

**SYG-EM**  
**SYGNO-FI EXPANDER MODULE**



**User instructions manual**

## GENERAL DESCRIPTION

The expander is a device used to extend the coverage of a wireless fire security system; it is also useful in those environments where the existence of physical obstacles hinder "long range" wireless communications, therefore concretizing the need to have adequately placed retransmission points that can make the deployment of a reliable wireless system possible.

This device needs an EN 54-4 certified external power supply source.



## TECHNICAL SPECIFICATIONS \*

Specification	Value
Power supply voltage range	from 9 Vdc to 30 Vdc
Typical power supply voltage value	12 Vdc
Typical current load	24 mA (12 Vdc)
Maximum current load	36 mA (12 Vdc)
Wireless frequency band	868 MHz
Radiated power value	14 dBm (25 mW)
Number of wireless channels	66
Wireless communication range **	200 m in open space
Maximum number of linked child devices	32
Technical temperature range	from -20 °C to 70 °C
EN 54 approved temperature range	from -10 °C to 55 °C
Humidity range without condensing	from 5% RH to 90% RH
Device dimensions	235 mm x 160 mm x 70 mm
Device weight	700 g
Technical IP rating	65
EN 54 approved IP rating	30

\* Additional technical information can be requested from your product supplier.

\*\* Environmental physical obstacles can reduce this value.

Table 1

## WARNINGS AND LIMITATIONS

Our devices use high quality electronic components and plastic materials that are highly resistant to environmental deterioration. However, after 10 years of continuous operation, it is advisable to replace the devices in order to minimize the risk of reduced performance caused by external factors. Ensure that this device is only used with compatible control panels.

Detection systems must be checked, serviced and maintained on a regular basis to confirm correct operation.

Smoke sensors may respond differently to various kinds of smoke particles, thus application advice should be sought for special risks.

Sensors cannot respond correctly if barriers exist between them and the fire location and may be affected by special environmental conditions.

Refer to and follow national codes of practice and other internationally recognized fire engineering standards.

Appropriate risk assessment should be carried out initially to determine correct design criteria and updated periodically.

Use only in Sygno-fi fire detection and alarm systems.

## WARRANTY

All devices are supplied with the benefit of a limited 3 years warranty relating to faulty materials or manufacturing defects, effective from the production date indicated on each product.

This warranty is invalidated by mechanical or electrical damage caused in the field by incorrect handling or usage.

Product must be returned via your authorized supplier for repair or replacement together with full information on any problem identified.

Full details on our warranty and product's returns policy can be obtained upon request.



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DoP SYG-EM



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DoPUK SYG-EM

Eurotech Fire Systems Ltd  
19/20 Stratfield Park  
Elettra Avenue  
Waterlooville  
Hampshire  
PO7 7XN  
United Kingdom

SYG-EM

EN 54-25:2008

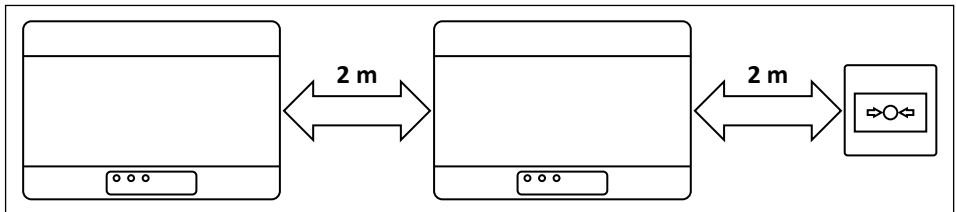
EN 54-18:2005

## CORRECT DEVICE POSITIONING

- Apply mandatory codes of practice and standards of your country.
- Use wireless channels that are free or reasonably free from other interfering signals; possibly avoid using channels that are already used by other systems.
- Don't install wireless devices in the vicinity of equipment using large amounts of electrical current.
- Don't install wireless devices in the vicinity of large metal objects, structures or metal ceiling structures.
- Don't install wireless devices in the vicinity of fluorescent light fixings.
- Don't install wireless devices in the vicinity of computers, their cabling and their network cabling.
- Wireless devices, in their final installation location, must have a minimum distance of at least 2 meters between each other.
- Install central and expander network nodes at an height of at least 2 - 2.5 meters from the floor.
- Fix central and expander network nodes flat on the wall.
- Environmental temperature and humidity must lay in the ranges specified in the technical specifications at the beginning of this manual. Environmental compatibility applies to all devices in general.
- Environmental conditions must be withstandable by the installed devices. Check the device's IP rating adequacy with the installation's environmental characteristics; IP rating value is found in the technical specifications at the beginning of this manual. Environmental compatibility applies to all devices in general.
- Make sure that all child devices (in their final installation location) are reached by good strong wireless signals from their father nodes (central and expander ones).
- Make sure that all father nodes (central and expander ones, in their final installation location) are reached by good strong wireless signals from their child devices.
- Make sure that all network nodes (central and expander ones, in their final installation location) are reached by good strong wireless signals from their linked-to network nodes.



