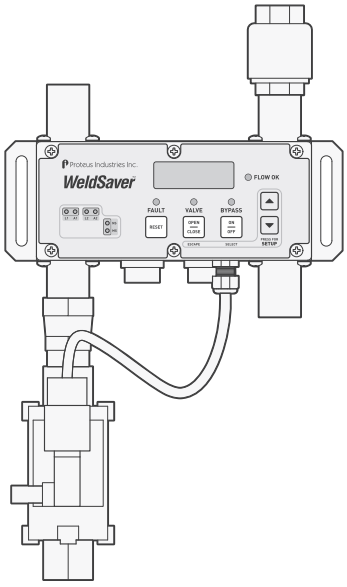
Proteus Industries Inc.

WeldSaver™6

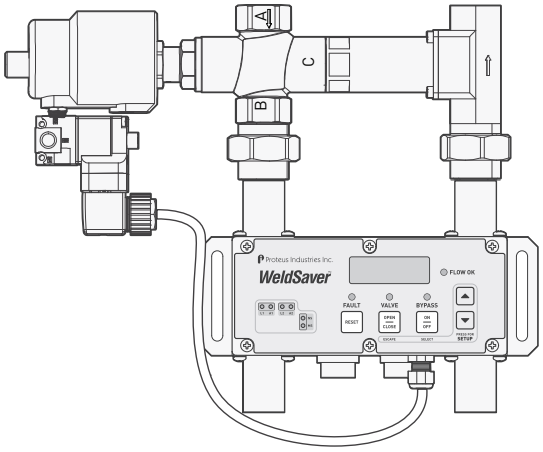
WeldSaver 6 Series

EtherNet/IP™ Interface

Vortex Flow Sensors



Models with Shutoff Valve



Models with eVac™ Module

TECHNICAL REFERENCE MANUAL

CONTENTS

1 OVERVIEW

Introduction

This document provides comprehensive technical information about the Proteus WeldSaver™ 6 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 6 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:

MJM Sales, Inc.
6620 Cobb Drive
Sterling Heights, MI 48312
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

	W	6	-	D	E	1	50	9	C	G	9	-	0	0	0

WeldSaver Base Model Family	**5**	Web Interface
	6	Display & Web Interface
WeldSaver Sub Model	**-**	Hyphen
	Q	Three Sensor (electrodes plus transformer)
	S	WeldSaver Solo Single Vortex*
	P	WeldSaver Passport Lightweight Dual Vortex*
Additional WeldSaver Feature	**D**	Drawback
	9	None
	O	Other*
Network Comm Interface	**D**	Discrete I/O
	E	EtherNet/IP
	P	PROFINET
	C	DeviceNet or other
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
	9	No Temperature
Shutoff Valve Type	**S**	Electric Solenoid with Manual Shutoff (Burkert)
	F	Electric Solenoid with Manual Shutoff (Dumning)
	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 further Customization to be captured in product description

What It Is and What It Does

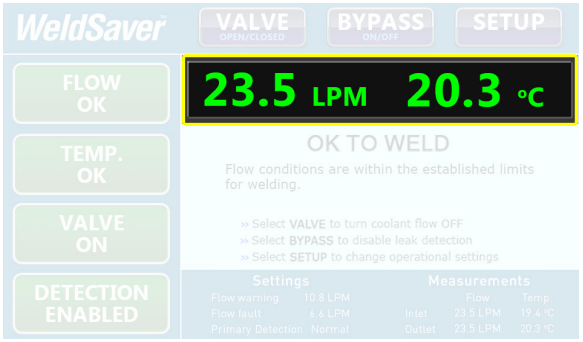
The Proteus WeldSaver™ is a unique coolant control unit designed to provide multiple functions to monitor and control coolant flow.

» 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.

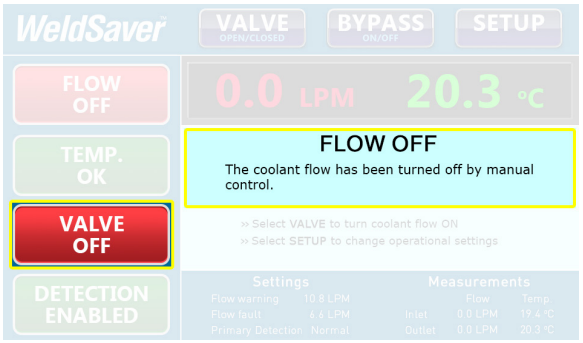
Products with optional temperature measurement capability also indicate the temperature of the coolant at the outlet as well as the temperature differential between the inlet and the outlet.



» 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, or locally using the keypad on the device.

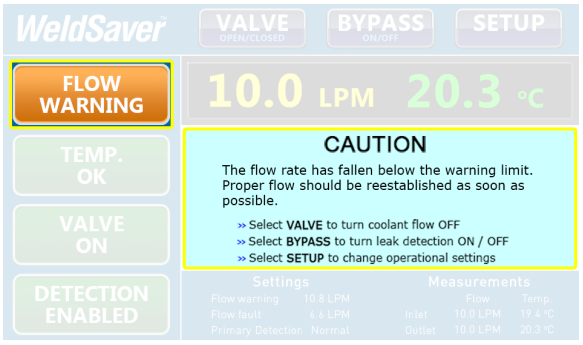
Valve status indicators on the browser interface and on the keypad show whether the shutoff valve is open or closed.



» 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.

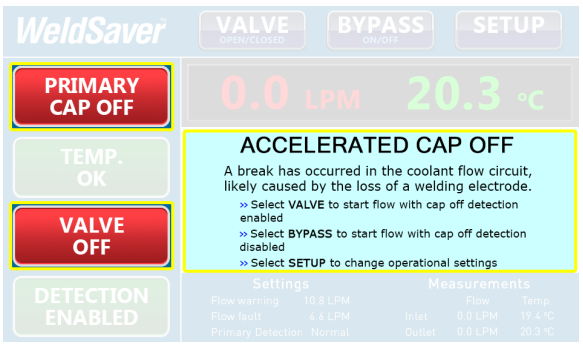
Status information is indicated on the browser interface as well as locally on the keypad. It is also transmitted to the weld controller via EtherNet/IP.



» It's a Very Fast Leak Detector

The WeldSaver simultaneously employs two different cap-off detection algorithms **(Primary and Secondary)** to ensure leak and cap-off events are detected exactly and in time.

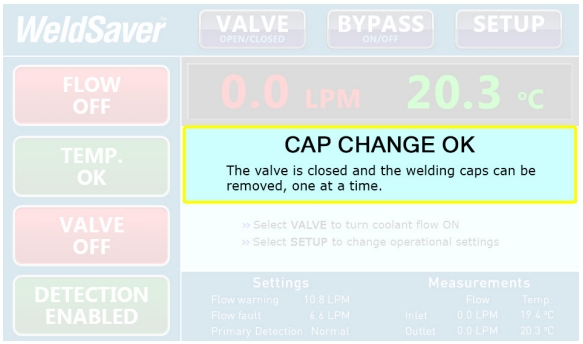
In the event of a weld-cap loss or other break in the coolant flow circuit, the leak is detected and coolant flow is shut off in less than one second.



