SEEPEX.
ALL THINGS FLOW

Installation Manual
Pump Monitor (SPM)

Type
SPMXXT001V*xxx*
SPMXXT002V*xxx*
SPMXXT005V*xxx*
SPMXXT006V*xxx*
SPMXXT007V*xxx*
SPMXXT008V*xxx*

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Table of Contents

1. Notes on these instructions

1.1 Validity of these instructions

This manual applies exclusively to devices bearing the type code specified on the cover page.

1.2 Other relevant documents

Manufacturer/type	Documentation	Description
SEEPEX SPM	Operating manual	Operating manual for the Pump Monitor

1.3 Symbols, notes and abbreviations

1.3.1 Information symbols

Symbol	Application
➢	Instruction/measure
–	supplementary instruction/measure
•	List item
i	Information
→	Cross-reference

1.3.2 Abbreviations

Abbreviations facilitate readability in drawings.
These abbreviations are explained below:

Abbreviation	Designation
FI	Frequency inverter
SPM	SEEPEX Pump Monitor

1.4 Structure of warning notes

➢ For the protection of personnel and for the safe and efficient use of the machine, observe warning notes.

Preceding warning notes
Preceding warning notes are placed at the beginning of each chapter or sequence of actions, and relate to the instructions following directly after.

⚠ DANGER

Type and source of danger.
Possible consequences.
➢ Measures to avert the danger.

Preceding warning notes with warning or mandatory signs
Specific dangers are identified with additional warning or mandatory signs.

Example:

⚠ DANGER

Type and source of danger.
Possible consequences.
➢ Measures to avert the danger.

Embedded warning notes
Embedded warning notes describe immediately relevant dangers, and are shown within a sequence of actions. They are placed immediately before the danger.

Examples:

➢ **⚠ WARNING** Type and source of danger. Possible consequences. Measures to avert the danger.

⚠ WARNING Type and source of danger. Possible consequences.
➢ Measures to avert the danger.

1.4.1 Warning levels

Warning notes are identified by coloured warning symbols and signal word fields. The different warning levels are identified by additional signal words, and describe the extent of the danger.

Personal injury

⚠ DANGER

DANGER indicates a dangerous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a dangerous situation which, if not avoided, may result in death or serious injury.

⚠ CAUTION

CAUTION indicates a dangerous situation which, if not avoided, may result in minor or moderate injury.

Property damage

NOTICE

NOTICE is used when the situation is not associated with personal injury.

2. Safety

2.1 Safety-related Information

SEEPEX devices are built in accordance with the state of the art. Nevertheless, there is residual risk, as the devices operate with electric voltage and currents, as well as with communication interfaces.

2.2 Designated use

The Pump Monitor (SPM) is a device intended for the status monitoring of SEEPEX pumps during operation. This is performed by means of sensors, which are assembled on and near the pump. The measured values are processed, in order to give the operator early indication of the occurrence of any defects or deviations.
The measured values as determined can be stored in the device or transferred to the cloud platform SEEPEX Connected Services.

- Use the Pump Monitor (SPM) for the status monitoring of SEEPEX pumps during operation.
- The Pump Monitor (SPM) is assigned to a pump, as well as individual components using the serial number of the Pump Monitor (SPM). Operate the Pump Monitor (SPM) only with the assigned components.
  - Read the serial number on the type plate of the device or view it in the user interface.
- Operate Pump Monitor (SPM) only under the environmental conditions described in the technical data.

2.3 Foreseeable misuse

Any use other than the intended use or any other type of use of the Pump Monitor (SPM) is regarded as misuse and could lead to serious physical injury or material damage of the Pump Monitor (SPM).

In particular, the following is not permitted:

- Use of the output signals of the Pump Monitor (SPM) for process control. The Protection Stop is an exception to this (see → chapter 3. "Description of the Pump Monitor (SPM)").
- Improper operations or modifications of the Pump Monitor (SPM) could compromise safety and may damage the device. Do not repair the Pump Monitor (SPM) yourself. Contact SEEPEX and coordinate any further action.
- Outdoor installation of the Pump Monitor (SPM) without weather protection cover.
- Use of the Pump Monitor (SPM) in the ATEX area.

2.4 Qualification of the personnel

In-depth expert knowledge is an indispensable requirement for any work on the Pump Monitor (SPM), so as to be able to identify and avoid potential dangers independently.

- Only a skilled electrician may carry out the installation and electric connection of the Pump Monitor (SPM) in compliance with the applicable electrotechnical regulations (standards, directives, etc.).
- The operator of the Pump Monitor (SPM) must have the following specialised knowledge:
  - Handling control technologies
  - Mechanical knowledge in handling SEEPEXpumps
- For other necessary information on qualification, see the relevant documents.

2.5 Safety concept for the monitored device

For the use of the device, the operator of the Pump Monitor (SPM) must prepare a suitable safety concept for the monitored machine and the entire system. This includes risk assessment in accordance with the applicable directives and standards, as well as a test report as proof of implementation of the safety functions.

3. Description of the Pump Monitor (SPM)

The use of the Pump Monitor (SPM) creates an intelligent field device from the pump, which constantly monitors itself. Connected to flexibly combinable sensors, live data, such as, for example, temperature, pressure, flow rate, etc., are measured, displayed and evaluated. In addition, all data can be recorded for later analysis.

A signal lamp on the casing of the Pump Monitor displays the current pump and system status using different signal colours. For detailed analyses, the user can constantly read the current as well as the recorded measured values of the pump via a Bluetooth connection and the SEEPEX Pump Monitor App.
Optionally, these measured values can also be read directly via a touch panel on the Pump Monitor.
The user can set individual warning and alarm thresholds in a multi-stage communication model, in order to be informed about deviations of the pump from the set behaviour. Optionally, the Pump Monitor (SPM) can be attached to the local process control. In this way, the alarms can be displayed, for example, in the control system, in order to make the details of the pump operation accessible to the maintenance staff.

The optional additional functionality “Mobile Notification Service” can send warning and alarm messages from the system via email or SMS to mobile devices using push message. In this way, for example, the following problems can be detected:

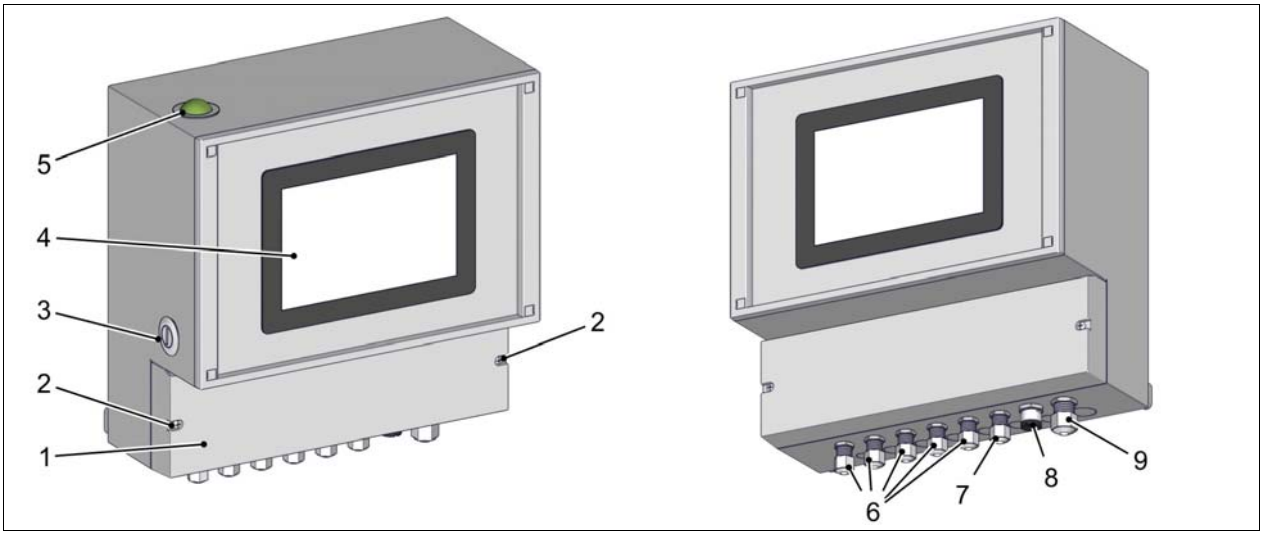
- Drop in current
- Stator/conveying product temperature too high
- Leakage
- Pump standstill
- Wear, etc.

