Original Instructions
BU-4001363 - REV. 01

EMERSON

Polaris Integrated Welder

Instruction Manual

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PRC, 201613
86-021-3781-0588

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Manual Change Information

At Branson, we strive to maintain our position as the leader in ultrasonics plastics joining, metal welding, cleaning and related technologies by continually improving our products. These improvements are incorporated as soon as they are developed and thoroughly tested.

Information concerning any improvements will be added to the appropriate technical documentation at its next revision. Therefore, when requesting service assistance for specific units, note the revision information found on this document.

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Chapter 1: Safety

1.1 Safety Requirements and Warnings

This chapter contains an explanation of the different safety notice symbols and icons found both in this manual and on the product itself and provides additional safety information for ultrasonic welding. This chapter also describes how to contact Branson for assistance.

1.1.1 Symbols Found on the Manual

These symbols used throughout this manual warrant special attention:

WARNING	Indicates a possible danger
	If these risks are not avoided, death or severe injury might result.

CAUTION	**Indicates a possible danger**
	If these risks are not avoided, slight or minor injury might result.

NOTICE	**Indicates a possible damaging situation**
	If this situation is not avoided, the system or something in its vicinity might be damaged. Application types and other important or useful information are emphasized.

1.1.2 Symbols Found on the Polaris IW System

Familiar graphic warning symbol is used to alert the user to items of concern or hazard. The following warning symbol appears on the Polaris IW System.

NOTICE	
	Only Branson service personnel or Branson trained representatives are allowed to open, maintain and service the system. Unauthorized tampering with, modifying, or opening the unit will void the warranty.

Figure 1.1 Labels on the back of the system

Table 1.1 Labels on the back of the system

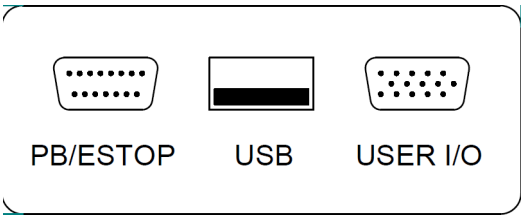
Label	Description
	**High Voltage Hazard** Hazardous voltage inside will cause death of severe injury. De-energize system before removing covers. Authorized personnel only.
	**Caution** Improper connection can cause a short and damage the unit.
	**Connectors** Connectors Label.
	**Caution** Label on the Polaris IW System for the factory air supply.

Table 1.2 Labels on the Left Cover

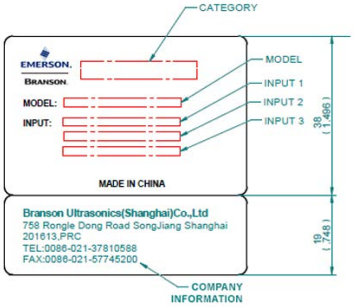
Labels on the Actuator	Label	Description
		**System Information Label** See Table 1.3 System Information Label for more information.
		**QR Code** Scan the code to find the manual in the website.
		**Disposal Label** System should not be disposed of in normal municipal waste.
		**CE Label** System is Compliant with Certification.
		**TÜV Rheinland** System has passed TÜV test.

Table 1.3 System Information Label

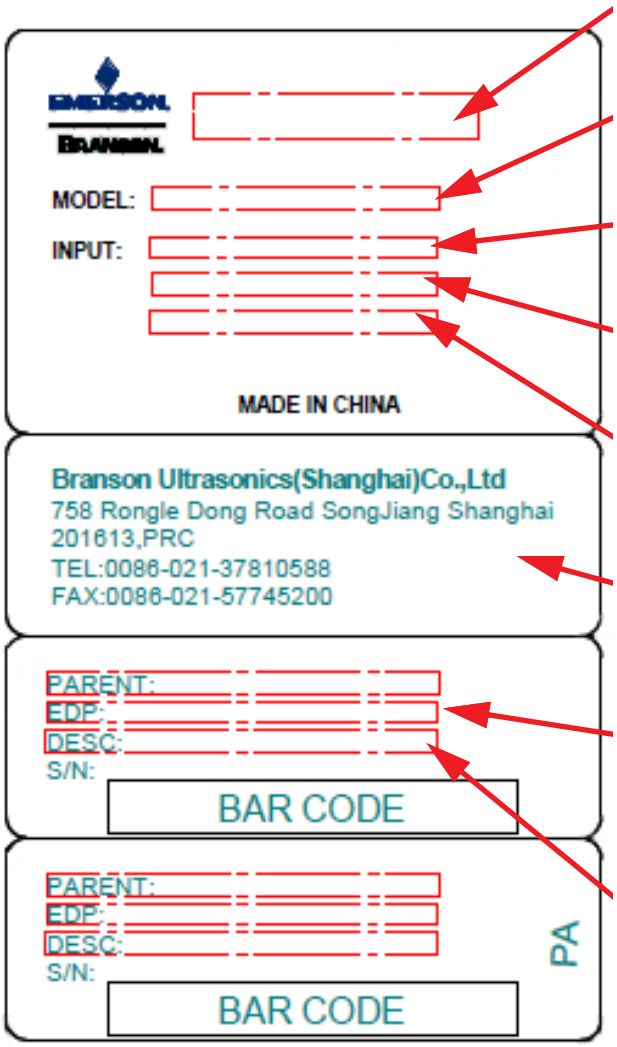
Label	Item	Description
	CATEGORY	Ultrasonic Welder
	MODEL	IW – BT/AM – 20:1.25/2.5/4.0
	INPUT 1	CYL 80 MM/63 MM
	INPUT 2	STROKE: 100MM
	INPUT 3	WEIGHT
	Company Information	Information of Branson
	EDP	Part Number of the Unit
	DESC	Description of the unit

Table 1.4 Labels on the front of the actuator

Label on Actuator	Label	Description
		**Caution** • High Voltage Hazard • Loud Noise Hazard • Burn Hazard
		Disconnect power before servicing.
		Ear and eye protection must be worn.
		Do not touch the tooling.

Figure 1.2 Labels on the base

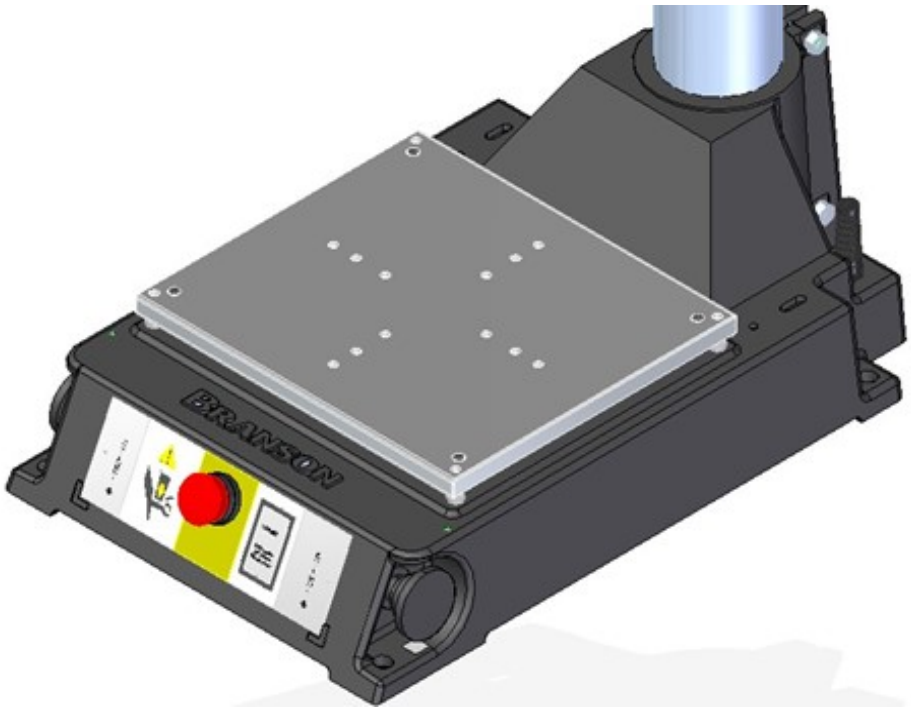
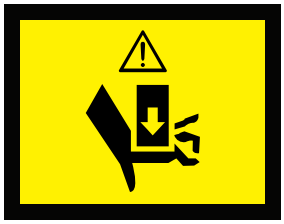


Table 1.5 Labels on the base

Label	Description
	**Crush Hazard** Moving parts present. Can result in serious injury to hands or fingers. Keep hands away from moving horn.
	**Emergency Stop Button** In case of emergency, push button to stop cycle.
	**Burn Hazard** Do not touch the tooling.

1.2 General Precautions

Ensure that the IW system installation is performed by qualified personnel and in accordance with local standards and regulation.

WARNING	
	**IW system produces high voltage. Before working on the system assembly, do the following:** • Turn off the power switch. • Unplug main power. • Allow at least 5 minutes for capacitors to discharge.

WARNING	
	To prevent the possibility of an electrical shock, always plug the system into a grounded power source.

WARNING	
	High voltage is present in the system. Do not operate with covers removed.

WARNING	
	High line voltages exist in the ultrasonic Polaris IW system assembly. Common points are tied to circuit reference, not chassis ground. Therefore, use only non-grounded, battery-powered multimeters when testing the Polaris IW system assembly. Using other types of test equipment can present a shock hazard.

CAUTION	
	Keep hands from under the horn. Down force (pressure) and ultrasonic vibrations can cause injury.

CAUTION	
	Do not cycle the welding system if either the RF cable or converter is disconnected.

CAUTION	
	Do not cycle the welding system without front cover in place.

CAUTION	
	When using larger horns, avoid situations where fingers could be pinched between the horn and the fixture.

CAUTION	
	Sound level and frequency of the noise emitted during the ultrasonic assembly process may depend upon a. type of application, b. size, shape and composition of the material being assembled, c. shape and material of the holding fixture, d. welder setup parameters and e. tool design. Some parts vibrate at an audible frequency during the process. Some or all of these factors may result in an uncomfortable noise being emitted during the process. In such cases operators may need to be provided with personal protective equipment. See 29 CFR (Code of Federal Regulations) 1910.95 Occupational Noise Exposure.

1.2.1 Emissions

Because of the various types of toxic or injurious gases that may be liberated during the welding based on the material being processed, sufficient ventilation should be provided to prevent a concentration of these gases in excess of 0.1 ppm. Check with your materials suppliers for recommended protection when processing their materials.

CAUTION	
	Processing of many materials, such as PVC, can be hazardous to an operator's health and could cause corrosion/damage to the equipment. Use proper ventilation and take protective measures.

1.2.2 Intended Use of the System

The Polaris IW components are designed to be used as part of an ultrasonic welding system. These are designed for a wide variety of welding or processing applications.

If the equipment is used in a manner not specified by Branson, the protection provided by the equipment may be impaired.

Branson Ultrasonics Corporation designs and manufactures machines giving the priority to safety precautions, to allow customers to use the machines safely and effectively. Only trained personnel should operate or service the equipment. Untrained operators can misuse the equipment or ignore safety instructions that can result in personal injury or equipment damage. It is essential that all operators and service personnel pay attention to safety instructions when operating and servicing the equipment.

1.2.3 Setting up the Workplace

Measures for setting up a workplace for safe operation of the ultrasonic welder are outlined in Chapter 4: Installation and Setup.

1.2.4 Regulatory Compliance

This product meets electrical safety requirements and EMC (Electromagnetic Compliance) requirements for North America and the European Union.

1.3 Compliance

1.3.1 REACH Certification

Figure 1.3 REACH Certification

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August 22, 2025

Subject: EU REACH Regulation (EC) No 1907/2006.

Dear Customer,

Emerson considers the environmental aspects of how we design, engineer and manufacture products, ensuring that materials and processes are safe and adhere to industry standards and government regulations.

In June 2007, the European Union Regulation (EC) 1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals ("REACH") entered into force. The Regulation establishes specific duties and obligations on companies that manufacture or import substances on their own, in mixtures or in articles in the European Economic Area (EEA).

BRANSON ULTRASONICS (a business unit of Emerson Electric Co.), is committed to complying with all applicable REACH obligations. Under REACH Article 33, Emerson as a manufacturer has a responsibility to communicate to its Customers sufficient information on Substances of Very High Concern ("SVHC") on the Candidate List for Authorization contained in Emerson products in concentrations above 0.1 % w/w. In line with this obligation we herewith inform you on presence of the following SVHC in Emerson products.

1. **List of products and substances.**

   The following listed products contain SVHC on the Candidate List of Substances of Very High Concern for Authorization in a concentration above 0.1% weight by weight.

   Below listed substances are on the most recent version of the Candidate List updated on **June 2025** available at the European Chemical Agency website: https://echa.europa.eu/candidate-list-table.

Product Series	Product Description
Polaris IW	POLARIS IW 80D 1.25kW
	POLARIS IW 80D 2.5kW
	POLARIS IW 80D 4kW
	POLARIS IW 63D 1.25kW
	POLARIS IW 63D 2.5kW
	POLARIS IW 63D 4kW
	POLARIS IW 80D 1.25KW HUB
	POLARIS IW 80D 2.5KW HUB

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	POLARIS IW 80D 4KW HUB POLARIS IW 63D 1.25KW HUB POLARIS IW 63D 2.5KW HUB POLARIS IW 63D 4KW HUB

SVHC	CAS No.
Lead	7439-92-1
Bis(2-ethylhexyl)tetrabromophthalate	26040-51-7
Melamine	108-78-1

Article (product) safe handling information:	Please follow applicable general product handling requirements. In course of use of the product including (re)packaging, industrial and professional processing or assembling, installation, maintenance, industrial or consumer end use, recycling, disposal, including use or recycling or disposal in combination or in conjunction with other articles or substances, consider SVHC safe handling information and requirements.	
SVHC safe handling information:	Fire-Fighting Measures:	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide (CO2).
	Storage:	Store in cool, dry, well-ventilated space away from incompatible materials. Keep away from sources of ignition. Do not store together with foodstuffs.
	Disposal:	Follow product instruction manual and applicable local laws and regulations governing disposal of concerned type of product and substances.

2. **Your responsibility if you resell Emerson products.**

The aim of Article 33 is to ensure that sufficient information is communicated down the supply chain to allow the safe use of articles by end-users including consumers. The information flow along the supply chain should enable all buyers and sellers to take, at their stage of the use of the article, the appropriate risk management measures to guarantee the safe use of articles containing Candidate List substances by end users or consumers.

If you purchase Emerson products to resell further down in the supply chain please note your duty to inform your customers, end users and consumers. You may have a more precise understanding of where and how the Products are used by end users or consumers, so you

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should identify and communicate any additional information available to you and relevant for the activities your customers carry out.

Please note that a distributor (reseller) supplying products to private consumers has a communication obligation to respond to consumer requests, which is not discharged by simply referring the consumer to your supplier, or the producer/importer of the articles.

Therefore, if you encounter requests from consumers please work with them to at least identify the nature of request and coordinate your response with us.

We will continue to monitor the Candidate List and provide all required information in accordance with Article 33 of the REACH Regulation.

We remain at your disposal if you have any further questions or comments. Please do not hesitate to contact us at Product.Compliance@Emerson.com at any time.

Yours Faithfully,

Francisco Mora

Francisco Mora
Compliance Engineer
Branson Ultrasonics - Mexico

1.3.2 RoHS Certification

Figure 1.4 RoHS Certification

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June 23, 2025

European Directive 2011/65/EU, amended with Directive (EU) 2015/863, Restriction on the use of certain Hazardous Substances in Electrical and Electronic Equipment

Dear Customer,

On the basis of information we received from our suppliers as to the maximum concentration values in respect of their products, we are pleased to inform you that the following product meets the substance requirements laid down in the RoHS Directive as of today:

Product Series	*Product Description*	*Eu RoHS Exemptions*
Polaris IW	POLARIS IW 80D 1.25kW POLARIS IW 80D 2.5kW POLARIS IW 80D 4kW POLARIS IW 63D 1.25kW POLARIS IW 63D 2.5kW POLARIS IW 63D 4kW POLARIS IW 80D 1.25KW HUB POLARIS IW 80D 2.5KW HUB POLARIS IW 80D 4KW HUB POLARIS IW 63D 1.25KW HUB POLARIS IW 63D 2.5KW HUB POLARIS IW 63D 4KW HUB	6(b), 6(c), 7(a), 7(c)-I, 7(c)-II

Branson Ultrasonics hereby certifies to the best of its knowledge that the products listed herein are compliant with EU RoHS as amended by the Delegated Directive.

Should you have any questions in this regard, please contact your usual contact in Branson Ultrasonics or email: Product.Compliance@Emerson.com.

Yours Faithfully,

Francisco Mora

Francisco Mora
Compliance Engineer
Branson Ultrasonics - Mexico

1.3.3 Declaration of Conformity

Figure 1.5 Declaration of Conformity

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DECLARATION OF CONFORMITY

We, the manufacturer:
Branson Ultrasonics (Shanghai) Co., Ltd.
2nd Floor, Building No. 5,
No. 758 East Rong Le Road,
Songjiang Industrial District, 201613 Shanghai,
P.R. China

declare under our sole responsibility, that the **Ultrasonic Welding System**, models:
IW-BT 20:1.25ϕ80, IW-BT 20:1.25ϕ63, IW-BT 20:2.5ϕ80, IW-BT 20:2.5ϕ63, IW-BT 20:4.0ϕ80, IW-BT 20:4.0ϕ63.

is in conformity with the following European Directives:
2006/42/EC; 2014/30/EU; 2011/65/EU

The safety objectives set out in the Low Voltage Directive 2014/35/EU were kept in accordance Annex 1 No. 1.5.1 of the Machinery Directive 2006/42/EC.

Applied standards:
EN ISO 12100:2010, EN 60204-1:2018, EN ISO 13849-1:2015, EN ISO 13849-2:2012, EN 55011:2016 / A1:2017/ A2:2021 / A11:2020, EN IEC 61326-1:2021, EN 61326-3-1:2017, EN 61010-1:2010+A1:2019.

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Shanghai, China
28.8.2025

Emily Liu
Engineering Director

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Chapter 2: Introduction

The Polaris IW system provides motion, force, power and cooling air to the ultrasonic stack assembly.

2.1 Models Covered

This manual covers the Branson Polaris IW system. The Polaris IW system may be found in the following configurations:

- An Actuator on a Column Support, Column and Ergonomic Base, also called a Stand on Base (as seen Figure 2.1).
- An Actuator on a Column Support, Column and Mounting Hub, sometimes called a Stand on Hub (as seen Figure 2.2).

This manual covers these configurations:

Figure 2.1 View of the Polaris System with Base

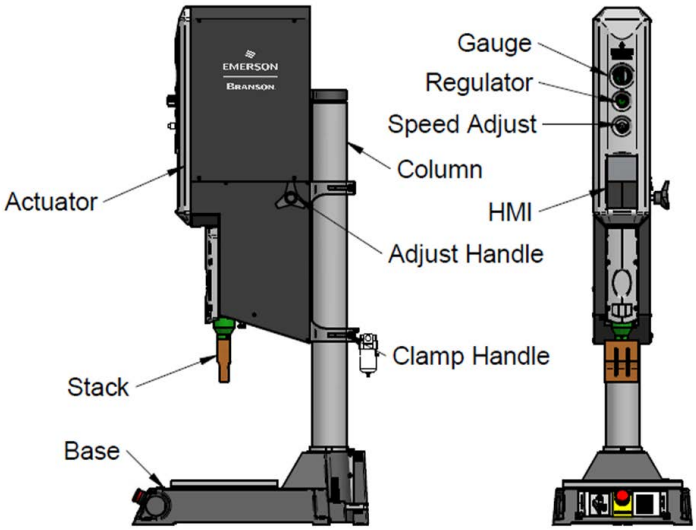
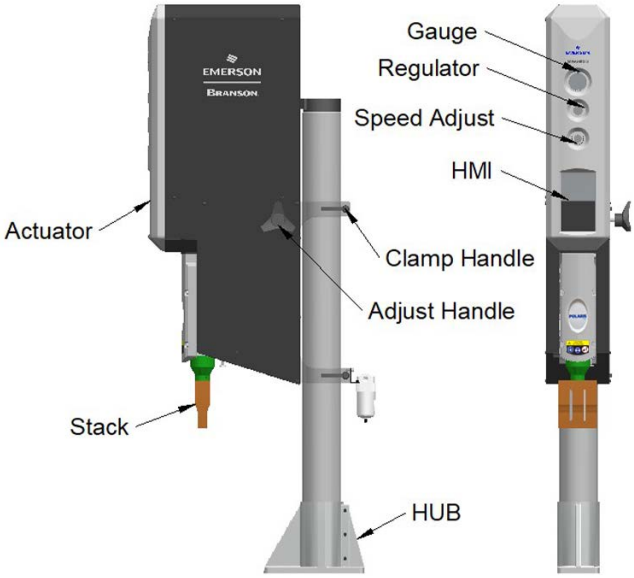


Figure 2.2 View of the Polaris System with Hub



2.2 Overview of this Model

The Polaris IW system is a compact, rigid unit designed for use in manual, semi-automated, and automated ultrasonic welding systems. The system can be mounted on a column and base with start switches and used in a manual or benchtop system. The system is designed to be operated in an upright position.

The Polaris IW is integrated with a power supply, there is no need for an extra power supply.

The Polaris IW system is designed with full, built-in pneumatic controls, and mechanical controls.

The Carriage and Slide System

The Polaris IW Actuator's carriage is driven by a double-acting air cylinder. It is mounted on a linear ball-bearing slide.

The Pneumatic System

The pneumatic system included on the Polaris model is contained within the Actuator's sheet-metal enclosure and consists of solenoid valves, an air cylinder, and a pressure regulator with an air pressure gauge. There is a gauge in the front bezel to read the regulated air pressure. The horn's rate of descent is adjusted by the Down speed control on the front bezel of the Actuator. The rate of return is fixed.

Dynamic Triggering and Follow-Through

Many welding applications require force to be built up on the part before ultrasonic energy is activated. To achieve this, the actuator contains a loadcell dynamic triggering mechanism, located between the air cylinder and the converter, which initiates (triggers) ultrasonics after a preset force is applied to the part. Dynamic follow-through maintains a consistent force on the part during the weld collapse. This system helps provide uniform weld quality.

The dynamic triggering and follow-through process operates as follows: upon activation of the operating cycle, the solenoid valve delivers regulated air to the upper portion of the cylinder, and exhausts air through the Down speed control from the bottom of the cylinder, causing the horn to advance and contact the workpiece. As the pressure increases, the cylinder compresses springs, forcing a cam to break the optical beam of the trigger switch. When the trigger switch closes a signal is sent to the Power Supply, which then starts the weld cycle. The palm buttons can be released at the end of holding time. As melting of the plastic occurs, spring reaction dynamic follow through maintains consistent force on the part, ensuring smooth, efficient transmission of ultrasonic energy into the part.

2.3 Features of the System

Listed below are many features of the Branson Polaris IW ultrasonic welding system.

- **1 Millisecond Control and Sampling Rate:** This feature provides sampling and control of the weld process 1000 times each second.
- **Auto tuning**: Ensures that the welder is running at peak efficiency.
- **Amplitude Setting:** If % is selected, the amplitude range shall be selectable between 10-100%. There shall be one amplitude setting in the recipe.
- **Limits in the different weld mode:** Plus, and minus Suspect and Reject limits can be set in the weld mode: Time, Absolute distance, and Collapse distance.
- **Horn Seek:** The horn seek function shall automatically track the operating frequency of the stack and store it in memory. The seek shall run 10% of amplitude for 500ms. If there is no overload condition during the seeking, the memory offset shall be set to the found frequency minus digital tune. If there is an overload condition during the seeking, the memory offset shall be set to zero.
- **Horn Down**:

  Clamp On: When in the horn down mode, the start switches can be released after the part is contacted while the part remains clamped in place. Press Retract Horn button to release.

