



Polaris

Ultrasonic Welder

Automation

Assembly Manual

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BRANSON

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User 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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1.1 Introduction

This chapter provides important safety information for the safe installation, operation, and maintenance of this equipment. Throughout this manual, safety messages are used to alert users to potential hazards and to specify actions required to avoid injury or equipment damage.

Safety messages are identified by signal words such as WARNING, CAUTION, and NOTICE, each indicating a different level of hazard severity. These messages follow a standardized format to clearly communicate the nature of the hazard, the potential consequences, and the measures required to prevent harm.

In addition to the safety messages included in this manual, safety labels are affixed to the machine to provide on-equipment hazard identification. These labels must be observed at all times and should not be removed, altered, or obscured.

Read and follow all safety instructions before working with the equipment. Failure to comply with these instructions may result in personal injury, equipment damage, or reduced system performance.

Observe the following safety information in these operating instructions; this information will warn you about risks and their consequences.

1.2 Safety Messages

	⚠️WARNING
	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	⚠️CAUTION
	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	NOTICE
	Is used to address practices not related to physical injury. 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.
	NOTE
	Provides additional information, clarification, or explanation that helps the user understand a procedure, feature, or concept.

1.3 Safety Labels

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.

1.3.1 Power Supply

Figure 1.1 Safety labels on the back of the power supply



Table 1.1 Safety labels on the back of the power supply

Label	Description
	High Voltage Hazard Hazardous voltage inside will cause death or severe injury. De-energize system before removing covers. Authorized personnel only.

1.3.2 Actuator

Figure 1.2 Safety labels on the back of the actuator



Table 1.2 Safety labels on the back of the actuator

Label	Description
 AIR INLET ENTRÉE D'AIR AIR SUPPLY MUST BE FREE OF OIL AND WATER MAX. PRESSURE 100 PSI / 690 kPa / 6.89 bar L'ALIMENTATION EN AIR DOIT ÊTRE EXEMPTÉ D'HUILE ET D'EAU. PRESSION MAXIMALE 100 PSI / 690 kPa / 6.89 bar	Compressed Air Air supply must be free of oil and water. Max. pressure 100 psi/690 kPa/6.89 bar
	Ground Grounding point.
GROUND UNIT BEFORE OPERATING DISCONNECT AIR AND POWER BEFORE SERVICING  METTRE L'UNITÉ À LA TERRE AVANT LE FONCTIONNEMENT COUPER L'ALIMENTATION EN AIR ET ÉLECTRIQUE AVANT DE PROCÉDER À L'ENTRETIEN	High Voltage Hazard Ground unit before operating. Disconnect air and power before servicing.

Figure 1.3 Safety labels on the front of the actuator



Table 1.3 Safety labels on the front of the actuator

Label	Description
	Caution • High Voltage Hazard • Flying Debris and Loud Noise Hazards • Burn Hazard
	High Voltage Hazard Disconnect power before servicing.
	Flying Debris and Loud Noise Hazards Eye and ear protection must be worn.
	Burn Hazard Hot surfaces. Do not touch the tooling.

