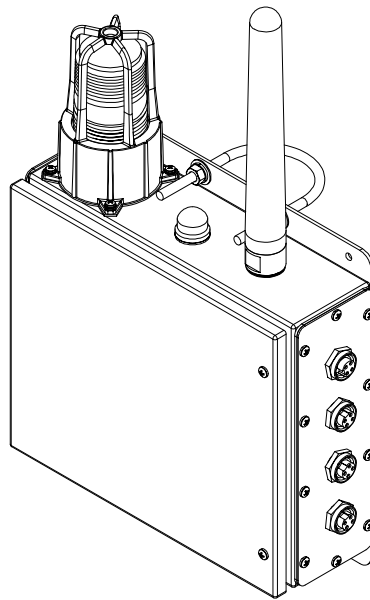# SmartWireless® CX

Sensor Station for SmartWireless® Mobile Gas Detection System

Operator's Installation and Instruction Manual

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1. Introduction

1.1 Features

The SmartWireless® CX Sensor Station (Figure 1) is an accessory to the SmartWireless® CXT. The CX wirelessly transmits the data from the sensors to the CXT and includes a battery that powers the radio, alarm devices, and the attached sensors. The CX can sustain either two or four 4-20mA wired sensors.

Remote mounted gas detection sensors include any analog 4-20maDC device such as;
- toxic gas,
- combustible gas, or
- oxygen deficiency sensors.

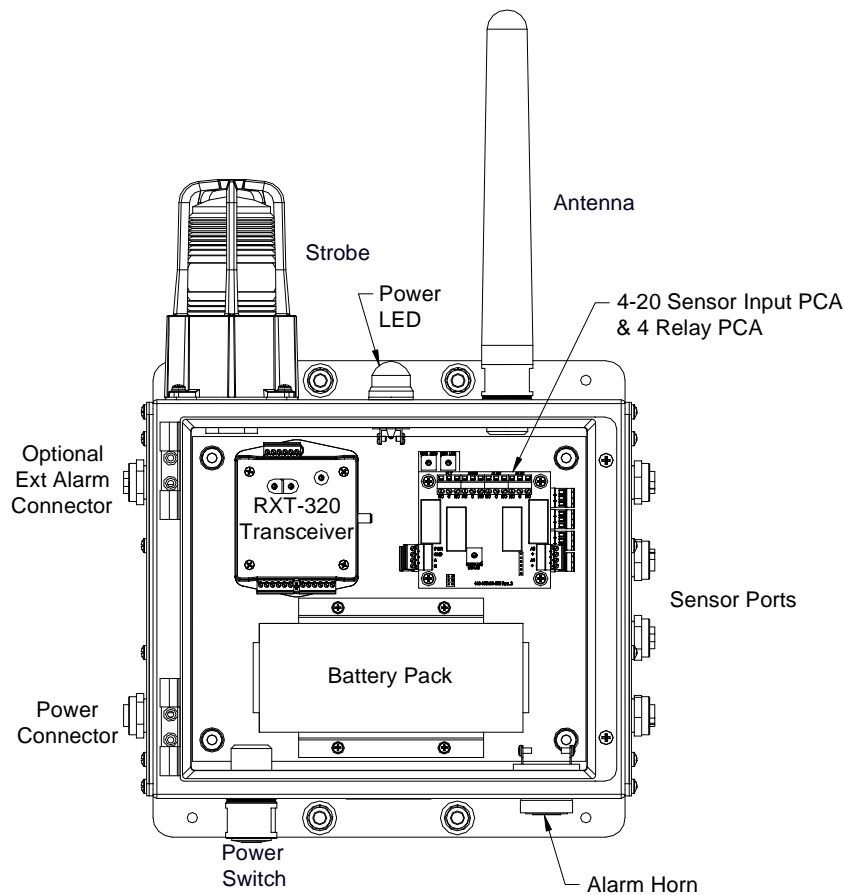Figure 1 SmartWireless® CX Sensor Station

The SmartWireless® CX control package is a Division 2 assembly housed in a 316 stainless steel enclosure that offers various connector options for multiple configurations.

System components of the SmartWireless® gas detection system include;
- Smart Wireless CXT Controller
- Smart Wireless CX Sensor Station,
- alarm stations and
- gas detection sensors.

SmartWireless® CXT Controller

The Detcon SmartWireless® CXT controller is a multi-channel mobile gas detection control system mounted on a tripod or a suitable stand. The CXT can be utilized as a self-contained gas detection, display/alarm system package or wirelessly connected to the main network. The CXT is equipped with an auto configure system to automatically search for Detcon equipment associated with the controller.

SmartWireless® CX Sensor Station

The SmartWireless® CX Sensor Station is an accessory to the SmartWireless® CXT. The CX wirelessly transmits the data from up to 4 wired sensors back to the CXT and includes a battery that powers the radio, alarm devices, and the attached sensors.

Alarm Stations

Alarm stations can be used as part of the gas detection system. Class I Division I and Class I Division II alarm stations are available. The stations are battery powered and controlled wirelessly by the CXT. The strobe and horn installed on the CX are activated by the CXT when the alarms levels are reached.

Alarm options are as follows:

1. Integral audio visual mounted on the CX (Class 1; Division 2 only)
2. Standalone audio visual alarm station (Class 1; Division 2)
3. Standalone audio visual alarm station (Class 1; Division 1)

Gas Detection Sensors

Gas sensors with a 4-20mA output can be connected directly to the CX. The Model CX sensors from Detcon are designed specifically to work with the SmartWireless® CX.

1.2 Optional Components

Options for the SmartWireless® CX are as follows:
- strobe
- horn
- external 'Wet' or 'Dry' alarm port

1.3 Alarms and Fault Condition

The CX includes an optional strobe and/or a piezoelectric horn and an external alarm connector. The strobe is associated with Alarm 1, the horn is associated with Alarm2 and the external alarm connector utilizes all alarm outputs (alarm 1, 2, 3 and fault) for connection to external alarm devices. The external alarm outputs can be used to control annunciating devices or as signal inputs to other control devices. The CX permits alarm and fault conditions to cause an assigned relay to fire, triggering external alarm devices. When the alarm level is reached either the devices mounted to the box or attached to the external alarm connector are activated, or both. The assigned relay outputs will return to normal state when a gas alarm or a fault condition clears. The Alarm Relay Output can be either 'Wet' or 'Dry' determined when the unit is ordered. The 'Wet output connector provides 12V outputs for external alarms. The 'Dry' output connector provides dry contacts for external power to control external alarms.

All alarms can be configured as Energized/De-Energized, Latching/Non-Latching and Silenceable/Non-Silenceable for the relays. This setup must be performed at the controller, refer to the controller manual for more information.

