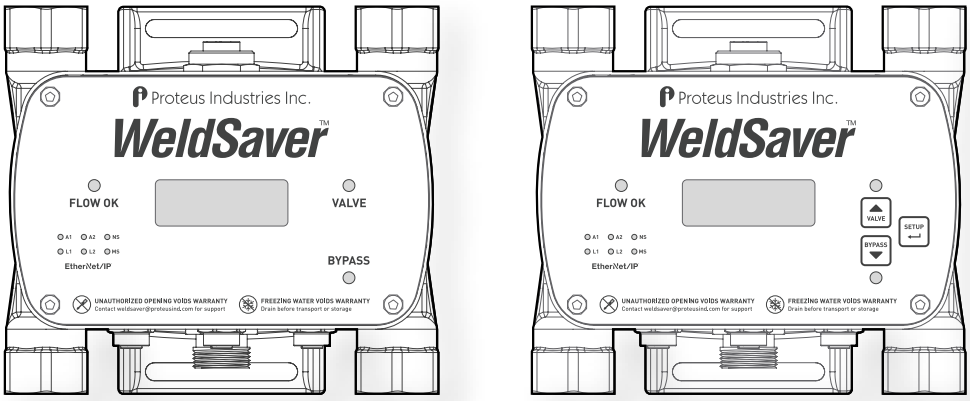
Proteus Industries Inc.

WeldSaver™

WeldSaver 5 Passport Series

Vortex Flow Sensors



TECHNICAL REFERENCE MANUAL

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1 OVERVIEW

Introduction

This document provides comprehensive technical information about the Proteus WeldSaver™ Passport Series coolant flow controller and leak detector featuring an Ethernet-based control interface and vortex flow sensing technology. The product features, specifications, and operating instructions described herein apply to standard WeldSaver Passport 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 device or contact WeldSaver Technical Support.

Important Safety Information

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

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.

Technical Support

For WeldSaver technical or applications assistance, please contact:

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

In the Midwestern and Southern U.S., local support is available from:

RAM Solutions, Inc.
1904 Woodslee Drive
Troy, MI 48083
TEL: (248) 299-0525
E-mail: mitch@ramsolutions.com

In China, local support is available from:

Faith Manufacturing
Room 2101, Building 34,
No. 258 Xinzhuan Road,
Songjiang District, Shanghai, China
TEL: +86 (21) 5852 7451
E-mail: info@faithmfg.com.cn

In India, local support is available from:

Natasha Enterprises
211, DLF Towers, 15 Shivaji Marg,
Delhi - 110015, India
TEL: +91 11 42263403
E-mail: sales@natashaenterprises.co.in

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.

Applicable Model Numbers

	W6	-	V	E	1	50	9	C	G	9	-	0	0	0

WeldSaver Product Series	**W5**	Display & Web Interface
	W6	Keypad, Display & Web Interface
WeldSaver Sub-Model	**-**	None (hyphen)
	Q	Three Sensor (electrodes plus transformer)
	S	WeldSaver Solo Single Vortex*
	P	WeldSaver Passport Lightweight Dual Vortex*
Additional WeldSaver Feature	**V**	eVac™ Coolant Retraction Module
	9	None
	O	Other*
Network Comm. Interface	**D**	DeviceNet™
	E	EtherNet/IP™
	P	PROFINET®
	R	Discrete I/O
Network Connections	**1**	Single Connection
	2	Dual Connections
Upper Flow Limit (LPM / GPM)	**13**	13 GPM (°F if temperature selected)
	50	50 LPM (°C if temperature selected)
Temperature	**T**	Temperature Measurement
	9	No Temperature Measurement
Shutoff Valve Type	**F**	Electric Solenoid with Manual Shutoff (100 psi Dunming)
	P	Pneumatic with Manual Shutoff (ESG)
	9	No Valve - M12 Connector Only
	A	No Valve - Type A 18mm DIN Connector
	B	No Valve - Type B 11mm DIN Connector
	C	Other*
Fitting Type	**G**	G Threads (BSPP) Female
	N	NPT Threads Female
	C	Other*
Other Customization	**C**	Other*
	9	None
Hyphen	**-**	
Unique 3-Character Identifier	**XXX**	

*Contact Proteus for assistance with additional customization options.

What It Is and What It Does

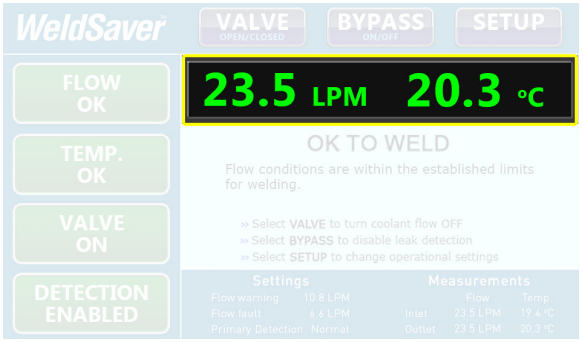
The Proteus WeldSaver™ is a unique coolant control unit designed to provide multiple functions to monitor and control coolant flow.

» 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 and locally on the large, bright digital display in LPM or GPM.

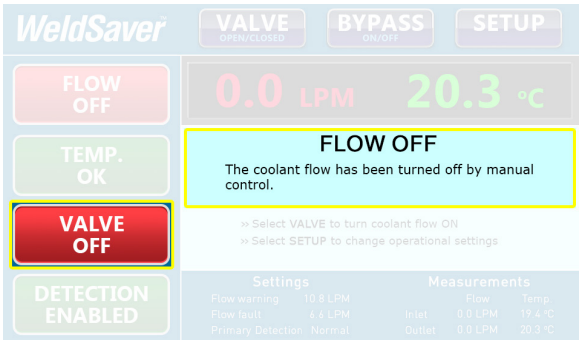
Products with optional temperature measurement capability also indicate the temperature of the coolant at the outlet as well as the temperature differential between the inlet and the outlet.



» 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.

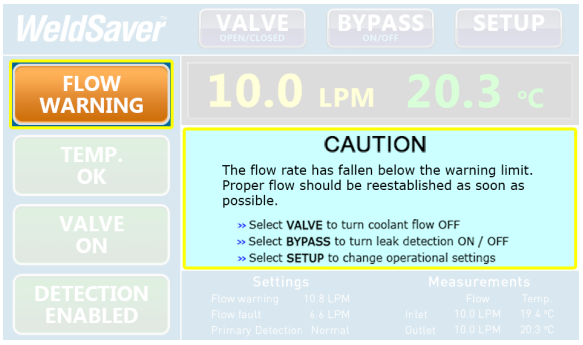
A valve status indicator shows whether the shutoff valve is open or closed.



» 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.

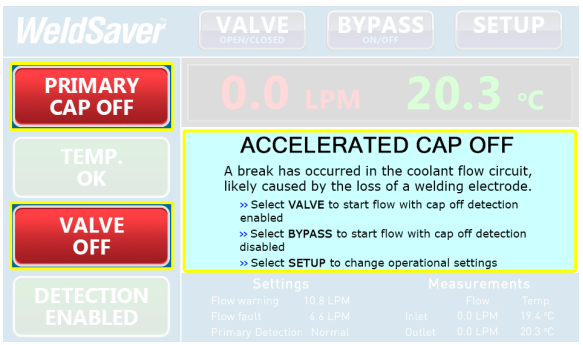
Status information is indicated on the browser interface as well as locally on the display. It is also transmitted to the weld controller via EtherNet/IP.



» It's a Very Fast Leak Detector

The WeldSaver simultaneously employs two different cap-off detection algorithms to rapidly and reliably detect any change in flow continuity.

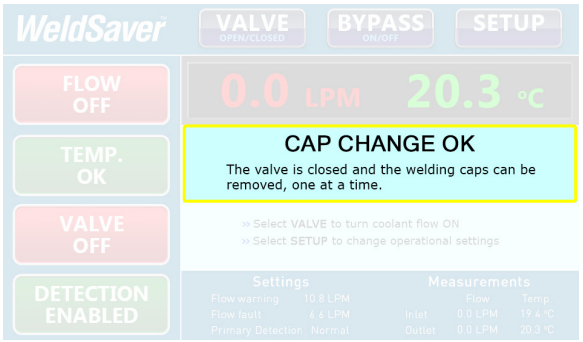
In the event of a weld-cap loss or other break in the coolant flow circuit, the leak is detected and coolant flow is shut off in less than one second.



What It Is and What It Does (Continued)

» eVac™ Coolant Retraction Module Option

In the event of a weld-cap loss or weld-cap change, the WeldSaver with an eVac module retracts coolant at the welding cell to ensure the cap change area dry and clean.

