Critical Control

TelePATH

USER MANUAL

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1) OVERVIEW

Thank you for purchasing a TelePATH Millennium digital wireless link from Critical Control. Your new TelePATH Millennium is a carefully engineered, high-quality, durable product. It is designed to deliver the quality and performance you expect from telecommunications equipment.

The TelePATH Millennium digital wireless link is a cost effective solution for point-to-point voice and data communication. The system provides a reliable toll-quality wireless connection between a public telephone and the wire connection back to the central office. The TelePATH Millennium may be used for both temporary and permanent installations where circumstances make conventionally wired installations impractical.

2) DESCRIPTION AND FEATURES

The TelePATH Millennium system consists of two Modules, two antennas, and two coaxial cables. Once installed, the components provide a transparent wireless link between a phone and the central office. The “Line Module” connects to the central office line. The “Phone Module” connects to the phone. The Phone and Line Modules are similar in appearance but each is clearly labelled to avoid confusion.

The TelePATH Millennium has been specifically designed for use with the Nortel Millennium payphone and supports all of its functions.

The TelePATH Millennium system must be professionally installed in compliance with FCC part 15 subpart C and Industry Canada’s Radio Standards Specification RSS-210, Issue 2, Rev.1.

3) INSTALLATION

A) EQUIPMENT REQUIRED

- Digital Multi-Meter
- 5/32” Security Allen Key
- 1/8” Width Flat Blade Screw Driver
- #8 Philips Head Screw Driver
- Cordless Drill with appropriate bits (Optional)
- Static Ground Strap

B) LINE MODULE AND ANTENNA

I) MOUNTING MODULE

Identify and locate the Line Module in an area suitable for obtaining access to dial-tone and power. The location selected must also allow for connection to the antenna. Fix the Module to the desired location using the two screws provided.

II) MOUNTING ANTENNA

Using the hardware provided, select and install the Line antenna in the desired location. For mast type antenna installations keep the mast as close as possible to the Line Module. Antennas must be installed a least two meters above grade. **Masts are not provided as part of the TelePATH Millennium system.** Where directional antennas are employed, the antenna elements must be oriented vertically (**Figure 1**). For optimal system performance the antenna should be mounted as far above grade as possible. Where Phantom antennas are employed, mounting is possible by drilling a 1” hole through the surface on which the antenna will be mounted provided the surface is no thicker than ¼”. Alternatively, an L bracket with a 1” hole and three mounting holes is supplied.

III) ANTENNA CONNECTION

Connect the Line Module to the Line antenna using the coaxial cable provided. For long-term out-door installations it recommended that the antenna connections be protected from corrosion by some suitable method (i.e. Tape Coat).

IV) TIP AND RING CONNECTION

Route the cable, providing tip and ring signalling from the central office, through the appropriate strain relief connector and terminate the tip and ring wires at the screw terminals labelled “T” and “R” respectively (**Figure 2**). Tighten the strain relief connector onto the cable finger tight. **Do not use a wrench!**

It is recommended that ground strap be used when making connections to the printed circuit boards in the Module enclosures. Failure to use a ground strap may result in permanent damage to the Module from static discharge!

V) POWER AND GROUND CONNECTIONS

The Line Module will operate from DC voltages in the range of 10 Vdc to 36 Vdc. Route cable providing the DC power and ground through the appropriate strain relief connector and terminate the wires at the screw terminals labelled “+” and “-“. Terminate the earth ground wire at the screw terminal labelled “E” (**Figure 1**). Tighten the strain relief connector onto the cable finger tight. **Do not use a wrench!**

VI) CHANNEL SELECTION

Any of the eight channels may be selected; however, your selection must be the same for both the Line and Phone Modules. Using the dip-switches (**Figure 6**), select the desired channel and then momentarily press the button labelled “RESET”. If interference is encountered, repeat the procedure with a different channel.

C) PHONE MODULE AND ANTENNA

I) MOUNTING MODULE

Identify and locate the Phone Module in a secure area suitable for obtaining access to power and the phone (Booth Header, Pedestal Module, etc.). The location selected must allow for connection to the antenna. Fix the Module to the desired location using the two screws provided.

