DELTA POINT™

EtherNet/IP™

Installation and Operation Manual
12 GPM EtherNet Unit

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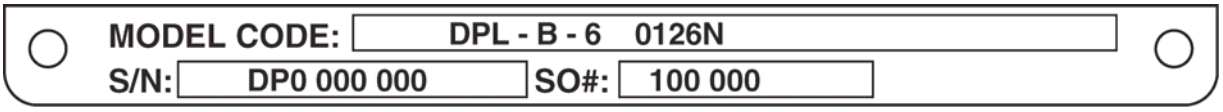
USING THIS MANUAL

In order to use this manual, you will need the model code that can be found on the nameplate of the flowmeter, as shown on the example below (see MODEL CODES). The Model Code allows you to determine minimum and maximum flow capabilities for the Delta Point water saver.

Nameplate Example



SPECIFICATIONS – 12 GPM (45 LPM) UNIT

Supply Voltage	24 VDC @ 750 mA (valve on)
Minimum Water Flow:	0.8 GPM (3 LPM)
Maximum Water Flow:	12.0 GPM (45 LPM)
Flow Measurement Accuracy:	±0.24 GPM (±0.9 LPM)
Flow Measurement Repeatability:	0.25% of actual flow
Minimum Detectable Leak:	0.5 GPM (1.9 LPM)
Response Time (Cap Pulled To Fault):	1.0 sec. typical with 30 feet. ¾ hose (9 meters)
Restart Delay:	1.0 – 3.0 sec. (user selectable) (See Note 1)
Water Temperature Range:	40 °F (4.4 °C) - 180 °F (82 °C)
Temperature Probe Accuracy:	±2 °F (±1 °C) from 32–200 °F (0–93 °C)
Operating Temperature Range:	32 °F (0 °C) - 122 °F (50 °C)
Storage Temperature:	-4 °F (-20 °C) - 158 °F (70 °C)
Port Size:	¾" NPTF (¾" BSPP)
Supply Water Pressure	
Minimum:	15 PSIG (1.0 bar)
Maximum:	100 PSIG (7 bar)
Differential Water Pressure	
Minimum:	2 PSID (.14 bar)
Maximum:	90 PSID (6 bar)
Pressure Drop Across Manifold (Including shut-off valve, manifold, ¾" I.D. 8-ft. hose, check valve):	2.1 PSIG @ 6 GPM @ 70 °F (.14 bar @ 22.7 LPM @ 21 °C)
Wetted Parts (Body and Sensor):	Brass, PVDF
Electrical Enclosure:	Aluminum
Weight:	14 lb. (6.4 kg.)

Pressure Drop Data

GPM	*1.5*	*2.0*	*3.0*	*4.0*	*5.0*	*6.0*	*7.0*	*8.0*	*9.0*	*10.0*	*11.0*	*12.0*	*13.0*	*14.0*	*15.0*
PSID	*0*	*.5*	*1*	*1.2*	*1.6*	*2.1*	*3.2*	*4.2*	*6*	*8.1*	*10.2*	*12.7*	*15.1*	*17.9*	*20.9*

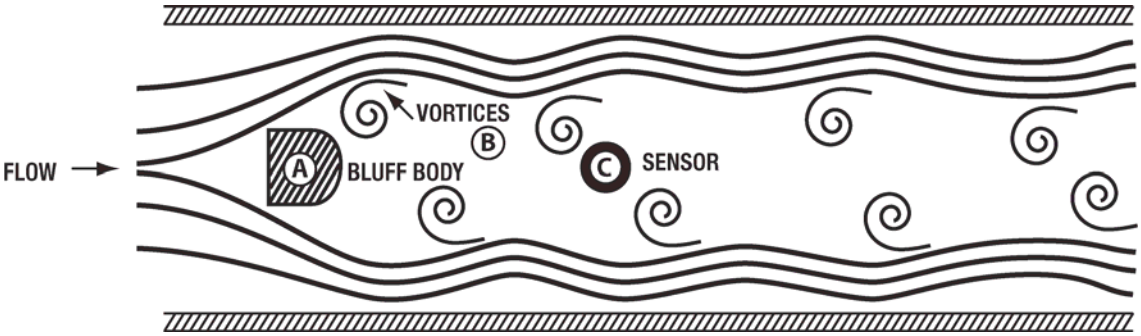
*Measured from inlet shut-off valve, through the unit, ¾" I.D. 8 ft hose loop, back through the unit and check valve.

Caution: The unit shall be supplied by a SELV (separated extra-low voltage) source in accordance with CSA Standard C22.2 No.1010.1-92 Annex H.

Environmental conditions: This device has been designed for use in Installation Category I, pollution degree 4, at altitudes up to 2000 meters (6560 ft.), either indoors or outdoors as defined in CSA Standard C22.2 No.1010.1-92.

Note 1: There is an additional 3-second delay at power-up associated with displaying the firmware banner. This delay is bypassed if a remote restart is sent to the instrument.

HOW VORTEX SHEDDING FLOW METER WORKS



When fluid passes by a bluff, oscillations occur. Examples of these oscillations in nature include the swirls produced downstream of a rock in a rapidly flowing river, or the waving of a flag in the wind with the bluff being the flag pole.

DeltaPoint Unit Supply Water Leg example above: The fluid strikes a bluff body (**A**), generating vortices (**B**) (eddies) that move downstream. The vortices form alternately, from one side to the other. A piezoelectric sensor housed in a sensor tube (**C**) directly downstream of the bluff senses the pressure zones created by the vortices. The sensor generates a frequency directly proportional to the vortices (flow). The pulses are then measured by the microprocessor.

Each DeltaPoint Unit has two vortex shedding flow meters. One flow meter monitors the supply path, and the other flow meter monitors the return path along with the temperature probe.
PLEASE NOTE: Bluff / Sensors not effected by dirty water.

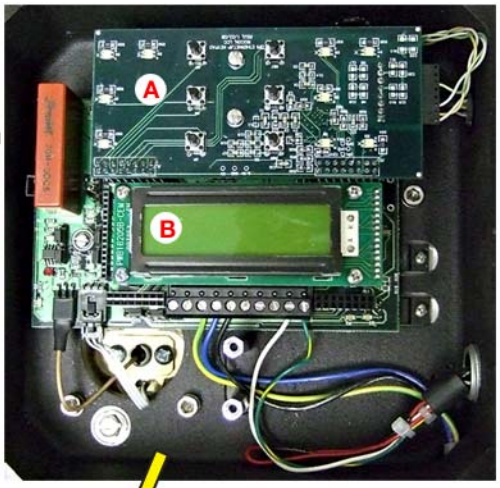
UNIT FRONT VIEW

A = Solenoid NC 2way Shutoff Valve
B = Manual Bypass Knob
C = Check Valve
D = Cover - LCD Screen
E = Cover - LED / Program Buttons
F = ID Tag
G = Power Supply Connector
H = Ethernet Connector

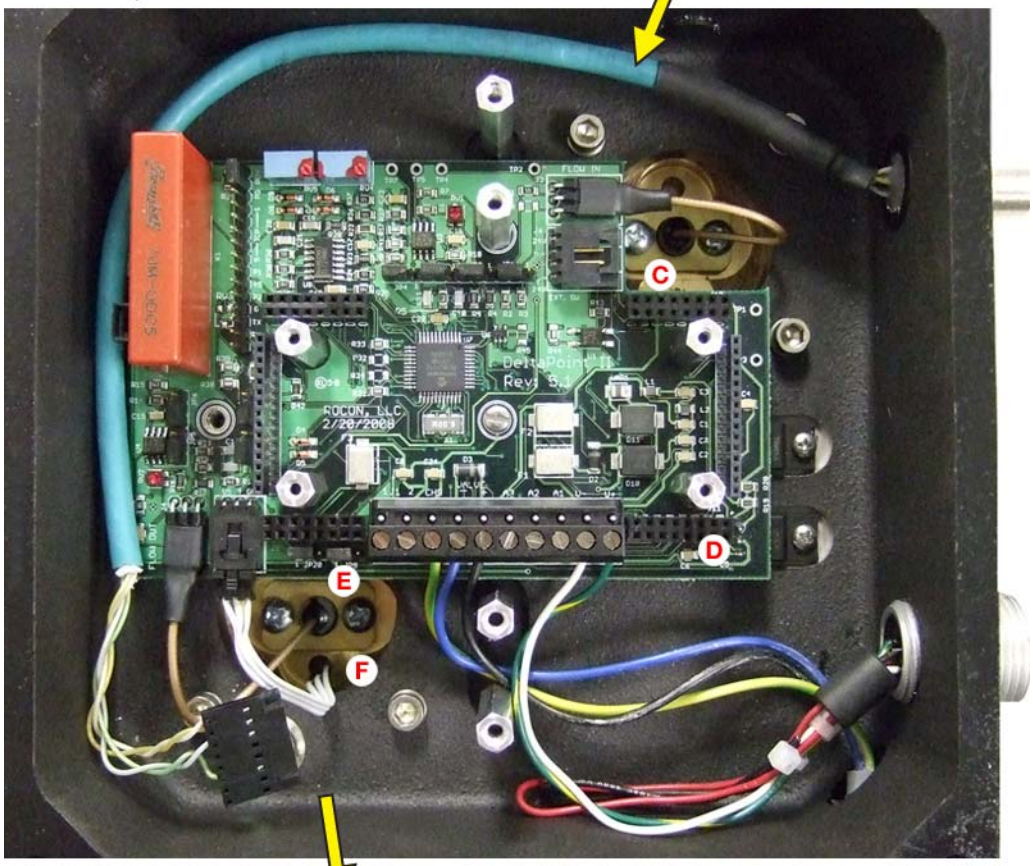
1 = Supply
2 = To Cell
3 = From Cell
4 = Return

