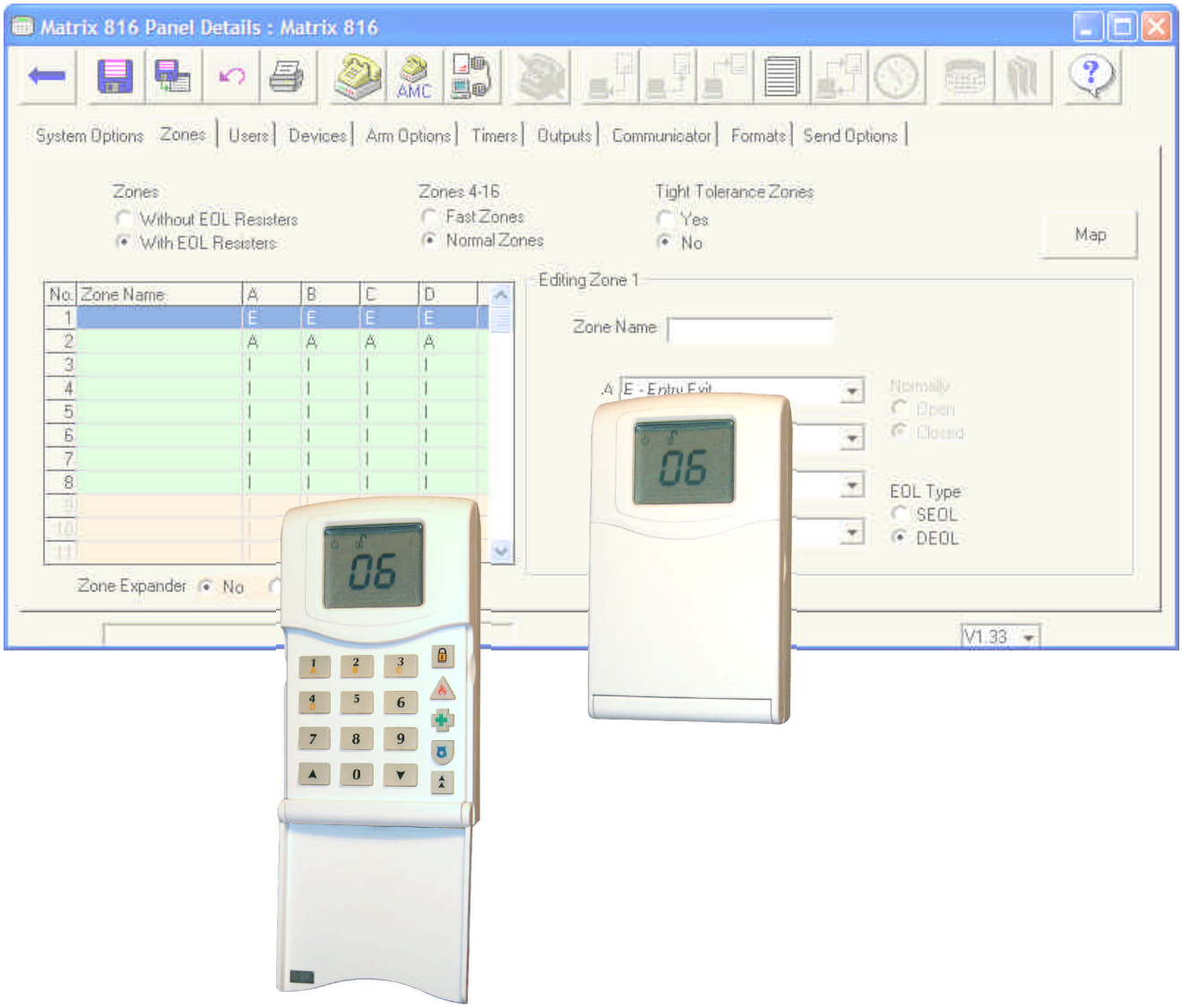
MATRIX 6/816

Control Panel with Remote Keypads

Software Version 1.34

INSTALLATION MANUAL



EN50131-1
PD6662:2004
Security Grade 2
Environmental Class 2

RINS546-7

Pyronix

Pyronix Installers Club (PI Club)

Installer Support

The PI Club has been developed with the focus on what you the installer would like to see from one of the world's leading manufactures of security equipment.

The philosophy behind the association is that you will receive tangible benefits, which are applicable to both the work and home environment.

The Loyalty Clubs Reward Scheme

By collecting the PI Club points, which are printed on product packaging you can redeem against vouchers for Argos, Marks and Spencer and Dunnes (ROI only). 35 Points is equal to a £1 voucher.

Dedicated Website

You will have access to a dedicated PI Club section of the Pyronix website which is packed full of features that will keep you updated on Pyronix and industry news.

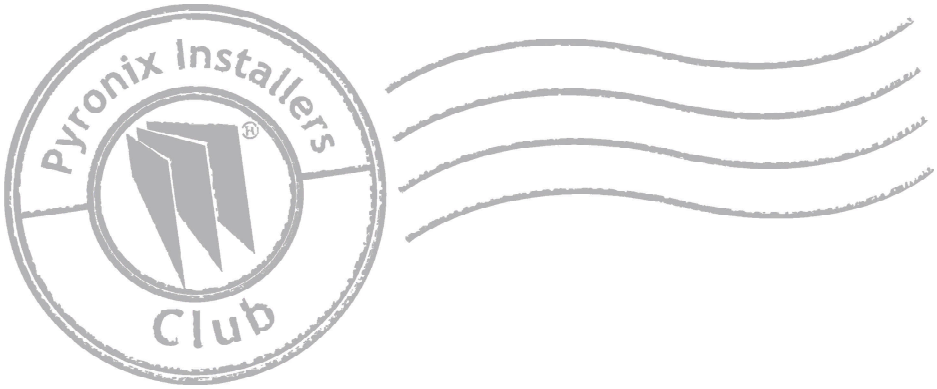
Product Training

Product training days are run monthly at Pyronix Head Office, and on-site training can also be provided to meet your individual needs.

Each company that completes training at Pyronix Head Office will receive a free demo case worth over £100!

To Join the PI Club please register at www.pyronix.com, or for further information please contact our marketing department at marketing@pyronix.com.

As a new member of the PI Club a technical help free phone number will be issued to you.



CONTENTS

1. INSTALLATION AND POWER-UP

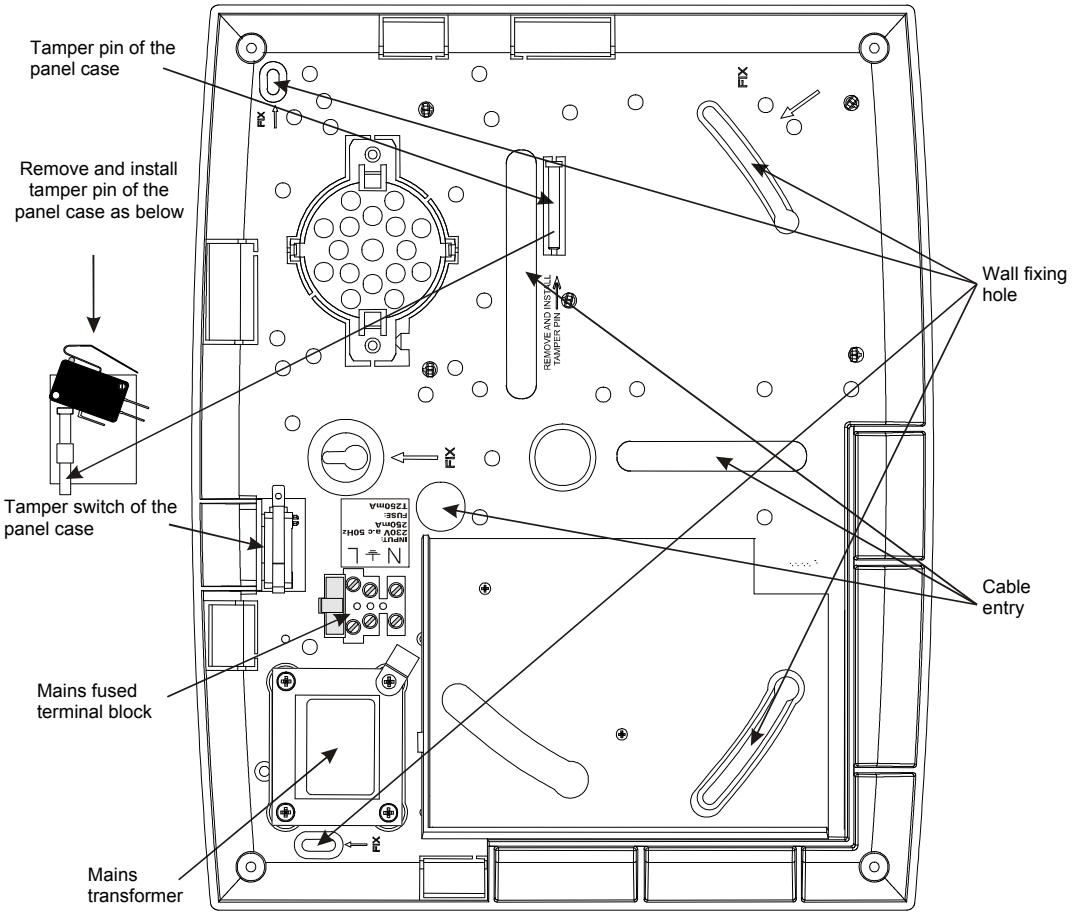
Before mounting the panel you must decide on the place of installation. The use of remote keypads means that the panel can be concealed anywhere on the premises, and it is recommended that the panel be housed in a concealed place.

NOTE: Screws should be tightened with hand tools ONLY. Do NOT use power drivers to tighten screws.

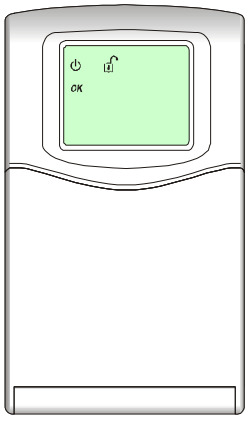
1.1 Plastic Case Assembly

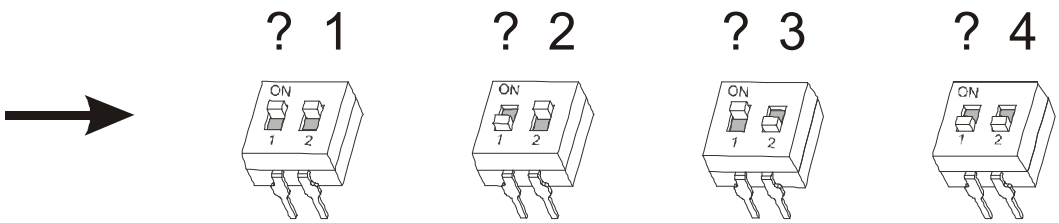
IMPORTANT

To ensure the correct airflow, always mount the unit vertically. Secure the unit to a sturdy and stable surface. The panel is not designed for operation in a high humidity environment and is only suitable for installation indoors.



1.2 Keypad Addressing





1.3 Cabling Rules for the Matrix Bus

Care must be taken when connecting devices to the bus over long cable runs. This is to ensure maximum system integrity under all circumstances (battery backup etc.). The following information is based on using wire of a minimum of 0.22mm cross sectional area.

The maximum number of devices that may be connected to the bus is limited to four keypads - this may not be exceeded. Other restrictions apply to each cable run. It is important to restrict the amount of current carried along each length of cable to limit voltage drops across the system. Apart from being affected by current magnitude, voltage drops are also dependent upon the length of cable and the types of devices fitted.

NOTE: It is the length of cable between panel and end device that is important rather than the overall length on the entire bus.

Table 1: 'KEN' (Keypad Equivalent Number) Values for ICON Keypad

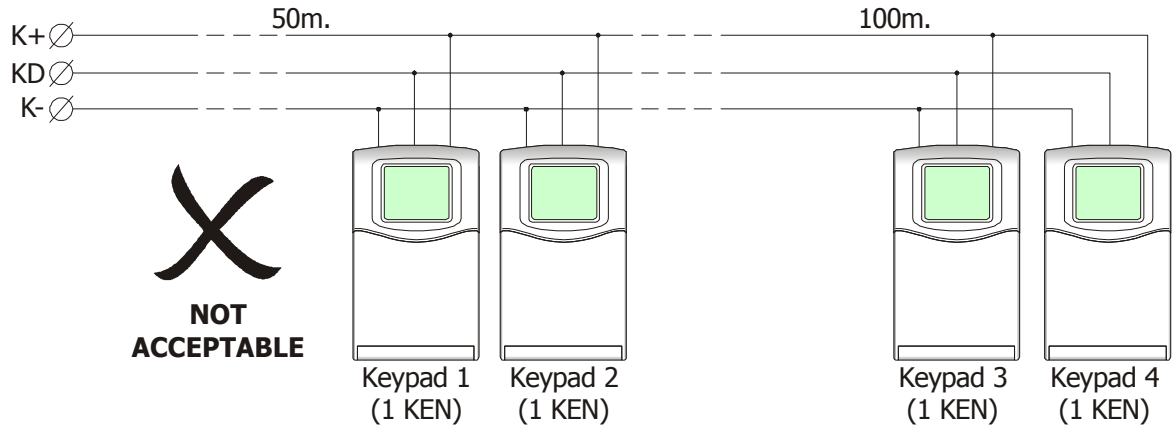
DEVICE	Description and Configuration	KEN
MX-ICON	Matrix ICON Keypad	1

NOTE: Remember that the maximum allowable current-draw from the Matrix for external devices is 0.8A. Any requirement exceeding this must be provided by a separate power supply.

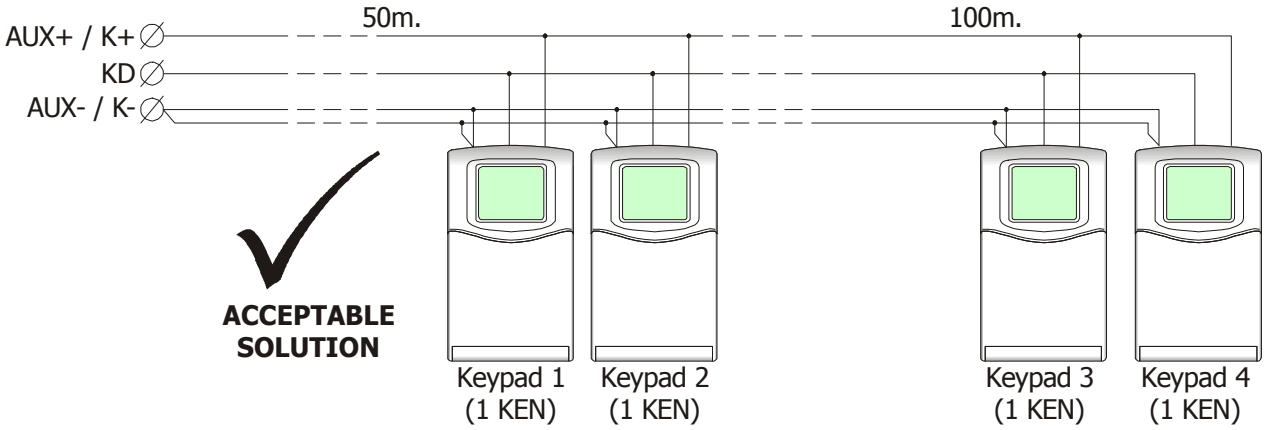
Table 2: Number of 'KENs' Allowed for Different Cable Lengths.

Length of Cable (meters)	Number of KEN allowed with Single core cable per signal	Number of KENs with standard cable 0V return doubled (2 cables)
100	3	4
75	4	6
50	6	9
25	13	18

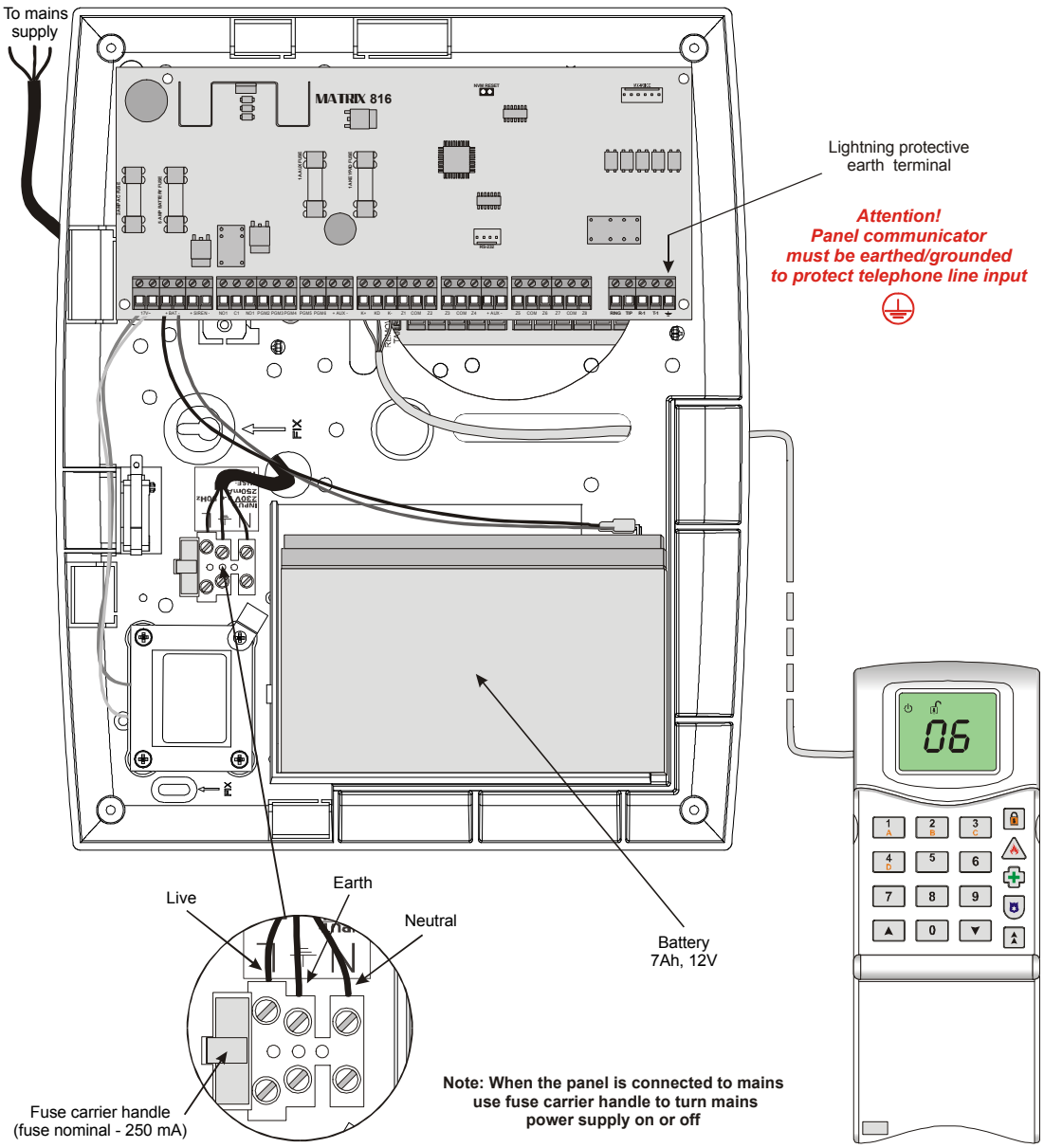
Example 1



Example 2



1.4 Power-up System



IMPORTANT

Mains connection should be carried out by technically competent personnel only, in accordance with the national and local electric installation regulations. Mind safety measures and means.

1.4.1 Power Up Delay

Upon power up the panel starts a 90 second delay. The primary function of this delay is to give detectors time to settle before the panel is fully operational and prevent false alarms.