Figure 1.4 Safety labels inside of the actuator

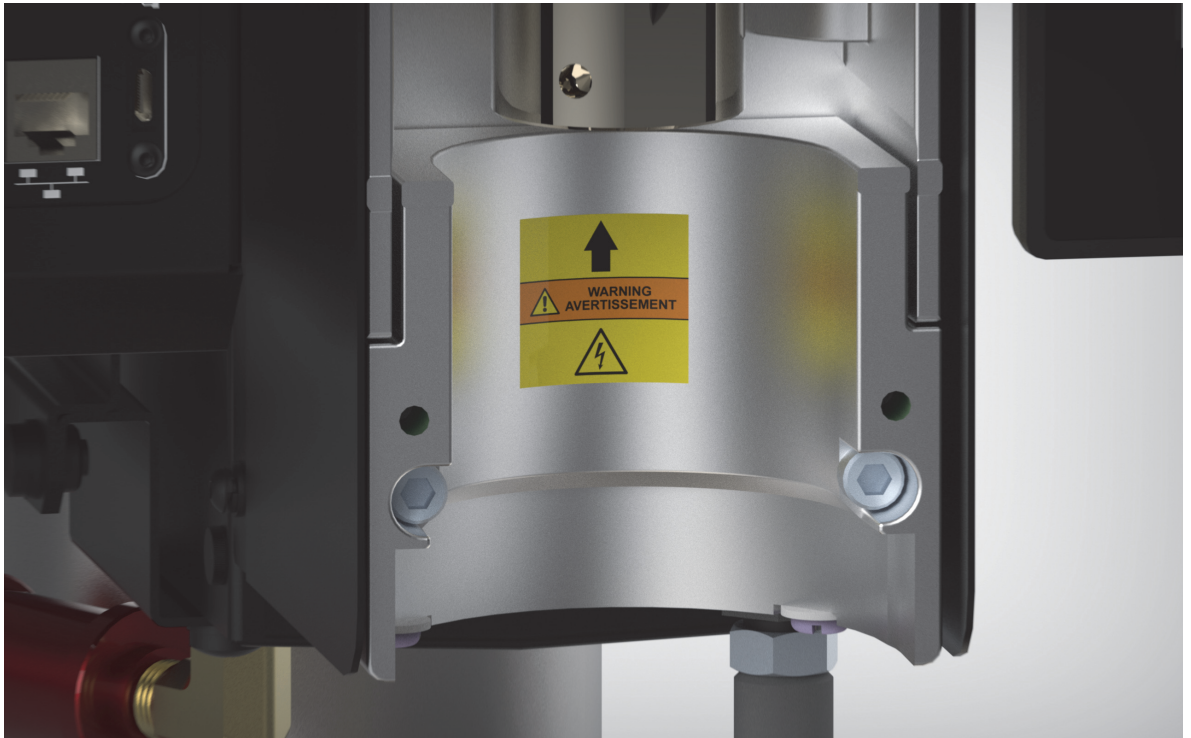


Table 1.4 Safety labels inside of the actuator

Label	Description
	High Voltage Hazard Disconnect power before servicing.

1.4 General Precautions

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

⚠ WARNING	
	Electrical Hazard Risk of electric shock from high-voltage components. Contact with live electrical parts can cause severe injury. • Always plug the power supply into a properly grounded power source. • Do not operate the system with covers or safety guards removed. • Disconnect power before performing any maintenance or service. • Inspect power cord, system cables, and connectors regularly for damage; replace if defective. • Do not cycle the welding system if either the RF cable or converter is disconnected.
⚠ CAUTION	
	Crushing Hazard Risk of injury from ultrasonic horn downforce and ultrasonic vibrations. Fingers or hands caught under the ultrasonic horn or between components can be crushed or severely injured. • Keep hands and other body parts away from the area beneath the ultrasonic horn at all times. • Do not place fingers or objects between the ultrasonic horn and the workpiece fixture during operation. • When using larger ultrasonic horns, avoid situations where fingers could be pinched between the ultrasonic horn and the workpiece fixture. • Ensure the system is powered off and locked out before performing adjustments or maintenance near the ultrasonic horn. • All welding, setup and maintenance functions must be performed by only one person.
⚠ CAUTION	
	Loud Noise Hazard High noise levels and audible vibrations during ultrasonic welding. Prolonged exposure can cause hearing damage or loss. Noise levels depend on several factors: • Type of application • Size, shape, and composition of the material being assembled • Shape and material of the holding workpiece fixture • Welder setup parameters • Tool design Some parts may vibrate at audible frequencies during the process, creating uncomfortable noise. • When noise levels exceed permissible limits, provide operators with appropriate hearing protection as required by local regulations. • Implement engineering or administrative controls to reduce noise where feasible. • Limit time spent near the machine during extended production runs.

⚠ CAUTION	
	Chemical Exposure Hazard Electrolyte leakage from the battery contains corrosive substances. Contact with leaked electrolyte can cause eye injury, skin irritation, or respiratory issues if inhaled. • Handle batteries with care to prevent damage or leakage. • Wear appropriate personal protective equipment (PPE), such as gloves and safety goggles, when handling batteries. • Do not attempt to open, crush, or incinerate batteries. First Aid Measures: • Eye Contact: Flush the eyes with plenty of clean water for at least 15 minutes immediately, without rubbing. Get immediate medical treatment. If appropriate procedures are not taken, this may cause eye injury. • Skin Contact: Wash the affected area under tepid running water using a mild soap. If appropriate procedures are not taken, this may cause sores on the skin. Get medical attention if irritation develops or persists. Inhalation: Remove to fresh air immediately. Get medical treatment immediately.
⚠ CAUTION	
	Eye Hazard Risk of eye injury from debris or dust during ultrasonic welding operations. Failure to protect eyes can result in irritation or serious eye injury. • Always wear safety glasses when operating or working near the welder. • Ensure protective eyewear is clean and in good condition before use. • Do not operate the system if proper eye protection is not available.
⚠ CAUTION	
	Burn Hazard The ultrasonic horn, tooling, or part may become hot during operation and may cause burn injury. • Do not touch the ultrasonic horn, tooling, or part while the actuator is operating. • Allow the part to cool before handling. • Allow the ultrasonic horn and tooling to cool before contact.
⚠ CAUTION	
	Impact Hazard Unexpected movement of equipment or components can cause serious injury. • Stored energy, emergency stops during motion, or improperly secured equipment may result in uncontrolled movement or falling parts. Keep clear of moving components and secure equipment before operation or service.