II) MOUNTING ANTENNA

Using the hardware provided, select and install the Line antenna in the desired location. For mast type antenna installations keep the mast as close as possible to the Line Module. Antennas must be installed a least two metres above grade. **Masts are not provided as part of the TelePATH Millennium system.** Where directional antennas are employed, the antenna elements must be oriented vertically (**Figure 1**). For optimal system performance the antenna should be mounted as far above grade as possible. Where Phantom antennas are employed, mounting is possible by drilling a 1” hole through the surface on which the antenna will be mounted provided the surface is no thicker than ¼”. Alternatively, an L bracket with a 1” hole and three mounting holes is supplied.

III) ANTENNA CONNECTION

Connect the Phone Module to the antenna using the coaxial cable provided. For long-term out-door installations it recommended that the antenna connections be protected from corrosion by some suitable method (i.e. Tape Coat).

IV) TIP AND RING CONNECTION

Route the cable, providing tip and ring signalling to the phone, through the appropriate strain relief connector and terminate wires at the screw terminals labelled “T” and “R” (**Figure 3**). Tighten the strain relief connector onto the cable finger tight. **Do not use a wrench!**

V) POWER AND GROUND CONNECTIONS

The Phone Module will operate from DC voltages in the range of 10 Vdc to 36 Vdc. Route cable providing the DC power supply and ground through the appropriate strain relief connector and terminate the wires at the screw terminals labelled “+” and “-“ (**Figure 1**). The Phone Module does not require an earth ground connection. Tighten the strain relief connector onto the cable finger tight. **Do not use a wrench!**

VI) CHANNEL SELECTION

As previously done for the Line Module, any of the eight channels may be selected; however, your selection must be the same for both the Line and Phone Modules. Using the dip-switches (**Figure 6**), select the desired channel and then momentarily press the button labelled “RESET”. If interference is encountered, repeat the procedure with a different channel.

D) SYSTEM REGISTRATION

TelePATH Phone and Line Modules must be registered with each other to operate. The registration process keys the installed Line Module to its mated Phone Module. This feature prevents unauthorized use of a second Phone Module on an installed system.

I) HOW CAN I TELL THAT REGISTERING IS NEEDED?

Registration is needed if dial-tone is denied and the COM LED is lit but blinks off very briefly every 2 seconds.

II) WHAT SHOULD I DO ?

Initialize the Line Module by pressing and holding its REG button (**Figure 2**) until the COM LED goes out for about 1/4 second (takes about 5 seconds).

Complete the registration by briefly pressing the Phone Module’s REG button (**Figure 3**).

III) HOW DO I KNOW IT WORKED ?

After about 5 seconds both the Phone and Line COM LEDs will stop blinking and remain on constantly.

E) GANGED MULTIPLE LINE INSTALLATIONS

I) BURST-SYNC CONNECTIONS

The TelePATH Millennium has been designed to accommodate up to eight co-located systems. In addition to the installation instructions outlined in the previous sections, when the TelePATH Millennium is employed in a multiple Line installation, connections must be made in the following manner:

- Locate the terminal strip marked “G”, “/D”, “D”, and “M” on each of the Line Modules.
- Select one of the Line Modules as the “Master” Module. The remaining Line Modules will be “Slaves” of the “Master”. The master Module co-ordinates communication between the Modules to prevent RF interference.
- Routing them through the appropriate strain relief connectors, run a “Daisy Chain” of jumper wires (in series) from the master Line Module’s “G” terminal to each of the slave Line Module terminals marked “G” (Ground). Repeat this for both the “D Bar” and “D” terminals (**Figure 4**).
- For each slave Line Module, install a jumper wire between its “G” and “M” terminals. This procedure enables “slave” mode.
- Tighten each of the burst-sync strain relief connectors onto the jumper cables finger tight.
- The burst-sync connections are now complete.

II) CHANNEL SELECTION

Where TelePATH Millennium systems are co-located, the channel selection must be set as outlined in the previous sections. In addition, the channels selected must be different for each matched set of Modules. Assign and set each co-located system to one of the eight available channels ensuring that there is no duplication (**Figure 6**).

