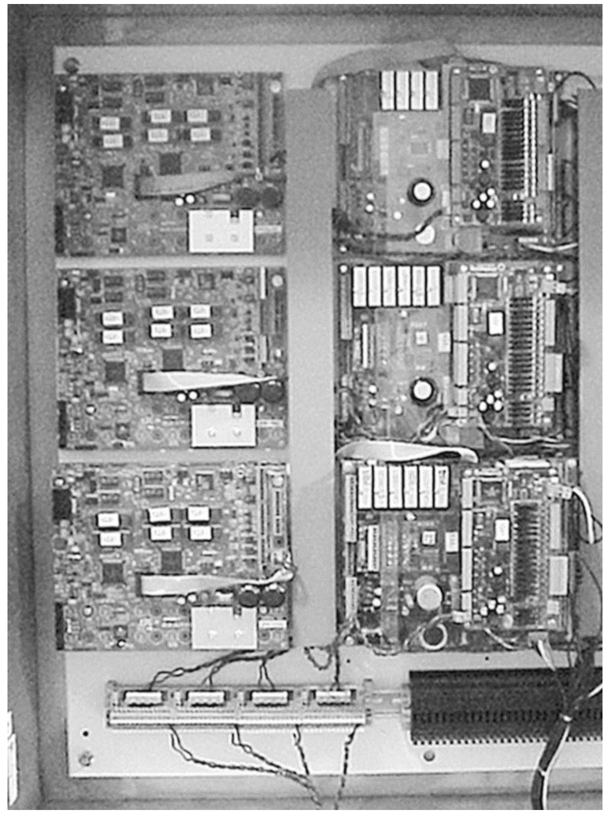
Electronic Preset Delivery System

Smith Meter® AccuLoad® III-SA

Installation Manual

Issue/Rev. 0.6 (8/15)

Bulletin MN06140



Caution

The default or operating values used in this manual and in the program of the AccuLoad III are for factory testing only and should not be construed as default or operating values for your metering system. Each metering system is unique and each program parameter must be reviewed and programmed for that specific metering system application.

Disclaimer

FMC Technologies Measurement Solutions, Inc. hereby disclaims any and all responsibility for damages, including but not limited to consequential damages, arising out of or related to the inputting of incorrect or improper program or default values entered in connection with the AccuLoad III.

Receipt of Equipment

When the equipment is received the outside packing case should be checked immediately for any shipping damage. If the packing case has been damaged, the local carrier should be notified at once regarding his liability. Carefully remove the unit from its packing case and inspect for damaged or missing parts.

If damage has occurred during shipment or parts are missing, a written report should be submitted to the Customer Service Department, FMC Technologies Measurement Solutions Inc., 1602 Wagner Avenue, Erie, Pennsylvania 16510.

Prior to installation, the unit should be stored in its original packing case and protected from adverse weather conditions and abuse.

Caution:

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this Instruction Manual, may cause interference to radio communications. It has not been tested to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

Warning

These preset devices must be used with fail-safe backup equipment to prevent accidental runaway delivery of product. Failure to provide backup equipment could result in personal injury, property loss and equipment damage.

On initial power-up of a new unit or after installation of a new computer board, there are several alarms that will be triggered which cannot be cleared until the AccuLoad is programmed.

United States NIST Handbook 44 UR.3.5.1. and UR.3.5.2.

For compliance to United States NIST Handbook 44 UR.3.5.1. and UR.3.5.2., invoices printed using a mechanical numeric-only printer (e.g., Smith Load Printer) must contain in preprinted form the following information:

a. Volume corrected to 60 degrees F
b. API/C of E ____________________
c. Temperature ___________________
d. Gross Volume ___________________

where the API/C of E, temperature, and gross volume may be hand-written on the ticket. Refer to Handbook 44, UR.3.5.1. and UR.3.5.2. for current requirements.

Table of Contents

Table of Contents

Section I – Introduction

This manual is to be used for the installation of the AccuLoad III Electronic Preset Controller with AccuLoad III-SA firmware. The manual will be divided into six sections: Introduction, Pre-Installation Considerations, Installation, Diagrams, Specifications, and Related Publications.

"Pre-Installation Considerations" describes the areas that must be considered prior to the installation of the AccuLoad III.

"Installation" describes the areas that have to be considered when installing the AccuLoad III.

"Diagrams" covers dimensional outline drawings, wiring schematics, etc.

"Specifications" describes the specifications of the AccuLoad III Electronic Preset.

"Related Publications" lists the literature that is associated with the AccuLoad III-SA.

Receipt of Equipment

When the equipment is received the outside packing case should be checked immediately for any shipping damage. If the packing case has been damaged, the local carrier should be notified at once regarding his liability. Carefully remove the unit from its packing case and inspect for damaged or missing parts.

If damage has occurred during shipment or if parts are missing, a written report should be submitted to the Customer Service Department, FMC Technologies Measurement Solutions, Inc., 1602 Wagner Avenue, Erie, Pennsylvania 16510.

Before installation, the unit should be stored in its original packing case and protected from adverse weather conditions and abuse.

Mechanical

In addition to the following, all previous warnings and cautions should be reviewed before installation.

1. A solid base (pedestal or shelf) should be used to support the AccuLoad III Man Machine Interface (MMI) housing.

2. The location and the height of the AccuLoad III should be selected to permit easy viewing of the display and to provide convenient access to the keypad by all users.

3. Access for servicing the AccuLoad III is through the front cover. For ease of service and removal of parts the cover must swing open more than 90°. The AccuLoad III is hinged on the left.

4. All wiring is through the conduit entrances located on the bottom of the NEMA IV housing. There are three 1.75" conduit entrances in the MMI and ten 2.00" conduit entrances in the Flow Control Module (FCM).

5. A din rail is mounted in the lower section of the FCM housing. The din rail has connectors to distribute the 24 Vdc power to the transmitters mounted on the meters. The din rail also provides for up to 50 1-amp fused disconnect lever terminal blocks.

6. In warm climates, the AccuLoad III should be shaded from direct sunlight. The maximum external temperature of the AccuLoad III housing must not exceed 140°F (60°C) to ensure that the internal temperature limit is not exceeded.

Electrical

1. **Caution: Each board set should be handled individually and contains its own "unique" 24v DC power supply. All external devices such as pulse transmitters, RTD's, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.**

2. All DC wiring must be routed into AccuLoad III through the conduit entries located in the bottom of the housing. Do not route DC and AC wiring through the same conduit entry. DC wiring must use internal DC wiring ducts.

3. The DC signal wires must be multi-conductor shielded cables of 18 to 24 AWG minimum strand copper.

Note: *The following recommendations are based on our knowledge of the electrical codes. The local electrical codes should be reviewed to ensure that these recommendations follow the local code. Also installation manuals of all the equipment being wired into the AccuLoad should be reviewed for transmission distances and wire recommendations.*

Table 1. Typical Wire Sizes

Equipment	Number and Gauge of Wire	Belden Number or Equivalent
Transmitters	4 / 18 Ga. 4 / 20 Ga.	9418 8404
Temp. Probes Density & Pressure Transmitters	4 / 22 Ga.	8729 OR 9940
EIA-232 Communications	3 / 24 Ga.	9533
EIA-485 Communications	4 / 24 Ga.	9842

Table 2. Maximum Cable Length and Baud Rate (EIA-232)

Baud Rate	Feet	Meters
38,400	250	75
19,200	500	150
9,600	1,000	305
4,800	2,000	610
2,400	4,000	1,220
1,200	4,000	1,220

Table 3. Maximum Cable Length and Baud Rate (EIA-485)

Baud Rates	Feet	Meters
1,200 to 38,400	4,000	1,220

Note: *For Ethernet communications, refer to IEEE and IT rules, regulations, and procedures regarding transmission distances when connecting to any hub, router, switch, etc.*

3. All AC wiring must be routed into the AccuLoad III through the conduit entries located in the bottom of the housing. Connectors are sized for a maximum of 14 gauge wire. Consult the local electrical codes for the minimum AC wire size required for your application. Do not route AC and DC wiring through the same conduit entry. AC wiring must use AC wiring ducts.

4. All AC wiring should be stranded copper and must comply with federal, state and local codes and specifications.

5. Two separate AC circuits must be provided from the breaker panel. One circuit will supply isolated power to the AccuLoad III electronics (instrument power). The second circuit will supply power to the external devices.

6. For proper operation the AccuLoad III must be earth grounded. The grounding point should be as close to the unit as possible. To ensure proper earth ground, the following conditions must be met:

   a) The resistance between the earth ground terminal in the AccuLoad III and the grounding point must not exceed 2 Ω

   b) The proper grounding point is a ½" to ¾" diameter copper stake that extends into the water table. Where this is not practical, a ground plane may be used;

      Note: *Electrical conduit, piping, and structural steel are not considered proper grounding points for equipment using electronics.*

   c) No other devices, except AccuLoad IIIs and ancillary equipment such as load printers, should be connected to any point in the grounding circuit.

7. If external relay permissives are used in series with AccuLoad III relays, an RC network must be placed in parallel with the permissive to prevent a false turn-on of the AccuLoad III relays. Recommended RC network = 0.1 UF capacitor and a 680 Ω resistor (Electrocube part number RG 2031-11).

8. Interposing relays must be installed between the pump controller, alarming device, and the AccuLoad III permissive sense relays.

Important Electrical Safety Installation Notes

Input and output wiring must be in accordance with Class I, Division 2 wiring methods and in accordance with the authority having jurisdiction.

This equipment is suitable for use in Class I, Div. 2, Groups C and D or non-hazardous locations only.

WARNING – Explosion Hazard – substitution of components may impair suitability for Class I, Div. 2.

WARNING – Explosion Hazard – do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

WARNING – EXPLOSION HAZARD. DO NOT REMOVE OR REPLACE FUSE UNLESS POWER HAS BEEN DISCONNECTED OR THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS OF FLAMMABLE GASES OR VAPORS.

The end-use installation must include a switch, suitable for the location where it is installed, so that power can be removed for replacement of fuse.

Mechanical

See Pre-installation Considerations.

Electrical

1. AC circuits must be isolated from DC circuits and brought into the unit through their respective conduit openings.

2. All signal and DC wiring should be connected before connecting AC wiring.

3. Be sure that all connections on the terminal blocks are tight.

4. All shields must be connected as follows:

   (a) Terminals 3, 13, 14, or 15 on terminal block TB4 on the EAAI board;
   (b) Terminals 3 and 4 on terminal block TB6 on the KDC board;
   (c) Terminals 9 and 10 on TB14 on the BSE board; or
   (d) Terminals 1-12 of P2 on +24Vdc distribution block.

5. All exposed shields must be properly insulated to prevent short circuits to other terminals or to the chassis. The shield at the device (e.g., temperature device, transmitter, etc.) must be cut back to the insulation and taped off. All shields should be continuous. If splices are required, they must be soldered and properly insulated.

6. If other communicating devices are used with the AccuLoad III, refer to the manual for that unit for shielding information. Shields for other communicating equipment should not be terminated in the AccuLoad III.

7. Sufficient slack should be provided for the wiring in the AccuLoad III to permit easy removal of the boards.

Installing and Removing the Analog I/O Module

Caution: *Turn off the power at the unit prior to installing or removing the Analog I/O Module. Failure to do so will damage modules.*

Care should be taken when installing or removing the Analog I/O modules so as not to damage the board or the module. To install the module, line up the alignment pins with the socket and push down on the module. Once it is seated, screw in the mounting screw until tight. Do not over-tighten the screw. To remove the modules from the board, loosen the mounting screw and pull up on the module.

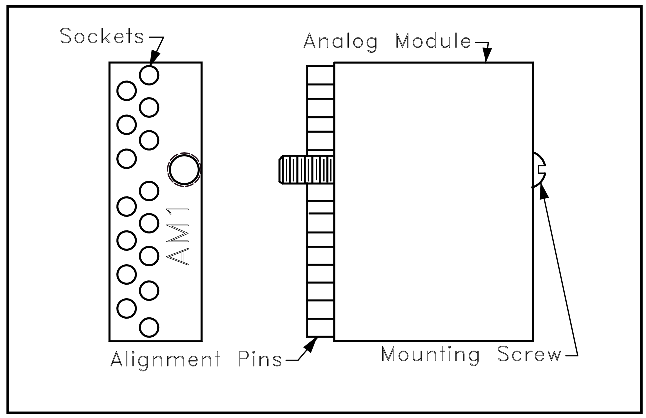


Figure 1. Analog Modules

Input Frequency x2

If the application requires a pulse rate that is higher than the meter is capable of putting out, the AccuLoad III has the capability of multiplying the incoming pulses times 2. This option is activated by switches located on the PIB boards. The PIB boards are located on the EAAI and the BSE boards.

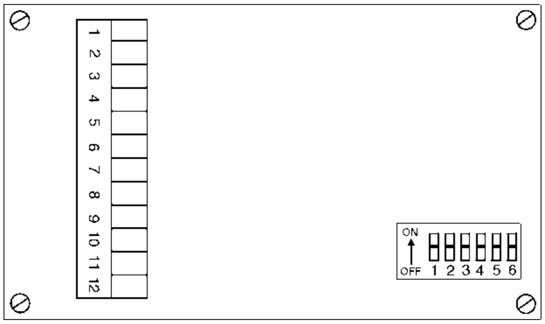


Figure 2. Connector and Switches on PIB Board

The default setting from the factory is "times 1." The switch is closed (ON). To multiply the incoming pulses times 2, push the switch of the incoming pulse channel to the open (OFF) position. The switches are located on the PIB boards, as shown in Figure 2 above. The PIB board that is located on the EAAI board is for pulse inputs 1 through 6. The PIB board that is located on the BSE board is for pulse inputs 7 through 12.

Note: *The switches correspond to the pulse input channels (i.e., Meter Pulse In #1 is equal to Switch #1.) See Table 6 for corresponding Pulse Input channels.*

Start-Up Procedure

1. Verify that wiring has been completed. Once it is complete, power can be applied to the unit.

2. The displays should light, indicating that the AccuLoad is ready for start-up.

3. The AccuLoad can be programmed either through the keypad or using a PC and the AccuMate programming tool. Comm port #1 on each board set is initialized at the factory to match the communication settings of the AccuMate.

4. Each board set is shipped from the factory with default addresses 1 through the number of arms (e.g., if ALX4 firmware, addresses 1 through 4).

5. All board sets on the communication line must be set up with a unique address for each arm (e.g., if two board sets are used for eight arms, each of the eight arms must have a unique address).

6. Disconnect all board sets except one from the comm line that the AccuMate is using until all the addresses have been programmed as unique addresses.

7. Once the addresses have all been set as unique addresses, the comm line can be connected to all the board sets.

8. Each board set can then be programmed.

9. One comm port on each board set must be configured to communicate with the MMI. It is suggested that this be comm port #2 as indicated in this manual. Suggested settings for this comm port are a 38,000 baud rate, 8 bits, and a five-second time-out.

10. The MMI must be set for MMI function with matching protocol.

11. Once the programming has been completed and tested, the system is ready for operation.

12. Record each board set's model and arm addresses for future reference.

Read the AccuLoad III-SA Operator Reference Manual, MN06139.

Board Set (A – D)

A set of boards is comprised of one each of the following boards: KDC, EAAI, BSE, and two PIBs.

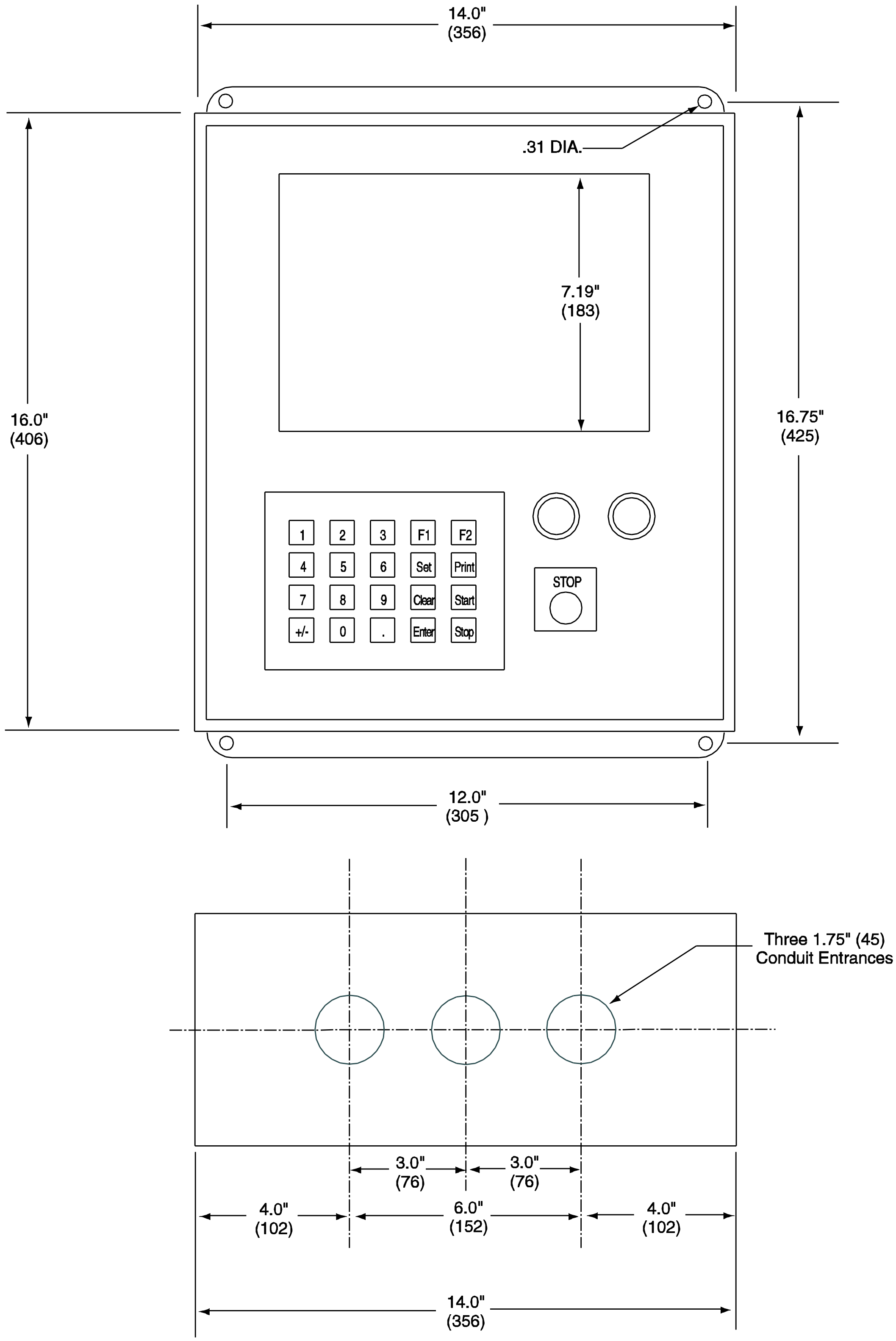


Figure 3. MMI Dimensions

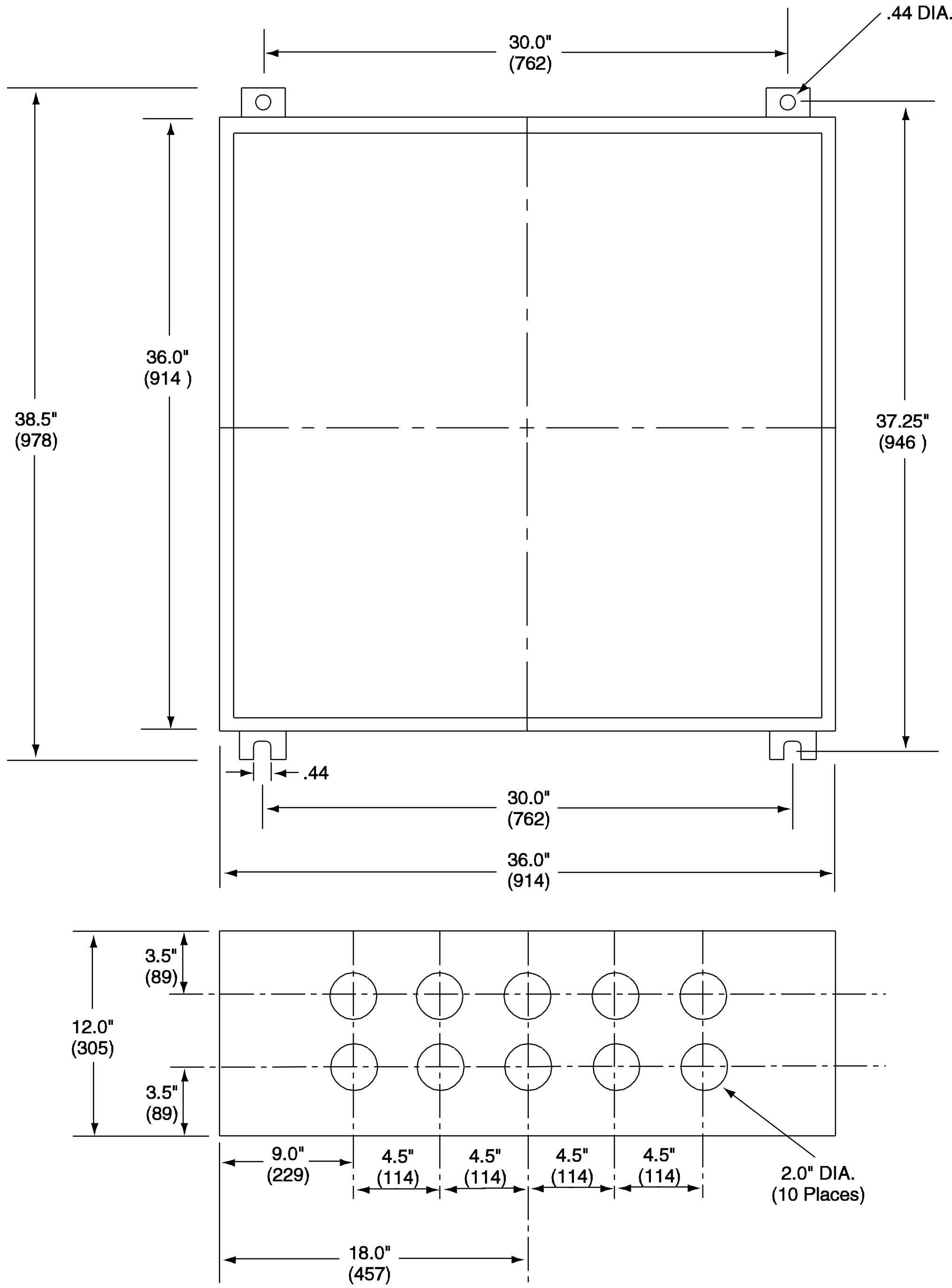


Figure 4. Flow Control Module Dimensions

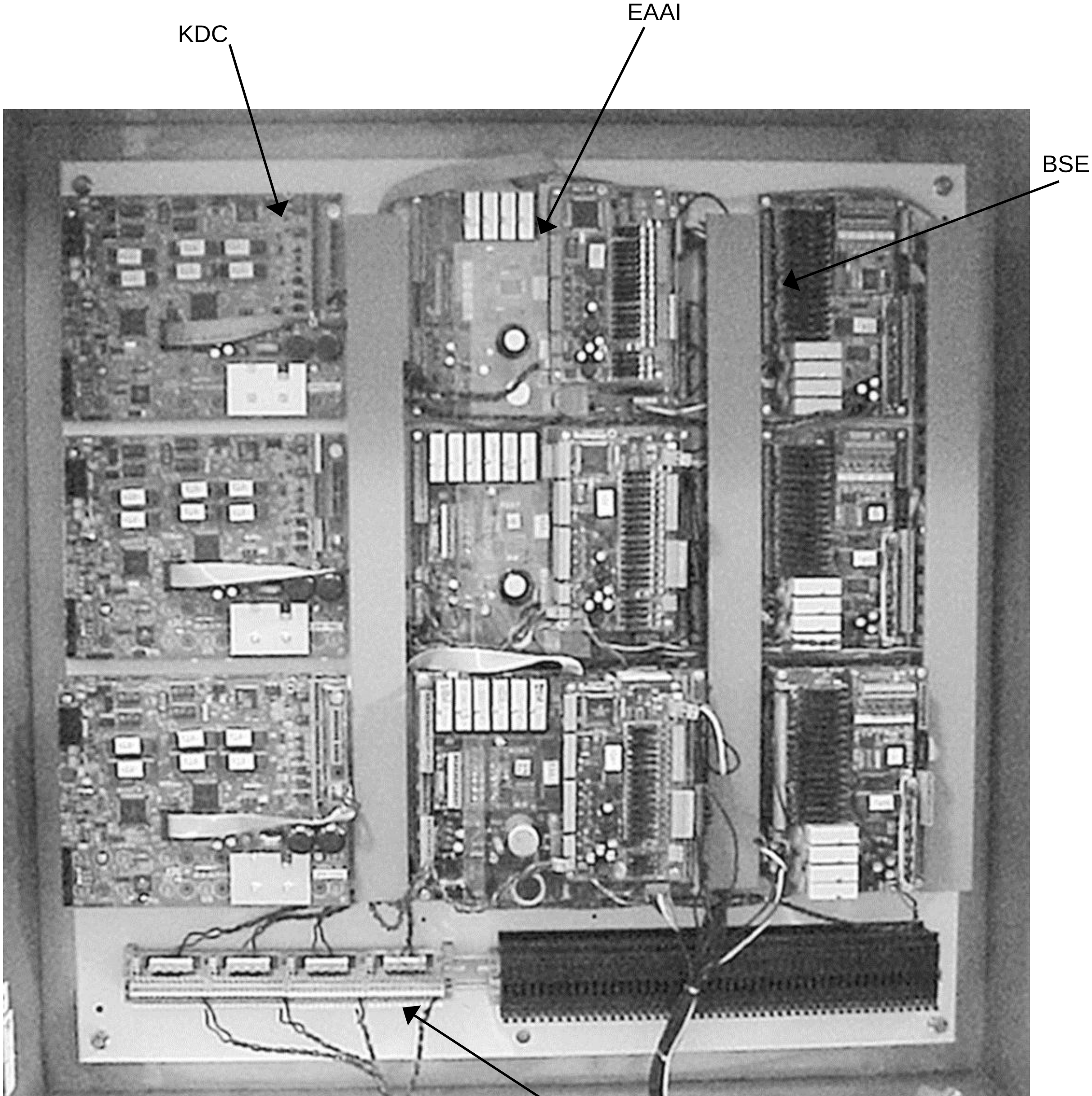


Figure 5. AccuLoad III-SA Board Layout Photograph

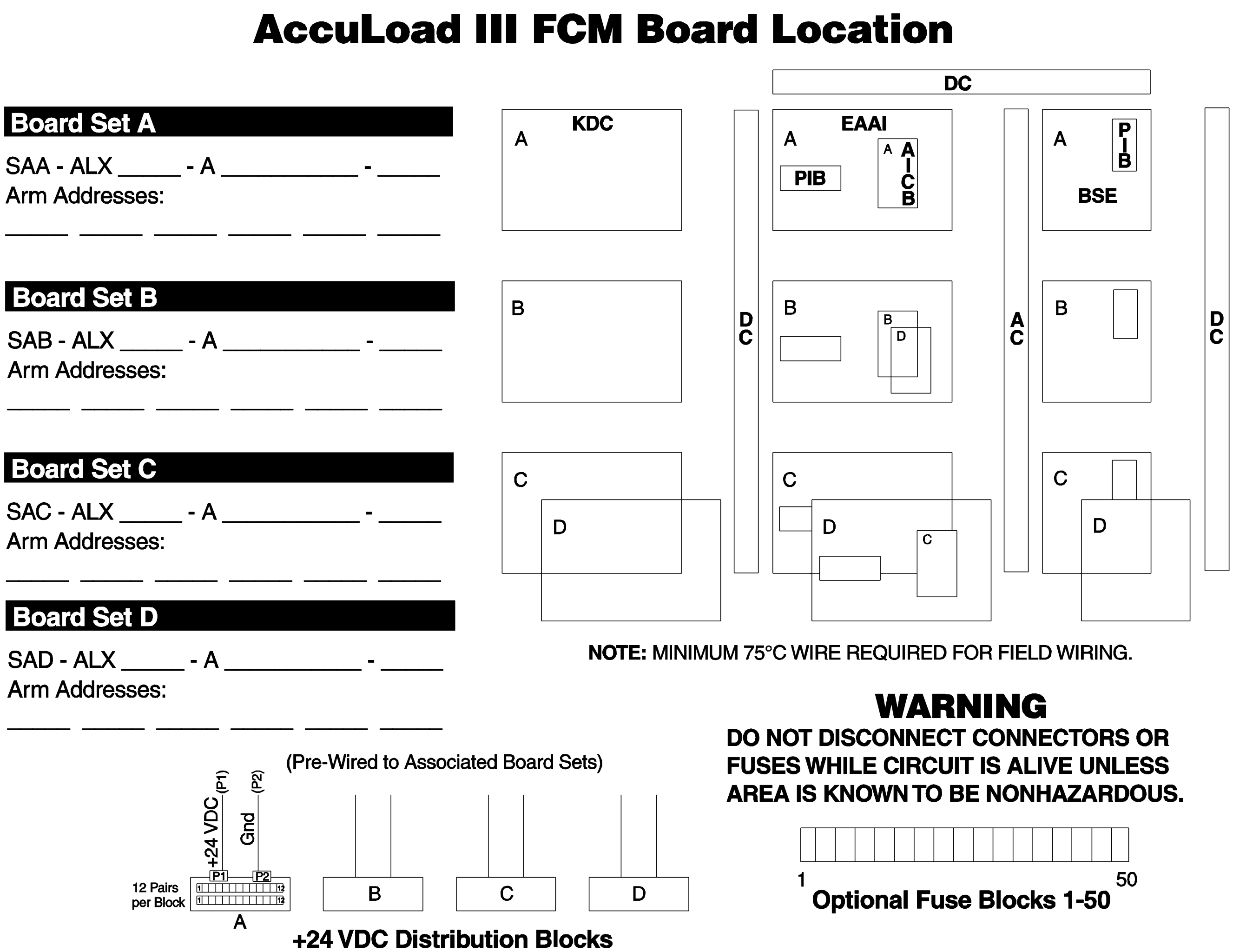


Figure 6. AccuLoad III-SA Board Layout Diagram

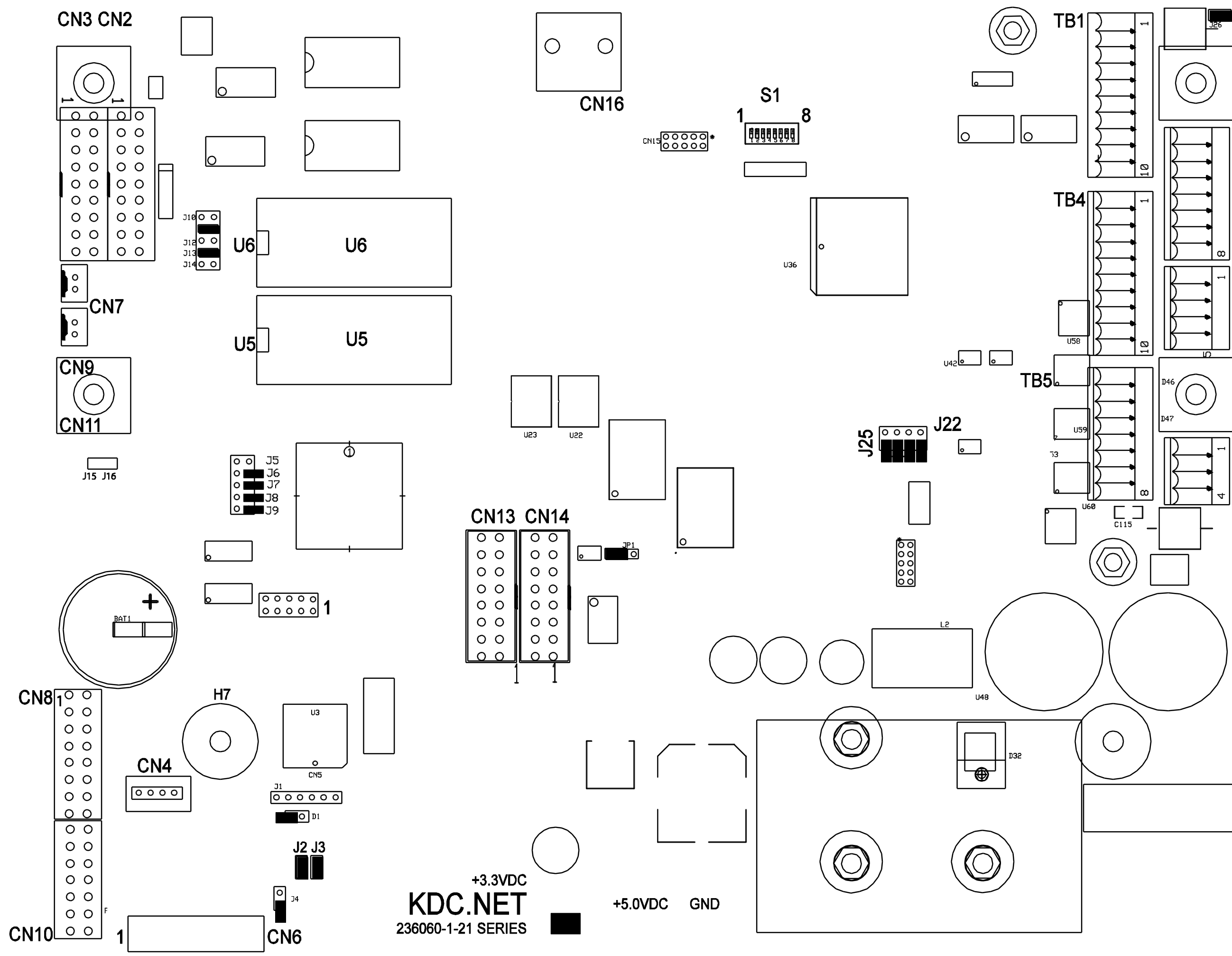


Figure 7. KDC Layout

Configurable jumper locations are heavily circled on the diagram above. It is important to note that all but one of these jumpers, J22, are factory defaults and should not be configured by the user. The proper settings are provided below so if one of these is accidentally changed, it can be returned to its original position. J22 is the jumper used to zero the passcodes. Jumpers are configured using the plugs that fit over the jumper prongs. A jumper with no prongs plugged, or with one prong plugged, is OUT. A jumper with both prongs plugged is IN.

