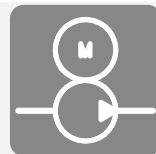


Servo hydraulic power pack type HS 120

Assembly instructions

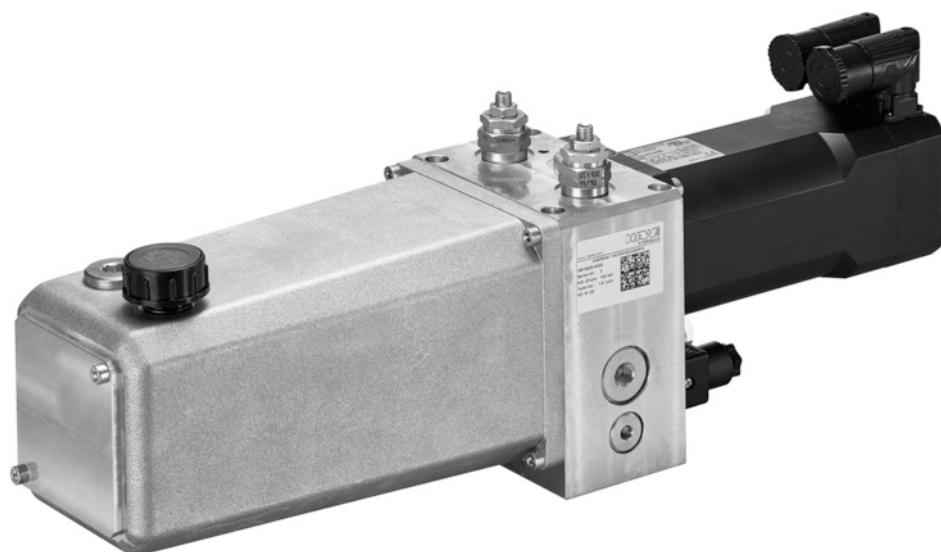


Operating pressure p_{\max} :

150 bar

Flow rate Q_{\max} :

8.9 lpm



(Translation of the original instructions)

B 6347

07-2022 -1.0 en

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HYDRAULIK

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1 About these instructions

This manual is part of the product and describes the safe and proper use in all operating phases.

All photos and drawings in this manual show an available product variant. For precise details concerning the variant you have purchased, please refer to the type plate attached to the product.

-  ▶ Read instructions before use.
- ▶ Make the manual accessible to operating and maintenance personnel at all times.
- ▶ Keep this manual for the lifetime of the product.
- ▶ Only pass on the product to third parties together with this manual.

1.1 Target audience

The target audience of this manual is trained and qualified personnel who are familiar with the installation, operation and maintenance of machines.






The manual provides relevant information for the machine manufacturer and machine operator as well as for training courses.

You can request further information on the product at: HAWE Hydraulik SE, Einsteinring 17, 85609 Aschheim/Munich, Germany.

1.2 Safety instructions and symbols

Safety indication





In these instructions, the following warning and safety notes are used:

Symbol	Meaning
	Draws your attention to a hazardous situation that can lead directly to serious injury or death if not avoided.
	Draws your attention to a hazardous situation that can indirectly lead to serious injury or death if not avoided.
	Draws your attention to a hazardous situation that can indirectly lead to light to moderate injury if not avoided.
	Notice to prevent environmental and material damage.
	Information to ensure the correct use of the product.

Safety symbols

	General safety symbol Draws your attention to additional safety information.		
	Slipping hazard		Dragging hazard from moving parts
	Harmful substances		Tripping and falling hazard
	Fire accelerants		Falling loads
	Burn hazard		Crushing hazard
	Electrical voltage		Suspended loads
	No access to persons with pacemakers and defibrillators		

Mandatory signs

Protective equipment	
	Safety boots Wear appropriate safety boots to protect your feet against mechanical hazards
	Work gloves Wear suitable work gloves to protect your hands against chemical and mechanical hazards.
	Safety goggles Wear safety goggles to protect your eyes against chemical and mechanical hazards.
	Protective clothing <ul style="list-style-type: none"> ▶ Wear fitted clothing without protruding parts. ▶ Follow the safety data sheet of the hydraulic fluid.

1.3 Applicable documents

Standards	Designation
2006/42/EC	Machinery Directive
2014/30/EU	EMC Directive
2011/65/EU, RoHS	Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment
DIN 51524	Pressure fluids - Hydraulic oils - Part 1: HL hydraulic oils, Minimum requirements
ISO 4406	Hydraulic fluid power. Fluids. Method for coding the level of contamination by solid particles
DIN EN ISO 4413	Hydraulic fluid power - General rules and safety requirements for systems and their components
Documents	
D 5488/1	Oil recommendations
D 6347	Data sheet for servo hydraulic power pack type HS 120

The product is built according to the state of the art and recognized safety regulations.

Nevertheless, there is a risk of personal injury and damage to property if this chapter and the safety instructions in this manual are not observed.

2.1 Intended use

- The product is a technical work tool and intended for commercial and industrial use only.
- The product may only be operated in accordance with the technical data, operating conditions and performance limits specified in this manual.
- Only use original accessories and original spare parts approved by the manufacturer.
- The product must be used indoors.
- The hydraulic power pack is only allowed to be operated with the servo synchronous motor specified in this manual or an appropriate customer-specific servo synchronous motor.



Partly completed machinery

The product is a partly completed machine according to the EC Machinery Directive 2006/42/EC and is intended exclusively for installation in a machine or system. The product is controlled via the manufacturer's machine / plant control.

- ▶ Comply with the manufacturer's operating instructions.

2.2 Misuse

- Use in other operating modes than specified in the intended use
- Using the product beyond the specified performance limits
- Using the product in potentially explosive areas.
- Coating over elastic seals, bearings of moving parts or hose lines.
- Using the product outdoors.

2.3 Residual risks

When handling hydraulic fluid, comply with the safety data sheet of the manufacturer of the hydraulic fluid.

DANGER

Risk to life due to explosive combustion

Hydraulic fluid and its associated mists and vapours are oxidizing. Contact with ignition sources will lead to explosive combustion. Risk of serious injury or death.

- ▶ Avoid fire and open light and do not smoke anywhere near the product.
- ▶ Immediately dispose of any flammable materials moistened with hydraulic fluid as hazardous waste.
- ▶ Do not use any flammable or corrosive cleaning agents.



⚠ WARNING

Electrical and magnetic fields

Electrical and magnetic fields impair the functionality of cardiac pacemakers and implanted defibrillators.

- ▶ People with pacemakers or implanted defibrillators must maintain a sufficient distance from magnets.
- ▶ Advise people with pacemakers or implanted defibrillators against approaching magnets.
- ▶ Cordon off the area around the drive system and affix suitable warning signs to the barriers.

⚠ WARNING

Risk of injury through crushing or cutting

Body parts might get trapped or cut off between the machine frame and hydraulic system in the event of careless transport, installation and de-installation.

- ▶ Never reach between the hydraulic system and the machine frame.
- ▶ Ensure that other people cannot enter the danger area.
- ▶ Wear gloves and work shoes.

