ProSoft TECHNOLOGY

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MVI56E-AFC

Installer Certification Requirements

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Document Information

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Important Installation Instructions

Power, Input, and Output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods, Article 501 to 4 (b) of the National Electrical Code, NFPA 70 for installation in the U.S., or as specified in Section 18-1J2 of the Canadian Electrical Code for installations in Canada, and in accordance with the authority having jurisdiction. The following warnings must be heeded:

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIV. 2.

WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES.

WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.
THIS DEVICE SHALL BE POWERED BY CLASS 2 OUTPUTS ONLY.

MVI (Multi Vendor Interface) Modules

WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.
AVERTISSEMENT - RISQUE D'EXPLOSION - AVANT DE DÉCONNECTER L'ÉQUIPEMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DÉSIGNÉ NON DANGEREUX.

Warnings

North America Warnings

Power, Input, and Output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods, Article 501 to 4 (b) of the National Electrical Code, NFPA 70 for installation in the U.S., or as specified in Section 18-1J2 of the Canadian Electrical Code for installations in Canada, and in accordance with the authority having jurisdiction. The following warnings must be heeded:

A Warning - Explosion Hazard - Substitution of components may impair suitability for Class I, Division 2.

B Warning - Explosion Hazard - When in hazardous locations, turn off power before replacing or rewiring modules.

C Warning - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

Avertissement - Risque d'explosion - Avant de déconnecter l'équipement, couper le courant ou s'assurer que l'emplacement est désigné non dangereux.

D Suitable for use in Class I, Division 2 Groups A, B, C and D Hazardous Locations or Non-Hazardous Locations.

ATEX Warnings and Conditions of Safe Usage

Power, Input, and Output (I/O) wiring must be in accordance with the authority having jurisdiction.

A Warning - Explosion Hazard - When in hazardous locations, turn off power before replacing or wiring modules.

B Warning - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

C These products are intended to be mounted in an IP54 enclosure. The devices shall provide external means to prevent the rated voltage being exceeded by transient disturbances of more than 40%. This device must be used only with ATEX certified backplanes.

D DO NOT OPEN WHEN ENERGIZED.

Battery Life Advisory

The MVI46, MVI56, MVI56E, MVI69, and MVI71 modules use a rechargeable Lithium Vanadium Pentoxide battery to back up the real-time clock and CMOS. The battery should last for the life of the module. The module must be powered for approximately twenty hours before the battery becomes fully charged. After it is fully charged, the battery provides backup power for the CMOS setup and the real-time clock for approximately 21 days. When the battery is fully discharged, the module will revert to the default BIOS and clock settings.

Agency Approvals and Certifications

Please visit our website: www.prosoft-technology.com.

Contents

Overview

Introduction

This document provides installer requirements pertaining to ProSoft Technology's MVI56E-AFC Flow Computer MID certification.

General Installation Requirements

The installation requirements shall be as specified in EN1776. The conversion device and the transducers shall be installed in a manner appropriate to the conditions necessary for their effective use. The installation and the presence of the conversion device shall not affect the measurement conditions by the gas meter with which it is associated.
The compatibility of the output of the gas meter and the input of the conversion device shall be verified. In addition, it shall be verified that the display (converted and unconverted readings) shall have a sufficient number of numerals to ensure that the volume passed during 8000 hours at the meter's flow rate of Qmax (and at the maximum likely conversion factor) does not return all of the numerals to their original position.
The installation in hazardous or potentially hazardous areas shall be done in conformity with EN 60079-0, EN 60079-1, EN 60079-2, EN 60079-5, EN 60079-6, EN 60079-7, EN 600709-11, and EN 60079-25.

The connections of transducers shall be done in accordance with manufacturer's requirements.

Modbus Transducer Requirements

All associated transducers that are connected via Modbus must have a part or evaluation certificate for the application legislation, R117 for Liquid, EN12405 for R140 for gas applications.

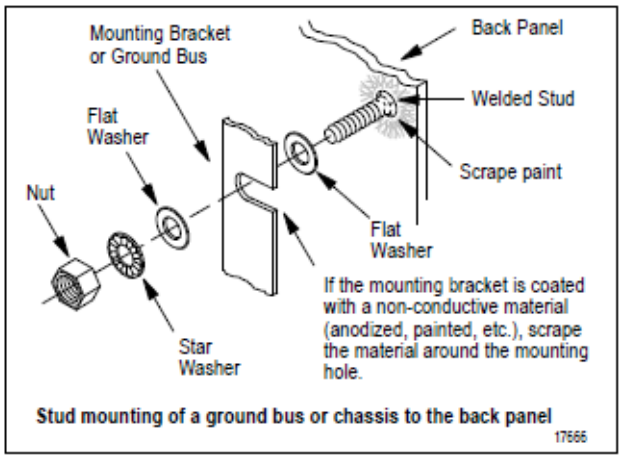
Mounting Requirements

Mount the chassis with bolts or welded studs. If mounting brackets to a chassis do not lay flat before nuts are tightened, use additional washers as shims to prevent the chassis from bending when the nuts are tightened.

