Pyronix

Enforcer X 280

Installation Guide

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Document version	02 - draft.01

INTRODUCTION

Unleashing the Full Potential with Precision and Ease

Welcome to the Pyronix Enforcer X 280 Physical Installation Guide – your key resource for installing the Enforcer X 280 Alarm Panel and ensuring its optimal performance. This guide is designed for installers, technicians, and security professionals seeking comprehensive instructions on physically setting up the Enforcer X 280, allowing them to tailor the system to specific security needs.

Purpose of the Guide

The Enforcer X Installation Guide is crafted to be a resource for individuals involved in the physical installation of the Enforcer X control panel. This guide aims to provide clear instructions and technical insights for a seamless and accurate physical installation of the Enforcer X components, ensuring that the security system is connected correctly with precision.

Target Audience

This guide is specifically tailored for professional installers and technicians responsible for the physical deployment of the Enforcer X security alarm system. Whether you're an experienced security professional or a technician new to the Enforcer X system, this guide is designed to meet the specific needs of those engaged in the hands-on installation process.

Scope and Limitations

The guides primary focus is on the physical installation aspects, covering the electronics of the alarm panel, wiring of sensors and bus peripherals, and inserting communication modules. While the guide provides comprehensive instructions, it is important to note that it may not cover every scenario. Users encountering unique challenges or specific system integrations are encouraged to consult additional resources or seek support from our technical assistance channels.

Overview of Topics

This guide not only provides a comprehensive overview of the main PCB but also incorporates detailed diagrams and educational sections. These sections specifically cover the wiring of data bus peripherals, zones, bells, and extension speakers. By combining theoretical insights with practical visual aids, the guide aims to enhance your understanding and proficiency in handling critical aspects of the installation process.

Benefits of Following the Guide

By following this programming guide, you will gain the expertise to harness the full potential of the Enforcer X, enabling you to create highly customised and sophisticated security solutions. Explore advanced programming options, optimize system settings, and tailor the alarm panel to meet the specific security needs of your environment.

This guide is designed to offer a holistic understanding of key installation components, encompassing the main PCB, data bus wiring, zone wiring, bell wiring, extension speaker wiring, and communication module installation. This approach guarantees that skilled installers acquire a detailed understanding of the complex components within the Enforcer X system

Quick Start

For those eager to dive straight into installation, a Quick Start Guide has been provided with the product as well as an overview of the PCB inside the control panel lid.

CONVENTIONS

! **Important**
An important message that serves as a pivotal piece of information that ensures clarity, safety, or the proper execution of a task. This message typically highlights a critical step, precaution, or key detail that users must pay attention to.

Please note
Denotes a note that highlight significant details, providing additional context, or conveying essential warnings that the reader should be aware of.

ⓘ **Tip**
Offers insights, shortcuts, or best practices that may not be immediately obvious but can contribute to a more efficient or effective execution of the task at hand. May share helpful knowledge, troubleshoot potential issues, or suggest alternative approaches that can benefit the user's experience.

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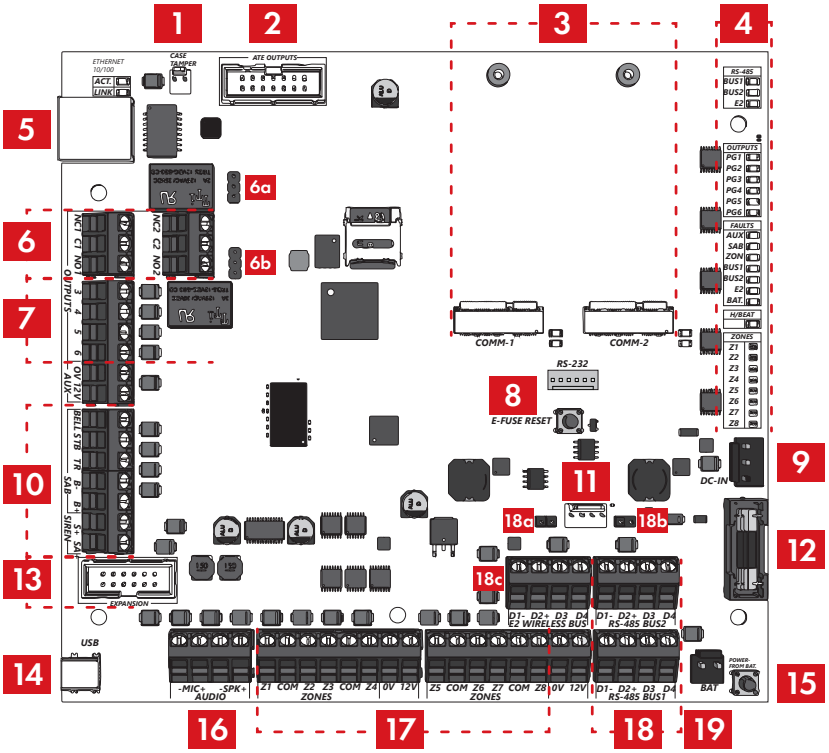


Case tamper connector

Connects the main PCB to the tamper switch on the metal housing of the endstation.

ATE connector

The ATE PGMs are connected to a third party signalling device in order to power the device and to send signals to a monitoring station.

Communication module slots

The communication module slots can accommodate any two of the following modules:

- Wi-Fi module – Must always go in comm slot 1
- 4G/2G module – Can go in either or both slots

Endstation LED indicators

The Endstation LEDs indicate the status of the following:

- RS485 bus
- Outputs
- Fuses
- Heartbeat
- Zones

Ethernet port

Once connected via a LAN cable to a network, it can be used to signal via IP to a central station or to communicate with InSite Pro Cloud. It can also be connected to directly with a PC/laptop for an InSite Pro Local connection.

Programmable outputs (PGMs)

There are two clean relays on the board and 4 transistorised outputs.

The 2 relay outputs are rated at 3A@30VDC each. Both relays have a 3-pin jumper which can be used to apply a voltage to the common of the relay. Placing a jumper linking the top two will make the common 12VDC and when the bottom two are linked, the common will be 0VDC.

The 4 transistorised outputs are rated 200mA@12VDC each and can operate in four different modes:

OUTPUT POLARITY OPTION	RESTORE STATE	TRIGGERED STATE
[0] 12v Removed	12v	Nothing

OUTPUT POLARITY OPTION	RESTORE STATE	TRIGGERED STATE
[1] 0v Removed	0v	Nothing
[2] 12v Applied	Nothing	12v
[3] 0v Applied	Nothing	0v

E-Fuse reset button
Resets all the electronic fuses on the board if any of them have tripped. (The fuses can also be reset through the engineer menu).

Transformer connector
Connects the incoming power to the endstation. Click here for power supply specifications.

External bell terminals
Terminals for wiring an external bell to the control panel. Click here for external bell wiring.

Engineer keypad Port
Is used to connect a temporary engineer keypad to.

3.15A anti-surge battery fuse
Sit in between the PCB components and the battery to protect the board and battery from issues such as reverse polarity.

8 zone expander port
For future use.

