

Instructions for set-up


Pump application
Application solution extension

UK



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1 Preliminary note


 You will find detailed instructions, technical data, approvals and further information using the QR code on the individual units / packagings or at www.ifm.com.

1.1 Symbols used

- ▶ Instruction
- > Reaction, result
- [...] Designation of keys, buttons or indications
- Cross-reference
-  Important note
Non-compliance may result in malfunction or interference.
-  Information
Supplementary note.

1.2 Further documents

- installation instructions
- operating instructions
- software manual
- instructions for set-up Pump application - Application solution

 The documents can be downloaded at: www.ifm.com

2 Safety instructions

- The devices described are integrated into a system as components.
 - The system architect is responsible for the safety of the system.
 - The system architect undertakes to perform a risk assessment and to create documentation in accordance with legal and normative requirements to be provided to the operator and user of the system. This documentation must contain all necessary information and safety instructions for the operator, the user and, if applicable, for any service personnel authorised by the architect of the system.
 - The system architect is responsible for the proper functioning of the application programs.
- Read this document before setting up the product and keep it during the entire service life.
- The product must be suitable for the corresponding applications and environmental conditions without any restrictions.
- Only use the product for its intended purpose (→ 3 Functions and features).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the product or incorrect use by the operator.
- Installation, electrical connection, set-up, operation and maintenance of the product must be carried out by qualified personnel authorised by the machine operator.
- Protect units and cables against damage.

3 Functions and features

Vibration diagnostics and condition monitoring of centrifugal pumps in accordance with the chosen application (pump type, rotational speed etc.). With these instructions, application solution extensions for pump monitoring can be connected to an existing pump application - application solution. A maximum of 6 extensions can be connected to an appliance (preconfigured industrial PC).

4 Function

The pump application is used for permanent monitoring of pumps and allows for condition-based system maintenance. Via the detection and evaluation of the motor's temperature and rotational speed and of vibration on pump and motor, continuous diagnostics is provided with regard to the following failure causes:

- unbalance
- wear
- contamination
- overall vibration
- bearing damage
- cavitation

Depending on the application that you have chosen (pump type, rotational speed etc.), you will receive the respective parameter set for configuration of the diagnostic unit (VSE100). In order to transfer the parameter set to the VSE100 unit, you only require a PC and the Application Package Assistant (APA) software.

The following illustration shows an example set-up of a pump application:

