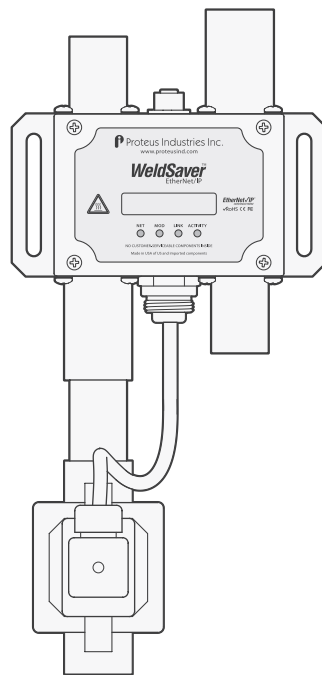


*WeldSaver*TM

WeldSaver 4 Series

EtherNet/IP Interface

Vortex Flow Sensors



TECHNICAL REFERENCE MANUAL

CONTENTS

- 1 Overview**
 - Introduction 1
 - Important Safety Information 1
 - Technical Support 1
 - Warranty 1

- 2 Features and Functions**
 - What It Is and What It Does 2
 - Flow Sensing and Measurement 3
 - Flow Comparison 3
 - Cap-Loss Detection 3
 - Functional Components 4
 - Front Panel 4
 - Optional Solenoid Valve 5
 - User Interface 7

- 3 Specifications and Performance**
 - Performance Characteristics 8
 - Wetted Materials 9
 - Dimensional Drawings 9
 - Compliance and Certifications 10
 - FCC Part 15 Notice 10

- 4 Installation and Setup**
 - Tools Required 11
 - Pneumatic Connections 11
 - Plumbing Connections 11
 - Electrical Connections 13
 - Network Connections 13
 - Configuring Network Settings 14
 - EtherNet/IP Operation 15
 - Electronic Data Sheet (EDS) 15

- 5 Functional Testing**
 - Power and Network Connectivity 16
 - Flow Detection 17
 - Valve Shut-Off 17
 - Bypass Mode 17
 - Cap-Off Detection 18

- 6 Parameter Setup**
 - WeldSaver Control Parameters 19
 - Factory Default Setup Values 19
 - Parameter Setup Page 20
 - Adjusting Control Parameter Values 21

- 7 Status Conditions** 22

- 8 Troubleshooting** 24

- A EtherNet/IP Device Profile** 26




1 OVERVIEW

Introduction

This document provides comprehensive technical information about the Proteus WeldSaver™ 4 coolant flow controller and leak detector featuring an EtherNet/IP™ interface and vortex flow sensing technology. The product features, specifications, and operating instructions described herein apply to standard WeldSaver 4 products and may not be valid for customized versions. For model-specific product information, please refer to the specification sheet provided with your WeldSaver device or contact WeldSaver Technical Support.


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

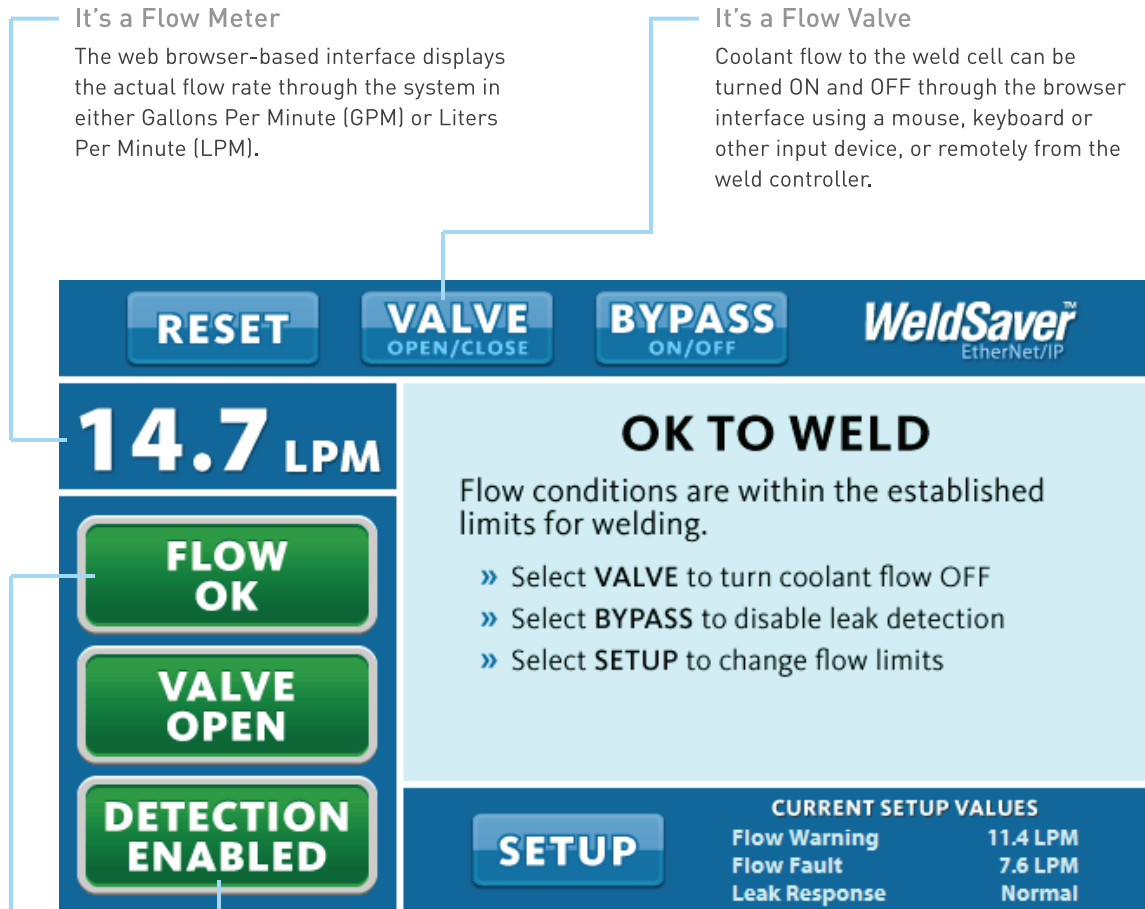
Warranty

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.

2 FEATURES AND FUNCTIONS

What It Is and What It Does

The Proteus WeldSaver™ 4 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.

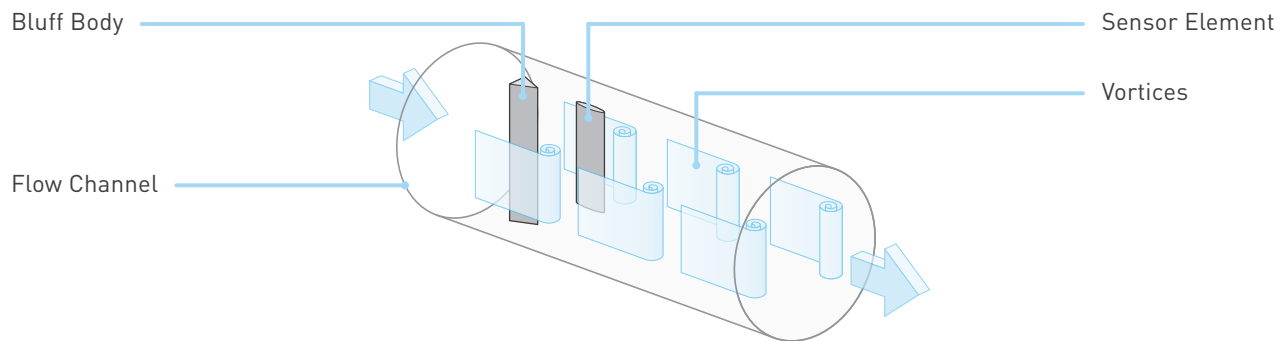
2 FEATURES AND FUNCTIONS

Flow Sensing and Measurement

The WeldSaver's coolant supply and return channels are equipped with sensitive and rugged vortex flow sensors.

