# OPERATION & MAINTENANCE MANUAL
# MODEL 114

# AUTOMATION PRODUCTS INC.
# Multi-Channel Explosion Proof Indicator/Controller


*SALES*
5480 La Sierra Drive
Dallas TX 75231
972.250.2093
972.250.6870 - Fax

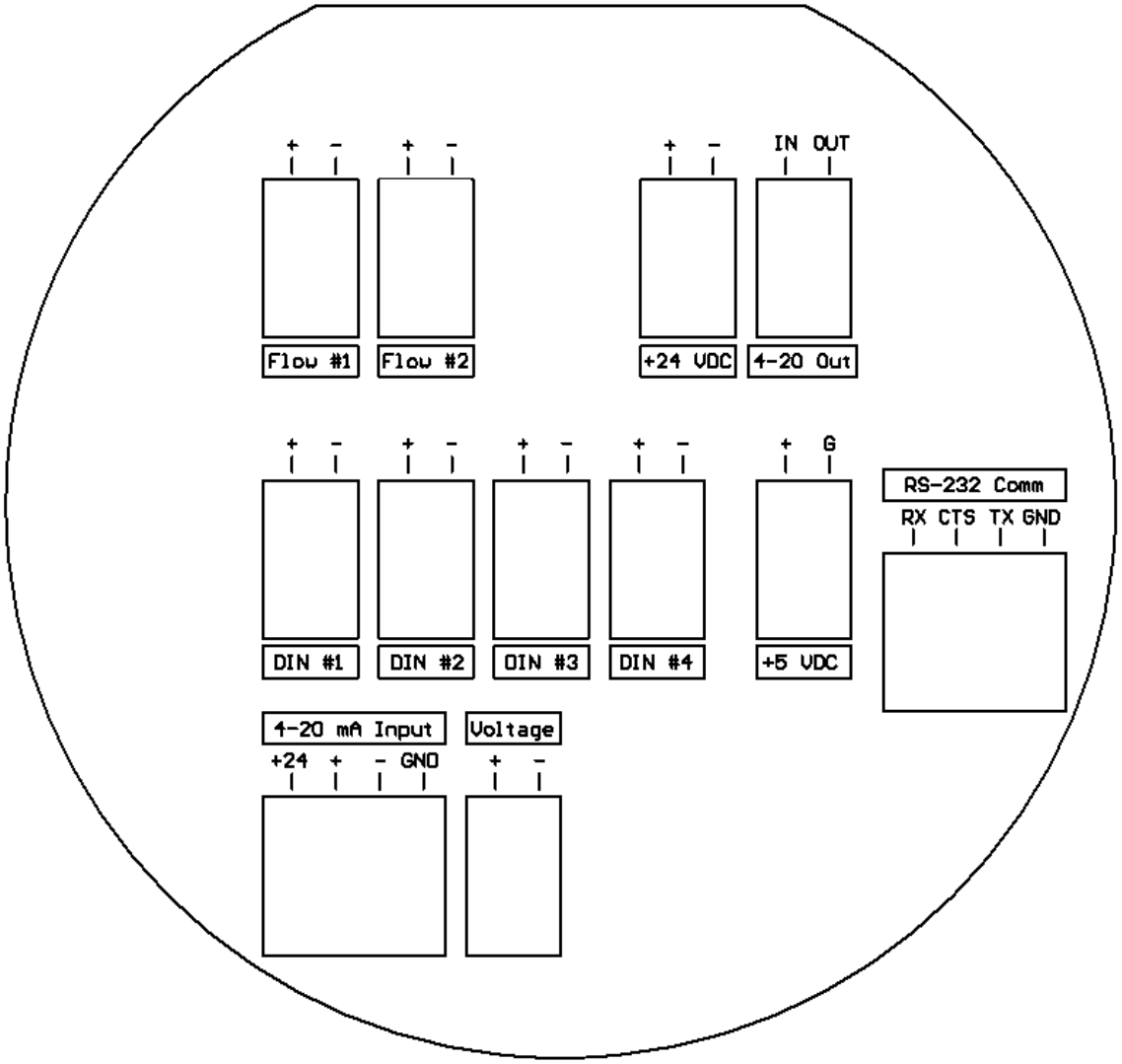
*ADMINISTRATIVE*
P O Box 835338
Richardson TX 75083
972.250.2093
972.250.6870 - Fax

