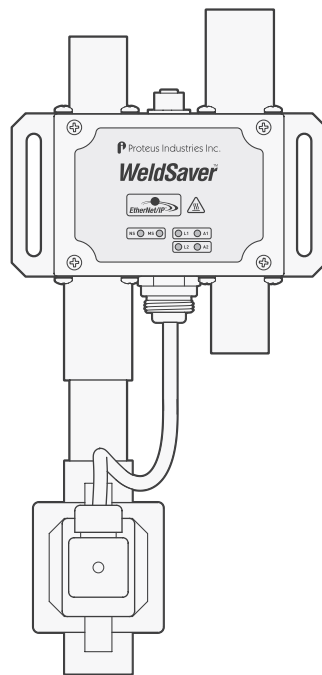


*WeldSaver*TM

WeldSaver 5 Series

EtherNet/IPTM Interface

Vortex Flow Sensors



TECHNICAL REFERENCE MANUAL

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1 OVERVIEW

Introduction

This document provides comprehensive technical information about the Proteus WeldSaver™ 5 Series coolant flow controller and leak detector featuring an EtherNet/IP™ 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 **WSEV13N** and **WSEV50G** 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 device or contact WeldSaver Technical Support.




Applicable Model Numbers

		Base Model Number										
		9	WS	E	V	50	G	T	-	1	-	001
Custom Product Code	9											
WeldSaver Product Code	WS											
Communication Interface	E											
	P											
Flow Sensor Type	V											
Upper Flow Limit	13											
	50											
Plumbing Connections	G											
	N											
Temperature Option	T											
	[blank]											
Hyphen	-											
Number of Network Ports	1											
	2											
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 device 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.

1 OVERVIEW

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.

2 FEATURES AND FUNCTIONS

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).

Products with optional temperature measurement capability also indicate the temperature of the coolant at the outlet as well as the temperature differential between the inlet and the outlet.

» 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.

A valve status indicator shows whether the shutoff valve is open or closed.

» It's a Flow Monitor

The coolant flow rate is continuously monitored and compared against programmed trip-point values. Products with temperature measurement capability also monitor and compare the outlet temperature and temperature differential against corresponding trip-point values.

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

» 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.

The screenshot shows the Proteus WeldSaver web interface. At the top, there are three tabs: 'RESET', 'VALVE', and 'BYPASS'. Below these are three buttons: 'FLOW OK', 'VALVE OPEN', and 'DETECTION ENABLED'. The main display area shows a large blue box with '14.7 LPM' in yellow. Below this, it says 'OK TO WELD' and 'Flow conditions are within the established limits for welding.' There are three instructions: 'Select VALVE to turn coolant flow OFF', 'Select BYPASS to disable leak detection', and 'Select SETUP to change operational settings'. At the bottom right, there is a 'SETUP' button and a table of 'Current Setup Values':

Current Setup Values	
Flow Warning	11.3 LPM
Flow Fault	7.6 LPM
Leak Response	Normal

The screenshot shows the Proteus WeldSaver web interface. At the top, there are three tabs: 'RESET', 'VALVE', and 'BYPASS'. Below these are three buttons: 'FLOW OFF', 'VALVE CLOSED', and 'DETECTION ENABLED'. The main display area shows a large blue box with '0.0 LPM' in yellow. Below this, it says 'FLOW OFF' and 'The coolant flow has been turned off by manual control.' There are two instructions: 'Select VALVE to turn coolant flow ON' and 'Select SETUP to change operational settings'. At the bottom right, there is a 'SETUP' button and a table of 'Current Setup Values':

Current Setup Values	
Flow Warning	11.3 LPM
Flow Fault	7.6 LPM
Leak Response	Normal

The screenshot shows the Proteus WeldSaver web interface. At the top, there are three tabs: 'RESET', 'VALVE', and 'BYPASS'. Below these are three buttons: 'FLOW WARNING', 'VALVE OPEN', and 'DETECTION ENABLED'. The main display area shows a large blue box with '10.3 LPM' in yellow. Below this, it says 'CAUTION' and 'The flow rate has fallen below the warning limit. Proper flow should be reestablished as soon as possible.' There are three instructions: 'Select VALVE to turn coolant flow OFF', 'Select BYPASS to turn leak detection ON / OFF', and 'Select SETUP to change operational settings'. At the bottom right, there is a 'SETUP' button and a table of 'Current Setup Values':

Current Setup Values	
Flow Warning	11.3 LPM
Flow Fault	7.6 LPM
Leak Response	Normal

The screenshot shows the Proteus WeldSaver web interface. At the top, there are three tabs: 'RESET', 'VALVE', and 'BYPASS'. Below these are three buttons: 'LEAK DETECTION', 'VALVE CLOSED', and 'DETECTION ENABLED'. The main display area shows a large blue box with '0.0 LPM' in yellow. Below this, it says 'CAP OFF' and 'A break has occurred in the coolant flow circuit, likely caused by the loss of a welding electrode.' There are three instructions: 'Select RESET to start flow with leak detection', 'Select BYPASS to start flow without leak detection', and 'Select SETUP to change flow and temperature limits'. At the bottom right, there is a 'SETUP' button and a table of 'Current Setup Values':

Current Setup Values	
Flow Warning	11.3 LPM
Flow Fault	7.6 LPM
Leak Response	Normal

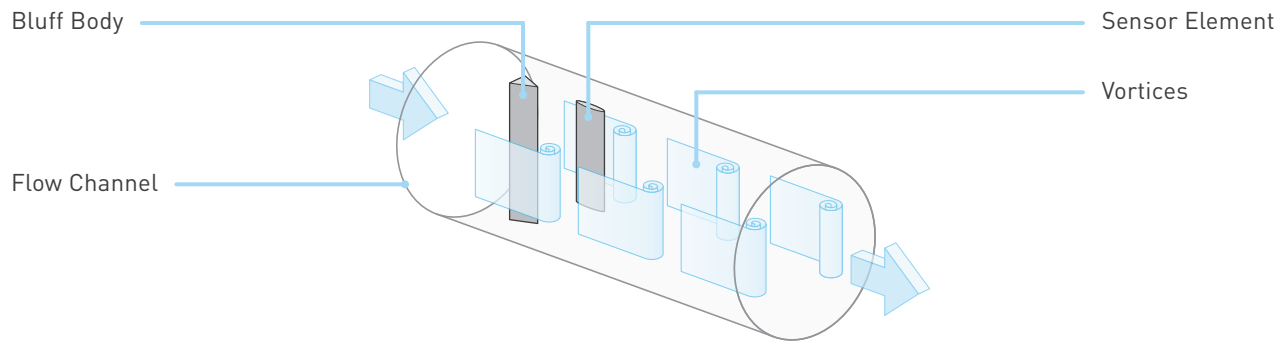
2 FEATURES AND FUNCTIONS

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 device. 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.

Models with temperature measurement capability feature Pt1000 RTD sensors integrated into each bluff body to provide reliable and accurate measurement of the coolant temperature at both the supply and return channels.



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.