1.4.1 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 beyond recommended levels. Check with your materials suppliers for recommended protection when processing their materials.

⚠ CAUTION	
	Respiratory Hazard Processing certain materials during ultrasonic welding may generate hazardous fumes and particulates that could result in serious respiratory injury.
	• Identify the materials being processed and assess potential emission hazards. • Provide adequate ventilation to remove fumes from the work area. • Wear appropriate personal protective equipment (PPE), such as respirators, when required. • Follow all applicable safety regulations and Safety Data Sheet (SDS) recommendations.
i NOTICE	
	Processing certain materials may generate emissions that can corrode or damage equipment. Use appropriate ventilation and follow material handling guidelines to minimize exposure.

1.4.2 Intended Use of the System

The Polaris 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.

i NOTICE	
	Branson Ultrasonics Corporation designs and manufactures machines giving the first priority to safety precautions, to allow customers to use the machines safely and effectively. Only trained personnel should operate 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 pay attention to safety instructions when operating the equipment.
	• To be considered a trained operator, it is mandatory to read and understand this user manual in its entirety. Operating the equipment without full knowledge of the procedures, safety precautions, and maintenance requirements outlined in this manual may result in improper use and potential hazards. • If the equipment is used in a manner not specified by Branson, the protection provided by the equipment may be impaired. The Polaris system is designed for indoor use only.
⚠ CAUTION	
	Crushing Hazard Activation of the palm buttons by another person can cause the ultrasonic horn to descend and crush hands or fingers, resulting in serious injury.
	• This equipment is designed to be operated by one person (1) only. Never allow more than one person to operate the machine at the same time.

1.4.3 Regulatory Compliance

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

1.5 Declaration of Incorporation

Figure 1.5 Declaration of Incorporation

EC DECLARATION OF INCORPORATION
According to the Machinery Directive 2006/42/EC

We, the manufacturer

BRANSON ULTRASONICS CORPORATION
29185 Cabot Drive
Novi, MI 48377
USA

expressly declare under our sole responsibility that the equipment Ultrasonic Welding System consisting of:

Branson Ultrasonic power supply model: P/S POLARIS (20:1.25, 20:2.5, 20:4.0, 30:1.5, or 40:0.8) or
P/S IND-ETH POLARIS (20:1.25, 20:2.5, 20:4.0, 30:1.5, or 40:0.8)

with serial Number: PPPYYMMXXXX

where: PPP=Prefix (LKS, LKU, LKX, LKZ, LLB, LLD, LLF, LLH, LLJ, LLL)
YY=Year, MM=Month, XXXX=Sequential Number
Manufacturing date: September 2026 or later

used with a Branson actuator model: ACTUATOR POLARIS CORE (40, 50, 63, or 80) MM, or
ACTUATOR POLARIS ADVANCED (40, 50, 63, or 80) MM, or
ACT POLARIS ADVANCED SS (40, 50, 63, or 80) MM,

used with converter model: CJ20, CJ-30, CA30, or 4TJ, and associated cables,

fulfills the relevant provisions of the Machinery Directive 2006/42/EC except below listed sections, which were not
completely applied with regard to intended use of this equipment. Requirements of following sections need to be applied by final
integrator: 1.1.2, 1.2.1, 1.2.2, 1.2.3, 1.2.4, 1.3.1, 1.3.7, 1.3.8, 1.4, 1.6. 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. This declaration has been issued
under the sole responsibility of the manufacturer.

The object of this declaration is in conformity with relevant Union harmonization legislation. The equipment, to which this
declaration relates, is in conformity with the following standards:

EN ISO 12100:2010
EN 61010-1:2010+A1:2019
EN 60204-1:2018
EN 55011:2016 + A1:2017 + A2:2021 + A11:2020
EN 61326-1:2021
EN 61326-3-1:2017
EN ISO 13849-1:2023

We are committing to present any information relevant to health and safety and, in particular, the relevant technical documentation,
in response to a duly reasoned request from the market surveillance authorities of one of the Member States.