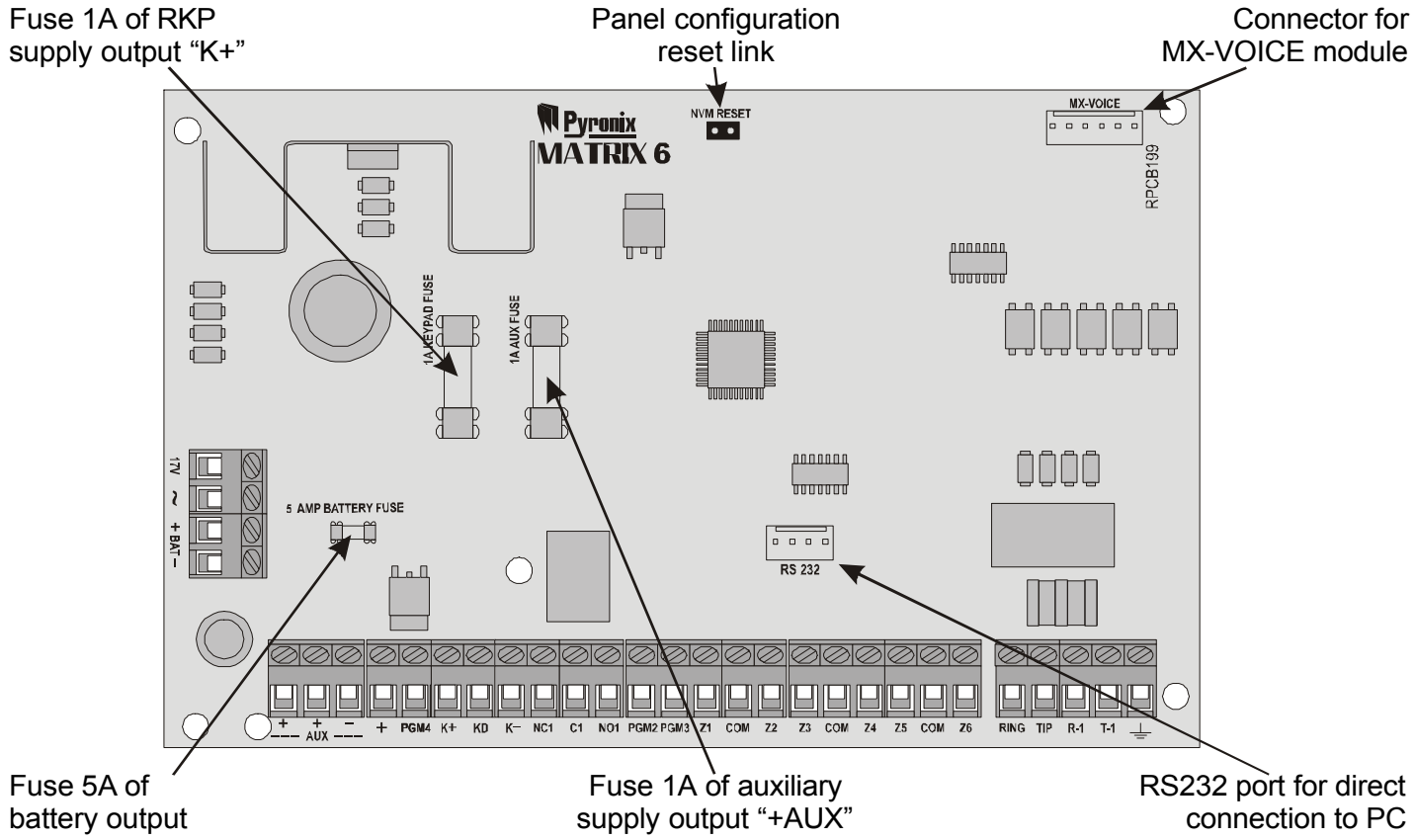
The remote keypads identify that the 90 second delay is running by cycling their segment displays, and the Power, Disarmed/Armed, and Ready icons are turned on to indicate that the panel is powered up and running.

During this 90 second delay the panel will initialise itself and turn on the battery charge circuitry, but WILL NOT scan any of its inputs. These include zones, telephone line, battery level, mains, expander input, monitored siren, and fuses.

After the 90 seconds has expired the remote keypads will sound an acceptance tone and stop cycling their segment displays. The panel will then resume normal operation and all inputs will be scanned as normal. The battery charge circuitry will also be placed back in control of battery monitoring.

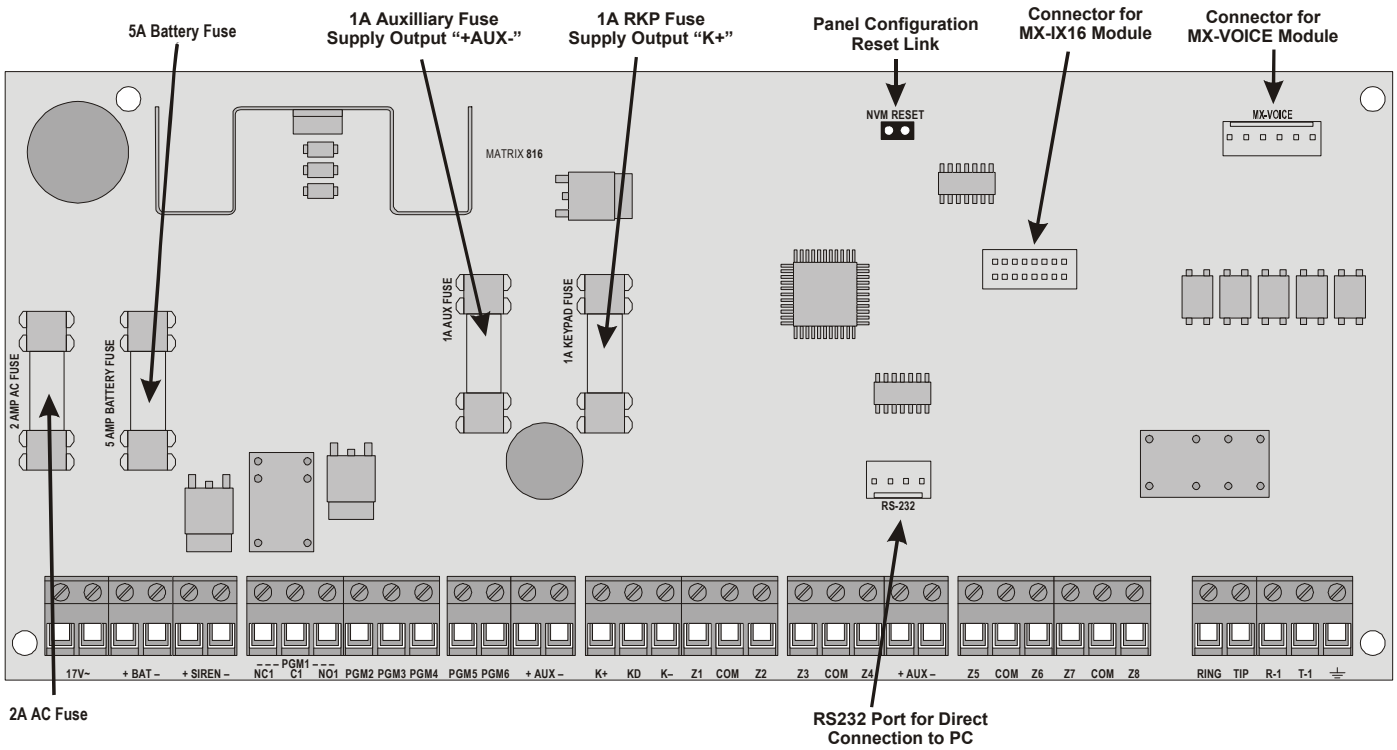
2. WIRING DIAGRAMS

2.1 Matrix 6 PCB



Terminal	Designation
17V ~	17V AC supply input for transformer connection
+BAT-	12V DC supply input for connection to the battery
+AUX-	Auxiliary supply output for detectors. Protected by a 1 Amp "AUX FUSE"
+	Positive supply to the bell sounder. Protected by a 1 Amp "AUX FUSE"
PGM4	PGM4 transistor output
K+, K–	RKP supply output. Protected by a 1 Amp "KEYPAD FUSE"
KD	RKP data bus
NC1	PGM1 relay output. Normally closed contact
?1	PGM1 relay output. Common contact
NO1	PGM1 relay output. Normally open contact
PGM2	PGM2 transistor output
PGM3	PGM3 transistor output
Z1	Zone 1 input
COM	Common input for zones (0V)
Z2	Zone 2 input
Z3	Zone 3 input
COM	Common input for zones (0V)
Z4	Zone 4 input
Z5	Zone 5 input
COM	Common input for zones (0V)
Z6	Zone 6 input
RING	Communicator input for connection to Analogue PSTN telephone line
TIP	Communicator input for connection to Analogue PSTN telephone line
R-1	Telephone line output for connection to the other telephone equipment
T-1	Telephone line output for connection to the other telephone equipment
⏚	Earth terminal for lightning protection

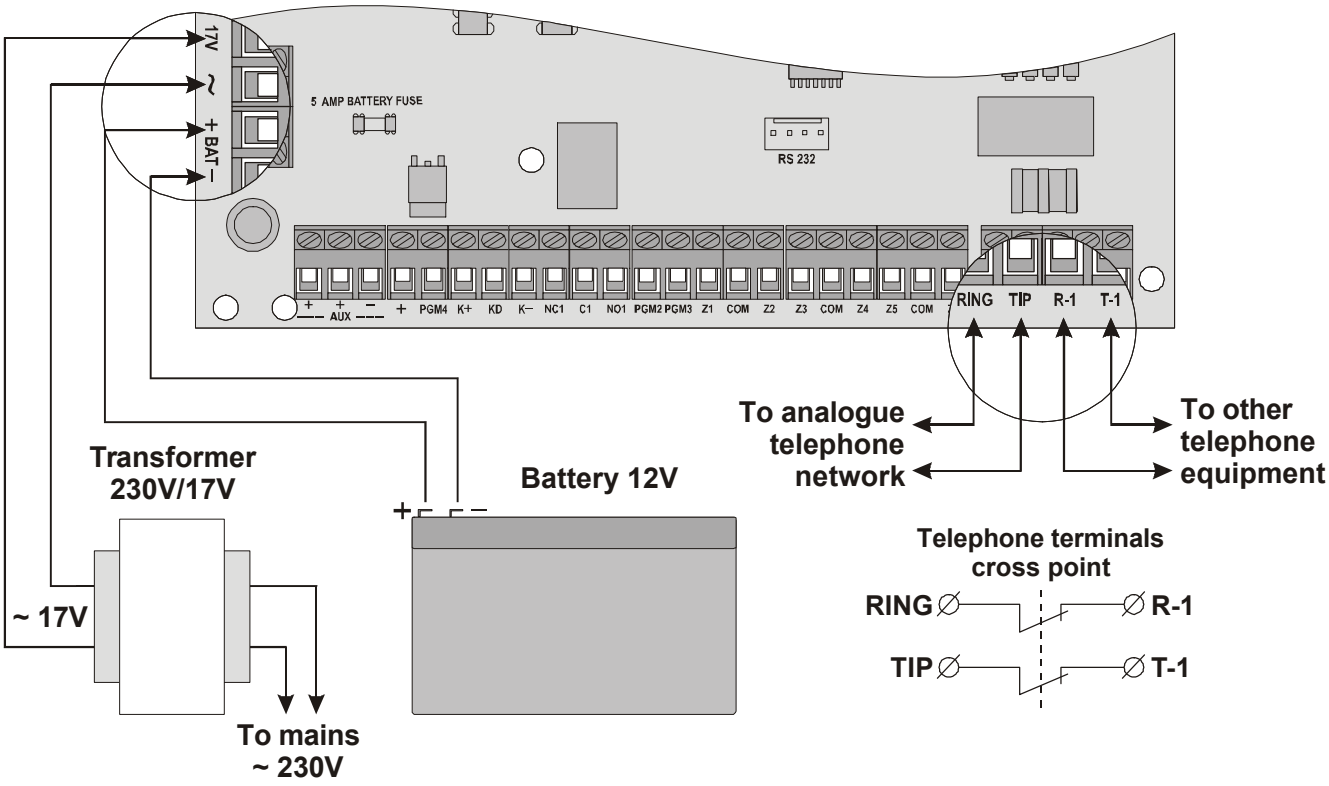
2.2 Matrix 816 PCB



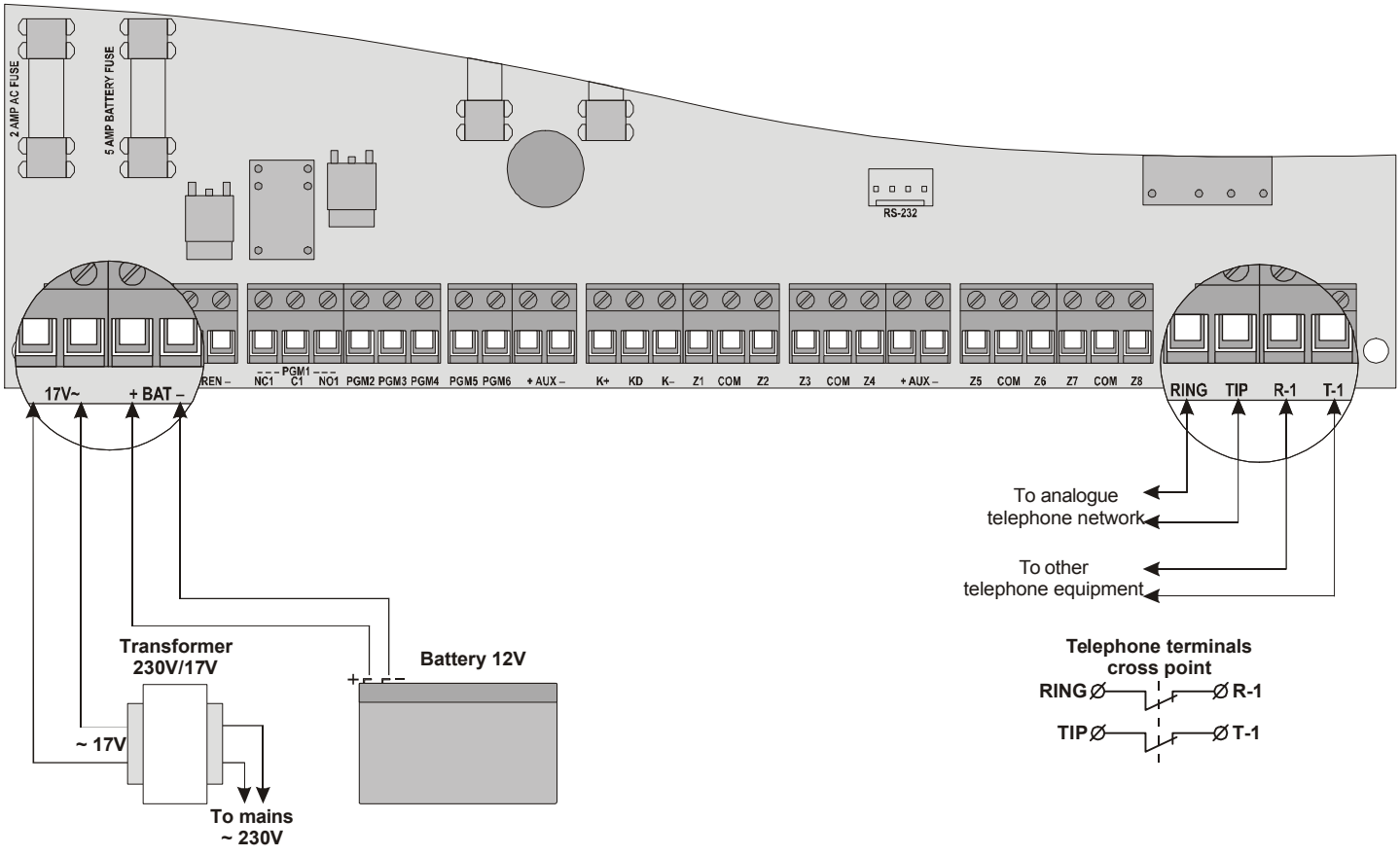
Terminal	Designation
17V ~	17V AC supply input for transformer connection. Protected by 2 Amp "AC FUSE"
+BAT-	12V DC supply input for connection to the battery. Protected by 5A "BATTERY FUSE"
+SIREN	Positive supply to Monitored Siren (PGM7). Protected by 1 Amp "AUX FUSE"
SIREN-	Monitored Siren transistor switched output (PGM7).
NC1	PGM1 relay output. Normally closed contact.
?1	PGM1 relay output. Common contact.
NO1	PGM1 relay output. Normally open contact.
PGM2	PGM2 transistor output.
PGM3	PGM3 transistor output.
PGM4	PGM4 transistor output.
PGM5	PGM5 transistor output.
PGM6	PGM6 transistor output.
+AUX-	Auxiliary supply output for detectors, keypad etc. Protected by 1 Amp "AUX FUSE"
K+, K–	RKP supply output. Protected by a 1 Amp "KEYPAD FUSE"
KD	RKP data line
Z1	Zone 1 input
COM	Common input for zones (0V)
Z2	Zone 2 input
Z3	Zone 3 input
COM	Common input for zones (0V)
Z4	Zone 4 input
Z5	Zone 5 input
COM	Common input for zones (0V)
Z6	Zone 6 input
Z7	Zone 7 input
COM	Common input for zones (0V)
Z8	Zone 8 input
RING	Communicator input for connection to Analogue PSTN telephone line
TIP	Communicator input for connection to Analogue PSTN telephone line
R-1	Telephone line output for connection to the other telephone equipment
T-1	Telephone line output for connection to the other telephone equipment
⏚	Earth terminal for lightning protection.

