



420 Series RS232 Encoder for Keypad Applications - Installation Instruction

Storm 420 Series Encoders allow interfacing between a Storm keypad and host system using the RS232 communications protocol. This model will also drive a 4 line x 20 character LCD display. For additional information download the 420 Encoder Application / Engineering Manual from www.storm-interface.com

SPECIFICATIONS

Input Power 5V dc \pm 0.25 V, regulated supply
 RS232 Output (via 6 pin Molex 2.54mm (.100") Pitch KK®)

Overall Size W 89mm x L 66mm x H 32mm
 Mounting Centres at 73.5mm x 43.2mm
 Temp Rating -20 deg C to +70 deg C

Drives Powertips 80 Character LCD Display
 (uses Hitachi HD44780U LCD-II Controller/Driver)

Direct connection for underpanel fixing 12, 16, 20 way Storm Keypads
 Ribbon Cable needed for top panel fixing 4, 12, 16 way Storm Keypads

Display Controls :

On host system : Ctrl + L - clears the display, Ctrl + C toggles cursor on and off

| Keypad Connector (on reverse of pcb) | | ✓ = pin connection made | | | | | | | | | | Direct connection to rear of keypad ? | | |
|--------------------------------------|---------------------|-------------------------|--------------------|---|---|---|---|---|---|---|---|---------------------------------------|---------------------|---|
| KEYPAD TYPE | | | | | | | | | | | | | | |
| 20 WAY BACKLIT | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | YES |
| 20 WAY NOT BACKLIT | Fit polarising pin | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Fit polarising pin | YES |
| 12 / 16 WAY BACKLIT | Fit polarising pin | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Fit polarising pins | YES —fit polarising pins to positions 1,12 and 13 |
| 12 / 16 WAY NOT BACKLIT | Fit polarising pins | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Fit polarising pins | YES |
| 4 WAY BACKLIT | Fit polarising pin | ✓ | Fit polarising pin | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Fit polarising pin | NO —separate cable required - See Note 1 below STD version needs 5 way cable BACKLIT version needs 7 way cable Fit polarising pins as required |
| 4 WAY NOT BACKLIT | Fit polarising pins | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Fit polarising pins | |

| Encoder Pin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|------------------------|------------------|-----------|----|----|----|----|----|----|----|----|------------------|------------|-----------|
| R = ROW, C = COLUMN | LED CATHODE | TAMPER IN | R1 | R2 | C1 | C2 | C3 | C4 | R4 | R3 | R5 FUNCTION KEYS | TAMPER OUT | LED ANODE |
| To Keypad | | | | | | | | | | | | | |
| | PIN 1 ON REVERSE | | | | | | | | | | | | |

NOTE 1—Connections for 4 way keypads

| ENCODER PIN | TO | KEYPAD PIN | STD | BACKLIT |
|-------------|----|------------|-----|---------|
| 2 | | | NC | 1 |
| 11 | | | 1 | 2 |
| 5 | | | 5 | 6 |
| 6 | | | 4 | 5 |
| 7 | | | 3 | 4 |
| 8 | | | 2 | 3 |
| 13 | | | NC | 7 |

RS232 OUTPUT

- DTR
- GND
- NC
- RTS
- RX
- TX (Pin 1)