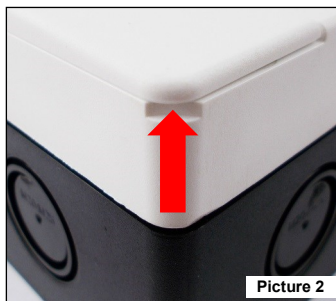
**It is advisable to use the SYG-STK survey kit to locate a good wireless installation location.**



Picture 1

## INSTALLATION

- 1) Remove the two plastic screw covers from the front side. Lifting the protective covers using the gaps at their angles makes this operation easier.



Picture 2

- 2) Remove the four sealing plastic screws.

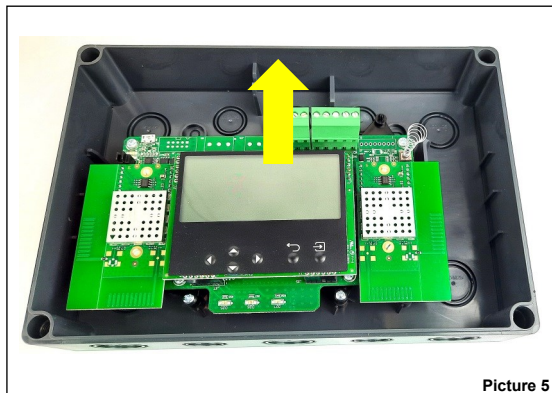


- 3) Remove the front protective cover.

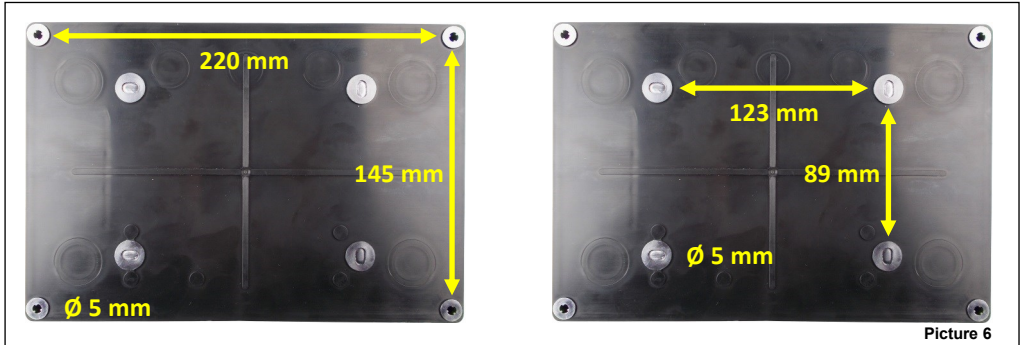
- 4) Remove the two holding screws at the base of the printed circuit board.



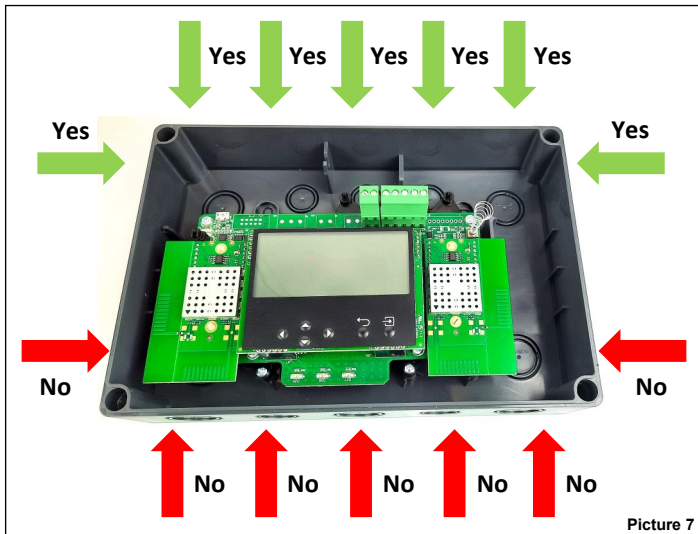
- 5) Slide upwards the board and extract it from the box.



