



TracXP™ TXP-WAR

Wireless Alarm Relay

Instruction Manual



IMPORTANT: Read and understand contents of this manual prior to operation. Keep these user instructions for reference.

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1 Safety Information

1.1 Read Before Installation and Operation

IMPORTANT



AVERTISSEMENT: Lire attentivement les instructions avant de mettre en marche.



CAUTION: FOR SAFETY REASONS THIS EQUIPMENT MUST BE OPERATED AND SERVICED BY QUALIFIED PERSONNEL ONLY. READ AND UNDERSTAND INSTRUCTION MANUAL COMPLETELY BEFORE OPERATING OR SERVICING.

ATTENTION: POUR DES RAISONS DE SÉCURITÉ, CET ÉQUIPEMENT DOIT ÊTRE UTILISÉ, ENTRETENU ET RÉPARÉ UNIQUEMENT PAR UN PERSONNEL QUALIFIÉ. ÉTUDIER LE MANUE D'INSTRUCTIONS EN ENTIER AVANT D'UTILISER, D'ENTREtenir OU DE RÉPARER L'ÉQUIPEMENT.



CAUTION: KEEP EXPLOSION PROOF COVER TIGHT WHILE CIRCUITS ARE ALIVE.

ATTENTION: GARDEZ LE COUVERCLE ANTI-EXPLOSION SERRÉ PENDANT QUE LES CIRCUITS SONT VIVANTS.

CAUTION: USE SUPPLY WIRES SUITABLE FOR 40°C ABOVE SURROUNDING AMBIENT.



ATTENTION: UTILISER DES FILS D'ALIMENTATION QUI CONVIENNENT A UNE TEMPERATURE DE 40°C AU-DESSUS DE LA TEMPERATURE AMBIANTE.

WARNING - EXPLOSION HAZARD

SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.

AVERTISSEMENT - RISQUE D'EXPLOSION

LA SUBSTITUTION DES COMPOSANTS PEUT PROVOQUER UNE ADAPTATION À LA CLASSE I, DIVISION 2.

WARNING- EXPLOSION HAZARD

DO NOT CONNECT OR DISCONNECT WHEN ENERGIZED UNLESS THE AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSEMENT - RISQUE D'EXPLOSION

NE PAS BRANCHER OU DÉBRANCHER LORSQU'IL EST SOUS TENSION, SAUF SI LA ZONE EST CONNUE POUR ÊTRE NON HASARDEUX.



CAUTION: A CONDUIT SEAL MUST BE INSTALLED WITHIN 18 INCHES OF THE ENCLOSURE.

ATTENTION: LE CONDUIT DOIT ÊTRE INSTALLÉ À MOINS DE 18 POUCEs DU BOÎTIER.

1.2 WARNINGS

- Do not paint any part of the unit or corresponding components.
- Do not use the unit if any enclosure is damaged or cracked or has missing components.
- Make sure covers, internal boards, and antenna connections are securely in place before operation.
- Do not expose TracXP devices to electrical shock or continuous severe mechanical shock.
- Protect TracXP devices from dripping liquids and high-power sprays.
- Use only for applications described within this manual.

2 Introduction

The TracXP TXP-WAR is a Wireless Relay device that receives a wireless signal from the TXP-WTA Sensor Transmitters to provide electromechanical relays to interface TXP-WTA system alarms with strobes, horns, or other wired components. The TXP-WAR can also be used to serve as a Repeater to extend the wireless communication range to a TXP- controller. These two modes of operation that can be used in individual or simultaneous applications. The TXP-WAR is available with globally acceptable 2.4GHz or 900MHz frequency to meet your communication requirements.

2.1 Key Features

- 900 MHz or 2.4 GHz Radios
- Cast Aluminum Explosion-Proof (NEMA 7) Enclosure
- Non-Volatile E2 Memory – Retains Config. Values in Event of Power Outage
- Four Alarm Indicators
- Four Alarm Level Relays
- Independent Horn Relay
- Multiple Password Levels for Security
- Magnetic Mounting Option
- Modular Design
- Multiple Antenna Options

2.2 Specifications

2.2.1 Power Input

- 10-30 VDC, 3 watts maximum

2.2.2 Input Signal

- 900MHz Receive Sensitivity Set At -100 dBm
- 2.4GHz Receive Sensitivity Set At -95 dBm
- 900MHz Input Entails:
 - 2mA during “sleep” mode
 - 40mA while receiving beacon
 - Up to 1 amp during 1 watt “transmit” mode
- 2.4GHz Input Entails:
 - 2mA during “sleep” mode
 - 170mA during 125mW Broadcasts

2.2.3 Standard Output

- Frequency-Hopping Spread Spectrum (FHSS) Wireless Modem w/ Data Encryption
- Frequency-Hopping Within 900MHz Occurs Between 902 – 928 MHz.
- Frequency-Hopping Within 2.4GHz Occurs Between 2400 – 2483.5 MHz
- 900MHz Power Adjustable From 10mW to 1 watt
- 2.4GHz Outset Set At 125mW/21dBm

2.2.4 Accuracy

- GHz frequency range: 2400 - 2483.5 MHz with 42 hops

- 2.4GHz indoor/urban range: Up to 1500 feet with 7dBi collinear antenna
- 2.4GHz outdoor RF LOS range: Up to two miles with high-gain antenna
- 900MHz frequency range: 902 - 928 MHz with 50 hops
- 900MHz indoor/urban range: Up to 3000 feet with 2dBi dipole antenna

3 Installation Instructions

3.1 System Diagrams

Refer to the following diagrams for identification of system components that may be referred to in this manual

