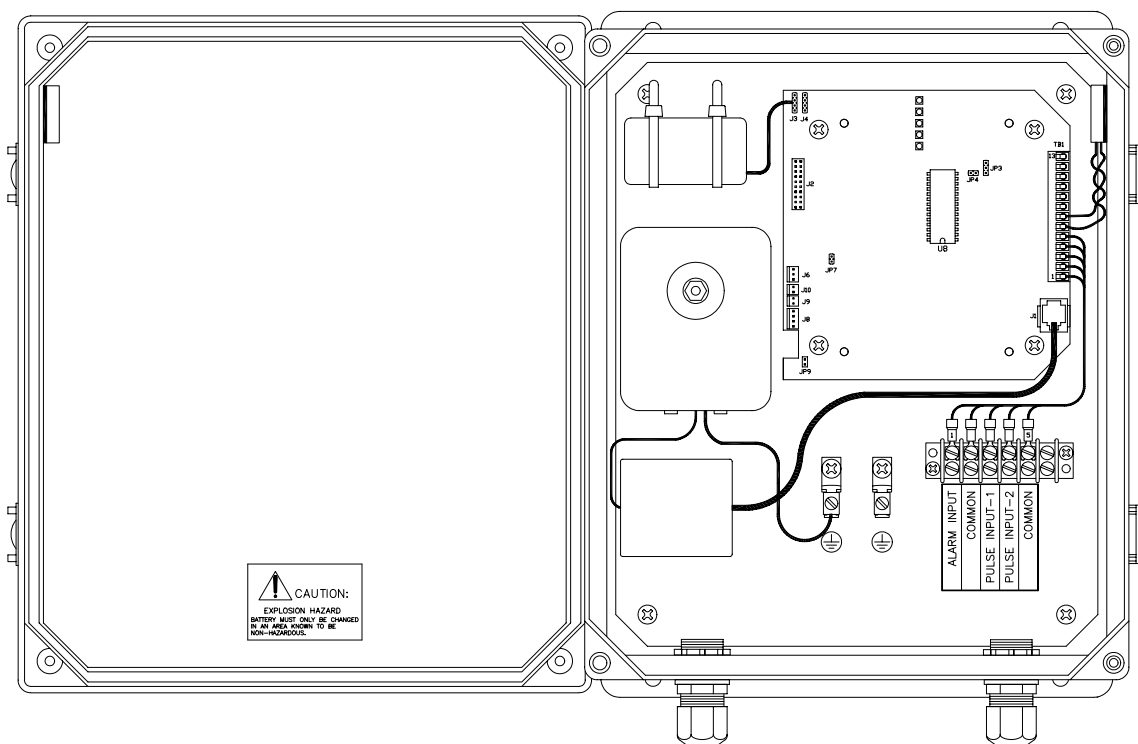


IMU-II/s Station Assembly Installation and Operation Manual (Supplement Document to 900297)



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SECTION ONE

ENCLOSURE DIMENSIONS & MOUNTING

- 1.1 Enclosure Hole Mount Pattern
- 1.2 Wire Inlet Feeders
- 1.3 Overall Enclosure Dimensions

Section 1.1 Enclosure Hole Mount Pattern

Mounting of the fiberglass enclosure is typically accomplished by bolting the unit to a wall, plywood sheet, or similar support structure. Figure 1.1 provides dimensional information concerning the spacing pattern for the four mounting holes. With the mounting hole size being 0.32 inches diameter, it is possible to use a bolt with a maximum shaft diameter of 5/16. Stainless steel hardware is usually recommended for reasons of corrosion resistance.