Note: *Do not bend the chassis. Bending the chassis may damage the backplane resulting in poor connections.*

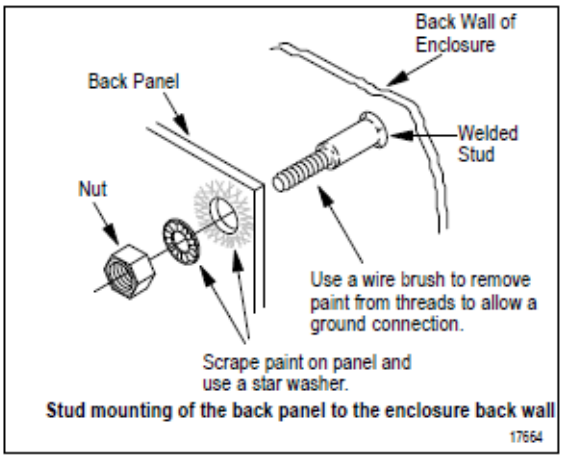
The following diagrams illustrate:

- Stud-mounting a ground bus or chassis to the back panel of an enclosure
- Stud-mounting a back panel to an enclosure
- Bolt-mounting a ground bus or chassis to the back panel of an enclosure



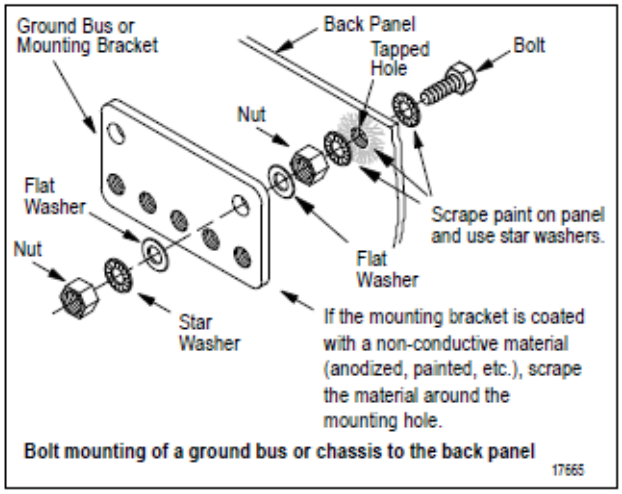
Stud mounting of a ground bus or chassis to the back panel

17666



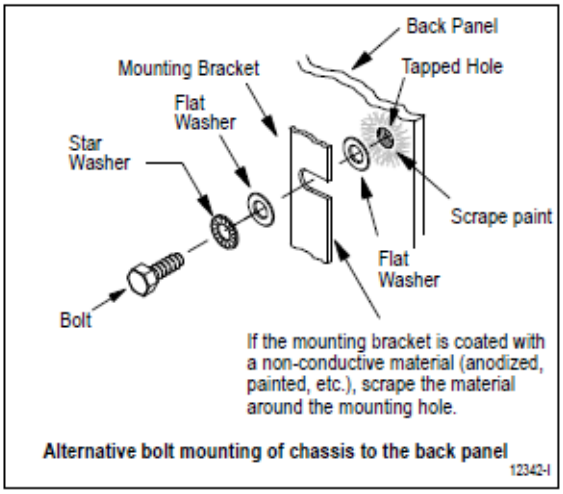
Stud mounting of the back panel to the enclosure back wall

17664



Bolt mounting of a ground bus or chassis to the back panel

17665



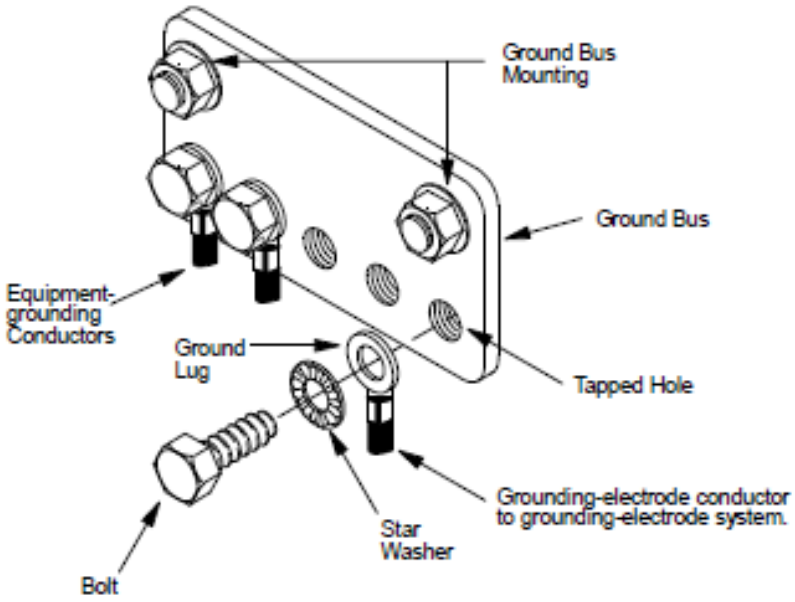
Alternative bolt mounting of chassis to the back panel

