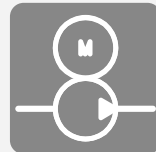


# Compact hydraulic power pack type INKA 1

## Assembly instructions



Oil immersed compact hydraulic power pack with built-in electric motor (AC or 3-phase version) and single-circuit pump.

For short period operation S2 and periodic intermittent operation S3.



(Translation of the original instructions)

B 8132-1

12-2023 -1.4 en

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

**Safety symbols**

	<b>General safety symbol</b> 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**

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

## 1.3 Applicable documents

Documents	
Spare parts list	according to the selection in (HAWE Customer portal)
D 8132-1	<b>Data sheet</b> Features and potential applications of this product
D 5488/1	<b>Data sheet</b> Oil recommendations
B 5488	General operating manual for the assembly, initial operation and maintenance of hydraulic components and systems
Declaration of incorporation (EU) Declaration of incorporation (UKCA)	"Enclosed in appendix"
Declaration of conformity (EU) Declaration of conformity (UKCA)	"Enclosed in appendix"

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



### 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 of the higher-level machine or system.

- 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.
- This product is used for controlling machine tools, hydraulic tools, handling systems, presses and production machinery.
- The product must be used indoors.
- Do not operate electronics near devices that generate powerful magnetic fields or near electrical conductors that carry high currents (> 30 A/m).
- All components must be suitable for the operating conditions when using an assembly.
- Stationary use

## Unintended use

### **WARNING**

#### Hazard from unintended use of the product

Any use of the product that goes beyond the intended use and/or varies from the intended use of the product has the potential of leading to hazardous situations.

- ▶ Only use the product for the stipulated purposes.
- Use in other operating modes than specified in the intended use
- Using the product beyond the specified performance limits

## 2.2 Residual risks

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

### ⚠ WARNING



#### Risk to life due to explosive combustion

Hydraulic fluid, and its associated mists and vapors, is a fire accelerant. Contact with ignition sources will lead to explosive combustion. Risk of serious injury or death.

- ▶ Avoid fire, open flames, and smoking 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 severed 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 other people cannot enter the hazardous area.
- ▶ Wear gloves and appropriate footwear.

## 2.3 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 any 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 personnel in all points of these instructions and ensure 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, qualified personnel must be able to recognize risks and avoid possible hazards.

## 2.4 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 their 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.

## 2.5 Personal protective equipment

Personal protective equipment (PPE) 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.

The supply of PPE, and instruction in its proper use, is carried out by the operator.

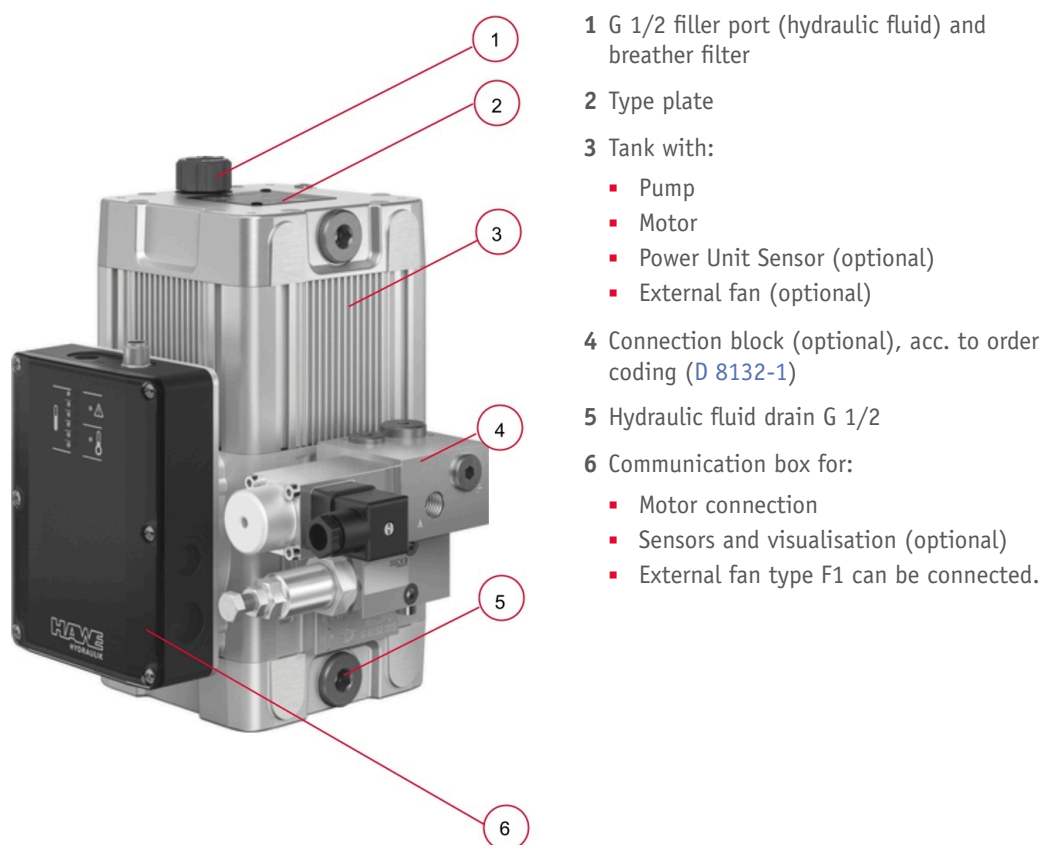
## 3 About this product

### 3.1 Structure

The compact hydraulic power pack type INKA consists of the tank, the integrated motor and the radial piston pump or gear pump directly attached to the motor shaft. The directly mounted electronic communication box with integrated real-time operating system allows the operating state to be recorded and visualised. The measured values of the integrated Power Unit Sensor (including the motor speed) can be passed on to the higher-level machine controls via standardised interfaces and processed there.

The consistently modular design of the type INKA means that different usage volumes and flow rates can be realised quickly and easily from the modular system. Compatible, ready-for-connection, complete solutions can be assembled easily using a wide range of connection blocks and the valve banks that can be combined with them.

It is designed in horizontal or vertical versions and supplies flow rate and pressure according to the technical data. Tank size as well as pump and motor types can be varied.



- 1 G 1/2 filler port (hydraulic fluid) and breather filter
- 2 Type plate
- 3 Tank with:
  - Pump
  - Motor
  - Power Unit Sensor (optional)
  - External fan (optional)
- 4 Connection block (optional), acc. to order coding (D 8132-1)
- 5 Hydraulic fluid drain G 1/2
- 6 Communication box for:
  - Motor connection
  - Sensors and visualisation (optional)
  - External fan type F1 can be connected.

#### Connection block (optional)

Depending on the version, the connection block features:

- Free ports for direct piping connection
- Valve bank connection
- Pressure or return line filter
- Valves (accumulator charging valve, idle circulation valve, two-stage valve, throttle valve)

**External fan (optional)**

The external fan is mounted on the side on the intermediate flange.

External fan start can be programmed for an oil temperature between 40°C and 70°C (any 10°C increment selectable). Programmed switching hysteresis is 10°C.

**Example:** in the case of type F140, the external fan starts when the oil temperature is 40°C and switches off again once the oil temperature reaches 30°C. Switch-off temperature should lie above the maximum expected ambient temperature. The external fan also switches off when oil temperature lies below the external fan's switch-on temperature for 30 minutes but switch-off temperature is not reached within this time.

## 3.2 Control



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

**Ensure the following on the machine**

- The technical data specifications in the data sheets must be complied with.
- Pipes, hose lines, fittings and connectors must be designed for the maximum pressure of the system.
- Faults on the product (hydraulic power pack) cannot trigger any hazard and can be safely rectified.
- There is no hazard from failure of the electric power supply to the product (hydraulic power pack).
- People cannot reach into the danger zone of the product (hydraulic power pack).
- People cannot burn themselves on the hot surfaces. After installing the product (hydraulic power pack) in the machine, mark any hot surfaces that could pose a danger to people.
- Protect the hydraulic system against vibrations and integrate the hydraulic power pack into the system such that its vibrations are not transferred to people.
- If surface temperatures > 60°C occur during operation, set up safety barriers.

**Central control system and software**

- 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.
- A main switch and emergency stop function are integrated in the machine/higher-level control.

## 3.3 Sensors

The Power Unit Sensor tracks a variety of parameters and supplies their values, together with a broad range of calculated values, to the user, a superordinate control system or other peripherals.

The following measured values are tracked:

- Hydraulic fluid level (capacitive)
- Hydraulic fluid temperature
- Speed of the drive unit incorporated in the hydraulic power pack

Automatically calculated values:

- Hydraulic power pack's cycle count
- Motor utilisation
- Theoretical flow rate
- Sensor operating time spread across several temperature ranges
- Hydraulic power pack's operating time spread across several temperature ranges
- Hydraulic power pack's operating time spread across several motor load ranges

Visualisation is by means of LEDs on the communication box's cover or through the IO-Link communications system.

**Variant sensors**

Two variants of the Power Unit Sensor are available:



- IO-Link
- Switch output

Function	Sensors with IO-Link	Sensors with switch output
IO-Link	✓	-
3 switch outputs	-	✓
Visualisation	✓	✓
External fan control	✓	✓
Parametrisation interface	Parametrisation via IO-Link	✓

#### Sensors with IO-Link interface

<b>IO-Link vendor ID (HAWE)</b>	1503 (0 x 5DF)
<b>IO-Link website</b>	io-link.com
<b>IODD Finder</b>	ioddfinder.io-link.com

**Sensors with switch output** Switch outputs 1, 2, and 3 can be configured independently of each other. Parametrisation handled at factory (D 8132-1, section 2.1).

### 3.3.1 Parametrisation

#### Parametrisation interface

##### NOTICE

To facilitate sensor parametrisation, some variants feature a parametrisation interface in the communication box.

The programming cable with USB connector can be connected to the parametrisation interface. Port: see "Connecting to parametrisation interface", page 26

#### Switch outputs

Behaviour of the switch outputs can be configured as desired. The following factors can be defined for each switch output separately:

- Parameter
- Operator ( $\leq$  or  $\geq$ )
- Reference value

These factors are evaluated according to the following logic:

- [parameter for observation] [operator] [reference value]

If the configured condition is true, supply voltage is applied to the respective output.

##### **Example:**

Configuration: Hydraulic fluid temperature  $\geq 60^\circ$

This parametrisation applies 24 V DC to the output as soon as the hydraulic fluid has reached a temperature of  $60^\circ\text{C}$ .

#### Power frequency

In order to infer additional information from the measured data, e.g. current hydraulic power pack utilisation, you need to parametrise in the sensors the power frequency used for running the hydraulic power pack.

- The hydraulic power pack's power frequency can be parametrised freely in the sensor.
- Power frequency is parametrised in the sensors at 50 Hz ex-works.
- Automatic detection – 60 Hz: If the sensor is parametrised to a power frequency of 50 Hz and then measures, over a time of 1 s, a speed at least 10% above idle speed (which is at least 1650 rpm in 4-pole motors), the parametrised power frequency is automatically raised to 60 Hz. Automatic parametrisation will not occur in the reverse direction.

### 3.3.2 Measured values

**Fluid level**

Fluid level in the hydraulic power pack is measured capacitively.

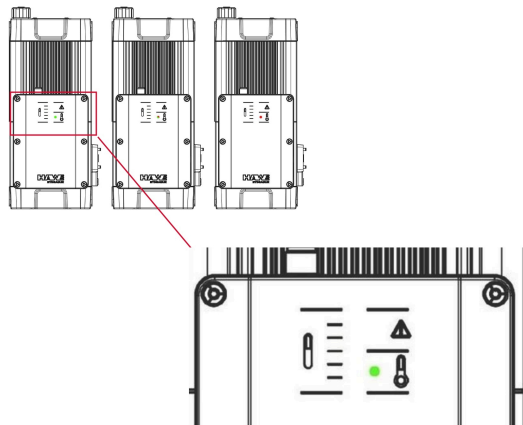
Visualisation: see Chapter 7.2.4.1, "", page 34

**Temperature**

Thresholds:

<b>Low-temperature warning</b>	< -20°C (freely parametrisable)
<b>High-temperature warning</b>	> 70°C (freely parametrisable)
<b>High-temperature fault</b>	> 80°C

Visualisation: The following values are pre-set and indicated by LED 1:



LED 1	Temperature				
	cannot be measured	≤ -20°C	-20 to 70°C	70 to 80°C	> 80°C

**Legend**

- Single-colour symbols: lit up
- 2-colour symbols: flashing

**Rotation speed**

Speed is measured by the speed transducer mounted on the motor shaft. The speed transducer is pre-configured and starts up automatically.

