impro®

MODEL NUMBER:
XER901-3-0-GB-XX XER902-3-0-GB-XX
XER903-3-0-GB-XX XER904-3-0-GB-XX
XER905-3-0-GB-XX

IMPROX ER

ImproX (ER) Extended Range Terminal and External Antenna(s) INSTALLATION MANUAL

SPECIFICATIONS

Read Capability	Impro Tags: Slim Tags, Omega Tags and ISO Animal Tags.	
Working Environment		
Terminal	Designed to work in an indoor (dry) environment similar to IP30. The ImproX ER is, therefore, NOT sealed against water.	
Antenna(s)	Designed to work in an indoor or outdoor environment similar to IP66. The Antenna(s) is(are), therefore, sealed against water.	
Input Voltage	10 V DC to 16 V DC, polarity sensitive.	
Power Requirements	**Current (mA)**	**Power (W)**
Input Voltage 10 V DC	500	5
Input Voltage 16 V DC	500	8
Relays		
Relay Output	1 Relay, SPDT, with NO, COM and NC contacts.	
Relay Contact Ratings	12 A at 120 V AC, 6 A at 220 V AC or 12 A at 28 V DC.	
Digital Inputs		
Type	2 Dry-contact inputs.	
Protection Range	+50 V to -50 V continuous, +80 V to -80 V surge.	
Buzzer		
Volume and Tone	Single tone, 4 step adjustable volume.	
LED Indicators		
Status LED	Red or Green LED (externally visible).	
Incoming RS485 Data	Green LED (flashing) (internally visible).	
Outgoing RS485 Data	Red LED (flashing) (internally visible).	
Auto-tuning Status	Green LED (internally visible).	

ImproX ER Antenna Types

350 mm x 350 mm	XER902-3-0-GB-XX (Fibreglass).
400 mm x 1 200 mm	XER903-3-0-GB-XX (ABS Plastic).
400 mm x 800 mm	XER904-3-0-GB-XX (ABS Plastic).
400 mm x 400 mm	XER905-3-0-GB-XX (ABS Plastic).
Antenna Frequency	134.2 kHz.

INSTALLATION INFORMATION

Accessories

Find the following when unpacking the Terminal:

- An ImproX (ER) Extended Range Terminal housed in a Black, Aluminium extruded Cabinet. The ImproX ER consists of a Top Cover, a Base and two End Plates. Each End Plate is attached with three Thread Cutter Screws (M3 x 8 mm).
- Four Brass Wood Screws (3.5 mm x 25 mm) and Wall Plugs (7 mm).
- An extra Fixed Address Label.

Find the following when unpacking the Fibreglass Antenna:

- An ImproX ER 350 mm x 350 mm Fibreglass Antenna. The Antenna includes 5 m (16.40 ft) of Black Coaxial, Multi-strand Cable.
- Four Mirror Screws (25 mm) and Wall Plugs (7 mm).

Find the following when unpacking the ABS Plastic Antenna(s):

- An ImproX ER ABS Plastic Antenna in one of three sizes (400 mm x 400 mm, 400 mm x 800 mm or 400 mm x 1 200 mm). The Antenna includes 5 m (16.40 ft) of Black Coaxial, Multi-strand Cable.

General

Remember the following when installing the Terminal and the Antenna(s):

Important Installation Considerations

- DO NOT mount the Antenna(s) directly on to a metal surface.
- **Always connect the Negative Power Input terminal to a good EARTH (Ground) point in order to get maximum read range.**
- DO NOT run power and RS485 communications in the same run of cable.
- DO NOT run the Antenna(s) cable(s) alongside any other communications or power cable, including the power and RS485 cables to the Terminal.
- DO NOT position the Antenna(s) within 3 m (3.28 yd) of data-carrying communications cables or high-voltage power lines.
- Always secure the Antenna(s) cable neatly.
- DO NOT position the Antenna(s) where they can be bumped or disturbed, to prevent micro-phonics.
- DO NOT position the Antenna(s) of one ImproX ER within 10 m (10.94 yd) of the Antenna(s) of a second ImproX ER.