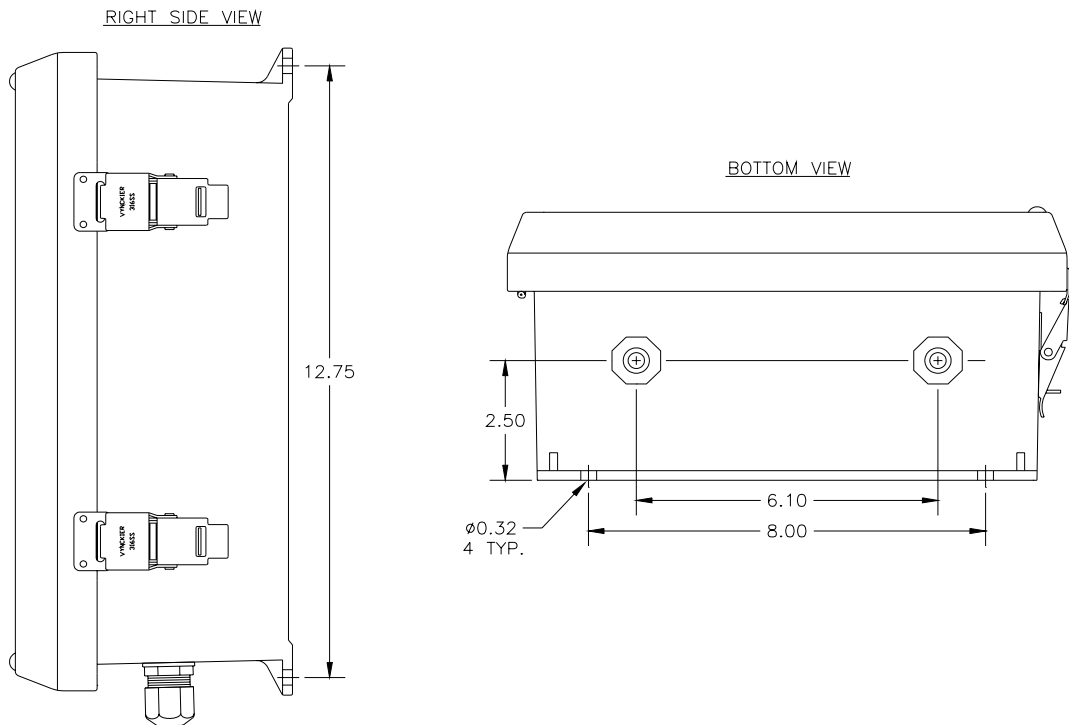


Figure 1.1
Enclosure Hole Mount Pattern
Wire Inlet Feeder Spacing

Section 1.2 Wire Inlet Feeders

Due to the necessity for being able to run multiple cables into the fiberglass enclosure while still maintaining the weatherproof integrity, special wire inlet feeders have been provided to serve this purpose. These feeders can accept a cable range from between 0.20 and 0.47 inches diameter, although it is possible to utilize even smaller diameter cables due to the wide compression range.

Spacing between the wire feeders is approximately six inches as shown in Figure 1.1. Normally it is desirable to have separation between the telephone line and the pulse data cables, therefore it is recommended that the phone line be fed into the left-hand side feeder, and the data cables into the right-hand side.

Section 1.3 Overall Enclosure Dimensions

Figure 1.2 provides an illustration of the maximum external dimensions for the enclosure.

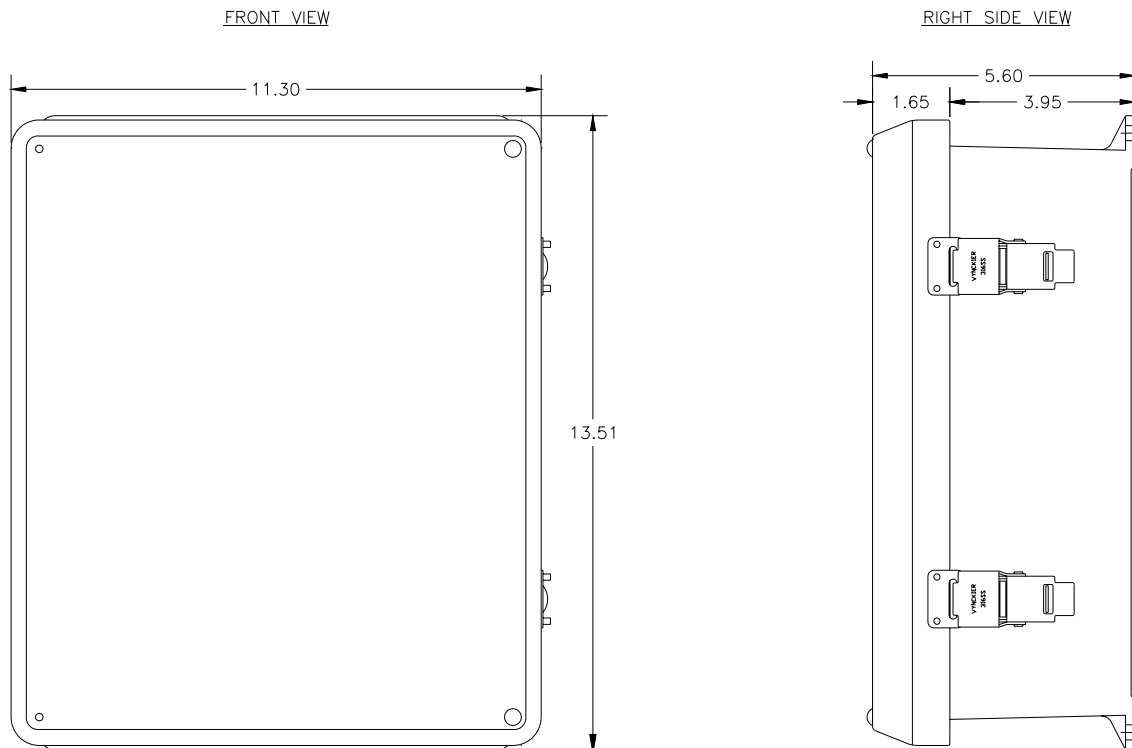



Figure 1.2
External Dimensions of the Enclosure

SECTION TWO STATION ASSEMBLY INTERNAL COMPONENTS

- 2.1 Summary of the Station Assembly
- 2.2 Internal Component Overview

Section 2.1 Summary of the Station Assembly

Consideration to user access and serviceability was provided during the initial design phase of the IMU-II/s Station Assembly. Figure 2.1 illustrates the component placement with their associated labels.



