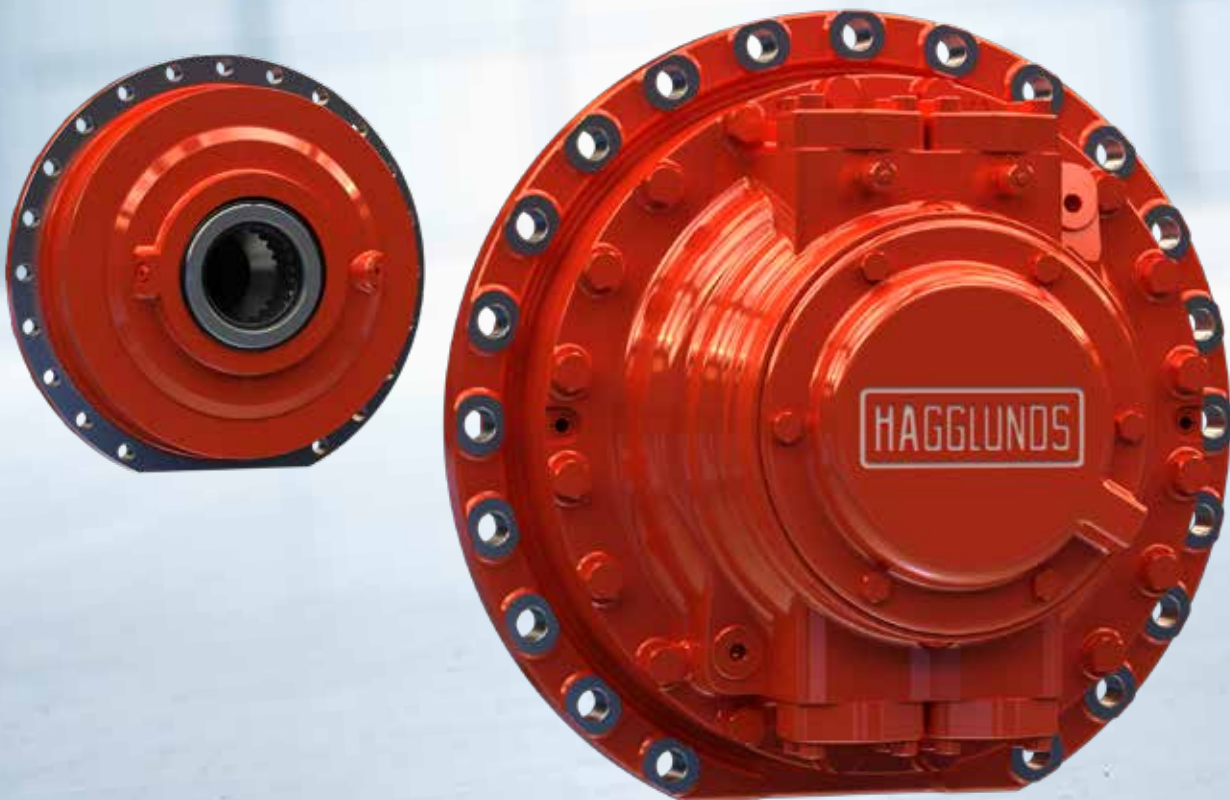


Häggglunds CA

Radial piston hydraulic motor



The data specified only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. Catalog specifications do not constitute assured characteristics. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

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The cover shows an example configuration. The product delivered may differ from the image on the cover.

The original instruction manual were prepared in English

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1 About this documentation

1.1 VALIDITY OF THE DOCUMENTATION

This documentation applies to the radial piston hydraulic motor Häggglunds CA and is intended for machine/system manufacturers, users and service engineers.

This documentation contains important information on the safe and appropriate assembly, transport, commissioning, operation, maintenance, disassembly and simple troubleshooting of the product.

- ▶ Prior to working with the Häggglunds CA, read the entire documentation carefully, in particular the “Safety instructions” chapter.

1.2 REQUIRED AND ADDITIONAL DOCUMENTATIONS






- ▶ Before commissioning the product, make sure to have received and fully understood the documentations identified by the book symbol  and observe the instructions included in these documentations.

Table 1: Required and additional documentations

	Title	Document number	Document type
	Radial Piston Hydraulic motor, Häggglunds CA	RE 15305	Data sheet
	Order confirmation	Contains the order-related technical data for your Häggglunds CA	Order confirmation
	Torque arms, Häggglunds TC A, DTCA, DTCB, DTCBM	RE 15355	Data sheet
	Hydraulic fluid quick reference Häggglunds products	RE 15414	Data sheet

1.3 PRESENTATION OF INFORMATION

Consistent safety instructions, symbols, terms and abbreviations are used in the present documentation to facilitate orientation for the reader and to ensure safe product handling. The explanations in the following sections will provide for easy understanding.

1.3.1 Safety messages




Consistent safety instructions, symbols, terms and abbreviations are used in the present documentation to facilitate orientation for the reader and to ensure safe product handling. The explanations in the following sections will provide for easy understanding.

Safety messages are structured as shown below:

 SIGNAL WORD
Type and source of risk Consequences if disregarded <ul style="list-style-type: none"> ▶ Precautionary measures ▶ <listing>

- **Warning sign:** Draws attention to the risk
- **Signal word:** Identifies the hazard level
- **Type and source of risk:** Identifies the type and source of the hazard
- **Consequences:** Describes what occurs when the safety messages are not complied with
- **Precautions:** Indicates how the hazard can be avoided



Table 2: Risk categories to ANSI Z535.6-2006

Warning sign, signal word	Meaning
 DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates potential property damage: the product or the environment may be damaged.

1.3.2 Symbols

The following symbols identify notices that are not safety-relevant, but enhance the comprehensibility of the documentation.

Table 3: Meaning of the symbols

Symbol	Meaning
	When this information is not observed, optimum use or operation of the product cannot be ensured.
▶	Single, independent step.
1.	Numbered instructions:
2.	The number indicates that the different steps are to be performed successively.
3.	
	Center of gravity Markings on packaging to indicate where the center of gravity are.

2 Safety instructions

2.1 ABOUT THIS CHAPTER

This product has been manufactured in strict compliance with the generally accepted rules of technology. However, this does not exclude the risk of damage to persons or property if this chapter and the safety instructions included in the present documentation are not observed.

- ▶ Read the entire documentation carefully before starting to use the product.
- ▶ Keep this documentation in a location where it is accessible to all users at any time.
- ▶ When passing over the product to third parties, make sure to include the necessary documentation.

2.2 INTENDED USE

The Häggglunds CA is a radial piston hydraulic motor.

In an application the CA motor is classified as component. The CA motor may only be commissioned after it has been installed in the machine/system for which it is intended and the safety of the entire system has been established in accordance with the machine directive.

The product is intended for professional and not for private use.

Intended use includes having read and understood the entire documentation, in particular the “Safety instructions” chapter.

The product is intended for the following use:

- Radial piston motor in open or closed circuit: The radial piston motor is only approved to be used in motor mode or pump mode.

Observe the technical data, application and operating conditions and performance limits as specified in the product-specific data sheet and in the order confirmation.

2.3 IMPROPER USE

Any use other than that described as intended use shall be considered as improper and is therefore impermissible.

Bosch Rexroth shall accept no liability whatsoever for damage resulting from improper use. The user shall bear all risks arising from improper use.

Similarly, the following foreseeable faulty usages are also considered to be improper

Improper use of the product includes:

- Using outside the operating parameters approved in the product-specific data sheet or in the order confirmation (unless customer-specific approval has been granted)
- Use of fluids outside of the standards as specified in *15.1.1: Hydraulic fluids* and in [Data sheet RE 15414](#) Hydraulic fluid quick reference.
- Modification of factory settings by non-authorized persons.

- Use of add-on parts (e.g. mountable filter, control unit, valves) that are not specified by Bosch Rexroth must be approved by contact at Bosch Rexroth.
- Extension or conversion is not permissible and has to be approved by contact at Bosch Rexroth.
- Using the Radial piston motor under water without necessary additional measures.
- Using the Radial piston motor when the exterior pressure is greater than the interior pressure (case pressure).
- Using the Radial piston motor in explosive environments unless the component or machine/system has been certified as compliant with the ATEX directive 2014/34/EU.
- Using the Radial piston motor in an aggressive environment without necessary additional measures.

2.4 PERSONNEL QUALIFICATION

The work steps described in the present documentation require basic skills in mechanical, electrical and hydraulic knowledge, as well as knowledge of the associated technical terms. In order to ensure safety at work, these jobs must be exclusively carried out by qualified technical personnel or by trained staff under the direction and supervision of qualified personnel.

For transporting and handling of the product, additional knowledge is necessary with regard to working with a lifting device and the corresponding attachment equipment. In order to ensure safe use, these activities may therefore only be carried out by appropriate qualified personnel or a trained person under the direction and supervision of qualified personnel.

Qualified personnel are in a position to recognize possible hazards and institute appropriate safety measures thanks to their professional training, knowledge and experience, as well as their understanding of the relevant conditions pertaining to the work to be done. Qualified personnel must observe the subject-specific rule and have the necessary hydraulic knowledge.

Hydraulic knowledge means, for instance:

- reading and fully understanding hydraulic diagram,
- fully understanding in particular the interrelationships regarding safety devices and having knowledge on the function and assembly of hydraulic components.



Bosch Rexroth offers training support for special fields. For more information about training, please contact your Bosch Rexroth representative.

2.5 GENERAL SAFETY INSTRUCTIONS

- Observe the regulations for accident prevention and environmental protection.
- Comply with the local safety provisions and regulations of the country in which the product is used.
- Make sure to use Rexroth products in perfect working order.
- Strictly observe all instructions on the product.
- Persons, who assemble, operate, disassemble or maintain Rexroth products must not consume any alcohol, drugs or pharmaceuticals that may affect their ability to respond.
- Use exclusively accessories and spare parts explicitly approved by the manufacturer (genuine Bosch Rexroth spare parts) to avoid accidents due to improper accessories and spare parts.

- Strictly observe the technical data and ambient conditions specified in the product documentation.
- Inadequate products installed or used for safety-relevant applications may produce unintended operating behavior and result in product or property damage. For this reason, use a product in safety-relevant applications only on condition that such use is specified and allowed in the corresponding product documentation.
- Prior to commissioning the product, make sure that the end product (e. g. a machine or line), into which Rexroth products are integrated, perfectly complies with the country-specific provisions, safety regulations and standards applicable to its use.

2.6 PRODUCT AND TECHNOLOGY-RELATED SAFETY MESSAGES

The safety instructions below is valid from chapter 6: *Transport and storage* to chapter 15: *Technical data*.

DANGER

Danger from excessively high pressure

Danger to life or risk of injury, damage to equipment.

Operating the motor above the permissible maximum pressure can cause components to burst and hydraulic fluid to escape under high pressure.

- ▶ Operate the motor only within permissible maximum pressure.

Danger from suspended loads

Danger to life or risk of injury, damage to equipment.

Improper transportation may cause the Häggglunds motors to fall down leading to injuries e.g. crushed or broken bones or damage to the product.

- ▶ Make certain that the forklift truck or lifting device has adequate lifting capacity.
- ▶ Never stand under or put you hands under suspended loads.
- ▶ Ensure your position is stable during transportation.
- ▶ Use Personal Protective Equipment, PPE (e.g. safety glasses, safety gloves, suitable working clothes, safety shoes).
- ▶ Use suitable lifting device for transport and storage, installation and for removal and repair. Make sure the motor is well mounted or anchored when the lifting device is disconnected.
- ▶ Observe the prescribed position of the lifting strap.
- ▶ Observe the local Federal laws and regulations on work and health protection and transportation.

Pressurized machine/system

Danger to life or risk of injury, serious injuries when working on energized machines/systems. Damage to equipment.

- ▶ Protect the complete system against being energized.
- ▶ Make sure that the machine/system is depressurized. Please follow the machine/ system manufacturer's instructions.
- ▶ Do not disconnect any line connections, ports and components when the machine/system is pressurized.
- ▶ Switch off all power-transmitting components and connections (electric, pneumatic, hydraulic, mechanical) in accordance with the manufacturer's instruction and secure them against being switched back on.

WARNING

Escaping oil mist

Risk of explosion, fire, health hazard, environmental pollution.

- ▶ Depressurize the machine/system and repair the leak.
- ▶ Keep open flames and ignition sources away from the Häggglunds motors.
- ▶ If Häggglunds motors are to be situated in the vicinity of ignition sources or powerful thermal radiators, a shield must be erected to ensure that any escaped hydraulic fluid can not ignite, and to protect hose lines from premature aging.

CAUTION

High noise development in operation

Danger of hearing damage and hearing loss.

- ▶ The noise emission of Häggglunds motors depends on speed, operating pressure and installation conditions.
- ▶ Always wear hearing protection when in the vicinity of the operating Häggglunds motor.

Hot surfaces on the Häggglunds motor

Risk of burns.

- ▶ Allow the Häggglunds motors to cool down sufficiently before touching it.
- ▶ Wear heat-resistant protective clothing, e.g. gloves.

Improper routing of cables and lines

Tripping hazard and damage to equipment.

- ▶ Lay cables and lines so that they can not be damaged and nobody can trip over them.

Contact with hydraulic fluid

Hazard to health e.g. eye injuries, skin damage, toxication during inhalation.

- ▶ Avoid contact with hydraulic fluids.
- ▶ When working with hydraulic fluids, strictly observe the safety instructions provided by the lubricant manufacturer.
- ▶ Use your personal protective equipment (e.g. safety glasses, safety gloves, suitable working clothes, safety shoes).
- ▶ If hydraulic fluid inadvertently comes into contact with your eyes or bloodstream or is swallowed, consult a doctor immediately.

Escaping hydraulic fluid due to machine/system leakage

Risk of burns and risk of injury due to escaping oil jet.

- ▶ Depressurize and de-energiize the machine/system and repair the leak.
- ▶ Never attempt to block or seal the leak or oil jet with a cloth.

2.7 PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE is the responsibility of the user of the Häggglunds motors. Observe the safety regulations and provisions of your country. All components of the PPE must be intact.

3 General notes regarding property damages and product damages

NOTICE

Danger from improper handling

Product can be damaged.

- ▶ Do not expose the product to an impermissible mechanical load.
- ▶ Never use the product as a handle or step.
- ▶ Do not place/lay any objects on the product.
- ▶ Do not strike the Häggglunds motor or any part of it or its accessories.
- ▶ Do not set/place the Häggglunds motor on the drive shaft or fittings.
- ▶ Do not strike fittings (e.g. sensors or valves).
- ▶ Do not strike sealing surfaces (e.g. service line ports).
- ▶ Leave the protective covers on the Häggglunds motor until shortly before the lines are connected.
- ▶ Make sure that the electronics are not electro-statically charged (e.g. for painting operations).

Damage to equipment due to improper lubrication

Product can be damaged or destroyed.

- ▶ Never operate the Häggglunds motor with insufficient hydraulic fluid.
- ▶ When commissioning a machine/system, make sure that the case interior and the main lines of the Häggglunds motor are filled with hydraulic fluid and remain filled during operation.
- ▶ With above-reservoir installation, the case interior may drain via the drain line after longer standstill periods (air enters via the shaft seal).

Mixing of hydraulic fluids

Product can be damaged.

- ▶ Before installation, remove all fluids from the Häggglunds motor to prevent mixing with the hydraulic fluid used in the machine/system.
- ▶ Any mixing of hydraulic fluids of different manufacturers or different types of the same manufacturer is not permissible in general.

Damage from electro-welding

Product can be damaged.

- ▶ Do not perform electro-welding on the Häggglunds motor.
- ▶ Do not perform any electro-welding on the driven machine without disconnecting the pivoted attachment from ground.
- ▶ Do not perform any electro-welding at all on the driven machine with a flange mounted motor without providing some special grounding to avoid any current going through the hydraulic motor.
- ▶ Remove any sensitive electronic equipment before performing any electro-welding on the machine.

NOTICE

Contamination of the hydraulic fluid

The cleanliness of the hydraulic fluid has a considerable impact on the cleanliness and service life of the hydraulic system. Contamination of the hydraulic fluid could cause premature wear and malfunctions.

- ▶ Make sure that the working environment at the installation site is fully free of dust and foreign substances in order to prevent contaminants, such as welding beads or metal cuttings, from getting into the hydraulic lines and causing product wear or malfunctions. The Häggglunds motor must be installed in a clean condition.
- ▶ Use only clean connections, hydraulic lines and attachments (e.g. measuring equipment).
- ▶ No contaminants may enter the connections when they are plugged.
- ▶ Before commissioning, make sure that all hydraulic connections are tight and that all of the connection seals and plugs are installed correctly to ensure that they are leakproof and fluids and contaminants are prevented from penetrating the product.
- ▶ Use a suitable filter system to filter hydraulic fluid during filling to minimize solid impurities and water in the hydraulic system.

Improper cleaning

Product can be damaged.

- ▶ Plug all openings with the appropriate protective equipment in order to prevent detergents from entering the hydraulic system.
- ▶ Never use solvents or aggressive detergents. Use only water and, if necessary, a mild detergent to clean the Häggglunds motor.
- ▶ Do not point the power washer at sensitive components, e.g. shaft seal, electrical connections and components.
- ▶ Use lint-free cloths for cleaning.

Environmental pollution due to incorrect disposal

Careless disposal of the Häggglunds motor and its fittings, the hydraulic fluid and the packaging material could lead to pollution of the environment.

- ▶ Dispose of the Häggglunds motor, hydraulic fluid and packaging in accordance with the national regulations in your country.
- ▶ Dispose of the hydraulic fluid in accordance with the applicable safety data sheet for the hydraulic fluid.

Escaping or spilling hydraulic fluid

Environmental pollution and contamination of the ground water.

- ▶ Always place a drip tray under the Häggglunds motor when filling and draining the hydraulic fluid.
- ▶ Use an oil binding agent if hydraulic fluid is spilled.
- ▶ Observe the information in the safety data sheet for the hydraulic fluid and the specifications provided by the system manufacturer.

The warranty applies only to the delivered configuration.

The entitlement to warranty cover will be rendered void if the product is incorrectly installed, commissioned or operated, or if it is used or handled improperly.

4 Scope of delivery

Included in the delivery contents is Hägglunds CA as per order confirmation.

5 About this product

5.1 PERFORMANCE DESCRIPTION

The Hägglunds CA is a radial piston hydraulic motor that converts hydraulic flow into mechanical rotation. Refer to product-specific data sheet and the order confirmation for technical data, operating conditions and operating limits of the specific CA motor.

5.2 PRODUCT DESCRIPTION

The Hägglunds CA is a radial piston hydraulic motor with a rotating cylinder block shaft and a stationary housing. The cylinder block is mounted in fixed roller bearings in the housing. An even number of pistons are radially located in bores inside the cylinder block, and the distributor directs the incoming and outgoing oil to and from the working pistons. Each piston is working against a cam roller.

When the hydraulic pressure is acting on the pistons, the cam rollers are pushed against the slope on the cam ring that is rigidly connected to the housing, thereby producing a torque. The cam rollers transfer the reaction force to the piston which are guided in the rotating cylinder block. Rotation therefore occurs, and the torque available is proportional to the pressure in the system.

Oil main lines are connected to ports in the connection block and drain lines to ports in the motor housing. The motor is connected to the shaft of the driven machine through the cylinder block. The torque is transmitted by splines or shrink disc coupling

1. Cam ring
2. Cam roller
3. Piston
4. Shrink disk
5. Cylinder block/hollow shaft
6. Cylinder block/spline
7. Housing cover
8. Cylindrical roller bearing
9. Connection housing
10. Distributor
11. Combined axial and radial bearing
12. Wear ring

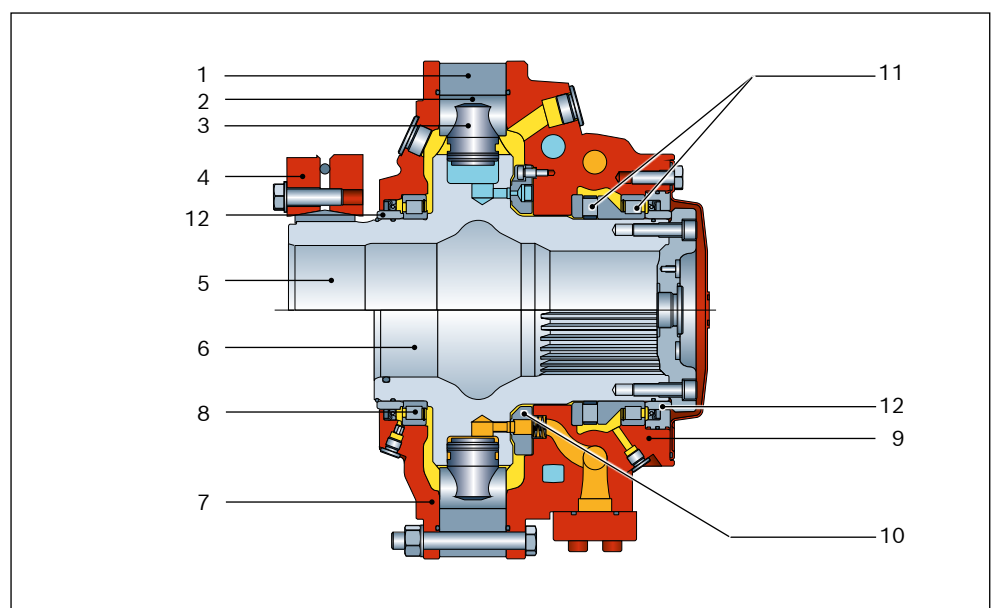
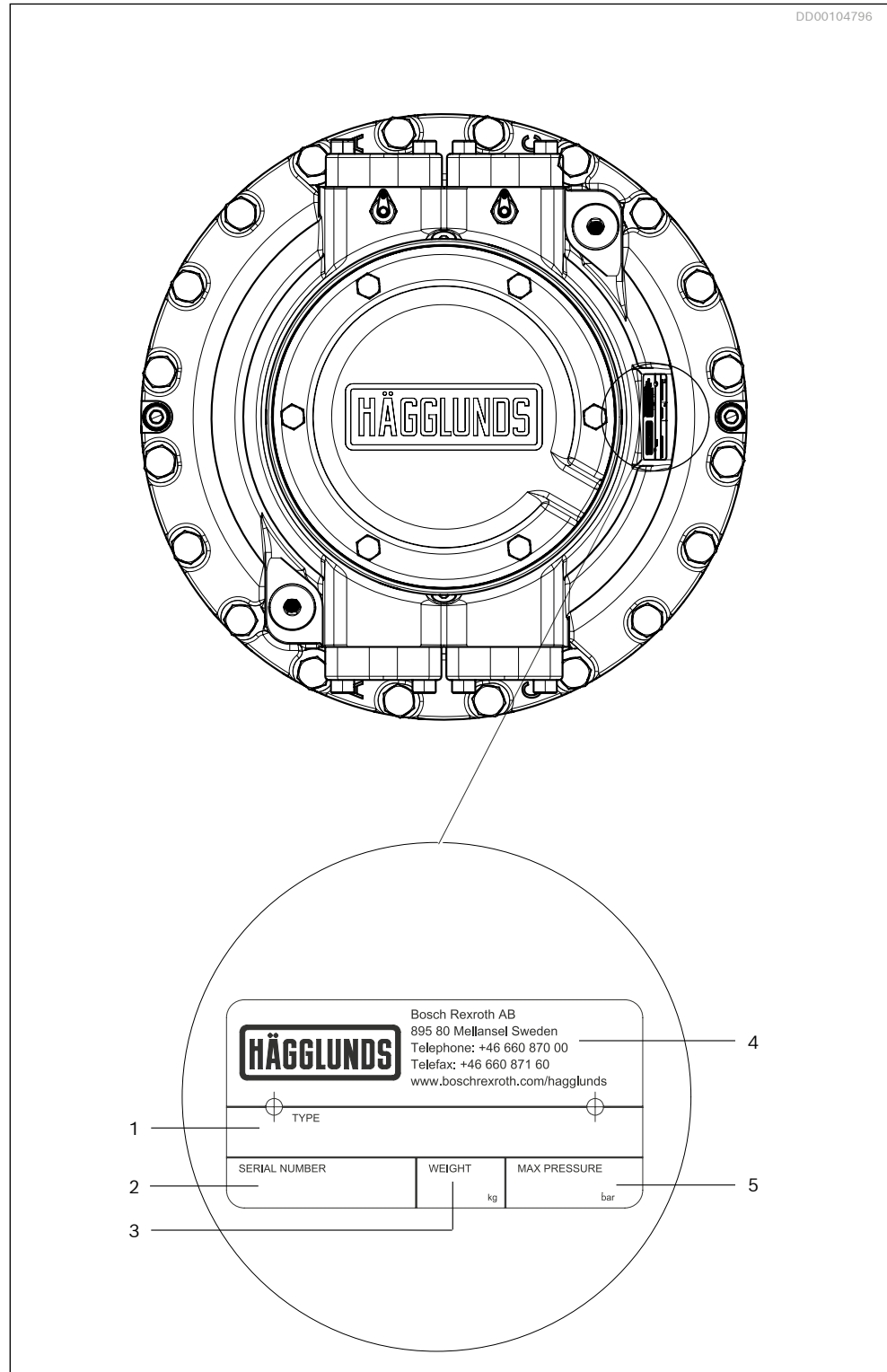


Fig. 1: The CA radial piston motor

5.3 PRODUCT IDENTIFICATION

DD00104796



1. Type of product
2. Serial number
3. Weight
4. Manufacturer
5. Max pressure

Fig. 2: Plate on motor

6 Transport and storage

6.1 PRODUCT TRANSPORT

6.1.1 Lifting methods

! **DANGER**

Danger while transporting or lifting Hägglunds motors due to heavy weight
 Danger to life, risk of injury or serious injuries and risk of damage to equipment.

- ▶ Make sure that lifting device is correctly installed.
- ▶ Do not stand under suspended load.
- ▶ Always make sure where the centre of gravity is before any lifting.

Danger if using wrong lifting equipment
 Danger to life, risk of injury or serious injuries and risk of damage to equipment.

- ▶ Make sure the correct lifting equipment is used.