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.

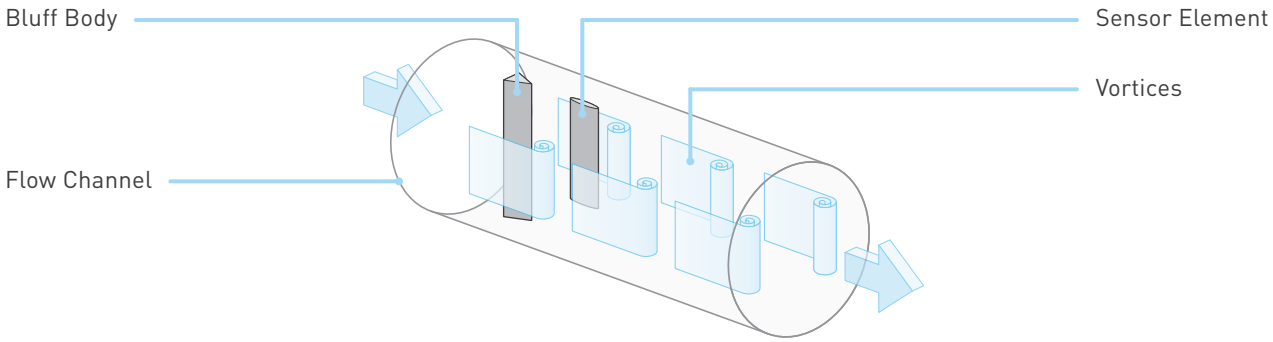


Flow Sensing and Measurement

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.

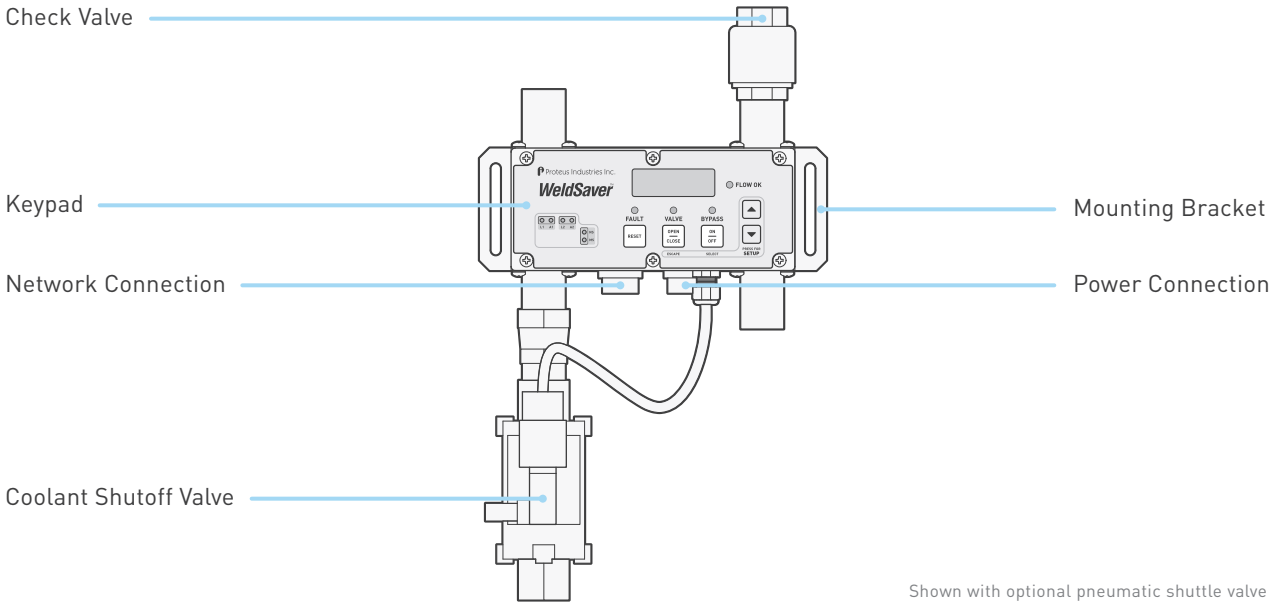
Intelligent Leak Detection (Primary and Secondary Algorithms)

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**.

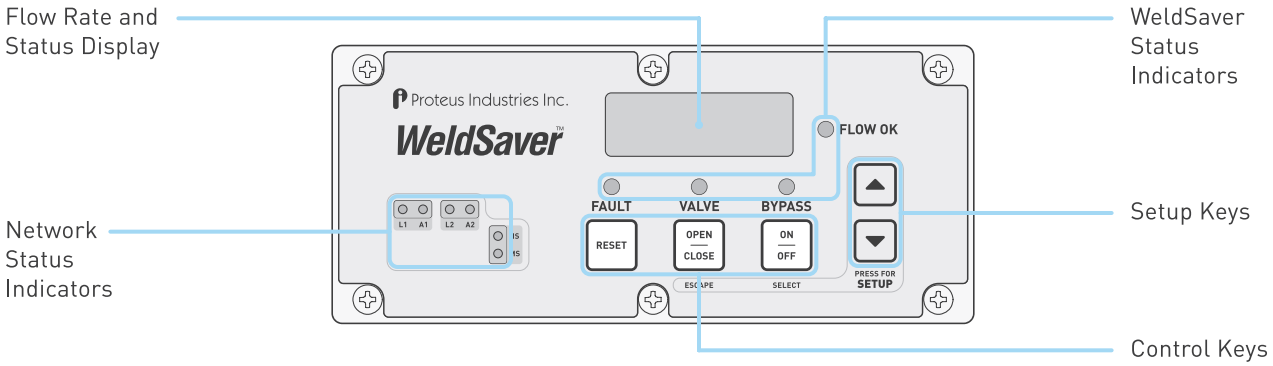
In the event that a leak is detected, the WeldSaver shuts off coolant flow and signals a state change to the weld controller. The weld controller then makes a decision to shut down weld operations.

Functional Components



Shown with optional pneumatic shuttle valve

Keypad



» Key Functions

KEY	FUNCTION	KEY	FUNCTION
RESET	The RESET key clears fault conditions to restore coolant flow and the leak detection function.	▲	The UP ARROW key is used in setup mode to navigate upward in the parameter menu and to increase the value of a selected parameter.
OPEN / CLOSE	The VALVE key opens and closes the coolant shutoff valve to stop and restore coolant flow. It also functions as the ESCAPE key in setup mode.	▼	The DOWN ARROW key is used in setup mode to navigate downward in the parameter menu and to decrease the value of a selected parameter.
ON / OFF	The BYPASS key turns Bypass Mode on and off to enable or disable the leak detection function. It also functions as the SELECT key in setup mode.		