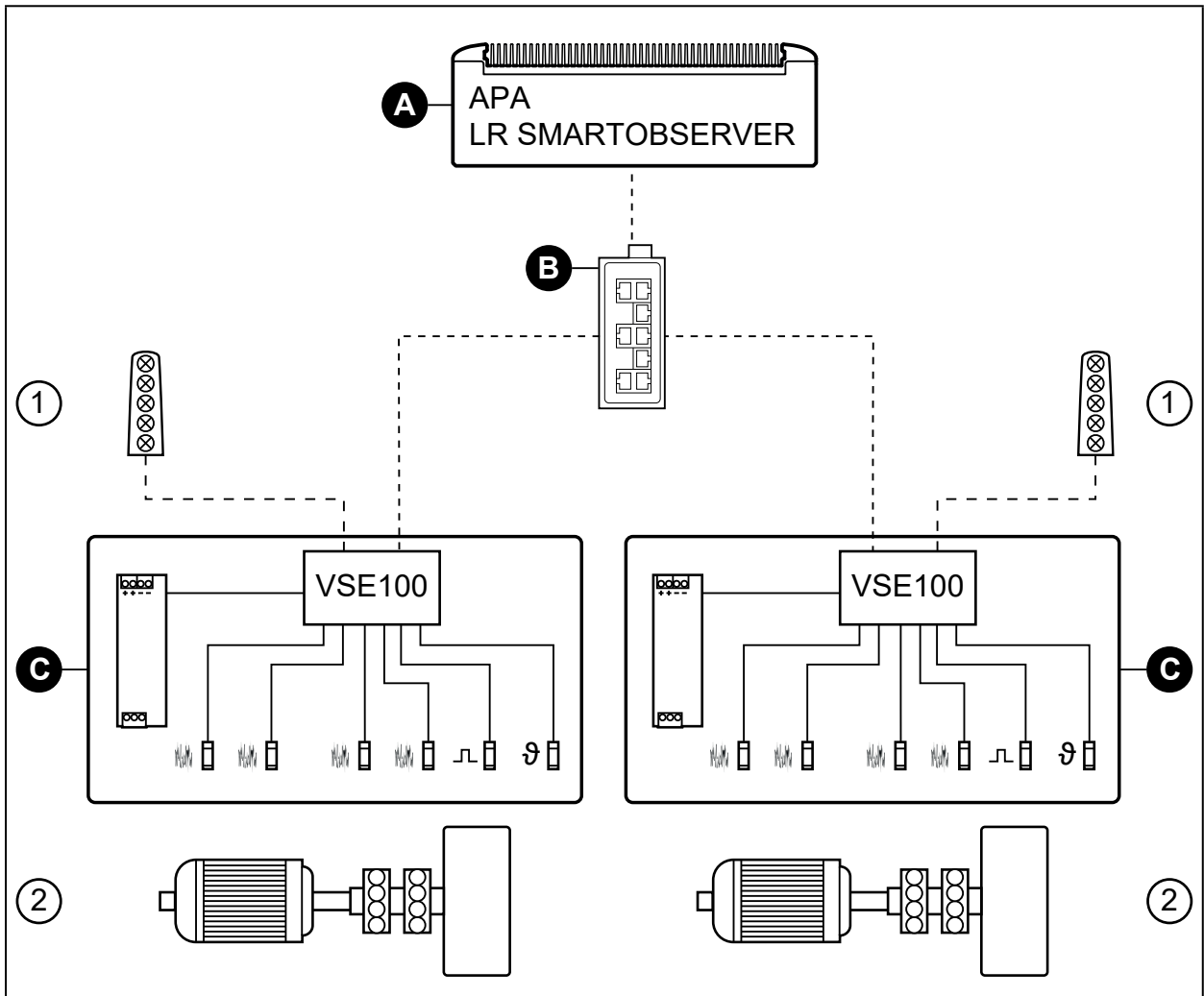


Fig. 1: application solution extension overview

A: appliance, not supplied

B: switch (optional)

C: application packages (maximum 7), each consisting of:

- power supply
- diagnostic unit VSE100
- vibration sensors
- temperature sensor
- inductive sensor

1: 5-segment light tower (optional)

2: not included in scope of supply, individual equipment / devices

5 Installation

! ▶ Disconnect the power of the machine before installation.

Adhere to the instructions enclosed to the individual devices.

5.1 Sensors

- ▶ Install the vibration sensors as close as possible to the bearing.
- ▶ Install the temperature sensor flat on the motor in order to enable precise temperature measurement.
- ▶ Install the inductive sensor.

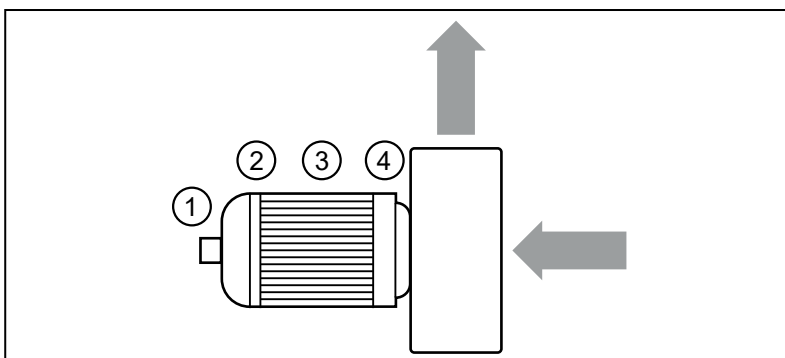
i The inductive sensor is used for rotational speed monitoring. This requires that a screw is fixed on the shaft. The screw head serves as the switching cam. Another option is to attach a small metal plate at a suitable position on the motor of the pump (e.g. on the fan blade). The inductive sensor has to be fixed in a way that allows for it to be damped by the screw or the small metal plate.

It is recommended to compensate for the additional weight by removing an equivalent amount of weight.

i Tighten all sensors with the indicated tightening torque.

Sensor positioning depends on the pump type.

