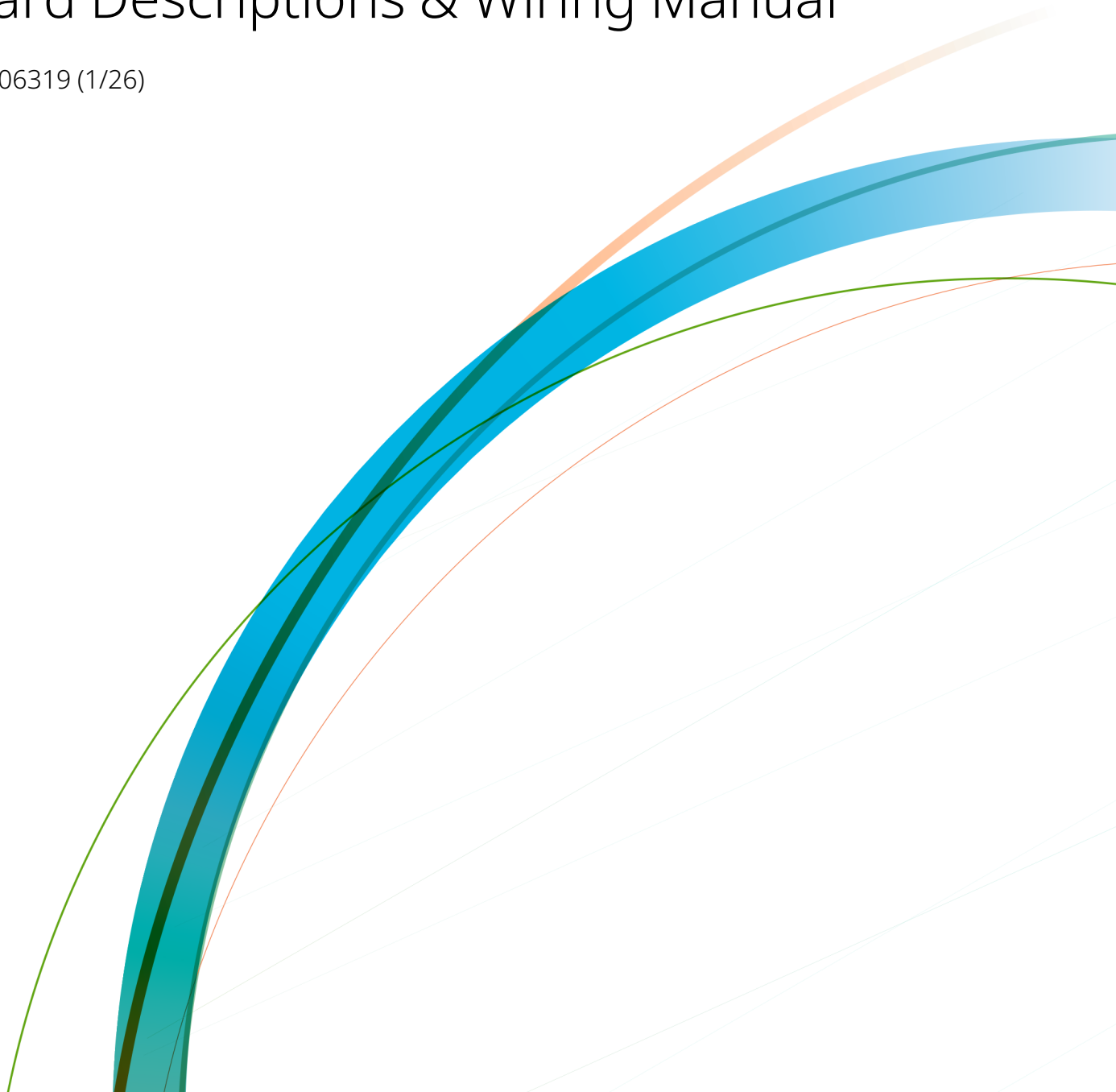
GUIDANT

1010CB Load Computer

Card Descriptions & Wiring Manual

MN06319 (1/26)



Important

All information and technical specifications in this document have been carefully checked and compiled by the author; however, we cannot completely exclude the possibility of errors. Guidant Measurement is always grateful to be informed of any errors; contact us at TechnicalCommunications@GuidantMeasurement.com.

Caution

The default or operating values used in this document and in the configuration parameters of the product described in this document are for factory testing only and should not be construed as default or operating values for your system. Each system is unique and each configuration parameter must be reviewed and programmed for that specific system application.

Disclaimer

Guidant hereby disclaims all responsibility for damages, including but not included to consequential damages arising out of or related to the inputting of incorrect or improper program or default values entered in connection with the product described in this document.

Technical Support

Field Service Response Center

24/7 Technical Support/Schedule a Technician: +1 844.203.4014
System installation supervision, startup, and commissioning services are available.

Customer Support

Erie Customer Service

Guidant Measurement
1602 Wagner Avenue
Erie, PA 16510 USA
+1 814.898.5000
MS.ResponseCenter@GuidantMeasurement.com

Ellerbek Customer Service

Guidant Measurement
Smith Meter GmbH
Regentstrasse 1 25474 Ellerbek, Germany
P.O. Box 1164 25470 Ellerbek, Germany
+49 4101 304-0
ResponseCenter.MS@GuidantMeasurement.com

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Contents

1 Card Descriptions & Terminal Layouts

The terminal layouts in this document show a typical 4-arm configuration. Where the number of arms is less than 4 ignore the arm connections on the terminal diagrams that relate to the arms not being used.

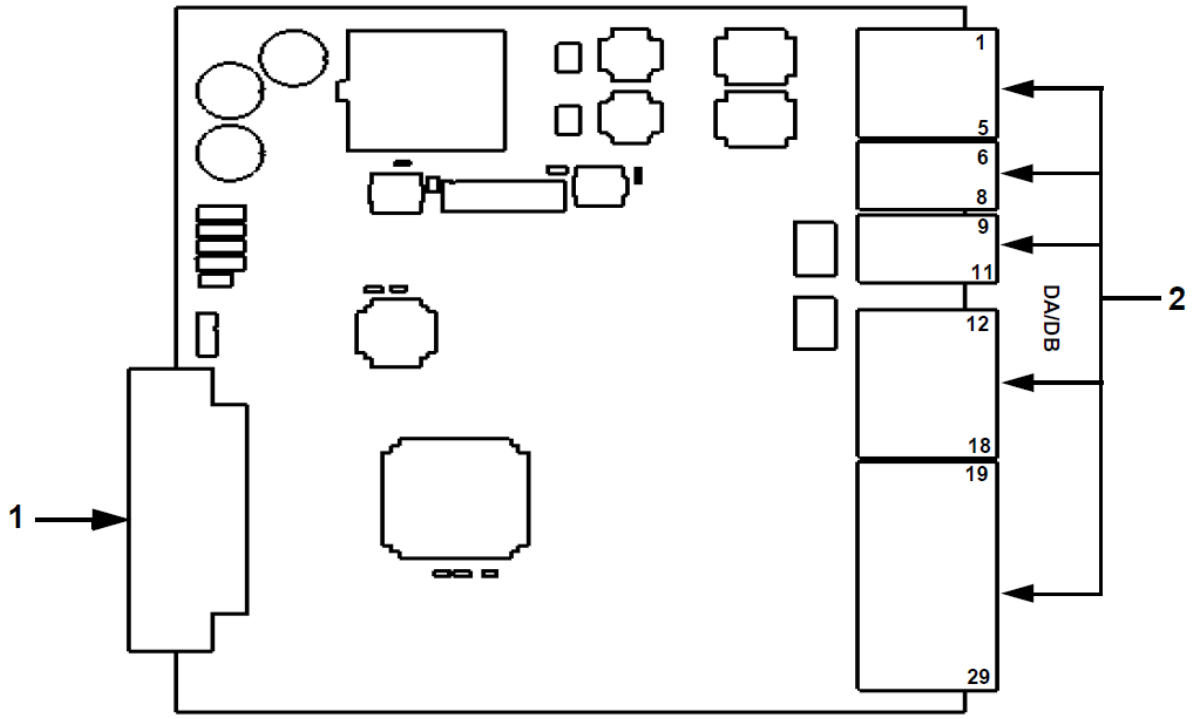
1.1 CPU Card - S10CPU-xxx-I3

1.1.1 Card Description

This CPU card is designed to work in the 1010 C series of loading instruments. The 1010 C series instruments feature a large graphics display, battery backed real time clock, and non-volatile flash memory, which is used to store all configuration and transaction data.

The card has three isolated serial communication ports and two isolated Ethernet 10/100 TCP/IP Port, which can be set up through software via configuration settings.

- Port 1: Isolated Ethernet 10/100 TCP/IP Port (standard)
- Port 2: Isolated Ethernet 10/100 TCP/IP Port (standard)
- Port 3: Isolated RS485/232 (standard)
- Port 4: Isolated RS485 (standard)
- Port 5: Isolated RS485 (standard)



Item	Description
1	Motherboard connector
2	Wiring terminals

The card also has inputs that are software selectable for the following:

- Touch Key (2 key inputs) using MTL zener barrier
- Touch Key (2 key inputs) without barrier
- Two logic inputs
- Touch Key via MTL zener barrier and one logic input
- Touch Key without barrier and one logic input
- 4 x 4-20mA inputs, which can be used for pressure or density
- 3 x flow meter inputs, which can be used for additives (dual inputs on each channel)
- 12 x general purpose inputs

1.1.2 Replacement Batteries

Use only 3 volt lithium batteries, size CR2032.