USB port
The USB port can be used for the following features:

- Import and export panel configuration
- Exporting panel logs

Battery connect button
Forces the relay that connects and disconnects the battery circuit to switch and connect the battery to the endstation. This is particularly useful to power up the endstation when there is no incoming mains supply to the panel.

Microphone and speaker terminals
Terminals to wire in an external microphone (for future use) and an 10W, 16Ω AC extension speaker.

Zone terminals
The zone terminals are in a Z1, COM configuration and can be wired in any of the following:

- Double pole (N/C or N/O)
- Single end of line (SEOL)
- Double end of line (DEOL)
- Triple end of line (3EOL)

RS485 bus terminals
All keypads, proximity readers, wired and wireless expanders (both zone and output) are wired to these terminals.

RS485 End of Bus (EOB) resistors
Above the RS485 terminals, each bus has its own EOB two-pin jumper header. If the RS485 bus needs a terminating resistor, the respective jumper is used to incorporate a 100Ω terminating resistor across the data line at the endstation. If this is used, a 100Ω resistor should be fitted at the furthest point of the bus across the D3 and D4 terminals.

ⓘ **'EOB1' is for 'RS485 BUS1', 'EOB2' is for 'RS485 BUS2' and 'EOE2' is for future use.**

E2 RS485 bus
For future development.

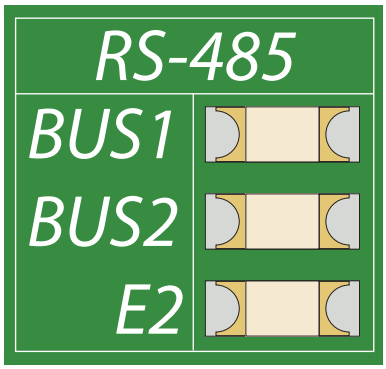
Back-up battery connection
Connects the battery to the endstation.

It is recommended that a battery rated 7-17AHr is connected to the panel.

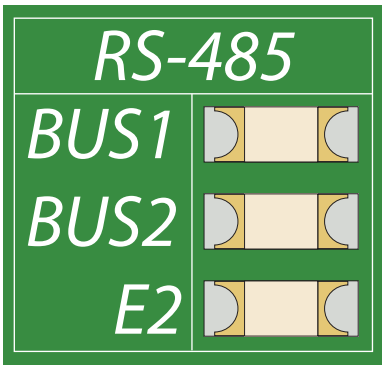
RS-232 connector
For connection to 3rd party communication devices.

ENDSTATION LED INDICATORS
Most of the LED indicators are only active when the system is in engineer mode'. The only LEDs which are always active are the 'Heartbeat' LED and the communication LEDs.

RS485
This section of LEDs show the status of the RS485 terminals. When a device is wired into these terminals and programmed to be active, the LED will illuminate.

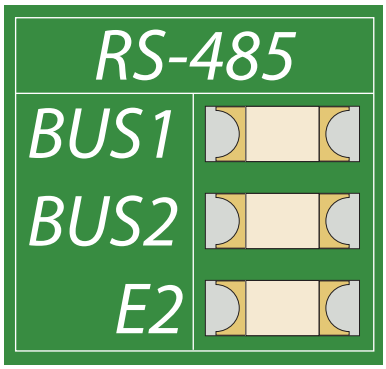


No LEDs will be illuminated when there are no devices connected to the RS485 terminals



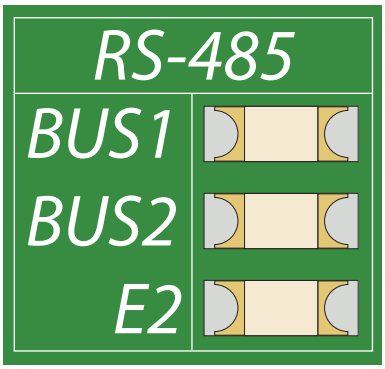
RS485 Bus1

When a device is wired into 'RS-485 BUS1' and programmed, the green LED next to 'BUS1' will illuminate.



RS485 Bus2

When a device is wired into 'RS-485 BUS2' and programmed, the green LED next to 'BUS2' will illuminate.

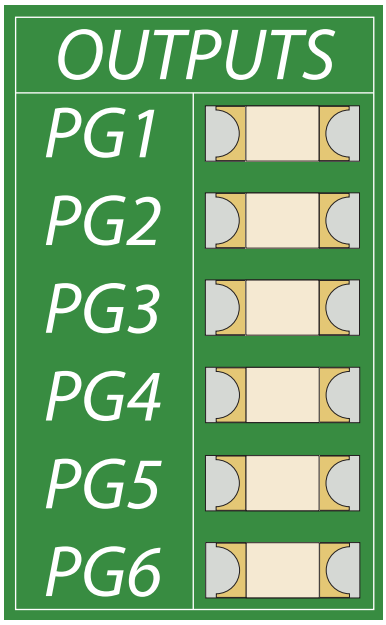


E2 RS485 Bus

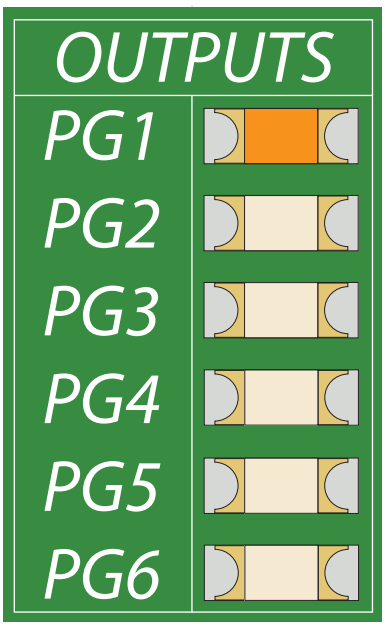
This is for future use.

RLY and O/P Outputs

When the relevant output is triggered, the LED for that PGM output will illuminate and then extinguish when it returns to a quiescent state.

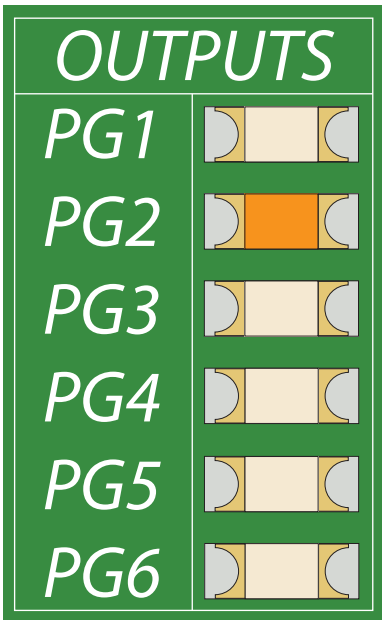


When all the PGM outputs are in a quiescent state, none of the LEDs from this section will be illuminated.