3.1.1 External System Diagram



Figure 3-2 – External System Diagram

3.1.2 Assembly Diagram

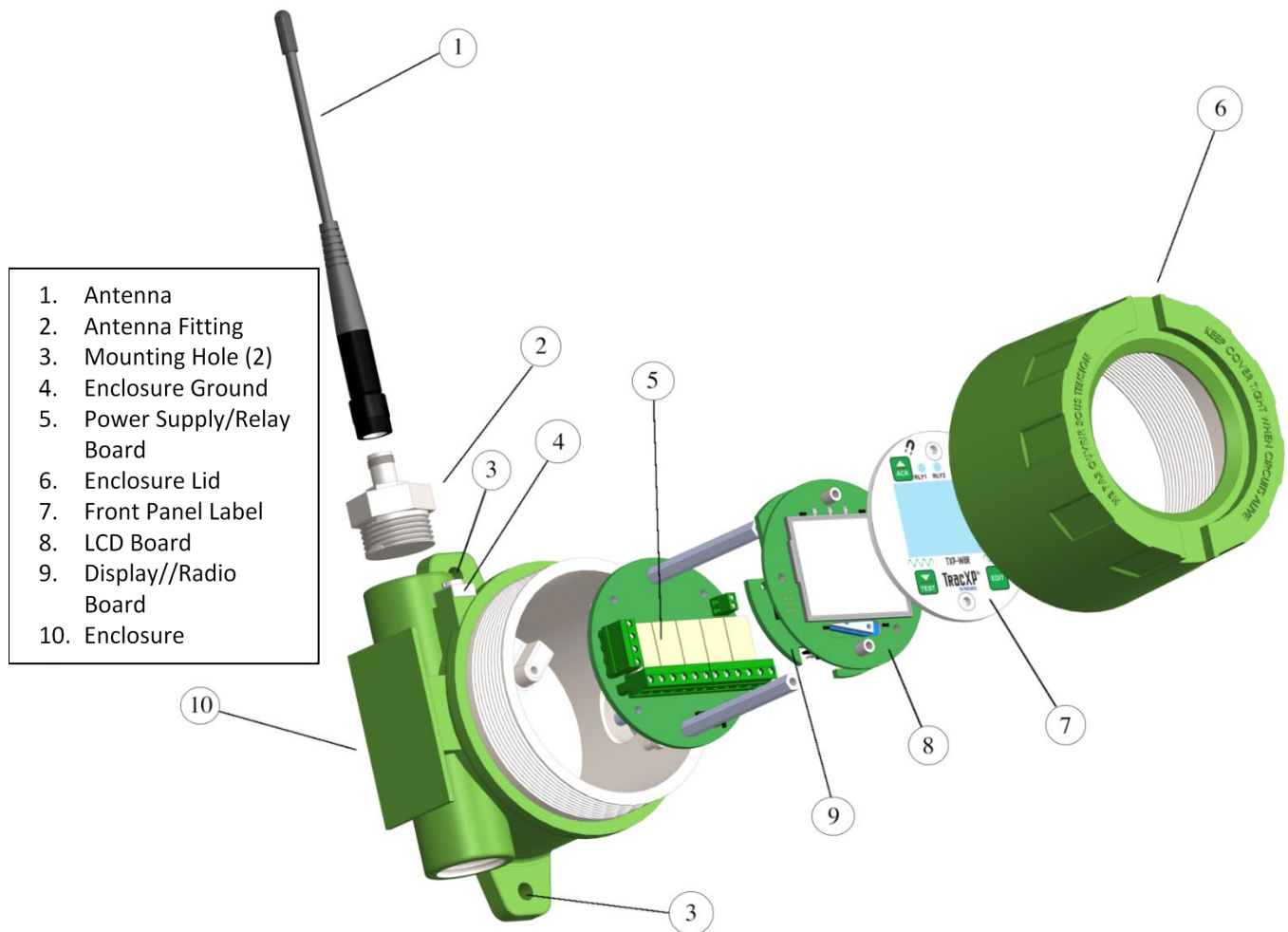


Figure 3-3 – Assembly Diagram

3.2 TXP-WAR Relayer Description

The TracXP by Macurco TXP-WAR is designed to control alarm event relay switching for up to 32 TXP-WTAs. The TXP-WAR receives Fail, Alarm 1, Alarm 2 and Alarm 3 signals from each TXP-WTA, maps them to its four programmable relays, while adding features such as Failsafe, Alarm Acknowledge and Refresh. Four standard 5- amp alarm relays may be programmed to activate based upon various alarm combinations. These four programmable relays may then be mapped to a single dedicated horn drive which may be set to off, pulse or steady for each of the relays.

A backlit graphic LCD and front LEDs clearly indicate the alarm status of monitored channels (Figure 3 1). When there are no channels with alarm conditions:

- The TXP-WAR displays ALARMS STATUS CLEAR as the Main Screen.
- When there are channels with alarms the ALARMS STATUS CLEAR screen is replaced by the Channel Alarm Status screen which displays any active channel in alarm and followed by an alternating line which shows the channel's Measurement Name and the current alarm (Section 3.3.2).

On the right side of the screen is found the range indicator. One of four indicators will be displayed vertically. When the TXP-WAR has been out of range of the Server for at least 30 seconds the Previously Out of Range icon will be displayed:

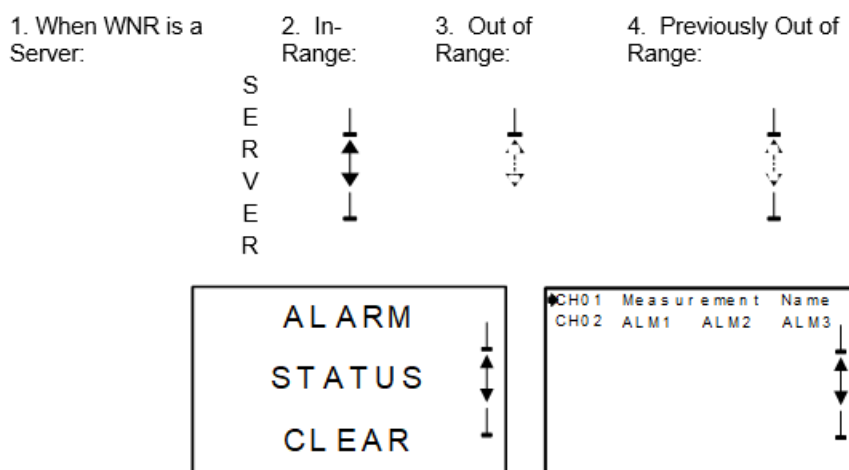


Figure 3-4 – Main Screen

3.3 TXP-WAR Relayer Menus

Below, in Figure 3-5, is the complete menu tree for the TXP-WAR. To navigate the menus, use the magnetic keypad.

