

Your Global Automation Partner

TURCK

WCIOL Water Controller User Manual

MA3001



1	General Information	4
1.1	About these instructions	4
1.2	Explanation of symbols used	4
1.2.1	Warnings	4
1.3	Contents	4
1.4	Feedback about these instructions	5
1.5	Technical support	5
2	Getting Started	6
2.1	Hardware Requirements	6
2.2	Software Requirements	6
3	Instructions for use	7
3.1	Specifications	7
3.1.1	Minimum operating pressure 6 GPM (22.7 LPM)	7
3.1.2	Minimum operation pressure 12 GPM (45.4 LPM)	8
3.2	Dimensions	8
3.3	Installation Examples	8
3.3.1	Applications	8
3.3.1.1	Weld Gun Parallel Installation	9
3.3.1.2	Weld Gun Series Installation	9
3.3.1.3	Weld Gun with Transformer Parallel Installation	9
3.4	WCIOL-xxGPM-75NPT-H1151	10
3.4.1	System LCD, LEDs, and Button Locations	10
3.4.2	Operation of sensing technology	11
3.4.3	Operational Modes	11
3.4.4	Setup via Pushbutton with LED (Standalone Mode)	12
3.4.4.1	Setup flow switch point	12
3.4.4.2	Setup flow units (GPM or LPM)	12
3.4.5	Parameterization via TBEN-x-8IOL webserver	14
3.4.5.1	Parameterization via webserver	16
3.4.6	IO-Link process data structure	17
3.4.6.1	IOL device Info	17
3.4.6.2	IO-Link parameters	18
3.4.6.3	IO-Link input process data map	18
3.4.6.4	IO-Link Output Process Data Map	19
3.5	IO-Link Connection Wiring (M12 x 1)	19
3.6	Diagnostics	19

1 General Information

1.1 About these instructions

The following user manual describes the setup, functions, and use of the system. It helps you to plan, design, and implement the system for its intended purpose.

Note*: Please read this manual carefully before using the system. This will prevent the risk of personal injury or damage to property or equipment. Keep this manual safe during the service life of the system. If the system is passed on, be sure to transfer this manual to the new owner as well.

1.2 Explanation of symbols used

1.2.1 Warnings

Action-related warnings are placed next to potentially dangerous work steps and are marked by graphic symbols. Each warning is initiated by a warning sign and a signal word that expresses the gravity of the danger. The warnings absolutely must be observed: The following symbols are used in these instructions:



DANGER!

DANGER indicates an immediately dangerous situation, with high risk, the death or severe injury, if not avoided.



WARNING!

WARNING indicates a potentially dangerous situation with medium risk, the death or severe injury, if not avoided.



ATTENTION!

indicates a situation that may lead to property damage, if it is not avoided.



NOTE

In NOTES you find tips, recommendations, and important information. The notes facilitate work, provide more information on specific actions, and help to avoid overtime by not following the correct procedure.



CALL TO ACTION

This symbol identifies steps that the user has to perform.



ACTION RESULT

This symbol identifies relevant results of steps

1.3 Contents

The following manual consists of the following:

- WCIOL-xxGPM-75NPT-H1151

**ATTENTION!**

- All examples shown in this guide are for reference only.
 - Please consult TURCK technical support for additional information beyond the scope of this guide.
-

1.4 Feedback about these instructions

We make every effort to ensure that these instructions are as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to USTechnical.Documentation@turck.com

1.5 Technical support

For additional support, email inquiries to appsupport@turck.com, or call Application Support at 763-553-7300, Monday-Friday 8AM-5PM CST.

2 Getting Started

2.1 Hardware Requirements

- WCIOL-xxGPM-75NPT-H1151
- Any IOL Master or TBEN-Lx-8IOL

2.2 Software Requirements

- UFM-LARS_38kBd-20220714-IODD1.1.zip



NOTES

Please visit the Turck Support website under Software at <http://www.turck.us> to download UFM-LARS_38kBd-20220714-IODD1.1.zip