A multitude of sensors can be used on the Pump Monitor (SPM) for recording measured values, e.g.:

- Pressure sensor
- Temperature sensor
- Leakage sensor
- Flow meter
- Vibration sensor
- Fill level sensors
- Frequency inverter (digital data, such as speed, frequency, torque, power consumption, release time, etc.).

3.1 Design of the Pump Monitor (SPM)

Design of the Pump Monitor (SPM) - Outside



Figures similar

S.No.	Designation
1	Clamping plate cover
2	Fixing screws of cover for clamping plate
3	Key-operated switch
4	Touch panel (optional)
5	Signal LED (multicolour)

S.No.	Designation
6	Cable screw for sensors
7	Cable screw for motor connection
8	Network connection (optional)
9	Cable screw 230 V connection

3. Description of the Pump Monitor (SPM)

Design of the Pump Monitor (SPM) - Inside

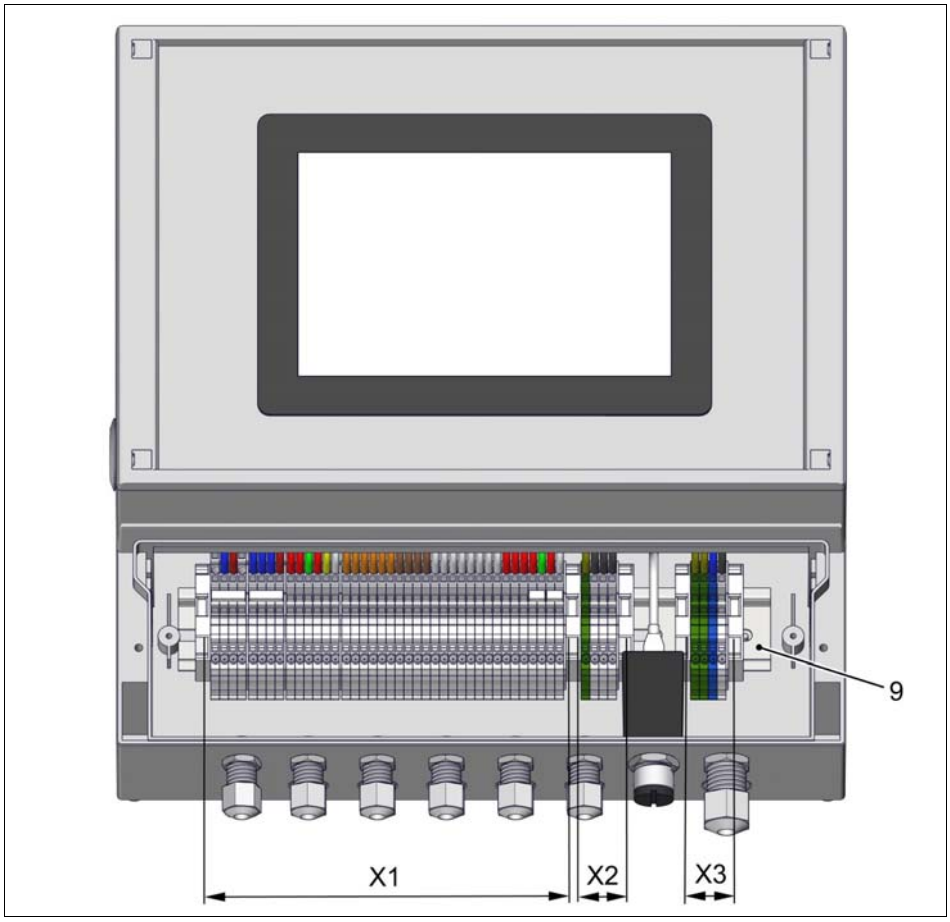
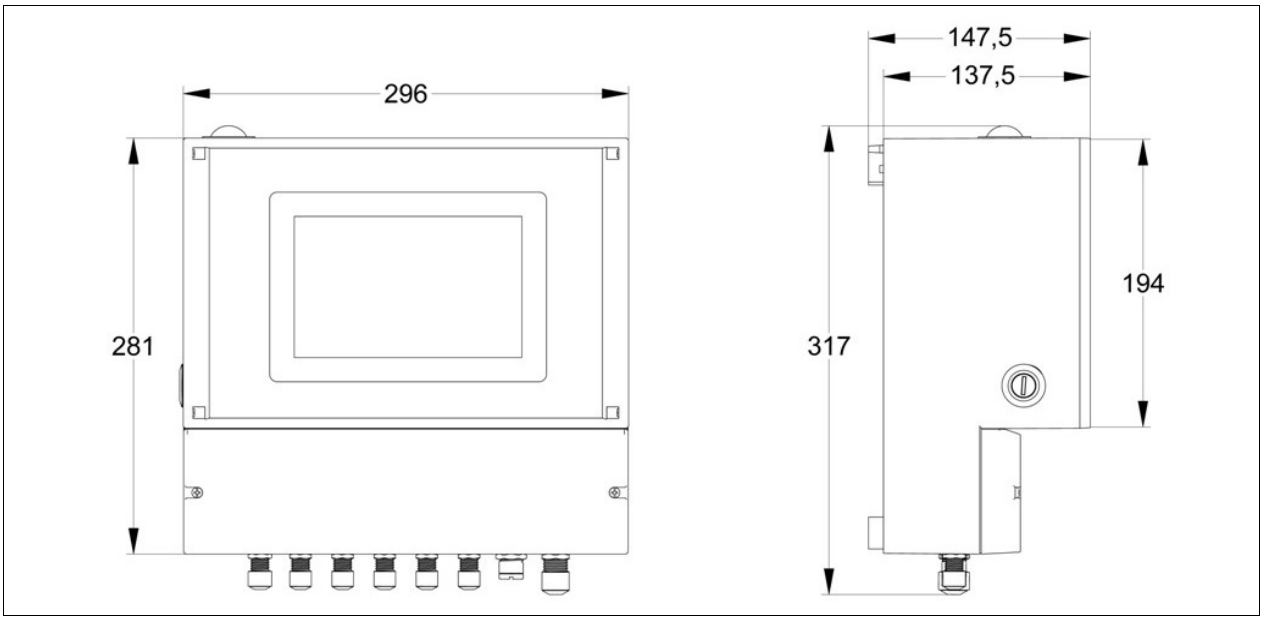


Figure similar

S.No.	Designation
1	Clamping plate
X1	Clamps for signals and sensors
X2	Clamps for motor phases
X3	Clamps 115/230 VAC supply

3.2 Casing dimensions (in mm)



3.3 Technical Data

Input voltage range	24 VDC or 110 - 240 VAC
Power drain	max. 40 W
Control voltage	24 VDC
Casing material	Acrylnitril butadien styrol (ABS) – Applicable to type SPMXXT*xxx*V001 (cf. → type plate) Polycarbonate (PC): – Applicable to type SPMXXT*xxx*V002 (cf. → type plate)
Casing dimensions	See chapter 3.2 "Casing dimensions (in mm)"
Weight	max. 4.5 kg
IP protection class	IP56
ATEX	Not permitted
Installation site	Indoor installation or outdoor installation connected with a weather protection cover
Ambient temperature (operation)	-20 °C to +50 °C
Ambient temperature (transport/storage)	-20 °C to +70 °C
Atmospheric humidity (operation/transport/storage)	< 95%
Supported pumps	All SEEPEX pumps