Note: *Should Program Mode be inaccessible after changing PROMs, or if the operator loses or forgets the access code, set J22 to In, then power up. Entry to the program mode is provided. Check passcodes and remove jumper J22 when finished.*

1 – In	4 – Out	7 – Out	10 – Out	13 – In	16 – Out	25 – Out
2 – In	5 – Out	8 – Out	11 – In	14 – Out	23 – In	
3 – In	6 – In	9 – Out	12 – Out	15 – In	24 – In	

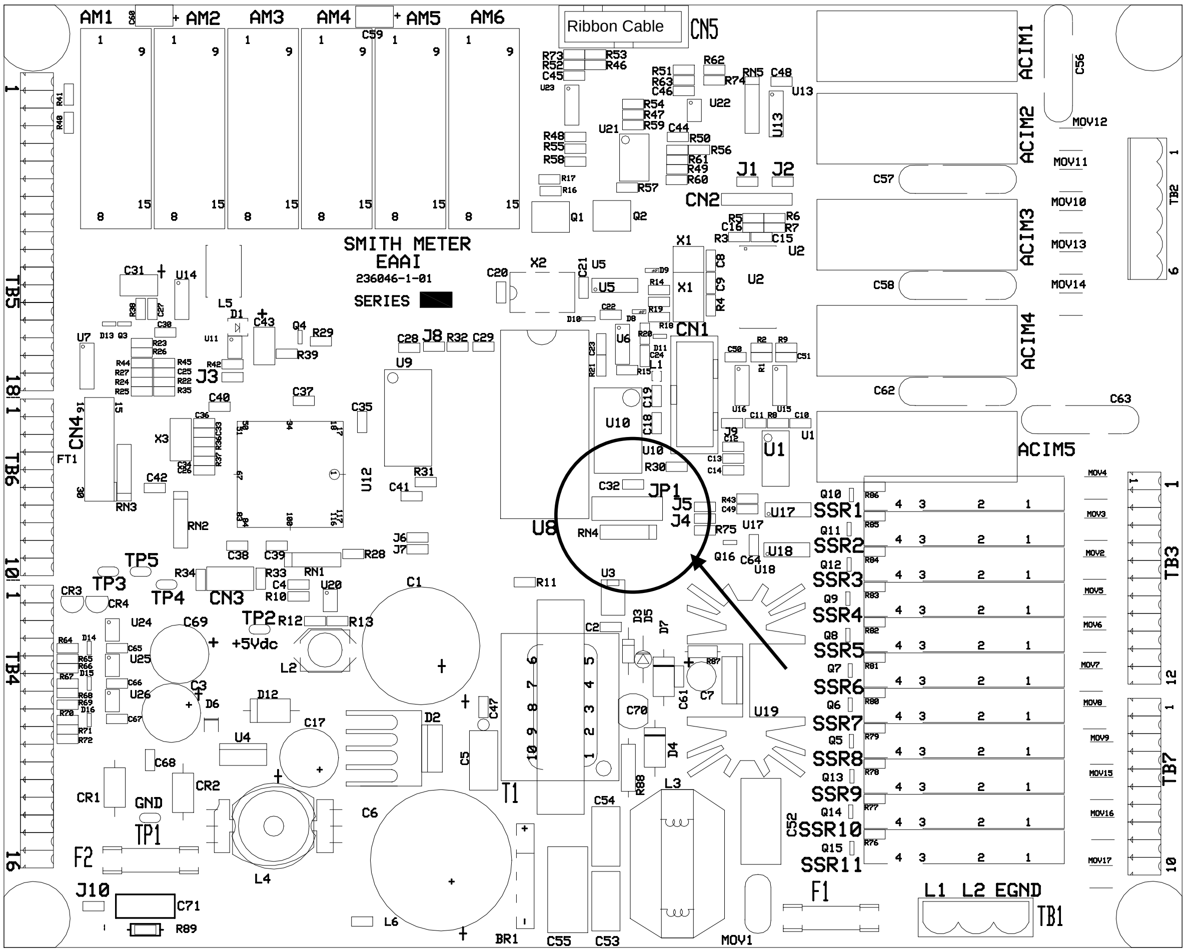


Figure 8. EAAI Layout

The user-configurable jumper on the EAAI board is indicated by a circle and arrow in the diagram above. See the table on the following page for an explanation of analog module settings. This jumper has been configured for the modules that were shipped with the unit. Changes should only be made if different modules are added or deleted. Modules must be installed with inputs first, followed by outputs.

Analog Module Settings (JP1 on EAAI)

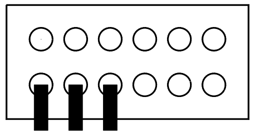
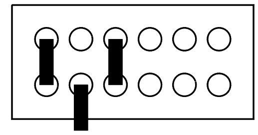
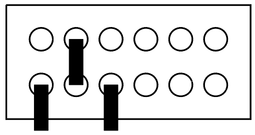
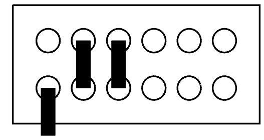
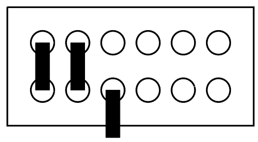
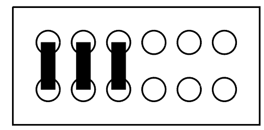
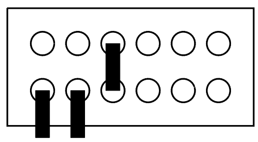
6 Inputs, 0 Outputs		**2 Inputs, 4 Outputs**	
5 Inputs, 1 Output		**1 Input, 5 Outputs**	
4 Inputs, 2 Outputs		**0 Inputs, 6 Outputs**	
3 Inputs, 3 Outputs			

Table 4. Analog Module Settings

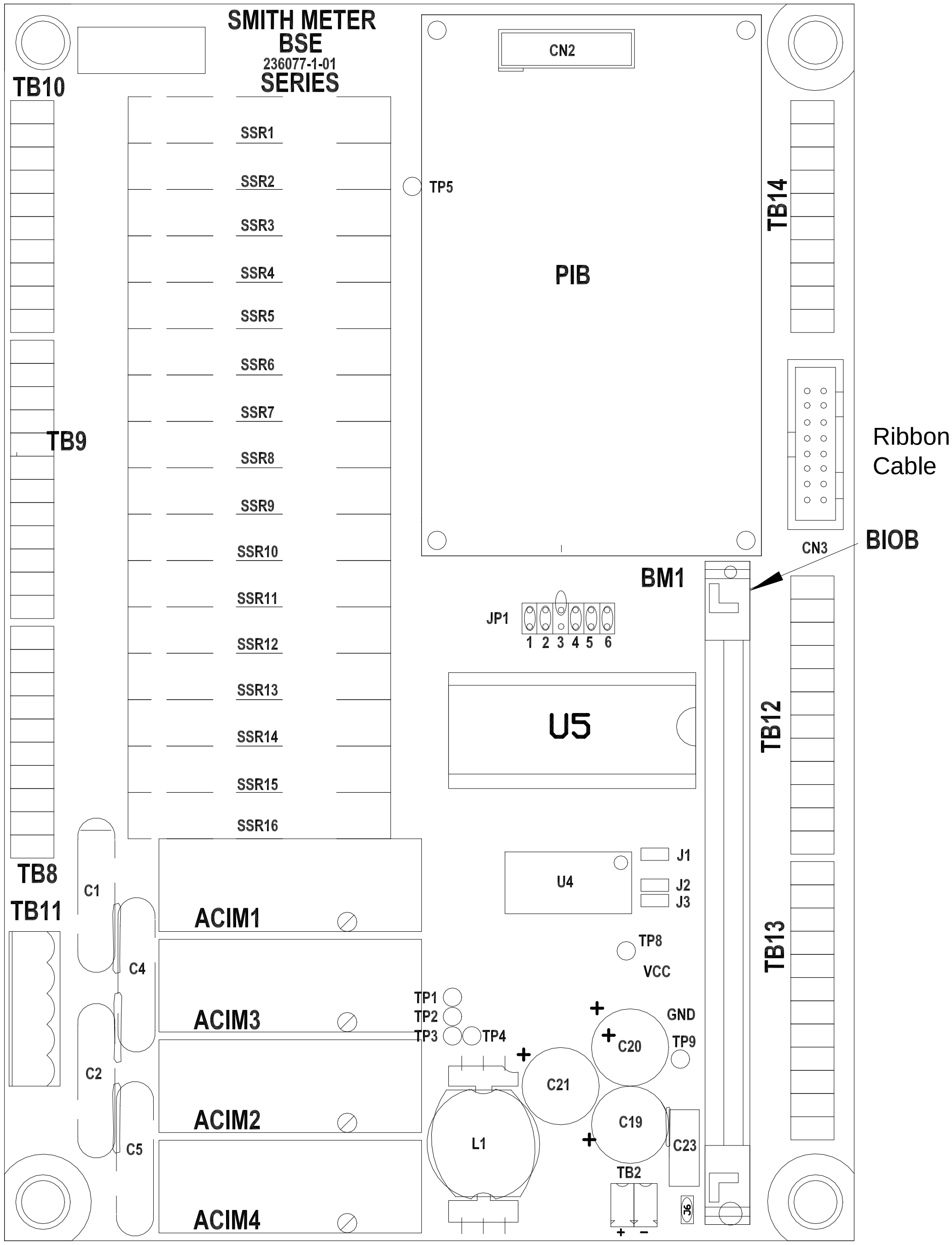


Figure 9. BSE Layout

Note: *JP1 3 through 6 define the number of BIOB inputs. JP1 1 and 2 are not used.*

Bi-State DC Inputs and Output Jumper Settings (JP1 on the BSE)

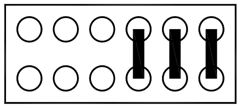
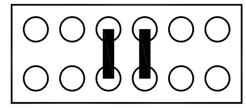
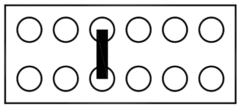
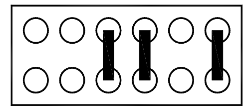
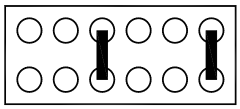
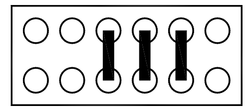
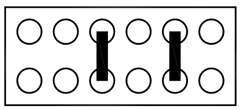
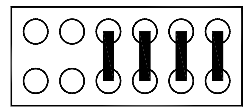
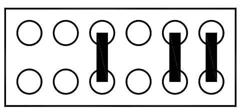
8 Inputs, 0 Outputs		**3 Inputs, 5 Outputs**	
7 Inputs, 1 Output		**2 Input, 6 Outputs**	
6 Inputs, 2 Outputs		**1 Inputs, 7 Outputs**	
5 Inputs, 3 Outputs		**0 Inputs, 8 Outputs**	
4 Inputs, 4 Outputs			

Table 5. Bi-State Inputs and Outputs

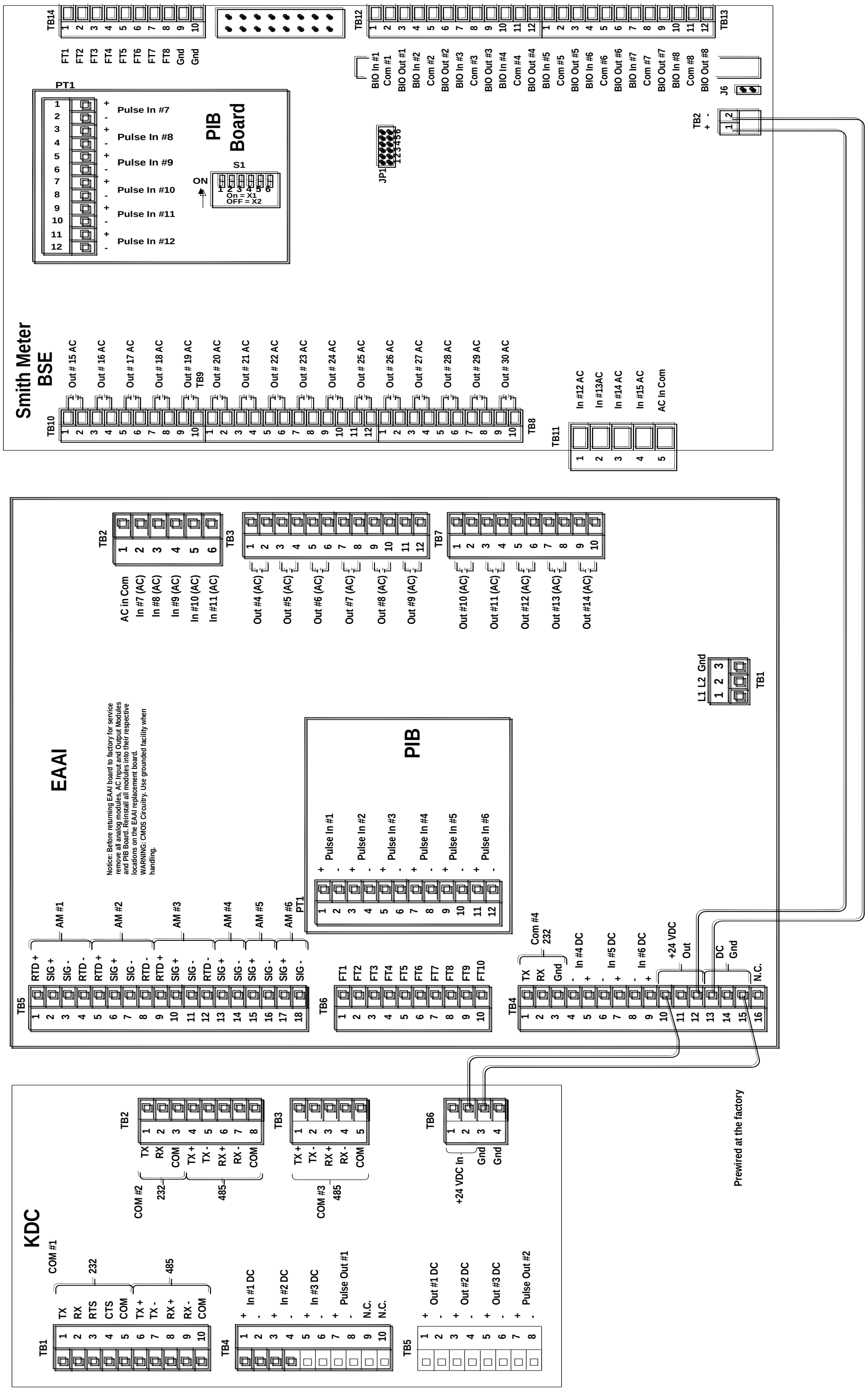
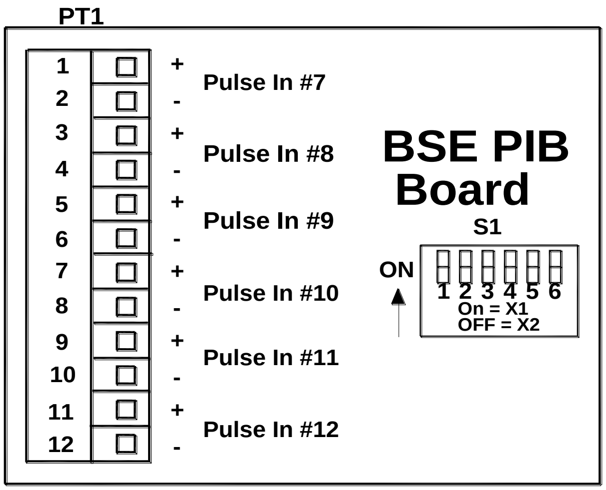


Figure 10. KDC/EAAI/PIB/BSE Boards (One Board Set)

Caution: Each board set should be handled individually and contains its own “unique” 24v DC power supply. All external devices such as pulse transmitters, RTD’s, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution board. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.



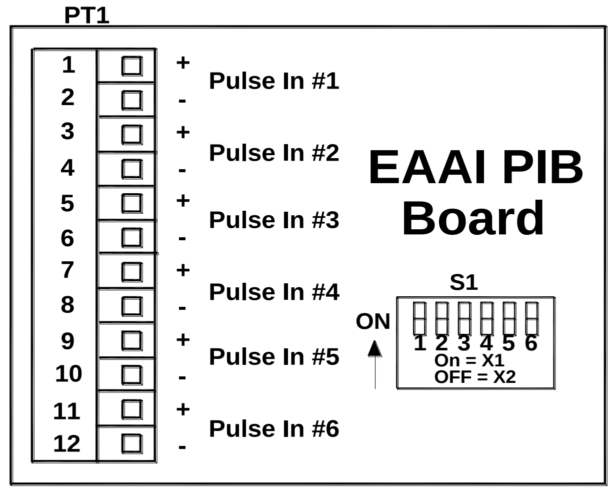


Figure 11. PIB Boards (One Board Set)

Caution: Each board set should be handled individually and contains its own "unique" 24v DC power supply. All external devices such as pulse transmitters, RTD's, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

The PIB boards provide the connectors for wiring the pulse inputs. Refer to the table on the following page to determine what connectors to use for specific pulse inputs.

Pulse doubling: S1 on the PIBs is used for multiplying the meter inputs by two (X2). Refer to the following chart to determine which position on S1 to use for each meter input.

S1 on EAAI PIB					
6-Product Meters	**5-Product Meters**	**4-Product Meters**	**3-Product Meters**	**2-Product Meters**	**1-Product Meter**
Meter 1, S1-1	Meter 1, S1-1	Meter 1, S1-1	Meter 1, S1-1	Meter 1, S1-1	Meter 1, S1-1
Meter 2, S1-2	Meter 2, S1-2	Meter 2, S1-2	Meter 2, S1-2	Meter 2, S1-2	X
Meter 3, S1-3	Meter 3, S1-3	X	X	X	X
S1 on BSE PIB					
6-Product Meters	**5-Product Meters**	**4-Product Meters**	**3-Product Meters**	**2-Product Meters**	**1-Product Meter**
Meter 4, S1-1	Meter 4, S1-1	Meter 3, S1-1	Meter 3, S1-3	X	X
Meter 5, S1-2	Meter 5, S1-2	Meter 4, S1-2	X	X	X
Meter 6, S1-3	X	X	X	X	X

Note: *Switches 4, 5, and 6 on S1 (PIB) not used.*

PIB Update

Date/Revision	**Functionality**
4/04/2002 – Rev. 1 to Rev. 2	Expanded memory cells and switched to surface mount EPLD
8/29/2005 – Rev. 2 to Rev. 3	High speed prover output

Note: *If AccuLoad III-X Rev. 10.12 or higher is being used and the reverse flow is implemented; PIB board Rev. 3 or above must be used.*

Pulse Inputs (One Board Set)

6-Product Meters						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Single Pulse	Meter #1A	Meter #2A	Meter # 3A	Injector/Dens.	Injector/Dens.	Injector/Dens.
Dual Pulse	Meter #1A	Meter #1B	Meter # 3A	Meter #2A	Meter #2B	Meter # 3B
Dual/Integrity	N/A	N/A	N/A	N/A	N/A	N/A
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Single Pulse	Meter #4A	Meter #5A	Meter #6A	Injector/Dens.	Injector/Dens.	Injector/Dens.
Dual Pulse	Meter #4A	Meter #4B	Meter #6A	Meter #5A	Meter #5B	Meter #6B
Dual/Integrity	N/A	N/A	N/A	N/A	N/A	N/A
5-Product Meters						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Single Pulse	Meter #1A	Meter #2A	Meter # 3A	Injector/Dens.	Injector/Dens.	Injector/Dens.
Dual Pulse	Meter #1A	Meter #1B	Meter # 3A	Meter #2A	Meter #2B	Meter # 3B
Dual/Integrity	N/A	N/A	N/A	N/A	N/A	N/A
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Single Pulse	Meter #4A	Meter #5A	Injector/Dens.	Injector/Dens.	Injector/Dens.	Injector/Dens.
Dual Pulse	Meter #4A	Meter #4B	Injector/Dens.	Meter #5A	Meter #5B	Injector/Dens.
Dual/Integrity	N/A	N/A	N/A	N/A	N/A	N/A
4-Product Meters						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Single Pulse	Meter #1A	Meter #2A	Injector/Dens.	Injector/Dens.	Injector/Dens.	Injector/Dens.
Dual Pulse	Meter #1A	Meter #1B	Injector/Dens.	Meter #2A	Meter #2B	Injector/Dens.
Dual/Integrity	Meter #1A	Meter #1B	Meter #1A Bar	Meter #2A	Meter #2B	Meter #2A Bar
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Single Pulse	Meter #3A	Meter #4A	Injector/Dens.	Injector/Dens.	Injector/Dens.	Injector/Dens.
Dual Pulse	Meter #3A	Meter #3B	Injector/Dens.	Meter #4A	Meter #4B	Injector/Dens.
Dual/Integrity	Meter #3A	Meter #3B	Meter #3A Bar	Meter #4A	Meter #4B	Meter #4A Bar
3-Product Meters						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Single Pulse	Meter #1A	Meter #2A	Injector/Dens.	Injector/Dens.	Injector/Dens.	Injector/Dens.
Dual Pulse	Meter #1A	Meter #1B	Injector/Dens.	Meter #2A	Meter #2B	Injector/Dens.
Dual/Integrity	Meter #1A	Meter #1B	Meter #1A Bar	Meter #2A	Meter #2B	Meter #2A Bar
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Single Pulse	Meter #3A	Injector	Injector/Dens.	Injector/Dens.	Injector/Dens.	Injector/Dens.
Dual Pulse	Meter #3A	Meter #3B	Injector/Dens.	Reserved	Reserved	Injector/Dens.
Dual/Integrity	Meter #3A	Meter #3B	Meter #3A Bar	Injector/Dens.	Injector/Dens.	Injector/Dens.

2-Product Meters						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Single Pulse	Meter #1A	Meter #2A	Injector/Dens.	Injector/Dens.	Injector/Dens.	Injector/Dens.
Dual Pulse	Meter #1A	Meter #1B	Injector/Dens.	Meter #2A	Meter #2B	Injector/Dens.
Dual/Integrity	Meter #1A	Meter #1B	Meter #1A Bar	Meter #2A	Meter #2B	Meter #2A Bar
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Single Pulse	Injector	Injector	Injector/Dens.	Injector/Dens.	Injector/Dens.	Injector/Dens.
Dual Pulse	Injector	Injector	Injector/Dens.	Injector/Dens.	Injector/Dens.	Injector/Dens.
Dual/Integrity	Injector	Injector	Injector/Dens.	Injector/Dens.	Injector/Dens.	Injector/Dens.
1-Product Meter						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Single Pulse	Meter #1A	Reserved	Injector/Dens.	Injector/Dens.	Injector/Dens.	Injector/Dens.
Dual Pulse	Meter #1A	Meter #1B	Reserved	Injector/Dens.	Injector/Dens.	Injector/Dens.
Dual/Integrity	Meter #1A	Meter #1B	Meter #1A Bar	Injector/Dens.	Injector/Dens.	Injector/Dens.
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Single Pulse	Injector	Injector	Injector/Dens.	Injector/Dens.	Injector/Dens.	Injector/Dens.
Dual Pulse	Injector	Injector	Injector/Dens.	Injector/Dens.	Injector/Dens.	Injector/Dens.
Dual/Integrity	Injector	Injector	Injector/Dens.	Injector/Dens.	Injector/Dens.	Injector/Dens.

Table 6. Pulse Inputs

Note: *When using dual pulse and not the A Bar inputs for transmitter security, the pulse inputs for the A Bar assignment will be not used.*

Caution: Each board set should be handled individually and contains its own “unique” 24v DC power supply. All external devices such as pulse transmitters, RTD’s, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Dual Pulse Inputs for Rev. 10.07 and Above Firmware (With Flow Controlled Additive)

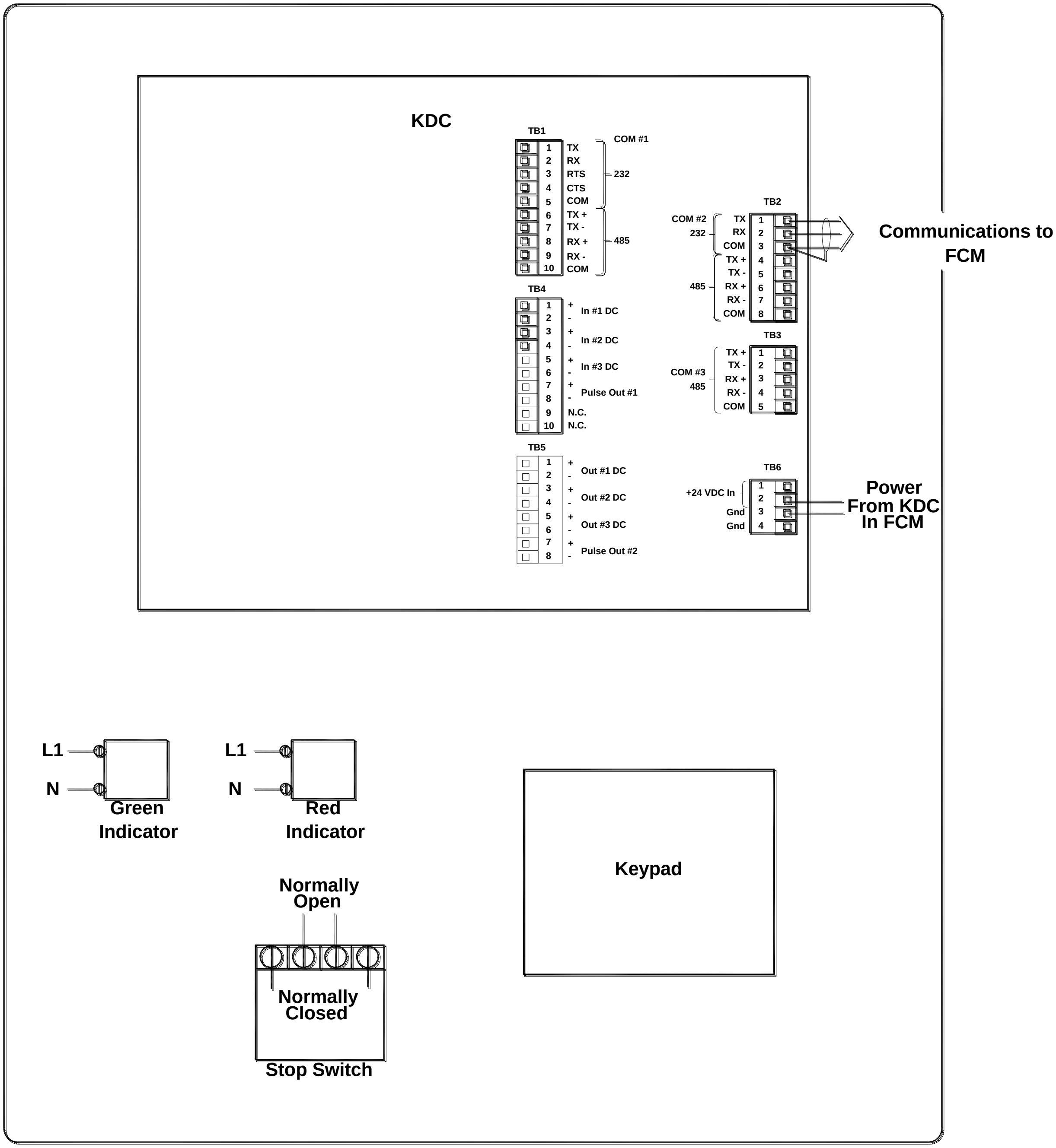
5 Product Meters with 1 Flow Controlled Additive						
	Input #1	Input #2	Input #3	Input #4	Input #5	Input #6
Dual Pulse	Meter #1A	Meter #1B	Meter #3A	Meter #2A	Meter #2B	Meter #3B
Dual/Integrity	NA	NA	NA	NA	NA	NA
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Dual Pulse	Meter #4A	Meter #4B	FC Inj #1A	Meter #5A	Meter #5B	FC Inj #1B
Dual/Integrity	NA	NA	NA	NA	NA	NA
4 Product Meters with 2 Flow Controlled Additive						
	Input #1	Input #2	Input #3	Input #4	Input #5	Input #6
Dual Pulse	Meter #1A	Meter #1B	Meter #3A	Meter #2A	Meter #2B	Meter #3B
Dual/Integrity	NA	NA	NA	NA	NA	NA
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Dual Pulse	Meter #4A	Meter #4B	FC Inj #2A	FC Inj #1A	FC Inj #1B	FC Inj #2B
Dual/Integrity	NA	NA	NA	NA	NA	NA

4 Product Meters with 1 Flow Controlled Additive						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Dual Pulse	Meter #1A	Meter #1B	Meter #3A	Meter #2A	Meter #2B	Meter #3B
Dual/Integrity	NA	NA	NA	NA	NA	NA
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Dual Pulse	Meter #4A	Meter #4B	Injector/Dens	FC Inj #1A	FC Inj #1B	Injector/Dens
Dual/Integrity	NA	NA	NA	NA	NA	NA
3 Product Meters with 3 Flow Controlled Additive						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Dual Pulse	Meter #1A	Meter #1B	Meter #3A	Meter #2A	Meter #2B	Meter #3B
Dual/Integrity	NA	NA	NA	NA	NA	NA
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Dual Pulse	FC Inj #1A	FC Inj #1B	FC Inj #3A	FC Inj #2A	FC Inj #2B	FC Inj #3B
Dual/Integrity	NA	NA	NA	NA	NA	NA
3 Product Meters with 2 Flow Controlled Additive						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Dual Pulse	Meter #1A	Meter #1B	Meter #3A	Meter #2A	Meter #2B	Meter #3B
Dual/Integrity	NA	NA	NA	NA	NA	NA
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Dual Pulse	FC Inj #1A	FC Inj #1B	Injector/Dens	FC Inj #2A	FC Inj #2B	Injector/Dens
Dual/Integrity	NA	NA	NA	NA	NA	NA
3 Product Meters with 1 Flow Controlled Additive						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Dual Pulse	Meter #1A	Meter #1B	Injector/Dens	Meter #2A	Meter #2B	Injector/Dens
Dual/Integrity	Meter #1A	Meter #1B	Meter #1 Bar	Meter #2A	Meter #2B	Meter #2 Bar
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Dual Pulse	Meter #3A	Meter #3B	Injector/Dens	FC Inj #1A	FC Inj #1B	Injector/Dens
Dual/Integrity	Meter #3A	Meter #3B	Meter #3 Bar	FC Inj #1A	FC Inj #1B	FC Inj #1 Bar
2 Product Meters with 4 Flow Controlled Additive						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Dual Pulse	Meter #1A	Meter #1B	FC Inj #1A	Meter #2A	Meter #2B	FC Inj #1B
Dual/Integrity	NA	NA	NA	NA	NA	NA
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Dual Pulse	FC Inj #2A	FC Inj #2B	FC Inj #4A	FC Inj #3A	FC Inj #3B	FC Inj #4B
Dual/Integrity	NA	NA	NA	NA	NA	NA