2.4 Duties of the operator

Observe and comply with regulations:

- ▶ The product must not be commissioned until the complete higher-level machine or system complies with the provisions, safety regulations and standards relevant in that country for the application.
- ▶ Observe and apply regulations for accident prevention and environmental protection.
- ▶ Assess and document the new dangers in the complete system's manual.

Operate product safely:

- ▶ Despite safety devices, the product still poses residual risks. Observe the safety instructions in this manual to reduce health hazards and avoid dangerous situations.
- ▶ The operating company must ensure the operating conditions (see the technical data) are within the limits for use of the product.
- ▶ Keep all instructions / signs on the product in legible condition and observe them.

Instruct personnel:

- ▶ Regularly train the personnel in all points of these instructions and ensure that they are observed.
- ▶ Ensure the terms of the industrial safety and operating instructions are observed.
- ▶ Only use qualified personnel. Due to their training and experience, the qualified personnel must be able to recognize risks and avoid possible hazards.

2.5 Qualification of the personnel

The activities described in these instructions require basic knowledge of mechanics, hydraulics and electrics.

For the transport and handling of heavy loads, additional knowledge in handling hoists and slings is required.

- ▶ The activities may only be carried out by an appropriate specialist or an instructed person under the supervision of a specialist.
- ▶ Activities other than those described in these instructions may only be performed by HAWE or authorized specialist companies.
- ▶ The personnel must have read and understood these instructions.

Trained personnel

Personnel instructed comprehensively, by skilled staff on behalf of the owner, in how to perform its appointed tasks and in how to use the product safely.

Specialist personnel

Due to their technical training, knowledge and experience, specialists are able to assess and carry out the assigned work and can independently recognize possible dangers.

Qualified electrician

A person with appropriate professional training, knowledge and experience, so that he/she can recognize and avoid dangers that can be caused by electricity.

Auditor

Persons of a technical inspection body who are authorized to perform testing and monitoring tasks for pressure equipment and electrical systems.

2.6 Personal protective equipment

Personal protective equipment is designed to prevent and reduce hazards.

In the instructions, safety instructions with mandatory symbols indicate the wearing of special protective equipment for special activities.

Instruction and supply is carried out by the operator.

3 About this product

3.1 Structure

Servo hydraulic power packs are suitable for hydraulic systems with variable speeds and dynamic requirements. Due to the energy efficiency of the servo-controlled pump drive, no separate cooling is required.

The ready-for-connection servo hydraulic power pack type HS 120 contains a very compact and powerful servo electric drive.

The servo hydraulic power pack HS 120 is intended for reversible operation of single or double-acting hydraulic consumers.

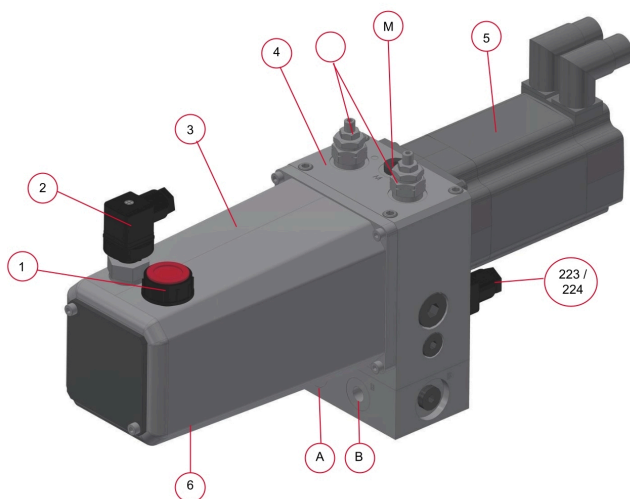
The hydraulic power pack renders the electrical input variables from the machine controls into hydraulic pressure and flow rate. The machine controls govern the power or the speed/position of a consumer via a speed-variable motor-pump unit.

Depending on the rotation direction of the motor-pump unit, hydraulic pressure or flow rate is available either at connection A or connection B. The optional electrically actuated check valve in connection A enables the pressure to the consumer to be confined.

Pump carrier

Depending on the version, the pump carrier features:

- Connecting holes for connection with a customer-side connection block
- Pressure switches, pressure gauge, measurement fitting
- Check valves in accordance with order (D 6347)
- Single connection block with exposed connections G1/4" for direct piping



- 1 G 1/2 filler port (hydraulic fluid) and breather filter
- 2 Level and temperature switch (optional)
- 3 Tank with pump
- 4 Pump carrier according to version with:
 - Pressure-limiting valves (DBV)
 - Measurement fitting (M) for pressure switches or pressure gauge
 - Check valves in accordance with order coding (type 223 or 224)
 - Single connection block with exposed connections (A and B) G 1/4" for direct piping (optional)
- 5 Motor (in accordance with order)
- 6 Hydraulic fluid drain

3.2 Functions

Pressurization at connection A or B

Energise the electric drive so there is pressure at connecting line A. The motor and pump deliver a flow rate. The flow rate flows upon simultaneously energised check valve MB1 (type 223) or deenergised check valve MB1 (type 224) to consumer port A if the motor turns clockwise. If pressure is to be built up at consumer port B, the motor rotation direction must be anti-clockwise (when looking at the pump shaft).

Holding consumer in place hydraulically

Switch off the electric drive upon simultaneously deenergised check valve MB1 (type 223) or energised check valve MB1 (type 224). In this way, the consumer is held into connection A hydraulically via the check valve.

	Motor MA 1	Check valve MB 1 (type 223)	Check valve MB 2 (type 224)
Pressure at connection A	1 (Rotation direction clockwise)*	1	0
Pressure at connection B	1 (Rotation direction anti-clockwise)*	1	0
Consumer hydraulically held in place	0	0	1

* Looking at the pump shaft

Check valve 223 deenergised and closed

Check valve 224 deenergised and open

3.3 Control



All of the necessary safety equipment, safety functions and the safety controller should be provided by the machine manufacturer.

- The motor's duty cycle should be monitored by the device control. An increase in the duty cycle is an indicator of abnormal internal leakage.

The following must be integrated in the machine controls:

- The technical data specifications in the data sheets must be complied with.

4 Transport and storage

Observe the following safety instructions additionally to the safety instructions in chapter [For your safety](#).

⚠ CAUTION



Personal injury through tipping or falling load

The product might tip over or fall during transport. This could lead to hands and feet becoming trapped.

- ▶ Adhere to the symbols on the packaging.
- ▶ Use permitted transport aids to carefully transport the product as close to the installation location as possible.
- ▶ Select transport aids that will allow the maximum load to be transported safely.
- ▶ Wear safety shoes, work gloves and safety glasses.

4.1 Transport equipment

! NOTICE

Avoid transport damage

- ▶ Valves or other mounted components must not be subjected to a load.
- ▶ Do not bend hoses.

Only use tested and approved tools. Use existing eyelets or transport devices for transporting hydraulic components.

4.2 Scope of delivery

Delivery of the fully assembled units corresponding to the respective order acc. to order coding (D 6347) includes:

- Hydraulic power pack with pump (external gear pump), pump carrier and mounted tank

optional

- Add-on parts on pump carrier in accordance with order coding
- Level and temperature switch
- Single connection block
- Servomotor
- Converter

Not included in the scope of delivery

- Accessories for commissioning
- Hydraulic fluid

4.3 Checking the delivery

Unpacking

1. Remove product.
2. Check product for transport damage and completeness.
 - ▶ Note transport damage on the transport documents or on the carrier's delivery bill.
 - ▶ Document transport damage with photos and report to the manufacturer.
3. Properly dispose of the product packaging in accordance with local regulations.