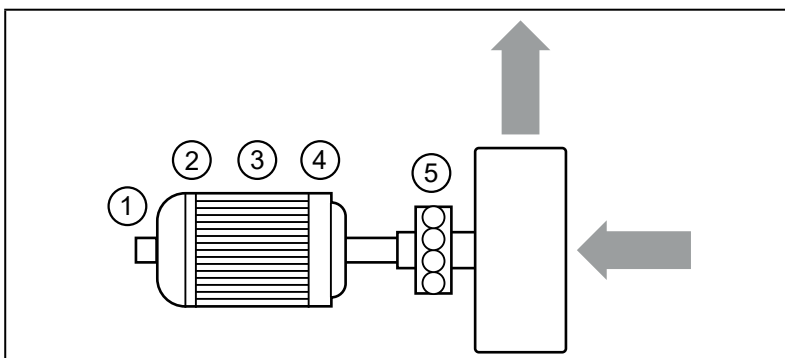
5.1.1 Centrifugal pump, pump on the motor shaft



Positioning

- 1: inductive sensor for rotational speed detection
- 2: vibration sensor (motor, non drive end)
- 3: temperature sensor
- 4: vibration sensor (motor, drive end)

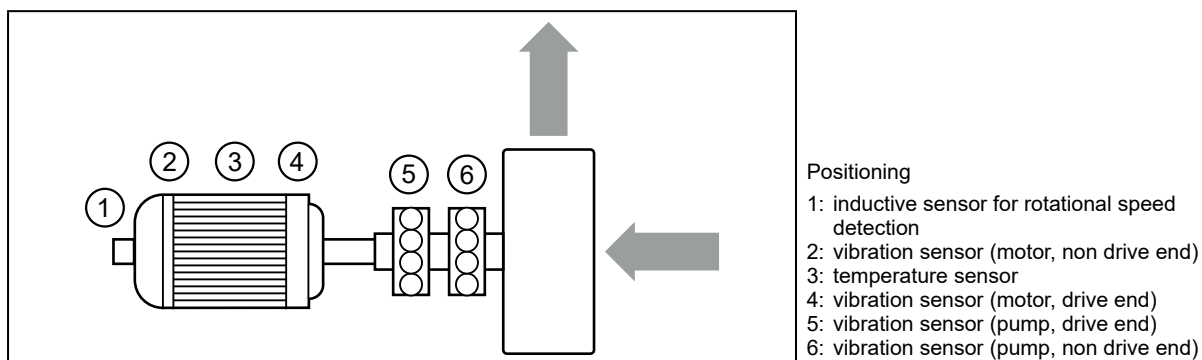
5.1.2 Centrifugal pump with a single bearing on the pump shaft



Positioning

- 1: inductive sensor for rotational speed detection
- 2: vibration sensor (motor, non drive end)
- 3: temperature sensor
- 4: vibration sensor (motor, drive end)
- 5: vibration sensor (pump, drive end)

5.1.3 Centrifugal pump with dual bearings on the pump shaft



5.2 Diagnostic unit VSE100

Mount the unit in a control cabinet with a protection rating of at least IP 54 to ensure protection against accidental contact with dangerous contact voltages and against atmospheric influence. The control cabinet should be installed in accordance with local and national rules and regulations.

Mount the unit on a DIN rail. Mount it vertically and leave enough space between the unit and the top and bottom of the control cabinet (to enable air circulation to avoid excessive heating).


 Suited for DIN rails according to EN 60715 with a height of 7.5 or 15 mm.

At maximum ambient temperature, additional convection cooling is necessary.

Prevent the penetration of conductive or other dirt during installation and wiring.

5.3 Power supply


- ▶ Install the power supply in the control cabinet, taking into account the following:
 - Suited for DIN rails according to EN 60715 with a height of 7.5 or 15 mm.
 - The input terminals are located on the lower front part of the device.
 - Adhere to the following installation distances under permanent full load operation: Left / right: 5 mm (15 mm for adjacent heat sources)
Top: 40 mm, bottom: 20 mm from the device.

-  The device is designed for convection cooling.
 - ▶ The air circulation must not be impeded. Adhere to the installation distances.

5.4 Ethernet switch (optional, own switch or ifm switch)

- ▶ Install the Ethernet switch in the control cabinet.
 - Suited for DIN rails according to EN 60715 with a height of 7.5 or 15 mm.
 - Align the input terminals upwards.

