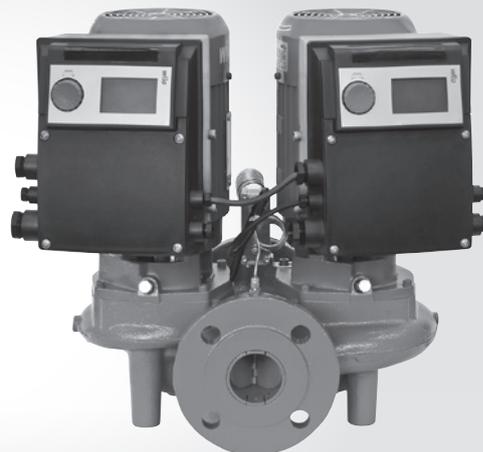


## Wilo-VeroLine-IP-E Wilo-VeroTwin-DP-E



- de** Einbau- und Betriebsanleitung
- en** Installation and operating instructions
- fr** Notice de montage et de mise en service
- nl** Inbouw- en bedieningsvoorschriften



Fig. 1: IF-Modul

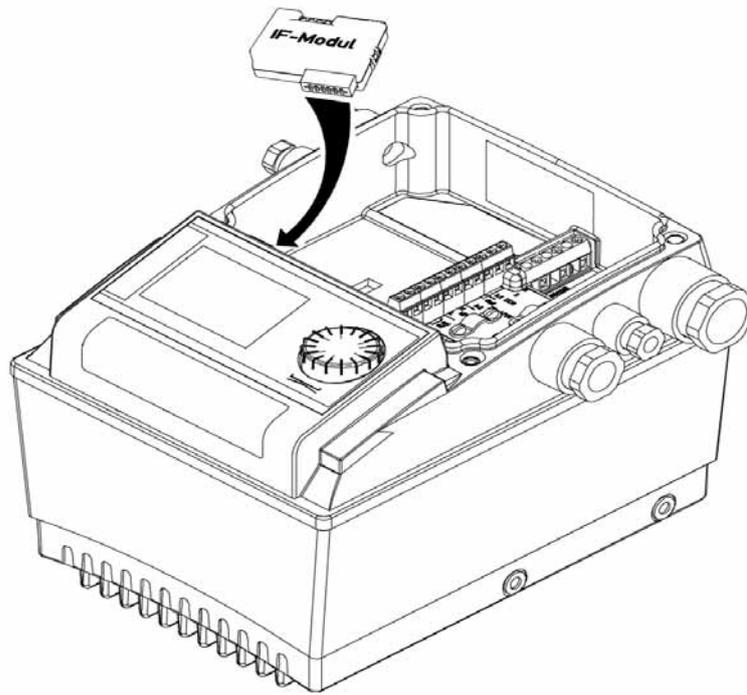


Fig. 2:

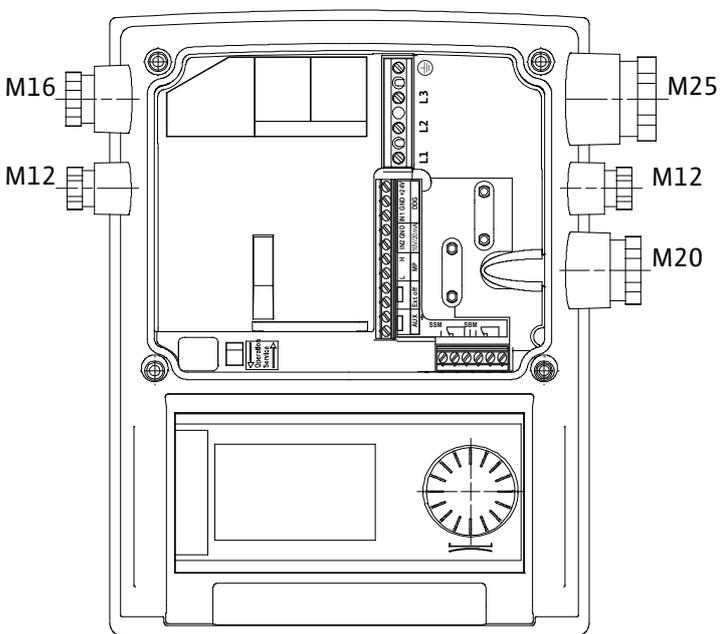


Fig. 3:

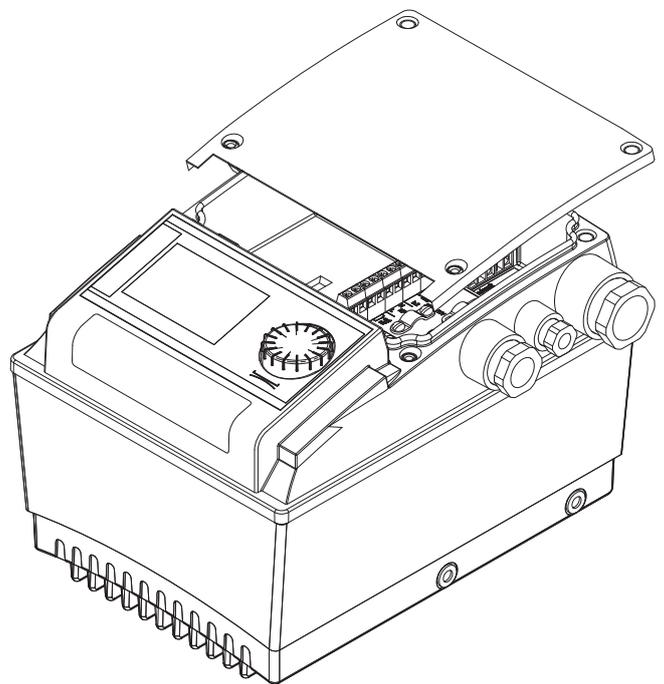


Fig. 4:

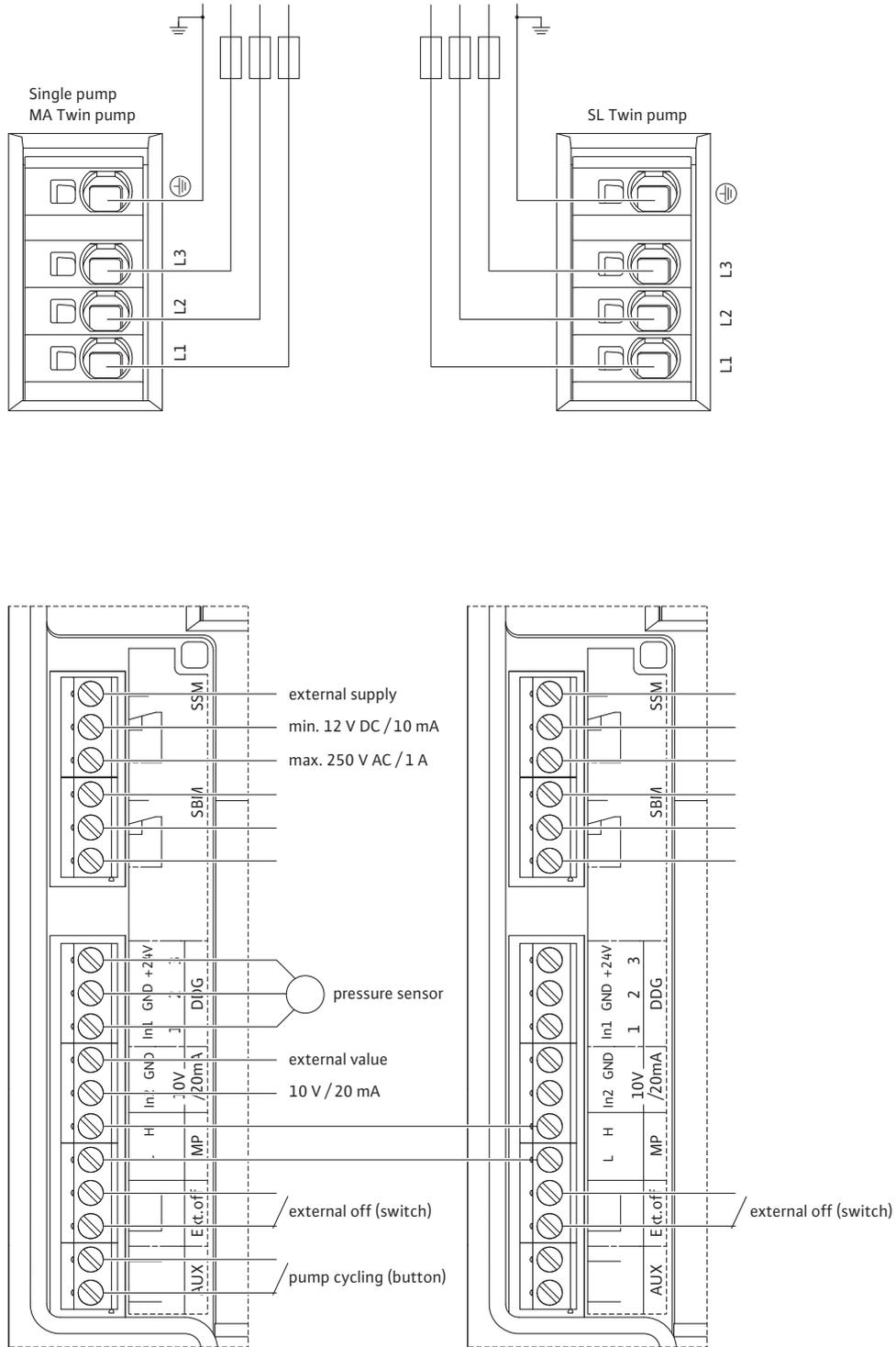


Fig. 5:

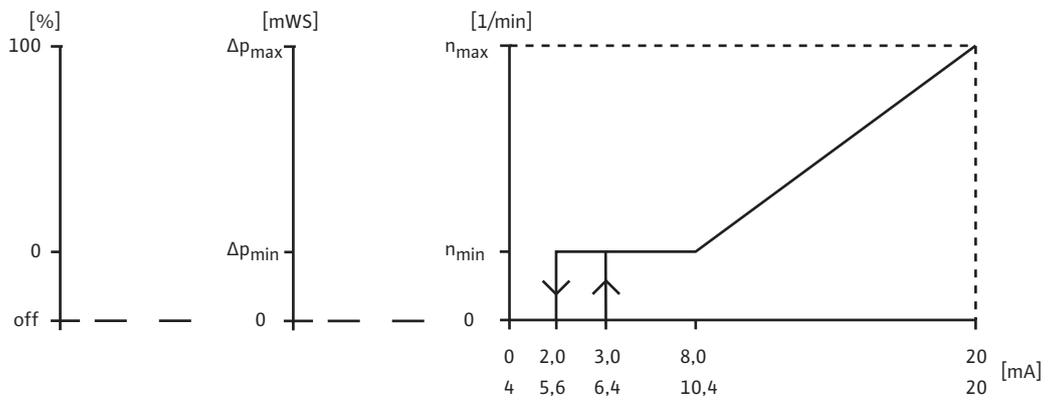
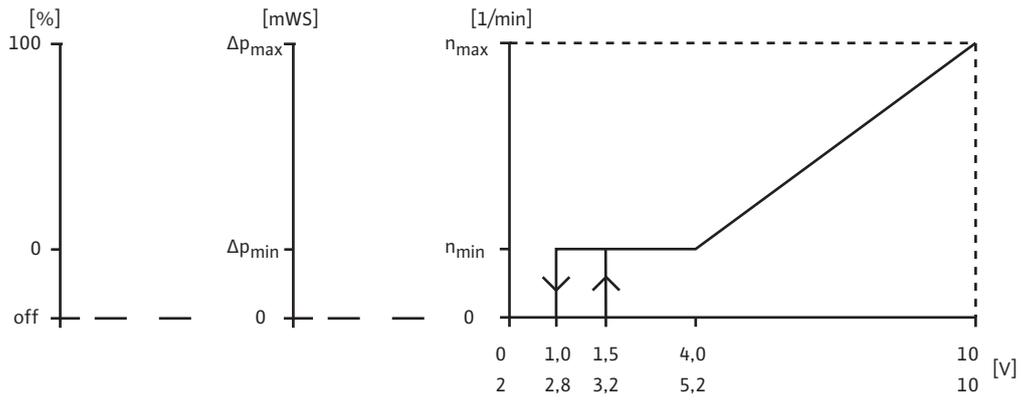
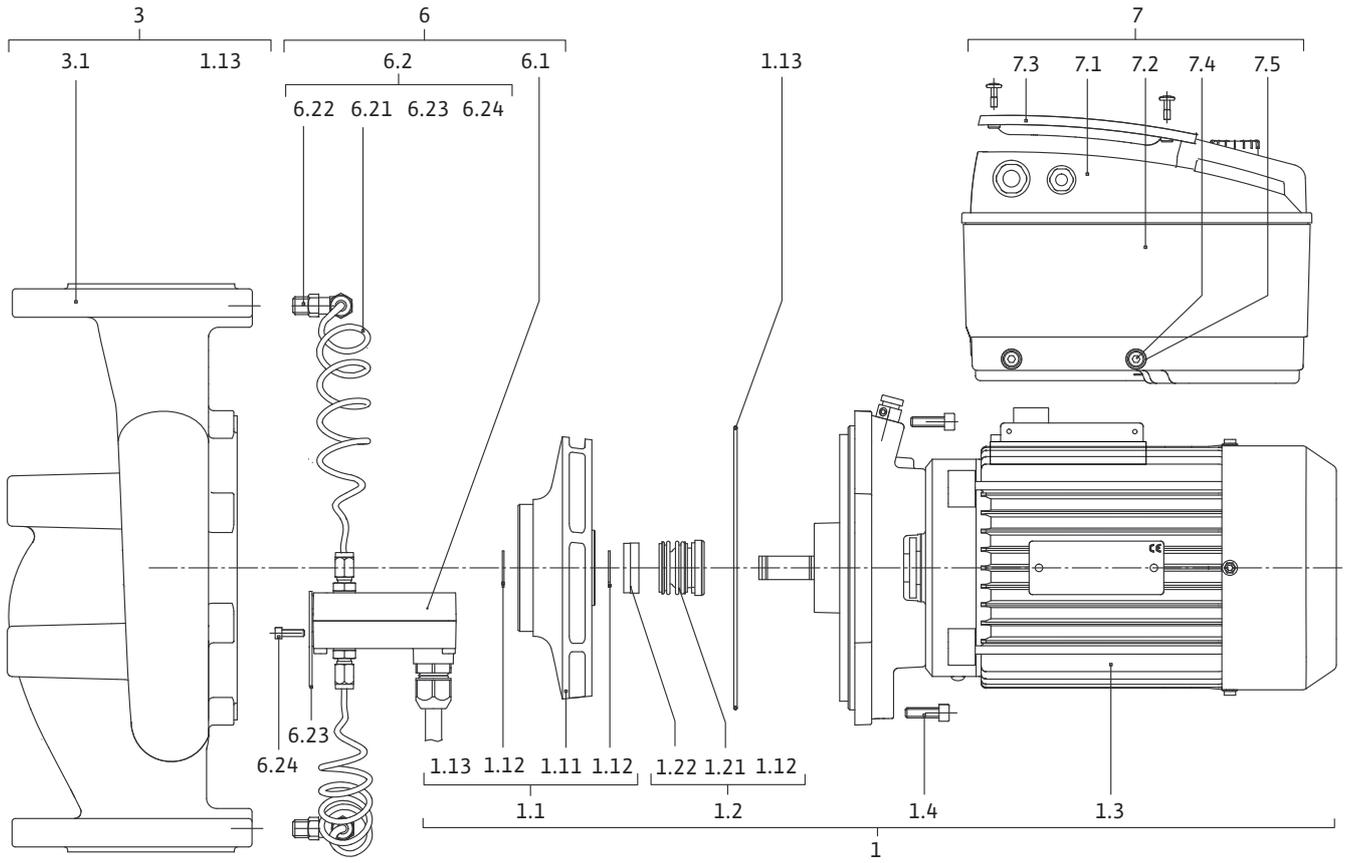


Fig. 6: IP-E/DP-E



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## 1 General information

### About this document

The language of the original operating instructions is German. All other languages of these instructions are translations of the original 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 precondition for the proper use and correct operation of the product.

These installation and operating instructions correspond to the relevant version of the product and the underlying safety regulations and standards valid at the time of going to print.

EC declaration of conformity:

A copy of the EC declaration of conformity is a component of these operating instructions.

If a technical modification is made on the designs named there without our agreement or the declarations made in the installation and operating instructions on product/personnel safety are not observed, this declaration loses its validity.

## 2 Safety

These operating instructions contain basic information which must be adhered to during installation, operation and maintenance. For this reason, these operating 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 under the main point "safety" that must be adhered to but also the special safety instructions with danger symbols included under the following main points.

### 2.1 Symbols and signal words in the operating instructions

#### Symbols



**General danger symbol**



**Danger due to electrical voltage**



NOTE

#### Signal words

**DANGER!**

**Acutely dangerous situation.**

**Non-observance results in death or the most serious of injuries.**

**WARNING!**

**The user can 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 is likely if this information is disregarded.**

NOTE:

Useful information on handling the product. It draws attention to possible problems.