Communications Distance

The RS485 communications distance between the first ImproX ER and the associated Controller, MUST NOT exceed 1 km (1 090 yd). Achieve this by using good quality screened, twisted pair cable, with the screen EARTHED at one end.

The individual conductor cross sectional area of the each cable conductor must not be less than 0.2 mm² (0.0003 in²).

Distance between the Antenna and the Terminal

You may extend the Antenna(s) supplied cable beyond the 5 m (16.40 ft) supplied length. However, please keep in mind that this will decrease the Tag reading range.

Distance between Antennas Connected to the SAME Terminal

Where more than one Antenna is connected to the SAME ImproX ER, install the Antennas no closer than 800 mm (2.63 ft) apart.

Distance between Antennas Connected to DIFFERENT Terminals

Where more than one ImproX ER is installed, install the adjacent Antennas no closer than 10 m (10.94 yd) apart.

Distance between Terminals

You may install other ImproX Terminals, with lower sensitivity Antennas, within 5 m (5.47 yd) of the ImproX ER.

Line Termination Jumper Link

Long transmission lines or multiple “star” connections, may cause communication problems. Placing a Jumper Link across the Line Termination Link [TR1] in the LAST UNIT AT THE END OF THE CABLE RUN should solve the problem.

EARTH Connection

Connect the Terminal to a good EARTH point. Using the RS485 Port, connect the EARTH Lead to the ‘SHD’ terminal. Use a cable with a conductor cross sectional area of at least 1.0 mm² (0.002 in²) and Keep the EARTH line as short as possible. Use a good quality copper EARTH spike if possible. Mains EARTH can be used, but electrical noise may exist.

NOTE: This ETH point must only be connected at one end of the cable.

Blank Space

Arc Suppression

Snubber devices are recommended for EMF Flyback and Arc Suppression when driving an inductive load with the Relay, see Figure 1.

