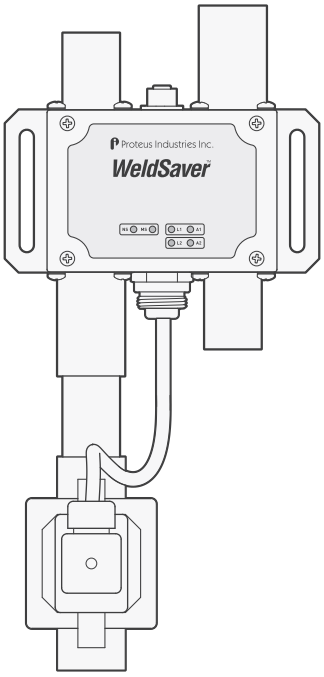
Proteus Industries Inc.

WeldSaver™

WeldSaver 5 Series

PROFINET® Interface

Vortex Flow Sensors



TECHNICAL REFERENCE MANUAL

CONTENTS

1 OVERVIEW

Introduction

This document provides comprehensive technical information about the Proteus WeldSaver™ 5 Series coolant flow controller and leak detector featuring a PROFINET® control interface and vortex flow sensing technology. The product features, specifications, and operating instructions described herein apply to standard WeldSaver 5 products with base model numbers **WSPV13N** and **WSPV50G** and may not be valid for all customized versions. For model-specific product information, please refer to the specification sheet provided with your instrument or contact WeldSaver Technical Support.

Applicable Model Numbers

Base Model Number

	9	WS	P	V	50	G	-	1	-	001

Custom Product Code	**9**	
WeldSaver Product Code	**WS**	
Communication Interface	**E**	EtherNet/IP™
	P	PROFINET®
Flow Sensor Type	**V**	Vortex sensors
Upper Flow Limit	**13**	13 GPM
	50	50 LPM
Plumbing Connections	**G**	G threads (BSPP)
	N	NPT threads
Hyphen	**-**	
Number of Network Ports	**1**	1 port
	2	2 ports
Hyphen	**-**	
Unique 3-Character Identifier	**XXX**	

Important Safety Information

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

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.

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.

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.
6620 Cobb Drive
Sterling Heights, MI 48312
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.

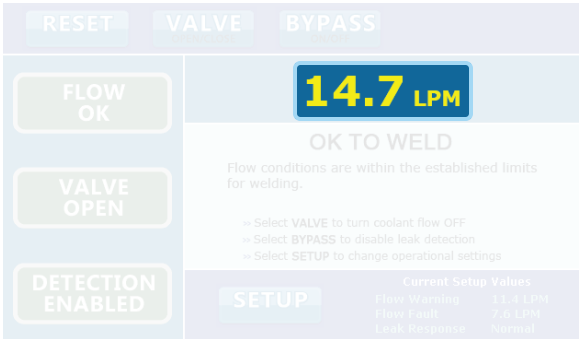
What It Is and What It Does

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

» It's a Flow Meter

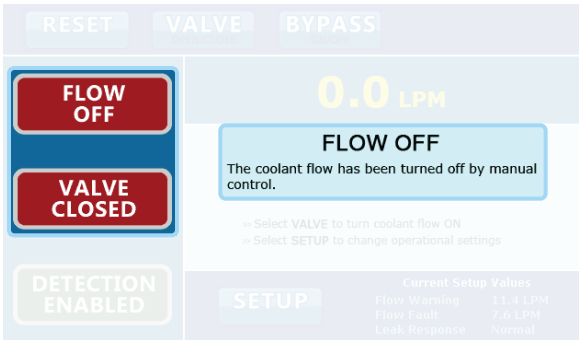
Integrated sensors continuously measure the flow of coolant to and from the weld cell.

The measured liquid flow rate is indicated on the web-browser-based user interface in liters per minute (LPM) or gallons per minute (GPM).



» It's a Flow Valve

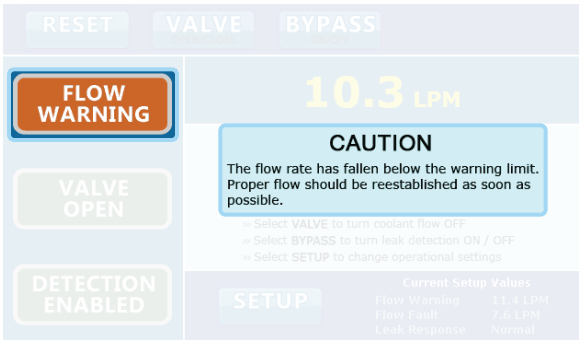
Coolant flow to the weld cell can be turned ON and OFF remotely using the browser interface or from the weld controller.



» It's a Flow Monitor

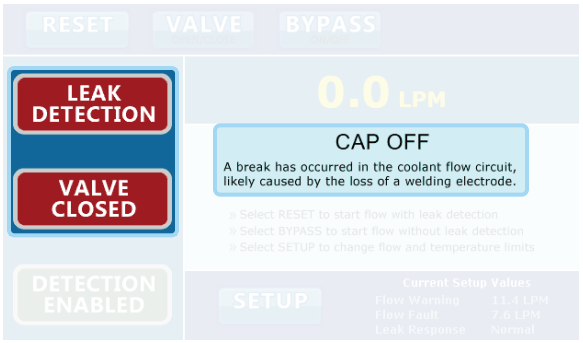
The coolant flow rate is continuously monitored and compared against programmed trip-point values.

Status information is indicated on the browser interface and is also transmitted to the weld controller via PROFINET.



» 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 coolant flow is shut off in less than one second.