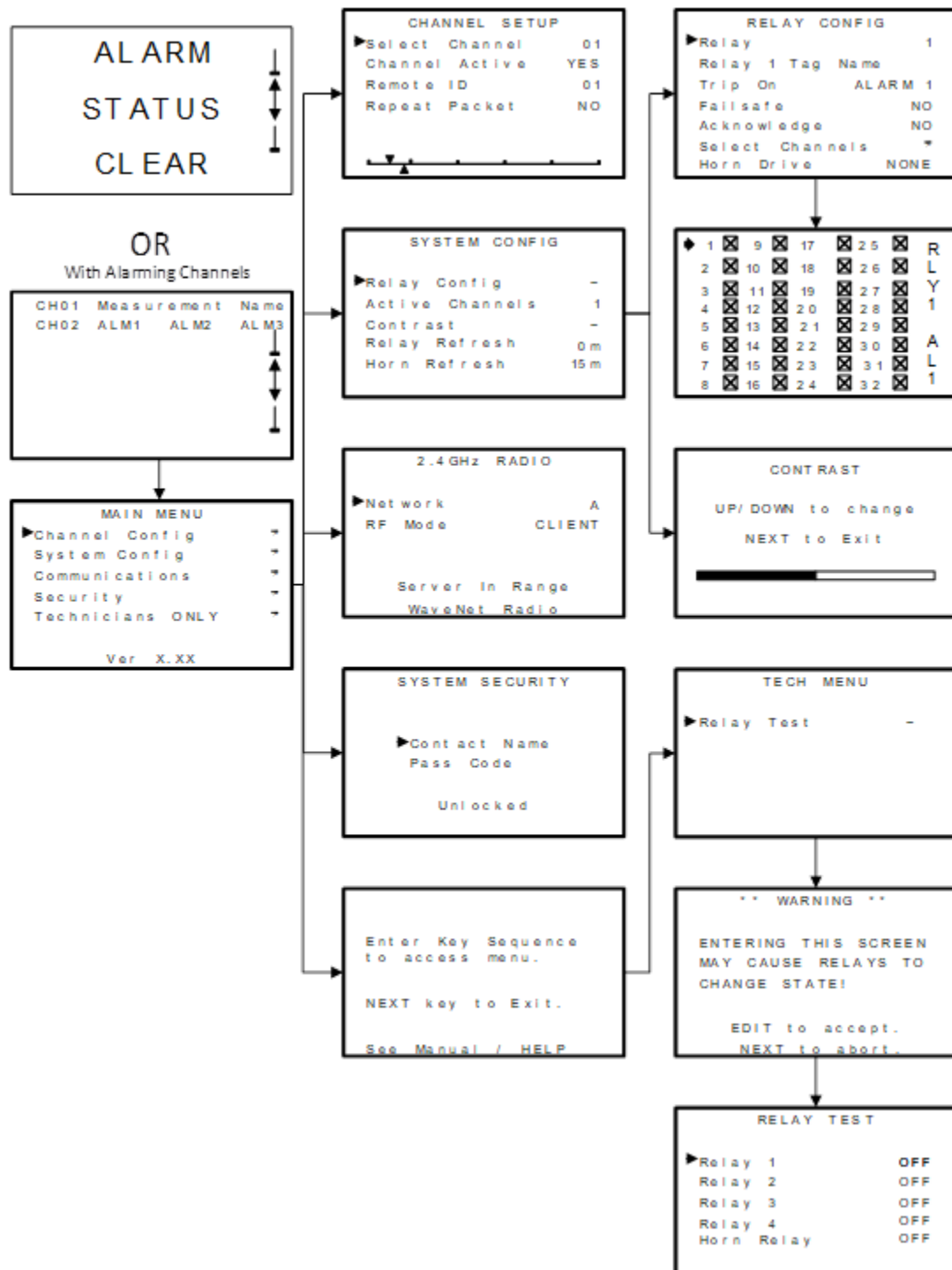


Figure 3-5 – Menu Tree

3.3.1 Main Menu

To reach The MAIN MENU group shown in Figure 3-6 below:

1. Swipe the EDIT key while on the Home Screen.

NOTE: This is the entry-level screen to Channel Config, System Config, Communications, Security and Technicians ONLY menus, and displays the current firmware version.

2. Use the UP/DOWN keys to move the pointer to the desired menu.
3. Swipe the EDIT key.

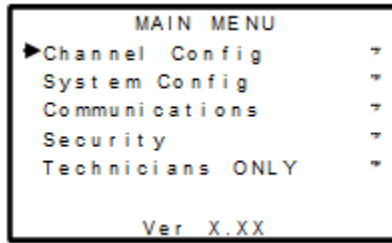


Figure 3-6 – Main Menu

3.3.2 Channel Config Menu Group

The CHANNEL CONFIG menu shown in Figure 3-7 allows configuration of variables specific to the selected channel. To select the channel to be affected:

1. Swipe the EDIT key.
2. If the selected channel is in an alarm state, the Comm Error Timeline will be replaced by an indication of the type of alarm being received.

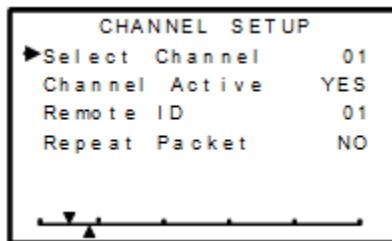


Figure 3-7 – Channel Config Menu

3.3.2.1 Channel Active

Channel Active is a YES/NO field that allows temporarily deactivating channels. Channels that may be deactivated are limited to the number of Total Channels designated in the System Config menu group (see Section 3.3.3.2).

NOTE: If a channel is to be permanently removed, then Total Channels should be adjusted down to reflect the number of sensor assemblies communicating to this TXP-WAR

3.3.2.2 Remote ID

Key Qualities

- Determines which TXP-WTA Sensor Transmitter Remote ID number is assigned to this TXP-WAR channel.
 - Remote ID numbers are limited to 1-32, but any of these may be assigned to any of the 32 TXP-WAR channels.

- Useful for arranging which TXP-WAR channels are used to relay specific TXP-WTA Sensor Transmitter information. For example, dual gas sensor assemblies have consecutive Remote ID numbers.

NOTE: It might be desirable to separate these at the TXP-WAR in order to keep same gas types together.

3.3.2.3 Repeat Packet

Turn on the Repeat Packet option to ensure any received packet by the TXP-WAR will automatically be retransmitted on the current hopping frequency, and distant TXP-WTA Sensor Transmitter transmissions will reach all of the controller and TXP-WAR receivers.

NOTE: If two TXP-WARs are in range of one another, both should not be set to repeat.

3.3.2.4 COMM Error Timeline

The horizontal Comm Error Timeline on the bottom of this screen is divided into five segments, from left to right.