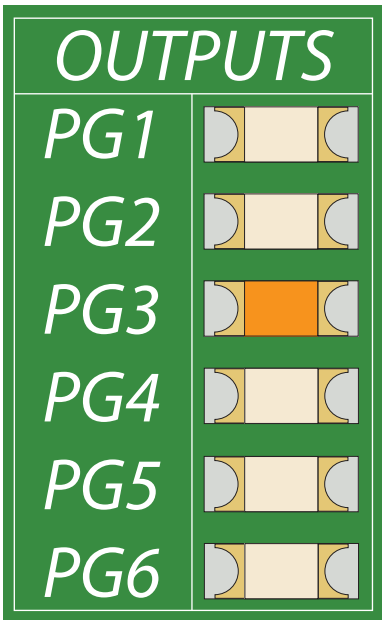
Relay O/P1

When this relay is triggered, the orange LED next to 'RLY1' will illuminate.



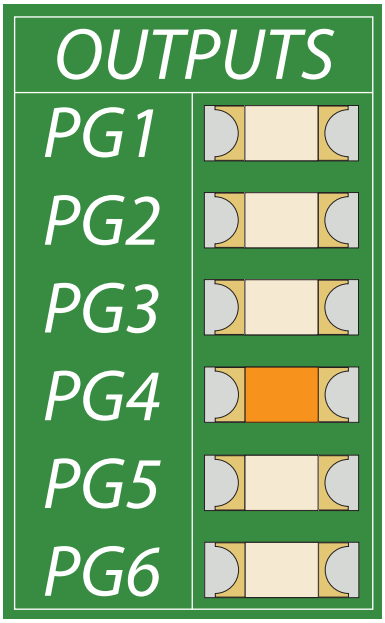
Relay O/P2

When this relay is triggered, the orange LED next to 'RLY2' will illuminate.



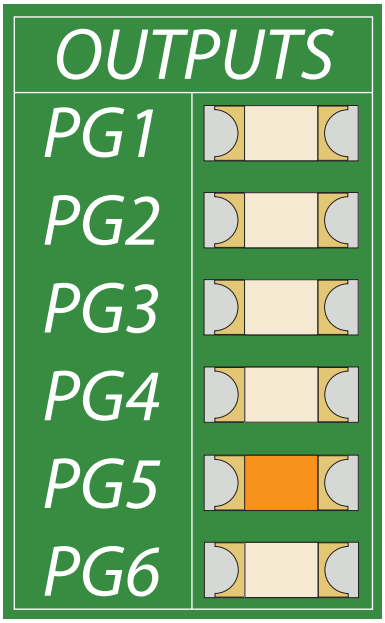
Transistor O/P3

When this output is triggered, the orange LED next to 'O/P3' will illuminate



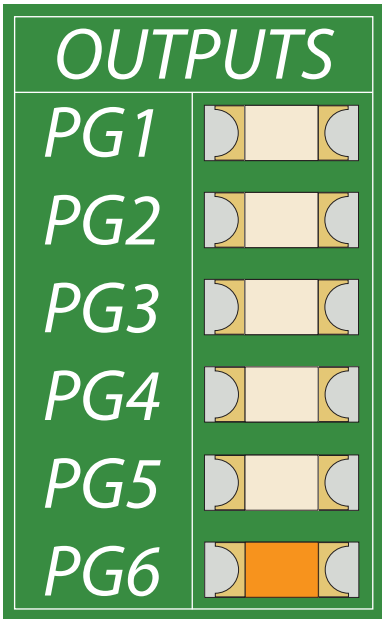
Transistor O/P4

Then this output is triggered, the orange LED next to 'O/P4' will illuminate.



Transistor O/P5

When this output is triggered, the orange LED next to 'O/P5' will illuminate.

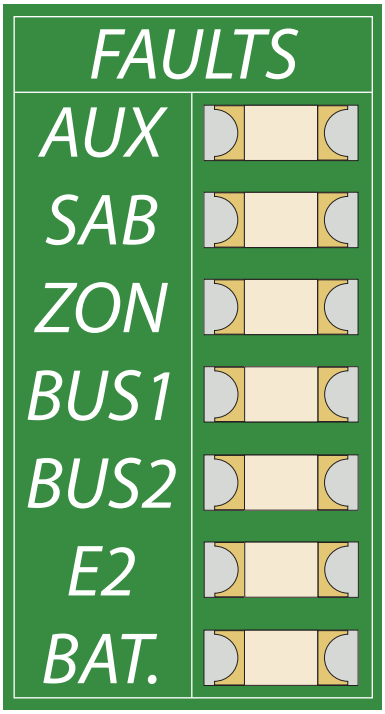


Transistor O/P6

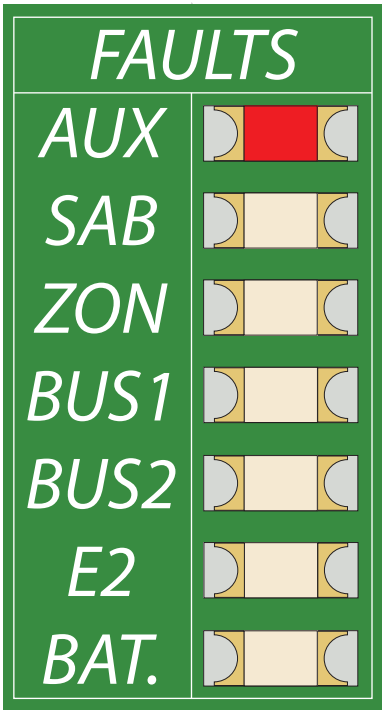
When this output is triggered, the orange LED next to 'O/P6' will illuminate

Faults

All fuses except the battery fuse are thermal fuses and can be reset by pressing and holding down the 'E-FUSE RESET' button in the middle of the PCB. They can also be reset in the Engineers menu in the option ENGINEER MAINTENANCE > Reset Efuses.

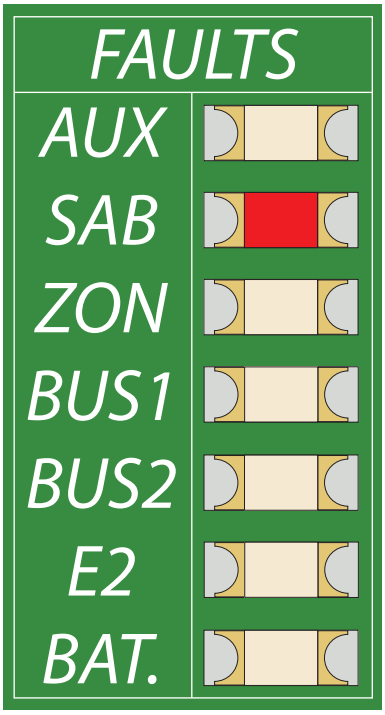


When the control panel is healthy and none of the fuses are tripped, no LEDs will be illuminated.