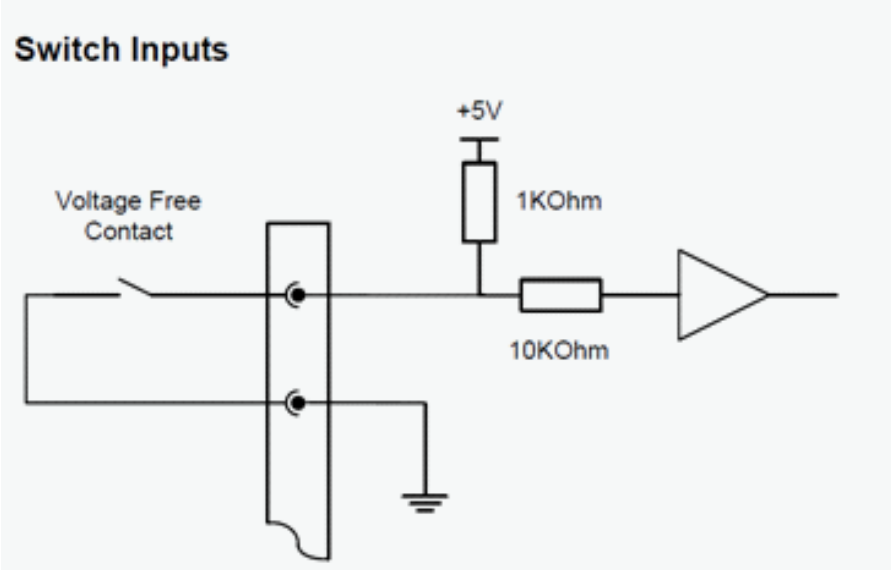
1.1.3 Terminal Descriptions

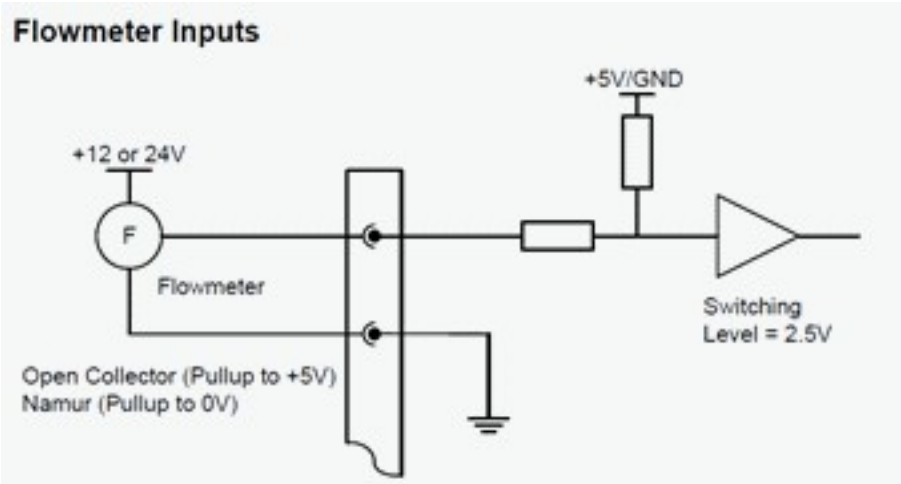
ETH 0V Common -	DB1	DA1	- ETH 0V Common
Port 2 ETH_TXP -	DB2	DA2	- Port 1 ETH_TXP
Port 2 ETH_TXN -	DB3	DA3	- Port 1 ETH_TXN
Port 2 ETH_RXN -	DB4	DA4	- Port 1 ETH_RXN
Port 2 ETH_RXP -	DB5	DA5	- Port 1 ETH_RXP
Port 1 A RS485 -	DB6	DA6	- Port 1 Tx RS232
Port 1 B RS485 -	DB7	DA7	- Port 1 Rx RS232
Port 1 0V Common-	DB8	DA8	- Port 1 0V Common
Port 3 A RS485 -	DB9	DA9	- Port 2 A RS485
Port 3 B RS485 -	DB10	DA10	- Port 2 B RS485
Port 3 0V Common -	DB11	DA11	- Port 2 0V Common
Signal Ground -	DB12	DA12	- Signal Ground
GP Input 23 -	DB13	DA13	- GP Input 17
GP Input 24 -	DB14	DA14	- GP Input 18
GP Input 25 -	DB15	DA15	- GP Input 19
GP Input 26 -	DB16	DA16	- GP Input 20
GP Input 27 -	DB17	DA17	- GP Input 21
GP Input 28 -	DB18	DA18	- GP Input 22
Signal Ground -	DB19	DA19	- Signal Ground
Card Int/Touch Key#1/In #1 -	DB20	DA20	- +5V to Reader
Card Data/Touch Key#2/In #2 -	DB21	DA21	- Signal Ground (Flow)/4-20mA(-)
Card Present -	DB22	DA22	- Flow Input Meter 5A
Signal Ground (Flow)/4-20mA(-) -	DB23	DA23	- Flow Input Meter 5B
Flow Input Meter 7A -	DB24	DA24	- Flow Input Meter 6A
Flow Input Meter 7B -	DB25	DA25	- Flow Input Meter 6B
Signal Ground (Flow)/4-20mA(-) -	DB26	DA26	- Signal Ground (Flow)/4-20mA(-)
4-20mA 11 (+) -	DB27	DA27	- 4-20mA 9 (+)
4-20mA 12 (+) -	DB28	DA28	- 4-20mA 10 (+)
4-20mA Channel 1 V+ -	DB29	DA29	- 4-20mA Channel 1 Iout

NOTES:

- Flow inputs provide for dual pulse signals from each flow meter as a pulse integrity check of the flow signal. Flow meter 5 therefore has two inputs, 5A and 5B.
- All switch inputs on DA12 to DA18 and DB12 to DB18 must be voltage-free switch contacts from a relay or switch.
- All inputs must be shielded. Connect only one end of the cable shield to chassis earth unless the equipotential bonding is reliable and there is no potential difference between both ends of the cable.
- Unused flow meter channels can be used for the internal additive feature that allow 2 injectors per flowmeter channel.
- GP Inputs 17 through 28 are configurable to any function of either permissive, system input or arm input.

- Flow inputs provide for dual pulse signals from each flow meter as a pulse integrity check of the flow signal. Flow meter 5 therefore has two inputs, 5A and 5B.
- All switch inputs on DA12 to DA18 and DB12 to DB18 must be voltage-free switch contacts from a relay or switch.
- All inputs must be shielded. Connect only one end of the cable shield to chassis earth unless the equipotential bonding is reliable and there is no potential difference between both ends of the cable.
- Unused flow meter channels can be used for the internal additive feature that allow 2 injectors per flowmeter channel.
- GP Inputs 17 through 28 are configurable to any function of either permissive, system input or arm input.





1.2 Input Card - S10NA

1.2.1 Card Description

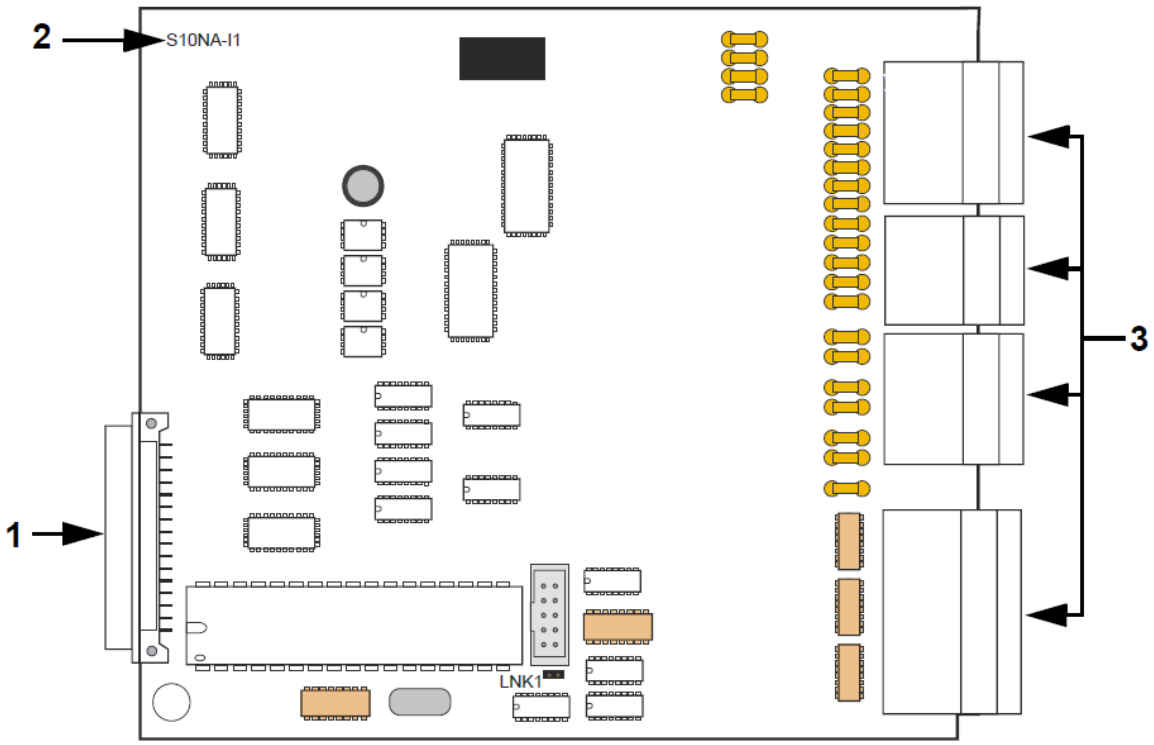
The S10NA is a general purpose input card designed for 1 to 4 arm systems. This is a general purpose input card and is composed of the following input functions:

- 4 x RTD/4-20 mA temperature inputs
- 4 x 4-20 mA inputs, which can be used for pressure or density

- 4 x flow meter inputs (dual inputs on each channel)
- 16 x general purpose inputs

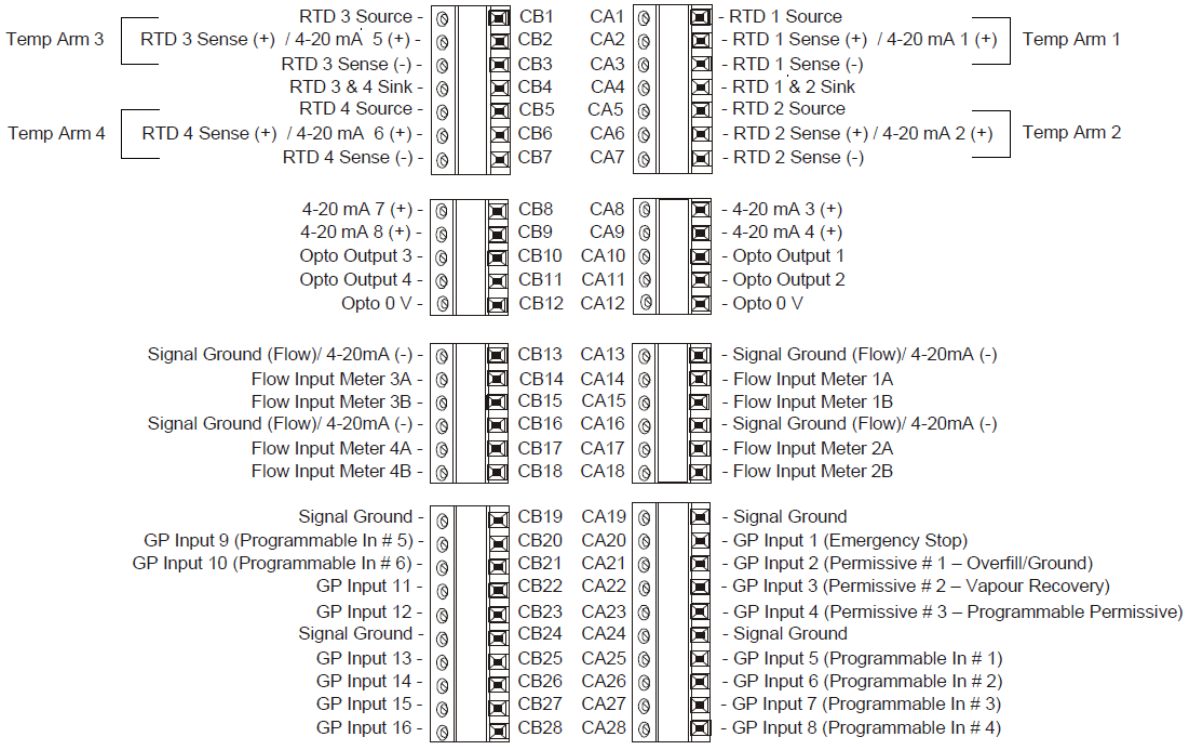
Each input has transient protection.

- An unscaled opto output is coupled to the “A” side of the flowmeter input circuitry to retransmit the flow signal. This output can be used for proving or for driving additional registers.



Item	Description
1	Motherboard connector
2	Part and Issue numbers
3	Wiring terminals

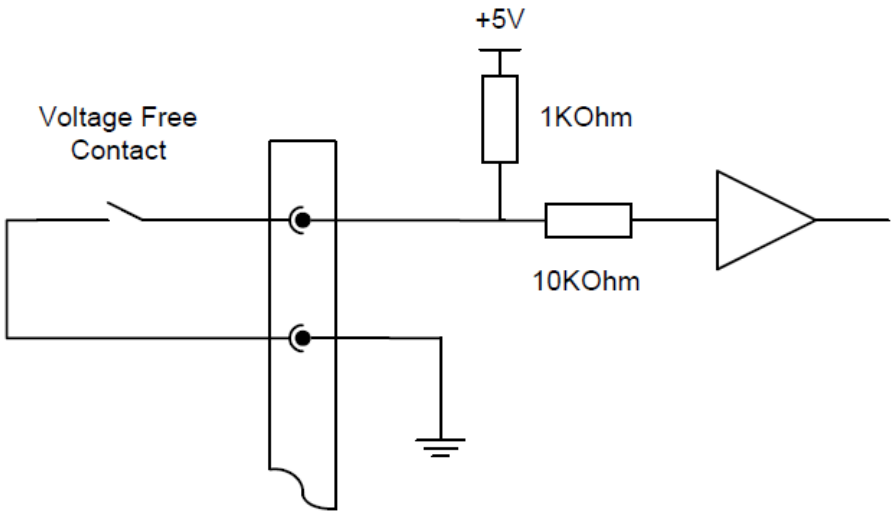
1.2.2 Terminal Descriptions



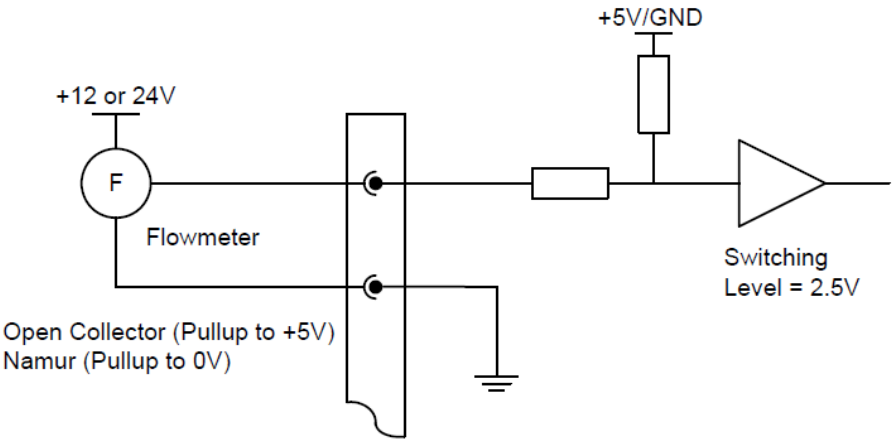
NOTES:

1. Flow inputs provide for dual pulse signals from each flow meter as a pulse integrity check of the flow signal. Flow meter 1 therefore has two inputs, 1A and 1B.
2. Temperature inputs share a common ground.
3. All switch inputs on CA20 to CA28 must be voltage-free switch contacts from a relay or switch.
4. All inputs must be shielded. Connect only one end of the cable shield to chassis earth unless the equipotential bonding is reliable and there is no potential difference between both ends of the cable.
5. Unused flow meter channels can be used for the internal additive feature that allow 2 injectors per flowmeter channel.
6. GP Inputs 2 through 16 are configurable to any function of either permissive, system input or arm input. Defaults are shown in brackets above.