2.3 Power Supply & Telephone Line Wiring

2.3.1 Matrix 6

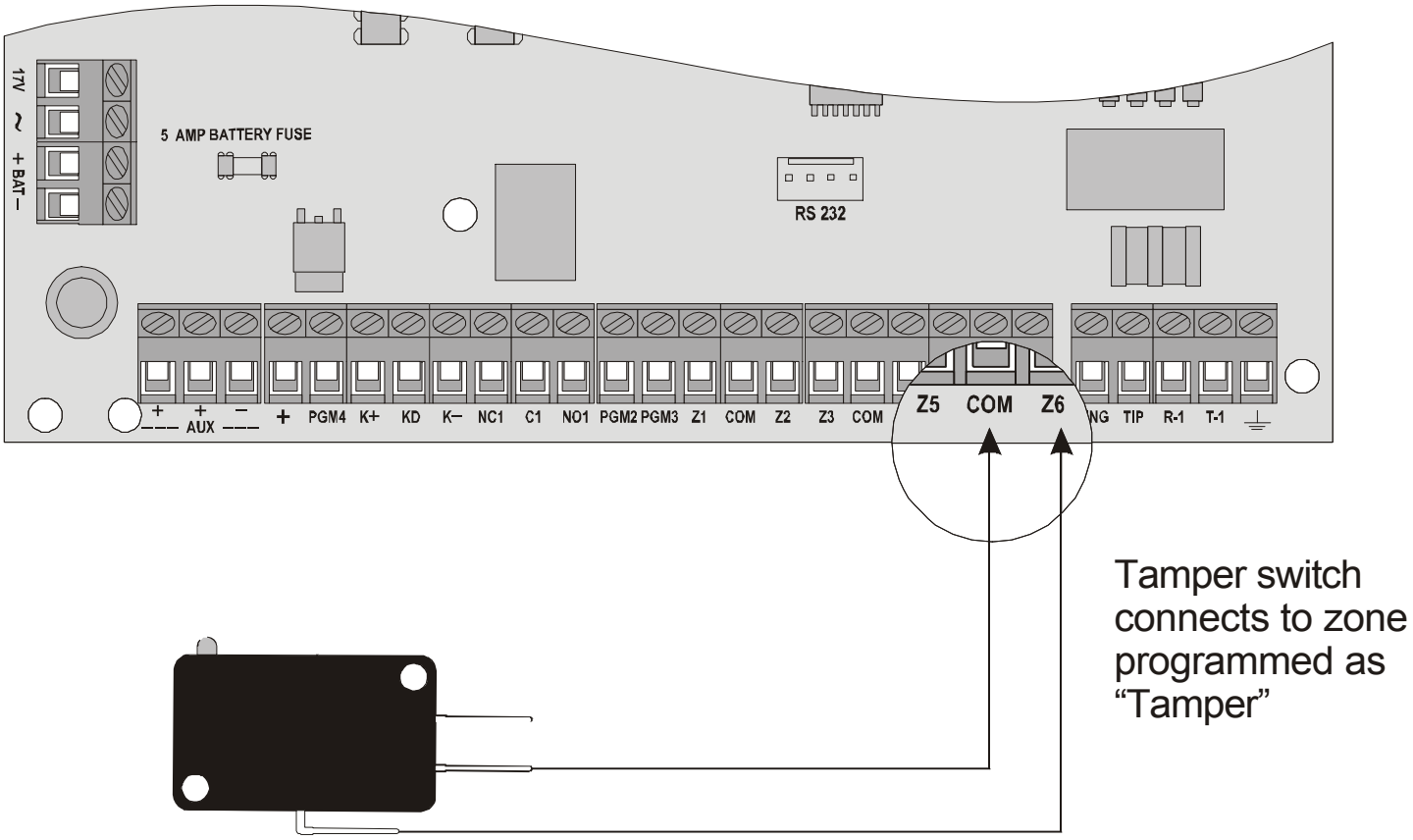


2.3.2 Matrix 816

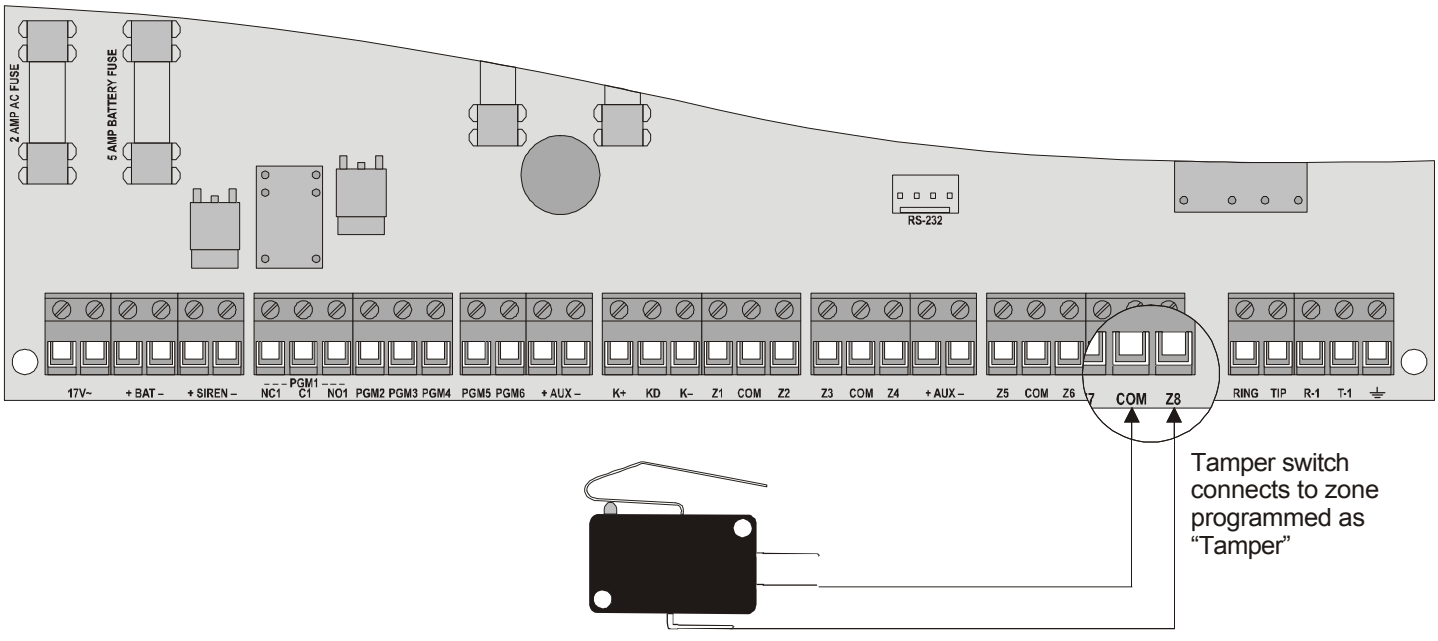


2.4 Tamper Switch Wiring

2.4.1 Matrix 6



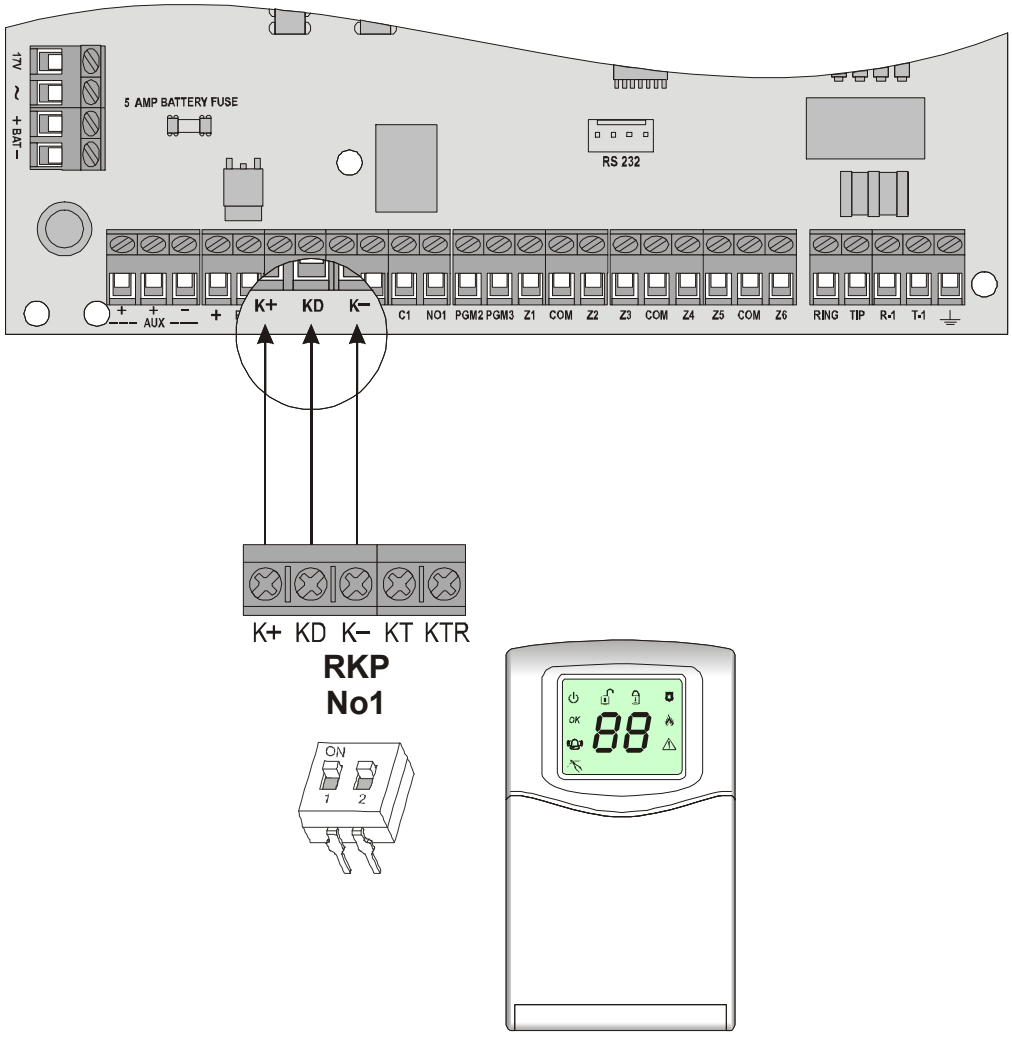
2.4.2 Matrix 816



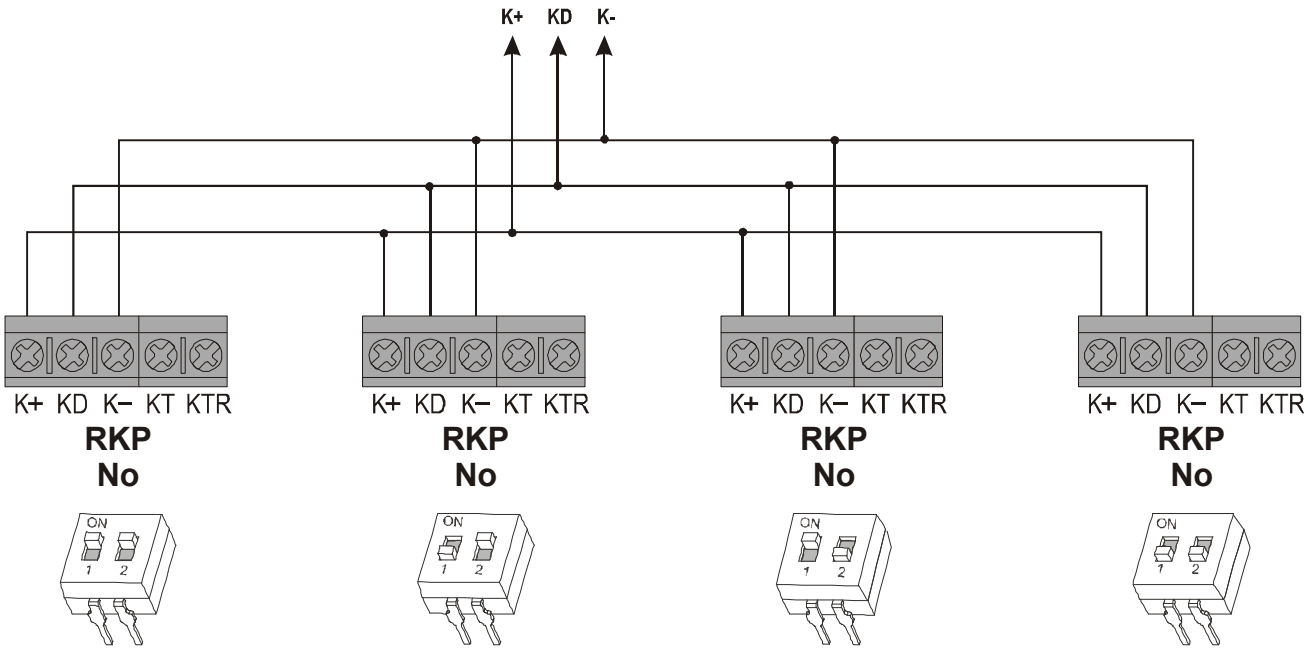
2.5 Keypad Wiring

2.5.1 Matrix 6

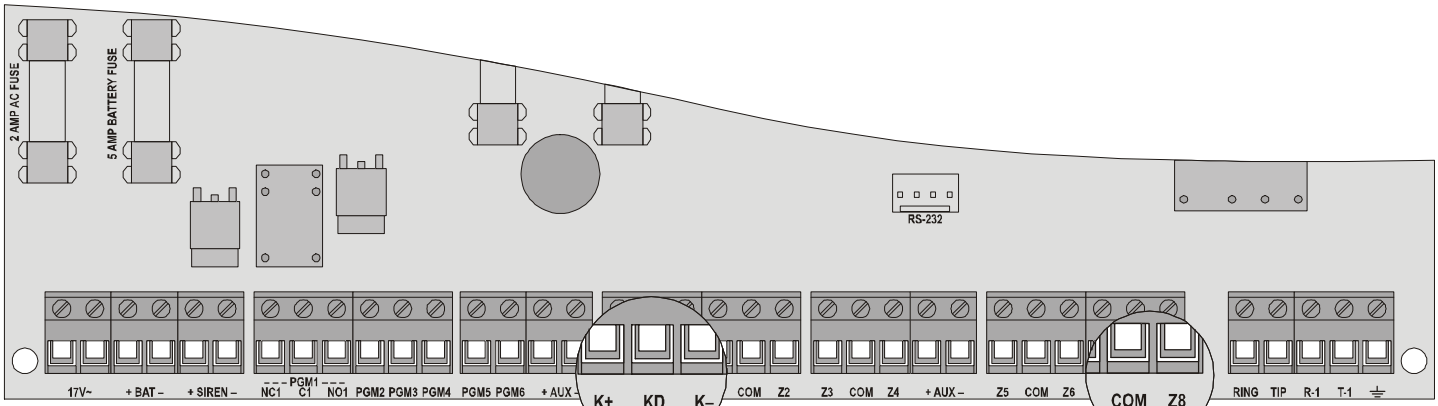
Without Tamper



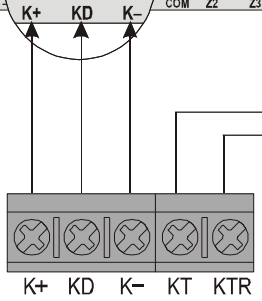
Multiple RKP connection to the panel

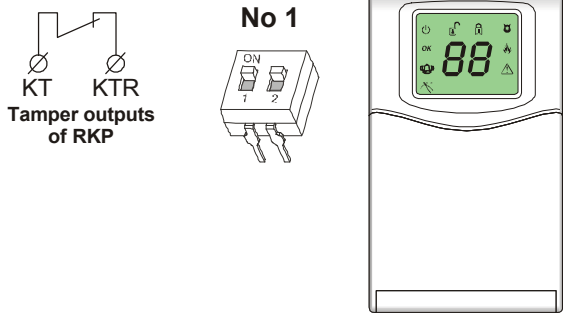


With Tamper – South Africa

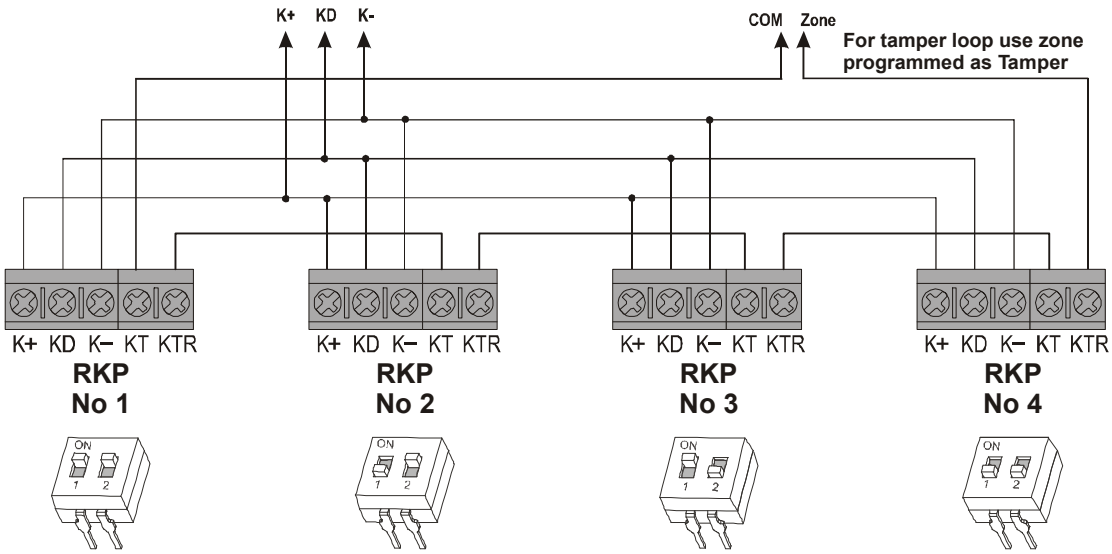


For tamper loop use zone programmed as Tamper

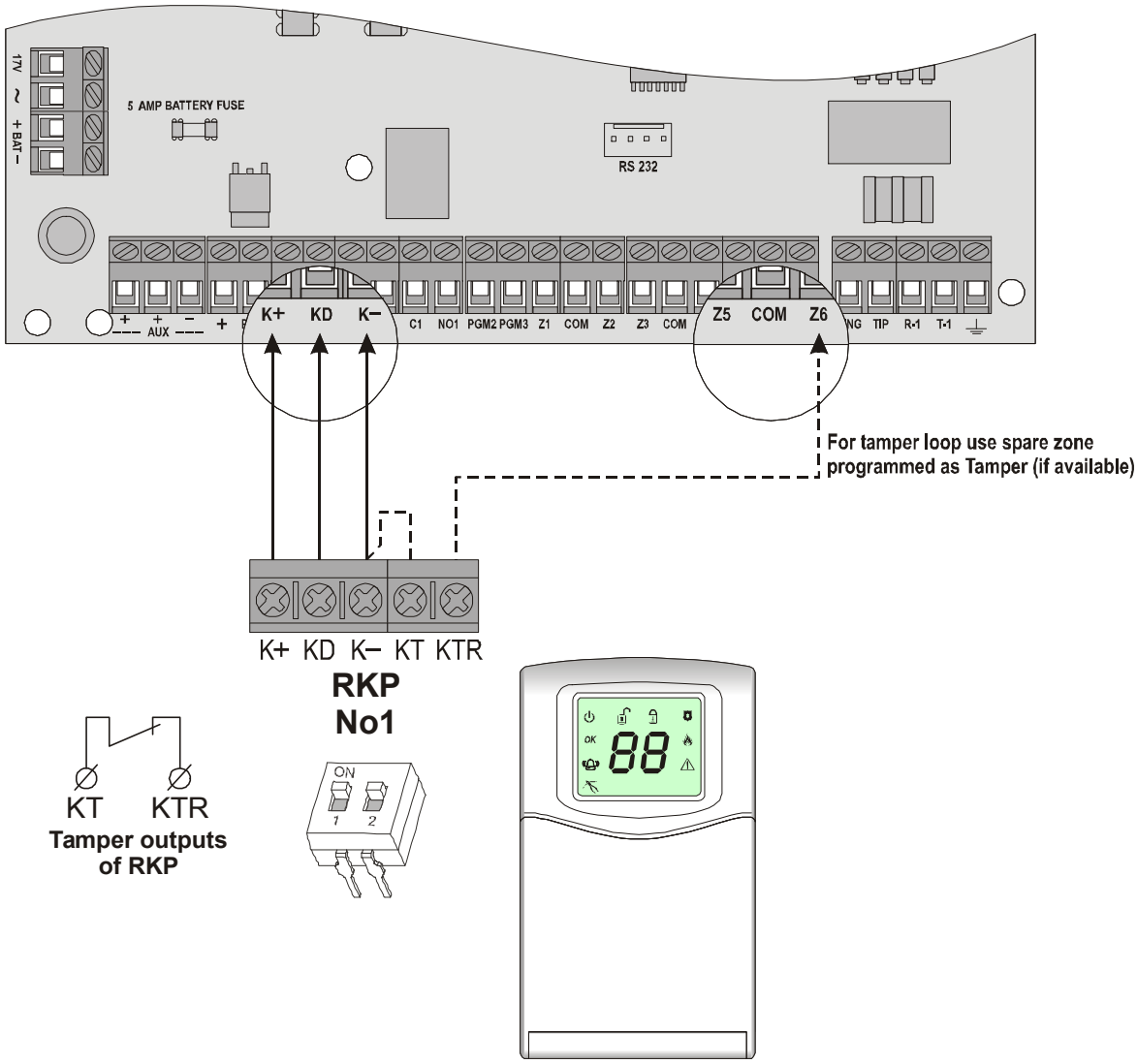




