Pioneering for You

# Wilo-Helix VE 11/15/18,5/22kW – IE5
# Wilo-MVIE 11/15/18,5/22kW – IE5

**en** Installation and operating instructions

4 257 897-Ed.01 / 2022-10-Wilo

Fig. 1

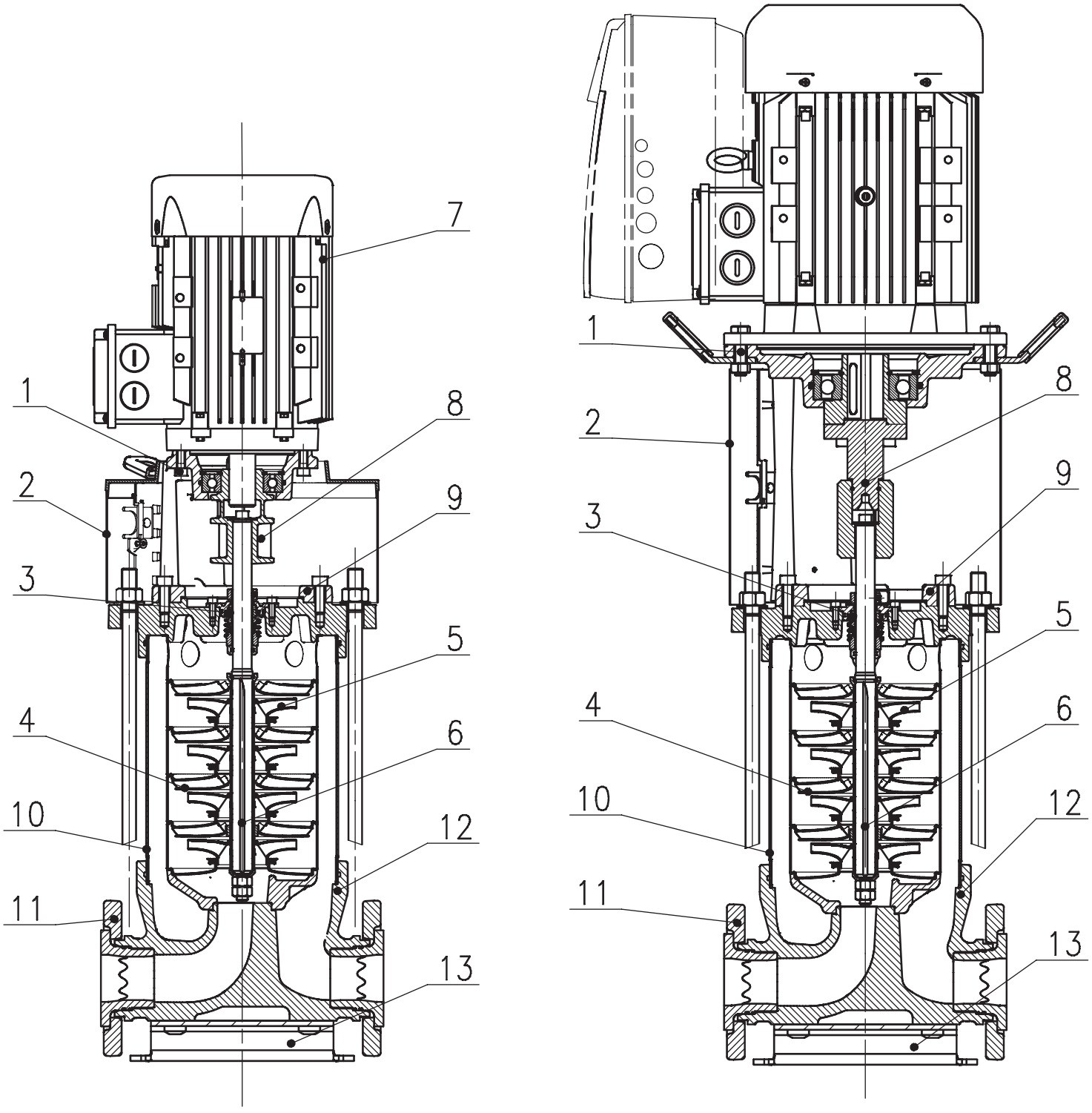


Fig. 2 – HELIX VE 10-16

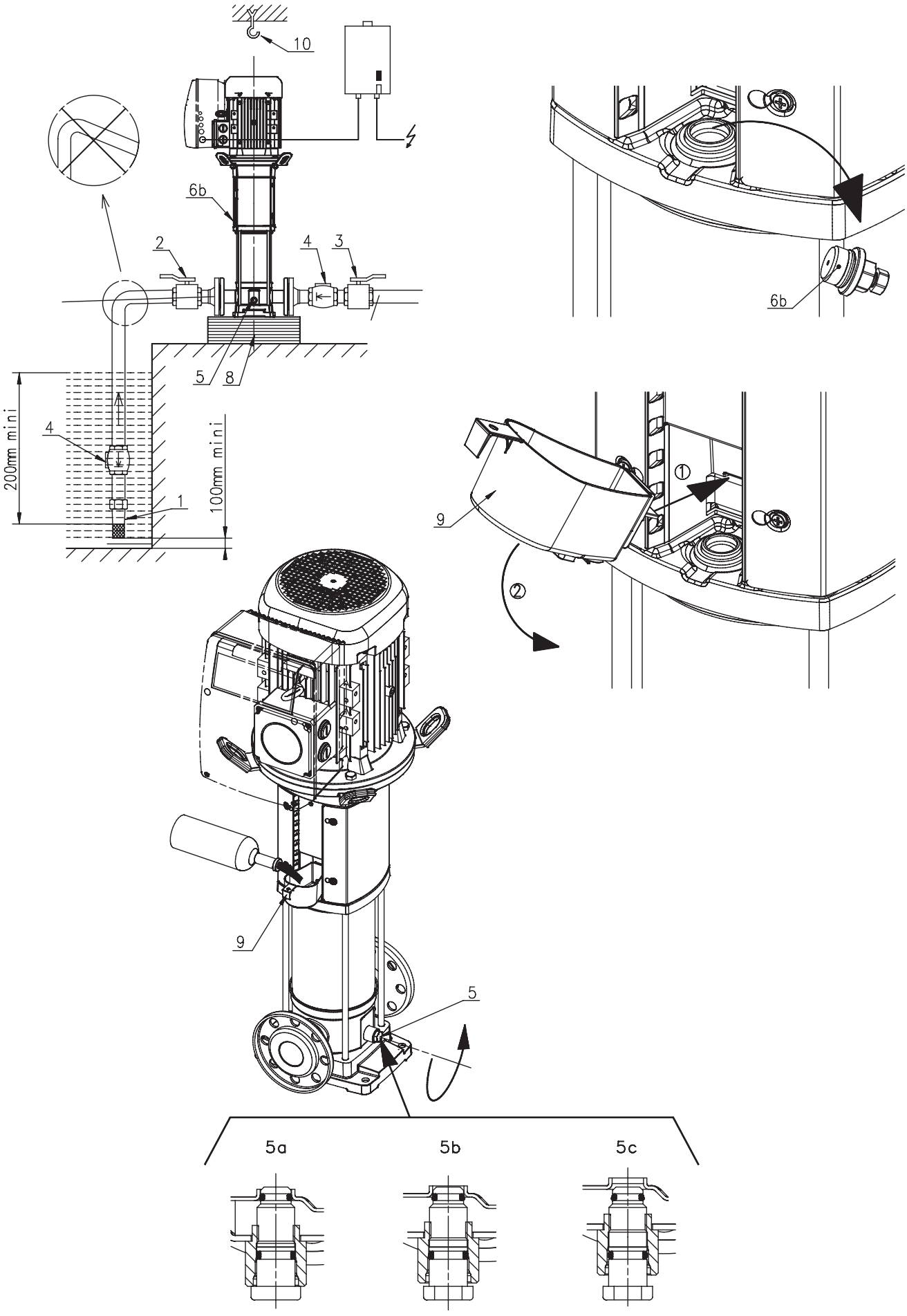


Fig. 2 – HELIX VE 22-36-52

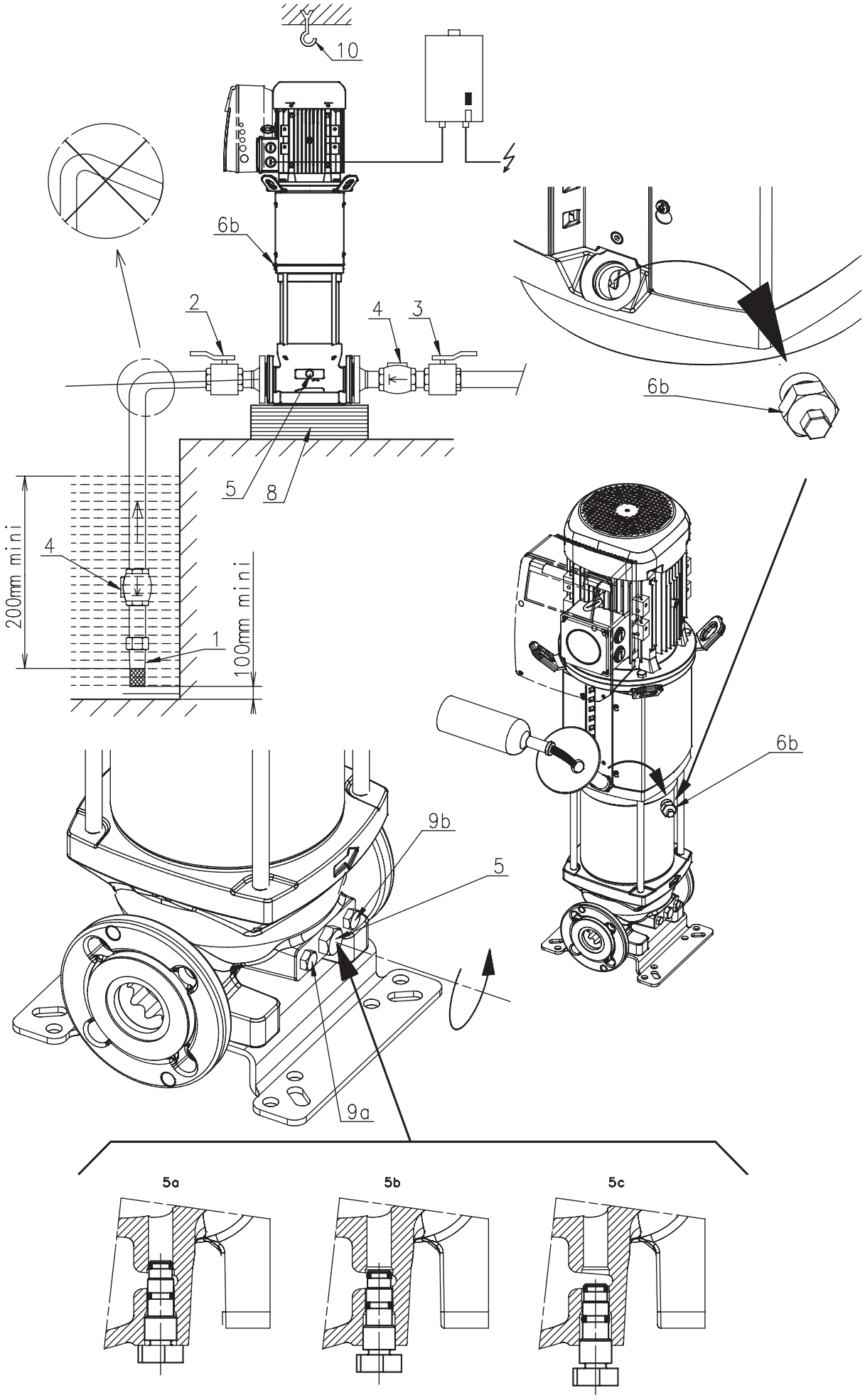


**Fig. 3 – HELIX VE 10–16**

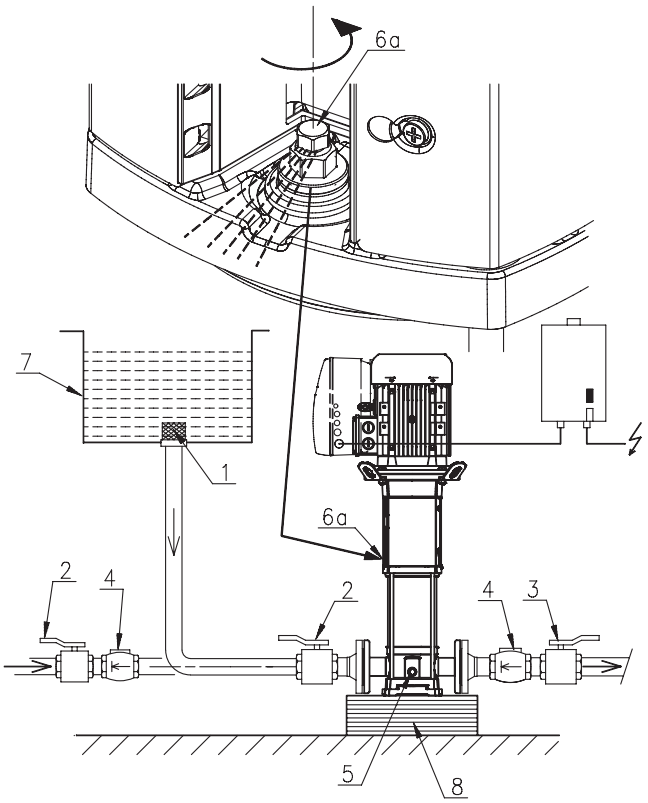



**Fig. 6 – HELIX VE 10–16**

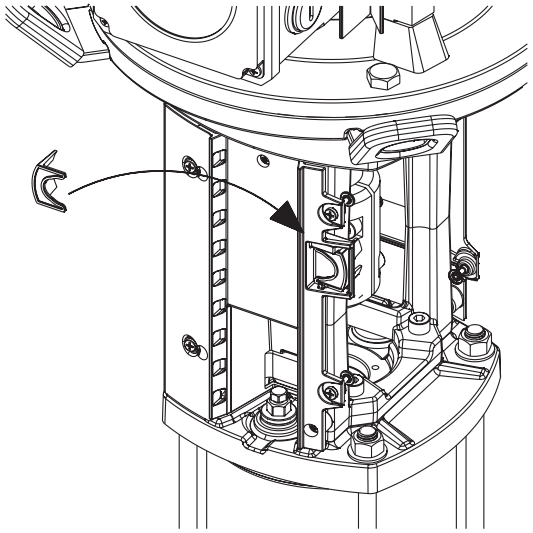
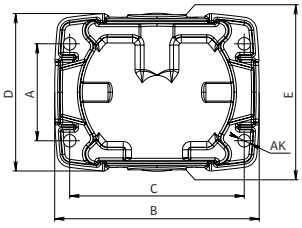
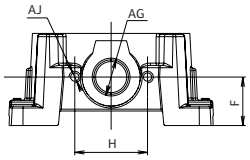
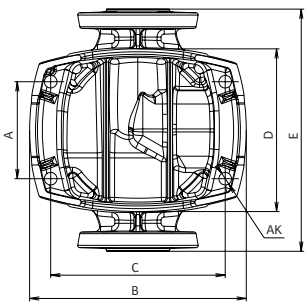