12342-I

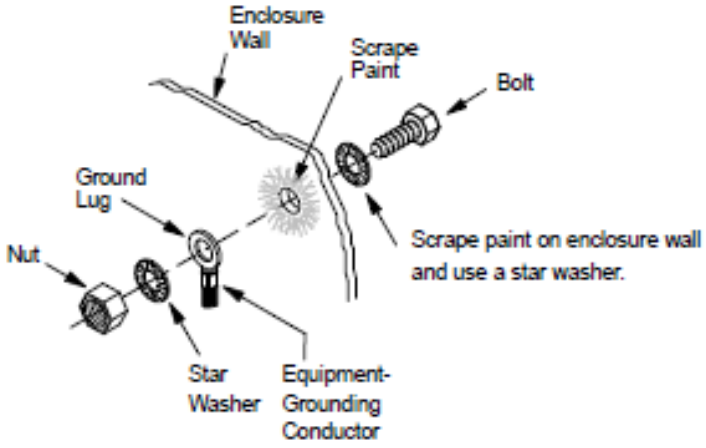
Grounding Requirements

- Complete grounding instructions are included in the *Rockwell Automation 1770-4.1 Application Data – Industrial Automation Wiring and Grounding Guidelines (p6)*.
- Shielded cable instructions are included in the *Rockwell Automation 1770-4.1 Application Data – Industrial Writing and Grounding Guidelines (P9).*

Ground Bus Connections



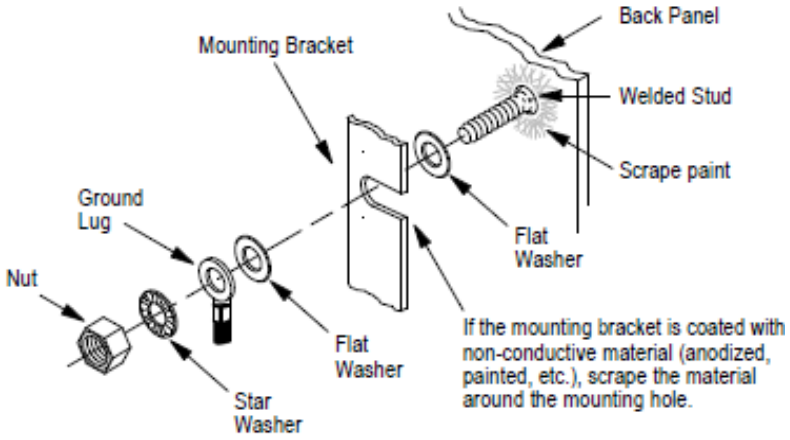
Enclosure Wall Ground Connections



- Use a steel enclosure to guard against Electromagnetic Interference (EMI). If the enclosure door has a viewing window, it should be a laminated screen or a conductive optical substrate to block EMI.
- Do not rely on hinges for electrical contact between the enclosure and the enclosure door. Install a bonding wire.
- Connect an equipment grounding conductor directly from each chassis to an individual bolt on the ground bus.
- If the chassis does not have a ground stud, use a mounting bolt as shown above.

