

INSTALLATION & MAINTENANCE MANUAL

Hägglunds Fusion

Drive system

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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Changes in the equipment may occur. We therefore reserve the right to introduce amendments in the manual as we deem necessary without notice or obligations.

This Installation and maintenance manual is valid for drive systems manufactured after 01.01.2022. For older drive systems please contact your nearest Bosch Rexroth representative.

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

Original instruction manual

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1 This documentation

1.1 Validity of the documentation

This documentation applies to the Drive System, Hägglunds Fusion, European and American version, and is intended for machine/system manufactures, fitters and service engineers.

Hägglunds Fusion is a flexible product with a wide option range, this installation and maintenance manual is intended to cover all these options. Some options might not be included in the delivered drive system, see order specific documentation for the exact content.

This documentation contains important information required to transport, install, commission, operate, use, service and dismantle the product safely and professionally.

- Read this documentation completely before using the Hägglunds Fusion

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: Necessary and supplementary documentation.

Title	Document no	Document type
 Order confirmation	Order specific	Order confirmation
 Order documentation	Order specific	E.g. hydraulic and electric diagrams, bill of material, specifications
 Hägglunds CA ¹	RE 15305-WA	Installation & maintenance manual
 Hägglunds Quantum ¹	RE 15428-WA-A	Installation & maintenance manual
 Hägglunds BICA brake ²	EN 643	Installation & maintenance manual
 Hägglunds Spider 2 ²	RE 15330-WA	User manual
 HJägglunds Fusion	RE 15345	Data sheet
 Hägglunds Torque arms	RE 15355	Data sheet
 Hägglunds SPDC	RE 15350	Data sheet
 Hydraulic fluid quick reference Hägglunds products	RE 15414	Data sheet
 Axial piston variable pump A4VG series 32 Europe	92003-01-B	Instruction manual

¹ Depending on the hydraulic motor type in the drive system

² Required if included in scope

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




This documentation includes safety messages placed before sequential operating procedures that may involve the risk of personal or property damage. The described precautionary measures must be observed.

Safety messages are structured as shown below:

 SIGNAL WORD
Type and source of risk Consequences if disregarded ▶ Precautionary measures

- **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 of non compliance type
- **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.
	Center of gravity Markings on packaging to indicate where the center of gravity are.

1.3.3 Abbreviations

The following abbreviations are used in the present documentation

Table 4: Abbreviations

Abbreviation	Meaning
QMX	Hågglunds Quantum (former Hågglunds CB)

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 this 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 providing the product to third parties, make sure to include the necessary documentation.

2.2 Intended use

The Hägglunds Fusion is a hydraulic drive system.

In the application the Hägglunds Fusion drive system is classified as a partly completed machinery in the sense of the EU machine directive 2006/42/EC, Appendix IIB. A partly completed machinery is exclusively intended to form an incomplete or a complete machine together with other components or partly completed machineries. The drive system 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. Intended use includes having read and understood the complete documentation, especially the chapter 2: *Safety instructions*.

The product is intended for the following use:

- Closed loop hydraulic system to convert electric energy to mechanical rotation of a shaft.

Special drive systems

Standard drive systems are not allowed to be used outside an ambient temperature range of -20 °C to 40 °C (-4 °F to 104 °F), or in areas with potentially explosive atmospheres.

Drive systems intended for use in ambient temperature below 0 °C (32 °F), can be fitted with special optional equipment for preheating the hydraulic system before start.

Observe the technical data, application and operating conditions and performance limits as specified in the product-specific documentation 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:

- Using outside the operating parameters approved in the product specific data sheet or in the order specific documentation.
- Use of fluids outside of the standards as specified in [RE15414 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 has to 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 drive system in explosive environments unless the component or machine/system has been certified as compliant with the local regulations.
- Using the drive system in an aggressive atmosphere without necessary additional measures.

2.4 Personnel qualifications

The activities described in this documentation require basic mechanical, electrical and hydraulic knowledge, as well as knowledge of the associated technical terms. For transporting and handling 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 an instructed person under the direction and supervision of qualified personnel.

Qualified personnel are those who can recognize possible hazards and institute the appropriate safety measures due to their professional training, knowledge, and experience, as well as their understanding of the relevant regulations pertaining to the work to be done. Qualified personnel must observe the rules relevant to the subject area and have the necessary hydraulic, electric and automation 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.

Electric knowledge means, for instance:

- Reading and fully understanding of electrical diagrams
- Certification for work with electrical equipment

Automation knowledge means, for instance:

- Reading and fully understanding of logic diagrams
- Knowledge of programmable equipment (PLC, VFD etc)

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 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-specific safety instructions

The safety instructions below apply to chapters 6: *Transport and storage* to 14: *Technical data*

DANGER

Danger from excessively high pressure

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

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

- ▶ Operate the components only within permissible maximum pressure.

Danger from suspended loads

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

Improper transportation may cause the Hågglunds drive system to fall down lead 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 you hands under suspended loads.
- ▶ Ensure your position is stable during transportation.
- ▶ Use your personal protective equipment (e.g. protective goggles, safety gloves, suitable working clothes, safety shoes).
- ▶ Use suitable lifting device for transport and storage, installation and for removal and repair. Make sure the electric motor is well mounted or anchored when the lifting device is disconnected.
- ▶ Observe the prescribed position of the lifting strap.
- ▶ Observe the national 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 machines/ systems not shutdown! Damage to equipment.

- ▶ Always lockout-tagout electric motors before maintenance.
- ▶ Do not disconnect any line connections, ports and components when the machine/system is pressurized.
- ▶ Always ensure that no energy is accumulated before any measures.
- ▶ Ensure that no pressure will enter the hydraulic system in the drive system via the hydraulic motor e.g. loads on the shaft or winch drum.

 **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 Hägglunds drive system.

High voltage

Danger to life or personal injury hazard through electrical shock.

- ▶ Prior to accessing electrical parts with a voltage higher than 50 volts always disconnect the device from the mains or power unit. Secure the electrical equipment against being switched on again by accident.
- ▶ Observe the general deployment regulations, safety regulations and domestic laws for work on heavy-current equipment.
- ▶ The operation, maintenance and/or repair of such equipment is reserved to skilled personnel qualified to work on or with electrical equipment.
- ▶ Prior to switching the equipment on always check the protective earth conductor for reliable connection to all electrical equipment according to the connection diagram.
- ▶ Exclusively run the component/device - even for short-time measurements or tests - with the protective earth conductor reliably connected to the dedicated connection points.

Danger due to incorrect mounting and setting of electrical, hydraulic and mechanical functions as well as controls

Risk of personal injury or property damage.

- ▶ Follow instructions for delivered equipment.

Rotating parts

Risk of injury or serious injuries.

- ▶ Do not touch rotating parts or in the zone of rotating parts.


CAUTION
High noise development in operation

Danger of hearing damage, deafness.

The noise emission of Hågglunds drive system depends on speed, operating pressure and installation conditions.

- ▶ Always wear hearing protection when in the vicinity of the operating drive system.

Hot surfaces on the drive system

Risk of burns.

- ▶ Allow the Hågglunds drive system 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/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 your personal protective equipment (e.g. protective goggles, safety gloves, suitable working clothes, safety shoes).
- ▶ If hydraulic fluid should, nevertheless, come 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 the machine/system and repair the leak.
- ▶ Never attempt to block or seal the leak or oil jet with a cloth.

Operator error

Risk of personal injury or damage to the product.

- ▶ Check both the general and the custom technical documentation to identify the features of your unique drive system

2.7 Personal protective equipment

Use personal protective equipment like helmet, protective goggles, safety shoes and hearing protection.

The personal protective equipment is the responsibility of the user of the Hågglunds drive system. Observe the safety regulations and provisions of your country.

All components of the Personal protective equipment must be in perfect condition.

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 Hägglunds drive system or any part of it or its accessories.
- ▶ Do not set/place the Hägglunds 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 Hägglunds drive system until shortly before installation.
- ▶ Make sure that the electronics are not electro-statically charged

Damage to equipment due to improper lubrication

Product can be damaged or destroyed.

- ▶ Never operate the Hägglunds drive system with insufficient hydraulic fluid.
- ▶ When commissioning a machine/system, make sure that the case interior and the service lines of the hydraulic motor and pump are filled with hydraulic fluid and remain filled during operation.

Mixing of hydraulic fluids

Product can be damaged.

- ▶ Any mixing of hydraulic fluids of different manufacturers or different types of the same manufacturer is not permissible in general.

Wrong voltage

Electric motor damage.

- ▶ All electrical supply levels shall be within the limits that the equipment is constructed for, see order specific Hägglunds Fusion documentation and product identification.

Damage from electro-welding

Product can be damaged.

- ▶ Do not perform electro-welding on the Hägglunds drive system.
- ▶ Do not perform any electro-welding on the driven machine without disconnecting the articulated connection from ground.
- ▶ Remove any sensitive electronic equipment before performing any electrowelding 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 drive system must be installed in a clean condition.
- ▶ Use only clean connections, hydraulic lines and attachments (e.g. measuring equipment).
- ▶ Keep the connections plugged as long as possible.
- ▶ 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 drive system.
- ▶ Never use a high pressure washing system to clean inside the drive system
- ▶ For outside washing, do not point the power washer at sensitive components, e.g. electrical connections and components.
- ▶ Use lint-free cloths for cleaning.

Environmental pollution due to incorrect disposal

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

- ▶ Dispose of the Häggglunds drive system, 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.

- ▶ 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 are:

- Hägglunds Fusion as per order confirmation

5 About this product

5.1 Product description

Hägglunds Fusion is a closed loop hydraulic system that converts electric energy to mechanical rotation of a shaft. All included parts are assembled in a compact cabinet. The drive system has one pump driven by one electric motor to provide the hydraulic motor with the required flow of oil and pressure at the right time. The main pump is an axial piston pump with variable displacement for closed loop systems. The electric motor is totally enclosed (TEFC).

The standard control function is a pump control with system control interface for controlling the pump and gather sensor signals to a common customer interface. The drive system is a flexible product with an option range. This makes it possible to select a standard drive system to fulfill the features needed in many different applications.

This installation and maintenance manual is intended to cover all standard options. It may not cover all details on customized drive systems that differ from the standard Hägglunds Fusion concept.

5.2 Product identification

- 1 Type code
- 2 Serial number
- 3 Weight
- 4 Manufacturer
- 5 Max pressure

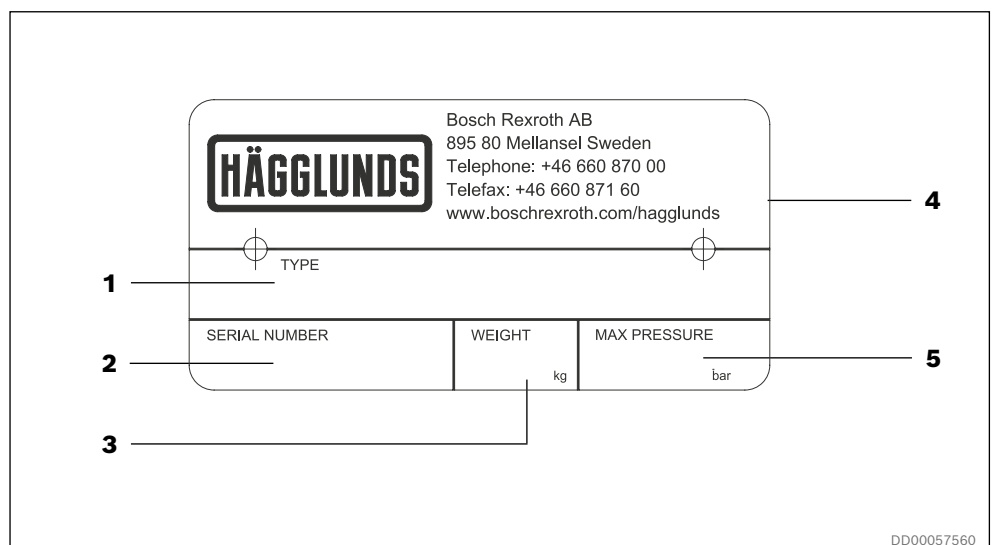


Fig. 1: Example of product identification from Fusion European version

5.3 Main components

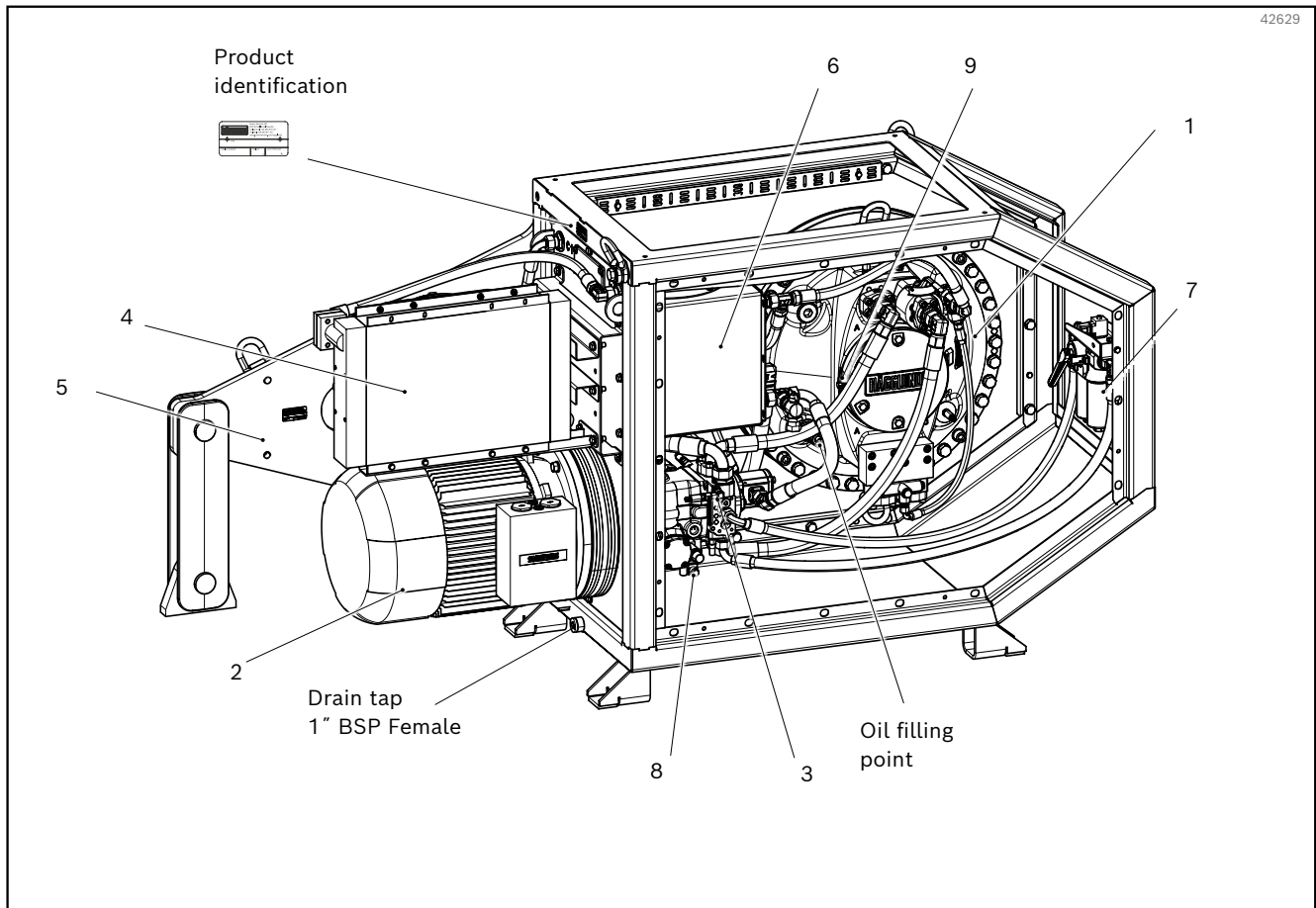


Fig. 2: Main components Hågglunds Fusion

Main components		
Item	Description	See also figure
1	Hydraulic motor	–
2	Electric motor	–
3	Main pump	–
4	HDC cooler	–
5	Torque arm	–
6	Tank	3
7	Oil Filter	–
8	Pump control and power amplifier	–
9	Speed sensor	–

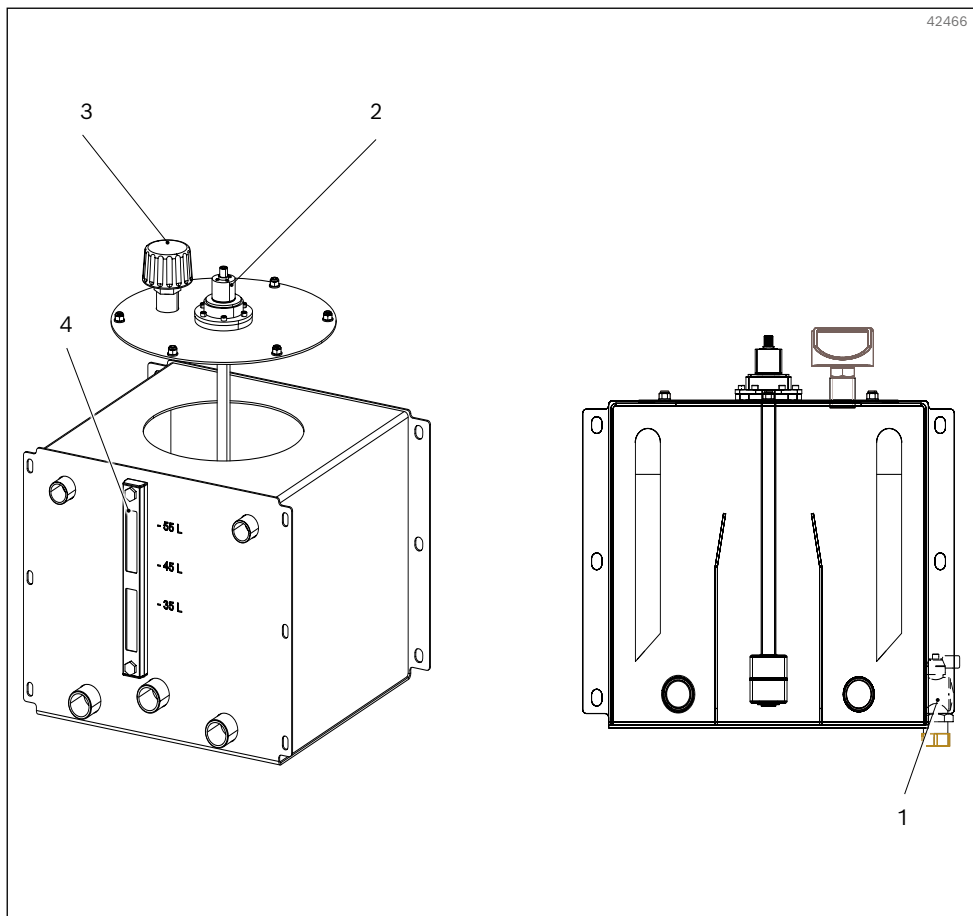


Fig. 3: Detailed view, tank

Item	Description
1	Oil-drain valve
2	Level and temperature sensor
3	Air filter breather
4	Level gauge

5.4 Hydraulic fluids

The Hågglunds hydraulic system is primarily designed for operation with hydraulic fluids according to ISO 11158 HM.