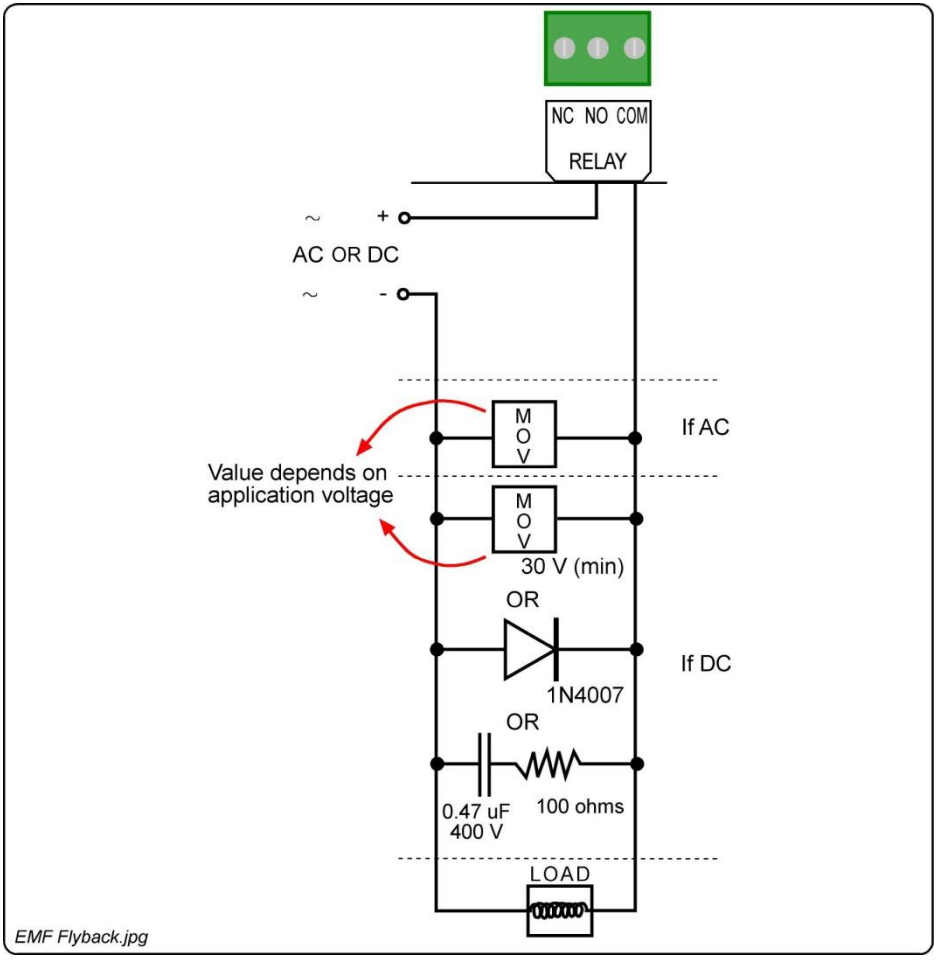

Figure 1: EMF Flyback and Arc Suppression

Mounting the Terminal and the Antenna(s)

CAUTION: Make certain that you mount the Terminal on a vibration-free surface.

Please keep the following information in mind, when selecting the mounting position of the ImproX ER and the selected Antenna(s).

Secure the Terminal and the Antenna(s) to the mounting surface, using four suitable screws and wall plugs, nuts and bolts or rivets.

Antenna Detection Patterns

The various Antenna configurations that can be used with the Terminal (single Antenna, dual Antennas in-phase, or dual Antennas anti-phase) have Tag detection patterns that determine the range of detection for Tags presented in various orientations to the Antenna(s).

Tag Read Ranges

The range, at which the Terminal can read Tags, depends on the type of Tag being read. Table 1 shows typical Tag read ranges.

Tag Type	Typical Range (Minimum)	
	(mm)	(in)
ISO Credit Card Tag (Slim)	500	19.68
ISO Animal Bolus	800	31.49
Ring Tag	250	9.84
Sheep Tag	600	23.62
200 mm Round Tag	1 200	47.24
100 mm Round Tag	800	31.49
Tear Drop Tag	250	9.84
NOTE: Tag ranges stated are for one Antenna only.		

Table 1: Typical Read Ranges

Blank Space

Single Antenna Installation

In an installation where only a single Antenna is used, the Antenna must be connected to the Channel 1 Output. The orientation of the Tag is critical, so position the Antenna so that it most suits the orientation of the Tag (Figure 2).

A typical installation would be access through a single door.

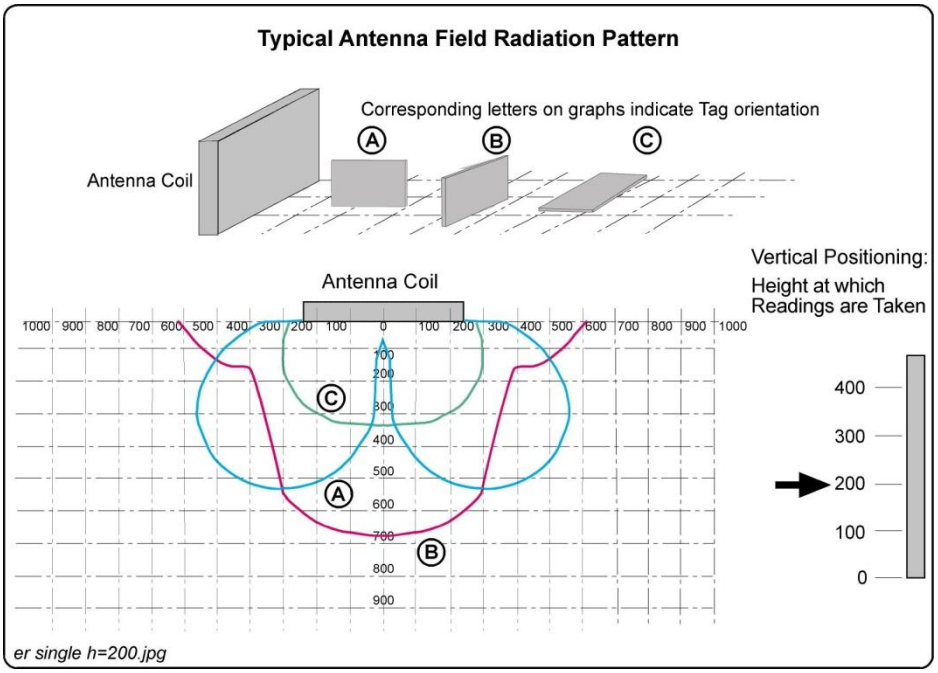

Figure 2: Single Antenna Field Diagram

NOTE: All dimensions are in millimeters.

