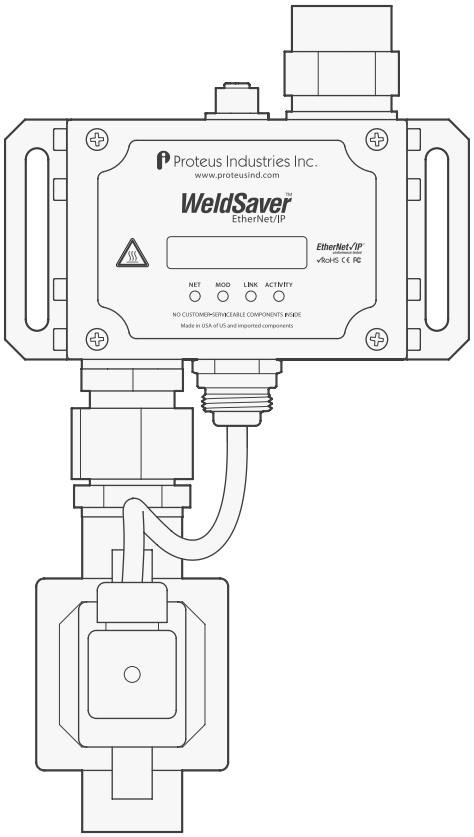
Proteus Industries Inc.

WeldSaver™
EtherNet/IP



TECHNICAL REFERENCE MANUAL

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1 OVERVIEW

Introduction

This document provides comprehensive technical information about the EtherNet/IP™ version of the Proteus WeldSaver™ coolant monitor and flow controller. The product features, specifications, and operating instructions described herein apply to standard WeldSaver products and may not be valid for customized versions.

Important Safety Information

Throughout these instructions, **NOTE**, **CAUTION** and **WARNING** statements are used to highlight important operational and safety information.

NOTE	**NOTE** statements provide additional information that is important to the successful operation of the device.
CAUTION!	**CAUTION** statements identify conditions or practices that could result in damage to equipment or other property.
WARNING!	**WARNING** statements identify conditions or practices that could result in personal injury or loss of life.

Taking proper precautions to avoid damage to your instrument's sensors during installation helps to ensure consistent, error-free operation, which lowers costs and assists on-time completion of your work.

The safety-related statements contained in these instructions provide an alert to installers and operators to take sensible steps to allow the WeldSaver to operate correctly the first time and every time.

NOTE	
	It is recommended that the installation of this product be performed by qualified service personnel only.

Technical Support

For technical or applications assistance, please contact:

Proteus Industries Inc.
340 Pioneer Way
Mountain View, CA 94041
TEL: (650) 964-4163
FAX: (650) 965-0304
E-mail: weldsaver@proteusind.com

In the Detroit, MI area, local support is available from:

MJM Sales, Inc.
45445 Mound Road, Suite 117
Shelby Township, MI 48317
TEL: (248) 299-0525
FAX: (248) 299-0528
E-mail: sales@mjmsales.com

Warranty

Proteus WeldSaver products are manufactured under ISO 9001-certified processes and are warranted to be free from defects in materials and workmanship for two (2) years from the date of shipment. The full text of this limited warranty is available on the Proteus Industries website at www.proteusind.com/warranty.

What It Is and What It Does

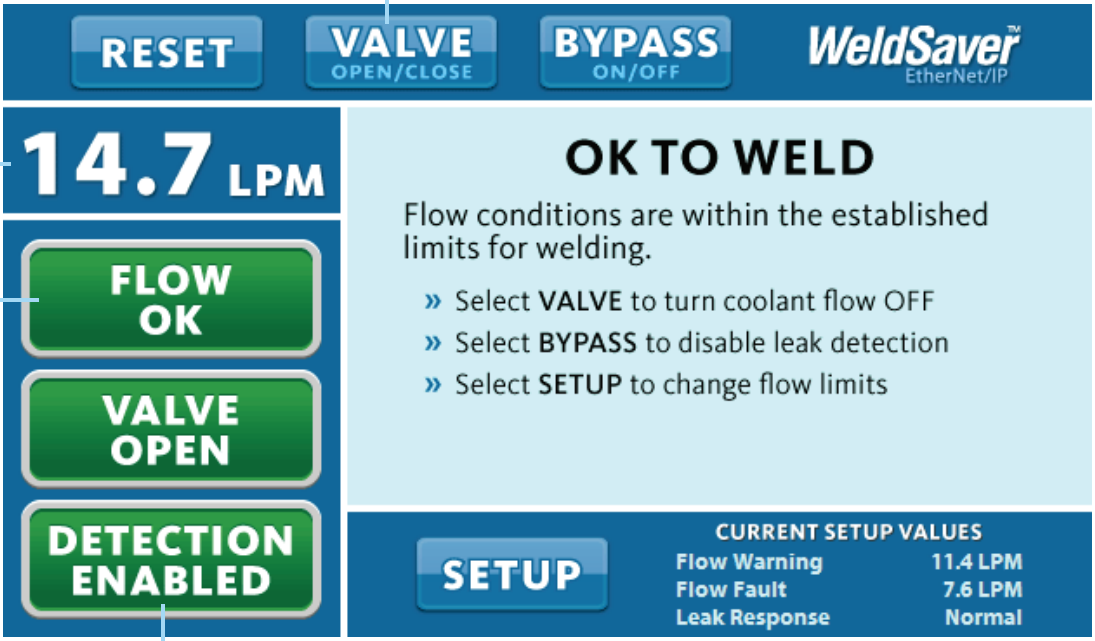
The Proteus WeldSaver™ featuring EtherNet/IP™ is a unique coolant control unit designed to provide multiple functions to monitor and control coolant flow.

It's a Flow Meter

The web browser-based interface displays the actual flow rate through the system in either Gallons Per Minute (GPM) or Liters Per Minute (LPM).

It's a Flow Valve

Coolant flow to the weld cell can be turned ON and OFF through the browser interface using a mouse, keyboard or other input device, or remotely from the weld controller.



It's a Flow Monitor

Flow status is clearly indicated on the interface at all times.

When flow to the weld cell is greater than the user-programmed Flow Warning rate, the FLOW OK status is displayed.

When flow to the weld cell is less than the Flow Warning rate, but higher than the Flow Fault rate, the FLOW WARNING status is displayed.

When flow to the weld cell is less than the Flow Fault rate, the FLOW FAULT status is displayed.

It's a Very Fast Leak Detector

In the event of a weld cap loss or other break in the coolant flow circuit, the leak is detected and water flow is shut off in less than 1 second.

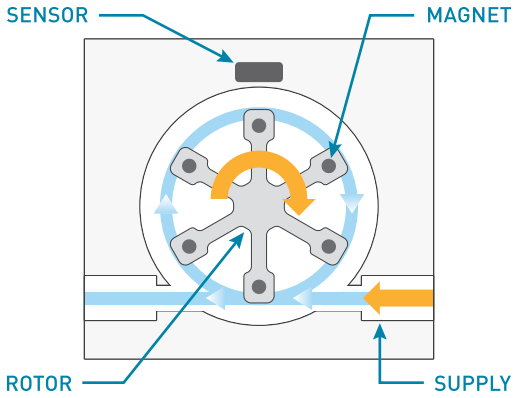
A CAP OFF fault message is displayed and the system controller is advised of the alarm condition.

Flow Sensing and Measurement

A sensitive and rugged flow sensor is located in both the supply and return coolant lines.

A six-spoke rotor is mounted on a stainless steel shaft in the cylindrical turbine chamber. Coolant enters the turbine chamber through a precision-drilled orifice, causing the rotor to spin at a rate that is directly proportional to the linear velocity of the liquid passing through the chamber.

Magnets embedded in the rotors switch a Hall-Effect sensor located outside the turbine chamber. The frequency output of the Hall-Effect sensor is measured by a microcomputer that calculates the flow rate of the liquid.