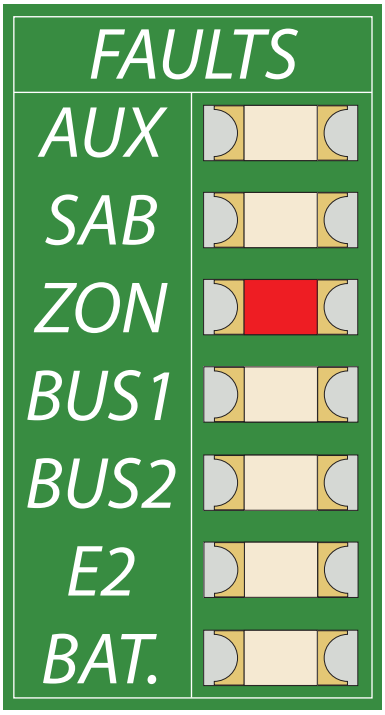
Auxiliary Fuse

This fuse will be tripped if the current drawn from the AUX terminals exceed the limit.
Recommended 1.0A
Maximum 1.5A



Self-Actuating Bell (SAB) Fuse

This fuse will be tripped if the current drawn from the SAB terminals exceed the limit.
Recommended 1.5A
Maximum 2.0A

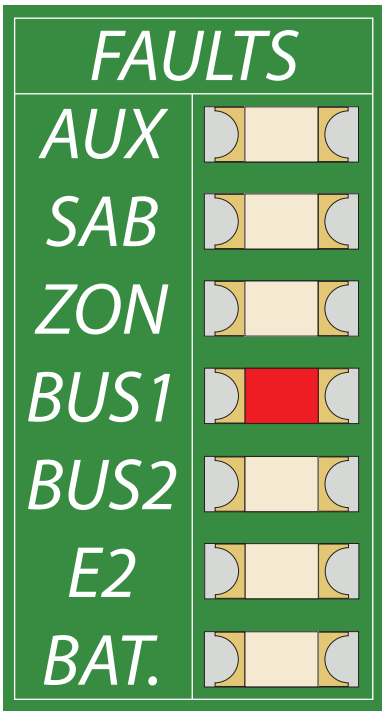


Zones Fuse

This fuse will be tripped if the current drawn from the 12VDC terminals that supply the zones exceed the limit.

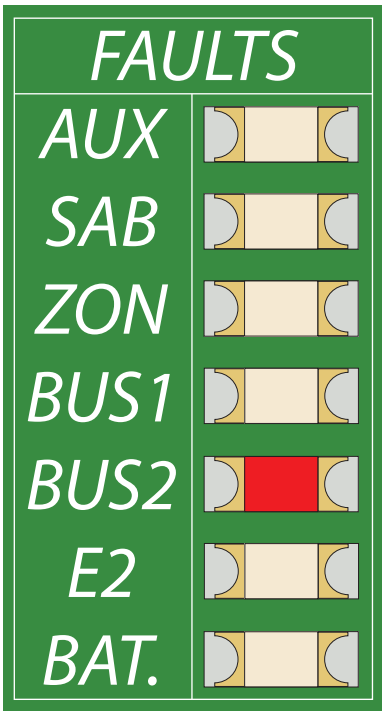
Recommended 1.0A

Maximum 1.5A



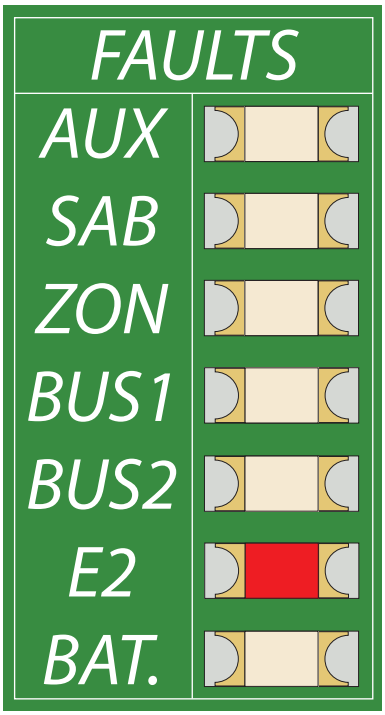
RS485 Bus1 Fuse

This fuse will be tripped if the current from the RS485 BUS1 terminals exceed the limit.
Recommended 1.0A
Maximum 1.5A



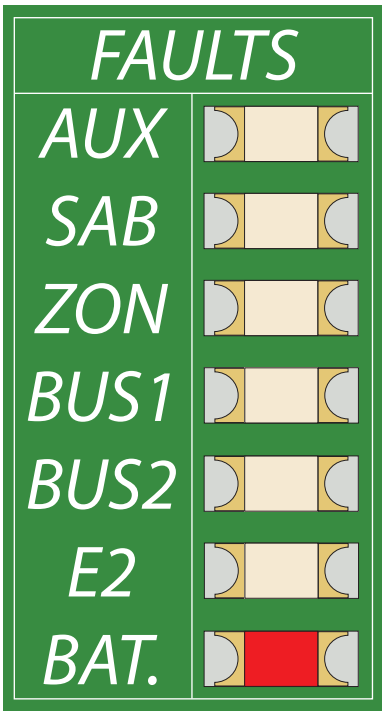
RS485 Bus2 Fuse

This fuse will be tripped if the current from the RS485 BUS2 terminals exceed the limit.
Recommended 1.0A
Maximum 1.5A



E2 RS485 Bus Fuse

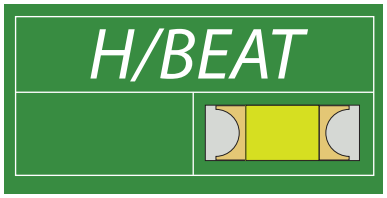
For future use.
Recommended 1.0A
Maximum 1.5A



Battery Fuse

This is a glass anti-surge timed blow fuse and will blow if the current drawn from the battery exceed the limit.
Maximum 3.15A

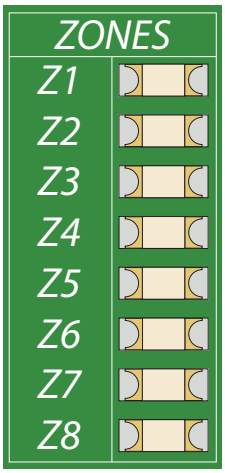
Heartbeat



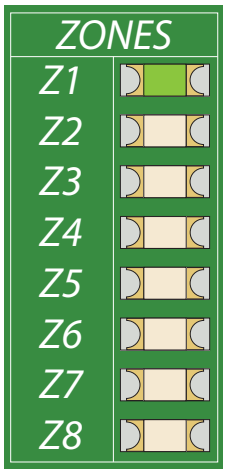
The 'Heartbeat' LED indicates that the control panel processor and firmware are running correctly.

Zones

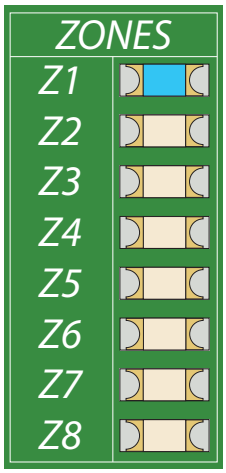
The zone LEDs are tri-colour to visually display all states that the zone can be in and not illuminated if the zone is not programmed. The below examples show the various states that the first zone can be in.