NOTICE

For any defect found, file a complaint immediately with:

HAWE Hydraulik SE
Einsteinring 17
85609 Aschheim near Munich, Germany
Tel.: +49 89 379100-1491
service@hawe.de

Claims for damages can only be addressed within the applicable complaint periods. HAWE does not accept any liability for subsequent complaints.

4.4 Storage

NOTICE

Property damage from incorrect storage

Incorrect storage can lead to damage. Refer to the technical data.

Store the product and its separate components as follows:

- Do not store outdoors.
- Store dry and free of dust.
- Protect the equipment against sunlight (UV radiation).
- optimum storage temperature: 15 - 20 °C
- Do not store close to ignition and heat sources, aggressive media (e.g. acids, fuel, lubricants), and ozone-emitting illuminants (e.g. fluorescent light sources, mercury vapor lamps).
- Protect the valves and valve controllers against gumming of the hydraulic fluid if stored more than 2 years. To do so, contact the manufacturer of the hydraulic fluid.
- Avoid mechanical jolts.

5 Assembly and installation

Observe the following safety instructions additionally to the safety instructions in chapter [For your safety](#).

WARNING



Risk of injury through crushing or cutting

Body parts might get trapped or cut off between the machine frame and hydraulic system in the event of careless transport, installation and de-installation.

- ▶ Never reach between the hydraulic system and the machine frame.
- ▶ Ensure that other people cannot enter the danger area.
- ▶ Wear gloves and work shoes.

NOTICE

Material damage due to mechanical damage

Protect the product from mechanical damage during assembly and installation, e.g. by padding.

5.1 Mechanical connection

NOTICE

Property damage from incorrectly installed hydraulic system

- ▶ Assembly by trained specialists only.
- ▶ Ensure all labels and markings of the hydraulic system are easily visible and legible after assembly.
- ▶ Check installation space/connection points for damage.

NOTICE

Damage from connecting soiled components

Connecting soiled components may cause system failure and irreparable damage.

- ▶ Clean the workspace before connecting the hydraulic system.
- ▶ Clean hydraulic components before connecting the hydraulic system.
- ▶ Only use hydraulic fluid of sufficient grade.

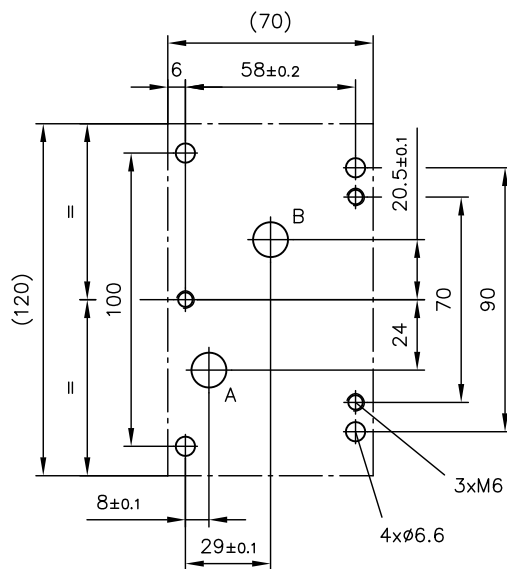
Add components which are not included in the scope of delivery (e.g. hydraulic fluid). Use filtered hydraulic fluid (10 µm).

1. Place the hydraulic power pack in position in the higher-level machine.
2. Check that the support/frame possesses sufficient load capacity. This depends on the hydraulic power pack's weight.
3. Ensure all the fastening bores and hydraulic connections align correctly.
4. Depending on the version, attach the hydraulic power pack to the pump carrier or the connection block:
 - ✓ The attachment process must match the version (see type plate)
 - ✓ Mounting hole pattern, see D 6347

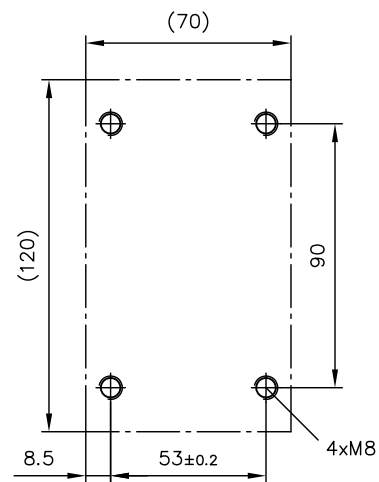
- Version without connection block:
 - a) Attach hydraulic power pack via the three threaded holes on the pump carrier (3 x M6) with screws of property class 8.8 with maximum torque 9.5 Nm (+/- 10 %) or
 - b) Attach hydraulic power pack via the four through-holes on the pump carrier (4 x M6) with screws of property class 8.8 with maximum torque 9.5 Nm (+/- 10 %).
 - Version with connection block: Attach hydraulic power pack via the four threaded holes on the underside of the connection block (4 x M8 thread) with screws of property class 8.8 with maximum torque 23 Nm (+/- 10 %).
5. Connect hydraulic lines:
- on connection block or
 - on your own connection block.
6. After a week of operating time at the latest, check the fittings.

Mounting hole pattern

Version without connection block



Version with connection block



5.2 Hydraulic connection

! NOTICE

Damage to valves caused by air bubbles

The system to be connected must already be filled with hydraulic fluid free of air bubbles before the hydraulic power pack is connected. Air bubbles in the hydraulic fluid cause damage to valves.

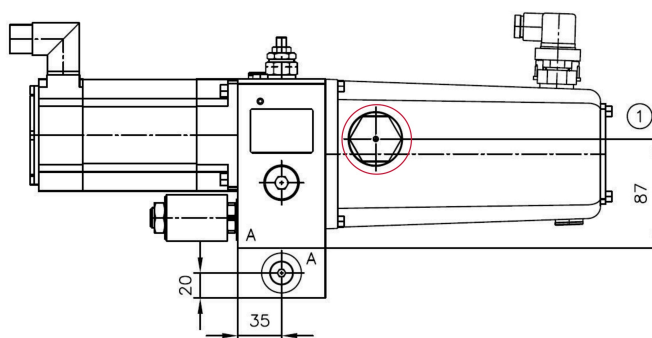
Filling with hydraulic fluid

1. Open the tank filling screw.
2. Filter fresh hydraulic fluid. Recommended filter: 10 µm, see Chapter 10.1, "Technical data", page 31
3. Pour the filtered hydraulic fluid into the tank.
4. Use the sight glass on the tank to read off the maximum permitted amount. The level of hydraulic fluid should be above the middle of the sight glass and below the top edge of the sight glass.
5. Close the tank opening with the breather filter.

Bleeding

1. Operate the system with the hydraulic power pack 2-3x with low pressure until there is no more air in the system.
1. Check the fluid level in the tank.

- ▶ The level of hydraulic fluid should be above the middle of the sight glass and below the top edge of the sight glass.