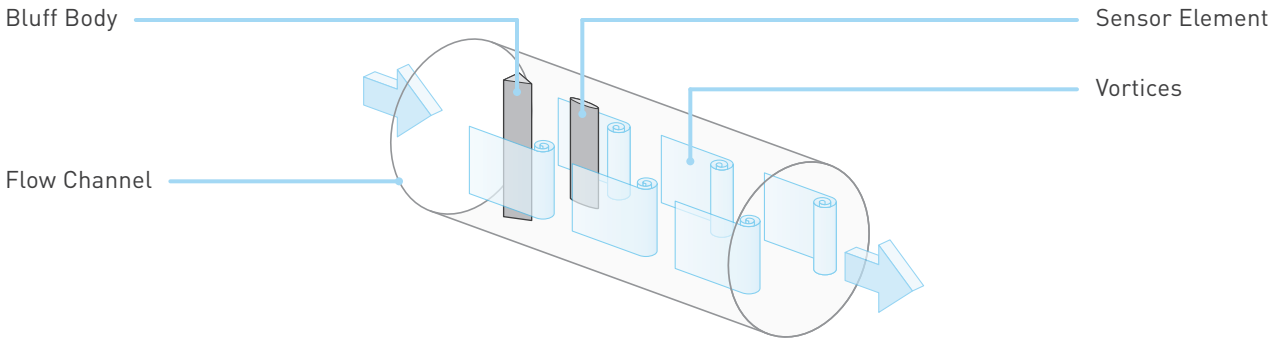


Flow Sensing and Measurement

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

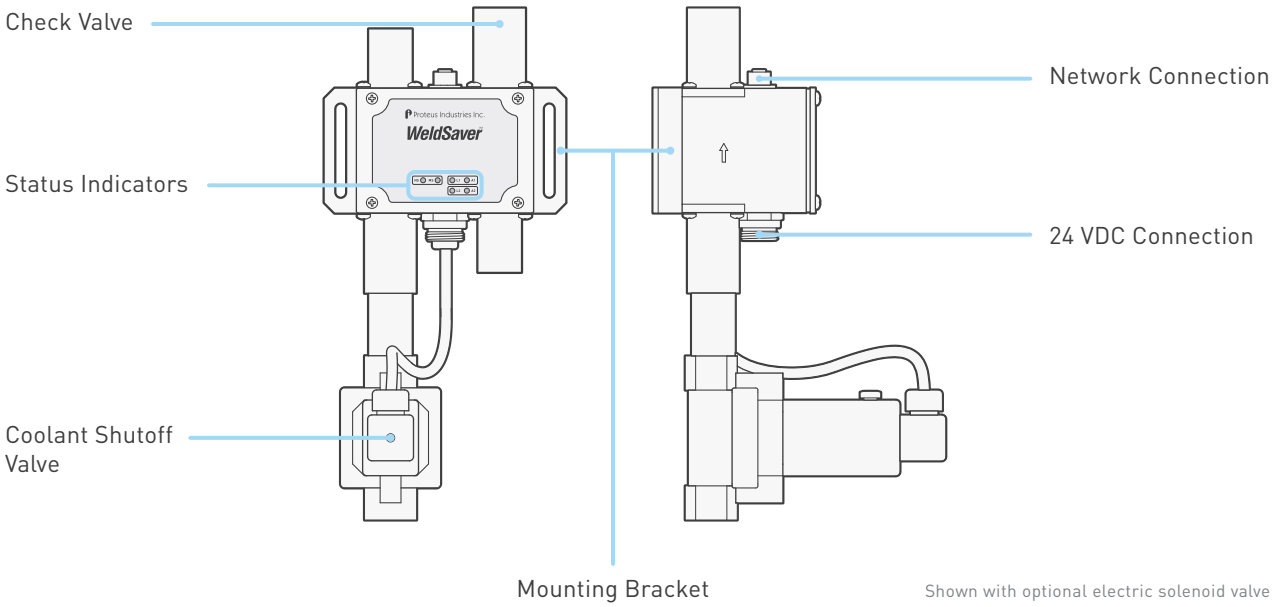
The weld controller makes decisions affecting weld operations based on the flow status reported by the WeldSaver.

Cap-Loss and Slow-Leak 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 loss of flow continuity in less than 0.3 seconds.

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

Functional Components



Shown with optional electric solenoid valve

Coolant Shutoff Valve

WeldSaver™ products are available with an optional shut-off valve for stopping the flow of coolant water. Proteus has specified the following valve types for use with the WeldSaver:

Manufacturer / Series	ESG 100 Series	ESG 200 Series	Burkert Type 5282
Valve Type	Pneumatic angle seat valve	Pneumatic shuttle valve	Electric solenoid valve
Flow Coefficient (Cv)	11.0	13.2	5.8
Flow Factor (Kv)	9.5	11.4	5.0
Valve Configuration	Normally closed (N.C.)	Normally closed (N.C.)	Normally closed (N.C.)
Pneu. Inlet Connection Size	1/8" NPT	1/8" NPT	n/a
Pneu. Control Medium	Compressed air	Compressed air	n/a
Pneu. Control Medium Temp.	0–50 °C / 32–122 °F	0–50 °C / 32–122 °F	n/a
Pneu. Control Pressure	0.3–0.8 MPa / 43.5–116 psi	0.3–0.8 MPa / 43.5–116 psi	n/a

All valve options feature a manual override function to allow water to flow through the system for leak testing without applying 24 VDC electrical power or for troubleshooting in the event that the WeldSaver or the valve malfunctions. Refer to pages 6–7 for detailed information about each valve type.

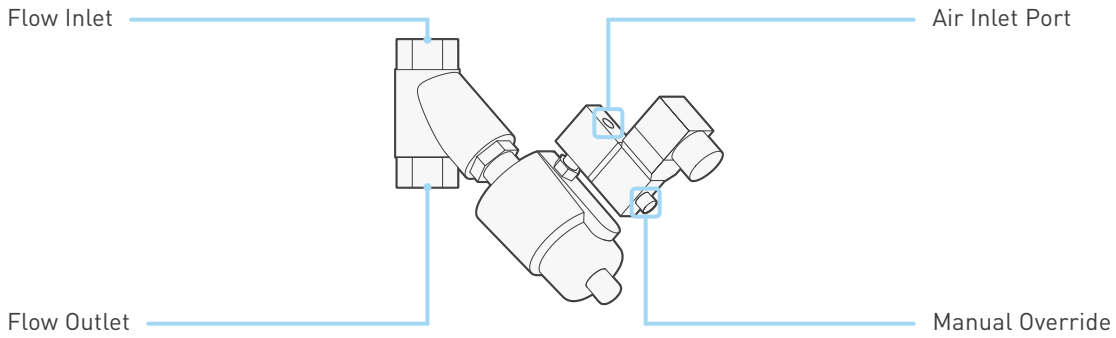
CAUTION!

When manual override is engaged, the valve will remain open and WILL NOT close in response to a remote command or in the event that a leak is detected.