2 Product Meters with 3 Flow Controlled Additive						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Dual Pulse	Meter #1A	Meter #1B	FC Inj #1A	Meter #2A	Meter #2B	FC Inj #1B
Dual/Integrity	NA	NA	NA	NA	NA	NA
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Dual Pulse	FC Inj #2A	FC Inj #2B	Injector/Dens	FC Inj #3A	FC Inj #3B	Injector/Dens
Dual/Integrity	NA	NA	NA	NA	NA	NA
2 Product Meters with 2 Flow Controlled Additive						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Dual Pulse	Meter #1A	Meter #1B	Injector/Dens	Meter #2A	Meter #2B	Injector/Dens
Dual/Integrity	Meter #1A	Meter #1B	Meter #1 Bar	Meter #2A	Meter #2B	Meter #2 Bar
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Dual Pulse	FC Inj #1A	FC Inj #1B	Injector/Dens	FC Inj #2A	FC Inj #2B	Injector/Dens
Dual/Integrity	FC Inj #1A	FC Inj #1B	FC Inj #1 Bar	FC Inj #2A	FC Inj #2B	FC Inj #2 Bar
2 Product Meters with 1 Flow Controlled Additive						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Dual Pulse	Meter #1A	Meter #1B	Injector/Dens	Meter #2A	Meter #2B	Injector/Dens
Dual/Integrity	Meter #1A	Meter #1B	Meter #1 Bar	Meter #2A	Meter #2B	Meter #2 Bar
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Dual Pulse	FC Inj #1A	FC Inj #1B	Injector/Dens	Reserved	Reserved	Injector/Dens
Dual/Integrity	FC Inj #1A	FC Inj #1B	FC Inj #1 Bar	Injector/Dens	Injector/Dens	Injector/Dens
1 Product Meters with 4 Flow Controlled Additive						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Dual Pulse	Meter #1A	Meter #1B	FC Inj #2A	FC Inj #1A	FC Inj 1 B	PC Inj #2B
Dual/Integrity	NA	NA	NA	NA	NA	NA
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Dual Pulse	FC Inj #3A	PC Inj #3B	Injector/Dens	FC Inj #4A	FC Inj #4B	Injector/Dens
Dual/Integrity	NA	NA	NA	NA	NA	NA
1 Product Meters with 3 Flow Controlled Additive						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Dual Pulse	Meter #1A	Meter #1B	Injector/Dens	FC Inj #1A	FC Inj 1 B	Injector/Dens
Dual/Integrity	Meter #1A	Meter #1B	Meter #1 Bar	FC Inj #1A	FC Inj 1 B	FC Inj # 1 Bar
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Dual Pulse	FC Inj #2A	PC Inj #2B	Injector/Dens	FC Inj #3A	FC Inj #3B	Injector/Dens
Dual/Integrity	FC Inj #2A	PC Inj #2B	PC Inj #2 Bar	FC Inj #3A	FC Inj #3B	FC Inj # 3 Bar

1 Product Meters with 2 Flow Controlled Additive						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Dual Pulse	Meter #1A	Meter #1B	Injector/Dens	FC Inj #1A	FC Inj 1 B	Injector/Dens
Dual/Integrity	Meter #1A	Meter #1B	Meter #1 Bar	FC Inj A	FC Inj 1 B	FC Inj Bar
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Dual Pulse	FC Inj #2A	PC Inj #2B	Injector/Dens	Reserved	Reserved	Injector/Dens
Dual/Integrity	FC Inj #2A	PC Inj #2B	PC Inj #2 Bar	Injector/Dens	Injector/Dens	Injector/Dens
1 Product Meters with 1 Flow Controlled Additive						
	Input #1	**Input #2**	**Input #3**	**Input #4**	**Input #5**	**Input #6**
Dual Pulse	Meter #1A	Meter #1B	Injector/Dens	FC Inj A	FC Inj 1 B	Injector/Dens
Dual/Integrity	Meter #1A	Meter #1B	Meter #1 Bar	FC Inj A	FC Inj 1 B	FC Inj Bar
	Input #7	**Input #8**	**Input #9**	**Input #10**	**Input #11**	**Input #12**
Dual Pulse	Injector	Injector	Injector/Dens	Injector/Dens	Injector/Dens	Injector/Dens
Dual/Integrity	Injector	Injector	Injector/Dens	Injector/Dens	Injector/Dens	Injector/Dens

Table 7. Dual Pulse Inputs



Back Side of MMI Door

Figure 12. MMI Wiring Diagram

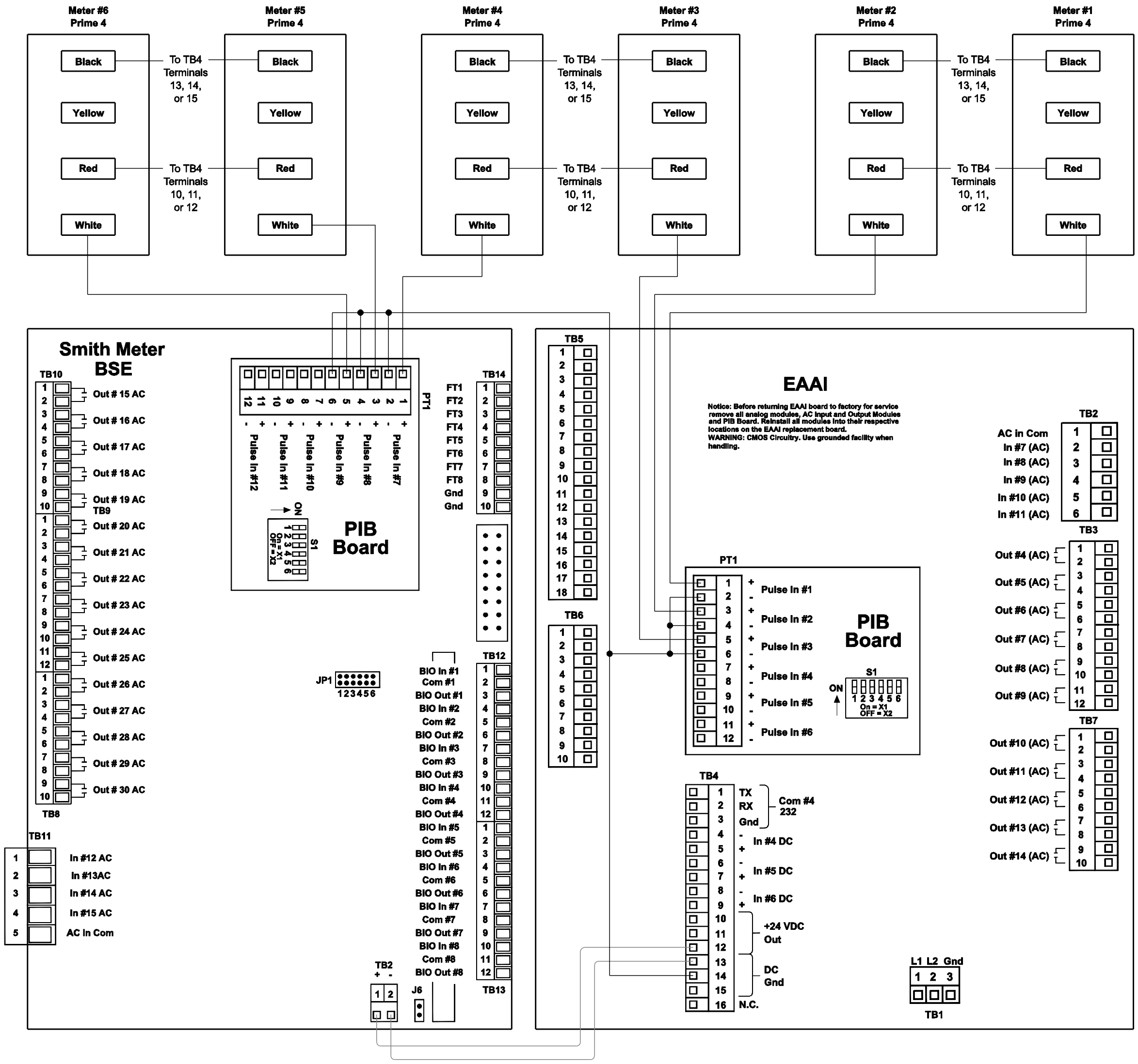


Figure 13. Wiring Diagram, Prime 4 Meter Single Pulse (One Board Set)

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

Note: *Wiring between transmitter and AccuLoad should be done using a shielded cable per each transmitter. If selected cable utilizes twisted pairs, do not run more than one signal in a twisted pair.*

Caution: Each board set should be handled individually and contains its own "unique" 24v DC power supply. All external devices such as pulse transmitters, RTD's, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Note: *The 24-volt power for the transmitters can be wired through the terminal block located in the bottom of the cabinet, as shown in Figure 5.*

Prime 4 Wire Codes:
Black: Common
Red: Input Power
White: Signal A Output
Yellow: Signal B Output

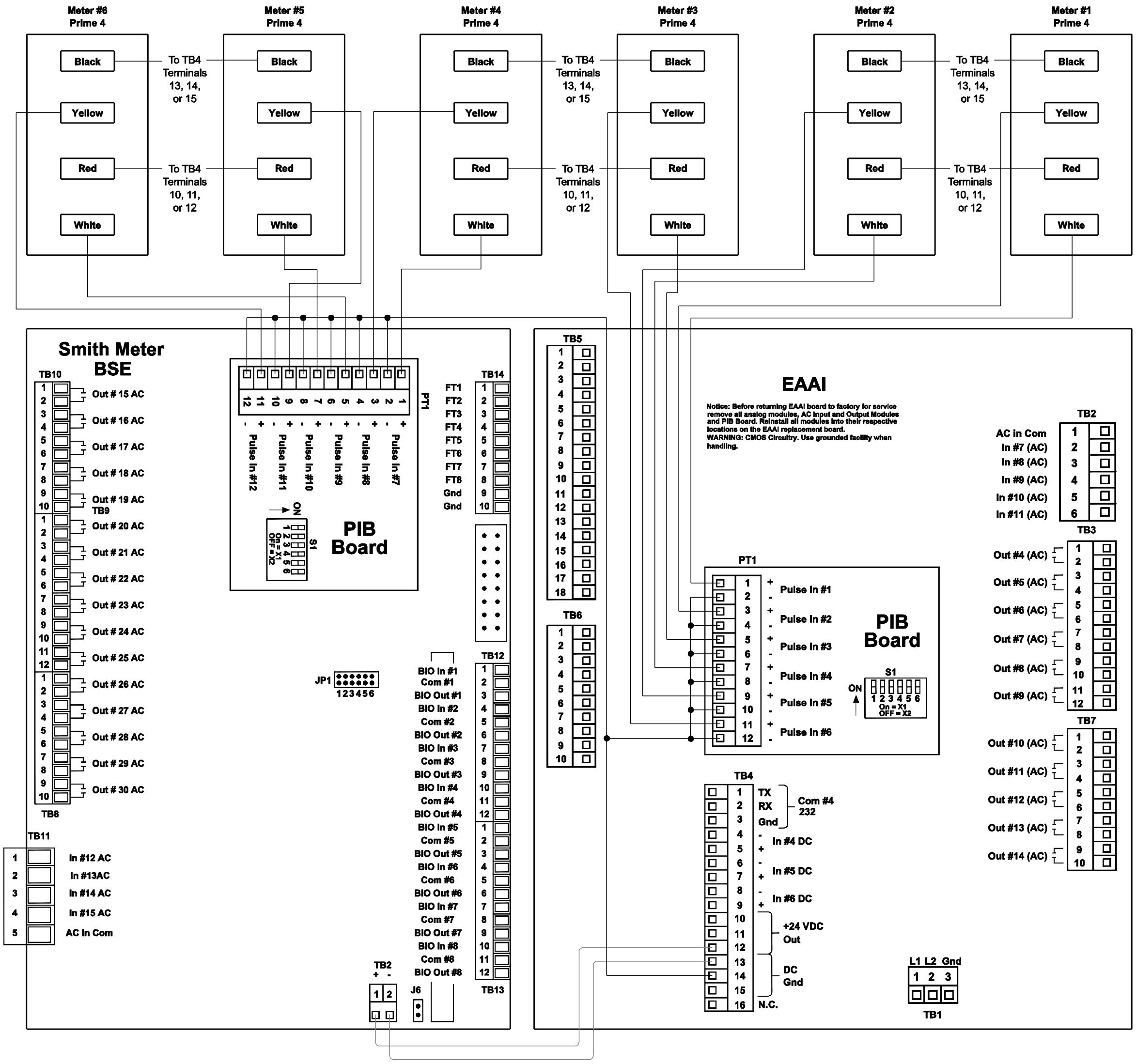


Figure 14. Wiring Diagram, Prime 4 Meters Dual Pulse (One Board Set)

Note: *Drawing is shown with dual meters and each meter being shown wired as a dual pulse input. When not using the dual pulse input, see figure 13.*

Note: *The 24-volt power for the transmitters can be wired through the terminal block located in the bottom of the cabinet, as shown in Figure 5.*

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

Note: *Wiring between transmitter and AccuLoad should be done using a shielded cable per each transmitter. If selected cable utilizes twisted pairs, do not run more than one signal in a twisted pair.*

Caution: Each board set should be handled individually and contains its own "unique" 24v DC power supply. All external devices such as pulse transmitters, RTD's, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Prime 4 Wire Codes:
Black: Common
Red: Input Power
White: Signal A Output
Yellow: Signal B Output

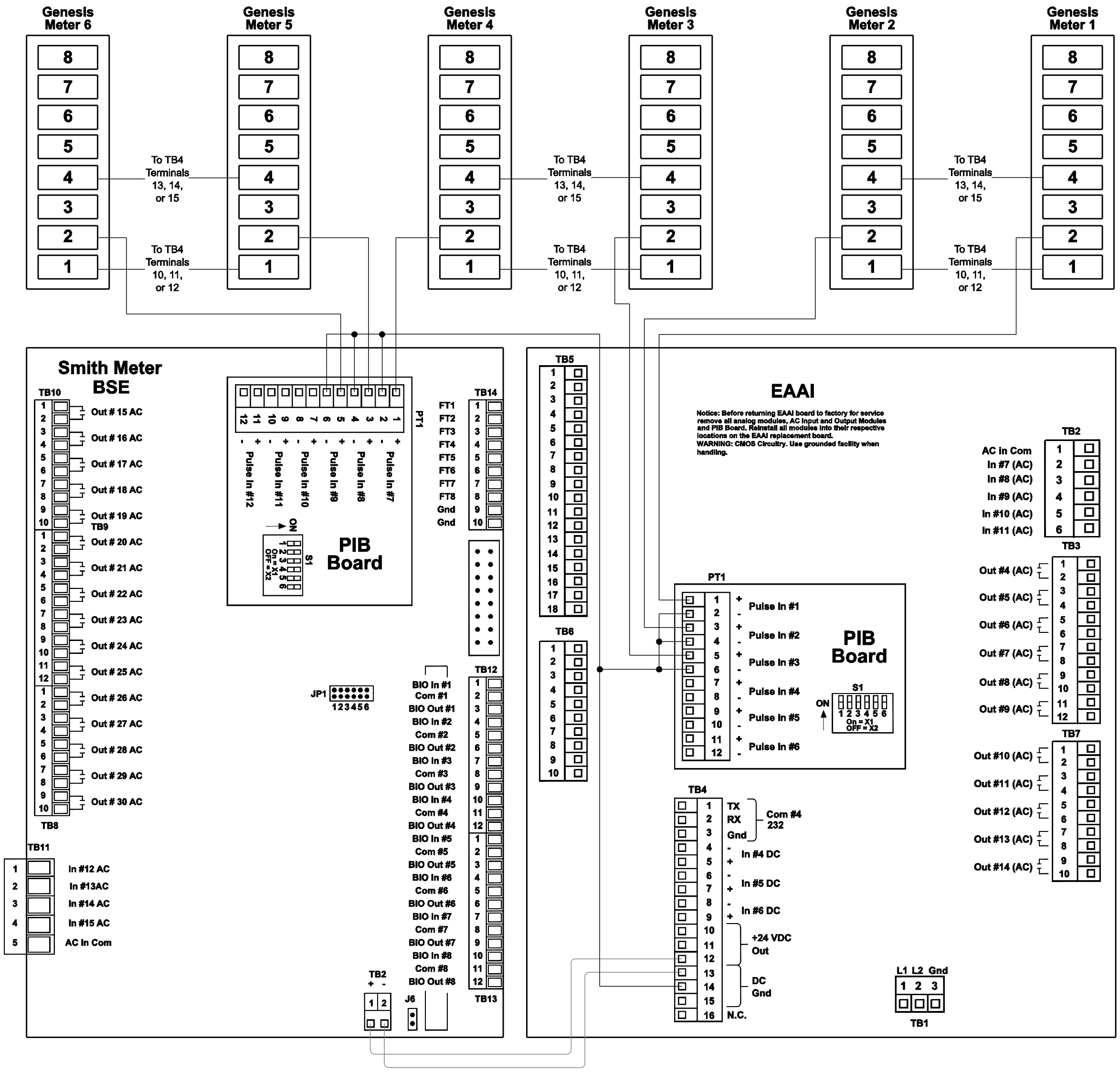


Figure 15. Wiring Diagram, Genesis Meter Single Pulse

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

Note: *Wiring between transmitter and AccuLoad should be done using a shielded cable per each transmitter. If selected cable utilizes twisted pairs, do not run more than one signal in a twisted pair.*

Genesis Terminal Connections:
1: Input Power
2: Signal A Output
3: Signal B Output
4: Electronics Ground
5: Not used
6: Not used
7: Not used
8: Not used

Caution: Each board set should be handled individually and contains its own "unique" 24v DC power supply. All external devices such as pulse transmitters, RTD's, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

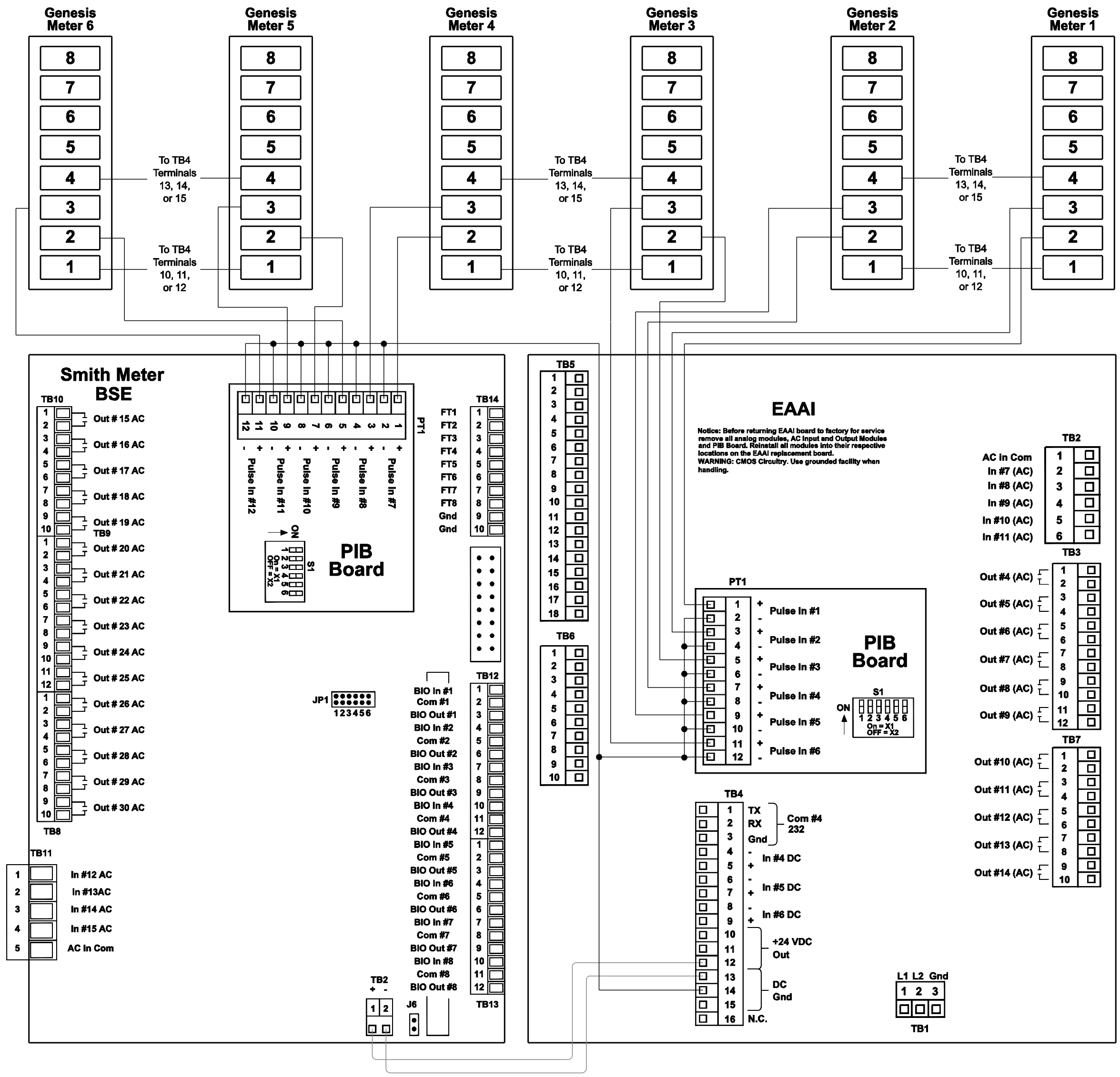


Figure 16. Wiring Diagram, Genesis Meter Dual Pulse

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

Note: *Wiring between transmitter and AccuLoad should be done using a shielded cable per each transmitter. If selected cable utilizes twisted pairs, do not run more than one signal in a twisted pair.*

Genesis Terminal Connections:

1: Input Power
2: Signal A Output
3: Signal B Output
4: Electronics Ground
5: Not used
6: Not used
7: Not used
8: Not used

Caution: Each board set should be handled individually and contains its own “unique” 24v DC power supply. All external devices such as pulse transmitters, RTD’s, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

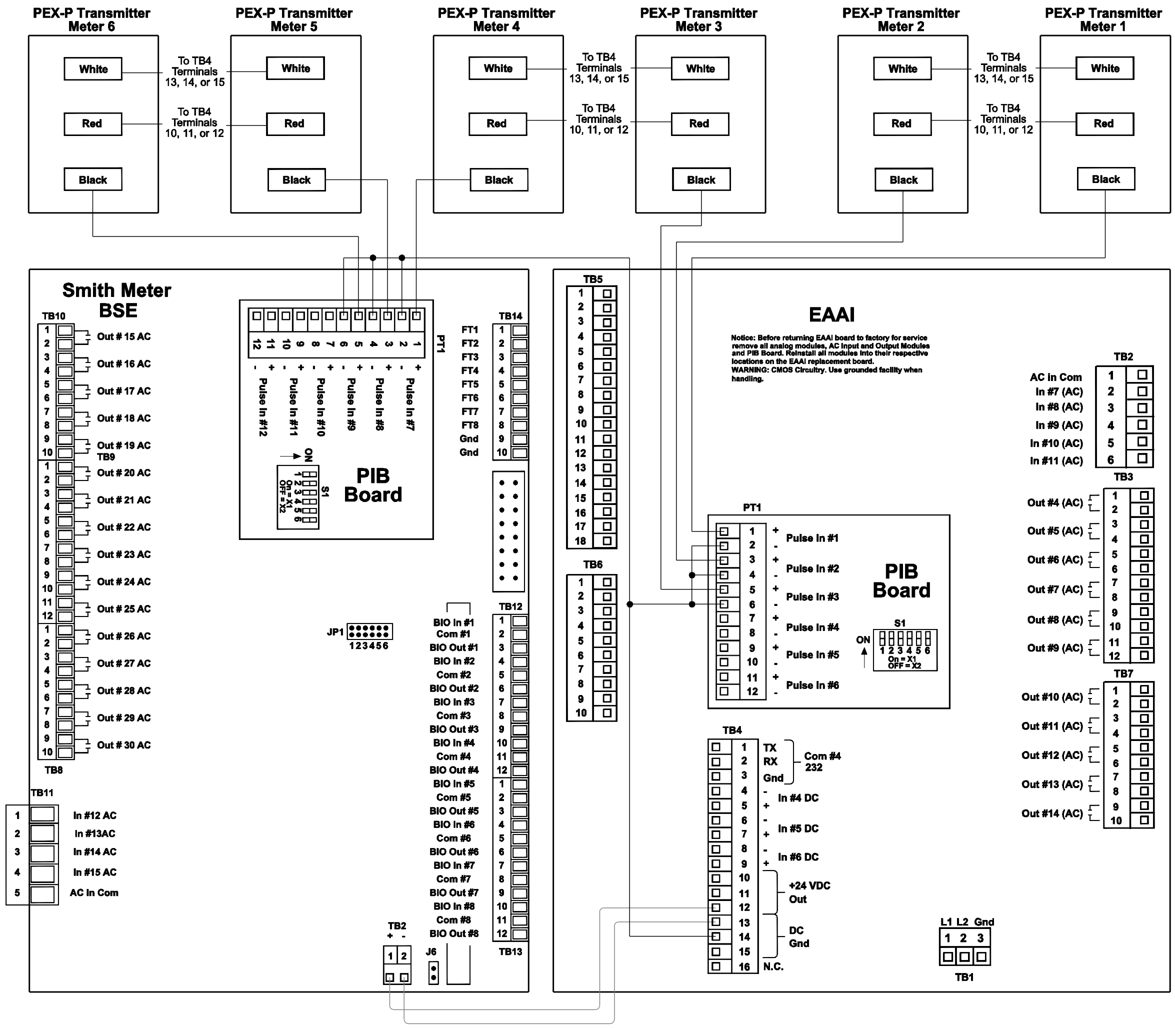


Figure 17. Wiring Diagram, PEX-P Transmitter Single Pulse (One Board Set)

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

Note: *Wiring between transmitter and AccuLoad should be done using a shielded cable per each transmitter. If selected cable utilizes twisted pairs, do not run more than one signal in a twisted pair.*

Caution: Each board set should be handled individually and contains its own "unique" 24v DC power supply. All external devices such as pulse transmitters, RTD's, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Note: *The 24-volt power for the transmitters can be wired through the terminal block located in the bottom of the cabinet, as shown in Figure 5.*

PEXP Wire Codes:
Black: Signal Output
Red: Input Power
White: Common

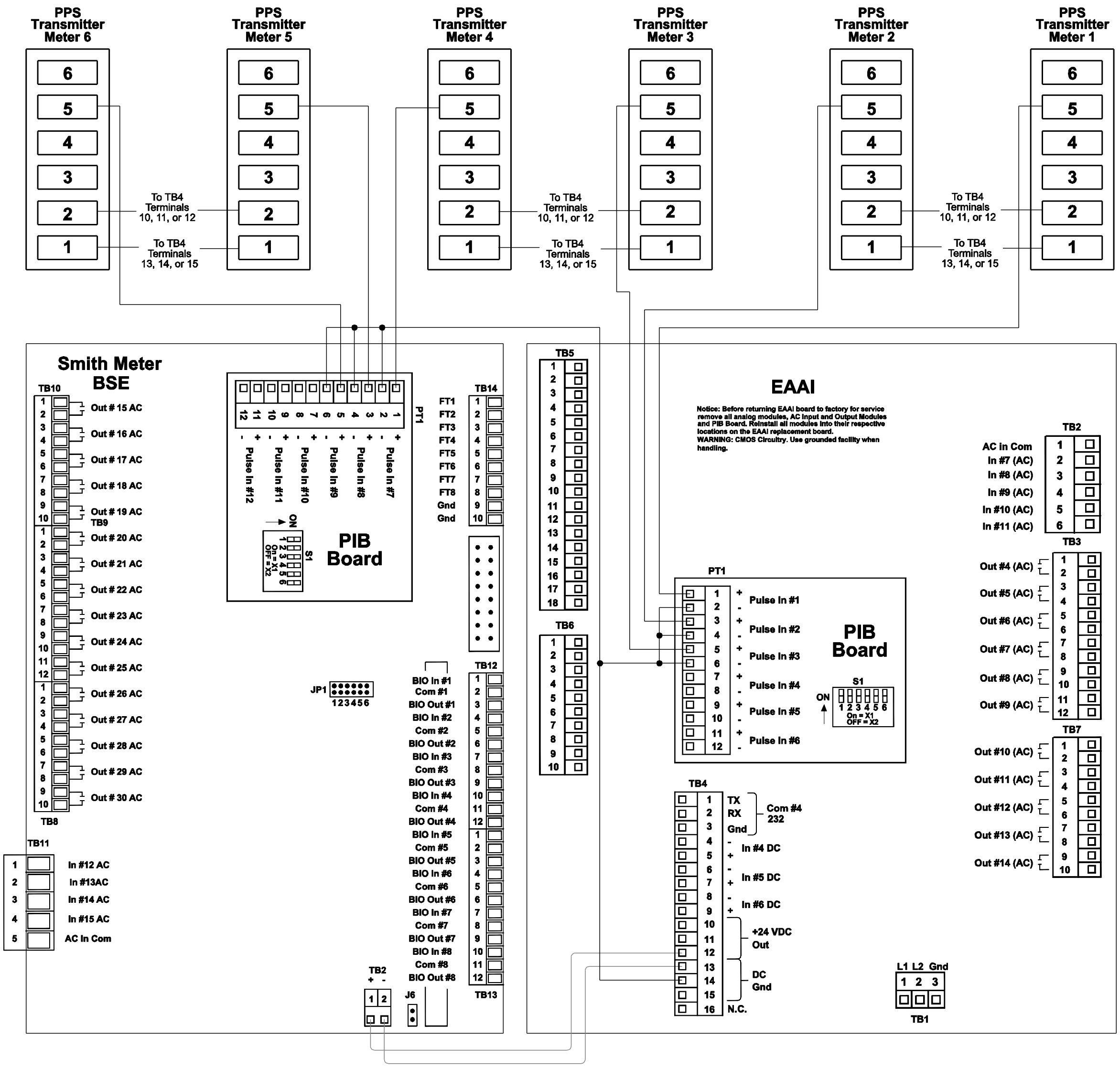


Figure 18. Wiring Diagram, PPS Transmitters Single Pulse (One Board Set)

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

Note: *Wiring between transmitter and AccuLoad should be done using a shielded cable per each transmitter. If selected cable utilizes twisted pairs, do not run more than one signal in a twisted pair.*

Caution: Each board set should be handled individually and contains its own "unique" 24v DC power supply. All external devices such as pulse transmitters, RTD's, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Note: *The 24-volt power for the transmitters can be wired through the terminal block located in the bottom of the cabinet, as shown in Figure 5.*

PPST Terminal Connections

1: Common
2: Input Power
3: Signal B Output
4: $\overline{B}$ Output
5: Signal A Output
6: $\overline{A}$ Output

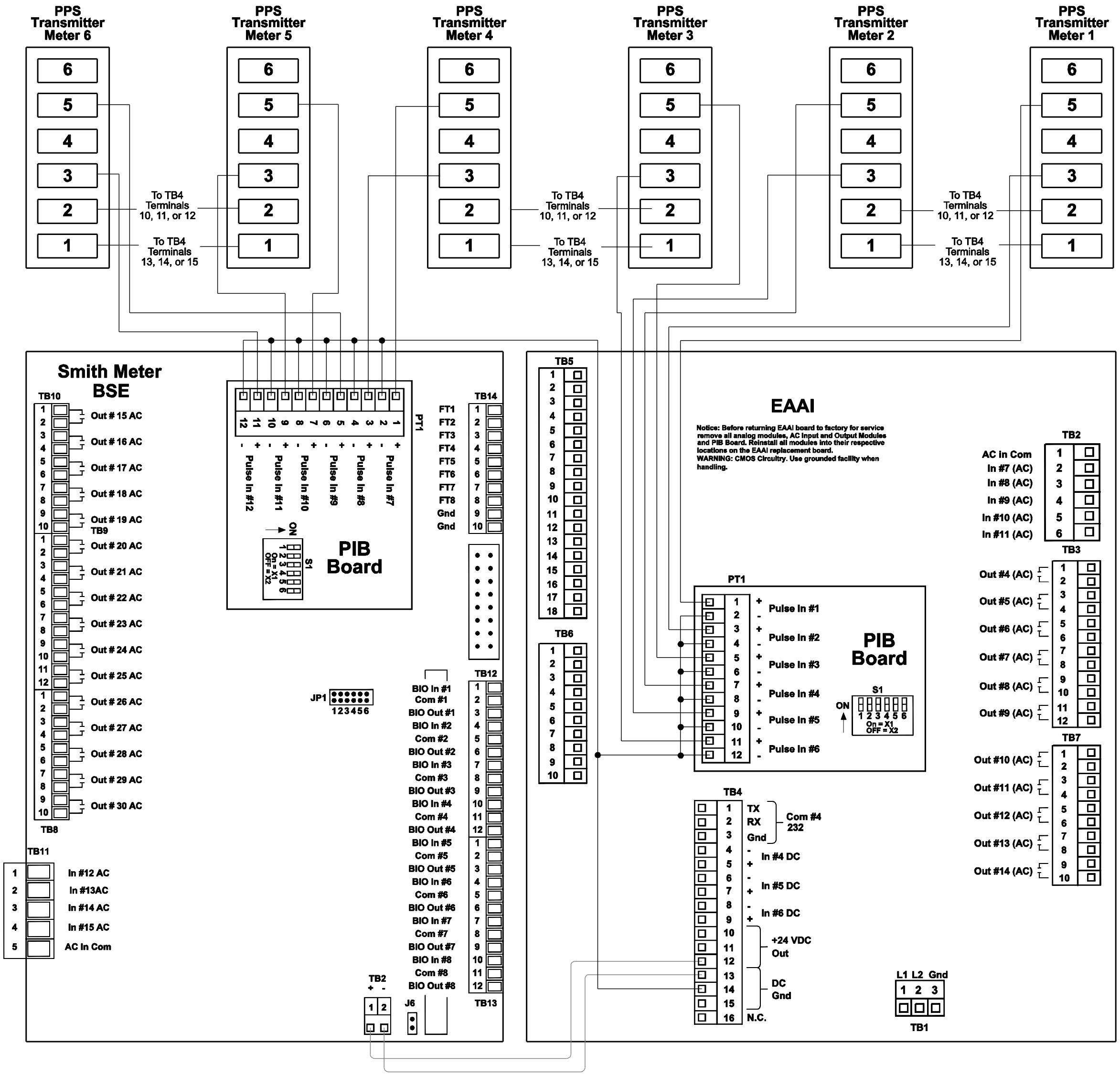


Figure 19. Wiring Diagram, PPS Dual Pulse Transmitter (One Board Set)