CAUTION

To avoid damage to the electronics caused by static discharge, ensure that proper ESD control procedures are followed. Reference Appendix-A for additional information.

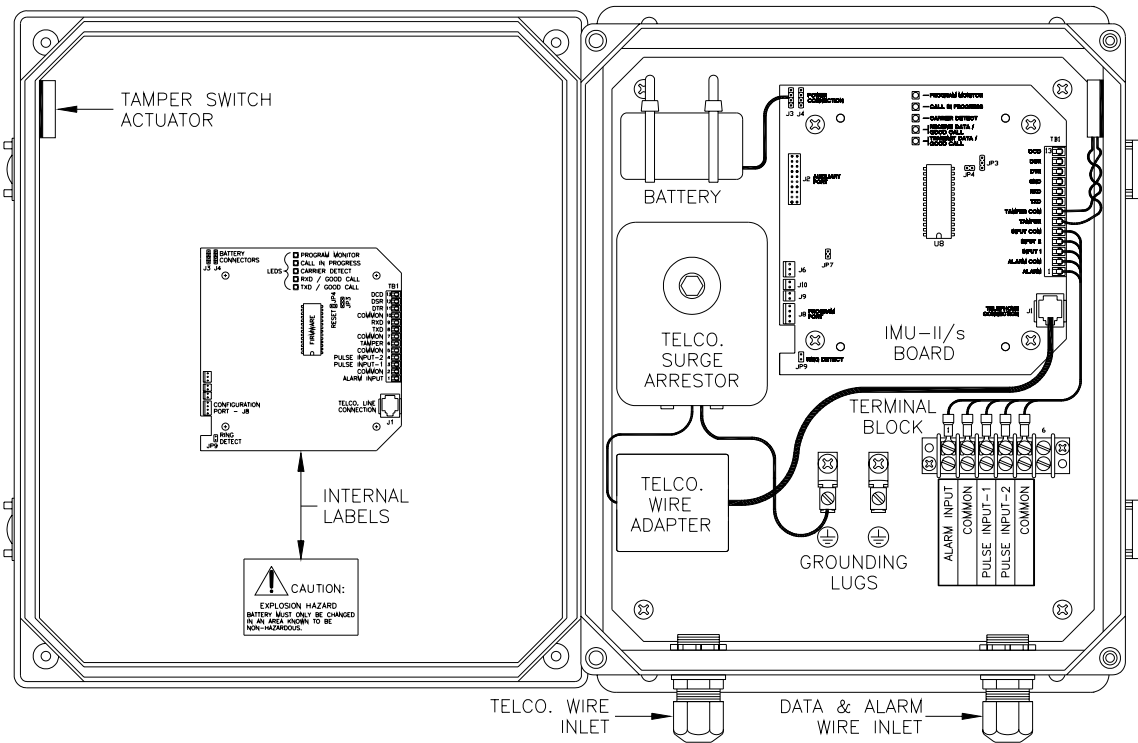


Figure 2.1
Station Assembly Internal Components

Section 2.2 Internal Component Overview

IMU-II/s Board: Serves as the central component in the station assembly by collecting the pulse data, reporting alarm events, and providing the communications path via a phone line MODEM connection.

Terminal Block: A large terminal block has been provided that can accept wires terminated with a ring or fork type terminal, or alternatively bare wires.

Grounding Lugs: Two grounding lugs (one is pre-wired to the surge arrestor) are provided to permit a simple and reliable method for making an earth-ground connection to the station assembly.

Telco Wire Adapter: This small housing with the RJ-11 telephone connector serves to adapt the RJ-11 type cable to a conventional two conductor wire cable that can be routed into the surge arrestor.

Telco Surge Arrestor: It is the intent of the surge arrestor unit to provide some degree of protection to the IMU-II/s telephone electronics in the event of an induced surge on the telephone line. While most lesser surges can be controlled with this arrangement, a direct lightning strike will be outside capability for any surge arrestor to resist.

Tamper Switch & Actuator: Each station assembly enclosure is provided with a tamper switch and magnetic actuator that serves to initiate an alarm call via the IMU-II/s. This tamper switch will notify the operators at the central computer site that either a regular service event is being executed, or else that the unit is being tampered with by an unauthorized person.

Battery Pack: A simple holder with nylon tie-downs is provided for the battery pack assembly. Electrical connection for the battery pack is at the adjacent J3 or J4 connector on the IMU-II/s circuit board. Typical voltage output from a fresh battery is approximately 3.6 volts.