NOTE: Figure 2 shows the field for ONE side of the Antenna only. Be aware that the field is duplicated on the rear side of the Antenna.

This means that you may present a Tag on either side of the Antenna.

NOTE: For specific Tag read ranges, refer to Table 1 on page 5.

Blank Space

Dual Antenna Installation

In an installation where dual Antennas are used, the Antennas are connected to the Channel 1 and Channel 2 outputs respectively. Phasing of the two Antennas is critical for the best performance of the System. Set the phasing of the Antennas in such a way that most suits the orientation of the Tag (Figure 3 and Figure 4).

A typical installation would be access through a corridor.

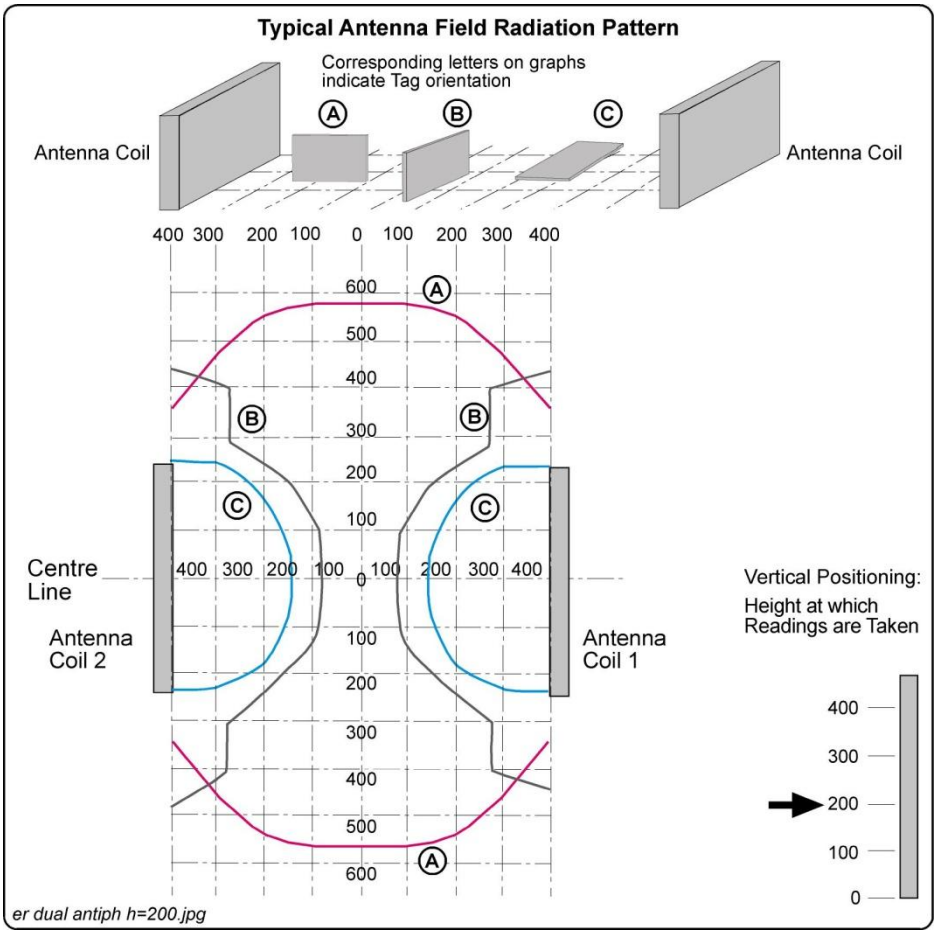

Figure 3: Dual Anti-phase Antenna Field Diagram

NOTE: All dimensions are in millimeters.

