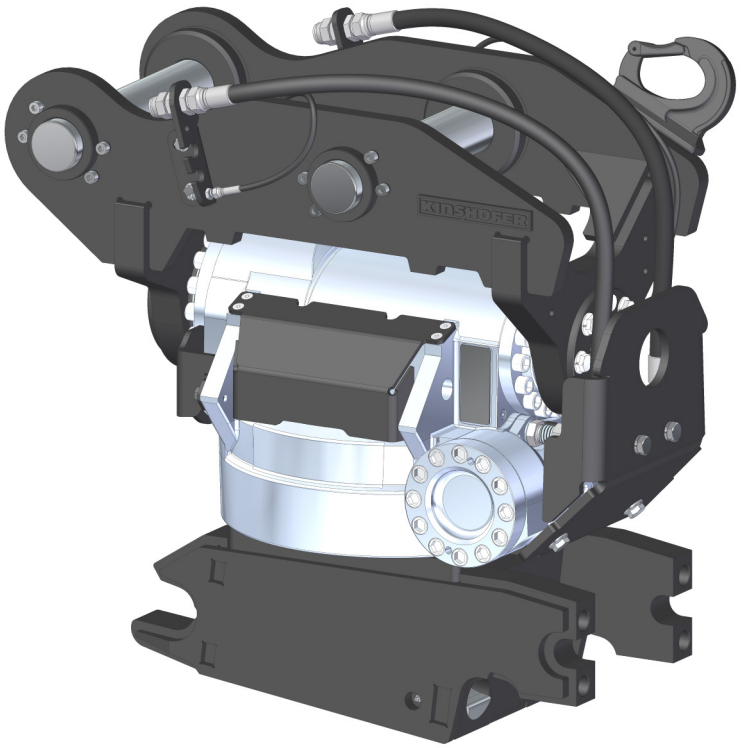
KINSHOFER crane and excavator attachments

Operating instructions

NOX Tiltrotator

TR07-TR11-TR14-TR19-TR25



March 2020 [EN]

Subject to changes that may arise in the course of constant product development and product improvement.

Issuer of the original operating instructions* and manufacturer of the attachment:

KINSHOFER GmbH
Raiffeisenstrasse 12
83607 Holzkirchen
Germany
Tel.: +49 (0)8021 - 88 99 0
Fax: +49 (0)8021 - 88 99 37
Email: info@kinshofer.com
www.kinshofer.com

*** The original operating instructions, for which the manufacturer assumes responsibility, are the German-language version. All other versions are translations of the original operating instructions.**

Table of Contents

1. Important notes

These instructions apply to the attachment pictured on the title page, which was developed and produced with the utmost dedication. Technical information, assembly and maintenance instructions are provided in this manual.

Service manual and spare parts list
A service manual is available upon request for carrying out repairs on premium line products. A spare parts list can be ordered for all products.

We will be happy to help if you have any questions about the product.
The telephone / fax numbers and the email / internet addresses are provided at the end of this operating manual.
In order to receive quick and accurate service, state the **serial number** of the attachment.
The serial number is provided on the type plate, on the delivery documents, on the receipt on the conformity declaration and engraved on the attachment.

WARNING
If the delivered attachment is not properly installed, operated and maintained, the attachment and/or carried load could fall down causing serious injuries or damage to property.

Installation, operation and maintenance of the attachment may only be carried out by authorised, trained and experienced personnel.
Before beginning, these personnel must read and understand the following information:

- the operating and safety instructions for the attachment
- the separate**"Safety instructions"** booklet (see **Safety instructions** chapter)
- the instructions for the carrier and other equipment, such as a quick coupler

Failure to observe these instructions may lead to accidents, downtimes, and loss of warranty.

NOTICE
All instructions and safety guidelines of the manufacturer must be observed.
Other regional safety and environmental protection regulations must be observed.

1.1. Safety instructions

These operating instructions are valid only in conjunction with the **„Safety instructions“** booklet, which is delivered with every attachment.
If the booklet is missing, it can be requested free of charge for all EU languages using article number **194079333**.
In the event of discrepancies between these operating instructions and the **„Safety instructions“** booklet, the information in these operating instructions shall have priority.

1.2. Statutory safety and accident prevention

The following regulations apply:

EC **European directives**
EC Directive 2006/42/EC
EC Directive 2003/37/EC

DIN EN ISO **Harmonised standards used:**
DIN EN ISO 4413 Hydraulic fluid power – General rules
DIN EN 474-1 Earth-moving machinery – Safety
DIN EN ISO 12100 Safety of machinery – General design principles
German standards used:
DIN 15428 Lifting equipment – Technical delivery conditions

BGR **Safety and health rules at work – BGR (Germany)**
BGR A1 Basic principle of prevention
BGR 137 Handling of hydraulic liquids
BGR 500 Operation of work equipment

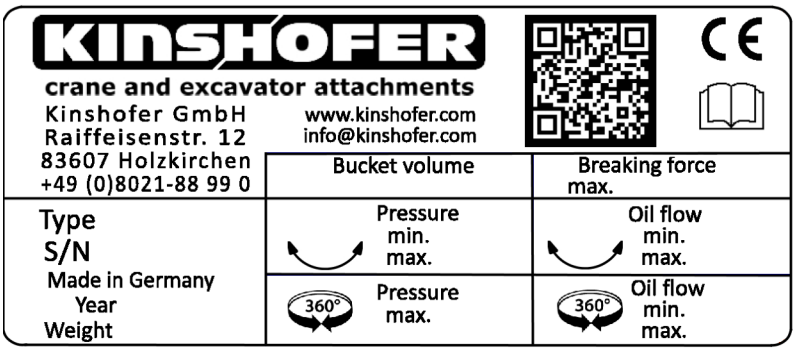
LOCAL **Safety and health regulations for your country**

1.2.1. Safety directives for quick exchange systems

DIN EN **Regulation applied for quick couplers**
DIN EN 474 series - Earth-moving machinery - Safety -
Part 1: General requirements
Annex B: Quick change couplers

1.3. Type plate

The type plate on the attachment must remain legible.
One of these type plates is attached to the attachment:

Rectangular type plate	Oval type plate for rotator, HPX drive, rotary drive, quick-changer
	

1.4. Transport, Unloading and Packaging

The attachment is carefully packed by the manufacturer in order to avoid damage during transportation.

WARNING
Personal injuries and damage to property can be caused by lifted loads falling down.

- Observe the weight information and any symbols which are attached to the transportation packaging.
- Use lifting equipment with sufficient carrying capacity to unload the attachment from the transport vehicle.

1.5. Incoming goods inspection

NOTICE
Unpack the delivered goods carefully so that no parts remain in the packaging. Immediately after unpacking, check:

- The attachment as well as any accessory parts delivered with it for transport damage and defects.
- The completeness of the delivery with reference to the delivery note.

Use the original packaging for any return shipping. Dispose of the packaging in accordance with regional regulations.

1.6. Service link

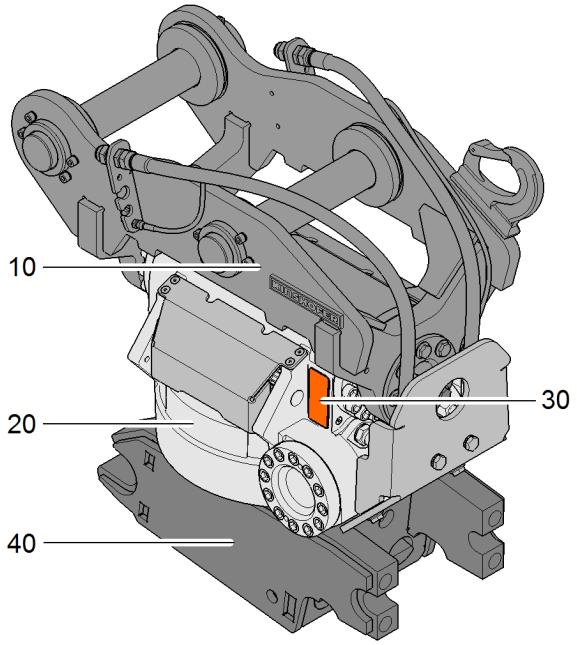
- Spare parts
- Technical support
- Returns

Service link *http://www.kinshofer.com/eng/index.php/en/service*

2. Product information

2.1. Product overview

These operating instructions apply to NOX Tiltrotator TR07, TR11, TR14, TR19 and TR25.

Product overview	Explanation
	10: Upper bracket (UB) 20: Tiltrotator (NOX) 30: Type plate (TP) 40: Lower quick coupler (LQC)

2.2. Controllers

The following Kinshofer controllers are available:

CSP Standard / CSP High Flow

- Proportional controller via integrated valves.
- All hydraulic functions are powered by a simple effective hydraulic circuit.
- All functions can be executed simultaneously.
- Tool and profiles are selected via the display.
- The High Flow variant offers an extra function for a higher oil flow.
- Swivel:
  - Quick coupler (safety circuit integrated for hydraulic quick coupler).
  - Extra function 1
  - Extra function 2
  - Separate overflow oil line (for attachments).
  - Electrical swivel (12x 0.5 A) optional.

DF10 Standard / DF10 High Flow

- All functions are controlled directly from the carrier:
  - Tilt.
  - Rotate.
  - Quick coupler (safety circuit must be integrated in the carrier).
  - Extra function 1.
  - Extra function 2.
  - Separate overflow oil line (for attachments).
  - Electrical swivel (12x 0.5 A) optional.

An upgrade kit is available for the standard variant. It makes it possible to toggle between extra 1 and extra 2 or alternatively between tilt and extra.
The High Flow variant offers an extra function for a higher oil flow.

DF4 Standard

- Control via two double-acting hydraulic circuits, integrated valves for switching between functions.
- Circuit I controls the rotation function.
- Circuit II controls the tilt function, extra function and the quick coupler, which cannot be used simultaneously. (Safety circuit integrated for hydraulic quick coupler).
- Separate overflow oil line (for attachments).
- Electrical swivel (12x 0.5 A) optional.

2.3. Intended use

The NOX Tiltrotator is an infinitely rotating and tiltable attachment.
Its infinite rotation of 360° and tilting angle of up to 2x 50° enables universal use. When a quick coupler is attached, the used attachments, such as a bucket, HPX grab, fork set, levelling shield, compressor and gripper, can be used with higher degrees of freedom than a rotator.

2.4. Foreseeable misuse

NOTICE
During daily work, it's possible that routines cause **operating errors to occur** or that instructions are ignored. This can be caused by inadequate attention or inadequate knowledge on the part of the operator.

Examples of foreseeable misuse:

- Do not beat or break with the attachment to break up conglomerate rock or other material.
- Do not use the attachment for compacting material.
- For cardanically mounted attachment: Do not use the attachment to pull or push a load by applying lateral pressure.
- Do not operate the attachment in such a manner, in which external forces are caused that exceed the allowable loads and moments of the attachment.

2.5. Restrictions

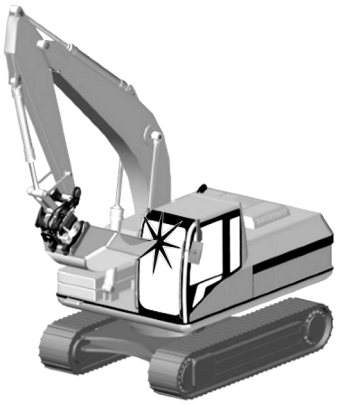
WARNING
Danger of injury and property damage due to misuse.
Improper use of the attachment can lead to hazardous situations, operational interruptions and to the voiding of the warranty.
► Observe the uses that are described in chapter **Proper intended use**.

NOTICE
The use of **hydraulic hammers** leads to increased wear and is not recommended by the manufacturer.

WARNING
Attaching the attachment can result in
- the stability of the carrier reducing due to the increased reach.
- the tipping load of the carrier changing due to the increased weight and reach, such that the machine manufacturer's calculations must be checked and adjusted if necessary.

Reduce the permissible load capacity of the excavator by the weight of the attachment fitted, to reduce the risk of accidents.
In the event of a doubt relating to knowledge or safety, always contact the supplier or manufacturer.

WARNING
Assembling the attachment results in an increased risk of a **collision with the carrier machine** (see also chapter **Safety stickers – dipper arm**).
Careless work can lead to **serious injury** to the operator or **significant damage to the carrier machine**.
In order to reduce the risk, ensure caution and concentration during work.



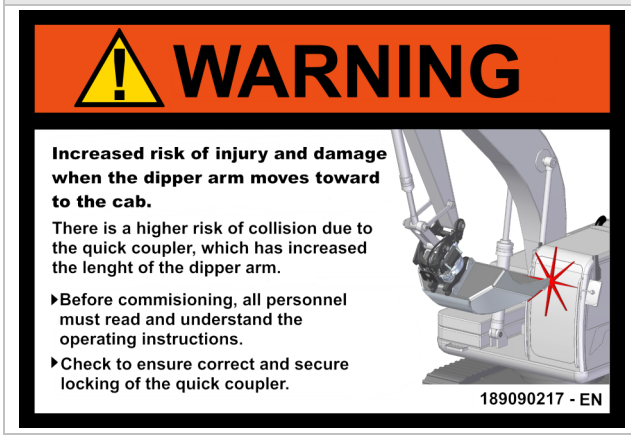
2.6. Safety stickers

NOTICE
All safety stickers must remain legible.

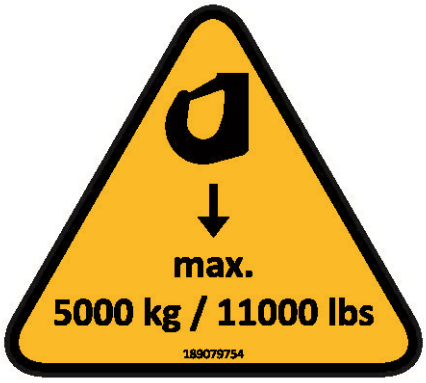
Safety stickers

Symbol	Description	Symbol	Description
	**DANGER / WARNING / CAUTION** Before entering a hazardous situation: Pay attention to the risk of injuries, material or property damage. Follow the instructions.		Adhere to the safety clearance: At least 10 m / 30 ft.
	Before carrying out maintenance and repair work: Switch the machine off, read and comprehend the operating instructions and the safety instructions.		Warning of hand injuries: Do not guide the attachment by hand. Keep hands away from moveable / moving parts.
	Read the operating instructions, safety instructions and regional regulations carefully, and ensure you understand them to guarantee safe and proper operation and maintenance.		Warning of suspended load: Do not stand under the suspended load.

2.7. Safety sticker - bucket arm

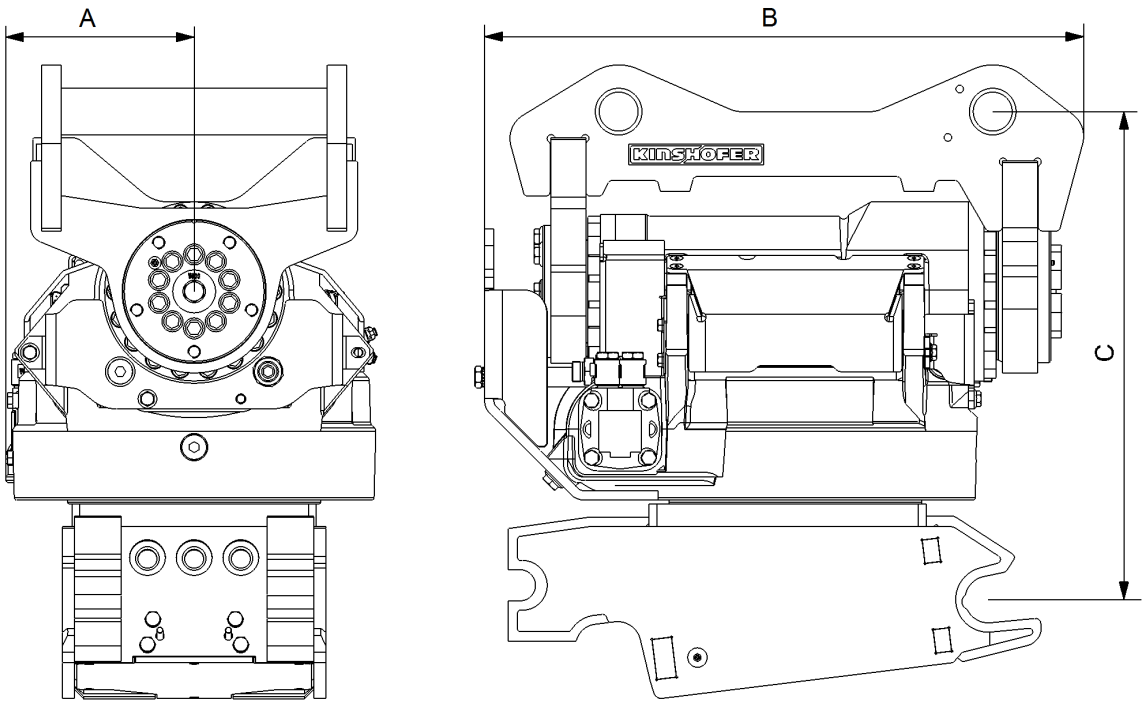
Safety sticker	Description
	**WARNING** **Increased risk of injury and damage when the dipper arm moves toward to the cab.** There is a higher risk of collision due to the quick coupler, which has increased the length of the dipper arm. • Before commisioning, all personnel must read and understand the operating instructions. • Check to ensure correct and secure locking of the quick coupler.

2.8. Hook safety sticker

Hook load capacity 2000 kg	Hook load capacity 3000 kg
	
Article number: **189079724**	Article number: **189079734**
Hook load capacity 5000 kg	**Hook load capacity 10000 kg**
	
Article number: **189079754**	Article number: **189093387**

3. Technical Information

3.1. Technical data



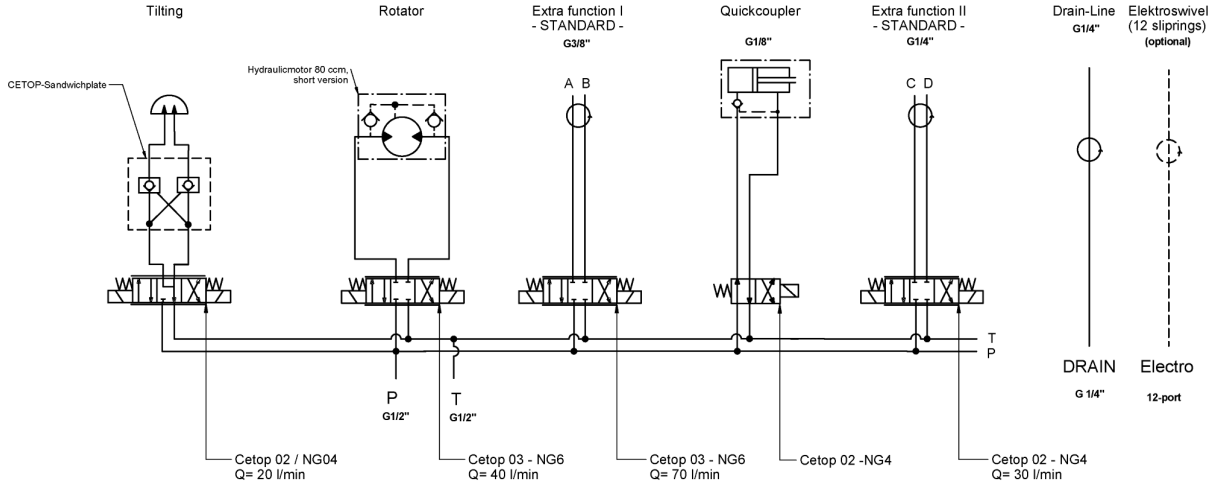
Type	TR07	TR11	TR14	TR19	TR25
Width A	170	200	225	240	260
Length B	500	580	610	700	760
Height C	390	495	550	625	650

Type		TR07			TR11		
		DF10	DF4	CSP	DF10	DF4	CSP
Operating weight	[t]	3 - 7			6 - 11		
max. breakout force (ISO)	[kN]	50			75		
Max. bucket width	[mm]	1100			1300		
Weight (incl. UB, excl. LQC)	approx. [kg]	190			330		
Tilting angle	[°]	2 x 50			2 x 50		
Tilting torque	[kNm]	10			16		
Rotational speed	[1/min]	8.5 @ 32 l/min			8.5 @ 40 l/min		
Rotation torque	Nm	4600 @ 360° continuous			6400 @ 360° continuous		
Recom. pump capacity	[l/min]	30 - 80			40 - 100		
Recom. tilting/rotating oil flow	[l/min]	15 / 32	15 / 32	45	21 / 40	21 / 40	60
Max. oil flow, extra function 1/2	**SD*** [l/min]	70 / 30	70 / 30	70 / 30	-	70 / 30	70 / 30
	HF* [l/min]	-	-	-	30 / 90	-	-
Max. hydraulic pressure	Rotation [MPa]	20	20	-	20	20	-
	Tilt [MPa]	25	25	25	27	27	27
Max. back pressure	[MPa]	2.5			2.5		
Hose sizes	**SD*** [in]	3/8			1/2		
	HF* [in]	3/8			1/2		
Transmission oil quantity	[l]	0.7			1.0		
Rotary feedthrough: Ducts, extra function		4			4		
Rotary feedthrough: Ducts, quick coupler		2			2		
Rotary feedthrough: Leak oil duct		-			1		
Electric rotary feedthrough (optional)	Ducts x[A]	12 x 0.5			12 x 0.5		
Max. load capacity (WLL) Load hook (optional)	[t]	3			5		
Max. load capacity (WLL) Lifting eye (optional)	[t]	3.25			4.75		
Lifting eye (optional) Shackle size	[in]	5/8			3/4		
SD* = Standard rotary feedthrough; HF* = High-Flow rotary feedthrough							
The tilt and rotation torque values only apply for the respective maximum permissible pressures.							

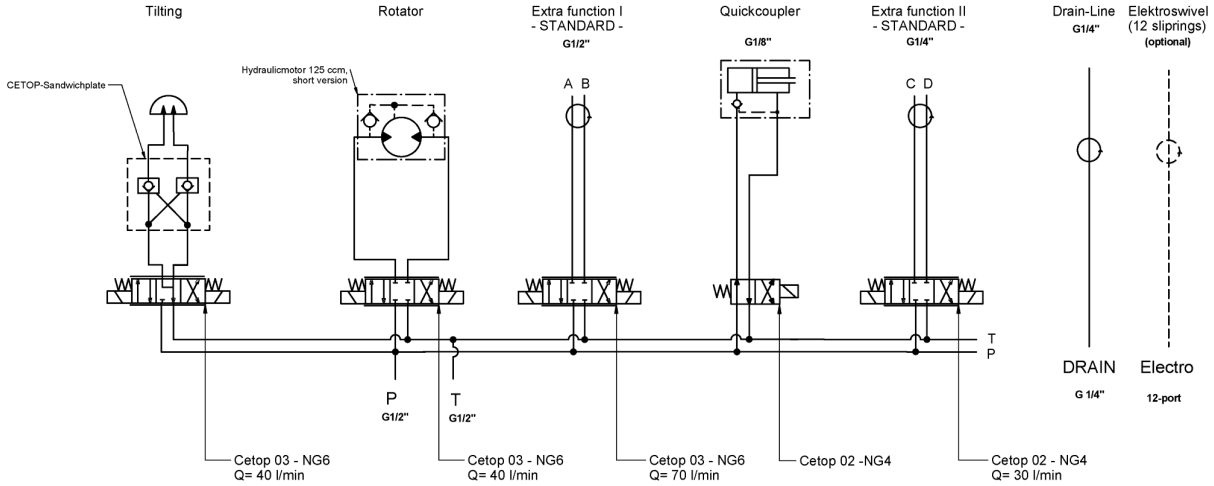
Type		TR14			TR19			TR25		
		DF10	DF4	CSP	DF10	DF4	CSP	DF10	DF8	CSP
Operating weight	[t]	10 - 14			14 - 19			18 - 25		
max. breakout force (ISO)	[kN]	110			150			170		
Max. bucket width	[mm]	1600			1700			2000		
Weight (incl. UB, excl. LQC)	approx. [kg]	400			540			610		
Tilting angle	[°]	2 x 50			2 x 50			2 x 50		
Tilting torque	[kNm]	26			34			44		
Rotational speed	[1/min]	8.5 @ 45 l/min			8.5 @ 50 l/min			8.5 @ 60 l/min		
Rotation torque	Nm	6000 @ 360° continuous			7000 @ 360° continuous			8500 @ 360° continuous		
Recom. pump capacity	[l/min]	80 - 160			100 - 180			120 - 200		
Recom. tilting/rotating oil flow	[l/min]	40 / 45	40 / 45	80	60 / 50	60 / 50	100	70 / 70	70 / 70	120
Max. oil flow, extra function 1/2	**SD*** [l/min]	70 / 30	70 / 30	70 / 30	70 / 30	70 / 30	70 / 30	70 / 30	70 / 30	70 / 30
	HF* [l/min]	70 /120	-	70 /120	70 /120	-	70 /120	70 /150	-	70 /150
Max. hydraulic pressure	Rotation [MPa]	20	20	-	20	20	-	20	20	-
	Tilt [MPa]	30	30	30	30	30	30	30	30	30
Max. back pressure	[MPa]	2.5			2.5			2.5		
Hose sizes	**SD*** [in]	5/8			5/8			3/4		
	HF* [in]	3/4			3/4			1		
Transmission oil quantity	[l]	1.5			2.0			2.5		
Rotary feedthrough: Ducts, extra function		4			4			4		
Rotary feedthrough: Ducts, quick coupler		2			2			2		
Rotary feedthrough: Leak oil duct		1			1			1		
Electric rotary feedthrough (optional)	Ducts x[A]	12 x 0.5			12 x 0.5			12 x 0.5		
Max. load capacity (WLL) Load hook (optional)	[t]	5			5			10		
Max. load capacity (WLL) Lifting eye (optional)	[t]	8.5			8.5			12		
Lifting eye (optional) Shackle size	[in]	1			1			1 1/4		
SD* = Standard rotary feedthrough; HF* = High-Flow rotary feedthrough										
The tilt and rotation torque values only apply for the respective maximum permissible pressures.										