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

Note: *Wiring between transmitter and AccuLoad should be done using a shielded cable per each transmitter. If selected cable utilizes twisted pairs, do not run more than one signal in a twisted pair.*

Caution: Each board set should be handled individually and contains its own "unique" 24v DC power supply. All external devices such as pulse transmitters, RTD's, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Note: *The 24-volt power for the transmitters can be wired through the terminal block located in the bottom of the cabinet, as shown in Figure 5.*

PPST Terminal Connections

1: Common
2: Input Power
3: Signal B Output
4: $\overline{B}$ Output
5: Signal A Output
6: $\overline{A}$ Output

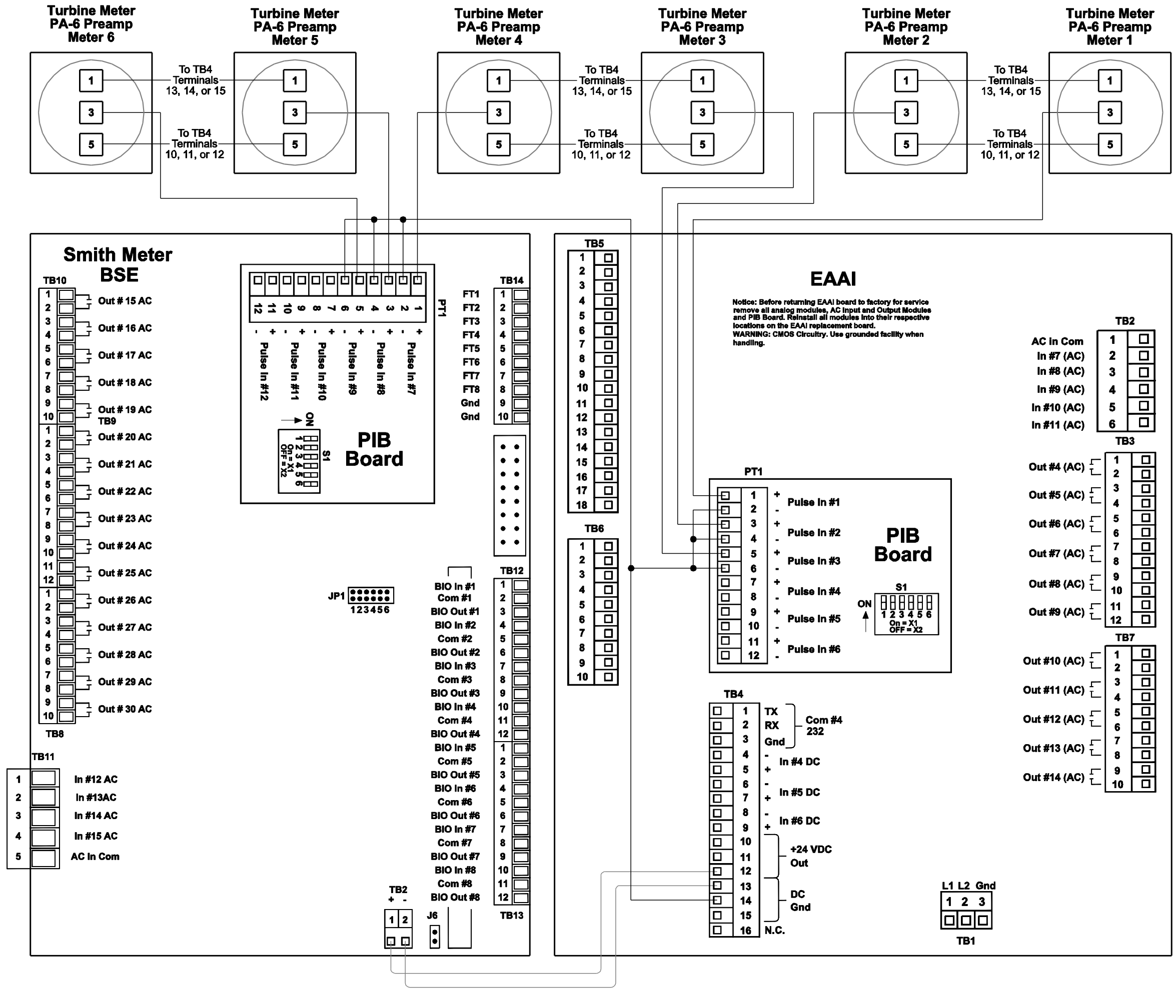


Figure 20. Wiring Diagram, Turbine Meters with PA-6 Pre-amps Single Pulse (One Board Set)

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

Note: *Wiring between transmitter and AccuLoad should be done using a shielded cable per each transmitter. If selected cable utilizes twisted pairs, do not run more than one signal in a twisted pair.*

Caution: Each board set should be handled individually and contains its own “unique” 24v DC power supply. All external devices such as pulse transmitters, RTD’s, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Note: *The 24-volt power for the transmitters can be wired through the terminal block located in the bottom of the cabinet, as shown in Figure 5.*

PA-6 Terminal Connections

1: Common
3: Signal Output
5: Input Power

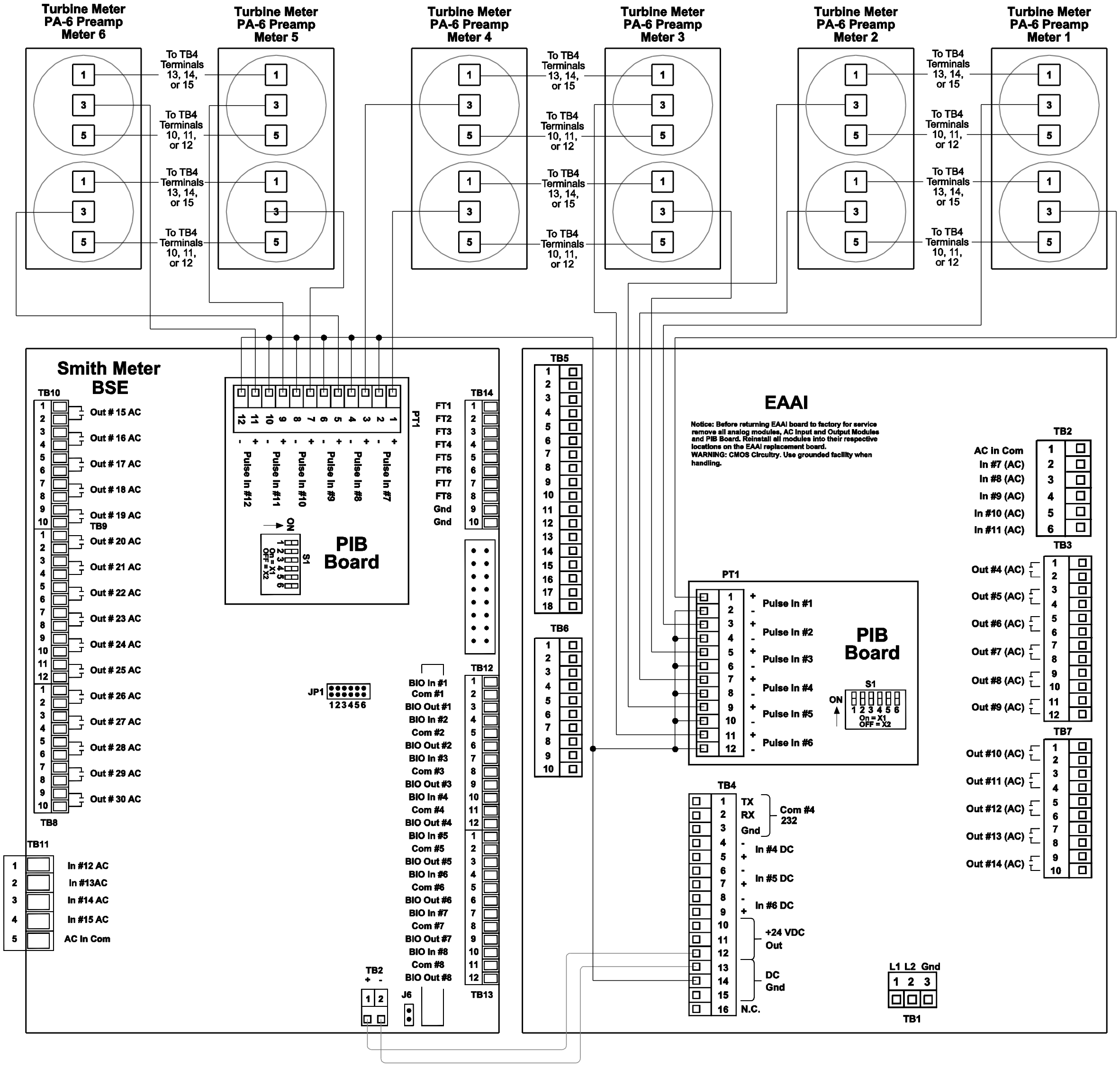


Figure 21. Wiring Diagram, Dual Pulse Turbine Meters with PA-6 Pre-amps (One Board Set)

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

Note: *Wiring between transmitter and AccuLoad should be done using a shielded cable per each transmitter. If selected cable utilizes twisted pairs, do not run more than one signal in a twisted pair.*

Caution: Each board set should be handled individually and contains its own “unique” 24v DC power supply. All external devices such as pulse transmitters, RTD’s, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Note: The 24-volt power for the transmitters can be wired through the terminal block located in the bottom of the cabinet, as shown in ***Figure 5.***

PA-6 Terminal Connections (Pre-amp #1)

1: Common
3: Signal A Output
5: Input Power

PA-6 Terminal Connections (Pre-amp #2)

1: Common
3: Signal B Output
5: Input Power

Promass 80, 83, and 84 Coriolis Meters

When connecting the Promass 84 (does not apply to the Promass 80 or 83 models) to an AccuLoad it is important that the “Line Monitoring” function on the Promass 84 be disabled. This is because the pulse input circuitry of the AccuLoad requires the input pulse “off” voltage to be less than one volt (and the “on” voltage to be greater than 5 volts). If the “Line Monitoring” on the Promass 84 is enabled, the “off” voltage of the pulses will be greater than one volt and therefore will be counted by the AccuLoad. There are three jumpers on each of the frequency output submodules on the I/O board that enable/disable the “Line Monitoring” function. The factory default is to enable “Line Monitoring”. Follow the steps from section 6.4.2 of the Proline Promass 84 Operating Instructions – Bulletin MN0M032 to enable/disable this function.

Use this table to determine if the Promass can be wired for single or dual pulse output and the terminal number corresponding to each unique model. The wiring diagrams are shown on the following pages.

Transmitter/Sensor	Modeling	+ Terminal	- Terminal
80XXX	-X-XXX-X-X-X-X-X-X-A	24	25
80XXX	-X-XXX-X-X-X-X-X-X-D	24	25
80XXX	-X-XXX-X-X-X-X-X-X-S	24	25
80XXX	-X-XXX-X-X-X-X-X-X-T	24	25
80XXX	-X-XXX-X-X-X-X-X-X-8	22	23
83XXX	-X-XXX-X-X-X-X-X-X-A	24	25
83XXX	-X-XXX-X-X-X-X-X-X-B	24	25
83XXX	-X-XXX-X-X-X-X-X-X-S	24	25
83XXX	-X-XXX-X-X-X-X-X-X-T	24	25
83XXX	-X-XXX-X-X-X-X-X-X-C	24	25
83XXX	-X-XXX-X-X-X-X-X-X-D	24	25
83XXX	-X-XXX-X-X-X-X-X-X-N	22	23
83XXX	-X-XXX-X-X-X-X-X-X-P	22	23
83XXX	-X-XXX-X-X-X-X-X-X-2	24	25
83XXX	-X-XXX-X-X-X-X-X-X-4	24	25
83XXX	-X-XXX-X-X-X-X-X-X-5	24	25
84XXX	-X-XXX-X-X-X-X-X-X-S	24	25
84XXX	-X-XXX-X-X-X-X-X-X-T	24	25
84XXX	-X-XXX-X-X-X-X-X-X-N	22	23
84XXX	-X-XXX-X-X-X-X-X-X-D	24	25
84XXX	-X-XXX-X-X-X-X-X-X-2	24	25

Table 8. Promass Modeling for Single Pulse Wiring

Transmitter/Sensor	Modeling	+ Terminal	- Terminal
83XXX	-X-XXX-X-X-X-X-X-X-M	22, 24	23, 25
84XXX	-X-XXX-X-X-X-X-X-X-M	22, 24	23, 25
84XXX	-X-XXX-X-X-X-X-X-X-1	22, 24	23, 25

Table 9. Promass Modeling for Dual Pulse Wiring

Note: *In dual pulse mode, Output 1 (24/25) leads Output 2 (22/23) when flowing in the forward direction.*

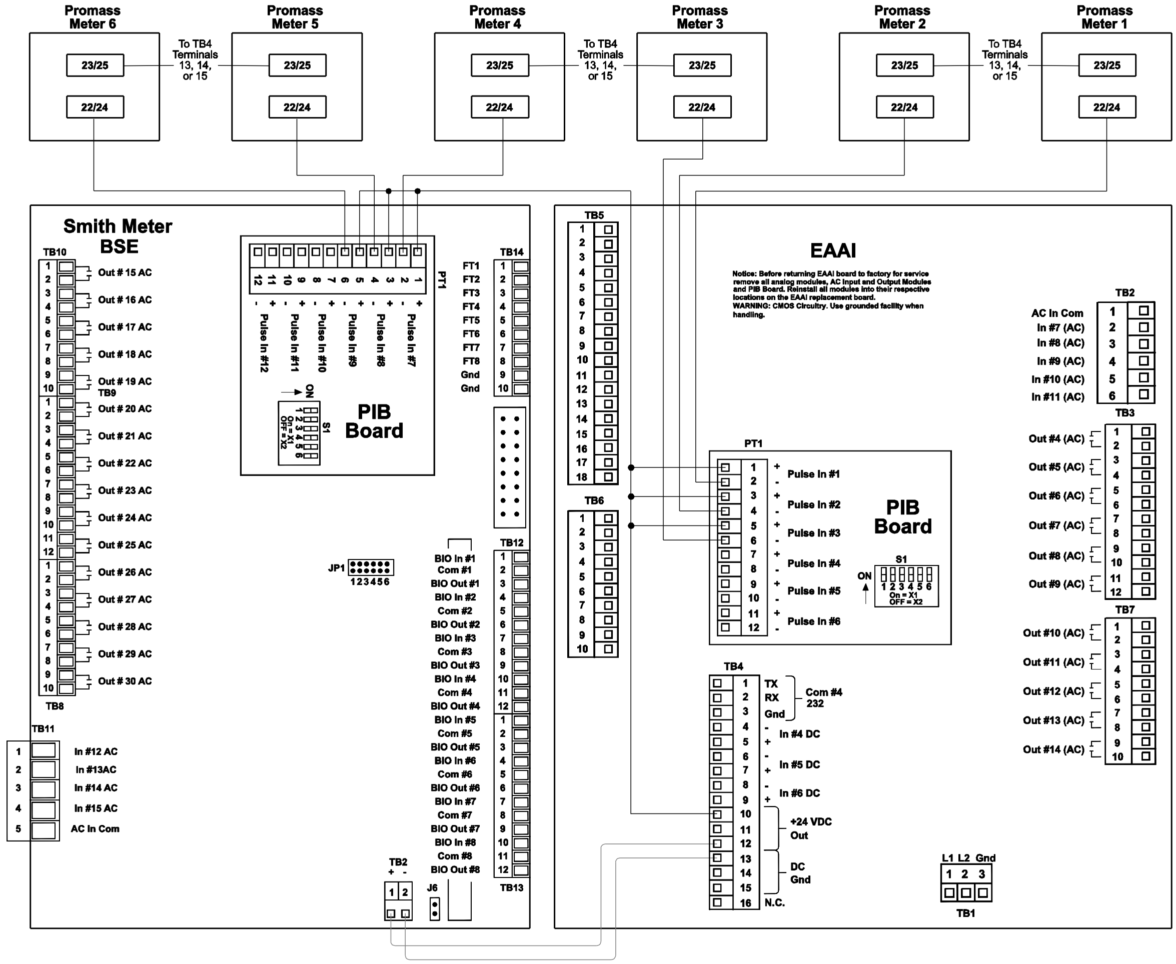


Figure 22. Wiring Diagram, Promass 80, 83, and 84 Single Pulse

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

Note: *Wiring between transmitter and AccuLoad should be done using a shielded cable per each transmitter. If selected cable utilizes twisted pairs, do not run more than one signal in a twisted pair.*

Caution: Each board set should be handled individually and contains its own "unique" 24v DC power supply. All external devices such as pulse transmitters, RTD's, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Promass Wire Codes:

Terminal 22/24: +
Terminal 23/25: -

Note: *The pulse input circuitry on the PIB has 1.6kΩ of current limiting resistance "built-in" so that an external pull-up resistor is not required when an open collector output device is connected as shown.*

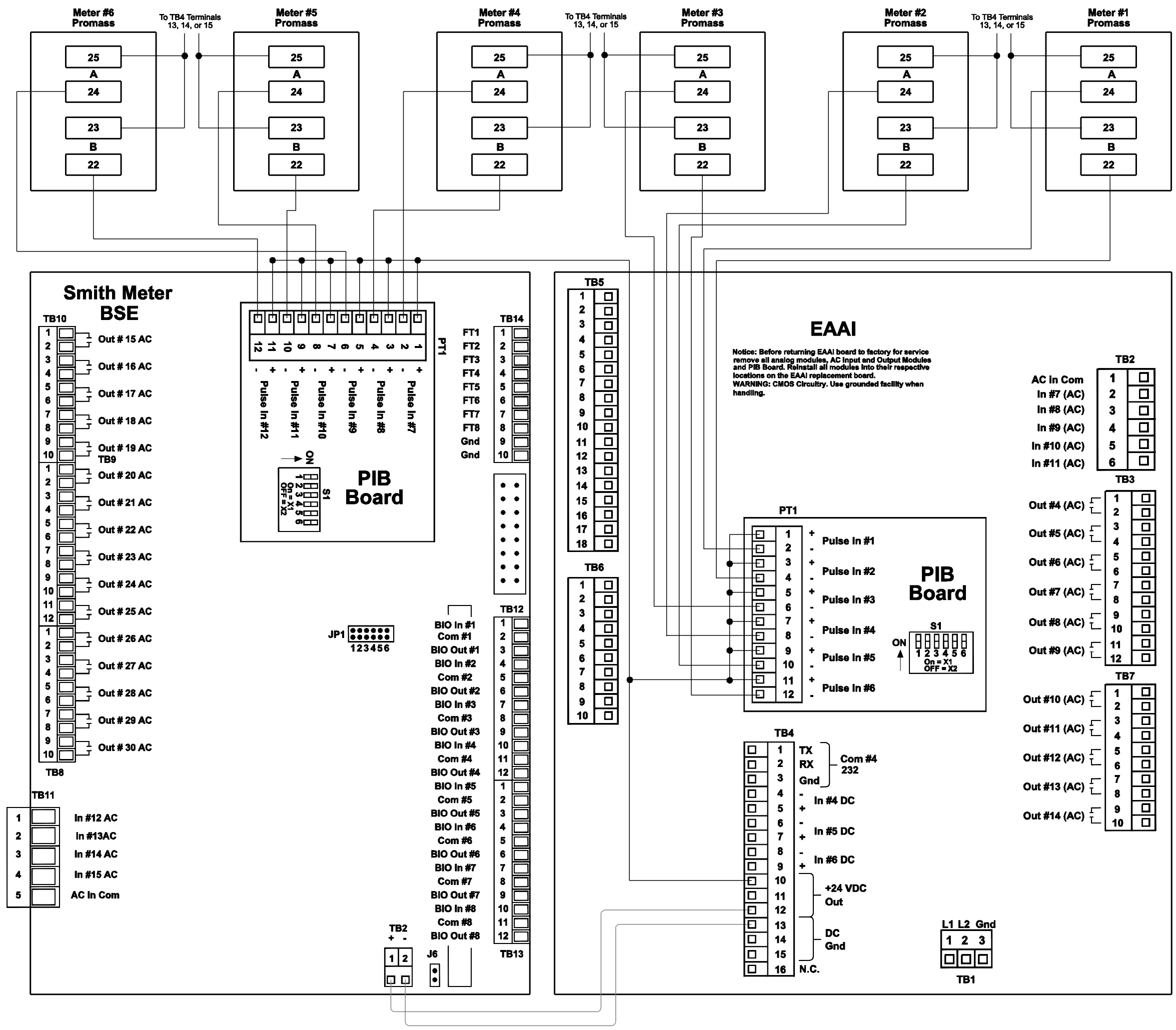


Figure 23. Wiring Diagram, Promass 83 and 84 Dual Pulse

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

Note: *Wiring between transmitter and AccuLoad should be done using a shielded cable per each transmitter. If selected cable utilizes twisted pairs, do not run more than one signal in a twisted pair.*

Caution: Each board set should be handled individually and contains its own “unique” 24v DC power supply. All external devices such as pulse transmitters, RTD’s, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Promass Wire Codes:
Terminal 22: Output 2+
Terminal 23: Output 2-
Terminal 24: Output 1+
Terminal 25: Output 1-

Note: *The pulse input circuitry on the PIB has 1.6kΩ of current limiting resistance “built-in” so that an external pull-up resistor is not required when an open collector output device is connected as shown.*

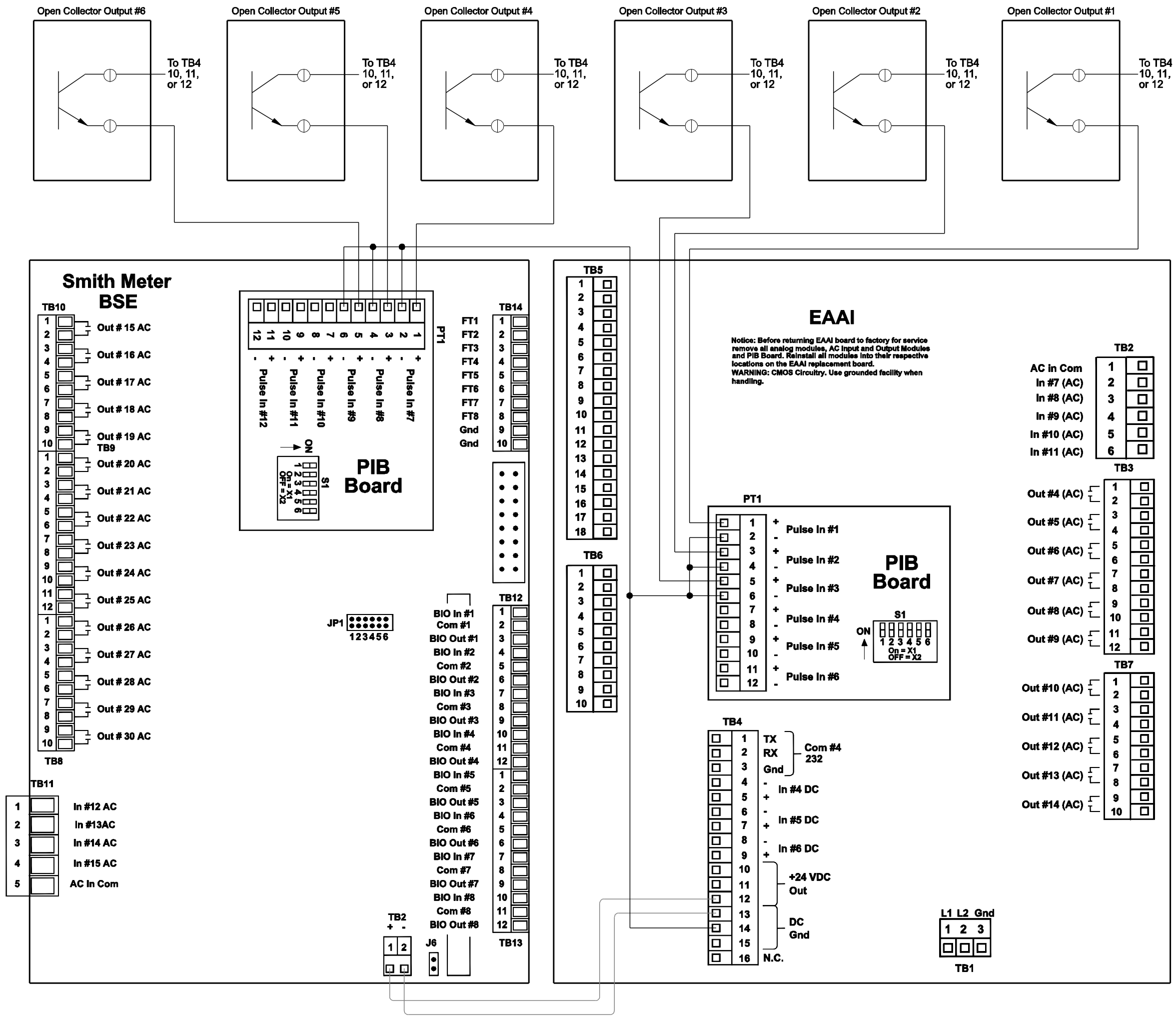


Figure 24. Wiring Diagram, Optically Isolated Open Collector Output (One Board Set)

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

Note: *Wiring between transmitter and AccuLoad should be done using a shielded cable per each transmitter. If selected cable utilizes twisted pairs, do not run more than one signal in a twisted pair.*

Caution: Each board set should be handled individually and contains its own "unique" 24v DC power supply. All external devices such as pulse transmitters, RTD's, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Note: *This diagram assumes that each output's collector and emitter are isolated.*

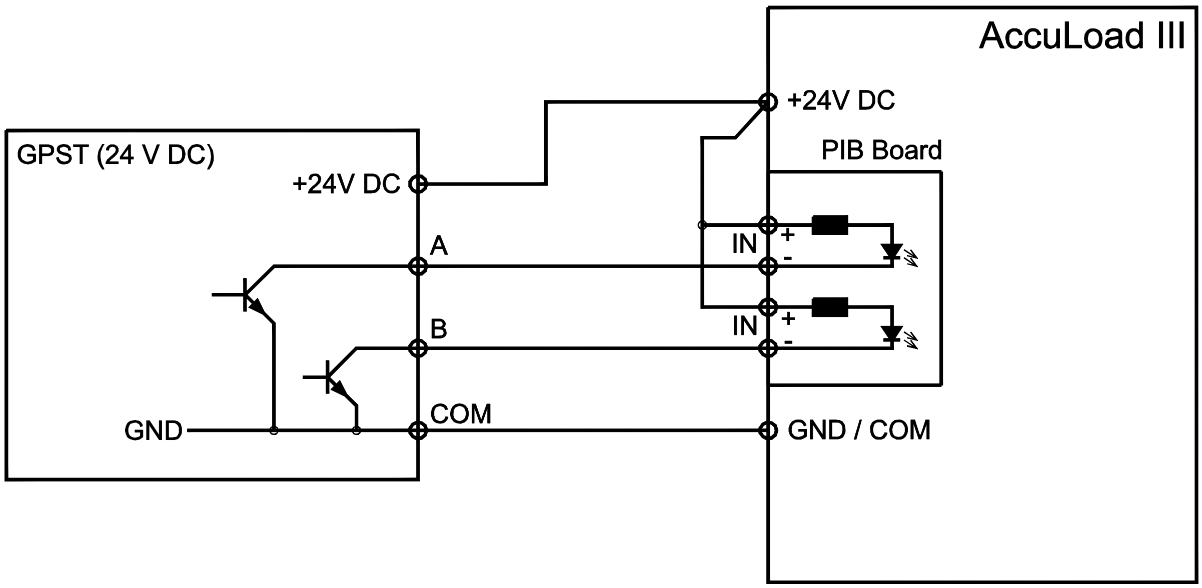


Figure 25. Wiring Diagram, GPST Dual Pulse Transmitter + 24 Vdc with Open Collector Output with Common Ground

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

Note: *Wiring between transmitter and AccuLoad should be done using a shielded cable per each transmitter. If selected cable utilizes twisted pairs, do not run more than one signal in a twisted pair.*

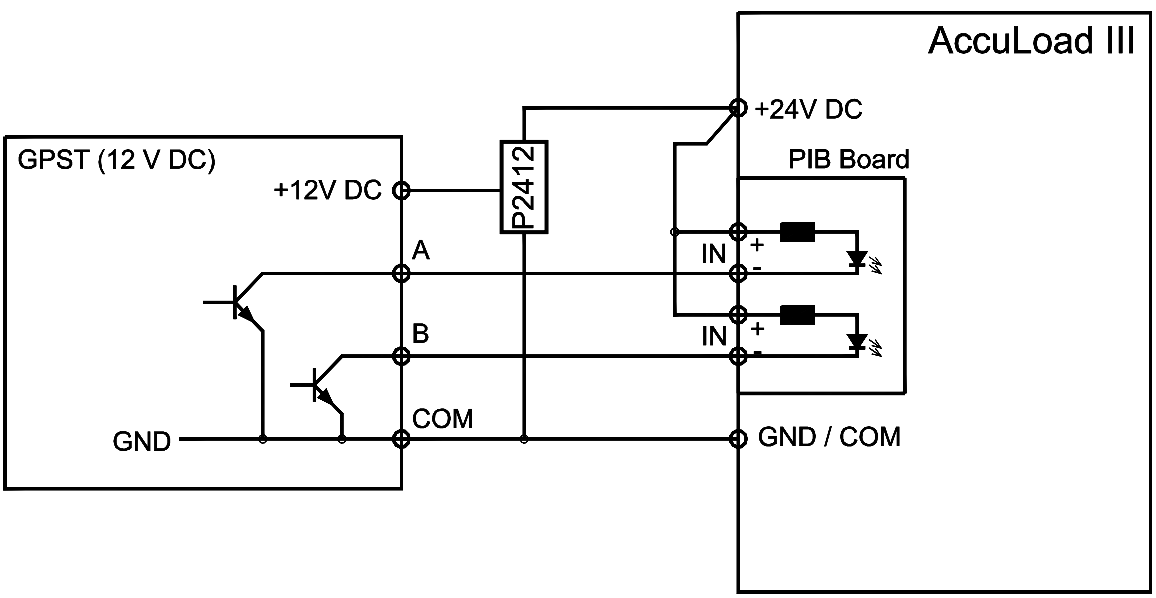


Figure 26. Wiring Diagram, GPST Dual Pulse Transmitter + 12 Vdc with Open Collector Output with Common Ground Converter P2412 see MN06117.