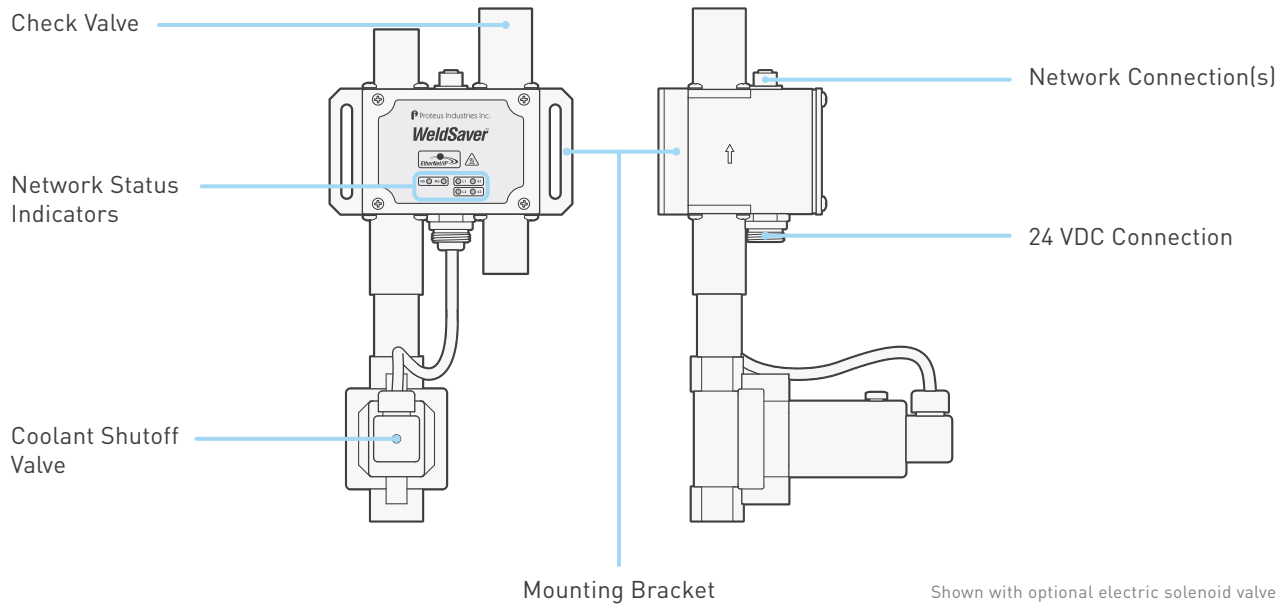
Intelligent Leak Detection

The WeldSaver's microcomputer continuously monitors the output frequencies of both the supply and return flow sensors and uses a patented leak-detection algorithm to rapidly identify subtle flow velocity changes that distinguish true leaks from pressure-, temperature-, and motion-induced effects. This algorithm is able to positively identify the loss of a weld cap or other loss of flow continuity in **less than 0.3 seconds**.

In the event that a leak is detected, the WeldSaver shuts off coolant flow and signals a state change to the weld controller. The weld controller then makes a decision to shut down weld operations.

2 FEATURES AND FUNCTIONS

Functional Components



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 5–7 for detailed information about each valve type.

CAUTION!



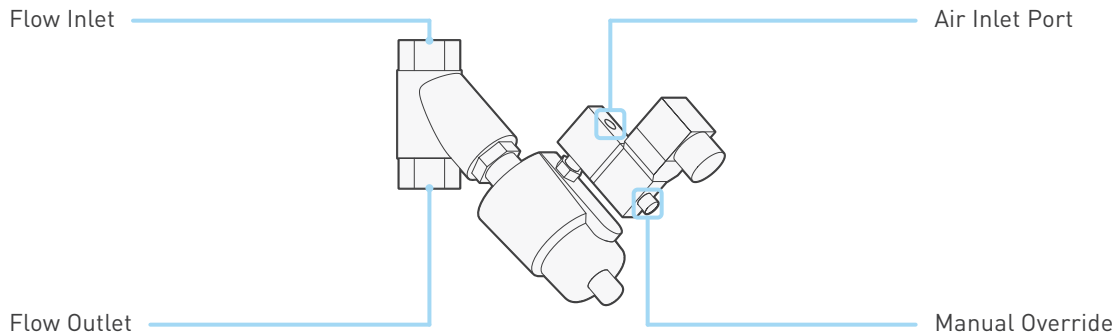
When manual override is engaged, the valve will remain open and WILL NOT close in response to a remote command or in the event that a leak is detected.

2 FEATURES AND FUNCTIONS

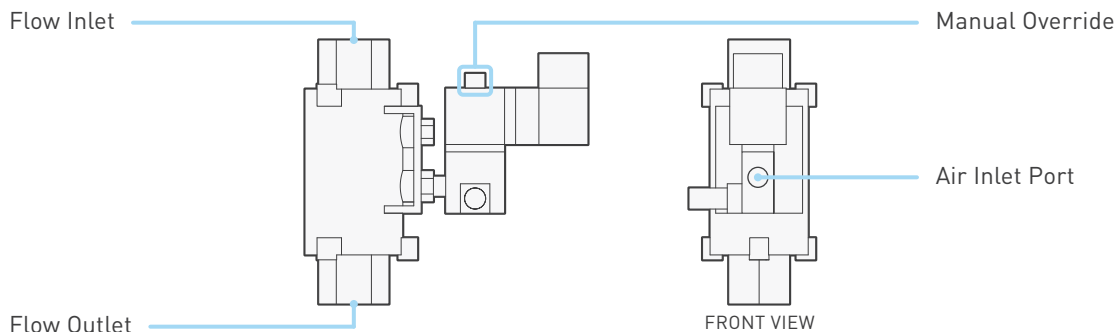
Coolant Shutoff Valve (Continued)

» 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.

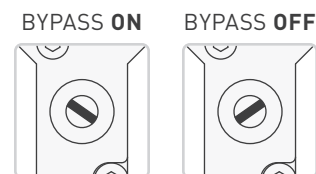
- › When the solenoid valve is open, compressed air flows to the pneumatic valve; the air pressure opens the pneumatic valve to allow water to pass through.
- › When the solenoid valve closes, it stops the flow of compressed air to the pneumatic valve, which automatically closes and thereby stops the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

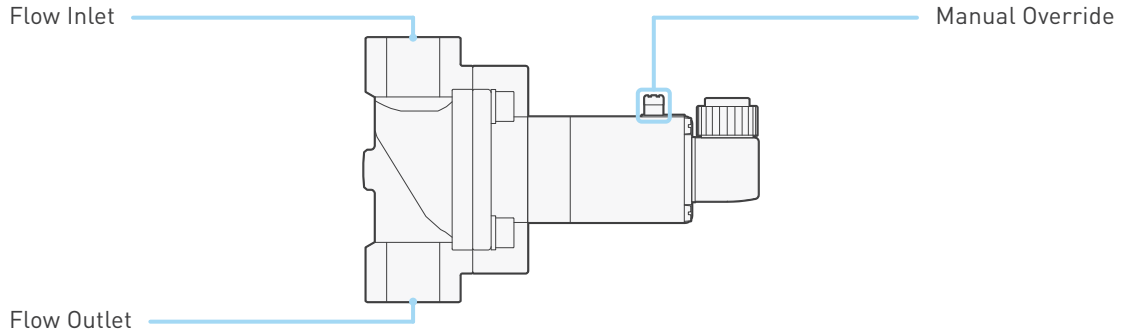
- › To engage the bypass, use a small flat-head screwdriver to depress the screw and turn it 60° clockwise. When correctly engaged, the screw will remain depressed while in the BYPASS ON position.
- › To disengage the bypass and restore normal operation, push down the screw using the screwdriver and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



2 FEATURES AND FUNCTIONS

Coolant Shutoff Valve (Continued)

» Burkert Solenoid Valve



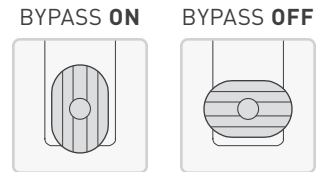
The solenoid valve controls the flow of water through the WeldSaver. When power is applied to the valve, it opens to allow water to pass through; when power is switched off, the valve automatically closes and thereby stops the flow of water.

