

## Wilo-MVIE 5,5 -> 7,5 kW



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

**nl** Inbouw- en bedieningsvoorschriften  
**ru** Инструкция по монтажу и эксплуатации

Fig. 1

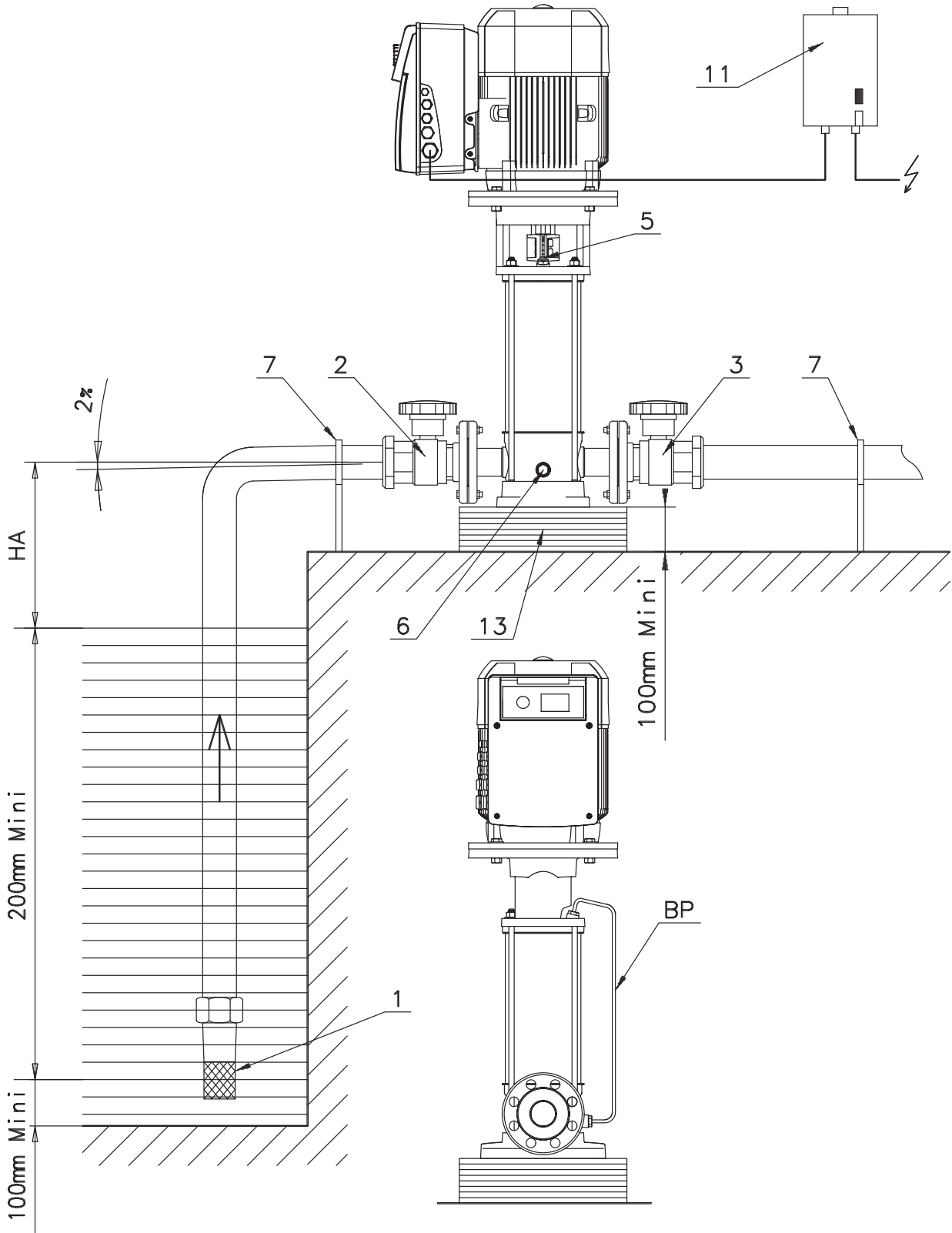


Fig. 2

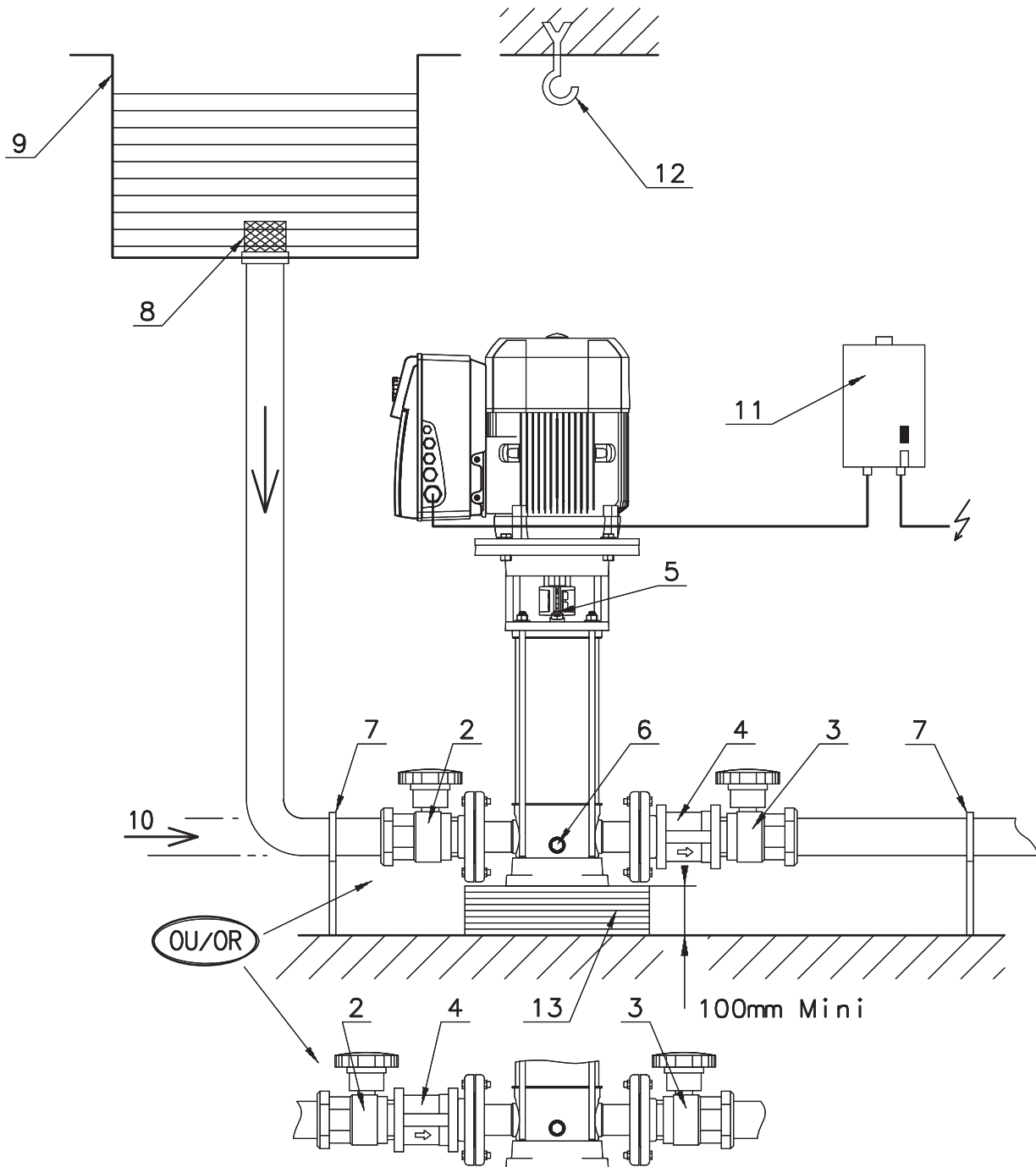


Fig. 3

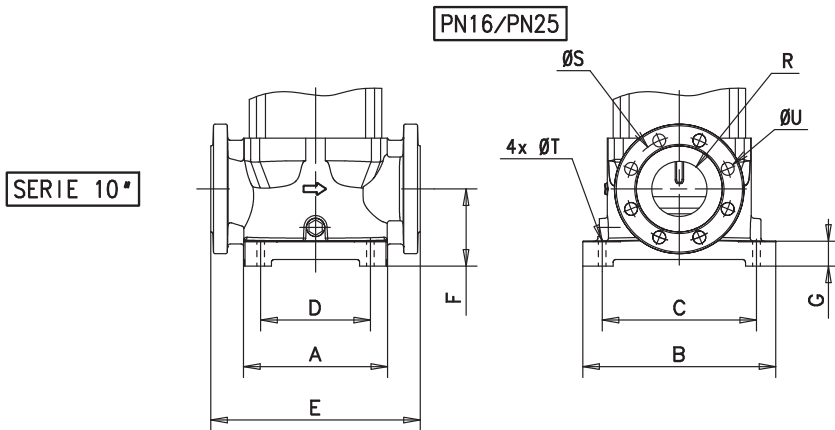
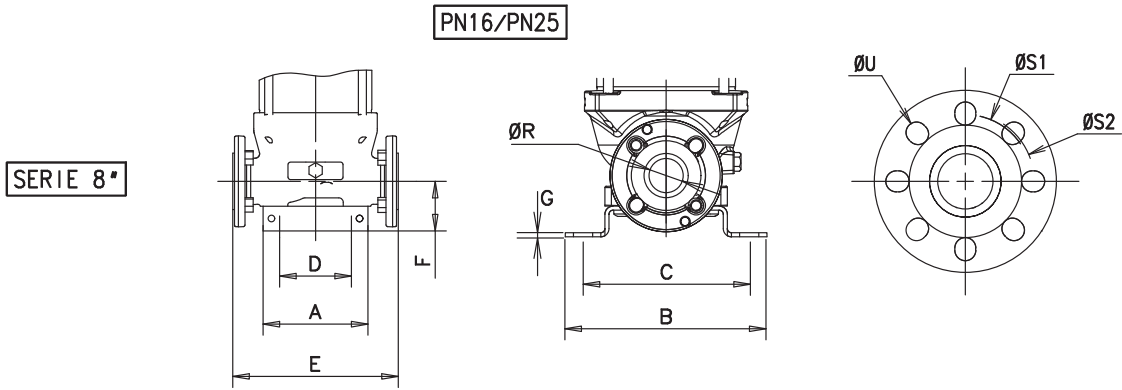
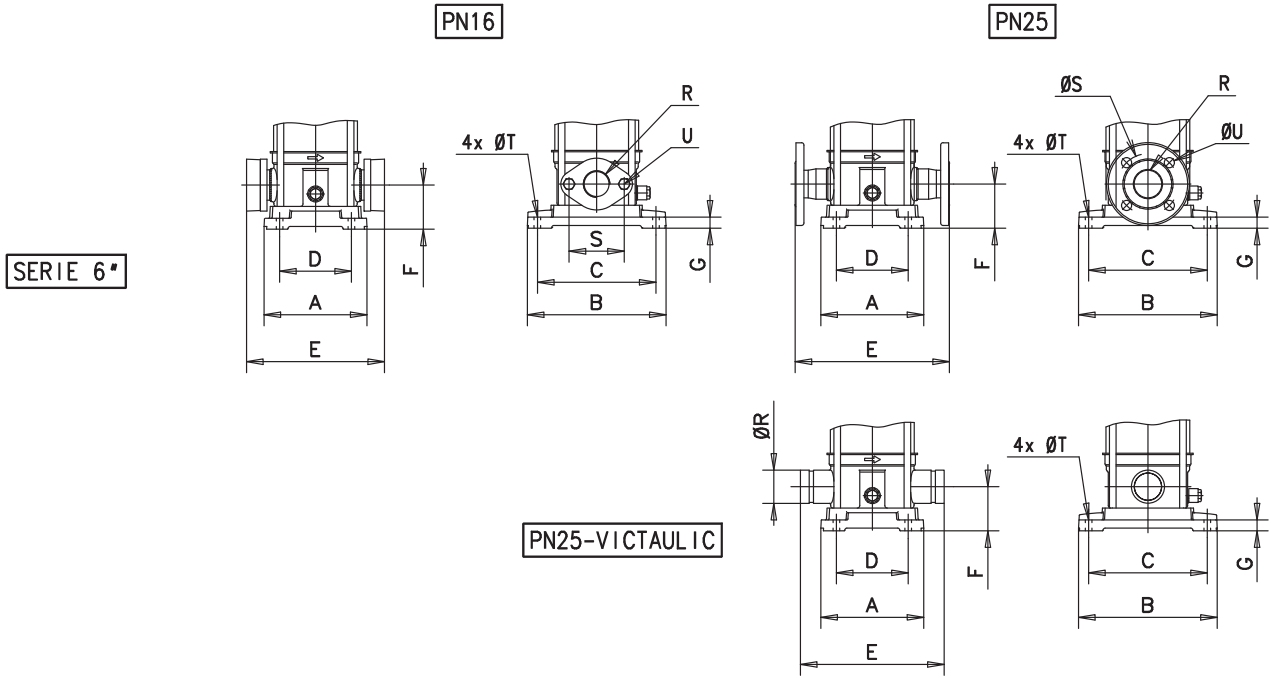