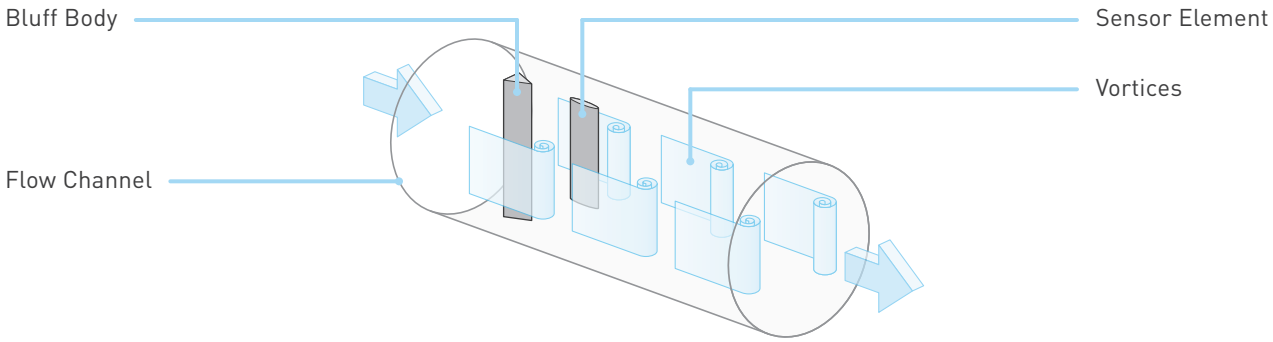


Flow Sensing and Measurement

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 (Primary and Secondary Algorithms)

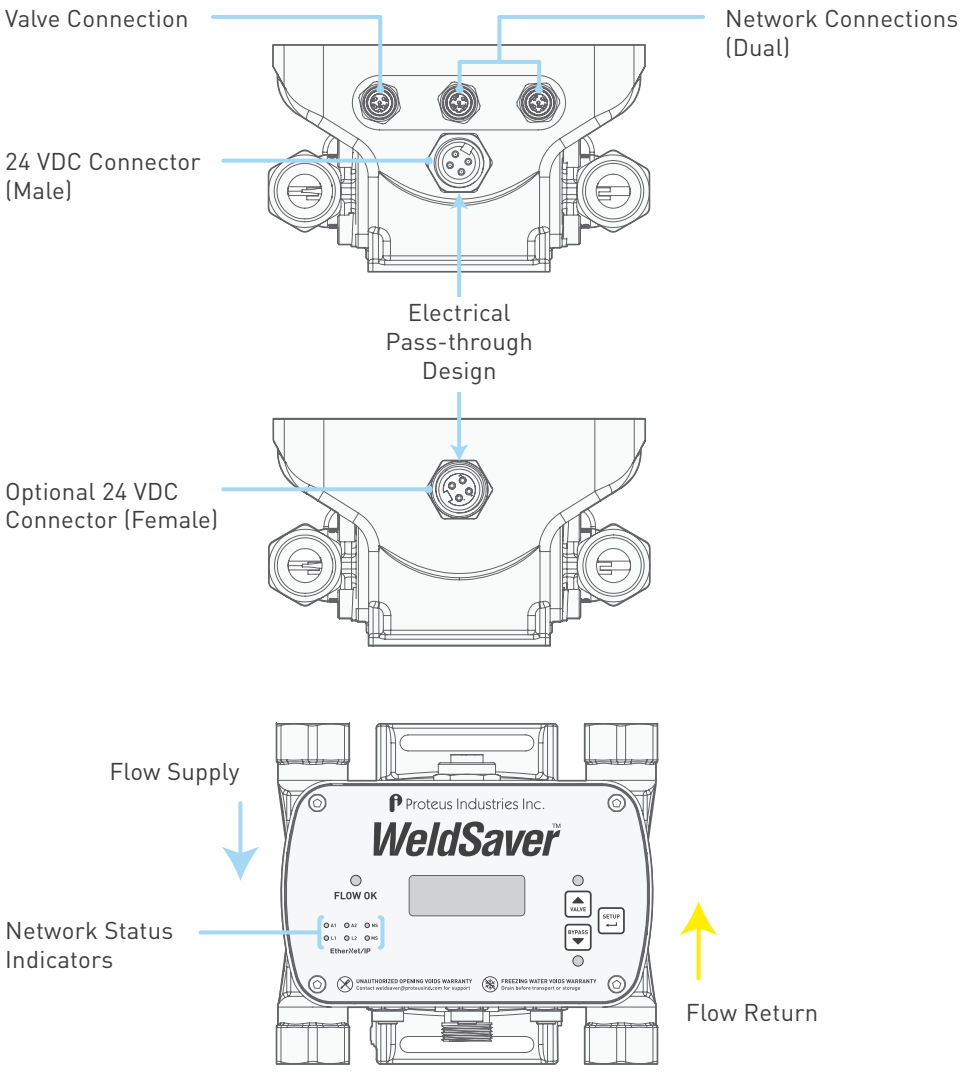
The WeldSaver simultaneously employs two different cap-off detection algorithms to ensure leak and cap-off events are detected exactly and in time. Our claim to fame is our highly sophisticated **primary detection**, which is based not on the flow rate measurements, but instead on the first derivative of the raw frequency measurements from the flow sensors, indicating the relative acceleration and deceleration of the coolant. So even if the flow meters drift out of calibration, this detection will still work.

For the **secondary detection** algorithm, 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.

Functional Components

The WeldSaver Passport features two Ethernet ports, two power ports with pass-through design, and one valve port. Please see the illustrations below for more details.



Key Functions

KEY	NAME	FUNCTION
VALVE	VALVE & UP ARROW	The VALVE key opens, closes the coolant shutoff valve to stop coolant flow, and clears fault conditions to restore coolant flow and the leak detection function. It also functions as the UP ARROW key in setup mode for moving up the parameter menu and for increasing parameters values.
BYPASS	BYPASS & DOWN ARROW	The BYPASS key turns Bypass Mode on and off to enable or disable the leak detection function. It also functions as the DOWN ARROW key in setup mode for moving down the parameter menu and for decreasing parameters values.
SETUP	ENTER, SAVE, & EXIT	The SETUP key is used to enter and exit setup mode. To enter setup mode, simply press the SETUP key. To exit, press and hold the SETUP key for over one second. Within setup mode, it also functions as the SAVE button.

WeldSaver LED Indicators

LED indicators located on the front face of the WeldSaver provide information about the current operational status of the device.

LED	APPEARANCE	STATUS	DESCRIPTION
Flow OK	Off	Stabilizing	Monitoring is momentarily disabled to allow flow to stabilize
	Fault	Fault detected	The WeldSaver has detected one or more fault conditions
	Solid green	Normal operation	Flow conditions are within the established limits for welding
Valve	Off	Normal operation	The shutoff valve is open and coolant is flowing
	Solid red	Valve closed	The shutoff valve has been closed and coolant flow is off
	Flashing red	Valve fault	The shutoff valve failed to turn off the coolant flow
Bypass	Off	Detection enabled	Leak Detection is enabled (Bypass mode is OFF)
	Amber	Detection disabled	Leak Detection has been disabled (Bypass mode is ON)

Network LED Indicators

LED indicators located on the front face 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

LED Display Status

The bright digital LED screen has a wide variety of information display capabilities, including WeldSaver flow and temperature status, warnings, and error notifications.

DISPLAY INFORMATION	DESCRIPTION
FLO › [flow rate]	Current measured flow rate
LO › FLO › [flow rate]	Flow rate has fallen below the Flow Warning limit
-LO › FLO › [flow rate]	Flow rate has fallen below the Flow Fault limit
CAP › OFF › [flow rate]	A break has occurred in the coolant flow circuit
CAP › CHG	Coolant retraction in progress
tP › [temp.]	Current measured temperature
dt › [temp.]	Current measured differential temperature
HI › tP › [temp.]	Temperature has increased above the Temperature Warning limit
HI › dt › [temp.]	Differential temperature has increased above the Temperature Warning limit
-HI › tP › [temp.]	Temperature has increased above the Temperature Fault limit
-HI › dt › [temp.]	Differential temperature has increased above the Temperature Fault limit
tP › nA	Temperature sensor reading error
dt › nA	
Lct	The key currently pressed is in a locked state.
rCtL	The key currently pressed is locked by a PLC.

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:

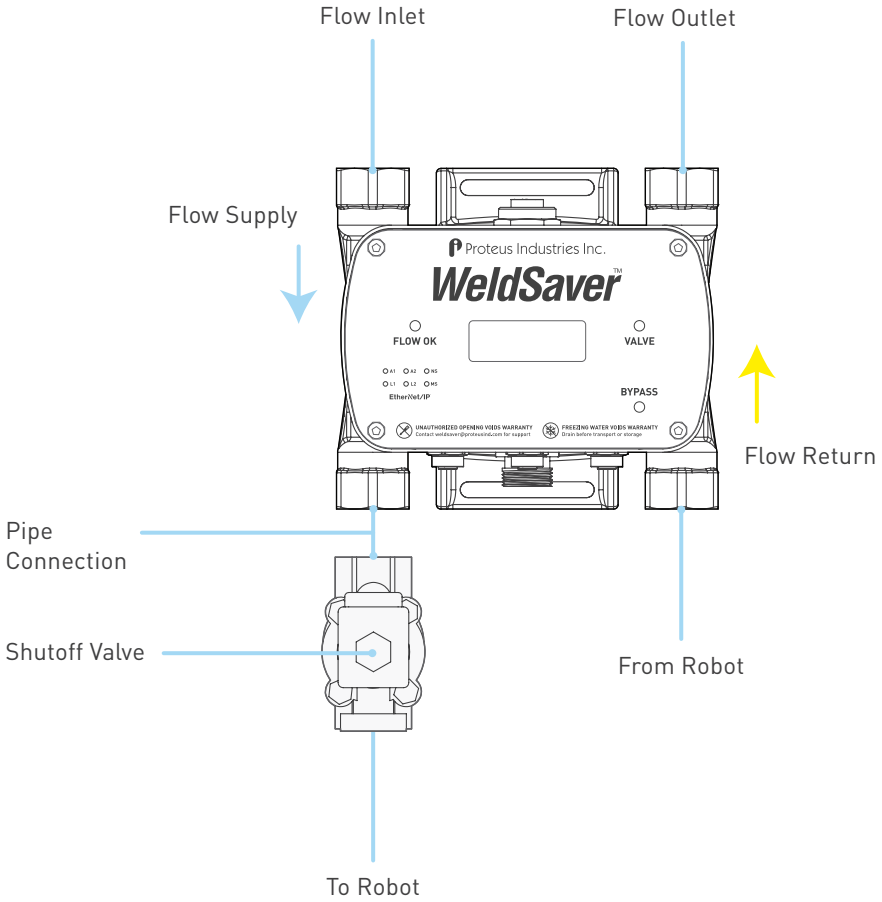
Manufacturer / Series	ESG 100 Series	ESG 200 Series	Dunming ZC51-20BS-0.8

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 7–12 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.