As liquid flows around a bluff body inside each flow channel, swirling vortices are formed and carried downstream at the velocity of the flowing liquid. Alternating localized high- and low-pressure zones characteristic of a vortex stream are detected by a piezoelectric crystal that produces a small pulse each time a vortex passes the sensor element. The number of vortices formed is directly proportional to the linear velocity of the liquid passing through the instrument.

The frequency produced by the vortex flow sensor in the supply channel is measured by a microcomputer to calculate the actual flow rate of the liquid.



Flow Comparison

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

FLOW RATE CONDITION	FLOW STATUS
Measured Flow Rate > Flow Warning Value > Flow Fault Value	OK to Weld
Flow Warning Value ≥ Measured Flow Rate > Flow Fault Value	Flow Warning
Flow Warning Value > Flow Fault Value ≥ Measured Flow Rate	Flow Fault

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

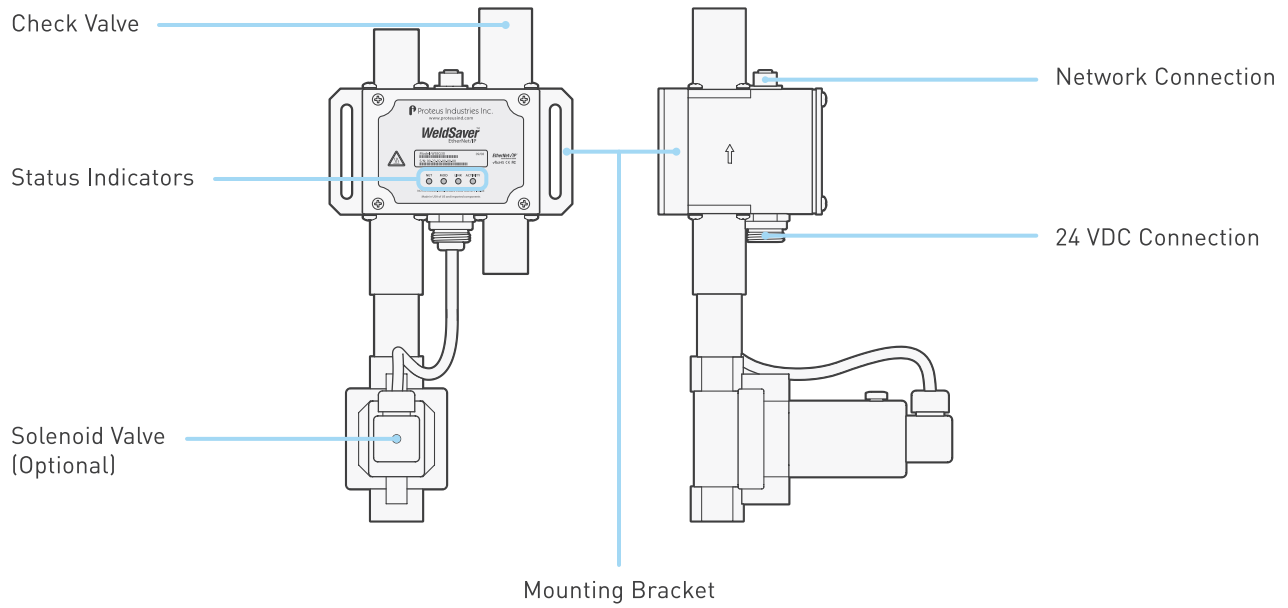
Cap-Loss Detection

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.

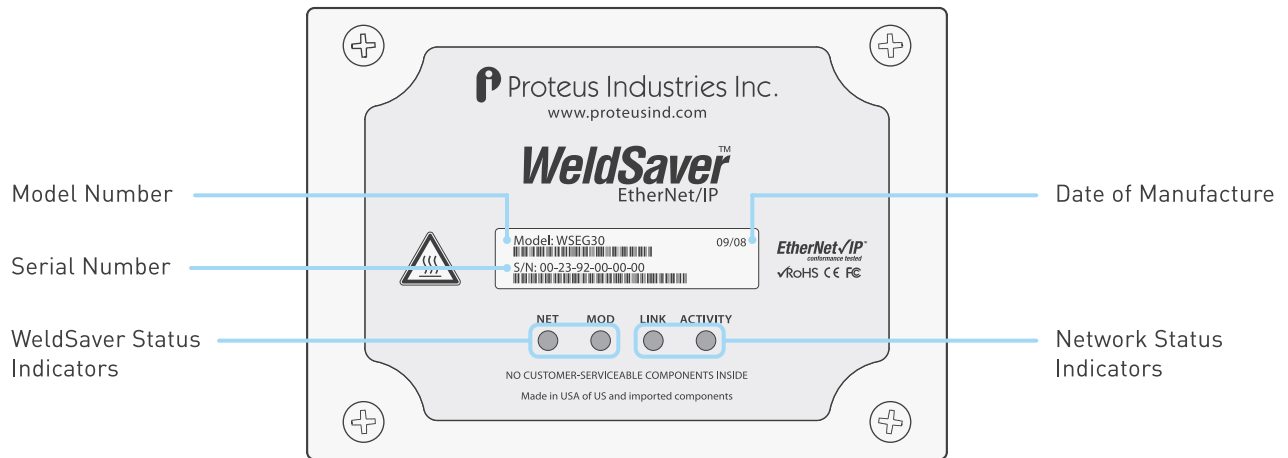
When a cap loss event is detected, the microcomputer shuts off coolant flow and signals the weld controller. The weld controller makes a decision to shut down weld operations.

2 FEATURES AND FUNCTIONS

Functional Components



Front Panel

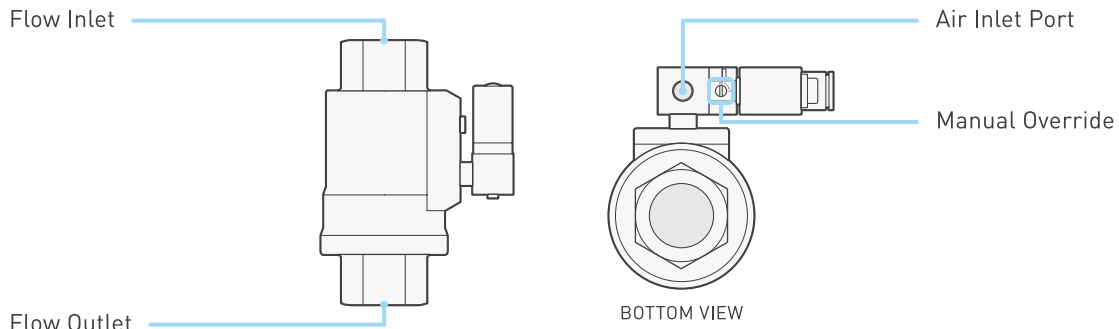


2 FEATURES AND FUNCTIONS

Optional Solenoid Valve

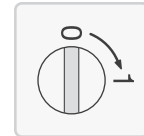
WeldSaver™ products are available with an optional electric or pneumatic solenoid valve for shutting off coolant flow. Both versions feature a manual override function.