3.2. Hydraulic diagrams

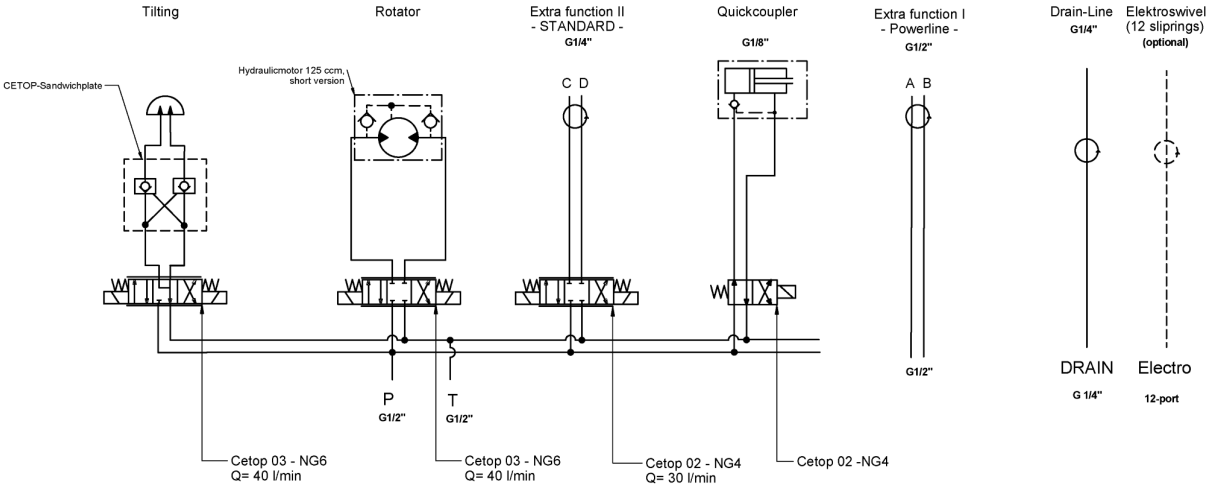
3.2.1. TR07 - CSP



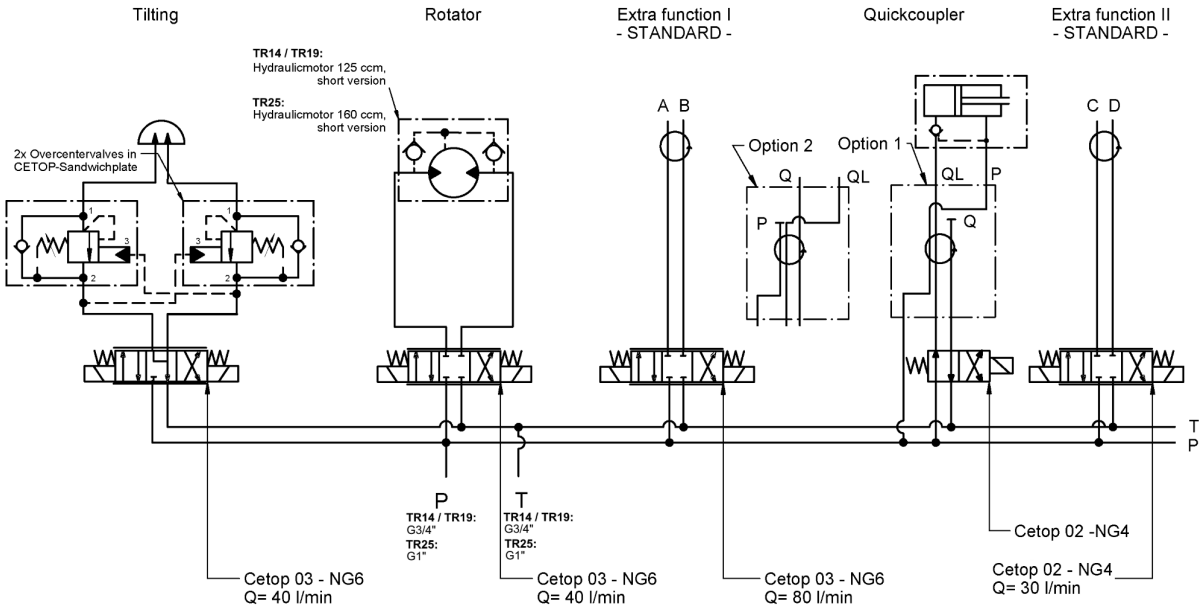
3.2.2. TR11 - CSP

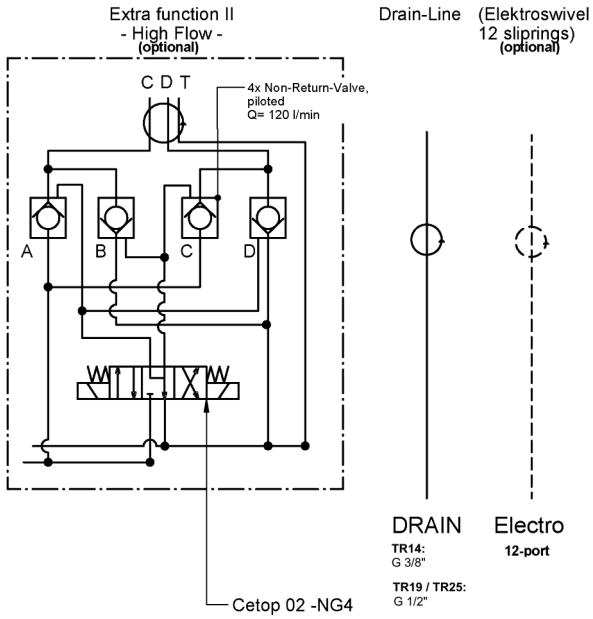


3.2.3. TR11 - CSP-PL

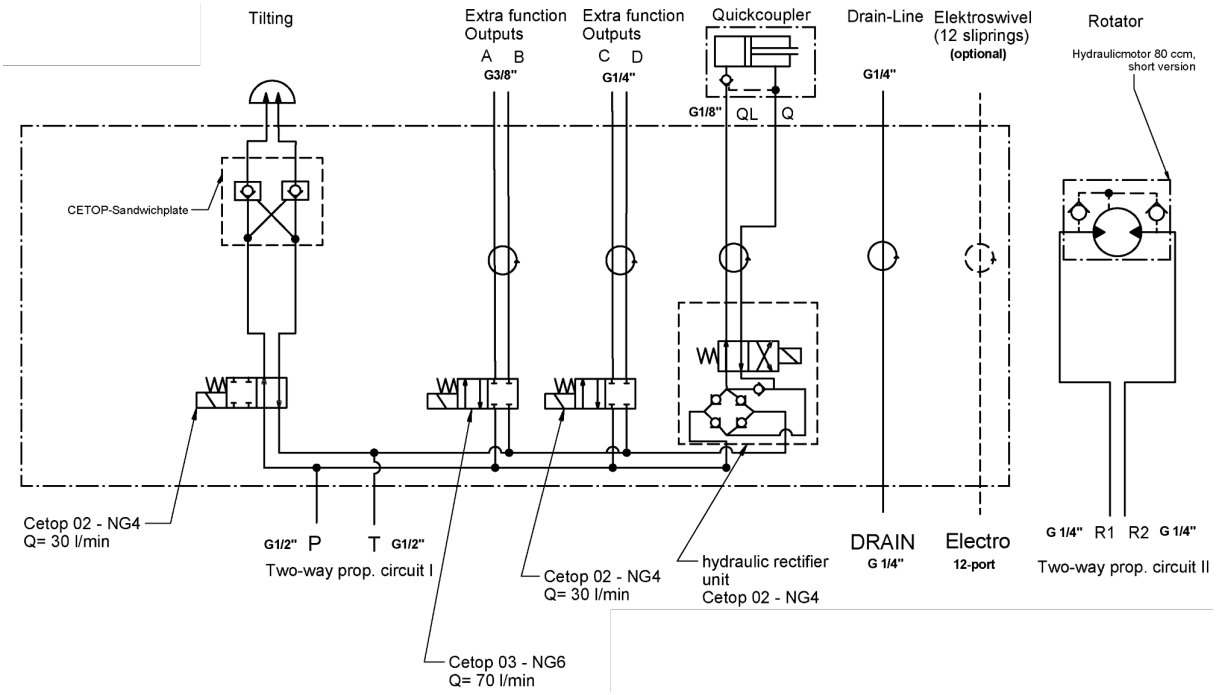


3.2.4. TR14 / TR19 / TR25 - CSP

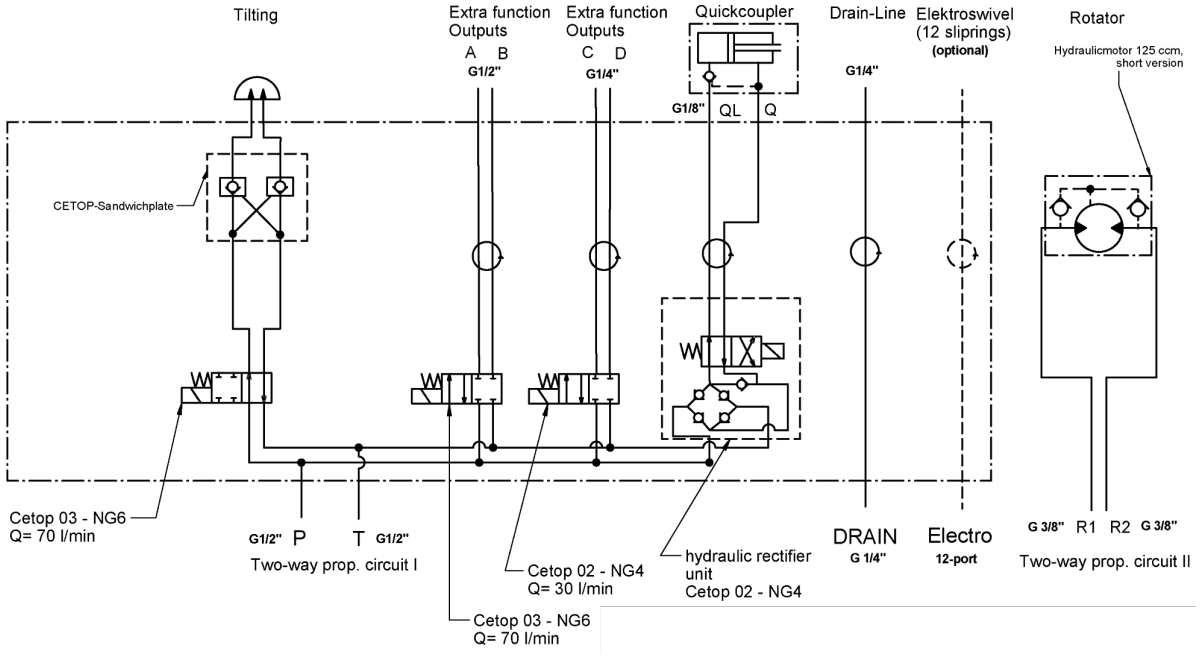




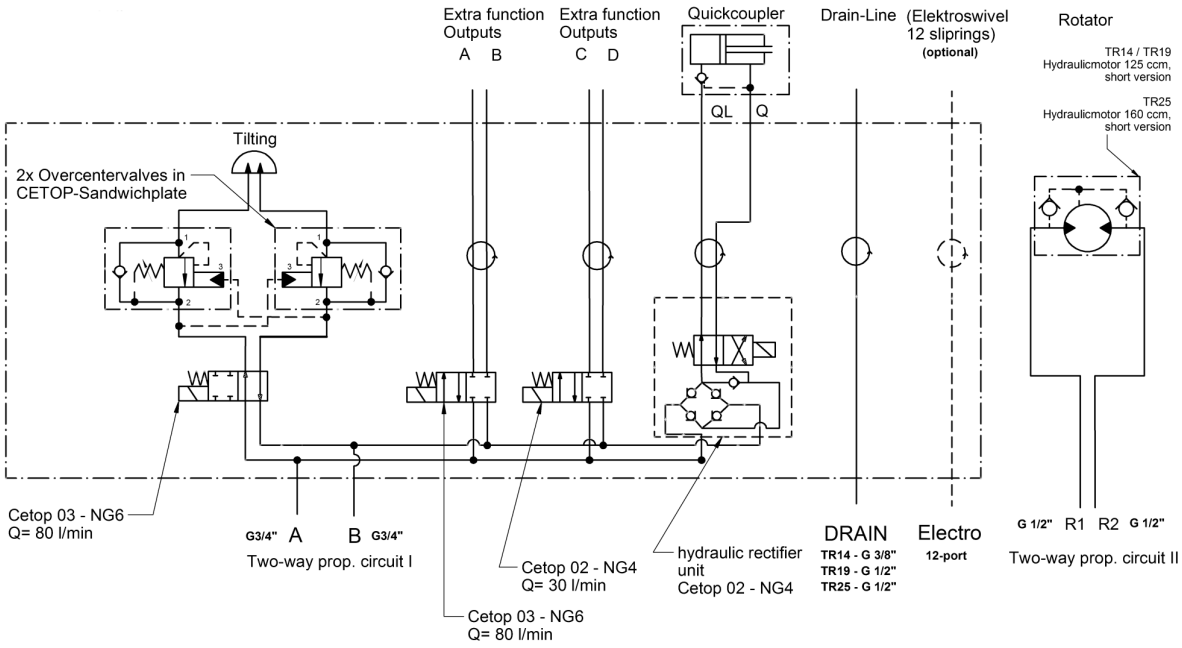
3.2.5. TR07- DF4



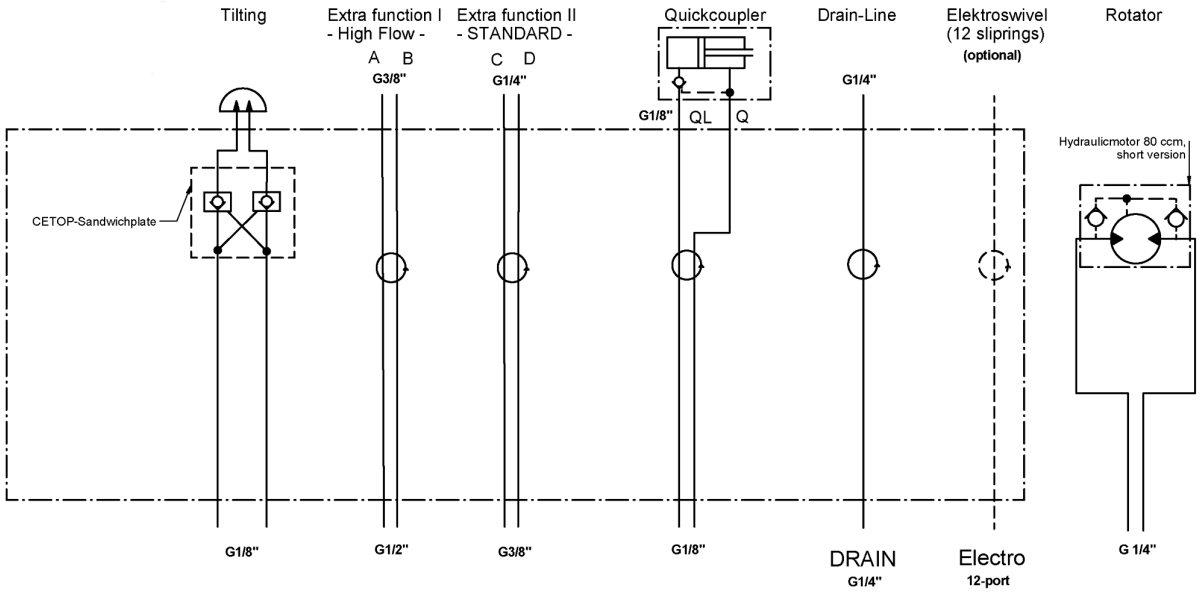
3.2.6. TR11- DF4



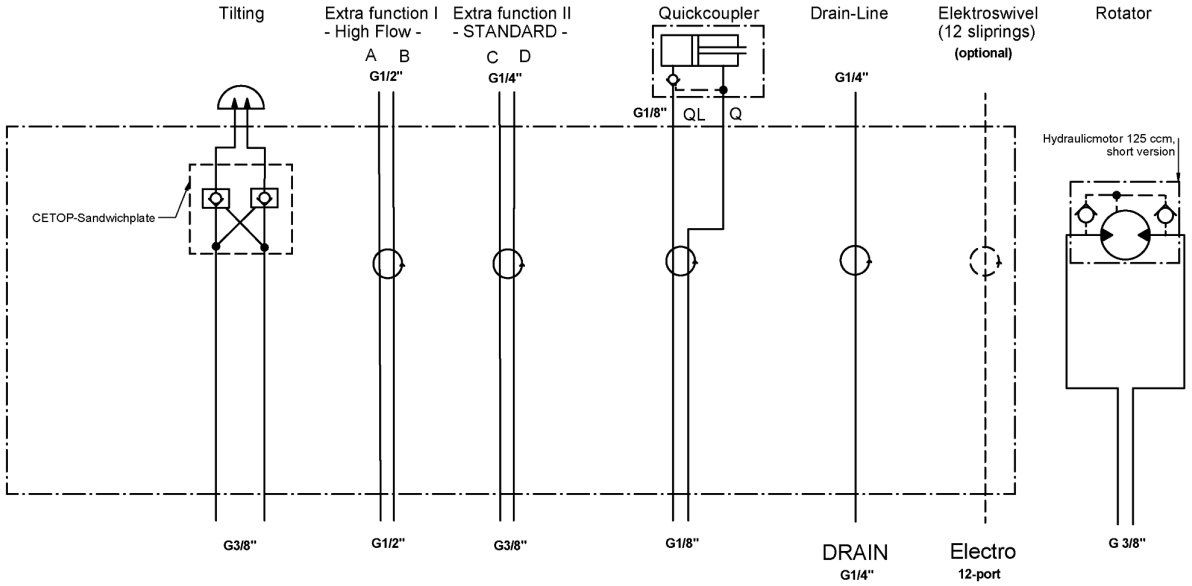
3.2.7. TR14 / TR19 / TR25 - DF4



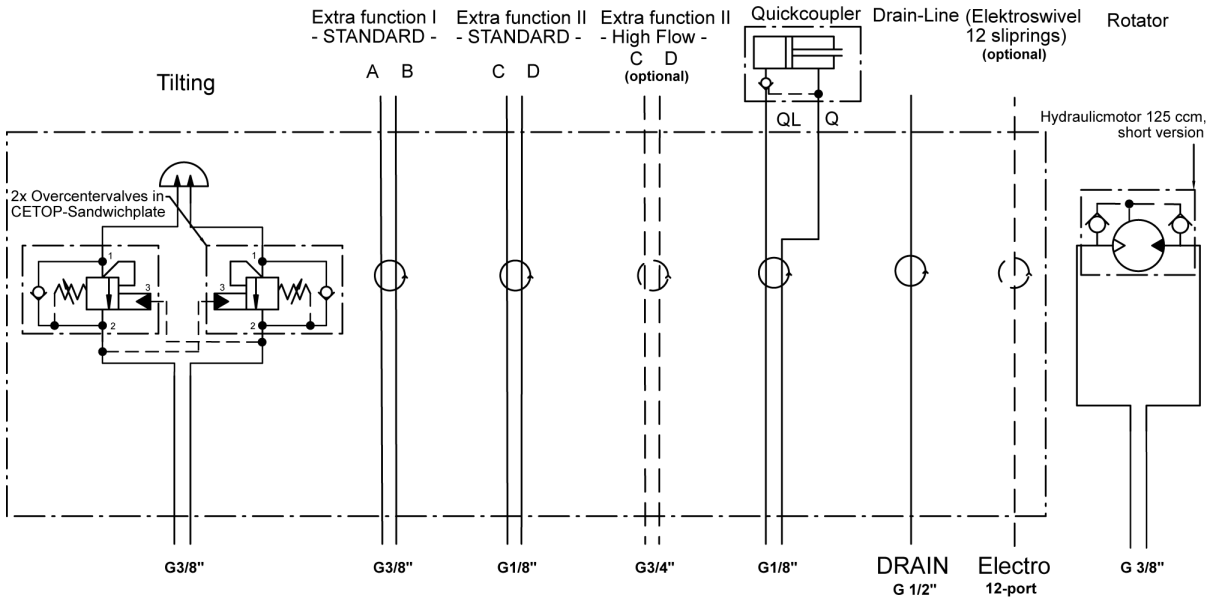
3.2.8. TR07 - DF10



3.2.9. TR11 - DF10

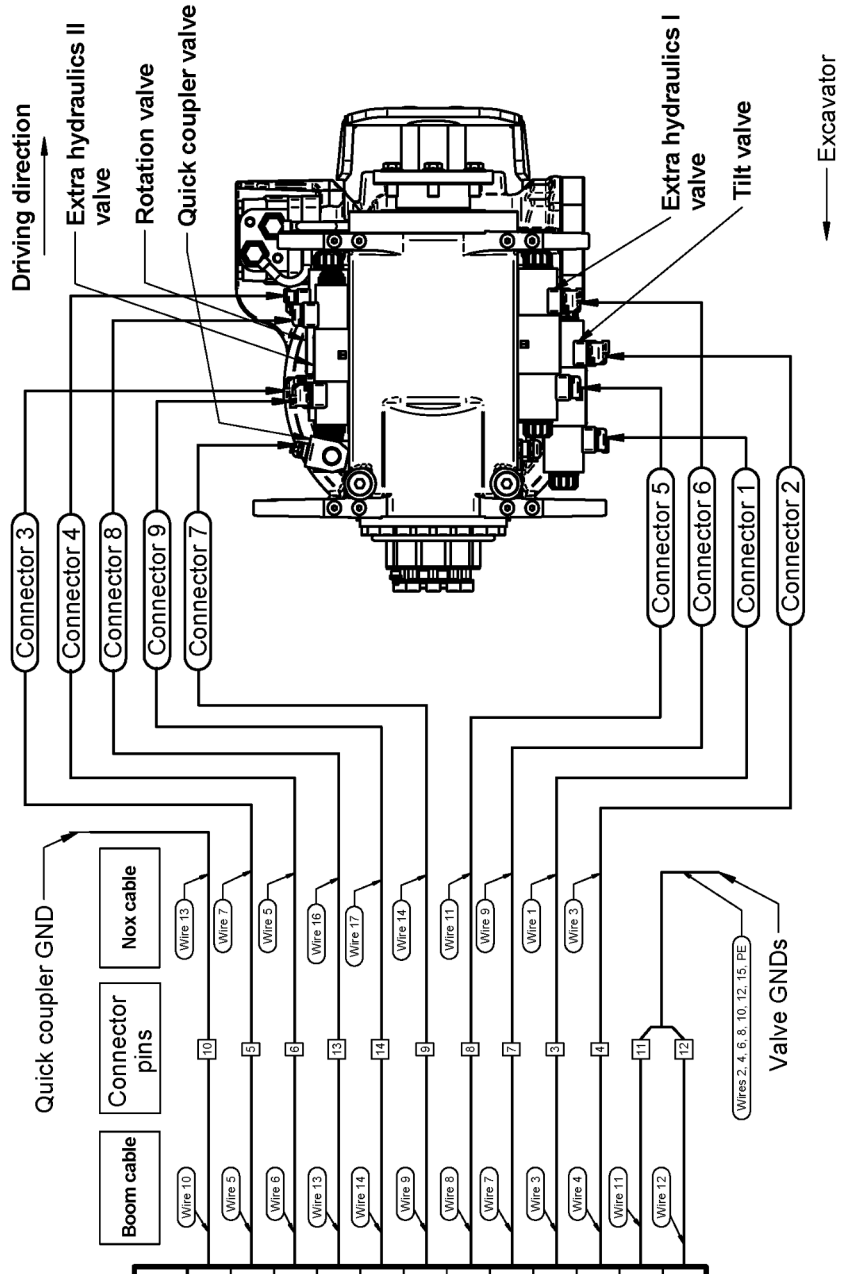


3.2.10. TR14 / TR19 / TR25 - DF10



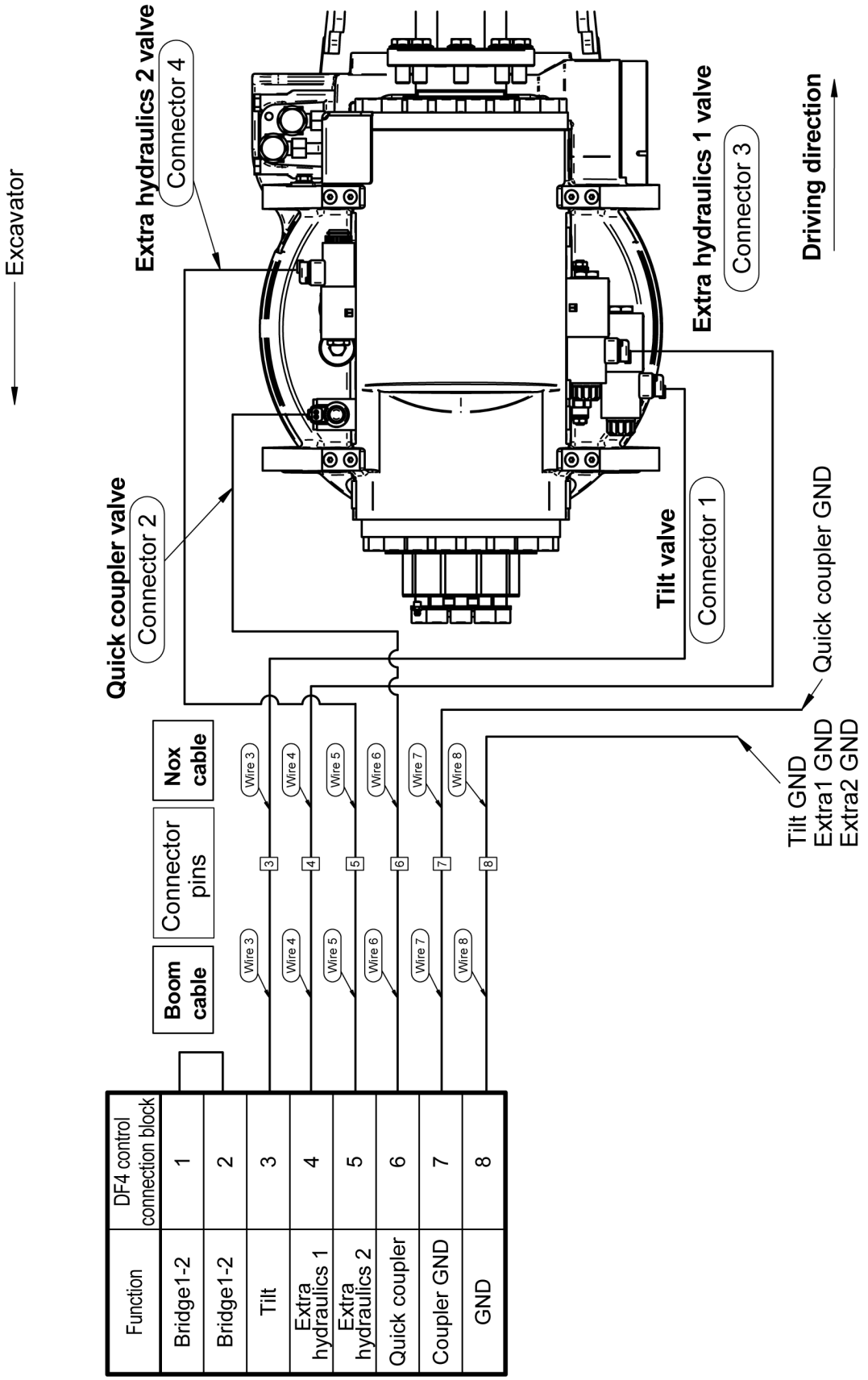
3.3. Wiring diagrams

3.3.1. TR07 / TR11 / TR14 / TR19 / TR25 - CSP



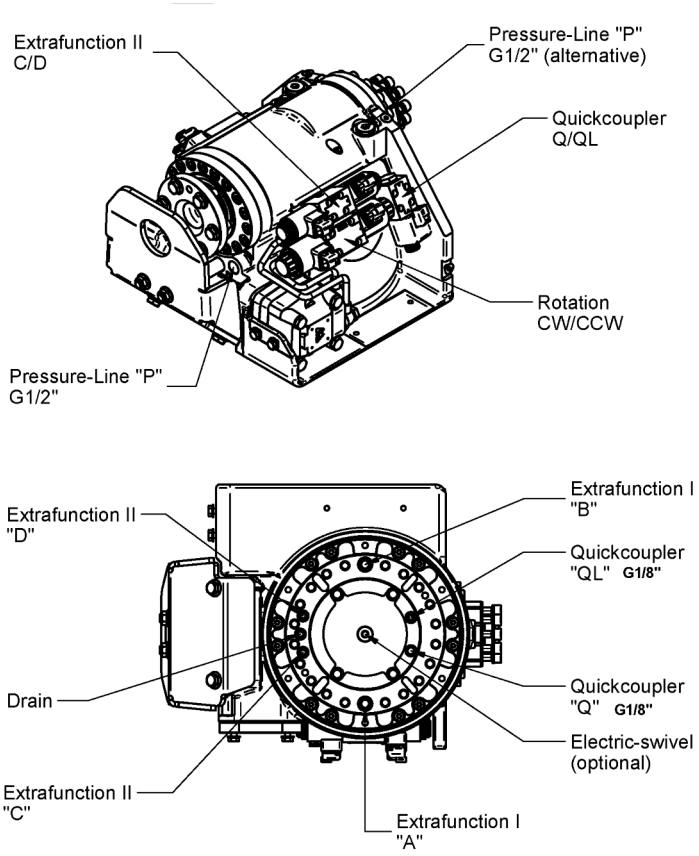
Function	SVAB circuit board	NOXPROP Connection block
Coupler GND	Coupler GND	15
Rotation CCW	Out 1A	3
Rotation CW	Out 1B	4
Extra hydraulics II	N/A	7
Extra hydraulics II	N/A	8
Quick coupler	Out 5	14
Extra hydraulics I	Out 4B	5
Extra hydraulics I	Out 4A	6
Tilt left	Out 2A	1
Tilt right	Out 2B	2
GND	GND	16
GND	GND	17

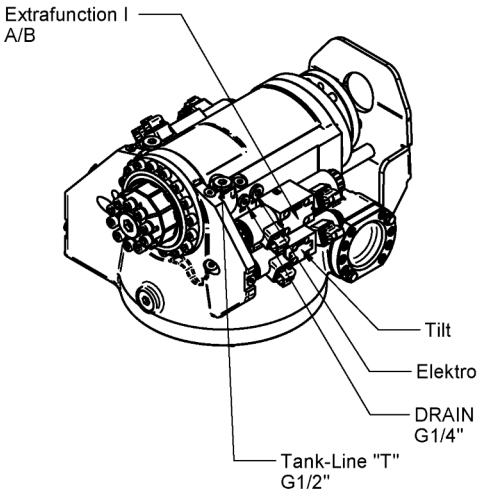
3.3.2. TR07 / TR11 / TR14 / TR19 / TR25 - DF4