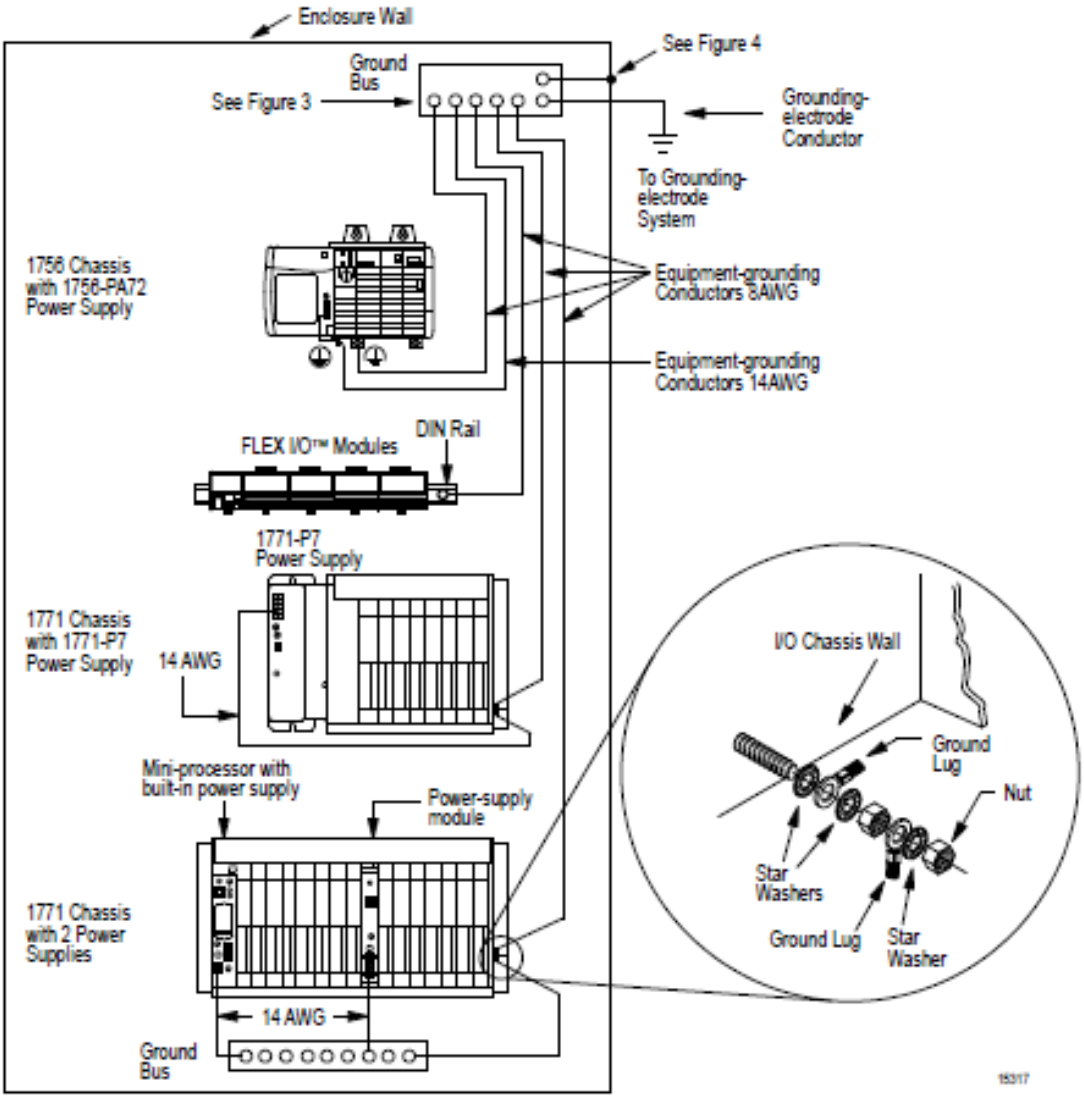
For chassis with a ground stud, use the ground stud for this connection as shown in the following diagram.

Details of Ground Connection at Mounting Bracket of Chassis with No Ground Stud



For a power supply without a ground-able power supply chassis (such as a power supply module or mini processor with an integral power supply) with a chassis that is not internally connected to its GND terminal, use a 14 AWG copper wire to connect its GND terminal to the ground stud or mounting bolt connected to the ground bus. This helps to ensure adequate ground for noise immunity.

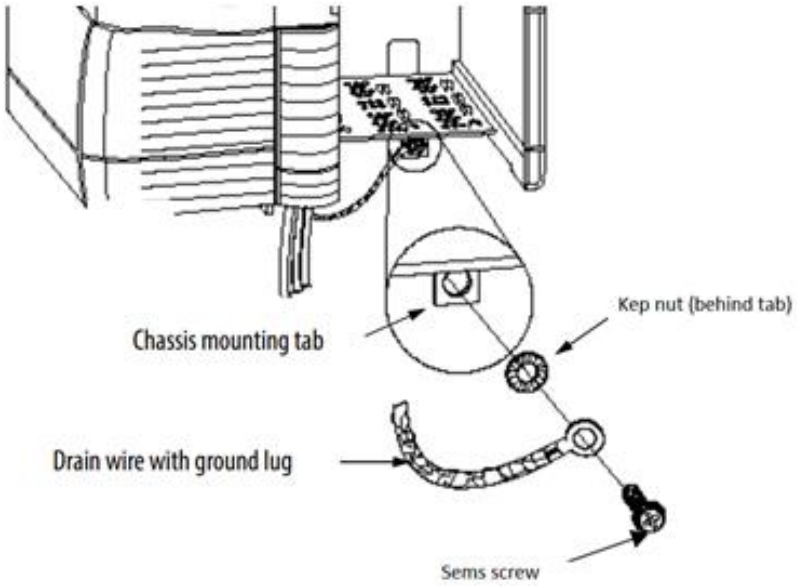
Typical Grounding Configuration



Cabling

Analog Input Wiring – 1756-IF16

Use Belden 8761 cables for each analog input channel. Connect the terminal of ground wire of the 8761 cable to the chassis mounting tab using the Sems screw and Kep nut. The complete grounding instructions for grounding of the 1756-IF16 is included in the Rockwell Automation ControlLogix Analog I/O Modules User Manual, 1756-UM009D-EN-P.