Fluids by the standards given in Table 5 are suggested. 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

Table 5: Suggested fluid types

ISO 11158	ISO 15380	ISO 12922
Mineral oil based and mineral oil related hydraulic fluids	Environmentally acceptable hydraulic fluids	Fire resistant hydraulic fluids

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, see Fig. 4. General recommendation is to have a system temperature of 50°C, see dotted line in Fig. 4. A VG 68 fluid will render just above 40 cSt at this point.

- Optimum viscosity range is 40 to 150 cSt.
- Running above 150 cSt or below 40 cSt results in reduced efficiency.
- Running above 400 cSt results in substantial efficiency loss.
- For pumps, the maximum start-up viscosity is 1600 cSt.
- For motors, starting at above 10000 cSt imparts unnecessary strain on parts.
- Running below 30 cSt may impact the service life.
- Running below 20 cSt may render instant seizure.

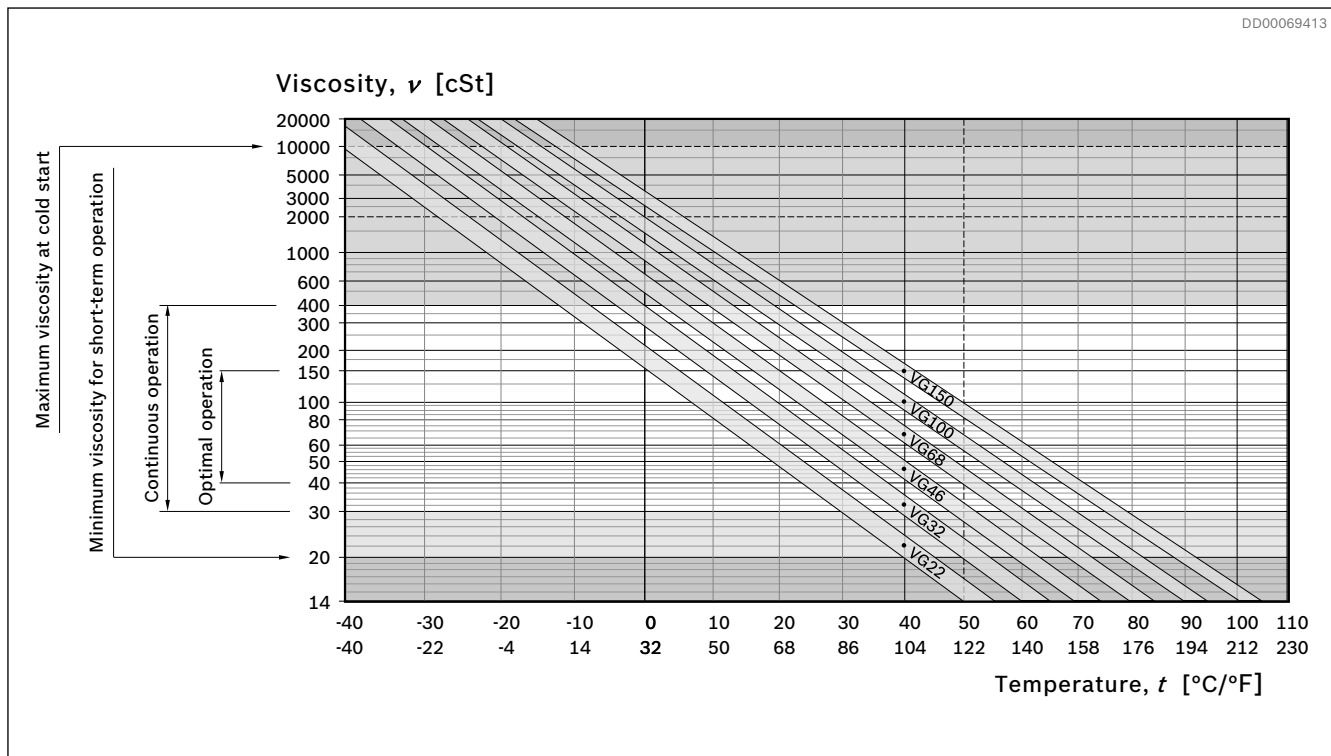


Fig. 4: Selection diagram for viscosity ranges with straight fluids, i.e. viscosity index 100

5.5 Requirements for hydraulic fluid cleanliness

The drive systems are equipped with a filter in the charge line. In order to obtain stated service life it is important to follow recommendations concerning cleanliness levels and maintenance.

Cleanliness level recommendations

- When filling the system with hydraulic fluid it is important to fill through the dedicated oil filling connection (see 8.2: *Filling up the system with hydraulic fluid*).
- For industrial applications the contamination level should not exceed ISO 4406:1999 18/16/13.
- Have a water content of <200 ppm (0,02%).
- Always use filter elements recommended and supplied by Bosch Rexroth.
- The hydraulic fluid should be analysed according to the maximum intervals on the maintenance chart (see *Table 19: Maintenance chart*). Be particularly careful when removing equipment for repairs or maintenance, dirt must not be allowed to enter the system, clean prior to opening and plug open connections.

NOTICE

Dirt in oil

Damage on equipment.

- ▶ Do not re-use hydraulic fluid which has leaked out.

5.6 Drive system monitoring

The following function **must** be fulfilled in the system. See order specific Hågglunds Fusion documentation for the monitoring settings.

The monitoring of the drive system switches and sensors are grouped in two levels according to Fig. 5.

The warning indication is to give an indication about a problem in the drive system that does not need an immediate action.

The alarm indicates a need for stopping the pump. The stop sequence is to first stop the hydraulic motor by setting the pump swash angle to zero without ramp to allow the hydraulic drive to stop and after a short delay switch off the electric motor.

The low (charge) pressure indicator must be interlocked during stop and startup of the electric motor to avoid alarm and give the pump time to build up the charge pressure after start.

Note! For Fusion with pump control alarm and warning must be handled by customer control system.

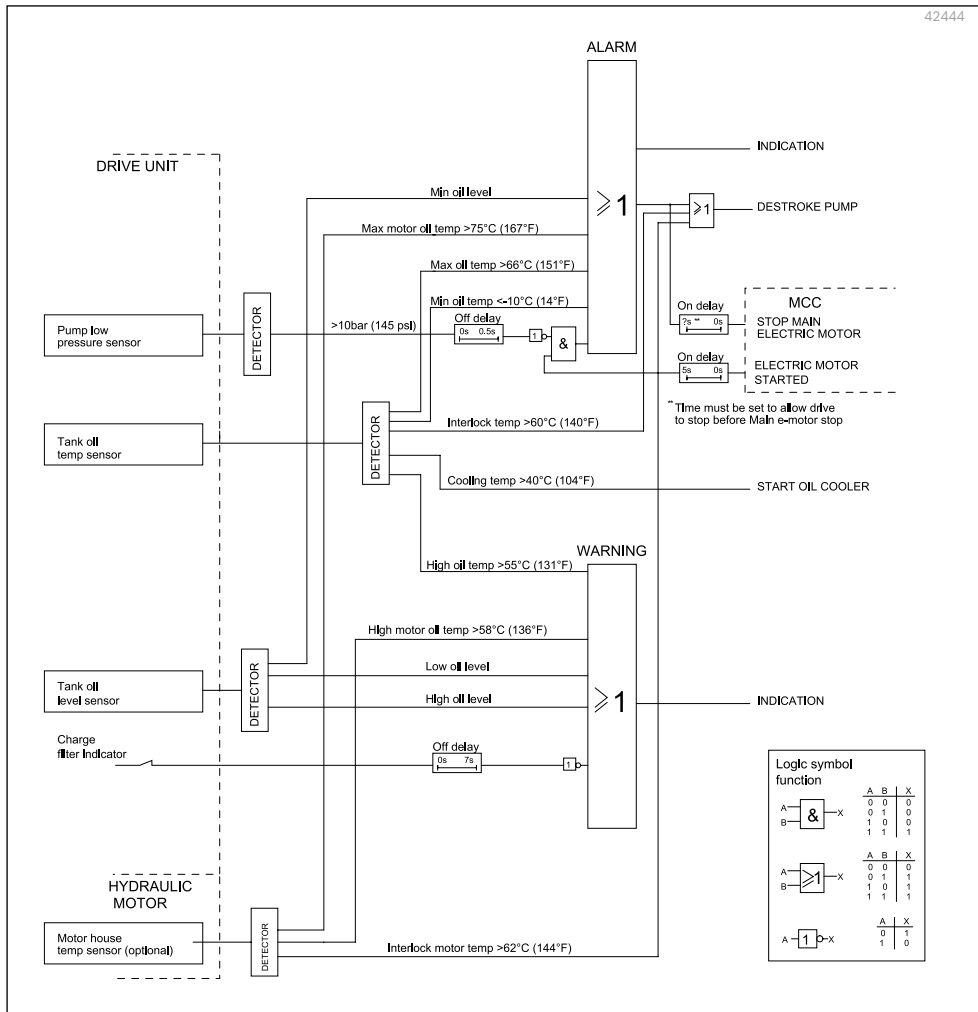


Fig. 5: Example of monitoring logic diagram with ISO VG 68 oil

6 Transport and storage

6.1 Storage of the packed drive system

At delivery the drive system is protected by a wooden crate covering a sealed plastic hood and internally protected with desiccant bags to absorb moisture. Do not remove the plastic hood until installation!

Parts delivered separately are delivered in plastic hoods with VCI corrosion protection.



The plastic hood and the desiccant bags provide sufficient corrosion protection for **indoor storage** up to 12 months from delivery date. If storage time exceeds 12 months, the crate must be opened to access the plastic hood.

Open the plastic hood gently to avoid damage. Exchange the desiccant bags.

Original used type Propadry A311 with absorption capacity 750 g/desiccant bag

Table 6: Required quantity of original desiccant bags

Frame size	Quantity
M	5 pcs
L	7 pcs

For separately delivered parts stored more than 18 months from delivery date, the VCI protection can be extended. Open the plastic hood gently to avoid damage and add VCI foam pads, 1 pad/250 litres box volume.

Close the plastic hood carefully and seal according to original protection. If the plastic hood has damages the holes must be sealed or the hood exchanged.

6.2 Lifting the packed drive system

The packed drive system is marked with center of gravity and weight. The drive system package is designed for forklift handling.

WARNING

Packed drive system can tip over

Danger to life or risk of injury, damage to equipment

- ▶ See label on the crate for center of gravity.
- ▶ Avoid rapid acceleration, deceleration and turns while moving the goods.
- ▶ Position the forks according to the instructions below.

Lifting with fork lift

The lifting of drive systems must be done from the long side. Lift with motor shaft towards forklift, due to center of gravity.

Parts that are delivered separately

- The package is always marked with the weight.
- Packages are only designed for forklift truck handling.

7 Installation

7.1 Installation directives

If the drive system is to work properly it must be installed in accordance with these instructions. The conditions the system will operate in must be taken into consideration.

Improper installation, not following the instructions in this manual and in the attached technical documentation, may affect the function and/or the service life of the drive system. It is important that the safety precautions in this manual always are followed.

Position the drive system

- pivot attachment to a firm foundation.
- to ease maintenance and service.
- protected from airborne sprays, heavy contamination, and radiated heat.
- to ensure free ventilation for cooling purposes for the electric motor and the air-oil cooler.

NOTICE

Frame feet bolted to foundation

Damage on equipment due to frame not designed to handle external forces.

- ▶ Do not bolt frame feet to foundation .

7.2 Lifting methods

Lifting with ropes/chains

DANGER

Danger while transporting or lifting Hägglunds drive system due to heavy weight!

Danger to life, risk of injury or serious injuries and risk of damage to equipment

- ▶ Do not lift the drive system with a fork lift.
- ▶ Make sure that lifting device is correctly installed.
- ▶ Do not stand under hanging load.
- ▶ Always make sure where the center 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.
- ▶ Use only lifting equipment adapted to the weight of the drive system (check rating plate inside the cabinet).
- ▶ Always use the number or lifting points, seen in Fig. 6 when lifting the drive system.

Note! The Drive System shall only be lifted without top panel
 The working load limit of individual load ring are calculated using the following formula and are based on symmetrical loading:

$$W_{LL} = \frac{G}{n \times \cos \beta}$$

W_{LL} = working load limit
 G = load weight (kg)
 n = number of load bearing leg
 β = angle or inclination of the chain to the vertical

G = Weight of Hågglunds Fusion. See 14.1: Weights
 $n = 2$ (due to asymmetrical load)
 $\beta = 0 - 45^\circ$

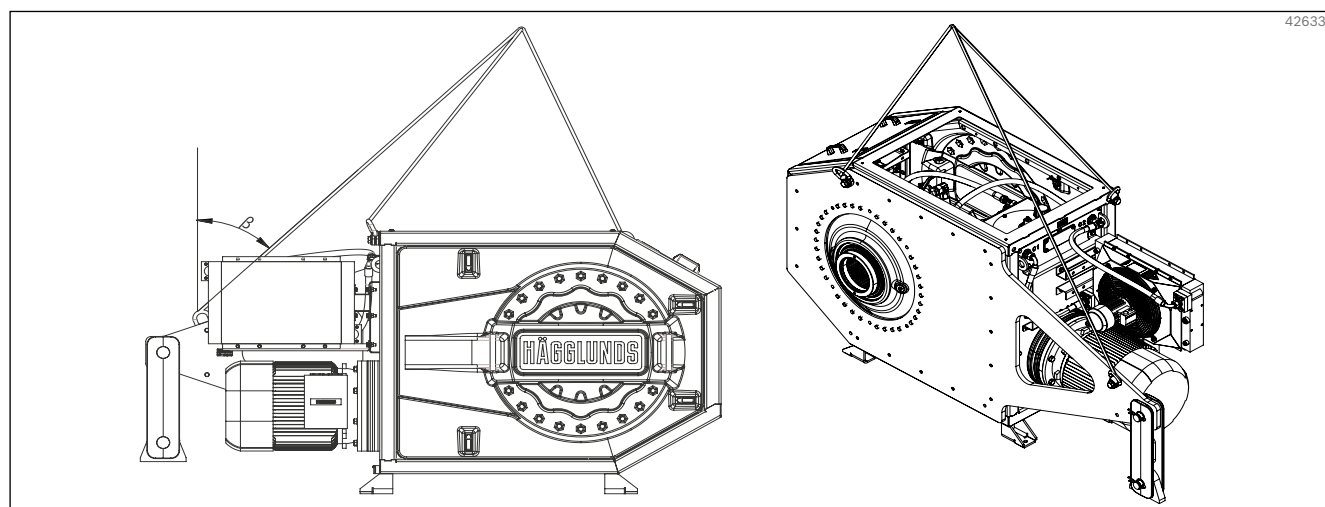


Fig. 6: Lifting Fusion

$\cos 0^\circ = 1$
 $\cos 30^\circ = 0,87$
 $\cos 45^\circ = 0,71$

Table 7: Max load for each lifting hook

	Working Load Limit(W_{LL})	
	kg	lb
Safety factor 4	3500	7716
Safety factor 8	1750	3858
Safety factor 10	1400	3086

Example:

Weight for complete unit for combination Quantum 840-840 with shrink disc coupling, 125 cc pump and 75 kW electric motor 3300 kg.
 Angle of inclination of the chain 45° . Gives $W_{LL} = 3300 / (2 * 0,71) = 2324$ kg. Gives safety factor above 4 but below 8 according to Table 7.

Hints for assembly load ring:

The load rings must be rotatable 360° when installed. Please observe the following:

- For a single use hand tightening with a spanner is sufficient. Bolt supporting area must sit proper on bolt-on surface

7.3 Positioning the drive system

The following space must be left free around the drive system, to allow free ventilation (distance A_A and B_A) and to provide sufficient working space for maintenance (distance B and C). Heavier maintenance such as change of motor/pump will demand more working space.

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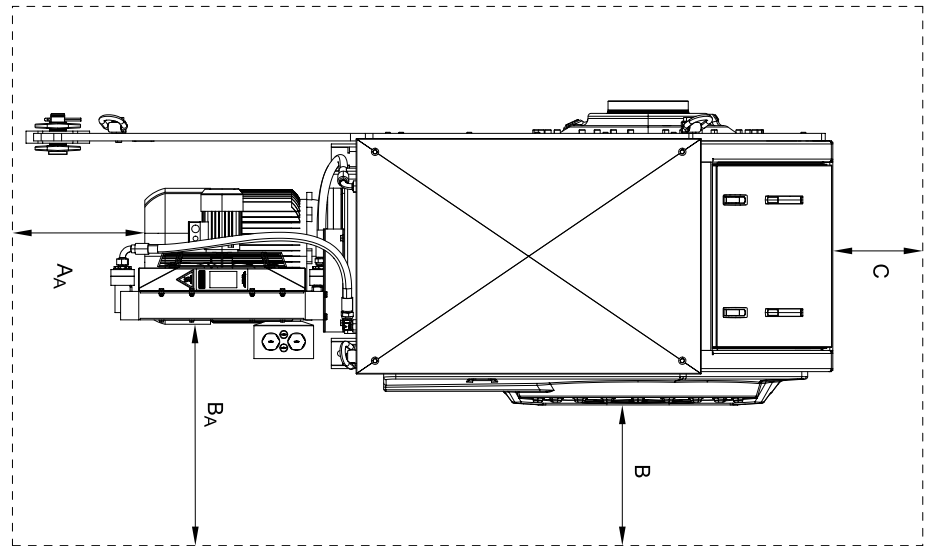


Fig. 7: Recommended minimum space around drive system

Table 8: Minimum space around drive system

Minimum space		mm	in
A_A		150	5.9
B		1000	39.4
B_A	HDC 030-4	500	19.7
	HDC 050-4	772	30.4
	HDC 060-4	815	32.1
C		700	27.6

7.4 Required tools

Assembly tool for CA and Quantum motor

For easier and faster mounting of the motor on 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 driven shaft. The motor is pulled onto the shaft by turning the nut on the assembly tool.

