

# TracXP™ TXP-T40

Wired, Dual Channel Transmitter Assembly

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 metre 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

- Shock Hazard - Disconnect or turn off power before servicing this instrument.
- WARNING- EXPLOSION HAZARD- DO NOT REPLACE FUSE UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.
- WARNING- EXPLOSION HAZARD- DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.
- Use a properly rated CERTIFIED AC power (mains) cable installed as per local or national codes
- A certified AC power (mains) disconnect or circuit breaker should be mounted near the controller and installed following applicable local and national codes. If a switch is used instead of a circuit breaker, a properly rate CERTIFIED fuse or current limiter is required to be installed as per local or national codes. Markings for positions of the switch or breaker should state (I) for on and (O) for off.
- Clean only with a damp cloth without solvents.
- Equipment not used as prescribed within this manual may impair overall safety.



## 2 Introduction

The TracXP TXP-T40 sensor transmitter is a versatile unit that has a bright color display and embedded web page promoting simple intuitive user interface. The web page is accessed through the standard Ethernet connection and allows the transmission of data over existing network infrastructure to computers, tablets, smart phones and TracXP TXP-C64 64 channel controller.

### 2.1 Key Features

- QVGA color TFT display which displays engineering units and monitored data graphically as a bar graph and 30-minute trend.
- Display changes color to indicate alarm status
- Ethernet: embedded webpage for configuration and HMI, Modbus TCP master/slave
- Webpage offers offsite viewing capabilities.
- Remote sensor abilities
- Single/Dual modes standard
- Modbus TCP, Modbus RTU, EC, bridge and 4-20mA inputs
- Magnetic switches allow "one man" sensor calibration in hazardous areas without area declassification with a simple magnetic wand.

### 2.2 Optional Features

- Three programmable relays and a dedicated fault relay. (Optional)
- Two individually programmable RS-485 ports for Modbus master or slave. (Optional)

### 2.3 Ratings and Certifications

- NRTL CSA Version Division 1 and 2 Group A, B, C, D Exia. (with Explosion Proof Smart Sensor Housing)
- Aluminum Explosion Proof Housing Class 1, Division 1 and 2, Groups A, B, C, and D
- Polycarbonate Explosion Proof Housing Class 1, Division 2, Groups A, B, C, and D

### 2.4 Specifications

#### 2.4.1 Power Input

- 10-30VDC at 10W max

#### 2.4.2 Standard Output

- 3-wire 4-20mA current source output with nominal 24VDC power supply

#### 2.4.3 Accuracy

- $\pm 1\%$  of full scale

#### 2.4.4 Display

- 240X320 pixel LCD displays
- 30-minute trend, bar-graph, large engineering units, LED Backlight

#### 2.4.5 Ambient Temperature

- -40°F to 140°F
- -40°C to 60°C

#### 2.4.6 Temperature Drift

- Less than .1% per degree Celsius over ambient temperature change

### 3 Installation Instructions



WARNING - EXPLOSION HAZARD

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

AVERTISSEMENT - RISQUE D'EXPLOSION

LA SUBSTITUTION D E COMPOSANTSP EUTR ENDRE CE MATERIEL NACCEPTABLE POUR LES EMBLACEMENTS DE CLASSE I, DIVISION 2.

#### 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 Assembly Diagram

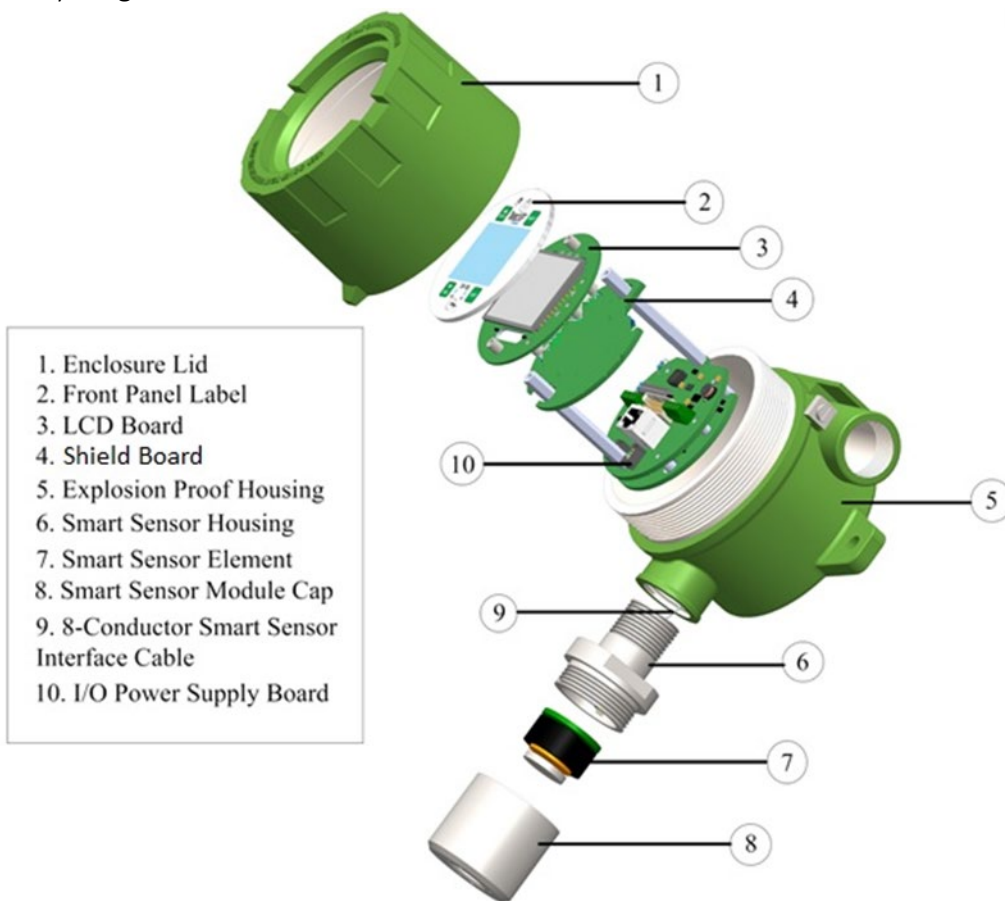


Figure 3-1 – Assembly Diagram

## 3.1.2 External System Diagram

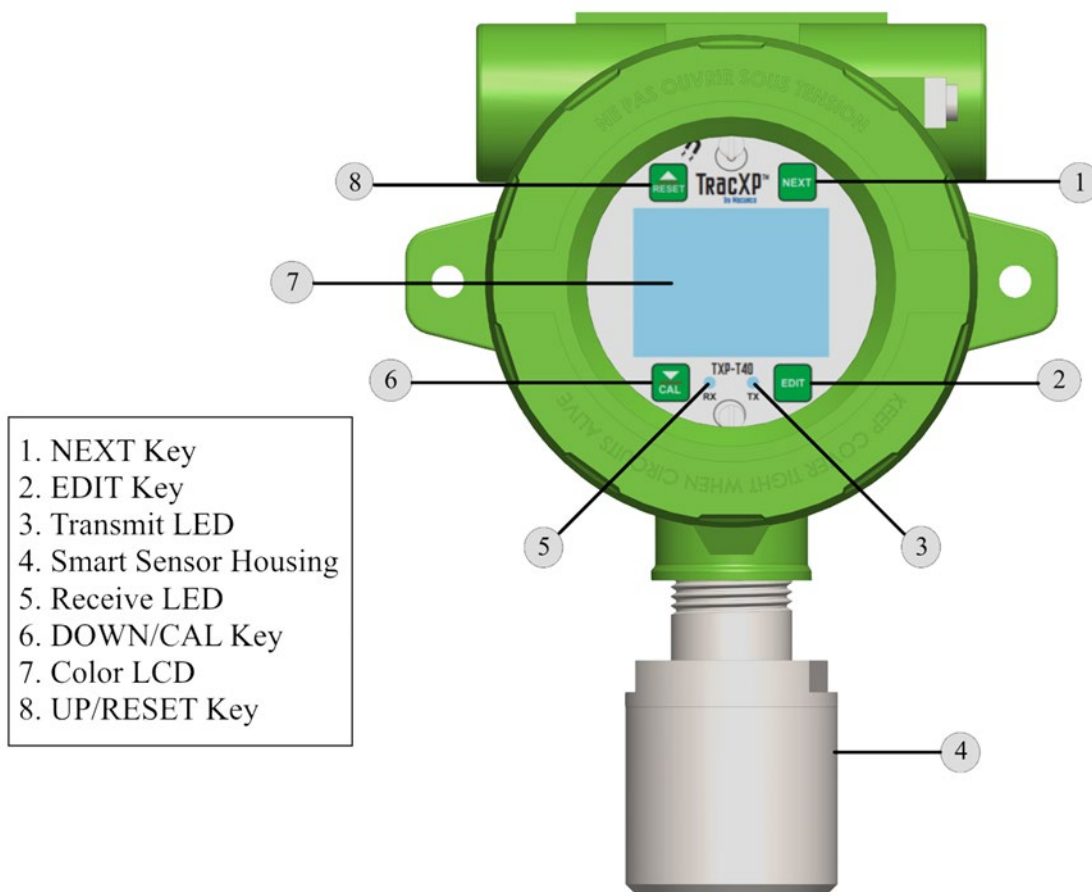


Figure 3-2 – External System Diagram

## 3.2 Sensor Location

Correct sensor location can be affected by factors such as:

- Air Movement - Air movement by fans, prevailing winds and convection should be carefully evaluated to determine if a leak is more likely to raise gas levels in certain areas within the facility.
- Gas Density in Relation to Air - Vapor density of a gas determines if it will rise or fall in air when there are no significant currents.
- Personnel Traffic- Gas detection sensor transmitters should be mounted between potential leaks and normal personnel traffic areas.
- Emission Sources- Detectors should be mounted near possible gas leak sources.
- Environmental Variables- Dirt/Mud can block the gas flow into a detector as well as spider webs, snow and water. Other environmental variables include Vibration from machinery and Shock, both physical and from lightning.

**NOTE:** Lighter than air gases should have the TXP-T40 Sensor Transmitters mounted 12-18 inches (30-45 centimeters) above the potential gas leak and applications for heavier than air gases the transmitter should be mounted 12-18 inches below the potential leak point and/or 12-18 inches above the floor.

**NOTE:** Even though TXP-T40 Sensor Transmitters are designed for rugged service and harsh environments, they should be protected against unnecessary environmental damage from water, snow, shock, vibration and dirt.

### 3.3 Mounting the Enclosure

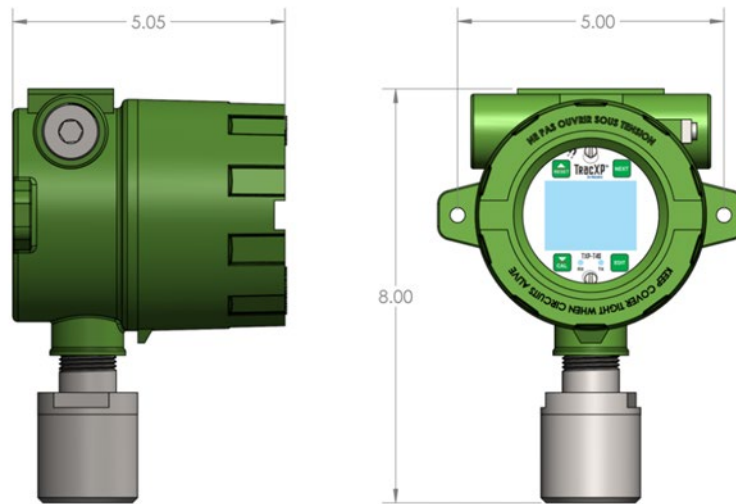


Figure 3-3 - TXP-T40 Single Sensor Cast Aluminum Explosion-Proof Housing Enclosure

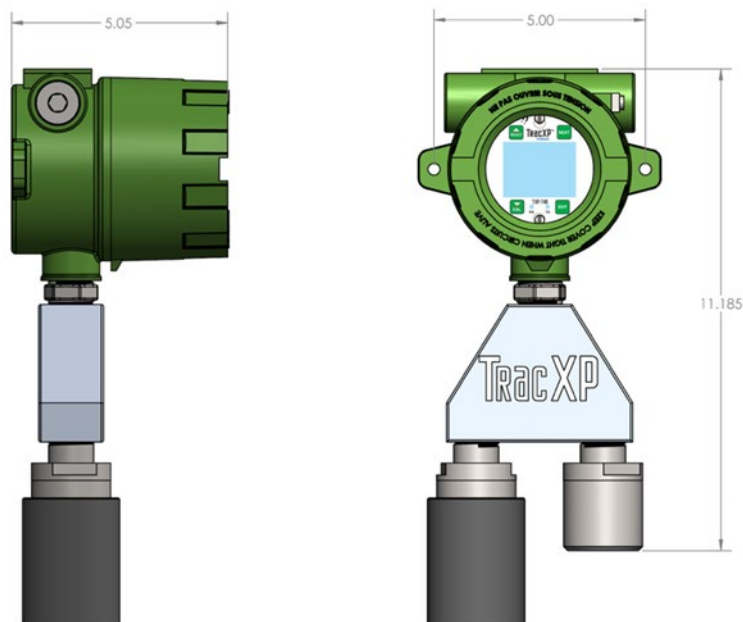


Figure 3-4 – TXP-T40 Dual Sensor Cast Aluminum Explosion-Proof Housing Enclosure

**NOTE:** Allow for at least five inches of clearance below the sensor for attaching the calibration adapter and/or the splashguard.

Modular design simplifies the installation of the TXP-T40:

1. A top Display Assembly is mounted with captive thumbscrews and is easily removed to access field-wiring terminals.
2. An optional Alarm Relay/RS-485 Modbus board mounts piggyback to the back of the Display Assembly in the aluminum, stainless steel and poly enclosures.
3. Wiring from simple bridge sensors terminates at the TB2 of the I/O PCB.
4. The bottom I/O Power Supply board generates voltages needed for LCD, relays, RS-485 Modbus, Bridge/ Electrochemical Smart Sensor Connections and Simple Bridge sensors.



**WARNING:** Qualified personnel should perform the installation according to applicable electrical codes, regulations and safety standards.

1. Ensure correct cabling and sealing fitting practices are implemented.
2. Do not aim the sensor pointing upward.
3. Install the TXP-T40 to a wall or bracket using the predrilled mounting flanges with I.D. 0.25 on 5-inch centers. If conduit is rigid and able to support the weight of the TXP-T40, the mounting bolts may be omitted.



**CAUTION:** The sensor head should never be installed pointing upwards.

### 3.4 3-Wire 4-20mA Mode Installation

- TB2 provides inputs for Channel 1 and Channel 2. By default, it is set to provide a Simple Bridge input for Channel 1 and a 4-20mA input for Channel 2. However, a slight board modification will switch Channel 1 from a Simple Bridge input to a 4-20mA input.
- J4 provides a connection for EC Smart Sensors for Channel 2 inputs.
- J5 provides a connection for Bridge or EC Smart Sensors for Channel 1 inputs.
- J3 provides an Ethernet connection for connecting the TXP- T40 to a network.
- TB1 provides terminals for 24V power input, Common and 4-20mA outputs for Channel 1 & Channel 2.

To switch Channel 1 to a 4- 20mA input, ensure SB1 and SB2 have their left pad and center pad connection cut and the center and right pad soldered together. This will provide 24V power to the first (leftmost) terminal of TB2 and a 4-20mA input at the terminal second from the left (Figure 3-5).

#### Instructions:

1. Remove the cover on the TXP-T40.
2. Loosen the two thumbscrews holding the display assembly in place and remove it.
3. A 14-pin ribbon cable is attached with sufficient length to allow access to the I/O PCB mounted in the bottom of the enclosure.
4. Power and signal connection are to TB1 where 24VDC, Signal and Common wires must be connected.

5. A blocking diode protects the TXP-T40 if polarity of the power supply is reversed, but it will not operate.
6. Reassemble the TXP-T40.
7. Follow the procedures and recommendations in the receiver and power supply manuals to complete the installation.
8. Apply power to activate the TXP-T40.

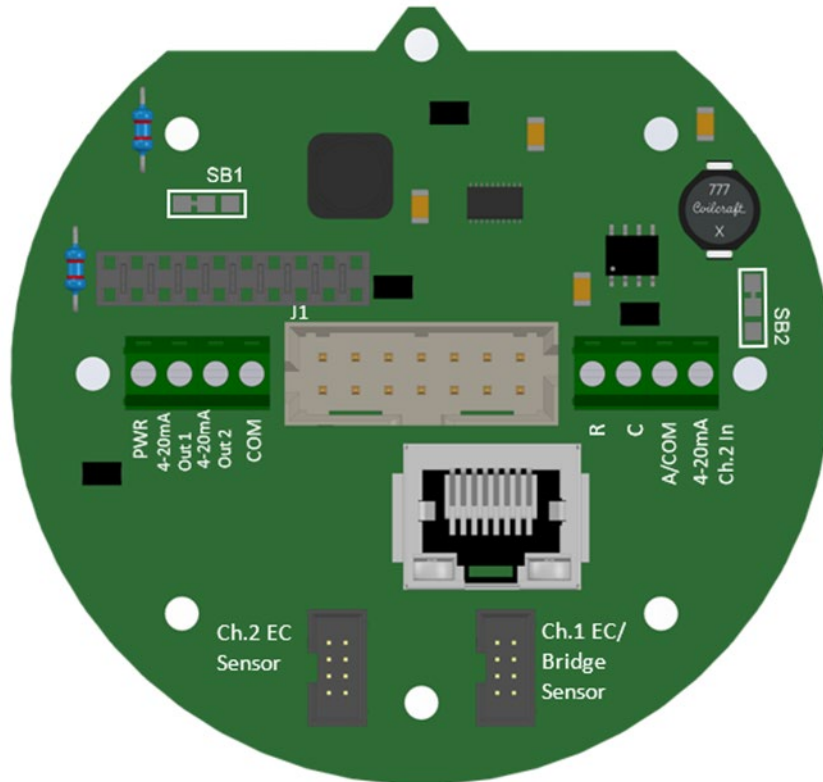


Figure 3-5 – TXP-T40 I/O Power Supply Board

### 3.5 Sensor Installation

The TXP-T40 design accommodates users wishing to continue use of their existing catalytic bead Simple type of sensors, however, EC Simple sensors are not supported.

- The TXP-T40 Smart Sensor interface uses proven EC technology for toxic/oxygen and catalytic bead for LEL combustibles but has taken this technology a step further.
- A tiny memory IC is incorporated into the TXP-T40 factory supplied Smart Sensors allowing them to contain the entire database of TXP-T40 parameters onboard the replaceable Smart Sensor assembly.
- This Smart Sensor Interface may be used to configure Smart Sensors and/or TXP-T40s from a PC rather than entering all variables via the magnetic keypad.

EC and catalytic bead smart sensors both plug into the TXP-T40 Smart Sensor Head, which connects to the TXP-T40 with its 8-conductor Smart Sensor Interface cable (Figure 3-6).

**NOTE:** TXP-T40 Smart Sensor Heads with EC/Oxygen sensors may connect to J4 or J5 on the I/O Board. Bridge Smart sensors can only be connected to J5.

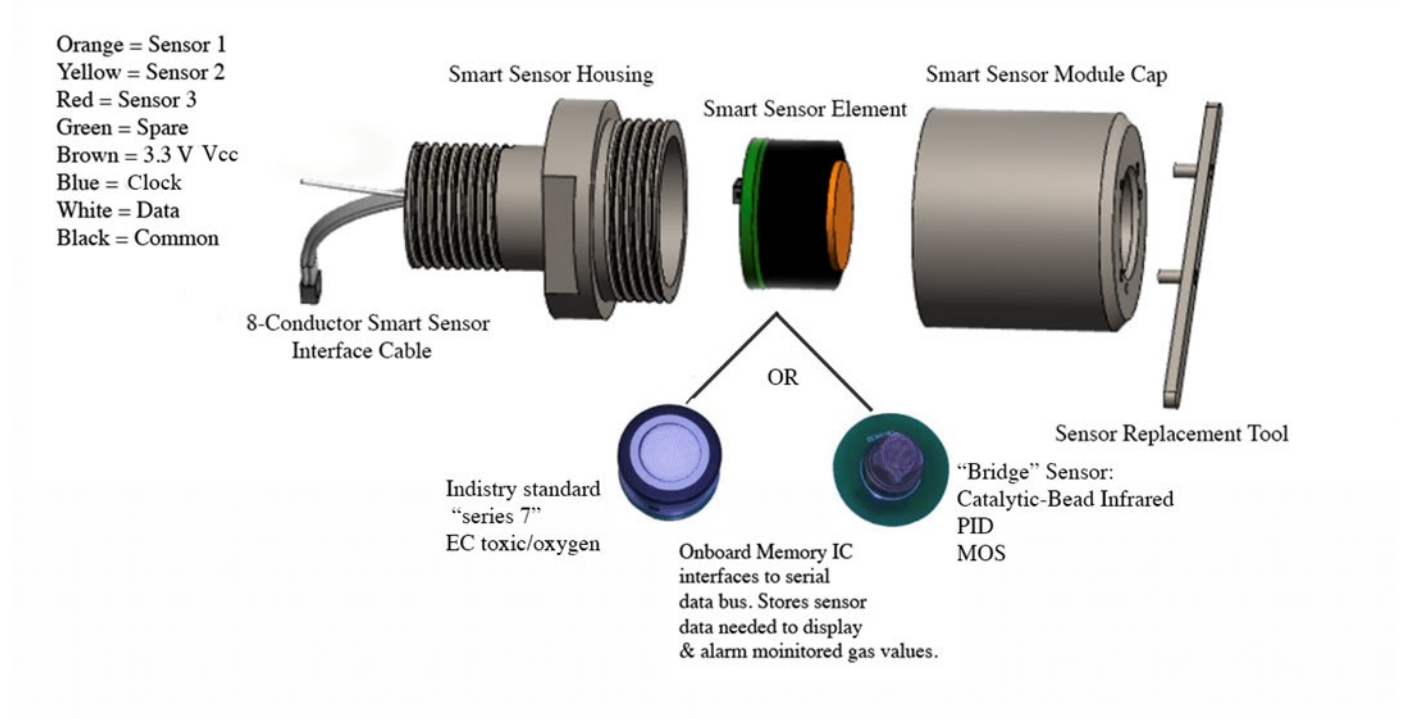


Figure 3-6 – Smart Sensor Head Assembly



## 4 General Operating Instructions

### 4.1 Introduction

Each TXP-T40 Sensor Transmitter is supplied with a magnetic wand, PN: 88-C000-0000-02 (for AL and SS enclosures) or PN: 88-C000-0000-01 (for Poly enclosures) for non-intrusive magnetic keypad operation.

Keys are identified as UP, DOWN, NEXT and EDIT and function similar to touch keys except a “swiping” motion of the magnet is used instead of pressing a key.

In this manual, a “swipe” means:

1. Place the magnet against the enclosure’s glass cover above the key and pull it away in the same motion.
2. Each “swipe” equals one press of the key.

**NOTE:** In the following procedure “Swiping” the magnet is a Momentary hold. It’s like using the magnet to “Press & Release” a button. Be careful not to “swipe” too close to one of the other keys and activate it by mistake.