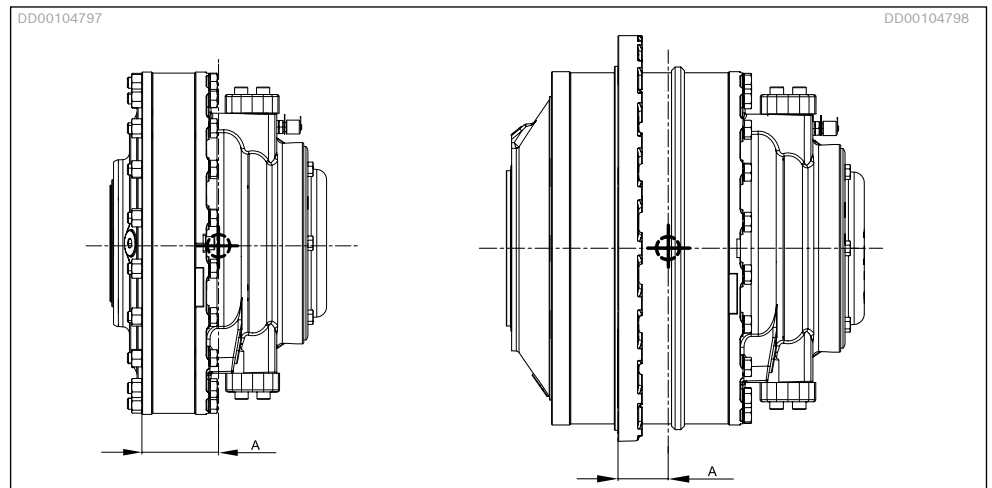


Fig. 3: Center of gravity

Table 4: Center of gravity

Motor type	Mounting alternative shaft	Measure A	
		mm	in
CA 50	C	76	2.99
	S	108	4.25
CA 70	C	82	3.23
	S	102	4.02
CA 100	C	26	1.02
	S	58	2.28
CA 140	C	16	0.63
	S	45	1.77
CA 210	C	35	1.38
	S	69	2.72

6.1.2 Lifting motors and accessories

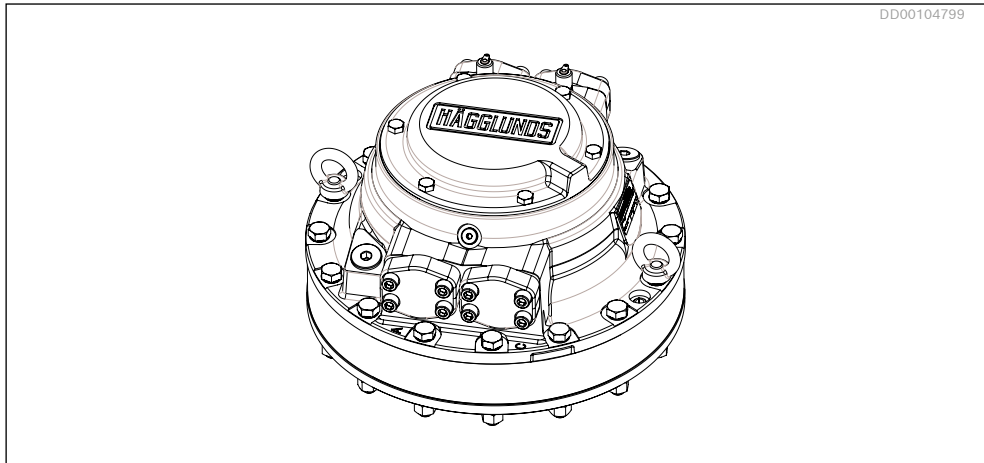


Fig. 4: Lifting eyes are included in delivery only for CA 50 and CA 70

Table 5: Tightening torque for lifting eyes

Motor type	Screw dimension	Number of screws	Tightening torque	
			Nm	lbf-ft
CA 50 / CA 70	M16	2	150	111

! WARNING

Shrink disc coupling slipping off motor and falling down
 Danger to life, risk of injury or serious injuries and risk of damage to equipment.
 ► Remove the shrink disc coupling before lifting the motor in a vertical position



The end cover and the screws must be removed before mounting the lifting eyes.

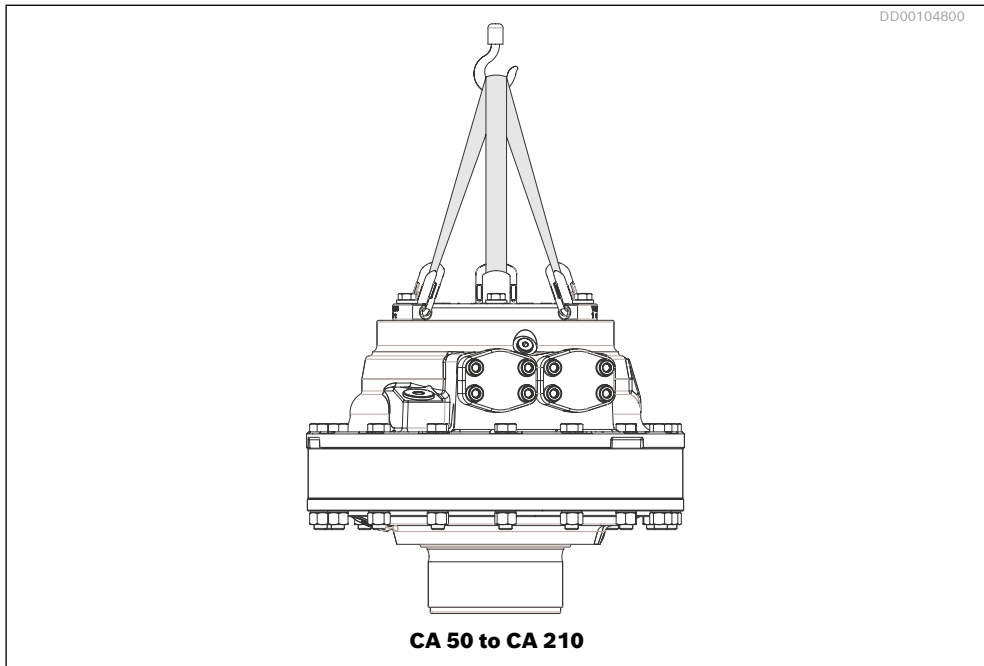


Fig. 5: Example, lifting of motor with shaft in vertical position

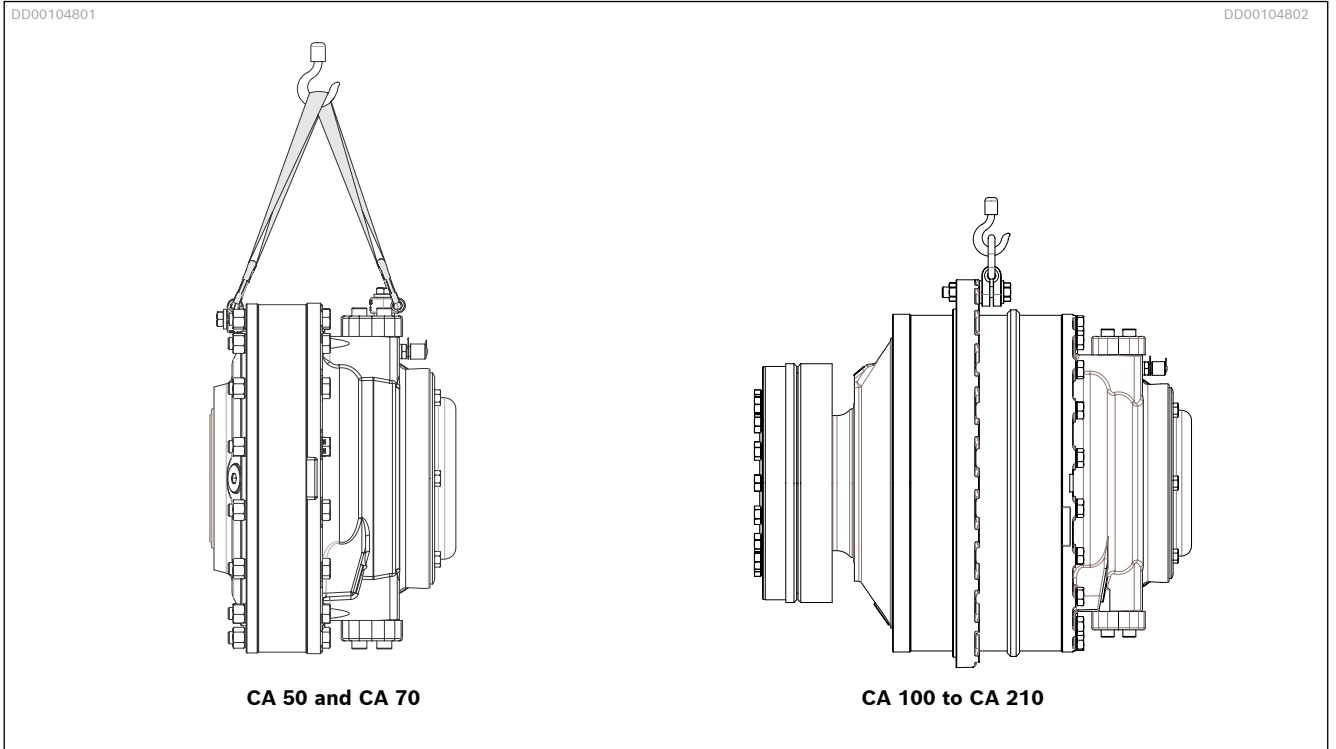


Fig. 6: Example, lifting of motor with shaft in horizontal position

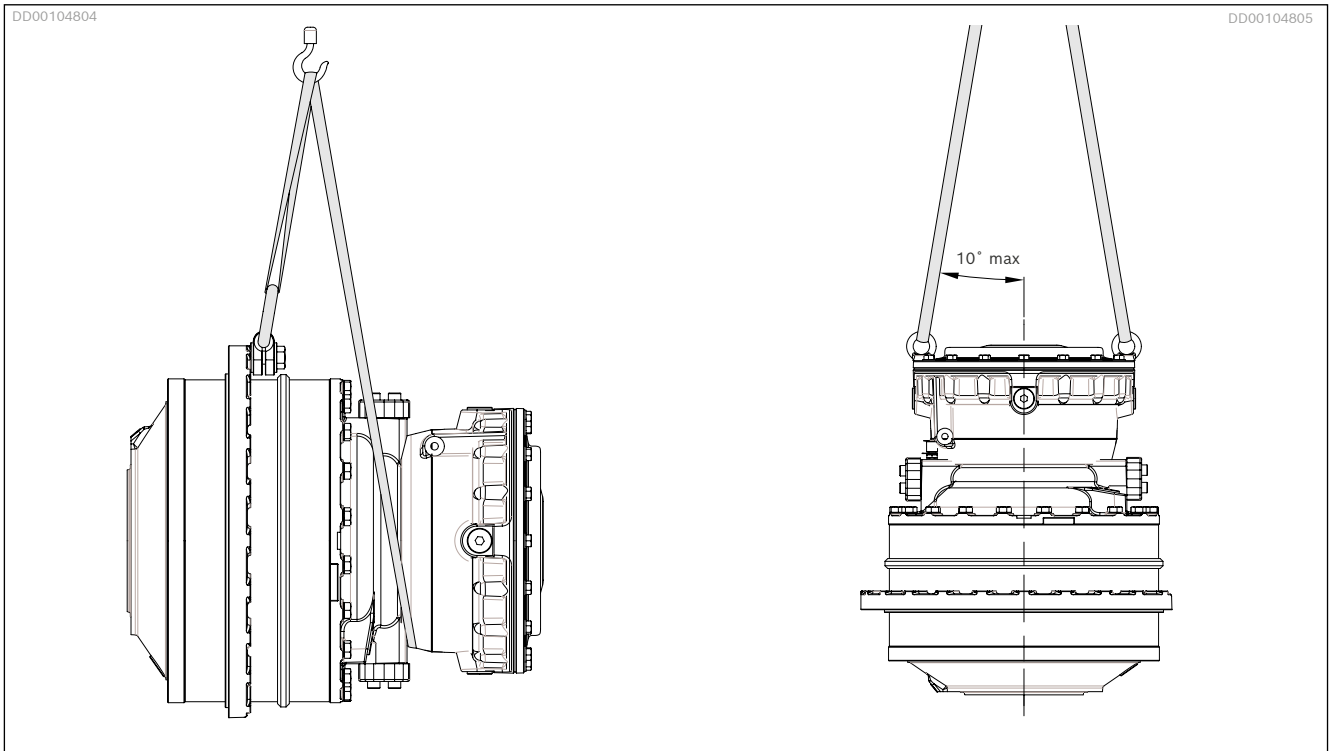


Fig. 7: Example, lifting CA 210 with mounted MDA brake

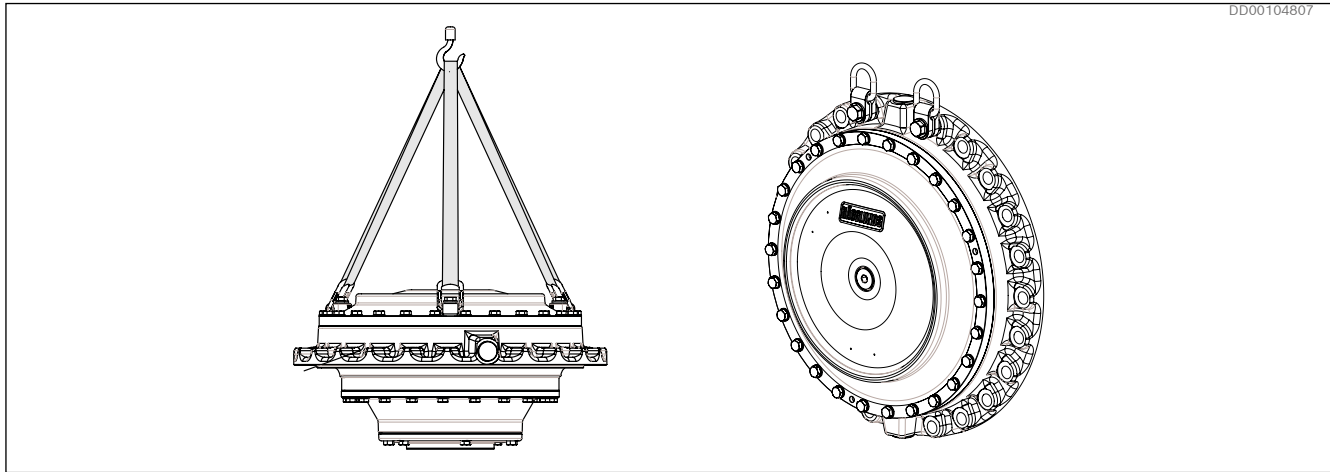


Fig. 8: Example, lifting of MDA 14 and MDA 21

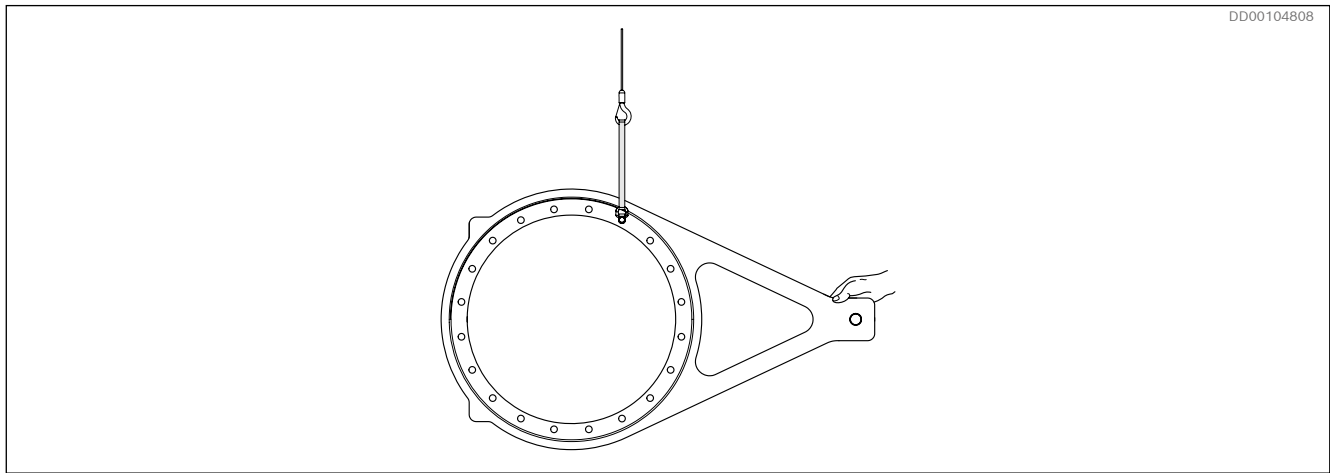


Fig. 9: Example, lifting of single ended torque arm

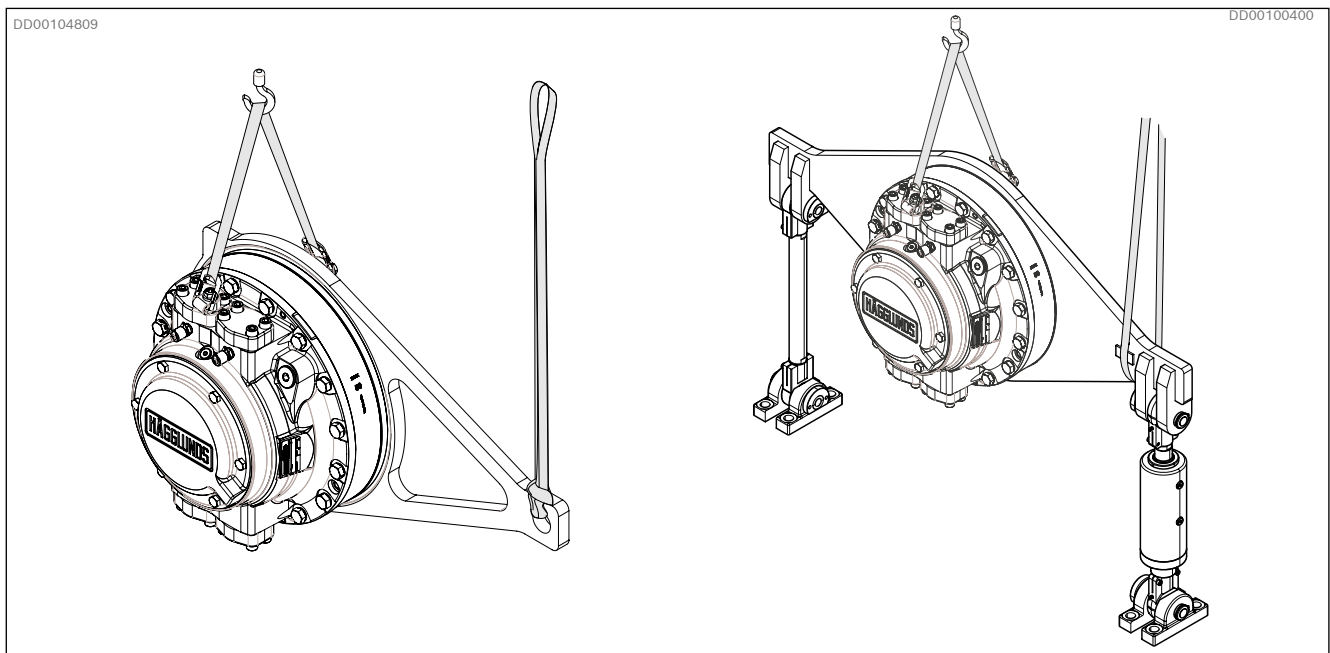


Fig. 10: Example, lifting of motor mounted to single/double ended torque arm

6.2 PRODUCT STORAGE

The motor is delivered with internal protection in the form of an oil film with vapor state corrosion inhibitors, and external protection in form of a VCI plastic bag. This provides sufficient protection for indoor storage in normal temperatures for about 12 months.

6.2.1 Standing the motor on a flat surface

! DANGER

Unsecured motor can fall

Danger to life or risk of injury, damage to equipment.

- ▶ When in storage or during oil filling, the motor must always be secured from falling.

NOTICE

Incorrect placement of the motor

Risk of damage to equipment.

- ▶ When in storage with shaft vertical, the motor must always be placed with the hollow shaft facing down.
- ▶ It is also advisable to provide supports at the mounting surface of the motor, see Fig. 11.

When the motor is placed on a flat surface such as a floor, it must stand either on its outer diameter or on the suitably protected end face of the hollow shaft. It is also advisable to provide supports shown in Fig. 11.

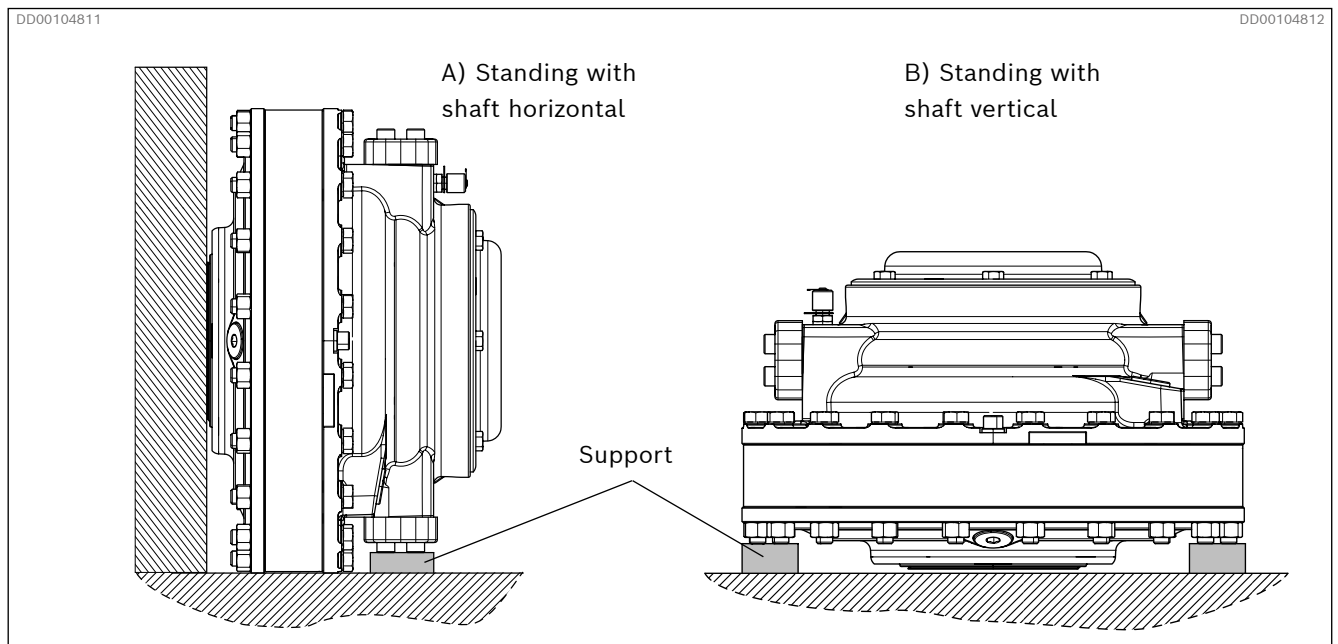


Fig. 11: Example, CA motor standing on a flat surface

6.2.2 Storing for extended periods or in uncontrolled environment

NOTICE

Insufficient cleanliness

Risk of damage to equipment.

- ▶ Take extreme care to ensure that no contamination enters the motor.

If the motor is stored for more than 3 months in uncontrolled environment or more than 12 months in controlled environment, it must be totally filled with oil according to below:

1. Place the motor as shown in *Fig. 11, B*) Standing with shaft vertical.
2. Fill the motor full with filtered oil containing a mixture of 2% Shell VSI 8235, or similar compatible corrosion inhibitor in the selected fluid in the following order: D1, A1, C1.
NOTE! See *Table 6* for oil volume.
3. Fit the plug to D1.
4. Seal connections A1 and C1 with the cover plates fitted to the connection surface at delivery. Check that the O-rings or rubber seals are in position in the cover plates
5. Position the motor as shown in *Fig. 11, A*) Standing with shaft horizontal or alt. B) Standing with shaft vertical.
6. The motor must be turned a few revolutions once a month to prevent internal corrosion in the motor.

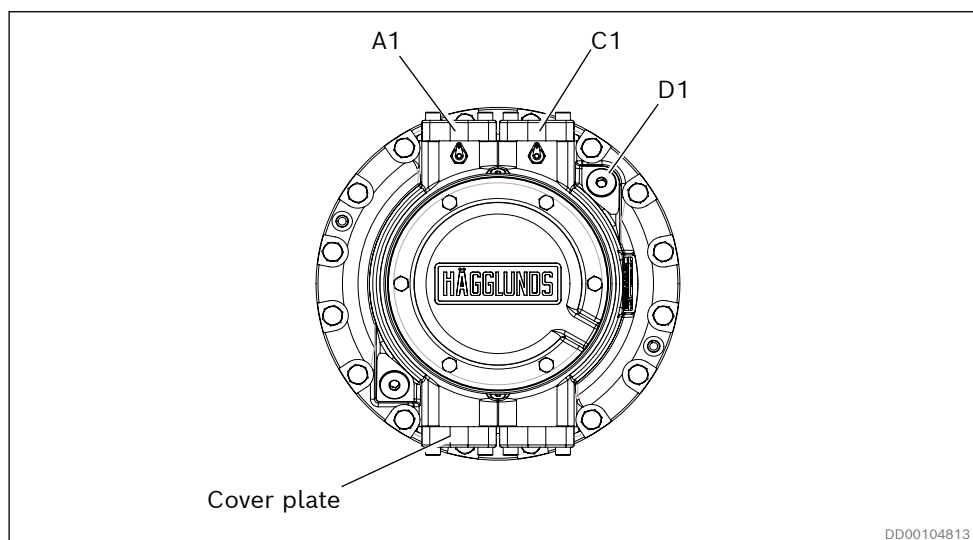


Fig. 12: Filling the motor with oil

Table 6: Motor case oil volume

Motor size	Motor case oil volume including channels	
	Litre	US gallon
CA 50	2.0	0.53
CA 70	2.5	0.66
CA 100	3.7	0.98
CA 140	5.0	1.32
CA 210	6.8	1.80

6.2.3 Storing during maintenance

If the motor has been in operation and the oil in the hydraulic system fulfills the requirements in [data sheet RE 15414](#), regarding water content, the drained motor can be stored for one month without additional rust protection.

The oil connections of the motor must be properly plugged/covered during the whole storage period to avoid any contamination or humidity/water to enter the motor.

If the storage time is longer than one month, follow the instructions in 6.2.2, or if the motor is kept on the shaft, the power unit must be started and the motor rotated once a month.

7 Installation

7.1 UNPACKING

CAUTION

Danger from parts falling out

If the packaging is not opened correctly, parts may fall out and damage the parts or even cause injuries.

- ▶ Place the packaging on a flat and solid surface.
- ▶ Only open the packaging from the top.
- ▶ Remove the packaging from the Hägglunds motor.
- ▶ Check the Hägglunds motor for transport damage and completeness, see chapter 4: *Scope of delivery*.
- ▶ Dispose of the packaging according to the environmental regulations of your country.