JUMPER SETTING CONTROLS BACKLIT KEYPAD LED COLOUR

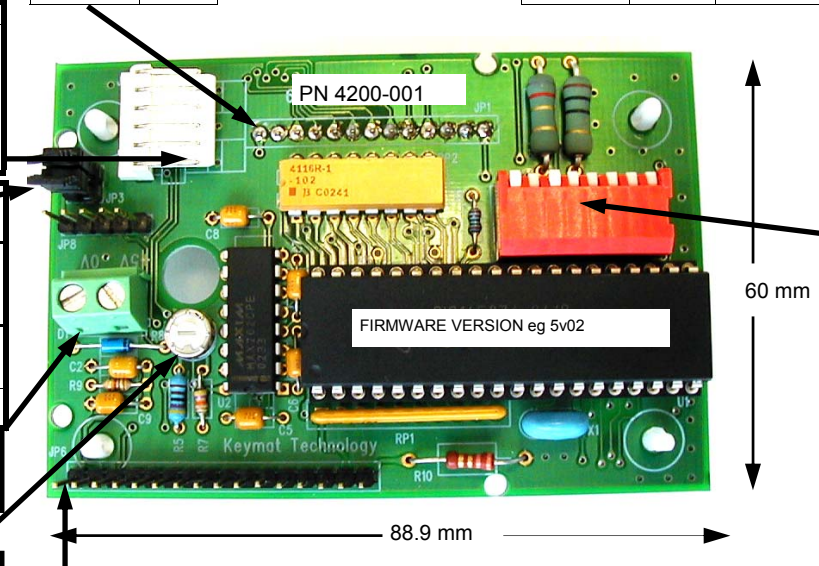
RED

GREEN

JP8 FACTORY USE ONLY

Input Power Terminals

LCD Display Contrast Adjustment



LCD Display Connector, 16 pins, 0.1" square pins

| Pin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|--------|-----|-----|----|----|----|---|-----|-----|-----|-----|-----|-----|-----|-----|----|----|
| Symbol | Vss | Vdd | Vo | RS | RW | E | DB0 | DB1 | DB2 | DB3 | DB4 | DB5 | DB6 | DB7 | A | K |

Configuration Switches

ORDERING DETAILS

Stock No 4200-00[X] Item RS232 Encoder

[X] denotes packaging variant

free downloads from www.storm-interface.com :-

420 Encoder Application/Engineering Manual
 Test Software

Mounting Details Page 1 of 4
 420-XX-08KT Rev 3 Oct 2013



FM39602

Whilst every effort is made to ensure details are correct at time of print, specifications are subject to change without notice.



Backplane Systems Technology

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Fitted to 4, 12 or 16 WAY KEYPAD

| Configuration Switch Settings | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Installation Checklist |
|---|----|--|-----|-----|-----|-----|-----|---|------------------------|
| 4 Way Keypads | ON | CHARACTER ECHOING SELECTOR ON = ECHO ON OFF = ECHO OFF | OFF | ON | ON | ON | OFF | BAUD RATE SELECTOR OFF=9600 BAUD ON=1200 BAUD | |
| 12 and 16 Way Telephone Layout Keypads | ON | | OFF | OFF | OFF | OFF | ON | | |
| 12 and 16 Way Calculator Layout Keypads | ON | | OFF | ON | OFF | OFF | ON | | |
| | | | | | | | | | |

| Installation Checklist |
|--|
| ✓ Keypad |
| ✓ Encoder , configuration switch set |
| ✓ Panel Fixing prepared |
| ✓ +5V regulated supply |
| ✓ RS 232 cable with 6 way Molex socket |
| ✓ Ribbon cable keypad to encoder if needed |
| ✓ LCD and 16 way ribbon cable if needed |
| ✓ Polarisising pins fitted to encoder |

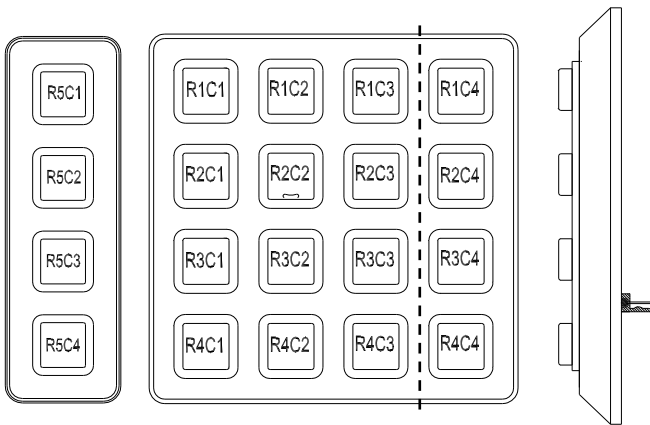
ROW / COLUMN DESIGNATIONS (KEYPADS FRONT VIEW)

For Example R1C2 = Row 1 Column 2. NB : A 20 way keypad is treated as 4 way + 16 way.