NOTE: For this configuration with the Antennas facing each other, connect the Antenna Phasing Link to position 1. This configuration is best for Tag orientation A. (Figure 5 shows the position of the Antenna Phasing Link).

NOTE: For specific Tag read ranges, refer to Table 1 on page 5.

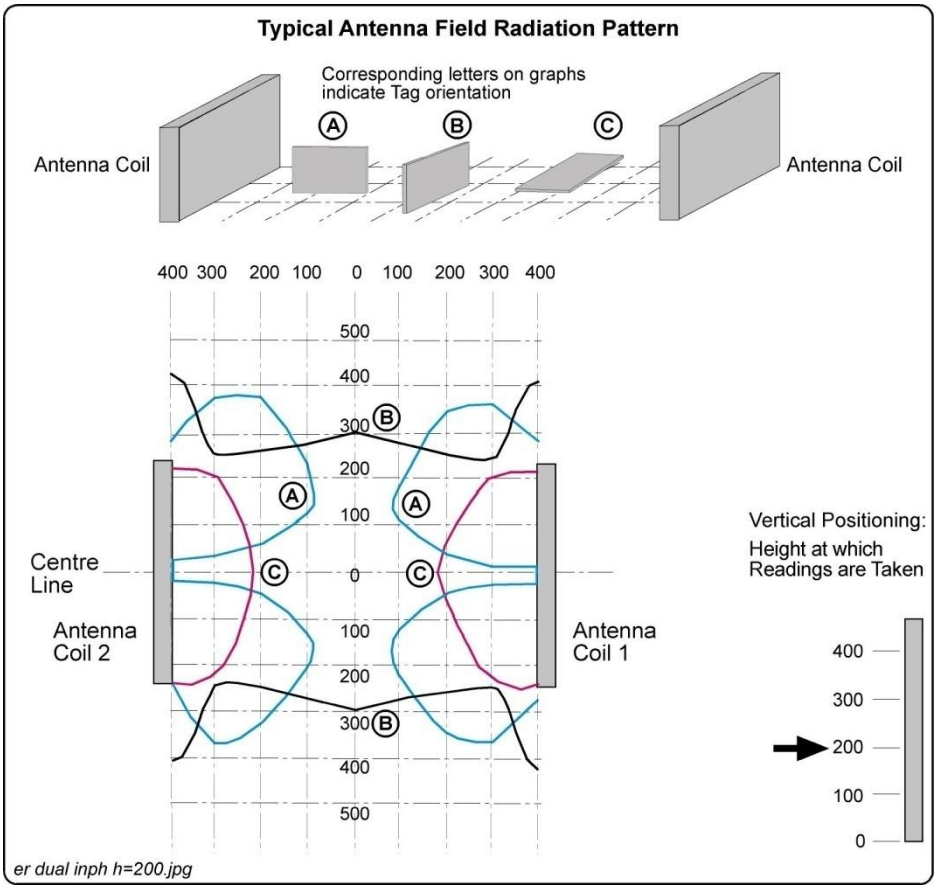

Figure 4: Dual In-phase Antenna Field Diagram

NOTE: All dimensions are in millimeters.

NOTE: For this configuration with the Antennas facing each other, connect the Antenna Phasing Link to position 2. This configuration is best for Tag orientation B. (Figure 5 shows the position of the Antenna Phasing Link).

NOTE: For specific Tag read ranges, refer to Table 1 on page 5.

Auto-tuning

The ImproX ER is capable of automatically tuning and re-tuning itself if the environment surrounding the Antenna(s) changes. This occurs when a metallic object is placed in the vicinity of the Antenna(s).

If the metallic object, placed within the Antenna Field, is large or too near the Antenna, you could reach the auto-tuning limit.

Auto-tuning Indicator

We provide a visual indicator on the ImproX ER as an aid in auto-tuning and installing the Terminal. The visual indicator is a low intensity LED indicator located in the ImproX ER Cabinet.