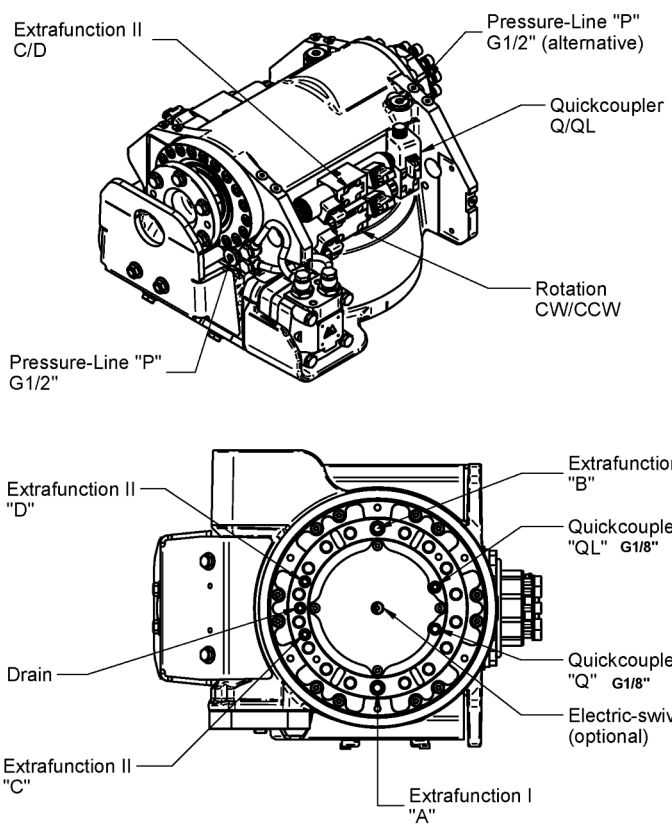
3.4. Connection points

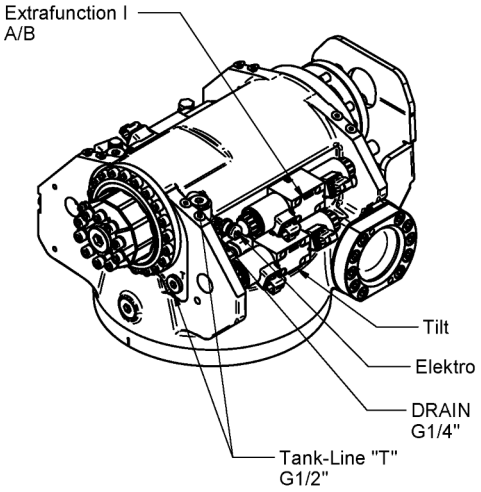
3.4.1. TR07 - CSP



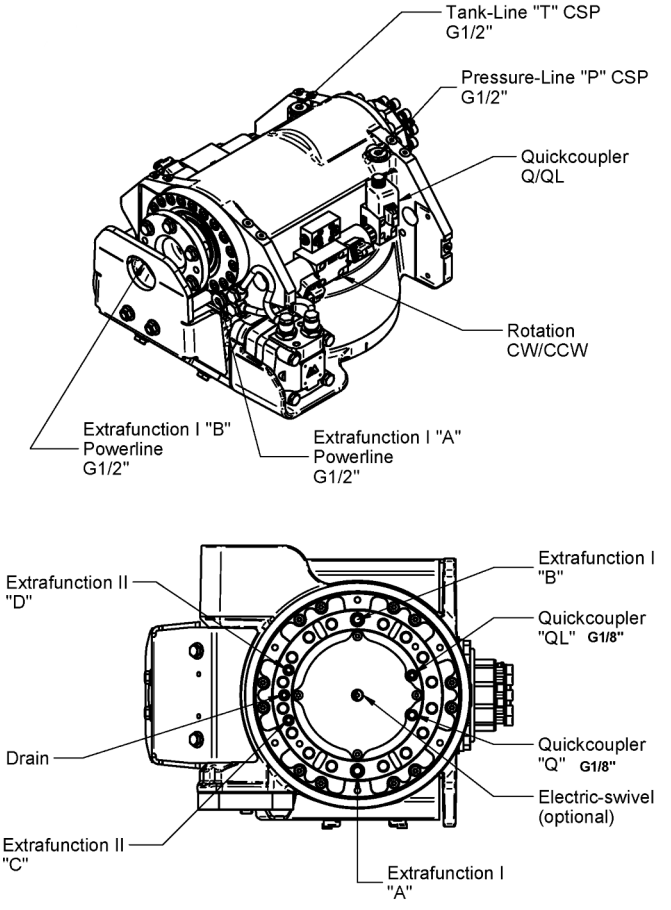


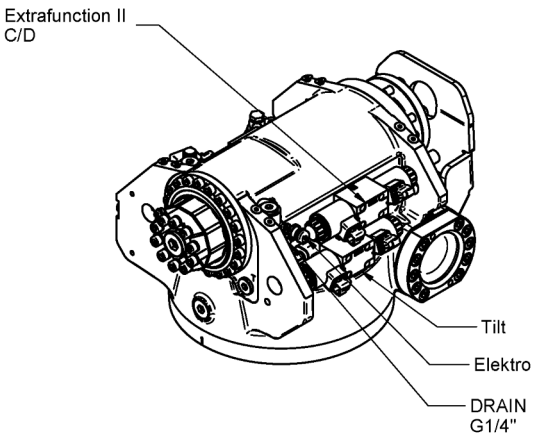
3.4.2. TR11 - CSP



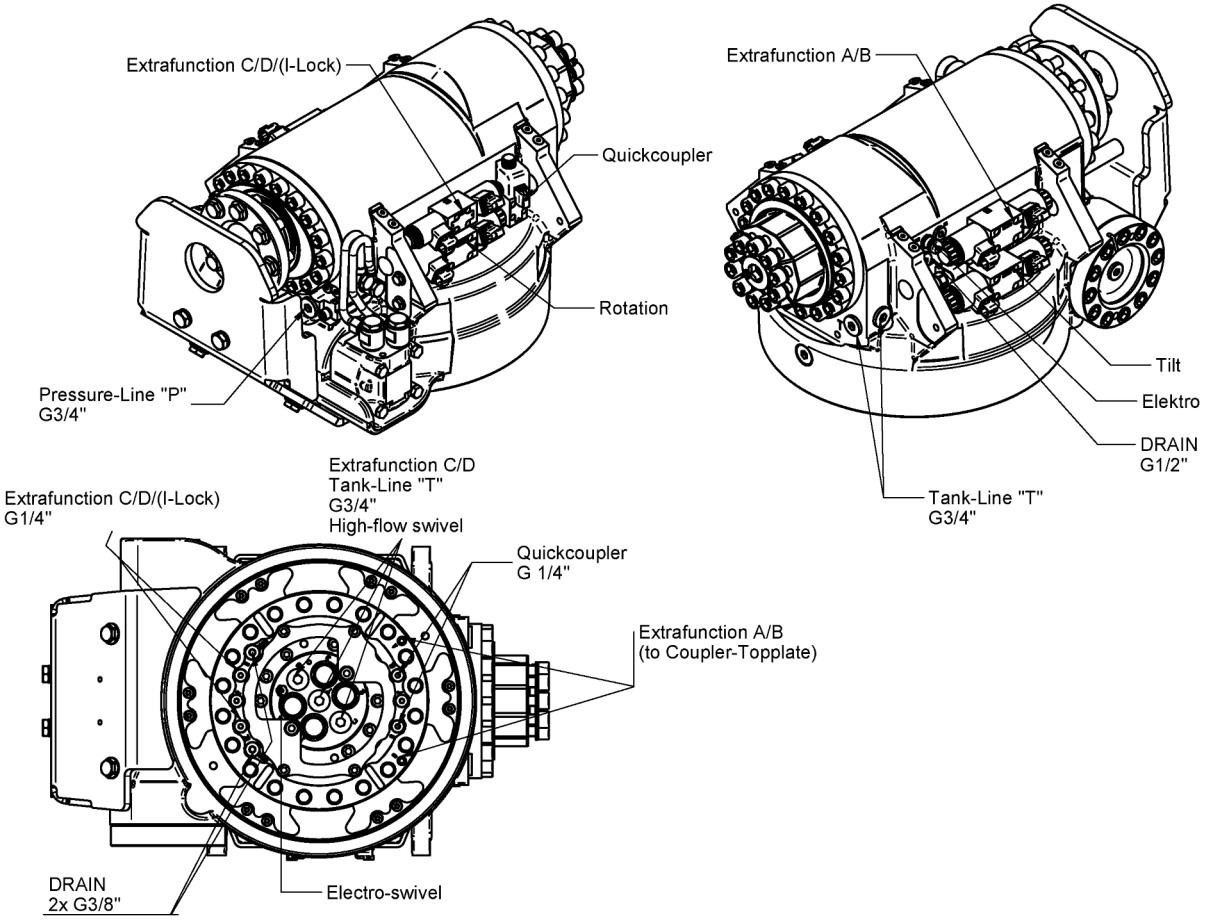


3.4.3. TR11 - CSP-PL

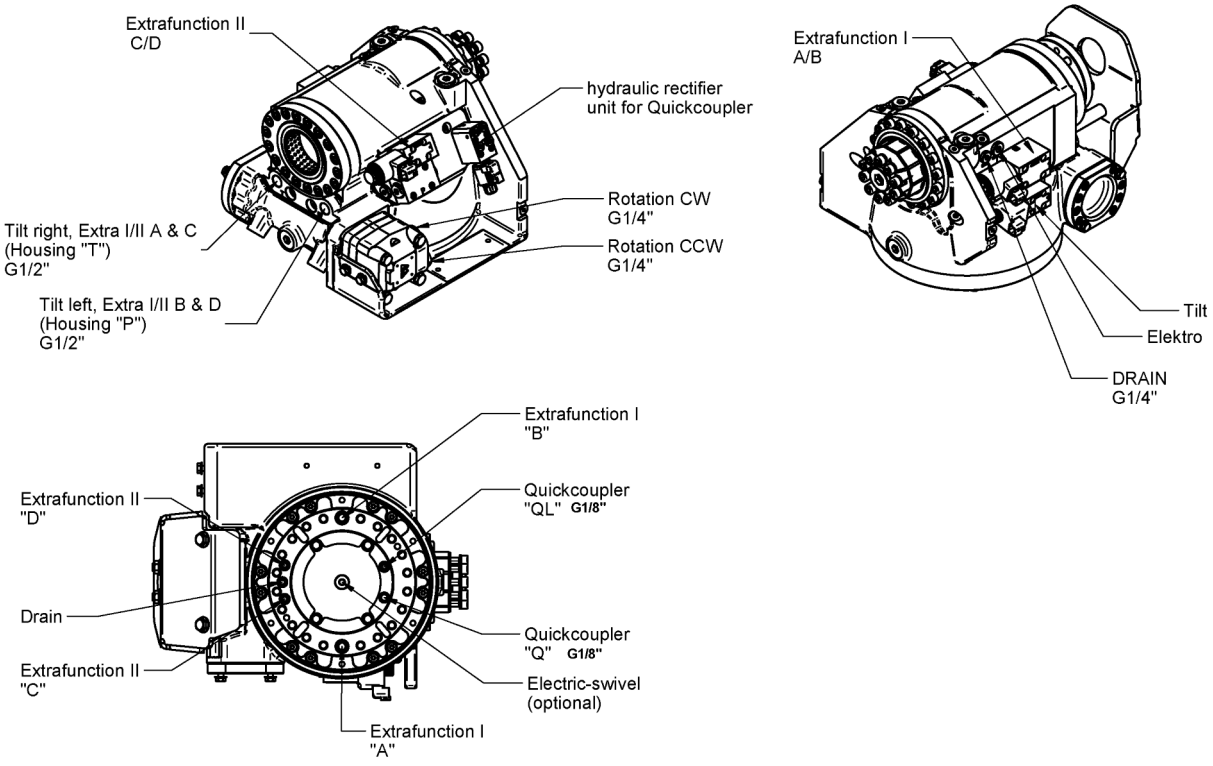




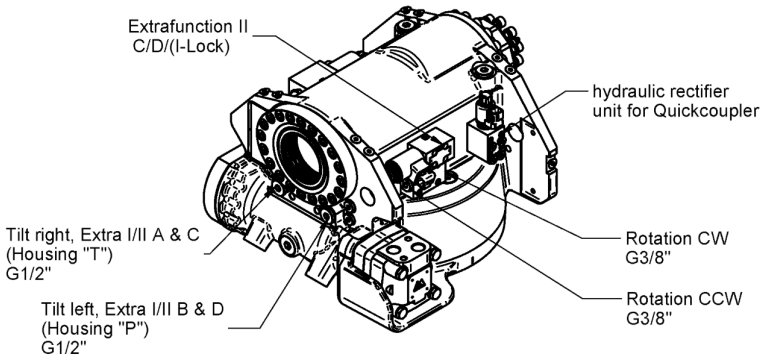
3.4.4. TR14 / TR19 / TR25 - CSP

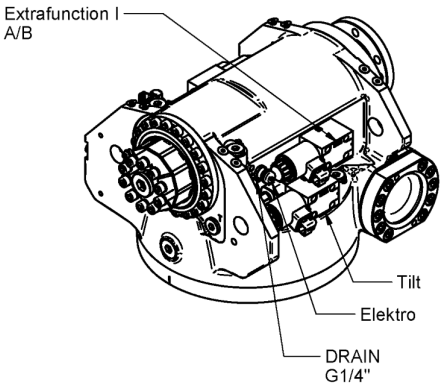


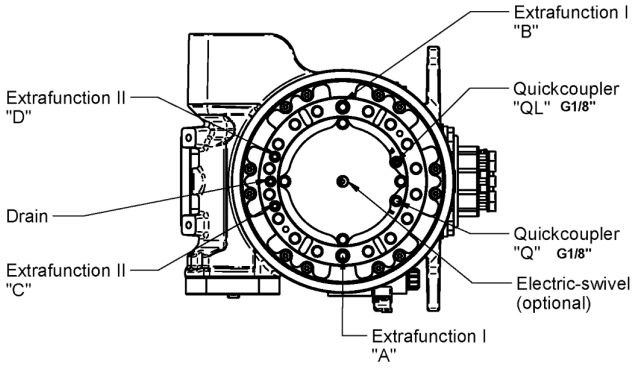
3.4.5. TR07 - DF4



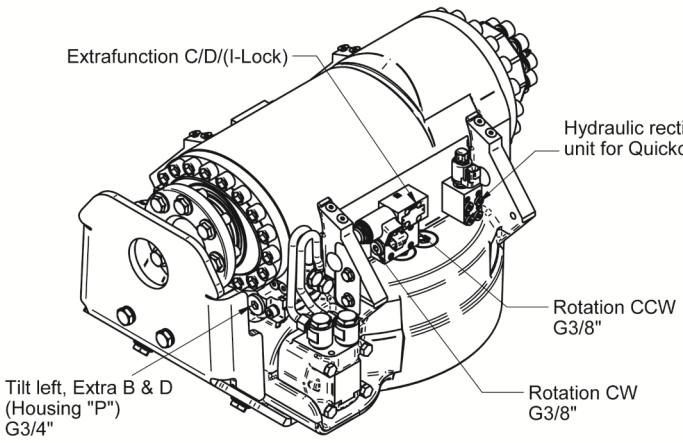
3.4.6. TR11 - DF4

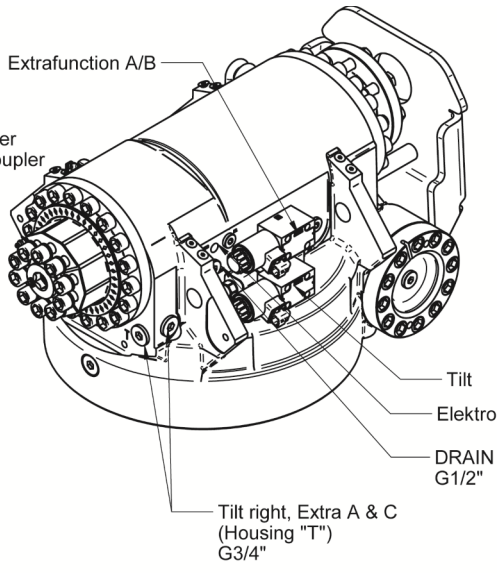


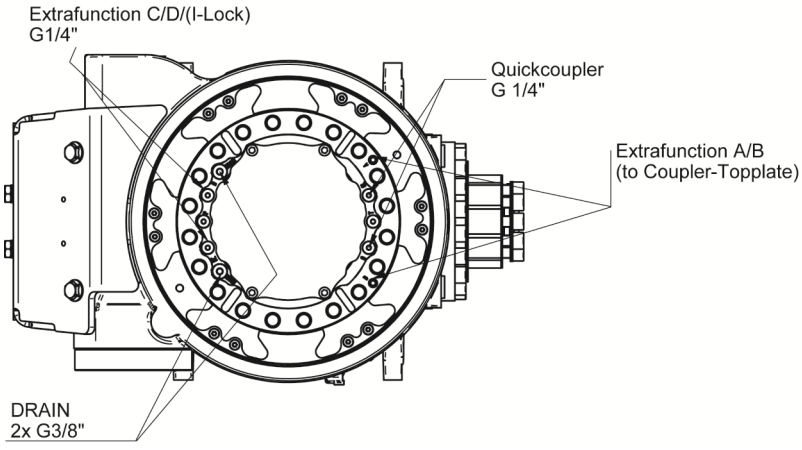




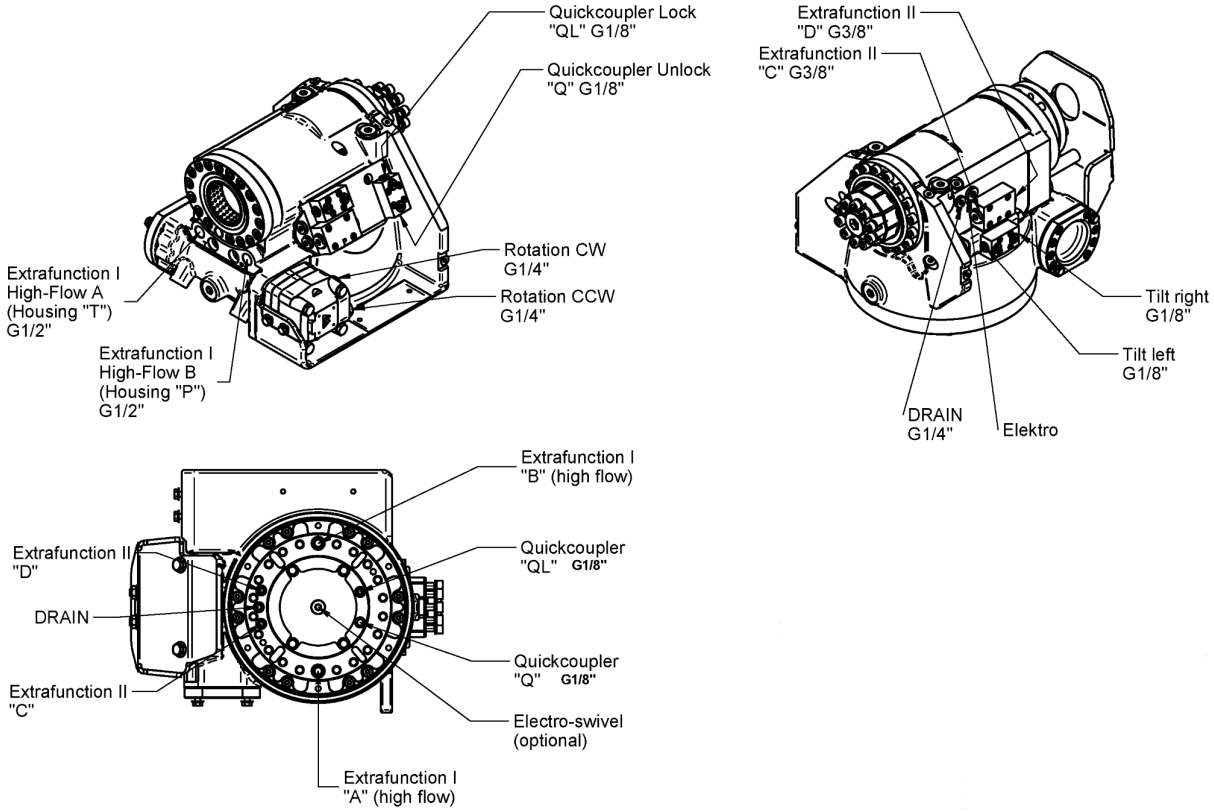
3.4.7. TR14 / TR19 / TR25 - DF4



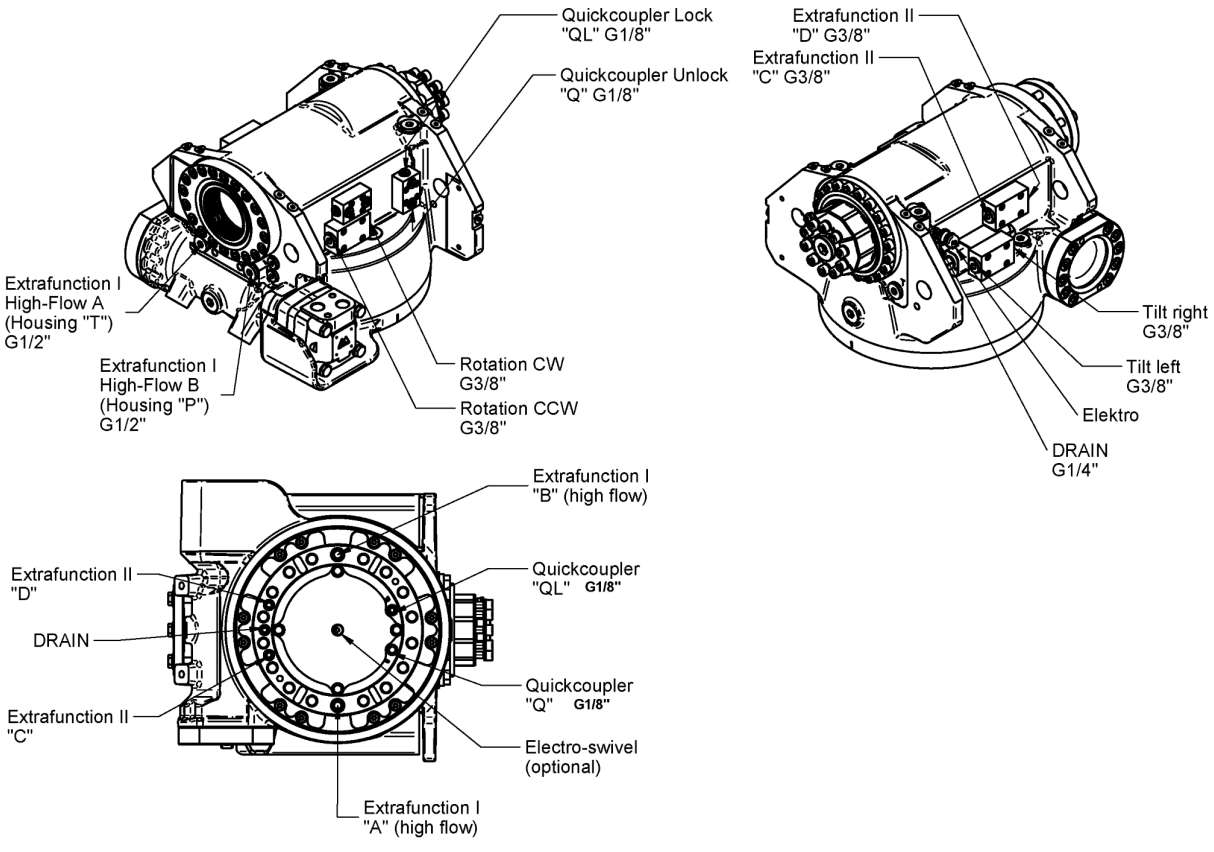




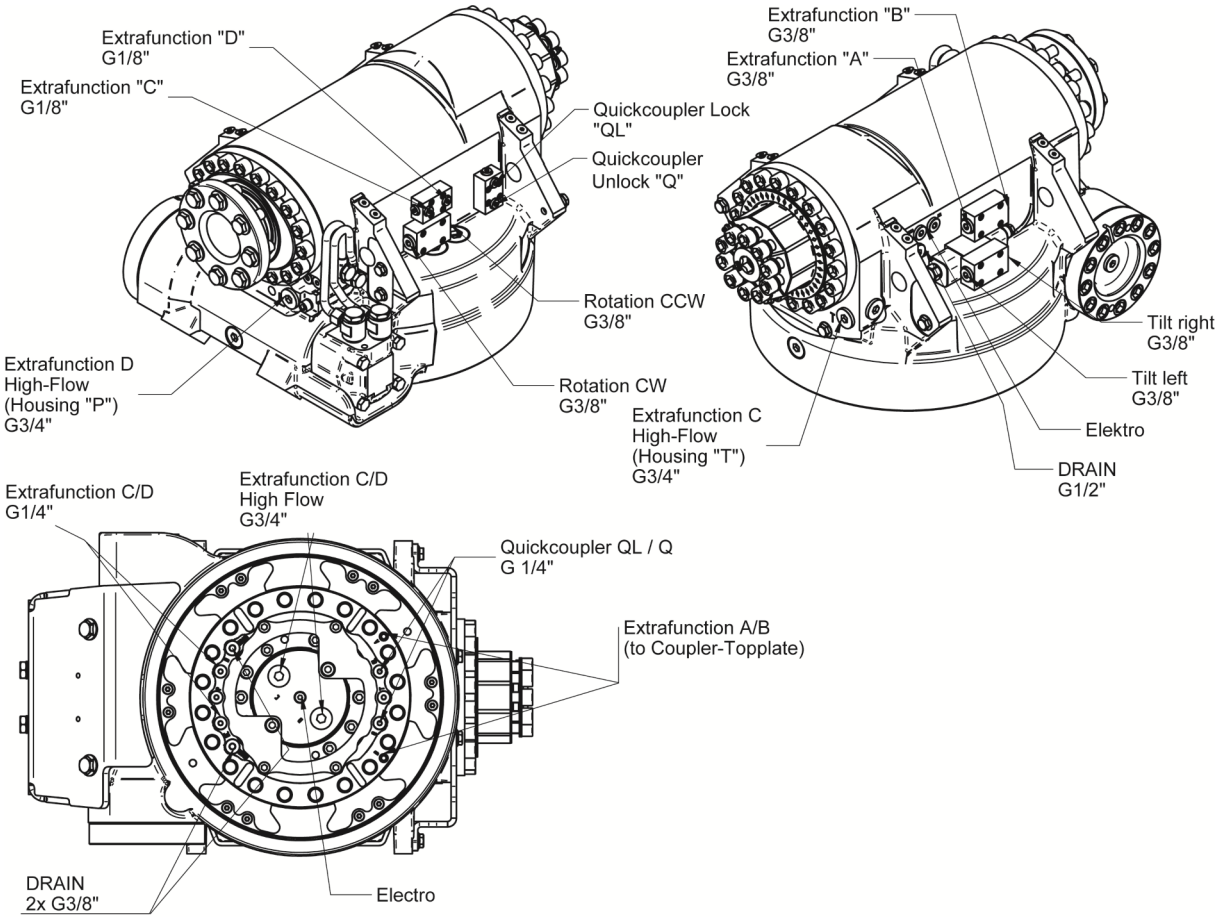
3.4.8. TR07 - DF10



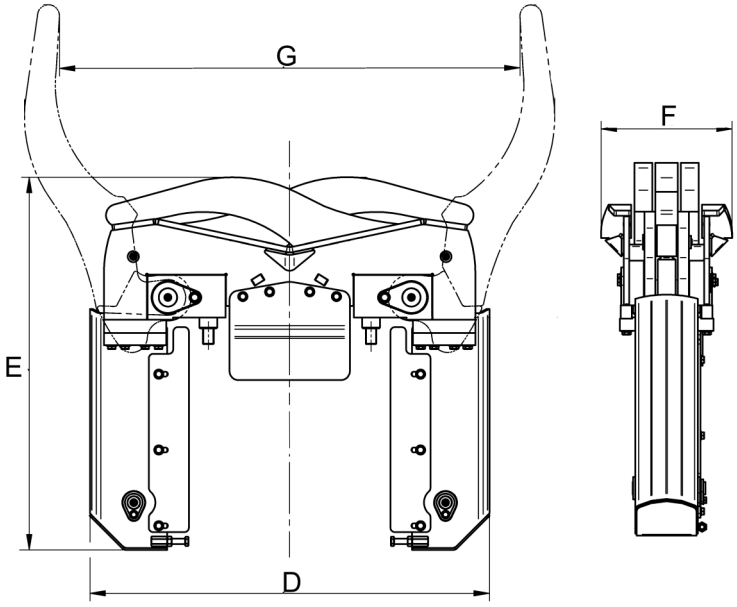
3.4.9. TR11 - DF10



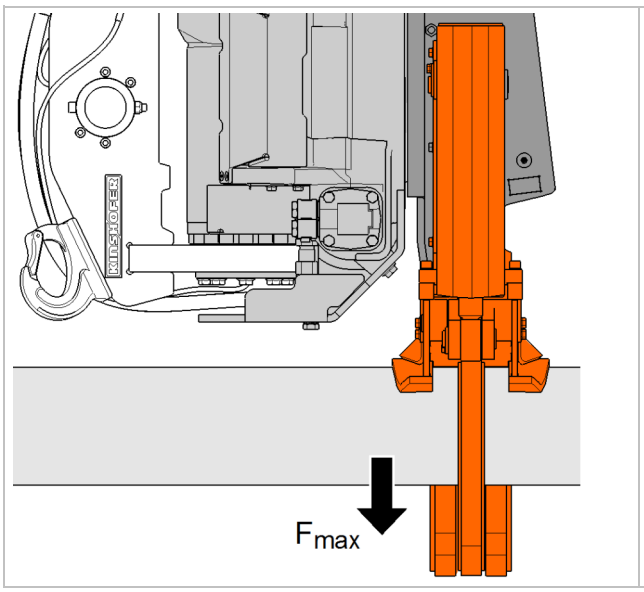
3.4.10. TR14 / TR19 / TR25 - DF10

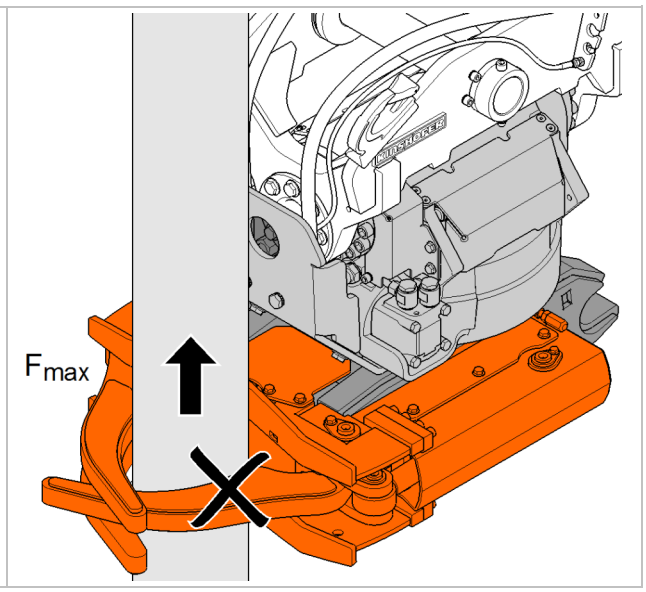


3.5. Optional hydraulic grab module (gripper): Dimensions and weight



Type		TRG07	TRG11	TRG19	TRG25
		S40 KHS03	S45/50 KHS08, KMS08 Hydrema	S60 KHS10, KMS10, MH18 NTP10, S1, B20	S70
Self weight	kg	40	90	120	240
Dimensions D x E x F	mm	469 x 523 x 148	601 x 660 x 211	698 x 714 x 265	896 x 835 x 294
Max. opening range G	mm	518	644	734	1030
Closing time[1)]	s	1.5	1.3	1.7	2
Closing force	kN	7.5	10	18.5	19
Max. load capacity	kg	300	500	900	1300
1) at 25l/min.					



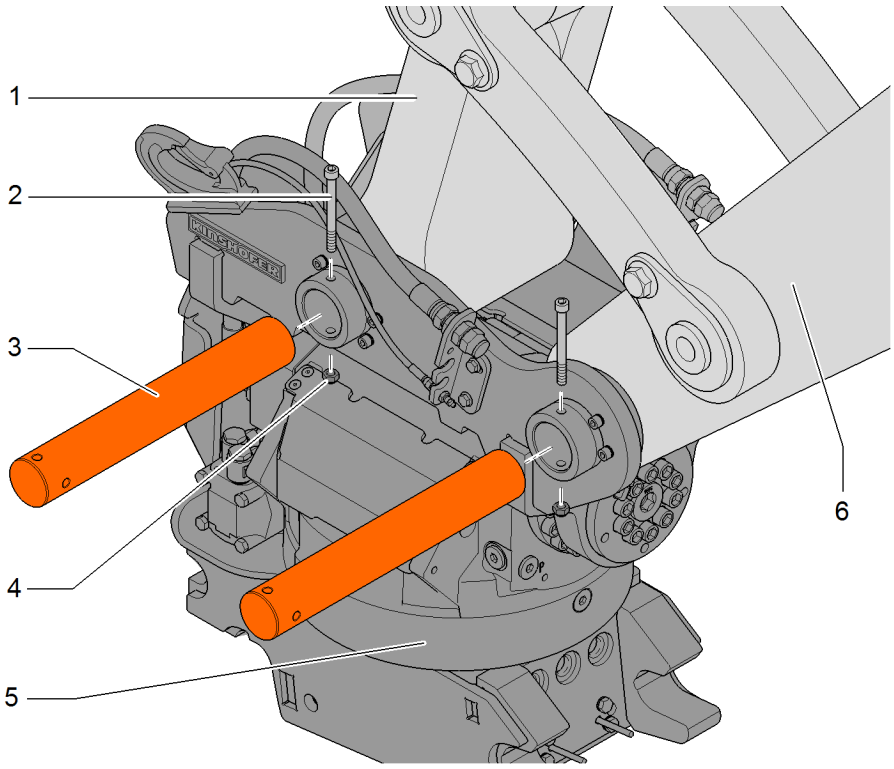


4. Installation and initial operation

4.1. Mechanical connection on the carrier machine

The information refers to the rigid connection of the NOX Tiltrotator. If the NOX Tiltrotator is connected to a quick coupler, the information provided in the quick coupler operating instructions applies.

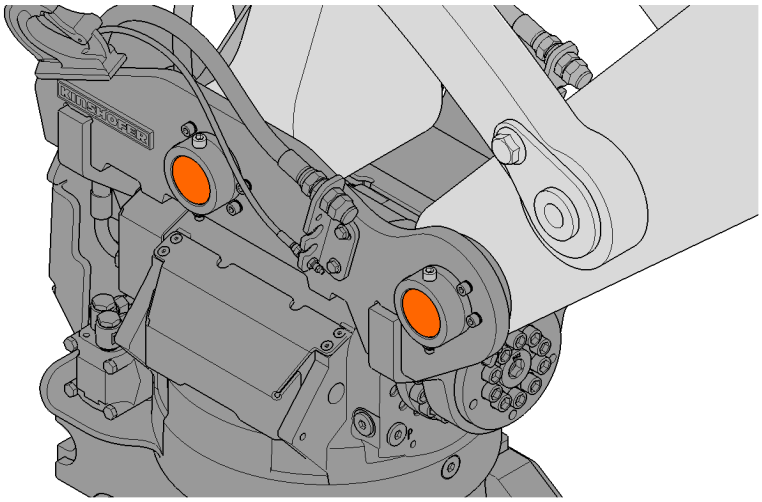
WARNING
Check the permissible load capacity of the excavator if the NOX Tiltrotator was mounted to reduce the risk of accidents.
Improper installation can lead to hazardous situations.
In the event of a doubt relating to knowledge or safety, always contact the supplier or manufacturer.



Pos. number	Designation
1	Carrier boom
2	Socket head cap screw
3	Pins
4	Nut
5	Attachment
6	Carrier dipper

Procedure

- Set down attachment on a level, firm surface.
- Position jib of carrier so that carrier can be connected to its support.
- Connect the carrier boom (1) and attachment (5) with a pin (3) and secure the pin with a socket head cap screw (2) and nut (4).
- Raise and align the attachment so that the carrier dipper can be connected to the attachment.
- Connect the carrier dipper (6) and attachment (5) with a pin (3) and secure the pin with a socket head cap screw and nut (3).
- Verify the correct and secure seating of the socket head cap screws.



4.2. Quick coupler

As the quick coupler is supplied in a variety of versions, no explicit description is possible.

NOTICE
Observe the accompanying operating instructions for the quick coupler.

