markings on the inside **(Fig. 415)** are completely visible.

End limit switches monitor the **horizontal** movements of the outriggers. If these switches recognise that the outriggers have reached the required positions, an acoustic alert is emitted.

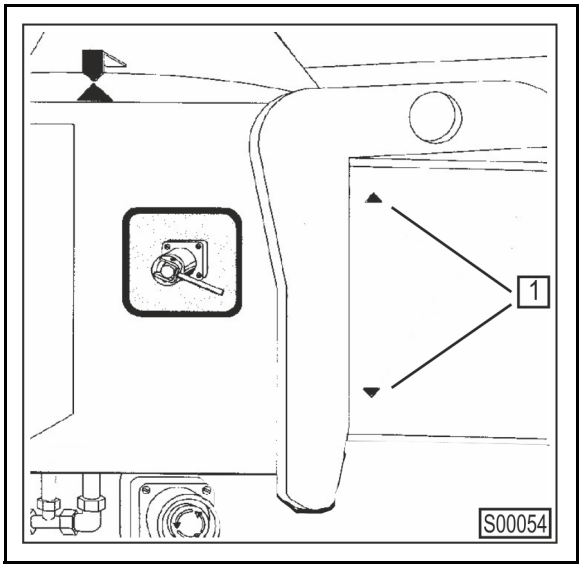


Fig. 415 Markings on the outriggers

6.1.7 The EASyflex II screen

The control system and remote control SC50 offers the EASyflex II screen for support. This screen provides a quick overview of the outrigger configuration, the current position of the placing boom, and the permitted and restricted work areas.

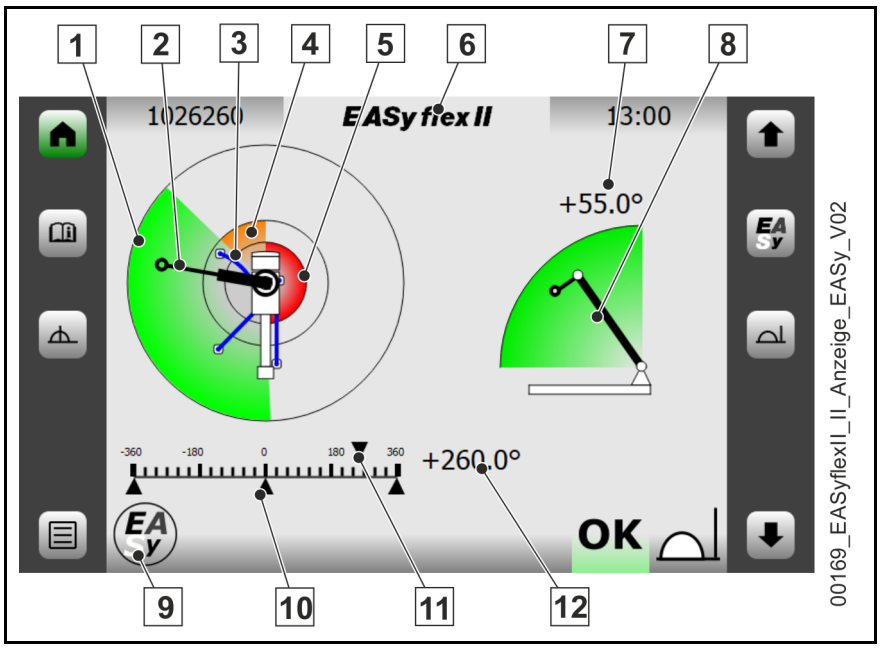


Fig. 416 The EASyflex II screen

Illustration legend (Fig. 416)			
Pos.	**Description**	**Pos.**	**Description**
1	Released work area[1] (green)	7	Numerical display: Inclination angle of boom section 1
2	Graphical presentation: Placing boom	8	Graphic display: Inclination angle of boom section 1
3	Outrigger extended towards front horizontally and vertically.[2]	9	Selected support type[1] • Full support • Partial support (EASy)
4	Restricted range of rotation[1] (orange)	10	Position of boom support
5	Locked range of rotation[1] (red)	11	Graphic display: Placing boom angle of rotation
6	Screen title (according to equipment variant)	12	Numerical display: Placing boom angle of rotation

1. Only with EASyflex II
2. The supporting plates pictured indicate that the vertical outrigger has been extended and released correctly.

6.1.8 Setting up the machine with EASyflex II

An overhead folding system with the EASyLeft work area variant is described as an example for setting up the machine. In this configuration, all steps that might be required when setting up the machine must be completed.

For some machine and work area combinations, not all steps must be completed. For example, the boom support is located in the permitted work area in the EASyLeft variant for normal folding systems. Therefore, the steps for positioning the placing boom vertically and swivelling the placing boom into the work area are not required.

Information

Optional steps are marked with the note “**Optional step:**” in the instructions. If the step is not required for your machine variant or work area, then proceed directly with the next step.

1. Observe the instructions from chapter **3.8 "Setting up machines"**.
2. Start up the control system as described in the "Control system" chapter.
3. Switch to LOCAL mode. LOCAL mode is shown in the status bar. Partial support is preselected as standard in the control.
4. **Optional step:** The machine determines the areas based on the outrigger configuration. If there is a sensor or control error, the control may not be able to recognise the outrigger configuration. In this case, full support can be selected manually. Press the EASy Direkt selector button.
5. **Optional step:** If the control does not recognise the outrigger configuration, select the full work area.
6. **Optional step:** If the control does not recognise the outrigger configuration, confirm using the “Execute” button.

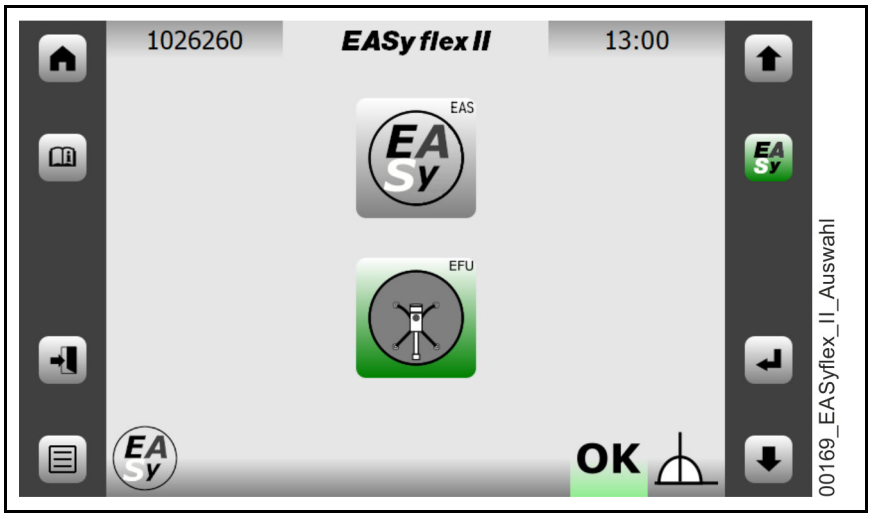


Fig. 417 Selecting EASyflex II and full support

Attention!

Risk of damage due to the front supporting leg and the machine's fender colliding!

For some machine types, the supporting leg must not be fully retracted vertically while retracting or extending the front outrigger horizontally.

If necessary, slightly extend the supporting leg of the outrigger vertically before moving it horizontally in order to avoid a collision.

7. Extend the outriggers horizontally as you wish. The EASyExtend position is marked on the outriggers. In addition, the remote control emits an acoustic signal when an outrigger reaches the EASyExtend position. The machine control restricts the work area according to the selected outrigger configuration.
8. Extend all outriggers vertically until all of the wheels on the machine have left the ground.
9. Use the spirit level to align the machine horizontally. The machine must not be tilted more than 3° along any axis.

Danger!

Loss of stability due to machine being at a prohibited inclination!

Serious injuries or death can be caused by the machine tipping over.

Do not tilt the machine more than 3° on any axis when setting it up.

10. Switch to REMOTE mode. A dialogue appears where the machine asks if all outriggers are positioned correctly. The REMOTE button becomes the “CONFIRMATION” button.

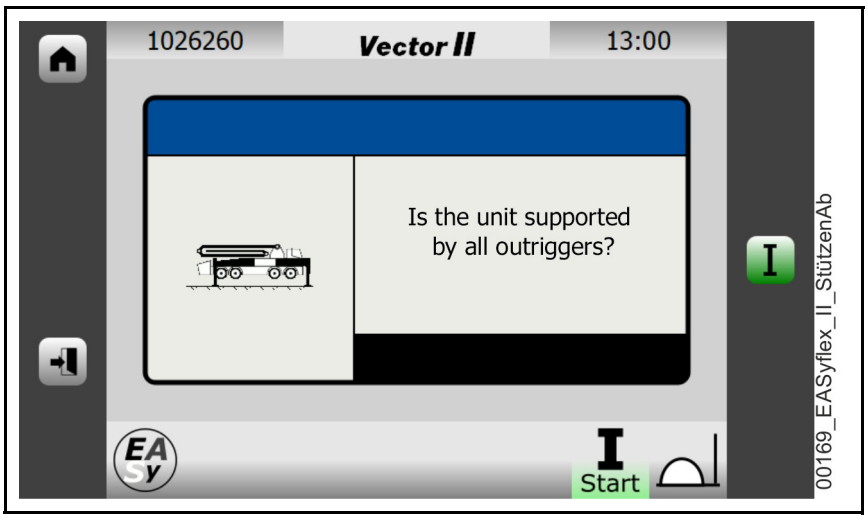


Fig. 418 Outrigger request

11. Confirm the vertical position of all outriggers in the control system using the “CONFIRMATION” button. The placing boom can now be operated with the remote control. You can exit the dialogue screen at any time using the “Main screen” or “Back” buttons. To reach the dialogue screen again, press the HELP button or switch to REMOTE mode.

Information

The movements of the placing boom are restricted by the control system while it is being folded out.

Only movements that do not jeopardise stability are permitted by the control system.

12. **Optional step:** This step is required only for overhead folding systems. Move placing boom section 2 until the opening angle between placing boom section 1 and placing boom section 2 is more than 20°.
13. Lift placing boom section 1 out of the boom support.
14. **Optional step**[1]**:** This step is only required if you need to drive through the restricted area in order to reach your work area. Position placing boom section 1 vertically (min. 87° - max. 93°).

1. For the S24X and S28X, please also observe chapter (6.1.8.1 Special features of the S 24 X and S 28 X with slewing cylinders).

Information

When the machine is tilted, the inclination angle of placing boom section 1 changes when turning. If the inclination angle limits for vertical positioning are exceeded or not reached, the slewing movement is stopped by the control.

Adjust the placing boom section 1 inclination angle until it is back within the limits. The slewing movement is then released again.

15. **Optional step:** This step is only required if you must drive through the restricted area in order to reach your work area. Slew the placing boom into the required work area.
16. Now fold out the placing boom completely.

6.1.8.1 Special features of the S 24 X and S 28 X with slewing cylinders

For the S 24 X and S 28 X with slewing cylinders, placing boom section 1 does not need to be vertical when driving through the restricted range of rotation during folding in and out. However, the rest of the boom package must be completely folded together. This must be confirmed by the operator in an additional query from the control using the “CONFIRMATION” button. When driving through the restricted area, the rotating warning light is activated.

Fig. 419 Boom folded together query?

6.1.9 Working with EASyflex II

When working with EASyflex II in the full work area, the operator can move the placing boom freely within the entire work area without any restrictions. When working with a restricted work area, only boom movements are permitted that do not jeopardise stability.

If you move the placing boom at the edge of a limit, the speed of the placing boom is always reduced first. If the placing boom reaches the cut-off point, then any dangerous boom movements are stopped. You can move the placing boom out of the limit range at any time with a countermovement or drive through the restricted area by setting placing boom section 1 vertically.

6.1.10 Taking down the machine with EASyflex II

An overhead folding system with the EASyLeft work area variant is described as an example for taking down the machine. In this configuration, all steps that are possible when taking down the machine must be completed. For some machine and work area combinations, not all steps must be completed. For example, if the boom support is located in the work area of the placing boom, then you can fold together and stow the placing boom directly. No other steps are necessary.

Information

Optional steps are marked with the note “**Optional step:**” in the instructions. If the step is not required for your work area, then proceed directly with the next step.

1. Observe the instructions from the machine-specific chapter **“Assembling the placing boom”**
2. **Optional step**[1]**:** This step is only required when the restricted work area must be driven through.Position placing boom section 1 vertically (min. 87° - max. 93°).
3. **Optional step:** This step is only required when the restricted work area must be driven through. Slew the boom through the restricted area to the boom support.
4. Fold the placing boom together up to placing boom section 1. In the case of overhead folding systems, leave the B joint between placing boom section 1 and placing boom section 2 open by approx. 20°.
5. Lower the folded together placing boom into the boom support.
6. **Optional step:** This step is required only for overhead folding systems. Fold the B joint between placing boom sections 1 and 2 together until an opening angle of 0° is reached.

1. For the S24X and S28X, please also observe chapter (6.1.8.1 Special features of the S 24 X and S 28 X with slewing cylinders).

7. Switch to LOCAL mode.
8. Observe the instructions in Chapter **3.24 "Preparing the machine for driving"** for taking down the machine.
9. Retract the outriggers on the machine vertically.

Attention!

Risk of damage due to the front supporting leg and the machine's fender colliding!

For some machine types, the supporting leg must not be fully retracted vertically while retracting or extending the front outrigger horizontally.

If necessary, slightly extend the supporting leg of the outrigger vertically before moving it horizontally in order to avoid a collision.

10. Retract the outriggers horizontally.
11. Lock the outriggers.

6.1.11 Changing the EASy work area

In order to change the EASy work area, the placing boom and the outriggers must be moved completely into the transport position. You can then set another outrigger configuration and set up the machine again.

6.1.12 Restarting the control system after a malfunction/failure

When the control system is restarted during operation (e.g., because the vehicle ignition was switched off) with EASyflex II, the machine checks the outrigger and boom configuration automatically while starting up. You can now proceed directly with step **10.** in chapter (6.1.8 Setting up the machine with EASyflex II).

6.1.13 Shutdowns

6.1.13.1 Functional shutdown

If the placing boom reaches the limit range of the set EASyflex II variant, its speed is automatically reduced.

If it reaches the cut-off point, the placing boom is stopped.

Move the placing boom in the opposite direction into the work area.

6.1.13.2 Safety shutdown in case of malfunction

If a sensor is defective, there is a serious fault in your machine's safety system and the EMERGENCY STOP is triggered automatically.

The placing boom stops!

The “REMOTE” operating mode is terminated and an acoustic signal sounds.

The control system detects a serious fault and displays a corresponding message:

Danger!

Loss of stability due to EASy failure!

Serious injuries or death can be caused by the machine tipping over. Without a partial support system, the placing boom movements are not restricted.

Stop working and move the placing boom into the transport position in emergency operation. Have EASy repaired immediately.

1. Acknowledge the serious fault in the control cabinet of the control system (the acknowledgement of serious faults is stored!).

Stop the work, fold the placing boom in completely and lower it into the boom support.

Depending on the situation, there are two options available.

a) Mode with restricted support from the safety system:
Try to change to “Full support” mode and with the remote control and increased caution, fold in the placing boom completely within the previously released areas and lower it into the boom support.
If the “Full support” mode is not possible, proceed with option b).

b) Emergency operation without support from the safety system:
With the remote control and increased caution, fold in the placing boom completely within the previously released areas and lower it into the boom support.

Inform SCHWING’s customer service and have the EASyflex II system repaired.

6.1.13.3 Error messages

Information

This list is not exhaustive.

Depending on the software version other (further) messages can be displayed.

Warning!

Serious injury may occur due to non-observance of event messages!

Serious accidents are possible if event messages are ignored.

Read every event message and resolve the problem.

Code	International output	Text output (national)	Meaning: necessary action!
E45H		!Safety shutdown! Machine is not correctly supported!	Check the outrigger. Support the machine according to the operating instructions.
E50H		!Safety shutdown! External control Slewing gear!	Check the placing boom position.
E51H		!Safety shutdown! External control boom joint A!	Check the placing boom position.
B22L		Function of slewing gear primary sensor[1] faulty!	Have the EASy system repaired.
B23L		Function of slewing gear redundant sensor[2] faulty!	Have the EASy system repaired.
B24L		Function of boom joint A redundant sensor faulty!	Have the EASy system repaired.
B25L		Function of boom joint A redundant sensor faulty!	Have the EASy system repaired.
B26L		Zero point adjustment of slewing gear primary sensor faulty!	Have the EASy system repaired.
B27L		Zero point adjustment of slewing gear redundant sensor faulty!	Have the EASy system repaired.
B28L		Zero point adjustment of boom joint A redundant sensor faulty!	Have the EASy system repaired.
B29L		Zero point adjustment of boom joint A redundant sensor faulty!	Have the EASy system repaired.
B30H		!Safety shutdown! Redundant safety[3] impaired by slewing gear sensor!	Operation can be continued with increased caution. Have the EASy system checked/ repaired before the next use.

Code	International output	Text output (national)	Meaning: necessary action!
B31H		!Safety shutdown! Redundant safety impaired by slewing gear sensor!	Operation can be continued with increased caution. Have the EASy system checked/ repaired before the next use.
B32H		!Safety shutdown! Redundant safety impaired by sensor on boom joint A!	Operation can be continued with increased caution. Have the EASy system checked/ repaired before the next use.
B33H		!Safety shutdown! Redundant safety impaired by sensor on boom joint A!	Fold in the placing boom and end operation with EASy. Have the EASy system repaired.

1. First channel sensor
2. Second channel sensor
3. The two-channel nature of the sensors is impaired.

6.1.14 Repair / Updates

Danger!

Loss of stability due to incorrect calibration of EASy!

Serious injuries or death can be caused by the machine tipping over. Not calibrating EASy or calibrating it incorrectly can cause malfunctions when restricting the work area for the placing boom.

Stop working and have EASy repaired immediately.

Repair work on the EASyflex II must only be performed by people authorised by SCHWING. After any repair work, EASy must be calibrated. This also applies for replacing individual parts and software updates.

6.2 High-pressure cleaner (HPC)

6.2.1 Preface

SCHWING machines can be equipped as special equipment with a high-pressure cleaning system (hereinafter referred to as HPC).

The present operating instructions are based on the manufacturer's documentation and take into account the installation in SCHWING machines.

The position of the individual components of the high-pressure cleaner (high-pressure pump, hose reel, etc.) can vary depending on the model.

The images used in these instructions merely serve as an example.

The handling of the HPC system remains the same.

Should you have any queries or issues, please contact our Customer Service department or your SCHWING representative.

6.2.2 General warnings for HPC system

Danger!

Danger to life due to voltage transfer!

Electrically live components may not come into contact with water. This may result in danger to life due to voltage transfer.

Never hold the water jet of the HPC directly on or in the vicinity of electrical or electronic components.

Danger!

Danger to life from inhalation or ingestion of dangerous substances!

Do not clean any material containing dangerous substances (e.g. asbestos).

Do not use chemicals, detergents and hot water as spraying agent.

May be fatal if swallowed and entering the airways.

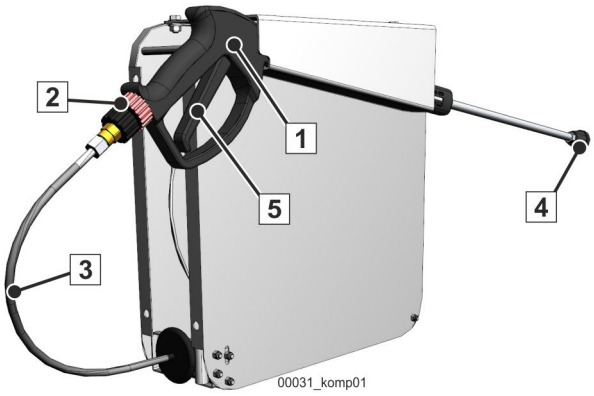


Fig. 420

Also observe the manufacturer's instructions on high-pressure cleaning systems, which have been enclosed separately with your machine.

The operator of the machine is responsible for instructing the operating personnel in how to use the machine.

For special safety warnings, refer to the instructions provided by the manufacturer of the special equipment "High-pressure cleaner" and the system "VDMA safety manual [German Engineering Federation]".

- Before and during work, check the seal of the suction and pressure line.
- Make sure the spray lance trigger operates smoothly and resets on its own (5) **(Fig. 420)**, and ensure that the pump shuts down automatically.

Warning!

Severe injuries may be caused by liquid under pressure!

Hydraulic oil escaping under high pressure can penetrate the skin and lead to death if not treated medically.

During operation of the high-pressure pump, no one may remain in the immediate vicinity.

If a malfunction occurs, hydraulic oil and water steam under high pressure can escape from the corresponding overpressure valves on the pump.

In case of danger, actuate an EMERGENCY OFF button on the machine.

All protective covers must be attached and in good working condition.

Warning!

Risk of severe injury due to high-pressure water jet!

The high-pressure water jet can cause severe injuries.

Never leave the HPC's spray lance unattended while under operating pressure!

At the end of work, separate the connections on the oil and water side.

Never work with the high-pressure cleaning system from a ladder or the like.

Always provide sufficient stability.

- Always hold the spray lance with both hands and take into account the recoil from the HPC.
- Never work in the danger zones of vehicles, machines, jobsites, etc.
- Never direct the spray lance at people, animals, fragile or loose material.
- Interrupt operation if people or animals are approaching the vicinity.

The water jet of the HPC can damage hydraulic hoses, lubrication points and other machine components.

- Only use the HPC to clean machine components that are used to process concrete.
- Prevent the system from being switched on unintentionally or without proper authorisation by closing and locking the covers over the control devices on the machine.
- Do not twist, tear or bend high-pressure hoses, since the smallest damage to the hose can result in serious accidents.

Repairs may only be carried out by authorised personnel.

Unauthorised opening of the pump voids the guarantee!

Only use original spare parts.

Altering the factory-set pressure relief limit (2) **(Fig. 432)** is strictly prohibited!

The use of accessories or mounting parts not included in the scope of delivery is not permitted and will void the warranty, guarantee and general liability of the manufacturer.

6.2.2.1 Operating interruptions

In the event of a malfunction, interrupt the operation as follows:

- Release the spray lance trigger immediately
- Stop the hydraulic drive of the high-pressure pump on the local or remote control unit
- Release pressure in the spray lance by squeezing the trigger

6.2.2.2 Structure of the HPC

The hydraulically powered high-pressure pump (HP pump) (5) **(Fig. 422)** of the cleaning system is usually installed on the right, next to the supply control.

Pressing down the switch (6) on the local control unit **(Fig. 421)** switches a directional valve, which directs the oil flow to the hydraulic motor of the high-pressure pump, and the pump starts pumping immediately.

Opening the ball valve (4) **(Fig. 423)** causes the HP pump to draw in water from the water case of your machine via a filter (3) **(Fig. 423)**.

The water can now be extracted from the spray lance on the hose reel (8) **(Fig. 422)** or an extension cable at the rear of the machine, depending on the machine type.

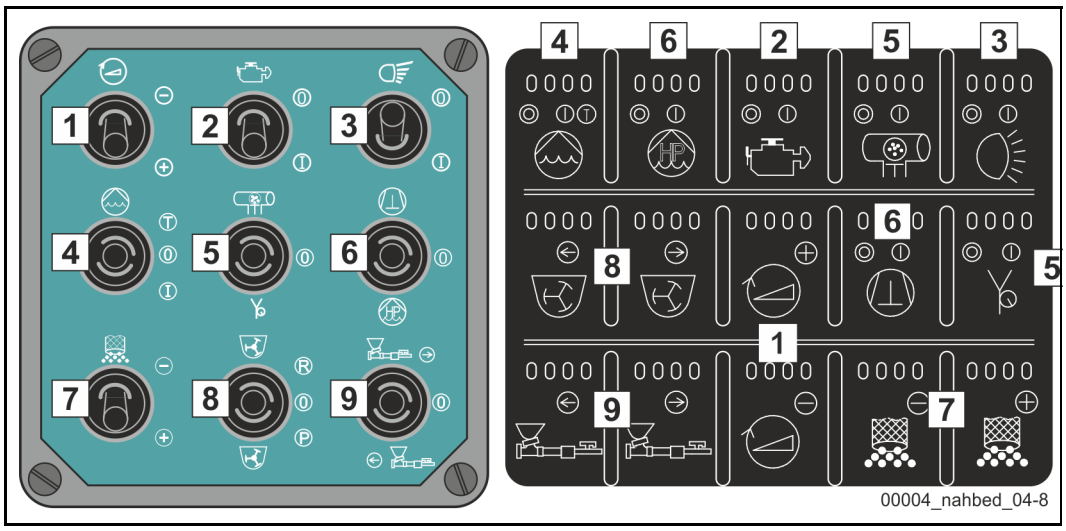


Fig. 421 Local control keypad

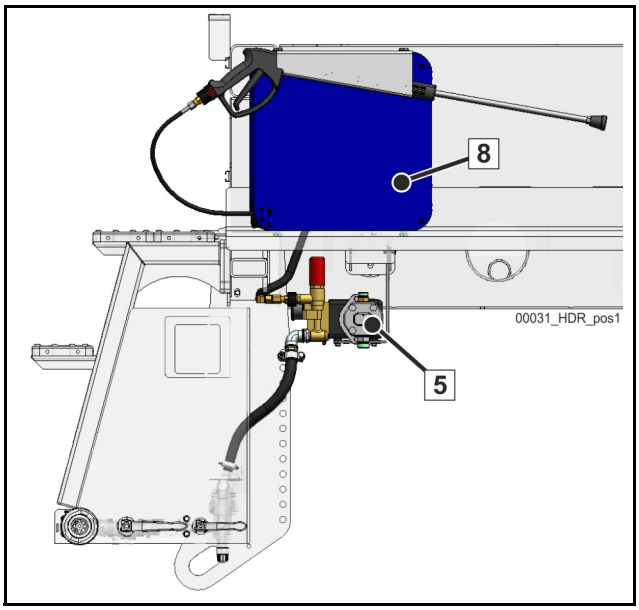


Fig. 422 Components of the HPC system (fig. similar)

6.2.2.3 Water system with HP pump

(Example **(Fig. 423)** / **(Fig. 424)** / **(Fig. 425)**)

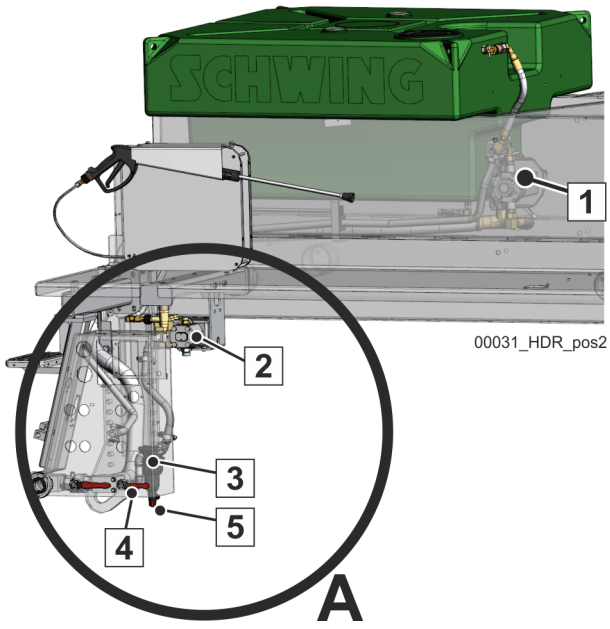


Fig. 423

Caption for (Fig. 423)	
1	Water pump
2	High-pressure pump
3	HP suction socket with water filter
4	Ball valve for high-pressure water system
5	Turn-lock fastener for suction pipe drainage

(The base frame and supply control are illustrated clearly in **(Fig. 423)**.)

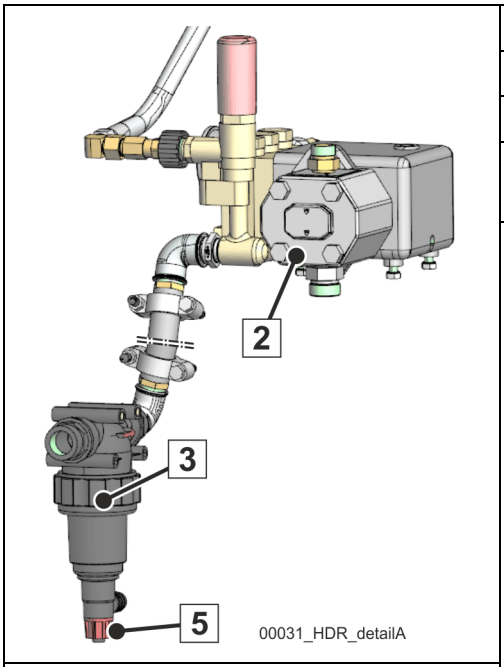


Fig. 424 Detail A

Caption for (Fig. 424)	
2	High-pressure pump
3	HP suction socket with water filter
5	Turn-lock fastener for suction pipe drainage

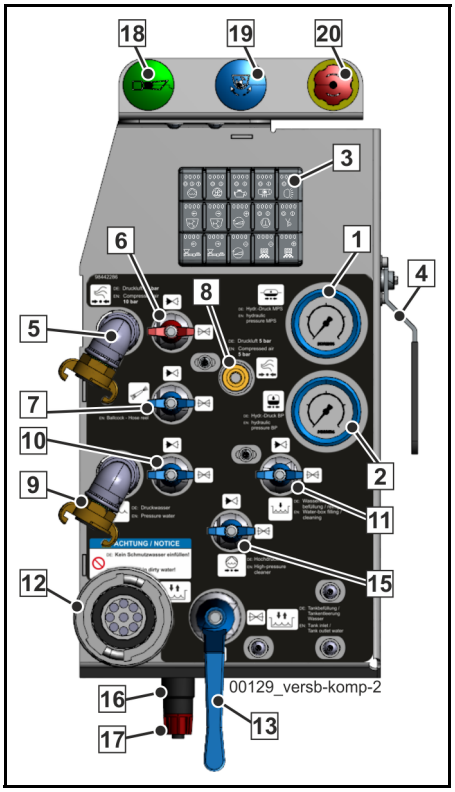


Fig. 425 (15) HPC ball valve

6.2.2.4 Accessories

The high-pressure cleaning system delivered by SCHWING as special equipment is ready for use.

Any accessories available on the market will be neither tested nor approved by SCHWING.

Neither SCHWING nor the pump manufacturer can be charged with damages or accidents caused by unsuitable accessories.

Information

Any damages caused as a result of incorrect or negligent operation, maintenance and repair, or due to improper use, shall void all warranty and liability claims against the company SCHWING GmbH.

This also applies to expansions and retrofit parts, as well as other changes to the machine that were not approved by SCHWING!

6.2.3 Water supply

The high-pressure pump draws in water from the water case of machine.

Only use clean water to fill the water case of your machine.

Dirty water quickly wears down the water pumps and clogs the water filter insert (3) **(Fig. 423)** causing damage to the HP pump.

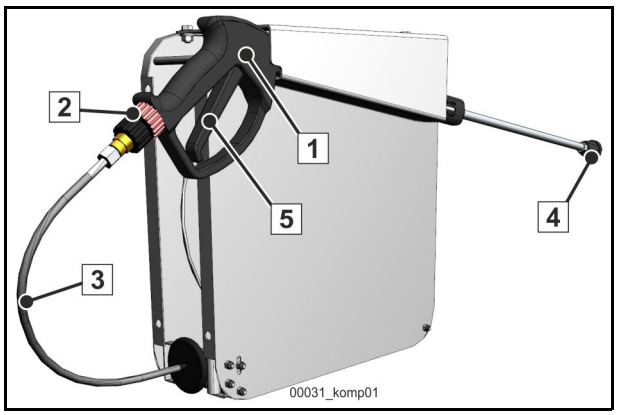


Fig. 426

Caption for (Fig. 426)			
1	Handle of spray lance with trigger	4	High-pressure nozzle
2	Knurled nut (connects the spray lance to the high-pressure hose)	5	Spray lance trigger
3	High-pressure hose		

6.2.4 Operation

- Maximum permissible water temperature 60 °C.
- Do not use additives.
- Maximum permissible water pressure 160 bar.
- Minimum permissible spraying distance 30 cm.

6.2.4.1 Each time the device is started

➤ Check the water level in the water case.
The HP pump does not start if too little water is in the water case. Clean the water filter insert (siehe **“Maintenance / Inspections”** auf Seite 623).

➤ Check the suction line of the water case to the HP pump for leaks. The permanent aspiration of air causes damage to the high-pressure pump.

➤ Always vent the system before the device is started (siehe **“Bleeding the spray lance”** auf Seite 618).

Attention!

Material damage caused by air in the system!

Vent the system on the water side before each commissioning.

Otherwise, damage to the high-pressure pump can occur, which is not covered by the manufacturer warranty.

➤ Opening the ball valve (15) **(Fig. 427)** directs water from your machine’s water case to the high-pressure pump.
See information sign on the supply control.

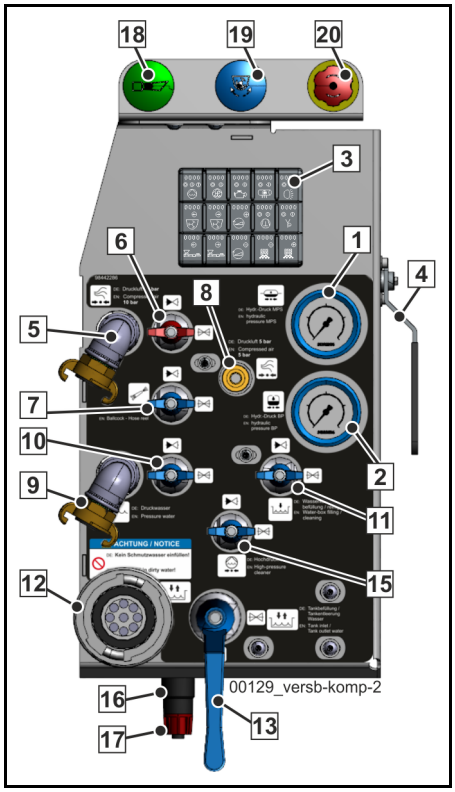


Fig. 427 Supply control

6.2.4.2 Unrolling the hose

Warning!

Severe injuries due to defective high-pressure hoses.

The spray lance can detach from the hose like a projectile and cause severe injuries.

Only pull on the high-pressure hose when unrolling or rolling up the hose and never on the spray lance.

The system is equipped with rolling equipment (8**) (Fig. 428)** for the high-pressure hose.

The hose reel has a mechanical spring motor for rolling up the high-pressure hose.

➤ Unroll the hose from the hose reel under light traction and in a straight line. Unrolling the hose diagonally causes material wear and possible leaks in the high-pressure hose due to unnecessary abrasion.

Pulling out the high-pressure hose tensions the mechanical spring motor in the hose reel.

- When the required hose length has been unrolled, lock the hose by lightly tugging on it and then letting it slowly retract to the next "Snap-in point".
- Only switch on the HPC if you have unrolled the required hose length.

6.2.5 Rolling up the hose

- Switch off the HPC.
- Clean the high-pressure hose from the outside before rolling it up.
- Disengage the lock on the high-pressure hose by pulling slightly on the hose.
- Guide the hose by hand while being rolled up onto the hose reel. The spring motor pulls the hose onto the hose reel.
- Ensure that the high-pressure hose is rolled up evenly.
- Do not allow the hose to spring back in an uncontrolled manner, as this could cause personal injury or material damage.

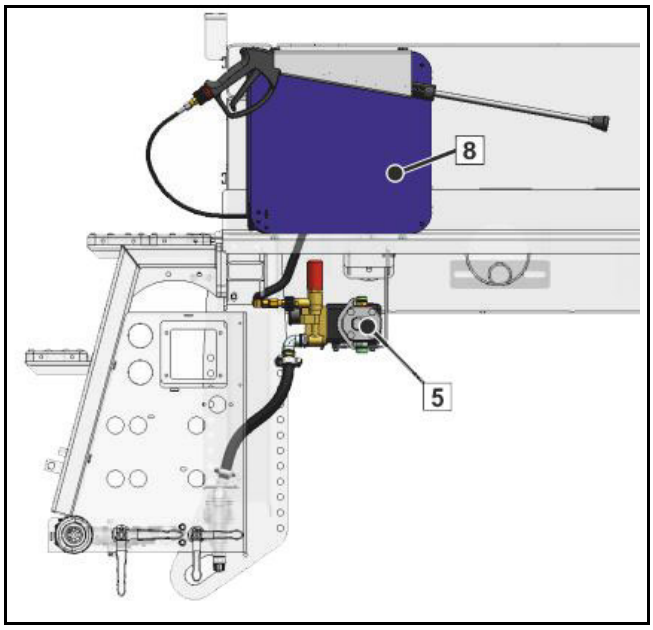


Fig. 428 Hose reel (8) fig. similar

6.2.5.1 Bleeding the spray lance

- Reduce the speed of the drive motor to idle.
- Hold the spray lance tightly and direct the spraying nozzle (4) **(Fig. 429)** such that the water can flow out freely.
- Actuate the trigger of the spray lance (1) **(Fig. 429)** until water no longer escapes from the spraying nozzle.
- If you switch on the HP pump using the local control (6) **(Fig. 430)**, the pump will draw its water from your machine's water case.
  If the trigger is not actuated, the HP pump cannot pump water to the spray lance.
- Switch off the HPC in the event of malfunctions.
- Carry out trouble shooting (siehe **"Troubleshooting"** auf Seite 628). Only start cleaning up if you are convinced that the HPC is functioning properly.

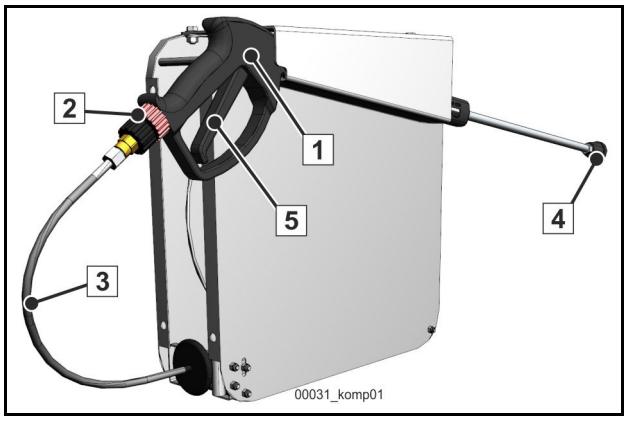


Fig. 429 Hose reel and spray lance

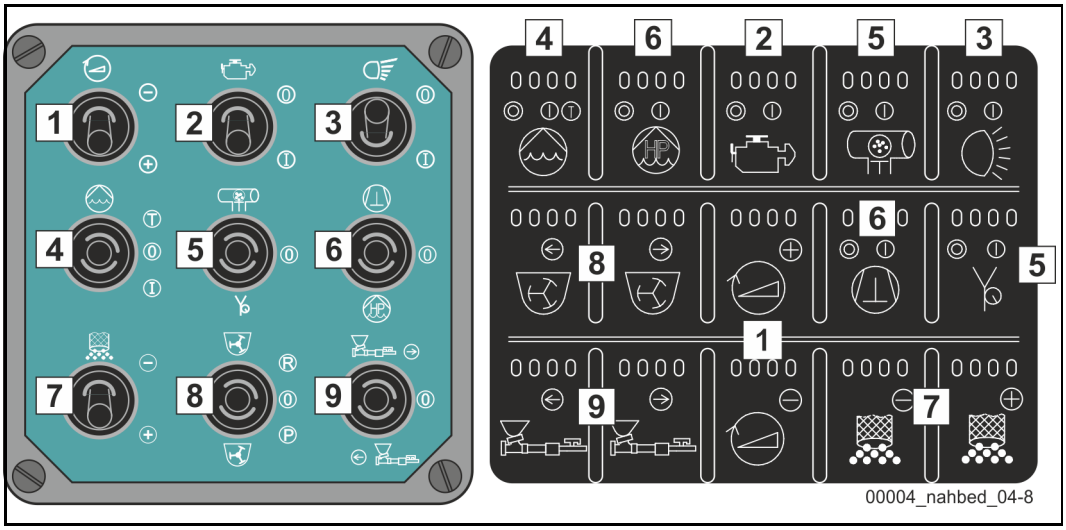


Fig. 430 Local control keypad

6.2.6 Cleaning operation

- Begin the cleaning work by actuating the spray lance trigger.
- Always pay attention for leaks on your machine.
- Interrupt work immediately if leaks occur and carry out troubleshooting according to Section Troubleshooting.

The speed of the vehicle engine affects the water pressure.

- Increase the drive speed of the vehicle engine only so far that an increase in the water pressure is still detectable.
- If an increase in the water pressure is detected, slightly reduce the speed of your vehicle engine again!
- Ensure that the automatic operation is working properly by squeezing and releasing the spray lance trigger several times.

If the trigger is not actuated, the HP pump cannot pump water to the spray lance.

6.2.7 End of operation and interruptions

➤ Release the spray lance trigger

➤ Switch off the HP pump using the selector switch on the local control of the machine.

Depressurise the HPC by actuating the trigger of the spray lance once more until water stops flowing out!

