LES-RACK Local Extinguishing System

Operation Manual and Installation Guide

Product name: LES RACK

This manual serves as a product documentation for installation and commissioning of the **LES-RACK**, supplied by **CONTEG spol. s r.o.** This device is only to be used according to the instructions and under the operational conditions described in this manual. It is advised to read it thoroughly and keep it at one's disposal.

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Contents

CONTEG, spol. s r.o.
Štětkova 1638/18, 140 00 Prague 4, Czech Republic
Tel.: +420 261 219 182, Email: conteg@conteg.com, **www.conteg.com**
Company ID: 25701843, VAT ID: CZ25701843

3

● GENERAL INFORMATION

○ General

LES-RACK is an autonomous, fully automatic fire detection and extinguishing system designed for a localized fire protection of control, telecommunication and data center cabinets and other rack enclosures using the 19" racking system, where the device is sited at the top.

It consists of a fully equipped automatic fire detection system, control, evaluation, communication and extinguishing unit. In the event of device activation, the manufacturer recommends the inspection of those equipment that have been exposed to the extinguishing. **CONTEG spol. s r.o.** company is not responsible for any damage caused to the data carriers.

The extinguishing agent used in the LES-RACK device is FK 5-1-12 and fulfills EN 15004-2 requirements. FK-5-1-12 is a clean, colourless, delicate-odour liquid agent. The extinguishant is non-corrosive and non-conductive. Unlike carbon dioxide, it does not cause thermal shock to extinguished objects. It has a density corresponding to 11 times the density of air, Upon application, no traces of residue are left as it evaporates. It is totally safe for people and the environment. It is mainly designed for extinguishing A, B, and C group fires, as well as for extinguishing of electrical circuits with nominal voltage up to 1000V.

Fire detection is ensured using two optical smoke and temperature detectors, built in the LES-RACK. These are designed in a redundant connection in such a way that false alarms and errors in the so-called two-sensor dependency are excluded.

The lifespan of the device, excluding the back-up battery, extinguishing agent and pressurized nitrogen, is 10 years from the year of manufacture. The life of the batteries depends on the working environment, especially on the working temperature higher than 25°C, and is set by the manufacturer for 4 years. In general, the higher the temperature, the shorter the battery life. Product warranty is 2 years from the moment of purchase, considering the right operating conditions are ensured and regular maintenance is carried out. See the chapter Maintenance.

Functional test of the entire system, including detection, pressure and drive parts of the equipment should be performed every 12 months. The quality of the extinguishant, battery capacity and the pressure inside the tanks and their integrity shall be inspected at least once every 24 months. Each inspection is performed by a person trained by the manufacturer or authorized distributor.

○ Usage

LES-RACK may only be used in accordance with the operating conditions specified in the technical documentation and operating instructions. If the device is used in a way that is outside of defined operating conditions, the manufacturer shall not be liable for any damages caused by such use. All risks imposed by incorrect use are strictly under the operator's responsibility. **CONTEG spol. s r.o.** is also not liable for any damages caused by fire itself or damages caused by products of combustion. The operator must also carry out regular

CONTEG, spol. s r.o.
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Tel.: +420 261 219 182, Email: conteg@conteg.com, www.conteg.com
Company ID: 25701843, VAT ID: CZ25701843

4

visual and functional checks in accordance with the operating conditions and the maintenance plan. Maintenance and service must be documented.

The user of the equipment must draw attention to all changes and modifications in the monitored and protected area or an object that could affect the function or effectiveness of the LES-RACK fire extinguishing system (e.g. shading the fire nozzle when installing new equipment, adding or establishing new ventilation holes in guarded area, etc.). Visual and functional inspections are fully the responsibility of the customer. Other Inspections may only be carried out by persons trained by the manufacturer/distributor. More in the Inspection chapter.

○ General Safety requirements

Activation of the LES-RACK fire extinguisher can create risks for the user arising from the natural form of the fire extinguisher itself, or from decomposition products caused by contact of the fire extinguisher with fire or hot surfaces. The user of the equipment is obliged to prevent any exposure of the user to the effect of both the fire extinguisher itself and the decomposition products, especially by observing regular training.

The actuation of a fire extinguisher may be accompanied by a noise loud enough to attract attention, but not so loud as to result in injury. A fire extinguisher discharged from a device nozzle at high velocity can flow with sufficient force to move physical objects in or near its path. Discharged extinguishing agent may cause currents in the protected space sufficient to set in motion light unsecured objects.

WARNING: Pressure cartridges are part of the device, therefore it is necessary to treat the device as a pressure device !

○ Safety

The equipment described here has been manufactured in accordance with the latest technical regulation and recognized safety rules and is characterized by a high degree of operational safety.

However, the device may present a hazard or damage the system or other property if used improperly or otherwise than intended. The device may only be used in an undamaged and fully functional state. The instructions for installation, operation and maintenance of this device contained in this user manual are aimed at correct, safe and error-free operation. Since applicable regulations may vary around the world, the applicable national regulations and laws at the place of use must be followed, even if they conflict with the warnings contained in this user manual.

Particular attention should be paid to the following:
- National regulations for safety and accident prevention.
- National standards and laws, especially with regard to hazard detection systems.
- National regulations for assembly and installation.
- Generally accepted technical principles.
- This user manual including the safety and warning notices contained therein.
- Characteristics and technical specifications of this device.

CONTEG, spol. s r.o.
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5

If it is suspected that safe operation is no longer possible (e.g. in the event of damage), the device must be immediately taken out of service and secured against inadvertent re-commissioning.

NOTE: *This "LES-RACK Fire Extinguisher Assembly and Operating Instructions" serves as working documentation for the installation and commissioning of the equipment. However, they cannot fully replace training.*

○ **Working conditions**

The device is intended for installation in an area protected against weather conditions class 3K3 according to ČSN EN 60721-3-3 with a temperature range of +5°C to +45°C. The correct function of the device is conditioned by the working position of the device and its location in a closed, protected space. The working position must always be horizontal, the control panel of the device must be easily accessible. The device must be placed in the highest possible place of the protected area. The working capacity of the device is guaranteed in the temperature range from +5°C to 45°C with a maximum humidity of 85% and in an environment where moisture condensation does not occur. Checking whether the maximum permitted temperature has not been exceeded in the Device assembly chapter assembly chapter.

WARNING: *If the temperature of the device exceeds 45°C, there may be an uncontrolled leakage of fire extinguishing agent through the safety pressure valve. This is a consequence of the high temperature of the fire extinguisher in the tank, during which a gradual change of state from liquid to gas can occur. The result is an increase in pressure in the tank.*

○ **Operator responsibility**

The operator undertakes to allow work on/with the LES-RACK active firefighting system only to persons who are familiar with the basic regulations on occupational safety and accident prevention. Who have been instructed in the handling of this device and the entire system and who have read and understood the instruction manual including the safety and warning notices contained therein.

○ **User responsibility**

Installation, maintenance, inspections and repairs may only be carried out by persons with appropriate professional qualifications. Such persons are, for example, "individuals competent in matters relating to hazard detection systems" or "qualified electricians for hazard detection systems". The applicable national regulations must be observed, especially with regard to the required qualification, in the country of use.

Furthermore, all individuals working with the equipment undertake to always comply with the basic regulations on work safety and accident prevention, to familiarize themselves with the conditions of the object and its environment, the safety concept, the protection system and, if applicable, the monitoring system of the superior fire detection system before starting work. He has read and understood the operator's manual, including its safety and warning

CONTEG, spol. s r.o.
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Company ID: 25701843, VAT ID: CZ25701843

6

notices. Any questions regarding the instruction manual should be reported immediately to the appropriate authorized third party or the equipment manufacturer.

NOTE:

● *Unauthorized changes and modifications to the device are not permitted and void any liability of the manufacturer.*

● *Use only original spare parts.*

● *We reserve the right to make changes in the interest of technical development while maintaining the key features of the described type of device, without modifying this instruction manual.*

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7

● DESCRIPTION

○ Technical parameters

Table number 1

LES-RACK parameters:	Value:
AC supply input voltage range	100-240 VAC
Frequency	50-60 Hz
Current at 230V AC	0,5 A
Efficiency	88%
Current at 230V AC	<1mA
Output voltage	U_n = 24 VDC
IP	20
Extinguishant container volume	1,8 l
Operating temperature	+5 až +45
Storage temperature without the extinguishant	-40 až +80°C
Relative humidity (non-condensing)	85%
Dimensions (WxHxD)mm – w/o the nozzle	482x45x602mm
Weight without the extinguishant	14,7 kg

○ Design

The casing of the device is made of steel sheet metal. The extinguishant container and the piping are made of stainless steel and other non-corrosive materials. All materials have been tested and correspond with the described operating conditions and the extinguishant used and are to last throughout the lifespan of the device.

All metal components of the casing are finished with black polyester powder coating (RAL 9005). Minimal thickness of the coating is 60 μm. The resistance to separation corresponds to class 1 according to ISO 2409. The surface should not contain any defects, like scratches, excess paint, dirt etc.