1.2.3 Switch Inputs

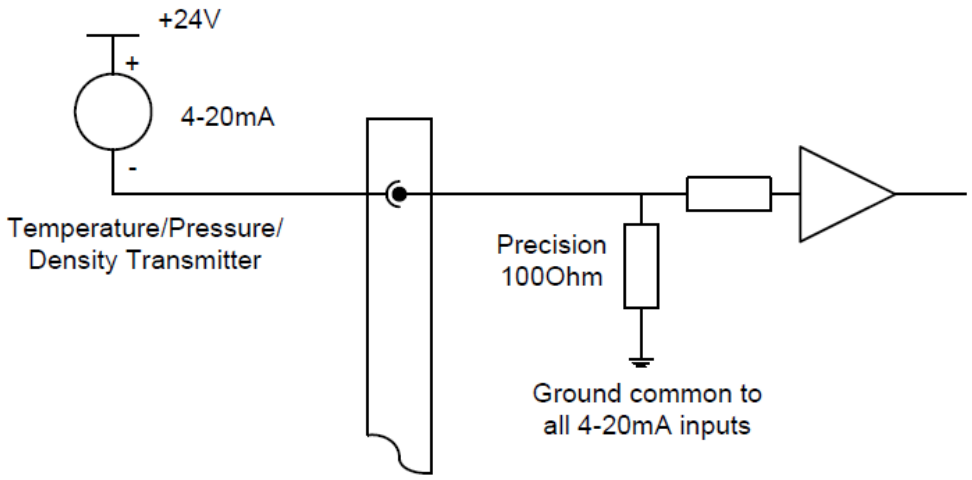


1.2.4 Flowmeter Inputs



The type of flow meter input can be selected through the configuration menu.

1.2.5 Temperature Inputs

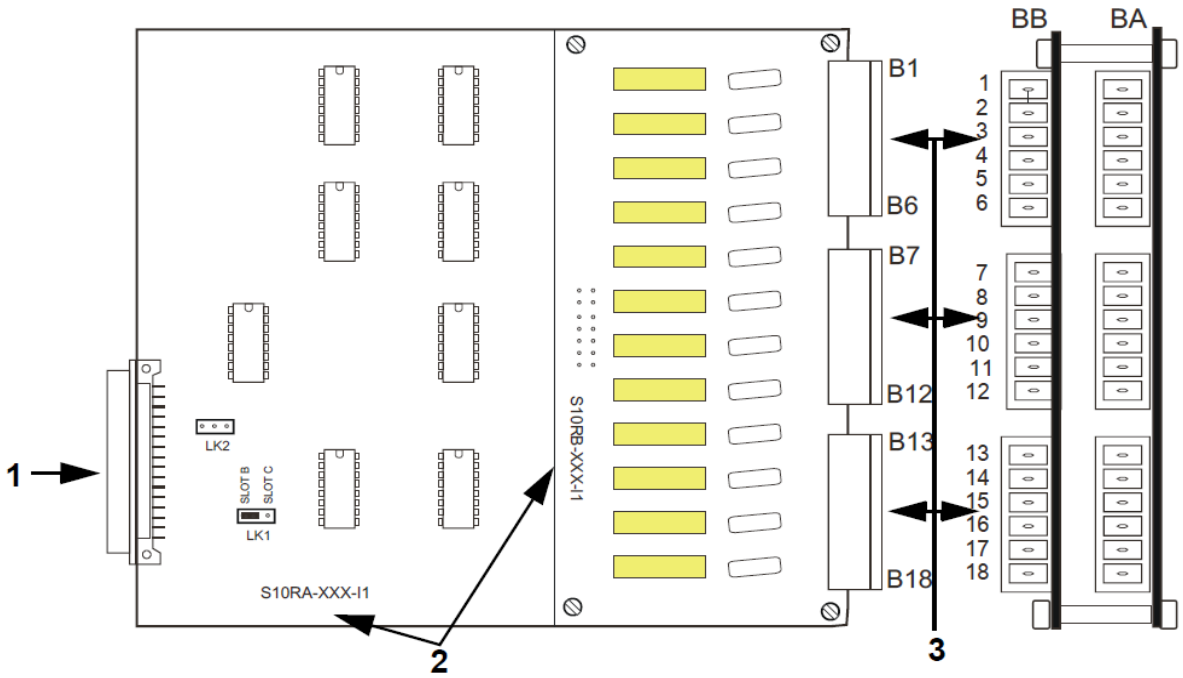


1.3 Output Relay Card - S10RA-XXX-RB-XXX

1.3.1 Card Description

This card is a general purpose relay output card and is made up of 24 relay outputs. The S10RB-XXX-I1 card is mounted onto the S10RA- XXX-I1 card, each providing 12 relay outputs.

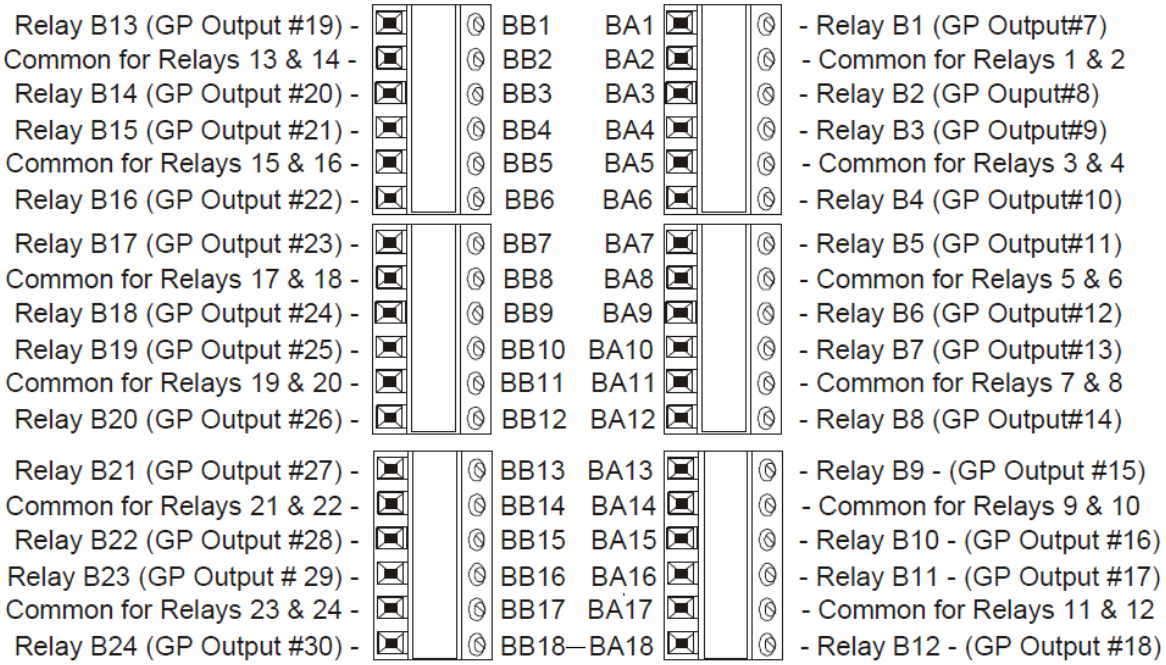
- Relays can be 100-240 Vac solid state or Electromechanical
- The X in S10RA-XXX can either be S or R depending upon the type of relays on board. (S indicates solid state and R indicates Electro- mechanical relays).
- There are a total of 6 relay banks each having 4 relays. Each bank can be of different relay types. The default combination is S10RA- SSR-RB- RRR.
- Electromechanical relay outputs have MOV's across the output.
- Solid state relay outputs are suitable for driving digital control valves where continual switching of the outputs would otherwise wear out a mechanical relay. The outputs are fully isolated and capable of driving only A.C. voltages. The outputs have a snubber network across the output to minimise voltage spikes when switching inductive loads such as coils.



Item	Description
1	Motherboard connector
2	Part and Issue numbers
3	Wiring terminals

1.3.2 Terminal Descriptions

Outputs
(S10RA-xxx-RB-xxx)



NOTES:

Link 1 provides addressing for the board so that it may be mounted in slot B or C.

- Card Mounted in Slot B (Default)

  Link in positions A & B (as shown above)

- Card Mounted in Slot C

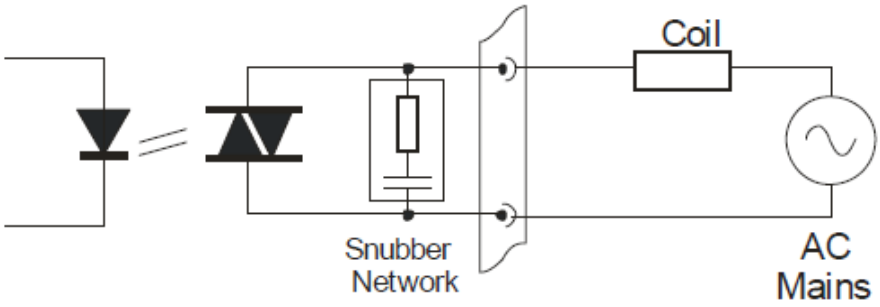
  Link in positions B & C

Link 2 is not required.

- Relay B1,B3,B5&B7
  - Two Stage Valve - Slow Flow
  - Digital Control Valve - Inlet
  - On/Off Valve - On and Off
- Relay B2,B4,B6&B8
  - Two Stage Valve - High Flow
  - Digital Control Valve - Outlet

Relay B3,B4,B5,B6,B7&B8 also used, dependant on Sales Code, as internal additives solenoid control outputs.