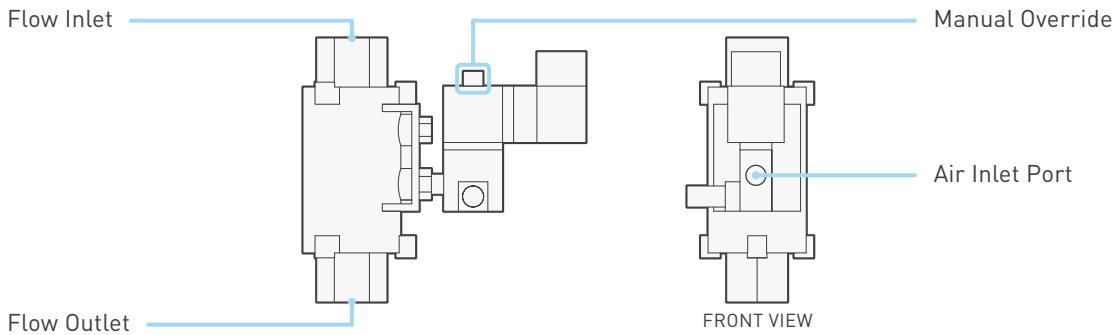
Coolant Shutoff Valve (Continued)

» ESG Pneumatic Valves (100 Series and 200 Series)

100 Series Angle Seat Valve



200 Series Shuttle Valve



Both pneumatic valve assemblies are composed of small solenoid valve that controls the flow of compressed air to a larger pneumatic valve.

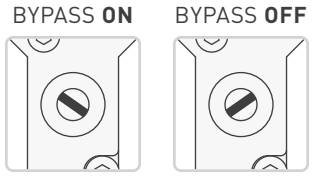
- When the solenoid valve is open, compressed air flows to the pneumatic valve; the air pressure opens the pneumatic valve to allow water to pass through.
- When the solenoid valve closes, it stops the flow of compressed air to the pneumatic valve, which automatically closes and thereby stops the flow of water.

The solenoid valve features a mechanical bypass to lock the valve in the open position.

- During normal operation, the bypass is OFF and the valve will open when power is applied and close when power is switched off. Water flow through the system can be controlled from the WeldSaver browser interface or from the weld controller.
- When the bypass is ON, the solenoid valve will be open regardless of whether power is on or off. Compressed air will flow to the pneumatic valve, thus keeping the pneumatic valve open. The valve cannot be controlled remotely and will not close in the event that the WeldSaver detects a fault condition.

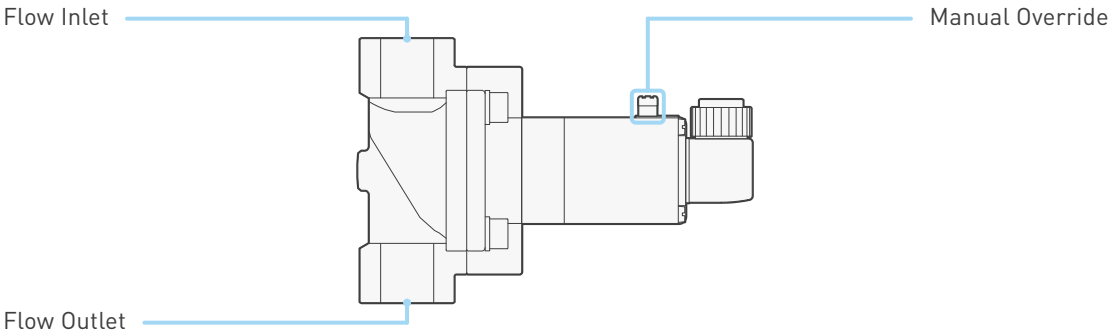
The manual override is operated by a small bypass screw located adjacent to the solenoid valve cable connection.

- To engage the bypass, use a small flat-head screwdriver to depress the screw and turn it 60° clockwise. When correctly engaged, the screw will remain depressed while in the BYPASS ON position.
- To disengage the bypass and restore normal operation, push down the screw using the screwdriver and turn it 60° counterclockwise. In the BYPASS OFF position, the screw will no longer be depressed.



Coolant Shutoff Valve (Continued)

» Burkert Solenoid Valve



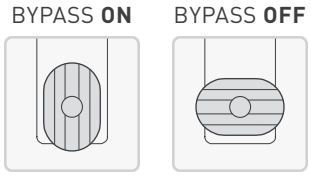
The solenoid valve controls the flow of water through the WeldSaver. When power is applied to the valve, it opens to allow water to pass through; when power is switched off, the valve automatically closes and thereby stops the flow of water.

The valve features a mechanical bypass to lock the valve in the open position.

- During normal operation, the bypass is OFF and water flow through the system can be controlled from the WeldSaver browser interface or from the weld controller.
- When the bypass is ON, the solenoid valve will be open regardless of whether power is on or off. The valve cannot be controlled remotely and will not close in the event that the WeldSaver detects a fault condition.

The manual override is operated by a small bypass knob located adjacent to the solenoid valve cable connection.

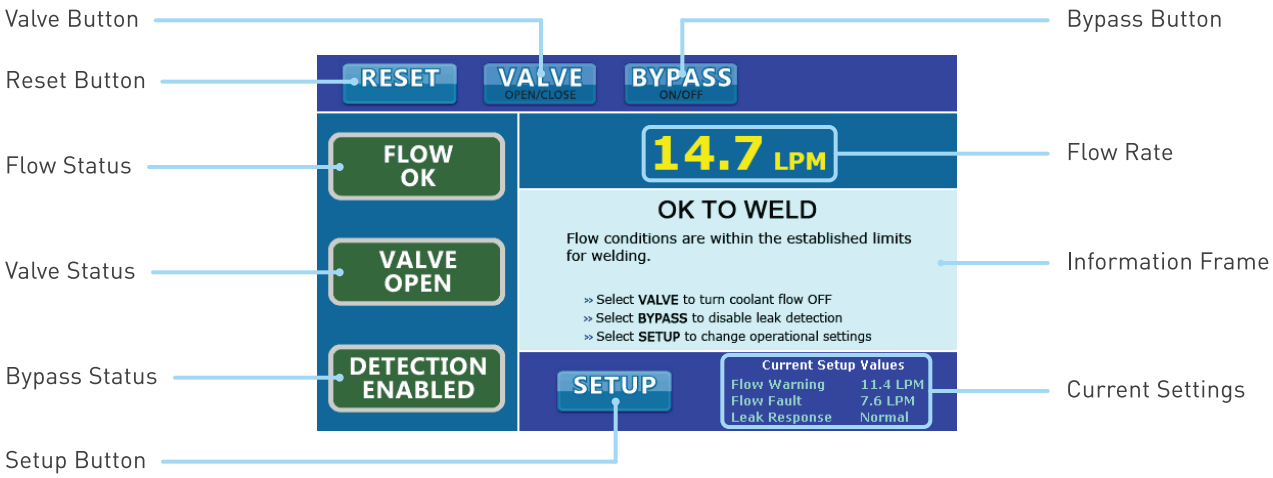
- To engage the bypass, depress the knob and turn 90° clockwise to the BYPASS ON position.
- To disengage the bypass and restore normal operation, depress the knob and turn it 90° counterclockwise to the BYPASS OFF position.