1.4 Power Supply-Internal Rechargeable Battery and Charging Accessory

SmartWireless® CXT is powered by an internal rechargeable Smart Battery capable of delivering continuous operation in a no alarm condition for two to eight weeks depending on the quantity and type of sensors tied to the control panel. The internal re-chargeable battery pack shall only be charged in a non-hazardous area where the required operating temperature limits are 0C to +45C. It may be used in the field and be discharged in the temperature range of -20C to +60C.

⚠ *CAUTION*	The internal re-chargeable battery pack shall only be charged in a non-hazardous area where the required operating temperature limits are 0C to +45C. Charging outside this temperature range may degrade the life of the battery pack.

⚠ *CAUTION*	The Battery Pack Detcon PN 360-3S6PFP-290 contains an internal protection circuit which maintains its safe operation against all potential hazard conditions.

⚠ *CAUTION*	No other Battery Pack except Detcon PN 360-3S6PFP-290 may be used in the operation of this device.

The internal battery can only be recharged in a non-hazardous area and only using the Detcon supplied Battery Charger Accessory that runs on AC power.

Detcon Approved Battery Charger Accessory Ratings:

AC Input Power
      Voltage: 100-240 VAC, 50-60 Hz (requires correct PN version for optional 110 or 220 VAC use)
      Current: 2.0 Amps maximum
DC Output Power
      Voltage: 24+/- 1 VDC
      Current: 3.1 Amps maximum

NOTE 1	No other Battery Charger or VDC input power source may be used with this CXT Controller product.

1.5 Radio Module

The SmartWireless® CX offers a wireless option to connect it to the SmartWireless CXT and other devices wirelessly. The Radio Module includes a transceiver that operates at 2.4GHz and conforms to non-licensed radio frequency usage worldwide. Spread spectrum technology supports integrity and security for the wireless network.

The SmartWireless CXT and CX products use a wireless network with a mesh topology. If radio communication directly between two devices is impossible due to distance or obstruction, each wireless device is capable of locating an alternate route through an additional wireless device to communicate with the designated device. This innovative technology is designed to create a robust network that automatically

routes around congestion and line-of-sight obstacles while improving throughput as subscriber device density increases.

The radio module is housed in a black ABS box mounted inside of the CX stainless steel enclosure. The standard package includes two PCAs mounted inside the black ABS box (radio PCA and Smart battery charging PCA), 5 dB antenna, and a protective antenna cover. The battery PCA includes circuitry to safely recharge the battery from a 24VDC input and a fuel gauge circuit to monitor the charge remaining in the battery.

The radio PCA includes a 2.4Ghz radio and a rotary switch for setting the RF channel of the system (Figure 2). Use a small screwdriver to rotate the switch until the arrow points to the desired RF channel number (16 channels available, 0h-Fh).

NOTE	All devices within the network must be on the same RF channel to operate correctly.

Each radio module is required to have a unique address. These addresses typically start at 01h and continue sequentially for each SmartWireless CX in the gas detection system. The radio PCA includes a pair of rotary switches to set this address (Figure 2).

NOTE	The switch for the most significant digit (MSD) is on the right and the least significant digit (LSD) is on the left.
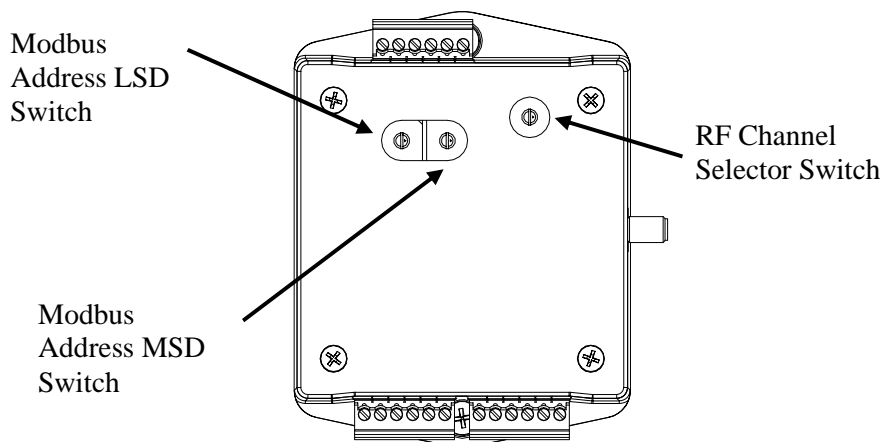
Figure 2 SmartWireless® CXT Radio Module

1.6 Sensor Inputs

The SmartWireless® CXT includes a Sensor Input PCA that accepts 4-20mA inputs from up to 4 attached sensors. The PCA includes two rotary switches to set its Modbus address (Figure 3). This address is set to 01 for SmartWireless® systems using a CXT or Model X40 controller. If an MCX-32 controller is being used, this address needs to be unique for each CXT in the system. For an MCX-32 system, the addresses should start at 40h and continue sequentially for each CXT in the system.

Sensor Connector Ratings
        Voltage: 9-11.2 VDC
        Current: 100 mA max through any single sensor connector
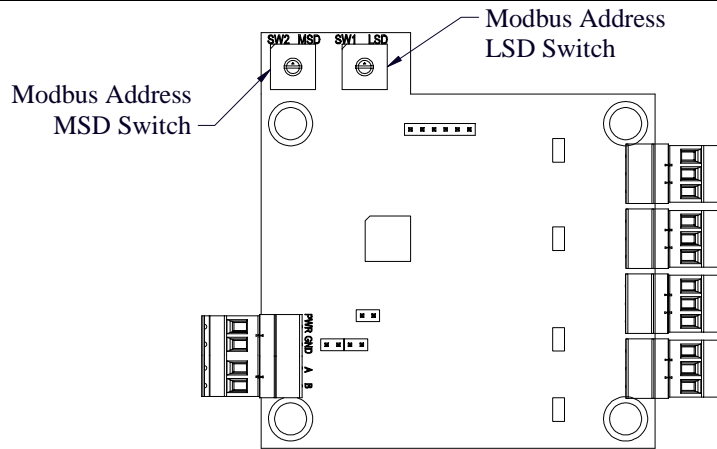
Figure 3 Sensor Input PCA

Four "quick connects" on the side of the CXT are for sensor connection (Figure 4), supply power to the sensor from the internal battery and accept the 4-20mA signal from the sensor.

NOTE	Power supplied to the sensors is 11VDC. Any attached sensor must be designed to work at this voltage level.

The four sensor input lines are fused at the PC board level for safety purposes. These fuses are not designed for field replacement and shall not under any circumstances be attempted to be changed out by anyone but Detcon Factory trained Service personnel.