III) REGISTRATION

Co-located TelePATH systems must be registered in the proper sequence. Following the procedure described in section “D”, begin by initializing the “Master” Line Module and then intialize the “Slave” Line Modules in sequence. Proceed to the Phone Modules and, beginning with the “Master” Phone Module, complete the registration process.

F) CRAFT INTERFACE

- Apply power to both the Line and Phone Modules. Verify that each green LED, marked “PWR” is illuminated.
- Verify that each LED, marked “COM”, is illuminated. This LED indicates that the RF link is active between the Line and Phone Modules.
- For line of site installations, using directional Antennas, first visually align the Antennas towards each other. To fine tune the alignment, attach the leads from a digital multi-meter to the terminals marked RSSI on either the Line or Phone Modules. Set the meter to read a range of 0 to 1 VDC. For each antenna, move the antenna until the voltage reading reaches a maximum.
- The system should now be operational. Pick up the receiver of the phone being serviced and verify that a call cam be completed.

4) SERVICE INFORMATION

Installation assistance may be obtained by calling (306) 382-3301.

With the exception of the five fuses, your TelePATH Millennium does not contain any field serviceable parts. Should a problem arise beyond replacement of one the fuses:

1. The defective equipment should be removed and replaced.
2. Contact Critical Control at (306) 382-3301 to obtain the required RMA (Return Materials Authorization) number which must appear on all shipping documentation.
3. Pack product and return prepaid to:

Critical Control Corp.
Bay 6, 816 First Avenue North
Saskatoon, Saskatchewan
Canada S7K 1Y3

During the warranty period, and subject to the terms of the warranty, the equipment will be repaired and replaced at no charge.

5) SPECIFICATIONS

General

Digital voice coding	32 kbps ADPCM
Voice delay	<10 ms end-to-end
Signalling	Hook status, Pulse dialing, T&R polarity, Ring cadence
Data Rate	Up to 14.4 kbps (supports Bell 212A, V.32bis)
Dimensions	6.0”x6.5”x2.5” (HxWxD)
Weight	600 g
Operating temperature	Extended -40° to 70° C
Humidity	0 to 95% non-condensing

Radio

Frequency Range	ISM, 902-928 MHz
Channels	8
RF Modulation	GMSK
Digital Modulation	Direct Sequence Digital Spread Spectrum
Bandwidth	2.3 MHz
Output power	100 mW (20 dBm +/- 2 dBm)
Receiver sensitivity	-90 dBm @ 10e-3 BER
Antenna	3 dBd omni-directional 6 dBd directional
Certification	IC RSS210 Issue 2, FCC Part 15 Subpart B and C

Phone

Interface	600 Ω, loop-start
Ringing Amplitude	> 45 Vrms @ 1 REN
Ringing Frequency	20 Hz
Ringer Waveform	Sinusoidal
Battery Voltage	-48 Vdc
Loop Current	25 mA
Supply Voltage	10 to 36 Vdc
Supply Power	2.75 W (max)
Power Termination	Screw Terminal (2 position) + / -
Loop Termination	Screw terminal (2 position) T / R
Burst-sync Termination	Screw Terminal (4 position) M, D, /D, G
Cable Access	Through weather resistant strain relief
Antenna Termination	External reverse TNC connector
Protection	Secondary
Certification	IC CS03 Issue 8, FCC Part 68 Subpart D

Line

Interface	> 600 Ω, loop-start
Ringing load	< 1 REN
Ring detect	40 - 120 Vrms
Supply Voltage	10 to 36 Vdc
Supply Power	1.75 W (max)
Power Termination	Screw Terminal (3 position) + / - / Earth ground
Loop Termination	Screw terminal (2 position) T / R
Burst-sync Termination	Screw Terminal (4 position) M, D, /D, G
Cable Access	Through weather resistant strain relief
Antenna Termination	External reverse TNC connector
Protection	Primary, Secondary
Certification	IC CS03 Issue 8, FCC Part 68 Subpart D

Craft Support

Power On	LED
Communication Link	LED
RF Receive Signal Strength	Analog output, 0 to 1 Vdc
Registration	Push-button switch
Monitor Port	3 pin header

6) LIMITED WARRANTY

The TelePATH Millennium product is warranted against manufacturing defects for one year from date of purchase. Within this period Critical Control Corp. will repair the product without charge for parts and labour. Warranty does not cover transportation costs. Nor does it cover a product subjected to misuse, accidental damage, or unsuitable operating conditions. Except as provided herein, Critical Control makes no warranties, expressed or implied, including warranties of merchantability and fitness for a particular purpose.