  Clamp Off: The horn will retract whenever the start switches are released in the horn down mode.
- **Horn Down Display:** During Horn Down, the Absolute Distance, Force, down speed, are displayed digitally so that you can determine correct values for process limits and cutoffs.
- **Horn Down Mode:** A manual procedure used to verify system setup and alignment.
- **Horn Scan:** A scan to enhance selection of operating frequency and control parameters.
- **Pre trigger:** The user shall have the option to turn on/off the Pre-trigger feature. Pre-trigger shall start from time of setting in "Pre-trigger Delay".
- **After burst:** Option to turn on/off the After-burst feature. After burst, turn on ultrasonics during the after-bust time state to break away sticking parts from the tooling. The system shall allow the user to select After burst Delay, the time delay between the end of hold time and the start of the after burst. The system shall allow the user to select After burst Time, the duration of the after burst.
- **Process Alarm Display**:

  Protects the P/S, converter, and other components. Ensure max reliability to avoid equipment failures and downtime.

  The system shall detect phase excursion and generate an alarm if the error occurs.

  The system shall detect over voltage and generate an alarm if the error occurs. The system shall detect over current and generate an alarm if the error occurs. The system shall detect over temperature and generate an alarm if the error occurs.

  The system shall detect overpower and generate an alarm if the error occurs.

  The system shall detect frequency out of band and generate an alarm if the error occurs.
- **English (USCS)/Metric Units:** Allows the welder to be set in the local units.
- **System Information Screen:** This is a screen that will give you information about your welding system (e.g., Model, Machine name, Lifetime welds, power, software versions). Refer to this screen when contacting Branson for service and support.
- **True Power:** Power shall be displayed in %.
- **Load cell:** The load cell allows the ultrasonics to be triggered at a designated force input into the system.
- **Encoder:** Allows the HMI to monitor the distance the horn has travelled, enabling the use of distance functions
- **Weld Modes:** Time, Absolute, Collapse. The Polaris IW system offers multiple weld modes so that you can choose the mode of control that best meets your specific application need.
- **Weld Parameter Entry through Digital Keypad:** User Setup is direct and easy, by selecting the menu parameter by name and using the keypad to enter the precise value. The controls also support entry by incrementing existing values.
- **Foreign Languages:** Software supports user selectable languages; English, French, German, Italian, Spanish, Simplified Chinese, Japanese and Korean.
- **Password Protection:** This feature allows you to secure your setup from unauthorized changes. You can select your own password.
- **Down speed**: Controls the down speed of the stack.
- **Pressure Gauge:** Allows the operator to monitor the system pressure.

2.4 Controls and Indicators

- **Load Cell:** Provides an indication of the force on a part during a weld. This indication can be used to determine when to trigger ultrasonics and also to produce a force/distance graph of the operating cycle.

The front panel controls on the Polaris IW Actuator are listed below.

- **Pressure Gauge:** Indicates the amount of factory air pressure applied to the cylinder; dual graduated at 0-100 PSI and 0-700 kPa.
- **Pressure Regulator:** Adjust the amount of air pressure applied to the cylinder; range of 5-100 PSI (35-700 kPa). Pull to set; push to lock.
- **Down speed Control:** Down speed knob controls the rate of descent and force buildup on the part to be welded.
- **Carriage Door:** Provides access to the converter-booster-horn stack; secured by four captive hex screws. Use a M5 T-handle wrench to tighten the cap screws for the carriage door.
- **Mechanical Stop:** Limits the stroke length to prevent the horn from contacting the fixture when no workpiece is in place.

NOTICE	
	The mechanical stop is not intended for welding by distance.

CAUTION	
	Turning the mechanical stop too far can cause it to come apart.

2.5 Welding Systems

2.5.1 Ultrasonic Plastics Welding

Thermoplastic parts are welded ultrasonically by applying high-frequency vibrations to the parts being assembled. The vibrations, through surface and intermolecular friction, produce a sharp rise in temperature at the welding interface.

When the temperature is high enough to melt the plastic, there is a flow of material between the parts. When the vibrations stop, the material solidifies under pressure and a weld results.

2.5.2 The Plastics Welding System

The welding system consists of electric system, pneumatic system, and a converter-booster-horn stack. The system can perform a variety of ultrasonic welding operations, including inserting, staking, spot welding, swaging, debating, and continuous operations. It is designed for use in automated, semi-automated, and/or manual production systems.

2.5.3 Power Supply integrated in IW System

The Polaris IW system converts conventional 50/60 Hz line current to high frequency electrical energy. It also contains all the electronic controls This allows the operator to adjust or reprogram the welding cycle and related welding, tooling, and parts-handling systems.

The Polaris IW system also contains a DC P/S for electrical power to operate the electrical components and control circuits.

The Polaris IW system is configured with a digital UPS.

2.5.4 Converter

The converter is mounted in the actuator as part of the ultrasonic stack. The ultrasonic electrical energy from the Polaris IW system is applied to the converter (sometimes called the transducer). This transforms the high frequency electrical oscillations into mechanical vibrations at the same frequency as the electrical oscillations. The heart of the converter are piezoelectric ceramic elements. When subjected to an alternating voltage, these elements alternately expand and contract, resulting in better than 90% conversion of electrical to mechanical energy.

2.5.5 Booster

Success in ultrasonic assembly depends on the right amplitude of movement at the horn face. Amplitude is a function of horn shape, which is largely determined by the size and form of the parts to be assembled. The booster can be used as a mechanical transformer to increase or decrease the amplitude of vibrations applied to the parts through the horn.

The booster is a resonant half-wave section of aluminum or titanium. It is mounted between the converter and the horn, as part of the ultrasonic stack. It also provides a clamping point for rigid stack mounting.

Boosters are designed to resonate at the same frequency as the converter with which they are used. Boosters are usually mounted at a nodal (minimum vibration) point of axial motion. This minimizes the loss of energy and prevents vibration from being transmitted into the actuator.

2.5.6 Horn

The horn is selected or designed for a specific application. Each horn is tuned typically as a half-wave section that applies the necessary force and vibration uniformly to the parts to be assembled. It transfers ultrasonic vibrations from the converter to the workpiece. The horn is mounted to the booster as part of the ultrasonic stack.

Depending on their profile, horns are referred to as stepped, conical, exponential, bar, or catenoidal. The shape of the horn determines the amplitude at the face of the horn. Depending on the application, horns can be made from titanium alloys, aluminum, or steel. Titanium alloys are the best materials for horn fabrication due to their high level of strength and low loss. Aluminum horns are usually chrome- or nickel-plated or hard-coated to reduce wear. Steel horns are for low amplitude requiring hardness, such as ultrasonic insertion applications.

2.5.7 Loadcell Dynamic Trigger Mechanism

The Loadcell measures the force being applied to the part to trigger ultrasonics and record the welding parameters. The Dynamic Trigger Mechanism ensures that pressure is applied to the part prior to the application of ultrasonic energy. This adjustable, pressure-activated device is located between the air cylinder and the converter.

To maintain horn-to-part contact and force as the joint collapses, springs provide dynamic follow-through. As the plastic melts, the springs extends to ensure smooth transmission of ultrasonic energy into the part.

2.5.8 Encoder

The encoder measures the distance the horn has travelled. Depending on the Polaris IW system settings, it can:

- Allow for distance welding in absolute and collapse modes.
- Detect improper setup controls.
- Monitor the distance data of the weld.

2.6 Glossary

The following terminology may be encountered when using or operating a Polaris IW system.

Table 2.1 Glossary of Terms

Name	Description
After burst	Ultrasonic energy applied after the hold step. Used to break away sticking parts from the tooling.
AB Delay	Time delay between the end of the hold and the start of the after burst.
AB Time	The duration of the after burst.
Absolute Cutoff	Ends the ultrasonic portion of the cycle when the set absolute distance is reached.
Absolute Distance	The distance the horn has traveled from home (ULS deactivation).
Absolute Mode	A mode of operation in which the ultrasonic portion of the cycle is terminated when a user-specified distance from home has been reached.
Absolute Position	The position of the actuator after clearing the Upper Limit Switch.
Accept-as-is	A disposition permitted for a nonconforming item when it can be established that the item is satisfactory for its intended use without violating safety or functional requirements.
Actual	A reported value that occurred during the weld cycle. The converse is the set parameter that was requested during the setup.
Actuator	The unit that houses the converter, booster, and horn assembly in a rigid mounting allowing it to move up and down either mechanically or pneumatically to apply a predetermined pressure on the workpiece.
Administrator	The highest authority level. The Administrator has all the access of Technician plus the option to edit and view system settings. Multiple Administrator level users can be created in System Admin.
Alarm Beeper	An audible signal that sounds when a general alarm has occurred.
Alarm Log	A record of alarms that have occurred to the welder. Records time, date, alarm number, and cycle number.
Amp Control	The ability to set amplitude digitally or by an external control.
Amplitude	The peak-to-peak movement at the horn face. Always expressed as a percentage of the maximum.
Auto Scale Graph	When turned on, the graph will be auto scaled, when off allows X Scale to set scale.
Automation	Used in automation when an operator log in is not required. When in automation, weld setup and configuration menus are disabled.
Batch Setup	Controls how many parts will be welded in a batch.
Booster	A one-half wavelength long resonant metal section mounted between the converter and horn, usually having a change in cross-sectional area between the input and output surfaces. Mechanically alters the amplitude of vibration at the driving surface of the converter.
Cal Actuator	Calibrate Actuator. Menus to guide the user through actuator calibration; distance can be verified.
Cal Sensor	The menu title for accessing the calibration and verification of pressure and force.
Clamping Force	The pressure exerted by the horn on the workpiece.
Collapse Distance	The distance the horn has traveled from the trigger point of ultrasonics.

Table 2.1 Glossary of Terms

Name	Description
Collapse Mode	A mode in which the ultrasonics portion of the cycle is terminated when a user-specified distance from the trigger point has been reached.
Components Verify	Verification, before running a weld, that the system configuration's system components and the weld preset's system components match.
Control Limits	Additional parameters that determine the end of the ultrasonic portion of the cycle and the move to the hold state.
Converter	The device that converts electrical energy into mechanical vibrations at a high frequency (an ultrasonic rate). The converter is a central component of the welding system and is mounted in the actuator.
Counters	A record of the number of cycles run by category, for example, alarms, good parts, and so on.
Cycle Aborts	Settings that end the cycle immediately.
Digital Filter	A smoothing technique used to provide more meaningful data.
Digital Frequency	A specific starting frequency for a horn. Set to Default (recommended) for factory default starting frequency.
Down speed	The user-definable speed of descent (percentage of maximum speed) during the down stroke of the actuator.
Down speed Tuning	Run actuator test cycles for measuring speed and allowing fine adjustments to the speed setting.
Energy Braking	Allows the power supply time to reduce the amplitude before the sonics are shut off. Any overloads that occur will be ignored in this state. They will be handled in the hold state.
Energy Compensation	Extend the weld time up to 50% greater than the weld time setting or whenever the minimum energy is reached or shut off the weld before the expected (set) weld time if the maximum energy value is reached.
Event History	A record of changes made to the welder configuration and weld setup. Records time, date, user ID and comments made for changes. Used for audit purposes
External U/S Delay	If External Trigger Delay is enabled, weld state machine shall wait for external trigger delay input to become active in less than 30 seconds. When the time expires and input is still inactive, alarm will be recorded, and cycle aborted.
Extra Cooling	When on, allows cooling air to start when upper limit switch is triggered and remains on throughout the cycle. When off, air is applied at ultrasonics application.
F Actual	Actual Frequency. The operating frequency of the ultrasonic stack, as measured during a cycle.
F Memory	Frequency as stored in the power supply memory. The intended operating frequency value for an ultrasonic stack, stored in the memory of the power supply.
Force	Weld Force. The mechanical force applied to the part during the cycle.
Force Act	Actual Force. The measured mechanical force determined from the results of a weld cycle.
Freq Chg.	Frequency Change. (Frequency at Start versus Frequency at End).
Freq End	The frequency at the end of the ultrasonic portion of the welding cycle (when ultrasonics are terminated).
Freq Max	Maximum Frequency. Highest frequency reached during weld cycle.
Freq Min	Minimum Frequency. Lowest frequency reached during weld cycle.
Freq Start	Frequency at Start. Frequency at the time ultrasonics was turned on.

Table 2.1 Glossary of Terms

Name	Description
Frequency	The operating frequency of the ultrasonic stack. The frequency stored is measured at the end of the ultrasonic portion of the cycle (when ultrasonics are terminated).
Frequency Offset	An offset factor applied to the ultrasonic frequency stored in the power supply.
General Alarm	An alarm that occurs due to system fault and/or tripping a limit.
Hold Force	The force on the part during the hold portion of the cycle.
Hold Pressure	The pressure applied during the hold portion of the cycle. If set to Default, hold pressure equals weld pressure.
Hold Time	The duration of the hold step.
Horn Clamp	If set to ON, the horn will stay down and hold the part in place in the event of an alarm. A Supervisor can reset it and remove the part.
Horn Down	A mode in which ultrasonics are locked out and the user can advance the actuator for setup and alignment.
I/O Connector	Presets 1 through 15 are available.
Linear Encoder	Provides carriage (horn) distance measurement during the actuator cycle.
Load Cell	Provides force measurement for accurate ultrasonic triggering and graphing of force.
Main Menu	The list of categories of features available in the software, as displayed on the front panel of the power supply.
Minus Limit	The user-defined lower limit, or lower extreme of an acceptable range for a given parameter. Used with suspect and reject limits.
Operator	Authority level below Technician. The Operator can run a weld and view system information, weld history, and current setup. The Operator cannot access the weld setup or configuration menu. Multiple Operator level users can be created in System Admin.
Password Recovery Kit	PRK. A dongle that plugs into the back of the power supply to disable authority check.
Plus Limit	The user-defined upper limit. See Control Limits, Suspect, Reject and Missing Part Limits.
Post Weld Seek	Used to determine the operating frequency of the Stack, after the Hold and/or After burst portion of the weld cycle. Ultrasonics are run at a low level (5%) amplitude during this step, and the frequency is stored to memory.
Power Graph	A graph of power in percentage of maximum plotted against time.
Preset	User-stored parameters constituting a weld setup. Saved in non-volatile memory in the power supply, can be recalled for quick Setup of the system.
Pre trigger	The setting that causes ultrasonics to start before contact with the part (or, before the set Trigger Force has been met).
Ready Position	State in which the welder is retracted to the home position and ready to receive the start signal, ready to operate.
Reject Limits	User-definable limits at which the violating cycle is identified as having produced a bad part.
Reset Required	State used with limits indicating that a reset will be required when the limit is exceeded. The reset is accomplished by using the reset key on the front of the power supply, or by external reset at the User I/O.
Run Screen	The screen showing weld status, alarms, weld count, and process information. Available using a front-panel button on the power supply.

Table 2.1 Glossary of Terms

Name	Description
Seek	The activation of ultrasonics at a low-level (5%) amplitude, for the purpose of finding the resonant frequency of the Stack.
Setup Limits	Minimum and maximum parameter changes allowed for a weld preset.
Stack	Converter, Booster, and Horn.
Start Frequency	The frequency stored in memory and the starting frequency of the horn.
Suspect Limits	User-definable limits at which the resultant weld in a welding cycle is identified as potentially bad (suspect).
Technician	Authority level below Administrator. The Technician has all the access of Operator Authority level plus recipe management. The Technician cannot access all of the system configuration settings. Multiple Technician level users can be created in the System Admin.
Time Mode	Terminates the ultrasonics at a user-specified time.
Trigger	Trigger force triggers the start of ultrasonics based on a set force level. Trigger distance triggers the start of ultrasonics based on a set travel distance. Trigger distance doesn't consider force when used.
Upper Limit Switch (ULS)	A switch when activated indicates the actuator is in the home position.
User I/O	The User I/O is used to configure actuator inputs and outputs. This menu can only be entered when the welder is not in a weld cycle.
User-defined Limits	For process resultants, where "-" is the user-defined lower limit, and "+" is the user defined upper limit: • -/+ S/R Energy: The energy reached during the weld. • -/+ Force: The force at the end of the weld. • -/+ S/R Freq: The peak frequency reached during a weld. • -/+ S/R Power: The peak power as a percentage of the maximum reached during the weld. • -/+ S/R Abs D: The absolute distance reached during the weld from the Upper Limit Switch. • -/+ S/R Col D: The collapse distance reached from trigger to end of weld. • -/+ S/R Trg D: The distance at which the trigger occurred. • -/+ S/R Time: The weld time reached during the weld.
View Setup	Available in Main Menu as a read only menu identical to the Weld Setup menu. It is not password protected even if the Weld Setup menu is protected.
Weld Count	Count of acceptable weld cycles.
Weld Force	The force at the end of the weld cycle.
Weld History	The last 10 weld summary data lines are saved.
Weld Results	A summary of information concerning the last weld cycle.
Weld Time	The time for which ultrasonics are on.

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Chapter 3: Technical Specifications

3.1 Technical Specifications

NOTICE	
	All specifications are subject to change without notice.

3.1.1 Environmental Specifications

The Polaris Integrated Welder has the following environmental specifications:

Table 3.1 Environmental Specifications

Environmental Condition	Acceptable Range
Ambient Operating Temperature	+5°C to +40°C
	+41°F to +104°F
Storage / Shipping Temperature	-25°C to +55°C
	-13°F to +131°F
Operating Altitude	2000 m
	6561 ft
Humidity	Maximum 85%, non-condensing
IP Rating	2X

3.1.2 Performance Specifications

The following tables detail some of the performance specifications associated with the Polaris IW system.

3.1.2.1 Polaris IW System

Table 3.2 Input Current

Model	Power	Nominal AC Input	Current Rating
20 kHz	1.25kW	200-240V @ 50/60Hz, Single Phase	10 Amp Max. @ 200V
	2.5kW	200-240V @ 50/60Hz, Single Phase	20 Amp Max. @ 200V
	4.0kW	200-240V @ 50/60Hz, Single Phase	30 Amp Max. @ 200V

NOTICE	
	High duty cycles require additional cooling for the converter.

NOTICE	
	System average power must be limited to the specified continuous maximum.

3.1.2.2 Performance Requirements

Table 3.3 Max. welding force, dynamic trigger force, dynamic follow-through

Cylinder Size	Max. clamp force at 0.7MPa	Stroke length
63 mm	2250 N	100 mm
80 mm	3500 N	100 mm

Table 3.4 Maximum Speed (Application dependent)

Down and Return Speed	**Up to 150 mm per sec. max at 0.6MPa**

3.2 Physical Description

3.2.1 Standard Items

Actuator Support

The actuator support is firmly clamped to the column. With the actuator support, you can adjust the height of actuator housing above the fixture position. You can set the height as needed for your application, or to facilitate servicing.

Actuator Base

Table 3.5 Description of Controls on Base

Name	Description
Start Switches	Activate the operating cycle through the actuator to the Polaris IW system when pressed simultaneously.
Emergency Stop Button	Interrupts the operating cycle (through the power supply) and causes the carriage to retract. Twist to reset.
Start Cable	Connects base to START connector on Actuator.

Slide Mechanism

The slide mechanism is based on eight sets of preloaded, permanently lubricated bearings, providing consistent, precise alignment of the horn, smooth linear motion, and long-term reliability.

Limit Switch

The optical Upper Limit Switch (ULS) signals the control circuits in the Polaris IW system that the carriage has returned to the top of its stroke (home) and is ready to start another operating cycle.

Mechanical Stop

The mechanical stop limits the downward travel of the horn. To prevent equipment damage, adjust the stop so that the horn will not contact the fixture when no workpiece is in place. It is not intended for use in welding by distance.

CAUTION	
	Do not loosen the top hex-headed nut. Damage to the mechanical stop can result.

NOTICE	
	Turning clockwise will increase the stroke length; turning counter- clockwise will shorten the stroke length. Adjustment is approximately 0.04-inch (1 mm) per rotation.

Pneumatic System

The pneumatic system is contained within the actuator's sheet metal enclosure.

The system consists of:

1. a primary solenoid valve,
2. a cooling solenoid valve,
3. an air cylinder,
4. a pressure regulator,
5. and an air-pressure gauge.
6. down speed flow control valve

The horn's rate of descent (down speed) is adjusted at the front of the actuator using the Down speed control knob. The rate of ascent is fixed.

The Loadcell

Measures the force being applied to the part to trigger ultrasonics and record the welding parameters. The ensures that pressure is applied to the part prior to the application of ultrasonic energy.

To maintain horn-to-part contact and force as the joint collapses, provide dynamic follow-through. As the plastic melts, the ensure smooth transmission of ultrasonic energy into the part.

