

User Manual SmokeESC FSC-3000 regulator

1 Introduction

FSC-3000, based on pressure readings from the PS-3000 sensors, regulates the fan speed to maintain the specified overpressure in the protected space. The implemented algorithms, such as Innovation Vent Thrace, ensure short response times and compliance with the EN 12101-6 and EN 12101-13 standards.

1.1 Technical Parameters

PARAMETER	VALUE
Supply Voltage	24 V DC \pm 15%
Current consumption	typ. 90 mA, $I_{MAX} < 160$ mA
Battery type	CR2032
Communication	USB, IV BUS, Modbus RTU
Operating temperature	From -25°C to +50°C
Storage temperature	From -25°C to +70°C
Humidity	<90% RH, without condensation
Environmental class	2
Output signal level	0-10V DC / 4-20 mA
Case protection class	IP20
Dimensions	108 × 90 × 62 mm
Weight	200 g
Altitude above sea level	<2000 m AMSL
Mount type	TH35 Rail

1.2 Device description

For proper operation, the FSC-3000 regulator requires additional devices such as PS-3000 or SDC-3000. Communication between these devices is facilitated by the Innovation Vent BUS. Information about the current state of the regulator and the system is displayed through LED indicators and an LCD display. A computer can be connected to the regulator via a micro USB port, and a configuration application allows for reading and modifying the system settings. The regulator controls an inverter with a 0-10 V output or an optional 4-20 mA loop output. The FSC-3000 is equipped with a start input, fault signaling output, and allows integration with building management systems using Modbus RTU over an RS-485 port. The device is designed for installation on a TH35 rail.

2 Installation and startup

Before connecting the unit, make sure it has no visible damage and the installation has been performed in accordance with the recommendation of this manual.

2.1 Installation recommendation

The dimensions of the regulator are presented in figure 1. The device should be installed on a TH35 rail in accordance with the diagram in figure 2. The regulator must be installed in an enclosure that ensures a stable temperature and protection against sunlight and humidity.

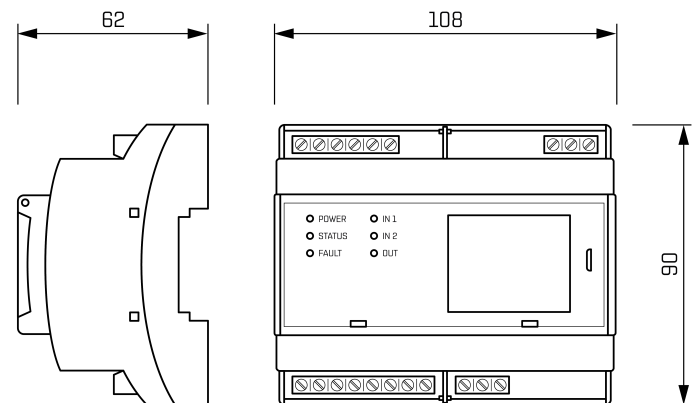


Fig. 1: Device dimensions in mm

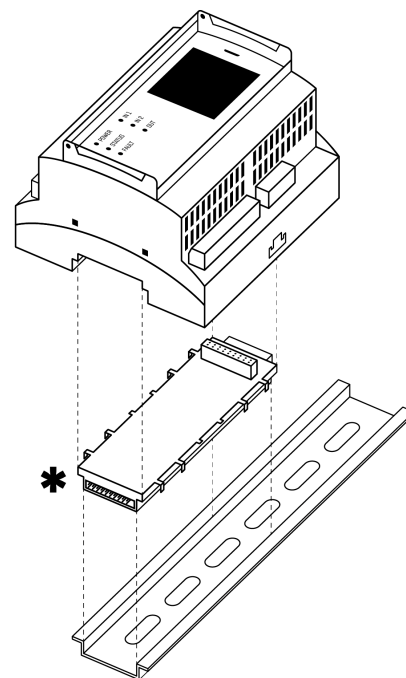


Fig. 2: Installation scheme

* Communication bus sold separately. Applicable only for integration with FirePLC controllers.