Material ID Assembly tool for CA and Quantum motor:

Material ID R939003803

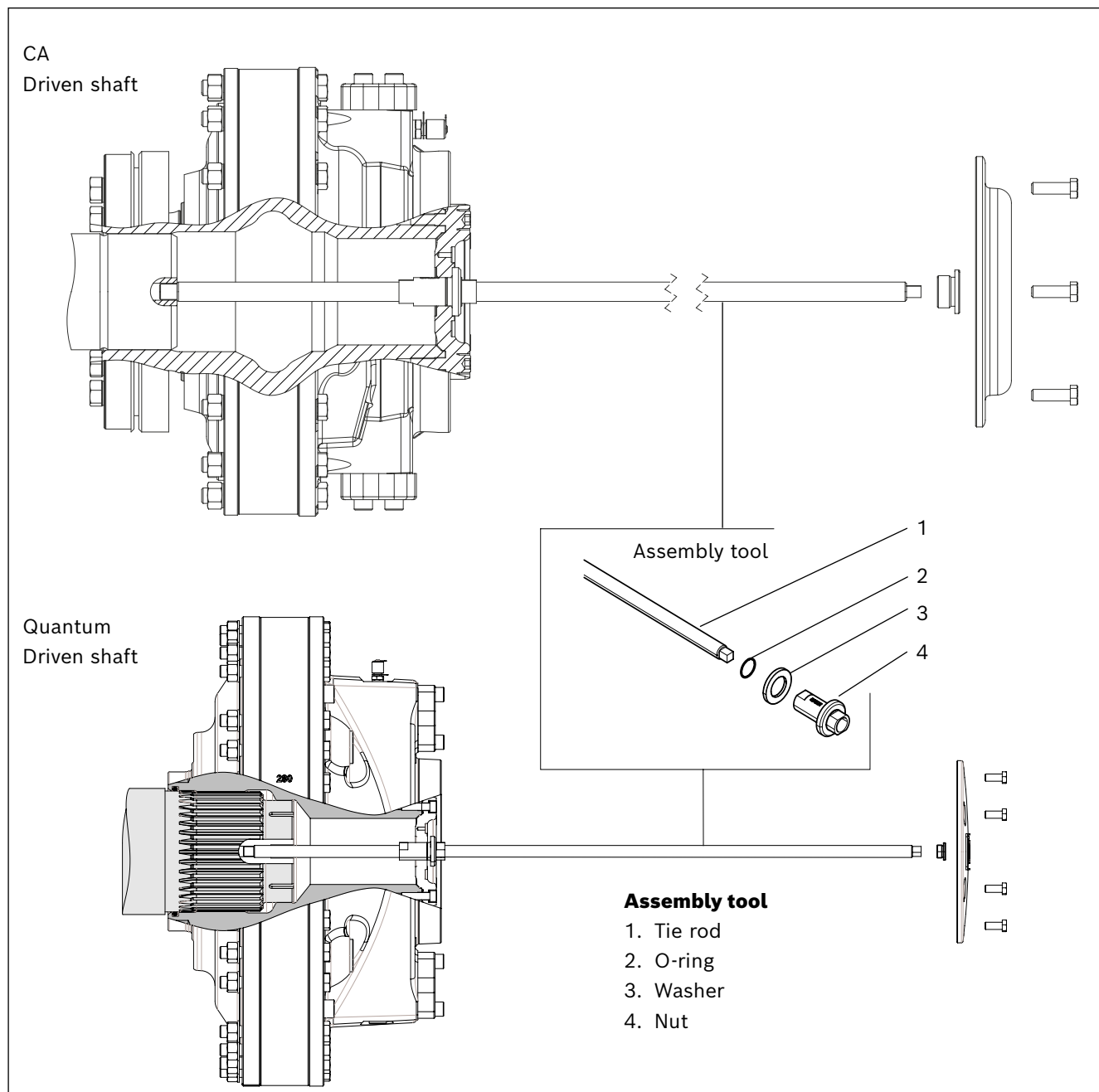


Fig. 8: Mounting CA and Quantum motor with assembly tool

7.5 Drive system mounting

7.5.1 Before mounting the Fusion drive system

Instruction to follow when mounting the Hägglunds Fusion on a driven shaft.

Before it is mounted there are some preconditions which must be fulfilled:

- ▶ The shaft material for the driven shaft must be of a quality which meets the minimum requirements specified by Bosch Rexroth.
- ▶ The shaft must have the dimensions as recommended in [RE 15345](#)
- ▶ Note that the couplings are lubricated from the factory with MoS2 (Molykote) on the conical surfaces and the bolts. This lubricants shall remain on those surfaces.

NOTICE

Unauthorized modificaton of component

Risk of damage equipment

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

7.5.2 Mounting the motor on to the driven shaft

Section 7.2: Installation condition in respectively Installation & Maintenance Manual [RE 15428-WA-A Hägglunds Quantum](#) and [RE 15305-WA Hägglunds CA](#) must be read before start of mounting

Shrink disc:

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 or shaft adapter.
- ▶ Clean hands free from grease before start of mounting

Incorrect installation

Damage of motor or customer shaft.

- ▶ See section 7.4.4 Mounting of coupling motor in [RE 15305-WA Hägglunds CA](#) respectively 7.4.4 Mounting of motor and coupling adapter in [RE 15428-WA-A Hägglunds Quantum](#)

Table 9: Clamping length

Motor	Length B	
CA 50/CA 70	71.5 mm	2.81 in
CA 100/CA 140	84.5 mm	3.33 in
CA 210	105 mm	4.13 in
QMX 280	106 mm	4.17 in
QMX 400	117 mm	4.61 in
QMX 560 to QMX 840	153 mm	6.02 in

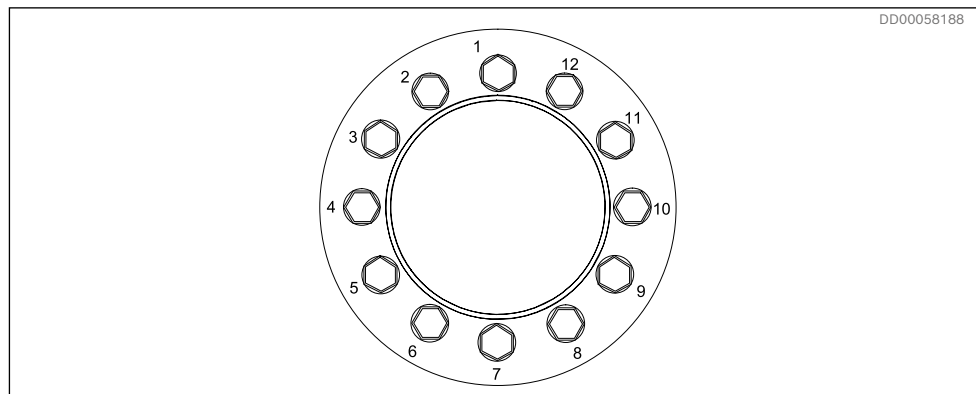


Fig. 9: Tightening order

Table 10: 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	∅ 290	8	M16 x 55	10.9	250	185	Hexagon
CA 100/CA140	∅ 330	12	M16 x 65	10.9	250	185	Hexagon
CA 210	∅ 350	15	M16 x 80	10.9	250	185	Hexagon
QMX 280	∅ 405	12	M20 x 80	10.9	490	362	Hexagon
QMX 400	∅ 440	15	M20 x 90	10.9	490	362	Hexagon
QMX 560	∅ 520	20	M20 x 100	10.9	490	362	Hexagon
QMX 840	∅ 520	20	M20 x 100	10.9	490	362	Hexagon

Splines:

NOTICE

Incorrect installation

Damage of motor and customer shaft

- ▶ See section section 7.4.5 Mounting of spline motor in [RE 15305-WA Hågglunds CA](#) respectively section “Mounting the spline motor to the coupling adapter/ driven shaft” in 7.4.4 Mounting of motor and coupling adapter in [RE 15428-WA-A Hågglunds Quantum](#).

Table 11: Oil Volume for lubrication of spline connection, torque arm mounting

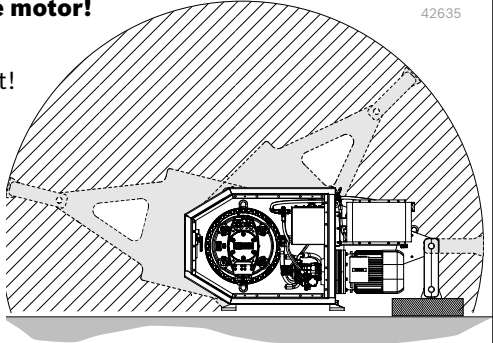
Frame size	Litre	US gallon
CA 50	0.2	0.05
CA 70	0.5	0.13
CA 100	0.8	0.21
CA 140	0.7	0.18
CA 210	1.0	0.26
QMX 280	0.8	0.22
QMX 400	1.7	0.45
QMX 560	1.7	0.45
QMX 840	2.7	0.71

7.5.3 Mounting the reaction point (articulated connection)

! **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. 11, Fig. 12, 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

1. $x \leq \pm 2 \text{ mm}$ (0,079 inch) misalignment in installation.
 $x \leq \pm 15 \text{ mm}$ (0,59 inch) movement when in use.
2. The articulated connection and the spherical plain bearing must be dismantled during welding. See Fig. 13
3. Steel: EN 10025-3 – S355N (1.0545), shall be protected against corrosion after welding.

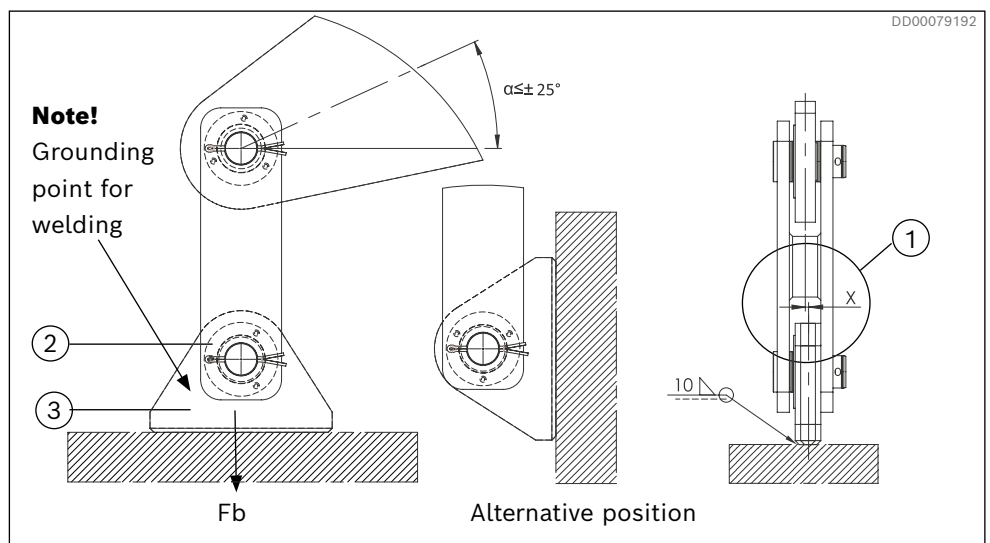


Fig. 10: Installation instruction for articulated connection

Load calculations

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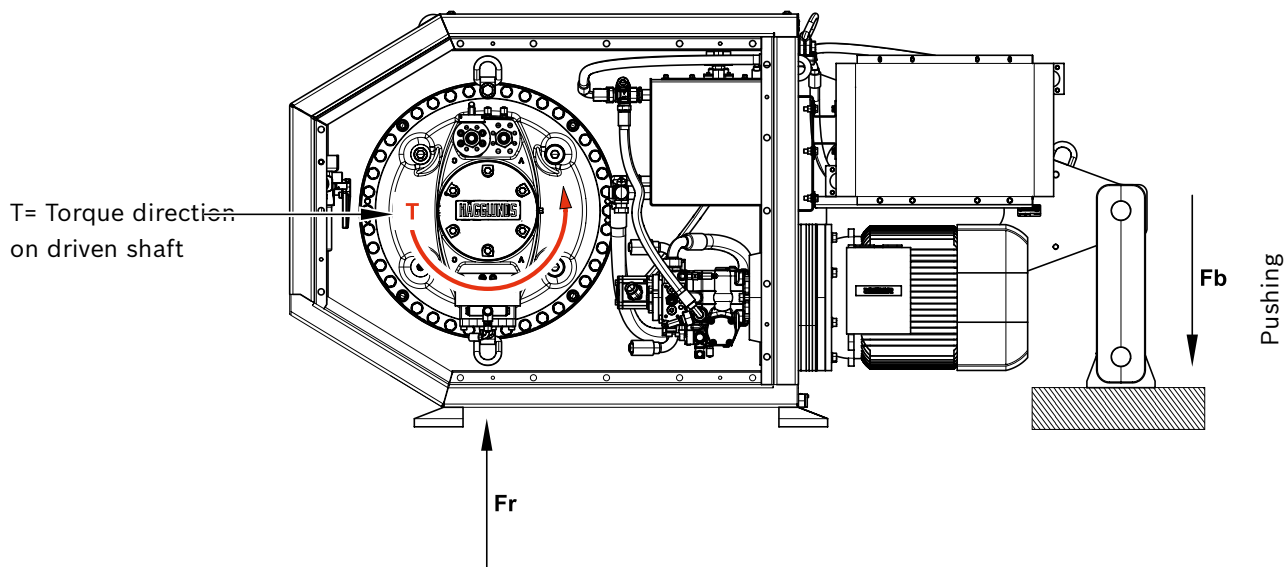


Fig. 11: External forces Fr, Fb for torque arm (3 o'clock position)

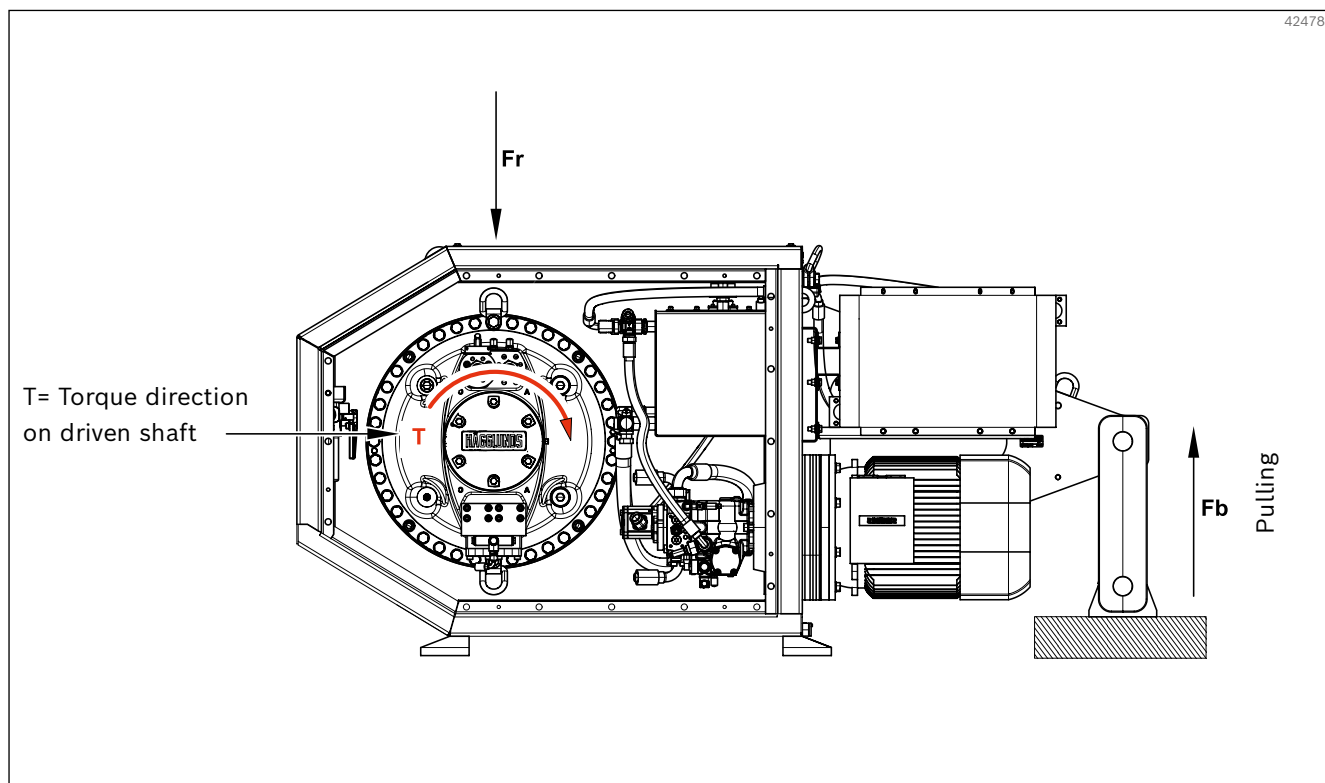


Fig. 12: External forces Fr, Fb for torque arm (3 o'clock position)

Table 12: External forces torque arm valid for delta pressure 400 bar (5800 psi) static

Hydraulic motor	Electric motor	Force Fb		Force Fr ¹⁾	
		kN	lbf	kN	lbf
CA 50-50 S	15 kW	10	2250	21	4725
	75 kW	10	2250	28	6300
CA 70-70 S	15 kW	14	3150	25	5625
	75 kW	14	3150	32	7200
CA 100-100 S	15 kW	20	4500	32	7200
	75 kW	20	4500	39	8775
CA 140-140 S	15 kW	28	6300	40	9000
	75 kW	28	6300	48	10800
CA 210-210 S	15 kW	42	9450	55	12375
	75 kW	42	9450	63	14175
QMX 280-280 S	15 kW	56	12600	72	16200
	75 kW	56	12600	80	18000
QMX 400-400 S	22 kW	80	18000	101	22725
	75 kW	80	18000	107	24075
QMX 560-560 S	30 kW	113	25425	134	30150
	75 kW	113	25425	140	31500
QMX 840-840 S	37 kW	169	38025	193	43425
	75 kW	169	38025	199	44775
CA 50-50 C	15 kW	10	2250	21	4725
	75 kW	10	2250	28	6300
CA 70-70 C	15 kW	14	3150	25	5625
	75 kW	14	3150	33	7425
CA 100-100 C	15 kW	20	4500	32	7200
	75kW	20	4500	39	8775
CA 140-140 C	15 kW	28	6300	41	9225
	75 kW	28	6300	48	10800
CA 210-210 C	15 kW	42	9450	56	12600
	75 kW	42	9450	63	14175
QMX 280-280 C	15 kW	56	12600	73	16425
	75 kW	56	12600	81	18225
QMX 400-400 C	22 kW	80	18000	102	22950
	75 kW	80	18000	108	24300
QMX 560-560 C	30 kW	113	25425	135	30375
	75 kW	113	25425	141	31725
QMX 840-840 C	37 kW	169	38025	195	43875
	75 kW	169	38025	201	45225

¹⁾ The Force Fr is calculated including the total weight of the Fusion unit.