5.5 5-segment light tower DV1500 (optional)

-  ▶ For installation choose a flat mounting surface.

More information about available accessories at www.ifm.com

6 Electrical connection



The devices must be connected by a qualified electrician.

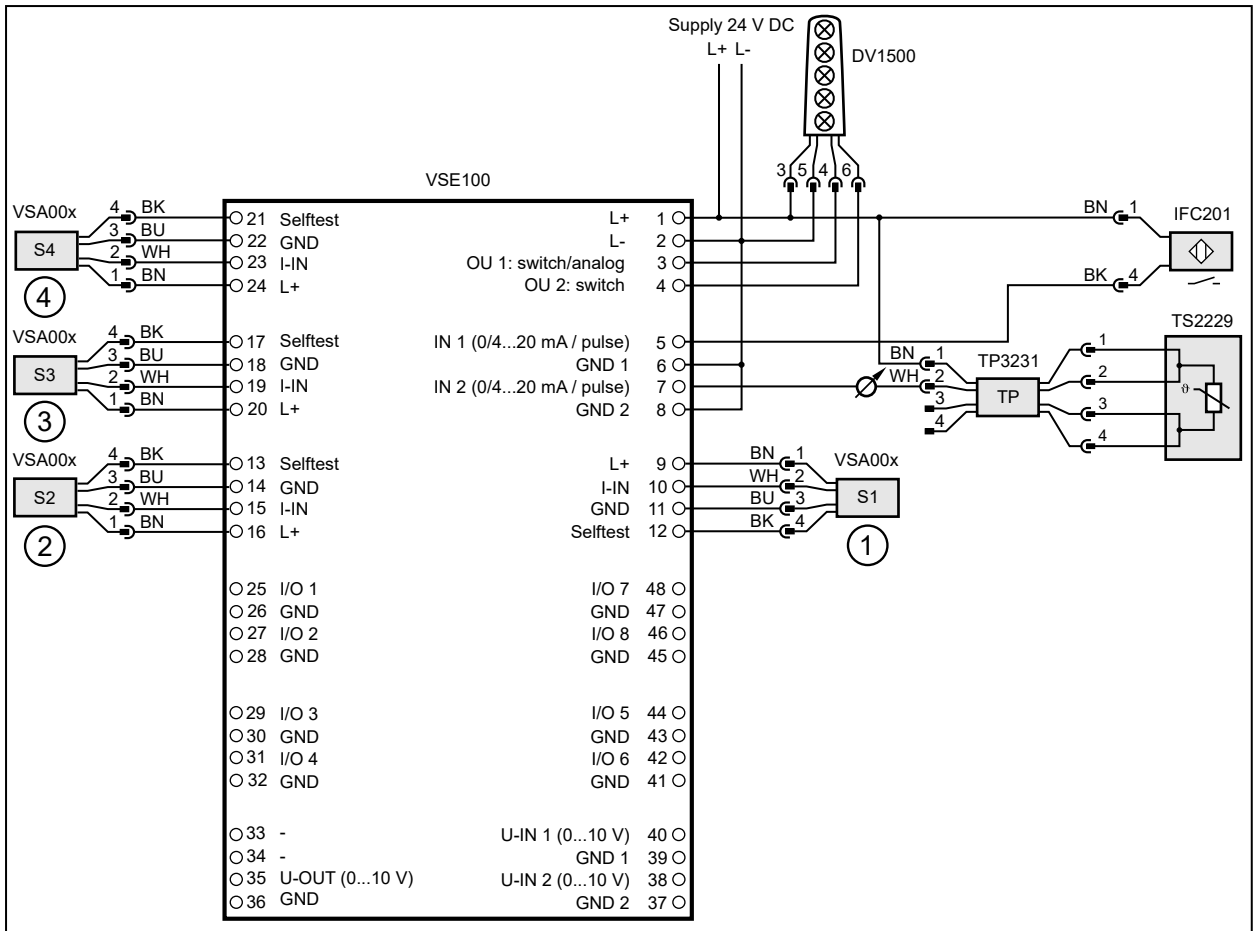
- ▶ Observe the national and international regulations for the installation of electrical equipment.
- ▶ Adhere to the instructions enclosed to the individual devices.
- ▶ Disconnect power.