7.2 INSTALLATION CONDITIONS

7.2.1 Spline motor at spline shaft

The splines shall be lubricated with hydraulic oil, see 7.4.5 or filled with transmission oil from any connected gearbox or similar according to *Fig. 42*.

To avoid wear in the splines, the installation must be within the recommendations and specified tolerances according to data sheet [RE 15305](#).

7.2.2 Coupling motor at plain shaft

Recommended design of driven shaft end on normally loaded shaft

In drives with only one direction of rotation and/or load where the stresses in the shaft are moderate, the shaft can be plain. For further information see data sheet [RE 15305](#).

Recommended design of driven shaft end on heavily loaded shaft

Where the driven shaft is heavily loaded and is subject to high stresses, for example for changes in the direction of rotation and/or load, it is recommended that the plain driven shaft should have a stress relieving groove. For further information see data sheet [RE 15305](#).

Thread for assembly tool

To make it easier to mount the motor on the driven shaft end or to remove the motor from the shaft it is recommended that a hole should be drilled and tapped in the centre of the shaft for a mounting tool. For further information see data sheet [RE 15305](#).

7.3 REQUIRED TOOLS

7.3.1 Assembly tool for CA motor

For easier and faster mounting of the motor on the coupling adapter or driven shaft, a special assembly tool can be used. The assembly tool is passed through the motor and screwed into a pre made thread in the coupling adapter or driven shaft. The motor is pulled onto the shaft by turning the nut on the assembly tool.

Material ID Assembly tool for CA motor:

Material ID R939003803

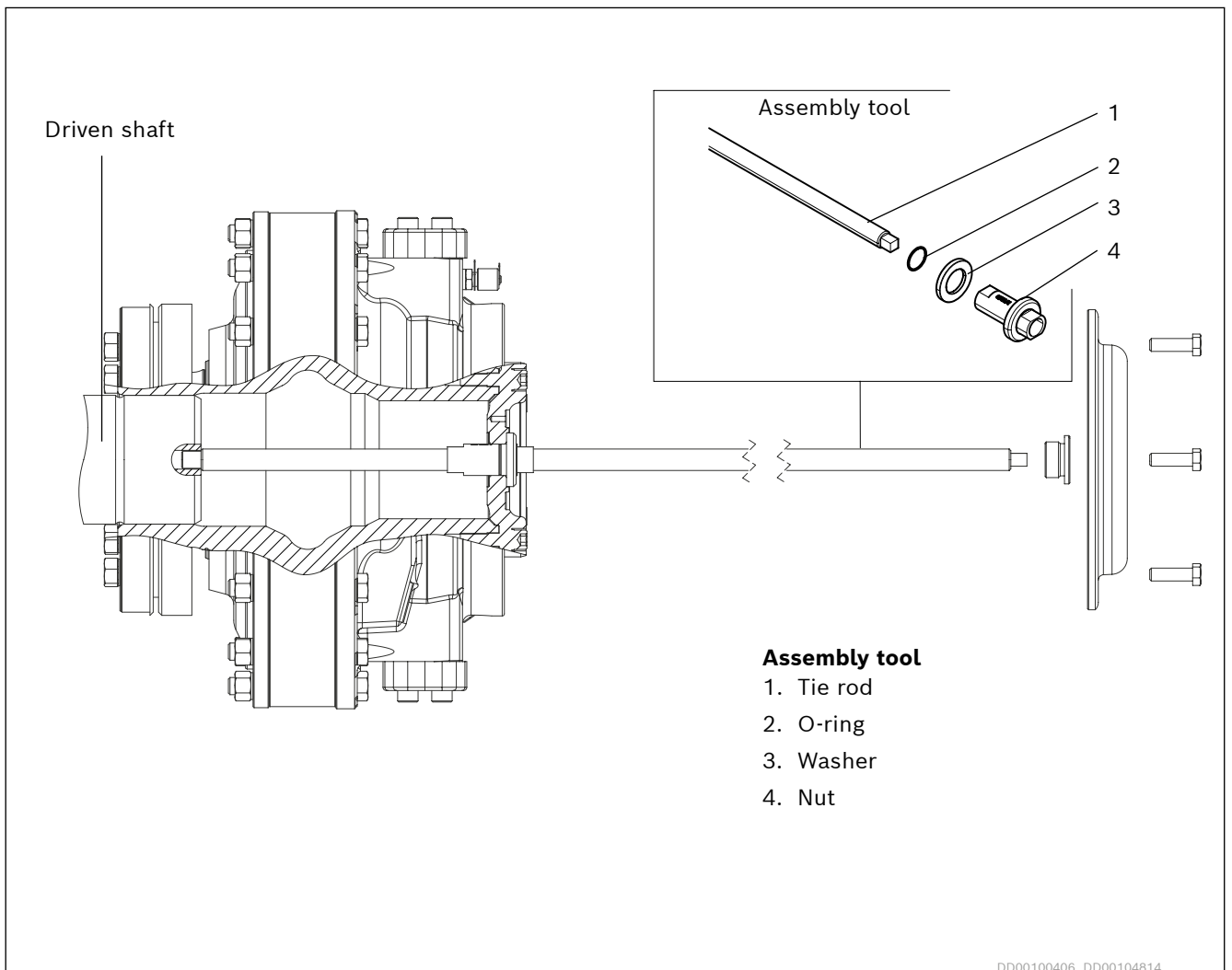


Fig. 13: Mounting CA motor with assembly tool

7.4 PRODUCT INSTALLATION

Before the installation, drain all fluids from the motor.

DANGER

Danger from suspended loads

Danger to life or risk of injury, damage to equipment! Improper transportation may cause the Hägglunds motors to fall down leading to injuries e.g. crushing or broken bones or damage to the product.

- ▶ Make certain that the forklift truck or lifting device has adequate lifting capacity.
- ▶ Never stand under or put your hands under suspended loads.
- ▶ Ensure your position is stable during transportation.
- ▶ Use PPE (e.g. safety glasses, safety gloves, suitable working clothes, safety shoes).
- ▶ Use suitable lifting device for transport and storage, installation and for removal and repair. Make sure the motor is well mounted or anchored when the lifting device is disconnected.
- ▶ Observe the prescribed position of the lifting strap.
- ▶ Observe the local federal laws and regulations on work and health protection and transportation.

CAUTION

Risk for pressurized hydraulic fluid in the motor due to temperature variations

Risk of health hazard, environmental pollution.

- ▶ Be careful when opening plugs.
- ▶ Use PPE (e.g. safety glasses, safety gloves).

Contact with hydraulic fluid

Hazard to health/health impairment e.g. eye injuries, skin damage, toxication during inhalation!

- ▶ Avoid contact with hydraulic fluids.
- ▶ When working with hydraulic fluids, strictly observe the safety instructions provided by the lubricant manufacturer.
- ▶ Use PPE (e.g. safety glasses, safety gloves, suitable working clothes, safety shoes).
- ▶ If hydraulic fluid should, inadvertently comes into contact with your eyes or bloodstream or is swallowed, consult the medical care immediately.

NOTICE

Escaping or spilling hydraulic fluid

Environmental pollution and contamination of the ground water!

- ▶ Always place a drip tray under the Hägglunds motor when filling and draining the hydraulic fluid.
- ▶ Use an oil binding agent if hydraulic fluid is spilled.
- ▶ Observe the information in the safety data sheet for the hydraulic fluid and the specifications provided by the system manufacturer.

7.4.1 Fitting the torque arm on the motor

NOTICE

Unauthorized modification of component

Risk of damage to equipment.

- ▶ Do not weld, drill, grind or carry out any similar work on the torque arm without Bosch Rexroth approval.

General information for TC A and DTCA

The torque arm shall be fitted to the motor before the motor is mounted on the driven shaft. See also data sheet [RE 15355](#).

1. Clean the mating surfaces on the torque arm and motor.
2. Oil the screws (1).
3. Make sure that the foundation can withstand the forces from the torque arm (see *Fig. 21*, *Fig. 29*, *Table 9* and *Table 12*).
4. The motor must be turned until the drain outlets are positioned according to *7.4.10*
5. Mount the torque arm on the motor with the screws and washers.
6. Tighten the screws (1) to the torque stated in *Table 7*.

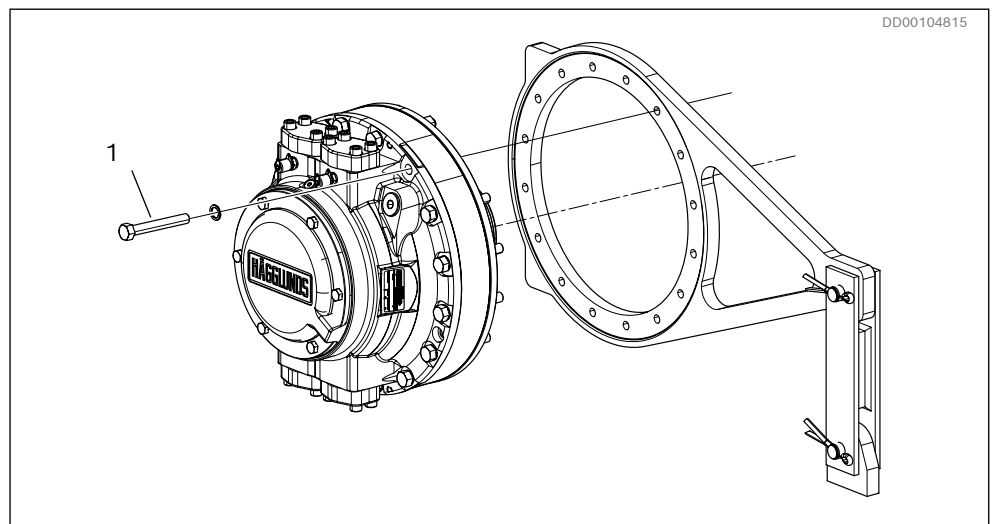


Fig. 14: Mounting single ended torque arm TC A 0050 and TC A 0070 for CA 50 and CA 70

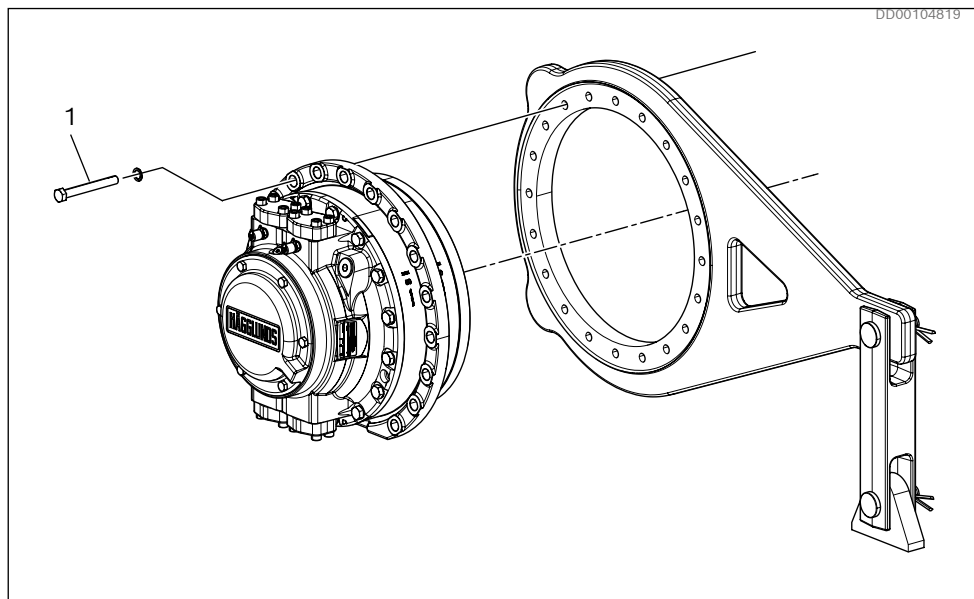


Fig. 15: Mounting single ended torque arm TC A 0100 to TC A 0210 for CA 100 to CA 210

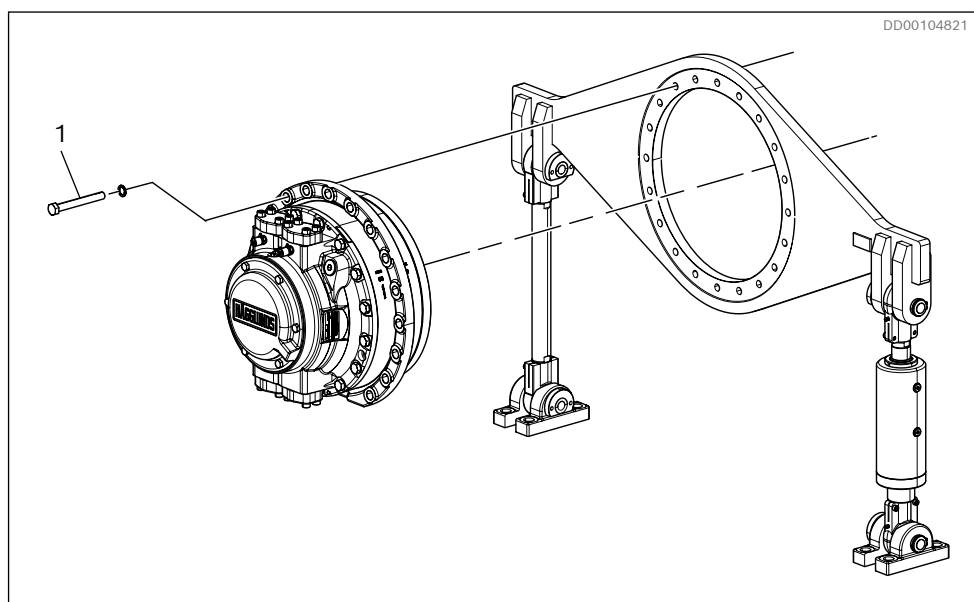


Fig. 16: Mounting double ended torque arm DTCA 0050 to DTCA 0210 for CA 50 to CA 210

Table 7: Screw dimensions

Torque arm	Motor type	Screw dimension	Number of screws	Tightening torque Nm	lb-ft
TC A 0050 DTCA 0050	CA 50	M16x120-10.9	16	280	206
TC A 0070 DTCA 0070	CA 70	M16x120-10.9	20	280	206
TC A 0100 DTCA 0100	CA 100	M20x70-10.9	17	540	400
TC A 0210 DTCA 0140/0210	CA 140/CA 210	M20x70-10.9	21	540	400



Use calibrated torque wrench and oiled screws.

7.4.2 Single ended torque arm installation

The single ended torque arm is fitted to the motor before the motor is mounted on the driven shaft. See 7.4.1 , Fig. 14 and Fig. 15

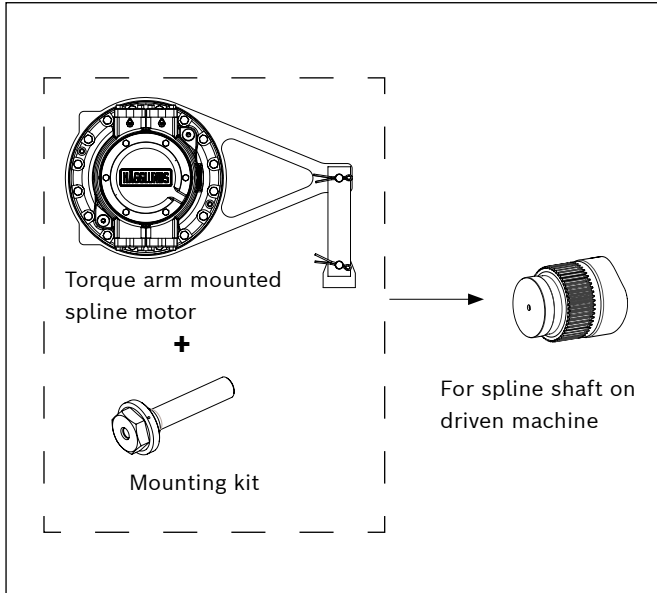


Fig. 17: Single ended torque arm mounting for spline shaft

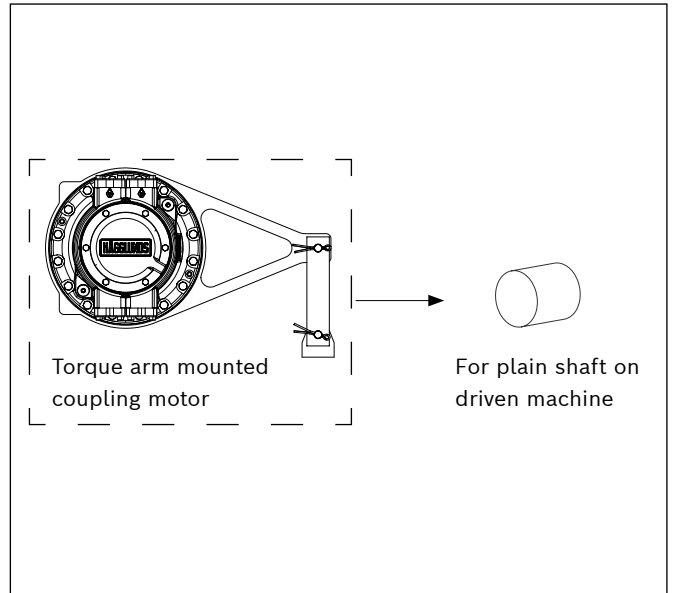


Fig. 18: Single ended torque arm mounting for plain shaft

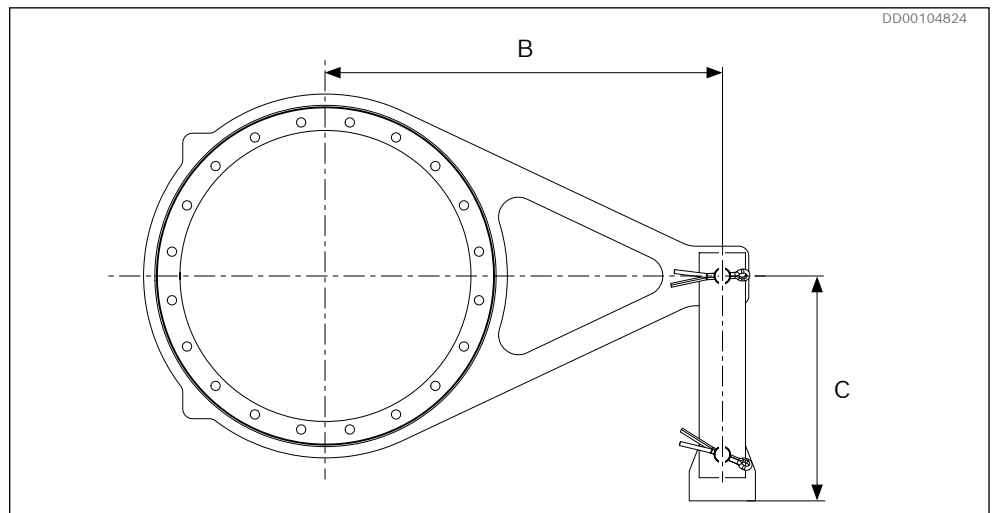


Fig. 19: Single ended torque arm TC A

Table 8: Dimensions torque arm TCA

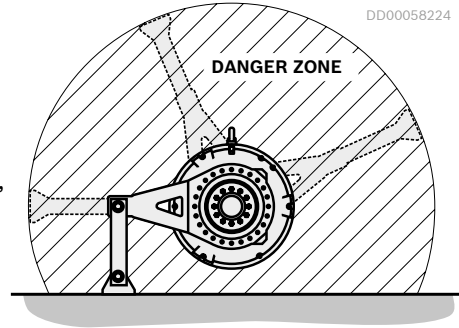
Torque arm	Motor type	B		C		Weight ¹⁾	
		mm	in	mm	in	kg	lb
TC A 0050	CA 50	600	23.62	340	13.39	28	62
TC A 0070	CA 70	600	23.62	340	13.39	31	68
TC A 0100	CA 100	800	31.50	430	17.20	91	200
TC A 0210	CA 140 / CA 210	800	31.50	430	17.20	81	179

¹⁾ Single ended torque arm with articulated connection.

Mounting of articulated connection for TC A**! DANGER****Articulated connection rotates with the motor**

Risk to life and risk of injury or serious injuries and risk of damage to equipment.

- ▶ Make sure the foundation and the customer machine can withstand the forces from the torque arm. See *Fig. 21*, *Fig. 29*, *Table 9* and *Table 12*.
- ▶ Do not stand in the danger zone.

**! WARNING****Heating of material (welding)**

Risk of fire, health hazard, damage to equipment, environmental pollution.

- ▶ Only perform welding work when the machine/system is depressurized.
- ▶ The product is painted with thermosetting plastic paint containing an isocyanate component. When a thermosetting plastic paint is heated to over 150-175°C, gases are emitted that can cause serious health risk. If hot work (e.g. welding) is done on the product, protective breathing equipment must be used.
- ▶ **Never** use motor as grounding point.

Articulated connection in general

- ▶ $x \leq \pm 2 \text{ mm}$ (0,079 inch) misalignment in installation.
 $x \leq \pm 15 \text{ mm}$ (0,59 inch) movement when in use.
- ▶ The articulated connection and the spherical plain bearing (1) must be dismantled during welding. See Fig. 22
- ▶ Steel: EN 10025-3 – S355N (1.0545), shall be protected against corrosion after welding (2).

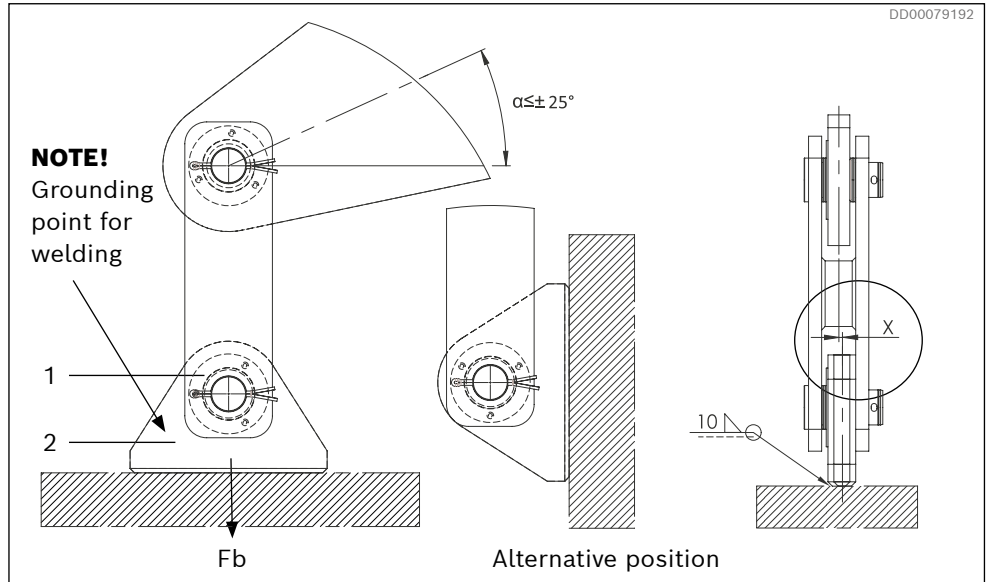


Fig. 20: Installation of articulated connection for TC A

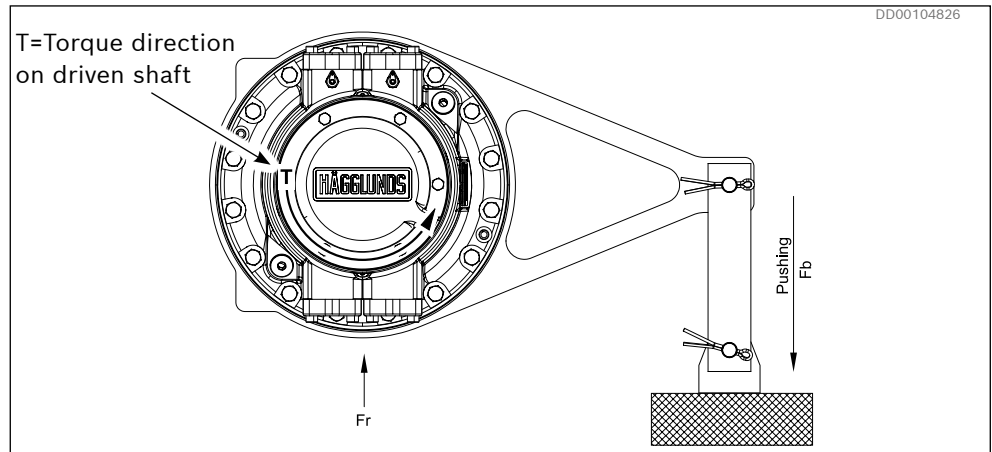


Fig. 21: External forces Fr, Fb for TC A

Table 9: External forces single ended torque arm valid for a pressure difference of 420 bar [6000 psi] static

Torque arm	Motor	Force Fb		Force Fr 1)	
		N	lb	N	lb
TC A 0050	CA 50 50	35 000	7 686	33 077	7 436
TC A 0070	CA 70 70	49 000	11 016	46 754	10 511
TC A 0100	CA 100 100	52 500	11 802	49 164	11 053
TC A 0210	CA 140 140	73 500	16 523	69 517	15 628
	CA 210 210	110 250	24 785	105 384	23 691

1) The force Fr is calculated including the weight of spline motor and torque arm.