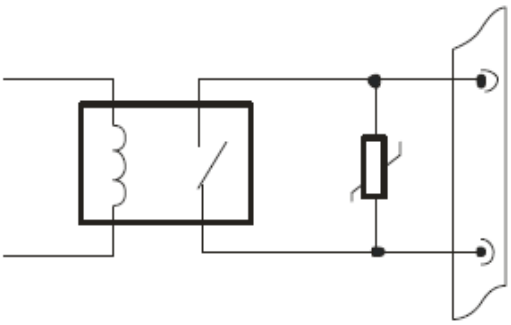
1.3.3 Solid State Relay Outputs



- Switching Voltage: AC Only 90 - 240 Vac, 1 Amp max.
- Transient Protection: Snubber Network 47 nF, 47R

1.3.4 Electromechanical Relays

- Rating: 240 Vac, 30 Vdc Max, 1 Amp max.
- Protection: 275 Vac MOV transient protection



1.4 Power Supply Card—S800PS4-6

1.4.1 Card Description

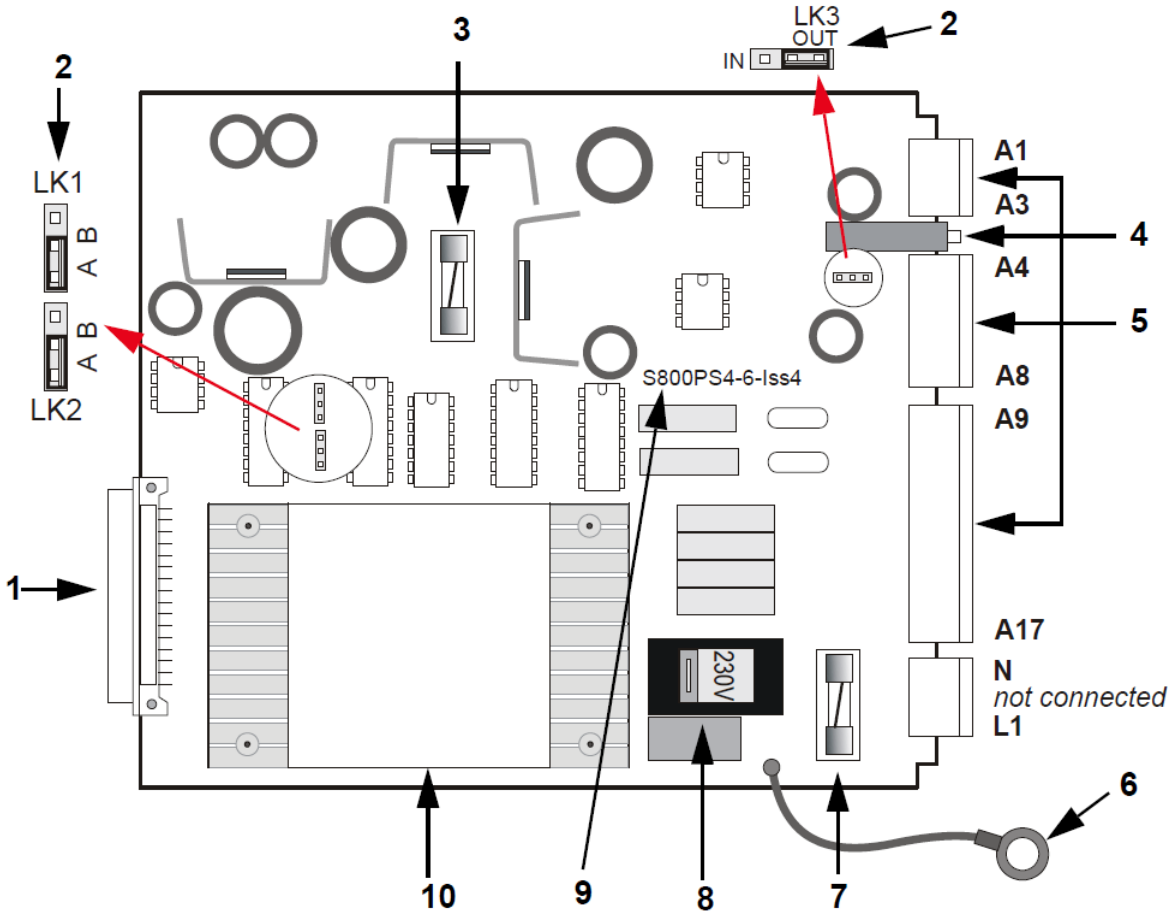
This card is a general purpose power supply card. It is made of the following:

- 110/220 Vac mains input
- 6 electromechanical relay outputs
- 5 to 30 Vdc power out (100 mA max.)
- 12 Vdc power out (250 mA max.)

Mains voltage is selected by a switch on the board and can be either 110 Vac (95 to 135 Vac) or 220 Vac (190 to 260 Vac). A 500 mA fuse and varistor provide protection on the mains inputs against power spikes and short term overvoltage connection.

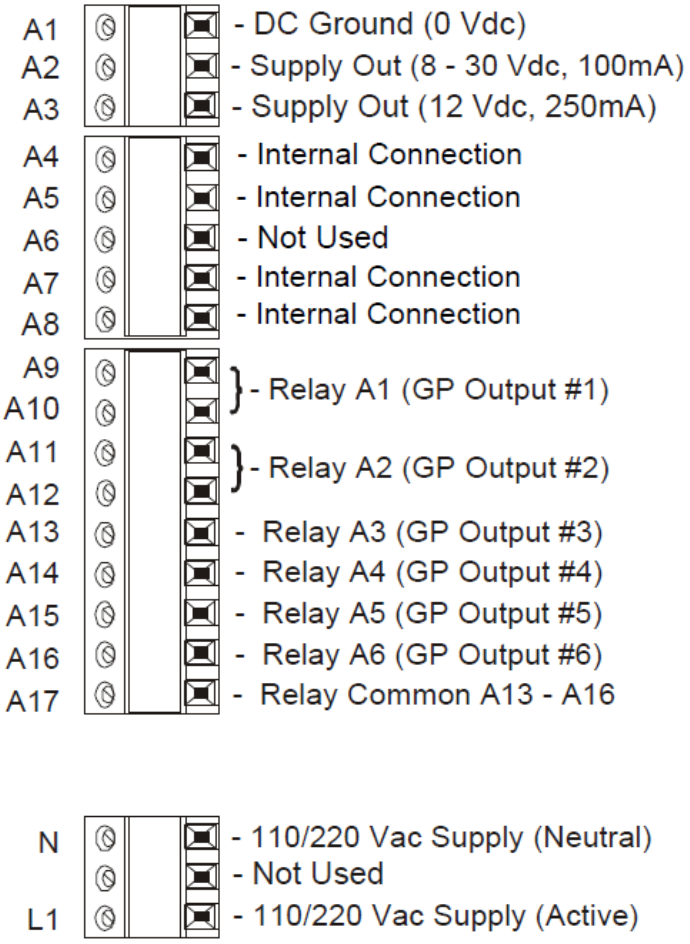
The 5 to 30 Vdc power output is adjustable by means of a trim potentiometer adjacent to terminal A3. This should be adjusted with a screwdriver while

monitoring the resultant voltage on terminal A2 with a voltmeter. The default value when shipped from the factory is 24V.



Item	Description
1	Motherboard connector
2	Link
3	DC fuse, 250 Vac, 1.5 A Slow-Blow Size: 20 x 5 mm (used only in DC operation)
4	DC voltage adjustment
5	Wiring terminals
6	To chassis (earth for CE compliance)
7	Mains fuse, 250 Vac, 500 mA Slow-Blow Size: 20 x 5 mm
8	Mains selection, 110 or 220 VAC
9	Part and issue numbers
10	Mains transformer

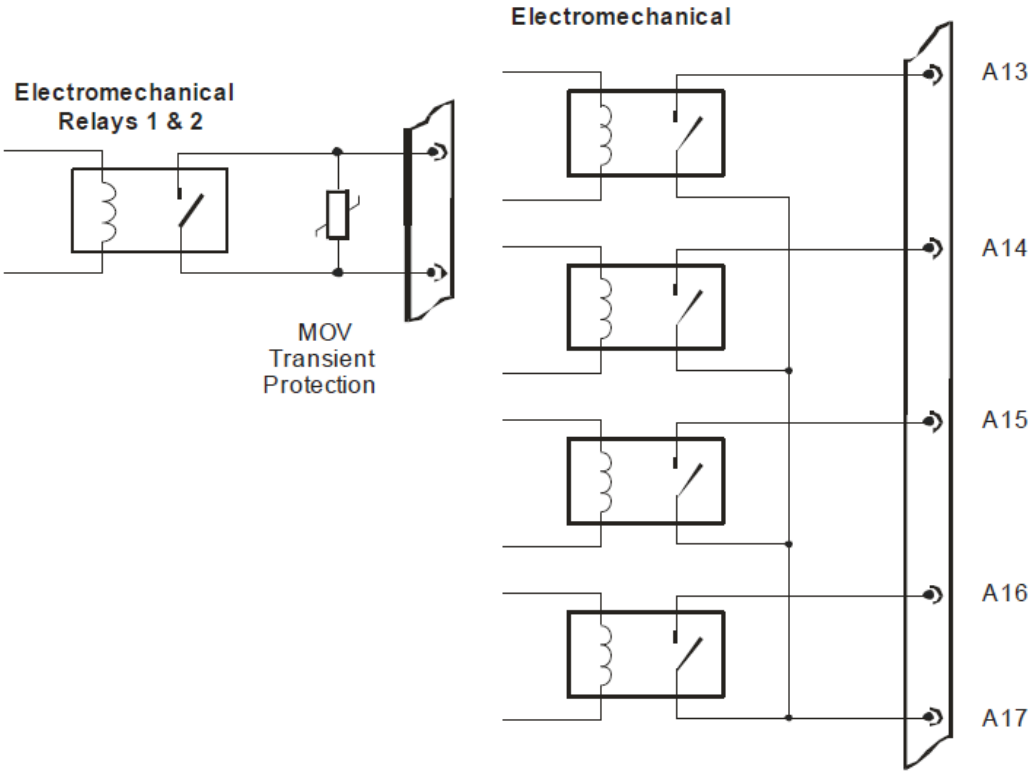
1.4.2 Terminal Layout



1.4.3 Electromechanical Relays

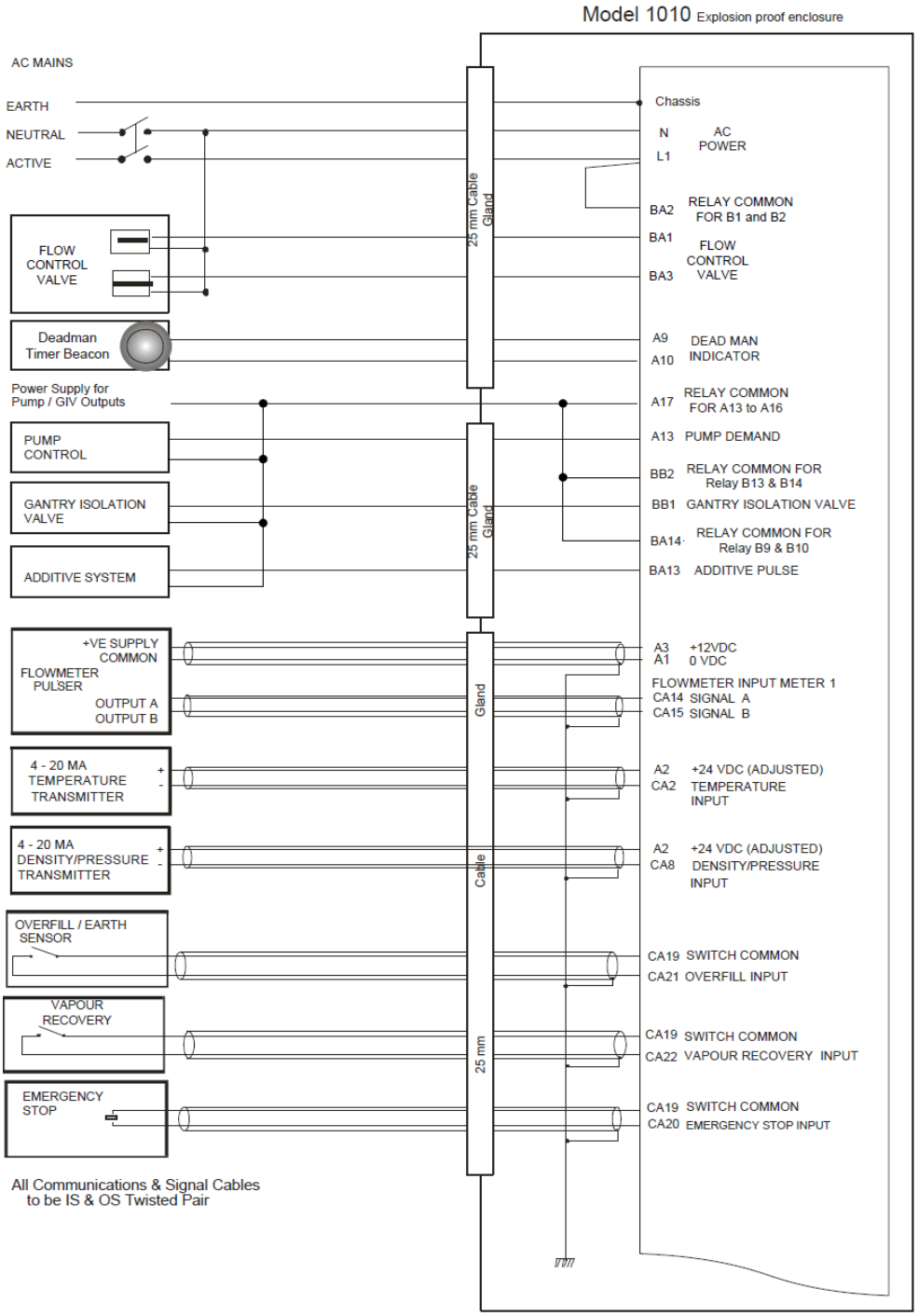
Rating: 240 Vac, 30 Vdc Max 1 Amp max.