SECTION THREE IMU-II/S BOARD LEVEL DETAILS

- 3.1 Board Level Components
- 3.2 Summary Description of IMU-II/s Components

Section 3.1 Board Level Components

Numerous connectors, LED indicators, and other components are located on the IMU-II/s circuit board. It is necessary to have a working knowledge of a certain number of parts in order to perform the initial setup, as well as periodic servicing operations. Figure 3.1 provides an illustration of the most prominent components, and their associated labels.

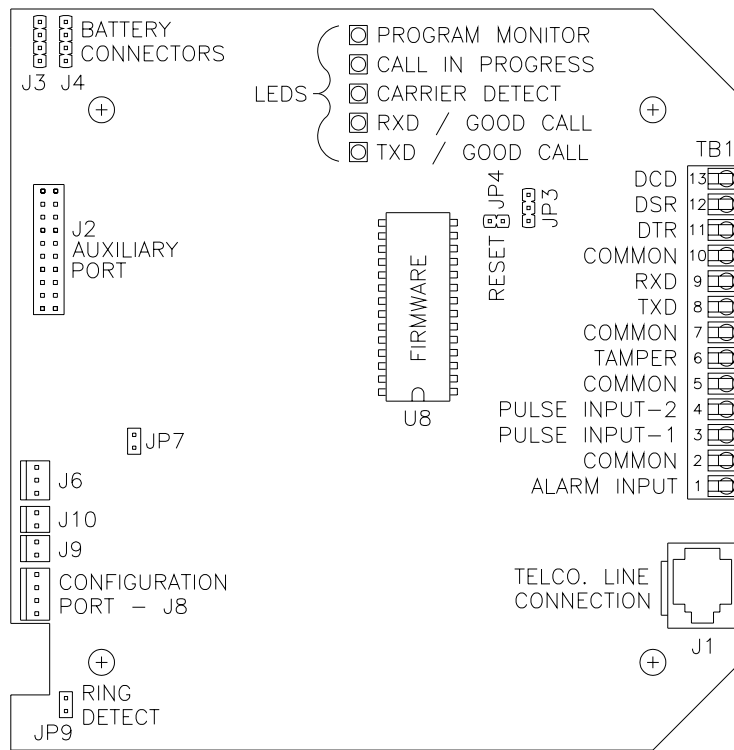


Figure 3.1
IMU-II/s Component Identification

Section 3.2 Summary Description of IMU-II/s Components

Terminal Block TB1: Provides the main entry point for the electrical connections to the pulse data inputs, alarm inputs, and serial RS-232 port.

Telco. Line Connection J1: This is the connection point for the two-wire telephone line. It is possible that there may be additional wires in the phone line cable, but only the red and green wires carry the important communications signals.

Note: Extreme caution should be used when working with telephone lines as there is a possibility for obtaining an electrical shock from these wires.

Battery Connectors J3 & J4: This is the connection point for the lithium battery pack. Either J3 or J4 can be the attachment point for the battery pack, although it is important that only a single pack is left connected at a time. Connecting two batteries simultaneously could result in damage to the batteries and/or the IMU-II/s.

Jumper JP3: Permits selection of the DSR signal level on the terminal block. Position A+B is the default that selects DSR to be driven at RS232 signal levels. Position B+C selects DSR to be driven at 5 volt logic levels.

Jumper JP4: A momentary short across this jumper will serve to reset the microprocessor on the IMU-II/s board. The same effect can be achieved by removal of the battery power source for a ten second duration.

Jumper JP7: This is a special test mode jumper that is used during the manufacturing test process at the factory. It is not recommended that this jumper ever be activated by the user in the field.

Jumper JP9: Installing this jumper permits the IMU-II/s to respond to incoming rings on the telephone line. If multiple IMU units are attached to the same phone line, then the installer will need to decide which device has the highest priority for having JP9 installed.

Connector J2: This is a special auxiliary connection port (20 pin female) for optional accessory items such as cellular phones.

Connector J6: When the IMU-II/s is used with an optional AC mains powered supply, this connection becomes necessary so that the IMU can monitor that status of the AC power. In lithium battery powered applications, this connector can be ignored.

Connector J8: This is a commonly accessed connector that is used as the attachment point for the programming cable. If the user has a need to change one of the EEPROM memory parameters within the IMU-II/s (i.e. -- phone number, AIS number, etc.), then the programming cable attachment is made here with a computer running the MP32 programming software.

Connector J9: This 2-position connector is normally not accessed except for specialized applications.

Firmware U8: Contains the operating program for the microprocessor on the IMU-II/s board. On rare occasions a firmware upgrade may be provided with a new chip that the user would then install into position U8. If a firmware update should become necessary in the future, detailed installation instructions will be provided at that time.

LED Indicators: A set of five LED lights are provided so that the user in the field can obtain some immediate feedback as to the operating status of the IMU-II/s board. The functionality of these LEDs is indicated by the labels shown in Figure 3.1.