The inside of the device, including the component placement is shown in the Figure no.1

○ Description
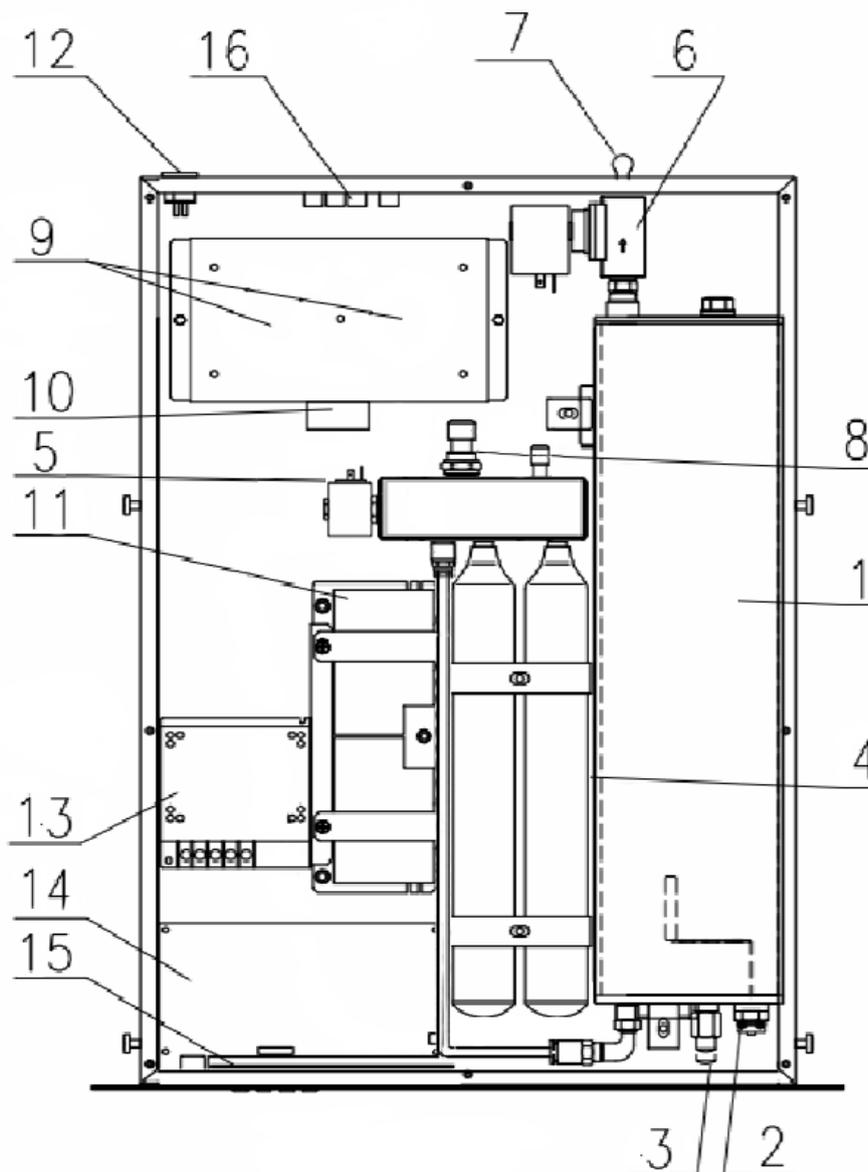
Figure number 1 – Product desccription

The fire extinguishing unit is composed of:

- **The fire extinguisher tank** (1) consists of a stainless steel non-pressurized rectangular storage container (1), filled with fire extinguisher (FK-5-1-12, dodecafluoro-2-methylpentan-3-one). The volume of the tank is 1.8 l, i.e. approx. 2.7 kg of fire extinguisher.
- **The level gauge** (2) is used to continuously check the amount of fire extinguisher in the tank. When the level drops below the set limit, the "System fault" signal lights up. At the same time, this status can be monitored over the network.
- **The pressure relief valve** (3) is used to protect the device in the event of a malfunction and overheating of the tank above the permitted temperature limit, when gasification of the fire extinguisher may occur already in the tank.

- **Compressed nitrogen in the pressure cartridge** (4) when extinguishing is started after opening the **electromagnetic valve** (5), the reduced pressure will be released and the fire extinguisher will be pushed out of the tank. The extinguishing agent is then directed through the open **electromagnetic valve** (6) and **the nozzle** (7) and dispersed under pressure into the protected space.
- **The pressure switch** (8) is used to check the pressure in the pressure cartridges.
- **The bulit-in detectors** (9) are stored in the left rear part of the cabinet. It is a combination of temperature and optical smoke detection. Air is slowly sucked into the detectors by an **auxiliary fan** (10).
- **Backup battery Un** (11) is used to back up the system in the event of a power failure or DC source failure. The battery capacity will fully cover the energy requirements of the system during extinguishing for a maximum of 4 hours, however, the time is not guaranteed throughout the life of the device due to the decreasing life of the batteries. More in the category Connecting and disconnecting backup batteries
- **The AC connector** (12) is used to connect the **DC source** (13) to the 230V AC distribution network.
- **The control board** (14) concentrates and evaluates data from all inputs and sensors. The operation of the entire system is then controlled based on the results.
- **The manual control and local signaling board** (15) is used for manual control, control and detection of the system status. Unequivocal indication of device status using LED elements on the front panel reports any current combination of device functional states. More in the Singaling chapter.
- **The board of external inputs and outputs** (16) ensures the collection of signals from external safety elements and the control of auxiliary devices of the system using internal relays. At the same time, it enables the connection of 4 potential-free relay outputs. More in the chapter Setting input/output devices. Setting input/output devices.

■ **Front Panel**

The device can be controlled locally using the elements on the front panel or remotely using the network connection also on the front panel.
The layout of control elements and signal diodes on the front panel is shown in Fig. no. 2.
All control elements and signal diodes are marked with a functional description - functional label. More in the Singaling chapter..

Back-up battery connections switch
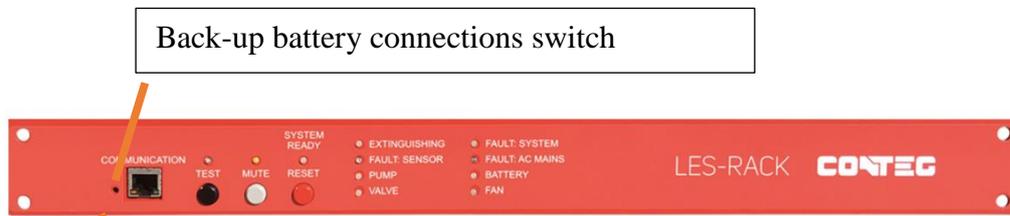
Figure number 2 – Front panel

Back-up battery disconnection. Located on the bottom side of the panel, apx. 1,5cm from the left edge and 4cm from the front

■ **Back panel**

On the back panel, the input/output terminal block is equipped with 4 relays for controlling external devices, connectors for connecting signals from external safety elements and connectors for switching external devices. All connectors are marked with a function label. More in the chapter Setting input/output devices.
The layout of the individual connectors is shown in Fig. no.: 3 and 4

1. Nozzle
2. PE

3. Relay board
4. AC inlet

Figure number 3 – Back panel

Figure number 4 - Description of the terminal board for connecting Input/Output devices

■ **Setting input/output devices**

For any changes to the software settings, see below, you also need to restart the device after saving (Main Menu -> Upload -> Reset).

Figure number 5 - Upload

For the software settings, see Getting to know the web interface chapter.

● **Relay outputs**

The LES-RACK is equipped with 4 SPDT relay outputs, one of which is DPDT switch (Double Pole Double Throw Switch). Separate activation of the relay can be set up by the user. It is also possible to activate relays during testing. „TEST" (Alarms -> Select alarm 20 Test).

The software setting of the relay can be done in the Outputs main menu after logging into the web interface.

The maximum switching voltages and currents are listed in Table No. 2.

Software settings chapter Outputs.

CONTEG, spol. s r.o.
Štětkova 1638/18, 140 00 Prague 4, Czech Republic
Tel.: +420 261 219 182, Email: conteg@conteg.com, www.conteg.com
Company ID: 25701843, VAT ID: CZ25701843

12

Figure number 6 - Switching settings and relay name

Table number 2

Síť:	Umax	Imax / Un
AC	60V	0,5
DC	24V	0,5

NOTE: *These outputs can be used, for example, to connect a GSM module, where one of the outputs will be switched on in the event of a fault (Alarms -> Select alarm: 22 Minor/23 Major) and the other in the event of fire detection and extinguishing (Alarms -> Select alarm: 25 Extinguishing).*

Figure number 7 – Minor alarm setting

Figure number 8 – Setttings of alarm extinguishing function

● **Door sensor switch**

Prevents extinguishing to discharge when the door is open. Opening the door turns on the door switch and this deactivates the extinguishing. The reason is that with the door open, the extinguishing agent would not reach the required concentration inside the cabinet. The integrity of the contact circuit is constantly monitored.

The wiring diagram for the door contact is shown in Figure no. 10.

When the extinguishing is blocked, the „EXTINGUISHING" indicator on the front panel lights up yellow

The door sensor switch must be first set, after connecting to the web interface in the menu Alarms -> Select alarm 2 Door, by selecting the Blocking function and activating the functionality of the door switch sensor. Several door sensors can be connected in parallel. The circuit must always be terminated with a terminating resistor, see Figure no. 10.

Figure number 9 - Extinguishing blocking setting

The resistance values in the diagram are as follows:

Rp: 1K8 Ohm, 0,1 W
Rs: 470 Ohm, 0,1 W
Resistors are part of the delivery, only 4 pcs of each type.
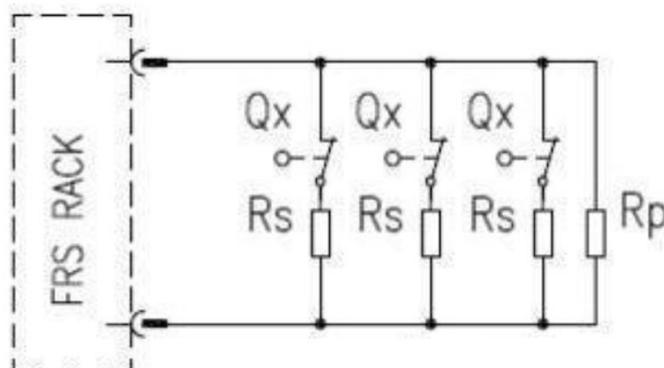
Figure number 10 - Wiring diagram of door sensor switch

- **External Sounder LED Beacon**

    It is used for acoustic signaling in other, remote areas than the guarded area. The external sounder LED Beacon is activated simultaneously with the extinguishing command. It can be turned off with the "MUTE" button on the LES-RACK front panel.