Flow Comparison

The WeldSaver's microcomputer compares the measured inlet flow rate with the Flow Warning and Flow Fault trip point values as selected by the operator.

- When the measured flow rate is greater than the Flow Warning and Flow Fault values, the microcomputer sends the digital messages **diWS_OktoWeld** and **diWS_MinFlow** to the weld controller.
- When the measured flow rate is less than the Flow Warning value, but greater than the Flow Fault value, the microcomputer sends only the **diWS_OktoWeld** digital message to the weld controller.
- When the measured flow rate is less than the Flow Fault value, the microcomputer stops sending the **diWS_OktoWeld** digital message.

The weld controller makes decisions affecting weld operations based on the flow status reported by the WeldSaver.

FLOW STATUS	FLOW RATE CONDITION	SIGNAL(S) TO WELD CONTROLLER	
OK to Weld	Flow Rate > Flow Warning Value > Flow Fault Value	diWS_OktoWeld	diWS_MinFlow
Flow Warning	Flow Warning Value ≥ Flow Rate > Flow Fault Value	diWS_OktoWeld	
Flow Fault	Flow Warning Value > Flow Fault Value ≥ Flow Rate		

Cap Loss Detection

The WeldSaver's microcomputer uses a patented algorithm to continuously monitor the output frequencies of both the supply and return flow sensors. This algorithm is able to detect the loss of a weld cap or other catastrophic loss of flow continuity in less than 0.3 seconds.

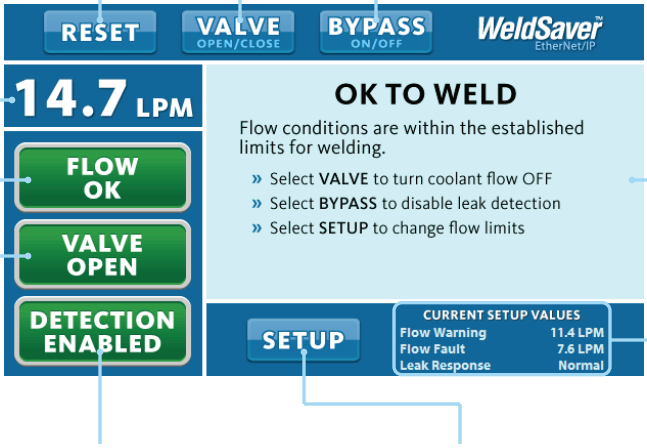
- When a cap loss event is detected, the microcomputer shuts off coolant flow in both the supply and return lines and sends the digital message **diWS_CapLoss** to the weld controller.

The weld controller makes a decision to shut down weld operations.

User Interface

The WeldSaver graphical user interface provides information on device status in real time, with clear visual indicators and descriptions. The interface can be accessed over a network using most JavaScript™-enabled web browsers by entering the working IP address of the device.

NOTE	
ⓘ	**Standard WeldSaver products are programmed with a default IP address of 172.24.1.1.**



Reset Button
Clears a Fault to restart the coolant flow and the leak detection function.

Flow Rate
Displays the actual flow rate through the system.

Flow Status
Indicates the status of coolant flow through the system.

Valve Status
Indicates whether the solenoid valve is open or closed.

Bypass Status
Indicates whether the leak detection function is enabled or disabled.

Setup Button
Loads the Parameter Setup page for viewing or modifying control parameter values.

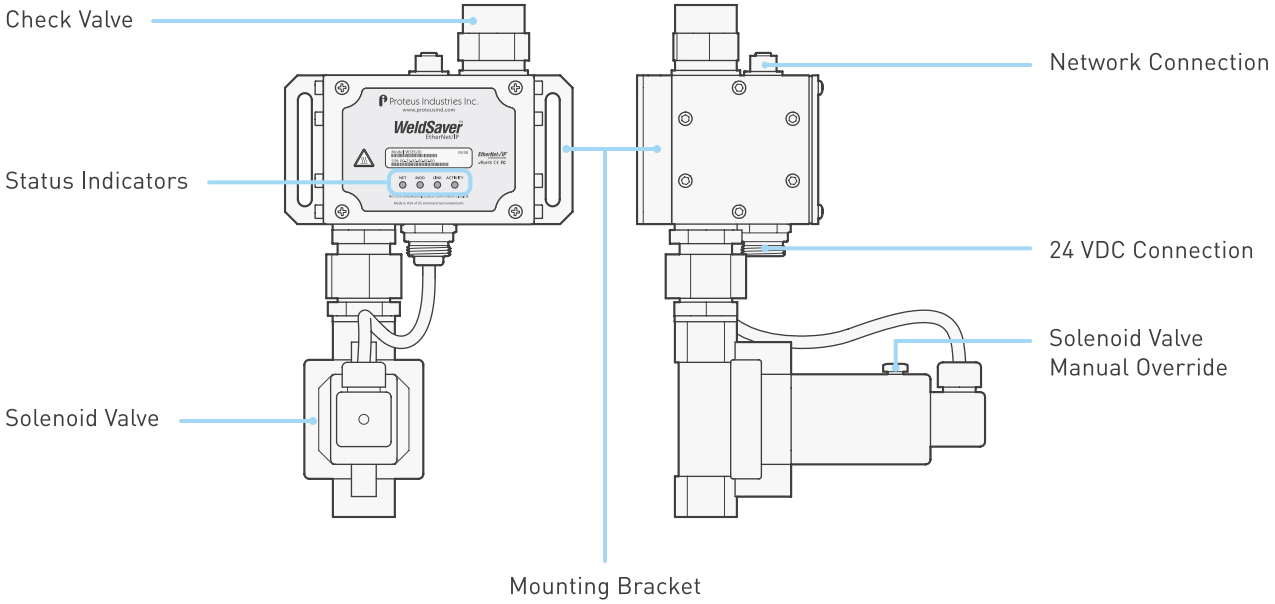
Valve Button
Opens and closes the solenoid valve to turn the coolant flow ON or OFF.

Bypass Button
Turns Bypass Mode ON and OFF to disable or enable the leak detection function.

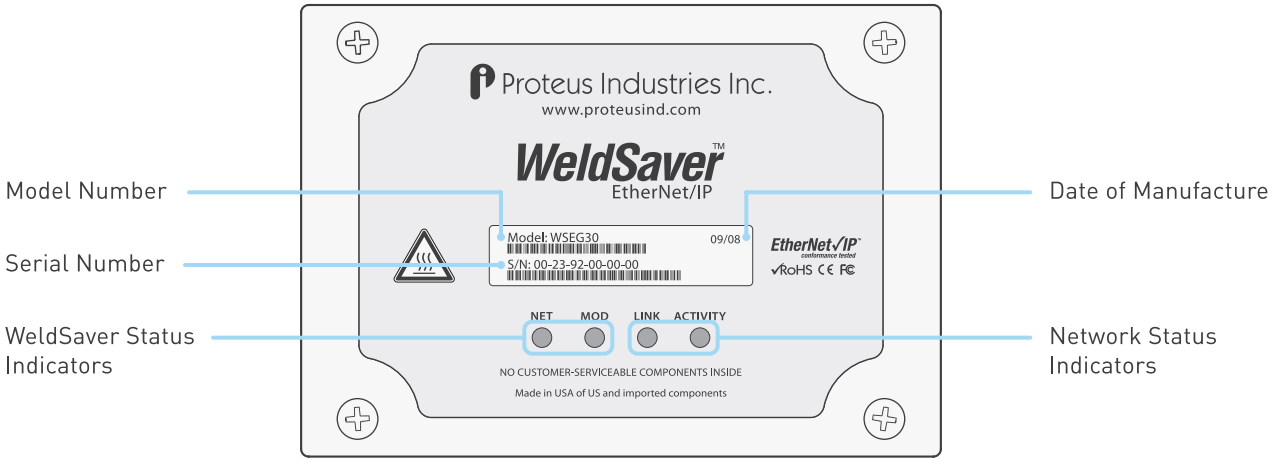
Information Frame
Displays detailed status information, including warnings, descriptions and contextual help.