⚠ *CAUTION*	These PC board mounted fuses are not designed for field replacement and shall not under any circumstances be attempted to be changed out by anyone but Detcon Factory-Trained Service personnel.
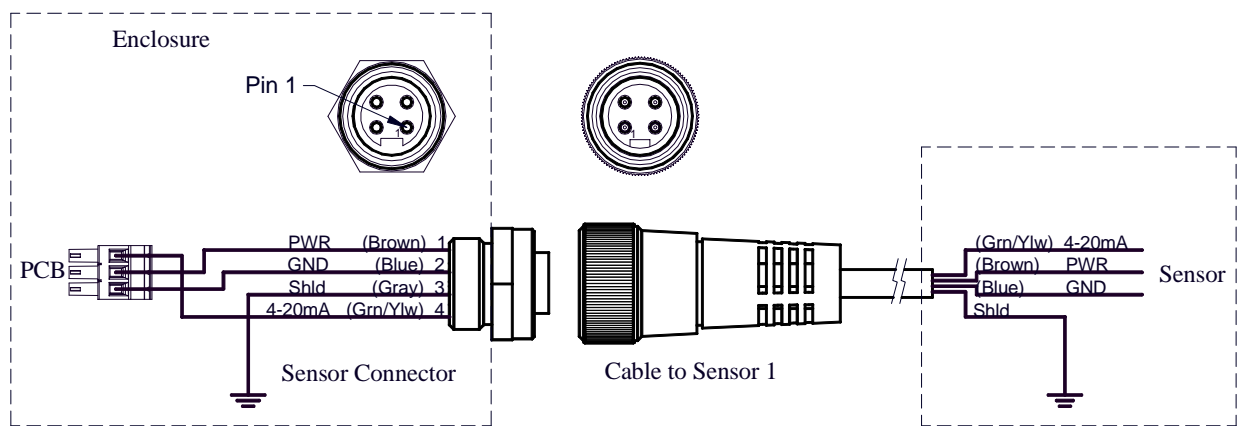
Figure 4 Sensor Input Connector Pin-out

1.7 Alarm Outputs

The SmartWireless® CXT can optionally include an internal Relay PCA for activating alarm annunciators. The Relay PCA includes four Class I Division II relays rated for 10A @ 30VDC/250VAC. If the SmartWireless® CXT includes an attached strobe and/or horn, these devices are also activated by the Relay PCA.

Each Relay PCA must have a unique Modbus address. The Relay PCA includes a single rotary switch to set its Modbus address (Figure 5). The most significant digit of the address is hard-wired to "8". The least significant digit (LSD) is controlled by the rotary switch. The Relay PCA addresses should start at 80h and continue sequentially for each SmartWireless® CXT in the system.
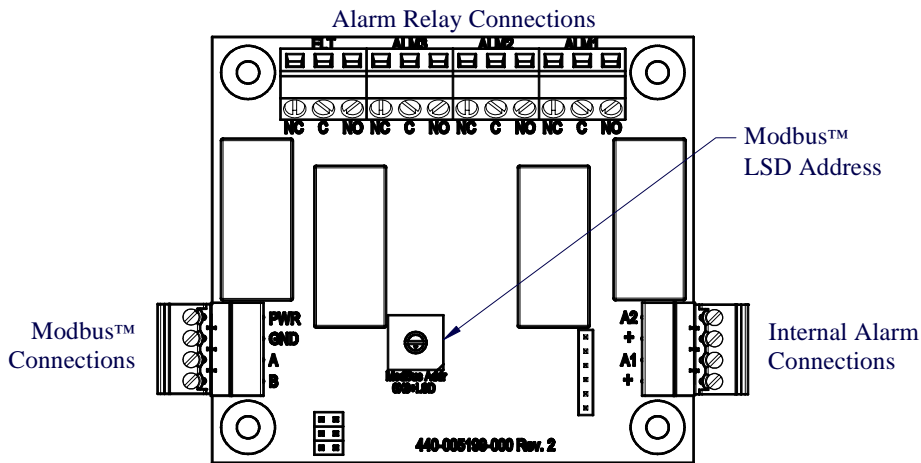
Figure 5 Relay PCA

If the Smart Wireless® CXT is ordered with the Relay PCA option, the Relay PCA can be configured to provide either 'Wet' or 'Dry' contacts for external annunciator activation. The 'Wet' contact option provides 12V Battery Power to external annunciators when an alarm is initiated. The 'Wet' contacts are available on a 5 pin Alarm Connector (Figure 6). These outputs are specifically meant for external 12V annunciators such as the external A1 C1D2 Horn, which is designed to operate on the unit's 12V Battery.

Figure 6 External Alarm Connector pin out for 'Wet' alarm contacts

Sensor Connector Ratings
  Voltage: 9-11.2 VDC
  Current: 2 Amps max through single relay connector (2 Amps max total across 4 connectors.

> ⚠️ *CAUTION*   When utilizing 'Wet' contacts, the maximum power that can be drawn by the annunciators is 2A.

The Smart Wireless® CXT is also available with 'Dry' relay contacts (Figure 7). Dry relay Contacts allow the user to control annunciators that operate off an exterior power source that relies on the controller to provide only contact closure to apply voltage to the annunciator. The relays are rated for 10A @ 30VDC/250VAC. It is important to note that the 'Dry' contact feature utilizes a common return for all annunciators.