1 ideal level of hydraulic fluid

- ▶ Fluid level too low: top up hydraulic fluid.
3. Close the tank filling screw with a tightening torque of $6 + 2$ Nm.
 4. Assemble the hydraulic power pack in the intended installation position.
 5. Vent the hydraulic system using the venting provisions on the consumer.
 6. Correctly dispose of the hydraulic fluid, hydraulic fluid container and any cloths contaminated with hydraulic fluid.

5.3 Electrical connection

WARNING



Risk of fatal injury from electric shock

Touching live components directly or indirectly causes injury or death.

- ▶ Electrical and electronic components must only be replaced and connected by trained specialist personnel.
- ▶ Obey all applicable electrical safety rules.
- ▶ Only connect electric lines to the hydraulic system while the system is de-energized.

WARNING



Electrical and magnetic fields

Electrical and magnetic fields impair the functionality of cardiac pacemakers and implanted defibrillators.

- ▶ People with pacemakers or implanted defibrillators must maintain a sufficient distance from magnets.
- ▶ Advise people with pacemakers or implanted defibrillators against approaching magnets.
- ▶ Cordon off the area around the drive system and affix suitable warning signs to the barriers.

! NOTICE**Hazard for electronic components – property damage**

Electromagnetic waves lead to malfunctions of electrical or electronic equipment.

- ▶ To prevent electrostatic discharge, do not touch electronic components and contacts.
- ▶ After switching off the electrical power supply, wait at least 15 minutes for the energy stored in the capacitors to dissipate.
- ▶ Do not expose components to moisture and an aggressive environment.
- ▶ To avoid overheating, always keep ventilation openings (if any) open and allow sufficient air circulation.

i This is to avoid electromagnetic waves leading to functional interference

- ▶ Twist and shield the lines.
- ▶ Route intersections at right angles.
- ▶ Connect the shield at only one end and close to the control system at ground potential.
- ▶ Route control cables and power cables separately.
- ▶ Leave a 10 to 20 cm gap between the control cables and power cables.
- ▶ Provide separate shields for analogue and digital control lines.

5.3.1 Connecting the motor

1. Secure the unit against being switched on unintentionally.
2. Ensure that nobody is in the danger area.
3. The motor and braking resistor are electrically connected at the converter.
 - ✓ Observe the terminal connections
(see [KEB instructions for converter](#))
4. Wire the motor according to the circuit diagram via terminal strip X1B with the converter. (See D 6347)

5.3.2 Connecting the converter

1. Secure the unit against being switched on unintentionally.
2. Ensure that nobody is in the danger area.
3. Connection to the power supply (400-V devices):
 - ✓ Converter is installed in the switch cabinet.
 - ✓ Terminal connections have been observed. ([KEB instructions for converter](#))
 - ✓ Power choke (if present) is wired. ([KEB instructions for power choke](#))
 - ✓ Braking resistor (if present) is wired. ([KEB instructions for braking resistor](#))
 - ✓ Converter is wired to the machine controls.
4. Compare leakage currents with calculated values.
5. Connect protective ground and functional ground.
6. Connect the hydraulic power pack to the electrical power supply.
7. Check the electrical connections after a week's operating time.

6 Start-up

Observe the following safety instructions additionally to the safety instructions in chapter [For your safety](#).

DANGER



Danger to life from pressurized systems

When lines and components on pressurized systems are disconnected, hydraulic fluid escapes at high pressure and penetrates deep into the body via the skin and eyes. Severe injury or death.

- ▶ Depressurize the hydraulic system including the pressure tank.
- ▶ Secure the hydraulic system against unintentional restart.
- ▶ Check components for correct assembly before pressure is applied.
- ▶ Observe maximum pressure load for fittings and lines.

WARNING

Risk of injury from pressurised components

Risk of serious injury or death.

- ▶ Check all components for correct installation before charging the hydraulic system to operating pressure.

WARNING



Danger of crushing/malfunction from unexpected startup

Body parts may be crushed or severed if the system starts up unexpectedly.

- ▶ Keep the danger zone clear of people.
- ▶ Wear protective clothing.

CAUTION



Burn hazard from hot surfaces and hydraulic fluid

A burn hazard results from directly or indirectly coming into contact with hot hydraulic fluid and hot components of the hydraulic system.

- ▶ Wear work gloves.
- ▶ Arrange the access to the hydraulic system in such a way that hot surfaces are not accessible to the user.
- ▶ Wait until the hydraulic system has cooled down before servicing or disassembling it.

! NOTICE

If surface temperatures > 60°C occur during operation, set up safety barriers. Ensure that fresh air can be drawn in and that warm air can escape. No changes of any kind (mechanical, welding or soldering work) may be made.

- Only trained specialist personnel may perform commissioning.
 - The unit is secured against being switched on unintentionally.
1. Check the hydraulic power pack has been connected correctly:
 - ✓ Mechanical: attachment to the machine, the frame and the base
 - ✓ Hydraulic: piping, hoses, cylinders, motors
 - ✓ Electrical: wiring, power supply, control
 2. Check the hydraulic fluid level,
[see Chapter 7.2.2, "Check the hydraulic fluid level", page 23](#)
 - a) Fill volume, see D 6347
 - b) Filter fresh hydraulic fluid. Recommended filter: 10 µm.
 - c) Unscrew the breather filter.
 - d) Fill filtered hydraulic fluid into the tank – up to at least the middle of the sight glass but no further than the top edge of the sight glass.
 - e) Screw on the breather filter.
 3. Bleed the hydraulic lines connecting to the hydraulic power pack:
During the venting process, it is not permitted for anyone to be in the hazardous area. Please refer to the operating instructions of the machine manufacturer/system operator for the measures and regulations for a safe venting process.
 4. Check the hydraulic fluid level again after several strokes or after the hydraulic system has been vented.
 5. Check valve switching and functional sequence as per the [Functions](#).

7 Maintenance

Maintenance measures consist of inspection, service and repair. Maintenance measures are described here.

- ▶ Maintenance work must only be carried out by qualified personnel.
- ▶ Tasks not described in this chapter may only be carried out by HAWE Service.
- ▶ If faults or damage occur, switch off the hydraulic system immediately.
- ▶ Observe the information in the supplier documentation.
- ▶ Document all activities in a maintenance log.

WARNING

Danger of accident and fatal injury due to lack of maintenance or careless maintenance

Omitted or negligently performed maintenance can cause the hydraulic system to malfunction. Improperly performed maintenance or improperly conducted troubleshooting can pose a danger to personnel.

- ▶ Read and abide by all instructions provided in this section.

Observe the following safety instructions additionally to the safety instructions in chapter [For your safety](#).

WARNING

Risk of injury from electrical, mechanical or hydraulic hazards when working on the hydraulic power pack

Risk of serious injury or death

- ▶ Prior to all work on the hydraulic power pack, disconnect the power supply from the drive motor.
- ▶ Prior to all work on the hydraulic power pack, relieve the pressure in the hydraulic system.

CAUTION

The hydraulic power pack and valves' solenoids may become hot during operation.

Risk of injury from minor burns

- ▶ If surface temperatures $>60^{\circ}\text{C}$ occur during operation, set up safety barriers.
- ▶ Allow the hydraulic power pack and the solenoids to cool sufficiently before touching them.
- ▶ Ensure that the device can aspirate sufficient volumes of fresh air and that hot air can escape.
- ▶ Modifications of any kind, especially mechanical, welding or soldering, are prohibited.

