# expander²
# expert² slave
# EX INOUT 16-32

(Part Nos: 5002-3063, 5002-3042, 5002-3060)

# User Guide

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## Foreword



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## Cautions and Notes

The following symbols are used in this guide:

**CAUTION! This indicates an important operating instruction that should be followed to avoid any potential damage to hardware or property, loss of data, or personal injury.**

**NOTE.** This indicates important information to help you make the best use of this product.

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# 1. Introduction

**EXpander²** is an add-on card, designed to be fitted into either an EXpert² or EXpert² SLAVE, which adds capacity for an extra 2 doors to the system.

**EXpert² SLAVE** is an access control unit that contains a single EXpander². It must be connected to an EXpert² via RS485 and adds capacity for an extra 2 doors to the system. An additional EXpander² can be fitted inside the same case, or an EXin-out32-16 can be fitted instead. Up to 7 EXpander² boards in total can be connected to an EXpert² using a daisy-chain RS485 configuration.

**EXin-out$^{32\text{-}16}$** is an add-on card, designed to be fitted into either an EXpert² or EXpert² SLAVE, which adds capacity for an extra 32 inputs and 16 outputs (relays) to the system. This PCB has 32 inputs and 16 relays (inputs 9 to 40, relays 5 to 20).

All inputs are capable of tamper-detection using 1- or 2-resistor supervision as well as simple on/off detection.

The ideal option would be to have any I/O boards fitted to EXpander² units and not directly to an EXpert² that controls EXpander² units, allowing the EXpert to give priority for processing.

## 1.1 Suppression of Electrical Noise and Spikes

**CAUTION! Lock strike suppression devices (2 TDSi SUPPRESSORS ARE SUPPLIED) MUST be fitted directly across all inductive loads, such as lock strikes, secondary relays and automatic door openers. Failure to adhere to this notice will invalidate the warranty of this product and may result in irreparable damage to it and other connected equipment. Refer to the Next page for information. Use with EXgarde PRO software.**

TDSi provides 2 suppressors each with the EXpert2 Slave and Expander 2. This suppressor's wires can be fitted any way round. The TDSi suppressor provided is specialised and supports both AC and DC locks - part number 4262-0095.

**Figure 1 Supplied suppressor**

# 1.2 What's in the Box

## EXpander 2

- 2 suppressors come with this kit
- + 4 way connector lead
- + 4 screws and 3 snap fit pillars
- Installation manual

## EXpert 2 Slave

- 2 suppressors come with this kit
- Expander 2 fitted into a Cabinet with PSU
- Documentation CD +Installation manual
- + 3 Raw plugs and 3 Screws

## EXin/out 32/16

- 1 Ribbon Cable
- + 6 screws and 3 snap fit pillars
- Installation manual

# 2. Installation

## 2.1 Guidelines

- Try to leave a 50mm (2 inch) gap at the top of the case (this allows the cover to be removed easily). If possible, leave a 50mm gap all around the case.
- All cabling runs should be in shielded or screened cable and at least 2 metres long for full EMC protection and maximum reliability.
- Always run the power to the lock in a separate cable.
- Follow the reader connection instructions supplied with the reader. (Wire colour codes and connections are most up-to-date in the reader leaflet).
- Fit the supplied suppression at the lock NOT at the ACU (Access Control Unit)
- In general the cable screens (shield) should be EARTHED AT THE ACU ONLY.
- The one exception to this rule is if the item (e.g. reader, egress, lock, etc.) is fitted to anything metal. In this instance EARTH THE CABLE THERE and NOT at the ACU.
- The communications cable should be earthed on the incoming side only, that is the cable that is bringing communications in from the computer or previous ACU. The communications cable leaving the ACU should ideally be taped off. (This prevents earth loops).
- Keep all unshielded cable runs and earth/drain wire “pig tails” as short as possible. Never remove more cable sheathing than necessary to minimise exposed earth braid.
- Know your ACU, the best identification if you are unsure is the 1st digit of the UID number printed on the Square chip in the middle of the board. The UID number takes the form: X-000-100-123
  where X is 1=EXpert 2=EXpander 3=EXcel2 4=EXcel4
- If you are using the ACU internal power supply, A lead-acid type 7Ah battery should be sat on the lower right of the cabinet which supplies back up battery for both the ACU & Locks.
- On EXcel & EXpert ACU’s put the J4 (memory battery link) ON. (An EXpander does not have one). On EXpert and EXpander PCB’s ensure J2 (local comms link) is fitted in the 2W position.
- Fill out the Installation Reference Sheet attached to this document. This is useful for your records and forms part of a TDSi commissioning site visit requirement.