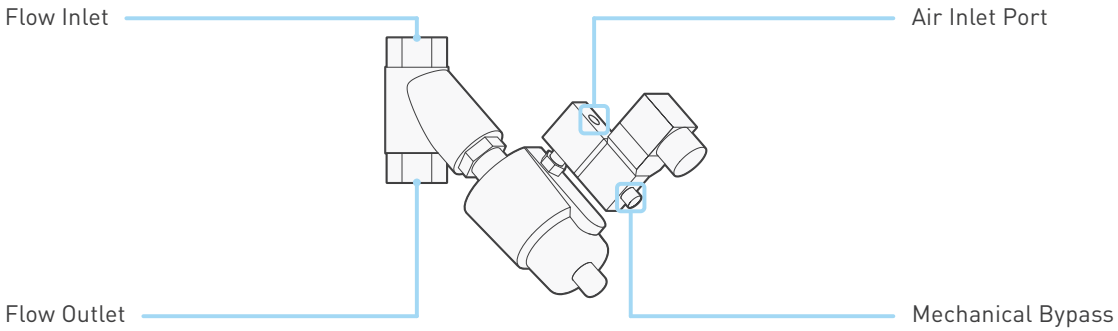
Please see the illustration below for the optimum installation position of shutoff valves.



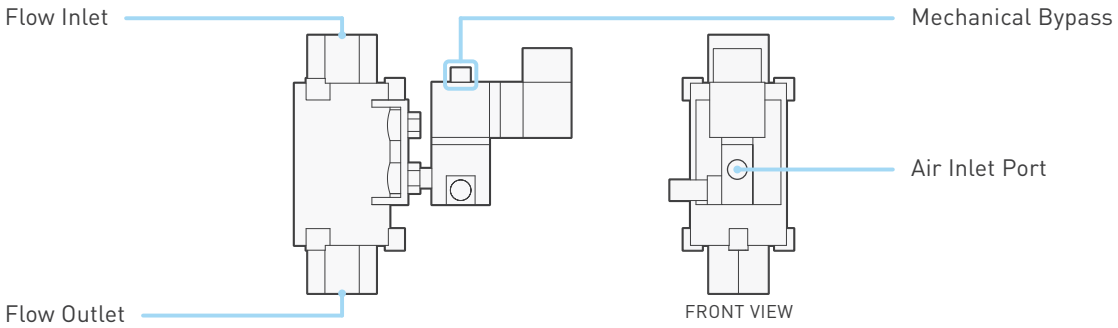
Coolant Shutoff Valve (Continued)

» 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.

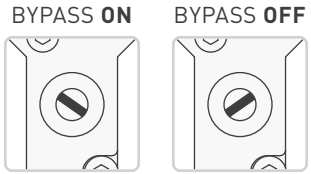
- When the solenoid valve is open, compressed air flows to the pneumatic valve; the air pressure opens the pneumatic valve to allow water to pass through.
- When the solenoid valve closes, it stops the flow of compressed air to the pneumatic valve, which automatically closes and thereby stops the flow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

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

- During normal operation, the mechanical 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 mechanical 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.

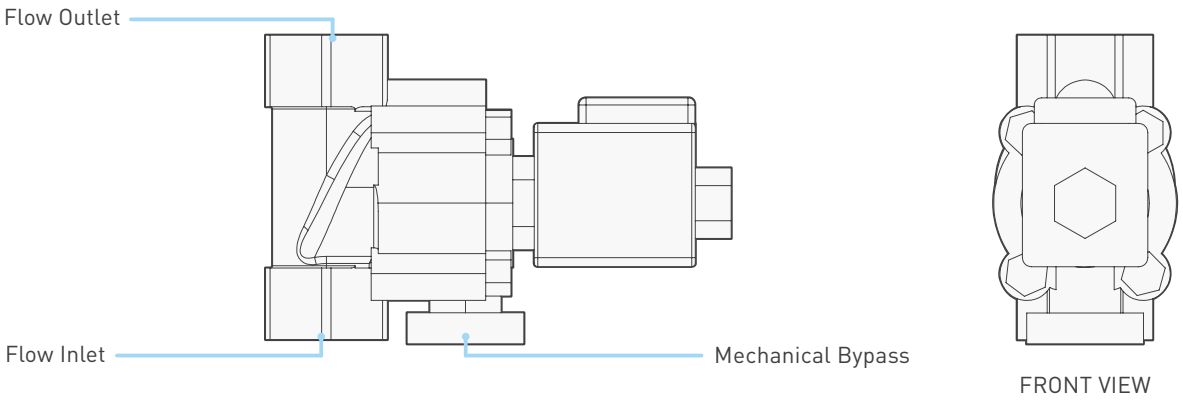
The mechanical bypass is operated by a small bypass screw located adjacent to the solenoid valve cable connection.

- To engage the mechanical 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 mechanical 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)

» Dunming Valve



The Dunming valve controls the flow of water or air 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.

When power is off, the Dunming valve can be adjusted to the open position or closed position with a mechanical bypass.

- Normally open valve type: the mechanical bypass is set at the open position. When power is off, to close the Dunming valve, adjust the mechanical bypass to the closed position.
- Normally closed valve type: the mechanical bypass is set at the closed position. When power is off, to open the Dunming valve, adjust the mechanical bypass to the open position.

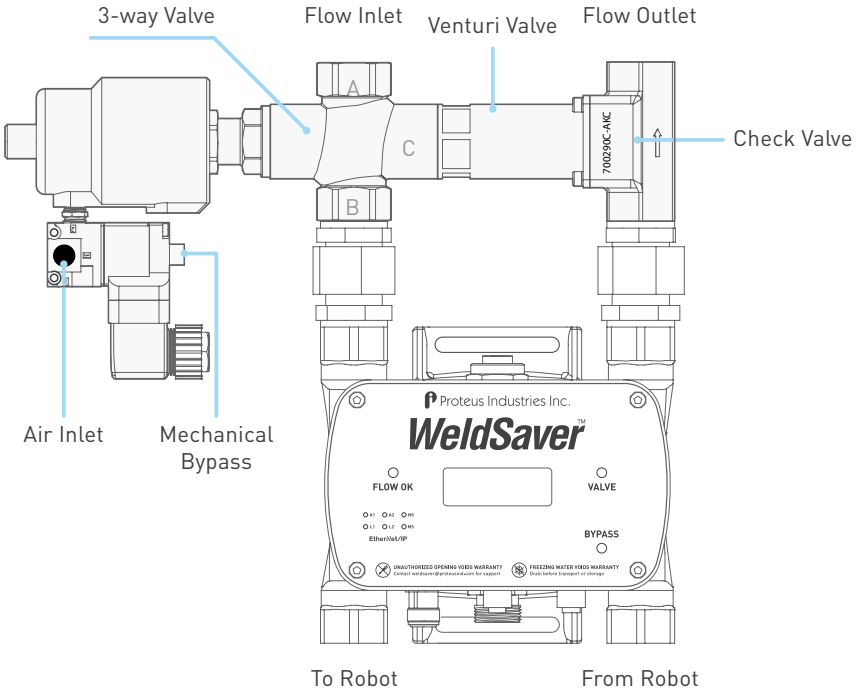
BYPASS **Knob**

The mechanical bypass is operated by a small bypass knob located adjacent to the flow inlet of the solenoid valve.

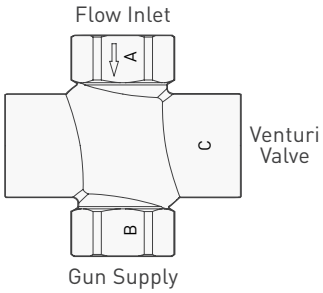
- To engage the mechanical bypass, depress the knob and turn 90° clockwise to the BYPASS ON position.
- To disengage the mechanical bypass and restore normal operation, depress the knob and turn it 90° counterclockwise to the BYPASS OFF position.

eVac™ Coolant Retraction Module

During cap-change events, or in the event of a cap loss, WeldSaver™ products featuring the optional eVac™ Coolant Retraction Module not only stop the flow of coolant but also retract coolant at the welding cap, thereby keeping the welding cap area clean, dry, and safe.



The pneumatic valve assembly is composed of a small solenoid valve that controls the flow of compressed air to the pneumatic valve (the actuator).

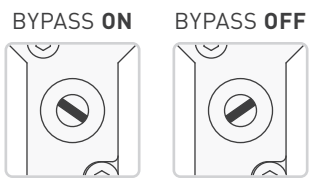


- When the solenoid valve is open, compressed air flows to the pneumatic valve; the air pressure opens the pneumatic valve to allow water to flow to the welding gun (A to B).
- When the solenoid valve closes, it stops the flow of compressed air to the pneumatic valve, which automatically closes and thereby stops the flow of water to the welding gun. The water will be directed through the venturi valve (A to C).

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

- During normal operation, the mechanical bypass is in the BYPASS OFF position 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 mechanical bypass is the BYPASS ON position, 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 mechanical bypass is operated by a small bypass screw located adjacent to the solenoid valve cable connection.



- To engage the mechanical 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 mechanical 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.