- 6) Drill into the wall the required number of holes you need to fix the box. Refer to the following pictures for the distances between the four "IP safe" holes and the distances between the four mould-printed knock-out slots on the rear side of the box. Use the IP safe holes if you want to preserve the original IP rating of the device box, otherwise use the internal knock-outs. If you use the internal knock-outs, the manufacturer is discharged from the liability following damage to the device that can occur from environmental factors.



- 7) The box is designed with M16/M20/M25 knock-out holes to provide IP safe compatibility with electrical cable glands. Knock out the required ones. If one or more holes have been opened but remain unused, fill them with suitable IP safe blanking plugs in order to maintain the native ingress protection degree of the box. It is suggested to select external cabling entries that are at a certain distance from the device's antennas. Upper side entries of the box are the best choice.



- 8) Install the required cable glands.
- 9) Fix the device box to the wall; use adequate screws and avoid the countersunk type.
- 10) Slide into the box the printed circuit board.
- 11) Fix the board to the box using the two screws you removed before.
- 12) Perform the required wiring.
- 13) Program the device.
- 14) Reinstall the front cover.
- 15) Screw the front cover: fixing has to be IP safe and not loose.
- 16) Reinstall the plastic screw covers.
- 17) Check that your installation is safe, secure and fault-free; perform the functional test.

## WIRING - PRELIMINARY NOTES

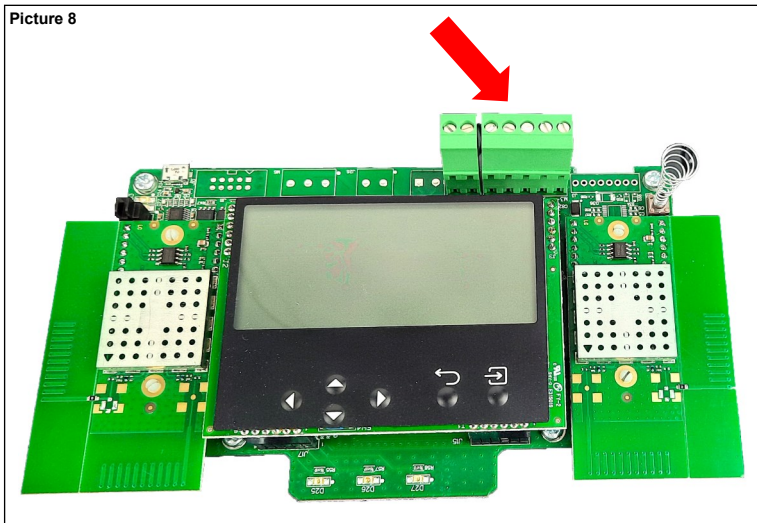
- Apply mandatory codes of practice and safety standards of your country.
- This device requires a EN 54-4 certified power supply source.
- Allow a maximum cable length of 3 meters between the EN 54-4 power supply source and the device.
- When performing wiring operations disconnect the power supply source.
- The printed circuit board is sensitive to electrostatic discharges: take suitable precautions when handling it in order to avoid damage.
- Connect the wire terminals to their correct blocks on the printed circuit board; keep this manual handy as a reference for good connection implementation.
- Safely screw the wire terminals to their corresponding blocks.
- Avoid mechanically loose or weak connections.
- Avoid accidental shorts between terminals.
- Allow sufficient wire length into the device box so you can comfortably screw the terminals to their corresponding blocks; this is also important to avoid mechanical stress on terminal-block couplings.



**The printed circuit board is sensitive to electrostatic discharges: take suitable precautions when handling it in order to avoid damage.**

## TERMINAL BLOCKS LOCATION

Terminal blocks are located on the printed circuit board in the position highlighted in the following picture:

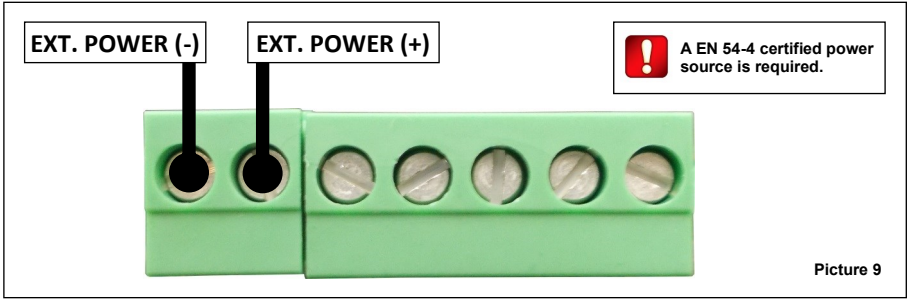


## SYG-EM WIRING PROCEDURE IN DETAIL

In detail, the wiring procedure for the SYG-EM is as follows:

- 1) Connect the power supply terminals.
- 2) Connect the power supply's monitoring inputs (optional).