## 2.2 Initial Power-Up

1. On initial power-up the reader LED's should flash rapidly (about twice per second).
2. If you have removed the door sense link of DOOR 1 and not fitted a door sensor or a normally open one, the buzzer may sound after 15 seconds or so. (To stop the buzzer change the door sensor type, fit a link or simply close the door)
3. Presenting a card to a reader will ensure the reader type is detected and the reader LEDs will start to flash every 2 seconds. The Egress (Push to Exit) should also be working at this point.
4. If you have EXgarde PRO software update this with the Extra Boards added.

## 2.3 Hardware Defaults

**Reader LED** bi-colour

**Door sense** door closed=contact closed

## 2.4 Grounding

1. Before terminating the cable cores, loosen the grounding clamp nearest to the connector.
2. Pass the braid behind the grounding clamp and tighten the screw. Make sure the screen is completely within the clamp and that it points away from the connector blocks.

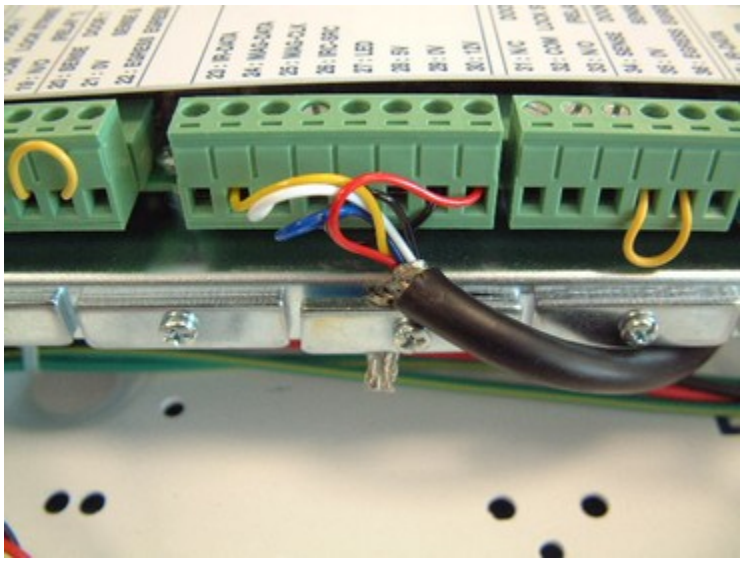


**Figure 2 Clamping the cable screen to the chassis**

# 2.5 Firmware

For correct operation, the Expert Master Controller to which this EXpert Slave or Expander 2 is to be connected to must have VERSION 2.8 or above FIRMWARE.

1. Check the firmware version, using the **EXkeypad** hand-held programmer or the EXgarde Toolkit applications: **Xchat** or **Xsearch**.
2. Should an update be necessary, you will need to obtain the file: EX2MF208.EXE or firmware later than this (see below to find out how to identify hardware versions). This is available on request from our Technical Support Department or can be downloaded from the TDSI website (http://www.tdsi.co.uk).
3. Copy the file to a suitable location and run it by double-clicking on it.
4. Select an appropriate *Destination Directory* and click the **Start** button (see Figure 5). The **X installer** application will then install and run automatically.
5. If necessary, close the application and edit the INSTALL.INI file to change the COM PORT setting and start the Xinstaller application again.
6. Select the unit number to which the new firmware is to be installed and press enter.
7. The firmware will now be uploaded to the unit.