The option BICA brake is not considered in the calculation of external forces.

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 shall be mounted with the slot in the outer ring perpendicular towards the load direction. See *Fig. 13*
3. Lock the bearings with the circlips (5)
4. Assemble the rest of the components according to *Fig. 13*

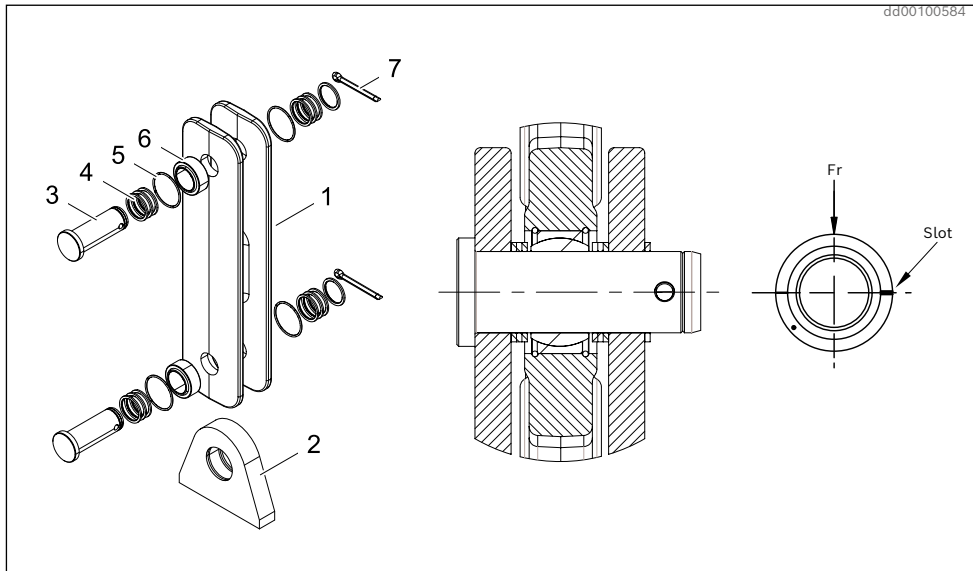


Fig. 13: Articulated connection

Pos	Description	Pcs
1	Linkage part	1
2	Fastening support	1
3	Bolt	2
4	Supporting disc	12
5	Circlip	4
6	Spherical plain bearing	2
7	Split pin	2

7.5.4 Mounting of main electric motor

In some cases the electric motor is delivered separately. The following instructions are applicable for these cases only.

WARNING

Unsecured motor can fall

Risk to life or serious injury or material damage.

- ▶ Do not stand under hanging load.
- ▶ Use all lifting ears when the electric motor is hanging free.
- ▶ Earbolts must be screwed in right up to their supporting surface and tightly fastened
- ▶ Use only lifting equipment adapted to the weight on the rating plate.
- ▶ No hands between electric motor and bellhousing during assembly.
- ▶ If necessary, use suitable, sufficiently-sized transport equipment such as lifting straps (EN1492-1)

1. Unpack the electric motor

Unpack the electric motor. Check the electric motor for external damage and that all rating plate data are the same as in the attached technical documentation.

2. Check the shaft coupling

Check that the axial shaft coupling for external damage and that the locking screw is tightened.

3. Lift the electric motor

Lift the electric motor horizontally.

Do not use the motor shaft as lifting point!

One or more lifting strap can be exchanged with chain block(s), or similar, to facilitate the alignment of the motor.

4. Mount the electric motor in the drive system

Lift the electric motor on to the drive system. It is important that the electric motor is hanging horizontally and in line with the pump shaft coupling. Fit the shaft coupling into the ring gear coupling without causing any damage. Check the assembly through the inspection hole see *Fig. 14*. The connection box should be positioned according to the order specific documentation. Bring the motor flange to a position approximately 5 mm (0,2 in) from the bellhousing. You may need a chain block, or similar, to rotate the motor when aligning the holes on the motor flange and the screw holes in the bellhousing. Place screws in the holes and tighten by hand. Leave the motor hanging in the lifting equipment until the screws are tightened with the final torque.

5. Tighten screws to the bellhousing

Inspect that there is an axial clearance (*Fig. 14 and Table 14*) through the inspection hole in the bellhousing. Tighten the attached screws to the bellhousing with torque according to *Table 13*.

Table 13: Tightening torques of bellhousing

	M8		M10		M12		M16		M20		M24	
	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft
Aluminium	12	9	23	17	40	29	100	74	190	140	—	—
Cast iron	23	17	46	34	79	58	195	144	395	291	680	502
Steel	34	25	67	49	115	85	290	214	560	413	970	715

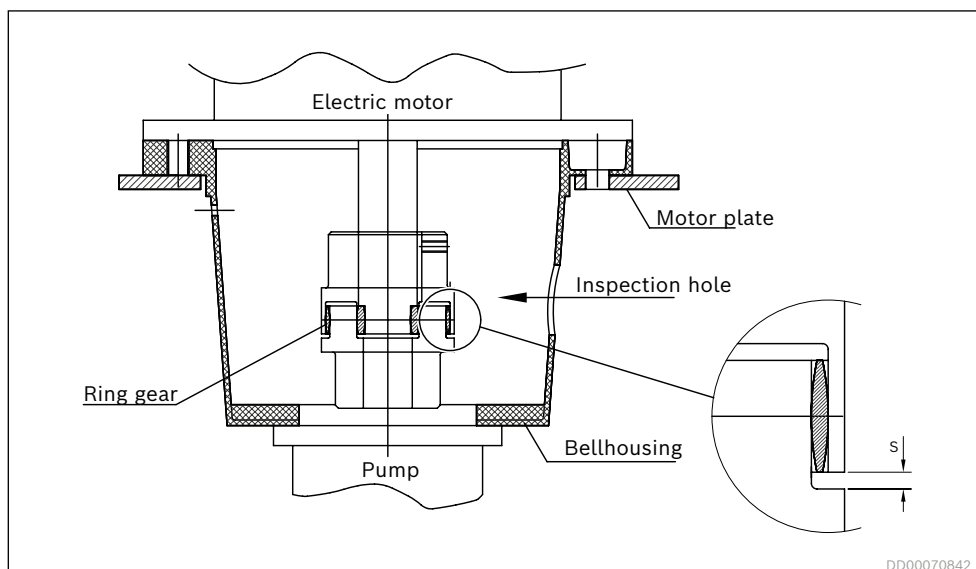


Fig. 14: Mounting of electric motor

Shaft coupling

For information about coupling type, see order specific Hågglunds Fusion documentation

Table 14: Axial shaft coupling clearance

Coupling types	Axial clearance, S	
	mm	in
R38	3.0	0.118
R42	3.0	0.118
R48	3.5	0.138
R55	4.0	0.157
R75	5.0	0.197

7.5.5 Control system

For installation and commissioning of the control system see order specific Hågglunds Fusion documentation and [RE 15330-WA](#) .

7.5.6 Mounting of air-oil cooler

The air-oil cooler is normally mounted on the drive system. In some cases is the cooler separately mounted. For dimensions and placement of air-oil cooler see order specific Hägglunds Fusion documentation.
 For electric connections see 7.6.2.

! CAUTION

The air-oil cooler starts without warning. Particles may go together with the outgoing air flow.
 Risk of injury
 ▶ Disconnect electric power to the air-oil cooler electric motor if working in the area of the airflow

NOTICE

Dirt in the system
 Risk of damage to the equipment
 ▶ The coupling protections must be kept on until final assembly

Air-oil cooler mounted separately from drive system

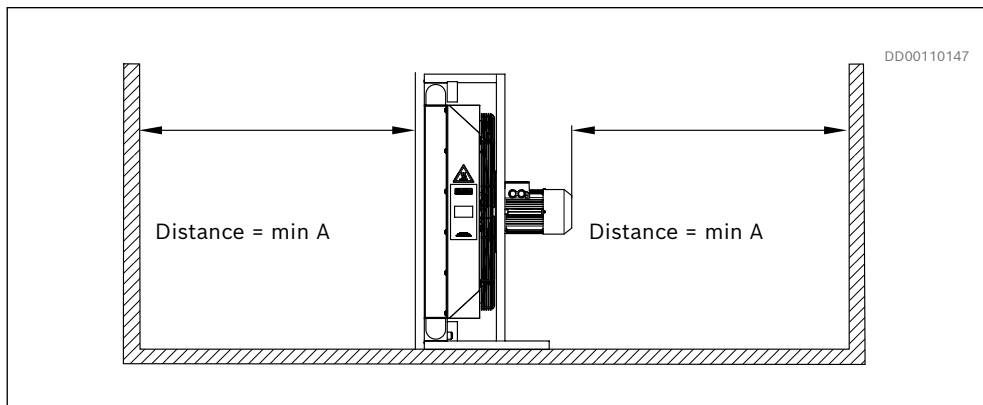


Fig. 15: Recommended minimum space around air-oil cooler

Table 15: Recommended minimum space around air-oil cooler

Cooler size	A	
	mm	in
HDC 030-4	500	19.7
HDC 050-4	772	30.4
HDC 060-4	815	32.1
HDC 080-4	1035	40.7

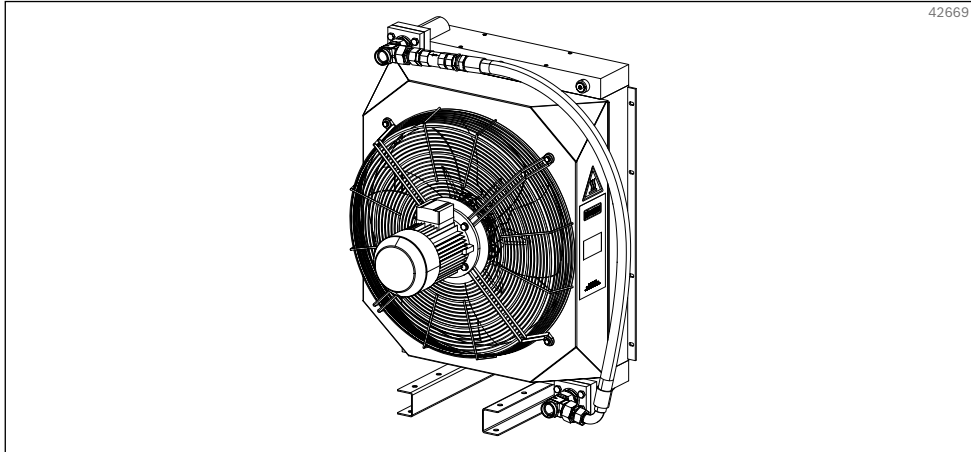


Fig. 16: Mounting of air-oil cooler HDC 080 with by-pass

If by-pass on the cooler is needed (see order specific Hägglunds Fusion documentation). Mount the preassembled by-pass kit (including connectors, check valve and hose) according to *Fig. 16*

Note!

The check valve must always be mounted at the top connection point and notice the flow direction on the check valve

7.5.7 Air breather

When the drive system is delivered oil filled.

1. Clean the area around the air filter breather. See *Fig. 3*
2. Remove the plug and dispose according to environmental regulations.
3. Mount the filter and make sure no foreign material has entered the oil tank.

7.6 Electric connections

NOTICE

The system will not fulfill the functionality

Damage to the customer equipment

- ▶ Installation of electrical equipment must in most countries be installed by licensed electricians (ref. to domestic laws)
- ▶ All electric equipment has to be installed and used by qualified personnel who are familiar with relevant safety requirements and domestic laws.
- ▶ Personal protective equipment necessary for the prevention of accidents at the mounting and operating site shall be provided in accordance with the regulations prevailing in the local country.
- ▶ Grounding shall be carried out according to local regulations before the electric equipment is connected to the main voltage. Grounding point is on the side of the frame see *Fig. 20*.
- ▶ All electrical supply levels must be within the limits that the equipment is constructed for, see order specific Hägglunds Fusion documentation and rating plates.

7.6.1 Control system

All external electrical connections must be connected according to the electrical drawings in the order specific Hägglunds Fusion documentation.

7.6.2 Air-oil cooler

The main voltage and connection are marked on the electric motor marking plate. Y or D Connection is done depending on supply voltage in accordance to *Fig. 19* from MCC (Motor Control Center). The start and stop signal to control the MCC shall be connected according to the order specific Hägglunds Fusion documentation. Check direction of rotation, see air stream arrow in *Fig. 17*

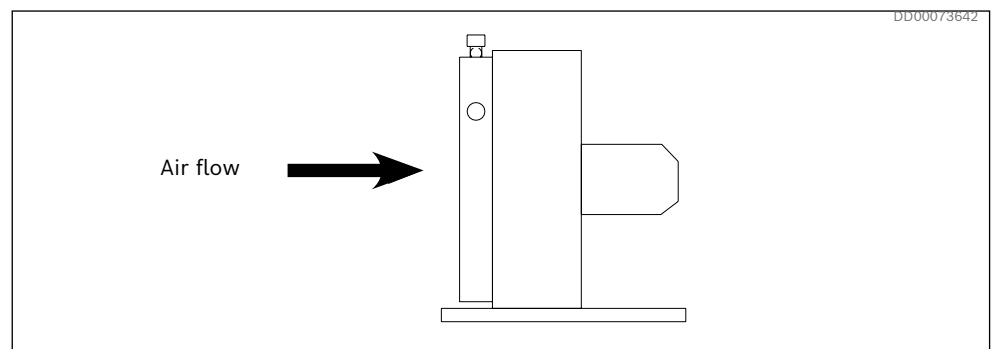


Fig. 17: Air-oil cooler

7.6.3 Electric motor

The main voltage and connection are marked on the electric motor marking plate, see Fig. 18.

Y or D Connection is done depending on supply voltage in accordance to Fig. 19 from MCC (Motor Control Center).

Electric motor must be separately grounded.

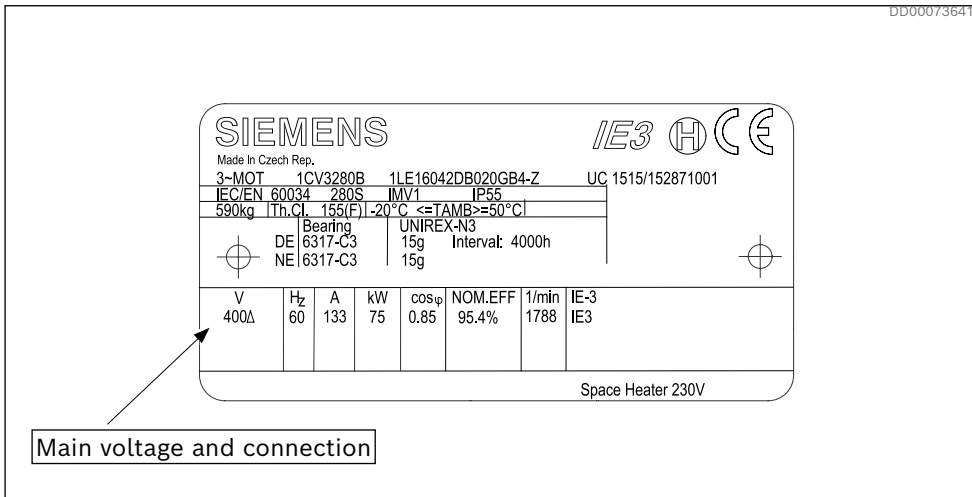


Fig. 18: Example Siemens marking plate

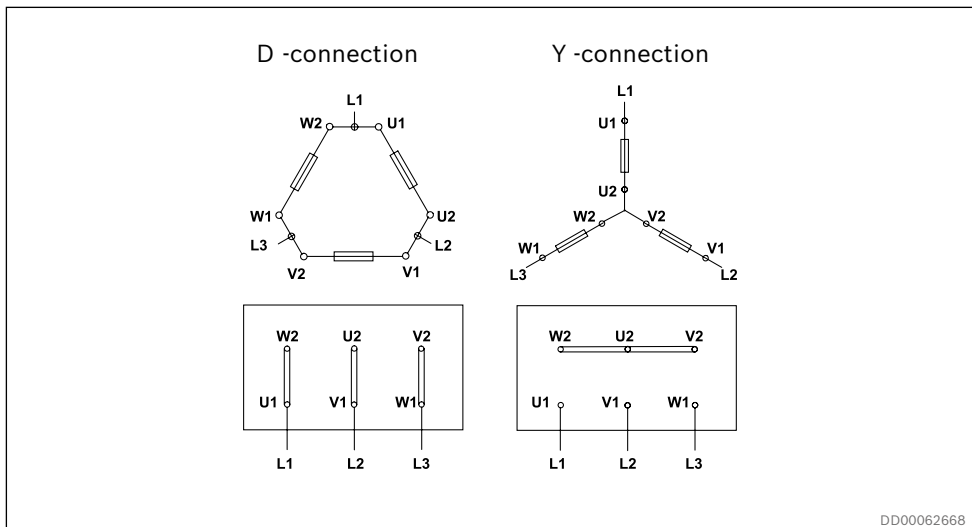


Fig. 19: D and Y connections

7.6.4 Voltage equalization
External grounding

The Hägglunds drive system must be connected to external grounding for voltage equalization. The grounding point of the Hägglunds drive system is on the side of the frame to a M8 bolt. Minimum required cable area for equalization connection is 10 mm² (0.016 in²).