Current Settings
Displays the current Flow Warning, Flow Fault and Leak Response values.

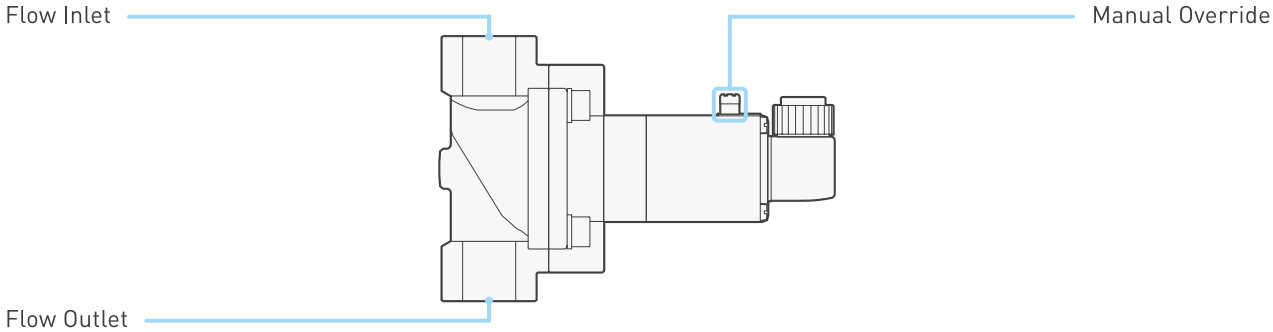
Functional Components



Front Panel

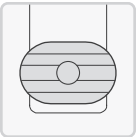


Electric Solenoid Valve



Standard WeldSaver products are equipped with an electric solenoid valve featuring a manual override function.

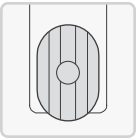
» Normal Operation



The solenoid valve is functional when the slot in the knob is in a **horizontal** position.

During normal operation, the valve enables the control of flow through the system, either locally using the WeldSaver keypad or remotely from the weld controller.

» Manual Override



The solenoid valve can be bypassed by depressing the knob and turning it 90° clockwise to a **vertical** position.

In the manual override state, water can flow through the system to allow leak testing without engaging 24 VDC electrical power.

3 SPECIFICATIONS AND PERFORMANCE

Performance Characteristics

Base Model Number	WSEG11	WSEG30	WSEN3	WSEN8
Flow Range	1.0 – 11 LPM	7.5 – 30 LPM	0.5 – 3.0 GPM	2.0 – 8.0 GPM
Connections	G 3/4" (BSPP)		3/4" FNPT	
Pressure Drop	< 15 kPa at 4.0 LPM	< 15 kPa at 14 LPM	< 2.0 psig at 1.0 GPM	< 2.0 psig at 3.6 GPM
Coolant Supply Pressure	83 – 620 kPa / 12 – 90 psig			
Coolant Return Pressure	70 – 350 kPa / 10 – 50 psig			
Differential Pressure	14 – 415 kPa / 2.0 – 60 psig			
Coolant Temperature	4.0 – 110 °C / 39 – 230 °F			
Leak Response Time	~300 msec at most sensitive condition; ~1 sec at sensitivity setting "Faster"			
Low Flow Response	< 0.2 sec			
Reset / Override Response	< 1.0 sec			
Leak Detection	0.3 – 1.0 sec depending on response time setting			
Leak Sensitivity	Able to detect a loss of flow continuity from 1 to 20 balanced parallel flow paths			
Accuracy	± 3% of flow range			
Repeatability	± 1% of flow range from 0.1 to 1.0 × flow range			
Operating Environment	Indoor use only			
Ambient Temperature	4.0 – 50 °C / 39° – 122 °F			
Max. Relative Humidity	80%			
Enclosure Protection	IP65 / NEMA 4X			

CAUTION!

Do NOT exceed the maximum rated flow rate of your instrument.

Extended operation above the rated maximum flow rate of the instrument will reduce its usable life.

WARNING!

Do NOT exceed the temperature limit of your instrument.

Operation above the rated temperature can cause failure and create a hazard to operators and equipment.

WARNING!

Do NOT exceed the pressure limit of your instrument.

Operation above the rated pressure can cause failure and create a hazard to operators and equipment.

Electrical Requirements

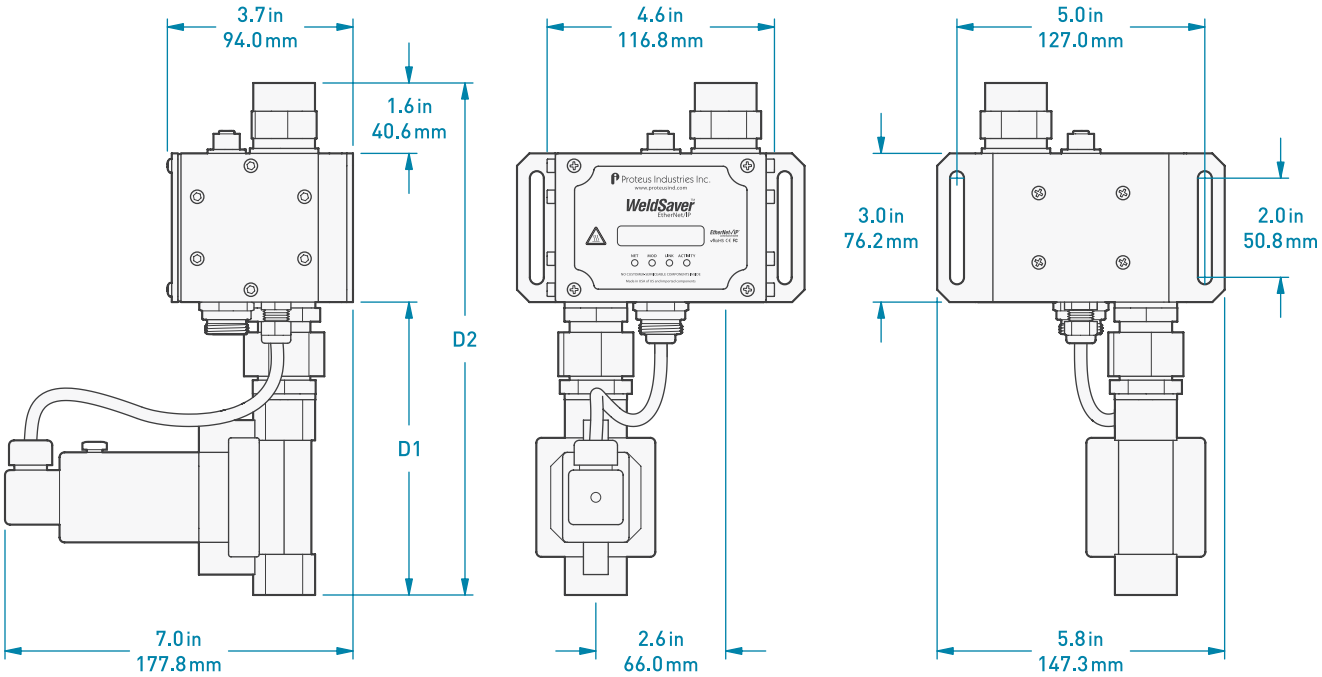
Input Power Voltage	+24 VDC ± 10%
Input Power Consumption	< 16 VA at normal flow; < 8 VA with solenoid valve closed
Max. Rated Input Current	0.75 A

Wetted Materials

COMPONENT	MATERIAL
Flow Body, Solenoid Valve, Check Valve, Fittings	Brass
Rotor	Kynar®
O-Ring	Viton®
Rotor Shaft	316 Stainless Steel