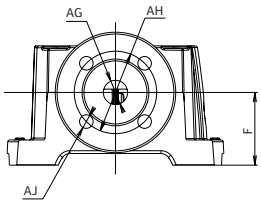
**Fig. 4 – HELIX VE 10–16**



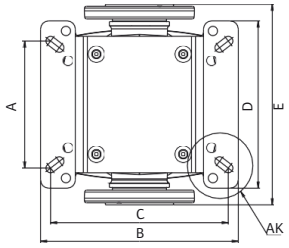

| Type | | (mm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H | J | K |
| HELIX VE10... | PN16 | 130 | 251 | 215 | 181 | 200 | 80 | D50 | 100 | 2 x M12 | 4 x Ø 13 |
| HELIX VE16... | PN16 | 130 | 251 | 215 | 181 | 200 | 90 | D50 | 100 | 2 x M12 | 4 x Ø 13 |

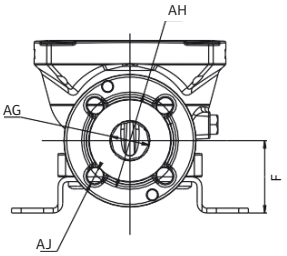



| Type | | (mm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H | J | K |
| HELIX VE10... | PN16<br>PN25 | 130 | 252 | 215 | 187 | 280 | 80 | D40 | 110 | 4 x M16 | 4 x Ø 13 |
| HELIX VE16... | PN16<br>PN25 | 130 | 252 | 215 | 187 | 300 | 90 | D50 | 125 | 4 x M16 | 4 x Ø 13 |

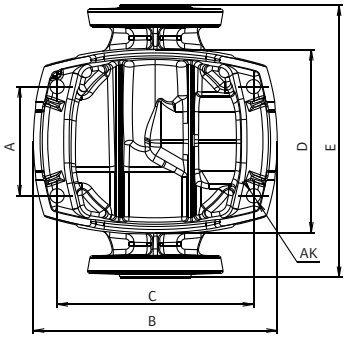
**Fig. 4 - HELIX VE 22-36-52**

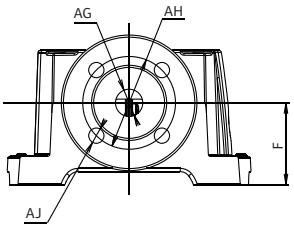



Material code -2

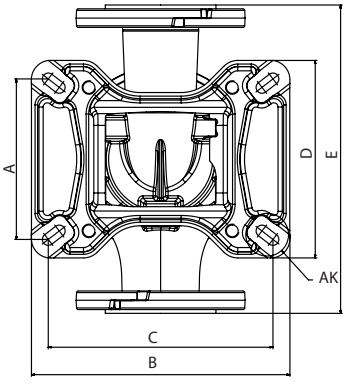
| Type | | (mm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H | J | K |
| Helix VE 22 | PN16/PN25 | 130 | 296 | 215 | 250 | 300 | 90 | DN50 | 125 | 4 × M16 | 16 × Ø14 |
| Helix VE 36 | PN16 | 170 or 220 | 296 | 240 or 220 | 250 | 320 | 105 | DN65 | 145 | 4 × M16 | |
| | PN25 | | | | | | | | | 8 × M16 | |
| Helix VE 52 | PN16/PN25 | 190 or 220 | 296 | 266 or 220 | 250 | 365 | 140 | DN80 | 160 | 8 × M16 | |

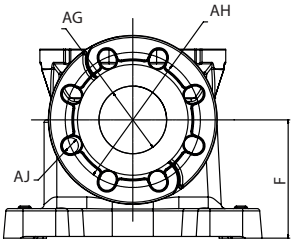



Material code -4 -5

| Type | | (mm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H | J | K |
| Helix VE 22 | PN16/PN25 | 130 | 260 | 215 | 226 | 300 | 90 | DN50 | 125 | 4 × M16 | 4 × Ø14 |
| Helix VE 36 | PN16 | 170 | 294 | 240 | 226 | 320 | 105 | DN65 | 145 | 4 × M16 | |
| | PN25 | | | | | | | | | 8 × M16 | |
| Helix VE 52 | PN16/PN25 | 190 or 170 | 295 | 266 or 240 | 226 | 365 | 140 | DN80 | 160 | 8 × M16 | |

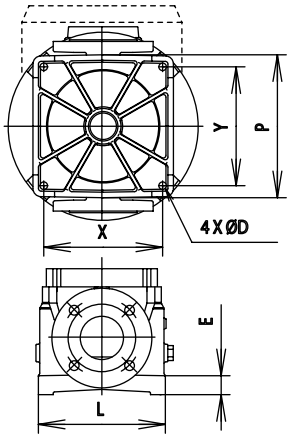



Material code -1

| Type | | (mm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H | J | K |
| Helix VE 22 | PN16/PN25 | 130 | 262 | 215 | 226 | 300 | 90 | DN50 | 125 | 4 × M16 | 4 × Ø14 |
| Helix VE 36 | PN16 | 170 | 282 | 240 | 212 | 320 | 105 | DN65 | 145 | 4 × M16 | |
| | PN25 | | | | | | | | | 8 × M16 | |
| Helix VE 52 | PN16/PN25 | 190 or 170 | 306 | 266 or 240 | 234 | 365 | 140 | DN80 | 160 | 8 × M16 | |

**Fig. 4 – MVIE 70–95**




| Type | | (mm) | | | | | |
|---|---|---|---|---|---|---|---|
| | | L | P | X | Y | E | ØD |
| MVIE 70 | PN16/PN25 | 350 | 261 | 280 | 199 | 45 | 14 |
| MVIE 95 | PN16/PN25 | | | | | | |