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 5 products are programmed with a default IP address of 172.24.1.1. **Some customized models may be programmed with a unique customer-specified default IP address. For model-specific product information, please refer to the specification sheet and/or test report provided with your WeldSaver device.**



» Control Buttons

Reset Button	Clears a Fault to restart the coolant flow and the leak detection function.
Valve Button	Opens and closes the coolant shutoff valve to turn the coolant flow ON or OFF.
Bypass Button	Turns Bypass Mode ON or OFF to disable or enable the leak detection function.
Setup Button	Loads the Setup Menu for viewing or modifying the control parameter values.

» Status Indicators

Flow Status	Indicates the status of the coolant flow through the system.
Valve Status	Indicates whether the coolant shutoff valve is open or closed.
Bypass Status	Indicates whether the leak detection function is enabled or disabled.

» Measured Value

Flow Rate	Displays the measured coolant flow rate in LPM or GPM.

» Key Information

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.

3 SPECIFICATIONS AND PERFORMANCE

Performance Characteristics

Base Model Number	WSPV50G	WSPV13N
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 full scale	
Repeatability	± 1% of full scale from 0.1 to 1.0 × full scale	
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 valve: < 12.0 VA at normal flow; < 9.6 VA with valve closed Solenoid valve: < 16.8 VA at normal flow; < 9.6 VA with valve closed	
Max. Rated Input Current	0.75 A	

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.

Wetted Materials

COMPONENT	MATERIAL
Flow body • Fittings • Check valve (3/4" NPT option)	304 Stainless steel
Solenoid valve (option) • Check valve (G 3/4 and 3/4" NPT options)	Brass
Pneumatic valve (option)	316 Stainless steel
Bluff body	PPA (Polyphthalamide PA6T/6I; 40% glass fiber)
Sensor element	ETFE (Ethylene tetrafluoroethylene)
O-rings	EPDM (Ethylene propylene diene monomer)

Storage and Transportation

WeldSaver products should be stored and transported in the original packaging to protect against damage.

CAUTION!

All coolant water MUST be thoroughly drained from the WeldSaver prior to storage or transport.

If subjected to freezing temperatures, any liquid remaining inside the WeldSaver body or valves may expand and cause damage to the flow sensors or other internal components.

There are two possible methods to ensure that all coolant water is thoroughly drained from the WeldSaver:

- Position the WeldSaver so that the supply and return lines are vertical and allow to drain. Rotate the device 180 degrees and allow to drain again.
- Engage the coolant shutoff valve manual override and allow to drain. (Refer to pages 6–7 for more information.) After clearing all water from the device, disengage manual override.

CAUTION!

The coolant shutoff valve manual override MUST be disengaged prior to storage or transport.

If manual override is left engaged, the valve will remain open and WILL NOT close on command.

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 shutoff 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 inlet port on the pneumatic valve. (Refer to page 6 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

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.

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.

1. Flush the cooling system.

CAUTION!

Thoroughly flush the cooling system BEFORE connecting the WeldSaver.

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.

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

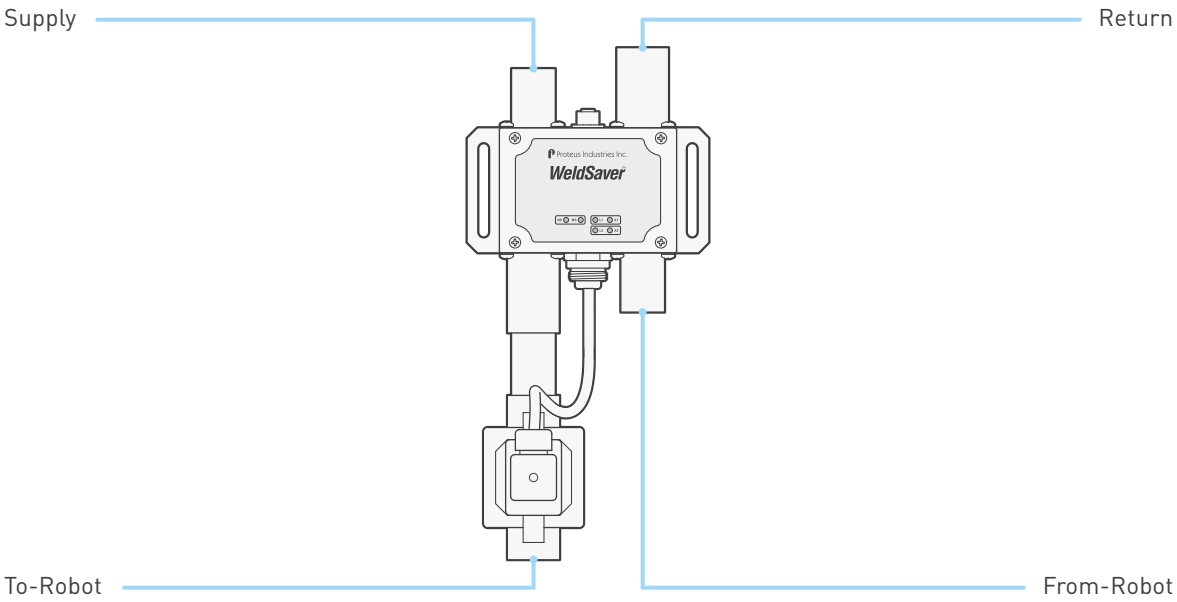
CAUTION!

DO NOT allow excess pipe sealant to enter the flow sensors.

Excess material may foul the WeldSaver's flow sensors or clog smaller orifices in the system.

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 coolant shutoff valve manual override to enable flow. (Refer to pages 5–7 for more information.)
7. Turn water ON slowly.

WARNING!

The WeldSaver body is NOT insulated.

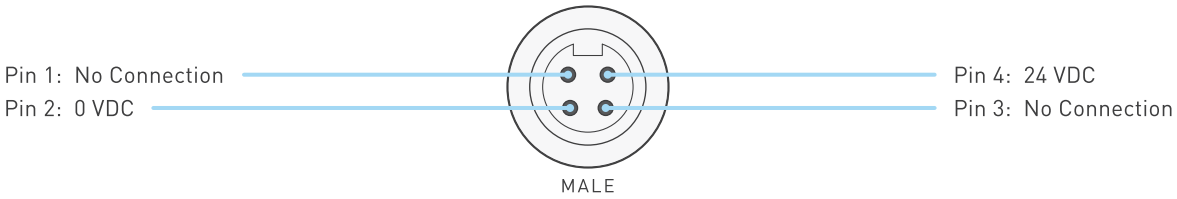
When using hot liquids, touching the surface could result in burns. Use personal protective equipment.