Information that appears directly on the product, such as

- Direction of rotation arrow
- Connection marks
- 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 results in the loss of any claims to damages.
- In detail, non-observance can, for example, result in the following risks:
- Danger to persons due to electrical, mechanical and bacteriological factors
  - 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 safety instructions included in these installation and operating instructions, the existing national regulations for accident prevention together with any internal working, operating and safety regulations of the operator are to be complied with.
- 2.5 Safety instructions for the operator**
- This appliance 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 appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- 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 a shaft seal) of hazardous fluids (e.g. explosive, toxic or hot) must be conveyed away so that no danger to persons or to the environment arises. National statutory provisions are to be complied with.
  - Highly flammable materials are always to be kept at a safe distance from the product.
  - 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 adhered to.
- 2.6 Safety instructions for installation and maintenance work**
- The operator must ensure that all installation and maintenance work is carried out by authorised and qualified personnel who are sufficiently informed from their own detailed study of the operating instructions.
- Work on the product/unit may only be carried out when the system is 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 and manufacture of spare parts

Unauthorised modification and manufacture of 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 will absolve us of liability for consequential events.

## 2.8 Improper use

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

## 3 Transport and interim storage

### 3.1 Shipping

The pump is delivered from the factory packaged in a cardboard box or secured to a pallet and protected against dust and moisture.

#### Transport inspection

On arrival, inspect the pump immediately for any transport damage. If damage is detected, the necessary steps involving the forwarding agent must be taken within the specified period.

#### Storage

Before installation, the pump must be kept dry, frost-free and protected from mechanical damage.



**CAUTION! Risk of damage due to incorrect packaging!**  
If the pump is transported again at a later time, it must be packaged so that it cannot be damaged during transport.

- Use the original packaging for this, or choose equivalent packaging.

### 3.2 Transport for installation/dismantling purposes

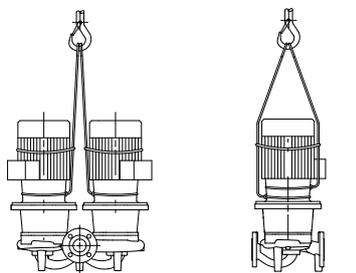


Fig. 7: Transporting the pump



**WARNING! Risk of injury!**  
Improper transport can lead to personal injury.

- The pump must be transported using approved lifting gear (e.g. block and tackle, crane, etc.). This must be secured to the pump flanges and, if necessary, to the external diameter of the motor (protection against slipping is required!).
- To lift with a crane, the pump must be supported by suitable belts, as shown. Place the belt around the pump in loops which tighten from the pump's own weight.
- The transport eyes on the motor are only for guiding while bearing the load (Fig. 7).
- The transport eyes on the motor are only for transporting the motor, and are not approved for transporting the complete pump (Fig. 8).

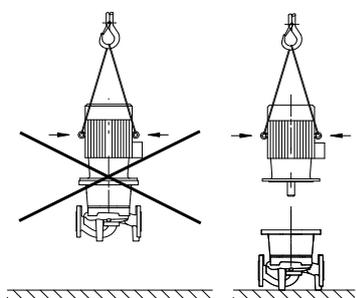


Fig. 8: Transporting the motor



**DANGER! Risk of fatal injury!**  
The pump itself and pump parts can be extremely heavy. Falling parts pose a risk of cuts, crush injuries, bruises or impacts, which may lead to death.

- Always use suitable lifting equipment and secure parts against falling.
- Never stand underneath a suspended load.
- Make sure the pump is securely positioned and is stable during storage and transport as well as prior to all installation and other assembly work.

## 4 Intended use

### Purpose

Glanded pumps in the IP-E series (in-line single) and DP-E series (in-line double) are intended for use as circulation pumps in building services.

### Fields of application

They may be used for:

- Hot water heating systems
- Cooling and cold water circulation systems
- Industrial circulation systems
- Heat carrier circuits

### Contraindications

The pumps are exclusively intended for installation and operation in enclosed rooms. Typical installation locations are technical rooms within the building with other domestic installations. No provision has been made for direct installation of the device in rooms used for other purposes (residential and work rooms). The following is not permitted:

- Outdoor installation and operation outdoors



#### **CAUTION! Risk of property damage!**

**Non-permitted substances in the fluid can destroy the pump.**

**Abrasive solids (e.g. sand) increase pump wear.**

**Pumps without an Ex rating are not suitable for use in potentially explosive areas.**

- **The intended use includes complying with these instructions.**
- **Any other use is considered to be outside the intended use.**

## 5 Product information

### 5.1 Type key

The type key consists of the following elements:

Example:	IP-E 40/160-4/2-xx DP-E 40/160-4/2-xx
IP	Flange-end pump as In-line single pump
DP	Flange-end pump as in-line <b>D</b> ouble pump
-E	with <b>E</b> lectronic module for electronic speed control
40	Nominal diameter DN of the flange connection [mm]
160	Impeller diameter [mm]
4	Rated power P <sub>2</sub> [kW]
2	Number of poles, motor
xx	Variant: e.g. <b>R1</b> – without differential pressure sensor

### 5.2 Technical data

IP-E/DP-E property	Value	Remarks
Speed range	750 – 2900 rpm	
Nominal diameters DN	32/40/50/65/80 mm	
Pipe connections	Flanges PN 16	EN 1092-2
Permissible min./max. fluid temperature	-20 °C to +120 °C	Depending on fluid
Ambient temperature min./max.	0 to +40 °C	Lower or higher ambient temperatures on request
Storage temperature min./max.	-20 °C to +60 °C	
Maximum permissible operating pressure	10 bar	
Insulation class	F	

IP-E/DP-E property	Value	Remarks
Protection class	IP 55	
Electromagnetic compatibility Emitted interference in acc. with Interference resistance in acc. with	EN 61800-3 EN 61800-3	Residential Industrial
Sound-pressure level <sup>1)</sup>	$L_{pA, 1m} < 71 \text{ dB(A)   ref. } 20 \mu\text{Pa}$	Depending on pump type
Permissible fluids <sup>2)</sup>	Heating water according to VDI 2035 Cooling/cold water Water/glycol mixture up to 40% vol. Heat transfer oil Other fluids	Standard version Standard version Standard version Only for special version Only for special version
Electrical connection	3~380 V -5%/+10%, 50/60 Hz 3~400 V $\pm 10\%$ , 50/60 Hz 3~440 V $\pm 10\%$ , 50/60 Hz	Supported mains types: TN, TT
Internal electric circuit	PELV, galvanically isolated	
Speed control	Built-in frequency converter	
Relative humidity - at $T_{\text{ambient}} = 30 \text{ }^\circ\text{C}$ - at $T_{\text{ambient}} = 40 \text{ }^\circ\text{C}$	< 90%, non-condensing < 60%, non-condensing	

<sup>1)</sup> Average value of the sound-pressure level at a spatially rectangular measuring surface at a distance of 1 m from the pump surface in accordance with DIN EN ISO 3744.

<sup>2)</sup> For more information about permissible fluids, see the "Fluids" section on the next page.

Tab. 1: Technical data

## Fluids

If water/glycol mixtures are used (or fluids with a viscosity other than that of pure water), an increase in power consumption of the pump is to be taken into account. Only use mixtures with corrosion inhibitors. The respective manufacturer's instructions are to be observed!

- The fluid must be sediment-free.
- Wilo's approval must be obtained for the use of other fluids.
- Mixtures with a proportion of glycol of > 10% influence the  $\Delta p$ -v pump curve and the flow calculation.
- In systems built according to the state of the art, it can be assumed under normal system conditions that the standard seal/standard mechanical seal is compatible with the fluid. Special circumstances (e.g. solid material, oils or EPDM-corrosive substances in the fluid, air in the system etc.) may require special seals.



NOTE:

The flow value shown on the IR-Monitor/IR-Stick display or output to the building management system must not be used to control the pump. This value is merely an indicator of general trends.

A flow value is not output on every type of pump.



NOTE:

Always read and follow the material safety data sheet for the fluid being pumped!

### 5.3 Scope of delivery

- IP-E/DP-E pump
- Installation and operating instructions

### 5.4 Accessories

Accessories must be ordered separately:

- 3 mounting brackets with fixation material for installation on a base
- Blind flanges for double pump housing
- IR-Monitor
- IR-Stick
- IF-Module PLR for connecting to PLR/interface converter

- IF-Module LON for connection to the LONWORKS network
- IF-Module BACnet
- IF-Module Modbus
- CAN IF-Module

For a detailed list, consult the catalogue and spare parts documentation.



**NOTE:**  
IF-Module may only be plugged in when the pump is de-energised (voltage-free).

## 6 Description and function

### 6.1 Description of the product

The pumps described here are single-stage low-pressure centrifugal pumps with a compact construction and a coupled drive. The pumps can be installed both directly as a pipe installation pump in a sufficiently anchored pipe or placed on a foundation base.

The pump housing of the IP-E and the DP-E is configured in an in-line design, i.e. the flanges on the suction and pressure sides are located in the same axis. All pump housings are provided with pump support feet. Installation on a foundation base is recommended.



**NOTE:**  
Blind flanges, which allow the motor impeller unit to be replaced even in double pump housing, are available for all pump types/frame sizes in the DP-E series (see chapter 5.4 "Accessories" on page 63). A drive can therefore remain in operation while replacing the motor impeller unit.

### Functional assemblies

#### Electronic module

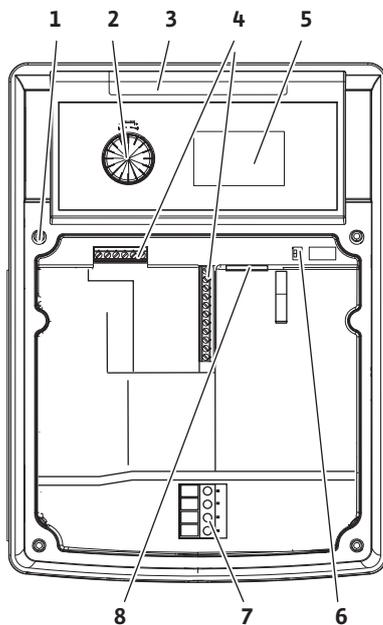


Fig. 9: Electronic module

The electronic module controls the speed of the pump within the control range that can be adjusted by the setpoint.

The hydraulic output is controlled by differential pressure and the set control mode.

In all control modes, however, the pump adapts itself continuously to the changing power requirements of the system, which is the case especially when thermostatic valves or mixers are used.

The basic advantages of the electronic control are:

- Energy saving at the same time as reduced operating costs
- Reduced number of differential pressure valves required
- Reduction of flow noise
- Adaptation of the pump to changing operating requirements

Legend (Fig. 9):

- 1 Attachment point, cover
- 2 The red button
- 3 Infrared window
- 4 Control terminals
- 5 Display
- 6 DIP switch
- 7 Power terminals (mains terminals)
- 8 Interface for IF-Module

## 6.2 Control modes

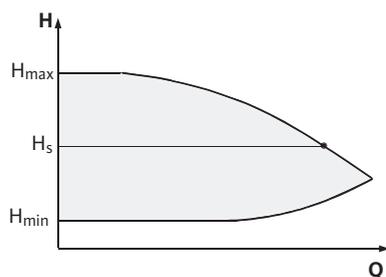


Fig. 10:  $\Delta p$ -c control



The selectable control modes are:

### $\Delta p$ -c:

The electronics keep the differential pressure created by the pump above the permitted feed flow range constantly at the pre-selected differential pressure setpoint  $H_s$  up to the maximum pump curve (Fig. 10).

$Q$  = Volume flow

$H$  = Differential pressure (min./max.)

$H_s$  = Differential pressure setpoint

NOTE:

For further information about setting the control mode and the associated parameters, see chapter 8 "Operation" on page 79 and chapter 9.4 "Setting the control mode" on page 95.

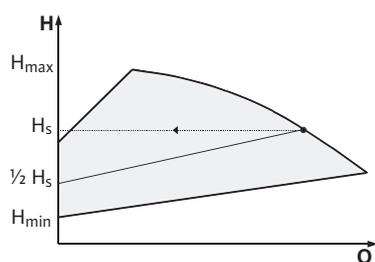


Fig. 11:  $\Delta p$ -v control



### $\Delta p$ -v:

The electronics linearly change the differential pressure setpoint to be kept by the pump between the delivery heads  $H_s$  and  $\frac{1}{2} H_s$ . The differential pressure setpoint  $H_s$  decreases or increases with the volume flow (Fig. 11).

$Q$  = Volume flow

$H$  = Differential pressure (min./max.)

$H_s$  = Differential pressure setpoint

NOTE:

For further information about setting the control mode and the associated parameters, see chapter 8 "Operation" on page 79 and chapter 9.4 "Setting the control mode" on page 95.



NOTE:

A differential pressure sensor is needed for the control modes that are being performed ( $\Delta p$ -c and  $\Delta p$ -v) which sends the actual value to the electronic module.



NOTE:

The pressure range of the differential pressure sensor must match the pressure value in the electronic module (menu <4.1.1.0>).

### Manual control mode:

The speed of the pump can be kept to a constant speed between  $n_{\min}$  and  $n_{\max}$  (Fig. 12). "Manual control" mode deactivates all other control modes.

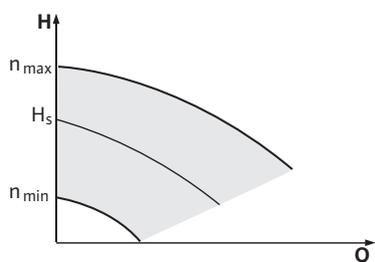


Fig. 12: Manual control mode

### PID control:

If the aforementioned standard control modes cannot be used – e.g. if other sensors are to be used or the distance between the sensors and the pump is very large – then the PID control (Proportional Integral Differential control) is available.

By selecting a good combination of individual control portions, the operator can ensure fast reacting, constant control without lasting setpoint deviations.

The output signal of the selected sensor can take any intermediate value. The respective actual value reached (sensor signal) will be shown as a percent (100% = maximum measurement range of the sensor) on the status page of the menu.



NOTE:

The displayed percent value only corresponds indirectly to the current delivery head of the pump(s). It is possible, for example, that the maximum delivery head has already been reached at a sensor signal < 100%.

For further information about setting the control mode and the associated parameters, see chapter 8 "Operation" on page 79 and chapter 9.4 "Setting the control mode" on page 95.

**6.3 Dual pump function/Y-pipe application**

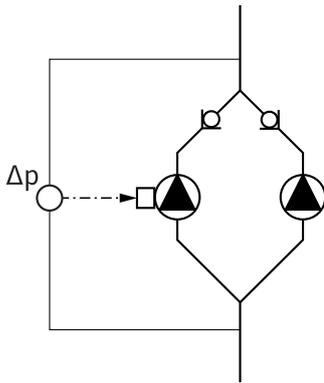


Fig. 13: Example, differential pressure sensor connection

**InterFace-Module (IF-Module)**



**NOTE:**

The properties described below are only available if the internal MP interface (MP = Multi Pump) is used.

- Both pumps are controlled by the master pump.

If one of the pumps malfunctions, the other will run according to the master's control settings. In case of a total failure of the master, the slave pump operates at emergency operation speed.

The emergency operation speed can be set in menu <5.6.2.0> (see chapter 6.3.3 on page 68).

- The master's display will show the status of the double pump. On the slave display, 'SL' will appear.
- In the example in Fig. 13, the master pump is the left-hand pump in the direction of flow. Connect the differential pressure sensor to this pump.

The measuring points of the differential pressure sensor of the master pump must be on the suction and pressure side of the double-pump system in the corresponding collector pipe (Fig. 13).

For communication between pumps and the building management system, one IF-Module (accessories) is required. This is plugged into the terminal space (Fig. 1).

- The master-slave communication uses an internal interface (terminal: MP, Fig. 23).
- Normally for double pumps, only the master pump must be equipped with an IF-Module.
- For pumps in Y-pipe applications in which the electronic modules are connected to each other through the internal interface, only the master pumps require an IF-Module.

Communication	Master pump	Slave pump
PLR/interface converter	IF-Module PLR	No IF-Module necessary
LONWORKS network	IF-Module LON	No IF-Module necessary
BACnet	IF-Module BACnet	No IF-Module necessary
Modbus	IF-Module Modbus	No IF-Module necessary
CAN bus	CAN IF-Module	No IF-Module necessary

Tab. 2: IF-Modules



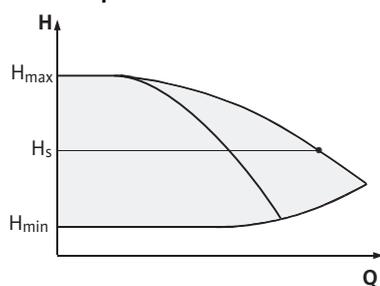
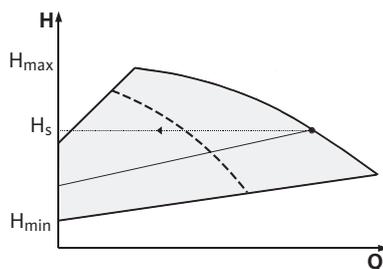
**NOTE:**

The procedure and further information for commissioning and configuring the IF-Module on the pump can be found in the installation and operating instructions of the IF-Module used.