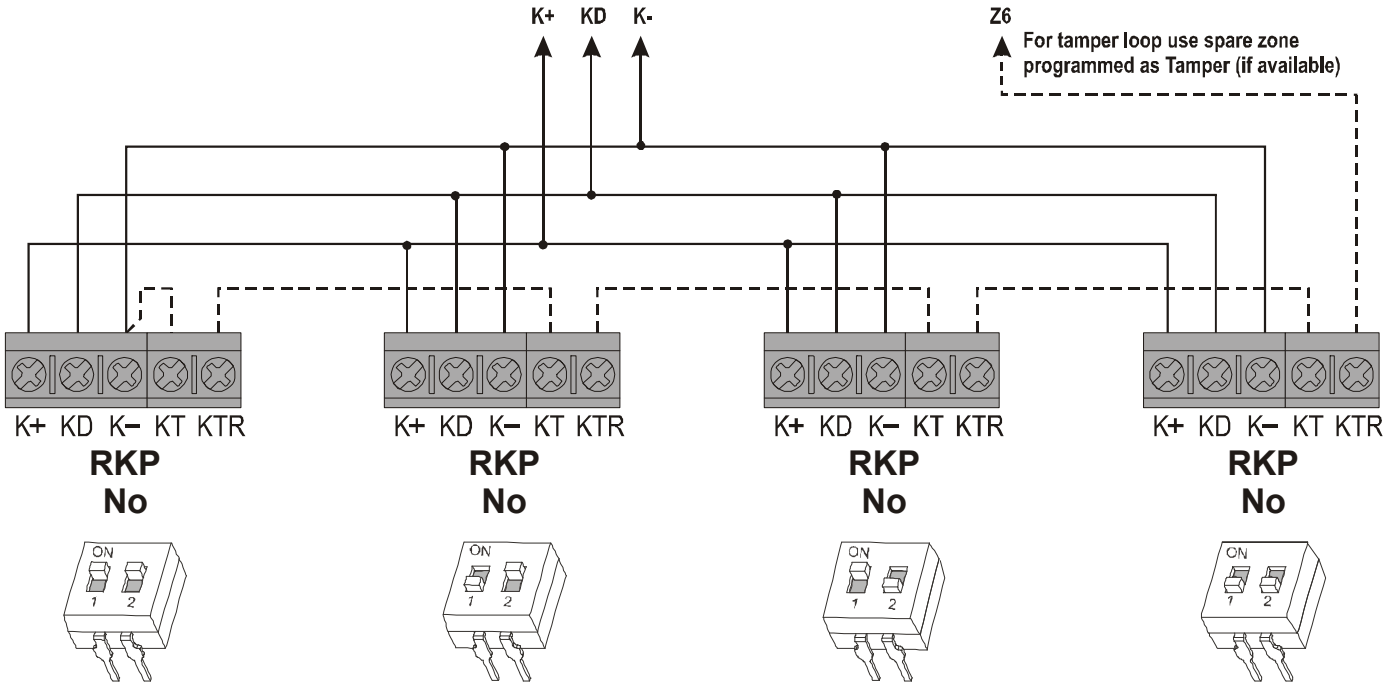
Multiple RKP connection to the panel



With Tamper – Other Countries

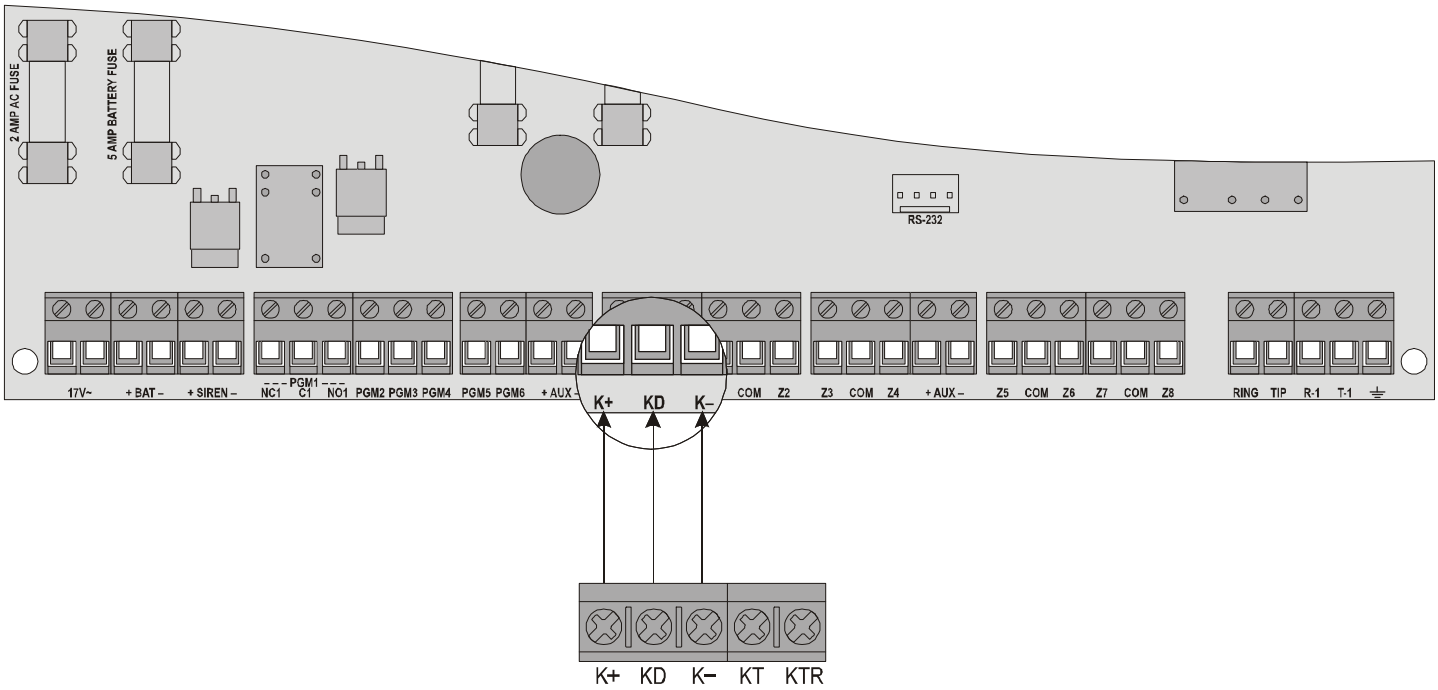


Multiple RKP connection to the panel

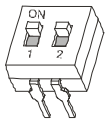


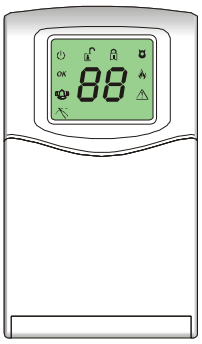
2.5.2 Matrix 816

Without Tamper

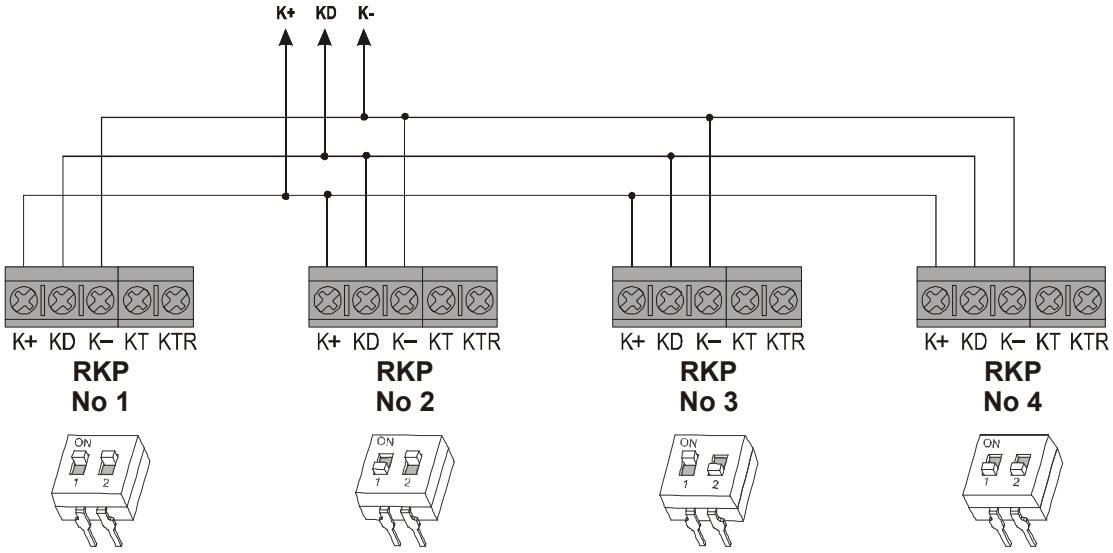


RKP No 1

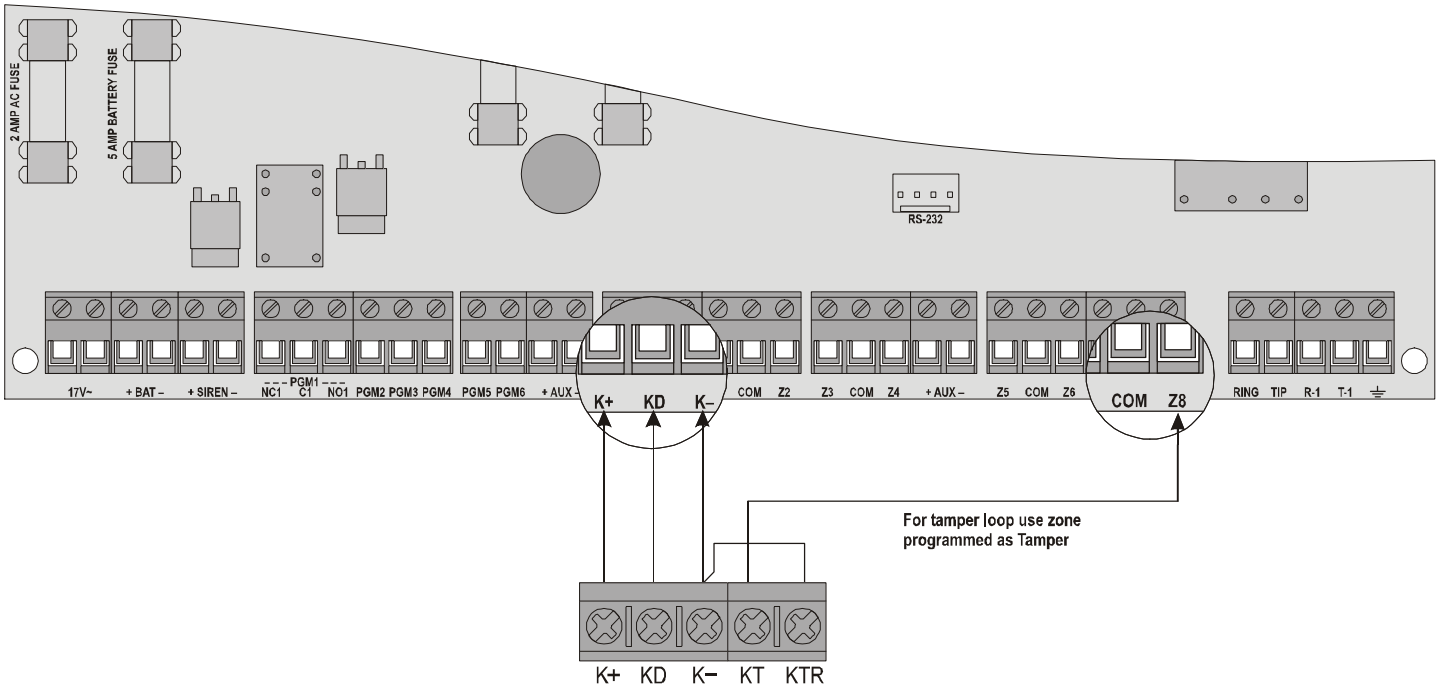


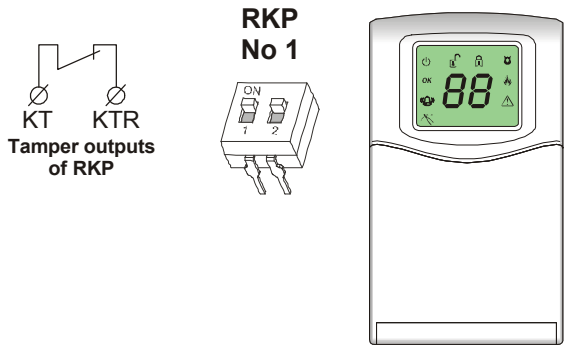


Multiple RKP connection to the panel

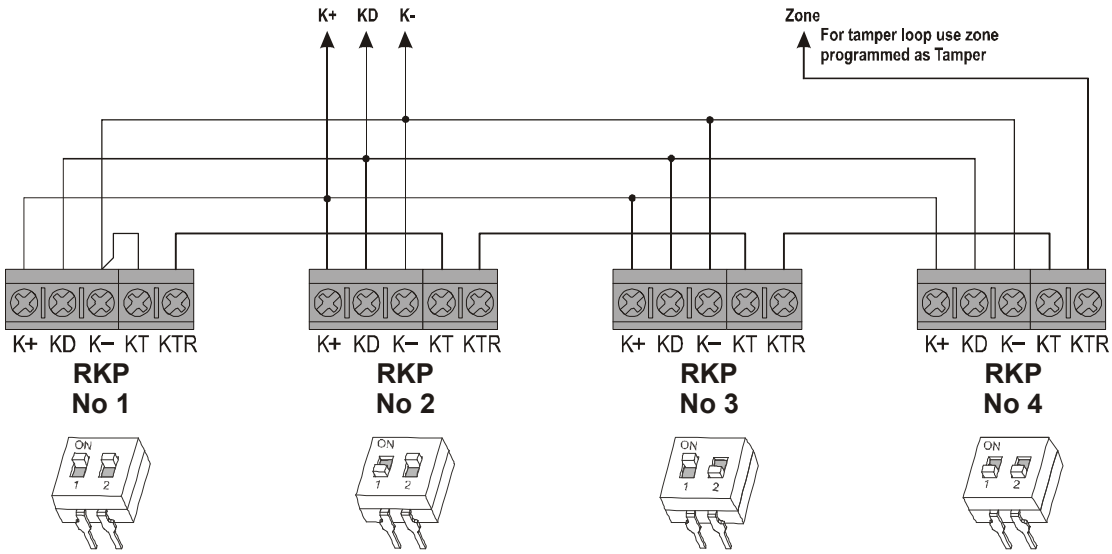


With Tamper





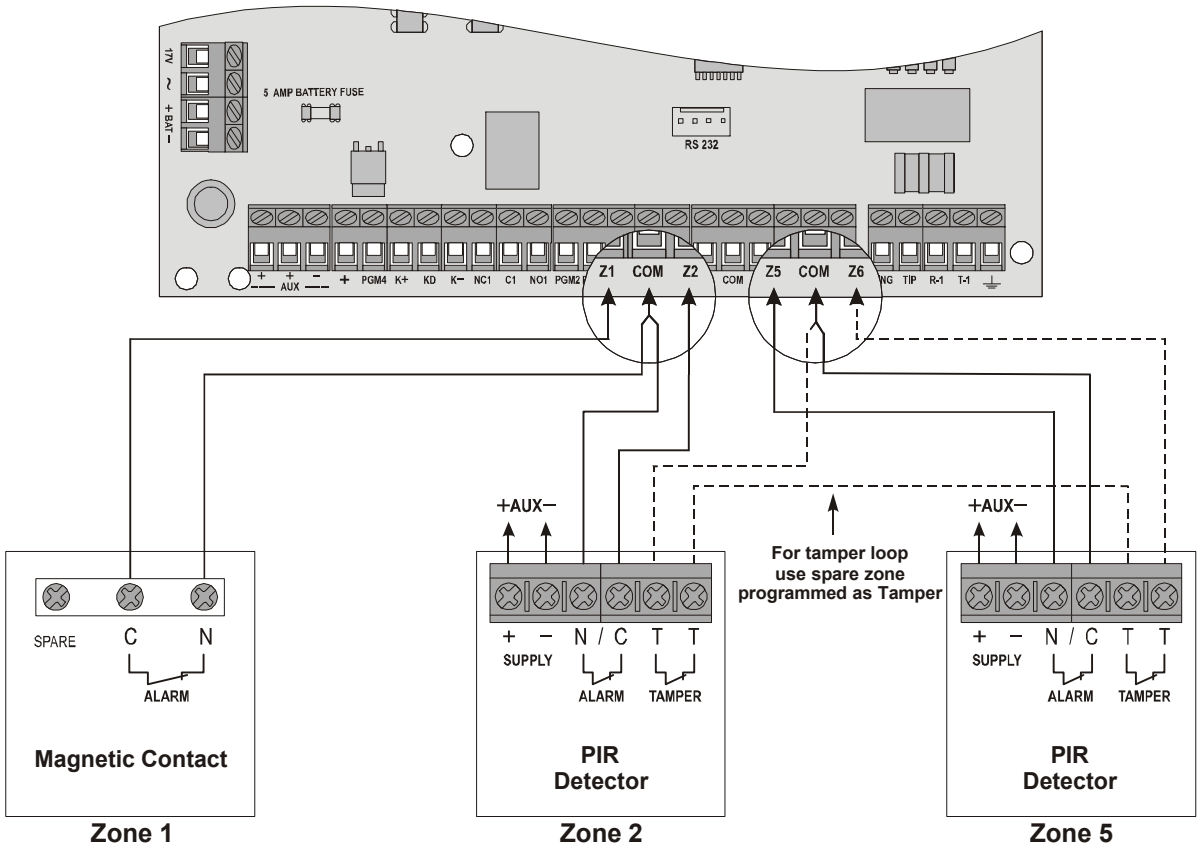
Multiple RKP connection to the panel



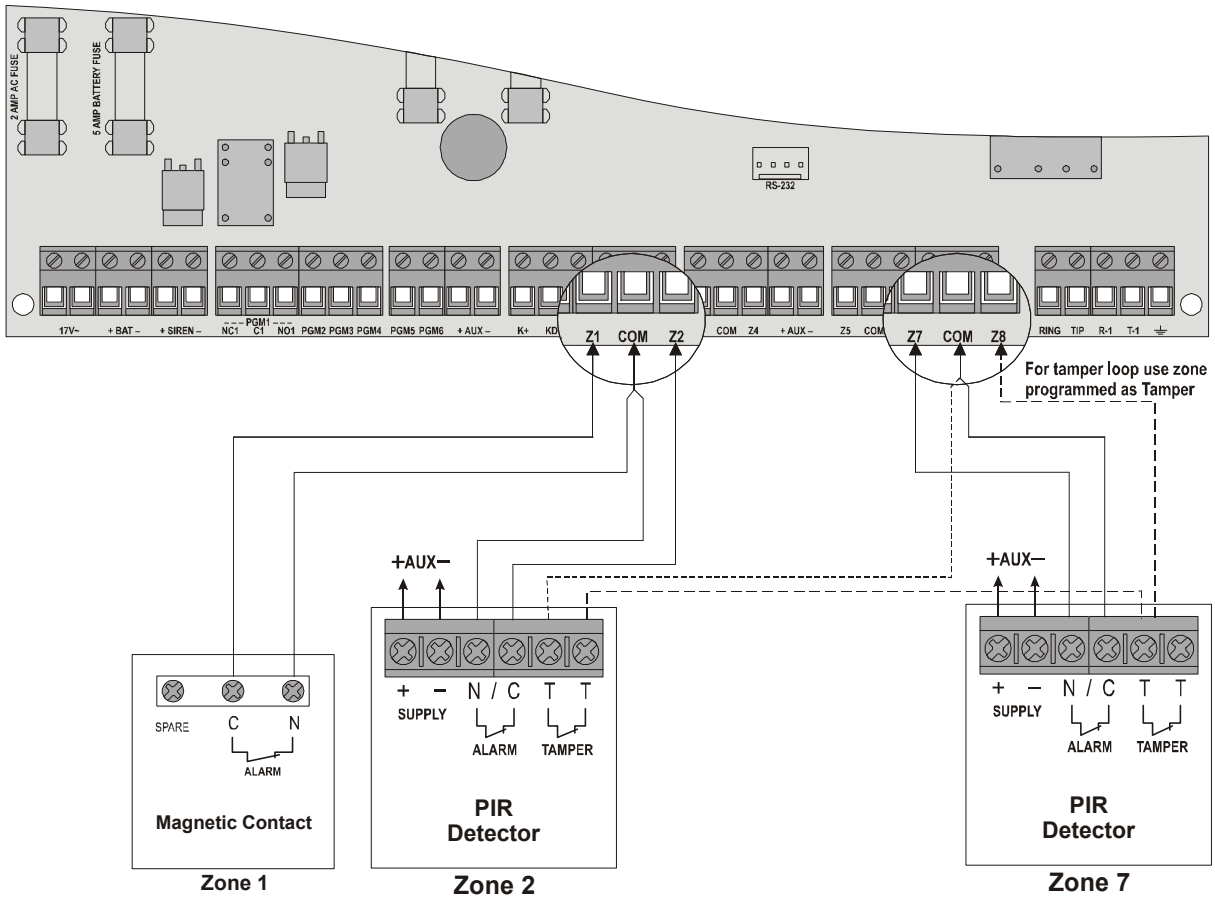