Standard articulated connection

1. The bearing (5) shall be mounted by using a mounting sleeve or tube applied on the bearing outer ring.
2. The bearing shall be mounted with the slot in the outer ring perpendicular towards the load direction. See Fig. 22
3. Lock the bearings with the circlips (4)
4. Assemble the rest of the components according to Fig. 22

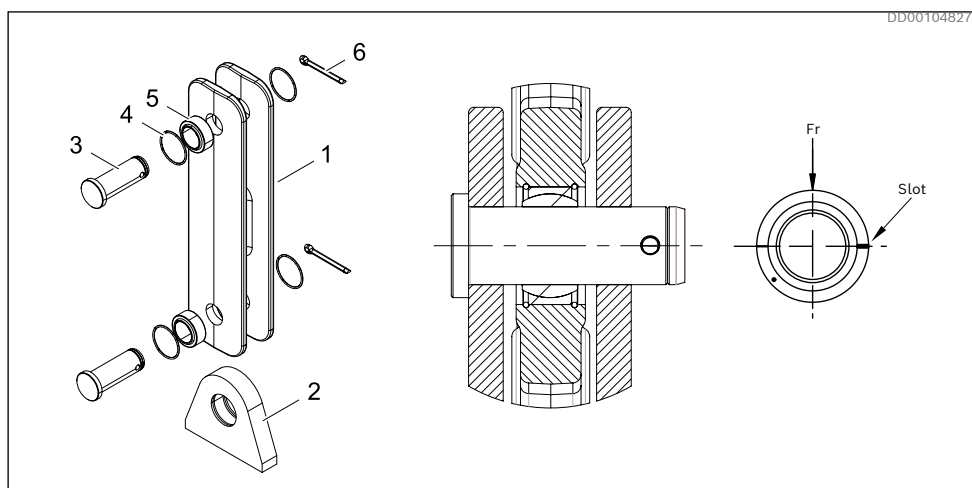


Fig. 22: Standard articulated connection for TC A

Pos	Description	Pcs
1	Linkage part	1
2	Fastening support	1
3	Bolt	2
4	Circlip	4
5	Spherical plain bearing	2
6	Split pin	2

Heavy duty articulated connection

- 1.** The bearing (6) shall be mounted by using a mounting sleeve or tube applied on the bearing outer ring.
- 2.** The bearing (6) shall be mounted with the slot in the outer ring perpendicular towards the load direction. See Fig. 23
- 3.** Lock the bearings (6) with the circlips (5)
- 4.** Grease the chonical sleeves (7) and shaft (3) with grease available, preferably graphite grease. Do not grease the threads.
- 5.** Insert the shaft (3) and then the supporting sleeves (4) and position the shaft (3) in the bores. Make sure the shaft is centered, see Fig. 23. Install the sleeves (7), then wedge lock washers (8) and nuts (9). Tighten the nuts with 115 Nm (85 lb-ft) for TC A 0050 to TC A 0070 / 175 Nm (129 lb-ft) for TC A 0100 to TC A 0210.
- 6.** After initial torque, check the torque after 10 hours, 40 hours and at regular service intervals to ensure proper seating of the sleeves.

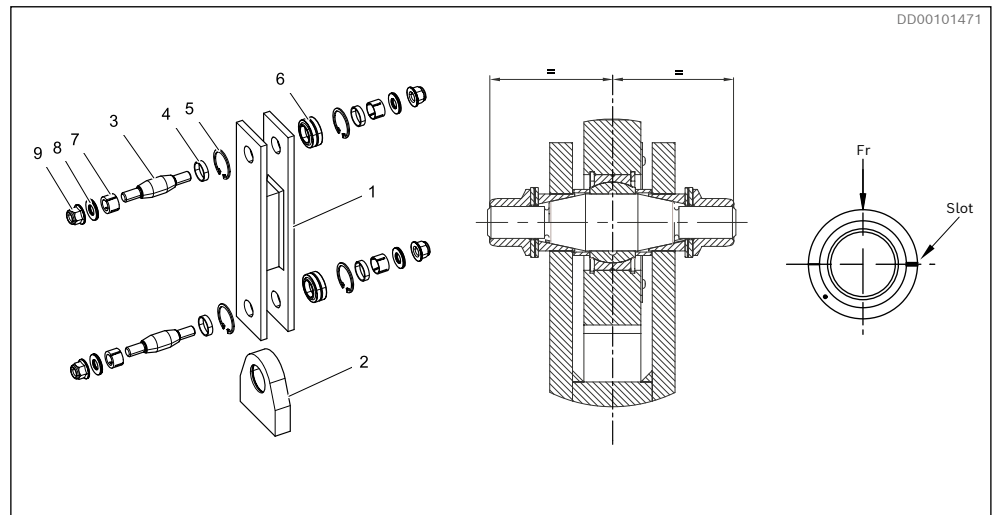


Fig. 23: Heavy duty articulated connection for TC A

Pos	Description	Pcs
1	Linkage part	1
2	Fastening support	1
3	Shaft	2
4	Supporting sleeve	4
5	Circlip	4
6	Spherical plain bearing	2
7	Conical sleeve	4
8	Set of wedge lock washers	4
9	Nut	4

7.4.3 Double ended torque arm installation

The double ended torque arm is fitted to the motor before the motor is mounted on to the driven shaft, see 7.4.1 Fig. 16

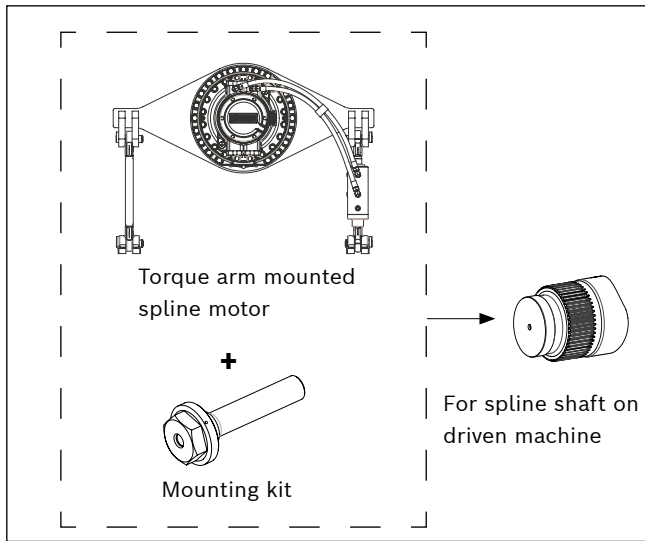


Fig. 24: Double ended torque arm mounting for spline shaft

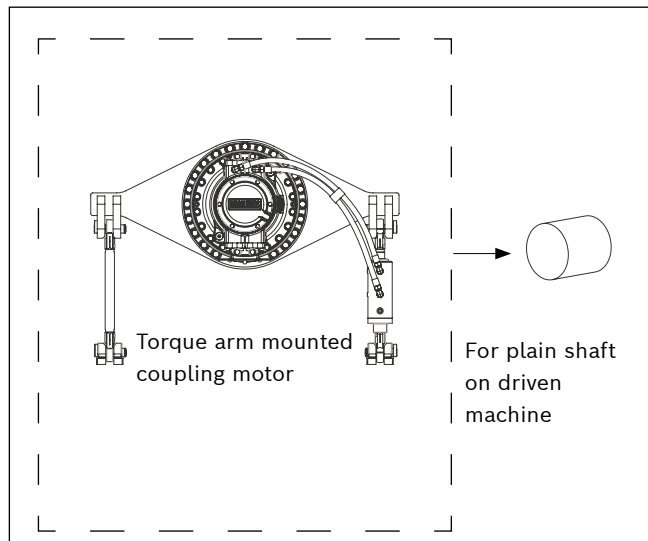


Fig. 25: Double ended torque arm mounting for plain shaft

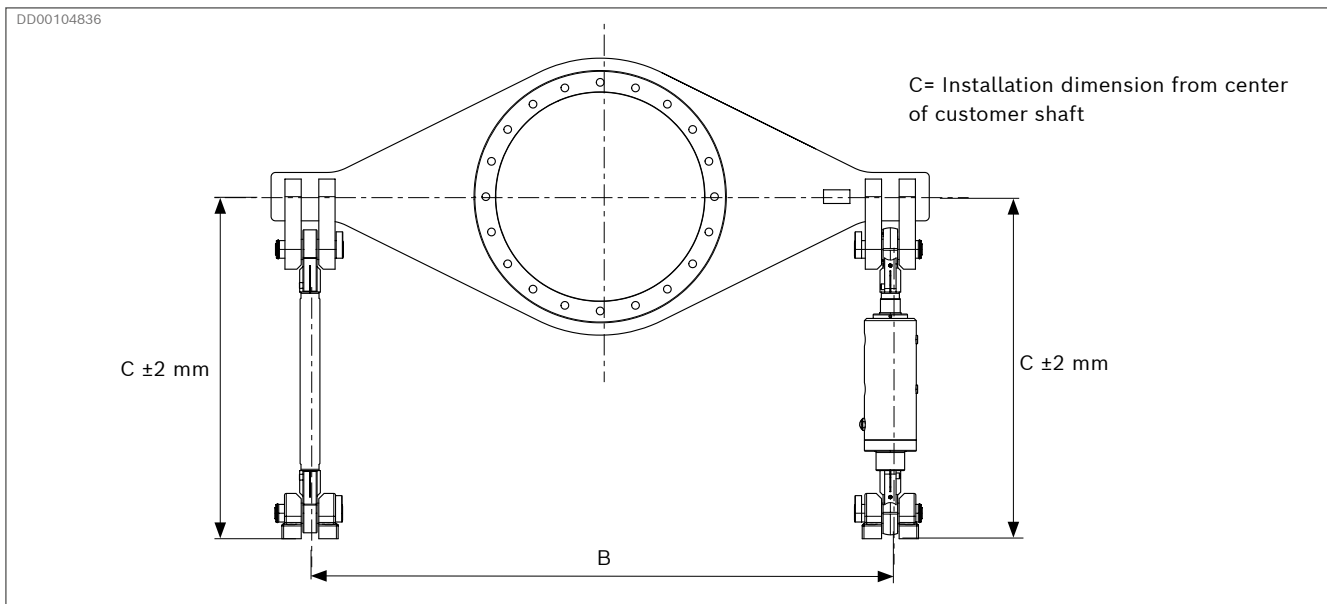


Fig. 26: Double ended torque arm DTCA

Table 10: Dimensions torque arm DTCA

Torque arm	B		C		Weight ¹⁾	
	mm	in	mm	in	kg	lb
DTCA 0050	625	24.6	730	28.74	95	209
DTCA 0070	900	35.4	730	28.74	100	220
DTCA 0100	1 015	40.0	780	30.71	135	297
DTCA 0140	1 165	45.9	780	30.71	155	341
DTCA 0210	1 320	52.0	780	30.71	162	357

1) Double ended torque arm with articulated connection and hydraulic cylinder

Mounting of hydraulic cylinder and articulated connection for DTCA

- ▶ $x \leq \pm 2 \text{ mm}$ (0,079 inch) misalignment in installation.
 $x \leq \pm 15 \text{ mm}$ (0,59 inch) movement when in use.
- ▶ Hole pattern and dimensions for ground attachment see Fig. 28 and Table 11

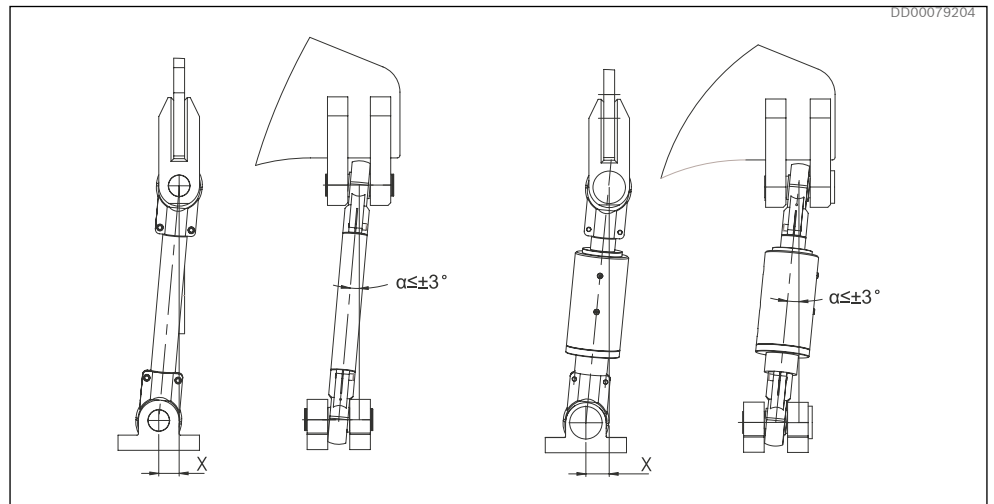


Fig. 27: Installation of articulated connection and hydraulic cylinder for DTCA

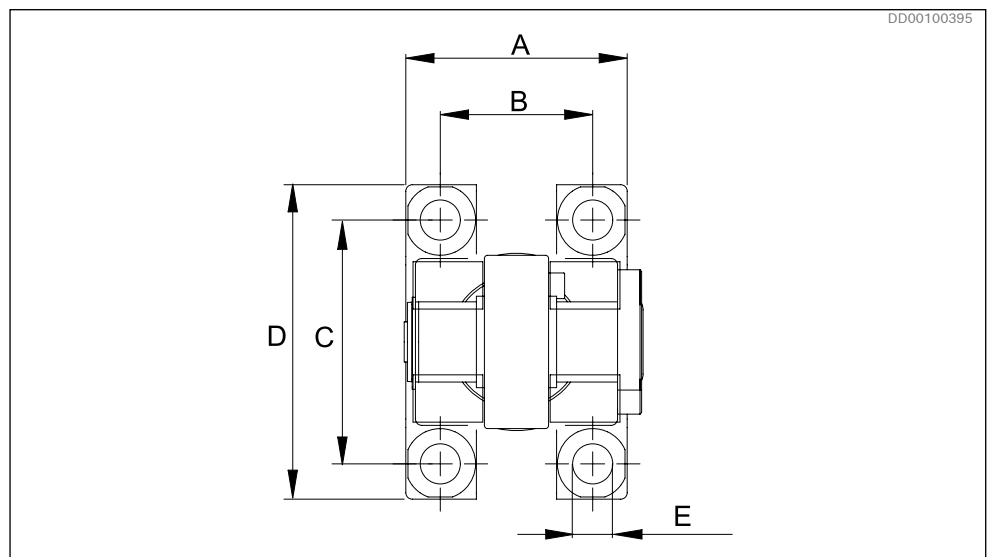


Fig. 28: Hole pattern for articulated connection and hydraulic cylinder for DTCA

Table 11: Hole pattern and dimensions for articulated connection and hydraulic cylinder for DTCA

Torque arm	A		B		C		D		E	
	mm	in	mm	in	mm	in	mm	in	mm	in
DTCA 0050 / DTCA 0070	69	2.72	47	1.85	88	3.46	110	4.33	13	0.51
DTCA 0100 to DTCA 0210	129	5.08	85	3.35	152	5.98	196	7.72	25	0.98

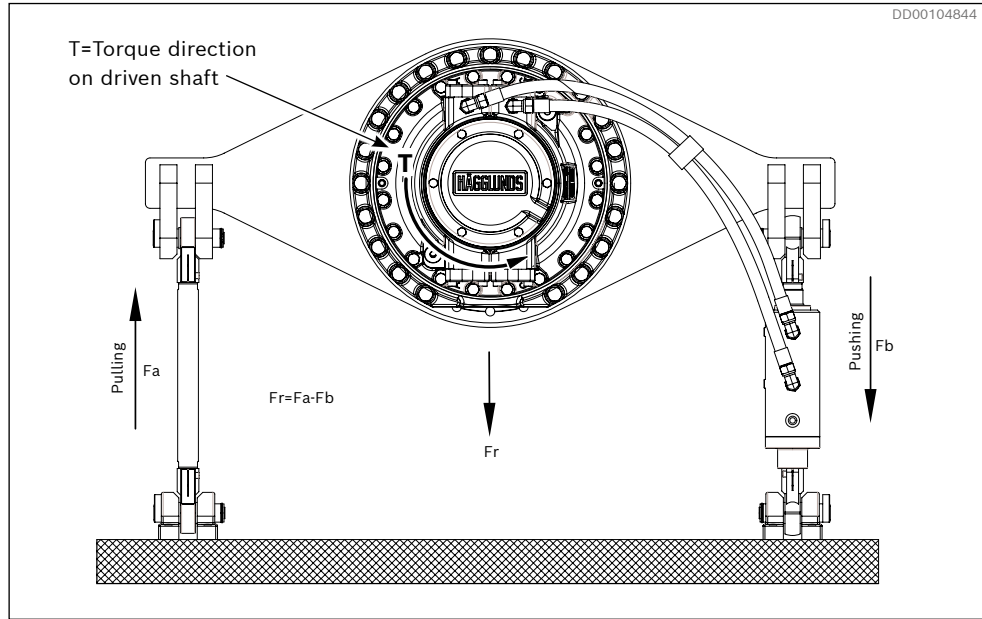


Fig. 29: External forces Fr, Fa, Fb for DTCA

Table 12: External forces double ended torque arm valid for a pressure difference of 420 bar [6000 psi] static

Torque arm	Motor	Force Fa, Fb on foundation		Force Fr on driven shaft ¹⁾	
		N	lb	N	lb
DTCA_0050 01	CA 50 50	31 013	6 972.00	2 182	490.53
DTCA_0070 01	CA 70 70	31 013	6 972.00	815	183.22
DTCA_0100 02	CA 100 100	38 298	8 609.733	3 142	706.35
DTCA_0140 03	CA 140 140	46 727	10 504.65	3 531	793.80
DTCA_0210 04	CA 210 210	61 836	13 901.29	4 213	947.12

1) The force Fr is calculated included the weight of splines motor and torque arm.

1. Mount the articulated connection on the left side of the torque arm (viewed from the connection side of the motor), use the pins (2) and lock them in place with circlips (3).
2. Mount the hydraulic cylinder with the piston rod facing upwards on the right side of the torque arm (viewed from the connection side of the motor), use the pins (2) and lock them in place with circlips (3).
3. Attachment brackets (6) for torque arm should be fastened with screws (7)
4. Check and adjust the distance C for the cylinder according to *Table 10* (Note! depending on application this distance can be different). Shim between the torque arm attachment brackets and the foundation or if possible, adjust the mounting plate of the foundation to reach the required distance.

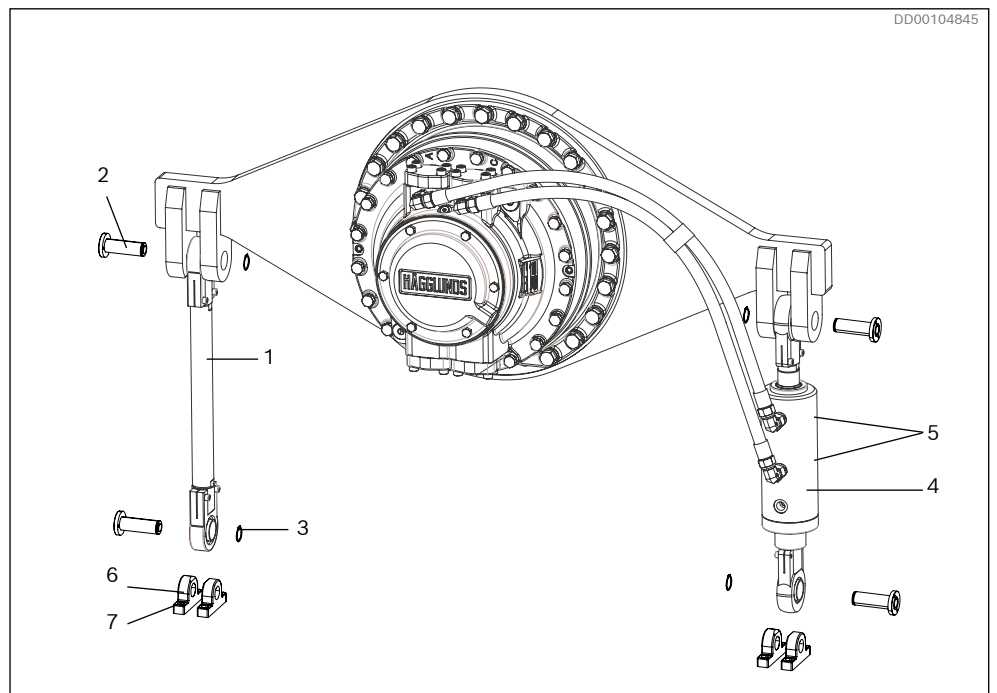


Fig. 30: Articulated connection and hydraulic cylinder for DTCA

Pos	Description	Pcs
1	Articulated connection	1
2	Pins	4
3	Circlips	4
4	Hydraulic cylinder	1
5	Air bleeding (opposite side of connections) G ½" (DTCA 0050 and DTCA 0070) G ¼" (DTCA 0100 to DTCA 0210)	2
6	Attachment brackets	4
7	Screw M24-8.8 Tightening torque 750 Nm (53 lb ft)	8*

*Not included in delivery

Hydraulic connection between motor and hydraulic cylinder

This is valid with the hydraulic cylinder on the right hand-side of the the motor.

See Fig. 31

1. Mount the hoses, The hose mounted to connection T1 has to be mounted to the hydraulic cylinder connection (A) and the hose from connection T2 has to be mounted to the cylinder connection (B).

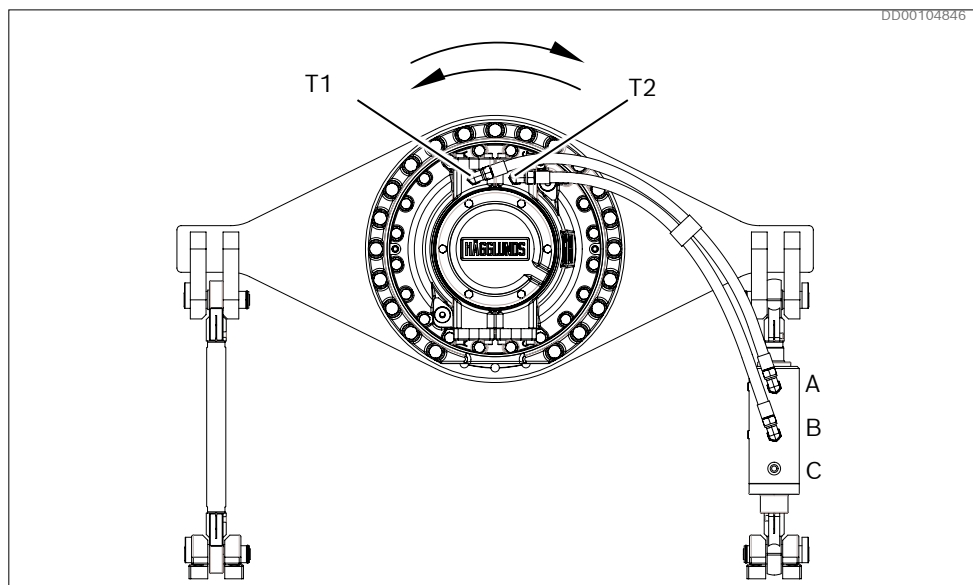


Fig. 31: Hydraulic connections DTCA

Table 13: Hydraulic connections DTCA

Connection	Description	Dimensions	Remarks
T1	Pressure connection	G $\frac{1}{4}$ "	To be connected to A on cylinder
T2	Pressure connection	G $\frac{1}{4}$ "	To be connected to B on cylinder
A	Pressure connection	G $\frac{1}{2}$ "	
B	Pressure connection	G $\frac{1}{2}$ "	
C	Air ventilation	G $\frac{1}{2}$ "	Air filter

NOTICE

Overload of driven shaft

Damage of equipment.

- Make sure to follow the installation instructions regarding hydraulic connections



The cylinders should be vented from air during commissioning by using the air bleeding screws on the cylinder, see Fig. 30

7.4.4 Mounting of coupling motor

NOTICE

Slipping shaft

Damage of motor or customer shaft.

- ▶ Grease must under no circumstances be transferred to the surfaces between the driven shaft and the coupling motor (see *Fig. 33*).
- ▶ Clean hands free from grease before start of mounting

Incorrect tightening of shrink disc

Damage the motor hollow shaft.

- ▶ Never tighten the coupling screws before the motor has been mounted on the driven shaft

Mounting of shrink disc to coupling motor

1. The shrink disc arrives from the factory lubricated with grease on the conical surfaces and the screws (see *Fig. 33*). This lubricants shall remain on these surfaces.
2. Clean the outside of the hollow shaft.
3. Remove the spacers between the two clamping rings of the shrink disc.
4. Mount the shrink disc on the hollow shaft. Use an approved sling between the clamping rings (see *Fig. 32* and *Fig. 33*). The coupling must be pushed completely to the stop of the hollow shaft. If necessary separate the clamping ring for easier mounting.
5. Absolutely no grease on the surfaces between driven shaft and hollow shaft. Clean the driven shaft and the inside of the hollow shaft

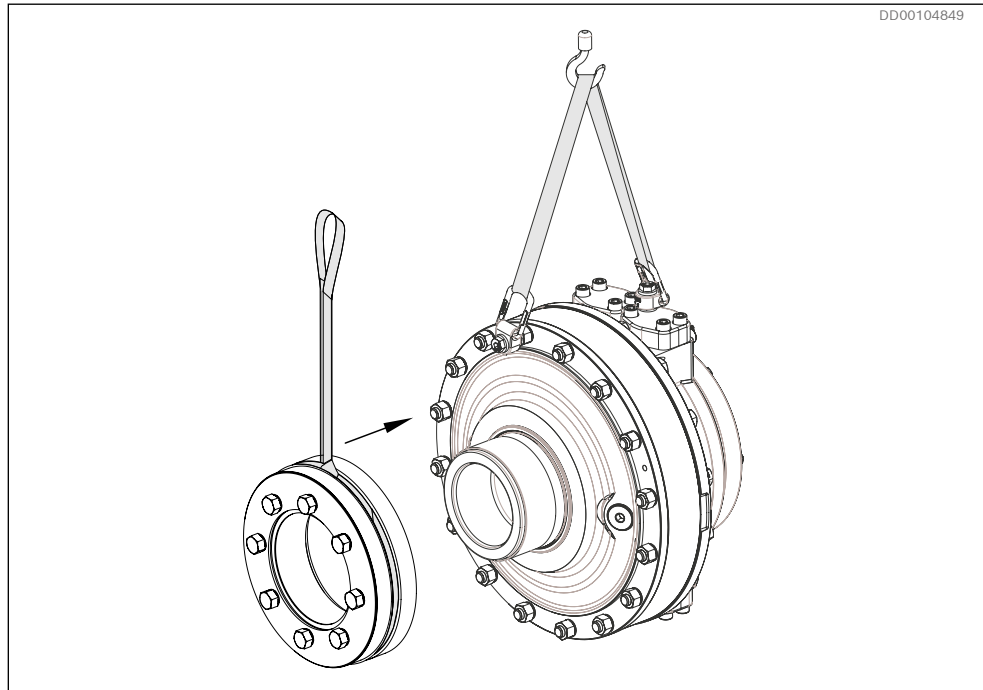


Fig. 32: Mounting of shrink disc on coupling motor

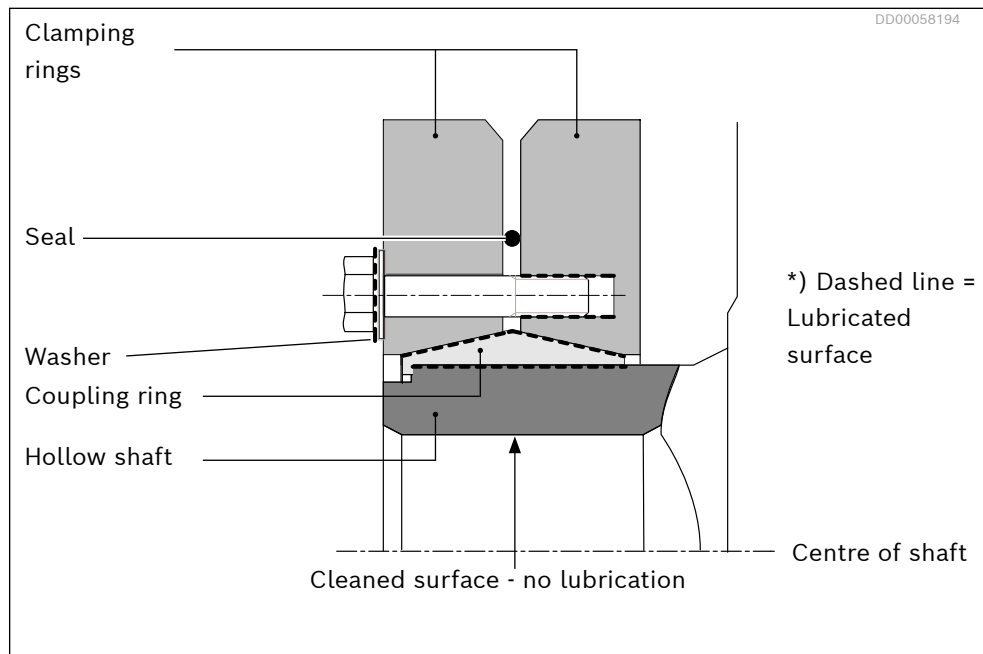


Fig. 33: Shrink disc



*) The conical surface between the coupling ring and the clamping rings as well as the screws shall be coated with Molykote G-Rapid plus paste, (see Fig. 33). This is done from the factory at delivery.