1. Disconnect the VSE100 unit that is already part of the system from the appliance (industrial PC) and connect it to the Ethernet switch.
2. Connect application package extension 1
 - Connect the sensors (vibration, speed and temperature) to the VSE100 unit.
 - Connect the VSE100 unit to the secondary side of the power supply.
 - Connect the VSE100 unit to the Ethernet switch via the Ethernet interface.
 - Connect the 5-segment light tower to the diagnostic unit (optional).
3. To connect further extensions, repeat the actions in step 2.
4. Connect the Ethernet switch to Ethernet interface 1 of the appliance (industrial PC)
5. Connect the Ethernet switch to the secondary side of the power supply.
6. Connect the primary sides of the power supplies to the voltage supply.



The 5-segment light tower has been preconfigured for the wiring illustrated below and is ready for operation.

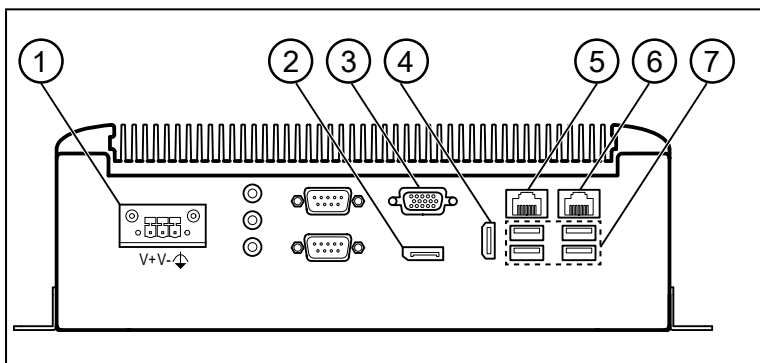
For special configurations observe the device's operating instructions.



- 1: vibration sensor (motor, non drive end)
- 2: vibration sensor (motor, drive end)
- 3: vibration sensor (pump, drive end)
- 4: vibration sensor (pump, non drive end)

S3 and S4 only for centrifugal pumps with a single bearing or dual bearings on the pump shaft