To modify a menu item:

1. Use the UP and DOWN keys to move the selector arrow on the left side of the display next to the item to be edited.
2. Swipe the EDIT key to display the flashing cursor below the letter/number to be edited.
3. Swipe UP/DOWN to change that character to the desired letter/number.
4. Swipe NEXT to move the cursor to the next letter/number to be edited.
5. After you are finished entering all the letter/numbers needed, swipe EDIT to save the changes and exit the edit text mode.



Figure 4-1 – 88-C000-0000-02 Magnetic Wands

## 5 Routine Sensor Calibration

Calibration is the most important function for ensuring correct operation of the TXP-T40.

### 5.1 Key Features

- The CAL MODE is designed to make calibration quick, easy and error free.
- A successful Zero and Span calibration requires only four keystrokes.
- The 4-20mA output indicates Cal Mode by transmitting the InCal mA as set in Section 7.2.9.8 (default of 3mA). It then transmits 4mA during the subsequent Cal Purge Delay as set in Section 9.2.5 to prevent external alarms during calibration.
- Local TXP-T40 alarm relays (optional TXP-T40 Relay/RS-485 Board) are inhibited during Cal Mode. Cal Mode is exited automatically if no keystrokes are detected after five minutes.

Follow these TXP-T40 calibration guidelines:

1. Calibration accuracy is only as good as the calibration gas accuracy. Macurco recommends calibration gases with National Institute of Standards and Technology (NIST) traceable accuracy to increase the validity of the calibration.
2. Do not use gas cylinders beyond their expiration date.
3. Calibrate a new sensor before it is put in use.
4. Allow the sensor to stabilize before starting calibration.
5. Calibrate on a regular schedule. TracXP recommends once every 3 months, depending on use and sensor exposure to poisons and contaminants.
6. Calibrate only in a clean atmosphere, free of background gas. Macurco recommends using a cylinder of Zero Air or Nitrogen, depending on the sensor type, for fresh air or zero calibration.



Figure 5-1 – Calibration Gas Input

Use the following step-by-step procedure to perform Zero and Span calibrations (Figure 5-2 may be used for reference to the Menus.):

**NOTE:** The first three steps must be performed before the timer in the bottom right corner expires, 15 seconds, otherwise the TXP-T40 will exit back to the Data Display Screen.

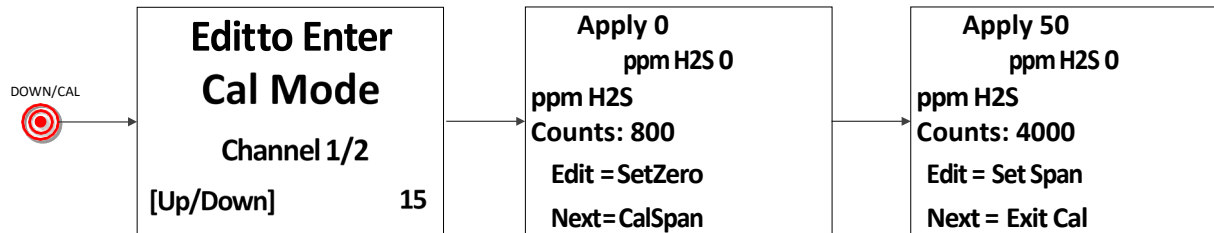


Figure 5-2 Cal Mode Flowchart and Menus

1. Enter Cal mode from any of the Data Display Screens by swiping the DOWN/CAL key.
2. Swipe the Up and/or Down key to select the Channel to be calibrated.

**NOTE:** Only channels with Local Cal enabled, per Section 7.2, will be available for calibration.

3. Swipe the EDIT key to enter Cal Mode.
4. Apply a clean Zero Gas (Figure 5-1), using the Cal Cup, or be sure there is no background target gas in the monitored area.
5. After the reading is stable (approximately 2 minutes), swipe the EDIT key to Set the Zero Calibration. After a good Zero Calibration the display will show “ZERO CAL Successful” for 1 second then automatically changes to the Span Cal screen showing “Apply 25 ppm H2S” for example.
6. Apply the indicated concentration of Span Gas at 0.5 liters/min. flow rate.
7. After the reading is stable (approximately 2 minutes), swipe the EDIT key to Set the Span Calibration.
8. Display will show “SPAN CAL Successful” for a second and then “Remove Cal Gas”
9. Remove the Cal Gas.
10. Once the Cal Purge Delay (Section 9.2.5) has expired, normal alarm and relay functionality will be restored.

**NOTE:** To skip the Zero calibration and go to the Span calibration swipe the NEXT key and the Span Calibration screen will show on the display.

**NOTE:** To skip the Span Calibration swipe the NEXT key. The TXP-T40 will exit back to the Data Display Screen.

Calibration history records are logged and may be viewed in the Sensor Information (Section 7.2).

## 6 Alarm Outputs

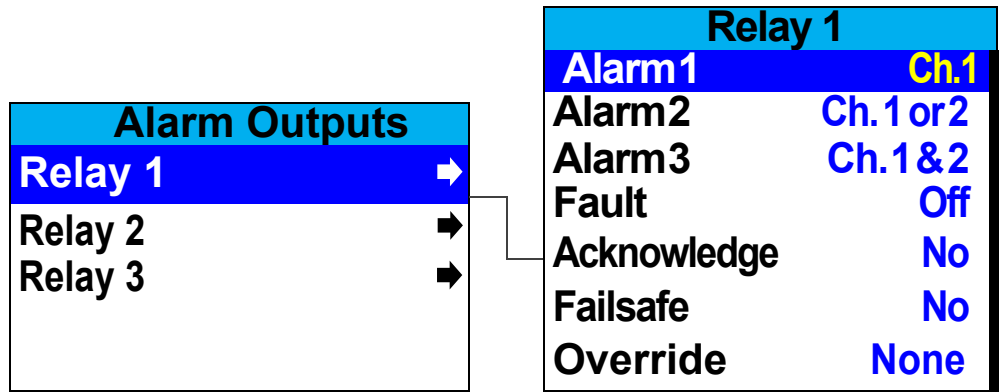


Figure 6-1 – Alarm Outputs Menu Tree

The Alarm Outputs Menu is accessed via the Main Menu, and is used to configure the mapping of the three programmable relays to the alarm setpoints, and relay configuration items such as:

- Acknowledge
- Failsafe
- Override

The Relay/RS 485 Option Board has:

- Three programmable relays
- A fourth relay which is dedicated to the Fault alarm

**NOTE:** While these settings only affect relays if the TXP-T40 Relay/RS 485 Option Board is installed, the menu options are always available for configuration purposes, regardless as to whether the option board is installed or not.

### 6.1 Relay 1/2/3

Relay 1, 2, and 3 Menus are Identical

Relay 1	
Alarm 1	Ch.1
Alarm 2	Ch.1 or2
Alarm 3	Ch. 1 &2
Fault	Off
Acknowledge	No
Failsafe	No
Override	None

Figure 6-2 – Relay Menu

From this menu, the user may select one of the three programmable relays for which the user would like to change the settings or mapping.

#### 6.1.1 ALARM 1/2/3/FAULT

To determine the mapping of the relay to an alarm setpoint, simultaneously to activate the relay, use:

- Alarm 1
- Alarm 2
- Alarm 3
- Fault

Options for each of these items are:

- Off
- Ch.1
- Ch.2
- Ch.1 & 2
- Ch.1 or 2

Example: If the user is in the Relay 1 menu, and have the following settings Alarm 1 set to Ch.1, Alarm 2 set to Ch.1 & 2 and Alarm 3 set to Ch.1 or 2. Relay 1 will energize in the event that the Alarm 1 setpoint for Channel 1 is reached AND The Alarm 2 setpoint for BOTH Channel 1 and Channel 2 are reached AND the setpoint for Alarm 3 is reached for either Channel 1 or Channel 2.

#### 6.1.2 Acknowledge

Set to Yes means the UP/RESET key will set the relay to the normal state even if the alarm condition still exists. This is useful for silencing an audible device driven from the relay.

#### 6.1.3 Failsafe

Set to Yes means the relay de-energizes during alarm and energizes with no alarm. This is useful for signaling an alarm on a loss of power. The dedicated Fault alarm is always Failsafe.

#### 6.1.4 Override

Override allows the user to have an OR type of condition for energizing/de-energizing a relay and is necessary to have the relay trip when either of two different setpoints are reached. The options are:

- |                |                       |
|----------------|-----------------------|
| 1. None        | 8. Ch2 Alarm 3        |
| 2. Ch1 Alarm 1 | 9. Ch2 Fault          |
| 3. Ch1 Alarm 2 | 10. Ch1/2 Cal Zero    |
| 4. Ch1 Alarm 3 | 11. Ch1 Cal Span      |
| 5. Ch1 Fault   | 12. Ch2 Cal Span      |
| 6. Ch2 Alarm 1 | 13. 1/2 Cal Zero/Span |
| 7. Ch2 Alarm 2 |                       |

## 7 Channel Settings

The Channel Settings Menu is accessed via the Main Menu.

### 7.1 Channel 1/2

The Channel 1 and Channel 2 Menus are accessed via the Channel Settings Menu.

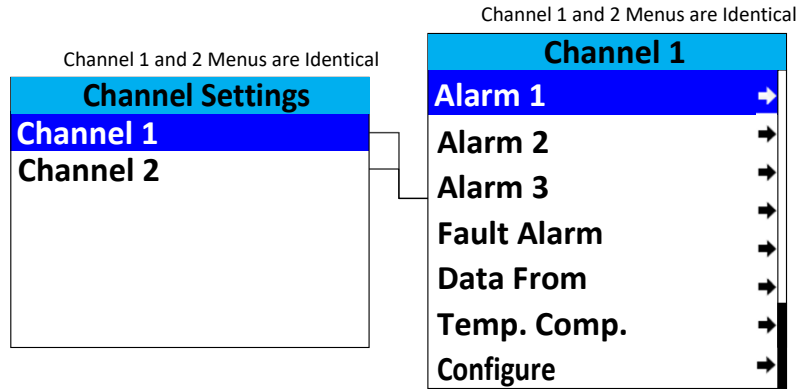


Figure 7-1 Channel 1/2 Menu Tree

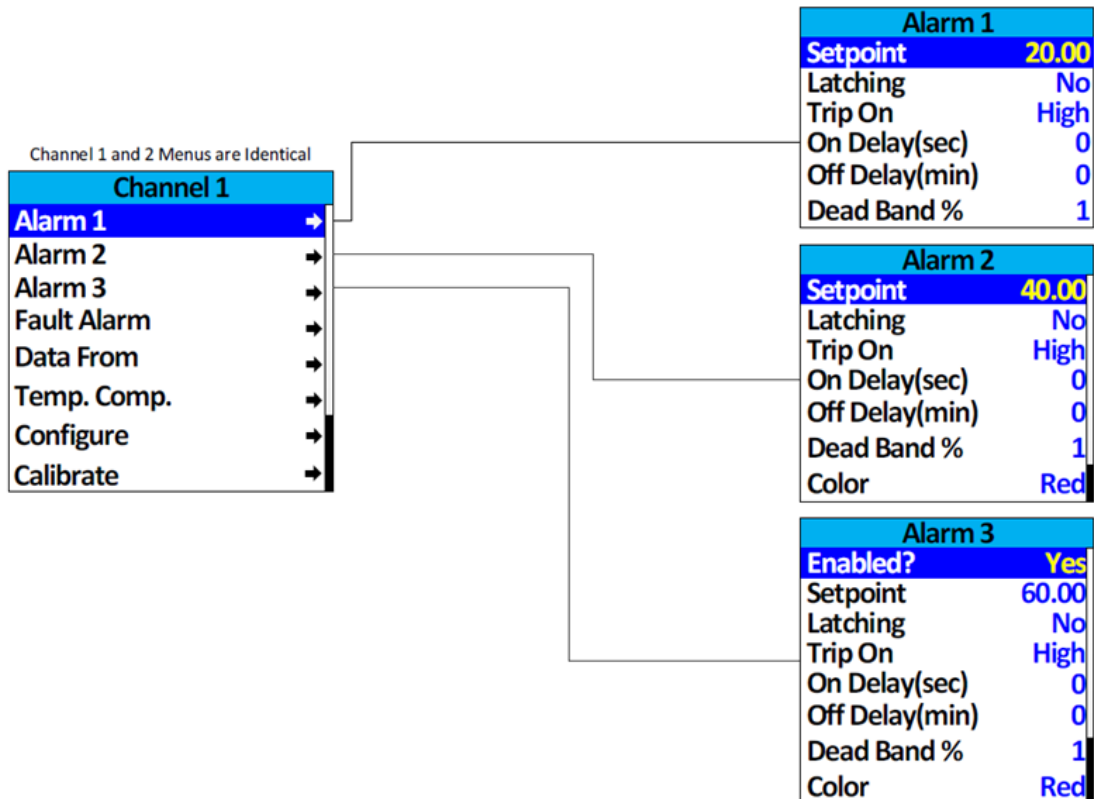


Figure 7-2 Alarm 1/2/3 Menu Tree

### 7.1.1 Alarm 1 / 2 / 3

To access Alarm 1, 2, and 3 Menus, display the Channel 1 and Channel 2 Menus.

Alarm 1 is always enabled and has the following settings:

- Setpoint
- Latching
- Trip On
- On Delay
- Off Delay
- Dead Band

Alarm 2 has the same setting options as Alarm 1, but also adds the Color setting. Alarm 3 is the same as Alarm 2, but may be Enabled or Disabled.

#### 7.1.1.1 Setpoint

Setpoint enters the engineering unit value where the alarm will trip. It may be negative and trip when monitored values fall out of range in this direction.

#### 7.1.1.2 Latching

To have the alarm remain active even after the condition is gone:

1. Set Latching to YES.
2. Reset when the UP/RESET key is swiped from a data display.

#### 7.1.1.3 Trip ON

To have the alarm trip when the value goes above the setpoint, set Trip ON to HIGH.

To have the alarm trip when the value falls below the setpoint, set Trip ON to LOW.

#### 7.1.1.4 ON Delay (SEC)

On Delay allows entering a maximum 10 second delay before this alarm becomes active. This is useful for preventing spurious alarms by brief spikes beyond the alarm setpoint.

#### 7.1.1.5 OFF Delay (MIN)

Off Delay allows entering a maximum 120-minute delay before clearing an alarm after the alarm condition is gone. This is useful for continuing an alarm function, such as operation of an exhaust fan, for a period of time after the alarm condition clears.

#### 7.1.1.6 Deadband Percent

Deadband allows forcing low values to continue to read zero. This is useful when there are small amounts of background gases that cause fluctuating readouts above zero. The highest amount of Deadband allowed is 5%.

**NOTE:** Deadband affects all outputs as well as the local reading.

#### 7.1.1.7 Color

Selecting Color changes the screen color associated with the particular alarm. The color options are Red, Blue & Orange for all except Alarm 1. Alarm 1 is always set to Yellow.

7.1.2 Fault Alarm

The Fault Alarm is always enabled and is accessed through the Channel 1 and Channel 2 menus.

7.1.2.1 Setpoint

Default setting is '-10' and Low Trip set for YES. This makes it function as a FAULT alarm and trip when the monitored value falls to less than '-10'.

The Fault Setpoint is typically set for a value equal to "-10%" of the full-scale range. Therefore, if the full-scale range is 50 you would adjust the Setpoint to "-5". With a range of 25 the Setpoint would typically be "-2.5".

7.2 Data From



**Important:** The TXP-T40 will only search for an installed sensor of the type set up for that channel. E.g. If Data From is set to Bridge Sensor, and a sensor of type EC is installed, transmitter will not load the sensor and it will not be found until Data From is changed to EC Sensor

7.2.1 EC Sensor

Data From	
EC Sensor	
Remote Sensor	No
Min Raw	800
Max Raw	4000
Filter(second)	20
Polarity	NEG
PGA Gain	➔
Heater Enabled	No
Heat(degC)	25.00
Local Cal	Yes

Figure 7-3 – Data from EC Sensor Menu

7.2.1.1 Remote Sensor

Enable Remote Sensor when using the optional Remote Sensor Option Board, see Section 16.

When enabled, two additional menu items appear, Remote ID and Interface. Remote ID matches the Remote ID of the Remote Sensor Option Board and is set between 1 and 247. Interface indicates which of the two COM ports are being used for that channel.

**NOTE:** In order to use the Remote Sensor Board, the TXP-T40 must have a Relay / RS-485 option board installed.

7.2.1.2 MIN Raw

Min Raw defines the minimum range of input counts that provide Measurement Range read-out values. This menu entry is determined by the A/D converter resolution of the channel's input.

For example, if the input is 0 at 800 then Min Raw should be set to 800.



If the input device's resolution is unknown, the live counts variable on the Analog inputs menu displays actual raw A/D counts currently being read by this channel. This reading may be used to test the input device for what A/D counts are provided for zero. Forcing the input device to read zero should provide the A/D counts value needed to make this channel's display also read zero.

#### 7.2.1.3 MAX Raw

Max Raw defines the maximum range of input counts that provide Measurement Range read- out values. This menu entry is determined by the A/D converter resolution of the channel's input. For example, if the input is 100% at 4000 then Max Raw should be set to 4000.

If the input device's resolution is unknown, the live counts variable on the Analog inputs menu displays actual raw A/D counts currently being read by this channel. This reading may be used to test the input device for what A/D counts are provided for 100%. Forcing the input device to read 100% should provide the A/D counts value needed to make this channel's display also read 100%.

#### 7.2.1.4 Filter (Second)

The Filter setting sets the number of seconds over which samples are averaged. This may be set from 0 to 60 seconds. If a channel has a noisy input the time may be increased to filter out some of the noise by averaging it over a longer period of time. This causes the reading to react slower to a change in input.

#### 7.2.1.5 Polarity

Polarity sets the polarity of the sensor:

- POS for positive
- NEG for negative

#### 7.2.1.6 PGA Gain

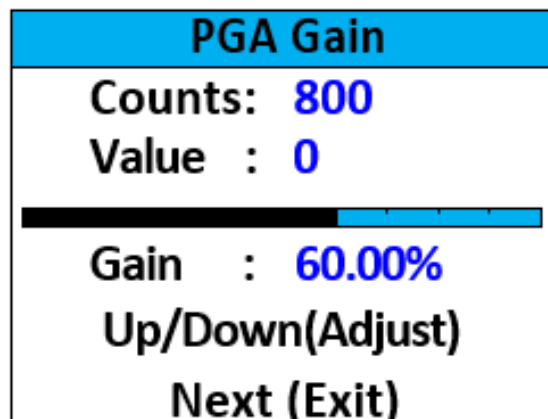


Figure 7-4 – PGA Gain Menu

Depending upon the input type, TXP-T40 inputs range from a few micro amps to hundreds of micro amps. PGA Gain is the adjustment that matches the input signal range to the TXP-T40 input signal conditioning circuits.

Altering the PGA Gain setting automatically resets:

- Previous calibration Offset
- Gain values to Unit

If it is determined the PGA Gain value is incorrect:

1. Apply the desired up-scale input.
2. Use the UP/DOWN keys to obtain the correct Value. Counts are the binary A/D value.

Caution: For standard installations, this is a factory adjustment. Do not use the PGA Gain menu for calibrating sensors. It should only be adjusted if a new measurement gas or input range is required.

#### 7.2.1.7 Heater Enabled

Heater Enabled enables the locally mounted heater/ temperature controller circuit on the EC Sensor Amplifier Series 7 board and the Series 4 board.

**NOTE:** This feature should only be used in low temperature environments.

#### 7.2.1.8 (deg C)

The Heat setting indicates the minimum temperature at which the temperature controller circuit will energize the heater if enabled. It may be set from -25 to 25C.

NOTE: The Heater function should only be enabled in low temperature environments.

#### 7.2.1.9 Local CAL

Local Cal allows the sensor to be calibrated locally from the TXP-T40. To configure the Calibration Settings, refer to Section 7.2.10. To perform sensor calibration, refer to Section 5.

#### 7.2.1.10 View Sensor Info

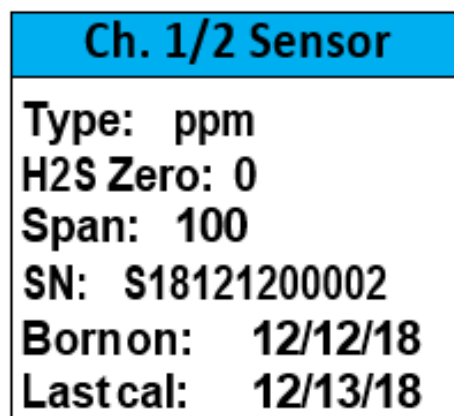


Figure 7-5 – Sensor Information Screen

View Sensor Info gives you the sensor's:

- Gas Type
- Zero Value
- Span Value
- Serial Number
- Born on Date
- Last Calibration Date

7.2.2 Bridge Sensor

Data From	
Bridge Sensor	
Remote Sensor	No
Min Raw	800
Max Raw	4000
Filter(second)	20
PGA Gain	→
Bridge Volts	→
Balance	→
Local Cal	Yes

Figure 7-6 Data from Bridge Sensor Menu

7.2.2.1 Remote Sensor

Enable Remote Sensor when using the optional Remote Sensor Board.

When enabled, two additional menu items appear for Remote ID and Interface. Remote ID matches the Remote ID of the Remote Sensor Board and is set between 1 and 247. Interface indicates which of the two COM ports are being used for that channel.

**NOTE:** In order to use the Remote Sensor Board, the TXP-T40 must have a Relay / RS-485 Option board installed.

7.2.2.2 MIN Raw

Min Raw defines the minimum range of input counts that provide Measurement Range read-out values. This menu entry is determined by the A/D converter resolution of the channel's input.

For example, if the input is 0 at 800 then Min Raw should be set to 800.

If the input device's resolution is unknown, the live counts variable on the Analog inputs menu displays actual raw A/D counts currently being read by this channel. This reading may be used to test the input device for what A/D counts are provided for zero. Forcing the input device to read zero should provide the A/D counts value needed to make this channel's display also read zero.

7.2.2.3 MAX Raw

Max Raw defines the maximum range of input counts that provide Measurement Range read- out values. This menu entry is determined by the A/D converter resolution of the channel's input. For example, if the input is 100% at 4000 then Max Raw should be set to 4000.

If the input device's resolution is unknown, the live counts variable on the Analog inputs menu displays actual raw A/D counts currently being read by this channel. This reading may be used to test the input device for what A/D counts are provided for 100%. Forcing the input device to read 100% should provide the A/D counts value needed to make this channel's display also read 100%.

### 7.2.2.2 Filter (Second)

The Filter setting sets the number of seconds over which samples are averaged. This may be set from 0 to 60 seconds. If a channel has a noisy input the time may be increased to filter out some of the noise by averaging it over a longer period of time. This causes the reading to react slower to a change in input.

### 7.2.2.3 PGA Gain

Depending upon the input type, TXP-T40 inputs range from a few micro amps to hundreds of micro amps. PGA Gain is the adjustment that matches the input signal range to the TXP-T40 input signal conditioning circuits.

Altering the PGA Gain setting automatically resets:

- Previous calibration Offset
- Gain values to Unit

If it is determined the PGA Gain value is incorrect:

1. Apply the desired up-scale input.
2. Use the UP/DOWN keys to obtain the correct Value. Counts are the binary A/D value.



**Caution:** For standard installations, this is a factory adjustment. Do not use the PGA Gain menu for calibrating sensors. It should only be adjusted if a new measurement gas or input range is required.