Key Qualities & Notes

- Each segment = 1 TXP-WTA Sensor Transmitter Wakeup Timer interval from the TXP-WTA providing data to this TXP-WAR channel (see sensor transmitter manual).
- The arrow on the top side of the Timeline slides across the line as time goes by for the current channel being observed.

NOTE: Each time the broadcast packet is received on this channel, the pointer resets to the left of the timeline.

- If the pointer reaches the right of the timeline the TXP-WAR will raise a comm error for this channel.
- The pointer should never exceed the 1st Wakeup Timer line segment.
- The arrow on the bottom side of the Timeline slides across the line as time goes by in a similar manner to the other arrow.

NOTE: This arrow represents the channel which is furthest along it's timeline for all of the monitored channels. This is useful in determining if any channels have missed a transmission without having to cycle through observing all of the channels.

- If the arrow on the bottom side has not passed the first segment, all of the monitored channels have received their latest transmission.

3.3.3 System Config Menu Group

The SYSTEM CONFIG menus shown in Figure 3-8 allows configuration of variables for the TXP-WAR unrelated to any specific channel. This includes:

- Editing how the relays function
- Total number of channels
- Contrast
- Relay refresh time

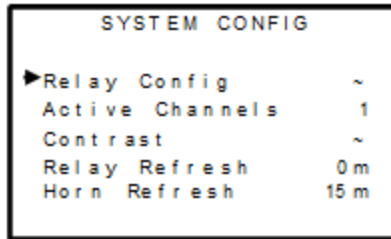


Figure 3-8 – System Config Menu

3.3.3.1 Relay Config

The RELAY CONFIG screen shown in Figure 3-9 allows sophisticated programming of each of the four programmable relays. To select the relay to be configured:

1. Point to the Relay menu.
2. Swipe EDIT.

NOTE: The fifth relay, the dedicated Horn Relay, is enabled by the Horn Drive setting for each of the four programmable relays.

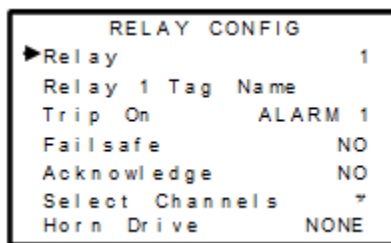


Figure 3-9 – Configure Relays Menu

- Tag Name may be edited to give the selected relay a name, which will help identify which sensor assemblies are connected to that relay or the type of alarm associated with that relay or any name of the user's choosing.
- Trip On controls what conditions will cause the relay to activate. These may be:
 - A1
 - A2
 - A3
 - FAULT/COMM
 - Any Alarm (from a sensor transmitter)
- Failsafe is an ON/OFF field where ON causes the relay to energize when the condition is not present. When the Trip On condition becomes true the relay de-energizes. Failsafe is often utilized when it is desirable for loss of power to indicate the alarm condition.
- Acknowledge is an ON/OFF field with ON typically used when the relay controls an audible device and it is desirable to silence the horn audible while troubleshooting the alarm. Applying an Alarm Reset causes the relay to return to its inactive state even though the alarm condition remains in effect. The Relay Refresh menu (see Section 3.3.3.4) may be used to re-activate acknowledged relays.
- Select Channels brings up a Check Box (Figure 3-10) screen for assigning which of the Active Channels are assigned to this relay. This allows creating Zones among the active channels.

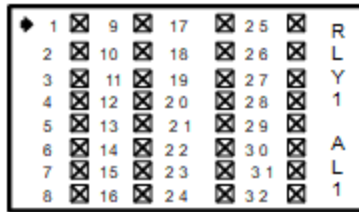


Figure 3-10 – Select Channels Menu

- Horn Drive controls the operation of the horn drive in relation to any of the four programmable relays. Horn Drive selects how the horn drive will function for the relay selected. Select one of three options:
 - None – no horn
 - Pulse
 - Steady

NOTE: Steady overrides the pulse condition.

When the alarm condition is present for the selected relay the relay will energize along with the horn drive in the manner selected.

3.3.3.2 Active Channels

Active Channels may be set from 1 to 32 and limits the maximum number of active channels. For example, if this menu is set for 10, then only 10 channels are available in the CHANNEL CONFIG menus discussed in Section 3.3.3.

3.3.3.3 Contrast

To set LCD Contrast Adj. for optimum viewing using the menu shown in Figure 3-11:

1. Swipe the UP/DOWN keys to adjust the contrast.
2. Swipe NEXT to save the changes.

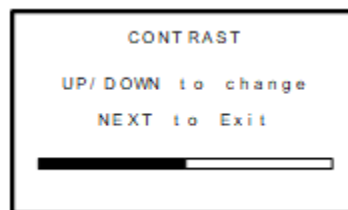


Figure 3-11 – LCD Contrast Adjust

3.3.3.4 Relay Refresh

Key Qualities

- May be set from 0 to 120 minutes with 0 turning the Refresh function OFF.
- Each relay may be set to allow Acknowledge (see Section 3.3.3.1) which means an Alarm Reset deactivates the relay even though the alarm condition still exists.
- Refresh will re-activate the relay after this timer expires. This feature is useful for silencing audible devices, and then automatically activating them again if the alarm condition remains after a period of time.

3.3.3.5 Horn Refresh

Key Qualities

- May be set from 0 to 120 minutes with 0 turning the Refresh function OFF.
- Each relay may be set to allow Acknowledge (see Section 3.3.3.1) which means an Alarm Reset deactivates the relay even though the alarm condition still exists.
- Refresh will re-activate the relay after this timer expires. This feature is useful for silencing audible devices, and then automatically activating them again if the alarm condition remains after a period of time.

3.3.4 Communications

The Communications Menu shown below allows setting the Network ID and RF Mode.

For 900MHz models the power level option is also available from this screen.

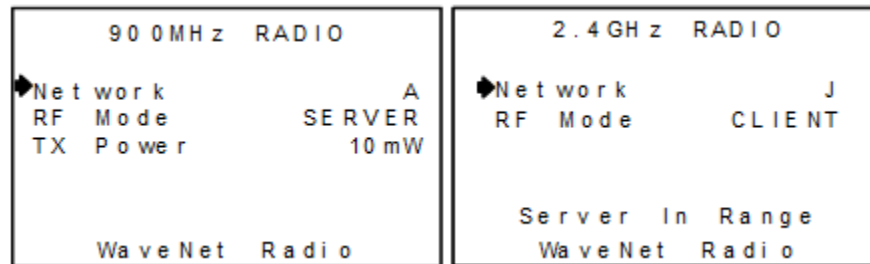


Figure 3-12 – Communications Menu

3.3.4.1 Network

TXP-WAR devices utilize the Network setting to assign up to 26 unique hopping patterns. To simplify system setup, Network is entered using letter designators A through Z:

- A = [Hop Channel 1, System ID 1]
- Z = [Hop Channel 26, System ID 26].
- M – Z = Encrypted Networks (When selected, data will be encrypted via proprietary methods ensuring that only devices on that network will be able to decipher the data being transmitted).