NOTE:

Additional information regarding the IMU-II/s board can be found in owners manual 900297. It is the intent that this document serve primarily as a supplement to 900297.
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NOTES

SECTION FOUR STATION ASSEMBLY WIRING DETAILS

- 4.1 Factory Pre-wired Connections
- 4.2 Earth Ground Safety Wire Connection
- 4.3 Phone Line Wire Connections

Section 4.1 Factory Pre-wired Connections

In an effort to make the wiring task easier for the Customer, some of the internal wiring connections have already been pre-wired. A schematic drawing of this arrangement is shown in Figure 4.1 below.

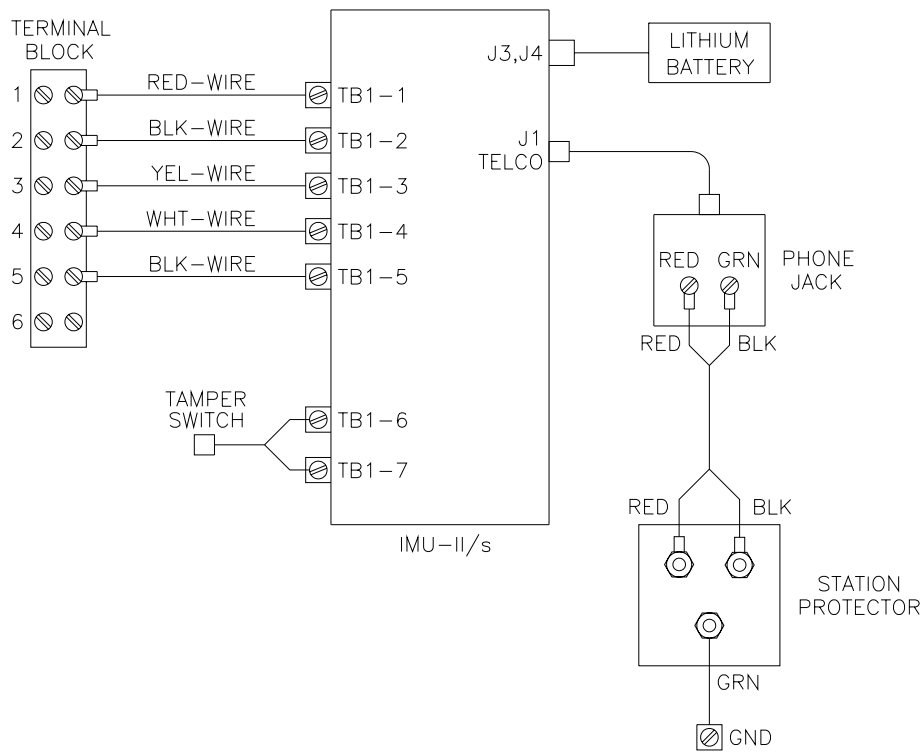


Figure 4.1
Station Assembly Wiring Diagram

In addition to the standard terminal block TB1 that is provided directly on the IMU-II/s board, an ancillary terminal block has been added for more convenient access. The function for each wire connection on the terminal block is clearly indicated via the adjacent label.

Section 4.2 Earth Ground Safety Wire Connection

It is imperative that all possible steps be taken to enhance user safety where possible during a new product installation. One method for accomplishing this with the IMU-II/s station assembly is to make certain that the internal metal plate is properly earth grounded. Two copper grounding terminals are provided on the metal back plate, although one of them is already pre-wired to the surge protection module. The other available grounding lug can be wired in the configuration shown in Figure 4.2 using standard NEC wiring practices.