### 7.2.2.4 Bridge Volts

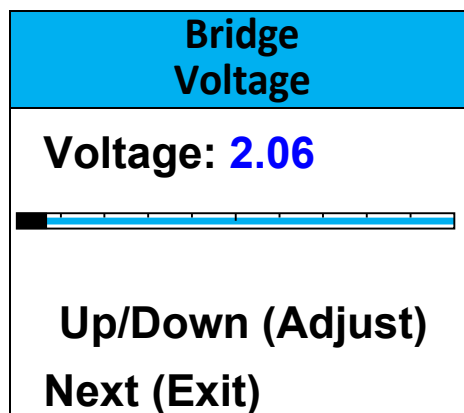


Figure 7-7 – Bridge Voltage Adjust Menu

The Bridge Voltage is factory configured, and only requires field adjustment if the catalytic bead sensor is mounted remotely from the TXP-T40 or if a new sensor is installed. TXP-T40 bridge sensors may be from 2 to 6 volts excitation voltage at the sensor. This means, if the sensor is mounted a long distance away, the voltage at the TXP-T40 may have to be higher in order to compensate for losses in the field wiring.



**Caution:** Be careful not to exceed correct sensor voltage at the sensor's A and R terminals.

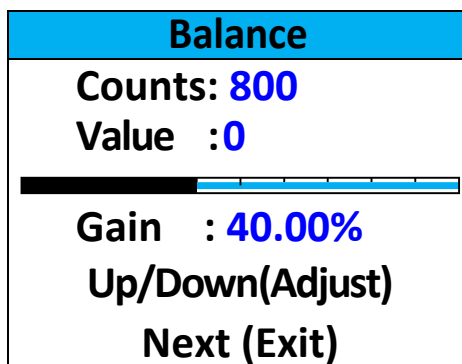
7.2.2.5 *Balance*

Figure 7-8 – Bridge Balance Adjust Menu

The Bridge Balance is factory configured, and only requires field adjustment if the catalytic bead sensor is mounted remotely from the TXP-T40 or if a new sensor is installed. Balance allows adjusting the balance of the catalytic bead sensor and must only be performed with ZERO gas on the sensor. Balance is similar to a very coarse ZERO calibration, and does not need to be precise, since subsequent calibrations will correct for small errors. ZERO gas applied to the sensor should provide a reading of -3 to +3 on the Value in the Balance Menu.

7.2.2.6 *Local CAL*

Local Cal allows the sensor to be calibrated locally from the TXP-T40. To configure the Calibration Settings, refer to Section 7.2.10. To perform sensor calibration, refer to Section 5.

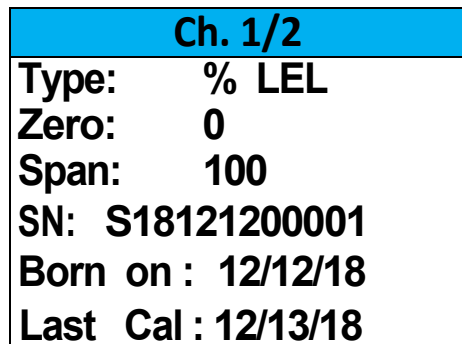
7.2.2.7 *View Sensor Info*

Figure 7-9 – Sensor Information Screen

Sensor Info includes the sensor's:

- Gas Type
- Zero values
- Span values
- Serial Number
- Born on Date
- Date when the last Calibration was performed

## 7.2.3 AI 4-20mA

Data From	
AI 4-20mA	
Min Raw	800
Max Raw	4000
Filter(second)	5
Local Cal	Yes
Marker Menu	➔

Figure 7-10 – Data from Analog Input 4-20mA Menu

## 7.2.3.1 MIN Raw

Min Raw defines the minimum range of input counts that provide Measurement Range read-out values. This menu entry is determined by the A/D converter resolution of the channel's input.

For example, if the input is 0 at 800 then Min Raw should be set to 800.

If the input device's resolution is unknown, the live counts variable on the Analog inputs menu displays actual raw A/D counts currently being read by this channel. This reading may be used to test the input device for what A/D counts are provided for zero. Forcing the input device to read zero should provide the A/D counts value needed to make this channel's display also read zero.

## 7.2.3.2 MAX Raw

Max Raw defines the maximum range of input counts that provide Measurement Range read-out values. This menu entry is determined by the A/D converter resolution of the channel's input. For example, if the input is 100% at 4000 then Max Raw should be set to 4000.

If the input device's resolution is unknown, the live counts variable on the Analog inputs menu displays actual raw A/D counts currently being read by this channel. This reading may be used to test the input device for what A/D counts are provided for 100%. Forcing the input device to read 100% should provide the A/D counts value needed to make this channel's display also read 100%.

## 7.2.3.3 Filter (Second)

The Filter setting sets the number of seconds over which samples are averaged. This may be set from 0 to 60 seconds. If a channel has a noisy input the time may be increased to filter out some of the noise by averaging it over a longer period of time. This causes the reading to react slower to a change in input.

## 7.2.3.4 Local CAL

When enabled, this allows the sensor to be calibrated locally from the TXP-T40. To configure the Calibration settings, refer to Section 7.2.10. To perform sensor calibration, refer to Section 5.

## 7.2.3.5 Marker Menu

Marker Menu	
Marker Enabled	No
Marker%	-15.63
Mark as	INCAL
SensorLife	NO

Figure 7-11 – Marker Menu

Some monitors indicate special modes of operation such as Calibration or Maintenance by:

- Transmitting a special <4mA "Marker" value.



**Caution:** Since FAULT alarms are also tripped in the < 4mA region it is important to understand that the Marker events override the FAULT alarm.

- To activate the Marker, select Yes in the Marker Enabled field.
- To enter value from -20% to 0%, select Marker %.
- Mark as allows entry of the up to six-digit ASCII message the readout will display when the marker is detected.

#### 7.2.4 Modbus 16-Bit

Data From	
	Modbus 16bit
Min Raw	800
Max Raw	4000
Remote ID	1
Alias	31001
Interface	COM1
Marker Menu	➔

Figure 7-12 – Data from Modbus 16-bit Menu

For additional information on Modbus slave configuration, refer to Chapter 5.

##### 7.2.4.1 MIN RAW

Min Raw defines the minimum range of input counts that provide Measurement Range read-out values. This menu entry is determined by the A/D converter resolution of the channel's input.

For example, if the input is 0 at 800 then Min Raw should be set to 800.

If the input device's resolution is unknown, the live counts variable on the Analog inputs menu displays actual raw A/D counts currently being read by this channel. This reading may be used to test the input device for what A/D counts are provided for zero. Forcing the input device to read zero should provide the A/D counts value needed to make this channel's display also read zero.

#### 7.2.4.1 MAX Raw

Max Raw defines the maximum range of input counts that provide Measurement Range read- out values. This menu entry is determined by the A/D converter resolution of the channel's input. For example, if the input is 100% at 4000 then Max Raw should be set to 4000.

If the input device's resolution is unknown, the live counts variable on the Analog inputs menu displays actual raw A/D counts currently being read by this channel. This reading may be used to test the input device for what A/D counts are provided for 100%. Forcing the input device to read 100% should provide the A/D counts value needed to make this channel's display also read 100%.

#### 7.2.4.2 Remote ID

Each device on a Modbus network must have a unique Remote ID. When Data From is set to Modbus, Remote ID is where the slave's unique ID number is entered. Remote ID numbers up to 247 are valid.

#### 7.2.4.3 Alias

The Alias register numbers define the location of the variable representing the input value of the Modbus data received through the Communications ports.

To obtain this number, contact the manufacturer of the Modbus RTU device.

#### 7.2.4.4 Interface

The Interface assigns what communication port the Modbus slave is connected to and the channel will get its data from. The communication port that is assigned here must be configured as a Modbus Master.

#### 7.2.4.5 Marker Menu

Marker Menu	
<b>Marker Enabled</b>	<b>No</b>
<b>Marker%</b>	<b>-15.63</b>
<b>Mark as</b>	<b>INCAL</b>
<b>SensorLife</b>	<b>NO</b>

Figure 7-13 – Marker Menu

Some monitors indicate special modes of operation such as Calibration or Maintenance by:

- Transmitting a special <4mA "Marker" value.





**Caution:** Since FAULT alarms are also tripped in the < 4mA region it is important to understand that the Marker events override the FAULT alarm.

- To activate the Marker, select Yes in the Marker Enabled field.
- To enter value from -20% to 0%, select Marker %.
- Mark as allows entry of the up to six-digit ASCII message the readout will display when the marker is detected.

### 7.2.5 Modbus 16-Bit Signed

<b>Data From</b>	
<b>Modbus 16bit Signed</b>	
<b>MinRaw</b>	<b>800</b>
<b>MaxRaw</b>	<b>4000</b>
<b>Remote ID</b>	<b>1</b>
<b>Alias</b>	<b>31001</b>
<b>Interface</b>	<b>COM1</b>
<b>Marker Menu</b>	<b>➔</b>

Figure 7-14 – Data from Modbus 16-bit Signed Menu

For additional information on Modbus slave configuration, refer to Chapter 5.

#### 7.2.5.1 *Min RAW*

Min Raw defines the minimum range of input counts that provide Measurement Range read-out values. This menu entry is determined by the A/D converter resolution of the channel's input. For example, if the input is 0 at 800 then Min Raw should be set to 800.

If the input device's resolution is unknown, the live counts variable on the Analog input's menu displays actual raw A/D counts currently being read by this channel. This reading may be used to test the input device for what A/D counts are provided for zero. Forcing the input device to read zero should provide the A/D counts value needed to make this channel's display also read zero.

#### 7.2.5.2 *Max RAW*

Max Raw defines the maximum range of input counts that provide Measurement Range read- out values. This menu entry is determined by the A/D converter resolution of the channel's input. For example, if the input is 100% at 4000 then Max Raw should be set to 4000.

If the input device's resolution is unknown, the live counts variable on the Analog input's menu displays actual raw A/D counts currently being read by this channel. This reading may be used to test the input device for what A/D counts are provided for 100%. Forcing the input device to read 100% should provide the A/D counts value needed to make this channel's display also read 100%.

### 7.2.5.3 Remote ID

Each device on a Modbus network must have a unique Remote ID. When Data From is set to Modbus, Remote ID is where the slave's unique ID number is entered. Remote ID numbers up to 247 are valid.

### 7.2.5.4 Alias

The Alias register numbers define the location of the variable representing the input value of the Modbus data received through the Communications ports.

To obtain this number, contact the manufacturer of the Modbus RTU device.

### 7.2.5.5 Interface

The Interface assigns what communication port the Modbus slave is connected to and the channel will get its data from. The communication port that is assigned here must be configured as a Modbus Master.

## 7.2.6 Modbus 32-Bit

<b>Data From</b>	
<b>Modbus 32bit</b>	
<b>Remote ID</b>	<b>1</b>
<b>Alias</b>	<b>31001</b>
<b>Interface</b>	<b>COM1</b>
<b>Byte Order</b>	<b>BADC</b>
<b>Marker Menu</b>	<b>➔</b>

Figure 7-16 – Data from the Modbus 32-Bit Menu

For additional information on Modbus slave configuration, refer to Chapter 5.

### 7.2.6.1 Remote ID

Each device on a Modbus network must have a unique Remote ID. When Data From is set to Modbus, Remote ID is where the slave's unique ID number is entered. Remote ID numbers up to 247 are valid.

### 7.2.6.2 Alias

The Alias register numbers define the location of the variable representing the input value of the Modbus data received through the Communications ports.

To obtain this number, contact the manufacturer of the Modbus RTU device.

### 7.2.6.3 Interface

The Interface assigns what communication port the Modbus slave is connected to and the channel will get its data from. The communication port that is assigned here must be configured as a Modbus Master.

### 7.2.6.4 Byte Order

Byte Order determines WORD and BYTE alignment of data at the remote Modbus transmitter when sending its 4-byte IEEE Floating Point values. The default setting is BADC.

With the selection bar on this entry, swipe the Edit key to toggle between the four possible modes.

7.2.6.5 Marker Menu

Marker Menu	
Marker Enabled	No
Marker%	-15.63
Mark as	INCAL
SensorLife	NO

Figure 7-17 – Marker Menu

Some monitors indicate special modes of operation such as Calibration or Maintenance by:

- Transmitting a special <4mA "Marker" value.



**Caution:** Since FAULT alarms are also tripped in the < 4mA region it is important to understand that the Marker events override the FAULT alarm.

- To activate the Marker, select Yes in the Marker Enabled field.
- To enter value from -20% to 0%, select Marker %.
- Mark as allows entry of the up to six-digit ASCII message the readout will display when the marker is detected.

7.2.7 Low Power IR

Data From	
Low Power IR	
Remote Sensor	No
Min Raw	800
Max Raw	4000
Filter (second)	20

Figure 7-18 – Data from Bridge Sensor Menu

7.2.7.1 Remote Sensor

Enable Remote Sensor when using the optional Remote Sensor Board, see Section 16.

When enabled, two additional menu items appear for Remote ID and Interface. Remote ID matches the Remote ID of the Remote Sensor Board and is set between 1 and 247. Interface indicates which of the two COM ports are being used for that channel.

**NOTE:** In order to use the Remote Sensor Board, the controller must have a Relay/ RS-485 Option board installed.

#### 7.2.7.2 *Min Raw*

Min Raw defines the minimum range of input counts that provide Measurement Range read-out values. This menu entry is determined by the A/D converter resolution of the channel's input.

For example, if the input is 0 at 800 then Min Raw should be set to 800.

If the input device's resolution is unknown, the live counts variable on the Analog inputs menu displays actual raw A/D counts currently being read by this channel. This reading may be used to test the input device for what A/D counts are provided for zero. Forcing the input device to read zero should provide the A/D counts value needed to make this channel's display also read zero.

#### 7.2.7.3 *Max Raw*

Max Raw defines the maximum range of input counts that provide Measurement Range read-out values. This menu entry is determined by the A/D converter resolution of the channel's input. For example, if the input is 100% at 4000 then Max Raw should be set to 4000.

If the input device's resolution is unknown, the live counts variable on the Analog inputs menu displays actual raw A/D counts currently being read by this channel. This reading may be used to test the input device for what A/D counts are provided for 100%. Forcing the input device to read 100% should provide the A/D counts value needed to make this channel's display also read 100%.

#### 7.2.7.4 *Filter (Second)*

The Filter setting sets the number of seconds over which samples are averaged. This may be set from 0 to 60 seconds. If a channel has a noisy input the time may be increased to filter out some of the noise by averaging it over a longer period of time. This causes the reading to react slower to a change in input.

## 7.2.8 Temp. Comp.

<b>Temp. Comp.</b>		
<b>Temp</b>	<b>Gain</b>	<b>Offset</b>
<b>-40</b>	<b>1.00</b>	<b>+0.00</b>
<b>-30</b>	<b>1.00</b>	<b>+0.00</b>
<b>-20</b>	<b>1.00</b>	<b>+0.00</b>
<b>-10</b>	<b>1.00</b>	<b>+0.00</b>
<b>0</b>	<b>1.00</b>	<b>+0.00</b>
<b>10</b>	<b>1.00</b>	<b>+0.00</b>
<b>20</b>	<b>1.00</b>	<b>+0.00</b>
<b>30</b>	<b>1.00</b>	<b>+0.00</b>
<b>40</b>	<b>1.00</b>	<b>+0.00</b>
<b>50</b>	<b>1.00</b>	<b>+0.00</b>
<b>60</b>	<b>1.00</b>	<b>+0.00</b>

Figure 7-4 – Temperature Compensation Menu

Temperature Compensation allows the user to adjust the gain and offset that is applied to sensors to compensate for temperature drift. Factory supplied sensors are preprogrammed with these values which are automatically uploaded to the TXP-T40 from the smart sensor. The default values are 1.000 for gain and 0.000 for offset. With these default values entered, there is no extra gain or offset applied to the sensor.

This menu is not accessible unless a smart sensor, which is equipped with the temperature sensor, is installed. From this menu:

1. Adjust the gain and offset applied to the sensor at 10C increments from -40 to 60C.
2. The gain is applied to the span value, and the offset is adjusted to make the sensor read zero at different temperatures.

## 7.2.9 Channel Configure

Configure	
Measurement Name	
E.Unit	PCTLEL
Zero	0.00
Span	100.00
Decimal Points	0
Channel On?	Yes
Deadband(%)	1.00
InCal mA	3.00
Backup/Restore	➔

Figure 7-20 – Channel Configuration Menu

7.2.9.1 *Measurement Name*

Measurement Name may be edited to contain virtually any 16-character ASCII field. It is typically used to describe the monitored point by user tag number or other familiar terminology.

7.2.9.2 *E.Unit*

Engineering Units (EUNIT) may have up to a 10-character ASCII field. Many common gases have preconfigured EUNITs based upon the sensor type, and each may be edited in this menu.

7.2.9.3 *Zero*

Zero defines the reading to be displayed when 4mA (0%) is the TXP-T40 output.

7.2.9.4 *Span*

Span defines the reading to be displayed when 20mA (100%) is the TXP-T40 output. The highest reading allowed is 9999 and include a polarity sign and a decimal point.

7.2.9.5 *Decimal Points*

Decimal Points sets the resolution of the displayed reading and may be set to zero, one or two decimal points.

7.2.9.6 *Channel ON*

Channel ON determines whether or not the channel is active and being used.

7.2.9.7 *Deadband Percent*

Deadband allows forcing low values to continue to read zero. This is useful when there are small amounts of background gases that cause fluctuating readouts above zero. The highest amount of Deadband allowed is 5%.

**NOTE:** Deadband affects all outputs as well as the local reading.

7.2.9.8 *INCAL MA*

InCal mA determines the output when the channel is in Calibration mode. It may be set from 0 to 20mA. This signal may be used by the controller to determine that the unit is in calibration.

## 7.2.9.9 Backup / Restore

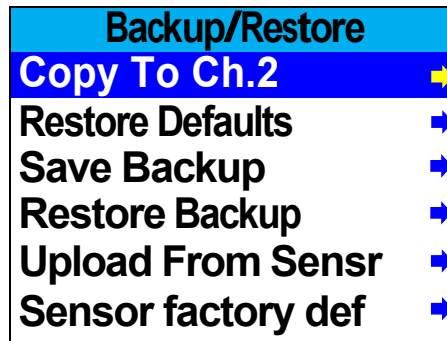


Figure 7-21 – Configuration Backup / Restore Menu

The Backup/Restore Menu allows the user to perform many operations dealing with the configuration of the TXP-T40.

- To copy the current channel's configuration to the other channel, select 'Copy To Ch.1/Ch.2'.
- To set all configuration data back to factory defaults, select Restore Defaults.
- To save a copy of the configuration to non-volatile memory for restoration later, select Save Backup.
- To restore the configuration to the last saved Backup, select Restore Backup.
- To upload the sensor configuration data to the TXP-T40, select 'Upload From Sensr'

## 8 Comm Settings

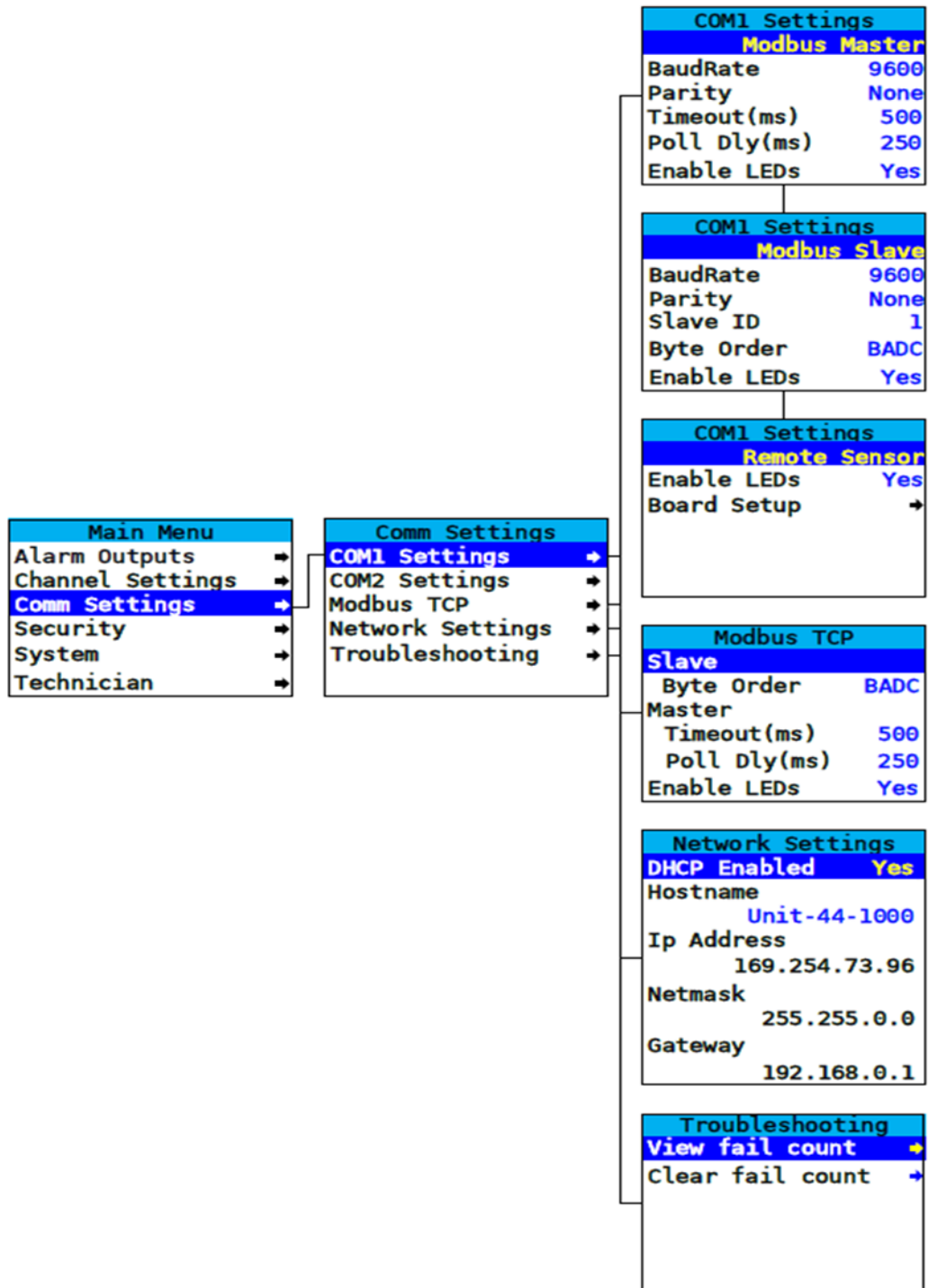


Figure 8-1 – Comm Settings menu Tree

Comm Settings Menu used to configure the two possible communication ports on the optional Relay/RS-485 Modbus Option Board. To access this menu, display the main menu.



### 8.1 COM1 / COM2 Settings

COM1 Settings Modbus Master		COM1 Settings Modbus Slave		COM1 Settings Remote Sensor	
BaudRate	9600	BaudRate	9600	Enable LEDs	Yes
Parity	None	Parity	None	Board Setup	➔
Timeout(ms)	500	Slave ID	1		
Poll Dly(ms)	250	Byte Order	BADC		
Enable LEDs	Yes	Enable LEDs	Yes		

Figure 8-1 COM1 and COM2 Settings Menu

The function parameter allows the communication ports to be set to Modbus Master, Modbus Slave or Disabled.

Modbus Master Mode allows the communication port to poll any device using the Modbus RTU protocol.

Modbus Slave Mode allows the communication port to be polled by any Modbus Master device using the Modbus RTU protocol.