Notes on safety

- Before the first startup, carefully read this user manual.
- Neglecting to observe warnings and recommendations can result in electric shock, serious bodily injury, or fire.
- All connections and changes should be made with the power disconnected on all poles.
- Ensure proper operating conditions in accordance with the technical requirements of the device. Check the supply voltage, current output of the power source, and environmental conditions.
- Incorrectly connected device may become damaged.
- Only qualified individuals (after familiarizing themselves with this user manual) are allowed to connect the device and perform wiring.
- The responsibility for proper installation lies with the installer. Ensure that all guidelines and standards applicable in the given country are met.
- The device may be installed in a location accessible only to adults.
- Any attempts to make unauthorized changes to the device or self-repairs result in warranty voidance.

2.2 Device connection

2.2.1 Electrical connection

Caution!

The connection of the device must be carried out by authorized personnel. Any installations should be performed with the power turned off on all power supply poles. The device must be installed in the same building where the wiring connected to its connectors is done. All wires connected to the device must comply with the IEC 60332 standard.

The supply connection should be made in accordance with Figure 3. The minimum cross-section of the supply cable should be 0.5 mm². Connect the supply cable to terminals 1 and 2 of the regulator, paying attention to the supply line's polarization

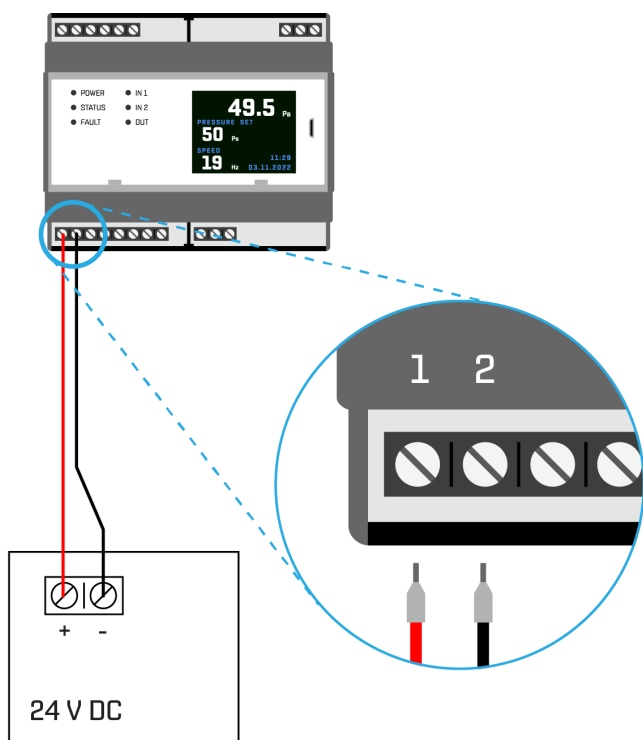


Fig. 3: Supply connection

2.2.2 Connection of BMS

The regulator is equipped with an optically isolated RS-485 interface designed for communication with BMS (Building Management Systems) using the Modbus RTU protocol. To establish the connection, use connectors 3-4. The connection method is illustrated in Figure 4. This port allows for reading the status of the FSC-3000 and the status of devices connected to it.