Fig. 4

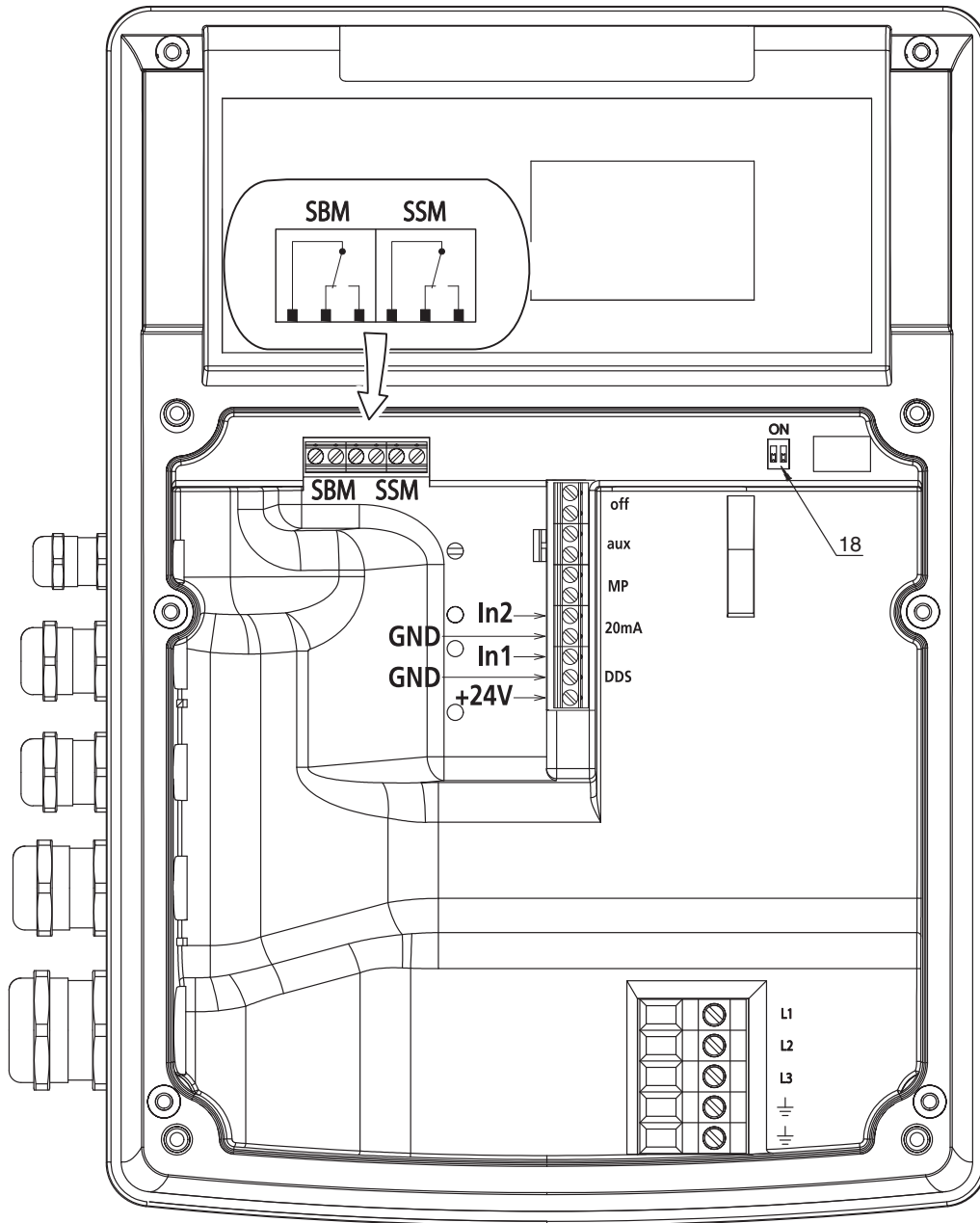


Fig. 5

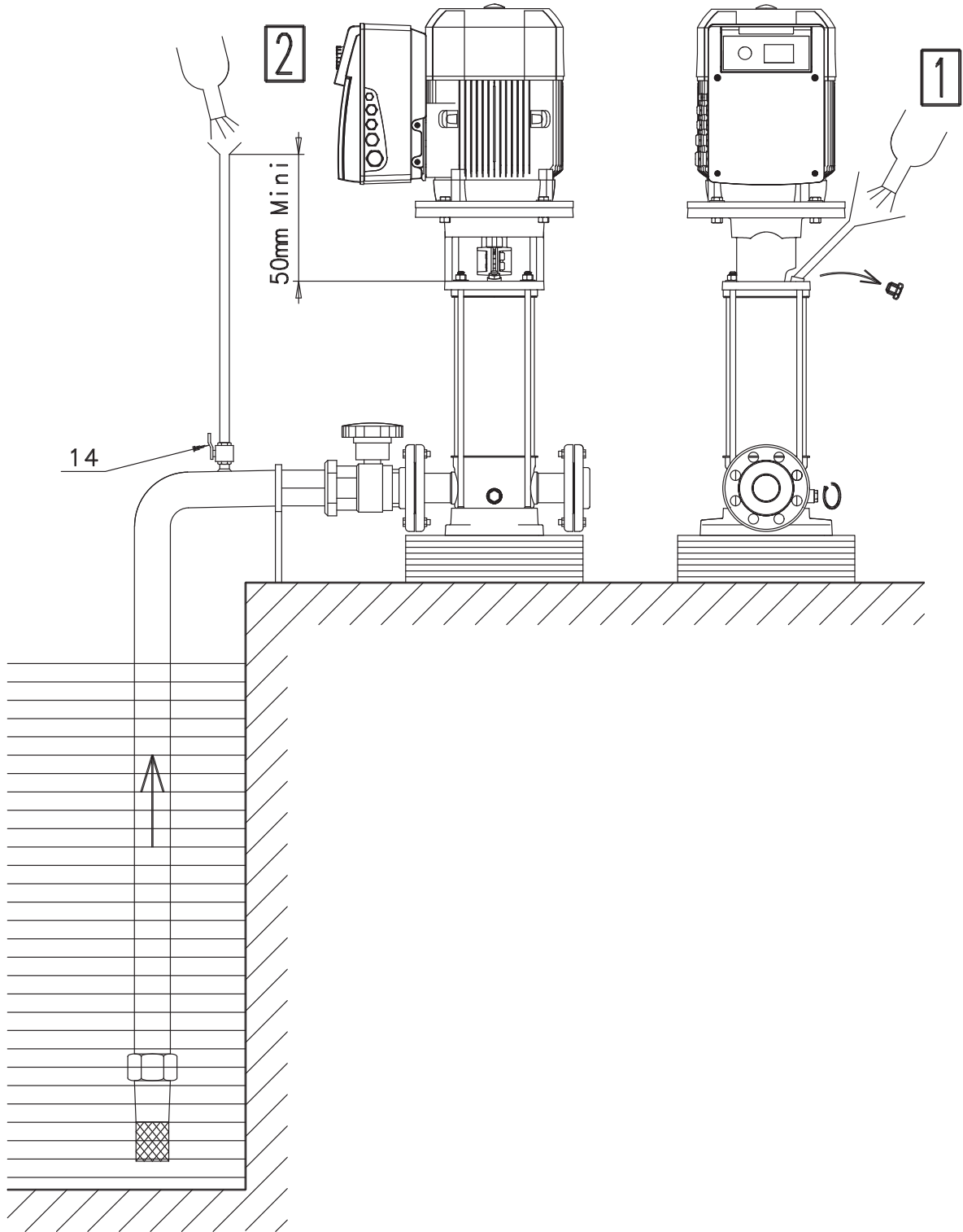


Fig. 6

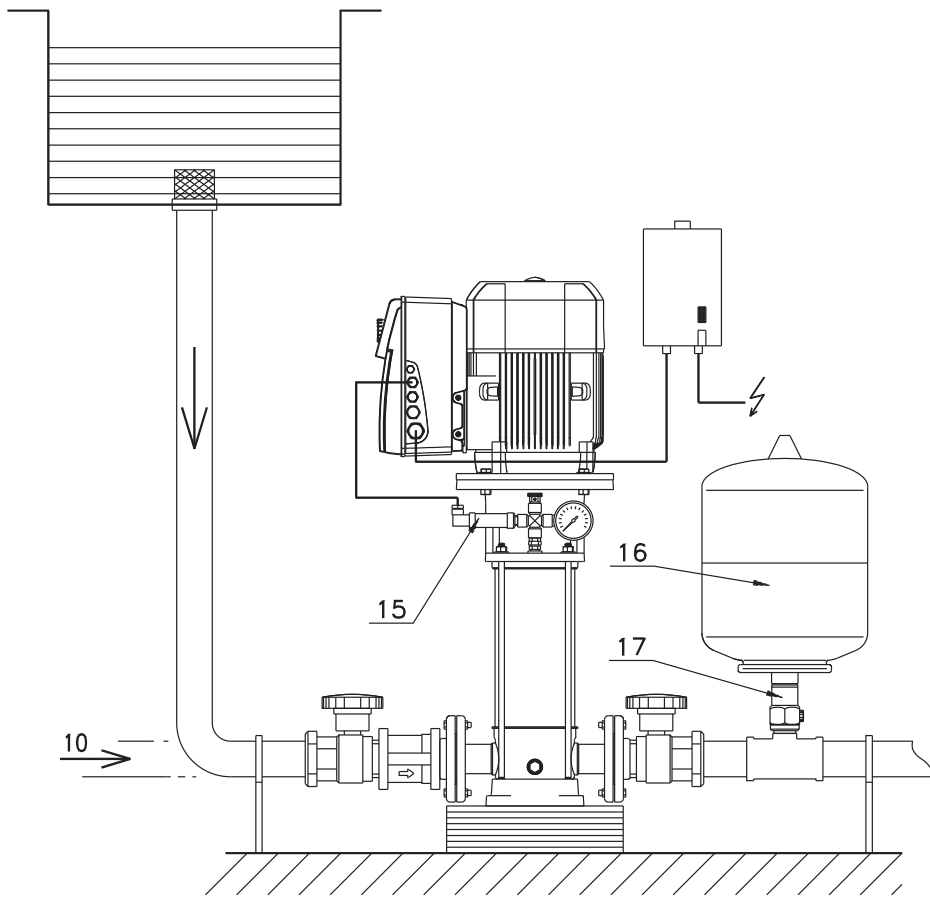


Fig. 7

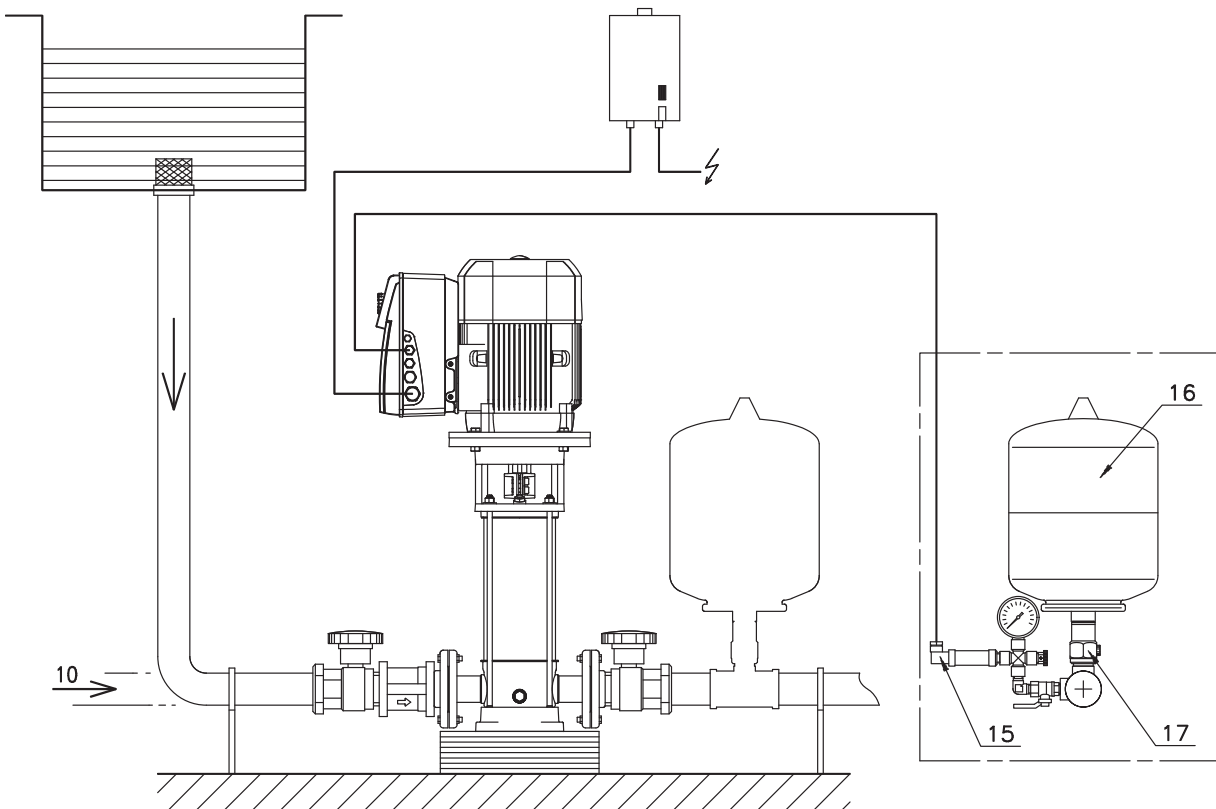


Fig. 8

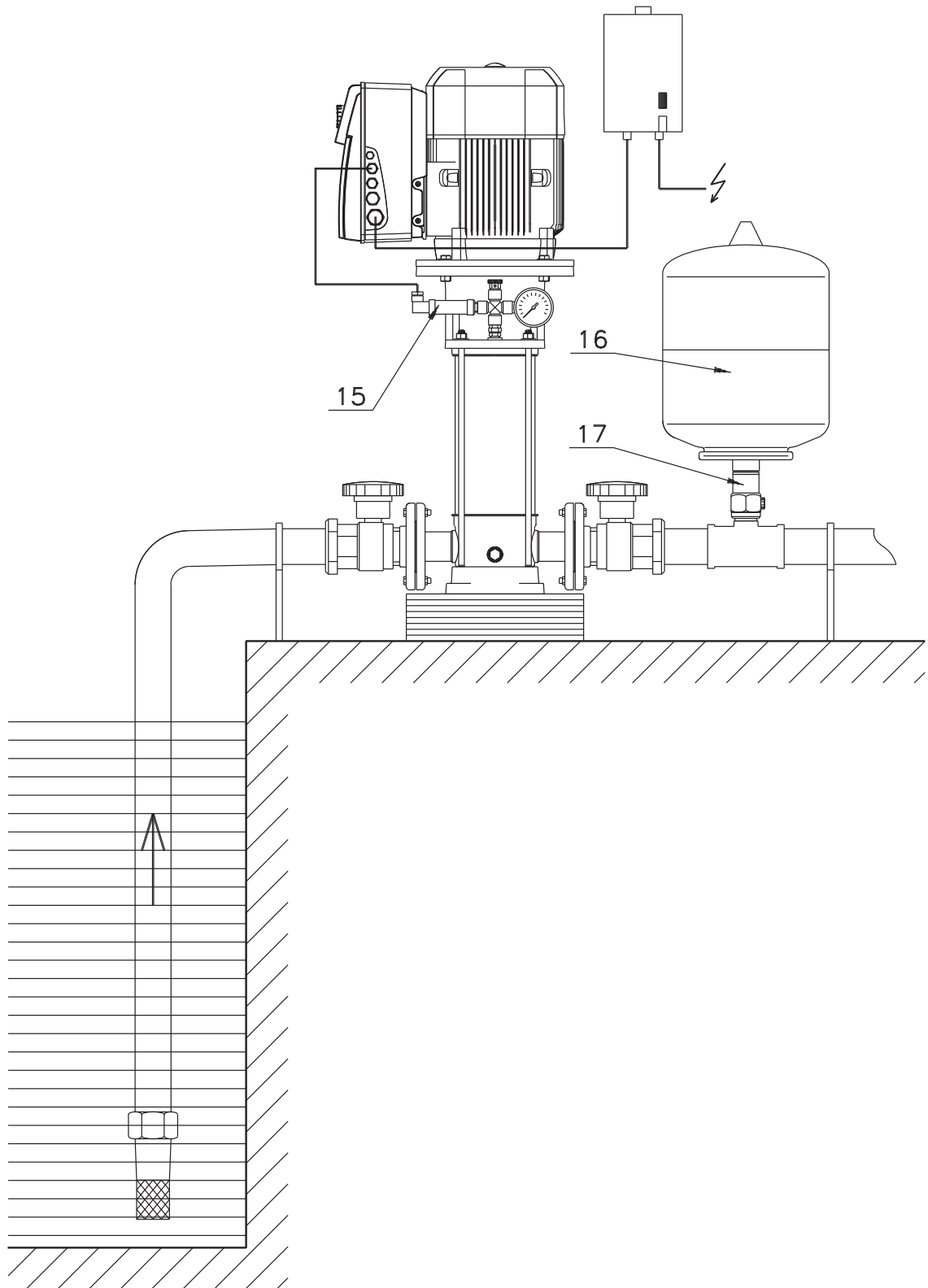




Fig. 9

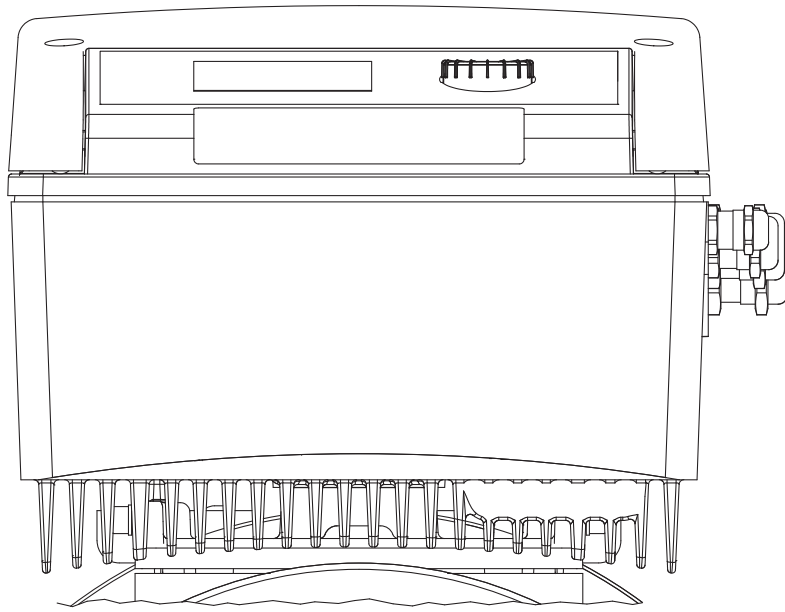


Fig. 10

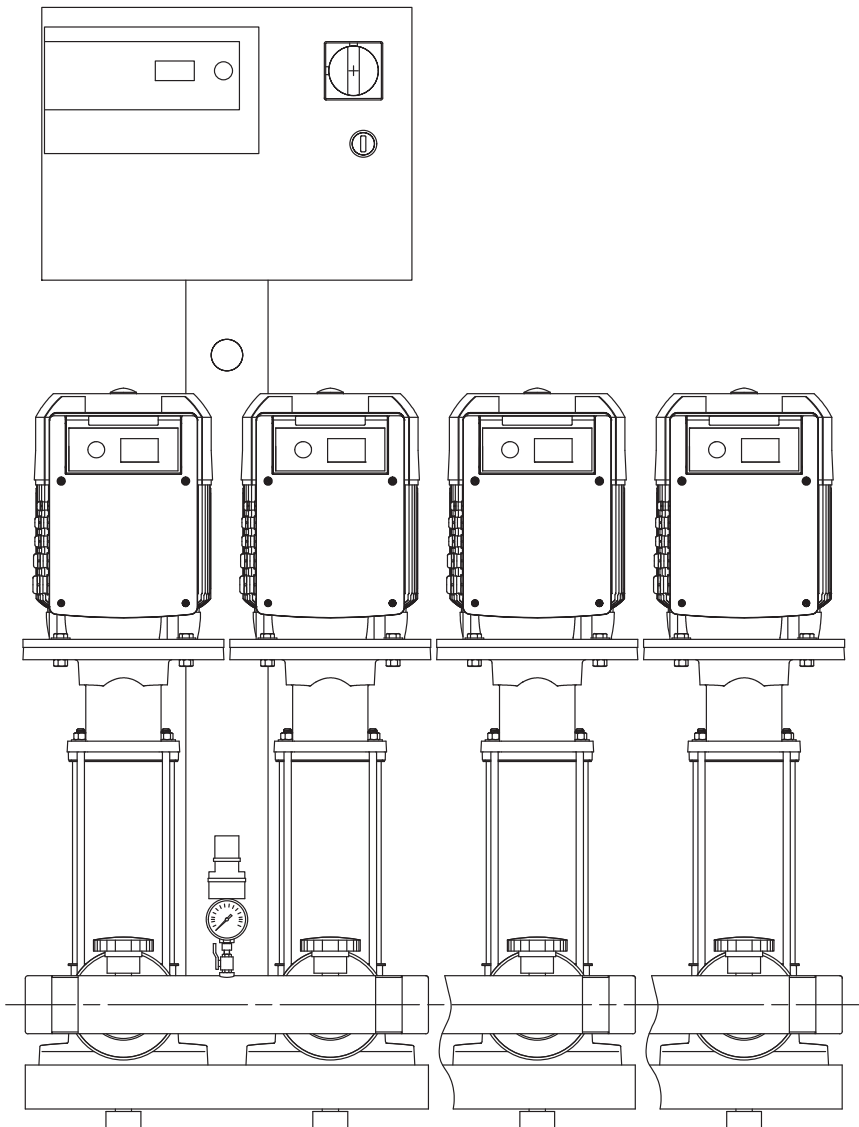
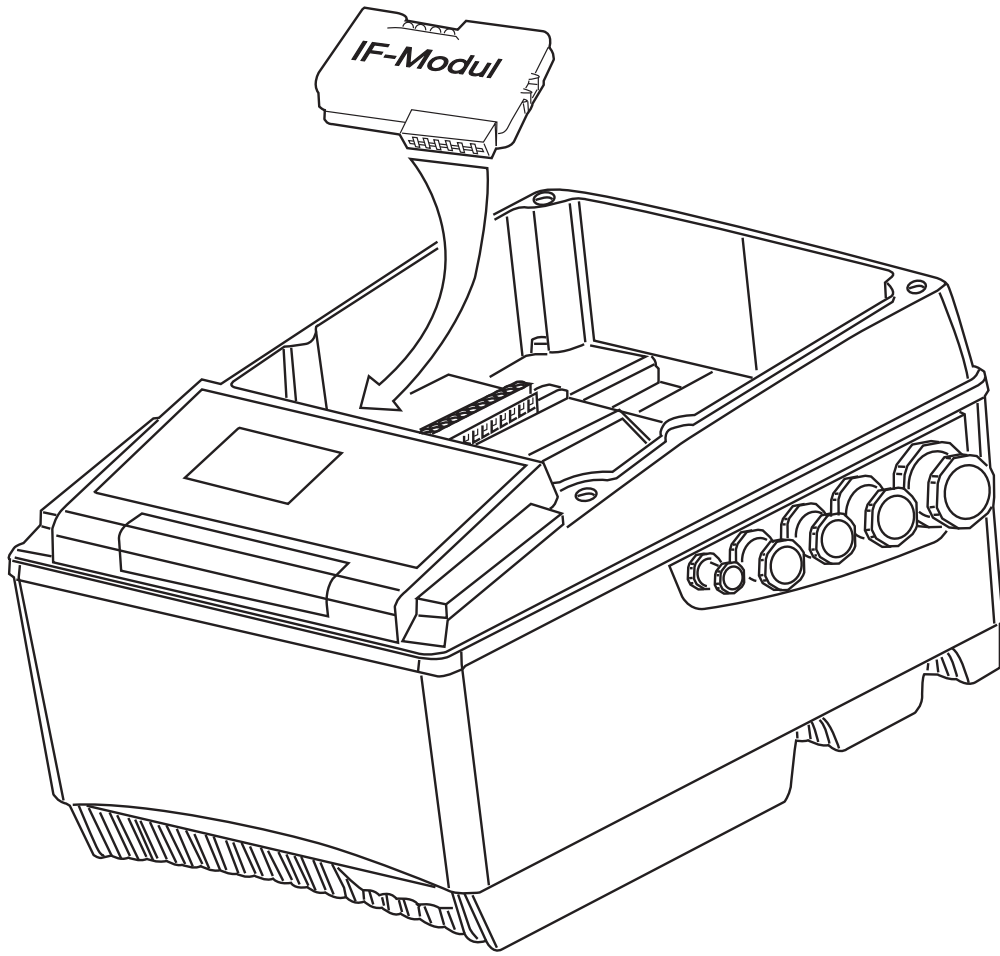


Fig. 11



## 1. General

### 1.1 About this document

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 conform to the relevant version of the product and the underlying safety standards valid at the time of going to print.

## 2. Safety

These operating instructions contain basic information which must be adhered to during installation and operation. For this reason, these operating instructions must, without fail, be read by the service technician and the responsible 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 Indication of instructions in the operating instructions

#### Symbols



General danger symbol.



Danger due to electrical voltage.



NOTE: ....

#### Signals:

**DANGER! Actually 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 pump/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.

### 2.2 Personnel qualifications

The installation personnel must have the appropriate qualifications for this work.

### 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 pump/unit. Non-observance of the safety instructions can result in the loss of any claims to damages.

In detail, non-observance can, for example, result in the following risks:

- Failure of important pump/unit functions,
- Failure of required maintenance and repair procedures
- Danger to persons from electrical, mechanical and bacteriological influences,
- Property damage.

### 2.4 Safety instructions for the operator

The existing directives for accident prevention must be adhered to.

Danger from electrical current must be eliminated. Local directives or general directives [e.g. IEC, VDE etc.] and local power supply companies must be adhered to.

### 2.5 Safety instructions for inspection and installation work

The operator must ensure that all inspection and installation work is carried out by authorised and qualified personnel, who are sufficiently informed from their own detailed study of the operating instructions.