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

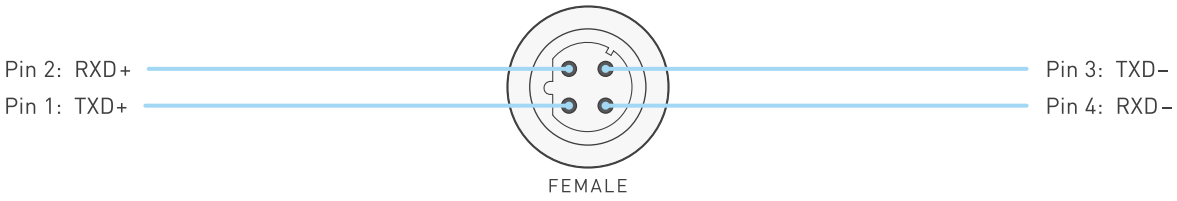
CAUTION!
Connect the power cable to the 24 VDC power source BEFORE connecting it to the WeldSaver.

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.

Default Network Settings

NOTE

The default settings shown below are applicable to standard WeldSaver 5 products and may not be valid for all customized versions. For model-specific product information, please refer to the specification sheet and/or test report provided with your WeldSaver device.

SETTING	DEFAULT	DESCRIPTION
MAC ID		Factory-assigned physical address
Device Name	weldsaverpn	Name of station of PROFINET specification
Working IP Address	172.24.1.1	Currently used IP address
Primary IP Address	172.24.1.1	The first and second addresses that appear on the Setup IP tab of the Setup Menu. (If both addresses are the same, the Setup IP tab will not be displayed.)
Secondary IP Address	172.24.1.2	
Gateway	172.24.1.100	Network gateway address
Netmask	255.255.0.0	Network subnet mask
DNS 1	172.24.1.100	Not used. Any valid address may be entered.
DNS 2	172.24.1.100	Not used. Any valid address may be entered.
End Port	Auto-configuration	Speed and duplex mode for network ports 1 (end) and 2 (switch). Two options are provided: • Auto-negotiation (full duplex) • 100 Mbps (full duplex)
Switch Port	Auto-configuration	
DHCP	Disabled	Enables/disables DHCP (Dynamic Host Configuration Protocol) feature

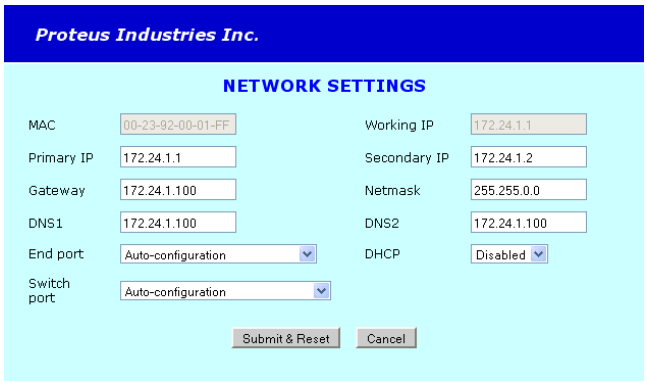
Configuring Network Settings

The WeldSaver's network settings 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.

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



Configuring Network Settings (Continued)

2. Change the network settings as needed for compatibility with your network configuration.
3. 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.
4. 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.**

5. 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.
6. If you wish to confirm the changes made to the network settings, enter http://<ip address>/network.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.

General Station Description (GSD) File

The WeldSaver 5 GSDML file can be downloaded directly from the device using a web browser.

1. Enter http://<ip address>/about.cgi in the browser's address bar.
   - » The About page will display in the browser window.
2. Select the **Download GSD (General Station Description) File** link at the bottom of the page.
   - » The browser will display a download prompt to save the GSDML file.
3. Select the **Go to Main Page** button to exit the About page and return to normal operation.

The GSDML file for your WeldSaver model may also be obtained by contacting WeldSaver Technical Support.

Cyclic Data Exchange

The WeldSaver 5 supports cyclic exchange of I/O data in real time. The modules available for cyclic data exchange are shown in the tables below.

» Input Data

BYTE	NAME	BYTE ORDER	DESCRIPTION
0–1	Sensor Status	Little endian	Refer to Sensor Status table below
2–3	Supply Flow Rate	Little endian	Supply flow rate in 1/100th GPM (or LPM)
4–5	Return Flow Rate	Little endian	Return flow rate in 1/100th GPM (or LPM)
6–7	Differential Temperature	Little endian	Differential temperature in 1/100th °F (or °C)
8–9	Outlet Temperature	Little endian	Outlet temperature in 1/100th °F (or °C)
10–11	Thermal Load	Little endian	Thermal load in 1/100th MBH (or KW)

» Sensor Status

BIT	NAME	VALUE
0	Adequate Flow	0: Flow rate is below Flow Warning limit 1: Flow rate is above Flow Warning limit
1	Valve Closed	0: Coolant shutoff valve is open 1: Coolant shutoff valve is closed
2	Bypass Mode	0: Leak detection is enabled 1: Leak detection is disabled
3	Minimal Flow	0: Flow rate is below Flow Fault limit 1: Flow rate is above Flow Fault limit
4	Cap Loss	0: Normal operation 1: Weld-cap loss or other break in coolant circuit detected
5	Valve Fault	0: Normal operation 1: Control valve failed to respond to shut-off command
6	Flow Sensor Fault	0: Normal operation 1: No output signal is detected from flow sensor(s)
7	Power OK	0: No auxiliary power to device 1: Normal operation
8	Metric Units	0: Flow units = GPM; Temperature units = °F 1: Flow units = LPM; Temperature units = °C
9*	Outlet Temperature Fault	0: Outlet temperature is below Outlet Temperature Fault limit 1: Outlet temperature is above Outlet Temperature Fault limit
10*	Outlet Temperature Warning	0: Outlet temperature is below Outlet Temperature Warning limit 1: Outlet temperature is above Outlet Temperature Warning limit
11*	Differential Temperature Fault	0: Differential temperature is below Differential Temperature Fault limit 1: Differential temperature is above Differential Temperature Fault limit
12*	Differential Temperature Warning	0: Differential temperature is below Differential Temperature Warning limit 1: Differential temperature is above Differential Temperature Warning limit
13*	Temperature Sensor Fault	0: Normal operation 1: No output signal is detected from temperature sensor(s)
14*	Thermal Load Fault	0: Thermal load is below Thermal Load Fault limit 1: Thermal load is above Thermal Load Fault limit
15*	Thermal Load Warning	0: Thermal load is below Thermal Load Warning limit 1: Thermal load is above Thermal Load Warning limit

*For models without temperature measurement capability, the value of this bit is always 0.