*MANUFACTURING*
4700 Elmo Weedon Road #116
College Station TX 77845
979.776.5148
979.776.5145 - Fax

## TABLE OF CONTENTS

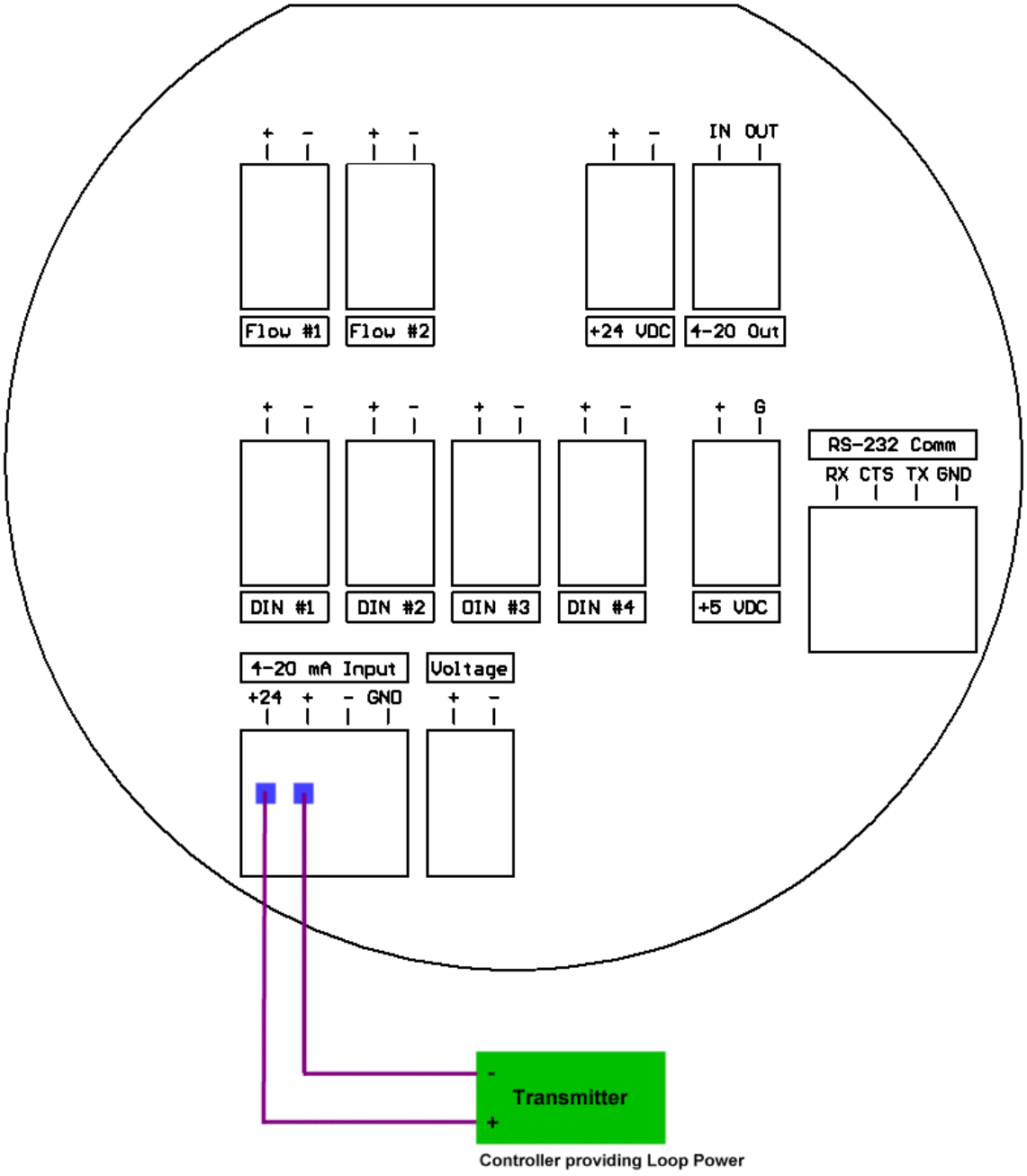
Section 1.0 Wiring

Figure 1



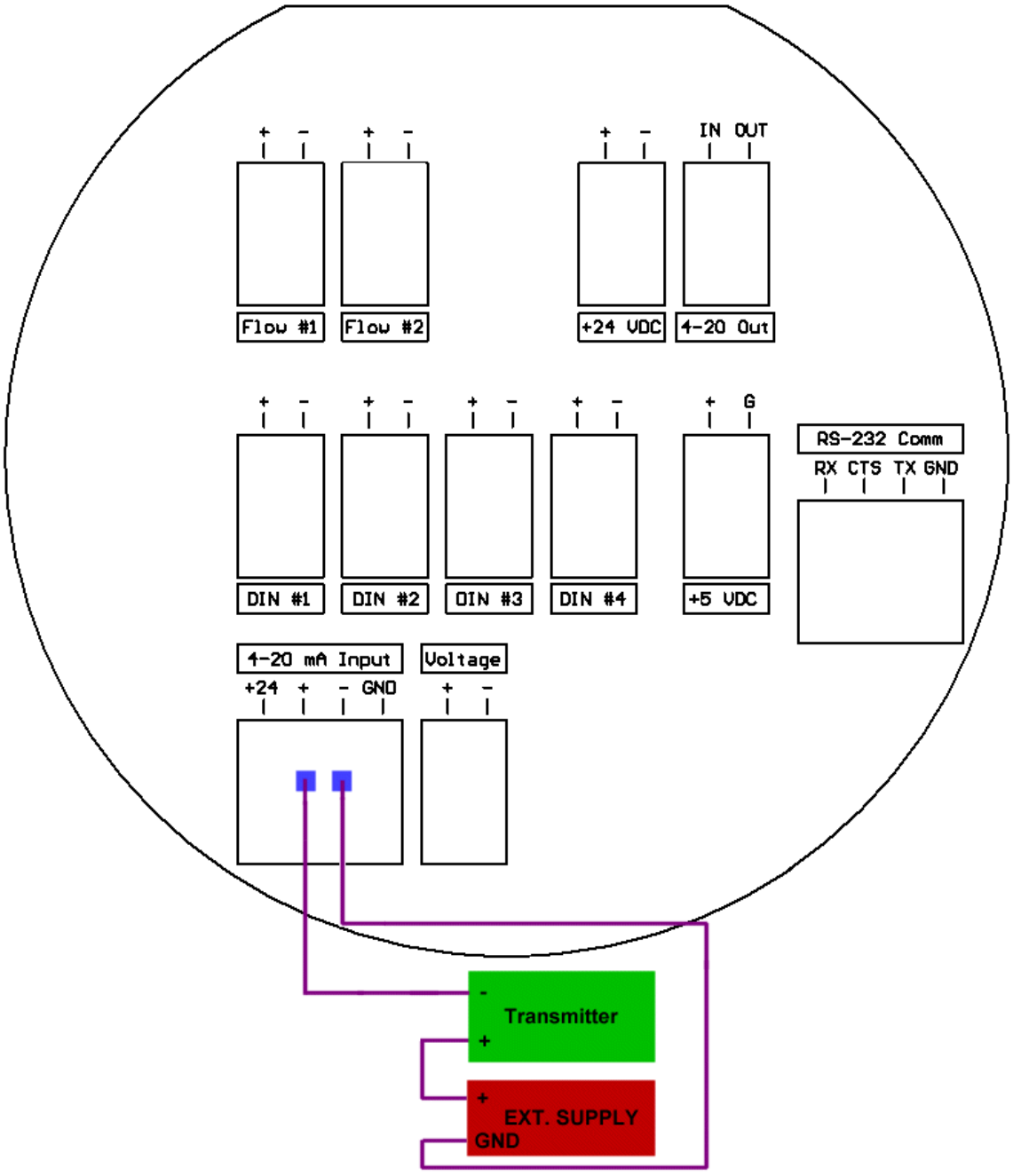

**OVERALL WIRING**

Figure 2



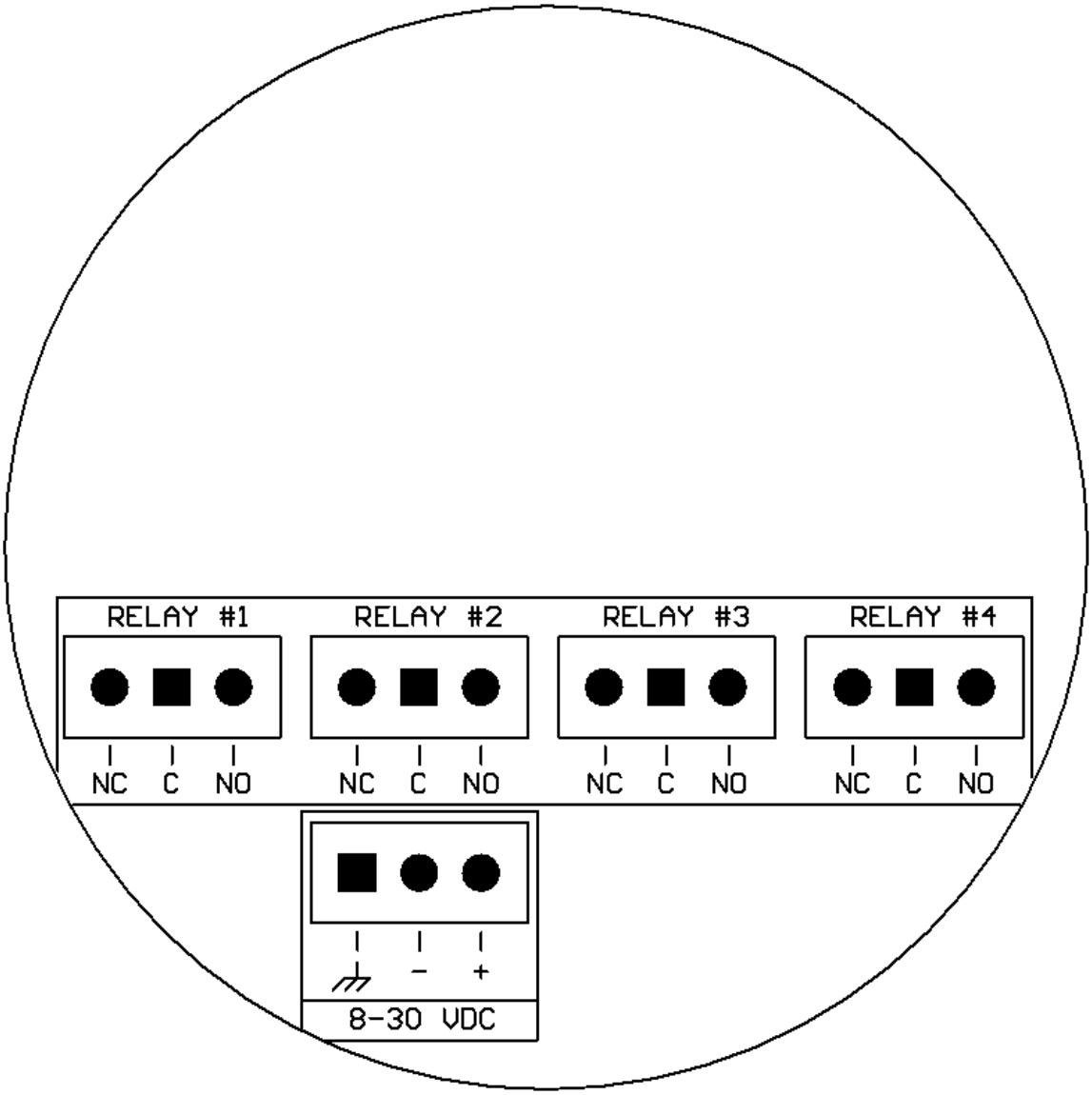