4.3. Installing the control systems

WARNING
Switch off the carrier, depressurise and secure to prevent reactivation.

NOTICE
Observe the respective operating instructions and installation instructions for the control systems CSP and DF4.
With the control system DF10, the hydraulic and electrical connection are established without an additional installation direct on the NOX Tiltrotator.

NOTICE
Completely unscrew the hydraulic quick couplings. Pay attention to cleanliness when connecting the hydraulic connections. Remove any attached dirt particles.

NOTICE
Selection of supply and return line
All hydraulic hoses must be dimensioned so the backpressure is minimised.
We recommend selecting the return line to the tank (**Tank Line label**) and the supply line (pressure line (**Pressure Line label**)) according to the sizes in **the chapter Technical data** .

NOTICE
Length of the hydraulic hoses!
Note that the hydraulic hoses are not too long, since they would otherwise be damaged during operational movements, nor are they too short, since they would otherwise tear during operational movements.

Approved hydraulic fluids
The attachment has been function-tested by the manufacturer.
To protect hydraulic components, use only hydraulic fluid with the ISO viscosity noted below.
Fresh fluid has an inferior degree of purity. To bring fresh fluid to the required level of purity before use, refill through a filter or use a filling device.
Mixing hydraulic fluids of types

- HEES, HEPG, HETG and HEPR (quickly biodegradable) or
- mineral oil is not permitted.

We use a hydraulic fluid that is specified in the **chapter Oil and grease.**
Ensure that the oil you select has the same specifications!

WARNING
When connecting the electrical connections, note the electrical precautions.
Improper installation can lead to hazardous situations.
In the event of a doubt relating to knowledge or safety, always contact the supplier or manufacturer.

NOTICE
During installation, the permissible values **the chapter Technical data** must be observed.

4.3.1. Control system CSP Standard / CSP High Flow

Usage

The product is used to control NOX Tiltrotators.
All functions are controlled via proportional valves using joystick handles and can be executed simultaneously.

Procedure

- The hydraulic lines of the attachment are connected with the carrier.
  1. **First connect the return line** (**Tank label**) to the tank.
  2. Connect the supply line (pressure line (**Pressure Line label**)).
  3. Establish the electrical connection.

- Check that the hydraulic oil flows back into the tank without any backpressure.
- The maximum permissible backpressure is 25 bar.
- Check that the "Hammer" function is selected on the carrier and that the ball valves are open, especially after a power failure of the on-board battery.
- Completely unscrew the hydraulic quick couplings. This prevents impermissible backpressure.
- Set the maximum permissible operating pressure and the recommended oil flow in the table in **the chapter Technical data**.