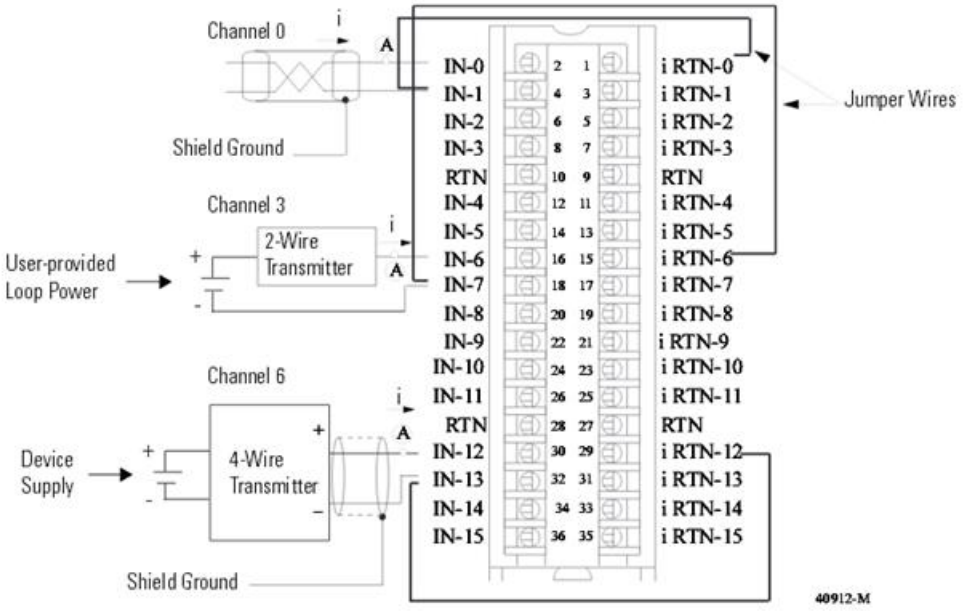
Ferrite Beads are to be double wound and used on each analog input signal cable as specified in the *Rockwell Automation 1770-4.1 Application Data – Industrial Automation Wiring and Grounding Guidelines*.

Ferrite beads can provide additional suppression of transient EMI. Fair-Rite Products Corporation manufactures a ferrite bead (part number 2643626502) which can be slipped over category-2 and -3 conductors. You can secure them with heat-shrink tubing or tie-wraps. With a ferrite bead located near the end of a cable (or cable segment in the case of a daisy-chain or dropline configuration) transient EMI induced onto the cable can be suppressed by the bead before it enters the equipment connected to the end of the cable.

Differential Mode

Used for applications that can have separate signal ports or a common ground is not available. This method is recommended for environments where improved noise immunity is required.

1756-IF16 Differential Current Wiring Example.



Note: *Use the table when wiring your module in differential mode.*

Channel	Terminals	Channel	Terminals
Channel 0	IN-0 (+), IN-1 (-) & i RTN-0	Channel 4	IN-8 (+), IN-9 (-) & i RTN-8
Channel 1	IN-2 (+), IN-3 (-) & i RTN-2	Channel 5	IN-10 (+), IN-11 (-) & i RTN-10
Channel 2	IN-4 (+), IN-5 (-) & i RTN-4	Channel 6	IN-12 (+), IN-13 (-) & i RTN-12
Channel 3	IN-6 (+), IN-7 (-) & i RTN-6	Channel 7	IN-14 (+), IN-15 (-) & i RTN-14

- All terminals marked RTN are connected internally.
- A 249Ω current loop resistor is located between IN-x and I RTN-x terminals.
- If multiple (+) or multiple (-) terminals are tied together, connect the tie point to a RTN terminal to maintain the module's accuracy.
- Place additional loop devices (strip chart records, etc.) at the A location in the current loop.
- Do not connect more than two wires to any single terminal.