**WIRING - POWER SUPPLY'S TERMINAL BLOCKS LAYOUT**

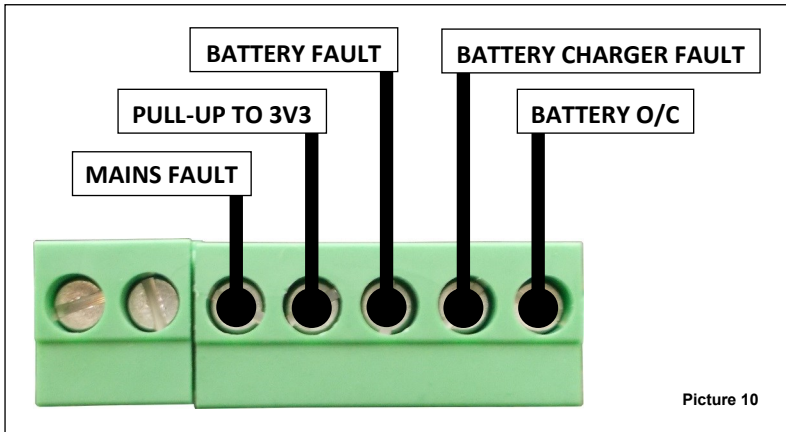


Picture 9

Block	Description	Note
EXT. POWER (-)	Power supply, negative pole	EN 54-4 certified power source is required
EXT. POWER (+)	Power supply, positive pole	EN 54-4 certified power source is required

Table 2


**WIRING - POWER SUPPLY'S FAULT DETECTION INPUTS - TERMINAL BLOCKS LAYOUT**



Picture 10

Block	Description	Note
MAINS FAULT	Mains' power supply fault input	Check settings. See: <b>EN 54-4 POWER SUPPLY SUPERVISORY FEATURES MANAGEMENT</b>
PULL-UP TO 3V3	Internal pull-up to 3.3 V	-
BATTERY FAULT	Battery fault's input	Check settings.
BATTERY CHARGER FAULT	Battery charger fault's input	See: <b>EN 54-4 POWER SUPPLY SUPERVISORY FEATURES MANAGEMENT</b>
BATTERY O/C	Battery open circuit fault's input	

Table 3

 Through the SygNEX configuration software always check and, eventually, activate / deactivate / set the EN 54-4 power supply supervisory features and settings.

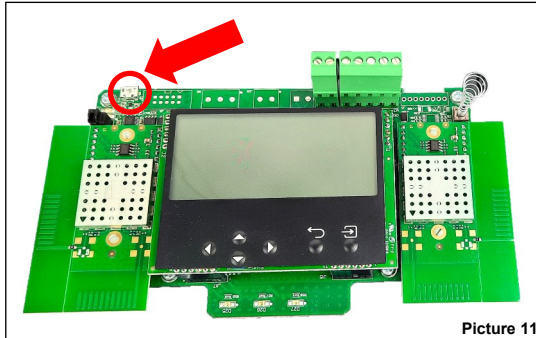
## THE PURPOSES OF PROGRAMMING

Programming is done for the following purposes:

- activating or deactivating the signalling of power supply's fault events;
- activating or deactivating the signalling of tamper events;
- integrating the **SYG-EM** into the wireless system; this means creating a wireless exclusive direct link with other **SYG-EMs** and, eventually, the central node of the system (**SYG-CEM** or **SYG-W2W**);
- creating wireless exclusive links with local child devices (detectors, call point, sounders....).

## PROGRAMMING SETUP PROCEDURE

- 1) Install on your personal computer the **SygNEX** software.
- 2) Connect your personal computer to the printed circuit board; for this operation a standard-to-micro USB cable is used; micro USB socket location is highlighted in the picture below:



Picture 11

- 3) Make sure the device is powered up.

## PROGRAMMING

For more data about programming this device refer to the following documentation:

- the **SygNEX** software manual;
- the user instructions manuals of the Sygno-fi series' products.