Fig. 8

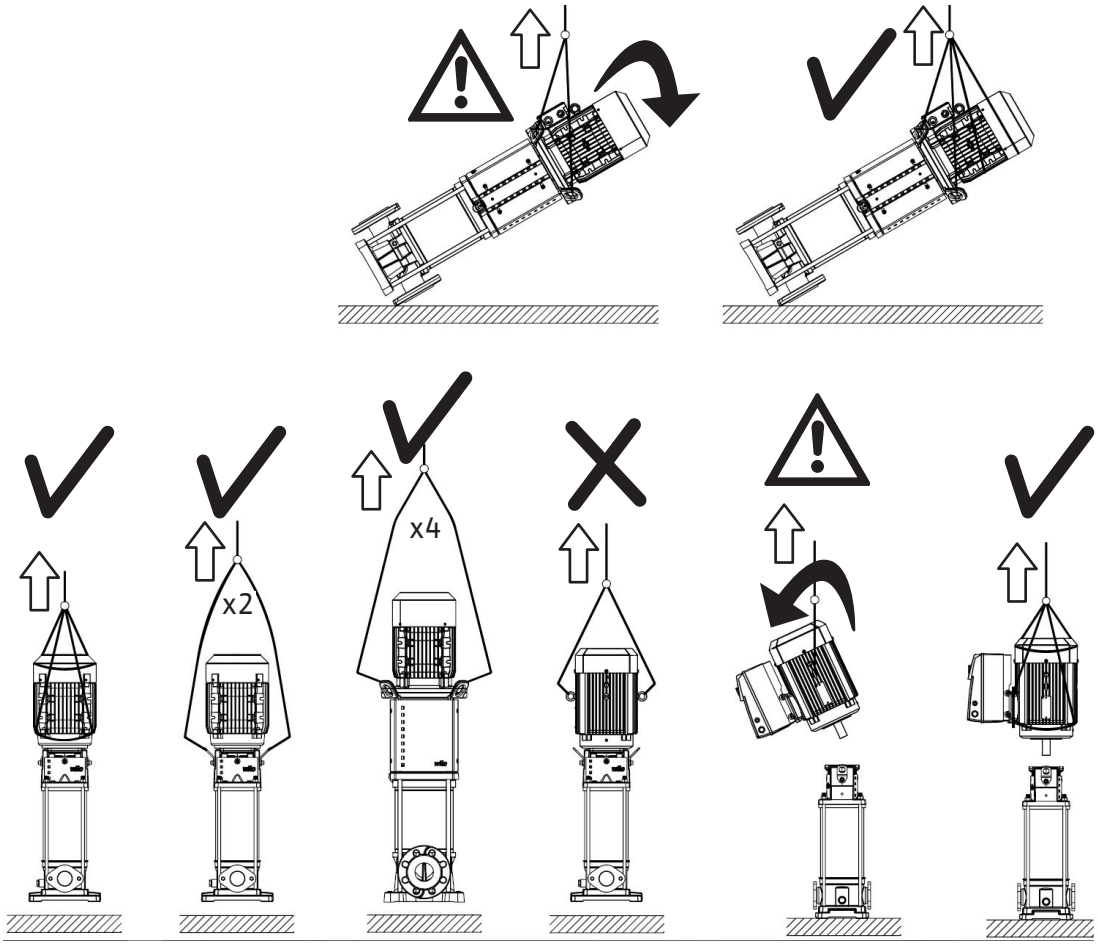



Fig. 9 HELIX – VE 22–36–52

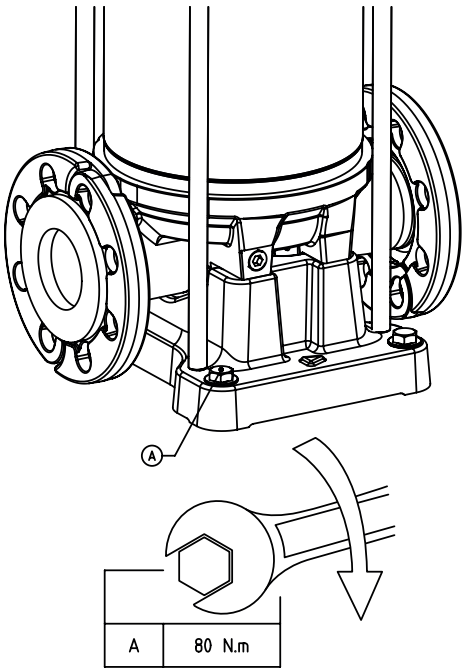


**Fig. A1**

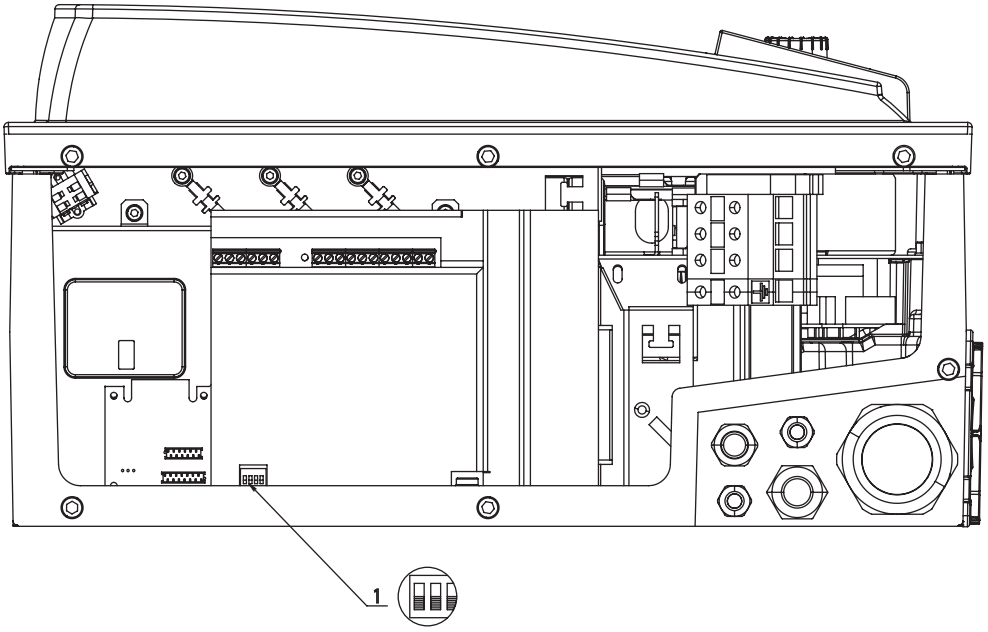


Fig. 2D

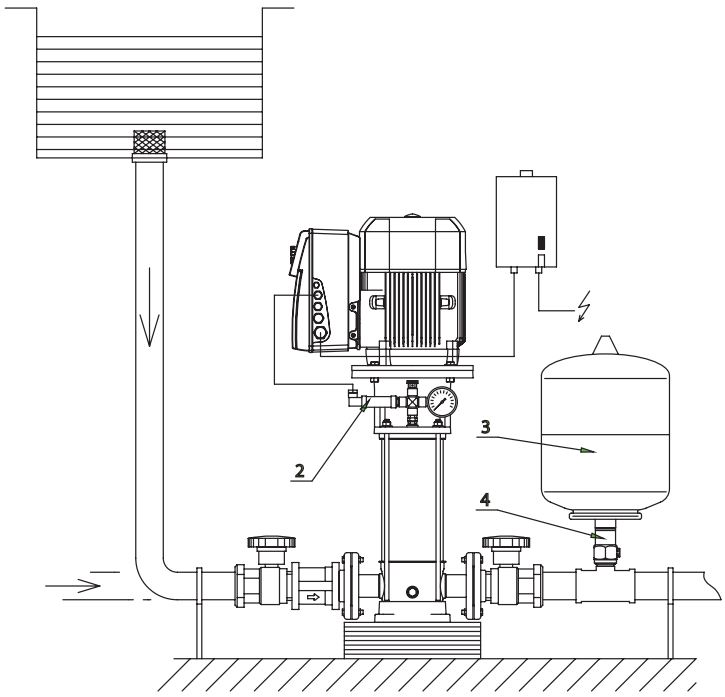



Fig. 4D

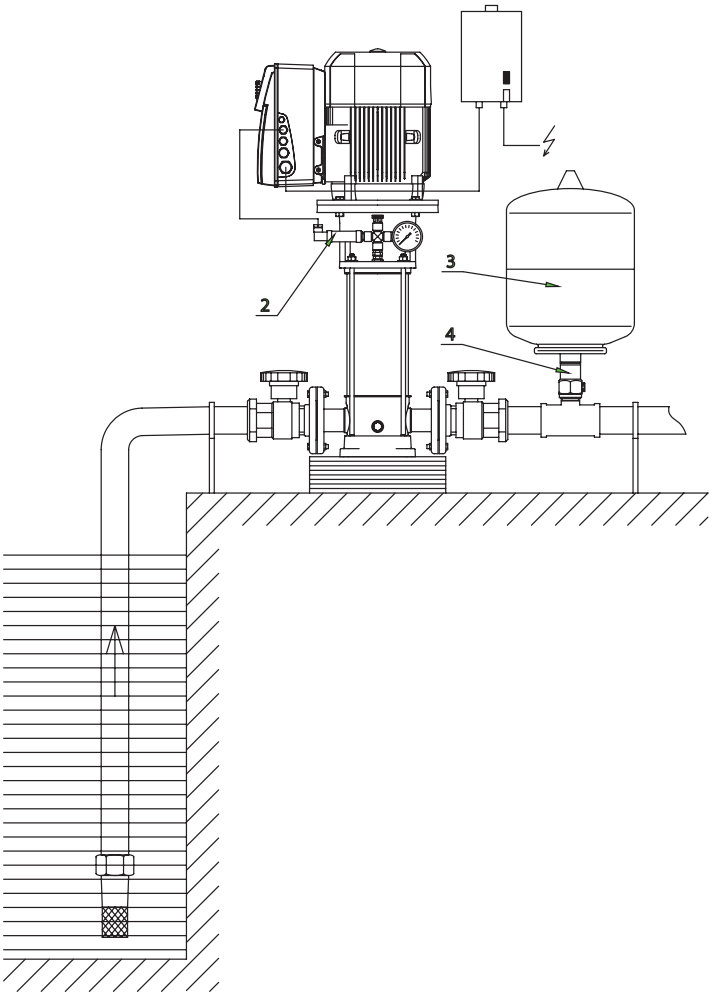
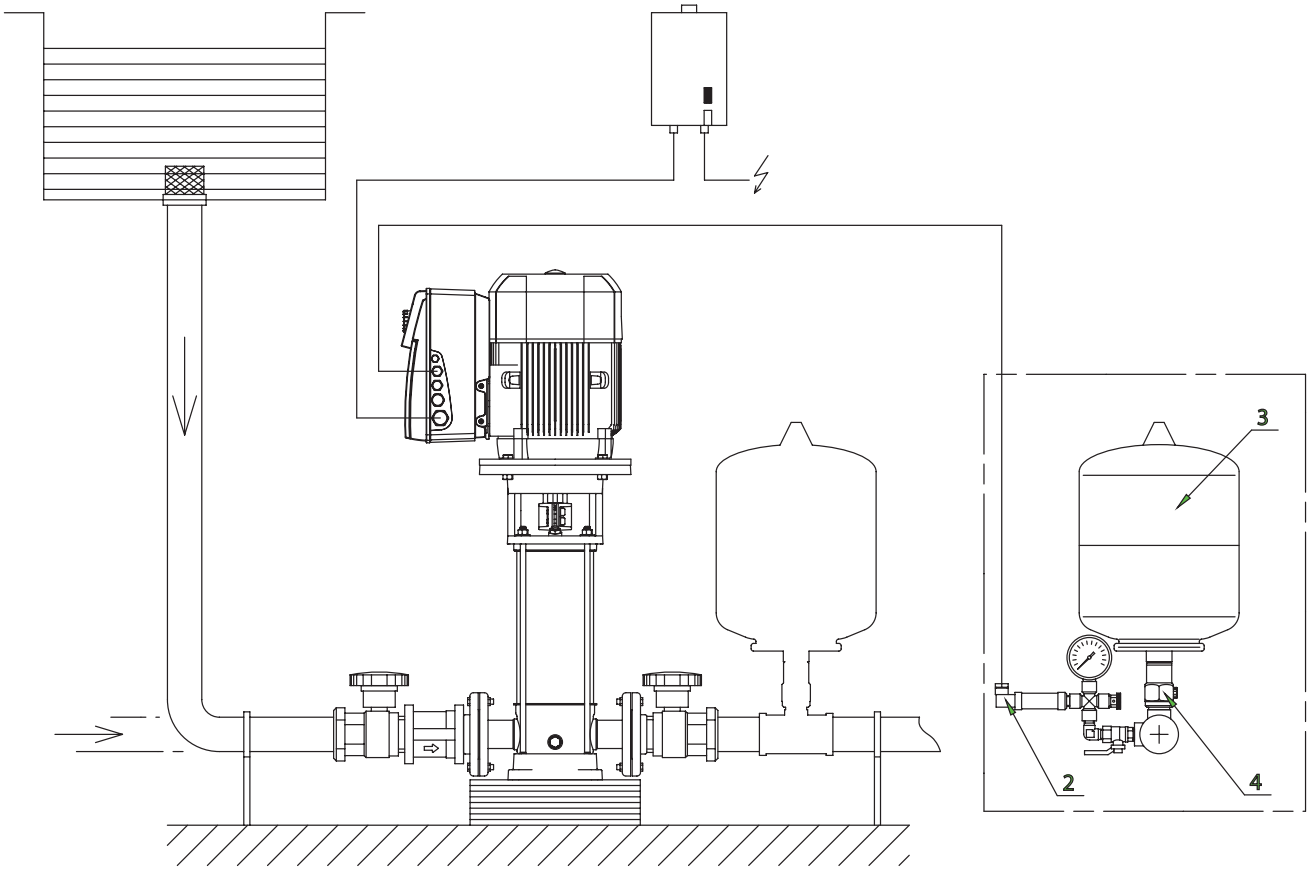



Fig. 3D



# 1. General

## 1.1 About this document

The language of the original installation and operating instructions is English. All other languages of these instructions are translations of the original installation and operating instructions.
These installation and operating instructions are an integral part of the product. They must be kept readily available at the place where the product is installed. Strict adherence to these instructions is a necessary condition for the correct installation and operation of the product.
These installation and operating instructions correspond to the relevant version of the product and the underlying safety standards valid at the time of going to print.

# 2. Safety

These installation and operating instructions contain important information which must be adhered to during installation, operation and maintenance. For this reason, these instructions must, without fail, be read by the service technician and the responsible specialist/operator before installation and commissioning.
It is not only the general safety instructions listed in this section that must be adhered to but also the special safety instructions with danger symbols included in the following sections.

## 2.1 Symbols and signal words in the operating instructions

**Symbols**


General danger symbol


Danger due to electrical voltage


NOTICE: ...

**Signal words:**

**DANGER! Acutely dangerous situation. Non-observance will result in death or the most serious of injuries.**

**WARNING! The user may suffer (serious) injuries. 'Warning' implies that (serious) injury to persons is probable if this information is disregarded.**

**CAUTION! There is a risk of damaging the product/unit. "Caution" implies that damage to the product and its operation is likely if this information is disregarded.**

NOTICE: Useful information on handling the product. It draws attention to possible problems.
Information that appears directly on the product, such as

- the arrows indicating the direction of rotation,
- identifiers for connections,
- rating plate,
- warning stickers,

must be strictly complied with and kept in legible condition.

## 2.2 Personnel qualifications

The installation, operating and maintenance personnel must have the appropriate qualifications for this work. Area of responsibility, terms of reference and monitoring of the personnel are to be ensured by the operator. If the personnel are not in possession of the necessary knowledge, they are to be trained and instructed. This can be accomplished if necessary by the manufacturer of the product at the request of the operator.

## 2.3 Danger in the event of non-observance of the safety instructions

Non-observance of the safety instructions can result in risk of injury to persons and damage to the environment and the product/unit. Non-observance of the safety instructions also results in the loss of any claims to damages. In detail, non-observance can, for example, result in the following risks:

- Danger to persons from electrical, mechanical and bacteriological influences
- Damage to the environment due to leakage of hazardous materials
- Property damage
- Failure of important product/unit functions
- Failure of required maintenance and repair procedures.

## 2.4 Safety consciousness on the job

The existing directives for accident prevention must be adhered to.
Danger from electrical current must be eliminated. Local directives or general directives [e.g. IEC, VDE etc.] and instructions from local energy supply companies must be respected.
This device is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the device by a person responsible for their safety. Children should be supervised to ensure that they do not play with the device.

## 2.5 Safety instructions for the operator

This device is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the device by a person responsible for their safety.
Children should be supervised to ensure that they do not play with the device.

- If hot or cold components on the product/the unit lead to hazards, local measures must be taken to guard them against touching.
- Guards protecting against touching moving components (such as the coupling) must not be removed whilst the product is in operation.

- Leakages (e.g. from the shaft seals) of hazardous fluids (which are explosive, toxic or hot) must be led away so that no danger to persons or to the environment arises. National statutory provisions must be respected.
- Danger from electrical current must be eliminated. Local directives or general directives [e.g. IEC, VDE etc.] and instructions from local energy supply companies must be respected.

### 2.6 Safety instructions for installation and maintenance work

The operator must ensure that all maintenance and installation work is carried out by authorised and qualified personnel, who are sufficiently informed from their own detailed study of the installation and operating instructions. Work on the product/unit must only be carried out when at a standstill. It is mandatory that the procedure described in the installation and operating instructions for shutting down the product/unit be complied with.
Immediately on conclusion of the work, all safety and protective devices must be put back in position and/or recommissioned.

### 2.7 Unauthorised modification of components and use of unauthorised spare parts

Unauthorised modification of components and use of unauthorised spare parts will impair the safety of the product/personnel and will make void the manufacturer's declarations regarding safety. Modifications to the product are only permissible after consultation with the manufacturer.
Original spare parts and accessories authorised by the manufacturer ensure safety. The use of other parts absolves the manufacturing company of any and all liability.

### 2.8 Improper use

The operating safety of the supplied product is only guaranteed for conventional use in accordance with Section 4 of the installation and operating instructions. The limit values must on no account fall below or exceed the values specified in the catalogue/data sheet.

## 3. Transport and temporary storage

When you receive the equipment, check that it has not been damaged during transport. If damage has occurred during shipping, take all necessary action with the carrier within the time allowed.

**CAUTION!** The storage environment may cause damage to the product.
If the delivered material is to be installed at a later date, store it in a dry place and protect it from impacts and any external influences (humidity, frost etc.).

The pump should be cleaned thoroughly before it is put into temporary storage. New pumps are prepared in such a way that they can be stored for one year.
Handle the pump with care so as not to damage the product before installation.

## 4. Application

This pump has been designed to pump hot or cold water, water/glycol mixtures or other low-viscosity fluids that are free of mineral oil, solid or abrasive substances, or materials containing long fibres. Pumping corrosive chemicals requires the manufacturer's approval.

**DANGER! Risk of explosion!**
Do not use this pump to convey flammable or explosive liquids.

### 4.1 Application areas

- water distribution and overpressure systems,
- industrial circulation systems,
- process fluids,
- cooling water circuits,
- fire-fighting and washing stations,
- sprinkling systems, irrigation, etc.

### 4.2 Contraindications

**DANGER! Risk of fatal injury!**

**The permanently magnetised rotor inside the motor presents an acute danger to persons with pacemakers. Non-observance results in death or the most serious of injuries.**

- **Persons with pacemakers must follow the general behavioural guidelines that apply for handling electrical equipment when working on the pump!**
- **Do not open the motor!**
- **Only allow Wilo customer service to dismantle and install the rotor for maintenance and repair work!**
- **Only allow persons who do not have a pacemaker to dismantle and install the rotor for maintenance and repair work.**

NOTICE: The magnets inside the motor do not pose a danger **provided the motor is completely mounted**. As such, the pump assembly does not pose a special danger to persons with pacemakers, who can safely approach the pump without any restrictions.

**WARNING! Risk of injury!**

**Opening the motor leads to high, suddenly occurring magnetic forces. These can cause serious cuts, crushing injuries and bruises.**

- **Do not open the motor!**
- **Only allow Wilo customer service to dismantle and install the motor flange and the bearing plate for maintenance and repair work.**

# 5. Product information

## 5.1 Type key

| Example: VE2205/1-1/16/E/K/3 | |
|---|---|
| **Helix V**<br>**Helix FIRST V** | High-efficiency multistage in-line pump in vertical design |
| **E** | Equipped with a frequency converter |
| **22** | Rated flow rate in $m^3/h$ |
| **05** | Number of stages |
| **/1** | Number of trimmed impellers |
| **-1** | Pump material code<br>1 = Pump housing Stainless steel 1.4308 (AISI 304)<br>+ Hydraulics 1.4307 (AISI 304)<br>2 = Modular pump housing Stainless steel 1.4409 (AISI 316L)<br>+ Hydraulics 1.4404 (AISI 316L)<br>4 = Monobloc Pump housing cast iron EN-GJL-250 (ACS and WRAS approved coating)<br>+ Hydraulics 1.4307 (AISI 304)<br>5 = Monobloc Pump housing cast iron EN-GJL-250 (standard coating)<br>+ Hydraulics 1.4307 (AISI 304) |
| **/25** | Pipe connection<br>16 = PN16<br>25 = PN25 |
| **/E** | E = EPDM O-rings (WRAS/KTW)<br>V = FKM O-rings |
| **/K** | K = Cartridge mechanical seal<br>S = The sheet coupling protector is on a line with the inlet |
| **/3** | 3 = Three-phase<br>1 = Single-phase |

| Example: MVIE7004/2-3/25/E/3 | |
|---|---|
| **MVI** | High-efficiency multistage inline pump in vertical design |
| **E** | Equipped with a frequency converter |
| **70** | Rated flow rate in $m^3/h$ |
| **04** | Number of stages |
| **/2** | Number of trimmed impellers |
| **-3** | Pump material code<br>3 = pump casing GJL-250 + coat + hydraulic stainless steel 304 |
| **/25** | Pipe connection<br>16 = PN16<br>25 = PN25 |
| **/E** | E = EPDM Orings (WRAS/KTW)<br>V = FKM O-rings |
| **/3** | 3 = Three-phase<br>1 = Single-phase |

## 5.2 Technical data

<table>
<tr><th colspan="2">Maximum utilisation pressure</th></tr>
<tr><td>Pump housing</td><td>16, 25 or 30 bar depending on the model</td></tr>
<tr><td>Maximum suction pressure</td><td>10 bar<br>Notice: the actual input pressure (P input) + the pressure at zero delivery rate (P zero delivery rate) must always be lower than the maximum authorised operating pressure (P max). If the maximum authorised operating pressure is exceeded, the mechanical seal and the roller bearing can be damaged or their life span reduced.<br>P input + P zero delivery rate ≤ Pmax<br>Refer to the pump plate for the maximum operating pressure: Pmax</td></tr>
<tr><th colspan="2">Temperature range</th></tr>
<tr><td>Fluid temperature</td><td>–30 °C to +120 °C<br>–15 °C to + 90 °C (FKM version for O'ring and mechanical seal)</td></tr>
<tr><td>Ambient temperature</td><td>–15 °C to +50 °C On request for other temperature</td></tr>
<tr><td>Storage temperature min./max.</td><td>–20 °C to +60 °C</td></tr>
<tr><th colspan="2">Electrical data</th></tr>
<tr><td>Motor efficiency</td><td>IE5</td></tr>
<tr><td>Motor protection rating</td><td>IP55</td></tr>
<tr><td>Insulation class</td><td>155 (F)</td></tr>
<tr><td>Frequency</td><td>See motor plate</td></tr>
<tr><td>Power supply voltage</td><td>
<table>
<tr><th colspan="4">Power (kW)</th></tr>
<tr><td>11</td><td>15</td><td>18.5</td><td>22</td></tr>
<tr><td colspan="4">400 V (±10 %) 50 Hz<br>380 V (±10 %) 60 Hz<br>480 V (±10 %) 60 Hz</td></tr>
</table>
</td></tr>
<tr><td>Types of supported power supplies</td><td>TN, TT</td></tr>
<tr><th colspan="2">Other characteristics</th></tr>
<tr><td>Ambient humidity</td><td>< 90 % without condensation</td></tr>
<tr><td>Altitude</td><td>< 1000 m (> 1000 m on request)</td></tr>
<tr><td>Max. suction height</td><td>Depending on NPSH of the pump</td></tr>
<tr><td>Noise Level Lp dB(A), ref. 20 µPa at 1 m, BEP tolerance 0–3dB(A)</td><td>
<table>
<tr><th colspan="4">Power (kW)</th></tr>
<tr><td>11</td><td>15</td><td>18.5</td><td>22</td></tr>
<tr><td colspan="4">79</td></tr>
</table>
</td></tr>
<tr><td>Power supply cable cross section diameter (cable equipped with 4 wires) mm²</td><td>
<table>
<tr><th colspan="4">Power (kW)</th></tr>
<tr><td>11</td><td>15</td><td>18.5</td><td>22</td></tr>
<tr><td>4 – 6</td><td>6 – 10</td><td colspan="2">10 – 16</td></tr>
</table>
</td></tr>
</table>

- Electromagnetic compatibility (*)
- Residential emission – 1st environment: PN-EN 61800-3
- Industrial interference resistance – 2nd environment: PN-EN 61800-3

(*) In the frequency range between 600 MHz and 1 GHz, the display or the pressure indication in the display might be disturbed in the exceptional case of the direct vicinity (<1 m from the electronic module) of radio transmission installations, transmitters or similar devices working in this frequency range. The operation of the pump is not affected at any time.