4 Way Front View

12 / 16 Way Front View

Side View



PIN-OUT FOR 4, 12 and 16 WAY MATRIX KEYPADS

4 WAY KEYPAD (NO BACKLIGHT) CONTACT CONNECTIONS (REAR VIEW)

| | |
|------------|-----------|
| PINS | • • • • • |
| PIN NUMBER | 5 4 3 2 1 |

CONTACT MATRIX

| PIN | ROW / COLUMN |
|-----|--------------|
| 1 | R5 |
| 2 | C4 |
| 3 | C3 |
| 4 | C2 |
| 5 | C1 |

4 WAY BACKLIT KEYPAD CONTACT CONNECTIONS (REAR VIEW)

| | |
|------------|---------------|
| PINS | • • • • • • • |
| PIN NUMBER | 7 6 5 4 3 2 1 |

CONTACT MATRIX

| PIN | ROW / COLUMN |
|-----|--------------|
| 1 | LED POWER |
| 2 | R5 |
| 3 | C4 |
| 4 | C3 |
| 5 | C2 |
| 6 | C1 |
| 7 | LED POWER |

12 / 16 WAY KEYPAD (NO BACKLIGHT) CONTACT CONNECTIONS (REAR VIEW)

| | |
|------------|-----------------|
| PINS | • • • • • • • • |
| PIN NUMBER | 8 7 6 5 4 3 2 1 |

CONTACT MATRIX (NO BACKLIGHT)

| PIN | ROW / COLUMN |
|-----|------------------|
| 1 | R1 |
| 2 | R2 |
| 3 | C1 |
| 4 | C2 |
| 5 | C3 |
| 6 | C4 (16 WAY ONLY) |
| 7 | R4 |
| 8 | R3 |

12 / 16 WAY BACKLIT KEYPAD CONTACT CONNECTIONS (REAR VIEW)

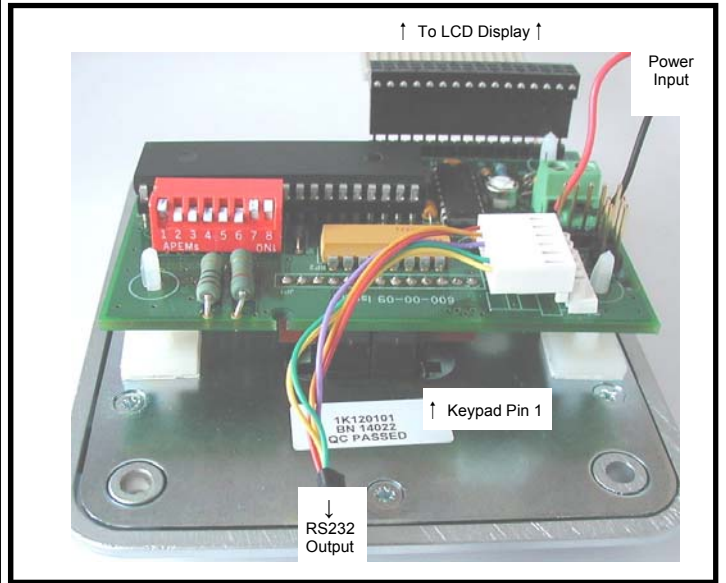
| | |
|------------|----------------------|
| PINS | • • • • • • • • • • |
| PIN NUMBER | 10 9 8 7 6 5 4 3 2 1 |

CONTACT MATRIX (WITH BACKLIGHT)

| PIN | ROW / COLUMN |
|-----|------------------|
| 1 | LED POWER |
| 2 | R1 |
| 3 | R2 |
| 4 | C1 |
| 5 | C2 |
| 6 | C3 |
| 7 | C4 (16 WAY ONLY) |
| 8 | R4 |
| 9 | R3 |
| 10 | LED POWER |

TYPICAL INSTALLATION

(rear view, encoder direct connection to keypad, LCD display used)



ASCII CODE TABLES

4 WAY KEYPAD ASCII CODES

| ROW / COLUMN | R5 |
|--------------|----|
| C1 | 11 |
| C2 | 12 |
| C3 | 13 |
| C4 | 14 |

NOTE 1 : These codes are non-printing ASCII device control codes. The application software will need to assign usage

NOTE 2 : The COMMON pin on a 4 way is termed ROW 5 to be consistent with applications using 4 function keys.