Basically there are three tuning states that the Terminal can be in, namely 'Tuned', 'Busy Tuning' and 'Not Able to Tune'. Each of these states has a visual indication and is described in Table 2.

Status	LED State
Tuned	ON
Busy Tuning	Flashing
Not Able to Tune	OFF

Table 2: Auto-tuning Indicators

NOTE: If the Terminal indicates 'Not Able to Tune' check whether the Antenna(s) is(are) obstructed by, or mounted on, a metallic surface. If so re-position the Antenna(s) or remove the metallic interference.

Disabling the Auto-tuning Facility

Although the auto-tuning facility is required under normal conditions, disabling the facility is sometimes necessary. This condition is typical, where a Tag is mounted on a metallic object (including vehicles or conveyors) that is constantly moving through the Antenna Field. This prevents the ImproX ER from constantly trying to compensate for the moving metallic object.

1. Install and set up the Terminal and Antenna(s).
2. Position the metallic object into position and allow the ImproX ER auto-tuning to compensate for the metallic object.
3. Place the jumper over the Tuning Disable Link. Refer to Figure 5 for the location of this Link. The ImproX ER will now refrain from auto-tuning.

NOTE: Once the metallic object is removed from the Antenna Field the Visual Tuning Indicator may switch OFF. This is natural as when the metallic object is re-introduced into the Antenna Field the Antenna(s) will once again be tuned, the Visual Tuning Indicator will switch ON and the Tag will be read optimally.

NOTE: If the power is removed and then re-introduced to the Terminal and the Tuning Disable Link is in place the Terminal will return to the tuning value stored when the Link was last placed. To resume the auto-tuning facility, remove the Tuning Disable Link.

Failure to Tune

If the Terminal indicates the state 'Not Able to Tune' then check the following:

- Is either of the Antenna(s) obstructed by, or mounted on a metallic object? If so re-position the Antenna(s) or remove the metallic object.
- Is either of the Antenna connectors not properly connected to the ImproX ER?
- Is either of the Antennas damaged?

ELECTRICAL CONNECTIONS

Connecting the ImproX ER

Figure 5 shows a detailed electrical connection diagram for the ImproX ER.