Cyclic Data Exchange (Continued)

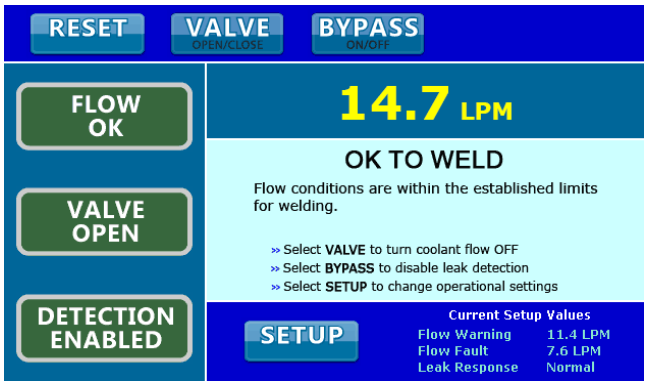
» Output Data

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

Power and Network Connectivity

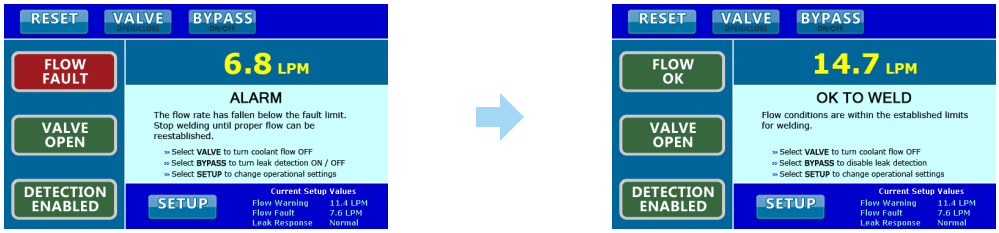
NOTE
A valid Ethernet connection and a JavaScript™-enabled web browser are required to operate the WeldSaver. If operating the WeldSaver using a welding robot pendant, refer to the robot manufacturer's pendant operating manual for instructions on accessing network devices. If connecting to the WeldSaver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

1. Turn 24 VDC power ON.
   - » The network status (NS) indicator will turn GREEN and flash.
   - » The module status (MS) indicator will turn GREEN.
2. Confirm that the WeldSaver has established a valid Ethernet connection.
   - » The link (L1) status indicator will be AMBER.
   - » The activity (A1) 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.



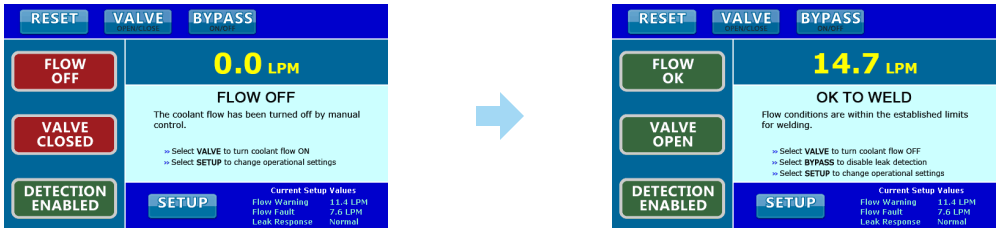
Flow Detection

1. Confirm that 24 VDC power is ON.
   - » If the coolant flow is OFF, or if the measured flow rate is less than the programmed Flow Warning or Flow Fault values, the browser interface will indicate a FLOW OFF, FLOW WARNING, or FLOW FAULT condition.
   - » The indicated flow rate will be 0.00 (if the flow is OFF) or the actual measured flow rate.
2. Turn the coolant flow ON or increase it until it reaches the optimum system flow rate.
3. Select the RESET button.
   - » The fault condition will reset and the interface will indicate the OK TO WELD condition and the actual flow rate.



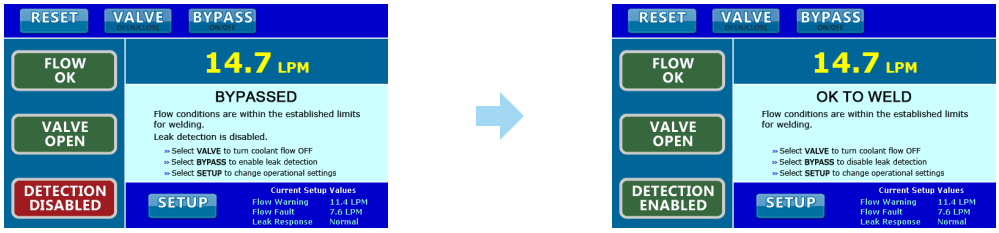
Valve Shut-Off

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.



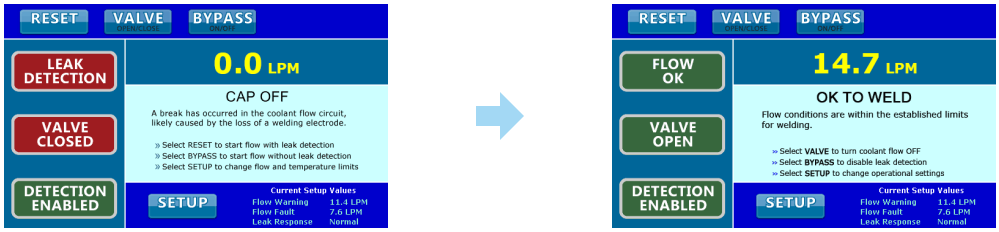
Bypass Mode

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.



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.



WeldSaver Control Parameters

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

» Flow Warning Trip Point

The flow rate above which the welding system should be operated (OK to Weld). Coolant flow above this rate provides sufficient cooling capacity to allow welds to be produced at the desired rate under all ambient temperature conditions.

» Flow Fault Trip Point

The flow rate below which the welding system should not be operated. Coolant flow below this rate does not provide sufficient cooling capacity to allow satisfactory welds to be produced.

» Leak Detection – Slow Leak Difference

The maximum allowable difference between the measured Supply and Return flow rates. A low setting provides a more sensitive response to the loss of a weld cap or to the presence of a slow leak in the coolant circuit.