Key points:

1. Release spray lance trigger
2. Switch off HP pump
3. Actuate spray lance trigger again

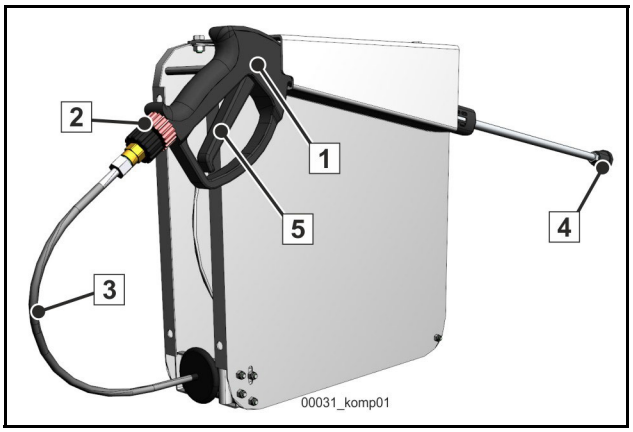


Fig. 431

6.2.8 Operating faults

Warning!

Severe injury may be caused by systems under pressure!

If a malfunction occurs, hydraulic oil and water steam under high pressure can escape from the corresponding overpressure valves on the pump.

This can result in severe injuries.

During operation of the high-pressure pump, no one may remain in the immediate vicinity.
In case of danger, actuate an EMERGENCY OFF button on the machine.
All protective covers must be attached and in good working condition.

The diffuser in the thermal safety valve on the "water side" (6) **(Fig. 432)** can be rotated.

- Ensure that the opening is aligned so that any vented steam cannot injure persons or damage the machine!

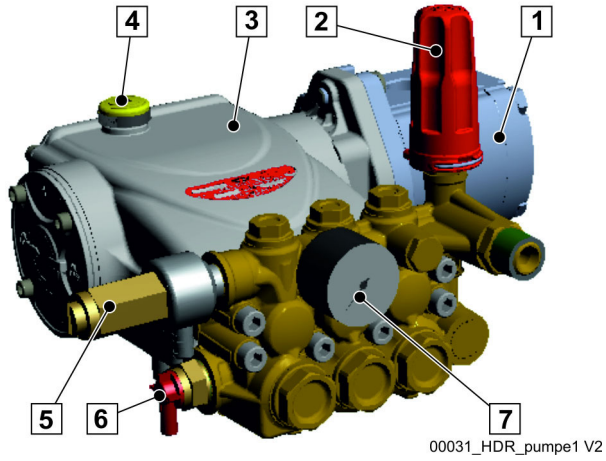


Fig. 432

Caption for (Fig. 432)	
1	Hydraulically driven gear motor
2	Pressure settings (Never change factory configuration)
3	Pump
4	Lock for gear oil
5	Safety valve
6	Thermal safety valve
7	Pressure gauge

6.2.9 Winter operation (below 5 °C)

Only switch on a system that is free of ice!

This can be achieved by carefully draining the system after the last use (siehe **“Draining the HPC system”** auf Seite 621).

- Run the HP system without pressure for approx. one minute before starting cleaning work.
- Set a low engine speed.

Attention!

Material damage due to frost!

Switching on a frozen HPC system can result in severe material damage.

Never operate the HP pump in high-pressure mode if the oil is cold!

Never begin operating the high-pressure pump if parts of the pump are still frozen.

Do not attempt to thaw the high-pressure pump in a different manner (e.g. with a blowtorch).

Allow the pump to “warm up” by letting it idle for approx. 1 minute!

6.2.9.1 Draining the HPC system

In order to avoid freezing, the system must be carefully drained after every operation.

Please proceed as follows:

➤ Loosen the fuse (5.1) **(6.2.10)** on the water case and lock the connection to the water case by switching the ball valve (5) **(6.2.10)**.

➤ Open the ball valve (15) **(Fig. 433)** and the turn-lock fastener (17) **(Fig. 433)** on the supply unit.

Leave the ball valves open during drainage.

The suction line runs dry.

➤ Set a low drive speed.

Attention!

Material damage due to “running dry”!

The high-pressure pump will be destroyed if it is switched on while the suction pipe is closed!

Do not under any circumstances operate the pump without water!

Switch on the pump until the system is completely drained, which will take at most 5 seconds.

➤ Switch off the pump after the 5 seconds.

- After draining the pump, close the ball valve (15) **(Fig. 433)** and the turn-lock fastener (17) **(Fig. 433)** on the supply unit.
- Before restarting the HPC, do not forget to switch the ball valve (5) **(6.2.10)** on the water case to the “Operating position”.

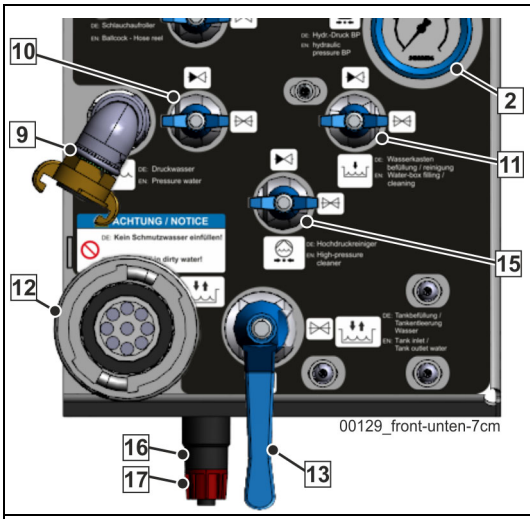


Fig. 433 Supply control

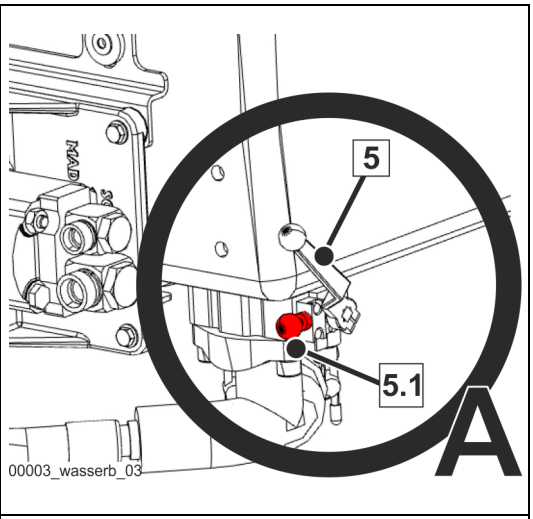


Fig. 434 Water case ball valve

6.2.10 Maintenance / Inspections

6.2.10.1 Cleaning the suction filter

Check the suction filter before each commissioning and clean it, if necessary.

Set cleaning intervals according to the operating conditions.

Clean the filter as follows:

- Lock the connection to the water case by switching the ball valve (15) **(Fig. 435)** on the supply control.
- Loosen the housing (5) **(Fig. 436)** by hand.
- Remove the screen (2) **(Fig. 436)** from the housing of the suction filter.
- Rinse the screen and housing of the suction filter under running water. Do not use any cleaning agents or objects.
- Replace heavily soiled or damaged screens.
- Do not operate the HP pump without a sieve element.
- Check and replace the O-rings (1+3) **(Fig. 436)**, if necessary.

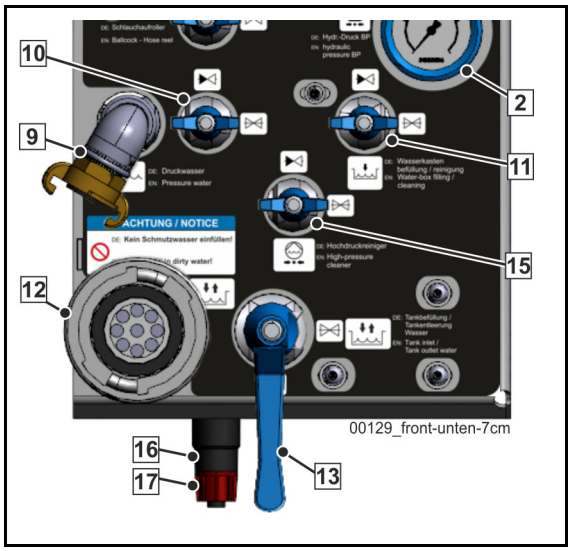


Fig. 435

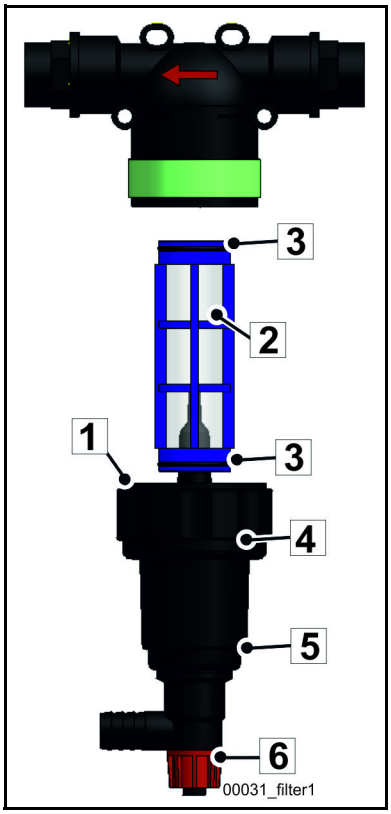


Fig. 436 Suction filter

Caption for suction filter (Fig. 436)			
Pos.	**Description**	**Pos.**	**Description**
1	O-ring	4	Ring
2	Screen	5	Housing
3	O-rings	6	Turn-lock fastener for draining

6.2.11 Functional testing

Under normal operating conditions, the water pressure is at approx. 170 bar.

The highest value is thereby reached when the spray lance is closed.

When the spray lance trigger is squeezed, water is pumped again and the pressure decreases.

- Regularly check that the pump switches off when the spray lance is closed. See section: “Troubleshooting”.

6.2.12 Oil change

Before changing the oil, you must have read and understood the instructions of the manufacturer “INTERPUMP GROUP s.P.a.”

In particular, the required torque for the oil drain screw (3).

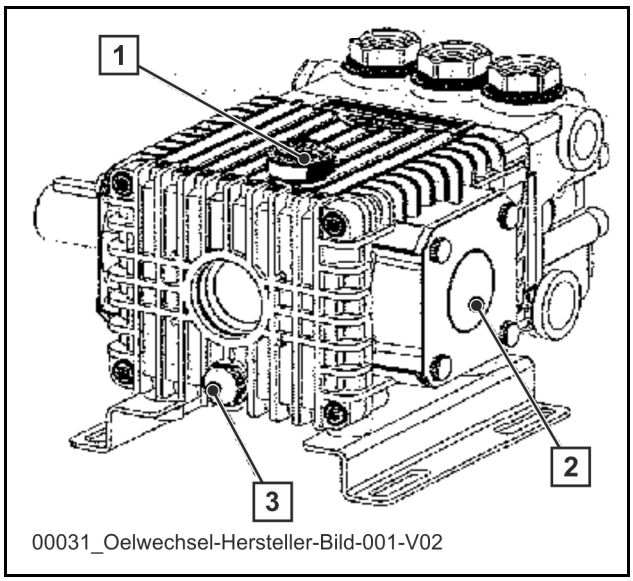


Fig. 437

Caption for (Fig. 437)	
Pos.	**Description**
1	Lock with rod
2	Sight glass (oil level indicator)
3	Oil drain screw

Table 24

The oil must be at operating temperature for the oil change.

➤ Place a reservoir under the oil drain screw (3) that can hold all of the old oil.

➤ Remove the lock with the rod (1).

- Then remove the oil drain screw (3).
- Let all of the oil drain out.
- Screw on the oil drain screw (3) with a torque of 20 Nm once all of the old oil has drained out.
- Pour in the fresh oil through the lock (1).
- Fill the fresh oil up to the middle line of the oil level indicator lock (2).
- Reattach the lock (1) once you have finished topping up the oil.

6.2.12.1 Recommended oil type for the pump

The manufacturer recommends the following oil for a temperature range between -10°C and 40°C:

SAE 15 W-40 Mineral -– ISO VG100DIN 51524 – Interpump X 9.9

The manufacturer recommends the following oil for a temperature range between 0 °C and 50 °C:

SAE 80 W-910 - ISO VG220 DIN 51524

Attention!

Environmental damage!

Old oil must be collected in containers and disposed of according to the applicable regulations at centres intended for that purpose.

Under no circumstances may it be disposed of in a way that is harmful to the environment.

6.2.13 Maintenance intervals for the pump

When:	What:
After the first 50 hours	Oil change
Every 500 hours	Oil change
Every 100 hours (Reduce intervals for large-scale assignments)	Inspection/Replacement: Valve set, pump seals

6.2.14 Prolonged downtime

For prolonged periods of disuse, we recommend filling the high-pressure pump with antifreeze (glycol) or a pump preservation oil on the water side.

6.2.15 Repair

- In the event of a malfunction, try to localise the error with the help of the “Troubleshooting” section.

Warning!

Do not dismantle the high-pressure pump!

Improperly assembled high-pressure pumps can cause severe injuries on failure.

If you cannot remedy a fault, please contact SCHWING customer service or send the high-pressure pump to the manufacturer for repairs.

For proper repairs, special tools are required.

Repair attempts invalidate the guarantee.

Information

Any damages caused by incorrect or negligent operation, maintenance and repair or by improper use result in the expiration of all warranty and liability claims against the company SCHWING GmbH.

This also applies to expansions and retrofit parts, as well as other changes to the machine that were not approved by SCHWING!

6.2.16 Troubleshooting	(not exhaustive)
HIGH-PRESSURE PUMP DOES NOT RUN:	
Water case empty	• Top up
Switching error	• Switch hydraulic directional valve • Acknowledge electrical control
SPRAY PRESSURE FLUCTUATES:	
insufficient water supply	• Ball valve in the water suction line not switched properly • Clean suction filter • Relay the suction line without kinks
Air is sucked in	• Check the hydraulic system for leaks
Spraying nozzle blocked	• Clean
HIGH-PRESSURE PUMP SHUTS DOWN DURING SPRAYING OPERATIONS:	
Spraying nozzle blocked or too small	• Clean nozzle or use prescribed nozzle
HIGH-PRESSURE PUMP DOES NOT SHUT DOWN WHEN THE SPRAY LANCE IS CLOSED OR SWITCHES ON BY ITSELF:	
Water leak in the high-pressure line	• Check O-rings, couplings and connections
HIGH-PRESSURE PUMP OR HYDRAULIC SYSTEM BECOMES TOO HOT:	
Cross-sectional narrowing in the hydraulic system	• Check pipe work

HIGH-PRESSURE PUMP RUNS, BUT DOES NOT BUILD UP ANY PRESSURE:	
Pump sucks in air	• Switch ball valve in the water suction line
Oil flow insufficient	• Increase the drive speed
Drive hydraulics defective	• Switch ball valve and check other functions (water pump)
PUMP MAKES NOISES	
Pump sucks in air	• Check water suction line
Cavitation	• Suction line interior destroyed • Suction filter dirty
WATER LEAKING BETWEEN PUMP HEAD AND PISTON HOUSING	
O-ring defective	• Repair by customer service
OIL SPRAYS FROM THE SAFETY VALVE	
dynamic pressure to high in the return pipe	• Check hydraulic system

Caution!

Do not dismantle the high-pressure pump.

If you cannot remedy the fault with the help of the table above, please contact SCHWING customer service or send the high-pressure pump to the manufacturer for repairs.

6.2.17 Technical data

- Pump type: UL 1716 IV
- max. drive volume (oil): approx. 17 l/min
- max. output volume (water): approx. 13 l/min
- max. operating pressure: approx. 170 bar
- Spraying nozzle: 0.4 mm
- Pressure settings (oil): see switching diagram for the machine

Recommended oil type for the HPC pump:
In a temperature range between -10 °C and 40 °C = SAE 15 W-40 Mineral ISO VG100DIN 51524 – Interpump X 9.9
In a temperature range between 0 °C and +50 °C = SAE 80 W-910 ISO VG220 DIN 51524

Interpump Group

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Web: http: //www.interpumpgroup.it

6.3 End hose stop valve

SCHWING truck-mounted concrete pumps, truck mixer concrete pumps, and separate placing booms can be equipped with a pneumatically operated end hose stop valve as a piece of special equipment.

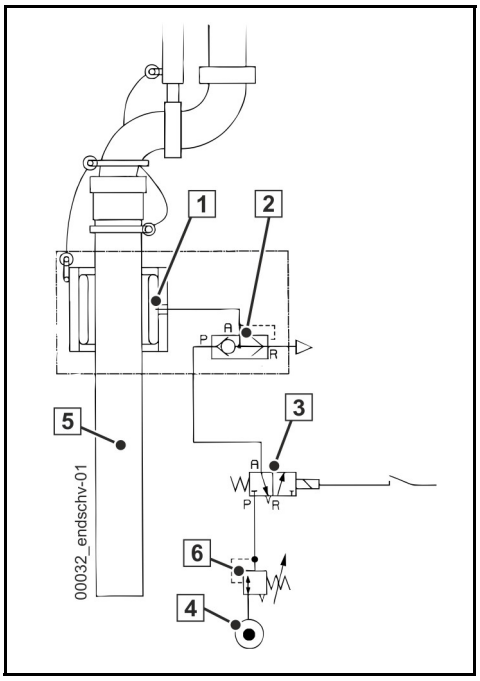
6.3.1 Functional description

The end hose stop valve prevents the pumping line from running dry after switching off the concrete pump.

It consists of a pipe with an interior inflatable hose (1) **(Fig. 438)** and the required pneumatic components.

The end hose stop valve is attached to the end hose below the fixing and mounted on the pumping tube.

The compressed air for the end hose stop valve is supplied by the vehicle air system or an external compressor (4). The pressure is set to the required value using a pressure release valve (6). The end hose stop valve is controlled via the directional valve (3) and shuttle valve (2).



Legend (Fig. 438)	
Pos.	**Description**
1	End hose stop valve with inner hose
2	Shuttle valve (quick breather valve)
3	3/2-way solenoid valve
4	4-circuit protection valve on the vehicle or external compressed air supply
5	End hose
6	Pressure release valve

Fig. 438 Components

By filling the inner hose with compressed air, the inner hose expands and presses together the end hose. This blocks the flow in the end hose.

Warning!

Risk of being crushed by end hose stop valve!

Risk of body parts being crushed.

Never reach into the end hose stop valve or hold onto any objects inside it.

After venting the inner hose, the end hose regains its original form and releases the flow.

For the truck-mounted and truck mixer concrete pumps, the activated end hose stop valve opens and closes automatically while pumping, regardless of the concrete pump.

For the separate placing booms, the end hose stop valve can be opened and closed manually.

Manual emergency control is possible for the pneumatic valve.

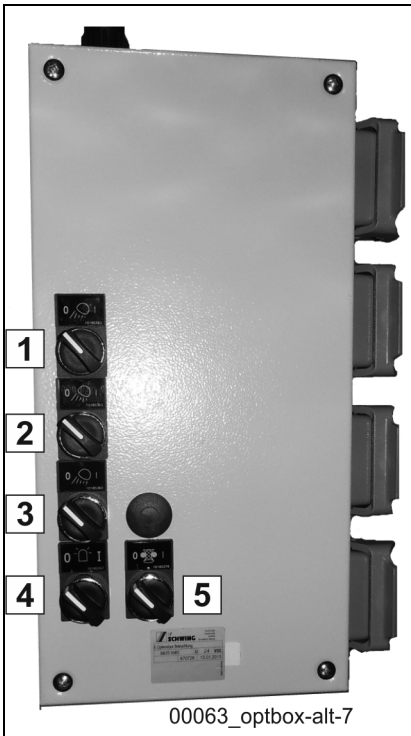
6.3.2 Operation for truck-mounted pumps and truck mixer concrete pumps

Truck-mounted pumps and truck mixer concrete pumps feature an automatic mode and a manual mode for the end hose stop valve.

6.3.2.1 Selector switch

The selector switch (5) **(Fig. 439) (Fig. 441)** is located in a separate housing next to the switch cabinet with the machine controls.

For truck mixer concrete pumps (FBP) a selector switch (11) **(Fig. 440)** on the local control unit serves the same purpose.



00063_optbox-alt-7

Fig. 439 E-option box on a truck-mounted concrete pump

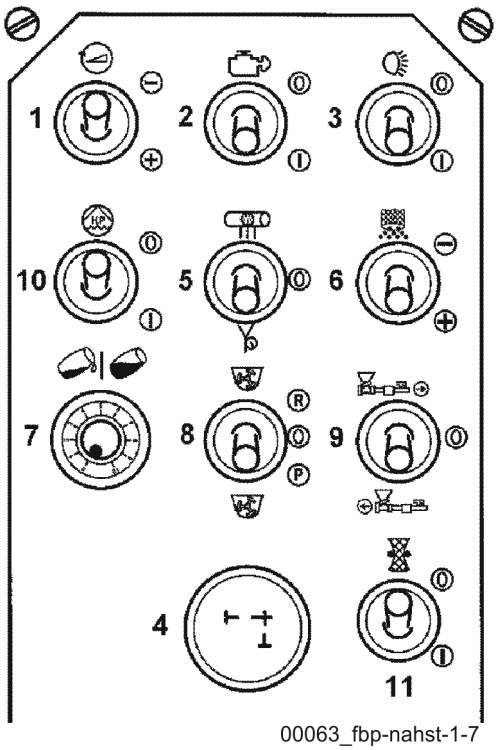


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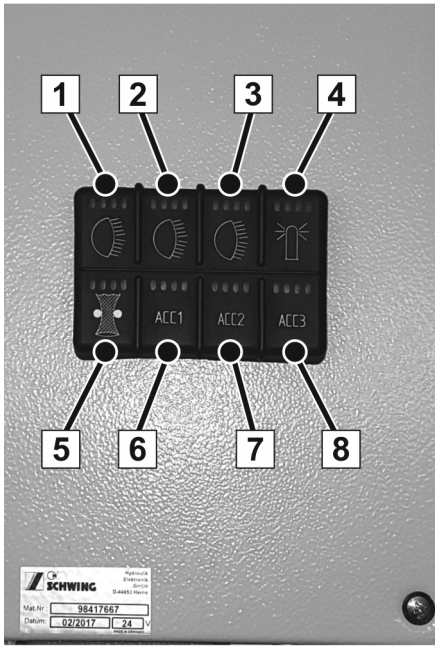
Fig. 440 Local control unit for a truck mixer pump



00063 opbox-neu

Fig. 441 E-option box (new) on a truck-mounted concrete pump

In the "I" position, the selector switch automatically opens and closes the end hose stop valve, depending on the concrete pump.

In the "0" position, the end hose stop valve is not active. The end hose stop valve stays permanently open.

Control	Switch	End hose stop valve
on	"0"	to
Off	"0"	to
on	"I"	Automatic
Off	"I"	to
on	"I" EMERGENCY STOP	closed

6.3.2.2 Operation in automatic mode

Start the vehicle engine and switch on the machine controls.

In its default position, the solenoid valve (3) **(Fig. 442)** is de-energised. The compressed air supply to the shuttle valve (2) is interrupted.

The inner hose of the end hose stop valve (1) is vented via the shuttle valve and the end hose (5) is open.

➤ Switch the selector switch on the machine to the “I” position.

The solenoid valve is energised and switches.

The compressed air passes through the shuttle valve to reach the inner hose of the end hose stop valve. The inner hose (1) **(Fig. 443)** is inflated and blocks off the end hose.

➤ Close the top cover of the toolbox in which the switch is located in order to prevent unauthorised switching.

➤ Switch on the concrete pump (suction or pump).

The solenoid valve is automatically de-energised in the default position: switched to “Vent”. It simultaneously blocks the compressed air supply.

The shuttle valve is relieved and also switches.

The inner hose is vented and the end hose stop valve opens **(Fig. 442)**.

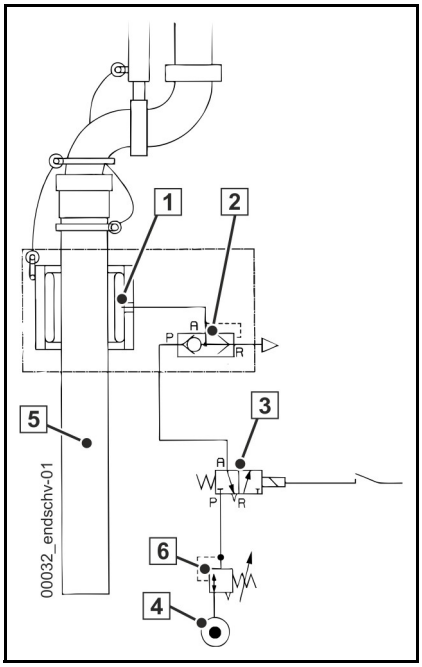


Fig. 442 opened

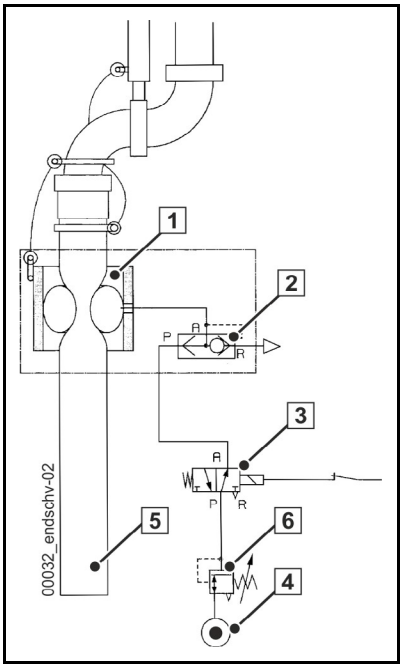


Fig. 443 closed

Information

In order to ensure that the concrete pump only starts once the end hose stop valve is completely open, the pump starts after a delay of approx. 5 seconds.

In order to reduce "dripping" from the end hose, the concrete pump starts in suction operation without delay.

➤ Switching off the concrete pump

After shutting down the concrete pump, the solenoid valve is reactivated and switches.

The inner hose is inflated by the compressed air and blocks off the end hose.

Warning!

Risk of injury due to falling pumped medium!

Risk of injury due to pumped medium escaping from below the end hose even while the end hose stop valve is closed.

Standing directly below the end hose is prohibited when the pumping line is filled.

6.3.2.3 Manual mode

Automatic operation can be switched off via remote control.

➤ Flip the selector switch on the remote control unit to the position: "Automatic off": 

The end hose stop valve opens.

This function makes it possible to deposit residues of the pumped medium precisely while the concrete pump is stationary, for example.

When the selector switch is in the "0" position on the remote control, the end hose stop valve is controlled as described under **“Operation in automatic mode”** on page 634.

6.3.2.4 EMERGENCY STOP

If an EMERGENCY STOP button is pressed when in automatic mode, then the end hose stop valve closes.

It only reopens if after unlocking the EMERGENCY STOP button and restarting the control system, the concrete pump is switched on as previously described.

6.3.3 Operation for separate placing booms

Separate placing booms feature only a manual mode for the end hose stop valve.

6.3.3.1 Prerequisites

The end hose stop valve requires an external air compressor to be provided on site that can generate at least 5 bar.

The compressed air is limited to 5 bar by the pressure limit valve on the pneumatic module in order to prevent damage to the end hose stop valve.

The compressed air line from the compressor to the compressed air connection on the placing boom must be routed on site.

The compressed air line to be routed must have an adequate length and compressive strength.

Route the compressed air hose so that it does not cause any obstructions.

Make sure that you have the required quick-acting coupling for the compressed air connection (1) **(Fig. 444)**.

Make sure that it is possible for the operator of the placing boom to communicate with the operator of the concrete pump so that the opening and closing of the end hose stop valve can be coordinated with the concrete pump.

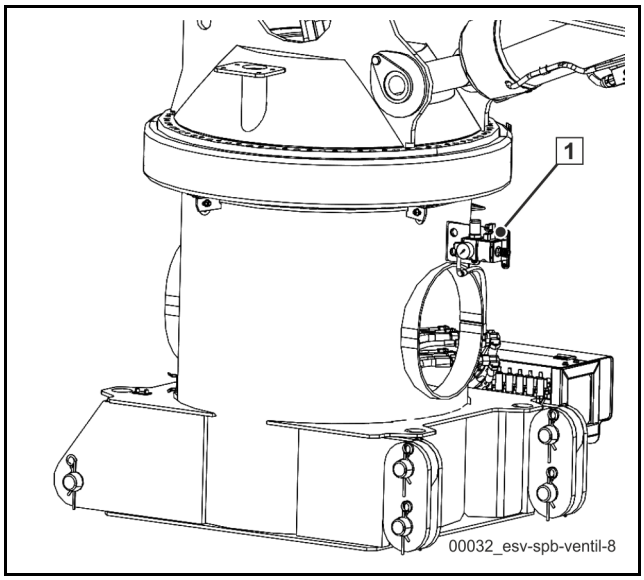


Fig. 444 Compressed air connection

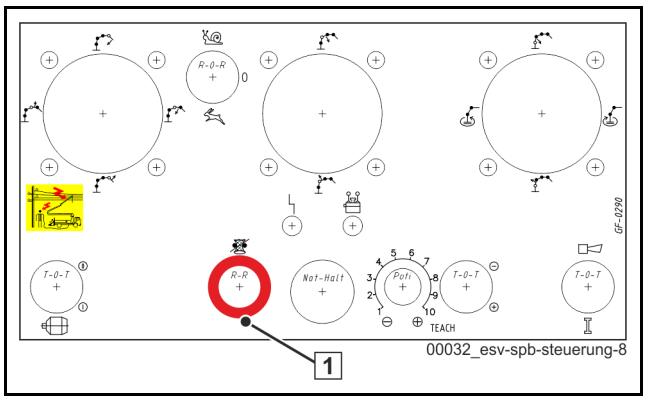


Fig. 445 Schematic diagram of remote control

The remote control has a selector switch (1) **(Fig. 445)** for opening and closing the end hose stop valve. The selector switch is a toggle switch.

The selector switch has two positions:

1.  = the end hose stop valve is closed

2. without symbol = the end hose stop valve is open.

6.3.3.2 Manual mode

➤ Stop the concrete pump.

➤ Close the end hose stop valve using the selector switch.

The solenoid valve (3) **(Fig. 443)** is activated and switches. The compressed air passes through the shuttle valve (2) to reach the inner hose of the end hose stop valve (1). The end hose stop valve closes.

Warning!

Risk of injury due to pumped medium escaping under high pressure!

Concrete can escape from the end hose under high pressure.

Close the end hose stop valve only after the concrete pump has been switched off.

Warning!

Risk of injury due to falling pumped medium!

Risk of injury due to pumped medium escaping from below the end hose even while the end hose stop valve is closed.

Standing directly below the end hose is prohibited when the pumping line is filled.

➤ Open the end hose stop valve using the selector switch.

The solenoid valve is de-energised and switches to the default position: "Vent". It simultaneously blocks the compressed air supply.

The shuttle valve is relieved and also switches.

The inner hose is vented and the end hose stop valve opens **(Fig. 442)**.

➤ Switch on the concrete pump (suction or pump).

6.3.3.3 EMERGENCY STOP

When using separate placing booms, there are multiple EMERGENCY STOP areas that react independently of one another.

Example structure:

- EMERGENCY STOP area 1 (placing boom)
- EMERGENCY STOP area 2 (concrete pump)
- EMERGENCY STOP area 3 (air compressor)

The end hose stop valve is only incorporated into the EMERGENCY STOP area of the placing boom.

Warning!

Risk of injury due to escaping pumped medium!

Pressing the EMERGENCY STOP button on the remote control for the placing boom does not interrupt the flow.

Press an EMERGENCY STOP button on the concrete pump to interrupt the flow.

Actuating the EMERGENCY STOP from the placing boom no longer activates the directional valve and the end hose stop valve opens.

After unlocking the EMERGENCY STOP, the directional valve is reactivated when the selector switch is on “Close”. This closes the end hose stop valve again.

Before continuing to pump, open the end hose stop valve using the selector switch.

Warning!

Risk of injuries due to escaping pumped medium!

Pumped medium can escape from the end hose under high pressure.

Close the end hose stop valve only after the concrete pump has been switched off.

6.3.4 Emergency control

In the event the electrical control system fails, the solenoid valve (4) can be switched manually using an emergency control (3) **(Fig. 446)**.

The compressed air module (pressure release valve + solenoid valve) is located near the boom control block in the switch cabinet of the machine or on the compressed air connection of the placing boom.

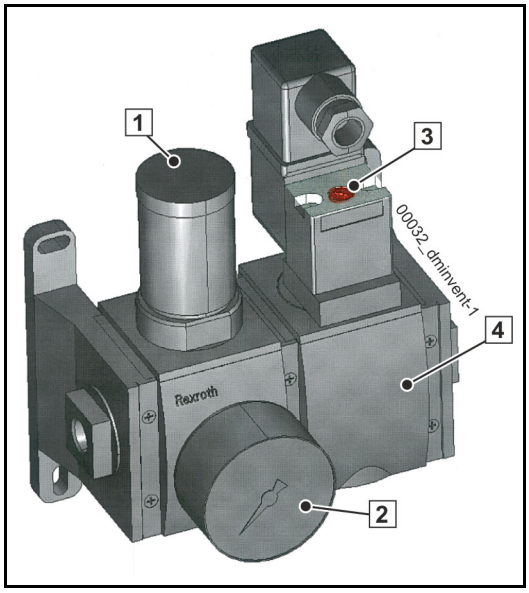


Fig. 446 Compressed air module

6.3.5 Maintenance

6.3.5.1 Adjusting the pressure release valve

- ➤ Start vehicle motor or compressor. For vehicles, fill the air reservoir up to the maximum value on the pressure gauge in the cab.
- ➤ Read the pressure gauge (2) **(Fig. 446)** on the pressure release valve.
- ➤ Set the pressure to 5 bar by turning the set screw (1).

6.3.5.2 Daily maintenance

- Functional inspection
- Seal of pneumatic components
- Mounting the end hose stop valve
- Visual inspection of the end hose

Due to the increased load, the end hose in the area of the end hose stop valve must be inspected more frequently (also on the inside).

In addition to the daily visual inspection, we recommend inspecting new end hoses thoroughly (also on the inside) for the first time after having conveyed 1000 m³ of pumped medium.

Depending on the inspection results, schedule additional inspections.

6.3.6 Retrofitting

As a rule, the end hose stop valve is installed in the factory.

Warning!

Risk of injury due to improper installation of end hose stop valve

Retrofitting may only be carried out by representatives of SCHWING and according to guidelines from SCHWING.

A shorter end hose may need to be installed due to the additional weight. Make sure the end hose is the right length when using the end hose stop valve.

6.4 Chamber valve

The chamber valve enables the cleaning of the pumping line by blow-out in the pumping direction.

The residual concrete can be placed at the construction site.

Overflow of the concrete filling-in hopper, as during re-suction, is avoided.

For cleaning, a cleaning ball is inserted into the filled concrete pumping line by means of a hydraulically powered chamber.

Then, compressed air is supplied to the chamber.

When a chamber valve is ordered, the compressor is included in the scope of delivery.

As the chamber blocks the pumping line in "suction direction", the compressed air pushes the cleaning ball and the concrete column through the pumping line in the pumping direction.

Danger!

Danger to life when cleaning with compressed air!

Compressed air released uncontrollably may cause fatal injuries.

Compressed air may only be used for cleaning under supervision of a competent person.

- Only authorised persons (experts) must operate the chamber valve. This also applies to all other compressed-air operated cleaning devices of SCHWING GmbH.
- Persons not involved must leave the danger area of the chamber valve.
- During the cleaning process, no one may be at the end of the pressure line around the concrete outlet.
- Make sure to read the safety manual and the “Cleaning” chapter in the concrete pump operating instructions.
- Use caution when opening the ball valve (7) **(Fig. 449)**. Residual concrete can be ejected from the blow valve opening.
- The pumping line must only be opened when pressure free. This also applies for extending the chamber.

Do not use the chamber valve under any circumstances in order to prevent clogging!

Do not supply compressed air to the extended chamber. Residual concrete can be ejected from the chamber.

6.4.1 Location of the components of the chamber valve

The chamber valve is installed in the pumping line for the boom outlet on the rear of the machine (2) **(Fig. 449)**.

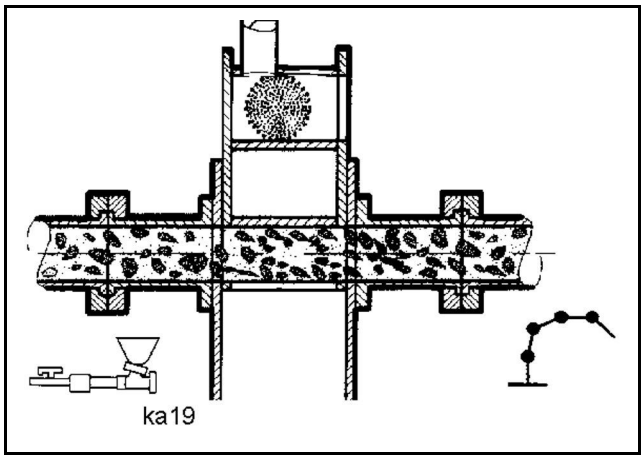


Fig. 447 Chamber extended - concrete is pumped as per normal

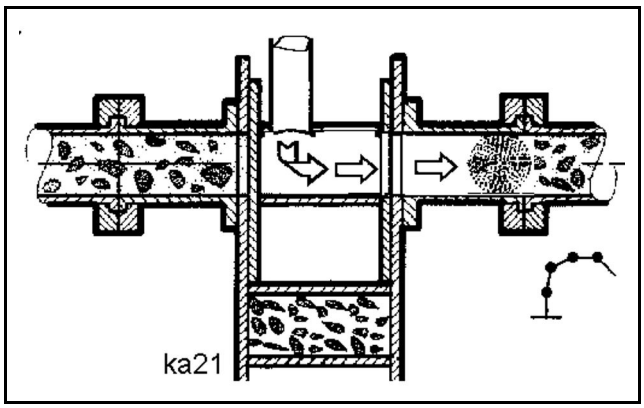


Fig. 448 Chamber retracted - cleaning mode

Information

The control devices for the system are located on the rear of the machine, on the right (1) **(Fig. 449)**.

The location of the control elements can vary depending on the machine type.

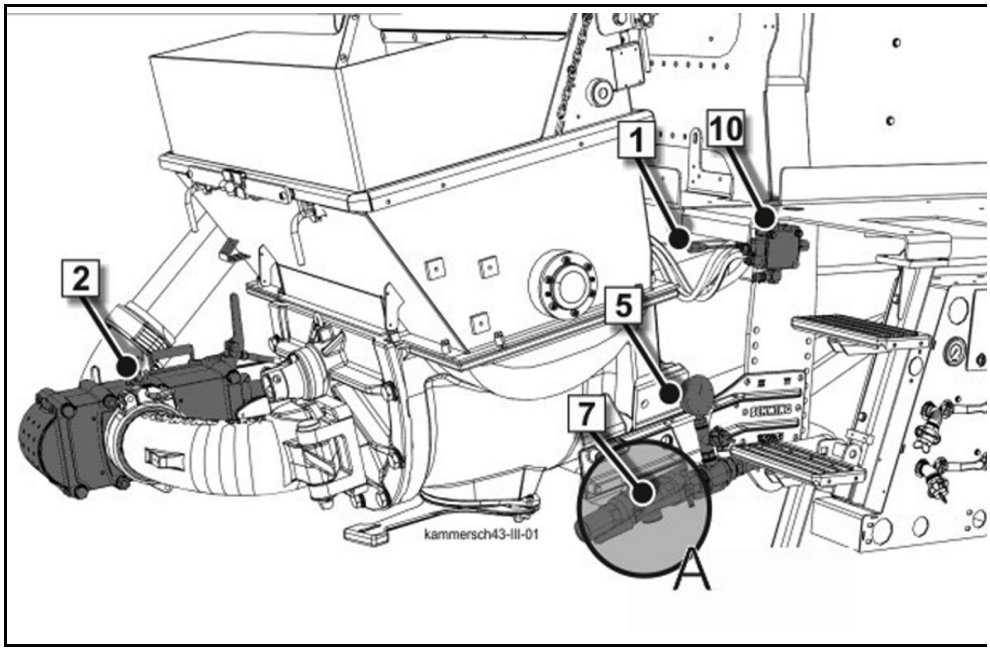


Fig. 449 Complete chamber valve

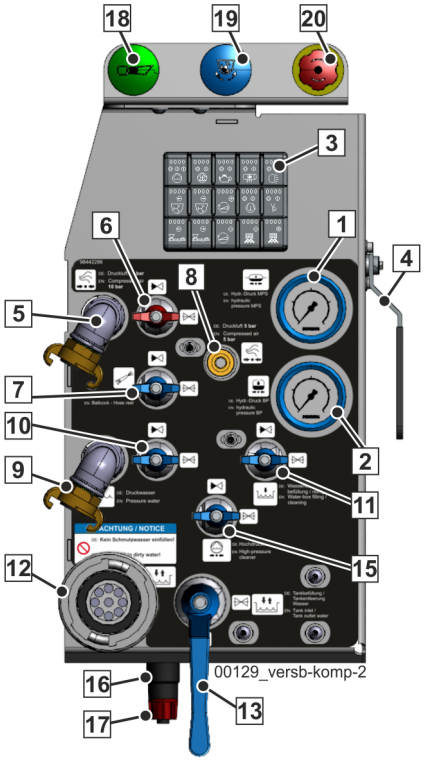


Fig. 450

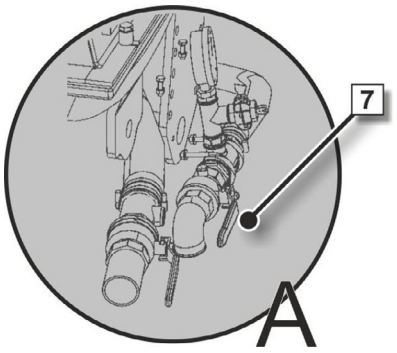


Fig. 451

Caption for (Fig. 449), (Fig. 450)	
Pos.	**Description**
1	Control lever chamber: RETRACT - 0 - EXTEND
2	Chamber valve
5	Pressure gauge
6	Ball valve: Compressed air supply
7	Ball valve: Discharge compressed air
10	Pressure settings: Chamber valve

6.4.2 Preparation

Align the placing boom so that the concrete can be discharged without danger.