**Motor utilisation**

Motor utilisation is a calculated value indicating the current percentage of hydraulic power pack capacity utilised. The value is calculated from current speed, parametrised power frequency and parametrised motor slip under full load.

Because the maximum available motor torque depends on supply voltage, which is permitted to fluctuate by ±10%, valid statements regarding system pressure are impossible to make.

**Theoretical flow rate**

The measured speed and the geometric pump output volume configured ex-works are used to continuously calculate the (theoretical) flow rate. This value is equivalent to the flow rate under ideal conditions, i.e. without taking into account internal leaking etc.

**Operating data memory**

The sensor records the following operating data:

- Sensor operating time depending on temperature. (Purpose: inferring sensor's thermal stress level.)
- Hydraulic power pack's operating time depending on temperature. (Purpose: inferring hydraulic power pack's thermal stress level.)
- Hydraulic power pack's operating time depending on load. (Purpose: inferring hydraulic power pack's mechanical stress level.)
- Hydraulic power pack's cycles (purpose: inferring hydraulic power pack's mechanical stress level, e.g. hydraulic power pack's or motor's cycle duration)
- Sensor cycles. (Purpose: double-checking reliability of sensor's operating data.)
- Minimum fluid level during operation. (Purpose: inferring wear levels.)
- Mean speed during operation. (Purpose: inferring hydraulic power pack's utilisation.)

**Error codes**

For a list of all error codes and their explanations, refer to [see Chapter 9, "Troubleshooting", page 42.](#)

**IO Device Description (IODD)**

The interface description according to IO-Link specification includes a description of the device's parameter space as well as a definition of the graphical user interface. All IODDs are available for download through the IODD Finder.

**Firmware update**

While the firmware is updating, all interfaces are disabled except for the communications interface. This means that all LEDs are off, the external fan is running and the switch outputs are at GND potential.

If the firmware is invalid (e.g. because the update was interrupted), the sensors remain in this operating mode.

## 4 Transport and storage

In addition to the safety instructions presented in Section 2 "For your safety" follow the safety instructions below.

### ⚠ 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 appropriate PPE.

### 4.1 Transport equipment

### ! NOTICE

#### Preventing damage in transit

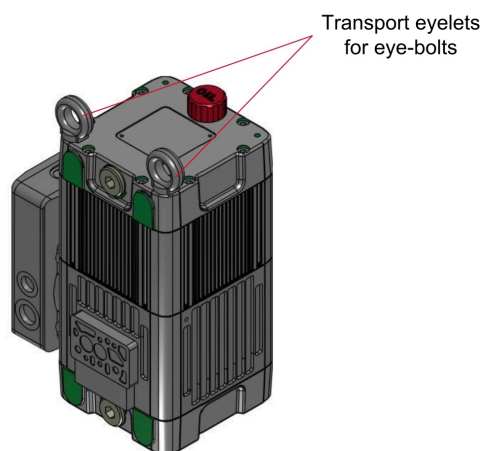
- ▶ Do not subject valves or other assembled components to any loads.
- ▶ Do not kink hoses.

Only tested and approved aids are permitted for use. Use existing eyelets or transport devices to transport hydraulic components.

- 2 transport eye-bolts on container

#### Transporting the product

- ☑ Make sure that the eye-bolts are firmly attached, that there are enough of them and that they are in the correct positions on the hydraulic power pack.
- ▶ Keep the tank vent (if present) closed. To do so, use a sealing plug or screw in the respective filter.



- ▶ For environmental reasons, only transport the product when the tank is not filled.
- ▶ Vertical version with valve assemblies requires a retaining plate for transportation purposes.

## 4.2 Scope of delivery

Depending on the respective order, delivery of the fully assembled units acc. to the order coding (D 8132-1) includes:

- Hydraulic power pack with mounted tank, motor, communication box (motor connection), pump (gear or radial piston pump)
- Drain screw for hydraulic fluid
- Breather filter with tank sealing screw
- 2 eye-bolts for transport

### Optional

- Sensors and visualisation
- Suppression module
- External fan
- Drain hose
- Connection block with mounted parts acc. to order coding

### Not included in the scope of delivery

- Motor protection circuit
- Capacitor for version with AC motor
- Accessories for commissioning
- Cable fitting M20x1.5 for version with communication box or M16x1.5 for connecting motor in communication box (not required for version with HARTING plug [P1-P3])
- Hydraulic fluid

## 4.3 Checking the delivery

### Unpacking

1. Remove product.
  - ▶ Remove the tightening straps carefully.
2. Check that the product is complete according to the bill of material/order coding and check for transport damage.
  - ▶ Note any transport damage on the transport documents or on the carrier's delivery note.
  - ▶ Take photos of any transport damage and show them to the manufacturer.
3. Properly dispose of the product packaging in accordance with local regulations.



### 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

In addition to the safety instructions presented in Section 2 "For your safety" follow the safety instructions below.

### **WARNING**



#### **Risk of injury through crushing or cutting**

Body parts might get trapped or severed 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 other people cannot enter the hazardous area.
- ▶ Wear gloves and appropriate footwear.

### **NOTICE**

#### **Material damage due to mechanical damage**

Protect the product against mechanical damage, e.g. by applying suitable padding.

- ▶ Such as foam, covers, cardboard

### 5.1 Set-up - Positioning - Attachment

### **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.

#### **Check before connecting components**

- ▶ before connecting components:
  - The dimensions of all connections, ports and connecting lines correspond to the specifications of the system.
  - Pipes, hose lines, fittings and couplings are designed to withstand the system's maximum pressure because pipes, hose lines, fittings and couplings with insufficient inner diameter and excessive length cause pressure losses. This impairs the performance of the hydraulic system.
  - All lines are as short as possible and not kinked. No bend radii are smaller than the smallest bend radius specified by the manufacturer.
  - The smallest-possible number of fittings has been used so as to minimise potential leaks.

- Hydraulic lines have been installed with stress relief to reduce noise emission and damage from resonance.
- Cylinders, fittings, connectors and hose lines have been flushed before assembly to prevent contamination of the hydraulic system.

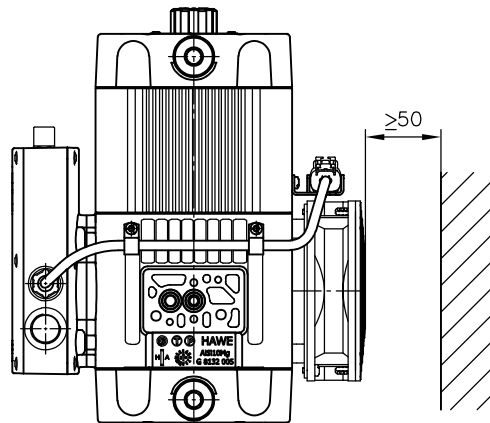
Add components which are not included in the scope of delivery (e.g. hydraulic fluid or fastening screws).

**Assembling the hydraulic power pack**

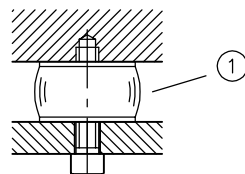
Use filtered hydraulic fluid according to the associated data sheet or the information in see "[Applicable documents](#)", page 7.

1. Place the hydraulic power pack in position in the higher-level machine.
    - Ensure sufficient ventilation.
    - Make sure there is sufficient space for operation and maintenance.
    - Drill fastening holes as instructed by the mounting hole pattern.
  2. Observe the installation position according to version, see type plate or technical data in appendix.
    - Horizontal version H
    - Vertical version V
- On devices with an external fan, the Minimum wall clearance has been observed:

**Minimum wall clearance**



3. Check that the base/frame possesses sufficient load capacity. This depends on the hydraulic power pack's weight.
4. Ensure that:
  - all the fastening bores and hydraulic connections align correctly.
  - hydraulic lines have stress relief to reduce noise emission and damage from resonance.
  - damping elements are used for fastening purposes in order to minimise vibrations and noise emission.
5. Recommended attachment:



1 Damping element  $\varnothing 40 \times 30 / M8$  (65 Shore)

Subject damping elements to compressive stresses only.

✓ Mounting hole pattern, see [D 8132-1](#)



6. Fasten the hydraulic power pack to the connection block/pump carrier by the four threaded holes (4 x M6, engagement length 16) to a maximum torque of 8 Nm:
  - For horizontal installation position: on bottom cover
  - For vertical installation position: on front and rear cover
7. After a week of operating time at the latest, check the fittings.

## 5.2 Hydraulic connection



### **⚠ WARNING**

#### **Danger of crushing/malfunction from unexpected startup**

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

- ▶ Keep the hazardous area clear of people.
- ▶ Wear protective clothing.

### **⚠ CAUTION**

#### **Risk of falling and harm to health through contact with hydraulic fluid**

Coming into contact with hydraulic fluid can cause irritation of the eyes, mucous membranes or skin. Spilled or escaped hydraulic fluid may form a slippery film on the floor surface, which could lead to loss of balance.

- ▶ Wear appropriate PPE.
- ▶ Avoid prolonged skin contact with hydraulic fluids.
- ▶ Thoroughly wash any body parts exposed to hydraulic fluid.
- ▶ Observe safety instructions on the safety data sheet of the hydraulic fluid manufacturer.
- ▶ Make sure the floor has a suitable slip resistance rating (we recommend R13 according to DIN 51130)

### **! 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.

## 5.2.1 Filling the hydraulic system

- Filling with hydraulic fluid**
- Hydraulic power pack has been connected to the higher-level hydraulic system.
  - Hydraulic system has been vented, [see Chapter 7.2.3, "Venting", page 34,](#)
  - Pipes, hose lines, fittings and couplings are clean.
  - Screw for draining hydraulic fluid is screwed in.

---

### NOTICE

The hydraulic system connected to the hydraulic power pack must contain as little hydraulic fluid as possible. Otherwise the hydraulic power pack may overflow when running after filling.

---

1. Unscrew the filler and breather filter.
2. Filter fresh hydraulic fluid. Information on the type and quantity of the hydraulic fluid and the recommended filter ([see Chapter 10.1, "Technical data"](#)).
3. Pour the filtered hydraulic fluid into the tank.
  - ▶ Maximum permissible quantity ([see Chapter 10.1, "Technical data"](#))
4. Close tank opening.
  - ▶ Filler and breather filter
5. 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

#### Risk of injury due to electric shock from the operating capacitor

Burns, serious injuries or death may result if electromagnetic waves lead to functional interference with the temperature measurement.

- ▶ Ensure the operating capacitor is discharged to a safe voltage level.

### 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 or 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 or an aggressive environment.
- ▶ To avoid overheating, always keep ventilation openings (if any) open to allow sufficient air circulation.

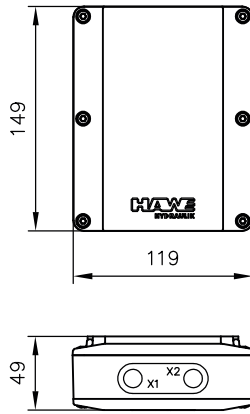
### 5.3.1 Connecting the sensors

1. Secure the unit against being switched on unintentionally.
2. Ensure that nobody is in the danger area.
3. Plug in the sensors' M12 plug (5-pin, male, A-coded):
  - Sensors with IO-Link (coding E1): Position X1: permitted cable length 20 m (M12 for IO-Link)
  - Sensors with switch output (coding E2): Position X2, permitted cable length 20 m (M12 for interface's switch output)

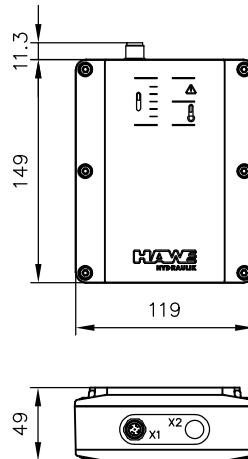
**! NOTICE**

When not using the plug, protect it with an IP67-rated protective cover.