## THE USER'S KEYPAD AND DISPLAY

The device keypad and display system is used for two basic purposes:

- Diagnose the **SYG-EM** and the system: check event occurrences, faults, settings, etc.
- Program device and system's settings.

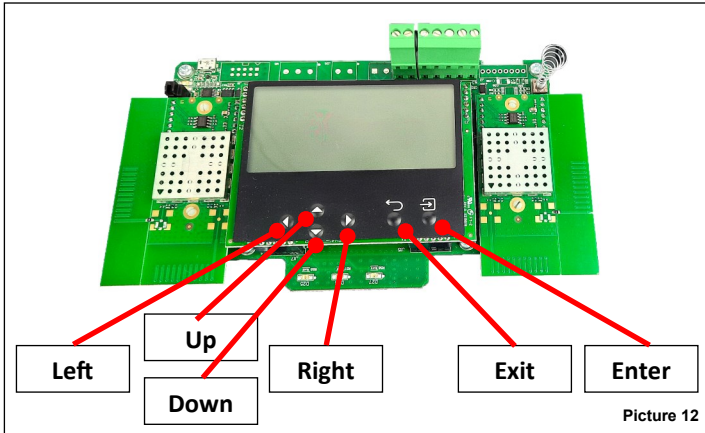
Keypad and display system is the manual alternative to the use of the **SygNEX** configuration software.



In this edition of the manual, programming procedures through the keypad / display system is not described. Use SygNEX instead.



## THE USER'S KEYPAD



Keypad buttons are:

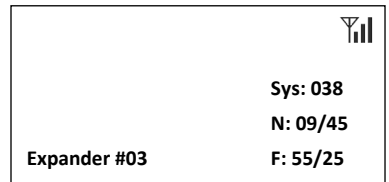
- Up** Pulls up the display's menu selection.  
If applied to a value, the selected digit is increased.
- Down** Pushes down the display's menu selection.  
If applied to a value, the selected digit is decreased.
- Left** Returns to the previous menu.  
If editing a value, sets the cursor to the left digit.
- Right** Enters into the next submenu.  
Some options require exclusively the "Enter" key to gain access to the next submenu.  
If editing a value, sets the cursor to the right digit.
- Enter** Enters into the next submenu.  
Confirms the selected setting.
- Exit** Returns to the previous menu.

## THE USER'S DISPLAY

In a normal and eventless condition the display will have picture 13's lookalike.

Of the main window, displayed data has the following meaning:

- Expander #03** Indicates that this device is a **SYG-EM**.  
# 03 indicates that is **SYG-EM** number 3.
- Sys: 038** Indicates the number that identifies the Sygno-fi wireless system (system code); in this case 038.
- N: 09/45** "Network" channels; system-wide wireless network numbered channels that are used by the **SYG-EM** to exchange data with the central node and other expanders; in this case channel 9 and channel 45.
- F: 55/25** "Field" channels; local wireless network numbered channels that are used by the **SYG-EM** to exchange data with local child devices; in this case channel 55 and channel 25.



This icon indicates that this **SYG-EM** is synchronized with the system's central node.

## EN 54-4 POWER SUPPLY SUPERVISORY FEATURES MANAGEMENT

On SYG-EM's properties window of the SygNEX software, you will have the following options:

EN54-4 Power Supply Unit:	Mains fault	<input checked="" type="radio"/> Disabled	<input type="radio"/> Open	<input type="radio"/> Low
	Battery fault	<input checked="" type="radio"/> Disabled	<input type="radio"/> Open	<input type="radio"/> Low
	Battery charger fault	<input checked="" type="radio"/> Disabled	<input type="radio"/> Open	<input type="radio"/> Low
	Battery O/C	<input checked="" type="radio"/> Disabled	<input type="radio"/> Open	<input type="radio"/> Low

Picture 14

Selected option	"Open" is selected	"Low" is selected
<b>Mains fault</b>	A fault condition is raised if there is an open circuit between <b>MAINS FAULT</b> terminal block and <b>EXT. POWER (-)</b> . Signal is in a high impedance state.	A fault condition is raised if there is a short circuit between <b>MAINS FAULT</b> and <b>EXT. POWER (-)</b> . Signal is in a low state.
<b>Battery fault</b>	A fault condition is raised if there is an open circuit between <b>BATTERY FAULT</b> terminal block and <b>EXT. POWER (-)</b> . Signal is in a high impedance state.	A fault condition is raised if there is a short circuit between <b>BATTERY FAULT</b> and <b>EXT. POWER (-)</b> . Signal is in a low state.
<b>Battery charger fault</b>	A fault condition is raised if there is an open circuit between <b>BATTERY CHARGER FAULT</b> terminal block and <b>EXT. POWER (-)</b> . Signal is in a high impedance state.	A fault condition is raised if there is a short circuit between <b>BATTERY CHARGER FAULT</b> and <b>EXT. POWER (-)</b> . Signal is in a low state.
<b>Battery O/C</b>	A fault condition is raised if there is an high impedance between <b>BATTERY O/C</b> terminal block and <b>EXT. POWER (-)</b> . Signal is in a high impedance state.	A fault condition is raised if there is a short circuit between <b>BATTERY O/C</b> and <b>EXT. POWER (-)</b> . Signal is in a low state.