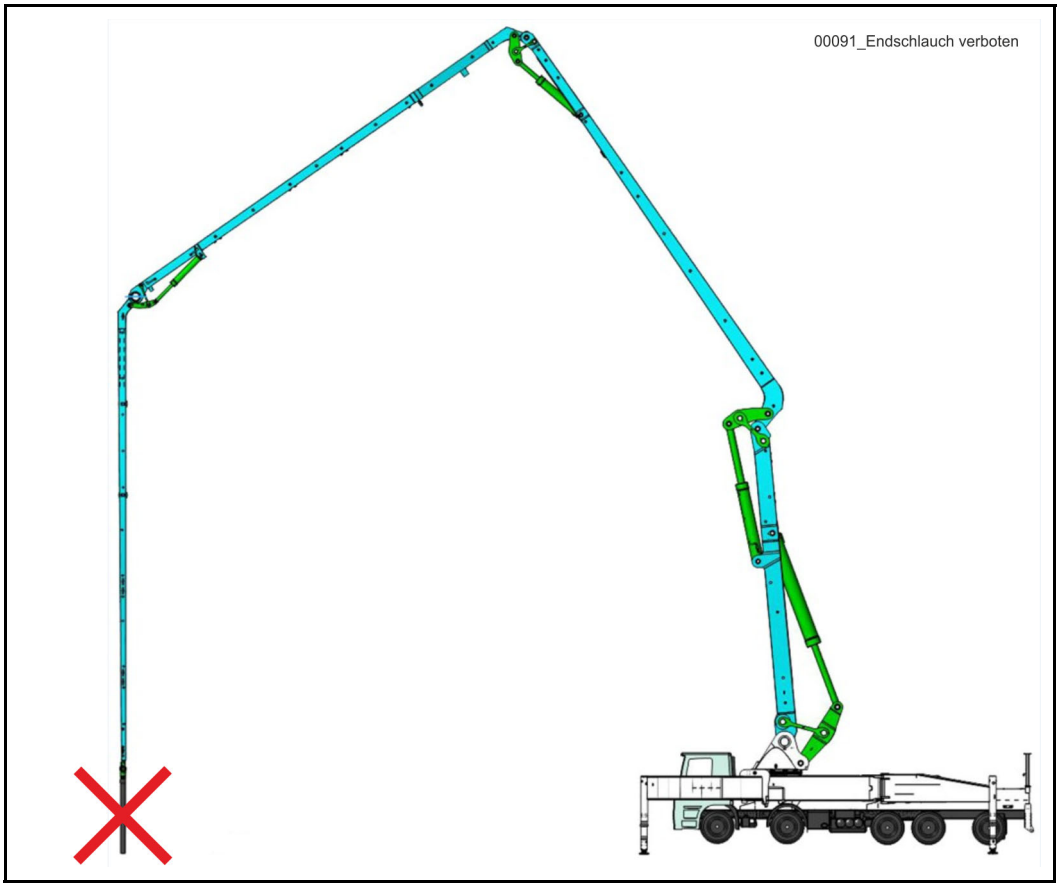


Fig. 452 End hose forbidden in compressed-air cleaning operation

Danger!

Risk of the machine toppling over during compressed-air cleaning!

The machine may topple over with an installed end hose.

The end hose must be removed for compressed-air cleaning.

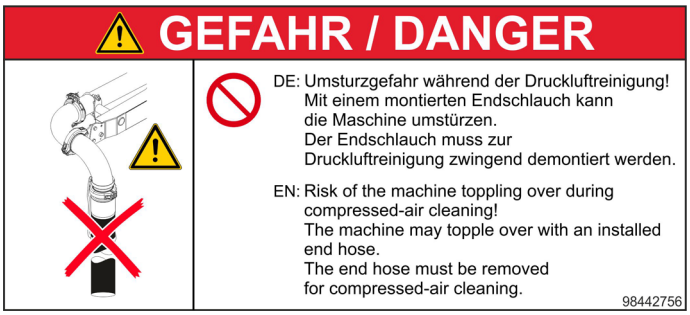


Fig. 453 Signs and labels on the machine

Danger!

Danger to life due to compressed air in the pumping line!

Severe or even fatal injuries due to material being ejected.

Remaining in the danger zone at the end of the pumping line is forbidden.

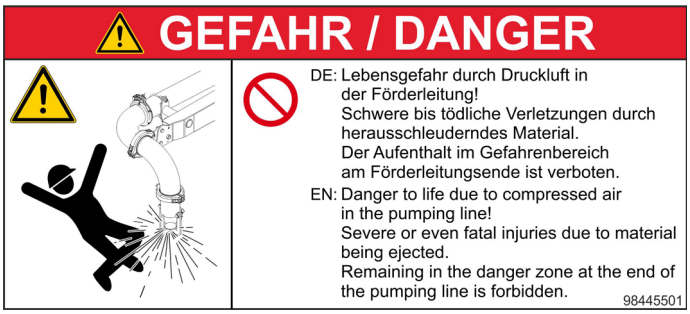


Fig. 454 Signs and labels on the machine

1. Empty the filling-in hopper of the concrete pump as far as possible by pumping.
2. Switch off the concrete pump.
3. Remove the end hose (3) and possibly additionally installed components at the end of the pumping line (1), see example (4) **(Fig. 455) (Fig. 456)**.
4. Mount the trap basket (2) **(Fig. 457)** at the end of the pumping line (1). The trap basket must be aligned vertically.
5. Assign a competent person with specialist knowledge to oversee the concrete discharge point. No one must stay in the danger zone where the concrete exists!
6. Agree on clear communication signals with the overseer.

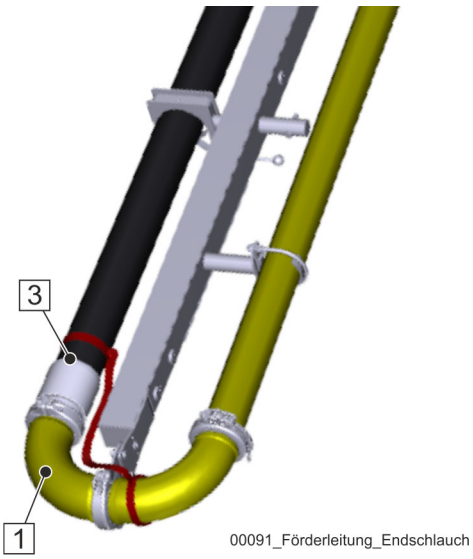


Fig. 455 End hose

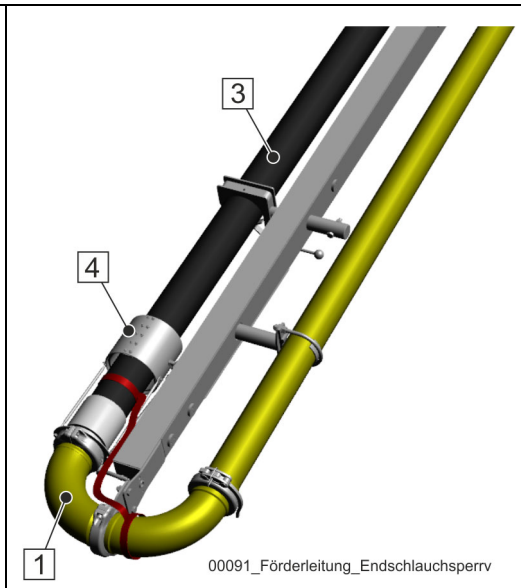


Fig. 456 End hose stop valve

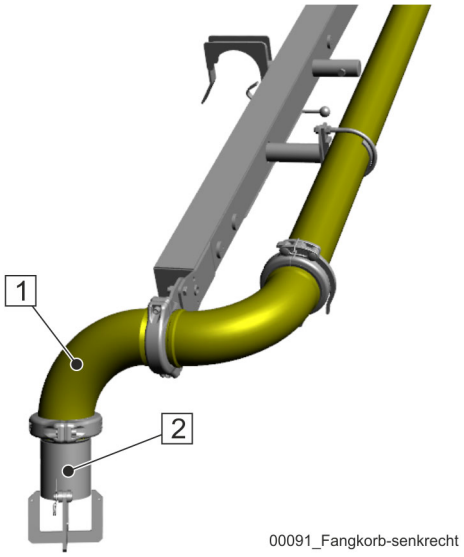


Fig. 457 Trap basket

Caption for (Fig. 455) - (Fig. 456)	
Pos.	**Description**
1	End of pumping line (last component of pumping line)
2	Trap basket (not part of the pumping line)
3	End hose (not part of the pumping line)
4	End hose stop valve (not part of the pumping line)

6.4.3 Cleaning the pumping line

6.4.3.1 Inserting the cleaning ball

- Shut the ball valves for the air system (6) **(Fig. 450)** and (7) **(Fig. 449)**.
- Shut the ball valve by pulling the lever (4) **(Fig. 458)** up 90° so that the hydraulic cylinders cannot be actuated and the ball flap can be opened.
- Open the flap of the chamber valve using the handle (8) and lock it in place with the toggle (9) **(Fig. 458)**.

Warning!

Danger of crushing and shearing injuries caused by valve!

Parts of the body may be crushed or severed.

Pay attention to the safety function.

The flap can only be opened if the lever (4) **(Fig. 458)** is turned (ball valve closed).

If the ball valve is closed, the chamber cannot be run.

- Push a damp, hard cleaning ball into the chamber **(Fig. 459)**.
- Release the toggle (9) **(Fig. 459)** again so that the flap (8) can be closed.
- Close the flap (8).
- Open the ball valve (4) **(Fig. 460)**, lever (4) is engaged - ball valve is open.

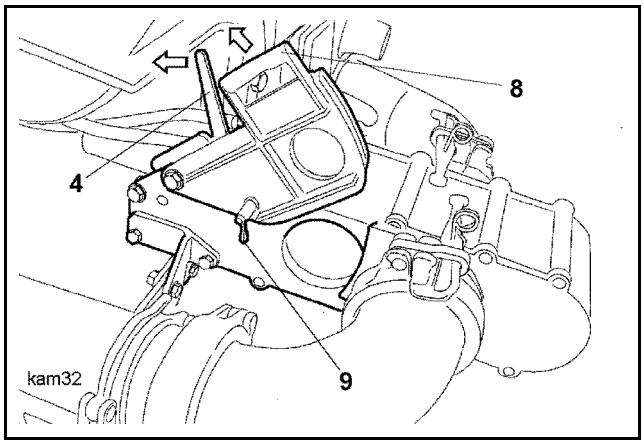


Fig. 458

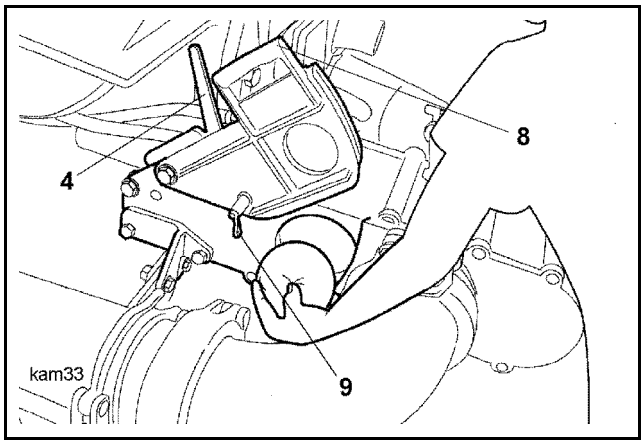


Fig. 459

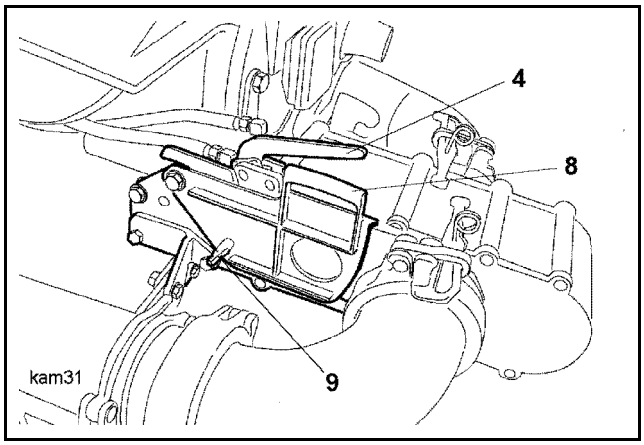
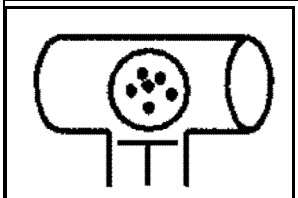
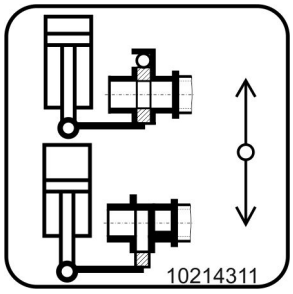


Fig. 460

6.4.3.2 Blowing out the pumping line

	Press the switch on the currently active control in the direction of this symbol to make the chamber valve ready for operation.
	Actuate the control lever (1) **(Fig. 449)** until the chamber with the ball is completely inside the gate valve housing **(Fig. 461)**. The connection between the concrete pump and boom pumping line is then interrupted. When the spring-centred control lever (1) **(Fig. 449)** is released, it returns to the "Neutral position".

➤ Open the ball valves for the air system (6) **(Fig. 450)** (7) **(Fig. 449)**.

	➤ Switch the compressor on using the switch of the active control. The compressed air first escapes through the ball valve (7) **(Fig. 449)**.

➤ Slowly shut the ball valve (7) **(Fig. 449)**.

The compressed air which then gets into the chamber pushes the cleaning ball and the concrete column out of the pumping line in pumping direction **(Fig. 462)**.

➤ During the cleaning process, monitor the compressed-air pressure gauge continuously (5) **(Fig. 449)**.

An increase in pressure means = blockage!

Immediately open the ball valve (7) **(Fig. 449)**!

The pressure in the pumping line is reduced.

A decrease in pressure means that the concrete column is becoming lighter and speeding up.

Immediately open the ball valve (7) **(Fig. 449)**!

This prevents the residual concrete at the end of the pumping line from shooting out.

➤ Completely open the ball valve (7) **(Fig. 449)** when the ball has come out of the pumping line.

➤ Switch off the air compressor.

Stop the compressed air supply to the chamber valve using the ball valve (6) **(Fig. 450)** on the supply line.

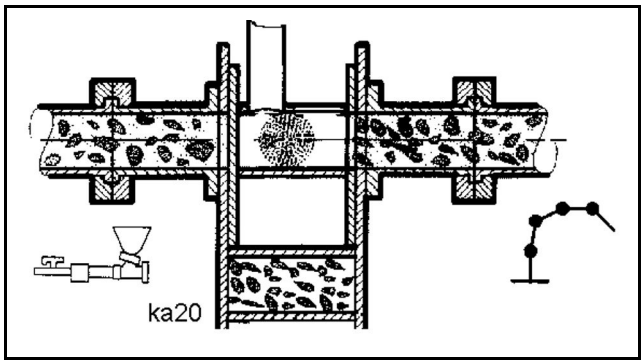


Fig. 461

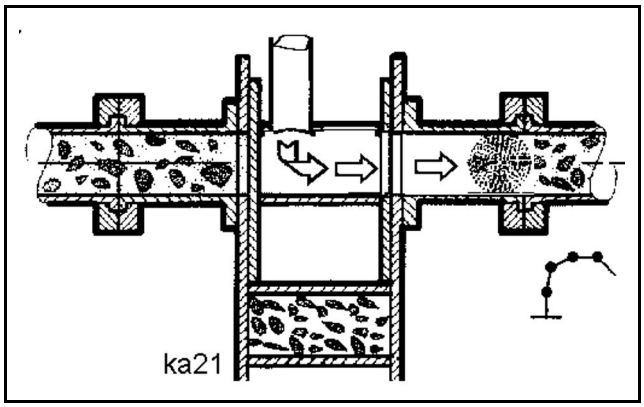


Fig. 462

6.4.3.3 Reverse pumping residual concrete

Danger!

Danger caused by systems under pressure!

If pressure is present, residual concrete may shoot out of the chamber and cause severe injury.

The pumping line must only be opened when pressure free.

This also applies for extending the valve chamber.

Extend the valve chamber only while the compressor is off and the pressure gauge (5) **(Fig. 449)** displays "0 bar".

- Place a soft cleaning ball into the chamber as described above **(Fig. 463)**.
- Retract the chamber and move the ball into the pumping line with a short blast of air **(Fig. 464)**.
- Switch the compressor off and shut the ball valve (6) **(Fig. 450)**.
- Depressurise the pumping line by opening the discharge ball valve (7) **(Fig. 449)**.
- Extend the chamber once more **(Fig. 465)**.
- Switch the concrete pump to "Suction" and suck the ball back into the feeding hopper together with the residual concrete.
- Afterwards, switch off the concrete pump.

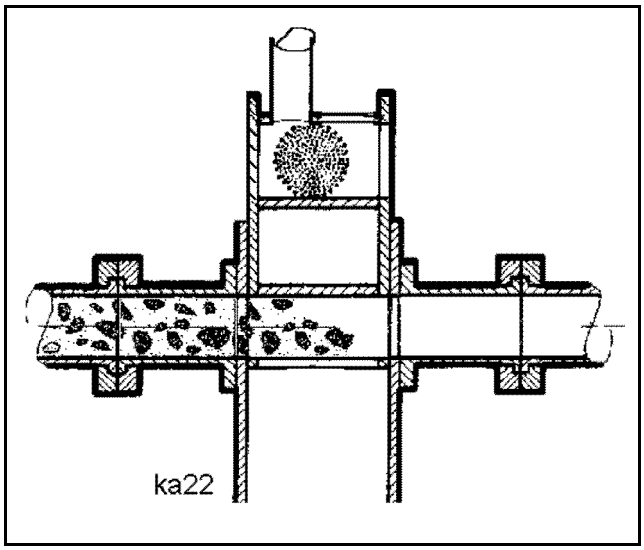


Fig. 463

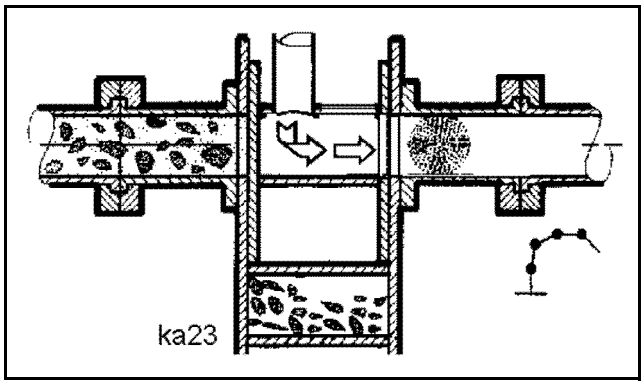


Fig. 464

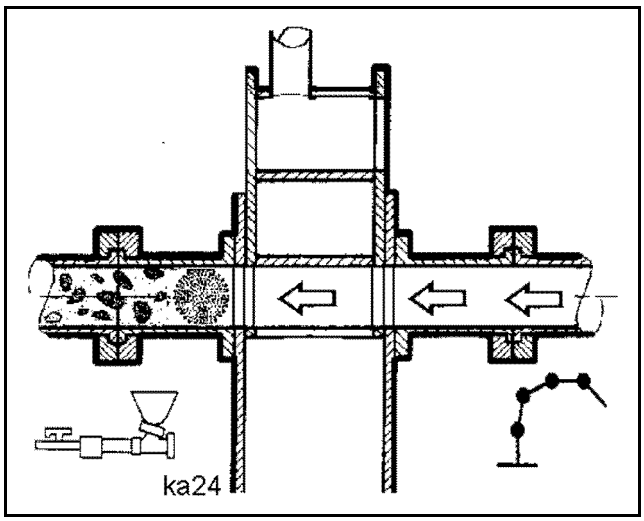


Fig. 465

6.4.4 Cleaning the truck-mounted concrete pump

- Switch off the concrete pump.
- Clean the chambers (1+2) **(Fig. 466)** and the exterior of the chamber valve with water.
- Clean the machine as described in the operating instructions for the concrete pump.
- Lubricate all grease nipples (pos. 1-8) **(Fig. 467) (Fig. 468)** on the chamber valve.

Warning!

Risk of being crushed and sheared!

Parts of the body may be crushed or severed.

If the "outlet" (1) **(Fig. 469)** is folded up, the chamber valve (3) and the rock valve (2) can be accessed.

Moving one of the two valves can pose a danger of being crushed or sheared **(Fig. 470)**.

Do NOT reach into the chamber valve or the rock valve.

For this reason:

- Prior to opening the outlet, switch off the drive motor of the machine and secure the machine against being switched on without authorisation.
- Do not reach into the openings of the rock valve or the chamber valve and do not insert any objects into them.
- While cleaning with the water hose, do not insert any objects into the openings of the rock valve or the chamber valve.

Information

Should the concrete pump need to be switched on for cleaning, use the local control unit.

The machine operator is responsible for ensuring that during cleaning no unauthorised persons get near the rock valve or the chamber valve and the control elements belonging to them.

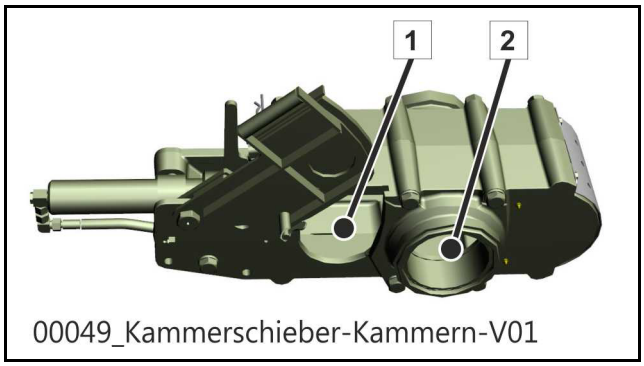


Fig. 466

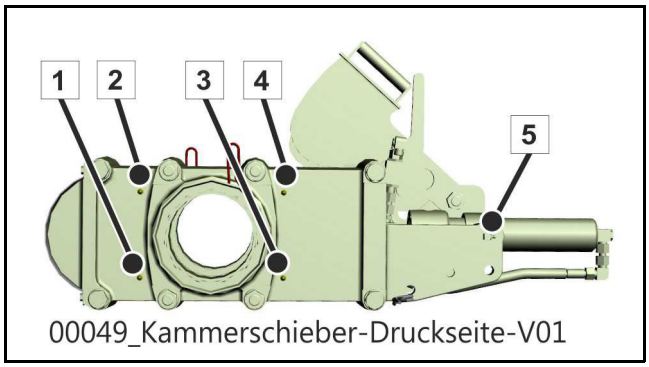


Fig. 467

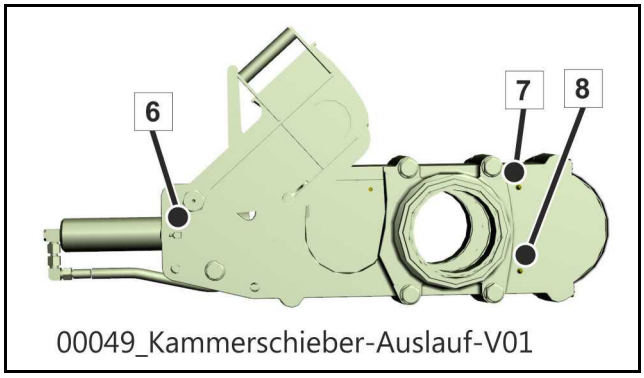


Fig. 468

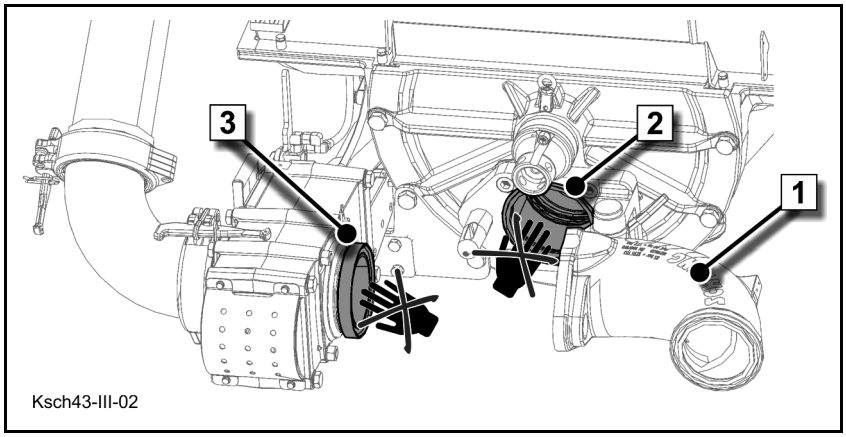


Fig. 469

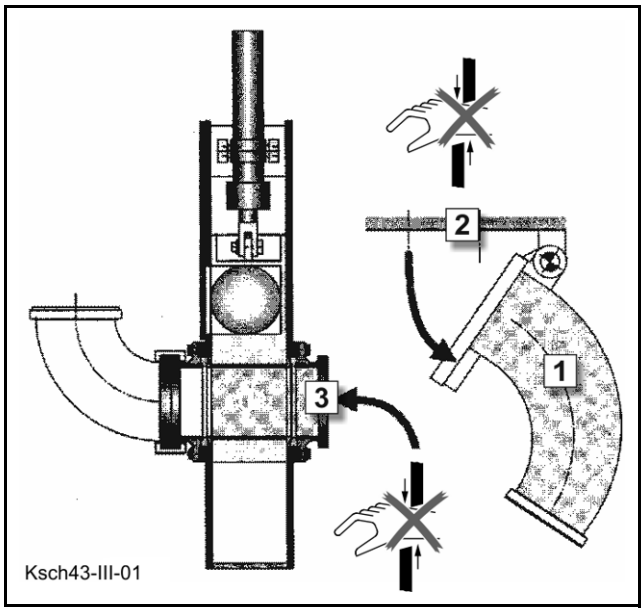


Fig. 470

6.5 Central lubrication system (special equipment)

SCHWING machines can be equipped with a central lubrication system as special equipment. Two different types are used. Type A with an electronic display and type B without a display **(Fig. 471)**.

The electrically powered piston pump, reservoir and electronic control part are combined into a single unit **(Fig. 471)**. This unit supplies the lubrication points of the machine via distributors and lines **(Fig. 472)**.

Any other use is deemed improper.

The amount of grease and lubricating intervals are set at the factory.

On truck-mounted concrete pumps, the settings can only be implemented on the control part of the piston pump. The lubrication only occurs during pumping operations (pump kit ON).

For stationary machines (SP 3800/4800), the settings can be configured in the control system and on the display of the piston pump.

Information

Please note that the settings in the control system and those on the electronic control unit of the piston pump interact.

Should an adjustment to special operating conditions appear necessary, please contact the SCHWING customer service for the purpose of reprogramming.

Type A

Type B

Fig. 471

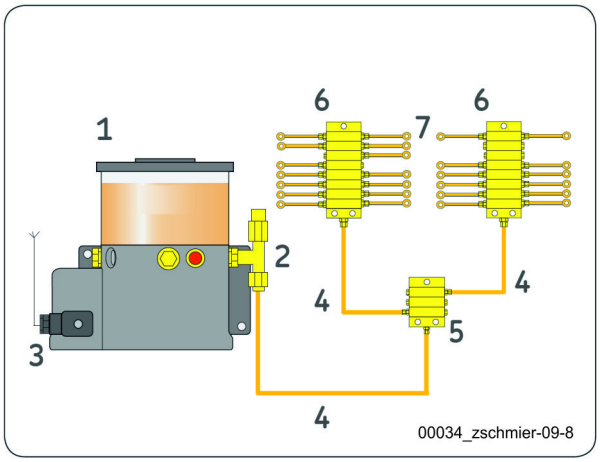


Fig. 472 Example of a progressive system

6.5.1 Safety

In addition to these operating instructions, the legal provisions and related regulations on accident prevention and environmental protection must be observed and applied.

Information

Observe external documentation!

For built-in supplier components, the manufacturer only provides the essential information in the operating instructions, which is required for proper operation and maintenance of the machine.

Further information can be found in the documentation for the respective supplier component.

6.5.2 Instructions for filling with lubricant

Attention!

Material damage due to incorrect use of lubricating grease!

The wrong lubricating grease, the wrong lubricating grease quality or dirty lubricating grease can cause damage to the machine.

When filling or topping up with lubricating grease, always ensure the right type of lubricating grease, the right lubricating grease quality and cleanliness when working. Do not mix lubricating greases from different manufacturers.

Fig. 473

- Use a lubricating grease as indicated in our lubricant recommendations **(chap. 4.3)**: (KP 2 K according to DIN 51502 without solid lubricant, NLGI class 2).

The central lubrication system can operate at up to approx. -25 °C when using the lubricating grease prescribed for our machines.

6.5.2.1 Filling with lubricant

The machine is filled with lubricant via the cone-type lubricating nipple DIN 71412-AM10x1 (1) **(Fig. 474)(Fig. 475)** using a conventional grease gun. The cone-type lubricating nipple can be repositioned to position (2) **(Fig. 474)(Fig. 475)**, e.g. in order to provide improved access.

The filling of the reservoir must be carried out correctly (observe the filling level monitoring).

For the optional filling via the reservoir cover, absolute cleanliness must be ensured.

6.5.2.2 Filling level check on the pump unit

The transparent lubricant reservoir enables a visual filling level check. This check must be carried out regularly for safety reasons. If the reservoir has been drained to below the "min" mark, the entire system must be vented.

Fig. 474

Fig. 475

6.5.2.3 Vent system

- Fill reservoir with lubricant
- Remove the main lines (1) **(Fig. 477)** from the male connector (2) **(Fig. 477)** on the pump elements (3) **(Fig. 477)**
- Let the pump run until lubricant emerges from the male connector on the pump elements without any air bubbles
- Reattach the main lines
- Let the pump run until grease emerges from all lubrication points.

Furthermore, “emergency grease nipples” (4) **(Fig. 477)** are available on the male connectors of the pump elements.

Through these, the separate lubricant circuits of the lubrication system can be amply supplied with lubricant manually via hand-operated grease guns in the case of power failures or pump faults.

6.5.2.4 Pressure relief valve

A pressure relief valve (5) **(Fig. 478)** protects the entire lubrication system against excessive system pressures. It is mounted directly on the pump element.

The configured opening pressure is 300 or 200 bar, depending on the valve.

If a clogged distributor or lubrication point causes an operating pressure of over 300 or 200 bar, the valve opens and grease will visibly emerge from the escape point (6) **(Fig. 478)**.

At the same time this also acts as an optical system monitoring.

As such, the pump unit is protected against damage.

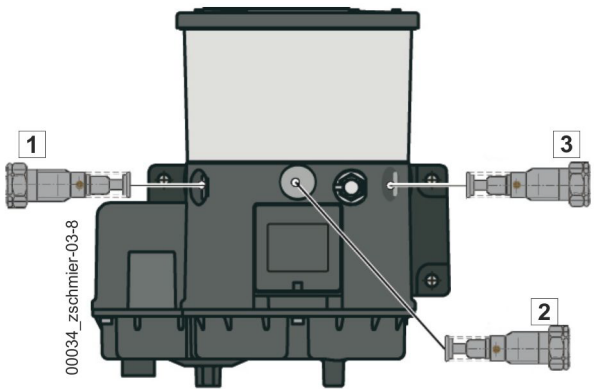


Fig. 476 Arrangement of the pump elements

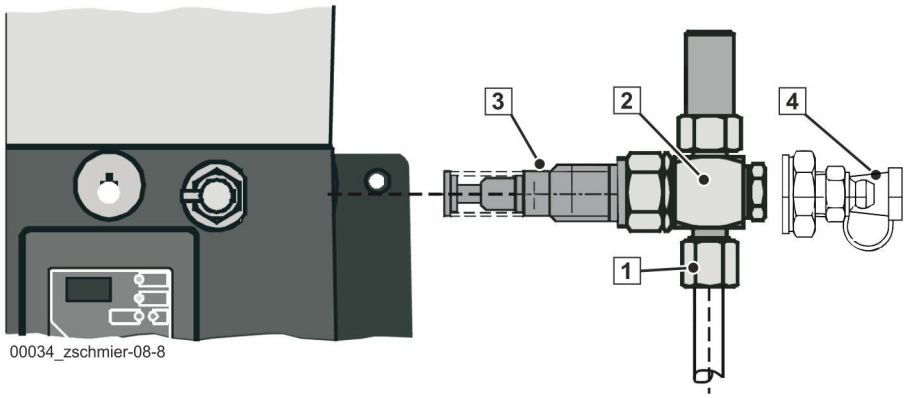


Fig. 477

Pump element (3) with male connector (2) and emergency grease nipple (4)

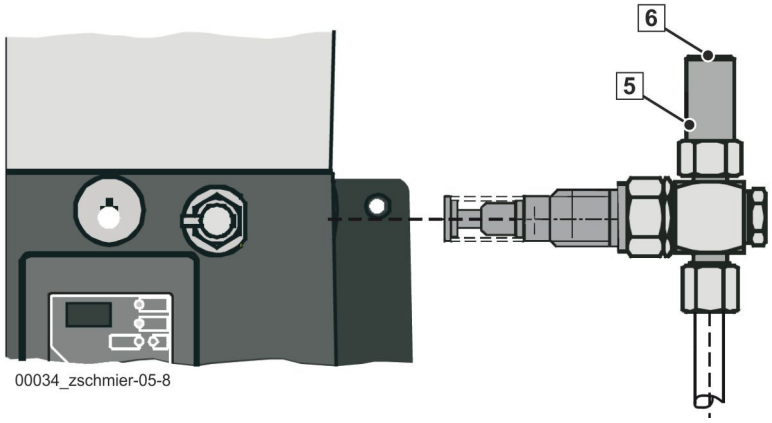


Fig. 478

Pressure relief valve with discharge opening

6.5.3 Configuring the system (type A)

The type A pump units are equipped with an integrated control part with an operating display **(Fig. 479)**. Operating parameters such as pause times (Timer) and pump runtimes (Contact) can be parameterised via the control part.

The display and operating unit is protected from spray water and mechanical damage by a transparent plastic cover. For programming, the cover must be removed and then reinstalled.

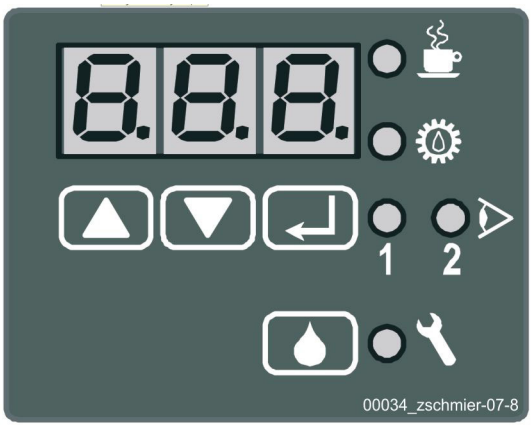


Fig. 479 Operating display

Display elements and controls on the operating display **(Fig. 479)**		
Depiction	Designation	Function
	Three-digit LED display	Values and operating status
	PAUSE LED	Pause time
	CONTACT LED	Contact time display (pumping operation)
	1 = CS LED 2 = PS LED	CS=Cycle Switch: monitors the function with an external cycle switch PS=Pressure Switch: monitors the function with an external pressure switch
	FAULT LED	Fault message
	UP or DOWN button	Switch on display Display values and parameters Set values and parameters
	SET button	Switch between programming and display mode Confirm values
	DK button	Trigger in-between lubrication Erase fault message

As lubrication of the lubrication points is only necessary at given intervals, the lubrication cycle or lubrication procedure is divided into a pump runtime and a pause time. A lubrication cycle always begins with a pump runtime.

After the pump runtime, the lubrication cycle is interrupted and then resumed after the configured pause time.

This means, a lubrication cycle always starts with the "residual lubrication time" or "residual pause time".

Even a power failure cannot erase the integrated data memory.

6.5.4 Configuring the system (type B)

The type B pump units are equipped with an integrated control part. Operating parameters such as pause times (Timer) and pump runtimes (Contact) can be parameterised via the control part.

The control part is located behind the screw cap (3) **(Fig. 475)**.

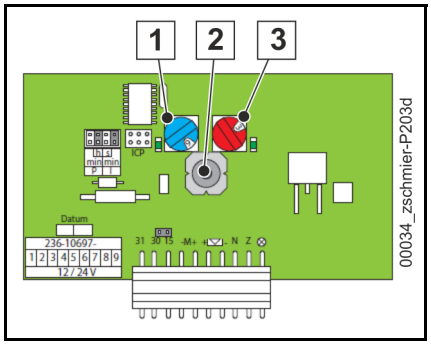


Fig. 480 Control board

As lubrication of the lubrication points is only necessary at given intervals, the lubrication cycle or lubrication procedure is divided into a pump runtime and a pause time. A lubrication cycle always begins with a pump runtime.

The pause time can be set with the rotary switch (1) and the lubrication time is set with the rotary switch (3). The additional lubrication is triggered by pressing the push-button (2) for 2 seconds.

Position	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Pause time in h (blue)	1[1]	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Lubricating time in min (red)	2	4[1]	6	8	10	12	14	16	18	20	22	24	26	28	30

1.Basic setting

6.5.5 Setting parameters

6.5.5.1 Pump runtime

The pump runtime corresponds to the time in which the pump conveys the lubricant.

In the case of a division into lubrication segments, one of the segment valves will be opened at the same time and closed again at the end of the pump runtime.

The duration of the pump runtime can be configured as a time value in hours, minutes and seconds.

6.5.5.2 Pause time

In the pause time, also referred to just as pause, the pump rests or in the case of a division into lubrication segments, the valve for the affected lubrication segment is closed.

The duration of the pause time can be configured.

In automatic operating mode, the pause time is determined by specifying a time value (Pause timer).

When configuring the lubrication scenario, the pause time thus corresponds to a delay time, by which the valves of the individual lubrication segments are opened successively once a lubrication cycle has been started. This therefore prevents all valves from opening at the same time.

6.5.5.3 Intermediate lubrication

Manual intermediate lubrication only works when the central lubrication system is supplied with power!

The central lubrication system is supplied with power under the following conditions:

- A function (concrete pump or placing boom) is activated.
- After starting the control system and actuating an outrigger button for the first time for a period of 5 minutes.

Once the 5 minutes have elapsed, the periodic lubrication process will be triggered automatically and possibly continued independently of the control system if the control was interrupted in the meantime.

If additional lubrication appears necessary under certain operating conditions, you can trigger intermediate lubrication by pressing the button (1) **(Fig. 481)** (for type B, press for at least 2 seconds) while the above conditions are met.

The piston pump runs for 4 minutes after being pressed once. You can actuate the button again after 4 minutes of runtime.

The pause time is set to "0" after the intermediate lubrication. The periodic lubrication then continues to run as configured.

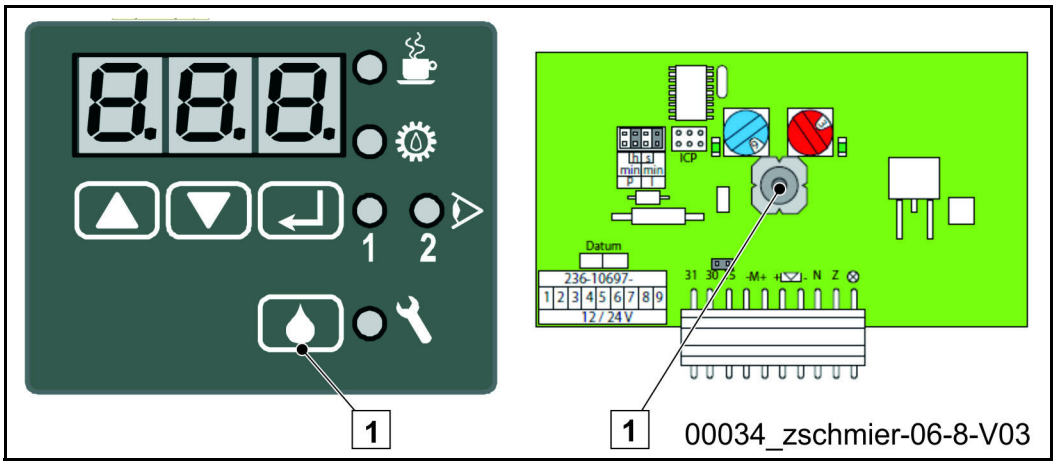


Fig. 481 Trigger (1) for intermediate lubrication

6.5.6 Checking the system

- Check the system of lines (visual inspection) daily for leaks and external damages
- Check the supplied bearing points (visual inspection) daily

There must be clearly visible traces of lubricant.