Remote Sensor Mode allows communication with the remote sensor option board via Modbus RTU protocol. For more information on how to configure COM 1 and COM 2 for remote sensor operation, refer to Section 16.

To turn the port off, if not needed, select Disabled.

#### 8.1.1 Baudrate

Baudrate allows users to set the data rate of the communication port. The options include:

- 9600
- 19200
- 38400
- 57600
- 115200

#### 8.1.2 Parity

A Parity bit is a bit that is added to ensure that the number of bits with the value "1" in a set of bits is even or odd. Parity bits are used as the simplest form of error detecting within code. The default is None.

#### 8.1.3 TimeOut (MS)

The Timeout menu item affects the TXP-T40's Master Modbus ports. Timeout is the length of time, in milliseconds, the controller waits before a Modbus request fails. Three consecutive failed requests must occur before a communication error is indicated. This item is useful for optimizing throughput to the TXP-T40 from other slave RTUs.

#### 8.1.4 Poll DLY (MS)

Poll Dly is the time in milliseconds the unit will delay between Modbus master requests.

### 8.1.5 Byte Order

Byte Order determines WORD and BYTE alignment of data at the remote Modbus transmitter when sending its 4-byte IEEE Floating Point values. Selecting this value cycles through four options:

1. ABCD
2. CDAB
3. BADC (default)
4. DCBA

### 8.1.6 Enable LEDs

Enable LEDs enables the RX and TX LEDs to flash green on valid transmit and receive transmissions. For ports configured as master, the RX LED will flash red if there is a Comm Error or if an exception is received. Slave ports will cause the RX LED to flash red under the same conditions but can also cause the TX LED to flash red if an invalid function code is received or if the wrong register is given.

Caution: When using the LEDs to assist with troubleshooting it is important to note that LEDs may be enabled via Comm Port settings and Modbus TCP settings. So it is important to disable the LEDs for the ports which are not being tested.

### 8.1.7 Slave ID

Slave ID is set to uniquely identify an TXP-T40 in Modbus Slave mode. May be set to any value 1-247.

## 8.2 Modbus TCP

Modbus TCP	
Slave	
ByteOrder	BADC
Master	
Timeout(ms)	500
Poll Dly(ms)	250
EnableLEDs	Yes

Figure 8-3 – Modbus TCP Menu

### 8.2.1 Slave Byte Order

If Modbus Slave is selected, Slave Byte Order determines WORD and BYTE alignment of data at the remote Modbus transmitter when sending its 4-byte IEEE Floating Point values. The default is set to BADC. Min/Max Raw values are not used in this mode.

With the select bar on this entry, swipe the EDIT key toggles between the 4 possible modes.

### 8.2.2 Master Timeout (MS)

Master Timeout is the time in milliseconds before the unit gives up on a Modbus request and moves on to the next channel. After three consecutive timeouts, the channel enters the COM Error state.

### 8.2.3 Master Poll (MS)

Master Poll Dly is the time in milliseconds the unit will delay between Modbus Master requests.

### 8.2.4 Enable LEDs

Enable LEDs enables the RX and TX LEDs to flash green on valid transmit and receive transmissions. For ports configured as master, the RX LED will flash red if there is a Comm Error or if an exception is received. Slave ports will cause the RX LED to flash red under the same conditions but can also cause the TX LED to flash red if an invalid function code is received or if the wrong register is given.



**Caution:** When using the LEDs to assist with troubleshooting it is important to note that LEDs may be enabled via Comm Port settings and Modbus TCP settings. It is important to disable the LEDs for the ports which are not being tested.

## 8.3 Network Settings

Network Settings	
DHCP Enabled	Yes
Hostname	Unit-44-1000
Ip Address	169.254.93.184
Netmask	255.255.0.0
Gateway	192.168.0.1

Figure 8-4 Network Settings Menu

For integrating a TXP-T40 into a network, refer to Section 14.

### 8.3.1 DHCP Enabled

DHCP Enabled allows the IP address to be set automatically by an external DHCP server. When this parameter is enabled, the unit can be accessed by its hostname or IP address. However, the IP address will be dependent on the DHCP server and could potentially change.

### 8.3.2 Hostname

Hostname identifies the TXP-T40 on a network as an alternative to the IP address.

### 8.3.3 IP Address

IP Address identifies the TXP-T40 on a network. This is automatically set when DHCP is enabled.

### 8.3.4 NetMask

Specify if the user's network requires. Netmask specifies the subnet addressing scheme. This is automatically set when DHCP is enabled.

### 8.3.5 Gateway

Gateway is the IP address of the device that may connect this subnet to other networks. This is automatically set when DHCP is enabled.

## 8.4 Troubleshooting

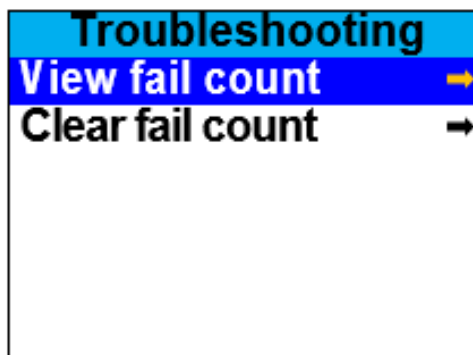


Figure 8-5 – Troubleshooting Menu

The Troubleshooting Menu may be used to observe communication issues during serial communication.

### 8.4.1 View Fail Count

View the number of failed communication attempts when using serial communications.

### 8.4.2 Clear Fail Count

Clear the fail count to reset the value to zero.

## 8.5 Security

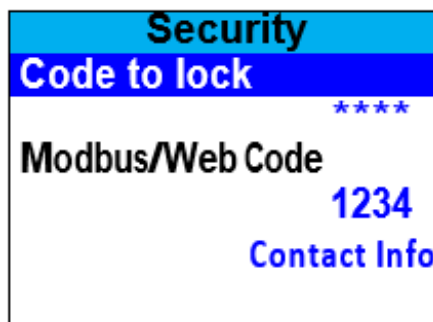


Figure 8-6 – Security Menu

The Security Menu offers the ability to lock the TXP-T40 using a four-digit Code. Once enabled, the only actions that may be taken are to:

- View the menus
- View the data displays
- Perform calibrations

No fields may be edited without entering the Code to unlock in the Security Menu.

To enable the Security Mode, enter a four-digit Code.

**NOTE:** This is a one-time use code, which will be used to unlock the unit at a later time. Re-enter the Code to confirm and the TXP-T40 will lock.

To disable the Security Mode, enter the four-digit Code entered previously in the Security Menu.

The Modbus/Web Code is used on the embedded webpage to provide security by preventing inadvertent manipulation of the configuration from the webpage (See Section 13.1).

The Contact Info field is a 16-character ASCII field available for displaying a phone number or name of personnel who know the Code.

Lost codes may be recovered by:

1. Entering the locked security menu
2. Entering the code 8621

## 9 System Menu

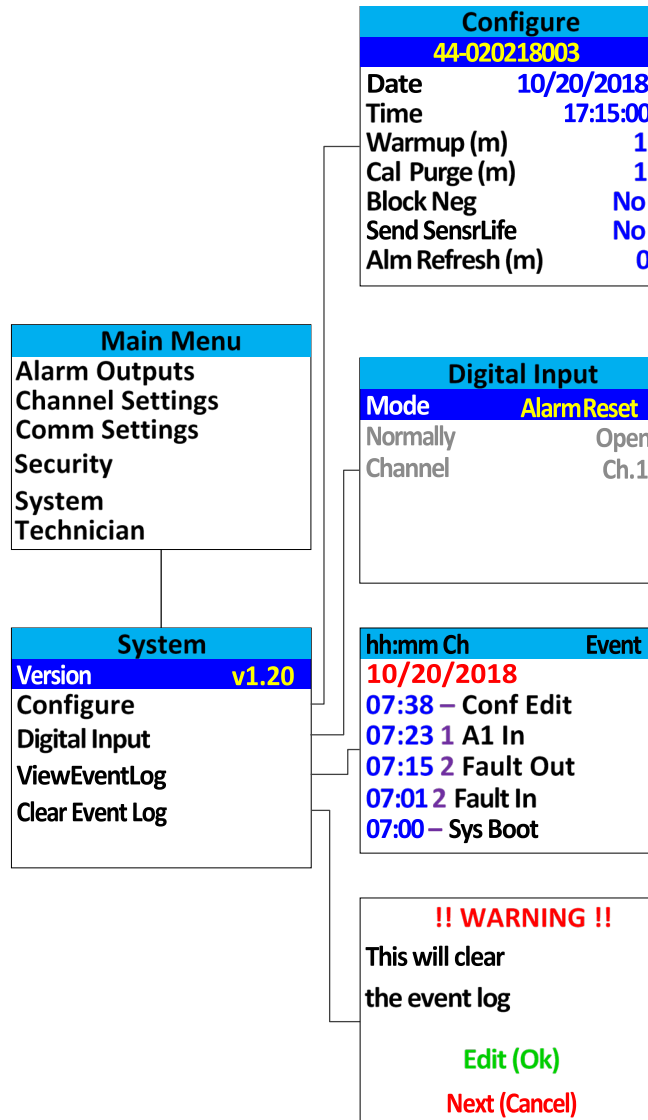


Figure 9-1 – System Menu Tree

The System Menu is accessed through the Main Menu. System Menu items are items which effect the entire TXP-T40 and are not specific to either channel. Submenus are accessed by highlighting the desired item and swiping the Edit key.

To access this menu, display the Main Menu.

To access submenus:

1. Highlight the desired item.
2. Swipe the EDIT key.

## 9.1 Version

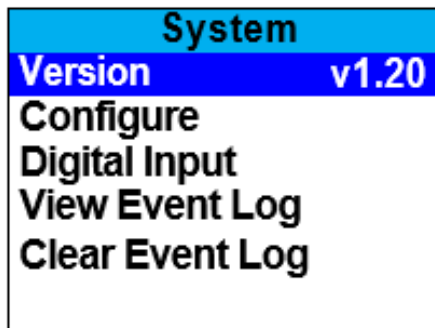


Figure 8-2 – System Menu

The Version line in the System Menu displays the version of firmware that is programmed in the TXP-T40.

## 9.2 Configure

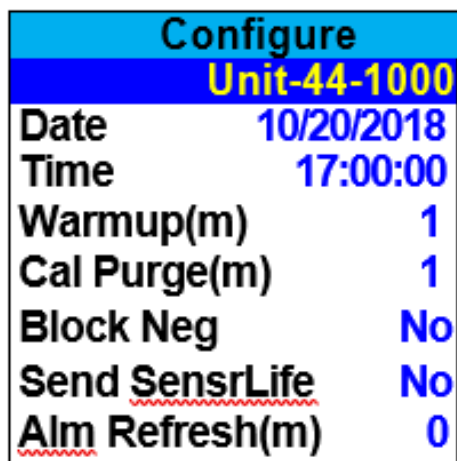


Figure 9-3 – Configure System Menu

To edit the Configure Menu items:

1. Highlight the desired item.
2. Swipe the EDIT key.
3. Swipe the UP and DOWN key to change the value highlighted by the cursor.
4. Swipe NEXT to move the cursor.
5. Swipe EDIT again to save the value.

### 9.2.1 Unit Name

Unit Name is used to assign the transmitter a name for use in the backup configuration file name. The unit name is limited to 16 characters.

### 9.2.2 Date

Date, which is a factory setting and may need to be adjusted for the user's location, is used for:

- Data
- Event Logging

### 9.2.3 Time

Time (24-hour clock), which is a factory setting and may need to be adjusted for the user's location, is used for:

- Data
- Event Logging

### 9.2.4 Warmup (M)

Warmup is available to prevent unwanted alarm trips during sensor warmup. This time can be adjusted up to five minutes for sensors that take a long time to warm up.

### 9.2.5 CAL Purge (M)

Cal Purge is available to prevent unwanted alarm trips during calibration purge time. This time can be adjusted up to five minutes for sensors that take a long time to drift back down after calibration.

### 9.2.6 Block NEG

Block Neg prevents negative channel values from being displayed. It applies to both channels.

### 9.2.7 Send SensrLife



**Important:** In order for the Sensor Life to be read by the receiver, the Cal Marker setting must correspond to the In Cal setting of the transmitter. Otherwise, the receiver will not check for the sensor life data from the transmitter after calibration is completed.

**NOTE:** For Oxygen sensors, the Cal Marker setting is set at 83% of full scale on a 0-25% zero to span range. This allows sensor life information to be transmitted with the upscale values associated with Oxygen sensors.

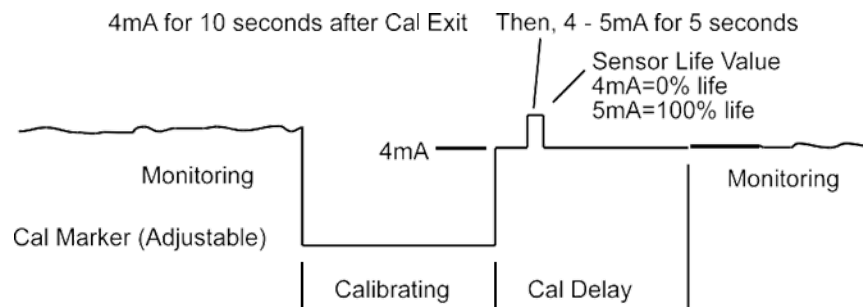


Figure 9-4 – Send SensrLife Time Diagram

Set for Yes, Send SensrLife causes the TXP-T40 to transmit a sensor life value after successful calibrations during the Cal Purge Delay.

- Normal operation is the TXP-T40 transmits 4mA during the Cal Purge Delay, but with Send SensrLife set to Yes it will transmit 4mA for the first 10 seconds.
- Then, for 5 seconds it will transmit a value between 4mA and 5mA, with 4mA equal to 0% sensor life and 5mA equal to 100% sensor life.
- The output then returns to 4mA for the remainder of the Cal Purge Delay. For example, if after a calibration sensor life is 75%, the TXP- T40 transmits 4.75mA during the 5 second interval.



**NOTE:** Send SensrLife should always be set for No unless the 4-20mA receiver is capable of interpreting the sensor life signal. The TracXP TXP-C64 and TXP-C16 are both capable of this function.

9.2.8 Modbus Output

Unlike the 4-20mA output for Sensor Life, timing is not precise. When the master detects the transmitter has exited the Cal Marker state it will read the sensor life Modbus register to obtain the sensor life information.

9.2.9 ALM Refresh (M)

Alarm Refresh allows reactivation of Acknowledged alarms after the time period expires. This feature is used primarily to restart audible alarm devices after having been silenced by an acknowledge function (via serial port or swiping the Up/Reset button). An entry of 0 minutes effectively disables the Alarm Refresh function. A maximum of 60 minutes is allowed.

9.3 Digital Input

Digital Input	
Mode	AlarmReset
Normally	Open
Channel	Ch.1

Figure 9-5 – Digital Input System Menu

If a digital input is installed on the Relay/RS-485 Option Board, the Digital Input Menu can be set to one of three available configuration options:

1. Alarm Reset – when selected any active alarms, acknowledge enabled, will be acknowledged and reset when an input is received.
2. A3 Override – when selected, Alarm 3 will be activated on the selected channels when a signal is received. The Normally menu option refers to the type of connection to the digital input. If the input is normally a short it should be set to Normally Closed, otherwise it should be set to open (This is useful in a similar manner to the Failsafe mode mentioned in Section 6.1.3)
3. Flt Override – when selected, the Fault Alarm will be activated on the selected channels when a signal is received. The Normally menu option refers to the type of connection to the digital input. If the input is normally a short it should be set to Normally Closed, otherwise it should be set to open (This is useful in a similar manner to the Failsafe mode mentioned in Section 6.1.3)

## 9.4 View Event Log

hh:mmCh	Event
<b>10/20/2013</b>	
<b>07:38</b> –	<b>Conf Edit</b>
<b>07:23</b> 1	<b>A1 In</b>
<b>07:15</b> 2	<b>Fault Out</b>
<b>07:01</b> 2	<b>Fault In</b>
<b>07:00</b> –	<b>Sys Boot</b>

Figure 9-6 – View Event Log System Menu

View Event Log displays the Event Log for the unit, which displays the last 100 events.

To scroll through the log, swipe the UP and DOWN keys.

Entries have a date and time stamp followed by the channel number (or dash for system entries) and the type of event logged events include:

1. Alarms/Fault In and Out
2. Alarm and Remote Alarm Resets
3. Alarm Refresh
4. Event Log Cleared
5. Configuration Changed
6. Calibration in and out
7. System and Cold Boots
8. Communication and Configuration Errors
9. Corrupt Sensor
10. Sensor Error
11. Configuration Edits

## 9.5 Clear Event Log

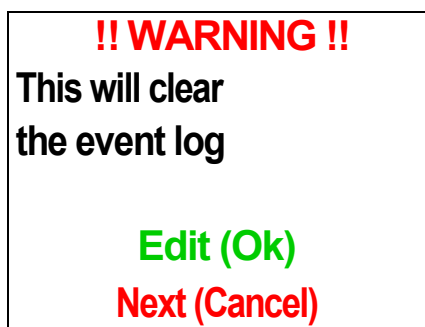


Figure 9-7 – Clear Event Log System Menu

Clear Event Log clears the event log, to confirm, swipe the EDIT key.

## 10 Technician

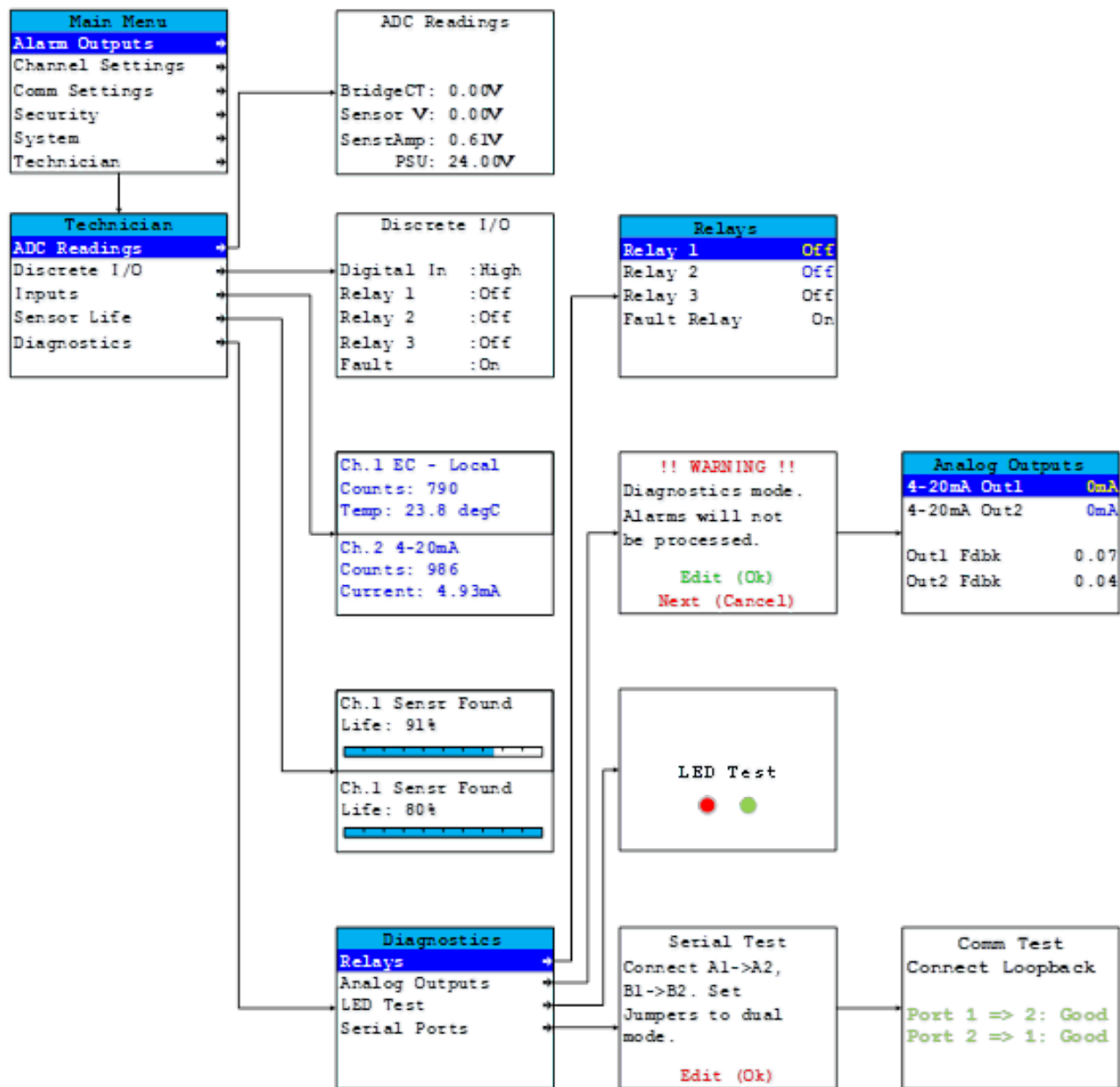


Figure 10-1 – Technician Menu Tree

## 10.1 ADC Readings

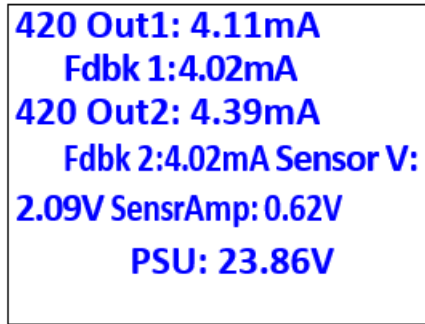


Figure 10-2 ADC Readings Diagnostics Menu

The ADC Readings displays:

- Channel 1/2 4-20mA output and feedback current
- Sensor voltage for bridge inputs
- Sensor amplifier and power supply voltage as shown in Figure 10-2

These values may be useful to technicians when trying to determine whether or not a sensor is working properly.

The Fdbk1 and Fdbk2 can be useful in determining if there are issues with the output. A circuit is installed on each of the two outputs which measures the actual current flow out of the output terminals.

**NOTE:** If this number reads zero when an output is stimulated, it could indicate that there is a cut wire or some other failure in connection with the wiring to the controller.

## 10.2 Discrete I/O

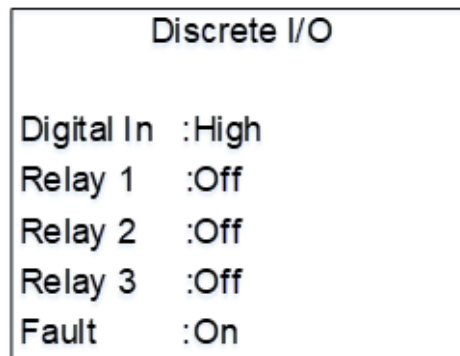


Figure 10-3 – Discrete I/O Menu

### 10.3 Inputs

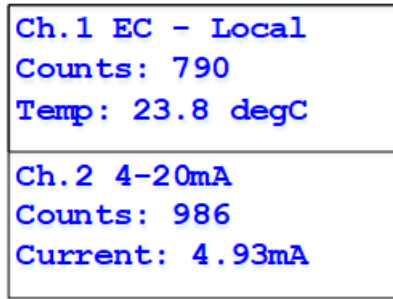


Figure 10-4 – Inputs Menu

The Inputs Menu displays both channel's raw counts and input data.