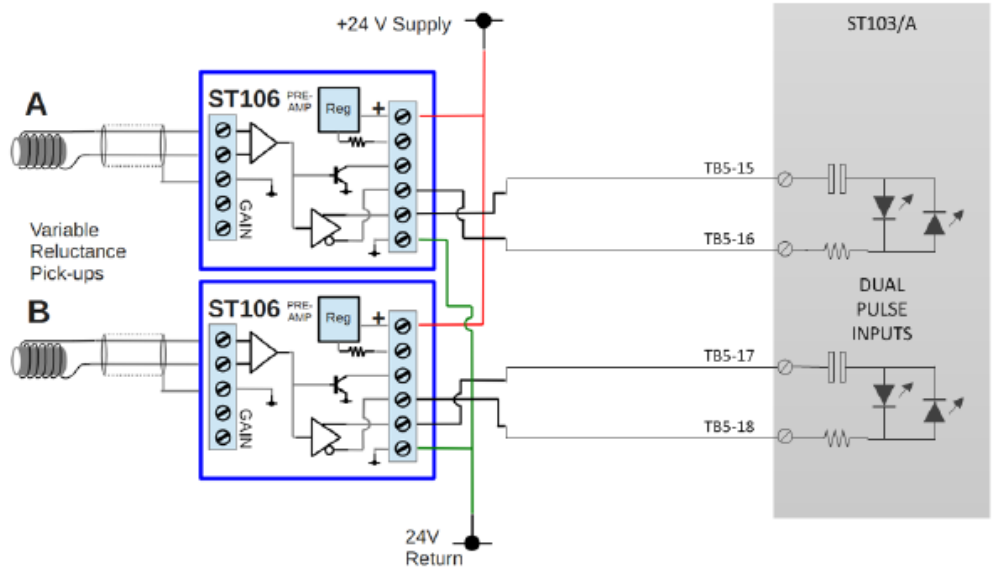
Note: *When operating in four channel, high-speed mode, only use channels 0, 2, 4, and 6.*

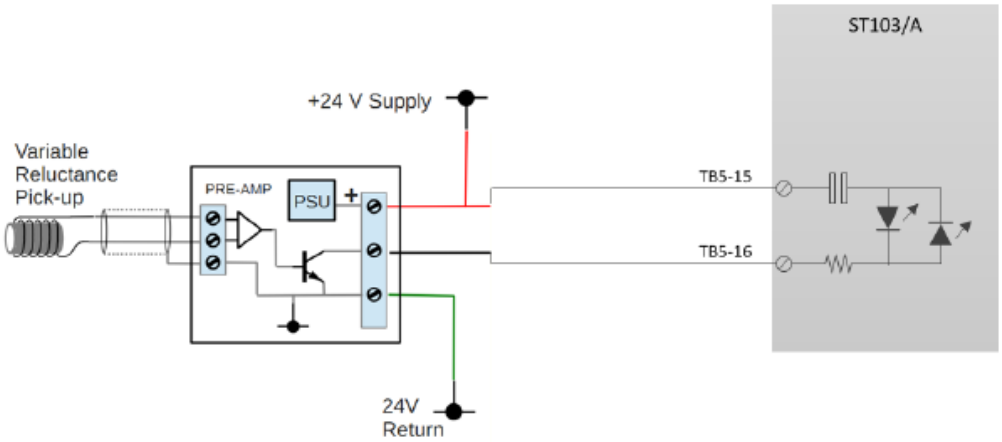
Pulse Fidelity Wiring (ST103)

The ST103 will require two counters: one for the main pulse (Pulse A) and the other one for the redundant pulse (Pulse B). Good and bad pulse counts as well as counter status is determined via Modbus communication.

Pulse Input Wiring

Description	Function	Signal	Skt/TB	Pin
Dual Pulse Input A / Single Pulse Input	Pulse Input A	+	TB 5	15
		-	TB 5	16
Dual Pulse Input B / Single Pulse Input	Pulse Input B	+	TB 5	17
		-	TB 5	18





Connect the serial cable that contains an RJ-45 connector to the middle port of the MVI56E-AFC module located in Rack 3 (the liquid meter rack). Connect the DB-9 end to the ProSoft 1454-9F adapter. Wire the adapter to the ST-103 as follows:

ProSoft 1454-9F pin	ST-103 pin
1	TB 2-11
8	TB 2-12
5	TB 2-6

Shielded Cables

Shielded cables help reduce the effect of electrical noise coupling. Ground each shield at one end only. Shields grounded at both ends forms a ground loop which can cause a processor to fault. Each shield must be connected directly to a chassis ground.

Never connect a shield to the common side of a logic circuit.

Avoid breaking shields at junction boxes. Many types of connectors for shielded conductors for shielded conductors are available from various manufacturers. If you break a shield at a junction box, do the following:

- Connect only Category-2 conductors in the junction box
- Do not strip the shield back any further than necessary to make a connection
- Connect the shields of the two cable segments to ensure continuity along the entire length of the cable.