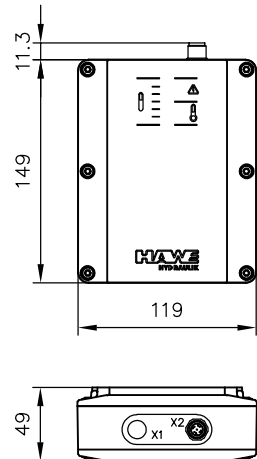
Coding E0



Coding E1



Coding E2



**Observe the following pin assignment:**

a) Sensors with IO-Link (class B):

Pin	Function
1	L+ (24 V DC for sensor)
2	P 24 (24 V DC for external fan)*
3	L- (GND for sensor)
4	C/Q (IO-Link data line)
5	N24 (GND for external fan)*

\* When running without an external fan, pins 2 and 5 do not need to be assigned.

b) Sensors with switch output (class A):

Pin	Function
1	L+ (+24 V DC for sensor and external fan)
2	Switch output 1
3	L- (GND for sensor and external fan)
4	Switch output 2
5	Switch output 3

4. Check the electrical connections after a week's operating time.

### 5.3.2 Connecting the motor

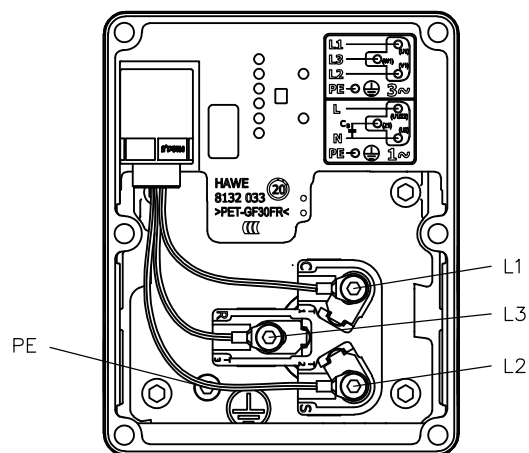
1. Secure the unit against being switched on unintentionally.
2. Ensure that nobody is in the danger area.
3. Wire the motor with the machine controls in accordance with the circuit diagram.

**Optional connection to communication box (Coding P0)**

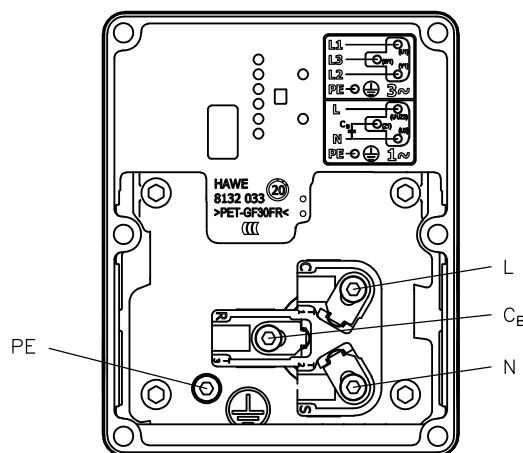
- The product type can optionally connect the motor to the communication box (order coding in [D 8132-1D 8132-1](#)).

- ▶ Remove communication box's cover

### 3-phase power



### Alternating current



	Y *	Δ
L1	U1	U1/W2
L2	V1	V1/U2
L3	W1	W1/V2
PE	⊕	⊕

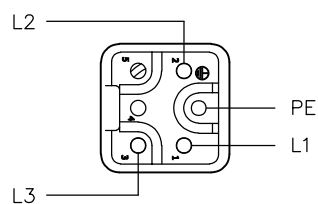
L	U1/Z2
N	U2
C <sub>B</sub>	Z2
PE	⊕

\* U2, V2, W2 connected at factory

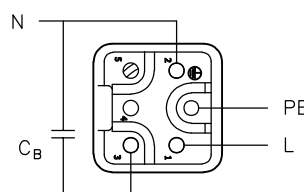
### Optional connection with plug connector (Coding P1 P2 P3)

- ☑ The product type can optionally connect the motor using a plug connector (order coding in D 8132-1D 8132-1).

### 3-phase power



### Alternating current



- ▶ Position of plug connection in D 8132-1.

- ✓ Determine the maximum current consumption, see Chapter 10.1.7, "Motor data", page 53
- ✓ Set motor protection circuit

### **i** Set motor protection circuit to 0.85 to 0.9 times the motor current ( $I_M$ ).

- When operating normally, the motor protection circuit will not trip prematurely.
- When the pressure-limiting valve triggers, the period until shutdown does not become long enough for the hydraulic fluid's temperature to exceed maximum.

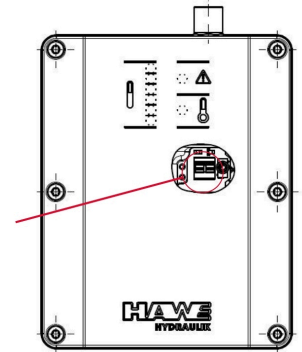
- ✓ Run a test run to check the motor protection circuit's settings.

- Place the communication box's cover back in position and tighten the screws to a torque of  $1 + 0.3$  Nm.
- Connect the hydraulic power pack to the electrical power supply.
- Check the electrical connections after a week's operating time.

### 5.3.3 Connecting an external fan

#### Communication box (Coding P0)

- ☑ Product type features a communication box (order coding in D 8132-1).
- ☑ The unit is secured against being switched on unintentionally.
- ☑ Motor is connected.
- ▶ Check external fan's wiring to communication box.

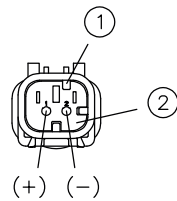


#### Plug connector (Coding P1 to P3)

- ☑ The unit is secured against being switched on unintentionally.
- ☑ Motor is connected.
- ▶ Connect external fan using the plug connector.

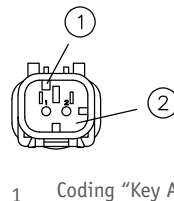
#### Plug connector for external fan

##### F10S



- 1 Coding "Key B" for 24 V DC Plug connector 776428-2
- 2 Colour of connector housing: grey

##### F11S, F12S



- 1 Coding "Key A" for 1~230 V/1~110 V Plug connector 776428-1
- 2 Colour of connector housing: red

### 5.3.4 Connecting the operating capacitor

For alternating current only.

1. Secure the unit against being switched on unintentionally.
2. Ensure that nobody is in the danger area.
3. Wire the operating capacitor to the machine controls in accordance with the circuit diagram.
4. Connect the hydraulic power pack to the electrical power supply.
5. Check the electrical connections after a week's operating time.

### 5.3.5 Connecting to parametrisation interface

#### Materials and aids

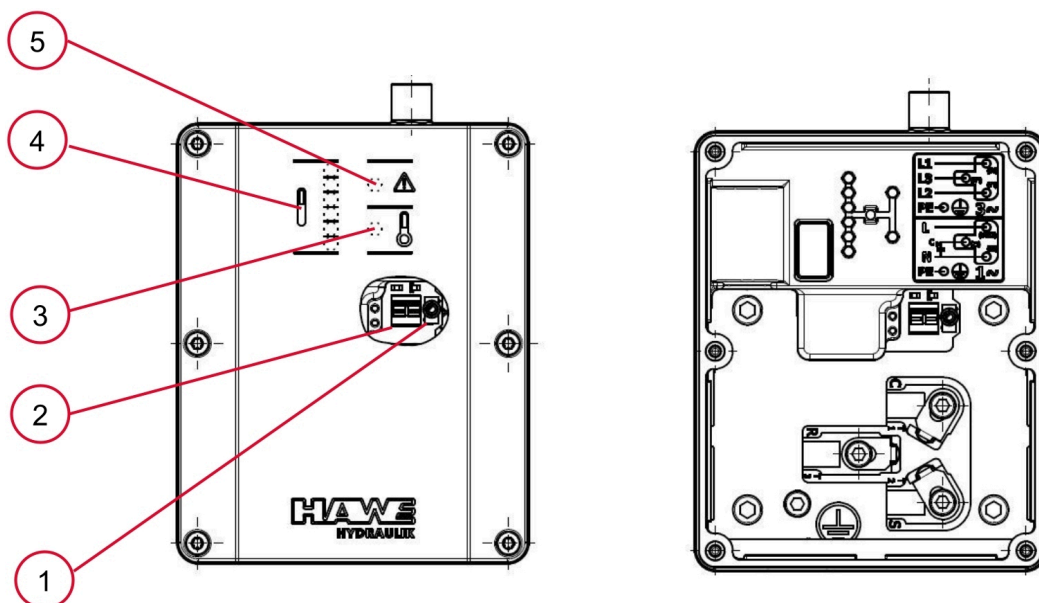
- Programming cable with USB plug (material number: 6964 0050-08)
- HAWE eLink parametrisation software, download from [www.hawe.com/edocs](http://www.hawe.com/edocs)

#### Parametrisation interface with HAWE eLink

When using the parametrisation interface and the HAWE parametrisation tool HAWE eLink, connect the programming cable and Power Unit Sensor as follows:

Sensors with switch output are available. (Order coding in D 8132-1)

1. Secure the unit against being switched on unintentionally.
2. Remove communication box's cover.
3. Plug the programming cable into one of the PC's USB ports.
4. Power the Power Unit Sensor through the customer interface.
  - ✓ Parametrisation and access to sensors' parameters is now possible through HAWE eLink.
  - ✓ Scope of information is equivalent to IO-Link variant.
5. Remove the programming cable.
6. Place the communication box's cover back in position and tighten the screws to a torque of 1 + 0.3 Nm.



- 1 Parametrisation interface
- 2 Port for the external fan (version F1)\*
- \* Other versions of the external fan are connected in the higher-level machine using a cable or connector.
- 3 Visual temperature indicator for hydraulic fluid
- 4 Visual fluid level indicator
- 5 Visual status indicator

### Sensors with IO-Link

Sensors with IO-Link are available. (Order coding in D 8132-1D 8132-1)

- Parametrisation is handled through the superordinate machine control's IO-Link interface.

**⚠ WARNING****Risk of injury from pressurised components**

Risk of serious injury or death. When releasing lines and components on pressurised systems, hydraulic fluid may escape at high pressure and enter the body via your skin or eyes.

- ▶ Check all components for correct installation before charging the hydraulic system to operating pressure.
- ▶ Depressurise the system before releasing lines and components on the hydraulic system.

**⚠ WARNING****Danger of crushing/malfunction from unexpected startup**

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

- ▶ Keep the hazardous area 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 and protective goggles.
- ▶ 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.

**⚠ CAUTION**

**Prolonged periods of working at a noise level of 80 dB (A) can lead to permanent hearing loss.**

- ▶ Wear hearing protection.

**! 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.

**6.1 Checks before commissioning****Check for correct connection**

- Only trained specialist personnel may perform commissioning.
- The unit is secured against being switched on unintentionally.
- Any accumulator systems have been filled,  
see Chapter 7.2.9, "Checking accumulator systems", page 38



An external fan has been connected, if present,  
see [Chapter 5.3.3.1, ""](#), page 26.

Electric power supply has been connected.

1. Fixed installation: attachment to the machine, the frame and the base
2. Hydraulic: piping, hoses, cylinders, motors, connectors (e.g. flange connectors, fitting)
3. Electrical: wiring, power supply, controller

### Setting the motor protection circuit

► The electric motor must be protected with a motor protection circuit, see [Chapter 5.3.2, "Connecting the motor"](#), page 24

### Filling the hydraulic power pack with hydraulic fluid

#### NOTICE


The hydraulic system connected to the hydraulic power pack must be in the state in which it contains the lowest-possible volume of oil. The hydraulic power pack may otherwise overflow when running after filling.