» Pneumatic Solenoid Valve



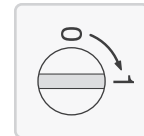
Normal Operation

- › The solenoid valve is functional when the slot in the screw is in the vertical **0** 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 valve can be bypassed by depressing the screw and turning it 90° clockwise to the horizontal **1** position.
- › In the manual override state, water can flow through the system to allow leak testing without engaging 24 VDC electrical power.



Valve Configuration	Normally closed (N.C.)
Inlet Port Connection Size	G 1/8" (ISO 288)
Control Media	Compressed air (filtered and lubricated)
Control Media Temperature	0–50 °C / 32–122 °F
Air Pressure Requirement	420–800 kPa / 61–116 psig

WARNING!



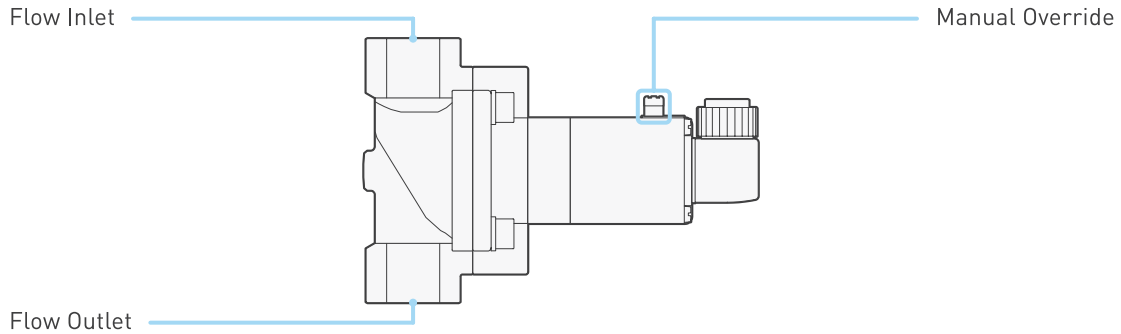
Do NOT exceed the pressure limit of your instrument.

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

2 FEATURES AND FUNCTIONS

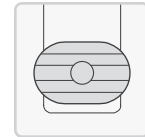
Optional Solenoid Valve (Continued)

» Electric Solenoid Valve



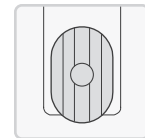
Normal Operation

- > 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.



NOTE




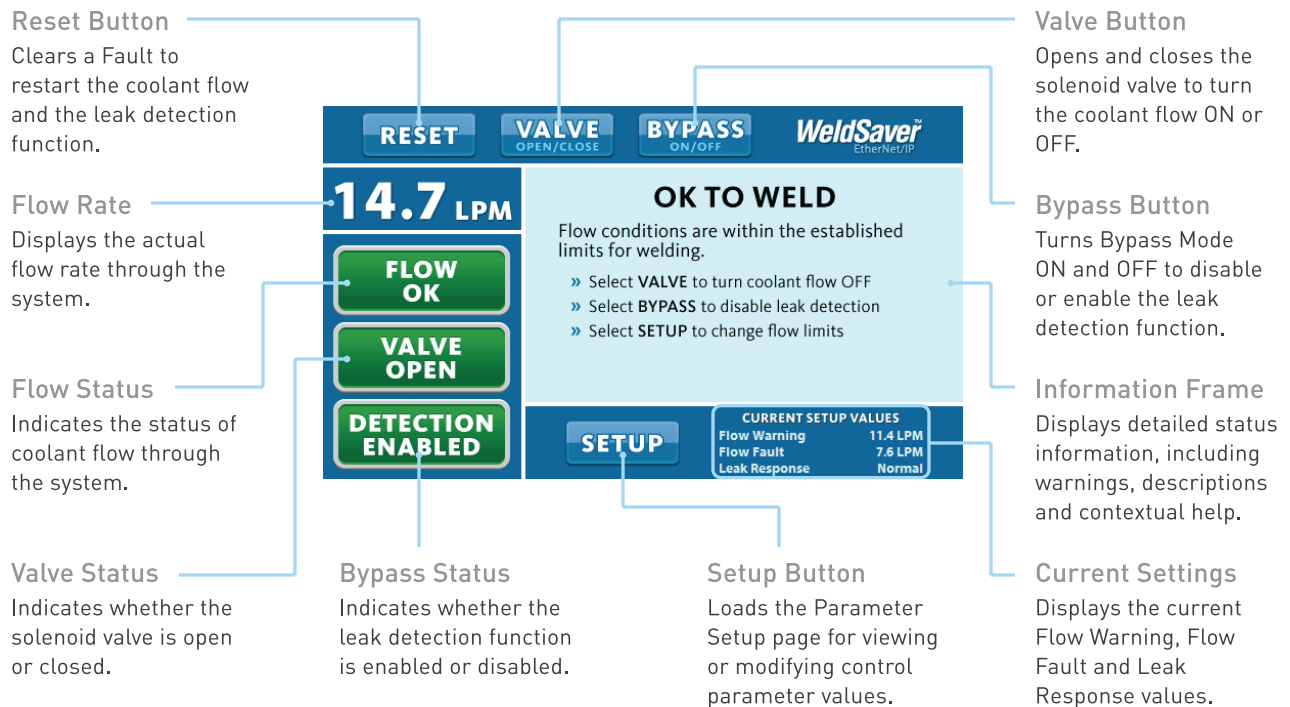
Due to pressure drop inherent in the design of the electric solenoid valve, WeldSaver products equipped with an electric valve have a reduced upper flow limit of 30 LPM / 8 GPM.

2 FEATURES AND FUNCTIONS

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 4 products are programmed with a default IP address of 174.24.1.1 .



3 SPECIFICATIONS AND PERFORMANCE

Performance Characteristics

Base Model Number	WSEV50G	WSEV13N
Flow Range*	6.0 – 50 LPM	1.5 – 13 GPM
Connections	G 3/4" (BSPP)	3/4" MNPT
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 ms at most sensitive condition; ~1 sec. at sensitivity setting "FAS"	
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	IP66 / NEMA 4X	
Input Power Voltage	+24 VDC ± 10%	
Input Power Consumption	Pneumatic solenoid valve: < 12.0 VA at normal flow; < 9.6 VA with valve closed Electric solenoid valve: < 16.8 VA at normal flow; < 9.6 VA with valve closed	
Max. Rated Input Current	0.75 A	

*The stated flow ranges are valid for products equipped with a pneumatic solenoid valve and products with no solenoid valve installed. Products equipped with an electric solenoid valve have a reduced upper flow limit of 30 LPM / 8 GPM.

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.