Checking functions

1. Test all joystick functions.
2. Correct incorrect settings.

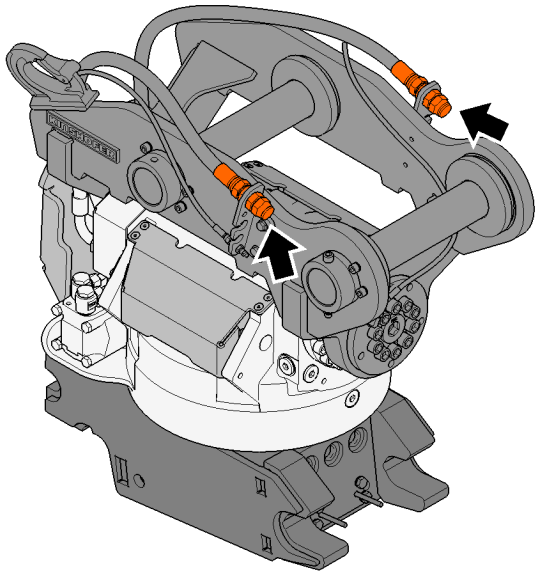
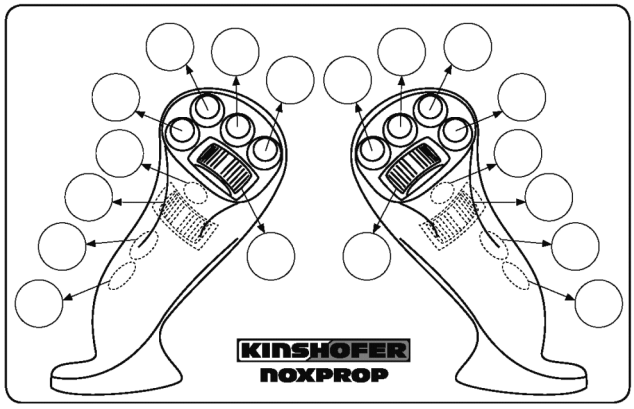
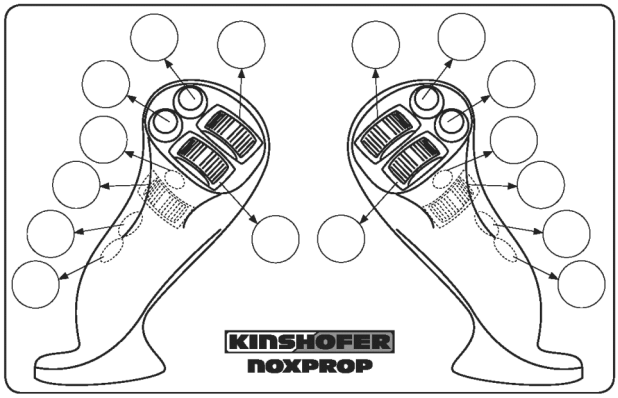


Fig: Hydraulic connections on Tiltrotator

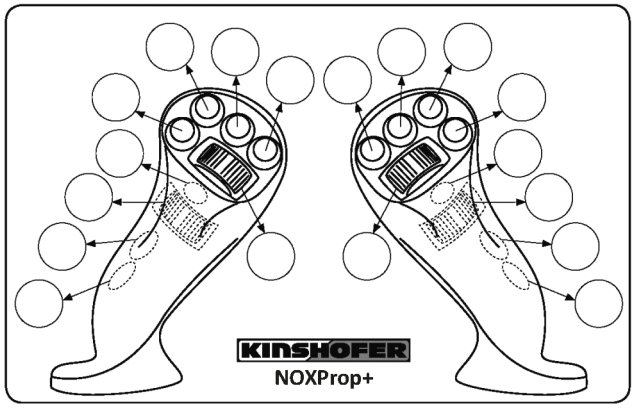
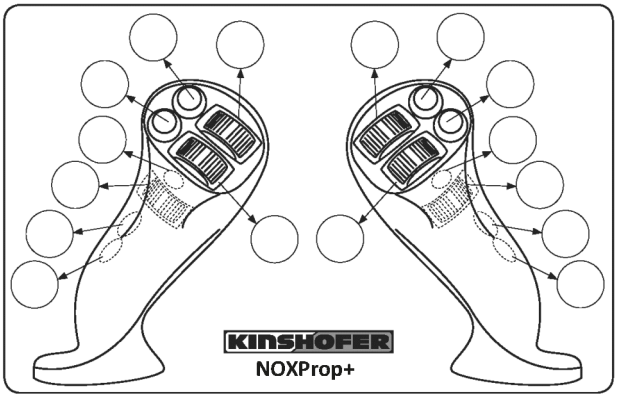
Label	Function	Connecting thread			
		TR07 TR11	TR14	TR19	TR25
PRESSURE LINE	Pressure line	G 1/2" BSP	G 3/4" BSP	G 3/4" BSP	G 3/4" (SD) G 1" (HF)
TANK LINE	Tank line	G 1/2" BSP	G 3/4" BSP	G 3/4" BSP	G 3/4" (SD) G 1" (HF)
DRAIN LINE	Overflow oil line (optional)	G 1/4" BSP	G 3/8" BSP	G 1/2" BSP	G 3/4" BSP

Excavator cabin stickers and symbols for the pushbuttons used

NOXPROP Joystick 1 roller	NOXPROP Joystick 2 roller
	

Explanation of symbols

24V	Electric potential		Open shell-grab
	Differential lock		Close shell-grab
	Unlock swing axle		Toggle between tilt / grab
	Swing axle locked		Idling
	Shell-grab		Lock swivel linkage
	Rotate shell-grab		Tilt main arm to the right
	Open grab		Tilt main arm to the left
	Close grab		Breaker
FNR	Travel selector switch	(P)	Parking brake
	Horn		Toggle between rotate / grab
	Vibration damping		Mute radio
	Rotate		Reduce rotation speed
	Toggle between rotate / extra		Toggle between tilt / extra (additional function)
	Unlock/lock tool		Rapid traverse
	Slow traverse		tilt
			for labelling as needed

Excavator cabin stickers and symbols for the pushbuttons used	
NOXProp+ joystick 1 roller	**NOXProp+ joystick 2 roller**
	

Explanation of symbols

Functions of the excavator control

	Horn		Breaker
	Open grab		Travel selector switch
	Close grab		Parking brake
	Open shell-grab		Differential lock
	Close shell-grab		Unlock swing axle
	Rotate shell-grab clockwise		Swing axle locked
	Rotate shell-grab counter-clockwise		Tilt main arm to the right
	Slow traverse Low rotation speed		Tilt main arm to the left
	Reduce rotation speed		Lock swivel linkage
	Idling		Unlock/lock tool
	Rapid traverse High rotation speed		Vibration damping
	Electric potential		Mute radio

Functions of the cabin module			
	Rotate		Toggle between tilt / accelerator pedal
	Toggle between rotate / extra 1		Toggle between tilt / steer
	Toggle between rotate / extra 2		Toggle between tilt / extra 1
	Toggle between rotate / grab		Toggle between tilt / extra 2
	Toggle between rotate / steer		Steering or caterpillar steering active
	Toggle between rotate / accelerator pedal		Steering not permitted
	Tilt		Backwards / forwards in caterpillar steering mode
	Toggle between tilt / grab		

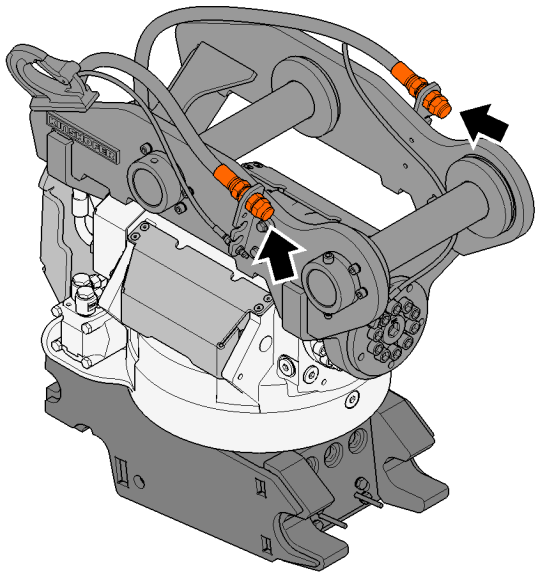
4.3.2. Controller DF4

Usage

- Control via two double-acting hydraulic circuits, integrated valves for switching between functions.
- Circuit I controls the rotation function.
- Circuit II controls the tilt function, extra function and the quick coupler, which cannot be used simultaneously. (Safety circuit integrated for hydraulic quick coupler)
- Separate overflow oil line (for attachments)
- Electrical swivel (12x 0.5 A) optional

Checking functions

Set the maximum permissible operating pressure and the recommended oil flow in the table in **the chapter Technical data**.



Hydraulic connections on Tiltrotator

Label	Function	Connecting thread				
		TR07	TR11	TR14	TR19	TR25
Rotation CW	Rotate clockwise	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP
Rotation CCW	Rotate anti-clockwise	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP
tilt LEFT/ EXTRA 1&2 (A)/ coupler	Tilt left/ Extra function 1&2/ Quick coupler	G 3/8" BSP	G 1/2" BSP	G 3/4" BSP	G 3/4" BSP	G 3/4" BSP
tilt RIGHT/ EXTRA 1&2 (B)/ coupler	Tilt right/ Extra function 1&2/ Quick coupler	G 3/8" BSP	G 1/2" BSP	G 3/4" BSP	G 3/4" BSP	G 3/4" BSP
DRAIN LINE	Drain line (optional)	G 1/4" BSP	G 1/4" BSP	G 3/8" BSP	G 1/2" BSP	G 3/4" BSP

4.3.3. Controller DF10 Standard / DF10 High Flow

Usage

All functions are controlled directly from the carrier:

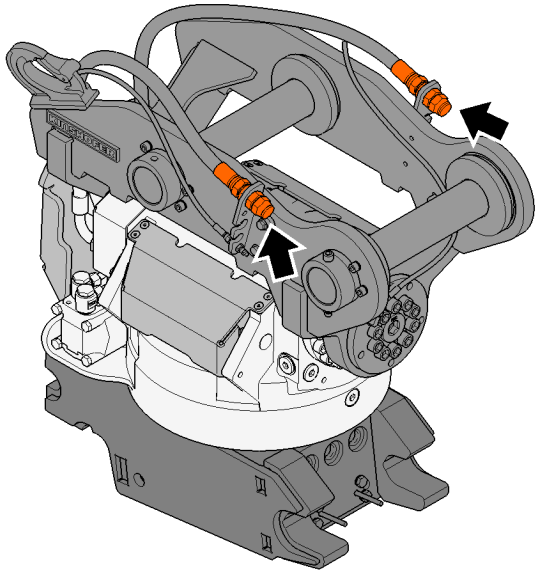
- Tilt.
- Rotate.
- Quick coupler (safety circuit must be integrated in the carrier).
- Extra function 1.
- Extra function 2.
- Separate overflow oil line (for attachments).
- Electrical swivel (12x 0.5 A) optional.

Procedure

- Check the hydraulic connections on the NOX Tiltrotator for cleanliness.
- Install the hydraulic lines. Observe the following explanations. The function is marked on hose with a label.

Checking functions

Set the maximum permissible operating pressure and the recommended oil flow in the table in **the chapter Technical data**.

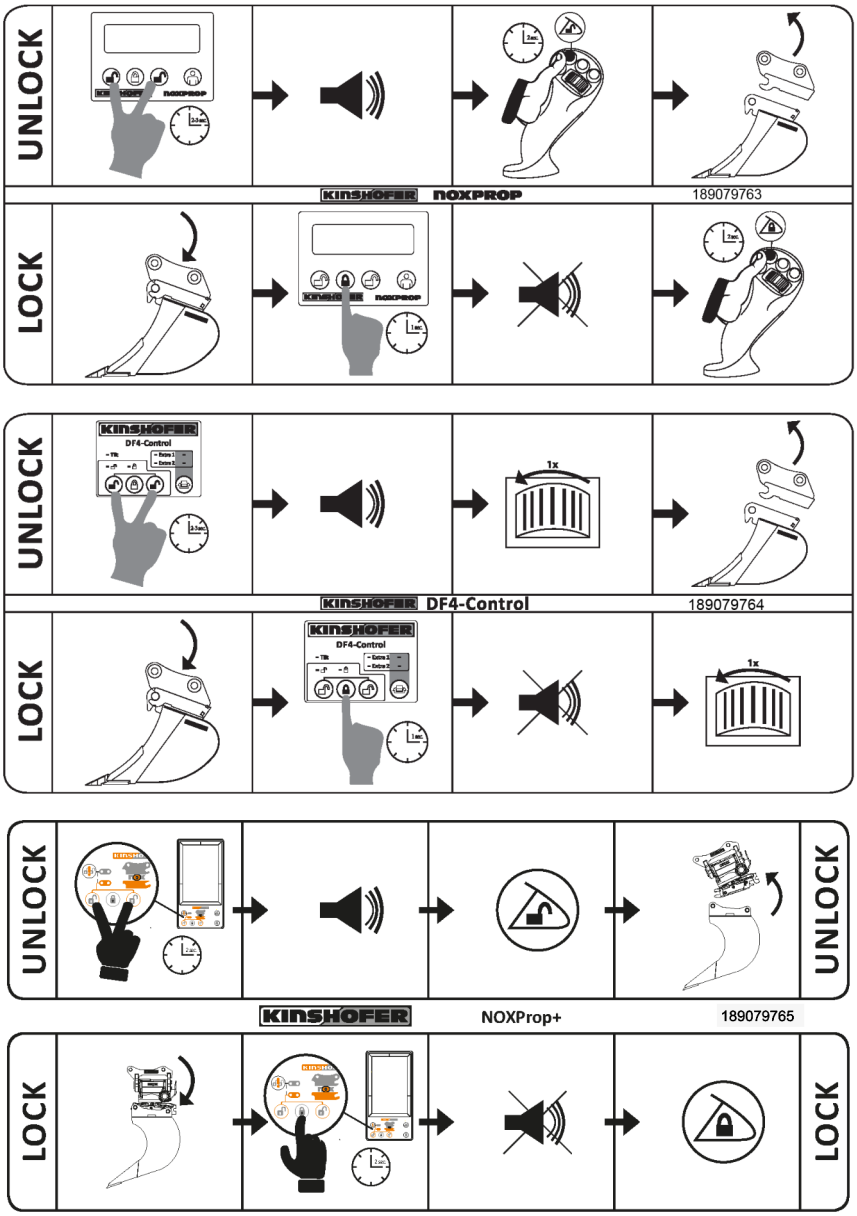


Hydraulic connections on Tiltrotator

Label	Function	Connecting thread				
		TR07	TR11	TR14	TR19	TR25
Rotation CW	Rotate clockwise	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP
Rotation CCW	Rotate anti-clockwise	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP
tilt LEFT	Tilt left	G 1/4" BSP	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP
tilt RIGHT	Tilt right	G 1/4" BSP	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP
EXTRA 1 (A/B)	Extra function A/B	G 3/8" BSP	G 1/2" BSP	G 3/8" BSP	G 3/8" BSP	G 3/8" BSP
EXTRA 2 (C/D)	Extra function C/D	G 1/4" BSP	G 1/4" (SD/HF)	G 1/4" (SD) G 3/4" (HF)	G 1/4" (SD) G 3/4" (HF)	G 1/4" (SD) G 1" (HF)
coupler LOCK	Locking the quick coupler	G 1/8" BSP	G 1/4" BSP	G 1/8" BSP	G 1/4" BSP	G 1/4" BSP
coupler UNLOCK	Unlocking the quick coupler	G 1/8" BSP	G 1/4" BSP	G 1/8" BSP	G 1/4" BSP	G 1/4" BSP
DRAIN LINE	Drain line (optional)	G 1/4" BSP	G 1/4" BSP	G 3/8" BSP	G 1/2" BSP	G 3/4" BSP

4.4. Excavator cabin sticker for the quick coupler

Selecting excavator cabin sticker for the quick coupler
Select the sticker in accordance with the control system and attach - also for repeat orders.
NOXPROP: Article number 189079763
DF4: Article number 189079764
NOXProp+: Article number 189079765



4.5. Function check

Procedure

- Carry out a functional check of the attachment after completing all works. Functional check carried out without accessories attached!
- Ensure that all functions are working correctly:
  1. Check each function individually with little operating pressure, at low motor speed and slow speed.
  2. Slowly increase operating pressure, motor speed and speed. Check functions individually.
  3. Slowly increase operating pressure, motor speed and speed to the maximum. First check the functions individually and then also together.
- Check whether all connected lines can move freely.
  In order to avoid wear, the lines must not rub against each other or be too short or too long!
- Check that all screw connections are firmly seated. Since the screws are glued, they may not be tightened. Remove all loose screws and replace them with new ones. Observe the tightening torque in **maintenance chapter** and the requirements in the service manual.
- Check that all hydraulic connections are firmly seated and free of leaks. Check loose connections according to the requirement in the service manual. Observe the tightening torque in **maintenance chapter** .

4.6. Troubleshooting - TR NOX III control systems

With the **CSP**, **DF4**, **DF10** and **DF10 control systems with upgrade kit**, the following functional faults may occur:

Functional fault	Control system	Cause	Remedial measures
» **No function.**	**CSP**	» **Electrical connection** faulty: » Plug connection not connected to the outrigger. » Defective cable, solenoid coil or valve.	» Connect plug connection. » Repair cable, solenoid coil or valve, replace if necessary.
		» **Control system** is not working: » Plug connection not connected to the display.	» Check plug connections on the display and connect.
		» **Hammer valve** does not open.	» Activate additional hydraulics on the carrier.
	DF4	» **Carrier valves** must not be switched.	» Activate additional hydraulics on the carrier.
	DF10	» **Carrier valves** must not be switched.	» Activate additional hydraulics on the carrier.
	DF10 with upgrade kit	» **Carrier valves** must not be switched.	» Activate additional hydraulics on the carrier.

Functional fault	Control system	Cause	Remedial measures
» Does **not** » **tilt** or tilts » **too slowly**.	**CSP**	» **Electrical connection** faulty: » Plug connection not connected to the display. » Defective cable, solenoid coil or valve.	» Connect plug connection. » Repair cable, solenoid coil or valve, replace if necessary.
		» **No electrical contact** on the valve.	» Check valve connector under the covering and connect.
		» **Faulty configuration** of the control system.	» Configure control system.
		» **Counterbalance valve** incorrectly adjusted.	» Re-adjust counterbalance valve.
	DF4	» **Electrical connection** faulty: » Plug connection not connected to the display. » Defective cable, solenoid coil or valve.	» Connect plug connection. » Repair cable, solenoid coil or valve, replace if necessary.
		» **No electrical contact** on the valve.	» Check valve connector under the covering and connect.
		» **Counterbalance valve** incorrectly adjusted.	» Re-adjust counterbalance valve.
		» **Oil flow rate** not sufficient.	» Optimise dimensioning of the hoses. » Check hydraulic connections and couplers for tight fit.

	DF10	» **Counterbalance valve** incorrectly adjusted.	» Re-adjust counterbalance valve.
		» **Oil flow rate** not sufficient.	» Optimise dimensioning of the hoses.
	DF10 with upgrade kit	» **Electrical connection** faulty: » Plug connection not connected to the display. » Defective cable, solenoid coil or valve.	» Connect plug connection. » Repair cable, solenoid coil or valve, replace if necessary.
		» **No electrical contact** on the valve.	» Check valve connector under the covering and connect.
		» **Counterbalance valve** incorrectly adjusted.	» Re-adjust counterbalance valve.
		» **Oil flow rate** not sufficient.	» Optimise dimensioning of the hoses. » Check hydraulic connections and couplers for tight fit.

Functional fault	Control system	Cause	Remedial measures
» **Does not** » **rotate** or rotates » **too slowly**.	**CSP**	**Electrical connection** faulty: » Plug connection not connected to the outrigger. » Defective cable, solenoid coil or valve.	» Connect plug connection. » Repair cable, solenoid coil or valve, replace if necessary.
		» **No electrical contact** on the valve.	» Check valve connector under the covering and connect.
		» **Faulty configuration** of the control system.	» Configure control system.
	DF4	**Electrical connection** faulty: » Plug connection not connected to the outrigger. » Defective cable, solenoid coil or valve.	» Connect plug connection. » Repair cable, solenoid coil or valve, replace if necessary.
		» **No electrical contact** on the valve.	» Check valve connector under the covering and connect.
		» **Oil flow rate** not sufficient.	» Optimise dimensioning of the hoses. » Check hydraulic connections and couplers for tight fit.
	DF10	» **Oil flow rate** not sufficient.	» Optimise dimensioning of the hoses. » Check hydraulic connections and couplers for tight fit.

	DF10 with upgrade kit	**Electrical connection** faulty: » Plug connection not connected to the outrigger. » Defective cable, solenoid coil or valve.	» Connect plug connection. » Repair cable, solenoid coil or valve, replace if necessary.
		» **No electrical contact** on the valve.	» Check valve connector under the covering and connect.
		» **Oil flow rate** not sufficient.	» Optimise dimensioning of the hoses. » Check hydraulic connections and couplers for tight fit.

Functional fault	Control system	Cause	Remedial measures
» **Unintentional rotating** - despite activation of **tilt** or **extra function**.	**CSP**	» **Pressure Line** and **Tank** connections were reversed.	» Note label marking. » Correctly connect hoses of the carrier.

» **Malfunction on the quick coupler.**	**CSP**	**Electrical connection** faulty: » Plug connection not connected to the outrigger. » Defective cable, solenoid coil or valve.	» Connect plug connection. » Repair cable, solenoid coil or valve, replace if necessary.
		» **No electrical contact** on the valve.	» Check valve connector under the covering and connect.
		» **Faulty configuration** of the control system.	» Configure control system.
	DF4	**Electrical connection** faulty: » Plug connection not connected to the outrigger. » Defective cable, solenoid coil or valve.	» Connect plug connection. » Repair cable, solenoid coil or valve, replace if necessary.
		» **No electrical contact** on the valve.	» Check valve connector under the covering and connect.
		» **Faulty configuration** of the control system.	» Configure control system.
	DF10	» **Oil flow rate** not sufficient.	» Optimise dimensioning of the hoses. » Check hydraulic connections and couplers for tight fit.
			» Check carrier installation.
	DF10 with upgrade kit	» **Oil flow rate** not sufficient.	» Optimise dimensioning of the hoses. » Check hydraulic connections and couplers for tight fit.
			» Check carrier installation.

5. Handling

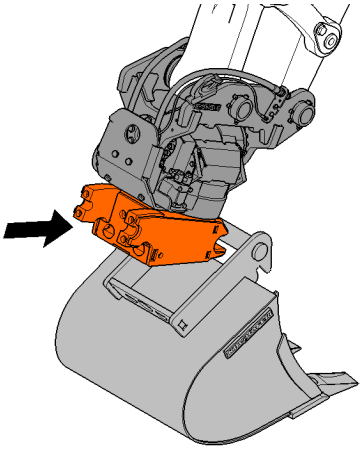
WARNING
In addition to the Kinshofer operating instructions for the NOX Tiltrotator, the operating instructions for the carrier (excavator), quick coupler and attachment also apply. All operating instructions must be freely accessible at all times.
If necessary, reorder any missing operating instructions from the manufacturer.

WARNING
The attachments are connected to a mechanical or hydraulic quick coupler.
The quick coupler is a safety component and requires regular thorough maintenance and must be checked for cracks and damage.

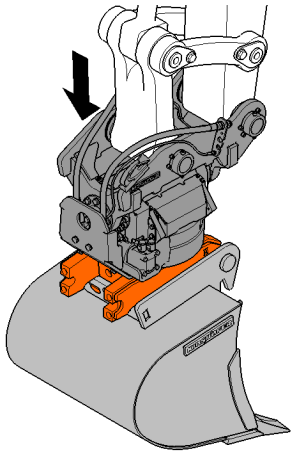
NOTICE
The following steps are intended as a general guide only.
For details, see the operating instructions for the quick coupler.
Improper installation can lead to hazardous situations.
In the event of a doubt relating to knowledge or safety, always contact the supplier or manufacturer.

NOTICE
The installed control system also controls the locking and unlocking of the quick coupler.
The correct installation of the control system ensures that the operating pressure is applied for the "Lock coupler" function for a hydraulic quick coupler in the pressure line.

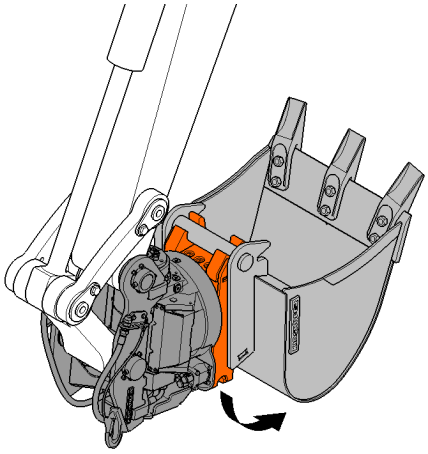
5.1. Assembling the attachment



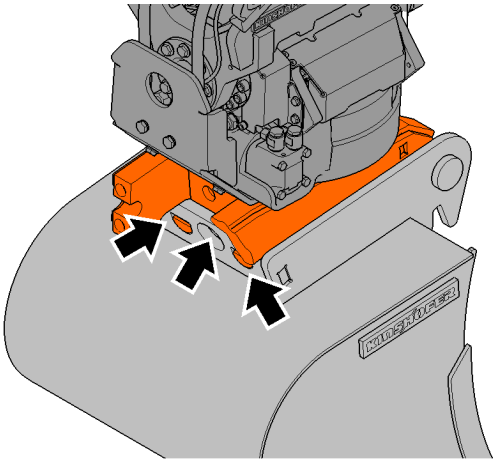
- Engage the coupling claws of the quick coupler in the coupling shaft of the attachment.
- Pivot the quick coupler into the adapter of the attachment.
- Unlock the quick coupler.



- Tilt/roll in the bucket cylinder or quick coupler and press the quick coupler into the adapter until it is seated fully in the adapter.