Work to the pump/unit must only be carried out when at a standstill.

### 2.6 Unauthorised modification and manufacture of spare parts

Modifications to the pump/unit are only permissible after consultation with the manufacturer. Original spare parts and accessories authorised by the manufacturer ensure safety. The use of other parts can nullify the liability from the results of their usage.

### 2.7 Inadequate use

The operating safety of the supplied pump/unit is only guaranteed for conventional use in accordance with Section 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 storage

### 3.1 Shipping

The pump is supplied ex works in a box or fixed to a pallet with straps and is protected against dirt and moisture.

### 3.2 Transport inspection

When delivered, check the pump immediately for any transport damage. If a damage is discovered, the necessary procedure involving the forwarding agent must be taken within the specified period.

### 3.3 Storage

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



**CAUTION!** Danger of damage due to incorrect packaging! If the pump is transported again later on, it must be well packed to avoid any damage during transport.

- Use the original packaging for this, or select a similar packaging.

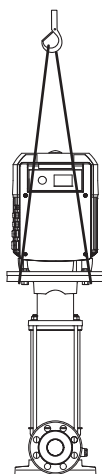


**WARNING!** Danger of personal injury!

Inadequate transport can lead to personal injury!

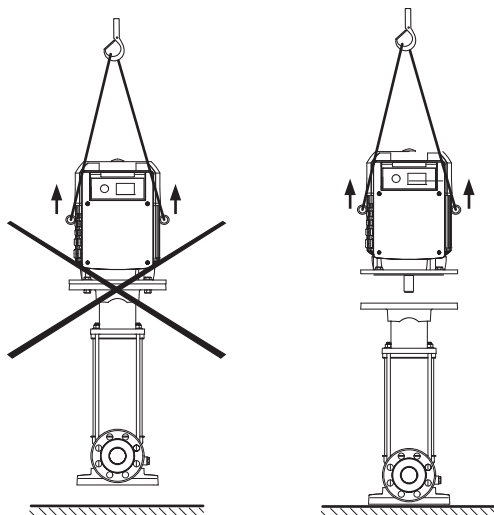
- The pump must be transported using approved load bearing equipments. Operate a slinging on the pump flanges and, if necessary, on the outer motor diameter (safety device required to protect against slipping!).
- Due to high position of the centre of gravity and small ground surface of this type of pumps, beware of instability during handling to avoid any falling down that may cause a risk for the safety of the persons.

Handle the pump carefully so as not to alter the geometry and the alignment of the unit.



**CAUTION!** Danger of damage for the pump!

The transport eyes on the motor should only be used for transporting the motorconverter, and are not approved for transporting the complete pump.



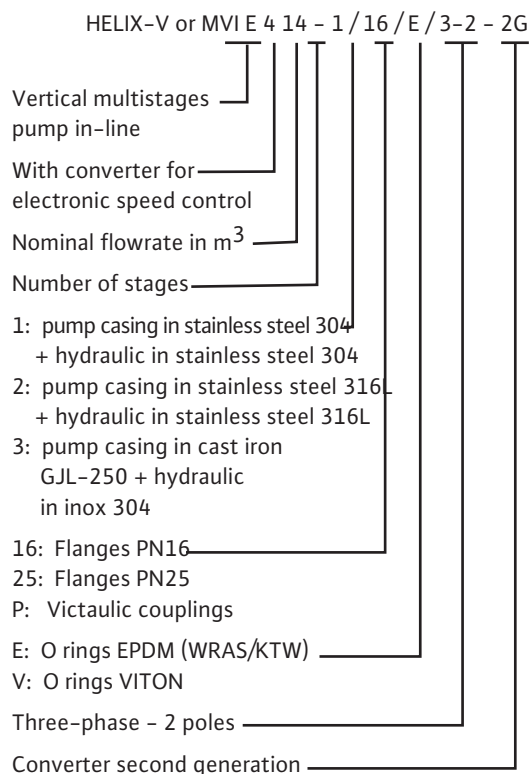
## 4. Application

Pumps aimed at pumping clear liquids in building, agriculture and industry areas ...