12 / 16 WAY TELEPHONE KEYPAD ASCII CODES

| ROW / COLUMN | C1 | C2 | C3 | C4 |
|--------------|----|----|----|----|
| R1 | 31 | 32 | 33 | 61 |
| R2 | 34 | 35 | 36 | 62 |
| R3 | 37 | 38 | 39 | 63 |
| R4 | 2A | 30 | 23 | 2E |

12 / 16 WAY CALCULATOR KEYPAD ASCII CODES

| ROW / COLUMN | C1 | C2 | C3 | C4 |
|--------------|----|----|----|-----|
| R1 | 37 | 38 | 39 | 1B |
| R2 | 34 | 35 | 36 | 0C* |
| R3 | 31 | 35 | 33 | 05 |
| R4 | 7F | 30 | 0D | 2E |

* = Form Feed Code to give CLEAR function

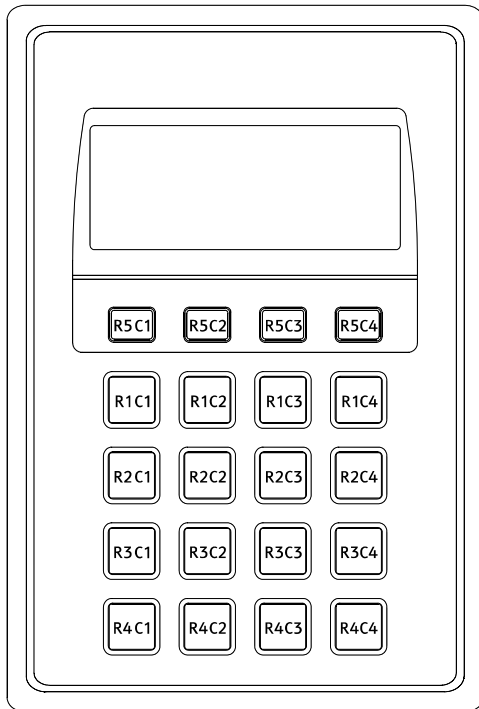
Fitted to INTEGRATED 20 WAY KEYPAD AND DISPLAY

| Configuration Switch Settings | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Installation Checklist |
|---|-----|--------------------------------|----|-----|-----|----|-----|---|------------------------|
| Integrated 20 Way Keypad and Display - Telephone Layout | OFF | CHARACTER ECHOING SELECTOR | ON | OFF | OFF | ON | OFF | BAUD RATE SELECTOR OFF=9600 BAUD ON=1200 BAUD | |
| Integrated 20 Way Keypad and Display - Calculator Layout | OFF | | ON | ON | ON | ON | OFF | | |
| Note : Remove Jumpers from JP3 and JP4 in this configuration. | | ON = ECHO ON OFF = ECHO OFF | | | | | | | |

- ✓ Integrated 20 way Keypad
- ✓ Encoder , configuration switch set
- ✓ LCD and 16 way ribbon cable if needed
- ✓ Panel Fixing prepared
- ✓ +5V regulated supply
- ✓ RS 232 cable with 6 way Molex KK socket
- ✓ 13 way ribbon cable keypad to encoder if needed
- ✓ Polarisng pins fitted to encoder

ROW / COLUMN DESIGNATIONS (KEYPAD FRONT VIEW)

For Example R1C2 = Row 1 Column 2. NB : A 20 way keypad is treated as 4 way + 16 way.