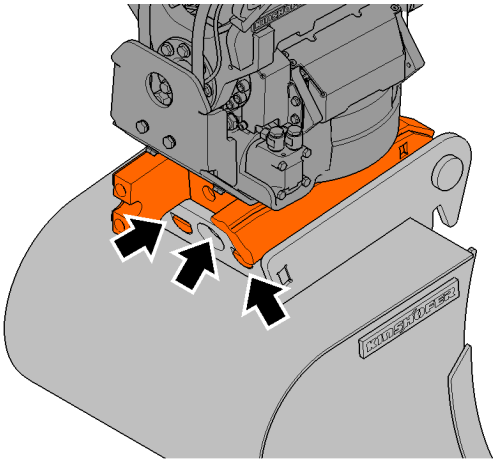
- Raise the bucket stem until the attachment is suspended just above the ground.
- Tilt/roll in the bucket cylinder or quick coupler until the attachment is located in the correct end position on account of its self weight.
- Locking the quick coupler



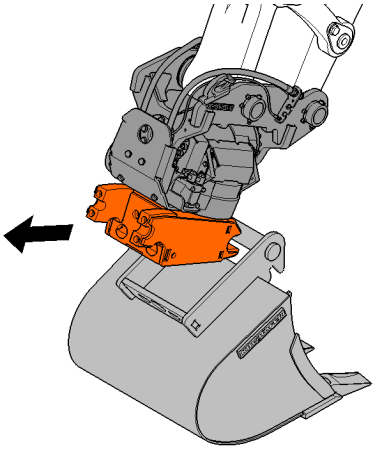
- Perform a safety check (visual inspection) to ensure the correct seating of the locking parts.
- By checking the lock indicator, ensure that the attachment is securely locked.

WARNING
- Check lock by carrying out a movement cycle, and visual and safety check.
- If any anomalies occur, cease working immediately.
- Report and/or rectify faults.
- Switch off the carrier, depressurise and secure to prevent reactivation.

5.2. Dismantling the attachment



- Set the attachment down on the ground.
- Unlock the quick coupler.



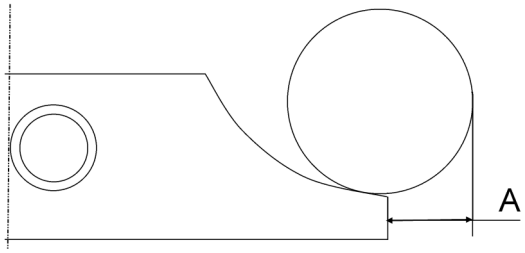
- Tilt/roll out the bucket cylinder or quick coupler and tilt the quick coupler out of the adapter.
- Carefully disengage the quick coupler from the coupling shaft.

5.3. Checking the quick coupler

WARNING
If A (max) is exceeded or the value falls below A (min), cease working immediately.
- If any anomalies occur, cease working immediately.
- Report and/or rectify faults.
- Switch off the carrier, depressurise and secure to prevent reactivation.

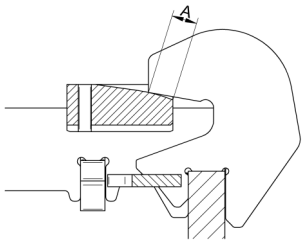
The used quick coupler must be checked regularly (at least every 4 weeks) for wear and cracks. For detailed instructions, see the operating instructions for the quick coupler.

Symmetrical quick coupler



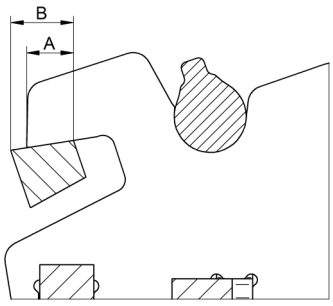
Bottom connection	A (max) mm
S30	5
S40	10
S45	15
S50	10
S60	20
S70	22
S80	25

Volvo/NTP/Bofors quick coupler



Bottom connection	A (min) mm
S1/NTP10/B20	30
S2/NTP20/B27	30
S3/B30	30

Verachtert quick coupler



Bottom connection	A (min) mm
CW10 - CW55	A>=B *0.7
At least 70% must be covered.	

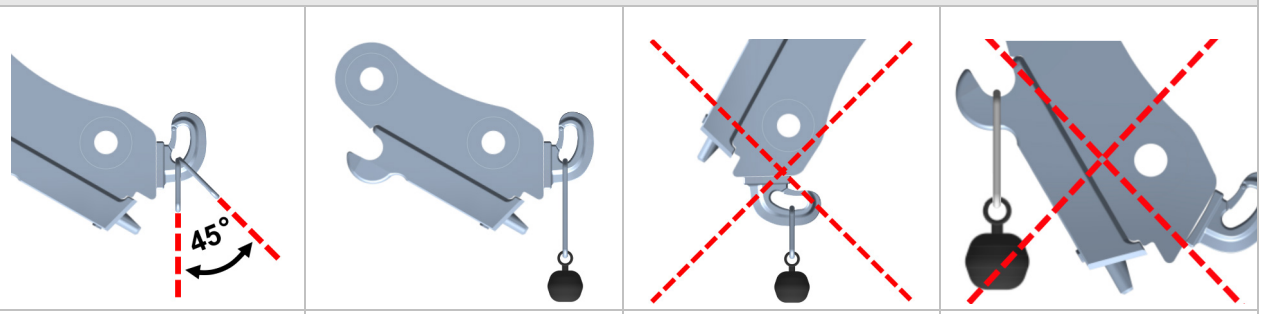
5.4. Working with attachment points

The attachment points (load hook and lifting eye) are available as accessories.

WARNING

- Use only with carrier machines that are equipped with load safety devices per **EN 474-5:2006+A2:2012**.
  - Payload table at driver's station
  - Overload warning device
  - Hose rupture safety device on lift and dipper arm cylinder
- Observe the load bearing capacity of the carrier machine.
- Observe the operating manual for the carrier machine.
- Observe the working load limit of the attachment points.
- Make sure the attachment points are loaded correctly.
- Only use approved lifting attachments / slings.
- Lift the load slowly and carefully.
- Observe the stipulated safety distances.

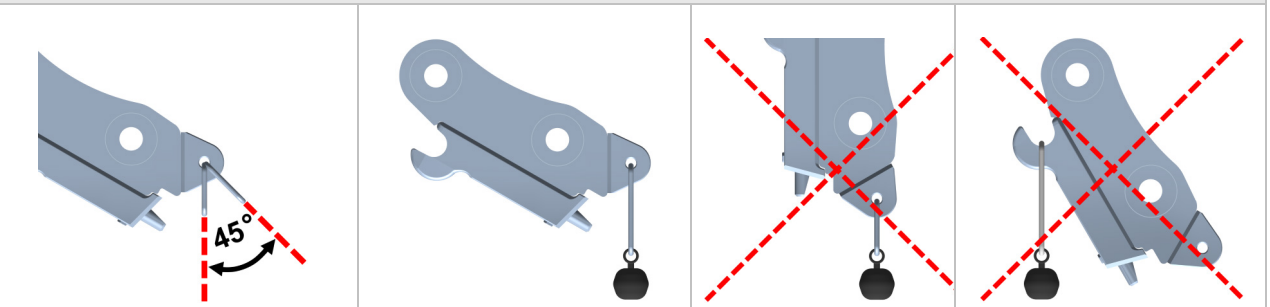
Load lifting examples with load hook



correct	correct	incorrect	incorrect

Load lifting - hook load

Load lifting examples with lifting eye



correct	correct	incorrect	incorrect

Load lifting - lifting eye

NOTICE

All possibilities that are not shown are non-intended uses and are prohibited.

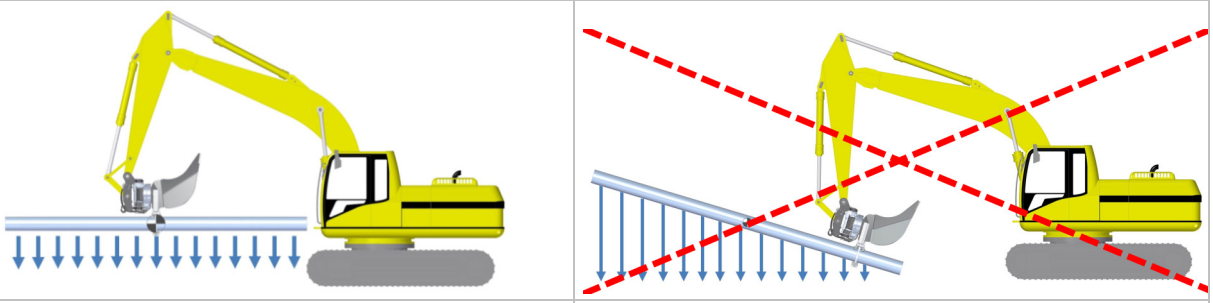
5.5. Working with the grab

The hydraulic grab module (gripper) is available as an option.

NOTICE
Material damage due to excessively high pressure.
Each grab must be equipped with an over centre valve in accordance with the Machinery Directive.

WARNING
- Use only with carrier machines that are equipped with load safety devices per **EN 474-5:2006+A2:2012**.
  - Payload table at driver's station
  - Overload warning device
  - Hose rupture safety device on lift and dipper arm cylinder
- Observe the load bearing capacity of the carrier machine.
- Observe the operating manual for the carrier machine.
- Observe the working load limit of the attachment points.
- Make sure the attachment points are loaded correctly.
- Only use approved lifting attachments / slings.
- Lift the load slowly and carefully.
- Observe the stipulated safety distances.

Load lifting examples with the grab



correct	incorrect

NOTICE
All possibilities that are not shown are non-intended uses and are prohibited.

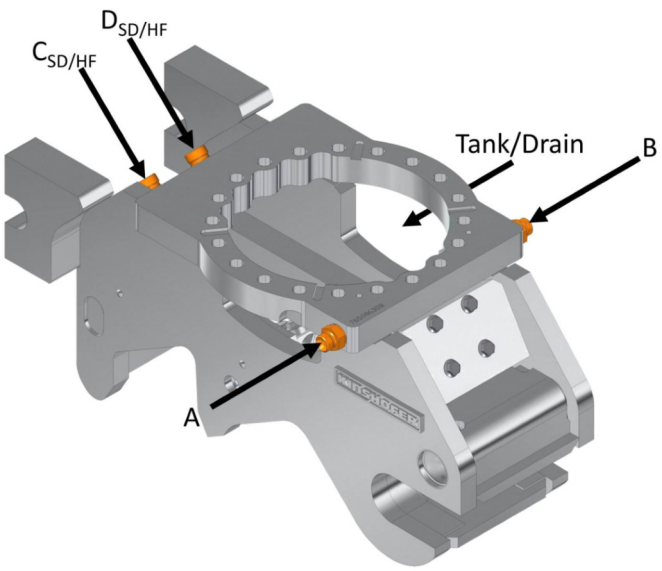
5.6. Connection of hydraulic attachments

NOTICE
Ensure absolute cleanliness when connecting the hydraulic connections, in particular with the sandwich version.

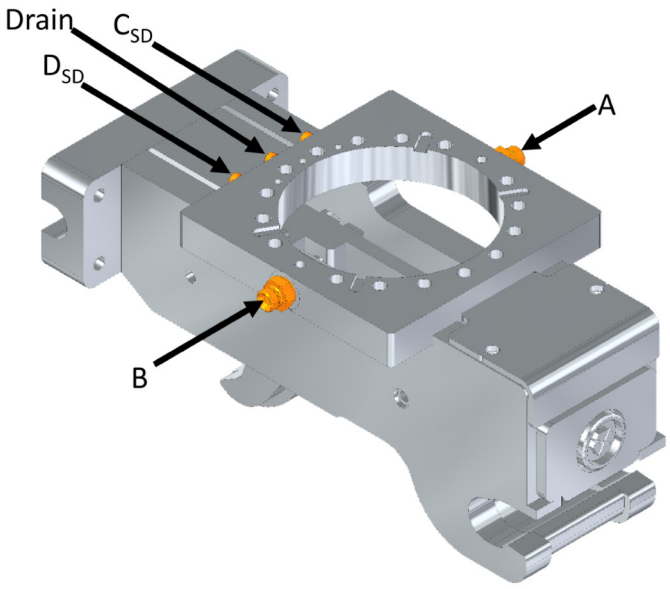
WARNING
Switch off the carrier, depressurise and secure to prevent reactivation.

Depending on the equipment and control system, max. two double-acting hydraulic functions (A/B, C/D) are available under the Tiltrotator, as well as an overflow oil line (tank/drain).
The respective position can be taken from the following figures.
You can find information on the oil flows for the functions in **the chapter Technical data**.

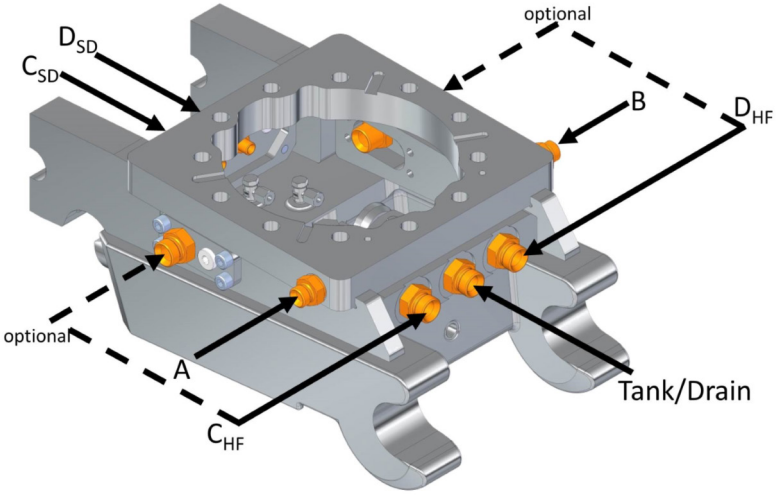
Pin to Pin CMX



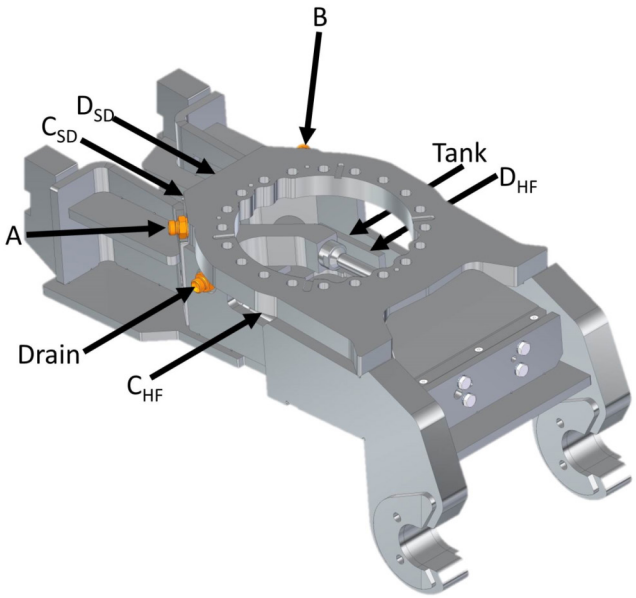
Pin to Pin D-Lock



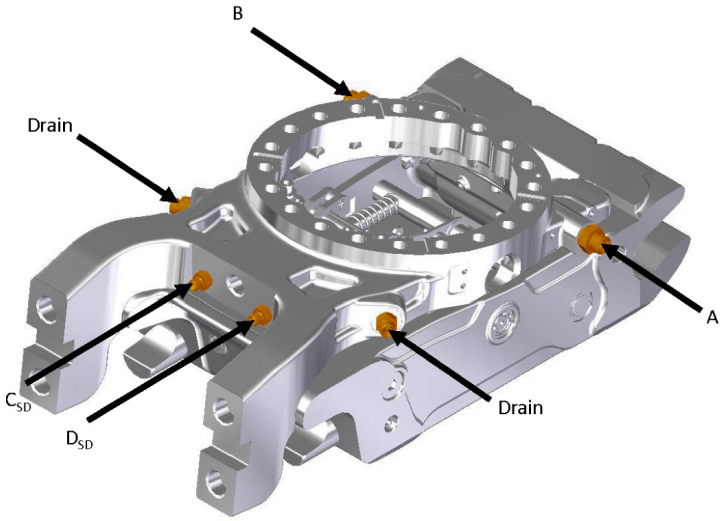
KHS/KMS



NTP/Volvo



Symmetric quick coupler S-coupler



6. Shutting down and disassembly

Shut down

1. Set the attachment down on a horizontal and stable surface before dismantling from the carrier.
2. Switch off the carrier machine drive.
3. Ignition on, actuate all hydraulic valves in the control circuits for the attachment until all of the pressure in the attachment or in the hydraulic lines has been dissipated.
4. Secure the attachment or the carrier machine to prevent erroneous or unauthorised starting up.
5. Disconnect the mechanical and hydraulic connections to the carrier.

NOTICE
Observe the additional requirements for shut down as described **in the chapter Shut down,** section **Safety instructions** .

WARNING
Environmental pollution!
Dismantling, maintenance and cleaning can cause hydraulic fluid to leak from the hydraulic lines of the attachment and carrier!
Leaking hydraulic fluid or lubricating grease can pose a hazard of environmental damage.
Oils and greases must be collected and be disposed of in an environmentally friendly manner (observe local regulations).

Dismantling the hydraulic hoses

- Perform shut down as described above.
- Place a suitable container (e.g. collecting basin) under the disconnecting point to collect the hydraulic fluid.
- Firstly, disconnect the pressure line (label: PRESSURE LINE) from the outrigger of the carrier.
- Then, disconnect the tank line (label: TANK LINE).
- Seal the hydraulic lines so that foreign bodies such as sand and water cannot penetrate.
- Disconnect all other lines, if present.
- Leaking hydraulic fluid must be disposed of in an environmentally friendly manner (observe local regulations).

Dismantling the attachment

- Dismantling takes place in reverse order to assembly, see **Assembly and commissioning/Mechanical connection**
- Store the attachment in a suitable, secure and dry location.
- For the requirements for **extended shut down** and **commissioning after extended shut down**, see **Maintenance and service** .

7. Cleaning and care

- The cleaning of the **attachments** should be carried out on a suitable surface with an **oil separator**.
- Adjust the cleaning intervals to the operating conditions, at least **once weekly** (see chapter **Maintenance and service**)!

Notice
Paint damage, damage to seals and bearings, oil leaks and other damage are possible if cleaning is not carried out properly.

1. The attachment can be cleaned with the help of compressed air:
   - If the attachment is dry.
   - max. **1 MPa** (10 bar) air pressure.
   - min. **400 mm** nozzle distance.

2. The attachment can be cleaned with the help of a high pressure cleaner:
   - max. **80 °C** water temperature.
   - max. **7 MPa** (70 bar) water pressure.
   - min. **400 mm** nozzle distance.
   - Never clean seals and seal gaps directly with a pressure washer.
   - The paint requires **two weeks**, to harden completely after commissioning or after being repainted. Do not use a pressure washer during this period.

Lubrication and Functional checks

Every time after cleaning, the attachment must be lubricated and a functional check carried out, see chapter **Technical data / Overview greasing point** and chapter **Assembly and commissioning / Functional checks**.

8. Maintenance and service

WARNING
Switch off the carrier, depressurise and secure to prevent reactivation.

8.1. Maintenance

Checks and maintenance must be carried out in accordance with the maintenance check list in order to guarantee the safety, functional capability and long service life of the product.

- Maintenance work must be carried out by specially trained personnel.
- Pay attention to cleanliness when carrying out maintenance work.
- Before opening the hydraulic connections, these should be cleaned along with the immediate environment in order to prevent dirt getting in to the hydraulic system.
- Clean the greasing points before lubricating.

NOTICE
Use under intensified working conditions
All information relates to an 8 hour working day.

Maintenance intervals should be cut in half or performed every day with:

- Construction site operation where there are extreme levels of dirt.
- Increased operating times, e.g. multi-shift operation.
- Significant external influences.
- Frequent underwater use.

Replace hydraulic hoses every 2 years under these conditions.
Property damage, including destruction of the attachment can occur under these conditions if the attachment is not properly maintained!

NOTICE
In the event of damage, the attachment must not continue to be used!

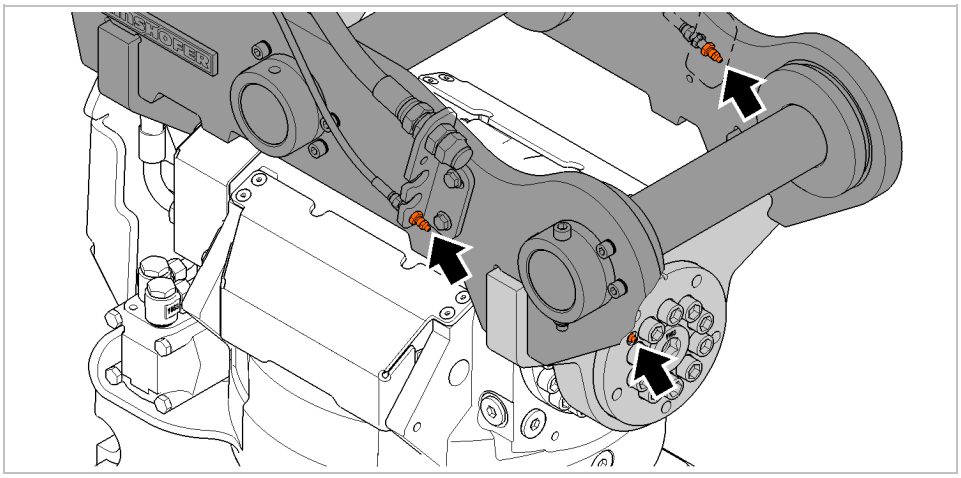
WARNING

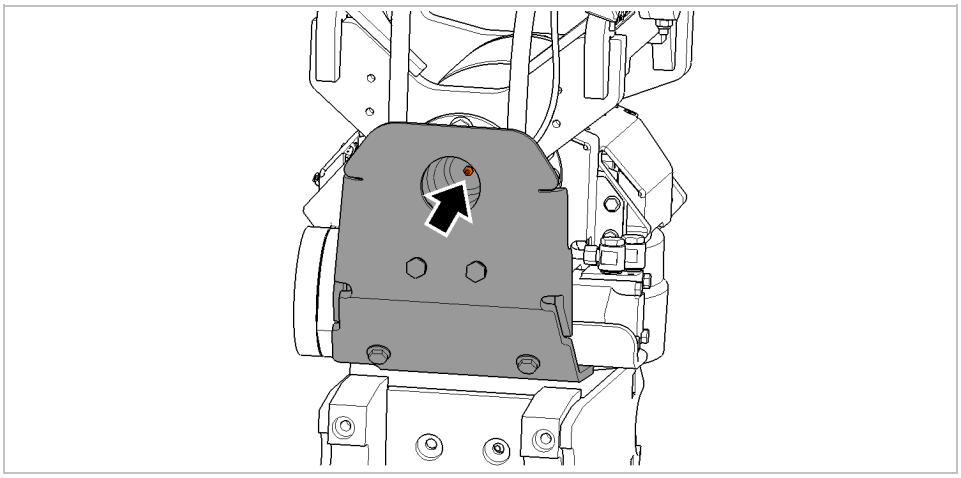
Danger of injury and crushing with:
- Maintenance work
- Repair work
- Cleaning work

In order to avoid health risks:
- Wear eye protection
- Wear hand protection
- Wear hearing protection

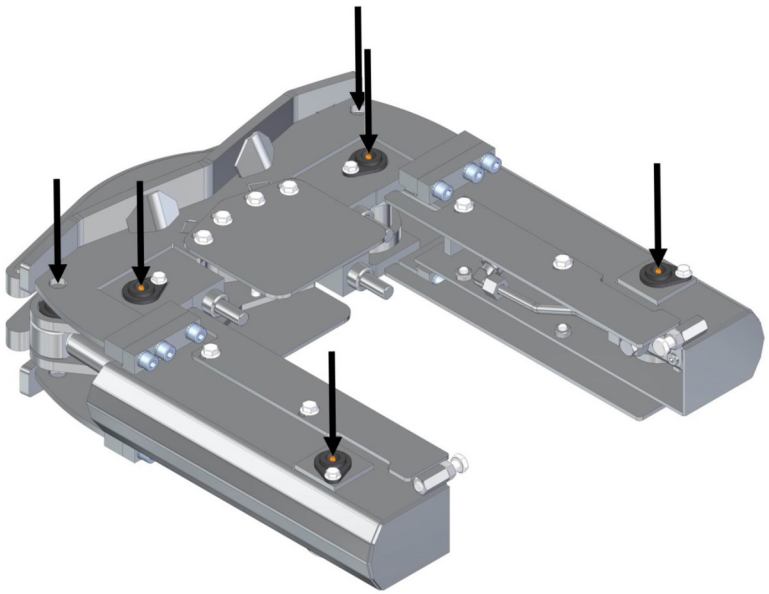
8.1.1. Greasing points on NOX Tiltrotator

Greasing points are at the front and rear of the housing in the travel direction or if greasing points are installed, at the left and right on the upper bracket.