Linear Encoder

The encoder measures the distance the horn has traveled. Depending on the Polaris IW system settings, it can:

- Allow for distance welding
- Detect improper setup controls
- Monitor the quality of the weld

3.2.2 Dimensional Drawings

Figure 3.1 Front side

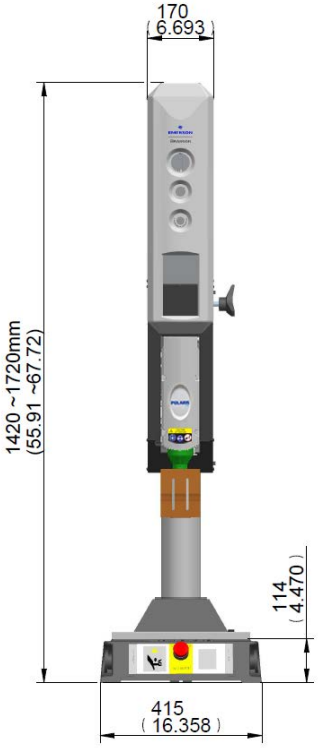


Figure 3.2 Rear side

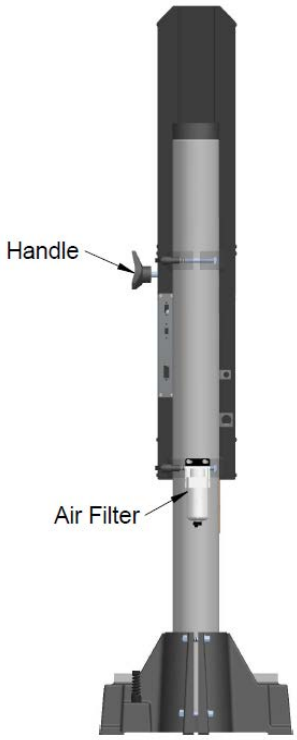


Figure 3.3 Left side

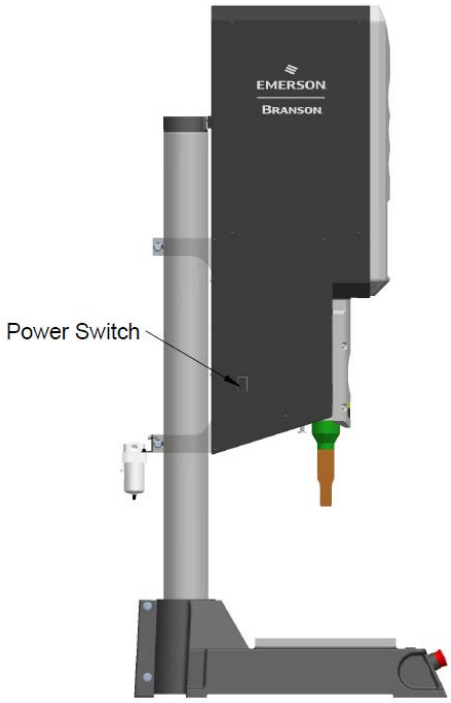


Figure 3.4 Right side

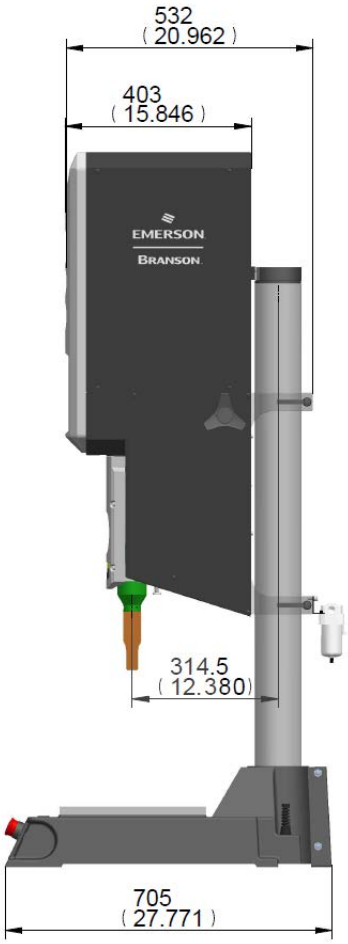
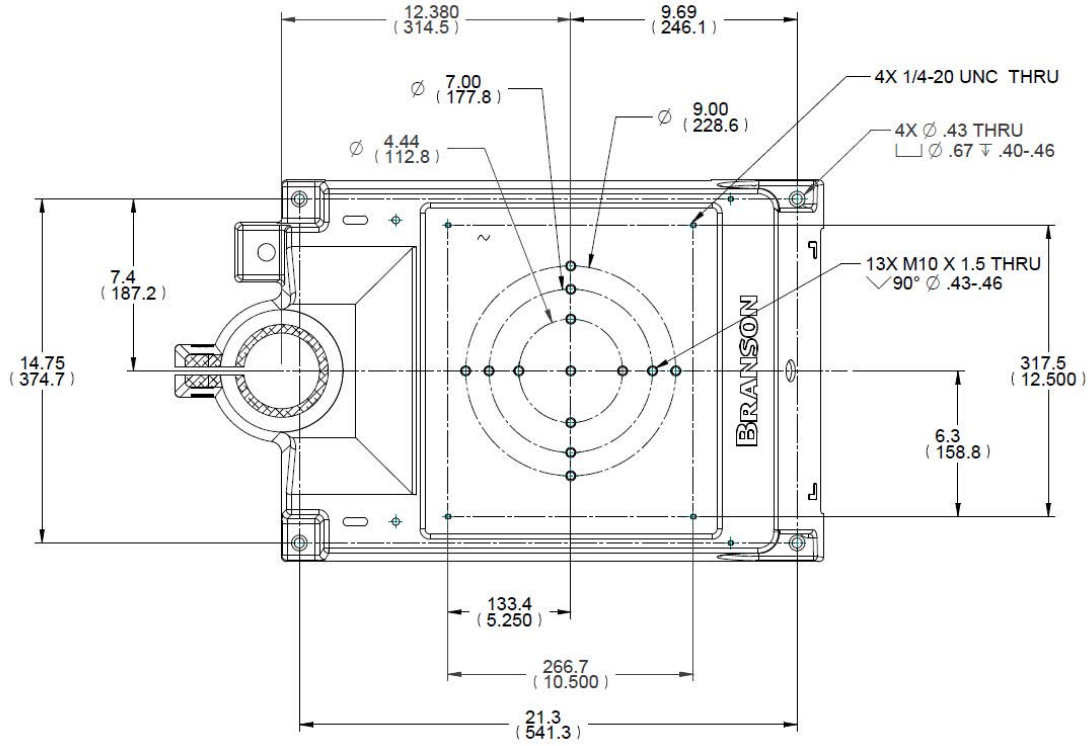


Figure 3.5 Base



Chapter 4: Installation and Setup

4.1 About Installation

This chapter is intended to help the installer with the basic installation and setup of your new Polaris IW System.

CAUTION	Heavy Object
	The Polaris IW System is heavy and can cause a pinching or crushing injury during installation or adjustment. Keep clear of moving parts and do not loosen clamp unless directed to do so. Handling, unpacking, and installation can require help or the use of lifting platforms or hoists. Use the lift point to interface with lifting equipment.

International safety labels are found on the Polaris IW system. Those that are of importance during installation of the system are identified in the figures in this and other chapters of the manuals.

4.2 Handling and Unpacking

If there are any visible signs of damage to the shipping containers or the product, or you later discover hidden damage, NOTIFY YOUR CARRIER IMMEDIATELY. Save the packing material.

1. Unpack the Polaris IW components as soon as they arrive. Refer to the following procedures.
2. Verify you have all of the equipment ordered. Some components are packed inside other boxes.
3. Inspect the controls, indicators, and surfaces for signs of damage.
4. Save all packing material, including the pallets and wood spacer blocks. Evaluation systems will be returned using this packing material.

4.2.1 Unpack the System

The stand system is heavy and packed in a protective shipping container. The toolkit is packed with the system. A booster, converter and other components may be packed inside the shipping container (depending on the equipment ordered).

- Stands are shipped on a wooden pallet.

CAUTION	
	The linear encoder (on the left side of the actuator) is very sensitive. Do not use the linear encoder assembly as a hand-hold, do not allow any impact on it, and do not place any weight on it.

1. Move the shipping container close to the intended installation location, leave it on the floor.
2. Open the top of the box. Remove the insert from the top of the protective box, which may contain the booster, converter, and the toolkit.
3. Remove the staples at the bottom of the protective box. Lift the protective box off the pallet.

CAUTION	
	The column and column support are under spring tension from the counterbalance spring. Do NOT attempt to disassemble the column from the stand, but always keep the column support clamped together. When making height adjustments, carefully and slowly release the clamps to control the motion, and hold the stand to prevent sudden movements or injury.

4. Cut the two packing straps around the base and pallet. Pry off the two wooden shipping blocks (to the rear of the base) which prevent the base from sliding on the pallet.
5. The stand can now be moved into its desired location by sliding it off the pallet. Stands have a lifting hook for the use of overhead hoists to lift the assembly in place.
6. Remove the block of wood between the base and the column support by carefully loosening the two column clamps (allowing the actuator to rise slightly, but not allow sudden movements) and then cutting the shipping tape on the block of wood. RETIGHTEN THE COLUMN CLAMPS.
7. Unpack the toolkit, insert box, and other parts (converter, booster, etc.) that may have shipped with the stand. Save the packing material.

4.3 Installation Requirements

4.3.1 Location

The system may be installed in a variety of positions. The stand (on a base) is often manually operated, using its base-mounted start switches, and so is installed at a safe and comfortable workbench height (approximately 30-40 inches) with the operator sitting or standing in front of the system. Stands (on hubs) are often used in automated systems and may be manually or automatically loaded and unloaded.

WARNING	
	The stand may tip over if moved around the axis of its column, if not properly secured. The work surface on which a stand is installed must be sturdy enough to support it, and secure enough to not tip over when the stand is adjusted during installation or setup.

The Polaris IW system must be accessible for user parameter changes and settings and must be placed in a vertical orientation. The Polaris IW system should be positioned so it does not draw in dust, dirt or material via its rear fans. Refer to the illustrations on the pages that follow for a dimensional drawing of each component. All dimensions are approximate and may vary between models:

4.3.2 Environmental Specifications

Table 4.1 Environmental Specifications

Environmental Concern	Acceptable Range
Humidity	Maximum 85%, non-condensing
Operating Altitude	Up to 6560 ft (2000 m)
Ambient Operating Temperature	+5°C to +40°C (41°F to 104°F)
Storage / Shipping Temperature	25°C to +55°C (-13°F to +131°F); Up to +70°C (+158°F) for 24 hours

4.3.3 Electrical Input Power Ratings

Plug the Polaris IW system into a single-phase, grounded, 3-wire, 50 or 60 Hz power source.

The ground screw on the rear of the actuator must be connected to earth ground with #8 gauge wire.

Table 4.2 Input Power requirements

Model	Power	Voltage Rating	Connector
For 20 kHz models	1250W 2500W 4000W	200VAC~240VAC	*

* To be hardwired by customer.

4.3.4 Factory Air

The factory compressed air supply must be "clean (to a 5-micron level), dry and unlubricated" air with a regulated maximum pressure of 100 PSI (690 kPa). Depending on your application, the system requires between 35 to 100 PSI. Stands include an in-line air filter. Actuators (alone) require a customer-provided air filter. A quick-disconnect fitting is suggested. Use a lockout device on the air line if required.

WARNING	
	Synthetic air compressor lubricants containing Silicone or WD-40 will cause internal actuator damage and failure due to the solvents contained within these types of lubricants.

4.3.4.1 Air Filter

IW system has an air filter which protects from particulate matter of 5 microns or larger. If a stand is mounted in a position other than upright (vertical), its air filter must be relocated and oriented, so its bowl is the lowest point, and the air flow across the air filter is horizontal. This may require some re-plumbing of the existing equipment at the customer site. The air filter is held in place by two screws on a bracket bolted to the column support, and by the factory-installed tubing.

4.3.4.2 Pneumatic Tubing and Connectors

IW system assemblies are not externally plumbed from the factory but provide conventional 8mm OD pneumatic tubing connection at the air inlet. If making connections for an actuator, or if re-plumbing your system for a new air filter location, you must use 6mm OD tubing and connectors rated above 100 PSI.

4.3.4.3 Pneumatic Connections to IW system

Air connection to the Polaris IW system is made to the AIR INLET connector on the top rear of the actuator, with plastic pneumatic tubing. For installations using actuator- alone assemblies, you must provide an air filter assembly which will support at least to 100 PSIG and remove particulate matter of 5 microns or larger.

4.4 Installation Steps

WARNING	
	This product is heavy and can cause a pinching or crushing injury during installation or adjustment. Keep clear of moving parts and do not loosen clamps unless directed to do so.

CAUTION	
	If a stand is not mounted in a vertical position, the air filter (on the column support) must be removed, reoriented, and replumbed. Failure to do so can cause air filter failure, and actuator failures.

4.4.1 Mounting the Stand system (Actuator on Base)

The base must be bolted to your workbench to prevent tipping or undesired movement. Four mounting bolt holes are provided at the corners of the casting and will accept your 3/8 inch or M10 cap screws. Use flat washers against the metal casting to prevent gouging.

CAUTION	
	You must secure the base to your work surface using four bolts, to prevent tipping or undesired movement, in the event the actuator is moved off-center or rotated around the column.

1. Ensure there are no overhead obstructions and that no pinch or rub points exist. Remember that the actuator is taller than the column when fully raised, and there are exposed connections.
2. Connect factory air to the air quick- disconnect fitting on the stand (Φ8).
3. Verify the base/start switch control cable is properly connected to the top of actuator.
4. Verify the linear encoder connector is properly connected to the top of the actuator.
5. Verify earth ground is connected with #8 gauge wire to the ground terminal on the rear of the actuator.

4.4.2 Input Power (Main)

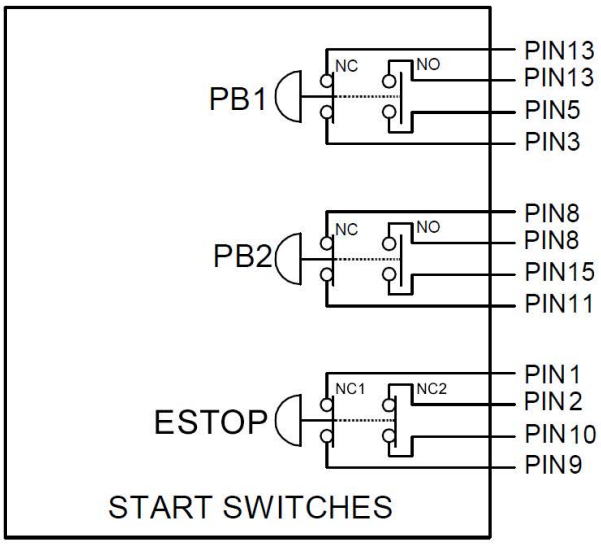
The system requires single-phase input power, which you connect to the Polaris IW system using the integral power cord.

Refer to the unit's Model Data Tag to be sure of the power rating of the Model in your system.

4.4.3 Start Switch Connection

IW system requires two start switches and emergency stop connection. Stands on a base include this connection (factory installed and connected from the base) while the stand on hub applications requires the user make their own start switch/E-stop connections, as follows:

Figure 4.1 Start Switch Connection Codes (Full Unit)



PB/ESTOP	
Pin No.	Signal
1	ESTOP_NC_1
2	ESTOP_NC2_SCR
3	PB1_NC_24V
4	N/C
5	PB1_NO_24V
6	SV1_A1
7	N/C
8	PB2_DRV_24V
9	ESTOP_NC1_SRC
10	ESTOP_NC2
11	PB2_NC_24V
12	N/C
13	PB1_DRV_24V
14	SV1_A2
15	PB_NO_24V

NOTICE	
	Solid state devices may be used in lieu of mechanical start switches providing their leakage current does not exceed 0.1mA.

NOTICE	
	Start Switches PB1 and PB2 must be closed within 200 milliseconds of each other, and remain closed until the WELD cycle complete, to effect a start condition.

BASE/START is the DB-15 female connection on the back of the actuator. Your cable requires a female DB-15 (D-shell) connector, or you could also choose Branson's remote start cable assembly conveniently. PB1 and PB2 are 1NC and 1NO start-switches which must be operated simultaneously to start the welding cycle. These must be closed within 200 milliseconds of each other, or the machine will not respond.

4.4.4 User I/O Interface

The user I/O is a standard interface for automation, provided on the rear of the IW system. It provides the ability for the customer to make their own interface for their automation or special control or reporting needs.

The interface cable has an CONN D-SUB HD HOUSING RCPT 15POS connection on the rear of the power supply. The electrical interface have 4 same inputs circuits, 4 same output circuits, as following indicated.

Figure 4.2 Input

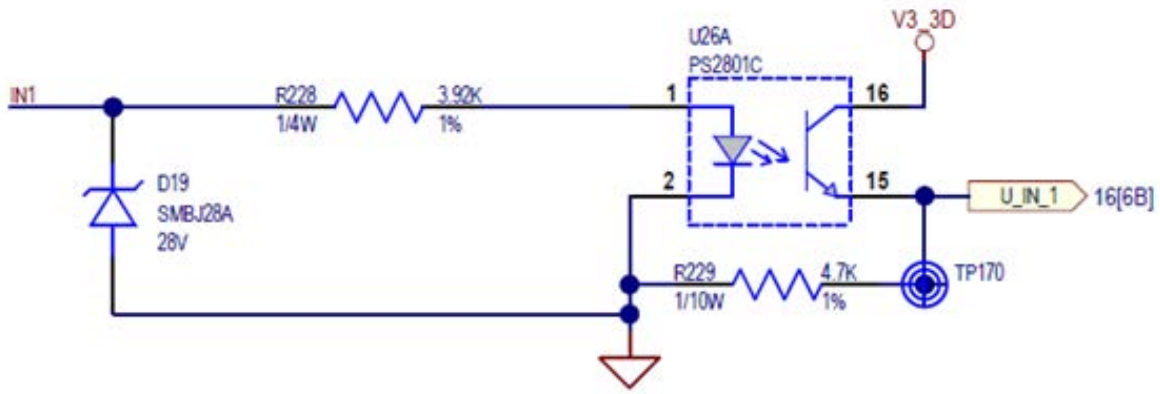


Figure 4.3 Output

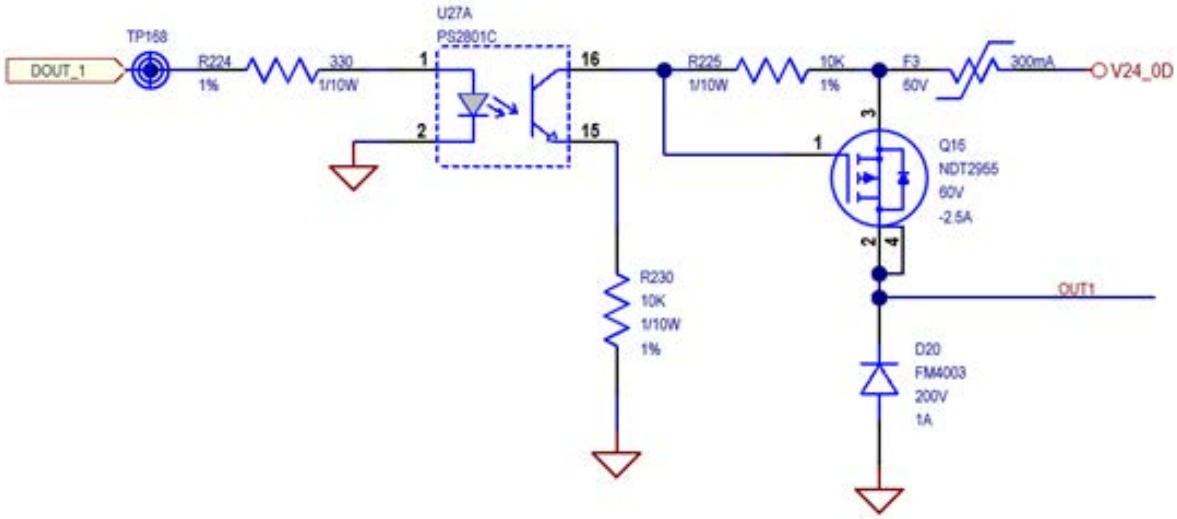
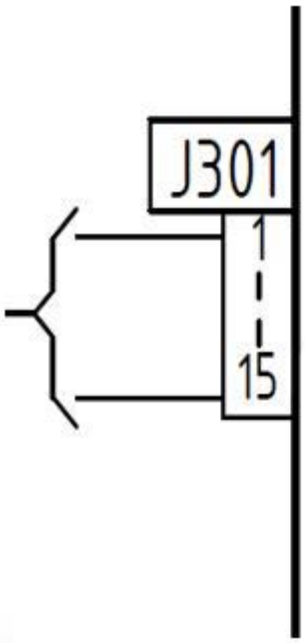


Table 4.3 User I/O Pin Identification and Signal Information

User IO			
	**Pin No.**	**Signal Name**	**Signal Type**	**Signal Range**
	1	24VDC	Power 24VDC	24VDC
	2	24VDC	Power 24VDC	24VDC
	3	24VDC	Power 24VDC	24VDC
	4	RESET	Input	0/24VDC
	5	IN2(reserved)	Input	0/24VDC
	6	IN3(reserved)	Input	0/24VDC
	7	IN4(reserved)	Input	0/24VDC
	8	Alarm	Output	0/24VDC, max 300mA
	9	Ready	Output	0/24VDC, max 300mA
	10	Weld On	Output	0/24VDC, max 300mA
	11	Clamp Fixture	Output	0/24VDC, max 300mA
	12	GND	GND	——
	13	GND	GND	——
	14	GND	GND	——
	15	GND	GND	——

NOTICE	
	Connectivity: • USB 3.0 Type A (Software Upgrades) • User IO 15 Pin D-Sub High Density (3 rows) • E-Stop and Two Hand Palm Button 15 Pin D-Sub (2 rows)

Note:

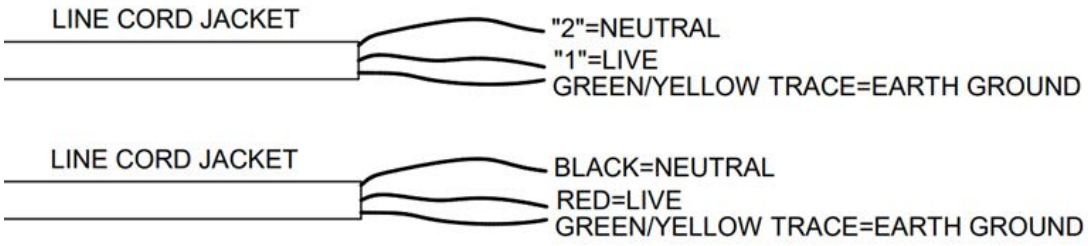
The maximum output capacity of the 24V-DC power supply is 500mA.

4.4.5 Input Power Plug

If you must add or change the input power plug, use the following color code for the conductors found in the international harmonized line cord. Add the plug that is appropriate for your input power receptacle.

CAUTION	
	The Polaris IW system can be permanently damaged if it is connected to the incorrect line voltage, or if the wiring connection is mis-wired. It also presents a safety hazard if mis-wired. Use of the correct plug or connector helps prevent incorrect connections.

Figure 4.4 Line Cord Color Code

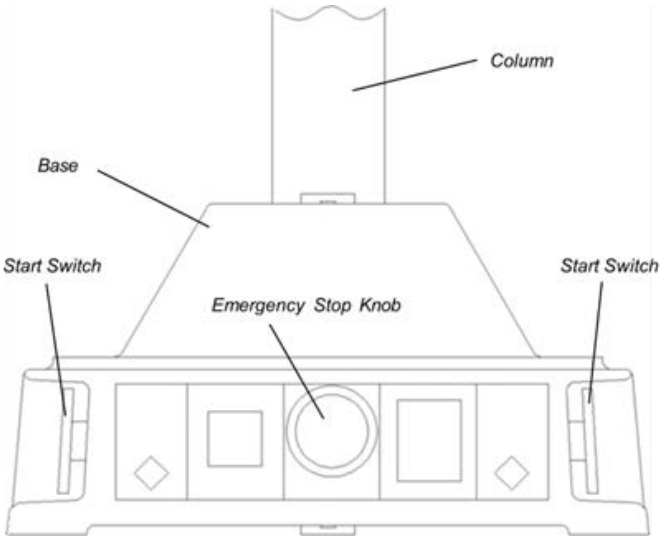


4.5 Guards and Safety Equipment

4.5.1 Emergency Stop Control

If you use the Emergency Stop button on the base to terminate a weld, twist the button to reset it. (The welder will not operate until this button is reset.) You must then press Reset at the power supply. If you are running automation, you can use external reset that is connected to your User I/O board.

Figure 4.5 Actuator Emergency Stop Button



If you are using an Emergency Stop signal from the User I/O, you must clear the Emergency Stop condition before the System will operate.

WARNING	
	The Emergency Stop should be engaged prior to removing the door.

4.6 Acoustic Stack

4.6.1 Torque Wrench Kit

Welding systems function with greatest efficiency when the stack components (converter, booster, and horn) are properly assembled and torqued.

Figure 4.6 Torque Wrench Kit

Benefits

- Ensures proper torque and eliminates failures from improper torquing
- Can be calibrated
- Reduces maintenance required because stacks are assembled correctly

Torque Guidelines

The charts in this section provide guidelines for applying torque with the kit.

4.6.2 Safety

CAUTION	
	The following procedure must be performed by a trained operator. If necessary, secure the largest portion of a square or rectangular horn in a soft jawed (brass or aluminum) vise. NEVER attempt to assemble or remove a horn by holding the converter housing or the booster clamp ring in a vise.

CAUTION	
	Do not use silicone grease with Mylar washers. Use only 1 (one) Mylar washer of the correct inside and outside diameters at each interface.