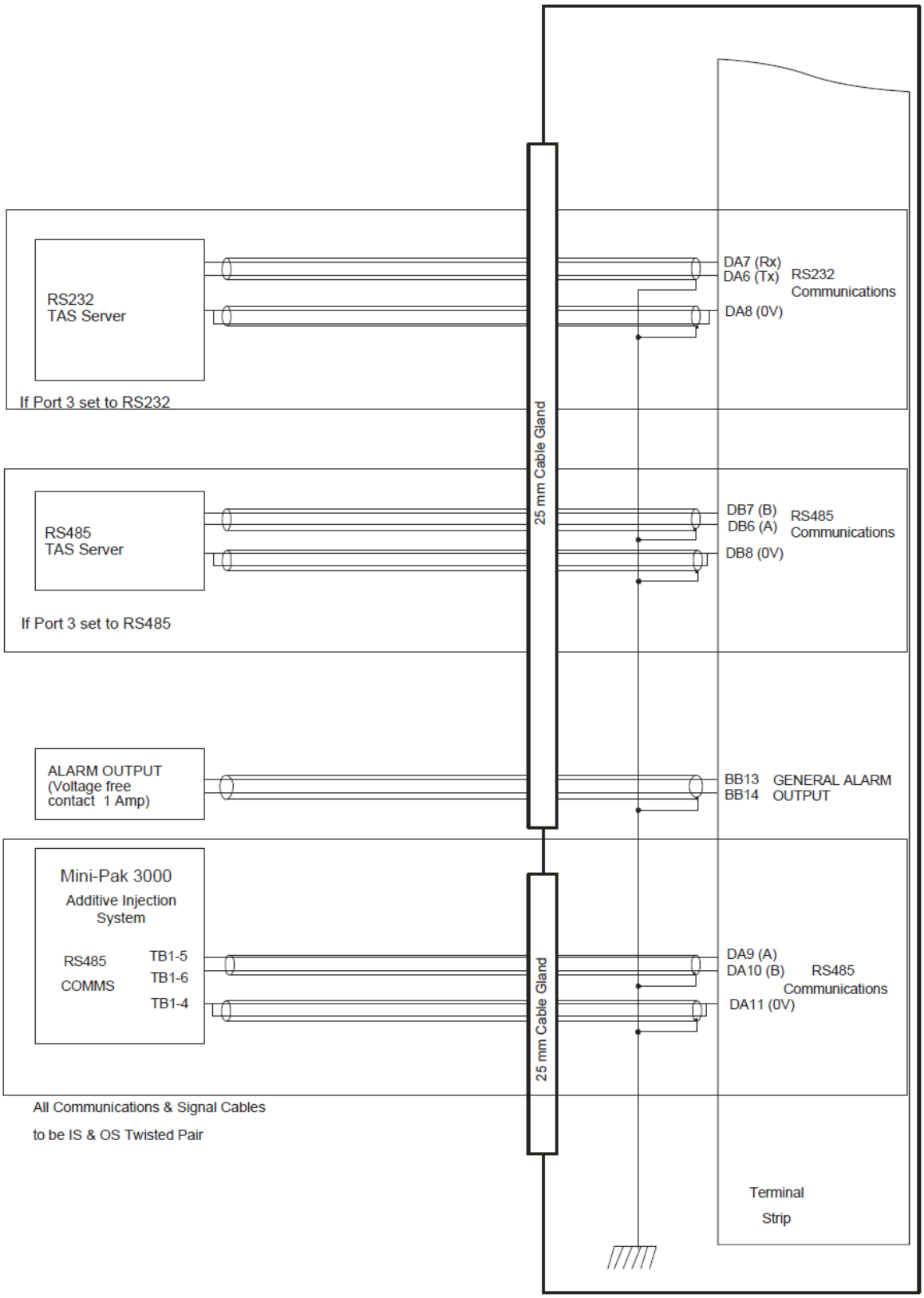
Protection: 275 Vac MOV transient protection


Electromechanical
Relays 1 & 2
MOV
Transient
Protection
Electromechanical
A13
A14
A15
A16
A17

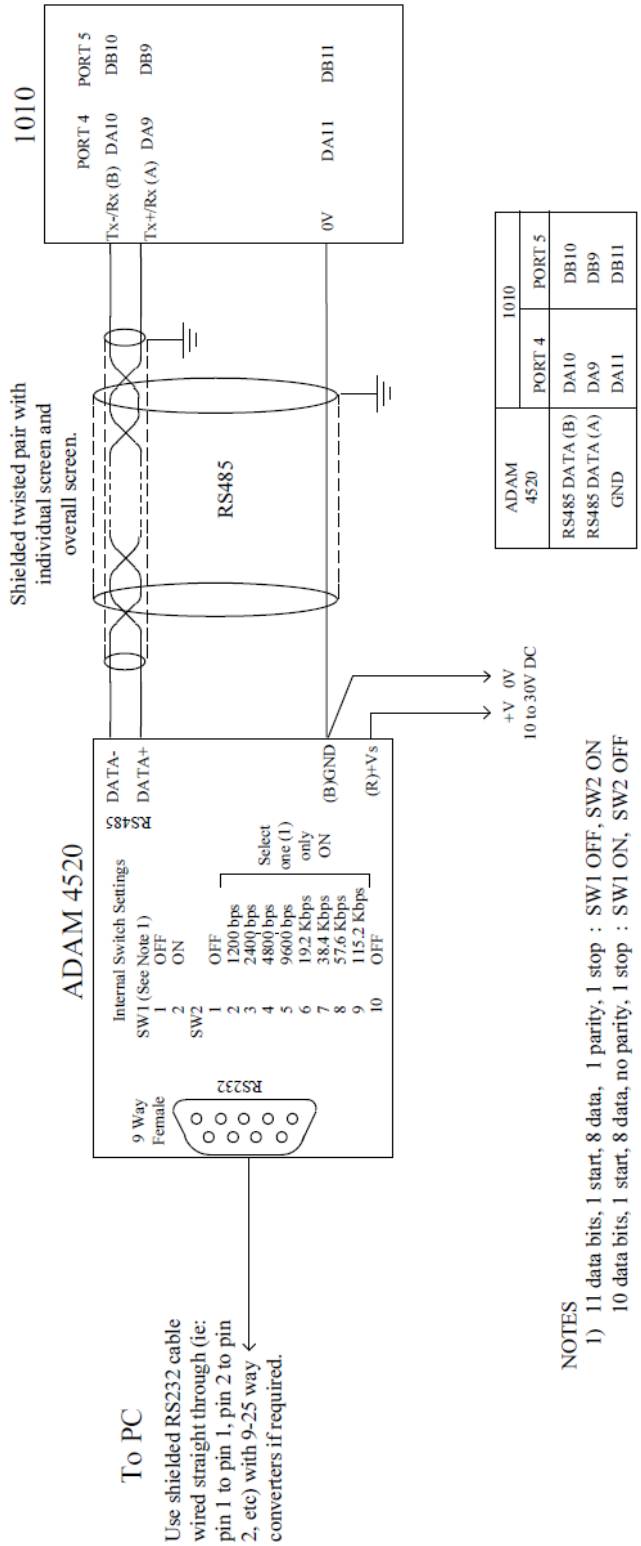
2 Typical Wiring Diagram

This section describes a typical wiring diagram for a single arm 1010 installation. This is intended as a guide only.

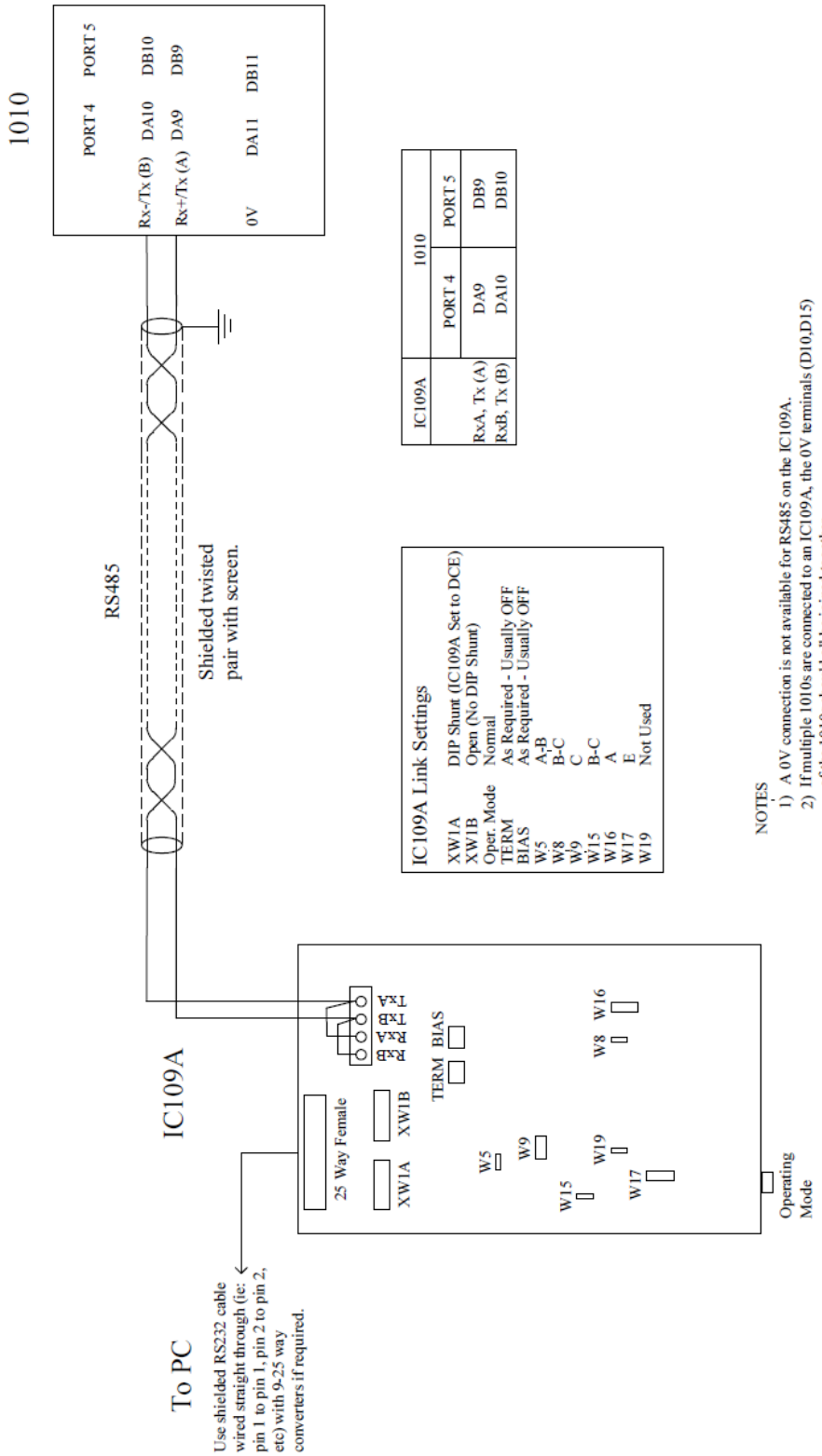



RS232
TAS Server
If Port 3 set to RS232
DA7 (Rx)
DA6 (Tx)
RS232
Communications
DA8 (0V)
25 mm Cable Gland
RS485
TAS Server
If Port 3 set to RS485
DB7 (B)
DB6 (A)
RS485
Communications
DB8 (0V)
ALARM OUTPUT
(Voltage free
contact 1 Amp)
BB13
BB14
GENERAL ALARM
OUTPUT
Mini-Pak 3000
Additive Injection
System
RS485
COMMS
TB1-5
TB1-6
TB1-4
DA9 (A)
DA10 (B)
RS485
Communications
DA11 (0V)
25 mm Cable Gland
All Communications & Signal Cables
to be IS & OS Twisted Pair
Terminal
Strip