» Leak Detection – Slow Leak Delay

The maximum allowable period of time during which the difference between the measured Supply and Return flow rates can exceed the specified Flow Rate Difference value. If the Flow Rate Difference value is exceeded for longer than this interval, the WeldSaver will indicate a CAP OFF condition.

» Startup Stabilization Delay

The amount of time required to purge air from the cooling system and stabilize flow at startup or after the coolant shutoff valve is opened to resume flow. Setting the delay interval too low can result in false cap-loss events.

» 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.

» Flow Units

Flow rate information can be displayed and transmitted in liters per minute (LPM) or gallons per minute (GPM). If the Flow Units setting is changed, the programmed parameter values will automatically convert accordingly.

Factory Default Setup Values

NOTE

The default values shown below are applicable to standard WeldSaver 5 products and may not be valid for all customized versions. For model-specific product information, please refer to the specification sheet and/or test report provided with your WeldSaver device.

» WSPV50G BASE MODELS

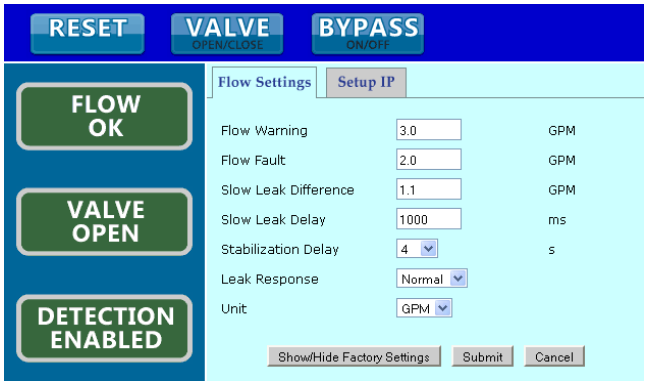
CONTROL PARAMETER	SELECTABLE VALUES					DEFAULT
Flow Warning Trip Point	0.0 - 50.0 LPM					11.4 LPM
Flow Fault Trip Point	0.0 - 50.0 LPM					7.6 LPM
Slow Leak Difference	0.0 - 50.0 LPM					4.0 LPM
Slow Leak Delay	0 - 10,000 ms					1,000 ms
Startup Stabilization Delay	1 sec.	2 sec.	4 sec.	6 sec.	8 sec.	4 sec.
Leak Response Sensitivity	Slowest	Slow	Normal	Fast	Fastest	Normal
Flow Units	GPM	LPM				LPM

» WSPV13N 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
Slow Leak Difference	0.0 - 13.0 GPM					1.1 GPM
Slow Leak Delay	0 - 10,000 ms					1,000 ms
Startup Stabilization Delay	1 sec.	2 sec.	4 sec.	6 sec.	8 sec.	4 sec.
Leak Response Sensitivity	Slowest	Slow	Normal	Fast	Fastest	Normal
Flow Units	GPM	LPM				GPM

Browser Interface Setup Menu

The WeldSaver provides a setup menu that is accessible through the browser interface by selecting the SETUP button on the home screen. The menu consists of two pages—Flow Settings and Setup IP—which can be accessed by selecting the corresponding tab at the top of the Information Frame.



» Flow Settings

The Flow Settings page contains the control parameters that determine the behavior of the device. (Refer to page 21 for descriptions of each parameter.)

» Setup IP

The Setup IP page provides the capability to toggle between the Primary and Secondary IP addresses specified on the Network Settings page. (Refer to page 14 for information about the Network Settings page.) This feature makes it possible for two WeldSaver devices to be paired for a dual-gun welding application.

NOTE

The Setup IP tab is only displayed when the Primary IP address and Secondary IP address are configured as two unique addresses. If the Primary and Secondary IP addresses are identical, the Setup IP tab will not be displayed. (The Setup IP tab is hidden by default.)

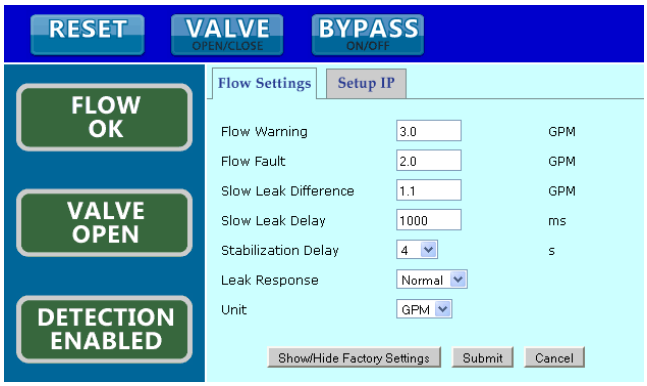
CAUTION!

The IP address selection should be used only during the initial commissioning of the WeldSaver.

Changing the IP address during normal operation will result in a network failure.

Adjusting Control Parameter Values

1. Select the **SETUP** button on the user interface.
   - » The setup menu will display in the Information Frame and show the current stored values for each parameter setting.



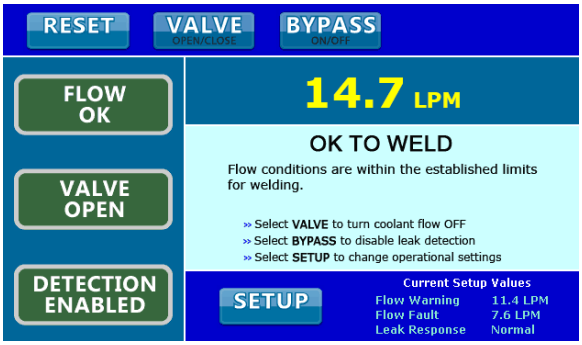
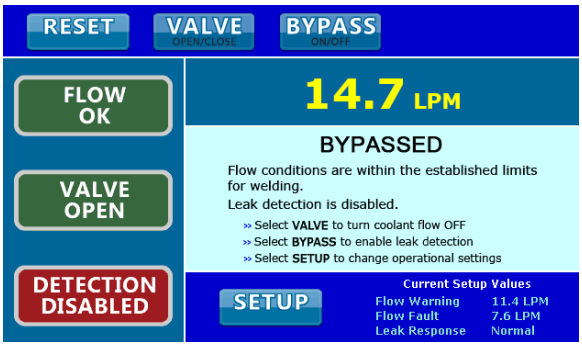
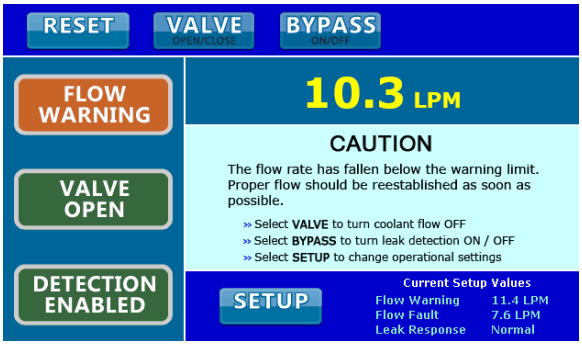
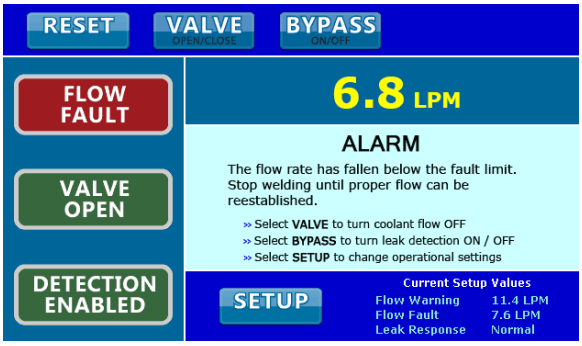
NOTE
The factory default parameter values can be viewed by selecting the **Show/Hide Factory Settings** button at the bottom of the page.