### 10.4 View Sensor Life

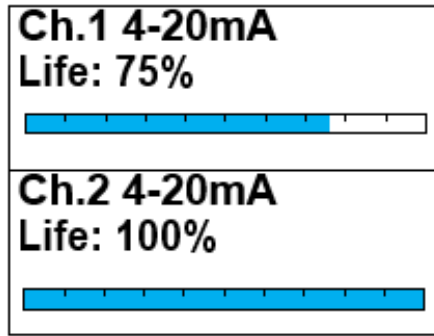


Figure 10-5 View Sensor Life System Menu

View Sensor Life provides an indication of the Sensor Life remaining. This percentage is calculated by comparing the amount of gain needed to be applied at the most recent calibration when compared to the amount of gain needed to be applied at the initial calibration.

## 11 Diagnostics

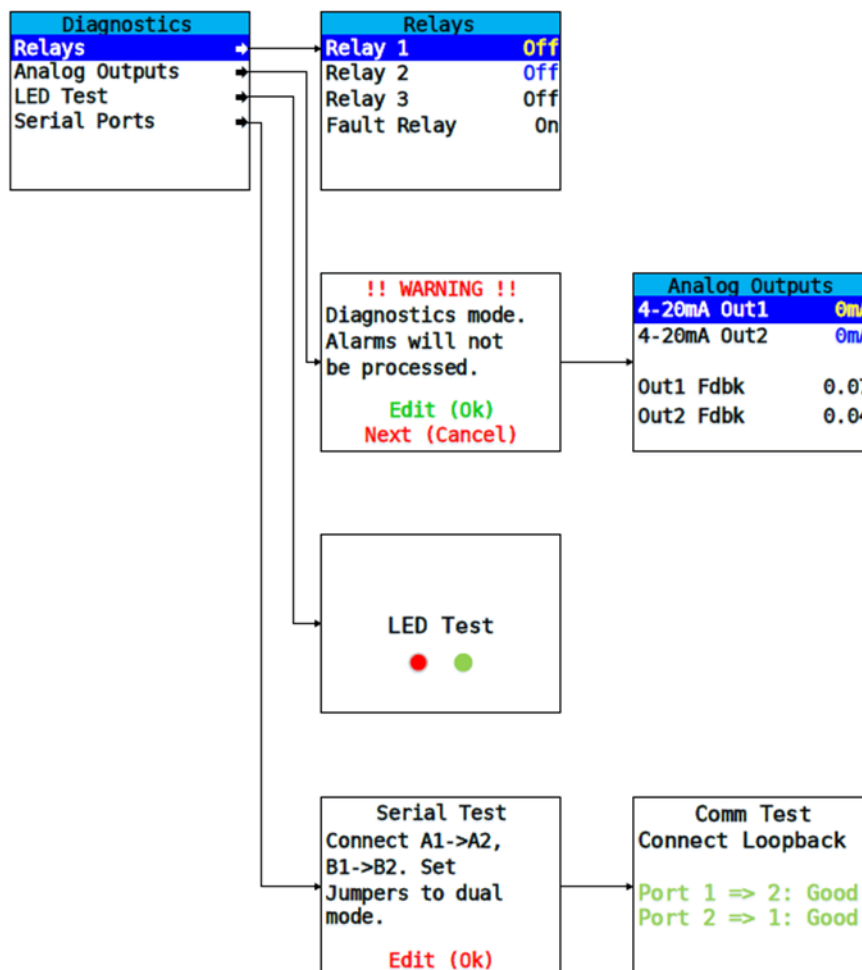


Figure 11-1 – Diagnostics Menu Tree

A System Diagnostic Mode shown in Figure 11-1 may be entered during normal operation from the Main Menu. The entry menu offers useful routines for:

- Testing front panel LEDs
- Relays
- Serial ports
- ADC readings
- Analog I/O

To manually exit, swipe the NEXT key with a magnet.

To automatically exit, do not swipe keys for five minutes.



**Caution:** It is very important to understand that CHANNEL DATA IS NOT PROCESSED DURING THE SYSTEM DIAGNOSTICS MODE. It is possible to miss important input values while utilizing this mode, and appropriate safeguards should be in place. However, the System Diagnostics Mode can prove invaluable

when testing I/O since relays and analog outputs may be stimulated without driving inputs to precise levels.

### 11.1 Relays

Relays	
Relay1	Off
Relay2	Off
Relay3	Off
FaultRelay	On

Figure 11-2 – Relay Diagnostics Menu

The Relays Menu allows manual actuation of the Relays (optional TXP-T40 Relay/RS-485 Option Board) while in the System Diagnostics Mode.

To de-energize a relay:

1. Highlight the relay to be actuated.
2. Swipe EDIT.
3. Confirm relay actuation.
4. Swipe EDIT again.

### 11.2 Analog Outputs

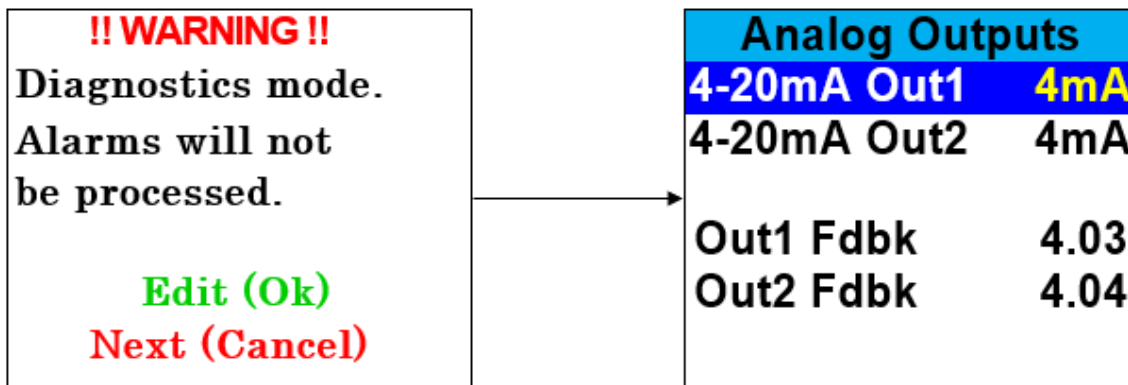


Figure 11-3 – Analog Outputs Diagnostics Menu

To manually stimulate the 4-20mA outputs within the Analog Outputs Menu:

1. Select the channel.
2. Swipe the EDIT key.

Each swipe increments the output by 4mA from 0-20mA. The Out1 Fdbk and Out2 Fdbk can be useful in determining if there are issues with the output. A circuit is installed on each of the two outputs which measures the actual current flow out of the output terminals.

**NOTE:** If this number reads zero when an output is stimulated, it could indicate that there is a cut wire or some other failure in connection with the wiring to the controller.

### 11.3 LED Test

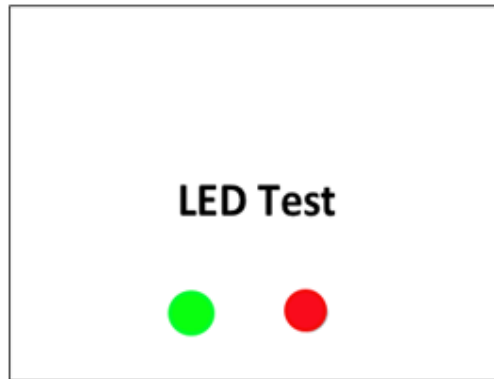


Figure 11-4 – LED Test Diagnostics Menu

LED Test causes the two LEDs on the front panel to blink alternating red and green.

### 11.4 Serial Ports

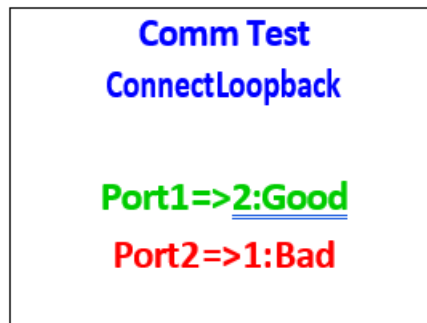


Figure 11-5 – Serial Ports Diagnostics Menu

Serial Ports is used to test the two communication ports on the optional Relay/RS-485 Modbus Option Board. To test the Serial Ports:

1. Connect A1 to A2 and B1 to B2.
2. Set jumpers J3 and J5 to dual port mode, position B.
3. The screen will then display a Good or Bad status report as shown in Figure 11-5.



## 12 Modbus

The TXP-T40 may be equipped with two optional (Relay/RS-485 Modbus Option Board) RS-485 ports which can be independently configured as Modbus master or slave. Chapter 5 defines register locations of data available via the TXP-T40 slave port.

### 12.1 Modbus TCP

#### Key Qualities

- Enabled through the Ethernet port
- Polled by its IP Address
- When Modbus TCP slave is used, the Slave ID field of the message is ignored
- Channels can be configured to poll using the TXP-T40's Modbus TCP master interface

### 12.2 Modbus Slave Writes

#### Key Qualities

- Allows function code 5 (write coil), as well as function code 6, and 16 (write holding registers). These function codes can be used to write configuration parameters to the TXP-T40.
- By default, all Modbus writes are disabled except the unlock parameter 40099.
  1. The Modbus lock code can be written to register 40099 to enable writes to other registers.
  2. The unit will be unlocked for 10 minutes after the last write occurs.
  3. After the 10-minute timeout, the unit will automatically save any parameters that have been written to. All written parameters can be saved manually by writing a value of 1 to coil 95 or register 40095.
  4. Writing parameters that span multiple register (such as 32-bit floating points) requires function code 16.
  5. All registers must be written at once.

### 12.3 Modbus Slave Register Location

The following table describes the TXP-T40's Modbus slave database. Any portion of this data may be read by a Modbus master device such as a PC, PLC or DCS. Since the Modbus port is RS-485, multiple TXP-T40s may be multi-dropped onto the same cable.

Variable Name	Alias	Read	Write	Notes
Ch1AnalogOutputRaw	31001	4	N/A	12-bit value; 800=4mA; 4000=20mA
Ch2AnalogOutputRaw	31002	4	N/A	12-bit value; 800=4mA; 4000=20mA
Ch 1 A2D Raw Counts	31003	4	N/A	12-bit value from A/D converter
Ch 2 A2D Raw Counts	31004	4	N/A	12-bit value from A/D converter
Ch 1 Sensor Life	31009	4	N/A	16-bit signed integer ranging from -1 to 100 where -1 indicates Cal Required
Ch 2 Sensor Life	31010	4	N/A	16-bit signed integer ranging from -1 to 100 where -1 indicates Cal Required
Ch 1 Sensor Temp	31011	4	N/A	16-bit integer from 1 to 4095 scaled for -55°C to +125°C

Ch 2 Sensor Temp	31012	4	N/A	16-bit integer from 1 to 4095 scaled for -55°C to +125°C
Ch 1 4-20mA Out FP	31210	4	N/A	32-bit floating point
Ch 2 4-20mA Out FP	31212	4	N/A	32-bit floating point
Ch1OutputFeedbackFP	31214	4	N/A	32-bit floating point
Ch2OutputFeedbackFP	31216	4	N/A	32-bit floating point
12V Input FP	31218	4	N/A	32-bit floating point
Sensor Volts FP	31220	4	N/A	32-bit floating point
Bridge Amp FP	31222	4	N/A	32-bit floating point
Bridge Out FP	31224	4	N/A	32-bit floating point
Product ID	32001	4	N/A	Factory use only
Version	32002	4	N/A	Factory use only
Custom Feature	32003	4	N/A	Factory use only
Customer ID	32004	4	N/A	Factory use only
Lock Status	32005	4	N/A	
Boot Year	32006	4	N/A	Last power-up time & date
Boot Month	32007	4	N/A	Last power-up time & date
Boot Day	32008	4	N/A	Last power-up time & date
Boot Hour	32009	4	N/A	Last power-up time & date
Boot Minute	32010	4	N/A	Last power-up time & date
Boot Second	32011	4	N/A	Last power-up time & date
SR 1 State	32020	4	N/A	True if relay #1 active
SR 2 State	32021	4	N/A	True if relay #2 active
SR 3 State	32022	4	N/A	True if relay #3 active
FR State	32023	4	N/A	True if fault relay active
Warmup	32025	4	N/A	True if unit in warm-up
SR 1 Flashing	32026	4	N/A	True if relay #1 flashing
SR 2 Flashing	32027	4	N/A	True if relay #2 flashing
SR 3 Flashing	32028	4	N/A	True if relay #3 flashing
FR Flashing	32029	4	N/A	True if fault relay flashing
DI State	32034	4	N/A	Digital input status
Ch 1 Fixed Point	33001	4	N/A	Compatible with TXP-T40
CH 2 Fixed Point	33002	4	N/A	Compatible with TXP-T40
Ch 1 Floating Point	33010	4	N/A	32-bit IEEE 754 float
Ch 1 Value String	33012	4	N/A	6 character string; zero terminated
Ch 1 Temperature Float	33015	4	N/A	Sensor temperature
Ch 1 A1 Status	33017	4	N/A	True if alarm 1 active
Ch 1 A1 Flashing	33018	4	N/A	True if alarm 1 indicator flashing
Ch 1 A2 Status	33019	4	N/A	True if alarm 2 active
Ch 1 A2 Flashing	33020	4	N/A	True if alarm 2 indicator flashing
Ch 1 A3 Status	33021	4	N/A	True if alarm 3 active

Ch 1 A3 Flashing	33022	4	N/A	True if alarm 3 indicator flashing
Ch 1 Fault Status	33023	4	N/A	True if fault active
Ch 1 Comm Error	33024	4	N/A	True if comm error
Ch 1 Config Error	33025	4	N/A	True if config error
Ch 1 I/O Error	33026	4	N/A	True if input/output error
Ch 1 Cal Flag	33027	4	N/A	True if calibration in progress
Ch 1 Marker Flag	33028	4	N/A	True if marker active
Ch 1 Linearize	33029	4	N/A	True if linearization table active
Ch 1 Err Flashing	33030	4	N/A	True if channel error
Ch 2 Floating Point	33040	4	N/A	32-bit IEEE 754 float
Ch 2 Value String	33042	4	N/A	6-character string; zero terminated
Ch 2 Temp Float	33045	4	N/A	Sensor temperature
Ch 2 A1 Status	33047	4	N/A	True if alarm 1 active
Ch 2 A1 Flashing	33048	4	N/A	True if alarm 1 indicator flashing
Ch 2 A2 Status	33049	4	N/A	True if alarm 2 active
Ch 2 A2 Flashing	33050	4	N/A	True if alarm 2 indicator flashing
Ch 2 A3 Status	33051	4	N/A	True if alarm 3 active
Ch 2 A3 Flashing	33052	4	N/A	True if alarm 3 indicator flashing
Ch 2 Fault Status	33053	4	N/A	True if fault active
Ch 2 Comm Error	33054	4	N/A	True if comm error
Ch 2 Config Error	33055	4	N/A	True if config error
Ch 2 I/O Error	33056	4	N/A	True if input/output error
Ch 2 Cal Flag	33057	4	N/A	True if calibration in progress
Ch 2 Marker Flag	33058	4	N/A	True if marker active
Ch 2 Linearize	33059	4	N/A	True if linearization table active
Ch 2 Err Flashing	33060	4	N/A	True if channel error
Alarm Reset	40001	N/A	3	Write to acknowledge alarm
System Name	40010	4	N/A	16-character ASCII text
<b>Holding Registers</b>				
Date Year	40020	3	N/A	Current time & date
Date Month	40021	3	N/A	Current time & date
Date Day	40022	3	N/A	Current time & date
Date Hour	40023	3	N/A	Current time & date
Date Minute	40024	3	N/A	Current time & date
Date Second	40025	3	N/A	Current time & date
Refresh Time	40026	3	N/A	Alarm refresh (minutes)
Warmup Time	40027	3	N/A	Warm up delay (minutes)
Cal Purge Time	40028	3	N/A	Cal purge delay (minutes)
BlockNegative Flag	40029	3	N/A	True if prohibit display of neg values
Comm 1 Function	40030	3	N/A	MODBUS serial port #1
Comm 1 Baud Rate	40031	3	N/A	MODBUS serial port #1

Comm 1 Parity	40032	3	N/A	MODBUS serial port #1
Comm 1 Slave ID	40033	3	N/A	MODBUS serial port #1
Comm 1 Timeout	40034	3	N/A	MODBUS serial port #1
Comm 1 Poll Delay	40035	3	N/A	MODBUS serial port #1
Comm 1 Byte Order	40036	3	N/A	MODBUS serial port #1
Comm 1 Wireless T/O	40037	3	N/A	MODBUS serial port #1
Comm 1 LED Enable	40038	3	N/A	MODBUS serial port #1
Comm 2 Function	40040	3	N/A	MODBUS serial port #2
Comm 2 Baud Rate	40041	3	N/A	MODBUS serial port #2
Comm 2 Parity	40042	3	N/A	MODBUS serial port #2
Comm 2 Slave ID	40043	3	N/A	MODBUS serial port #2
Comm 2 Timeout	40044	3	N/A	MODBUS serial port #2
Comm 2 Poll Delay	40045	3	N/A	MODBUS serial port #2
Comm 2 Byte Order	40046	3	N/A	MODBUS serial port #2
Comm 2 Wireless T/O	40047	3	N/A	MODBUS serial port #2
Comm 2 LED Enable	40048	3	N/A	MODBUS serial port #2
DHCP Enabled	40050	3	N/A	Ethernet port; DHCP or fixed address
Host Name	40051	3	N/A	Ethernet port: 16 ASCII characters
IP Address	40066	3	N/A	Ethernet port: xxx.xxx.xxx.xxx
Net Mask	40070	3	N/A	Ethernet port: xxx.xxx.xxx.xxx
Gateway IP	40074	3	N/A	Ethernet port: xxx.xxx.xxx.xxx
Modbus TCP Byte Order	40080	3	N/A	MODBUS/TCP function
Modbus TCP Timeout	40081	3	N/A	MODBUS/TCP timeout (mSec)
Modbus TCP Poll Delay	40082	3	N/A	MODBUS/TCP poll delay (mSec)
Save Config	40095	N/A	3	Write command to save local config
Config Changed	40096	3	N/A	True if config changed since last read
Security Unlock	40099	3	N/A	TBD
Relay 1 A1 Votes	40101	3	N/A	Alarm relay #1 configuration
Relay 1 A2 Votes	40102	3	N/A	Alarm relay #1 configuration
Relay 1 A3 Votes	40103	3	N/A	Alarm relay #1 configuration
Relay 1 Fault Votes	40104	3	N/A	Alarm relay #1 configuration
Relay 1 Override	40105	3	N/A	Alarm relay #1 configuration
Relay 1 Ack	40107	3	N/A	Alarm relay #1 configuration
Relay 1 Failsafe	40108	3	N/A	Alarm relay #1 configuration
Relay 2 A1 Votes	40111	3	N/A	Alarm relay #2 configuration
Relay 2 A2 Votes	40112	3	N/A	Alarm relay #2 configuration
Relay 2 A3 Votes	40113	3	N/A	Alarm relay #2 configuration
Relay 2 Fault Votes	40114	3	N/A	Alarm relay #2 configuration
Relay 2 Override	40115	3	N/A	Alarm relay #2 configuration
Relay 2 Ack	40117	3	N/A	Alarm relay #2 configuration
Relay 2 Failsafe	40118	3	N/A	Alarm relay #2 configuration

Relay 3 A1 Votes	40121	3	N/A	Alarm relay #3 configuration
Relay 3 A2 Votes	40122	3	N/A	Alarm relay #3 configuration
Relay 3 A3 Votes	40123	3	N/A	Alarm relay #3 configuration
Relay 3 Fault Votes	40124	3	N/A	Alarm relay #3 configuration
Relay 3 Override	40125	3	N/A	Alarm relay #3 configuration
Relay 3 Ack	40127	3	N/A	Alarm relay #3 configuration
Relay 3 Failsafe	40128	3	N/A	Alarm relay #3 configuration
Force Sensor Upload	40141	3	N/A	Binary
Digital Input Mode	40150	3	N/A	Alarm ack or flow switch input
Digital Input Type	40151	3	N/A	Alarm ack or flow switch input
Digital Input Mode	40152	3	N/A	Alarm ACK or flow switch input
Send Sensor Life	40153	3	N/A	True if transmit sensor life value
Contact Info String	40160	3	N/A	16 ASCII characters (2 per register)
Ch 1 Measurement Name	40401	3	N/A	16 ASCII characters (2 per register)
Ch 2 Measurement Name	40409	3	N/A	16 ASCII characters (2 per register)
Ch 1 EUNITS	40423	3	N/A	10 ASCII characters (2 per register)
Ch 2 EUNITS	40428	3	N/A	10 ASCII characters (2 per register)
Ch 1 Preamp gain	40433	3	N/A	Contact factory
Ch 2 Preamp gain	40434	3	N/A	Contact factory
Ch 1 Cal Zero	42001	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 1 Cal Span	42003	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 1 Zero Value	42005	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 1 Span Value	42007	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 1 Fault Value	42009	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 1 Alarm 1 Setpoint	42011	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 1 Alarm 2 Setpoint	42013	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 1 Alarm 3 Setpoint	42015	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 1 Manual Gain	42017	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 1 Manual Offset	42019	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 2 Cal Zero Value	42021	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 2 Cal Span Value	42023	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 2 Zero Value	42025	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 2 Span Value	42027	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 2 Fault Value	42029	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 2 Alarm 1 Setpoint	42031	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 2 Alarm 2 Setpoint	42033	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 2 Alarm 3 Setpoint	42035	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 2 Manual Gain	42037	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 2 Manual Offset	42039	3	N/A	Modbus 32-bit IEEE 754 Floating Pt

Ch 1 Alarm 1 Latch	43001	3	N/A	False = NO; True = YES
Ch 1 Alarm 1 Trip	43002	3	N/A	False = HIGH; True = LOW
Ch 1 Alarm 1 On Delay	43003	3	N/A	Activation delay in seconds
Ch 1 Alarm 1 Off Delay	43004	3	N/A	Deactivation delay in minutes
Ch 1 Alarm 1 Hysteresis	43005	3	N/A	Percent of scale
Ch 1 Alarm 2 Latch	43011	3	N/A	False = NO; True = YES
Ch 1 Alarm 2 Trip	43012	3	N/A	False = HIGH; True = LOW
Ch 1 Alarm 2 On Delay	43013	3	N/A	Activation delay in seconds
Ch 1 Alarm 2 Off Delay	43014	3	N/A	Deactivation delay in minutes
Ch 1 Alarm 2 Hysteresis	43015	3	N/A	Percent of scale
Ch 1 Alarm 2 Color	43016	3	N/A	TBD
Ch 1 Alarm 3 Latch	43021	3	N/A	False = NO; True = YES
Ch 1 Alarm 3 Trip	43022	3	N/A	False = HIGH; True = LOW
Ch 1 Alarm 3 On Delay	43023	3	N/A	Activation delay in seconds
Ch 1 Alarm 3 Off Delay	43024	3	N/A	Deactivation delay in minutes
Ch 1 Alarm 3 Hysteresis	43025	3	N/A	Percent of scale
Ch 1 Alarm 3 Color	43026	3	N/A	TBD
Ch 1 Alarm 3 Enabled	43027	3	N/A	False = NO; True = YES
Ch 1 Data From	43031	3	N/A	Selection
Ch 1 Min Raw	43032	3	N/A	Binary (800)
Ch 1 Max Raw	43033	3	N/A	Binary (4000)
Ch 1 Remote ID	43034	3	N/A	Binary
Ch 1 Interface	43035	3	N/A	Binary
Ch 1 Byte Order	43036	3	N/A	Byte order
Ch 1 Alias	43037	3	N/A	Binary; 32-bit; 2x
Ch 1 IP Address	43039	3	N/A	Binary; 4x unsigned bytes
Ch 1 Port	43041	3	N/A	Binary; 32-bit; 2x
Ch 1 Remote Sensor	43043	3	N/A	Binary
Ch 1 DP	43079	3	N/A	Number of decimal points
Ch 1 Enable	43080	3	N/A	False = NO; True = YES
Ch 1 Deadband	43081	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 1 Marker Enable	43083	3	N/A	False = NO; True = YES
Ch 1 Marker Percent	43084	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 1 Marker Info	43086	3	N/A	6 ASCII characters
Ch 1 Marker Life	43089	3	N/A	Binary
Ch 1 Filter Count	43090	3	N/A	Binary ;0 to 60
Ch 1 Radio Reg	43091	3	N/A	Binary
Ch 1 Coefficient	43092	3	N/A	Binary
Ch 1 Bridge Voltage	43093	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 1 Balance	43095	3	N/A	Binary
Ch 1 Heater Enable	43096	3	N/A	False = NO; True = YES