*For full capability of the device, please **DO NOT** change or modify the eVac module position from its original installation.

eVac™ Coolant Retraction Module (Continued)

» How It Works

The WeldSaver with eVac coolant retraction module delivers water to a welding gun during normal welding operations, and retracts excess water from the gun during cap changing operations to prevent or reduce water spillage when the caps are removed. The module operates in two states, water delivery and water retraction.

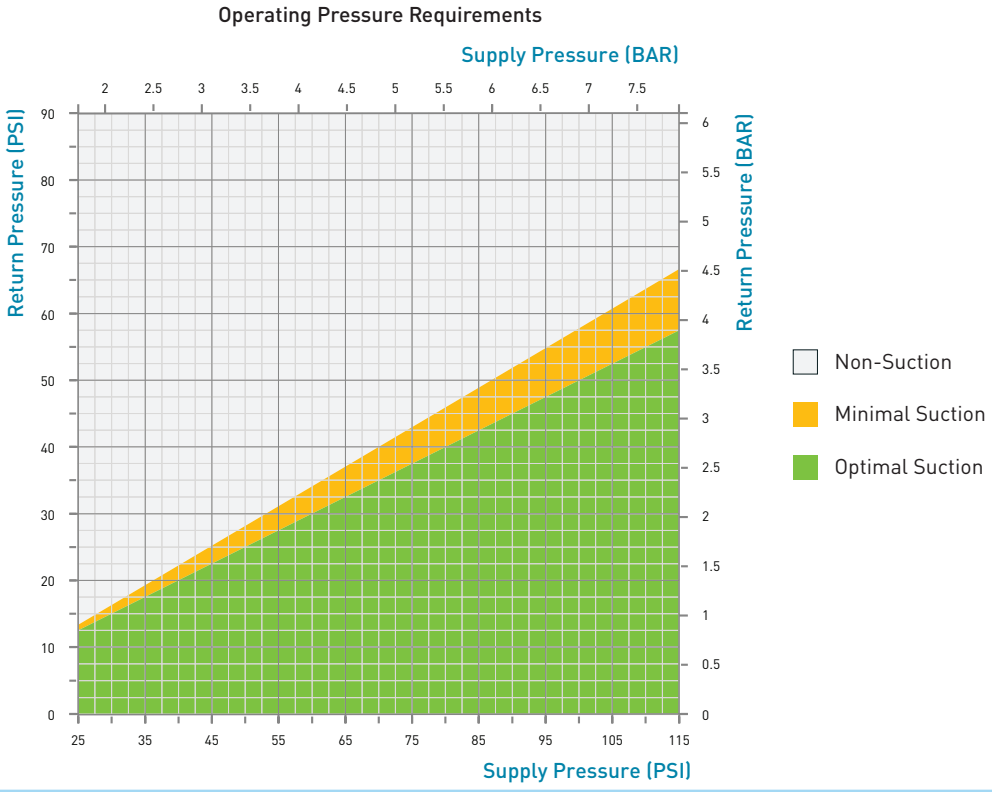
- In the water delivery state, water from the main plant supply system flows from the supply side of the module to the gun, and is returned from the gun to the return side of the module, passing through its integrated check valve, and onward to the main plant water return system.
- In the water retraction state, the module blocks the supply of water to the gun, diverting it instead directly to the main plant water return system. The module uses this diverted flow to generate a continual vacuum force that is applied to the return cooling line from the gun to retract excess water during cap changing.

» Basic System Requirements

The eVac coolant retraction module uses the plant's water system pumping power to generate vacuum force; therefore, it is important to ensure the plant water system can provide adequate coolant supply and return pressure for the module to generate this required vacuum force. The flow rate through the module in the water retraction state can be greater than the normal flow to the gun by as much as fifty percent. This is necessary to generate the vacuum force. A water system that may be marginally adequate for cooling a welding gun may not be sufficient to generate the vacuum force. The module is designed to provide optimum vacuum force, but this comes with a trade-off; if the flow is inadequate in the retraction state, the module may allow a backflow of water to the gun through the return line when caps are removed. Therefore, it is vital to assure the module gets adequate flow to generate the vacuum force.

» Water Line Best Practices

The best way to assess the plant water delivery system to ensure proper operation of the module is to monitor the water pressures at the module's supply and return connections to the plant system. Pressure gauges can be installed on the supply and return sides (in a demo cell at least before plant-wide installation of the WeldSaver). The chart below shows the pressure conditions necessary to generate a vacuum force.



eVac™ Coolant Retraction Module (Continued)

» Water Line Best Practices (Continued)

As the flow rate in the retraction state could be higher than the flow rate to the gun, it's important to assure the operating pressure conditions remain in the green area of the chart while in the retraction state. Keep in mind that the increased flow of the retraction state can cause greater pressure drops through the piping that connects the module to the plant's water supply and return, and may force conditions outside the requirements shown below. Thus, it is important to follow good piping design practices, which include use of adequate pipe and hose sizes, minimizing the use of restrictions and elbows, oversizing the piping on the return line, and use of 50-micron mesh filters. Ideally, all of the cooling lines on the gun would run nearly parallel to the floor, with return lines lower than supply lines, but in practice there are often dips and loops that can hold pockets of water.

Since the vacuum force is applied on the return line to the gun, there are several factors to consider for best performance. To start, consider that since the vacuum is applied only to the return, there must be at least one flow path on the gun for the vacuum force to transfer to the supply side of the caps. This is typically provided by a parallel connection of the two caps across the water supply and return, or a parallel connection of a transformer cooling circuit. This is common practice in welding gun design, although particular configurations of electrode and transformer cooling circuits from different gun manufacturers may affect how well the vacuum will transfer to the supply side, and prevent water from spilling when caps are removed.

» Cap Changing Considerations

Before a cap is actually removed, little if any water can actually be retracted from the gun, since the space occupied by the water in the cooling lines must be replaced with air from the opening provided by a removed cap. Thus, when manually removing the caps, it may be beneficial to first loosen a cap for a few seconds, without fully removing it, to allow enough air into the lines for the vacuum to draw water away from the caps. But even in doing so, the amount of spillage may vary, due to differences in the routing of the cooling lines between gun models, and the position in which the gun is parked for cap changing. Thus, the results can vary, from perfectly dry removal of both caps at the same time, to some degree of water dribble from one or both caps. If dribble occurs on both caps, try removing and replacing them sequentially, with only one cap removed at a time. If dribble occurs on only one cap, try reversing the order of cap removal and replacement, again with only one cap removed at a time. A different parking position of the gun may also reduce or eliminate dribble.

In automated cap changing applications, the robot may even be programmed to pull away from the cap changer after the first cap is loosened, either with or without completely removing and/or replacing it, and pivot the gun through 90 to 180 degrees of rotation on one or more axis to drain water that may be trapped in cooling line pockets, allowing it to be vacuumed into the module.

» Plant / Cell Considerations

Finally, back to plant water conditions, the higher the difference between the supply and return pressure at the connection to the module, the higher the diverted flow rate through the module will be, and the greater the generated vacuum force will be, with resulting improvement in the effectiveness of the water retraction. So, the overall plant water system must be considered. For example, maintaining appropriate flow rates on all of the welding cells throughout a plant can be a challenge. If many cells consume more flow than necessary, this can lead to starving other cells from receiving adequate flow, and/or increasing the overall water return back pressure. Excessive back pressure is a leading cause of reduced flow and poor water retraction performance. Thus, it's advisable to regulate the flow rate to each welding cell, so that each receives an adequate flow necessary for proper equipment cooling, but not more than required.

Performance Characteristics

Base Model Number	W-	W-
Flow Range	6.0 – 50 LPM	1.5 – 13 GPM
Connection	3/4" NPT	
Valve / Module	ESG • Dunming • eVac coolant retraction	
Display	7-Segment LED	
Keypad	Keypad • Non-keypad	
Power Port	Single power • Dual (pass-through) power	
Control Interface	EtherNet/IP™ • PROFINET® • Discrete I/O	
Coolant Supply Pressure	83 – 620 kPa / 12 – 90 psig (customize to 100 psig / 689 kPa on request)	
Coolant Return Pressure	70 – 350 kPa / 10 – 50 psig (customize to 100 psig / 689 kPa on request)	
Differential Pressure	14 – 415 kPa / 2.0 – 60 psig • With eVac module: 137.9 – 413.7 kPa / 20 – 60 psig	
Compressed Air Pressure	300 – 800 kPa / 43.5-116 psig	
Coolant Temperature	4.0 – 110 °C / 39 – 230 °F (supply coolant temp. ⩽ 80 °C /176 °F; return coolant temp. ⩽ 100 °C / 212 °F)	
Primary Leak Detection 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	
Weight	2.5 kg / 5.5 lb	
Input Power Voltage	+24 VDC ± 10%	
Input Power Consumption	With pneumatic valve: < 12.0 VA at normal flow; < 9.6 VA with valve closed With solenoid valve: < 16.8 VA at normal flow; < 9.6 VA with valve closed With eVac module: < 11.4 VA at normal flow; < 9.6 VA at retraction mode	
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.