- If any faults are detected during the check, have SCHWING's customer service repair the system immediately in order to prevent any consequential damages caused by a lack of lubrication.

Attention!

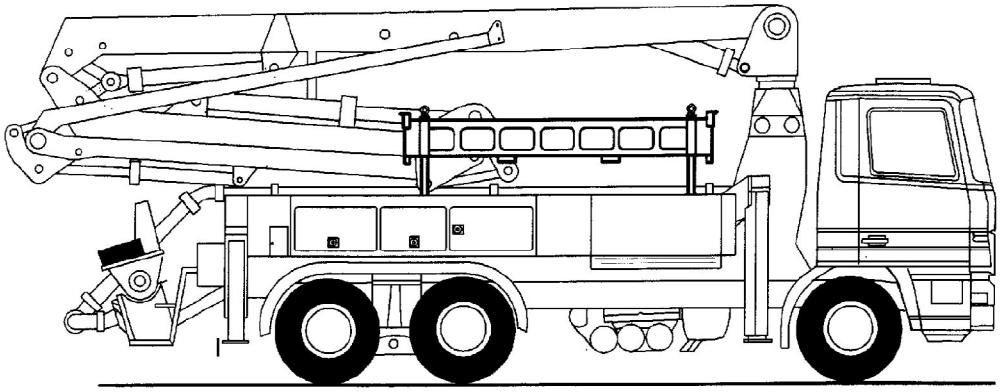
The drive line bearings of the concrete pump cannot be connected to the central greasing.

These lubrication points must be supplied "manually" according to the maintenance schedule.

If some lubrication points were not connected to the central greasing at customer request, they must also be lubricated using a grease gun.

6.6 Removable stowing boxes/cassettes

Installation on S 20 / S 24 X / S 28 X / S31 XT



00182_S52_55_SX_Ladebox_140

The aforementioned SCHWING truck-mounted concrete pumps (hereinafter referred to as "machine") can be equipped with completely removable stowing boxes as special equipment, or certain machines with individually removable stowing cassettes.

The structure of positive testing thereby depends on the relevant machine data.

Stowing boxes of varying length and features are available.

Stowing cassettes are 3.0 meters long.

Stowing boxes and stowing cassettes are intended for loading by crane or forklift.

Loading with the placing boom is possible under certain circumstances by means of an additional lifting device.

6.6.1 Safety

- The stowing boxes and cassettes may only be carried on the machine loaded with conventional machine accessories.
- It is forbidden to transport or lift other payloads or persons in or with the stowing boxes and cassettes.
- The permissible total weight of the machine must be observed.
- The stowing boxes and cassettes may only be placed on the machine on an associated carrier system.

6.6.1.1 Maximum permissible weight of stowing boxes and cassettes

Caution!

Danger due to overload!

In compliance with the permissible total weight of the machine and the capacity of the lifting gear used, the loaded boxes or cassettes - irrespective of their length - must not weigh more than listed below.

Model	Permissible total weight
S 20 (with short span)	620 kg
S 20	620 kg
S 24 X	820 kg
S 28 X	820 kg
S 31 XT	820 kg

Further information on weight determination can be found in chapter **"Weight determination"** on page 677.

6.6.1.2 Loading with crane or forklift

Only authorised persons are permitted to fasten and move a stowing box or cassette by crane or forklift under observation of the relevant safety regulations.

6.6.1.3 Loading with the placing boom

Caution!

Risk of damage due to improper use of the placing boom!

The placing boom is not a lifting gear and must not be used as a lifting gear.

In exceptional cases, SCHWING may approve any additional usage if:

- only conventional machine accessories are loaded.
- the SCHWING lifting device is used with load limitation system.
- the maximum loads are adhered to according to **"Maximum permissible weight of stowing boxes and cassettes"** on page 670.
- these operating instructions are observed.

6.6.1.4 Personnel

For safe use of the lifting device, operating personnel must be authorised and trained in the use of the lifting device, as well as being qualified as a concrete pump operator.

Ensure the following points:

- specific training regarding the potential dangers during additional usage has been received.
- the stowing boxes and cassettes are fastened from a safe location. Suitable ladders and hoists, as well as personal protective equipment (fall arrester, etc.) are used. Also read the safety manual in the operating instructions of the truck-mounted concrete pump.
- the load and danger zone is observed during the additional use. Remaining in the danger zone is forbidden!
- the placing boom is moved at low speed by **remote control**.
- the special warning and information signs on the machine are observed and renewed in case of damage.

6.6.1.5 Truck-mounted concrete pump

Ensure the following points:

- The machine must be operationally supported on all four supports during the additional use. See also **“Setting up machines”** on page 191 in the operating instructions of the truck-mounted concrete pump.
- The installed concrete pump must be decommissioned.

6.6.1.6 Fastening and moving loads

- The SCHWING lifting device may only be used to fasten the SCHWING stowing boxes and cassettes to the placing boom in the manner described under **“Loading with the placing boom”** on page 691. Fastening other loads is strictly forbidden.
- During fastening, the suspension bolt of the placing boom must be located centrally above the stowing box. Diagonal pull or dragging loads **is prohibited**.
- All lifting hooks must always be latched (stowing cassette = 2 lifting hooks, stowing box = 4 lifting hooks).

- It is strictly prohibited to position the raised stowing boxes and cassettes manually, **while** being **moved** by means of a lifting device. When improving the position, use the handle (1) **(Fig. 482)** taking occupational safety into account and only when the stowing box or cassette is stationary.
- Do not step under suspended load!

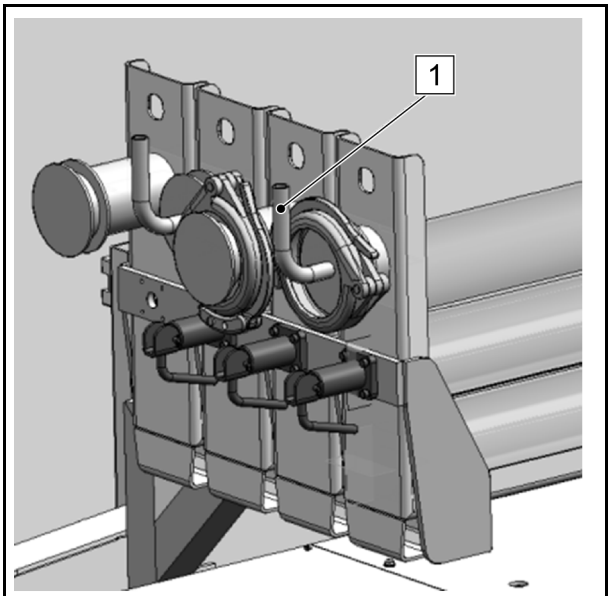


Fig. 482 Handle

6.6.1.7 Checking the lifting devices

- Check the lifting device and stowing boxes or cassettes for damage before and after each use. Repairs may only be carried out by experts.
- An expert must test the lifting devices and stowing boxes and cassettes as required, however, at least once every year according to operating conditions and operational conditions.

6.6.2 Variants and equipment options

Warning!

Risk of accident!

Stacking on the machine is forbidden!

The following stowing box and cassette variants are available:

Stowing boxes (lengths)	Stowing cassettes (models)	
3.1 m	S 20	3.0 m
4.1 m	S 24 X	3.0 m
5.1 m	S 28 X	3.0 m

Information

Equal length stowing boxes are stackable (even when assembled) **(Fig. 483)**.

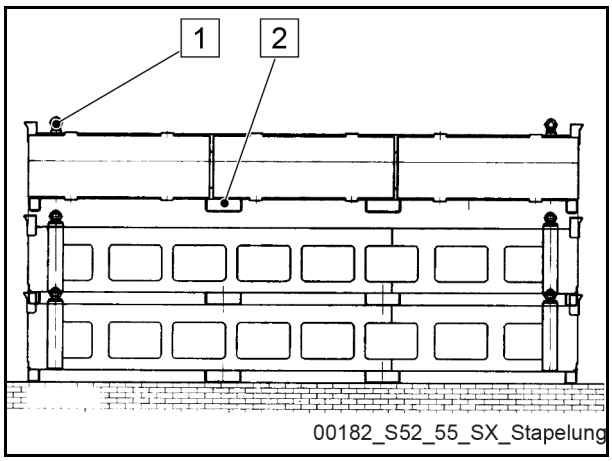


Fig. 483 Stacking of equal length stowing boxes

For a smooth appearance, the outside of the stowing boxes and cassettes can be covered with aluminium sheeting.

It is also possible to mount 3.1 m and 4.1 m long stowing boxes with sleeves in order to receive DN 65/DN 75 and DN 100 pumping hoses.

The stowing boxes and cassettes are equipped with bushings (2) **(Fig. 483)** so they can be lifted using a forklift and ring screws (1) **(Fig. 483)** or bores (for cassettes) for crane loading.

6.6.2.1 Mounting 3.1 m and 4.1 m stowing boxes (Fig. 484)

Mounting	Quantity and size
A	24 loose hoses/tubes DN 65
B	14 loose hoses/tubes DN 100
C	11 loose hoses/tubes DN 125
D	8 hoses DN 100 in sleeves
E	14 hoses DN 65/DN 75 in sleeves

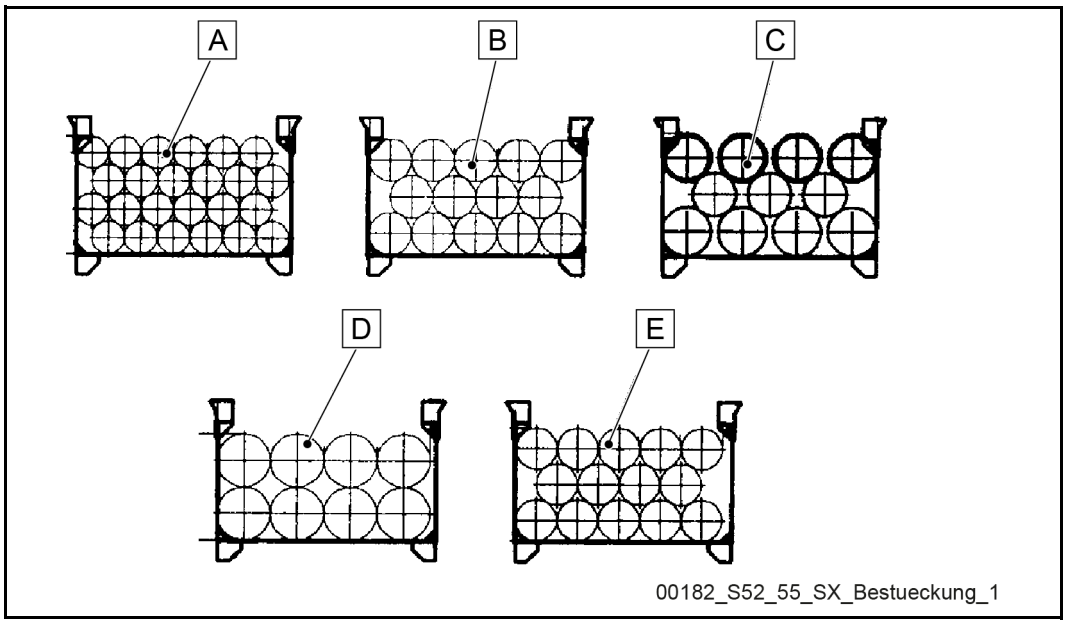


Fig. 484 Mounting 3.1 m and 4.1 m stowing boxes

6.6.2.2 Mounting 5.1 m stowing boxes (Fig. 485)

Mounting	Quantity and size
F	11 loose hoses/tubes DN 100
G	18 loose hoses/tubes DN 65

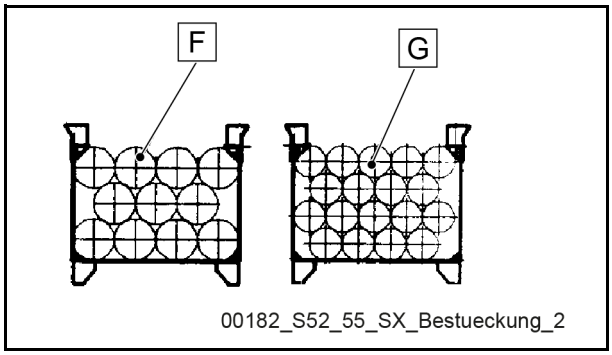


Fig. 485 Mounting 5.1 m stowing boxes

6.6.2.3 Mounting 3.0 m stowing cassettes

Caution!

Risk of damage!

Super 2000, Super 3000 and thick-walled pumping pipes must **not** be loaded in stowing boxes!

Information

A truck-mounted concrete pump can be mounted with a maximum of 4 stowing cassettes **(Fig. 486)**.

Information

For truck-mounted concrete pumps S 28 X, only 3 x pumping pipes DN 100 can be loaded per stowing cassette due to geometrical reasons (space requirement of the boom).

Mounting	Quantity and size
A	4 x pumping pipe DN 100
B	3 x pumping pipe DN 125

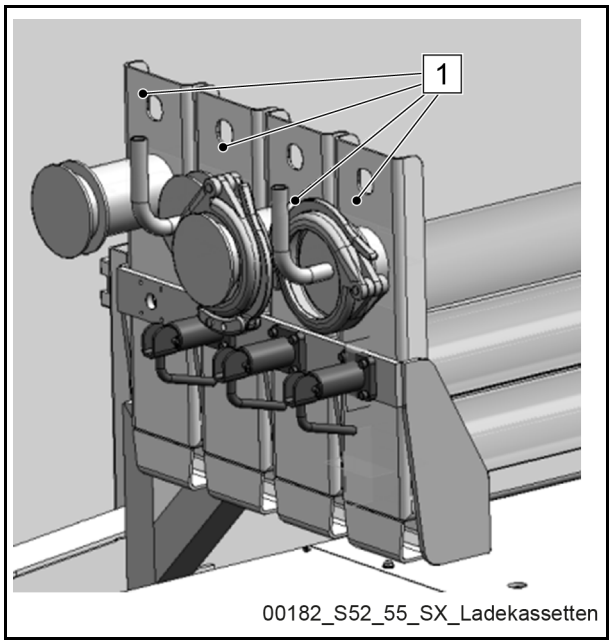


Fig. 486 Mounting stowing cassettes

6.6.3 Weight determination

In compliance with the permissible total weight of the machine and the capacity of the lifting gear used, the loaded boxes or cassettes - irrespective of their length - must not weigh more than specified in **“Maximum permissible weight of stowing boxes and cassettes”** on page 670.

Below (**“Calculation of the total weight for an open stowing box (3.1 m long)”** on page 681 and onwards) are tables with the individual weights of the boxes, hoses and tubes. It is easy to calculate this way, whether you exceed the permissible maximum load with the desired mounting, if necessary.

We recommend copying the following chapters, in order to use the copies for later calculations.

- **“Calculation of the total weight for an open stowing box (3.1 m long)”** on page 681
- **“Calculation of the total weight for an open stowing box (4.1 m long)”** on page 682
- **“Calculation of the total weight for an open stowing box (5.1 m long)”** on page 683
- **“Calculation of the total weight for a stowing box (4.1 m long) mounted with sleeves”** on page 684
- **“Calculation of the total weight for four stowing cassettes (3.0 m long)”** on page 685

6.6.3.1 Calculation example 1 (loading on S 20)

Situation

A 4.1 m long stowing box with aluminium covering from tread plate and 14 PE sleeves ∅ 125 x 3.1 should be loaded with 4 m long hoses DN 65.

How many hoses may be loaded?

Solution

Parameters	Calculation	
Permissible total weight of the stowing box		620 kg
Stowing box	–	208 kg
Aluminium covering	–	25 kg
14 PE sleeves	–	63 kg
Payload	=	324 kg
Payload		324 kg
Hose weight	/	21.5 kg
End result	=	**15.1**

=> The maximum capacity of the stowing box (14 hoses) can be used.

6.6.3.2 Calculation example 2 (loading on S 31 XT)

Situation

A 5.1 m long stowing box **without** outer covering should be loaded with 5 m long hoses DN 100.

How many hoses may be loaded?

Solution

Parameters	Calculation	
Permissible total weight of the stowing box		820 kg
Stowing box	**–**	179 kg
Payload	**=**	641 kg
Payload		641 kg
Hose weight	**/**	48.3 kg
End result	**=**	**13.3**

=> The maximum capacity of the stowing box (11 hoses) can be used.

6.6.3.3 Calculation example 3 (loading on S 24 X)

Situation

Four 3.0m long stowing cassettes should be loaded with 16 pumping pipes DN 100 and 16 couplings DN 100.

How many pumping pipes may be loaded?

Solution

Parameters	Calculation	
Permissible total weight of the stowing box		820 kg
Tube girders, each 42 kg	–	183 kg
2 Girders, each 23 kg	–	46 kg
16 Couplings, each 3.27 kg	–	53 kg
Payload	=	538 kg
Payload		538 kg
Pumping pipe weight	/	31.94 kg
End result	=	**16.8**

=> The maximum capacity of the stowing cassette (16 pumping pipes) can be used.

6.6.3.4 Calculation of the total weight for an open stowing box (3.1 m long)

(please copy, complete and store for each loading variant)

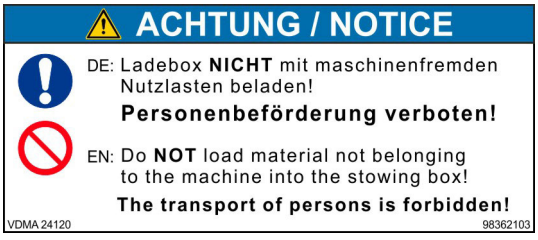
1.0	3.1m stowing box, empty, incl. lifting gear				138 kg
2.1	Outer covering, Alu, smooth			=> 10 kg	10 kg
2.1	Outer covering, Alu, tread plate			=> 19 kg	19 kg

Caution!

Risk of damage due to different weights!

Weights may vary according to design and manufacturer. Weigh, if necessary!

		Individual weight	Number	Subtotal	
3.1.1	3m tube, DN 65	15.25 kg	x =	kg =>	kg
3.1.2	3m tube, DN 75	kg	x =	kg =>	kg
3.1.3	3m tube, DN 80 (4 ½“)	22.57 kg	x =	kg =>	kg
3.1.4	3m tube, DN 85 (4½”)	kg	x =	kg =>	kg
3.1.5	3m tube, DN 100	31.94 kg	x =	kg =>	kg
3.1.6	3m tube, DN 100 (Super 2000)	37.0 kg	x =	kg =>	kg
3.1.7	3m tube, DN 125	39.3 kg	x =	kg =>	kg
3.1.8	3m tube, DN 125 (Super 2000)	45.33 kg	x =	kg =>	kg
3.2.1	3m hose, DN 65	17.6 kg	x =	kg =>	kg
3.2.2	3m hose, DN 75	20.4 kg	x =	kg =>	kg
3.2.3	3m hose, DN 85 (4 ½“)	kg	x =	kg =>	kg
3.2.4	3m hose, DN 100	33.5 kg	x =	kg =>	kg
3.2.5	3m hose, DN 125	39.5 kg	x =	kg =>	kg
				Total weight	kg



6.6.3.5 Calculation of the total weight for an open stowing box (4.1 m long)

(please copy, complete and store for each loading variant)

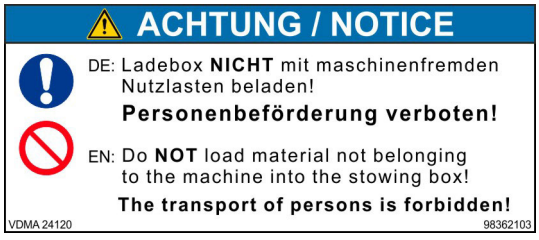
1.0	4.1m stowing box, empty, incl. lifting gear				168 kg
2.1	Outer covering, Alu, smooth			=> 14 kg	14 kg
2.1	Outer covering, Alu, tread plate			=> 25 kg	25 kg

Caution!

Risk of damage due to different weights!

Weights may vary according to design and manufacturer. Weigh, if necessary!

		Individual weight	Number	Subtotal	
3.1.1	4m tube, DN 65	kg	x =	kg =>	kg
3.1.2	4m tube, DN 75	kg	x =	kg =>	kg
3.1.3	4 m tube, DN 80	kg	x =	kg =>	kg
3.1.4	4 m tube, DN 85	kg	x =	kg =>	kg
3.1.5	4m tube, DN 100	kg	x =	kg =>	kg
3.1.6	4m tube, DN 100 (Super 2000)	kg	x =	kg =>	kg
3.1.7	4m tube, DN 125	52.0 kg	x =	kg =>	kg
3.1.8	4m tube, DN 125 (Super 2000)	kg	x =	kg =>	kg
3.2.1	4m hose, DN 65	21.5 kg	x =	kg =>	kg
3.2.2	4m hose, DN 75	25.0 kg	x =	kg =>	kg
3.2.3	4m hose, DN 85 (4 ½“)	34.7 kg	x =	kg =>	kg
3.2.4	4m hose, DN 100	40.8 kg	x =	kg =>	kg
3.2.5	4m hose, DN 125	60.4 kg	x =	kg =>	kg
				Total weight	kg



6.6.3.6 Calculation of the total weight for an open stowing box (5.1 m long)

(please copy, complete and store for each loading variant)

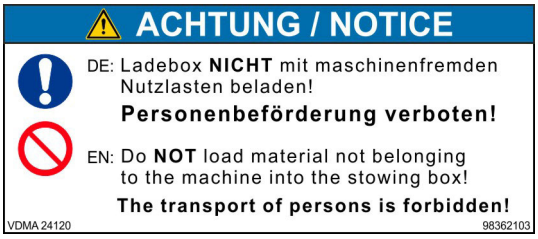
1.0	5.1m stowing box, empty, incl. lifting gear				179 kg
2.1	Outer covering, Alu, smooth			=> 17 kg	17 kg
2.1	Outer covering, Alu, tread plate			=> 32 kg	32 kg

Caution!

Risk of damage due to different weights!

Weights may vary according to design and manufacturer. Weigh, if necessary!

		Individual weight	Number	Subtotal	
3.1.1	5m tube, DN 65	kg	x =	kg =>	kg
3.1.2	5m tube, DN 75	kg	x =	kg =>	kg
3.1.3	5 m tube, DN 85 (4½")	kg	x =	kg =>	kg
3.1.4	5m tube, DN 100	kg	x =	kg =>	kg
3.1.5	5m tube, DN 100 (Super 2000)	kg	x =	kg =>	kg
3.1.6	5m tube, DN 125	kg	x =	kg =>	kg
3.1.7	5m tube, DN 125 (Super 2000)	kg	x =	kg =>	kg
3.2.1	5m hose, DN 65	25.4 kg	x =	kg =>	kg
3.2.2	5m hose, DN 75	29.6 kg	x =	kg =>	kg
3.2.3	5m hose, DN 85 (4 ½")	41.1 kg	x =	kg =>	kg
3.2.4	5m hose, DN 100	48.2 kg	x =	kg =>	kg
3.2.5	5m hose, DN 125	71.5 kg	x =	kg =>	kg
				Total weight	kg



6.6.3.7 Calculation of the total weight for a stowing box (4.1 m long) mounted with sleeves

(please copy, complete and store for each loading variant)

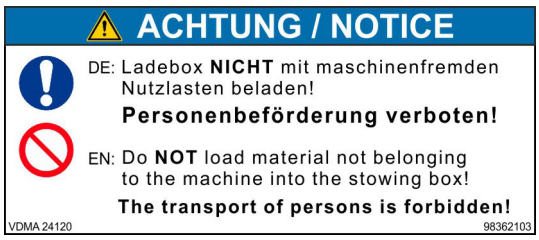
1.0	4.1m stowing box, empty, incl. lifting gear				208 kg
2.1	Outer covering, Alu, smooth			=> 14 kg	14 kg
2.1	Outer covering, Alu, tread plate			=> 25 kg	25 kg

Caution!

Risk of damage due to different weights!

Weights may vary according to design and manufacturer. Weigh, if necessary!

		Individual weight		Number	Subtotal	
3.1.1	4 m PE sleeve ∅ 160 x 3.9	7.295 kg	x	8 =	58.4 kg =>	kg
3.1.2	4 m PE sleeve ∅ 125 x 3.1	4.507 kg	x	14 =	63.0 kg =>	kg
4.1.1	4m tube, DN 65	kg	x	=	kg =>	kg
4.1.2	4m tube, DN 75	kg	x	=	kg =>	kg
4.1.3	4 m tube, DN 80 (4 ½“)	kg	x	=	kg =>	kg
4.1.4	4m tube, DN 100	kg	x	=	kg =>	kg
4.1.5	4m tube, DN 100 (Super 2000)	kg	x	=	kg =>	kg
4.2.1	4m hose, DN 65	21.5 kg	x	=	kg =>	kg
4.2.2	4m hose, DN 75	25.0 kg	x	=	kg =>	kg
4.2.3	4m hose, DN 85 (4 ½“)	34.7 kg	x	=	kg =>	kg
4.2.4	4m hose, DN 100	40.8 kg	x	=	kg =>	kg
					Total weight	kg



6.6.3.8 Calculation of the total weight for four stowing cassettes (3.0 m long)

(please copy, complete and store for each loading variant)

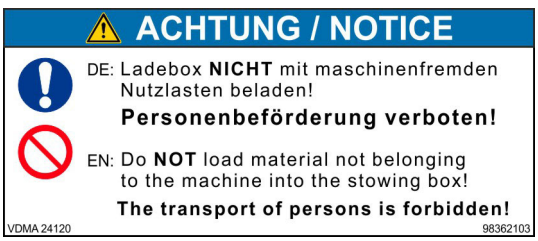
1.0	Tube girder - 3.0 m - empty - each piece 42 kg x 4 + lifting gear	183.0 kg
2.1	Girder - each piece 23.0 kg x 2 =	46.0 kg

Caution!

Risk of damage due to different weights!

Weights may vary according to design and manufacturer. Weigh, if necessary!

		Individual weight	Number	Subtotal	
4.1.1	3m tube, DN 65	15.25 kg	x =	kg =>	kg
4.1.2	3m tube, DN 75	kg	x =	kg =>	kg
4.1.3	3 m tube, DN 80 (4 ½“)	22.57 kg	x =	kg =>	kg
4.1.4	3 m tube, DN 85 (4½”)	kg	x =	kg =>	kg
4.1.5	3m tube, DN 100	31.94 kg	x =	kg =>	kg
4.1.6	3m tube, DN 100 (Super 2000)	37.0 kg	x =	kg =>	kg
4.1.7	3m tube, DN 125	39.3 kg	x =	kg =>	kg
4.1.8	3m tube, DN 125 (Super 2000)	45.33 kg	x =	kg =>	kg
4.2.1	3m hose, DN 65	17.6 kg	x =	kg =>	kg
4.2.2	3m hose, DN 75	20.4 kg	x =	kg =>	kg
4.2.3	3m hose, DN 85 (4 ½“)	kg	x =	kg =>	kg
4.2.4	3m hose, DN 100	33.5 kg	x =	kg =>	kg
4.2.5	3m hose, DN 125	49.3 kg	x =	kg =>	kg
4.3.1	Split coupling DN 100	3.27	x =	kg =>	kg
4.3.2	Split coupling DN 125	4.67	x =	kg =>	kg
				Total weight	kg



6.6.4 Loading the stowing box

The stowing box may only be placed on the machine on the associated carrier system **(Fig. 487)**.

Warning!

Risk of injury due to incorrect positioning of the stowing box!

The stowing box can fall down if the carrier system is set up incorrectly.

When positioning and removing the stowing box, the machine must be in a horizontal position!

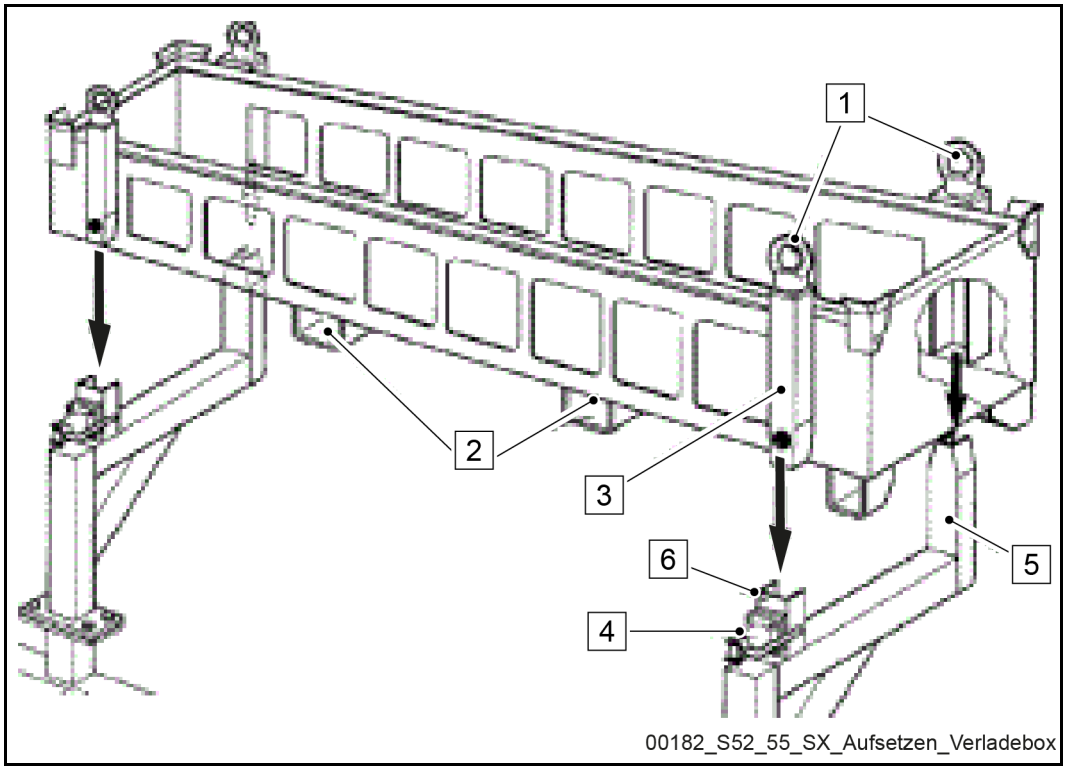


Fig. 487 Positioning the stowing box

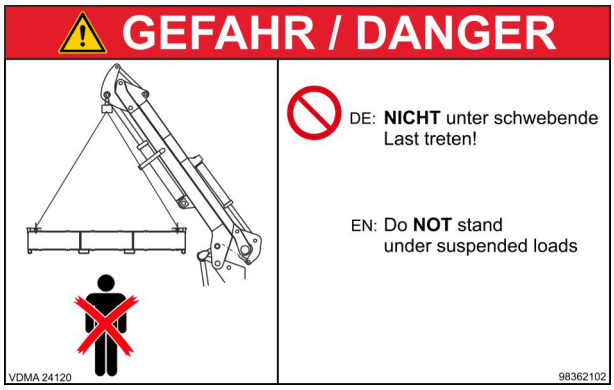


Fig. 488 Identification plate; Do not step under suspended loads

There are two vertical U-shaped beams located on each of the outer- and inner side of the box. They guide the box upon positioning on the carrier system and keep it in place during the drive. A hole is located on each of the smaller, inner guides (3) **(Fig. 487)** for the bolts of the transport safety devices (4).

6.6.4.1 Lift stowing box

- Fasten the lifting gear and loosen the transport safety devices **(Fig. 489)**.
- Lift the stowing box with a crane, forklift (see **"Loading with crane or forklift"** on page 670) or placing boom (see **"Loading with the placing boom"** on page 670).

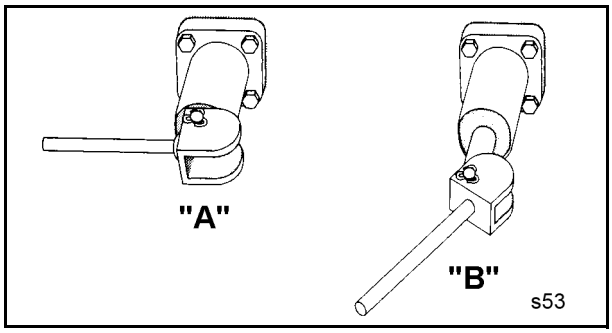


Fig. 489 Example: Transport safety device

Caption (Fig. 489)	
Pos.	**Description**
A	Secured
B	Not secured

6.6.4.2 Position stowing box

- Loosen the transport safety devices.
- Position the stowing box above the receivers of the carrier system.
- Lower the stowing box carefully.

Warning!

Risk of injury due to crushing!

There is a risk of crushing when lowering or swinging the load.

Do not guide the stowing box manually during lowering.

Improve the position of the stowing box for better lowering only when the stowing box is stationary.

- When positioning the box, make sure that the outer guides of the box first slide over the receivers of the girders (5) **(Fig. 487)**. Upon further lowering, the inner guides (3) are then taken up by the corresponding U-shaped beams (6) of the girders.
- After lowering the box, insert transport safety devices (4) and remove lifting gear.

6.6.5 Loading the stowing cassette

The stowing cassette may only be placed on the machine on the associated carrier system **(Fig. 491)**.

Information

When positioning and removing the stowing cassette, the machine must be in a horizontal position!

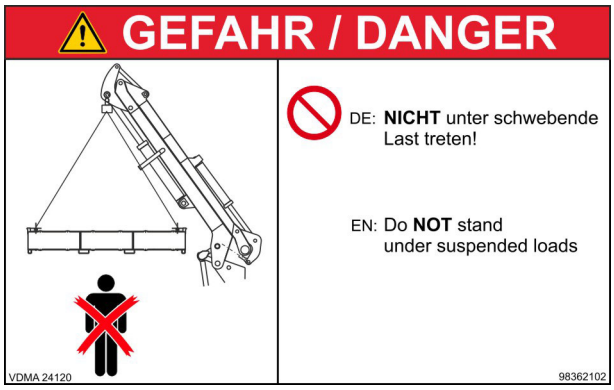


Fig. 490 Identification plate; Do not step under suspended loads

The girders (3) **(Fig. 491)** serve as brackets for the tube girders (2). These girders guide the cassettes upon positioning on the carrier system and keep them in place during the drive. The bolts of the transport safety devices (5) are located on the side of the girders (3).

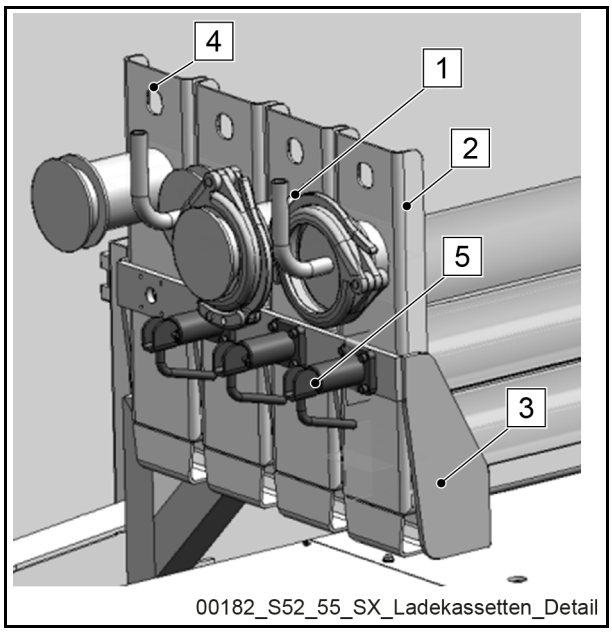


Fig. 491 Stowing cassette components

Caption (Fig. 491)	
Pos.	**Description**
1	Handle
2	Bracket for tube girder
3	Girder
4	Bores
5	Transport safety device

6.6.5.1 Lift stowing cassettes

- Fasten the lifting gear to the bores (4) **(Fig. 491)** and loosen the transport safety devices (5) **(Fig. 491)** and **(Fig. 492)**.
- Lift the stowing cassette with a crane, forklift (see **"Loading with crane or forklift"** on page 670) or placing boom (see **"Loading with the placing boom"** on page 670).

Information

The stability of the stowing cassettes on the ground can be increased by inserting squared timber or similar through the forklift shoes.

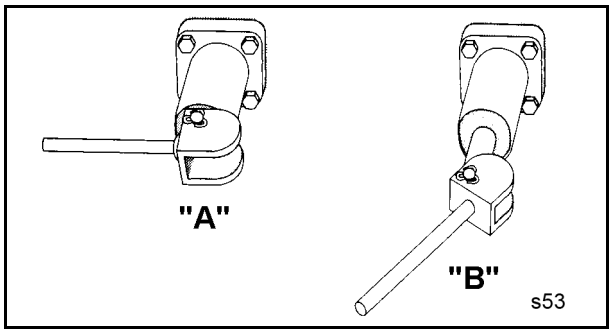


Fig. 492 Example: Transport safety device

Caption (Fig. 489)	
Pos.	**Description**
A	Secured
B	Not secured

6.6.5.2 Position loading cassette

- Loosen the transport safety devices (5) **(Fig. 491)**.
- Position the stowing cassette above the receivers of the carrier system.
- Lower the stowing cassette carefully.
- When positioning the stowing cassette, make sure that the tube girders (2) first slide over the receivers of the girders (3). Upon further lowering, the tube girders (2) are then taken up by the corresponding girders (3).
- After lowering the stowing cassette, insert the transport safety devices (5) and remove the lifting gear.

6.6.6 Loading with the placing boom

6.6.6.1 Preparations

Caution!

Risk of damage due to improper use of the placing boom!

The placing boom is not a lifting gear and must not be used as a lifting gear. Loading stowing boxes and cassettes is only permitted with a lifting device with load limitation system **(Fig. 493)**!

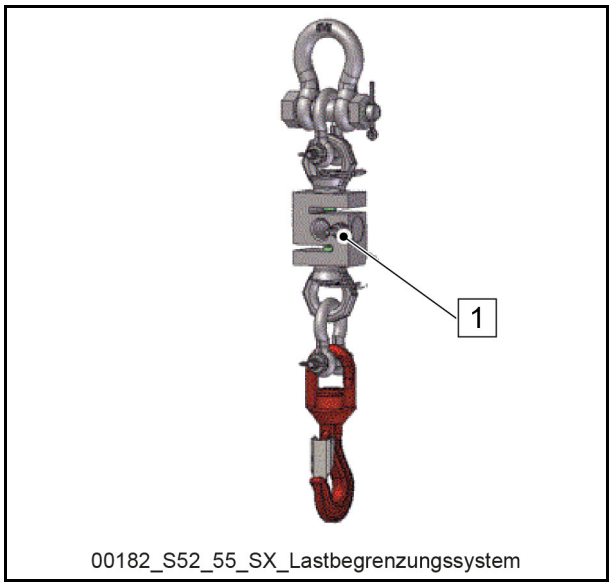


Fig. 493 Load limitation system

Caption (Fig. 493)	
Pos.	**Description**
1	Force sensor on the load limitation system

➤ Check the complete lifting device and the stowing boxes and cassettes before each use for damage, screw seat, strong corrosion, wear, deformations, etc. Repairs may only be carried out by experts.

➤ An expert must test the lifting device and the stowing boxes and cassettes as required, however, at least once every year according to operating conditions and operational conditions.

- In compliance with the permissible total weight of the machine, the boxes and cassettes to be loaded - irrespective of their length - may not weigh more than indicated under **“Safety”** on page 669.
- The machine must be operationally supported.

➤ Empty the pumping line of the placing boom, if necessary.

- Decommission the installed concrete pump.
- Retract the telescope of the S 31 XT completely!
  In type S 20, the boom functions of the boom sections 1 + 2 are limited to 115 degrees.
- Fold in boom section 4 and boom section 3 of the placing boom up to the system.
- Observe the information on lifting and positioning the stowing boxes (**"Loading the stowing box"** on page 686) and cassettes (**"Loading the stowing cassette"** on page 688).
- **Only** drive the placing boom with the remote control.

Warning!

Risk of injury due to overload!

The load of the S 31 XT may not be positioned by driving the telescope.

Observe the warning sign on the machine **(Fig. 494)**.

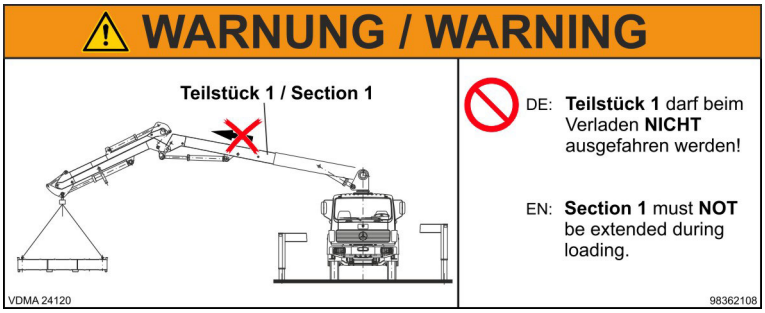


Fig. 494 Identification plate; Do not extend section 1

6.6.6.2 General description: Lifting device with load limitation system (LBS)

The load limitation system prevents the machine-specific max. permissible load from being exceeded. If a load is detected on the load limitation system, the LBS activates automatically.

A force sensor (1) **(Fig. 493)** is used for the load limitation system in the lifting device. The software of the VECTOR control blocks further lifting of the placing boom when exceeding the max. permissible load.