Water supply, water tower, sprinkling, high pressure washing, boiler supply (with mandatory bypass kit) – lifting of condensates – air conditioning – industrial networks and integration in all modular systems.

## 5. Product information

### 5.1 Type key



### 5.2 Technical data

- Maximum operating pressure
  - pump casing PN25: 25 bar
  - pump casing PN16: 16 bar
  - pump casing - rapid hose coupling for Victaulic: 25 bar (only 4, 8, 16 m<sup>3</sup>/h)
- Maximum suction pressure: 10 bar
- Water temperature range
  - EPDM version for O'ring and mechanical seal (KTW approval – german standard) and (WRAS approval – british standard): - 15°C to + 120°C
  - Viton version for O'ring and mechanical seals: - 15°C to + 90°C
- Maximum suction head: according to NPSH of the pump
- Ambient temperature: - 15°C to +40°C (standard product)
- Ambient humidity: < 90 % without condensation

- Acoustic pressure level:  $\leq 72$  dB(A)
- Insulation class: F
- Protection class: IP55
- Electromagnetic compatibility (\*)
  - residential emission - 1st environment: EN 61800-3
  - industrial immunity - 2st environment: EN 61800-3
- Operating voltages: 400V ( $\pm 10\%$ )  
50Hz  
380V ( $\pm 10\%$ )  
60Hz  
440V ( $\pm 6\%$ ) 60Hz
- Section of the power cable (cable equipped of 4 wires):
  - 5,5 kW - stranded wires: 2,5 mm<sup>2</sup> to 4 mm<sup>2</sup>  
rigid wires: 2,5 mm<sup>2</sup> to 6 mm<sup>2</sup>
  - 7,5 kW - stranded wires: 4 mm<sup>2</sup>  
rigid wires: 4 mm<sup>2</sup> to 6 mm<sup>2</sup>

(\*) In the frequency range between 600 MHz and 1 GHz, the display or the pressure indication in the display might be disturbed in the direct vicinity (< 1 m from the electronic module) of radio transmission installations, transmitters or similar devices working in this frequency range. The functioning of the pump is at no time affected.

### 5.3 Accessories

Accessories must be ordered separately.

- IF-Module PLR for connecting to PLR/interface converter.
  - IF-Module LON for connection to the LONWORKS network. The IF Modul PLR is connected directly inside the connection area of the converter (Fig. 11).
  - By-pass kit.
  - Insulating valves.
  - Bladder or galvanised tank.
  - Tank for antihammer blow effect.
  - Weld-on (Steel) or screw-on (Stainless Steel) counterflange • rapid hose coupling like "Victaulic".
  - Non-return valves (with nose or spring ring when operating in constant pressure).
  - Strainer-foot valve.
  - Vibrationless sleeves.
  - Protection kit against dry-running
  - Sensor kit for pressure regulation (accuracy :  $\leq 1\%$  ; use between 30 % and 100 % of the reading range).
- See catalogue for detailed list.

## 6. Description and function

### 6.1 Description of the product

#### The pump

- Multistage vertical pump not self-priming, with ports in line on the same axis in bottom part.
- Shaft sealing by standardized mechanical seal.

- Hydraulic connection.  
Oval flanges on the PN 16 pump casing (only for the pump 400, 800, 1600/6): pump supplied with oval cast iron counterflanges for screw-on tube, rings and bolts.  
Round flanges: pump delivered with rings and bolts without counterflanges (accessories as option).  
Rapid hose coupling (only for the pump 400, 800, 1600/6) for "Victaulic" bracket: pump delivered without brackets (accessories as option).

#### The motor and its converter

- Cage induction motor with standardized flange and shaft end for vertical operation fitted with its converter.
- Motor-pump linked by a coupling with safety guards.

### 6.2 Function

The basic advantages of the electronic control are:

- Energy savings.
- Reduction of flow noises.
- Adaptation of the pump to changing operating requirements.  
The operating modes are:
  - « Speed control »: setting of the frequency by hand or external control.
  - « Constant pressure » : regulation through a pressure sensor and setting point (internal or external).
  - « P.I.D. control »: regulation through a sensor (temperature, flow,...) by P.I.D.control and setting point (internal or external).

## 7. Installation and electrical connection



**CAUTION!** Danger of material damage!

Danger of damage due to inadequate handling. The pump should only be installed by skilled personnel.

### 7.1 Preparation

- The pump should only be installed when all welding and soldering works are completed and, if necessary flushing of the pipe system. Dirt can cause pump failure.
- The pumps must be protected against bad weather and in an environment protected from some dust and from the frost, ventilated well and in not explosive atmosphere.
- Install the pump in an easy-to-access location so that later inspections, maintenance (e.g. mechanical seal) or exchange is easily possible. The air access to the dissipator of the converter may not be limited.

## 7.2 Description (Fig. 1, 2, 5, 6, 7, 8)

- 1 - Strainer-foot valve
  - 2 - Pump suction valve
  - 3 - Pump discharge valve
  - 4 - Non-return valve
  - 5 - Venting and filling plug
  - 6 - Drain-priming plug
  - 7 - Pipe supports or brackets
  - 8 - Strainer
  - 9 - Storage tank
  - 10 - Town water supply
  - 11 - Disconnecting switch with fuses
  - 12 - Lifting hook
  - 13 - Foundation block
  - 14 - Cock
  - 15 - Pressure sensor
  - 16 - Tank
  - 17 - Insulation valve of the tank
  - 18 - Switch block
  - 19 - Pump identification sticker
- BP - By-pass  
HA - Maximum suction head  
HC - Minimum inlet pressure

## 7.3 Installation

Two standard types.

Fig. 1: pump in suction

Fig. 2: pump in load on storage tank (item 9) or town water supply (item 10).

- Install the pump in a place easy to reach, protected against frost and as close as possible from the drawing point.
- For heavy pumps provide a point of attachment (lifting hook) in the pump axis (item 12) to facilitate removal.
- Install the pump on a concrete block (at least 10 cm high) (item 13) and fix with anchor bolts (installation plan see Fig. 3).
- Foresee an insulating material under the concrete block (cork or reinforced rubber) to avoid any noise and vibration transmission into the installation.
- Before final tightening of anchor bolts, ensure that the pump axis is vertical: use shims if necessary.



NOTE: Keep in mind that the altitude of the installation place and the water temperature may reduce the suction possibilities of the pump.

Altitude	Loss of head
0 m	0 mCL
500 m	0,60 mCL
1000 m	1,15 mCL



NOTE: Beyond 80° C, plan to install the pump in load.

Temperature	Loss of head
20°C	0,20 mCL
30°C	0,40 mCL
40°C	0,70 mCL
(50°C)	1,20 mCL
(60°C)	1,90 mCL
(70°C)	3,10 mCL
(80°C)	4,70 mCL
(90°C)	7,10 mCL
(100°C)	10,30 mCL
(110°C)	14,70 mCL
(120°C)	20,50 mCL



**CAUTION!** Danger of material damage!

- The installation has to bear the pressure reached when the pump runs at maximum frequency and zero flow rate.
- Pump with oval flange pump casing : with threaded screw-on tubes directly on the tapped oval counterflanges delivered with the pump.
- Pump with round flange pump casing: with weld-on or screw-on tube in the counterflanges (counterflanges available as accessories).
- Pump casing with rapid hose coupling : with a bracket, to be installed with an end to be fixed on the pipe (bracket and threaded end available as accessories).
- The diameter of the pipe must never be smaller than the one of the counterflange.
- Pumps series 400, 800, 1600/6: the direction of the fluid flow is indicated on the pump identification sticker.
- Pumps series 2200, 7000, 9500: an arrow on the pump casing shows the direction of the fluid flow.



**CAUTION!** Danger of material damage!

Connections have to be correctly sealed, no air entrance is allowed on the suction pipe which shows a minimum mounting declivity of 2% (Fig. 1).

- Limit the length of the suction pipe and avoid all features that cause losses of head (bends, valves, tapers).
- Use supports or collars (Fig. 1, 2, item 7) so that the pump does not bear the weight of the pipes.



**CAUTION!** Danger of material damage!

When the pump is in load, it is recommended to connect the non-return valve to the pump discharge to protect it against hammer blow effects.



NOTE: To pump water with a large content of air or hot water, we recommend to install the bypass kit (Fig. 1, item BP). Mount the pressure sensor on the discharge pipe (Fig. 7).

Principal dimensions and connections (Fig. 3)

Pump type								Version PN16					Version PN25									
	B	C	D	F	G	ØT	A	E	F	S	ØU	R	A	E	F	ØS	ØU	R	Victaulic			
																				E	F	S
6"	400	212	180	100	50	20	12	157	204	50	75	M10	G1" 1/4	172	250	75	100	18	DN 32	210	50	Ø 42,4
	800	252	215	130	80	20	12	187	250	80	100	M12	G1" 1/2	187	280	80	110	18	DN 40	261	80	Ø 60,3
	1600/6	252	215	130	90	20	12	187	250	90	100	M10	G2"	187	300	90	125	18	DN 50	261	90	Ø 60,3
8"	2200	270	215	130	90	5	14	190	300	90	ØS1 121 ØS2 125	19	DN 50	190	300	90	ØS1 121 ØS2 125	19	DN 50	-		
10"	7000 9500	350	280	199	140	45	12	264	380	140	190	19	DN 100	264	380	140	190	23	DN 100			

7.4 Electrical connections



**DANGER!** Danger of death!  
Inadequate installation and electrical connections can be life-threatening.

- Electrical connections shall only be made by approved specialised electricians and in compliance with the applicable regulations.
- Accident prevention regulations must be observed.
- Do not forget to connect to earth.

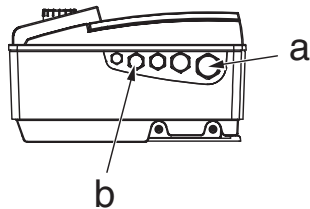


**CAUTION!** Danger of mains overload!  
An inadequate mains design can lead to system failures and can lead to cable fires due to mains overload.

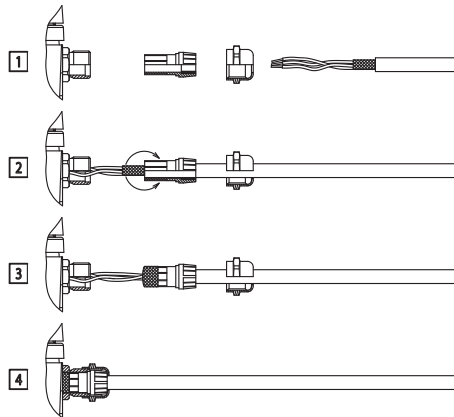


**CAUTION!** Danger of material damage!  
A connection error would damage the converter. The power cable shall never touch the pipe or the pump ; make sure that it is protected against any humidity.

(Pos. a) The power cable (3 phases + earth) must be fed through the cable gland M25. Nonallocated cable glands must remain sealed with the plugs provided by the manufacturer.



(Pos. b) The sensor, external setpoint and [aux.]/[ext.off] input cable must be necessarily screened and must be inserted into the gland M12 or M16. The cable glands of the converter are adapted to the assembly with a shielding braid (see below).



- The electric characteristics (frequency, voltage, nominal current) of the motor-converter are mentioned on the pump identification sticker (item 19). Check that the motor-converter complies with the mains supply used.
- The electric protection of the motor is integrated into the converter. The parameters take into account the characteristics of the pump and must ensure its protection and the one of the motor.
- In case of impedance between earth and neutral point, install a protection before motor-converter.
- Provide a fuse-disconnecting switch (type gF) to protect the mains installation (Fig. 1, 2, item 11).



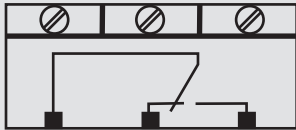
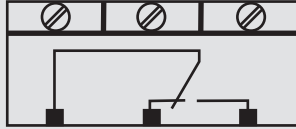
**NOTE:** If you have to install a differential circuit-breaker for users protection, it must have a delay effect. Adjust it according to the current mentioned on the pump identification sticker (item 19).





### Connection terminal allocation

- Loosen the screws and remove the converter cover.

Designation	Allocation	Notes
L1, L2, L3	Mains connection voltage	Three-phase current 3 ~ IEC 38
PE (x2)	Earth connection	
IN1	Sensor 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: $R_B = 500 \Omega$ Can be configured in the « Service » menu <5.3.0.0>
IN2	External setpoint 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: $R_B = 500 \Omega$ Can be configured in the « Service » menu <5.4.0.0>
GND (x2)	Ground connections	For both inputs IN1 and IN2
+ 24 V	DC voltage for sensor	Load max. : 60 mA The voltage is short-circuit proof
Ext. off	Control input (ON/OFF) « 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 switch-ons/off/day), switching on/off is to be done via « ext. off ».
SBM	« Available transfer » relay 	In normal operating, the relay is activated when the pump runs or is in a position to run. When a first defect appears or by main supply cutoff (the pump stops), the relay is deactivated. Information is given to the control box, regarding the availability of the pump, even temporarily. Can be configured in the « Service » menu <5.7.6.0> Contact load: minimum: 12 V DC, 10 mA maximum: 250 V AC, 1 A
SSM	« Failures transfer » relay 	After a series of detection (from 1 to 6 according to significance) of the same type of defect, the pump stops and this relay is activated (up to manual action). Contact load: minimum: 12 V DC, 10 mA maximum: 250 V AC, 1 A
PLR	Connection terminals of the interface PLR	The optional IF-Module PLR is to be pushed into the multiplug in the connection area of the converter. The connection is twist-proof.
LON	Connection terminals of the interface LON	The optional IF-Module LON is to be pushed into the multiplug in the connection area of the converter. The connection is twist-proof (Fig. 11).



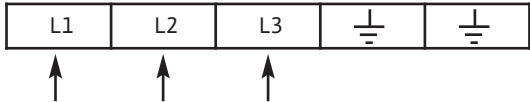
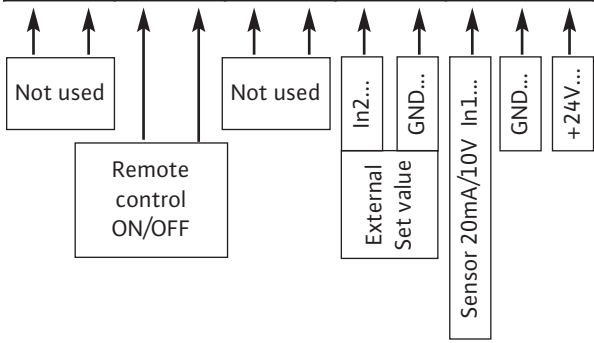
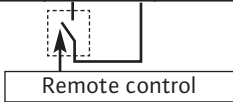
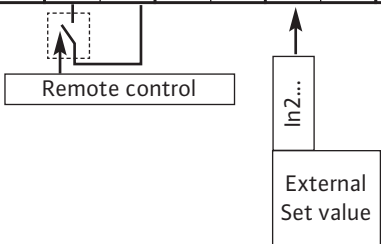
NOTE: The terminals IN1, IN2, GND and Ext. Off meet the requirement for «safe isolation» (in acc. with EN61800-5-1) to the mains terminals, as well as to the SBM and SSM terminals (and vice versa).