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.



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

WARNING!



DO NOT exceed the temperature limit of your device.
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 device.
Operation above the rated pressure can cause failure and create a hazard to operators and equipment.

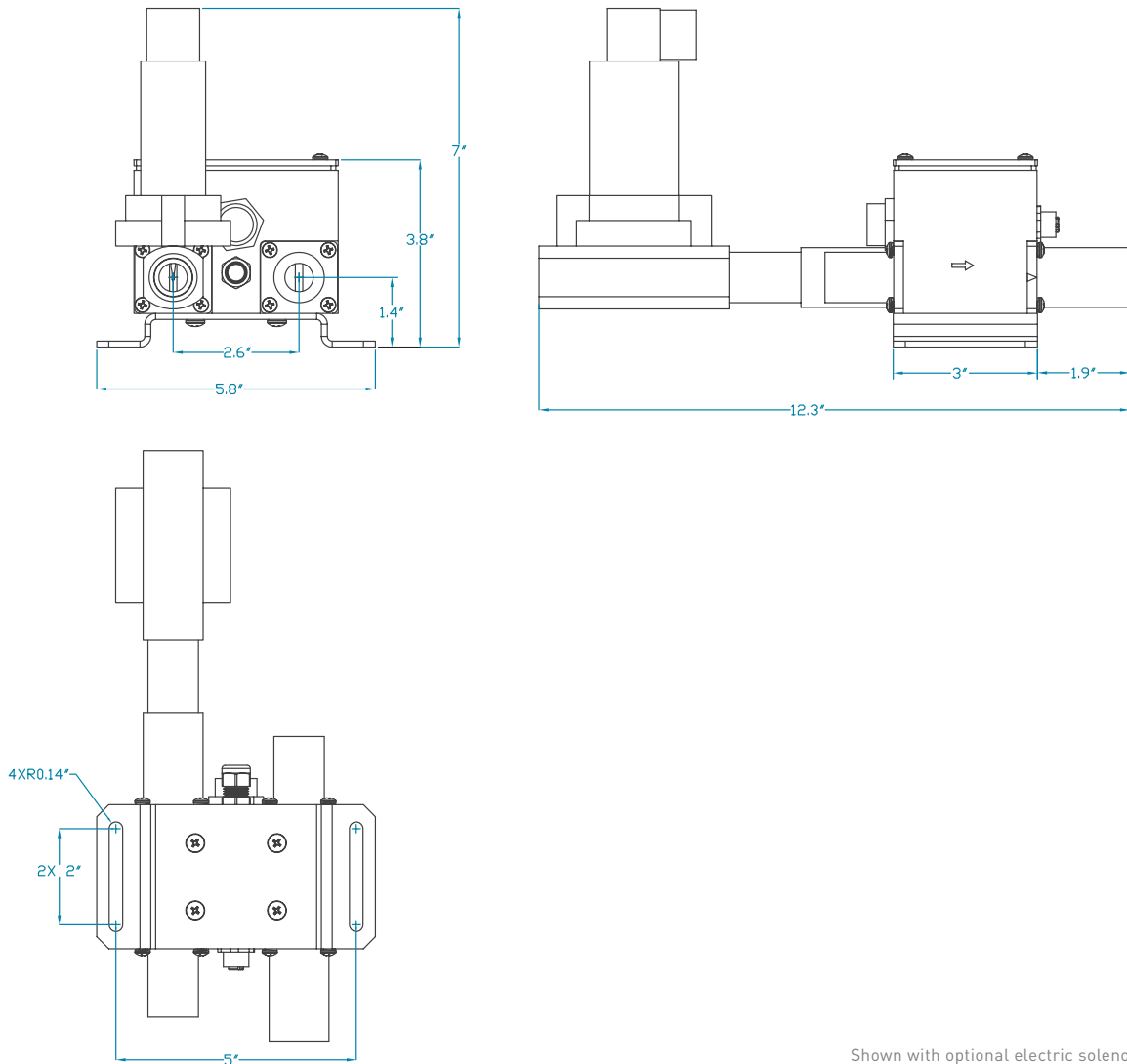
3 SPECIFICATIONS AND PERFORMANCE

Wetted Materials

COMPONENT	MATERIAL
Flow body • Fittings • Check valve (3/4" NPT option)	304 Stainless steel
Burkert valve (option) • Check valve (G 3/4 and 3/4" NPT options)	Brass
ESG 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)

Dimensions

Product dimensions (in inches) for standard models are provided below for reference only. To request a dimensional drawing or solid model for a customized model, please contact WeldSaver Technical Support.



Shown with optional electric solenoid valve

3 SPECIFICATIONS AND PERFORMANCE

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 5–7 for more information.) After clearing all water from the device, disengage manual override.

CAUTION!

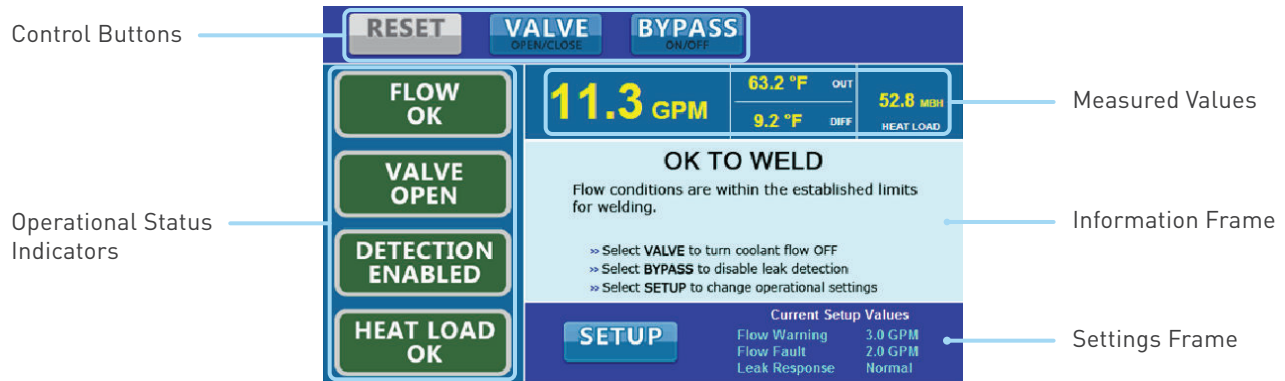


The coolant shutoff valve manual override **MUST** be disengaged prior to storage or transport. If manual override is left engaged, the valve will remain open and **WILL NOT** close on command.

4 USER INTERFACE

Web Browser 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.



» 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.

» Operational 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.

Temperature Status

Indicates the status of the coolant temperature.

» Measured Values

Flow Rate

The measured instantaneous coolant flow rate in LPM or GPM.

Outlet Temperature

The measured temperature at the circuit outlet in °C or °F.

Temp. Differential

The difference between the inlet and outlet temperatures in °C or °F.

Thermal Load

The calculated thermal load in W or BTU/h.

» Information Frame and Settings Frame

Information Frame

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

Setup Button










Loads the Setup Menu for viewing or modifying the control parameter values.