    External sounder LED Beacon power supply is Un, maximum current 150mA
    The wiring diagram of the external siren is shown in Figure 12.

The external sounder LED Beacon does not need to be activated by software, but it is advisable to set an error message (see figure no. 11) if it is disconnected or if there is another malfunction of the siren.

Figure number 11 - External Sounder LED Beacon setting

The resistance values in the wiring diagram are as follows:
Rp: 1K8 Ohm, 0,1 W
Rectifier diode
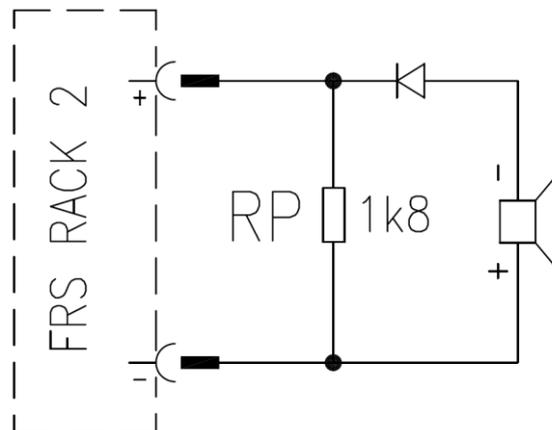
Figure number 12 - Wiring diagram of External Sounder LED Beacon

● **Manual extinguishing release button**

Allows to initiate extinguishing remotely and manually. The integrity of the circuit is constantly monitored. The setting of the manual extinguishing release button is shown in Figure no. 13.

The extinguishing action when the button is pushed must first be activated in software after logging into the web interface (Alarms -> Select alarm: 1 Button). Multiple manual start

buttons can be connected in parallel. The circuit must always be terminated with a terminating resistor, see figure no.14.

Figure number 13 – Manual extinguishing release setting

The resistance values in the diagram are as follows:

Rp: 1K8 Ohm, 0,1 W
Rs: 470 Ohm, 0,1 W
Resistors are part of the delivery, only 4 pcs of each type.
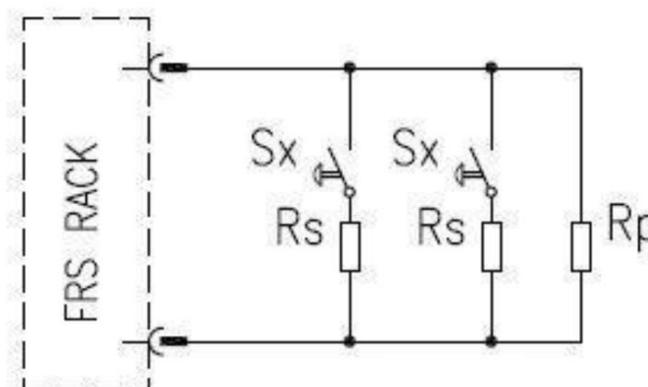
Figure number 14 - Wiring diagram of Manual release button

● **External dry contact sensors**

These inputs allow remote control of the LES-RACK from other devices connected to it (extinguishing start-up/extinguishing block/connection of fire alarm systems). If the

connected equipment requires power supply, it should be supplied by an external source. However, in no case are these inputs intended for connecting external fire detectors, unless they have a relay output.

The integrity of external sensor circuits is also continuously monitored. If several external sensors are connected in parallel, the circuit must also be terminated with a terminating resistor

Wiring diagram of External dry contact sensors is shown in Figure no.15

The resistance values in the diagram are as follows:
Rp: 1K8 Ohm, 0,1 W
Rs: 470 Ohm, 0,1 W

Resistors are part of the delivery, only 4 pcs of each type.
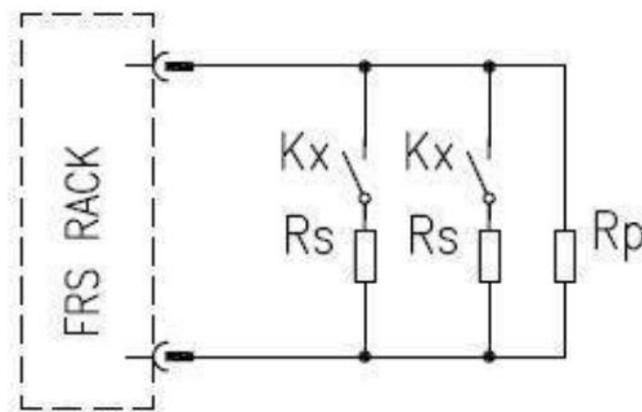
Figure number 15 - Wiring diagram of External dry contact sensors

Figure Number 16 - Setting the function of the external sensor

NOTE: *These inputs can be used, for example, to connect door sensor switches when we want to distinguish which door sensor is open at a given moment and monitor this status with the name of the sensor, which will be visible in the log, see figure no. 16 (Text). LES-RACK can therefore have up to 4 door sensor switches that can be distinguished from each other. If there is no need to differentiate the door sensors, you can connect the door sensor switches in parallel. However, it is necessary to observe the same connection principle as shown above and activate the Blocking function. (Alarms -> Select alarm: 6 Sensor1-3).*

- **External temperature monitoring sensor**

  The installation is carried out in the protected space in which the temperature needs to be monitored. The temperature sensor is used to check the temperature in the guarded area. When the preset temperature limits are exceeded, the user-selected relay is switched on. The length of the temperature monitoring cable (included in the product package) is 25 cm, at the customer's request we can also deliver a cable with a length of up to 2 m or more.

  After connection, the sensors must be activated via the web interface (Temperature -> Thermometer -> Temperature2-3) Figure no. 17.
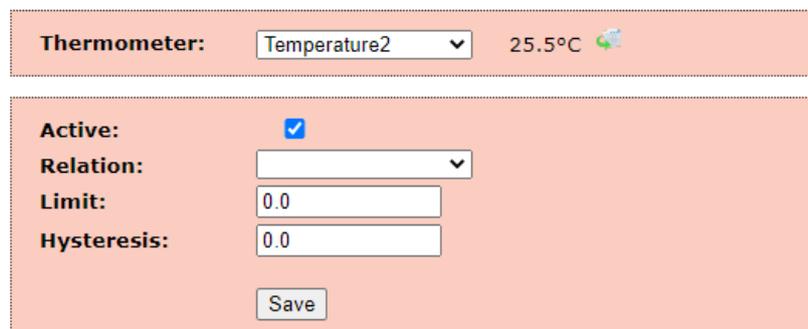

Figure number 17 - Activation of the external temperature sensor

Relation: relation between the measured temperature and the set temperature
Limit: temperature limit
Hysteresis: idle interval

CONTEG, spol. s r.o.
Štětkova 1638/18, 140 00 Prague 4, Czech Republic
Tel.: +420 261 219 182, Email: conteg@conteg.com, www.conteg.com
Company ID: 25701843, VAT ID: CZ25701843

19

Figure number 18 - Setting the function of the external temperature sensor

- **RS485**

Used to connect standard serial communication. RS-485 (as well as RS-422) is characterized by a two-wire connection of units. These wires are marked with the letters A and B. In the idle state, the voltage on wire A is lower than on wire B. The maximum length of the bus is up to 1,200 m, the maximum number of nodes (i.e. devices transmitting and receiving data along the line) is 32. When using repeaters, the number of nodes can be higher. The maximum transmission speed is inversely proportional to the length of the line. The transmission speed for short connections (up to 10 m) can be up to 10 Mb/s. When communicating over longer distances, the line must be terminated on both sides with termination resistors, or terminators. The purpose of "terminators" is to prevent signal reflections from the ends of the line, they also help to increase the resistance of the line against interfering signals. Ideally, the terminator should have a value of 110 Ω (so-called image impedance), the resulting impedance of the line is then 55 Ω (110 Ω ∥ 110 Ω). For connection, use one of the two RS485 contacts, the other can subsequently be used to connect another control panel in series (so-called cascade). For more info . Settings in the Network main menu.

Figure number 19 – MODBUS protocol setting

● WEB INTERFACE OVERVIEW

Shows the state and network settings of the device.

Default values:
IP address: 192.168.1.103
Mask: 255.255.255.0
Gateway: 192.168.1.1
Login: admin
Password: admin

Log in (name, password) is necessary for saving the device settings. If the user does not authorise, or if the log in information is incorrect, saving button will show unavailable. To log in again, close the web interface and repeat authorisation.

NOTE:Authorisation data transfer is not encrypted.
WARNING: Older versions of the browser may display the web interface incorrectly.