WeldSaver LED Indicators

LED indicators located on the WeldSaver keypad 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 detected	The WeldSaver has detected one or more fault conditions
	Solid green	Normal operation	Flow conditions are within the established limits for welding
Fault	Off	Normal operation	The flow rate is above the programmed trip-point values
	Solid red	Fault detected	The flow rate has fallen below one or more trip-point values
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 WeldSaver keypad 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 › CH9	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 fallen below the Temperature Fault limit
-HI › dt › [temp.]	Differential temperature has fallen below the Temperature Fault limit
tP › nA	Temperature sensor reading error
dt › nA	

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 10–12 for detailed information about each valve type.

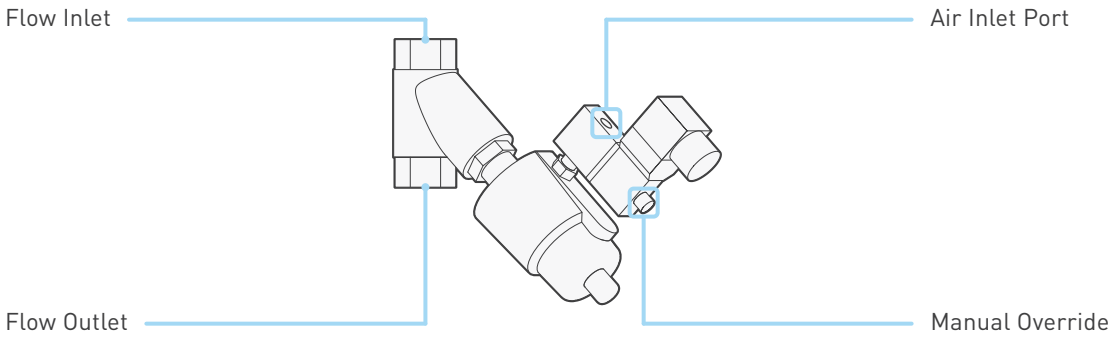
CAUTION!

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.

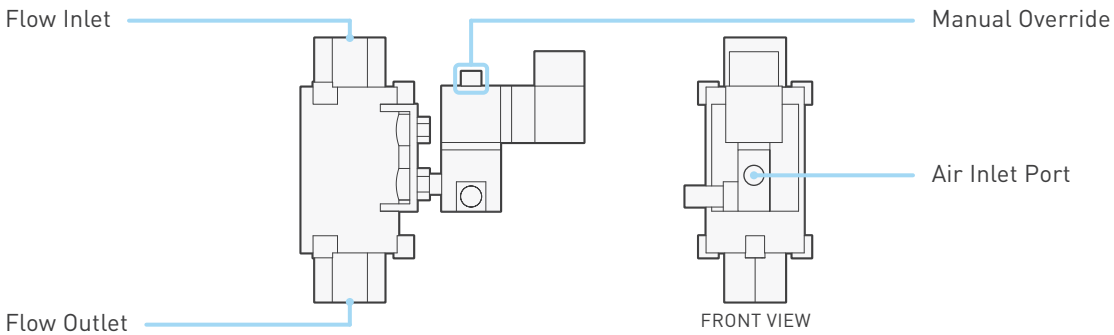
Coolant Shutoff Valve (Continued)

» ESG Pneumatic Valves (100 Series and 200 Series)

100 Series Angle Seat Valve



200 Series Shuttle Valve



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

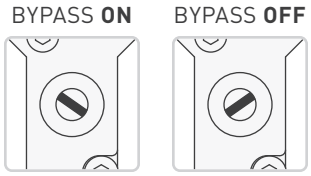
- When the solenoid valve is open, compressed air flows to the pneumatic valve; the air pressure opens the pneumatic valve to allow water to pass through.
- When the solenoid valve closes, it stops the flow of compressed air to the pneumatic valve, which automatically closes and thereby stops the flow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

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

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

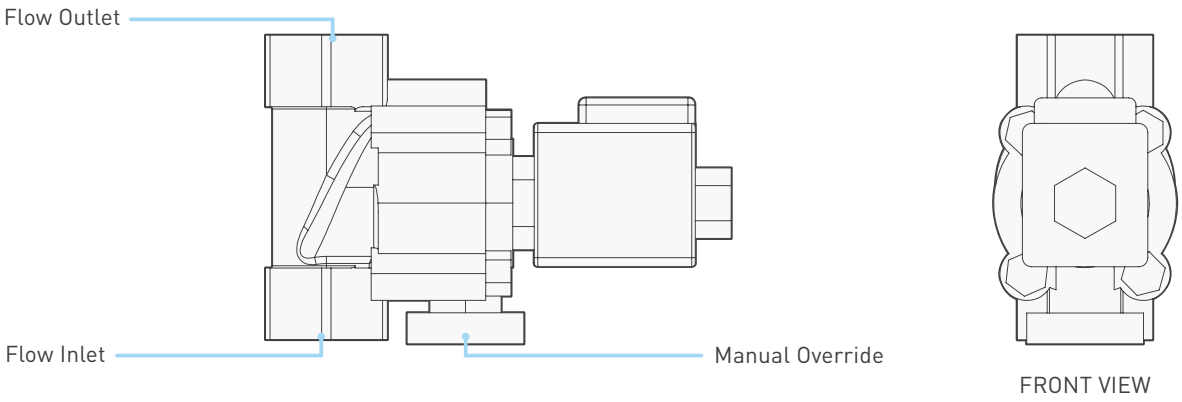
The manual override is operated by a small bypass screw located adjacent to the solenoid valve cable connection.

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



Coolant Shutoff Valve (Continued)

» Dunming Valve



FRONT VIEW

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 manual knob.