Current Settings

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













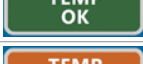






4 USER INTERFACE

Button Descriptions

NAME	APPEARANCE	STATUS	DESCRIPTION
Reset Button		Functional	Clears a fault condition to restart the coolant flow and return the device to normal operation.
		Disabled	This function is not supported in the current device state.
Valve Button		Functional	Opens and closes the coolant shutoff valve to turn the coolant flow ON or OFF.
		Disabled	This function is not supported in the current device state.
		Locked	This function is not available because the valve has been closed by the weld controller. The button will be unlocked when the controller opens the valve.
Bypass Button		Functional	Turns Bypass Mode ON or OFF to disable or enable Leak Detection.
		Disabled	This function is not supported in the current device state.
		Locked	This function is not available because Leak Detection has been disabled by the weld controller. The button will be unlocked when the controller enables Leak Detection.
Setup Button		Functional	Opens the Setup Menu for viewing or modifying the WeldSaver control parameter values.

4 USER INTERFACE

Operational Status Indicator Descriptions

NAME	APPEARANCE	STATUS	DESCRIPTION
Flow Status		Flow OK	The normal operating condition in which flow conditions are within the established limits for welding.
		Low Flow Warning	The inlet flow rate has fallen below the Flow Warning limit.
		Low Flow Fault	The inlet flow rate has fallen below the Flow Fault limit.
		Flow Off	The shutoff valve has been closed to turn off the coolant flow.
		Leak Detected	A leak has been detected in the flow circuit and the coolant flow has been turned off.
Valve Status		Valve Open	The shutoff valve is open.
		Valve Closed	The shutoff valve is closed.
		Valve Fault	The shutoff valve failed to respond to a command to turn off the coolant flow.
		Valve Closed by Controller	The shutoff valve has been closed by the weld controller and cannot be controlled by the Valve Button on the user interface.
Leak Detection Status		Detection Enabled	The Leak Detection function is enabled. (Bypass Mode is OFF.)
		Detection Disabled	The Leak Detection function has been disabled by manual control via the user interface. (Bypass Mode is ON.)
		Detection Disabled by Controller	The Leak Detection function has been disabled by the weld controller and cannot be controlled via the user interface. (Bypass Mode is ON.)
Temp. Status		Temperature OK	Temperature conditions are within the established limits for welding.
		High Temperature Warning	The outlet temperature and/or differential temperature has risen above the Warning limit.
		High Temperature Fault	The outlet temperature and/or differential temperature has risen above the Fault limit.
		Heat Load OK	The calculated thermal load is within the established limits for welding.
		Heat Load Warning	The calculated thermal load is above the Warning limit.
		Heat Load Fault	The calculated thermal load is above the Fault limit.
		Temperature Sensor Fault	The WeldSaver electronics do not detect a resistance signal from the inlet and/or outlet temperature sensor.

5 INSTALLATION AND SETUP

Tools Required

- » Adjustable wrenches
- » Pipe wrenches
- » Non-hardening pipe sealant
- » M5×12 screws for mounting bracket

Physical Installation

Refer to the diagram on page 9 of this document for the dimensions of the mounting bracket. Using M5×12 screws, mount the WeldSaver to the fence, robot, or other location as required by your installation.

CAUTION!



For electrical safety and interference reduction, Proteus recommends connecting the WeldSaver chassis to the control system ground plan following proper grounding practices.

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.


5 INSTALLATION AND SETUP

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>

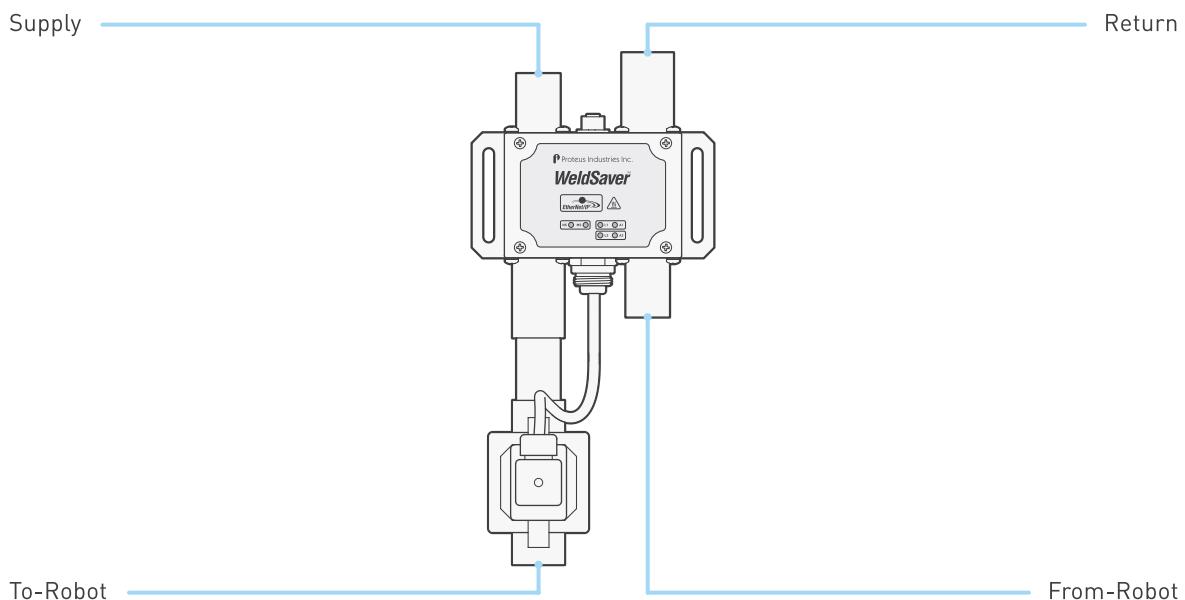
1. Flush the cooling system.

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>

3. Refer to the diagram below to identify the WeldSaver plumbing connections.



5 INSTALLATION AND SETUP

Plumbing Connections (Continued)

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.

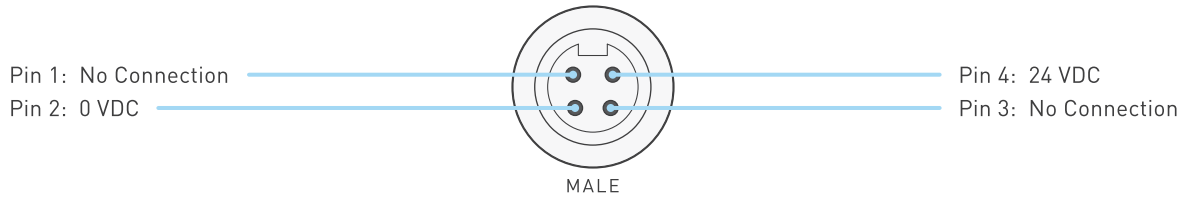
8. Check for leaks at all connections to the WeldSaver.
9. Eliminate all leaks before proceeding.
10. Disengage the coolant shutoff valve manual override for normal operation.

5 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.