Mobile communication standards	
Applicable to following Pump Monitor (SPM) (cf. → type plate): SPMXXT001Vxxx SPMXXT002Vxxx SPMXXT005Vxxx SPMXXT006Vxxx	GSM 900 / 1800 MHz UMTS 900 / 2100 MHz LTE (Europe)

Analogue inputs	
Type	4 - 20 mA input
Resolution	0.1 mA
Maximum measurement error	2.5% of final value
Sensor supply	24 V, max. 50 mA

Temperature inputs	
Type	Resistance temperature device (PT100/PT1000)
Resolution	1 °C
Maximum measurement error	5% of measured value

Leakage inputs	
Type	Resistance measurement between electrode pair
Measuring range	10 k...1 MΩ
Resolution	1 kΩ
Maximum measurement error	±10 % of final value in the measuring range 10 k…100 kΩ ±25 % of final value in the measuring range 101 k…1 MΩ

Digital outputs	
Output type	Open collector, Active low Max. 500 mA

Communication interface Modbus	
Type	RS-485
Log	Modbus RTU
Baud rates	2400, 4800, 9600, 19200, 38400 (standard), 57600, 115200

Cable specification and cable screws	
Properties	EMC compatible, for cable and lines with shielding
Protection class	min. IP x6
Clamping range	M12: min. 4.5 mm to max. 6 mm M16: min. 6 mm to max. 8 mm M20: min. 8 mm to max. 12 mm

➢ For other details of cable specification, refer to → chapter 5.4.1 "Prepare cable and lines".

4. Transport

NOTICE

The Pump Monitor (SPM) falling down.
Defects in electronic components, as well as potential destruction of the touch panel possible.
- ➢ Secure Pump Monitor (SPM) during the transport against falling down and slipping.

- ➢ Observe transportation instructions on the packing.
- ➢ Do not climb on the packing.
- ➢ Ensure dry, clean and weatherproof environment during transport and intermediate storage. In particular, protect the touch panel from damage. Observe technical data.
- ➢ Dispose of packing material in accordance with the environmental regulations.

5. Installation

This chapter describes the steps which are necessary before commissioning the Pump Monitor (SPM). These include installation of the Pump Monitor (SPM), installation of all necessary sensors, and the wiring of the sensors with the inputs and outputs of the Pump Monitor (SPM).

To comply with the limit values of the EMC directives, observe the following points:

- ➢ As far as possible, use short lines with a sufficiently large cross-section.
- ➢ Use shielded lines for control circuits. Keep unshielded line ends as short as possible.
- ➢ Lay control lines and load lines separately (separate cable ducts, etc.).
- ➢ Observe admissible power load of connection terminals, plugs and supply lines.

DANGER

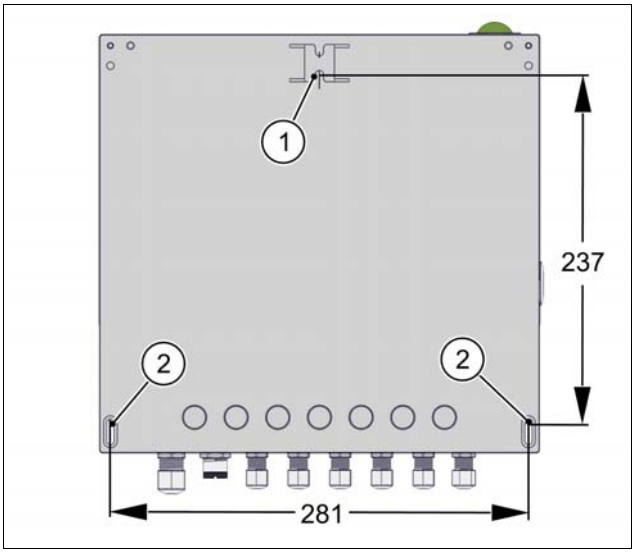
Risk of fatal injury from electric current.
There is an immediate danger of fatal electric shock as a result of contact with live parts.

- ➢ Observe safety regulations.
- ➢ Before starting work, disconnect the Pump Monitor (SPM), the sensors to be connected and the pump drive from all energy sources.
- ➢ Prevent electrical connections from being switched on again.
- ➢ Ensure that there is no residual voltage present on any electric connections.

5.1 Assemble Pump Monitor (SPM)

- ➢ Before starting assembly of the Pump Monitor (SPM), observe the following points:
  - – Ensure sufficient freedom of assembly.
  - – Ensure that the assembly location is clean and tidy. Loose components and tools lying on top of one another or left around the area are potential sources of accidents.
  - – Avoid malfunction due to components present nearby.
  - – Avoid heat build-up or heat accumulation during operation. Allow for sufficient space for ventilation.
  - – Protect the Pump Monitor (SPM) from direct sun rays (risk of overheating).
  - – Protect the Pump Monitor (SPM) from standing humidity and rain.
  - – To operate the Pump Monitor (SPM) using the cloud service “SEEPEX Connected Services”, ensure that a suitable mobile network is accessible.

- ➢ Mark drill hole for upper holding device **(1)**.
- ➢ Drill the hole for upper holding device **(1)**.
- ➢ Insert suitable dowel and assemble screw.
- ➢ Fix and align the Pump Monitor (SPM) on the upper holding device **(1)** on the wall.
- ➢ Mark drill holes for lower hold points **(2)**.
- ➢ Remove the Pump Monitor (SPM).
- ➢ Drill holes for lower hold points **(2)**.
- ➢ Insert suitable dowel.
- ➢ Fix the Pump Monitor (SPM) on the upper holding device **(1)** on the wall.
- ➢ Assemble the Pump Monitor (SPM) using suitable screws and washers on lower hold points **(2)**.
- ➢ Check if the Pump Monitor (SPM) is firmly fitted.



5.2 Set up pump

- ➢ Observe relevant operating and assembly instructions for assembly of the pump.

5.3 Assemble sensors on pump

- ➢ To ensure perfect operation of the Pump Monitor (SPM), provide the Pump Monitor (SPM) with correct measured values. For the assembly of sensors, observe the respective manufacturer's instructions.

5.3.1 Information on temperature sensors

The following sensors for the measurement of temperature are supported:

- PT100
- PT1000

Possible assembly position of the sensors (examples):

- ➢ To measure the stator temperature, assemble temperature sensors in the connection head on the stator of the pump.
- ➢ To measure the gear box temperature, assemble temperature sensors in the oil drain plug or at a suitable place on the gear box.

5.3.2 Information on leakage sensors

The following principle is supported for the measurement of leakages:

- Conductivity measurement with 24 VAC

Possible assembly position of the sensors:

➢ To measure suction side leakage (e.g., on the mechanical seal), assemble suitable leakage sensor in the drain hole of the lantern.

5.3.3 Information on assembly of sensors on analogue inputs

➢ Observe manufacturer's documents of the respective sensor.

Possible assembly position of the sensors (examples):

- Pressure transmitter on the pressure branch of the pump
- Flow meter transmitter in the pipeline on the pump

5.4 Wire Pump Monitor (SPM)

➢ In order to ensure the IP protection class specified in the technical data, assemble all cable screws properly and seal all cable entries not in use.

NOTICE

Exceeding the maximum admissible power drain during connection of sensors.
Possible defect in the Pump Monitor (SPM) wiring due to overload.

➢ Always comply with maximum admissible power drain of the respective sensor inputs (cf. → chapter 3.3 "Technical Data").

➢ If the maximum admissible power consumption is possibly exceeded, supply sensors through external supply point (power supply pack) (on the part of the customer).

5.4.1 Prepare cable and lines

In order to ensure a reliable operation of the Pump Monitor (SPM) wiring, the cable and linings must meet certain requirements. These are specified in the following chapter.