NOTICE

Disconnecting electrical power sources

- ▶ Plug connection on compact hydraulic power pack (various types of plug optionally available) or
- ▶ Power supply unit in overall machinery (see owner's operating instructions)

7.1 Maintenance plan



Failure of hydraulic systems

Hydraulic system failures are often caused by an incorrect choice of hydraulic fluid or excessive solid contamination in the hydraulic fluid. High solid contamination is due to lack of maintenance of the hydraulic system.

- ▶ Select hydraulic fluid according to specifications.
- ▶ Carry out the activities described in this section carefully and in due time.

Activities to be performed	Interval		
	Once a week following commissioning	As required	Every 3 months
Checking the electrical contacts	✓	✓	
Bleed the hydraulic power pack		✓	
Visual check for external leakage	✓	✓	
Check the hydraulic fluid level			✓
Replacing the hydraulic fluid		✓	
Cleaning the hydraulic tank		✓	
"Checking and replacing the breather filter"		✓	

7.2 Service

7.2.1 Bleed the hydraulic power pack

Maintenance interval

As required.

The machine manufacturer has set up provisions for venting on the consumer for the hydraulic system.

1. Place a suitable receptacle under the hydraulic power pack.
2. Switch the pump on and off several times so that the pump bleeds automatically.
 - ✓ When the hydraulic fluid flow is free of bubbles, the pump has been bled.
3. Then move the consumer(s) back and forth several times until the air there has been removed too and movement is smooth.
4. If the consumers have bleed points, loosen the locking elements and only tighten them once the escaping hydraulic fluid is free of bubbles. Catch the escaping hydraulic fluid.
5. Correctly dispose of the escaped hydraulic fluid, hydraulic fluid container and any cloths contaminated with hydraulic fluid.

7.2.2 Check the hydraulic fluid level

Maintenance interval

Every 3 months.

! NOTICE

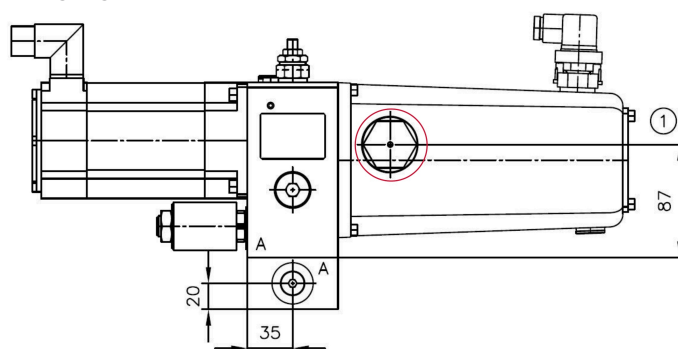
Material damage due to operation without hydraulic fluid

If the hydraulic fluid level falls below the minimum level, the operating temperature may rise, the hydraulic pump may suck in air and the hydraulic pump may fail due to cavitation.

- ▶ During initial commissioning and after each opening of the hydraulic system
- ▶ Fluid level too low: top up hydraulic fluid.

1. Check the fluid level in the tank.

- ▶ The level of hydraulic fluid should be above the middle of the sight glass and below the top edge of the sight glass.



1 ideal level of hydraulic fluid

- ▶ Fluid level too low: top up hydraulic fluid.

7.2.3 Replacing the hydraulic fluid

Maintenance interval

As required.

- The hydraulic system is switched off and secured against unintentional restart.
- The system is pressureless.
- The work environment is clean.

1. Wait until the system has cooled down.
2. Place a suitable receptacle under the hydraulic power pack.
3. Open the hydraulic fluid drain (G 3/8") on the underside of the hydraulic tank so that the hydraulic fluid can completely flow out of the tank into the receptacle.
4. Close the tank drain (tightening torque: 30+/-2 Nm).
5. Remove breather filter.
6. Filter fresh hydraulic fluid. Recommended filter: 10 µm.
see Chapter 10.1, "Technical data", page 31
7. Pour the filtered hydraulic fluid into the tank.
8. Close the tank filler opening by screwing on the breather filter.
9. Bleed the hydraulic system, see Chapter 7.2.1, "Bleed the hydraulic power pack", page 22.
10. Correctly dispose of the drained hydraulic fluid, hydraulic fluid container and any cloths contaminated with hydraulic fluid.

7.2.4 Cleaning the hydraulic tank

Maintenance interval

As required.

Hydraulic fluid is drained

1. Dismantle the hydraulic tank from the pump carrier:
 - ✓ Loosen the four M5x20 screws.
2. Clean hydraulic tank with a lint-free cloth.
3. Assemble the hydraulic tank to the pump carrier:
 - ✓ Check O-ring for correct positioning.
 - ✓ Tighten the four M5x20 screws (tightening torque: 5.5 Nm +/-10 %)
4. Refill the tank. see Chapter 7.2.3, "Replacing the hydraulic fluid", page 23

7.2.5 Checking and replacing the breather filter

Maintenance interval

As required.

Checking

1. Check the hydraulic ports for visible signs of damage.
2. If external leakages are found, shut down and repair the system.

Replacing

The hydraulic system is switched off and secured against unintentional restart.

The system is pressureless.

The work environment is clean.

1. Wait until the system has cooled down.
2. When replacing the breather filter, hydraulic fluid may escape. Use suitable aids, e.g. a cloth, to catch escaping hydraulic fluid.
3. Screw the breather filter out of the hydraulic power pack's connection or filter block.
4. Wet the new filter with hydraulic fluid on its front seal.
5. Screw a new filter onto the tank by hand.
6. Commission the hydraulic power pack.

7.3 Repair

7.3.1 Replacing the level and temperature monitor

- The hydraulic system is switched off and secured against unintentional restart.
 - The system is pressureless.
 - The work environment is clean.
1. Wait until the system has cooled down.
 2. Remove the plug of the level and temperature monitor.
 3. Remove the level and temperature monitor.
 4. Assemble a new level and temperature monitor (tightening torque: 50 Nm (+/-10 %))
 5. Commission the hydraulic power pack.

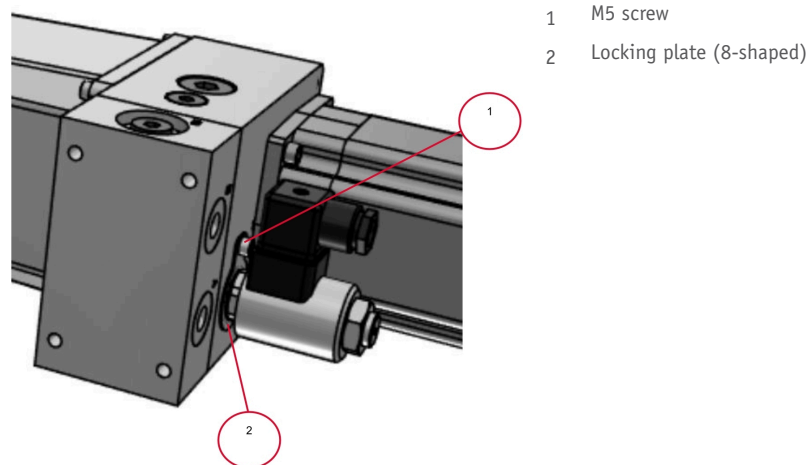
7.3.2 Replacing the solenoid of the check valve

- The hydraulic system is switched off and secured against unintentional restart.
 - The system is pressureless.
 - The work environment is clean.
1. Wait until the system has cooled down.
 2. Remove the plug of the check valve.
 3. Remove the hex nut and the O-ring.
 4. Pull the solenoid off the support of the check valve.
 5. Place a new solenoid onto the support of the check valve.
 6. Assemble the O-ring and SW24 hex nut with a tightening torque of 5 Nm (+30 %).
 7. Commission the hydraulic power pack.