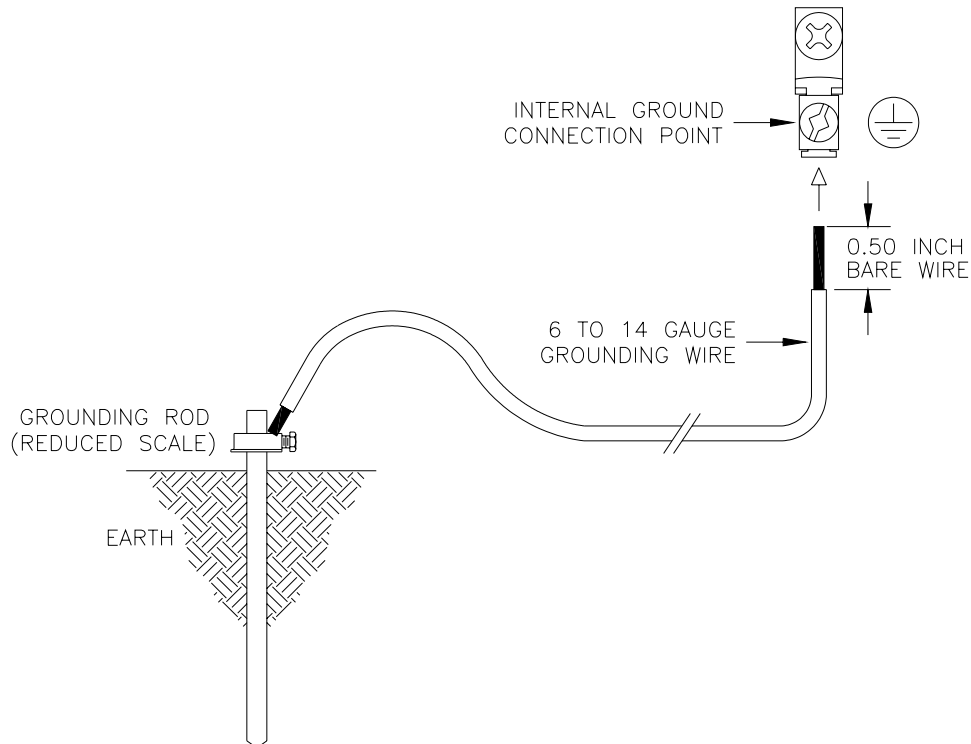


Figure 4.2
Earth Ground Wiring Connection

Section 4.3 Phone Line Wire Connections

CAUTION

- Never install telephone wiring during a lightning storm.
- Never touch un-insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution whenever installing, modifying, or servicing telephone lines.

Routing of the telephone company phone line cable is executed as shown in Figure 4.3. At some installation sites it might be preferable to run the phone line cable through PVC or conduit pipe, although the concept remains the same. Ultimately, the two connection points for the phone line cable are contained within the surge protector module.

Attachment of the phone line is a simple matter of stripping a portion of insulation from the Red and Green wires, and then securing them to the brass terminals.

Note: It is not necessary to make any internal connections within the Telco Line Adapter unit, as these have already been pre-wired at the factory level.

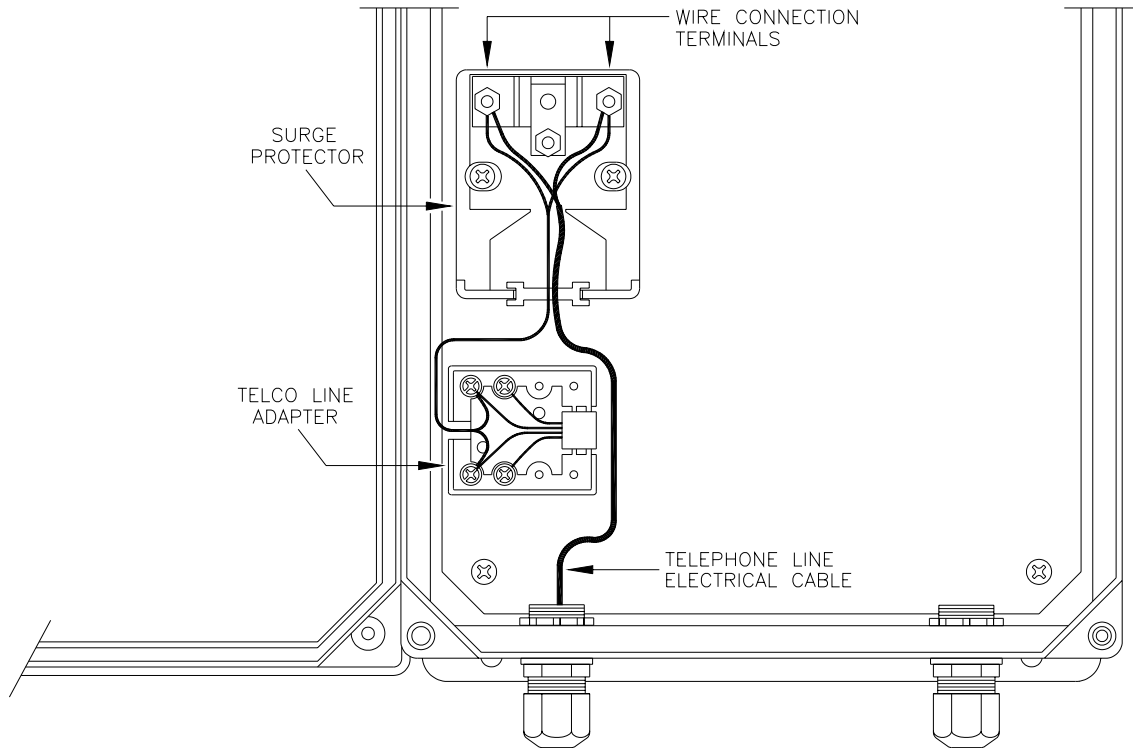


Figure 4.3
Telephone Cable Routing

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SECTION FIVE BATTERY MOUNTING & POWER APPLICATION

- 5.1 Battery Pack Mounting Location
- 5.2 Application of Battery Power
- 5.3 Maintenance Recommendations

Section 5.1 Battery Pack Mounting Location

Typically the IMU-II/s board will be powered by a single ‘D’ cell lithium battery pack provided under Metretek stock number 1011-0022B-001. This battery has a nominal output of 3.6 volts, a capacity of 13Ahr, and a wide temperature range that is well suited for outdoor applications. The mounting position is illustrated in Figure 5.1, with two nylon tie-wraps used for securing the battery in place.