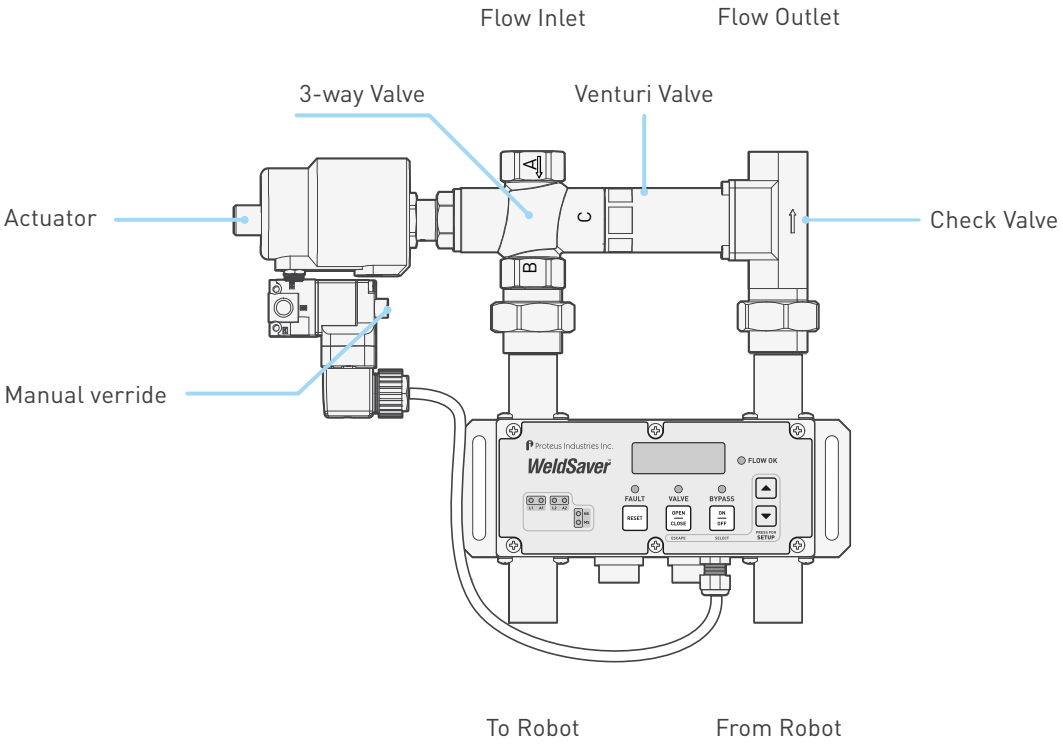
- Normally open valve type: the manual knob is set at the open position. When power is off, to close the Dunming valve, rotate the manual knob to the closed position.
- Normally closed valve type: the manual knob is set at the closed position. When power is off, to open the Dunming valve, rotate the manual knob to the open position.

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

BYPASS **Knob**

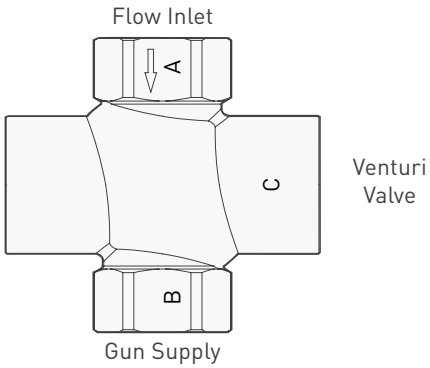
- To engage the bypass, depress the knob and turn 90° clockwise to the BYPASS ON position.
- To disengage the bypass and restore normal operation, depress the knob and turn it 90° counterclockwise to the BYPASS OFF position.

eVac™ Coolant Retraction Module



The eVac coolant retraction module is composed of a 3-way valve, a venturi valve and a check valve.

- During normal operation, the WeldSaver controls the eVac module to close flow direction from A to C and open flow direction from A to B.
- At the event of a cap loss or cap change, the WeldSaver controls the eVac module to close flow direction from A to B and open flow direction from A to C. Thanks to the principle of differential pressure, coolant on welding caps will be withdrawn through the venturi valve and back into your water return system.



The actuator of the 3-way valve features a manual override function that allows coolant to flow through one direction from A to B or A to C regardless of whether power is on or off. Enable this function by rotating a small bypass knob located adjacent to the valve cable connection.

CAUTION!

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 6 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.

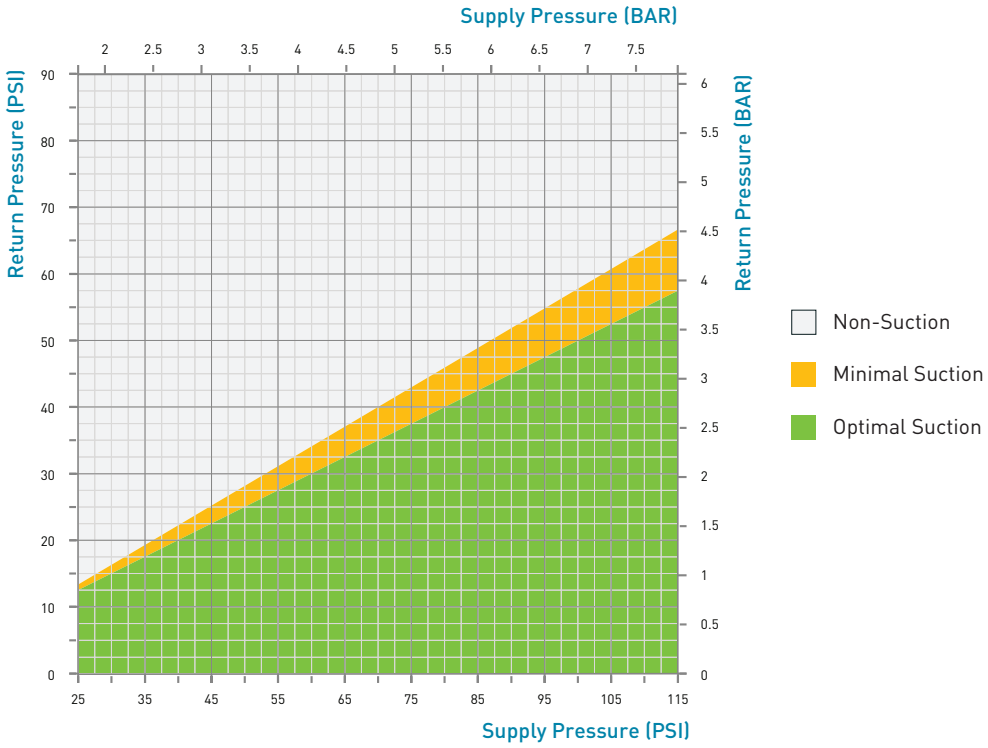
» Basic System Requirements

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.

Operating Pressure Requirements



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	W6-DE150T	W6-DE113T
Flow Range*	6.0 – 50 LPM	1.5 – 13 GPM
Connections	G 3/4 (BSPP)	3/4" MNPT
Valve / Module	ESG • Dunming • eVac coolant retraction	
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 For eVac models: 137.9 – 413.7 kPa / 20 – 60 psig	
Compressed Air Pressure	300 – 800 kPa / 43.5-116 psig	
Drawback Response	n/a	
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	
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.