**TRANSMITTER WIRING**

Figure 3




**TRANSMITTER WIRING WITH EXTERNAL POWER SUPPLY**

Figure 4

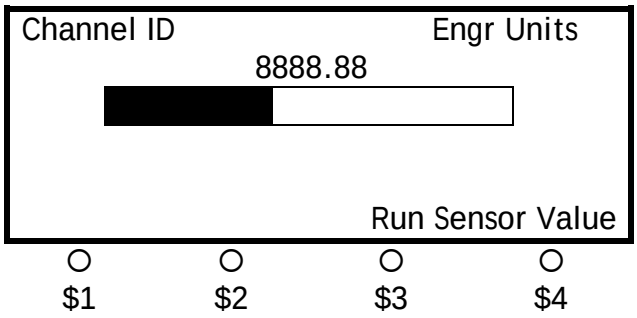



**POWER WIRING**

## Section 2.0 Programming & Setup Mode

Apply Power: Unit comes up in Run Mode

Unit Screen: Run Mode



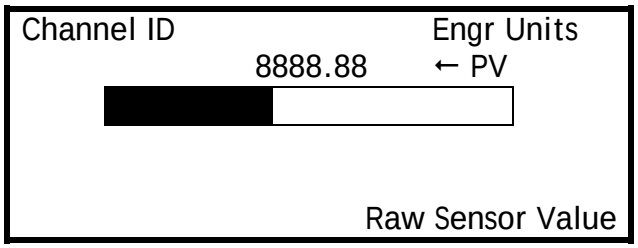