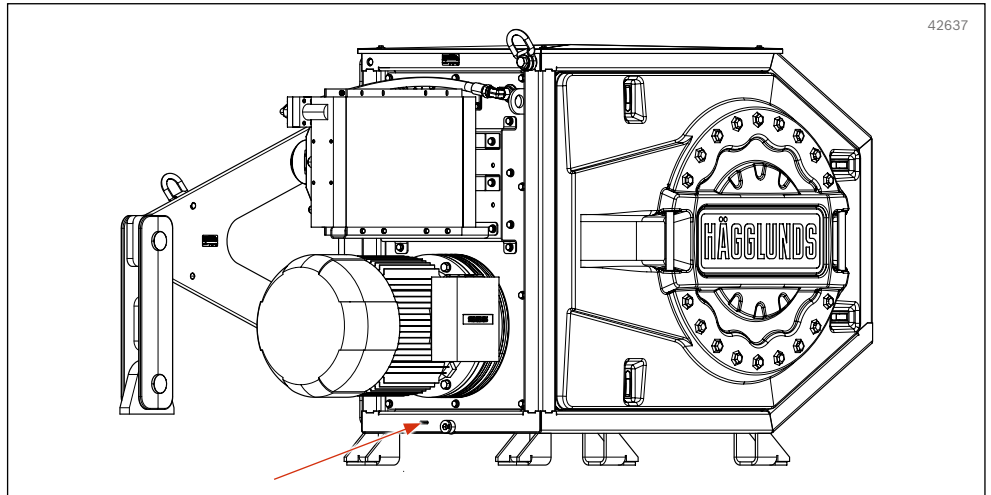


Fig. 20: Grounding point

7.6.5 Cabinet heater (optional)

Heating capacity ¹	Operation voltage	Max current	Setting range ²
1200 W	AC 230 V, 50/60Hz	13.0 A	0 to 60 °C (32° to 140°F)

¹ At 20 °C (68°F) ambient temperature

² Switching difference 7°C ± 4°C (12.6°F ± 7°F).
 Standard settings from Hägglunds 10°C (50°F)

Connect the cables on the screw terminals inside the cabinet heater. Tightening torque 0.8 Nm.(7.1 lbf ·in)

The device must be connected to mains via an all-pole disconnecting device (with contact gap of at least 3 mm in the switched-off state).

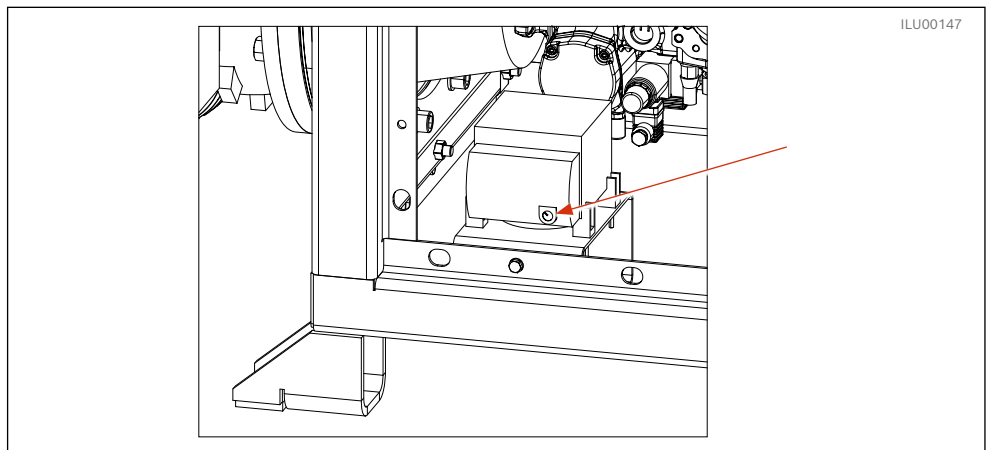


Fig. 21: Setting thermostat

8 Commissioning

NOTICE

Dirt particles!

A hydraulic motor containing particle contamination, having not been sufficiently run-in, is at high risk for damage on the internal sliding surfaces. 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 Before commissioning

General

- Read and understand this complete manual and the other attached technical documentation.
- Visually check the whole system for: signs of damage, incorrect circuitry, security of foundations.
- Check that all hydraulic couplings and plugs are properly tightened to prevent leakage.
- Check that the coupling between the electric motor and pump is properly mounted.
- The accumulator (when required) has to be filled with dry nitrogen to a pressure level in accordance with the attached order specific Hägglunds Fusion documentation (the accumulator is normally precharged to approx. 2 bar (29 psi) at delivery due to transportation safety reason).

NOTICE

The system will not fulfill the functionality

Damage to the customer equipment

- ▶ The accumulator must be charged with dry nitrogen from a bottle equipped with a pressure reducing valve.

Cleanliness

- The external hydraulic system must be thoroughly cleaned on the inside.

Electrical

- Check that electric motor, control system and other electrical components are connected to the correct voltages.
- Check the function of electrical components and monitoring system manually. Instruments that cannot be actuated can be checked for correct wiring and possibly operated manually. Level sensor and indication should be checked when filling up the tank.
- Check interlock of electric motor.
- Check the stop sequence of the system at alarm.

8.2 Filling up the system with hydraulic fluid

If the Hägglunds system is delivered oil filled from manufacturer, this chapter can be disregarded during commissioning if the oil level is ok.

- Do not mix different types of hydraulic fluid.
- Check that the correct type and quality of hydraulic fluid is used, see order specific documentaion for details if filled from manufacturer.
If not filled from manufacturer, select the hydraulic fluid in accordance with the recommendations, see chapter 5.4 and Data sheet [RE 15414 Hydraulic fluid quick reference](#).
- Check that the barrel with hydraulic fluid and tank/hoses are not contaminated with water or other substances.
- Make sure that all fluids have been drained from the motor to prevent accidental mixing with the hydraulic fluid used in the system.
- Fill the motor case with hydraulic fluid via a filter into the drain outlet D2, for minimum oil volumes needed, see *Table 16 and Table 18*.
- If required, fill the pump case with hydraulic fluid via a filter into the drain outlet T2. To prevent unexpected actuation and damage, the stroking chambers must be air bled via the ports X1 and X2.

Use a fluid filling pump unit with a filter rating of $\beta_{10} \geq 75$.



Cleanliness in barrels with new oil is insufficient for the system and must be filtrated before filling the system to avoid problems.

NOTICE

Dirty oil in the system!

Damage on the equipment!

- ▶ Only use the specific filling point in the drive system to fill up the hydraulic system, see *Fig. 2*

Always pump the fluid in through the female quick connection included in delivery. The fluid filled into the system shall be filtered. See *Fig. 22*.

The tank must be filled with oil to the nominal level before starting for the first time, according to *Table 16*. Check the function of the level sensor and indication on the level gauge during filling of the tank.

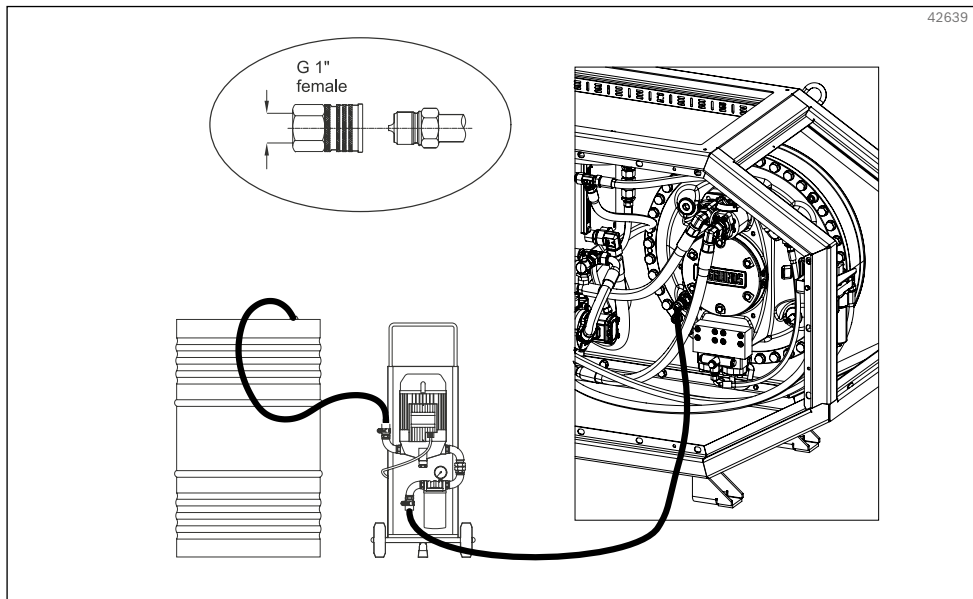


Fig. 22: Oil filling

! WARNING

Leakage of hydraulic oil

Risk of personal injury

- ▶ Check the caution sign on the hydraulic fluid container and the warnings in section 2.
- ▶ Avoid long contact between skin and hydraulic fluid.
- ▶ Remove any spilled oil from the floor, great risk to slip and fall.

Table 16: Oil volume in tank

Inclination	Volume		Nominal level		Signal	Volume		Max level		Signal
	litre	US gal	mm	in		litre	US gal	mm	in	
0°	55	14.5	73	2.87	17.3	60	15.8	44	1.73	18.9
-14°	55	14.5	73 (22)	2.87 (0.86)	17.3	58	15.3	56 (5)	2.20 (0.20)	18.3
+14°	55	14.5	73 (125)	2.87 (4.92)	17.3	58	15.3	56 (108)	2.20 (4.25)	18.3
Inclination	Volume		Warning level		Signal	Volume		Alarm (Stop) level		Signal
	litre	US gal	mm	in		litre	US gal	mm	in	
0°	50	13.2	102	4.02	15.7	44	11.6	136	5.35	13.8
-14°	50	13.2	102 (51)	4.02 (2.01)	15.7	44	11.6	136 (85)	5.35 (3.35)	13.8
+14°	50	13.2	102 (154)	4.02 (6.06)	15.7	44	11.6	136 (188)	5.35 (7.40)	13.8

Distance from top = Distance from float switch flange bottom for threshold level.

Values in () = Distance level seen in visual level gauge see Fig. 23.

Table 17: Volumes for oil gauge levels readings

Inclination	Nominal level		Max level ¹⁾		Warning level		Alarm (stop) level	
	litre	US gal	litre	US gal	litre	US gal	litre	US gal
0°	55	14.5	60	15.8	50	13.2	44	11.6
-14°	64 ²⁾	16.9	67 ³⁾	17.7	59	15.6	53	14.0
+14°	46	12.2	49	12.9	41	10.8	35	9.2

1) Note difference in max level when tilted

2) When the oil volume in the tank is 55 liter (nominal level) will the oil gauge in front show 64 liter. **Note**, above max level 60 liter (max reading oil gauge)

3) When the oil volume in the tank is 58 liter (max level tilted) will the oil gauge in front show 67 liter. **Note**, above max level 60 liter (max reading oil gauge)

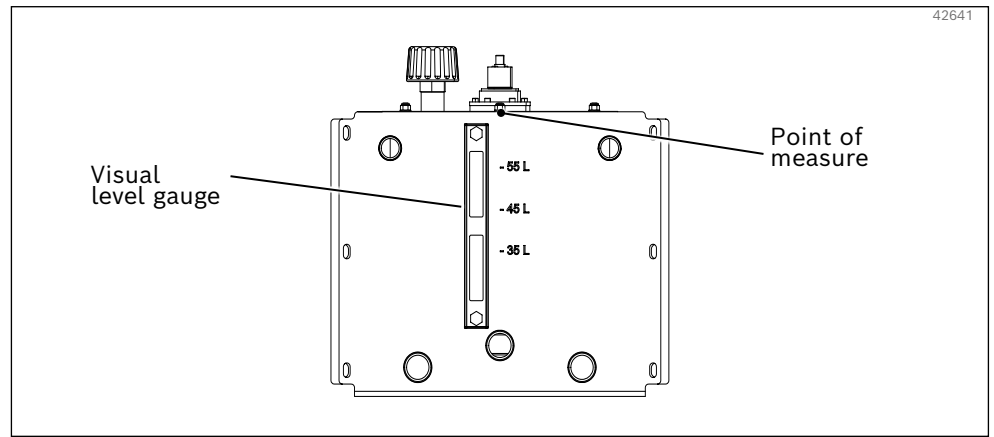


Fig. 23: Point of measure

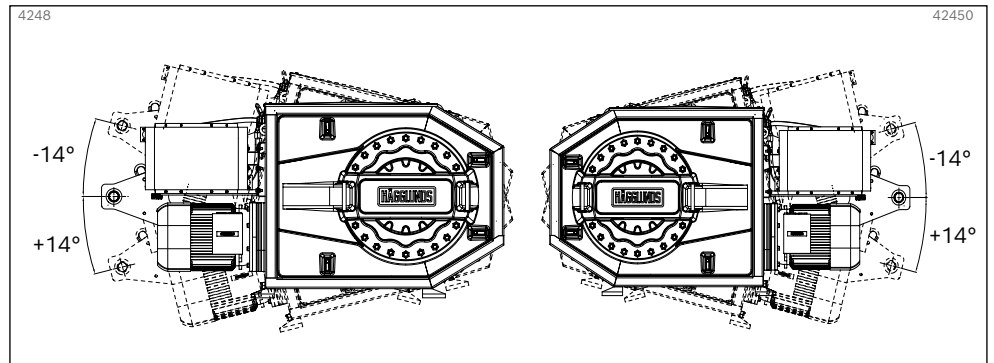


Fig. 24: Alternative positions

Table 18: 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
QMX 280	15	4.0
QMX 400	21	5.5
QMX 560	19	5.0
QMX 800	25	6.6

8.3 Initial start up procedure

Important

- Follow section 2: *Safety instructions*.
- Make sure the driven system and driven machine are ready to run.
- Warn all personnel in the area that the system will be started.
- Never operate the drive system with defective instruments or control elements.
- Keep inflammable materials away from the drive system.
- During start-up period, the hydraulic system will be cleaned from built-in dirt particles, therefore keep an eye on the filter indicator during the entire start up procedure.

STEP 1

Immediately before starting

- Check that the prescribed steps in section 8.1: *Before commissioning* have been carried out.
- Check fluid level in the tank and refill to the nominal level, see 8.2: *Filling up the system with hydraulic fluid*
- Check if any components need filling with clean hydraulic fluid, i.e. motor case.
- Check safety equipment.
- Make sure that all valves on the suction, pressure and inlet side of the pump, as well as any valves on drain lines, are open.
- Check that cooling water is connected and turned on if a water-oil cooler is used.
- For adjustments and settings on the control system (if any) see special instruction in attached order specific Hägglunds Fusion documentation.

STEP 2

Start with unloaded pump at short intervals

Starting of the drive system shall be carried out with a completely unloaded pump in short intervals.

CAUTION

Wrong direction of rotation of the pump

Pump will be damaged. System contaminated

- ▶ Make sure that the pump has the correct direction of rotation. The correct direction of rotation is marked with a sign placed between electric motor and motor plate, see *Fig. 25*.

Rotating parts!

Risk of injury.

- ▶ Do not touch rotating parts inside the inspection hole (see *Fig. 25*) or in the zone of rotating parts.

- When the hydraulic fluid is cold some restarts may be needed to raise the charge pressure.
- Check the charge pressure level and confirm with data and settings in attached order specific Hägglunds Fusion documentation.
- If OK, the pump may be allowed to come on stroke and introduce flow into the unloaded hydraulic system. Check that the charge pressure is still OK.

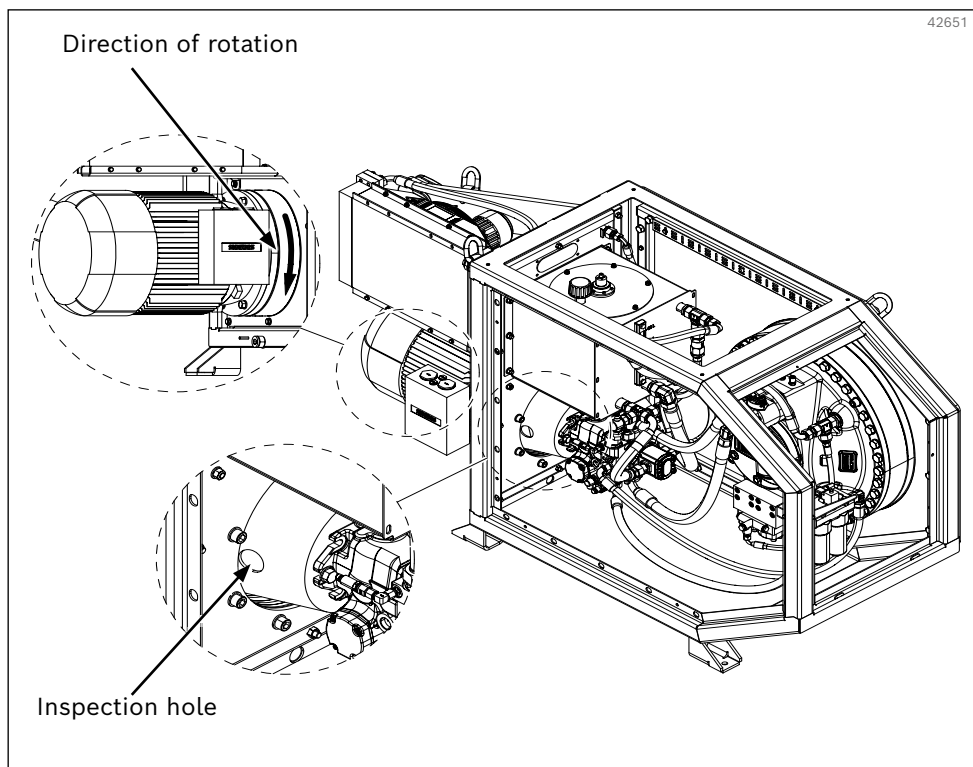


Fig. 25: Direction of rotation

STEP 3

Unloaded pump at longer intervals

- Run for a period at no load condition until system is stable and control is established.
- Check fluid level in the tank.
- Filling up the system with fluid may be needed as parts of the system has been filled up.
- Check for unusual noises or vibrations.
- Check that the specified pressure levels for charge pressure at the drive system are maintained in accordance with the values stated on the hydraulic diagram in the order specific Hägglunds Fusion documentation. These pressure levels are preset at the factory and normally not needed to readjust.
- Check for leakage points.
- Stop the electric motor and correct if any faults discovered on the points above.
- Check all connections, screws etc. and tighten if necessary.
- Restart when finished.