Ch 1 Heater Setpoint	43097	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 1 Temp Comp -40	43099	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 1 Temp Comp -30	43103	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 1 Temp Comp -20	43107	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 1 Temp Comp -10	43111	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 1 Temp Comp 0	43115	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 1 Temp Comp +10	43119	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 1 Temp Comp +20	43123	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 1 Temp Comp +30	43127	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 1 Temp Comp +40	43131	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 1 Temp Comp +50	43135	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 1 Temp Comp +60	43139	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 1 Sensor Type	43143	3	N/A	TBD
Ch 1 Send Sensor Life	43144	3	N/A	False = NO; True = YES
Ch 1 Cal mA Setting	43145	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 1 Local Cal	43147	3	N/A	False = NO; True = YES
Ch 1 AI Range	43148	3	N/A	TBD
Ch 2 Alarm 1 Latch	43201	3	N/A	False = NO; True = YES
Ch 2 Alarm 1 Trip	43202	3	N/A	False = HIGH; True = LOW
Ch 2 Alarm 1 On Delay	43203	3	N/A	Activation delay in seconds
Ch 2 Alarm 1 Off Delay	43204	3	N/A	Deactivation delay in minutes
Ch 2 Alarm 1 Hysteresis	43205	3	N/A	Percent of scale
Ch 2 Alarm 2 Latch	43211	3	N/A	False = NO; True = YES
Ch 2 Alarm 2 Trip	43212	3	N/A	False = HIGH; True = LOW
Ch 2 Alarm 2 On Delay	43213	3	N/A	Activation delay in seconds
Ch 2 Alarm 2 Off Delay	43214	3	N/A	Deactivation delay in minutes
Ch 2 Alarm 2 Hysteresis	43215	3	N/A	Percent of scale
Ch 2 Alarm 2 Color	43216	3	N/A	TBD
Ch 2 Alarm 3 Latch	43221	3	N/A	False = NO; True = YES
Ch 2 Alarm 3 Trip	43222	3	N/A	False = HIGH; True = LOW
Ch 2 Alarm 3 On Delay	43223	3	N/A	Activation delay in seconds
Ch 2 Alarm 3 Off Delay	43224	3	N/A	Deactivation delay in minutes
Ch 2 Alarm 3 Hysteresis	43225	3	N/A	Percent of scale
Ch 2 Alarm 3 Color	43226	3	N/A	TBD
Ch 2 Alarm 3 Enabled	43227	3	N/A	False = NO; True = YES
Ch 2 Data From	43231	3	N/A	Selection
Ch 2 Min Raw	43232	3	N/A	Binary (800)
Ch 2 Max Raw	43233	3	N/A	Binary (4000)
Ch 2 Remote ID	43234	3	N/A	Binary
Ch 2 Interface	43235	3	N/A	Binary
Ch 2 Byte Order	43236	3	N/A	Byte order

Ch 2 Alias	43237	3	N/A	Binary; 32-bit; 2x
Ch 2 IP Address	43239	3	N/A	Binary; 4x unsigned bytes
Ch 2 Port	43241	3	N/A	Binary; 32-bit; 2x
Ch 2 Remote Sensor	43243	3	N/A	Binary
Ch 2 DP	43279	3	N/A	Number of decimal points
Ch 2 Enable	43280	3	N/A	False = NO; True = YES
Ch 2 Deadband	43281	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 2 Marker Enable	43283	3	N/A	False = NO; True = YES
Ch 2 Marker Percent	43284	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 2 Marker Info	43286	3	N/A	6 ASCII characters
Ch 2 Marker Life	43289	3	N/A	Binary
Ch 2 Filter Count	43290	3	N/A	Binary ;0 to 60
Ch 2 Radio Reg	43291	3	N/A	Binary
Ch 2 Coefficient	43292	3	N/A	Binary
Ch 2 Bridge Voltage	43293	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 2 Balance	43295	3	N/A	Binary
Ch 2 Heater Enable	43296	3	N/A	False = NO; True = YES
Ch 2 Heater Setpoint	43297	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 2 Temp Comp -40	43299	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 2 Temp Comp -30	43303	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 2 Temp Comp -20	43307	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 2 Temp Comp -10	43311	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 2 Temp Comp 0	43315	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 2 Temp Comp +10	43319	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 2 Temp Comp +20	43323	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 2 Temp Comp +30	43327	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 2 Temp Comp +40	43331	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 2 Temp Comp +50	43335	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 2 Temp Comp +60	43339	3	N/A	32-bit FP Gain ;32-bit FP Offset
Ch 2 Sensor Type	43343	3	N/A	TBD
Ch 2 Send Sensor Life	43344	3	N/A	False = NO; True = YES
Ch 2 Cal mA Setting	43345	3	N/A	Modbus 32-bit IEEE 754 Floating Pt
Ch 2 Local Cal	43347	3	N/A	False = NO; True = YES
Ch 2 AI Range	43348	3	N/A	TBD
Ch 1 Value	45001	3	N/A	800 = "0"; 4000 = Full Scale
Ch 2 Value	45002	3	N/A	800 = "0"; 4000 = Full Scale
Ch 1 Value	45003/04	3	N/A	MODBUS 32-bit floating point
Ch 2 Value	45005/06	3	N/A	MODBUS 32-bit floating point
Ch 1 Alarm 1 Status	45007	3	N/A	"1" = Fault
Ch 1 Alarm 2 Status	45008	3	N/A	"1" = Fault
Ch 1 Alarm 3 Status	45009	3	N/A	"1" = Fault



Ch 1 Fault Status	45010	3	N/A	"1" = Fault
Ch 2 Alarm 1 Status	45011	3	N/A	"1" = Fault
Ch 2 Alarm 2 Status	45012	3	N/A	"1" = Fault
Ch 2 Alarm 3 Status	45013	3	N/A	"1" = Fault
Ch 2 Fault Status	45014	3	N/A	"1" = Fault
Ch 1 Sensor Life	45015	3	N/A	0-100 binary
Ch 2 Sensor Life	45016	3	N/A	0-100 binary
Ch 1 Sensor Temp	45017	3	N/A	Binary 0 - 4095
Ch2 Sensor Temp	45018	3	N/A	Binary 0 - 4095
Ch 1 Sensor Temp	45019/20	3	N/A	MODBUS 32-bit floating point
Ch 2 Sensor Temp	45021/22	3	N/A	MODBUS 32-bit floating point

## 13 Special Features

### 13.1 Webpage

All TXP-T40 transmitters come standard with an embedded webpage. The webpage gives remote access to view and configure parameters inside the transmitter. The required login allows the user to change configuration parameters directly from the computer.

The webpage requires a modern web browser. Supported browsers include:

- Internet Explorer 8\*
- Google Chrome
- Mozilla Firefox 2+

**NOTE:** Viewing pages in an outdated browser will result in improperly drawn pages.

In order to view the webpage:

1. The user must know the IP address, or, if DHCP enabled, the transmitter's hostname. This information can be viewed from the Network Settings Menu (see Section 8.3).
2. The user will be able to see channel data, event logs and configuration.
3. If a parameter needs to be changed, the user must login before the transmitter will accept the change. To change this login password:
  - a. Display the Security menu under Modbus/Web Code (see Section 8.5).
  - b. The default Modbus/Web Code is 1234.

**NOTE:** Internet Explorer does not allow access to hostnames that contain a '\_' character.

## 13.2 Status Screen

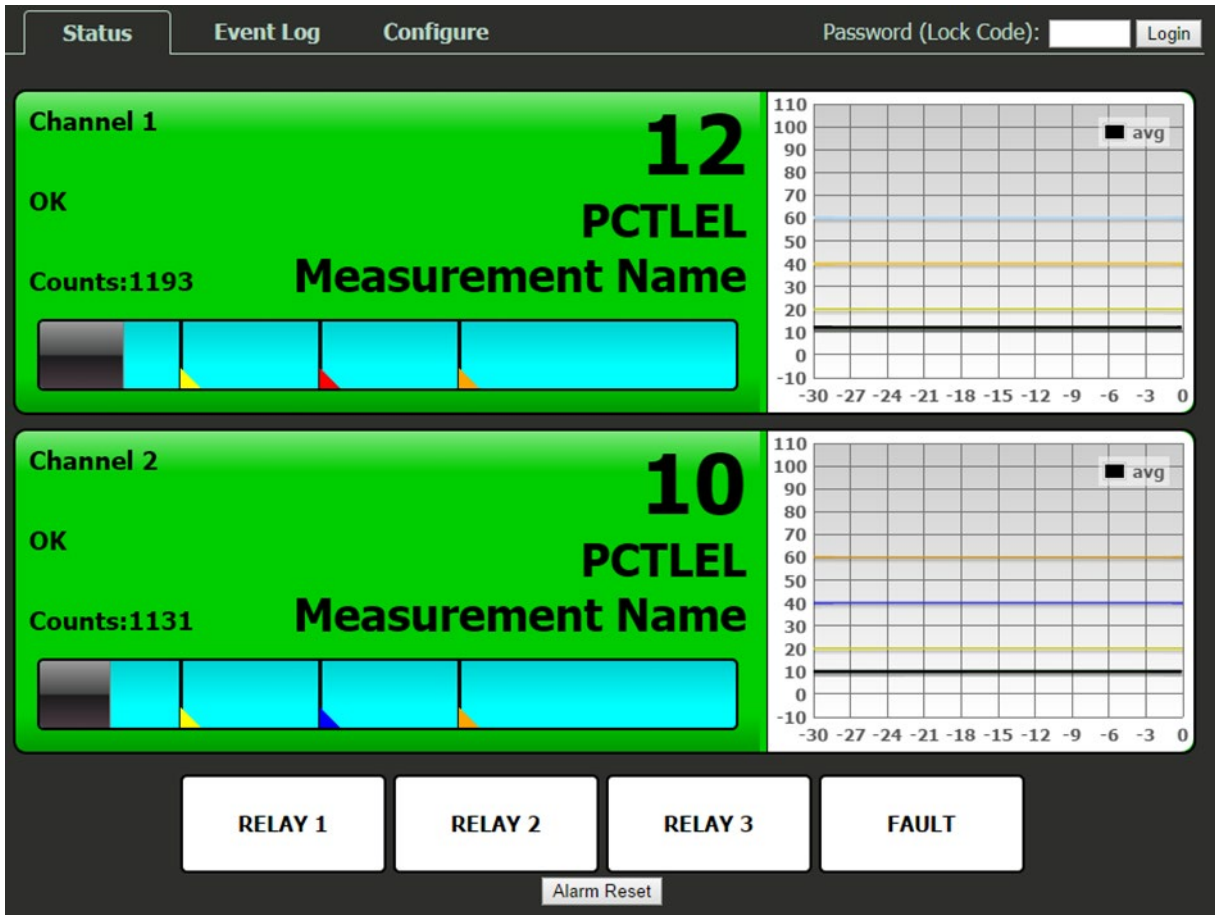


Figure 13-1 – Status Screen

The Status Screen shown above (Figure 13-1) displays the active channels simultaneously depending on the transmitter's configuration and is automatically updated every 15 seconds.

This screen, similar to the Dual Channel screen, displays:

- Measurement name and reading
- Colored cells that flash with new alarms to indicate alarm conditions

Once the alarms have been acknowledged by an operator,

1. The cell will remain the appropriate color
2. The cell will stop flashing, showing the alarm has been acknowledged

The four alarm relay states are shown at the bottom of the screen. A red box indicates an energized (de-energized in fail safe) relay.

A thirty-minute trend graph is viewable on the right-hand side of the screen.

- Vertical tic marks are each 10% of full scale.
- Colored lines indicate alarm levels.

- Since each data point must be collected for several seconds before it may be displayed it is likely input values will fluctuate during this interval. In this case a light blue indicates a minimum value and a brown line indicates a maximum value.

### 13.3 Event Log Screen

	Date	Time	Channel	Event
0	09/24/2014	10:20	-	Conf Edit
	09/24/2014	10:05	2	Fault Out
	09/24/2014	10:05	2	Fault In
	09/24/2014	10:05	2	A2 Out
	09/24/2014	10:05	2	A3 Out
	09/24/2014	10:05	2	A3 In
	09/24/2014	10:05	2	A2 In
	09/24/2014	10:05	2	A2 Out
	09/24/2014	10:04	2	A3 Out
	09/24/2014	10:04	2	A3 In
10	09/24/2014	10:04	2	A2 In
	09/24/2014	10:04	2	A1 In
	09/24/2014	10:04	2	Fault Out
	09/24/2014	10:04	2	Fault In
	09/24/2014	08:32	-	Conf Edit
	09/24/2014	08:31	2	A1 Out
	09/24/2014	08:31	2	A2 Out
	09/24/2014	08:31	2	A3 Out
	09/24/2014	08:31	2	A3 In
	09/24/2014	08:29	2	A3 In

Figure 13-1 – Event Log Screen

The Event Log Screen displays the last 100 events logged in the TXP-T40. The events are logged in a first in first out format, in non-volatile memory.

Logged events include:

- Alarms/Fault In and Out
- Alarm and Remote Alarm Resets
- Alarm Refresh
- Event Log Cleared
- Configuration Changed
- Calibration in and out
- System and Cold Boots
- Communication and Configuration Errors
- Corrupt Sensor
- Sensor Error
- Configuration Edits

The events are time and date stamped and if channel specific the number of the channel is shown in the third column in Figure 13-2. above.

### 13.4 Configure

The configuration pages allow viewing and editing of most system parameters. The exceptions are communication and security settings which must be set from the unit's magnetic switch interface.

To ensure all changes made to the parameters will be saved, enter the correct login password.

#### 13.4.1 Relay Config

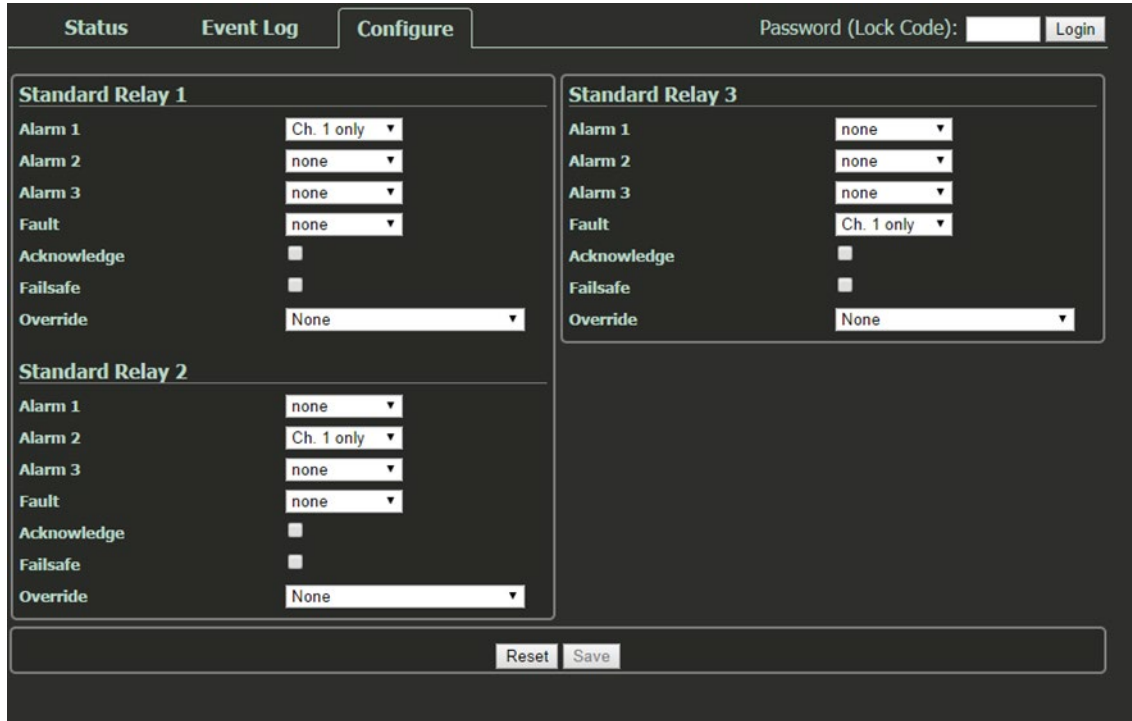


Figure 13-2 – Relay Config Screen

The Relay Config Screen is shown in Figure 13-3. For information on how to configure the relays, refer to Section 6.

### 13.5 Channel Config

The screenshot shows the 'Configure' tab of the Channel Config screen. At the top, there are tabs for 'Status', 'Event Log', and 'Configure', along with a 'Password (Lock Code):' field and a 'Login' button. Below the tabs, there are navigation buttons: '1' (selected), 'Ch. Down', and 'Ch. Up'.

**Alarm 1**

- Setpoint: 20.000
- Latching:
- Trip On: High
- On Delay (seconds): 0
- Off Delay (minutes): 0
- Deadband (%): 1

**Alarm 2**

- Setpoint: 40.000
- Latching:
- Trip On: High
- On Delay (seconds): 0
- Off Delay (minutes): 0
- Deadband (%): 1
- Color: Red

**Alarm 3**

- Enabled:
- Setpoint: 80.000
- Latching:
- Trip On: High
- On Delay (seconds): 0
- Off Delay (minutes): 0
- Deadband (%): 1
- Color: Red

**Temperature Compensation**

Gain	Offset	Temp
1.000	0.000	-40°C
1.000	0.000	-30°C
1.000	0.000	-20°C
1.000	0.000	-10°C
1.000	0.000	-00°C
1.000	0.000	10°C
1.000	0.000	20°C
1.000	0.000	30°C
1.000	0.000	40°C
1.000	0.000	50°C
1.000	0.000	60°C

**Configure**

- Channel Enabled:
- Tag: Measurement Name
- Engineering Units: PCTLEL
- Zero: 0.000
- Span: 100.000
- Decimal Places: 0
- Deadband (%): 1.000
- In Cal Output (mA): 3.000

**Data From**

- Source: Bridge
- Min Raw: 800
- Max Raw: 4000
- Filter Count (seconds): 5

**Marker**

- Marker Enable:
- Marker Percent: -15.625
- Marker Text: IN CAL
- Sensor Life Enabled:

**Fault**

- Fault Setpoint: -10.000

Buttons: Restore Defaults, Copy Channel

Bottom navigation: Reset | Save | Ch. Down | Ch. Up

Figure 13-3 – Channel Config Screen

The Channel Config Screen is shown in Figure 13-4. For information on configuring channels, refer to Section 7.

13.5.1 System Config

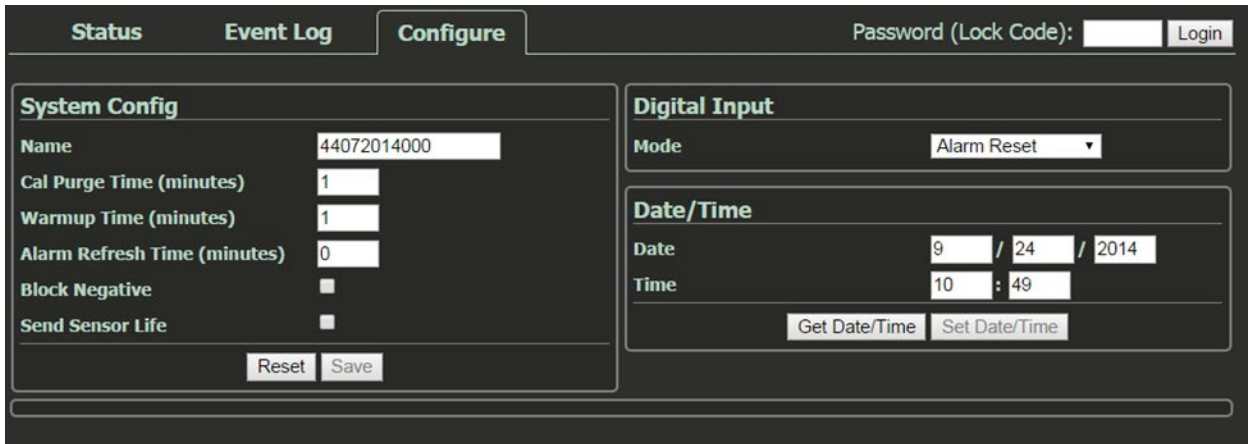


Figure 13-4 – System Config Screen

The System Config Screen is shown in Figure 13-5. For information on how to configure the system, refer to Section 9.

13.5.2 Config Transfer

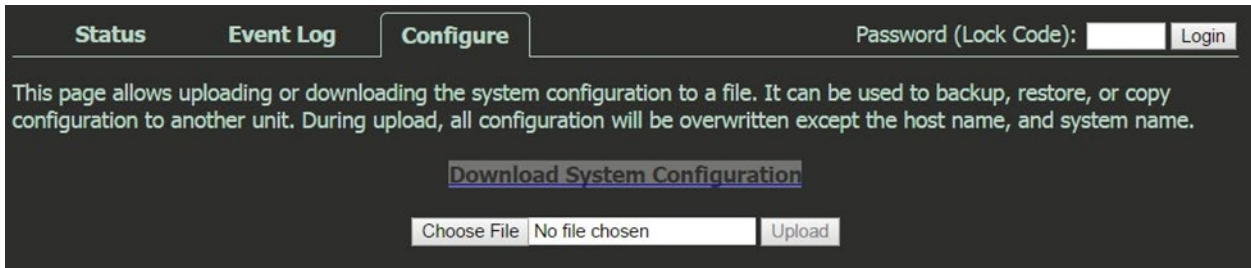


Figure 13-5 Config Transfer Screen

The Config Transfer Screen, Figure 13-6, allows the transferring of system configuration to or from the unit via the webpage. When the download link is clicked, the unit saves the current configuration into a file and transfers it to the user. It should be saved as a .cfg file.

When uploading configuration:

1. Select a .cfg file.
2. Press upload.
3. After a successful upload, the unit will restart, and the webpage will attempt to refresh after 30 seconds.

**NOTE:** The maximum length of a filename for an uploaded file is 28 characters.

## 14 Network Connection

### 14.1 Direct Connection with Crossover cable or Hub/Switch

If a network is not available, or if it is desired to keep the TXP-T40 and PC(s) completely separated from another computer, a simple network can be created.

The simplest network can be created by connecting the TXP-T40 to a PC directly using an Ethernet crossover cable.