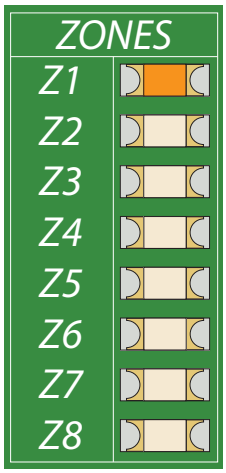
When an zone is programmed as 'Unused' the LED will not illuminate.



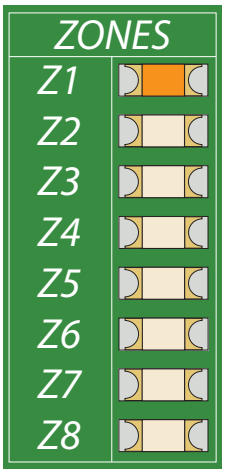
When the zone is in a restore or 'healthy' state, the LED will illuminate green.



When the zone is in an alarm or 'open' state, the LED will illuminate blue.



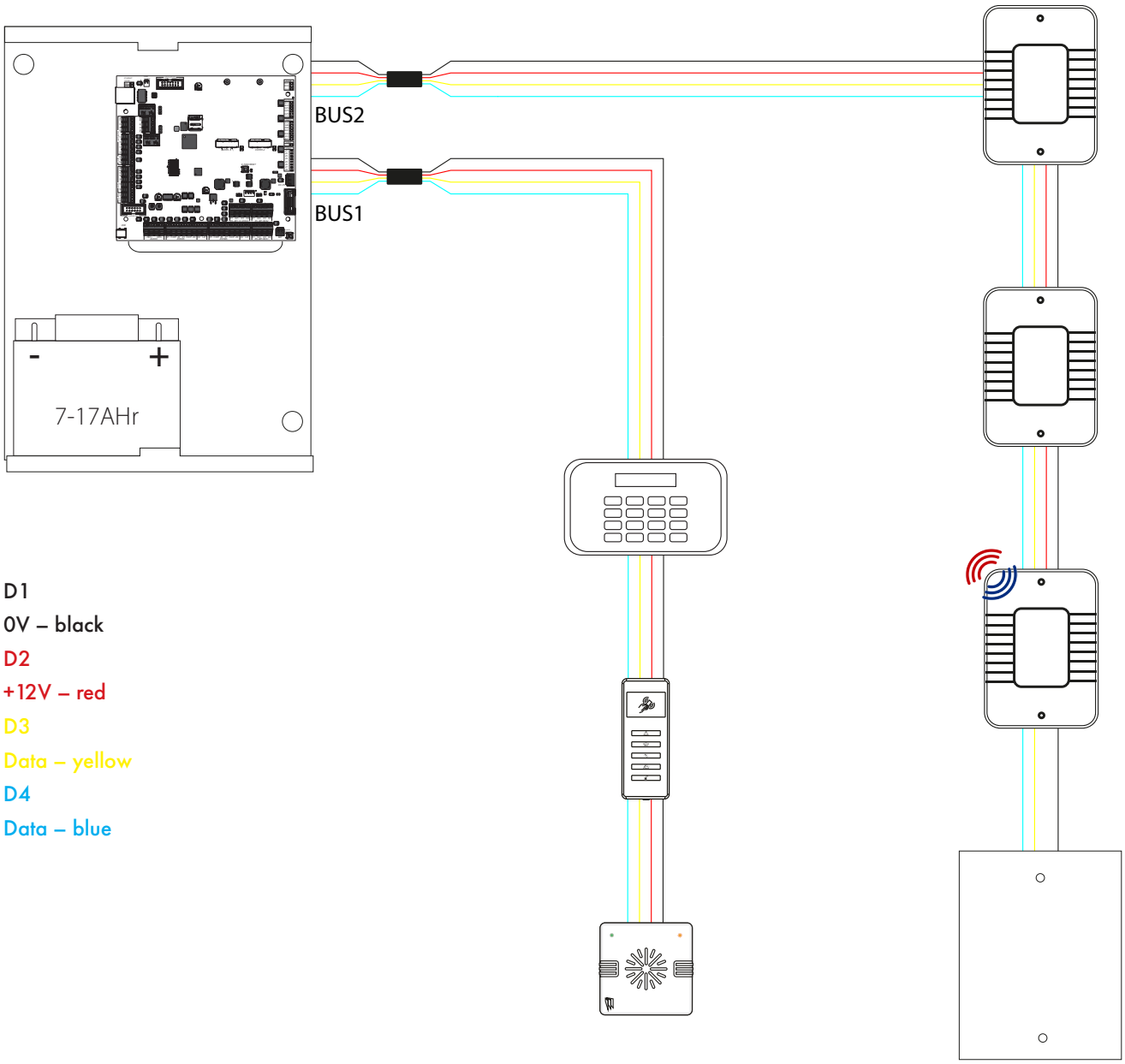
When the zone is in tamper or 'trouble' state, the LED will illuminate orange.



If the zone is masked, the LED will flash orange.

RS485 BUS WIRING

Example of peripherals wired on the RS485 buses.



Each peripheral that is wired on the RS485 bus will contain its own installation guide which will contain detailed wiring instructions.

RS485 is a standard defining the electrical characteristics of drivers and receivers for use in serial communications systems. Virtually all alarm systems use a RS485 data bus to connect all wired components that need to communicate with the endstation.

The general principle of wiring a RS485 bus is that D1 (0V) is connected to D1 at the device, D2 (12VDC) connected to D2 at the device and so forth. The colours used are not important however, it is good practice to use black for 0V and red for 12VDC and that the same colours are used throughout the installation for the data (D3 and D4).

The Enforcer-X wired control panels have two sets of standard RS485 bus terminals and one RS485 E2 bus. All buses work independently and it does not matter which devices are wired to RS485 bus1 and bus2.

The RS485 E2 bus is for future development.

CABLE TYPE AND RANGE

CABLE TYPE	SCREEN CABLE	BUS RANGE (M)	DAISY CHAIN RANGE (M)	STAR RANGE (M)
4 core alarm cable	Use when the bus is located near fragmented 230VAC main power line	300	1000 For greater than 1000m range, standard isolated RS485 repeaters are required	50
6 core alarm cable doubling D1 (0V) and D2 (12VDC)		1000		
Twisted pair		1000		

ⓘ **Whilst star wiring will still work in most cases, it is always better to wire in daisy chain format where possible.**

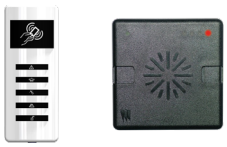
GENERAL PRINCIPLES

- No alarm system cable should be run with other cables carrying AC or digital signals.
- The cables should be protected by the use of grommets where appropriate.
- If an expansion module with a power supply on board is connected, the D2+ terminal must not be connected between the main bus and module.

DEVICES

The RS485 bus is used to communicate with peripherals that transfer and receive data. The main devices that are wired on to the RS485 bus are keypads, tag readers, zone expanders and PGM output expanders.