STEP 4

Loaded hydraulic system

- The hydraulic system can be loaded when the hydraulic system functions works satisfactorily in unloaded running condition.
- Gradually increase load until satisfactory operation is obtained.
- It may be necessary at this point to make adjustments to flow, ramp rates, etc.
- Cycle the system until normal operating temperature is reached.
- If system will run with speed feedback, check and adjust feedback regulator parameters.

STEP 5**Check:**

- Unusual noises or vibrations.
- Function of the safety equipment.
- Temp in tank and closed loop. Check also that the cooler control is stable. If not, investigate water supply, controls, air-oil cooler, etc.
- Leakage points.
- Pump compensator pressure control and pressure sensors. At delivery, these pressure levels are set according to the order specific hydraulic diagram and normally no readjustment will be necessary. Pump compensator pressure can be checked by closing the valve on the high pressure leg and stroke the pump until the pressure is indicated on the control system display or on an optional gauge.

STEP 6**After test**

- Correct any faults discovered at the points above.
- Check the filter indicator. It might be necessary to change filter elements due to particles from the piping. When changing filter elements carefully follow the instructions in 9.3: *Filter change* to avoid dirt into the system. If there still is dirt in the system, additional flushing is necessary in order to prevent premature failure of system components.
- Check all connections, screws etc. and tighten if necessary.

8.4 Pump settings and adjustments**8.4.1 Variable displacement pump**

Charge pressure level, high pressure relief valves and pressure compensator are set from factory and there is normally no need for readjustment. Always check the pressure levels in the attached order specific Hägglunds Fusion documentation. Setting of pressures on the pump must be performed by skilled service personnel familiar with the functions and risks involved with the pump. The pressures shall be set during operation of electric motor and with the system at operating temperature. Note that pressures can change with different viscosities

1. Checking and adjust charge pressure

Carry out checking and adjustment at operating temperature. The charge pressure shall be measured at port G.

Size 28 - 56

Note! If the checked values differ from the original settings, please contact your Bosch Rexroth representative in terms of adjusting the settings

Size 71 -125

To adjust the charge pressure the pump shall be in neutral position (zero displacement). Release the lock nut, and adjust the charge pressure to the necessary level by turning the setting screw. The charge pressure shall normally be set to 25 bar (363 psi)

2. High pressure relief valves (HD valves) setting A and B side

For setting levels see the order specific Hägglunds Fusion documentation. The high pressure relief valve setting should be 40 bar [580 psi] > compensator pressure setting. Carry out checking and adjustment at operating temperature. To be able to do checking and / or adjustment, main-port has to be blocked.

Measure the working pressure in both the MA and MB port

To block the pressure cut-off (item 1 in Fig. 26) when testing the high pressure valves, the adjustment screw, with the lock-nut loosened, has to be screwed in **with a max. torque of 2 Nm in the depressurized condition** until the end stop is reached.

Forces larger than 2 Nm bend the spring and spring plate. The pressure cut-off setting can then no longer be guaranteed.

Swivel the pump to a low pump flow in A-side.

Check setting value.

Size 28 - 56

Note! If the checked values differ from the original settings, please contact your Bosch Rexroth representative in terms of adjusting the settings.

Size 71 -125

Adjust the high pressure relief valve on A-side if needed, see Fig. 26

Check setting value (only for a short time due to fast temperature increase)

Change setting values in the depressurized condition.

Then check setting values.

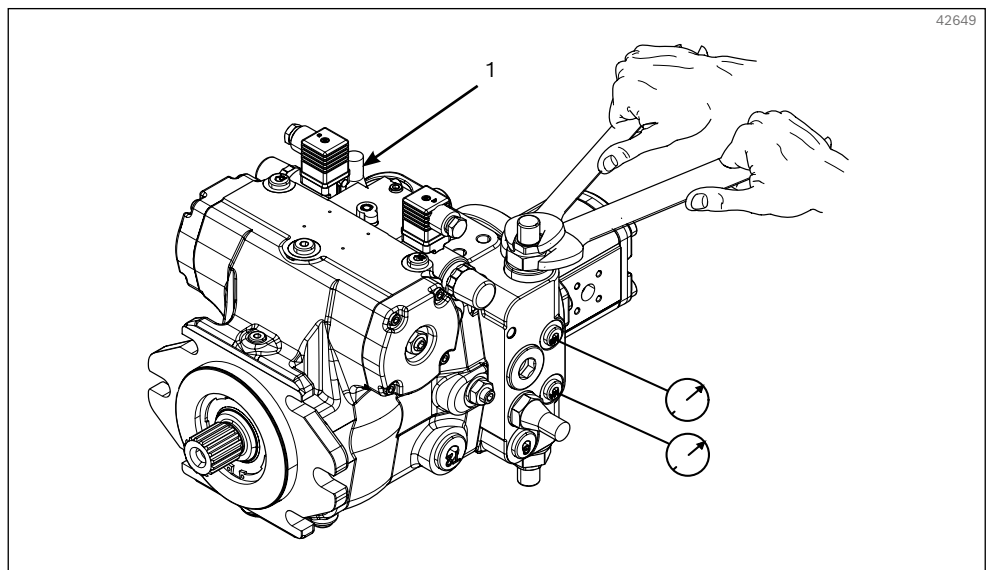


Fig. 26: Setting high pressure relief valve

Valid for all pump sizes

After that do the corresponding procedure on B-side.

Pressure cut-off:

Turn back setting screw to measurement.

Check pressure value and readjust if necessary.

3. Pressure compensator (pressure cut-off) setting

Measure the working pressure in both the MA and MB port

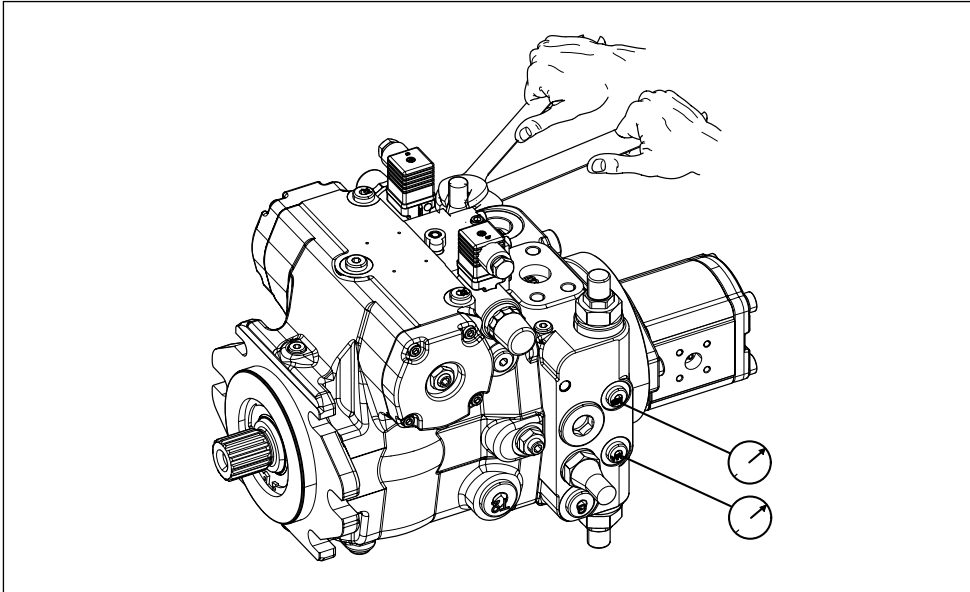


Fig. 27: Setting pressure compensator

Release the lock nut and adjust the setting screw. The pressure compensator shall be adjusted with blocked main-port or blocked actuator. Stroke the pump to about 50% of max flow. Set the compensator pressure to a value according to the order specific Hägglunds Fusion documentation.

4. Manual control of flow on A4VG pump

The A4VG pump flow can be controlled manually with a button on each side of the pump controller. The manual control must be handled with high precaution as this will override all interlock of the drive.

CAUTION

Manual control of pump

Risk of personal injury or damage of equipment

- Use with high precaution

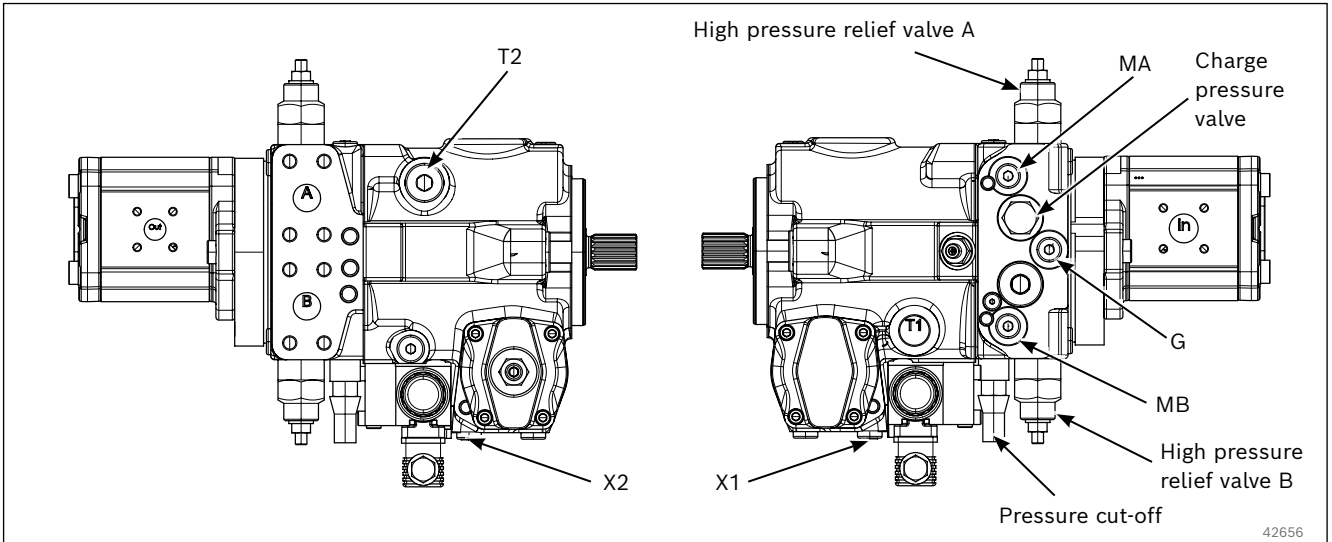


Fig. 28: Pump A4VG28

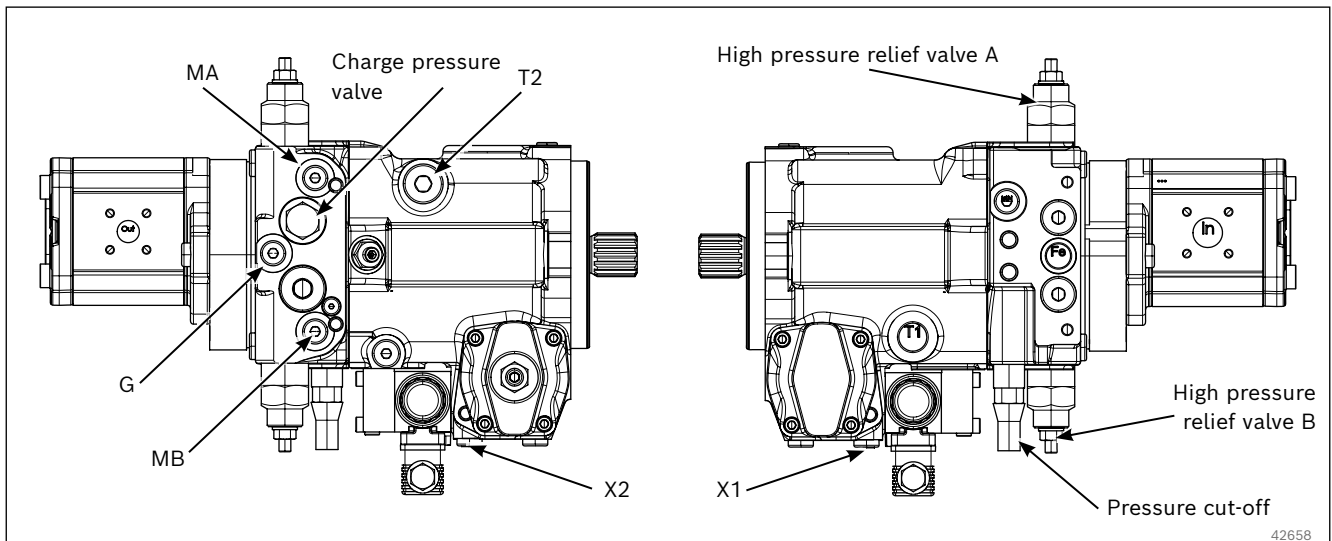


Fig. 29: Pump A4VG40, A4VG56

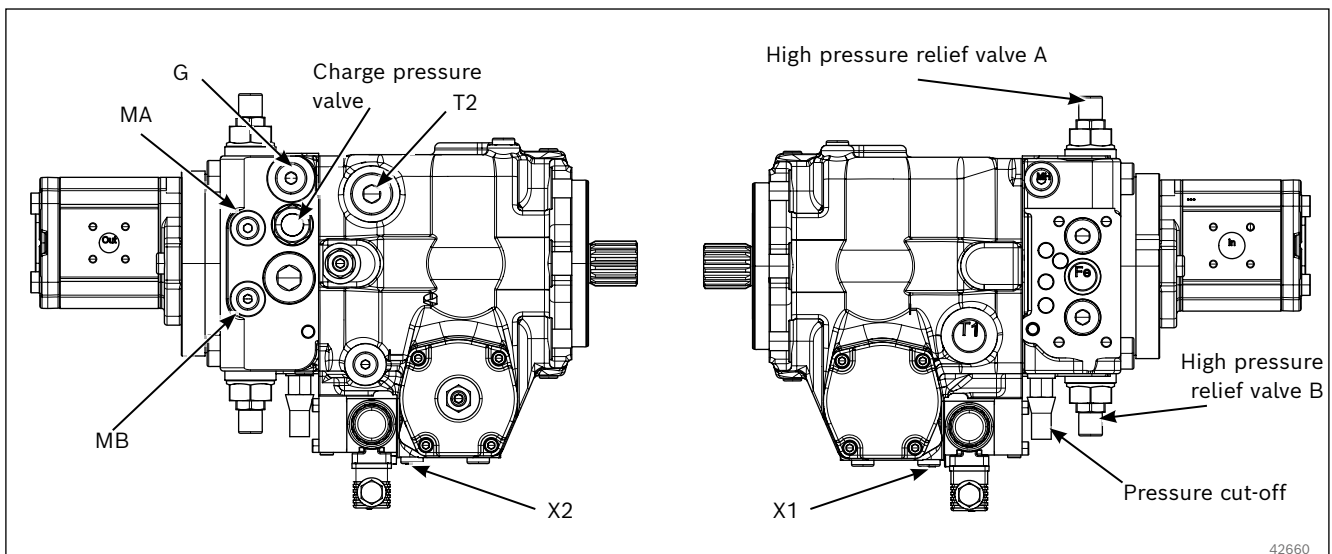


Fig. 30: Pump A4VG71, A4VG90, A4VG125

8.5 Hägglunds BICA Brake

Its important to bleed the brake before start up. For more infomation see [EN 643](#).

9 Maintenance and repair

9.1 Maintenance log

We recommend that a maintenance log is kept to record service/maintenance/repair, addition and alteration of the equipment. Each note, observation or comment should be dated.

9.2 Preventive maintenance

Common

The maintenance of hydraulic systems is designed to prevent failure of the system and to keep the system running efficiently to specification. The specific procedures will depend on the nature of the equipment, the environment it is working in and the duty cycle, bearing in mind the consequences of a breakdown. To optimize the maintenance intervals economically a Life Cycle Cost (LCC) analysis is recommended.

Follow the 2: *Safety instructions* during the checks.

The panels covering the drive system can be dismantled by opening the lever latches or removing the M8 nuts to simplify the access to the components inside the unit.

CAUTION

Drop of panels

Risk of injury.

- ▶ Use two persons when lifting the panels if weight is more than 20 kg (44 lb).

Daily checks, first week after commissioning

- Fluid leaks
- Fluid level in the tank
- Operating temperature
- System pressure
- System performance and general condition
- Unusual noises
- Contamination indicators on the filters

Pre-start checks (even daily)

- Fluid leaks
- Fluid level in the tank

Frequent checks

- Unusual vibrations or noises
- Fluid leaks
- Fluid level in the tank
- The unit is clean
- The air flow paths are not blocked
- Pressure levels normal - stable
- Actuator speeds normal - stable
- Operating temperature
- The drive is running smoothly
- Contamination indicators on the filters
- Check and clean the oil pan

Scheduled maintenance

Planned maintenance at specific time intervals, including the following checks and actions:

- All points under frequent checks
- Check all pressure levels
- Check for stable temperature levels around the system
- Drain water and sludge from the tank at the drain tap
- Check the electric motor
- Check the function of monitoring equipment/switches, etc
- Cleaning.