○ Menu

Status – status window
Network – network setting
Alarms – alarm setting and input/output components
Temperature – temperature sensors setting
Mail – email setting
Outputs) – ovládání výstupních relé
Date & Time) – date and time setting
Logs) – events history
Download) – MIB tree for SNMP and list of logs in CSV format
Upload) – settings back up, language change (Upload of file lang.txt)

○ Status

A main screen that shows statuses same way as shown on the device front panel. Status System or Sensor can be further explored by clicking the cirle button which shows more information about errors or sensor status.
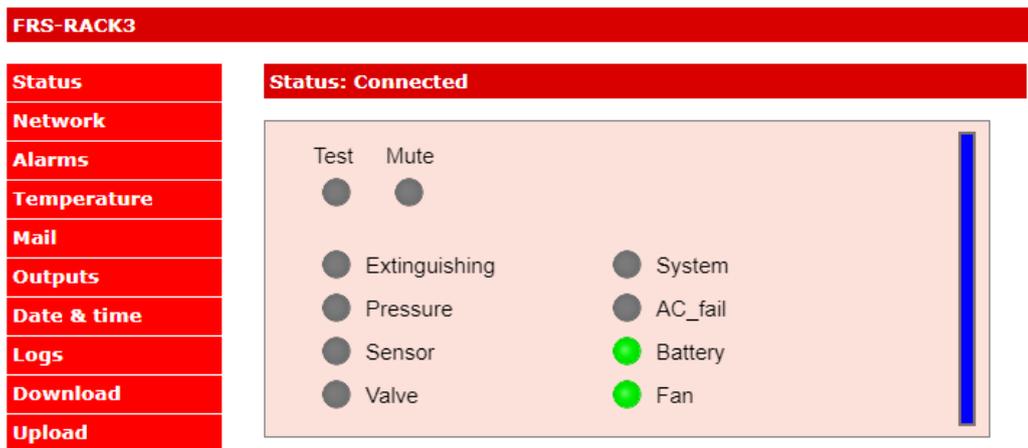
Fiagure number 20 - Status

● **Status window:**

Shows state of the extinguisher level. The fire extinguisher level indicator panel is on the right.
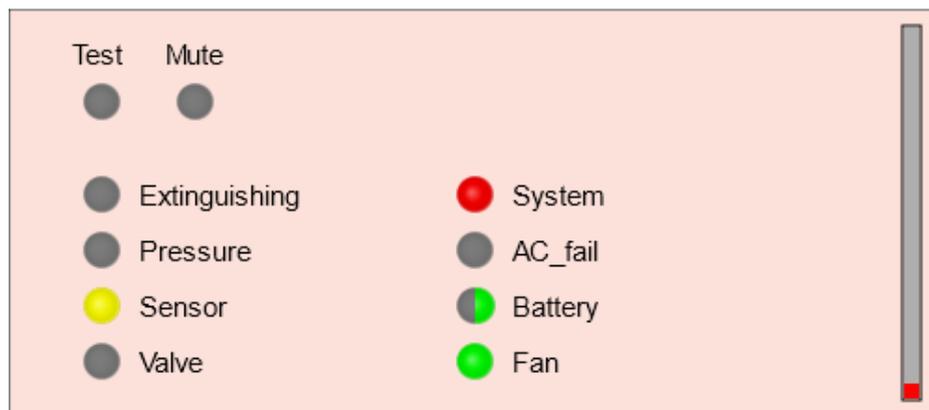
Figure number 21 – Status window example 1

Above status window shows:
- system fault signaling MAJOR in red (MINOR is in yellow)
- The battery (flashing green) is physically connected but not software connected.
- FAN is OK.
- Fire extinguisher level is low (indicating panel shows low status).
- The fire sensor (Sensor) is faulty.

If a system fault (MINOR, MAJOR) is active, press the System LED to view the details of the fault.

System alarms   **Location**

Alarms:
Zone1 MAJOR
Low level MAJOR

Figure number 22 - System detail

Press LED Sensor to display the assignment of fire sensors to zones and their status

	Zone1[2]	Zone2[0]	Zone3[0]
F. sensor1	✔		
F. sensor2	⚠		
F. sensor3			
F. sensor4			
F. sensor5			
F. sensor6			

Sensors reset

Figure number 23 - Fire detector status window

✔	sensor OK
🔥	sensor is active
⚠	faulty sensor
⏻	sensor power supply is off - reset is being performed
⏻	sensor power supply is off - indicating short line

The Sensors reset button is used to reset the sensors.

Figure number 24 – Status window example 2

Above status window shows:
- FAN in work
- Battery in testing mode
- Fire extinguisher level is OK

○ **Network**

Figure number 25 – Network setting

IP address: device IP-address.
Gateway: must be entered even if not used.
Primary and secondary DNS: in case of mail functions use.
SNMP trap1, 2:

      IP: SNMP-server address.

      Port: default value is 162, can be edited, if the port is occupied.

      Community: SMNP trap community.

TCP port: TCP communication port.
UDP port: UDP communication port.
Read, Write community: SNMP community.
Refresh HTML: window content refresh rate in ms.
Type: Title
Header: header text.
Footer: footer text (HTML tags can be used to link to web addresses).
Group extinguish: the devices entered to the same group (except 0) will be activated simultaneously, if a fire is detected by any of them. Same works with testing, muting, and resetting after the extinguishing. The devices should be in the same network segment. For other cases UDP broadcasting can be used.
BAUD RATE: RS485 speed (2400, 4800, 9600, 19200)
Modbus ID: slave ID
User, Password: editing username and password.

NOTE: If the IP address or password is forgotten or lost, they can be reset to default values

For that, press and hold down the "RESET" button until the LED indicator starts flashing green and red, now you have several options:

- **Press the TEST button, and the device will default password and IP address values.**
- **Press the MUTE button, and the device will reset without changing its settings.**
- **Press the RESET button to exit reset mode.**

○ Alarms

Figure number 26 – Alarm setting example

Select alarm: choose the alarm you need to edit.
SEP: displays status of the alarm.
Zone settings:
#sensors: number of simultaneously triggered sensors for extinguishing activation
F. sensor1-6: checked, if the sensor belongs to the selected zone
Notification settings:
Text: description of the alarm to be displayed in the log and SNMP protocol
Trap: status change or fault will send a trap.
Mail: status change or fault will send an email.
Error Major: fault will be displayed as major system fault.
Error Minor: fault will be displayed as minor system fault.
State Major: change of state will be displayed as major system fault.
State Minor: change of state will be displayed as major system fault.
Extinguishing: checked status will activate extinguishing.
Blocking: checked status will block extinguishing.
Relay 1-4: checked status activates relay switches.
Inv. relay: relay inversion
Inv. status: state inversion
Ext. delay: delay of extinguishing in seconds. The sensors must remain active until the extinguishing begin – only for extinguishing notifications.

NOTE: available settings vary depending on the alarm selected.

Alarm descriptions:

Table number 3

Alarm	Description	Status 0	Status 1	Error
Zone 1	Fire Zone 1	OK	Extinguishing	Zone error
Zone 2	Fire Zone 2			
Zone 3	Fire Zone 3			
Fire sensor1	Fire sensor 1	OK	Fire	Failure, disconnected
Fire sensor2	Fire sensor 2			
External button	External Activation button	OK (off)	ON	Failure, disconnected
Door	Door sensor	OK (closed)	OPEN	Failure, disconnected
Propellant gas pressure	Gas pressure switch	OK (No pressure)	Pressure exceeded	Failure, disconnected
External Sounder LED Beacon	External Sounder LED Beacon	OK	ON (Sound)	Failure, disconnected
Battery	Back up battery	Disconnected	Connected	Test failed
External sensor 1	External Sensors	Inactive	Active	Failure, disconnected
External sensor 2				
External sensor 3				
Valve 1	Solenoid Valve – propellant gas	Closed	Open	Failure, disconnected
Valve 2	Solenoid valve - extinguishant	Closed	Open	Failure, disconnected
Extinguishant level	Level sensor	Normal extinguishant level	Low	Failure, disconnected
AC fail	Power Supply 230V AC	Network OK	Outage	
PS	Power Supply Un	OK	Battery test	Low voltage
PS 12 V	Power Supply 12 V	OK		Low voltage
PS 29 V	Power Supply 29 V	OK		Low voltage
Temp 1 - internal	Intenal temperature sensor	OK	Temperature exceeded set limit	Failure
Temp 2 - external	External temperature sensor	OK	Temperature exceeded set limit	Failure
Temp 3 - external				
Fan	Fan	Idle	OK	Failure
Mute	Sounder LED Beacon mute		On (sound inactive)	
Test	Testing		On	
Reset	Manual extinguishing state reset		On	
Minor	Minor alarm	Inactive	Active	
Major	Major alarm	Inactive	Active	
Blocking	Blocking	Neblokováno	Blocked	
Extinguishing		OK	Extinguishing	
System Alarm	System Alarm	OK	Active	

○ **Temperatures**
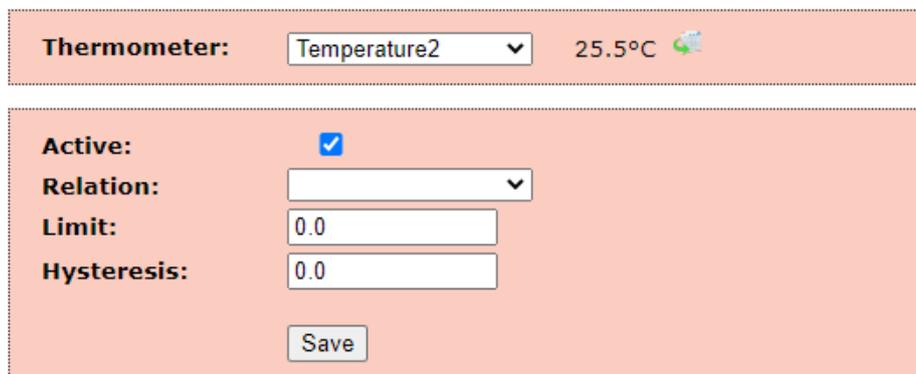
Figure number 27 - Activation and setting of the external temperature sensor

Up to 2 external temperature sensors can be connected to the extinguishing module (and one Temperature1 sensor is already built in).