ASCII CODE TABLES

| Row / Column | Telephone Layout | | Calculator Layout | |
|---|------------------|-------|-------------------|-------|
| | Character | ASCII | Character | ASCII |
| R5C1 | ▲ | 11 | ▲ | 11 |
| R5C2 | ▲ | 12 | ▲ | 12 |
| R5C3 | ▲ | 13 | ▲ | 13 |
| R5C4 | ▲ | 14 | ▲ | 14 |
| R1C1 | 1 | 31 | 1 | 31 |
| R1C2 | 2 ABC | 32 | 2 | 32 |
| R1C3 | 3 DEF | 33 | 3 | 33 |
| R1C4 | A | 41 | ENTER | 1B |
| R2C1 | 4 GHI | 34 | 4 | 34 |
| R2C2 | 5 JKL | 35 | 5 | 35 |
| R2C3 | 6 MNO | 36 | 6 | 36 |
| R2C4 | B | 42 | CLEAR | 0C |
| R3C1 | 7 PQRS | 37 | 7 | 37 |
| R3C2 | 8 TUV | 38 | 8 | 38 |
| R3C3 | 9 WXYZ | 39 | 9 | 39 |
| R3C4 | C | 43 | ? | 05 |
| R4C1 | * CLR | 2A | * | 7F |
| R4C2 | 0 | 30 | 0 | 30 |
| R4C3 | # ENT | 23 | # | 0D |
| . | ENTER | 2E | CANCEL | 2E |
| ANTI-TAMPER OPEN CIRCUIT | | 07* | | 07* |
| * = CODE REPEATS EVERY 10 SECONDS WHILST CONDITION REMAINS ACTIVE | | | | |

PIN-OUT FOR 20 WAY KEYPAD

20 WAY KEYPAD
CONTACT CONNECTIONS
(REAR VIEW)

| | |
|------------|---------------------------------|
| PINS | • • • • • • • • • • • • • • • • |
| PIN NUMBER | 13 12 11 10 9 8 7 6 5 4 3 2 1 |

CONTACT MATRIX

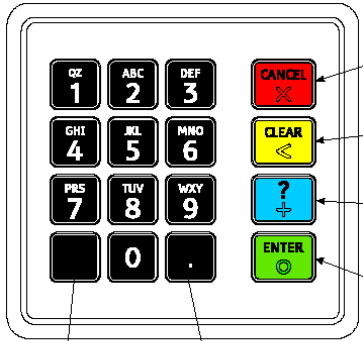
| PIN | ROW / COLUMN |
|-----|--------------|
| 1 | NOT USED |
| 2 | TAMPER IN |
| 3 | R1 |
| 4 | R2 |
| 5 | C1 |
| 6 | C2 |
| 7 | C3 |
| 8 | C4 |
| 9 | R4 |
| 10 | R3 |
| 11 | R5 |
| 12 | TAMPER OUT |
| 13 | NOT USED |



Fitted to 6000 SERIES PINPAD

| Configuration Switch Settings | R3 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Installation Checklist |
|---|-------------------|-----|--|----|-----|----|-----|-----|---|---|
| 6000 Series Pinpad - Basic Layout | fitted | OFF | CHARACTER ECHOING SELECTOR ON = ECHO ON OFF = ECHO OFF | ON | OFF | ON | OFF | OFF | BAUD RATE SELECTOR OFF=9600 BAUD ON=1200 BAUD | <ul style="list-style-type: none"> ✓ Keypad ✓ Encoder , configuration switch set ✓ Panel Fixing prepared ✓ +5V regulated supply ✓ RS 232 cable with 6 way Molex KK socket ✓ 13 way ribbon cable keypad to encoder if needed ✓ Polarisng pins fitted to encoder |
| 6000 Series Pinpad - UK Layout | Remove before use | OFF | | ON | OFF | ON | OFF | OFF | | |
| 6000 Series Pinpad - USA Layout | Remove before use | OFF | | ON | ON | ON | OFF | OFF | | |
| Note : R3 may need to be removed depending on the configuration required. | | | | | | | | | | |

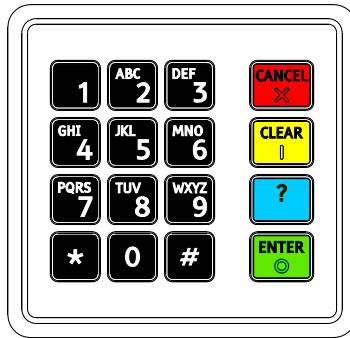
BASIC LAYOUT



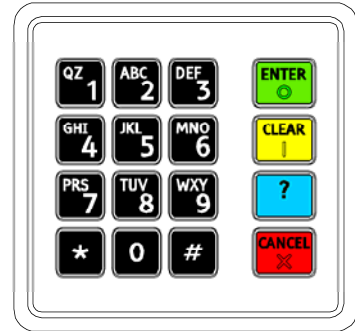
BLANK KEY
No Key Code with Standard Firmware