8.1.2. Gripper greasing points



8.1.3. Maintenance schedule

Annual maintenance activities may be performed in conjunction with the excavator service.

Maintenance activity	Daily	Every 500 h	Annually or every 1500 operating hours	6 years	Commissioning after extended Shut down (from 1 month)
Lubrication	X [1.2]	X [1.2]	X [1.2]	X [1.2]	X [1.2]
Check hydraulic connections for leaks	X	X	X	X	X
Check bolt(ed) connections, replace loose screws, bolts and apply adhesive	X [2]				
Check for: deformation, cracks, wear, smooth running	X	X	X	X	X
Expert inspection of functional safety		X	X	X	X
Replace hydraulic fluid			X [2]		
Replace the transmission lubricant in the rotary drive			X [2]	X [2]	
Replace hydraulic hoses				X	
Check and/or replace seals					X
Calibrate the joysticks with control system variant CSP			X		

See operating instructions in chapter:
[1]Overview of greasing points
[2]Oil and grease

8.1.4. Maintenance check list

Maintenance intervals	☑
Daily	
Lubrication [1, 2]	
Check hydraulic connections for leaks and tighten if necessary	
Check bolt(ed) connections, replace loose screws, bolts and apply adhesive	
Check pinned joints and safety parts, tighten or replace if necessary	
Check for: deformation, cracks, wear, smooth running	
Every 500 operating hours	
Expert inspection for functional safety, corrosion, deformation, cracks, wear, smooth running	
Annually or every 1500 operating hours	
Expert inspection for functional safety, corrosion, deformation, cracks, wear, smooth running	
Crack checking by means of die penetration process according to EN 571 and EN ISO 3452	
Replace hydraulic fluid[2]	
Replace transmission lubricant in the rotary drive[3]	
Every 6 years	
Replace hydraulic hoses	
Commissioning after extended shut down (from 1 month)	
Lubrication [1, 2]	
Check bolt(ed) connections, replace loose screws, bolts and apply adhesive	
Check pinned joints and safety parts, tighten or replace if necessary	
Check hydraulic connections for leaks and tighten if necessary	
Check for cracks, wear, corrosion and functional safety	
Check or replace seals	

See operating instructions in chapter:
[1] Overview greasing points
[2] Oil and grease
[3] Transmission lubricant oil volume (see table **Technical data)**.

Location, Date	Stamp with signature

8.1.5. Daily inspection

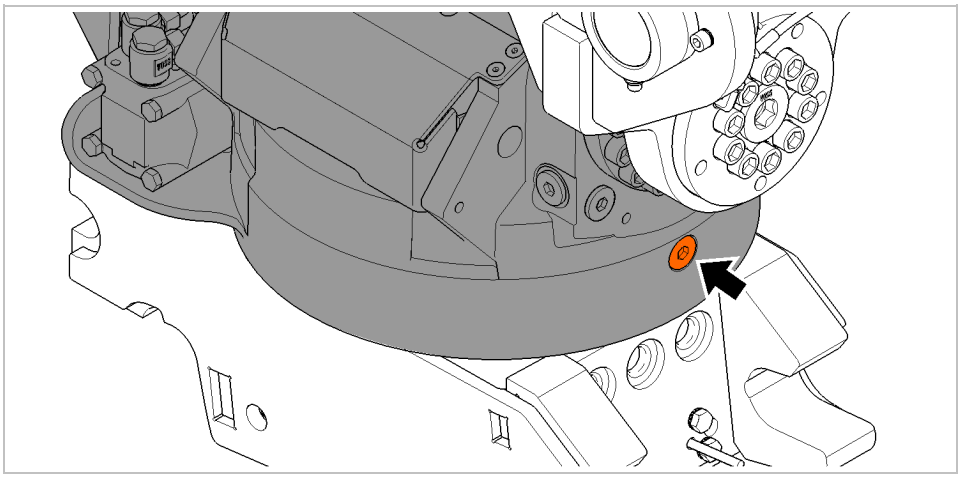
- Check the product for irregularities, deformation, cracks and wear.
- Check all hydraulic connections and hydraulic lines for leaks and externally visible damage.
- Check bolt(ed) connections, replace loose screws, bolts and apply adhesive
- If necessary, replace all damaged parts in order to assure operational safety.
- Use a grease gun to lubricate the grease nipple (see **chapter Maintenance - Overview greasing point**) until the grease emerges between the bearings. Use grease with properties as described in **chapter Maintenance - Oil and grease** .

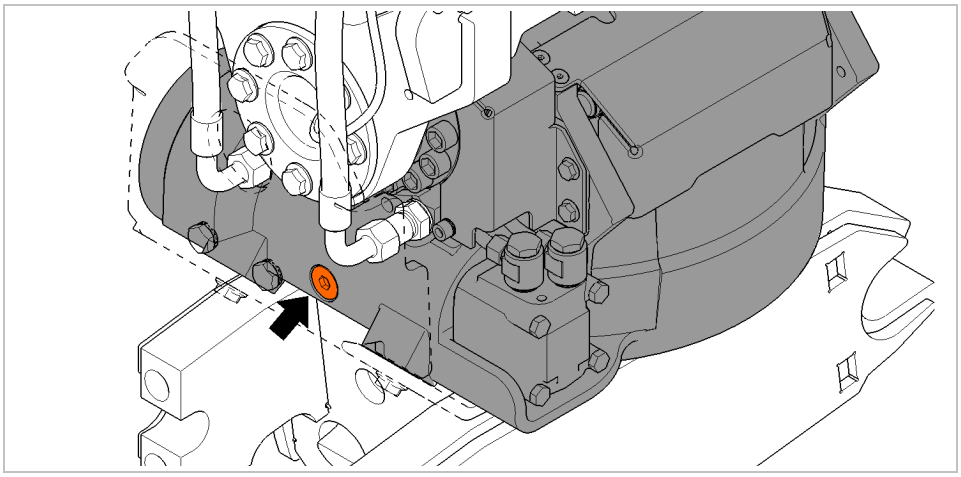
Cylinder and hexagon head cap screws/nuts [Friction coefficient 0.125]							
Quality class		8.8	10.9	12.9	8.8	10.9	12.9
Thread [metric]	SW [mm]	Tightening torques [Nm]			Tightening torques [ft-lbs]		
M5	8	5.8	8.1	9.7	4.3	6	7.2
M6	10	10	14	17	7.5	10.5	12.5
M8	13	24	34	40	20	25	30
M10	17	48	67	81	35	50	60
M12	19	83	117	140	60	85	105
M14	22	132	185	220	95	135	160
M16	24	200	285	340	150	210	250
M18	27	275	390	470	205	290	345
M20	30	390	550	660	290	405	485
M22	34	530	745	890	390	550	656
M24	36	675	950	1140	500	700	840
M27	41	995	1400	-	734	1032	-
M30	46	1350	1900	-	995	1400	-
M33	50	1830	2580	-	1350	1903	-
M36	55	2360	3310	-	1740	2440	-
M39	60	3050	4290	-	2250	3164	-
M42	65	-	4500	-	-	3320	-
M48	-	-	6500	-	-	4795	-

Locking screws/nuts [Friction coefficient 0.125]							
Type		Tensilock screws/nuts				Ribbed screws/nuts	
Quality class		Class 80		Class 100		Class 100	
Carrier material		Steel	Cast iron	Steel	Cast iron	Steel	Cast iron
Thread [metric]	SW [mm]	Tightening torques [Nm/ft-lbs]					
M6	10	16 / 11.8	13 / 9.6	21 / 15.5	16 / 11.8	19 / 14	16 / 11.8
M8	13	34 / 25.1	28 / 20.7	44 / 32.5	36 / 26.6	42 / 31	35 / 25.8
M10	17	58 / 42.8	49 / 36.1	75 / 55.3	64 / 47.2	85 / 62.7	75 / 55.3
M12	19	97 / 71.5	83 / 61.2	120 / 88.5	105 / 77.4	130 / 95.9	115 / 84.8
M14	22	155 / 114.3	130 / 95.9	185 / 136.4	170 / 125.4	230 / 169.6	200 / 147.5
M16	24	215 / 158.6	195 / 143.8	280 / 206.5	260 / 191.8	330 / 243.4	300 / 221.3

8.1.6. Annual replacement of the transmission lubricant

The transmission lubricant is to be changed at operating temperature.





Drain The drain plugs are on the housing.

- Place a collecting tray underneath.
- Unscrew the screw plug.
- Rotate the housing by approximately 45° to drain the transmission lubricant.
- Wait a few minutes until the transmission lubricant is completely drained.

Dispose of the drained transmission lubricant to ensure there is no harm to the environment. Observe national and regional regulations for disposing of used oil and grease.

Filling For transmission oil specification and filling quantities, refer to the chapter **"Oil and grease"**.

- Tilt the housing for filling.
- Top up the transmission oil.
- Check seal ring on the drain plug and replace it, if necessary.
- Screw in and tighten the drain plug.

8.1.7. Annual maintenance

Inspection according to regional regulations

Carry out an **expert inspection** for cracks, wear, corrosion and functional safety according to the country-specific health and safety directives.
In Germany the test must be carried out per regulation **BGR 500, chapter 2.8, section 3.15.2**.

Hydraulic fluid replacement

- Clean the hydraulic connections before opening in order to prevent dirt from penetrating the oil circuit.

8.1.8. Replace the hydraulic components after 6 years

Regardless of the operating times, the hydraulic hoses, hydraulic quick couplings and screwed connections on the attachment must be replaced after 6 years at the latest. If necessary, they can be replaced sooner.

8.1.9. Commissioning after being shut down for 1 month or more

Carry out all maintenance work according to the **maintenance check list**.
If the attachment has been exposed to environmental influences and temperature fluctuations (e.g. storage outdoors), then exchange the seals.

Maintenance

- Carry out all necessary maintenance work independent of the operating hours and the duration of decommissioning, but nevertheless at least **"daily maintenance"** and **"maintenance after 50 operating hours"**.

NOTICE
Activities for certified dealers only!
The following activities may only be performed by certified dealers for certain attachments:

- With the NOX Tiltrotator:
  - Installation of the controllers CSP and DF4
  - Seal replacement
- For HPX and TC:
  - Seal replacement

8.2. Tightening torques

Check bolted connections and tighten if necessary.

Cylinder and hexagon head cap screws/nuts [Friction coefficient 0.125]							
Quality class		8.8	10.9	12.9	8.8	10.9	12.9
Thread [metric]	SW [mm]	Tightening torques [Nm]			Tightening torques [ft-lbs]		
M5	8	5.8	8.1	9.7	4.3	6	7.2
M6	10	10	14	17	7.5	10.5	12.5
M8	13	24	34	40	20	25	30
M10	17	48	67	81	35	50	60
M12	19	83	117	140	60	85	105
M14	22	132	185	220	95	135	160
M16	24	200	285	340	150	210	250
M18	27	275	390	470	205	290	345
M20	30	390	550	660	290	405	485
M22	34	530	745	890	390	550	656
M24	36	675	950	1140	500	700	840
M27	41	995	1400	-	734	1032	-
M30	46	1350	1900	-	995	1400	-
M33	50	1830	2580	-	1350	1903	-
M36	55	2360	3310	-	1740	2440	-
M39	60	3050	4290	-	2250	3164	-
M42	65	-	4500	-	-	3320	-
M48	-	-	6500	-	-	4795	-

Locking screws/nuts [Friction coefficient 0.125]							
Type		Tensilock screws/nuts				Ribbed screws/nuts	
Quality class		Class 80		Class 100		Class 100	
Carrier material		Steel	Cast iron	Steel	Cast iron	Steel	Cast iron
Thread [metric]	SW [mm]	Tightening torques [Nm/ft-lbs]					
M6	10	16 / 11.8	13 / 9.6	21 / 15.5	16 / 11.8	19 / 14	16 / 11.8
M8	13	34 / 25.1	28 / 20.7	44 / 32.5	36 / 26.6	42 / 31	35 / 25.8
M10	17	58 / 42.8	49 / 36.1	75 / 55.3	64 / 47.2	85 / 62.7	75 / 55.3
M12	19	97 / 71.5	83 / 61.2	120 / 88.5	105 / 77.4	130 / 95.9	115 / 84.8
M14	22	155 / 114.3	130 / 95.9	185 / 136.4	170 / 125.4	230 / 169.6	200 / 147.5
M16	24	215 / 158.6	195 / 143.8	280 / 206.5	260 / 191.8	330 / 243.4	300 / 221.3

8.2.1. Hydraulic connection - DKS

Metric connections

For hydraulic applications, metric connections with **sealing cones (24°)** in heavy-duty designs are widely used.
There are also connections that feature an **O-ring** as an additional sealing element (**DKOS**).

Tightening torque for hydraulic connections DKS/DKOS			
Nominal size	**Union nut thread**	**[Nm]**	**[ft-lbs]**
08S	M16 x 1.5	30 - 50	22.1 - 36.9
10S	M18 x 1.5	30 - 50	22.1 - 36.9
12S	M20 x 1.5	40 - 60	29.5 - 44.3
16S	M24 x 1.5	50 - 70	36.9 - 51.6
20S	M30 x 2.0	90 - 120	66.4 - 88.5

8.2.2. Hydraulic connection - DKL

DKLs are light-duty metric nut fittings with a sealing taper (24°).
DKOLs are equipped with an O-ring as a sealing element.

Tightening torque for hydraulic connection DKL/DKOL			
Nominal size	Threaded coupling nut	Nm	ft-lbs
08L	M14x1,5	20-40	14,7-29,5
10L	M16x1,5	30-50	22,1-36,9
12L	M18x1,5	30-50	22,1-36,9
15L	M22x1,5	50-70	36,9-51,6

8.2.3. Hydraulic connection - DKJ (JIC)

DKJs (JIC) are imperial fittings with a sealing taper (27°).

Tightening torques for hydraulic connector DKJ					
Nominal size	Threaded coupling nut	Size	Nm	ft-lbs	F.F.F.T.
¼"	7/16-20 in	4	15-17	10.8-12.5	2
3/8"	9/16-18 in	6	27-30	19.6-22.0	1¼
½"	3/4-16 in	8	59-65	45.5-47.8	1

8.2.4. Internal threads of hydraulic fittings

Tightening torques: BSP / metric thread					
Series	AD pipe	Screw thread			
		BSP	MA [Nm]	ISO thread [metric]	MA [Nm]
L	6	G1/8 A	25	M10 x 1.0	25
	8	G¼ A	50	M12 x 1.5	30
	10	G¼ A	50	M14 x 1.5	50
	12	G3/8 A	80	M16 x 1.5	80
	15	G½ A	160	M18 x 1.5	90
	18	G½ A	105	M22 x 1.5	160
	22	G¾ A	220	M26 x 1.5	285
	28	G1 A	370	M33 x 2.0	425
	35	G1¼ A	600	M42 x 2.0	600
	42	G1½ A	800	M48 x 2.0	800
S	6	G¼ A	60	M12 x 1.5	35
	8	G¼ A	60	M14 x 1.5	60
	10	G3/8 A	110	M16 x 1.5	95
	12	G3/8 A	110	M18 x 1.5	120
	14	G½ A	170	M20 x 1.5	170
	16	G½ A	140	M22 x 1.5	190
	20	G¾ A	320	M27 x 2.0	320
	25	G1 A	380	M33 x 2.0	500
	30	G1¼ A	600	M42 x 2.0	600
	38	G1½ A	800	M48 x 2.0	800

8.3. Repair and welding work

NOTICE
Loss of all warranty and liability claims through unauthorised modifications to the attachment. Possible damage to property and loss of functional safety.

- No structural modifications or changes to settings may be undertaken on the attachment or on components.
- Welding work only after consultation with the manufacturer and compliance with the:
  - Welding instructions.
  - Specification of the filler material

NOTICE
Loss of guarantee claims due to use of non-original parts. Possible loss of operating and functional safety.

- For repair work and replacement of wearing part only **original spare parts** from the manufacturer may be used in order to guarantee functionality and safety.

Exceptions include standardised parts such as screws and hydraulic fittings.

8.4. Oil and grease

Only use the manufacturer's authorised **mineral hydraulic oils** and **greases**.

Hydraulic fluid

The attachment may be operated with industry-standard mineral oils according to the information in the operating instructions for the carrier.

NOTICE
Because of the functional test completed by the manufacturer, residual material of the following **hydraulic oil** may still be present in the attachment:

HLP46 according to DIN 51524 Part 2 / ISO VG 46

In order to be able to use the attachment on ecologically sensitive terrain or in protected areas, the manufacturer authorises operation with the following quickly biologically degradeable **hydraulic oil**:

HEES according to ISO 15380 or OECD 301 B

NOTICE
Possible damage due to using non-homogeneous hydraulic oil.
- Do not mix hydraulic oils of differing standards under any circumstances.
- In case of doubt regarding the specification or mixture, replace the hydraulic oil completely.
- The proportion of foreign oil must not exceed **2%**.
- Hydraulic oils should be analysed every **500 operating hours** to avoid a premature oil change.

Observe the information in the operating instructions for the carrier.

Lubricating grease

Lubricate greasing points and surfaces with the following **multi-purpose grease**:

EP2 according to DIN 51825: KP2K-20 and ISO / DIS 6743-9: ISO L-XBCHB 2

NOTICE
Grease nipples as described in the **Maintenance - Overview of greasing points** chapter.

Transmission lubricant

Transmission oil recommendation and first filling:

Anderol 5999XEP	
175086433	20 l
175086432	3 l

Alternatively, the following transmission oil may also be used:

ISO VG 1000 per DIN 51517-3, Q8 Schumann G 1000

In special cases, use the following **fluid grease**:

Alvania EP 0 high-performance fluid grease DIN 51502 GP0G-30 consistency class 0 (DIN 51818)

NOTICE
For the filling quantity for the transmission lubricant, refer to the chapter **Technical Data**.

8.5. Disposal

Oil and grease

Observe country-specific and regional disposal directives.

Attachment

After proper shut down and removal of hydraulic oil and grease residues, the attachment can be disassembled and the materials recycled.

9. Complaints, guarantee, and liability

9.1. Complaint

In the event of a complaint, contact the contractual partner or manufacturer. After agreement with the manufacturer, return damaged parts in their original packaging.
Enclose a completed **returns form** with the return.
Include the serial number of the attachment (see chapter **1**).
For transport damage: Provide the name of the transport company, delivery date and delivery time, name of the driver and registration number of the transport vehicle. Include the delivery papers with the return.

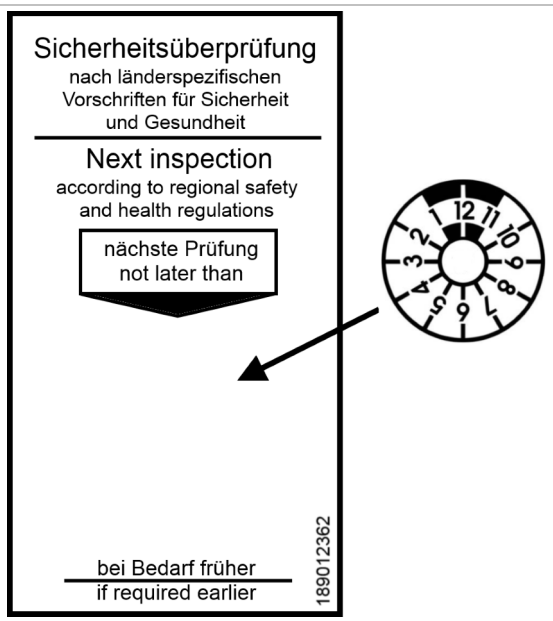
9.2. Warranty and liability

General terms and conditions of service

Services and deliveries are provided exclusively according to the **general terms and conditions of service** of the manufacturer.
Agreements deviating from these terms must be agreed to in writing and confirmed by the manufacturer.
Guarantee and liability claims for personal and property damage are excluded if the limitations in the general terms of service are not observed.

10. Certificate of Inspection

Cranes and excavators must be inspected according to regional regulations. This is the responsibility of the operator.
If an inspection sticker is on the attachment at delivery, the manufacturer recommends replacing the round sticker after each inspection for the next due date.
Stickers can be obtained from the manufacturer.



Certificate of Inspection

Verification of SAFETY CHECKS having been carried out:	
Type:	
Serial number:	

Year	Date	Qualified expert	Company

11. Inspection certificate DIN EN 10204

Inspection certificates and figures are for illustration purposes only. Figure may differ from the attachment supplied. The respective inspection certificates for weld-on hooks may be requested from the manufacturer using the serial number.

11.1. Inspection certificate for 2t weld-on hook

Article number: 154050408

Prüfbescheinigung DIN EN 10204 10204-2.2
Inspection documents DIN EN 10204

THIELE

Dieses Prüfzeugnis wurde EDV unterstützt erstellt und ist ohne Unterschrift gültig
This certificate was generated by computer and is valid without a signature

Hersteller: THIELE GmbH & Co.KG
Werkstr. 3 D-58618 Iserlohn
Telefon: (+49) / (0)2371 / 947 - 0
Fax: (+49) / (0)2371 / 947 - 241
Email: info@thiele.de

Nr. / No. 392691

Kinshofer GmbH
Hauptstr. 76
D 83666 Waakirchen

Bestell-Nr. / Order-No.: 612797+386141

Auftrags-Nummer / Our order-No.: 1600096/010

Chiffre-Nr. / Works-No.: 5444

Bezeichnung / Designation: MONTAGEHAKEN MHF 02 2TO M.SICHERUNG

Dieses Prüfzeugnis ist über die gesamte Nutzungsdauer aufzubewahren
This certificate must be kept during the entire service life
QM-MANAGEMENTSYSTEM NACH DIN ISO 9001
CONTROLLED QUALITY-SYSTEM ACCORDING ISO 9001

Stückzahl / Number: 150,000 STK

Artikel-Nr. / Part-No.: F32752

Herstellerzeichen / Manufacturer's mark: H4 "2" ./.

Werks-Nr. / Indification-No.: RW

Bruchdehnung A
Elongation at break A

Werkstoff / Material	**Tragfähigkeit WLL** Working load limit WLL	**Fertigungsprüfkraft MPF_1** [1] Manufacturing proof force MPF_1 [1]	**Bruchkraft BF** / Breaking force BF
EN10025	2T*	./.	./.

TWN 0850/1

* IN HAUPTZUGRICHTUNG

BG-PRÜFZERT

Dieses Prüfzeichen gilt für Ketten zum Heben (nach DIN 5684, DIN EN 818, DIN 32891 u.ä.) und Kettenzubehörteile (nach DIN 5691, EN 1677).
This approval mark applies to lifting chains (to DIN 5684, DIN EN 818, DIN 32891 etc.) and chain accessories (to DIN 5691, EN 1677).

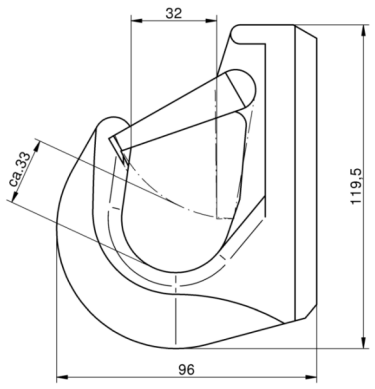
Ergebnis der Prüfung / Result of tests
OHNE BEANSTANDUNG / Without any objections

1) Prüfabschnitte MPF_1 bis MPF_4 gemäß EN 818-4, Tabelle 4
1) Manufacturing proof force MPF_1 to MPF_4 according EN 818-4, Table 4

Prüfabschnitt / Test Segment	**Faktor** / Factor
MPF_1	**2,5**
MPF_2	**3,5**
MPF_3	**4,0**
MPF_4	**5,25**

26.10.15
Datum Date

Abnahmebeauftragter WT
Signature of the tester
Quality management/ WT



11.2. Inspection certificate for 3t weld-on hook

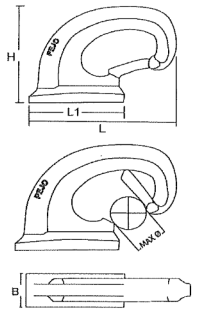
Article number: 154082118

Pejo AB
Box 252
611 26 Nyköping
SWEDEN

Inspection certificate 2.2 - EN 10204:2004
Number:

Delivery data and markings			
Customer:			
Manufacturer: Pejo AB	**Supplier:** Combi Wear Parts	**Marking**	
Purchase order number:	**Order date:**	**Identification of manufacturer**	PEJO
Delivery note number:	**Delivery date:**	**Identification of product**	C
Item number: 65103	**Description:** PEJO HOOK C203	**Identification of production lot**	
Steel category: Alloy Steel	**Raw Material:** TK23F SA290	**Working load limit**	3
Traceability code:	**Quantity:** / **Approx. Weight each:** 1,25 kg	**Grade expression with number/letter**	3

Check for dimensional accuracy



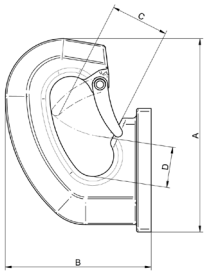
All dimensions lie within the specified manufacturing limit deviations ±4% [mm]

Rated values					
H	L1	L	B	MAX Ø	
101,5	83,5	134,5	35	25	

Loads references			
WLL Working load Limit (t)	**MPF** Manufacturing proof force (kN)	**BF** Min breaking force (kN)	**SF** Safety factor
3	74	118	4

Test result: The specified minimum MPF and BF were met or exceeded

Angelica J Karlsson
Issued by **Signature**



Article number Weld-on hook	Load capacity	A= Height	B= Width	C= Folding dimension	D= Ø
154082118	3 t	133	100	40	28
154082120	5 t	190	135	60	40
154082122	8 t	256.5	170	70	70
154082123	10 t	255.5	175	80	70
Dimensions are approximate.					