Module Wiring Options

Analog interface modules (AIFMs) - Mounts on DIN rails to provide the output terminal blocks for the I/O module. Use the AIFMs with the pre-wired cables that match the I/O module to the interface module.
Feed-through and Fusible AIFMs - Allows you to customize the wiring system to your application. The fused AIFMs have 24V DC blown fuse indicators to locate and replace blown fuses.
Pre-wired cables - Have a pre-wired RTB on one end to connect to the front of an analog module and a D-shell connector on the other end to plug into a D-shell terminal.
The D-shell connectors, which are either 15 or 25 pins have a slide-locking mechanism for a secure connection.

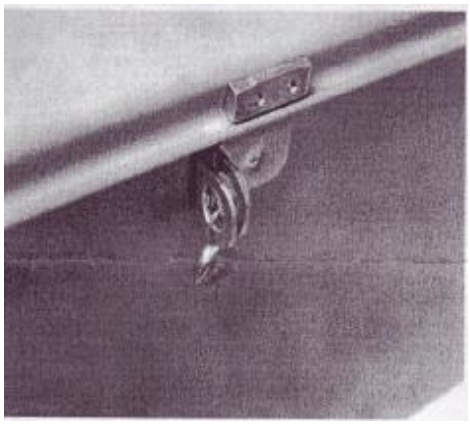
Refer to *Rockwell Automation Publication 1756-UM009D-EN-P – March 2015* for a complete listing of available cables.

Sealing

The installer must seal process input and communications cables entry to the MVI56E-AFC. This includes the communication cable between the MVI56E-AFC and the indicator device (which views the MVI56E-AFC web page via a web browser). The type of seal used and location is determined by the installer. However, all seals must meet the requirements set forth in this document.

General Sealing Requirements

- Sealing is preferably carried out by means of lead seals. However, other types of sealing are permitted on fragile instruments or when these seals provide sufficient integrity (electronic seals for instance).
- Seals shall, in all cases, be easily accessible.
- Sealing devices shall be provided on all parts of the measuring systems that cannot materially be protected otherwise against action likely to influence the measuring accuracy.
- Sealing devices should prevent the parameters (among others, correction and conversion parameters) used for determining the measurement results from being altered when these parameters are not managed according to documented provisions or a quality assurance system providing traceability of modifications.
- A stamping plate, the purpose of which is to receive the control marks, shall be sealed or shall be permanently fixed on the measuring system. This stamping plate may be combined with the identification plate of the measuring system.
- The seals shall be visibly fixed and easily accessible.
- Access shall only be allowed to authorize operators and secured in a manner sufficient for the National Authority pertinent to the installation location.
- All connections between the MVI56E-AFC and transducers should be protected by separate seals to avoid the breaking of the main metrological seal in case of component replacement.
- Access to the interior of the enclosure is sealed via the padlock hasp with a lead and wire seal and the metal guard blocks above and below the hinge.



Controller Battery

The battery compartment for the controller should make provisions to prevent unauthorized access. Batteries shall be replaced only after the breaking of a seal.

Secured Communication

Communication to components of the MVI56E-AFC are to be sealed to ensure that information transferred may not be tampered with.

Controller Key Switch

The ControlLogix controller uses a key switch located on the front of the module. The key switch prevents all program changes while set to RUN.

Key switch in RUN position – key inserted:

Key switch in RUN position – key removed:

Refer to the ControlLogix Controller documentation for operational information.

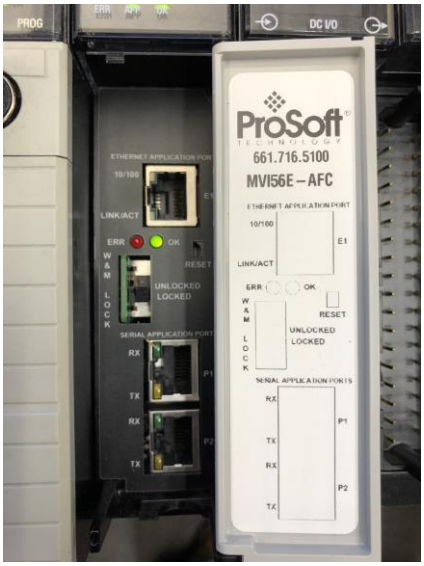
Weights and Measures Lock Switch

The MVI56E-AFC Weights & Measures (W&M) Lock Switch is a physical unlocked/locked switch located on the front of the module and can be accessed during operation if granted physical access to the module. Configuration changes to the flow computer module are prevented by inserting a jumper across the two pins beside the Weights & Measures Lock label.

The W&M lock switch is to be in the locked position to prevent:

- Controllable events, that is, changes to sealable parameters,
- Firmware changes via the web server communications interface.