7.3.3 Replacing the check valve

- ☑ The hydraulic system is switched off and secured against unintentional restart.
- ☑ The system is pressureless.
- ☑ The work environment is clean.

1. Wait until the system has cooled down.
 - ✓ Solenoid of the check valve is removed.
 - ✓ Hydraulic fluid is drained.
 - ✓ M5 screw is removed from (8-shaped) locking plate.
 - ✓ Remove locking plate.



2. Remove check valve.
3. Assemble new check valve with a tightening torque of 30 Nm (+/-10 %).
 - ✓ Put (8-shaped) locking plate into position and
 - ✓ tighten with screw (M5), tightening torque of 5.5 Nm (+/-10%)
 - ✓ Assemble solenoid.
4. Refill the tank. [see Chapter 7.2.3, "Replacing the hydraulic fluid", page 23](#)
5. Commission the hydraulic power pack.

7.3.4 Replacing the pressure-limiting valve

- ☑ The hydraulic system is switched off and secured against unintentional restart.
- ☑ The system is pressureless.
- ☑ The work environment is clean.

1. Wait until the system has cooled down.
 - ✓ Hydraulic fluid is drained.
2. Remove pressure-limiting valve.
3. Assemble new pressure-limiting valve with a tightening torque of 25 Nm (+/-10 %).
4. Refill the tank. [see Chapter 7.2.3, "Replacing the hydraulic fluid", page 23](#)
5. Commission the hydraulic power pack.


7.3.5 Setting the pressure-limiting valve

Setting of pressure-limiting valve at connection A


The working environment is clean.

Tank has been filled.

1. Select the rotation direction and actuation of the motor such that sufficient pressure can build up at connection A.
2. Arrange consumer at connection A such that the maximum permissible pressure is reached, or disconnect consumer and close connection A.
3. Provide measurement fitting M with suitable measurement equipment, such as a pressure gauge or pressure sensor.
4. Release lock nut SW13 from pressure-limiting valve VD BE04.
5. Start motor.
6. Turn adjusting screw with SW4 hex socket on pressure-limiting valve VD BE04, in order to set the permissible value (see type plate):
 - a) anti-clockwise for lowering
 - b) clockwise for raising the pressure.
7. After setting the pressure-limiting valve, tighten the lock nut of the valve with a torque of 23 Nm +/-10% while keeping a firm hold of the adjusting screw.

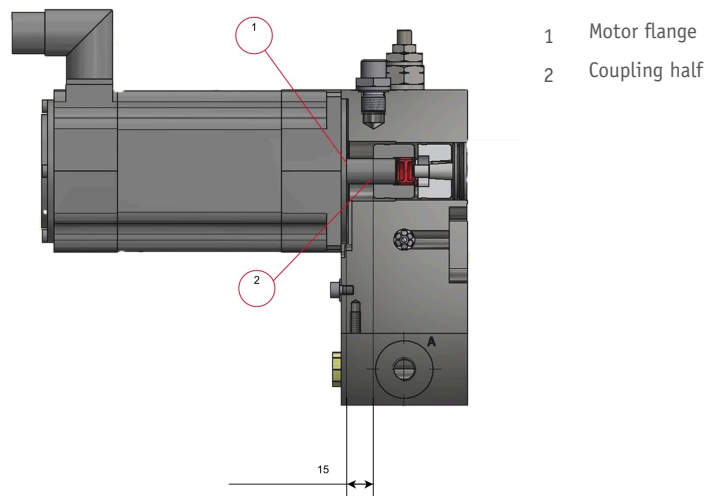
 In order to prevent the hydraulic fluid from heating up unnecessarily, it is recommended to apply the settings swiftly and then to switch off the hydraulic power pack.

Setting of pressure-limiting valve at connection B

 To set the pressure-limiting valve at connection B, suitable measurement equipment must be applied to connection B, as no separate measurement fitting is available. The setting process is carried out in the same manner as for the setting of the pressure-limiting valve at connection A.

7.3.6 Replacing the motor

- ☑ The hydraulic system is switched off and secured against unintentional restart.
 - ☑ The system is pressureless.
 - ☑ The work environment is clean.
1. Wait until the system has cooled down.
 - ✓ Motor is secured against falling.
 2. Release the cable from the motor.
 3. Remove the coupling half.
 4. Assemble new coupling half with a tightening torque/clamping screw of 1.34 Nm (+/-10 %).
 5. Set distance between motor flange and coupling half (adjustment value: 15 mm).



6. Insert motor:
 - ✓ Screw in M6x20 screws with a tightening torque of 9.5 Nm ($\pm 10\%$).
 - ✓ Further information: [KEB instructions for converter](#)
7. Commission the hydraulic power pack.

7.3.7 Replacing the gear ring of the coupling

- ☑ The hydraulic system is switched off and secured against unintentional restart.
 - ☑ The system is pressureless.
 - ☑ The work environment is clean.
1. Wait until the system has cooled down.
 - ✓ Motor is secured against falling.
 2. Release the cable from the motor.
 3. Remove motor.
 4. Replace gear ring.
 5. Insert motor:
 - ✓ Screw in M6x20 screws with a tightening torque of 9.5 Nm ($\pm 10\%$).
 - ✓ Connect cable to motor.
 - ✓ Further information: [KEB instructions for converter](#)
 6. Commission the hydraulic power pack.

Observe the following safety instructions additionally to the safety instructions in chapter [For your safety](#).

⚠ WARNING
Sudden movement of the hydraulic drives when disassembled incorrectly

Risk of serious injury or death

- ▶ Depressurise the hydraulic system.
- ▶ Perform safety measures in preparation for maintenance.

⚠ CAUTION
Burn hazard from hot surfaces and hydraulic fluid

A burn hazard results from directly or indirectly coming into contact with hot hydraulic fluid and hot components of the hydraulic system.



- ▶ Wear work gloves.
- ▶ Arrange the access to the hydraulic system in such a way that hot surfaces are not accessible to the user.
- ▶ Wait until the hydraulic system has cooled down before servicing or disassembling it.

! NOTICE

- ▶ Do not release hydraulic fluid into the environment.
- ▶ Collect cleaning, operating and lubrication fluids and consumable materials in suitable containers and dispose of them according to local regulations.

Disassembly

1. Shut down the hydraulic system in the machine controls.
2. Secure it against unintentional restarting.
 - ✓ System shut down securely.
3. Drain hydraulic fluid.
 - ✓ The hydraulic system has been depressurized and can be disassembled.
4. Disconnect electrical cables.
5. Disconnect hydraulic lines.
6. Disassemble electrical and hydraulic components.
7. Properly dispose of all disassembled parts.