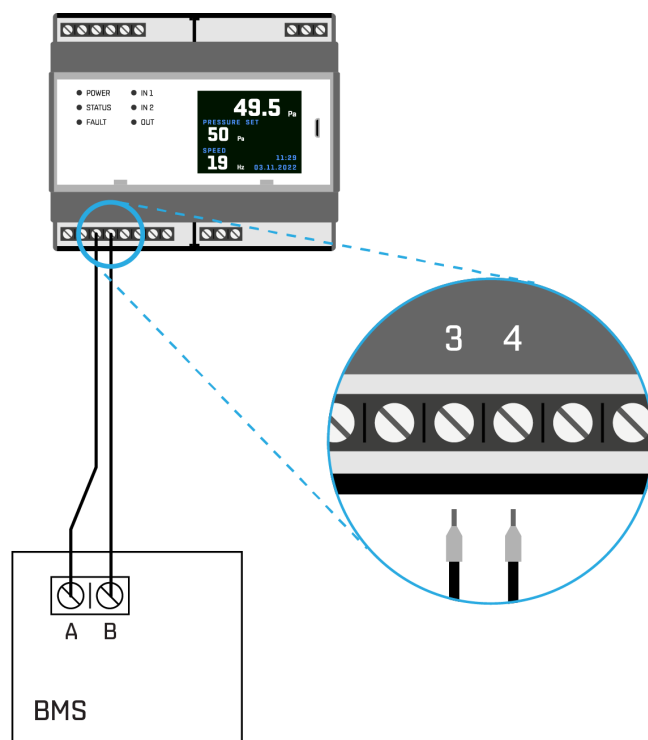


Fig. 4: Modbus connection

2.2.3 Connection of Innovation Vent Bus

Innovation Vent Bus allows for the connection of PS-3000 or SDC-3000 devices. The total number of connected devices must not exceed 24. To connect these devices, use a cable such as YnTKSYekw 1x2x0.8 or equivalent with similar characteristics. Connect the bus according to the diagram shown in figure 5, using inputs 6-7 and 9-10 of the device. Ground the cable shield at the beginning of the bus in one spot using, for example, an EMC clamp or grounding connector in the control cabinet. When connecting the bus to PS-3000 or SDC-3000 devices, ensure the continuity of the shield by using additional connectors or clamps inside these devices.

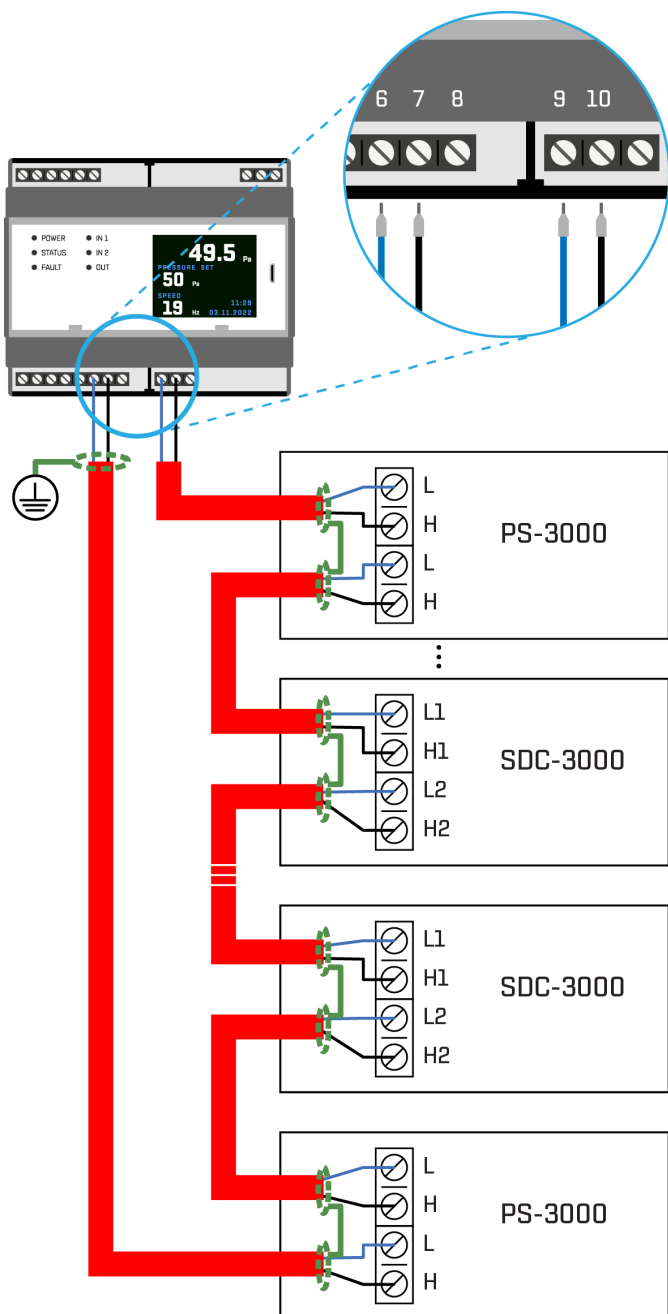


Fig. 5: Connection of Innovation Vent Bus

Maximum length of a connection is 350 m. Range may be shorter due to using wrong cable type, lack of proper shielding or due to electromagnetic interference. Range can be extended with usage of a REP-3000 extender. One REP-3000 extends range by up to 350 meters. It is recommended to use max 4 of REP-3000 devices in one bus.

2.2.4 Connection of relay outputs

FSC-3000 device is equipped with 2 relay outputs (SPDT) to which a load of maximum 30 V DC and a maximum current of 1A can be connected. The maximum cable cross-section is 1.5mm³. Output 1 uses connectors 20-21 and its type is NC. Output 2 uses connectors 22-23 and its type is NO. Output 1 is for fault signalling or lack of power signalling. Figure 6 pictures exemplary connection of a relay outputs.