A TXP-WAR will not indicate Server In-Range status or communicate with any device operating on a different Network ID. This feature allows multiple wireless systems to be located within range of each other without interference.

2.4GHZ used in EU countries:

- Hop channels on 2.4 GHZ models may be set between 1 and 26.
- Hop channels A-R include EU “low band” frequencies 2406 – 2435MHZ.
- Hop channels S-Z include EU “high band” frequencies 2444 – 2483.5MHZ.

IMPORTANT: EXPLORE WHAT FREQUENCIES ARE APPROPRIATE FOR THE FINAL LOCATION OF ANY WIRELESS SYSTEM.

3.3.4.2 RF Mode

RF Mode determines if the TXP-WAR is a Server or a Client.

Specifications

- ONLY ONE SERVER IS ALLOWED PER WIRELESS NETWORK.
- Numerous TXP-WARs may share the same Network, but only one may be the Server.

- Networks with multiple TXP-WARs should have the most centrally located unit designated as the Server.

3.3.4.3 TX Power

The TX Power menu is only available on 900MHz systems and allows the setting of the TX Power for the radio. The settings for this are:

- 10mW
- 200mW
- 400mW
- 1W

3.3.4.4 Security

The SECURITY menu in Figure 3-13 requires the 4-digit Pass Code prior to altering menus.

Specifications

- Entering a Pass Code and locking the menu locks the entire menu database until the correct Pass Code is entered.
- Contact Name is a 12-character ASCII field available for displaying a phone # or name of personal who know the Pass Code.
- Lost Pass Codes may be recovered by entering the locked security menu and holding the UP key for 5 seconds.
- The 4-digit code appears near the bottom of the screen.

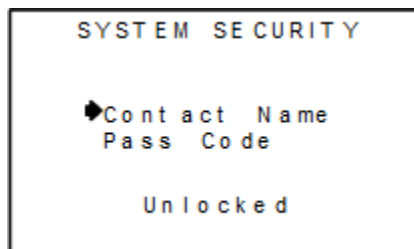


Figure 3-13 – Security Menu

3.3.5 Technicians Only

WARNING: USERS OF THESE MENUS MUST HAVE A DETAILED UNDERSTANDING OF THEIR FUNCTIONS. PROCESSING OF ALARMS AND WIRELESS COMMUNICATIONS SHOULD NOT BE RELIED UPON WHILE EDITING THESE MENUS.

The TECHNICIAN ONLY menu group access requires a special key sequence of four consecutive UP keystrokes to prevent accidental modification of critical items. The TECHNICIANS ONLY menu tree is shown in Figure 3-14

The TECHNICIAN ONLY menu group contains a Relay Test function which allows the user to stimulate the five relay outputs to ensure proper operation.

- Use the UP/DOWN keys to highlight the desired relay.
- Select using EDIT to energize the relay.

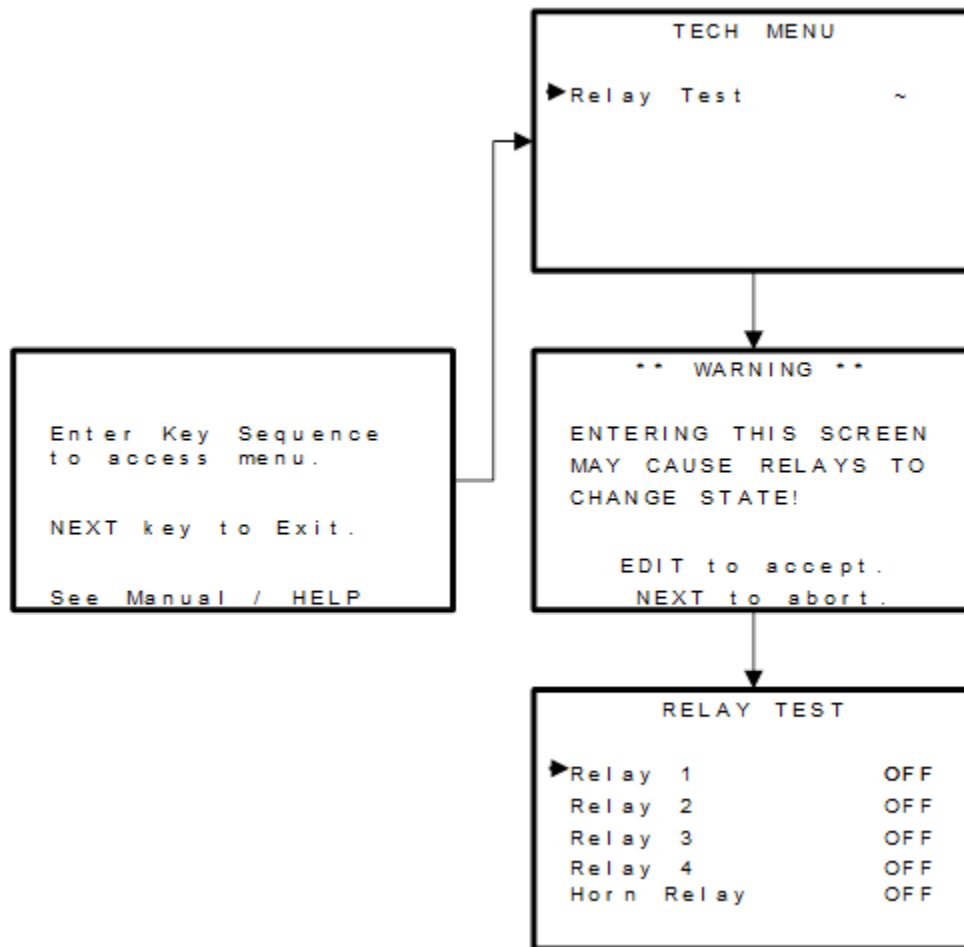


Figure 3-14 – Technicians Only Menu Tree

3.4 TXP-WAR Relayer Boards

3.4.1 Display / Radio Board

TracXP systems support both 900 MHz and 2.4GHz FHSS networks determined by the radio module mounted to the Display / Radio Board. The 900 MHz radio module mounts to the back of the Display transmitter as shown in Figure 3-3. Its MMCX RF connector attaches to the coax pigtail of the antenna fitting required for 900 MHz models.