3 Instructions for use

3.1 Specifications

Flow operating range	2.3...22 l/min
Accuracy	±5% full scale
Repeatability	±0.25% actual flow
Pressure (resistance)	200 PSIG (max)
Temperature sensor (range)	1...+90°C
Material	Brass, Stainless, PVDF, Buna N
Process Connection	3/4" NPT
Electrical Connection	M12x1 (5-pin male)
Protection Class	IP67
Power supply	10-30VDC
Current consumption	≤Max 80mA
Display	3 digit 0.3" LED
Output 1	Relay (NO/NC)
Output 2	IOL/switching output (PNP)
Communication Protocol	IOL
IOL specification	V1.1
IOL port type	Class B
Transmission rate	COM 2 / 38.4 kbps
Minimum cycle time	3ms
Materials: Sensor	Brass, PVDF, BUNA

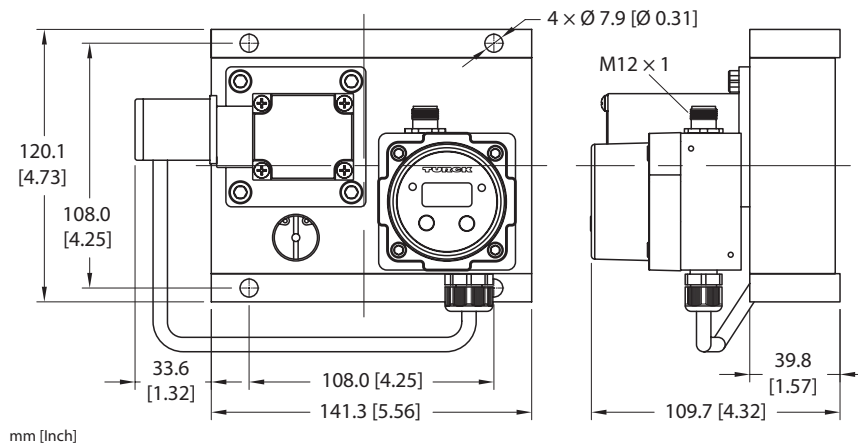
3.1.1 Minimum operating pressure 6 GPM (22.7 LPM)

Flow GPM	Pressure Drop PSID	Flow LPM	Pressure Drop BAR
6.00	1.62	22.7	0.11
5.23	1.35	19.8	0.09
4.46	1.09	16.9	0.07
3.69	0.95	13.9	0.06
2.91	0.81	11.0	0.05
2.14	0.55	8.1	0.04
1.37	0.52	5.2	0.03
0.60	0.51	2.3	0.03

3.1.2 Minimum operation pressure 12 GPM (45.4 LPM)

Flow GPM	Pressure Drop PSID	Flow LPM	Pressure Drop BAR
12.00	5.56	45.4	0.38
10.46	4.05	37.2	0.28
8.91	3.05	29.1	0.21
7.37	1.54	25.0	0.11
5.83	1.28	16.8	0.09
4.29	1.02	12.7	0.07
2.74	0.76	8.6	0.05
1.20	0.51	4.5	0.03