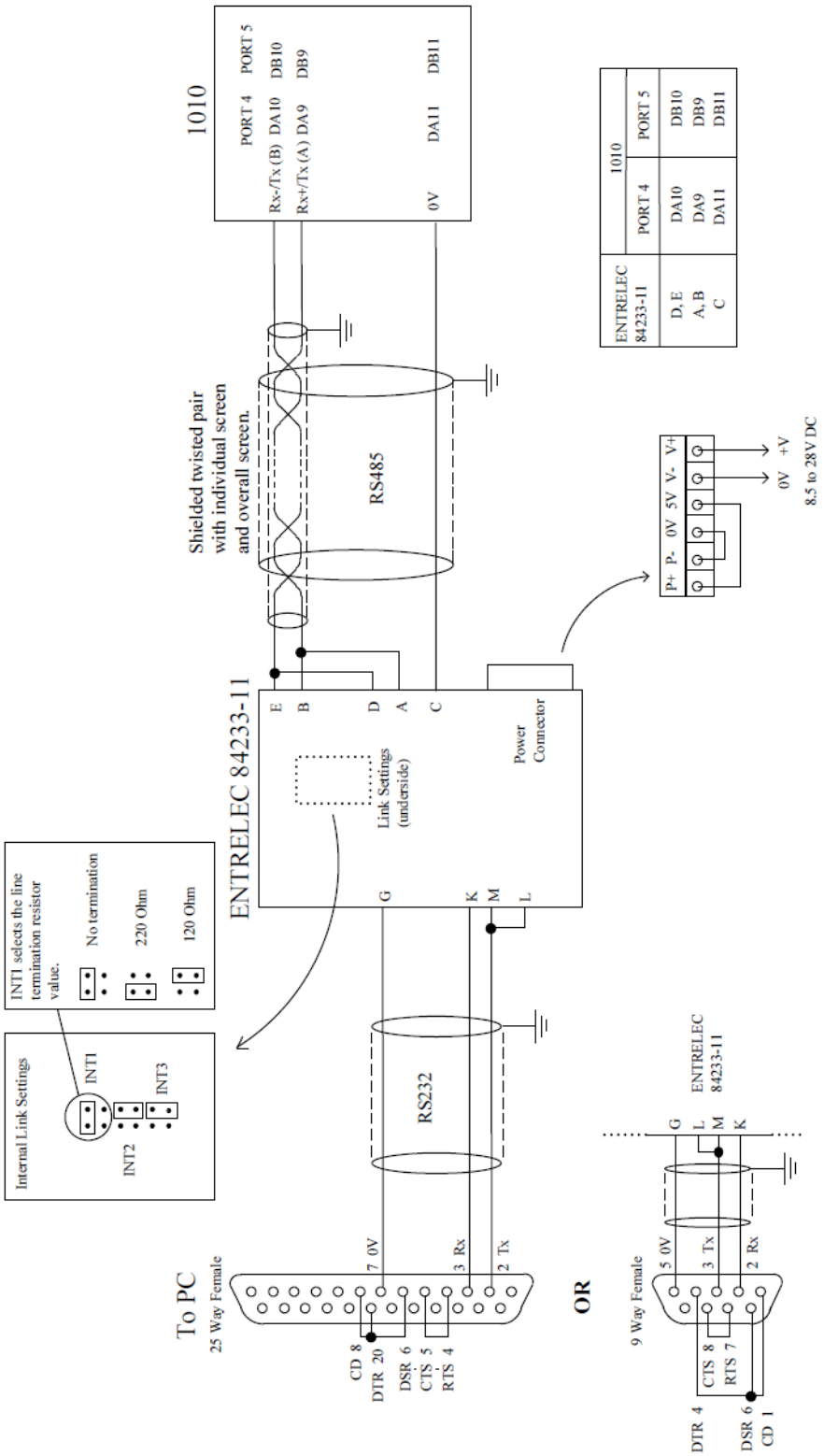
2.1 1 Twisted Pair + 0V



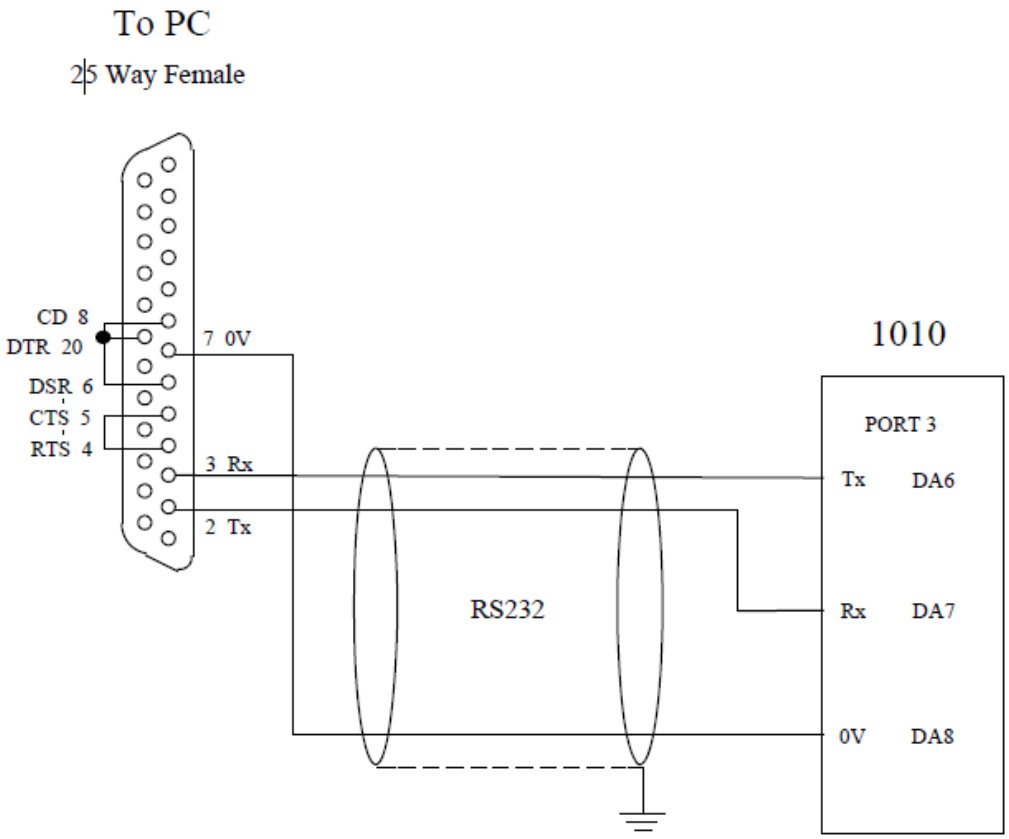
2.2 RS 485: 1 Twisted Pair



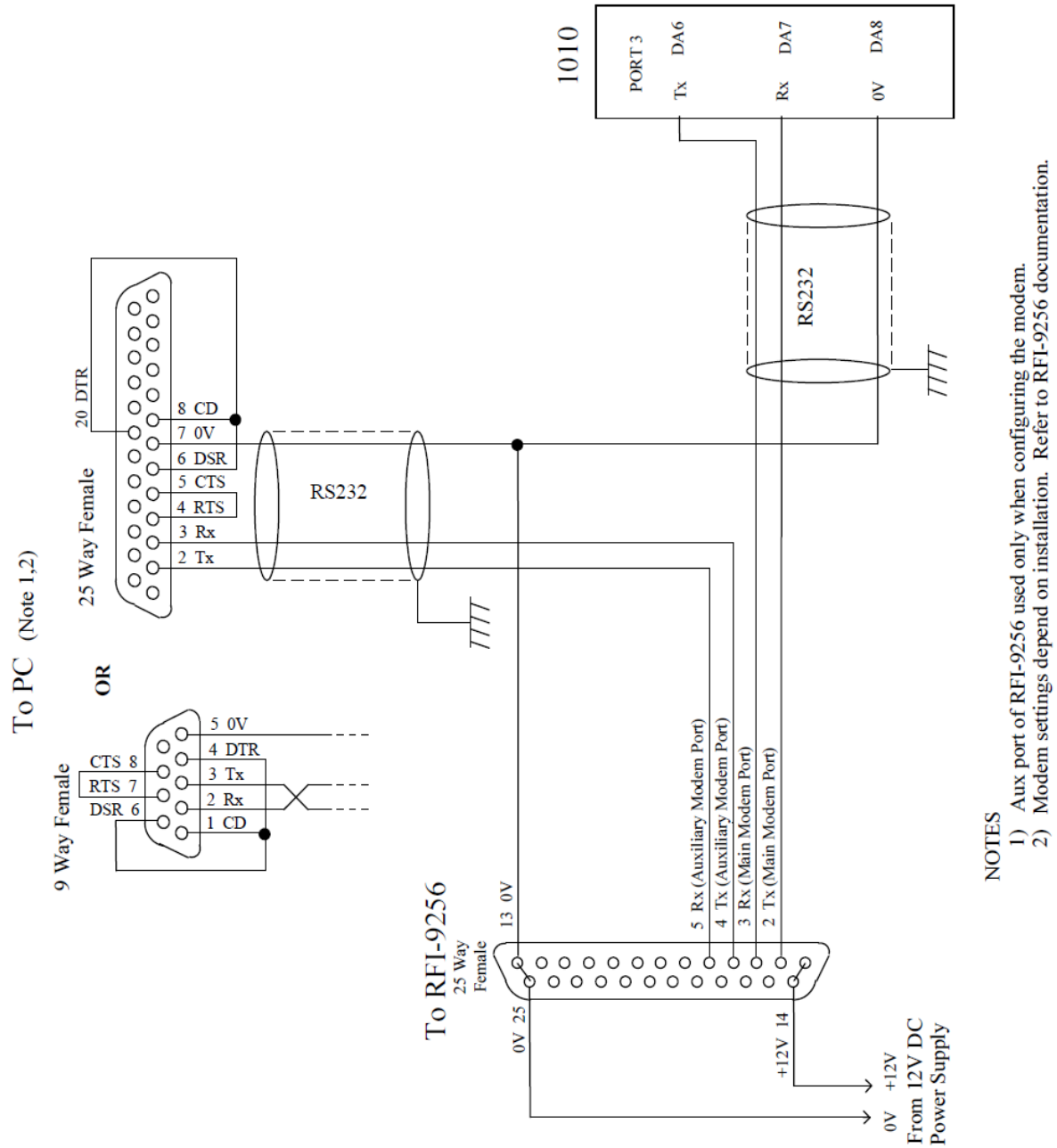
2.3 RS 485: 1 Twisted Pair + 0V



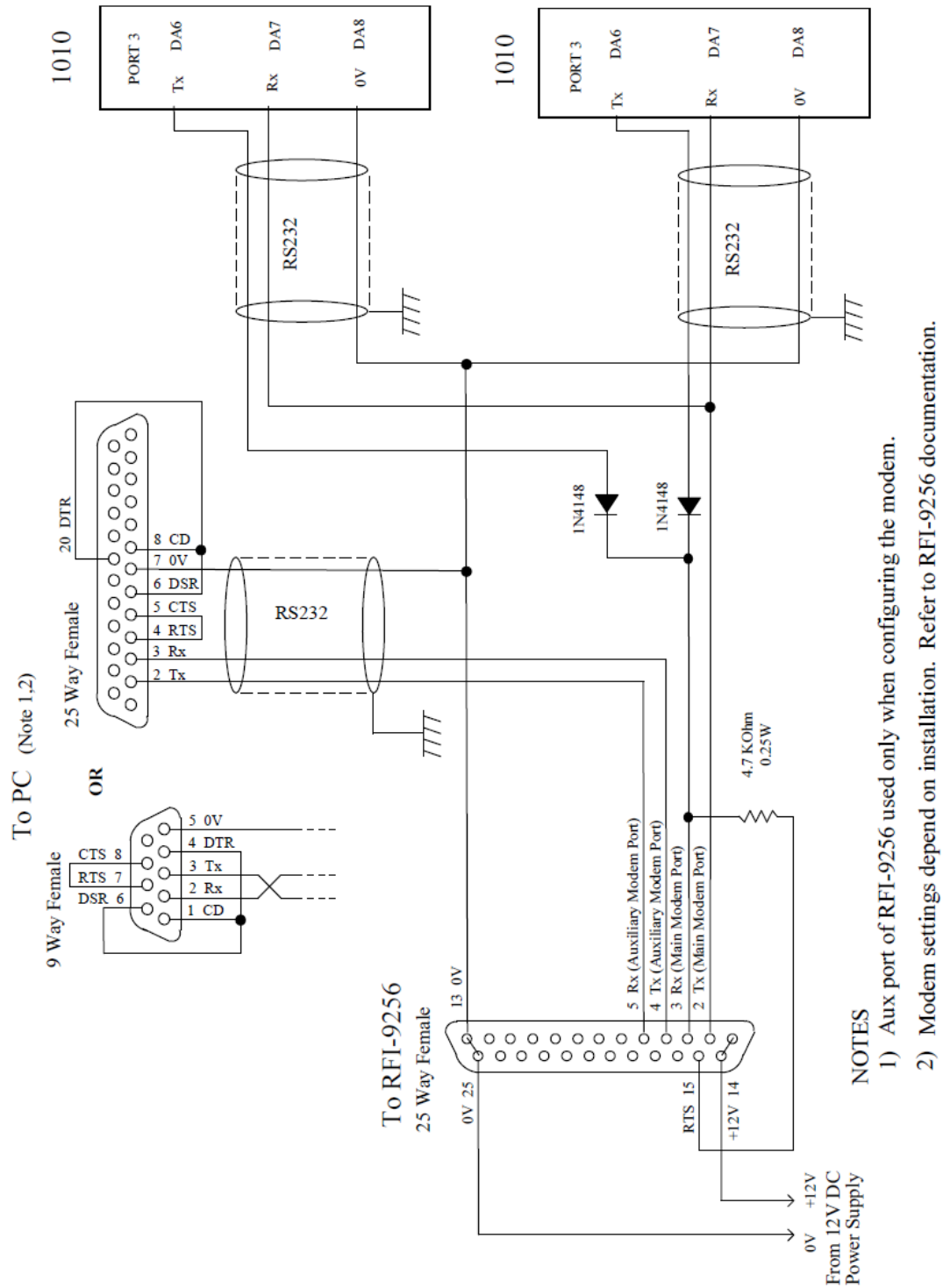
2.4 1010 to PC (RS232)



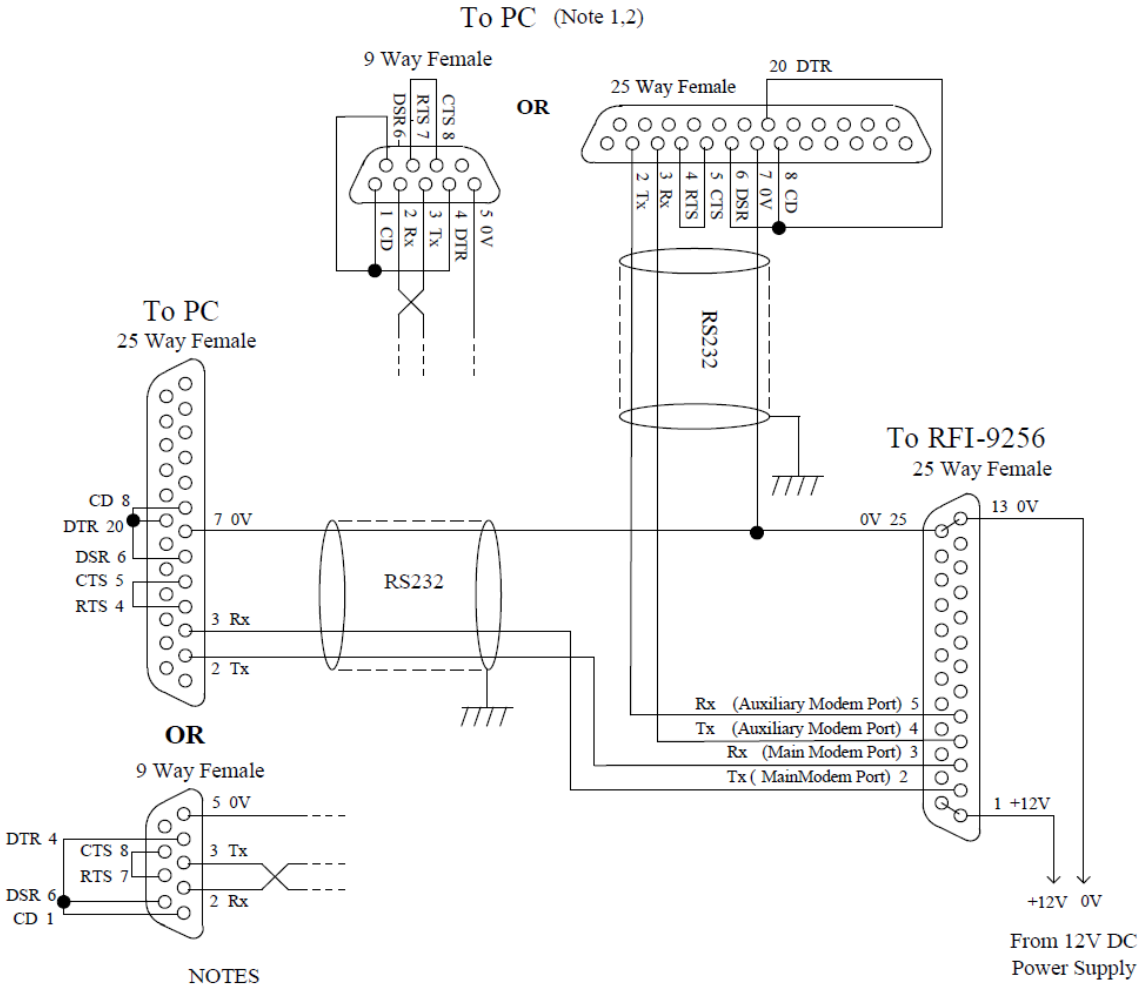
2.5 1010 to RFI-9256 Radio Modem (RS232)