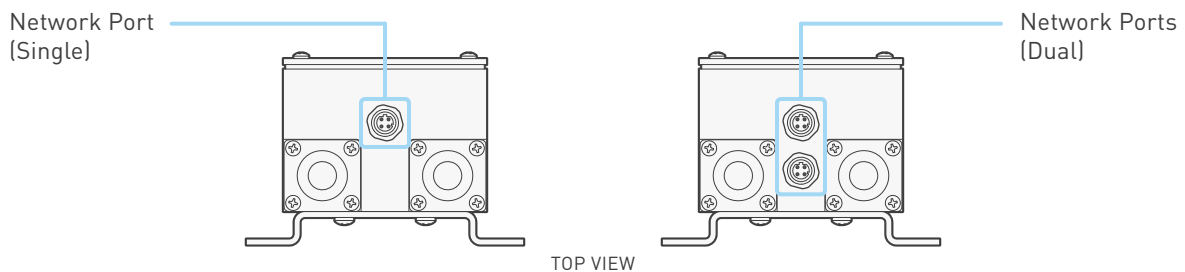
CAUTION!	
	Connect the power cable to the 24 VDC power source BEFORE connecting it to the WeldSaver.

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.

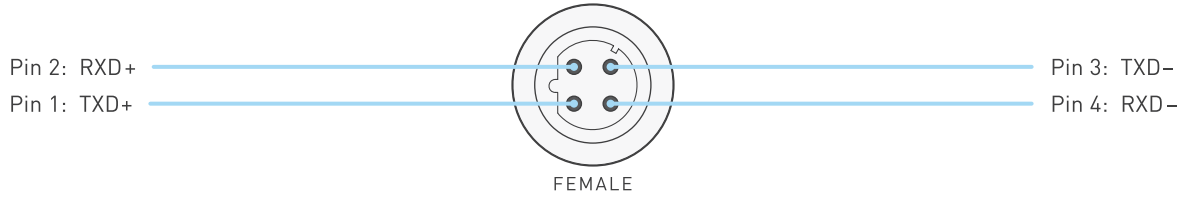
WeldSaver 5 products are available with either one or two network ports, which are located on the top of the body. Models with dual network ports feature embedded switch technology to enable multiple devices to be configured in a linear network topology (i.e., “daisy-chained”). The two ports are equal and interchangeable; if only one connection is required, either port can be used.



5 INSTALLATION AND SETUP

Network Connections (Continued)

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



2. Connect the RJ-45 end of an 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.


Network Status Indicators

LED indicators located on the front panel of the WeldSaver provide diagnostic information about the current state of the device and its connections to the network. The LEDs conform to the ODVA Ethernet/IP specification.

LED	APPEARANCE	STATUS	DESCRIPTION
Network Status (NS)	Off	No IP address	The device does not have an IP address (or no power supplied)
	Flashing green	No connection	There are no established connections to the device
	Solid green	Connected	There is at least one established connection to the device
	Flashing red	Connection timeout	One or more of the connections to the device have timed out
	Solid red	Duplicate IP address	Another device with the same IP address has been detected
Module Status (MS)	Off	No power	No power is supplied to the device
	Flashing green	Standby	The device has not been configured
	Solid green	Normal operation	The device is operating correctly
	Flashing red	Minor fault	A recoverable fault has been detected
	Solid red	Major fault	An unrecoverable fault has been detected
Link (L1 or L2)	Off	No link	The device has not established a network link
	Amber	Link	The device is connected to the network
Activity (A1 or A2)	Off	No activity	The device is not communicating with the network
	Flashing green	Port activity	The device is transmitting data over the network


5 INSTALLATION AND SETUP

Default Network Settings

NOTE	
	The default settings shown below are standard for most WeldSaver 5 products, but 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 device or contact WeldSaver Technical Support.

SETTING	DEFAULT	DESCRIPTION
MAC ID		Factory-assigned physical address
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


Refer to **Appendix A** on page 33 of this document for complete Common Industrial Protocol (CIP™) information for WeldSaver 5 products.

NOTE	
	<p>ODVA™ strongly recommends the use of Ethernet switches that implement IGMP snooping. When IGMP snooping is used, devices will only receive the multicast packets in which they are interested (i.e., for which they have issued an IGMP membership message).</p> <p>Proteus WeldSaver products assume that this recommendation is followed.</p>

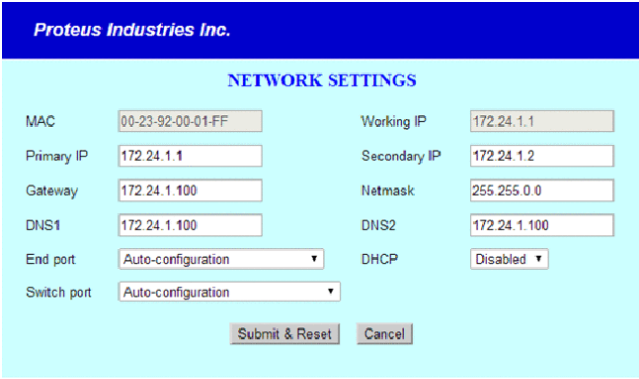
5 INSTALLATION AND SETUP

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.



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.

5 INSTALLATION AND SETUP

Electronic Data Sheet (EDS)


The WeldSaver 5 Electronic Data Sheet (EDS) 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 EDS (Electronic Data Sheet) File** link at the bottom of the page.
 - » The browser will display a download prompt to save the EDS file.
3. Select the **Go to Main Page** button to exit the About page and return to normal operation.

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

6 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 Network Status (NS) indicator will be SOLID GREEN.
 - » The Module Status (MS) indicator will be SOLID GREEN.
2. Confirm that the WeldSaver has established a valid Ethernet connection.
 - » The Link (L1/L2) status indicator(s) will be SOLID AMBER.
 - » The Activity (A1/A2) status indicator(s) will be FLASHING GREEN.
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 rate of coolant flowing through the device (if any).

Flow Detection

1. Confirm that coolant is flowing through the device at the optimum system flow rate.
 - » The interface will indicate the OK TO WELD condition and the measured flow rate.
2. Reduce the coolant flow rate (if possible) or turn the coolant flow OFF.
 - » The browser interface will indicate a FLOW WARNING, FLOW FAULT, or FLOW OFF condition, depending on the rate of coolant flowing through the device (if any).
 - » The indicated flow rate will be the actual measured flow rate or 0.00 (if the flow is OFF).
2. Turn the coolant flow ON or increase it until it once again reaches the optimum system flow rate.
3. Select the RESET button.
 - » The WARNING or 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.

6 FUNCTIONAL TESTING

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.

Leak 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.


7 PARAMETER SETUP

WeldSaver Control Parameters

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

PARAMETER	DESCRIPTION															
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.															
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.															
Units	Flow rate information can be displayed and transmitted in liters per minute (LPM) or gallons per minute (GPM). If the Units setting is changed, the temperature-related units and all programmed parameter values will automatically convert accordingly. <table border="1" data-bbox="534 1087 1390 1230"> <thead> <tr> <th>FLOW RATE</th> <th>TEMPERATURE</th> <th>THERMAL LOAD</th> <th>COOLANT DENSITY</th> <th>COOLANT HEAT CAPACITY</th> </tr> </thead> <tbody> <tr> <td>LPM</td> <td>°C</td> <td>kW</td> <td>kg/m³</td> <td>J/kg °C</td> </tr> <tr> <td>GPM</td> <td>°F</td> <td>MBH</td> <td>lb/gal</td> <td>BTU/lb °F</td> </tr> </tbody> </table>	FLOW RATE	TEMPERATURE	THERMAL LOAD	COOLANT DENSITY	COOLANT HEAT CAPACITY	LPM	°C	kW	kg/m ³	J/kg °C	GPM	°F	MBH	lb/gal	BTU/lb °F
FLOW RATE	TEMPERATURE	THERMAL LOAD	COOLANT DENSITY	COOLANT HEAT CAPACITY												
LPM	°C	kW	kg/m ³	J/kg °C												
GPM	°F	MBH	lb/gal	BTU/lb °F												

Default Flow Settings

NOTE	
	The default values shown below are standard for most WeldSaver 5 products, but 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.