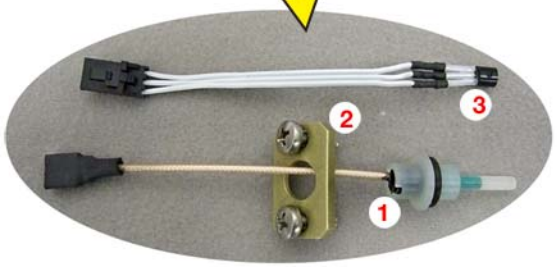
FRONT VIEW, ELECTRICAL ENCLOSURE, COVER REMOVED

A = Key Pad
B = LCD Screen



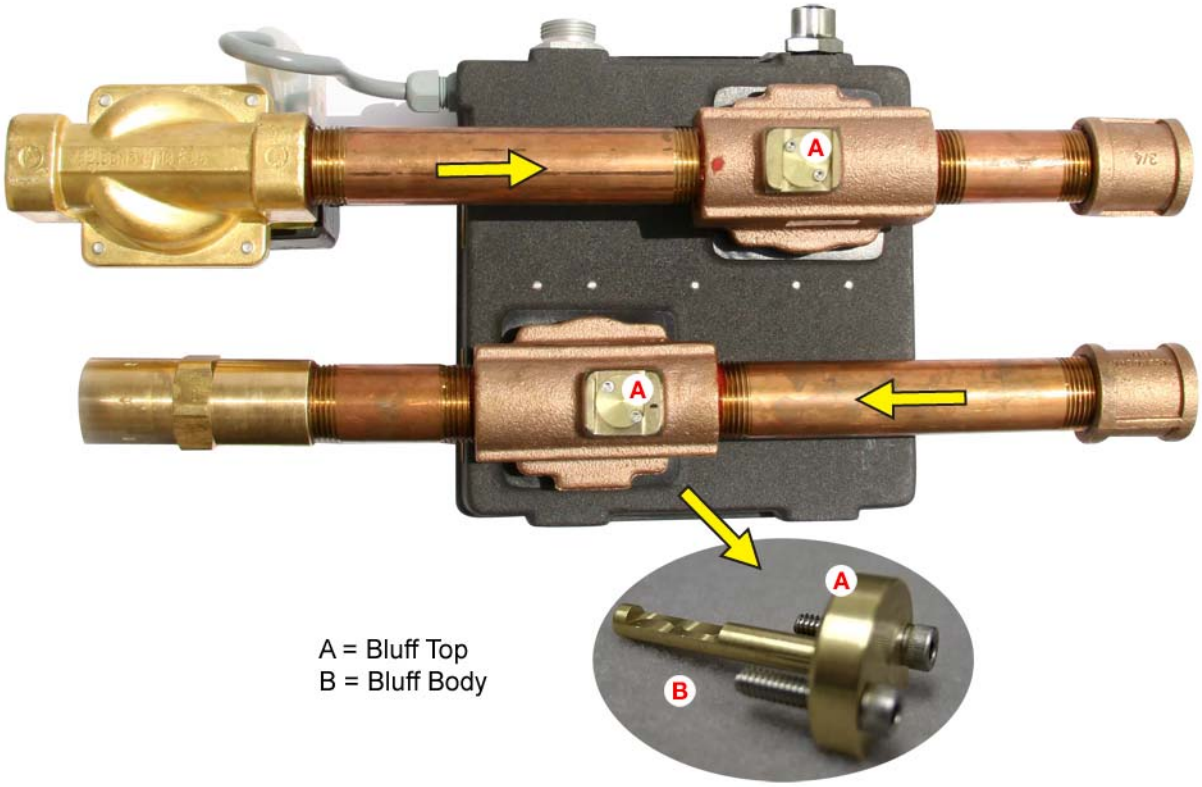
Electrical Box with Key Pad
and LCD Screen Removed
C = Supply Sensor
D = Mother Board
E = Return Sensor
F = Temperature Probe



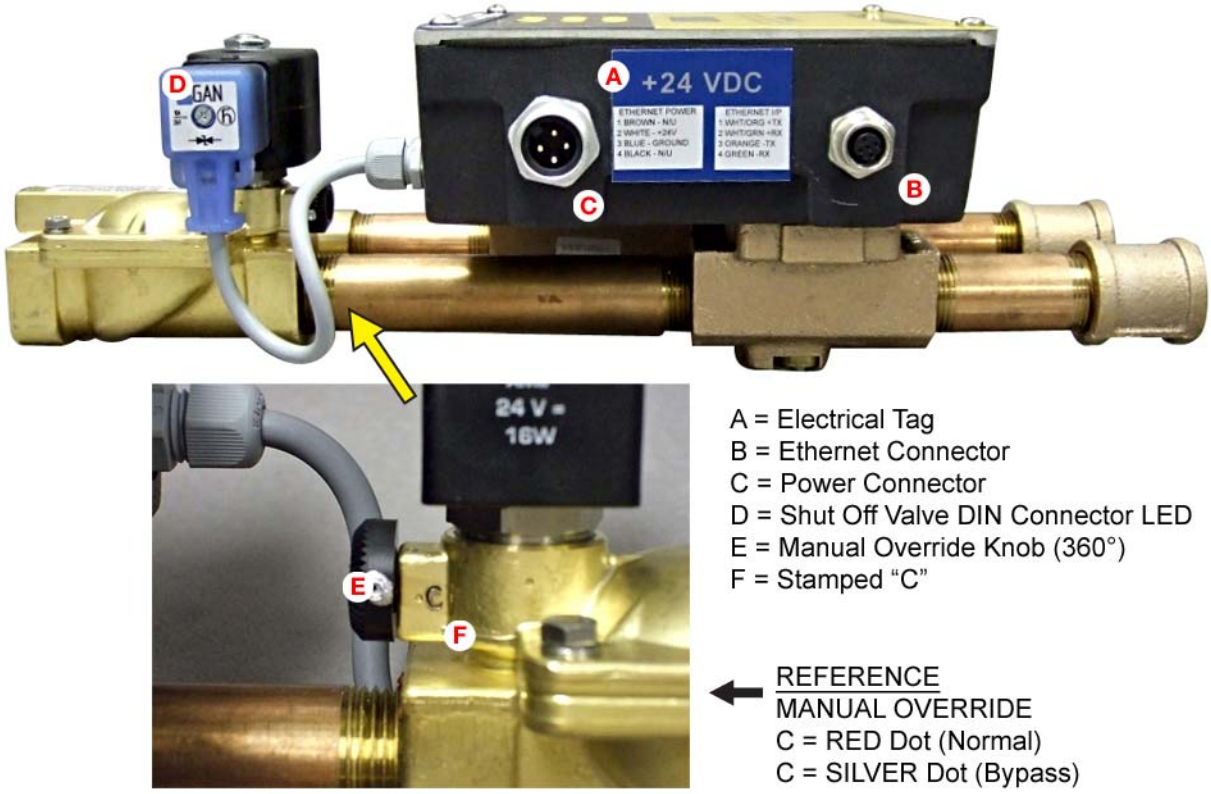


1 = Sensor (W/ ORing)
2 = Sensor Hold Down Bracket
3 = Temperature Probe

UNIT REAR VIEW



UNIT SIDE VIEW



A = Electrical Tag
B = Ethernet Connector
C = Power Connector
D = Shut Off Valve DIN Connector LED
E = Manual Override Knob (360°)
F = Stamped “C”

REFERENCE
MANUAL OVERRIDE
C = RED Dot (Normal)
C = SILVER Dot (Bypass)

HOW THE DELTAPOINT MONITORS COOLING WATER IN THE ROBOTICS CELL

Each DeltaPoint unit has two vortex shedding flow meters. One flow meter monitors the supply path, and the other flow meter monitors the return leg. The fluid strikes a bluff body, generating vortices (eddies) that move downstream. The vortices form alternately, from one side to the other. A piezoelectric sensor housed in a sensor tube directly downstream of the bluff senses the pressure zones created by the vortices. The sensor generates a frequency directly proportional to the vortices (flow). The pulses are then measured by the microprocessor.

An internal temperature sensor, housed in a small thermo well downstream of the return flow sensor, measures the fluid temperature.

The robotic cooling water enters through the SUPPLY port and travels through the inlet flow sensor, continues through the TO CELL port and to the equipment to be cooled. Water that has cooled the equipment reenters the unit through the FROM CELL port, through the return flow sensor and is then discharged into the plant return water system.

The inlet and outlet flow meter signals are compared. When a cap is pulled or a hose bursts the flow in the return leg drops below the supply leg. The microprocessor detects this difference and signals the weld controller to stop welding. It also shuts off the cooling water via a solenoid valve in the supply leg and a check valve in the return leg, thus stopping the water flow in both directions.

No field adjustment required, each unit is calibrated and tested at the factory. In fact no adjustments or tweaking needed even out of the box. Just connect the power and the unit is ready for operation. If custom adjustments preferred the unit is very easy to program for the following: FLOW OK, MINIMUM FLOW, OVER TEMPERATURE, LEAK RATE, RESPONSE TIME or RESTART DELAY and finally USA or METRIC setting.