1. Check the hydraulic fluid level,  
see [Chapter 7.2.4, "Checking the hydraulic fluid level"](#), page 34
  - a) For filling quantity, see [D 8132-1](#).
  - b) Filter fresh hydraulic fluid. Recommended filter: 10 µm.
  - c) Unscrew the breather filter.
  - d) Fill filtered hydraulic fluid into the tank – up to the fill level monitor's top marking on the breather filter.
  - e) Screw on the breather filter.
2. Vent the connecting hydraulic lines 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.
3. Vent the hydraulic power pack, see [Chapter 7.2.3, "Venting"](#), page 34

## 6.2 Switching the hydraulic system on/off

#### NOTICE

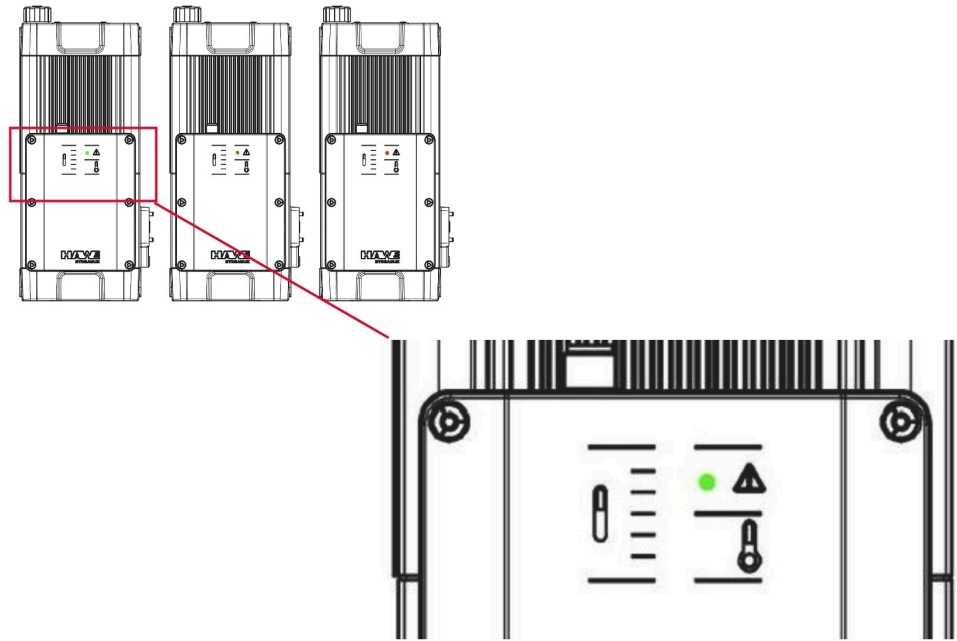
**The hydraulic power pack is switched on and off via the system control.**

 When using with an external fan, it must be ensured that fresh air can be aspirated and that the hot air can be vented.

## 6.3 Functional test

### Checking the sensor signals

1. Turn on the supply voltage
2. Check the LED status
  - External fan on, LEDs off, all switch outputs (optional) switched to GND
  - External fan off, LED for overall status is red, all switch outputs (optional) switched to GND
  - The operating states of the external fan, LEDs and switch outputs (optional) match their parametrisation.
  - Check LEDs' status
  - Compare switch outputs' status with expected values



	Overall status – hydraulic power pack		
	no error/warning	Warning	Error
Hydraulic power pack off			
Hydraulic power pack on			

**Legend**

- Single-colour symbols: lit up
- 2-colour symbols: flashing

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.

---

In addition to the safety instructions presented in Section 2 "[For your safety](#)" follow the safety instructions below.

## 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	Once a year
Visual check: Electrics (cables, connections, plugs)	✓	✓		
Venting		✓		
Visual check for external leakage	✓		✓	
Cleaning and visual check for damage				✓ and as required
Checking the hydraulic fluid level			✓	
Replacing the hydraulic fluid				✓
Cleaning or replacing the filler and breather filter				✓
Checking the motor				✓
If present: Replacing the pressure filter or return line filter				✓
If present: Checking and replacing the valves				✓
If present: Checking accumulator systems		✓		

## 7.2 Service

### WARNING

**Risk of injury due to stored pressure escaping in an uncontrolled manner.**

Risk of serious injury or death.

- ▶ Relieve the pressure in the hydraulic system prior to all maintenance and disassembly work.

### WARNING

**Danger of crushing/malfunction from unexpected startup**

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

- ▶ Keep the hazardous area clear of people.
- ▶ Wear protective clothing.



### **⚠ CAUTION**

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

Risk of injury from minor burns

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

### **⚠ CAUTION**

**Prolonged periods of working at a noise level of 80 dB (A) can lead to permanent hearing loss.**

- ▶ Wear hearing protection.

### **! 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)

## **7.2.1 Visual check: Electrics (cables, connections, plugs)**

### **! NOTICE**

**Damage due to incorrect motor rotation direction**

Incorrect motor rotation direction will damage the pump.

- ▶ Always check the rotating direction during the test run.

**Immediately repair any damage of this kind to electrical systems:**

- ▶ Visible signs of external damage, like brittle insulation, abrasion, kinks, material aging etc.
- ▶ Corroded electrical plugs and sockets
- ▶ Check all electrical connections and connectors for corrosion, replace if necessary.
- ▶ Check all electrical lines and connectors for damage (brittling insulation, abrasion etc.) and replace if necessary.

## **7.2.2 Cleaning and visual check for damage**

### **! NOTICE**

**Damage from improper cleaning**

The use of incorrect cleaning agents will damage seals, resulting in leakage.

**Observe the following points when cleaning the hydraulic system:**

- ▶ Only clean with a damp, lint-free cloth.
- ▶ Do not use cleaning wool or similar.
- ▶ Never use brake cleaner or universal thinner to clean glued labels and markings.
- ▶ Do not use sharp, angular or pointed tools for cleaning.
- ▶ Do not use high-pressure cleaners.
- ▶ Never spray the electronics/electronics cover with water (e.g. using a garden hose or high-pressure cleaner)

### 7.2.3 Venting

- Trained specialist personnel
  - Correct connection has been checked.
  - Loads are lowered.
1. 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.
  2. Place a suitable receptacle under the hydraulic power pack.
  3. Switch on the system.
  4. Vent the connecting hydraulic lines to the hydraulic power pack.
    - Choose a venting point as high up as possible.
    - Slightly open the vent screw on the hydraulic power pack or connected consumer.
    - Switch the directional valve so that the pump can operate with pressure-free circulation. This is shown by the hydraulic schematic for the system.
    - If the controller is not designed for this:
      - Connect a pipe screw connection with a short pipe bracket and a transparent plastic hose to port P.
      - Insert the other end into the tank filler opening (unscrew the breather filter).
  - ✓ When the hydraulic fluid flow is free of bubbles, the hydraulic system has been flushed.
  5. Check the hydraulic fluid level again after the hydraulic system has been vented.
  6. Seal off the vent points again (e.g. vent screw).
  7. Properly dispose of the escaped hydraulic fluid, hydraulic fluid container and any cloths contaminated with hydraulic fluid.

### 7.2.4 Checking the hydraulic fluid level

#### 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.

**Hydraulic power packs without fluid level indicator: E0**

 **On hydraulic power packs without a fluid level indicator, use an oil dipstick to check the fluid level.**

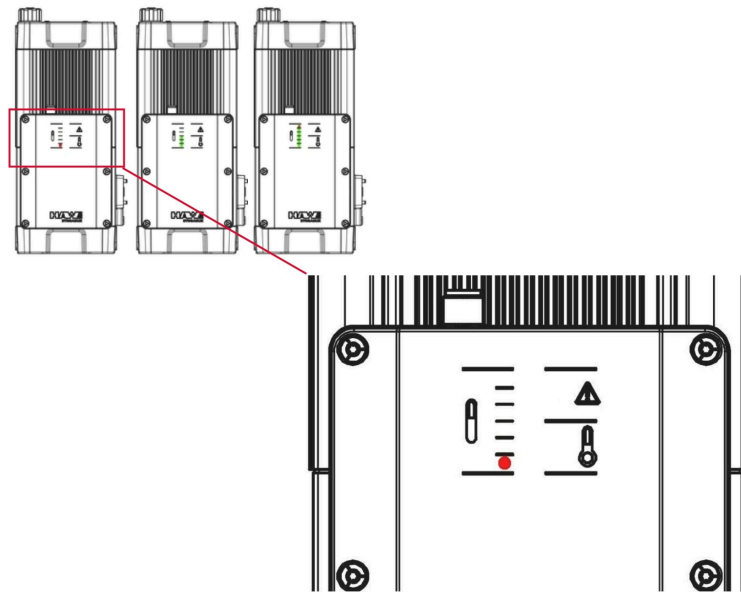
- The hydraulic power pack features a fluid level indicator

1. Check the fluid level in the tank.
2. Fluid level too low: top up hydraulic fluid.

**Hydraulic power packs with capacitive fluid level measurement: E1 and E2**

- The hydraulic power pack features a fluid level indicator

1. Check the fluid level in the tank.



	Fluid level								
	Cannot be measured	0 to 10%	10 to 20%	20 to 40%	40 to 60%	60 to 80%	70 to 80%	80 to 98%	> 98%
LED 6									
LED 5									
LED 4									
LED 3									
LED 2									
LED 1									

**Legend**

- Single-colour symbols: lit up
- 2-colour symbols: flashing

2. Fluid level too low: top up hydraulic fluid.

## 7.2.5 Replacing the hydraulic fluid



### ⚠ 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 and protective goggles.
- ▶ 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.

### ! NOTICE

#### **No contamination may enter the product or the hydraulic system.**

Otherwise, the product may suffer damage.

- ▶ Fill hydraulic fluid via the system filter or a mobile filter station wherever possible.
- ▶ Observe the recommended cleanliness class for the hydraulic fluid.
- ▶ Keep all pipes, hose lines, fittings and couplings clean.
- ▶ Carry out all work in a clean environment.
- ▶ Clean hands and clothing before working.

#### **Prerequisites for working on the hydraulic system**

- The hydraulic system is switched off and secured against unintentional restart.
- Loads are lowered.
- The system is pressureless.
- The system has cooled down.
- The work environment is clean.
  - ✓ Work can be performed on the hydraulic system.
- Directional valve is in switching position in which the depressurised circulation of the pump is possible
  1. Place a suitable receptacle under the hydraulic power pack.
    - Observe the maximum tank filling quantity
    - Tank filling quantity: (see Chapter 10.1, "Technical data", page 45)
  2. Open the hydraulic fluid drain so that the hydraulic fluid can completely flow out of the tank into the receptacle.
  3. Unscrew and remove the filler and breather filter.
  4. Filter fresh hydraulic fluid. Recommended filter: 10 µm.  
see Chapter 10.1, "Technical data", page 45
  5. Pour the filtered hydraulic fluid into the tank.
  6. Seal off the tank opening. To do so, screw in the breather filter.
  7. Vent the hydraulic system, see Chapter 7.2.3, "Venting".
  8. Correctly dispose of the drained hydraulic fluid, hydraulic fluid container and any cloths contaminated with hydraulic fluid.

### Replacing the hydraulic fluid



## 7.2.6 Cleaning or replacing the filler and breather filter

1. Open the filler and breather filter in order to inspect the filter.
2. Check the filter for contamination.
3. In the event of heavy contamination, clean the filter with compressed air.
4. In the event of high dust content, replace the filter or filter cartridge.

## 7.2.7 Replacing the pressure filter or return line filter

Hydraulic power pack has been switched on

1. Visual inspection for damage.
  2. If external leakages are found, shut down and repair the system.
- The filter contaminated signal indicates that changing the filter is required.

### Replacing the filter

#### Prerequisites for working on the hydraulic system

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

Loads are lowered.

The system is pressureless.

The system has cooled down.

The work environment is clean.