7) CUSTOMER INFORMATION

A) ANALOGUE DEVICE WARNINGS

This equipment complies with Part 68 of the Federal Communications Commission (FCC) rules for the United States.

A label is located on the underside of the base unit containing the FCC registration number and Ringer Equivalence Number (REN). You must upon request, provide the following information to your local telephone company:

Facility Interface Code: NE9TM2000
Service Order Code:
USOC Jack Type:
REN: 0.4 B

Should you experience trouble with this telephone equipment, please contact:

Critical Control Corp.
Bay 6, 816 First Avenue North
Saskatoon, Saskatchewan
Canada S7K 1Y3

The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line as determined by the total RENs, contact the local telephone company.

If trouble is experienced with this equipment (TelePATH Millennium), for repair or warranty information, please contact Critical Control Corp. at (306)382-3301. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

Your telephone company may discontinue your service if your equipment causes harm to the telephone network. They will notify you in advance of disconnection, if possible. During notification, you will be informed of your right to file a complaint to the FCC.

Occasionally, your telephone company may make changes in its facilities, equipment, operation, or procedures that could affect the operation of your equipment. If so, you will be given advance notice of the change to give you an opportunity to maintain uninterrupted service.

B) INDUSTRY CANADA WARNINGS

NOTICE:

The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational, and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable

method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be co-ordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

NOTICE: The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on a Module may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Number of all the devices does not exceed 5.

C) RADIO INTERFERENCE STATEMENT

This device compiles with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experience radio/TV technician for help

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This Class B digital apparatus complies with Canadian ICES-003.

(French Version)

L'utilisation de ce dispositif est autorisee seulement aux conditions suivantes: (1) Ils ne doit pas produir de brouillage, et (2) L'utilisateur du dispositif doit etre pret a accepter tout brouillage radioelectrique recu, meme si ce brouillage est susceptible de compromettre le fonctionnement du dispositif.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