- Outline and connection dimensions (Fig. 4).

## 5.3 Scope of delivery

- High-pressure multistage centrifugal pump.
- Operating manual.

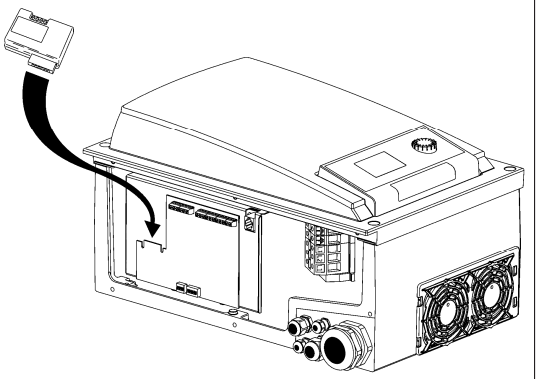
### 5.4 Accessories

The following original accessories are available for the Helix series:

| Designation | Article nº. |
|---|---|
| 2 Round counterflanges, stainless steel, 1.4404 (PN16 – DN50) | 4038587 |
| 2 Round counterflanges, stainless steel, 1.4404 (PN25 – DN50) | 4038589 |
| 2 Round counterflanges, steel, (PN16 – DN50) | 4038585 |
| 2 Round counterflanges, steel, (PN25 – DN50) | 4038588 |
| 2 Round counterflanges, stainless steel, 1.4404 (PN16 – DN65) | 4038592 |
| 2 Round counterflanges, stainless steel, 1.4404 (PN25 – DN65) | 4038594 |
| 2 Round counterflanges, steel, (PN16 – DN65) | 4038591 |
| 2 Round counterflanges, steel, (PN25 – DN65) | 4038593 |
| 2 Round counterflanges, stainless steel, 1.4404 (PN16 – DN80) | 4073797 |
| 2 Round counterflanges, stainless steel, 1.4404 (PN25 – DN80) | 4073799 |
| 2 Round counterflanges, steel, (PN16 – DN80) | 4072534 |
| 2 Round counterflanges, steel, (PN25 – DN80) | 4072536 |
| Bypass kit 30 bar | 4230274 |
| | 4230275 |
| | 4230276 |
| Bypass kit (with pressure gauge 25 bar) | 4230316 |
| | 4230317 |
| | 4230318 |
| Baseplate with dampers for pumps up to 5.5 kW | 4157154 |

- IF module PLR for connecting to PLR/interface converter
- IF module LON for connection to LONWORKS network. These modules plug directly into the connection interfaces of the converter (see Fig. below).
- Non-return valves (with tab or spring ring for operation at constant pressure)
- Protection kit against dry-running
- Pressure sensor kit for control (accuracy: ≤ 1 %; use between 30 % and 100 % of the measurement range).
  Use only accessories that are new.

| Power (kW) | | | |
|---|---|---|---|
| 11 | 15 | 18.5 | 22 |



## 6. Description and function

### 6.1 Description of the product

**Fig. 1**
1 – Motor fixation bolt
2 – Coupling guard
3 – Mechanical seal
4 – Hydraulic stage housing
5 – Impeller
6 – Pump shaft
7 – Motor
8 – Coupling
9 – Lantern
10 – Tube liner
11 – Flange
12 – Pump housing
13 – Base plate

**Fig. 2, 3**
1 – Strainer
2 – Pump suction valve
3 – Pump discharge valve
4 – Check valve
5 – Drain + priming plug
6 – Venting plug and filling plug
7 – Tank
8 – Foundation block
9 – Option: pressure plugs
(a – suction, b – discharge)
10 – Lifting hook

**Fig. A1, A2, A3, A4**
1 – Block of DIP switches
2 – Pressure sensor
3 – Tank
4 – Insulation valve of the tank

### 6.2 Product characteristics

- Helix pumps are vertical multistage high-pressure non-self-priming pumps for in-line connection.
- Helix pumps combine highly efficient hydraulic systems and motors (if present).
- All metal components in contact with the fluid are made of stainless steel or grey cast iron.
- Special versions for aggressive liquids exist with all components in contact with the liquid being made of stainless steel.
- A cartridge seal is used as standard for all products of the Helix range to facilitate maintenance.
- Depending on the model, the pump casing is equipped with additional connections for connecting accessories (Fig. 10).
- The Helix lantern design includes an additional ball bearing that takes up hydraulic axial forces: this allows the pump to be fitted with an entirely standard motor.
- Special handling devices are integrated to facilitate pump installation (Fig. 8).

## 7. Installation and electrical connection

**All installation and electrical work may only be carried out by qualified personnel and in compliance with local codes and regulations!**

**WARNING! Risk of severe injury!**
The applicable regulations for the prevention of accidents must be complied with.

**WARNING! Risk of electrical shock!**
Danger from electric current must be eliminated.

### 7.1 Upon receipt of the product

Unpack the pump and recycle or dispose of the packaging in an environmentally responsible manner.

### 7.2 Installation

The pump must be installed in a dry, well-ventilated location free of frost.

**CAUTION! Risk of damage to the pump!**
The presence of foreign matter or impurities in the pump housing may affect the functioning of the product.

- It is recommended to perform any welding and soldering work before installing the pump.
- Rinse the circuit completely before installing and commissioning the pump.

– The pump must be installed in a place easy to access for the purposes of inspection or replacement.
– For heavy pumps, install a lifting hook (Fig. 2, pos. 10) above the pump to facilitate its disassembly.

**WARNING! Risk of accident due to hot surfaces!**
The pump must be installed in such a way that no one can touch the hot surfaces of the product when it is in operation.

– Install the pump in a dry and frost-free place on a flat concrete block using appropriate screws. If possible, use an insulating material under the concrete block (cork or reinforced rubber) to avoid any noise and vibration transmission into the unit.

**WARNING! Risk of tipping!**
The pump must be screwed to the ground. Observe the tightening torque (Fig. 9).

– The pump must be installed in an easily accessible location to facilitate inspection and maintenance work. The pump must always be installed perfectly upright on a concrete baseplate.

**CAUTION! Risk of foreign matter in the pump!**
Ensure that all blanking plugs are removed from the pump housing before installation.

NOTICE: All pumps are factory-tested for their hydraulic properties and may therefore contain a small amount of residual water. For hygiene purposes, it is recommended to rinse the pump before installing it in any potable water supply.

– For installation and connection dimensions see section 5.2.
– Lift the pump only with appropriate lifting devices and suitable slings in compliance with lifting regulations. The integrated lifting hooks must be used for lifting and the fixation of the pump.

**WARNING! Risk of tipping!**
There is a high risk of tipping due to the high centre of gravity, especially for larger pumps. Take special care over the safe fixation of the pump when handling.

**WARNING! Risk of tipping!**
Use integrated lifting hooks only if they are not damaged (e.g. by corrosion). Replace them if required.

**WARNING! Risk of tipping!**
Never lift the complete pump using the motor hooks as these are designed to lift the motor only.

– Motors are equipped with drain holes for condensed water that are sealed at the factory by plastic plugs to ensure IP55 protection. If used in air-conditioning or cooling systems, remove these plugs to allow draining.

### 7.3 Pipe connection

- After removing the plugs from the pump housing and cleaning the seal faces between the pump and the system, connect the pump to the pipework using appropriate counterflanges, screws, nuts, washers and seals.

**CAUTION!**
**Tighten the nuts crosswise in steps of 20 Nm and do not exceed 80 Nm**
Use of impact wrench is prohibited.

- The circulation sense of the fluid is indicated on the identification label of the pump.
- Pump must be installed in such a way that it is not stressed by the pipework. The pipes must be attached so that the pump does not bear their weight.
- It is recommended that isolation valves be installed on the suction and discharge side of the pump.
- Use of expansion joints may mitigate noise and vibration of the pump.
- As regards the nominal cross-section of the suction pipe, we recommend a cross-section at least as large as that of the pump connection.
- A check valve could be placed on the discharge pipe in order to protect the pump against hammer shock.
- For direct connection to a public drinking water system, the suction pipe must also have a check valve and a guard valve.
- For indirect connection via a tank, the suction pipe must have a strainer to keep any impurities out of the pump and a check valve.
- In case of half flanges pump design, it is recommended to connect the hydraulic network and then keep out the plastic fixation links to prevent any leakage risk.

### 7.4 Electrical connections

**DANGER! Risk of fatal injury!**

**Hazardous voltage due to the discharge of the converter capacitors.**

- Before any work on the converter, wait for 5 minutes after disconnecting the power supply.
- Check that all electrical connections and contacts are not live.
- Check that the pressure connection terminals have been allocated correctly.

**DANGER! Risk of fatal injury!**

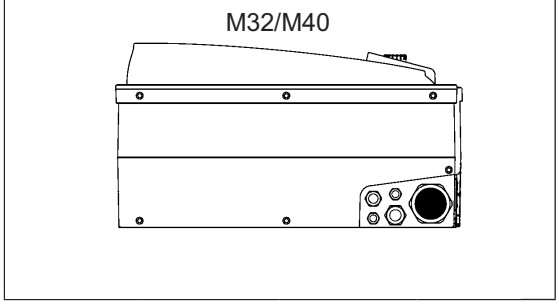
**For generator operation or turbine operation of the pump (rotor drive), there may be a dangerous contact voltage at the module's contacts.**

- **Close the shut-off devices upstream and downstream of the pump.**

- The supply cable must be routed in such a way that it does not contact the pipework and/or pump and motor casing.
- The power cable (3 phases + earth) must be fed through the threaded cable connection shown in black below.
  Non-assigned threaded cable connections must remain sealed with the plugs provided by the manufacturer.

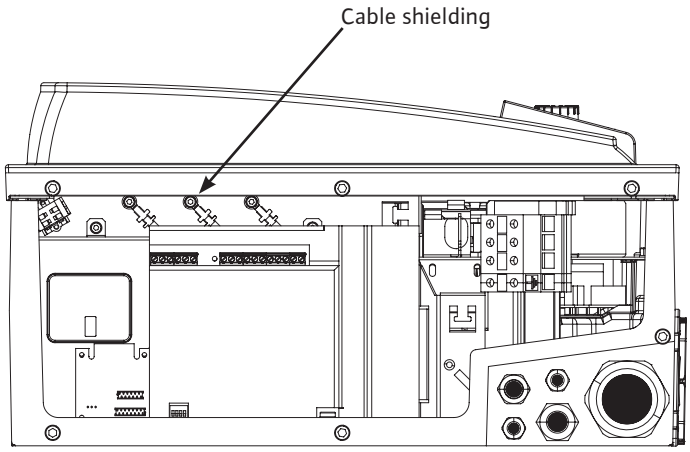
- The power supply cable (3 phases + earth) must be inserted into the gland indicated below in black.
- The glands that aren't used must remain sealed using plugs provided by the manufacturer.

| Power (kW) | | | |
|---|---|---|---|
| 11 | 15 | 18.5 | 22 |



– The cables for the sensor, the external instruc-tion, the inputs [Ext. Off] and [Aux] must be shielded.

| Power (kW) | | | |
|---|---|---|---|
| 11 | 15 | 18.5 | 22 |




1×M32/40
1×M20
1×M16
2×M12

- The electric characteristics (frequency, voltage, nominal current) of the frequency converter are specified on the pump identification label. Ensure that the frequency converter complies with the power supply it will be used with.
- The electric protection of the motor is integrated into the converter. It is set up to take into account the pump characteristics and ensure the protection of pump and motor.
- In all cases, install a fused isolator (type gF) to protect the unit.

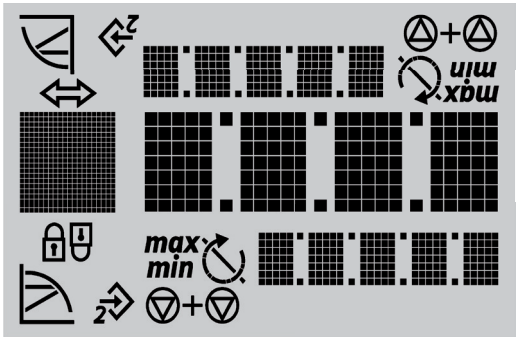
NOTICE: If a residual-current device needs to be installed for the user's protection, it must have a delay effect. Adjust the circuit breaker rating according to the current provided on the pump identification sticker.

NOTICE: This pump is equipped with a frequency converter and does not require protection from a residual-current device. Frequency converters can impair the function of residual-current devices.
Exception: Residual-current devices that have a selective universal-current-sensitive design are permitted.

- Labelling: FI 
- Trigger current: > 30 mA

- Use only power cables complying with applicable regulations.
- Protection on mains side: max. admissible 25 A. Trigger characteristic of the fuses: B.

As soon as the power supply to the converter is activated, a 2-second display test is carried out during which all characters on the display are shown.




NOTICE: Requirements and limit values for harmonic currents.

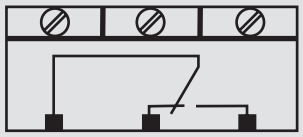
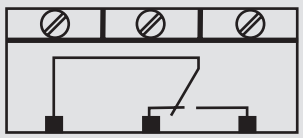
Pumps with the engine-power classes of 11 kW, 15 kW, 18.5 kW and 22 kW are equipment for professional usage. These devices are subject to special connectivity conditions since a short-circuit ratio Rsce of 33 at the connecting point is not sufficient for your type of operation. The connection to the public low-voltage mains is regulated by the standard IEC 61000-3-12 – the basis for these pumps' rating is table 4 for three-phase devices under specified conditions.
For all public connection points, the short-circuit power Ssc at the interface between the user's electrical installation and the public power supply must be greater than or equal to the values in the table below. It is the responsibility of the installer or of the user, and if applicable the distribution system operator too, to ensure that these pumps are operated properly. If the pump is used within an industrial middle-voltage system, the connectivity conditions are the sole responsibility of the operator.

| Motor power [kW] | Short-circuit Ssc power [kVA] |
|---|---|
| 11 | 1800 |
| 15 | 2400 |
| 18.5 | 3000 |
| 22 | 3500 |

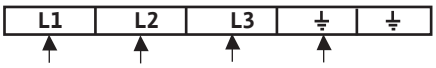
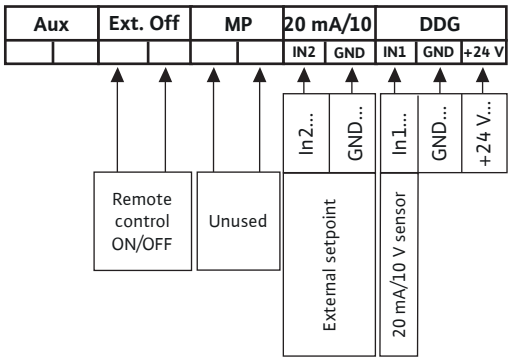
By installing an appropriate harmonic filter between the pump and the power supply, the harmonic current content will be reduced.

Connection terminal assignment

- Remove the screws and take off the converter cover.