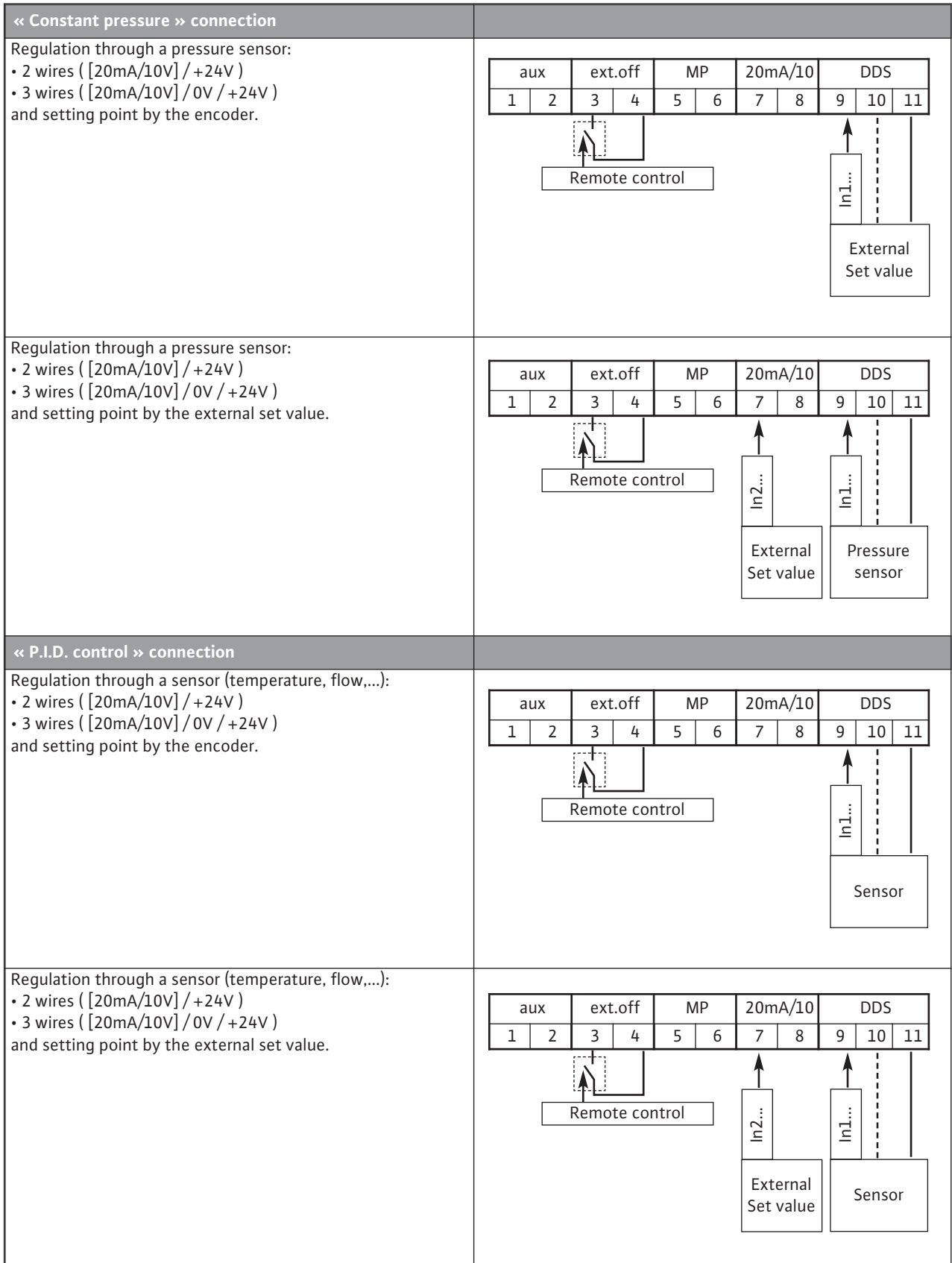


#### **DANGER! Danger of death!**

Contact voltage hazardous due to the discharge of the converter capacitors.

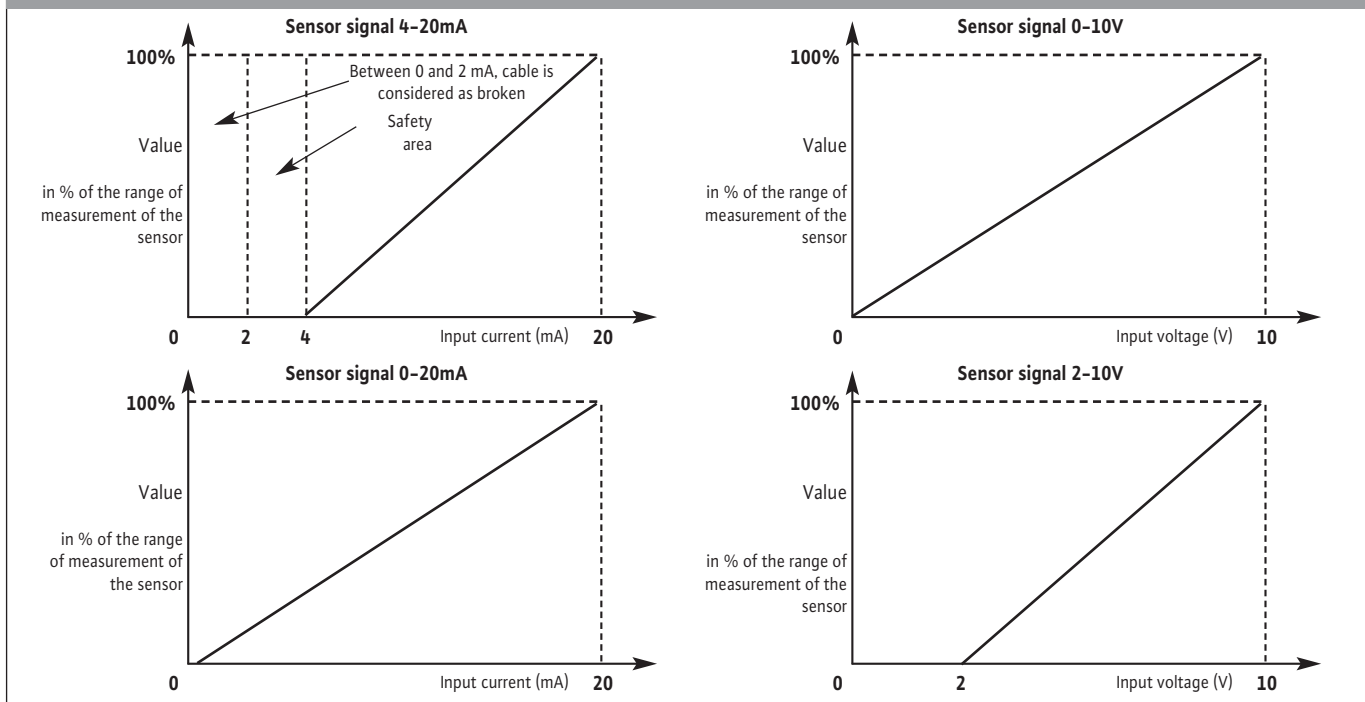
- Before any intervention on the converter, wait for 5 minutes after disconnecting of the supply voltage.
- Check whether all electrical connections and contacts are voltage-free.
- Check the right allocation of the connection terminals.
- Check the right earth connection of the pump and installation.

<p><b>Connection to mains supply</b></p> <p>Connect the 4 wires cable on the power terminals (phases + earth).</p>	<p><b>Power terminals</b></p> 																						
<p><b>Connection of inputs / outputs</b></p> <ul style="list-style-type: none"> <li>The sensor, external setpoint and [ext.off] inputs cable must be necessarily screened.</li> </ul>	<p><b>Inputs / outputs terminals</b></p> <table border="1" data-bbox="826 517 1422 595"> <thead> <tr> <th colspan="2">aux</th> <th colspan="2">ext.off</th> <th colspan="2">MP</th> <th colspan="2">20mA/10</th> <th colspan="3">DDS</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th> </tr> </thead> </table> 	aux		ext.off		MP		20mA/10		DDS			1	2	3	4	5	6	7	8	9	10	11
aux		ext.off		MP		20mA/10		DDS															
1	2	3	4	5	6	7	8	9	10	11													
<ul style="list-style-type: none"> <li>The remote control allows the switching On or Off of the pump (free contact), this function has priority on the others.</li> <li>This remote control can be removed by shunting the terminals (3 and 4).</li> </ul>	<p>Example: Float switch, pressure gauge for dry-running...</p>																						
<p><b>« Speed control » connection</b></p>																							
<p>Setting of the frequency by hand:</p>	<table border="1" data-bbox="831 1279 1430 1357"> <thead> <tr> <th colspan="2">aux</th> <th colspan="2">ext.off</th> <th colspan="2">MP</th> <th colspan="2">20mA/10</th> <th colspan="3">DDS</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th> </tr> </thead> </table> 	aux		ext.off		MP		20mA/10		DDS			1	2	3	4	5	6	7	8	9	10	11
aux		ext.off		MP		20mA/10		DDS															
1	2	3	4	5	6	7	8	9	10	11													
<p>Setting of the frequency by external control:</p>	<table border="1" data-bbox="831 1541 1430 1619"> <thead> <tr> <th colspan="2">aux</th> <th colspan="2">ext.off</th> <th colspan="2">MP</th> <th colspan="2">20mA/10</th> <th colspan="3">DDS</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th> </tr> </thead> </table> 	aux		ext.off		MP		20mA/10		DDS			1	2	3	4	5	6	7	8	9	10	11
aux		ext.off		MP		20mA/10		DDS															
1	2	3	4	5	6	7	8	9	10	11													

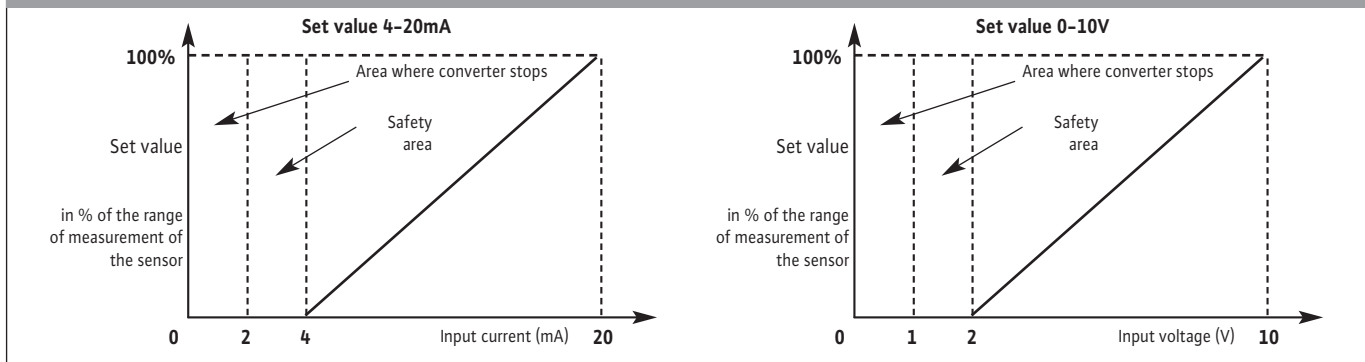


**Control laws**

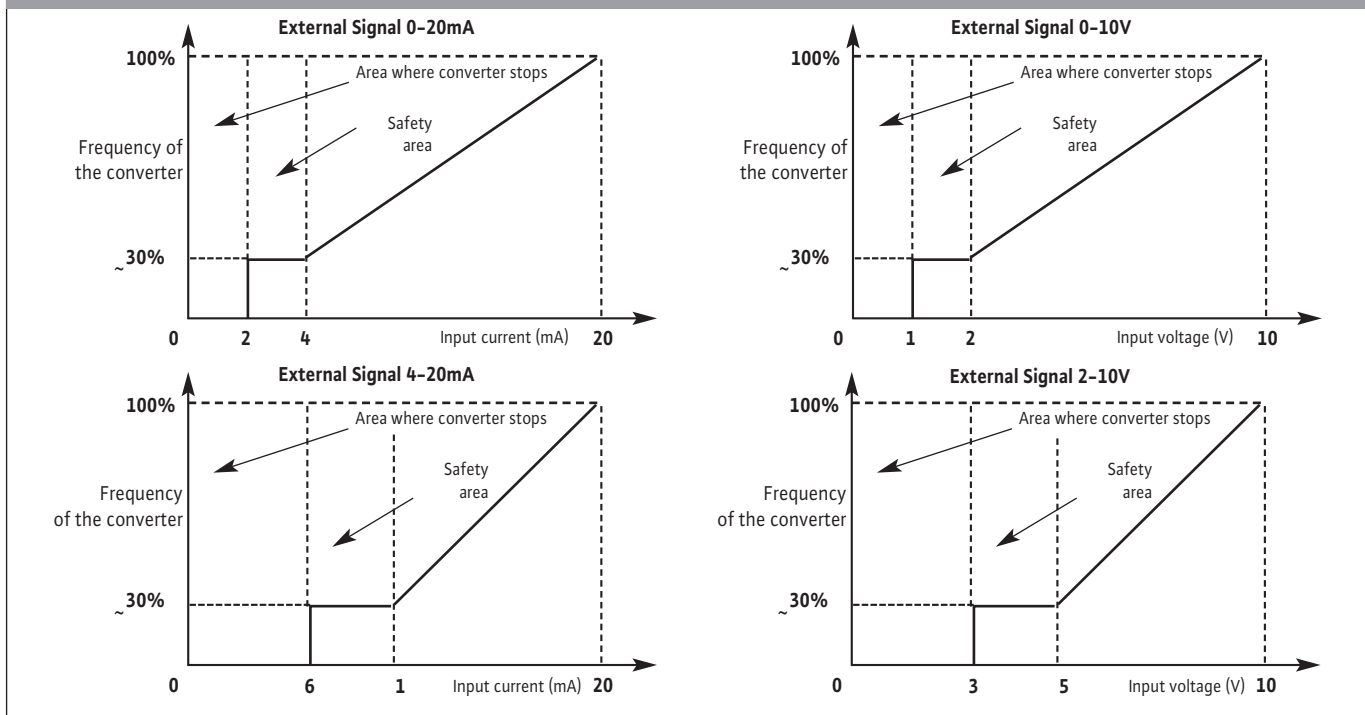
**IN1 : Input signal in « Constant pressure » and « P.I.D. control » mode**



**IN2 : Input of the external set value control in « Constant pressure » and « P.I.D. control » mode**



**IN2 : Input of external frequency control in « Speed control » mode**

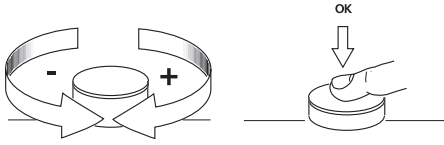


## 8. Operation

### 8.1 Control elements

The converter operates using the following control elements:

#### The encoder

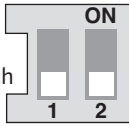


#### Setting with encoder

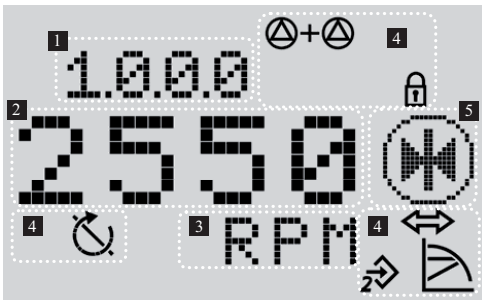
- The selection of a new parameter is done only with a simple rotation, « + » on right and « - » on left.
- A short impulse on the encoder validates this new setting.