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

Note: *Wiring between transmitter and AccuLoad should be done using a shielded cable per each transmitter. If selected cable utilizes twisted pairs, do not run more than one signal in a twisted pair.*

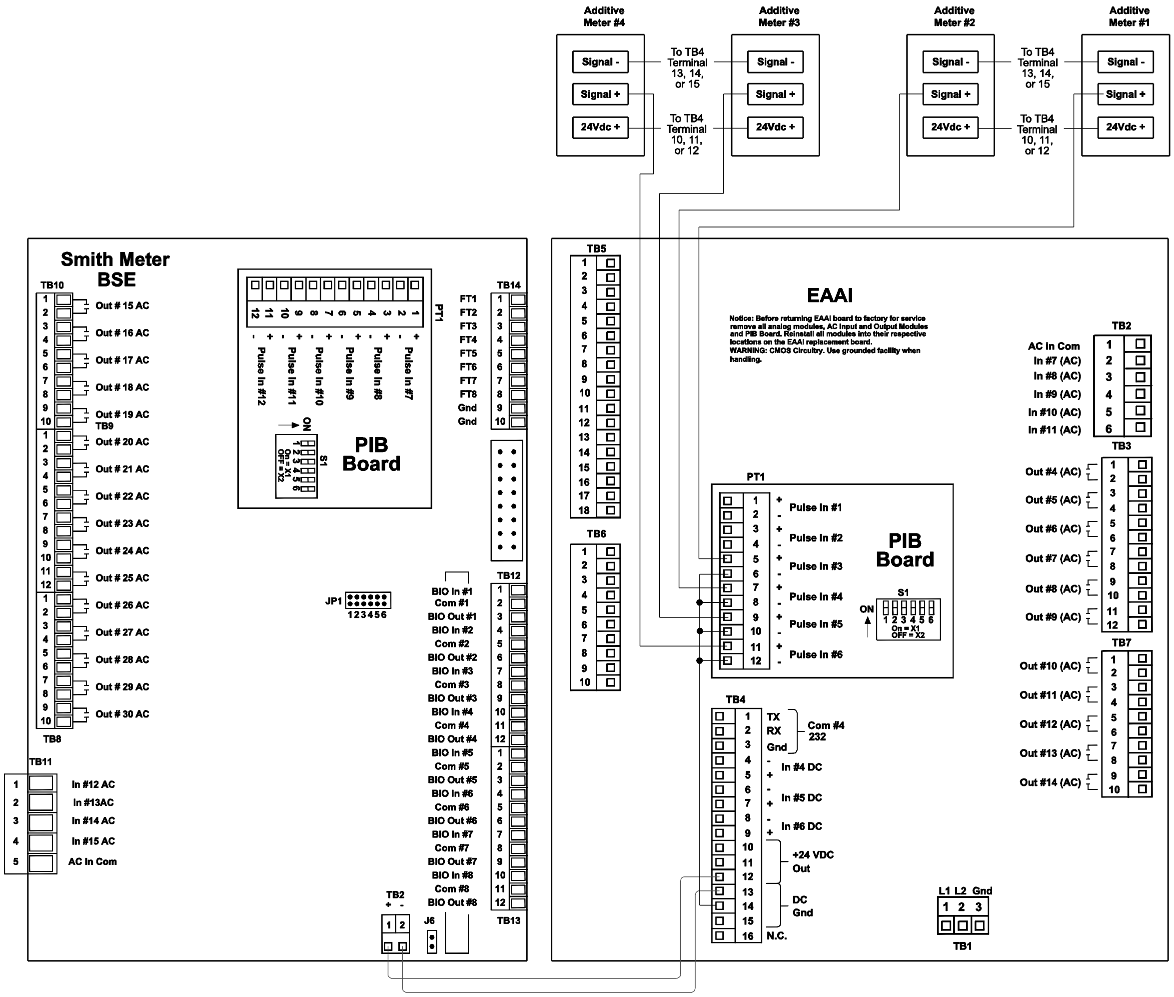


Figure 27. Wiring Diagram, Four Additive Meters, Active Outputs (One Board Set)

This diagram is valid only when using one or two product meters. For other setups refer to table 6 for available wiring connections.

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

Note: *Wiring between transmitter and AccuLoad should be done using a shielded cable per each transmitter. If selected cable utilizes twisted pairs, do not run more than one signal in a twisted pair.*

Caution: Each board set should be handled individually and contains its own “unique” 24v DC power supply. All external devices such as pulse transmitters, RTD’s, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Note: *The 24-volt power for the transmitters can be wired through the terminal block located in the bottom of the cabinet, as shown in Figure 5.*

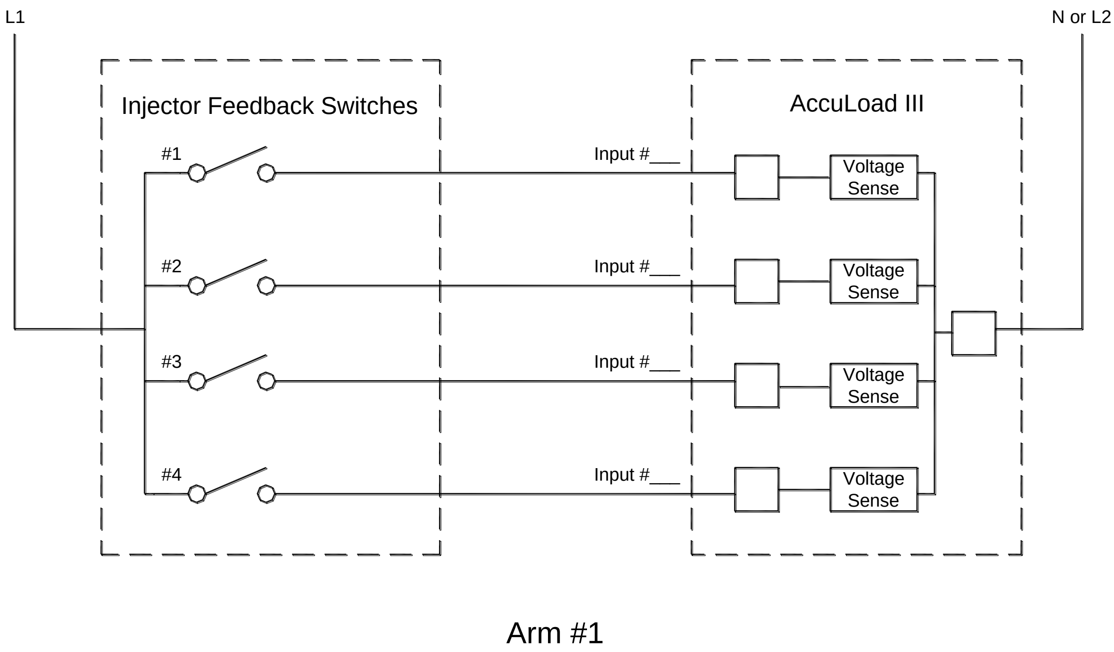
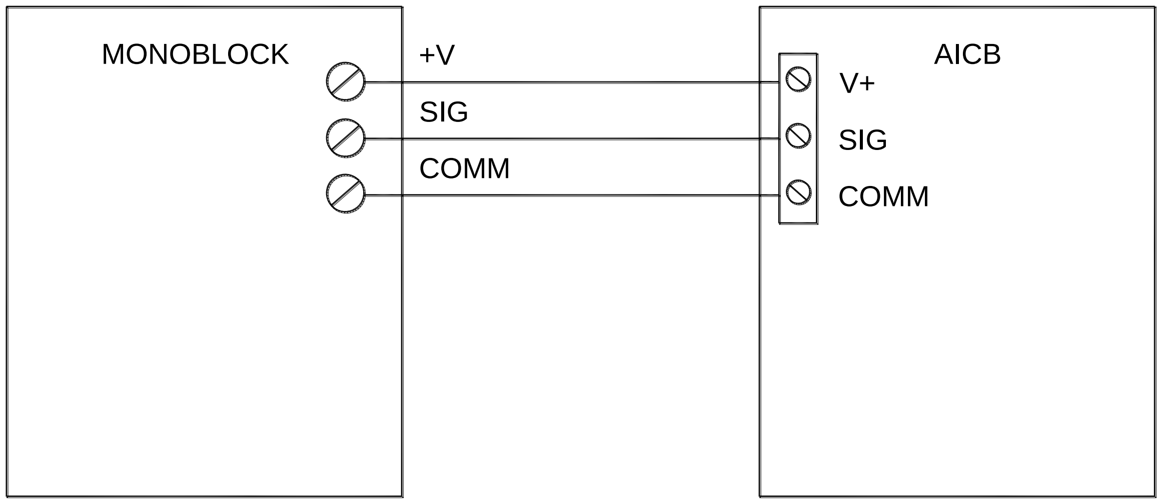


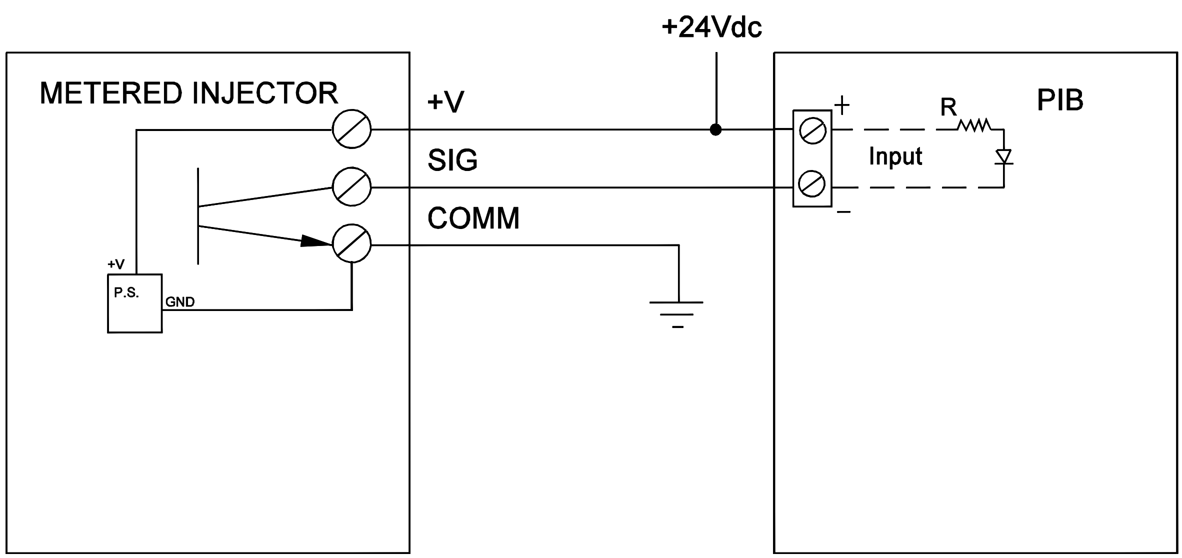
Figure 28. Typical Additive Feedback Wiring



Gate City Monoblock Additive Meter

Figure 29. Monoblock to AICB Wiring Diagram

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.



Typical Metered Injector Additive Meter

Figure 30. Monoblock to PIB Wiring Diagram

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

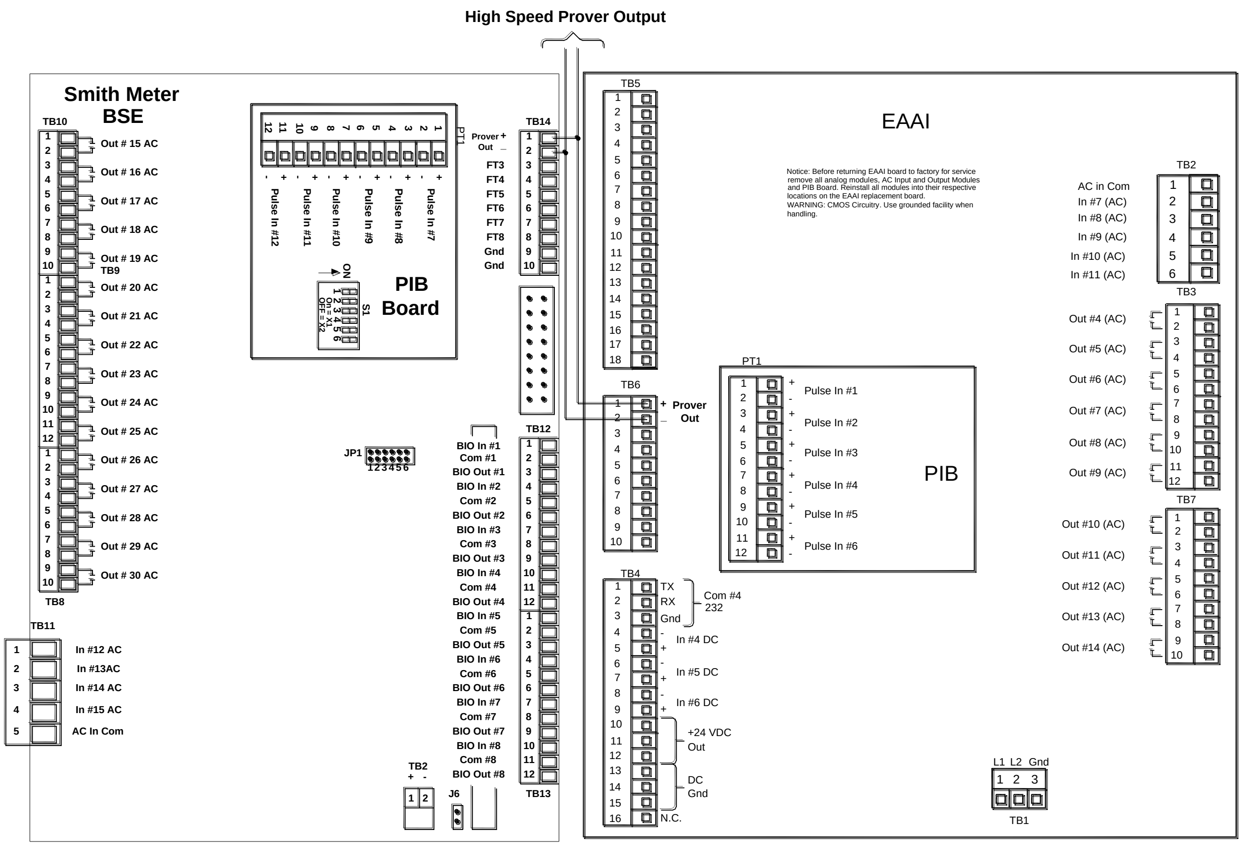


Figure 31. **Wiring Diagram, High Speed Prover Output (Open Collector Opto Coupler)**

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

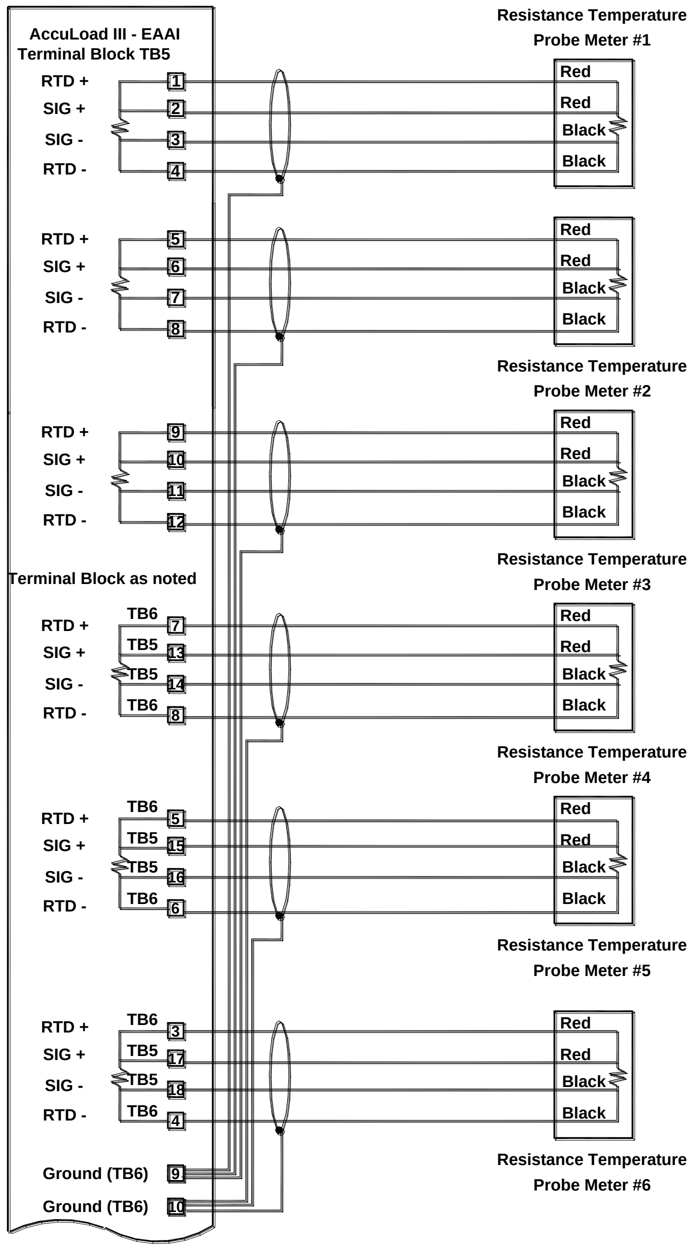


Figure 32. Resistance (RTD) Input (One Board Set)

Caution: Each board set should be handled individually and contains its own “unique” 24v DC power supply. All external devices such as pulse transmitters, RTD’s, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Note: *If using two twisted pairs of wires, RTD+ and RTD– should be wired with one twisted pair. Sig+ and Sig– should be wired with another twisted pair.*

Used for temperature input from a platinum RTD. This input requires a four-wire connection to a platinum sensor with the following specification:

1. *100 Ω @ 0 Degrees Celsius.*
2. *0.00385 Ω/Ω/Deg. C., DIN 43760, IEC 751, or BS1904, ITS-90*

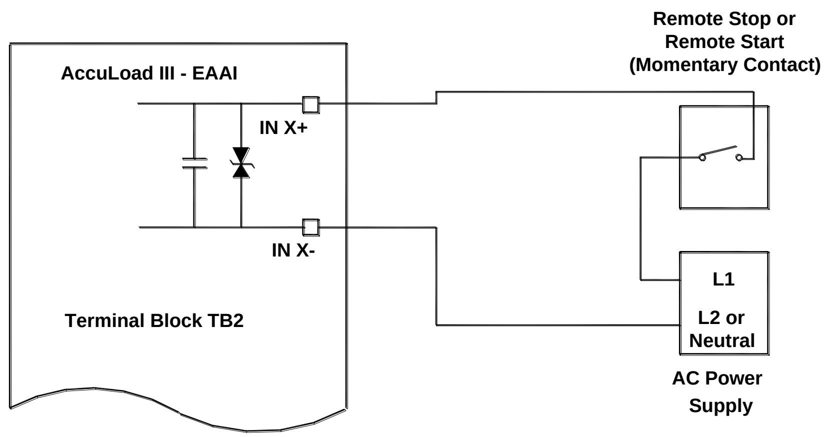


Figure 33. AC Remote Start and Stop

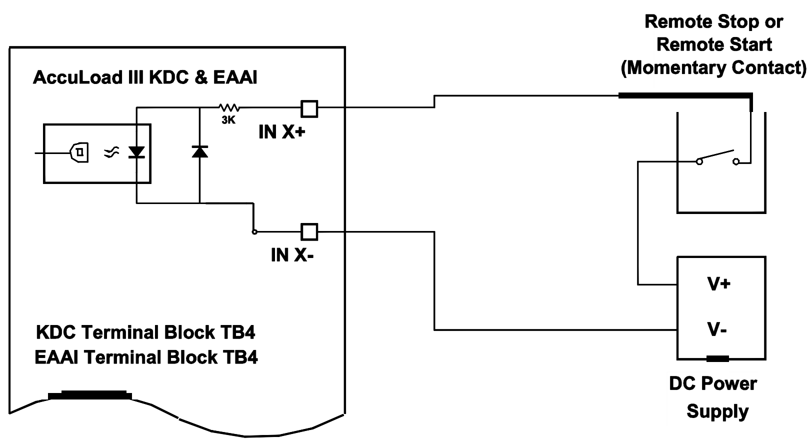


Figure 34. DC Remote Start and Stop

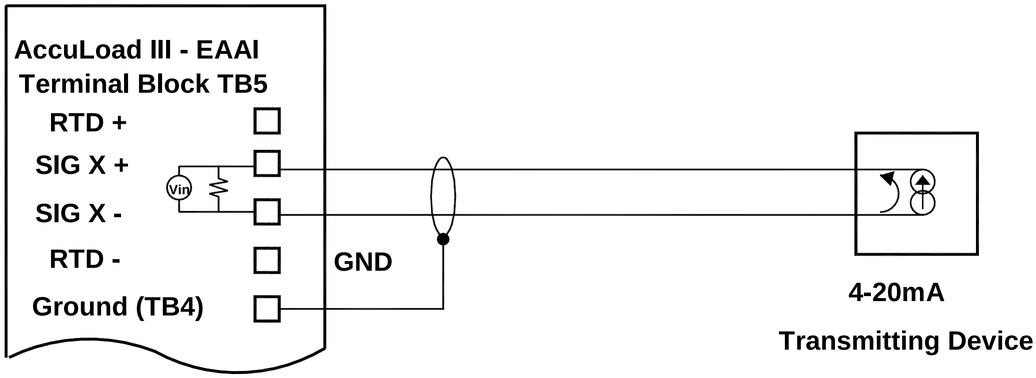


Figure 35. 4-20mA Inputs (Active)

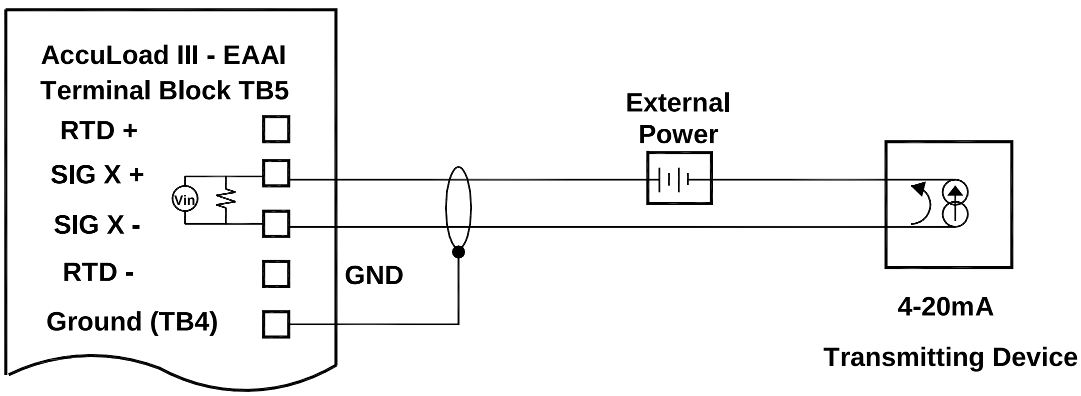


Figure 36. 4-20mA Inputs (Passive)

The 4-20mA inputs are isolated from the processor and main power and can be programmed for the function required by the application. The analog inputs are also scalable through the I/O Configuration Menu of the unit. The resolution of the input is 16 bits or one part in 65,536. The inputs should be wired with shielded twisted pairs of wires of 18 to 24 gauge.

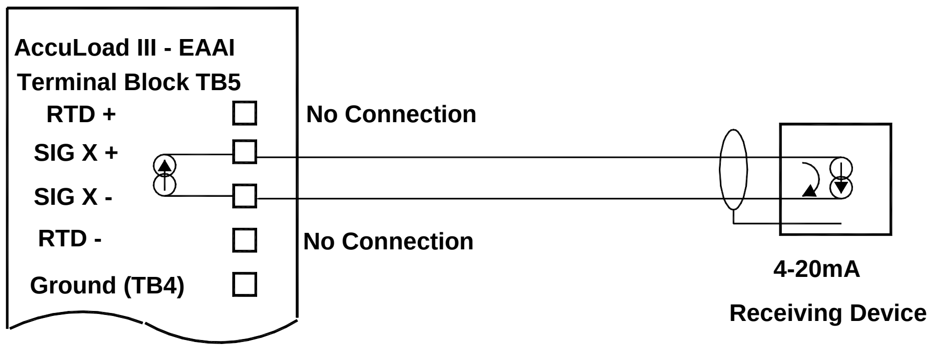


Figure 37. 4-20mA Outputs

The 4-20mA outputs are isolated from the processor and main power and can be programmed for the function required by the application. The analog outputs are also scalable through the I/O Configuration Menu of the unit. The resolution of the output is 16 bits or one part in 65,536. The outputs should be wired with shielded twisted pairs of wires of 18 to 24 gauge.

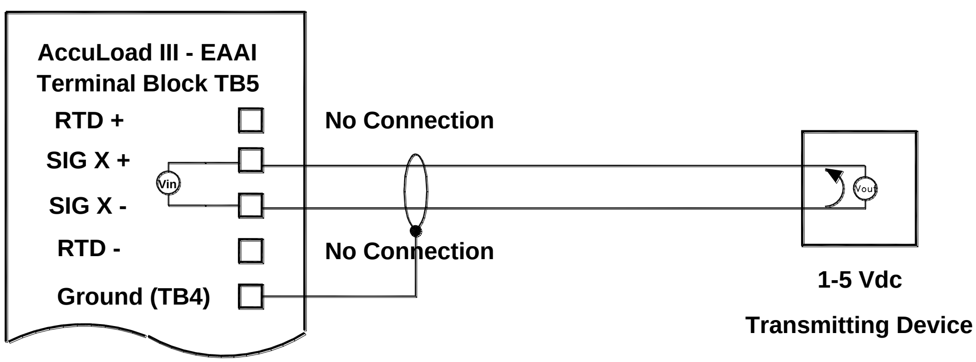


Figure 38. 1-5 Vdc Input

The 1-5 Vdc inputs are isolated from the processor and main power and can be programmed for the function required by the application. The inputs are scalable through the I/O Configuration Menu of the unit. The resolution of the input is 16 bits or one part in 65,536. The inputs should be wired with shielded twisted pairs of wires of 18 to 24 gauge.

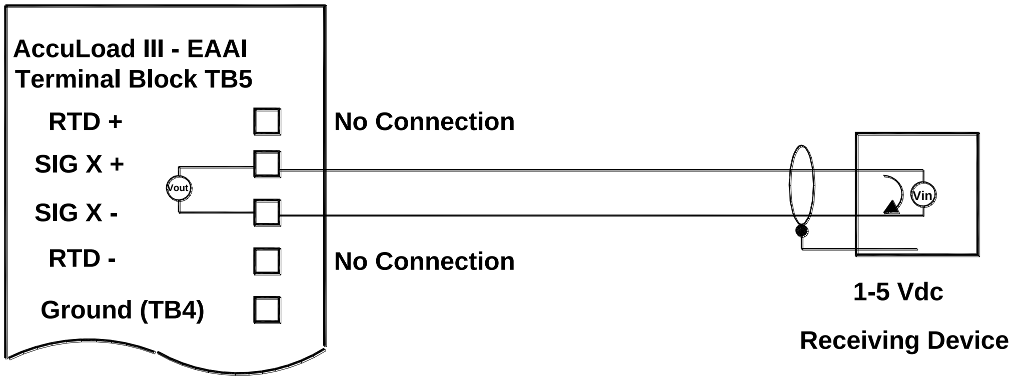


Figure 39. 1-5 Vdc Output

The 1-5 Vdc outputs are isolated from the processor and main power and can be programmed for the function required by the application. The outputs are also scalable through the I/O Configuration Menu of the unit. The resolution of the output is 16 bits or one part in 65,536. The outputs should be wired with shielded twisted pairs of wires of 18 to 20 gauge.

Wiring Terminals, 4-20mA and 1-5 Vdc Inputs/Outputs (One Board Set)

Module Number	Connection	Terminal Number	Board	Terminal Block
AM #1	+	2	EAAI	TB5
AM #1	-	3	EAAI	TB5
AM #1	Shield	3, 13, 14, or 15	EAAI	TB4
AM #2	+	6	EAAI	TB5
AM #2	-	7	EAAI	TB5
AM #2	Shield	3, 13, 14, or 15	EAAI	TB4
AM #3	+	10	EAAI	TB5
AM #3	-	11	EAAI	TB5
AM #3	Shield	3, 13, 14, or 15	EAAI	TB4
AM #4	+	13	EAAI	TB5
AM #4	-	14	EAAI	TB5
AM #4	Shield	3, 13, 14, or 15	EAAI	TB4
AM #5	+	15	EAAI	TB5
AM #5	-	16	EAAI	TB5
AM #5	Shield	3, 13, 14, or 15	EAAI	TB4
AM #6	+	17	EAAI	TB5
AM #6	-	18	EAAI	TB5
AM #6	Shield	3, 13, 14, or 15	EAAI	TB4

Table 10. Analog Terminal Connection

Digital Inputs

Each set of boards is capable of providing fourteen DC digital inputs and nine AC digital inputs (standard). The inputs can be programmed as to function through the configuration directory. Eight of the DC digital inputs are bi-state and can be used as either inputs or outputs depending on how they are programmed and wired. Examples of configurations for the digital inputs are permissives that have to be connected before the AccuLoad will allow the driver to load, feedback from additive injectors, and swing arm permissive inputs (to ensure that the swing arm and the ground are connected on the correct lane, etc.). For optional inputs, see AICB.

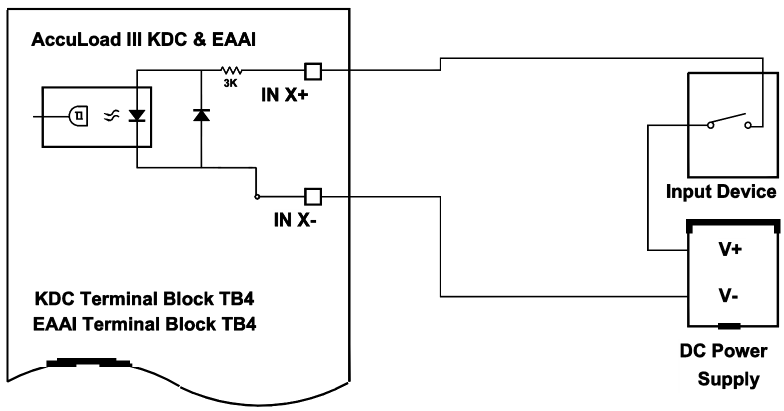


Figure 40. DC Inputs

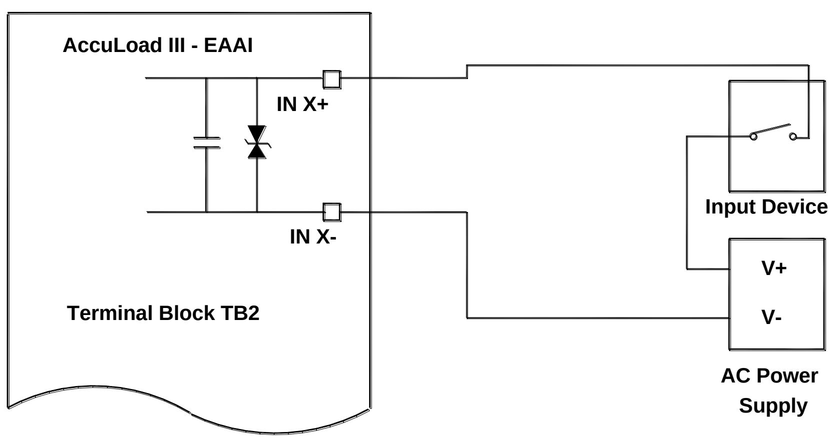


Figure 41. AC Inputs

Wiring Terminals, Digital Inputs (One Board Set)

Input #	Voltage Type	Board	Terminal Block	Terminal Input (+)	Connections Common (-)
1	DC	KDC	TB4	1	2
2	DC	KDC	TB4	3	4
3	DC	KDC	TB4	5	6
4	DC	EAAI	TB4	5	4
5	DC	EAAI	TB4	7	6
6	DC	EAAI	TB4	9	8
7	AC	EAAI	TB2	2	1
8	AC	EAAI	TB2	3	1
9	AC	EAAI	TB2	4	1
10	AC	EAAI	TB2	5	1
11	AC	EAAI	TB2	6	1
12	AC	BSE	TB11	1	5
13	AC	BSE	TB11	2	5
14	AC	BSE	TB11	3	5
15	AC	BSE	TB11	4	5

Table 11. Digital Inputs

Caution: Each board set should be handled individually and contains its own “unique” 24v DC power supply. All external devices such as pulse transmitters, RTD’s, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Digital Outputs

Each set of boards is capable of providing eleven DC digital outputs and twenty-seven AC digital outputs (standard). The outputs can be programmed as to function through the configuration directory. Eight of the DC digital outputs are bi-state and can be used as either inputs or outputs depending on how they are programmed and wired. The digital outputs are used to control the flow control valve, turn on the product pumps, turn on the additive pumps, signal the additive injector to inject, etc. For optional outputs, see AICB.