Select thermometer: select the thermometer you want to work with. The current temperature is displayed on the right.

- displays all temperatures in one status window

Active: the sensor is connected, it must be selected if we want it to be functional.

Relation: relation between the measured temperature and the set temperature
Limit: temperature limit
Hysteresis: idle interval

If we want to take some action based on the temperature measured on the external temperature sensors, it is possible to adjust this setting in the Alarms -> Select alarm menu: 16 Temperature2/17 Temperature3.

○ **Mail**

Figure number 28 – Email setting

Server: SMTP server
User, Password: if authorisation is required by the server.
To: receiving address
From: sender, must be entered
Subject: the subject of the message (example LES-RACK-ID0001) identification of a specific device.

Log in is necessary for saving the device settings. If the user does not authorise, or if the log in information is incorrect, saving is unavailable. To log in again, close the web interface and repeat authorisation.

NOTE:Authorisation data transfer is not encrypted.
WARNING: Older versions of the browser may display the web interface incorrectly.

○ **Outputs**

The window with the description "Relay" is used to change the name of the output. The new name is saved with the ">" button.
The "Switch" window is used to manually switch the logic of the respective relay from open in idle state to closed when switched and vice versa.

Figure number 29 - Setting the value of the output relays

○ Date and Time

Figure number 30 – Date and Time setting

NTP server: NTP server
Timezone: Time zone selection

○ Logs

The event history is stored in the log sorted by newest.

<- - alarm state change.
-> - relay state change.
[< - changes made through HTML.
[> - actions initiated through HTML.
|- - device activation.

-| - device shut off
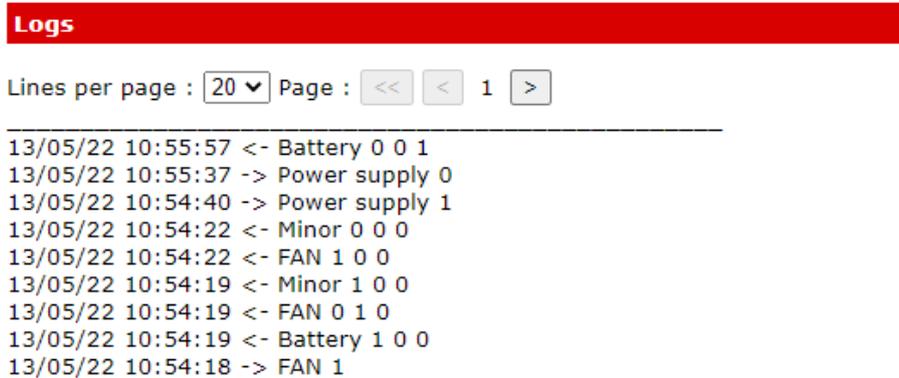
Figure number 31 – Logs list

○ **Download**

Figure number 32 - Download menu

MIB: Management Information Base file download
Logs - CSV: exporting log as a CSV file
Export language: downloading language settings file, which can be edited and uploaded to the device to. Only parts of the file following „=" should be edited. Commentary following „//" is only shown here, it is not a part of the language settings file.
CFG : complete configuration
CFGU : partly configuration

Example:
LNG
f00=,   // decimals separator
f01=.   // date separator
f02=y // 1st date value d/y/m
f03=m // 2nd date value d/y/m
f04=d // 3rd date value d/y/m
G00   // HTML pages text

```
m00=State
m01=Network
m02=Alarms
m03=Temperatures
m04=Mail
m05=Outputs
m06=Date &Time
m07=Logs
m08=Download
m09=Upload
G01
t00=STATUS: Connection lost


G02
t00=Status: OK
G03
t00=System alarms
...
G14
t00=Upload
t01=ERROR: File error, try again.
t02=STATUS: File saved.
t03=File:
b00=Save
b01=Backup
b02=Restore
b03=Reset
I29     // alarm description (max. 29 characters)
i00=Sensor
i01=Button
i02=Door
…
L10     // LED description in Status tab (max. 30 characters)
l00=Test
l01=Mute
…
O16     // input signal description (max. 20 characters)
o00=Valve2
o01=Valve1
…
o15=RESET LED
END
```

○ **Upload**
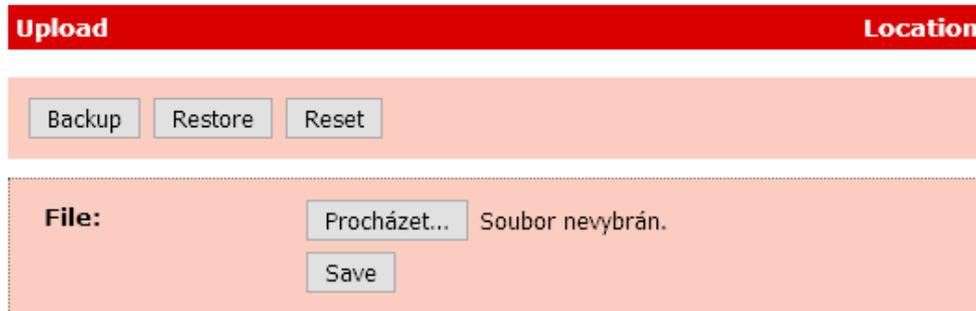
Figure number 33 - Upload

Backup: saving the device configuration for backup.
Restore: restoring the device from the backup file.
Reset: resetting the device.
Choose file…: import the language settings file.
Save: saving language settings.

○ **MODBUS RTU**

RS485 parameters:
        Baud rate – 2400, 4800, 9600, 19200
        Lenght – 8 bits
        Stop Bit – 1
        Parity – None
ModBus parameters:
        ID – defined by user
        Fucntion codes – 1, 4, 5

Function 4 - read coils

Table number 4.

Alarm	Reg	State - 0	State - 1	Reg	Error - 1
Zone 1	0	OK	Extinguishing	50	Failure
Zone 2	1	OK	Extinguishing	51	Failure
Zone 3	2	OK	Extinguishing	52	Failure
Fire sensor1	3	OK	Fire	53	Failure
Fire sensor2	4	OK	Fire	54	Failure
External button	9	Off	On	59	Failure
Door	10	Closed	Open	60	Failure
Propellant gas pressure	11	OK	Low	61	
External Sounder	12		Sound activated	62	Failure

LED Beacon					
Battery	13	Disconnected	Connected	63	Failure
External sensor 1	14	OK	Active	64	Failure
External sensor 2	15	OK	Active	65	Failure
External sensor 3	16	OK	Active	66	Failure
Gas Valve	17	Closed	Open	67	Failure
Extinguishant Valve	18	Closed	Open	68	Failure
Extinguishant level	19	OK	Low	69	Failure
Power Supply230V AC	20	OK	Outage	70	
Power Supply 24 V DC	21	OK	Battery test	71	Failure
Power Supply 12 V	22			72	Failure
Power Supply 29 V	23			73	Failure
Temperature 1 - internal	24	OK	Temperature exceeded set limit	74	Failure
Temperature 2 - external	25	OK	Temperature exceeded set limit	75	Failure
Temperature 3 - external	26	OK	Temperature exceeded set limit	76	Failure
Fan	27	Idle	OK	77	Failure
	28			78	
Mute	29		Alarm inactive	79	
Test	30		Testing	80	
Reset	31		Resetting	81	
Minor	32		Active	82	
Major	33		Active	83	
Blocking	34		Extinguishing blocked	84	
Extinguishing	35		Activated	85	
System Alarm	36			86	System Failure

Function 4 - read inputs

Reg.0..4

0 – Temperature 1- internal – 1 decimal

1 – Temperature 2 – external – 1 decimal

2 - Temperature 3 – external – 1 decimal

3 – power voltage - 2 decimals

4 – level sensor value – 0-100%, values above 100 indicates failure

Function 5 – write single coil.

Reg. 0-3 activates output relays.

● INSTALLATION AND COMMISSIONING

○ Short description

LES-RACK is designed closed spaces of volume not exceeding 2 m3. The device cannot be exposed to aggressive substances, direct sunlight, risk of mechanical damage and working conditions outside of described in this manual. Before installing the device please be sure to familiarise yourself with local fire protection and safety norms.

For the correct functioning of the LES-RACK device ,the hazard zone can be equipped with ventilation/cooling system that does not let air out of the protected area. LES-RACK can be connected to such systems to switch off the ventilation during the extinguishing.
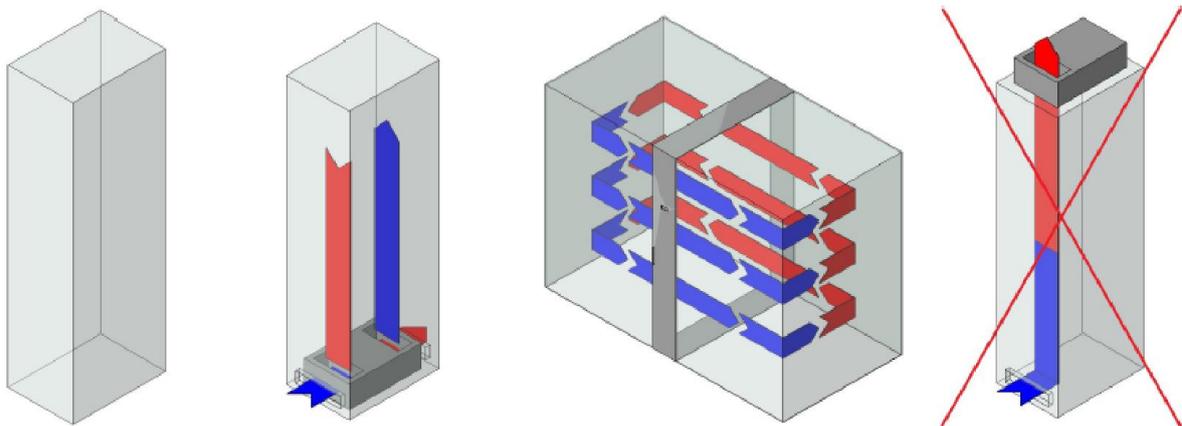
Figure number 34 – Protected area

○ Safety

EN 50110-1 applies concerning protection from the electric current. The device can be installed only by a person certified according to EC 842/2006 and trained as stated by local legislation. This person shall not handle the internal elements of the device, interfere with electrical circuits due to the risk of shock.