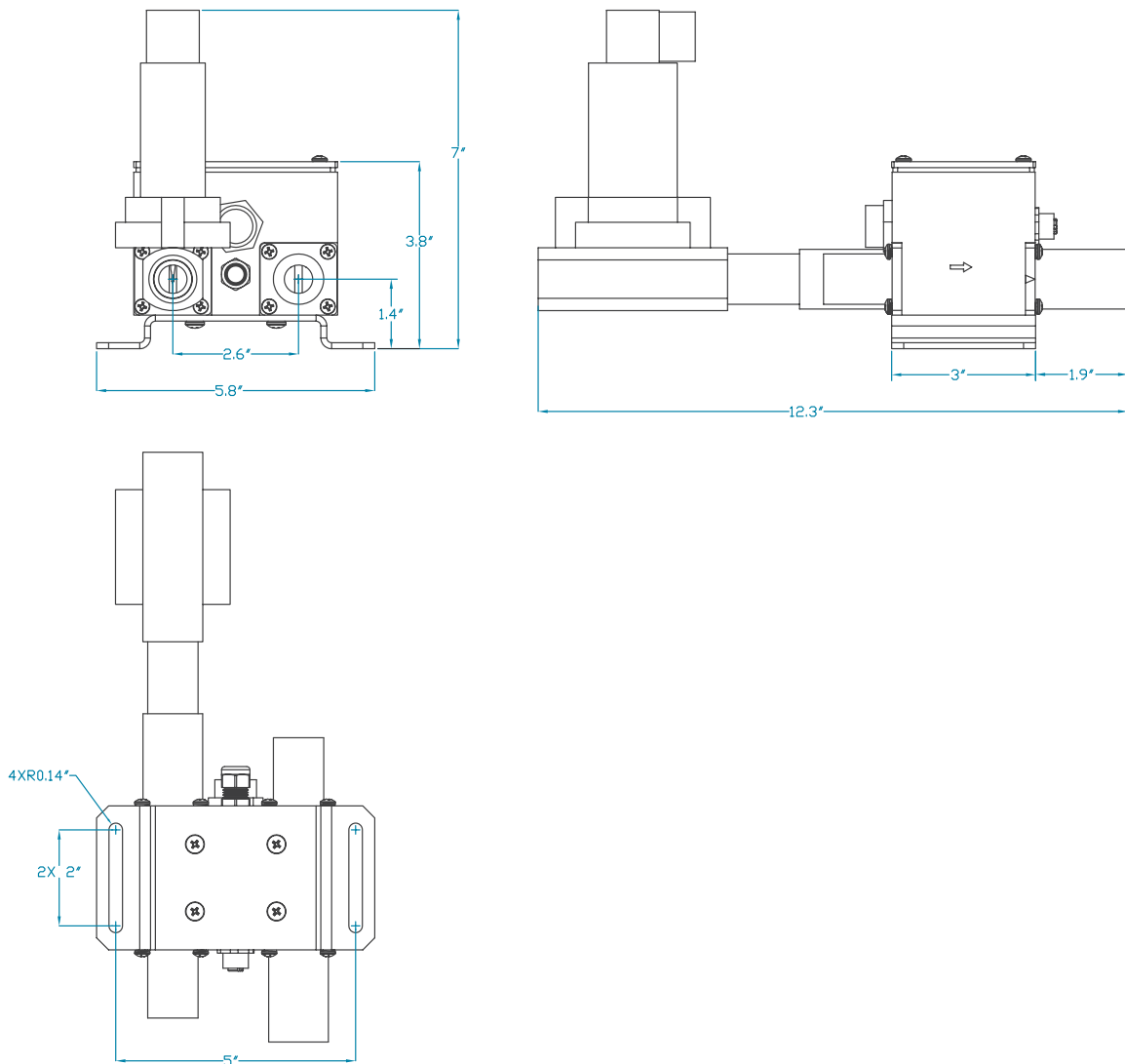
3 SPECIFICATIONS AND PERFORMANCE

Wetted Materials

COMPONENT	MATERIAL
Flow body • Fittings • Check valve (NPT models)	304 Stainless steel
Electric solenoid valve (optional) • Check valve (metric models)	Brass
Pneumatic solenoid valve (optional)	Nickel-plated brass
Bluff body	PPA (Polyphthalamide PA6T/6I; 40% glass fiber)
Sensor element	ETFE (Ethylene tetrafluoroethylene)
O-rings	EPDM (Ethylene propylene diene monomer)

Dimensional Drawings

Product dimensions in inches are provided below for reference only. (Shown with optional electric solenoid valve.) To request dimensional drawings or solid models of customized products, please contact WeldSaver Technical Support.



3 SPECIFICATIONS AND PERFORMANCE

Compliance and Certifications

» **EtherNet/IP Conformance**

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

EtherNet/IP™
conformance tested

» **CE Compliance**

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

CE

» **Environmental Compliance**

2011/65/EU Restriction of Hazardous Substances (RoHS) Directive
1907/2006/EC Regulation on Registration, Evaluation, Authorisation
and Restriction of Chemicals (REACH)

RoHS 

» **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

FC

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.

4 INSTALLATION AND SETUP

Tools Required

- » Adjustable wrenches
- » Pipe wrenches
- » Non-hardening pipe sealant
- » 2 × M5x12 screws for mounting bracket


Pneumatic Connections

NOTE	
	WeldSaver products equipped with a normally closed (N.C.) pneumatic solenoid valve require connection to a compressed air supply to enable flow through the valve.


1. Clear the air line of all contaminants.
2. Disconnect the air supply and depressurize the air line.
3. Connect the air line to the G 1/8" inlet port on the pneumatic solenoid valve. (Refer to page 5 for the inlet location.)
4. Reconnect the air supply and confirm that the pneumatic connection is secure and leak-free.

Plumbing Connections


The typical response of the WeldSaver, and thus its calibration, may be affected by the inner diameter (ID) of the incoming pipe as well as any devices attached to the inlet connections and any nearby upstream devices.

NOTE	
	<p>The inner diameter (ID) of the inlet piping or the through-hole of any connecting element must be greater than or equal to 15.0 mm / 0.59 in.</p> <p>Expanding flow profiles create flow conditions in which the accuracy and the short-term stability of the WeldSaver may be compromised. For assistance with installations involving elbows or other possible flow restrictions, please contact WeldSaver Technical Support.</p>

1. Flush the cooling system.

CAUTION!	
	<p>Thoroughly flush the cooling system BEFORE connecting the WeldSaver.</p> <p>Failure to remove contaminants or other debris from the coolant lines and any components or equipment installed in the cooling circuit may result in damage to the WeldSaver's flow sensors or the clogging of smaller orifices in the system.</p>

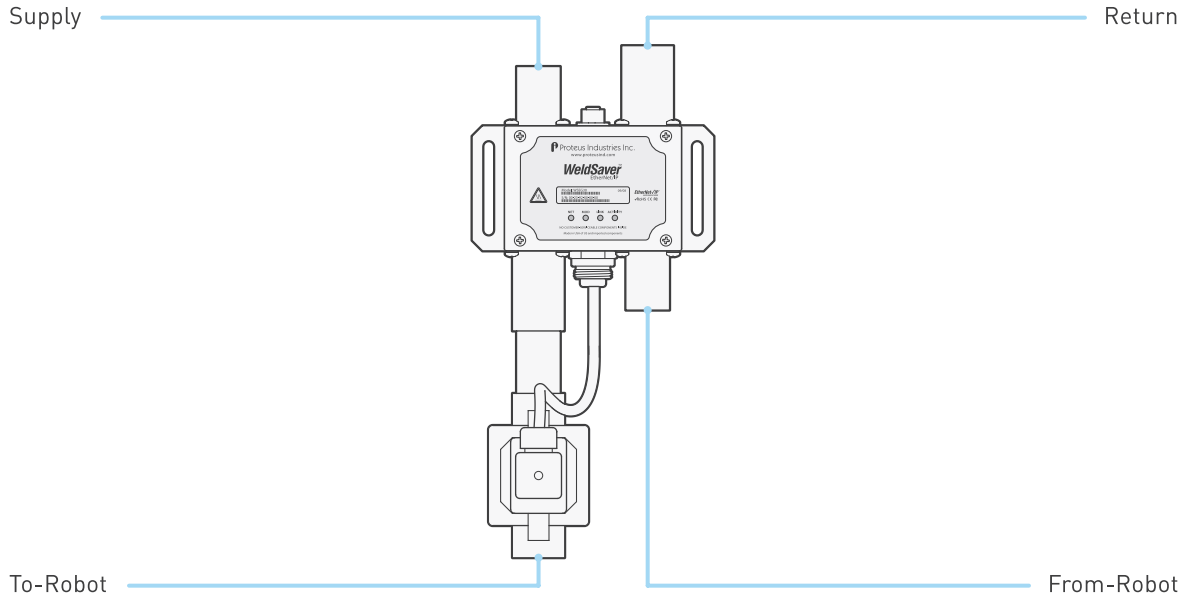
2. Lubricate all pipe threads using a non-hardening pipe sealant to help simplify installation and seal plumbing connections.