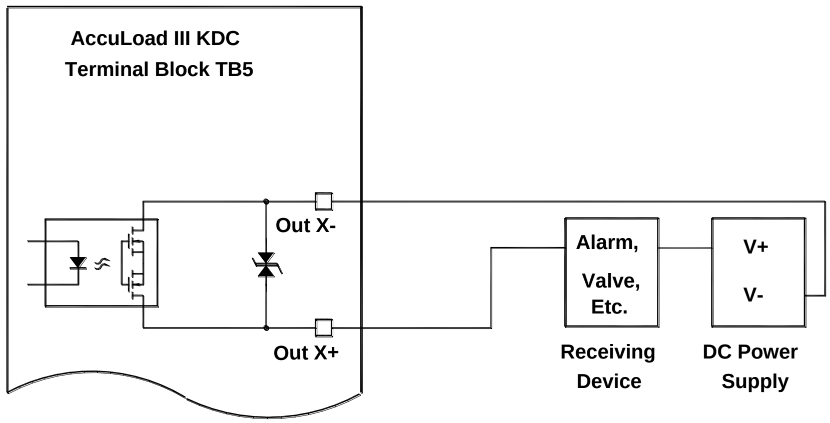


Figure 42. DC Outputs

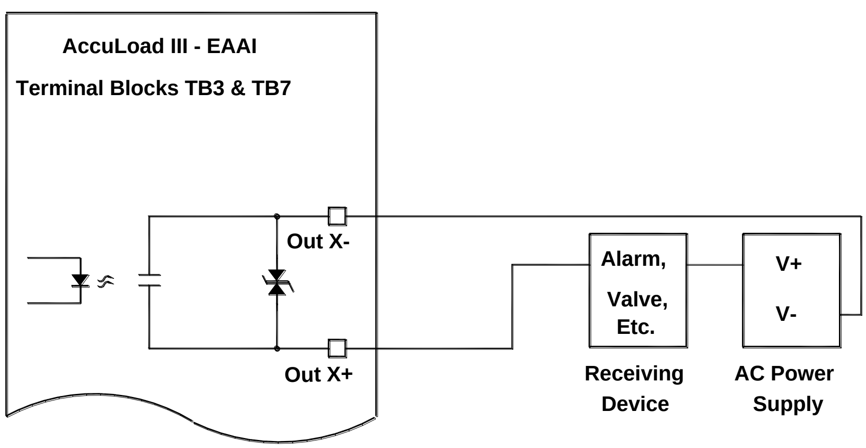


Figure 43. AC Outputs

Wiring Terminals, Digital Outputs (One Board Set)

Output #	Voltage Type	Board	Terminal Block	Terminal Output (+)	Connections Common (-)
1	DC	KDC	TB5	1	2
2	DC	KDC	TB5	3	4
3	DC	KDC	TB5	5	6
4	AC	EAAI	TB3	1	2
5	AC	EAAI	TB3	3	4
6	AC	EAAI	TB3	5	6
7	AC	EAAI	TB3	7	8
8	AC	EAAI	TB3	9	10
9	AC	EAAI	TB3	11	12
10	AC	EAAI	TB7	1	2
11	AC	EAAI	TB7	3	4
12	AC	EAAI	TB7	5	6
13	AC	EAAI	TB7	7	8
14	AC	EAAI	TB7	9	10
15	AC	BSE	TB10	1	2
16	AC	BSE	TB10	3	4
17	AC	BSE	TB10	5	6
18	AC	BSE	TB10	7	8
19	AC	BSE	TB10	9	10
20	AC	BSE	TB9	1	2
21	AC	BSE	TB9	3	4
22	AC	BSE	TB9	5	6
23	AC	BSE	TB9	7	8
24	AC	BSE	TB9	9	10
25	AC	BSE	TB9	11	12
26	AC	BSE	TB8	1	2
27	AC	BSE	TB8	3	4
28	AC	BSE	TB8	5	6
29	AC	BSE	TB8	7	8
30	AC	BSE	TB8	9	10

Table 12. Digital Outputs

Caution: Each board set should be handled individually and contains its own “unique” 24v DC power supply. All external devices such as pulse transmitters, RTD’s, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Input*	Output*	Voltage Type	Board	Terminal Block	Terminal Connections		
					Input +	Common -	Output +
16	31	DC	BSE	TB12	1	2	3
17	32	DC	BSE	TB12	4	5	6
18	33	DC	BSE	TB12	7	8	9
19	34	DC	BSE	TB12	10	11	12
20	35	DC	BSE	TB13	1	2	3
21	36	DC	BSE	TB13	4	5	6
22	37	DC	BSE	TB13	7	8	9
23	38	DC	BSE	TB13	10	11	12

Table 13. Bi-state Inputs/Outputs

Note: *Relay numbers for programming*
Note: *Refer to Table 5 to set JP1 on the BSE to match the number of inputs and outputs that are configured and wired.*

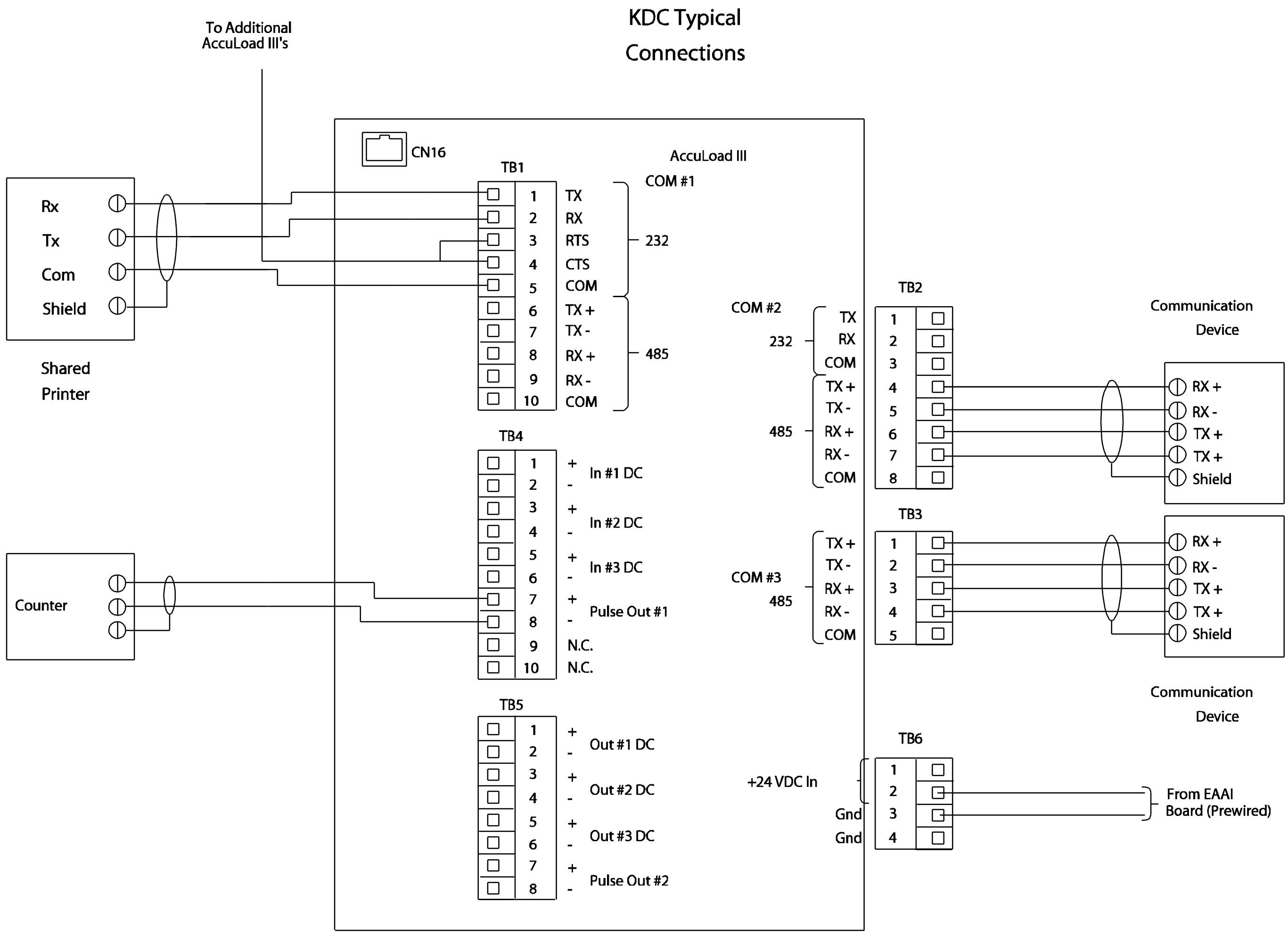


Figure 44. KDC Typical Diagram (One Board Set in FCM)

Caution: Each board set should be handled individually and contains its own "unique" 24v DC power supply. All external devices such as pulse transmitters, RTD's, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

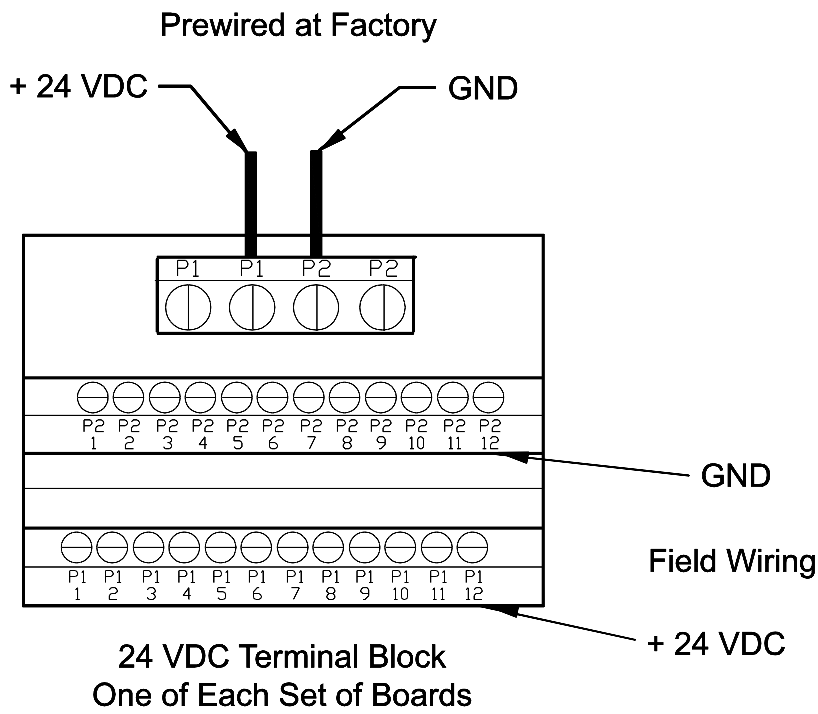


Figure 45a. 24Vdc Terminal Block Diagram (units built before January 1, 2014)

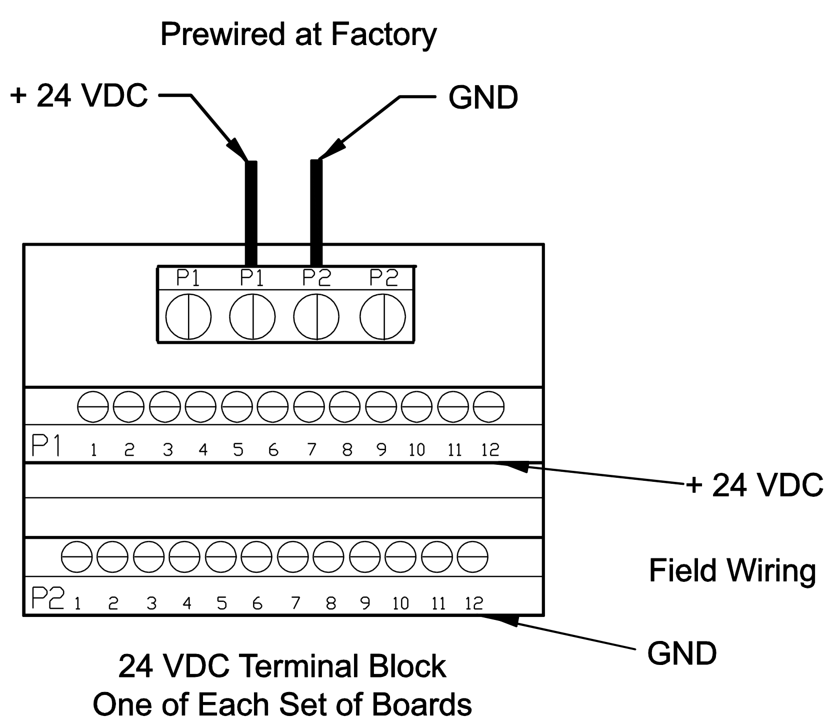


Figure 45b. 24Vdc Terminal Block Diagram (units built after January 1, 2014)

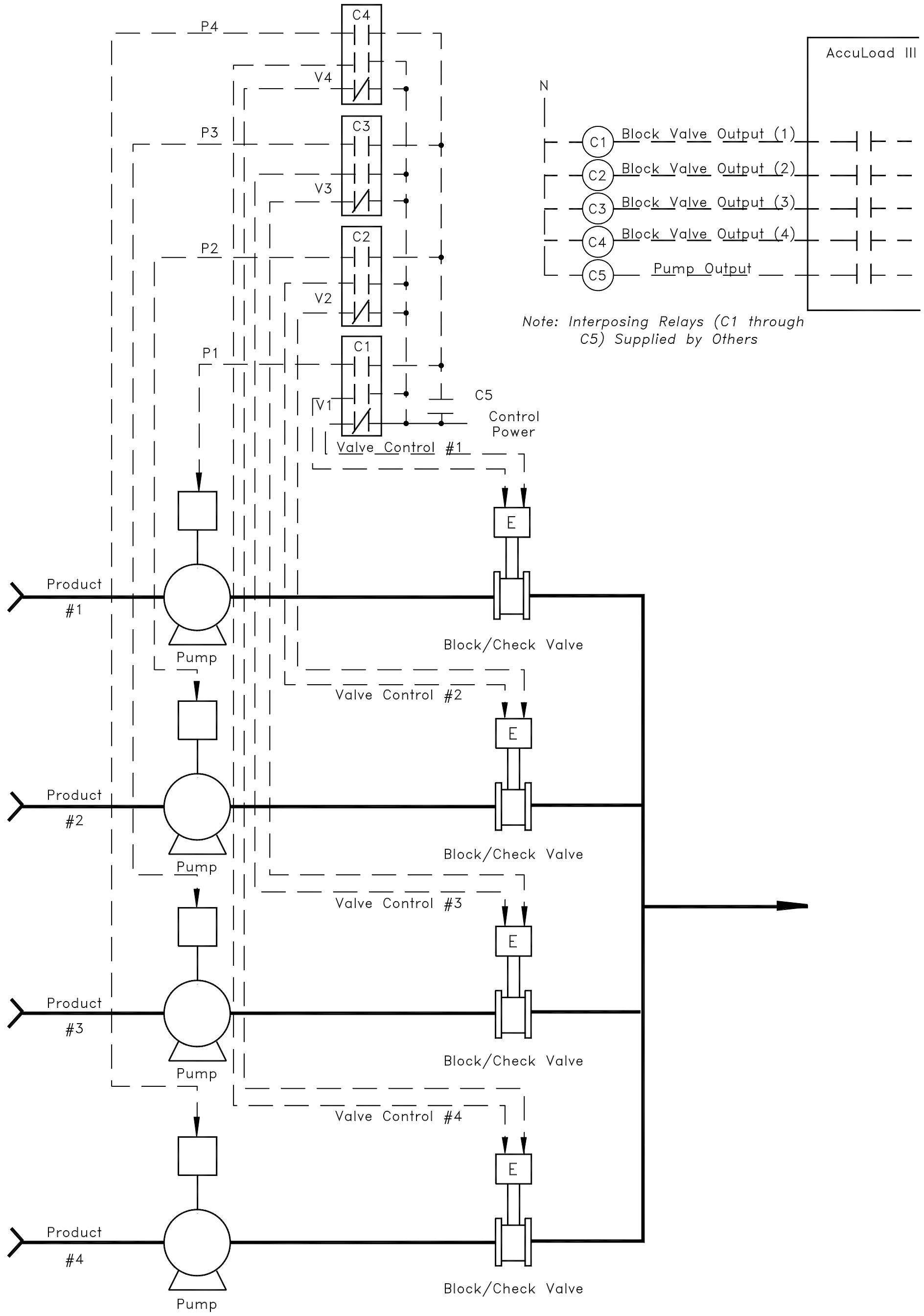


Figure 46. Pump and Block Valve Wiring Diagram

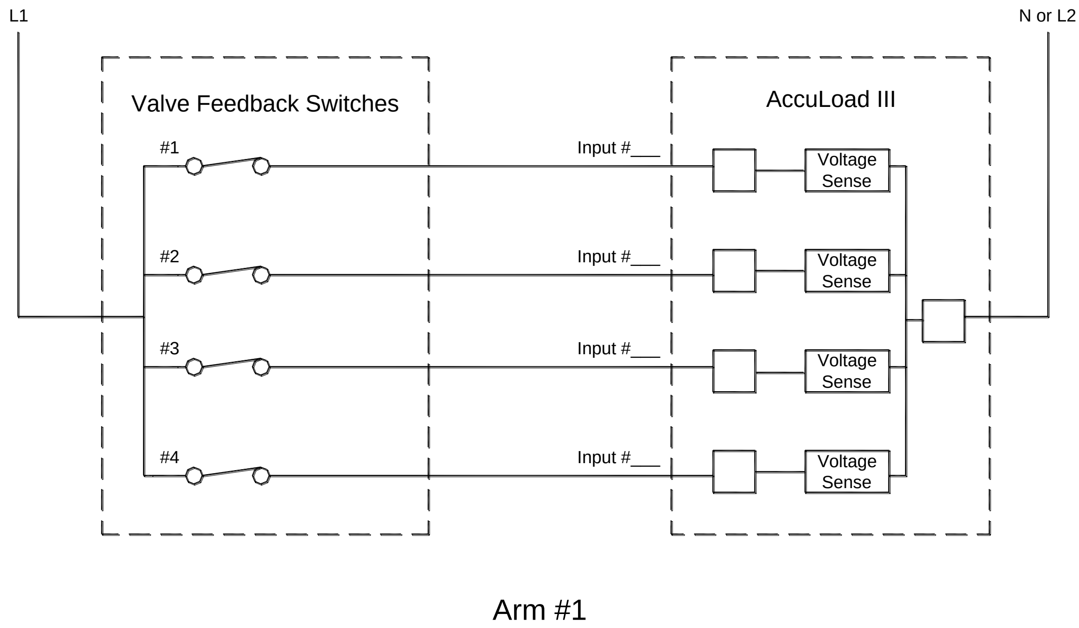


Figure 47. Typical Block Valve Feedback Wiring

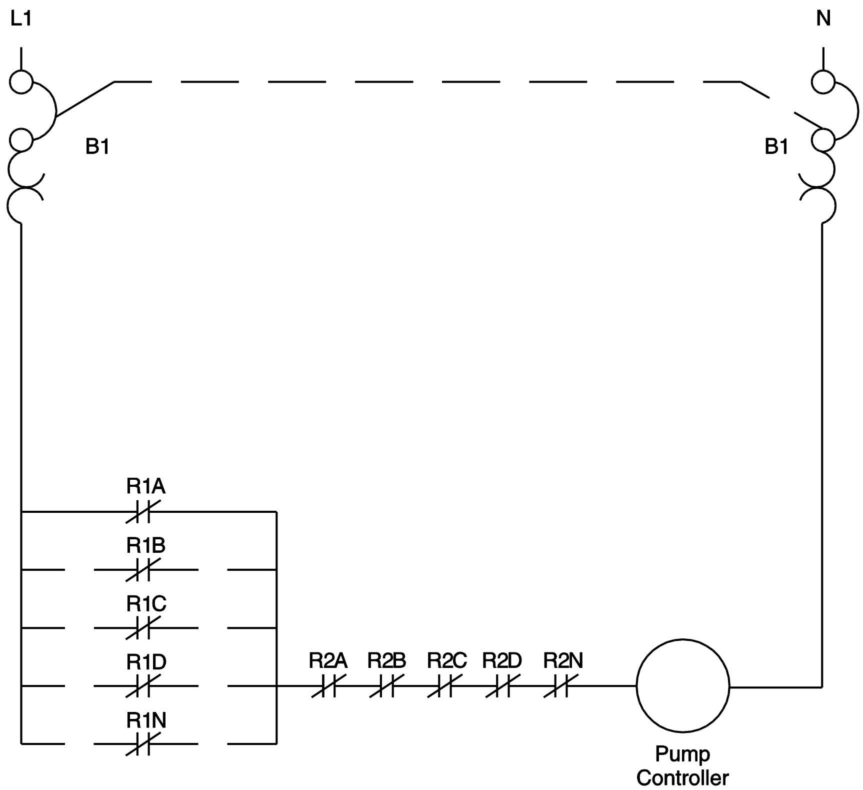


Figure 48. Pump and Alarm Contact Wiring

Notes:

1. *This figure shows wiring for a typical pump and alarm contact array for multiple AccuLoad controlled load arms, if the pump and alarm control options are used.*
2. *R1A through R1N represents the contacts of the customer supplies relay (R1) on the output of the AccuLoad pump permissive contacts.*
3. *R2A through R2N represents the contacts of the customer supplied relay (R2) on the output of the AccuLoad alarm permissive contacts.*
4. *An interposing relay must be used between the pump controller and the AccuLoad pump contacts.*

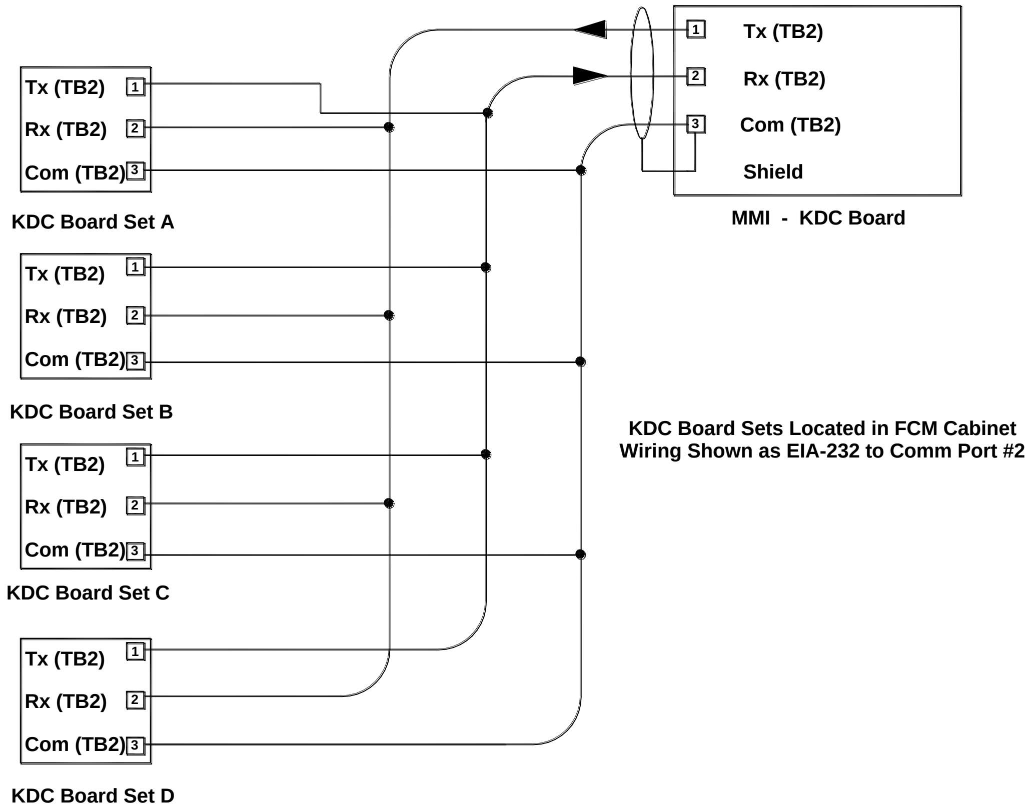


Figure 49. MMI to FCM RS232 Comm Port Wiring (With Four Board Sets)

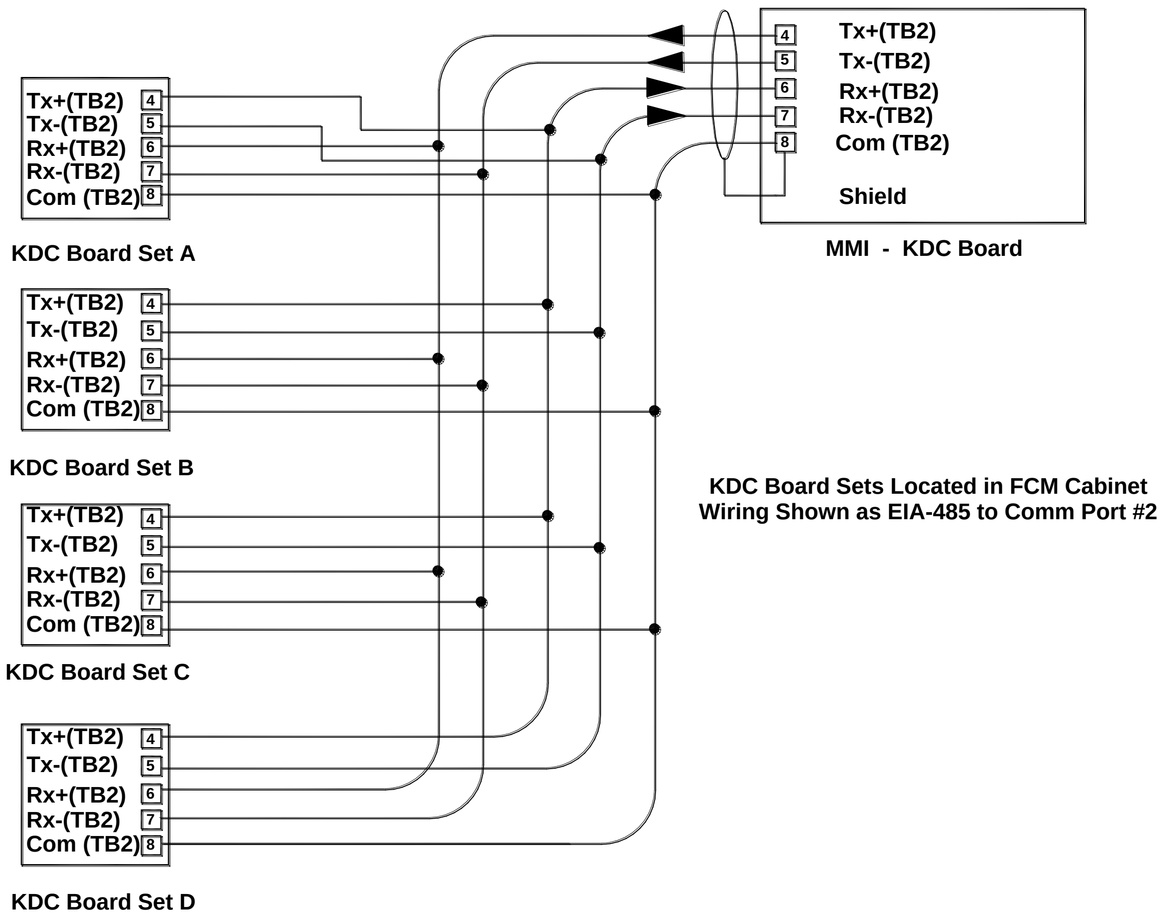


Figure 50. MMI to FCM 485 Comm Port Wiring (With Four Board Sets)

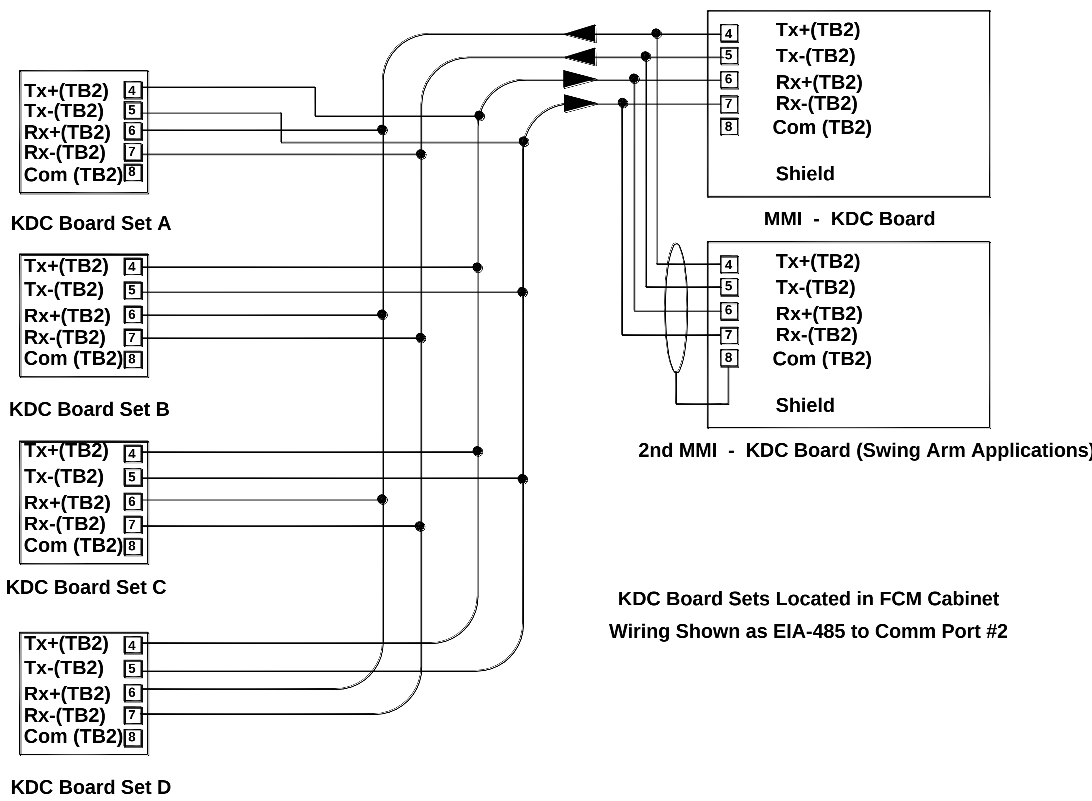


Figure 51. Dual MMI 485 Comm Port Wiring (With Four Board Sets)

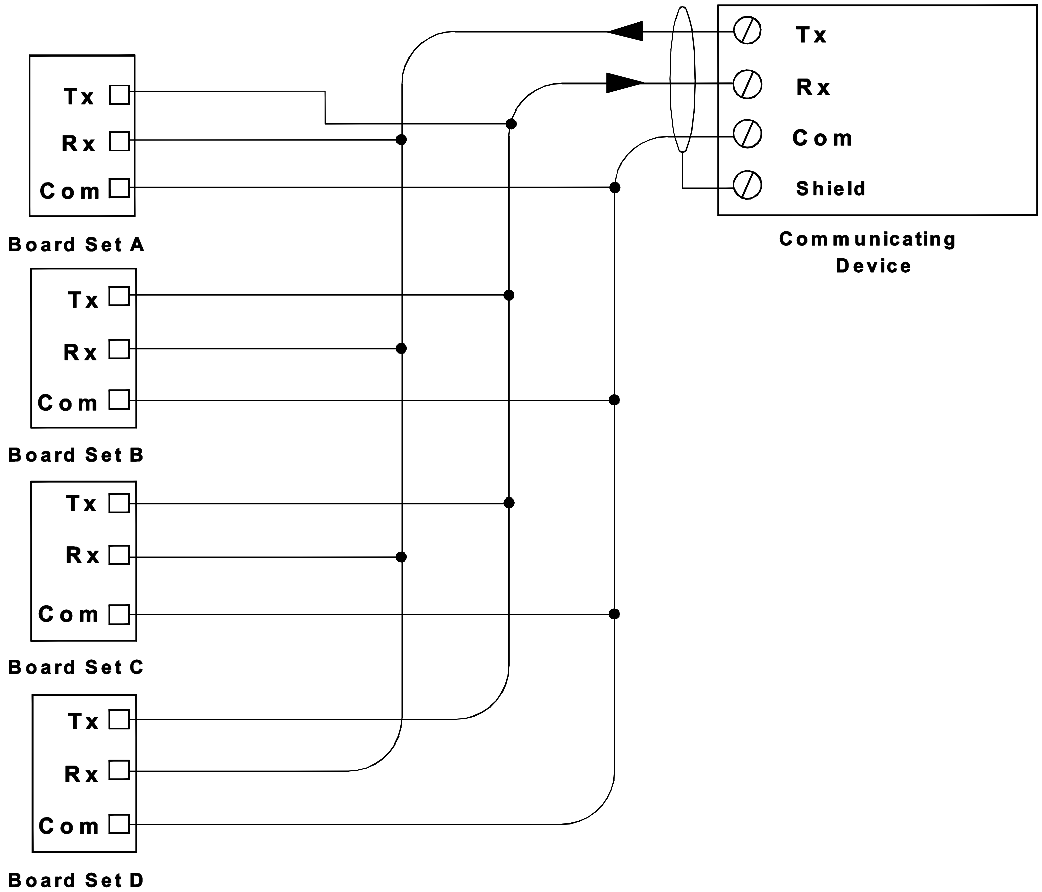


Figure 52. EIA-232 Multi-Drop Communications

The figure shows the typical wiring scheme for multi-drop communications between a communications device (other than the MMI) and the AccuLoad III. Refer to the table below for pin numbers on each of the EIA-232 communication ports. Note that the shield is to be terminated at the communication device.