INSTALLATION

1 DeltaPoint unit is preferred to be mounted on the outside of the fence line, for ease of service.

2 DeltaPoint can be mounted in any orientation: horizontally, vertically or at any other angle. The orientation has no effect on performance. It is suggested that unions or hosing be used when connecting to the main supply and return piping, this will facilitate ease of maintenance or removal of unit if needed.

3 The Cover can be rotated 180° to change the location of the shut off devices. Contact factory.

4 Caution: Brass pipe nipples installed on the “Supply” and “From Cell” ports cannot be removed. They are needed for proper operation of the flow sensors

5 See DIMENSIONS for mounting hole pattern.

6 Connecting fluid ports: The unit has ¾-inch NPT female pipe ports. Port 1 “SUPPLY” cooling water into the unit, Port 2 “TO CELL” cooling water to tooling or robot, Port 3 “FROM CELL” returns water from the cell or robot. Port 4 “RETURN” cooling water leaving the DeltaPoint unit.

7 Units can be installed where the pipe or hose diameter is larger than the port size. Do not exceed ¾-pipe or hose diameter with the 4 GPM unit and 1-inch pipe or hose diameter with the 12 GPM unit.
Caution: Water flow cannot exceed 5 GPM for a 4 GPM unit and 15 GPM for a 12 GPM unit.

8 Connecting electrical power. All units have an Electrical Callout Tag reference page 20 that describes the pin number, location, wire color and function.

9 Caution: When the water inlet ball valves is opened do it SLOWLY to prevent water hammer damage to the SENSORS.

10 Installation is complete.

If problems contact the factory. 248-542-9635 or 1-877-684-0589

SUGGESTED START UP PROCEDURE

1. Water OFF/Power OFF.

2. Connect electrical cable to Switch Box, turn Power ON. The LCD Screen and Power Light will be activated. If a problem occurs, see TROUBLESHOOTING.

A – Power activated – LCD Screen

A 0.0 GPM	BFault
C75 °F	OK

A = 0.0 GPM, Water flow not present.
B = FAULT, No water flow, ALARM
C = Water Temperature

B – Power activated – Status Lights

"FLOW OK" Green LED off

"MIN FLOW" Yellow LED – Solid

"VALVE", Red LED – Solid

3. If an air-operated shut-off valve is used:
   - Turn air shut-off ball valve open.
   - DIN connector pilot light deactivated.
   - Activate "Override" Red Button; push in and out several times. If you hear the sound of air exhaust, continue to the next step. If not, consult Factory.

4. WATER ON – **SLOWLY** turn the water shut-off ball valves open in both Supply and Return water legs.
   Push the **RESET** Button located on the front cover to allow circulation to remove air; clear all faults and restart the unit.

A – LCD Screen

A 7.4 GPM	BOK
C100 °F	OK

A = Actual Supply Water Flow
B = Water Flow Status OK
C = Water Temperature

B – Status Lights

"FLOW OK", Green LED – Solid

"MIN FLOW" Yellow LED - off

Shut-off valve DIN connector light is ON to indicated valve is open; otherwise, there will be no flow.

START-UP TEST CYCLE

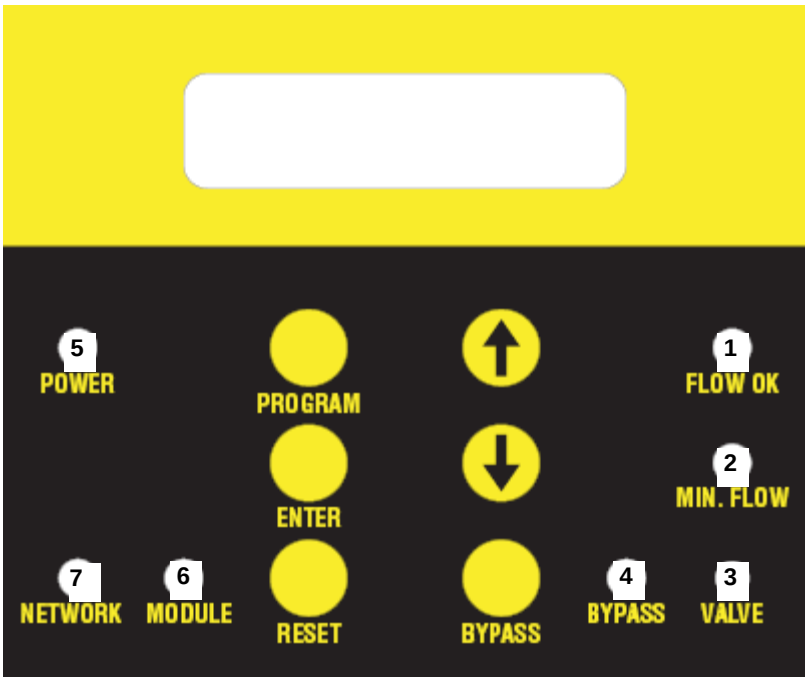
Shut-Off Fault Alarm and Weld Controller Fault Alarm Test

If unit is operational with water flow present:
1. Turn one of the cooling water shutoff valves OFF.
2. The LCD screen indicates “Water Flow Fault.”
3. The LED status lights indicate that:
   a) Minimum/Low Flow – Solid (Yellow)
   b) Shut-Off Closed – Solid (Red)
4. The DIN Connector LED on Solenoid Valve is OFF, because the shut-off valve solenoid coil is deactivated.
5. Confirm that the Weld Controller received “Water Flow Fault” through the EtherNet communication (see ETHERNET I/O MAP).
6. Open the cooling water ball valve; push **RESTART**. Unit should be activated as described above.
7. If no problems occurred, proceed to the next test. If unit did not pass, see TROUBLESHOOTING.

Leak and Response Time Test

If unit is operational with water flow present:
1. Pull off one of the weld gun arm electrode caps.
2. The water shuts off and the LCD screen indicates “Fault.” Status Lights #1 and #3 are activated.
3. Reinstall weld gun cap.
4. Send a remote **RESTART** (through EtherNet) or push **RESTART** on the front panel of the unit and wait 3 seconds for the unit to return to normal operation.
5. Pull off the other weld gun arm cap. And verify Steps 1-4, above.
6. If a faster response time is needed, lower the response time and/or the leak rate (see USER MENU).
   CAUTION:
   - If the setting gets too low or is too fast, false leak faults could occur. Continue testing until satisfactory results are obtained.
7. If the unit passed the above tests, it is ready for the production line.

INDICATOR LIGHTS, PROGRAMMING KEYPAD, AND LCD MESSAGES EXPLAINED



	Color	Status	Function	Comments
1	Green	Solid	OK	Programmable. Flow => Flow OK setpoint. LCD shows “Flow OK”
1	Green	Flashing	Temperature Fault	Programmable. Temperature exceeds Temp. Fault setpoints. LCD shows “Fault” on the second line.
2	Yellow	Solid	Low Flow	Non-programmable. Flow is between Min Flow and Flow OK setpoints. LCD shows “Low Flow”
2	Yellow	Solid	Minimal Flow	Programmable. Flow =< Min Flow setpoint. LCD shows “Min Flow” (Note: Text on the instrument cover plate may show Flashing = Minimal Flow. This is no longer the case. The firmware has been revised to keep the yellow LED solid under both Low and Minimal flow conditions.)
3	Red	Solid	Valve Shut	Shut-off valve closed. Can happen when leak exceeds Leak Rate setpoint or flow < Low Flow.
3	Red	Flashing	Valve Shut Off Failure	Shut-off valve failure. Power off to coil but water flow is still present.
4	Yellow	Solid	In Bypass	“BYPASS” button pushed, shut-off valve *forced* open.
4	Yellow	Flashing	Flow Fault in Bypass	Flow fault detected but valve cannot be shut off because the unit is in “Bypass.”
5	Green	Solid	Power On	24V-DC (Aux. power) present.
6	Green / Red	Solid	EtherNet Module	Green LED OK - Red LED indicates error
7	Green / Red	Solid or Flashing	EtherNet Network	Flashing Green LED means waiting for server communication Red LED indicates error

INDICATOR LIGHTS, PROGRAMMING KEYPAD, AND LCD MESSAGES EXPLAINED - CONTINUED

Programming Via Keypad

1 

Push and hold for 1 second to enter User Menu.

2 

View IP address, Subnet Mask, and MAC ID (3 seconds each). This is only for "viewing", not for changing the address. MAC ID is a pre-assigned value by EIP server. It cannot be changed by the user.

3 

View input/output status in binary format on the LCD second line. It is displayed as 000 00000000. The first 3 bits are the remote command bits (from orig into to water saver). The next 8 bits are the water saver status bits being sent to the originator.

4 

View inlet flow on the LCD first line, outlet flow on the second line. A troubleshooting aid to compare sensor values.

5 

Push once to force the shut-off valve open; push again to return to normal operation. ***Caution***: Unit will not shut off water, but will send alarm fault when cap loss is detected.

6 

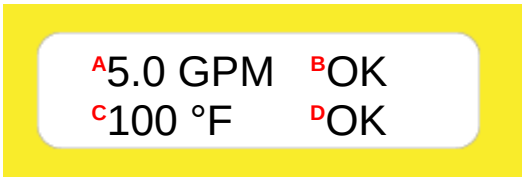
Push to manually restart after Fault or push to exit from User Menu.

7 

\+ 

Factory default values. Press ENTER first. While IP, Mask, and MACID values are being displayed, press and hold PROGRAM (holding both buttons together). The unit will enter Factory Reset. When the dots on the LCD reach the end of the line the unit restores all of its factory set points (IP address and Subnet mask will not be changed to factory setting, as there is no standard setting for these parameters). When "DONE" is displayed, release the buttons.