IT IS FORBIDDEN TO PUT THIS EQUIPMENT INTO SERVICE UNTIL THE MACHINERY INTO WHICH IT IS TO BE INCORPORATED HAS
BEEN DECLARED IN CONFORMITY WITH THE PROVISIONS OF THE MACHINERY DIRECTIVE.

Person authorised to compile the relevant technical documentation:
BRANSON ULTRASONICS, a.s.
Piestanska 1202
915 01 Nove Mesto nad Vahom
Slovak Republic

Luis Benavides
Luis Benavides (Sep 22, 2026 11:44:08 CDT)

Novi, MI, USA
September 22, 2026

Luis Benavides
Director of Engineering, Systems / Product Safety Officer

1.6 Cybersecurity Vulnerability Reporting

In accordance with the EU Cyber Resilience Act, we provide a Single Point of Contact for reporting cybersecurity vulnerabilities or security incidents related to this product.

If you discover a potential vulnerability, please report it to us using the dedicated contact channel: Branson.PSIRT@emerson.com or via the reporting form available at <https://emerson.com/reportvulnerability>.

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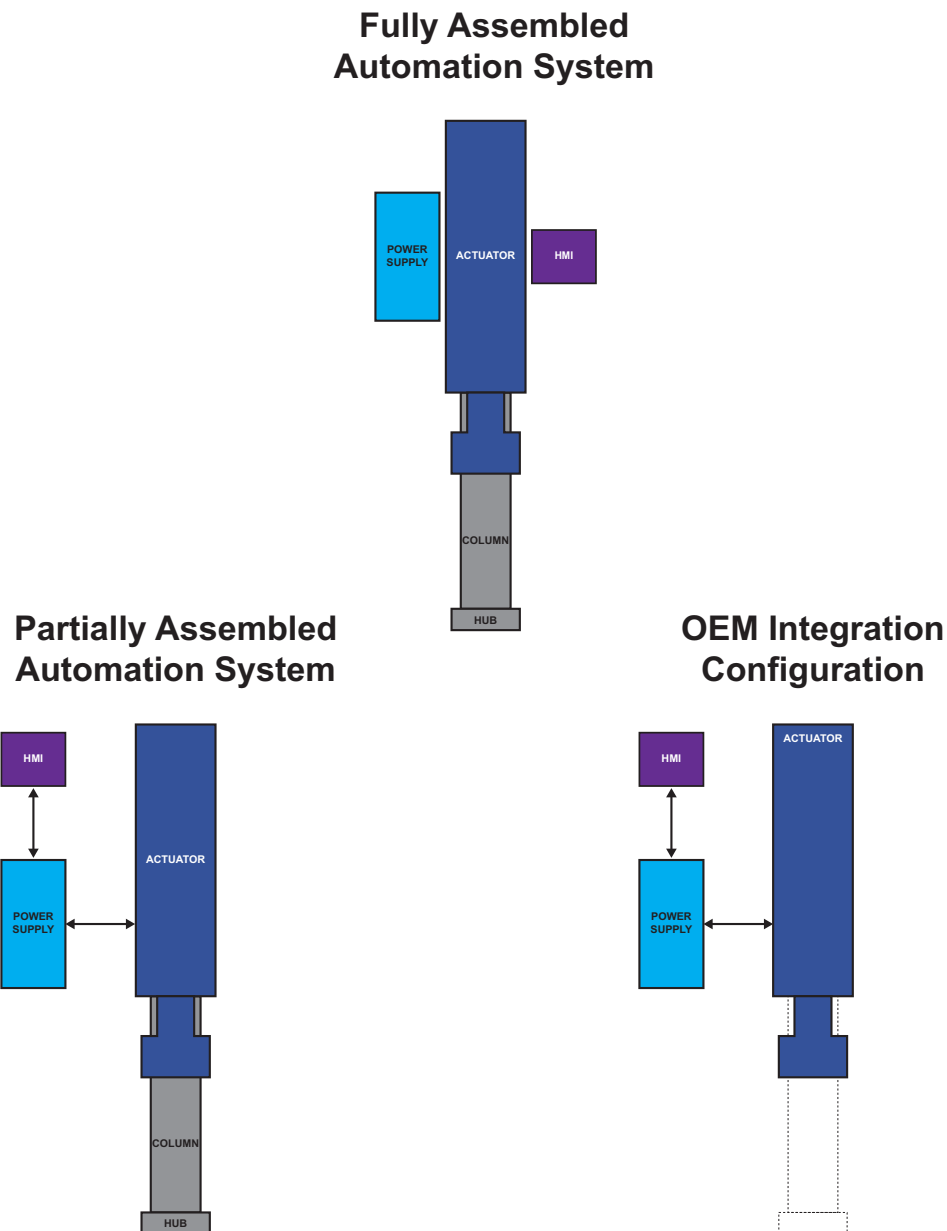
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2.1 Polaris Automation System Configurations