The 2.4 GHz radio module also mounts to the back of the Display transmitter as shown in Figure 3-15. Its u.FL RF connector attaches to the coax pigtail of the antenna fitting required for 2.4 GHz models.

A slender 5 conductor cable connects between the Display / Radio Board and the Battery Board bolted to the bottom of the enclosure.

NOTE: The Display / Radio Board accepts either the 900 MHz or 2.4 GHz radio module. A Shield Board is not shown but must be removed to access the radio modules and RF connectors.

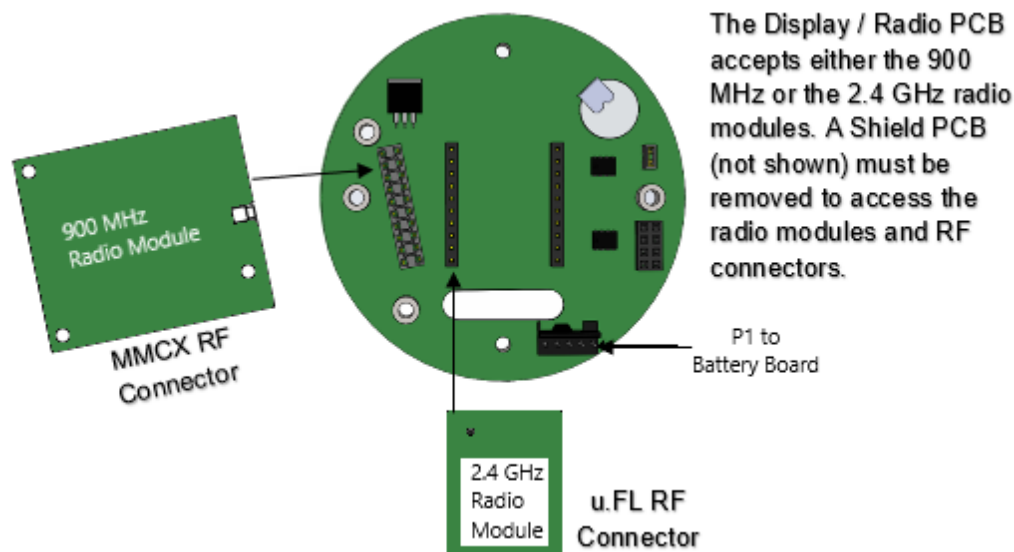


Figure 3-15 – Display / Radio Board (83-8008-0000-00)

3.4.2 TXP-WAR Relayer Power Supply / Relayer Board

CAUTION: Alarm relays have dry contacts and power must be supplied from an external source. If this power source exceeds 3 amps users should consider fusing relay wiring with 3-amp fuses. Contacts are rated for resistive loads!

Inductive loads, such as contactor coils or motors, may cause contact arcing, which shortens life and emits RFI into the sensor signals. Use appropriate arcing snubbers and MOV's across inductive loads and keep wiring away from signal wires. External wiring to TB3 (Remote Alarm Reset) should be shielded and protected from noise spikes to prevent false Alarm Reset.

Relay terminals are labeled:

- NO (normally open)
- NC (normally closed)
- COM (common)

These designators correspond to the de-energized, state of the relays.

AC or DC power supplies to relays on the Power Supply/Relay Board must be the same for each relay. Example: 24VDC should not be the power switched by one relay and 115VAC by others.

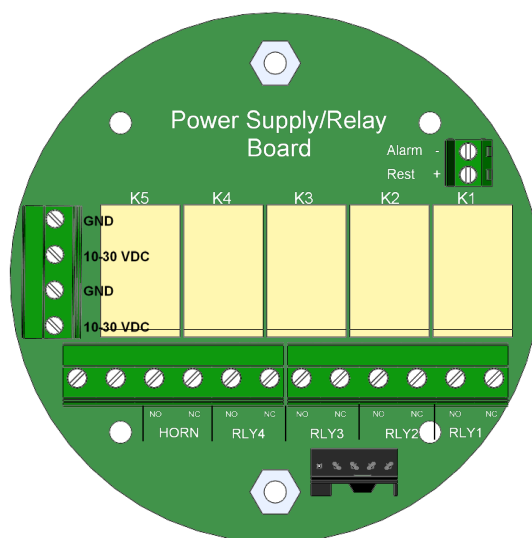


Figure 3-16 – Power Supply / Relay Board (83-800R-0000-00)

4 Antenna Transmission Range

The distance radio signals can travel is dependent upon several factors including:

- Antenna Design
- Transmitter Power
- Free-space Losses

NOTE: In order for a wireless link to work, the available system operating margin (TX power - RX Sensitivity + Antenna gains) must exceed the free-space loss and all other losses in the system. For best RF line-of-site, the combined height of both antennas must exceed the Fresnel zone diameter.

Distance Between Antennas	Fresnel Zone Diameter	Freespace Loss (dB)
1000 ft. (300 m)	16 ft. (4.9 m)	81
1 Mile (1.6 km)	32 ft. (9.7 m)	96
5 miles (8 km)	68 ft. (20.7 m)	110

Example:

A 2.4 GHz TracXP system has following parameters:

- RF TX power setting = 21 dBm (125 mW)
- RF RX sensitivity = -95 dBm (this is a constant)
- Antenna gain (standard equipped rubber collinear) = 7dBi x 2 = 14dBi

The system operating margin is $21 - (-95) + 14 = 130$ dBm. This is enough to transmit 5 miles if free space was the only loss in the system. For this to be the case, the antennas must be mounted with a combined height greater than 68ft above all obstructions (including the ground) to keep the Fresnel zone clear. In practice, however, there are many losses in the system besides just free-space and it is recommended there be at least 20dB extra system operating margin.

RF “Rules of Thumb”:

- Doubling the range with good RF “Line of Sight” (LOS) requires an increase of 6 dB.
- Doubling the range without good RF LOS requires an increase of 12 dB.
- Doubling the power increases dBm by 3.

5 TracXP Antenna Selection

5.1 Antenna selection

5.1.1 Dipole and Collinear Antennas

Key Qualities & Notes

- Connected to the Radio via a length of coax cable.