✓ Work can be performed on the hydraulic system.

1. When replacing the return line filter, hydraulic fluid may escape. Use suitable aids, e.g. a cloth, to catch escaping hydraulic fluid.
2. Screw the return line filter out of the hydraulic power pack's connection or filter block. Make sure that the double nipple for holding the return line filter is not screwed out as well.
3. Wet the new filter with hydraulic fluid on its front seal.
4. Screw the new filter back onto the double nipple's thread on the manifold by hand.
5. Commission the hydraulic power pack.

## 7.2.8 Checking and replacing the valves

### Checking

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

### Replacing



#### Faulty valve

If any leakages or other impairments to valve function are found, the valve needs to be replaced.

- Contact HAWE

1. Switch off the hydraulic system and secure it from being unintentionally switched on again.
2. Ensure that the system is depressurised.
3. Remove any component coverings.
4. Disconnect the connection cable from the coil of the solenoid valve if necessary.
5. Remove the valve.
6. Screw on the new valve.
7. Connect the connection cable to the coil of the solenoid valve.
8. Check the function of the solenoid valve by actuating.
9. Re-attach the component coverings.
10. Commission the hydraulic power pack, see Chapter 6, "Start-up", page 28.

## 7.2.9 Checking accumulator systems

**Maintenance interval** As required.

---

**! NOTICE**

**Damage to accumulator systems**

Accumulators should be filled using designated equipment in accordance with the pressure specifications of the hydraulic schematic. The relevant operating and maintenance manuals must be followed.

---

**Checking and filling**

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**! NOTICE**

Refer to the following additionally applicable documents concerning checking and filling of accumulator systems:

- ▶ D 7969
  - ▶ D 7571
-

## 7.2.10 Checking the motor

### NOTICE

#### Testing electrical equipment

- ▶ The testing must only be performed by an electrically skilled person or by electrically instructed personnel.
- ▶ Only use suitable measurement and test devices.
- ▶ The high-voltage test values or results of the insulation test may be impaired due to old or contaminated hydraulic fluid.

### NOTICE

#### Operating electrical systems safely

You can only properly and reliably operate electrical systems or equipment in a safe manner if their condition is guaranteed to be perfect at all times. The German DGUV Vorschrift 3 accident prevention regulations specifies inspection intervals and test methods. The associated instructions (DA) detail how the safety goals can be achieved.

#### Recurring inspections acc. to DGUV Vorschrift 3

- Visual check
- Check PE and equipotential bonding
- Check insulation
- Check shutdown conditions
- Check circuit breakers
- Measure earth
- Test certificate

### NOTICE

#### Faulty motor

Replace hydraulic power pack/motor. Contact HAWE.

## 7.2.11 Replacing an external fan

### 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.

Maintenance work may be performed only by a qualified electrician or a person who has received electrical engineering instructions.

The unit is secured against being switched on unintentionally.

1. Disconnect the unit from the electric power supply.
2. Disconnect the external fan from the communication box or unplug the plug connector.
3. Undo the flange connection between tank and external fan.
4. New external fan:
  - ▶ Connect mechanically.
  - ▶ Wire to communication box or connect using the plug connector.
5. Connect the electric power supply.

## 8 Disassembly and disposal

In addition to the safety instructions presented in Section 2 "For your safety" follow the safety instructions below.

### 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 and protective goggles.
- ▶ 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.

### 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 cloths, 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
Excessive noise production	Fluid level in the tank too low (foaming hydraulic fluid)	<ul style="list-style-type: none"> <li>▶ see "Checking the hydraulic fluid level", page 34.</li> <li>▶ Top up hydraulic fluid.</li> </ul>	
	Defective pump	<ul style="list-style-type: none"> <li>▶ Remove the hydraulic power pack from operation and replace or send in for repair.</li> <li>▶ Alternatively: replace the pump on site.</li> </ul>	
	Air bubbles due to poor venting of the hydraulic system (foaming hydraulic fluid)	<ul style="list-style-type: none"> <li>▶ see "Venting", page 34.</li> </ul>	
	Water in the hydraulic fluid	<ul style="list-style-type: none"> <li>▶ Check contamination of hydraulic fluid.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Flush lines with filtered hydraulic fluid.</li> <li>▶ If necessary, see "Replacing the hydraulic fluid", page 36.</li> </ul>
	Components (e.g. fittings) loosened by vibrations	<ul style="list-style-type: none"> <li>▶ Remove the hydraulic power pack from operation.</li> <li>▶ Check loosened components and their seals for damage and, if necessary, replace them. Refasten components.</li> </ul>	
Consumer does not move	Power supply disrupted	<ul style="list-style-type: none"> <li>▶ Measure the voltage.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Restore power supply.</li> </ul>
	motor faulty	<ul style="list-style-type: none"> <li>▶ There is voltage present but the motor does not work.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Replace the hydraulic power pack.</li> <li>▶ Contact HAWE.</li> </ul>
Insufficient or no pressurisation	Faulty connections	<ul style="list-style-type: none"> <li>▶ Check the connections.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Replace the connections if required.</li> </ul>
	Hydraulic power pack is switched off	<ul style="list-style-type: none"> <li>▶ Switch on hydraulic power pack and check it is operating correctly.</li> </ul>	
	Supply voltage too low	<ul style="list-style-type: none"> <li>▶ Measure voltage directly on the motor.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Restore power supply.</li> </ul>
	Heavily contaminated hydraulic fluid	<ul style="list-style-type: none"> <li>▶ With the hydraulic power pack connected, flush it with filtered hydraulic fluid.</li> <li>▶ If necessary, see "Replacing the hydraulic fluid", page 36.</li> </ul>	
Hydraulic power pack provides no flow rate, or the flow rate is too low	Use of excessively viscous hydraulic fluid		
	Hydraulic power pack faulty	<ul style="list-style-type: none"> <li>▶ Replace the hydraulic power pack.</li> <li>▶ Contact HAWE</li> </ul>	
Hydraulic power pack overheated	External fan faulty	<ul style="list-style-type: none"> <li>▶ There is voltage present but external fan is not running.</li> <li>▶ Loud noises</li> </ul>	<ul style="list-style-type: none"> <li>▶ <a href="#">Replacing an external fan.</a></li> </ul>
	Motor faulty	<ul style="list-style-type: none"> <li>▶ There is voltage present but the motor does not work.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Replace the hydraulic power pack.</li> <li>▶ Contact HAWE.</li> </ul>

### Sensor error codes

Error code	Type	Description
0 [0x0]	Info	No malfunction
4096 [0x1000]	Error	General malfunction – unknown error
6144 [0x1800]	Error	System monitoring error – the firmware module for system monitoring is reporting an error.

Error code	Type	Description
6145 [0x1801]	Warning	Orientation unknown – the orientation cannot be determined and is not parametrised.
6146 [0x1802]	Warning	Fluid level not detected – the fluid level cannot be measured.
6147 [0x1803]	Warning	Fluid level too high – the fluid level is too high. The hydraulic power pack may overflow.
6148 [0x1804]	Warning	Fluid level low – the fluid level is low but still within the permitted range.
6149 [0x1805]	Error	Minimum fluid level not reached – the fluid level is too low. Top up the hydraulic fluid to prevent damage.
6150 [0x1806]	Warning	Conductivity warning
6151 [0x1807]	Warning	Speed too high
6152 [0x1808]	Warning	Watchdog reset
6153 [0x1809]	Error	Reduced function scope – a fault has occurred and the device has been restarted with limited functions.
6154 [0x180A]	Error	Safe mode – several faults have occurred and the device has been restarted with minimal functions (diagnostics).
6155 [0x180B]	Error	Module deactivated – a function module has been deactivated in order to ensure the stability of the remaining system.
6156 [0x180C]	Warning	Temperature unknown – the temperature cannot be measured or the measured value is potentially invalid (e.g. if the fluid level is too low)
6157 [0x180D]	Warning	High permittivity – the hydraulic fluid's permittivity has reached a critical value. The fluid may be impure.
6163 [0x1813]	Error	Measurement reference error – the measurement reference's capacity is too low. There is most likely not enough hydraulic fluid in the hydraulic power pack.
6164 [0x1814]	Info	Interference in measurement environment – there is a high degree of interference in the measurement environment. This adds a minor level of uncertainty to the measured values.
16384 [0x4000]	Error	Temperature error – overload
16912 [0x4210]	Warning	Overheating
16928 [0x4220]	Warning	Temperature too low
20480 [0x5000]	Error	Hardware fault – replace device.
20496 [0x5010]	Error	Component fault – replace device.
20497 [0x5011]	Error	Memory error
24576 [0x6000]	Error	Software error – check firmware version.
25376 [0x6320]	Error	Parametrisation error – check data sheet and values.
25377 [0x6321]	Error	Parameter missing – check data sheet.
25424 [0x6350]	Error	Parameter changed – check configuration.
30480 [0x7710]	Error	Short circuit – check installation. A short circuit is also possible within the hydraulic power pack.
30481 [0x7711]	Error	Short to ground – check installation.
35840 [0x8C00]	Error	Application error – reset device and check firmware version.
35841 [0x8C01]	Warning	Simulation active – check operating mode and firmware version.

<b>Error code</b>	<b>Type</b>	<b>Description</b>
35856 [0x8C10]	Warning	Process data too high – process data implausible.
35872 [0x8C20]	Error	Measuring range error – check application.
35888 [0x8C30]	Warning	Process data too low – process data implausible.
35904 [0x8C40]	Info	Cleaning message
35905 [0x8C41]	Info	Refill message
35906 [0x8C42]	Info	Replacement message
36350 [0x8DFE]	Error	Test parameter event A
36351 [0x8DFF]	Error	Test parameter event B



# 10 Annex

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 upon request.

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

<b>Conformity</b>	<ul style="list-style-type: none"> <li>▪ Declaration of incorporation according to Machinery Directive 2006/42/EC</li> <li>▪ Declaration of conformity according to Low-Voltage Directive 2014/35/EU</li> <li>▪ UKCA declaration of conformity according to Electrical Equipment (Safety) Regulations 2016 No. 1101</li> </ul> <p>for all coding except -U</p> <ul style="list-style-type: none"> <li>▪ UL conformity of stators – use of UL-approved insulation materials, motor wires according to UL Style 1330</li> <li>▪ Communication box – UL-approved plastic, UL File E41938 and UL File E121562</li> </ul> <p>for coding -U see SK 8132 000 U</p>
<b>Version / Model</b>	Hydraulic power pack with built-in electric motor (1-phase or 3-phase version) and single-circuit pump
<b>Pump version</b>	Valve-controlled radial piston pump or gear pump
<b>Operating mode</b>	<ul style="list-style-type: none"> <li>▪ Short period operation (S2)</li> <li>▪ Periodic intermittent operation (S3)</li> </ul>
<b>Installation position</b>	vertical (INKA..V) or horizontal (INKA..H)
<b>Material</b>	Housing: Aluminium Corrosion-proof up to 480 h after salt spray test ISO 9227 Communication box: Plastic
<b>Attachment</b>	Tightening torque: 8 Nm
<b>Hydraulic connection</b>	Via screwed-on connection block according to D 8132-1
<b>Hydraulic fluid</b>	Hydraulic fluid, according to DIN 51 524 Parts 2 to 3; ISO VG 10 to 68 according to DIN ISO 3448 Viscosity range: <b>type H:</b> 4 - 800 mm <sup>2</sup> /s, <b>type HD:</b> 4 - 300 mm <sup>2</sup> /s, <b>type Z:</b> 6 - 500 mm <sup>2</sup> /s Optimal operating range: <b>type H:</b> 10 - 500 mm <sup>2</sup> /s, <b>type HD:</b> 10 - 100 mm <sup>2</sup> /s, <b>type Z:</b> 10 - 100 mm <sup>2</sup> /s Also suitable for biologically degradable hydraulic fluids type HEES (synthetic ester) at operating temperatures up to approx. +70°C.
<b>Cleanliness level</b>	<b>ISO 4406</b> <hr style="width: 20%; margin-left: 0;"/> 21/18/15...19/17/13
<b>Temperatures</b>	Environment: approx. -20 to +60°C, hydraulic fluid: -20 to +80°C, ensure the correct viscosity range. Biologically degradable hydraulic fluids: note manufacturer specifications. With consideration for the seal compatibility, not above +70°C. Start temperature: down to -40 °C is permissible (take account of the start viscosities!), as long as the steady-state temperature is at least 20 K higher during subsequent operation.