CONTROL PARAMETER	SELECTABLE VALUES					DEFAULT VALUES	
	LPM		GPM			LPM	GPM
Flow Warning Trip Point	0.0 - 50.0 LPM		0.0 - 13.0 GPM			11.4 LPM	3.0 GPM
Flow Fault Trip Point	0.0 - 50.0 LPM		0.0 - 13.0 GPM			7.6 LPM	2.0 GPM
Slow Leak Difference	0.0 - 50.0 LPM		0.0 - 13.0 GPM			4.0 LPM	1.0 GPM
Slow Leak Delay	0 - 10,000 ms					4,000 ms	
Stabilization Delay	1 sec.	2 sec.	4 sec.	6 sec.	8 sec.	4 sec.	
Leak Response Sensitivity	Slowest	Slow	Normal	Fast	Fastest	Normal	


7 PARAMETER SETUP

Temperature Parameters

WeldSaver models with optional temperature measurement capability provide multiple parameters and alarm settings to ensure adequate electrode cooling.

PARAMETER	DESCRIPTION															
Outlet Temperature – Warning Trip Point	The optimum temperature of the coolant returning from the weld cell.															
Outlet Temperature – Fault Trip Point	The maximum coolant temperature at which the welding system should be operated.															
Differential Temperature – Warning Trip Point	The optimum temperature difference between the coolant flowing to and returning from the weld cell.															
Differential Temperature – Fault Trip Point	The maximum temperature difference between the coolant flowing to and returning from the weld cell.															
Thermal Load – Warning Trip Point	The optimum thermal load for the welding cooling system.															
Thermal Load – Fault Trip Point	The maximum thermal load for the welding cooling system.															
Coolant Density	The density of the coolant used in the cooling system.															
Coolant Heat Capacity	The heat capacity of the coolant used in the cooling system.															
Heat Load Threshold	The differential temperature limit for calculating the thermal load.															
Units	<p>Temperature information can be displayed and transmitted in Celsius (°C) or Fahrenheit (°F). If the Units setting is changed, the flow units and all programmed parameter values will automatically convert accordingly.</p> <table border="1"> <thead> <tr> <th>TEMP.</th> <th>THERMAL LOAD</th> <th>COOLANT DENSITY</th> <th>COOLANT HEAT CAPACITY</th> <th>FLOW RATE</th> </tr> </thead> <tbody> <tr> <td>°C</td> <td>kW</td> <td>kg/m³</td> <td>J/kg °C</td> <td>LPM</td> </tr> <tr> <td>°F</td> <td>MBH</td> <td>lb/gal</td> <td>BTU/lb °F</td> <td>GPM</td> </tr> </tbody> </table>	TEMP.	THERMAL LOAD	COOLANT DENSITY	COOLANT HEAT CAPACITY	FLOW RATE	°C	kW	kg/m ³	J/kg °C	LPM	°F	MBH	lb/gal	BTU/lb °F	GPM
TEMP.	THERMAL LOAD	COOLANT DENSITY	COOLANT HEAT CAPACITY	FLOW RATE												
°C	kW	kg/m ³	J/kg °C	LPM												
°F	MBH	lb/gal	BTU/lb °F	GPM												

Default Temperature Settings

NOTE	
	The default values shown below are standard for most WeldSaver 5 products, but 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.

TEMPERATURE PARAMETER	SELECTABLE VALUES		DEFAULT VALUES	
	°C	°F	°C	°F
Outlet Temperature – Warning Trip Point	0 - 100 °C	32 - 212 °F	50 °C	120 °F
Outlet Temperature – Fault Trip Point	0 - 100 °C	32 - 212 °F	60 °C	140 °F
Differential Temperature – Warning Trip Point	0 - 100 °C	32 - 212 °F	30 °C	30 °F
Differential Temperature – Fault Trip Point	0 - 100 °C	32 - 212 °F	40 °C	40 °F
Thermal Load – Warning Trip Point	0 - 200 kW	0 - 690 MBH	70 kW	238.85 MBH
Thermal Load – Fault Trip Point	0 - 200 kW	0 - 690 MBH	90 kW	307.09 MBH
Coolant Density	(any) kg/m ³	(any) lb/gal	1,000 kg/m ³	8.3 lb/gal
Coolant Heat Capacity	(any) J/kg °C	(any) BTU/lb °F	4180 J/kg °C	1 BTU/lb °F
Heat Load Threshold	(any) °C	(any) °F	0.5 °C	33 °F

7 PARAMETER SETUP

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. Depending on the specific configuration of your WeldSaver device, the menu may consist of 1 to 3 pages (described below), which can be accessed by selecting the corresponding tab at the top of the Information Frame.

NOTE



It is only possible to adjust the settings on one page at a time. Changes are only saved when the **Submit** button is selected. If you make changes on one page in the setup menu and then navigate to a different page, the unsaved changes on the first page will be discarded.

» Flow Settings

Contains the control parameter settings that determine the behavior of the device in response to flow conditions. (Refer to page 24 of this document for descriptions of each parameter.)

Available buttons:

- › **Show/Hide Factory Settings** – Displays the factory default control parameter values. (Selecting the button a second time hides the default values.)
- › **Submit** – Saves the new parameter value(s) and exits the setup menu.
- › **Cancel** – Exits the setup menu WITHOUT saving any changes.

Parameter	Value	Unit
Flow Warning	3.0	GPM
Flow Fault	2.0	GPM
Slow Leak Difference	1.1	GPM
Slow Leak Delay	1000	ms
Stabilization Delay	4	s
Leak Response	Normal	
Unit	GPM	

» Temperature Settings

Contains the parameter settings that determine the behavior of the device in response to temperature conditions. (Refer to page 25 of this document for descriptions of each parameter.)

Additionally displays the availability status of the inlet and outlet temperature sensors.

Available buttons:

- › **Show Factory Settings** – Loads a new page displaying the factory default temperature parameter values.
- › **Submit** – Saves the new parameter value(s) and exits the setup menu.
- › **Cancel** – Exits the setup menu WITHOUT saving any changes.

Parameter	Warning Value	Fault Value	Unit
Outlet Temperature	50.0	60.0	°C
Differential Temperature	30.0	40.0	°C
Thermal Load	70.0	90.0	KW
Coolant Density	1000.0		kg/m³
Coolant Heat Capacity	4180.0		J/kg °C
Heat Load Threshold	0.5		°C
Unit	°C		

▲ Error reading INLET and OUTLET temperature sensors

NOTE



The Temperature Settings page is only available in WeldSaver models with optional temperature measurement capability.

7 PARAMETER SETUP

Browser Interface Setup Menu (Continued)

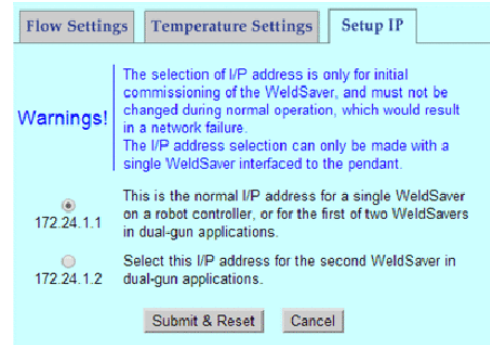
» Setup IP

Provides the capability to toggle between the Primary and Secondary IP addresses specified on the Network Settings page. (Refer to page 20 of this document for information about the Network Settings page.)