CAUTION!	
	<p>Do NOT allow excess pipe sealant to enter the flow sensors!</p> <p>Excess material may foul the WeldSaver's flow sensors or clog smaller orifices in the system.</p>

4 INSTALLATION AND SETUP

Plumbing Connections (Continued)

3. Refer to the diagram below 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 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.

5. Adjust pipe connections as required for proper alignment of the WeldSaver.
6. Engage the solenoid valve manual override to enable flow. (Refer to pages 5–6 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.

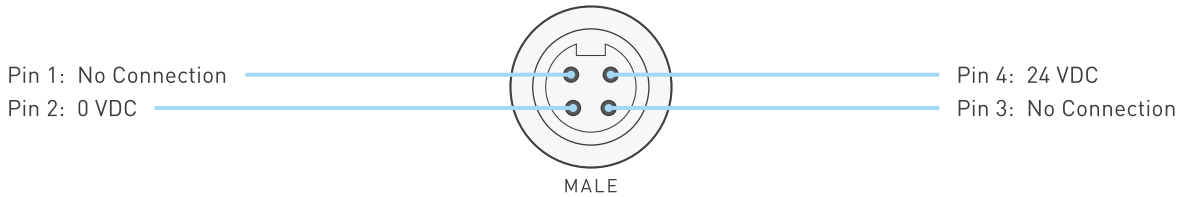
8. Check for leaks at all connections to the WeldSaver.
9. Eliminate all leaks before proceeding.
10. Disengage the solenoid valve manual override for normal operation.

4 INSTALLATION AND SETUP


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.

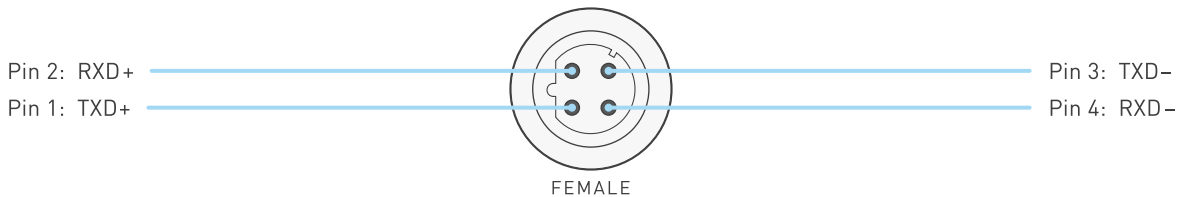
CAUTION!	
	Connect the power cable to the 24 VDC power source BEFORE connecting it to the WeldSaver.

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 bottom 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 bottom of the WeldSaver body.

4 INSTALLATION AND SETUP

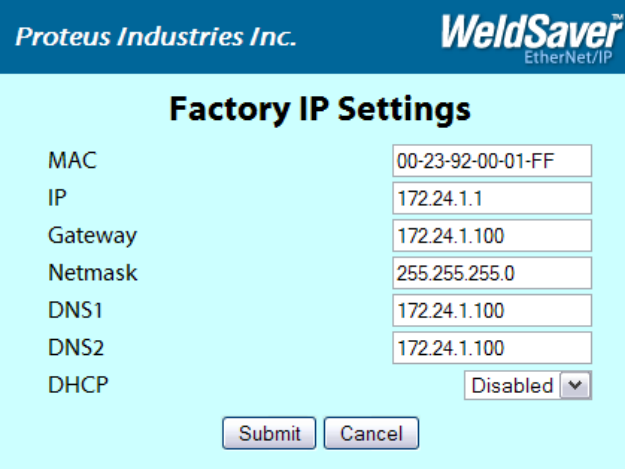
Configuring Network Settings

The network settings of a WeldSaver can be configured using a JavaScript™-enabled web browser.

NOTE	
	This section provides the basic steps for configuring the network settings of the WeldSaver for installation on an Ethernet network. The actual process may require additional steps by your network administrator depending on the requirements of your specific network configuration.


NOTE	
	Standard WeldSaver 4 products are programmed with a default IP address of 174.24.1.1 .

1. To access the WeldSaver Network Settings page, enter http://<ip address>/setup_ip.cgi in the browser's address bar.
 - » The Network Settings page will display in the browser window.



<i>Proteus Industries Inc.</i>		WeldSaver™ EtherNet/IP
Factory IP Settings		
MAC	<input type="text" value="00-23-92-00-01-FF"/>	
IP	<input type="text" value="172.24.1.1"/>	
Gateway	<input type="text" value="172.24.1.100"/>	
Netmask	<input type="text" value="255.255.255.0"/>	
DNS1	<input type="text" value="172.24.1.100"/>	
DNS2	<input type="text" value="172.24.1.100"/>	
DHCP	<input type="text" value="Disabled"/>	
<input type="button" value="Submit"/> <input type="button" value="Cancel"/>		

1. Change the network settings as needed for compatibility with your network configuration.
2. Select the Submit & Reset button to save the new settings. To exit the Network Settings without saving any changes, select the Cancel button.
 - » The WeldSaver user interface will display in the browser window.
 - » The status indicated on the screen will depend on the measured flow rate through the device.
3. Turn 24 VDC power OFF, wait a few moments, and then turn 24 VDC power back ON.

NOTE	
	After making changes to the network settings, the WeldSaver must be power-cycled for the changes to take effect. It is not necessary to disconnect the power or network connections when power-cycling.

4 INSTALLATION AND SETUP

Configuring Network Settings (Continued)

4. Enter the IP address of the WeldSaver in the browser's address bar to establish a new connection to the device. If the IP address was changed prior to power-cycling, enter the new IP address.
 - » The WeldSaver user interface will display in the browser window.
 - » The status indicated on the screen will depend on the measured flow rate through the device.
5. If you wish to confirm the changes made to the network settings, enter http://<ip address>/setup_ip.cgi in the browser's address bar to access the Network Settings page.
 - » The Network Settings page will display in the browser window and contain the new network settings.

EtherNet/IP Operation


Refer to **Appendix A** on page 26 of this document for complete Common Industrial Protocol (CIP) information for standard WeldSaver 4 products.

Electronic Data Sheet (EDS)

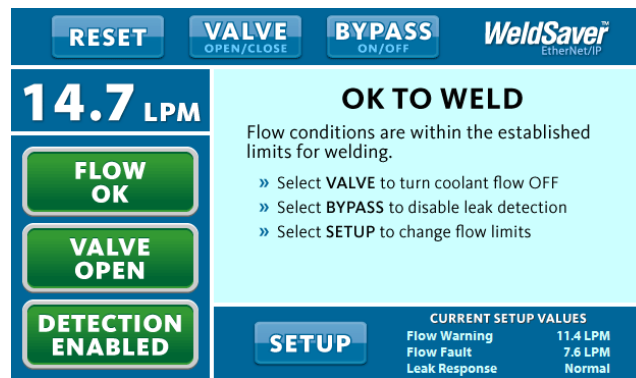
To request the Electronic Data Sheet (EDS) file for your WeldSaver model, please contact WeldSaver Technical Support.