Performance Characteristics (Continued)

» Shutoff Valve

Manufacturer / Series	ESG 100 Series	ESG 200 Series	Burkert Type 5282	Dunming ZC51-20BS-0.8
Valve Type	Pneumatic angle seat valve	Pneumatic shuttle valve	Electric solenoid valve	Electric solenoid valve
Valve Configuration	Normally closed (N.C.)	Normally closed (N.C.)	Normally closed (N.C.)	Normally closed (N.C.)
Pneu. Inlet Connection Size	1/8" NPT	1/8" NPT	n/a	n/a
Pneu. Control Medium	Compressed air	Compressed air	n/a	n/a
Pneu. Control Medium Temp.	0–50 °C / 32–122 °F	0–50 °C / 32–122 °F	n/a	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	n/a

» 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

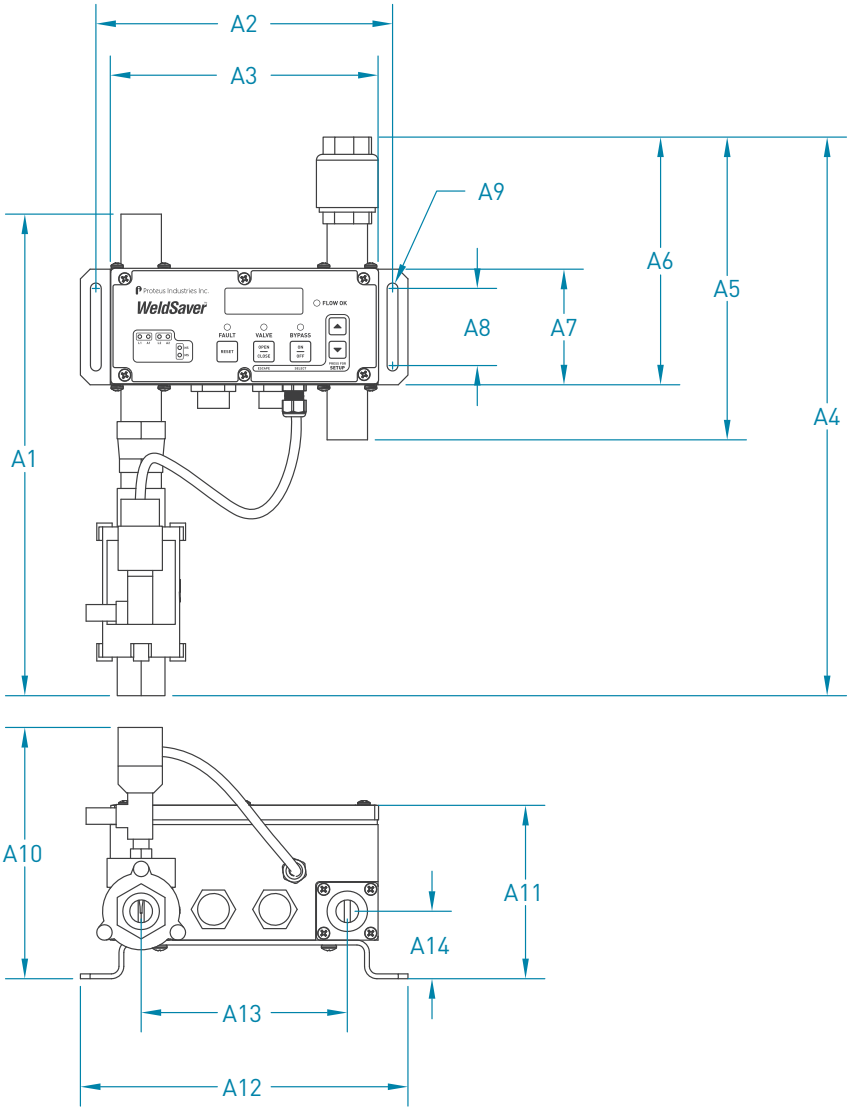
Wetted Materials

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 inches) 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.

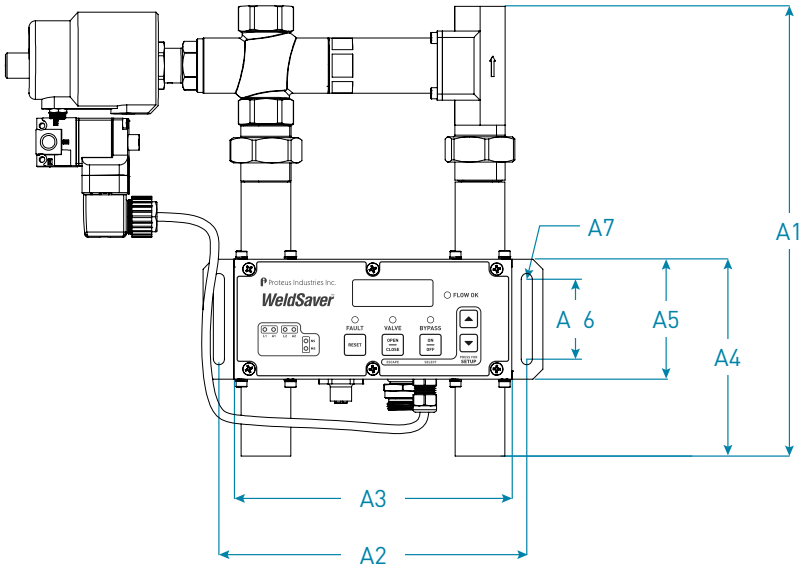
With optional electric solenoid valve

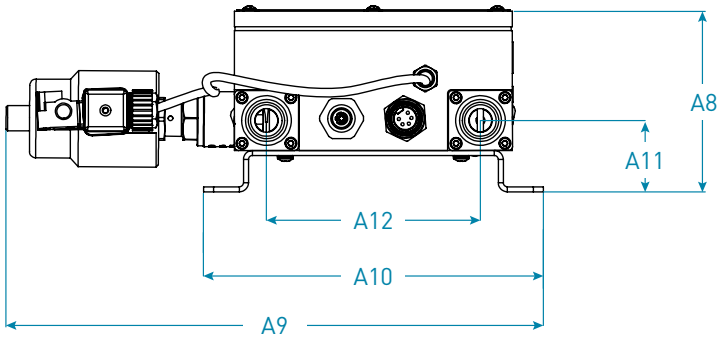


Unit	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14
inch	12.5	7.7	7.0	14.5	7.9	6.4	3.0	2x2.0	4xR0.14	6.5	4.5	8.5	5.4	1.75
mm	317.5	195.6	177.8	368.3	200.7	162.6	76.2	2x50.8	4xR3.6	165.1	114.3	215.9	137.2	44.5

Dimensions (Continued)

With optional eVac module





Unit	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
inch	11.2	7.7	7.0	4.9	3.0	2x2.0	4xR0.14	4.5	13.5	8.5	1.75	5.4
mm	284.5	195.6	177.8	124.5	76.2	2x50.8	4xR3.6	114.3	342.9	215.9	44.5	137.2

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 9–12 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.