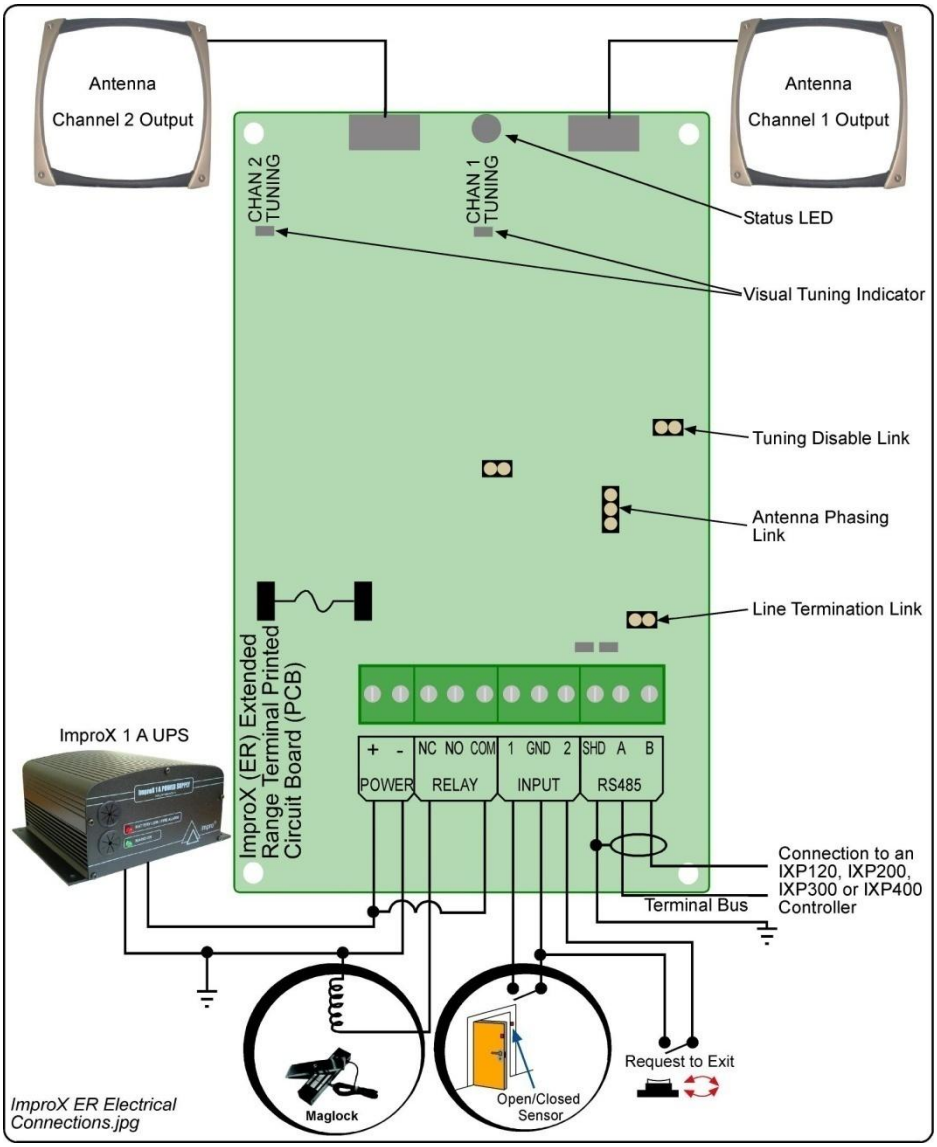

Figure 5: Typical ImproX ER Electrical Connections

Installation Test Mode

As an aid during installation the ImproX ER contains a test facility to indicate the Tag reading status.

To access the Test Mode do the following:

1. Remove the RS485 communications from the ImproX ER. Wait approximately 10 seconds until the ImproX ERs Status LED indicates a Red intermittent flash.
2. Present Tags to the Antenna(s). When a Tag is read the Status LED will go solid Green and the Buzzer will emit an audible tone.

To return to normal operation power the ImproX ER down, reconnect the RS485 Bus and power up.

NOTE: This Test Mode only applies to Firmware version 5.14 and upwards.

Power-on Self-test

The Power-on Self-test tests the RAM, ROM checksums, and Tag read circuitry.

The results of the Self-test are made available as diagnostic information, via the protocol, to the associated Controller or PC.

If any parameter in the Self-test fails, the Terminal emits a continuous beep for 2 seconds.

When the Terminal passes the Self-test, the Terminal emits two short beeps of 200 ms duration, separated by a 200 ms inter-beep pause.

Fixed Address Label

Once the ImproX ER is installed, sketch a rough site plan. Attach the loose (additional Fixed Address Label packaged with the Terminal) Fixed Address Label in the position of the Terminal on the sketched site plan. When the system installation is complete and all the units are represented on the site plan by their Fixed Address Labels, file the site plan for future reference.

GUARANTEE OR WARRANTY

This product conforms to our Guarantee or Warranty details placed on our Web Site, to read further please go to www.impro.net.

USER NOTES

This manual is applicable to the:
ImproX (ER) Extended Range Terminal XER901-3-0-GB-03,
ImproX ER 350 mm x 350 mm Fibreglass Antenna XER902-3-0-GB-01,
ImproX ER 400 mm x 1 200 mm ABS Plastic Antenna XER903-3-0-GB-01,
ImproX ER 400 mm x 800 mm ABS Plastic Antenna XER904-3-0-GB-01,
ImproX ER 400 mm x 400 mm ABS Plastic Antenna XER905-3-0-GB-01.
(The last two digits of the Impro stock code indicate the issue status of the product).

XER300-0-0-GB-08	Issue 09	Jan 2008	ImproX ER\English Manuals\LATEST ISSUE \ImprX ER-insm-en-09.docx