Cable for sensors

Conductor cross-section	0.25 - 1.5 mm^2 / 20 ... 16 AWG
Shielding	full
Cable length	≤ 30 m
Types of conductors	At least 0.5 mm^2 / 20 AWG directly pluggable • Fine-wire conductor with end ferrules • Stranded conductor • Single-wire conductor Use at least 0.25 mm^2 / 24 AWG operating tool for push-in clamps • Fine-wire conductor • Stranded conductor • Single-wire conductor
Stripping length	9 … 11 mm / 0.35 … 0.43 inch

Cable for motor

Conductor cross-section	0.75 - 4 mm^2 / 18 ... 12 AWG
Shielding	full
Cable length	≤ 30 m
Safety device	In accordance with VDE and applicable directives At least: Secure line with fuse 1 A (ampere) slow on the motor connection point, e.g., motor terminal box. Observe dielectric strength!
Connection data	Directly pluggable: • Fine-wire conductor with end ferrules • Stranded conductor • Single-wire conductor Use operating tool for push-in clamps: • Fine-wire conductor
Stripping length	10 … 12 mm / 0.39 … 0.47 inch

Cable for power supply 230V AC

Conductor cross-section	min. 0.75 mm^2
Conductor cross-section PE	min. 0.75 mm^2
Cable length	For longer lengths of line, observe the maximum admissible voltage drop.

Cable for power supply 24V DC

Conductor cross-section	min. 1.5 mm^2
Conductor cross-section PE	min. 1.5 mm^2
Cable length	For longer lengths of line, observe the maximum admissible voltage drop.

5.4.2 Terminal block connections

Terminal block connections X1

Clamp	Designation	Function
1	24 VDC	Voltage input with external supply to SPM with 24 V
2	24 VDC	Voltage output, e.g., for supply to sensors
3	24 VDC	
4	24 VDC	
5	GND	GND input with external supply to SPM
6	GND	GND output reference potential GND for the connection of sensors
7	GND	
8	GND	
9	BT_EN	Bluetooth Enable input - key-operated switch position I
10	R_EN	Remote Enable input - key-operated switch position II
11	DI1	Digital input 1
12	DI2	Digital input 2
13	DO1	Digital output 1 - Status OK (signal lamp green), active low
14	DO2	Digital output 2 - Status warning (signal lamp yellow), active low
15	DO3	Digital output 3 - Status error (signal lamp red), active low
16	DO4	Digital output 4
17	Temp 1 +	Temperature sensor input PT100/PT1000
18	Temp 1 -	
19	Temp 2 +	Temperature sensor input PT100/PT1000
20	Temp 2 -	
21	Temp 3 +	Temperature sensor input PT100/PT1000
22	Temp 3 -	
23	LI1+	Leakage sensor input - conductance sensor/meander
24	LI1 -	
25	LI2 +	Leakage sensor input - conductance sensor/meander
26	LI2 -	
27	AI0 +	Analogue input 4-20 mA sensor
28	AI0 -	
29	AI1 -	Analogue input 4-20 mA sensor
30	AI2 -	
31	AI3 -	Analogue input 4-20 mA sensor
32	AI4 -	
33	AI5 -	Analogue input 4-20 mA sensor
34	AI6 -	
35	P-stop 11	Protection Stop 11 Common
36	P-stop 14	Protection Stop 14 Normally Open NO
37	P-stop 12	Protection Stop 12 Normally Closed NC

Clamp	Designation	Function
38	RS485 A	Modbus RTU A
39	RS485 B	Modbus RTU B

Tab. 5-1 Terminal block connections block X1 - sensors

Terminal block connections X2

Clamp	Designation	Function
PE	Motor PE	Protective conductor input, motor monitoring
U	Motor phase 1 (U)	Phase 1 input, motor monitoring
V	Motor phase 2 (V)	Phase 2 input, motor monitoring
W	Motor phase 3 (W)	Phase 3 input, motor monitoring

Tab. 5-2 Terminal block connections block X2 - motor monitoring

Terminal block connections X3

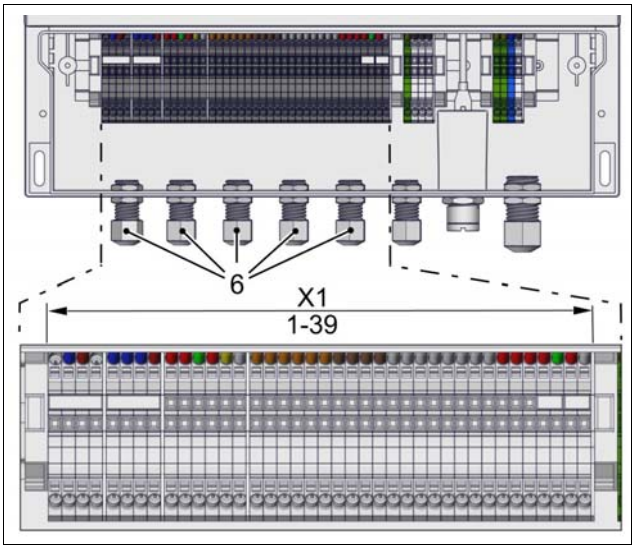
Clamp	Designation	Function
PE	PE supply	Protective conductor input, mains side
N	N supply	Neutral conductor, mains side
L	L supply	Phase, mains side

Tab. 5-3 Terminal block connections X3 - power supply 230 V

5.4.3 Connect sensors

This chapter describes how different sensors must be connected to the Pump Monitor (SPM), in order to achieve safe and reliable operation of the Pump Monitor (SPM).

- Connect sensors to clamping plate **X1** of the Pump Monitor (SPM).
- Use cable screws M12 **(6)**.

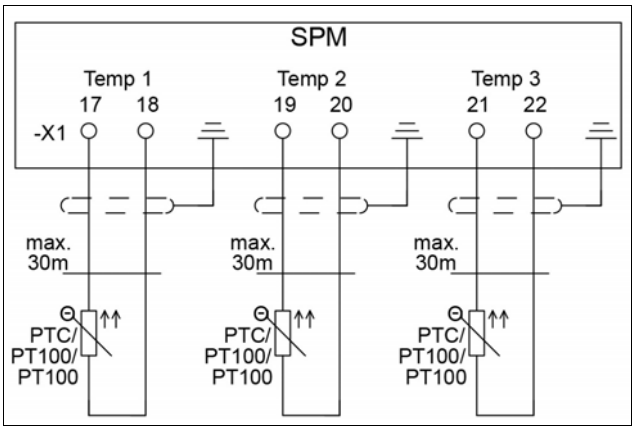


- Should more cable ducts be required, pre-punch passages on the Pump Monitor (SPM) and assemble cable screws.

Connect sensors for the measurement of temperatures

The temperature input 1 (Temp 1) is monitored and, if the set limit values are exceeded, this causes protection stop of the pump.

➢ Observe wiring diagram and connection diagram.

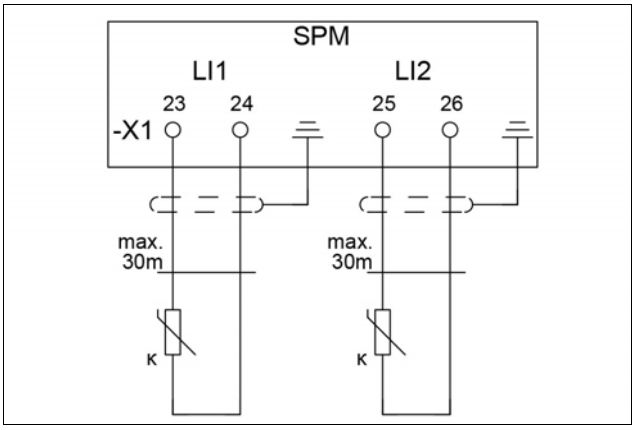


Clamp	Designation	Function
17	Temp 1 +	Temperature sensor input PT100/PT1000
18	Temp 1 -	
19	Temp 2 +	Temperature sensor input PT100/PT1000
20	Temp 2 -	
21	Temp 3 +	Temperature sensor input PT100/PT1000
22	Temp 3 -	

Tab. 5-4 Connection diagram temperature sensors

Connect sensors for the detection of leakage

➢ Observe wiring diagram and connection diagram.