INDICATOR LIGHTS, PROGRAMMING KEYPAD, AND LCD MESSAGES EXPLAINED - CONTINUED



LCD, 2 line x 16 character backlit alphanumeric

A The current amount of water flow through the Supply side. Return side water flow is not displayed but it is always close to Supply side; otherwise, a leak fault would occur. Expressed in GPM or LPM; the amount can vary per unit used.

B The status of the current water flow: OK, Low, Min or Fault.
When in Fault condition, unit sends alarm to weld controller.

C The current temperature of the water. Expressed in Fahrenheit or Celsius.

D The status of the current water temperature: OK or Fault.

Power-up
Unit starts out by displaying:

"DPII R5.1.1.09"
"EIP1.01 3-19-08"
After 1 second, the second line shows "Going Online…"

After 5 seconds the unit enters RUN mode and starts monitoring flow and temperature. The 5-second startup is not user adjustable. This is part of the Ethernet communication startup sequence.

Faults
Leak: Closes the valve, sends the corresponding bits to EIP.
No-Flow: Closes the valve, sends the corresponding bits to EIP.
Temperature: Does not closes the valve, sends the corresponding bit to EIP. (Green LED no longer flashes in temperature fault.)

LCD messages
"Local RESET": Reset button pushed, shown while the startup delay is counting down.
"EIP RESET": Remote reset command is active. It remains in this state and continues counting down through the startup delay repeatedly until this bit is cleared by the EIP server.

"EIP Bypass ON": Remote bypass command is active.

"EIP BP/SO": Remote Bypass and water Shut-Off are both active (Bypass overrides Shutoff and keeps the valve open).

Heartbeat: Flashing dot on the last LCD position (end of second line). Flashing means the flow is being monitored and results displayed on the LCD. No flashing means flow is no longer being monitored (reset is needed).

INDICATOR LIGHTS, PROGRAMMING KEYPAD, AND LCD MESSAGES EXPLAINED - CONTINUED

Bypass Button

CAUTION PLEASE NOTE

ONCE THE ROCON / DELTAPOINT UNIT IS PLACED IN BYPASS, THE OPERATOR IS CHOOSING TO IGNORE THE MONITORING OF THE WATER FLOW TO THE CELL (IE – WATER OFF OR LEAK). THEREFORE ROCON, IS THEN RELIEVED OF RESPONSIBILITY FOR ANY RESULTING PERSONAL OR EQUIPMENT DAMAGE.

All faults can be bypassed either locally or remotely. EIP bypass overrides the local pushbutton bypass (local bypass cannot undo the remote bypass command).

Note: Unit must be restarted after a fault, even if bypass has opened the valve to allow water flow. The reset can be either local or through EIP. This allows the faults to reset, and the unit to resume monitoring.

When in bypass, the unit will energize and continue to energize the solenoid shutoff valve (SV); as well as set the “Bypass” and “OK to Weld” bits, allowing the robot to weld. The SV will remain on until the bypass command is released from its origin, or the unit is reset locally.

If the unit is placed in bypass and a fault occurs, water will continue to flow, however the Min Flow bit will turn off and the “fault” LED will be flashing. The “Bypass” and “OK to Weld” bits will remain on, allowing the robot to weld.

Water Shutoff

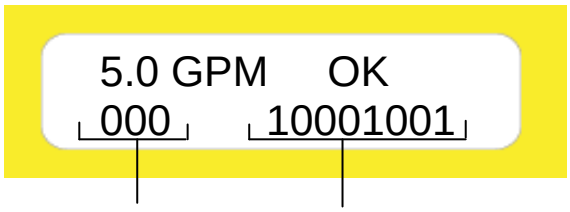
Leak or No-flow faults cause the water to shut off. Remote command (EIP Water OFF) also de-energizes the valve shut, EXCEPT when there is a remote Bypass request. If EIP Bypass is ON, the EIP Water OFF command will not shut the valve. Remote Water OFF command overrides local Bypass (if the unit is in bypass via the pushbutton, the remote command can still shut the valve).

Reset

Local pushbutton and EIP Reset command. Startup delay user programmable or 1-3 seconds.

Viewing EtherNet Bit Patterns

Bytes 1 and 4 can be viewed on the LCD for informational and/or troubleshooting purposes. When the instrument is run mode, press and hold the UP arrow on the keypad, the second line on the LCD will look like this:



From EtherNet Master

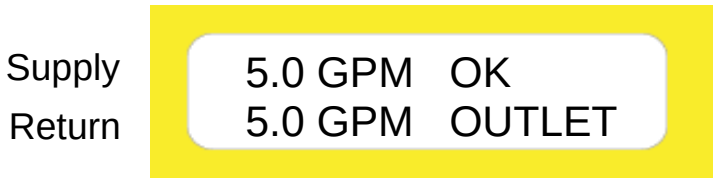
From Watersaver to EtherNet Master

(Push and hold)

INDICATOR LIGHTS, PROGRAMMING KEYPAD, AND LCD MESSAGES EXPLAINED - CONTINUED

Viewing Flow Comparison Values

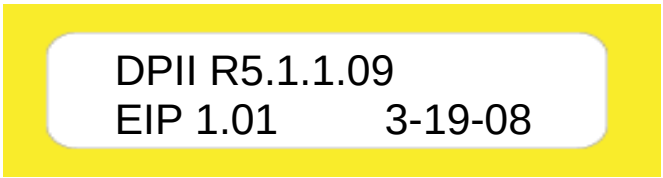
Supply and Return flows can be viewed simultaneously to aid in Sensor Verification/Troubleshooting.




(Push and hold)

Viewing Firmware Revision

Firmware revision displayed at power up only.



Factory Reset

To change all the setpoints back to the original factory values, proceed as follows:

- In Run mode, push and hold ENTER.
- While holding ENTER, push and hold PROGRAM.
- The LCD will show “Factory Reset” on Line 1 followed by “…” on Line 2. After 5 seconds, the LCD displays “DONE”, release pushbuttons. The unit reverts back to the original setpoints. See FACTORY SETPOINTS.

PROGRAMMING - USER MENU

Press the PROGRAM button on the keyboard to enter the User Menu.

- The PROGRAM button is used to enter or skip each individual menu. For example, to change Response Time, push PROGRAM 6 times until Response Time is displayed.
- In any of the above menus, if no buttons are pushed for 5 seconds, the User Menu reverts back to Run mode.

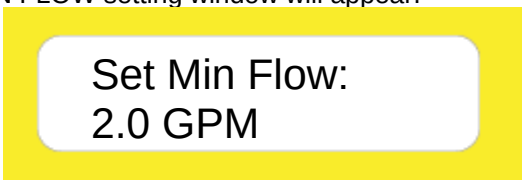
REFERENCE

STANDARD FACTORY SETPOINTS

Parameter	**12 GPM**	
	Range	Factory Setpoint
Flow OK	1.0 - 12.0	4.0
Min Flow	0.8 - 11.5	2.0
Low Flow	Not adjustable	<1.5
Leak Rate	0.5 - 1.0	1.0
Fault Temp.	45 - 210 °F	150 °F
Response Time	.5 - 3.0 sec	0.5 sec.
Restart Delay	1.0 – 3.0 sec.	1.0 sec.
Engineering Units	English -Metric	English

Set Min Flow

Push PROGRAM button, the MIN FLOW setting window will appear.



What is Displayed:

2.0 GPM — Current setpoint

Adjustable Range: — *12 GPM:* .8 – 11.5 GPM in 0.1 increments

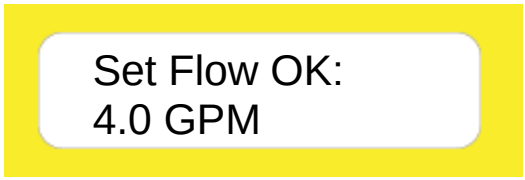
- To change this value, use the UP and DOWN arrows. When the desired value is selected, push ENTER to record in memory. SET will be displayed on the LCD, and then the FLOW OK setting window will appear.

- To skip this menu and go to the next, push PROGRAM.

PROGRAMMING - USER MENU CONTINUED

Set Flow OK

The MIN FLOW value must change to enter into the FLOW OK screen.
Please Note: MIN FLOW must be 0.5 GPM less then FLOW OK value.



What is Displayed:

4.0 GPM	Current setpoint
Adjustable Range:	*12 GPM:* 1.0 – 12.0 GPM in 0.2 increments.

- To change this value, use the UP and DOWN arrows. When the desired value is selected, push ENTER to record in memory. SET will be displayed on the LCD, and the LEAK RATE setting window will appear.

- To skip this menu and go to the next, push PROGRAM.

Set Leak Rate

What is Displayed:

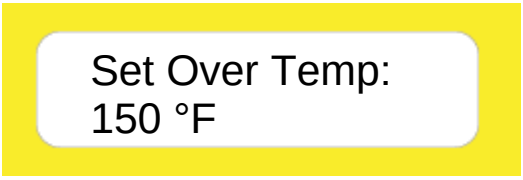
1.0 GPM	Current setpoint
Adjustable Range:	*12 GPM:* 0.5 – 1.0 GPM in 0.1 increments
	Note: Setting the leak rate to a higher value prevents false errors.

- To change this value, use the UP and DOWN arrows. When the desired value is selected, push ENTER to record in memory. SET will be displayed on the LCD and the HIGH TEMP setting window, followed by the LOW TEMP setting window will appear.