Performance Characteristics (Continued)

» Shutoff Valve

Manufacturer / Series	ESG 100 Series	ESG 200 Series	Dunming ZC51-20BS-0.8
Valve Type	Pneumatic angle seat valve	Pneumatic shuttle valve	Electric solenoid valve
Valve Configuration	Normally closed	Normally closed	Normally closed
Pneu. Inlet Conn. Size	1/8" NPT	1/8" NPT	n/a (not applicable)
Pneu. Control Medium	Compressed air	Compressed air	n/a (not applicable)
Pneu. Control Med. Temp.	0–50 °C / 32–122 °F	0–50 °C / 32–122 °F	n/a (not applicable)
Pneu. Control Pressure	300–800 kPa / 43.5–116 psi	300–800 kPa / 43.5–116 psi	n/a (not applicable)

» eVac Module

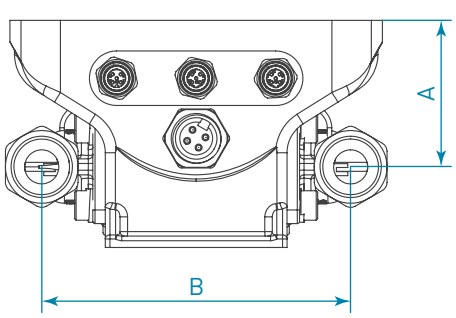
Air Control Valve	
Pressure Range	Vacuum to 8.2 bar / 119 psi
Temperature Range	-18 to 50 °C / 0 to 122 °F
Filtration	40 µ
Pneumatic Directional Valve (103 Series Pneumatic Three-Way Angle Seat Valve)	
Pipeline Pressure	Maximum 16 bar / 232 psi
Control Medium	Clean compressed air • neutral gas
Medium Temperature	-10 to 150 °C / 14 to 302 °F
Ambient Temperature	-10 to 80 °C / 14 to 176 °F
Leakage Rating	DIN EN 12266 Class A
Wetted Materials	Body: CF8M • Actuator: CF8 • Seals: PTFE

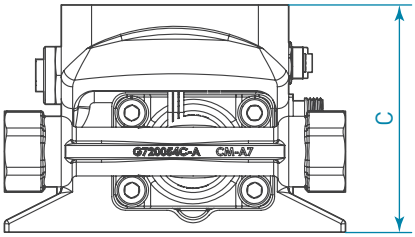
Wetted Materials

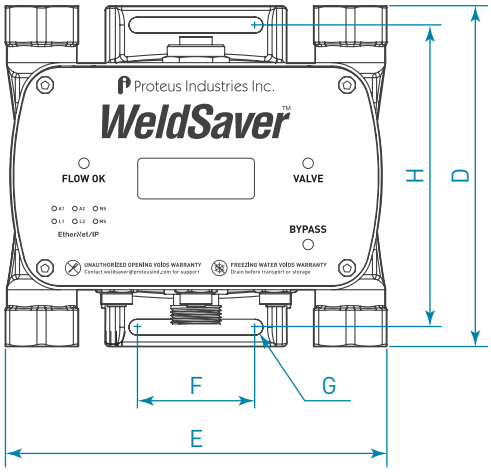
COMPONENT		MATERIAL
Flow body • Fittings • Check valve (3/4" NPT option)		304 Stainless steel
ESG valve (option)		316 Stainless steel
Dunming valve (option)		Stainless steel
eVac module (option)	3-way valve	316 Stainless steel
	Venturi valve body • Check valve	304 Stainless steel
	Venturi tube	PPS
	Seal materials	PTFE • EPDM • Buna-N
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 mm) for a typical product configuration are provided below for reference only. To request a dimensional drawing or solid model for a specific model, please contact WeldSaver Technical Support.



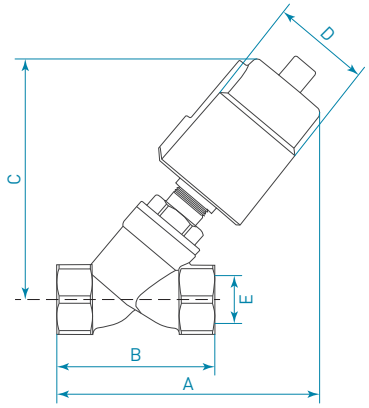




Unit	A	B	C	D	E	F	G	H
inch	2.5	5.4	3.9	5.9	6.6	2.0	R0.14	5.2
mm	64.5	136	100	150	168	52	R3.5	133

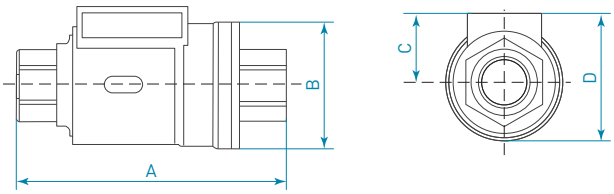
Dimensions (Continued)

» ESG Pneumatic Valves



100 Series Angle Seat Valve

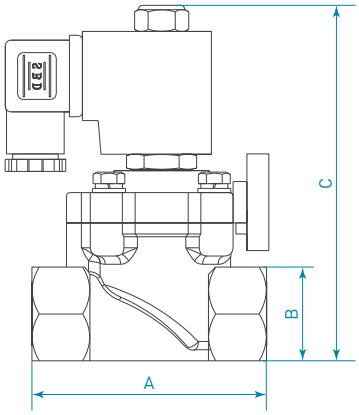
DN15	Actuator	A	B	C	D	E
inch	1.6	4.9	2.7	44	2.0	1/2
	2.0	5.3		4.9	2.4	
mm	40	124	68	112	50.5	12.7
	50	135		125	60	



200 Series Shuttle Valve

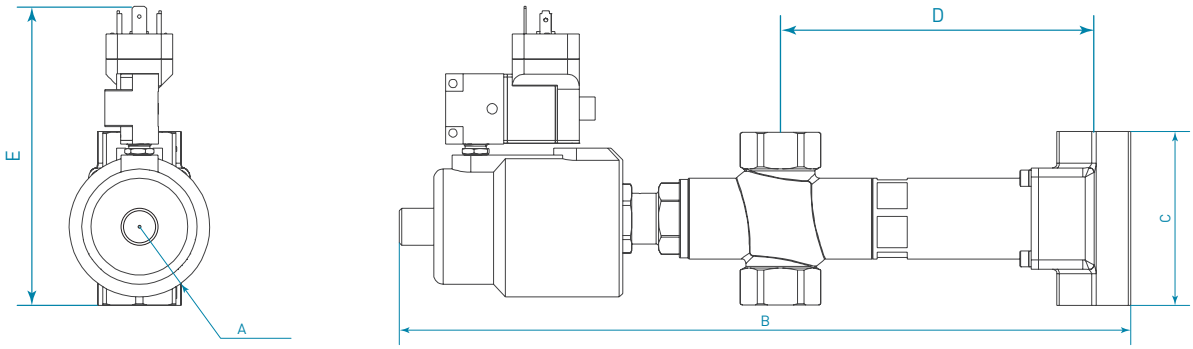
DN15	A	B	C	D
inch	4.4	2.0	1.4	2.4
mm	112	52	35	61

» Dunming Valve



DN20	A	B	C
inch	3.3	1.3	5.1
mm	85	34	130

» eVac Module



DN20	A	B	C	D	E
inch	R1.2	12.5	3.0	5.4	5.1
mm	R30.5	317	75.5	136	130

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:

1. 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.
2. Engage the coolant shutoff valve manual override and allow to drain. (Refer to pages 7–12 for more information.) After clearing all water from the device, disengage manual override.

WeldSavers have a potential for freezing damage with standing water trapped above the check valve, please break the pipe connection at the outlet of the check valve before shipping.

CAUTION!

For WeldSaver with an eVac coolant retraction module, please also open any ball valves that may be attached above or below the WeldSaver, and will allow the water trapped above the eVac module to drain to the floor.

NOTE

Proteus recommends power cycling the installed valves open for several seconds once the WeldSaver connections are open to atmosphere for transport.

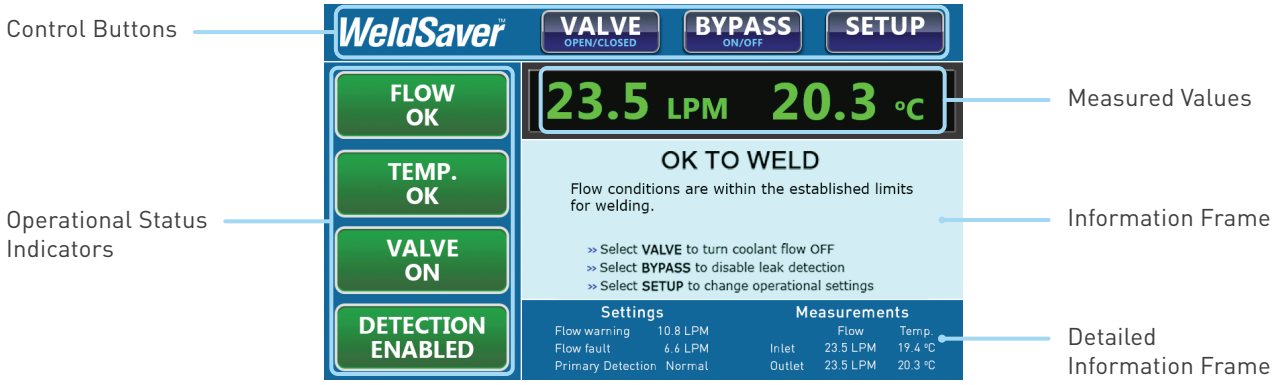
CAUTION!

The coolant shutoff valve / eVac module 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.

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

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.

» Operational Status Indicators

Flow Status	Indicates the status of the coolant flow through the system.
Temperature Status	Indicates the status of the coolant temperature.
Valve Status	Indicates whether the coolant shutoff valve is open or closed.
Detection Status	Indicates the status of the detection functions.

» 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.

» Information Frame

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

» Detailed Information Frame

Current Settings	Displays the current Flow Warning, Flow Fault, and Primary Leak Detection values.
Current Values	Displays the current temperatures and flow rates of the inlet and outlet coolant.