<b>Rotation direction</b>	Radial piston pump (type H) – any Gear pump (type Z) – anticlockwise (Rotation direction only ascertainable from check of flow rate; if there is no flow rate in the 3-phase version, replace two of the three main conductors)		
<b>Speed range (min ... max)</b>	Radial piston pump H:	<b>H:</b>	200 to 3500 rpm 200 to 2850 rpm (optimal)
	Gear pump Z:	<b>Z 0.75:</b> <b>Z 1.5:</b> <b>Z 2.25:</b>	1000 to 3000 rpm 800 to 2500 rpm 800 to 2000 rpm
<b>Visualisation</b>	Visualisation via LEDs. No output of values.		
<b>Breather filter</b>	PU filter, filter fineness 10 µm Protect breather filter against moisture penetration.		
<b>Operating elevation</b>	< 2000 m above sea level		
<b>Permitted water content</b>	< 0.1%		
<b>Transport equipment</b>	2 transport eye-bolts on container		

### 10.1.2 Pressure and volumetric flow

<b>Pressure</b>	<ul style="list-style-type: none"> <li>Pressure side (port P): depending on version and flow rate see <a href="#">D 8132-1</a></li> <li>Suction side (container interior): ambient air pressure. Not suitable for charging.</li> </ul>
<b>Start against pressure</b>	<ul style="list-style-type: none"> <li>The version with 3-phase motor and pump type H, Z can run counter to the pressure <math>p_{max}</math>.</li> <li>The version with 3-phase motor and pump type HD can only run counter to a minor pressure (circulation pressure).</li> <li>The version with single-phase motor cannot start against pressure.</li> </ul>
<b>Flow rate</b>	see <a href="#">D 8132-1</a>

### 10.1.3 Weight

<b>Basic type</b>	<b>Type</b>	
	INKA 14	10 kg
<b>Tank</b>	<b>Tank size</b>	
	1	+ 0 kg
	2	+ 0.3 kg
	3	+ 0.7 kg
<b>Motor</b>	3 ~ 0.25 kW	+ 0.3 kg
	3 ~ 0.55 kW	+ 2.2 kg
	1 ~ 0.37 kW	+ 1.2 kg
<b>Pump version</b>	<b>Type</b>	
	H	+ 0.3 kg
	HD	+ 1.6 kg
	Z	+ 0.5 kg
<b>External fan</b>	F1	+ 0.2 kg
	F10L, F10S	+ 0.25 kg
	F11L, F12L, F11S, F12S	+ 0.54 kg

#### Example 1:

INKA 141 - H 0,27.. -3 x.. 0,25

Category	Basic pump	Tank	Motor	Pump version	Total weight
<b>Selection</b>	<b>INKA 14</b>	<b>1</b>	<b>3 ~ 0.25 kW</b>	<b>H 0.27</b>	
<b>Individual weights</b>	10 kg	0 kg	0.3 kg	0.3 kg	= 10.6 kg

### 10.1.4 Tank size

Coding	Vertical		Horizontal	
	Fill volume (l)	Usable volume (l)	Fill volume (l)	Usable volume (l)
<b>1</b>	1.60	0.55	1.60	0.65
<b>2</b>	2.10	1.05	2.05	0.85
<b>3</b>	2.75	1.65	2.60	1.10

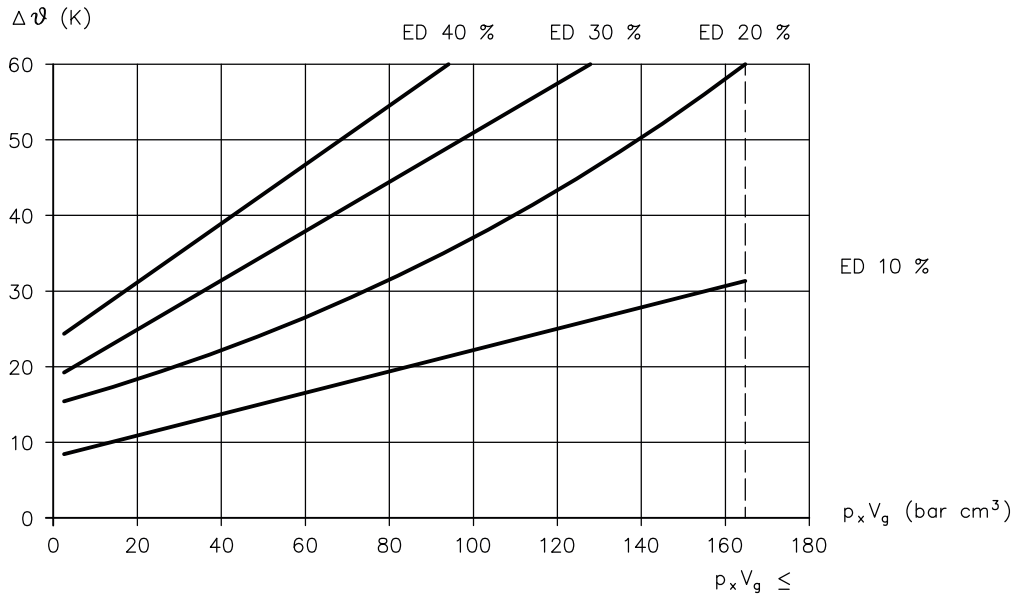
#### NOTICE

Tank size 1 only available with 3-phase motor 0.25 kW

**10.1.5 Characteristic lines**

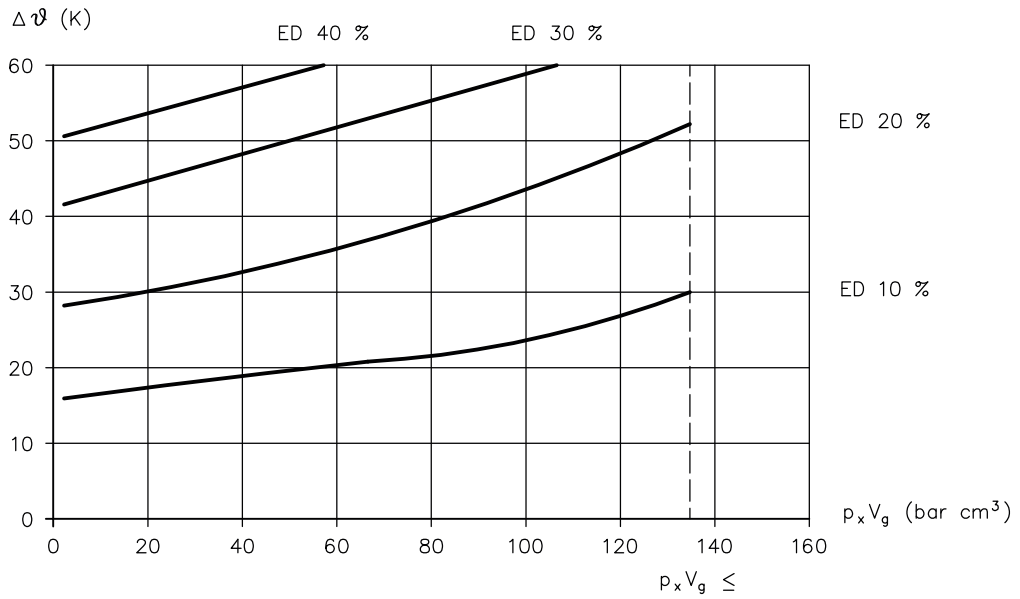
**10.1.5.1 Build-up of heat**

**0.25 kW**



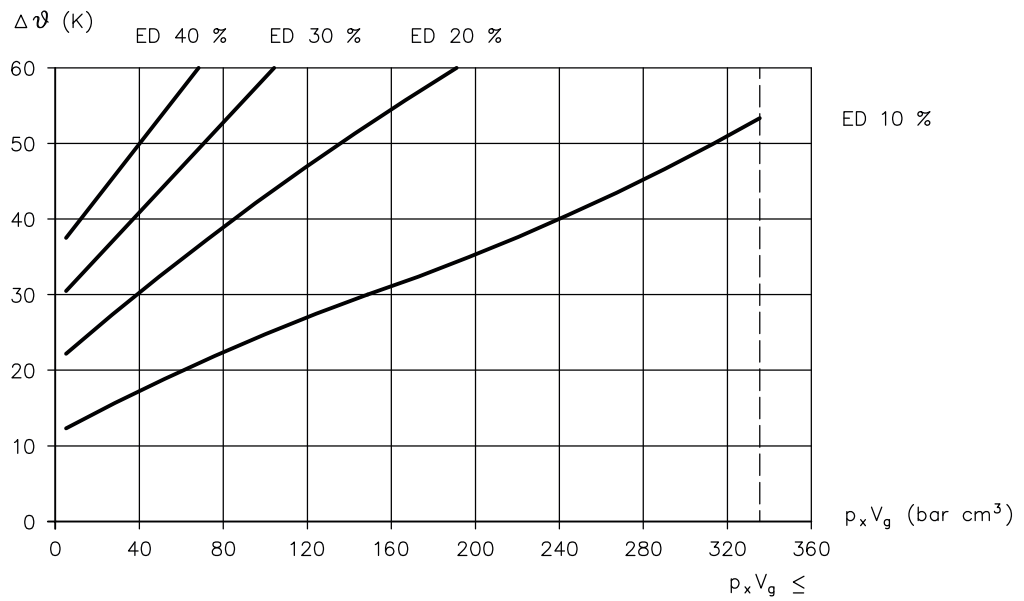
$p_x V_g$  hydraulic work value (bar cm<sup>3</sup>);  $\Delta \vartheta$  steady-state excess temperature (K)  
Duty cycle = Relative duty cycle

**0.37 kW**



$p_x V_g$  hydraulic work value (bar cm<sup>3</sup>);  $\Delta \vartheta$  steady-state excess temperature (K)  
Duty cycle = Relative duty cycle

**0.55 kW**



$p_x V_g$  hydraulic work value (bar cm<sup>3</sup>);  $\Delta \vartheta$  steady-state excess temperature (K)  
Duty cycle = Relative duty cycle

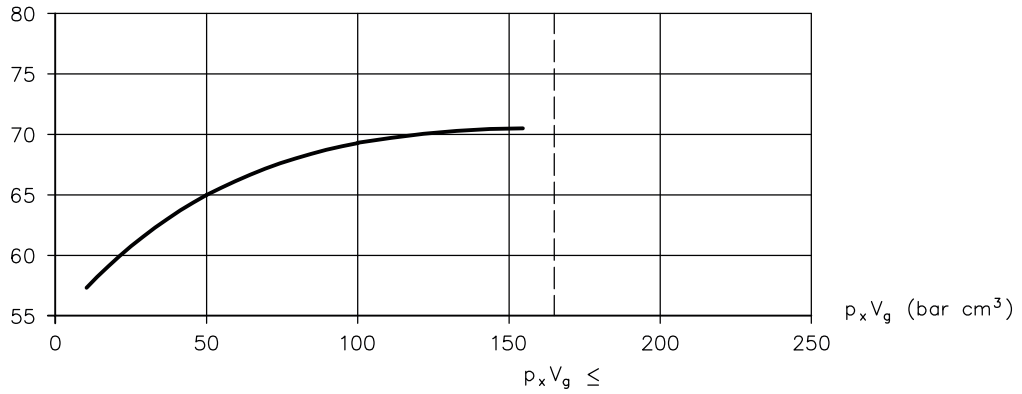
### 10.1.5.2 Running noise

#### Running noise H pump

Measured in acoustic measurement chamber acc. to DIN EN ISO 3744, distance sound sensor to pump (d) = 1 m