The lifting procedure can only be started or continued when the weight of the stowing boxes/cassettes is less or the same than the maximum permissible peak load of the placing boom.

Vertical fluctuations on the boom can distort the measured values. These measured values are added to the actual weight of the stowing boxes/cassettes.

When the system detects a serious fault (see message list), the fault can be acknowledged in order to bring the stowing boxes and cassettes into a safe position, see **“Operating modes with lifting device”** on page 695.

Warning!

Risk of accident due to overload!

Moving the placing boom without LBS functions is only permitted to reduce the exceeded max. permissible load or prevent accidents!

The machine operator is responsible for ensuring that no person remains in the danger zone!

The lifting device with load limitation system may not be disassembled from the placing boom.

If the force sensor (1) **(Fig. 493)** and thus the electrical connection to the SCHWING control system is disassembled or damaged, operation of the machine is only possible after acknowledging the safety shutdown, see **“Operating modes with lifting device”** on page 695.

The lifting device is mounted at the end of boom section 2 **(Fig. 495)**.

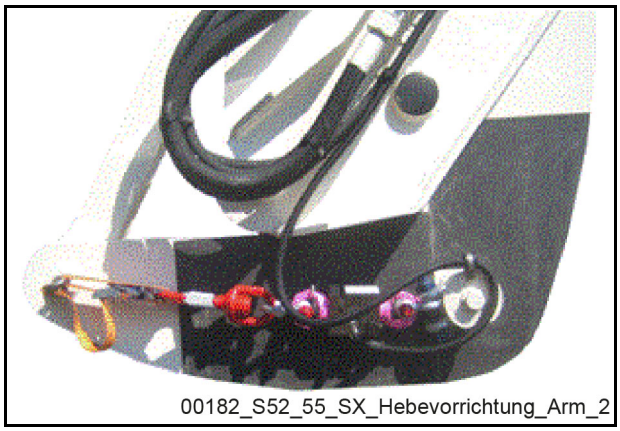


Fig. 495 Lifting device at the end of boom section 2

6.6.6.3 General functions

The display of the VECTOR control indicates the weight in kg under operating data.

Exemplary display in the VECTOR control under operating data:

Load limitation system parameters	Wet
Operating hours	2.22 h
AI22 LBS input	12.3 mA
Load	522 kg

A short honking sounds for boom functions, as with the boom limitation.

Waiting time boom release

The threshold value must be undercut for 4 seconds after boom function shutdown in order to reactivate the boom functions.

6.6.6.4 Operating modes with lifting device

Danger!

Danger due to acknowledgement of the safety shutdown!

The machine operator bears the whole responsibility! Only drive the placing boom to bring the load into a safe position.

- Reduce the weight of the stowing boxes and cassettes.
- The machine operator is responsible during use for the safety in the danger zone.

Load on the lifting device present = Operating mode lifting device

- The speed of the slewing gear and boom sections 1 and 2 are limited in order to minimise fluctuations in the movement of the placing boom.
- The concrete pump and telescoping on the boom (only S 31 XT) are blocked.

Information

If the threshold value is undercut, the limitations/blocks are released again after a short time.

Load too high = Operating mode boom function shutdown

“Load too high” means: Value for the maximum permissible load is exceeded.

- Boom function “boom section 1 UP” and “boom section 2 UP +DOWN” are blocked.
- Boom function “ROTATE boom” is blocked to prevent diagonal pull or dragging loads.
- The concrete pump and telescoping on the boom (only S 31 XT) are blocked.

Information

If the threshold value is undercut, the limitations/blocks are released again after a short time.

Maximum load exceeded = Operating mode EMERGENCY STOP

“Maximum load exceeded” means: Value for maximum permissible load, plus the variable weight caused by fluctuations of the boom, is exceeded.

- Concrete pump and all boom functions will be switched off.
- If the fault is detected for the first time, a "serious fault" is generated and displayed. This is associated with an EMERGENCY STOP of the machine. Emergency operation is also blocked in this case.
- When concrete pump or boom functions are operated, a horn sounds (boom limitation).

Information

If the fault occurs again, see **“Load limitation system (LBS) functions are reactivated after a serious fault = Operating mode lifting device”** on page 698.

Maximum load exceeded will be acknowledged = Operating mode lifting device

“Maximum load exceeded” means: Value for maximum permissible load, plus the variable weight caused by fluctuations of the boom, is exceeded.

Further proceeding of the placing boom is described under **“Load on the lifting device present = Operating mode lifting device”** on page 695.

This makes it possible to bring the machine into a safe state after malfunction or incorrect operation. As long as the signal of the sensor is outside the permitted operating area, this status shall be maintained. The acknowledgement will be stored!

Information

Observe the safety instructions.

Sensor failed = Operating mode EMERGENCY STOP

- Concrete pump and all boom functions will be switched off.
- If the fault is detected for the first time, a "serious fault" is generated and displayed. This is associated with an EMERGENCY STOP of the machine. Emergency operation is also blocked in this case.
- When concrete pump or boom functions are operated, a horn sounds (boom limitation).

Information

If the fault occurs again, see **“Load limitation system (LBS) functions are reactivated after a serious fault = Operating mode lifting device”** on page 698.

Failed sensor will be acknowledged = Operating mode remote control without load limitation system (LBS) functions

Further proceeding of the placing boom and concrete pump are no longer restricted. All LBS functions are now deactivated. This makes it possible to bring the machine into a safe state with the remote control.

As long as the signal of the sensor is outside the permitted operating area, this status shall be maintained. The acknowledgement will be stored!

Information

Observe the safety instructions.

Load limitation system (LBS) functions are reactivated after a serious fault = Operating mode lifting device

- When a serious fault was acknowledged and thus the LBS functions are disabled, the LBS functions can be reactivated when:

  - At least 10 seconds have passed.
  - The sensor signal is again within the permitted operational areas.
  - LBS functions do not detect any reason for intervention (e.g. weight reduction).

Serious fault reoccurs = Operating mode emergency operation

If a fault **reoccurs**, concrete pump and all boom functions are switched off, such as described under **“Maximum load exceeded = Operating mode EMERGENCY STOP”** on page 696 and **“Sensor failed = Operating mode EMERGENCY STOP”** on page 697.

However, **no** emergency stop is triggered. The stowing boxes and cassettes can only be brought into a safe position through the emergency operation under the personal responsibility of the operator.

Information

Observe the safety instructions.

6.6.7 Load limitation system message list

Warning!

Risk of accident due to unresolved faults!

Faults must be remedied immediately, as soon as they are reported and displayed.

The machine operator is responsible for ensuring that faults displayed once (Code "L" or "H") are repaired immediately.

- The company SCHWING is not liable for damage caused by unresolved faults.
- Indication of a "minor fault" does not mean that the fault can be completely ignored but only that the working operation may be completed, possibly with restrictions!
- Contact SCHWING's customer service if no qualified personnel are available. Always inform customer service of the reported fault code.

Information

If a fault message has been deleted but the fault has not been remedied, fault messages will **not** reappear!

Information

This list is not exhaustive. Detailed information can be found in chapter **"VECTOR II control system"** on page 113.

Code	International output		Text output (national)
E41M		LBS	Weight on lifting device too high
E42H		LBS	!Safety shutdown! Sensor on lifting device failed
E43H		LBS	!Safety shutdown! Weight on lifting device too great

6.6.8 Fasten load

- Position the placing boom with the lifting device at ground level to loosen the transport safety device (lashing strap) (1) **(Fig. 496)**.
- Hang the rope harness in the swivel hook (2) of the lifting device **(Fig. 497)**.
- Hang the lifting hooks of the rope harness in the loading receivers of the stowing boxes or cassettes.
- Lift the boom and make sure that the lifting device is not twisted or damaged.
- Lift and position the stowing box or cassette by driving the boom sections 1+2 further.

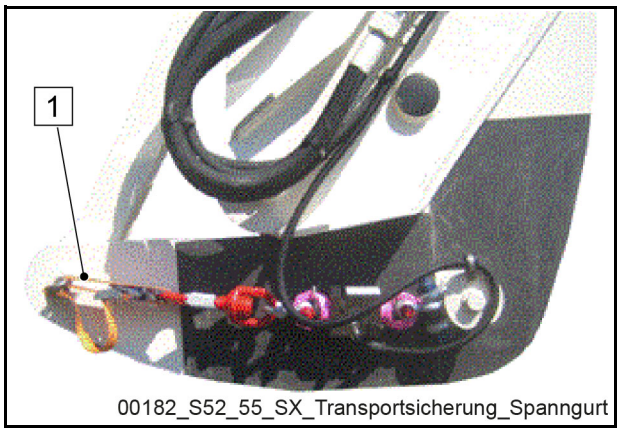


Fig. 496 Transport safety device

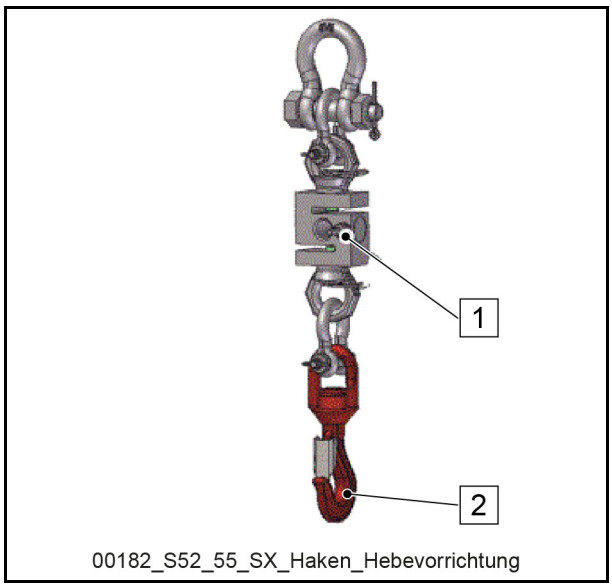


Fig. 497 Lifting device swivel hook

6.6.9 Decommissioning the lifting device

➤ If the lifting device is not required for loading work of stowing boxes and cassettes, attach the lifting device with the lashing strap (2) to the bracket on the placing boom intended for that purpose **(Fig. 496)**.

Do not overtighten lashing strap! If the tension of the lashing strap is too tight, the boom limitation functions are automatically activated, and normal operation is not possible! The lashing strap may only be used to attach the lifting device on the placing boom.

6.7 Hydraulically lowerable stowing box

Danger!

Danger of crushing!

Switch off the drive motor before working between stowing box and vehicle.

6.7.1 Preface

The truck-mounted concrete pumps S 24 X BR03 and S 28 X can be equipped with a hydraulically lowerable stowing box as special equipment on the left side of the vehicle.

The structure of positive testing thereby depends on the relevant machine data.

The stowing box (1) **(Fig. 498)** is fitted with sleeves to receive 3-m-long pumping pipes or hoses.

You can choose between DN 125 or DN 160 sleeves.

DN 125 for hoses/tubes DN 65

DN 160 for hoses / tubes DN 100

As an additional accessory, the stowing box can be closed at the top with an enclosure or supplemented with an additional box (2) **(Fig. 498)**.

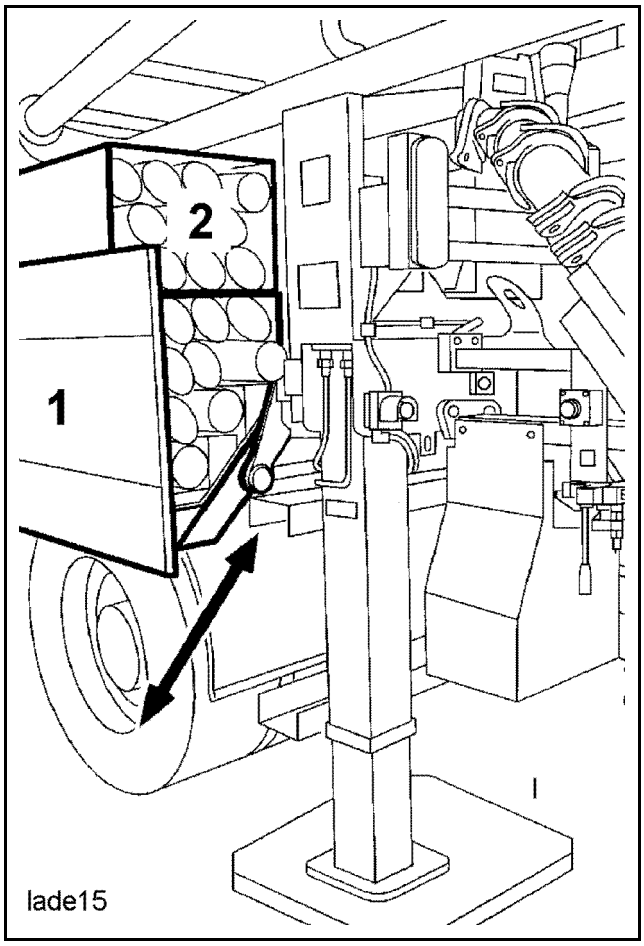


Fig. 498

6.7.1.1 Personnel

In order to ensure that the device is used safely, the operating personnel must:

1. Be authorised and trained
2. Have received specific training regarding the potential dangers
3. Observe the special warning and information signs on the machine and replace them in the event of damage
4. Monitor the danger area during operation

Warning!

Remaining in the danger zone is forbidden!

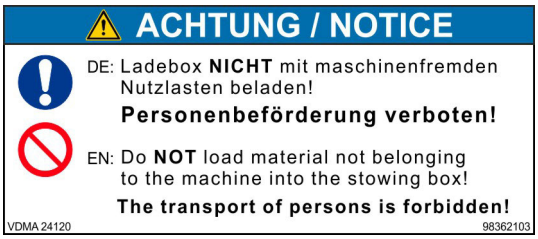
The entire room taken up by the stowing box while being lowered or raised is considered as danger zone.

Do not reach into moving machine parts

6.7.1.2 Stowing box

The stowing box may only be loaded with the hoses and tubes provided.

Transporting or lifting other loads or persons with the stowing box is prohibited.



6.7.1.3 Truck-mounted concrete pump

- The machine must be operationally supported on all four outriggers* before lowering or raising the stowing box.
- Driving with lowered stowing box is prohibited.
- The concrete pump must be shut down.

* See operating instructions for the truck-mounted concrete pump.

6.7.1.4 Testing

An expert must test the lifting device and stowing box as required, however, at least once every year in accordance with the operating conditions and operational circumstances.

Repairs may only be carried out by experts.

6.7.2 Functional description

The stowing box is guided at both ends with spline ends on inclined ramps.

Both spline ends are connected by means of a lever system with a torsional wave.

A hydraulic cylinder drives the torsional wave. The hydraulic cylinder receives pressure oil from the outrigger's hydraulic system through a manually operated directional valve.

Upon actuating the directional valve, the piston rod of the cylinder retracts or extends, and rotates the torsional wave.

The lever system transfers the rotation of the torsional wave onto the spline ends, and converts it into a sliding movement.

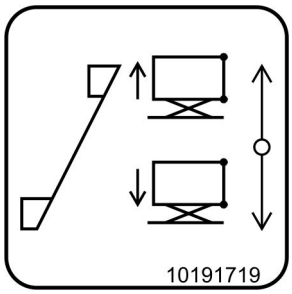
The stowing box slides up or down on the sloping ramps.

6.7.3 Lowing / Raising the stowing box

- Support the machine operationally on all four outriggers.
- Pay attention to the space required for the stowing box and remove any obstacles, if necessary.
- Loosen the transport safety devices on both spline ends, example (1) **(Fig. 499)**, **(Fig. 500)**.

➤ Press and hold the release button (1) **(Fig. 501)**.

➤ Move the stowing box up or down with the control lever (2) **(Fig. 501)** until the respective limit stop is reached.



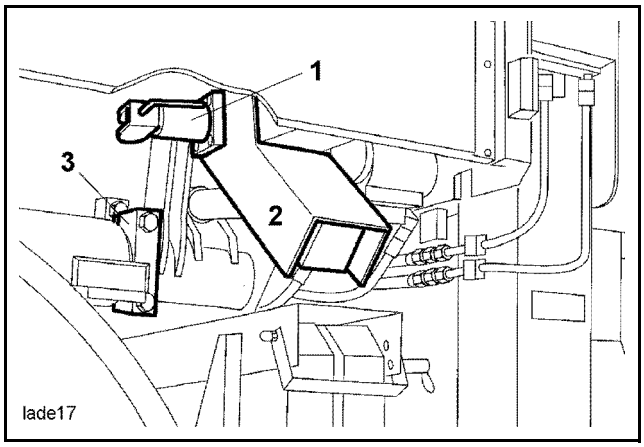


Fig. 499

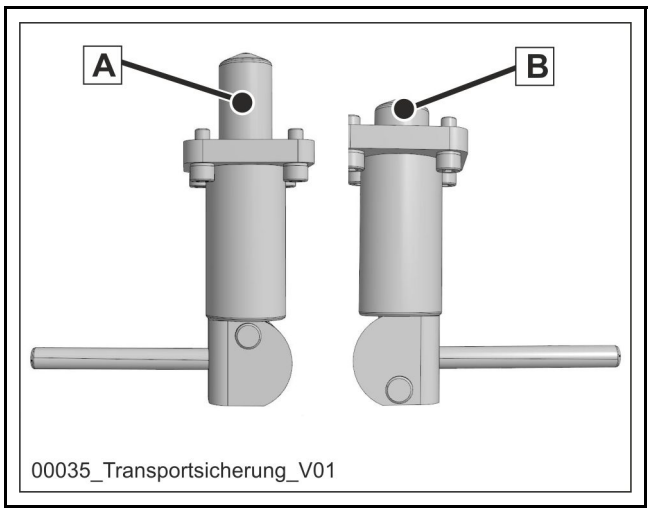


Fig. 500 “A” = secured / “B” = unlocked

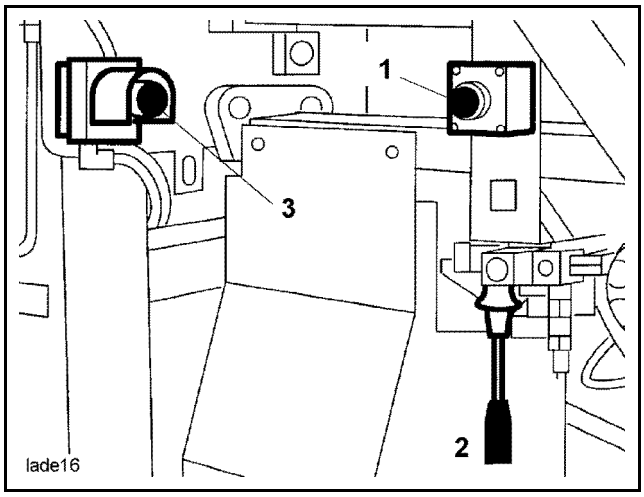


Fig. 501

Information

The control lever (2) is spring-centred. After releasing, it returns to the centre position and the movement of the stowing box stops.

In case of faults or danger, pressing the EMERGENCY OFF button (3) **(Fig. 501)** interrupts the movement of the stowing box.

To restart the device after an "EMERGENCY OFF", see the operating instructions for the truck-mounted concrete pump.

Danger!

Danger to life caused by lost cargo or by lowering the stowing box!

Do not forget to close the box with the removable door after loading it.

Do not forget to secure the stowing box in the transport position with the transport safety devices.

6.7.4 Maintenance

- Lubricate both pillow blocks (3) **(Fig. 499)** of the torsional wave according to the operating conditions, at least once every month with a grease gun (one grease nipple each).
- Grease the slipway of the sliding pieces with a brush according to the operating conditions.
  We recommend using an adhesive and pressure resistant grease.

Proceed as follows:

➤ Remove the access cover plates (2) above the ends of the slipways in the transport position.

➤ Grease the free ends and reattach the access cover plates.

➤ Lower the stowing box.

➤ Grease the upper parts of the slipways.

6.8 Water heater

Make sure to observe the following warnings.

Information

During operation the heater takes fuel and electrical power from the automotive system.

Always ensure that the starter batteries are in good condition and that there is sufficient fuel if using the heater.

Warning!

Danger to life from toxic gases!

Exhaust fumes from internal combustion engines are toxic.

Ensure an appropriate fresh air supply and wear personal protective equipment.

Caution!

Risk of burns due to hot surfaces!

Components such as hydraulic components and components from the drive motor can be hot during operation.

Let these components cool down before starting any maintenance work. Wear protective gloves.

Caution!

Risk of scalding due to leaking hot liquids!

Hot liquids can scald the skin.

Never open pressurised reservoirs.

Allow the system to cool before opening.

The water heater **(1) (Fig. 502)** is a piece of special equipment.

The water heater is mounted onto the water case and runs on diesel fuel.

The diesel fuel is taken from the vehicle fuel tank.

An electrically driven water pump pumps the heat transfer medium through the heating coil of the heater.

The heating is turned on separately on the switch cabinet (situated in the system's tool compartment by default).

A temperature sensor in the water case turns the heating off at > 35 °C and on again at temperatures below 35 °C.

A level switch controls the water level in the water case and turns the heating off if the water level is too low or prevents the heating from being turned on, in order to avoid overheating.

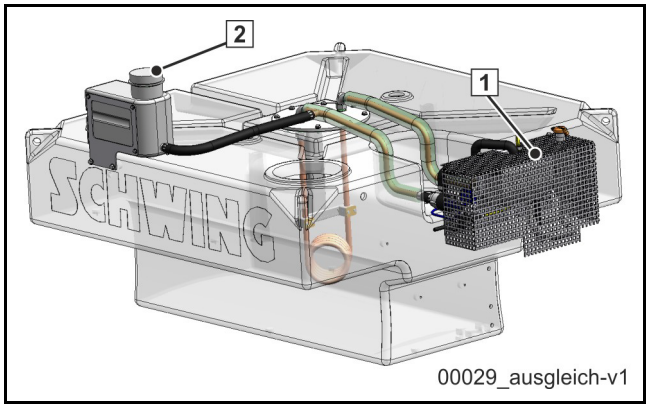


Fig. 502

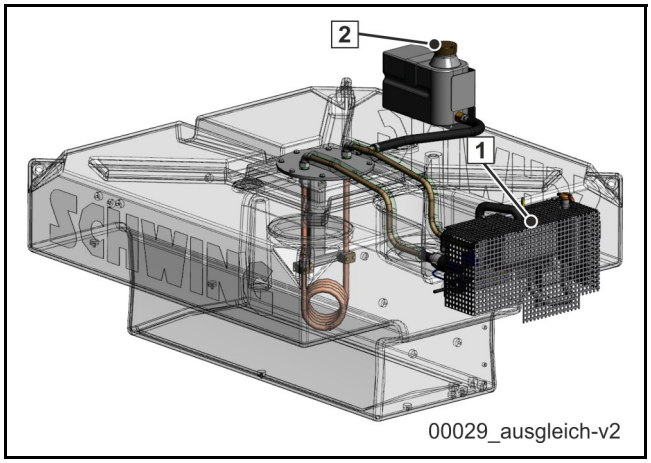


Fig. 503

6.8.1 Preparations for operation

- Before commissioning, check the levels of diesel fuel and water.

There are two possible installation points for the expansion tank: (2) **(Fig. 502)** or **(Fig. 503)**.

- Make sure there is enough fluid in the heating circuit's expansion tank (2).

The equalising reservoir should only be filled halfway - do not overfill!

Loss of fluid indicates the presence a leak.

When topping up the equalising reservoir, use the antifreeze utilised by SCHWING.

See the antifreeze packaging for the required mixing ratio.

6.8.2 Turning the heating on

- Turn the heater on using the selector button **(Fig. 504)** on the electronic terminal box for the water heater.

The selector button will light up to indicate that the system has started.

Fig. 504

Information

Note the water level!

The heater will not switch on if the temperature is too high or the water level is too low.

At water temperatures below 35 °C in the reservoir, the heater starts to heat the water.

At a temperature of over 35 °C, the heating is turned off by a temperature sensor.

Through automatically turning the heating on and off, a constant temperature of 35 °C is maintained.

6.8.3 Turning the heating off

- Use the selector button **(Fig. 504)** to turn the heating system off.

The light in the push-button goes out and the pump continues running briefly to equalise the temperature.

6.8.4 Winter operation

The heating system was not designed to thaw out a frozen water case.

Attention!

Damages to machines due to freezing water!

Water expands at the time of freezing, due to which there is danger of frost wedging of containers and pipelines.

If there is a risk of frost, fill with water immediately before concreting or use the optional water heater. After the work is completed, all containers and pipelines must be emptied.

6.9 Fall arresters for truck-mounted concrete pumps

Various truck-mounted concrete pumps from SCHWING have a lowerable railing for the left and/or right machine side in order to increase safety when working on the machine near the boom column.

Thus the risk of falling is reduced during work on the placing boom or near the slewing gear.

If work is to be carried out on the machine, the machine and vehicle motor must be switched off.

This railing is a special equipment and must be ordered separately.

6.9.1 Safety

If the machine needs to be entered to carry out maintenance work, safe climbing aids (hoists, ladders, etc.) must be used.

For accessing and installing the railing, a fall arrester in accordance with DIN EN 361 (personal protective equipment (PPE) against falling, category) must be used.

Machines without a railing must generally only be accessed with personal protective equipment (PPE). Follow the operational health and safety regulations of your company.

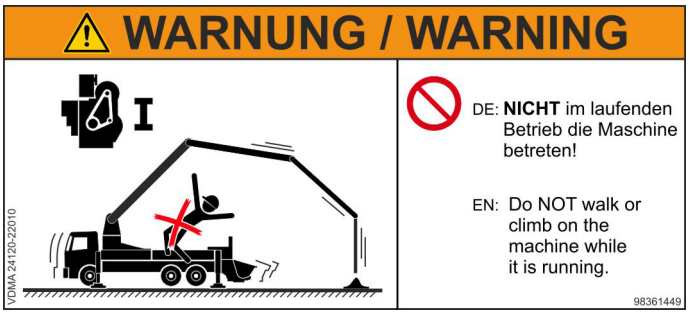
Warning!

Risk of falling!

Severe injury, in particular to the head, may occur if you fall due to vibration, slippery surfaces or movements of the machine.

It is prohibited to enter the machine during operation!

Prior to carrying out any work at the machine, always switch off the machine and the vehicle motor.



Caution!

Danger of crushing!

There is a danger of crushing of limbs when disassembling the railing.

During the disassembly process, only hold onto the railing using the handle provided for that purpose.

Attention!

Damage to the placing boom and the railing!

The placing boom and installed railings may collide.

Lower the railings before moving the placing boom.

This section applies mainly to the following machine types:

- S 20
- S 24 X
- S 28 X
- S 31 XT
- S 36 X

6.9.1.1 Reasonably foreseeable misuse

If the railing is not operated as intended, SCHWING is not liable for any resulting damage to the machine, other assets or private goods, or for consequential damages in the event of injury or death of persons or animals.

- Do not use the installed railing as a transport safety device.
- Do not use the railing as a climbing aid.

6.9.1.2 To be observed in the case of lowerable stowing boxes

The machine models S 24 X and S 28 X can be equipped with hydraulically lowerable stowing boxes on request.

In order to move this stowing box, the railing must be installed.

The position of the railing is obtained by an end limit switch. The stowing box cannot be driven with the railing lowered.

6.9.1.3 To be observed in the case of stowing troughs!

Your machines can be equipped with stowing troughs on request.

Locking bolts for railings are located behind the stowing troughs for machines with stowing troughs.

Caution!

Danger of crushing due to stowing troughs!

Fingers and other limbs can get caught between handrails and stowing troughs and can be badly crushed.

When installing and removing railings, always use the handle provided for that purpose.

6.9.1.4 Securing the foldable railing

Caution!

Danger of crushing due to the railing dropping!

If the installed railing is not secured by the locking bolt, it may drop under load and crush parts of the body.

Never forget to correctly secure the railing with the locking bolt!

The railing is secured in the installed position by two bolts.

The locking bolts for locking the railing in place are located at the top on the railing girders on all machine models.

When folded up, the railing is secured by its own gravity.

6.9.1.5 Raising the foldable railing

Only lift the railing using the handle (2; **(Fig. 505)**).

➤ Insert the locking bolts (1) when the railing is installed.

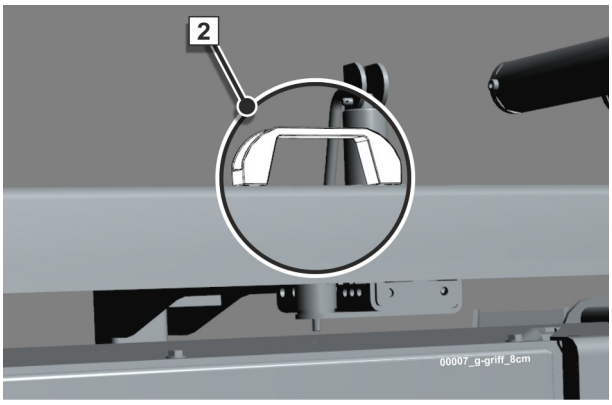


Fig. 505

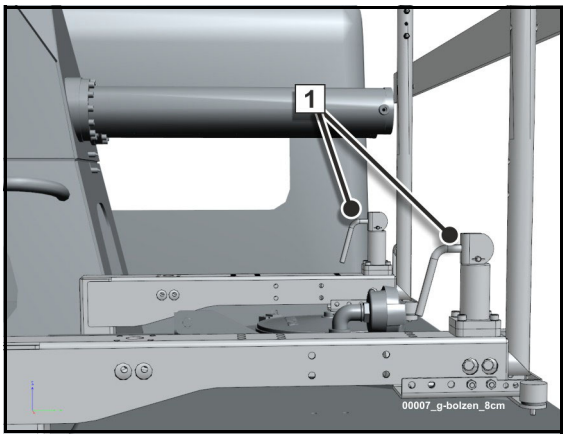


Fig. 506 ; Locking bolts

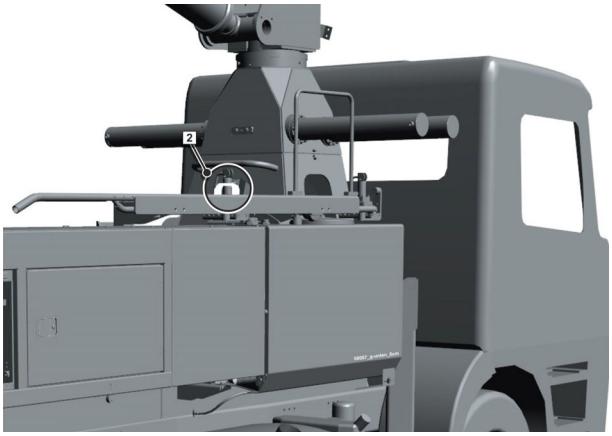


Fig. 507

Fig. 508

6.9.2 Remove the railing

Proceed in the reverse order of assembly.

➤ Loosen the locking bolt (if present).

Caution!

Danger of crushing!

There is a danger of crushing of limbs when disassembling the railing.

During the disassembly process, only hold onto the railing using the handle provided for that purpose.

➤ Put the railing together with the necessary care.

The folding rail has no lock when lowered.

6.10 Release agent sprayer (special equipment)

The release agent sprayer made by Birchmeier, offered by SCHWING as special equipment, combined with Total Biomoldol S demoulding oil helps to prevent concrete from adhering to the hopper walls of your SCHWING machine and to clean the hopper better after each pumping operation.

Prior to each pumping operation, spray the Biomoldol S demoulding oil onto the dry walls of the hopper using the release agent sprayer.

After each pumping run, clean the hopper with water in the normal way.

6.10.1 Safety

Warning!

Improper handling of release agents can cause severe injury!

Severe damage to skin, eyes and respiratory tract may result from improper handling of the release agent sprayer.

- Whenever using release agents, wear personal protective equipment (protective clothing, protective glasses, rubber gloves, protective mask)!
- Avoid contact with skin and eyes and inhalation of spray.
- Use the sprayer only outdoors!

Observe the safety data sheet and the release agent manufacturer's instructions regarding accident prevention and health protection!

SCHWING accepts no responsibility for accidents or damage resulting from the use of inappropriate material!

Warning!

Fire hazard!

The release agent may ignite if sprayed onto hot surfaces, ignition sources or open flames.

Severe burns may occur!

Never spray onto hot machine parts or in the vicinity of sources of ignition!

Cigarettes and naked flames are prohibited in the vicinity of the sprayer.

Do not use water to extinguish fires!

It is essential to observe the release agent manufacturer's safety data sheet!

Attention!

Damage due to wrong release agent!

The use of other release agents may damage painting or rubber parts of the SCHWING machine and the release agent sprayer itself!

Strongly corrosive or explosive media must not be used!

Only use the release agent recommended by SCHWING or a release agent with an identical composition.

Be sure to wear personal protective equipment (safety goggles, protective clothing, rubber gloves, protective mask) whenever using the release agent sprayer!

The release agent sprayer may only be used by trained personnel.

SCHWING recommends Total Biomoldol S exclusively as the release agent.

The release agent sprayer is equipped with a pressure relief valve.

The safety valve is set to 6 bar.

It is expressly indicated that any modification to the device is impermissible. In such a case, no warranty claims can be asserted against BIRCHMEIER Sprühtechnik AG and SCHWING GmbH.

Repair work must only be carried out by the manufacturer or by qualified personnel.

Prior to cleaning, always cut off the compressed air supply and release the pressure by lifting the pressure relief valve.

If available, interrupt the compressed air supply by closing the ball valve (3) **(Fig. 509)**. If there is no ball valve, shut down the vehicle.

Never transport the release agent in the pressure tank of the release agent sprayer.

The action of frost can damage the release agent sprayer.

Do not spray the release agent in strong winds or against the wind.

Do not apply more release agent than necessary for the surface to be treated.

Take particular care to ensure that persons or animals are not exposed to the escaping release agent!

- Never blow through clogged nozzles and valves with your mouth (danger of poisoning!).
- The release agent sprayer must be cleaned after use. Ensure that you do not contaminate bodies of water.

Do not fill chemicals into other containers (bottles, cans etc.).

- When passing the device on to third parties, it is absolutely necessary to provide this user manual as well!

6.10.2 Technical data

Permissible operating pressure:	max. 6 bar
Max. admissible temperature:	50 °C
Min. admissible temperature:	5 °C
Tank capacity:	4.8 l
Volume filled in:	10 l
Delivery rate:	
At 6 bar jet:	1.73 l/min.
Regulating nozzle mist:	0.65 l/min.
Fan nozzle at 6 bar:	2.2 l/min.

6.10.3 Location of the release agent sprayer on your machine

The special equipment "release agent sprayer", consisting of a pressure tank (1) spray gun (2) and a ball valve (3) **(Fig. 509)** is generally located at the rear of your SCHWING machine.

The compressed air for the pressure tank of the release agent sprayer is supplied from the vehicle's air system.

When you start the vehicle's engine, compressed air is supplied to the release agent sprayer.

As of September 2019, the release agent sprayer can be disconnected on some machines from the permanent compressed air supply by using the ball valve (3), e.g. to prevent slight leaks in the spray gun. Step by step, all SCHWING machines will be equipped with this ball valve.

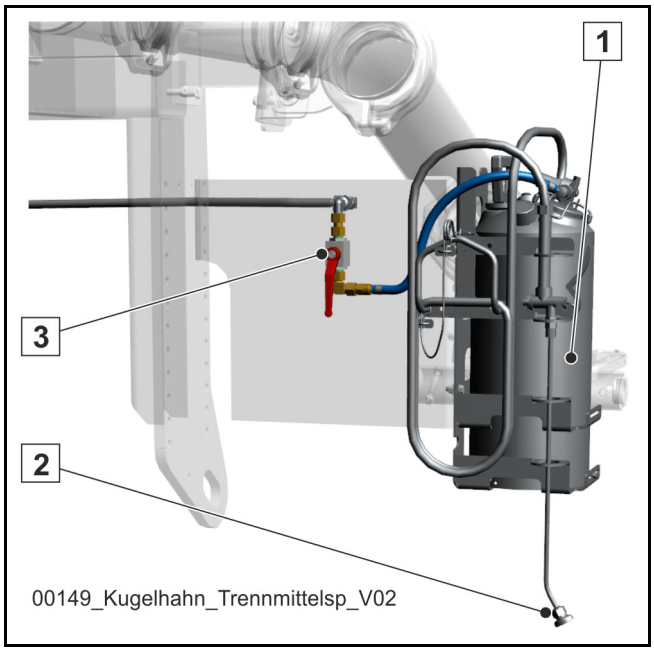


Fig. 509

Caption (Fig. 509)	
Pos.	**Designation**
1	Pressure tank
2	Spray gun
3	Ball valve

6.10.4 Filling the pressure tank with release agent

Warning!

Severe injury may be caused by systems under pressure.

Prior to opening the pressure tank, always depressurise it.

Only open the pressure tank if the pressure gauge on the pressure tank (1) **(Fig. 510)** is pointing to "0".

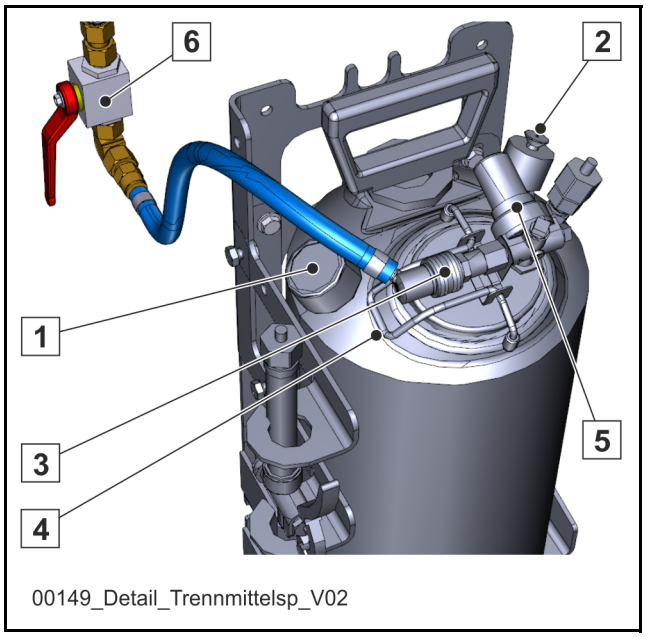


Fig. 510

Caption (Fig. 510)	
Pos.	**Designation**
1	Pressure gauge
2	Pressure relief valve (6 bar)
3	Quick-acting coupling - compressed air hose
4	Clamp of the top cover
5	Pressure release valve
6	Ball valve separation vehicle compressed air system

- Switch off the vehicle engine to switch off the compressed air supply or close the ball valve (6), if available.
- Lift the pressure relief valve (2) until no compressed air exits from the pressure reservoir.
- Disconnect the quick-acting coupling (3) of the compressed air supply from the pressure tank.
- Flip the clamp (4) over.
- Hold on to the top cover and press it towards the pressure tank.
- Once the top cover is released, turn it one quarter.

The top cover is captive.

- Fill a maximum of 5 litres of the release agent into the pressure tank. The remaining volume is required to act as an air cushion.
- When closing the top cover, ensure that the O-ring is supported evenly on the tank opening and the clamp is completely closed.

Attention!

Damage may occur due to exiting release agent!

Release agent may exit without control if the pressure tank is too full!

Fill the release agent up to max. 50 of the tank volume.

The remaining volume is necessary as an air cushion.

- Put the top cover back on and lock it with the clamp.

When closing the top cover, ensure that the O-ring is supported evenly on the tank opening and the clamp is completely closed.

6.10.5 Operation / Cleaning

Attention!

Before each use, make sure that the release agent sprayer is:

1. Correctly assembled;
2. not damaged;
3. properly functioning!

In particular, ensure that the hose connections are tight and the pressure relief valve is functioning correctly.

The release agent sprayer must be operated only in upright position (pressure gauge/plastic handle at top).

1. Wear your personal protective equipment.
2. Connect the quick-acting coupling (3) **(Fig. 510)** to the compressed air supply of the pressure tank.
3. If available, open the ball valve (6) **(Fig. 510)**.
4. Start the vehicle engine.
5. Disperse the release agent with the spray gun.

Information

When the vehicle engine is started, compressed air is immediately supplied to the release agent sprayer.

Warning!

Injury and/or damage may occur due to improper setting of the pressure release valve.

The pressure tank may burst!

Valves and hoses may tear off!

Release agent may exit with high pressure.

The pressure release valve (5) **(Fig. 510)** is set to the optimal value in the factory and may only be changed by a SCHWING representative.

6.10.6 End of operation / Cleaning

Warning!

Injury may be caused by systems under pressure!

Explosive / implosive release of pressure from the device can cause severe injuries.

Prior to cleaning the pressure tank, cut off the compressed air supply and release the pressure still in the tank by lifting on the pressure relief valve!

Empty the release agent sprayer after each use.

Never store the release agent in the sprayer.

To completely empty the pressure tank, it can be dismounted.

- Disconnect the compressed air supply from the pressure tank, if available, by closing the ball valve (6) **(Fig. 510)** or by switching off the vehicle and disconnecting the quick-acting coupling (3) **(Fig. 510)**.
- Open the pressure relief valve (2) until compressed air no longer exits the pressure tank.
- Relieve the spray gun by actuating the trigger.
- Remove the pressure tank from the vehicle.
- Open the filler cap and empty the pressure tank.

- Collect the release agent in a suitable receptacle.
- Fill the pressure tank with clean water.