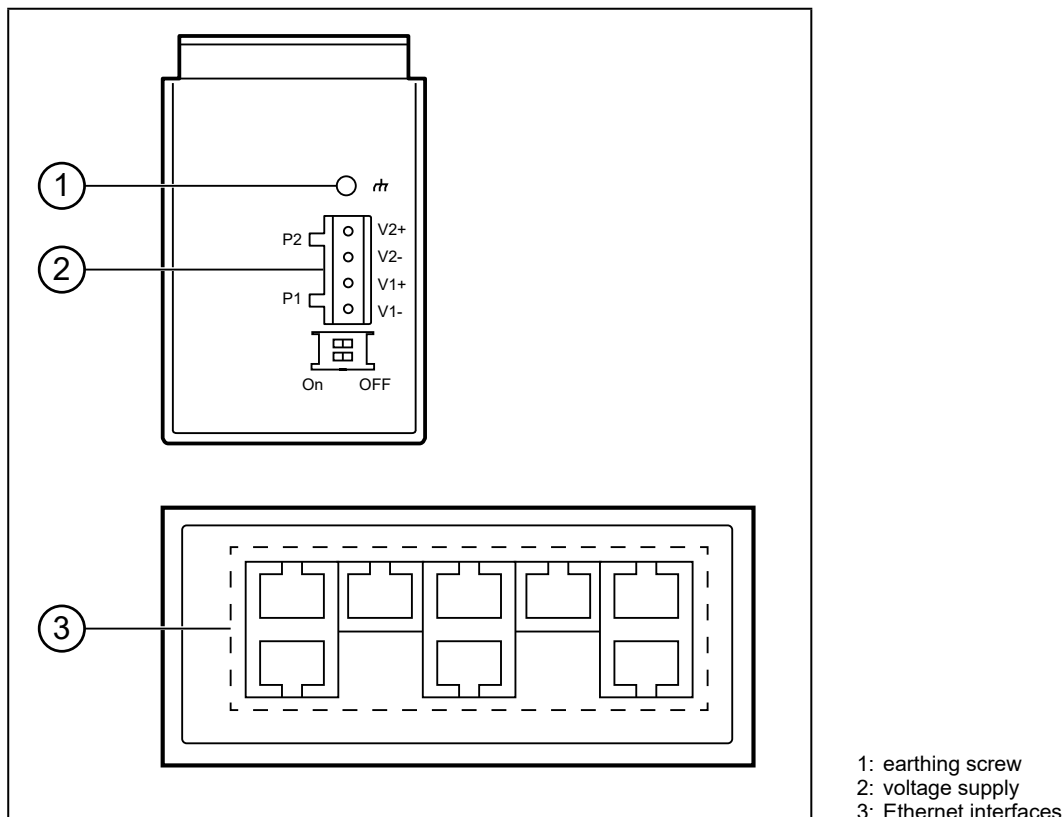
6.1 Wiring diagram appliance



- 1: voltage supply
- 2: display port
- 3: VGA socket
- 4: HDMI interface
- 5: Ethernet interface 2
- 6: Ethernet interface 1
- 7: USB ports



6.2 Wiring diagram Ethernet switch (optional, only for ifm switch)



7 Set-up

When the operating voltage has been switched on, the components of the application solution extensions work with the factory settings. The LEDs indicate the status of the devices and interfaces (→ instructions of the individual components).

! Local access or remote access possible (see instructions for set-up Pump application - Application solution).

7.1 Select a parameter set

Via the appliance:


- ▶ [File Explorer] > [This PC] > [Local Disk (C:)] > [ifm] > [parameter sets]
- ▶ Double-click [eCl@ass VSE100 for AS_Parameter_download_ifm_EN]
- > A spreadsheet program opens.
- ▶ Select the correct parameter set based on the following criteria:
 - equipment
 - type
 - speed category
 - installation
 - industry
- ▶ Copy the selected parameter code (e.g. 36-43-14-03-ftp-BD-01-02-04-0V-1-02-80-011) to the clipboard.

7.2 Start the APA set-up software

- ▶ [Windows Start] > [APA]
- ▶ The APA software opens.

7.3 Configure a new application

- ▶ Disconnect the VES100 unit with the IP address 192.168.0.1 that is already part of the system from the switch.
- ▶ Click the [+] button in the window [Select application].
- > The window [New application] appears.
- ▶ Click the [Select] button in the [Select file] section.
- ▶ In the folder [This PC] > [Local Disk (C:)] > [ifm] > [parameter sets] > [Pump], search for the parameter code selected under → 7.1, select the corresponding ipar file and click [Open].
- > Application information from the parameter file is displayed in an overview.
- ▶ Check application.
- ▶ If the application is OK, click the [>] button, otherwise open another parameter file.
- > [Select device] appears.
- > The program searches for devices in the network and shows the found devices in a table.
- ▶ Select a device.
- ▶ Enable [Device network settings].

 IP address allocation for the extension packages:

Application package	IP address	Subnet mask	Default gateway IP address
Extension 1	192.168.0.2	255.255.255.0	192.168.0.244
Extension 2	192.168.0.3	255.255.255.0	192.168.0.244
Extension 3	192.168.0.4	255.255.255.0	192.168.0.244
Extension 4	192.168.0.5	255.255.255.0	192.168.0.244
Extension 5	192.168.0.6	255.255.255.0	192.168.0.244
Extension 6	192.168.0.7	255.255.255.0	192.168.0.244

The appliance's IP address must be in the same subnet (e.g. 192.168.0.50; this is the preset IP address of the appliance).

- ▶ Enter the desired network settings for the VSE unit in the lower section of the dialogue.
- ▶ Click [Write the TCP/IP settings to the device].
- > Connecting to device.
- > The network settings are written to the device.
- ▶ Click [>].
- > The parameters from the parameter file are written to the device.
- > [Done] is displayed when the writing process is finished.
- ▶ Close the window by clicking [✓].
- ▶ Reconnect the first VSE100 unit with the IP address 192.168.0.1 to the switch.

7.4 Display current measured values of the parameters

- ▶ Click [Configuration].
- > The live status and the measured values of the parameters are displayed under [Value] in the table.