Polaris automation systems are available with multiple mounting, operator interface, and power supply configurations to support a wide range of automation applications. All automation systems are shipped unassembled and require installation by the customer. Customers can select a column-mounted system or an OEM integration configuration, choose either a physical HMI or PC HMI software, and specify whether the power supply is mounted on the column or installed remotely in a customer-supplied electrical enclosure.

Figure 2.1 Polaris Automation System Configurations



2.2 Polaris Automation System Components

Figure 2.2 Polaris Automation System Components



Table 2.1 Polaris Automation System Components

Item	Description	Quantity
1	Power Supply*	The power supply provides ultrasonic power and system control functions. The power supply is required and is included with all Polaris automation systems.
2	Power Supply Mounting Brackets	Mounting brackets are included with all power supplies and allow installation in an electrical cabinet or other customer-supplied structure.
3	Actuator*	The actuator contains the ultrasonic stack and welding mechanism. The actuator is required and is included with all Polaris automation systems.
4	Column* (Optional)	The column provides a mounting structure for the actuator. Brackets are provided to allow the power supply to be mounted directly to the column. The column also includes a VESA mounting arm that can be used to mount and position the optional HMI near the system for convenient operator access. Customers may omit the column when mounting the actuator directly to a machine frame or other supporting structure.
5	Mounting Hub (Optional)	The mounting hub secures the column to a work surface or supporting structure. The hub is included whenever the column option is ordered.

Table 2.1 Polaris Automation System Components

Item	Description	Quantity
6	HMI (Optional)	The HMI provides a touchscreen interface for system setup, operation, monitoring, and diagnostics. Customers may choose PC HMI software instead of a physical HMI.
7	Actuator-to-Power Supply Cables	These cables connect the actuator to the power supply and are included with all Polaris automation systems.
8	HMI-to-Power Supply Cables (Optional)	These cables are provided when the physical HMI option is ordered and connects the HMI to the power supply.
9	Remote Start Cable	The remote start cable is included with all Polaris automation systems and allows integration of an external start signal.
10	User I/O Cable (Optional)	The User I/O cable provides access to the system's configurable input and output signals for integration with external equipment.
11	Ground Detect Cable (Optional)	The Ground Detect cable provides the connection required for Ground Detect applications.

	NOTE
	Figure 2.1 illustrates a representative Polaris automation configuration. Available components and mounting arrangements may vary depending on the selected system options. See section 2.3 Actuator, Power Supply and Column Configurations for available actuator, power supply, and column configurations.

2.3 Actuator, Power Supply and Column Configurations

2.3.1 Actuator Configurations

2.3.1.1 Advanced Actuator

Figure 2.3 Advanced Actuator



2.3.1.2 Core Actuator

Figure 2.4 Core Actuator



2.3.2 Power Supply Configurations

2.3.2.1 Bottom Exit

Power supply with connections on the bottom of the unit.

Figure 2.5 Power Supply - Bottom Exit



2.3.2.2 Rear Exit

Power supply with connections on the back of the unit.

Figure 2.6 Power Supply - Rear Exit



2.3.3 Column Configurations

2.3.3.1 Round Column

Figure 2.7 Round Column



2.3.3.2 Square Column

Figure 2.8 Square Column



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Chapter 3: Interconnection

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3.1 Interconnection Diagram & Cables