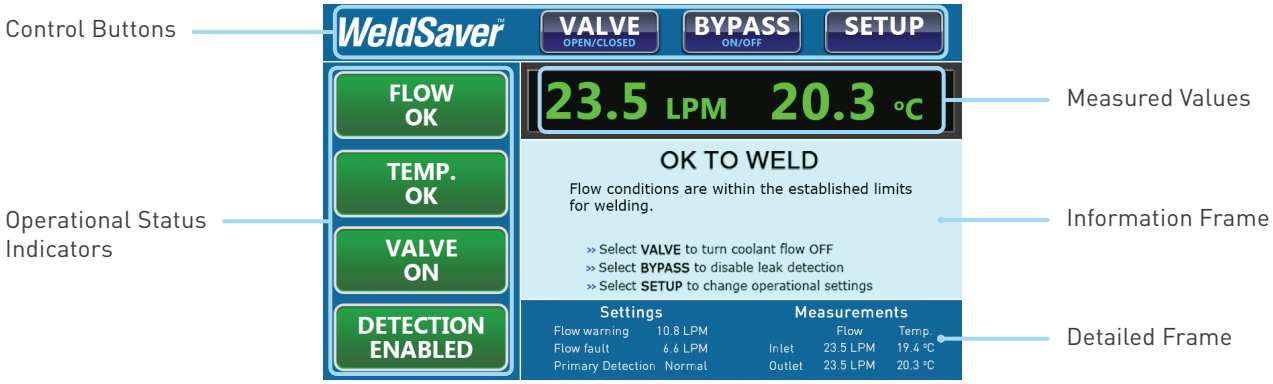
CAUTION!

The coolant shutoff valve 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 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

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 main sensor (outlet/inlet) and/or differential temperature is above the warning limit.

High Temperature Fault

The main sensor (outlet/inlet) and/or 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
- M5×12 screws for mounting bracket

Physical Installation

Refer to the diagram on page 17 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 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.

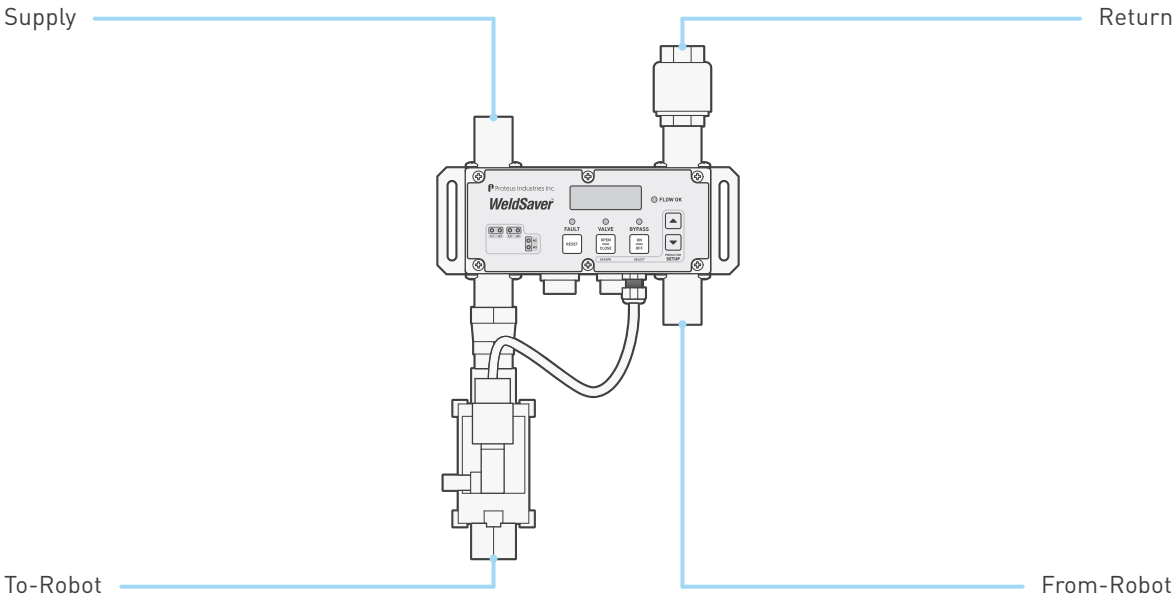
1. Flush the cooling system.

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 9–12 for more information.)
8. Turn water ON slowly.

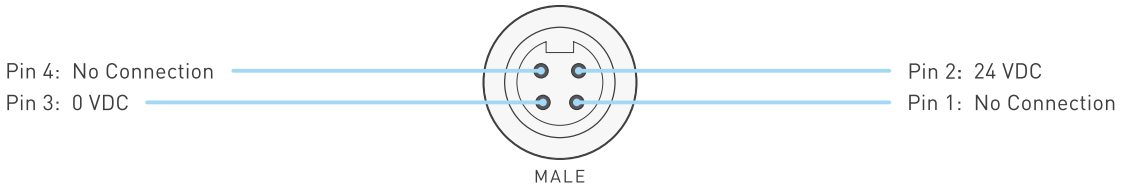
WARNING!	
	**The WeldSaver body is NOT insulated.** **When using hot liquids, touching the surface could result in burns. Use personal protective equipment.**

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.**

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 3.

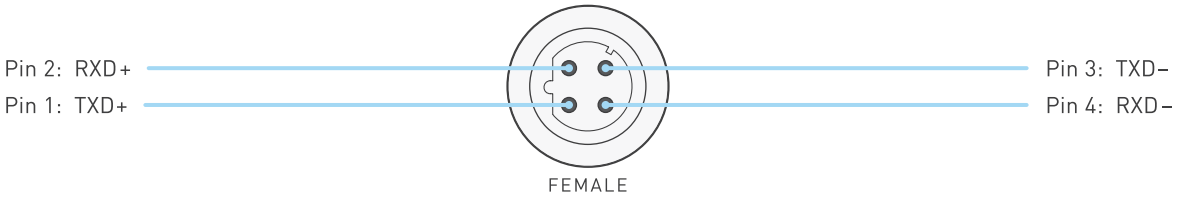
CAUTION!
Connect the power cable to the 24 VDC power source BEFORE connecting it to the WeldSaver.

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

Network Connections

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

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



2. Connect the RJ-45 end of 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 6 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 45 of this document for complete Common Industrial Protocol (CIP™) information for WeldSaver 6 products.

NOTE

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).

Proteus WeldSaver products assume that this recommendation is followed.

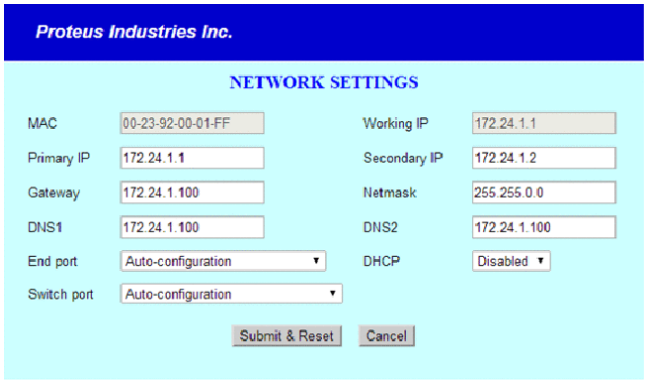
Configuring Network Settings

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 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 page 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.