3.2 Dimensions

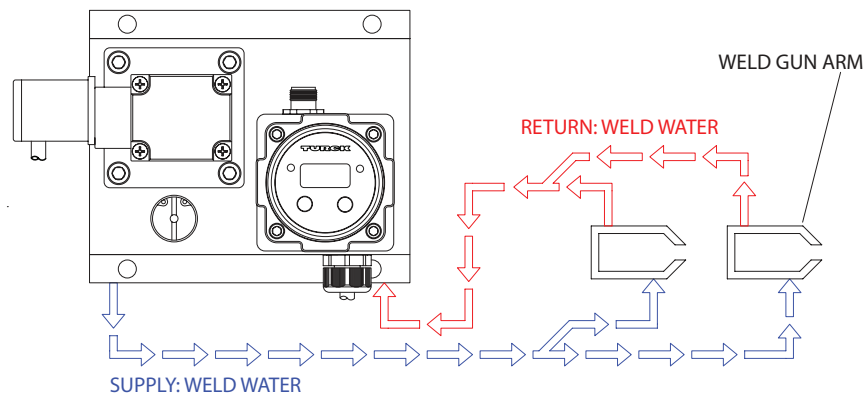


3.3 Installation Examples

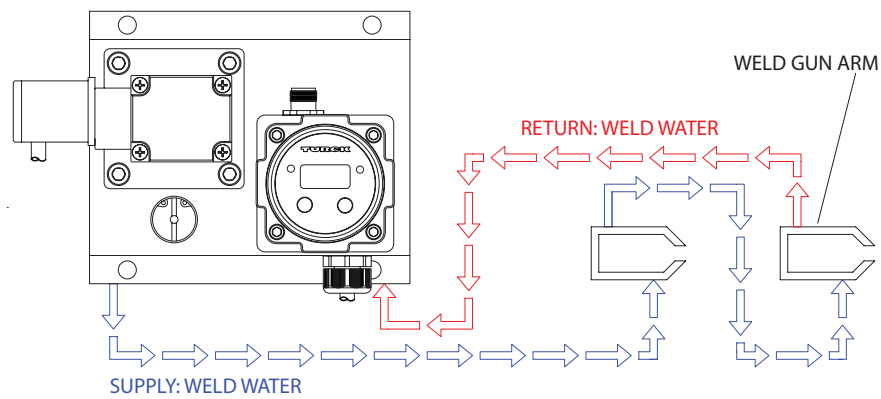
3.3.1 Applications

The TURCK Water Control block can be used on clean or dirty water, compatible with brass, PVDF and Viton. The fluid should not include long fibers or a significant level of abrasive solids. Typical applications will be for weld gun cooling loops using water or 50% glycols found in the automotive industry.