**6.3.1 Operating modes**

**Main/standby mode**

Each of the two pumps provides the configuration flow rate. The other pump is available in case of malfunction or runs after pump cycling. Only one pump runs at a time (see Fig. 10, 11 and 12).

**Parallel operation**Fig. 14:  $\Delta p$ -c control (parallel operation)Fig. 15:  $\Delta p$ -v control (parallel operation)

In the partial load range, the hydraulic output is provided at the beginning by one pump. The second pump will be switched on when it is most effective to do this, i.e. when the total power consumption  $P_1$  of both pumps in the partial load range is less than the power consumption  $P_1$  of one pump. Both pumps will then be simultaneously adjusted upwards to the maximum speed. (Fig. 14 and 15).

In manual control mode, both pumps always run synchronously.

Parallel operation of two pumps is only possible with two identical pump types.

See chapter 6.4 "Other functions" on page 69.

**6.3.2 Behaviour in dual pump operation****Pump cycling**

In dual pump operation, a pump cycling occurs periodically (the period can be set; factory setting: 24 h).

Pump cycling can be triggered:

- Internally, time-controlled (menu <5.1.3.2> + <5.1.3.3>)
- Externally (menu <5.1.3.2>) by a positive edge at the "AUX" contact (See Fig. 23)
- Manually, (menu <5.1.3.1>)

Manual or external pump cycling is possible five seconds after the last pump cycling, at the earliest.

Activation of external pump cycling simultaneously deactivates internal time-controlled pump cycling.

Pump cycling can be described schematically as follows (see also Fig. 16):

- Pump 1 turns (black line)
- Pump 2 is switched on at minimum speed and soon afterwards reaches the setpoint (grey line)
- Pump 1 is switched off
- Pump 2 continues to run until the next pump cycling

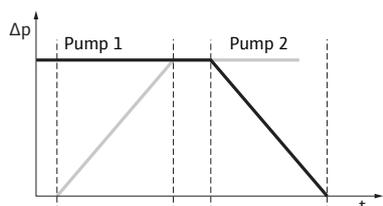


Fig. 16: Pump cycling

**NOTE:**

In manual control mode, a slight increase in flow can be expected. Pump cycling is depending on the ramp time and generally lasts 2 s. In auto control, there may be minor fluctuations in the delivery head. However, pump 1 adjusts itself to the changed conditions. Pump cycling is dependent on the ramp time and generally lasts 4 s.

**Behaviour of the inputs and outputs**

Actual value input In1 setpoint input In2

- At the master: acts on the whole unit
- "External off":
  - Set at the master (menu <5.1.7.0>): depending on the setting in menu <5.1.7.0>, acts only on the master or on the master and the slave
  - Set at the slave: acts only on the slave

**Fault and run signals**

**ESM/SSM:**

- A collective fault signal (SSM) can be connected to the master for a central control centre.
- In this case, the contact may only be made to the master.
- The display is for the whole unit.
- This signal can be programmed on the master (or using the IR-Monitor/IR-Stick) as an individual fault signal (ESM) or a collective fault signal (SSM) in menu <5.1.5.0>.
- The contact must be made to each pump for individual fault signals.

**EBM/SBM:**

- A collective run signal (SBM) can be connected to the master for a central control centre.
- In this case, the contact may only be made to the master.
- The display is for the whole unit.
- This signal can be programmed on the master (or using the IR-Monitor/IR-Stick) as an individual fault signal (ESM) or collective fault signal (SSM) (menu <5.1.6.0>).
- The functions – “Readiness”, “Operation”, “Mains-On” – from EBM/SBM can be set at <5.7.6.0> on the master.



**NOTE:**

- “Readiness” means: The pump could run, there is no fault.
- “Operation” means: Motor turning.
- “Mains on” means: Mains voltage is present.

- The contact must be made to each pump for individual run signals.

**Operating possibilities at the slave pump**

The only settings that are possible at the slave are “External Off” and “Disable/enable pump”.



**NOTE:**

If an individual motor is switched voltage-free in a double pump, the integrated dual pump management is deactivated.

**6.3.3 Operation during interruption of communication**

When communication is interrupted between two pump heads in dual pump operation, both displays show the error code “E052”. Both pumps behave as single pumps for as long as the interruption lasts.

- Both electronic modules report the malfunction via the ESM/SSM contact.
- The slave pump runs in emergency operation (manual control) mode according to the emergency operation speed previously set on the master (see menu items <5.6.2.0>). The factory setting for the emergency operation speed is about 60% of the pump’s maximum speed. For 2-pole pumps:  $n = 1850$  rpm.
- After acknowledging the fault display, the status display will be shown on both pump displays for the duration of the communication interruption. This resets the ESM/SSM contact at the same time.
- The slave pump display will show the symbol (🔄) – pump running in emergency operation).
- The (former) master pump continues to have control. The (former) slave pump follows the emergency operation settings. Emergency mode can only be exited by triggering the factory setting, eliminating the interruption in communication or by switching the mains off/on.



**NOTE:**

During communication interruptions, the (former) slave pump cannot run in auto control, since the differential pressure sensor has switched to the master. When the slave pump is running in emergency operation mode, changes cannot be made to the electronic module.

- After the end of the communication interruption, the pumps will resume regular dual pump operation as before the malfunction.

## Slave pump behaviour

### Leaving emergency operation at the slave pump:

- Factory settings restored  
During a communication interruption on the (former) slave, if emergency operation is discontinued because the factory settings have been restored, the (former) slave will start up with the factory settings of a single pump. It will then run in  $\Delta p$ -c mode at about half the maximum delivery head.



#### NOTE:

In the absence of a sensor signal, the (former) slave will run at maximum speed. To prevent this, the (former) master's differential pressure sensor signal can be looped through. When the double pump is operating normally, it is not affected by sensor signals pending on the slave.

- Mains off/mains on  
During a communication interruption on the (former) slave, if emergency operation is discontinued due to mains off, mains on, the (former) slave will start up with the latest emergency operation settings received from the master (for example, control mode with preset speed or off).

## Master pump behaviour

### Leaving emergency operation at the master pump:

- Factory settings restored  
During a communication interruption on the (former) master, if the factory settings are restored, it will start up with the factory settings of a single pump. It will then run in  $\Delta p$ -c mode at about half the maximum delivery head.
- Mains off/mains on  
During a communication interruption on the (former) master, if emergency operation is discontinued due to mains off, mains on, the (former) master will start up with the latest settings it has from the double pump configuration.

## 6.4 Other functions

### Disabling or enabling a pump

A particular pump can generally be enabled or disabled in terms of operation in menu <5.1.4.0>. A disabled pump cannot be used in operation until the disabling has been manually lifted.

The setting can be made at each pump directly or over the infrared interface.

This function is only available with dual pump operation. If a pump head (master or slave) is disabled, the pump head is no longer ready for operation. In this state, errors are identified, displayed and reported. If an error occurs in the enabled pump, the disabled pump does not start up.

However, the pump kick is still performed if it is activated. The interval to the pump kick starts with the disabling of the pump.



#### NOTE:

If a pump head is disabled and operating mode "Parallel operation" is activated, it cannot be ensured that the desired duty point will be achieved with just one pump head.

### Pump kick

A pump kick takes place after a configurable time has elapsed since a pump or pump head stopped operating. The interval can be set manually in menu <5.8.1.2> on the pump for a period of between 2 h and 72 h, in 1 h steps.

Factory setting: 24 h.

The reason for the standstill is not important (Manual off, External off, Fault, Adjustment, Emergency operation, BMS setting). This procedure is repeated until the pump is switched back on via a control mechanism.

The “pump kick” function cannot be disabled via menu <5.8.1.1>. As soon as the pump is switched on via the control system, the count-down to the next pump kick is interrupted.

A pump kick lasts 5 seconds, during which the motor turns at the set speed. The speed can be set between the minimum and maximum permissible pump speeds in menu <5.8.1.3>.

Factory setting: minimum speed

If both pump heads on a double pump are switched off, for example, via External off, both will run for 5 seconds. Pump kick takes place even in “main/standby operation” mode if pump cycling takes longer than 24 hours.



NOTE:

A pump kick is also attempted even in case of a fault.

The remaining operating time until the next pump kick can be read off in menu <4.2.4.0>. This menu is only available when the motor is stopped. The number of pump kicks can be read off in menu <4.2.6.0>.

All faults, with the exception of warnings, that occur during the pump kick switch the motor off. The corresponding error code is shown on the display.



NOTE:

The pump kick reduces the risk of the impeller jamming in the pump housing. This is intended to ensure pump operation after a long standstill. If the pump kick function is deactivated, secure starting of the pump can no longer be guaranteed.

### Overload protection

The pumps are equipped with an electronic overload protection function which switches off the pump in the event of an overload.

For data storage, the electronic modules are equipped with a non-fading memory. The data is retained no matter how longer the module is disconnected from the power supply. When the power supply is re-established, the pump continues to run with the values set prior to disconnection from the power supply.

### Behaviour after being switched on

During commissioning, the pump will work with the factory settings.

- The service menu deals with the setting and converting of individual pumps; see chapter 8 “Operation” on page 79.
- To correct faults, also see chapter 11 “Faults, causes and remedies” on page 100.
- For additional information about the factory settings, see chapter 13 “Factory settings” on page 110.



**CAUTION! Risk of property damage!**

**Modifying the settings for the differential pressure sensor can lead to malfunctions. The factory settings are configured for the supplied WILO differential pressure sensor.**

- **Default value: input In1 = 0–10 volts, pressure value correction = ON**
- **When using the supplied Wilo differential pressure sensor, these settings must not be changed!**

**Modifications are only needed if another differential pressure sensor is used.**

### Switching frequency

At high ambient temperatures, the thermal load on the electronic module can be reduced by lowering the switching frequency (menu <4.1.2.0>).



NOTE:

Carry out the switch over/change only when the pump is at a standstill (not when the motor is running).

The switching frequency can be changed via the menu, the CAN bus or the IR-Stick.

Lower switching frequencies result in increased noise levels.

## Variants

If the menu <5.7.2.0> “Pressure value correction” is not available on the display of a given pump, that pump is a variant in which the following functions are not available:

- Pressure value correction (menu <5.7.2.0>)
- Efficiency-optimised activation and deactivation in double pumps
- Flow rate trend display

## 7 Installation and electrical connection

### Safety



**DANGER! Risk of fatal injury!**

Incorrect installation and improper electrical connections can be life-threatening.

- Have the electrical connections established by licensed electricians only, in compliance with the applicable regulations!
- Adhere to regulations for accident prevention!



**DANGER! Risk of fatal injury!**

Failure to install safety devices on the electronic module or near the coupling/motor can cause electrical shock or contact with rotating parts, potentially resulting in life-threatening injuries.

- Before commissioning, all safety devices such as module covers or coupling covers that were removed must be reinstalled!



**CAUTION! Risk of property damage!**

Risk of property damage if the electronic module is not installed.

- Normal operation of the pump is only permitted with the electronic module installed.
- The pump is not allowed to be connected or operated without the electronic module being installed.



**DANGER! Risk of fatal injury!**

The pump itself and pump parts can be extremely heavy. Falling parts pose a risk of cuts, crush injuries, bruises or impacts, which may lead to death.

- Always use suitable lifting equipment and secure parts against falling.
- Never stand underneath a suspended load.
- Make sure the pump is securely positioned and is stable during storage and transport as well as prior to all installation and other assembly work.



**CAUTION! Risk of property damage!**

Danger of damage due to incorrect handling.

- Have the pump installed by qualified personnel only.
- The pump may never be operated without the electronic module being installed.



**CAUTION! Damage to the pump due to overheating!**

The pump must not be allowed to operate dry for more than 1 minute. Dry running causes a build-up of energy in the pump, which can damage the shaft, impeller, and mechanical seal.

- Make sure that the volume flow does not fall below the minimum value  $Q_{\min}$ .

Calculation of  $Q_{\min}$ :

$$Q_{\min} = 10\% \times Q_{\max \text{ pump}} \times \frac{\text{Actual speed}}{\text{max. speed}}$$

**7.1 Permitted installations position and change of the arrangement of components before the installation**

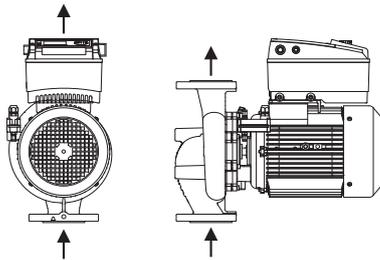


Fig. 17: Arrangement of the components upon delivery

**Permitted installation positions with horizontal motor shaft**

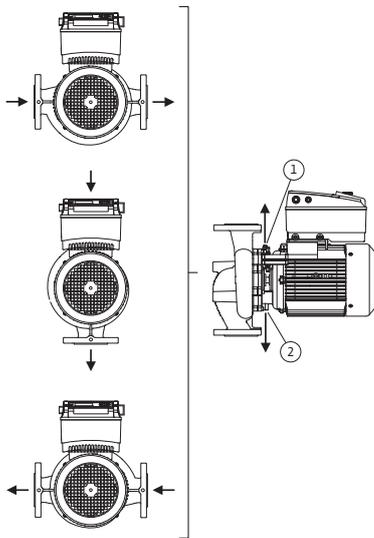


Fig. 18: Permitted installation positions with horizontal motor shaft

**Permitted installation positions with vertical motor shaft**

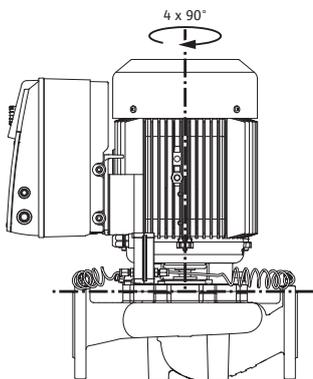


Fig. 19: Permitted installation positions with vertical motor shaft

**Changing the component arrangement**



**NOTE:**

To make the installation work easier, it can be helpful to install the pump in the piping without electrical connection and without filling of the pump or system (see chapter 10.2.1 “Replacing the mechanical seal” on page 98 for installation steps).

The component arrangement concerning the pump housing is pre-installed as a factory setting (see Fig. 17) at can be changed if need be at the operating location. This can be necessary, for example, to:

- Ensure the venting of the pumps
- Make operation easier
- Prevent impermissible installation positions (i.e. motor and/or electronic module downwards)

In most cases, it is enough to rotate the motor impeller unit relative to the pump housing. The possible arrangement of components is the result of the permitted installation positions.

The permitted installation positions with horizontal motor shaft and electronic module facing up (0°) are shown in Fig. 18. The permissible installation positions with electronic module mounted on the side (+/-90°) are not shown. Any installation position is allowed except for “electronic module facing down” (-180°). The venting of the pump is only ensured when the air vent valve is pointing upwards (Fig. 18, Item 1).

Only in this position (0°) can condensate be directed away via an existing drilled hole, pump lantern and motor (Fig. 18, Item 2).

The permitted installation positions with horizontal motor shaft are shown in Fig. 19. All installation positions except for “motor facing down” are allowed.

Depending on the pump type, the motor impeller unit can be arranged in four or eight different positions, relative to the pump housing (each shifted by 90° or 45°).

- Depending on the pump type, rotate the motor impeller unit by 45°, 90° or 180° (or 90° or 180°) in the desired direction. Then reinstall the pump in reverse order.
- Fasten the holder of the differential pressure sensor (Fig. 6, Item 6) with one of the screws (Fig. 6, Item 1.4) on the side opposite the electronic module (the position of the differential pressure sensor relative to the electronic module does not change when doing this).
- Wet the O-ring (Fig. 6, Item 1.13) well before installation (do not install the O-ring in a dry condition).

**NOTE:**

Be sure that the O-ring (Fig. 6, Item 1.13) is not installed in a twisted position or squeezed during installation.

- Before commissioning, fill the pump/system and apply system pressure; check for leaks afterwards. If there is a leak at the O-ring, first air will come out of the pump. This leakage can, for example, be checked with a leakage spray at the gap between the pump housing and the lantern as well as their screwed connections.
- In the event of continual leakage, use a new O-ring, if need be.

**CAUTION! Risk of property damage!**

**Incorrect handling can result in property damage.**

- **When turning the components, make sure that the pressure measuring lines are not bent or kinked.**
- When reinstalling the differential pressure sensor, bend the pressure measuring lines evenly and as little as possible to put them into the required position or into a suitable position. When doing this, do not deform the areas at the clamp boltings.
- For optimal positioning of the pressure measuring lines, the differential pressure sensor can be separated from the holder (Fig. 6, Item 6), rotated by 180° around the longitudinal axis and reinstalled.

**NOTE:**

When turning the differential pressure sensor, make sure not to mix up the pressure and suction sides on the differential pressure sensor. For additional information about the differential pressure sensor, see chapter 7.3 "Electrical connection" on page 75.