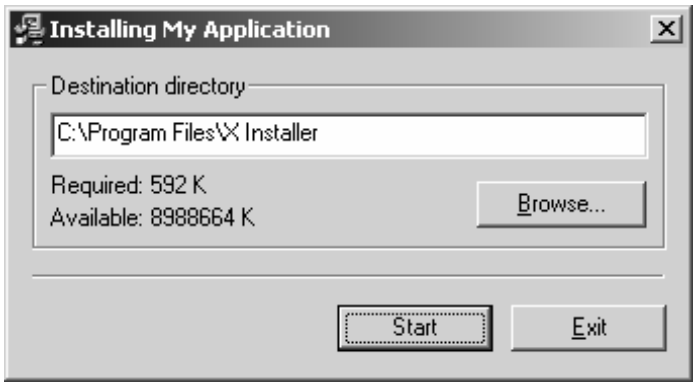



**Figure 3 Installing a firmware upgrade**

## 2.5.1 Identifying Versions of Hardware

Version 3 hardware has ONLY 1 SQUARE processor chip displaying the UID number. (see Figure 4- this is an EXpert Board). Any Expander or EXpert 2 Slave board with Version3 hardware already has version 3 firmware or above).

Version 2 hardware has two square processor chips: the UID processor chip and a WSI processor next to it.

To Upgrade version 3 firmware you will need the latest version of **X installer** (which can also be used for upgrading V2 PCBs).


**Figure 4 Identifying hardware**

# 2.6 EXpert & EXpander Communications

When an EXpert is powered up it checks for any EXpanders that are connected to it. This is indicated by the LOCAL COMMS LEDs flashing. You should see constant flickering “chatter” on both Red and Green LED’s.

1. If you have 2 boards in the same case and are using the 4-core white wire loom then check the loom connection. This loom simply connects pins 10, 11, 12 & 13 on both boards. If you suspect a defective loom then just connect pins 10 to 10, 11 to 11, 12 to 12 & 13 to 13.
2. Check that all the J2 (LOCAL COMMS LINK) are in position 2 and NOT position 4. This means that the jumper should be making the connection on the 2 pins nearest the centre of the board.
3. Perform a reset on the EXpert. This will force a check again to all Expanders the EXpert is connected to. If you have more than one Expander then the EXpert will assign the first Expander it sees as Unit 1, the second it sees as Unit 2 and so on. It may not be in the order that you would want. This can be overruled using the programmer or software. If you wish, you could connect one Expander on-line at a time in the order you want slave units 1 onwards to be nominated.

# 2.7 Installation EXin-out32-16

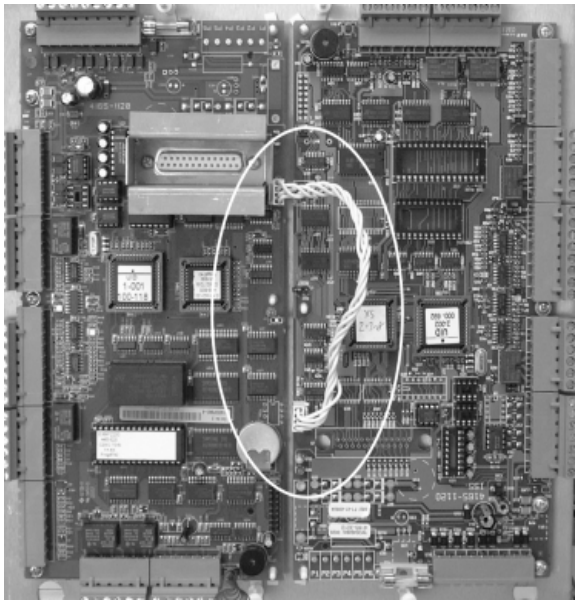
The EXin-out32-16 is supplied with a ribbon cable to connect it to the EXpert² or EXpander².

After mounting the board to the chassis, connect the supplied ribbon cable between the EXpert² (or Expert Slave) and the newly installed board. The ribbon cable has a red wire, although technically it does not make any difference, the red wire is usually for the Pin 1 (pin nearest J4 Batt – top end). On powering up the I/O will be auto detected.