S1 = Switch 1
S2 = Switch 2
S3 = Switch 3
S4 = Switch 4

While the unit is in the Run Mode, Switch #1 places the unit in the "Programming Mode".

Switch #4 scrolls through each screen.

Switches #2 and #3 are not used in the Run Mode.

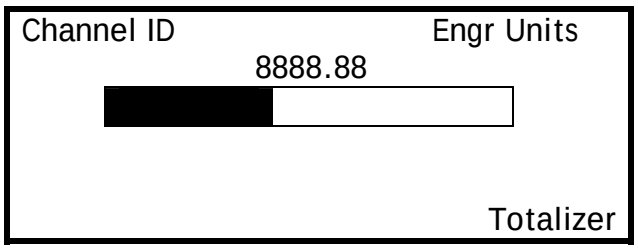
Screen in Run Mode, hit Switch #4 multiple times to scroll through the Run Mode Screens.
Screen #1: Run Mode




**FLOW INPUT SCREEN**

For flow input Screen #1, hit SW #4 (2x).

For flow input Screen #2, hit SW #4 (3x).



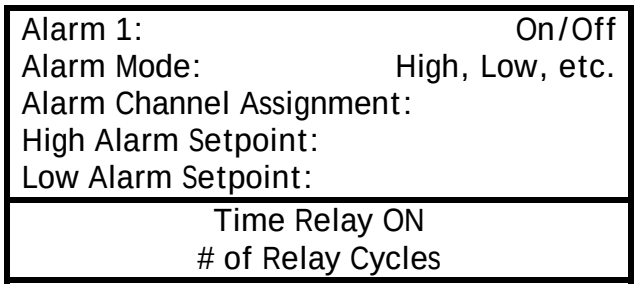

Flow Input Screen

Hit SW #4 multiple times to scroll through screen.