Process-related interfering signals may affect vibration diagnostics. If the diagnostic values vary considerably, it is recommended to reduce the monitoring range or the spectrum of the diagnosis objects.

The bearing diagnostic values can also be affected by various factors (such as special plant configurations, start-up and switch-off cycles when running in resonant ranges, process-related factors during operation). If the diagnostic values are heavily affected, a reference movement is recommended for the bearing diagnostics.

7.5 Configure parameters

Depending on the application, limit values may have to be adapted.

- ▶ Click [Configuration].
- ▶ Click [Edit parameters].
- ▶ Enter / set limit values for warning alarm and damage alarm and confirm with [Enter].
- ▶ Click [Write to device].
- > Changed parameter values are active in the device.

7.6 Configure further extensions

- ▶ To connect further extensions, repeat the actions in → 7.1, → 7.3, → 7.4 and → 7.5.

7.7 Start the Windows service for the extension package

- ▶ Start Windows application "Services".
- ▶ Right-click on the corresponding service "LR Agent (Pump2...7)".
- ▶ Select [Properties].
- ▶ Select start-up type [Automatic].
- ▶ Click [Apply].
- > The service is enabled and is automatically initiated when the appliance is started.
- ▶ Click on [Start] under [Service status].
- > The service is started.

8 Operation

8.1 Monitor process data

The LR SMARTOBSERVER enables the monitoring of process data. The LR SMARTOBSERVER is preconfigured for the "pump" application solution.

Access to the LR SMARTOBSERVER via

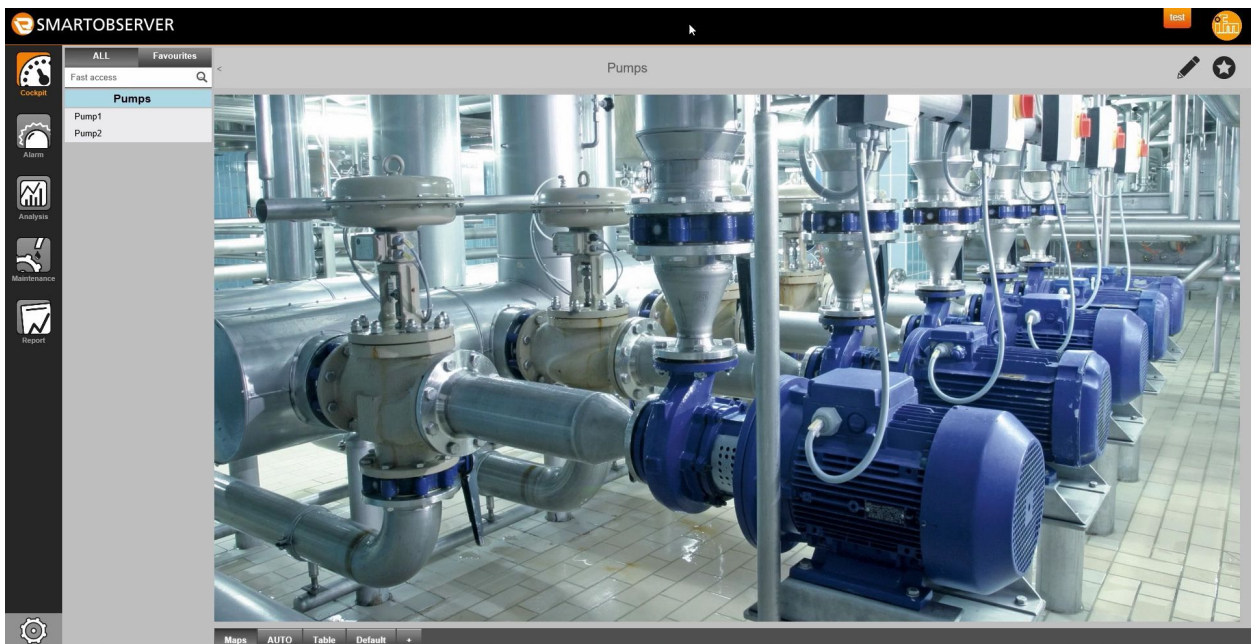
- remote access via the web interface of the LR SMARTOBSERVER (<http://192.168.2.50:45235/smartobserver>)
- local access (see instructions for set-up Pump application - Application solution)
- remote access via remote desktop connection (see instructions for set-up Pump application - Application solution)