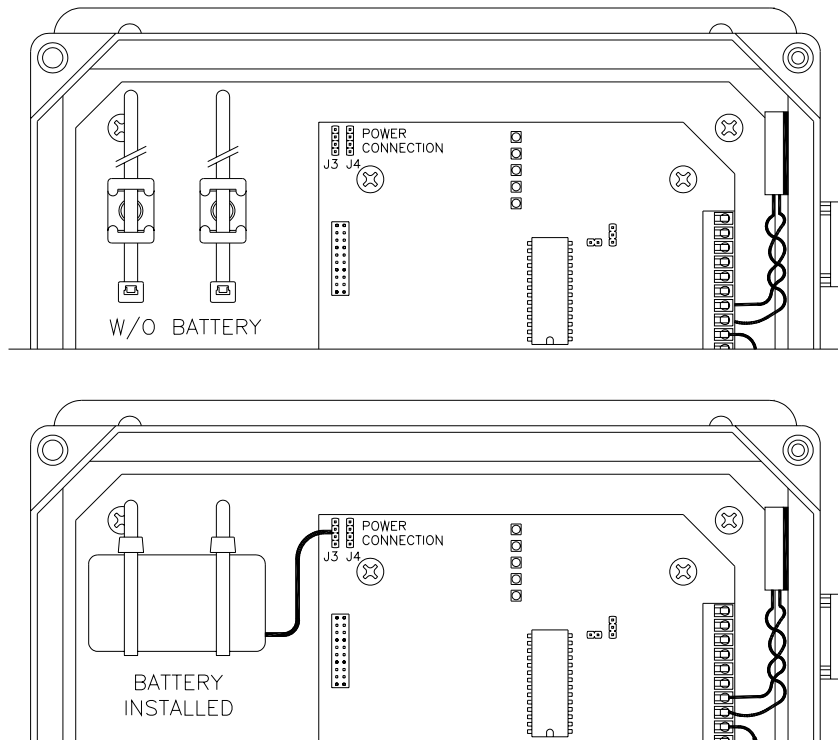


Figure 5.1
Battery Installation Position

Section 5.2 Application of Battery Power

Battery power is applied to the IMU-II/s board by simply attaching the battery connector terminal to either J3 or J4. It is not critical whether J3 or J4 is utilized, except for the limitation that they should not both be connected to a power source simultaneously. Additional information concerning the normal call sequence of the IMU-II/s board can be found in owners manual 900297.

Section 5.3 Maintenance Recommendations

Long-term exposure to the outdoor elements will result in a certain amount of aging effect on the unit enclosure. Fortunately, the housing is specially constructed to resist harsh environments, and also carries a rating of Nema-4X. Some factors to consider when performing routine service maintenance are listed below:

- Inspect the foam seal on the enclosure lid for lacerations.
- Examine the inside of the enclosure for evidence of water accumulation.
- Check for insects that may have gained access through the wiring ports. Tighten the plastic fittings if necessary to block the entry path.
- Inspect the wiring to ensure that the outside jacket is not cracked. Defective wiring should be replaced to maintain integrity.

Note: It is normal for the enclosure's color to fade after being exposed to outdoor environments. Aside from the fading effect, there is no degradation to the environmental protection provided by the housing.

Periodic replacement of the lithium battery pack will be necessary of course, with the typical life span being in the vicinity of 2 to 3 years. An exact prediction of the battery life is not possible however due to the many variables that exist such as operating temperature, frequency of the phone calls, number of pulsers connected to the inputs, and other factors.

Aside from the above maintenance recommendations, most IMU-II/s station assemblies should require relatively little service work.

APPENDIX - A

HAZARDOUS AREAS & ESD PRECAUTIONS

Hazardous Area Classification

At the time of this publication, no hazardous area safety approvals have been received for the IMU-II/s Station Assembly product. It is therefore necessary to ensure that the product is only installed at locations that are classified as 'safe area' sites. Safety barriers must be utilized if it becomes necessary to route any cables into a hazardous area boundary. Refer to the U.S. National Electrical Code (NEC) book, article 510, as well as any relevant local ordinance for guidance with hazardous area wiring. It is the responsibility of the user to ensure compliance with regulations regarding hazardous area locations. This may require the site to be inspected by a certified electrician to maintain full compliance.

ESD Handling Precautions

Most of the circuit boards within this product contain electronics components that are sensitive to ESD (electrostatic discharge). For example, people experience up to 35kV ESD, typically while walking on a carpet in low humidity environments. In the same manner, many electronic components can be damaged by less than 1000 volts of ESD. For this reason, you must observe the following handling precautions when servicing this equipment:

- Always wear a conductive wrist strap.
- Eliminate static generators (plastics, Styrofoam, and so on) in the work area.
- Remove nylon or polyester jackets, roll up long sleeves, and remove or tie back loose hanging neckties, jewelry, and long hair.
- Store and transport all static sensitive components in ESD protective containers.
- Disconnect all power from the unit before ESD sensitive components are removed or inserted, unless noted.
- Use a static safeguarded workstation, which can be set up by using an anti-static kit (Motorola part number 0180386A82). This kit includes a wrist strap, two ground cords, a static control tablemat, and a static control floor mat.