## 7.2 Installation

### Preparation

- The pump should only be installed after completion of all welding and soldering work and, if necessary, flushing of the pipe system. Dirt can cause the pump to fail.
- The pumps must be protected from the weather and installed in a frost/dust-free, well-ventilated environment which is not potentially explosive. The pump must not be installed outdoors.
- Install the pump in a place that is easy to access so that subsequent inspections, maintenance (e.g. mechanical seal) or replacement is easily possible. The air access to the heat sink of the electronic module must not be restricted.

### Positioning/alignment

- A hook or eyelet with the corresponding bearing capacity is to be installed vertically above the pump (for the total weight of the pump: see catalogue/data sheet), to which hoisting gear or similar aids can be attached when conducting maintenance or repair work on the pump.

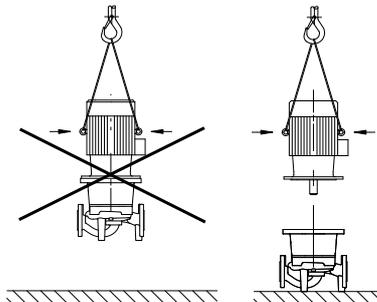


Fig. 20: Transporting the motor



**DANGER! Risk of fatal injury!**

The pump itself and pump parts can be extremely heavy. Falling parts pose a risk of cuts, crush injuries, bruises or impacts, which may lead to death.

- Always use suitable lifting equipment and secure parts against falling.
- Never stand underneath a suspended load.



**CAUTION! Risk of property damage!**

Danger of damage due to incorrect handling.

- Only use lifting eyes on the motor for carrying the weight of the motor and not for carrying the entire pump (Fig. 20).
- Only lift the pump with approved lifting gear (e.g. block and tackle, crane, etc.; see chapter 3 “Transport and interim storage” on page 61).
- When installing the pump, an axial minimum wall/roof clearance of the motor’s fan cover of 200 mm + diameter of the fan cover is to be maintained.



**NOTE:**

Shut-off devices shall be installed upstream and downstream from the pump in all cases, in order to avoid having to drain the entire system when checking or renewing the pump. A non-return valve shall be installed on the pressure side of each pump.



**NOTE:**

A settling section must be provided before and after the pump, in the form of a straight pipe. The length of this settling section should be at least 5 x DN of the pump flange (Fig. 21). This measure serves to avoid flow cavitation.

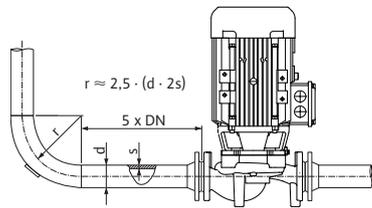


Fig. 21: Settling section before and after the pump

- The pipes and pump must be free of mechanical stress when installed. The pipes must be fixed in such a way that the pump is not supporting the weight of the pipes.
- The direction of flow must correspond with the direction arrow on the pump housing flange.
- The air vent valve at the lantern (Fig. 38, Item 1) always has to be pointed upwards if the motor shaft is horizontal (Fig. 6/38). If the motor shaft is vertical, any orientation is permitted.
- All installation positions except for “motor facing down” are allowed.
- The electronic module must not face downwards. If required, the motor can be turned after loosening the hexagon head screws.



**NOTE:**

After loosening the hexagon head screws, the differential pressure sensor is attached to the pressure measuring lines only. When turning the motor housing, make sure that the pressure measuring lines are not bent or kinked. Furthermore, while rotating the motor housing, it must be ensured that the housing O-ring seal does not become damaged.

- For the permitted installation positions, see chapter 7.1 “Permitted installations position and change of the arrangement of components before the installation” on page 72.

**Pumping out of a tank**



**NOTE:**

When pumping out of a tank, ensure that the liquid level is always high enough above the suction port of the pump so that the pump never runs dry. The minimum inlet pressure must be observed.

**Condensate draining, insulation**

- When the pump is used in air-conditioning or cooling systems, the condensation that forms in the lantern can be drained specifically via an existing hole. A drain pipe can be connected at this opening. Small amounts of fluid leakage can be also drained off.

The motors are equipped with holes for condensation which are sealed with plastic plugs at the factory (in order to guarantee that protection class IP 55 is achieved).

- If used in air-conditioning/cooling systems, this plug must be removed downwards so that condensation water can drain.
- With a horizontal motor shaft, the condensate hole must be positioned towards the bottom (Fig 18, Item 2). If necessary, the motor must be turned accordingly.

**NOTE:**

If the plastic plug is removed, protection class IP 55 is no longer ensured.

**NOTE:**

In the case of insulated systems, only the pump housing may be insulated, not the lantern, drive and differential pressure sensor.

An insulating material which does not contain ammonia compounds must be used when insulating the pump, in order to prevent stress corrosion cracking of the union nuts. If this is not possible, direct contact with the brass screw connections must be avoided. Stainless steel screwed connections are available for this as an accessory. As an alternative, corrosion protection tape (e.g. insulating tape) can also be used.

### 7.3 Electrical connection

#### Safety

**DANGER! Risk of fatal injury!**

**An improper electrical connection can result in a fatal electrical shock.**

- **Have the electrical connection established by an electrician approved by the local electricity supplier only and in accordance with local regulations.**
- **Observe the installation and operating instructions for the accessories!**

**DANGER! Risk of fatal injury!**

**Contact voltage hazardous to human life.**

**Work on the electronic module may only be started once 5 minutes have passed, due to the dangerous residual contact voltage (capacitors).**

- **Before working on the pump, disconnect the power supply and wait for 5 minutes.**
- **Check whether all connections (including potential-free contacts) are voltage-free.**
- **Never use an object to poke around the openings on the electronic module and never insert anything into the terminal box!**

**WARNING! Risk of mains overload!**

**An inadequate mains design can lead to system failures and cable fires due to mains overload.**

- **When designing the mains, with regard to the cable cross-sections and fuses, give special consideration to the fact that short-term simultaneous operation of all pumps is possible in multi-pump operation.**

#### Preparation/notes

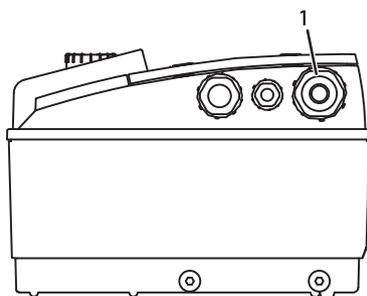


Fig. 22: M25 threaded cable connection

- The electrical connection must be made using a permanently installed mains connection line (see following table for cross-section) with a plug-and-socket connection or an all-pole switch with a contact opening width of at least 3 mm. If flexible cables are used, ferrules must be used.

- The power cable is to be fed through the M25 threaded cable connection (Fig. 22, Item 1).

Power $P_N$ [kW]	Cable cross-section [mm <sup>2</sup> ]	PE [mm <sup>2</sup> ]
0.55 – 4	1.5 – 4.0	2.5 – 4.0



**NOTE:**

See the list “Tab. 9: Screw tightening torques” on page 99 for the correct tightening torques for the terminal screws. Use only a calibrated torque wrench.

- The following cables must always be shielded, in order to comply with EMC standards:
  - Differential pressure sensor (DDG) (if installed onsite)
  - In2 (setpoint)
  - Dual-pump (DP) communication (for cable lengths > 1 m); (“MP” terminal)

Note the polarity:

MA = L => SL = L

MA = H => SL = H

- Ext. off
- AUX
- Communication cable IF-Module

The shield must be applied to both sides: on the EMC cable clips in the electronic module and on the other end. The lines for SBM and SSM do not have to be shielded.

In the electronic module, the shield is connected in the terminal box to the earth rails.

- In order to ensure drip protection and strain relief on the threaded cable connection, cables are to be used which have a sufficient outer diameter and are to be screwed sufficiently tightly. Also, the cables near the threaded cable connection are to be bent to form a drainage loop, to drain any accumulated drips. Position the threaded cable connection or lay the cables accordingly to ensure that no drips can run into the electronic module. Non-assigned threaded cable connections must remain sealed with the plugs provided by the manufacturer.
- The connection line is to be installed in such a way that it cannot under any circumstances come into contact with the pipe and/or the pump and motor housing.
- When pumps are used in systems with water temperatures above 90 °C, a suitably heat-resistant power cable must be used.
- This pump is equipped with a frequency converter and may not be protected by a residual-current device. Frequency converters can impair the function of residual-current-operated protection circuits.

Exception: residual-current devices which have a selective type B universal-current-sensitive design are allowed.

- Labelling: RCD
- Trigger current: > 30 mA
- Check the current type and voltage of the mains connection.
- Observe the rating plate information for the pump. The current type and voltage of the mains connection must correspond to the details on the rating plate.
- Fuse on mains side: max. 25 A
- Take additional earthing into account!
- The use of a miniature circuit breaker is recommended.



**NOTE:**

Miniature circuit breaker tripping characteristic: B

- Overload: 1.13–1.45 x  $I_{nominal}$
- Short-circuit: 3–5 x  $I_{nominal}$

## Terminals

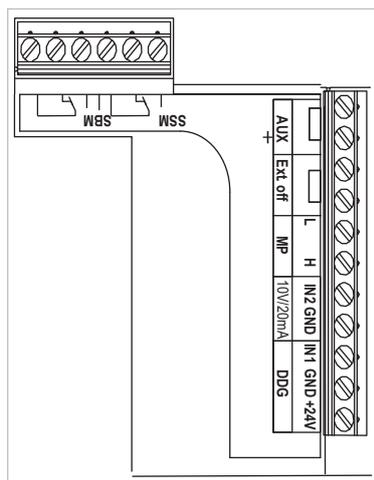


Fig. 23: Control terminals

- Control terminal (Fig. 23)  
(See following table for assignment)

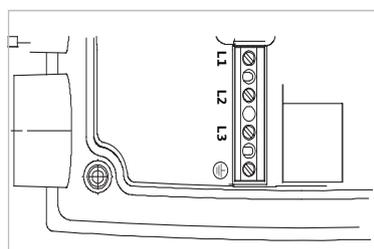


Fig. 24: Power terminals (mains connection terminals)

- Power terminals (mains connection terminals) (Fig. 24)  
(See following table for assignment)

### Connection terminal assignment

Designation	Assignment	Notes
L1, L2, L3	Mains connection voltage	3~380 V AC – 3~440 V AC, 50/60 Hz, IEC 38
 (PE)	Protective conductor connection	
In1 (1) (input)	Actual value input	Type of signal: Voltage (0–10 V, 2–10 V) Input resistance: $R_i \geq 10 \text{ k}\Omega$  Type of signal: Current (0–20 mA, 4–20 mA) Input resistance: $R_i = 500 \text{ }\Omega$  Can be configured in the service menu <5.3.0.0> Connected at the factory via the M12 threaded cable connection (Fig. 2), via (1), (2), (3) according to the sensor cable designations (1,2,3).
In2 (Input)	Setpoint input	In2 can be used as the input for remote setpoint adjustment in all operating modes.  Type of signal: Voltage (0–10 V, 2–10 V) Input resistance: $R_i \geq 10 \text{ k}\Omega$  Type of signal: Current (0–20 mA, 4–20 mA) Input resistance: $R_i = 500 \text{ }\Omega$  Can be configured in the service menu <5.4.0.0>
GND (2)	Earth connections	For both input In1 and In2
+ 24 V (3) (output)	DC voltage for an ext. consumer/sensor	Max. load 60 mA The voltage is short-circuit proof. Contact load: 24 V DC/10 mA
AUX	External pump cycling	Pump cycling can be performed using an external, potential-free contact. One-time bridging of the two terminals will cause external pumping to take place, if it is enabled. Bridging a second time will cause the procedure to repeat, provided the minimum run time is adhered to. Can be configured in the service menu <5.1.3.2> Contact load: 24 V DC/10 mA
MP	Multi Pump	Interface for dual pump function
Ext. off	Control input “Overriding off” for external, potential-free switch	The pump can be switched on/off via the external potential-free contact. In systems with a high switching frequency (> 20 on/off operations per day); switching on/off must take place via “External off”. Can be configured in the service menu <5.1.7.0> Contact load: 24 V DC/10 mA
SBM	Individual run signal/collective run signal, readiness signal and mains On signal	Potential-free individual run signal/collective run signal (changeover contact), operation readiness signal is available at the SBM terminals (menus <5.1.6.0>, <5.7.6.0>).
	Contact load:	minimum permitted: 12 V DC, 10 mA, maximum permitted: 250 V AC/24 V DC, 1 A
SSM	Individual/collective fault signal	Potential-free single/collective fault signal (changeover contact) is available at the SSM terminals (menu <5.1.5.0>).
	Contact load	minimum permitted: 12 V DC, 10 mA, maximum permitted: 250 V AC/24 V DC, 1 A
Interface IF-Module	Connection terminals of the serial digital BA interface	The optional IF-Module is pushed into a multi-plug in the terminal box. The connection is twist proof.

Tab. 3: Connection terminal assignment

**NOTE:**

The terminals In1, In2, AUX, GND, Ext. Off and MP meet the requirement for “safe isolation” (in acc. with EN61800-5-1) to the mains terminals, as well as to the SBM and SSM terminals (and vice versa).

**NOTE:**

The control is designed as a PELV (protective extra low voltage) circuit, meaning that the (internal) supply meets the requirements for safe supply isolation; the GND is connected to PE.

## Differential pressure sensor connection

Cable	Colour	Terminal	Function
1	Black	In1	Signal
2	Blue	GND	Mass
3	Brown	+ 24 V	+ 24 V

Tab. 4: Differential pressure sensor cable connection

**NOTE:**

The electrical connection of the differential pressure sensor is to be fed through the smallest threaded cable connection (M12) on the electronic module.

For a double pump or Y-pipe installation, the differential pressure sensor is to be connected to the master pump.

The measuring points of the differential pressure sensor of the master pump must be on the suction and pressure side of the double-pump system in the respective collector pipe.

### Procedure

- Establish connections observing the terminal allocation.
- Earth the pump/installation in accordance with the regulations.

## 8 Operation

### 8.1 Operating elements

The electronics module is operated using the following operating elements:

#### The red button

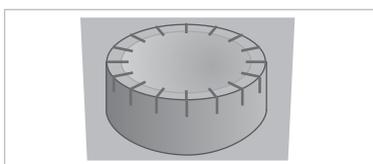


Fig. 25: The red button

The red button (Fig. 25) can be turned to select menu elements and used to change values. Pressing the red button activates a selected menu element and confirms values.

#### DIP switch

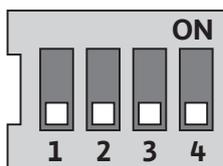


Fig. 26: DIP switch

The DIP switches (Fig. 9, Item 6/Fig. 26) are located under the housing cover.

- Switch 1 is for switching between the standard and service mode.  
For additional information, see chapter 8.6.6 “Activating/deactivating service mode” on page 85.
- Switch 2 allows activations or deactivation of the access disable feature.  
For additional information, see chapter 8.6.7 “Activating/deactivating access disable” on page 86.
- Switches 3 and 4 permit termination of the multi-pump communication.  
For additional information, see chapter 8.6.8 “Activating/deactivating termination” on page 86.



## 8.4 Symbols in graphics/instructions

Chapter 8.6 “Operating instructions” on page 83 contains graphics that illustrate the operating concept and provide instructions for configuring settings.

In the graphics and instructions, the following symbols are used as simple representations of menu elements or actions:

### Menu elements



- **Menu status page:** Standard view on the display
- **“One level down”:** A menu element that can be used to jump to a lower menu level (e.g. <4.1.0.0> to <4.1.1.0>).
- **“Information”:** A menu element that shows information about the device status or settings that cannot be changed.
- **“Selection/setting”:** A menu element that provides access to a changeable setting (element with menu number <X.X.X.0>).
- **“One level up”:** A menu element that can be used to jump to a higher menu level (e.g. <4.1.0.0> to <4.0.0.0>).
- **Menu error page:** In the event of an error, the current error number is displayed instead of the status page.

### Actions



- **Turn red button:** Turn the red button or increase or decrease settings or menu numbers.
- **Press red button:** Press the red button to activate a menu element or confirm a change.
- **Navigate:** Perform the steps that follow to navigate in the menu to the displayed menu number.
- **Wait time:** The remaining time (in seconds) is displayed on the value display until the next state is reached automatically or manual input can be made.
- **Set DIP switch to the ‘OFF’ position:** Set the DIP switch number “X” under the housing cover to the ‘OFF’ position.
- **Set DIP switch to the ‘ON’ position:** Set the DIP switch number “X” under the housing cover to the ‘ON’ position.

## 8.5 Display modes

### Display test

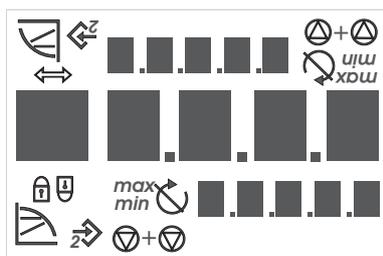


Fig. 28: Display test

As soon as the power supply of the electronic module has been established, a 2-second display test is carried out, during which all characters on the display are shown (Fig. 28). Afterwards the status page is displayed.