Button Descriptions

Depending on the WeldSaver state, the status of buttons on the web browser or pendant interfaces shall be Functional, Disabled, or Locked.

Functional

Opens and closes the coolant shutoff valve to turn the coolant flow ON or OFF.

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.

Functional

Clears the current CAP OFF state and returns the device to normal operation.

Functional

Turns Bypass Mode ON or OFF to disable or enable Leak Detection.

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.

Disabled

This function is not supported in the current device state.

Functional

Opens the Setup Menu for viewing or modifying the WeldSaver control parameter values.

Functional

Clears a fault condition to restart the coolant flow and return the device to normal operation.

Operational Status Indicator Descriptions

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.

The Primary cap off algorithm has detected a Cap Off and shut the valve off.

The Secondary cap off algorithm or the one-time check at the end of the stabilization delay has detected a Cap Off and shut the valve off.

Valve Open

The solenoid valve is open.

Valve Closed

The solenoid valve is closed.

Valve Fault

The solenoid valve failed to respond to the command to turn off the coolant flow.

Valve Closed by Controller

The valve has been closed by the controller and thus cannot be controlled by the on-screen VALVE button.

Detection Enabled

Leak detection feature is currently working.

Secondary cap off detection is enabled and Primary cap off detection is disabled.

Primary cap off detection is enabled and Secondary cap off detection is disabled.

Detection Disabled

Leak detection feature is disabled by manual control (on-screen BYPASS button).

Detection Disabled by Controller

Leak detection feature is disabled by controller and thus cannot be controlled by the on-screen BYPASS button.

Temperature OK

Temperature conditions are within the established limits for welding.

High Temperature Warning

The outlet / inlet / differential temperature is above the warning limit.

High Temperature Fault

The outlet / inlet / differential temperature is above the fault limit.

Temperature Sensor Fault

The main inlet and / or outlet temperature sensor is unplugged.

Tools Required

- Adjustable wrenches
- Pipe wrenches
- Non-hardening pipe sealant
- M6 screws for mounting bracket

Physical Installation

Refer to the diagram on page 17 of this document for the dimensions of the mounting bracket. Using M6 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 10 for the inlet location.)
4. Reconnect the air supply and confirm that the pneumatic connection is secure and leak-free.

Coolant Filtering

Your circulating liquid may contain particles. While not essential to the operation of the flow sensor, it is good practice to filter your liquid. A 100-micron filter is often used to remove rust and other particles from the liquid. Good coolant filtering practices can increase the usable life of the vortex flows sensors as well as your associated pumps and other liquid system components.

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.

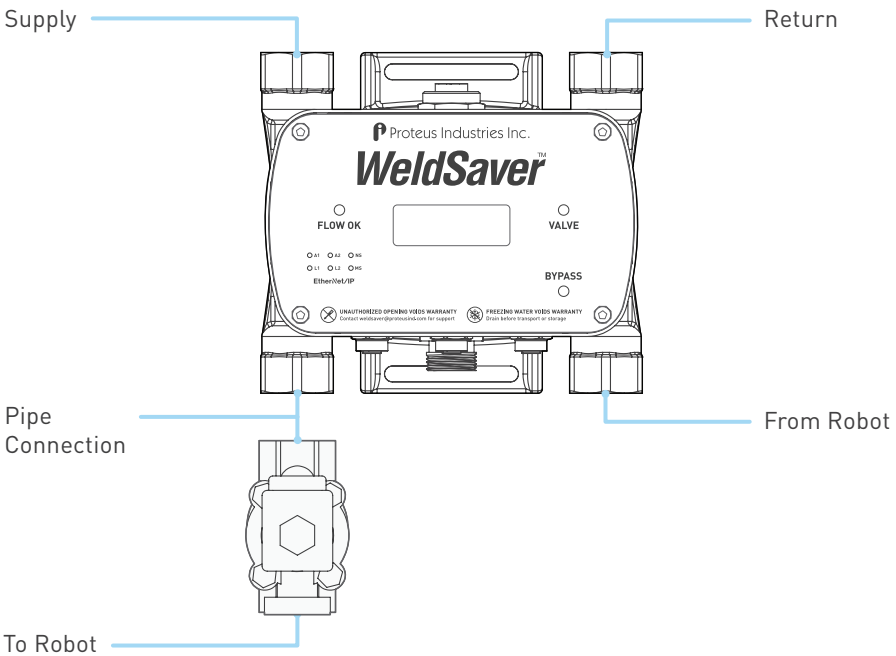
1. Flush the cooling system.

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.

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



Plumbing Connections (Continued)

4. Make plumbing connections from the shutoff valve to the WeldSaver. Skip this step if the shutoff valve has been installed by Proteus.
5. 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.**

6. Adjust pipe connections as required for proper alignment of the WeldSaver.
7. Engage the coolant shutoff valve manual override to enable flow. (Refer to pages 7–12 for more information.)
8. 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.**

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

Electrical Connections

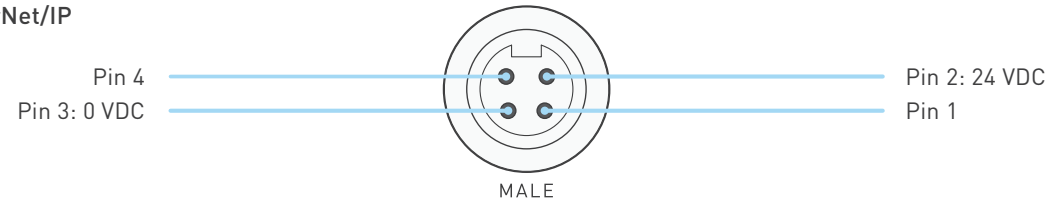
NOTE
The WeldSaver must be connected to 24 VDC auxiliary power to perform correctly. Proteus highly recommends connecting the WeldSaver to certified DC power supplies only.

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

Single Power Port Configuration

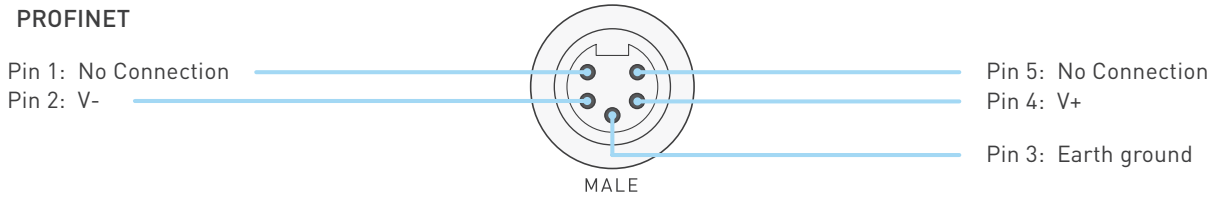
1. Refer to the wiring diagram below for the 24 VDC power connector on the bottom of the WeldSaver body.

EtherNet/IP



2. Confirm that the power cable has 24 VDC present between pins 2 and 3.
3. Connect the power cable to the 4-pin connector on the bottom of the WeldSaver body.

PROFINET

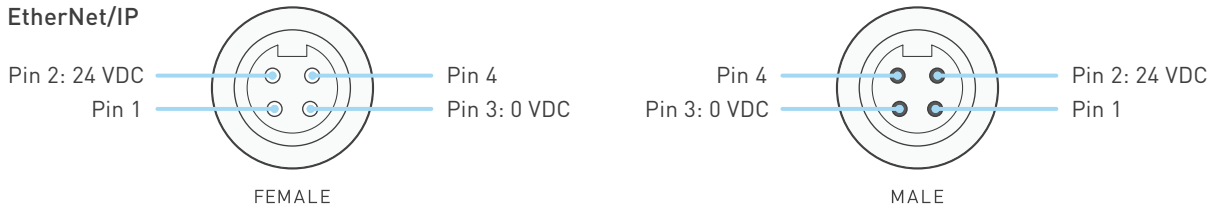


2. Confirm that the power cable has 24 VDC present between pins 2 and 4.
3. Connect the power cable to the 5-pin connector on the bottom of the WeldSaver body.

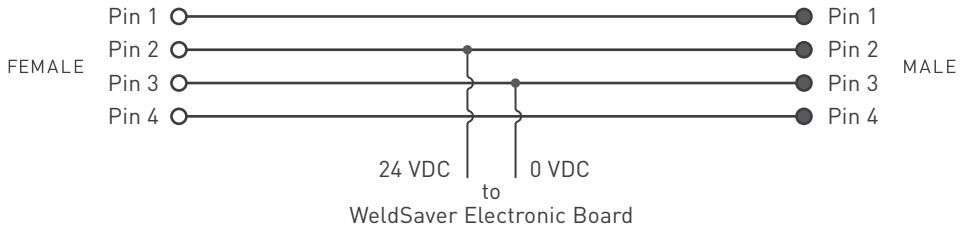
Electrical Connections (Continued)

Dual Power Port Configuration (Pass-Through)

1. Configuration with the pass-though power design features 2 connectors, one female connector on the top and one male connector on the bottom of the WeldSaver body. Please refer to the wiring diagrams below for the 24 VDC power connectors and the pass-though design.



Pass-Through Wiring Diagram:



2. Confirm that the upstream power cable has 24 VDC present between pins 2 and 3, and connect the upstream power cable to the male connector on the bottom of the WeldSaver body.*

   *Maximum pass-through current: 10 Amps

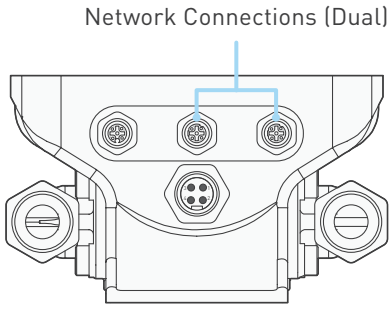
3. Connect the downstream power cable to the female connector on the top of the WeldSaver body.