Comm Port	Tx	Rx	Common	Board	Terminal Block
1	1	2	5	KDC	TB1
2*	1	2	3	KDC	TB2
4	1	2	3	EAAI	TB4

Table 14. EIA 232 Communication Ports

Note: *Communications Ports 1 and 2 can be either EIA-232 or EIA-485.*

**Normally used for MMI Communications*

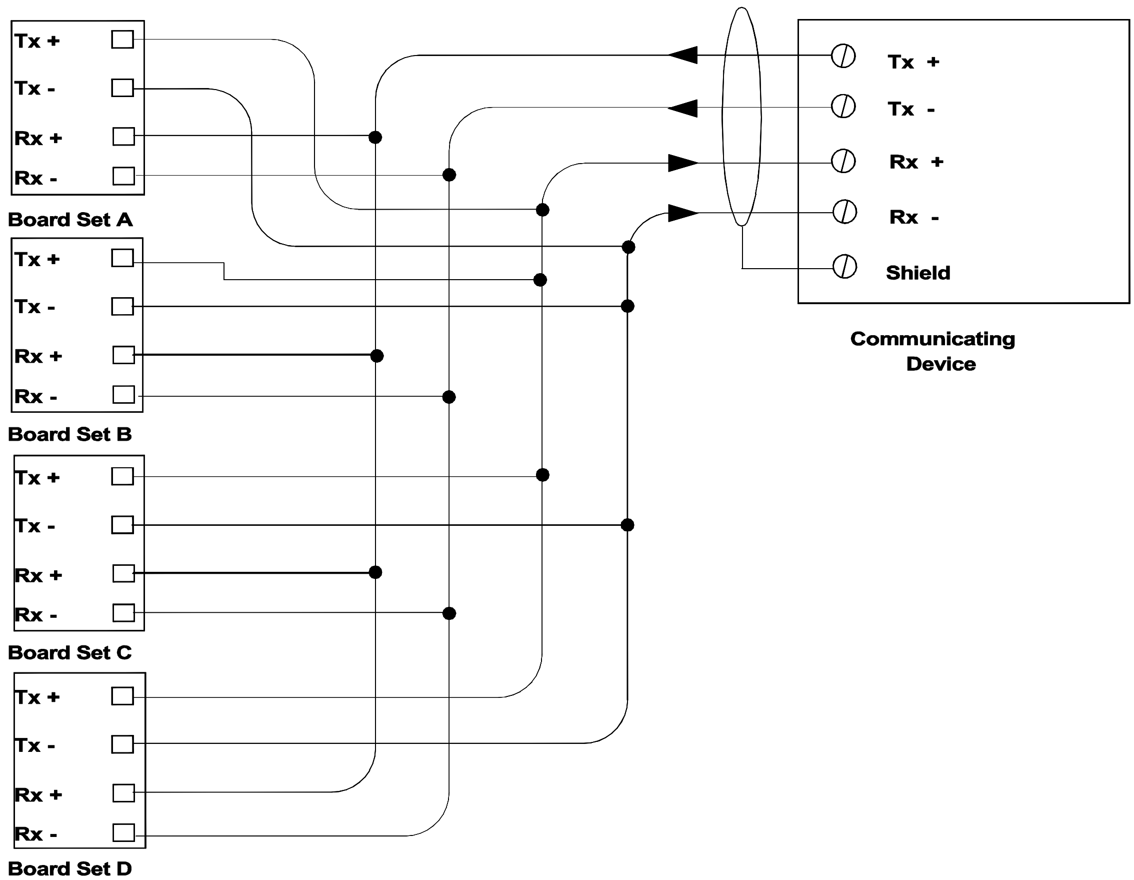


Figure 53. EIA-485 Multi-Drop Communications

The figure shows the typical wiring scheme for multi-drop communications between a communications device (other than the MMI) and the AccuLoad. Refer to the table below for pin numbers on each of the EIA-485 communication ports. Note that the shield is to be terminated at the communication device.

Comm Port	Tx +	Tx -	Rx +	Rx -	Board	Terminal Block
1	6	7	8	9	KDC	TB1
2*	4	5	6	7	KDC	TB2
3	1	2	3	4	KDC	TB3

Table 14. EIA 485 Communication Ports

Note: *Communications Ports 1 and 2 can be either EIA-485 or EIA-232.*

**Normally used for MMI communications*

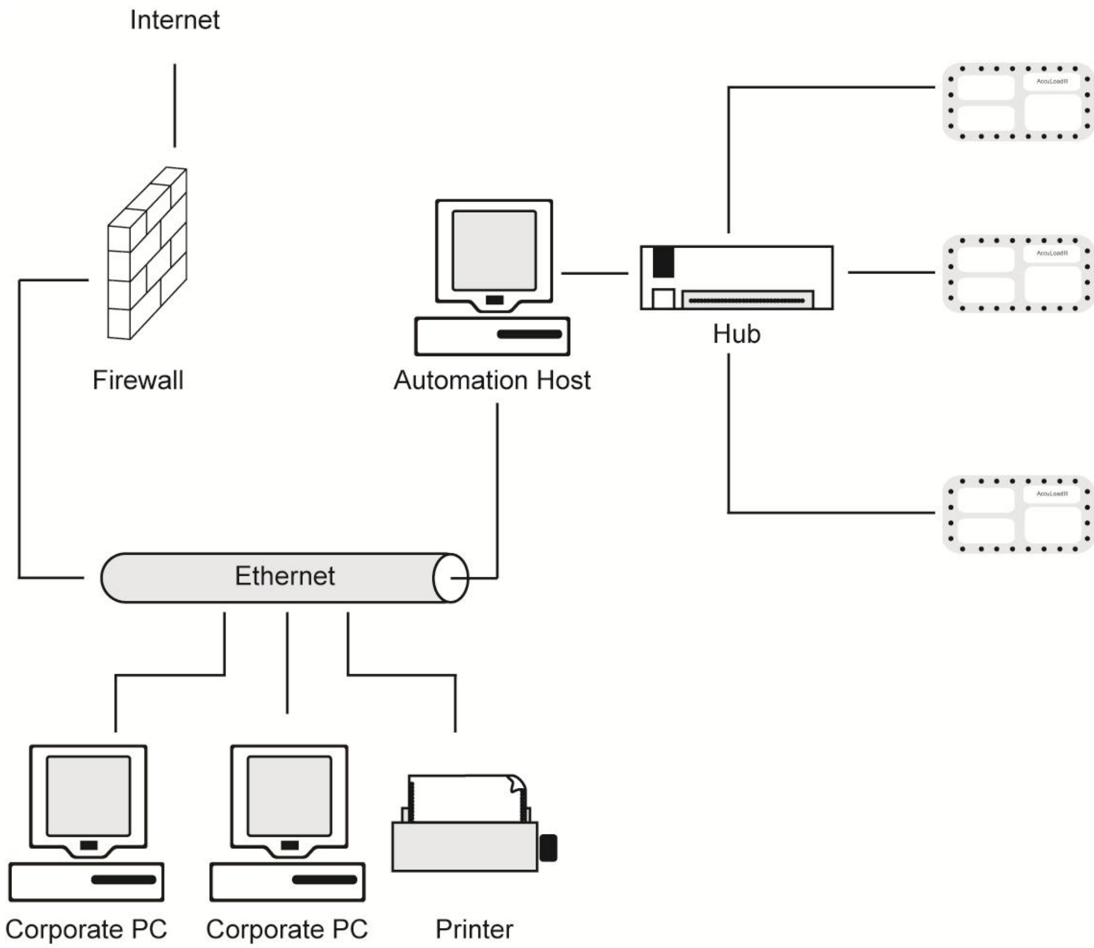


Figure 54. Network configuration for multiple AccuLoads connected via a hub then linked directly to the automation system and LAN.

Refer to the standards IEEE 802.X states for wiring and using Ethernet connectivity rules and regulations. Utilize standard IT practices and protocol when connecting several AccuLoads to any type of hub, router, or switching device. There are various connectivity configurations and the responsibility of each configuration is left to each individual. Distances, transmission time, etc. will all follow the standard IEEE spec rating. If there are any questions regarding installation of multiple AccuLoads over Ethernet communications, please consult the factory.

Employ the standard CAT 5 Cable, used for connecting an AccuLoad to any router, switch, or hub.

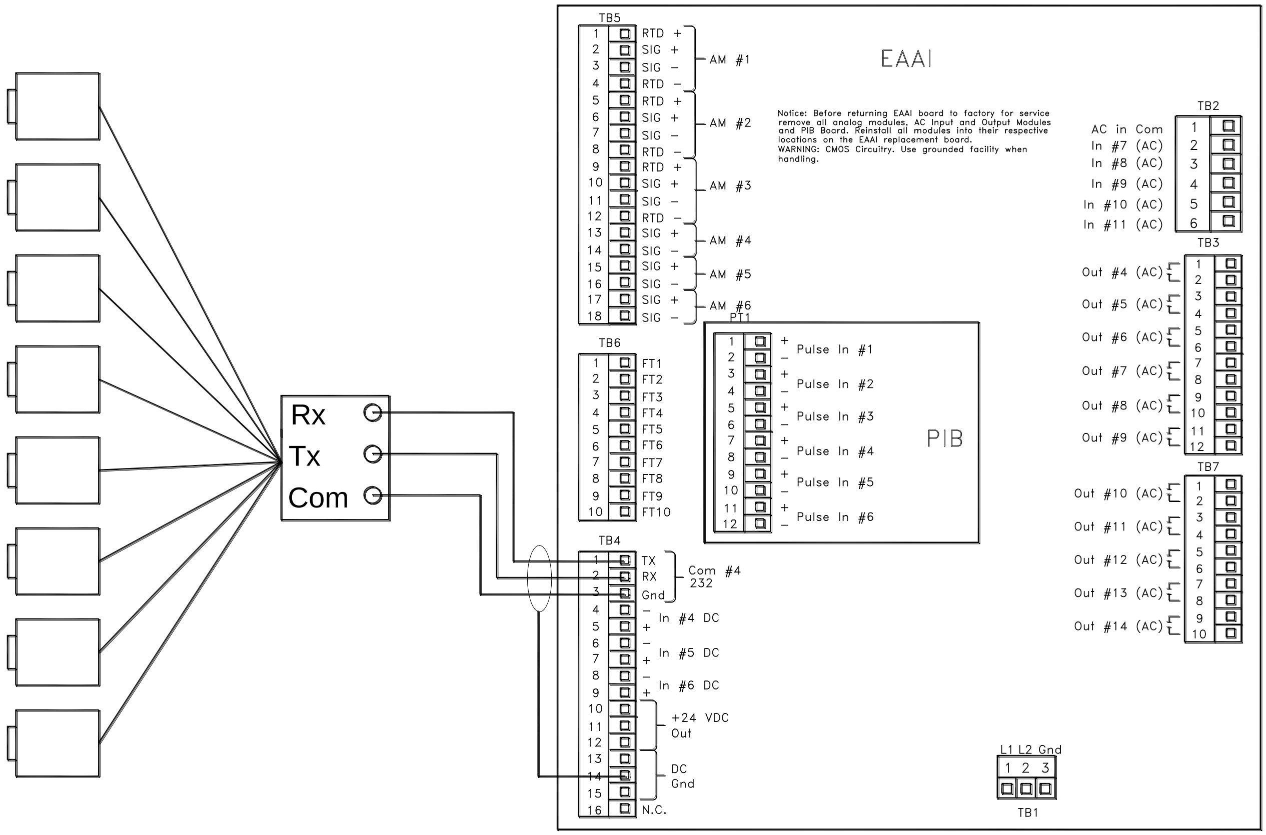


Figure **55**. Lubrizol EIA-232 Communications (One Board Set)

Caution: Each board set should be handled individually and contains its own “unique” 24v DC power supply. All external devices such as pulse transmitters, RTD’s, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

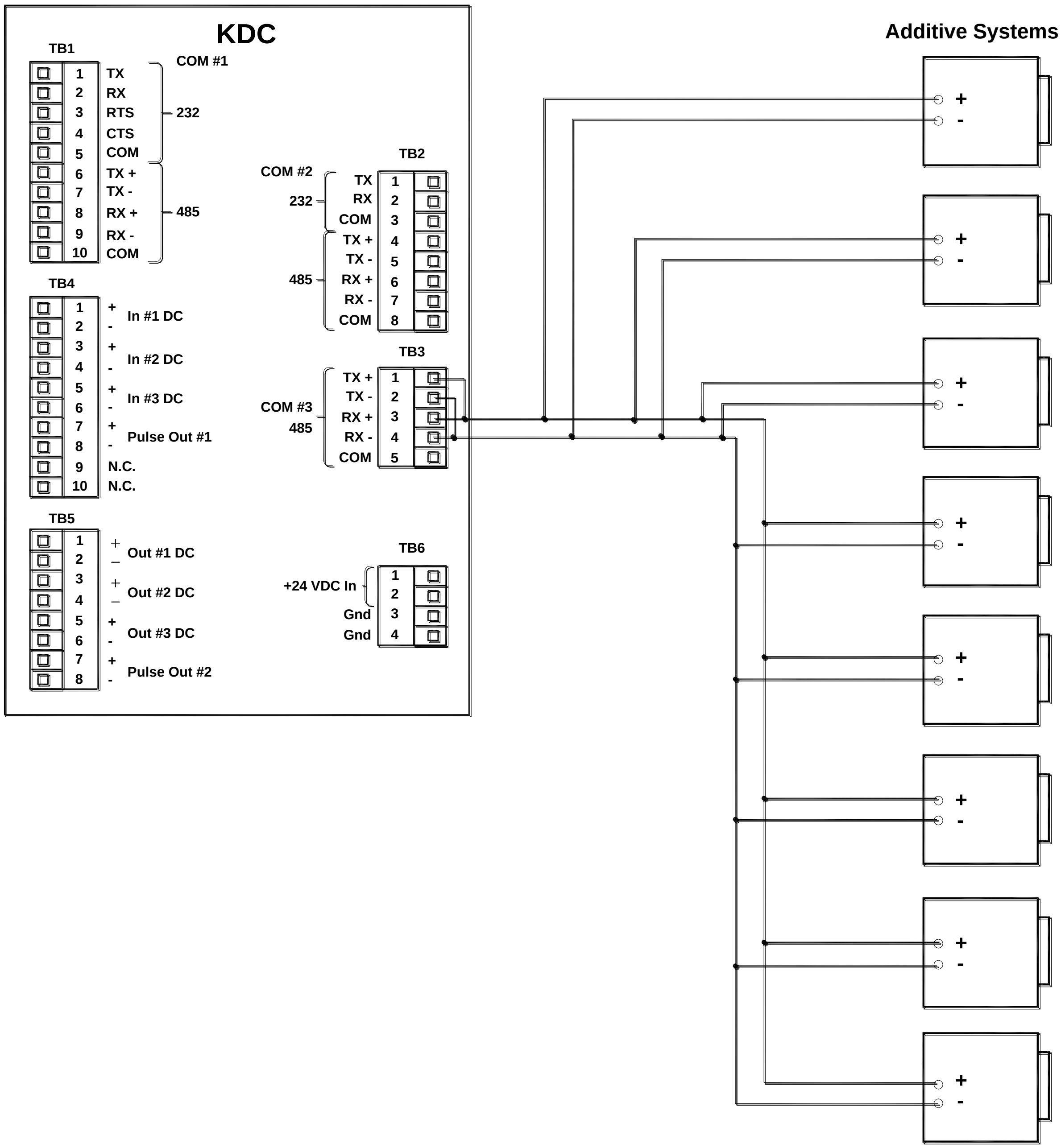


Figure 56. Lubrizol EIA-485 (Two-Wire) Communications (One Board Set)

Caution: Each board set should be handled individually and contains its own "unique" 24v DC power supply. All external devices such as pulse transmitters, RTD's, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

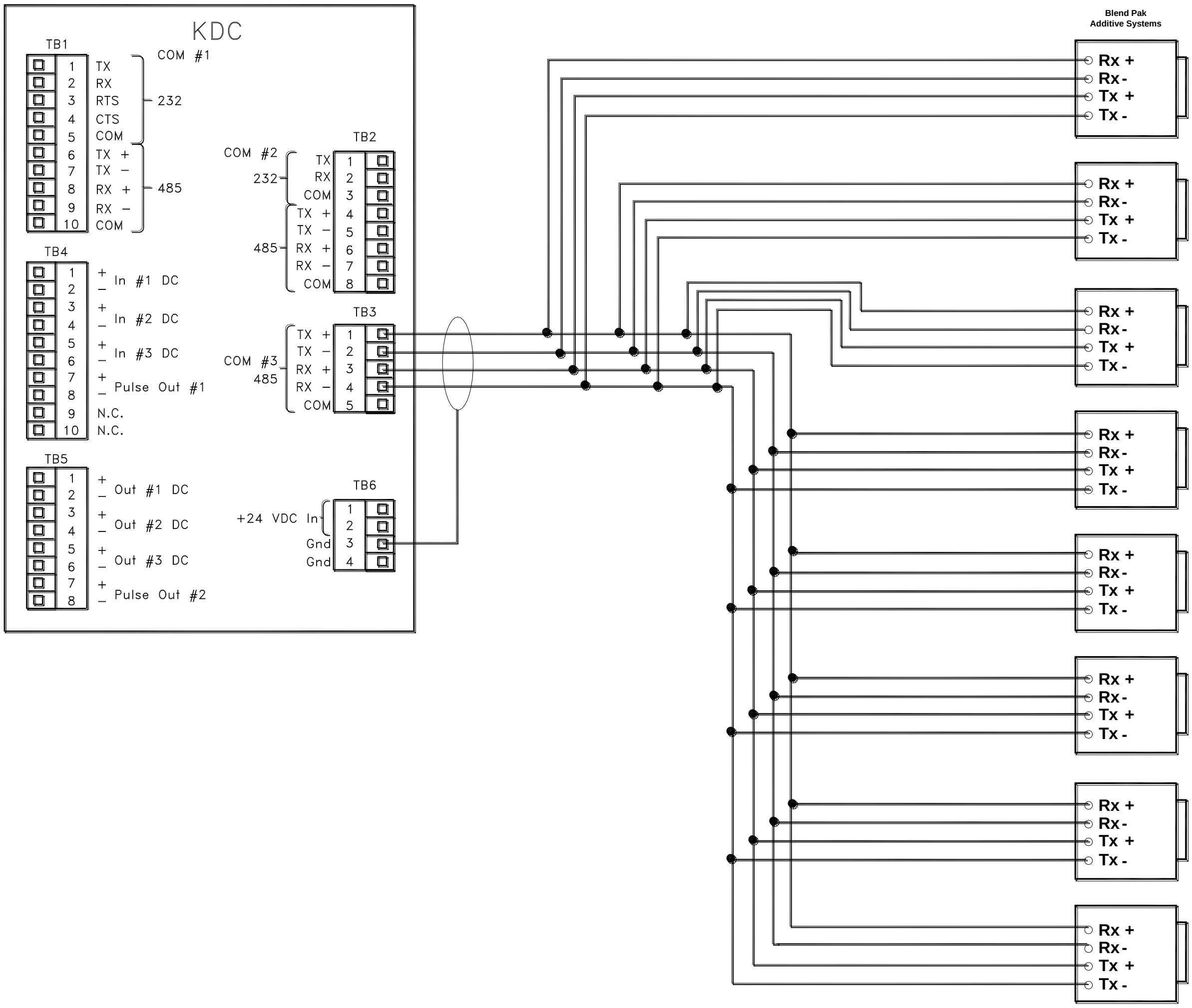


Figure 57. EIA-485 (Four-Wire) Additive Communication (Lubrizol Blend-Pak) (One Board Set)

Caution: Each board set should be handled individually and contains its own "unique" 24v DC power supply. All external devices such as pulse transmitters, RTD's, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

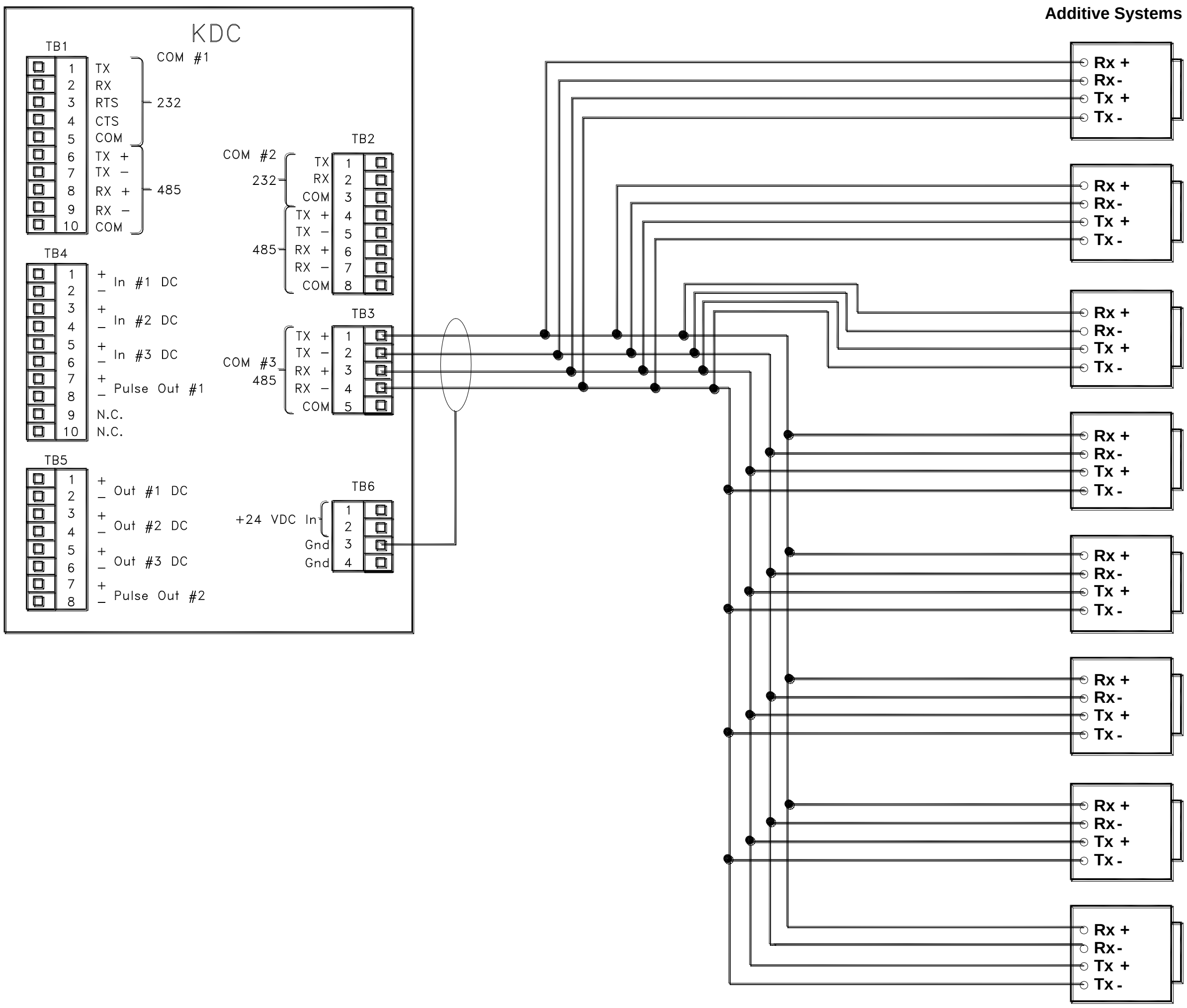


Figure 58. EIA-485 (Four-Wire) Additive Communication (Titan Pac3) (One Board Set)

Caution: Each board set should be handled individually and contains its own “unique” 24v DC power supply. All external devices such as pulse transmitters, RTD’s, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

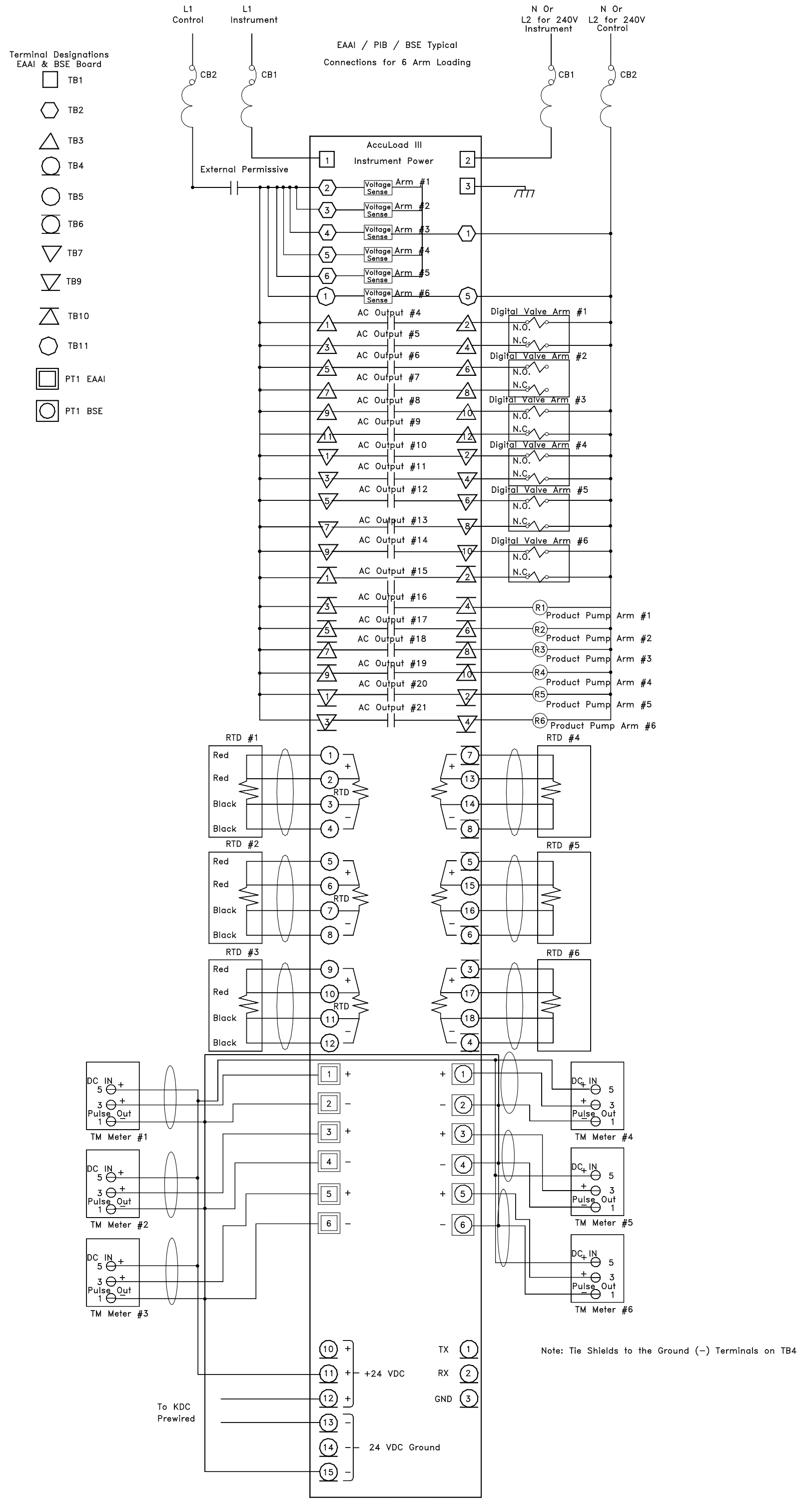


Figure 59. Typical Six-Arm Straight Product Loading (One Board Set)

Caution: Each board set should be handled individually and contains its own “unique” 24v DC power supply. All external devices such as pulse transmitters, RTD’s, 4-20mA devices and communication wiring that interface with a board set MUST be powered by the +24VDC supplied by that board set and all the grounds including shield wires must be connected/isolated to that board set, including the associated +24VDC distribution block. A sharing of power supplies and grounding between board sets can cause ground loops leading to communication problems, external device issues and instability of the DC power supply output from the EAAI board.

Optional AICB Board (Additive Inputs/Outputs) (Per Board Set)

Terminal connections for the optional AICB board are shown in Figure . Metered Additive Pulses 1 through 4 are wired into the PIB board on the EAAI board. Metered Additives 5 through 24 are wired to the AICB board(s). Connections are shown in the table below.

Meter Pulses (Optional AICB)				
Injector #		**Metered Additive Pulses**		
ALIII-SA Hardware	**Terminal Block**	**+ Voltage**	**Signal**	**Common**
5	TB5	1	2	3
6	TB5	4	5	6
7	TB5, TB4	7 (TB5)	8 (TB5)	1 (TB4)
8	TB4	2	3	4
9	TB4	5	6	7
10	TB4	8	9	10
11	TB3	1	2	3
12	TB3	4	5	6
13	TB3	7	8	9
14	TB3	10	11	12

Table 16. Meter Pulses

Additive Pumps 1 through 4 are wired to the programmed terminals on the EAAI board. Additive Pumps 5 through 24 are wired per the following table. Terminals are automatically assigned as additive pumps if metered injectors are programmed in the AccuLoad.

Additive Pumps (Optional AICB)		
Additive Pump #		
ALIII-SA Hardware	**Terminal +V**	**Terminal Block**
5	10	TB8
6	8	TB8
7	6	TB8
8	4	TB8
9	2	TB8
10	10	TB7
11	8	TB7
12	6	TB7
13	4	TB7
14	2	TB7

Table 17. Additive Pumps

Additive Solenoids 1 through 4 are wired to the programmed terminals on the EAAI board. Additive Solenoids 5 through 24 are wired per the following table. Terminals are automatically assigned as additive solenoids if metered injectors are programmed in the AccuLoad.