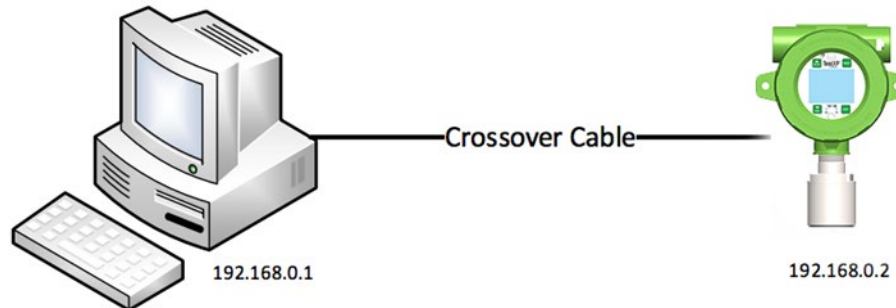


Figure 14-1 - Direct Connection with Crossover Cable

If a crossover cable is not available, or if multiple computers need access to the TXP-T40, a switch can be connected to the TXP-T40 and one or more computer using standard patch cables.

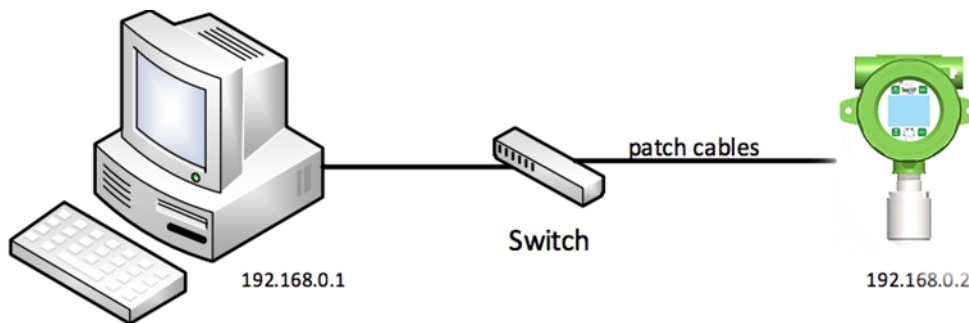


Figure 14-2 – Direct Connection with Switch and Patch Cables

These simple networks will not likely have access to a DHCP server. If the TXP-T40 is configured for DHCP:

- It will automatically select an IP address on the subnet 169.254.x.x.
- The subnet uses a netmask of 255.255.0.0 and is compatible with the default IP address chosen by Microsoft Windows.

To configure for DHCP:

1. Connect the PC with a patch cable.
2. View the TXP-T40 'Communication Settings' Menu.
3. View the 'Network Settings' Menu.

4. The IP address field will show a value.
5. Enter the value into the web browser to view the webpage.

**NOTE:** The recommended option for a permanent network is to set up a static IP on the TXP-T40 and any other devices (or computers) on the network (see Section 14.4).

## 14.2 Connecting the TXP-T40 to an Existing LAN

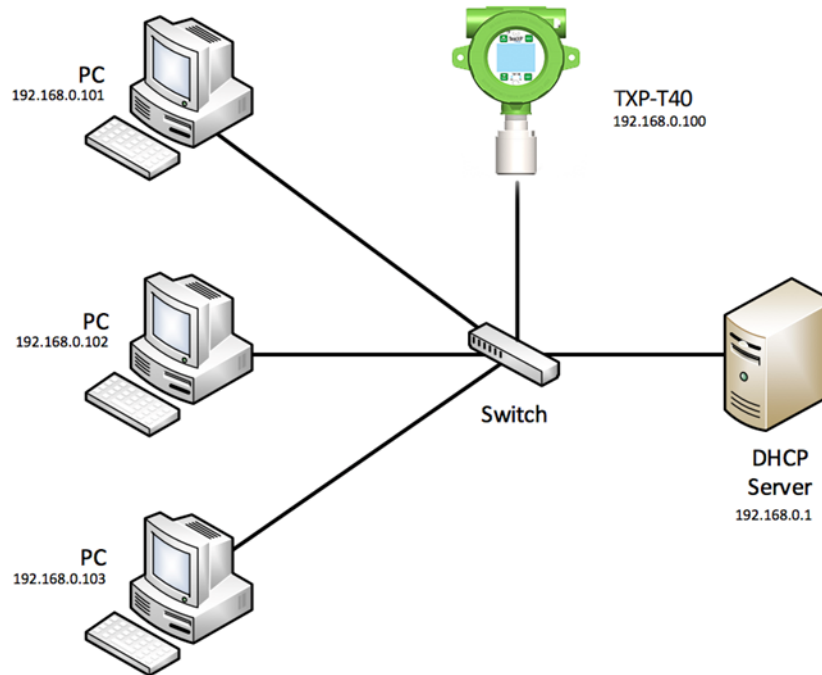


Figure 14-3 – Connecting the TXP-t40 to an Existing LAN

A typical network will have a DHCP server, a switch (sometimes combined) and several devices connected to that switch.

A TXP-T40 can normally be added to such a network by:

1. Connecting the Ethernet port to the switch using an Ethernet patch cable.
2. The default settings will allow it to obtain an IP address from the DHCP server.
3. Once an IP address is obtained, the TXP-T40 can be accessed from computers and other devices on the network. Computers access the TXP-T40 by hostname, or by IP address.

When utilizing more than one TXP-T40 on the network, and if they need to communicate with each other, use a static IP configuration (see Section 14.4) to avoid communication failure.

**NOTE:** Static configuration is necessary when using Modbus TCP master or slave mode over TCP/IP.

If accessing the TXP-T40 from a computer or other device that can resolve its hostname, dynamic configuration is fine.



### 14.3 Connecting the TXP-T40 to an Isolated Network

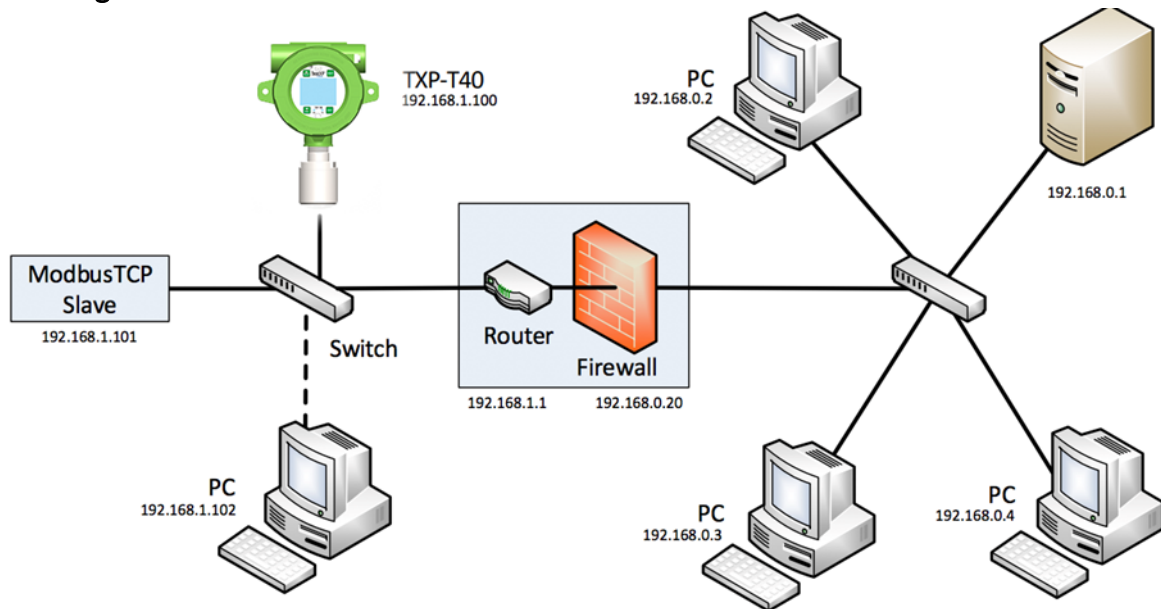


Figure 14-4 – Connecting the TXP-T40 to an Isolated Network

Another possible network configuration for the TXP-T40 involves:

1. Connecting the transmitter, with Modbus TCP slave devices, and possibly computers on a network.
2. This network can then be isolated from a larger company network using a router/firewall.
3. The isolated network will not see any traffic from the company network unless port forwarding rules are set up in the router.
4. This configuration offers greater security and improved network performance when the company network has a large amount of traffic.

When creating an isolated network, use a different private IP address range than the outside network.

Port forwarding rules can usually be configured to only allow certain computers outside the firewall access to the TXP-T40. The method for creating forwarding rules is heavily dependent on the router/firewall being used. See router documentation.

The following will need to be set:

- IP address or MAC address of the source (outside computer)
- Incoming port,
- Destination (TXP-T40) IP address
- Destination port
- Protocol

**NOTE:** The source IP address should be set to allow a range or single IP address. Some firewalls can restrict access by MAC address. This can be used instead of or in addition to the source IP address. The protocols for forwarding rules should be TCP/IP. The destination ports should be 80 for access to the web server, and 502 for access to Modbus TCP.

In most cases, a router and firewall will separate the network from the internet.

**NOTE:** It is not recommended to forward ports from the internet to an TXP-T40. In cases where offsite access is needed, a VPN, or tunnel, connection could be used to get inside the network.

## 14.4 Static IP Configuration

If the user is setting up a Static IPs on a larger company network, consult the IT administrator to obtain an IP address, the correct netmask, and gateway.

**NOTE:** In this case, do not choose the user's own addresses or the user could cause an address conflict with other devices on the network.

### 14.4.1 TXP-T40 Static IP Configuration

To disable DHCP:

1. Access the Network Settings Menu on the TXP-T40.
2. The IP address should be set to 192.168.0.x where 'x' is any number from 0 to 255. A typical address would be 192.168.0.76.
3. The netmask should be set to 255.255.255.0.
4. The gateway can be left as 0.0.0.0 unless the TXP-T40 will be accessing Modbus TCP devices outside a router/firewall. If the TXP-T40 needs to poll outside devices, the Gateway IP will need to be set.

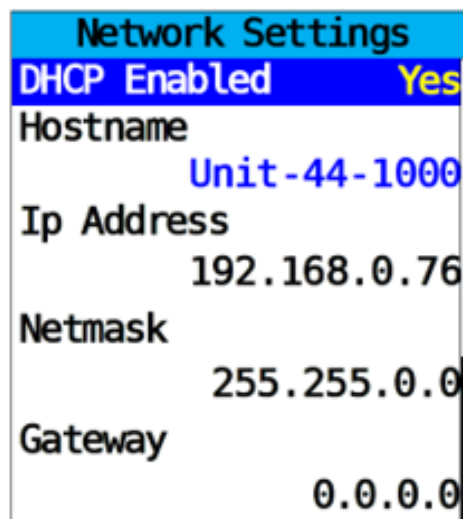


Figure 14-5 – Network Settings Menu

After making changes to the Network Settings Menu:

1. A power cycle is required.
2. Exit the menu before cycling power to ensure saved changes.

### 14.4.2 Windows 10 Static IP Configuration

These steps are similar but not exactly the same in other versions of Windows.

To connect a PC to a TXP-T40 using static IP configuration, the PC must also be configured.

Access the PC network adapter settings:

1. Right click on the “Widows” Icon.
2. Click “Network Connections”.
3. In the Settings window, under Change your network settings, click on “Change adapter options”.

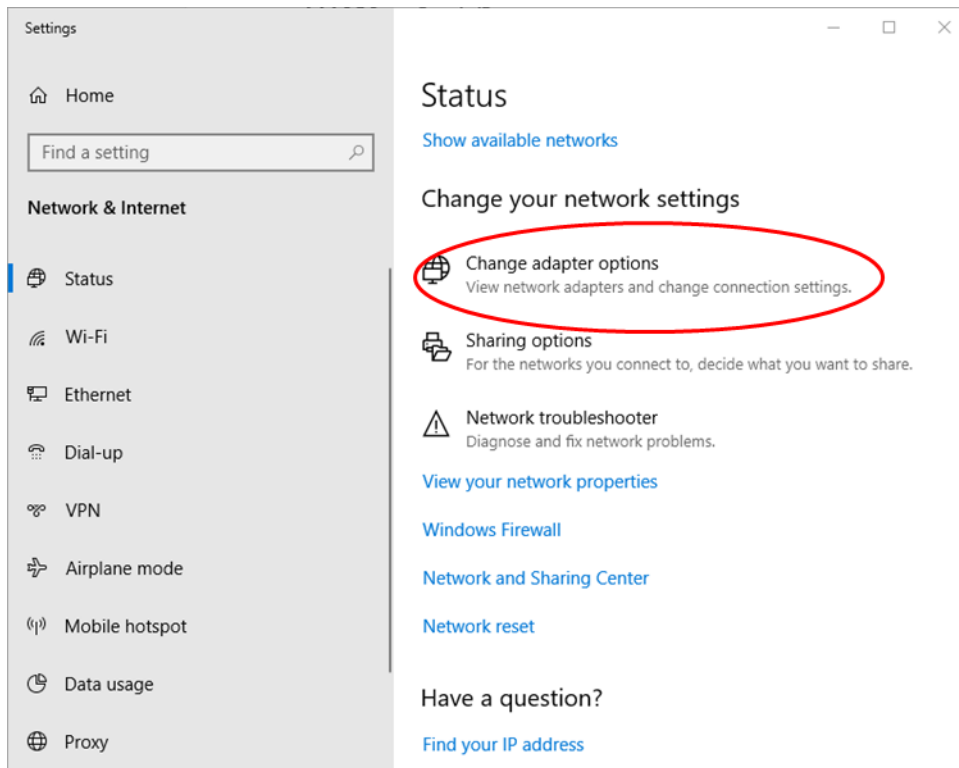


Figure 14-6 – Settings

4. In the Network Connections window, right click on the desired Ethernet connection and click “Properties”.



Figure 14-7 Ethernet Connection

5. Select on “Internet Protocol Version 4 (TCP/IPv4)” then click “Properties”.

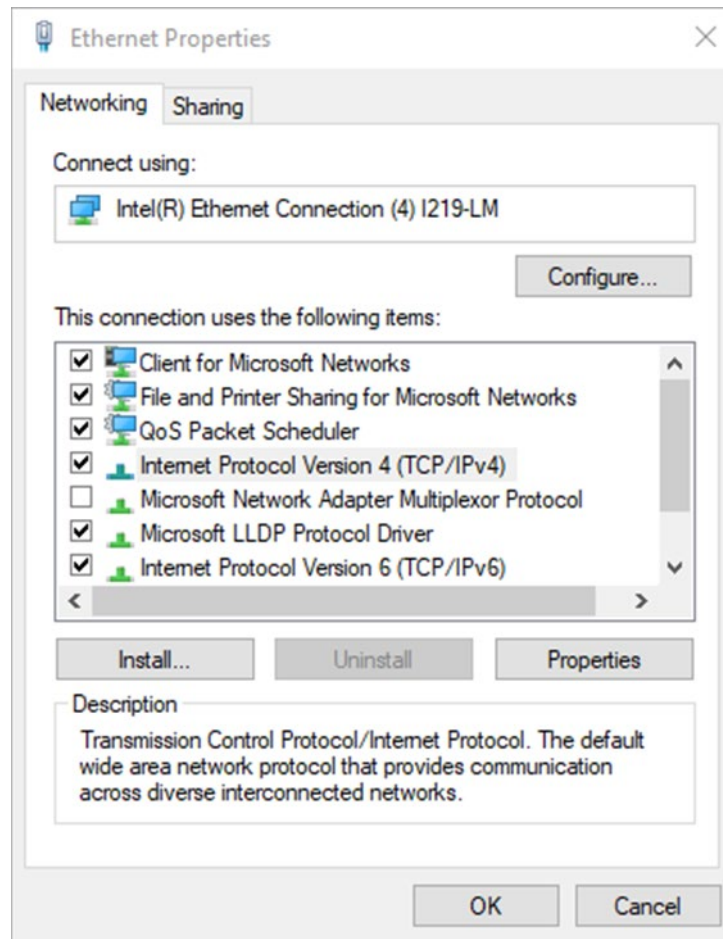


Figure 14-8 – Ethernet Properties

6. Select "Use the following IP Address". The IP address should be chosen different than the one set on the TXP-T40. For the network created in the 'TXP-T40 Static IP Configuration', only the last digit can be changed. A typical choice is 192.168.0.1. The subnet mask is set to 255.255.255.0.

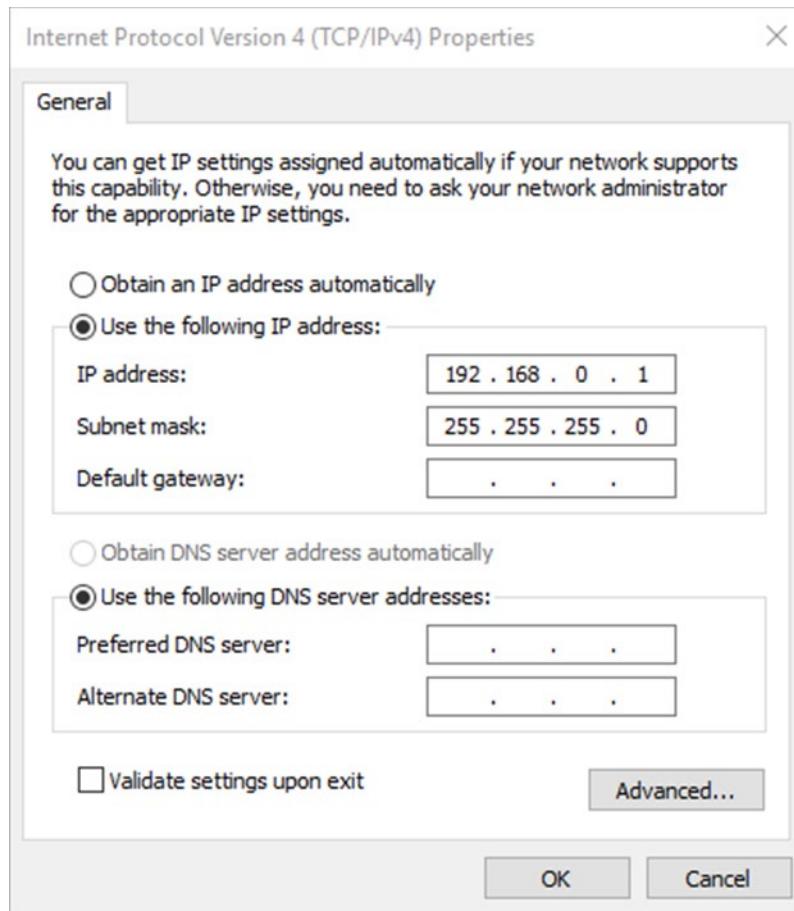


Figure 14-9 – Internet Protocol Version 4 (TCP/IPv4)

7. If a gateway is present, its address should be set; otherwise it can be left blank.
8. Click “OK” in the Internet Protocol Version 4 (TCP/IPv4) window.
9. Click “OK” in the Ethernet Properties window.
10. Close the Network Connections window by clicking the “X” in the upper right-hand corner.
11. Close the Settings window by clicking the “X” in the upper right-hand corner.

#### 14.4.3 Dynamic IP Configuration

The TXP-T40 defaults to use a dynamic IP address. This setting may be used if a DHCP server is available on the network.

**NOTE:** It is recommended for TXP-T40s unless there are multiple TXP-T40s that need to communicate to each other.

NetworkSettings	
DHCPEnabled	Yes
Hostname	Unit-44-1000
Ip Address	192.168.0.72
Netmask	255.255.0.0
Gateway	192.168.0.1

Figure 14-10 – Network Settings Menu with DHCP Enabled

To enable dynamic IP:

1. Set DHCP to Yes in the Network Settings Menu.
2. Allow power to be cycled before this change takes effect.
3. Exit the menu to ensure saved changes.

A PC will normally have DHCP enabled by default. If not:

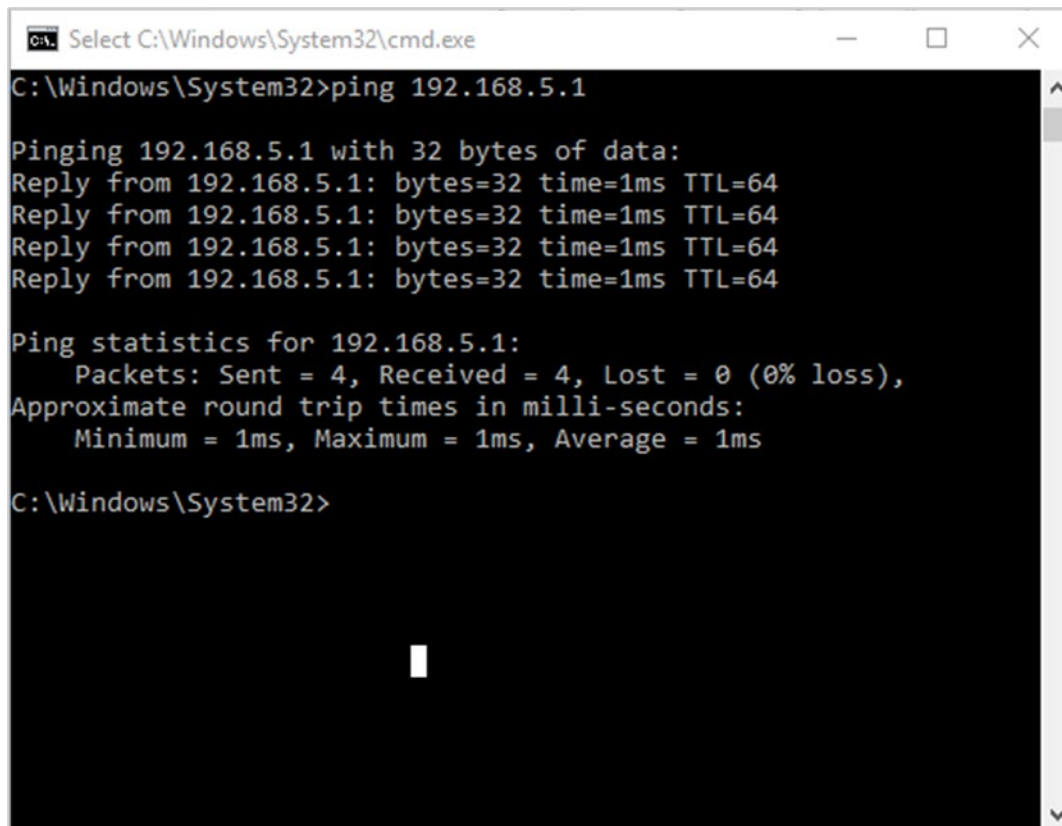
1. Follow the steps in Section 14.4.
2. Choose "Obtain IP Address Automatically" in the last step.

## 14.5 Testing Connections

To verify that an TXP-T40 is accessible and communicating on the network:

To test the connection in Windows 10:

1. Click on the Windows Icon and type "cmd".
2. Click on the "Command Prompt" app.
3. In the Command Prompt window type, ping, then the IP address of the unit and press "enter".



```
Select C:\Windows\System32\cmd.exe
C:\Windows\System32>ping 192.168.5.1

Pinging 192.168.5.1 with 32 bytes of data:
Reply from 192.168.5.1: bytes=32 time=1ms TTL=64
Reply from 192.168.5.1: bytes=32 time=1ms TTL=64
Reply from 192.168.5.1: bytes=32 time=1ms TTL=64
Reply from 192.168.5.1: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.5.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Windows\System32>
```

Figure 14-11 – Command Prompt Window

4. Verify that the 4 reply lines are printed.
5. Close the Command Prompt window by clicking the “X” in the upper right-hand corner.