Key Code = Decimal Point

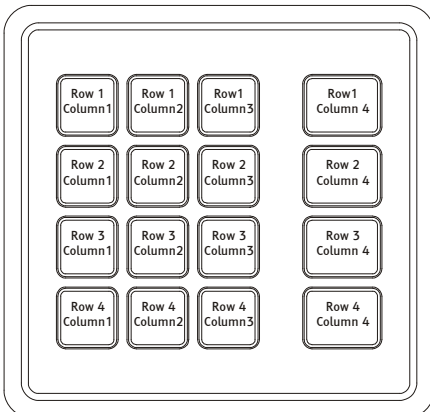
UK LAYOUT



USA LAYOUT

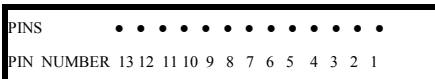


ROW / COLUMN DESIGNATIONS



PIN-OUT FOR 16 WAY MATRIX PINPAD

CONTACT CONNECTIONS
(REAR VIEW)



CONTACT MATRIX

| PIN | ROW / COLUMN |
|-----|--------------|
| 1 | NOT USED |
| 2 | TAMPER |
| 3 | R1 |
| 4 | R2 |
| 5 | C1 |
| 6 | C2 |
| 7 | C3 |
| 8 | C4 |
| 9 | R4 |
| 10 | R3 |
| 11 | NC |
| 12 | TAMPER |
| 13 | NOT USED |

ASCII CODE TABLES

| Row / Column | Basic Layout | | | UK Layout | | | USA Layout | | |
|--------------------------|--------------|----------------------------------|---------|-----------|----------------------------------|-------|------------|----------------------------------|-------|
| | Marking | Base Key | ASCII | Marking | Base Key | ASCII | Marking | Base Key | ASCII |
| R1C1 | 1 QZ | Black | 31 | 1 | Black | 31 | 1 QZ | Black | 31 |
| R1C2 | 2 ABC | Black | 32 | 2 ABC | Black | 32 | 2 ABC | Black | 32 |
| R1C3 | 3 DEF | Black | 33 | 3 DEF | Black | 33 | 3 DEF | Black | 33 |
| R1C4 | CANCEL | Red with raised Cross | 0D | CANCEL | Red with raised Cross | 0D | ENTER | Green with raised circle | 1B |
| R2C1 | 4 GHI | Black | 34 | 4 GHI | Black | 34 | 4 GHI | Black | 34 |
| R2C2 | 5 JKL | Black with Homepip | 35 | 5 JKL | Black with Homepip | 35 | 5 JKL | Black with Homepip | 35 |
| R2C3 | 6 MNO | Black | 36 | 6 MNO | Black | 36 | 6 MNO | Black | 36 |
| R2C4 | CLEAR | Yellow with raised vertical line | 7F | CLEAR | Yellow with raised vertical line | 7F | CLEAR | Yellow with raised vertical line | 7F |
| R3C1 | 7 PRS | Black | 37 | 7 PQRS | Black | 37 | 7 PRS | Black | 37 |
| R3C2 | 8 TUV | Black | 38 | 8 TUV | Black | 38 | 8 TUV | Black | 38 |
| R3C3 | 9 WXY | Black | 39 | 9 WXYZ | Black | 39 | 9 WXY | Black | 39 |
| R3C4 | ? | Blue with raised Plus | 05 | ? | Blue | 05 | ? | Blue | 05 |
| R4C1 | | Black | No Code | * | Black | 2A | * | Black | 2A |
| R4C2 | 0 | Black | 30 | 0 | Black | 30 | 0 | Black | 30 |
| R4C3 | . | Black | 2E | # | Black | 23 | # | Black | 23 |
| R4C4 | ENTER | Green with raised circle | 1B | ENTER | Green with raised circle | 1B | CANCEL | Red with raised Cross | 0D |
| ANTI-TAMPER OPEN CIRCUIT | | | 07* | | | 07* | | | 07* |

*= CODE REPEATS EVERY 10 SECONDS WHILST CONDITION REMAINS ACTIVE.
TO RESET—DISCONNECT POWER FOR 30 SECONDS.