This feature makes it possible for two devices to be paired for a dual-gun welding application.

Available buttons:

- › **Submit & Reset** – Resets the WeldSaver to apply the selected IP address.
- › **Cancel** – Exits the setup menu WITHOUT saving any changes.



NOTE



The Setup IP page 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 a WeldSaver device.
Changing the IP address during normal operation will result in a network failure.

7 PARAMETER SETUP

Adjusting Control Parameter Values

1. Select the **SETUP** button on the browser interface.
 - » The setup menu will open to display the Flow Settings page in the Information Frame. The page will show the current stored value for each parameter setting.
 - » Depending on the configuration of your WeldSaver device, one or more tabs for accessing additional setup menu pages may appear at the top of the Information Frame.
2. If necessary, navigate to the settings page that you wish you adjust by selecting the corresponding tab at the top of the frame.
3. Adjust the parameter values as desired using the text fields and/or 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.

4. Select the **Submit** button to save the new control parameter value(s) and exit the setup menu. To exit the setup menu **WITHOUT** saving any changes, select the **Cancel** button.
 - » The setup menu will close and the Information Frame will display the current WeldSaver status.
5. If you wish to adjust the parameter values on any other pages in the setup menu, repeat steps 1–4 above for each additional page.
6. Confirm that the new parameter values are correct.
 - » The current Flow Warning, Flow Fault, and Leak Response values are displayed in the Settings Frame at the bottom of the browser interface.
 - » To review the current settings for all parameter values, select the **SETUP** button to return to the setup menu. To exit the setup menu without making any additional changes, select the **Cancel** button on any page.

8 STATUS CONDITIONS

STATUS CONDITION	VISUAL INDICATION	
<p>OK to Weld</p> <p>The normal operating condition in which flow conditions are within the established limits for welding. The measured coolant flow rate is above the Flow Warning and Flow Fault limits.</p>	Info Frame Text	"OK TO WELD"
	Flow Status Indicator	"FLOW OK"
<p>Stabilizing</p> <p>System monitoring is momentarily disabled to allow flow to stabilize. This occurs at startup and after the shutoff valve opens (while leak detection is enabled.)</p> <p>The Stabilization Delay setting controls the duration time.</p>	Info Frame Text	"FLOW STABILIZING"
<p>Bypass Mode</p> <p>The Leak Detection function is disabled. Flow monitoring is still functional.</p> <ul style="list-style-type: none"> » Leak Detection has been disabled by manual control via the user interface To exit Bypass Mode and enable leak detection, select the BYPASS button. » Leak Detection has been disabled by the weld controller The BYPASS and RESET buttons will not operate until the weld controller releases control of the WeldSaver. 	Info Frame Text	"BYPASSED"
	Bypass Status Indicator	"DETECTION DISABLED"
<p>Low Flow Warning</p> <ul style="list-style-type: none"> » Flow has fallen below the Flow Warning limit <ol style="list-style-type: none"> 1. Check the Flow Warning setting. Adjust 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. 	Info Frame Text	"CAUTION"
	Flow Status Indicator	"FLOW WARNING"
<p>Low Flow Fault</p> <ul style="list-style-type: none"> » Flow has fallen below the Flow Fault limit <ol style="list-style-type: none"> 1. Stop welding until sufficient flow is reestablished. 2. Check the Flow Fault setting. Adjust 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. 	Info Frame Text	"ALARM"
	Flow Status Indicator	"FLOW FAULT"
<p>Cap Off Fault</p> <ul style="list-style-type: none"> » The WeldSaver has detected the loss of a weld cap or other leak, and the coolant flow has been shut off Eliminate the leak 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. 	Info Frame Text	"CAP OFF"
	Flow Status Indicator	"LEAK DETECTION"
	Valve Status Indicator	"VALVE CLOSED"

8 STATUS CONDITIONS

STATUS CONDITION	VISUAL INDICATION	
<p>Flow Off</p> <ul style="list-style-type: none"> » The coolant flow has been turned off by manual control via the user interface Select the VALVE button to the coolant flow ON. » The coolant flow has been turned off by the weld controller The BYPASS, VALVE, and RESET buttons will not operate until the weld controller releases control of the WeldSaver. 	Info Frame Text	"FLOW OFF"
	Flow Status Indicator	"FLOW OFF"
	Valve Status Indicator	"VALVE CLOSED"
<p>Valve Fault</p> <p>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.</p> <p>Select the VALVE button to disengage the control valve shutoff signal.</p> <ul style="list-style-type: none"> » 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. 	Info Frame Text	"VALVE FAULT"
	Flow Status Indicator	"FLOW OFF"
	Valve Status Indicator	"VALVE FAULT"
<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.</p> <p>Eliminate the leak and select the RESET button to clear the fault.</p> <ul style="list-style-type: none"> » 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. 	Info Frame Text	"VALVE FAULT"
	Flow Status Indicator	"LEAK DETECTION"
	Valve Status Indicator	"VALVE FAULT"

9 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.

9 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.

■ 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 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.

A ETHERNET/IP DEVICE PROFILE

General EtherNet/IP Information

» Supported Services

SERVICE CODE	SERVICE NAME
01 (0x01)	Get_Attribute_All
05 (0x05)	Reset
14 (0x0E)	Get_Attribute_Single
16 (0x10)	Set_Attribute_Single
84 (0x54)	Forward_Open
78 (0x4E)	Forward_Close

» Object Classes

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

» Data Types

TYPE	DESCRIPTION	SIZE	RANGE
USINT	Unsigned short integer	1 byte	0 to 255
INT	Integer	2 bytes	-32768 to 32767 (little endian)
UINT	Unsigned integer	2 bytes	0 to 65535 (little endian)
UDINT	Unsigned double integer	4 bytes	0 to 2 ³² -1 (little endian)
WORD	Bit string	16 bits	
DWORD	Bit string	32 bits	
SHORT_STRING	Character string (1 byte per character, 1 byte length indicator)	variable	
STRING	Character string (1 byte per character)	variable	
EPATH	CIP path segments	variable	

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	Maximum instance number

A ETHERNET/IP DEVICE PROFILE

Identity Object, Class 0x01 (Continued)

» 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	43	Indication of general type of product
3	Get	Product Code	UINT	5	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	-	Device status
6	Get	Serial Number	UDINT	-	Device serial number / MAC ID
7	Get	Product Name	SHORT_STRING	WS5-EIP	Product name

» Common Services

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

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	Maximum instance number

» Instance 100 (Input) Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
3	Get	Input Data	STRUCT of:		Data produced by the device
		Input States	WORD	-	Refer to Input States table on page 35
		Supply Flow Rate	UINT	-	Supply flow rate in 1/100th LPM (or GPM)
		Return Flow Rate	UINT	-	Return flow rate in 1/100th LPM (or GPM)
		Differential Temp*	INT	-	Differential temperature in 1/100th °C (or °F)
		Outlet Temp*	INT	-	Outlet temperature in 1/100th °C (or °F)
		Thermal Load*	INT	-	Thermal load in 1/100th kW (or MBH)

*Valid for products with temperature measurement capability only.