## 15 Relay/RS 485 Option Board

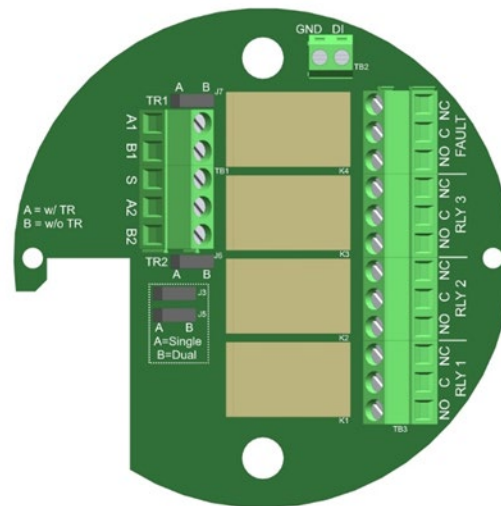


Figure 15-1 Relay / RS-485 Option Board

The Relay/RS-485 Option Board is installed as a “piggyback” board on the back of the TXP-T40’s CPU/Display Board.

The option board comes equipped with the following features:

- Two RS-485 Modbus Communication ports
- Three Programmable relays
- Dedicated Fault Relay
- Digital Input

The optional Relay/RS-485 Modbus Option Board supplies three programmable alarm relays:

1. A FAULT relay
2. A RS-485 Modbus RTU master/slave port
3. A second RS-485 Modbus RTU master/slave port

This board is "piggybacked" behind the TXP-T40 CPU/Display Board within aluminum and SS enclosures.

### CAUTION, ENSURE THE FOLLOWING:



1. Alarm relays have dry contacts and power must be supplied from an external source.
2. If this power source exceeds 3 amps, users should consider fusing relay wiring with 3-amp fuses.
3. Contacts are rated for RESISTIVE loads! Inductive loads, such as contactor coils or motors, may cause contact arcing. This will shorten life and emit RFI into the sensor signals.
4. Use appropriate arcing snubber and MOVs across inductive loads and keep wiring away from signal wires.
5. External wiring to TB2 should be shielded and protected from noise spikes to prevent false alarm resets or overrides.

### 15.1 RS-485 Modbus Communications Ports

The two available Modbus Communication ports may be configured to work as a single port or two independent ports by positioning J3 and J5 to the desired position.



- When the jumpers are installed in the A, or "Single", position, the two ports are tied together to form a single port, e.g. A1 = A2 and B1 = B2.
- When the jumpers are installed in the B, or "Dual", position, the two ports function independently A1 with B1 and A2 with B2.

Each communication port is configured independently as discussed in Section 8.1. For details on Modbus Slave Registers, refer to Section 12.

RS-485 Modbus networks should be wired as shown below in Figure 15-2.

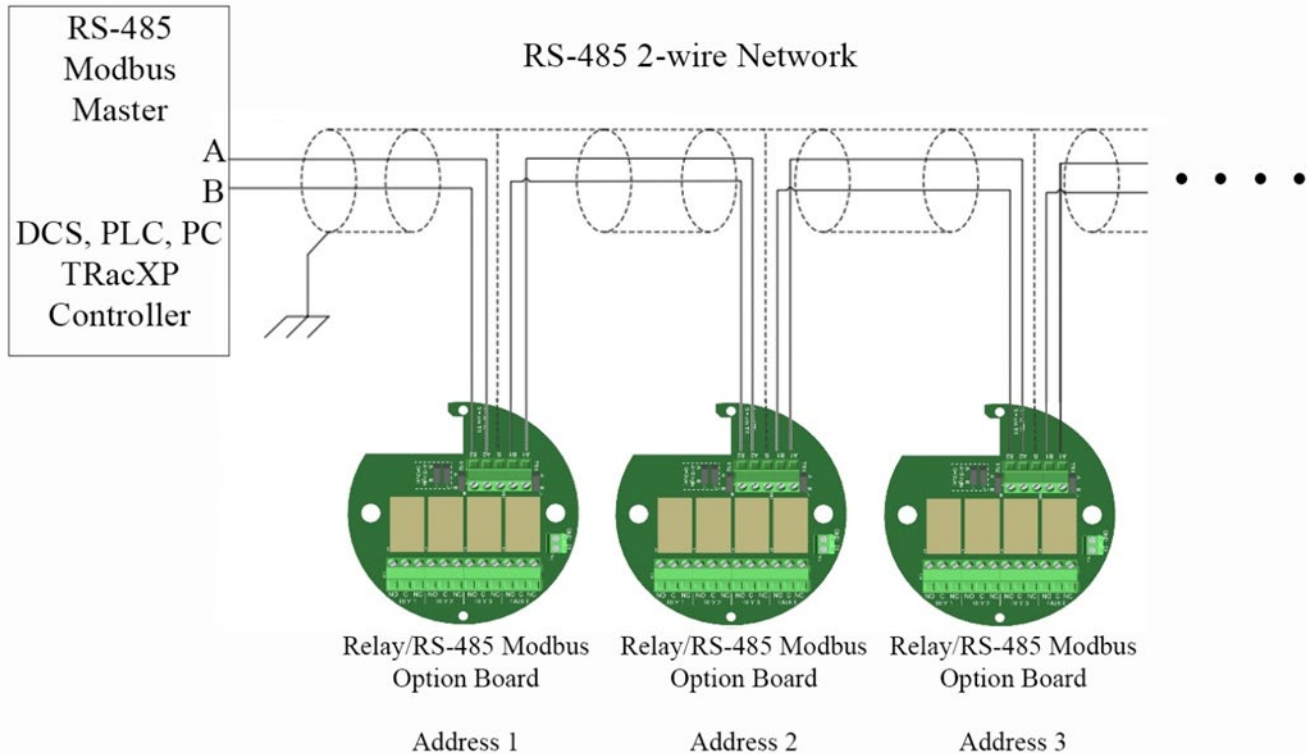


Figure 15-2 – RS-485 Modbus Wiring

Each TXP-T40:

- Represents an RTU.
- Must have a unique Remote ID address, which are assigned in the Data From Menu discussed in Section 7.2.
- Cabling must be a daisy chain as opposed to a star pattern for reliable operation.
- The "end of line" unit should have J6 and J7 installed in the A position.

## 15.2 Programmable Relays

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. This will shorten life and emit RFI into the sensor signals. Use appropriate arcing snubber and MOVs across inductive loads and keep wiring away from signal wires. External wiring to TB2 should be shielded



and protected from noise spikes to prevent false alarm resets or overrides. The relays installed on the optional relay board are rated as form C 5AMP @ 30VDC and 240VAC RESISTIVE type relays.

Relay terminals, which correspond to the shelf, or de-energized, state of the relays either accessed locally via TXP-T40 or remotely via embedded webpage, are labeled:

- NO (Normally Open)
- NC (Normally Closed)
- C (Common, or pole)

To configure the relays locally at the TXP-T40 transmitter, refer to Section 6.1.

To configure the relays via the embedded webpage, refer to Section 13.4.1.

To view a convenient diagnostics tool available for testing relay wiring and operation, refer to Section 10.1.

### 15.3 Fault Relays



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. This will shorten life and emit RFI into the sensor signals. Use appropriate arcing snubber and MOVs across inductive loads and keep wiring away from signal wires. External wiring to TB2 should be shielded and protected from noise spikes to prevent false alarm resets or overrides.

### 15.4 Digital Input

External wiring to the Digital Input should be shielded and protected from noise spikes to prevent false signals.

Configuration for the Digital input is discussed in Section 9.3, where the input can be set up to be used for Alarm Reset, Alarm 3 Override and Fault Override functions.

## 16 Remote Sensor Option Board

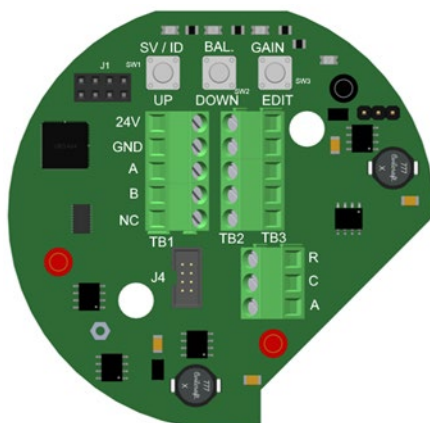


Figure 16-1 – Remote Sensor Option Board

**NOTE:** Using the Remote Sensor Option Board requires the TXP-T40 transmitter to have a Relay/RS-485 Option Board (Figure 16-1) installed. The Remote Sensor Option Board communicates to TXP-T40 transmitter through one of the two RS-485 Comm Ports on the Relay/RS-485 Option Board.

### 16.1 Wiring the Remote Sensor Option Board

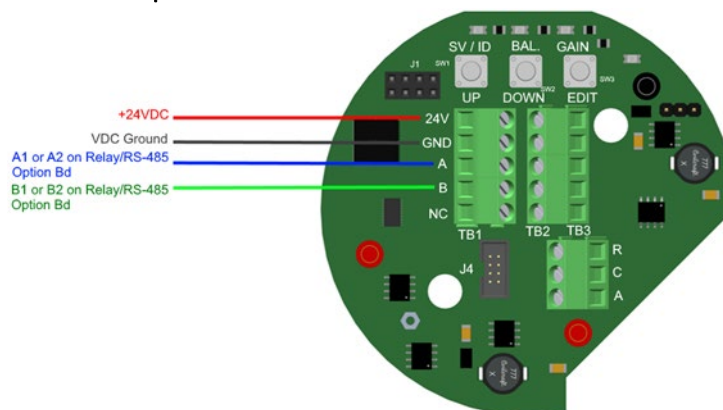


Figure 16-2 – Remote sensor Option Board Wiring

As shown in Figure 16-2 above, connect +24VDC to the 24V terminal and VDC Ground to the GND terminal on TB1 or TB2 of the Remote Sensor Bd. It is preferable to connect these to the T40 transmitter power supply.

Next, connect the A & B terminals of either TB1 or TB2 of the Remote Sensor Bd to the Relay/RS-485 Option Bd (Figure 15-1) terminals A1 & B1 or to terminals A2 & B2.

## 16.2 Remote Sensor Setup

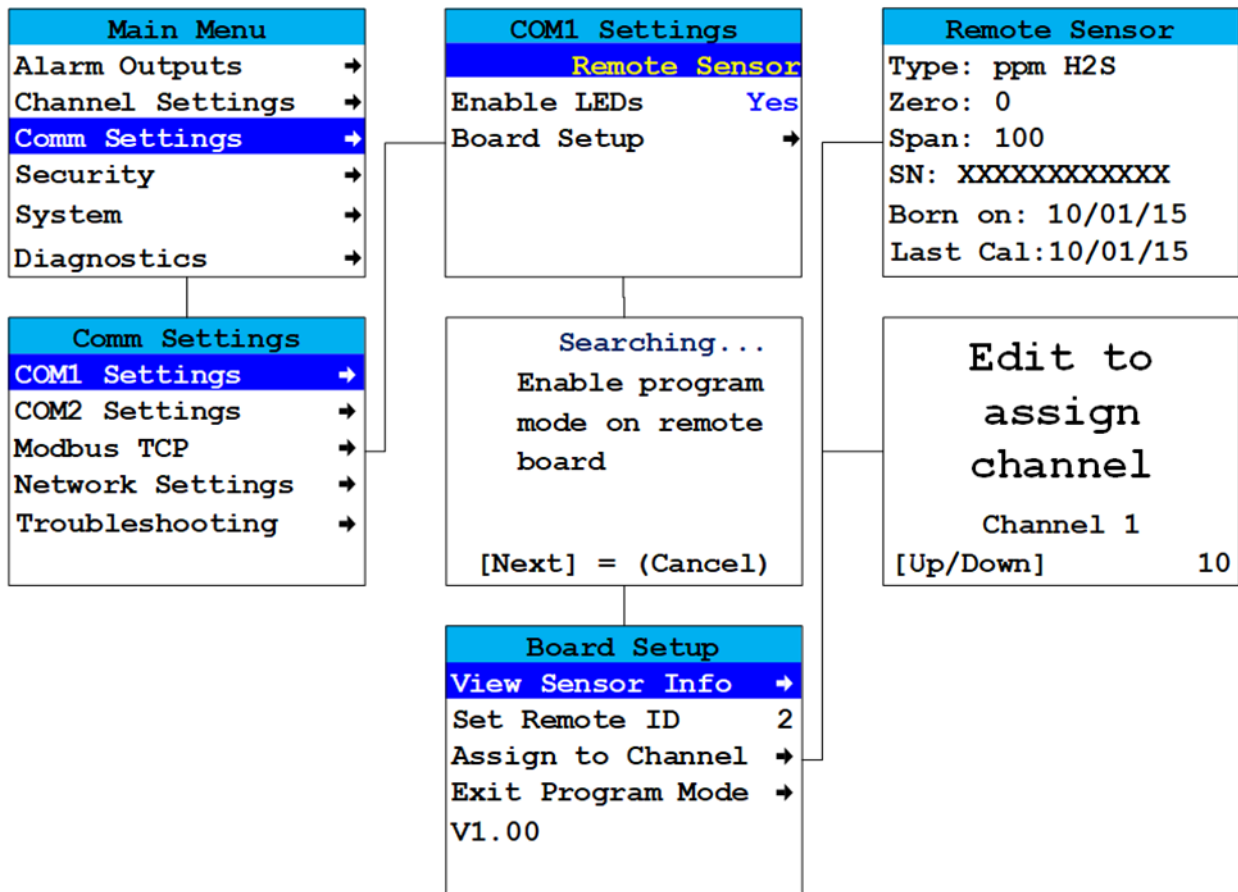


Figure 16-3 – Remote Sensor Setup Menus

To set up the remote sensor, enter the Comm Settings menu then select COM1 Settings or COM2 Settings, whichever one the Remote Sensor is wired to (COM1 and COM2 Settings Menus are identical). Swipe the edit key until Remote Sensor is displayed. Highlight the Board Setup menu option and swipe the Edit key. The T40 will begin Searching for the Remote Sensor Option Board. To put the Remote Sensor Option Bd in program mode press and hold the Edit key, located at the top of the board, until the T40 display enters the Board Setup Menu and the SVC/ID LED on the Remote Sensor Option Bd top left begins slowly fading in and out.

To complete the setup process, set the Remote ID to a value between 1 and 247. This must match the Remote ID entered in the Data From menu when Remote Sensor is set to Yes. assign the remote sensor to Channel 1 or 2 and select Exit Program Mode.

**NOTE:** Swiping the Next key will exit the Board Setup Menu, however, it will not exit the Remote Sensor Option Board from Setup Mode. This means the board will not enter normal Modbus communication. To properly exit the setup mode the Exit Program Mode menu option **MUST** be selected.

### 16.2.1 Board Setup Menu

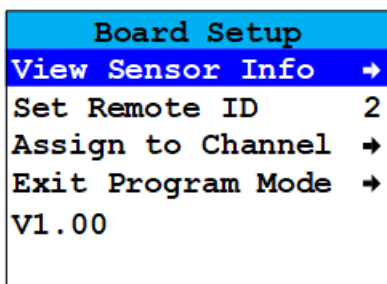


Figure 16-4 – Board Setup Menu

The Board Setup Menu allows viewing sensor info for the sensor, which is installed on the Remote Sensor Option Board, setting of the remote ID, assigning the remote sensor to channel 1 or channel 2 and viewing of the firmware version on the Remote Sensor Option Board.

### 16.2.2 View Sensor Info Menu

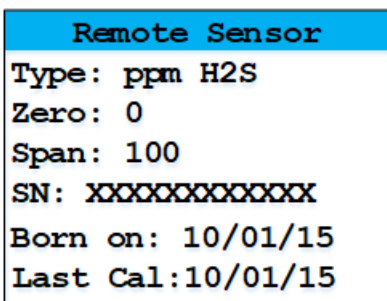


Figure 16-5 – View Sensor Info Screen

Sensor Info includes the sensor's Type, Zero and Span values, Serial Number, Born on Date and the Date when the last Calibration was performed.

### 16.2.3 Assign to Channel Menu

To change the assigned channel for the remote sensor, swipe the UP or DOWN keys to cycle between Channel 1 and Channel 2. When the desired channel is shown, swipe the Edit key to assign the remote sensor to that channel.

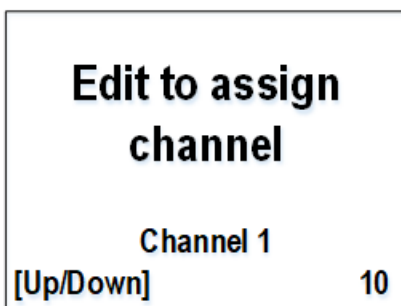


Figure 16-6 – Assign to Channel Menu

To change the assigned channel for the remote sensor, swipe the UP or DOWN keys to cycle between Channel 1 and Channel 2. When the desired channel is shown, swipe the Edit key to assign the remote sensor to that channel.

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## 18 Appendix B – Catalytic Bead Correction Factor

This is a guideline for calculating correction factors of Catalytic Bead LEL sensors. For best accuracy, Macurco recommends Catalytic Bead sensors be calibrated to the intended target gas when possible. Please contact the factory for other Span Gas availability.

### 18.1 LEL Correction Factors

Catalytic Bead LEL sensors can be used for the detection of a wide variety of combustible gases and vapors that exhibit different responses. Because Catalytic Bead LEL sensors use a diffusion barrier to limit the gas flux to the catalytic bead, they tend to have the greatest sensitivity to high-diffusivity compounds. Therefore, they are substantially more sensitive to small molecules like hydrogen and methane than to heavy components like kerosene. The best way to calibrate any sensor to different compounds is to use a standard of the gas of interest. However, Correction Factors (CFs) have been determined that enable the user to quantify many chemicals using only a single calibration gas, typically Methane or Propane. In our LEL sensors, Correction Factors can be used in one of two ways:

1. Calibrate the unit with Methane in the usual fashion to read in methane %LEL equivalents. Manually multiply the reading by the Correction Factor (CF) to obtain the %LEL of the gas being measured.
2. Calibrate the unit with Methane, but input an equivalent, “corrected” span gas concentration when prompted for this value.

**Example:** to read in N-heptane LEL units, apply 25% LEL Methane but enter  $25 \times 2.00 = 50$  for the span gas concentration.

### 18.2 Oxygen Requirement and Matrix Effects

Catalytic Bead sensors require oxygen to be effective and cannot be used in environments that contain less than 10% volume Oxygen. This threshold is the safe limit for up to 100% LEL detection of nearly all flammable gases and vapors but can be dependent upon the combustible gas concentration.

### 18.3 Methane Sensitivity Changes

The Correction Factors in the referenced table apply to new sensors. An LEL sensor gradually loses sensitivity over time and the sensors response to Methane may decrease more rapidly than for higher hydrocarbons. In this case, the Correction Factors gradually decrease and calibration with Methane tends to overestimate the %LEL of the other gas. Therefore, Methane calibration is the safest approach. TracXP LEL sensors do not exhibit changes in Correction Factors in laboratory tests but may do so under special-use conditions. Calibrating with other organic vapors such as Propane or Pentane is a good way to avoid Correction Factor changes. The only drawback to this approach is that it is possible to underestimate Methane while still measuring the higher hydrocarbons. If Methane is known to be absent under all circumstances, the use of Propane or Pentane calibration is appropriate.

### 18.4 Correction Factors when Calibrating with Non-methane Compounds

To obtain Correction Factors for other span gases, simply divide the value on the Methane scale in the table by the Methane value for the span compound. For example, to obtain CFs on the N-pentane scale, divide all the numbers in the table, Methane CF column LEL CF by 1.818.

**Example:** to figure the Correction Factor for N-propanol when calibrating with N-pentane divide  $4.000 / 1.667 = 2.2$  CF

Gas/Vapor	Chemical formula	100% LEL (%/VOL)	Relative sensitivity	Methane CF	Propane CF
Acetic acid	CH <sub>3</sub> COOH	5.4	5	20.000	11.000
Acetone	(CH <sub>3</sub> ) <sub>2</sub> CO	2.6	25	4.000	2.200
Ammonia	NH <sub>3</sub>	15	70	1.429	0.786
Butyl Acetate	C <sub>4</sub> H <sub>9</sub> COOH	1.2	15	6.667	3.667
Carbon monoxide	CO	12.5	40	2.500	1.375
Cyclo-hexane	C <sub>6</sub> H <sub>12</sub>	1.3	55	1.818	1.000
Cyclo-pentane	C <sub>5</sub> H <sub>10</sub>	1.4	55	1.818	1.000
Dioxane	(CH <sub>2</sub> ) <sub>4</sub> O <sub>2</sub>	2	55	1.818	1.000
Ethane	C <sub>2</sub> H <sub>6</sub>	2.9	76.4	1.309	0.720
Ethanol	C <sub>2</sub> H <sub>5</sub> OH	3.3	40	2.500	1.375
Ethyl acetate	C <sub>2</sub> H <sub>5</sub> COOH	2.2	30	3.333	1.833
Ethylene	C <sub>2</sub> H <sub>4</sub>	2.7	70	1.429	0.786
Hydrogen	H <sub>2</sub>	4	95	1.053	0.579
Iso-butane	C <sub>4</sub> H <sub>10</sub>	1.8	55	1.818	1.000
iso-butyl alcohol	C <sub>2</sub> C(CH <sub>3</sub> )CH <sub>2</sub> OH	1.7	25	4.000	2.200
Iso-octane	C <sub>8</sub> H <sub>18</sub>	1	50	2.000	1.100
iso-pentane	CH <sub>3</sub> C(CH <sub>3</sub> )C <sub>2</sub> H <sub>6</sub>	1.4	55	1.818	1.000
Iso-propanol	CH <sub>3</sub> -C <sub>2</sub> H <sub>4</sub> COOH	2.2	30	3.333	1.833
Methane	CH <sub>4</sub>	5	100	1.000	0.550
Methanol	CH <sub>3</sub> OH	6.7	55	1.818	1.000
Methyl tert-butyl ether (MTBE)	C <sub>5</sub> H <sub>12</sub> O	1.6	55	1.818	1.000
N-butane	C <sub>4</sub> H <sub>10</sub>	1.8	45	2.222	1.222
N-heptane	C <sub>7</sub> H <sub>16</sub>	1.05	50	2.000	1.100
N-hexane	C <sub>6</sub> H <sub>14</sub>	1.2	45	2.222	1.222
n-octane	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>6</sub> CH <sub>3</sub>	0.8	35	2.857	1.571
N-pentane	C <sub>5</sub> H <sub>12</sub>	1.4	60	1.667	0.917
n-propanol	C <sub>3</sub> H <sub>7</sub> OH	2.1	25	4.000	2.200
Propane	C <sub>3</sub> H <sub>8</sub>	2.1	55	1.818	1.000
Propylene	CH <sub>3</sub> -CH=CH <sub>2</sub>	2.4	50	2.000	1.100
Styrene	C <sub>6</sub> H <sub>5</sub> CH=CH <sub>2</sub>	1.1	15	6.667	3.667
Toluene	C <sub>6</sub> H <sub>5</sub> CH <sub>3</sub>	1.2	20	5.000	2.750
Xylene	C <sub>6</sub> H <sub>4</sub> (CH <sub>3</sub> ) <sub>2</sub>	1.1	20	5.000	2.750



For other gas applications or questions, please contact Technical Support at 1-844-325-3050



## 19 Macurco Gas Detection Product limited warranty

Macurco warrants the TXP-T40 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.

## Macurco Gas Detection

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