Figure 3.1 Interconnection Diagram 01

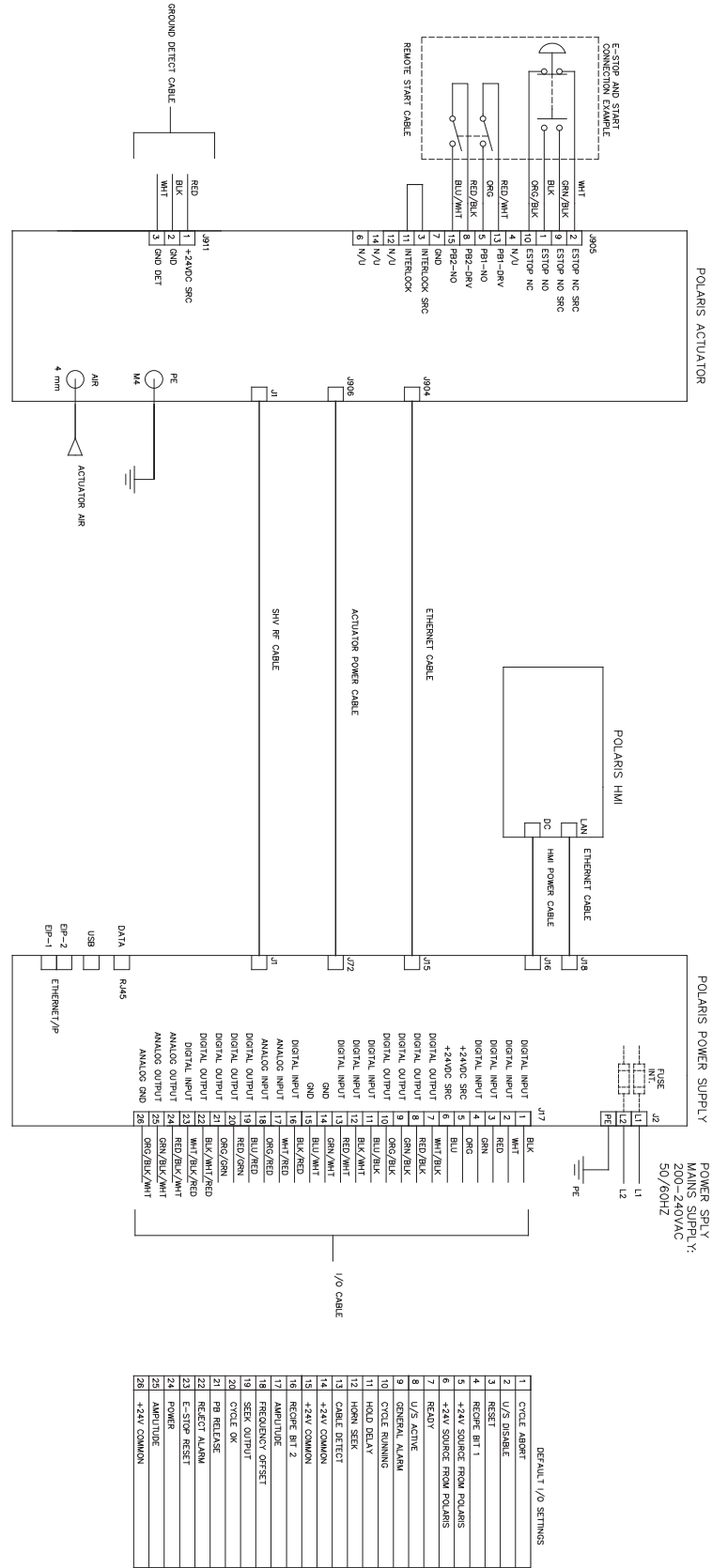


Figure 3.2 Interconnection Diagram 02

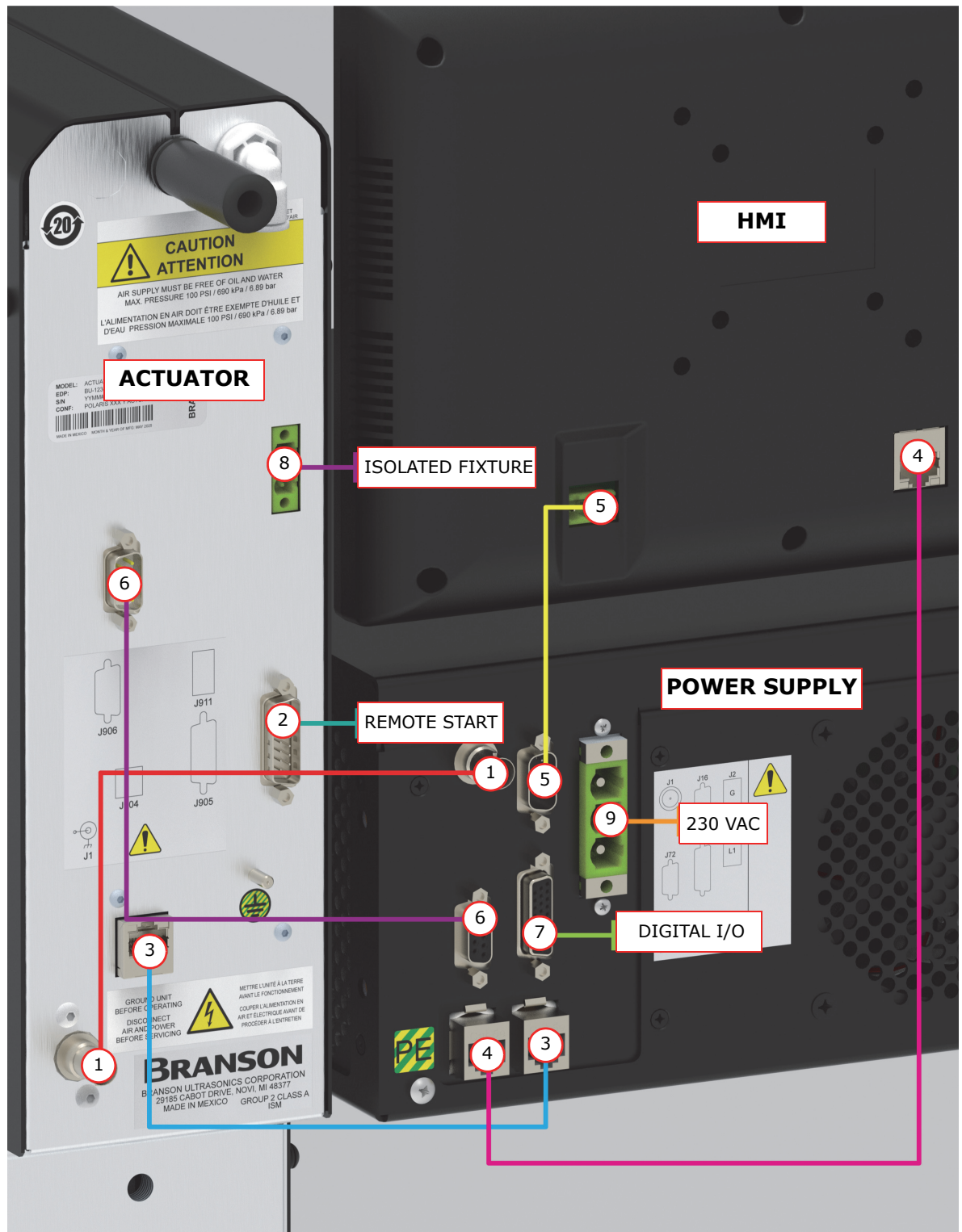


Table 3.1 Interconnection Cables

Item	EDP	Length	Description	Connection Points	Reference
1	100-240-383	2.5 m	RF SHV Cable	Actuator J1–Power Supply J1	
	100-240-385	7.5 m			
	100-240-386	15 m			
2	BU-1044041	2.5 m	E-Stop, Palm Buttons Remote Start Cable	Actuator J905–External PLC	
	BU-1044042	7.5 m			
	BU-1044043	15 m			
	BU-1044135	2.5 m	E-Stop, Palm Buttons Remote Start ETH Cable	Actuator J905–External Safety Interlock	
	BU-1044136	7.5 m			
	BU-1044137	15 m			
3	BU-1044044	2.5 m	Actuator–Power Supply Communication Cable	Actuator J904–Power Supply J15	
	BU-1044045	7.5 m			
	BU-1044046	15 m			
4	BU-1044047	2.5 m	Power Supply–HMI Communication Cable	Power Supply J18–HMI J10	
	BU-1044048	7.5 m			
	BU-1044049	15 m			

Table 3.1 Interconnection Cables

Item	EDP	Length	Description	Connection Points	Reference
5	BU-1044050	2.5 m	HMI Power Cable	Power Supply J16– HMI 24 VDC Power Input	
	BU-1044051	7.5 m			
	BU-1044052	15 m			
6	BU-1044055	2.5 m	Actuator Power Cable	Power Supply J72– Actuator J906	
	BU-1044056	7.5 m			
	BU-1044057	15 m			
7	1019375	2.5 m	User I/O Cable	Power Supply J17– External PLC	
	100-240-392	7.5 m			
	100-240-393	15 m			
8*	BU-1044059	2.5 m	Ground Detect Cable NOTE *Optional	Actuator J911– Isolated Fixture	
9	1014991	3 m	Power Supply Line Cord	Power Supply J2– 230 VAC	
	1015997	3 m	Power Supply Line Cord 20 kHz/4000 W	Power Supply J2– 230 VAC	