NOTE: If the cable is larger than 6mm diameter (1/4 inch), be aware of sideways tension on the connection. Thick cables have large bending radii and sideways force on the connector can cause a poor connection

- The polarity of these antennas is the same as the main axis, and they are normally installed vertically. If the antenna is mounted vertically, it is only necessary to mount the other antennas vertically for optimum “coupling” – this is easy to achieve.
- They can be mounted horizontally (horizontal polarity), however the antenna at the other end of the wireless link would need to be mounted perfectly parallel for optimum performance.

NOTE: This is very difficult to achieve over distance.

- It is important the antenna mounting bracket is well connected to “earth” or “ground” for good lightning surge protection.
- RF Antenna’s provide the best performance when installed with at least 1 to 2 wavelengths clearance of walls or steelwork. 900MHz antennas require at least 2 Feet of clearance and 2.4GHz should have 6 inches. Antennas may be mounted with less clearance, but the signal will be reduced. This will not cause a problem if the distance between the transmitter and controller is short.

The wavelength is based on the frequency—for example:

- Wavelength in meters = $300 / \text{frequency in MHz}$
- Wavelength in feet = $1000 / \text{frequency in MHz}$

Antennas may be mounted with less clearance, but radiation will be reduced. If the radio path is short this won’t matter. It is important the antenna mounting bracket to well connected to “earth” or “ground” for good lightning surge protection.

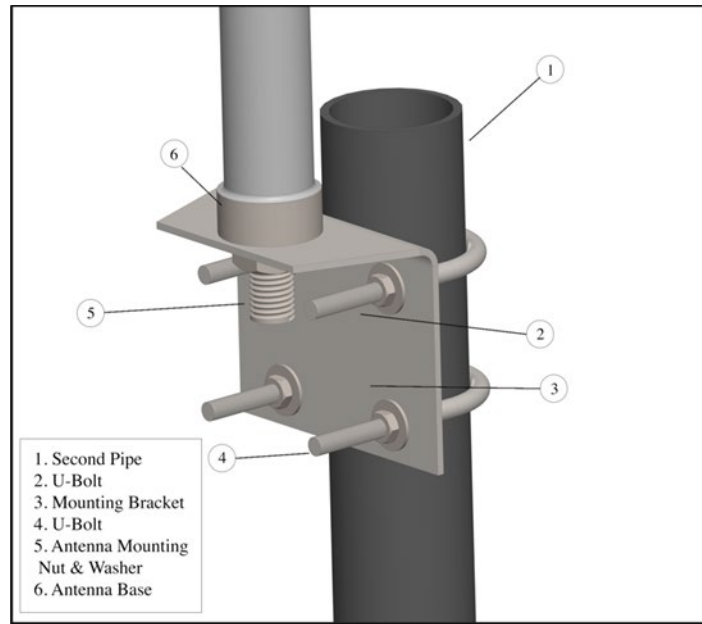


Figure 5-1 – Dipole Antenna Installation Diagram

5.1.2 Yagi Antennas

NOTE: Care needs to be taken to ensure the Yagi is aligned correctly to achieve optimum performance. If a Yagi has drainage holes in the dipole element, do not mount with the drain hole up. It can fill with water and cause a negative impact on radio effectiveness.

Key Qualities & Notes

- Directional along the central beam of the antenna.
- Folded element is located towards the back.
- Antenna should be pointed in the direction of the transmission.
- In networks spread over wide areas, it is common for a central unit to have an omni-directional antenna and the remote units to have Yagi antennas.

NOTE: In the case of having an omni-directional antenna, as the omni-directional antenna will be mounted with vertical polarity, then the Yagi's must also have vertical polarity.

- Two Yagi antennas can be used for a point-to-point link.

NOTE: In the case of two Yagi antennas being used, they can be mounted with the elements horizontally to give horizontal polarity.

- Should be mounted with at least 1 to 2 wavelengths of clearance from other objects.

NOTE: There is a large degree of RF isolation between horizontal and vertical polarity (approx. -30dB) so this installation method is a good idea if there is a large amount of interference from another system close by transmitting vertical polarity.

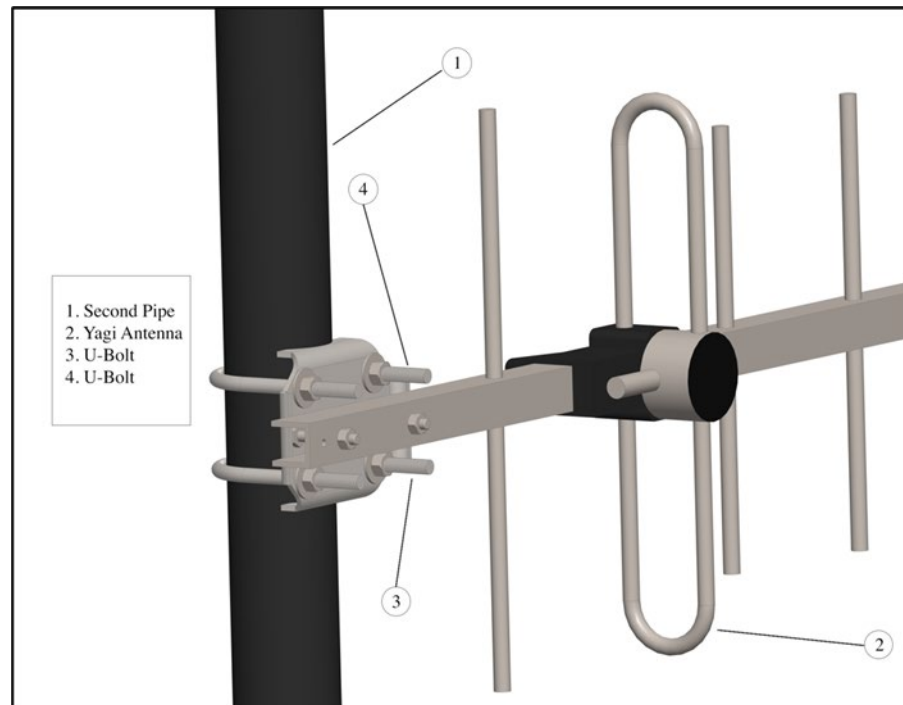


Figure 5-2 – Yagi Antenna Installation Diagram

5.1.3 Mounting Near Other Antennas

NOTE: Avoid mounting your network's antenna near any other antenna even when the other antenna is transmitting on a different radio band. High RF energy of the transmission from a close antenna can deafen a receiver. This is a common cause of problems with wireless systems.