The Motorola part number for a replacement wrist strap that connects to the tablemat is 4280385A59.

- When anti-static facilities are unavailable, use the following technique to minimize the chance of damaging the equipment:
- Let the static sensitive component rest on a conductive surface when you are not holding it.
- When setting down or picking up the static sensitive component, make skin contact with a conductive work surface first and maintain this contact while handling the component.
- If possible, maintain relative humidity of 70-75% in development labs and service shops.

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APPENDIX - B

TECHNICAL SPECIFICATIONS

IMU-II/s Station Assembly Enclosure Dimensions:

Width: 11.3 inches (28.7 cm)
Height: 13.5 inches (34.3 cm)
Depth: 5.6 inches (14.2 cm)
Hole Pattern: 8.0 x 12.75 inches (20.3 x 32.4 cm)

Station Assembly Weight:

7.5 pounds (3.4 kg) including the lithium battery pack

Lithium Battery Specifications:

Metretek Stock Number: 1011-0022B-001
Voltage: 3.6
Capacity: 13 Ahr
Chemistry: Lithium thionyl chloride, spiral wound
Maximum Current: 1800mA
Operating Temperature: -76 to +185 degrees Fahrenheit (-60 to +85 degrees Celsius)

IMU-II/s Board Specifications:

Board Dimensions: 5.7" x 5.7" x 0.75" (14.5cm x 14.5cm x 1.90cm)
Operating temperature range: -22° to +158° Fahrenheit (-30° to +70° Celsius)
RAM memory: 32K total with approx. 28K available for data storage
ROM memory: 32K, contains the system operating program
EEPROM memory: 512 bytes, used for retaining the configuration settings
Number of inputs: Two dedicated data inputs (Form-A type)
One dedicated tamper alarm input (Form-B type)
Maximum pulse input rate: 10 Hertz on the data input(s)
Wetting voltage per input: 3 to 5 volts nominal
Wetting current per input: 175uA nominal
Ringer equivalence: 0.3 B
FCC registration number: BK5USA-24666-DT-E
Data output level: Less than -9dBm
Modem sensitivity: -40dBm minimum
Modulation standards: Bell 103 (300 bps)
Bell 212A (1200 bps)
CCITT V.22 (1200 bps)
CCITT V.22bis (2400 bps)

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APPENDIX – C WARRANTY INFORMATION

The seller warrants its hardware to be free from defects in material and workmanship under normal and proper use for a period of 12 months from the date the hardware is shipped from Metrotek, Incorporated. The seller's sole liability and the buyer's sole remedy for any breach of the foregoing provision is, at the seller's option, the timely no-charge repair or replacement of any defective hardware or part that Metrotek inspects and finds reasonable evidence that a defect in material or workmanship exists. The buyer shall provide the labor required to remove the defective hardware and install its replacement at no charge to the seller. The equipment will be shipped to the seller at the buyer's expense. The replacement or repaired equipment will be shipped to the buyer at the seller's expense.

Warranty claims to be honored under this warranty must be made promptly. Such claims shall specify the nature and details of the claim, the date that the cause of the claim was first observed, and the affected equipment's unit serial number. Defective equipment shall not be returned to the seller's factory without prior authorization from the seller. A copy of the claim's documentation must be attached to the defective equipment and sent to the seller's manufacturing facility. Defective components replaced under this warranty shall become the property of the seller.

The seller makes no representation or warranty other than those set forth in this agreement. THE WARRANTY STATED HEREIN IS EXPRESSLY IN LIEU OF ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY EXPRESSED OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SUCH WARRANTY CONSTITUTES THE ONLY WARRANTY MADE BY THE SELLER WITH RESPECT TO THIS AGREEMENT, THE EQUIPMENT UNITS, OR THE SERVICES TO BE SUPPLIED HEREBY. THE SELLER SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND.

This warranty will not extend to equipment subjected to accident, to misuse, or to alterations/repair not made and documented in writing by Metrotek.

RETURNS PROCEDURE

If it has been determined through troubleshooting that the problem cannot be resolved without returning the equipment for repair, then a return authorization (RA) number will need to be obtained. Please call **1-800-327-8559** to contact the repairs department for obtaining the RA number as well as the return form document that should be filled out. When filling out the repair return form, it is beneficial to provide a description of the problem with as much detail as is necessary to fully characterize the symptom(s). This will assist our technicians in being able to narrow in on the problem, and reduces the possibility that a unit will be returned to the customer with "no problem found". Intermittent type problems can be especially difficult to troubleshoot without a detailed description of the symptoms.

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