2. Adjust the parameter values on the Flow Settings page as desired using the text fields and drop-down menus.

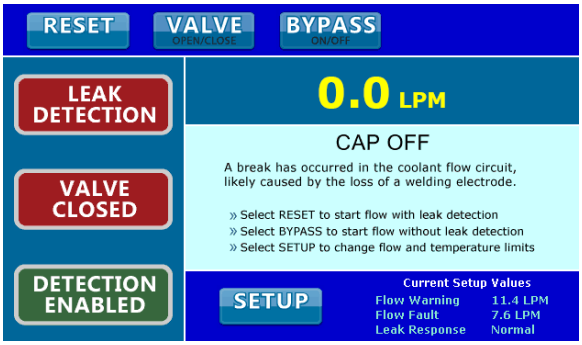
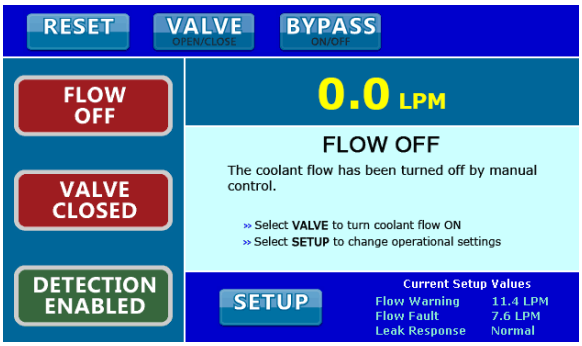
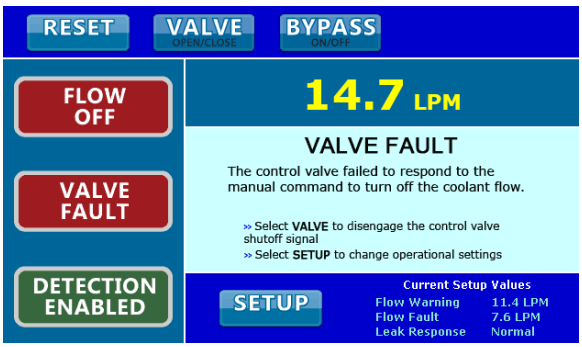
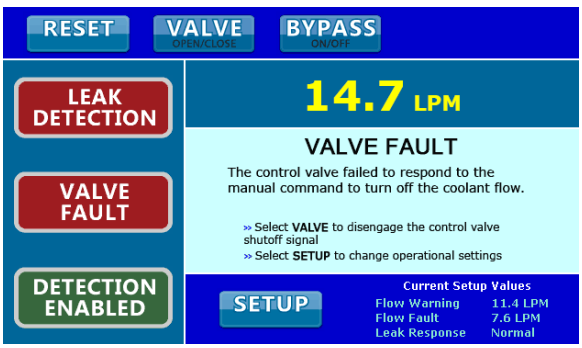
CAUTION!
Enter only NUMERIC characters in the text fields in the setup menu. Any invalid characters entered into these fields will be ignored by the WeldSaver.

3. Exit the setup menu.
   - » 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 setup menu.

7 STATUS CONDITIONS

STATUS CONDITION	ON-SCREEN DISPLAY
OK TO WELD The normal 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.	
LOW FLOW FAULT » Flow has fallen below the Flow Fault flow rate 1. Stop welding until sufficient 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
CAP OFF FAULT » The WeldSaver has detected the loss of a weld cap or other leak, 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 and no other leak is present (false cap-loss event) Reduce the Leak Response Sensitivity 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 command to turn off the coolant flow. The indicated flow rate does not decrease to 0.00. Select the **VALVE** button to disengage the control valve shutoff signal. » The coolant shutoff valve manual override is engaged Disengage manual override (see pages 5–7). » The coolant shutoff valve is fouled Clean or replace the coolant shutoff 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 coolant shutoff valve manual override is engaged Disengage manual override (see pages 5–7). » The coolant shutoff valve is fouled Clean or replace the coolant shutoff valve.	

8 TROUBLESHOOTING

The network status (NS) and module status (MS) 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 (L1) and activity (A1) 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 setup menu.
2. Select a faster Leak Response Sensitivity value from the pull-down menu on the Flow Settings page.
3. Select the **Submit** button to save the new value and return to normal operation.

8 TROUBLESHOOTING

The WeldSaver does not detect a leak in the coolant circuit.

» The Slow Leak Difference setting is too high.

1. Select the **SETUP** button to access the setup menu.
2. Enter a lower Slow Leak Difference parameter value on the Flow Settings page.
3. Select the **Submit** button to save the new value and return to normal operation.

The WeldSaver does not detect a leak immediately after reset

» The Slow Leak Delay setting is too high

1. Select the **SETUP** button to access the setup menu.
2. Enter a lower Slow Leak Delay parameter value on the Flow Settings page.
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 setup menu.
2. Select a higher Stabilization Delay value from the pull-down menu on the Flow Settings page.
3. Select the **Submit** button to save the new value and return to normal operation.

The WeldSaver does not shut off coolant flow

» The coolant shutoff valve manual override function is engaged

Disengage manual override. (Refer to pages 5–7).

» The coolant shutoff valve pilot flow is blocked

Clean or replace the coolant shutoff valve.

» The check valve is blocked or fouled

Clean or replace the check valve.

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 setup menu.
2. Select a lower Leak Response Sensitivity value from the pull-down menu on the Flow Settings page.
3. Select the **Submit** button to save the new value and return to normal operation.

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

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