#### Switches

- This converter has got a block with two switches with two positions each (Fig.4, item 18):
- Switch 1 allows to change the « OPERATION » mode [switch 1-→OFF] to « SERVICE » mode [switch 1-→ON] and conversely. The « OPERATION » position allows the selected mode to run and hinders the access to parameters input (normal operating). The « SERVICE » position is used to enter the parameters of the different operations.
- Switch 2 is for activating or deactivating the « Access lock », see <chapter 8.5.3>.



### 8.2 Display structure



Pos.	Description
1	Menu number
2	Value display
3	Units display
4	Standard symbols
5	Icon display

### 8.3 Description of standard symbols

Symbol	Description
	Operating in « Speed control » mode.
	Operating in « Constant pressure » or « P.I.D. control » mode.
	Input IN2 activated (external setpoint).
	Access locked. When this symbol appears, current settings or measurements cannot be changed. Information displayed is only in reading.
	BMS (building management system) PLR or LON is active.
	Pump runs.
	Pump stops.

### 8.4 Display

#### 8.4.1 Display status page

- The status page is shown as the standard view on the display. The currently set setpoint is displayed. Basic settings are displayed using symbols.





Example of display status page



NOTE: If the encoder is not activated within 30 seconds in all menus, the display returns to the status page and the change is not registered.

#### 8.4.2 Navigation element

- The arborescence of the menu allows to call the functions of the converter. A number is attributed to every menu and submenu.
- The rotation of the encoder allows the scrolling of a same menu level (example 4000-→5000).
- Any blinking elements (value, menu number, symbol or icon) allow the choice of a new value, a new menu number or a new function.

Symbol	Description
	When the arrow appears: • An impulse on the encoder allows the access to the submenu (example 4000->4100).
	When the arrow « return » appears: • An impulse on the encoder allows the access to the higher menu (example 4150->4100).

## 8.5 Menu description

### 8.5.1 List (Fig. 12)

<1.0.0.0>

Position	Switch 1	Description
OPERATION	OFF	Adjustment of the setting point, possible for both cases.
SERVICE	ON	

- To adjust the setting point, turn the encoder. The display changes to menu <1.0.0.0> and the set-point begins to blink. The new rotation allows to increase it or decrease it.
- To confirm the change, give an impulse on the encoder, the display returns to the status page.

<2.0.0.0>

Position	Switch 1	Description
OPERATION	OFF	Only on reading for operating modes.
SERVICE	ON	Setting for operating modes.

- The operating modes are the « Speed control », the « Constant pressure » and the « P.I.D. control ».

<3.0.0.0>

Position	Switch 1	Description
OPERATION	OFF	Setting ON / OFF of the pump.
SERVICE	ON	

<4.0.0.0>

Position	Switch 1	Description
OPERATION	OFF	Only reading for the « Information » menu.
SERVICE	ON	

- The « Information » menu displays measuring, device and operating data, see, (Fig. 13).

<5.0.0.0>

Position	Switch 1	Description
OPERATION	OFF	Only reading for the « Service » menu.
SERVICE	ON	Setting for « Service » menu.

- The « Service » menu allows to get access to the converter parameter setting.

<6.0.0.0>

Position	Switch 1	Description
OPERATION	OFF	Display of the error page.
SERVICE	ON	

- If one or several defects arise, the page of defects appears.
- The letter « E » followed by three digit code appears, see <chapter 11>.

<7.0.0.0>

Position	Switch 1	Description
OPERATION	OFF	Display of « Access lock » symbol.
SERVICE	ON	

- The « Access lock » is available when the switch 2 is in the ON position, see <chapter 8.5.3>.



**CAUTION! Material damage!**

Inadequate setting changes can lead to pump operation defects, which can lead to material damage on the pump or installation.

- Settings in « SERVICE » mode should only be made during commissioning and only by skilled technicians.

Fig. 12

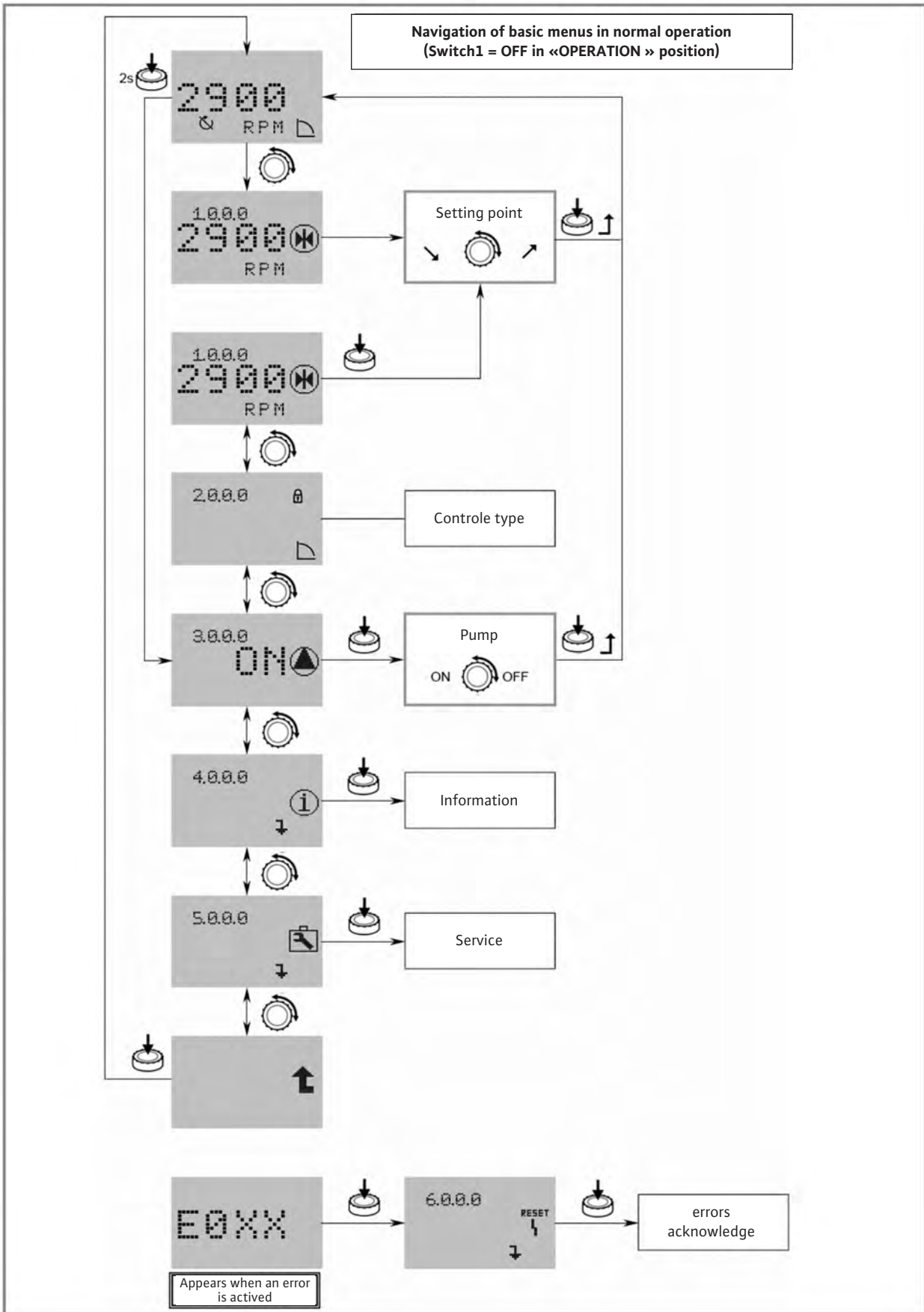
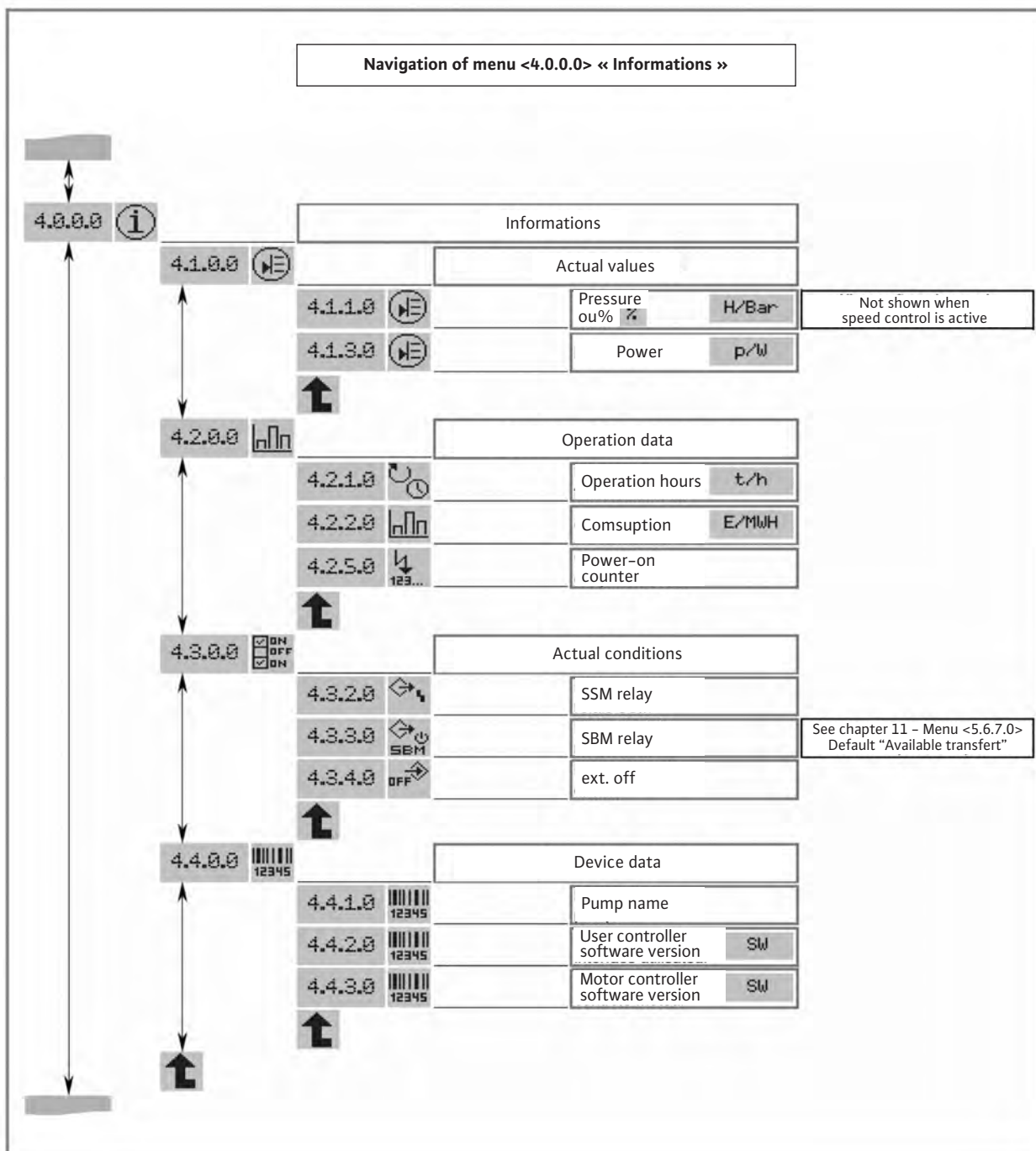


Fig. 13





**8.5.2 Parametrization of <2.0.0.0> and <5.0.0.0> menu**

In « SERVICE » mode, the menu parameters <2.0.0.0> and <5.0.0.0> can be modified.

Two setting modes exist:

- The « **Easy Mode** » : fast mode to get access to the 3 operating modes.
- The « **Expert Mode** » : mode to get access to all parameters.

- Put the switch 1 on ON position (Fig. 4, item 18).
- The « SERVICE » mode is activated. This symbol blinks on the status page of the display (Fig. 14).