4.6.3 Tool Kits and Miscellaneous

4.6.3.1 Torque Wrench Kit #1

For 20 kHz acoustic stacks (EDP 101-063-787):

Table 4.4 Torque Wrench Kit #1

Replacement Parts	EDP
Torque Wrench	200-118-037
3/8” Adapter	200-121-067
3/16” Hex and Bit Driver	200-038-099
1/4” Hex and Bit Driver	200-038-098
Adapter, 20 kHz	100-115-082
1 1/4” Open end Wrench	200-121-071

4.6.3.2 Miscellaneous

Table 4.5 Miscellaneous

Tool	EDP
20 kHz Spanner Wrench	201-118-019
Adjustable Face Spanner	201-118-027
Silicone Grease	101-053-002
Mylar Washer 150 CT for Kit 1/2”	100-063-471

4.6.4 Assembly Instructions

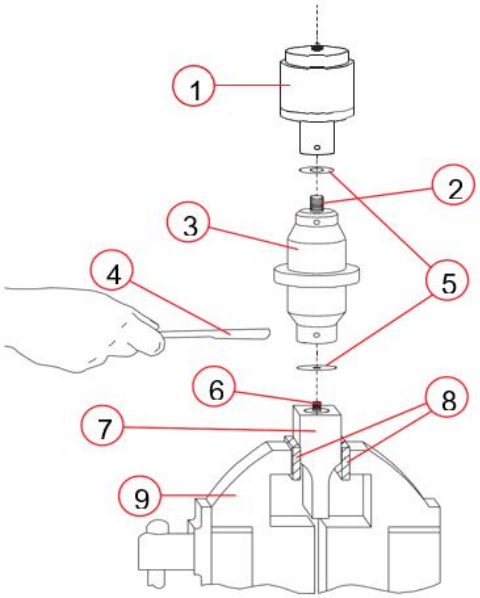
4.6.4.1 Assembly Instructions For a 20 kHz System

Table 4.6 Assembly Instructions For a 20 kHz System

Step	Action
1	Clean the mating surfaces of the converter, booster, and horn. Remove any foreign material from the threaded holes.
2	Install the threaded stud into the top of the booster. Torque to 450 in·lbs, 50.9 N·m. If the stud is dry, apply 1 or 2 drops of a light lubricant oil before installing (if required).
3	Install the threaded stud into the top of the horn. Torque to 450 in·lbs, 50.9 N·m. If the stud is dry, apply 1 or 2 drops of a light lubricating oil before installing (if required).
4	Install a single Mylar washer (matching the size of the washer to the stud) to each interface.
5	Assemble the converter to the booster and the booster to the horn.
6	Torque to 220 in·lbs, 24.9 N·m.

4.6.5 Assembling the Acoustic Stack

Figure 4.7 Assembling the Acoustic Stack



Shown with rectangular horn secured in the vise.

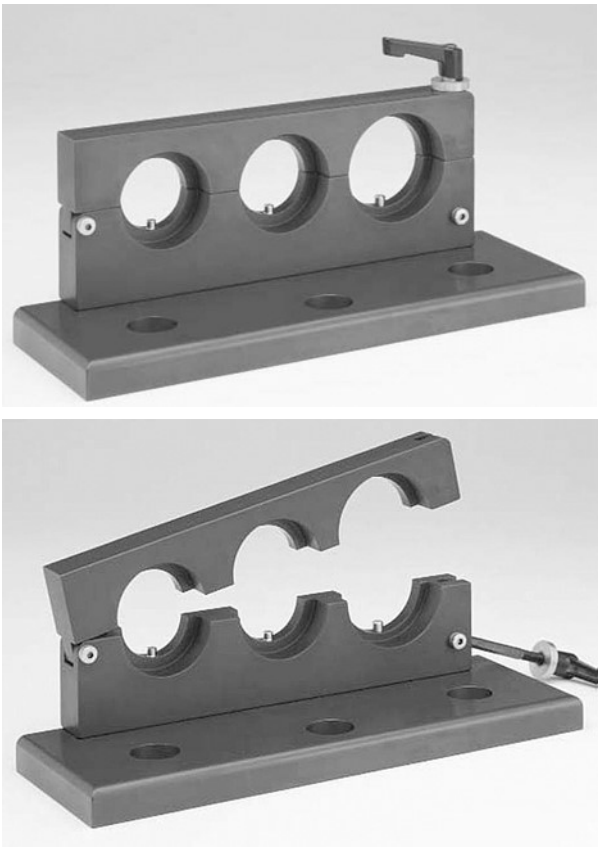
Table 4.7 Assembling the Acoustic Stack

Item	Description	Item	Description	Item	Description
1	Converter	2	Booster Stud	3	Booster
4	Spanner	5	Washer	6	Horn stud
7	Horn	8	Vise jaw protectors	9	Vise

4.6.5.1 Universal 20 kHz Stack Vise

The 20 kHz Universal Stack Vise is used for the separation, assembly, and torquing of 20 kHz stacks. The Vise features three openings (11/2”, 15/8” and 2”) to fit most horns, boosters, and converters. The stack vise is made of aluminum to prevent marking on both the aluminum and titanium horns, boosters, and converters. It has bolt holes for permanent mounting on a bench top, or it can be simply clamped to a table top. This stack vise is to be used in conjunction with torque kits.

Figure 4.8 20 kHz Universal Stack Vise, EDP 100-063-642



4.6.5.2 Procedure to replace a stud from a horn or booster

Table 4.8 Mounting the Stand

Step	Action
1	Remove the studs from the horn or booster.
2	Before reinserting a stud which has been used in an aluminum horn or booster, use a file or wire brush to clean the aluminum bits from the knurled end of the stud. Also clean the threaded hole using a clean cloth or towel. Replace studs used in titanium horns. Studs tightened in titanium horns experience damage to the knurled end preventing satisfactory locking when reused. Studs used in titanium horns should be disposed of and a new one used. Do not apply grease to the new threaded stud.
3	Using a torque wrench, tighten the stud at the torque specification shown in section 4.6.6.1 Stud for Horns. Failure to follow these torque specifications may result in the horn/booster stud loosening, stud breakage, and unexplained overloads.

4.6.6 Stack Assembly Torque

NOTICE	
	The use of a Branson torque wrench or the equivalent is recommended. EDP 101-063-787 for 20 kHz and 30 kHz systems, and EDP 101-063-618 for 40 kHz systems.

4.6.6.1 Stud for Horns

Table 4.9 Torque values

Stud Size	EDP#	Frequency	Horn Material	Torque
3/8”-24 x 1”	100-098-120	20 kHz	Ti	33 N·m, 290 in·lbs
3/8”-24 x 1-1/4”	100-098-121		Al, Steel	33 N·m, 290 in·lbs
1/2”-20 x 1-1/4”	100-098-370		Ti, Steel	51 N·m, 450 in·lbs
1/2”-20 x 1-1/2”	100-098-123		Al	51 N·m, 450 in·lbs

Table 4.10 Studs for Boosters

Stud	EDP#	Frequency	Torque
1/2”-20 x 1-1/2”	100-098-123	20 kHz	51 N·m, 450 in·lbs

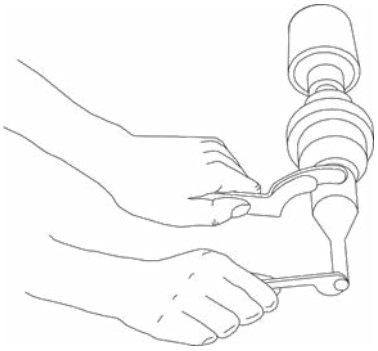
Add a drop of Loctite 290 to the stud, torque, and let cure for 30 minutes before use.

4.6.6.2 Connecting Tip to Horn

Table 4.11 Mounting the Stand

Step	Action
1	Clean the mating surfaces of the horn and tip. Remove foreign matter from the threaded stud and hole.
2	Hand assemble the tip to the horn. Assemble dry. Do not use any silicone grease.
3	Use the spanner wrench and an open-end wrench (refer to Figure 4.9 Connecting Tip to Horn below) and tighten to the specifications in Table 4.12 Tip to Horn Torque Specification.

Figure 4.9 Connecting Tip to Horn



4.6.6.3 Tip to Horn Torque Specifications

Table 4.12 Tip to Horn Torque Specification

Tip Thread	Torque
1/4”-28	12 N·m, 110 in·lbs
3/8”-24	20 N·m, 180 in·lbs

CAUTION	
	It is recommended to do a risk assessment of the tooling according to its design to prevent any damage, such as dropping a heavy tooling, or cutting your hands, when installing the stack in the actuator.

4.6.6.4 Stud Washers

Table 4.13 Stud Washers - 20 kHz

Description	EDP	Torque
3/8”-24 to 3/8”-24	109-116-1224	33 N·m, 290 in·lbs
3/8”-24 to 1/2”-20	109-116-1334	51 N·m, 450 in·lbs
1/2”-20 to 3/8”-24	109-116-1225	33 N·m, 290 in·lbs
1/2”-20 to 1/2”-20	109-116-1124	51 N·m, 450 in·lbs

Table 4.14 Step Studs for Horns*

Stud Booster Side/ Horn Side	EDP	For	Torque
3/8”-24 to 1/2-20”	100-098-395	Titanium horns with 1/2”-20 threads	51 N·m, 450 in·lbs
3/8”-24 to 1/2-20”	100-098-394	Aluminum horns with 1/2”-20 threads	51 N·m, 450 in·lbs
1/2”-20 to 3/8”-24	100-098-249	Titanium horns with 3/8”-24 threads	33 N·m, 290 in·lbs
1/2”-20 to 3/8”-24	100-098-363	Aluminum horns with 3/8”-24 threads	33 N·m, 290 in·lbs

*Step studs should only be used in prototype applications, NOT production.

4.6.6.5 Follow Up Notes

- Always use Mylar washer between the booster and the horn surface
- Do not use Mylar between stud washer and horn
- Do not use a Mylar washer between stud washer and booster

4.7 Still Need Help?

Branson is pleased that you chose our product and we are here for you! If you need parts or technical assistance with your Polaris IW system, call your local Branson representative or contact Branson customer service by calling the appropriate department as indicated in Section 8.2 How to Contact Branson.

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Chapter 5: Polaris Actuator Operation

5.1 Actuator Controls

This section describes how to operate a weld cycle using the Polaris IW Actuator.

WARNING	
	When setting up and operating the Actuator, observe the following precautions: • Keep hands away from under the horn. Down force (pressure) and ultrasonic vibrations can cause injury. • Plastic parts can vibrate within the audible frequency range when welded. If this occurs, use hearing protectors to prevent possible injury. Do not allow the ultrasonically activated horn to touch a metal base or a metal fixture

WARNING	
	When using larger horns, avoid situations where fingers could be pinched between the horn and the fixture. Contact Branson for information on an optional guard.

5.2 Initial Actuator Settings

There are several functions need to be manually controlled:

- Factory Air Source
- Regulated Air Pressure and Air Pressure Gauge
- Down speed Control
- Mechanical Stop
- Actuator Position and Height above fixture (Horn travel)
- Emergency Stop (on Base, and provided as a User I/O signal for automation)

Each of these will affect the operation of the Actuator.

5.2.1 Regulated Air Pressure and Air Pressure Gauge

When factory air is present, it is delivered to the regulator located in the actuator. The regulator knob is a push-to-lock knob to prevent undesired changes in your air pressure. settings.

CAUTION	
	When factory air is removed from the system, or the dump valve is activated, the Actuator may "settle" to a lower position, since it is held up by the constant air pressure. Be sure to keep your hands and fingers from under the Horn or other pinch points and use a block of wood or other soft material to block the Horn up to prevent damage to the tooling.

Initially, set the Regulator Knob to a counterclockwise position, which is a low pressure setting. In the event something is incorrectly connected, a low air pressure setting will reduce any sudden movement. A typical initial setting is approximately 20-25 PSI for a new or unproven setup.

CAUTION	
	Permanent damage to the system and possible injury can result if the Actuator is supplied with factory air above the maximum gauge reading of 100 PSIG (690kPa). Set the pressure regulator to zero before connecting or disconnecting the factory air supply.

5.2.2 Factory Air Source

Factory air must be turned on, supplying the actuator's air pressure regulator with air pressure. If factory air is too low (below 35 PSI maintained) the actuator will not weld or operate reliably. Factory air is also used to provide cooling air to the converter.

Factory air input may affect weld results for applications requiring more weld pressure buildup.

NOTICE	
	Factory Air pressure must be greater than the maximum system requirements. The compressed air system must have sufficient capacity to serve all of the systems connected to it. The use of an accumulator may be required to provide continuous air flow.

5.2.3 Down speed Control

The Down speed Control regulates the horn velocity. Down speed has a significant effect on the force buildup on the workpiece, and hence the quality of the weld. If the Down speed control is closed, the actuator will not extend.

NOTICE	
	Be sure to set the down speed control to a slow setting, between 5 and 15, for an initial setup. The down speed control knob has a set- screw locking mechanism that can be used, if desired.

5.2.4 Actuator Alignment and Height (Horn travel)

The horn carriage will travel up and down on the actuator's slides. The actuator can also be adjusted up or down on the column. The distance between the fixture and horn should allow easy and ready access and removal of your parts.

- Minimum stroke cannot be less than 1/4" (6 mm)
- Maximum stroke cannot exceed 3-3/4" (95 mm) before part contact to allow for the operation of the dynamic flow through mechanism.

Consistent weld results are best measured when the horn travel is more than 1/4 inch, because a shorter distance can be affected by other components of the welding system and a suitable build-up of pressure on the parts.

5.2.5 Mechanical Stop

The Mechanical Stop affects the amount of downward travel the Actuator is allowed to have, up to the full stroke length of the unit. The multi-turn knurled knob to the right of the Stack, on the bottom of the Actuator, is the Mechanical Stop adjustment.

The Mechanical Stop is designed to stop the Horn from contacting your Fixture in the event your part is missing. It is not a precision measuring device, and it is usually *not recommended* that this be used as a 'collapse' or other distance weld limiting device. The "missing part" function can also be used to control critical horn to fixture distances.

Initially, set the mechanical stop to allow at least 1/4 inch of Horn travel, but any distance up to the full stroke length is suitable.

Table 5.1 To adjust the Mechanical Stop

Step	Action
1	Activate the manual dump valve and manually lower the carriage until the horn is just above the fixture.
2	If the horn does not reach the fixture and has not traveled 4 inches (100 mm), loosen the lock ring fully and turn the mechanical stop-adjusting knob clockwise until the carriage reaches the desired position. If the horn reaches the desired position before contacting the stop, turn the adjusting knob counterclockwise until the stop contacts the carriage.
3	Check the height of the horn and make any necessary adjustments to the stop.
4	When you have reached the setting you want, tighten the lock ring. The lock ring will prevent the mechanical stop adjustment from vibrating loose during operation.

5	Place a part in the fixture, reset the air pressure, and perform a test weld.
6	Check that full force develops between the horn and the part. If not, readjust the mechanical stop.

NOTICE	
	Due to Dynamic Follow Through, do not weld in the last 1/4” of stroke.

5.2.6 Emergency Stop

The Emergency Stop is a user control that will prevent the actuator from running, and will also immediately terminate a weld cycle and cause the Horn to retract. It does not remove power from the system. The controls can be configured to provide a beep sound when the emergency stop is engaged. The front panel display of the Polaris IW system will indicate that the system is in emergency stop mode when it is. Twist the emergency stop button to reset the system.

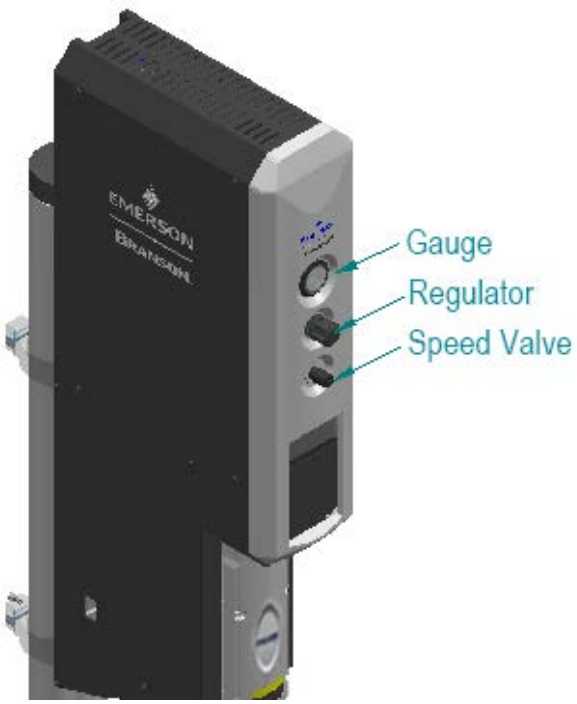
5.2.7 Weld Pressure

You can set the MPa /PSI pressure by manual control that will be delivered in any welding mode.

5.2.8 Down speed

Sets the air flow from the actuator’s pneumatic cylinder for speed control. The settings can be made by control the flow valve in the front bezel.

Figure 5.1 Front of the Actuator



5.3 Operating the IW system

For detailed information about Polaris IW Actuator Controls, see the steps.

Table 5.2 To operate the Polaris IW Actuator

Step	Action
1	If your application has been analyzed in the Branson Applications. Laboratory, consult the Branson Lab Report for appropriate settings or check the Polaris IW system manual.
2	Properly adjust the mechanical stop so that the horn does not make contact with your fixture.
3	If the Actuator is mounted on a Base, make sure that the Emergency Stop button is not pushed in. If not using the Branson Base, verify that the Emergency Stop signal source is not in the Emergency Stop mode.
4	With a part in place, depress and hold both start switches simultaneously, or activate the start mechanism.
5	The horn advances and contacts the part.
6	Force develops between the horn and the part, activating the Loadcell.
7	Ultrasonic vibrations are activated. The power bar graph on the power.
8	Ultrasonics stop and the horn continues to clamp the part for the hold time you selected.
9	After the completion of the hold cycle, the horn retracts automatically, and you can remove the part from the fixture.
10	Weld a few parts using the initial parameters and check for the desired properties.

If you do not obtain optimal results initially, based on the quality of the weld obtained and the loading meter reading, you can alter settings to achieve satisfactory results. Change one setting at a time until a weld is produced in minimum time with maximum strength.

Chapter 6: Polaris System Operation

6.1 Factory User and Password Setting

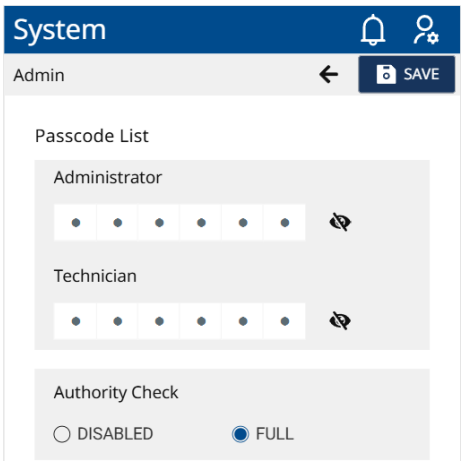
Polaris IW system factory default authority check is “DISABLED”.

User can change to “FULL” according to Product requirement.

There shall be three levels of password protection: Operator, Technician, Administrator.

Authority lists see the Appendix B: Password Protection.

Figure 6.1 Default Authority Check



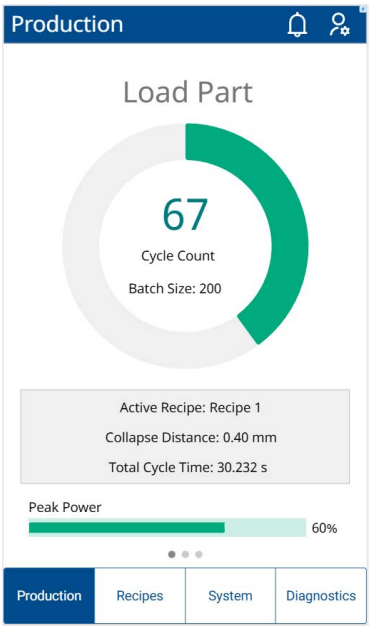
Item	Authority Check	Function
1	DISABLED	Three-level authority function failure
2	FULL	Three-level authority function activation

If user change the authority check to “FULL”, the three-level authority function will be active.

The default user access level is Operator, and a password is not required.

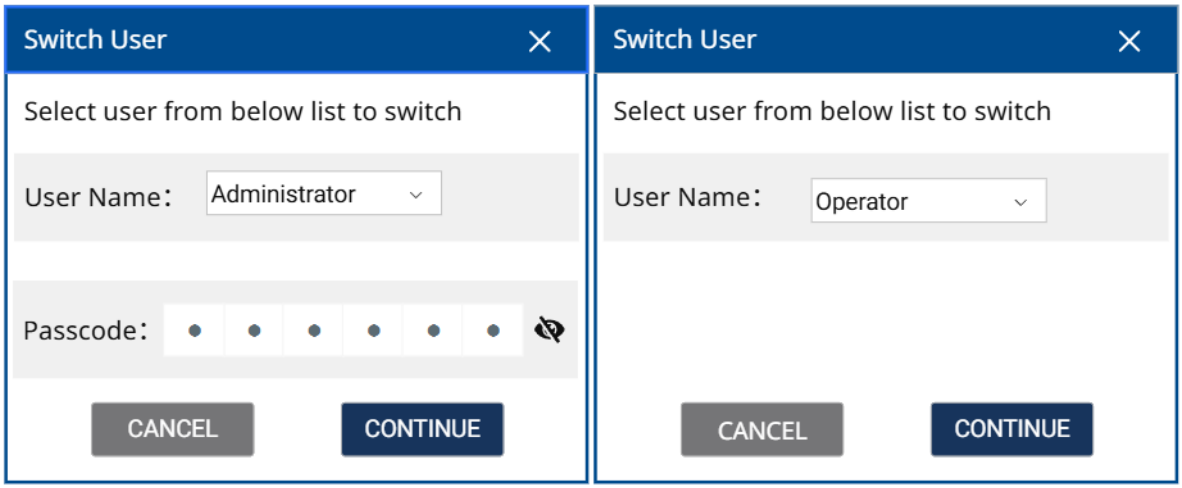
User can change access level to “Administrator” or “Technician”, the default password for this change is “000000”.

Figure 6.2 Default screen



Item	Description
1	Switch User
2	Alarm Information

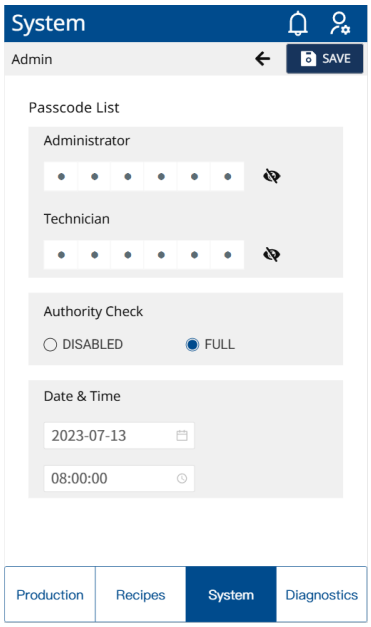
Figure 6.3 Switch User



User can change the password, date & time from the Admin page.

The system provides each alarm with a time and date stamp for control purposes.

Figure 6.4 Change Password



Item	Action
1	Administrator Password Change
2	Technician Password Change
3	Date & Time Setting

NOTICE	
	Keep a record of your password and user ID.

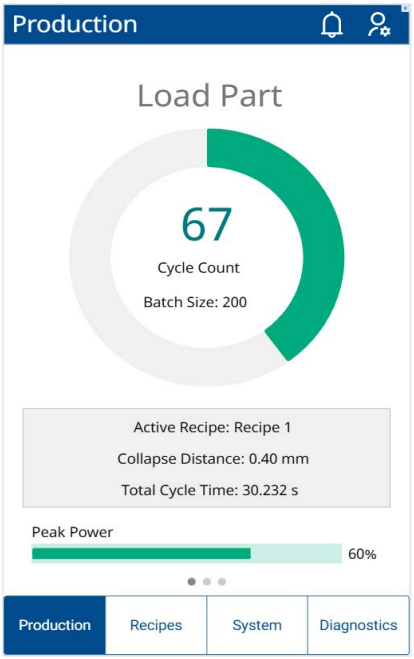
6.2 Main Menu

The Polaris IW system using VxWorks operating system which stored in ASC board, and the software can be updated by USB port.

The default page display on the HMI is production section.

The following choices are available on default page.