- To skip this menu and go to the next, push PROGRAM.

PROGRAMMING - USER MENU CONTINUED

Set Over Temperature



What is Displayed:

150 °F	Current setpoint
Adjustable Range:	45 F – 210 F in 5 degree increments

What Happens:

When water temperature in the return leg is over this value, the LCD displays “Fault” and the fault signal is transmitted to the weld controller. The Green FLOW OK, LED on the membrane also flashes.

- To change the OVER TEMP value, use the UP and DOWN arrows. When the desired value is selected, push ENTER to record in memory. SET will be displayed on the LCD and the RESPONSE TIME setting window will appear.
- To skip this menu and go to the next, push PROGRAM.

PROGRAMMING - USER MENU CONTINUED

Set Response Time

What is Displayed:

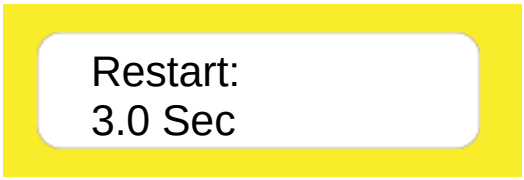
1.0 Sec	Current setpoint
Adjustable Range:	0.5 – 3.0 seconds in 0.5 increments

What Happens:

DeltaPoint tries to look for a Leak Fault within this timeframe. For higher values, the flow readings are averaged internally for the defined period. This may be a good idea to prevent false errors.

- To change this value, use the UP and DOWN arrows. When the desired value is selected, push ENTER to record in memory. SET will be displayed on the LCD, and the RESTART time setting window will appear.
-
- To skip this menu and go to the next, push PROGRAM.

Restart Delay



What is Displayed:

3.0 Sec	Current setpoint
Adjustable Range:	1 – 3.0 seconds in 1.0 second increments

Note: There is an additional 3-second delay at power-up associated with displaying the firmware banner. This delay is bypassed if a remote restart is sent to the instrument.

What Happens:

At power up, DeltaPoint waits this long before it starts monitoring the water flow. This is the time that it takes for water flow to stabilize throughout the circuit after the solenoid valve is opened, and for removing all trapped air in the water line after a cap is replaced. Short delays may result in a mismatch between the Supply and Return flow readings, thus issuing an incorrect Fault signal.

- To change this value, use the UP and DOWN arrows. When the desired value is selected, push ENTER to record in memory. SET will be displayed on the LCD, and the UNITS setting window will appear.

- To skip this menu and go to the next, push PROGRAM.

PROGRAMMING - USER MENU CONTINUED

UNITS

What is Displayed:

English	Current setting
Selectable	English or Metric

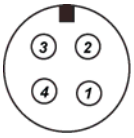
What Happens:

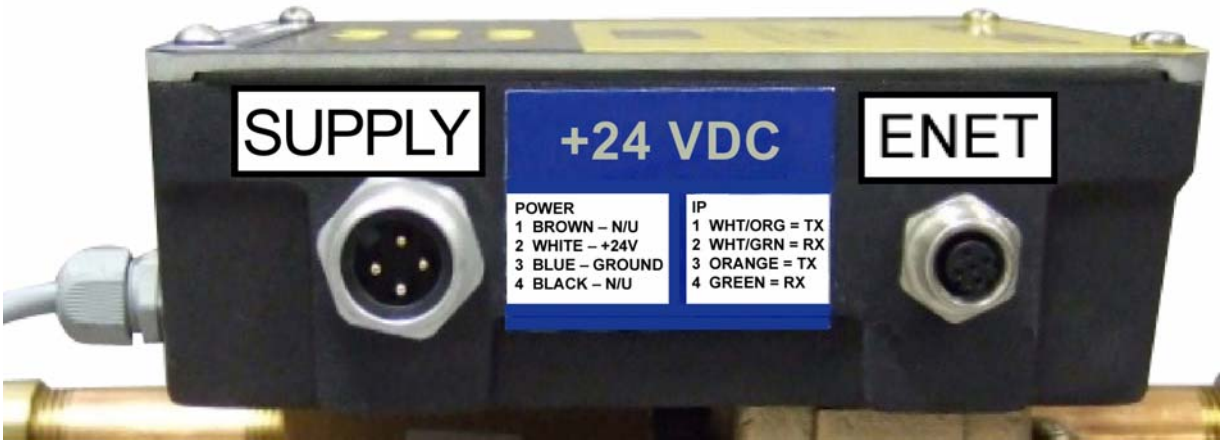
The display will be in GPM / F for English or LPM / C for Metric

- To change this value, use the UP and DOWN arrows. When the desired value is selected, push ENTER to record in memory. SET will be displayed on the LCD, and the UNITS setting window will appear.

- To skip this menu and go to the next, push PROGRAM.

ELECTRICAL CONNECTORS

Supply Power Connector	EtherNet Connector
(View of Cable Side)  1 Brown – N/U 2 White – +24V 3 Blue – GROUND 4 Black – N/U	(View of Cable Side)  1 White/Orange = TX+ 2 White/Green = RX+ 3 Orange = TX- 4 Green = RX-



EtherNet I/O Map

Input Points – From the Water Saver to the EtherNet Master

There are 4 bytes associated with the input points, as follows:

- Byte 1 (transmitted first):

bit 0	OK to Weld	1 = ok	Tripped when a fault (either flow or temperature) occurs.
bit 1	Valve Closed	1 = closed	Solenoid valve is shut off due to fault or cap change.
bit 2	Bypass	1 = bypass	Water saver is in bypass (does not close the solenoid valve when a leak is detected).
bit 3	Minimal flow	0 = flow is minimal Below Min Flow	Monitors the supply flow. It is tripped when water flow is below minimum.
bit 4	Leak	1 = cap lost	Cap loss indicator. Outlet flow < inlet flow (1 = cap lost, 0 = ok to operate)
bit 5	Not used	Always 0	
bit 6	Temp Fault	1 = temp ok 0 = temp fault	Tripped when water temperature exceeds the limit.
bit 7	Not used	1 = Power On	

- Byte 2: Supply flow in GPM (analog, transmitted as 10x the flow value)
- Byte 3: Return flow in GPM (analog, transmitted as 10x the flow value)
- Byte 4: Water temperature in °F (analog, transmitted as 1x temperature value)

Output Points – From EtherNet Master to the Water Saver

There is one byte associated with discrete output points:

Bit 0	Reset water saver	1 = reset the Water Saver	0 = normal run
Bit 1	Water off	0 = water on	1 = shut off the water
Bit 2	Bypass	0 = Normal Run	1 = Bypass
Bit 3	Not used		
Bit 4	Not used		
Bit 5	Not used		
Bit 6	Not used		
Bit 7	Not used		

MAINTENANCE

DeltaPoint water savers require no maintenance. If the flow tubes become clogged with debris, the unit should be removed for service and cleaning. Significant clogging may result in erratic operation, errors or faults. Do not place tools into the tubes, as this may permanently damage the vortex sensor. The vortex sensor *cannot* be repaired.

To clean the flow tubes, remove the shut-off valve and check valve. Run clean water into the downstream end of each leg. Large objects jammed against the bluff body may be dislodged by lightly tapping the upstream end of the flow tube against a firm surface. **CAUTION: Do not tap the flow tube too hard or damage may occur.**

Shut-Off Valve

The manufacturer recommends that the diaphragm be removed and cleaned periodically. The operation of the valve is based on small orifices functioning properly. Depending on the level of water contamination, cleaning frequency could vary from monthly to yearly. If a low-maintenance type valve is required and air is available, please contact factory and request information on the air-operated shut-off valve.

Check Valve

If check valve is leaking, it may be disassembled and cleaned.

See APPENDIX for information on this valve.

Cleaning

These meters do not require any special cleaning of the external surfaces. If cleaning is deemed necessary, strong solvents, detergents, or chemicals should not be used. A damp cloth may be used to wipe off dirt or debris.

Note

If used outside the parameters specified in this manual, the proper operation of the flowmeter cannot be guaranteed.

TROUBLESHOOTING

	PROBLEM	EXPLANATION/SOLUTION
1	LCD blank, no LEDs	Power not present. Check power cable.
2	LCD Line 2 “Return > Supply”	Refer “LINEARITY TESTING”
3	EtherNet “Network Status”	If the LCD shows readings, the EtherNet communication may or may not be working. Step 1 - Remove the faceplate and check if the keypad is plugged onto the motherboard properly. Step 2 - Check for loose screws on the keypad.
4	EtherNet “Module Status”	EtherNet communication problem. Make sure the proper EDS file is loaded on the EtherNet Master computer.
5	DeltaPoint does not respond to remote shut-off and/or restart commands from EtherNet Master	Check the EtherNet Master program to make sure these bits are correctly transmitted to the water saver (see ETHERNET I/O MAP). Only bits 0, 1 and 2 are used. Bits 3-7 are ignored by the water saver.
6	DeltaPoint does not transmit the correct data on EtherNet	Make sure the “Module Status” LED is green (on). If not, see numbers 4 and 5 above. See ETHERNET I/O MAP for the correct bit pattern and data format.
7	“EIP WATER OFF” LCD Line 1 Shows and Solenoid Valve Shuts	A Shut-Off signal was received via EtherNet. See ETHERNET I/O MAP for the correct bit pattern. Bit 1 must return to 0 (Logic 0) after a Shut-Off Request (Logic 1) has been sent to DeltaPoint.
8	DeltaPoint continuously restarts	A Restart signal was sent via EtherNet, and the request is still active. “EIP RESET” will be displayed on the top line of the display. See ETHERNET I/O MAP for the correct bit pattern. Bit 0 must return to 0 (Logic 0) after a Restart Request (Logic 1) has been sent to DeltaPoint.
9	DeltaPoint restarts and shows flow briefly, then proceeds to shutdown	a) EtherNet shutoff bit has not been reset by the server. b) The return sensor affected by debris or malfunctioning Refer – “**COMPARISON TESTING**” and “**SUPPLY FLOW IS GREATER THAN RETURN FLOW**”. If either sensor is misreading, first flush the Bluffs, then work on sensors.
10	Comparison Testing	The test is performed by pressing the “DOWN” Arrow button on the front cover. It can be pressed at any time during operation. The display shows both supply/return flow rates, if the difference is greater than 0.5 GPM (return being lower), then there might be a problem with the return sensor. Refer “**REPLACING THE SENSOR**”