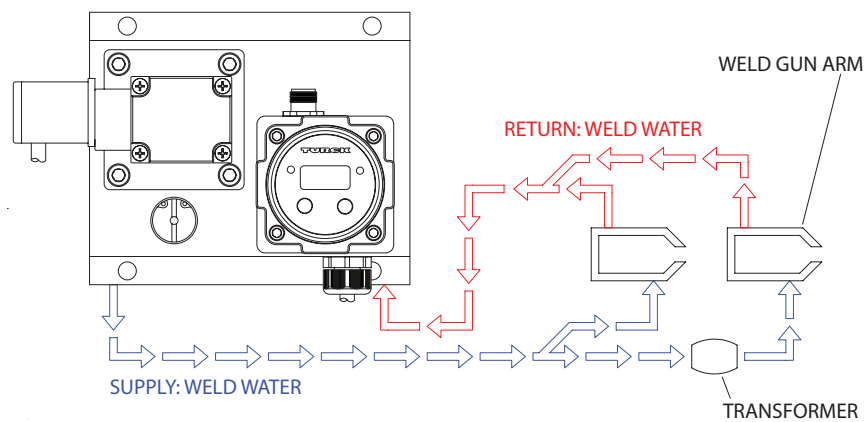
3.3.1.1 Weld Gun Parallel Installation



3.3.1.2 Weld Gun Series Installation

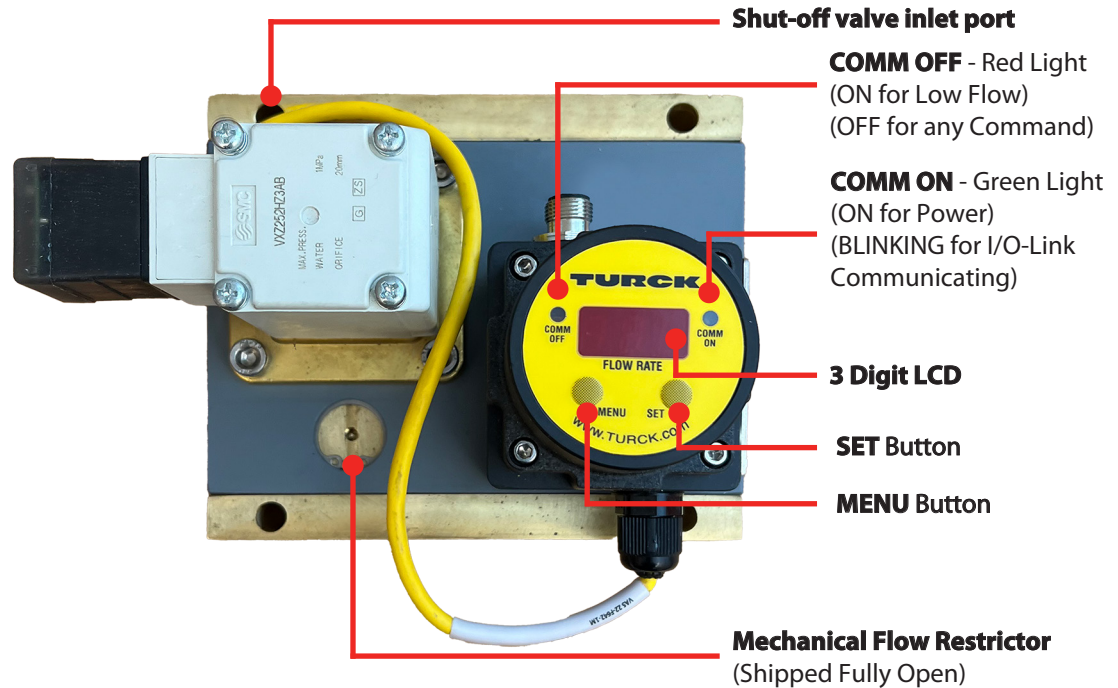


3.3.1.3 Weld Gun with Transformer Parallel Installation



3.4 WCIOL-xxGPM-75NPT-H1151

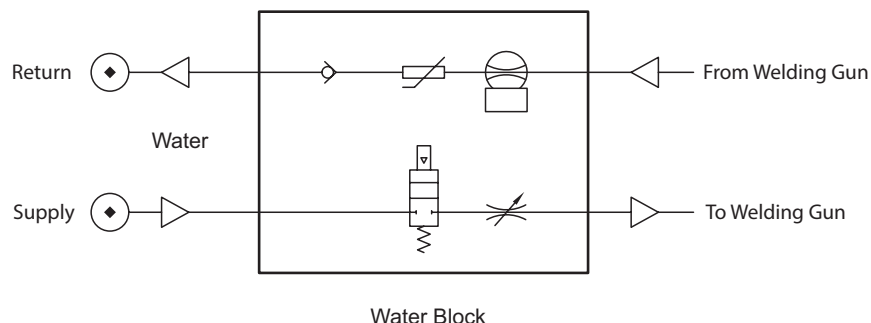
3.4.1 System LCD, LEDs, and Button Locations



NOTES

- Simultaneously pressing and holding both “**MENU**” and “**SET**” buttons puts the water control block into Bypass mode. Bypass mode allows the user to manually open the shut-off valve to allow water to pass through the check valve and exit the water control block through the outlet port. This is like the IOL Process Data Command “**RESTART**” which will do the same. This functionality is automatically disabled once a command is triggered from IOL.
- The flow rate LED displays actual water flow in the return water leg.
- The shut-off valve LED confirms that the coil has power, therefore the valve is open. The shut-off valve is a Normally Closed (NC) valve, which is a valve held “**OPEN**” condition.

3.4.2 Operation of sensing technology



Water enters the Water Control block through the shut-off valve inlet port. The outlet from the manifold passes through a metering circuit and then attached to the weld gun circuit. The weld gun consists of the weld gun arms and/or transformer in cooling circuit. The return water from these devices is connected to the Water Control block. The water control block is directly inline on the return circuit and utilizes the vortex shedding measuring principle. The water strikes a bluff body, which impacts alternating vortices downstream of the bluff, which creates a pressure on the sensor body containing a piezoelectric crystal. The movement of the sensor is proportional to the velocity of the water flow. Vortex technology yields a Water Control block with no moving parts to hang up or wear. The water passes through the check valve and exits the Water Control block through the outlet port. The Water Control block displays, via the LED display and the IOL Process Data, the actual water flow on the return leg.

If water flow is present, the Water Control block provides a “Flow OK” signal via the IOL Process Input Mapping. If a cap is pulled or the water is shut off, the Water Control block detects this condition change and the “Flow OK” signal will change condition if it is below the programmed set point. The shut-off valve stops the supply water flow leg and the check valve stops the return water leg from reversing flow through the gun arms.

3.4.3 Operational Modes

There are two ways to operate/parameterize the water control block.

1. Via MENU/SET pushbuttons operating as a Standalone device¹, or
2. Via an IOL master operating as an IOL slave².



NOTE 1

- This mode does not require I/O-Link or PLC Interaction, only a 24VDC power supply.
- Standalone is overwritten as soon as you connect IOL Master



NOTE 2

- This mode does require I/O-Link or PLC Interaction



NOTE 3

- BYPASS is available in both Stand Alone and IOL Configuration. In IOL operation, it is shown on the Process data screen. In BYPASS, the Coil LED Yellow light is activated and the Flow Switch display flashes, indicates actual water flow in the cooling circuit. OK TO WELD relay to weld controller is present.
- The BYPASS status input via IOL Process data, indicates the unit is no longer monitoring water flow.
- This mode should only be used for troubleshooting or initial setup purposes.