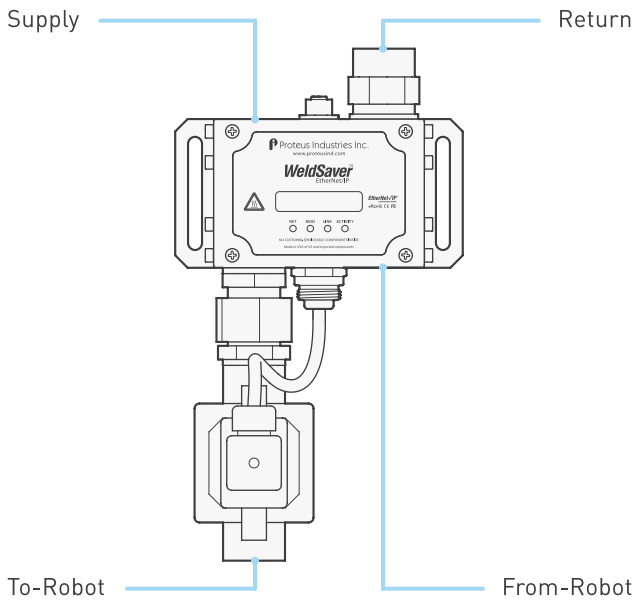
Dimensional Drawings

Product dimensions for standard WeldSaver EtherNet/IP models are indicated below. Three-dimensional drawings are accessible on the Proteus Industries website at www.proteusind.com/wseip. Solid models are available upon request; please contact Proteus Technical Support.



BASE MODEL NUMBER	D1	D2
WSEG11	5.9 in 149.9 mm	10.5 in 266.7 mm
WSEG30		
WSEN3	6.3 in 160.0 mm	10.9 in 276.9 mm
WSEN8		

Plumbing Connections



Compliance and Certifications

» EtherNet/IP Conformance

EtherNet/IP Conformance Tested™ in compliance with ODVA specifications.

» CE Compliance

2004/108/EC	Electromagnetic Compatibility
2006/95/EC	Low Voltage Directive

» Environmental Compliance

Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

» Electromagnetic Compatibility

EN 55011:2007	Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment
EN 61326-1:2006	Electrical Equipment for Measurement, Control and Laboratory Use

FCC Part 15 Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

Tools Required

- Adjustable wrenches
- Pipe wrenches
- Teflon®-based pipe sealant
- 2 × M5x12 screws for mounting bracket

Plumbing Connections

1. Flush the inlet piping.

CAUTION!	
⚠	Flush contaminants and other accumulated construction debris from the upstream pipe BEFORE connecting the WeldSaver. Failure to flush coolant lines may result in the fouling of the WeldSaver's supply flow sensor and the clogging of smaller orifices in the system supply lines, manifolds and the weld gun.

CAUTION!	
⚠	Flush contaminants and other debris from water lines connecting the system, manifold, transformer, SCR and any other water-cooled components BEFORE connecting them to the WeldSaver. Failure to flush these lines may result in the fouling of the WeldSaver's return flow sensor and the clogging of smaller orifices in the system supply lines, manifolds, transformer, SCR, weld gun and any other water-cooled components.

2. Lubricate all pipe threads using a non-hardening pipe sealant, such as Teflon® paste, to help simplify installation and seal plumbing connections.

CAUTION!	
⚠	Do NOT allow excess pipe sealant to enter the flow sensors! Excess material may foul the sensors and cause the clogging of smaller orifices in the system's supply lines, manifold, transformer, SCR, weld gun and any other water-cooled components.

3. Refer to page 9 of this document to identify the WeldSaver plumbing connections.
4. Make plumbing connections to the Supply, Return, To-Robot and From-Robot connection ports on the WeldSaver using appropriate pipe fittings and sealing washers.

CAUTION!	
⚠	Ensure that the correct hoses have been connected to the WeldSaver To-Robot and From-Robot connections. Check hose labels or trace water flow to confirm that the WeldSaver is connected to include the water circuit cooling the weld gun. If the hose connections are not correct, the WeldSaver may NOT be able to detect the loss of a weld cap or other loss of flow continuity.

Plumbing Connections (Continued)

5. Adjust pipe connections as required for proper alignment of the WeldSaver.
6. Depress the solenoid valve manual override knob and turn it 90° clockwise to a vertical position to enable flow. (Refer to Electric Solenoid Valve section on page 6 for more information.)
7. Turn water ON slowly.

WARNING!

The WeldSaver body is NOT insulated!

When using the WeldSaver with hot liquids, use personal protective equipment.

8. Check for leaks at all connections to the WeldSaver.
9. Eliminate all leaks before proceeding.
10. Turn the solenoid valve bypass knob 90° counterclockwise to return it to a horizontal position for normal operation.

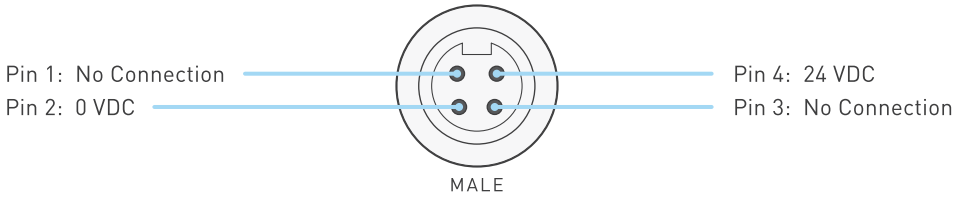
Electrical Connections

NOTE

The WeldSaver must be connected to 24 VDC auxiliary power to perform correctly.

Proteus highly recommends connecting the WeldSaver to certified DC power supplies only.

1. Refer to the wiring diagram below for the 24 VDC power connector on the bottom of the WeldSaver body.



2. Confirm that the power cable has 24 VDC present between pins 2 and 4.

CAUTION!

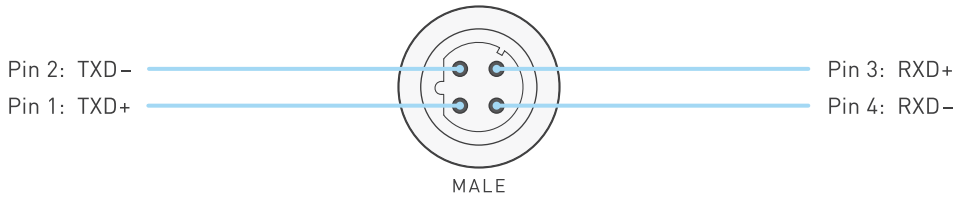
Connect the power cable to the 24 VDC power source BEFORE connecting it to the WeldSaver.

3. Connect the power cable to the 4-pin connector on the bottom of the WeldSaver body.

Network Connections

NOTE	
ⓘ	**The WeldSaver must be connected to an Ethernet network to perform correctly.**

1. Refer to the wiring diagram below for the network connector on the top of the WeldSaver body.



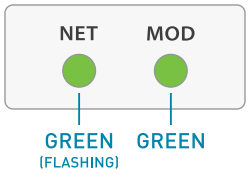
2. Connect the RJ-45 end of the Ethernet cable to an Ethernet LAN port or broadband modem port on a computer.
3. Connect the other end of the Ethernet cable to the 4-pin connector on the top of the WeldSaver body.

Power and Network Connectivity

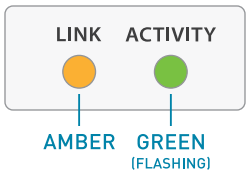
NOTE	
ⓘ	A valid Ethernet connection and a JavaScript™-enabled web browser are required to operate the WeldSaver. If operating the WeldSaver using a welding robot pendant, refer to the robot manufacturer's pendant operating manual for instructions on accessing network devices. If connecting to the WeldSaver from a personal computer, it may be necessary to disable or reconfigure any firewall or security software running on the system. Standard WeldSaver products are programmed with a default IP address of 172.24.1.1.