Temperature Display and Keypad Lock Settings

The Display and Keypad Settings page provides configuration options for the display of temperature information (in supported devices) and the keypad lock feature.

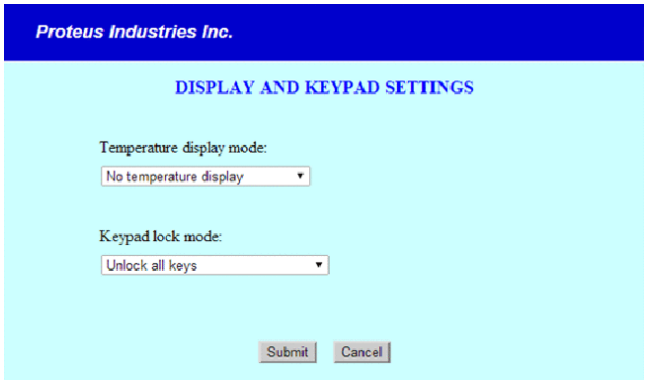
SETTING	SELECTABLE VALUES
Temperature Display Mode	No temperature display
	Display outlet temperature
	Display differential temperature
	Display heat load
Keypad Lock Mode	Unlock all keys
	Lock setup keys (UP and DOWN)
	Lock all keys

NOTE

The Temperature Display Mode setting is only available for WeldSaver models with optional temperature measurement capability.

This setting can also be configured through the keypad setup menu. (See page 36.)

1. Enter http://<ip address>/setup_display.cgi in the browser's address bar.
   - » The Display and Keypad Settings page will display in the browser window.



2. Adjust the Temperature Display Mode and/or Keypad Lock Mode settings as desired.
3. Select the **Submit** button to save the new settings. To exit the Display and Keypad Settings page without saving any changes, select the **Cancel** button.
   - » They Display and Keypad Settings page will close and the WeldSaver will return to normal operation.

Electronic Data Sheet (EDS)

The WeldSaver 6 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.

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 **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.

eVac 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 6 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 6 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

Browser Interface Setup Menu

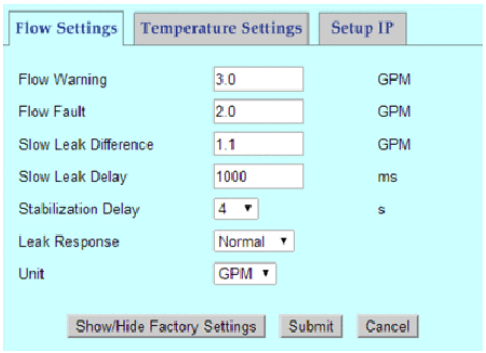
The WeldSaver provides a setup menu that is accessible through the browser interface by selecting the SETUP button on the home screen. Depending on the specific configuration of your WeldSaver device, the menu may consist of 1 to 3 pages (described below), which can be accessed by selecting the corresponding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

The Flow Settings page contains the control parameter settings that determine the behavior of the device in response to flow conditions. (Refer to page 32 of this document for descriptions of each parameter.)

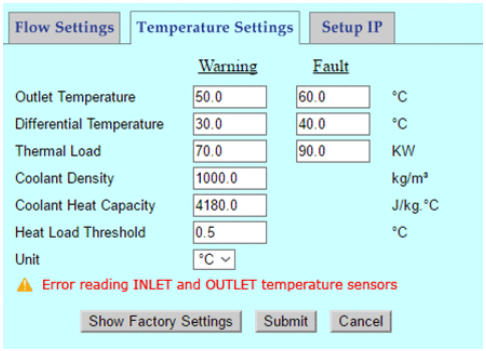


Available buttons:

- **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

The Temperature Settings page contains the parameter settings that determine the behavior of the device in response to temperature conditions. (Refer to page 33 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)

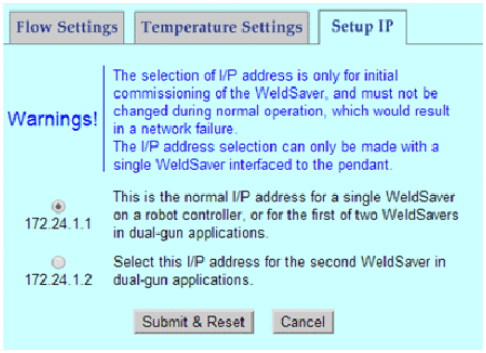
» Setup IP

The Setup IP page provides the capability to toggle between the Primary and Secondary IP addresses specified on the Network Settings page. (Refer to page 27 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.

Adjusting Parameter Values Using the Browser Interface

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.

Adjusting Parameter Values Using the Browser Interface (Continued)

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.

Keypad Setup Menu

The WeldSaver keypad provides access to a setup mode in which the operator can view and adjust the currently stored flow and temperature settings.

» Key Functions for Setup Mode

KEY	FUNCTION	KEY	FUNCTION
▲	**UP ARROW** › Enters setup mode and opens Flow Settings menu › Navigates upward in parameter menu › Increases value of selected parameter	ON / OFF	**SELECT** (BYPASS) › Displays current stored value of selected parameter › Saves new parameter value after adjustment › Opens Leak Detection settings sub-menu
▼	**DOWN ARROW** › Enters setup mode and opens Temperature Settings menu* › Navigates downward in parameter menu › Increases value of selected parameter	OPEN / CLOSE	**ESCAPE** (VALVE) › Exits setup mode and returns to monitoring mode without saving any changes

*For models without temperature measurement capability, pressing either arrow key will open the Flow Settings menu.

NOTE

When using the UP ARROW or DOWN ARROW keys to navigate the parameter menu or adjust a parameter value, pressing and holding either key for >1 second will initiate continuous scrolling in the corresponding direction.

Keypad Setup Menu (Continued)

» Flow Settings Menu

Refer to page 32 for descriptions of each parameter.

PARAMETER			SELECTABLE VALUES		
SYMBOL	DESCRIPTION		DISPLAY	LPM	GPM
FLO	Flow Warning Limit		[value]	0.0 - 80 LPM (in 0.8 incr.)	0.0 - 20.0 (in 0.2 incr.)
-FLO	Flow Fault Limit		[value]	0.0 - 80 LPM (in 0.8 incr.)	0.0 - 20.0 (in 0.2 incr.)
rSP	Primary Leak Detection		HI	Fastest response	
			FAS	Faster response	
			nor	Normal response	
			SLO	Slower response	
			LO	Slowest response	
StA	Stabilization Delay		8	8 seconds	
			6	6 seconds	
			4	4 seconds	
			2	2 seconds	
			1	1 second	
LEA	Secondary Leak Detection Sub-Menu				
	dIF	Secondary Leak Difference	[value]	0.0 - 80.0 (in 0.8 incr.)	0.0 - 20.0 (in 0.2 incr.)
	dLY	Secondary Leak Delay	[value]	0 - 10 sec (in 0.2 incr.)	
rSt	Reset to Factory Defaults		no	Cancel	
			YES	Restore all values to factory defaults	

» Temperature Settings Menu

Refer to page 33 for descriptions of each parameter.