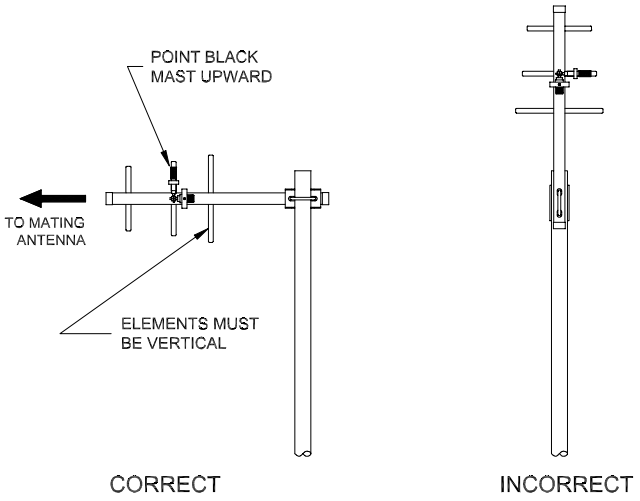

Figure 1: Antenna Orientation

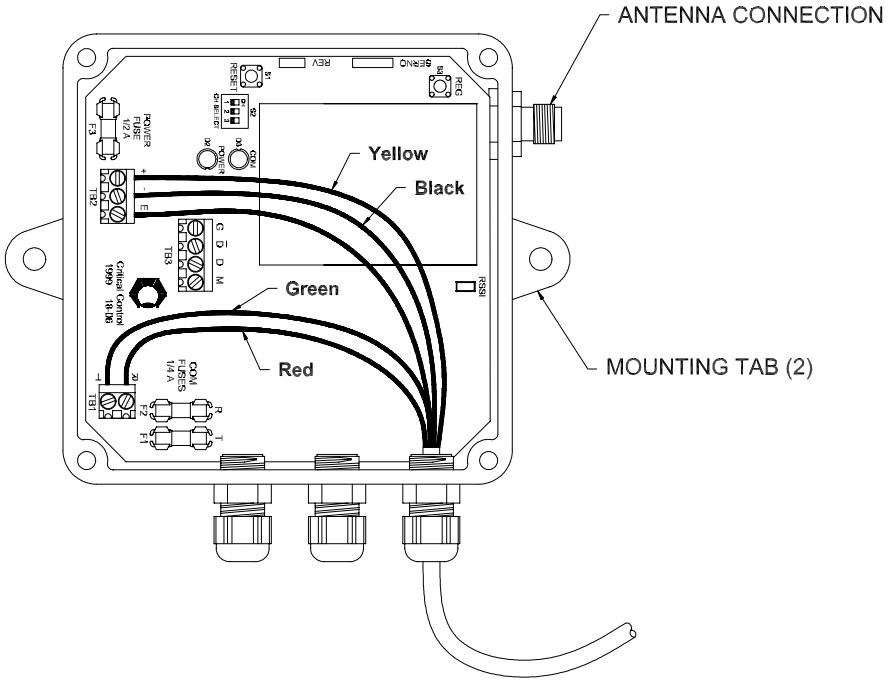

Figure 2: Line Module Wiring

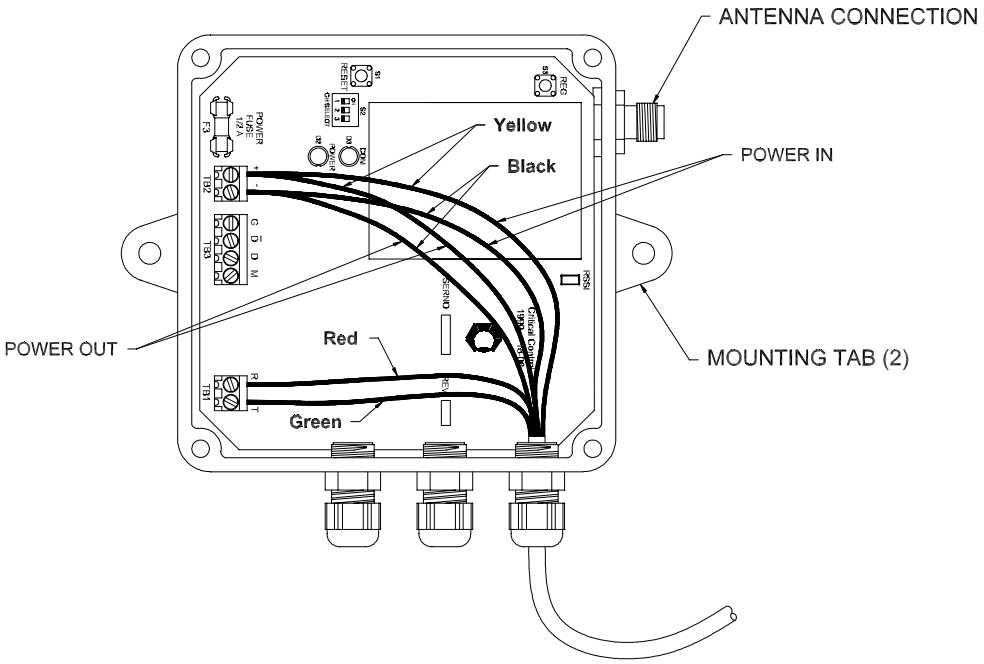

Figure 3: Phone Module Wiring

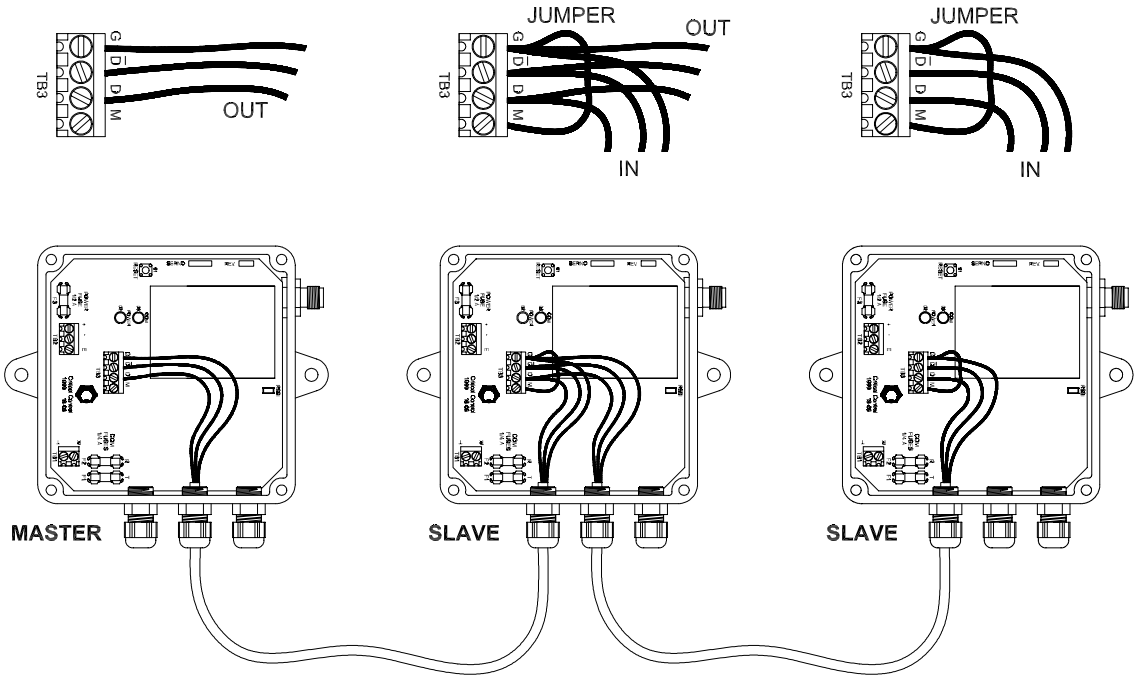