Table 4

## THE DISCOVERY OPERATION


The discovery of all possible routes for the wireless messages travelling throughout the system is called "discovery".

The discovery operation concerns only the network devices (**SYG-W2W / SYG-CEM** and **SYG-EMs**) and not the child devices.

Discovery is performed only once at the beginning, during the installation phase. It can be performed successively (e.g. following environmental changes) in order to redefine the best messaging routes for the system.


Discovery procedure:

- 1) Set all **SYG-EM** system's devices in "Discovery mode".  
This operation is accomplished only through the **SYG-EM's** keypad / display system.
  - a) **[Main window]** Press "Enter".
  - b) **[Password window]** Insert level 1 password.
  - c) **[Main Menu]** Select "Expander Config" and press "Enter".
  - d) **[Expander Config]** Select "Set Discovery Mode" and press "Enter".
  - e) **[Password window]** Insert level 2 password.
  - f) **[Select channel window]** Select discovery channel A, B or C.
  - g) Press "Enter".
  - g) **[Discovery confirmation window]** Press "Enter".
  - h) **[Discovery reconfirmation window]** Press "Enter".
- 2) Trigger and complete the discovery operation from **SygNEX**.  
See **SygNEX's** manual.

 **SYG-EM's user interface and SygNEX will prompt you whether to use channel A, B or C for discovery. Use the less congested / relatively free channel: if channel A gives problems use B; if B gives problems use C.**

**Preferably, use the SYG-STK survey kit to diagnose channel A, B and C.**

**Make sure you specify the same channel on the SYG-EMs and SygNEX.**

 **SYG-W2W / SYG-CEM does not require any particular keypad / display operation for the discovery operation.**

## EVENT SIGNALLING

Wireless system's events, like faults and alarms, are notified to the user in both of the following ways:

- through specific LEDs, visible even if the printed circuit board is hidden by the front cover;
- through written messages visualized on the LCD display; the LCD is visible only if the front cover is not installed.

### **LED SIGNALS - DEVICE IS POWERED ON**

The blinking green LED above the "Power" icon indicates that the device is switched on.



Picture 15

### **LED SIGNALS - ALARM**

The red LED above the "Flame" icon indicates that an alarm event has occurred.



Picture 16

### **LED SIGNALS - FAULT**

The yellow LED above the "Spanner" icon indicates that a fault event has occurred.



Picture 17

### **LED SIGNALS - DISCOVERY MODE**

When the device is in discovery mode, the LED above the "Power" icon and the LED above the "Spanner" icon alternately blink.



Picture 18

## TAMPER DETECTION

**SYG-EM** is equipped with a tamper detection switch; when the front cover is removed, the switch-spring system is released, causing a tamper event message to be routed to the control panel.



Picture 19

Tamper detection capability can be disabled / enabled from **SygNEX**.



**EN 54 requires you to keep tamper detection enabled.**

## ONBOARD DISPLAY'S EVENT SIGNALLING

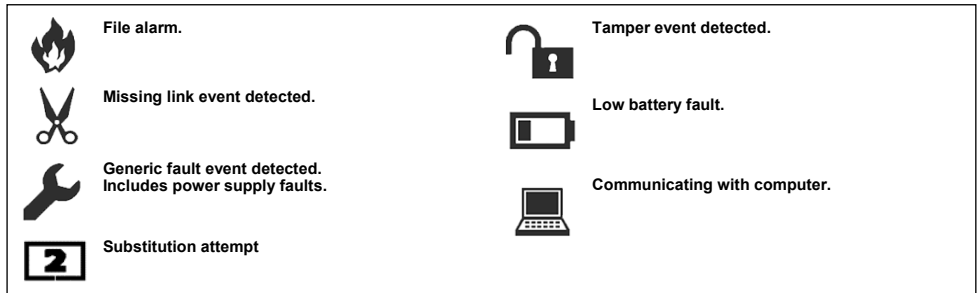
Event occurrences are notified on the **SYG-EM**'s onboard display as in the following example:



Picture 20

<b>Where: n:</b>	The "n." row indicates the number of the message event and the total of the messages available for viewing. To go through the message events use the left / right and up / down keys.
<b>RF Addr.</b>	This row indicates the address of the device "affected" by the event. "RF Addr." is the wireless address which is a composed by the network device address ( <b>SYG-EM</b> 's) and the child device address (if "0" refers to the network device itself).
<b>Expander</b>	In this example it is the generic description of the <b>SYG-EM</b> .
<b>Tamper</b>	In this example it is a "tamper" detection event type.

During event signalling icons are also displayed, carrying the following meanings:



Picture 21

### **FUNCTIONAL TEST - ALARM**

Test the **SYG-EM**'s alarm signalling capability as follows:

- 1) Activate an alarm through a local child device.
- 2) Check that the **SYG-EM** signals the alarm event.
- 3) Check that the control panel latches in alarm.
- 4) Check that eventually present local output child devices activate as expected.
- 5) Check that system output child devices activate as expected.
- 6) Reset the control panel.

### **FUNCTIONAL TEST - FAULT**

Test the **SYG-EM**'s fault signalling capability as follows:

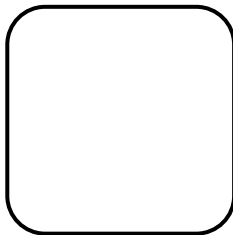
- 1) Activate a fault event through a local child device.
- 2) Check that the **SYG-EM** signals the fault event.
- 3) Check that the control panel signals the fault event.
- 4) Reset the control panel.



**Apply mandatory testing and periodic testing policies of your country.**

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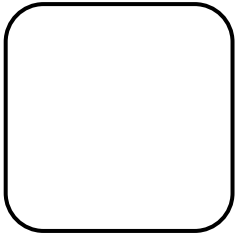
## **NETWORK DEVICE QR CODE**



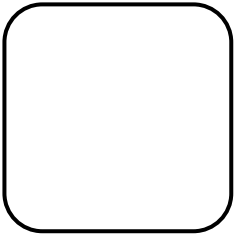
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NOTE

**FIELD DEVICES QR CODE**

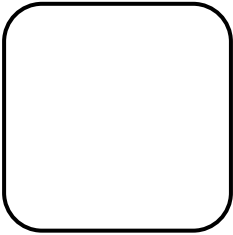


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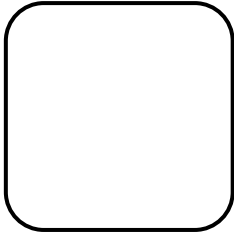


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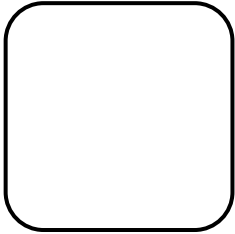


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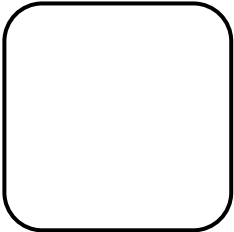


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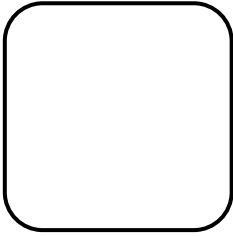
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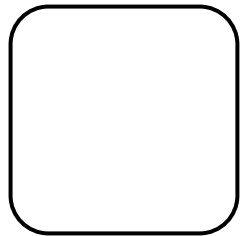
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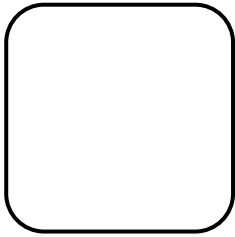


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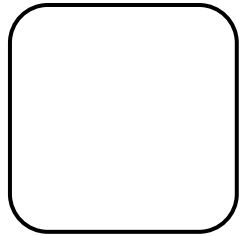


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**FIELD DEVICES QR CODE**

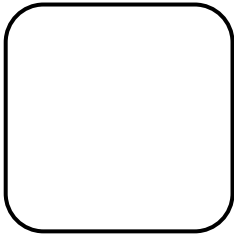


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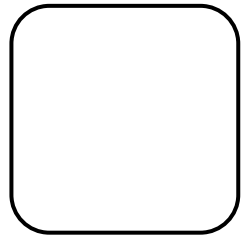