2.6 Zone Wiring

2.6.1 Normally Closed Wiring – South Africa

Matrix 6

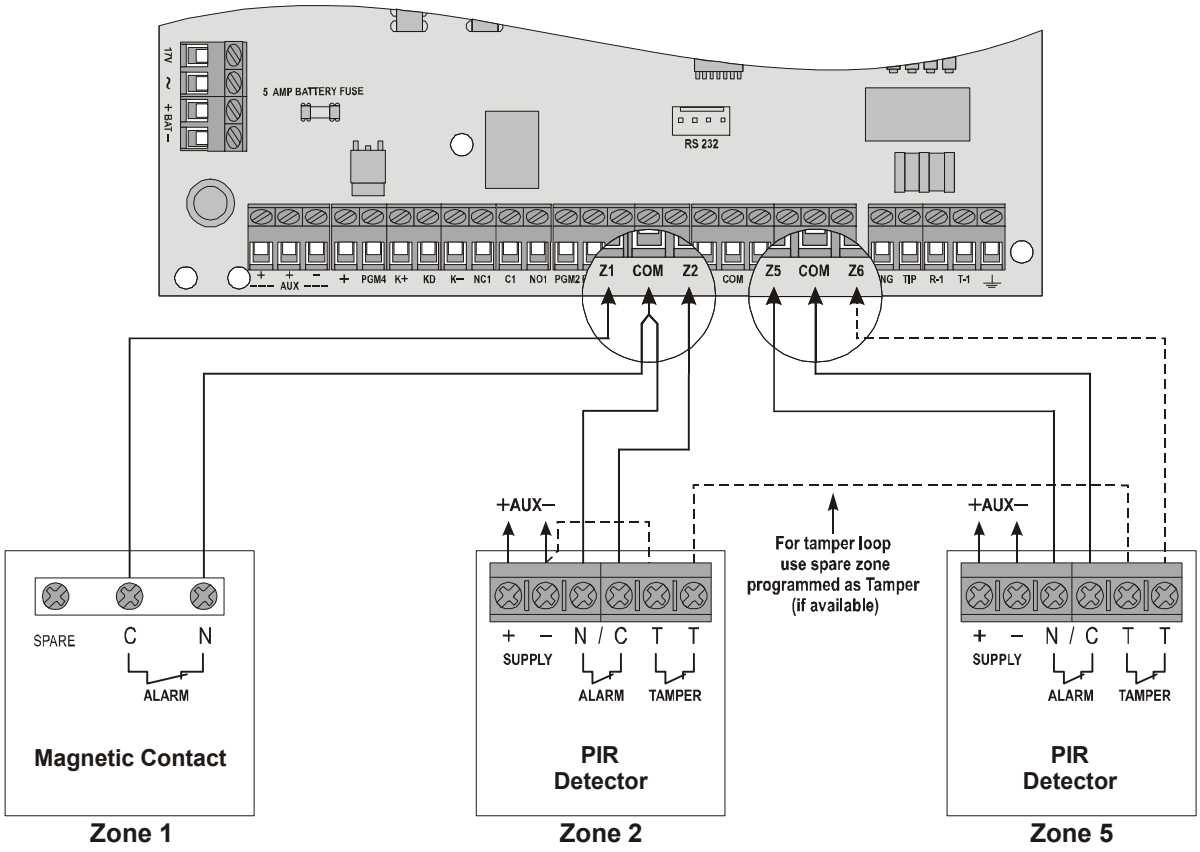


Matrix 816

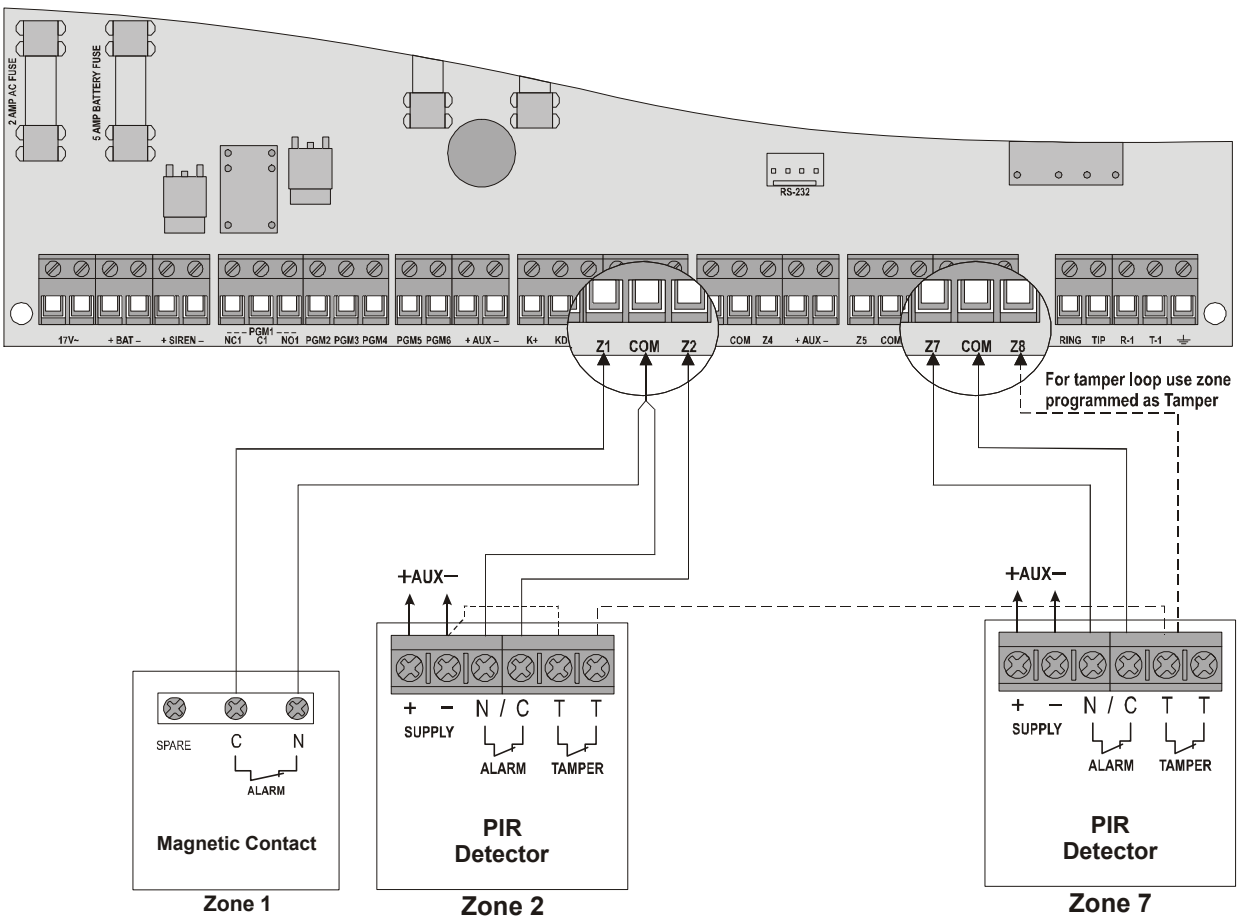


2.6.2 Normally Closed Wiring – Other Countries

Matrix 6



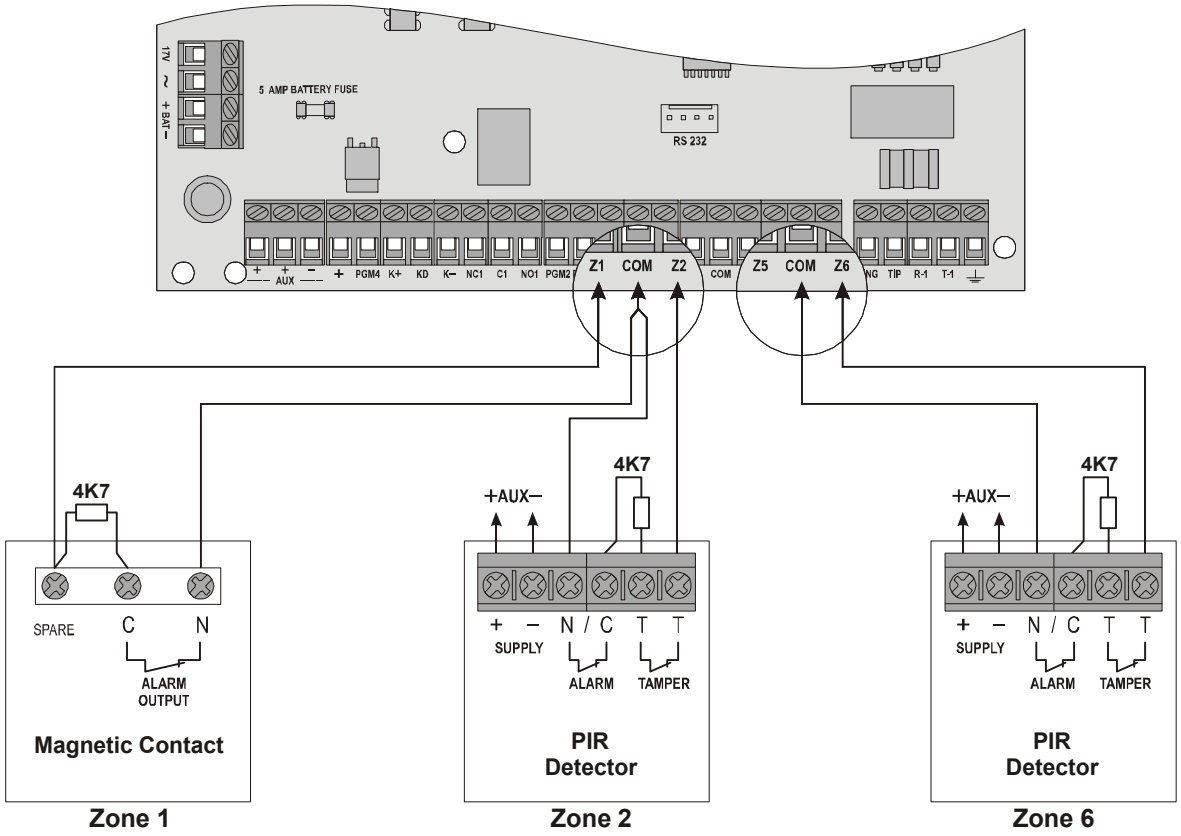
Matrix 816



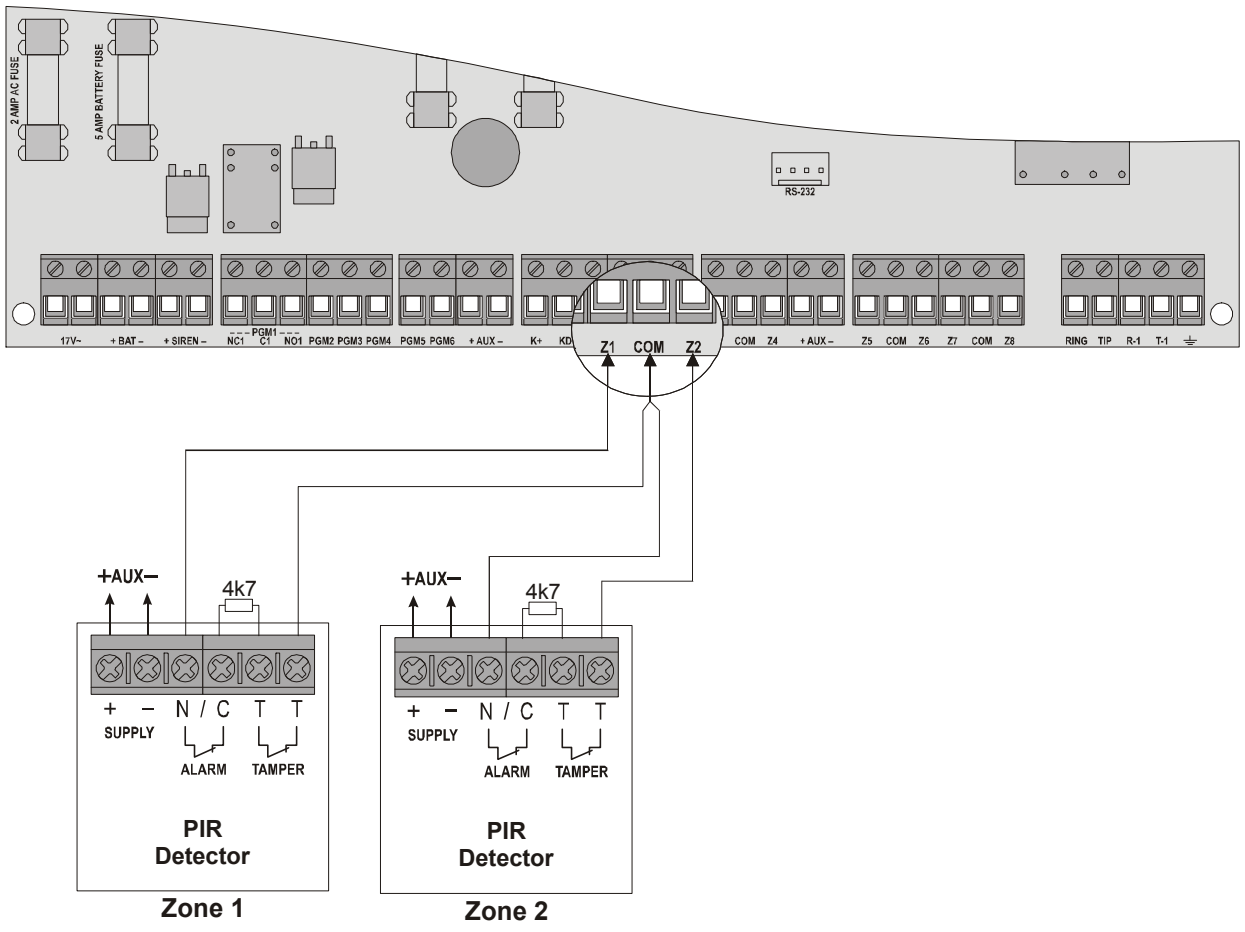
2.6.3 Single End of Line (SEOL) Resistor Wiring

NOTE: Any unused zones should be linked out using a 4k7O resistor.

Matrix 6



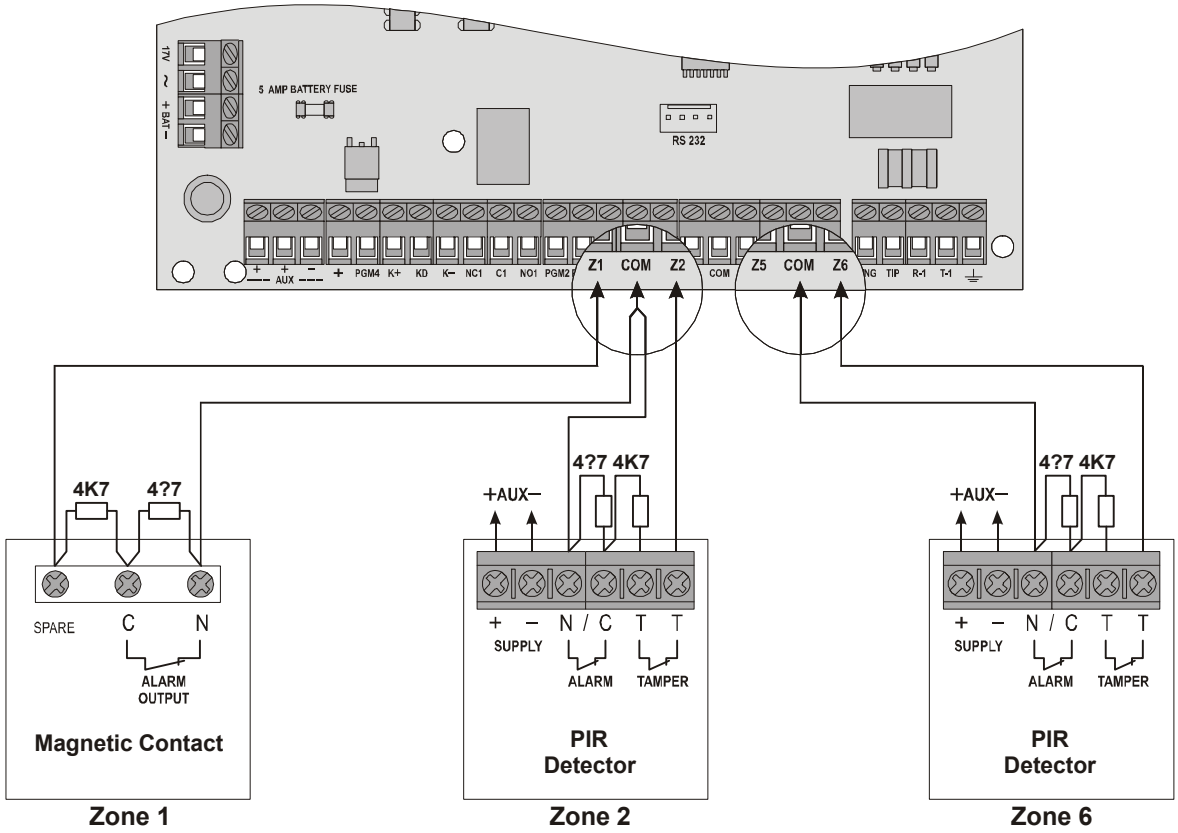
Matrix 816



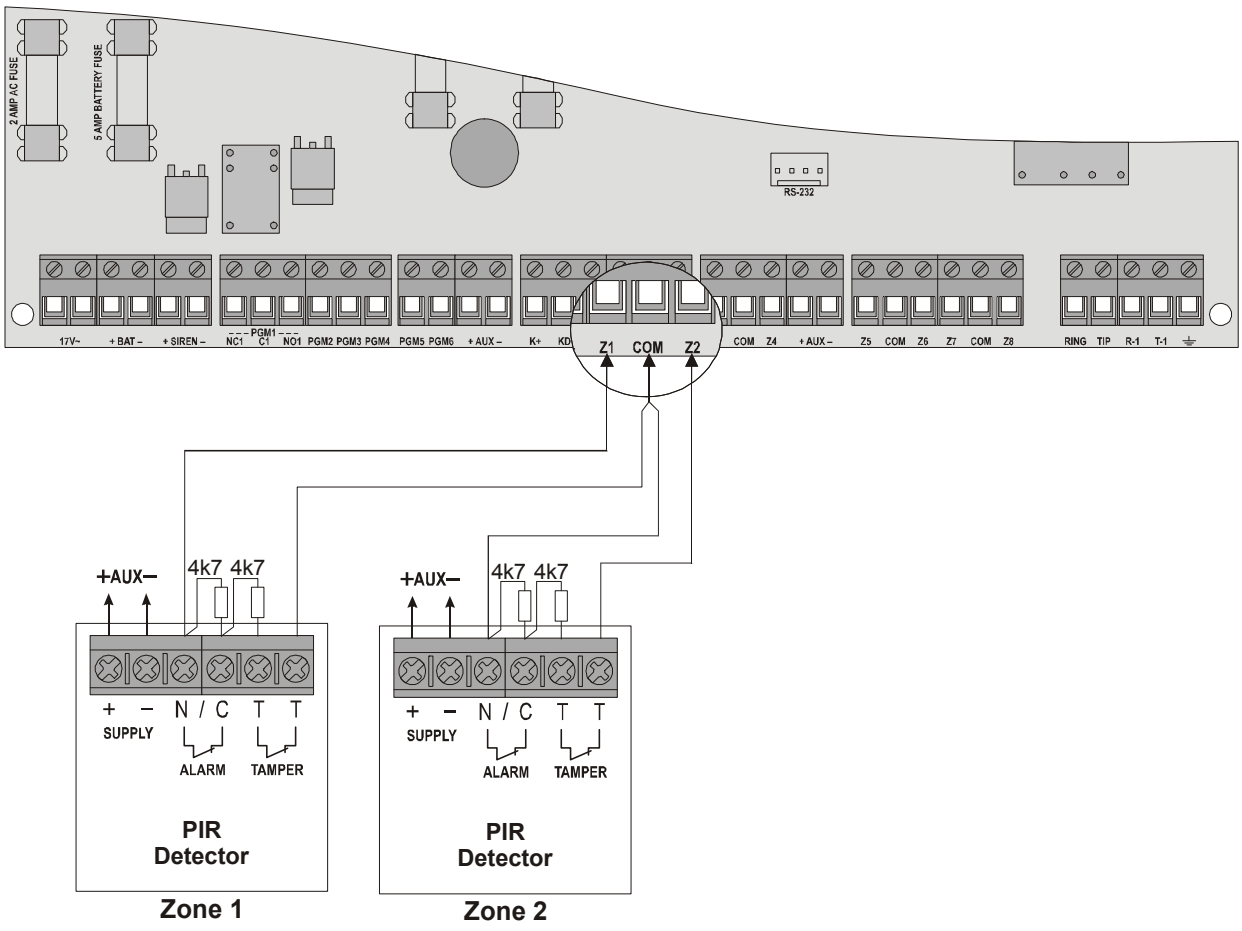
2.6.4 Double End of Line (DEOL) Resistor Wiring

NOTE: Any unused zones should be linked out using a 4k7O resistor.