5 FUNCTIONAL TESTING

Power and Network Connectivity

NOTE	
	<p>A valid Ethernet connection and a JavaScript™-enabled web browser are required to operate the WeldSaver.</p> <p>If operating the WeldSaver using a welding robot pendant, refer to the robot manufacturer's pendant operating manual for instructions on accessing network devices.</p> <p>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.</p>

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.

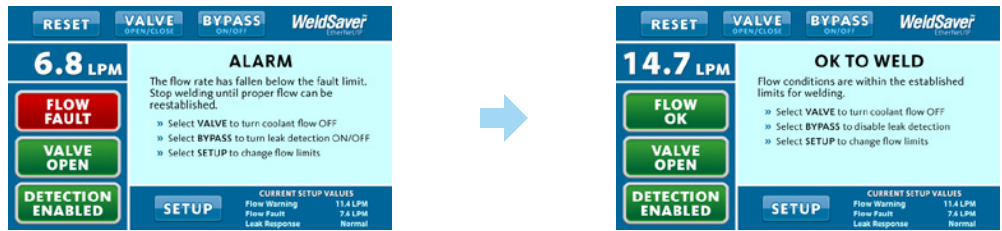


The screenshot displays the WeldSaver web interface. At the top, there are control buttons: **RESET**, **VALVE OPEN/CLOSE**, and **BYPASS ON/OFF**, along with the **WeldSaver EtherNet/IP** logo. The main display area shows a flow rate of **14.7 LPM** in large blue text. Below this, three green status indicators are shown: **FLOW OK**, **VALVE OPEN**, and **DETECTION ENABLED**. To the right, a light blue box contains the text **OK TO WELD** and a message: "Flow conditions are within the established limits for welding." Below this message are three instructions: "» Select VALVE to turn coolant flow OFF", "» Select BYPASS to disable leak detection", and "» Select SETUP to change flow limits". At the bottom right, a **SETUP** button is visible, and a table titled **CURRENT SETUP VALUES** lists: Flow Warning (11.4 LPM), Flow Fault (7.6 LPM), and Leak Response (Normal).

5 FUNCTIONAL TESTING

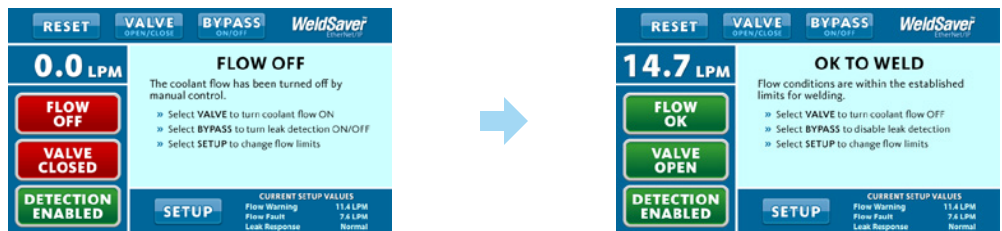
Flow Detection

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 browser interface 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 interface will indicate the OK TO WELD condition.



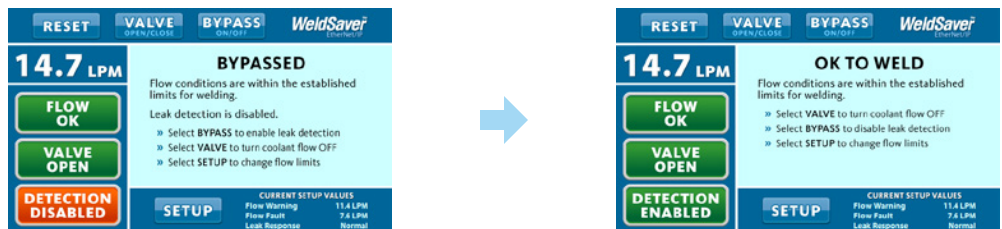
Valve Shut-Off

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



Bypass Mode

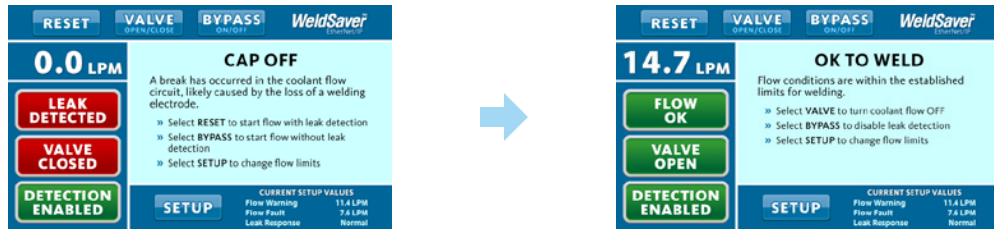
1. Select the BYPASS button.
 - » The leak detection function will turn OFF and the interface will indicate the BYPASSED condition.
2. Select the BYPASS button again.
 - » The leak detection function will turn ON and the interface will return to the OK TO WELD condition.



5 FUNCTIONAL TESTING

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 interface 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 interface will indicate the OK TO WELD condition and the actual flow rate.



6 PARAMETER SETUP

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 lowest 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 flow rate above which the welding system should be operated. Coolant flow below 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

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

» WSEVG50 BASE MODELS

CONTROL PARAMETER	SELECTABLE VALUES					DEFAULT
Flow Warning Trip Point	0.0 - 50.0 LPM					11.4 LPM
Flow Fault Trip Point	0.0 - 50.0 LPM					7.6 LPM
Leak Response Sensitivity	Slowest	Slow	Normal	Fast	Fastest	Normal
Startup Stabilization Delay	1 sec.	2 sec.	4 sec.	8 sec.	16 sec.	4 sec.
Leak Detection Threshold	2.0 LPM	4.0 LPM	6.0 LPM	8.0 LPM	10 LPM	4.0 LPM

*The upper limit of 50.0 LPM is valid for products equipped with a pneumatic solenoid valve and products with no solenoid valve installed. Products equipped with an electric solenoid valve have a reduced upper limit of 30.0 LPM.

» WSEVN13 BASE MODELS

CONTROL PARAMETER	SELECTABLE VALUES					DEFAULT
Flow Warning Trip Point	0.0 - 13.0 GPM					3.0 GPM
Flow Fault Trip Point	0.0 - 13.0 GPM					2.0 GPM
Leak Response Sensitivity	Slowest	Slow	Normal	Fast	Fastest	Normal
Startup Stabilization Delay	1 sec.	2 sec.	4 sec.	8 sec.	16 sec.	4 sec.
Leak Detection Threshold	0.5 GPM	1.0 GPM	1.5 GPM	2.0 GPM	2.5 GPM	1.0 GPM

*The upper limit of 13.0 GPM is valid for products equipped with a pneumatic solenoid valve and products with no solenoid valve installed. Products equipped with an electric solenoid valve have a reduced upper limit of 8.0 GPM.

6 PARAMETER SETUP

Parameter Setup Page

The WeldSaver provides a Parameter Setup page that is accessible through the browser interface by selecting the SETUP button on the home screen. This page contains the control parameters that determine the behavior of the device. (Refer to page 19 for descriptions of each parameter.)