NOTICE**High pressure washing**

Damage on equipment

- ▶ Never use a high pressure washing system to clean inside the drive system

- Check the cables
- Check drain line flows and drain line oil condition
- Check the hoses, couplings and pump, with respect to cracks, leakages and condition
- Check the shaft coupling through the inspection hole.


CAUTION
Rotating parts!

Risk of injury.

- ▶ Do not touch rotating parts inside the inspection hole see *Fig. 25.* or in the zone of rotating parts.

- Check the cooling water flow
- Check that the cover of the Fusion not are damaged

Table 19: Maintenance chart

Absolute max. intervals for major inspection and replacement	Accumulator	Air inlet**	Oil filters	Air breather on tank	Hydraulic fluid	Ring gear
After the first 100 working hours	-	-	R*	-	-	-
After 3 months or 500 working hours	-	-	R*	-	-	-
Once every 3 months	-	-	-	-	-	-
Once every 6 months	I	I	-	-	I	-
Once every 12 months	-	-	R*	R	-	I

I = Inspection

R = Replacement

* If the contamination indicator is tripped out, the filter must be changed immediately and the oil examined.

** For both electric motor and air oil cooler.

9.3 Filter change

WARNING

High temperature oil /components

Risk of injury

- ▶ Do not open filters that are in operation
- ▶ Use suitable personal protective equipment

Weight of filter bowl

Risk of injury

- ▶ Be careful when dismantling the bowl

Pressurized machine/system

Danger to life or risk of serious injuries, damage to equipment

- ▶ Remove the filter bowl only if it is depressurized
- ▶ Do not exchange the maintenance indicator while the filter is under pressure
- ▶ Do not operate the switching lever during the filter element exchange



When removing a filter element take some time to inspect and look for unusual contamination within the pleats and in the bottom of the filter bowl. Contact your Bosch Rexroth representative for advice.

Single filter

Stop the operation and lockout-tagout electric motor.

1. If filter is equipped with drain plug, loosen the drain plug under the filter bowl to empty from hydraulic fluid. Drain the oil into a clean container to be able to collect eventual contamination particles for analysis. When empty - tighten the drain plug.
2. Change filter cartridge.
It is very important during the mounting not to expose the cartridge to any dirt i.e. keep it in the plastic cover as long as possible.
3. Check the O-ring and the backup ring for damage. Change parts if necessary.
4. Mount the filter bowl. Tighten by hand to stop and back off 1/4:th of a turn.

When removing a filter element take some time to inspect and look for unusual contamination within the pleats. Contact your Bosch Rexroth representative for advice.



Duplex filter

1. Establish which filter side is in operation – look at pictogram on the filter
2. Pull the switching lever away from filter and turn the lever through 90° to change flow direction in the filter housing, see Fig. 31.
3. Open the vent screw (do not unscrew it completely) at the switched off filter side in order to reduce the pressure.
4. If filter is equipped with drain plug, loosen the drain plug under the filter bowl to empty from hydraulic fluid. Drain the oil into a clean container to be able to collect eventual contamination particles for analysis. When empty - tighten the drain plug.
5. Change filter cartridge.
It is very important during the mounting not to expose the cartridge to any dirt i.e. keep it in the plastic cover as long as possible.
6. Check the O-ring and the backup ring for damage. Change parts if necessary.
7. Mount the filter bowl. Tighten by hand to stop and back off 1/4:th of a turn.

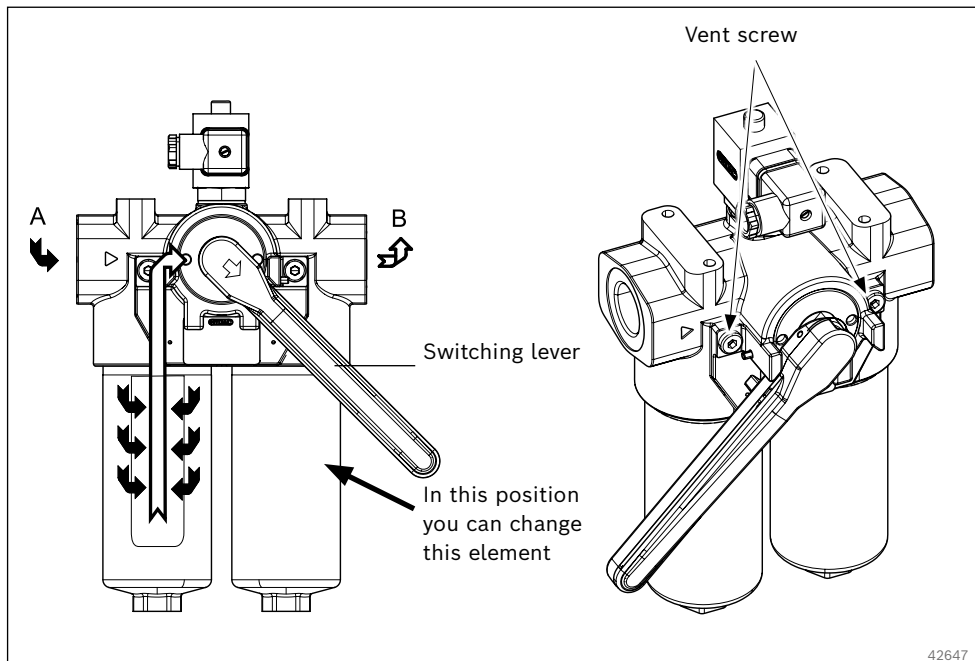


Fig. 31: Duplex filter change

Table 20: Weight filter bowl

Filter size	Weight bowl (dry)		Weight cartridge (dry)	
	Kg	lb	Kg	lb
Single filter 110 (100 bar)	0.6	1.32	0.2	0.44
Duplex filter 110 (63 bar)	0.6	1.32	0.2	0.44

9.4 Inspection of hydraulic fluid

CAUTION

Hot hydraulic fluid.

Risk of injury

- ▶ Use personal protective equipment

NOTICE

Danger associated to hydraulic fluid.

Risk of environmental damage

- ▶ Store used hydraulic fluid and contaminated filter elements for disposal.



Different hydraulic fluids are affected differently - consult the manufacturer.

Oil analysis

The purpose of taking an oil sample is to check the condition of the oil.

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, overhaul, maintenance or repairs, thus saving money on equipment repairs and downtime.

The most used method is to take samples in a special bottle and send it to a fluid laboratory for a analysis to get a report, following a specific international standard. The analysis should cover viscosity, oxidation, water content, particle counting possibly including element analysis of particles.

Another method is to install an inline particle counter direct in your hydraulic system which give you 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 motors should be running at normal operation while the sample is taken.

The cleanliness is extremely important during sampling.

Always use bottles adapted to oil samples, they can be ordered from any fluid analysis laboratory.

Never try to clean your own bottle if you want a true value of the 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.

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

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

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 using the ball valves.

Clean the coupling and the hose carefully.

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

Let minimum 2 l (0,53 gal) of oil flush into a bucket before you fill the bottle.

Remove the cap of the bottle as late as possible and avoid any contamination to be in touch with the cap, bottle or 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 0.2 l (0,053 gal) are needed for a good analysis.

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

Inline measure

The measure can be taken at the mini-mess coupling on the pump low pressure side of the main loop system (MB or MA port depending on the main flow direction). Return flow can be connected to the mini-mess coupling on the hydraulic motor T2 port. Clean the couplings and the hoses carefully before connection.

Connect the hoses according to the particle counter manual.

To get a true value of the contamination, readings have to be stable for 10 min.

9.5 Air filter breather change

1. Clean the area around the air filter breather. See *Fig. 3*
2. Remove the existing filter and dispose according to environmental regulations.
3. Mount a new filter and make sure no foreign material has entered the oil tank.

9.6 Electric motor

9.6.1 Lubrication



For electric motors with regreasing system, relubrication intervals, grease quantity and grease grade are provided on the lubrication plate. Additional data can be taken from the electric motors rating plate see *Fig. 18*.

Grade of grease for standard motors, Unirex N3 - ESSO.

It is not permissible to mix different types of grease.

Procedure

To relubricate the rolling bearings, proceed as follows:

1. Clean the grease nipples at the drive end and non-drive end.
2. Press-in the specified grease and amount of grease according to the data stamped on the lubrication plate.
 - Please observe the information on the rating and lubricant plates.
 - Regreasing should be carried out when the motor is running (max. 3600 rpm).

Specified lubrication intervals are valid for 40° C (104° F) ambient temperature. In case of other conditions, consult the electric motor manual or the lubrication data plate on the electric motor for selection of type of grease and lubrication intervals.

! CAUTION

Grease splash

Risk of injury

- ▶ Check the warning label on the grease cartridge

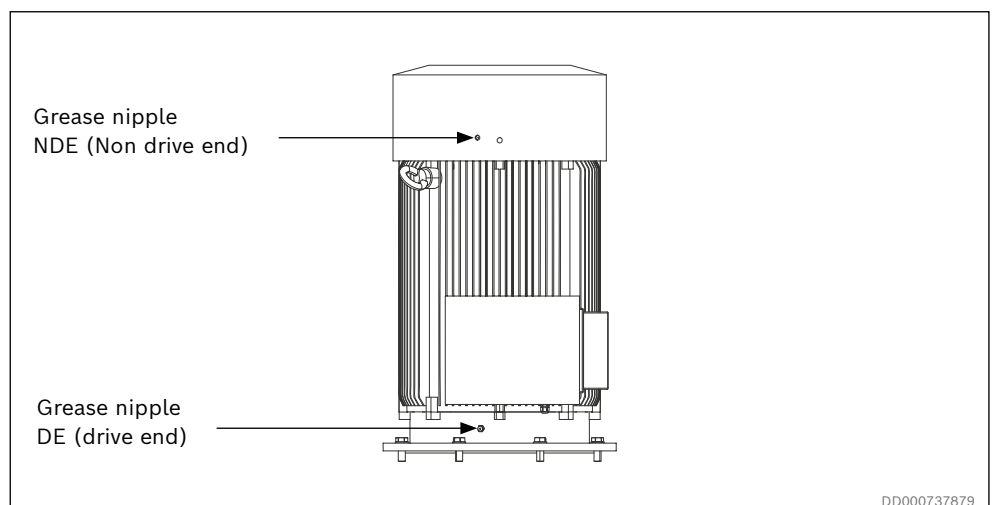


Fig. 32: Grease nipples, electric motor

9.6.2 Air inlet

Check that the air inlets on the electric motor are not clogged by dirt and that air can pass easily.

9.6.3 Draining

The condensate drain holes must be opened at regular intervals, depending on climatic conditions.

NOTICE

Reduction of the degree of protection

Material damage to the electric motor

- ▶ After the condensation has been drained, all of the drain holes must be closed again

9.7 Cleaning of air oil cooler

The cooler has to be cleaned when the temperature in the hydraulic system is above specified limits due to low cooling capacity.

Before cleaning:

- Stop the drive system
- Disconnect the cooler from the main power supply

NOTICE

Improper handling

Environmental risk

- ▶ Follow the safety precautions on the container of the cleaning agent used
- ▶ Cleaning agent and waste water from rinsing should not be disposed in nature

CAUTION

Hot cooler

Risk of burnes

- ▶ Make sure that the air-oil cooler has cooled down

Side of air fins

- The air fins can be cleaned with compressed air. If seriously soiled, cleaning should be done by means of a highpressure cleaner and degreasing agent. The jet should be kept carefully and in parallel with the air fin.

Oil side of cooling element

- The oil side of the cooling element is cleaned by flushing with a degreasing agent. Afterwards flush with the fluid/medium which is used later.

9.8 Drive system out of service

Periods out of service

1. Check system for leaks. All system pipe joints and rotating seals are to be checked to find if any leaks exists. Leaking pipe joint shall be immediately corrected, if possible by tightening. Joints that repeatedly continue to show leakage are to be replaced during off-season maintenance. Leaking rotating shaft seals are remarked in logbook and corrected during the off-season maintenance. A corrective action has to be verified under operation, which means that checking of leaks preferably is done two to three weeks in advance of shut down.

2. Topping up system oil. If necessary system oil shall be filled before the system is shut down for the off-season stop. Doing so means that the oil is well cleaned trough filters before shut down and reservoir bottom silt is avoided.

Note! When system oil is filled, always use the drive system filling connection.

3. Air bleeding. To avoid internal corrosion ensure that components are oil filled. With the hydraulic pump in idling it is recommended to air bleed the pump as well as the hydraulic motor casings in conjunction with the final stop. The pump air bleeding is done at the upper most drain port (T2) on the pump casing by slowly open the hose connection nut and keep open until a smooth oil flow is coming through the threads. Air bleeding can be substituted by adding vapour active anti corrosion agent in to the oil before the planned shutdown. Introduction of such additive shall be done a couple of weeks in advance to the stop. Quantities to be added shall be in accordance with supplier's recommendation.

4. Stopping the drive system. Final shut down is carried out as any normal drive stop only with the exception that before the pump is stopped, in idling mode, the cooling water supply is cut. With this sequence, any risk for cooling water to entrain the oil through the cooler is avoided due to the higher pressure in oil circuit.

5. Check of water in oil. To check status of cooler water leakage, drain some quantity of oil from the tank bottom using the drain cock valve located at tank front. If any water or milk similar oil drain from the tank, it is necessary to locate the leak and correct before next start. If such quantities of water are found, change of oil may also be required.

Take an oil sample to check the condition of the oil, see section 9.4

6. Change of filters. The hydraulic drive is equipped with different filters for hydraulic oil and air breathing of tank. None of these filters are cleanable and has to be changed, see 9.3 and 9.5 In conjunction with changing filter, inspection of the same can be used to monitor status on pump and motor. If the filter surface shows high quantity of wear debris, the reason for this shall be located and corrected. If the debris appears grey, the hydraulic motor wears extensively. Yellow or bronze debris indicates wear in the hydraulic pump.

7. Cleaning of coolers. Clean the coolers acc to section 9.7.

8. Electric motor lubrication. Lubricate acc to section 9.6.1.



Re-commissioning

Before the system is re-started after a long stop period, a check must be done to verify the system function.

Measures to be done:

- Remove preservative fluid and any signs of contamination.
- Follow the procedure in 8.3: *Initial start up procedure*.

9.9 Repair

Bosch Rexroth offers a comprehensive range of services for the repair of Hägglunds products.

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

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

In the event of questions regarding repairs, contact your Bosch Rexroth representative.

9.10 Flushing after repair

There is no need for flushing of a Fusion drive unit when its delivered new from the manufacturer!

9.10.1 Cleaning of system after break down

If something has happened in the system during operation, that may have produced some kind of contamination. E.g. pump failure. All components in the hydraulic system has to be taken apart, inspected and cleaned thoroughly.

A pressure filter and check valve has to be connected to the main line at the Drive system. This filter is connected on the return side of the drive pump.

Recommended filtration degree $\beta_{10} \geq 75$.

The size of the flushing filter should be matched to the installed pump, so that the pressure drop across the filter is not excessive and that the max. pressure/flow ratings for the filter is not exceeded.

The main lines should be connected together at the motor side enabling the entire system to be flushed, see *Fig. 33*.

If the system is not fitted with a flushing line to the hydraulic motor, the drain line from the motor has to be plugged.

If the system is fitted with a flushing line to the hydraulic motor, the flushing line shall be connected to the drain line of the motor to enable cleaning of the flushing line.

! CAUTION

Wrong direction of rotation of the pump

Pump will be damaged. System contaminated

- ▶ Make sure that the pump has the correct direction of rotation. The correct direction of rotation is marked with a sign placed between the electric motor and motor plate see *Fig. 25*.

Rotating parts!

Risk of injury.

- ▶ Do not touch rotating parts inside the inspection hole see *Fig. 25*. or in the zone of rotating parts.

The maximum flow from the drive system should be flushed through the main circuit for at least 2 hours. Use extreme caution to ensure pump is stroked in sync with free flow direction of check valve. Use a check valve sized for the oil flow. When using the main pump the maximum pressure should be reduced. After cleaning and flushing of the system, particle content has to be verified with oil sample test, inline cleanliness measurement or corresponding. High cleanliness is important for long lifetime of the hydraulic system.

In the event of questions regarding repairs, contact your Bosch Rexroth representative for advice.

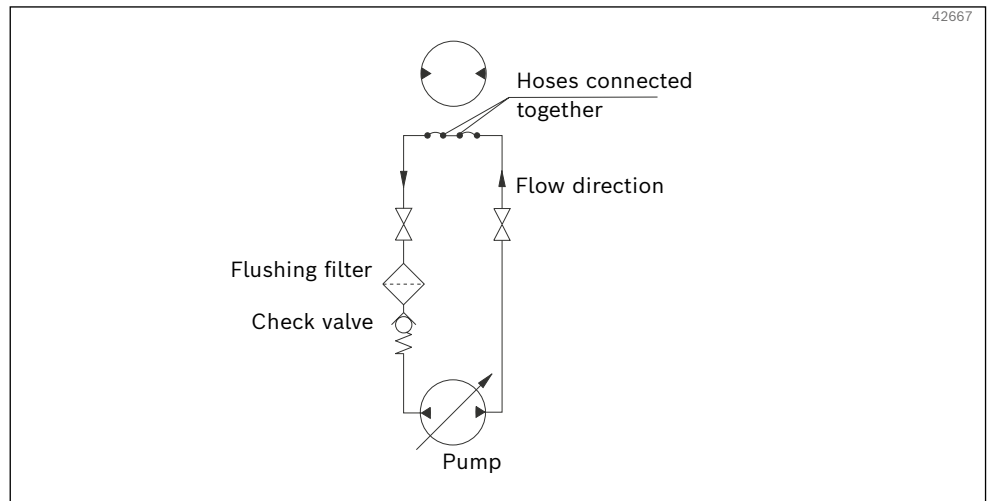


Fig. 33: Hydraulic circuit flushing

9.11 Spare parts

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

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 Hägglunds product, otherwise the functional reliability of the Hägglunds product can not be assured and you lose your warranty entitlement.