Figure 6.5 Main Menu



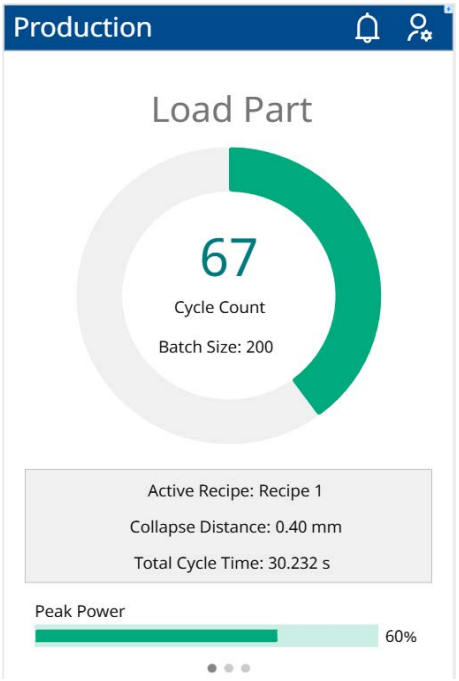
Name	Description
Production	Monitor the welding status, including welding history and curve.
Recipes	Add, edit, or delete the recipe.
System	Configuration/ calibrate/admin/service count/user I/O Information.
Diagnostics	Scan/ test/ actuator setup.

6.3 Production

6.3.1 Default Screen

The default screen displays the cycle count is XX, and the Batch size is YYY. XX is the number of welds happened in this batch and YYY is the total number of welds in this batch.

Figure 6.6 Production Screen

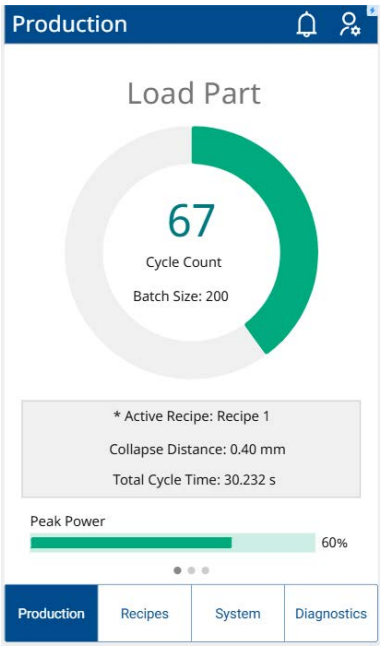


Name	Description
Load Part	Indicates welder is ready for part to be loaded.
Cycles	Total number of cycles since starting run.
Batch Size	Number of welds required in the batch.
Active Recipe	Current Active Production Recipe.
Weld Mode	Weld Mode Options: Time/Collapse Distance/Absolute Distance.
Total Cycle Time	Total time count for each welding cycle.
Peak Power	Power bar graph, display according to the actual welding results.

6.3.2 Default Screen (Unsaved)

If you did not save the recipe when you created or edited the recipe, the screen displays symbol "*" before "Active Recipe".

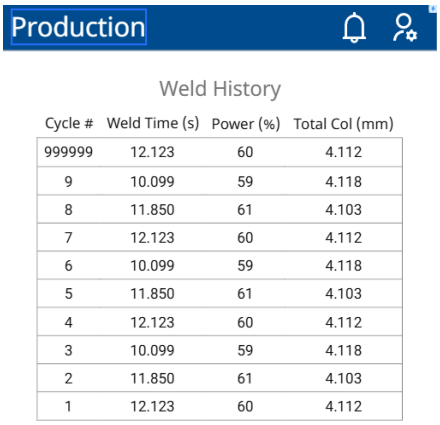
Figure 6.7 Production Screen (Unsaved)



6.3.3 Weld Result

Swipe the screen, find weld history. It only shows the last 10 weld results on Production screen. Each weld result displays Cycle Number, Weld Time, Power, and Time Collapse Distance.

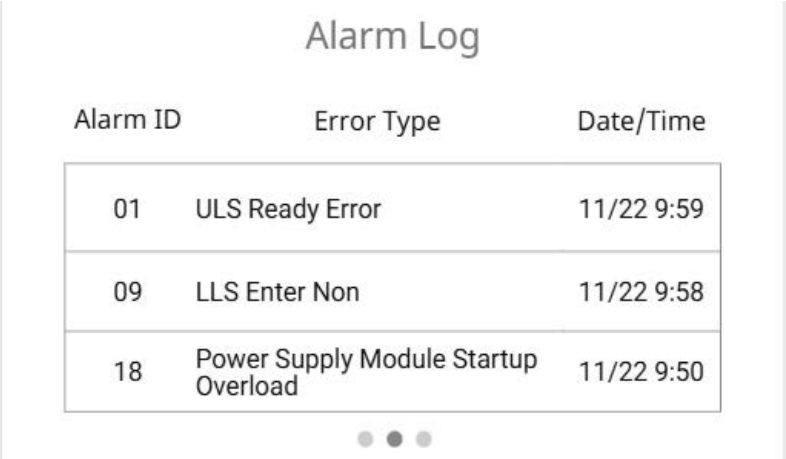
Figure 6.8 Weld Results history



6.3.4 Alarm Log

Swipe the screen to show alarm log. It only shows the last 3 alarms. Each alarms displays error code, description, and time.

Figure 6.9 Alarm Log



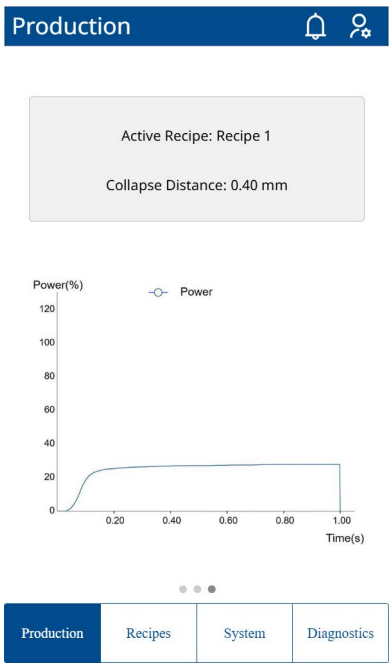
6.3.5 Weld Curve

Swipe the screen to find the power curve displays on the screen.

Only the power curve for the latest welding cycle is displayed.

The curve is updated after each weld is completed.

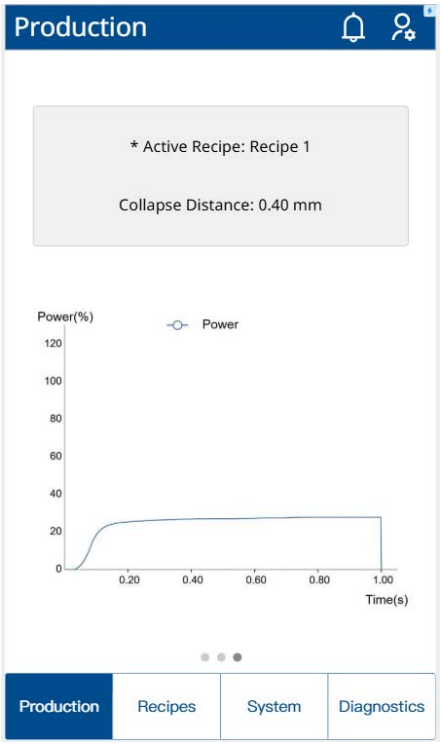
Figure 6.10 Weld Results curve



6.3.6 Weld Curve (Unsaved)

If you did not save the recipe when you created or edited the recipe, the screen displays symbol "*" before "Active Recipe".

Figure 6.11 Weld Results curve (Unsaved)



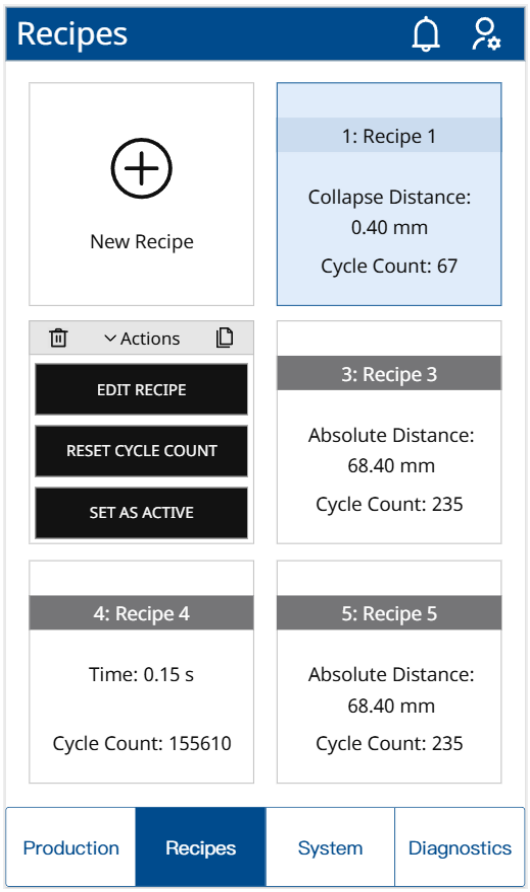
6.4 Recipes

You can set up the Polaris IW system to weld a particular application and then save the settings to a recipe. There are two types of pages in the recipes screen, namely recipe library and recipe editing page.

6.4.1 Recipe Library

The library page is used to display all recipes stored in the device, and some settings can be adjusted on this page.

Figure 6.12 Recipe Library



Name	Description
New Recipe	Create new recipe.
Delete Recipe	Delete the existing recipe.
Copy Recipe	Copy recipe and jump to the editing page.
Edit Recipe	Edit recipe according to request.
Reset Cycle Count	Clean cycle count.
Set as Active	The selected recipe to be set as active recipe.
Batch Setting	Batch setting according to request.

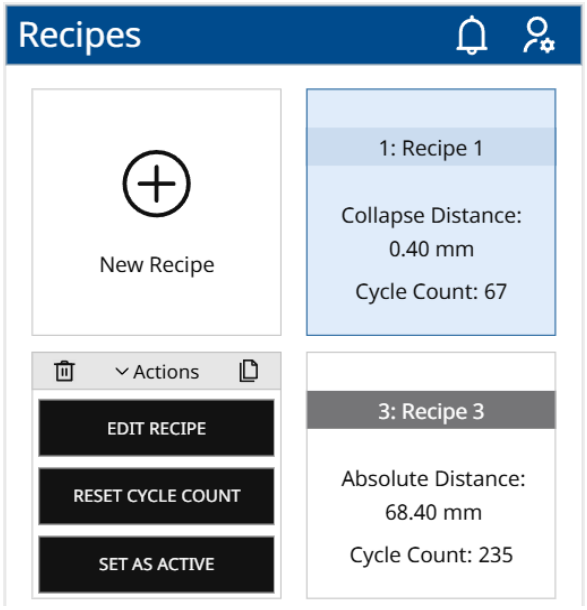
6.4.1.1 New Recipe

Click the New Recipe button ⊕, the HMI will jump to the new recipe edit page, and this recipe will be set as the active recipe.

6.4.1.2 Delete Recipe

Click this button 🗑 to delete the recipe.

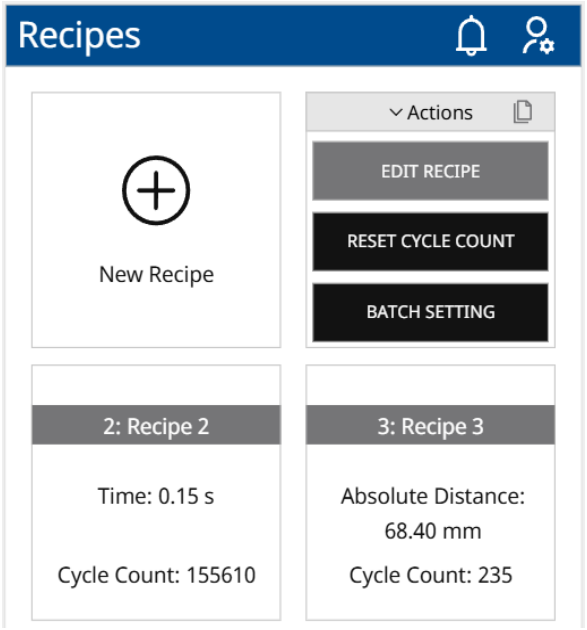
Figure 6.13 Delete Recipe Action



6.4.1.3 Copy Recipe

Click the copy button 🗋, and the HMI will create a new recipe using the parameters of this recipe and jump to the editing page of the new recipe. At the same time, the new recipe will be set as the active recipe. When copying a recipe, the cycle count of the destination recipe shall be set to 0.

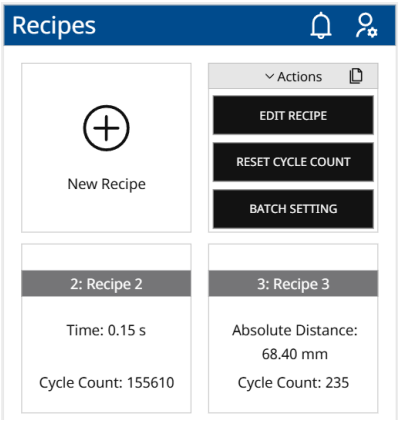
Figure 6.14 Copy Recipe Action



6.4.1.4 Edit Recipe

After clicking this button, the HMI will jump to the editing page of this recipe. At the same time, this recipe will be set as the active recipe.

Figure 6.15 Edit Active Recipe



6.4.1.5 Reset Cycle Count

Click this button to clear the cycle count for this recipe.

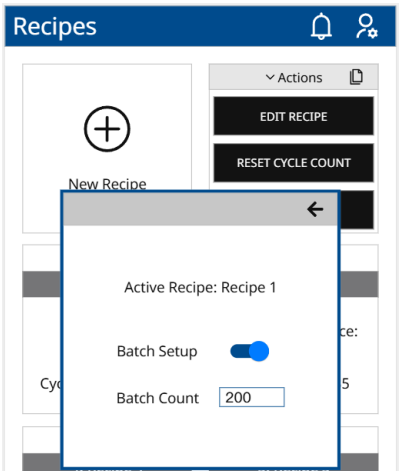
6.4.1.6 Set as Active

After clicking the Set as Active button, this recipe will be set as the active recipe.

6.4.1.7 Batch Setting

The switch of Batch Setup and the value of Batch Count are used as internal parameters of the recipe. Each recipe has its own switch and value. Modifying the switch status and value on the Batch setting page will take effect immediately. Modify the switch status and value on the Batch setting page. The saving time is related to whether the recipe is saved. If the recipe has unsaved parameters (with asterisks), the modified content of Batch will be saved to the memory. If the recipe parameters have been saved (without asterisks), the modified content of Batch will be saved to EE. The up limit of batch count is 100000. When batch setting is set to 0, it means that batch size verification is not performed. When the batch size setting value is reached, the HMI will display an alarm prompt.

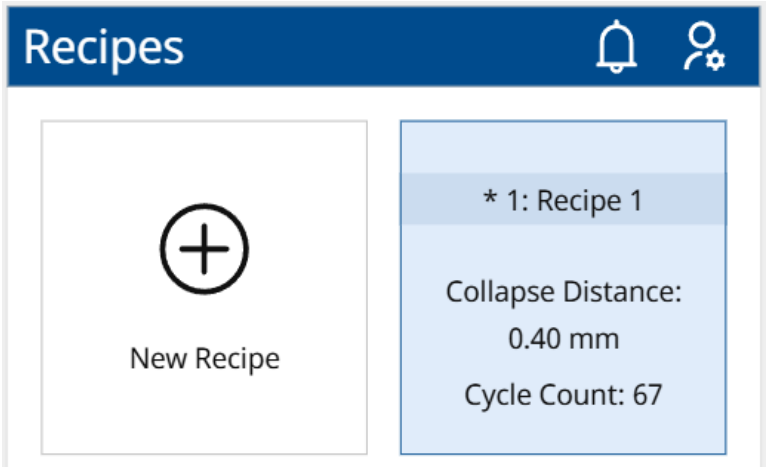
Figure 6.16 Batch Setting



6.4.2 Library Unsaved

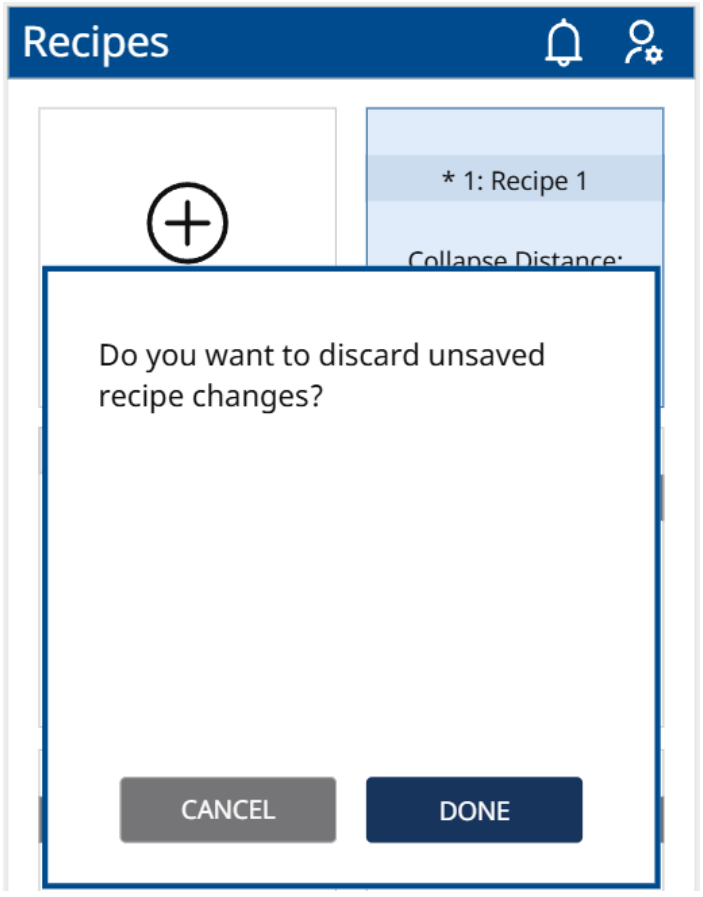
If you forgot to save the current recipe after editing, symbol "*" will be displayed.

Figure 6.17 Recipe Unsaved



If you want to discard the unsaved recipe change, please select "DONE".

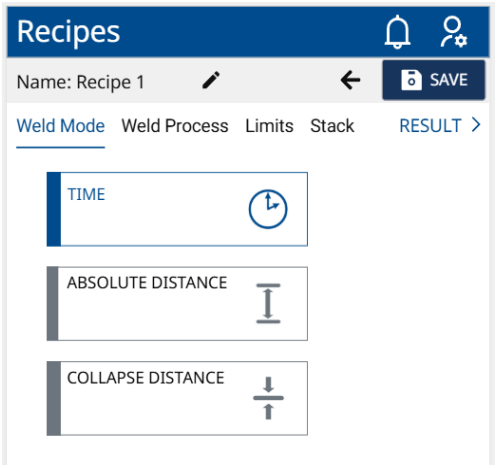
Figure 6.18 Discard Recipe change



6.4.3 Weld Mode

The recipes Setup Menu allows you to select and set all the parameters necessary to successfully operate in any available weld mode. The following parameters are available in recipes Setup.

Figure 6.19 Weld Mode



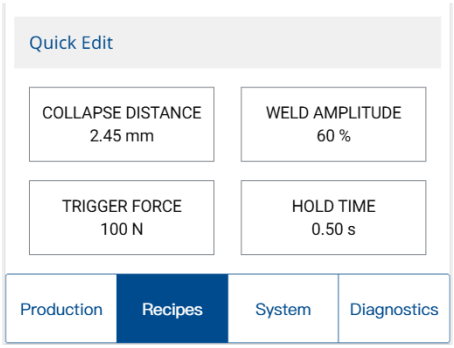
The following table describes each mode:

Mode	Description
Time	Use Time mode to select the length of time (in seconds) that ultrasonic energy is applied to your parts. Within Time mode, you can also select several other parameters, ranging from Hold Time (in seconds) to Suspect and Reject Limits.
Absolute Distance	You can use the Absolute Distance Mode to select the distance (in inches or milliliters) the horn will travel before ultrasonic energy is terminated. Within Absolute Mode, you can also select several other parameters ranging from Hold Time (in seconds) to Suspect and Reject limits.
Collapse Distance	You can use the Collapse Distance Mode to select the distance (in inches or millimeters) your part will be collapsed before ultrasonic energy is terminated. This distance parameter can be set when in Collapse Mode to establish Suspect and Reject Limits. Total Collapse Limits in Collapse Mode is that value achieved at the end of Hold. Within Collapse Mode, you can also select several other parameters, ranging from Hold Time (in seconds) to Suspect and Reject limits.

6.4.4 Weld Mode Parameters

After you select the weld mode, you can edit the related Parameters according to different weld mode.

Figure 6.20 Quick Edit in Time Mode



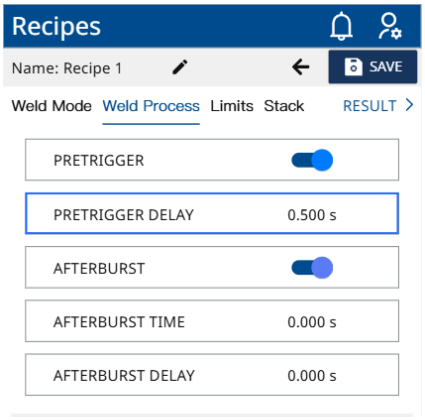
Parameter	Description
Weld Time	Set the length of time (in seconds) that ultrasonic energy will be transmitted to your parts. **NOTICE** Only available in Time mode.
Absolute Distance	Set the vertical distance (in millimeters) that the horn travels from the ready position before ultrasonics are terminated. **NOTICE** Only available in Absolute Distance mode.
Collapse Distance	Set the vertical distance (in millimeters) that your part collapses before ultrasonics are terminated. **NOTICE** Only available in Collapse Distance mode.
Weld Amplitude	You can set the amplitude of the ultrasonic energy that will be delivered in any welding mode. Default is to use 100% of the available amplitude. By changing the amplitude to some lesser percentage of the total available, or by setting the amplitude to begin at one level and finish at another, you can fine tune your overall welding procedure without making changes to your tooling.
Trigger Force	Set the number of newtons of trigger force that will trigger ultrasonics. When the force on your part is equal to the value you have set, ultrasonic energy is applied.
Hold Time	Sets the duration (in seconds) of the Hold step (the step during which there is no ultrasonic energy transmitted to your part, but force is maintained).

6.4.5 Weld Process

6.4.5.1 Pre-trigger

You can select whether the ultrasonic energy will be started before the horn contacts the part. If you select ON, you can set the pre-trigger delay time, ultrasonic will be started, and the amplitude same as the current recipe.

Figure 6.21 Pre-trigger



6.4.5.2 After Burst

You can select whether there will be a burst of ultrasonic energy after welding is complete. This feature is useful for removing parts stuck to the horn. If you select ON, you can also set the delay and length of the after burst (in seconds), and the amplitude that will be used.

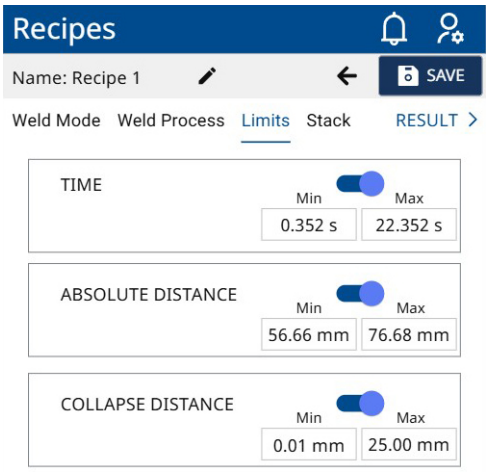
Table 6.1 Parameters

Function	Description
After burst	Press the After burst button to toggle the functionality between ON and OFF.
After burst Delay	Time delay between the end of the weld and the start of the after burst.
After burst Time	The duration of the after burst.