Network Connections

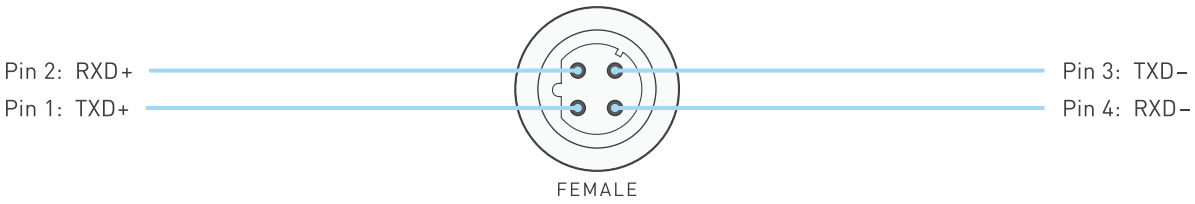
NOTE
The WeldSaver must be connected to an Ethernet network to perform correctly.

NOTE
If necessary, please refer to the Network LED Indicators on page 7 for current network status.

WeldSaver Passport products are available with two network ports, which are located on the bottom of the body. WeldSaver Passport features 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.



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

Default Network Settings

NOTE

The default settings shown below are standard for most WeldSaver Passport 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 Proteus's **WeldSaver Passport Profile** manual for complete Common Industrial Protocol (CIP™) information for WeldSaver Passport products.

NOTE

The WeldSaver information might not be displayed in the computer's browsers if the network IP address settings for both the WeldSaver and the computer are duplicated or incompatible.

The subnet mask settings for both the WeldSaver and the computer need to be identical to ensure proper communication.

NOTE

ODVA™ strongly recommends the use of Ethernet switches that implement IGMP snooping. When IGMP snooping is used, devices will only receive the multi-cast packets in which they are interested (i.e., for which they have issued an IGMP membership message).

Proteus WeldSaver products assume that this recommendation is followed.

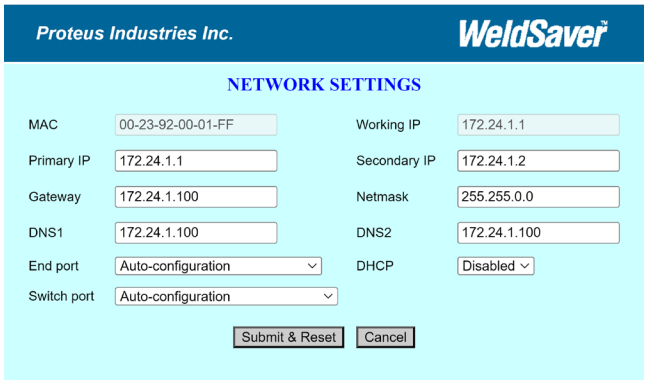
Configuring Network Settings

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 https://<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 https://<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.

Electronic Data Sheet (EDS), General Station Description (GSD)

The WeldSaver Passport EDS file (EtherNet/IP models) or GSDML file (PROFINET models) can be downloaded directly from the device using a web browser.

1. Enter https://<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** or the **Download GSD (General Station Description) File** link at the bottom of the page.
   » The browser will display a download prompt to save the file.
3. Select the **Go to Main Page** button to exit the About page and return to normal operation.

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

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 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.
   - » The Flow OK status LED on the front face of the WeldSaver will be SOLID GREEN.
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 Flow OK status LED on the front face of the WeldSaver will be off.
   - » The indicated flow rate will be the actual measured flow rate or 0.00 (if the flow is OFF).
3. Turn the coolant flow ON or increase it until it once again reaches the optimum system flow rate.
4. From the WeldSaver web interface, select the VALVE button.
   - » The WARNING or FAULT condition will reset and the interface will indicate the OK TO WELD condition and the actual flow rate.
   - » The Flow OK status LED will be SOLID GREEN.

Valve Shut-Off

1. From the WeldSaver web interface, select the VALVE button.
   - » The coolant flow will turn OFF and the interface will indicate the VALVE CLOSED condition.
   - » The Valve status LED on the front face of the WeldSaver will be SOLID RED.
2. From the WeldSaver web interface, 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.
   - » The Valve status LED on the front face of the WeldSaver will be off.

Bypass Mode

1. From the WeldSaver web interface, select the BYPASS button.
   - » The Leak Detection function will turn OFF and the interface will indicate the BYPASSED condition.
   - » The Bypass status LED on the front face of the WeldSaver will be AMBER.
2. From the WeldSaver web interface, select the BYPASS button again.
   - » The Leak Detection function will turn ON and the interface will return to the OK TO WELD condition.
   - » The Bypass status LED on the WeldSaver will be off.

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.
   - » The Valve status LED on the front face of the WeldSaver will be SOLID RED.
2. Reinstall the weld cap and confirm that it is properly secured to the weld gun.
3. From the WeldSaver web interface, select the VALVE button.
   - » The WeldSaver will restore the coolant flow, and the interface will indicate the OK TO WELD condition and the actual flow rate.
   - » The Valve status LED on the front face of the WeldSaver will be off.

Please see the Tips for Cap-off Detection section on page 44 to make the best of the leak-detection function of the WeldSaver.

Coolant Retraction

1. From the WeldSaver web interface, select the VALVE button.
   - » The coolant flow will turn OFF and the interface will indicate the CAP CHANGE OK condition.
2. From the WeldSaver web interface, 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.

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.
Primary Leak Detection	The setting determines how quickly a leak will be detected. Selecting a slowing option reduces sensitivity to false cap-loss events, selecting a fasting option increases sensitivity. Checking the Disable box will disable the Primary Leak Detection.
Secondary Leak Detection	The setting determines 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. Checking the Disable box will disable the Secondary Leak Detection and Secondary Leak Delay.
Secondary Leak Delay	The maximum allowable period of time during which the actual difference between the measured Supply and Return flow rates exceeds the Secondary Leak Detection value. If the actual 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.
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 will automatically convert accordingly.

Default Flow Settings

NOTE

The default values shown below are standard for most WeldSaver Passport 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
Primary Leak Detection	Slowest	Slow	Normal	Fast	Fastest	Normal	
Secondary Leak Detection	0.0 - 50.0 LPM			0.0 - 13.0 GPM		4.0 LPM	1.0 GPM
Secondary Leak Delay	0 - 10,000 ms					4,000 ms	
Stabilization Delay	1 sec.	2 sec.	4 sec.	6 sec.	8 sec.	4 sec.	

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.
Units	Temperature information can be displayed and transmitted in Celsius (°C) or Fahrenheit (°F). If the Units setting is changed, the flow units will automatically convert accordingly.

Default Temperature Settings

NOTE

The default values shown below are standard for most WeldSaver Passport 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	122 °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	54 °F
Differential Temperature – Fault Trip Point	0 - 100 °C	32 - 212 °F	40 °C	72 °F

Browser Interface Setup Menu

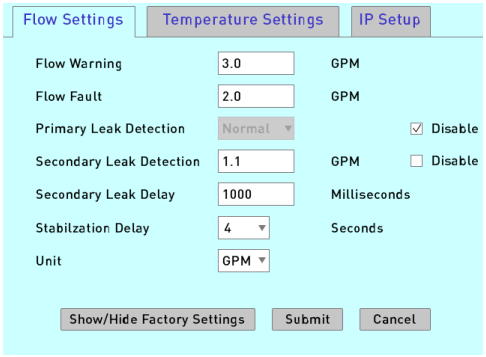
The WeldSaver provides a setup menu that is accessible through the browser interface by selecting the SETUP button on the home screen. Depending on the specific configuration of your WeldSaver device, the menu may consist of 1 to 3 pages (described below), which can be accessed by selecting the corresponding 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 34 of this document for descriptions of each parameter.)



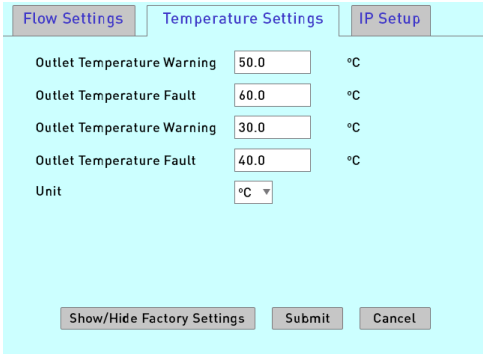
Available buttons:

- **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.

» Temperature Settings

Contains the parameter settings that determine the behavior of the device in response to temperature conditions. (Refer to page 35 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.

NOTE

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

Browser Interface Setup Menu (Continued)

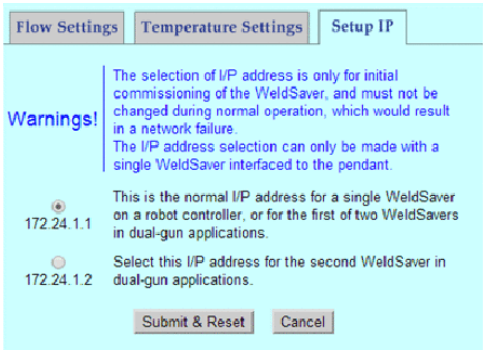
» Setup IP

Provides the capability to toggle between the Primary and Secondary IP addresses specified on the Network Settings page. (Refer to page 29 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.