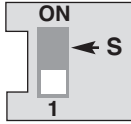
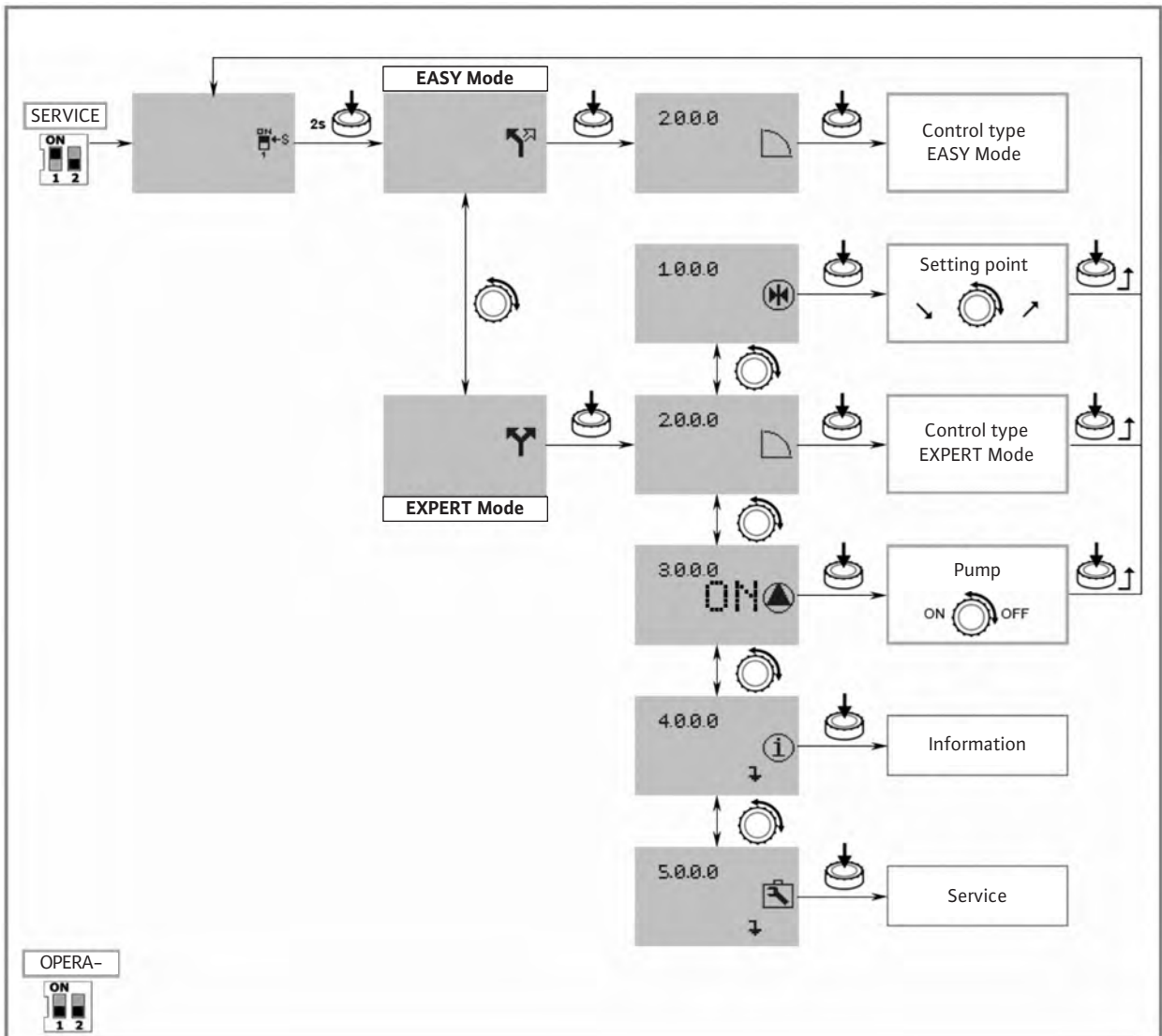


Fig. 14



### Easy Mode



- Press the encoder during 2 secondes. The symbol « Easy Mode » appears (Fig. 14).
- Press the encoder to validate this choice. The display changes to menu number <2.0.0.0>.
 

The « Easy Mode » allows, quickly, the setting of the 3 operating modes (Fig. 15)
- Speed control »
- « Constant pressure »
- « P.I.D. control »
- After setting, put the switch 1 on OFF position (Fig. 4, item 18).

### Expert Mode



- Press the encoder during 2 secondes. Go to the expert mode, the symbol « Expert Mode » appears (Fig. 14).
- Press the encoder to validate this choice. The display changes to menu number <2.0.0.0>.
 

At first, select the operating mode in menu <2.0.0.0>.
- « Speed control »
- « Constant pressure »
- « P.I.D. control »
- Then in menu <5.0.0.0>, the expert mode gives access to all the converter parameters (Fig. 16).
- After setting, put the switch 1 on OFF position (Fig. 4, item 18).

Fig. 15

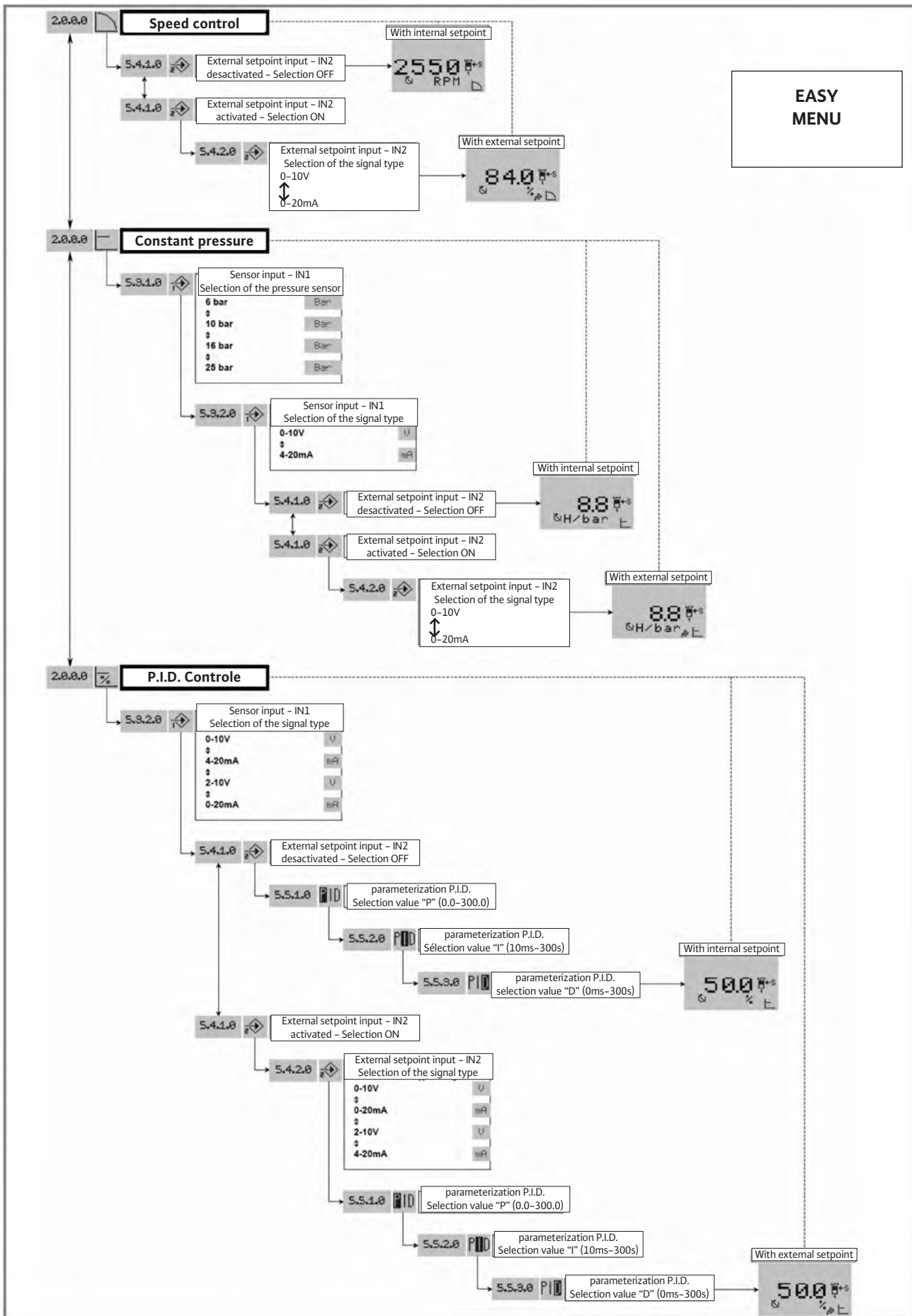
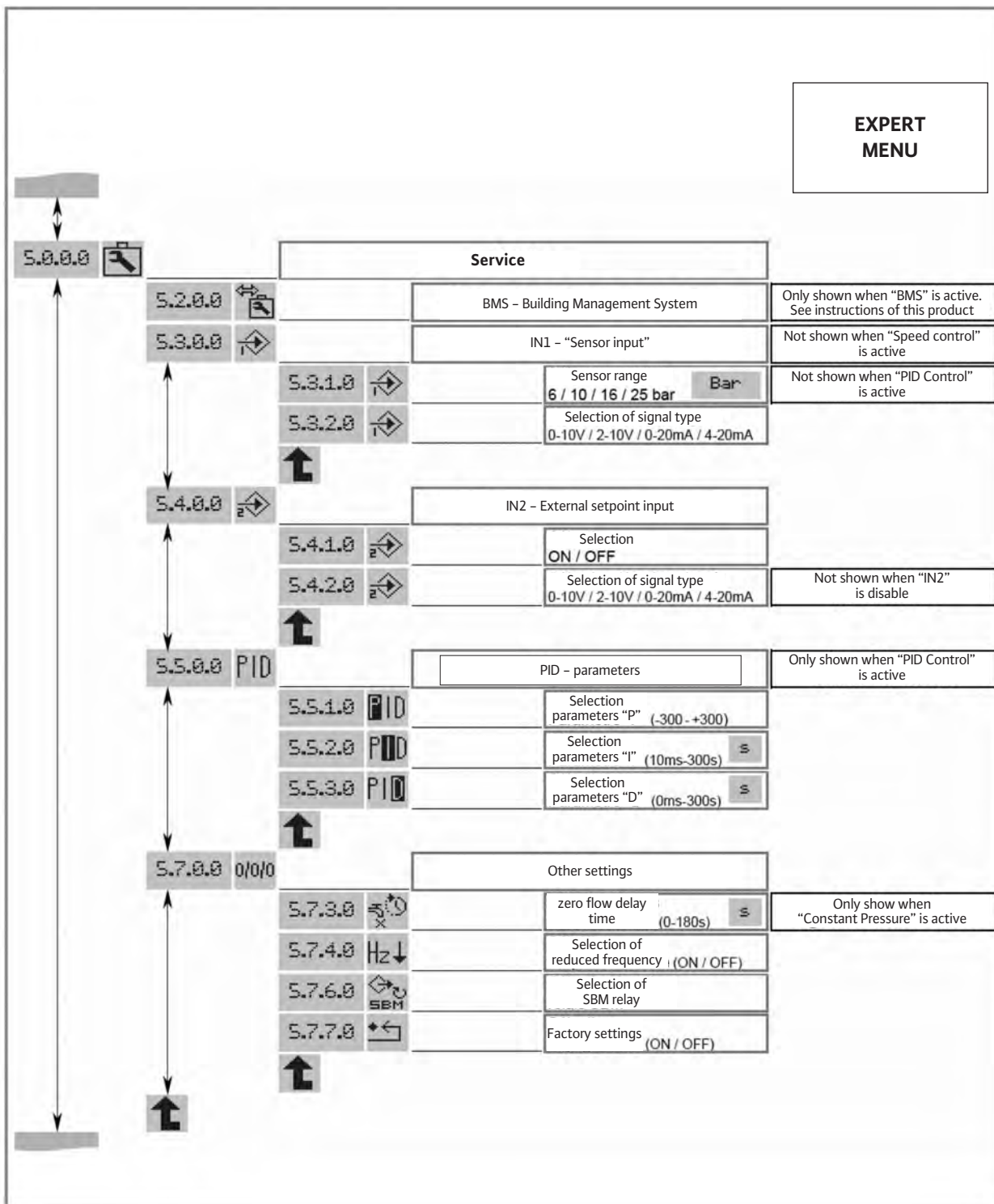


Fig. 16



### 8.5.3 Access lock

In order to lock the pump settings, it is possible to use the « Access lock ».

To activate or deactivate it, proceed as follows.

- Put the switch 2 on ON position (Fig. 4, item 18). The <7.0.0.0> menu is called up.
- Turn the encoder to activate or deactivate the locking. The current state of the locking is represented with the following symbols:



Lock active: Parameters are locked, the access to menus is allowed only on reading.



Lock inactive: Parameters can be changed, the access to menus is allowed for setting.

- Return the switch 2 on OFF position (Fig. 4, item 18). The display returns to the status page.

## 9. Commissioning



NOTE: If the pump is delivered as separate part, not integrated into a system we mounted, the standard configuration mode is « Speed control ».

### 9.1 Configurations

#### 9.1.1 « Speed control » mode (Fig. 1, 2)

Setting of the frequency by hand or external control.

- For the starting up, we recommend to set the motor speed at 2400 RPM.

#### 9.1.2 « Constant pressure » mode (fig. 6, 7, 8)

Regulation with a pressure sensor and setting point (internal or external).

- The addition of a pressure sensor (with tank; sensor kit delivered as accessories) allows a pressure regulation of the pump.
- The accuracy of the sensor shall be  $\leq 1\%$  and it is used between 30 % and 100 % of the measuring scale range. The tank must have a useful volume of 8L minimum.
- For the starting up, we recommend a pressure set value at 60% of its maximum pressure.

#### 9.1.3 « P.I.D. control » mode

Regulation with a sensor (temperature, flow,...) by P.I.D.control and setting point (internal or external).

### 9.2 Preliminary rinsing

The hydraulic features of every pump is tested in factory, some water may remain in them. It is recommended for hygien purposes, to carry out a rinsing of the pump before any using with potable water supply.

### 9.3 Filling – degassing



**CAUTION!** Danger of material damage!  
Never operate the pump dry, even briefly!

#### Pump in load (Fig. 2).

- Close the discharge valve (item 3).
- Open the venting plug (item 5), the suction valve (item 2) and completely fill the pump.
- Close the venting plug only after water flows out and complete aeration.



#### **WARNING!** Danger of burn!

In hot water, a stream of water may escape from the venting plug port.

- Take all required precautions as regards persons and motor-converter.

#### Pump in suction (Fig. 1).

Two possible cases:

1st case (Fig. 5.1).

- Close the discharge valve (Fig. 1, item 3), open the suction valve (Fig. 1, item 2).
- Remove the venting plug (Fig. 1, item 5).
- Unscrew about 4 turns the bottom drain-priming plug (Fig. 1, item 6) located on the pump casing.
- Put a funnel into the venting plug port and completely fill the pump and the suction pipe.
- After water flows out and total air exit, filling is achieved.
- Screw the venting plug and the bottom drain-priming plug back in.

2st case (Fig. 5.2).

- Filling can be made easier by fitting a vertical pipe (Fig. 5, item 14) fitted with a  $\varnothing 1/2$ " stopcock and a funnel, on the suction pipe of the pump.