11.3. Inspection certificate for 5t weld-on hook

Article number: 154053934

THIELE

Hersteller: THIELE GmbH & Co. KG · Werkstr. 3 · D-58640 Iserlohn
Telefon: (+49) / (0) 23 71 / 947 - 0
Fax: (+49) / (0) 23 71 / 947 - 241
Email: info@thiele.de

Prüfbescheinigung DIN EN 10204 10204-2.2

Inspection documents DIN EN 10204
Documents de contrôle DIN EN 10204
Certificado de test segun DIN EN 10204

Dieses Prüfzeugnis wurde EDV unterstützt erstellt und ist ohne Unterschrift gültig
This certificate was generated by computer and is valid without a signature

Nr. / No. / N° / N°: 356259

Kinshofer GmbH
Hauptstr. 76
D 83666 Waakirchen

Bestell-Nr. / Order-No. / N° de commande. / N° de la orden del pedido: 603956

Auftrags-Nummer / Our order-No. / Notre N° de commande / N° de pedido: 1308683/020

Chiffre-Nr. / Works-No. / N° de chiffre / N° de lote no: 6210

Bezeichnung / Designation / Désignation / Denominación: ANSCHW.-HAKEN M.SICH. GH5 ROT SYSMA

Stückzahl / Number / Nombre de pièce(s) / Número de pieza(s): 3,000 STK

Artikel-Nr. / Part-No. / N° de l´article / N° de artículo: Z05629

Dieses Prüfzeugnis ist über die gesamte Nutzungsdauer aufzubewahren
This certificate must be kept during the entire service life
QM-MANAGEMENTSYSTEM NACH DIN / ISO 9001 ÜBERWACHT
CONTROLLED QUALITY-SYSTEM ACCORDING / SELON / ACORDE CON / ISO 9001

Herstellerzeichen / Manufacturer´s mark / Marque du fabricant / Marca del fabricante: FF 5T

Werks-Nr. / Indification-No. / N° d´usine / N° de identificación: P14301997

Bruchdehnung A / Elongation at break A / Elongation tot. à la rupt. A / Alargamiento a la rotura A/. %

Werkstoff / Material / Matériaux / Material de fabricación:

Tragfähigkeit WLL / Working load limit WLL / Charge ´utilisation WLL / Carga de trabajo WLL: 5 T kg

Fertigungsprüfkraft MPF_1 [1] Manufacturing proof force MPF_1 [1] Force d´ épreuve de fabrication MPF_1 [1] Test de esfuerzo final MPF_1 [1]: 122 kN

Bruchkraft BF / Breaking force BF / Force de rupture BF / Fuerza de rotura BF: ./. kN

Ergebnis der Prüfung / Result of tests / Résultat du test / Resultado del test:
OHNE BEANSTANDUNG / Without any objections / Sans reclamation / Sin objecion

1) Prüfabschnitte MPF_1 bis MPF_4 gemäß EN 818-4, Tabelle 4
1) Manufacturing proof force MPF_1 to MPF_4 according EN 818-4, Table 4
1) Sections de contrôle MPF_1 à MPF_4 selon EN 818-4, Tableau 4
1) Tramos comprobados MPF_1 hasta MPF_4 según EN 818-4, Tabla 4

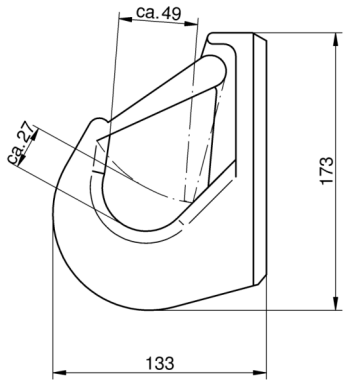
Prüfabschnitt / Test Segment Section de contrôle / Tramo comprobado	Faktor / Factor Faktor / Factor
MPF_1	2,5
MPF_2	3,5
MPF_3	4,0
MPF_4	5,25

BG-PRÜFZERT

Dieses Prüfzeichen gilt für Ketten zum Heben (nach DIN 5684, DIN EN 818, DIN 32891 u.ä) und Kettenzubehörteile (nach DIN 5691, EN 1677).
This approval mark applies to lifting chains (to DIN 5684, DIN EN 818, DIN 32891 etc.) and chain accessories (to DIN 5691, EN 1677).
Ce signe de contrôle est seulement valable pour les chaînes destinées au levage (selon DIN 5684, DIN EN 818, DIN 32891 et autres) et les accessoires pour chaînes (selon DIN 5691, EN 1677).
Este símbolo de certificación se utiliza para cadenas de elevación (según DIN 5684, DIN EN 818, DIN 32891, etc.) y accesorios de cadenas (según DIN 5691, EN 1677).

17.03.14 i.A.

Datum	Abnahmebeauftragter QM/WT
Date	Signature of the tester Quality Management / QM/WT
Date	Signature du contrôleur du Service de Qualité / QM/WT
Fecha	Firma del comprobador Dirección de calidad / QM/WT



11.4. Inspection certificate for 5t weld-on hook

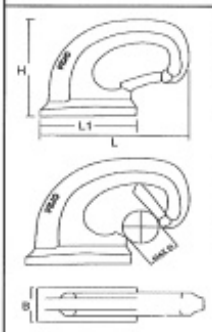
Article number: 154082120

Pejo AB
Box 252
611 26 Nyköping
SWEDEN

Inspection certificate 2.2 - EN 10204:2004
Number:

Delivery data and markings				
Customer:				
Manufacturer: Pejo AB	Supplier: Combi Wear Parts		Marking	
Purchase order number:	Order date:		Identification of manufacturer	PEJO
Delivery note number:	Delivery date:		Identification of product	C
Item number: 65105	Description: PEJO HOOK C205		Identification of production lot	
Steel category: Alloy Steel	Raw Material: TK23F SA290		Working load limit	5
Traceability code:	Quantity:	Approx. Weight each: 3,3 kg	Grade expression with number/letter	5

Check for dimensional accuracy



All dimensions lie within the specified manufacturing limit deviations ±4% [mm]

Rated values					
H	L1	L	B	MAX Ø	
133	113	187,5	44	40	

Loads references			
WLL Working load Limit (t)	MPF Manufacturing proof force (kN)	BF Min breaking force (kN)	SF Safety factor
5	123	196	4

Test result:	The specified minimum MPF and BF were met or exceeded

Angelica J Karlsson
Issued by Signature

11.5. Inspection certificate for 10t weld-on hook

Article number: 154059894SK

Prüfbescheinigung DIN EN 10204 10204-2.2
Inspection documents DIN EN 10204

Dieses Prüfzeugnis wurde EDV unterstützt erstellt und ist ohne Unterschrift gültig
This certificate was generated by computer and is valid without a signature

Hersteller: THIELE GmbH & Co.KG
Werkstr. 3 D-58618 Iserlohn
Telefon: (+49) / (0) 2371 / 947 - 0
Fax: (+49) / (0) 2371 / 947 - 241
Email: info@thiele.de

Nr. / No. **392709**

Kinshofer GmbH
Hauptstr. 76
D 83666 Waakirchen

Bestell-Nr. / Order-No.: 609635

Auftrags-Nummer / Our order-No.: 1502900/010

Chiffre-Nr. / Works-No.: 7708

Bezeichnung / Designation: ANSCHW.-HAKEN M.SICH. GH10 nsw SYSMA

Dieses Prüfzeugnis ist über die gesamte Nutzungsdauer aufzubewahren
This certificate must be kept during the entire servive life
QM-MANAGEMENT SYSTEM NACH DIN ISO 9001
CONTROLLED QUALITY-SYSTEM ACCORDING ISO 9001

Stückzahl / Number: 2,000 STK

Artikel-Nr. / Part-No.: Z08570

Herstellerzeichen / Manufacturer's mark: H94 ./.

Werks-Nr. / Indification-No.: P1200766

Bruchdehnung A
Elongation at break A

Werkstoff / Material	**Tragfähigkeit WLL** Working load limit WLL	**Fertigungsprüfkraft MPF_1** [1] Manufacturing proof force MPF_1 [1]	**Bruchkraft BF** / Breaking force BF
DIN 17115	10T	245	392

Dieses Prüfzeichen gilt für Ketten zum Heben (nach DIN 5684, DIN EN 818, DIN 32891 u.ä.) und Kettenzubehörteile (nach DIN 5691, EN 1677).
This approval mark applies to lifting chains (to DIN 5684, DIN EN 818, DIN 32891 etc.) and chain accessories (to DIN 5691, EN 1677).

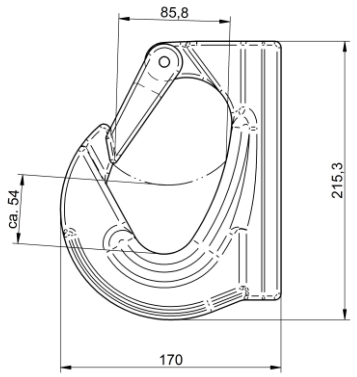
Ergebnis der Prüfung / Result of tests
OHNE BEANSTANDUNG / Without any objections

1) Prüfabschnitte MPF_1 bis MPF_4 gemäß EN 818-4, Tabelle 4
1) Manufacturing proof force MPF_1 to MPF_4 according EN 818-4, Table 4

Prüfabschnitt / Test Segment	**Faktor** / Factor
MPF_1	**2,5**
MPF_2	**3,5**
MPF_3	**4,0**
MPF_4	**5,25**

26.10.15
Datum
Date

Abnahmebeauftragter WT
Signature of the tester
Quality management/ WT



11.6. Inspection certificate for 3,25t lifting eye

Article number: 154092359

Declaration of Compliance

EN 10204 - 2.1

ROPEBLOCK

Client	: Kinshofer GmbH	**S.O. No.**	: 190257-2
PO. No.	: 631338	**Packing ref.**	: 77805
P.O. date	: 15-1-2019		
Qty	: 1		

Product code : PE 22.20.3,25
Description : PAD EYE; WLL 3,25 mT - FoS 6:1.
Suitable for (5/8") 3,25t shackle acc. standard EN 13889 / Fed. Spec. RR-C-271

Description	Qty	Marking	Material	Remarks
Pad Eye	1	162953-1	S355J2N	

Remarks:

We hereby certify that:
- The above mentioned product is in accordance with the requirements of the order.
- The above mentioned product has been inspected in accordance with the specifications and has met the requirements.

EC :
The undersigned certifies on behalf of his company, that the above mentioned product is correct and that the intended hoisting equipment or application continued can be declared according the regulations of the Machine Directive 2006/42/EC, appendix II-A or II-B, after assembly. Products must not be put in service until the final application has been declared in conformity with the provisions in the 2006/42/EC directive.

Reference standards, used (partly or as whole) where applicable and considered state of the art:
- EN 13001, 13135, 13411, 818, 1677, 13889
- ISO 4301, 4308, 8087, 3189, 9927, 17558
- NEN 3318, NEN 3320, 3508, 3305, 2729
- Standards and rules as mentioned in the contract and/or drawings.
- DIN 15400, 15401, 15402, 15018, 15020, 15061, 15063, 82017
- FEM 1.001, 5.004
- US Fed. Spec. RR-S550D, RR-C-271

Signed for and behalf of Ropeblock Rigging Hardware B.V. / The Netherlands

Name: Ing. J. Eertman / Technical Director

Date: 18-1-2019

11.7. Inspection certificate for 4.75t lifting eye

Article number: 154092360

Declaration of Compliance

EN 10204 - 2.1

ROPEBLOCK

Client	: Kinshofer GmbH	**S.O. No.**	: 190257-3
PO. No.	: 631338	**Packing ref.**	: 77805
P.O. date	: 15-1-2019		
Qty	: 1		

Product code : PE 25.23.4,75
Description : PAD EYE; WLL 4,75 mT - FoS 6:1.
Suitable for (3/4") 4,75t shackle acc. standard EN 13889 / Fed. Spec. RR-C-271

Description	Qty	Marking	Material	Remarks
Pad Eye	1	589443	S355J2N	

Remarks:

We hereby certify that:
- The above mentioned product is in accordance with the requirements of the order.
- The above mentioned product has been inspected in accordance with the specifications and has met the requirements.

EC :
The undersigned certifies on behalf of his company, that the above mentioned product is correct and that the intended hoisting equipment or application continued can be declared according the regulations of the Machine Directive 2006/42/EC, appendix II-A or II-B, after assembly. Products must not be put in service until the final application has been declared in conformity with the provisions in the 2006/42/EC directive.

Reference standards, used (partly or as whole) where applicable and considered state of the art:
- EN 13001, 13135, 13411, 818, 1677, 13889
- ISO 4301, 4308, 8087, 3189, 9927, 17558
- NEN 3318, NEN 3320, 3508, 3305, 2729
- Standards and rules as mentioned in the contract and/or drawings.
- DIN 15400, 15401, 15402, 15018, 15020, 15061, 15063, 82017
- FEM 1.001, 5.004
- US Fed. Spec. RR-S550D, RR-C-271

Signed for and behalf of Ropeblock Rigging Hardware B.V. / The Netherlands

Name: Ing. J. Eertman / Technical Director

Date: 18-1-2019

11.8. Inspection certificate for 8.5t lifting eye

Article number: 154092361

Declaration of Compliance

EN 10204 - 2.1

ROPEBLOCK

Client	: Kinshofer GmbH	**S.O. No.**	: 190257-4
PO. No.	: 631338	**Packing ref.**	: 77805
P.O. date	: 15-1-2019		
Qty	: 7		

Product code	: PE 35.30.8,5
Description	: PAD EYE; WLL 8,5 mT - FoS 6:1. Suitable for (1") 8,5t shackle acc. standard EN 13889 / Fed. Spec. RR-C-271

Description	Qty	Marking	Material	Remarks
Pad Eye	7	928501	S355J2N	

Remarks:

We hereby certify that:

- The above mentioned product is in accordance with the requirements of the order.
- The above mentioned product has been inspected in accordance with the specifications and has met the requirements.

EC :

The undersigned certifies on behalf of his company, that the above mentioned product is correct and that the intended hoisting equipment or application continued can be declared according the regulations of the Machine Directive 2006/42/EC, appendix II-A or II-B, after assembly. Products must not be put in service until the final application has been declared in conformity with the provisions in the 2006/42/EC directive.

Reference standards, used (partly or as whole) where applicable and considered state of the art:

- EN 13001, 13135, 13411, 818, 1677, 13889
- ISO 4301, 4308, 8087, 3189, 9927, 17558
- NEN 3318, NEN 3320, 3508, 3305, 2729
- Standards and rules as mentioned in the contract and/or drawings.
- DIN 15400, 15401, 15402, 15018, 15020, 15061, 15063, 82017
- FEM 1.001, 5.004
- US Fed. Spec. RR-S550D, RR-C-271

Signed for and behalf of Ropeblock Rigging Hardware B.V. / The Netherlands

Name: Ing. J. Eertman / Technical Director

Date: 18-1-2019

11.9. Inspection certificate for 12t lifting eye

Article number: 154092362

Declaration of Compliance

EN 10204 - 2.1

ROPEBLOCK

Client	: Kinshofer GmbH	**S.O. No.**	: 190257-5
PO. No.	: 631338	**Packing ref.**	: 77805
P.O. date	: 15-1-2019		
Qty	: 3		

Product code : PE 45.37.12
Description : PAD EYE; WLL 12 mT - FoS 6:1.
Suitable for (1-1/4") 12t shackle acc. standard EN 13889 / Fed. Spec. RR-C-271

Description	Qty	Marking	Material	Remarks
Pad Eye	3	931779	S355J2N	

Remarks:

We hereby certify that:
- The above mentioned product is in accordance with the requirements of the order.
- The above mentioned product has been inspected in accordance with the specifications and has met the requirements.

EC :
The undersigned certifies on behalf of his company, that the above mentioned product is correct and that the intended hoisting equipment or application continued can be declared according the regulations of the Machine Directive 2006/42/EC, appendix II-A or II-B, after assembly. Products must not be put in service until the final application has been declared in conformity with the provisions in the 2006/42/EC directive.

Reference standards, used (partly or as whole) where applicable and considered state of the art:
- EN 13001, 13135, 13411, 818, 1677, 13889
- ISO 4301, 4308, 8087, 3189, 9927, 17558
- NEN 3318, NEN 3320, 3508, 3305, 2729
- Standards and rules as mentioned in the contract and/or drawings.
- DIN 15400, 15401, 15402, 15018, 15020, 15061, 15063, 82017
- FEM 1.001, 5.004
- US Fed. Spec. RR-S550D, RR-C-271

Signed for and behalf of Ropeblock Rigging Hardware B.V. / The Netherlands

Name: Ing. J. Eertman / Technical Director

Date: 18-1-2019

12. Certificate according to the Machinery Directive 2006/42/EC

12.1. EC Declaration of Conformity for weld-on hooks

Valid for item numbers: 154050408; 154053934; 154076255

THIELE

Artikel-Nr.	B07952
Änd. Index	B
Ausgabe	DE-030713

EG-Konformitätserklärung
gemäß Maschinenrichtlinie 2006/42/EG, Anhang II A
für eine vollständige Maschine

Der Hersteller

THIELE GmbH & Co. KG
Werkstraße 3
D-58640 Iserlohn
Telefon: 02371 / 947 – 0

erklärt hiermit, dass folgende Produkte

- **Montagehaken TWN 0849/1**
- **Montagehaken TWN 0850/1**

(TWN=THIELE-Werk-Norm)

konform sind mit den einschlägigen Bestimmungen der EG-Maschinenrichtlinie 2006/42/EG.

Folgende Prüfgrundsätze der Berufsgenossenschaft wurden angewandt:

- GS-OA 15-03 — Grundsätze für die Prüfung und Zertifizierung von Anbauhaken für Erdbaumaschinen im Hebezeugeinsatz

Diese Erklärung beinhaltet keine Zusicherung von Eigenschaften.
Die Sicherheitshinweise und Betriebsanleitungen der Produkte sind zu beachten.

Dokumentationsverantwortlicher: Dr. Jürgen Obenauf, Tel.: 02371 / 947-541
(Leitung Qualitäts- und Umweltmanagement)

Iserlohn am 03.07.2013

Dr. Günther Philipp
(Geschäftsführer)

KG: Sitz Iserlohn, HRA Iserlohn 613,
Persönlich haftende Gesellschafterin:
THIELE Verwaltungs GmbH, Sitz Iserlohn
HRB Iserlohn 1306
Geschäftsführer: Dr. Günther Philipp

13. EC Declaration of conformity

We hereby declare that the attachment

Type:		CE
Serial number:		
Date:		

in the version supplied, complies with the health and safety requirements of the EC machinery directive 2006/42/EC of 17/05/2006 of the Council of the European Community.

The attachment for cranes or excavators is suitable, for example, for lifting, transporting, digging or breakdown of various materials or for changing equipment on construction sites and other industrial areas.

Applied harmonised standards:	
DIN EN ISO 12100	Safety of machinery
DIN EN 474-1	Earth-moving machines - safety
DIN EN 1501-5	Waste collection vehicles
DIN EN 13155	Non-fixed load lifting attachments
DIN EN ISO 4413	Fluid technology - General rules and safety requirements on hydraulic systems and their components
Applied German standards and technical specifications:	
DIN 15428	Attachments - Technical delivery conditions
BGR 500	Operation of work equipment
Country-specific safety and health regulations	
Party responsible for documentation:	Director of Technical Documentation, **Kinshofer GmbH**

Kinshofer is certified in accordance with ISO 9001 by DVS Zert e.V., Düsseldorf, Germany

Kinshofer GmbH
Raiffeisenstrasse 12
DE-83607 Holzkirchen

(T. Friedrich, managing director)

14. Locations

KINSHOFER

Contact

KINSHOFER Branches

Hauptsitz Deutschland:
KINSHOFER GmbH
Raiffeisenstrasse 12
83607 Holzkirchen
Tel.: +49 (0) 8021 88 99 0
Email: info@kinshofer.com
www.kinshofer.com

United Kingdom:
KINSHOFER UK Ltd.
4 Milton Industrial Court
Horsfield Way, Bredbury
Stockport, Cheshire, SK6 2TA
Tel.: +44 (0) 161 406 7046
Fax: +44 (0) 161 406 7014
Email: sales-uk@kinshofer.com
www.kinshofer.com

France:
KINSHOFER France S.A.R.L.
8 Bis, rue Gabriel Voisin, CS 40003
F-51688 Reims Cedex 2
Tel.: +33 (0) 3 88 39 55 00
Fax: +33 (0) 3 88 79 06 75
Email: sales-france@kinshofer.com
www.kinshofer.com

Canada:
KINSHOFER North America
5040 Mainway Drive, Unit #11
Burlington, ON L7L 7G5
Tel.: +1 (905) 335-2856
Fax: +1 (905) 335-4529
Toll Free (North America): 1-800-268-9525
Email: sales-northamerica@kinshofer.com
www.kinshofer.com

United States of America:
KINSHOFER USA
6420 Inducon Drive
Suite G
Sanborn, NY, 14132
Tel.: +1 (716) 731-4333
Toll Free (North America): 1-800-268-9525
Email: sales-usa@kinshofer.com
www.kinshofer.com

Part of the
KINSHOFER
Group

kinshofer.com

DVS ZERT
KINSHOFER is an
ISO 9001 certified Company.
DVS ZERT is a registred trademark
of DVS ZERT® e.V., Düsseldorf.

KINSHOFER Subsidiaries

Nederland:
DEMAREC Demolition and Recycling Equipment B.V.
De Hork 32
NL-5431 NS Cuijk
Tel.: +31 (0) 485 442300
Fax: +31 (0) 485 442120
info@demarec.com
www.demarec.com

Sverige:
RF System AB
Furutorpsgatan 6
SE-288 34 Vinslöv
Tel.: +46 (0) 44 817 07
Fax: +46 (0) 44 859 63
Email: info@rf-system.se
www.rf-system.se

United Kingdom:
Auger Torque Europe Limited
Hazleton
Cheltenham, GL54 4DX
Tel.: +44 (0) 1451 861 652
Fax: +44 (0) 1451 861 660
Email: sales@augertorque.com
www.augertorque.com

Australia:
Auger Torque Australia Pty Ltd.
122 Boundary Road, Rocklea
Queensland 4106
Tel.: +61 (0) 7 3274 2077
Fax: +61 (0) 7 3274 5077
Email: sales@augertorque.com.au
www.augertorque.com.au

Doherty Couplers & Attachments Ltd.
PO Box 701,
Annerley (Brisbane) QLD, 4103
Tel.: +61 1 800 057 021
Email: sales@dohertydirect.net
www.dohertydirect.net

New Zealand:
Doherty Engineered Attachments Ltd.
PO Box 9339, Greerton
Tauranga 3142
Tel.: +64 7 574 3000
Fax: +64 7 574 8030
Email: sales@dohertydirect.net
www.dohertydirect.net

United States of America:
Solesbee's Equipment & Attachments, LLC
2640 Jason Industrial Parkway
Winston, GA 30187
Toll Free (North America): 1-800-419-8090
Email: sales@solesbees.com
www.solesbees.com

中国:
Auger Torque China CO., Ltd.
Baozhan Rd, Tongyi Industry Zone
Dongwu, Yinzhou, Ningbo
China 315114
Tel.: + 86 (0) 574 8848 8181
Fax: + 86 (0) 574 8848 8687
Email: john.hu@attachmenttorque.com
www.augertorque.com

Italia:
Hammer S.r.l.
Via Oleifici dell' Italia Meridionale, lotto G1
IT-70056 Molfetta BA
Tel.: +39 080 337 5317
Email: info@hammereurope.com
www.hammereurope.com