When a motor has been in for overhaul or service and shall be reassembled it may be necessary to relubricate those surfaces with Molykote G-Rapid plus paste again but only on the specified surfaces.

Mounting the coupling motor with torque arm to the driven shaft

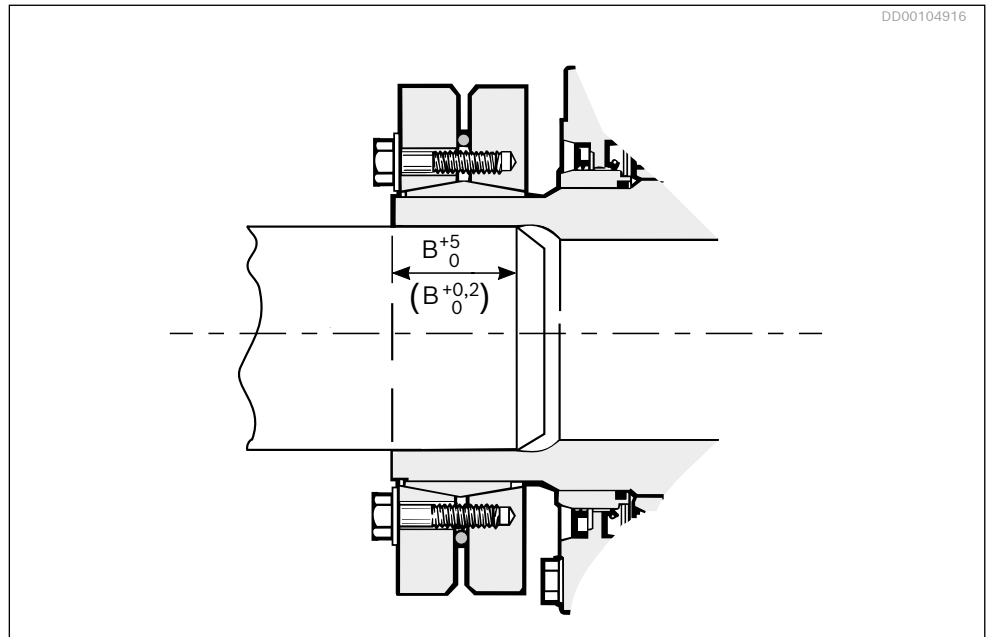


Fig. 34: Driven shaft without stress relieving groove

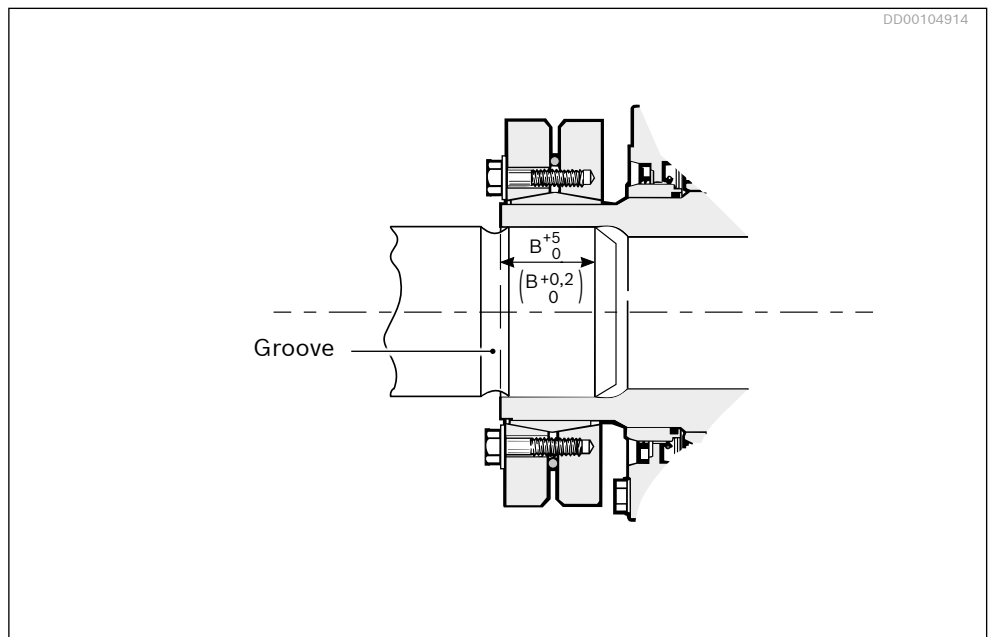


Fig. 35: Driven shaft with stress relieving groove

Table 14: Clamping length

Motor	Length B	
	mm	in
CA 50/CA 70	71.5	2.81
CA 100/CA 140	84.5	3.33
CA 210	105	4.13

The motor can be mounted to the driven shaft with or without a mounting tool, but the use of a mounting tool is recommended since it makes the work easier. Ensure that the full clamping length is used, by for example measuring and marking the driven shaft. This is of particular importance if the driven shaft has a stress relieving groove. See Fig. 34, Fig. 35 and Table 14.

1. Mount torque arm to the motor as described in chapter 7.4.1.
2. Remove the end cover (1) together with screws and washers.
3. Remove the plug G1" (2).
4. Align the motor with the driven shaft.
5. Install the assembly tool by passing the tie rod through the centre of the motor, and screw it into the driven shaft by using a wrench at the key grip at the end of the assembly tool. Assemble the washer and then the nut tight to the bearing retainer (3). See Fig. 36.
6. Pull the motor onto the shaft by turning the nut on the mounting tool until the length stated in the Table 14, is obtained; see Fig. 34 and Fig. 35.
7. Tighten the shrink disc see : *Tightening of shrink disc page 42*
8. Remove the mounting tool.
9. Remount the plug G1" (2).
10. Remount the end cover (1) and tighten the screws. Torque 80 Nm (59 lb-ft).

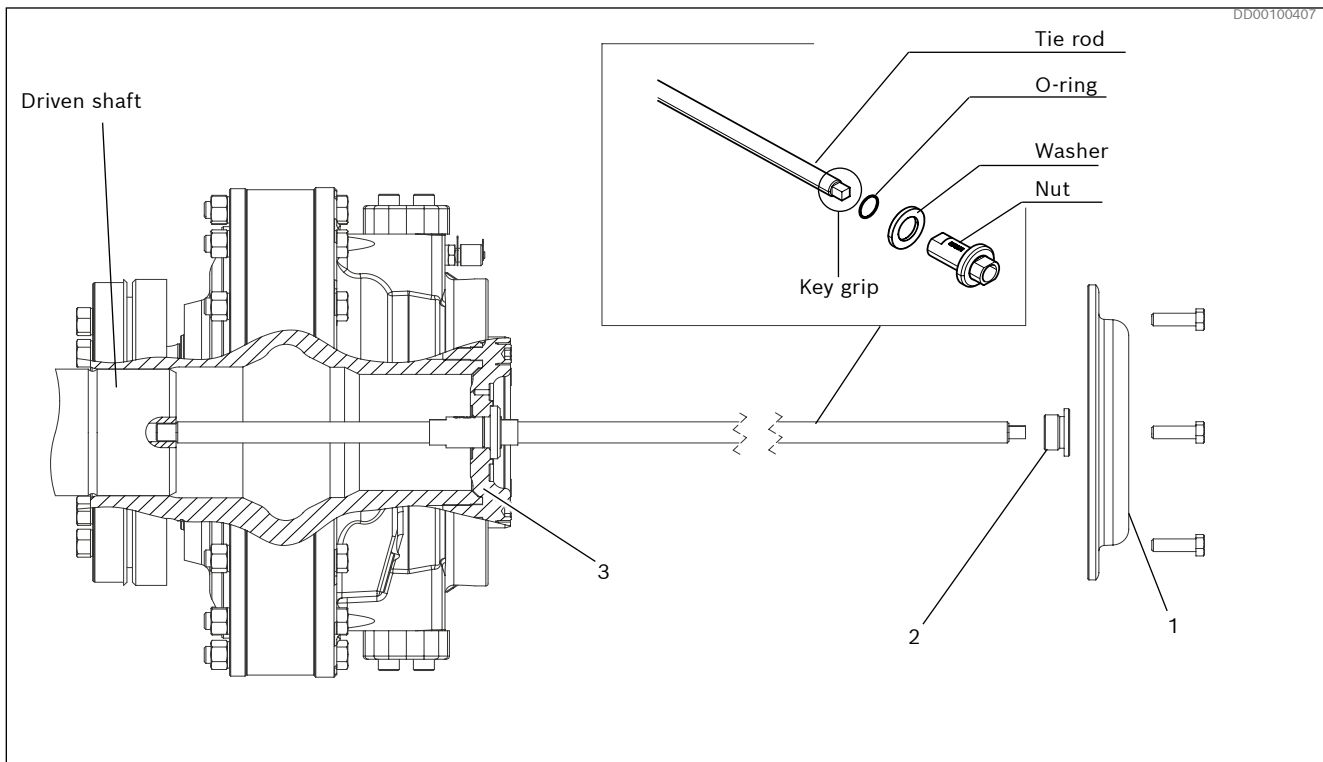
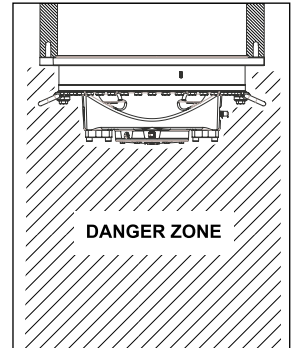


Fig. 36: Mounting of coupling motor with assembly tool

Vertical mounting of motor**! DANGER****Vertical mounted motor: Motor/flange falls down**

Risk to life and risk of injury or serious injuries and risk of damage to equipment!

- ▶ Make sure that the flange is correctly mounted to the foundation and can withstand the weight and forces from the motor.
- ▶ Make sure the motor is correctly mounted to the flange.
- ▶ Do not stand in the danger zone!
- ▶ The spline area must always be lubricated with hydraulic oil to prevent wear of spline interface. Wear of spline increase relative movement between driven shaft and motor, which can cause the mounting kit, holding the motor axially, to break.
- ▶ Torque arm mounted motor with spline and mounting kit can be used only for horizontal mounting and/or motor driven shaft pointing downwards unless extra safety arrangements is installed to secure the motor from falling.

**NOTE!**

Only recommended for coupling motor.

Mounting the motor onto the driven shaft using the assembly tool see : Mounting the coupling motor with torque arm to the driven shaft page 39.

NOTE!

If spline motor is to be used, contact your Bosch Rexroth representative.

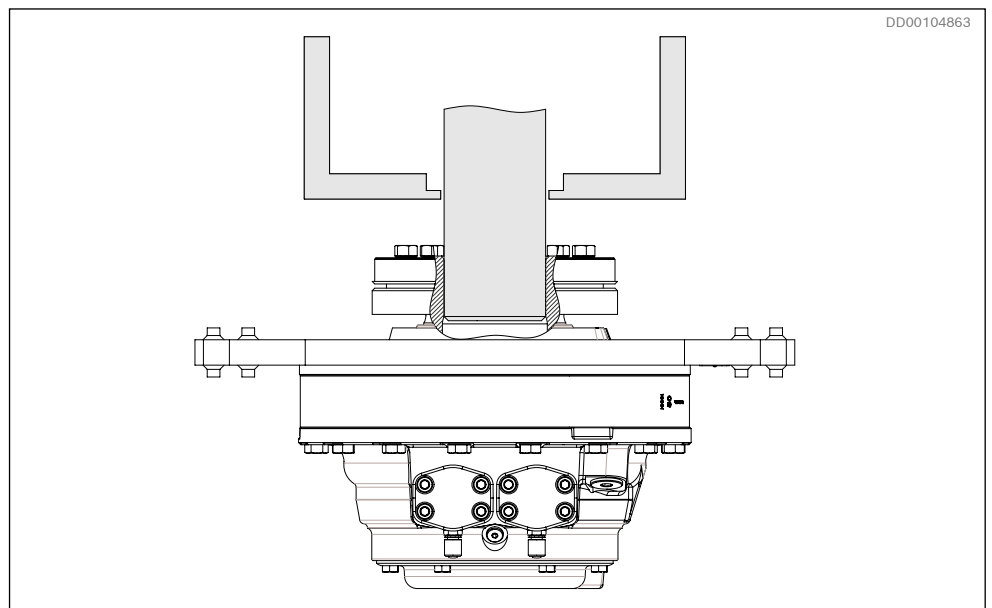


Fig. 37: Vertical mounted coupling motor with double ended torque arm DTCA

Tightening of shrink disc

1. Keep tension in the lifting straps to avoid a skewed setting of the coupling adapter or coupling motor during the tightening of the screws. Wobbling caused from a skewed setting will add a load to the main bearing of the motor.
2. In order to avoid misalignment of the two clamping rings during the tightening of the screws, the gap between the rings must be measured in several places during the process, see *Fig. 38*. The difference between the measured gaps must never vary more than 1 mm (0,04") during any stage of the tightening process.
3. Pre-set the coupling screws in opposite pairs (12-6-9-3 o'clock) to max 1/3 of the torque specified for the screws, see *Table 15*. It is very important that the misalignment is kept within the tolerance as described above.
4. Mark the screw head at 12 o'clock with a pen or paint so that you can follow the turning sequence of the screws.
5. Set the torque wrench to max 1/3 of the specified maximum torque for the coupling screws, tighten all bolts in sequence, shown in *Fig. 39*, for 2 or 3 passes. Increase the torque to max 2/3' of maximum torque and tighten the bolts another 2 or 3 of passes.
6. Set the torque wrench for the specified maximum torque of the coupling screws as shown on the sign of the coupling or *Table 15*.
7. Start tightening the screws in sequence shown in *Fig. 39*.
8. Keep on doing this until you have reached the stated torque. Several passes are required before the screws are tightened to specified torque. Keep checking the alignment of the coupling. (15-20 passes may be necessary).
9. When the specified torque is reached it is important that all screws are tightened with specified torque and that no further movement can be observed.

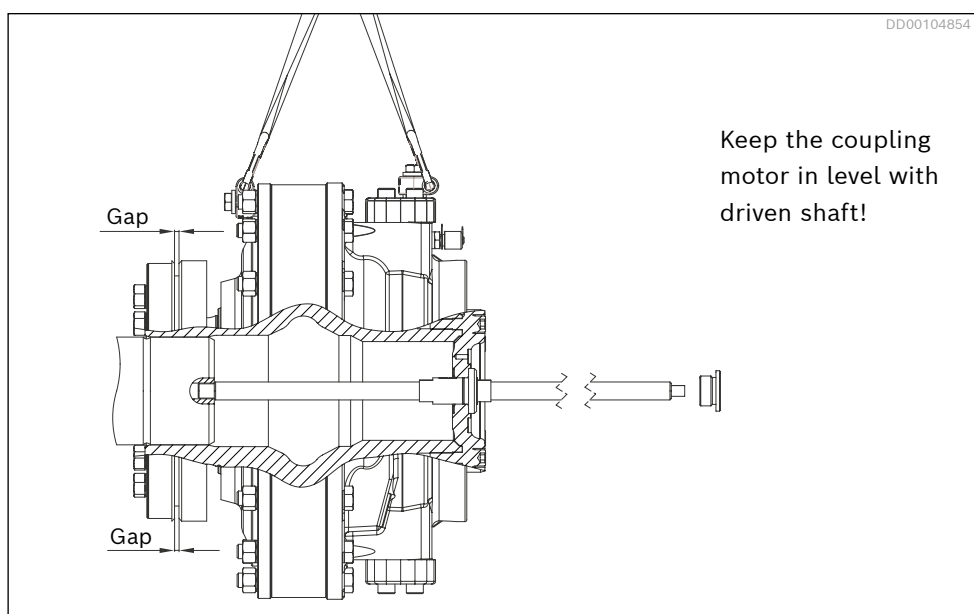


Fig. 38: Gap between the clamping rings

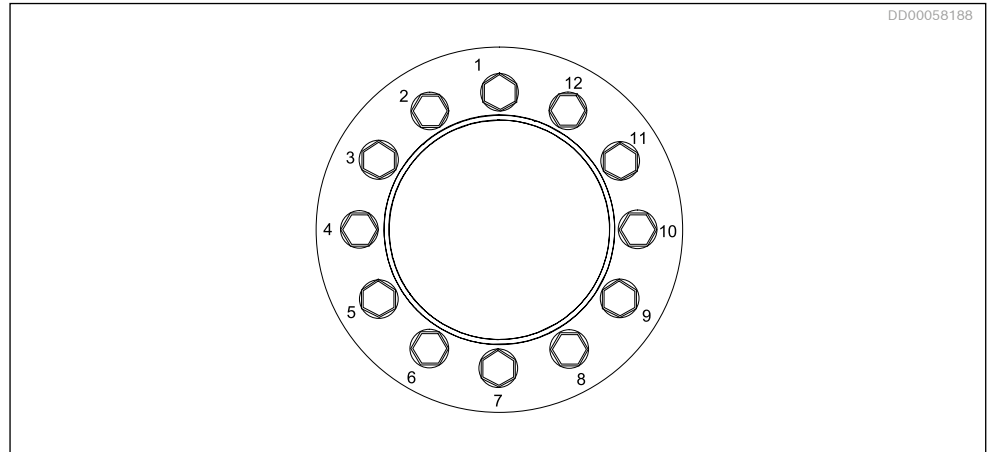


Fig. 39: Tightening order

Table 15: Screws and tightening torque, for standard shrink discs

Motor type	Shrink disc size	Number of screws	Screw dim.	Strength	Tightening		Type of head
					Nm	lb-ft	
CA 50/CA 70	Ø 290	8	M16 x 55	10.9	250	185	Hexagon
CA 100/CA140	Ø 330	12	M16 x 65	10.9	250	185	Hexagon
CA 210	Ø 350	15	M16 x 80	10.9	250	185	Hexagon

NOTICE

Slipping shaft

Damage of motor or customer shaft.

- ▶ There is a metallic sign on every shrink disc with a tightening torque stamped on it. This torque is always to be used.
- ▶ Tightening torque value is critical. Use calibrated torque wrenches.
- ▶ Uncoated screws shall be greased with Molykote G-Rapid plus paste.

7.4.5 Mounting of spline motor

Mounting of spline motor with torque arm to the driven shaft

The motor can be mounted to the driven shaft with or without a mounting tool, but the use of a mounting tool is recommended since it makes the work easier.

This instruction is related to the pictures *Fig. 40, Fig. 41*.

1. Mount torque arm to the motor as described in chapter 7.4.1.
2. Lubricate the o-ring (5) and make sure it is undamaged. The O-ring is delivered with the motor.
3. Check shaft/splines for burrs, to minimize the risk to damage the o-ring. Lubricate shaft/splines with hydraulic fluid.
4. Remove the end cover (1) together with screws and washers.
5. Remove the plug G1" (2).
6. Mark spline tooth location on the outside of the cylinder block to assist alignment during installation.
7. Align the motor with the driven shaft.
8. Install the assembly tool by passing the tie rod through the centre of the motor, and screw it into the driven shaft by using a wrench at the key grip at the end of the assembly tool. Assemble the washer and then the nut tight to the bearing retainer (3).
9. Rotate the cylinder block/motor to line up the splines with the drive shaft.
10. Pull the motor onto the shaft by turning the nut on the assembly tool.
11. Remove the assembly tool.
12. Fill up with hydraulic oil to the G1" thread (clearance between the shaft and the bearing retainer). Oil volume, see *Table 16*.
13. Fix the motor to the driven shaft with the mounting kit (4) which consists of a M20 screw and an O-ring. Torque 385 Nm (284 lb·ft).
14. Remount the end cover (1). Torque 80 Nm (59 lb·ft).

Table 16: Oil Volume for lubrication of spline connection, torque arm mounting

Frame size	Horizontal mounted		Vertical with motor with motor shaft downwards		Vertical mounted with motor shaft upwards	
	Litre	US gallon	Litre	US gallon	Litre	US gallon
CA 50	0.2	0.05	0.6	0.16	0.2	0.05
CA 70	0.5	0.13	1.2	0.32	0.2	0.05
CA 100	0.8	0.21	0.8	0.21	1.6	0.42
CA 140	0.7	0.18	0.7	0.18	1.6	0.42
CA 210	1.0	0.26	1.0	0.26	2.3	0.61

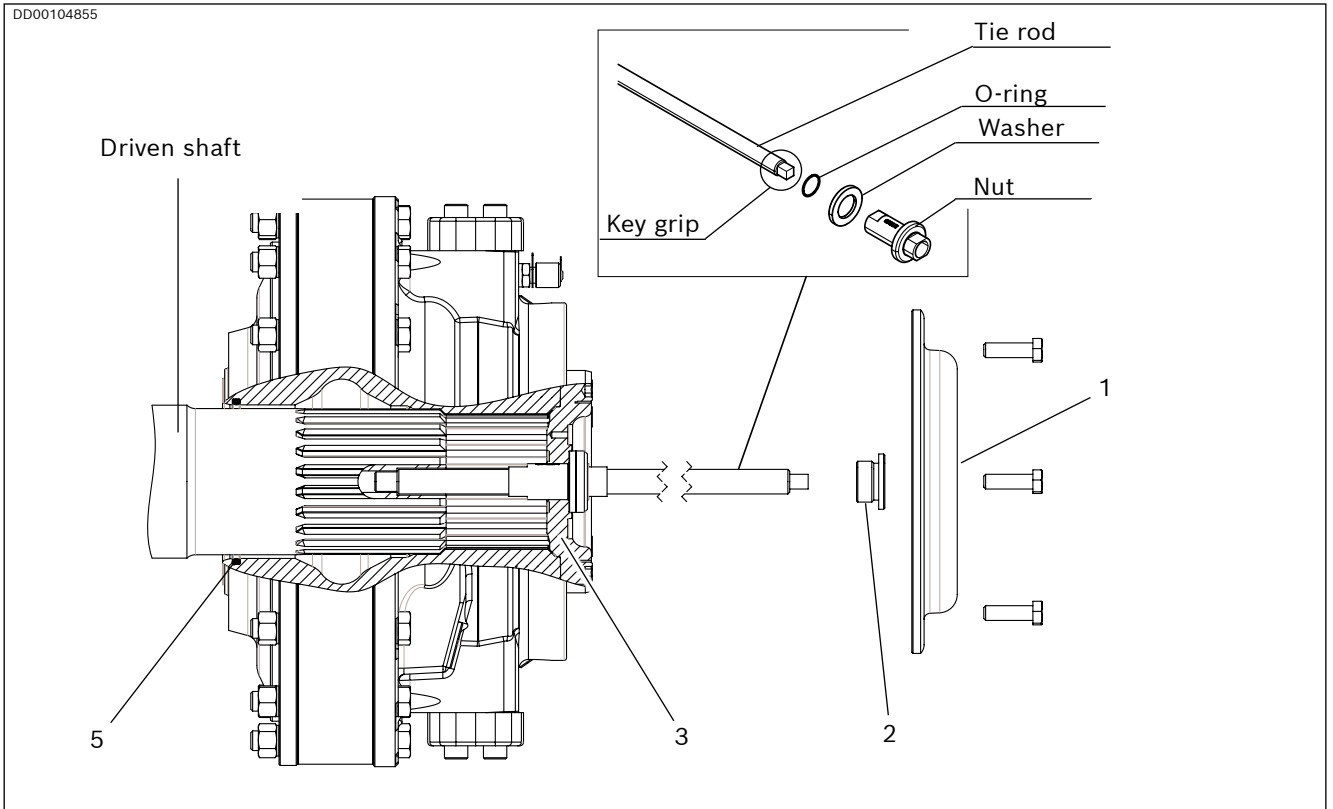


Fig. 40: Mounting spline motor with assembly tool

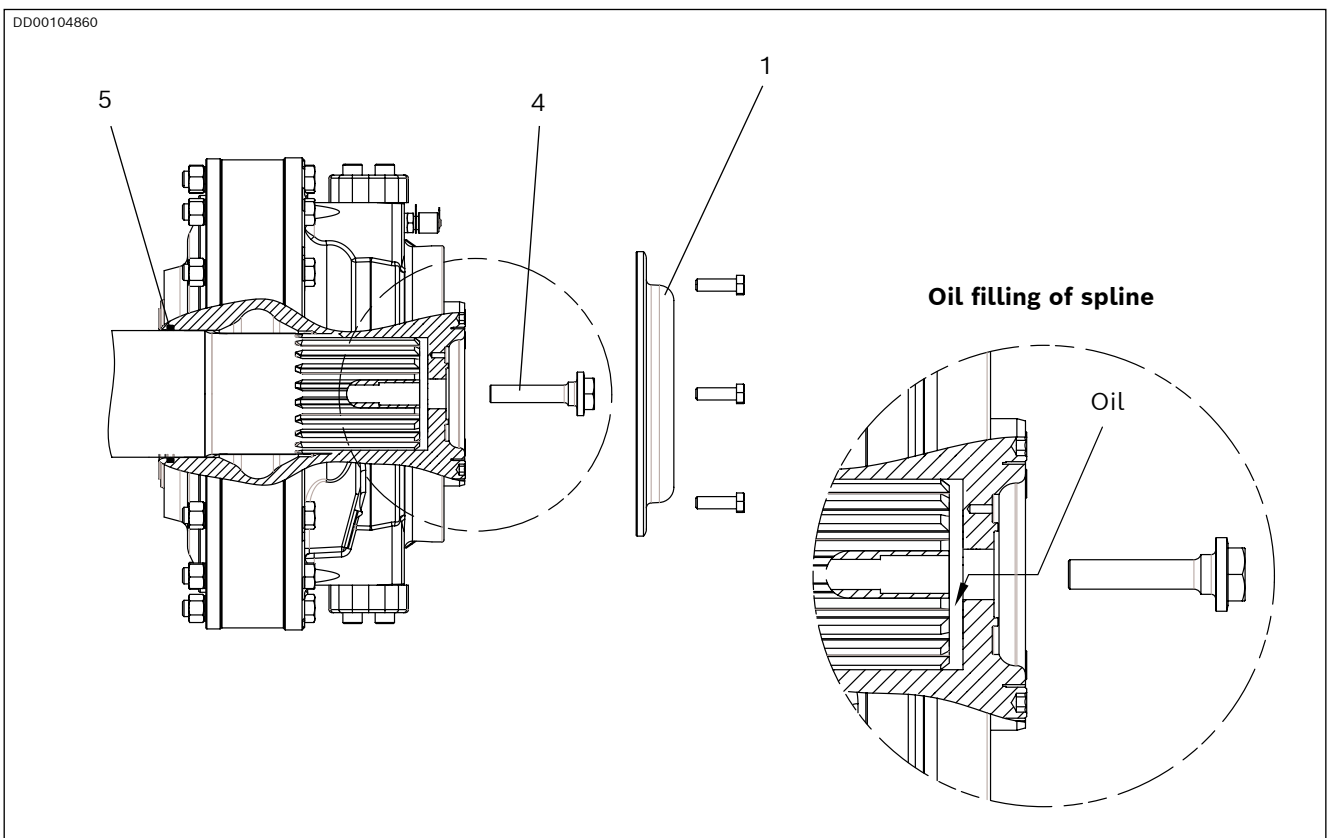


Fig. 41: Fix the spline motor with the mounting kit, horizontal mounting

Flange mounting of motor

NOTE!