Keypads



Proximity readers

Zone expanders

Output expanders

WIRING ZONES

Resistors

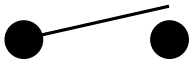
Each circuit is made up of one, two or three resistors depending on whether the circuit is being wired single end of line (SEOL), double end of line (DEOL) or triple end of line (3EOL). There are multiple terms that are used to describe the different states a circuit can be in, some of these are as follows:

TAMPER	NORMAL	ALARM	MASK
• Trouble	• Restore • Closed • Healthy	• Triggered • Open	• Fault • Covered

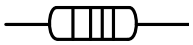
This circuit is comprised of two resistors.

1. The alarm resistor which will indicate to the control panel when the zone has been triggered and is in an 'alarm' state.
2. The end of line resistor which indicates to the control panel that the circuit is healthy and the tamper is closed.

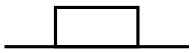
A typical example of this is below, showing the circuit and the resistors wired in a DEOL configuration.



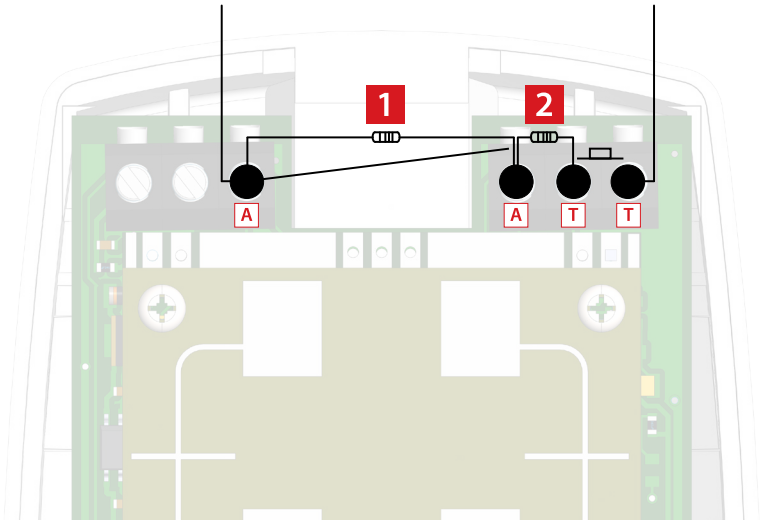
Relay switch



Resistor



Tamper switch



1	Alarm resistor 4k7	2	Tamper resistor 2k2
A	Alarm terminals	T	Tamper terminals

Choosing the Correct Resistors

It is extremely important that the correct resistors are used when wiring the circuit. The EOL resistor is measured in the system all the time, when the detector goes into alarm, it adds this value to the EOL resistor . In the case of a masking scenario, the mask and alarm resistors are added to the EOL resistor allowing the control panel to distinguish four states – alarm, fault, mask and tamper. When selecting the resistors, it is vital to take notice of the range of each state and that, when added together, the resistance measured falls inside the range.

The below table shows the full range of resistances that can be selected in the control panel.

ZONE STATE RESISTANCE TOLERANCES				
CHOICE (ALARM/TAMPER*)	NORMAL (K)	ALARM (K)	FAULT (K)	MASK (K)
4k7/2k2* (default)	1.8 – 2.6	5.5 – 8.3	8.4 – 10.9	11.0 – 16.4
1k/1k*	0.8 – 1.2	1.6 – 2.4	6 – 8	8.2 – 17
1k1/2k2*	1.8 – 2.6	2.7 – 4.0	4.1 – 8.0	8.1 – 12.1
2k2/2k2*	1.8 – 2.6	3.5 – 5.3	5.4 – 8.9	9.0 – 13.4
2k7/2k7*	2.2 – 3.2	4.3 – 6.5	6.6 – 9.7	9.8 – 14.6
2k2/6k8*	5.4 – 7.1	7.2 – 10.8	10.9 – 12.5	12.6 – 19.0
3k3/3k3*	2.6 – 4.0	5.3 – 7.9	8.0 – 10.6	10.7 – 16.1
4k7/3k3*	2.6 – 4.0	6.4 – 9.6	9.7 – 11.7	11.8 – 17.8
4k7/4k7*	3.8 – 6.9	7.5 – 10.3	10.2 – 13.9	14.0 – 19.4

ZONE STATE RESISTANCE TOLERANCES				
CHOICE (ALARM/TAMPER*)	NORMAL (K)	ALARM (K)	FAULT (K)	MASK (K)
5k6/5k6*	4.5 – 6.7	9.0 – 13.4	13.5 – 14.3	14.4 – 12.6
6k8/4k7*	3.8 – 5.6	9.2 – 14.8	14.9 – 18.7	18.8 – 22.6
6k98/3k74*	3.0 – 4.5	8.6 – 12.9	13.0 – 13.9	14.0 – 21.0
10k/10k*	8.0 – 12.0	16.0 – 24.0	N/A	24.1 – 32.2

Again, using the examples of 4.7k/2.2k resistance range. The tolerance table is as shown:

RANGE SELECTED	NORMAL		ALARM		FAULT		MASKING		TAMPER	
4k7/2k2	from	to	from	to	from	to	from	to	from	to
	1.8	2.6	5.5	8.3	8.4	10.9	11.0	16.4	<1.8	>16.4

The resistors that should be chosen

To wire in the 4.7k/2.2k resistor range, the resistors used should be a 2.2k for end of line, 4.7k for the alarm relay and 6.8k for the mask relay. The resistors will fall in to the ranges as follows when the zone changes states

- Normal state 2.2k
- Alarm state 4.7k + 2.2k = 6.9k
- Fault state 6.8k + 2.2k = 9k
- Masked state 4.7k + 2.2k + 6.8k = 13.7k

The default resistance range is 4.7k/2.2k but can be changed in Program Zones. This is a global setting and will change the resistance range of all wired zones to the system.

Double Pole

The zones can also be wired in a double pole configuration; meaning either normally closed or normally open. If the zone is wired in this configuration, it must be programmed to operate in 0k/0k.

If the zones are wired in a normally open configuration, the zone needs programming on the system to reflect this. This programming can be altered in engineer menu PROGRAM ZONES > Choose Zone > Zone Attributes > Normally Open.

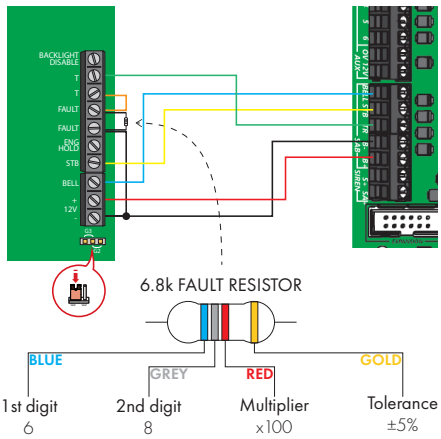
WIRING BELLS

EXTERNAL BELL TERMINALS

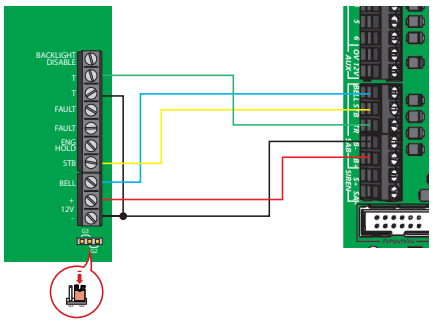
PCB MARKING	TERMINAL FUNCTION	OPERATION
BELL	Bell trigger	Negative applied output
STB	Strobe trigger	Negative applied output
TR	Tamper return	Negative input
B-	Bell negative	0V auxiliary power for the bell
B+	Bell positive	12VDC auxiliary power for the bell
S+	Siren trigger	Positive applied output
SA+	Self-powered siren trigger	Positive removed output