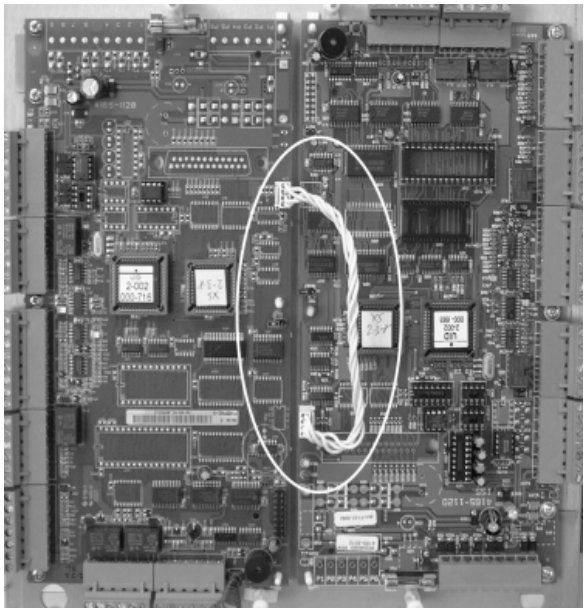
The Links LK 12V and LK0V are connected as default providing the +12V and 0V to the respective terminals.

# 2.8 Installation EXpander2

EXpander2 is fitted inside the case on the right-hand side using the screws and snap-fit pillars supplied. Note that the board is “upside down” when compared to the board on the left.



eXpander² fitted into eXpert²



eXpander² fitted into eXpert² SLAVE

**Figure 5 Installing a firmware upgrade**

The EXpander2 is supplied with a 4-wire connector (circled in the pictures above) to connect it to the EXpert2 or EXpert2 SLAVE. Two cores carry power and two carry RS485. This cable can be replaced by making the following connections:

**Table 1 Connecting EXpander² to EXpert² or EXpert² SLAVE**

| | EXpert2 or EXpert2 SLAVE | EXpander2 |
|---|---|---|
| **12V** | 10 | 10 |
| **0V** | 11 | 11 |
| **RS485 A** | 12 | 12 |
| **RS485 B** | 13 | 13 |

On powering up, EXpert² will start communication with the EXpander² board, as can be seen by observing the constant flickering of the **Local Communications LED's** (D9 Green LED & D10 Red LED) on both boards. This will auto allocate the next available slave unit number.

### 2.8.1 EXpander² connections

All connections on the EXpander 2 have the same terminal numbering and functions as for the equivalent EXpert 2 connections but beware of the board being upside down.

#### Testing

The readers of an Expander can be tested by putting the EXpert into *Installer Mode* – but this will require defaulting (Reset) the Expert.

If you have software connected then defining the Expanders for the Expert and Resetting from the software will set the controllers up.

If you have an **EXkeypad** or **XKDX** software running, then when an Expander comes on line it will tell you on the screen. Also you can see the Expanders on-line by going into the Menu Map:

From the main menu go to *Unit Control* and press * (Enter), then down arrow to "*Unit Info*" and press * (Enter).

## 2.9 Installation EXpert² SLAVE

The EXpert² SLAVE must be wired back to the EXpert² using 2-wire RS485 cable. If the EXpert² has an EXpander² fitted inside it, make this connection to the EXpander² instead of the EXpert². Note that if another EXpert² SLAVE is already connected to the EXpert², then the new slave must be added onto the RS485 network in a daisy-chain configuration.

**Table 2 RS485 connections between EXpander² or EXpert² and EXpert² SLAVE**

| | **EXpert² SLAVE** | **EXpert² or EXpander²** |
|---|---|---|
| **RS485 A** | 12 | 12 |
| **RS485 B** | 13 | 13 |

#### EXpert² SLAVE Back-up Battery Connections

Connect the PSU to the red and black connectors and site the battery on the bottom of the cabinet.