6.4.6 Limits

This screen is used for set limits for Time, Absolute Distance and Collapse Distance. After turning on the toggle on the screen, two values appear on the left and right sides of the toggle, the left side is the lower limit, and the right side is the upper limit. The limits value can be edited by click it on the screen. After selecting the value, a keyboard will pop up, and user can enter values. If the weld result is less or more than the limit, an alarm message will prompt on the screen. The limits function is different from the cutoff function, so that if the weld result reaches the upper limit, the welding process will not be cut off.

Figure 6.22 Limits – Setup



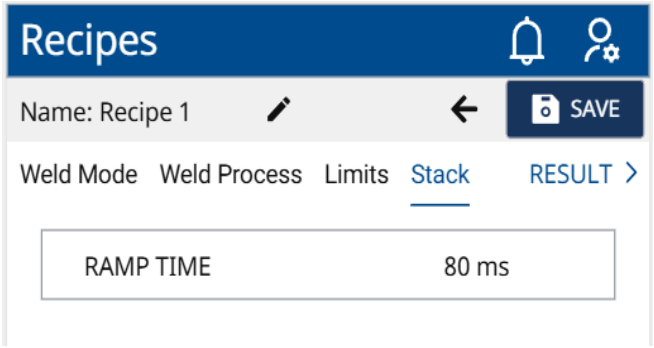
Function	Description
Time	Press the button to toggle the functionality between ON and OFF. Change the time in the textbox.
Absolute Distance	Press the button to toggle the functionality between ON and OFF. Change the distance in the textbox.
Collapse Distance	Press the button to toggle the functionality between ON and OFF. Change the distance in the textbox.

6.4.7 Stack (Ramp)

This controls how fast the amplitude of the horn rises from 0 to 100%. Long ramp times may be useful when using large horns or high gain stacks.

The ramp time shall have a range between 10 and 105 Ms.

Figure 6.23 Ramp Setup



6.4.8 Recipe Setting Review

To easily debug the system, you can edit the parameter according to the weld history and power curve.

Figure 6.24 Weld History

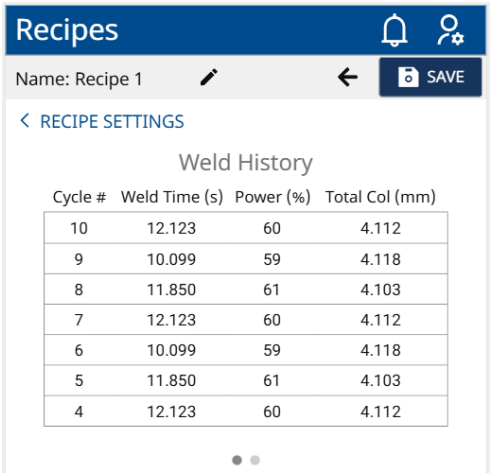
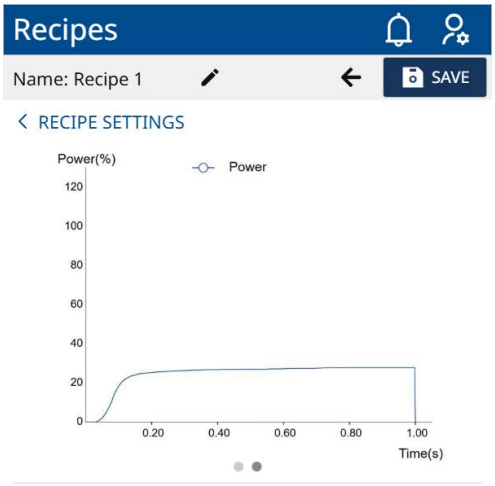


Figure 6.25 Power Curve



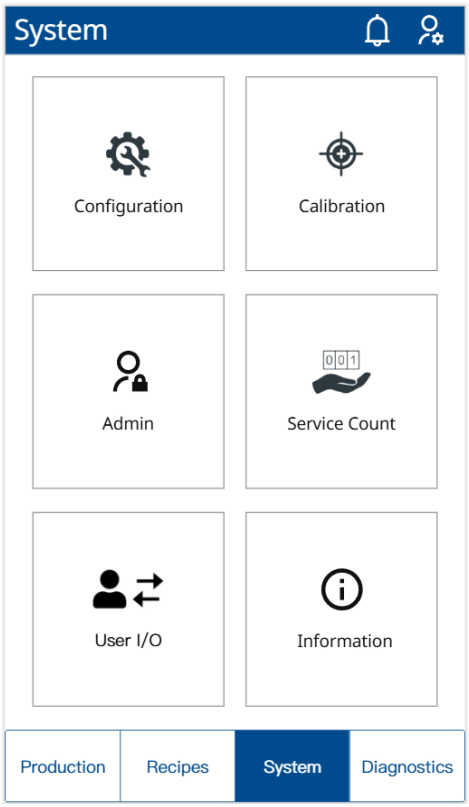
6.5 System

The following parameters are available in System configuration:

System screen includes 6 cards, click each card to jump to the corresponding page for system settings.

The following parameters are available in System configuration:

Figure 6.26 System



Name	Description
Configuration	Set and configure system settings. System settings apply to all recipes.
Calibration	Force calibration setup.
Admin	Change the User account, date & time setting, Authority check.
Service Count	Setting the limits of cylinder, converter, booster.
User I/O	Setting external signal for automation system.
Information	View the event log, and software details.

6.5.1 Configuration

Tap the configuration card to jump to the configuration screen.

The sub screen title is displayed as 'Configuration' under 'System'. There are also 3 icons on the right side. These icons are 'Restore to default',' Back', 'Save'.

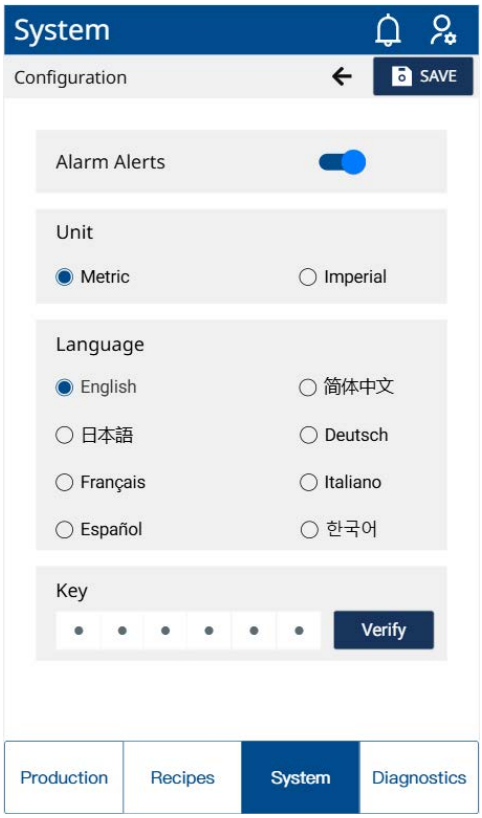
There are 4 parts of configuration screen, including 'Alarm Latch', 'Unit', 'Language', 'Key' for factory setting (Only for Branson's personnel).

Alarm latch status switch is used to control the alarm pop-up window. If the alarm latch status switch has been turned on, alarms will prompt pop-up window on HMI. If alarm latch status is turned off, alarms from AC and PC will prompt popup window on HMI, but alarms from SC will not.

In Unit part, there are metric and imperial options.

In Language part, there are 8 options, including 'English', '简体中文', '日本語', 'Deutsch', 'Français', 'Italiano', 'Español', '한국인'.

Figure 6.27 Configuration



Command List	
Alarm Latch Status	Click the button to open the function
Unit	Select the unit Metric or Imperial
Language	Select language

6.5.2 Calibration

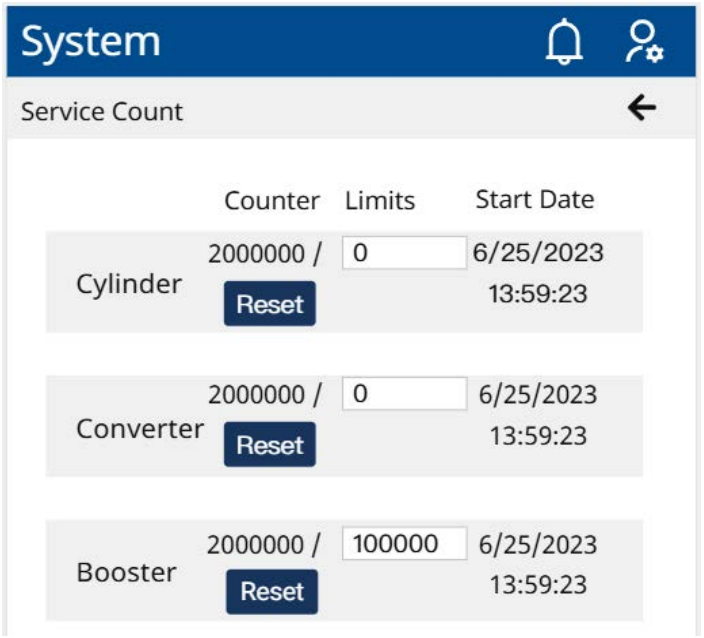
The system calibration is set at the factory and should be good for the life of the system. But if you are operating under regulatory requirements, calibrate the system according to

their schedule and Branson standards. For more detailed information on calibrating the system, you can contact Branson by calling the Technical Support.

6.5.3 Service Count

The usage count of cylinder, converter and booster is counted on this page. Each time welding is performed, the count number increases by one. Users can set the usage limit. The maximum limit value can be set to 100000. When the usage times reaches the upper limit, an alarm will be triggered. And the current cycle will be aborted. After the user clicks the Reset button, the usage count recorded by the welder will be cleared and the start date will become the current date. After each welding, the counter on the page will be updated.

Figure 6.28 Service Count



6.5.4 Admin

The admin screen has three sections: Passcode List, Authority Check Option, and Date & Time Settings.

- Passcode List: Users can view or hide the passcodes for Administrator and Technician by clicking the hide button. To change a passcode, click the passcode area and use the keyboard.
- Authority Check Option: Users can select and save the authority check setting.
- Date & Time Settings: Users can view the current date and time on the HMI. To change the date or time, click the Date & Time area.

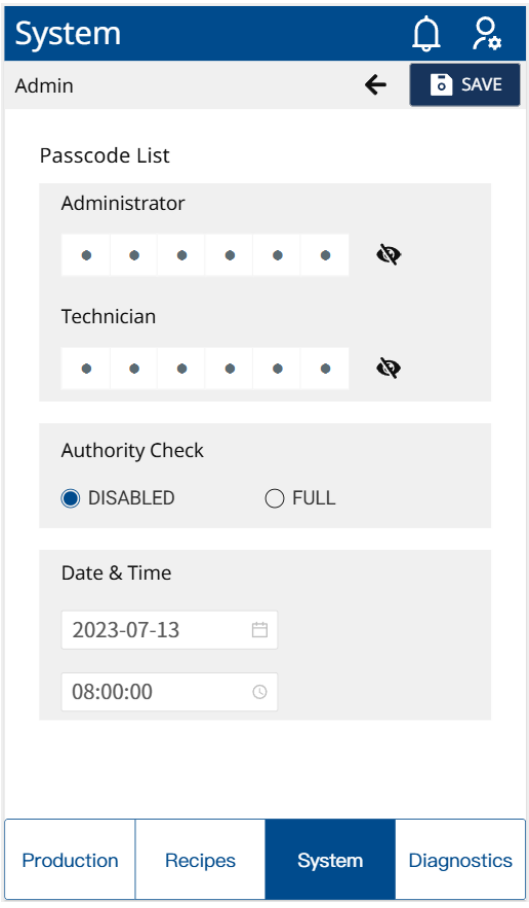
6.5.4.1 Authority Check

The admin screen includes an authority check function with two options: "DISABLED" and "FULL". By default, the authority check is set to "DISABLED".

When the machine is powered on, it checks the authority setting. If set to "DISABLED", the machine logs in using the "Administrator" user, and the "User Switch" option will not be visible in the upper right corner of the HMI. If set to "FULL", the machine logs in using the "Operator" user, and the "User Switch" option will be visible in the upper right corner of the HMI.

Users can change the authority check setting on the admin screen. Selecting "DISABLED" and saving will hide the "User Switch" option. Selecting "FULL" and saving will display the "User Switch" option. Changing the authority check setting does not affect the current user role.

Figure 6.29 Change Password



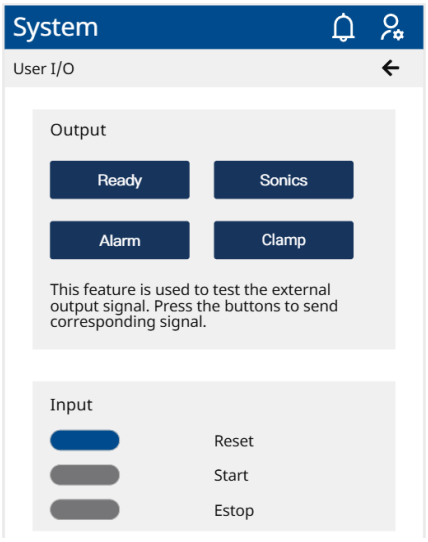
6.5.5 User I/O

The User I/O has 4 outputs and 1 input, and they are non-configurable.

Input: 24VDC high active. Outputs shall be PNP output type. High impedance for inactive and 24VDC high for active.

The 4 outputs are: a. General Alarm b. Ready c. Weld On d. External Clamp Fixture 1 input is: e. External Reset Horn will not move while the start buttons are pressed.

Figure 6.30 User I/O



Name	Signal Type
General Alarm	Output
Ready	Output
External Clamp Fixture	Output
Weld On	Output
External Reset	Input

Output: Users shall click buttons to test the corresponding output signals.

Input: After the welder receives the input signal, the corresponding indicator light will light up.

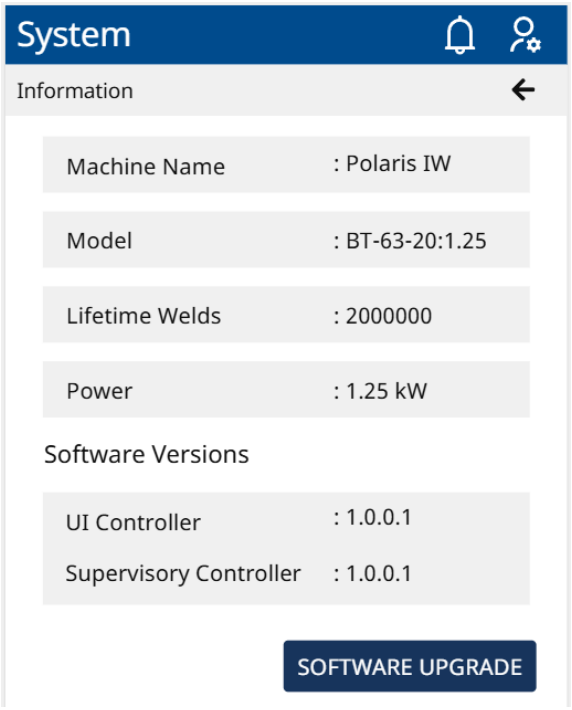
When the HMI displays this screen and the user presses start switches, the welder does not perform any action and will not weld.

6.5.6 System Information

You can view information from the System Information screen about the current setup of your System. This screen should be available whenever you are calling Branson for troubleshooting help.

Software upgrade can be performed by USB on this screen.

Figure 6.31 System Information



6.5.6.1 Software Upgrade

Press the Software Upgrade button to open the Firmware Upload screen. Browse the system files to locate and upload the new firmware file.

Figure 6.32 Software Upgrade

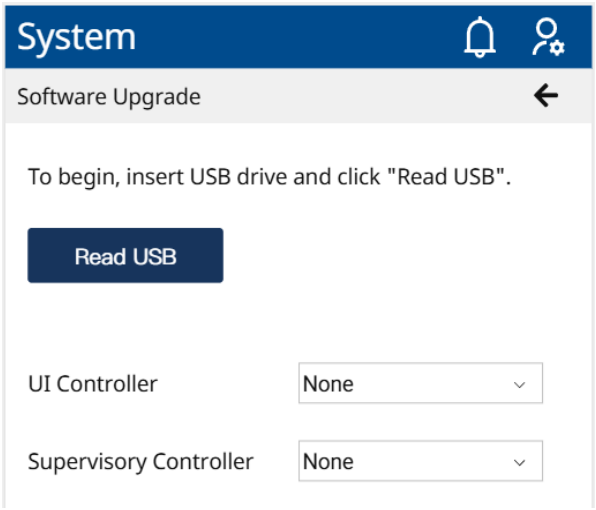
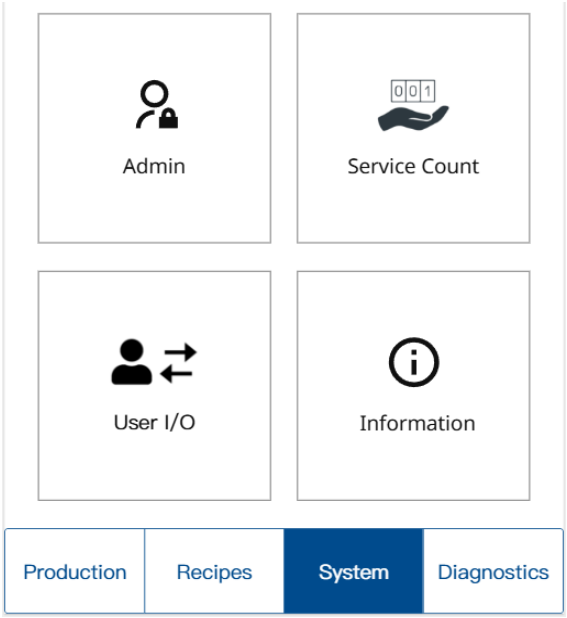
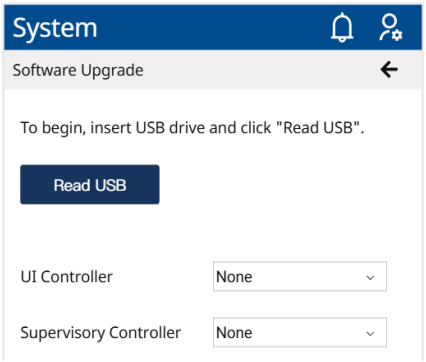
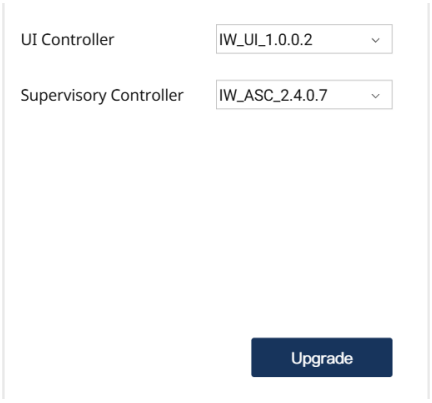
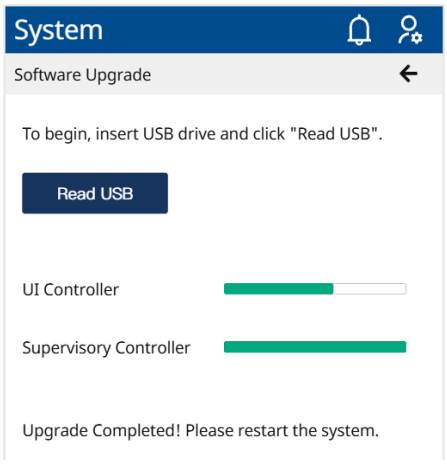
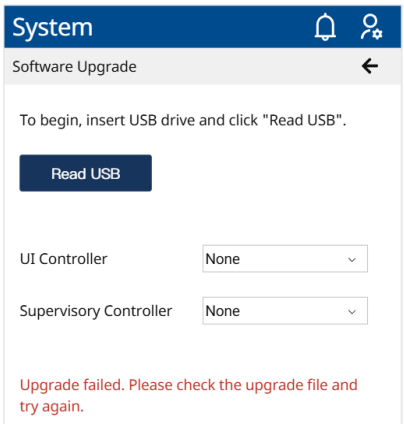


Table 6.2 Software Upgrade Instructions

Step	Action
1	Log in with your current credentials. Press the system button, and find the main interface of system. 
2	Click the button information, Inset the USB drive and click "Read USB".  **NOTICE** Please note the upgrade file format: •SC: IW_ASC_x.x.x.x.bin (Inset the USB drive from rear side of IW) •HMI: W_HMI_x.x.x.x.tar (Open the left cover, inset the USB drive on the HMI)

3	Check the revision and click “Upgrade” 
4	Check the status of the upgrade. The green color bar shows the progress status of upgrading. 
5	Upgrade Failed. 

6.5.7 Data Export

This functionality is not available on the Polaris IW. Contact Branson Sales if you need this functionality to see our full line of Welders that include this feature.

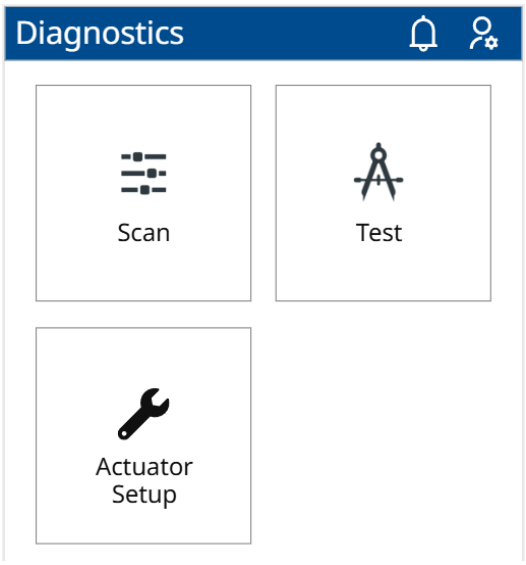
6.5.8 Connectivity

This functionality is not available on the Polaris IW. Contact Branson Sales if you need this functionality to see our full line of Welders that include this feature.

6.6 Diagnostics

Diagnostics includes 3 cards, click each card to jump to the corresponding page for diagnostics.

Figure 6.33 Diagnostics



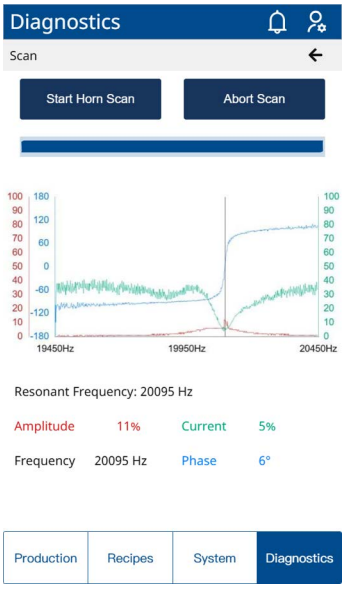
Data	Description
Scan	Horn scan, starts and stop frequencies shall be fixed and the range shall depend on the power supply frequency.
Test	Test the frequency, memory, power.
Actuator Setup	Horn mode. Check clamp force and down speed.

6.6.1 Horn Scan

During the horn scan, no other welding related functions shall be allowed.

Exiting the Horn Scan menu shall result in aborting the diagnostic and all data is discarded.

Figure 6.34 Horn Signature Graph

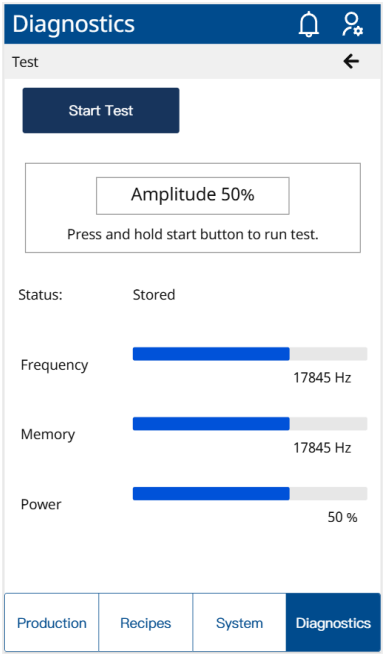


6.6.2 Test

Users can press Start Test button to start the sonics test using the amplitude which displays on the screen. The amplitude can be modified by click the input box on the screen.