3.4.4 Setup via Pushbutton with LED (Standalone Mode)

Power up the water control block. (Note: This can be done at the bench or when installed.)

On Power Up and NO flow, the display will alternate between “0.0” and countdown “9 - 0”, with the Valve light ON. After the countdown (default 10secs), the valve light will go OFF and the display will read a steady “0.0”.

COMM ON (Green Light) will be ON for Power or will be flashing if IOL is connected to an IOL Master, with proper communication.

COMM OFF (Red Light) will be ON.

3.4.4.1 Setup flow switch point

- Push and Hold the “SET” button for approximately 5 seconds to enter programming mode.
- The current set point will be displayed.
- Use the “MENU” button to change the current flow set point, if required.
- The set point display will roll over at “12.0 GPM (45.4 LPM)” and start again at “0.0”
- Once the desired set point is displayed, press the “SET” button again, to save the setting
- If NO button is pushed for approximately 5 seconds, the system defaults to the current setting.

3.4.4.2 Setup flow units (GPM or LPM)

- Push the “MENU” button to see what units the water control block is in, either “G” (GPM) or “L” (LPM) will be displayed. If the water control block is in the correct units, press the “SET” button to return to the flow “0.0” display.
- Push and Hold the “MENU” button for approximately 5 seconds to enter programming mode. The units will switch to the opposite unit as previously displayed.
- Press the “SET” button to change the current units, if required.
- Once the units are set, press the “MENU” button again, to save the setting.
- Press the “SET” button, to return to the flow “0.0” display.
- If NO button is pushed for approximately 5 seconds, the system defaults to the current setting.

3.4.5 Parameterization via TBEN-x-8IOL webserver

MAIN IODD CONFIGURATOR DOCUMENTATION LOGIN


TBEN-L5-8IOL

- i Info
- ⚙ Parameter
- 🔍 Diagnosis ⚠
- ⚡ Event log
- ↕ Ex- / Import
- 🔑 Change Password
- 📀 Firmware

LOCAL I/O ⚠

- i Info
- ⚙ Parameter
- 🔍 Diagnosis ⚠
- ⬇ Input
- ⬆ Output

TBEN-L5-8IOL - Gateway - Info



Compact Multiprotocol I/O Module for Ethernet
8 IO-Link Master Channels, 4 Universal Digital PNP Channels, 2 A, Channel Diagnostics

Device

Station information

Type	<input type="text" value="TBEN-L5-8IOL"/>
Ident. no.	<input type="text" value="6814017"/>
Firmware revision	<input type="text" value="3.4.1.0"/>
Bootloader revision	<input type="text" value="10.0.1.0"/>
EtherNet/IP revision	<input type="text" value="2.7.53.0"/>
PROFINET revision	<input type="text" value="1.7.27.0"/>
Modbus/TCP revision	<input type="text" value="2.4.7.0"/>
WEB revision	<input type="text" value="1.3.7.0"/>
Software build number	<input type="text" value="1480"/>
Addressing mode	<input type="text" value="Rotary"/> ?
ARGEE Core version	<input type="text" value="3.7.7.0"/>

Special device properties

Production data	<input type="text" value="00 00 00 00 00 00 00 00 00 00"/> ?
-----------------	--

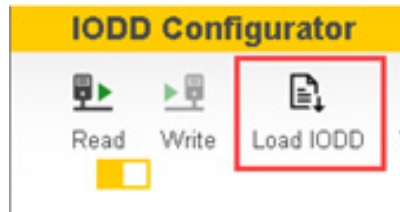
For comments or questions please find your local contact on www.turck.com