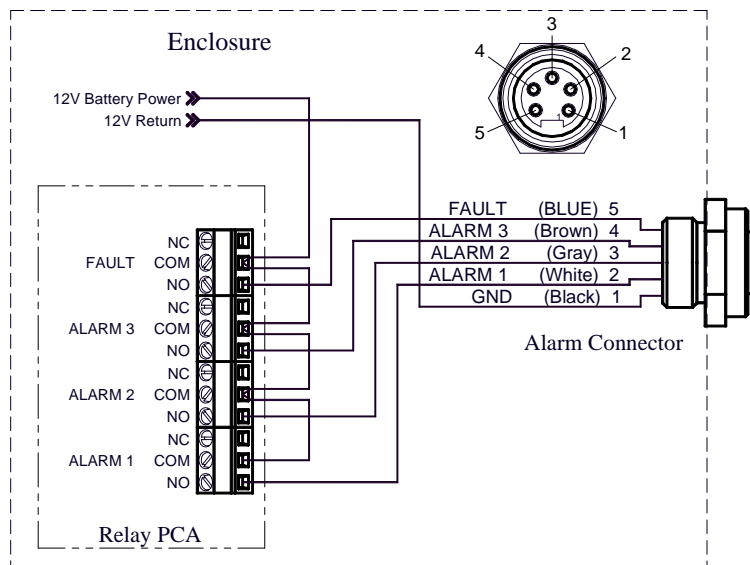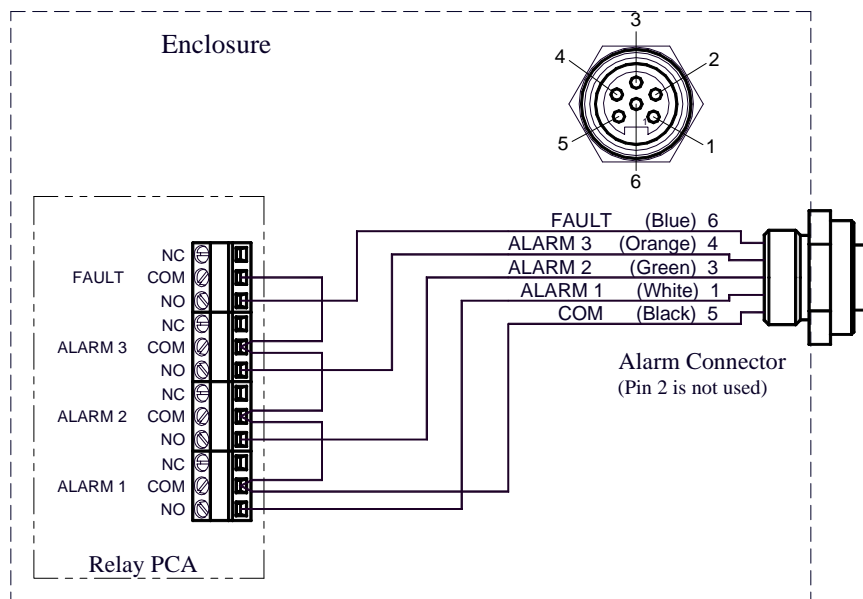Figure 7 External Alarm Connector Pin out for 'Dry' alarm contacts

1.8 Power Switch

Power to the SmartWireless CX is controlled by a power switch located on the bottom of the enclosure (Figure 1). Pressing this switch while the power is off will turn the CX on. Pressing the switch while the power is on will turn the power off. When the power to the CX is on, the green LED indicator on top of the enclosure will be illuminated.

1.9 Power Connector

The internal battery inside the SmartWireless® CXT controller can be recharged by connecting 24VDC to the power connector on the side of the enclosure (Figure 1). A VAC/24VDC battery charging adapter is included with every CX.

Detcon Approved Battery Charger Accessory Ratings:

AC Input Power
      Voltage: 100-240 VAC, 50-60 Hz (requires correctly selected 110 VAC or 220 VAC Charger)
      Current: 2.0 Amps maximum
DC Output Power
      Voltage: 24+/- 1 VDC
      Current: 3.1 Amps maximum

CAUTION   The SmartWireless® CXT must be charged with the Detcon supplied Battery Charger. (Detcon P/N: 976-0003BC-00T for 110VAC and P/N 976-0003BC-220 for 220VAC). Use of any other charger may damage the controller.

Pin 2   Pin 3

Pin 1

+24VDC   (White) 3
GND   (Black) 2
Chassis GND   (Green) 1

Figure 8 Power Connector

2. Safety Guidelines for safe use

If equipment is used in a manner not specified by Detcon, the protection provided by the equipment may be impaired. It is mandatory to read and follow all of the Safety Warnings and Cautions listed below.
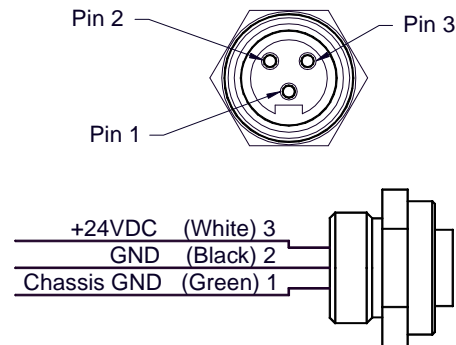
⚠ Warning	This apparatus is suitable for use in Class (as applicable), Division 2 groups (as applicable), or unclassified locations.
⚠ Warning	Explosion Hazard. Do not make any disconnections while the circuit is live or unless the area is known to be free of ignitable concentrations.
⚠ Warning	Charging of the internal Battery Pack shall never be done while equipment is located in the Division 2 hazardous area. The equipment must be moved to a non-hazardous are for the battery charging to take place.
⚠ Warning	Substitution of any component may impair suitability for Division 2 use.
⚠ Warning	Exposure to some chemicals may degrade the sealing properties of materials used in the following devices used in this equipment; namely the Div2 Strobe, relay contacts, and magnetic programming switches
⚠ *CAUTION*	The user must consult this manual for more information about any location marked with this symbol.
⚠ *DANGER*	Danger of electrical shock. User must ensure that power has been disconnected prior to installation or servicing of the equipment.

3. Installation

3.1 Initial Setup

NOTE	The Detcon tripod (P/N 975-TRIPOD-100) provides a stable and mobile base for the SmartWireless® CX Sensor Station. A maximum of two sensors can be secured to the tripod using Detcon brackets (P/N 943-004413-000) installed on the tripod

1. Unpack the tripod, open the legs and place on a level surface.

2. Mount the CX to the center pipe using the supplied U-bolts in accordance with Figure 9.

Pipe Mounting U-Bolts and hardware

Tripod Center Pipe
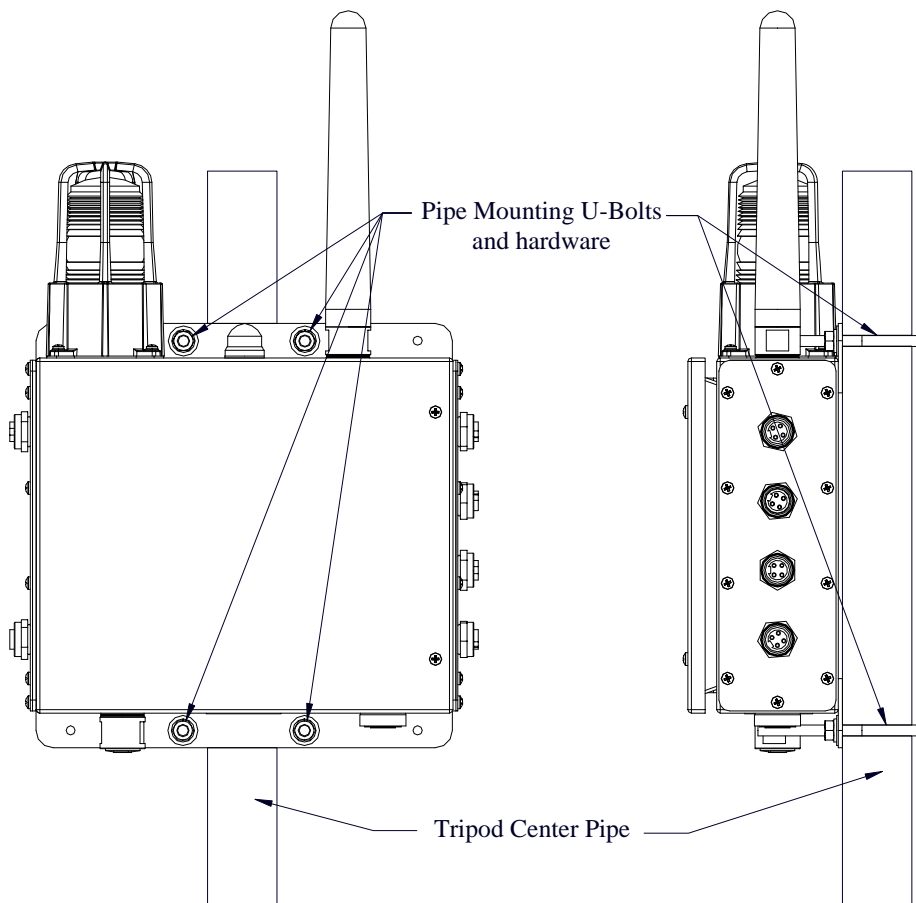
Figure 9 Mount CX on Tripod