NOTE	
ⓘ	A Configuration Guide describing the procedure for configuring the WeldSaver EtherNet/IP network settings is available on the Proteus Industries website. To access this document, please visit www.proteusind.com/wsecg.

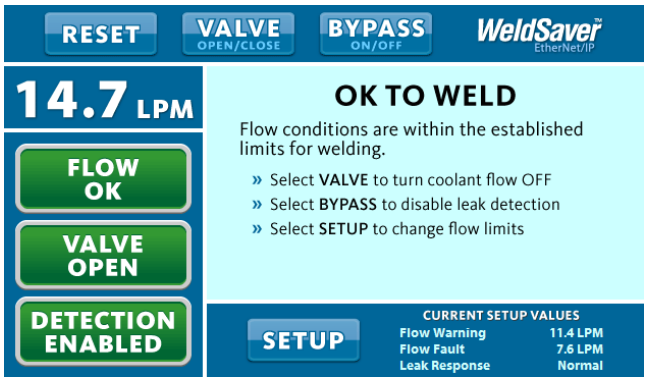
1. Turn 24 VDC power ON.
   - » The NET status indicator will turn GREEN and flash.
   - » The MOD status indicator will turn GREEN.



2. Confirm that the WeldSaver has established a valid Ethernet connection.
   - » The LINK status indicator will be AMBER.
   - » The ACTIVITY status indicator will be GREEN and flashing.

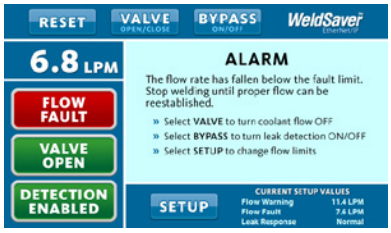


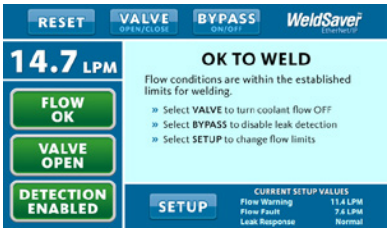
3. Open the web browser and access the IP address of the WeldSaver.
   - » The WeldSaver interface will display in the browser window.
   - » The status information indicated on the screen will depend on the measured flow rate through the device.



Flow Detection

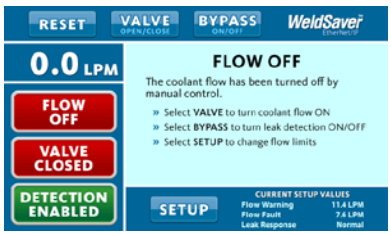
1. Confirm that 24 VDC power is ON.
   - » If the coolant flow is OFF or if the flow rate is less than the Flow Fault value, the display will indicate a FLOW FAULT condition.
   - » The indicated flow rate will be 0.00 (if the flow is OFF) or the actual flow rate.
2. Turn the coolant flow ON or increase it until it reaches the optimum system flow rate.
   - » The display will indicate the OK TO WELD condition.

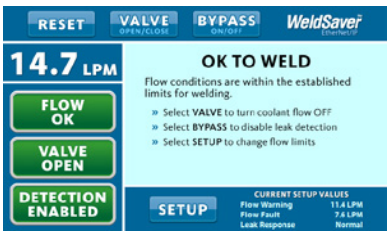




Valve Shut-Off

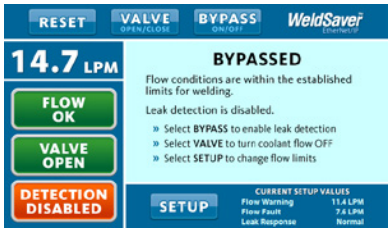
1. Select the VALVE button.
   - » The coolant flow will turn OFF and the display will indicate the VALVE CLOSED condition.
2. Select the VALVE button again.
   - » The coolant flow will turn ON and the display will indicate the OK TO WELD condition and the actual flow rate.

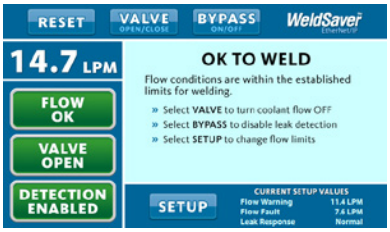




Bypass Mode

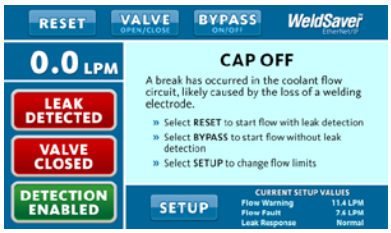
1. Select the BYPASS button.
   - » The leak detection function will turn OFF and the display will indicate the BYPASSED condition.
2. Select the BYPASS button again.
   - » The leak detection function will turn ON and the display will return to the OK TO WELD condition.

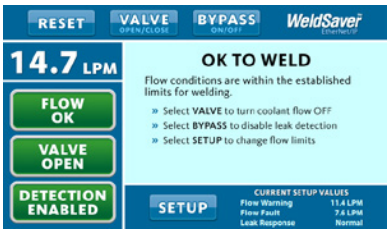




Cap Off Detection

1. Remove a weld cap to create a leak in the system.
   - » The WeldSaver will turn the coolant flow OFF and the display will indicate the CAP OFF condition.
2. Reinstall the weld cap and confirm that it is properly secured to the weld gun.
3. Select the RESET button.
   - » The WeldSaver will restore the coolant flow and the display will indicate the OK TO WELD condition and the actual flow rate.





WeldSaver Control Parameters

The WeldSaver features multiple control parameters that can be configured to achieve optimum performance within your system.

» Flow Warning Trip Point

This is the flow rate at which the welding system should be operated. This flow rate provides sufficient cooling capacity to allow welds to be produced at the desired rate under all ambient temperature conditions.

» Flow Fault Trip Point

This is the lowest flow rate at which the welding system should be operated. Coolant flow lower than this rate does not provide sufficient cooling capacity to allow satisfactory welds to be produced.

» Leak Response Sensitivity

This setting determines how quickly a leak will be detected. Slowing the response reduces sensitivity to false cap-loss events; speeding the response increases sensitivity.

» Startup Stabilization Delay Time

This setting selects the amount of time required to purge air from the cooling system at startup that could otherwise cause false cap-loss events.

» Startup Leak Detection Threshold

This setting checks whether the weld cap is properly in place and is not ejected from the weld shank when water pressure is applied. A low setting gives the most sensitive response to the loss of a weld cap at startup; a high setting gives the least sensitive response.

Factory Default Setup Values

» WSEG11 MODEL

CONTROL PARAMETER	SELECTABLE VALUES					DEFAULT
Flow Warning	0.0 - 11 LPM					3.0 LPM
Flow Fault	0.0 - 11 LPM					1.5 LPM
Leak Response	Slowest	Slow	Normal	Fast	Fastest	Normal
Startup Stabilization	1 Sec.	2 Sec.	4 Sec.	8 Sec.	16 Sec.	2 Sec.
Startup Leak	2.0 LPM	4.0 LPM	6.0 LPM	8.0 LPM	10 LPM	2.0 LPM

» WSEG30 MODEL

CONTROL PARAMETER	SELECTABLE VALUES					DEFAULT
Flow Warning	0.0 - 30 LPM					11.4 LPM
Flow Fault	0.0 - 30 LPM					7.6 LPM
Leak Response	Slowest	Slow	Normal	Fast	Fastest	Normal
Startup Stabilization	1 Sec.	2 Sec.	4 Sec.	8 Sec.	16 Sec.	2 Sec.
Startup Leak	2.0 LPM	4.0 LPM	6.0 LPM	8.0 LPM	10 LPM	4.0 LPM