Recommended spare parts (typical example).

For exact spares and material numbers, see order specific documentation

Commissioning/startup spares:

- Filter insert
- Ring gear (motor/pump coupling)
- Air filter (tank)

Operational/essential spares:

- Filter insert
- Ring gear (motor/pump coupling)
- Air filter (tank)
- Proportional solenoid (pump)
- Temperature and level sensor (tank)
- Control unit
- Pressure transducer (work pressure)
- Pressure transducer (charge pressure)
- Speed encoder
- Cabinet heater
- Shaft coupling
- Accumulator

Capital/insurance spares:

- Hydraulic motor
- Axial piston pump (main pump)
- Hy-gear pump (auxillary pump)
- Asynchron.motor 3-phase
- Air-oil cooler
- Articulated connection
- Brake

10 Removal and replacement

10.1 Required tools

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

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

10.2 Common

Before removing any hydraulic/electric components, disconnect the entire system as described in the instruction manual for the machine. Relieve pressure in the hydraulic system according to the instructions of the machine manufacturer. Make sure that the relevant system components are not under pressure or voltage. Make sure that the electric motor power is disconnected and locked and that no energy is accumulated in the system. Follow instructions in chapter 2: *Safety instructions*

Before disassembly:

- Clean all assemblies and components.
- Take all precautions necessary to prevent dirt entering the system.
- Disassembly shall only be done by professional service personnel.

DANGER

Danger from suspended loads!

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

Improper transportation may cause the Hägglunds drive system 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 drive system 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!

- ▶ 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.

Disassembly:

- Label the parts
- Protect easily damaged parts and machined surfaces.
- Inspect all parts during disassembly for wear or damage.
- If hydraulic fluid will be drained and reused, make sure that drain containers are clean and covered when not in use.
- Clean all metal parts with a suitable solvent and set aside on a clean and lintfree cloth to drain.

For details regarding removal from customer shaft see Installation and Maintenance manuals; [RE 15428-WA-A Hägglunds Quantum](#) respectively [RE 15305-WA Hägglunds CA](#)

Reassembly:

- Replace all seals, gaskets and o-rings with new items of the correct size and lubricate with system hydraulic fluid before assembly.
- Refill hydraulic fluid according to section 8.2: *Filling up the system with hydraulic fluid*

11 Disposal



WARNING

Danger when dismantling, components may contain accumulated energy

Risk of injury

- ▶ Check that the drive system is completely disconnected.
- ▶ Check pressure in the accumulator (if applicable).
- ▶ Take the fire hazard into consideration during dismantling.

11.1 Environmental protection

Always dispose of the Hägglunds Fusion, the hydraulic fluid and the packaging material in a way that will not lead to pollution of the environment.

Observe the following points when disposing of the Hägglunds Fusion:

1. Completely drain the system from fluid.
2. Dispose of the packaging material in accordance with the national regulations in your country.
3. Dispose 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 Fusion into its individual parts and properly recycle these parts separate according to material type, for instance:
 - Cast iron
 - Steel
 - Aluminum
 - Non-ferrous metal
 - Electronic waste
 - Plastic
 - Seals
5. The main materials for respective component is to be found in the data sheet [RE 15345 Hägglunds Fusion](#).
Dispose material in accordance with the national regulations in your country.

12 Extension and conversion

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

13 Troubleshooting

Please, contact your nearest Bosch Rexroth representative.

Causes Of Trouble And Its Effect In The Hydraulic Installation					
Source of trouble, (effects)	Mechanical Drive	Suction Line	Pump	Pressure Line	Return Line
Excessive noises	<ol style="list-style-type: none"> 1. Coupling wrongly aligned 2. Coupling loose 3. Coupling defective 4. Loose mounting on pump and/or motor 5. Other transmission elements loose. 6. Pump or motor defective 7. Direction of rotation wrong 	Suction line resistance excessive because: <ol style="list-style-type: none"> 1. Suction line blocked or leaking 2. Suction line has wrong dimensions (ie pipe bore), or too many bends. 3. Fluid level too low 	<ol style="list-style-type: none"> 1. Pump is running too fast 2. Maximum pump pressure exceeded 3. Boost pump defective 4. Shaft seals, or seals on suction side are defective 5. Pump defective 6. Pressure and return lines connected wrongly 7. Control system oscillating 8. Noise dampening not incorporated in design 	<ol style="list-style-type: none"> 1. Line mounts missing or loose 2. Poor installation 3. Pipe bore too small 4. Installation not bled completely 	<ol style="list-style-type: none"> 1. Line mounts missing or loose. 2. Poor installation 3. Pipe bore too small 4. Installation not bled 5. Return terminates above fluid level
Insufficient power and torque at the hydraulic motor (pressure too low)	<ol style="list-style-type: none"> 1. Power transmission defective 3. Direction of rotation wrong 4. Motor defective 5. Key sheared at pump or motor 		<ol style="list-style-type: none"> 1. Internal leakages due to wear 2. Unsuitable type 3. Pump defective 4. End-of-control pressure set too low, or control element defective 	<ol style="list-style-type: none"> 1. Leakages 2. Excessive line resistance 3. Pressure filter blocked 	<ol style="list-style-type: none"> 1. Excessive line resistance
Jerky motor movements. (variations in pressure and/or flow)	<ol style="list-style-type: none"> 1. Coupling wrongly aligned 2. Coupling loose. 3. Coupling defective 4. Loose mounting on pump and/or motor 5. Other transmission elements loose 6. Pump or motor defective 7. Direction of rotation wrong 	Suction resistance is excessive: <ol style="list-style-type: none"> 1. Suction line blocked or leaking 2. Suction line is sized wrong 3. Fluid level too low 	<ol style="list-style-type: none"> 1. With variable pumps, the control system is defective 2. Pump defective 3. System conditions react on the pump control system 4. Unsuitable pilot valve 	<ol style="list-style-type: none"> 1. Installation not bled completely 	<ol style="list-style-type: none"> 1. Excessive line resistance
Foaming of the hydraulic fluid		<ol style="list-style-type: none"> 1. Suction line leaks 2. Fluid level too low 3. Wrongly designed reservoir. 	<ol style="list-style-type: none"> 1. Shaft seals on the suction side are defective. 2. Case drain line terminates above the fluid level. 		<ol style="list-style-type: none"> 1. Return line terminates above the fluid level. 2. Vortex effect due to wrongly positioned lines

Causes Of Trouble And Its Effect In The Hydraulic Installation

Pressure Valves	Flow Control Valves	Directional Control Valves	Fluid	Motor	Others
<ol style="list-style-type: none"> 1. Valve chatter due to dirt on valve seal 2. Insufficient damping (unsuitable flow) 3. Flow noises when operating 4. Unsuitable characteristic curve 5. Wrong design 	<ol style="list-style-type: none"> 1. The valve oscillates and excites other control elements into oscillation 2. Flow noises 3. Control system oscillating 	<ol style="list-style-type: none"> 1. Valve chatters due to defective solenoid or the voltage is too low 2. Valve defective due to dirt or wear 3. Flow through valve is excessive 4. Pilot pressure variations 5. On valves with adjustable damping the adjustment has not been performed 6. Check the electrical controls 	<ol style="list-style-type: none"> 1. Cavitation problems due to low fluid level or viscosity too high. (fluid temperature is too low) 2. Fluid is contaminated and dirty leading to damage and blockage of equipment 3. Fluid foams 	<ol style="list-style-type: none"> 1. Wear of running surfaces 2. Control system oscillating 	
<ol style="list-style-type: none"> 1. Operating pressure set too low 2. Internal leakage due to wear 3. Dirty or damaged valve seat 4. Broken spring 5. Unsuitable type. (setting too low) 	<ol style="list-style-type: none"> 1. Pressure losses excessive 2. False setting 3. Valve defective 4. Unsuitable type 	<ol style="list-style-type: none"> 1. Wrong switched position (eg pressureless) 2. Solenoid defective 3. Internal leakage due to wear 4. Excessive fluid velocity 5. Spool jams 	<ol style="list-style-type: none"> 1. Viscosity too low, causing excessive leakage. 2. Viscosity too high causing excessive flow resistance 3. Fluid foams. 	<ol style="list-style-type: none"> 1. Internal Leakage 2. Wear or running surfaces 3. Excessive internal friction causing low efficiency 	<ol style="list-style-type: none"> 1. In the case of pressure controls there is a defect in the open (or closed) loop control circuit 2. Display instruments are defective
<ol style="list-style-type: none"> 1. Valve chatter due to dirt on valve seat or valve worn 2. Insufficient damping (unsuitable type) 3. Excessive length of undamped remote control line 4. Unsuitable remote- control valve 	<ol style="list-style-type: none"> 1. Valve dirty 2. Pressure losses excessive 	<ol style="list-style-type: none"> 1. Valve chatters due to defective solenoid or the voltage is too low 2. Valve defective due to dirt or wear 3. Flow through valve is excessive 4. Pilot pressure variations 5. Adjustable damping on valves, has not been set 6. Check the electrical controls. 	<ol style="list-style-type: none"> 1. Hydraulic fluid dirty 2. Hydraulic fluid foams. 	<ol style="list-style-type: none"> 1. Stick-slip effect due to friction 2. Operation below minimum recommended motor speed. 	<ol style="list-style-type: none"> 1. Insufficient load counter-balance (eg lowering control valve)
			<ol style="list-style-type: none"> 1. Unsuitable fluid for the duty. 		

Causes Of Trouble And Its Effect In The Hydraulic Installation					
Source of trouble, (effects)	Mechanical Drive	Suction Line	Pump	Pressure Line	Return Line
Power Take-off either does not turn at all or too slowly. (no delivery flow or insufficient delivery flow)	<ol style="list-style-type: none"> 1. Coupling wrongly aligned. 2. Coupling loose. 3. Coupling defective. 4. Loose mounting on pump and/or motor. 5. Other transmission elements loose. 6. Pump or motor defective. 7. Direction of rotation wrong. 	Suction resistance is excessive: <ol style="list-style-type: none"> 1. Suction line blocked or leaking. 2. Suction line is sized wrong. 3. Fluid level too low. 	<ol style="list-style-type: none"> 1. Internal leakage due to wear. 2. Pump defective. 3. Inlet and return lines wrongly connected. 	<ol style="list-style-type: none"> 1. Leakages. 2. Excessive line resistance. 3. Pressure filter blocked. 	<ol style="list-style-type: none"> 1. Excessive line resistance.
Excessive operating temperature			<ol style="list-style-type: none"> 1. Reduction in efficiency due to wear. 2. With variable pumps, the pump control system is defective. 3. Rotational speed and/or delivery excessive. 	<ol style="list-style-type: none"> 1. Pipe bore is too small, causing high frictional resistances. 2. Pressure filter blocked. 	<ol style="list-style-type: none"> 1. Pipe bore is too small, causing high frictional resistances.
Line shocks when switching takes place.				<ol style="list-style-type: none"> 1. Line mounts are missing or loose. 2. Poor installation. 3. Pipe bore too small. 4. Installation not bled. 5. Oil volume in lines is excessive 	<ol style="list-style-type: none"> 1. Lines loose.
The pump switches on and off too often.			<ol style="list-style-type: none"> 1. Pump defective. 		

Causes Of Trouble And Its Effect In The Hydraulic Installation					
Pressure Valves	Flow Control Valves	Directional Control Valves	Fluid	Motor	Others
1. Operating pressure set too low. 2. Internal Leakage due to wear. 3. Dirty or damaged valve seat. 4. Broken spring. 5. Unsuitable type (setting range too low)	1. Flow rate set too low. 2. Unsuitable valve type (operating range too low). 3. Valve blocked due to dirt.	1. Wrong switched position. 2. Solenoid defective. 3. Internal leakage due to wear. 4. Excessive fluid velocity. 5. Spool jams or sticks. 6. Manually operated valves are not open.	1. Viscosity too low, causing excessive leakage. 2. Viscosity too high, causing excessive flow. 3. Fluid foams.	1. Internal leakage. 2. Wear of running surfaces. 3. Excessive internal friction, causing low efficiency. 4. Seizure in Hydraulic motor.	1. Conditions for starting not fulfilled. 2. Electrical lines open circuit 3. Signalling elements, such as pressure or limit switches, are defective, wrongly set, or not connected.
1. Constant delivery flow is too high. 2. Undersized valve. 3. Pressure setting too high. 4. Response time too long.	1. Flow rate set too low (excessive pump delivery through pressure-relief valve). 2. Valve defective.	1. Leakage losses too high. 2. Pressure less oil circulation if used, fails to switch on. 3. Spool sticking.	1. Viscosity too low, causing excessive leakage. 2. Viscosity too high, causing excessive flow resistance. 3. Fluid foams.	1. Losses in efficiency due to wear. 2. Internal friction too high (poor level of efficiency). 3. Internal leakage losses.	1. Cooling performance inadequate. 2. Pressure less oil circulation when the pump is running. 3. Insufficient hydraulic fluid. 4. Coolant valve failed. 5. Thermostat set too high. 6. Fan not switched on. 7. Ambient too high. 8. Deposits in radiator.
1. Valve switches too quickly. 2. Restrictors or orifices are damaged or missing.		1. Switching time set too short. 2. Unsuitable type of valve (the opening cross-sectional area changes too quickly).	1. Foaming of the hydraulic fluid.	1. Excessive masses or forces. 2. No damping.	
1. Sequence valve or shut-off valve has wrong setting.					1. Pressure switch differential set too low. 2. Pressure switch set incorrectly.

14 Technical data

14.1 Weights

Total weight of the drive system

The total weight of the drive system, is marked on the product identification located on the cabinet frame, see *Fig. 2*.

Table 21: Weight hydraulic motor

Hydraulic motor frame size	Weight			
	Splines		Shrink disc coupling	
	kg	lb	kg	lb
CA 50	175	437	203	447
CA 70	205	450	232	512
CA 100	265	584	310	683
CA 140	305	672	347	765
CA 210	395	870	456	1005
QMX 280	705	1555	800	1760
QMX 400	1060	2335	1160	2555
QMX 560	1115	2450	1290	2840
QMX 840	1445	3185	1620	3570

Table 22: Weight torque arm

Hydraulic motor frame size	Weight	
	kg	lb
CA 50	360	794
CA 70	355	783
CA 100	350	772
CA 140/CA 210	360	794
QMX 280/QMX 400	370	816
QMX 560/QMX 840	330	728

Table 23: Weight pump

Pump cc	Weight	
	kg	lb
28	39	86
40	41	90
56	48	106
71	60	132
90	65	143
125	85	187

Table 24: Weight electric motor

Electric motor kW	Weight	
	kg	lb
11	80	176
15	110	243
18.5	170	375
22	190	419
30	240	529
37	285	628
45	340	750
55	420	926
75	620	1367

Table 25: Weight air-oil cooler

Air-oil cooler type	Weight	
	kg	lb
HDC 030-4	24	53
HDC 050-4	38	84
HDC 060-4	62	137
HDC 080-4	102	225

Table 26: Weight panels

Panels	Weight	
	kg	lb
Front panel	12	26
Top panel (M)	13	29
Top panel (L)	16	35
Side panel (M)	12	26
Side panel (L)	14	31

Table 27: Weight BICA brake

Brake size	Weight	
	kg	lb
BICA 13	87	192
BICA 24	175	385
BICA 37	210	462
BICA 48	210	462
BICA 64	310	682
BICA 90	310	682
BICA 134	570	1254
BICA 160	593	1307

15 Declaration of Incorporation



Declaration of Incorporation - Original
 As defined by the EC Machinery Directive 2006/42/EC, Appendix II B

Doc. No.: RB09776744
 Date: 2024-02-19

The manufacturer

Bosch Rexroth AB

hereby declares that the partly completed machinery

Name: **Hägglunds Fusion**
 Function: **Hydraulic Drive System**
 Model: **HD-FNX**
 Type: **HD-FNX including Control Systems**
 Serial number: **02000000001 - 02999999999**
 Trade name: **Hägglunds Fusion**

satisfies the following essential requirements of Machinery Directive 2006/42/EC in accordance with the chapter numbers in Appendix I:

General principle no. 1.												
1.1.2	1.1.3	1.1.5	1.2.1	1.2.3	1.2.4.1	1.2.4.2	1.3.1	1.3.2	1.3.3	1.3.4	1.3.6	1.4.1
1.5.1	1.5.2	1.5.4	1.5.13	1.5.14	1.5.15	1.6.1	1.6.2	1.6.3	1.6.5	1.7.1	1.7.2	1.7.4
1.7.4.1	1.7.4.3											

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The requirements are fulfilled provided that the data in the product documentation (fitting instructions, operating instructions, project management and configuration documents) are implemented by the product user. The requirements of Appendix I to Machinery Directive 2006/42/EC not mentioned here are not applied and have no relevance for the product.

It is also declared that the special technical documents for this partly completed machinery have been compiled in accordance with Appendix VII, Part B. These are transferred on request to the market surveillance body in paper-based/electronic format.

Conformity with the provisions of further EU Directives, Standards or Specifications:

SS-EN ISO 4413 EMC Directive 2014/30/EU
 SS-EN ISO 12100 Low Voltage Directive 2014/35/EU
 SS-EN 60204-1

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The partly completed machinery may only be put into operation when it has been established that the machine into which the partly completed machinery is to be incorporated conforms to the provisions of EC Machinery Directive 2006/42/EC, where relevant according to this directive.

The individual below is authorized to compile the relevant technical files:

Name: Daniel Kajhager, Head of Engineering, DC-HD/ENG
 Address: Västerselsvägen 12, S-895 80 Mellansel

Mellansel, dated 6/3-24
 Place Date Daniel Kajhager, DC-HD/ENG Karl Lindblom, DC-HD/GP

We reserve the right to make changes to the content of the Declaration of Incorporation. Current issue on request.

HÄGGLUNDS

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Häggglunds is a brand of Rexroth, a leading global supplier of drive and control technologies. Häggglunds solutions enrich a comprehensive Rexroth portfolio.

We reserve the right to make changes, these could pertain to this document and/or the product

RE 15345-WA, Version: 04.2024