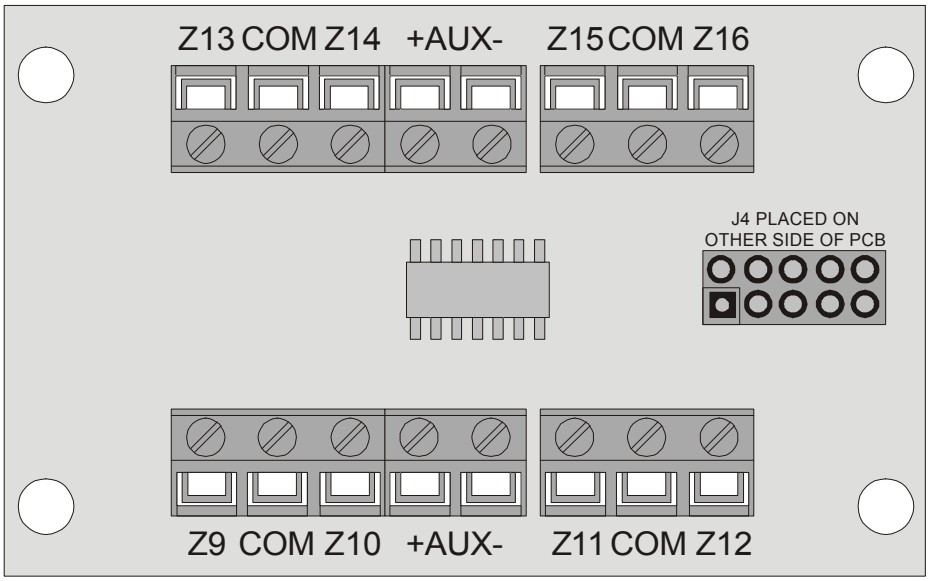
Matrix 6



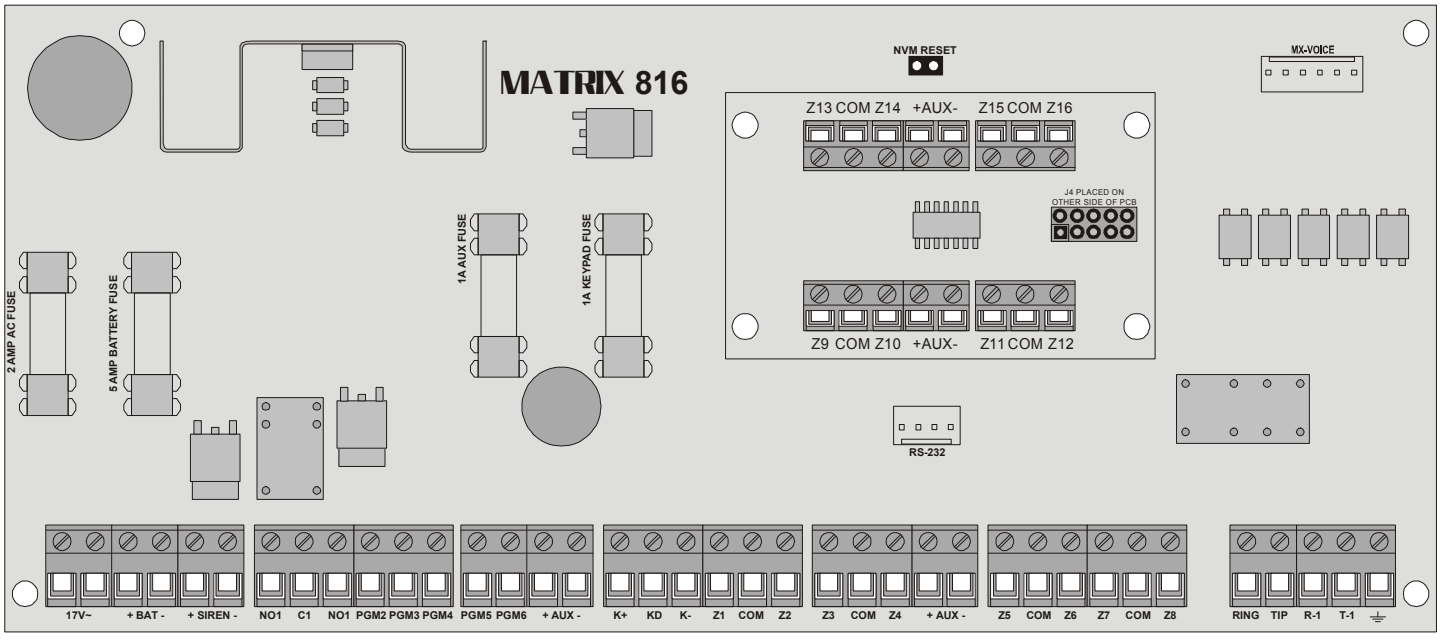
Matrix 816



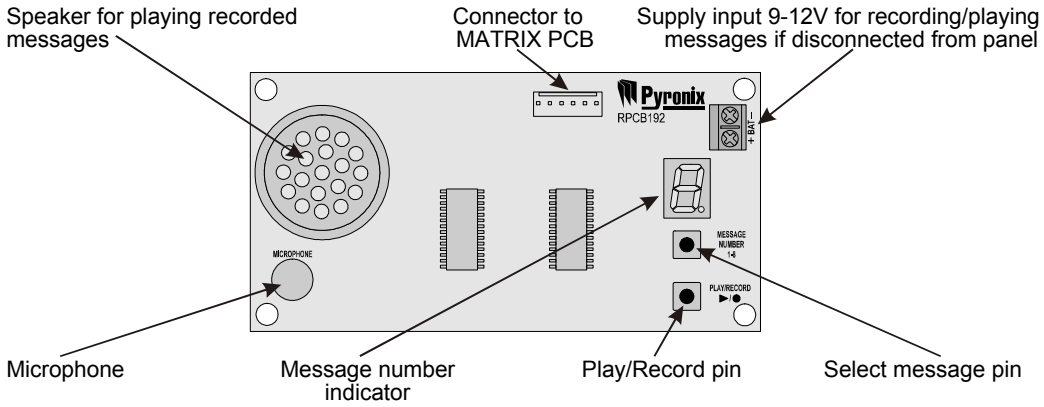
2.7 On-Board Zone Expander (Matrix 816 Only)



Terminal	Designation
Z9	Zone 9 input
COM	Common input for zones (0V)
Z10	Zone 10 input
+AUX-	Auxiliary supply output for detectors. Protected by a 1 Amp "AUX FUSE"
Z11	Zone 11 input
COM	Common input for zones (0V)
Z12	Zone 12 input
Z13	Zone 13 input
COM	Common input for zones (0V)
Z14	Zone 14 input
+AUX-	Auxiliary supply output for detectors. Protected by a 1 Amp "AUX FUSE"
Z15	Zone 15 input
COM	Common input for zones (0V)
Z16	Zone 16 input



2.8 MX-VOICE Module



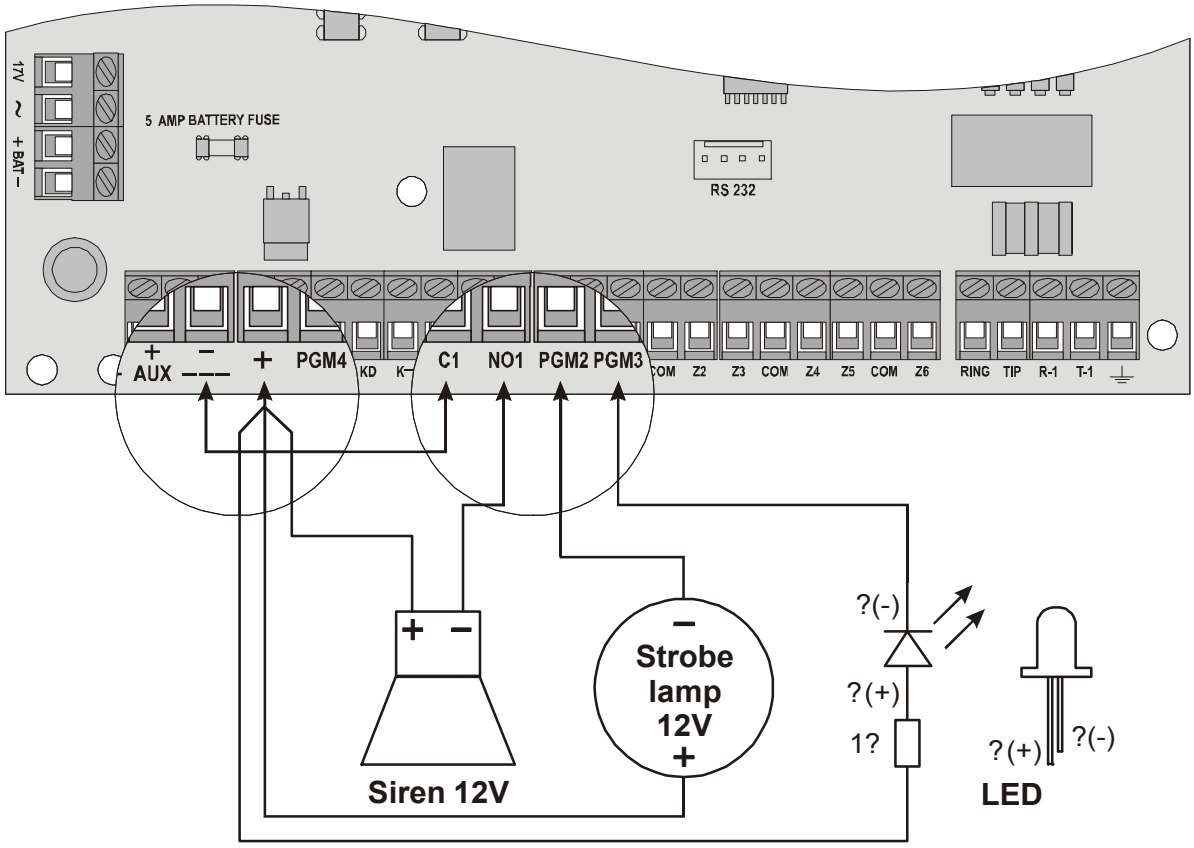
PROGRAMMING

Initial state: The MX-VOICE module should be connected to the panel or power supply unit.

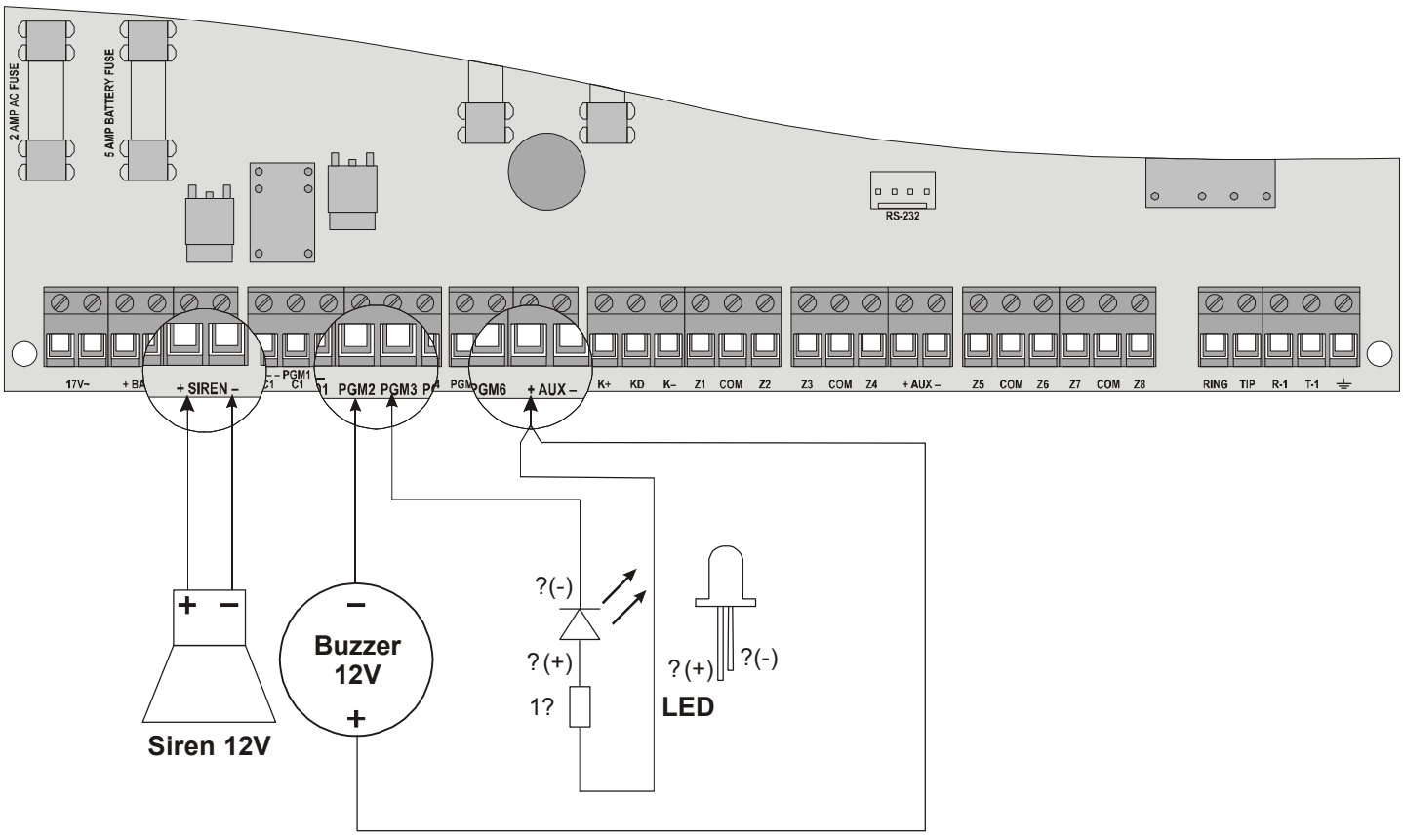
1. **SELECT VOICE MESSAGE NUMBER.** Press the «MESSAGE NUMBER» key until the required number is reached 1 … 8 (displayed on symbol LED).
2. **RECORDING.** Press the «PLAY/RECORD» key (recording will start when the voice message number will be flashing) and hold it while speaking into the on-board microphone. Release the «PLAY/RECORD» key after the message is finished. End of recording will be indicated as F. The maximum length of one message is 8 seconds.
3. **PLAYING A VOICE MESSAGE.** Choose the required voice message by pressing the «MESSAGE NUMBER» key until the required message number is displayed, and then press the «PLAY/RECORD» key once. The voice message will be played via the on-board speaker.

2.9 PGM Output Wiring

2.9.1 Matrix 6 Buzzer, LED & Any Siren Wiring

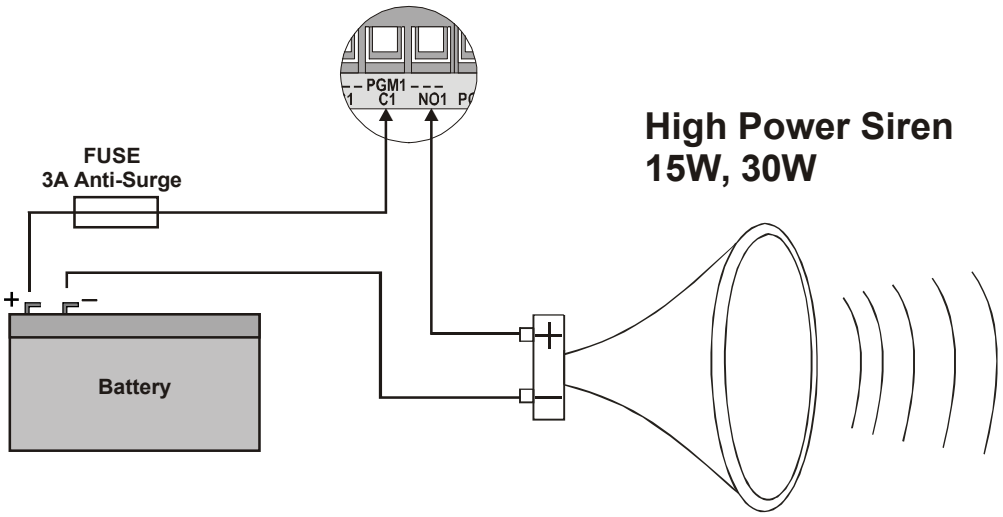


2.9.2 Matrix 816 – Monitored Siren (and Buzzer & LED)



NOTE: If a monitored siren is not to be used, either programme PGM 7 as Not Used, or link out the + SIREN – terminals with a 1KO resistor.

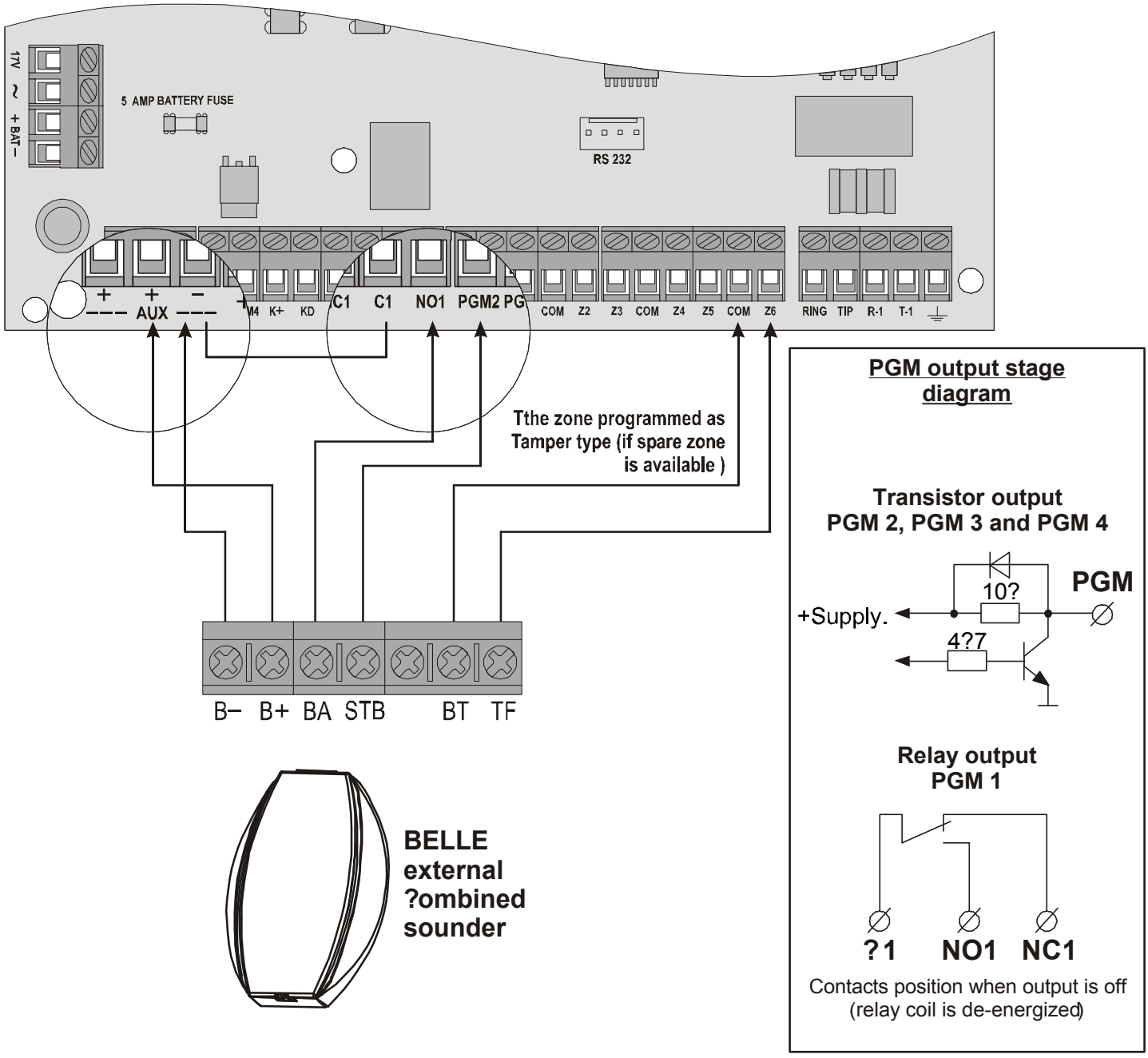
2.9.3 High Power Siren Wiring



NOTE: When a high power siren is to be connected to the Matrix, the PGM1 (C1, NO1) output should be used. This output uses a relay to switch up to a maximum 3A dc current capacity, allowing the use of an additional battery to power the siren as shown in the diagram above.