##### 0.25 kW

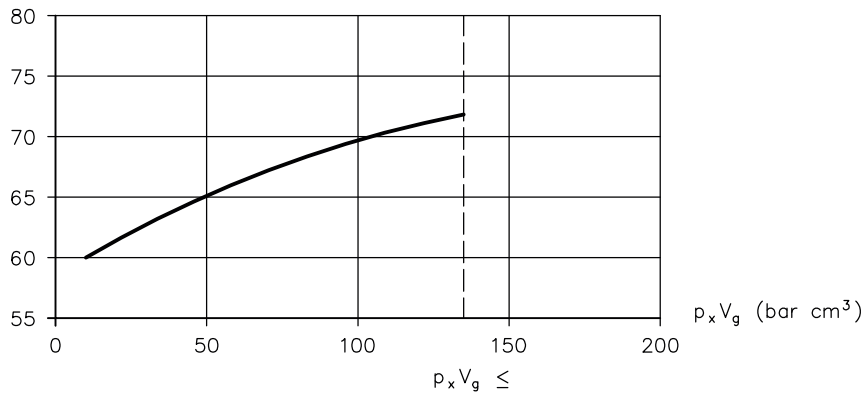
dB (A)



$p_x V_g$  hydraulic work value (bar cm<sup>3</sup>); noise level dB(A)

##### 0.37 kW

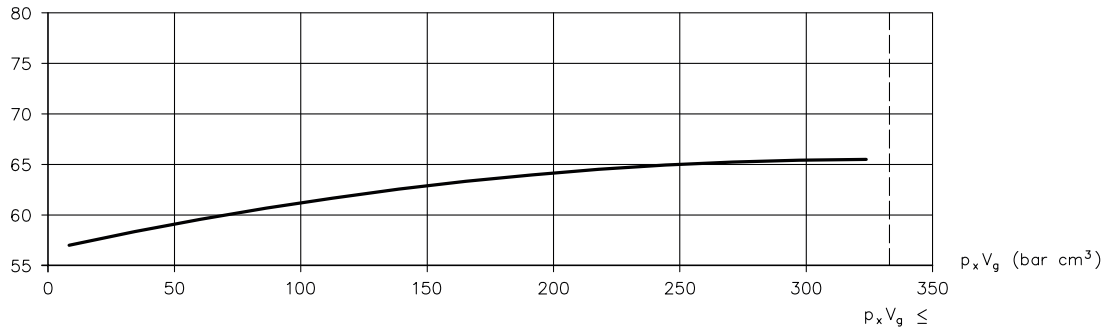
dB (A)



$p_x V_g$  hydraulic work value (bar cm<sup>3</sup>); noise level dB(A)

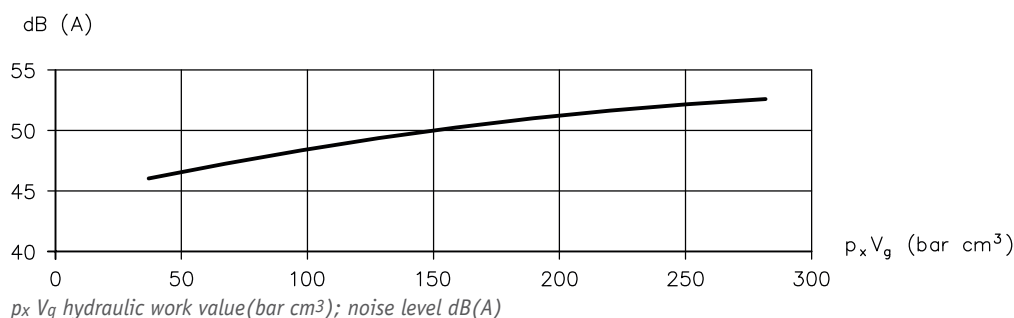
##### 0.55 kW

dB (A)




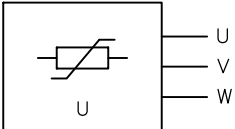
$p_x V_g$  hydraulic work value (bar cm<sup>3</sup>); noise level dB(A)

## Running noise Z pump



### 10.1.6 Electrical data

The drive motor forms an enclosed, non-separable unit with the tank and pump.

<b>Connection</b>	<p><b>part of product</b></p> <ul style="list-style-type: none"> <li>For version with HARTING connector: Screw-in housing HAN 3A-EG-M20, crimp connection, pin HAN Q 5/0-M-C</li> </ul> <p><b>not supplied</b></p> <ul style="list-style-type: none"> <li>For version with HARTING connector: Mating connector, e.g. straight mating connector: Bushing HAN 3A-GG-M20, crimp connection, socket HAN Q 5/0-M</li> <li>For version with communication box: Ring cable lug M5, cable fitting M16x1.5 or M20x1.5</li> <li>For version with sensors (E1 or E2): M12 plug</li> <li>For version with alternating current (motor 1~): capacitor (see Chapter 10.1.7, "Motor data")</li> </ul>
<b>Protection class</b>	<p>IP 65 according to IEC 60529</p> <p> Protect the breather filter from moisture penetration. Protection class applies to the hydraulic power pack without additional options.</p>
<b>Protection class</b>	VDE 0100 protection class 1
<b>Insulation</b>	<p><b>Designed in accordance with EN 60 664-1</b></p> <ul style="list-style-type: none"> <li>For 4-wire AC voltage systems L1-L2-L3-PE (3-phase systems) <b>with</b> an earthed neutral point up to 500 V AC nominal phase voltage phase-phase</li> <li>For 3-wire AC voltage systems L1-L2-L3 (3-phase systems) <b>without</b> an earthed neutral point up to a nominal phase voltage of 300 V AC phase-phase</li> <li>For a single-phase and earthed 2-wire alternating current system L-N (alternating current or mains) up to a nominal voltage of 300 V AC.</li> </ul>
<b>Insulation material class</b>	F
<b>Suppressor</b>	Type RC 3 R
<b>Coding E</b>	<ul style="list-style-type: none"> <li>Operating voltage: 3x 575 V AC</li> <li>Frequency: 10 to 400 Hz</li> <li>max. motor power: 7.5 kW</li> </ul> 

Capacitor

Capacitor is not included in the scope of delivery



## 10.1.7 Motor data

- i** The current consumption of the motor is dependent on the load. The nominal values only apply for one operating point. In modes S2 and S3 the motor may be used at up to about 1.8 times its nominal power. The heat development which is increased here is cooled in the no-load phases or during downtimes.
- The flow and pump flow rate can be estimated on the basis of the average and maximum hydraulic work values  $(pV_g)_m$  and  $(pV_g)_{max}$ .
- Re versions with 3-phase motors: The motor has to be ordered in star or delta circuit configuration and cannot be changed later.
- Re versions with AC motors: Actual current consumption is also dependent on the size of the operating capacitor. The operating capacitor is not included in the scope of delivery.  
For operating capacitor specifications: 1x230 V 50 Hz - ...  $\mu$ F / 400 V DB.
- Voltage tolerances:  $\pm 10\%$  (IEC 60038), at 3x460/265 V 60 Hz  $\pm 5\%$ . It can be operated at undervoltage.
- Notes on the selection and composition of the product: in [D 8132-1](#)

### 3-phase motor

Type	Nominal voltage and power frequency $U_N$ (V), f (Hz)	Nominal power $P_N$ (kW)	Rated speed $n_N$ (rpm)	Nominal current $I_N$ (A)	Starting current ratio $I_A / I_N$	Power factor $\cos \varphi$	Hydraulic work value $(pV_g)_{max}$ (bar $cm^3$ /rpm)		
							Pump		
							H	HD	Z
INKA 14 ..-0.25 kW	3~400 V 50 Hz / 460 V 60 Hz	0.25	1400 / 1730	0.70 / 0.67	4.2 / 5.1	0.75 / 0.65	165	148.5	156.75
	3~230 V 50 Hz / 265 V 60 Hz	0.25	1400 / 1730	1.21 / 1.16	4.2 / 5.1	0.75 / 0.65	165	148.5	156.75
	3~200 V 50 Hz / 3~220 V 60 Hz	0.25	1400 / 1730	1.4 / 1.3	4.2 / 5.1	0.75 / 0.65	165	148.5	156.75
INKA 14 ..-0.55 kW	3~400 V 50 Hz / 460 V 60 Hz	0.55	1380 / 1700	1.41 / 1.37	4.4 / 5.4	0.78 / 0.69	332.5	299.25	315.88
	3~230 V 50 Hz / 265 V 60 Hz	0.55	1380 / 1700	2.40 / 2.37	4.4 / 5.4	0.78 / 0.69	332.5	299.25	315.88
	3~200 V 50 Hz / 3~220 V 60 Hz	0.55	1380 / 1700	2.8 / 1.75	4.4 / 5.4	0.78 / 0.69	332.5	299.25	315.88

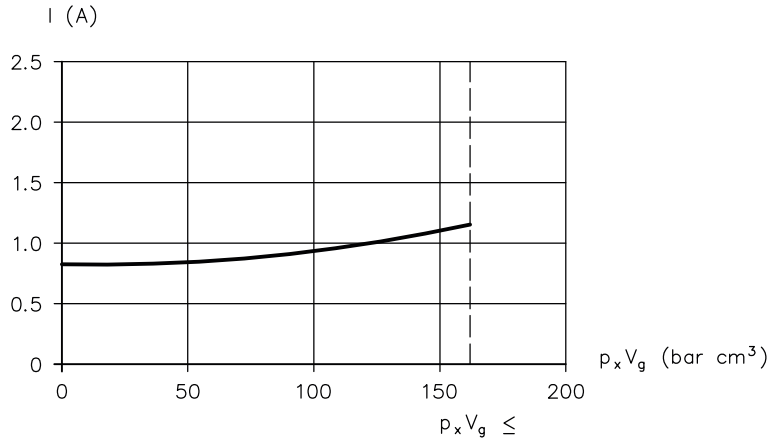
### AC motor

Type	Nominal voltage and power frequency $U_N$ (V), f (Hz)	Nominal power $P_N$ (kW)	Rated speed $n_N$ (rpm)	Nominal current $I_N$ (A)	Starting current ratio $I_A / I_N$	Power factor $\cos \varphi$	Hydraulic work value $(pV_g)_{max}$ (bar $cm^3$ )			Recommended operating capacitor $C_B$ ( $\mu$ F)
							Pump			
							H	HD	Z	
INKA 14 ..-0.37 kW	1~230 V 50 Hz	0.37	1380	2.69	2.5	0.95	135	121.5	128.25	12
	1~220 V 60 Hz	0.37	1640	2.7	2.5	0.95	135	121.5	128.25	12
	1~110 V 60 Hz	0.37	1640	5.7	2.5	0.95	135	121.5	128.25	50

**10.1.7.1 Current consumption characteristic lines**

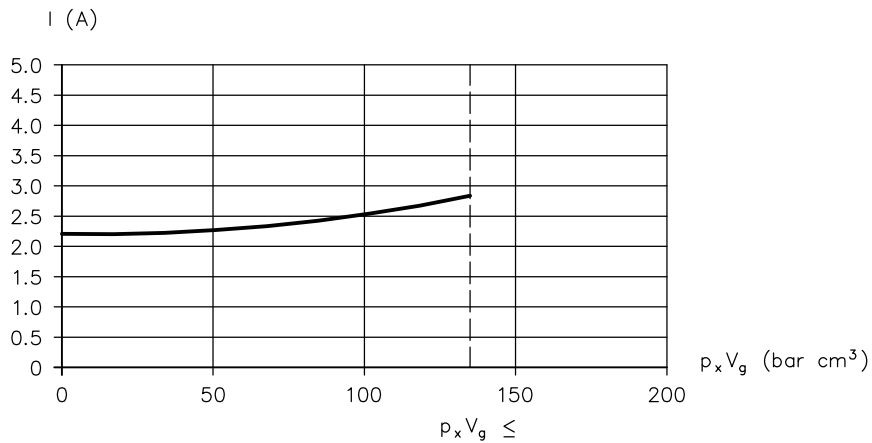
**i** For 230 V 50 Hz (265 V 60 Hz), the motor current values must be multiplied by  $\sqrt{3}$ .