Do not change the IP address during normal operation as this can result in a network failure.

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 Primary Detection values are displayed in the Detailed 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	
OK to Weld 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.	**Browser Interface**	
	Info Frame Text	"OK TO WELD"
	Flow Status Indicator	"FLOW OK"
	WeldSaver LED Display	
	Display	[flow rate]
	Flow OK LED	Solid green
Stabilizing 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.) The Stabilization Delay setting controls the duration time.	**Browser Interface**	
	Info Frame Text	"FLOW STABILIZING"
	WeldSaver LED Display	
	Display	Scrolling dash › [flow rate]
	Flow OK LED	Off
Bypass Mode The Leak Detection function is disabled. Flow monitoring is still functional. » 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** button will not operate until the weld controller releases control of the WeldSaver.	**Browser Interface**	
	Info Frame Text	"BYPASSED"
	Bypass Status Indicator	"DETECTION DISABLED"
	WeldSaver LED Display	
	Bypass LED	Amber
Low Flow Warning » Flow has fallen below the Flow Warning limit 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.	**Browser Interface**	
	Info Frame Text	"CAUTION"
	Flow Status Indicator	"FLOW WARNING"
	WeldSaver LED Display	
	Display	LO › FLO › [flow rate]
Low Flow Fault » Flow has fallen below the Flow Fault limit 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.	**Browser Interface**	
	Info Frame Text	"ALARM"
	Flow Status Indicator	"FLOW FAULT"
	WeldSaver LED Display	
	Display	-LO › FLO › [flow rate]
Cap Off Fault » 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 **VALVE** 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 Primary Leak Detection setting and select the **VALVE** button to restart the coolant flow.	**Browser Interface**	
	Info Frame Text	"CAP OFF"
	Flow Status Indicator	"PRIMARY / SECONDARY CAP OFF"
	Valve Status Indicator	"VALVE CLOSED"
	WeldSaver LED Display	
	Display	CAP › OFF › [flow rate]
	Valve LED	Solid red

8 STATUS CONDITIONS

STATUS CONDITION	VISUAL INDICATION	
Flow Off / Cap Change » 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** and **VALVE** buttons will not operate until the weld controller releases control of the WeldSaver.	**Browser Interface**	
	Info Frame Text	"FLOW OFF"
	Flow Status Indicator	"FLOW OFF"
	Valve Status Indicator	"VALVE OFF"
	WeldSaver LED Display	
	Display	0.0
	Flow OK LED	Off
	Valve LED	Solid red
Cap Change » 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** and **VALVE** buttons will not operate until the weld controller releases control of the WeldSaver.	**Browser Interface**	
	Info Frame Text	"CAP CHANGE OK"
	Flow Status Indicator	"FLOW OFF"
	Valve Status Indicator	"VALVE OFF"
	WeldSaver LED Display	
	Display	CAP › CH9
	Flow OK LED	Off
	Valve LED	Solid red
Cap Change Fault The WeldSaver requires a water pressure differential between the supply and return of at least 20-30 PSI. Eliminate any leak that happens in the coolant flow circuit and select the **VALVE** button to disengage the control eVac module signal.	**Browser Interface**	
	Info Frame Text	"CAP CHANGE FAULT"
	Flow Status Indicator	"FLOW OFF"
	Valve Status Indicator	"VALVE FAULT"
	WeldSaver LED Display	
	Display	CAP › CH9
	Flow OK LED	Off
	Valve LED	Flashing red
Valve Fault The WeldSaver requires a water pressure differential between the supply and return of at least 20-30 PSI. Eliminate any leak that happens in the coolant flow circuit and select the **VALVE** button to disengage the control eVac module signal.	**Browser Interface**	
	Info Frame Text	"VALVE FAULT"
	Flow Status Indicator	"PRIMARY / SECONDARY CAP OFF"
	Valve Status Indicator	"VALVE FAULT"
	WeldSaver LED Display	
	Display	CAP › OFF
	Valve LED	Flashing red
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. Eliminate the leak and select the **VALVE** button to clear the fault. » The coolant shutoff valve manual override is engaged Disengage manual override (see pages 7–12). » The coolant shutoff valve is fouled Clean or replace the coolant shutoff valve.	**Browser Interface**	
	Info Frame Text	"VALVE FAULT"
	Flow Status Indicator	"PRIMARY / SECONDARY CAP OFF"
	Valve Status Indicator	"VALVE FAULT"
	WeldSaver LED Display	
	Display	CAP › OFF › [flow rate]
	Valve LED	Flashing red

8 STATUS CONDITIONS

STATUS CONDITION	VISUAL INDICATION	
Temperature OK Temperature conditions are within the established limits for welding.	**Browser Interface**	
	Temp. Status Indicator	"TEMP. OK"
	WeldSaver LED Display	
	Display	tP › [temp.]
High Outlet Temperature Warning » The outlet temperature has risen above the Warning limit 1. Check the Outlet Temperature Warning limit setting. Adjust if necessary. 2. If the setting is OK, decrease the coolant temperature, if possible. 3. If the coolant temperature cannot be decreased, increase the Warning limit.	**Browser Interface**	
	Temp. Status Indicator	"TEMP. WARNING"
	WeldSaver LED Display	
	Display	HI › tP › [temp.]
High Differential Temperature Warning » The differential temperature has risen above the Warning limit 1. Check the Differential Temperature Warning limit setting. Adjust if necessary. 2. If the setting is OK, adjust the coolant temperature, if possible. 3. If the coolant temperature cannot be adjusted, increase the Warning limit.	**Browser Interface**	
	Temp. Status Indicator	"TEMP. WARNING"
	WeldSaver LED Display	
	Display	HI › dt › [temp.]
High Outlet Temperature Fault » The outlet temperature has risen above the Fault limit 1. Check the Outlet Temperature Fault limit setting. Adjust if necessary. 2. If the setting is OK, decrease the coolant temperature, if possible. 3. If the coolant temperature cannot be decreased, increase the Fault limit or stop welding operations.	**Browser Interface**	
	Temp. Status Indicator	"TEMP. FAULT"
	WeldSaver LED Display	
	Display	-HI › -tP › [temp.]
High Differential Temperature Fault » The differential temperature has risen above the Fault limit 1. Check the Differential Temperature Fault limit setting. Adjust if necessary. 2. If the setting is OK, adjust the coolant temperature, if possible. 3. If the coolant temperature cannot be adjusted, increase the Fault limit or stop welding operations.	**Browser Interface**	
	Temp. Status Indicator	"TEMP. FAULT"
	WeldSaver LED Display	
	Display	-HI › -tP › [temp.]
Temperature Sensor Error The WeldSaver is unable to detect the inlet and/or outlet temperature sensor. Contact WeldSaver Technical Support for assistance.	**Browser Interface**	
	Temp. Status Indicator	"SENSOR FAULT"
	WeldSaver LED Display	
	Display	tP › nA › [blank]

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 3 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 browser keeps displaying the previous data even after reloading the page

Clear cache & cookies. **Please note that Clearing cache and cookies may also removes data, such as saved passwords, web predictions, or auto-fill entries.**

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 Primary Leak Detection setting is too slow

1. Select the **SETUP** button to access the setup menu.
2. Select a faster Primary Leak Detection 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 detect a leak in the coolant circuit.

» The Secondary Leak Detection setting is too high

4. Select the **SETUP** button to access the setup menu.
5. Enter a lower Secondary Leak Detection parameter value on the Flow Settings page.
6. Select the **Submit** button to save the new value and return to normal operation.

9 TROUBLESHOOTING

The WeldSaver does not detect a leak immediately after reset

» The Secondary Leak Delay setting is too high

1. Select the **SETUP** button to access the setup menu.
2. Enter a lower Secondary 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 7–12).

» 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 Primary Leak Detection setting is too fast

1. Select the **SETUP** button to access the setup menu.
2. Select a lower Primary Leak Detection 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.

Tips for Cap-off Detection

To make the best of the leak-detection function of the WeldSaver, here are some tips that you can consider for your parameter setting.

» Tips for setting the primary leak detection are:

1. Disable the secondary leak detection.

   On the Flow settings page, check the Disable box of the secondary leak detection. This will allow you to know that any leak detection issues you may be seeing can be attributed to the primary leak detection parameter setting, for example, Fastest, Fast, Normal, Slow, and Slowest.

2. Then if the WeldSaver is not detecting a cap loss, try the "Fast" or "Fastest" setting. And conversely, if experiencing false cap off, try the "Slow" or "Slowest" setting.

» Tips for setting the secondary leak detection are:

1. The secondary leak detection does work by comparing the two flow rate values. So once the best setting is determined for the primary leak detection, then set the secondary leak detection parameter to 3 or 4 liters per minute (LPM). If the WeldSaver then starts experiencing false cap-off events, then set the secondary leak detection parameter 1 or 2 LPM higher.

2. And conversely, the lowest possible value for the primary leak detection can be determined by incrementally lowering the value until just above the threshold where false cap-off events begin to occur, although it is not necessary to push this to the lowest. If a setting of 3 or 4 LPM is working, then there's probably no benefit in going lower.

   A good test for the proper value is that it should be able to detect a cap-off when the flow goes from shutoff to normally flowing. You can do this by turning off the valve, removing a cap, and reopening the valve. The primary leak detection cannot determine this condition, so successfully detecting a cap-off from starting the flow to a missing cap indicates that the secondary leak detection is working. If the WeldSaver is not detecting this condition, the primary leak detection needs to be a lower value. However, a too low value will cause false cap-off events.

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WS5PTRM UNCONTROLLED DOCUMENT 05/2024