Figure 4: Master – Slave Wiring for Multiple Line Installations

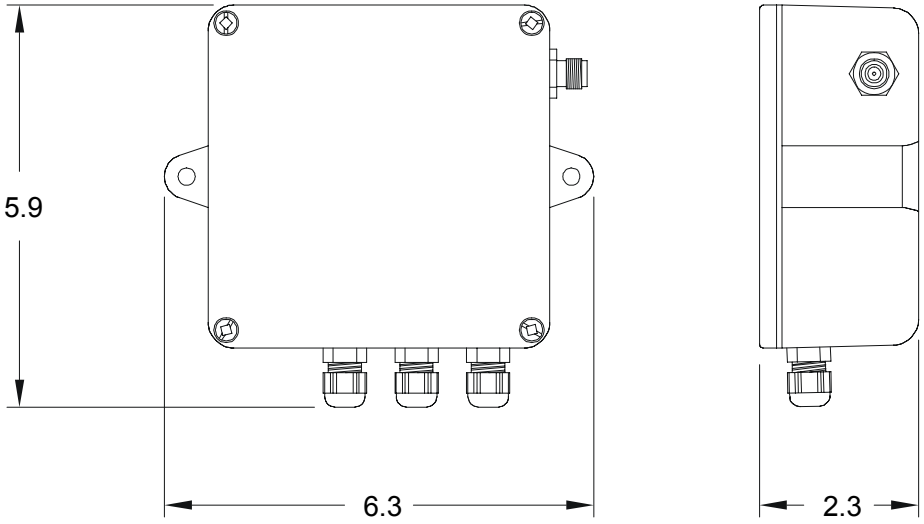

Figure 5: Enclosure Dimensions

CH	POSITION
0	ON 1 2 3
1	ON 1 2 3
2	ON 1 2 3
3	ON 1 2 3

CH	POSITION
4	ON 1 2 3
5	ON 1 2 3
6	ON 1 2 3
7	ON 1 2 3

Figure 6: Channel Selection using Dip-switch