CURRENT SETUP VALUES			
Flow Warning	11.4 LPM	Stabilization Delay	2.0 SEC
Flow Fault	7.6 LPM	Startup Leak	3.8 LPM
Leak Response	Normal		

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.

6 PARAMETER SETUP

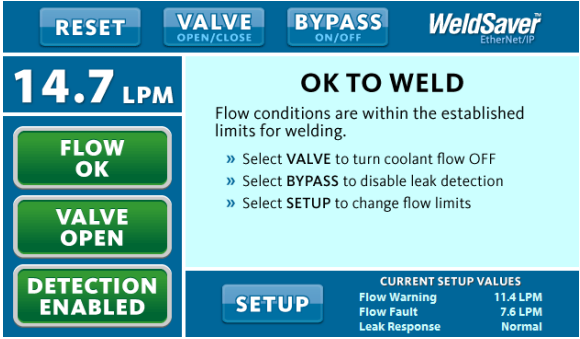
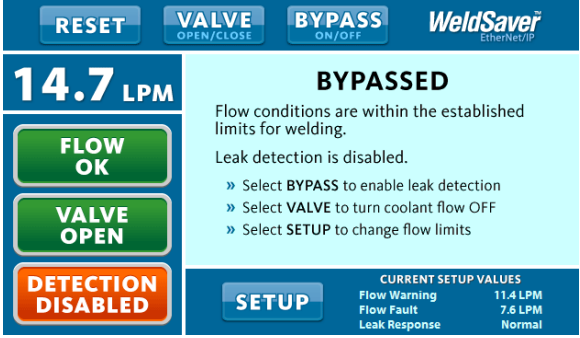
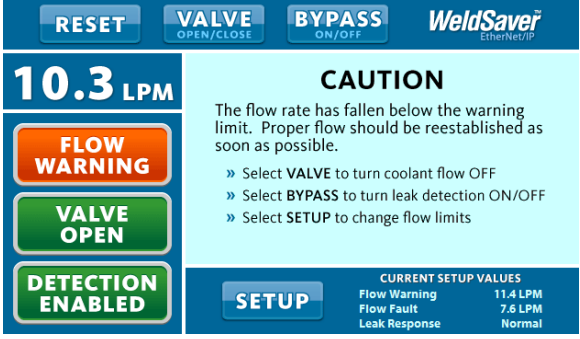
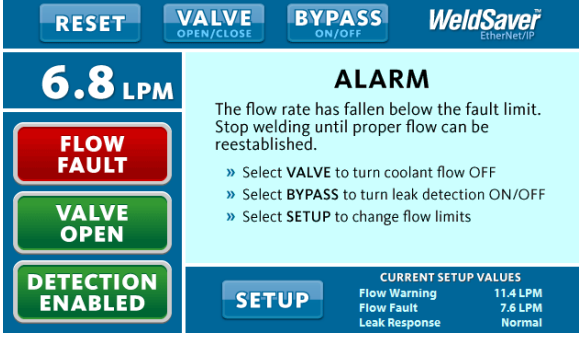
Adjusting Control Parameter Values

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.
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.

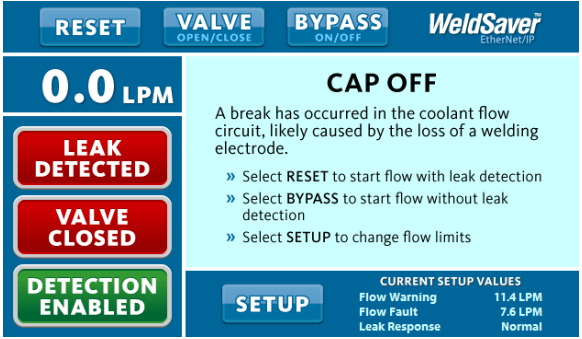
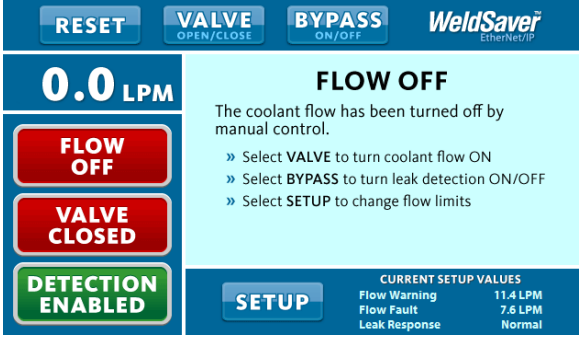
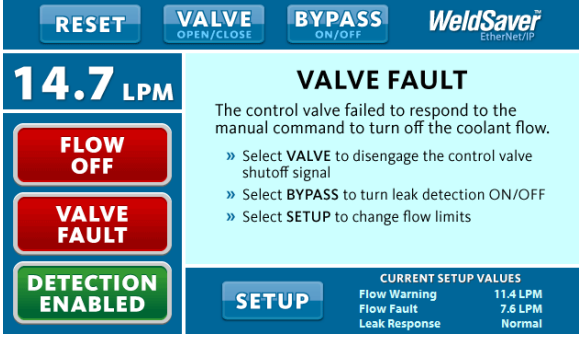
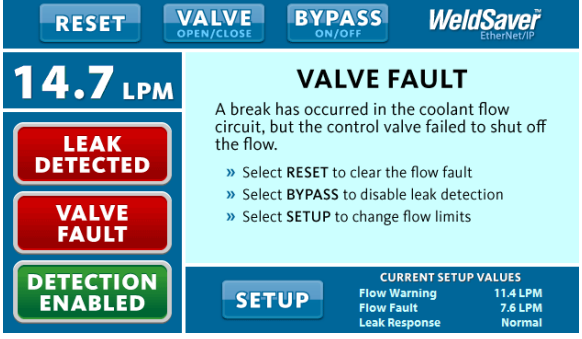
CAUTION!	
	<p>Enter only NUMERIC characters in the Flow Warning and Flow Fault text fields. Any invalid characters entered into these fields will be ignored by the WeldSaver.</p>

- » 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.

7 STATUS CONDITIONS

STATUS CONDITION	ON-SCREEN DISPLAY
<p>OK TO WELD</p> <p>The standard operating condition in which flow conditions are within the established limits for welding.</p>	
<p>BYPASS MODE</p> <p>Leak detection is disabled. Flow monitoring is still functional.</p> <p>To exit Bypass Mode and enable leak detection, select the BYPASS button.</p>	
<p>LOW FLOW WARNING</p> <ul style="list-style-type: none"> » Flow has fallen below the Flow Warning flow rate <ol style="list-style-type: none"> 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. 	
<p>LOW FLOW FAULT</p> <ul style="list-style-type: none"> » Flow has fallen below the Flow Fault flow rate <ol style="list-style-type: none"> 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. 	

7 STATUS CONDITIONS

STATUS CONDITION	ON-SCREEN DISPLAY
<p>CAP OFF FAULT</p> <ul style="list-style-type: none"> » 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. 	
<p>FLOW OFF</p> <p>The coolant flow has been turned off by manual control. Select the VALVE button to turn coolant flow ON.</p>	
<p>VALVE FAULT</p> <p>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.</p> <ul style="list-style-type: none"> » The solenoid valve manual override is engaged Disengage manual override (see pages 5–6). » The solenoid valve is fouled Clean or replace the solenoid valve. 	
<p>VALVE FAULT with CAP OFF FAULT</p> <p>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.</p> <ul style="list-style-type: none"> » The solenoid valve manual override is engaged Disengage manual override (see pages 5–6). » The solenoid valve is fouled Clean or replace the solenoid valve. 	