W&M lock switch in locked position without seal:



W&M lock switch in locked position with seal:

Casings

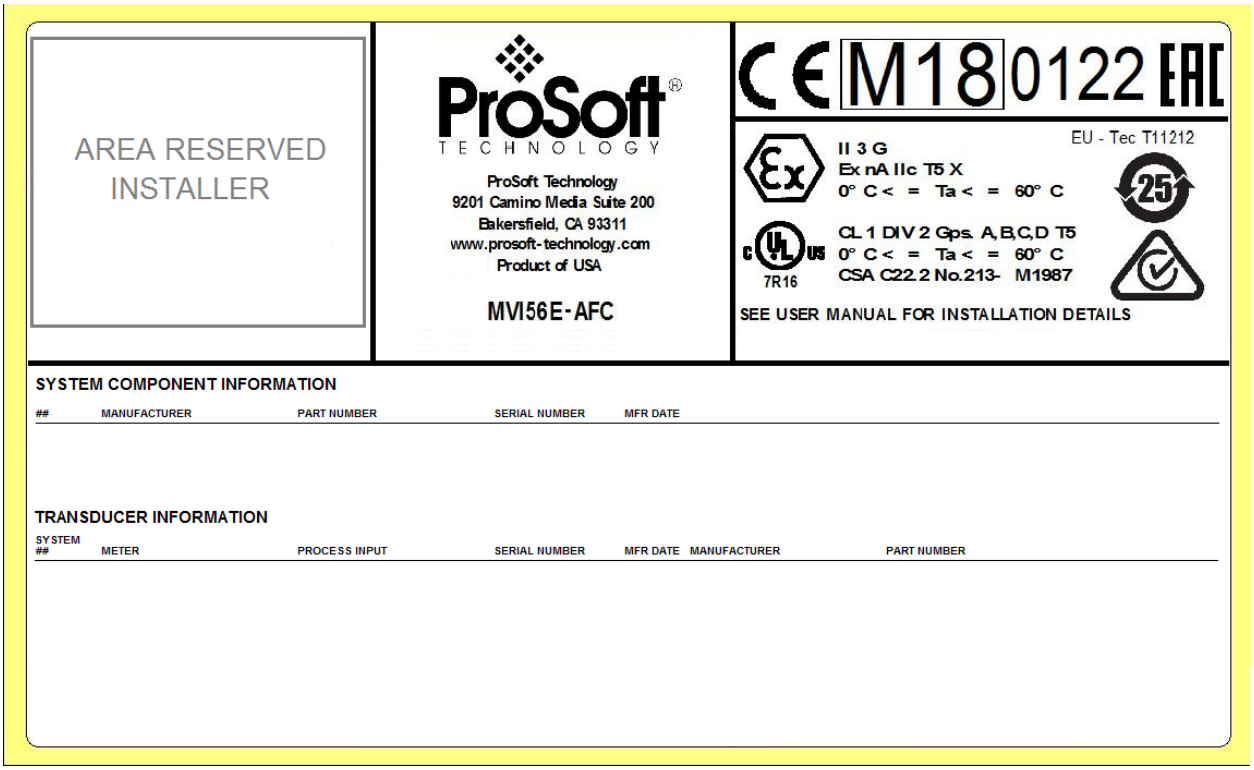
The casing of all the constituent elements of a conversion device shall have an ingress protection index (IP) specified in EN 60529, complying with the installation conditions specified by the manufacturer.

Any part of the conversion device designed for outdoor use and not intended to be installed in a weatherproof housing shall be at least in accordance with the severity level IP 65, specified in EN 60529.

System Nameplate

The MVI56E-AFC nameplate(s) must be ordered and installed on the casing visibly fixed and easily accessible. The MVI56E-AFC nameplate(s) include serial numbers for all components and all transducers specific to the installation location. The ambient temperature range presented on the MVI56E-AFC nameplate is to represent the component within the MVI56E-AFC having the least operating temperature range. The size of the MVI56E-AFC nameplate is dependent upon the installation.

MVI56E-AFC nameplate:



Support, Service & Warranty

Contacting Technical Support

ProSoft Technology, Inc. is committed to providing the most efficient and effective support possible. Before calling, please gather the following information to assist in expediting this process:

1. Product Version Number
2. System architecture
3. Network details

If the issue is hardware related, we will also need information regarding:

1. Module configuration and associated ladder files, if any
2. Module operation and any unusual behavior
3. Configuration/Debug status information
4. LED patterns
5. Details about the serial, Ethernet or Fieldbus devices interfaced to the module, if any.

Note: *For technical support calls within the United States, ProSoft's 24/7 after-hours phone support is available for urgent plant-down issues. Detailed contact information for all our worldwide locations is available on the following page.*

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