Factory Default Setup Values (Continued)

» WSEN3 MODEL

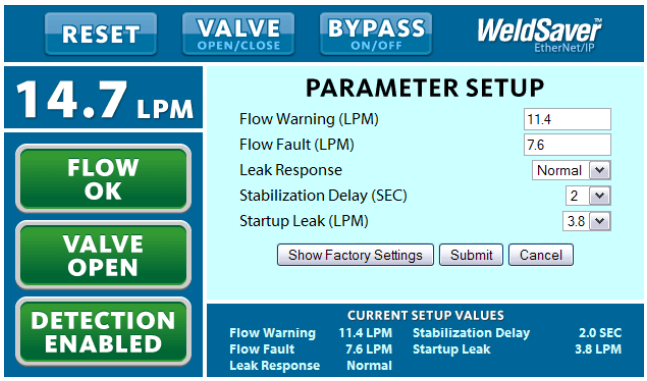
CONTROL PARAMETER	SELECTABLE VALUES					DEFAULT
Flow Warning	0.0 - 3.0 GPM					0.8 GPM
Flow Fault	0.0 - 3.0 GPM					0.4 GPM
Leak Response	Slowest	Slow	Normal	Fast	Fastest	Normal
Startup Stabilization	1 Sec.	2 Sec.	4 Sec.	8 Sec.	16 Sec.	2 Sec.
Startup Leak	0.5 GPM	1.0 GPM	1.5 GPM	2.0 GPM	2.5 GPM	0.5 GPM

» WSEN8 MODEL

CONTROL PARAMETER	SELECTABLE VALUES					DEFAULT
Flow Warning	0.0 - 8.0 GPM					3.0 GPM
Flow Fault	0.0 - 8.0 GPM					2.0 GPM
Leak Response	Slowest	Slow	Normal	Fast	Fastest	Normal
Startup Stabilization	1 Sec.	2 Sec.	4 Sec.	8 Sec.	16 Sec.	2 Sec.
Startup Leak	0.5 GPM	1.0 GPM	1.5 GPM	2.0 GPM	2.5 GPM	1.0 GPM

Adjusting Parameter Values

1. Select the SETUP button on the user interface.
   » The Parameter Setup page will display in the Information Frame and show the current parameter settings.



NOTE	
ⓘ	The current parameter values are displayed at the bottom of the Parameter Setup page. The factory default parameter values can be viewed by selecting the Show Factory Settings button. To return to the current parameter values view, click the Show Current Settings button.

Adjusting Parameter Values (Continued)

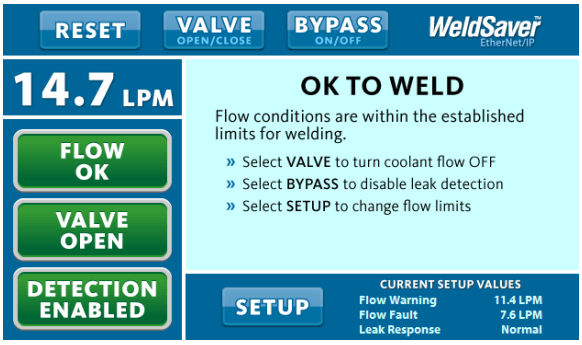
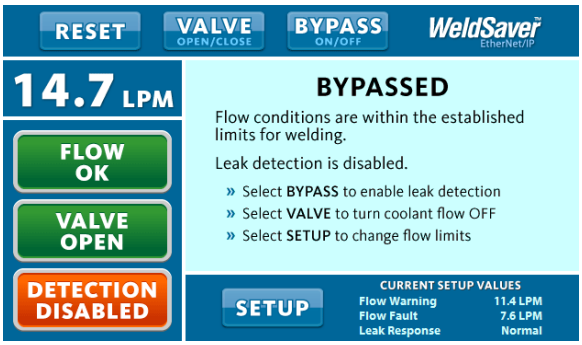
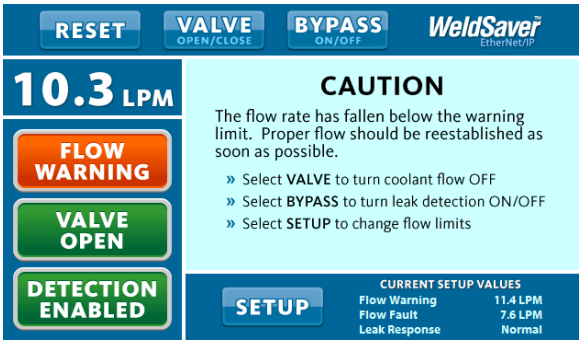
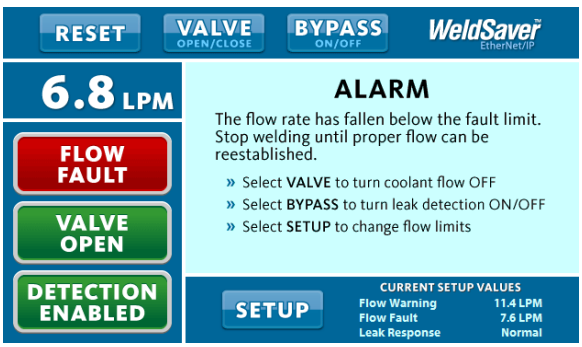
2. Adjust the parameter values as desired.
   - » To change the Flow Warning or Flow Fault settings, enter a new flow limit value in the corresponding text field.

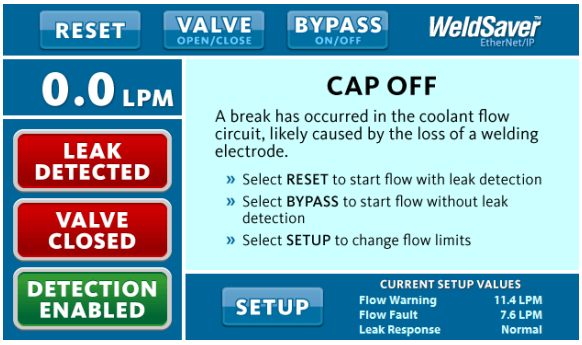
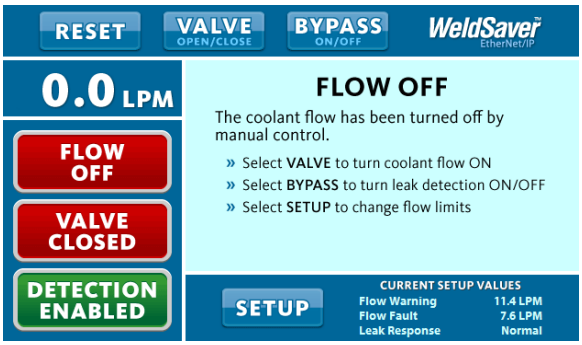
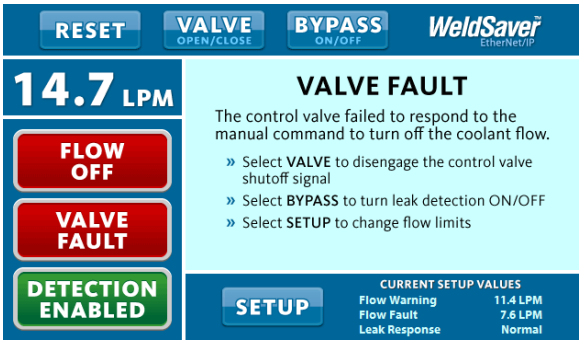
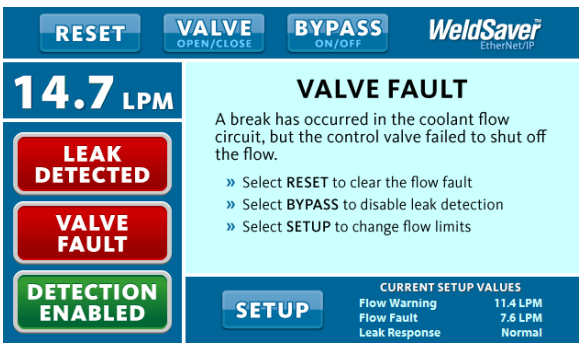
CAUTION!	
⚠	**Enter only NUMERIC characters in the Flow Warning and Flow Fault text fields.** **Any invalid characters entered into these fields will be ignored by the WeldSaver.**

   - » To change the Leak Response, Stabilization Delay or Startup Leak Detection settings, select a new value from the corresponding pull-down menu.