Clamp	Designation	Function
23	LI1+	Leakage sensor input - conductance sensor/meander
24	LI1 -	
25	LI2 +	Leakage sensor input - conductance sensor/meander
26	LI2 -	

Tab. 5-5 Connection diagram leakage sensors

Connect sensors on the analogue input 0 (Protection Stop)

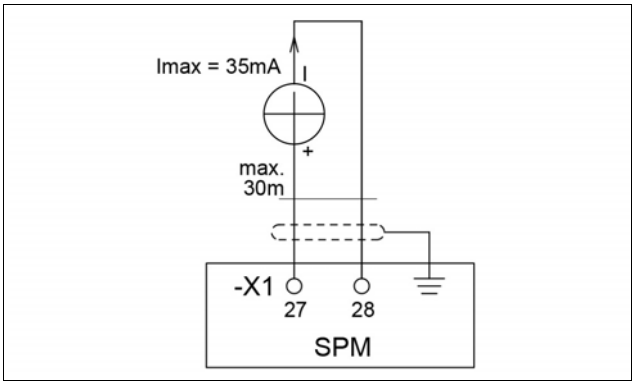
The following features for the use of analogue sensors are supported:

- Monitoring the analogue signal and triggering the Protection Stop when the threshold value is exceeded
- Measurable current strength 4 - 20 mA
- Support of 2-, or 3-wire sensors
- Short-circuit detection

The analogue input 0 (AI0) is monitored and if the factory-set limit values are exceeded, this causes protection stop of the pump.

Analogue input 0: 2-wire sensor:

- Observe wiring diagrams and connection diagram.

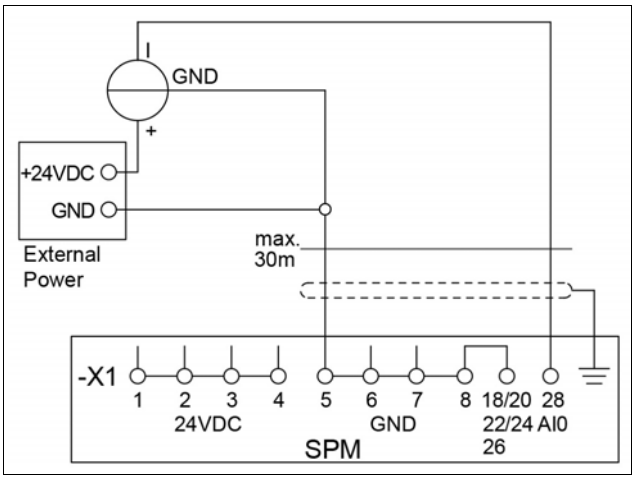


Clamp	Designation	Function
27	AI0 +	Analogue input 4 - 20 mA sensor
28	AI0 -	

Tab. 5-6 Connection diagram analogue input 0: 2-wire sensor

Analogue input 0: 3-wire sensor with external power supply

- Observe wiring diagrams and connection diagram.

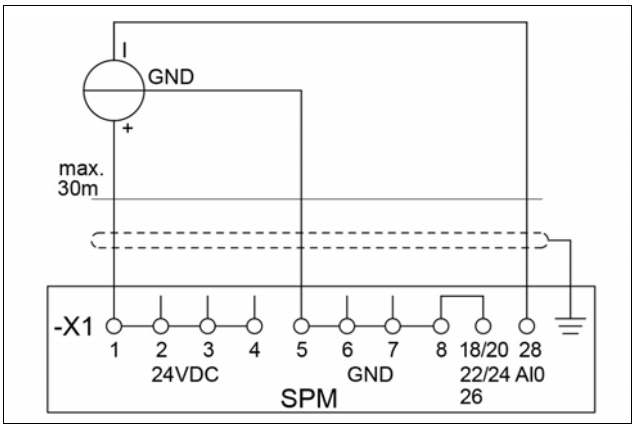


Clamp	Designation	Function
1	24 VDC	Voltage input with external supply to SPM with 24 V
2	24 VDC	Voltage output, e.g., for supply to sensors
3	24 VDC	
4	24 VDC	
5	GND	GND input with external supply to SPM
6	GND	GND output reference potential GND for the connection of sensors
7	GND	
8	GND	
18	Temp 1 -	Temperature sensor input PT100/PT1000
20	Temp 2 -	Temperature sensor input PT100/PT1000
22	Temp 3 -	Temperature sensor input PT100/PT1000
24	LI1 -	Leakage sensor input - conductance sensor/meander
26	LI2 -	Leakage sensor input - conductance sensor/meander
28	AI0 -	Analogue input 4 - 20 mA sensor

Tab. 5-7 Connection diagram analogue input 0: 3-wire sensor with external power supply

Analogue input 0: 3-wire sensor with internal power supply

- Observe wiring diagrams and connection diagram.



Clamp	Designation	Function
1	24 VDC	Voltage input with external supply to SPM with 24 V
2	24 VDC	Voltage output, e.g., for supply to sensors
3	24 VDC	
4	24 VDC	
5	GND	GND input with external supply to SPM
6	GND	GND output reference potential GND for the connection of sensors
7	GND	
8	GND	
18	Temp 1 -	Temperature sensor input PT100/PT1000
20	Temp 2 -	Temperature sensor input PT100/PT1000
22	Temp 3 -	Temperature sensor input PT100/PT1000
24	LI1 -	Leakage sensor input - conductance sensor/meander
26	LI2 -	Leakage sensor input - conductance sensor/meander
28	AI0 -	Analogue input 4 - 20 mA sensor

Tab. 5-8 Connection diagram analogue input 0: 3-wire sensor with internal power supply

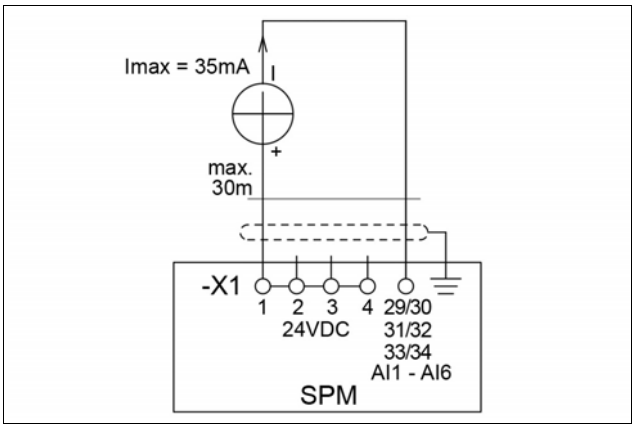
Connect sensors to analogue inputs 1-6

The following features for the use of analogue sensors are supported:

- Measurable current strength 4 - 20 mA
- Two-wire measurement
- Support of 2- or 3-wire sensors
- Short-circuit detection

Analogue input 1-6: 2-wire sensor

➢ Observe wiring diagram and connection diagram.
  – For connection diagram, refer to → chapter 5.4.2 "Terminal block connections" .

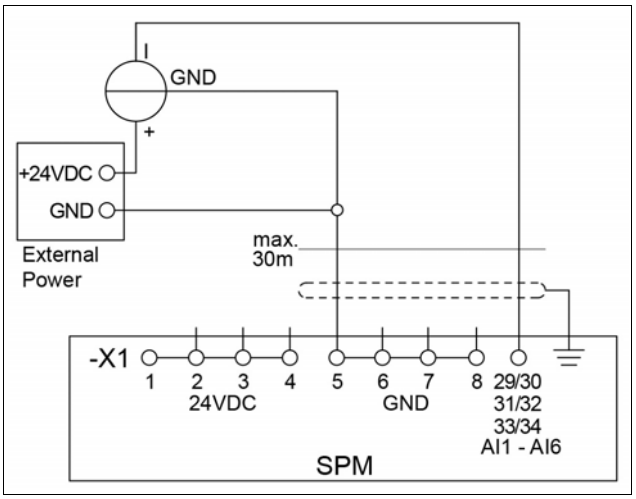


Clamp	Designation	Function
1	24 VDC	Voltage input with external supply to SPM with 24 V
2	24 VDC	Voltage output, e.g., for supply to sensors
3	24 VDC	
4	24 VDC	
29	AI1 -	Analogue input 4-20 mA sensor
30	AI2 -	Analogue input 4-20 mA sensor
31	AI3 -	Analogue input 4-20 mA sensor
32	AI4 -	Analogue input 4-20 mA sensor
33	AI5 -	Analogue input 4-20 mA sensor
34	AI6 -	Analogue input 4-20 mA sensor

Tab. 5-9 Connection diagram analogue input 1-6

Analogue input 1-6: 3-wire with external power supply:

- Observe wiring diagram and connection diagram.