When the user keeps pressing the button, the machine will continue to emit ultrasound until the button is released. During this time, the power bargraph displays real-time power data.

Figure 6.35 Test

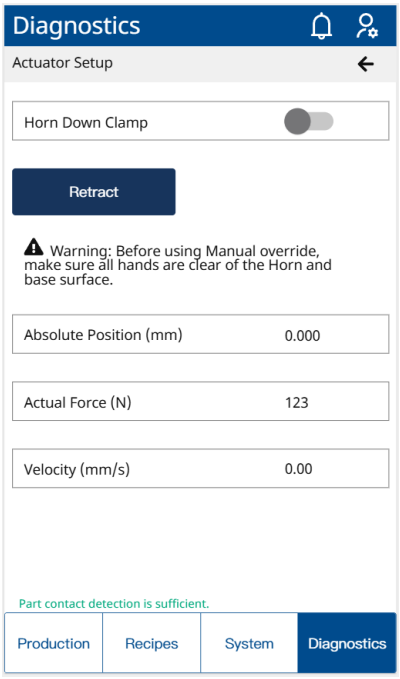


6.6.3 Actuator Setup

Users can perform Horn Down on the Actuator Setup screen. After Horn Down, the absolute position, Actual force and velocity will display on the screen. There is a clamp toggle on the screen. If user turn on this toggle, the horn will keep contact with tooling or part until user click "Retract" button (**Note:** this function requires an auxiliary box, only for professional Branson Technicians). The absolute position shows the distance from the ULS to the position where horn contacts the parts or tooling. The actual force shows the force value after the horn contacts the parts or tooling. The velocity shows the average horn down speed during the ULS to part contact.

WARNING	
	Make sure all hands are clear of the horn and base surface.

Figure 6.36 Horn Down



Chapter 7: Maintenance

7.1 General Maintenance Considerations

NOTICE	
	There are no customer replaceable components inside the system. Have all servicing done by a qualified Branson technician.

NOTICE	
	When performing maintenance on the welder, make sure that no other automated systems are active.

WARNING	
	Use LOTO (Lock Out Tag Out) lockable plug cover over line cord plug during any maintenance.

7.2 Periodically Clean the Equipment

7.2.1 External Covers

External covers may be cleaned with a damp sponge or cloth using a solution of mild soap and water. Do not allow cleaning solution to enter the unit.

To prevent rust in areas of high humidity, exposed steel surfaces, may require a very light film of rust preventing oil.

7.2.2 Touchscreen

When it is necessary to clean the touchscreen, wipe gently with a soft cloth dampened with a mild detergent. Give a final wipe to the entire screen with the soft damp cloth. Under no circumstances should you use solvents or ammonia to clean the screen.

7.3 Periodic and Preventive Maintenance

The following preventive measures will help ensure long term operation of your Branson Polaris IW machine.

7.3.1 Routine Component Replacement

The lifetime of certain parts is based on the number of cycles the unit has completed, or on hours of operation. Table 7.1 Component Replacements Based on Cycles Run lists the average number of hours or cycles one should use in determining when components should be replaced. Ambient operating temperature also affects lifetime. Higher temperatures reduce the number of cycles and hours before replacement is suggested. The charts below are for equipment operating at a temperature of 72 to 75°F (22 - 24°C).

The lifetime of system pneumatic components is influenced by the quality of the compressed air provided. All Branson systems require clean, dry, (normal) factory compressed air. When oil or moisture is present in the compressed air, the lifetime of the pneumatic components will be reduced. This table lists pneumatic parts with an average factory compressed air condition.

Table 7.1 Component Replacements Based on Cycles Run

Cycles Run	Component
At 10 Million Cycles	Air Cylinder
	Hydraulic snubber
At 20 Million Cycles	Base Palm Buttons
At 40 Million Cycles	Solenoid Valves
	Pressure Regulator
	Air Filter
	Cooling Valve
	Load cell
	Encoder Assembly
	Linear Bearing (2" stroke or greater)

7.3.2 For Reference Purposes

- A system operating at 60 welds per minute, 8 hours per day, 5 days per week, 50 weeks per year completes approximately 7.2 million cycles in 2000 hours.
- The same system at 24 hours per day, 5 days per week, in 50 weeks completes 21.6 million cycles in 6000 hours.
- 24 hours per day, 365 days per year produces 31.5 million cycles in 8760 hours.

Please note that parts replaced during preventive maintenance constitute normal wear and tear. They are not covered by warranty.

7.4 Recondition the Stack (Converter, Booster and Horn)

NOTICE	
	Never clean the converter-booster-horn stack mating surfaces by using a buffing wheel or by filing.

Welding system components work most efficiently when the converter-booster-horn stack mating surfaces are flat, in solid contact, and free from fretting corrosion. Poor contact between mating surfaces wastes power output, makes tuning difficult, increases noise and heat, and may cause damage to the converter.

For standard 20 kHz products, a Branson Mylar polyester film washer should be installed between the horn and booster, and horn and converter. Replace the washer if torn or perforated. Stacks using Mylar plastic film washers should be inspected every three months.

Stacks used with silicone grease, as with certain 20 kHz products, should be periodically reconditioned to eliminate fretting corrosion. A stack using silicone grease should be inspected every two weeks for corrosion. When experience is gained for specific stacks, the inspection interval can be adjusted to a longer or shorter period as required.

7.4.1 Stack Reconditioning Procedure

To recondition stack mating surfaces, take the following steps.

Table 7.2 Stack Reconditioning Procedure

Step	Action
1	Disassemble the converter-booster-horn stack and wipe the mating surfaces with a clean cloth or paper towel.
2	Examine all mating surfaces. If any mating surface shows corrosion or a hard, dark deposit, recondition it.
3	If necessary, remove the threaded stud from the part.
4	Tape a clean sheet of #400 (or finer) grit emery cloth to a clean, smooth, flat surface (such as a sheet of plate glass).
5	Place the interface surface on the emery cloth. Grasp the part at the lower end, with your thumb over the spanner-wrench hole, and lap the part in a straight line across the emery cloth. Do not apply downward pressure — the weight of the part alone provides sufficient pressure.
6	Lap the part, two or three times, in the same direction against the emery cloth.
7	Rotate the part 120 degrees, placing your thumb over the spanner-wrench hole, and repeat the lapping procedure in Step 6.
8	Rotate the part another 120 degrees to the next spanner-wrench hole, and repeat the lapping procedure in Step 6.
9	Re-examine the mating surface. If necessary, repeat Steps 2-5 until you remove most of the contaminant. Remember, this should not require more than two to three complete rotations for an aluminum horn or booster; a titanium component may require more rotations.

10	Before re-inserting a threaded stud in an aluminum booster or horn: • Using a file card or wire brush, clean any aluminum bits from the knurled end of the stud. • Using a clean cloth or towel, clean the threaded hole. • Examine the knurled end of the stud. If worn, replace the stud. Also, examine the stud and threaded hole for stripped threads. **NOTICE** Threaded studs cannot be reused in titanium horns or boosters. Replace all studs in these components.
11	Assemble and install the stack.

7.4.2 Stack Torque Values

Table 7.3 Stack Torque Values

Frequency	Torque
20 kHz	25 N·m
	220 in·lb

7.5 Accessories & Spare Parts

The following table list the available Accessories and Parts for the Polaris IW.

7.5.1 Polaris IW Systems

Table 7.4 Polaris IW Systems

Name	Description	EDP
IW-BT-CYL 80-20:1.25	POLARIS IW 80D 1.25kW	BU-1044498
IW-BT-CYL 80-20:2.5	POLARIS IW 80D 2.5kW	BU-1044499
IW-BT-CYL 80-20:4.0	POLARIS IW 80D 4kW	BU-1044500
IW-BT-CYL 63-20:1.25	POLARIS IW 63D 1.25kW	BU-1044501
IW-BT-CYL 63-20:2.5	POLARIS IW 63D 2.5kW	BU-1044504
IW-BT-CYL 63-20:4.0	POLARIS IW 63D 4kW	BU-1044503
IW-AT-CYL 80-20:1.25	POLARIS IW 80D 1.25KW HUB	BU-1043610
IW-AT-CYL 80-20:2.5	POLARIS IW 80D 2.5KW HUB	BU-1043611
IW-AT-CYL 80-20:4.0	POLARIS IW 80D 4KW HUB	BU-1043612
IW-AT-CYL 63-20:1.25	POLARIS IW 63D 1.25KW HUB	BU-1043613
IW-AT-CYL 63-20:2.5	POLARIS IW 63D 2.5KW HUB	BU-1043614
IW-AT-CYL 63-20:4.0	POLARIS IW 63D 4KW HUB	BU-1043615

7.5.2 Converters

Table 7.5 Converters

Description	EDP
CJ20	101-135-059R

7.5.3 Boosters

Table 7.6 Boosters - 20 kHz

Type of Booster	Description	EDP
Standard Series 1/2-20 Input; 1/20-20 Output 20 kHz	Aluminum, 1:0.6 (Purple)	101-149-055
	Aluminum, 1:1 (Green)	101-149-051
	Aluminum, 1:1.5 (Gold)	101-149-052
	Aluminum, 1:2 (Silver)	101-149-053
	Titanium, 1:0.6 (Purple)	101-149-060
	Titanium, 1:1 (Green)	101-149-056
	Titanium, 1:1.5 (Gold)	101-149-057
	Titanium, 1:2 (Silver)	101-149-058
	Titanium, 1:2.5 (Black)	101-149-059
Solid Mount 1/2-20 Input; 1/20-20 Output 20 kHz	Titanium, 1:0.6 (Purple)	101-149-095
	Titanium, 1:1 (Green)	101-149-096
	Titanium, 1:1.5 (Gold)	101-149-097
	Titanium, 1:2 (Silver)	101-149-098
	Titanium, 1:2.5 (Black)	101-149-099

7.5.4 Spare Parts List - General

Description	EDP Number
Linear Encoder Assembly	BU-1039487
Load Cell Assembly	BU-1039488
Bearing Slide	100-003-080
Spring Carriage Ext	100-095-139
Conv 20Khz CJ-20 Asia	101-135-059RA

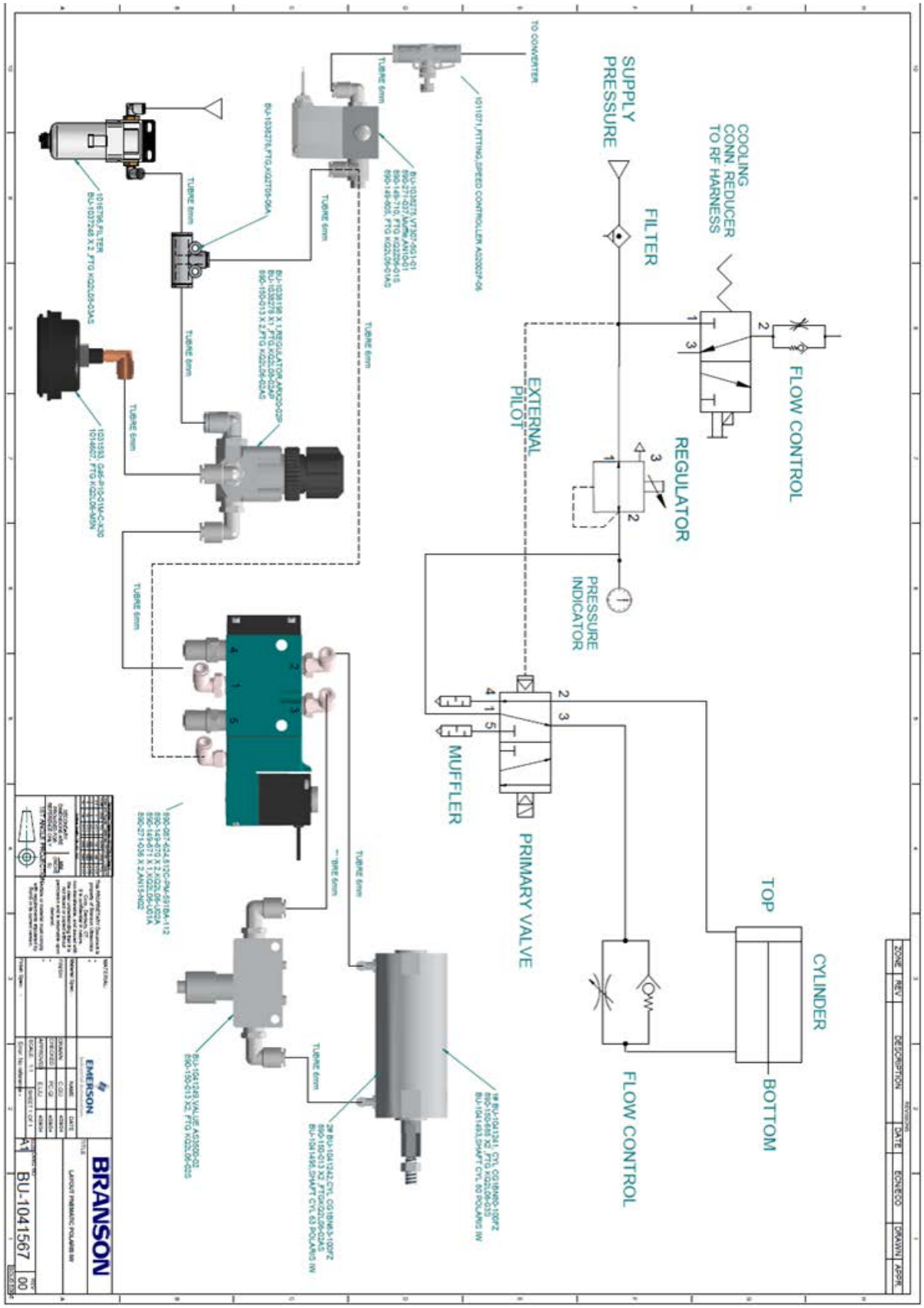
7.5.5 Spare Parts List-Pneumatic

If you need more information for the pneumatic system, please see the drawing: BU-1041567, Layout Pneumatic Polaris IW

Table 7.7 Pneumatic System Parts List

Description	EDP Number
Air Filter Dp	1016796
Cooling Valve Assembly	BU-1038728
Primary Solenoid Valve Assembly	560-087-123
Down speed Control	BU-1041249
Flow Controller	1011071
Regulator, ARX20-02P SMC,IW	BU-1038198
Cylinder 80mm Diameter	BU-1041241
Cylinder 63mm Diameter	BU-1041242
Pressure Indicator G46-P10-01M-C-X30 (SMC)	1013593

Figure 7.1 Layout Pneumatic Polaris IW



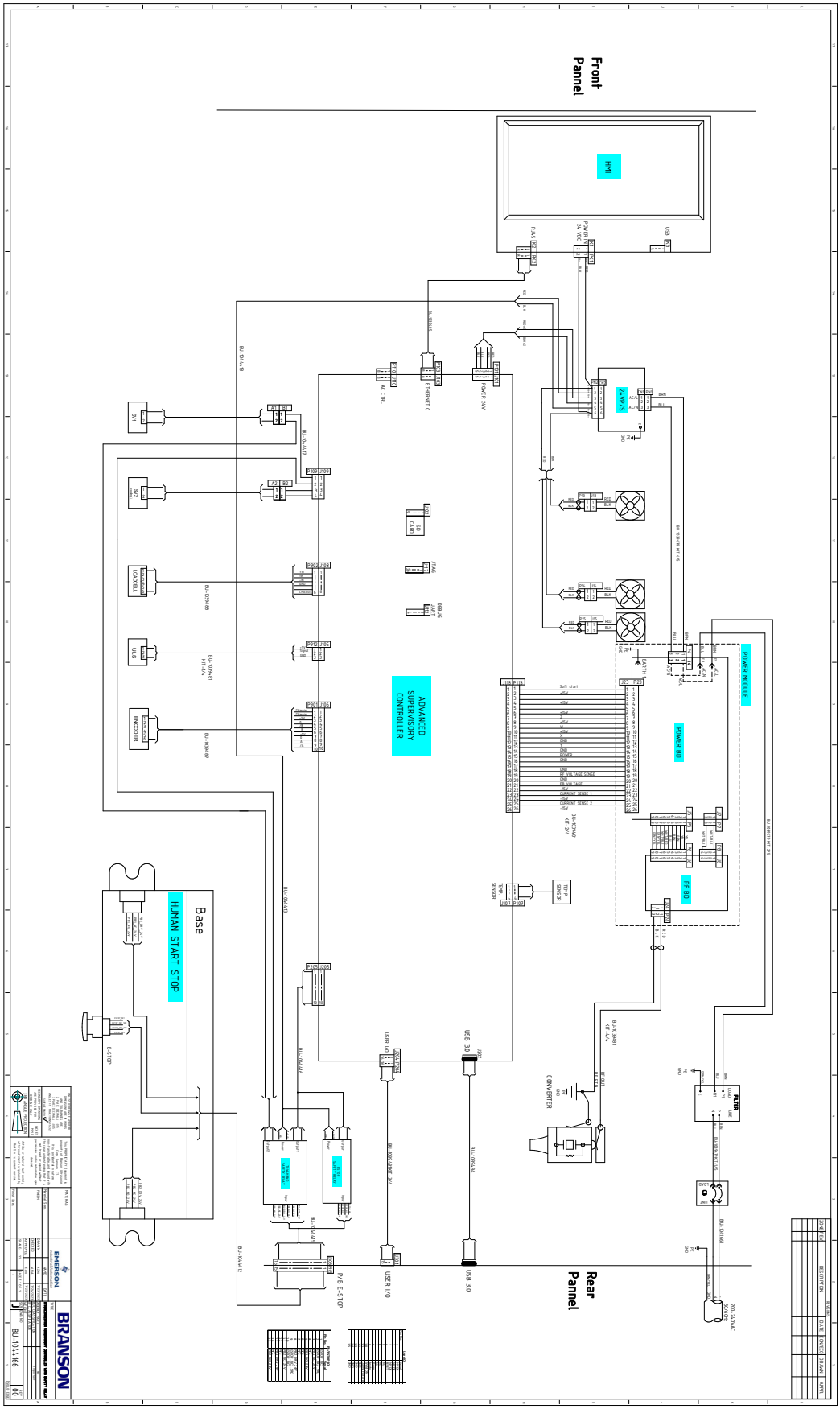
7.5.6 Spare Parts List (Electric)

If you need more information for electronic system, please see the drawing: BU-1038769, Interconnection Supervisory Controller

Table 7.8 Electric System Parts List

Description	EDP Number
Circuit breaker 25amp 250V	100-167-031
ASSY EMI FILTER 20KHZ	BU-1039489
ASSY MDL POLARIS IW 20KHZ 4.0KW	BU-1041844
ASSY MDL POLARIS IW 20KHZ 2.5KW	BU-1041845
ASSY MDL POLARIS IW 20KHZ 1.25KW	BU-1041846
P/S 24VDC AC/DC	1020899
ASSY PCB ACE-IW SUPERVISORY CONTROLLER	BU-1038772
SWITCH,OPTICAL(SHARP GP1A05A)	200-099-190R
FAN W/HARNESS NWS	1007923
FAN 24VDC 92mmX92mmX25mm	100-126-015R
ASSY LINE CORD 3G11AWG UL	BU-1041661
CBL USB 90° BEND ONE PORT	BU-1039484
CBL Ethernet CAT5E	BU-1039485
ASSY Hight Encoder ACE-IW	BU-1039487
ASSY Loadcell ACE-IW	BU-1039488
KIT ASSY Harness Power220VAC ACE-IW	BU-1039479
KIT ASSY Harness Power24VDC ACE-IW	BU-1039480
KIT ASSY Harness IO and Sensor ACE-IW	BU-1039481
SAFETY RELAY 440R-D23171 ROCKWELL	1016716
SAFETY RELAY 440R-N23114 ROCKWELL	1016714
PUSHBUTTON ROUND 1NO1NC BLACK HW	BU-1029061
SWITCH EMERGENCY STOP 2NC	BU-1044409
ASSY HARNESS BASE POLARIS IW WITH SAFETY RELAY	BU-1044412
ASSY HARNESS POWER 24VDC SAFETY RELAY POLARIS IW	BU-1044413
ASSY HARNESS INPUT TO SAFETY RELAY POLARIS IW	BU-1044415
ASSY HARNESS SAFETY RELAY TO ASC POLARIS IW	BU-1044416
ASSY HARNESS SAFETY RELAY TO SV1 CONNECTOR POLARIS IW	BU-1044417
BRKT SAFETY RELAY POLARIS IW	BU-1044426

Figure 7.2 Interconnection Supervisory Controller



Chapter 8: Support

8.1 Warranty

For warranty information please reference the warranty section of Terms and Conditions found at: www.emerson.com/branson-terms-conditions.

8.2 How to Contact Branson

We partner with companies of every size and scope to help resolve critical issues. Our global resources and unrivaled technical expertise are available where you need them. Our professionally trained Branson Service Specialists will help you address your needs to maximize productivity — while minimizing any chance of unwanted downtime.

Click on https://www.emerson.com/en-us/contact-us-v2 for more information and assistance.