Information

Properly dispose of release agent.

See safety data sheet from the manufacturer of the release agent.

6.10.7 Rinsing

Do not use hot water!

- Tightly close the cap of the pressure tank.
- Reinstall the pressure tank on the vehicle.
- Reconnect the compressed air supply to the pressure tank.
- Start the vehicle engine.
- Pull trigger of the gun and rinse the system until no more water comes out.

6.10.8 Maintenance

Give special attention to the wearing parts such as nozzle, filter and seals.

Clean nozzle and filter periodically.

The nozzle and the filter are easy to replace.

Do not use hard objects to clean the nozzle.

Never try to clean the nozzle by blowing it through with your mouth (danger of poisoning).

Preferably, use a hand brush or a toothbrush.

- We recommend opening the pressure tank to dry it.

6.10.9 Winter operation

The release agent sprayer must be operated only at a temperature of 5 °C or higher.

Depending on the release agent employed, the system must be emptied if there is a risk of frost. For additional information, see the product information from the release agent manufacturer.

- Clean the system as described above and allow it to dry.

6.10.10 Disposal

Dispose of release agent that can no longer be used as described in the manufacturer's safety data sheet.

6.10.11 Measures in the event of failures

Cause	Troubleshooting
Pressure in the pressure tank drops:	
Air pump, pressure gauge, hose pipes not tightly connected or seals defective	Tighten air pump, pressure gauge, hose pipes or replace defective seals
Hose is ruptured or punctured	Replace hose
Pressure tank defective or severely dented	Replace device Repair work is forbidden
Hand valve is stiff	
Valve is dirty	Disassemble the hand valve, clean carefully, grease valve stem and put back together again
Valve spring is stuck	Replace valve spring
Hand valve leaks	Replace seals
Nozzle sprays unevenly	
Nozzle is blocked	Clean nozzle
Nozzle bore is eroded	Replace nozzle

6.10.12 Spare parts and repairs

Immediately replace any part that is worn or damaged. Only use original parts.

For further information on handling and maintaining the sprayer, please contact your specialist dealer or our customer service department.

6.11 SoftShift

“SoftShift” is a special piece of equipment that optimises the pumping of concrete with a low viscosity and cleaning tasks with water.

In doing so, SoftShift reduces:

a) The spraying of concrete from the concrete feeding hopper, since the rock valve no longer strikes with as much force.

b) The striking of the differential cylinders when switching from “suction” mode to “pressure” mode in addition to the Mini Pause Switch (MPS).

Both functions can be used independently of one another.

The special “SoftShift” function can be enabled at any time, regardless of the machine’s current operating mode.

Please remember that the rock valve turns with reduced force in this case.

Information

Unsuitable concrete!

Normal concrete or viscous concrete with a normal or maximum grain size should not be pumped while SoftShift is enabled, since there is a risk that the rock cannot turn correctly.

6.11.1 Function a) Rock valve damping

➤ Move the ball valve (1) **(Fig. 512)** into a vertical position in order to enable SoftShift function a).

A sign near the ball valve indicates the correct position **(Fig. 511)**.

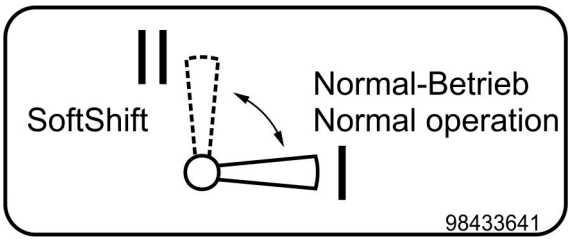


Fig. 511 Pressure accumulator sign

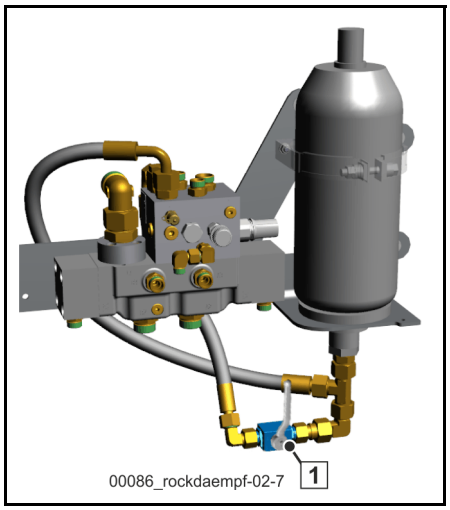


Fig. 512 Rock valve damping

The flow of hydraulic oil through the lower line is blocked.

Less hydraulic oil flows.

The rock no longer turns with as much force.

6.11.2 Function b) Differential cylinder damping

➤ Move the ball valve (1) **(Fig. 513)** into the “SoftShift” (DAN) position in order to enable SoftShift function b).

The second ball valve (1) **(Fig. 514)** provides extra damping for the differential cylinders in addition to the MPS (Mini Pause Switch).

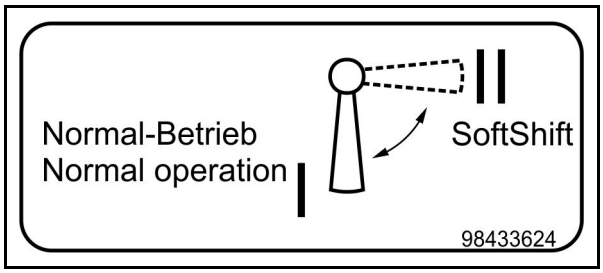


Fig. 513 Pump kit sign

HPD = High Pressure Drop

LPD = Low Pressure Drop

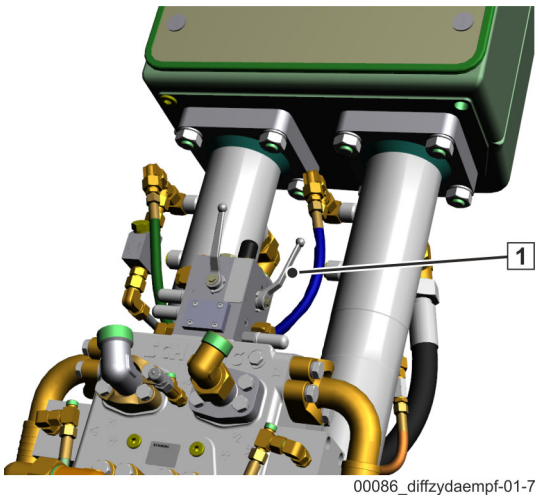


Fig. 514 Differential cylinder damping

Switch back to normal operation (DAH) for hydraulic pressures of approx. ≥150 bar as shifting problems can occur otherwise.

6.12 Ultra-fine filtration

Warning!

Risk of severe injuries due to hydraulic fluid escaping under pressure!

Explosive pressure relief in the event of improper work on the hydraulic system.

- Before working on the hydraulic system, switch off the drive motor.
- Relieve all pressure accumulators via the relief valves.
- Check the relief of the hydraulic system on the pressure gauges.

Before opening the hydraulic system, secure hydraulically moving parts that are subject to external forces, e.g. raised placing boom.

SCHWING truck-mounted concrete pumps can be equipped with an additional ultra-fine filtration **(Fig. 515)**.

The ultra-fine filter is integrated into the agitator circuit and constantly passed through when the pump drive is switched on (bypass flow).

The filtration also occurs when the agitator is switched off.

The pressure relief valve, ball valve and pressure gauge **(Fig. 516)** form a single unit that is located near the filter housing or in the control cabinet of the emergency control unit.

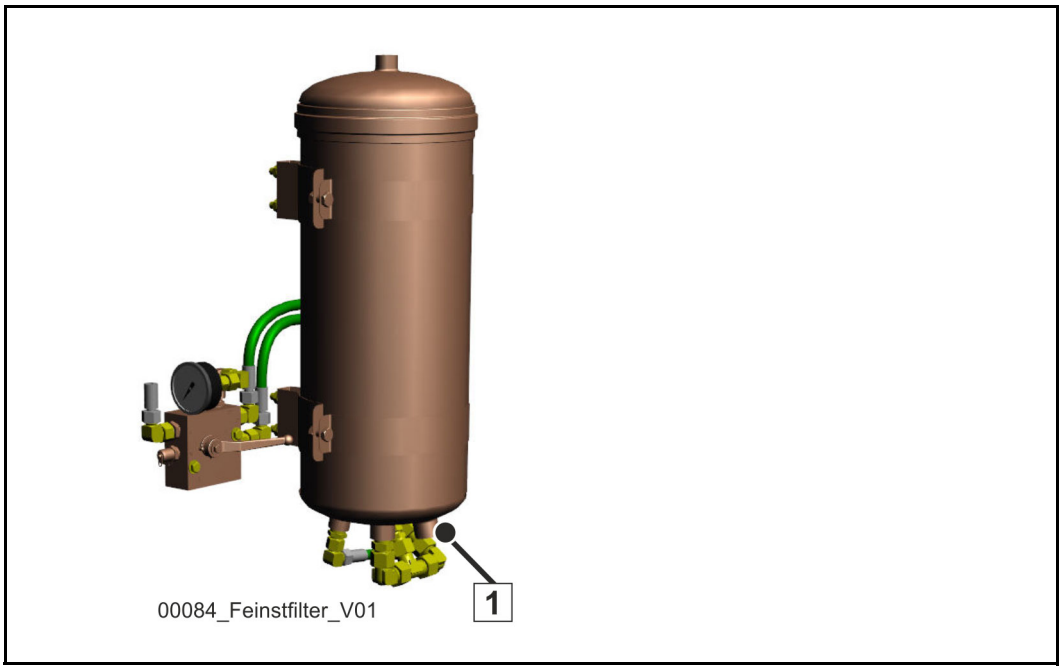


Fig. 515

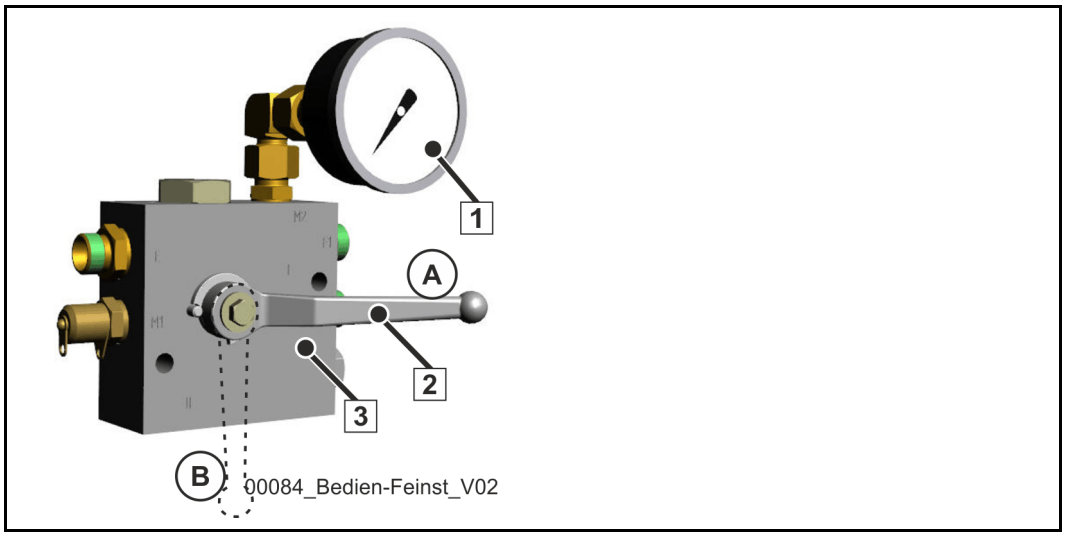


**Fig. 516 Pressure gauge (1), ball valve (2), pressure relief valve (3)
Operating position (A), maintenance position/filter change (B)**

6.12.1 Maintaining the ultra-fine filter

The best filter performance is achieved when the pressure gauge (1) **(Fig. 516)** displays a pressure between 2.0 bar and 4.0 bar.

Catching particles of dirt and water causes the pressure indicator to increase and the return flow volume to decrease.

We recommend replacing a filter element at the latest after:

- 2000 operating hours
- 6 months of use
- In the event of frequent downtimes
- Pressure indicator is above 4.0 bar

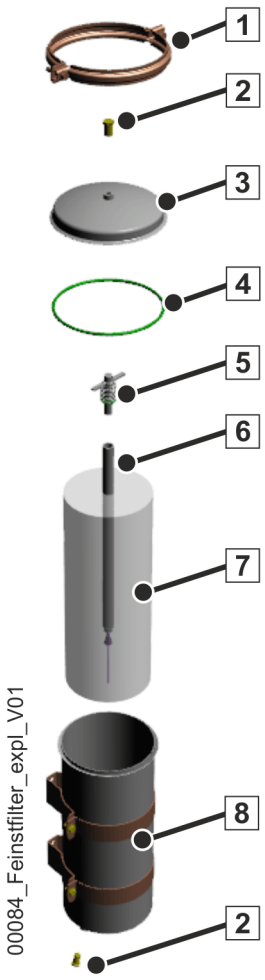
Attention!

Damage to the ultra-fine filter due to excessive pressure!

A pressure of more than 5.5 bar will damage the ultra-fine filter.

Change the filter element on time and make sure the pressure relief valve is working and set correctly.

6.12.2 Design of the ultra-fine filter



Caption for (Fig. 517)	
Pos.	**Designation**
1	Cover retaining clamp
2	Stopper
3	Filter cover
4	Filter cover seal
5	Retaining bolt with retaining bolt seal
6	Drain pipe
7	Filter element
8	Filter housing

Fig. 517 Design of the ultra-fine filter

6.12.3 Replacing the ultra-fine filter element

Warning!

Danger due to hydraulic oil jet!

Hydraulic oil escaping under pressure can penetrate the skin and cause severe tissue damage. This is an acute medical emergency.

Even a minor injury caused by a hydraulic oil jet requires immediate medical attention.

1. Switch the pump drive off and secure the machine against being started by uninformed persons.
2. Close the ball valve (2) **(Fig. 516)**.

Information

Closing the ball valve allows the filter to be separated from the system in the event of malfunctions.

This prevents the agitator's functions from being impaired.

3. Open the drain screw (1) **(Fig. 515)** and drain the filter housing completely into a container placed below it.
4. Carefully remove the screw connection on the cover retaining clamp (1) **(6.12.3)**. Only remove the cover (3) if the oil level has gone down as the oil will overflow otherwise.
5. Remove the cover retaining clamp (1) and the filter cover (3) **(6.12.3)**.
6. Loosen and remove the retaining bolt (5) for the filter element (7). Replacing the retaining bolt seal is part of replacing the filter.
7. Pull the filter element (7) off of the drain pipe (6) using the stirrups provided for that purpose.
8. Allow the filter element to drip dry, placing it in a separate container so as to prevent contamination caused by leaking oil. The disused filter element must be properly disposed of later (special waste).
9. Remove the course contamination in the filter housing (8) **(6.12.3)**.
10. Reattach the drain screw to the filter housing with Teflon tape.
11. Mount the new filter element in a straight and vertical position above the drain pipe.
12. Screw the retaining bolt into the drain pipe and ensure that the filter element is secured tightly.
13. Inspect the cover seal (4) for damage and replace it if necessary.

14. Seal the filter housing with the filter cover. The pivot of the retaining bolt must sit in the guide in the filter cover provided for the purpose.
15. Fasten the filter cover with the cover retaining clamp and tighten the screw connection.

Information

The ends of the cover retaining clamp are U-shaped and must interlock **(Fig. 518)**.

Ensure the correct installation without fail.

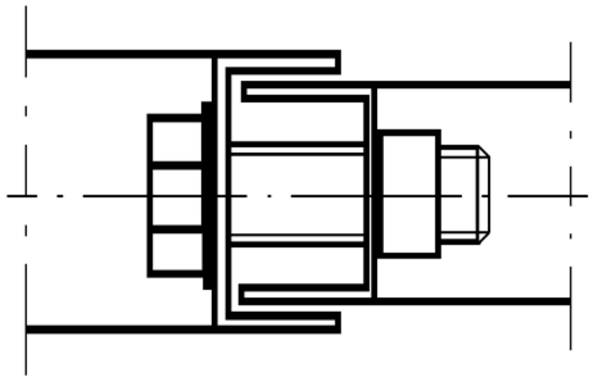


Fig. 518 Cover retaining clamps

The ultra-fine filtration is operational once more.

6.13 Rotatable stowing box

Optionally, SCHWING machine types S20 and S24X can be equipped with the “rotatable stowing box” accessory. If interested, please contact your nearest SCHWING representative.

These stowing boxes can be folded down hydraulically when loading and unloading, which makes it possible to load and unload the machine from the ground.

6.13.1 General warnings for the stowing box

Warning!

Risk of being crushed or rammed by rotatable stowing box!

Body parts, especially the head, can be seriously injured.

The danger area around the stowing boxes must be kept free of people and objects.

Warning!

Risk of collision when loading and unloading!

Serious accidents due to unsecured danger area.

Always secure the danger area according to regulations when loading and unloading your machine.

Attention!

Material damage to stowing box and placing boom!

The placing boom can collide with the stowing boxes when folded up.

A higher level of attention is required when moving the placing boom in connection with the “rotatable stowing box” accessory.

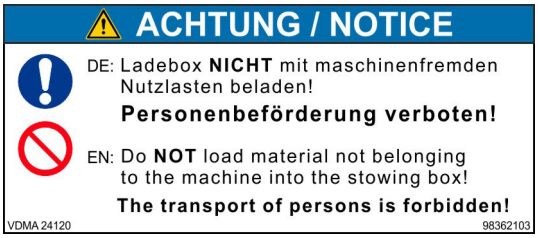


Fig. 519 Identification plate: Loading

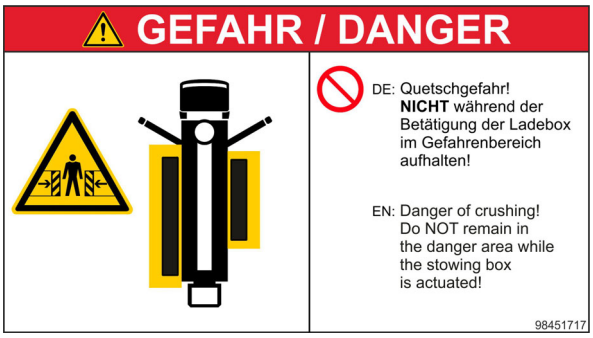


Fig. 520 Identification plate: Risk of being crushed

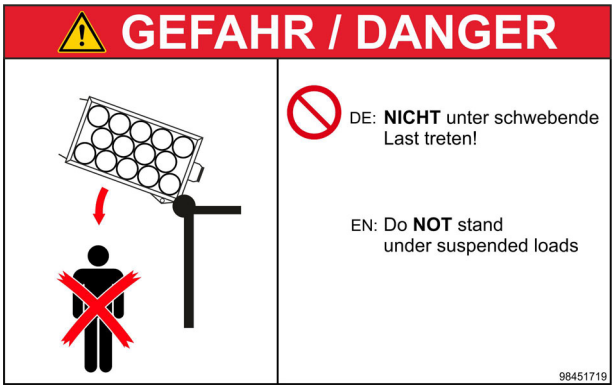


Fig. 521 Identification plate: Suspended load

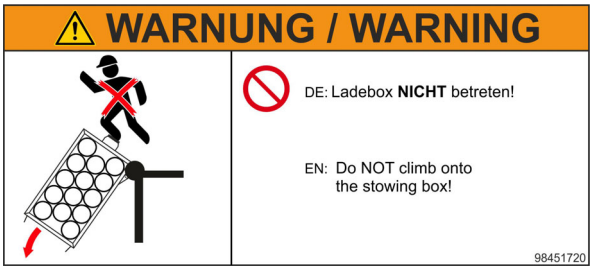


Fig. 522 Identification plate: Climbing

6.13.2 General information

Hoses with a maximum length of 5 metres can be stored in the stowing boxes.

For the machine type S24X, you can order stowing boxes for hoses with a maximum length of 5 metres for the left-hand side of the machine.

For the right-hand side of the machine, you can order stowing boxes for hoses with a maximum length of 3 metres.

For the machine type S24X, both sides of the machine can be outfitted with stowing boxes at once or individually **(Fig. 523)**.

For the machine type S20, you can order stowing boxes for hoses with a maximum length of 5 metres without exception for the left-hand side of the machine **(Fig. 524)**.

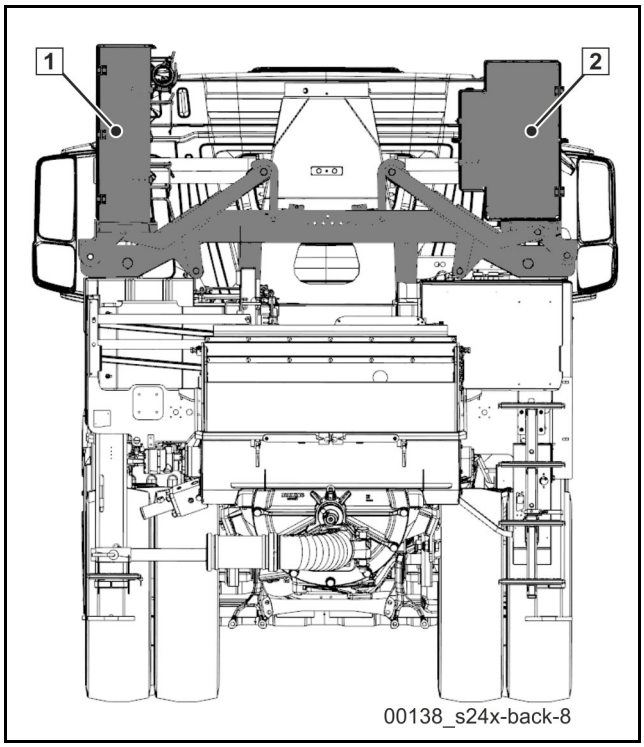


Fig. 523 S24X: Both stowing boxes. (1) Left-hand stowing box; (2) Right-hand stowing box

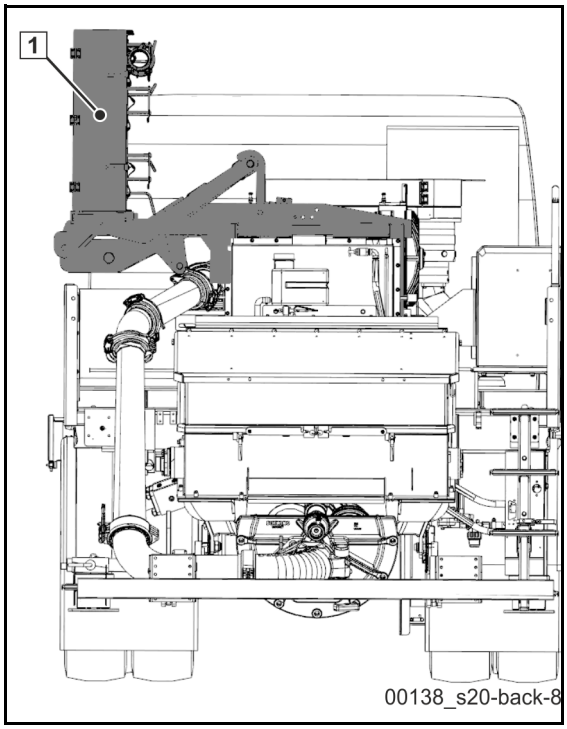


Fig. 524 S20: Stowing box only possible on left. (1) Left-hand stowing box

The function is activated via the hydraulic pump for the chamber valve.

This means that you must decide between the accessories “chamber valve” or “rotatable stowing box”. Using both accessories at the same time is not possible.

Likewise, it is not possible to combine the accessories “rotatable stowing box” and “fall arrester” on the same side of the machine.

The stowing boxes are automatically anchored in the transport position (for anchor, see **(Fig. 525)** and **(Fig. 526)**).

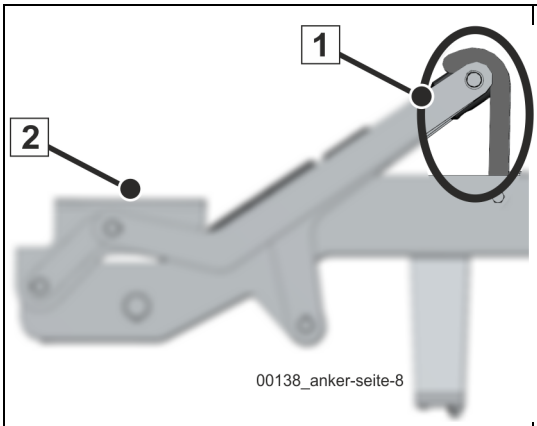


Fig. 525 Anchoring (1): View
(2) Console for stowing box

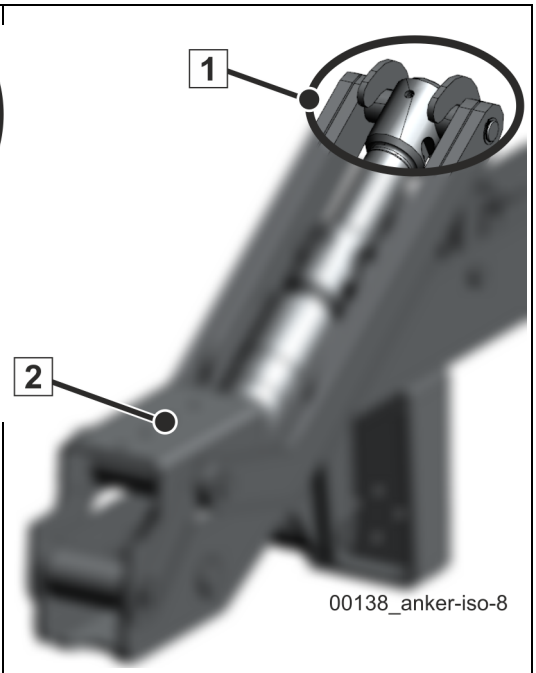


Fig. 526 Anchoring (1): ISO
(2) Console for stowing box

Information

Always support your machine completely vertically before moving the stowing boxes.

This avoids, among other things, placing excessive stress one side of the machine and thus prevents the associated wear on the machine.

Information

SCHWING recommends always folding down the stowing boxes before moving the placing boom.

This prevents collisions between the placing boom and the stowing boxes.

6.13.3 Intended use

The rotatable stowing boxes represent an extension of the hose reel system, making it possible to load and unload at ground level.

A maximum hose length of 5 metres can be stored.

The boxes must be folded up while driving.

The boxes must be folded down in order to operate the placing boom.

The boxes are only suited for storing concrete hoses and pumping lines from the company SCHWING.

6.13.4 Improper use

- No additional material may be fastened onto the stowing boxes.
- The stowing boxes are not suited for lifting loads.
- Climbing onto the stowing boxes is prohibited.
- The maximum load weight must be observed.
- Anything not in line with the intended use is prohibited.

6.13.5 Operating via remote control

Three switches on the radio control are used to activate the stowing box control system.

1. The hare / snail switch (S11) must always be in the centre position
2. The “Control release” switch (S3) must be held down
3. Move the switch (S2) into the “Chamber valve” position

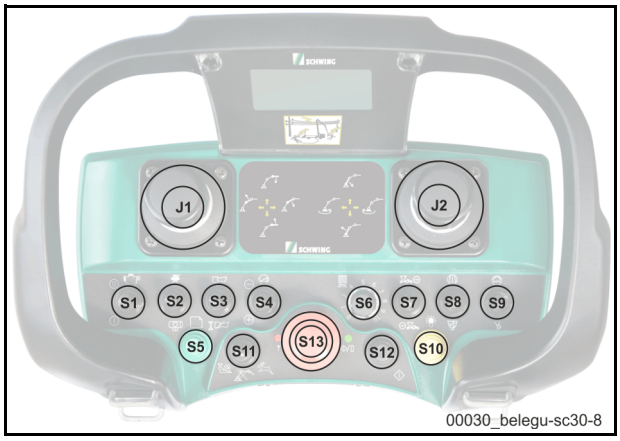


Fig. 527 Designation of SC30 buttons.

Now the joysticks are switched to the stowing box control system and the remote control displays the following screen **(Fig. 528)**.

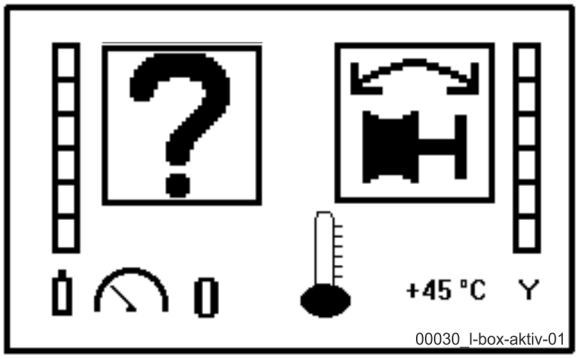


Fig. 528 SC30 display: Stowing box active

➤ In order to operate the stowing boxes, position yourself behind the concrete feeding hopper looking towards the driver’s cab.

The stowing boxes can be controlled using the joysticks in the same manner as the placing boom.

Joystick (J1) **(Fig. 527)** is responsible for controlling the left-hand stowing box.

Joystick (J2) **(Fig. 527)** is responsible for controlling the right-hand stowing box.

The stowing boxes remain active until the selector switch (S2) is moved into a different position.

After an emergency stop, the stowing box control system is disabled and must be reactivated.

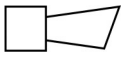
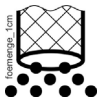
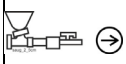
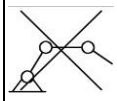
S 1	Selector push-button: I -0- I	S 4	Selector push-button: I -0- I
0  I	Vehicle engine (0) = off (stop) (I) = on (start) / **open EHP**	–  +	Speed of the vehicle engine (-) = reduce (+) = increase
S 2	**Selector switch: I -0- I**	**S 5**	**Push-button: I - 0**
 0 	End hose stop: Automatic off / **VarioPressure on** End hose stop: Automatic on Activate chamber valve / **rotate stowing boxes**		Browse display
S 3	**Selector push-button: I -0- I**	**S 6**	**Potentiometer: min - max**
 0 	Signal horn on vehicle on Acknowledge control release or diagnosis horn (switch off)		Adjust the delivery rate of the concrete pump proportionally
		S 7	**Selector switch: I -0- I**
		 0 	Concrete pump on forwards (pump operation) Concrete pump on backwards (suction operation)

Table 25

S 8	Selector switch: I -0- I	S 11	Selector switch: I -0- I
	Compressor on		Boom speed slow (concreting work)
0			Placing boom control off
	Agitator automatic operation on		Boom speed fast (installation and removal)
S 9	**Selector switch: I -0- I**	**S 12**	**Push-button: I - 0**
	Water pump on		Transmitter on
0			
	Concrete vibrator automatic operation on		
S 10	**Push-button: I - 0**	**S 13**	**EMERGENCY STOP button: I - 0**
	Display lighting on / off		Transmitter off / EMERGENCY STOP

6.13.6 Maximum load capacity

Attention!

Material damage due to overload!

The machine structure can be damaged and the vehicle handling can change dangerously.

Never exceed your vehicle's maximum permitted axle load and load capacity.

The maximum load capacity must never be exceeded as this could seriously impair the structure and the vehicle handling of your SCHWING machine.

Use Table 26 on page 747 to calculate the weights.

Always distribute the loads evenly.

Comply with your vehicle's permitted axle load. The respective limits can be found in the operating instructions of your vehicle's manufacturer.

Tare weights incl. supports						
S24X, right	Incl. sleeves	22 x 3m; DN 75				407kg
S24X, right	Incl. sleeves	13 x 3m; DN 100				400kg
S20 / S24X, left	Incl. sleeves	14 x 5m; DN 75				456kg
Load capacity for 3-metre box				Number	Subtotal	**Grand total**
Hose	3 m	DN 75	20.4kg			
Hose	3 m	DN 100	33.5kg			
Load capacity for 5-metre box						
Hose	5 m	DN 75	29.6kg			
Hose	10 m	DN 75	52.6kg			
					Total	

Table 26 Weight table

6.13.7 Emergency operation for stowing boxes

In the event of a power outage, an electronic malfunction or something similar, the stowing boxes must be moved into the transport position in order to drive in open traffic.

Warning!

Risk of machine falling down!

If the machine falls, it can cause serious or even fatal injuries.

Secure it with safety harnesses to prevent it from falling.

During emergency operation, the machine must be entered in order to access the valve block on the stowing box bracket **(Fig. 531)**, **(Fig. 533)**.

Only fasten the safety harness to appropriate machine components.

Warning!

Risk of accidents as a result of stowing boxes being folded down!

Serious or even fatal injuries.

Moving the machine while the stowing boxes are folded down is prohibited!

Two people are required to move the stowing boxes into the transport position **(Fig. 523)** during an emergency.

In such situations, one person must actuate the valves for upward and downward movements while secured to the top of the machine.

6.13.8 Operating the S20 stowing box during emergencies

- Unscrew valve block (1) **(Fig. 529)** in order to actuate valve (4) **(Fig. 530)**.
- Screw in the control lever on control block (5) **(Fig. 529)** and hold down the control lever in order to activate the “Chamber valve” function.
- Actuate the valves on stowing boxes (1) and (2) **(Fig. 531)** for upward and downward movements (on top of the machine).

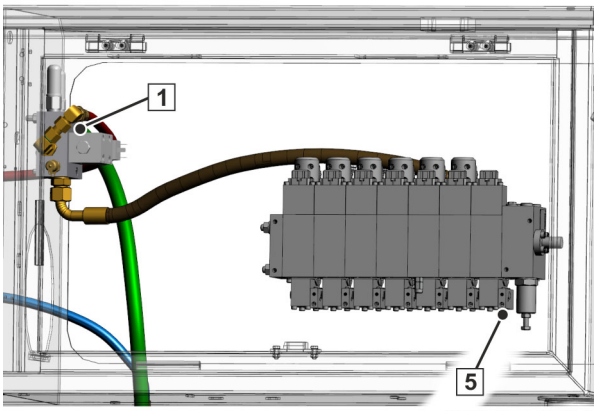


Fig. 529 S20 control cabinet

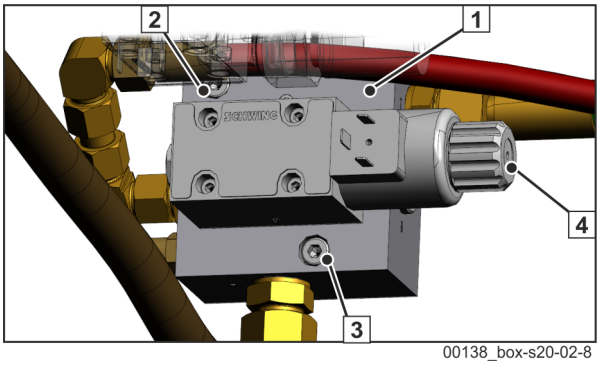


Fig. 530 Valve in control cabinet

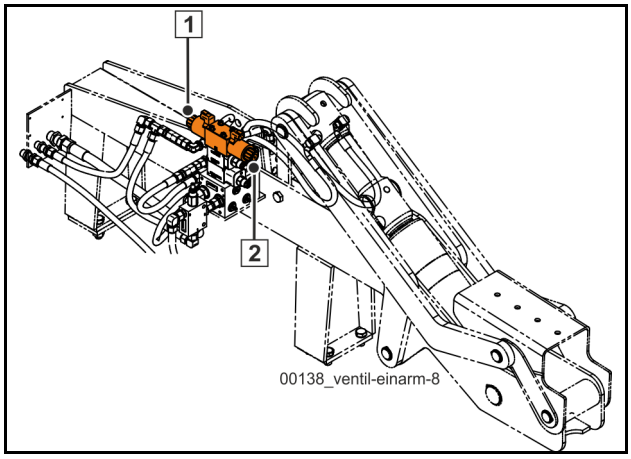


Fig. 531 Valve block on stowing boxes

6.13.8.1 Operating the S24X stowing boxes during emergencies

- Press valve (1) **(Fig. 532)** for the oil flow.
- Screw in control lever (2) **(Fig. 532)** on the control block and hold down the control lever in order to activate the “Chamber valve” function.
- Actuate valves (1) **(Fig. 533)** on the stowing boxes for the correct lever arm (right- or left-hand side) for upward and downward movements.

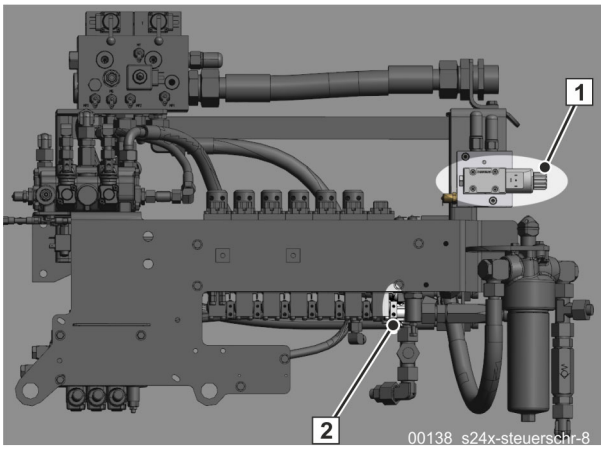


Fig. 532 S24X control cabinet

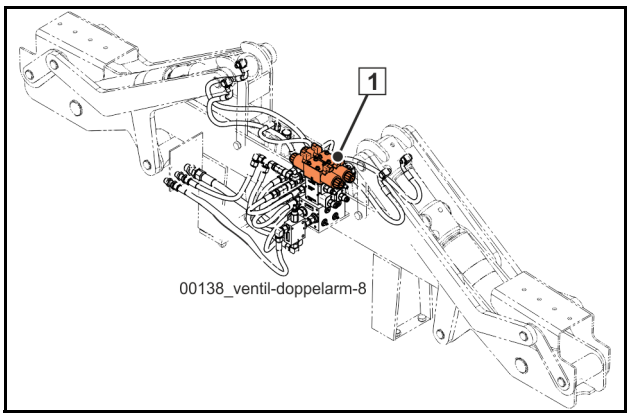


Fig. 533 Valve block on stowing boxes

7 Appendix

7.1 Information service

Are you already using our information service? - 5 minutes that are worth it!

Dear Customer,

With the purchase of your SCHWING machine, you have acquired a high quality product.

Of course, we are constantly working to improve our products and would like to inform you when new findings become available. This service is completely free of charge, because we highly value customer support and product monitoring!

Our offer also expressly applies when the SCHWING machine was obtained second-hand!

In order to send you our information, we need your address.

Please complete the following questionnaire and send it to

SCHWING GmbH

Service

Heerstraße 9-27

44653 Herne

GERMANY

Of course you can also fax us this page or reply by email:

Fax: +49 (0)2325 74674 Email: service@schwing.de

We look forward to your response!

Please complete in block letters:

Customer no.:	
Address:	
Country:	
Contact person:	
Telephone:	
Fax:	
Email:	
Machine type:	
Machine no.:	

7.2 Always nearby

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SCHWING GmbH
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Heerstraße 9-27
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ET Sales:
02325/987-352
Customer Service:
02325/987-231/232
Fax: 02325/987-470
Email: parts@schwing.de
Contact: Mr Beiersdorf

HAMBURG

SCHWING Stetter
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Gewerbegebiet Ost
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Fax: 04106/71810

Email: Hamburg@schwing.de
Contact: Mr Hermann

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Gewerbegebiet Neu Boston
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033678/62015
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GOTHA

Eberhard Becker & Partner GmbH

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03621/404445
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Email: Gotha@schwing.de
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7.4 QR-Code-Übersicht / QR-Code Overview

7.4.1 DE - Schwing Video-Tutorials 768
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7.4.1 DE - Schwing Video-Tutorials

Sehr geehrter Kunde,

um Sie beim Betrieb und der Wartung Ihrer Maschinen noch besser zu unterstützen und um die Zuverlässigkeit und Langlebigkeit Ihrer SCHWING-Produkte zu steigern, haben wir Erläuterungen zu Wartungsaufgaben und wertvolle Praxishinweise im Video-Format für Sie zusammengestellt.

Diese Video-Tutorials können Sie ganz einfach über das Scannen eines QR-Codes oder direkt über YouTube erreichen.

Information

Bitte beachten Sie, dass Sie eine App zum Scannen von QR-Codes und eine Verbindung zum Internet benötigen, um den Service nutzen zu können.

Das Scannen des QR-Codes leitet Sie umgehend auf die entsprechende YouTube Seite.

Achten Sie auf das Sprachkürzel hinter der Tutorialaufzählung.

DE steht für Videos in deutscher Sprache

EN steht für Videos in englischer Sprache

	Tutorial 01 - DE Wechsel der Förderkolben bei Schwing Autobetonpumpen
	Tutorial 02 - DE Reinigung von Autobetonpumpen
	Tutorial 03 - DE Wechsel der Filterelemente • Wechsel des Mastfilters • Wechsel des Filters am Ölkühler • Wechsel des Belüftungsfilters des Hydraulikbehälters
	Tutorial 06 I - DE EASy

	Tutorial 06 I - DE EASy mit EASy Front
	Tutorial 06 I - DE EASy Extend
	Tutorial 06 II - DE EASy Front

7.4.2 EN - Schwing Video-Tutorials

Dear Customer,

to support you even more in case of operating and maintening your Schwing machine and to enhance the reliability and durability of your Schwing product, we started to make videos for you which gives explanation to maintenance tasks and practical tips you might not have known yet.