After interruption of the power supply, the electronic module carries out various shut-off functions. The display will be shown for the duration of this process.



### **DANGER! Risk of fatal injury!**

**There can be electrical charges present in the display even if it is switched off.**

- **Observe general safety instructions!**

### 8.5.1 Display status page



The standard view on the display is the status page. The current set-point is displayed in the number segments. Other settings are displayed using symbols.

NOTE:

For dual pump operation, the operating mode is also shown in symbol format on the status page (“Parallel operation” or “Main/reserve”). The display of the slave pump shows “SL”.

**8.5.2 Display menu mode**

The electronic module functions can be called via the menu structure. The menu contains sub-menus on several levels.

The current menu level can be changed using “One level up” or “One level down” menu items, for example, to change from menu <4.1.0.0> to <4.1.1.0>.

The menu structure is similar to structure of the chapters and sections in these operating instructions: Section 8.5(.0.0) contains subsections 8.5.1(.0) and 8.5.2(.0); in the electronics module, menu <5.3.0.0> contains menu sub-items <5.3.1.0> to <5.3.3.0>, etc.

The currently selected menu element can be identified by the menu number on the display and the associated symbol.

Within a menu level, menu numbers can be selected sequentially by turning the red button.



NOTE:

If the red button is not operated for 30 seconds at any position in menu mode, the display returns to the status page.

Every menu level can contain four different element types:

**“One level down” menu element**



The “One level down” menu element is indicated on the display by the symbol shown here (arrow on the units display). If a “One level down” menu element is selected, pressing the red button causes a change to the next menu level down. On the display, the new menu level is indicated by a menu number that has increased by one digit as a result of the change; for example, menu <4.1.0.0> changes to menu <4.1.1.0>.

**“Information” menu element**



The “Information” menu element is marked on the display by the symbol shown here (standard symbol for “access disable”). If an “Information” menu element is selected, pressing the red button has no effect. When an “Information” menu element is selected, current settings or measurements that cannot be changed by the user are displayed.

**“One level up” menu element**



The “One level up” menu element is indicated on the display by the symbol shown here (arrow on the symbol display). If a “One level up” menu element is selected, briefly pressing the red button causes a change to the next higher menu level. On the display, the new menu level is indicated by the menu number. For example, when one returns from menu level <4.1.5.0>, the menu number jumps to <4.1.0.0>.



NOTE:

If the red button is pressed for two seconds while a “One level up” menu element is selected, the display jumps back to the status page.

**“Selection/setting” menu element**



The “Selection/setting” menu element does not have a special label on the display, but is identified graphically in these instructions by the adjacent symbol.

If a “Selection/setting” menu element is selected, pressing the red button will change to edit mode. In edit mode, flashing values can be changed by turning the red button.



In some menus, acceptance of the input by pressing the red button will be confirmed by the brief display of the “OK” symbol.

**8.5.3 Display error page**



If an error occurs, the error page will be shown on the display rather than the status page. The value display shows the letter “E” and the three-digit error code separated by a decimal point (Fig. 29).

Fig. 29: Error page (status in the event of an error)

## 8.5.4 Menu groups

### Basic menu

Basic settings are shown in the main menus <1.0.0.0>, <2.0.0.0> and <3.0.0.0>, which provide access to set values that may have to be changed during regular pump operation.

### Info menu

The main menu <4.0.0.0> and its sub-menu elements show measuring data, device data, operating data and current states.

### Service menu

The main menu <5.0.0.0> and its sub-menu elements provide access to basic system settings for commissioning. The sub-elements are in a write-protected mode as long as service mode is not activated.



#### **CAUTION! Risk of property damage!**

**Improper setting changes can lead to pump operation errors, which can lead to material damage to the pump or system.**

- **Settings in service mode should only be made during commissioning and only by qualified personnel.**

### Error acknowledgement menu

In the event of an error, the error page is displayed instead of the status page. Pressing the red button from this position opens the error acknowledgement menu (menu number <6.0.0.0>). Any fault signals present can be acknowledged after a waiting period.



#### **CAUTION! Risk of property damage!**

**Errors which are acknowledged without their cause having been remedied can result in repeated faults, which could lead to property damage to the pump or system.**

- **Only acknowledge errors after they have been remedied.**
- **Only have faults remedied by qualified personnel.**
- **If in doubt, consult the manufacturer.**

For additional information, see Chapter 11 “Faults, causes and remedies” on page 100 and the error table shown there.

### Access disable menu

The main menu <7.0.0.0> is only displayed when DIP switch 2 is in the ON position. It cannot be reached via normal navigation.

In the “Access disable” menu, the access disable can be activated or deactivated by turning the red button. The change is confirmed by pressing the red button.

## 8.6 Operating instructions

### 8.6.1 Adjusting the setpoint

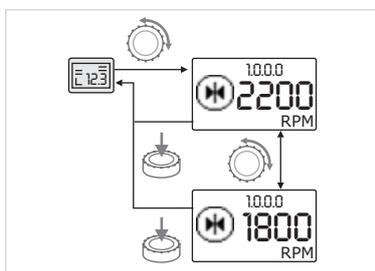


Fig. 30: Entering the setpoint



On the status page of the display, the setpoint can be adjusted as follows (Fig. 30):

- Turn the red button.

The display changes to menu number <1.0.0.0>. The setpoint begins to flash and is increased or decreased by continuing to turn.



- To confirm the change, press the red button.

The new setpoint will be accepted and the display will return to the status page.

### 8.6.2 Changing to menu mode



To change to menu mode, proceed as follows:

- While the display is showing the status page, press the red button for two seconds (except in case of an error).

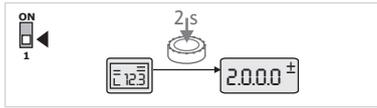


Fig. 31: Standard menu mode

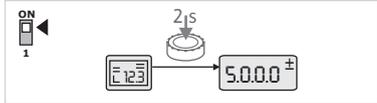


Fig. 32: Service menu mode

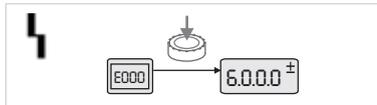


Fig. 33: Error case menu mode

**Standard behaviour:**

The display changes to menu mode. Menu number <2.0.0.0> is displayed (Fig. 31).

**Service mode:**

If service mode is activated via DIP switch 1 menu number <5.0.0.0> is displayed first (Fig. 32).

**Error case:**

In case of error, menu number <6.0.0.0> is displayed (Fig. 33).

**8.6.3 Navigation**

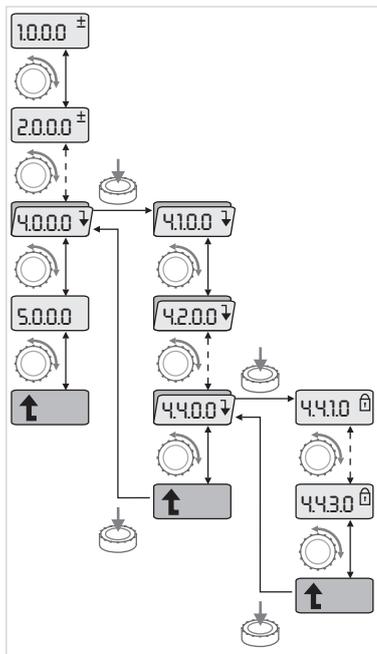


Fig. 34: Navigation example



- Change to menu mode (see chapter 8.6.2 “Changing to menu mode” on page 83).



- Carry out general menu navigation as follows (for an example, see Fig. 34):

During navigation, the menu number flashes.



- To select the menu element, turn the red button.

The menu number is incremented up or down. The symbol associated with the menu element and the setpoint or actual value are shown, if applicable.



- If the downward pointing arrow for “One level down” is shown, press the red button to change to the next level down. The new menu level is labelled on the display by the menu number, e.g., when changing from <4.4.0.0> to <4.4.1.0>.

The symbol for the menu element and/or the current value (setpoint, actual value or selection) is shown.



- To return to the next higher menu level, select the “One level up” menu element and press the red button.

The new menu level is labelled on the display by the menu number, e.g., when changing from <4.4.1.0> to <4.4.0.0>.



**NOTE:**

If the red button is pressed for two seconds while a “One level up” menu element is selected, the display jumps back to the status page.

### 8.6.4 Changing selection/settings

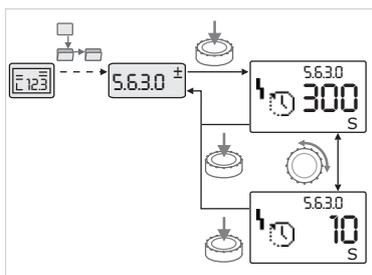


Fig. 35: Setting with return to the “Selection/settings” menu element

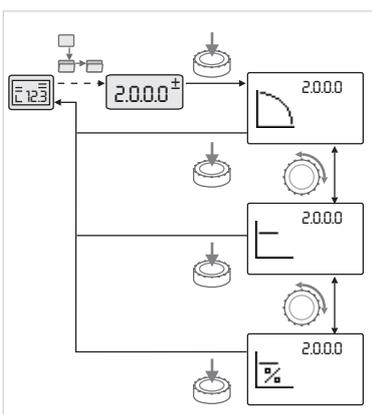


Fig. 36: Setting with return to the status page

To change a setpoint or a setting, generally proceed as follows (for an example, see Fig. 35):

- Navigate to the desired “Selection/settings” menu element.  
The current value or state of the setting and the associated symbol are displayed.
- Press the red button. The symbol representing the setpoint or the setting flashes.
- Turn the red button until the desired setpoint or setting is displayed. For an explanation of the settings represented by the symbols, see the table in chapter 8.7 “Menu elements reference” on page 87.
- Press the red button again.  
The selected setpoint or setting is confirmed, and the value or symbol stops flashing. The display is back in menu mode with the menu number unchanged. The menu number flashes.



#### NOTE:

When values are changed under <1.0.0.0>, <2.0.0.0> and <3.0.0.0>, <5.7.7.0> and <6.0.0.0>, the display jumps back to the status page (Fig. 36).

### 8.6.5 Calling up information

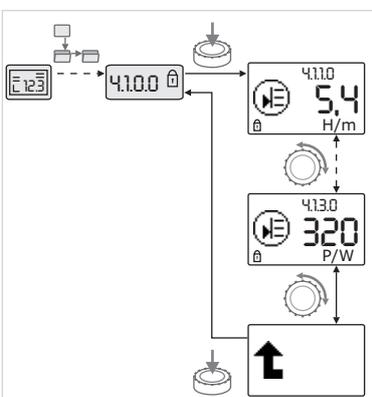


Fig. 37: Calling up information



Changes cannot be made in “Information” menu elements. These are identified on the display by the default “access disable” symbol. To call up current settings, proceed as follows:

- Navigate to the desired “Information” menu element (<4.1.1.0> in the example).
- The current value or state of the setting and the associated symbol are displayed. Pressing the red button has no effect.
- Turn the red button to access the “Information” menu elements in the current sub-menu (see Fig. 37). For an explanation of the settings represented by the symbols, see the table in chapter 8.7 “Menu elements reference” on page 87.
- Turn the red button until the “One level up” menu element is displayed.
- Press the red button.  
The display returns to the next higher menu level (<4.1.0.0> here).

### 8.6.6 Activating/deactivating service mode

Additional settings can be made in service mode. The mode is activated or deactivated as follows.



#### CAUTION! Risk of property damage!

Improper setting changes can lead to pump operation errors, which can lead to material damage to the pump or system.

- Settings in service mode should only be made during commissioning and only by qualified personnel.



- Set DIP switch 1 to the ON position.

**8.6.7 Activating/deactivating access disable**

- 

Service mode is activated. The symbol shown here flashes on the status page.
- 
  - The sub-elements of menu 5.0.0.0 switch from the "Information" element type to the "Selection/setting" element type, and the standard "access disable" symbol (see symbol) is hidden for the respective elements (except for <5.3.1.0>).
  - The values and settings for these elements can now be edited.
  - To deactivate, return the switch to its starting position.
- 

In order to prevent impermissible changes to the pump settings, all functions can be disabled.

When access is disabled, this is shown on the status page by the default "access disable" symbol.
- 

To activate or deactivate this, proceed as follows:

  - Set DIP switch 2 to the ON position.

Menu <7.0.0.0> is displayed.
- 
  - Turn the red button to activate or deactivate the disable.
- 
  - To confirm the change, press the red button.

The current state of the disable is represented on the symbol display by the symbols shown here.
- 

**Disable active**

No changes can be made to setpoints or settings. The read access to all menu elements remains as it was.
- 

**Disable inactive**

The elements of the basic menu can be edited (menu elements <1.0.0.0 >, <2.0.0.0> and <3.0.0.0>).
- 

NOTE:

To edit the sub-elements of menu <5.0.0.0>, service mode must also be activated.
- 
  - Reset DIP switch 2 to the OFF position.

The display returns to the status page.
- 

NOTE:

Errors can be acknowledged after a waiting period despite the "access disable" being active.

**8.6.8 Activating/deactivating termination**

- In order to establish a definite communication connection between the electronic modules, it is necessary to terminate both ends of the cable.

In a double pump, the electronic modules are already prepared for double pump communication at the factory.

To activate or deactivate this, proceed as follows:

  - Set DIP switches 3 and 4 to the "ON" position.

Termination is activated.
- 

NOTE:

Both DIP switches must always be in the same position.
- 
  - To deactivate, return the switches to the starting position.

## 8.7 Menu elements reference

The following table gives an overview of the available elements of all menu levels. The menu number and the element type are designated separately, and the function of the element is explained. If applicable, there is information about the setting options of the individual elements.



### NOTE:

A few elements are hidden under certain conditions and are therefore skipped in the menu navigation.

If, for example, the external setpoint adjustment under menu number <5.4.1.0> is set to "OFF", the number <5.4.2.0> will be hidden. Menu number <5.4.2.0> will only be visible if menu number <5.4.1.0> has been set to "ON".

No.	Designation	Type	Symbol	Values/explanations	Display conditions
1.0.0.0	Setpoint			Setting/display of the setpoint (for further information, see chapter 8.6.1 "Adjusting the setpoint" on page 83)	
2.0.0.0	Control mode			Setting/display of the control mode (for further information, see chapters 6.2 "Control modes" on page 65 and 9.4 "Setting the control mode" on page 95)	
				Constant speed control	
				Constant control Δp-c	
				Variable Δp-v control	
				PID control	
2.3.2.0	Δp-v gradient			Setting the gradient of Δp-v (value in %)	Not displayed for all pump types.
3.0.0.0	Pump on/off			ON Pump switched on	
				OFF Pump switched off	
4.0.0.0	Information			Information menus	
4.1.0.0	Actual values			Display of current actual values	
4.1.1.0	Actual values sensor (In1)			Depending on current control mode Δp-c, Δp-v: Value H in m PID control: Value in %	Not displayed for manual control mode
4.1.3.0	Power			Current power input P <sub>1</sub> in W	
4.2.0.0	Operating data			Display of operating data	The operating data refer to the electronic module currently being operated
4.2.1.0	Operating hours			Sum of the pump's active hours of operation (meter can be reset by infrared interface)	
4.2.2.0	Consumption			Energy consumption in kWh/MWh	

No.	Designation	Type	Symbol	Values/explanations	Display conditions
4.2.3.0	Countdown, pump cycling			Time to pump cycling in h (at a resolution of 0.1 h)	Shown only for double pump master and internal pump cycling Can be set in the service menu <5.1.3.0>
4.2.4.0	Remaining time until pump kick			Time until the next pump kick (after the pump has had a 24 h standstill (e.g. via External off), it will be automatically operated for 5 seconds)	Only displayed if pump kick is activated
4.2.5.0	Mains On counter			Number of switching-on procedures of the supply voltage (each occasion the supply voltage is established after an interruption is counted)	
4.2.6.0	Pump kick counter			Number of pump kicks carried out	Only displayed if pump kick is activated
4.3.0.0	States				
4.3.1.0	Base-load pump			The value display statically shows the identity of the regular base-load pump. The unit display statically shows the identity of the temporary regular base-load pump.	Only displayed for double pump master
4.3.2.0	SSM		  	ON State of the SSM relay if there is no fault signal	
			  	OFF State of the SSM relay if no fault signal is present	
4.3.3.0	SBM			ON State of the SBM relay if a readiness/operation or mains On signal is present	
				OFF State of the SBM relay if no readiness/operation or mains On signal is present	
			  	SBM Run signal	

No.	Designation	Type	Symbol	Values/explanations	Display conditions
				SBM Readiness signal	
				SBM Mains On signal	
4.3.4.0	Ext. off			Signal present at the input "External off"	
				OPEN Pump is switched off	
				SHUT Pump is enabled for operation	
4.3.5.0	BMS protocol type			Bus system active	Only displayed when BMS is active
				LON Field bus system	Only displayed when BMS is active
				CAN Field bus system	Only displayed when BMS is active
				Gateway Protocol	Only displayed when BMS is active
4.3.6.0	AUX			State of "AUX" terminal	
4.4.0.0	Device data			Displays device data	
4.4.1.0	Pump name			Example: IP-E 40/160-4/2 (display in ticker format)	Only the basic pump model appears on the display; version names are not shown.
4.4.2.0	Software version of user controller			Displays the software version of the user controller	
4.4.3.0	Software version of motor controller			Display the software version of the motor controller	
5.0.0.0	Service			Service menus	