8.2.1 Americas

Table 8.1 Authorized Service Centers (Americas)

Name	Address	Tel/Fax Number
CANADA		
Canada Branson Ultrasonics.	66 Leek Crescent Richmond Hill, ON L4B-1H1	T: +1 905 762-3301 F: +1 905-762-3317 www.emerson.com/branson
UNITED STATES		
Headquarters Branson Ultrasonics Corporation	120 Park Ridge Road Brookfield, CT 06804	T: +1 203-796-0400 F: +1 203-796-0450 www.emerson.com/branson
California Branson Ultrasonics Corporation	22693 Old Canal Road Yorba Linda, CA 92887	T: +1 714-637-1029 F: +1 714-637-1046 www.emerson.com/branson
	43272 Christy Street Fremont, CA 94538	T: +1 510-226-8210 www.emerson.com/branson
Illinois Branson Ultrasonics Corporation	145C Prairie Lake Road East Dundee IL 60118 United States	T: +1 847-229-0800 F: +1 847-229-0861 C: +1 847-989-1564 www.emerson.com/branson

Table 8.1 Authorized Service Centers (Americas)

Name	Address	Tel/Fax Number
Michigan Branson Ultrasonics Corporation	23028 Commerce Dr Farmington Hills MI 48335 United States	T: +1 586-276-0150 F: +1 586-276-0160 www.emerson.com/branson
Texas Branson Ultrasonics Corporation	3200 Emerson Way McKinney, TX 75070 United States	T: +1 972-385-9673 www.emerson.com/branson
MEXICO		
Nuevo Laredo Branson de Mexico S.A. de C.V.	Carretera Nacional Km 8.5 Modulo Industrial America Lote #4 C.P. 88277 Nuevo Laredo, Tamaulipas, Mexico	T: +52 867-711-0810 F: +52 867-711-0811
Monterrey Branson de Mexico S.A. de C.V.	Av. Norte 200 Parque Industrial Kalos C.P. 66600 Monterrey, Nuevo Leon, Mexico	T: +52 81-1332-0261

8.2.2 Europe

Table 8.2 Authorized Service Centers (Europe)

Name	Address	Tel/Fax Number
GERMANY		
Headquarters Branson Ultraschall	Niederlassung der Emerson Technologies GmbH & Co. OHG Waldstrasse 53-55 63128 Dietzenbach, Germany	T: +49 6074-497-0 F: +49 6074-497-199 www.branson.eu
FRANCE		
Rungis Branson Ultrasons	Parc d'affaires Silic 1 Rue des Pyrénées, BP 90404 94573 Rungis Cedex, France	T: +33 (0)1-4180-2550 F: +33 (0)1-4687-8729 www.branson.eu
ITALY		
Milan Branson Ultrasuoni, S.r.l.	Via Dei Lavoratori, 25 20092 Cinisello Balsamo Milano, Italy	T: +39 02-660-8171 F: +39 02-660-10480 www.branson.eu
SLOVAKIA		
Nove Mesto Emerson a.s., Division Branson	Piestanska 1202/44 91528 Nove Mesto Nad Vahom Slovak Republic	T: +421 32-7700-501 F: +421 32-7700-470
SPAIN		
Barcelona Branson Ultrasonidos S.A.E.	C/ Botánica, 131 08908 L´Hospitalet de Llobregat Barcelona, Spain	T: +34 93-586-0500 F: +34 93-588-2258 www.branson.eu

Table 8.2 Authorized Service Centers (Europe)

Name	Address	Tel/Fax Number
SWITZERLAND		
Geneva Branson Ultrasonic SA	9 Chemin du Faubourg-de-Cruseilles CH-1227, Carouge Geneve, Switzerland	T: +41 22-304-83-40
UNITED KINGDOM		
Berkshire Branson Ultrasonics	158 Edinburgh Avenue Slough, Berkshire England 5L1 4UE	T: +44 4753-756675 T: +44 1753-756675 F: +44 1753-551270 www.branson.eu

8.2.3 Asia/Pacific

Table 8.3 Authorized Service Centers (Asia/Pacific)

Name	Address	Tel/Fax Number
CHINA		
Headquarters Branson Ultrasonics (Shanghai) Co., Ltd. (China H.Q.)	758 Rong Le Dong Road, Song Jiang Shanghai, PRC, 201613	T: +86 21-3781-9600 F: +86 21-5774-5100 www.branson-china.com
Changzhou Branson Ultrasonics	Room B1206, Hu Tang World Trade Center Wujin District, Changzhou, China	T: +86 189-1753-8535
Chongqing Branson Ultrasonics	Room 5-2403, No.333 Dong Hu South Road, Yu Bei District, Chongqing, China, 401120	T: +86 23-6749-6660 F: +86 23-6749-6660
Dongguan Branson Ultrasonics	Unit B, 4/F, Block 9, Ke Gu Industrial Park No. 6 Zhong Nan Nan Road Shang Sha She Qu, Chang An Town Dongguan, Guangdong, China	T: +86 769-8541-0736 F: +86 769-8541-0735
Tianjin Branson Ultrasonics (Shanghai) Co., Ltd. (Tianjin Office)	Room 103, 5 Gates, Block K2, Haitai Green Industry Base Northwest Side of Sanjing Road and Erwei Road Huayuan Industrial Zone, Tianjin New Industrial Park, China	T: +86 22-8763-0822 F: +86 22-8763-0822
INDIA		
Navi Mumbai Emerson Process Management (India) Private Limited Branson Ultrasonics	PLOT NO C1, TALEGAON Industrial Area, MIDC PHASE 2, MINDEWADI, TALUKA MAWAL, District PUNE – 410 506, MAHARASHTRA, India	T: +91 211 411 110
JAPAN		
Fukuoka Branson Ultrasonics Div. of Emerson Japan Ltd. (Fukuoka Office)	No. 16 Hakata-higashi IR Bldg. 1-3-8 Toko, Hakata Fukuoka, Japan 812-0008	T: +81 92-473-8292 F: +81 92-473-8446 www.branson-jp.com

Table 8.3 Authorized Service Centers (Asia/Pacific)

Name	Address	Tel/Fax Number
Kanagawa Branson Ultrasonics Div. of Emerson Japan Ltd. (Japan H.Q.)	4-3-14 Okada, Atsugi-Shi Kanagawa, Japan, 243-0021	T: +81 46-228-2881 F: +81 46-288-8892 www.branson-jp.com
Nagoya Branson Ultrasonics Div. of Emerson Japan Ltd. (Nagoya Office)	2100 Hattanda Higashi-tanaka, Komaki, Aichi Nagoya, Japan, 485-0826	T: +81 568-41-5411 F: +81 568-41-5410 www.branson-jp.com
Osaka Branson Ultrasonics Div. of Emerson Japan Ltd. (Osaka Office)	3-3-3 Moto-machi, Naniwa Osaka, Japan, 556-0016	T: +81 6-6636-7601 F: +81 6-6636-7602 www.branson-jp.com
Saitama Branson Ultrasonics Div. of Emerson Japan Ltd. (Urawa Office)	2-18-7 Higashiurawa, Midori-ku, Saitama, Japan, 336-0926	T: +81 48 638 1600 F: +81 48 638 1601 www.branson-jp.com
MALAYSIA		
Kuala Lumpur Branson Ultrasonics Div. of Emerson Elec (M) Sdn Bhd.	Clean: No. 11, Jalan TP5A Taman Perindustian Sime UEP 47600 Subang Jaya, Selangor, Malaysia	T: +603 8081-3338 F: +603 8081-5188
Penang Branson Ultrasonics (Penang Office)	No. 1-3-35 Ideal Avenue, Jalan Tun Dr. Awang 11900 Bayan Lepas, Penang, Malaysia	T: +604 641-0276 F: +604 641-0273
SINGAPORE		
Singapore Branson Ultrasonics Div. of Emerson Electric (South Asia) Pte. Ltd.	Blk 4008 Ang Mo Kio Avenue 10 #04-16, TECHPLACE I Singapore 569625	T: +65 6556-1100 F: +65 6455-8459 www.bransonultrasonics.com
SOUTH KOREA		
Gunpo Branson Korea Co. Ltd.	82-20, Bongseong-ro, Gunpo-si Gyeonggi-do, Korea 15850	T: +82 31-422-0631 F: +82 31-422-9572
THAILAND		
Bangkok Emerson (Thailand) Ltd.	662/39-40 Rama 3 Road Bangpongpang, Yannawa Bangkok, Thailand, 10120	T: +66 2-293-0121-7 F: +66 2-293-0129 www.bransonultrasonics.com
Rayong Branson Ultrasonics	100/59-60, Moo 8, Khao Khan Song Sriracha, Chonburi 20110, Thailand	T: +66 2-293-0121 F: +66 2-293-0129

Appendix A: Alarms

When the HMI displays an Alarm ID, please find the detail information in the list.

A.1 Alarm for Source PC

Table A.1 Alarm for Source PC

Alarm ID	Description
0x63C	Sonics Source Lost
0x006	Temperature Overload
0x002	Current Overload
0x005	Voltage Overload
0x004	Power Overload
0x003	Frequency Overload
0x866	Seek Temperature Overload
0x862	Seek Current Overload
0x865	See Voltage Overload
0x864	See Power Overload
0x863	Seek Frequency Overload
0x846	Test Temperature Overload
0x842	Test Current Overload
0x845	Test Voltage Overload
0x844	Test Power Overload
0x843	Test Frequency Overload

A.2 Alarm for Source AC

Table A.2 Alarm for Source AC

Alarm ID	Description
0x625	Horn Return Back Timeout
0x604	ULS is not Active at Home Position
0x609	Start Switch Lost
0x628	Start Switch Timeout
0x41E	Force Calibration Failure
0x401	Trigger Force Failure

A.3 Alarm for Source SC

Table A.3 Alarm for Source SC

Alarm ID	Description
0x609	Start Switch Lost
0x71A	Reach out Batch Size
0x703	Sonics Timeout
0x42B	Weld Time Cutoff
0x41F	Collapse Distance Cutoff
0x41C	Absolute Distance Cutoff
0x506	Weld Time is more than upper limit
0x505	Weld Time is less than lower limit
0x50A	Collapse Distance is more than upper limit
0x509	Collapsedist Distance is less than lower limit
0x50C	Absolutedist Distance is more than upper limit
0x50B	Absolutedist Distance is less than lower limit
0x580	The cylinder count reaches the max value of service count.
0x581	The converter count reaches the max value of service count.
0x582	The booster count reaches the max value of service count.
0x450	EEPROM System Configure Error

Appendix B: Password Protection

There shall be three levels of password protection: Operator, Technician, Administrator.

B.1 Three Level Password Protection

Menu	Feature	Operator	Technician	Administrator
Header	Check Notification	√	√	√
	User Switch	√	√	√
Production	Run Active Recipe	√	√	√
	Reset Alarms	√	√	√
	Welding related info	√	√	√
Recipes	New Recipe		√	√
	Edit Recipe		√	√
	Delete Recipe		√	√
	Copy Recipe		√	√
	Reset Cycle Count	√	√	√
	Set As Active		√	√
	Batch Setting	√	√	√
System	Configuration			√
	Calibration		√	√
	Admin			√
	Service Count			√
	User I/O		√	√
	Information	√	√	√
	Software Upgrade			√
Diagnostics	Scan	√	√	√
	Test	√	√	√
	Actuator Setup	√	√	√

Appendix C: Timing Diagrams

C.1 State Timing Diagrams

C.1.1 Weld Cycle with No Alarms

The sequence below is for a weld cycle with no alarm happened during the whole weld cycle. PB (1,2) can be released when Clamp signal is inactivated.

Figure C.1 Normal Weld Cycle with No Alarms detected

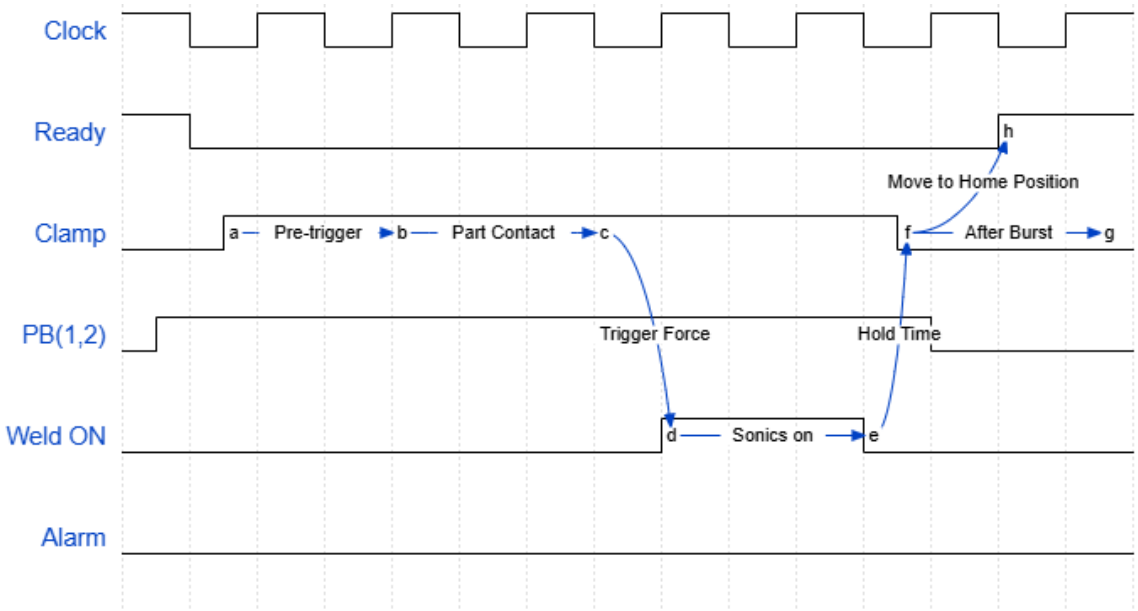
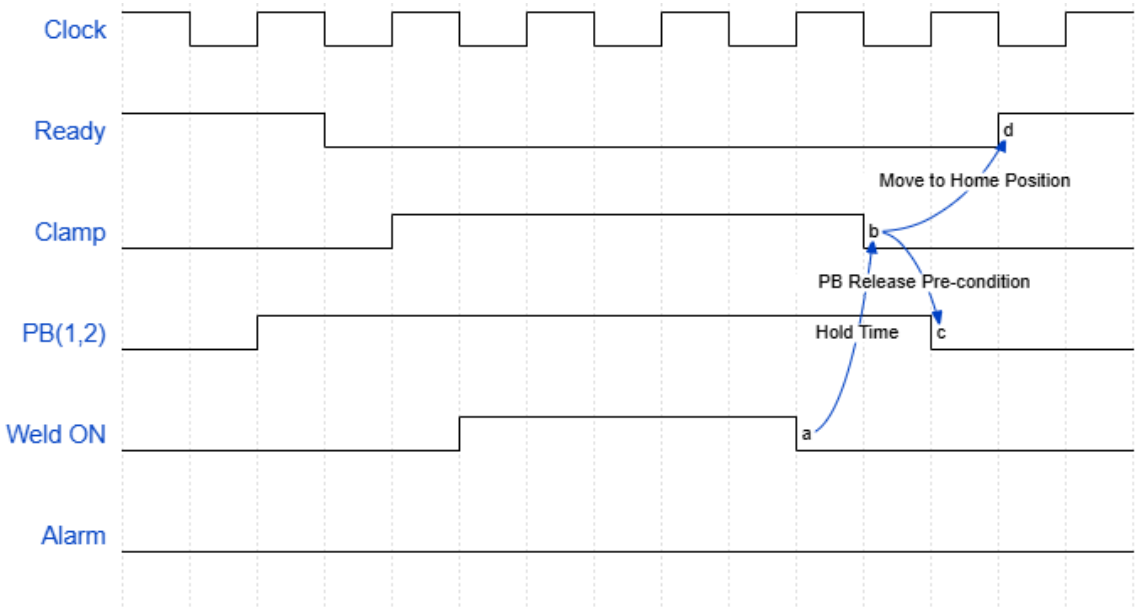


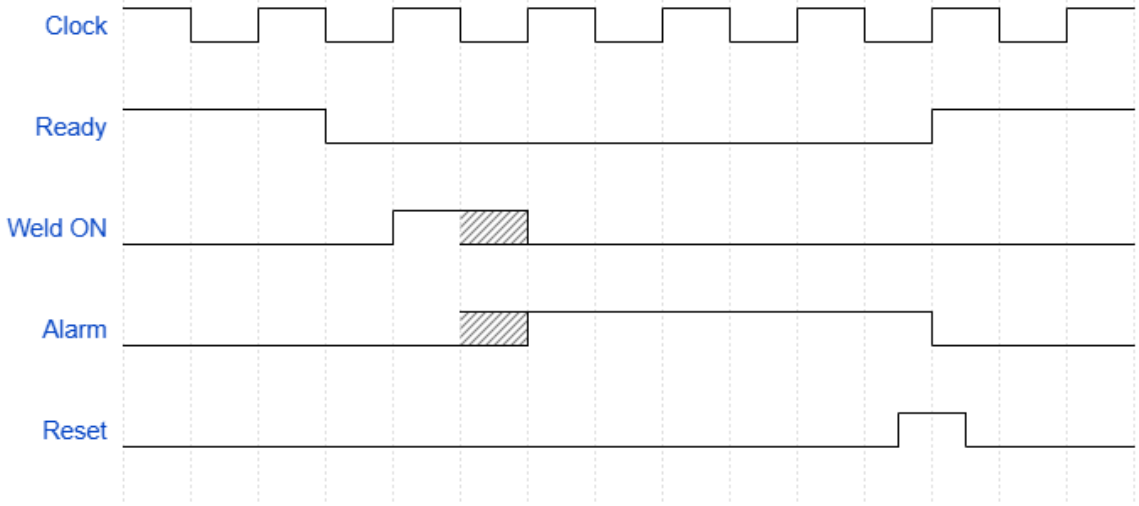
Figure C.2 PB(1,2) Release Pre-condition



C.1.2 Weld Cycle with alarm happened

The sequence below is a weld cycle. If there is an alarm detected during the welding cycle, the Alarm shall be activated that can be reset by Reset. The Ready single is the indicator that will be activated when the Alarm is reset. The new weld cycle can start until the Ready signal is activated again.

Figure C.3 Weld Cycle with Alarm

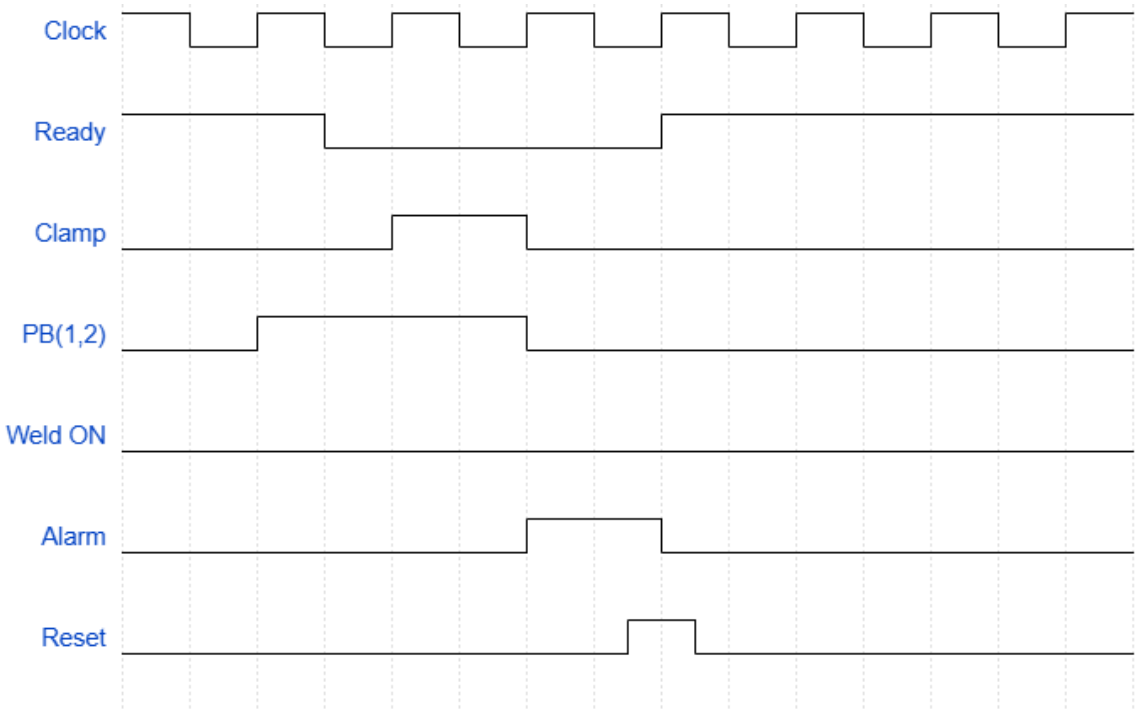


C.2 Output Timing Diagrams

C.2.1 PB Release and Alarm

Once PB (1,2) is released before Weld ON is activated, and an alarm will be prompted. After the Reset is activated, the alarm shall disappear automatically.

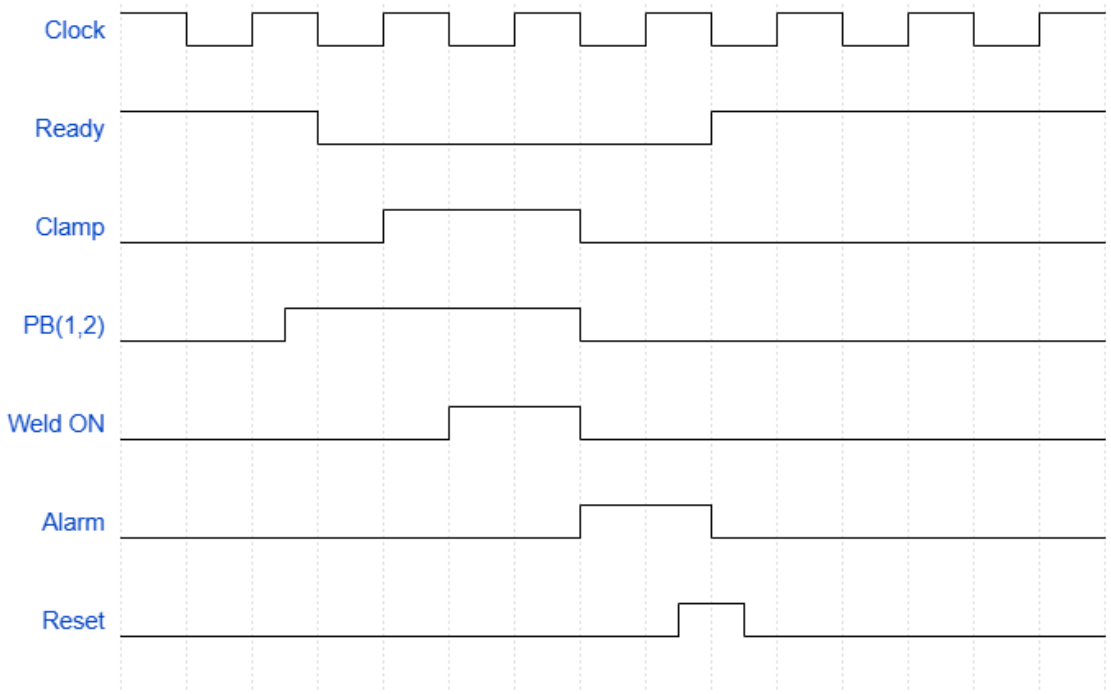
Figure C.4 PB(1,2) Release and Alarm



C.2.2 PB(1,2) Release, Weld ON and Alarm

The PB (1, 2) is released during the Sonics is sounding, Weld ON shall be inactivated, and an Alarm is prompted. The Alarm can disappear automatically when it is Reset.

Figure C.5 PB(1,2) Release, Weld ON and Alarm

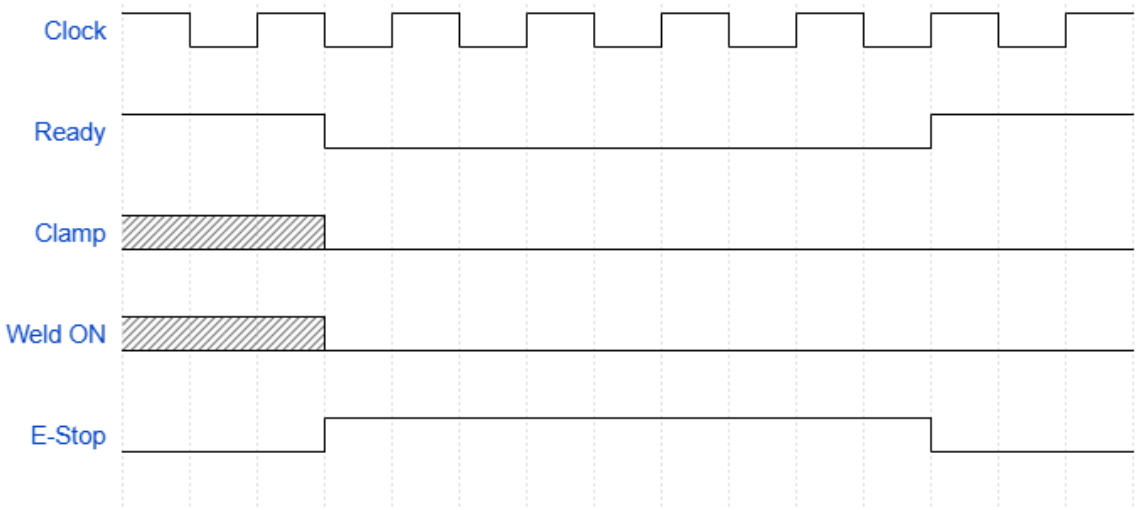


C.3 Estop Timing Diagrams

C.3.1 Estop Input & Ready Output

The E-Stop signal is activated, and the Ready, Weld ON, Clamp shall be inactivated until E-Stop is released.

Figure C.6 E-Stop Input & Ready, Clamp, Weld ON Outputs



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Original Instructions
BU-4001363 - REV. 01

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http://www.bransonultrasonics.com

BRANSON