**DIGITAL INPUT STATUS DISPLAY**

| | | |
|---|---|---|
| 1: | DI1 | On/Off |
| 2: | DI2 | On/Off |
| 3: | DI3 | On/Off |
| 4: | DI4 | On/Off |

**ALARM/RELAY #1 SCREEN**




Continue to hit SW #4 to scroll through alarms/relay 2 through 4 and back to Run Mode.

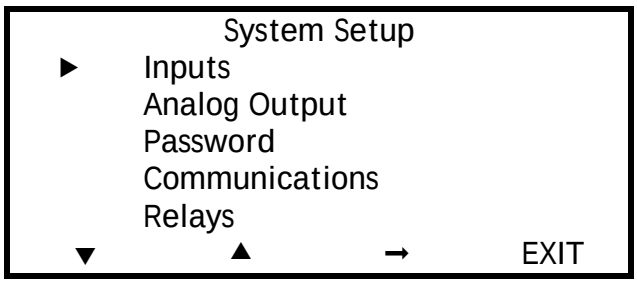
**SECTION 3.0: SYSTEM SETUP**

Hit SW#1 (1x). The system setup screen will appear.

- ▶ Use curser to scroll down through each mode of operation.

| | | |
|---|---|---|
| SW #1 | ▼ | Scrolls curser Down. |
| SW #2 | ▲ | Scrolls curser Up. |
| SW #3 | ▶ | Enter or curer move key (to the right) |
| SW #4 | | Exit key or return key |
| * | | Switch #4 anytime to return to Run Mode |

**SYSTEM SETUP DISPLAY**




**INPUTS:** Program analog inputs, flow meters 1 & 2 and digital inputs. Analog inputs can be 4-20mA, 0-5vdc or 100 ohm PLT RTD.

**ANALOG OUTPUTS:** (4-20mA).

**PASSWORD:** Sets up password

**MUNICATIONS:** Setup the ModBus ID, Baud Rate, Settings, and transmit delay time.

**RELAYS/ALARMS:** Programming mode for each relay.

**SYSTEM SETUP:** Main Screen
Inputs
Analog Outputs
Password
Communications
Relays

To enter subscreen, use Up/Down arrow keys and hit SW#3 → to enter mode.

| INPUTS | ANALOG OUTPUTS | PASSWORD | COMMUNICATIONS | RELAYS |
|---|---|---|---|---|
| Analog Input | 4mA Value | Enter | ModBus ID | Relay 1 |
| Flow Meter #1 | 20mA Value | Password | Baud Rate | Relay 2 |
| Flow Meter #2 | | | Settings | Relay 2 |
| Digital Inputs | | | TX Delay | Relay 4 |

To enter input screens → with curser on inputs, hit SW#3 to enter.

**INPUT SETUP SCREENS**

| ANALOG INIPUT | FLOW METER 1 | FLOW METER 2 | DIGITAL INPUTS |
|---|---|---|---|
| Channel Name | Channel Name | Channel Name | Digital 1 |
| Sensor Type | Sensor Setup | Sensor Setup | Digital 2 |
| Sensor Setup | Display Setup | Display Setup | Digital 3 |
| Display Setup | | | Digital 4 |

| | |
|---|---|
| Channel Name: | 10 alphanumeric digits |
| Sensor Type: | 4-20mA, 0-5vdc, 100 ohm PLT |
| Sensor Setup Analog: | Sets up scaling for max & min values for the process variable. |
| Sensor Setup flow meters: | Enables & disables flow meter inputs, sets, k-factor, resets totals. |
| Display setup: | Sets min/max values for bar graph, decimal place, and engineering unit. |

Go through each screen to set up your inputs. Example: scroll down to the sensor setup screen enter into high value by pressing → key. Use the → key to move cursor to the value you need. Use ↑↓ keys to program the values for your analog input. Hit the save key (switch #4) and the nigh 20mA value is now programmed. Go through all high and low values to finish the setup. Hit exit key to return to the main analog input screen. Finish programming all analog setup screens.