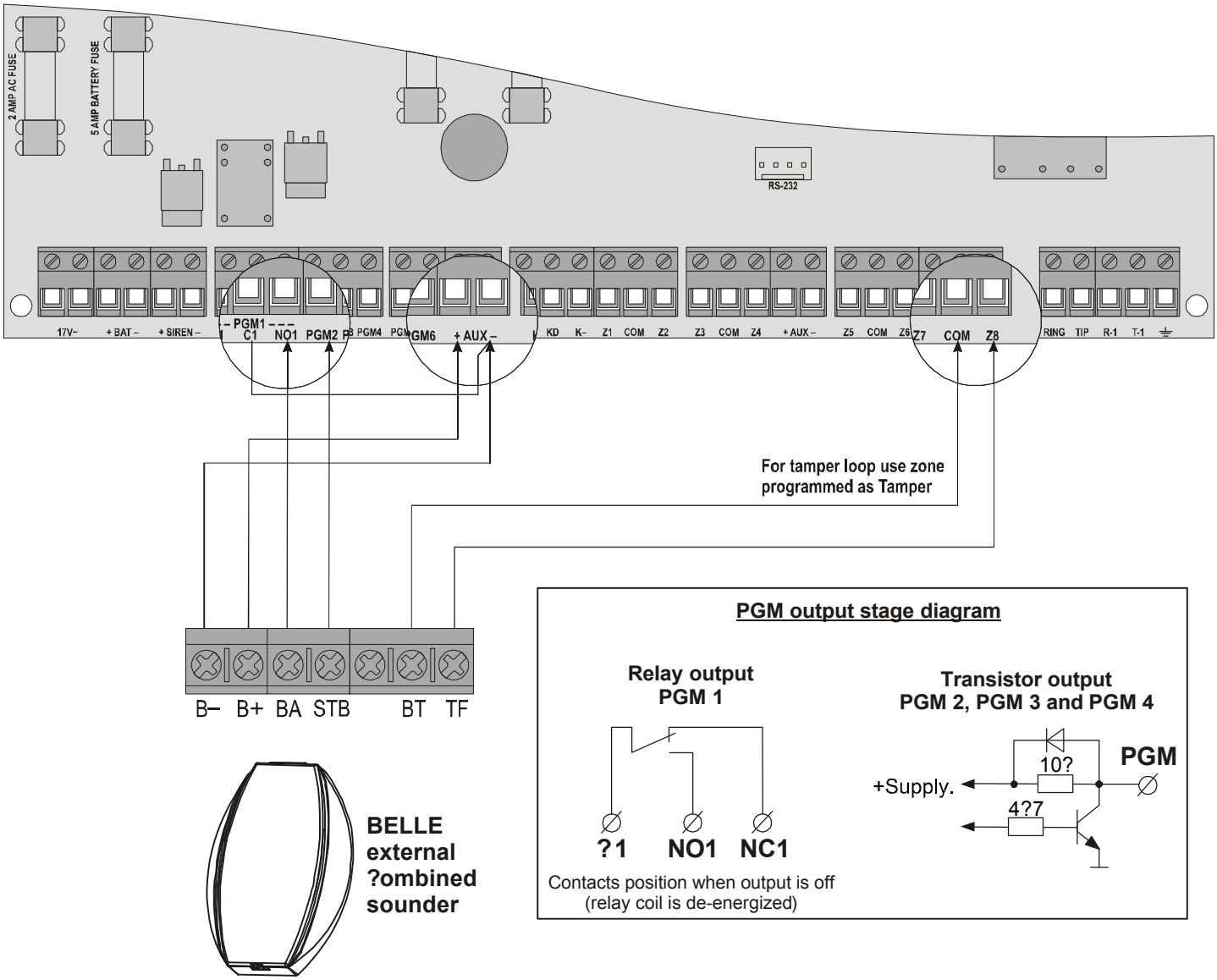
2.9.4 Belle Wiring

Matrix 6



NOTE: PGM1 must be programmed as "External Bell". PGM 2 (in this example) must be programmed as "Follow Strobe".

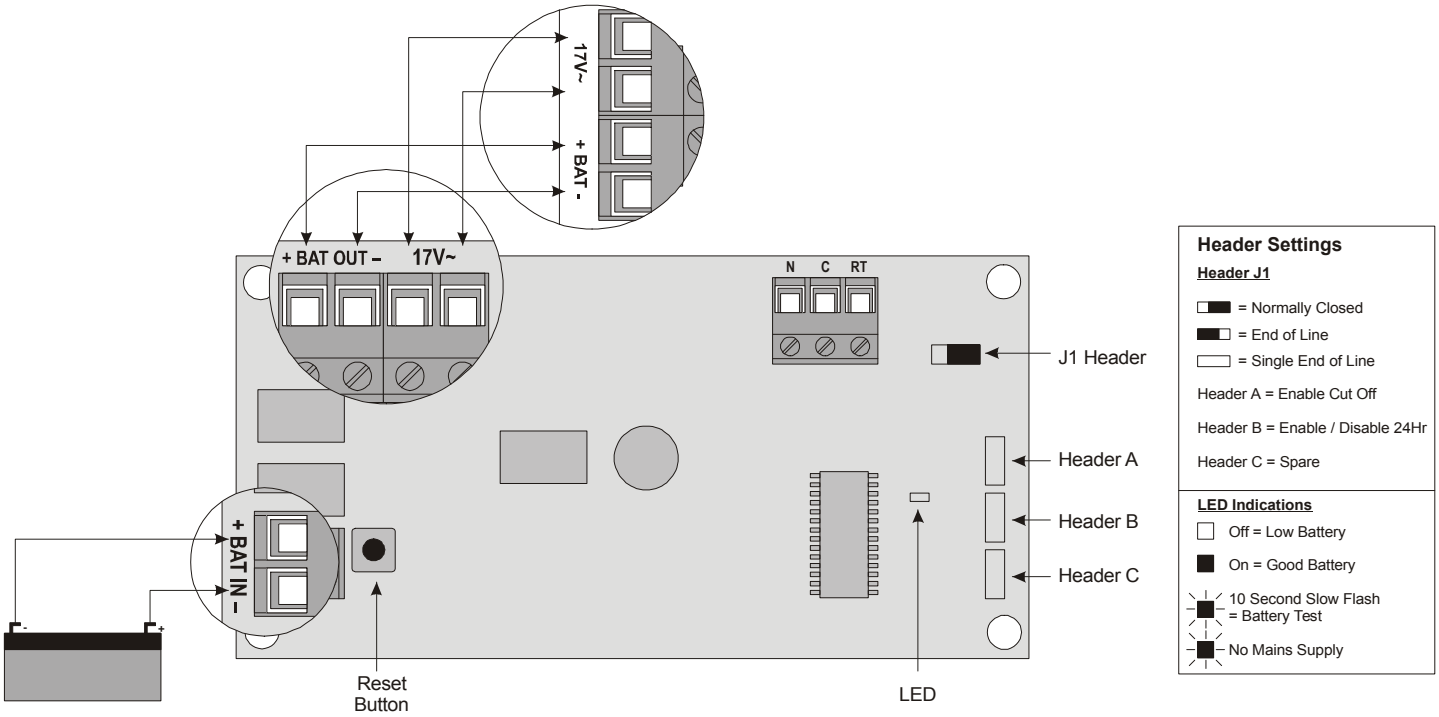
Matrix 816



BELLE external ?ombined sounder

<u>NOTE:</u> PGM1 must be programmed as "External Bell". PGM 2 (in this example) must be programmed as "Follow Strobe".

2.10 Battery Monitor Board Wiring



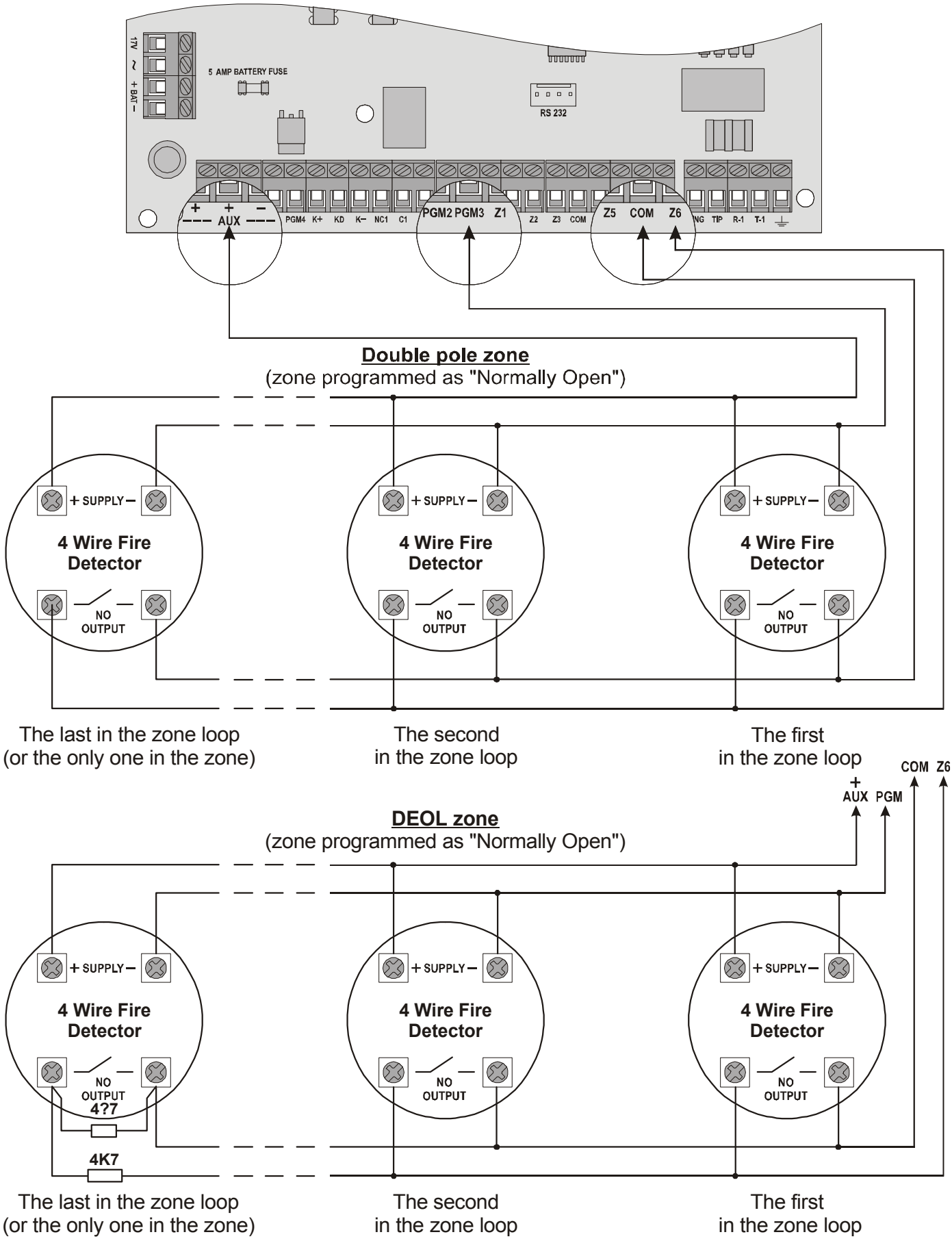
NOTE 1: **If the zone connection is used, adjust header J1 to the relevant zone setting, i.e., Normally Closed, End Of Line or Single End Of Line. The zone setting of the battery monitoring board must be the same as that of the control panel.**

NOTE 2: **The RT input will initiate a remote test.**

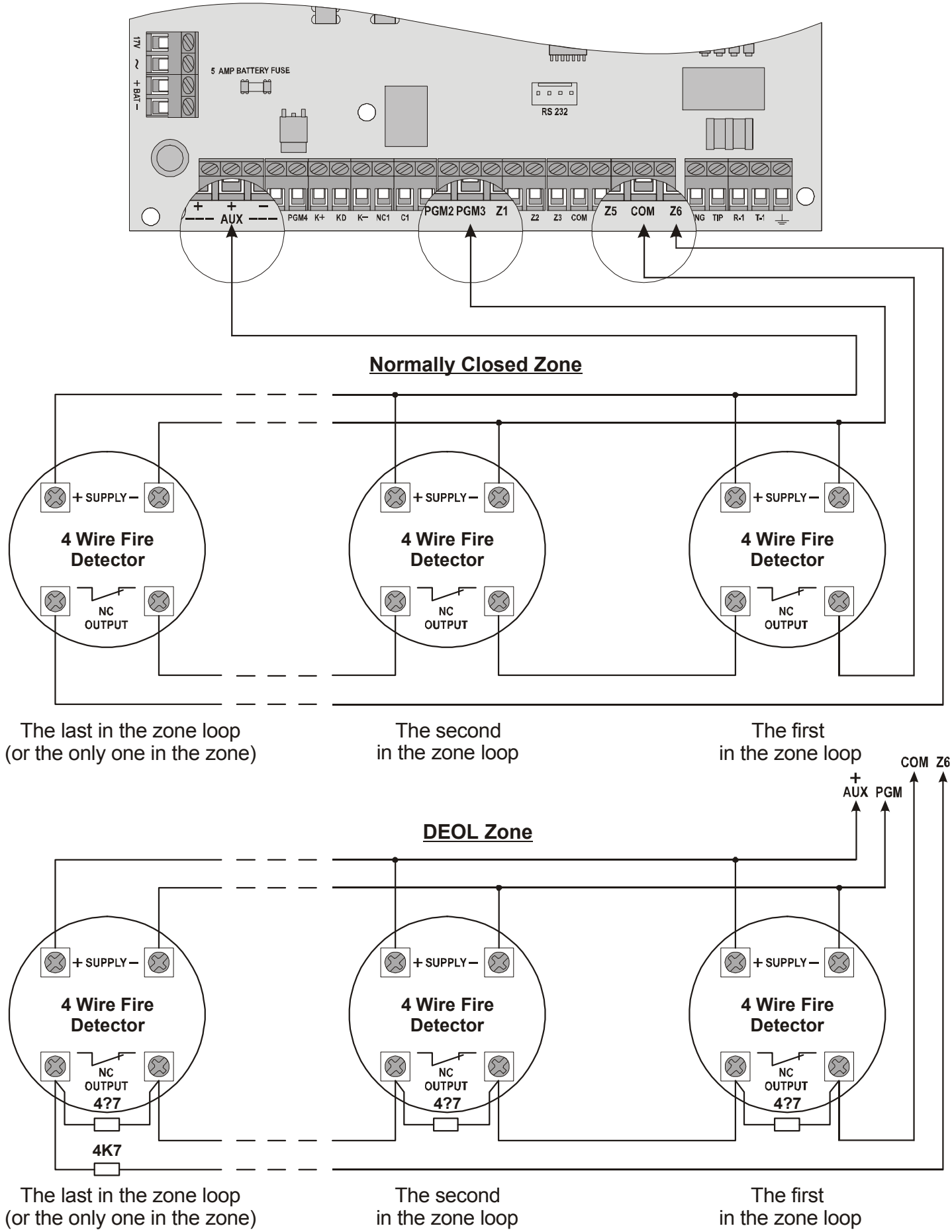
2.11 Smoke Detector Wiring

2.11.1 Matrix 6

Normally Open

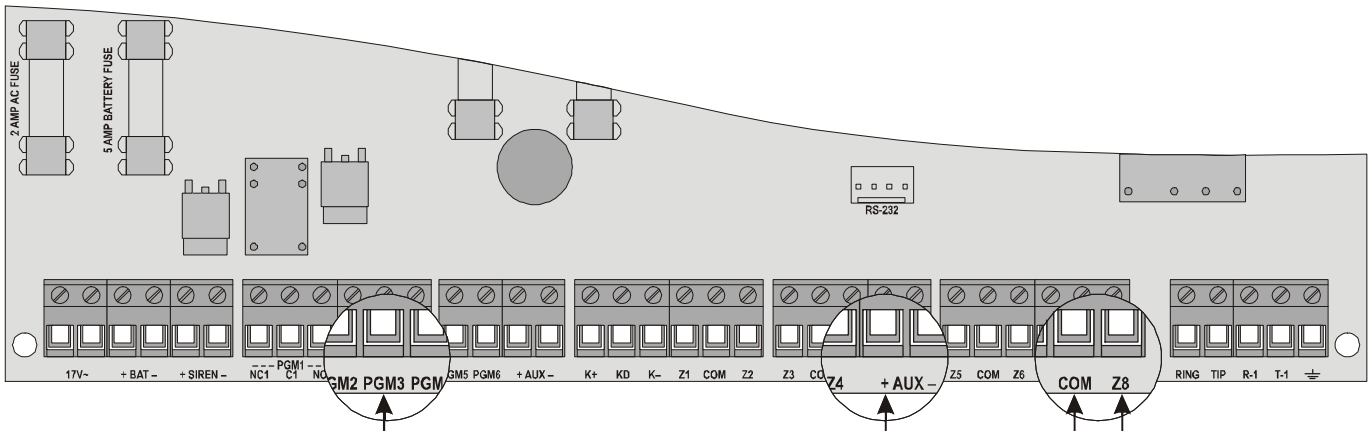


Normally Closed

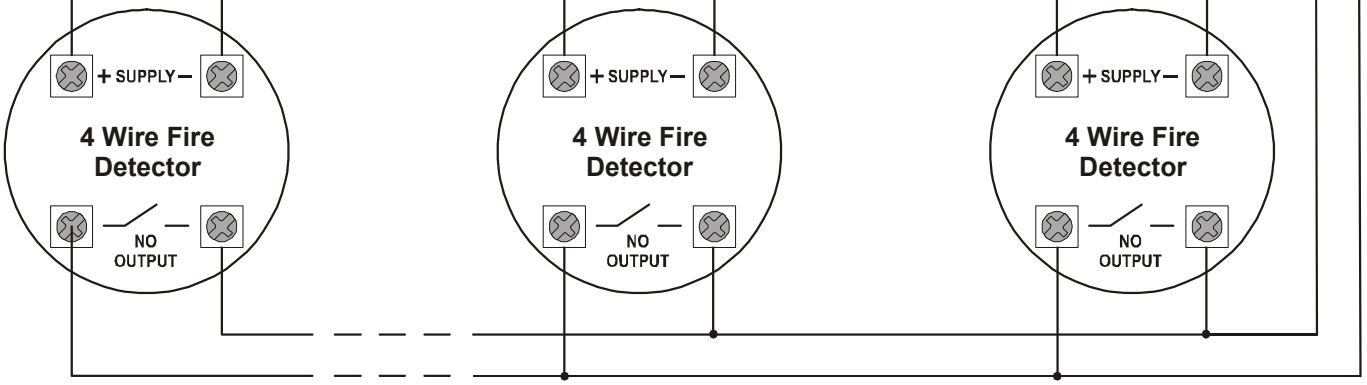


2.11.2 Matrix 816

Normally Open

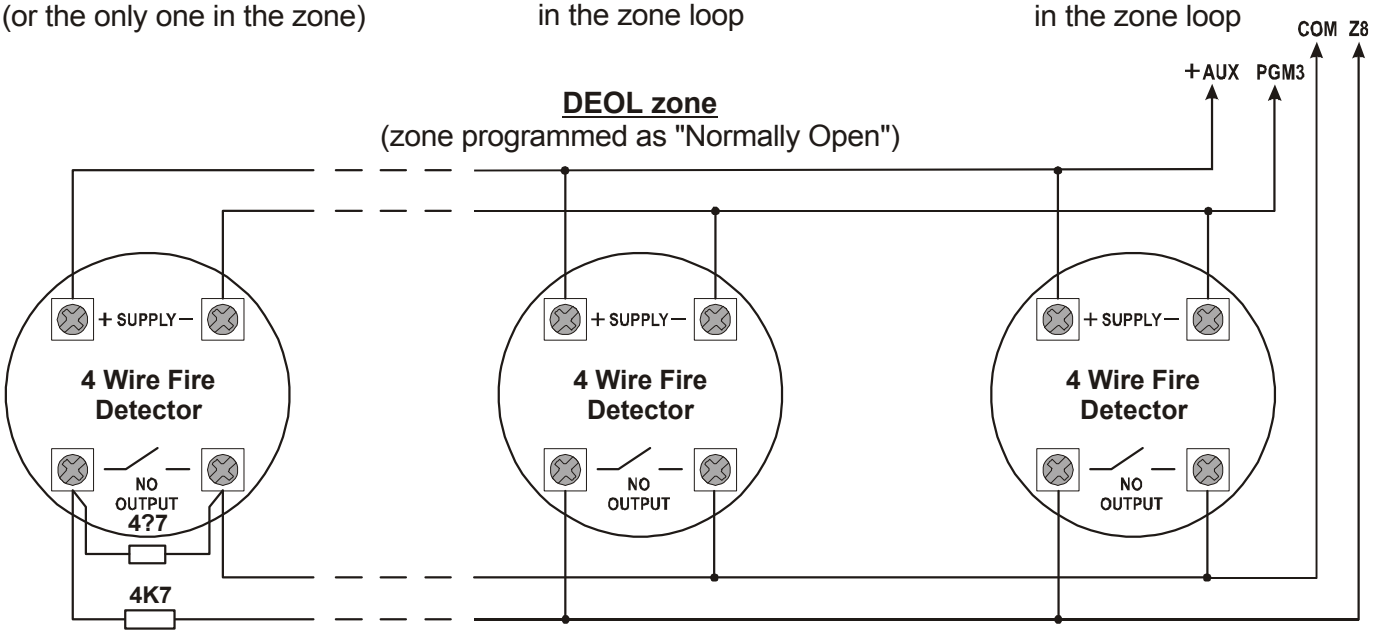


Double pole zone
(zone programmed as "Normally Open")