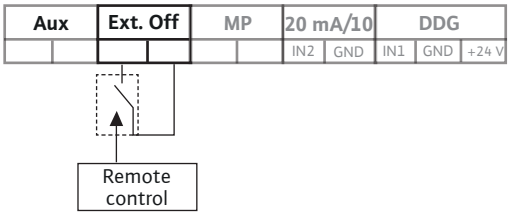
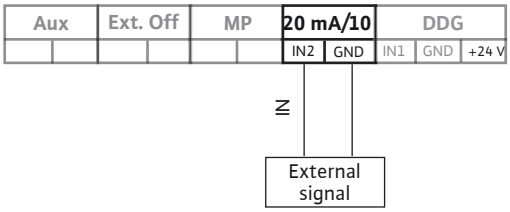
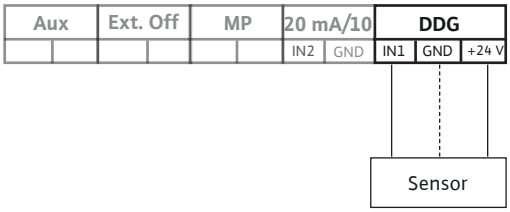
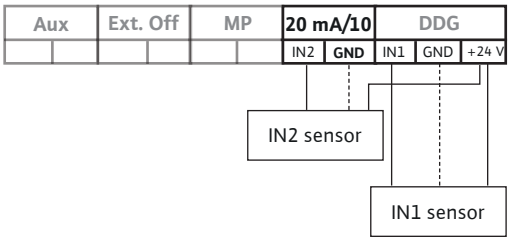
| Designation | Assignment | Remarks |
|---|---|---|
| L1, L2, L3 | Mains connection voltage | Three-phase current 3 ~ IEC38 |
| PE | Earth terminal | 11 \| 15 \| 18.5 \| 22<br>x2 |
| IN1 | Sensor input | Signal nature: voltage (0–10 V, 2–10 V)<br>Input resistor: Ri ≥ 10 kΩ<br>Signal nature: current (0–20 mA, 4–20 mA)<br>Input resistor: $R_B$ = 500 Ω<br>Can be configured in the “Service” menu <5.3.0.0> |
| IN2 | External setpoint input | Signal nature: voltage (0–10 V, 2–10 V)<br>Input resistor: Ri ≥ 10 kΩ<br>Signal nature: current (0–20 mA, 4–20 mA)<br>Input resistor: Rb = 500 Ω<br>Can be configured in the “Service” menu <5.4.0.0> |
| GND (x2) | Ground terminals | For each IN1 and IN2 input |
| +24 V | Continuous power supply for sensor | Max. current: 60 mA.<br>The power supply is protected from short-circuits. |
| Ext. Off | ON/OFF control input<br>“DEACTIVATION priority”<br>for a potential-free external switch | The potential-free external switch is used to activate and deactivate the pump.<br>On installations with high numbers of starts (> 20 per day), activation and deactivations should be performed via “Ext. Off”. |
| SBM | “Available transfer” relay  | In normal operation, the relay is activated when the pump is running or in standby.<br>The relay is deactivated if an initial malfunction occurs or if the main power supply is disconnected (pump switches off).<br>Pump availability, even temporarily, can thus be signalled to the switchgear.<br>Can be configured in the “Service” menu <5.7.6.0><br>Potential-free contact:<br>minimum: 12 V DC, 10 mA<br>maximum: 250 V AC, 1 A |
| SSM | “Failures transfer” relay  | If consecutive malfunctions of the same type are detected (from 1 to 6 according to significance), the pump switches off, and this relay is activated (until manual intervention).<br>Potential-free contact:<br>minimum: 12 V DC, 10 mA<br>maximum: 250 V AC, 1 A |
| PLR | Connection terminals of the PLR communication interface | The optional IF module PLR can be inserted into the multiple connector placed in the converter connector area.<br>The module is protected from polarity reversal. |
| LON | Connection terminals of the LON communication interface | The optional IF module LON can be inserted into the multiple connector placed in the converter connector area.<br>The module is protected from polarity reversal. |

NOTICE: Terminals IN1, IN2, GND and Ext. Off meet the requirements for “safe isolation” (in acc. with EN 61800-5-1) at the mains terminals as well as at SBM and SSM terminals (and vice versa).

| Mains connection | Power terminal block |
|---|---|
| Plug the 4-conductor cable into the power terminal block (phases + earth). |  |
| **Input/output connection** | **Input/output terminal block** |
| • The cables of the sensors, the external setpoint and the remote control (Ext. Off) must be shielded. |  |
| • Remote control enables the starting or deactivation of the pump (potential-free), this function has priority over the other functions.<br>• This remote control can be removed by shunting the terminals of the remote control (Ext. Off). | Example: float switch, low-water pressure regulator, etc. |

Connections and control rules of each operating mode:

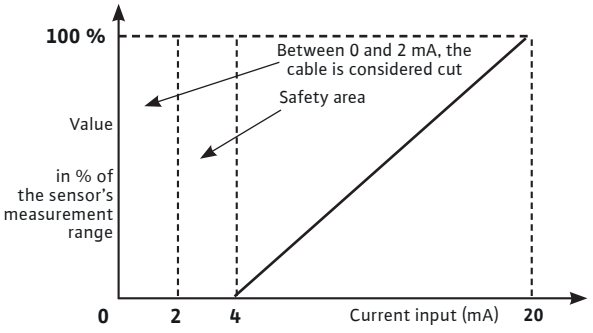
| Signal connections and control rules | | Connection | | Signal | |
|---|---|---|---|---|---|
| | | | | Current | Voltage |
| **Operating modes** | **Setting** | see the diagrams below | | | |
| • In “Speed stage control” mode  | ... speed, manual | C1 | / | / | / |
| | ... speed, external control | C1 | C2 | S3 | S4 |
| • In “Constant pressure: p-c” mode<br>• Control with a relative pressure sensor<br>• In “Δp-c” mode<br>• Control with a differential pressure sensor  | ... of the setpoint with the rotary knob | C1 | C3 | S1 | S2 |
| | ... by an external setpoint | C1 | C2 | S5 | S6 |
| | | | C3 | S1 | S2 |
| • In the mode “Variable pressure: Δp-v”<br>• Control with a differential pressure sensor  | ... of the setpoint with the rotary knob | C1 | C3 | S1 | S2 |
| | ... by an external setpoint | C1 | C2 | S5 | S6 |
| | | | C3 | S1 | S2 |
| • In “PID control” mode<br>• Control with a temperature sensor or delivery rate sensor...  | ... of the setpoint with the rotary knob | C1 | C3 | S1 | S2 |
| | ... by an external setpoint | C1 | C2 | S5 | S6 |
| | | | C3 | S1 | S2 |

| Input/output connections | |
|---|---|
| Remote control: Position [C1]<br>• Converter delivered with a jumper.<br>• Use of the remote control is optional |  |
| External signal IN2: Position [C2]<br>• 2 wires ([20 mA/10 V] / 0 V ) |  |
| IN1 sensor: Position [C3]<br>• 2 wires ([20 mA/10 V] / +24 V )<br>• 3 wires ([20 mA/10 V] / 0 V / +24 V) |  |
| IN1 and IN2 sensors: Position [C4]<br>• 2 wires ([20 mA/10 V] / +24 V)<br>• 3 wires ([20 mA/10 V] / 0 V / +24 V) |  |

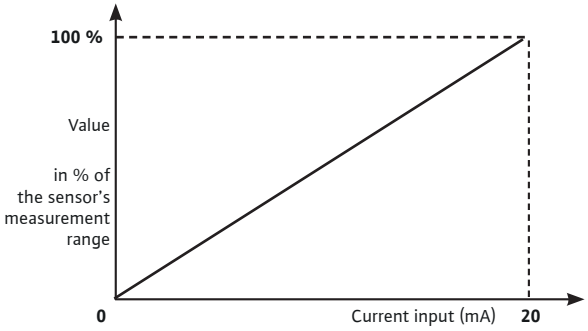
### Control rules of input signals

**Sensor input – Current signal: Position [S1]**

**Sensor signal 4–20 mA**

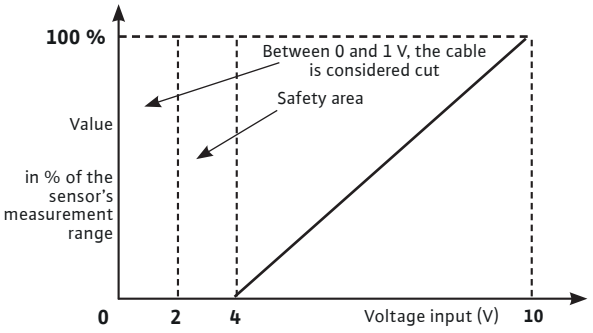



**Sensor signal 0–20 V**

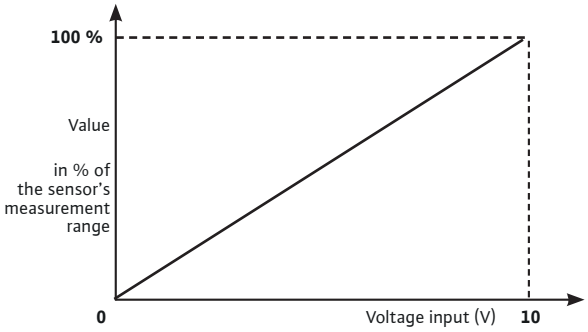



**Sensor input – Voltage signal: Position [S2]**

**Sensor signal 2–10 V**

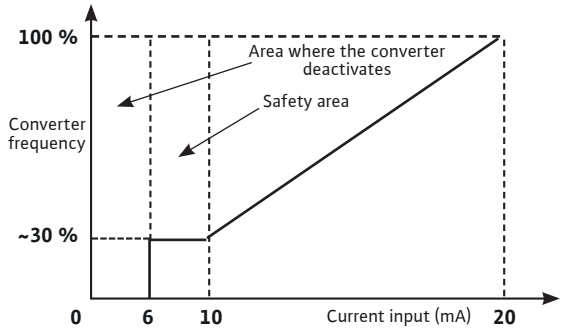



**Sensor signal 0–10 V**

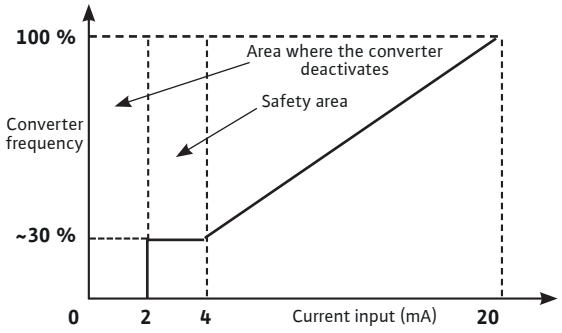


## External control input of the speed stage – Current signal: Position [S3]

**External signal 4–20 mA**

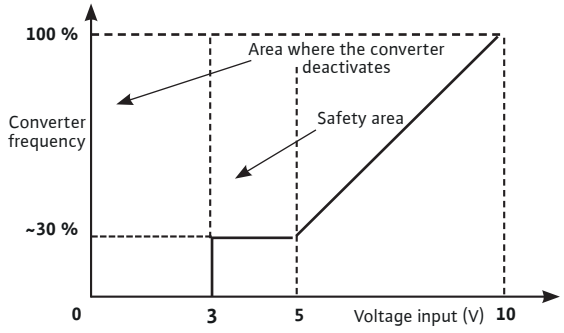



**External signal 0–20 mA**

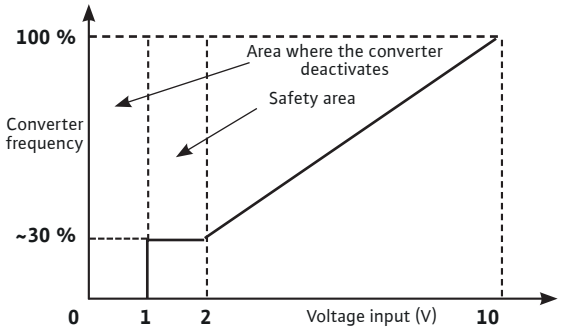



## External control input of the speed stage – Voltage signal: Position [S4]

**External signal 2–10 V**

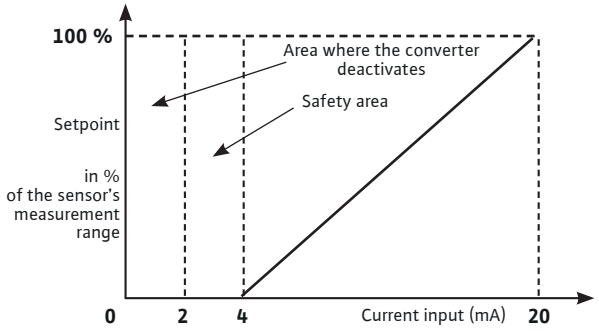



**External signal 0–10 V**

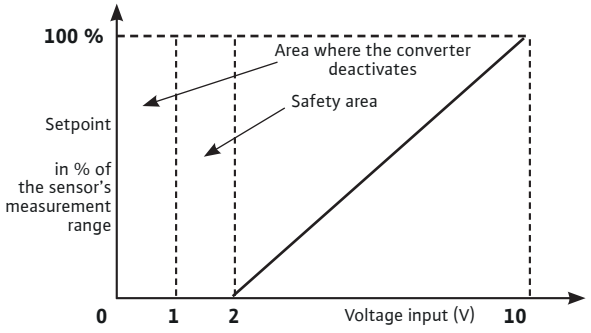



## External setpoint input of control with a sensor (pressure, temperature, delivery rate, etc.)

**Setpoint signal 4–20 mA: Position [S5]**




**Setpoint signal 2–10 V: Position [S6]**



# 8. Commissioning

## 8.1 Filling and degassing the system

**CAUTION! Risk of damage to the pump!**
Never operate the pump dry.
The system must be filled before starting the pump.

### 8.1.1 Venting – Pump in inlet mode (Fig. 3)

- Close the two guard valves (2 + 3).
- Open the drain cock of the venting plug (6a).
- Slowly open the valve on the suction side (2).
- Close the drain cock once the air has escaped and the liquid is flowing in the pump (6a).

**WARNING! Risk of burns!**
If the pumped fluid is hot and under high pressure, the fluid escaping at the drain cock may cause burns or other injuries.

- Open the guard valve on the suction side completely (2).
- Start the pump.

### 8.1.2 Venting process – Pump in suction mode (Fig. 2)

- Close the guard valve on the discharge side (3). Open the guard valve on the suction side (2).
- Remove the filling plug (6b).
- Partially open the priming/drain plug (5b).
- Fill the pump and the suction pipe with water.
- Ensure that there is no air trapped in the pump and suction pipe. Fill the system until all air is removed.
- Close the filling plug (6b).
- Start the pump and verify that the direction of rotation complies with the specification printed on the pump sticker. If this is not the case, interchange two phases in the motor terminal.

**CAUTION!**
An incorrect direction of rotation will cause poor pump performance and may damage the coupling.

- Slightly open the guard valve on the discharge side (3).
- Unscrew the drain cock to remove the air (6a).
- Close the drain cock once the air has escaped and the liquid is flowing in the pump.

**WARNING!**
If the pumped fluid is hot and under high pressure, the fluid escaping at the drain cock may cause burns or other injuries.

- Open the guard valve on the discharge side fully (3).
- Close the priming/drain plug (5a).

## 8.2 Starting

**CAUTION! Risk of property damage!**
The pump must not operate at zero flow (discharge valve closed).

**WARNING! Risk of injury!**
Coupling guards must be in place and secured by all required screws when the pump is running.