Additive Solenoids (Optional AICB)		
Additive Solenoid #		
ALIII-SA Hardware	**Terminal +V**	**Terminal Block**
5	9	TB8
6	7	TB8
7	5	TB8
8	3	TB8
9	1	TB8
10	9	TB7
11	7	TB7
12	5	TB7
13	3	TB7
14	1	TB7

Table 18. Additive Solenoids

Communications (AICB Boards)

Communications				
Type	**Function**	**Terminal**	**Jumpers**	
			CN4	**CN5**
EIA - 232	TX	TB2 (4)	1-2 Out 3-4 Out 5-6 In	1-2 Out 3-4 Out
EIA – 232	RX	TB2 (2)		
EIA – 232	Com	TB1 (2)		
EIA - 485	RX+	TB2 (1)	1-2 Out 3-4 Out 5-6 Out	1-2 In 3-4 In
EIA - 485	RX-	TB2 (2)		
EIA - 485	TX+	TB2 (3)		
EIA - 485	TX-	TB2 (4)		

Table 19. Communications

Jumper Locations (AICB Board)

Transmitter Power			
Designation	**Jumpers**	**Factory Default**	**Description**
CN2	1 – 2	In	24V – +V Out
CN2	3 – 4	Out	12V – +V Out
CN2	5 – 6	In	5V – +V Out
Communications			
Address	**Jumpers**	**Factory Default**	**Communications**
CN4	1 – 2	Out	In Address 200, Out Address 100*
CN4	3 – 4	Out	In 9600 Baud, Out 38.4K Baud
CN4	5 – 6	In	In 232 Communications, Out 485 Communications
Last Unit Only (Termination of Communications with AccuLoad)			
Address	**Jumpers**	**Factory Default**	**Communications**
CN5	1 – 2	Out	In EIA 485, Out EIA 232
CN5	3 – 4	Out	In EIA 485, Out EIA 232

Table 20 Jumper Locations

***Note:** *For Additives 5 through 14 on the ALIII-SA hardware, jumper must be out (Address 100), 15 through 24 Address 200.*
Note: *Jumpers CN1 and CN3 for factory use only.*

Optional AICB Board (General Purpose Inputs/Outputs)			
DC Inputs (Optional AICB)			
Input #	**Terminal Block**	**Signal**	**Common**
24	TB5	2	3
25	TB5	5	6
26	TB5/TB4	8 (TB5)	1 (TB4)
27	TB4	3	4
28	TB4	6	7
29	TB4	9	10
30	TB3	2	3
31	TB3	5	6
32	TB3	8	9
33	TB3	11	12

Table 21. Optional AICB Board

AC Outputs (Optional AICB Board)		
Output #	**Terminal +V**	**Terminal Block**
39	10	TB8
40	9	TB8
41	8	TB8
42	7	TB8
43	6	TB8
44	5	TB8
45	4	TB8
46	3	TB8
47	2	TB8
48	1	TB8
49	10	TB7
50	9	TB7
51	8	TB7
52	7	TB7
53	6	TB7
54	5	TB7
55	4	TB7
56	3	TB7
57	2	TB7
58	1	TB7

Table 22. AC Outputs

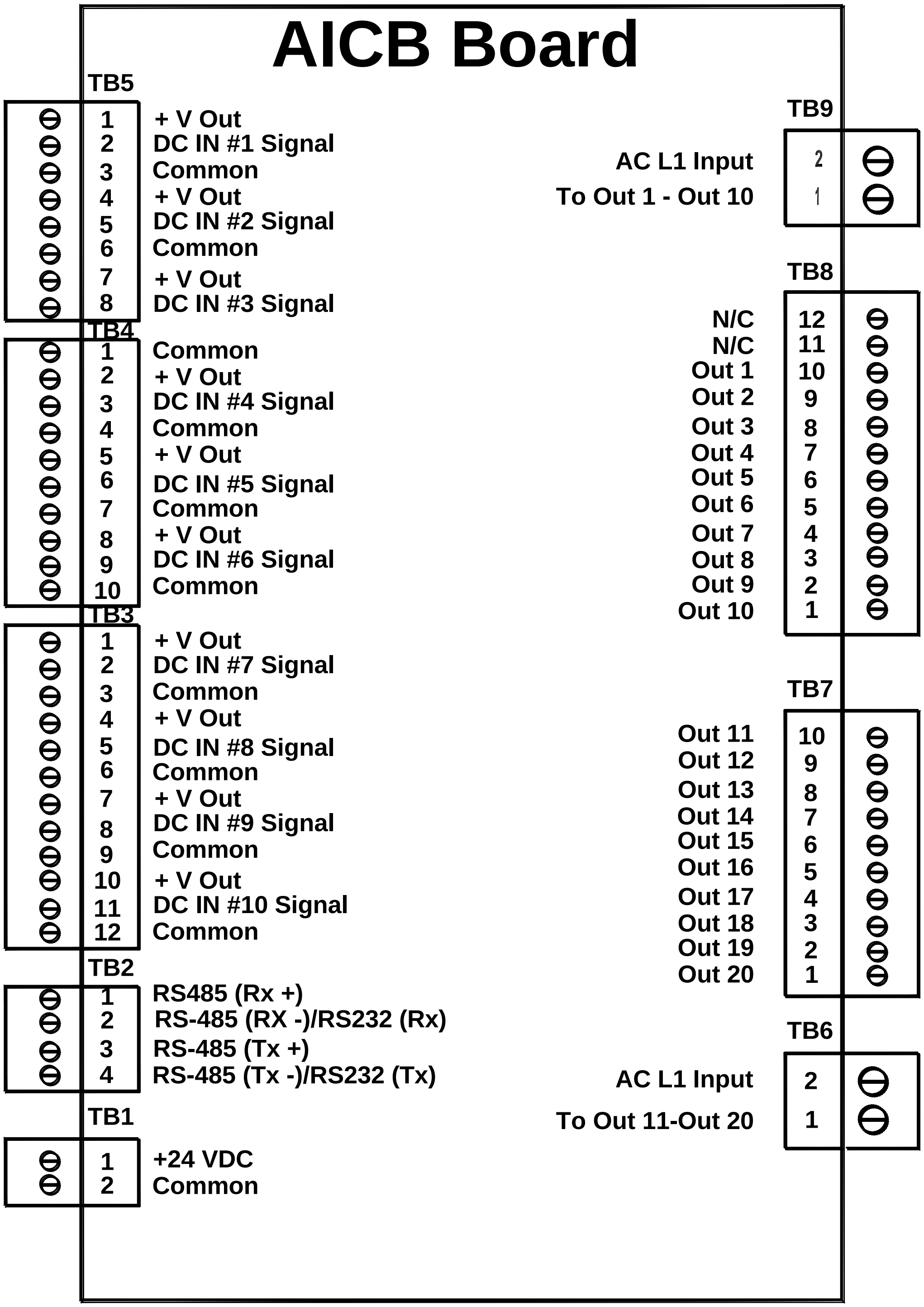


Figure 60. Optional AICB Board

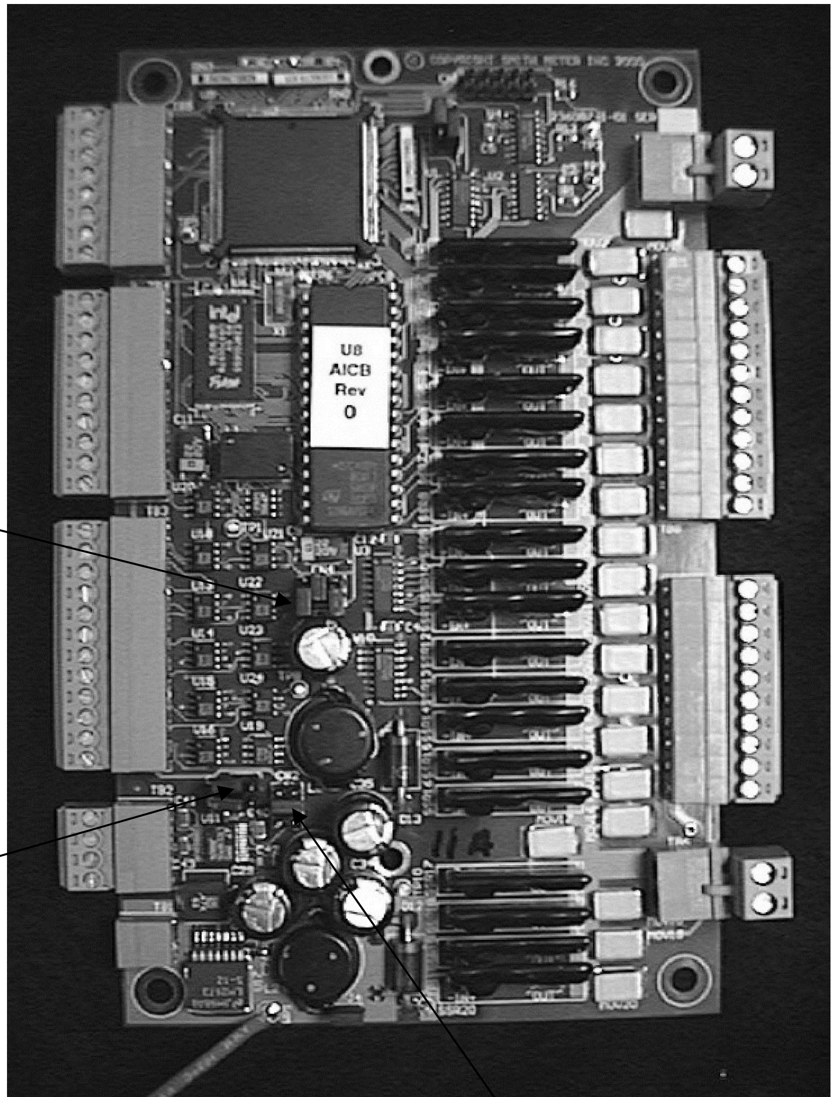


Figure 61. AICB Jumper Locations

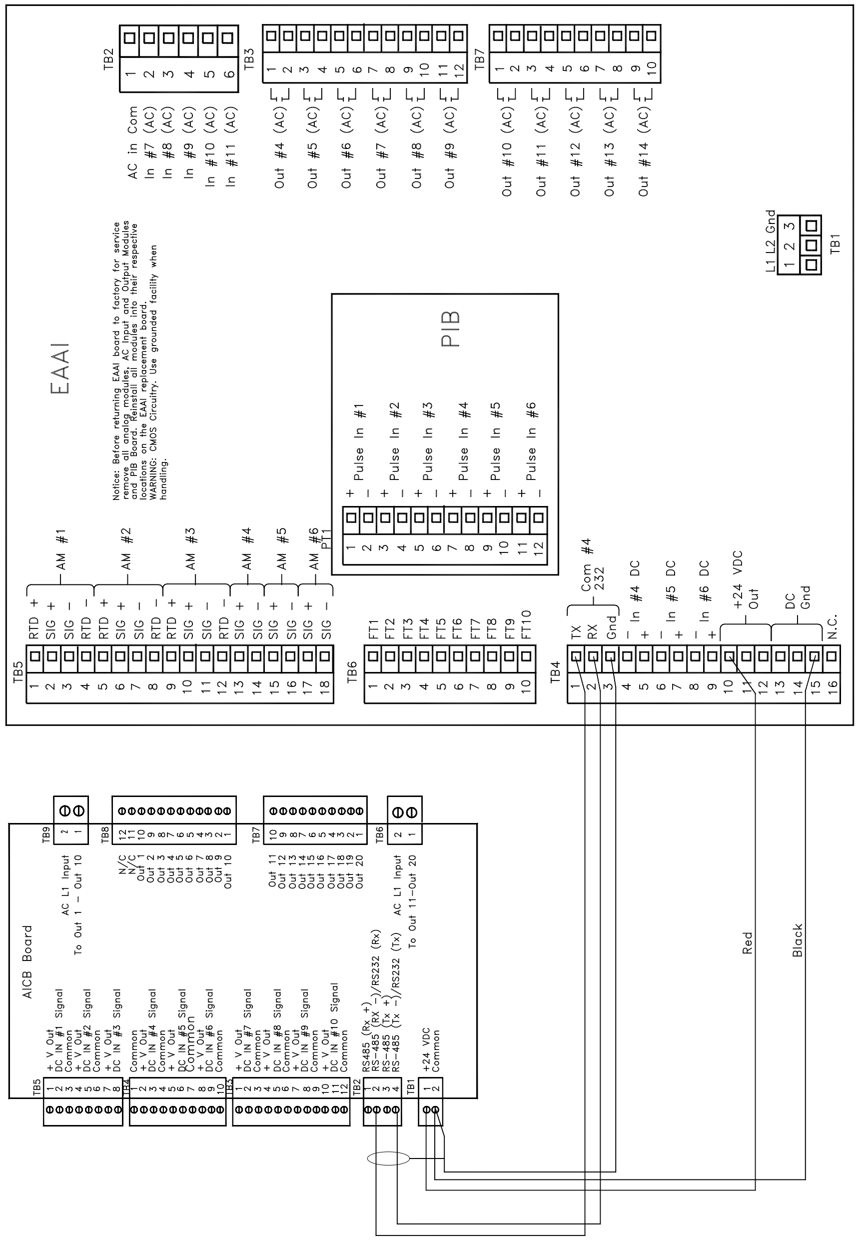


Figure 62. AICB Communications and DC Power

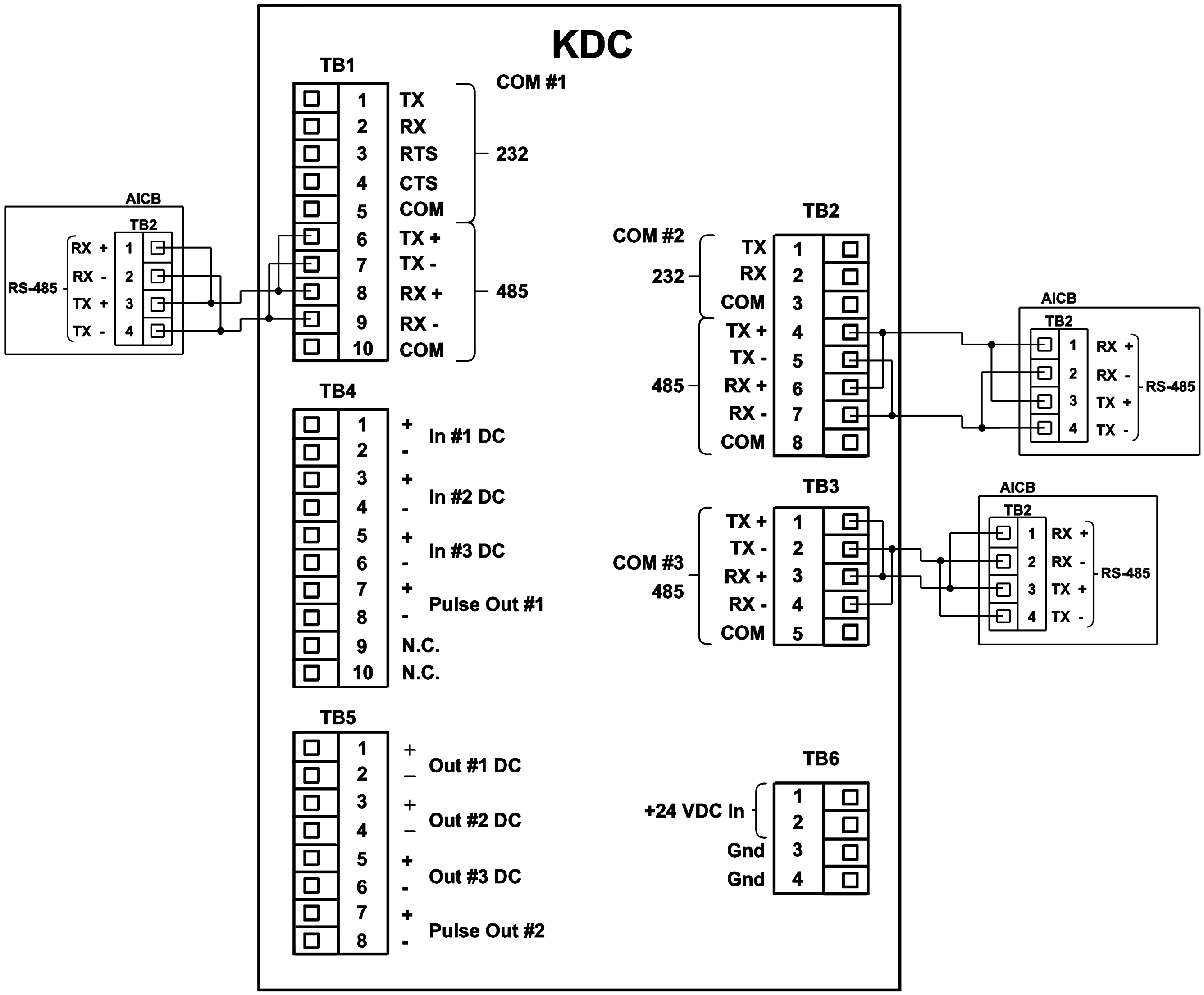
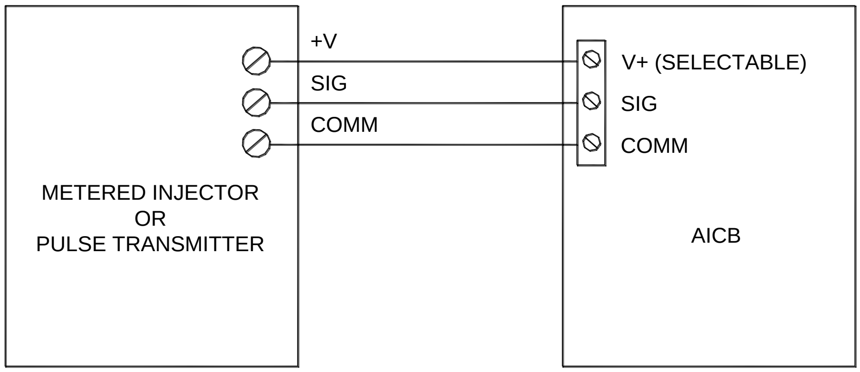


Figure 61 AICB Communications (Two-wire RS 485)

Figure 63. AICB Communications (Two-wire RS-485)

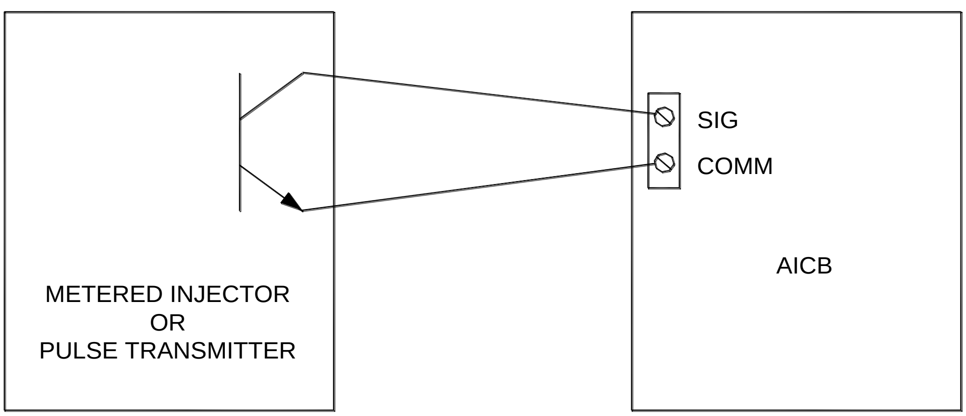
Digital Inputs – AICB



Monoblock Additive Meter

Figure 64. Metered Injector / Pulse Transmitter Wiring Diagram

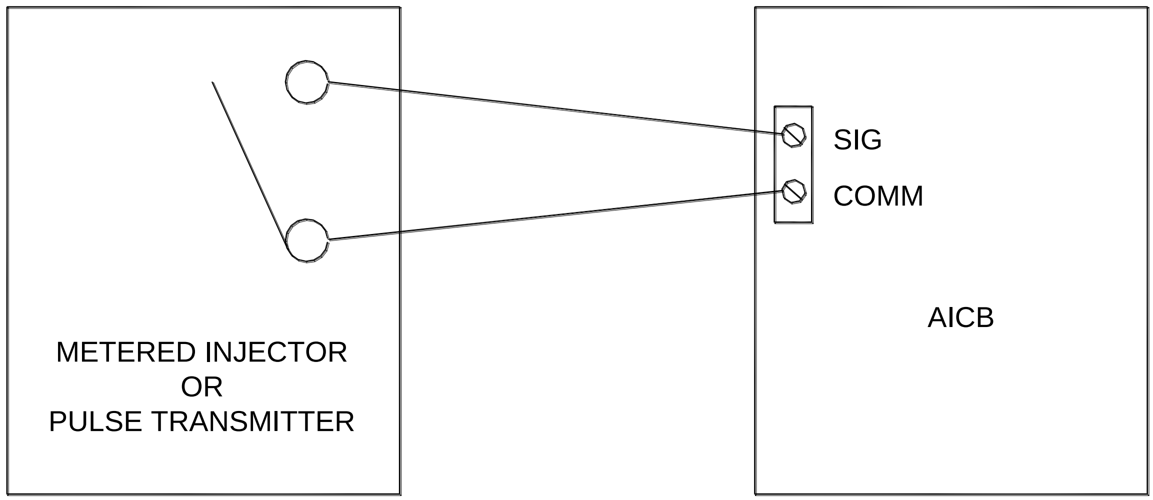
Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.



Monoblock Additive Meter

Figure 65. Metered Injector / Open Collector Wiring Diagram

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.



Monoblock Additive Meter

Figure 66. Metered Injector / Contact Closure Wiring Diagram

Caution: For clarity, shields not shown. Connect shields to Terminals 3, 13, 14, or 15 of Terminal Block 4.

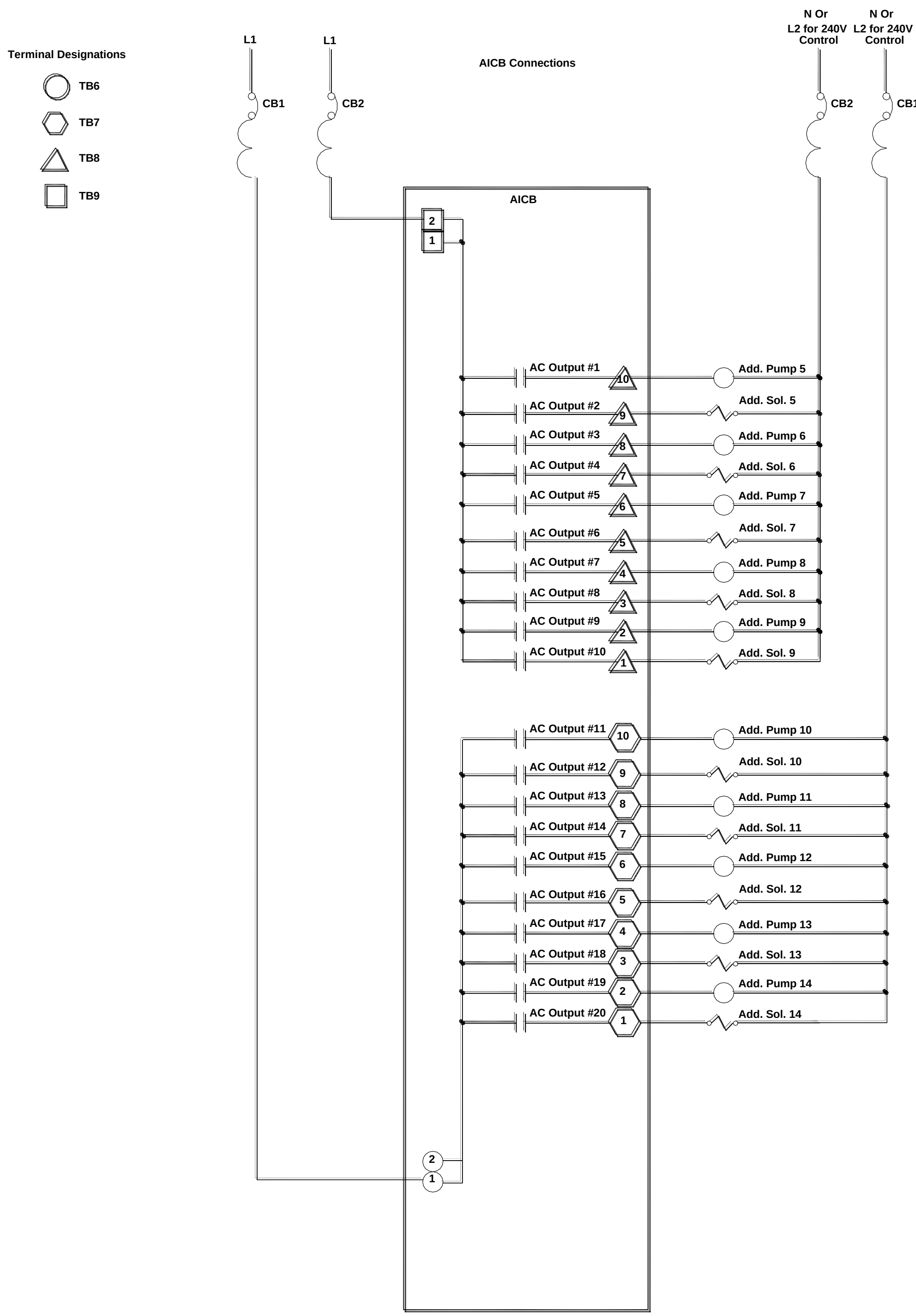


Figure 67. AICB Additive Outputs

Note: *ALIII-SA Hardware Additive Pumps start at 5 and go through 14, as do the additive solenoid*

Specifications (AccuLoad III)

Accuracy

Calculated Accuracy: The gross at standard temperature and pressure to gross volume ratio, excluding the accuracy of fluid temperature measurement, will exactly match the proper volume correction factor of ASTM-D-1250 (May 2004) over the fluid temperature range of -40°F to 572°F (-40°C to 300°C).

Temperature Measurement Accuracy: Fluid temperature is measured to within ±0.72°F (±0.4°C) over the fluid temperature range of -148°F to 572°F (-100°C to 300°C). Fluid temperature is measured to within ±0.45°F (±0.25°C) over the fluid temperature range of 32°F to 572°F (0°C to 300°C).

Stability: 0.1°F (0.06°C)/year.

Flow Totalizing: Within one pulse of input frequency.

Weight

AccuLoad III-MMI: Approximately 35 lb (15.90 kg).
AccuLoad III-FCM: Approximately 120 lb (54.54 kg).

Electrical Inputs (Per Board Set)

AC Instrument Power:

Universal input 100 to 240 Vac, 58W maximum, 48 to 63 Hz. The AC circuitry is fuse-protected.

Surge Current: 28A maximum for less than 0.1 seconds.

Power Interruption Tolerance: Interruption of power greater than .05 seconds (typical) will cause an orderly shut-down of the AccuLoad and the control valve will be immediately signaled to close.

Note: *A constant voltage transformer (CVT) is recommended if the available AC power is suspected not to comply with these specifications.*

Pulse Input:

Type: High-speed, edge-triggered, optically isolated pulse transmitter input. The input pulse must rise above V (high min.) for a period of time and then fall below V (low) to be recognized as a pulse by AccuLoad III.

V (High): 5 Vdc minimum to 28 Vdc maximum.

V (Low): 1 Vdc maximum.

Input Impedance: 1.8 KΩ

Pulse Resolution: 1 pulse/unit minimum, 9,999 pulses/unit maximum.

Frequency Range: 0 to 10.0 kHz.

Response: Within one pulse to a step change in flow rate.

Mode: Single, dual, dual with power sensing, density.

Duty Cycle: 35/65 to 65/35 (on/off).

Temperature Probe:

Type: Four-wire, 100 Ω Platinum Resistance Temperature Detector (PRTD).

Temperature Coefficient: @ 32°F: 0.00214 Ω/Ω/°F (0.00385 Ω/Ω/°C).

Temperature Range: -148°F to 572°F (-100°C to 300°C).

Offset: Temperature probe offset is program-adjustable through the AccuLoad keypad in ±0.1 degree increments in the unit of temperature measurement used.

Self-calibrating: Lead length compensation that requires no resistance balancing of leads.

Analog (4-20mA):

Type: Two-wire, 4-20mA current loop receiver, isolated from ground, programmable as to function.

Span Adjustment: Program-adjustable through the AccuLoad keypad or communication in tenths of the unit used.

Input Burden: 50 Ω.

Accuracy: ±0.025% of range.

Resolution: One part in 65,536.

Voltage Drop: 2 Volts maximum.

Sampling Rate: One sample/300 mSec minimum.

Analog (1-5 Vdc):

Type: Two-wire, 1-5 Vdc voltage loop receiver, isolated from ground, programmable as to function.

Span Adjustment: Program-adjustable through the AccuLoad keypad or communications in tenths of the unit used.

Input Burden: 1 m Ω

Accuracy: ±0.025% of range

Resolution: One part in 65,536.

Sampling Rate: One sample/300 mSec minimum.

AC Inputs:

Type: Optically-isolated, solid-state voltage sensor.

Input Voltage Range: 90 to 280 Vac.

Pickup Voltage: 90 Vac minimum.

Drop-out Voltage: 30 Vac maximum.

Current at Maximum Voltage: 20mA maximum.

Input Resistance: 44,000 Ω typical.

DC Inputs:
Type: Optically-isolated solid state voltage sensors

Input Voltage Range: 5 to 28 Vdc.

Pickup Voltage: 5 Vdc minimum.

Drop-out Voltage: Less than 1 volt.

Current at Maximum Voltage: 20mA maximum.

Input Level Duration: 120 mSec minimum.

Keypad:
Type: Metal encapsulated, one-piece, sealed, no moving parts, piezoelectric design. Protected against the environment.

Display:
The Graphics Display is a 240 by 64 pixel graphic Liquid Crystal Display (LCD) modules with LED back-lighting.

Electrical Outputs (Per Board Set)

DC Power:
24 Vdc ±10%, 1 A maximum, short circuit protected.

AC Outputs:
Type: Optically-isolated, AC, solid-state relays. User-programmable as to function.

Load Voltage Range: 90 to 280 Vac (rms), 48 to 63 Hz.

Steady-State Load Current Range: 0.05A (rms) minimum to 1.0A (rms) maximum into an inductive load.

Leakage Current at Maximum Voltage Rating: 5.2mA (rms) maximum @ 240 Vac.

On-State Voltage Drop: 2 Vac at maximum load.

DC Outputs:
Type: Optically-isolated solid state output. User-programmable as to function.

Polarity: Programmable (normally open or normally closed).*

Switch Blocking Voltage: 30 Vdc maximum.

Load Current: 150mA maximum with 0.6 volt drop.

Note: **Power-down normally open.*

Analog (4-20mA):
Type: Two-wire, 4-20mA current loop transmitter, isolated from ground, programmable as to function.

Span Adjustment: Program adjustable through the AccuLoad keypad or through communications.

Accuracy: ±0.025% of range.

Resolution: One part in 65,536.

Voltage Burden: 4 volts maximum.

Analog (1-5 Vdc):
Type: Two-wire, 1-5 Vdc voltage loop transmitter, isolated from ground, programmable as to function.

Span Adjustment: Program adjustable through the AccuLoad keypad or through communications.

Accuracy: ±0.025% of range.

Resolution: One part in 65,536.

Pulse Output:
Type: Optically-isolated solid state output. Pulser output units are program-selectable through the AccuLoad keypad or communications.

Polarity: Programmable (normally open or normally closed).

Switch Blocking Voltage (Switch Off): 30 Vdc maximum.

Load Current (Switch On): 10mA with 0.6 volts drop.

Frequency Range: 0 to 3000 Hz.

Duty Cycle: 50/50 (on/off).

Environment

Ambient Operating Temperature
-40°F to 140°F (-40°C to 60°C).

Humidity:
5 to 95% with condensation.

Enclosure:
Industrial type 4X.

Approvals

UL/CUL

Class I, Division 2, Groups C & D; UNL-UL Enclosure 4X, CNL-CSA Enclosure 4.

Class I, Zone 2, Group IIB.

UL/CUL File E23545 (N).

Notes: *The Standard AccuLoad III does not contain intrinsically-safe circuitry; therefore, all peripheral equipment must be suitable for the area in which it is installed.*

When supplied with the optional Civacon Overfill and Grounding Board the AccuLoad III does contain intrinsically safe circuitry. Only the equipment connected to the circuitry is intrinsically safe.

Communications (Per Board Set)

General

Number of Ports: Four.

Configuration: Multi-drop network.

Data Rate: Keypad-selectable to asynchronous data rates of 1,200, 2,400, 3,600, 4,800, 7,200, 9,600, 19,200, or 38,400 bps.

Data Format: Programmable one start bit, programmable seven or eight data bits - even, odd, or no parity, one stop bit.

Line Protocol: Half-duplex, full-duplex, no character echo.

Data Structure: ASCII character-oriented, modeled after ISO Standard 1155.

Protocol: Smith ASCII LRC, Smith ASCII CR, Smith ASCII binary, Modbus.

AccuLoad II Style: Terminal Mode, Minicomputer Mode.

EIA-232 (1 dedicated, 2 selectable)

Type: Interfaceable with EIA-232 data communication standards. Data transmitters are tri-state design.

Typical Applications: Product receipt ticket printing (used with a stand-alone ASCII printer or as a backup in the standby mode with automation for BOL emulation) or communications with Product Management Automation Systems. Up to 16 AccuLoads can be connected onto the same transmit and receive data lines.

EIA-485 (1 dedicated, 2 selectable)

Type: Interfaceable with EIA-485 data communication standards.

Typical Application: Communications with Product Management Automation Systems.

Number of Units per Communication Line: Up to 32 AccuLoads can be connected onto the same transmit and receive data lines.

Specifications (AICB Board - Optional)

Electrical Inputs

DC Instrument Power:

24 Vdc ±10%, 1 watt maximum

Pulse Input:

Type: High-speed, edge-triggered, optically isolated, compatible with contact closure, open collector or voltage sink/source pulse transmitter input. The input pulse must rise above V (high min.) for a period of time and then fall below V (low) to be recognized as a pulse.

V (High): 10 Vdc minimum to 24 Vdc maximum.

V (Low): 8 Vdc maximum.

Pulse Resolution: 1 pulse/unit minimum, 9,999 pulses/unit maximum.

Frequency Range: 0 to 5 kHz.

Response: Within one pulse to a step change in flow rate.

Minimum Pulse Width: 50 uS.

Electrical Outputs

AC Outputs:

Type: Optically-isolated, AC, solid-state relays. User-programmable by the host as to function.

Load Voltage Range: 90 to 275 Vac (rms), 48 to 63 Hz.

Steady-State Load Current Range: 0.05A (rms) minimum to 0.5A (rms) maximum into an inductive load.

Leakage Current at Maximum Voltage Rating: 0.1mA (rms) maximum at 240 Vac.

On-State Voltage Drop: 1.5 Vac at maximum load.

Environment

Ambient Operating Temperature

-40ºF to 140ºF (-40ºC to 60ºC).

Humidity:

5 to 95% with condensation.

Remote Enclosure:

Explosion-proof (NEMA 7, Class I, Groups C and D) and watertight (NEMA 4X), IP65

Approvals (Remote Enclosure)

UL/CUL:

Class I, Division 1, Groups C and D; UNL-UL Enclosure 4X, CNL-CSA Enclosure 4.

Class I, Zone 1, AEx d IIB T6, IP65.

Specifications (Red and Green Indicating Light Units - Optional)

Electrical Ratings

Bulbs:

LED Lamp, 120V AC in Red or Green

Terminals

Saddle clamp type for 1 x 22 AWG

Specifications (Stop Button - Optional)

Electrical Ratings

Contact Block:

A600 (AC): 120V maximum

Make and Emergency Interrupting Capacity (Amps): 60 (120V); 30 (240V)

Normal Load Break (Amps): 6 (120V); 3 (240V)

Thermal Current (Amp): 10

Voltamperes: Maximum Make 7200; Maximum Break 720

Contact Type:

1N0-1NC (Momentary)

Color: Black

Terminals

Stainless steel saddle clamp type for 1 x 18 - 14 AWG (0.75 - 2.5 sq. mm) solid or stranded copper conductor

Section VI – Related Publications

The following literature can be obtained from FMC Measurement Solutions Literature Fulfillment at measurement.fulfillment@fmcti.com or online at www.fmctechnologies.com/measurementsolutions.

When requesting literature from Literature Fulfillment, please reference the appropriate bulletin number and title.

AccuMate for AccuLoad III-SA

Specification ....Bulletin SS06032
Installation/Operation..Bulletin MN06136

AccuLoad III-SA

Specification ....Bulletin SS06039
Operator Reference ....Bulletin MN06139

AccuLoad III-X

Communications ....Bulletin MN06130L
Modbus Communications ....Bulletin MN06131L

Revisions included in MN06140 Issue/Rev. 0.6 (8/15):
Page 3: Updated Pre-Installation Considerations Section: See "Important Electrical Safety Installation Notes.

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