11	Flushing the Bluff	Procedure to flush the Bluff Chamber: **Step 1** – Closed both Supply/Return ball valves. Bleed off the water pressure by loosening a hose downstream or pulling a weld gun arm cap. **Step 2** – Using a 3/32 Allen Head Wrench remove both Bluffs' hold down screws. Remove bluffs, is there debris on ether bluff – remove. **Step 3** – Solenoid Valve – switch to BYPASS position. **Step 4** – Tighten the bleed off hose fitting or replace cap. **Step 5** – Supply Ball Valve – With the bluffs removed flush the sensor bodies by partially opening the valve and spraying with short bursts for 10 seconds to flush out the bodies. Any contamination build up should have been removed. **Step 6** – Reverse above steps and activate the Unit for proper operation.
12	Water doesn't shutoff.	Once both shutoff devices are closed (no electrical power). **Step 1** - Partially open the supply ball valve. If the water flows, then there is a problem with the solenoid valve. **Step 2** - If the water does NOT flow, shut the supply ball valve off. **Step 3** - Partially open the return valve. If the water flows, then there is a problem with the check valve.
13	Solenoid Valve Problem	Solenoid Valve will not shutoff the water: **Step 1** - Check the manual override on the valve. Confirm that it is in the NORMAL OPERATION position. Refer to APPENDIX Shutoff Valve Specification. The valve could have debris blocking the balancing orifice or the Plunger Assembly is stuck in the open position in the Sleeve Assembly. **Step 2** - Remove the coil / Din connector assembly. Remove the 4 screws holding the cover to the body. Turn cover over and insert a thin wire in the balance hole (farthest from the manual bypass knob) to insure that the orifice is not blocked. **Step 3** – Remove the Sleeve Assembly. The internal parts will be the Plunger and Plunger Spring. Do they move up and down freely? If NO then clean or replace with new Sleeve Assembly. **Step 4** - Replace the valve cap and the coil, reassemble and confirm that this has resolved the problem by removing another tip.
14	Check Valve Problem	Check Valve will not shut off the water. **Step 1** - The only way to remove the debris is to change out the check valve with a replacement and then clean out the check valve on the bench. **Step 2** - Remove the snap ring and push the piston out to remove any debris. **Step 3** - Replace the new check valve with the cleaned valve, reassemble and confirm that this has resolved the problem by removing another tip.

15	SUPPLY FLOW is greater than RETURN FLOW (UNIT CONTINUOUSLY FAULTS OUT)	This usually is a “return sensor” problem. Refer “**COMPARISON TESTING”** and “**FLUSHING THE BLUFF**”.
16	RETURN FLOW is greater than SUPPLY FLOW	This usually is a “supply sensor” problem. Refer “**COMPARISON TESTING”** and “**FLUSHING THE BLUFF**”.
17	Replacing the Sensor	Procedure to replace the a sensor: **Step 1** - Remove Power / Ethernet Cables. **Step 2** - Turn off the water and bleed off the pressure by loosening the hosing downstream (drains water out of sensor chamber, preventing water leaking into electrical box). **Step 3** – Remove the Cover – slotted screw driver. **Step 4** – Remove the Key Pad circuit board – slotted screw driver. **Step 5** – Remove the LCD screen – #2 Phillips screw driver. **Step 6** – Remove screws from hold-down bracket of the sensor to be swapped – Phillips screw driver. **Step 7** - Using a pair of needle nose pliers, remove the sensor. (Note the position of the “slot” in the sensor is vertical, following the flow). **Step 8** – Install new sensor and o ring assembly with needle nose pliers. **CAUTION**: Sensor SLOT must be aligned “perfectly” with the water flow direction. Slot can be rotated 180 degrees. **Step 9** - Replace the hold down bracket and screws, wipe down any water. **Step 10** – Replace the LCD screen, Key Pad and Cover. **Step 11** – Confirm the bleed off fitting is tight and the Supply/Return water ball valves OPEN. **Step 12** – Plug in the Power and Ethernet cables **Step 13** - Re-evaluate the unit. Push the “DOWN” Arrow. **ADVANCED TRAINING NEEDED FOR FOLLOW:** Adjusting the replaced sensor’s flow rate to match the other sensor’s flow rate by turning the sensor pot. The flow rates should be within 0.1 of a gallon of each other. Contact factory for training.

18 If all else fails

If both sensors are drastically off the expected flow (by more than a gallon) and it appears that there is a major problem. You have 2 options:
Option 1 ship the unit to Rocon for recalibration or
Option 2 Rocon can furnish electronics "kit," which will have the motherboard and both sensors. This would be equivalent to replacing the entire unit.

To replace the Ethernet motherboard with its accompanying sensors (S or I=Supply and R or O=Return):
Step 1 – Shut off the supply/return water ball valves
Step 2 - Remove Power and Ethernet cables.
Step 3 - Remove the LCD display (4 Phillips head screws) and keypad (2 slot head screws).
Step 4 - Unplug all sensors (2 flow and 1 temp).
Step 5 - Remove the 2 slot head screws and 1 Phillips head screws holding the mother board to the box.
Step 6 – Remove the Keypad standoff.
Step 7 – Remove motherboard
Step 8 – Remove supply sensor hold down bracket and pull the sensor assembly out. Label with tape SUPPLY.
Step 9 – Remove the return sensor as describe in step 8.
Step 10 - Replace the sensors from the kit, follow the same procedure as describe in "**Replacing the Sensor**"
Please note Kit – Supply/Return Sensor must be installed in their respective chambers.
Step 11 – Install the Kit Motherboard, Keypad and LCD screen as describe above.
Step 12 - Reconnect the power cables.
The unit should be operating properly.
If not, refer to "**Flushing the Bluff**".
Consult factory if problem.

19 Bypass

There are both electronic and manual bypasses on the units. The electronic bypass is a button on the face of the unit, and once pushed energizes the solenoid valve coil and sends a signal to the robot that the unit is in bypass. The coil will continue to be energized, until the button is pushed again.

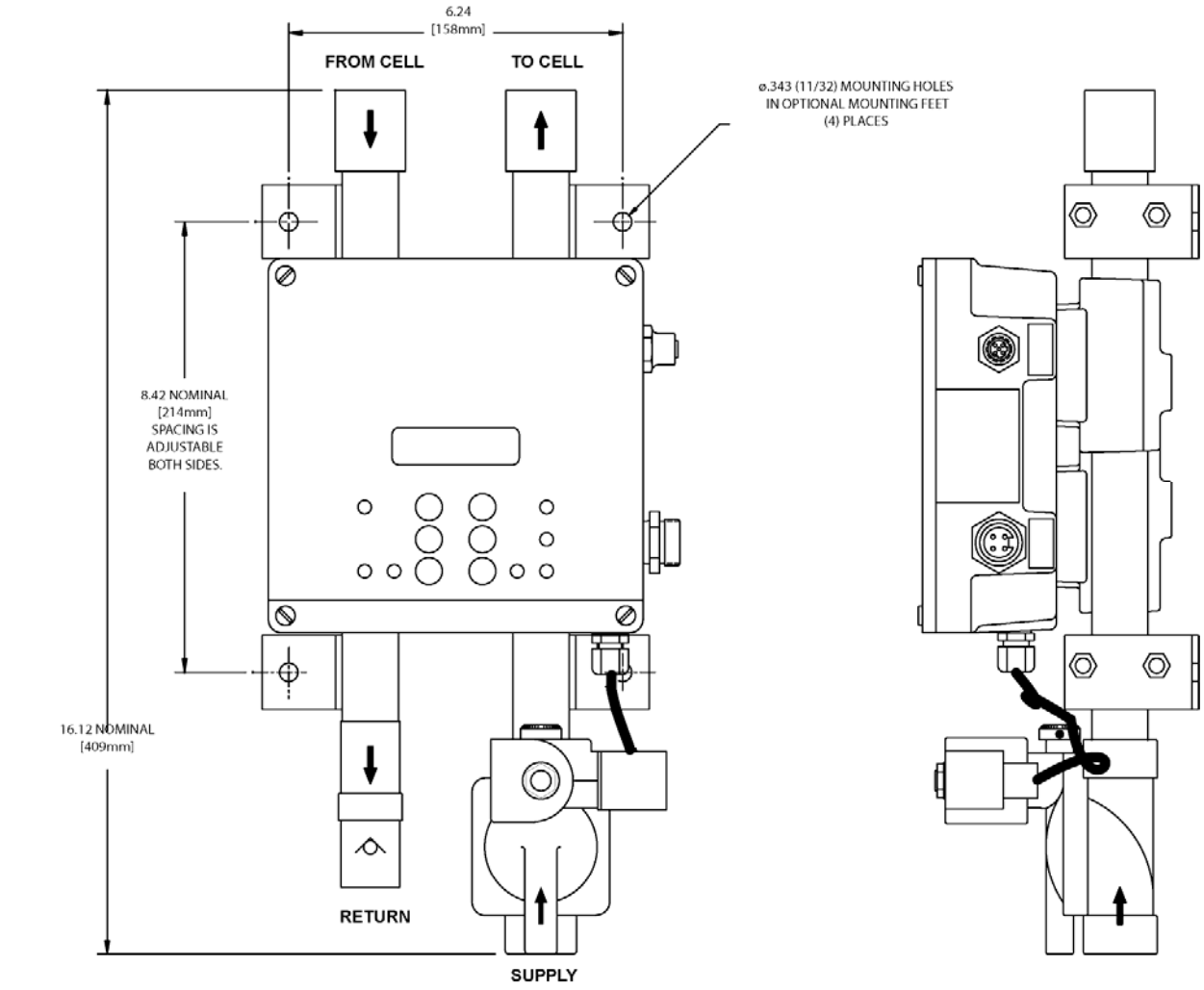
The manual bypass overrides the solenoid coil completely. It does not give a signal to the robot and water flow is maintained, regardless of the unit's status.