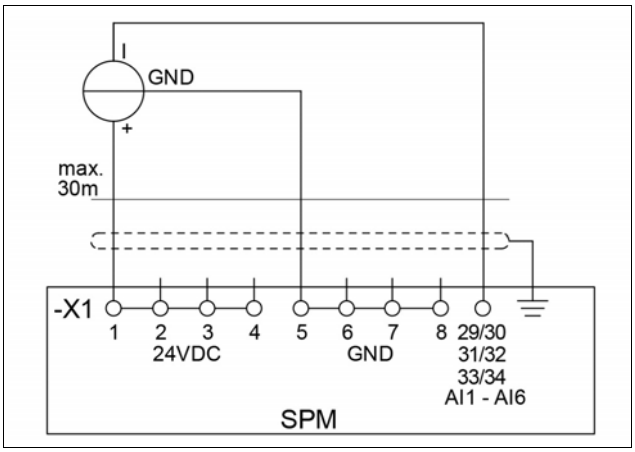


Clamp	Designation	Function
1	24 VDC	Voltage input with external supply to SPM with 24 V
2	24 VDC	Voltage output, e.g., for supply to sensors
3	24 VDC	
4	24 VDC	
5	GND	GND input with external supply to SPM
6	GND	GND output reference potential GND for the connection of sensors
7	GND	
8	GND	
29	AI1 -	Analogue input 4-20 mA sensor
30	AI2 -	
31	AI3 -	Analogue input 4-20 mA sensor
32	AI4 -	
33	AI5 -	Analogue input 4-20 mA sensor
34	AI6 -	

Tab. 5-10 Connection diagram analogue input 1-6: 3-wire with external power supply

Analogue input 1-6: 3-wire with internal power supply:

- Observe wiring diagram and connection diagram.

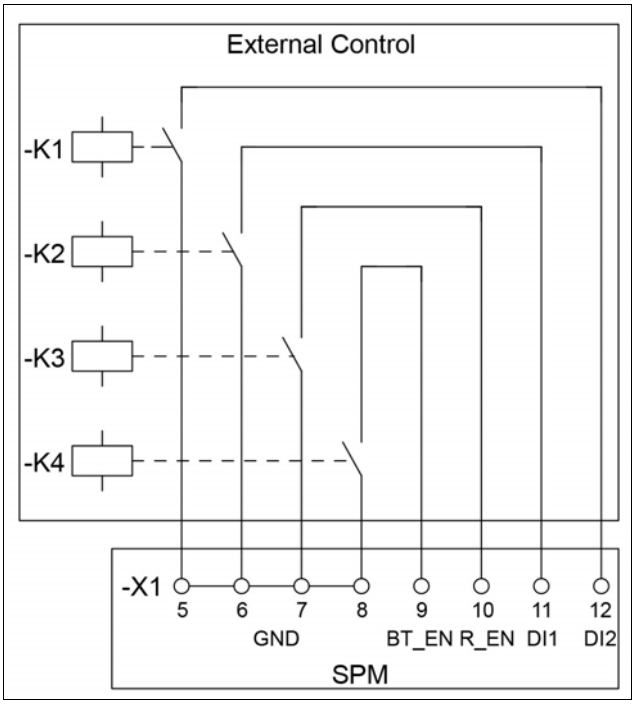


Clamp	Designation	Function
1	24 VDC	Voltage input with external supply to SPM with 24 V
2	24 VDC	Voltage output, e.g., for supply to sensors
3	24 VDC	
4	24 VDC	
5	GND	GND input with external supply to SPM
6	GND	GND output reference potential GND for the connection of sensors
7	GND	
8	GND	
29	AI1 -	Analogue input 4-20 mA sensor
30	AI2 -	Analogue input 4-20 mA sensor
31	AI3 -	Analogue input 4-20 mA sensor
32	AI4 -	Analogue input 4-20 mA sensor
33	AI5 -	Analogue input 4-20 mA sensor
34	AI6 -	Analogue input 4-20 mA sensor

Tab. 5-11 Connection diagram analogue input 1-6: 3-wire with internal power supply

Connect sensors to digital inputs

- Observe wiring diagram and connection diagram.



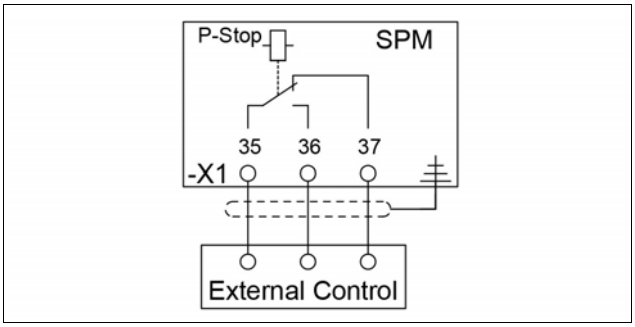
Clamp	Designation	Function
5	GND	GND input with external supply to SPM
6	GND	GND output reference potential GND for the connection of sensors
7	GND	
8	GND	
9	BT_EN	Bluetooth Enable input - key-operated switch position I
10	R_EN	Remote Enable input - key-operated switch position II
11	DI1	Digital input 1
12	DI2	Digital input 2

Tab. 5-12 Connection diagram - digital inputs

Connect protection stop to relay output

The Pump Monitor (SPM) can monitor individual sensors for the protection stop.
Sensors can be combined during this.

➢ Observe wiring diagram and connection diagram.



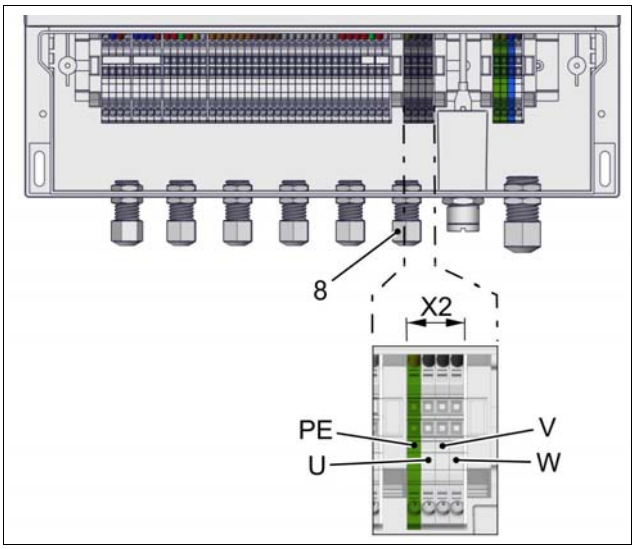
Clamp	Designation	Function
35	P-stop 11	Protection Stop 11 Common
36	P-stop 14	Protection Stop 14 Normally Open NO
37	P-stop 12	Protection Stop 12 Normally Closed NC