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**FIELD DEVICES QR CODE**

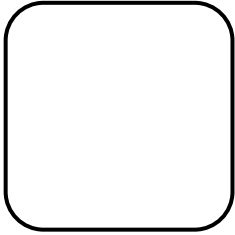


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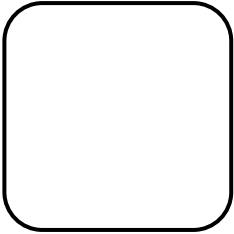


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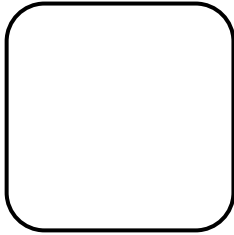


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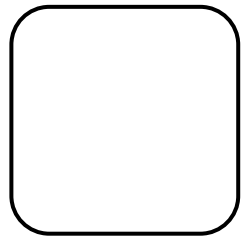


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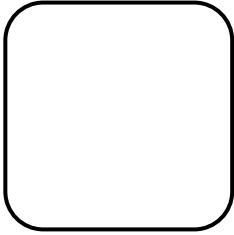


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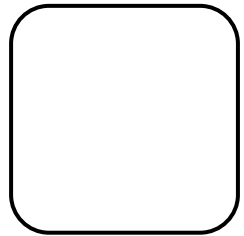


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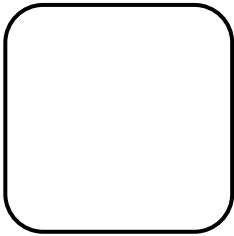


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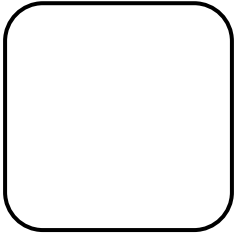


NOTE

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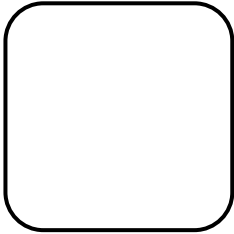


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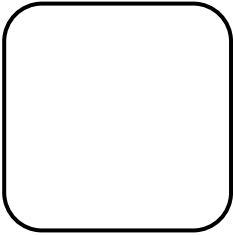


NOTE

**FIELD DEVICES QR CODE**



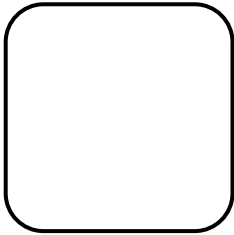
NOTE



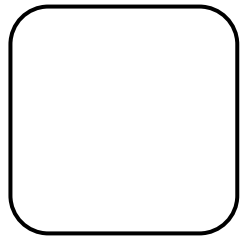
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**FIELD DEVICES QR CODE**

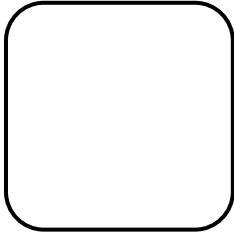


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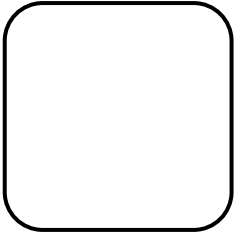


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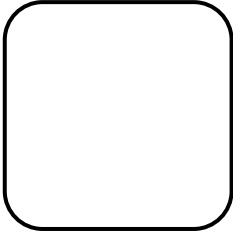


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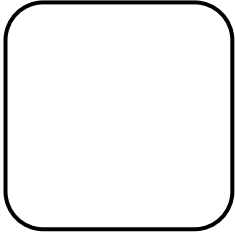


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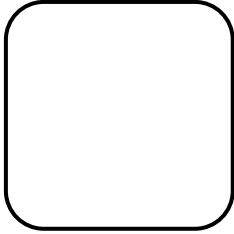


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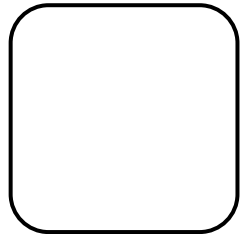


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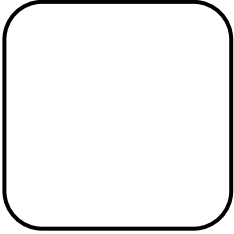


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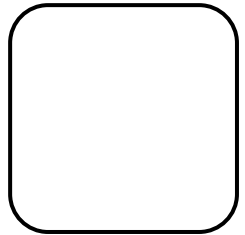


NOTE

**FIELD DEVICES QR CODE**



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