3. Exit the Parameter Setup page.
   - » To save the new control parameter value(s) and return to normal operation, select the Submit button.
   - » To return to normal operation WITHOUT saving any changes, select the Cancel button.
   - » After either button is clicked, the Information Frame will return to the current WeldSaver status display.

4. Confirm any changes made to the parameter values.
   - » Review the current Flow Warning, Flow Fault and Leak Response settings displayed at the bottom of the Information Frame beside the SETUP button.
   - » To review the current settings for all parameter values, select the SETUP button to return to the Parameter Setup page.

STATUS CONDITION	ON-SCREEN DISPLAY
OK TO WELD The standard operating condition in which flow conditions are within the established limits for welding.	
BYPASS MODE Leak detection is disabled. Flow monitoring is still functional. To exit Bypass Mode and enable leak detection, select the BYPASS button.	
LOW FLOW WARNING » Flow has fallen below the Flow Warning flow rate 1. Check the Flow Warning setting. Correct if necessary. 2. If the Flow Warning setting is OK, increase the flow rate if possible. 3. If the flow rate cannot be increased, reduce the Flow Warning setting. » The rotors are slowed by wear or fouling Clean or replace the rotors (see page 23).	
LOW FLOW FAULT » Flow has fallen below the Flow Fault flow rate 1. Stop welding until proper flow is reestablished. 2. Check the Flow Fault setting. Correct if necessary. 3. If the Flow Fault setting is OK, increase the flow rate if possible. 4. If the flow rate cannot be increased, reduce the Flow Fault setting. » The rotors are slowed by wear or fouling Clean or replace the rotors.	

STATUS CONDITION	ON-SCREEN DISPLAY
CAP OFF FAULT » The WeldSaver has detected the loss of a weld cap and the coolant flow has been shut off Replace the weld cap and select the RESET button to restart the coolant flow. » Welding has stopped, but the weld caps are still in place (false cap-loss event) Reduce the Leak Sensitivity Response setting and select the RESET button to restart the coolant flow.	
FLOW OFF The coolant flow has been turned off by manual control. Select the VALVE button to turn coolant flow ON.	
VALVE FAULT The control valve failed to respond to a manual command to turn off the coolant flow. Select the VALVE button to disengage the control valve shutoff signal. » The solenoid valve manual override is engaged Disengage manual override (see page 6). » The solenoid valve is fouled Clean or replace the solenoid valve.	
VALVE FAULT with CAP OFF FAULT The WeldSaver has detected a break in the coolant flow circuit, but the control valve failed to shut off the flow. Select the RESET button to clear the fault. » The solenoid valve manual override is engaged Disengage manual override (see page 6). » The solenoid valve is fouled Clean or replace the solenoid valve.	

8 TROUBLESHOOTING

The NET and MOD status indicators are off

» 24 VDC power is not present

1. Confirm the presence of 24 VDC at pins 2 and 4 of the 4-pin power connector on the bottom of the WeldSaver body.
2. If 24 VDC is present but the NET and MOD status indicators are off, replace the electronics board.

The LINK and ACTIVITY status indicators are off

» The WeldSaver does not have a valid Ethernet connection

1. Confirm the Ethernet cable connection on top of the WeldSaver unit.
2. Confirm that the Ethernet network is functioning properly.

» A firewall or other security software is blocking access to the WeldSaver

1. Disable or reconfigure any firewall or security software running on the system.
2. If the problem persists, consult with your network administrator.

The WeldSaver user interface does not display correctly on the web browser

» JavaScript™ is not enabled

1. Enable JavaScript following the steps necessary for your specific browser. (Refer to your browser's Help menu for assistance.)
2. Select the browser Reload/Refresh button to reload the WeldSaver interface.

» A firewall or other security software is blocking access to the WeldSaver

1. Disable or reconfigure any firewall or security software running on the system.
2. If the problem persists, consult with your network administrator.

The WeldSaver status information is no longer updating on the user interface

» The browser has stopped retrieving status information from the WeldSaver

1. Select the browser Reload/Refresh button to reload the WeldSaver interface.
2. If the problem persists, check the network connections and status.

The WeldSaver does not detect a cap-off condition

» The unit is in Bypass Mode

Select the BYPASS button to exit Bypass Mode and enable leak detection.

» The Leak Response setting is too slow

1. Select the SETUP button to enter Parameter Setup.
2. Select a faster Leak Response parameter value from the pull-down menu.
3. Select the Submit button to save the new value and return to normal operation.

» The rotors are slowed by wear or fouling.

Clean or replace rotors (see page 23).

The WeldSaver does not detect a cap loss immediately after reset

» The Startup Leak Detection Threshold setting is too high

1. Select the SETUP button to enter Parameter Setup.
2. Select a lower Startup Leak Detection Threshold parameter value from the pull-down menu.
3. Select the Submit button to save the new value and return to normal operation.

A FLOW FAULT or CAP OFF FAULT is detected immediately after replacing a weld cap

» The Startup Stabilization Delay setting is too short

1. Select the SETUP button to enter Parameter Setup.
2. Select a higher Startup Stabilization Delay parameter value from the pull-down menu.
3. Select the Submit button to save the new value and return to normal operation.

» The solenoid valve pilot flow is blocked

Clean or replace the solenoid valve.

» The check valve is blocked or fouled

Clean or replace the check valve.

A FLOW WARNING or FLOW FAULT is detected when sufficient flow is present

» The rotors are worn or fouled

Clean or replace the rotors (see page 23).

The flow rate display is erratic

» The rotors are worn or fouled

Clean or replace the rotors.

The flow rate reduces over time

» The rotors are worn or fouled

Clean or replace the rotors.

» For WeldSaver units fitted with the optional Y-strainer: The filter is clogged

Clean or replace the filter.

False cap-loss events occur repeatedly at the same step in the weld cycle when rapid robot movement occurs

» The Leak Response setting is too fast

1. Select the SETUP button to enter Parameter Setup.
2. Select a slower Leak Response parameter value from the pull-down menu.
3. Select the Submit button to save the new value and return to normal operation.

False cap-loss events occur with regularity

» The rotors are worn or fouled

Clean or replace the rotors.

Recommended Maintenance

Maintenance of the WeldSaver is ordinarily limited to cleaning the flow sensor chambers and rotors. The frequency at which the WeldSaver requires cleaning or other maintenance is wholly dependent on the quality and cleanliness of the liquid that is passed through the unit.

NOTE	
ⓘ	Annual cleaning of the WeldSaver is required to maintain reliable operation. Annual replacement of perishable components restores the original flow rate calibration accuracy.

The first indication of the need for cleaning may be an increasing frequency of false cap-loss events, which can occur when the flow-sensing rotors have become so unbalanced due to wear or fouling that they no longer spin in a uniform manner.

NOTE	
ⓘ	The accuracy of flow rate measurement affects only the repeatability of the Flow Warning and Flow Fault flow rate settings. The WeldSaver's patented cap-loss detection algorithm is not affected by changes in the response of either of the flow-sensing rotors.

WeldSaver Maintenance Kit

A WeldSaver maintenance kit containing replacements of all perishable components is available from Proteus Industries and our service partners around the world. For more information, please contact Proteus Sales at sales@proteusind.com or (650) 964-4163.