Tab. 5-13 Connection diagram - protection stop

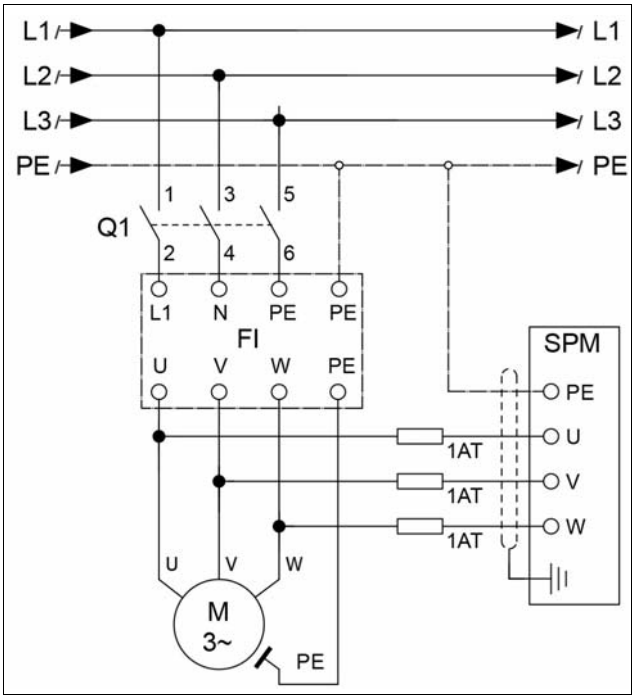
5.4.4 Connect asynchronous motor

The following features for monitoring an asynchronous motor are supported:
- Motors with direct activation/direct operation on the mains
- Motors on frequency inverters
- Monitoring the line voltage
- Monitoring the phases for detection of phase errors and asymmetries

- Connect cabling of motor to block **X2** of the Pump Monitor (SPM).
- Use cable screw M12 **(8)**.



- Observe wiring diagram and connection diagram.



Clamp	Designation	Function
PE	Motor (PE)	Protective conductor input, motor monitoring
U	Motor phase 1 (U)	Phase 1 input, motor monitoring
V	Motor phase 2 (V)	Phase 2 input, motor monitoring
W	Motor phase 3 (W)	Phase 3 input, motor monitoring

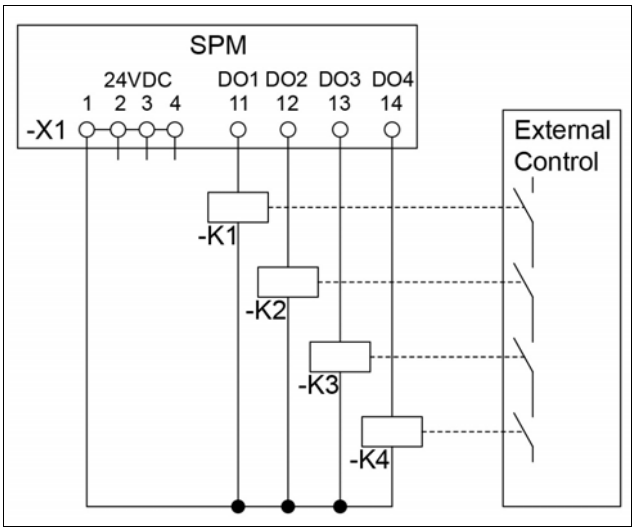
Tab. 5-14 Connection diagram motor monitoring

5.4.5 Connect status outputs

The Pump Monitor (SPM) is equipped with a signal lamp which conveys the status of the pump and Pump Monitor (SPM) using colour coding.
Status outputs can additionally communicate this status to a control unit.

Status outputs with internal power supply

- Observe wiring diagram and connection diagram, if the status signals with an internal power supply need to be forwarded to a control unit.

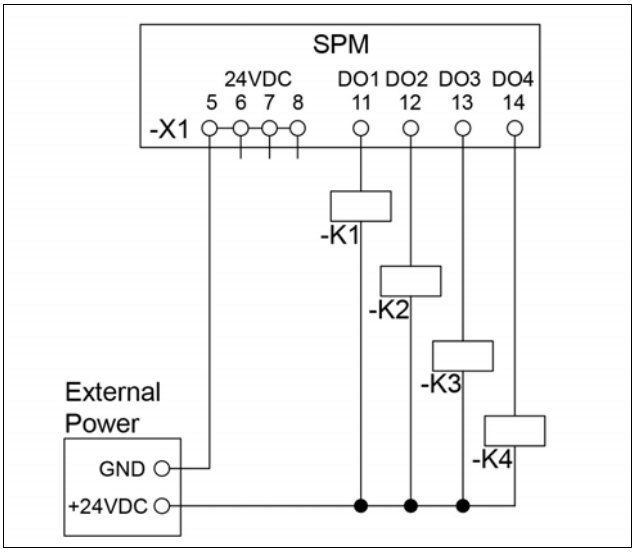


Clamp	Designation	Function
1	24 VDC	Voltage input with external supply to SPM with 24 V
2	24 VDC	Voltage output, e.g., for supply to sensors
3	24 VDC	
4	24 VDC	
13	DO1	Digital output 1 - Status OK (signal lamp green), active low
14	DO2	Digital output 2 - Status warning (signal lamp yellow), active low
15	DO3	Digital output 3 - Status error (signal lamp red), active low
16	DO4	Digital output 4

Tab. 5-15 Connection diagram of status outputs with internal power supply

Status outputs with external power supply

- Observe wiring diagram and connection diagram, if the status signals with an external power supply need to be forwarded to a control unit.



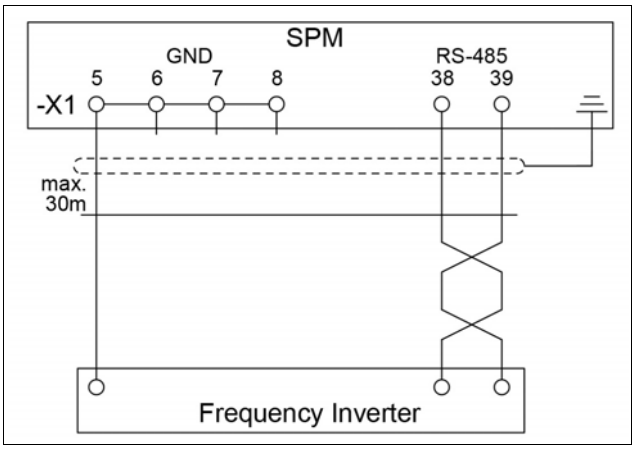
Clamp	Designation	Function
5	GND	GND input with external supply to SPM
6	GND	GND output reference potential GND for the connection of sensors
7	GND	
8	GND	
13	DO1	Digital output 1 - Status OK (signal lamp green), active low
14	DO2	Digital output 2 - Status warning (signal lamp yellow), active low
15	DO3	Digital output 3 - Status error (signal lamp red), active low
16	DO4	Digital output 4

Tab. 5-16 Connection diagram of status outputs with external power supply

5.4.6 Connect field devices via Modbus RTU

The Pump Monitor (SPM) has an RS-485 interface, which can communicate via Modbus RTU with field devices. Parameters such as, e.g., the speed, frequency or torque of an FI can be read using this interface and processed further in the Pump Monitor (SPM)

- Observe wiring diagram and connection diagram.