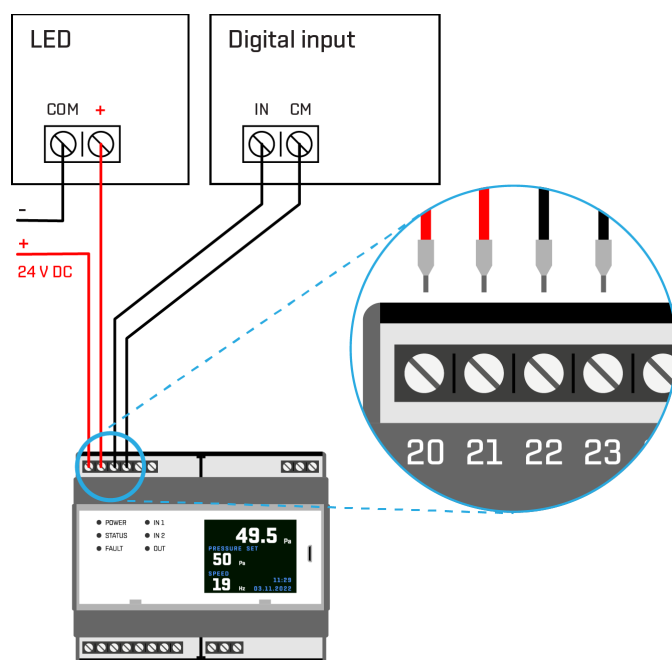


Fig. 6: Connection of a relay outputs

2.2.5 Connection of Frequency Inverter/Fan

FSC-3000 is equipped with a 0-10 V output and a 4-20 mA output designed for controlling the fan's rotational speed. The 0-10 V output is connected to connectors 24-25. The connection method is presented in figure 7. The 4-20 mA output is available as an option.

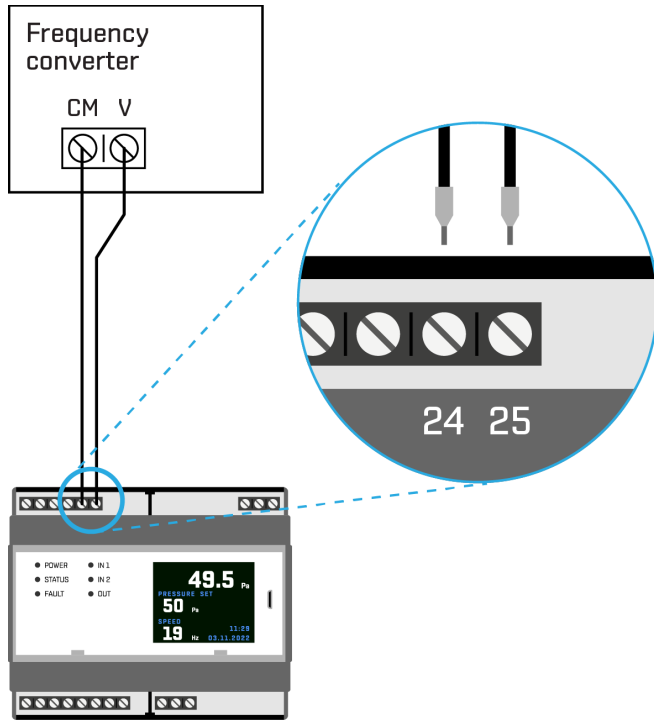


Fig. 7: Connection of a 0-10 V output

2.2.6 Connection of an input

The controller is equipped with two inputs that can work with potential-free outputs. To connect them, use cables with a maximum cross-section of 1.5 mm² and connect them to connectors 26-28. These inputs can detect three states: short-circuit, open, and a 10 kΩ resistance. IN1 is assigned to receive the start signal, and it is activated by a short-circuit. When the start signal is inactive, a 10 kΩ resistance must be connected to the input. The absence of resistance or an open circuit will trigger a fault signal. The connection method is shown in figure 8.