- ▶ **OPEN WEB BROWSER AND ENTER IP ADDRESS OF TBEN-X-8IOL**
- ▶ **SELECT LOGIN AND ENTER "PASSWORD"**

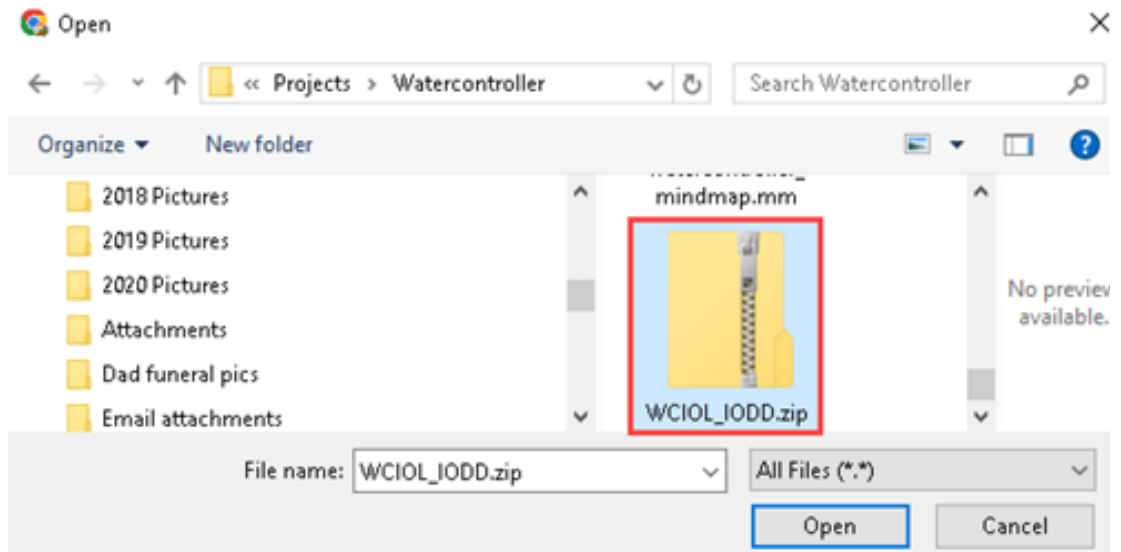
▶ **AFTER LOGGING IN, SELECT IODD CONFIGURATOR**



▶ **SELECT LOAD IODD**





▶ **BROWSE TO FOLDER WITH WCIOL_IODD.ZIP FILE, SELECT OPEN**





→ YOU SHOULD SEE THE FOLLOWING:


IODD Configurator



Read



Write


Unlink IODD


Print


Operator


Maintenance


Specialist

Identification	Vendor: UFM		
	Device: Coolpoint IOLink (38.4kBaud)		
Parameter	Coolpoint IOLink (38.4kBaud) V1.0 / 2019-05-20 Copyright 2019 Universal Flow Monitors Inc		
Process data	Direct Parameters - Page 1: Vendor ID 1	<input type="text" value="6"/>	?
Processdata Structure	Direct Parameters - Page 1: Vendor ID 2	<input type="text" value="5"/>	?
	Direct Parameters - Page 1: Device ID 1	<input type="text" value="0"/>	?
Active events	Direct Parameters - Page 1: Device ID 2	<input type="text" value="0"/>	?
Event history	Direct Parameters - Page 1: Device ID 3	<input type="text" value="1"/>	?

3.4.5.1 Parameterization via webservice

The screenshot shows the IODD Configurator web interface. At the top is a yellow header with the title "IODD Configurator". Below the header is a toolbar with icons for Read, Write, Export, Import, Set defaults, Unlink IODD, and Print. To the right of the toolbar are three mode buttons: Operator, Maintenance, and Specialist. The main content area is divided into a left sidebar and a main panel. The sidebar has buttons for Identification, Parameter (highlighted with a red box), Process data, Processdata Structure, Active events, and Event history. The main panel displays device information: Vendor: UFM, Device: Coolpoint IOLink (38.4kBaud), and a copyright notice. Below this is the "Direct parameters" section, which is also highlighted with a red box. It contains a list of parameters with corresponding input fields: Device Settings: Temp Setpoint (0), Device Settings: Unit Selection (English), Device Settings: Operating Mode (Standalone), Device Settings: Restart Delay (10), Device Settings: Response Time (100), and Device Settings: Flow Setpoint (40). A pencil icon is visible next to the Operating Mode dropdown.