Clamp	Designation	Function
5	GND	GND input with external supply to SPM
6	GND	GND output reference potential GND for the connection of sensors
7	GND	
8	GND	
38	RS485 A	Modbus RTU A
39	RS485 B	Modbus RTU B

Tab. 5-17 Connection diagram Modbus

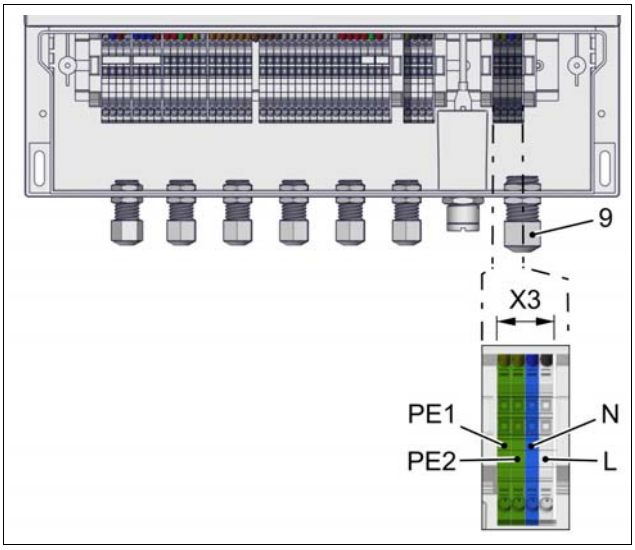
5.4.7 Supply Pump Monitor (SPM) with voltage

The text below describes which connections are required to connect the Pump Monitor (SPM) to an external power supply. The following options are available here:

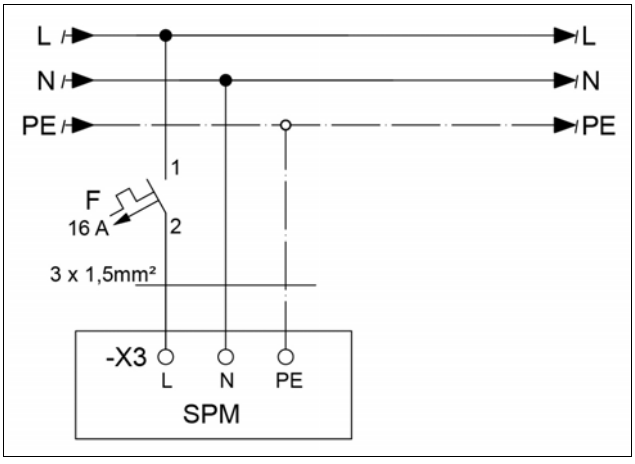
- 110 - 240 VAC
- 24 VDC

Power supply 110 V and 240 V

- ➢ Connect cabling of 110/240 VAC, 50/60 Hz power supply to clamping plate **X3** of the Pump Monitor (SPM).
- ➢ Use cable screw M16 **(9)**.



- ➢ Observe wiring diagram and connection diagram.

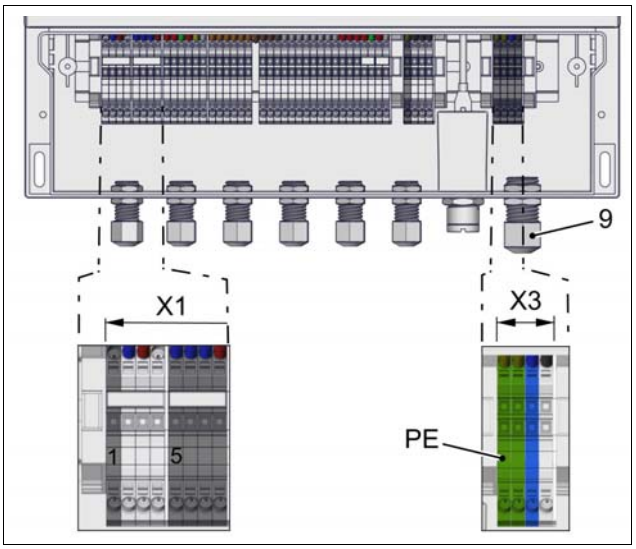


Clamp	Designation	Function
PE	PE supply	Protective conductor input, mains side
N	N supply	Neutral conductor, mains side
L	L supply	Phase, mains side

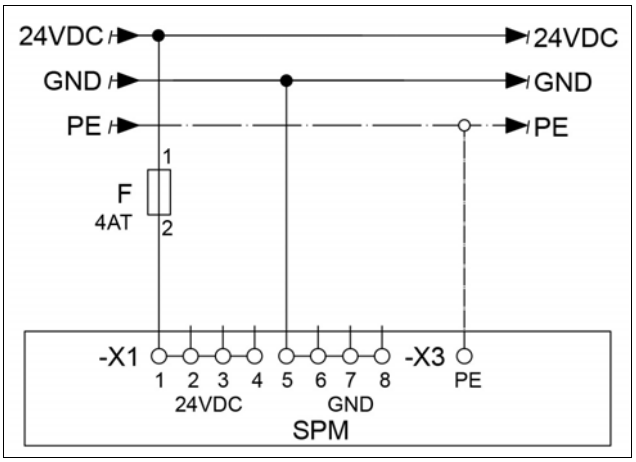
Tab. 5-18 Connection diagram power supply 230V

Power supply 24V

- Connect cabling of 24 VDC to clamping plate **X1-1** and **X1-5** of Pump Monitor (SPM).
- Connect cabling of PE to clamping plate **X3-PE** of the Pump Monitor (SPM).
- Use cable screw M16 **(9)**.



- Observe wiring diagram and connection diagram.



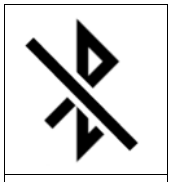
Clamp	Designation	Function
X1-1	24 VDC	Voltage input with external supply to SPM with 24 V
X1-2	24 VDC	Voltage output, e.g., for supply to sensors
X1-3	24 VDC	
X1-4	24 VDC	
X1-5	GND	GND input with external supply to SPM
X1-6	GND	GND output reference potential GND for the connection of sensors
X1-7	GND	
X1-8	GND	
X3-PE	PE supply	Protective conductor input, mains side

Tab. 5-19 Terminal block connections block X1 - sensors

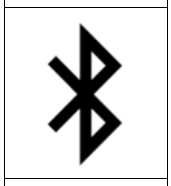
6. Commission Pump Monitor (SPM)

- Before commissioning the Pump Monitor (SPM), carry out the following steps:
  - Ensure that the protective conductor PE is connected and a circuit breaker is fitted.
  - Ensure that all components and sensors are connected correctly.
  - Log wiring, if required.

- Assemble cover **(1)** of the Pump Monitor (SPM) using fixing screws **(2)**.
- Turn switch Online Connection **(3)** to correct position.

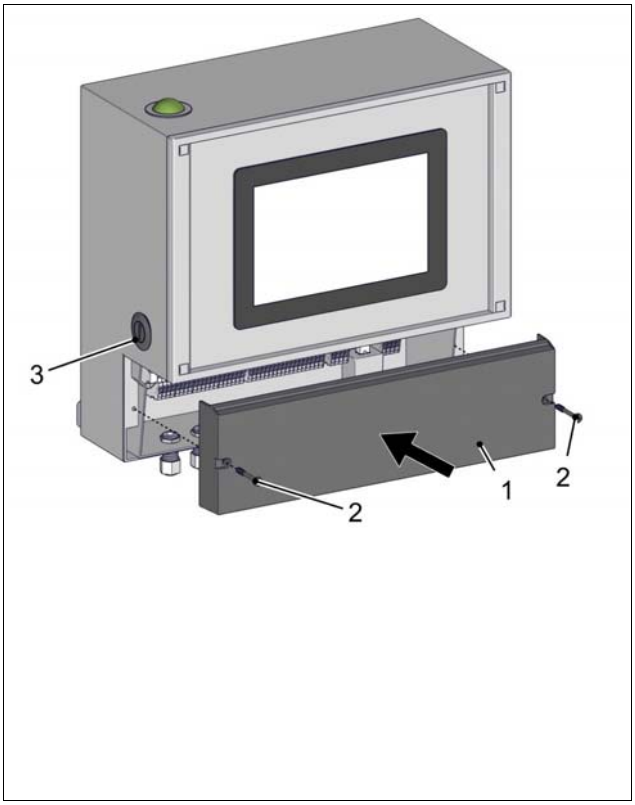


– Select adjacent switch position to switch off the Bluetooth connection. Use of a touch panel on the Pump Monitor (SPM) also possible.



– Select adjacent switch position for connecting with a Bluetooth device. Necessary if there is no touch panel available on the Pump Monitor (SPM).

– For future maintenance purposes. The Bluetooth connections remain active.



- Switch on power supply of the Pump Monitor (SPM).
- Observe operating manual of the Pump Monitor (SPM).

Keyword index

Keyword index

V

W

SEEPEX.
ALL THINGS FLOW

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