It is prohibited to:
- Place the device close to heating elements (in the zones of heating over 30 °C)
- Connecting the device to the power before installing it in place.
- Service or repair a device, connected to the electricity.
- Weld, smoke, and use open fire at distance lower than 25 meters from the device.

WARNING: *Any other method of placement or assembly itself can lead to damage to the device, weakening or complete loss of extinguishing ability. Any other procedure or change of location must first be consulted with the supplier or a trained entity.*

NOTE: *Always keep the original LES-RACK packaging. For the possibility of return the product for service or maintenance, the goods must be delivered in the original packaging.*

○ **Delivered product consists of following parts:**

- LES-RACK device with integrated batteries
- 1x power cable for LES-RACK device
- a set of two guide rails
- temperature sensor approx. 25cm
- 4x 3pin connector
- 8x 2pin connector
- 4x 470R resistor
- 4x 1K8 resistor
- 4x rectifying diode
- 1x set of M4 rack screws and clips
- 2x M5x16 screw and 2x clip

○ **Installation of the device**

The following checks and tests must be carried out before commissioning the equipment:
1. Inspection of the protected area
2. Inspection of mechanical components
3. Checking the integrity of the protected area

After removing the product from the packaging, the temperature label must be checked to see if the maximum permitted temperature limit 45°C was not exceeded during transport or other handling. The temperature label becomes irreversibly black as the temperature increases. It is generally recommended that no more than one indicating circle turns black which means the temperature did not exceeded 40°C. If more than three indicating circles turn black, its recommended to check the extinguisher level using the web interface by going to the Status menu and check if the extinguisher indicator panel is still blue = OK.

When exceeding 49°C, i.e. more than 4 indicator cirlces turn black, it is likely that there was an increase in a pressure in the tank due to the conversion of liquid fire extinguisher into a gaseous state and probably also a leak. If this temperature has been exceeded, but the water level is fine, we recommend an optical inspection of the LES-RACK device to see if the

cover plate has been lifted or deformed at the location of the tank. This is a case where the device was already exposed to a higher temperature, but the pressure was not sufficient to release through the safety valve. In such a case, we recommend consulting the manufacturer or a trained entity about the situation.

Figure number 35 – Indicator of the Temperature limits

WARNING: Do not install the LES-RACK device and do not put it into operation if the permitted temperature is exceeded or if the sheet metal cover is visibly deformed.

The device is designed for universal installation in all types of 19" cabinets. It is installed exclusively with the front panel facing the door of the cabinet using special guide rails (fig. no. 36), which are included in the product packaging.

First fix the guide rails to the cabinet with two M5 screws and clips. We recommend that the assembly of LES-RACK device is carried out before the installation of other devices located in the cabinet. In the case of limited space, at least two people should carry out the assembly. LES-RACK can then be connected, together with any other external component connectors, before or after inserting it into the guide rails and then screwed to the guide rail using 4 pcs of M5 screws.

WARNING: When installing the LES-RACK in the cabinet, extreme care must be taken due to the weight of the device and it must be done in such a way to not damage theh device under any circumstances.

The the guide rails (fig. No. 36) are inserted between the front and rear 19th rack or between the front 19th rail and the cabinet frame. On the front panel the guide rail has 3 holes with M5 screw-thread with a spacing equal to the 1U drilling in the 19th rack.

Included in the package are screws and ratchet clips, intended for attaching guide rails. First, fix the guide rails in place with two screws. A sliding foot with an M5 center hole is screwed on the back of the guide rail for attachment to the rear rack or cabinet frame. On the front side of the guide rail use a countersunk hole and a flat head screw. The remaining two holes are used to attach the LES-RACK after it is inserted into the guide rail and pushed against the face of the 19th. rack

Figure number 36 – Installation guide rails

Before installation, it is necessary to ensure sufficient space for installation in the cabinet. During assembly, the specified horizontal working position must be observed.

The device is installed in the upper part of the cabinet with a minimum distance of 20 cm between the lower part of the LES-RACK device and the nearest device below, as shown on the Figure no. 37. It is necessary that space be ensured under the nozzle and under the perforated part from the bottom of the device, where the sensors are stored, and that it is not shaded and its proper function is not prevented. The space is used for proper effectiveness and detection of extinguishing in the protected space.

The device must be located in the highest possible cabinet slot. LES-RACK does not require external connection and is powered by a standard IEC 320 C13/C14 power cord. LES-RACK device requires a 230V connection point inside the protected area with a maximum distance of 50cm from the device.
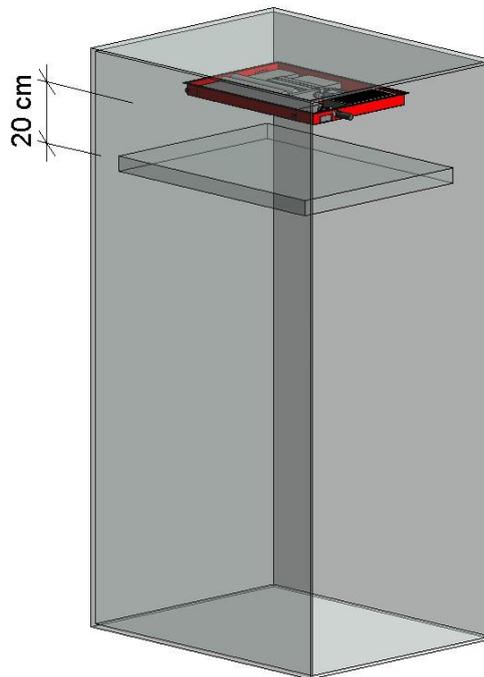
Figure number 37 – Placement of the device in the cabinet

■ **General assembly steps**

- Unpacking from the shipping box.
- Checking the temperature label on the back of the LES-RACK device, whether the limit temperature has not been exceeded during transport.
- Fastening guide rails in the cabinet in a horizontal position and securing them properly with screws.
- Inserting the LES-RACK device into the pre-prepared guide rails. Securing the device with 4 screws.
- Connecting the LES-RACK device to the network with a power cable.
- Connecting the temperature sensor to the RJ11 port and software activation using the web interface.
- According to the requirements of connecting external security peripherals (manual release button, external sounder LED Beacon , ...) and their Software activation using the web interface.
- Activate the back up battery with a thin pin by pressing the microswitch (small hole next to the network connection)
- Check placement location and its cleanliness.

Use Checklist.

○ **Signaling**

Local signaling is provided by multi-colored LEDs placed on the front panel of the device underneath of labels that describe a respective device function or system status. The individual states are described in table no. 5.

The meaning on abbreviations in the „colour" column is the following:

R   -   red
G   -   green
Y   -   yellow
B   -   blue
O   -   orange
R/G   -   alternating red and green
Y/R   -   alternating yellow and red

The meaning on abbreviations in the „state" column is the following:
- - -   - Off

S50% - Dimmed

S   - Continuous Glowing

B   - Blinking

■ Signaling of error-free and error states

Table number 5 – Local signaling

LED diode:	Indication:		Meaning:
	color:	**state:**	
TEST	---	---	System ready. Standard operating state.
	B	S	System in testing mode.
MUTE	---	---	Alarm active and ready.
	Y	S	Alarm inactive or disconnected during the extinguishing
SYSTEM READY	---	---	System disconnected from power, inactive
	G	B	System OK.
	R	B	The system has just finished a reset
	R/G	B	System ready for full reset. Special mode after holding the "RESET" button for a long time. Described further in the network setup software
EXTINGUISHING	Y	S	Delay before the extinguishing
	R	S	Ongoing extinguishing or extinguishing finished
	R	B	Extinguishing blocked, doors open
FAULT PRESSURE	R	S	Low gas pressure
FAULT SENSOR	R	S	Extinguishing has been initiated
	R	B	At least one sensor has been activated
	Y	S	At least one sensor is faulty – unable to extinguish
	Y/R	B	At least one sensor faulty – able to extinguish
	Y	B	At least one sensor has been activated – sensor count error
VALVE	G	S	Valve is open
	R	S	Valve fault
FAULT SYSTEM	R	S	Major fault, extinguishing might not be possible or will start with low level of extinguisher
	Y	S	Minor fault, does not affect main extinguishing
FAULT AC MAINS	- - -	- - -	AC feed OK
	R	S	AC feed fault, no power, interrupted feed
BATTERY	R	B	No battery, physically disconnected battery
	G	B	Physically connected battery, but electrically disconnected
	R	S	Battery fault, RESET button to clear the indication
	Y	S	Battery testing in progress
	G	S	Battery connected, battery parameters are OK
	G	S50%	After pressing the „TEST" button. Press „RESET" to disconnect the battery.
FAN	R	S	Fan fault
	O	S	Low fan power, low RPM
	G	S	Fan OK

NOTE: For a more detailed display of the error, you can use the web interface in the STATUS menu and click on the System indicator.