Disposal
Dispose of hydraulic fluid and system components as follows:

- ▶ Dispose of hydraulic fluid, packaging/containers, soaked cleaning cloth, etc., as stipulated in the specifications for hydraulic fluid according to the regional waste disposal requirements.
- ▶ Dispose of the electronic components at approved collection points or with approved disposal companies according to local regulations.
- ▶ Dispose of metal with approved specialist disposal companies.

The following table lists possible faults and measures to eliminate these. Contact the manufacturer in case of faults that cannot be remedied by following the descriptions here.

Fault	Possible cause	Test	Remedy
Consumer does not move	Power supply disrupted	Measure the voltage.	Restore power supply.
	Control circuit faulty (e.g. link circuit)	Measure the control voltage/check the converter.	Replace converter. Contact HAWE.
	Motor faulty	There is voltage present but the motor does not work.	Replace hydraulic power pack/motor. Contact HAWE.
Hydraulic power pack does not build up pressure, or the pressure is too low	Supply voltage too low	Measure voltage directly on the motor.	Restore power supply.
	Pressure-limiting valve settings are incorrect	Check pressure-limiting valve settings.	Setting the pressure-limiting valve Contact HAWE.
	Hydraulic power pack faulty		Replace the hydraulic power pack. Contact HAWE.
Hydraulic power pack provides no flow rate, or the flow rate is too low	Hydraulic power pack faulty		Replace the hydraulic power pack. Contact HAWE.
Hydraulic fluid is leaking from the hydraulic power pack	Hose line is loose	Visual check	Tighten hose line.
	Seals worn	Visual check	Check hydraulic components and replace components that are not leak tight.
	Seated valve loose	Visual check	Tighten seated valve housing (tightening torque 30 Nm +/-10 %).
Hydraulic fluid in tank is too hot	Hydraulic fluid level in the tank too low	Check fluid level.	Top up hydraulic fluid.
	Pressure too high	Check pressure-limiting valve settings.	Setting the pressure-limiting valve Contact HAWE.
Hydraulic pump is unusually loud during operation / operating pressure not reached	Hydraulic fluid level too low	Check fluid level.	Top up hydraulic fluid.
	Trapped air in hydraulic power pack		Bleed the hydraulic power pack.
	Motor faulty	Check motor.	"Replacing the motor" Contact HAWE.
	Hydraulic pump faulty.		Replace the hydraulic power pack. Contact HAWE.
	Coupling in pump carrier faulty.	Check coupling for wear.	"Replacing the gear ring of the coupling" Contact HAWE.

10 Appendix

Further documentation, such as technical data sheets, circuit diagrams, bills of material, installation drawings, as well as optional documents (e.g. works test certificate) form part of the technical documents and are delivered separately.

The attached product information from third-party manufacturers is not necessarily the most current version. To obtain the latest product information, contact the respective manufacturer.

10.1 Technical data

10.1.1 General data

Designation	hydraulic power pack
Design	speed-controlled external gear pump
Model	Servo hydraulic power pack
Installation position	Horizontal
Material	Pump support, tank: aluminium Motor: lacquered, RAL 9005 (deep black)
Conformity	<ul style="list-style-type: none"> ▪ Declaration of incorporation as per Machinery Directive 2006/42/EC ▪ For declarations of conformity for converters and motors see www.keb.de
Attachment	without connection block: Threaded hole 3 x M6 or 4 x through hole \varnothing 6.6 mm for fastening screw M6 with connection block: Threaded hole 4 x M8
Rotation direction	reversing external gear pump (rotation direction can only be determined by monitoring flow rate)
Speed range (min ... max)	External gear pump: 400 - 3000 rpm
Line connection	Via screwed on connection block,

10.1.2 Hydraulic data

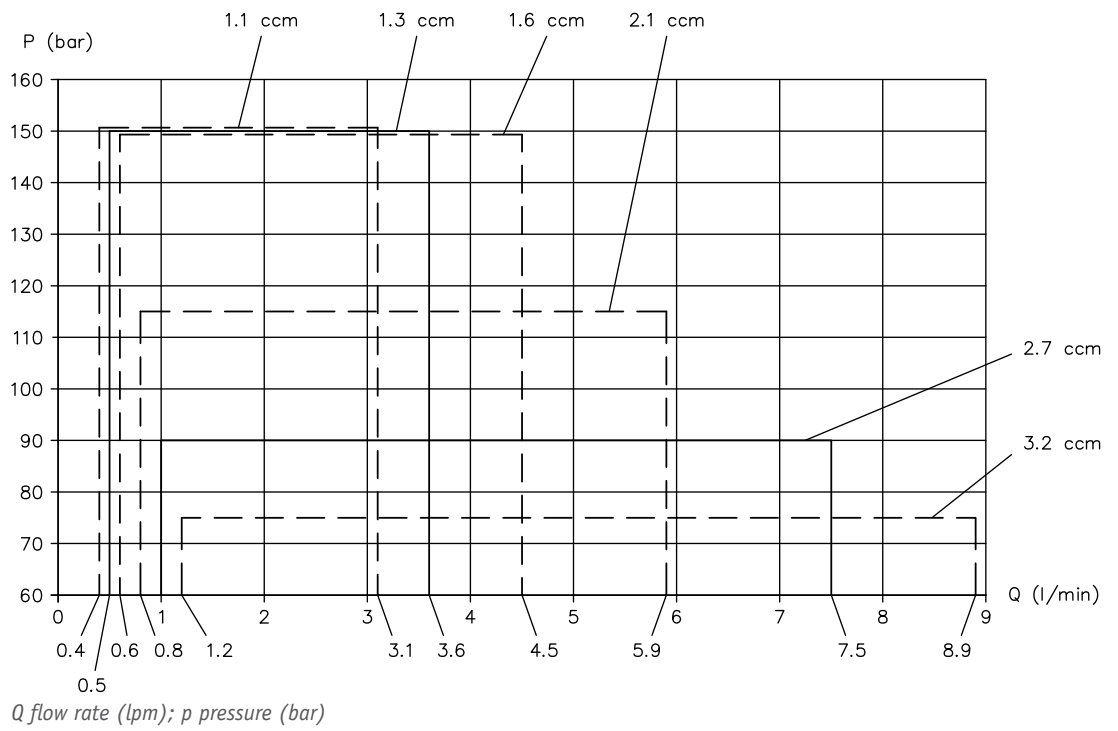
Pressure p_{max}	Coding for pump	Pressure
	11	150 bar
	13	150 bar
	16	150 bar
	21	115 bar
	27	90 bar
	32	75 bar
Starting against pressure	The version with a servomotor can start against a pressure of p _{max} .	
Hydraulic fluid	Hydraulic fluid, according to DIN 51 524 Parts 1 to 3; ISO VG 10 to 68 according to DIN ISO 3448 Viscosity range: 10 - 500 mm ² /s, continuous operation: 10 - 100 mm ² /s Other media on request	
Cleanliness level	ISO 4406 <u>18/15/12</u>	
Temperatures	Surrounding area: 0 to +40 °C, hydraulic fluid: 0 to +60 °C, ensure the correct viscosity range.	
Fill and usable volume	tank fill volume:	1.05 l
	usable volume:	0.3 l