PARAMETER		SELECTABLE VALUES		
SYMBOL	DESCRIPTION	DISPLAY	°C	°F
tP	Outlet Temperature Warning Limit	[value]	0 - 100 °C (in 1.0 incr.)	0 - 212 °F (in 2.0 incr.)
-tP	Outlet Temperature Fault Limit	[value]	0 - 100 °C (in 1.0 incr.)	0 - 212 °F (in 2.0 incr.)
dt	Differential Temperature Warning Limit	[value]	0 - 100 °C (in 1.0 incr.)	0 - 212 °F (in 2.0 incr.)
-dt	Differential Temperature Fault Limit	[value]	0 - 100 °C (in 1.0 incr.)	0 - 212 °F (in 2.0 incr.)
dSP	Temperature Display Mode	OFF	No temperature display	
		tP	Outlet temperature	
		dt	Differential temperature	
rSt	Reset to Factory Defaults	no	Cancel	
		YES	Restore all values to factory defaults	

Adjusting Parameter Values Using the Keypad Display

1. Enter setup mode by pressing either of the arrow keys.
   - » Pressing the UP ARROW key will open the Flow Settings menu. The Flow Warning parameter symbol (FLO) will appear on the display.
   - » Pressing the DOWN ARROW key will open the Temperature Settings menu. The Outlet Temperature Warning parameter symbol (tP)will appear on the display. (For models without temperature measurement capability, pressing either arrow key will open the Flow Settings menu.)

NOTE	
	**While in setup mode, any delay of more than 30 seconds between keystrokes will cause the WeldSaver to automatically exit setup mode without saving any changes.**

2. Select the parameter that you wish to adjust by pressing the UP ARROW key or DOWN ARROW key to move up or down the parameter menu until the symbol for the desired parameter is displayed.
   - » The parameter symbols are shown on page 37 of this document.
   - » Pressing and holding either arrow key for >1 second will initiate continuous scrolling in that direction.
3. Press the SELECT (BYPASS) key to enter edit mode for the displayed parameter.
   - » The current value of the selected parameter will be displayed.
4. Press the UP ARROW key or DOWN ARROW key to increase or decrease the value of the selected parameter.
   - » The selectable values for each parameter are provided on page 37 of this document.
   - » Pressing and holding either arrow key for >1 second will initiate continuous scrolling in that direction.
5. Press the SELECT key to save the new parameter value and exit setup mode. To exit setup mode WITHOUT saving any changes, press the ESCAPE (VALVE) key.
   - » After either key is pressed, a scrolling dash will appear on the display, and the WeldSaver will return to monitoring mode.

NOTE	
	**Upon exiting setup mode, the WeldSaver will remember the last parameter that was selected prior to exit. If setup mode is entered again within 10 minutes, it will open to the last-selected parameter. After 10 minutes, setup mode will open to the first parameter at the top of the menu.**

6. If you wish to adjust the value of any other parameter, press the UP ARROW key or DOWN ARROW key to return to setup mode, and repeat steps 1–5 above for each additional parameter.

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 OFFF"
	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 9–12). » 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]
Locked Key The key that has just been pressed is locked. » Keypad lock mode is engaged Check Display and Keypad settings (see page 29) and adjust if necessary. » The key function has been disabled by the weld controller and cannot be operated via the keypad or browser interface 1. View the browser interface to confirm whether a small lock icon appears in the lower right-hand corner of any status indicator(s). 2. Consult with your welding system administrator.	**Keypad**	
	Display	Lct
	Browser Interface	
	One or more status indicators	A lock icon may appear in lower right-hand corner

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.

1. Select the **SETUP** button to access the setup menu.
2. Enter a lower Secondary Leak Detection parameter value 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 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 9–12).

» 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.

The WeldSaver does not respond when the keypad keys are pressed

» Keypad lock mode is engaged

1. Access the Display and Keypad Settings page using browser interface. (See page 29.)
2. Adjust the Keypad Lock Mode setting as necessary.
3. Save the new value and return to normal operation.

» One or more functions has been disabled by the weld controller and cannot be operated via the keypad or browser interface

1. View the browser interface to confirm whether a small lock icon appears in the lower right-hand corner of any status indicator(s).
2. Consult with your welding system administrator.

» The keypad has failed and must be replaced

Contact WeldSaver Technical Support for assistance.

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.

A ETHERNET/IP DEVICE PROFILE

General EtherNet/IP Information

» Supported Services

SERVICE CODE	SERVICE NAME
01 (0×01)	Get_Attribute_All
05 (0×05)	Reset
14 (0×0E)	Get_Attribute_Single
16 (0×10)	Set_Attribute_Single
84 (0×54)	Forward_Open
78 (0×4E)	Forward_Close

» Object Classes

CLASS CODE	OBJECT NAME
01 (0×01)	Identity
04 (0×04)	Assembly
245 (0×F5)	TCP/IP Interface
246 (0×F6)	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 0×01

» 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

Identity Object, Class 0×01 (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	WS6-EIP	Product name

» Common Services

CODE	SERVICE NAME	CLASS	INSTANCE
14 (0×0E)	Get_Attribute_Single	Yes	Yes
01 (0×01)	Get_Attribute_All	No	Yes
05 (0×05)	Reset	No	Yes

Assembly Object, Class 0×04

» 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 47
		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.

Assembly Object, Class 0×04 (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 48

» Common Services

CODE	SERVICE NAME	CLASS	INSTANCE
14 (0×0E)	Get_Attribute_Single	Yes	Yes
16 (0×10)	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.

Assembly Object, Class 0×04 (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 0×F5

» 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	0×04	Refer to Configuration Capability table on page 49
3	Get / Set	Configuration Control	DWORD	0×00 or 0×02	Refer to Configuration Control table on page 49
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	0×20 (Log. Seg. Class) 0×F6 (Class number) 0×24 (Log. Seg. Instance) 0×01 (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	WeldSaver6-EIP	Host name string
13	Get / Set	Encapsulation Inactivity Timeout	UINT	0	Number of seconds of inactivity before TCP connection is closed

TCP/IP Interface Object, Class 0×F5 (Continued)

» Common Services

CODE	SERVICE NAME	CLASS	INSTANCE
14 (0×0E)	Get_Attribute_Single	Yes	Yes
01 (0×01)	Get_Attribute_All	No	Yes
16 (0×10)	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

Ethernet Link Object, Class 0×F6

» 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 51
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 52
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 52
		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

Ethernet Link Object, Class 0×F6 (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 52
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 52
		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 (0×0E)	Yes	Yes	Get_Attribute_Single
01 (0×01)	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

Ethernet Link Object, Class 0×F6 (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

WS6EVTRM UNCONTROLLED DOCUMENT 05/2024