All you have to do is scan the QR-code with your mobile phone or go directly to www.Youtube.com and search for „schwing stetter tutorial“.

Information

Please make sure that you have internet access and an app on your mobile phone to be able to scan QR-codes.

By scanning the QR code you will be immediately directed to the relevant YouTube page.

Take note of the language abbreviation behind the listed tutorials:

„DE“ - stands for videos in German

„EN“ - stands for videos in English

	Tutorial 01 - EN Change the pumping pistons on Schwing truck-mounted concrete pumps
	Tutorial 02 - EN Cleaning truck-mounted concrete pumps
	Tutorial 03 - EN Replacing the filter elements • Replacing hydraulic oil boom filter • Replacing main hydraulic oil filter (cooler) • Replacing ventilation filter for hydraulic oil box
	Tutorial 06 I - EN EASy

	Tutorial 06 I - EN EASy with EASy Front
	Tutorial 06 I - EN EASy Extend
	Tutorial 06 II - EN EASy Front

7.5 VDMA safety manual

This chapter serves as the safety manual and contains basic safety instructions regarding the operation of pumping, spraying and spreading machinery for concrete.

SCHWING also provides the safety manual for download. To do so, scan the QR code.

The safety manual is prepared jointly by leading manufacturers of concrete pumping and spreading machines under the auspices of the VDMA (Verband Deutscher Maschinen- und Anlagenbau/Mechanical Engineering Industry Association). It is applicable to our machines in full.

For this reason, the safety manual has a chapter of its own and separate page numbers.

Specific warnings can always be found before each description of a dangerous activity.

Baumaschinen und Baustoffanlagen

Safety Manual

Concrete delivery and placing machines

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Changes in this revision

- Foreword: “Notes” replaced with “Safety instructions”
  (Foreword P. 9)
- Definition of terms: “Starting to pump” added
  (Starting to pump P. 16)
- Danger zone: Measures in case of unauthorised access amended
  (Danger zone P. 21)
- End hose: Amended
  (End hose P. 22)
- Operating Instructions: “Hazard warnings” replaced with “Warning notices”
  (Operating Instructions P. 29)
- Rendering the machine ready for operation
  - Control and monitoring devices: Enumeration removed
  - Leaving the machine: Specifications removed

  (Rendering the machine ready for operation P. 37)
- Clearances from highvoltage lines
  - Graphic expanded
  - Reworded

  (Clearances from highvoltage lines P. 38)
- Loading and transporting the stationary machine: Reworded
  (Loading and transporting P. 42)
- Loading: Graphic removed
  (Loading P. 48)
- Procedure in storms: Amended
  (Procedure in storms P. 51)
- Place of work: Amended
  (Place of work P. 55)
- Remote control during breaks in pumping: Reworded
  (Remote control P. 56)
- New section: Securing the machine
  (Securing the machine P. 61)

Foreword

This Safety Manual contains important safety instructions for operating concrete delivery and placing machines safely, properly and economically. Observing these instructions helps to avoid danger, to reduce repair costs and downtimes and to increase the reliability and service life of the machine.

This Safety Manual must not be considered a substitute for knowledge of legal regulations, but should supplement and explain this knowledge in a practical way. The manufacturer's Operating Instructions that may be supplemented by this Safety Manual must also be observed. There has been no classification of the hazards according to the degree of injury or amount of damage to be expected.

Infringements of the rules laid down in this Safety Manual may lead to accidents and/or machine failures, even if not expressly described. Significant damage may be caused and persons in the vicinity of the machine could be injured or killed.

This Safety Manual must be read and applied by anyone who is tasked with working with/on the machine, and with the following in particular:

- Operation, including setting up, fault rectification in the course of work, maintenance, disposal of functional fluids and consumables
- Maintenance (servicing, inspection, repair) and/or
- Transport.

This Safety Manual is revised periodically. The current version can be obtained at any time from the publisher.

1 Terms, definitions, requirements

1.1 Definition of terms

The terms used in this Safety Manual are explained below, along with descriptions of the requirements placed on specific groups of people.

1.1.1 Machine

For the purposes of this Safety Manual, concrete delivery and placing machines are defined as:

- Truck-mounted concrete pumps (an ensemble of truck and concrete pump with and without placing boom). The safety regulations issued by the truck manufacturer also apply to the truck.
- Truck mixer concrete pump (an ensemble of truck mixer, concrete pump and placing boom). The safety regulations issued by the truck mixer manufacturer and by the truck manufacturer also apply to truck mixer concrete pumps.
- Stationary concrete pumps
- Stationary placing systems (an ensemble of placing boom and base structure)

1.1.2 Concrete pump

For the purposes of this Safety Manual, concrete pumps are defined as devices which are designed to deliver concrete to placement sites via pipes or hoses.

1.1.3 Arm assembly

Arm assembly is a synonym for placing boom and can be used interchangeably.

1.1.4 Placing boom

For the purposes of this Safety Manual, placing booms are defined as powered, slewable devices consisting of one or more swinging or folding sections for guiding the delivery line.

1.1.5 Base structure

For the purposes of this Safety Manual, base structures are defined as equipment which is designed to hold a stationary placing boom to give the latter the required stability.

1.1.6 Truck mixer

For the purposes of this Safety Manual, truck mixers are defined as vehicles with mixing equipment for transporting concrete.

1.1.7 Delivery line systems

For the purposes of this Safety Manual, delivery line systems are defined as self-contained pipes or hoses in which concrete is pumped from the concrete pump to the placement site. Devices for shutting off, diverting or cleaning delivery lines can be integrated into delivery line systems.

1.1.8 End hose

For the purposes of this Safety Manual, end hose is defined as the hose that is fitted on the placing boom at the end of the delivery line for distributing the concrete. There must be no couplings, spouts, discharge stops or other items fixed to the outlet end of the end hose unless they are approved by the manufacturer.

1.1.9 Manufacturer

Any natural or legal person that markets a machine or incomplete machine that is dealt with in this Safety Manual.

1.1.10 Operator

Authorised representative of the owner of the concrete pumps and/or placing booms. The operator is responsible for the use of these machines.

1.1.11 Machine operator

Persons trained in and charged with the operation of concrete pumps and placing booms.

1.1.12 Hoseman

Persons instructed by the site management in how an end hose is guided. Hosemen must be able to independently evaluate all dangerous situations which may occur in the area of the end hose and react according to the situation.

1.1.13 Signaller and other auxiliary personnel

Persons instructed by the site management to help the machine operator in his work if the latter is unable to observe all areas of operation and danger zones. Signallers must be able to independently evaluate all dangerous situations which may occur when working with a concrete pump and/or placing boom and react according to the situation. The signaller must have a suitable means of communication with the machine operator.

1.1.14 Truck mixer driver

Persons who supply the concrete pump with concrete from a truck mixer. Truck mixer drivers must be instructed by the machine operator to operate the operating elements on the concrete pump provided for their use. Truck mixer drivers must be able to independently evaluate all dangerous situations which may occur when working in the area of the hopper of a concrete pump and react according to the situation.

1.1.15 Subject expert

For the purposes of this Safety Manual, a subject expert is defined as a person who, through their professional training, their professional experience and their recent professional activity, has the required specialist knowledge to inspect the tools.

1.1.16 Qualified personnel

Persons who have completed specialist training for a particular activity which qualifies them to carry out their roles.

1.1.17 After Sales Service personnel

Qualified personnel employed by the manufacturer who are responsible in particular for maintenance of the machine.

1.1.18 Maintenance

Maintenance includes all measures required to inspect, maintain and repair a machine.

1.1.19 Starting to pump

Starting to pump describes the phase at the start of the pumping process until the delivery line including the end hose has filled with conveyed material and this conveyed material emerges evenly from the end hose.

The process of starting to pump occurs both when first starting the pumping process and after a break in pumping or another type of interruption. If the delivery line or parts of the delivery line need to be converted and/or refilled, this is also referred to as starting to pump.

1.1.20 Place of work, working area, danger zone

1.1.20.1 Mobile machines

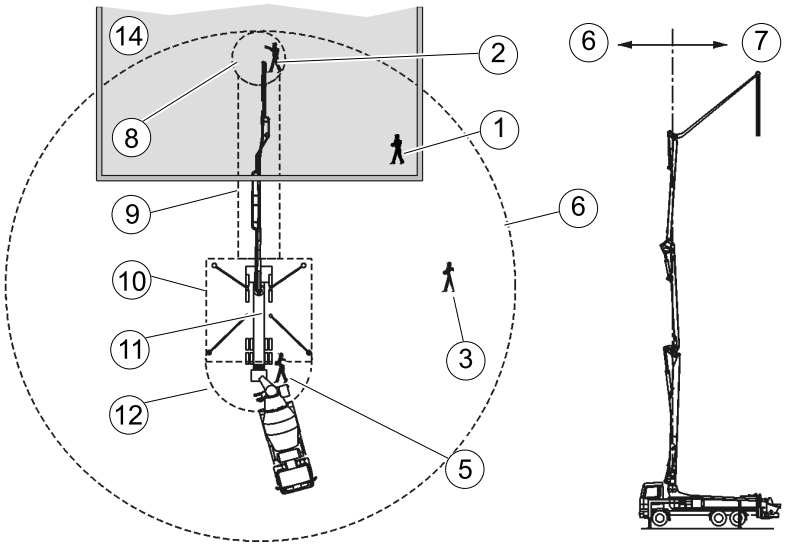


Figure 1: Example

1.1.20.2 Stationary machines

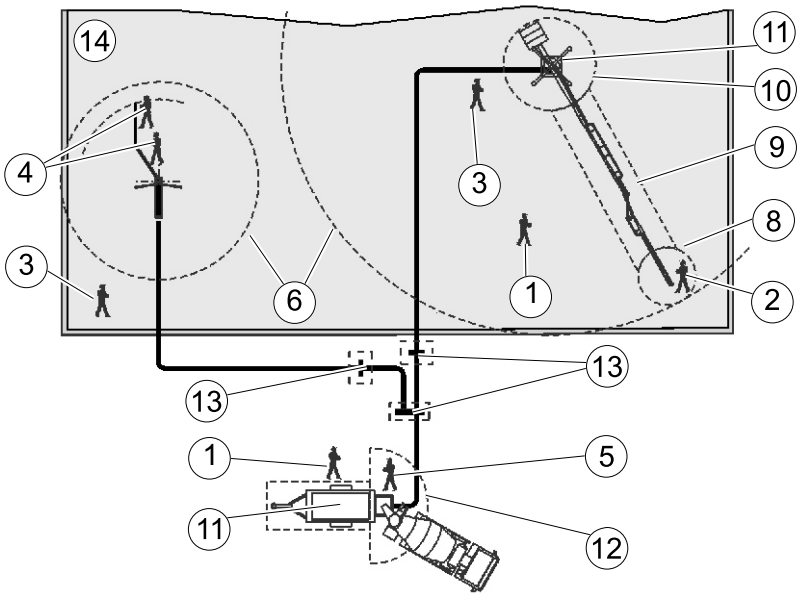


Figure 2: Example

Pos.	Designation		Explanation
1	Place of work (during pumping operations)	Machine operator	In normal operation, with the remote control
2		Hoseman	At the end hose in the danger zone
3		Signaller	In the machine operator's range of vision
4		Auxiliary personnel	As machine operators of the manual placing system
5		Truck mixer driver	At the hopper in the danger zone
6	Working area	Permitted	Area with a radius of the reach of the placing boom + end hose length
7	Working area	Impermissible	The end hose must not be moved backwards beyond the vertical of the placing boom.
8	Danger zone	At the end hose	Risk of injury when pumping is started, during pumping operations, when removing a blockage and during cleaning procedures. The diameter of the danger zone is twice the end hose length.
9	Danger zone	Beneath the placing boom	Risk of injury from falling items
10	Danger zone	Area of the support legs and feet or area of the base structure	Risk of crushing when setting up or dismantling the machine
11	Danger zone	On the machine	Any presence on or below the machine when the pump is in operation is prohibited
12	Danger zone	On the hopper	Risk of injury during cleaning procedures and when the hopper is being filled using a truck mixer
13	Danger zone	Area of the delivery line systems	Hazard posed if lines burst, risk of injury from crushing or shearing, particularly with gate valves
14	Structure or area being concreted		Example

1.1.20.3 Place of work

The place of work is the area in which people must remain in order to carry out the work.

Place of work – machine operator

The machine operator's place of work is with the remote control when the pump is in operation. The place of work must be selected so as to allow visual contact with the placement site and the truck mixer driver, and so that the working area can be observed at the same time. A signaller must otherwise be used.

The machine operator's place of work is with the machine when this is being set up or prepared for driving.

Place of work – hoseman

The hoseman's place of work is within the danger zone of the end hose, but not beneath the placing boom. This requires a greater level of caution. The hoseman and machine operator must have visual contact.

Place of work – truck mixer driver

The truck mixer driver's place of work is in the danger zone of the hopper and at operating elements for the agitator and truck mixer. This requires a greater level of caution. The truck mixer driver and machine operator must have visual contact.

1.1.20.4 Working area

The working area is the area in which work is carried out with or on the machine. Parts of the working area can become danger zones depending on the operation being carried out and the position of the placing boom.

The working area must be secured and clearly identified. Suitable personal protective equipment is required in the working area. The machine operator is responsible for safety in the working area of the machine whilst the machine is in use.

Impermissible working area

Because of their high manoeuvrability, some placing booms can also be shifted into positions for which they are not designed. This may overload or damage the placing boom. Placing booms must therefore only be moved within the permitted working area. *(Impermissible working area P. 26)*

1.1.20.5 Danger zone

The danger zone is the area surrounding the machine, in which people may be at risk of injury from movements required by the work.

The danger zone varies within the working area and depends on the activity being carried out and the position of the placing boom, if one is present. Danger zones must be secured and clearly identified. The machine operator must be capable of seeing the danger zone at all times and under all circumstances. If necessary, he must appoint a signaller to supervise the danger zone.

Depending on the working situation, places of work may occasionally fall within the danger zone, especially the place of work of the hoseman and the truck mixer driver. If a place of work falls within the danger zone, increased caution is required and suitable personal protective equipment is prescribed. Persons who are authorised to be present in such a place of work must use their own discretion to assess dangerous situations and be able to react according to the situation.

The machine operator is responsible for safety in the danger zone of the machine whilst the machine is in use.

If an unauthorised person enters the danger zone, the machine operator must immediately stop all hazardous machine functions and instruct the unauthorised person to leave the danger zone.

Immediately press the EMERGENCY STOP button if there is a risk to the life and limb of persons!

Support legs and support feet

There is a risk of crushing in the swingout and extension zone for the supports.

Placing boom

The danger zone when working with the placing boom is the zone over which the placing boom is slewed. In this area there is a risk of injury from falling concrete and delivery line components.

Machine

All the time the vehicle is in operation, there is a risk of injury on and below the machine from moving parts and bursting delivery lines or hydraulic hoses, as well as a risk of falling on slippery surfaces or steps.

End hose

As a general rule, the end hose and the area surrounding the end hose are always danger zones as the end hose may swing out unexpectedly. The diameter of the danger zone is twice the end hose length.

Hopper

In the area of the hopper, there is a risk of becoming trapped between the truck mixer and the hopper and of being sprayed with concrete. There is a risk of being crushed and of injury by shearing from the transfer tube. There is a risk of becoming caught in the rotating agitator.

Delivery line systems

In the area around the delivery line systems there is a risk of injury from the delivery line bursting if there is an abrupt rise in pressure. There is a risk of crushing and injury by shearing with devices integrated in delivery line systems.

1.2 Designated use

The machine must only be operated as intended and in technically perfect condition. All protective and safetyoriented devices, particularly removable protective devices and EMERGENCY STOP devices, must be available and fully functional.

The machine is designed exclusively for the delivery and placing of concrete up to a bulk density of 2400 kg/m^3. It must only be used for pumping operations on construction sites. The maximum delivery pressure must not exceed that specified on the rating plate or in the check book.

You must also observe the Operating Instructions and comply with the intervals and conditions for inspections (particularly retesting) and maintenance work in order to operate the machine within the limits of its proper use.

1.2.1 Retesting (safety inspection)

After initial commissioning of the machine, the operational safety of the machine must be checked regularly by a subject expert. The inspection intervals depend on the age of the machine. The older the machine, the greater the probability of damage. For this reason, regular retesting of the machine, appropriate to its age, must be carried out in order to detect damage in good time. Retesting should be carried out in accordance with the inspection intervals listed below.

Retesting must consist of the following:

- Retesting of the condition of the components and equipment with regard to the formation of cracks, damage, wear, corrosion and other changes;
- Retesting of the completeness and effectiveness of the safety equipment;
- Retesting to find out whether any defects which are found during the tests mentioned above and which could affect safety have been adequately rectified.

Retesting must include components which are used in conjunction with the machine (in particular, delivery line components and accessories).

Furthermore, information provided by the manufacturer to the operator with reference to special instructions for maintenance and inspection must be observed.

1.2.2 Inspection intervals for retesting

The inspection intervals are fixed as follows:

- Machines up to and including 5 years old:

Inspect after every 1000 operating hours or 1 year, whichever is soonest. The interval is repeated after every retest.

- Machines more than 5 years old:

  Inspect after every 500 operating hours or 1 year, whichever is soonest. The interval is repeated after every retest.

- Machines more than 10 years old:

  Inspect after every 250 operating hours or 1 year, whichever is soonest. The interval is repeated after every retest.

The day of initial commissioning in accordance with the handover report and the machine's operating hours meter are definitive for the intervals. This operating hours meter records the hours of pumping operations. The operating hours meter must always be kept in good working order. It must not be tampered with. For machines without an operating hours meter, the operating hours must be recorded in a traceable form in writing.

Retesting must be arranged by the operator. The results of retesting must be entered in the check book and signed. The check book must always be kept with the machine and must be produced upon the request of the national supervisory bodies.

Notwithstanding national legislation, the operator can be liable in the event of damage, if it is proved that the damage has arisen as a consequence of regular retesting not being properly carried out.

If retesting is not carried out, the manufacturer will assume that the machine has been shut down. When the machine is restarted, retesting must be carried out.

1.3 Improper use

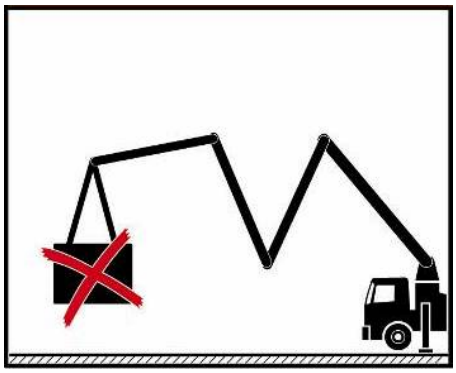
Improper use is defined as use which is not described in or goes beyond that described in the “Designated use”, *(Designated use P. 22)* section. The manufacturer accepts no liability for damage resulting from such use. Some examples of conceivable improper uses are given below.

1.3.1 Transporting goods

The machine must not be used for the transport of goods, except for carrying the accessories used for the machine, such as pipes, hoses, etc. The maximum permissible gross weight may not be exceeded.

1.3.2 Lifting loads

The placing boom must never be used for lifting loads.



1.3.3 Removing obstacles

The placing boom must not be used under any circumstances to remove obstacles. This would overload the placing boom, causing damage and endangering people.

1.3.4 Extending the reach

It is forbidden to attach an extension to the end hose or boom tip of the placing boom (e.g. freely suspended transition liner) in order to extend the reach or in order to be able to pump “around corners”. Since the placing boom and the lifting equipment for the extension have differing pivot points and modes of control, it is not possible to co-ordinate their movements.

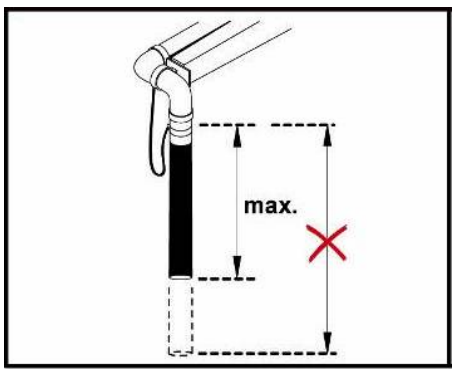
1.3.5 Extending the placing boom and end hose

Extension of the placing boom and end hose beyond the length specified on the rating plate is forbidden.

If the manufacturer defines the weight rather than the length of the end hose, you can use a reducer pipe with a longer end hose, for example. The quoted gross weight must not be exceeded. *(End hose P. 50)*

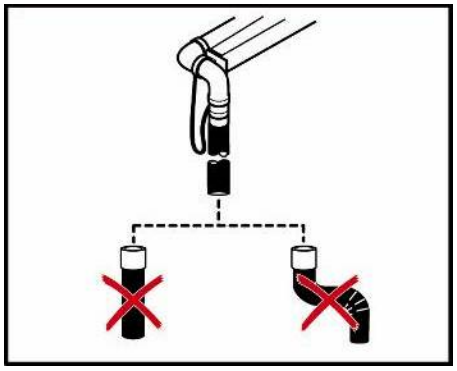
When using a longer end hose, the diameter of the danger zone also increases. *(End hose P. 50)*

End hoses with a length of more than 4 m must not be guided by hand.



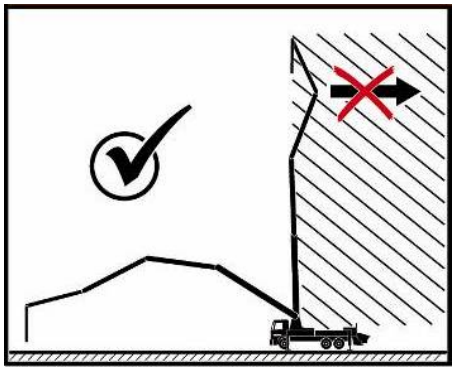
1.3.6 Impermissible end hose

There must be no couplings, spouts, discharge stops or other items fixed to the outlet end of the end hose unless they are approved by the manufacturer.



1.3.7 Impermissible working area

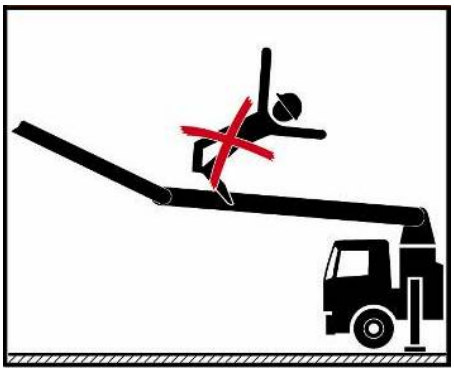
During pumping operations, the end hose must not be moved backwards beyond the vertical axis of rotation of the placing boom.



In addition to this, additional impermissible working areas exist, depending on the machine model and manufacturer, which are described in the Operating Instructions.

1.3.8 Climbing the placing boom

It is prohibited to climb the placing boom, to stand on top of it or to misuse it as a working platform or climbing aid.



1.3.9 Highpressure delivery

It is prohibited to deliver concrete at high pressure (delivery pressure greater than 85 bar) through the delivery line of the placing boom. Delivery line elements are marked with the maximum permissible delivery pressure. The delivery line and end hose are only suitable for delivery pressures of up to 85 bar until the wear threshold is reached. For the wear threshold, refer to the Operating Instructions for the machine.

1.3.10 Accessories and attachments

It is prohibited to fit accessories and attachments to the machine if they have not been expressly approved for use on this machine by the manufacturer.

1.3.11 Changes to the machine

You are not allowed to carry out your own changes to the machine. Changes must always be approved by the manufacturer.

1.4 Exclusion of liability

Where the manufacturer's delivery conditions are agreed, liability will be as described in the provisions there. The manufacturer is not liable for damage in cases specified there.

Unless the responsibility of the manufacturer, the warranty will be invalidated in the following situations in particular:

- use contrary to designated use.
- incorrect operation, maintenance and repair.
- use of spare parts or accessories other than original manufacturer's spare parts and accessories or their equivalents.
- conversions, alterations or modifications to the machine.
- fitting of accessories and attachments not approved by the manufacturer.
- adjustment of safety pressures, speeds of movement, power outputs, speeds of rotation and other settings to values other than those set in the works.

1.5 Personnel

The operator must ensure that only persons who are qualified or have received the necessary instruction work on or with the machine. It is the responsibility of the operator to carry out regular (e.g. annual) safety briefings for their employees. Suitable training can be requested from the machine manufacturer. The operator must clearly define who is responsible for operation and maintenance of the machine. The operating company must also ensure that only persons commissioned to work on the machine do so. In addition, the operator should provide the necessary personal protective equipment.

1.5.1 Requirements

Persons operating or carrying out maintenance work on the machine must meet the following requirements:

- They must be aged 18 years or over.
- They must be physically and mentally capable.
- They must be physiologically capable (rested and not under the influence of alcohol, drugs or medication).
- They must have been instructed in the operation and maintenance of the machine.

- They must have demonstrated their competence to the operator.
- They can be expected to reliably execute the tasks with which they are charged.

The operating personnel must not wear loose garments or jewellery, including rings. Long hair which is not tied back must be covered by a hair net. There is a risk of injury, in particular from being caught or trapped by moving parts.

All persons working on or with the machine must concentrate on the task at hand and not be distracted, particularly by smartphones and music played through headphones.

1.5.2 Qualifications

Persons who are being trained, introduced and instructed in the use of the machine are only permitted to operate the machine under the constant supervision of experienced personnel.

If you do not have qualified personnel, suitable workshop equipment, etc. available, you should commission the manufacturer's After Sales Department with the maintenance of your machine.

1.5.3 Responsibility of the machine operator

The operator must define the responsibility of the machine operator (including in respect to national road traffic regulations) and empower the machine operator to reject instructions from third parties prejudicial to safety. The machine operator must be able to reject the site of operations in the event of doubts regarding technical safety.

1.6 Operating Instructions, operating procedures and other regulations

1.6.1 Operating Instructions

Personnel that are authorised to work on the machine must have read the Operating Instructions, particularly the “Safety Regulations” section, and the Safety Manual before working with the machine. Reading the instructions after work has begun is too late. This applies especially to personnel working only occasionally on the machine, e.g. during setting up or maintenance.

As the operator, you must always make sure that the Operating Instructions are available. The Operating Instructions and check book must always be kept to hand at the site of use of the machine (in the tool compartment or container provided for this purpose).

As the operator, you must have personnel working on the machine confirm in writing their knowledge, understanding and application of the Operating Instructions and Safety Regulations and Safety Manual. At regular intervals of at least once a year, check that personnel are conscious of safety and the hazards involved in their work and are taking account of the Operating Instructions.

Personnel entrusted with work on the machine must observe all safety instructions and warning notices, and must be familiar with the machine itself. You must practice all the operating procedures described in the Operating Instructions (extending the supports, operating the placing boom, shifting the placing boom into the driving position, preparing the vehicle for moving, etc.) under the supervision of a subject expert until you are certain you can execute them safely. Ask questions if there is something you have not understood. Begin operating the machine only once you are fully and explicitly familiar with the layout and significance of all the control and monitoring devices and the method of operation of the machine.

1.6.2 Operating procedures

The operator must produce operating procedures for their personnel in accordance with national regulations. These operating procedures must also contain instructions (including the obligation to provide supervision and reports) concerning the observance of special operational features, particularly in respect of work organisation, working procedures or personnel deployment. Furthermore, reference must be made to other generally valid legal and otherwise mandatory regulations relating to accident prevention and environmental protection. Such regulations may also deal with handling hazardous substances, the issuing and wearing of personal protective equipment or with national road traffic regulations. You should familiarise yourself with the site of operations and with how to use fire extinguishers. Observe the firealarm and fire-fighting procedures.

1.6.3 Other regulations

The current regulations for concrete delivery and placing machines as issued by:

- The legal authorities in your country
- The national supervisory bodies
- The responsible commercial liability insurance company.

1.7 Personal protective equipment

To reduce the risk to life and limb, personal protective equipment must be used by the operating personnel whenever necessary or required by regulations. Safety helmet, protective gloves and safety footwear are specified for all persons working at or with the machine.

Personal protective equipment must at least comply with the specified standards.

Symbol	Meaning
	Safety helmet The safety helmet protects your head, e.g. against falling concrete or parts of the delivery line if the lines burst. (DIN EN 397:2013; Industrial safety helmets)
	Safety footwear Safety footwear protects your feet against falling objects and against penetration by projecting nails. (DIN EN ISO 20345:2012; Safety footwear for professional use; category S3)

Symbol	Meaning
	Hearing protectors Hearing protectors protect you against the noise generated in the vicinity of the machine when you are standing close to it. (DIN EN 352-1:2003; Hearing protectors - General requirements - Part 1: Earmuffs or DIN EN 352-3:2003; Hearing protectors - General requirements - Part 3: Earmuffs attached to an industrial safety helmet)
	Protective gloves Protective gloves protect your hands against aggressive or chemical substances and against mechanical effects (e.g. knocks) and cutting injuries. (DIN EN 388:2017; Protective gloves against mechanical risks; classification 1111)
	Protective goggles Protective goggles protect your eyes from injuries due to concrete spatter and other particles. (DIN EN 166:2002; Personal eye protection - Specifications)

Symbol	Meaning
	Safety harness When working at heights, use climbing aids and platforms that are intended for this purpose and comply with the safety regulations or wear a safety harness. Relevant national regulations must be observed. (DIN EN 361:2002; Personal protective equipment against falls from a height - Full body harnesses; category III)
	Respiratory protection and face mask Respiratory protection and face masks protect you from particles of building materials that may enter your body through the respiratory passages (e.g. concrete admixtures). (DIN EN 149:2009; Respiratory protection devices - Filtering half masks to protect against particles - Requirements, testing, marking; classification FFP1)

2 Setting up and working with the machine

2.1 Before working with the machine

2.1.1 Checking that the machine is ready for operation

As machine operator, it is your responsibility to check the machine for external damage and defects before any use of the machine. You must immediately report any changes (including changes in the working characteristics) to the organisation or person responsible. If necessary, shut the machine down immediately and secure it.

2.1.2 Rendering the machine ready for operation

As machine operator, you are responsible for rendering the machine ready for operation. This also includes topping up the functional fluids. Do not fill with fuel in enclosed spaces. Switch off the engine and the heating. Wipe up spilt fuel immediately. Do not smoke or use a naked flame when handling fuel.

Set all the control and monitoring devices to the zero position before you change the mode of control.

Never put the remote control down when the machine is ready for operation. If this is unavoidable in exceptional cases, you must switch off the remote control, disconnect it and lock it away.

2.2 Danger due to high voltage

2.2.1 High-voltage lines

Whenever you touch a high-voltage line, there is a risk of death for all persons either on the machine or in its vicinity or who are connected to it (via the remote control, end hose, etc.). A spark can jump across from a highvoltage line even if you just approach it and this will energise the machine and the surrounding area.

2.2.2 Discharge voltage pattern

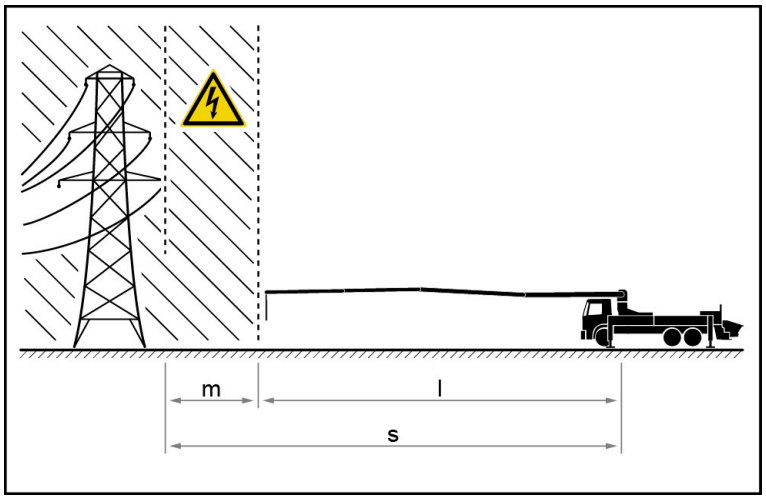
In the event of a flash over, what is known as a “discharge voltage pattern” is formed in the vicinity of the machine. The voltage decreases from the inside to the outside in this discharge voltage pattern. If you step inside this discharge voltage pattern, you will bridge different potentials. This will cause a voltage corresponding to the potential difference to flow through your body.

2.2.3 Clearances from highvoltage lines

Always maintain a safe clearance from high-voltage lines. The safe clearance is determined by adding the maximum placing boom length to the minimum clearance specified in the table. The maximum placing boom length is measured in the horizontal when the placing boom is fully extended. As long as the safe clearance is maintained, hazards caused by the high-voltage lines can be excluded and work can be performed without restrictions.

Rated voltage [V]	Minimum clearance [m]
Less than 1 kV	1.0
Between 1 kV and 110 kV	3.0
Between 110 kV and 220 kV	4.0
Between 220 kV and 380 kV	5.0
More than 380 kV or unknown rated voltage	5.0

The specified clearances are minimum requirements. You must observe any greater clearances that may be specified in the country of use.



Item	Designation
m	Minimum clearance
l	Max. placing boom length
s	Safe clearance

When maintaining the clearances (safe clearance or minimum clearance), the possibility of the high-voltage lines and the placing boom swaying in the wind must also be taken into consideration. You should further note that where air humidity is high, greater clearances are always necessary.

You must stand as close as possible to the unfolded placing boom if you wish to correctly estimate the movements of the boom and, above all, the clearance between the placing boom and obstacles or high-voltage lines.

A clearance smaller than the safe clearance may be used if absolutely required by the conditions on the construction site. The clearance to high-voltage lines must not be smaller than the minimum clearance specified in the table.

In case of clearances smaller than the safe clearance, contact between the placing boom and the high-voltage line cannot be excluded and there is a risk of death. Suitable organisational measures to guarantee the minimum clearance in all working situations must be developed, observed and documented to prevent this risk of death.

In the event that the minimum clearance between the placing boom and high-voltage lines cannot be maintained, the power station responsible must be contacted and you must have the highvoltage line switched off.

Should you have any doubts, it is better to forgo the use of the placing boom and to lay a separate delivery line.

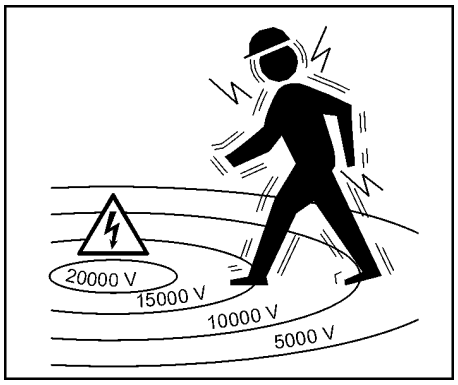
The first priority must always be to set up the machine with the safe clearance (placing boom length plus minimum clearance).

2.2.4 Highvoltage warning devices

According to the current rules of engineering, highvoltage warning devices do not meet a safety standard which enables minimum clearances to highvoltage lines that are smaller than the required minimum clearances to be used. Previous experience has shown that highvoltage warning devices cannot make all situations in working procedures safe. Flash overs and fatal accidents can occur despite the use of a highvoltage warning device. You must therefore always maintain the minimum clearances mentioned above.

2.2.5 Procedure in the event of a flash over

If, despite all precautions, a flash over occurs, stay calm and do not move (potential differential) or touch anything.



If your machine comes into contact with high-voltage lines:

- Warn people standing outside the area not to approach or touch the machine.
- Have the power switched off.
- Only leave the machine once you are sure that the line you have touched or damaged has been deenergised.

Electricity generator works are always equipped with automatic start-up systems. If a circuit breaker trips, the short-circuited line will be switched back on again after a brief interval. Brief intervals where the voltage is absent create a false sense of safety.

You must not move or rescue injured persons until a representative of the power station has notified you that the line has been switched off.

A radio remote control system only protects the machine operator if he is standing outside the discharge voltage pattern.

2.2.6 Earthing in the event of electrostatic charging

Working in the vicinity of transmitters (radio transmitter, etc.) can result in faults in the radio remote control system and dangerous electrical charges in the machine. Persons who bridge the charged parts to the earth suffer life-threatening electrification on contact.

Machines in use in the vicinity of transmitters must be earthed. This earthing may only be carried out by trained personnel.

Even with an earthed machine, the safe clearances to high-voltage lines *(Clearances from highvoltage lines P. 38)* and the instructions relating to storms and bad weather *(Procedure in storms P. 51)* must be complied with.

If you have any further questions about earthing the machine, please contact site management or the operator of the machine.

2.2.7 Earthing on construction sites with special installations

When carrying out work in the area of special installations (particularly overhead lines for railways or substations), it may be the case that the machine needs to be earthed upon request and in consultation with the operator of the special installation. This earthing must only be carried out by qualified personnel.

Even with an earthed machine, the safe clearances to high-voltage lines *(Clearances from highvoltage lines P. 38)* and the instructions relating to storms and bad weather *(Procedure in storms P. 51)* must be complied with.

2.3 Stationary machines

2.3.1 Setup site

Stationary machines are generally used on a construction site for a lengthy period. For this reason, site management should prepare the setup site carefully. Site management must deliver the necessary documents in good time in order to be able to prepare the foundations, base plates or similar on time.

When selecting the setup site, remember that the machine must be dismantled and transported away again at the end of its use on site. The ambient conditions may change as construction work progresses.

Please also observe the *(Setup site P. 42)* section.

2.3.2 Stationary placing booms

Stationary placing booms can be erected on tubular columns, lattice booms or other base structures. The base/structural elements to which the base structure is fixed must be able to withstand the forces and moments transferred via the base structure, as specified in the manufacturer’s information. The base frame of the base structure

must be fastened in place so that it is level on the base/structural elements in every direction. Check the documentation provided by the manufacturer in this regard and the corresponding notes in the operating instructions.

2.3.3 Lifting machines and components

Machines which are transported to the setup site in individual parts or not under their own power must only be lifted with suitable lifting equipment in accordance with the specifications in the Operating Instructions. The lifting gear on the machine must be capable of accepting the lifting equipment and lifting the load. Noone should stand under suspended loads. Before work is started, a subject expert must check that the assembled machine is working properly.

2.3.4 Loading and transporting

Only use suitable means to load and transport stationary machines. Ensure that noone can be injured by the machine tipping over or slipping.

The machine/components must be properly secured during transport. Observe the markings on securing points.

Many lifting points fitted to the machine are provided for assembly purposes only. They are not suitable for lifting the complete machine. The lifting points for lifting the entire machine are specially marked.

The transport vehicle and machine must be marked to conform with the road traffic regulations in the country concerned if they are to use the public highway.

Please also observe the *(Driving P. 46)* section.

2.4 Mobile machines

2.4.1 Setup site

Site management must prepare and assign the set-up site. It is the machine operator who takes responsibility for setting up the machine safely. The machine operator must inspect the setup site proposed by site management and must refuse to set the machine up at the site of operations if there are any doubts regarding safety.

As machine operator, you must familiarise yourself with the working area and surroundings before work is begun. The working area and surroundings include, in particular, obstacles in the work and travelling areas, the load-bearing capacity of the supporting ground and any barriers separating the construction site from public roads.

The setup site must have sufficient lighting to ensure safe operation of the machine. Ensure that the setup site is adequately lit.

Do not set up the machine in areas where equipment may fall down.

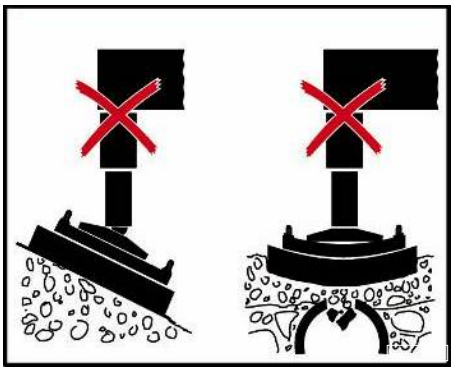
Incidents of overlapping with the working areas of other machines (particularly cranes, other placing booms, etc.) should be avoided as far as possible. If this is not possible, special care and attention is required when setting up and operating machinery. If necessary, you must use a signaller.

You must also check the approach route to the site where the machine will be set up. If you are unsure whether the approach route is suitable, prepare the route before work is started. It is especially necessary to walk the approach route once in darkness and at dusk or dawn. You should repeat this exercise again before leaving the construction site.

Always ask for a signaller if you need to reverse. If necessary, have the approach route closed off or secured by signallers. Have any materials or equipment that hinder your approach removed.

2.4.2 Supporting ground

Find out the load-bearing capacity of the supporting ground. The site management will be able to state the permitted ground pressure. If the load-bearing capacity is unknown, assume the that worst case scenario applies.



The supporting ground must be level and even. If necessary, set up a level surface on top of the uneven ground. There must be no voids or other ground irregularities under the support feet. Asphalt, concrete slabs, etc. may have been washed out underneath. Never set the machine up on backfilled ground, obvious or known voids or uneven ground.

The support area must be enlarged as required. Support plates and timber blocks may be used to increase the support area. The supports must be undamaged and free from ice, oil, grease, etc. The support blocks and timber blocks must be laid under the support plates such that the load is distributed uniformly and the support leg cannot slip off the side of the support.