8 TROUBLESHOOTING

■ The NET status 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 network and module 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 access the Parameter Setup page.
2. Select a faster Leak Response value from the pull-down menu.
3. Select the Submit button to save the new value and return to normal operation.

8 TROUBLESHOOTING

■ The WeldSaver does not detect a cap loss immediately after reset

» The Leak Detection Slow Leak Delay setting is too high

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

■ The WeldSaver does not shut off coolant flow

» The solenoid valve manual override function is engaged

Disengage manual override (see pages 5–6).

» 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.

■ The flow rate reduces over time

» A filter in the flow circuit 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 access the Parameter Setup page.
2. Select a lower Leak Response value from the pull-down menu.
3. Select the Submit button to save the new value and return to normal operation.

A ETHERNET/IP DEVICE PROFILE

Device Class

The Proteus WeldSaver 4 featuring EtherNet/IP is an Adapter Class device that provides Explicit Message Client and Server and I/O Connection Target capabilities.

Object Classes

CLASS CODE	OBJECT NAME
01 (0x01)	Identity
04 (0x04)	Assembly
245 (0xF5)	TCP/IP Interface
246 (0xF6)	Ethernet Link

Identity Object, Class 0x01

» Class (Instance 0) Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
1	Get	Revision	UINT	1	Revision of object
2	Get	Max Instance	UNIT	1	Highest initiated instance number

» Instance 1 Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
1	Get	Vendor ID	UINT	414	Identification of each vendor by number
2	Get	Device Type	UNIT	0	Indication of general type of product
3	Get	Product Code	UINT	4	Identification of a particular product
4	Get	Revision	STRUCT of:		Revision of item Identity Object represents
		Major Revision	USINT	-	Firmware major revision
		Minor Revision	USINT	-	Firmware minor revision
5	Get	Status	WORD	-	See Device Status table on page 27
6	Get	Serial Number	UDINT	-	Device serial number / MAC ID
7	Get	Product Name	STRUCT of:		Product name
		Length	USINT	21	Product name length (excluding terminal char.)
		Name	STRING	WeldSaver EtherNet/IP	Product name string

» Common Services

CODE	CLASS	INSTANCE	SERVICE NAME
14 (0x0E)	Yes	Yes	Get_Attribute_Single
01 (0x01)	No	Yes	Get_Attribute_All
05 (0x05)	No	Yes	Reset (0)

A ETHERNET/IP DEVICE PROFILE

Assembly Object, Class 0x04

» Class (Instance 0) Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
1	Get	Revision	UINT	2	Revision of object
2	Get	Max Instance	UNIT	129	Highest initiated instance number

» Instance 100 (Input) Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
3	Get	Input Data	STRUCT of:		WeldSaver EtherNet/IP input data
		Status	UINT	-	See Device Status table below
		Supply Flow Rate	UINT	-	Supply flow rate in 1/100th GPM (or LPM)
		Return Flow Rate	UINT	-	Return flow rate in 1/100th GPM (or LPM)

» Device Status

BIT	NAME	VALUE
0	Adequate Flow	0: Flow rate is below Flow Warning limit. (See page 22.) 1: Flow rate is above Flow Warning limit.
1	Valve Closed	0: Solenoid valve is open. 1: Solenoid valve is closed.
2	Bypass Mode	0: Leak detection is enabled. (See page 22.) 1: Leak detection is disabled.
3	Minimal Flow	0: Flow rate is below Flow Fault limit. (See page 22.) Unsafe to weld. 1: Flow rate is above the Flow Fault limit. Safe to weld.
4	Cap Loss	0: Normal operation. 1: Weld-cap loss or other break in coolant circuit detected. (See page 23.)
5	Valve Fault	0: Normal operation. 1: Control valve failed to respond to shut-off command. (See page 23.)
6	Flow Sensor Fault	0: Normal operation. 1: No frequency is detected from flow sensor(s). (See page 23.)
7	Power OK	0: No auxiliary power to device. 1: Normal operation.
8	Flow Units	0: Gallons per minute (GPM) 1: Liters per minute (LPM)
9-15	(Reserved)	N/A

» Instance 101 (Output) Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
3	Get / Set	Output Controls	UINT	-	See Output Controls table on page 28.

A ETHERNET/IP DEVICE PROFILE

Assembly Object, Class 0x04 (Continued)

» Output Controls

BIT	NAME	VALUE
0	Reset	Clears fault conditions to restore coolant flow and leak detection function.
1	Close Valve	Closes solenoid valve to stop coolant flow.
2	Bypass Mode	Turns Bypass Mode on to disable leak detection function.
3-15	(Reserved)	N/A

» Common Services

CODE	CLASS	INSTANCE	SERVICE NAME
14 (0x0E)	Yes	Yes	Get_Attribute_Single
16 (0x10)	No	Yes	Set_Attribute_Single

TCP/IP Interface Object, Class 0xF5

» Class (Instance 0) Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
1	Get	Revision	UINT	1	Revision of object

» Instance 1 Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
1	Get	Status	DWORD	1	Interface status
2	Get	Configuration Capability	DWORD	0	Interface capability flags
3	Get	Configuration Control	DWORD	0	Configuration method
4	Get	Link Object	STRUCT of:		Path to physical link object
		Path Size	UINT	2	Number of 16-bit words in Path
		Path	Padded EPATH	0x20 0xF6 0x24 0x01	Restricted to one logical class segment and one logical instance segment (Max. size is 12 bytes.)
5	Get	Interface Config.	STRUCT of:		TCP/IP network interface configuration
		IP Address	UDINT	172.24.1.1	Device IP address
		Network Mask	UDINT	255.255.255.0	Device network mask
		Gateway Address	UDINT	172.24.1.100	Gateway address
		Name Server	UDINT	172.24.1.100	Primary DNS
		Name Server 2	UDINT	172.24.1.100	Secondary DNS
Domain Name	STRING	0	Default domain name		
6	Get	Host Name	STRING	WeldSaverEIP	Host name string

A ETHERNET/IP DEVICE PROFILE

TCP/IP Interface Object, Class 0xF5 (Continued)

» Common Services

CODE	CLASS	INSTANCE	SERVICE NAME
14 (0x0E)	Yes	Yes	Get_Attribute_Single
01 (0x01)	No	Yes	Get_Attribute_All
16 (0x10)	No	Yes	Set_Attribute_Single

Ethernet Link Object, Class 0xF6

» Class (Instance 0) Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
1	Get	Revision	UINT	2	Revision of object

» Instance 1 Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
1	Get	Interface Speed	UDINT	100	Actual interface speed (in Mbps)
2	Get	Interface Flags	DWORD	3	Interface status flags
3	Get	Physical Address	Array of 6 USINTs	(MAC ID)	MAC layer address

» Common Services

CODE	CLASS	INSTANCE	SERVICE NAME
14 (0x0E)	Yes	Yes	Get_Attribute_Single
01 (0x01)	No	Yes	Get_Attribute_All
16 (0x10)	No	Yes	Set_Attribute_Single



Proteus Industries Inc.
340 Pioneer Way, Mountain View, CA 94041
Tel: (650) 964-4163 Fax: (650) 965-0304
www.proteusind.com sales@proteusind.com

Information in this document was correct at the time of printing; however, specifications are subject to change as Proteus Industries' continuous improvement processes establish new capabilities.

© Proteus Industries Inc. All rights reserved. All other company and product names may be trademarks of their respective companies.

WS4EVTRM Rev 001 10/2014