No.	Designation	Type	Symbol	Values/explanations	Display conditions
5.1.0.0	Multi pump			Double pump	Only displayed when DP is active (incl. sub-menus)
5.1.1.0	Operating mode			Main/standby mode	Only displayed for double pump master
				Parallel operation	Only displayed for double pump master
5.1.2.0	Setting, MA/SL			Manual converting from master to slave mode	Only displayed for double pump master
5.1.3.0	Pump cycling				Only displayed for double pump master
5.1.3.1	Manual pump cycling			Carries out pump cycling independent of the countdown	Only displayed for double pump master
5.1.3.2	Internal/external			Internal pump cycling	Only displayed for double pump master
				External pump cycling	Only displayed for double pump master, see "AUX" terminal
5.1.3.3	Internal: Time interval			Can be set between 8 h and 36 h in 4 h steps	Displayed when internal pump cycling is activated
5.1.4.0	Pump enabled/disabled			Pump enabled	
				Pump disabled	
5.1.5.0	SSM			Individual fault signal	Only displayed for double pump master
				Collective fault signal	Only displayed for double pump master
5.1.6.0	SBM			Individual readiness signal	Is only displayed for double pump master and SBM function at readiness/operation
				Individual run signal	Only displayed for double pump master
				Collective readiness signal	Only displayed for double pump master
				Collective run signal	Only displayed for double pump master
5.1.7.0	External off			Individual external off	Only displayed for double pump master
				Collective external off	Only displayed for double pump master
5.2.0.0	BMS			Settings for Building Management System (BMS) – building automation	Incl. all sub-menus, only displayed when BMS is active
5.2.1.0	LON/CAN/IF-Module Wink/service			The wink function permits the identification of a device in the BMS network. A "wink" is executed by confirmation.	Only displayed when LON, CAN or IF-Module is active
5.2.2.0	Local/remote operation			BMS local operation	Temporary state, automatic reset to remote operation after 5 min
				BMS remote operation	

No.	Designation	Type	Symbol	Values/explanations	Display conditions
5.2.3.0	Bus address		#	Setting of bus address	
5.2.4.0	IF gateway val A			Specific settings of the IF-Module, depends on protocol type	Further information can be found in the installation and operating instructions of the IF-Modules.
5.2.5.0	IF gateway val C				
5.2.6.0	IF gateway val E				
5.2.7.0	IF gateway val F				
5.3.0.0	In1 (sensor input)				
5.3.1.0	In1 (sensor value range)			Display of sensor value range 1	Not displayed with PID control
5.3.2.0	In1 (value range)			Setting of the value range Possible values: 0...10 V/2...10 V/ 0...20 mA/4...20 mA	
5.4.0.0	In2			Setting for external setpoint input 2	
5.4.1.0	In2 active/inactive			ON External setpoint input 2 active	
				OFF External setpoint input 2 inactive	
5.4.2.0	In2 (value range)			Setting of the value range Possible values: 0...10 V/ 2...10 V/0...20 mA/4...20 mA	Not displayed when In2 = inactive
5.5.0.0	PID parameters		PID	Settings for PID control	Only displayed when PID control is active (incl. all sub-menus)
5.5.1.0	P parameter			Setting of the proportional term of the control	
5.5.2.0	I parameter			Setting of the integral term of the control	
5.5.3.0	D parameter			Setting of the derivative term of the control	
5.6.0.0	Fault			Settings for behaviour in case of error	
5.6.1.0	HV/AC			HV "heating" mode	
				AC "cooling/air-conditioning" mode	
5.6.2.0	Emergency operation speed			Display of emergency operation speed	
5.6.3.0	Auto reset time			Time until automatic acknowledgement of an error	
5.7.0.0	Other settings 1				
5.7.1.0	Display orientation			Display orientation	

No.	Designation	Type	Symbol	Values/explanations	Display conditions
				Display orientation	
5.7.2.0	Pressure value correction			When pressure value correction is enabled, the differential pressure deviation measured by the differential pressure sensor that is factory-fitted on the pump flange is taken into account and corrected.	Only displayed in $\Delta p$ -c mode. Is not displayed for all pump variants.
				Pressure value correction off	
				Pressure value correction on	
5.7.5.0	Switching frequency			HIGH High switching frequency (factory setting)	Carry out the switch over/change only when the pump is at a standstill (not when the motor is running)
				MID Medium switch frequency	
				LOW Low switching frequency	
5.7.6.0	SBM function			Setting for behaviour of signals	
				SBM run signal	
				SBM readiness signal	
				SBM mains on signal	
5.7.7.0	Factory setting			OFF (default setting) Settings are not changed by confirming.	Is not displayed when access disable active. Is not displayed when building management system active
				ON Confirming will reset the settings to factory settings.  <b>Caution!</b> All manual settings will be lost.	Is not displayed when access disable active. Is not displayed when building management system active For parameters that are changed by a factory setting, see chapter 13 "Factory settings" on page 110.
5.8.0.0	Other settings 2				
5.8.1.0	Pump kick				
5.8.1.1	Pump kick active/inactive			ON (factory setting) Pump kick is activated.	
				OFF Pump kick is deactivated.	
5.8.1.2	Pump kick time interval			Can be set between 2 h and 72 h in 1 h steps	Is not displayed if pump kick is deactivated

No.	Designation	Type	Symbol	Values/explanations	Display conditions
5.8.1.3	Pump kick speed			Can be set between the pump's minimum and maximum speeds	Is not displayed if pump kick is deactivated
6.0.0.0	Error acknowledgement			For additional information, see chapter 11.3 "Acknowledge fault" on page 104.	Only displayed if an error is present
7.0.0.0	Access disable			"Access disable" inactive (changes possible) (for further information, see chapter 8.6.7 "Activating/deactivating access disable" on page 86).	
				"Access disable" active (no changes possible) (for further information, see chapter 8.6.7 "Activating/deactivating access disable" on page 86).	

Tab. 7: Menu structure

## 9 Commissioning

### Safety



#### **DANGER! Risk of fatal injury!**

**Failure to install safety devices of the electronic module and the motor can cause electrical shock or contact with rotating parts, potentially resulting in life-threatening injuries.**

- **Before commissioning as well as after maintenance work, all safety devices such as module covers and fan cover that were removed must be reinstalled.**
- **Keep a safe distance during commissioning.**
- **Never connect the pump without the electronic module.**

### Preparation

Before commissioning, the pump and electronic module must be at the ambient temperature.

### 9.1 Filling and venting

- Prime and vent the unit correctly.



#### **CAUTION! Risk of property damage!**

**Running dry will destroy the mechanical seal.**

- **Make sure that the pump does not run dry.**
- To avoid cavitation noises and damage, a minimum inlet pressure must be guaranteed at the suction port of the pump. This minimum inlet pressure depends on the operation situation and the duty point of the pump, and must be defined accordingly.
- The main parameters for defining the minimum inlet pressure are the NPSH of the pump at its duty point and the vapour pressure of the fluid.

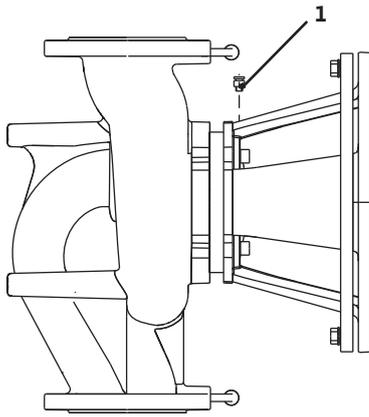


Fig. 38: Ventilation valve

- Vent the pumps by loosening the air vent valves (Fig. 38, Item 1). Any dry running would destroy the mechanical seal of the pump. The differential pressure sensor must not be vented (risk of destruction).



**WARNING! Danger due to extremely hot or extremely cold pressurised fluid!**

Depending on the temperature of the fluid and the system pressure, when the venting screw is opened completely, extremely hot or extremely cold fluid in liquid or vapour form may escape or shoot out at high pressure.

- Always exercise caution when opening the venting screw.
- Protect the module box from any water escaping when venting.



**WARNING! Danger of burns or freezing to the pump when body parts come into contact with the pump!**

Depending on the pump or system operating conditions (fluid temperature), the entire pump can become very hot or very cold.

- Keep a safe distance during operation!
- Allow the pump/system to cool off/warm up before performing any work.
- Always wear protective clothing, protective gloves and protective goggles when working.



**WARNING! Danger of injury!**

If the pump/system is installed improperly, liquid may be ejected during commissioning. Individual components may also become loose.

- Keep a safe distance from the pump during commissioning.
- Wear protective clothing, protective gloves and protective goggles.



**DANGER! Risk of fatal injury!**

Falling pumps or pump parts may result in life-threatening injuries.

- When performing installation work, protect the pump components against falling.

**9.2 Double pump installation/Y-pipe installation**



NOTE:

For double pumps, the left-hand pump in the direction of flow is already factory-configured as the master pump.



NOTE:

For the initial commissioning of a Y-pipe installation that has not been preconfigured, both pumps are set to their factory setting. After connecting the double pump communication cable, the error code "E035" is displayed. Both drives run at the emergency operation speed.

On acknowledgement of the error message, menu <5.1.2.0> is displayed and "MA" (= master) flashes. In order to acknowledge "MA", "access disable" must be deactivated and service mode must be active (Fig. 39).



Fig. 39: Setting the master pump

Both pumps are set to "master" and "MA" flashes on the displays of both electronic modules.

- Acknowledge one of the two pumps as master pump by pressing the red button. The status "MA" appears on the display of the master pump. The differential pressure sensor must be connected on the master. The measuring points of the differential pressure sensor of the master pump must be on the suction and pressure side of the double-pump system in the respective collector pipe.

The other pump will then display the status "SL" (= slave).

All further pump settings must now be made via the master only.



NOTE:

The procedure can be manually started later by selecting the menu <5.1.2.0> (for information about navigation in the service menu, see 8.6.3 "Navigation" on page 84).

### 9.3 Adjusting the pump output

- The system was designed for a certain duty point (full load point, calculated maximum heating capacity load). During commissioning, the pump output (delivery head) is to be set according to the duty point of the system.
- The factory setting does not correspond to the output required for the system. It is determined with the help of the pump curve diagram for the selected pump type (e.g. from data sheet).



#### NOTE:

The flow value shown on the IR-Monitor/IR-Stick display or output to the building management system must not be used to control the pump. This value is merely an indicator of general trends. A flow value is not output on every type of pump.



#### CAUTION! Risk of property damage!

**An inadequate volume flow can lead to damage on the mechanical shaft seal; the minimum volume flow depends on the rotation speed of the pump.**

- **Make sure that the volume flow does not fall below the minimum value  $Q_{\min}$ .**

#### Calculation of $Q_{\min}$ :

$$Q_{\min} = 10\% \times Q_{\max \text{ pump}} \times \frac{\text{Actual speed}}{\text{max. speed}}$$

### 9.4 Setting the control mode

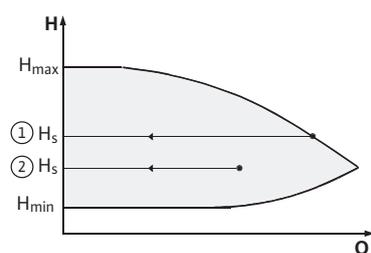


Fig. 40:  $\Delta p\text{-c}/\Delta p\text{-v}$  control

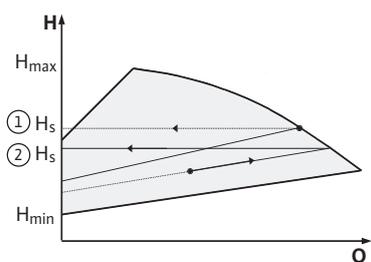
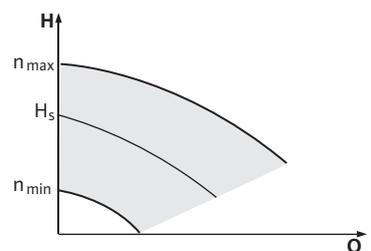


Fig. 41: Manual control mode



#### $\Delta p\text{-c}/\Delta p\text{-v}$ control:

	Setting (Fig. 40)	$\Delta p\text{-c}$	$\Delta p\text{-v}$
①	Duty point on maximum pump curve	Starting at the duty point, draw towards the left. Read off setpoint $H_s$ and set the pump to this value.	Starting at the duty point, draw towards the left. Read off setpoint $H_s$ and set the pump to this value.
②	Duty point within the control range	Starting at the duty point, draw towards the left. Read off setpoint $H_s$ and set the pump to this value.	Move to max. pump curve along control curve, then horizontally to the left, read off setpoint $H_s$ and set the pump to this value.
	Setting range	$H_{\min}$ , $H_{\max}$ See pump curves (e.g. on data sheet)	$H_{\min}$ , $H_{\max}$ See pump curves (e.g. on data sheet)



#### NOTE:

Alternatively, manual control mode (Fig. 41) or PID operating mode can also be set.

#### Manual control mode:

“Manual control” mode deactivates all other control modes. The speed of the pump is kept to a constant value and set using the rotary knob.

The speed range is dependent on the motor and pump type.

#### PID control:

The PID controller in the pump is a standard PID controller, as described in control technology literature. The controller compares a measured process value to a predefined setpoint and attempts to adjust the process value to match the setpoint as closely as possible.

Provided appropriate sensors are used, a variety of control systems (including pressure, differential pressure, temperature and flow control) can be realised. When selecting a sensor, keep in mind the electrical values presented in the table titled “Tab. 3: Connection terminal assignment” on page 78.

The control behaviour can be optimised by adjusting the P, I and D parameters. The P (or proportional) term of the controller contributes a linear gain of the deviation between the process (actual) value and the setpoint to the controller output. The sign of the P term determines the controller’s direction of action.

The I (or integral) term of the controller provides integral control based on the system deviation. A constant deviation results in a linear increase at the controller output. Hence a continuous system deviation is avoided.

The D (or derivative) term responds directly to the rate of change of the system deviation. This affects the rate at which the system responds. In the factory settings, the D term is set to zero, since this is an appropriate setting for a number of applications.

These parameters should only be changed in small increments, and the effects on the system should be monitored continuously. Parameter values should only be tuned by someone with training in control technology.

Controller term	Factory setting	Setting range	Increment
<b>P</b>	0.5	-30.0 ... -2.0	0.1
		-1.99 ... -0.01	0.01
		0.00 ... 1.99	0.01
		2.0 ... 30.0	0.1
<b>I</b>	0.5 s	10 ms ... 990 ms	10 ms
		1 s ... 300 s	1 s
<b>D</b>	0 s (= deactivated)	0 ms ... 990 ms	10 ms
		1 s ... 300 s	1 s

Tab. 8: PID parameter

The direction of action of the controller is determined by the sign of the P term.

**Positive PID control (default):**

If the sign of the P term is positive and the process value drops below the setpoint, the control will increase the pump speed until the setpoint has been reached.

**Negative PID control:**

If the sign of the P term is negative and the process value drops below the setpoint, the control will decrease the pump speed until the setpoint has been reached.



**NOTE:**

Check the controller’s direction of action if PID control is being used, but the pump is only running at minimum or maximum speed without responding to changes in the parameter values.

## 10 Maintenance

### Safety

**Have maintenance and repair work carried out by qualified skilled personnel only!**

It is recommended to have the pump serviced and checked by Wilo customer service.



**DANGER! Risk of fatal injury!**

There is a risk of fatal injury from electric shock when working on electrical equipment.

- Work on electrical equipment may only be done by electricians approved by the local electricity supplier.
- Before working on electrical equipment, switch it off and secure it against being switched on again.
- Any damage to the connection cable of the pump should always be rectified by a qualified electrician only.
- Never use an object to poke around the openings on the electronic module or motor and never insert anything into the module or motor.
- Follow the installation and operating instructions for the pump, level control device and other accessories.



**DANGER! Risk of fatal injury!**

Failure to install safety devices on the electronic module or near the coupling can cause electrical shock or contact with rotating parts, potentially resulting in life-threatening injuries.

- After maintenance, all safety devices such as module covers or coupling covers that were removed must be reinstalled!



**CAUTION! Risk of property damage!**

Danger of damage due to incorrect handling.

- The pump may never be operated without the electronic module being installed.



**DANGER! Risk of fatal injury!**

The pump itself and pump parts can be extremely heavy. Falling parts pose a risk of cuts, crush injuries, bruises or impacts, which may lead to death.

- Always use suitable lifting equipment and secure parts against falling.
- Never stand underneath a suspended load.
- Make sure the pump is securely positioned and is stable during storage and transport as well as prior to all installation and other assembly work.



**DANGER! Risk of burns or freezing to the pump when body parts come into contact with the pump!**

Depending on the pump or system operating conditions (fluid temperature), the entire pump can become very hot or very cold.

- Keep a safe distance during operation!
- In the case of high water temperatures and system pressures, allow the pump to cool down before all work.
- Always wear protective clothing, protective gloves and protective goggles when working.