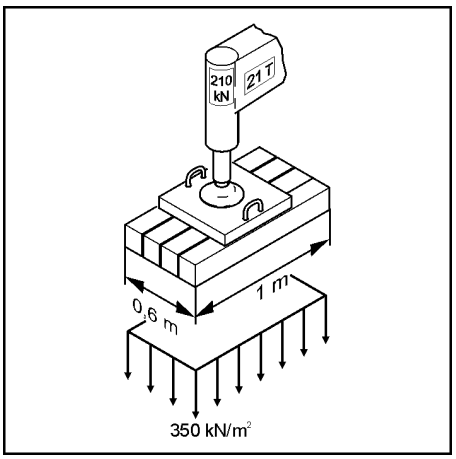
Check the stability of the machine regularly during operation. Interrupt the pumping operation if the machine becomes unstable.

Factors which reduce stability include, for instance:

- Modifications to the ground conditions, particularly caused by rain water or the thawing of frozen ground
- The support sinking on one side
- Fluid losses through leaks in the support hydraulics

2.4.3 Corner bearing loads

The corner bearing load is stated on each support leg. This value must always be legible.



The load supported by each support leg is conically diffused in the ground at an angle of 45 °. Safe clearance to the pits and slopes must be maintained, and such clearance must be determined in accordance with the nature of the ground. The safe clearance is measured from the foot of the pit.

The following guide values apply:

- On undisturbed, compacted ground, the safe clearance corresponds to the pit depth, but must be at least 2 m.
- On loose or backfilled ground, the safe clearance corresponds to double the pit depth, but must be at least 2 m.

If the ground conditions are unclear, you must contact the site management and enquire about the required minimum clearance.

2.4.4 Supports

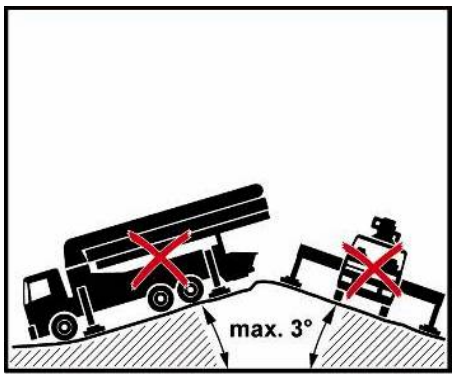
The placing boom must not be raised until the machine has been supported in accordance with the Operating Instructions. There is otherwise a risk of the machine toppling over.

Swing out and telescope the support legs to their end positions in sequence. Intermediate positions are prohibited to guarantee stability. Exceptions are machines which have been equipped by the manufacturer with a device which allows secure erection with a reduction in support. Check the corresponding notes in this regard in the operating instructions.

Do not carry out more than one movement at a time. If a movement is stopped, the entire volume of fluid is available for the remaining movements, and can increase their speeds. Depending on the design, it may be the case that carrying out several movements at once (as opposed to carrying out a single movement at maximum speed at any one time) does not bring any advantage in terms of time. Carrying out several movements at once requires an increased level of attentiveness.

Lock all supports mechanically, if this is provided for in the design. Close all shut-off valves in the support hydraulics. Leaks can cause the supports to sink on one side.

The machine must be made level in all directions. Provided the manufacturer does not state otherwise, the maximum permissible deviation from the horizontal is 3 °. Greater deviations from the horizontal overload the slewing gear for the placing boom as well as its overall support structure, jeopardising the stability of the machine.



Check stability regularly during operation. The elastic distortions to the machine frame occasionally occurring under extreme positions of the placing boom (one support foot lifts from the ground) must be compensated for by resetting the support cylinders until all support feet are firmly placed on the ground.

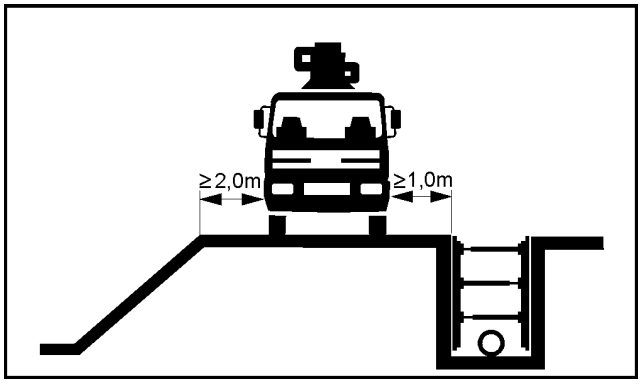
2.4.5 Driving

When preparing the machine for driving, you must perform the following tasks in particular:

- The placing boom must be folded in fully and positioned on the placing boom support provided.
- The support legs and support feet must be fully retracted and secured.
- Raised or locked axles must be lowered and released.
- Accessories and moving parts belonging to the machine must be safely stowed/secured.
- The maximum permissible gross weight must not be exceeded.

While the vehicle is being driven, the delivery line, pump and hopper must be empty. If there is concrete residue in the hopper, there is a risk of injury from the concrete residue, which may be thrown out while the vehicle is in motion. This also affects the centre of gravity of the machine. Observe the road traffic regulations and specifications of the machine manufacturer.

Maintain a distance of at least 1 m to the secured edges of the pit and a distance of at least 2 m to slopes.



Always make sure that there is sufficient clearance when driving under underpasses, over bridges and through tunnels or when passing under overhead cables. The same minimum clearances apply when driving under high-voltage lines as when working with the placing boom. Be aware of the height of the truck. Only drive over arches, bridges or other supporting structures if their load-bearing capacity is sufficient.

Do not drive across uphill or downhill gradients. Be aware of the elevated position of the truck's centre of gravity when travelling on a slope and on ascending or descending routes. Always adapt your travelling speed to the prevailing conditions on sloping terrain.

Observe national road traffic regulations. If necessary, clean the tyres, lights and number plate. Before travelling with the machine, check that the braking, steering, signalling and lighting systems are fully functional.

Persons accompanying the driver must be seated on the passenger seats provided for this purpose.

For truck mixer concrete pumps, only turn the mixer drum at the maximum specified speed of rotation whilst the truck is in motion. The truck is at risk of toppling over, particularly when travelling round corners.

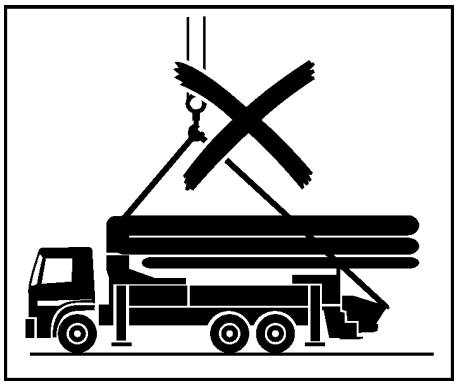
2.4.6 Towing

The machine must only be towed, loaded and transported in accordance with the Operating Instructions. Only use existing towing hitches for towing and observe the truck manufacturer's regulations.

You must comply with the prescribed driving position, permitted speed and itinerary when towing.

2.4.7 Loading

Many lifting points fitted to the machine are provided for assembly purposes only. They are not suitable for lifting the complete machine.



The lifting points for lifting the entire machine are specially marked.

Use only appropriate means of transport and lifting equipment of adequate load-bearing capacity. Lifting equipment, lifting tackle, support trestles and other auxiliary equipment must be reliable and safe in operation.

Only load the machine on stable loading ramps of adequate load-bearing capacity. Ensure that noone is at risk from the machine tipping over or slipping.

Secure the machine on the transport vehicle to prevent it rolling away, slipping and toppling over.

2.5 Placing booms

2.5.1 Unfold placing boom

Only raise a mobile placing boom from the driving position once the machine has been supported in accordance with the Operating Instructions. Stationary placing booms may only be raised after the proper set-up has been checked by a subject expert.

Only raise the placing boom in the sequence described in the Operating Instructions. The correct sequence depends on the “Folding system” (roll-and-fold system, Z fold system, etc.).

Do not carry out more than one movement at a time. If a movement is stopped, the entire volume of fluid is available for the remaining movements, and can increase their speeds. Depending on the design, it may be the case that carrying out several movements at once

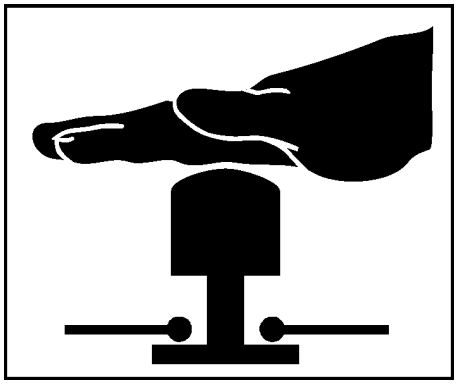
(as opposed to carrying out a single movement at maximum speed at any one time) does not bring any advantage in terms of time. Carrying out several movements at once requires an increased level of attentiveness.

The range of a radio remote control is long enough for the machine to receive control commands (e.g. from a great distance, from inside enclosed spaces) even without visual contact. If there is no visual contact, for example, because you are changing workplace, you must switch off the remote control. If there is no visual contact, for example, because the construction site is unclear, signallers MUST be used, and must remain in contact with the machine operator using suitable means, and have visual contact with the site of concrete placement, work areas and danger zones, and the machine.

Always ask the site management to provide you with an assistant to act as a signaller. Agree clear hand signals or other signals with the signaller so that you can communicate with each other. You should position the signaller such that he can always observe the whole of the placing boom. Your primary duty as the machine operator is to observe the site of concrete placement.

Only slew the placing boom over persons when the delivery line and end hose are empty. There is a risk of concrete falling out of the end hose.

Press the EMERGENCY STOP BUTTON immediately if the placing boom moves unexpectedly. If this should occur, you must cease working and have the cause of the fault rectified by your qualified personnel or our After Sales Service personnel.



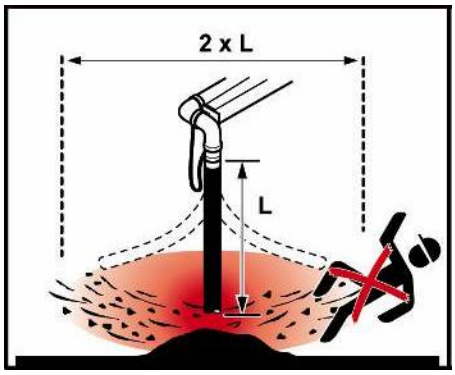
Placing booms with placing boom hinges which allow considerable flex angles have a very large potential working area. This high manoeuvrability means different placing booms can also be moved into dangerous positions. Prohibited areas can be found in the Operating Instructions.

There is a risk that you will damage the truck, truck superstructure or obstacles on the construction site with the placing boom. Under certain circumstances it is even possible to overload or cause damage to the placing boom. Uncontrolled movements may result from the sudden, violent release of the placing boom after collisions. This may also result in (possibly fatal) personal injury.

The manufacturer has indicated such impermissible working areas by the use of warning signs and information plates on the machine and appropriate notes in the Operating Instructions.

2.5.2 End hose

The end hose must hang freely each time you start pumping, when you start pumping again after blockages, and during cleaning procedures. Noone should stand within the danger zone of the end hose. The diameter of the danger zone is twice the end hose length. Do not guide the end hose when pumping is started. There is a risk of accident from the end hose swinging out or stones being ejected.



When using a longer end hose, the diameter of the danger zone also increases. *(Extending the placing boom and end hose P. 25)*

End hoses with a length of more than 4 m must not be guided by hand.

The end hose must not impede the movement of the placing boom; in particular, the end hose must not catch on the reinforcement or formwork. There is a risk of death if the machine topples over or the end hose shoots out on further movement of the placing boom.

Never bend the end hose over. Never attempt to straighten a bent end hose by increasing the pressure. The end hose must not be submerged below the surface of the concrete being delivered, otherwise the concrete may spray upwards.

The concrete may also spray from the end hose due to the presence of air in the delivery line. To prevent this from occurring, the hopper must be filled with concrete at least as far as the agitator shaft so that no air can be sucked in.

The end hose must be secured against falling.

2.5.3 Guiding the end hose ergonomically

The hoseman must guide the end hose in such a way that prevents excess spraying of concrete, and so that concrete is directed precisely into the site of concrete placement.

Control the placing boom so that the hoseman can guide the end hose without power consumption. The hoseman must not carry the end hose by hand, because the weight of it may cause permanent personal injury.

2.5.4 Connecting drills

If a drill is connected to the delivery line for the placing boom, it must not place any further strain on the placing boom. The placing boom must be connected to the drill in such a way that the placing boom does not require adjustment. There should be 1-2 delivery hoses between the placing boom and the drill; these must be secured so that they cannot move in an uncontrolled manner. If the drill is moved on the construction site, the placing boom must not be connected.

2.5.5 Procedure in storms

Return the placing boom to the driving position or rest position in the event of storms or bad weather.

Observe the manufacturer specifications for the maximum wind speed during operation!

The definitive wind speed is measured at the height of the boom tip.

Wind speeds in accordance with the Beaufort scale are average wind speeds measured over a period of 10 minutes. Higher speed gusts of wind may occur briefly during the measuring period.

Higher wind speeds jeopardise the stability and safety of structural elements. There is a risk of lightning strike in a thunderstorm.

Lightning strikes pose a risk of death. The machine and the surrounding area will be charged with electricity. Earthing the machine does not reduce this risk. For this reason, you should fold in the placing boom if there is a risk of lightning strike.

Wind speed measuring equipment is usually installed on construction sites, so you can find out the wind speed from the site management.

If there is no wind speed measuring equipment, request information about the current wind and weather situation from a reliable source.

2.5.6 Concreting in cold weather

Placing booms must not be used at temperatures of below minus 15 °C (+5 °F) except with the express approval of the manufacturer. There is a danger of damage to the steel (brittle fracture) and the seals throughout the system at such extreme minus temperatures.

In addition, such minus temperatures should be considered the realistic lower limit for concrete placement, as it is no longer possible to prepare concrete such that it can achieve its strength without the use of special additives.

2.6 Delivery line systems

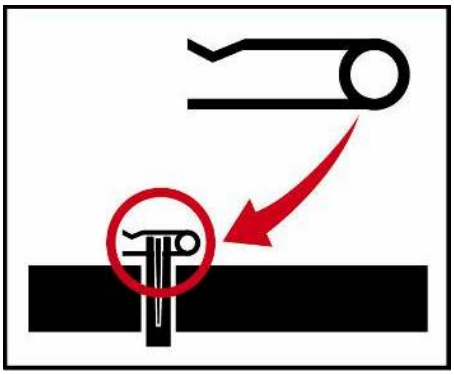
2.6.1 Suitable delivery lines

Use only delivery lines, end hoses, couplings, etc. which are in perfect condition and suitable for the delivery job and have been approved by the machine manufacturer. Delivery lines are subject to wear which varies according to the delivery pressure, concrete composition, the material from which the delivery line is made, etc.

If you are not responsible for the separate delivery lines, the permissible operating pressures of these should be confirmed by the operating company.

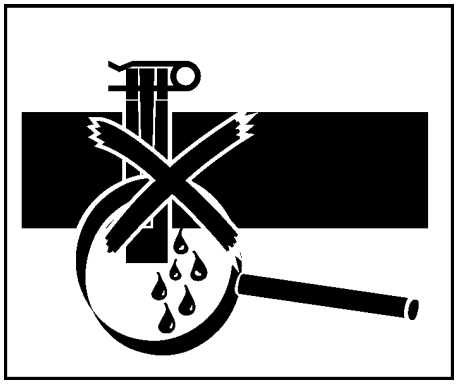
2.6.2 Securing delivery lines

Delivery lines, delivery hoses, end hoses and couplings must be securely fastened and secured to prevent spontaneous opening.



2.6.3 Leak tightness and blockages

Regularly force water through the delivery line under operating pressure to check that the system is watertight.

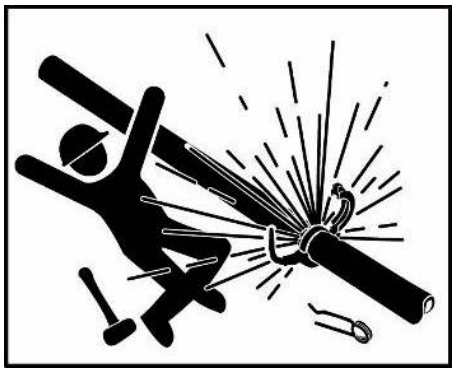


A properly cleaned delivery line is the best insurance against the formation of blockages. Blockages increase the risk of accidents. Never attempt to push through a blockage (e.g. by increasing the delivery pressure, using compressed air, etc.). There is a risk of death from the delivery line bursting or from concrete being ejected from the end of the delivery line.

Prevent blockages by adjusting the operating conditions. Remove blockages by reverse pumping and then restarting forward pumping. Repeat this process several times if necessary. If the blockage is not removed, relieve the pressure on the delivery line before removing the section of delivery line concerned.

2.6.4 Opening delivery lines

Delivery lines must not be opened or tapped off while they are pressurised. Concrete exiting under pressure can cause injury. The concrete column must be depressurised by reverse pumping before the delivery line is opened. Never bend over the coupling when you are working.



2.6.5 Clearance to delivery lines

Noone should remain in the vicinity of separate delivery lines during pumping operations. Cordon off the danger zone. If it is not possible to place a large enough cordon around the danger zone, the delivery line must be covered by suitable means.

2.6.6 Securing the delivery lines

Delivery lines, in particular riser lines which are not laid along placing booms, must be securely fastened in order to transfer the forces generated in them into the structure or other structural members. The lines must be laid so as to avoid kinks, sharp bends, stresses and damage during pumping operations.

2.6.7 Continuation delivery lines

Continuation delivery lines not described in the Operating Instructions must not put an additional strain on the placing boom.

While you connect, use and disconnect a continuation delivery line, you must switch off the placing boom control system to prevent unintended movements of the placing boom. There is a risk of accident posed by jerky movements of the boom tip.

2.6.8 Devices for shutting off, diverting and cleaning

During operation, there is a risk of being crushed and of injury by shearing. Hydraulically driven devices are generally supplied with power by the hydraulic system of a machine. For this reason, there must always be a line of sight between the devices and the machine fitted with the control unit. Observe the safety regulations for the machine and the device when connecting and operating a device. Before operating devices, ensure that no persons are present in the danger zone.

Use only devices that are suitable and in perfect working order to shut off, divert and clean the delivery line. Defective and unsuitable devices can lead to damage to the entire delivery system and injure people in the vicinity if they fail.

2.7 Pumping operations

2.7.1 Place of work

The machine operator's place of work is with the remote control when the pump is in operation. If you operate the machine using the remote control, all control and operating elements on the machine that are not protected by the control console lock must be secured. This is to prevent unauthorised access.

Do not leave your place of work while the machine is ready for operation, e.g. during breaks in pumping, interruptions or maintenance work. Secure the machine to prevent unauthorised use if you leave your place of work.

In the case of stationary placing booms, platforms or similar equipment are only provided for assembly and maintenance work. Use of these platforms as a place of work during operation is prohibited.

It is forbidden to climb onto the machine during operation. In the case of stationary placing booms, it is forbidden to climb ladders during operation.

2.7.2 Safety

Before switching on or restarting the machine or individual machine functions, you must ensure that doing so will not endanger anyone's safety.

Refrain from any procedures that may impair the stability of the machine or are prejudicial to safety in any other way.

2.7.3 Remote control

You must always carry the remote control on your person when the machine is ready for operation. Only in this way can it be guaranteed that you can press the EMERGENCY STOP BUTTON in the event of an emergency situation. The EMERGENCY STOP BUTTON may only be unlocked once the cause/emergency has been remedied.

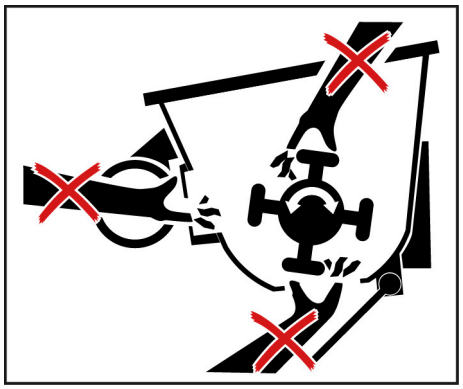
As a general rule, you must carry the remote control so that no control elements are activated unintentionally. If your attention is drawn away from the machine (particularly when changing place of work), you must switch off the remote control.

During breaks in pumping, interruptions, maintenance work, or before you leave the machine, you must secure it to prevent unintended movements and unauthorised use. Switch off the remote control and lock it away.

2.7.4 Moving machine components and hot surfaces

Keep all access covers, maintenance flaps, guards, etc. closed and locked during operation. This also applies in particular to the grille, water box cover and covers over cylinders. There is otherwise a risk of injury from moving machine components and a risk of burning on hot surfaces. In particular, there is a risk of burning from the engine, attached parts and the exhaust.

Never start work unless the grille is closed and bolted down or otherwise secured.



Do not touch moving parts of the machine, whether the machine is running or switched off. Always switch off the engine first, and dump the accumulator pressure where an accumulator is fitted.

Do not insert any objects (shovel handle, trowel, etc.) into moving machine components. Such objects could become trapped and dragged into the machine. They might then hit you or be torn from your hands and cause you injury.

2.7.5 Constant observation of the machine

You should be constantly observing the machine for any damage or faults while it is in use. In the event of faults or malfunctions that impair safety at work, shut the machine down immediately and secure it. Have the faults rectified immediately. If it is not possible to rectify faults which jeopardise the safe operation of the machine, you must suspend operations until the defects are rectified.

2.7.6 Truck mixer

As the machine operator, it is your role to instruct the truck mixer drivers who deliver the concrete to you, so that they are able to operate the operating elements on the concrete pump provided for their use. Only allow the truck mixer drivers to work alone once you are certain that they have understood your instructions.

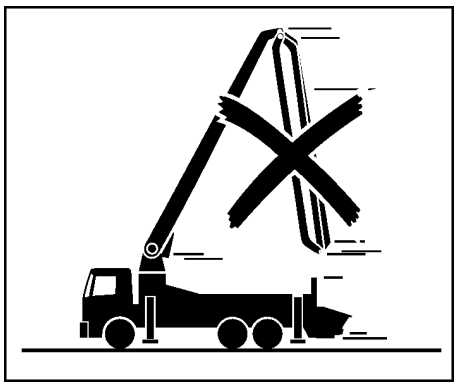
Make sure that no-one stands between the approaching truck mixer and the machine. There is a risk of crushing between the truck mixer and the machine.

2.8 Cleaning

2.8.1 General

You must drain the delivery line, pump and hopper completely. Concrete residue in the hopper, in particular, may be thrown out whilst the truck is moving.

The machine must not be driven with the placing boom unfolded or the support legs extended, even over short distances. This rule also applies when you have to drive the machine to a different site for cleaning. The placing boom and support legs must be fully retracted and secured.



The preferred methods for cleaning the delivery line are reverse pumping or forced cleaning with water. The agitator must be switched on during reverse pumping. Otherwise, the concrete flowing back into the hopper can bend the agitator shaft. Use a catch basket, pipe cleaning head and wash-out ball for forced cleaning to prevent any water from flowing into the formwork.

Never spray remote controls or control cabinets with barrier agents (mould oil or similar) to protect them against contamination. This causes significant corrosion damage to the electrical system.

There is a risk of injury at all points on the machine from slipping, tripping, bumping into things, etc. Use the handles and steps to climb into and out of the machine. It is forbidden to stand on the grille. Do not jump from the machine.

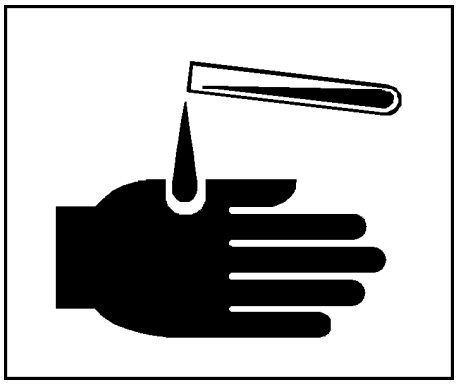
Do not reach into the hopper or any other moving machine components. This rule must also be followed when you are opening the outlet on the bottom of the hopper. Do not remove the grille.

Only point the water jet into the hopper or other moving machine components. Do not insert the hose. It could become entangled with moving machine components.

2.8.2 Cleaning agents

Take care when using aggressive cleaning agents. Aggressive cleaning agents may attack materials (e.g. rubber) and painted surfaces. You can use commercially available paint cleaning and care agents, as long as these have a pH value of between 4 and 9. Ask the manufacturer of the cleaning agent to confirm its suitability. Observe the

manufacturer's instructions regarding use and safe handling. Wear protective clothing. Always rinse off cleaning agent thoroughly with clean water; do not allow puddles to form.



Do not use sea water or other water containing salt for cleaning purposes.

Do not use any highly flammable agent for cleaning; there is a risk of fire.

2.8.3 Cleaning with compressed air

When the delivery line is being cleaned with compressed air, there is an increased risk of accidents caused by compressed air escaping explosively, spurting concrete, and delivery or end hoses moving uncontrollably if they have not been removed.

Compressed air should only be used for cleaning purposes under the supervision of a subject expert. All persons participating in the cleaning procedure must be instructed in the safety regulations.

The manufacturer accepts no liability for damage caused by incorrectly performed compressed air cleaning. You must observe the following rules without fail when you use compressed air to clean out the delivery line:

- Individual pipes and short pipe runs up to 10 m in length must not be blown through with compressed air. There is a risk of accident from rebound.
- Only blow out delivery lines that have the same nominal diameter throughout their length. Reducer pipes must be drained and flushed out by hand.
- No delivery or end hoses may be fitted at the end of the delivery line.

- A catch basket must be fastened at the end of the delivery line and a wash-out adaptor must be fitted on the head of the delivery line. The catch basket and washout adaptor must fit the delivery line system.
- The concrete must be able to flow freely from the end of the delivery line.
- There must be no persons present within the danger zone around the delivery line, at the end of the delivery line and, in particular, in front of the opening in the catch basket.
- Care must be taken to ensure that any concrete that might be expelled from the catch basket cannot injure anybody or cause any damage.
- The wash-out adaptor must be fitted with a separate, large dump cock and a pressure gauge.
- The pressure gauge must be kept under constant observation during the cleaning process. The pressure in the delivery line must be rapidly dumped via the dump cock in the event of a sudden drop in pressure (concrete column exiting from the end of the line) or increase in pressure (risk of blockage).
- The sponge ball or the plug used to push the concrete out must be sufficiently dense that the air does not pass through it into the concrete. In addition, the delivery line must be sealed to the rear when the sponge ball or plug is caught in the catch basket.
- Only work on the delivery line (particularly when opening the delivery line) if it has been depressurised. Make sure that the compressed air has been dumped completely.
- The dump cock must be opened in such a way that no-one can be injured by concrete residue that might be expelled from the dump cock.
- Separate delivery lines that are cleaned with compressed air must be securely fastened so that they cannot move uncontrollably.
- If continuing distribution systems (e.g. rotary distributors), gate valves or other delivery line elements are connected to the delivery line, they must be secured in such a way that they cannot move uncontrollably.
- Ensure that any elbows on the end of the delivery line are removed in the case of rotary distributors.

2.8.4 Protection against water

Water spraying on the machine from random directions has no damaging effect. The electrical system is protected against spray water, but is not waterproof.

You must close/seal all openings into which water/steam/cleaning agent must not penetrate for safety or functional reasons before cleaning the machine with water or a steam jet (high-pressure cleaner) or other cleaning agents. Electric motors and control cabinets are particularly at risk.

2.8.5 Post-cleaning procedure

After the machine is cleaned, the covers/tapes must be completely removed and the machine must be checked to ensure that it is ready for operation *(Before working with the machine P. 37)*.

Look out for leaks, loose connections, chafe marks and damage during the cleaning procedure. Any identified defects must be rectified immediately. The machine must be greased after it has been cleaned using a highpressure cleaner.

2.9 Securing the machine

If you need to leave your place of work, secure the machine as follows:

- Switch off the remote control.
- Remove the remote control, if applicable, and lock it away.
- Switch off the ignition or the main switch.
- Close and lock all control cabinets.

3 Maintenance and special work

3.1 Requirements for special work

As the operator, it is your responsibility to provide all the necessary information to the personnel involved before special work or maintenance work is carried out. Someone should be nominated as the person responsible for this.

Carry out the maintenance and inspection operations and comply with intervals specified in the Operating Instructions, including specifications for the replacement of parts and equipment. These tasks may only be carried out by qualified personnel.

Workshop equipment appropriate to the task in hand is absolutely necessary for the execution of maintenance work.

If changes have been made to the machine, it must be checked by a subject expert before recommissioning.

Secure a wide area around the maintenance area as far as is necessary.

A machine that has been completely shut down for maintenance and repair work must be secured to prevent it being restarted inadvertently:

- Lock the main control devices and remove the key.
- If a main switch is fitted, attach a warning plate to it.

Only carry out maintenance work if the machine is parked on level and sufficiently supporting ground and is secured to prevent it rolling away.

Use specially designed or otherwise suitable climbing aids and working platforms when carrying out assembly work above head height. Never use machine parts as climbing aids. Keep all handgrips, steps, railings, platforms and ladders free from dirt, snow and ice.

Carefully secure individual parts and large assemblies to lifting equipment when carrying out a replacement operation. Use only suitable and technically perfect lifting equipment and suspension systems with adequate lifting capacity. Never stand under suspended loads.

Attachment of loads and signalling to crane operators should only be entrusted to experienced personnel. The signaller must be within visual range of or in voice contact with the crane operator.

Observe national regulations when working with lifting equipment.

Work on chassis, braking and steering systems must only be carried out by qualified personnel trained for such work.

Clean any traces of oil, fuel or preservatives from the machine, especially connections and threaded unions, before carrying out maintenance or repair work. Do not use aggressive cleaning agents. Use lint-free cleaning rags.

Bolted connections that you have loosened for carrying out maintenance and repair work must always be replaced or retightened in accordance with manufacturer specifications.

Do not open gas-filled spring elements, as used on maintenance flaps, for instance. The spring elements are filled with gas under high pressure which can escape explosively if you attempt to open them. Relieve the tension on systems under mechanical stress.

Be aware of hot functional fluids and surfaces (hydraulic fluid, hydraulic fluid radiator, etc.).

Ensure that all functional fluids, consumables and replaced parts are disposed of safely and with minimum environmental impact.

3.2 Welding

Only carry out welding, flame cutting and grinding operations on the machine once this has been expressly approved by the manufacturer.

Only qualified personnel may carry out welding work in line with manufacturer specifications, especially on the placing boom, on the supports, on load-bearing parts, on fuel and oil tanks or other components which are important for industrial safety. This work must be inspected by qualified welding personnel. The operator must document the evidence of the formal qualifications of the welder and the qualified welding personnel.

Always attach the earth cable of the welding unit directly to the component which is being welded. The welding current must not flow through hinges, cylinders, etc. Significant damage may be caused in the event of a flash over.

Electronic components can be destroyed by stray voltage during arc welding processes. For this reason:

- Disconnect the remote control cable from the control console.
- Disconnect all cables leading to the receiver of the radio remote control system.
- Close connector sockets with caps.
- Disconnect the positive and negative leads from the battery.

Clean the machine and its surroundings of dust and flammable substances and make sure that the premises are adequately ventilated before carrying out welding, flamecutting and grinding operations, otherwise there is a risk of explosion.

3.3 Working on the placing boom

Only carry out maintenance and repair work on the placing boom if the placing boom is folded or properly supported, the engine is switched off and the support legs are secured.

Support the placing boom arms before starting work on the valves, cylinders or hydraulic lines on the boom.

The delivery line was installed without tension with the placing boom in the driving position and can only be replaced without difficulty in this condition. Stresses may be generated on folding if the delivery line is replaced when the placing boom is unfolded.

Do not remove the entire delivery line but rather replace the delivery line boom arm by boom arm, for example. Otherwise, the pivot points of the new delivery line will have to be redetermined using special equipment.

3.4 Safetyrelevant components

Work on safety-relevant components requires particular specialist knowledge.

The following activities in particular must only be carried out by qualified personnel that have been authorised by the manufacturer:

- Repairing, replacing or adjusting safety-relevant components and adjustable devices (pressure limiting valves, potentiometers, fluid flow limiters, hydraulic cylinders, sensors, etc.)
- Removing lead seals

Modifications to the machine data (in particular, increasing pressures, modifying speeds, etc.) are not permitted.

3.5 Software

If a machine is equipped with software, the software may only be used as is provided for in the manufacturer’s Operating Instructions.

Only persons authorised by the manufacturer may intervene in the machine's software. This also applies to updates.

Unauthorised interventions in the machine's software may lead to severe damage and accidents.

3.6 Protective and safety equipment

Any safety equipment removed for maintenance purposes must be refitted and checked immediately upon completion of this work.

All equipment required for safety and accident prevention (warning signs and information plates, grilles, guards, etc.) must be in place. Such equipment must not be removed, modified or damaged.

Keep all warning signs and information plates on the machine complete and in a perfectly legible condition.

It is your responsibility as operator to ensure that any warning signs and information plates that have been damaged or rendered illegible are replaced without delay.

3.7 Electrical power

3.7.1 General

Work on electrical systems or operating equipment must only be carried out by qualified personnel. For further information on machines that are operated using the site power supply, see also the *(Power at the construction site P. 70)* section.

Machine components which are to undergo maintenance work must be deenergised. Ensure that disconnected machine components cannot be restarted. First of all, you must check that deenergised parts are indeed deenergised, then earth and shortcircuit them and isolate adjacent live parts.

Disconnect the negative lead from the battery before starting any work on the electrical system of machines with an internal combustion engine. When reconnecting, connect the positive terminal first, and then the negative terminal.

Before starting work on highvoltage assemblies and after cutting the power supply, you must connect the supply cable to earth and shortcircuit the components, particularly the capacitors, with a rodtype earth electrode.

If work is to be carried out on live parts, the presence of a second person is required who can switch off the power supply to the machine in the event of an emergency. Secure the working area with a red-and-white safety chain and a warning plate. Use insulated tools only.

3.7.2 Electrical components

Control cabinet, motor and control elements are protected as standard in accordance with degree of protection IP 54.

IP 54 means:

- Complete protection against contact with live components or internal moving parts. Protection against damaging dust deposits.
- Water spraying on the equipment from random directions must not have a damaging effect.

Use only original fuses with the specified voltage rating. Bridging or the use of fuses with too high a rating can irreparably damage the electrical system. You must switch off the machine immediately if a fault occurs in the power supply.

3.7.3 Power at the construction site

The power on the construction site must be supplied from a special feed point (construction site power distribution point). Machines with an electric motor must not be connected to the mains power supply.

Only trained and qualified personnel are permitted to work on electrical systems with an operating voltage of more than 25 volts alternating voltage or 60 volts direct current. Only such qualified personnel may install, connect, disconnect and open electrical control cabinets.

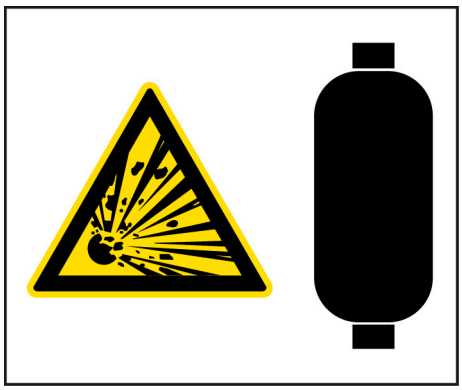
An electric shock (possibly with fatal consequences) may be the result of touching machines with electric motors or contact with other electrical cables if the electrical connection has not been made properly or the supply cable is damaged.

3.8 Hydraulic systems

3.8.1 General

Work on hydraulic systems must only be carried out by qualified personnel.

Always wear your personal protective equipment when carrying out work on the hydraulic system. Escaping fluid is toxic and can penetrate the skin.



Injection through the skin is a major medical emergency. In the event of injuries caused by pressurised fluid, inform the company medical officer and call a medical specialist immediately. This also applies for injuries which may seem only slight. Hydraulic fluid which has penetrated underneath the skin must be removed immediately. Otherwise, there is a risk of death due to impaired blood circulation and infections.

Before starting repair work, depressurise the system sections and pressure lines (hydraulic system, pneumatic system, delivery line) that are going to be opened in accordance with the assembly descriptions.

Never work on systems that are still under pressure. Switch the hydraulic pump drive and the engine off. Otherwise there is a risk of injury caused by functional fluids escaping under pressure. If there is a hydraulic accumulator, open the accumulator dump valve to prevent any machine movements caused by residual pressure. Modifications to the hydraulic accumulator are prohibited.

Be aware that enclosed hydraulic fluid can remain pressurised for a certain length of time. Do not open any hydraulic systems if they are under load from an external force (particularly from a raised placing boom).

Lay and install hydraulic lines in accordance with the current rules of engineering. Connections must be fitted at the appropriate points. Fittings and the length and quality of the hoses must comply with requirements.

The hydraulic system must be properly vented after all maintenance work. Otherwise there is a risk of injury caused by swinging and telescopic support legs extending rapidly, the placing boom lowering, etc.

Open vent valves very carefully until hydraulic fluid starts to escape. You should on no account open vent valves further than necessary or go so far as to remove them.

Damaged hydraulic lines must be replaced rather than repaired. You must replace damaged or saturated hydraulic hoses immediately. Hydraulic fluid spray escaping under pressure can cause injuries and fires.

3.8.2 Replacing hydraulic hoses

During retesting, hydraulic hoses must be checked by a subject expert for external damage. The retest must be recorded in the check book. The operator must have hydraulic hoses replaced if they show signs of external damage.

3.9 Noise emissions

The place of work in normal operation is with the remote control. For this reason, it is not possible to specify a particular place of work for the machine operator. Take the values for the sound pressure level and sound power level from the machine Operating Instructions.

Wear suitable personal protective equipment in the vicinity of the machine.

As the operator, you must instruct your personnel to always wear their personal hearing protectors. You are responsible for ensuring that your personnel comply with this regulation.

All soundproofing equipment must be fitted and in perfect condition. All soundproofing equipment must be closed during operation. A high sound level can cause permanent hearing damage.

3.10 Exhaust fumes

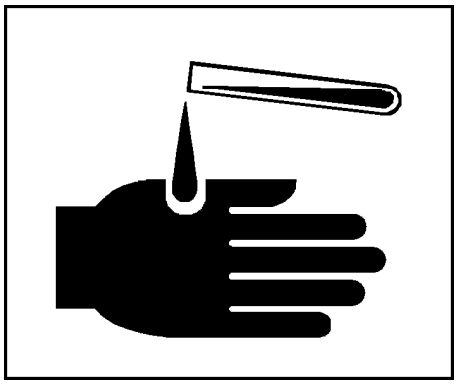
Vehicle exhaust gases contain constituents that can be deadly or carcinogenic. Operate internal combustion engines and fuel-operated heating systems only in adequately ventilated premises. Before starting up the engine in enclosed spaces, make sure that there is adequate ventilation and direct the exhaust gases away from the place of work.

Wear personal protective clothing and equipment for all work in which exhaust gases or particles of building material can enter the body through the respiratory passages. Comply with the information issued by the manufacturer of the building material.

3.11 Functional fluids

When handling oils, greases and other functional fluids, observe the safety regulations applicable to the product concerned (see the safety data sheet).

Oils, fuel and other functional fluids may be hazardous to health upon contact with the skin, etc. You must therefore always wear personal protective clothing and equipment when you are handling toxic, caustic or other functional fluids that are hazardous to health and always take note of the manufacturer’s information.



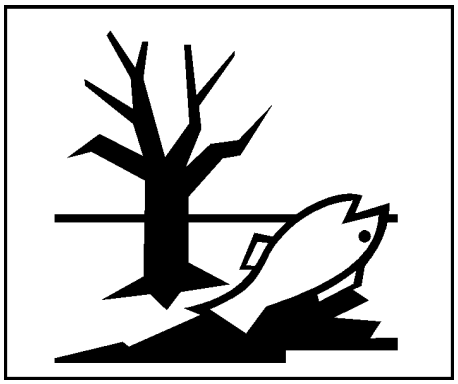
Take care when handling toxic and caustic functional fluids (brake fluid, battery acid, water glass, concrete set accelerating admixtures, cement, etc.). Building materials containing cement have a highly alkaline effect when they react with water (and also with perspiration). Admixtures are toxic and caustic.

Cleaning agents, concrete release agents, preserving agents etc. propelled by compressed air can cause very serious damage to the respiratory tract if a respiratory protection mask is not worn. Spray mist enters the lungs very easily.

Frequent injuries are eye injuries caused by concrete spatter, water glass or other chemical substances.

Take care when handling hot functional fluids and consumables (risk of burning or scalding).

Have used operating equipment and functional fluids such as filters, batteries, oil, brake fluid, etc. disposed of properly. Used cleaning rags should also be disposed of properly.



3.12 Disposal of the machine

To dispose of the machine, you must proceed in accordance with all points in the disposal regulations which apply in your country.

During the disposal operation, you must observe the following in particular:

- Remove the functional fluids, particularly hydraulic fluids, engine oils, fuel, brake fluid, concrete admixtures, any environmentally hazardous functional fluids or functional fluids which are hazardous in any other way, and dispose of these correctly.
- Remove the operating equipment, particularly the hydraulic fluid reservoir, hydraulic cylinder, hydraulic fluid radiator, hydraulic lines and hoses and other components which may contain residual functional fluids, and dispose of these correctly.
- Remove the steel structure and dispose of it correctly, e.g. by recycling.
- Dispose of the truck or the drive unit correctly.

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