**WARNING! High noise levels!**
High-power pumps may emit a high noise level. Use appropriate protection when working close to the pump for any extended period.

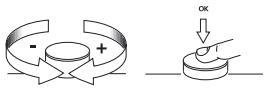
**WARNING!**
The installation must be laid out in such a way that there is no risk of injury in case of fluid leakage (e.g. caused by mechanical seal failure).

## 8.3 Operation of the converter

### 8.3.1 Control elements

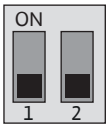
The converter is controlled using the following control elements:

**Rotary knob**




- Selecting a new parameter only requires rotating the knob in direction “+” to the right or “–” to the left.
- A short impulse on the rotary knob confirms this new setting.

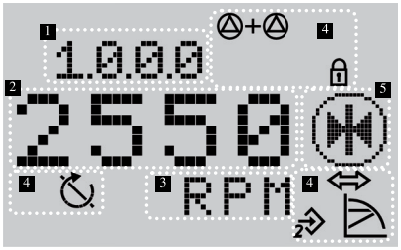
**DIP switches**
This converter has a block of two DIP switches (Fig. 1D, pos. 1) each with two positions.




- DIP switch 1 switches from “OPERATION” mode [DIP switch 1 OFF] to “SERVICE” mode [DIP switch 1 ON] and back again. The “OPERATION” position authorises the operation of the chosen mode and stops access to the parameterisation (normal operation). The “SERVICE” position allows the user to carry out parameterisation of the different operations.
- DIP switch 2 is used to activate or deactivate the “Access lock” (see section 8.3.6.5).

**Relay**
(see section 10)

### 8.3.2 Display structure




| Pos. | Description |
|---|---|
| 1 | Menu number |
| 2 | Value display |
| 3 | Unit display |
| 4 | Standard symbols |
| 5 | Icon display |

### 8.3.3 Description of standard symbols

| Symbol | Description |
|---|---|
| | Operation in “Speed stage control” mode |
| | Operation in “Constant pressure” or “PID control” mode |
| | Operation in “Variable pressure” or “PID control” mode |
| | IN2 input activated (external setpoint) |
| | Access lock<br>When this symbol appears, the settings or current measurement values cannot be modified. The information is displayed in read-only form |
| | BMS (Building Management System) PLR or LON is activated |
| | Pump in operation (if flashing, zero delivery rate detection detected) |
| | Pump switched off |

### 8.3.4 Display

**Display status page**

- The status page appears as the default page of the display.
  The currently set setpoint is displayed. Basic settings are displayed by symbols.


Example of display status page

NOTICE: In all menus, if the rotary knob is not operated within 30 seconds, the display will reappear and no change will be registered.

**Navigation element**

- The menu structure makes it possible to call up the functions of the converter. A number is attributed to every menu and submenu.
- Turn the rotary knob to scroll through any menu level (e.g. 4000 –> 5000).
- Blinking elements (value, menu number, symbol or icon) allow the selection of a new value, a new menu number or a new function.

| Symbol | Description |
|---|---|
| | When the arrow appears:<br>• An impulse on the rotary knob provides access to a sub-menu (e.g. 4000 –> 4100). |
| | When the “return” arrow appears:<br>• An impulse on the rotary knob provides access to the higher menu (e.g. 4130 –> 4100). |

### 8.3.5 Defining the application of an open or closed hydraulic loop

The product has two types of application. The type of application chosen defines the operating modes that can be accessed.

| Hydraulic application | Operating mode | |
|---|---|---|
| Open loop | “p-c” mode | Speed stage control mode |
| Closed loop | “Δp-c” mode<br>“Δp-v” mode | PID mode |

Menu 5.7.8.0 of the EXPERT menu can be used to select the type of application required.

NOTICE: The product must be reinitialised when the application is changed. All the user parameters will revert to the factory settings.

### 8.3.6 Defining operating modes

**Defining pressure sensors**

- The relative pressure sensor measures the pressure in relation to atmospheric pressure.
- The absolute pressure sensor measures the pressure in relation to the zero pressure in a vacuum.
- The differential pressure sensor measures the pressure between two points.

NOTICE: All the pressures indicated by the pump are measured in relation to the atmospheric pressure, except when a differential pressure sensor is used.

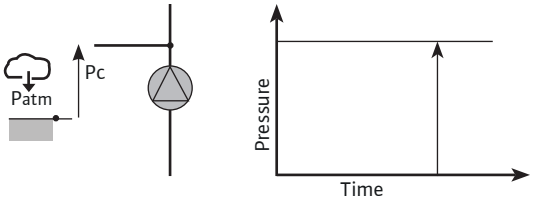
NOTICE: If the pump is provided alone, and not integrated into a system installed by us, the configuration mode upon delivery is the "speed stage control" mode.

**"Speed stage control" mode (Fig. 2, 3)**

- The duty point is obtained by manually adjusting the speed stage via the menus or using an external command signal for the speed stage expressed in %.
- For entry into service, the motor speed stage should be set at 2400 rpm.

**"Constant pressure: pc" mode (Fig. 2D, 3D, 4D)**

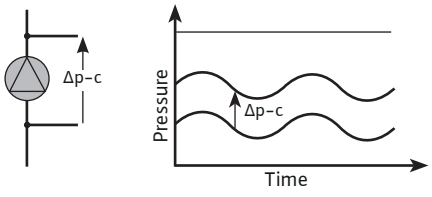
- In "p-c" mode, the converter maintains a constant pressure at the pump discharge irrespective of the delivery rate required by the installation.




- The duty point is defined manually via the menus or an external signal.
- This mode can be accessed when the open hydraulic loop parameter is selected in menu 5.7.8.0.
- A relative pressure sensor is used for control (sensor: accuracy: ≤ 1 %; using between 30 % and 100 % of the measuring range).
- For entry into service, the set pressure should be set at 60 % of the pump's maximum pressure.

**"Δp-c" mode (Fig. 2D, 3D, 4D)**

- In "Δp-c" mode, the converter maintains a constant differential pressure (generated by the pump) irrespective of the delivery rate required by the installation.




- The differential pressure is defined manually via the menus or via an external signal.
- This mode can be accessed when the closed hydraulic loop parameter is selected in menu 5.7.8.0.
- A differential pressure sensor is used for control (sensor: accuracy: ≤ 1 %; using between 30 % and 100 % of the measuring range).
- For entry into service, the set pressure should be set at 60 % of the pump's maximum pressure.

**Mode "variable pressure: Δp-v" (Fig. 2D-3D-4D)**

- In "Δp-v" mode, the converter changes the differential pressure of the pump in a linear manner, in line with the delivery rate required by the installation.
- The duty point (Pset) is defined manually via the menus or an external signal.
- The duty point at a zero delivery rate (%Pset) is defined manually via the menus.
- This mode includes zero delivery rate detection that switches off the pump.
- A differential pressure sensor is used for control (sensor: accuracy: ≤ 1 %; using between 30 % and 100 % of the measuring range).
- For entry into service, the set pressure should be set at 60 % of the pump's maximum pressure.
- This mode can be accessed when the closed hydraulic loop parameter is selected in menu 5.7.8.0.

**"PID control" mode**

- The converter enables control with another type of sensor (temperature, delivery rate, etc.) via control of the PID (proportional integral differential control).
- The duty point is expressed as a percentage of the measurement range of the sensor used. This point is defined manually via the menus or via an external control signal.

### 8.3.7 Menu description

**List of menus (Fig. A5)**

**<1.0.0.0>** Setpoint setting

**<2.0.0.0>** Operating mode setting

**<3.0.0.0>** On/Off pump setting

**<4.0.0.0>** "Information" menu
Reading the pump parameters

**<5.0.0.0>** "Service" menu
Access to the pump parameter settings

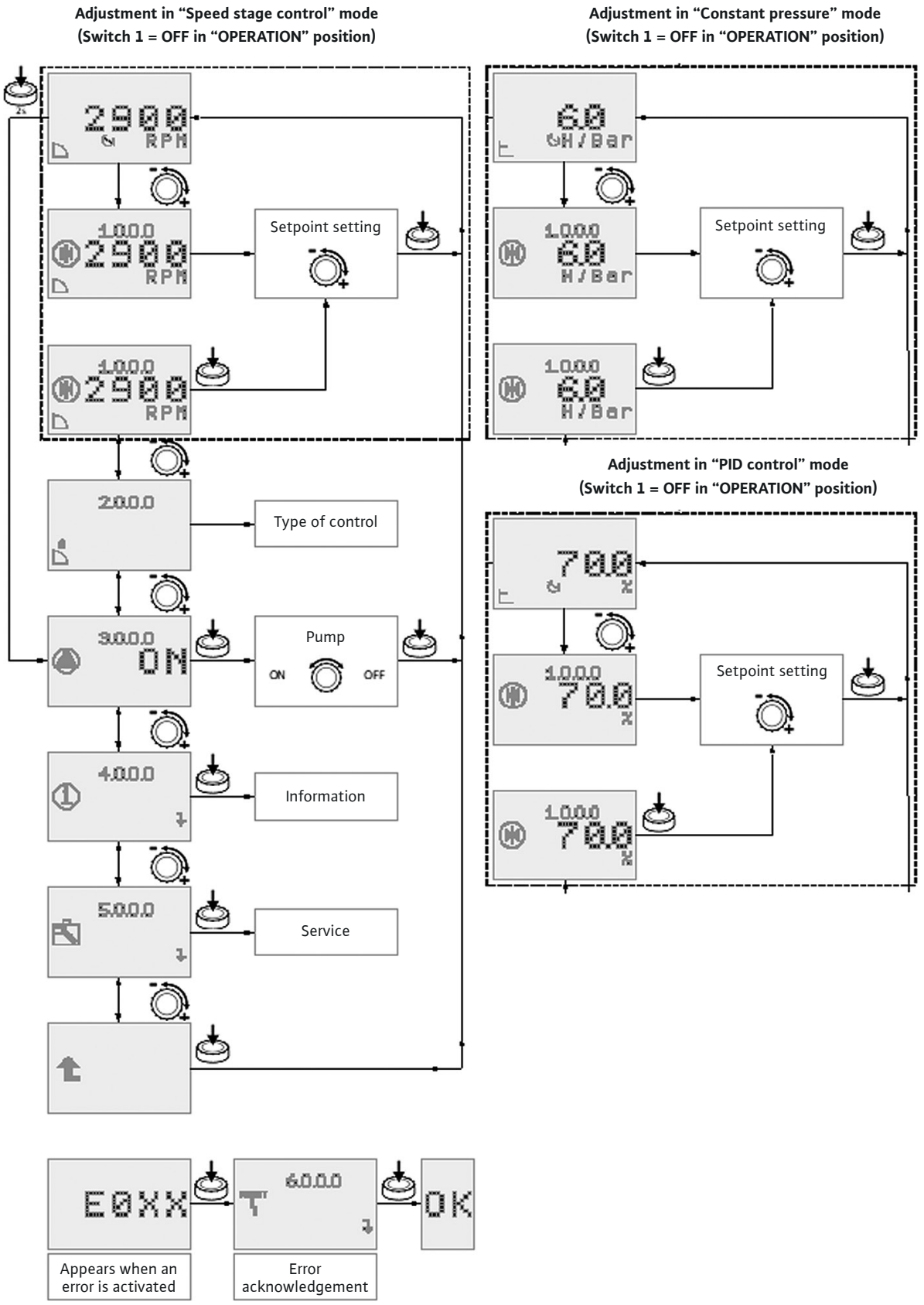
**<6.0.0.0>** Error acknowledgement
If one or more malfunctions occur, the malfunction page will appear. The letter "E" followed by a three-figure code will appear (see section 10).

**<7.0.0.0>** Access lock
The "Access lock" can be accessed if DIP switch 2 is in the ON position.

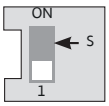
**CAUTION! Risk of property damage!**
Incorrect setting changes may cause pump operation faults which may lead to damage of the pump or installation.

**Menu navigation**

**Fig. A1**



- Only perform adjustments in “SERVICE” mode when commissioning, which should only be performed by specialist technicians.




**Navigating the “Easy” and “Expert” menus**

Place DIP switch 1 in the ON position (Fig. A1, pos. 1). The “SERVICE” mode is activated.
On the display, the symbol here will flash (Fig. A7).
In the “SERVICE” mode, the parameter of menus <2.0.0.0> and <5.0.0.0> can be changed.

There are 2 adjustment modes:

**Easy menu**

A simplified menu that provides access to the main parameters of the operating modes.

- Press the rotary knob for two seconds. The “Easy” menu symbol is displayed (Fig. A7).
- Press the rotary knob to validate this choice. The display will switch to menu number <2.0.0.0> (Fig. A8).
- After performing the adjustments, put DIP switch 1 in the OFF position (Fig. A1, pos. 1).

**Expert menu**

The menu for accessing all the parameters.

- Press the rotary knob for two seconds and turn it in order to select the expert menu.
  The “Expert” menu symbol is displayed (Fig. A7).
- Press the rotary knob to validate this choice. The display will switch to menu <2.0.0.0> (Fig. A8).
- Select the operating mode in menu <2.0.0.0> and validate.
- Select menu <5.0.0.0> to access all the converter’s parameters (Fig. A9).
- After performing the adjustments, put DIP switch 1 in the OFF position (Fig. A1, pos. 1).