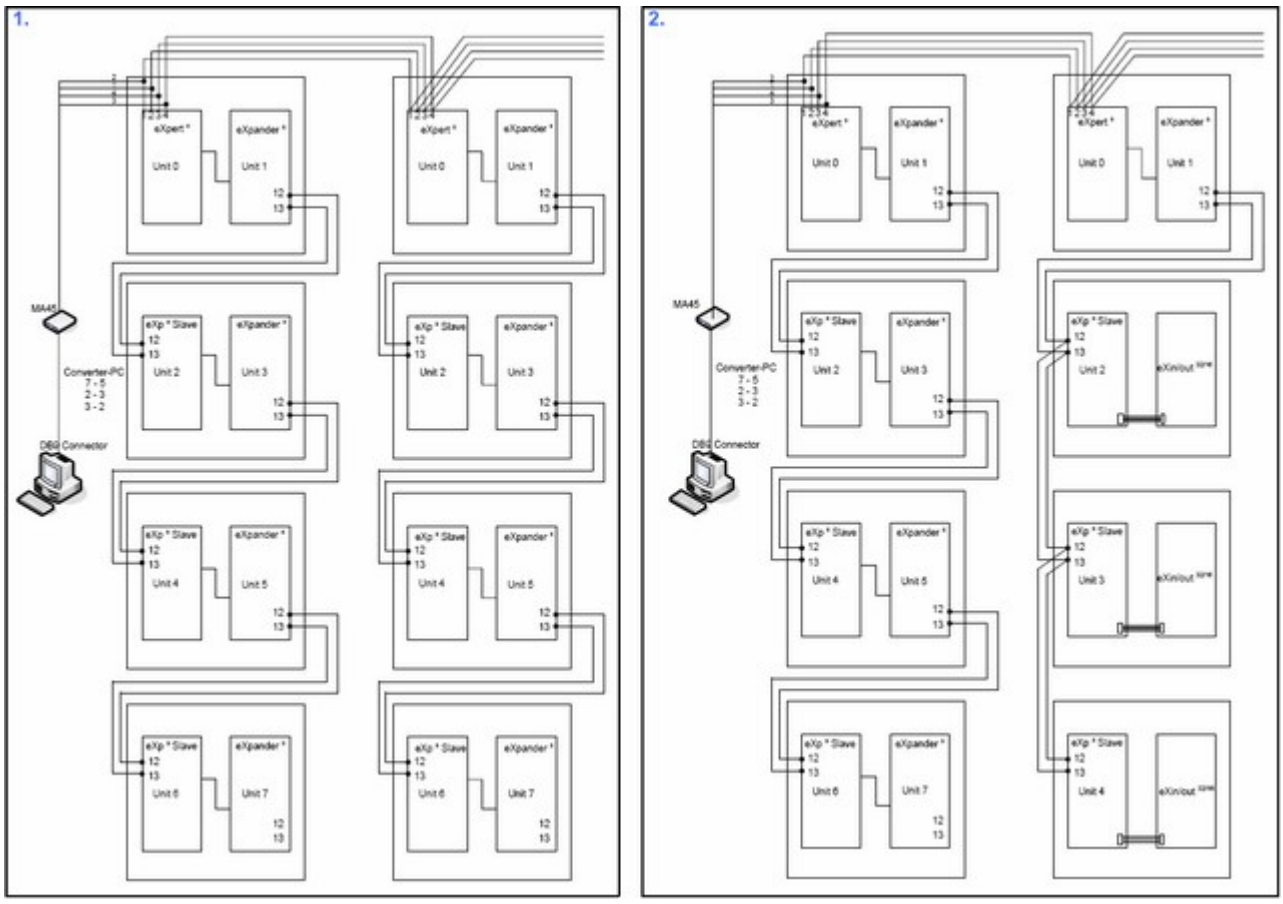



**Figure 6 Examples of communication connections**

Figure 6 shows two examples of communication connections for EXpert to EXpanders, EXpert Slaves and EXin/out (communications to the PC via an MA45 converter).

**NOTE.** For further information please refer to the EXpert installation manual or go to www.tdsi.co.uk.

# 3. Troubleshooting

## 3.1 Readers

### READER LED GOES OUT WHEN A CARD IS PRESENTED

The system default for a reader LED is Bi-Coloured so you may find that the LED goes out when you present a card. If this occurs change the LED type to Red Only.