Login details for the LR SMARTOBSERVER:

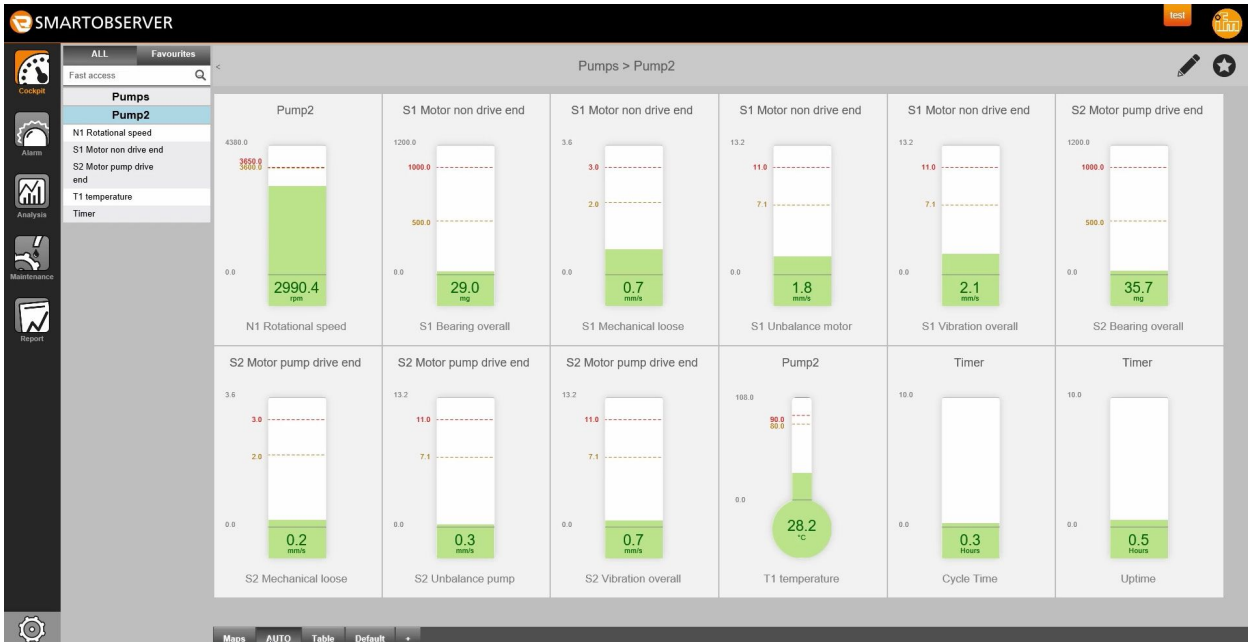
- user name: test
- password: test

- ▶ Start the LR SMARTOBSERVER.
- > The login screen appears.
- ▶ Enter the user name and password and confirm with [OK].
- > The user interface of the LR SMARTOBSERVER appears.



In the [Cockpit] section:

- ▶ Under [Pumps]: Select the application tag of the desired pump (e.g. Pump2).
- ▶ In the status line: Select the [AUTO] tab.
- > The window shows the current process values of the selected pump.




Explanation:

Display	Description	Source
Vibration overall	overall vibration: v-RMS (time domain)	vibration sensor (motor, non drive end / drive end, pump, non drive end / drive end)
Unbalance pump	unbalance	
Bearing overall	bearing monitoring	
Mechanical loose	soft foot, loose fitting	
Dirty blades	unbalance	
Temperature	current motor temperature	temperature sensor
Rotational speed	current speed of the motor in rpm	inductive sensor
Cycle Time	motor runtime	
Uptime	diagnostic unit runtime	diagnostic unit

8.2 Monitoring via the 5-segment light tower

It is also possible to visually signal alarms by means of the 5-segment light tower DV1500 (optional).

- ⊗ Segment 1: damage alarm
- ⊗ Segment 2: warning alarm
- ⊗ Segment 3: operating voltage
- ⊗ Segment 4: -
- ⊗ Segment 5: -

 For more detailed explanations we refer you to the operating instructions of the 5-segment light tower and to ifm.com.