Because antennas are designed to transmit parallel to the ground rather than up or down, vertical separation between antennas is a lot more effective than horizontal separation. If mounting near another antenna cannot be avoided, mounting it beneath or above the other antenna is better than mounting beside it.

Using different polarity to the other antenna (if possible) will also help to isolate the RF coupling.

5.1.4 Coax Cables

If a coax cable connects to the antenna via connectors, it is very important to weatherproof the connection using sealing tape. Moisture ingress into a coax cable connection is the most common cause of problems with antenna installations.

A three-layer sealing process is recommended:

1. Add an initial layer of electrical PVC tape.
2. Add a second layer of self-vulcanizing weatherproofing tape.
3. Add a final layer of electrical PVC tape.

Allowing a drip "U loop" of cable before the connection allows:

- Water to drip off the bottom of the U instead of into the connection
- Reduces installation strain

- Provides spare cable length in case later the original connectors need to be removed (the cable can be cut back, and new connectors fitted)

Avoid installing coax cables together in long parallel paths. Leakage from one cable to another has a similar effect as mounting an antenna near another antenna.

5.2 Surge Protection & Grounding

Voltage surges can enter the gas detection system via:

- Antenna connections
- Power supply connections
- Connections to other equipment
- The earth or ground connection

Surges are electrical energy following a path to earth and the best protection is achieved by draining the surge energy to earth via an alternate path. Wireless devices need to have a solid connection to earth via a ground stake or ground grid if the soil has poor conductivity. Solid connection means a large capacity conductor (not a small wire) with no coils or sharp bends. All other devices connected to the controller need to be grounded to the same ground point. There can be significant resistance between different ground points leading to very large voltage differences during lightning activity. As many wireless units are damaged by earth potential surges due to incorrect grounding as direct surge voltage.

It is very difficult to protect against direct lightning strikes but the probability of a direct strike at any one location is very small. Unfortunately, power line surges and electromagnetic energy in the air can induce high voltage surges from lightning activity several miles away.

5.2.1 Antenna Grounding

Electromagnetic energy in the air will be drained to ground via any and every earth path. An earth path exists between the antenna and the TXP-WTA Sensor Transmitter, and to protect against damage this earth path current must be kept as small as possible.

This is achieved by providing better alternate earth paths:

- Ground the antenna to the same ground point as the TXP-WTA Sensor Transmitter.

Surge energy induced into the antenna will be drained:

- By the mount's ground connection
- By the outside shield of the coax cable to the ground connection on the radio
- By the internal conductor of the coax cable via the radio electronics

NOTE: This path causes damage unless the other two paths provide a better earth connection allowing surge energy to bypass the electronics.

When an antenna is located outside of a building and outside of an industrial plant environment, external coax surge diverters are recommended to further minimize the effect of surge current in the inner conductor of the coax cable.

Coax surge diverters have gas-discharge element which breaks down in the presence of high surge voltage and diverts any current directly to a ground connection. A surge diverter is not normally required when the antenna is

within a plant or factory environment, as the plant steelwork provides multiple parallel ground paths and good earth grounding will provide adequate protection without a surge diverter.

5.2.2 Connections to Other Equipment

Data devices connected to the wireless unit should be well grounded to the same ground point as the wireless unit. Surges can enter the wireless unit from connected devices, via I/O, serial, or Ethernet connections.

Special care needs to be taken where the connected data device is remote from the wireless unit requiring a long data cable. As the data device and the wireless unit cannot be connected to the same ground point, different earth potentials can exist during surge conditions:

- Fit surge diverters to the data cable to protect against surges entering the wireless unit.
- Fit surge diverters for I/O wiring to protect the wireless unit from surge voltages being induced on long lengths of wire from nearby power cables.



6 TXP-WTA Legacy Mode

When using a TXP-WTA with other TracXP products—such as the TXP-C20, TXP-C40, and TXP-C16 or other legacy type controllers—it is necessary to operate wirelessly in Legacy Mode.

To enter Legacy mode:

1. Enter the RF Link Menu discussed in the WTA manual.

To switch from Wireless mode to Legacy mode:

1. Select RF Link.
2. Enter the special key sequence of four UP keystrokes.
3. Enter the appropriate Hop Channel and System ID in accordance with your Server's Network Configuration.

All other transmitter settings function as discussed in the TXP-WTA Sensor Transmitter manual.

7 Optional Add-ons

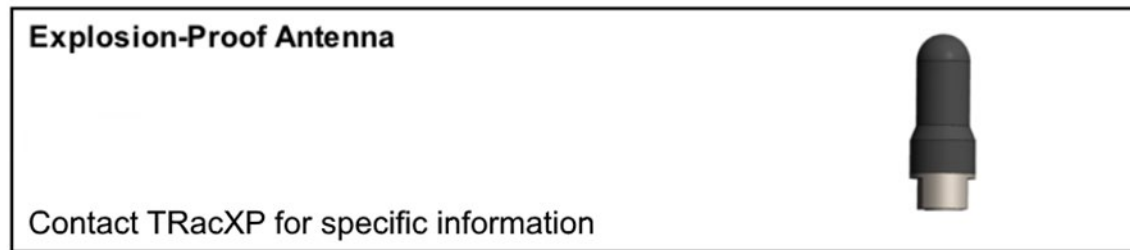


Figure 7-1 – Explosion-Proof Antenna

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9 Macurco Gas Detection Product limited warranty

Macurco warrants the TXP-WAR gas detector will be free from defective materials and workmanship for a period of two (2) years from the date of manufacture, provided it is maintained and used in accordance with Macurco instructions and/or recommendations. If any component becomes defective during the warranty period, it will be replaced or repaired free of charge, if the unit is returned in accordance with the instructions below. This warranty does not apply to units that have been altered or had repair attempted, or that have been subjected to abuse, accidental or otherwise. The above warranty is in lieu of all other express warranties, obligations or liabilities. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ARE LIMITED TO A PERIOD OF TWO (2) YEARS FROM THE PURCHASE DATE. Macurco shall not be liable for any incidental or consequential damages for breach of this or any other warranty, express or implied, arising out of or related to the use of said gas detector. The manufacturer or its agent's liability shall be limited to replacement or repair as set forth above. Buyer's sole and exclusive remedies are the return of the goods and repayment of the price, or repair and replacement of non-conforming goods or parts.

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