**SYSTEM SETUP CONTINUED**

Use exit key to return to the system setup screen

**ANALOG OUTPUT SCREEN**

4mA value - Zero PV
20mA value - span PV
Scales analog value to the process variable.

**PASSWORD**

sets up 10 digit alphanumeric passwords.

**COMMUNICATIONS SCREEN**

| MODBUS ID | BAUD RATE | SETTINGS | TX DELAY |
|---|---|---|---|
| 1-25C | 1200 to 38400 use → key to change. | Sets ModBus settings | Sets time delay. |

**RELAY SETUP**

Relay #1 Info

| RELAY MODE | CHANNEL | SETTINGS |
|---|---|---|
| Off | Assigns Relay | High Value |
| High | to Analog | Low Value |
| Low | Inputs | Delay On |
| Trigger Mode | Flow meters | Delay Off |
| Summary | Digital Inputs | |
| Supervisory | | |

Relay High: Relay energizes on an increasing process variable.

Relay Low: Relay energizes on a decreasing process variable.

Trigger Mode: Assigns relay.

Summary: Summary relay will energize if any of the other relays go into alarm.

Supervisory Relay: Relay will reenergize in unit fails.

Channel: Assigns relays to any analog input.

**SETTINGS**

High Value: High alarm relay set point.

Low Value: Low alarm relay set point.

Delay On: Time before the relay energizes once the set point is reached.

Delay Off: Time before the relay changes state after the process variable goes out of alarm.

Trigger Settings: (Flow meter). The set point value at which the relay energizes.

Pulse Width: Sets the relay closure time between 0.1 to 99 seconds.

**RETURN TO RUN MODE**

Hit exit key multiple times until the Run Mode display appears.

For service, wiring, and startup questions contact the service center in your area:


*SALES*
5480 La Sierra Drive
Dallas TX 75231
972.250.2093
72.250.6870 - Fax

*ADMINISTRATIVE*
P O Box 835338
Richardson TX 75083
972.250.2093
972.250.6870 - Fax

*MANUFACTURING*
4700 Elmo Weedon Road #116
College Station TX 77845
979.776.5148
979.776.5145 - Fax

PRODUCT DATA SHEET
00813-0100-4360

# OAP -114

**Oilfield Automation Products, Inc.**

August 2004

## DESCRIPTION

OA Products' single channel controller provides a dependable and economical method to accurately measure and control tank levels, flow rates, and pressures.
Control up to four pumps using 10 amp rated relays with 100 percent adjustable dead band. When using the unit as a flow/valve controller, the relay can be set-up to pulse on and off and any combination of time delays. The relays can be set for lead log pump control.


## FEATURES

- Explosion Proof Enclosure
- Sunlight Readable
- (1) Each 4-20mA or MV/V Input
- (1) Each Pulse Input from Turbine Meters
- (2) Each Digital Input for Status
- (1) Each 4-20mA Isolated Output Rated
- (4) Each 10 amp Relays
- ModBus® & Ethernet® RTU
- Power 8 to 50 VDC
- Relay Simulation Mode

## APPLICATIONS

- Flow Rate Valve Controller
- VRU Controller
- Pressure Controller
- Tank Level Indicator
- Pump Alternation
- Small RTU
- Can input MV/V Transducer
- Pressure Flow Override Controller

# SINGLE CHANNEL CONTROLLER
# Model OAP-114
## SPECIFICATIONS

Except where noted, all specifications apply to operation + 25°C

### GENERAL

| | |
|---|---|
| Display: | LCD; Backlit |
| Display Update: | 2 seconds (0.5 Hz) |
| Programming Method: | Front Panel buttons |
| Password: | Programmable, restricts modification of settings |
| Non-Volatile Memory: | Settings stored for a minimum of 10 years |
| Power: | 8-30VDC, 15 W |
| Surge Protection: | Analog inputs have chokes & TVSs |
| Operating Temp Range: | -20 to 140°F |
| Relative Humidity: | 100% |
| Storage Temperature: | -40 to 150°F |
| Connections: | Removable screw terminals & DB9 male |
| Dimensions: | 3” |
| Weight: | 5.5 lbs (2.5 kg) |
| Warranty: | One year parts & labor |