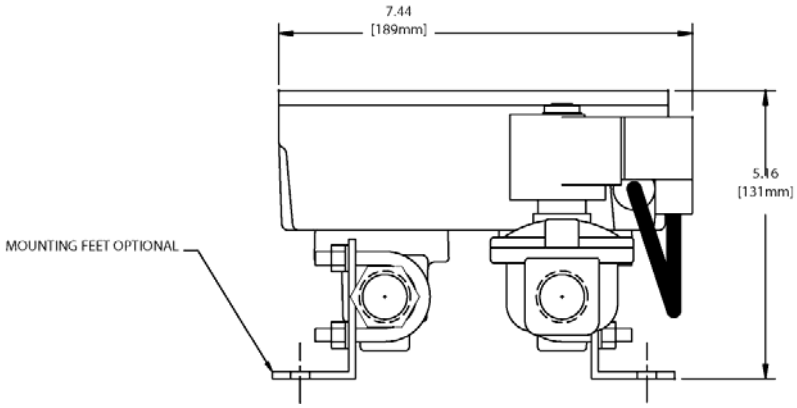
20 Ethernet

If the pushbutton (Keypad) circuit board is replaced, be sure to set the Ethernet IP address and Subnet Mask settings. The power must be cycled if either of the settings is changed. Both lights for the Ethernet should be a steady green to indicate that it is communicating correctly. If either is flashing, then the Ethernet handshake has not been established.

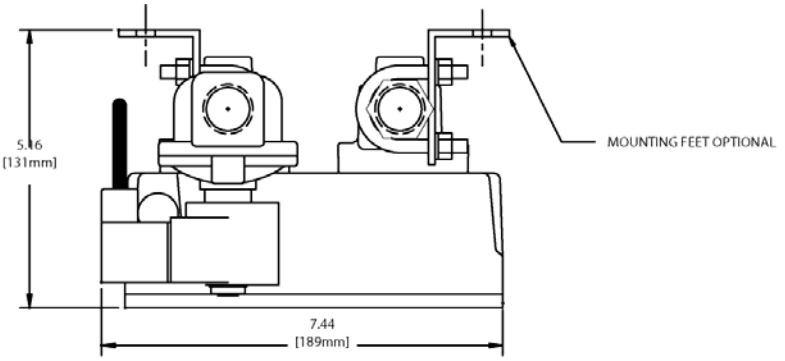
DIMENSIONS

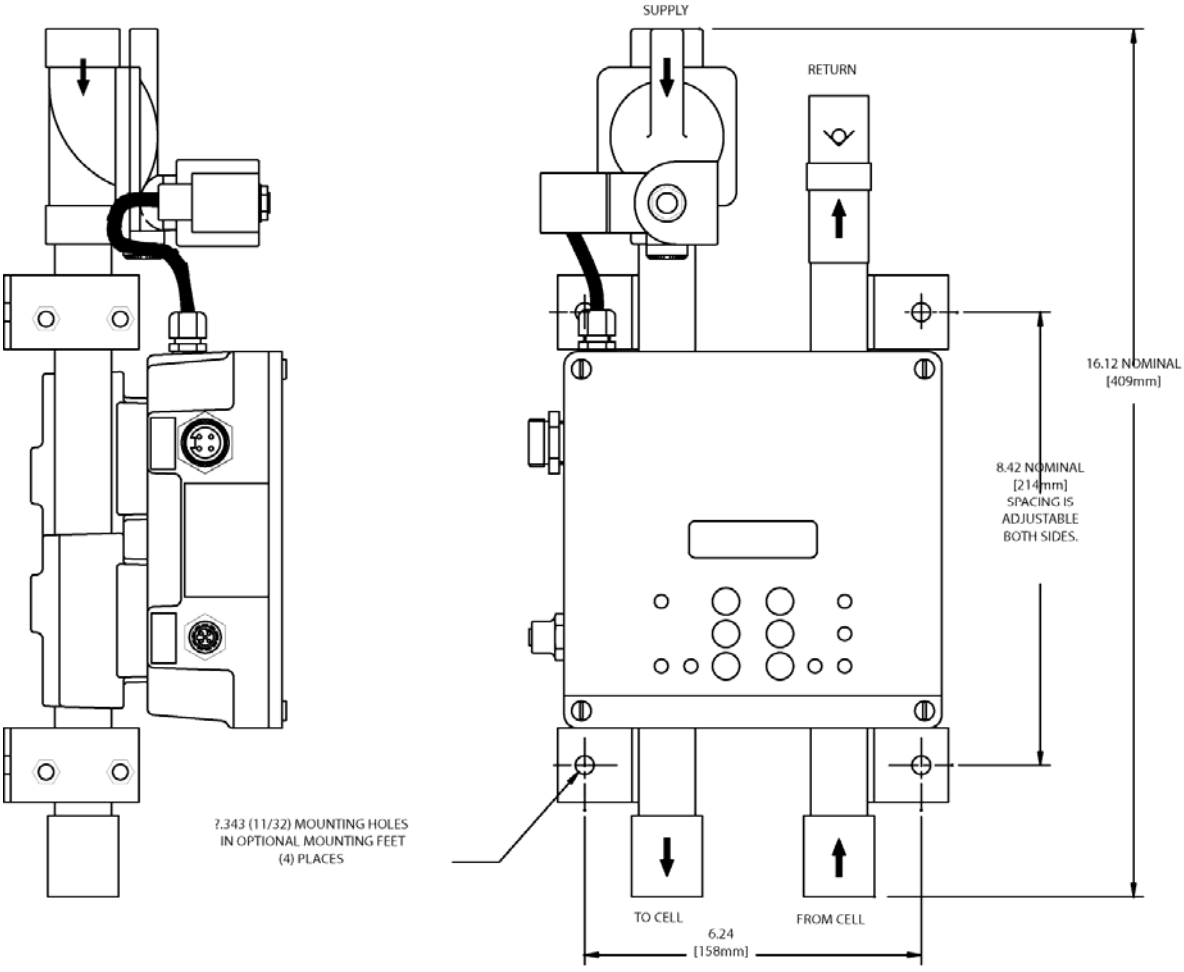
Unit shown with Mounting Bracket / Shut Off Valves in bottom position





Unit shown with Shut Off Valves in top position





MODEL CODES

DeltaPoint™

HOW TO ORDER

Select the appropriate symbols to build a model code:

EXAMPLE: DPL - B - 6 - ****E

FLOW RANGE
0.5 - 6.0 GPM / (1.9 - 11.4 LPM) ..... = A
0.8 - 12.0 GPM /(5.7 - 45.4 LPM) ..... = B

PORT SIZE
3/4 NPTF ..... = 6
3/4-14 BSPP..... = 12G

UNIT TYPE
DC ..... = D
DeviceNet ..... = N
EtherNet ..... = E

APPENDIX

Check Valve Specifications

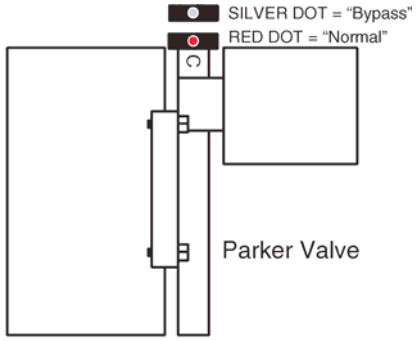
Style:	Piston Check Valve with embedded O-ring that seals on seat
Maximum operating pressure:	500 PSI (34.5 bar)
Maximum operating temperature:	180 °F (82 °C)
Cracking Pressure:	1 PSI
Material:	Brass Body and Piston, Beryllium Copper Ring

Shut-Off Valve Specifications

Function:	2-Way Normally Closed
Ports:	¾" NPT
Pressure Range:	2 PSI to 150 PSI (0.14 bar to 10 bar)
Temperature Ratings:	
Ambient:	14 °F to 122 °F (-10 °C to 50 °C)
Fluid Media:	176 °F (80 °C) Maximum
Coil Power Rating:	24VDC @ 750 mA (10 Watts) Maximum
Electrical Connector:	DIN Style Plug w/ Removable Cable Plug Adaptor
Materials of Construction:	
Body:	Brass
Seal:	Buna N
Other Wetted Parts:	Stainless Steel, PVDF, Brass
Coil:	Class F, Molded, Continuous Duty, UL & CSA Listed

Contact Factory for Spare Parts

Manual Override (Bypass)



MANUAL OVERRIDE
Rotate knob 180 degrees to either position
Starting point - "C" stamped on valve body.