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Assembly Object, Class 0x04 (Continued)

» Instance 101 (Output) Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
3	Get / Set	Output Data	STRUCT of:		Data consumed by the device
		Output Controls	UINT	-	Refer to Output Controls table on page 36

» Common Services

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

» Input States

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 (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
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 frequency is detected from flow sensor(s)
7	Power OK	0: No auxiliary power to device 1: Normal operation
8	Units of Measure	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 products without temperature measurement capability, the value of this bit is always 0.

A ETHERNET/IP DEVICE PROFILE

Assembly Object, Class 0x04 (Continued)

» Output Controls

BIT	NAME	VALUE
0	Reset	Resets the WeldSaver to clear a fault condition and restore the coolant flow.
1	Close Valve	Closes the shutoff valve to stop the coolant flow.
2	Bypass Mode	Turns on Bypass Mode to disable the Leak Detection function.
3-15	(Reserved)	N/A

TCP/IP Interface Object, Class 0xF5

» Class (Instance 0) Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
1	Get	Revision	UINT	3	Revision of object

» Instance 1 Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
1	Get	Status	DWORD	1	Interface status
2	Get	Configuration Capability	DWORD	0x04	Refer to Configuration Capability table on page 37
3	Get / Set	Configuration Control	DWORD	0x00 or 0x02	Refer to Configuration Control table on page 37
4	Get	Phys. Link Object	STRUCT of:		Path to physical link object
		Path Size	UINT	2	No. of 16-bit words in Path
		Path	EPATH	0x20 (Log. Seg. Class) 0xF6 (Class number) 0x24 (Log. Seg. Instance) 0x01 (Instance number)	Restricted to one logical class segment and one logical instance segment (Maximum size is 12 bytes)
5	Get	Interface Config.	STRUCT of:		TCP/IP network interface config.
		IP Address	UDINT	172.24.1.1	Device IP address
		Network Mask	UDINT	255.255.0.0	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	STRUCT of:		Host name
		Length	UINT	14	Host name length
		Name	STRING	WeldSaver5-EIP	Host name string
13	Get / Set	Encapsulation Inactivity Timeout	UINT	0	Number of seconds of inactivity before TCP connection is closed

A ETHERNET/IP DEVICE PROFILE

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

» Common Services

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

» Configuration Capability

BIT	NAME	VALUE
0	BOOTP Client	1: The device is capable of obtaining its network configuration via BOOTP
1	DNS Client	1: The device is capable of resolving host names by querying a DNS server
2	DHCP Client	1: The device is capable of obtaining its network configuration via DHCP
3	Reserved	0
4	Configuration Settable	1: The Interface Configuration attribute is settable
5	Hardware Configurable	1: The IP Address member of the Interface Configuration attribute can be obtained from hardware settings (e.g., pushwheel, thumbwheel, etc.)
6	Interface Configuration Change Requires Reset	1: The device requires a restart in order for a change to the Interface Configuration attribute to take effect
7	AcdCapable	1: The device is ACD capable
8-31	Reserved	0

» Configuration Control

BIT	NAME	VALUE
0-3	Configuration Method	0: The device shall use statically assigned IP configuration values 1: The device shall obtain its interface configuration values via BOOTP 2: The device shall obtain its interface configuration values via DHCP
4	DNS Enable	1: The device shall resolve host names by querying a DNS server
5-31	Reserved	0

A ETHERNET/IP DEVICE PROFILE

Ethernet Link Object, Class 0xF6

» Class (Instance 0) Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
1	Get	Revision	UINT	3	Revision of object
2	Get	Max Instance	UINT	2	Maximum instance number
3	Get	No. of Instances	UINT	2	Number of instances implemented

» Instance 1 Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
1	Get	Interface Speed	UDINT	0, 10, 100	Actual interface speed (in Mbps)
2	Get	Interface Flags	DWORD	-	Refer to Interface Flags table on page 39
3	Get	Physical Address	Array of 6 USINTs	(MAC ID)	WeldSaver MAC address
7	Get	Interface Type	USINT	2	Type of interface (2 = twisted pair)
8	Get	Interface State	USINT	-	Refer to Interface State table on page 40
10	Get	Interface Label	SHORT_STRING	End port	Human readable identification
11	Get	Interface Capabil.	STRUCT of:		Indication of the capabilities of the interface
		Capability Bits	DWORD	-	Refer to Capability Bits table on page 40
		Speed/Duplex Array Count	USINT	-	Number of elements in speed/duplex array
		Speed/Duplex Array	ARRAY of STRUCT of:		Speed/duplex array structure
		Interface Speed	UINT	-	10: 10 Mbps 100: 100 Mbps
		Interface Duplex Mode	USINT	-	0: Half duplex 1: Full duplex

A ETHERNET/IP DEVICE PROFILE

Ethernet Link Object, Class 0xF6 (Continued)

» Instance 2 Attributes

NO.	ACCESS	NAME	TYPE	VALUE	DESCRIPTION
1	Get	Interface Speed	UDINT	0, 10, 100	Actual interface speed (in Mbps)
2	Get	Interface Flags	DWORD	-	Refer to Interface Flags table below
3	Get	Physical Address	Array of 6 USINTs	(MAC ID)	WeldSaver MAC address
7	Get	Interface Type	USINT	2	Type of interface (2 = twisted pair)
8	Get	Interface State	USINT	-	Refer to Interface State table on page 40
10	Get	Interface Label	SHORT_STRING	Switch port	Human readable identification
11	Get	Interface Capabil.	STRUCT of:		Indication of the capabilities of the interface
		Capability Bits	DWORD	-	Refer to Capability Bits table on page 40
		Speed/Duplex Array Count	USINT	-	Number of elements in speed/duplex array
		Speed/Duplex Array	ARRAY of STRUCT of:		Speed/duplex array structure
		Interface Speed	UINT	-	10: 10 Mbps 100: 100 Mbps
		Interface Duplex Mode	USINT	-	0: Half duplex 1: Full duplex

» Common Services

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

» Interface Flags

BIT	NAME	VALUE
0	Link Status	0: Link is inactive 1: Link is active
1	Duplex	0: Half duplex 1: Full duplex
2-4	Negotiation Status	0: Auto-negotiation in progress 1: Auto-negotiation and speed detection failed 2: Auto-negotiation failed but detected speed 3: Successfully negotiated speed and duplex 4: Auto-negotiation not attempted (Forced speed and duplex)
5	Manual Setting Requires Reset	1: The device requires a reset in order for the changes to link parameters take effect
6	Local Hardware Fault	0: No hardware fault 1: A local hardware fault is detected
7-31	Reserved	0

A ETHERNET/IP DEVICE PROFILE

Ethernet Link Object, Class 0xF6 (Continued)

» Interface State

VALUE	DESCRIPTION
0	Unknown interface state
1	The interface is enabled and is ready to send and receive data
2	The interface is disabled
3	The interface is testing
4-255	Reserved

» Capability Bits

BIT	NAME	VALUE
0	Manual Setting Requires Reset	0: Manual setting via Ethernet Link Object is not supported and no reset is required
1	Auto-negotiate	0: The interface does not support link auto-negotiation 1: The interface supports link auto-negotiation
2	Auto-MDIX	0: The interface does not support auto-MDIX operation 1: The interface supports auto-MDIX operation
3	Manual Speed/Duplex	0: The interface does not support manual setting of speed/duplex 1: The interface supports manual setting of speed/duplex via the Interface Control attribute
4-31	Reserved	0



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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