2.6 Multiple 1010s to RFI-9256 Radio Modem (RS232)



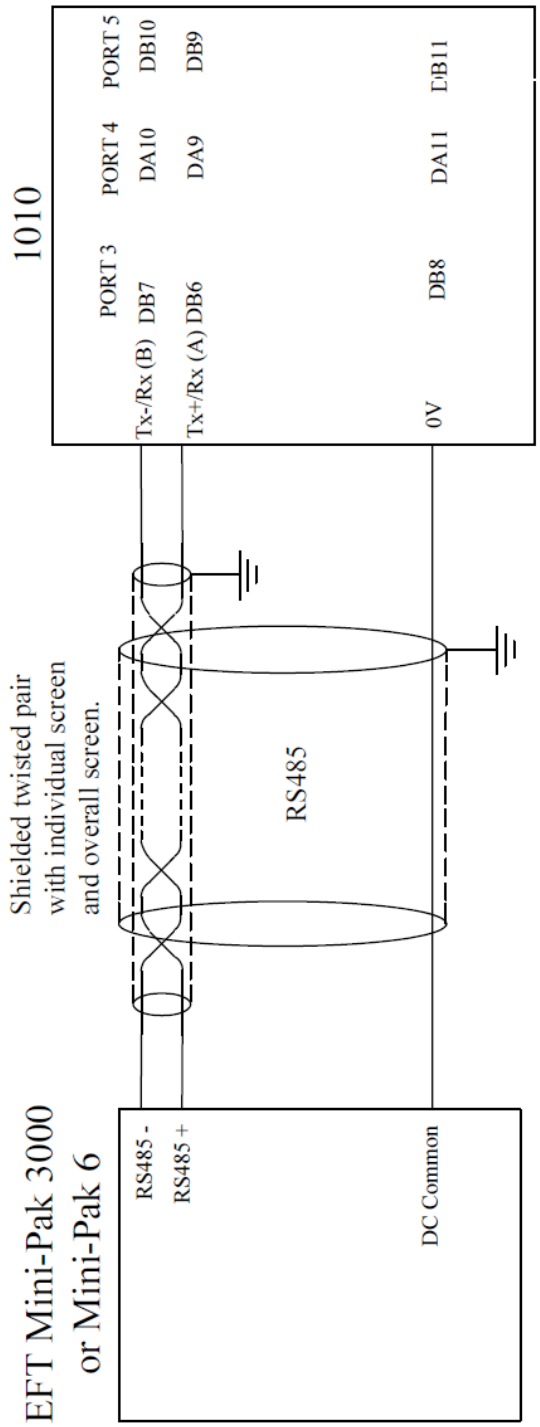
2.7 PC to RFI-9256 Radio Modem (RS232)



NOTES

1) Aux port of RFI-9256 used only when configuring the modem.
2) Modem settings depend on installation. Refer to RFI-9256 documentation.

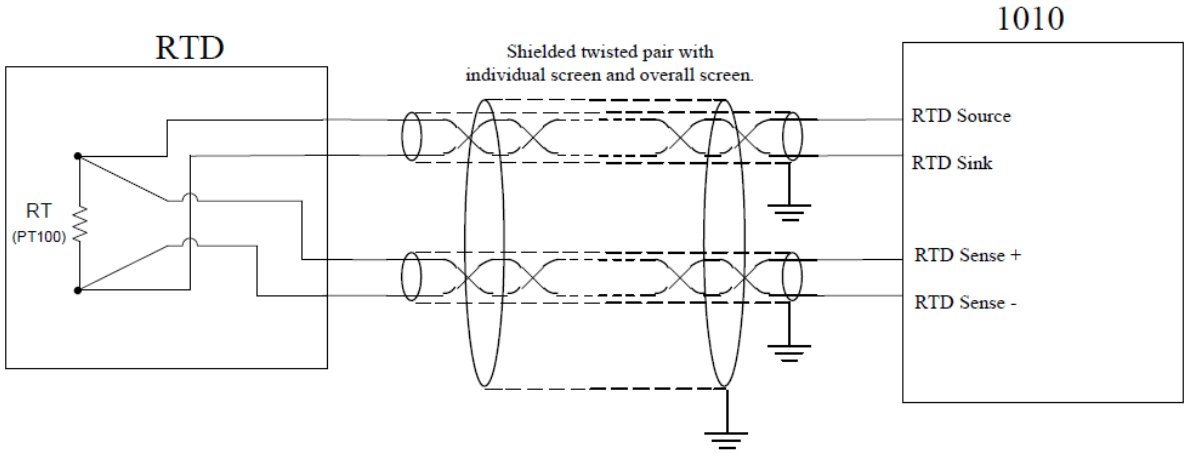
2.8 1010 to EFT Mini-Pak Additive Injector