3. Install the 8" antenna on the antenna connector on the top right of the CX controller (Figure 1).

4. Secure the antenna cover over the antenna.

5. If sensors are being mounted on the tripod legs, attach the sensor mounting brackets to the tripod legs using the supplied $^1/_4$" bolts, nuts and lock washers in accordance with Figure 10.
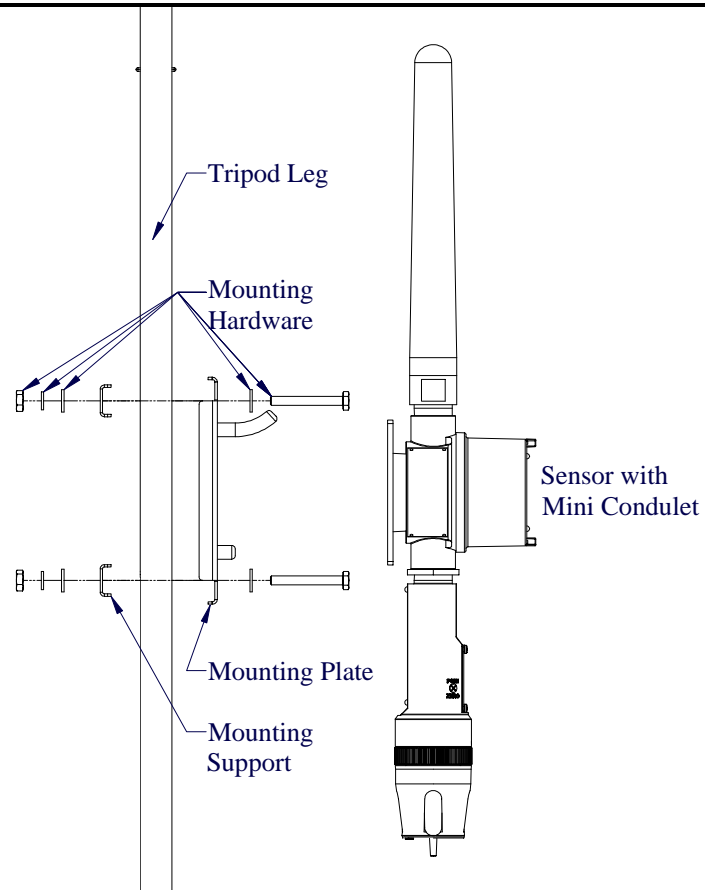
Figure 10 Attach Sensor Brackets to Tripod

6. Hang the sensors on the brackets using the hook and pin supplied with the bracket.

7. Connect sensor cables to the sensor ports on the CX (Figure 1).

8. If the unit is ordered with the optional external A1 C1D2 Horn, the horn should be mounted either on the tripod, or on a separate tripod. . The optional A1 C1D2 Horn requires the cable for the External 'Wet' Alarms.

    a. The horn should be wired to the 'Wet' Alarm Output cable per Figure 11.

    b. The alarm Cable should be connected to the External Alarm Connector on the controller.

Turck Alarm Cable
from Sentinel
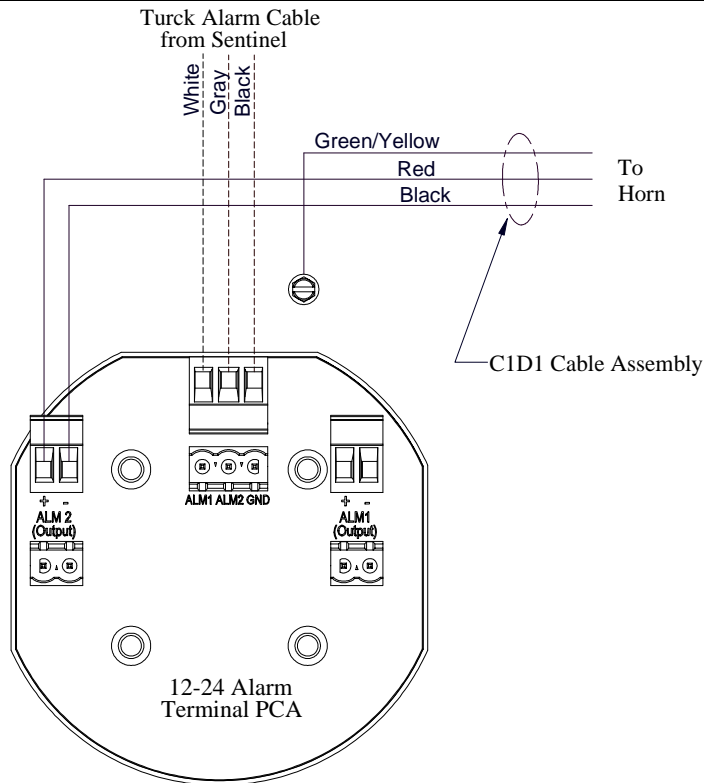
Figure 11 A1 C1D2 Alarm Connections