**DANGER! Risk of fatal injury!**

The tools used during maintenance work on the motor shaft can be flung out if they come into contact with rotating parts, and cause serious or even fatal injuries.

- The tools used during maintenance work must be removed completely before the pump is started up.

**10.1 Air supply**

The air supply to the motor housing must be checked at regular intervals. In case of contamination, ensure that an air supply is re-established in order to allow the motor and electronic module to cool sufficiently.

**10.2 Maintenance work**



**DANGER! Risk of fatal injury!**  
**There is a risk of fatal injury from electric shock when working on electrical equipment.**

- **Check for absence of voltage and cover or cordon off adjacent live parts.**



**DANGER! Risk of fatal injury!**  
**Falling pumps or pump parts may result in life-threatening injuries.**

- **When performing installation work, protect the pump components against falling.**

**10.2.1 Replacing the mechanical seal**

During the running-in period, a minor amount of dripping is to be expected. Even during normal operation of the pump, slight leakage involving occasional drops is common. Once in a while, however, a visual inspection is required. If there is clearly detectable leakage, the seal is to be changed.

Wilo offers a repair kit which contains the necessary parts for replacement.

**Dismantling**

1. Disconnect the system from the power and secure it against being switched on.
2. Close the shut-off device upstream and downstream of the pump.
3. Ensure system is voltage-free
4. Earth the work area and short-circuit.
5. Disconnect the power cable. If present, remove the cable for the differential pressure sensor.
6. Depressurise the pump by opening the air vent valve (Fig. 38 Item 1).



**DANGER! Risk of scalding!**  
**Due to high fluid temperatures there is a danger of scalding.**

- **If the pump fluid is hot, allow it to cool down before performing any work.**
7. Remove the motor/drive with impeller and shaft seal from the pump housing by undoing the flange screws, (Fig. 6, Item 1.4).



NOTE:  
 If a differential pressure sensor is installed on the pump, it will now be held in place by the coils of the pressure measurement lines only. To prevent damage to the differential pressure sensor, you can bend it slightly to the side.



NOTE:  
 To make it easier to dismantle the motor and to protect the electronic module, you should remove the electronic module by loosening the screws (Fig. 6, Item 7.4) and the tooth lock washers (Fig. 6, Item 7.5).

8. Remove the O-ring (Fig. 6, Item 1.13).
9. Remove the front retaining ring (Fig. 6, Item 1.12) from the shaft.
10. Pull the impeller (Fig. 6, Item 1.11) off the shaft.
11. Remove the rear retaining ring (Fig. 6, Item 1.12) from the shaft.
12. Remove the spacer (Item 1.22, see "Tab. 11: Spare part components" on page 109) from the shaft.
13. Pull the mechanical seal (Fig. 6, Item 1.21) off the shaft.

14. Push the counter ring of the mechanical seal out of seating in the motor flange and then clean the seating surfaces.
15. Clean the seating surfaces of the shaft carefully.

## Installation



### NOTE:

For the following steps, observe the screw tightening torque specified for the respective thread type (see Tab. 9 "Screw tightening torques" below).

16. Insert the new stationary ring.
17. Push the new mechanical seal (Fig. 6, Item 1.21) onto the shaft. Avoid damage to the mechanical seal due to jamming.
18. Push the new spacer (Item 1.22, see "Tab. 11: Spare part components" on page 109) onto the shaft.
19. Push the rear retaining ring (Fig. 6, Item 1.12) onto the pump shaft.
20. Mount the impeller (Fig. 6, Item 1.11) onto the shaft.
21. Push the front retaining ring (Fig. 6, Item 1.12) onto the pump shaft.
22. Insert a new O-ring (Fig. 6, Item 1.13).
23. Insert the motor/drive with impeller and shaft seal into the pump housing and fasten using the flange screws (Fig. 6, Item 1.4).



### NOTE:

If a differential pressure sensor is installed on the pump, fix it in place again when you fasten the flange screws.



### NOTE:

Observe the measures for commissioning (chapter 9 "Commissioning" on page 93).

24. Reclamp the connection cable of the differential pressure sensor/power cable if it was disconnected.
25. Open the shut-off devices in front of and behind the pump.
26. Reset the fuse.

## Screw tightening torques

Part	Fig./Item Screw (nut)	Thread	Tightening torque Nm $\pm$ 10% (if not otherwise specified)	Installation information
<b>Pump housing</b>	Fig. 6/Item 1.4	M6	20	Tighten evenly and diagonally
<b>Motor</b>		M10	35	
<b>Control terminals</b>	Fig. 23/Item 4	-	0.5	
<b>Power terminals</b>	Fig. 24/Item 7	-	0.5	
<b>Cable clips</b>	Fig. 2	-	0.5	
<b>Electronic module</b>	Fig. 6/Item 7	M5	4.0	
<b>Module cover</b>	Fig. 3	M4	0.8	

Tab. 9: Screw tightening torques

### 10.2.2 Replacing the motor/drive

- Carry out steps 1 to 7 to dismantle the motor/drive in accordance with chapter 10.2 "Maintenance work" on page 98.
- Remove the screws (Fig. 6, Item 7.4) and tooth lock washers (Fig. 6, Item 7.5) and pull the electronic module vertically upwards (Fig. 6).
- When installing the motor, follow steps 22 and 23 in chapter 10.2 "Maintenance work" on page 98.

- Before reinstalling the electronic module, pull the new O-ring between the electronic module and the motor (Fig. 6, Item 1) onto the contacting chamber.
- Press the electronic module into the contacting of the new motor and fasten with screws (Fig. 6, Item 7.4) and the tooth lock washers (Fig. 6, Item 7.5).



NOTE:  
The electronic module has to be pressed on as far as possible when it is installed.



NOTE:  
For the thread type, observe the specified screw tightening torque (see list “Tab. 9: Screw tightening torques” on page 99).



NOTE:  
Increased bearing noises and unusual vibrations indicate bearing wear. Then the bearing has to be changed by Wilo customer service.

### 10.2.3 Replacing the electronic module



**DANGER! Risk of fatal injury!**  
**There is a risk of fatal injury from electric shock when working on electrical equipment.**

- **Check for absence of voltage and cover or cordon off adjacent live parts.**
- Carry out steps 1 to 5 to dismantle the electronic module in accordance with chapter 10.2 “Maintenance work” on page 98.
- Remove the screws (Fig. 6, Item 7.4) and tooth lock washers (Fig. 6, Item 7.5) and pull the electronic module off the motor.
- Before reinstalling the electronic module, pull the new O-ring between the electronic module and the motor (Fig. 6, Item 1) onto the contacting chamber.
- Press the electronic module into the contacting of the new motor and fasten with screws (Fig. 6, Item 7.4) and the tooth lock washers (Fig. 6, Item 7.5).
- Proceed further (restore pump to operational standby) as described in chapter 10.2 “Maintenance work” on page 98 **in reverse order** (steps 5 to 1).



NOTE:  
The electronic module has to be pressed on as far as possible when it is installed.



NOTE:  
Observe the measures for commissioning (chapter 9 “Commissioning” on page 93).

## 11 Faults, causes and remedies

**Have faults remedied by qualified personnel only! Observe the safety instructions in chapter 10 “Maintenance” on page 97.**

- **If the malfunction cannot be rectified, consult a specialist technician or the nearest customer service centre or representative office.**

### Fault displays

For faults, their causes and remedies, see the “Fault/warning message” flow diagram in chapter 11.3 “Acknowledge fault” on page 104 and the following tables. The first column of the table lists the code numbers displayed in the event of a fault.



NOTE:  
If the cause of the fault no longer exists, some faults resolve themselves automatically.

**Legend**

The following types of errors can occur with differing priorities (1 = lowest priority; 6 = highest priority):

Error type	Description	Priority
A	A fault exists; the pump stops immediately. The fault must be acknowledged at the pump.	6
B	A fault exists; the pump stops immediately. The counter is increased and a timer counts down. After the 6th fault, this becomes a definite fault and has to be acknowledged at the pump.	5
C	A fault exists; the pump stops immediately. If the error exists for more than 5 min, the counter is increased. After the 6th fault, this becomes a definite fault and has to be acknowledged at the pump. Otherwise the pump restarts automatically.	4
D	Like error type A, but error type A has a higher priority than error type D.	3
E	Emergency operation: warning with emergency operation speed and activated SSM	2
F	Warning – pump continues to turn	1

**11.1 Mechanical faults**

Fault	Cause	Remedy
Pump does not start or stops working	Cable terminal loose	Check all cable connections
	Fuses defective	Check fuses; replace faulty fuses
Pump runs at reduced output	Stop valve on the pressure side throttled	Slowly open the stop valve
	Air in the suction line	Repair leaks on flanges, vent the pump, change the mechanical shaft seal in case of visible leakage
Pump making noises	Cavitation due to insufficient supply pressure	Increase supply pressure, observe minimum pressure at the suction port, check slide valve and filter on the suction side and clean if need be
	Motor has bearing damage	Have the pump checked by Wilo customer service or a specialised service centre and repaired if necessary

## 11.2 Error table

Classification	No.	Fault	Cause	Remedy	Error type	
					HV	AC
-	0	No fault				
<b>System errors</b>	E004	Undervoltage	Mains overloaded	Check electrical installation	C	A
	E005	Overvoltage	Mains voltage too high	Check electrical installation	C	A
	E006	2-phase operation	Missing phase	Check electrical installation	C	A
	E007	<b>Warning!</b> Generator operation (flow in flow direction)	The flow is driving the pump impeller; electrical current is being fed back to the mains	Check the setting, check system for proper operation <b>Caution!</b> Prolonged operation can cause damage to the electronic module	F	F
<b>Pump errors</b>	E010	Blocking	Shaft is mechanically blocked	If the blocking has not been removed after 10 seconds, the pump switches off. Check shaft for ease of movement Request customer service	A	A
<b>Motor errors</b>	E020	Excess winding temperature	Motor overloaded	Allow motor to cool down Check settings Check/correct the duty point	B	A
			Motor ventilation limited	Provide unobstructed air access		
			Water temperature too high	Lower water temperature		
	E021	Motor overload	Duty point outside of duty chart	Check/correct the duty point	B	A
			Deposits in the pump	Request customer service		
	E023	Short circuit/earth leakage	Motor or electronic module defective	Request customer service	A	A
	E025	Faulty contact	Electronic module has no contact to motor	Request customer service	A	A
		Winding interrupted	Motor faulty	Request customer service		
E026	WSK or PTC interrupted	Motor faulty	Request customer service	B	A	
<b>Electronic modules errors</b>	E030	Excess electronic module temperature	Limited air supply to the heat sink of the electronic module	Provide unobstructed air access	B	A
	E031	Excess hybrid/power section temperature	Ambient temperature too high	Improve room ventilation	B	A
	E032	Intermediate circuit undervoltage	Voltage fluctuations in the mains	Check electrical installation	F	D
	E033	Intermediate circuit overvoltage	Voltage fluctuations in the mains	Check electrical installation	F	D
	E035	DP/MP: multiple instances of same identity	Multiple instances of same identity	Reallocate master and/or slave (see Chapter 9.2 on page 94)	E	E
<b>Communication errors</b>	E050	BMS communication time-out	Bus communication interrupted or timed out Broken cable	Check cable connection to building automation	F	F
	E051	Impermissible DP/MP combination	Different pumps	Request customer service	F	F
	E052	DP/MP communications time-out	Cable MP communication defective	Check cable and cable connections	E	E

Classification	No.	Fault	Cause	Remedy	Error type	
					HV	AC
<b>Electronics errors</b>	E070	Internal communication error (SPI)	Internal electronics error	Request customer service	A	A
	E071	EEPROM error	Internal electronics error	Request customer service	A	A
	E072	Power section/frequency converter	Internal electronics error	Request customer service	A	A
	E073	Impermissible electronic module number	Internal electronics error	Request customer service	A	A
	E075	Charging relay defective	Internal electronics error	Request customer service	A	A
	E076	Internal transformer defective	Internal electronics error	Request customer service	A	A
	E077	24 V operating voltage for differential pressure sensor defective	Differential pressure sensor defective or connected incorrectly	Check differential pressure sensor connection	A	A
	E078	Impermissible motor number	Internal electronics error	Request customer service	A	A
	E096	Infobyte not set	Internal electronics error	Request customer service	A	A
	E097	FlexPump data record missing	Internal electronics error	Request customer service	A	A
	E098	FlexPump data record invalid	Internal electronics error	Request customer service	A	A
	E121	Motor PTC short-circuit	Internal electronics error	Request customer service	A	A
	E122	Interruption to NTC power element	Internal electronics error	Request customer service	A	A
	E124	Interruption to NTC electronic module	Internal electronics error	Request customer service	A	A
<b>Impermissible combinations</b>	E099	Pump type	Different pump types have been interconnected	Request customer service	A	A

Tab. 10: Error table

#### Additional explanations of error codes

##### Error E021:

Error 'E021' indicates that the pump requires more power than is permitted. To ensure that the motor and electronic module do not suffer irreparable damage, the drive protects itself by switching the pump off if an overload lasts more than 1 minute.

The most common causes of this error are a pump that is configured too small, especially when pumping viscous fluids, or an excessive volume flow in the system.

When this error code is displayed, there is not an error in the electronic module.

##### Error E070; possibly combined with error E073:

If additional signal lines or control lines are connected to the electronic module, the effects of EMC (immission/interference resistance) may interrupt communication. This results in error code E070 being displayed.

You can check this by disconnecting all the communication lines installed by the customer from the electronic module. If the error no longer occurs, there could be an external interfering signal on the communication line(s) that exceeds the applicable standard values. The pump can only return to normal operation once the source of interference is remedied.

### 11.3 Acknowledge fault

#### General

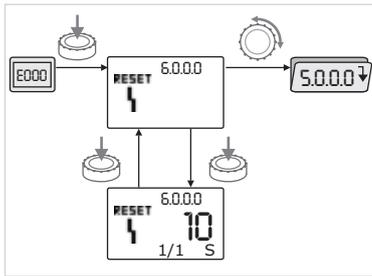


Fig. 42: Navigation in the event of an error



In the event of an error, the error page is displayed instead of the status page.

In this case, the following procedure can generally be used for navigation (Fig. 42):



- To change to the menu mode, press the red button.

Menu number <6.0.0.0> flashes on the display.

By turning the red button, it is possible to navigate in the menu as usual.



- Press the red button.

Menu number <6.0.0.0> appears steady on the display.

On the units display, the current incidence (x) as well as the maximum incidence of the error (y) are displayed in the format “x/y”.

Until the error can be acknowledged, pressing the red button again will cause a return to menu mode.



NOTE:

A 30-second time-out causes the display to revert to the status page or error page.



NOTE:

Each error number has a separate error counter that counts incidences of the error within the last 24 hours. The error counter is reset after manual acknowledgement, 24 hours after “Mains on” or after a repeated “Mains on”.

#### 11.3.1 Error type A or D

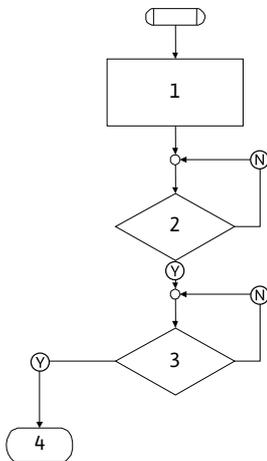


Fig. 43: Error type A, flowchart

Error type A (Fig. 43):

Program step/query	Contents
1	<ul style="list-style-type: none"> <li>• Error code is displayed</li> <li>• Motor Off</li> <li>• Red LED On</li> <li>• SSM is activated</li> <li>• Error counter is incremented</li> </ul>
2	> 1 minute?
3	Error acknowledged?
4	End; auto control resumes
Ⓨ	Yes
Ⓝ	No

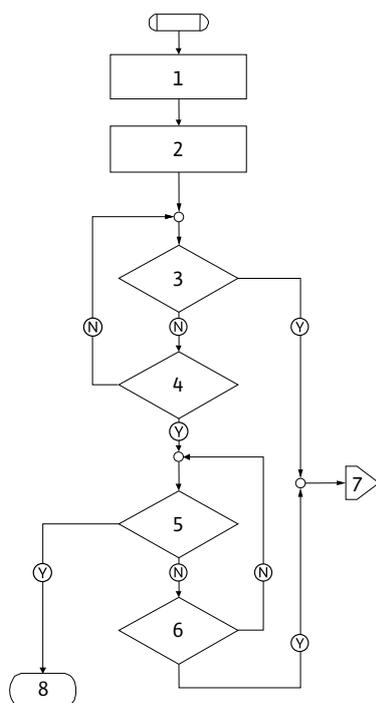


Fig. 44: Error type D, flowchart

Error type D (Fig. 44):

Program step/query	Contents
1	<ul style="list-style-type: none"> <li>• Error code is displayed</li> <li>• Motor Off</li> <li>• Red LED On</li> <li>• SSM is activated</li> </ul>
2	• Error counter is incremented
3	Is there a new type "A" error?
4	> 1 minute?
5	Error acknowledged?
6	Is there a new type "A" error?
7	Branching to error type "A"
8	End; auto control resumes
(Y)	Yes
(N)	No

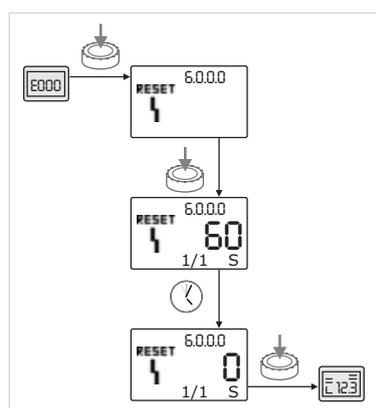


Fig. 45: Acknowledging error type A or D

If type A or D errors occur, proceed as follows to acknowledge (Fig. 45):

-  To change to the menu mode, press the red button. Menu number <6.0.0.0> flashes on the display.
-  Press the red button again. Menu number <6.0.0.0> appears steady on the display. The time remaining until the error can be acknowledged is displayed.
-  Wait until the remaining time is up. The time until manual acknowledgement is always 60 seconds for error types A and D.
-  Press the red button again. The error is acknowledged, and the status page is displayed.