Flow Sensor Maintenance Instructions

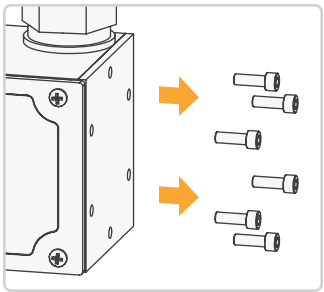
NOTE	
ⓘ	The WeldSaver flow sensor components can be cleaned and replaced without removing the unit from the coolant circuit.

CAUTION!	
⚠	Coolant flow to the WeldSaver must be shut OFF before accessing the flow sensors. Failure to shut off the coolant flow could result in damage to the WeldSaver and other equipment.

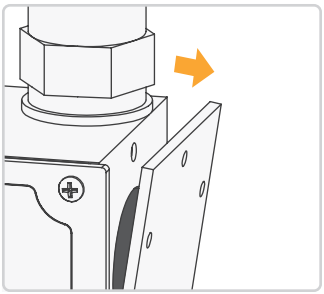
Flow Sensor Maintenance Instructions (Continued)

1. Close the valves in the supply and return lines to stop the coolant flow.

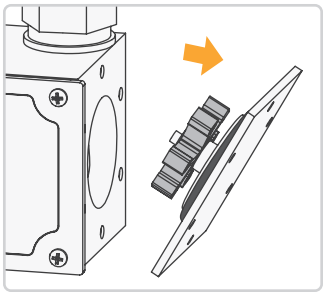
2. Remove and retain the six (6) screws and washers from the faceplate on the right-hand side of the WeldSaver body.



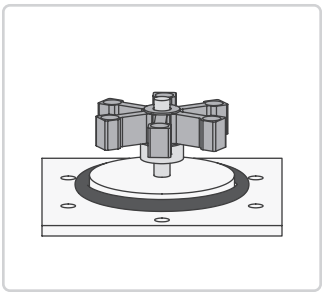
3. Separate the faceplate from the flow sensor body.



4. Carefully remove the faceplate, rotor and shaft from the flow sensor cavity.



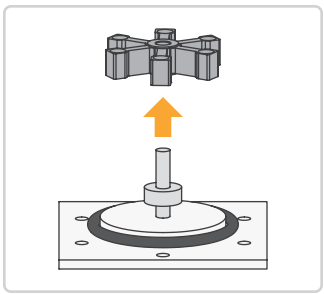
5. Place the faceplate with rotor and shaft on a flat surface.



6. Remove and inspect the rotor.

   If the bearing hole is no longer round or if the clearance to the shaft is greater than 0.02 in / 0.5 mm, replace the rotor.

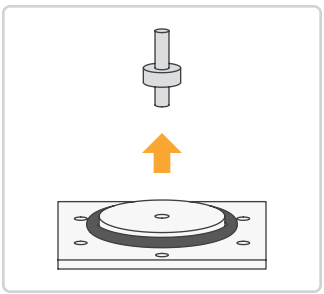
   Otherwise, clean with a damp cloth.



7. Remove and inspect the stainless steel shaft.

   Replace if worn.

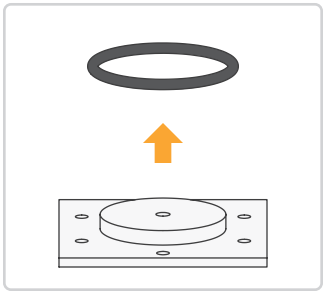
   Otherwise, clean with a damp cloth.



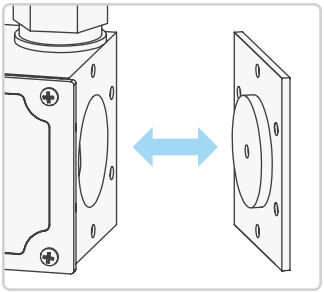
8. Remove and inspect the O-ring seal.

   Replace if worn or damaged.

   Otherwise, clean with a damp cloth.

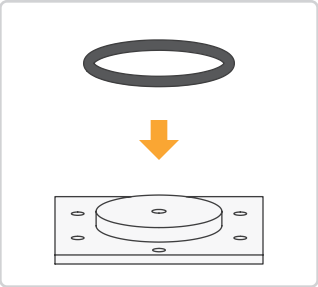


9. Clean the inside of the flow sensor cavity and the inner surface of the faceplate with a damp cloth.

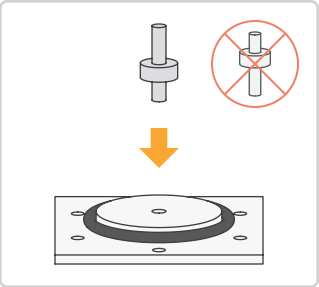


Flow Sensor Maintenance Instructions (Continued)

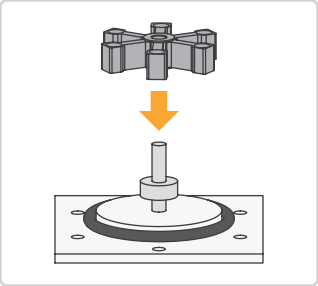
10. Place the O-ring inside the groove on the inner surface of the faceplate.



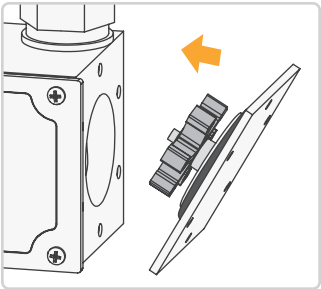
11. Place the shorter end of the shaft into the hole in the center of the faceplate.



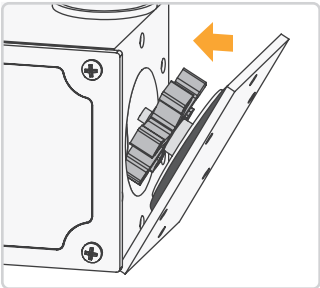
12. Place the rotor onto the longer end of the shaft and confirm that it spins freely.



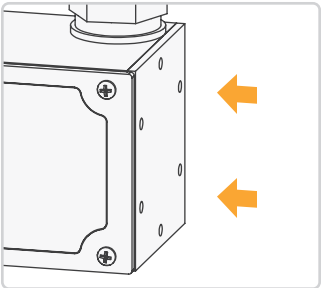
13. Align the faceplate, rotor and shaft with the flow sensor cavity.



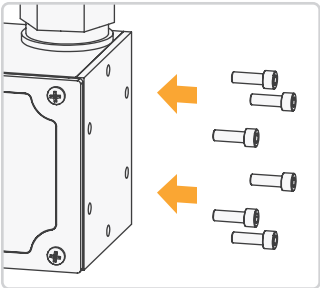
14. Carefully insert the rotor and shaft into the flow sensor cavity.



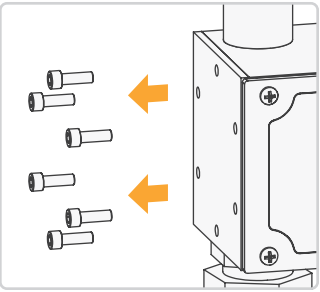
15. Confirm that the faceplate is fitted correctly to the WeldSaver body.



16. Fasten and tighten the six (6) retained screws with the securing washers.



17. Repeat steps 2 through 16 with the flow sensor on the left-hand side of the WeldSaver body.



18. For WeldSaver units fitted with the optional Y-strainer: After both flow sensors have been cleaned or replaced, open the Y-strainer and clean the filter mesh.

19. Open the valves in the supply and return lines to resume the coolant flow.

Flow Sensor Maintenance Instructions (Continued)

20. Confirm the new flow rate indication.

NOTE	
ⓘ	The cleaning of the WeldSaver flow sensor cavities and the cleaning or replacement of the rotors will usually result in a higher indicated flow rate.

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