- Temp Setpoint (English or Metric)
- Unit Selection (English or Metric)
- Operating Mode (Standalone or IOL)
- Restart Delay 10 seconds (default)
- Response Time 100ms (default)
- Flow Setpoint (Gallons or Liters)

3.4.6 IO-Link process data structure

Process data	Process data structure			
Processdata Structure	Process data in			
	Name	Offset	Length	Type
	Process Data Inputs: Temperature	0	8	UIntegerT
	Process Data Inputs: Flow	8	16	UIntegerT
Active events	Process Data Inputs: FlowOk	24	1	BooleanT
	Process Data Inputs: ValveClosed	25	1	BooleanT
	Process Data Inputs: In Bypass	26	1	BooleanT
Event history	Process Data Inputs: MinFlow	27	1	BooleanT
	Process Data Inputs: TempOk	30	1	BooleanT
	Process data out			
	Name	Offset	Length	Type
	Process Data Outputs: Flow Setpoint	0	16	UIntegerT
	Process Data Outputs: Restart	16	1	BooleanT
	Process Data Outputs: Shutoff	17	1	BooleanT
	Process Data Outputs: Bypass	18	1	BooleanT
	Process Data Outputs: Unit	19	1	BooleanT
	Process Data Outputs: Unlock	23	1	BooleanT

3.4.6.1 IOL device Info

IOL Revision	v1.1
Vendor ID	0x0605
Device ID	0x01
Port Class	B
Data Storage	No
Bit Rate	38.4kbps (COM2)
Minimum Cycle Time	3 ms
SIO Mode	Yes
Process Data Input Length	4 bytes
Process Data Output Length	3 bytes

3.4.6.2 IO-Link parameters

Index	Sub-Index	Name	Length	Value Range	Default	Access Rights
0	8	VendorID1	Byte		6	r/o
0	9	VendorID2	Byte		5	r/o
0	10	DeviceID1	Byte		0	r/o
0	11	DeviceID2	Byte		0	r/o
0	12	DeviceID3	Byte		1	r/o
1	1	Temp Setpoint	Byte	0-255	0	r/w
1	2	Unit Selection	Byte	0 = English 1 = Metric	0	r/w
1	3	Operating Mode	Byte	0 = Standalone 1 = IO-Link	0	r/w
1	4	Restart Delay (seconds)	Byte	0-20	10	r/w
1	5	Response Time (milliseconds)	Word	0-9999	100	r/w
1	6	Flow Setpoint (tenths)	Word	0-65535	45	r/w

3.4.6.3 IO-Link input process data map

Byte/Bit	7	6	5	4	3	2	1	0
0	Temperature							
1	Flow rate x 10							
2	Flow rate x 10							
3	N/A	N/A	N/A	TempOK	MinFlow	In Bypass	Valve Closed	FlowOK

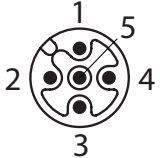
- Temperature Degree F or Celsius depending on units selected
- Flow Rate Multiplied by 10 (e.g., 50 = 5 GPM/LPM)
- N/A Not Applicable
- TempOK Temperature ok (no fault)
- MinFlow Flow greater than set point
- In Bypass Bypass enabled
- ValveClosed Valve is closed
- FlowOK Flow ok (no fault)

3.4.6.4 IO-Link Output Process Data Map

Byte/Bit	7	6	5	4	3	2	1	0
0	Flow Setpoint x 10							
1	Flow Setpoint x 10							
2	N/A	N/A	N/A	Unlock	Unit	Bypass	Shutoff	Restart

- Flow Setpoint Set as point x 10 (e.g., 45 for 4.5GPM/LPM)
NOTE: If set to 0, unit uses flow switch point from Index Data and ignores Unit Change command bit
- Restart Restarts water controller, opens valve and enters countdown
- Shutoff Shuts off valve
- Bypass Puts valve in bypass
- Units 0=GPM, 1=LPM
- Unlock Puts unit in standalone mode which allows operation using pushbuttons

3.5 IO-Link Connection Wiring (M12 x 1)

Wiring Diagram (Pinout)	Pin	Color	Function
	1	Brown	VAUX1 (V1)
	2	White	VAUX2 (V2)
	3	Blue	GND (V1)
	4	Black	C/Q
	5	Gray	GND (V2)

3.6 Diagnostics

LED	Display	Meaning	Remedy
Comm OFF	Solid Red		
	Off	No external power supply	Check power connection
Comm ON	Solid Green	No IO-L communication External power supply OK	Connect to IO-L master if necessary
	Green, flashing	IOL communication OK	
	Off	No external power supply	Check power connection
FLOW RATE	0.0, flashing	BYPASS	Check minimum water flow to unit. 6GM = 0.9 GPM (3.4 LPM) 12GM = 1.8 GPM (6.8 LPM)

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60 representations worldwide!

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