**Fig. A2**

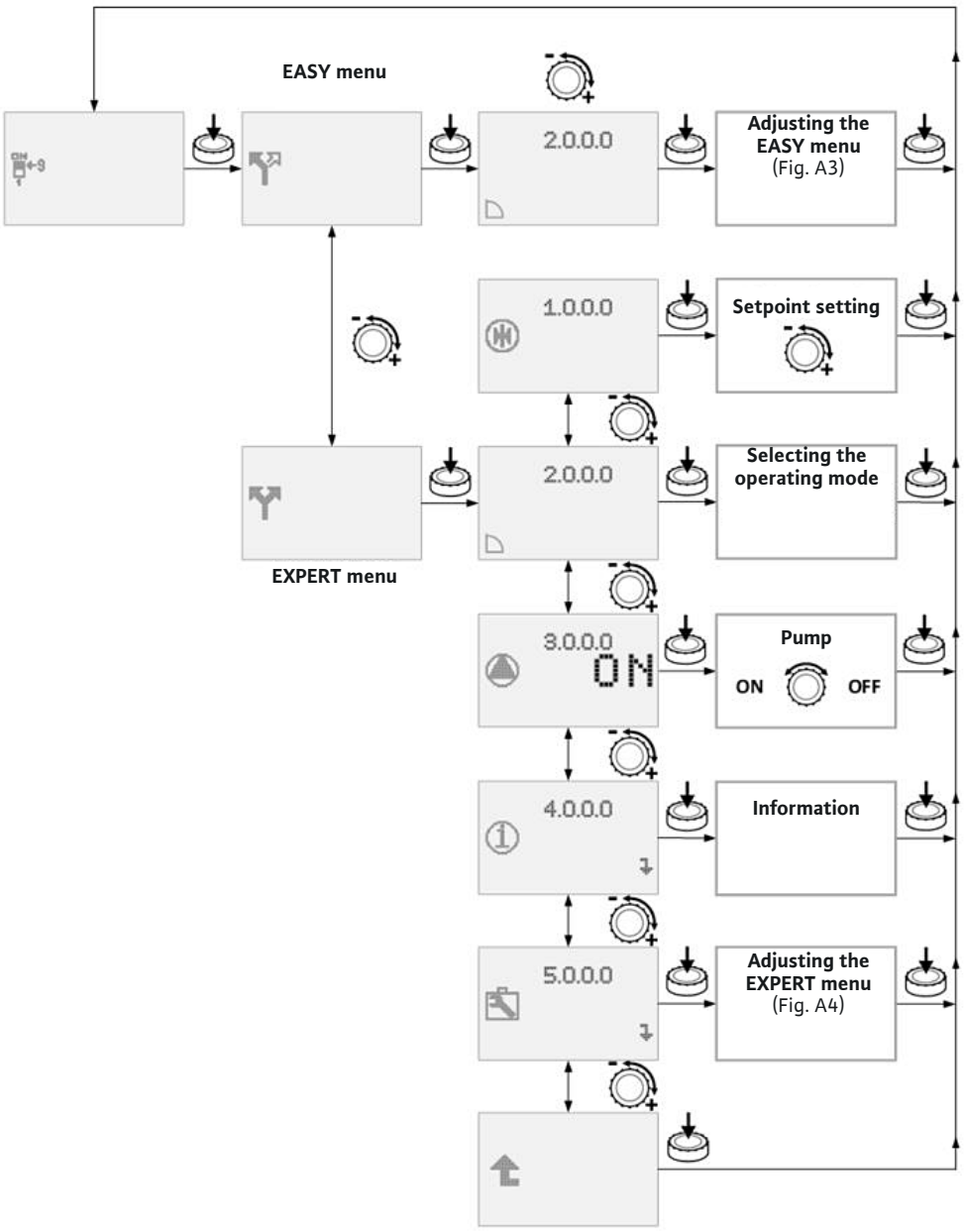

EASY menu
2.0.0.0
Adjusting the EASY menu (Fig. A3)
1.0.0.0
Setpoint setting
2.0.0.0
Selecting the operating mode
EXPERT menu
3.0.0.0
ON
Pump
ON
OFF
4.0.0.0
Information
5.0.0.0
Adjusting the EXPERT menu (Fig. A4)

Fig. A3

## ADJUSTING THE EASY MENU

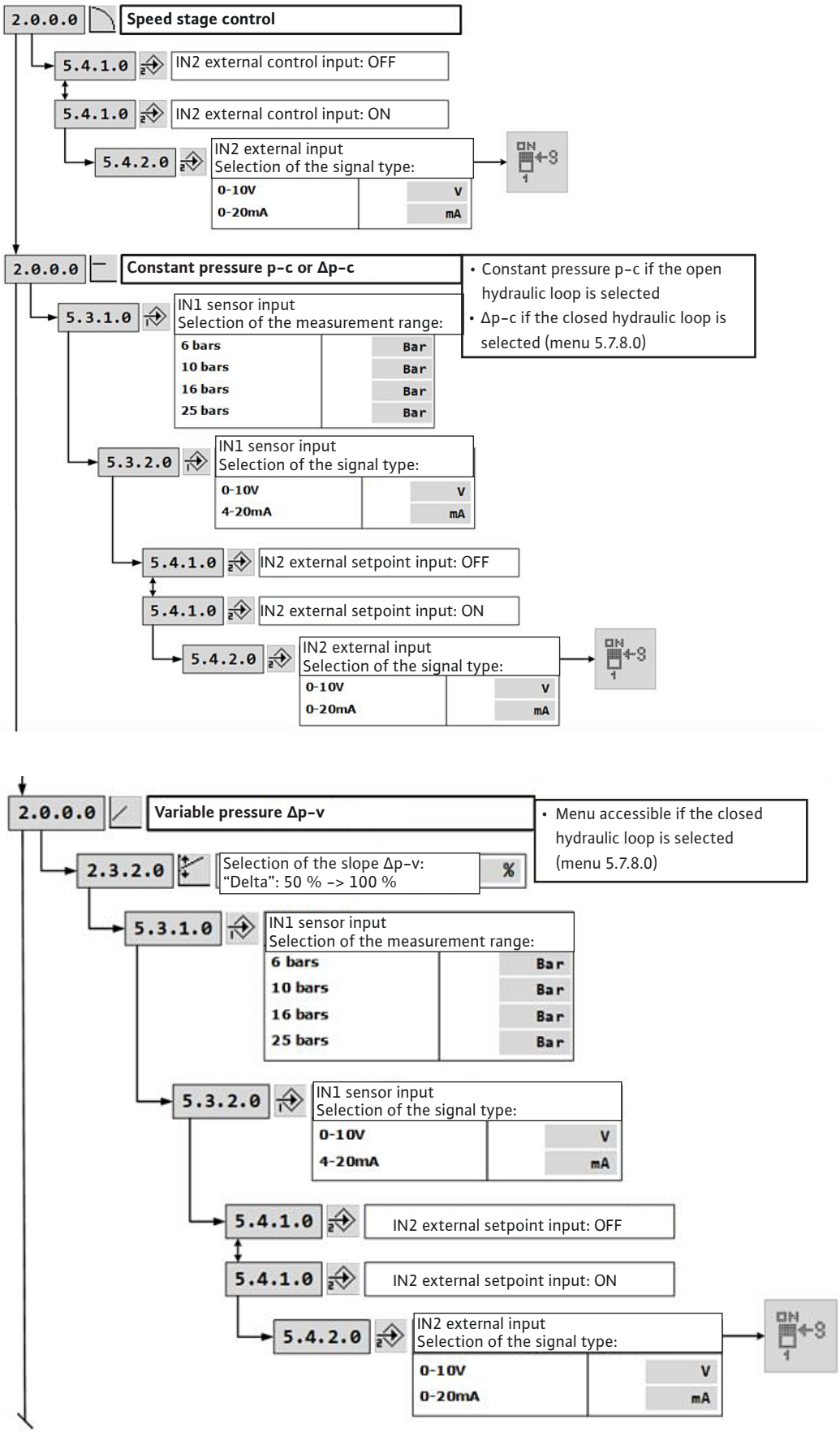


**Fig. A3**

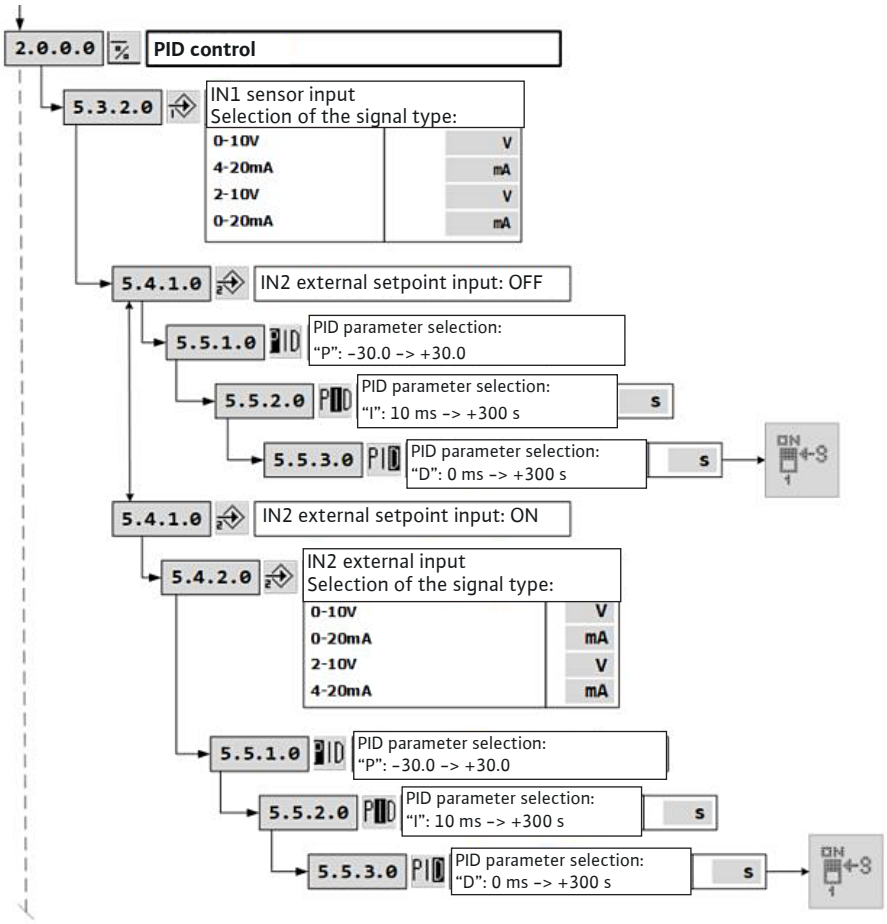

2.0.0.0
PID control
5.3.2.0
IN1 sensor input
Selection of the signal type:
0-10V
V
4-20mA
mA
2-10V
V
0-20mA
mA
5.4.1.0
IN2 external setpoint input: OFF
5.5.1.0
PID parameter selection:
"P": -30.0 -> +30.0
5.5.2.0
PID parameter selection:
"I": 10 ms -> +300 s
s
5.5.3.0
PID parameter selection:
"D": 0 ms -> +300 s
s
5.4.1.0
IN2 external setpoint input: ON
5.4.2.0
IN2 external input
Selection of the signal type:
0-10V
V
0-20mA
mA
2-10V
V
4-20mA
mA
5.5.1.0
PID parameter selection:
"P": -30.0 -> +30.0
5.5.2.0
PID parameter selection:
"I": 10 ms -> +300 s
s
5.5.3.0
PID parameter selection:
"D": 0 ms -> +300 s
s

Fig. A4

## ADJUSTMENT OF THE EXPERT MENU

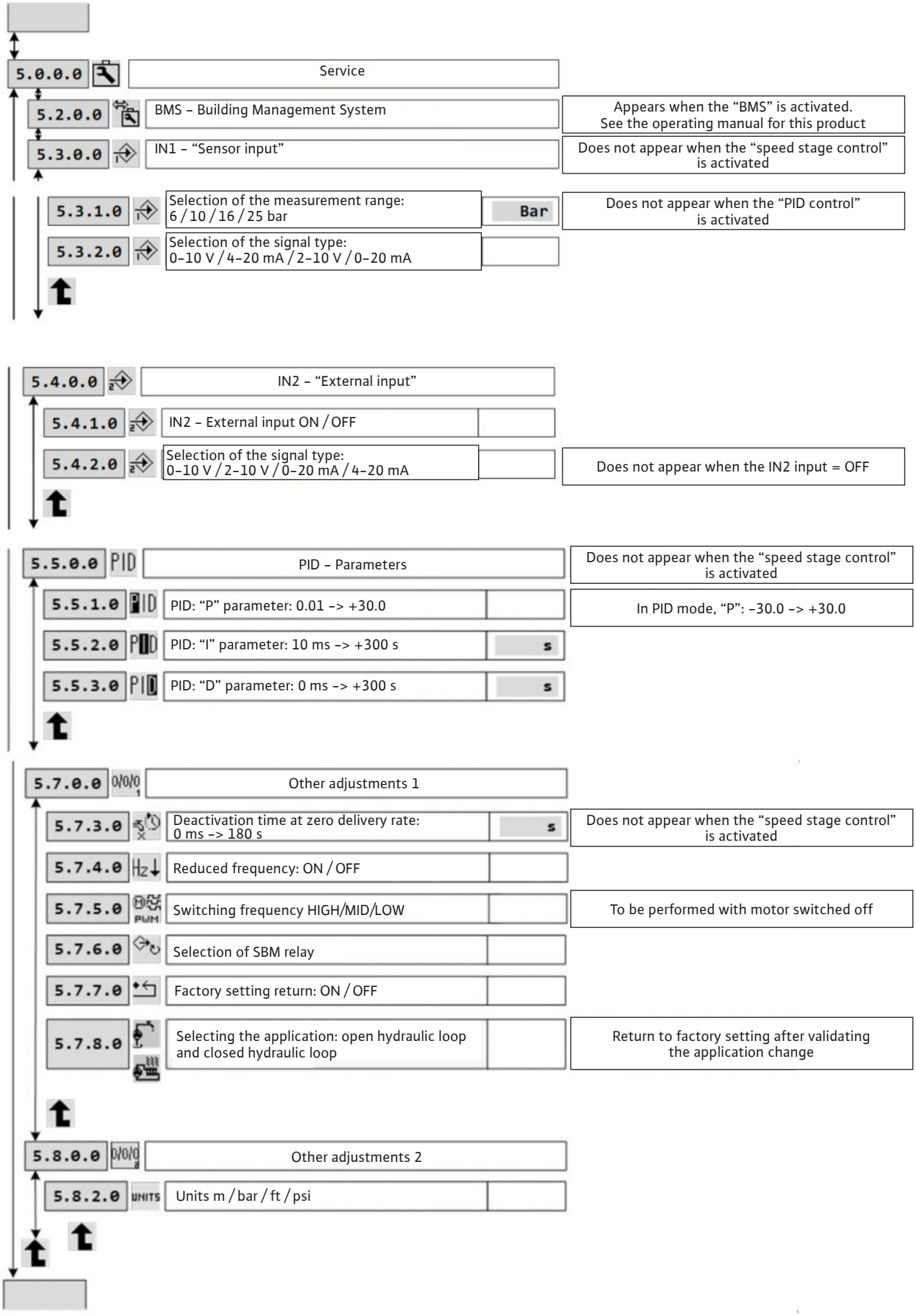
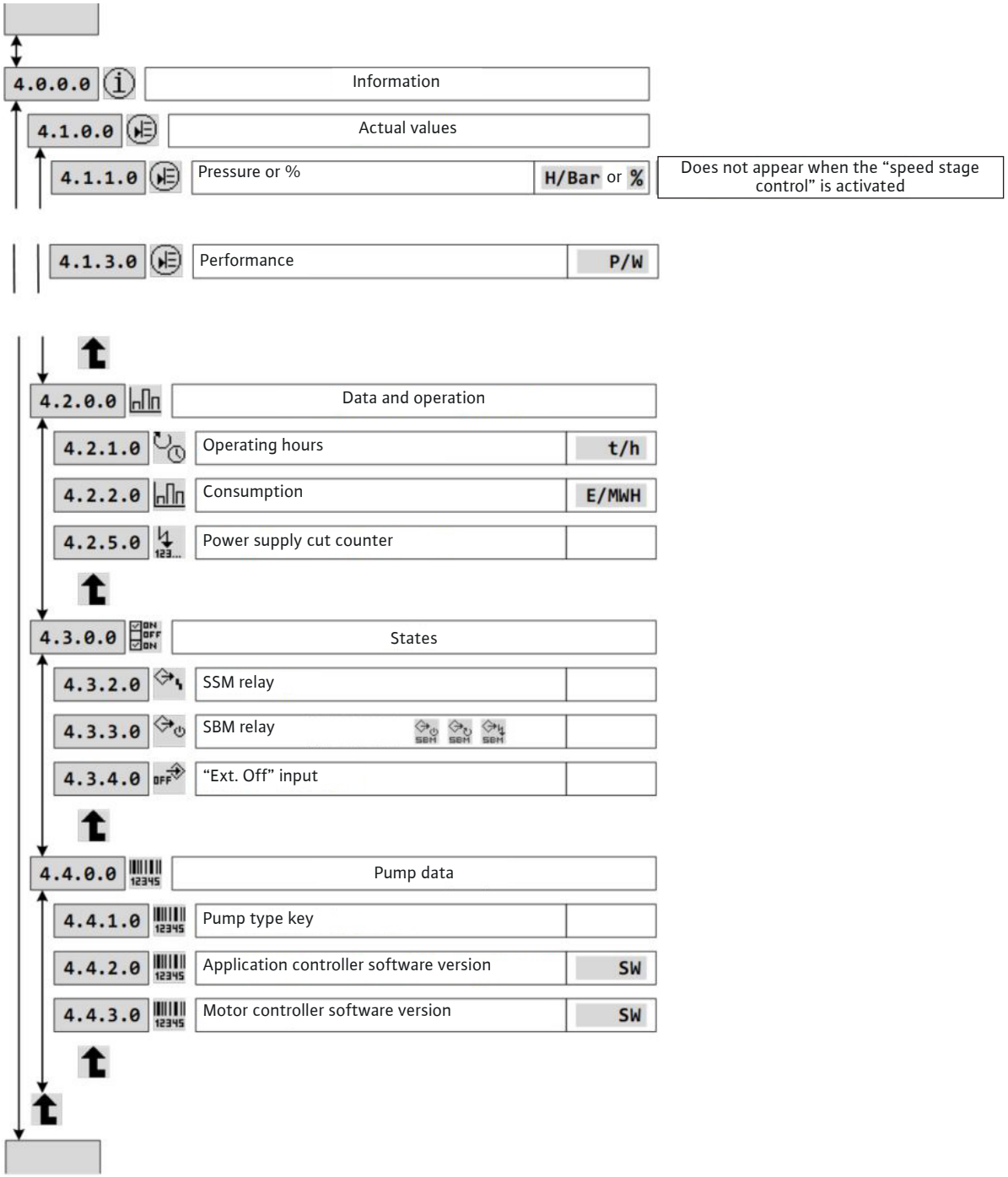


Fig. A5

## NAVIGATING THE “4000” INFORMATION MENU



**Access lock**
The “Access lock” can be used to block all adjustments to the pump.
Proceed as follows:

- Place DIP switch 2 in the ON position.
  The menu <7.0.0.0> will appear.
- Turn the rotary knob to activate or deactivate the lock. The current status of the lock is represented by the following symbols:

**Lock activated**: The parameters are locked and access to the menus is authorised in read-only mode.

**Lock deactivated**: The parameters can be changed and access to the menus to make adjustments is authorised.

- Place DIP switch 2 in the OFF position. The status setting will reappear.