PARKER VALVE

REFERENCE EIP Bit Status Table Rev. 1.08

Condition	Hex Values Byte 0	1=OK Aux Power Bit 7	1=OK Over Temp Bit 6	n/u Bit 5	1=Fault Leak Bit 4	1=Min Flow Min Flow Bit 3	1=Bypassed Bypass Bit 2	1=Closed Valve Closed Bit 1	1=Ok Flow OK Bit 0
Flow OK	C9	1	1	0	0	1	0	0	1
Flow OK, in bypass	CD	1	1	0	0	1	1	0	1
Low Flow, Std	C8	1	1	0	0	1	0	0	0
Low Flow, Bypass mode	CD	1	1	0	0	1	1	0	1
Min Flow, Std	C0	1	1	0	0	0	0	0	0
Min Flow, Bypass mode	C5	1	1	0	0	0	1	0	1
Leak, Std mode	D2	1	1	0	1	0	0	1	0
Leak, Bypass mode	D5	1	1	0	1	0	1	0	1
Leak, Bypass mode, increase flow	DD	1	1	0	1	1	1	0	1
No Flow, Std mode	C2	1	1	0	0	0	0	1	0
No Flow, Bypass mode	C5	1	1	0	0	0	1	0	1
Overtemp, Std mode	89	1	0	0	0	1	0	0	1
Overtemp, Bypass mode	8D	1	0	0	0	1	1	0	1

Mechanical failure of Valve or Valve in mechanical Bypass

Leak, STD,Valve still open	DA	1	1	0	1	1	0	1	0

RMA NOTICE RETURN MATERIAL AUTHORIZATION

Please read the following UFM policy information carefully. By following the guidelines outlined below you will assist in providing a timely evaluation and response regarding the status of your flow meter. UFM evaluates all AUTHORIZED RETURNED MATERIALS in a timely manner and will promptly provide notification regarding the status of the related materials and/or a written quotation indicating the total charges and description of the necessary repairs.

1 All returns must have a RMA form completed by the customer.
2 Any meter returned that was previously in service must have the OSHA requirements completed and a MSDS included where applicable.
3 An RMA number will only be issued when UFM has received a copy of the completed RMA form and any applicable MSDS.
4 A "Return Goods" shipping label (located in the back of the Instruction Manual) must be used for returning materials to UFM.
5 Returned goods must be shipped prepaid or they will be rejected.

REPAIRABLE MATERIAL
Written or verbal authorization to proceed with the repair under an assigned Purchase Order, must be received within 30 days of repair quotation. If the unit(s) are repaired, the $90.00 evaluation charge will be applied to the quoted repair costs. If no repairs are authorized within this 30 day period, the customer will be billed $90.00 plus shipping charges and the materials will be returned to the customer.

NON-REPAIRABLE MATERIAL
If materials are found not repairable, a written notice that the material is not repairable will be provided to the customer by UFM. If no disposition to scrap or return the material is received from the customer within 30 days, unrepairable material will be scrapped and the customer will be billed the $90.00 evaluation charge. If a UFM replacement unit is purchased within 30 days of non-repairable condition notice, the $90.00 evaluation fee will be waived. The return of non-repairable materials may be ordered by customer Purchase Order providing for shipping and handling charges.

RETURN FOR RESTOCK All goods returned for restock adjustment **must** be:
A. New and unused.
B. **Returned to the factory within ONE YEAR of date of original shipment.**
C. Returned through the distributor where the goods were originally purchased. This material will also be subject to an evaluation charge of $90.00.
The customer will be advised of the restocking adjustment for all restockable goods. Upon acceptance of the restocking adjustment, by the customer, the $90.00 evaluation fee will be waived and a credit issued by UFM. The customer will be advised of any **non-restockable** goods and will be charged the $90.00 evaluation fee plus any shipping charges if returned to the customer.
If no disposition is received by UFM within 30 days, the goods will be scrapped and the $90.00 evaluation fee will be billed.

WARRANTY RETURNS
Warranty returns must be shipped prepaid to UFM. UFM will review the goods and advise the customer of the evaluation and validity of the warranty claim. Valid warranty claims will be repaired or replaced at no charge. No evaluation fee will be charged for repairs made under warranty. Return shipping costs will be prepaid by UFM. Should UFM determine the returned material is not defective under the provisions of UFM's standard warranty; the customer will be advised of needed repairs and associated costs. All materials returned for warranty repair that are determined to not have a valid warranty claim will be subject to the "**Repairable Material**" policy outlined above.

RMA FORM

UNIVERSAL UFM FLOW MONITORS ROCON LLC

RETURN MATERIAL AUTHORIZATION
E-MAIL: ufm@flowmeters.com
1755 E. Nine Mile Rd., Hazel Park MI 48030
PH: (248) 542-9635
Fax: (248) 398-4274

IMPORTANT: *This form must be filled out completely and faxed to the Repair Department prior to issuing a RMA # (UFM) / NRA # (ROCON)*

Customer: _____
_____
_____
_____
_____
Contact Name: _____
Phone # _____
FAX # _____
E-mail: _____

Product Information Qty: _____
Model Code: _____
_____
S/N: _____
Sales Order: _____
_____
_____
Are before (as found) and after readings required?
_____ Yes _____ No

Reason for return: (Please be detailed as possible. **Lack of Information may increase labor charges.**)

Mechanical
- ☐ Leaks
- ☐ Sticks
- ☐ Calibration Off
- ☐ Switch does not work
- ☐ Other (describe below)

Electronics
- ☐ No signal
- ☐ Inaccurate signal
- ☐ No Display
- ☐ Other (describe below)

Details:
_____
_____
_____

Note: *There will be a minimum evaluation charge of $90.00 for all units returned (excluding units covered under warranty). Units WILL NOT be accepted without a valid Return Material Authorization Number (RMA#). A Material Safety Data Sheet on the process fluid must be received, when applicable, prior to the RMA# being issued.*

* OSHA Requirements: (to be filled out by customer) **NO EXCEPTIONS!!**

Process Fluid: _____
Meter must be flushed to remove all process fluids.

I hereby certify that the material being returned has been properly flushed and cleaned of all hazardous materials and does not require any special handling.

Print or Type Name _____ Signature: _____

Title _____ Date: _____

Distributor Information ***INTERNAL USE ONLY***
Company Name _____
Contact Name _____
PO # _____
Phone # _____ FAX # _____

_____
Authorized by _____
Date _____

Document #: 1400.9 Revision #: 6 Revision Date: 11/10/2004

ROCON / DELTAPOINT WARRANTY

1) ACCEPTANCE AND INTEGRATION CLAUSE: This Sales Order Acknowledgment and the sales order information that Rocon LLC attaches to or associates with it (this "Acknowledgement"), constitutes an acceptance by Rocon of an offer by the buyer upon the conditions and terms and at the prices stated in this Acknowledgement. This Acknowledgment contains the entire understanding of Rocon and the buyer regarding the subject matter of this Acknowledgement. This Acknowledgement may only be modified by a writing signed by the party against whom enforcement is sought.

2) WAIVER: Waiver by Rocon of any default(s) by the buyer shall not constitute waiver by Rocon of any of the conditions of the agreement between Rocon and the buyer as set forth here under with respect to any further or subsequent default by the buyer.

3) FORCE MAJEURE: Rocon shall not be responsible for failure or delays in deliveries due to fire, strikes, breakdowns, acts of God, failure of carriers, inability to secure required materials, or other causes beyond Rocon's control. Buyer waives any claims for damage arising by virtue of delay in delivery of material by Rocon.

4) LIMITED WARRANTY:
(a) Warranty: For a period of one year from the date of manufacture, Rocon warrants that each product covered by this Acknowledgement will be free from defects in material and workmanship. In order to qualify for any remedy provided in this Acknowledgement, buyer must give notice to Rocon within the one-year period, return the product to Rocon freight paid and intact with Material Safety Data Sheets covering all substances passing through the product or that form a residue on the product.

(b) Exclusive Remedy. The buyer's EXCLUSIVE REMEDY for failure of any product to conform to any warranty or otherwise for any defect is, at Rocon's sole option, (i) repair, (ii) replacement, or (iii) refund of the entire purchase price for the specific product. Without limiting the foregoing, in no case will Rocon be liable for deinstallation of any defective product or installation of any repaired or replacement product THIS REMEDY IS THE EXCLUSIVE REMEDY AVAILABLE TO THE BUYER OR ANY OTHER PERSON. ROCON SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, CONSEQUENTIAL, SPECIAL, PUNITIVE, OR OTHER DAMAGES IN CONNECTION WITH ANY CAUSE OF ACTION, WHETHER IN CONTRACT, TORT, OR OTHERWISE.

(c) Disclaimer of Other Warranties. The express warranty in this Acknowledgement is in lieu of any other warranty, express or implied. Without limiting the foregoing, ROCON DISCLAIMS THE IMPLIED WARRANTY OF MERCHANTABILITY AND ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

5) Products purchased by OEMs (original equipment manufacturers) are warranted only for the specific programs (installations for specific customers) designated when so identified.

6) Flow sensors are warranted for 5 years, electronic parts for 2 years and ancillary check valves and shut off valves for 6 months.