Battery Installation

9. Loosen the screws holding the door panel in place, and swing the front door of the enclosure open to gain access to the battery bracket.
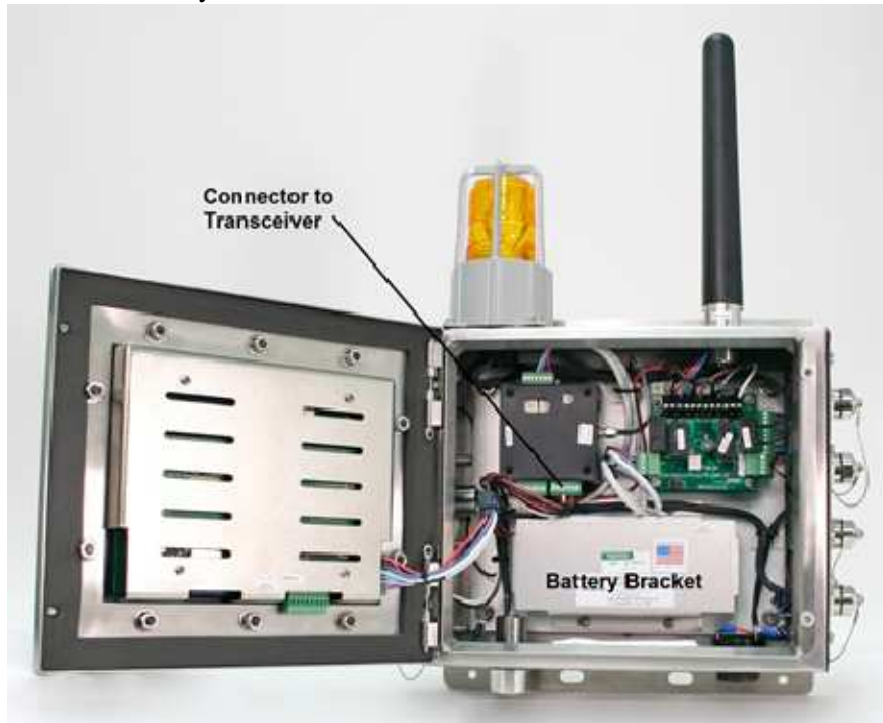
Figure 12 Enclosure

10. Unplug the connector from the transceiver, and move it out of the way to gain access to the screws holding the battery bracket in place. There should be enough of a service loop to safely move this connector out of the way for removal/installation of the battery bracket.
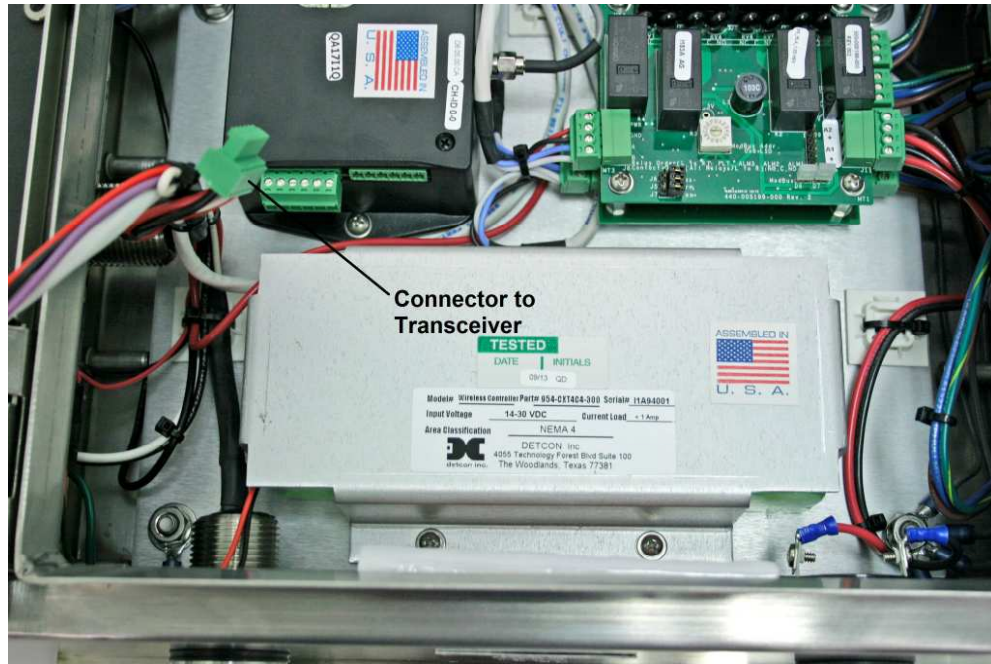
Figure 13 Connector to Transceiver

11. Remove the 6-32 screws and washers holding the battery bracket is place, and remove the bracket from the enclosure. Retain the screws and washers for installation of the bracket with the battery pack.
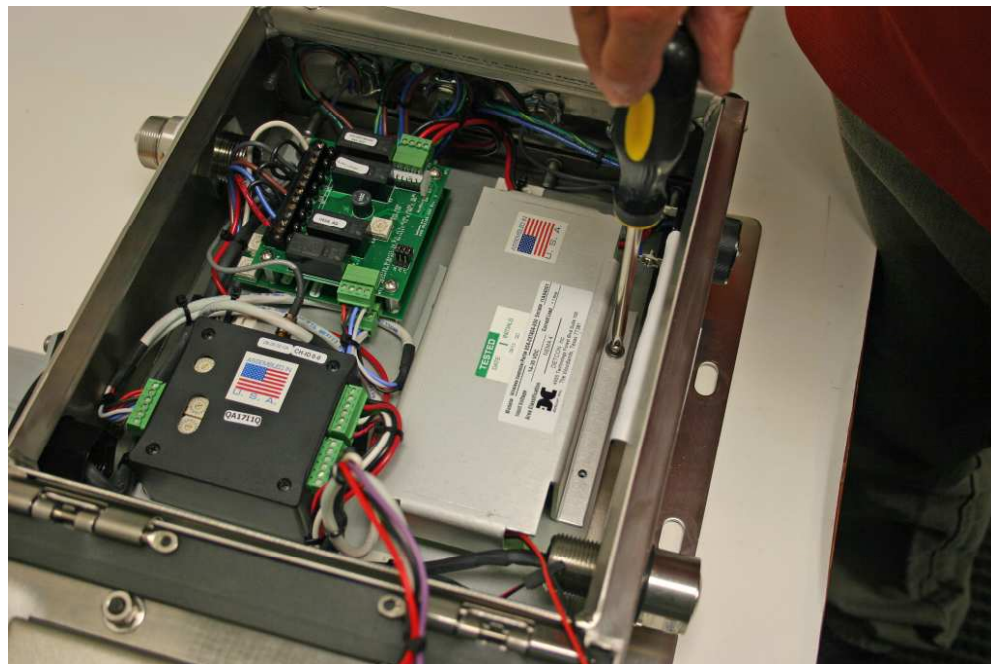
Figure 14 Battery Bracket in position