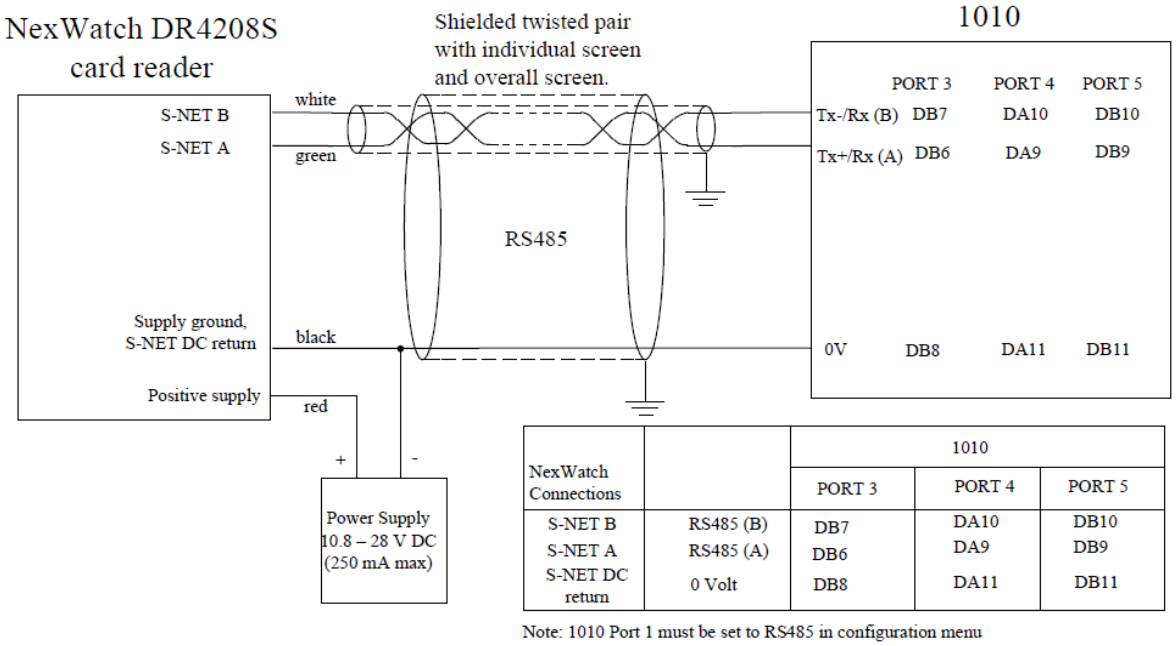
Mini-Pak - Connections			1010		
MP3000	MP6		PORT 3	PORT 4	PORT 5
TB1-6	TB8-3	RS485 (B)	DB7	DA10	DB10
TB1-5	TB8-2	RS485 (A)	DB6	DA9	DB9
TB1-4	TB8-1	0 Volt	DB8	DA11	DB11

Note: 1010 Port used must be set to RS485 in configuration menu

2.9 1010 to RTD (PT100)



2.10 1010 to NexWatch DR4208S Card Reader



NexWatch Connections		1010 PORT 3	1010 PORT 4	1010 PORT 5
S-NET B	RS485 (B)	DB7	DA10	DB10
S-NET A	RS485 (A)	DB6	DA9	DB9
S-NET DC return	0 Volt	DB8	DA11	DB11

Note: 1010 Port 1 must be set to RS485 in configuration menu

3 Solid State Relays

Solid State relays are an ideal method of switching high use equipment such as digital control valve solenoids and additive systems. There is practically no limit to the number switching operations compared to electro-mechanical relays.

The following outputs are Solid State relays:

- The control valve (digital, 2-stage and on/off)

The following outputs are normally electromechanical relays, but can be delivered as Solid State relays if required:

- Pump control outputs
- Gantry isolation valve outputs
- Solenoid Control for Internal Additives

Solid state relays are semiconductor switches which electronically switch the power on and off, rather than using an electro-mechanical contact.

The advantages of Solid State relays are:

- Long life
- Elimination of contact arcing and pitting
- No contact bounce, thereby reducing electrical transients inside the instrument
- Faster switching times.

The Solid State relays are particularly important when controlling digital control valves since the control solenoids on these valves are continually being switched on and off to control the flow rate. Using normal moving coil relays in this application would lead to reduced life expectancy.

When applying the Solid State relay, the following output parameters must be observed:

- Minimum Voltage across relay: 24 VAC Min
- Maximum Voltage across relay: 280 VAC Max

- AC/DC Switching: AC Only, (do not apply DC)
- Maximum Current: 1 Amp AC
- Maximum Surge Current: 1.5 Amp AC
- Leakage Current: 20 mA AC Max

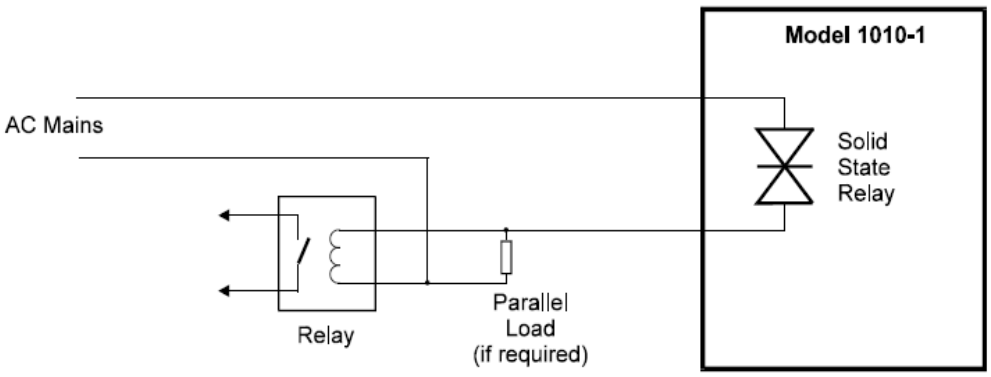
Most digital control valves meet these specifications, but some care must be taken when driving relays or contactors etc, particularly in relation to the leakage current, which is of particular concern in intrinsically safe solenoids.

Unless the load has a holding current greater than 20 mA it may not release. For example, when a relay is first turned on it takes a large amount of current (called the Pickup current) to move the contacts.

Once the relay has been activated it takes far less current (the holding current) to hold the contacts in the active state, called the Holding current.

If a relay had a pickup current of 30 mA and a holding current of 15 mA, the leakage current through the solid state relay would not be enough to activate the relay, but would be enough to hold the relay in the active state, even if the solid state relay was turned off, as the leakage current is always present.

Alternatively, a resistor or other load may need to be placed in parallel across the coil. The resistor diverts some of the leakage current away from the coil so that the relay will deactivate.

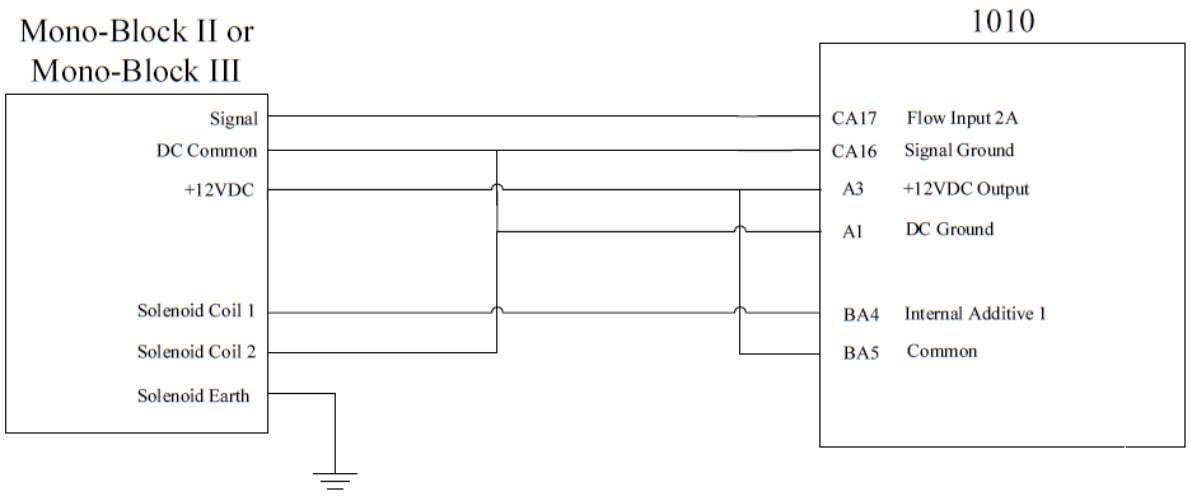


4 Internal Additives

The Internal Additives feature of the 1010CB can be utilised by the Monoblock II and Monoblock III, which are additive manifolds that contain a flowmeter output and a solenoid input. The instrument can accept up to 6 of these monoblock manifolds, depending on the sales code of the instrument used.

Typical wiring for internal additives is provided as follows:

4.1 1010CB Internal Additives DC termination via MonoBlock

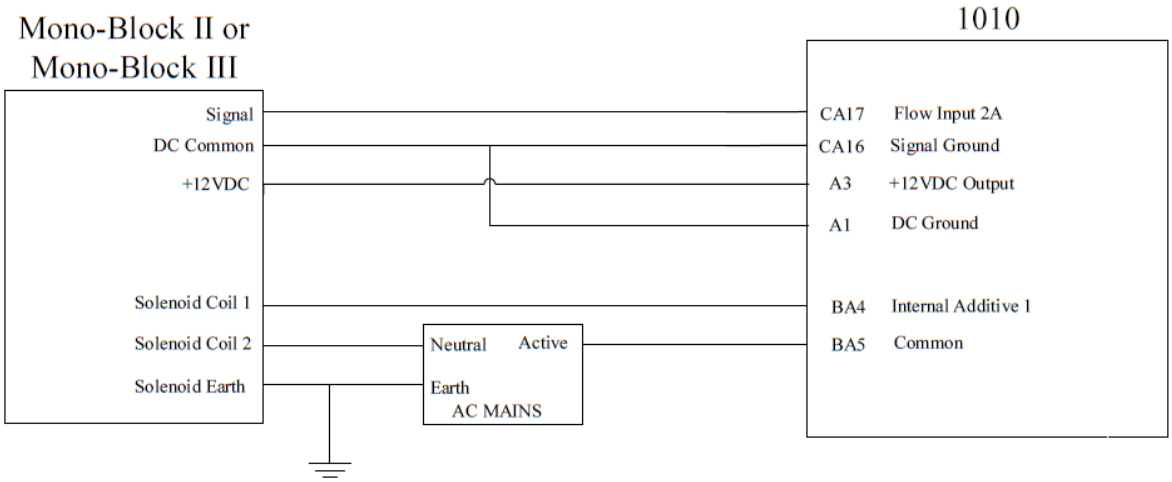


Mono-Block Connections			1010		
II	III		Power Pupply	Input Card	Output Card
Blue	Blue	Signal		CA17	
Black	Black	DC Common		CA16	
Red	Red	+12VDC	A3		
Red	Red	Solenoid Coil 1			BA4*
Red	Red	Solenoid Coil 2			
Green/Yellow	Green/Yellow	Solenoid Earth			

Note: Current Limit on +12VDC Output on power terminals A3/A1 needs to be taken into account when using this source. An external source will be required if total current of 250mA is exceeded.

* Internal Additive 1 at terminals BA4/BA5 is only applicable to Sales Code A, for Sales Code D use BA7/BA8 and for Sales Codes E & F use BA10/BA11 by default.

4.2 1010CB Internal Additives AC termination via MonoBlock



Mono-Block Connections			1010		
			Power Pupply	Input Card	Output Card
II	III				
Blue	Blue	Signal		CA17	
Black	Black	DC Common		CA16	
Red	Red	+12VDC	A3		
Red	Red	Solenoid Coil 1			BA4*
Red	Red	Solenoid Coil 2			
Green/Yellow	Green/Yellow	Solenoid Earth			

Note: Current Limit on +12VDC Output on power terminals A3/A1 needs to be taken into account when using this source. An external source will be required if total current of 250mA is exceeded.

* Internal Additive 1 at terminals BA4/BA5 is only applicable to Sales Code A, for Sales Code D use BA7/BA8 and for Sales Codes E & F use BA10/BA11 by default.

NOTE: For detailed instructions on the Mono-Block, refer to the Mono-Block III Installation & Operation Manual (MN06312).

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GuidantMeasurement.com

Corporate Headquarters
5825 North Sam Parkway West
Suite 120
Houston, TX 77086 USA

USA
1602 Wagner Avenue
Erie, PA 16510 USA
+1 814.898.5000

Germany
Regentstrasse 1
25474 Ellerbek, Germany
+49 4101 304.0