WIRING USING A PYRONIX G3/2 BELL

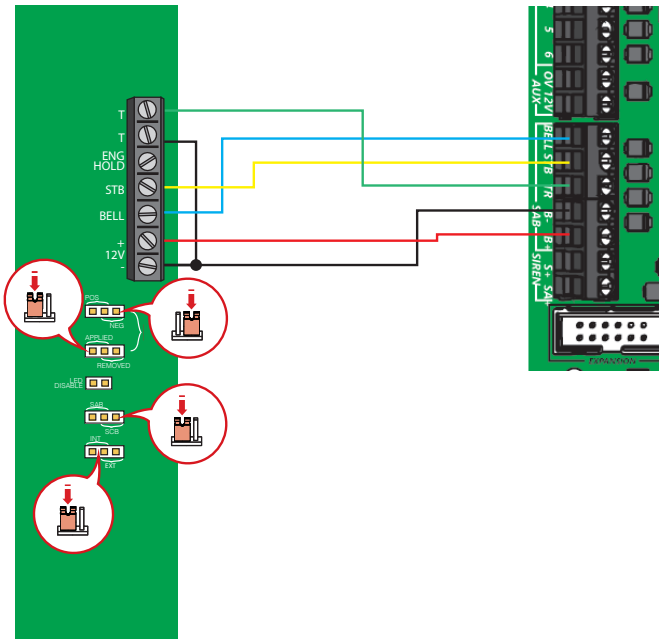
Grade 3 Wiring



Grade 2 Wiring

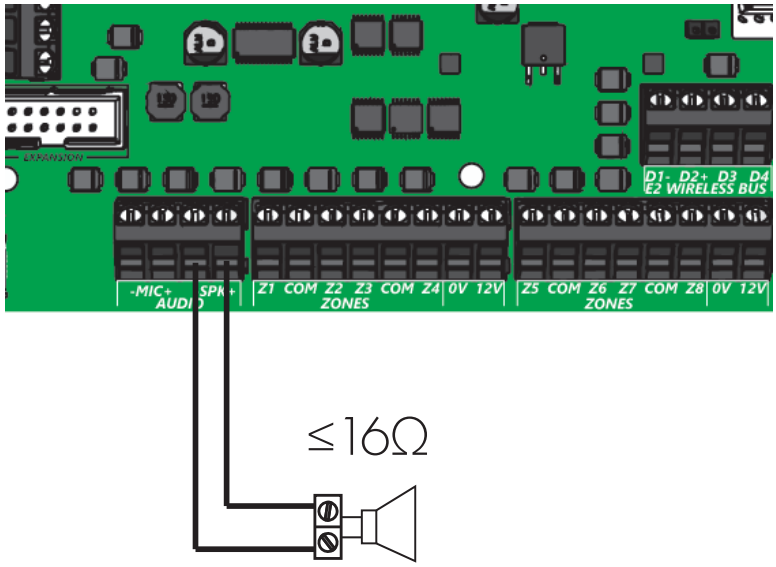


WIRING USING A PYRONIX G2 BELL



WIRING AN EXTENSION SPEAKER

An extension speaker should be wired between the -SPK and SPK+ terminals and should not be greater than 16Ω. It does not need programming and will follow the tones programmed in the panel such as chime and entry/exit tones.



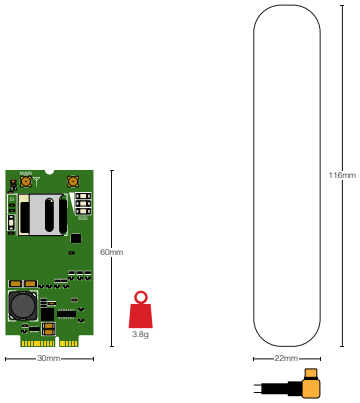
WI-FI COMMUNICATION MODULE

Partcode: ENFX-COMM-WIFI

EN 50136-1: 2012 +A1: 2018
EN 50136-2: 2013
PD 50136-9:2020
SP5 (Single Path)
Environmental Class (EC) II

SPECIFICATIONS

Dimensions

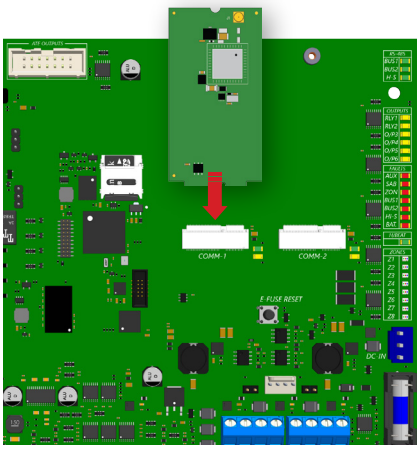


Electrical Specifications

SPECIFICATION	VALUE
Operating voltage	9-16VDC
Operating current	30mA
Storage temperature	-40°C to +80°C
Operating temperature	-10°C to +40°C

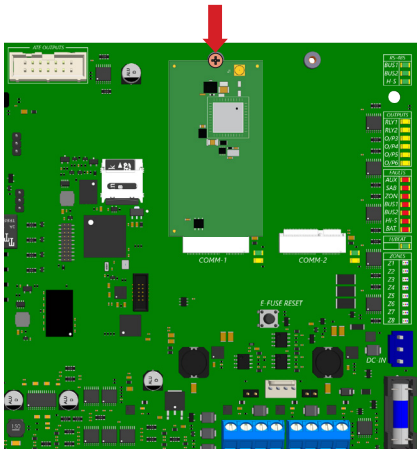
INSTALLATION

Fully power down the control panel before inserting or removing any communication modules.



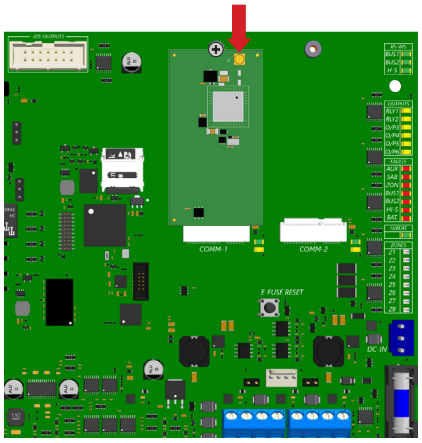
Step 1

Insert the module in to the communications slot.



Step 2

Secure the module in place using the screw provided.



Step 3

Attach the external antenna to the MMCX connection. Locate away from the control panel so that the best signal can be obtained.