12. Install the battery pack in the bracket. The battery will fit snugly into the holder, being somewhat held in place by the foam padding in the bracket.
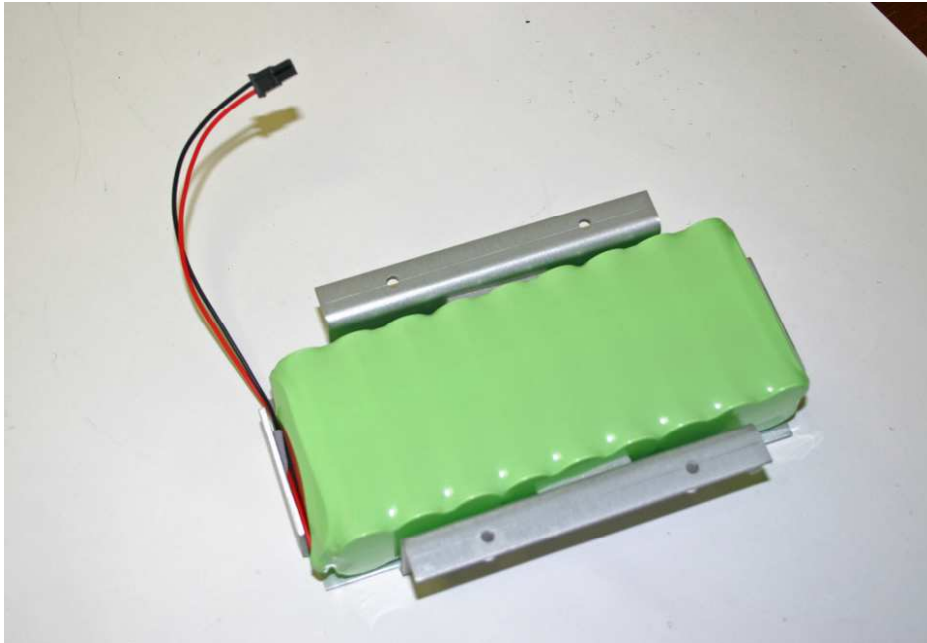
Figure 15 Battery and Battery Bracket

13. Position the battery bracket (and battery) with the connector on the left side, and install the battery and bracket in the enclosure using the 6-32 screws removed is step 11. Some wiring may need to be moved out of the way during this process to ensure that the wiring is not caught under the bracket.

14. Locate the connector mate for the battery connector, and plug the two connectors together.
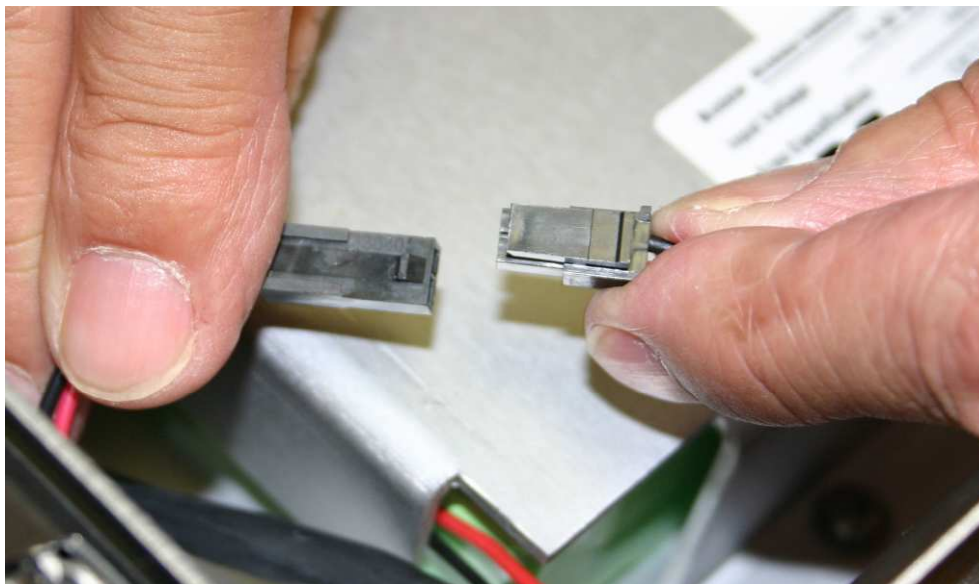
Figure 16 Battery Connections

15. Re-install the connector to the transceiver (removed in step 10).

16. Cycle power to ensure that the unit powers up. The LED on the top of the unit should illuminate to indicate power is applied. Close the front door panel and screw the front cover down. The screws should be tightened down to a 'snug' fit. These screws do not need to be tightened down completely, but need to be tightened down enough to give the front door a water tight seal.

17. If an optional Solar Panel is to be connected, connect the solar panel cable to the power-in port on the CX (Figure 1).

18. Turn power on to the unit. The LED on the top of the unit should illuminate to indicate power is applied.

4. Recharging the Internal Battery Pack

4.1 Non-Hazardous Area Location

At a safe time interval prior to full discharge of the internal battery pack, relocate the CXT Controller to a non-hazardous area that has suitable 110 VAC or 220 VAC AC power receptacles available.

4.2 Connecting to Mains Supply

Using the appropriate Battery Charging Accessory product (PN 976-0003BC-00T for 110 VAC or PN 976-0003BC-220 for 220 VAC), find the corresponding Mains Supply receptacle in the non-hazardous area and plug-in the pronged end of the cable. Connect the Turck connector to the external port labeled external power. Turn on the power switch and begin charging. Operate the charger for the necessary time it takes to accomplish a full charge.

⚠ *CAUTION*	Only the Mains supply cord that is supplied with the Detcon-approved Battery Charger Accessory product shall be used. Use of any other Mains supply cords will impair the safety of this device.

5. Troubleshooting Guide

Sensor COMM Error
- Verify all SmartWireless CX devices have a unique Modbus ID number.
- Verify the Sensor Input PCA and Relay PCA Modbus address are set correctly
- Verify the Radio Module Modbus address is set correctly

Sensor Fault
- Verify if sensor displays any fault. If so, follow sensor trouble shooting notes.
- Verify if sensor cell needs replacement.

Low Battery
- Attach external battery charger
- Verify solar panel (if used) is oriented correctly

Poor Link Quality
- Verify antenna is securely attached to all devices.
- Verify obstructions are eliminated or minimized between SmartWirelessCX devices and controller or other CX devices.

Slow Gas Response
- Some delay in gas response is normal if the network update rate is greater than zero. To increase response time, reduce the update rate. Reducing the update rate will reduce the battery life for devices.

SmartWirelessCX not found during controller Auto Configure
- Verify CX device set to correct RF Channel
- Verify Radio Module has correct Modbus address
- Verify the Sensor Input PCA and Relay PCA Modbus address are set correctly
- Verify a proper mA load is present on sensor input. Sensor inputs are not detected unless the mA input is greater than 1.9mA.