### READER WILL NOT WORK

Has the reader been wired according to the instructions supplied with the reader? This is important because colour codes may change from time to time and also reader outputs can be switched by connecting in different ways (i.e. Wiegand, Magnetic, RS232 etc).

The EX-series will detect many types of reader but if a 3rd party reader is being used you may need pull up resistors (normally 1kΩ to the 5V output). If the reader has a Wiegand output then the reader type may need to be set manually either via a keypad (if you have an EXpert) or in the software.

With Any readers that uses a separate power supply then ensure the Readers Ground 0V is connected to the ACU Ground 0V thus they are at the same Ground.

# 3.2 General Operation

## DOOR WON'T RELEASE OR LOCK TIME VERY SHORT

This problem will occur if you are using Monitored Locks connected to the door sense input. To give the required time it will be necessary to give the door sense input a time delay, either an ON or OFF delay depending on whether the input being used is normally open or closed.

## POOR OR INTERMITTENT CARD READS

If possible, bring the reader to the panel and connect it with a 2 metre length (max) of cable, if this solves the problem you may need a better quality cable or the cable could be damaged. Disconnect the lock and see if the problem still occurs. If this solves the problem, check that the supplied suppression has been fitted at the lock and also check the lock's power rating. The EX-Series L1 & L2 power supplies provide 1 amp each. If you are using powerful locks, a larger lock power supply and/or secondary lock relays may be needed.

# 4. EXpander²/EXpert² SLAVE connections

## 4.1 Reader Connections

**Table 3 Microcard Infra Red reader (5002-0035) connections**

| Terminal | Reader connection | Colour Cores |
|---|---|---|
| 23 | Reader 1 IR DATA | Yellow |
| 26 | Reader 1 IR-SRC | Blue |
| 27 | Reader 1 LED | Green |
| 28 | Reader 1 5V | Red, White, Black |
| | | |
| 37 | Reader 2 IR DATA | Yellow |
| 40 | Reader 2 IR-SRC | Blue |
| 41 | Reader 2 LED | Green |
| 42 | Reader 2 5V | Red, White, Black |

**Table 4 TDSi EXprox reader (5002-035x) connections**

TDSi EXprox² and EXProx 2K(5002-039X);
TDSI Mifare EXsmart reader (5002-044X)
TDSi EXsmart² readers (5002-043X)

| Terminal | Reader connection | EXprox Colour Cores |
|---|---|---|
| 24 | Reader 1 MAG-DATA | Yellow |
| 25 | Reader 1 MAG-CLK | White |
| 27 | Reader 1 LED | Blue |
| 29 | Reader 1 0V | Black |
| 30 | Reader 1 12V | Red |
| | | |
| 30 | Reader 2 12V | Red |
| 38 | Reader 2 MAG-DATA | Yellow |
| 39 | Reader 2 MAG-CLK | White |
| 41 | Reader 2 LED | Blue |
| 43 | Reader 2 0V | Black |

**Table 5 TDSi Optica (5002-039x) connections**

| terminal | Reader connection | Optica terminal PIN |
|---|---|---|
| 24 | Reader 1 MAG-DATA | 4 |
| 25 | Reader 1 MAG-CLK | 3 |
| 27 | Reader 1 LED | 5 |
| 29 | Reader 1 0V | 1 |
| 30 | Reader 1 12V | 2 |
| | | |
| 30 | Reader 2 12V | 2 |
| 38 | Reader 2 MAG-DATA | 4 |
| 39 | Reader 2 MAG-CLK | 3 |
| 41 | Reader 2 LED | 5 |
| 43 | Reader 2 0V | 1 |

# 4.2 Door, Input and Relay Connections

**Table 6 Fail-open lock connections**

| Terminal | Lock connection |
|---|---|
| 17 | Door 1 Lock relay n/c |
| 18 | Door 1 Lock relay pole |
| 31 | Door 2 Lock relay n/c |
| 32 | Door 2 Lock relay pole |