System alarms

Alarms:
Pressure MAJOR
AC fail MAJOR
Power supply MINOR

Figure number 38 – Indicator of temperature limit exceeded

○ **Recovery and device shut down**

　　■ **Connection and disconnection of backup batteries with sensor testing**

Table no. 6

Activity:		Function:	Indication		
			LED diode	**color**	**state**
I N S T A L L A T I O N - R E C O V E R E Y	Connector (12)	Connecting the AC supply to the socket. The system is under voltage, source GU1 supplies voltage Un.	**SYSTEM READY**	**G**	**B**
		The battery is not physically connected inside the cabinet, battery is missing or has insufficient capacity.	**BATTERY**	**R**	**B**
		The battery is physically connected, electrically disconnected.	**BATTERY**	**G**	~~**B**~~ **S50 %**
	Battery connection	Using a small pin with a diameter of up to 3 mm (pencil), gently press the microswitch located to the left of the network connection (15). It closes the internal relay (audible click) and connects the battery to the system.	**BATTERY**	**G**	**S**
T E S T	Device testing (w/o extinguishing)	By pressing the "TEST" button, the electromagnetic valves will be blocked, so that there is no leakage of the fire extinguisher. Other processes start testing as in the case of a real fire and extinguishing.	**TEST**	**B**	**S**

				EXTINGU ISHING	R	S50 %
			After 3 seconds, an extinguishing command accompanied by an acoustic signal will occur. The sound signal can be turned off with the "MUTE" button. After extinguishing, the smoke detector remains activated and must be deactivated with the "RESET" command	EXTINGU ISHING	R	S
			By switching on "RESET" the system recovery operation is in progress.	SYSTEM READY EXTINGU ISHING	R R	B S
			After completing the system recovery process by resetting, the system is ready for normal operation. The state is signaled.	EXTINGU ISHING SYSTEM READY BATTERY	--- G G	--- B S
			If we deactivated the siren with the "MUTE" button, it is necessary to press the "MUTE" button again to turn on the siren. The "MUTE" indicator will go out.	MUTE	Y ---	S ---
D E V I C E S H U T D O W N	Battery disconnection		If the device was disconnected from the supply for a longer period of time, the batteries would gradually discharge. For this case, it is necessary to electrically disconnect the batteries from the system. Disconnecting can be done in two ways: - by simultaneously pressing the "TEST" + "RESET" buttons - by turning on the microswitch in the lower left part of the cabinet, which is accessible from bottom of the device after partially sliding it out from inside of the cabinet (approx. 5 cm)	BATTERY	G	S50%

● EXTINGUISHING

After inserting the device into the 19" frame, testing it and with the battery connected, the device is ready for normal operation.

Table number. 7

Activity:		Function:	Signal		
			LED diode	**color**	**status**
E X T I N G U I S H I N G	Activation	The signal to start "Extinguishing" can happen in several ways, namely through: - the LES Rack 3 internal sensors - external manual release button - signal from external sensors - by network command After activation the signa lis lasting for 3 seconds.	**EXTINGUISHING**	**R**	**S50%**
	Extinguishing	After 3 seconds, an extinguishing command is issued. The tank outlet solenoid valve is opened and then the pressure cartridge solenoid valve is opened and extinguishing is started. The selected output relays will be switched. Extinguishing is accompanied by an acoustic signal. The sound signal can be turned off with the "MUTE" button. Pressing "MUTE" turns off the internal and external siren.	**EXTINGUISHING VALVE** **(EXTINGUISHING)** **(VALVE)** **MUTE**	**R** **G** **Y**	**S** **S** **S**
		After the fire extinguisher is released, valve 1 and valve 2 are turned off.Extinguishing is finished. For information about the extinguishing process, the extinguishing indicator remains on and, since the system is without fire extinguisher, the system error also lights up	**VALVE** **(EXTINGUISHING)** **FAULT SYSTEM**	**---** **R** **R**	**---** **S** **S**
	Conclusion	After extinguishing is finished, the smoke detector remains activated and must be deactivated with the "RESET" command. After executing the "RESET" command, the extinguishing signal goes away, the system error continues to light up.	**EXTINGUISHING** **(EXTINGUISHING)** **FAULT SYSTEM**	**---** **R**	**---** S

● INSPECTION

Device function is checked exclusively in TEST mode.
The procedure for putting the device into operation is shown in table No. 6, part "TEST".

○ Device switch off

Disconnect the battery by simultaneously pressing and holding the "TEST" and "RESET" buttons on the front panel of the device.
We turn off the device by interrupting the power supply.
The power supply is interrupted by turning off the upstream circuit breaker (switch) or by disconnecting the supply cable from the AC supply to the device.

ATTENTION: If the device is switched off for more than 4 months, it is necessary to connect the device to the network, put it into operation (connect the battery). The connection time is at least 12 hours, when the backup source (battery) is charged. After charging, the device must be turned off and can remain switched off again.

○ Device Operation

■ General requirements

The LES-RACK is designed and manufactured for fully automatic operation. The front panel contains signal LED elements informing about the status and ongoing processes of the device. An overview of local signaling is given in table no. 5.

The cover of the device may only be opened by a person authorized by the manufacturer. There is a risk of electric shock after opening the cover of the device. The user of the equipment is obliged to designate and have trained the persons responsible for the operation of the equipment, persons authorized to operate the equipment and persons authorized to maintain the equipment, who will be thoroughly familiar with this operating manual. Proper procedures must be in place to instruct maintenance personnel of other equipment so that they do not activate fire extinguishers during their activities. It is appropriate to prohibit or control the entry of unauthorized persons into the premises where the LES-RACK device is installed.

○ Maintenance

■ General requirements

The user must carry out an inspections, ensure a repair plan and keep records of inspections and repairs. The user is obliged to ensure the prevention of leaks and the immediate repair of detected leaks according to EC No. 842/2006, Article 3. The permanent ability of the LES-RACK device to maintain effective performance fully depends on adequate service procedures with regular testing. Prescribed inspections of the LES-RACK device may only be performed by persons who meet the required qualification requirements and are authorized by the manufacturer.

It is not permitted to interfere with parts of circuits, parts connected to the network located under the cover, as there is an immediate danger of electric shock. Repairs may only be

CONTEG, spol. s r.o.
Štětkova 1638/18, 140 00 Prague 4, Czech Republic
Tel.: +420 261 219 182, Email: conteg@conteg.com, www.conteg.com
Company ID: 25701843, VAT ID: CZ25701843

45

carried out by properly and demonstrably trained personnel of the service organization or the manufacturer. Before starting the inspection, the person responsible for the operation of the equipment must be informed about the performance of any inspection on the LES-RACK equipment. Before starting the inspection and putting into operation, it is necessary to prevent unwanted start-up of downstream equipment, if such are connected to the equipment, e.g. power off, fire dampers, air conditioning units.

It is also necessary to check the equipment after each use of the equipment or if the permitted operating limits such as temperature are exceeded.

○ User inspection

Consistent adherence to the inspection and maintenance schedule will lead to detection of LES-RACK equipment defects at an early stage. It will make it possible to carry out corrections before it is necessary for the device to intervene automatically, or it will ensure faultless operation in the event of a fire. The equipment inspection carried out must always demonstrate compliance with the general requirements and technical parameters specified in this manual.

- **Weekly inspection**
Vizuálně se kontroluje, zda nedošlo ke změnám rizik a těsnosti chráněného prostoru, jež by mohly snížit účinnost systému (ventilační otvory, ..). Provede se vizuální kontrola, zda všechna provozní zařízení a součásti systému jsou řádně umístěny a nepoškozeny.
Visual assessment of the protected area to identify potential risks or needs for device mounting adjustments which could reduce the efficiency of the system (ventilation holes, ..). Check the correct location of the equipment, check for any visible damage and check the correct function of the LED lights.
A visual check is made to ensure that all operating equipment and system components are properly located and undamaged.

Whether all parts of the LES-RACK device and components that are connected to the device or closely related to it (e.g. the strength of the attachment of the mounting rails) do not show signs of improper handling, whether they are correctly fixed in place, not damaged or significantly dirty.
A check for correct function is performed by visual inspection of the signal LED indicators on the front panel. Signaling chapter.

- **Monthly inspection**
Qualification of personnel - check that all personnel who could possibly work with the equipment are properly trained and have sufficient qualifications for such activity. Above all, whether new employees have been introduced to the use and operation of the system.

Protected area inspection - At least once a month, it must be thoroughly checked whether technical changes have been made to the protected space (change in cooling of the space, openings with ventilation, etc.) that would result in lower extinguishing efficiency. Has the air conditioner been disconnected, for example for maintenance, and thus exceeded the

maximum temperature for operation (temperature label on the back of the device - Installation of the device).

If it is found that there have been changes in the volume or type of risk in the protected area, a new fire protection solution must be developed to provide the original level of protection. It is recommended to regularly check the level of the fire extinguisher using the Status web interface. At the same time, the weekly control procedure is carried out.