Only recommended for spline motor

The splines shall be filled up with hydraulic oil to minimize the risk of wear. Mounting the motor onto the driven shaft using the assembly tool see 7.4.5.

NOTE!

Mounting kit shall normally not be used for flange mounted motors.

1. Mount the motor to the flange. For screw dimensions and tightening torque, see Table 7.
2. Fill up hydraulic oil to the G1" thread. See Fig. 42. Oil volume see Table 17
3. Mount the G1" plug (2). Torque 125 Nm (92 lb·ft).
4. Mount the end cover (1). Torque 80 Nm (59 lb·ft).

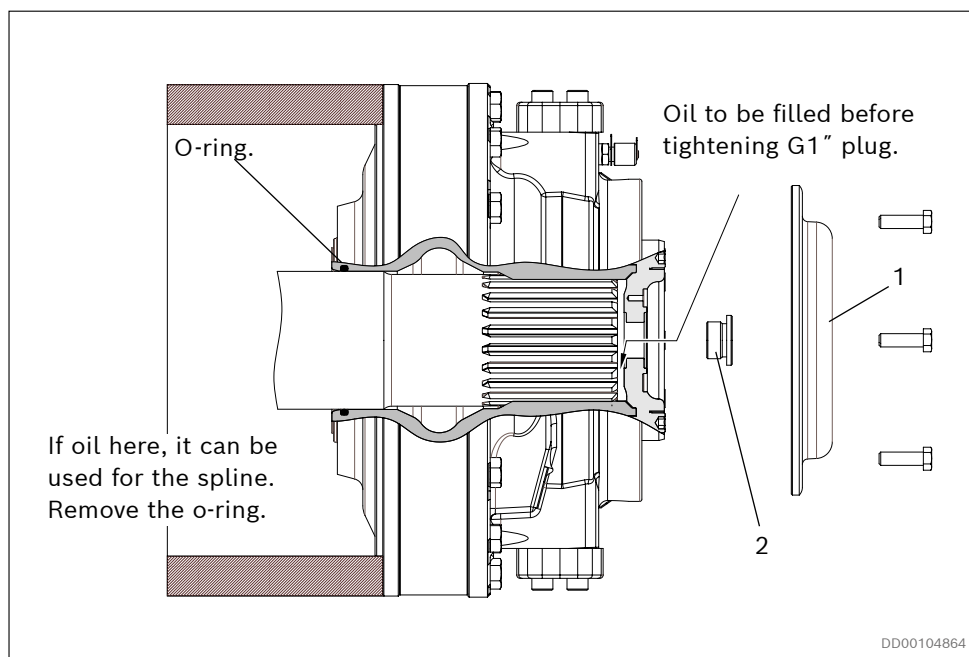


Fig. 42: Flange mounted motor, shaft horizontal

Table 17: Oil Volume for lubrication of spline connection, flange mounting

Frame size	Horizontal mounted		Vertical mounted with motor shaft downwards		Vertical mounted with motor shaft upwards	
	Litre	US gallon	Litre	US gallon	Litre	US gallon
CA 50	0.2	0.05	0.6	0.16	0.2	0.05
CA 70	0.5	0.13	1.2	0.32	0.2	0.05
CA 100	1.4	0.37	1.4	0.37	3.9	1.03
CA 140	1.2	0.32	1.2	0.32	2.8	0.74
CA 210	2.0	0.53	2.0	0.53	5.5	1.45

7.4.6 Mounting of motor with brake

Torque arm mounting of motor with MDA brake

Motors with MDA brake, must have the brake disassembled according to *Fig. 43* and disassembly description in chapter 7.4.8.

1. Mount torque arm to the motor as described in chapter 7.4.1.
2. Lubricate the o-ring (5) and make sure it is undamaged. The O-ring is delivered with the motor.
3. Check shaft/splines for burrs, to minimize the risk to damage the o-ring. Lubricate shaft/splines with hydraulic fluid.
4. Remove the plug G1".
5. Mark spline tooth location on the outside of the cylinder block to assist alignment during installation.
6. Align the motor with the driven shaft.
7. Rotate the cylinder block/motor to line up the splines with the drive shaft.
8. Pull the motor onto the shaft.
9. Fill up with hydraulic oil to the G1" thread (clearance between the shaft and the MDA disc centre). Oil volume, see *Table 16*.
10. Fix the motor to the driven shaft with the mounting kit (4) which consists of a M20 screw and an O-ring. Torque 385 Nm (284 lb·ft).
11. Remount the brake according to assembly description in chapter 7.4.8.

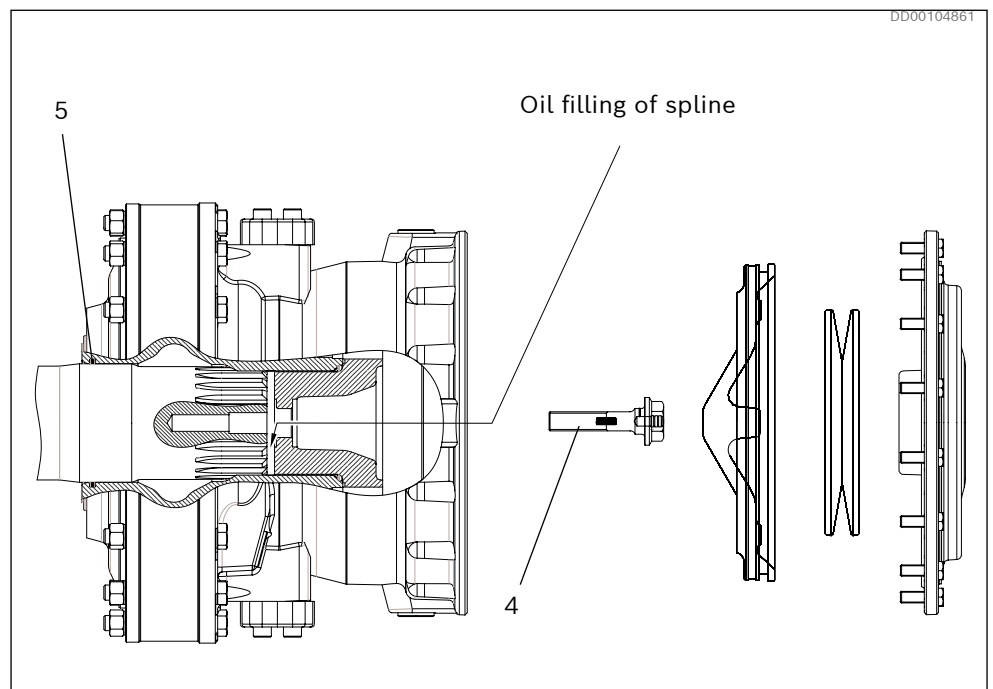


Fig. 43: Mounting of motor with MDA brake

Torque arm mounting of motor with BICA brake

Motors with BICA brake, must have the centre cover (6) disassembled according to *Fig. 44* and [Installation and Maintenance Manual for BICA](#)

1. Mount torque arm to the motor as described in chapter 7.4.1.
2. Lubricate the o-ring (5) and make sure it is undamaged. The O-ring is delivered with the motor.
3. Check shaft/splines for burrs, to minimize the risk to damage the o-ring. Lubricate shaft/splines with hydraulic fluid.
4. Remove the plug G1".
5. Mark spline tooth location on the outside of the cylinder block to assist alignment during installation.
6. Align the motor with the driven shaft.
7. Rotate the cylinder block/motor to line up the splines with the drive shaft.
8. Pull the motor onto the shaft.
9. Fill up with hydraulic oil to the G1" thread (clearance between the shaft and the BICA disc centre). Oil volume, see *Table 16*.
10. Fix the motor to the driven shaft with the mounting kit (4) which consists of a M20 screw and an O-ring. Torque 385 Nm (284 lb-ft).
11. Remount the centre cover (6)

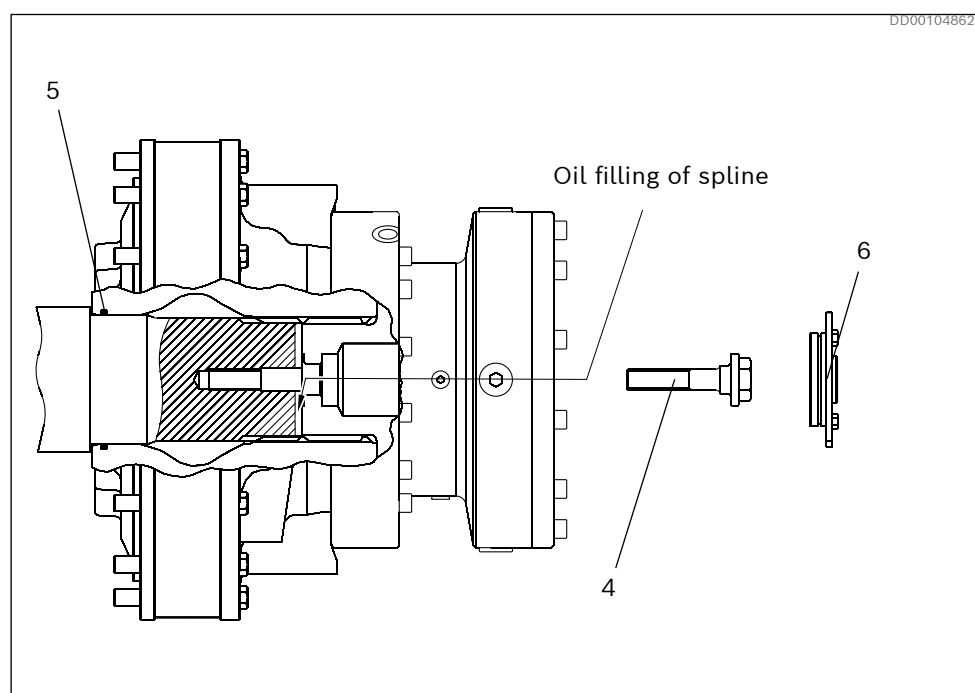


Fig. 44: Mounting of motor with BICA brake

7.4.7 MDA brakes

DANGER

Preloaded springs

Danger to life or risk of injury, damage to equipment.

- ▶ Loosen the screws on the brake cover in sequence, maximum one turn each until preload is zero
- ▶ The M12 thread in the center of the brake piston can not be used to release the brake mechanically or hold spring force while removing the screws (40), see Fig. 46

Wrong position of disc set

Danger to life or risk of injury, damage to equipment.

- ▶ When reassembly of brake parts, be aware of correct position of disc set. See Fig. 45

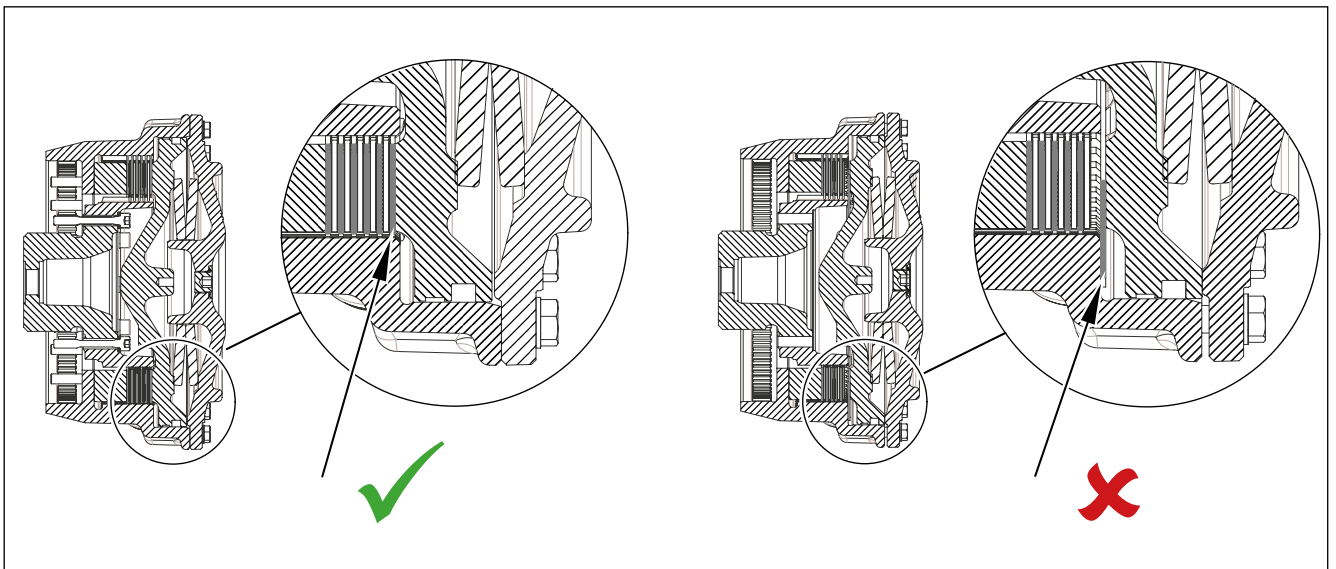


Fig. 45: Correct position of disc set

CAUTION

Escaping hydraulic fluid

Risk of injury or damage to equipment.

- ▶ The motor cannot be pressurized when the brake assembly is removed

7.4.8 MDA 5, MDA 7 and MDA 10

Disassembly

1. Start the disassembly by slightly loosening the screws (40). Not more than one turn each. Continue with one turn of each screw around the cover until the preload of the belleville springs (315)(cup springs) is zero. After that the screws can be removed and the brake cover (314) lifted off.
2. The brake piston (313) can be removed by installing a M12 screw in the centre hole and lifted off by using the screw.
3. Inner and outer discs (318, 320) can be removed and the screws (43) holding the spacer (3xx) in place can be removed.
4. Loosen the screws (52) holding the disc centre (302) in place.

Assembly

1. Clean the unpainted area of the outside of the motor and the internal splines of the cylinder block.
2. Unless the motor already is equipped with the correct seal and seal retainer (25), replace the seal retainer with the one that is delivered with the MDA brake.
The seal retainer(25) shall be assembled in the motor with the radial lip seal facing out.
3. Lubricate the o-ring below the splines on the outside of the connection block
4. Apply a thin layer of corrosion protection, Shell Ensis or similar, on the top surface of the cylinder block and connection block.

! CAUTION

Falling disc center

Risk of injury.

- ▶ Keep fingers away from underneath disc centre

5. Mount the disc centre (302) on the cylinder block, align the boltholes in the disc centre (302) with the threaded holes in the cylinderblock.
Oil the screws (52) and assemble with lock washers, torque crosswise to 136 Nm (100 lb·ft).
6. Apply grease to hold the two o-rings in place in the grooves on the brake housing (305), turn the brake housing (305) so that the o-rings are sealing around the F3 and F4 ports of the motor. Mount the brake housing (305).
7. Oil the screws (43) and assemble with washers, torque 136 Nm (100 lb·ft).
8. Place the correct spacer (3xx) inside the brake housing (305). See *Table 18*.
9. Mount the discs, start with an outer steel disc and alternate inner friction discs with outer steel discs until the correct number of discs are reached for the brake size. See *Table 18*. Always end with an outer steel disc.
10. Grease the piston seal and guide strip with multi-purpose grease without solid additives. Mount the brake piston (313) in the brake housing (305), tap it in place with a plastic hammer. Remove one of the plugs in B1-B4 connection to evacuate the air during assembly see *Fig. 47*.

11. Apply MoS2 Molykote long term 2 or equivalent on the belleville springs (315), the inner machined surface of the brake piston (313) and brake cover (314). Make sure no grease is transferred on to the contact surface between the brake housing (305) and brake cover (314). Put the belleville springs (315) on the centre shaft of the brake cover (314), the springs should be mounted against each other on the inner diameter.
12. Apply a thin layer of corrosion protection, Shell Ensis or similar, on the outer machined area of the brake piston (313).
13. Apply a string of liquid sealing compound on the contact surface between the brake housing (305) and brake cover (314). The sealing compound should be applied in a complete circle on the inside of the threaded holes of the brake housing (305).
14. Mount the brake cover (314) on the brake housing (305), oil the screws (40) and assemble with washers, tighten 4 bolts evenly in a cross pattern by hand, maintain brake cover (314) parallel against the brake housing (305). Tighten the remaining bolts by hand until they are flush against the brake cover (314). Start tighten all screws in a circular pattern not more than one turn at a time until the brake cover (314) is tight against the brake housing (305), torque the bolts to 114 Nm (84 lb·ft).
15. Remount plugs.

Table 18: Discs and spacers for MDA 5, MDA 7 and MDA 10

Brake	Discs	Spacer
MDA 5 16	4 outer, 3 inner	t=50.6 (2.00)
MDA 5 26	6 outer, 5 inner	t=39.4 (1.55)
MDA 7 34	8 outer, 7 inner	t=27.8 (1.09)
MDA 10 48	11 outer, 10 inner	t=10.4 (0.41)

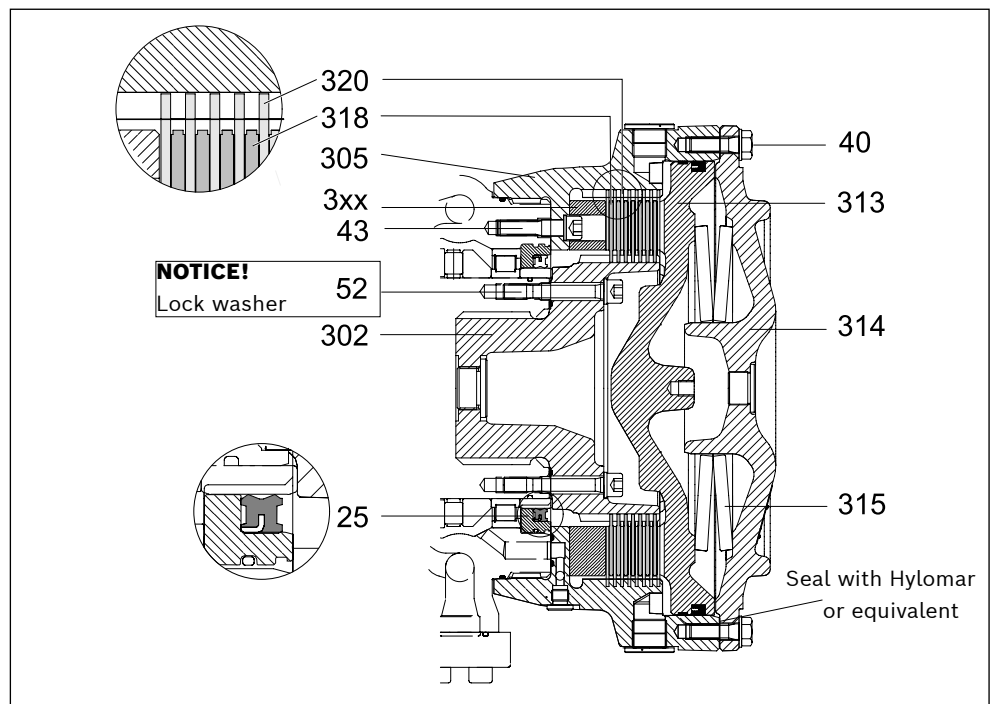


Fig. 46: Parts in MDA 5, MDA 7 and MDA 10

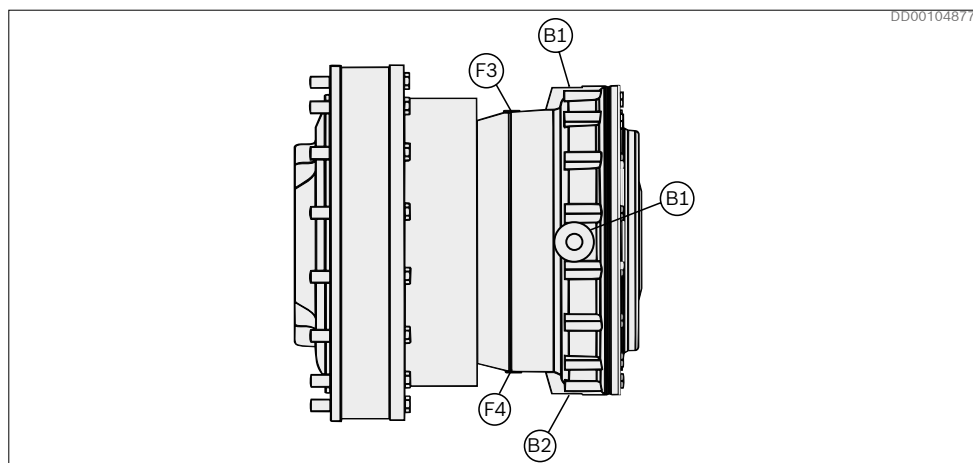


Fig. 47: Port connections at MDA 5, MDA 7 and MDA 10

Table 19: Port connections MDA 5, MDA 7 and MDA10

Connection	Description	Port connection
B1	Brake connection	G 3/4"
B2	Alt. brake connection	G 3/4"
F3, F4	Flushing connection (For flushing of motor axial bearing)	G1/4"

7.4.9 MDA 14 and MDA 21

Disassembly

1. Start the disassembly by slightly loosening the screws (40). Not more than one turn each. Continue with one turn of each screw around the cover until the preload of the belleville springs (315)(cup springs) is zero. After that the screws can be removed and the brake cover (314) lifted off.
2. The brake piston (313) can be removed by installing 3 screws (M8) and be lifted off by using the screws.
3. Inner and outer discs (318, 320) can be removed and the spacer (308) in place can be removed.
4. Loosen the screws (43), and take off the seal retainer (25).

Assembly

1. Oil the screws (43) and assemble with washers, torque 136 Nm (100 lb·ft).
2. Place the correct spacer (3xx) inside the brake housing (305). See *Table 20*.
3. Mount the discs, start with an outer steel disc and alternate inner friction discs with outer steel discs until the correct number of discs are reached for the brake size. See *Table 20*. Always end with an outer steel disc.
4. Grease the piston seal and guide strip with multi-purpose grease without solid additives. Mount the brake piston (313) in the brake housing (305), tap it in place with a plastic hammer. Remove one of the plugs in B1-B2 connection to evacuate the air during assembly.

5. Apply MoS2 Molykote long term 2 or equivalent on the belleville springs (315), the inner machined surface of the brake piston (313) and brake cover (314). Make sure no grease is transferred on to the contact surface between the brake housing (305) and brake cover (314). Put the belleville springs (315) on the centre shaft of the brake cover (314), the springs should be mounted against each other on the inner diameter.
6. Apply a thin layer of corrosion protection, Shell Ensis or similar, on the outer machined area of the brake piston (313).
7. Apply a string of liquid sealing compound on the contact surface between the brake housing (305) and brake cover (314). The sealing compound should be applied in a complete circle on the inside of the threaded holes of the brake housing (305).
8. Mount the brake cover (314) on the brake housing (305), oil the screws (40) and assemble with washers, tighten 4 bolts evenly in a cross pattern by hand, maintain brake cover (314) parallel against the brake housing (305). Tighten the remaining bolts by hand until they are flush against the brake cover (314). Start tighten all screws in a circular pattern not more than one turn at a time until the brake cover (314) is tight against the brake housing (305), torque the bolts to 114 Nm (84 lb·ft).
9. Remount plugs.