## 9. Maintenance

**All servicing must be performed by an authorized service representative only!**

**WARNING! Risk of electrical shock!**
Ensure that any electrical hazard is avoided.
Ensure that the power supply is switched off and secured against unauthorised switching before performing any work on the electric system.

**WARNING! Risk of scalding!**
In case of high water temperatures and high system pressures, close the insulating valves upstream and downstream of the pump.
First, allow pump to cool down.

- These pumps are maintenance free. Nevertheless a regular check is recommended every 15 000 hours.
- Optionally, the mechanical seal for certain models can be replaced easily thanks to its cartridge design.
- In case of pump with half flanges design and installation again after maintenance operation, it is suggested to add plastic link to maintain in easy way the half flanges together.
- For pumps equipped with one grease feeder (Fig. 7, pos. 1), respect lubrication frequences mentioned on sticker glued on lantern part (2).
- Insert its adjusting wedge in its housing (Fig. 6) once mechanical seal position is set.
- Always keep the pump perfectly clean.
- Pumps which are not being used during periods of frost should be drained to avoid damage: Close the guard valves, open completely the drain-priming plug and the air bleed screw.
- Service life: 10 years depending on the operating conditions and whether all requirements described in the operation manual have been met.

## 10. Faults, causes and remedies

**WARNING! Risk of electric shock!**
Danger from electrical current must be eliminated. Ensure that the pump's power supply is switched off and secured against unauthorised reactivation before performing any work on the electric system.

**WARNING! Risk of burns!**
In case of high water temperatures and high system pressures, close the guard valves upstream and downstream of the pump. First, allow pump to cool down.

| Faults | Causes | Remedies |
|---|---|---|
| The pump is not functioning | No electrical power supply | Check the fusible cut-outs, the wiring and the connections |
| | The motor protection device has cut off the power | Eliminate any motor overload |
| The pump is functioning but is failing to reach its duty point | Incorrect direction of rotation | Check the direction of rotation and correct it if necessary |
| | Parts of the pump are obstructed by foreign bodies | Check and clean the pump |
| | Air in the suction pipe socket | Make the suction pipe socket air-tight |
| | Suction pipe socket too narrow | Install a wider suction pipe socket |
| | The valve is not open far enough | Open the valve completely |
| The output of the pump is irregular | Presence of air in the pump | Remove the air from the pump and ensure that the suction pipe socket is sealed. Possibly start the pump for 20 – 30 s. Open the drain cock to let air escape. Close the drain cock and repeat several times until no more air comes out of the drain cock |
| | In "Constant pressure" mode, the pressure sensor is not adapted | Install a sensor with a compliant pressure scale and precision |
| The pump is vibrating or is noisy | Foreign matter in the pump | Remove the foreign matter |
| | The pump is not firmly secured to the ground | Tighten the anchor screws |
| | Bearing damaged | Contact Wilo customer service |
| The motor is overheating, the motor protection engages | A phase is interrupted | Check the fusible cut-outs, the wiring and the connections |
| | Ambient temperature too high | Provide cooling |
| The mechanical seal is leaking | The mechanical seal is faulty | Replace the mechanical seal |
| The delivery rate is inconsistent | In "Constant pressure" or "Variable pressure" mode, the pressure sensor is not adapted | Install a sensor with a compliant pressure scale and precision |
| In "Constant pressure" or "Variable pressure" mode, the pump does not switch off when the delivery rate is zero | The non-return valve is not impermeable | Clean or change it |
| | The non-return valve is not adapted | Replace it with an adapted non-return valve |
| | The tank does not have enough capacity for the installation | Change it or add another to the installation |

**If the fault cannot be resolved, please contact Wilo customer service.**

Faults must be remedied by qualified personnel only!
Observe the safety instructions in section 9 Maintenance.

**Relay**
The converter is fitted with 2 output relays serving as interface with the centralised control, e.g.: switchgear, pump control.

**SBM** relay:
This relay can be configured in the “Service” menu <5.7.6.0> in 3 operating modes.


**State: 1** (default setting)
“Available transfer” relay (normal operation of this pump type).
The relay is activated when the pump is running or in standby.
The relay is deactivated if an initial malfunction occurs or if the main power supply is disconnected (pump switches off). Pump availability, even temporarily, is signalled to the switchgear.

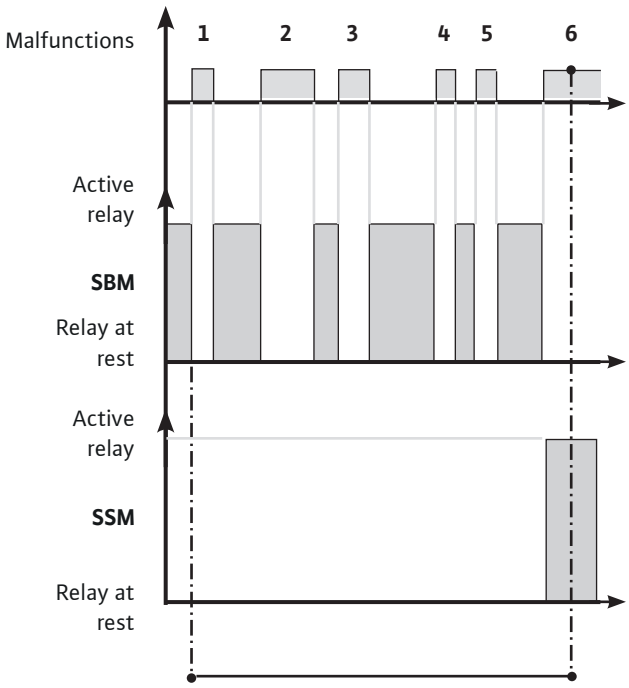

**State: 2**
“Run transfer” relay.
The relay is activated when the pump is running.


**State: 3**
“Power on transfer” relay.
The relay is activated when the pump is connected to the network.

**SSM** relay:
“Failures transfer” relay.
If consecutive malfunctions of the same type are detected (from 1 to 6 according to significance), the pump switches off, and this relay is activated (until manual intervention).

Example: 6 defects with a variable duration within 24 hours.

The state of the SBM relay is “Available transfer”.



### 10.1 Faults table

All incidents mentioned hereafter will have the following effect:

- Deactivation of the SBM relay (when parameterised in “available transfer” mode).
- Activation of the SSM relay “failure transfer” when the max. quantity of one malfunction type is reached within a 24-hour period.
- Lighting of a red LED

| Error code | Ramp time before signalling of error | Time before the error is taken into account after signalling | Waiting time before automatic reactivation | Max. error in 24 h | Faults<br>Possible causes | Remedies | Waiting time before reset |
|---|---|---|---|---|---|---|---|
| E001 | 60 s | 0 s | 60 s | 6 | The pump is overloaded, malfunctioning | Density and/or viscosity of the pumped fluid too high | 300 s |
| | | | | | The pump is obstructed by foreign bodies | Dismantle the pump, replace the malfunctioning components or clean it | |
| E004 (E032) | ~5s | 0 s | 300 s | 6 | The power supply to the converter is in undervoltage | Check the voltage at the converter terminals | 300 s |
| E005 (E033) | ~5s | 300 s | 0 s if error deleted | 6 | The power supply to the converter is at overvoltage | Check the voltage at the converter terminals | 0 s |
| E006 | ~5s | 300 s | 0 s if error deleted | 6 | A power supply phase is missing | Check the power supply | 0 s |
| E007 | 0 s | 0 s | 0 s if error deleted | Unlimited | The converter operates as a generator. Warning, no pump deactivation | The pump has switched direction, check the impermeability of the valve | 0 s |
| E010 | ~5s | 0 s | Unlimited | 1 | The pump is blocked | Dismantle pump, clean it and replace the faulty parts. Possible mechanical motor malfunction (roller bearings) | 60 s |
| E011 | 15s | 0 s | 60 s | 6 | The pump is deactivated or is running dry | Re-prime by filling the pump (See § 9.3). Check the impermeability of the foot valve | 300 s |
| E020 | ~5s | 0 s | 300 s | 6 | The motor is heating up | Clean the cooling ribs at the back and under the converter, as well as the fan cap | 300 s |
| | | | | | Room temperature above product characteristics | Improve the ventilation of the premises | |
| E023 | 0 s | 0 s | 60 s | 6 | The motor is short-circuited | Remove the motor-converter from the pump and check it or replace it | 60 s |
| E025 | 0 s | 0 s | Unlimited | 1 | A phase of the motor is missing | Check the connection between the motor and the converter | 60 s |
| E026 | ~5s | 0 s | 300 s | 6 | The motor’s temperature sensor is faulty or has a bad connection | Remove the motor-converter from the pump and check it or replace it | 300 s |
| E030 E031 | ~5s | 0 s | 300 s | 6 | The converter is heating up | Clean the cooling ribs at the back and under the converter, as well as the fan cap | 300 s |
| | | | | | Room temperature above product characteristics | Improve the ventilation of the premises | |
| E042 | ~5s | 0 s | Unlimited | 1 | The sensor cable (IN1) is cut | Check for the correct power supply and wiring to the sensor | 60 s |
| E050 | 60 s | 0 s | 0 s if error deleted | Unlimited | The BMS communication is faulty | Check the connection | 300 s |
| E077 | 0 s | 0 s | Unlimited | 1 | 24 V power supply voltage of sensors faulty | Check the sensors and their connections | 60 s |
| E--- | 0 s | 0 s | Unlimited | 1 | Converter internal malfunction | Call customer service | 60 s |

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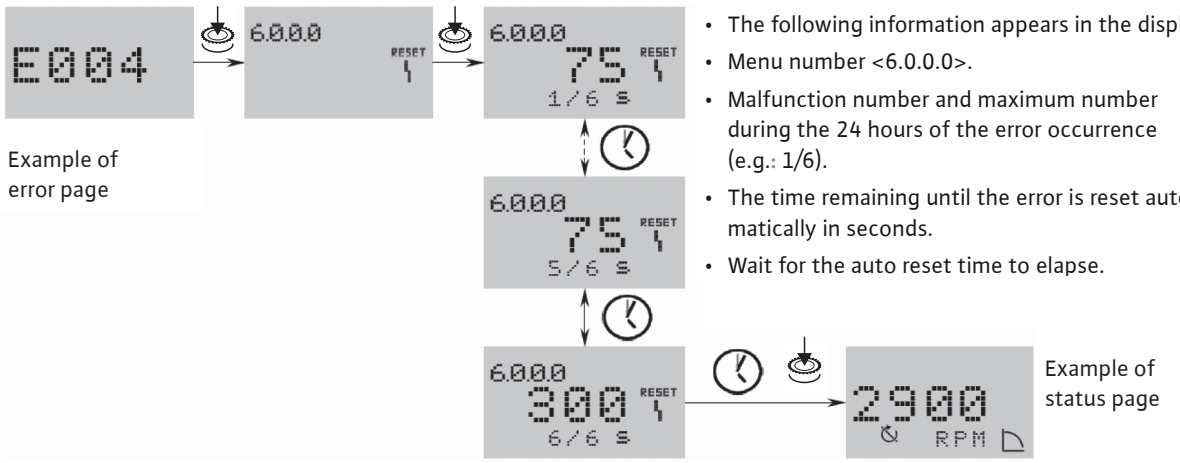
### 10.2 Errors acknowledgement

**CAUTION! Risk of property damage!**
Only acknowledge errors after they have been resolved.

- Errors may be resolved by qualified technicians only.
- When in doubt, contact the manufacturer.
- In case of a error, the malfunction page is displayed instead of the status page.
- To acknowledge a error, proceed as follows.
- Press the rotary knob.
- The following information appears in the display:
- Menu number <6.0.0.0>.
- Malfunction number and maximum number during the 24 hours of the error occurrence (e.g.: 1/6).
- The time remaining until the error is reset automatically in seconds.
- Wait for the auto reset time to elapse.




Example of error page

Example of status page

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A timer runs inside the system. The remaining time (in seconds) until the error is automatically acknowledged is displayed.

- When the maximum number of error is reached and the last follow-up time has elapsed, press the rotary knob to acknowledge.

The system returns to the status page.

NOTICE: If time for the resolution of the malfunction remains after the error signal (e.g.: 300 s), then the error must always be acknowledged manually.
The auto reset timer is inactive and “- - -” is displayed.

## 11. Spare parts

All spare parts must be ordered through local authorised technicians and/or the Wilo customer service.
Please state all data shown on the rating plate with each order to avoid queries and incorrect orders.

## 12. Safe disposal

**Information on the collection of used electrical and electronic products**
Proper disposal and appropriate recycling of this product prevents damage to the environment and dangers to your personal health.

**NOTICE: Disposal in domestic waste is forbidden!**
In the European Union, this symbol can appear on the product, the packaging or the accompanying documentation. It means that the electrical and electronic products in question must not be disposed of along with domestic waste.
To ensure proper handling, recycling and disposal of the used products in question, please note the following points:

- Only hand over these products at designated, certified collecting points.
- Observe the locally applicable regulations!
  Please consult your local municipality, the nearest waste disposal site, or the dealer who sold the product to you for information on proper disposal. For further information on recycling, go to www.wilo-recycling.com.

**Subject to change without prior notice.**

wilo

**Local contact at**
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