Contact the Detcon Service Department for further troubleshooting assistance at 713-559-9200

6. Customer Support and Service Policy

Detcon Headquarters
Shipping Address: 4055 Technology Forest Blvd, The Woodlands, Texas 77381
Mailing Address: P.O. Box 8067, The Woodlands Texas 77387-8067
Phone: 713.559.9200
Fax: 281.298.2868

• www.detcon.com
• service@detcon.com
• sales@detcon.com

All Technical Service and Repair activities should be handled by the Detcon Service Department via phone, fax or email (contact information given above). RMA numbers should be obtained from the Detcon Service Department prior to equipment being returned. For on-line technical service, have the model number, part number, and serial number of product(s) in question available.

All Sales activities (including spare parts purchase) should be handled by the Detcon Sales Department via phone, fax or email (contact information given above).

NOTE	All additional parts must be supplied by Detcon. Use of parts from a third party will void warranty and safety approvals.

NOTE	The SmartWireless CX should only be repaired by Detcon personnel or a Detcon trained representative.

7. Warranty Notice

Detcon Inc. warrants the SmartWireless® CX System to be free from defects in workmanship of material under normal use and service for one year from the date of shipment.

Detcon Inc. will repair or replace without charge any such equipment found to be defective during the warranty period. Full determination of the nature of, and responsibility for, defective or damaged equipment will be made by Detcon Inc. personnel.

Defective or damaged equipment must be shipped to the Detcon Inc. factory or representative from which the original shipment was made. In all cases, this warranty is limited to the cost of the equipment supplied by Detcon Inc. The customer will assume all liability for the misuse of this equipment by its employees or other contracted personnel.

All warranties are contingent upon the proper use in the application for which the product was intended and does not cover products which have been modified or repaired without Detcon Inc. approval, or which have been subjected to neglect, accident, improper installation or application, or on which the original identification marks have been removed or altered.

Except for the express warranty stated above, Detcon Inc. disclaims all warranties with regard to the products sold. Including all implied warranties of merchantability and fitness and the express warranties stated herein are in lieu of all obligations or liabilities on the part of Detcon Inc. for damages including, but not limited to, consequential damages arising out of, or in connection with, the performance of the product.

8. Appendix

8.1 Specifications

System Specifications

Capacity:	32 I/O Channels
Sensor Inputs:	Up to 4 Analog 4-20mA or up to 32 wireless sensors
Outputs:	4 switched alarm outputs, (11VDC)
Warranty:	One year

Environmental Specifications

1) Operating Temperature:	-20C to +60C (for field use where battery pack is only discharging)
2) Operating Temperature:	0C to +45C (for non-hazardous area where battery is only charging)
Storage Temperature:	-40C to +85C
Humidity:	0-99%RH, non-condensing
Altitude:	0 – 2000m

Electrical Specifications

Battery Charger Input:	100-240 VAC, 50-60 Hz, Max Current 2 Amps
Battery Charger Output:	24 +/- 0.1 VDC nominal, Max Current 3.1 Amps
Internal Battery Pack:	Rechargeable Lithium–Ion, 9-11.2 VDC, 17.4Ah capacity
External Alarm Connectors:	'Wet': 9-11.1 VDC, 2A max total (A1, A2, A3, and FLT outputs combined)
	'Dry': Dry Contact 120-220VAC/24VDC, 5A Max
Sensor Input Connectors:	9-11.1 VDC, 100mA max per connector
RFI/EMI Protection:	Complies with EN61326
Electrical Classification:	NEMA 4X, Class I Division II (pending)

Cabling Specifications

External Alarms Cables:	Use only Detcon cables, termination insulation resistance > 10K ohms.
	'Wet': Connector style is 5 pin Turck connector with security clip.
	'Dry': Connector style is 6 pin Turck connector with security clip.
Sensor Input Cables:	Use only Detcon cables, termination insulation resistance > 10K ohms
	Connector style is 4 pin Turck connector with security clip.
Power Input Cable:	Use only Detcon Battery Charging Accessory product
	Connector style is 3 pin Turck connector with security clip.

Mechanical Specifications

Dimensions:	12" W x 21.3" H x 4.73" D (including antenna and strobe)
	12" W x 12.25" H x 4.73 D (without antenna and strobe)

Wireless Specifications

Frequency:	ISM 2.4GHz
Range:	Indoor/No Line of Sight – 1,000ft
	Outdoor RF Line of Sight (with directional antenna) – 1.5 Miles
Spread Spectrum:	Digital-Sequence Spread Spectrum (DSSS)
Modulation:	0-QPSK
Sensitivity:	-102dBm (1% PER)

8.2 Spare Parts and Wireless Accessories

Part Number	Spare Parts
976-0003BC-00T	CXT Battery Charger Accessory for 110 VAC
976-0003BC-220	CXT Battery Charger Accessory for 220 VAC
976-0003A4-200	Antenna Assembly
960-798434-000	Condensation Prevention Packet (replace annually)
894-7845K6-400	Hole Plug
500-005199-000	Relay Board
500-005194-000	Sensor Input Board
360-3S6PFP-ASM	Battery Pack
320-N45161-000	Power Switch
302-RSFCC0-05M	Connector Dust Cap
302-RFK40D-05M	Sensor Connector
302-RFK380-05M	Power Connector
302-RFK520-05M	External Alarm Connector for 'Wet' Relay Contacts
302-PRSF63-M20	External Alarm Connector for 'Dry' Relay Contacts
275-556160-432	Power LED Indicator
976-001320-CHR	Radio Module (320 Network)
Part Number	**Accessories**
975-TRIPOD-100	Detcon tripod
943-004413-000	Detcon Tripod sensor brackets
975-TRIPOD-MNI	Mini Sensor Tripod
980-PRSM40-02M	2m Sensor Cable (with security clip)
980-PRSM40-10M	10m Sensor Cable (with security clip)
980-PRSM40-30M	30m Sensor Cable (with security clip)
980-PRSM40-45M	45m Sensor Cable (with security clip)
980-PRSM52-02M	2m External Alarm Cable for 'Wet' Alarms (with security clip)
980-PRSM52-30M	30m External Alarm Cable for 'Wet' Alarms (with security clip)
980-PRSM52-45M	45m External Alarm Cable for 'Wet' Alarms (with security clip)
980-PRKM63-30M	30m External Alarm Cable for 'Dry' Alarms (with security clip)
980-PRKM63-45M	45m External Alarm Cable for 'Dry' Alarms (with security clip)

8.3 Revision Log

Revision	Date	Changes made	Approval
1.0	03/27/2013	Release	LBU
1.1	10/30/13	Update for removable battery pack	LBU
1.2	11/20/13	Updates for Approval Agency	BM

Shipping Address: 4055 Technology Forest Blvd., The Woodlands Texas 77381
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