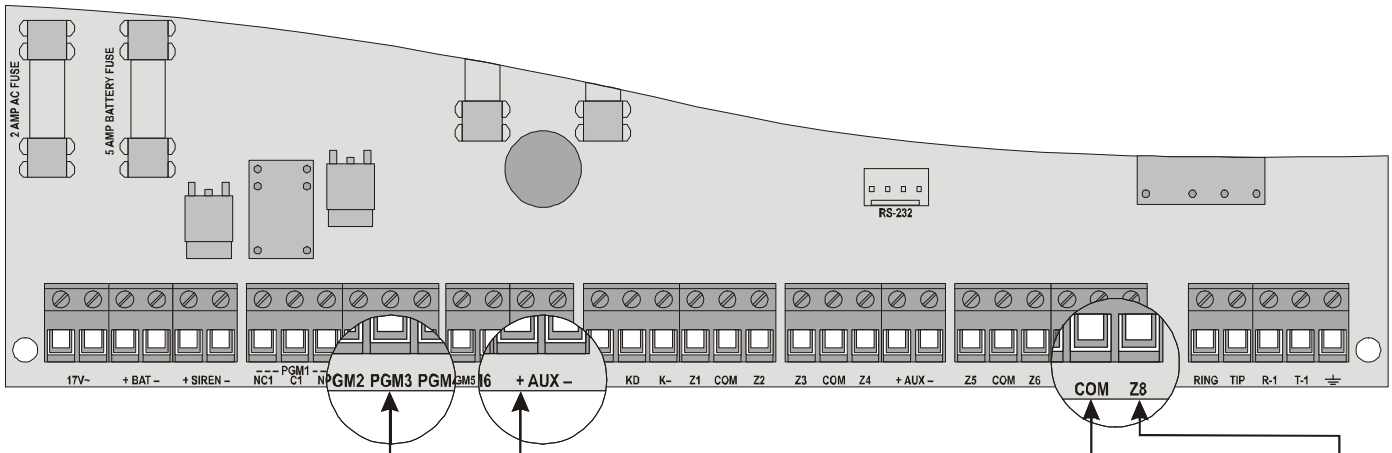
The last in the zone loop (or the only one in the zone) | The second in the zone loop | The first in the zone loop

DEOL zone
(zone programmed as "Normally Open")

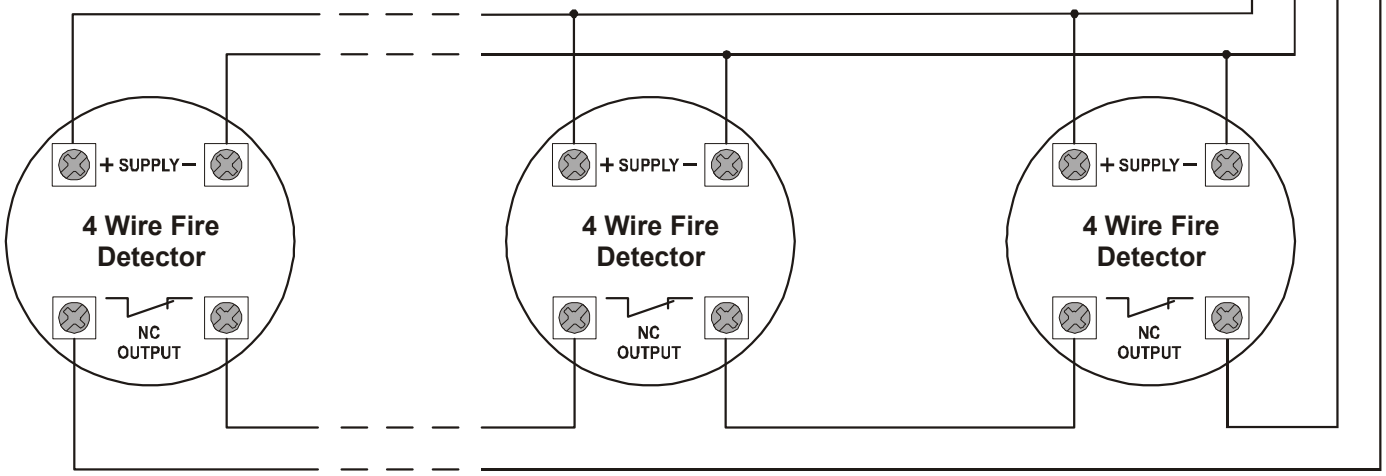


The last in the zone loop (or the only one in the zone) | The second in the zone loop | The first in the zone loop

Normally Closed



Normally Closed Zone

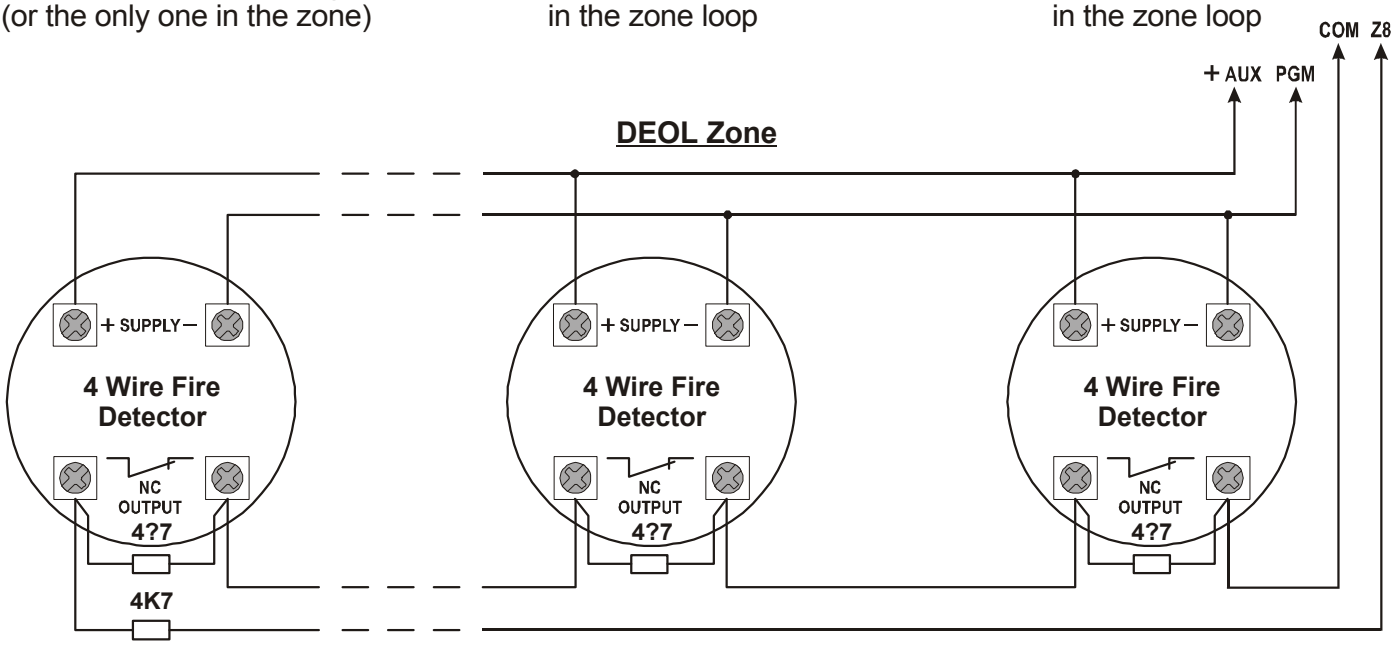


The last in the zone loop (or the only one in the zone)

The second in the zone loop

The first in the zone loop

DEOL Zone



The last in the zone loop (or the only one in the zone)

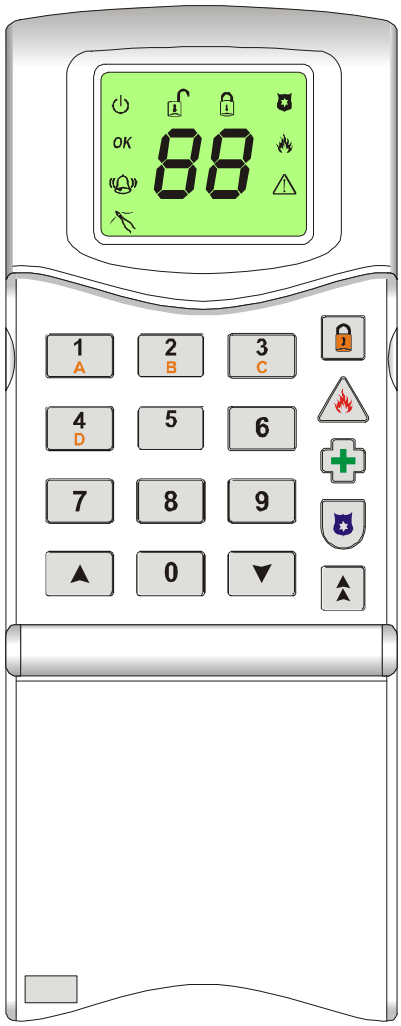
The second in the zone loop

The first in the zone loop

3. KEYPAD

3.1 Keypad Buttons

1 A, 2 B, 3 C, 4 D, 5, 6, 7, 8, 9, 0	**Numerical buttons** To enter user codes and other digital values
1 A, 2 B, 3 C, 4 D	**A, B, C and D** To select A, B, C or D arm modes
▲ ▼	**Directional buttons** To scroll through the display
	Arm button To change arm modes and on/off options in User and Engineer functions
	Fire button To activate a fire alarm
	Medical button To activate a medical alarm
	Personal Attack button To activate a PA alarm
	Function button Used during User and Engineer programming procedures.



3.2 Keypad Indications

		Rest of the World	Denmark, Norway, Finland & Sweden
Supply	Illuminated	Correct AC & DC power sources	AC power is OK
	Blinking	Indicates DC source (battery) fault	Indicates an AC fault
	Extinguished	Indicates AC fault / no power to panel	No power to the panel
Ready OK	Illuminated	OK to Arm, no open zones	
	Blinking	Programming function is active	
	Extinguished	One or more open zones	
Alarm	Illuminated	In Log: FTA - zone activation	
	Slow Blinking	Active alarm in FTA mode.	
	Fast Blinking	A latched alarm or fault needs clearing 'VIEW THE LOG'	
	Extinguished	No active alarms	
Tamper	Illuminated	Indicates a tamper condition (used in log display)	
	Blinking	Indicates a tamper condition in FTA mode	
	Extinguished	No tamper alarm active	
P.A.	Illuminated	Indicates a PA alarm condition (used in log display)	
	Blinking	Indicates a PA alarm condition in FTA mode	
	Extinguished	No PA active	
Fire	Illuminated	Indicates a Fire alarm condition (used in log display)	
	Blinking	Indicates a Fire alarm condition in FTA mode	
	Extinguished	No Fire alarm active	
Fault	Illuminated	Indicates a system Fault	
	Blinking	Keypad is in engineers mode	
	Extinguished	No Fault active	
Armed	Illuminated	The panel is armed	
	Blinking	Indicates the panel is arming with omitted zones	
	Extinguished	The panel is not armed	
Disarmed	Illuminated	The panel is disarmed	
	Blinking	Keypad is in user menu mode	
	Extinguished	The panel is not disarmed	

4. SPECIFICATIONS

4.1.1 Matrix 6

ZONES
Number of programmable zones – **6**
Zone loop types – **Normally Open, Normally Closed, SEOL, DEOL**
Zone loop current – **0.5mA max.**
Zone loop timers – **0.3sec. (normal zones), 30 ms (Fast Zones)**
Zone wire resistance – **not more than 470Ohm**

PGM OUTPUTS
Number of programmable outputs – **4**
Output types – **up to 36**
PGM1 – **Relay Contacts, 30V DC @ 3A**
PGM2 – **Transistor Open Collector, 200mA**
PGM3 – **Transistor Open Collector, 200mA**
PGM4 – **Transistor Open Collector, 500mA**

DIGITAL COMMUNICATOR
Digital communicator – **Analogue line**
Lightning protection – **6.75kV/125Amps**

MECHANICAL
Dimension – **340 ? 280 ? 101mm**
Material & colour – **Metal / White Polymer**

ENVIROMENTAL
Operation temperature: **0 to +40°C (+32 to +104°F)**
Storage temperature: **–20 to +40°C (–4 to +172°F)**

POWER SUPPLY
Power input – **17V AC**
Low voltage output – **13.8V DC regulated**
Max. capacity power output (incl. panel) – **1.25A**
Max. power for ext. devices (excl. battery) – **0.6A**

TRANSFORMER REQUIRED
For 230VAC, Primary – **230VAC, 50Hz, 20W min.** Secondary – **17VAC, 1.25A**
For 120VAC, Primary – **120VAC, 50Hz, 50W min.** Secondary – **16.5VAC, 40VA**

CURRENT CONSUMPTION
Matrix 6 PCB (alone) – **60mA**
Remote keypad MX-ICON – **50mA**
Remote keypad MX-LED – **60mA**

BATTERY
Type – **Lead Acid rechargeable**
Battery Charge commencing – **min. 5.5V**
Battery Capacity – **2.8A/h ... 7.2A/h**
Protection on BAT terminals – **short & reverse**

FUSE CONTROL
AC input – **2A** (quick blow F1L)
Auxiliary supply output – **1A** (quick blow F1L)
RKP supply output – **1A** (quick blow F1L)
Battery Input – **5A** (slow blow T5H)

When all parts are working normally, this equipment in combination with the PSTN and suitable ARC equipment will meet the requirements of ATS2.

EN50131-1
PD6662:2004
Security Grade 2
Environmental Class 2

This product is suitable for use in systems designed to comply with PD6662:2004 at Security Grade 2 and Environmental Class 2.

4.1.2 Matrix 816

ZONES
Number of programmable zones – **8, expandable to 16**
Zone loop types – **Normally Closed, Normally Open, SEOL, DEOL**
Zone loop current – **0.5mA max.**
Zone loop timers – **0.3sec (normal zones)** **30 ms (Fast Zones)**
Zone wire resistance – **not more than 470Ohm**

PGM OUTPUTS
Number of programmable outputs – **7**
Output types – **up to 36 for PGMs1-6, 37 for PGM7**
PGM1 – **Relay Contacts, 30V DC @ 3A**
PGM2 – **Transistor Open Collector, 200mA**
PGM3 – **Transistor Open Collector, 200mA**
PGM4 – **Transistor Open Collector, 500mA**
PGM5 – **Transistor Open Collector, 200mA**
PGM6 – **Transistor Open Collector, 200mA**
Siren – **Transistor Open Collector, 500mA**

DIGITAL COMMUNICATOR
Digital communicator – **Analogue line**
Lightning protection – **6.75kV/125Amps**

MECHANICAL
Dimension – **340 ? 280 ? 101mm**
Material & colour – **Metal / White Polymer**

ENVIROMENTAL
Operation temperature: **0 to +40°C (+32 to +104°F)**
Storage temperature: **–20 to +40°C (–4 to +172°F)**

POWER SUPPLY
Power input – **17V AC**
Low voltage output – **13.8V DC regulated**
Max. capacity power output (incl. panel) – **1.25A**
Max. power for ext. devices (excl. battery) – **0.6A**

TRANSFORMER REQUIRED
For 230VAC, Primary – **230VAC, 50Hz, 20W min.** Secondary – **17VAC, 1.25A**
For 120VAC, Primary – **120VAC, 50Hz, 50W min.** Secondary – **16.5VAC, 40VA**

CURRENT CONSUMPTION
Matrix 816 PCB (alone) – **60mA**
Remote keypad MX-ICON – **50mA**
On-board expander – 1mA

BATTERY
Type – **Lead Acid rechargeable**
Battery Charge commencing – **min. 5.5V**
Battery Capacity – **2.8A/h ... 7.2A/h**
Protection on BAT terminals – **short & reverse**
Low Battery Cut-Off – **10.4V**

FUSE CONTROL
AC input – **2A** (quick blow F1L)
Auxiliary supply output – **1A** (quick blow F1L)
RKP supply output – **1A** (quick blow F1L)
Battery Input – **5A** (slow blow T5H)

<u>NOTE:</u> The battery charging voltage is microprocessor controlled and switched on or off as needed. In order to measure this voltage the battery MUST be connected, otherwise a false voltage will be measured.

When all parts are working normally, this equipment in combination with the PSTN and suitable ARC equipment will meet the requirements of ATS2.

EN50131-1
PD6662:2004
Security Grade 2
Environmental Class 2

This product is suitable for use in systems designed to comply with PD6662:2004 at Security Grade 2 and Environmental Class 2

4.2 Battery Capacity Calculations

Maximum Battery recharge time does not exceed 72 hours to satisfy EN50131-6.

Total system current (including panel and auxiliary equipment) must not exceed 610mA (panel + Aux + bell + K+).

UK Requirements

In the event of mains failure BS4737 Part 1, Section 7.2.1, specifies that a stand-by battery should be able to power the system for a non-alarmed period of 8 hours. The typical Local Authority specified maximum bell alarm period is 20 minutes.

Example Calculation	
Non-alarmed condition 7 hrs 40mins = 7.67Hrs:	
Control panel	0.130A
Keypad	0.015A
Detectors (8 detectors at 15mA each)	0.120A
External sounder	0.050A
External strobe	0.000A
Total current	0.315A
Amp/hour capacity	0.315A x 7.67h = 2.41Ah
Alarmed condition 20mins = 0.33Hrs:	
Control panel	0.130A
Keypad	0.015A
Detectors (8 detectors at 15mA each)	0.120A
External sounder	0.350A
External strobe	0.150A
Total current	0.765A
Amp/hour capacity	0.765A x 0.33h = 0.25Ah
Minimum battery capacity = 2.41A + 0.25A	2.66Ah

Norwegian & Danish Requirements

Required capacity = (18 x A) + (0.5 x B)

Where:
A = Maximum non-alarmed total system current.
B = Maximum alarmed total system current.

Swedish Requirements

Required capacity = 12 x A

Where:
A = Maximum non-alarmed total system current

5. SAFETY & APPROVALS

SAFETY

1. A technically competent person must carry out the mains installation in accordance with the national and local electrical installation regulations
2. **Protective Earth:** This equipment **must** be earthed/grounded 
3. **Functional Earth:** Must be connected to earth terminal to allow the equipment to operate correctly. Has no safety implications.
4. Connect the unit to a single pole, unswitched, 3 Amp fused spur, using 0.75mm^2 cable. If the Neutral cannot be positively identified use a double pole disconnect version.
5. Always remove / isolate the mains supply before carrying out any servicing of the panel.
6. **Fuses:** For continued protection against the risk of fire, replace only with the same type and rating of fuse.
7. There are no user serviceable parts inside the equipment.
8. This unit should be mounted so that there will be no outside access to the electrical cable entry point
9. **Ventilation:** To ensure the correct airflow, always mount the unit vertically with the unit having a clear space on all sides. It must not be covered by clothes, furnishings, boxes, etc. It must not be mounted close to, or above, heat radiating sources.
10. On completion of wiring, use tie-wraps to prevent any loose wires causing a safety hazard.
11. The mechanical mounting of the unit must be secure enough to carry the full weight of the unit including all batteries.
12. **Batteries:** Ensure that the battery terminal connections will not create an electrical short-circuit on the case metalwork when the unit is closed. Use insulated battery lead connectors.
13. Dispose of old batteries as required by environmental legislation / recommendations.
14. The battery case must have a flame-retardant rating of UL94-V2/V1/V0 – IEC60950:2000
15. **Water:** The equipment must be kept free from dampness, water and any other liquids. It is only suitable for installation indoors.

ICONS

	**Protective Earth**	Must be connected to the electrical installation earth / ground
	**Protective Bonding**	Must be connected to the equipment protective earth terminal
	**Functional Earth**	Must be connected to earth terminal to allow the equipment to operate correctly. Has no safety implications.

Pyronix Limited
Pyronix House
Braithwell Way
Hellaby, Rotherham
S66 8QY, UK

Customer Support line (UK only): 0870 122 3360
This is a national rate line

Hours of business: 7:00 AM – 7:30 PM, Monday to Friday

Email: customer.support@pyronix.com

Website: www.pyronix.com

WARRANTY

This product is sold subject to our standard warranty conditions and is warranted against defects in workmanship for a period of 2 years. In the interest of continuing improvement of quality, customer care and design, Pyronix reserves the right to amend specifications without giving prior notice.