NOTE: The length of the pipe must be at least 50 mm higher than the venting plug level.

- Close the discharge valve (Fig. 1, item 3), open the suction valve (Fig. 1, item 2).
- Open the stopcock (Fig. 5, item 14) and the venting device (Fig. 1, item 5).
- Unscrew about 4 turns the drain-priming plug (Fig. 1, item 6).
- Completely fill the pump and the suction pipe until water flows out of the venting plug (Fig. 1, item 5).
- Close the stopcock (Fig. 5, item 14) (which can be left in place), remove the pipe, close the venting device (Fig. 1, item 5) and screw again the drain-priming plug (Fig. 1, item 6).



#### **CAUTION!** Risk of misuse!

Pump in load and in « Constant pressure » mode, the detection at zero flow can not run.

- Set the non-return valve before the pressure sensor (i.e. at pump suction if the sensor is mounted on this one – Fig. 6).

### 9.4 Starting up



#### **WARNING!** Danger of burn!

Depending on conveyed fluid and the operating cycles of the pump, surface temperature (pump, motor) can exceed 68°C.

- Take necessary means to avoid injuries!



**CAUTION!** Danger of material damage!

The pump must not operate at zero flow (closed discharge valve) for more than 10 minutes with cold water ( $T^{\circ}\text{C} < 40^{\circ}\text{C}$ ) and more than 5 minutes beyond  $60^{\circ}\text{C}$ .

- We recommend to ensure a minimum flow of about 10 % of the pump nominal flow to avoid any vapour lock at the top of the pump.
- Keep the discharge valve closed.
- Start the pump.
- Open draining plug to drain air. If no water leaks within 20s, close the plug and stop the pump, then wait for 20s to allow the settling of the air.
- Start again the pump.



NOTE: If necessary (particularly if the suction height exceeds 5 m) repeat these operations.

- If water leaks at draining plug (it means the pump delivers its pressure), slowly open the discharge valve. The pump has to be primed.
- Check pressure stability at discharge with a manometer, if instability, perfect air draining.
- In case of failure, do the filling in again and start the operation again.
- To perfect air draining, close the discharge valve and the draining plug, then stop the pump 20s, start the pump again and open the draining plug. Do it as long as air comes out.
- Open the discharge valve in order to have the wished working point.
- Check that the current input does not exceed the value indicated on the motor-converter data plate.

## 10. Maintenance

Maintenance and repairs may only be carried out by qualified experts.



**DANGER!** Danger of death!

There is a danger of electrocution, when working on electrical equipments.

- Only electricians approved by the local electricity supplier are allowed to work on electrical equipments.
- Before working on electrical equipment, switch it off and prevent it from being switched on again!



**WARNING!** Risk of burn!

High surface temperatures may be reached.

- Allow the pump to cool off before all works.
- Always wear protective clothing and gloves when working!
- No special maintenance in operation.
- Keep the pump and the motor-converter perfectly clean.
- In case of prolonged stopping, if there is no risk of frost, it is better not to drain the pump.
- The bearing holding the coupling and the motor bearings are lubricated for their total lifetime and do not require any lubrication.
- The mechanical seal does not require any maintenance in operation. It must never operate dry.

### Replacement frequencies



NOTE : These are only recommendations, the replacement frequency depends on the operating conditions of the unit , i.e.:

- Temperature, pressure and type of conveyed fluid for the mechanical seal.
- Load and ambient temperature for the motor and the other components.
- Starting frequency: continuous or intermittent running.

Parts or components subject to wear		Mechanical seal	Pump and motor bearings	Converter	Motor winding
Indicative operating lifetime		10 000 h to 20 000 h	12 000 h to 50 000 h	$\geq 15\,000$ h Amb. maxi 40°C	25 000 h Amb. maxi 40°C
Replacement frequency	Continuous	1 to 2 years	1,5 to 5 years	1 to 3 years	3 years
	15 hours per day 9 months per year	2 to 4 years	3 to 10 years	-	6 years

### 11. Faults, causes and remedies

Faults should only be remedied by qualified personnel!  
 Observe the safety instructions, see <chapter 10> Maintenance.

**Relays**

The converter is fitted with 2 output relays aimed for an interface to centralized control.  
 ex.: control box, pumps control.

**SBM relay:**

This relay can be configured in the « Service » menu < 5.7.6.0 > in 3 operating states.

**State: 1**



« Available transfer » relay (normal operating for this pump type).  
 The relay is activated when the pump runs or is in a position to run.  
 When a first defect appears or by mains supply cutoff (the pump stops), the relay is deactivated.  
 Information is given to the control box, regarding the availability of the pump, even temporarily.



**State: 2**  
 « Run transfer » relay.  
 The relay is activated when the pump runs.



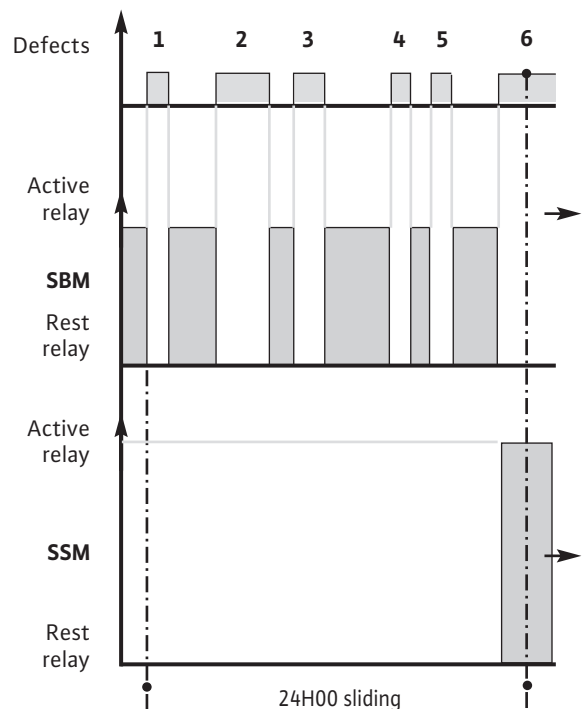
**State: 3**  
 « Power on transfer » relay.  
 The relay is activated when the pump is connected to the network.

**SSM relay:**

« Failures transfer » relay.  
 After a series of detection (from 1 to 6 according to significance) of the same type of defect, the pump stops and this relay is activated (up to manual action).

Example: 6 defects with a variable time limit on 24 sliding hours.

State of SBM relay is « Available transfer ».



### 11.1 Error table

All incidents hereafter mentioned give rise to:

- The deactivation of the SBM relay (When this one is parametrized in « available transfer » mode).
- The activation of the SSM relay « failure transfer » when the maximum quantity of one type of defect is reached over a 24-hour range.
- Lighthening of a red LED.

Error N°	Reaction time before error signalisation	Time before consideration of the defect, after signalisation	Waiting time before automatic restart	Max defects over 24 hours	Faults Possible causes	Remedies	Waiting time before reset
E001	60s	immediate	60s	6	The pump is in overload, defective.	Density and/or viscosity of the conveyed fluid are too big.	300s
					The pump is obstructed by particles.	Dismantle the pump and replace the defective components or clean them.	
E004 (E032)	~5s	300s	immediate if defect deleted	6	The converter supply is in under voltage.	Check the converter terminals: • error if network < 330V	0s
E005 (E033)	~5s	300s	immediate if defect deleted	6	The converter supply is in over voltage.	Check the converter terminals: • error if network > 480V	0s
E006	~5s	300s	immediate if defect deleted	6	A supply phase is missing.	Check the supply.	0s
E007	immediate	immediate	immediate if defect deleted	no limit	The converter runs like a generator. It is a warning, without stop of the pump.	The pump veers, check the tightness of the non-return valve.	0s
E010	~5s	immediate	no restart	1	The pump is locked.	Dismantle the pump, clean it and replace the defective parts. It may be a mechanical failure of the motor (bearings).	60s
E011	60s	immediate	60s	6	Pump is no more primed or runs dry.	Prime the pump once again by filling it (see chapter 9.3). Check the tightness of the foot valve.	300s
E020	~5s	immediate	300s	6	The motor heats.	Clean the cooling ribs of the motor.	300s
					Ambient temperature higher than +40°C.	The motor is foreseen to run at an ambient temperature of +40°C.	
E023	immediate	immediate	60s	6	The motor is in short-circuit.	Dismantle the motor-converter of the pump, check it or replace it.	60s
E025	immediate	immediate	no restart	1	Missing phase of the motor.	Check the connection between motor and converter.	60s
E026	~5s	immediate	300s	6	The thermal sensor of the motor is defective or has a wrong connection.	Dismantle the motor-converter of the pump, check it or replace it.	300s
E030 E031	~5s	immediate	300s	6	The converter heats.	Clean the cooling ribs rearside and under the converter as well as the fan cover.	300s
					Ambient temperature higher than +40°C.	The converter is foreseen to run at an ambient temperature of +40°C.	
E042	~5s	immediate	no restart	1	The cable of the sensor (4-20mA) is cut.	Check the correct supply and the cable connection of the sensor.	60s
E050	60s	immediate	immediate if defect deleted	no limit	BMS communications time-out.	Check the connection.	300s
E070	immediate	immediate	no restart	1	Internal communication error.	Call the after-sales technician.	60s
E071	immediate	immediate	no restart	1	EEPROM error.	Call the after-sales technician.	60s
E072	immediate	immediate	no restart	1	Problem inside converter.	Call the after-sales technician.	60s
E075	immediate	immediate	no restart	1	Inrush current relay defect.	Call the after-sales technician.	60s
E076	immediate	immediate	no restart	1	Current sensor defect.	Call the after-sales technician.	60s
E099	immediate	immediate	no restart	1	Unknown pump type.	Call the after-sales technician.	Power off/on



### 11.2 Acknowledging errors



**CAUTION!** Material damage!

Only acknowledge defect when they have been remedied.

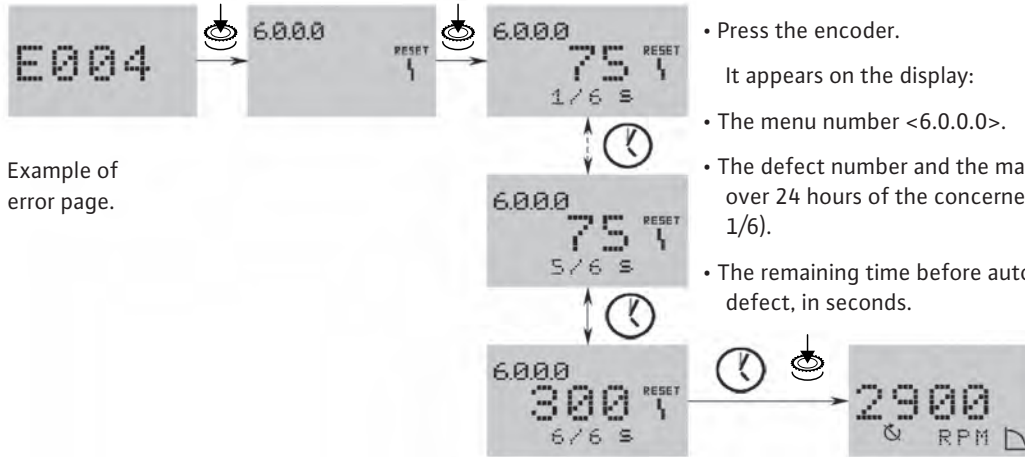
- Only skilled technicians are allowed to remedy the defect.
- If doubt, contact the manufacturer.
- In the event of an error, the error page is displayed instead of the status page.

To acknowledge, proceed as follows:

- Press the encoder.

It appears on the display:

- The menu number <6.0.0.0>.
- The defect number and the maximum number over 24 hours of the concerned defect (example: 1/6).
- The remaining time before auto reset of the defect, in seconds.



Example of error page.

Example of status page

- Wait for the auto reset time.



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

- When the maximum number of the defect is reached and the last timer has elapsed, press the encoder to acknowledge.

The system returns to the status page.



NOTE: When there is a time before considering of the defect, after signalling (example : 300s), the defect must always be manually acknowledged. The auto reset timer is inactive and “- -” is displayed.

### 11.3 Other defaults

Other defects, not detected by the converter, due to the pump.

Defaults	Possible causes	Remedies
The pump is running but no delivery	The pump does not run quickly enough.	Check the adequate adjustment of the requirement (conformity to the setpoint).
	The internal parts are obstructed by particles.	Let dismantle the pump and clean it.
	Suction pipe is obstructed.	Clean the pipe.
	Air in suction pipe.	Check tightness of the whole pipe up to the pump and make it tight.
	Suction pressure is too low, it causes generally cavitation noise.	Too high losses of load on suction or suction head is too high (check the NPSH of the pump installed and the installation).
The pump is vibrating	Pump is loosed on its foundation.	Check and tighten completely the nuts of the stud bolts.
	Particles obstructing the pump.	Have the pump dismantled and clean it.
	Difficult rotation of the pump.	Check the pump turns freely without abnormal sticking.
No sufficient pressure for the pump	The motor speed is not high enough.	Check if the setpoint is correctly adjusted.
	The motor is defective.	Replace it.
	Bad filling of the pump.	Open the venting device and vent until there are no more air bubbles.
	The drain-priming plug is not fully tightened.	Check it and screw it again.
The flow is irregular	The suction head ( $H_a$ ) is not observed.	Study again the installation conditions and the recommendations described in this instruction.
	The suction pipe has a lower diameter than the one of the pump.	The suction pipe must have at least the same diameter as the suction pump port.
	The strainer and the suction pipe are partially obstructed.	Remove and clean.
	In « Constant pressure » mode, the pressure sensor is not adequate. $\mu$	Put a sensor with conforming pressure scale and accuracy, see <chapter 5.3>.
In « Constant pressure » mode, the pump does not stop if the flow is zero	The non-return valve is not tight.	Clean it or change it.
	The non-return valve is not adequate.	Replace it by an adequate non-return valve, see <chapter 5.3>.
	The tank has low capacity due to the installation.	Change it or add an other one on the installation.



**WARNING!** Risk of wound!

The liquid is toxic, corrosive or dangerous for human being.

- The qualified person in charge of the repairing must be informed.
- Clean the pump to ensure complete safety of the operator.

### 12. Spare parts

Spare parts may be ordered via local approved technicians and/or the Wilo after-sales service.

To avoid any questions or wrong orders, all data of the name plate should be mentioned when ordering.



**CAUTION!** Danger of material damage!

Perfect pump function can only be guaranteed when original spare parts are used.

- Only use original spare parts.

**Subject to technical alterations!**

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