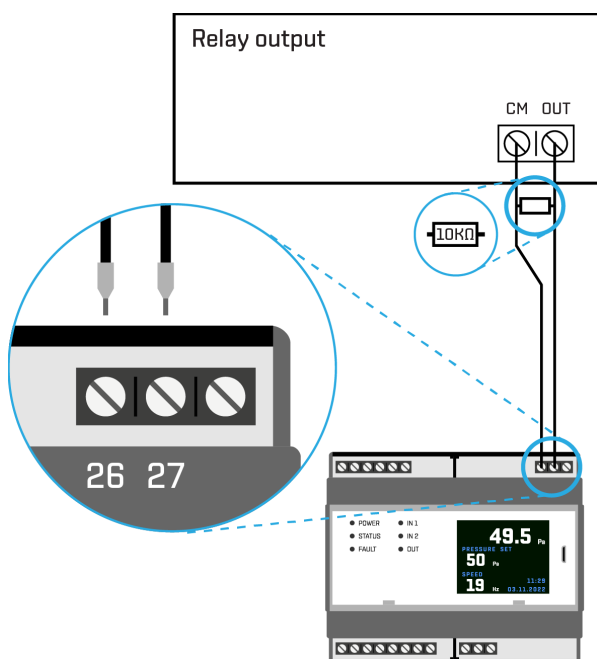


Fig. 8: Connection of input IN1

2.3 Other elements

2.3.1 USB connection

FSC-3000 has USB connector (micro USB type B) for connecting with PC application for loading and changing configuration of the device. Maximum length of a cable is 3 m.

2.3.2 LED Diodes

LED Diodes	Description
POWER	On - power supply available
STATUS	blinks - alarm detected is on - waiting for alarm
FAULT	blinks - fault detected
IN1	is on - IN1 fault
IN2	is on - IN2 fault
OUT	is on - NO relay is active

2.3.3 LCD display

FSC-3000 has built-in LCD display for displaying current parameters, configuration and information about faults collected from FSC-3000 and PS-3000 and SDC-3000 connected. Data is presented on three separate screens that details information to:

1. Configuration.
2. Work parameters.
3. Faults.

Device displays a maximum number of 18 faults that are split between 3 screens for 6 different faults. All other faults will be displayed after previous faults will be cleared. List of possible faults is available in appendix 1. Figures 9, 10, 11 and 12 show available screens. In parallel mode or constant work pressure is not present on a screen. In configuration with vestibules set pressure and measured pressure is available only when start signal is present on FSC-3000 and PS-3000 input.

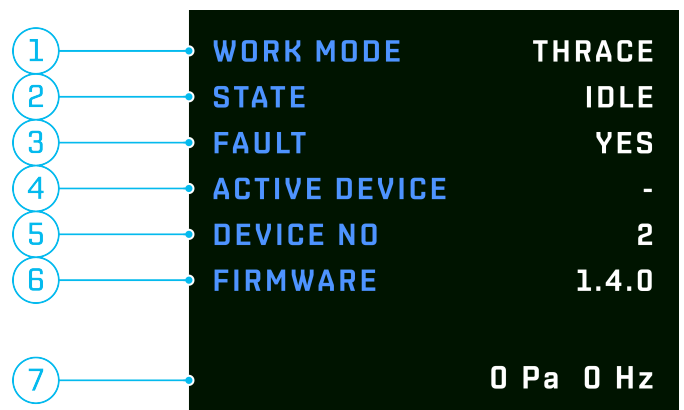


Fig. 9: Screen 1 - configuration

Index	Description
1	Work moded for selected device
2	Regulator state
3	Fault summary
4	Active device address
5	Amount of connected devices
6	Firmware version
7	Current measured pressure and set frequency [Hz]

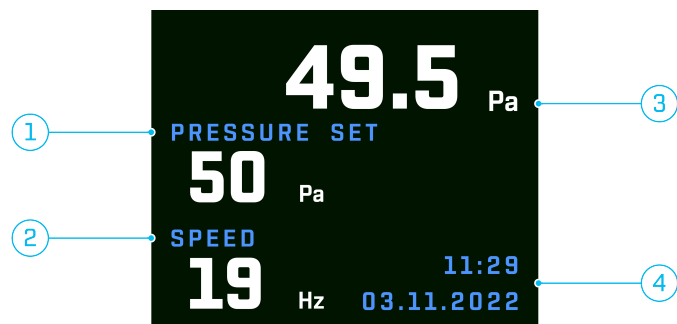


Fig. 10: Screen 2 - work parameters

Index	Description
1	Set pressure
2	Current fan frequency value
3	Current pressure measured
4	Current time and date