Extinguisher concentration level is indicated by a blue line on the right side of the screen if reached OR a red line if not reached
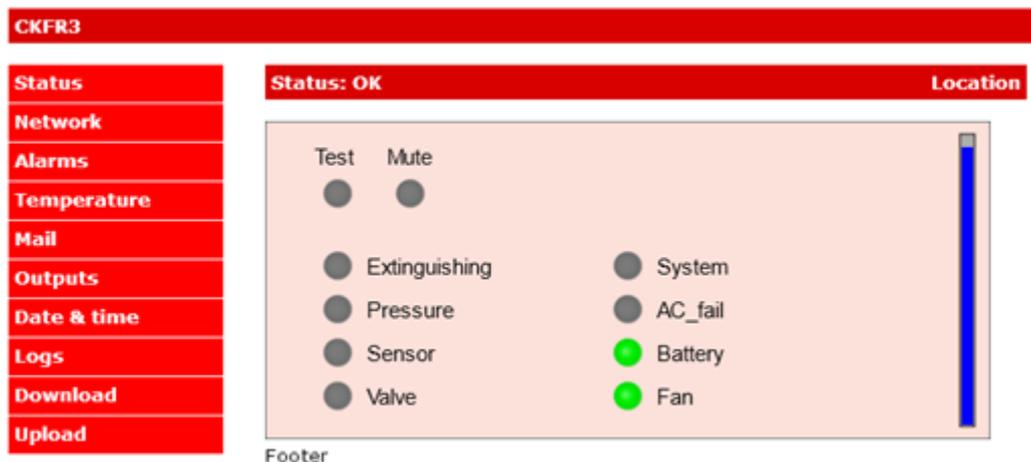

Figure Number 39 - Status panel with fire extinguisher level indicator (full)

○ Service provider inspection

■ Annual service inspection

The inspection is carried out by a person trained by the manufacturer/distributor. This is a functional check of the entire system, looking mainly at the detection, pressure and discharge parts of the device. A visual and physical inspection will be carried out incl. functionality of the mentioned circuits. At the same time, a weekly and monthly inspection is carried out.

■ 2-year service inspection

The inspection is carried out by a person trained by the manufacturer/distributor. Emphasis is placed on the correct functionality of the entire device. The quality of the contained fire extinguisher, the condition of the pressure parts of the device, and the functionality of the battery are assessed. At the same time, a weekly, monthly and annual inspection was carried out. If this service check is not carried out by the manufacturer/distributor, the manufacturer bears no legal responsibility for the malfunctioning of the device.

○ List of repairs and inspections performed by service provider

▪ Repairs may only be carried out by properly trained personnel of a service organization with qualifications in the field of electricity in accordance with the relevant regulations.

- All electrical detection and alarm systems are tested as recommended by the relevant national standards.

- All control valves are checked to see if they work correctly for manual operation and then whether they work correctly for automatic operation.

- Checking the surface of the device for signs of damage or unauthorized intervention.

- Control of the quality and parameters of the fire extinguisher according to valid standards (ČSN EN 15004 – 2).

- Check the pressure cartridges.

- Visual inspection checks for:

  - Correct device location
  - Serial code number
  - Correct attachment of the device
  - Accessibility of the device control
  - System cleanness

○ **Installation and commissioning checklist**

	The temperature indicator has not exceeded the permitted limit
	The device was inserted horizontally (checked with a level meter)
	The power cord is plugged into the power port AC power cord (12)
	The temperature cable is inserted into the RJ11 port
	The device is undamaged and shows no defects from improper handling
	The nozzle is pointing downwards and shows no signs of damage
	On the signaling panel - SYSTEM READY lights up intermittently in green
	The battery is connected - BATTERY lights up green
	On the signaling panel - FAN lights up green
	All other controls on the signaling panel are off
	Software control of fire extinguisher level
	In the case of connecting external peripherals:
	Sounder LED Beacon
	physically connected to the device with the correct connection of resistors
	software set notifications in case of fault
	Manual release extinguishing button
	physically connected to the device with the correct connection of resistors
	software set to activate extinguishing
	software set notifications in case of fault
	Door sensor switch
	physically connected to the device with the correct connection of resistors
	software set to block extinguishing when the door is open
	software set notifications in case of fault
	the Extinguishing light does not flash red
	the Extinguishing light flashes red when the door is opened
	Temperature monitoring sensor
	physically connected to the device with the correct connection of resistors
	activated via software
	The FAULT: SYSTEM light does not flash red
	On the signaling panel - SYSTEM READY lights up intermittently in green
	The battery is connected - BATTERY lights up green
	On the signaling panel - FAN lights up green
	All other controls on the signaling panel are off
	Software control of fire extinguisher level

Serial number:
Date:

● PROBLEM SOLVING

If the active FAULT: SYSTEM warning light comes on, find out the detailed cause of the problem through the web interface. In the web interface of the Status menu, click on the System signaling wheel for information about the error.

Error:	Root cause:	Solution
Device is not powered	The main power cable is not connected to the device	Check the power cable connection at the rear panel side of the device
Battery indicator diode flashes yellow	Batteries are not connected with the device through the software OR Batteries are deeply discharged	To connect the batteries, insert a thin pin into the hole located to the left of the network cable input, then press the button till the light goes green In case of discharged batteries, charge the batteries for at least 12 hours
TEST light is blue	The device is in test mode	To turn off the mode, press the Test button
MUTE light is yellow	The device's audio elements are muted	To turn off the mute, press the Mute button
EXTINGUISHING light flashes red	Extinguishing is blocked most likely by the door being open.	Close the door. If necessary, check other external elements connected to the Door Sensor contacts that have been set to block extinguishing.
FAULT: PRESSURE light is red	Low gas pressure	Contact supplier/manufacturer
FAULT: SENSOR light flashes red	At least one sensor has been activated	If this happened during/after the test when a test spray was used to activate the sensors. Wait for the gas to evaporate on its own or blow the sensors with a clean air.
FAULT: SENSOR light is yellow	Malfunction of at least one sensor - fire cannot be extinguished	RESET the device via the web interface, in the Status menu click the Sensors signaling wheel, then the Reset sensors

		button. If the solution does not help, contact the supplier/manufacturer.
FAULT: SENSOR light flashes yellow and red	Malfunction of at least one sensor – extinguishing works	RESET the device via the web interface, in the Status menu click the Sensors signaling wheel, then the Reset sensors button. If the solution does not help, contact the supplier/manufacturer.
VALVE light is red	Malfunction of one of the valves	If the FAULT PRESSURE light is not red, use the RESET device. If the FAULT PRESSURE light is red, there has been a drop in pressure, contact the supplier/manufacturer. If the solution does not help, contact the supplier/manufacturer.
FAULT: SYSTEM light is red	Majority error, when the system does not have to, but can extinguish (a small amount of fire extinguisher)	In the web interface of the Status menu, click on the System signaling wheel for error details.
FAULT: SYSTEM light is yellow	A minor error that does not prevent active extinguishing.	In the web interface of the Status menu, click on the System signaling wheel for error details.
FAULT: AC MAINS light is red	AC fault, AC failure, interrupted supply	The device is powered by batteries at this stage. Check the power cable connection to the device or if there is a physical break somewhere along the way.
BATTERY light flashes red	The battery is missing, the leads from the battery are disconnected.	Contact supplier/manufacturer. Service is required.
BATTERY light flashes green	The battery is in the system, the leads from the battery are connected, but it is not electrically connected to the system.	To connect the batteries, insert a thin pin into the hole located to the left of the network cable input, then press the button till the light goes green
BATTERY light is red	Battery failure.	Fault reset - "RESET" button.

CONTEG, spol. s r.o.
Štětkova 1638/18, 140 00 Prague 4, Czech Republic
Tel.: +420 261 219 182, Email: conteg@conteg.com, www.conteg.com
Company ID: 25701843, VAT ID: CZ25701843

51

BATTERY light is yellow	Battery test in progress	Wait until the battery test is finished. If the batteries are connected by software, the light is green.
FAN light is red	Fan failure, the fan does not spin.	Fault reset - "RESET" button. If the solution does not help, contact the supplier/manufacturer. Service is required.
FAN light is organge	Insufficient fan speed, reduced power.	Fault reset - "RESET" button. If the solution does not help, contact the supplier/manufacturer. Service is required.
Extinguishing level indicator signals empty	Fire extinguisher leak caused by extinguishing, by a rise in temperature or by an increase in pressure in the tank. Fire extinguisher is leaking through the safety valve.	Contact the supplier/manufacturer. Service is required.

● SHOP

○ External parts

SONOS Sounder LED Beacon - order code: **LES-FRS3COM0104**

Manufacturer: KLAXON
Red body, red lens
106 dB, 32 tones
17-60V DC, 10-50 mA
Shallow base
EN 54-3

Manual release extinguishing button - order code: **LES-FRS3COM0105**

Manufacturer: Bosch
Conventional manual release button
Color yellow
Double acting with detent
EN 12094
IP52

Door sensor switch - order code: **LES-FRS3COM0106**

Maufacturer: Schneider Electric
Switching function: Jumper link
Number of break contacts: 1
Number of switching contacts: 1
EN 50047
IP65

○ **Accessories**

Name:
Order number:

Pluggable terminal block; 5mm; póly: 3; 2EDGK-5.0-03P-14	LES-FRS3COM0095
Pluggable terminal block; 5mm; póly: 3; 2EDGK5.00-02P14	LES-FRS3COM0096
Metal film resistor 470 Ω TC-MF0W4FF4700KIT203	LES-FRS3COM0100
Metal film resistor 1.8 kΩ TC-MF0W4FF1801KIT203	LES-FRS3COM0101
Rectifier diode	LES-FRS3COM0102

On customer demand
At the customer's request, one or two more pairs of detectors connected in a so-called two-sensor dependency can be used for detection. It is about creating up to two additional zones in the protected area.

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Company ID: 25701843, VAT ID: CZ25701843

54