11.3.2 Error type B

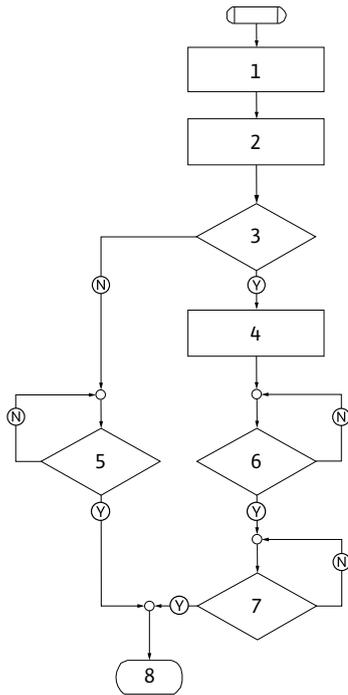


Fig. 46: Error type B, flowchart

Error type B (Fig. 46):

Program step/query	Contents
1	<ul style="list-style-type: none"> <li>Error code is displayed</li> <li>Motor Off</li> <li>Red LED On</li> </ul>
2	<ul style="list-style-type: none"> <li>Error counter is incremented</li> </ul>
3	Error counter > 5?
4	<ul style="list-style-type: none"> <li>SSM is activated</li> </ul>
5	> 5 minutes?
6	> 5 minutes?
7	Error acknowledged?
8	End; auto control resumes
Ⓨ	Yes
Ⓝ	No

If type B errors occur, proceed as follows to acknowledge:



- To change to the menu mode, press the red button. Menu number <6.0.0.0> flashes on the display.



- Press the red button again.

Menu number <6.0.0.0> appears steady on the display.

On the units display, the current incidence (x) as well as the maximum incidence of the error (y) are displayed in the format "x/y".

Incidence X < Y

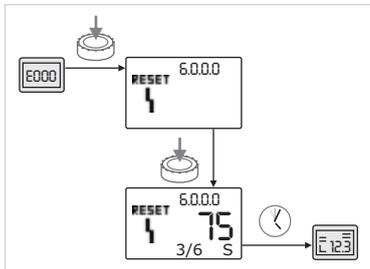


Fig. 47: Acknowledging error type B (X < Y)



- Wait for auto reset time.

On the value display, the remaining time until auto reset of the error is displayed in seconds.

After the auto reset time has run out, the error will be automatically acknowledged and the status page will be displayed.



NOTE:

The auto reset time can be set on menu number <5.6.3.0> (time input 10 to 300 s)

Incidence X = Y

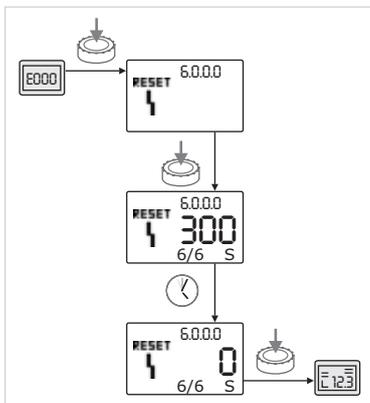


Fig. 48: Acknowledging error type B (X = Y)



- Wait until the remaining time is up.

The time until manual acknowledgement is always 300 seconds.

On the value display, the remaining time until manual acknowledgement of the error is displayed in seconds.



- Press the red button again.

The error is acknowledged, and the status page is displayed.

### 11.3.3 Error type C

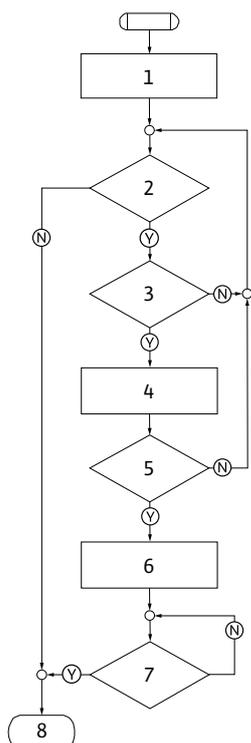


Fig. 49: Error type C, flowchart

Error type C (Fig. 49):

Program step/query	Contents
1	<ul style="list-style-type: none"> <li>Error code is displayed</li> <li>Motor Off</li> <li>Red LED On</li> </ul>
2	Error criterion fulfilled?
3	> 5 minutes?
4	Error counter is incremented
5	Error counter > 5?
6	SSM is activated
7	Error acknowledged?
8	End; auto control resumes
(Y)	Yes
(N)	No

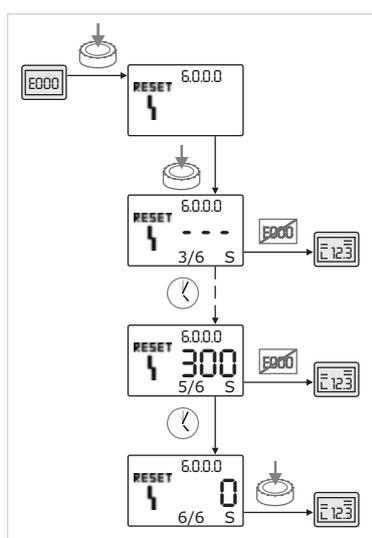


Fig. 50: Acknowledging error type C

If type C errors occur, proceed as follows to acknowledge (Fig. 50):



- To change to the menu mode, press the red button.

Menu number <6.0.0.0> flashes on the display.



- Press the red button again.

Menu number <6.0.0.0> appears steady on the display.

On the value display, “- - -” appears.

On the units display, the current incidence (x) as well as the maximum incidence of the error (y) are displayed in the format “x/y”.

After 300 seconds, the current incidence will be counted up by one.



NOTE:

The error will be acknowledged automatically if the cause of the error is eliminated.



- Wait until the remaining time is up.

If the current incidence (x) is the same as the maximum incidence of the error (y), this error can be acknowledged manually.



- Press the red button again.

The error is acknowledged, and the status page is displayed.

11.3.4 Error type E or F

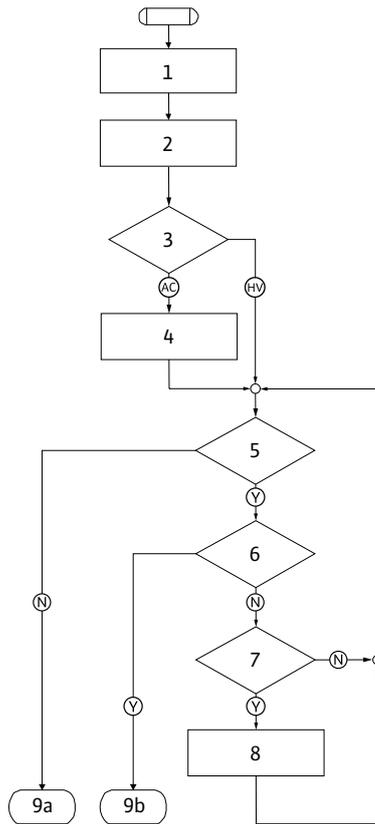


Fig. 51: Error type E, flowchart

Error type E (Fig. 51):

Program step/query	Contents
1	• Error code is displayed • Pump goes into emergency operation
2	• Error counter is incremented
3	Error matrix AC or HV?
4	• SSM is activated
5	Error criterion fulfilled?
6	Error acknowledged?
7	Error matrix HV and > 30 minutes?
8	• SSM is activated
9a	End; auto control (double pump) resumes
9b	End; auto control (single pump) resumes
Y	Yes
N	No

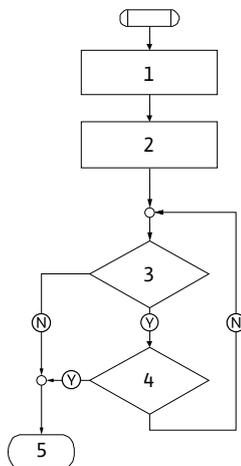


Fig. 52: Error type F, flowchart

Error type F (Fig. 52):

Program step/query	Contents
1	• Error code is displayed
2	• Error counter is incremented
3	Error criterion fulfilled?
4	Error acknowledged?
5	End; auto control resumes
Y	Yes
N	No

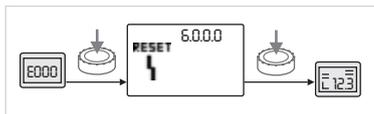


Fig. 53: Acknowledging error type E or F

If type E or F errors occur, proceed as follows to acknowledge (Fig 53):



- To change to the menu mode, press the red button.  
Menu number <6.0.0.0> flashes on the display.



- Press the red button again.  
The error is acknowledged, and the status page is displayed.



NOTE:  
The error will be acknowledged automatically if the cause of the error is eliminated.

## 12 Spare parts

Spare parts may be ordered via a local specialist and/or Wilo customer service.

Please provide all the information on the rating plate when ordering spare parts. This helps prevent return queries and incorrect orders.



### **CAUTION! Risk of property damage!**

**Trouble-free pump operation can only be guaranteed when original spare parts are used.**

- Only use original Wilo spare parts.
- Each component is identified in the table below.
- Information to be provided when ordering spare parts:
  - Spare part number
  - Name/description of the spare part
  - All data on the pump and drive rating plates



### NOTE:

For a list of original spare parts, see the Wilo spare parts documentation ([www.wilo.com](http://www.wilo.com)). The item numbers on the exploded view drawing (Fig. 6) are intended as orientation and to provide a list of the pump components (see list "Tab. 11: Spare part components" on page 109). These item numbers are not to be used to order spare parts.

### Spare parts table

For the allocation of assemblies, see Fig. 6.

No.	Part	Details
1.1	Impeller (set)	
1.11		Impeller
1.12		Retaining ring
1.13		O-ring
1.2	Mechanical seal (set)	
1.12		Retaining ring
1.13		O-ring
1.21		Mechanical seal
1.22		Spacer
1.3	Motor	
1.4	Motor/pump housing fastening screws	
3	Pump housing (set)	
1.13		O-ring
3.1		Pump housing
3.2		Screw plug (in version ...-R1)
3.3		Valve (for double pump)
6	Differential pressure sensor (set)	
7	Electronic module (set)	
7.1		Electronic module
7.3		Module cover
7.4		Screws
7.5		Tooth lock washers
8.2	Ventilation valve	

Tab. 11: Spare part components

**13 Factory settings**

For the factory settings, see Tab. 12 below.

Menu no.	Designation	Factory-configured values
1.0.0.0	Setpoints	<ul style="list-style-type: none"> <li>• Controller: approx. 60% of <math>n_{\max}</math> pump</li> <li>• <math>\Delta p\text{-c}</math>: approx. 50% of <math>H_{\max}</math> pump</li> <li>• <math>\Delta p\text{-v}</math>: approx. 50% of <math>H_{\max}</math> pump</li> </ul>
2.0.0.0	Control mode	$\Delta p\text{-c}$ activated
3.0.0.0	$\Delta p\text{-v}$ gradient	Lowest value
2.3.3.0	Pump	ON
4.3.1.0	Base-load pump	MA
5.1.1.0	Operating mode	Main/standby mode
5.1.3.2	Internal/external pump cycling	Internal
5.1.3.3	Pump cycling time interval	24 h
5.1.4.0	Pump enabled/disabled	Enabled
5.1.5.0	SSM	Collective fault signal
5.1.6.0	SBM	Collective run signal
5.1.7.0	External off	Collective external off
5.3.2.0	In1 (value range)	0–10 V active
5.4.1.0	In2 active/inactive	OFF
5.4.2.0	In2 (value range)	0–10 V
5.5.0.0	PID parameter	See chapter 9.4 “Setting the control mode” on page 95
5.6.1.0	HV/AC	HV
5.6.2.0	Emergency operation speed	approx. 60% of $n_{\max}$ pump
5.6.3.0	Auto reset time	300 s
5.7.1.0	Display orientation	Display on original orientation
5.7.2.0	Pressure value correction	Active
5.7.6.0	SBM function	SBM: Run signal
5.8.1.1	Pump kick active/inactive	ON
5.8.1.2	Pump kick interval	24 h
5.8.1.3	Pump kick speed	$n_{\min}$

Tab. 12: Factory settings

## 14 Disposal

Proper disposal and recycling of this product prevents damage to the environment and risks to personal health.

Disposal in accordance with the regulations requires the product to be drained and cleaned.

Lubricants must be collected. The pump components are to be separated according to material (metal, plastic, electronics).

1. Use public or private disposal organisations when disposing of all or part of the product.
2. For more information on proper disposal, please contact your local council or waste disposal office or the supplier from whom you obtained the product.



**NOTE:**

The product or any of its parts must not be disposed of with household waste! For further information on recycling, go to [www.wilo-recycling.com](http://www.wilo-recycling.com)

**Subject to change without prior notice!**

**D EG – Konformitätserklärung**  
**GB *EC – Declaration of conformity***  
**F *Déclaration de conformité CE***

*(gemäß 2006/42/EG Anhang II,1A und 2004/108/EG Anhang IV,2,  
according 2006/42/EC annex II,1A and 2004/108/EC annex IV,2,  
conforme 2006/42/CE appendice II,1A et 2004/108/CE l'annexe IV,2)*

Hiermit erklären wir, dass die Bauart der Baureihe :  
*Herewith, we declare that this pump type of the series:*

**IP-E**  
**DP-E**

*Par le présent, nous déclarons que le type de pompes de la série:*

*(Die Seriennummer ist auf dem Typenschild des Produktes angegeben./*

*The serial number is marked on the product site plate./ Le numéro de série est inscrit sur la plaque signalétique du produit.)*

in der gelieferten Ausführung folgenden einschlägigen Bestimmungen entspricht:  
*in its delivered state complies with the following relevant provisions:*  
*est conforme aux dispositions suivantes dont il relève:*

**EG-Maschinenrichtlinie**  
**EC-Machinery directive**

**2006/42/EG**

**Directive CE relative aux machines**

Die Schutzziele der Niederspannungsrichtlinie 2006/95/EG werden gemäß Anhang I, Nr. 1.5.1 der 2006/42/EG Maschinenrichtlinie eingehalten.

*The protection objectives of the low-voltage directive 2006/95/EC are realized according annex I, No. 1.5.1 of the EC-Machinery directive 2006/42/EC.*

*Les objectifs de protection (sécurité) de la directive basse-tension 2006/95/CE sont respectés conformément à l'annexe I, n° 5.1 de la directive CE relatives aux machines 2006/42/CE.*

**Elektromagnetische Verträglichkeit - Richtlinie**  
**Electromagnetic compatibility - directive**  
**Directive compatibilité électromagnétique**

**2004/108/EG**

**Richtlinie energieverbrauchsrelevanter Produkte**  
**Energy-related products - directive**  
**Directive des produits liés à l'énergie**

**2009/125/EG**

Die verwendeten 50Hz Induktionselektromotoren - Drehstrom, Käfigläufer, einstufig - entsprechen den Ökodesign - Anforderungen der Verordnung 640/2009 und der Verordnung 547/2012 von Wasserpumpen.

*This applies according to eco-design requirements of the regulation 640/2009 to the versions with an induction electric motor, squirrel cage, three-phase, single speed, running at 50 Hz and of the regulation 547/2012 for water pumps.*

*Qui s'applique suivant les exigences d'éco-conception du règlement 640/2009 aux versions comportant un moteur électrique à induction à cage d'écuréuil, triphasé, mono-vitesse, fonctionnant à 50 Hz et, du règlement 547/2012 pour les pompes à eau.*

und entsprechender nationaler Gesetzgebung,  
*and with the relevant national legislation,*  
*et aux législations nationales les transposant,*

angewendete harmonisierte Normen, insbesondere:  
*as well as following harmonized standards:*  
*ainsi qu'aux normes (européennes) harmonisées suivantes:*

**EN 809+A1**  
**EN 60034-1**  
**EN 61800-3:2004**  
**EN 61800-5-1**

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen ist:  
*Authorized representative for the completion of the technical documentation:*  
*Personne autorisée à constituer le dossier technique est:*

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Dortmund, 15. Januar 2013



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