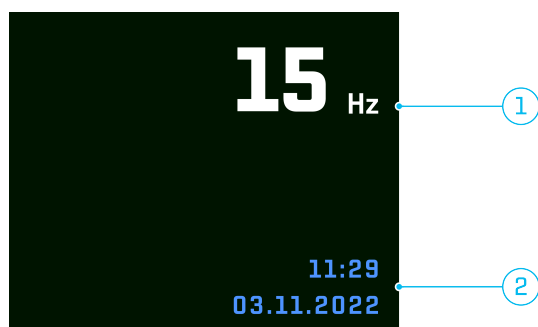


Fig. 11: Screen 3 - work parameters in constant set mode

Index	Description
1	Current fan work frequency
2	Current time and date

Scan to find out more.

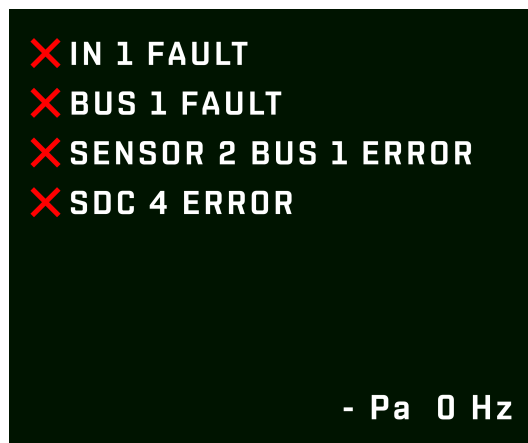


Fig. 12: Screen 4 - exemplary faults

2.3.4 Battery

Caution!

Battery replacement must only be carried out by qualified and authorised personnel after reading this operation manual. Before starting work switch off the power supply to the unit. Next replace the battery. Do not use different type of battery due to possibility of explosion or fire.

Caution!

Battery has not to be exposed to high temperature, fire or mechanical stress, ie. crushing, cutting or low air pressure. Otherwise it can cause a battery leakage of flammable gas.

The regulator contains CR2032 made by VARTA company and it should be replaced with same type of CR2032 battery made by VARTA. New battery should be transported only in an original package. Used battery should be protected against short-circuiting it's terminals. When replacing a battery make attention to the polarity marked on battery cage.



Technical issues?
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Appendix 1.

Faults displayed on the FSC-3000 screen

FSC-3000 possible faults	Description
No adapt data	Adaptation has not been performed
Adapt failed	Fault occurred during adaptation procedure
In 1 fault	FSC-3000 Input 1 discontinuous detected
In 2 fault	FSC-3000 Input 1 discontinuous detected
Bus 1 internal fault	FSC-3000 device bus internal 1 fault
Bus 2 internal fault	FSC-3000 device bus internal 2 fault
Repeater lost	Communication lost with FSC-3000 working in repeater mode
Bus 1 Fault	Lost communication with device on IV BUS 1
Bus 2 Fault	Lost communication with device on IV BUS 1
Firmware Incom.	Incompatible communication device detected
Sys SENS conf fail	Number of PS-3000 detected on the bus is not correct
Sys SDC conf fail	Number of SDC-3000 detected on the bus is not correct
Sensor fault	PS-3000 fault detected
Setpoint missed	Adaptation fault detected
Invalid group	Group configuration wrong or missing for PS-3000
Bus internal fault	FSC-3000 device fault detected
Invalid vest samples	Group configuration wrong or missing for PS-3000 group
Adapta setpoint not reached	Set pressure point not reached during adaptation

PS-3000 possible faults	Description
Sensor X bus 1 err	Communication error with PS-3000 with address X on IV BUS 1
Sensor X bus 2 err	Communication error with PS-3000 with address X on IV BUS 1
Sensor X in fault	Input discontinuous on PS-3000 with address X
Sensor X wrong cmd	Communication error with PS-3000 with address X
Sensor X sens err	Pressure sensor fault on PS-3000 with address X
Sensor X adres err	Two or more PS-3000 with address X detected
Sensor X lost	No communication with PS-3000 with address X
Sensor X not supp	PS-3000 device with address X has incompatible firmware version

SDC-3000 possible faults	Description
SDC X lost	Communication error with SDC-3000 with address X
SDC X error	SDC-3000 with address X fault detected