Even if more than one communication module is being used, the Wi-Fi module must always be seated in to the COMM 1 slot.
Do not affix the antenna to the metal enclosure of the control panel.
There can only be one Wi-Fi module per system.

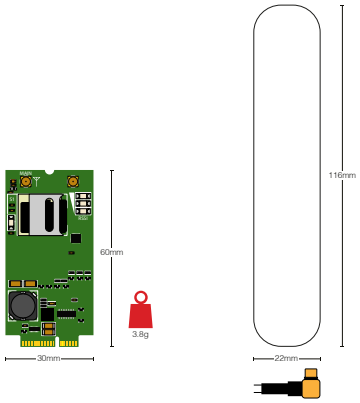
CELLULAR COMMUNICATION MODULE

Partcode: ENFX-COMM-4G/SIM

EN50136-1: 2012 +A1: 2018
EN50136-2: 2013
PD 50136-9:2020
SP5 (Single Path)
Environmental Class (EC) II

SPECIFICATIONS

Dimensions

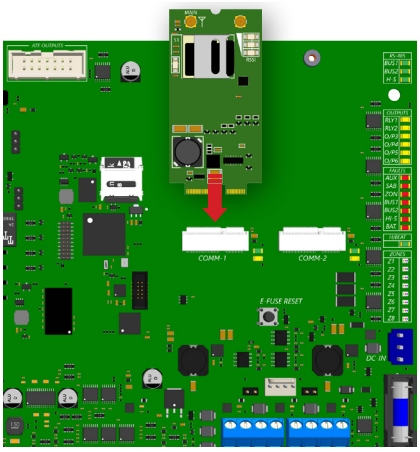


Electrical Specifications

SPECIFICATION	VALUE
Operating voltage	9-16VDC
Operating current	30mA
Storage temperature	-40°C to +80°C
Operating temperature	-10°C to +40°C

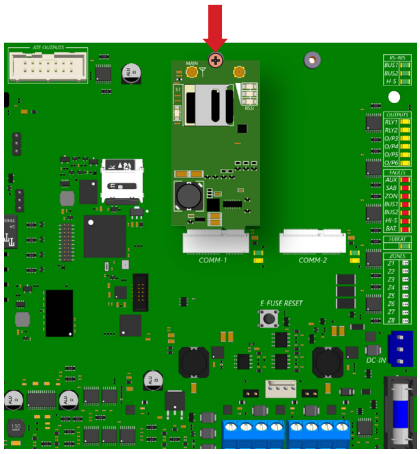
INSTALLATION

Fully power down the control panel before inserting or removing any communication modules.



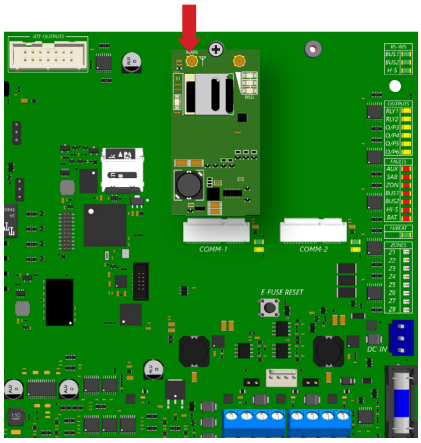
Step 1

Insert the module in to the communications slot.



Step 2

Secure the module in place using the screw provided.



Step 3

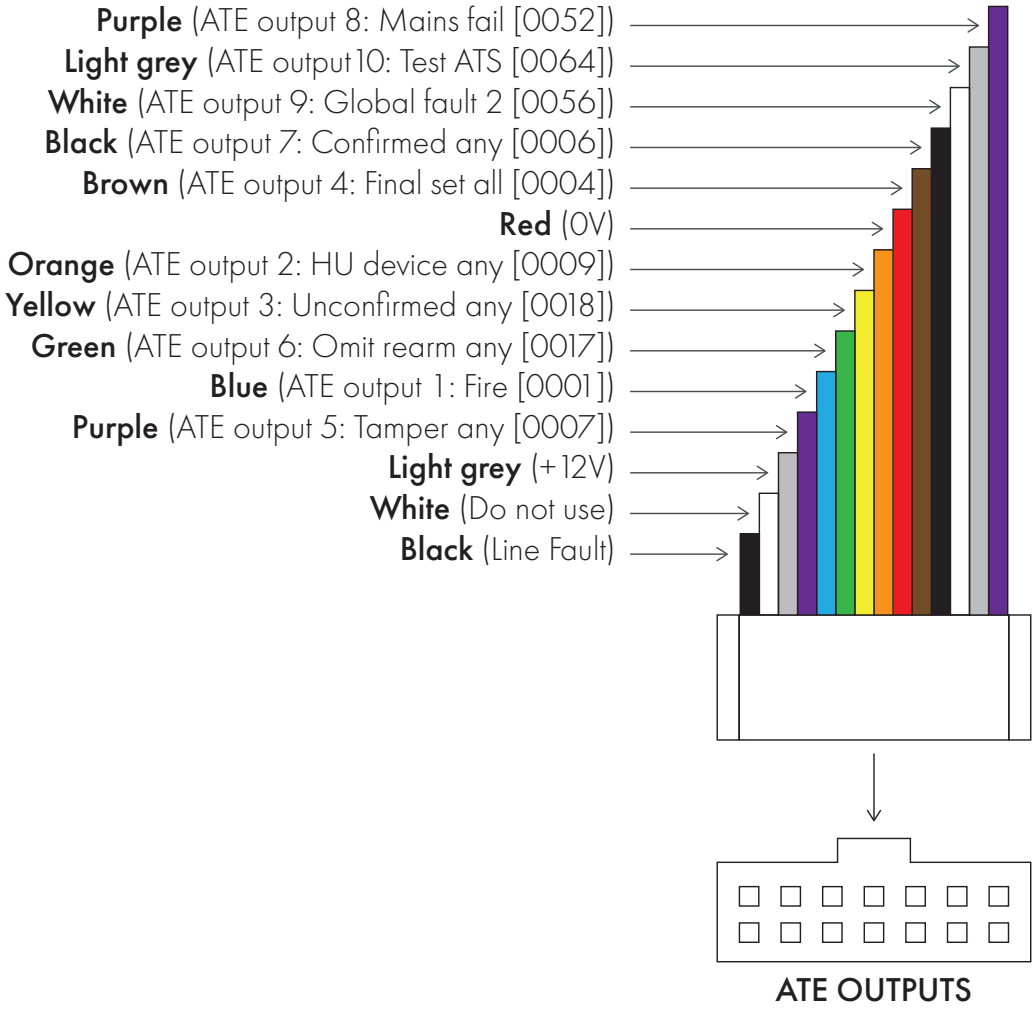
Attach the external antenna to the MMCX connection. Locate away from the control panel so that the best signal can be obtained.

The cellular module can be in either COMM 1 slot, COMM 2 slot or both.

Do not affix the antenna to the metal enclosure of the control panel.

ATE RIBBON

See below the ATE ribbon, its default programming and colour order.



This is used to connect to a 3rd party signalling device and can be reprogrammed in the engineer menu.

CE