**3 x 400 V 50 Hz 0.25 kW**



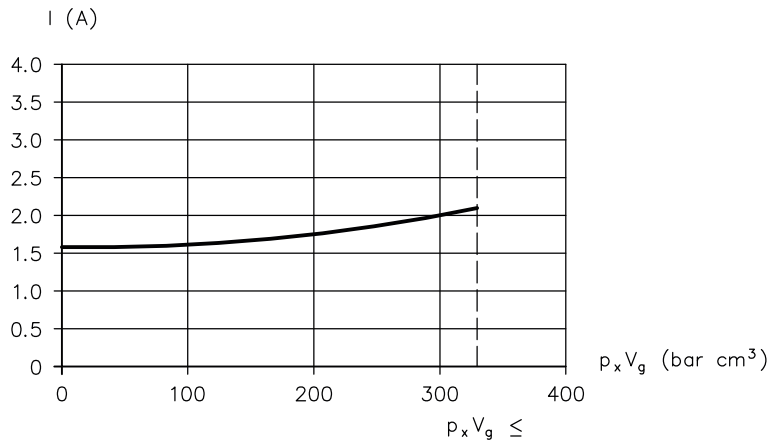
$p_x V_g$  hydraulic work value (bar cm<sup>3</sup>); I current consumption (A)

**3 x 400 V 50 Hz 0.37 kW**



$p_x V_g$  hydraulic work value (bar cm<sup>3</sup>); I current consumption (A)

**1 x 230 V 50 Hz 0.55 kW**



$p_x V_g$  hydraulic work value (bar cm<sup>3</sup>); I current consumption (A)

## 10.1.8 Additional options

### Pin assignment sensors E1

Pin		Function
1	L+	24 V DC for sensor
3	L-	GND for sensor
4	C/Q	I/O link data line

### Pin assignment sensors E2

Pin		Function
2		Switch output 1
4		Switch output 2
5		Switch output 3

### NOTICE

#### Power supply for sensors E1 and E2

- Supply voltage 18 to 30 V
- Maximum current 3 A

### 10.1.8.1 External fan

	F1., F10L, F10S	F11L, F11S	F12L, F12S
<b>Voltage</b>	24 V DC	1~115 V	1~230 V
<b>Frequency</b>	--	50 / 60 Hz	50 / 60 Hz
<b>Current consumption</b>	210 mA	230 / 200 mA	115 / 100 mA
<b>Power consumption</b>	5.0 W	19 / 17 W	19 / 17 W
<b>Rotation speed</b>	2800 rpm	2650 / 3100 rpm	2650 / 3100 rpm
<b>Max. flow rate</b>	170 m <sup>3</sup> /h	152 / 180 m <sup>3</sup> /h	152 / 180 m <sup>3</sup> /h
<b>Protection class</b>	IP 68	IP 68	IP 68
<b>Protection class</b>	III	I	I
<b>Noise level</b>	49 dB(A)	40 / 45 dB(A)	40 / 45 dB(A)
<b>Approval</b>	VDE, CSA, UL, CE	VDE, CSA, UL, CE	VDE, CSA, UL, CE

## 10.1.9 Sensor characteristics

<b>Designation</b>	Power Unit Sensor
<b>Speed measuring range</b>	120 to 5000 rpm
<b>Fluid level measurement accuracy</b>	±5%

<b>Operating data memory</b>	Resolution of temperature-dependent sensor operating time:	1 s
	Resolution of temperature-dependent hydraulic power pack operating time at speed > 0:	1 s
	Resolution of load-dependent hydraulic power pack operating time at speed > 0:	1 s
<b>Communication box connection</b>	Sensors with IO-Link	M12, 5-pin (male); position X1 on terminal box top left
	Sensors with switch output	M12, 5-pin (male); position X2 on terminal box top right

### Sensors with IO-Link interface (variant E1)

<b>Supply voltage</b>	18 to 30 V
<b>Potential difference L- to N24/L- to PE</b>	-15 to 15 V (must be ensured by superordinate system.)
<b>Activation/visualisation delay</b>	1000 ms
<b>IO-Link version</b>	1.1.2
<b>IO-Link transfer rate</b>	230.4 kbit/s (COM3)
<b>IO-Link vendor ID</b>	1503 (HAWE Vendor ID)
<b>IO-Link Process Data Input Length</b>	16 bit
<b>IO-Link Process Data Output Length</b>	0 bit
<b>IO-Link profiles</b>	49 (firmware update)

### Sensors with switch output (variant E2)

<b>Switch output</b>	Normally open (NO)
<b>Supply voltage</b>	18 to 30 V
<b>Current consumption*</b>	max. 3500 mA Limited by derated plug connector.
<b>Current per switch output*</b>	max. 500 mA
<b>Potential difference GND to PE</b>	-15 to 15 V (PELV electrical circuit recommended)
<b>Activation/visualisation delay</b>	1000 ms

\* At ambient temperatures above 50°C, the total current for the external fan and switch outputs must not exceed 3000 mA.

## 10.2 Documents

### 10.2.1 Declaration of incorporation



Solutions for a World under Pressure

#### 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: HAWE Hydraulik SE  
 Manufacturer: Einsteinerring 17  
 DE-85609 Aschheim/München

Die 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: **Typ INKA1 nach unserer Dokumentation D 8132-1**  
*Partly completed machinery: Type INKA1 according to our documentation D 8132-1*

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: HAWE Hydraulik SE  
*Person authorised to compile the technical file:* Abt. Produktmanagement  
 Einsteinerring 17  
 D-85609 Aschheim/München

Die 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, 2022-08-05



Axel Schwerdtfeger, CTO



Dogan Basöz, Product Manager

HAWE Hydraulik SE · Einsteinerring 17 · D-85609 Aschheim/München · info@hawe.de · Tel. +49 89 379100-1000 · Fax +49 89 379100-91000  
 Europäische Aktiengesellschaft (SE) · Sitz der Gesellschaft: München · USt ID Nr: DE180016108 · Registergericht München HRB 174760  
 Vorstand: Robert Schullian, Axel Schwerdtfeger, Wolfgang Sochor, Markus Unterstein, Jiang Ye  
 Vorsitzender des Aufsichtsrats: Karl Haeusgen  
 Hypo-Vereinsbank München, 1780008454 (BLZ 700 202 70), IBAN DE53 7002 0270 1780 0084 54, BIC HYVEDE33  
 Commerzbank München, 150623700 (BLZ 700 400 41), IBAN DE56 7004 0041 0150 6237 00, BIC COBADE33  
 Baden-Württembergische Bank, 2368049 (BLZ 600 501 01), IBAN DE90 6005 0101 0002 3680 49, BIC SOLADE33  
 Bayerische Landesbank, 203693428 (BLZ 700 500 00), IBAN DE86 7005 0000 0203 6934 28, BIC BYLADE33

Zertifiziert nach  
 ISO 9001  
 ISO 14001  
 ISO 50001  
 ISO 45001  
 www.hawe.com

**Declaration of incorporation of partly completed machinery – original**

according to Supply of Machinery (Safety) Regulations 2008, 2008 No. 1597, annex II B

**Einbauerklärung einer unvollständigen Maschine - Original**

nach Supply of Machinery (Safety) Regulations 2008, 2008 No. 1597, Anhang II B

Manufacturer: HAWE Hydraulik SE  
Hersteller: Einsteining 17  
DE-85609 Aschheim/München

This declaration of incorporation is issued under the sole responsibility of the manufacturer.  
*Die alleinige Verantwortung für die Ausstellung dieser Einbauerklärung trägt der Hersteller.*

Partly completed machinery: **Type INKA1 acc. to our documentation D 8132-1**  
*Unvollständige Maschine: Typ INKA1 nach unserer Dokumentation D 8132-1*

The following essential health and safety requirements of Directive 2008 No. 1597 apply:  
*Die folgenden grundlegenden Sicherheits- und Gesundheitsschutzanforderung der Richtlinie 2008 No. 1597 kommen zur Anwendung:*

**Chapters (Abschnitte) 1.1.2, 1.1.3, 1.1.5, 1.2 complete (komplett), 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 and 1.7.4.3.**

The following designated standards or other technical specifications have been applied:  
*Es wurden folgende harmonisierte Normen oder andere technische Spezifikationen zugrunde gelegt:*

**DIN EN ISO 12100:2011-03**

Person authorised to compile the technical file: Koppen & Lethem Ltd  
*Dokumentationsbevollmächtigter: 3 Glenholm Park, Brunel Drive  
Newark | Nottinghamshire | NG24 2EG  
United Kingdom*

The relevant technical documentation is compiled in accordance with part B of Annex VII.  
*Die speziellen technischen Unterlagen nach Anhang VII Teil B wurden erstellt.*

The manufacturer undertakes to electronically transmit the special technical documents on the partly completed machinery to national authorities on request.  
*Der Hersteller verpflichtet sich, die speziellen technischen Unterlagen zur unvollständigen Maschine einzelstaatlichen Stellen auf Verlangen elektronisch zu übermitteln.*

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 2008 No. 1597.  
*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 2008 No. 1597.*

Aschheim, 2022-08-05

  
Axel Schwerdtfeger, CTO

  
Dogan Basöz, Product Manager

**10.2.2 Declaration of conformity**

Solutions for a World under Pressure

**EU- Konformitätserklärung - Original**  
*EU Declaration of conformity - original*

Hersteller: HAWE Hydraulik SE  
Manufacturer: Einsteinring 17  
DE-85609 Aschheim/München

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.  
*This declaration of conformity is issued under the sole responsibility of the manufacturer.*

Produkt: **Typ INKA1 nach unserer Dokumentation D 8132-1**  
Product: *Type INKA 1 acc. to our documentation D 8132-1*

Gegenstand der Erklärung: **Unterölmotor des Hydraulikaggregates**  
*Object of the declaration: Immersed Motor of hydraulic power pack*

Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der EU:  
*The object of the declaration described above is in conformity with the relevant European Union harmonization legislation:*

**2014/35/EU**

Es wurden folgende harmonisierte Normen oder andere technische Spezifikationen zugrunde gelegt:  
*The following harmonized standards or other technical specifications have been applied:*

**DIN EN 60204-1 VDE0113-1:2019-06**

Aschheim, 2022-08-05

  
Axel Schwerdtfeger, CTO  
Dogan Basöz, Product Manager

**UKCA-Declaration of conformity - original**  
**UKCA Konformitätserklärung - Original**

Manufacturer:  
Hersteller: HAWE Hydraulik SE  
Einsteinring 17  
DE-85609 Aschheim/München

This declaration of conformity is issued under the sole responsibility of the manufacturer.  
*Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.*

Product:  
Produkt: **Type INKA1 acc. to our documentation D 8132-1**  
*Typ INKA1 nach unserer Dokumentation D 8132-1*

Object of the declaration:  
Gegenstand der Erklärung: Immersed Motor of hydraulic power pack  
*Unterölmotor des Hydraulikaggregates*

The object of the declaration described above complies with the relevant designated standards of the United Kingdom:  
*Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften des UK:*

**Electrical Equipment (Safety) Regulations 2016 No. 1101**

The following designated standards or other technical specifications have been applied:  
*Es wurden folgende harmonisierte Normen oder andere technische Spezifikationen zugrunde gelegt:*

**EN 60204-1:2018**

Person authorised to compile the technical file:  
Dokumentationsbevollmächtigter: Koppen & Lethem Ltd  
3 Glenholm Park, Brunel Drive  
Newark | Nottinghamshire | NG24 2EG  
United Kingdom

Aschheim, 2022-08-05

  
Axel Schwerdtfeger, CTO

  
Dogan Basöz, Product Manager



## 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. Electronic components, ideally matched to hydraulic components, complement modular systems and facilitate control, signal evaluation and error 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 14001, ISO 45001, ISO 50001.



### ■ HAWE subsidiaries and service repair shops

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

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- Slovenia
- 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](http://www.hawe.com).