10.1.3 Weight

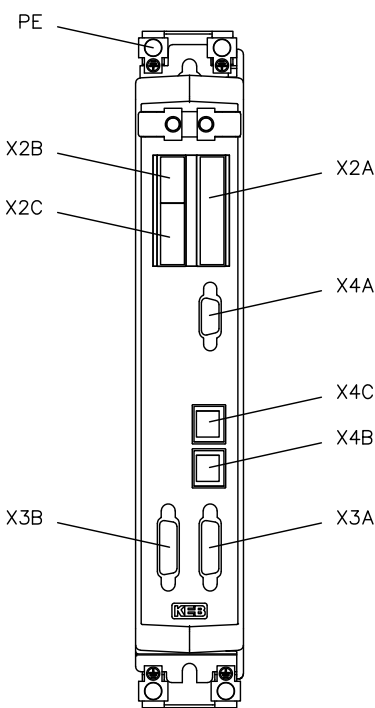
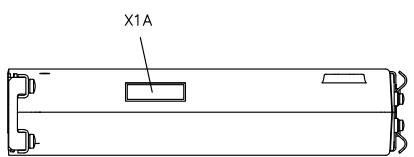
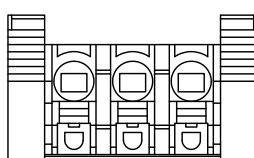
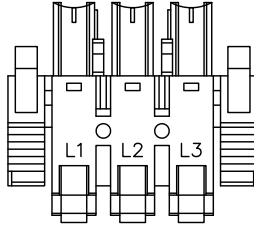
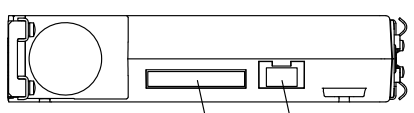
	With TA3S servomotor, without hydraulic fluid:	≈ 11.3 kg
	With TA3L servomotor, without hydraulic fluid:	≈ 13.9 kg
	Without servomotor, without hydraulic fluid:	≈ 6.3 kg
	Converter:	≈ 1.9 kg
	Connection block:	≈ 1.0 kg


10.1.4 Characteristic lines

Area of application of pump



10.1.5 Electrical data

<p>Connection</p>	<p>The electrical connection is made in the converter. Connections via optionally available cables including connectors . For detailed information on terminal connections, see www.keb.de</p>   <p>X1A Power input</p>   <p>3-phase power supply (400 V devices) Cross-section: 0.5 - 2.5 mm² AWG 20-14</p>  <p>X1B Motor output/connection for brake resistor X1C Temperature monitoring, brake control</p> <p>X2A Control terminal strip X2B Safety functions / DC 24 V supply X2C CAN bus/analogue inputs and outputs X3A Encoder interface, channel A X3B Encoder interface, channel B X4A Diagnostic interface X4B Field bus interface (in) X4C Field bus interface (out) PE Protective earth/functional earth</p>
<p>Protection class</p>	<p>IEC 60529</p> <p>Motor: IP 54 Converter: IP 20</p>
<p>Protection class</p>	<p>IEC 61140</p> <p>Motor: I</p>
<p>Insulation</p>	<p>EN 60 664-1</p> <p>Converter: Overvoltage category III</p>
<p>Insulation material class</p>	<p>Motor: 155 (F)</p>

Suppressor	Integrated HF filter in the power section of the converter. As an option, a line choke can be connected upstream
Brake resistor	 If returning flow rates have to be throttled by the servo hydraulic power pack, an external brake resistor must be used. <ul style="list-style-type: none">▪ For wiring instructions see www.keb.de

Einbauerklärung einer unvollständigen Maschine - Original

nach Maschinenrichtlinie 2006/42/EG, Anhang II B

Declaration of incorporation of partly completed machinery – original

according to machinery directive 2006/42/EC, Annex II B

Hersteller:
Manufacturer:HAWE Hydraulik SE
Einsteinring 17
DE-85609 Aschheim/MünchenDie alleinige Verantwortung für die Ausstellung dieser Einbauerklärung trägt der Hersteller.
*This declaration of incorporation is issued under the sole responsibility of the manufacturer.*Unvollständige Maschine:
*Partly completed machinery:***Typ HS120 nach unserer Dokumentation D 6347**
*Type HS120 according to our documentation D 6347*Die folgenden grundlegenden Sicherheits- und Gesundheitsschutzanforderung der Richtlinie 2006/42/EG kommen zur Anwendung:
*The following essential health and safety requirements of Directive 2006/42/EC apply:***Abschnitte (chapters) 1.1.2, 1.1.3, 1.1.5, 1.2 komplett (complete), 1.3.1, 1.3.2, 1.3.4, 1.3.6, 1.3.7, 1.5.1, 1.5.2, 1.5.3, 1.5.4, 1.5.5, 1.5.6, 1.5.8, 1.5.9, 1.5.16, 1.6.3, 1.7.1, 1.7.3, 1.7.4 und 1.7.4.3.**Es wurden folgende harmonisierte Normen oder andere technische Spezifikationen zugrunde gelegt:
*The following harmonized standards or other technical specifications have been applied:***DIN EN ISO 12100:2011-03**Dokumentationsbevollmächtigter:
*Person authorised to compile the technical file:*HAWE Hydraulik SE
Abt. Produktmanagement
Einsteinring 17
D-85609 Aschheim/MünchenDie speziellen technischen Unterlagen nach Anhang VII Teil B wurden erstellt.
*The relevant technical documentation is compiled in accordance with part B of Annex VII.*Der Hersteller verpflichtet sich, die speziellen technischen Unterlagen zur unvollständigen Maschine einzelstaatlichen Stellen auf Verlangen elektronisch zu übermitteln.
*The manufacturer undertakes to electronically transmit the special technical documents on the partly completed machinery to national authorities on request.*Die unvollständige Maschine darf erst dann in Betrieb genommen werden, wenn festgestellt wurde, dass die Maschine, in die die unvollständige Maschine eingebaut werden soll, den Bestimmungen der Richtlinie 2006/42/EG entspricht.
The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the directive 2006/42/EG.

Aschheim, 2022-07-04


Axel Schwerdtfeger, CTO
Bernhard Russ / Application Engineering

Further information

HAWE Hydraulik SE is a responsible development partner with application expertise and experience in more than 70 areas of mechanical and plant engineering. The product range includes hydraulic power packs, constant and variable pumps, valves, sensors and accessories. Modular systems are complemented by electronic components, are perfectly coordinated with the hydraulic components and simplifying control, signal evaluation and fault detection. The intelligent system solutions reduce energy consumption and operating costs. Compact drives save space and permit innovative machine design.

The company is certified to ISO 9001, ISO 4413, ISO 50001, OHSAS 18001.



■ HAWE subsidiaries and service repair shops

- Germany
- Denmark
- Austria
- Switzerland
- Italy
- France
- Spain

● HAWE sales partners

- Finland
- Sweden
- Slovenia
- Russia
- Canada
- USA
- Brazil
- China
- India
- Japan
- Korea
- Singapore
- Taiwan
- Australia

You can find further information on HAWE Hydraulik, your local contact and the range of hydraulics training sessions offered at: www.hawe.com.