Table 20: Discs and spacers for MDA 14 and MDA 21

Brake	Discs	Spacer
MDA 14 19	3 outer, 2 inner	t=52.5 (2.07)
MDA 14 38	5 outer, 4 inner	t=39.5 (1.56)
MDA 14 67	8 outer, 7 inner	t=19.7 (0.78)
MDA 21 95	11 outer, 10 inner	

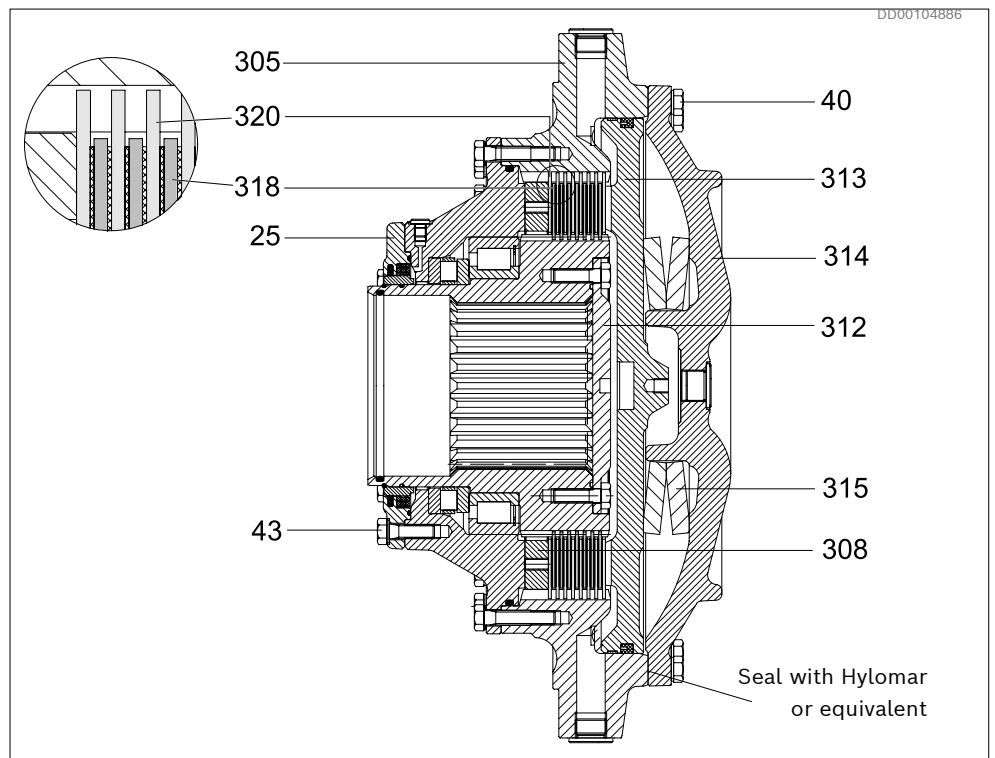


Fig. 48: Parts in MDA 14 and MDA 21

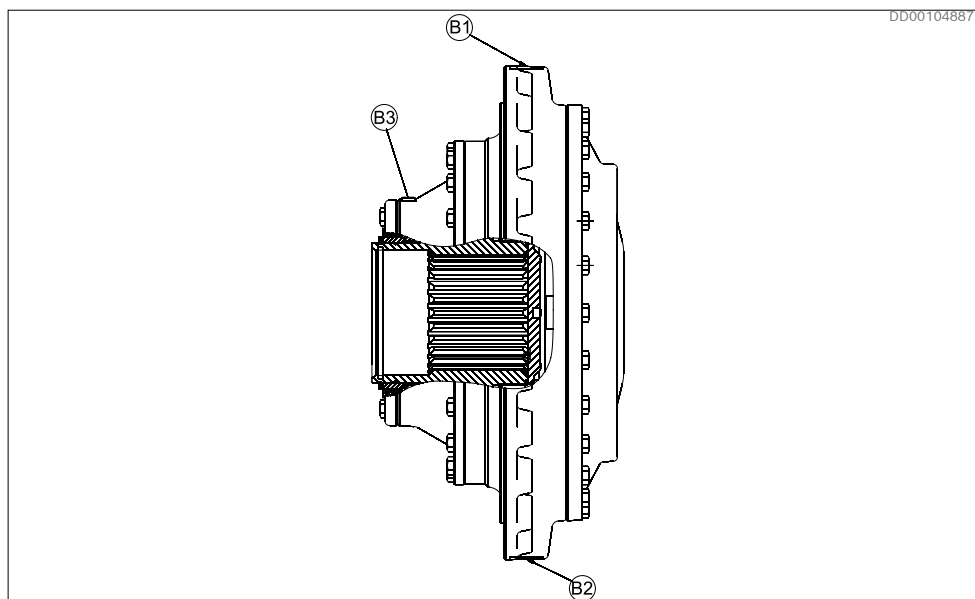


Fig. 49: Port connections at MDA 14 and MDA 21

Table 21: Port connections at MDA 14 and MDA 21

Connection	Description	Port connection
B1	Brake connection	G 3/4"
B2	Alt. brake connection	G 3/4"
B3	Flushing connection	G1/8"

Flange mounting of brake MDA 14 and MDA 21

The brakes, MDA 14 and MDA 21 are normally mounted to a bearing bracket or winch with 22 pcs of M20 10.9 screws. Torque 540 Nm (398 lb·ft). The spline shaft shall be greased with multi-purpose grease.

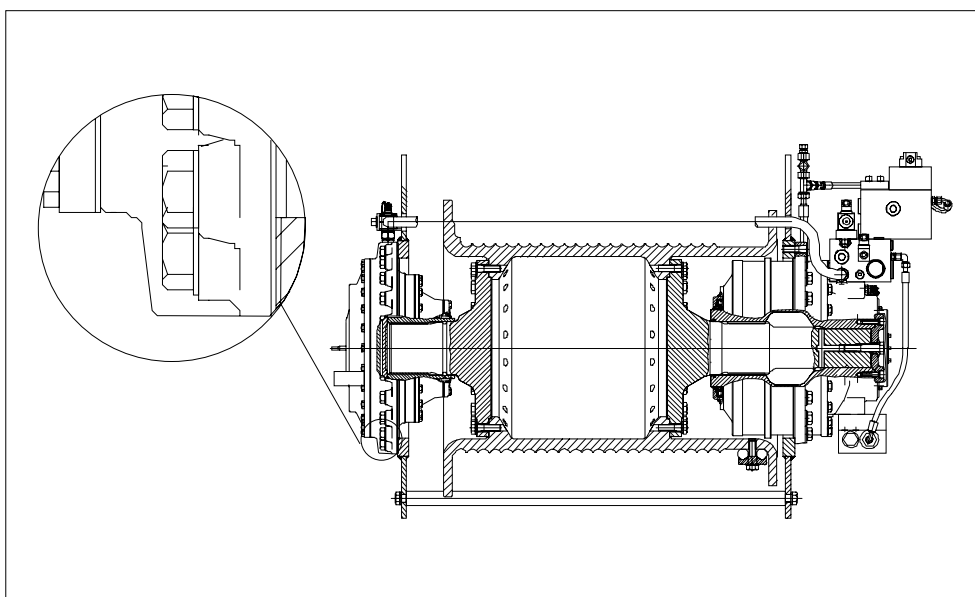


Fig. 50: Example of flange mounted MDA brake

Torque arm mounting of brake MDA 14 and MDA 21

Disassemble the brakes according to 7.4.9. Note: Remove cover (pos 312). See Fig. 48

1. Mount torque arm on the brake with M20 screws.
2. Lubricate and install o-ring at leading edge of brakes shaft
3. Check shaft/splines for burrs and lubricate shaft/splines with multi-purpose grease.
4. Mount the brake on the shaft.
5. Mount the mounting kit, R939058616, bolt and cover.
6. Torque the screw to 385 Nm (284 lb·ft).
7. Reassemble the brake according to 7.4.9.

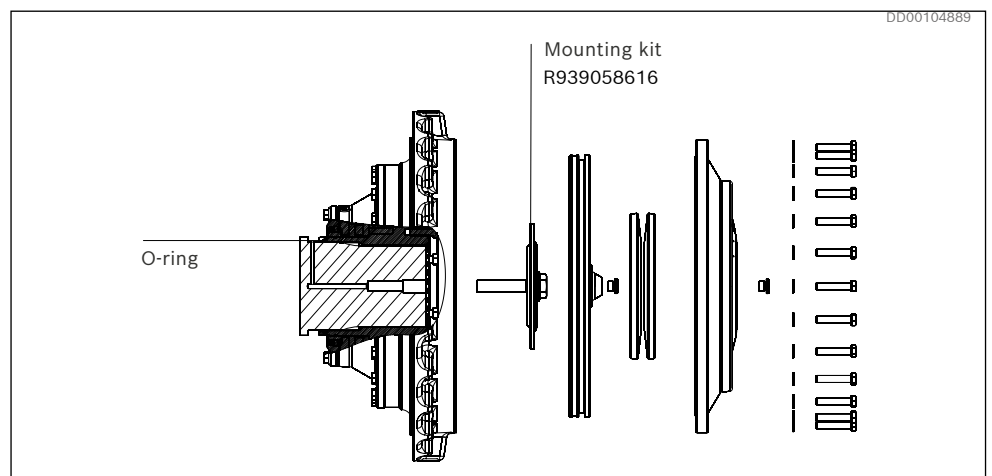


Fig. 51: Torque arm mounted brake

Tandem mounting of CA motor and MDA 14 or MDA 21

CA motor type B and tandem kit R939002266 must be used.

Fill splines and shaft with hydraulic oil.

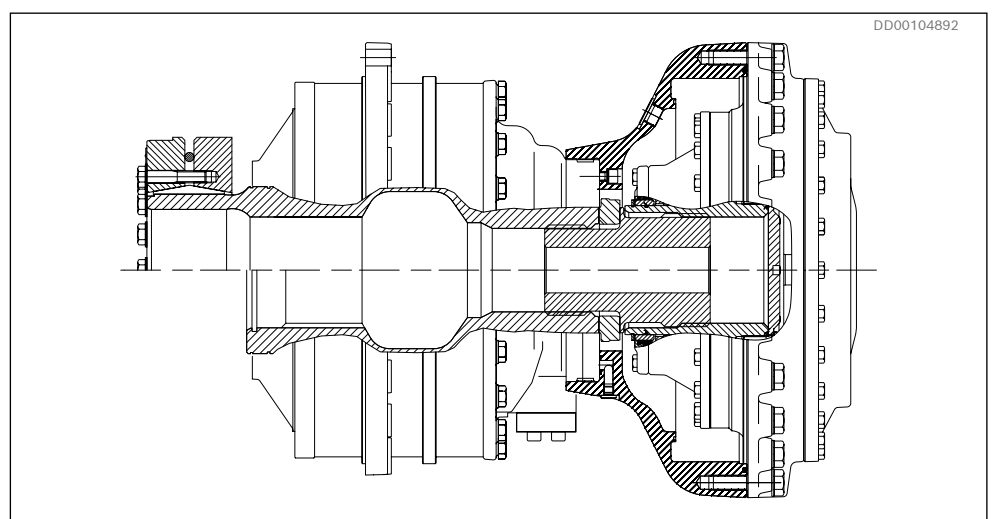


Fig. 52: Example of tandem mounted CA motor and MDA 14 or MDA 21

7.4.10 Draining and venting of the motor

Horizontal mounting

When the motor is installed with the shaft in the horizontal plane, the highest of the drain ports D1, D2 or D3 must always be used see Fig. 53.

Drain line must be connected to the tank with a minimum of restrictions, to ensure that the maximum case pressure is not exceeded.

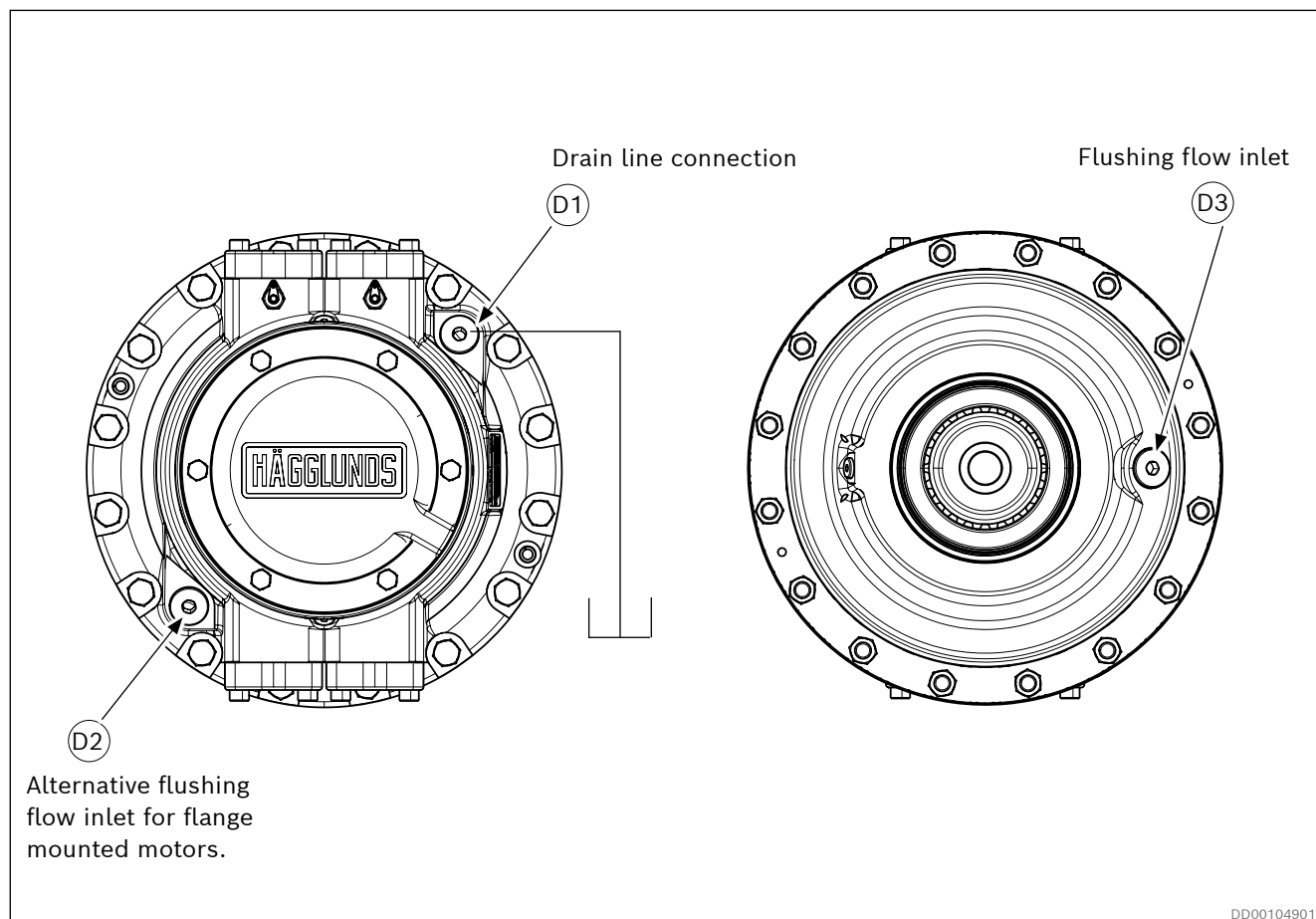


Fig. 53: Horizontal mounting

Vertical mounting

When the motor is mounted vertically, the highest of drain ports D1, D2 or D3 must be used. Flushing (lubrication) of radial seal from charge pressure (low pressure) is necessary.

A) Motor shaft pointing upwards

The drain line must be connected to the drain port D3 in the housing cover (See Fig. 54, alt. A) Shaft side upwards). The flushing connection F1 on the housing cover should be connected to the charge pressure. With bidirectional drives, use the connection with lowest average pressure.

(Connecting to high pressure will increase the motor drain flow).

B) Motor shaft pointing downwards

The drain line must be connected to one of the drain ports D1 or D2 in the connection block. Connect the flushing port F3 to the drain line. (See Fig. 54 alt. B) Shaft side downwards).

(Connecting to high pressure will increase the motor drain flow).

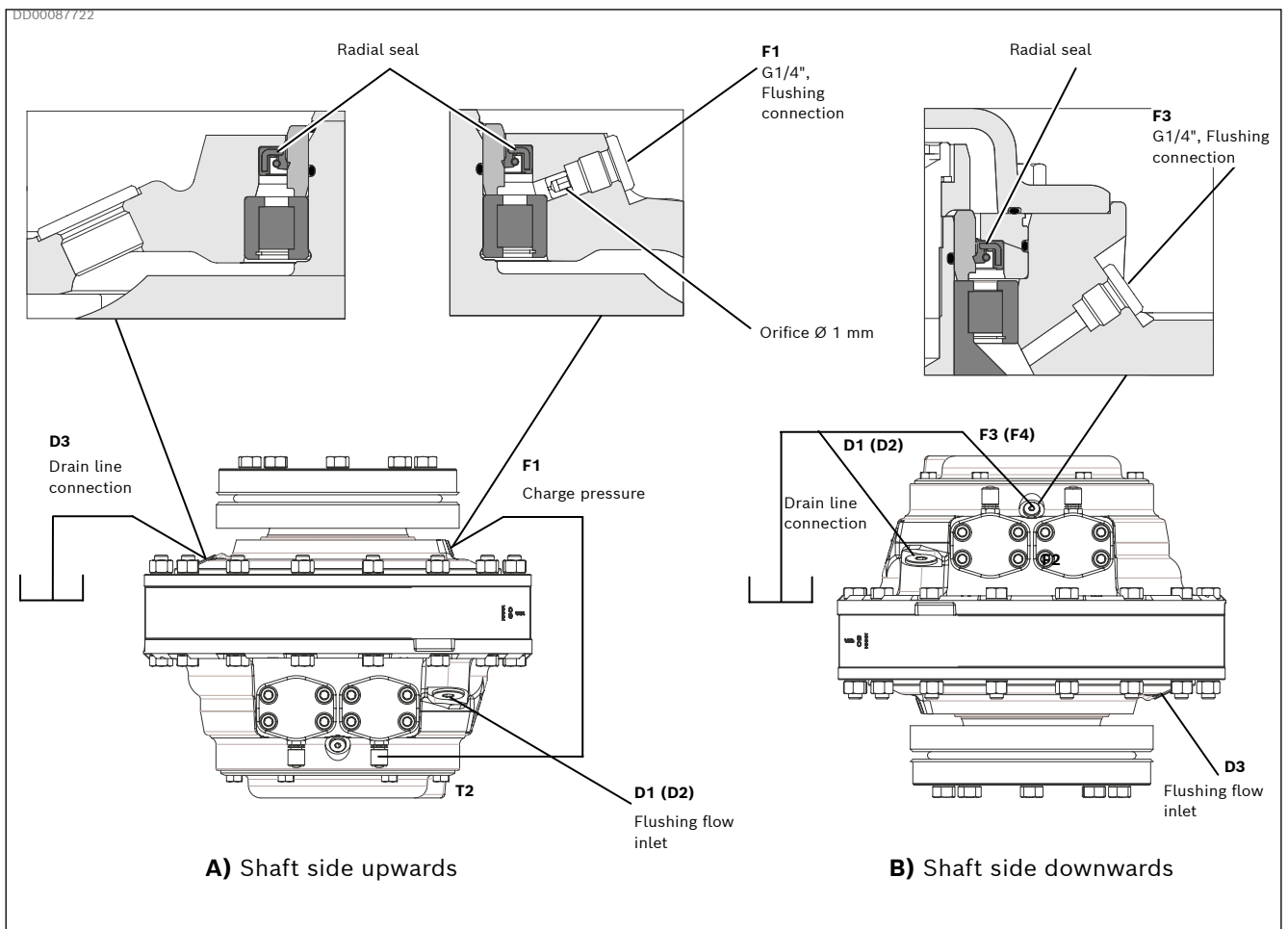


Fig. 54: Vertical mounting

7.4.11 Flushing

To avoid high temperature in the motor case the heat must be removed, because high temperature gives lower viscosity and that gives reduction in basic rated life / service life. The motor case must be flushed when the output power exceeds the max. values.

CAUTION

High temperature in motor case

Reduction in basic rated life/service life.

► Max. power without flushing:

CA 50 and CA 70 60 kW (80 hp)

CA 100 to CA 210 120 kW (160 hp)

For calculation of required flushing, see [data sheet RE 15305](#) or contact your Bosch Rexroth representative. The flushing oil shall be drained in the normal drainline, see chapter 7.4.10.

Connect the input flushing line at the lowest drain port, D1 to D3 at opposite side compared to the drain outlet in order to obtain a cross flushing flow through the motor, see *Fig. 53* and *Fig. 54*.

7.4.12 Hydraulic connections

When using (thick wall) piping and in applications with frequent reversal of rotation direction, it is recommended to fit flexible hoses between the motor and piping to avoid damage due to vibration and to simplify installation of the motor. The length of the hoses should be kept as short as possible.

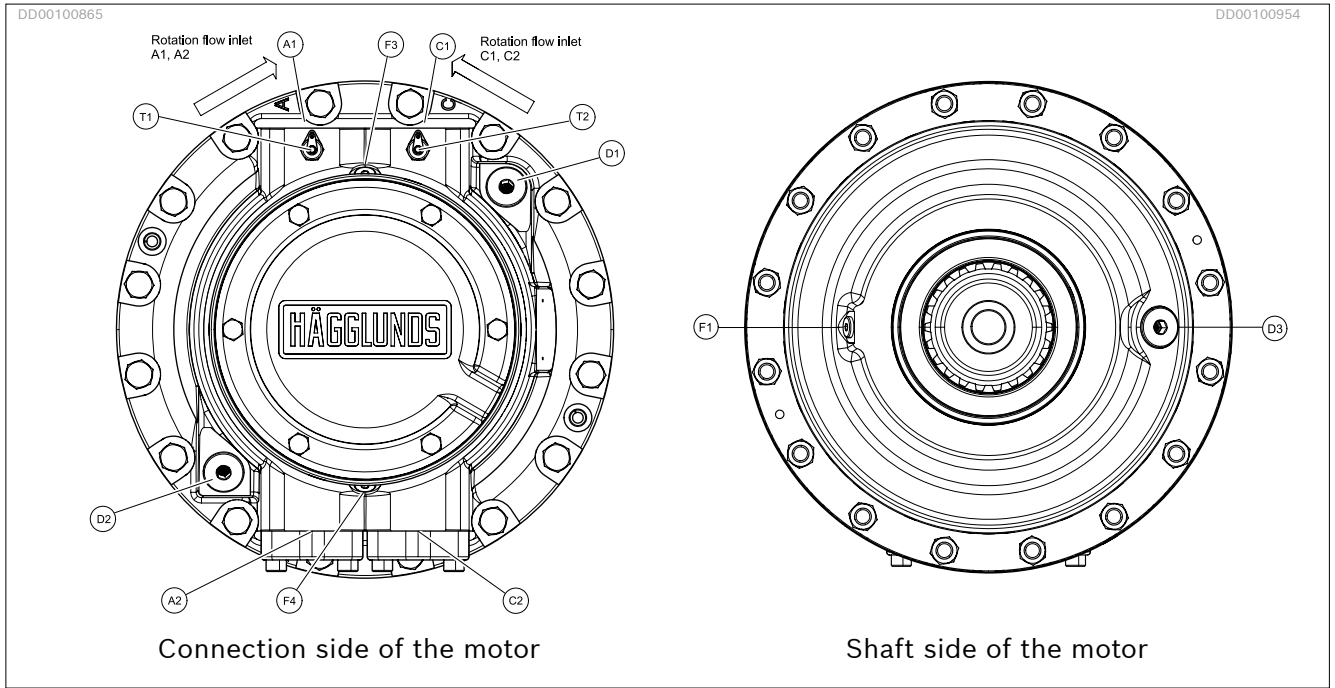


Fig. 55: Hydraulic connections

Table 22: Hydraulic connections

Connection	Description	Dimensions	Remarks
A1, A2	Main connection	1 1/4" *	If A is used as the inlet, the motor shaft rotates counterclockwise, viewed from the motor shaft side
C1, C2	Main connection	1 1/4" *	If C is used as the inlet, the motor shaft rotates clockwise, viewed from the motor shaft side
D1	Drain connection	G 3/4"	
D2	Alternative drain connection	G 3/4"	
D3	Alternative drain connection	G 3/4"	
T1	Test connection	G1/4"	Used to measure pressure and/or temperature at the main connections. Minimes M16
T2	Test connection	G1/4"	Used to measure pressure and/or temperature in drain oil. Minimes M16
F1	Flushing connection	G1/4"	For flushing of radial lip seal
F3, F4	Flushing connections	G1/4"	For flushing of motor housing and radial lip seal

*SAE flange J 518 , code 62, 420 bar (6000 psi).

All connections are normally plugged at delivery.

7.4.13 Direction of rotation of motor shaft

! WARNING

Rotating parts
 Risk of injury or serious injuries.
 ► Do not touch rotating parts or be in the zone of rotating parts.

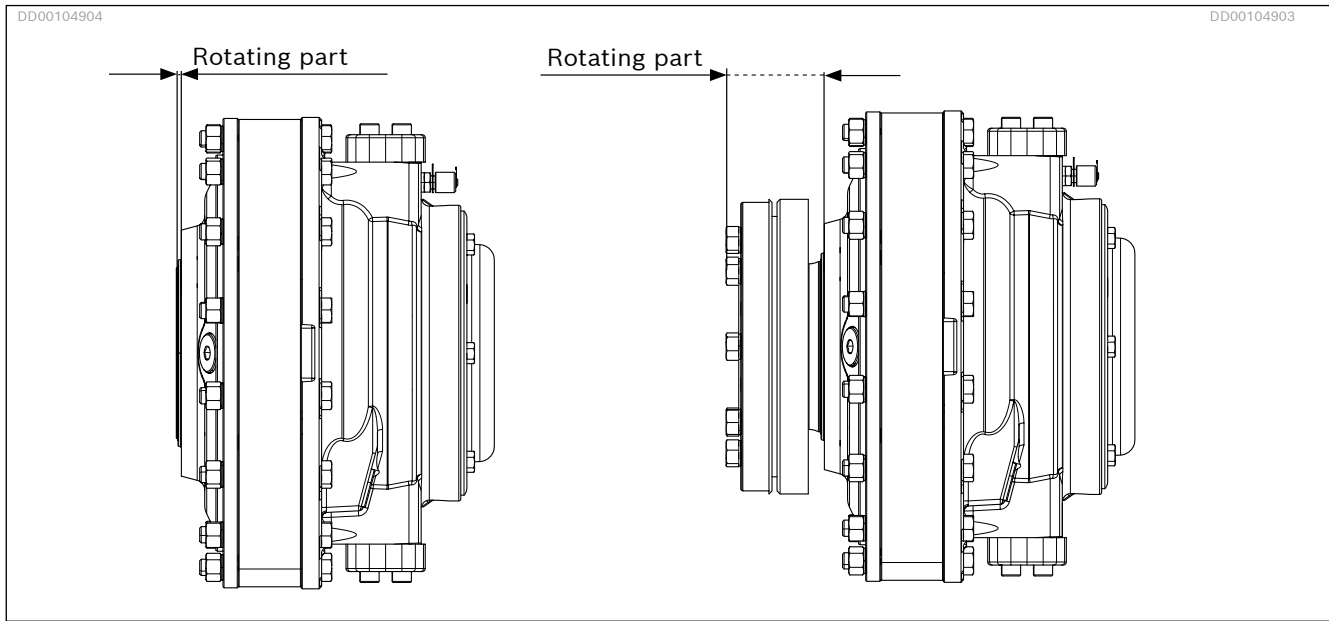


Fig. 56: Rotating part, spline motor and coupling motor

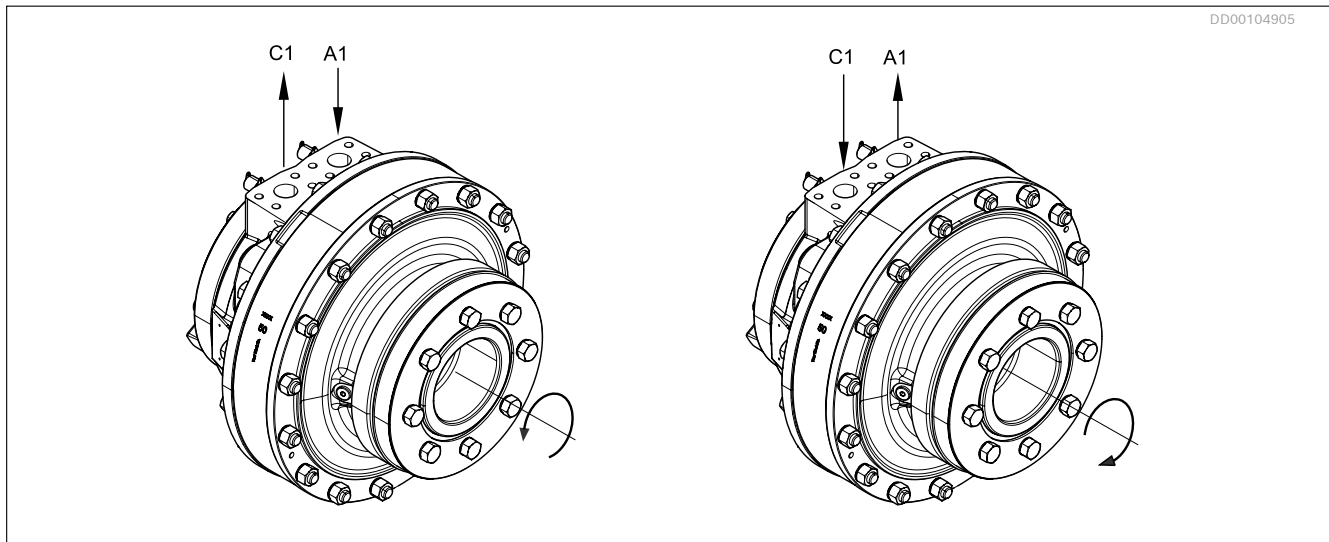


Fig. 57: Direction of rotation

With the inlet flow connected to port A, the motor shaft rotates in the direction shown by the arrow, anti-clockwise viewed from shaft side of the motor.