### SCREEN DISPLAYS

| | |
|---|---|
| Numeric Display: | Six digits, ±999999 or engineering units |
| Bargraph: | Ten divisions |
| Engineering Units: | User selectable or definable units (e.g. ppm, gal, m, lbs, g/h, psi, ozs, ft, mA, °C, °F, f&I, %) |
| Numeric Displays: | Show process value & engineering units |
| Individual Input Screen: | Show process and mA input value |
| Simulation Mode Screen: | Test setup without applying an input |

### ANALOG INPUTS

| | |
|---|---|
| Number: | One |
| Input Range: | 4-20 mA; minimum span of 1 mA |

### 4-20 mA ANALOG OUTPUT

| | |
|---|---|
| Number: | One - Isolated |
| Accuracy: | ±0.05% F.S. ±0.01 mA |
| Loop Resistance: | 10 to 600 Ω, powered by controller |
| External Power: | 12 VDC min (300 Ω); 32 VDC max (900 Ω max) |
| Isolation: | Line power isolated to 1500 VAC |

### MODBUS®

| | |
|---|---|
| Type: | RS-232 Modbus RTU |
| Baud Rate: | 1200 to 38400 |
| Data: | 8 bits (1 start bit, 1 stop bit) |
| Parity: | Even or None (none parity uses 2 bus bits) |
| Address: | Programmable between 1 and 247 |
| Transmit Delay: | Programmable between 0 and 300 ms |

### ETHERNET® Yes

### RELAYS

| | |
|---|---|
| Number: | 4 |
| Type: | SPDT (Form C) with built in MOVs |
| Rating: | 10 A @ 120/240 VAC resistive load; 1/3 HP @ 120/240 VAC inductive loads; 10 A @ 28 VDC |
| Minimum Load: | 50 mA for AC, 10 mA @ 5 VDC |
| Time Delay: | Programmable on/off delays, 0-999.9 secs |

### OPERATION

| | |
|---|---|
| Hi or Lo Alarm: | Assign to analog or pulse channel for on/off relay control. 100% adjustable deadband. |
| Hi or Low Pulse Action: | Assign to analog or pulse input channel for pulsing on/off timed relay control. |
| | Programmable pulse width and delay. |

| | |
|---|---|
| Input Range: | 4–20 mA; minimum span of 1 mA |
| Input Impedance: | 130 Ω |
| Accuracy: | ±0.03% of span ± 1 count |
| Short Circuit Protection: | Current limited to 40 mA max |
| Transmitter Supply: | 24 VDC @ 20 mA per input |

## PULSE INPUTS

| | |
|---|---|
| Number: | One |
| Input Range: | 100mVp-p to 15 Vp-p; 1 Hz to 10kHz |
| Conversion Factor: | 0.00001 to 999999 |
| Totalizer: | Calculates total based on rate, stored in memory every 5 min |
| Totalizer Reset: | Via front panel buttons (password restricted) |

## DIGITAL INPUTS

| | |
|---|---|
| Number: | Two |
| Type: | Switch closure, open collection transistor, or logic level |
| Input Impedance: | 240 Ω |

| | |
|---|---|
| | Programmable pulse width and delay. |
| Trigger: | Assign to pulse channel for indication of User-defined total increment. |
| | Programmable for scaled pulse output. |
| Lead-Lag | Link multiple relays for sequential |
| Alteration | Operation. Programmable override set |
| (Sequence): | Points to turn on additional relays. |
| Pulse Width | Assign to analog or pulse channel for |
| Modulation: | On/off signal modulated based on input. |
| | User selectable cycle time. |

## MANUAL OVERRIDE

Override any relay (password restricted). Relays do not respond to input in this mode.