**Table 7 Power supply for lock connections**

| Terminal | Lock connection | |
|---|---|---|
| +2 | Door Lock supply +12V DC | 4 Amps<br>are available across the four fused connectors |
| -2 | 0V | |
| +3 | Door Lock supply +12V DC | |
| -3 | 0V | |
| +4 | Door Lock supply +12V DC | |
| -4 | 0V | |

**Table 8 Door sensor connections**

| Terminal | Function |
|---|---|
| 20 | Door 1 Door sense input |
| 21 | Door 1 Door sense 0V |
| 34 | Door 2 Door sense |
| 35 | Door 2 Door sense 0V |

**Table 9 Egress button connections**

| Terminal | Function |
|---|---|
| 21 | Door 1 Egress 0V |
| 22 | Door 1 Egress input |
| 35 | Door 2 Egress 0V |
| 36 | Door 2 Egress input |

**Table 10 Input connections**

| Terminal | Function |
|---|---|
| 34 | Input 3 |
| 35 | 0V (for Inputs 3 & 4) |
| 36 | Input 4 |
| 50 | Input 5 |
| 51 | 0V (For inputs 5 & 6) |
| 52 | Input 6 |
| 53 | Input 7 |
| 54 | 0V (For inputs 7 & 8) |
| 55 | Input 8 |

**Table 11 Relay connections**

| Terminal | Function |
|---|---|
| 31 | Relay 2 n/c |
| 32 | Relay 2 pole |
| 33 | Relay 2 n/o |
| 44 | Relay 3 n/c |
| 45 | Relay 3 pole |
| 46 | Relay 3 n/o |
| 47 | Relay 4 n/c |
| 48 | Relay 4 pole |
| 49 | Relay 4 n/o |

# 5. Installer's Reference Sheet

**NOTE.** This information will be required for software commissioning. Please leave blank any items not fitted.

<table>
<tr><th colspan="3">UID NUMBER (On Square Chip)</th><th colspan="3">SERIAL NUMBER (On The Case)</th></tr>
<tr><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td rowspan="3">DOORS / BARRIERS ETC.</td><td colspan="2">DOOR 1</td><td colspan="3">DOOR 2</td></tr>
<tr><td colspan="2"></td><td colspan="3"></td></tr>
<tr><td>OUTSIDE AREA</td><td>INSIDE AREA</td><td>OUTSIDE AREA</td><td colspan="2">INSIDE AREA</td></tr>
<tr><td rowspan="3">READERS</td><td></td><td></td><td></td><td colspan="2"></td></tr>
<tr><td>READER 1</td><td>TYPE OF READER*</td><td>READER 2</td><td colspan="2">TYPE OF READER*</td></tr>
<tr><td></td><td></td><td></td><td colspan="2"></td></tr>
<tr><td rowspan="6">INPUTS</td><td colspan="2">INPUT 3 (IF NOT DOOR SENSE) (34-35)</td><td colspan="3">INPUT 4 (IF NOT EGRESS) (36-35)</td></tr>
<tr><td colspan="2"></td><td colspan="3"></td></tr>
<tr><td colspan="2">INPUT 5</td><td colspan="3">INPUT 6</td></tr>
<tr><td colspan="2"></td><td colspan="3"></td></tr>
<tr><td colspan="2">INPUT 7</td><td colspan="3">INPUT 8</td></tr>
<tr><td colspan="2"></td><td colspan="3"></td></tr>
<tr><td rowspan="4">RELAYS</td><td colspan="2">RELAY 2 (IF NOT DOOR 2)</td><td colspan="3">RELAY 3</td></tr>
<tr><td colspan="2"></td><td colspan="3"></td></tr>
<tr><td colspan="2">RELAY 4</td><td colspan="3"></td></tr>
<tr><td colspan="2"></td><td colspan="3"></td></tr>
</table>

*READER TYPES POSSIBLE ARE :- TDSi Infra-red Microcard, Mag-stripe track 2 ABA, Wiegand 26-bit, Wiegand 34 bit, Wiegand 37 bit, Octopus 44 bit, Me Lucky 34 bit, EXprox Proximity, EXsmart+ Mifare. Supports Universal Decode for EXgarde Software.

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