With the inlet flow connected to C port, the motor shaft rotates clockwise viewed from shaft side of the motor.

8 Commissioning

NOTICE

Dirt particles

A not run-in motor in combination with dirt particles in the oil can badly affect the sliding surfaces in the motor. This is valid during the first 100 hours.

- ▶ The Hägglunds radial piston hydraulic motor must be installed and commissioned in a clean condition.

8.1 COMMISSIONING

Check the following points before commissioning the motor, i.e. before starting the first time:

- Make sure that all fluids have been drained from the motor to prevent accidental mixing with the hydraulic fluid used in the system.
- Check that the motor is installed according to chapter 7
- Check that all hydraulic couplings and plugs are properly tightened to prevent leakage.
- Select the hydraulic fluid in accordance with the recommendations, See chapter 15.7.1 and Data sheet [RE 15414 Hydraulic fluid quick reference](#).
- Check that the motor is protected from overloads, see chapter *Motor data* in data sheet [RE 15305](#).

8.1.1 Oil filling

1. Fill the motor case with hydraulic fluid via a filter into one of the drain ports D1 to D3 (depending on how the motor is mounted), for oil volumes see *Table 6*.
2. Check the drain line to ensure that excessive pressure does not build up in the motor case; see *7.4.10*

8.1.2 Start of the hydraulic supply

1. During initial starting and the period immediately after it, any hydraulic installation must be regularly and carefully checked at frequent intervals.
2. The working pressure and charge pressure must be checked to ensure that they correspond to the contracted values. Check that the charge pressure conforms to the charge pressure curve, see chapter, *Recommended charge pressure* in data sheet [RE 15305](#).
3. The pressure in the drain line measured at the motor must be less than 3 bar (43.5 psi). This pressure limit is important for the life of the motor seals.
4. If leakage occurs, correct the fault and carry out new measurements.
5. Check all lines, connections, screws, etc. and correct if necessary.
6. Check other possible leakage points and replace faulty parts.
7. During the start up period, dirt particles in the system are removed by the filters. The filter cartridges have to be changed after the first 100 working hours and after that according to the maintenance chart, *Table 23*. See also Chapter 10.3 (second point) about filter clogged indicators.



It is important that the pressure is limited to 250 bar (3626 psi) when starting up the motor. This is valid for the first 100 hours.

8.2 RE-COMMISSIONING AFTER STANDSTILL

For recommissioning, proceed as described in chapter 8.1.

WARNING

Material or product damage

Risk of injury or serious injuries.

- ▶ Before re-commissioning, make sure that the Hägglunds product hasn't been damaged in any way.

In case of accident or malfunction where it is not possible to determine the status of the Hägglunds product, please contact your Bosch Rexroth representative.

9 Operation

The product is a component which requires no settings or changes during operation. For this reason, this chapter of the manual does not contain any information on adjustment options. Use the product only within the performance range provided in the technical data. The machine/system manufacturer is responsible for the proper project-planning of the hydraulic system and its controls.

10 Maintenance and repair

10.1 CLEANING AND CARE

NOTICE

Damage to surface

Aggressive solvents and detergents may damage the seals on the hydraulic motor and cause them to age faster.

- ▶ Never use solvents or aggressive detergents.
- ▶ If in doubt, check the compatibility of the detergent with the seal type (Nitrile or Viton) specified in the hydraulic motor.

Damage to the hydraulic system and the seals

Using a high-pressure cleaner could damage the speed sensor and the seals of the hydraulic motor.

- ▶ Do not point the high-pressure cleaner at sensitive components, e. g. shaft seals, seals in general, electrical connections, speed sensors and valves.

For cleaning and care of the hydraulic motor, observe the following:

- ▶ Plug all openings with suitable protective caps/devices.
- ▶ Check whether all plugs and plug seals are securely seated to ensure that no moisture can penetrate into the hydraulic motor during cleaning.
- ▶ Use only water and, if necessary, a mild detergent to clean the hydraulic motor.
- ▶ Remove coarse dirt from the outside of the motor and keep sensitive and important components, such as sensors and valve blocks clean.

10.2 INSPECTIONS

DANGER

Pressurized machine/system

Danger to life or risk of injury, serious injuries when working on energized machines/systems. Damage to equipment.

- ▶ Check and be aware of the pressure you may have on the connection before you connect your equipment.
- ▶ Do not disconnect any line connections, ports and components when the machine/system is pressurized.
- ▶ Be careful when connecting the mini-mess hose because the oil stream can be dangerous and should never point against any person or other sensitive object.

CAUTION

Contact with hydraulic fluid

Hazard to health e.g. eye injuries, skin damage, toxication during inhalation.

- ▶ Avoid contact with hydraulic fluids.
- ▶ When working with hydraulic fluids, strictly observe the safety instructions provided by the lubricant manufacturer.
- ▶ Use your personal protective equipment (e.g. safety glasses, safety gloves, suitable working clothes, safety shoes).
- ▶ If hydraulic fluid inadvertently comes into contact with your eyes or bloodstream or is swallowed, consult a doctor immediately.

10.2.1 Oil inspection

Purpose of taking oil sample

The purpose of oil sampling is to check the condition of the hydraulic fluid. With scheduled oil analysis, wear products can be identified and corrective action can be taken before failure occurs. Oil analysis can indicate when an oil change is required, point out shortcomings in maintenance and keep repair cost to a minimum. Using oil analysis can create a “window of opportunity”, allowing the user to schedule overhauls, maintenance or repairs, thus saving money on equipment repairs and unplanned downtime.

The most used method is to take samples in a clean sample bottle and send it to a fluid laboratory for an analysis. The laboratory should deliver a report following a specific international standard.

The analysis should at a minimum cover viscosity, oxidation, water content and particle counting (possibly including element analysis of particles). Another method is to install an inline particle counter direct in your hydraulic system which provides the contamination level according to international standards. The disadvantage with this method is that you only get the contamination level in the oil.

General

The intention is to verify the condition of the oil during operation. The motor should be running at normal operation while the sample is taken.

The cleanliness is extremely important during sampling.

Always use designated oil sample bottles, these can be ordered from any fluid analysis laboratory.

Never try to clean your own bottle if you want a reliable result.

The sample should be taken by using a mini-mess hose connected to a mini-mess coupling.

Always clean the connections carefully before you connect the mini-mess hose to the coupling.

Be careful when connecting the mini-mess hose because the oil stream can be dangerous and should never point against any person or other sensitive object.

Check and be aware of the pressure you may have on the connection before you connect.

How to do bottle samples

The sample shall be taken at the mini-mess coupling on the low pressure side of the motor in the main loop. Never take the sample out of the tank.

Clean the coupling and the hose carefully.

Connect the mini-mess hose to the coupling, be careful and aware of the direction of the oil stream.

Let minimum 2 liters (0.53 gallon US) of oil flush into a bucket before you fill the bottle.

Remove the cap of the bottle as late as possible and don't let any contamination be in touch with the cap, bottle or the mini-mess hose when the sample is taken.

To get a reliable result the system must run without moving any valves and the mini-mess hose should not touch the bottle.

Only $\frac{3}{4}$ of the bottle shall be filled because the laboratory has to shake the sample to get a mixed fluid when they analyse it. Minimum 200 ml are needed for a good analysis.

When the bottle is filled close the cap as soon as possible to prevent contamination from the air that might enter the bottle and give you a wrong result.

Inline measure

The sample shall be taken at the mini-mess coupling on the low pressure side of the motor in the main loop system. Clean the coupling and the hose carefully.

Connect the hoses according to the particle counters manual.

To get a true value the contamination readings have to be stable about 10 min before you stop to measure.

10.3 MAINTENANCE PLAN

When a hydraulic system has been in service for some time, it must undergo periodic maintenance and servicing at intervals which depend on the equipment and the type of duty. This periodic maintenance must include the following operations:

- ▶ Check the hydraulic system for leakage. Tighten screws and fittings, replace faulty seals and keep the drive clean.
- ▶ Inspect tank, pumps, motors and filters (e.g. air-, oil-, magnetic filters etc.), clean or change if necessary. Replace all filter cartridges for which a filter clogged indication has been given.
- ▶ Check the pressures and temperatures in the hydraulic system and carry out routine operations. Adjust valves etc. if necessary.
- ▶ Check the hydraulic fluid; see chapter 10.4.2.
- ▶ Make sure that no dirt or other contaminations enter the system during inspection. Check that the outside of the hydraulic motor in an installation is kept free of dirt, thus leakage and faults will be detected earlier.
- ▶ We recommend that a running log be kept and that planned inspections are carried out at set intervals.
- ▶ Maintenance checks and operations, see *Table 23*.
- ▶ Check torque arm and pivoted attachment.

Table 23: Maintenance chart

In operation	Oil filters	Oil	Torque arm
After the first 100 hours	R	-	I
After 3 months or 500 hours	R	-	-
Once every 2 weeks	-	-	-
Once every 6 months	R	I	I
Once every 12 months	-	-	-

R = Replacement, **I** = Inspection

10.4 MAINTENANCE

10.4.1 Filter maintenance

Filters in the hydraulic system must be changed after the first 100 working hours and the second change is to be carried out after 3 months or 500 working hours whichever is earlier. They must then be changed at regular intervals of 6 months or 4000 working hours.

10.4.2 Oil maintenance

See chapter 15.1.1 and Data sheet [RE 15414 Hydraulic fluid quick reference](#).

NOTE!

All hydraulic fluids are affected differently. Obtain the advice of your oil supplier or by nearest Bosch Rexroth representative

Analysis

It is recommended that the oil should be analysed every 6 months. The analysis should at a minimum cover viscosity, oxidation, water content and particle counting (possibly including element analysis of particles).

Most oil suppliers are equipped to analyse the state of the oil and to recommend appropriate action. The oil must be replaced immediately if the analysis shows that it is outside the specifications.

Viscosity

Many hydraulic oils display viscosity loss with increasing use, and this means poorer lubrication. The viscosity of the oil in service must never fall below the minimum allowed viscosity for the actual fluid or the recommended viscosity for the motor, see chapter *Hydraulic fluids* in data sheet [RE 15305](#).

Oxidation

Hydraulic oil oxidizes with time of use and temperature. This is indicated by changes in colour and smell, increased acidity or the formation of sludge in the tank. The rate of oxidation increases rapidly at surface temperatures above 60 °C (140 °F), and the oil should then be checked more often.

The oxidation process increases the acidity of the fluid; the acidity is stated in terms of the neutralization number (TAN). Typical oxidation is slow initially and increases rapidly later. A sharp increase (by a factor of 2 and 3) in the TAN between inspections is a signal that the oil has oxidized too much and should be replaced immediately.

Water content

Contamination of the oil by water can be detected by sampling from the bottom of the tank. Most hydraulic oils repel the water, which then collects at the bottom of the tank. This water must be drained off at regular intervals. Certain types of transmission oils and engine oils emulsify the water; this can be detected by coatings on filter cartridges or a change in the colour of the oil. Obtain the advice of your oil supplier in such cases.

Degree of contamination

Heavy contamination of the oil causes increased wear of the components in hydraulic systems. The cause of the contamination must be immediately investigated and remedied.

10.5 REPAIR

Bosch Rexroth offers a comprehensive range of services for repairs of Häggglunds products.

Repairs on the Häggglunds products may only be performed by service centers certified by Bosch Rexroth.

- ▶ Use exclusively original spare parts from Bosch Rexroth to repair the Häggglunds products, otherwise the functional reliability of the products can not be assured and you lose your entitlement under warranty.

In the event of questions regarding repairs, contact your responsible Bosch Rexroth Service partner or the service department of the manufacturer's plant for the Häggglunds products, see chapter 10.6

10.6 SPARE PARTS

CAUTION

Use of unsuitable spare parts

Spare parts that do not meet the technical requirements specified by Bosch Rexroth may cause personal injury or property damage!

- ▶ Use exclusively original spare parts from Bosch Rexroth to repair the Häggglunds product, otherwise the functional reliability of the Häggglunds product can not be assured and you lose your entitlement under warranty....

Address all questions regarding spare parts to your responsible Bosch Rexroth Service partner or the service department of the manufacturer's plant for the Häggglunds products. Details of the manufacturer's plant can be found on the product identification plate of the Häggglunds product.

11 Removal and replacement

11.1 REQUIRED TOOLS

In addition to standard tools the following are also needed, for example:

- ▶ Lifting tool/device
- ▶ Assembly tool
- ▶ Lifting eyes
- ▶ Waste oil collector

11.2 PREPARING FOR REMOVAL

1. Decommission the entire system as described in the instruction manual for the machine or system. Relieve pressure in the hydraulic system according to the instructions of the machine or system manufacturer. Make sure that the relevant system components are not under pressure or voltage.
2. Protect the complete system against being energized.
3. Remove the hoses, cables and pipelines from the motor.

11.3 REMOVING MOTOR

DANGER

Danger from suspended loads

Danger to life or risk of injury, damage to equipment! Improper transportation may cause the Häggglunds motors to fall down leading to injuries e.g. crushing or broken bones or damage to the product.

- ▶ Make certain that the forklift truck or lifting device has adequate lifting capacity.
- ▶ Never stand under or put your hands under suspended loads.
- ▶ Ensure your position is stable during transportation.
- ▶ Use PPE (e.g. safety glasses, safety gloves, suitable working clothes, safety shoes).
- ▶ Use suitable lifting device for transport and storage, installation and for removal and repair. Make sure the motor is well mounted or anchored when the lifting device is disconnected.
- ▶ Observe the prescribed position of the lifting strap.
- ▶ Observe the local federal laws and regulations on work and health protection and transportation.

CAUTION

Contact with hydraulic fluid

Hazard to health/health impairment e.g. eye injuries, skin damage, toxication during inhalation!

- ▶ Avoid contact with hydraulic fluids.
- ▶ When working with hydraulic fluids, strictly observe the safety instructions provided by the lubricant manufacturer.
- ▶ Use PPE (e.g. safety glasses, safety gloves, suitable working clothes, safety shoes).
- ▶ If hydraulic fluid should, inadvertently comes into contact with your eyes or bloodstream or is swallowed, consult the medical care immediately.

NOTICE

Escaping or spilling hydraulic fluid

Environmental pollution and contamination of the ground water!

- ▶ Always place a drip tray under the Häggglunds motor when filling and draining the hydraulic fluid.
- ▶ Use an oil binding agent if hydraulic fluid is spilled.
- ▶ Observe the information in the safety data sheet for the hydraulic fluid and the specifications provided by the system manufacturer.

Removing the CA spline motor

1. Secure the motor to a lifting device, see chapter 6.1.
2. Place the waste oil collector below the motor.
3. Remove the end cover (1) together with screws and washers.
4. Dismount the mounting kit (4) or the plug G1" (2).
5. Remove the bearing retainer (3). The oil will drain out.
6. Install the assembly tool with the nut according to *Fig. 58*. Screw it into the driven shaft by using a wrench at the key grip at the end of the assembly tool.
7. Remount the bearing retainer (3).
8. If the motor is flange mounted, unscrew the motor from the flange. If the motor is torque armed mounted, dismount the articulated connection.
9. Pull the motor off the shaft by turning the nut on the assembly tool.

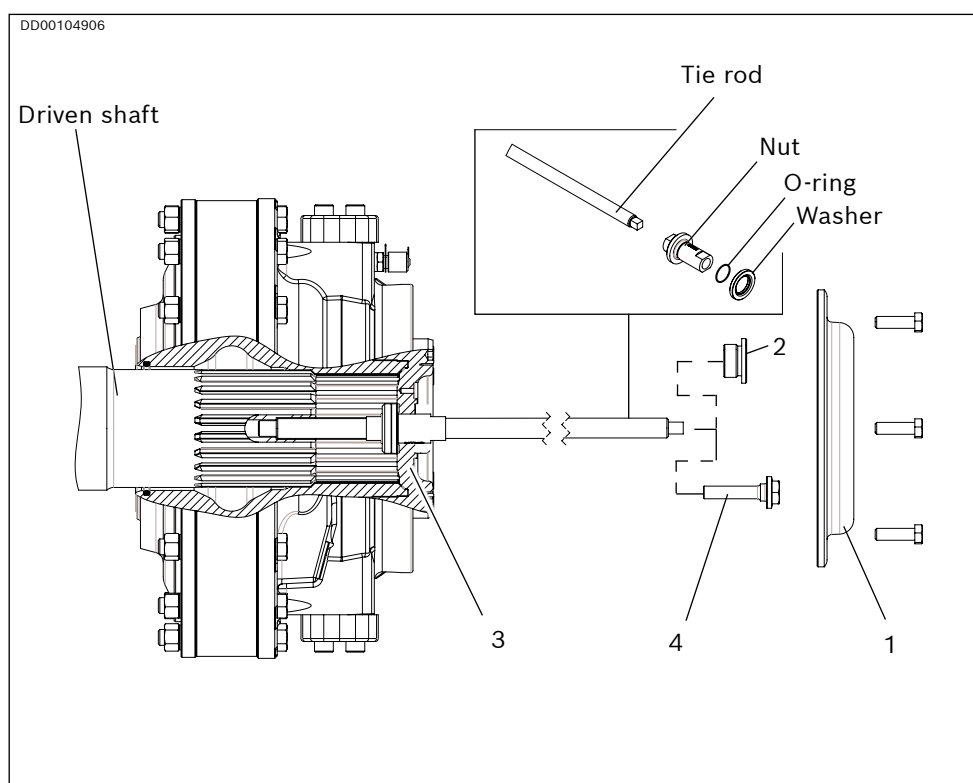


Fig. 58: Removing the CA spline motor

Removing the CA coupling motor

1. Secure the motor to a lifting device, see chapter 6.1.
2. Remove the end cover (1) together with screws and washers.
3. Dismount the plug G1" (2).
4. Remove the bearing retainer (3).
5. Install the assembly tool with the nut according to Fig. 59. Screw it into the driven shaft by using a wrench at the key grip at the end of the assembly tool.
6. Remount the bearing retainer (3) to the motor.
7. Disconnect the torque arm from the articulated connection.
8. Untighten the screws on the shrink disc gradually, approximately a quarter turn each. Keep doing this until all screws are loosened.
9. Pull the motor off the shaft by turning the nut on the assembly tool.

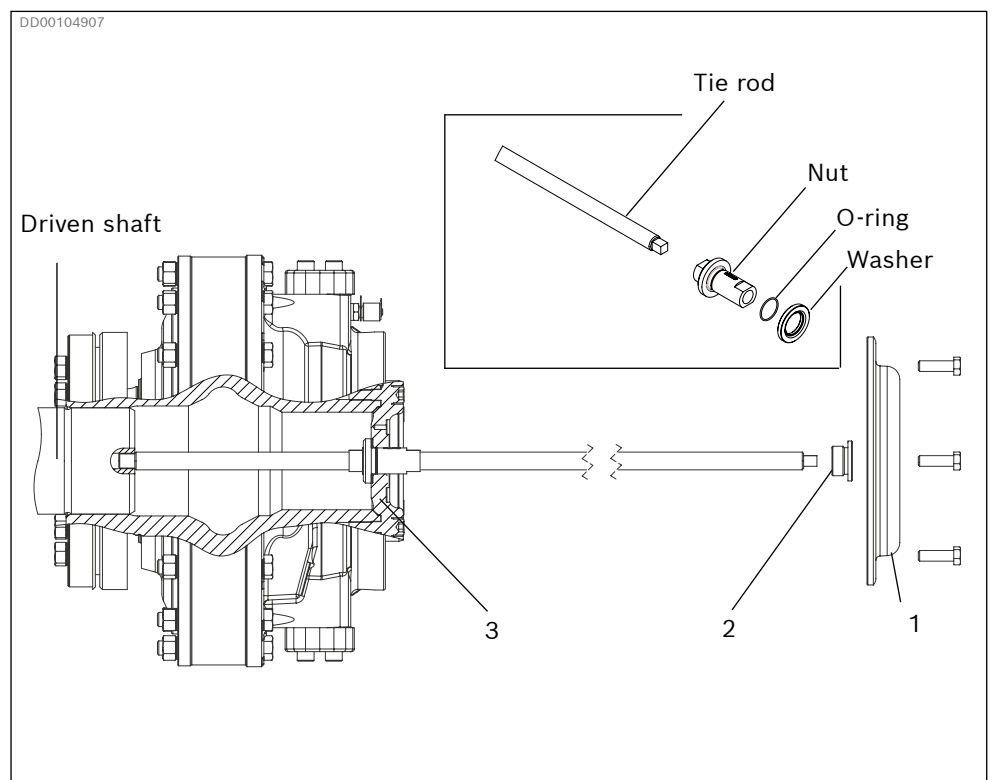


Fig. 59: Removing the CA coupling motor

11.4 PREPARING THE COMPONENTS FOR STORAGE OR FURTHER USE

Proceed as described in chapter 6.2.

12 Disposal

12.1 ENVIRONMENTAL PROTECTION

Careless disposal of the CA motor, the hydraulic fluid and the packaging material could lead to pollution of the environment.

Observe the following points when disposing of the CA motor:

- 1.** Completely drain the motor from fluid.
- 2.** Dispose of the motor and packaging material in accordance with the national regulations in your country.
- 3.** Dispose of the hydraulic fluid according to the national regulations of your country. Also observe the applicable safety data sheet for the hydraulic fluid.
- 4.** Remove the motor into its individual parts and properly recycle these parts and separate according to, for instance:
 - Cast iron
 - Steel
 - Aluminum
 - Non-ferrous metal
 - Electronic waste
 - Plastic
 - Seals

Dispose material in accordance with the national regulations in your country.

13 Extension and conversion

Do not modify Häggglunds products. Please contact your Bosch Rexroth representative for extension or conversion.

14 Troubleshooting

Please, contact your nearest Bosch Rexroth representative.

Table 24: Troubleshooting hydraulic motor

Fault	Probable cause	Action
The motor does not run.	Mechanical stop in the drive.	Check system pressure. If the pressure has risen to the relief valve setting, remove the load from the drive.
	The motor does not deliver enough torque because the pressure difference across the motor is not enough for the load.	Investigate the pressure level in the system and correct the setting of the pressure limiting valve if necessary.
	Insufficient or no oil being supplied to motor.	Check the hydraulic system. Check the external leakage of the motor (D connection).
Motor rotates in wrong direction.	Oil supply connections to motor incorrectly connected.	Connect the oil supply correctly.
Motor runs rough.	Pressure or flow fluctuations in the hydraulic system.	Find the cause in the system or in the driven unit.
Noise in the motor.	The motor is being operated with too low charge pressure.	Adjust the charge pressure to the correct level. See chapter Recommended charge pressure in data sheet RE 15305 .
	Internal faults in the motor.	Investigate the drain oil, if necessary. Put a magnetic plug in the oil flow and check the material that sticks to the magnet. Steel particles indicate damage. Note that fine material from the castings may be deposited and does not mean internal damage in the motor.
External oil leakage on the motor.	The radial lip seals or other seals is worn or damaged.	Replace the damaged seals.

15 Technical data

15.1 TECHNICAL DATA, HÄGGLUNDS CA

For complete technical data see [RE 15305](#).

DANGER

Hanging load falls down

Danger to life, risk of injury or damage to equipment, in hanging load applications.

- ▶ Charge pressure at motors connection must be according to recommended pressure under all conditions, see data sheet [RE 15305](#), chapter Recommended charge pressure.
- ▶ Changes to the factory settings must only be made by Bosch Rexroth specialist personnel.

15.1.1 Hydraulic fluids

The hydraulic CA motor is primarily designed for operation with hydraulic fluids according to ISO 11158 HM.

Before the start of project planning, see Data sheet [RE 15414 Hydraulic fluid quick reference](#) for detailed information on hydraulic fluids and specific additional demands.

Filtration of the hydraulic fluid

A contamination level of at most 18/16/13 according to ISO 4406 is required. The less contaminated the fluid, the longer the service life of the hydraulic motor.

Details regarding the selection of hydraulic fluid

The hydraulic fluid should be selected such that the operating viscosity in the temperature range, as measured in the motor housing, is within optimum operation range according to chapter *Hydraulic fluids* in data sheet [RE 15305](#).

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