3.2 Cable Interface Points

3.2.1 Actuator

Figure 3.3 Actuator Connections

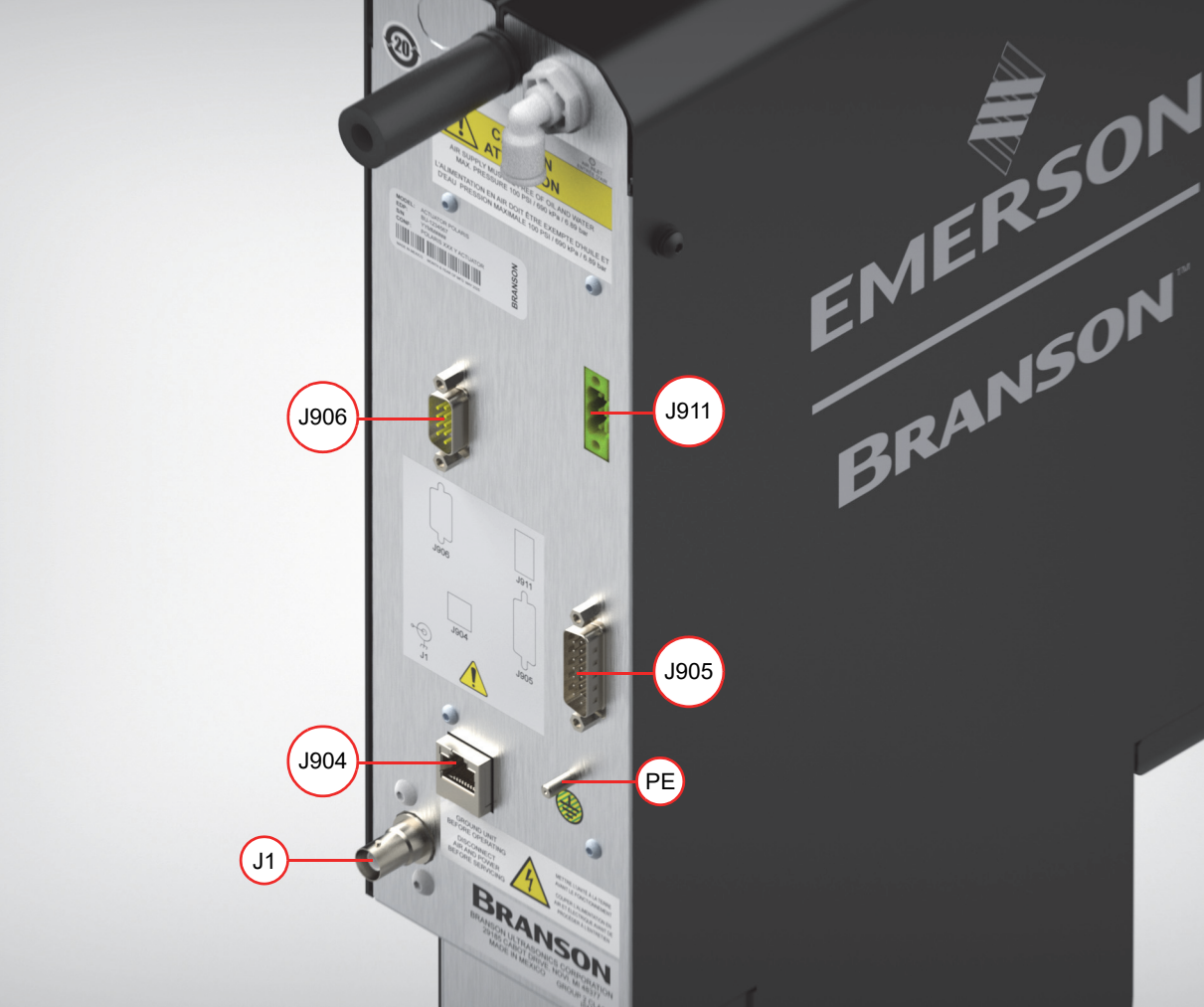


Table 3.2 Actuator Connections

Connection Point	Description	Cable Required/Notes
J1	RF In	RF SHV Cable Actuator J1–Power Supply J1
J904	Actuator–Power Supply Communication	Actuator–Power Supply Communication Cable Actuator J904–Power Supply J15
J905	E-Stop, Palm Buttons	Remote Start Cable Actuator J905–External PLC
J906	Actuator Power	Actuator Power Cable Actuator J906–Power Supply J72
J911	Ground Detect	Ground Detect Cable Actuator J911–Isolated Fixture
PE	Earth Ground	Actuator Ground - M4 stud

3.2.2 Power Supply

Figure 3.4 Power Supply Connections

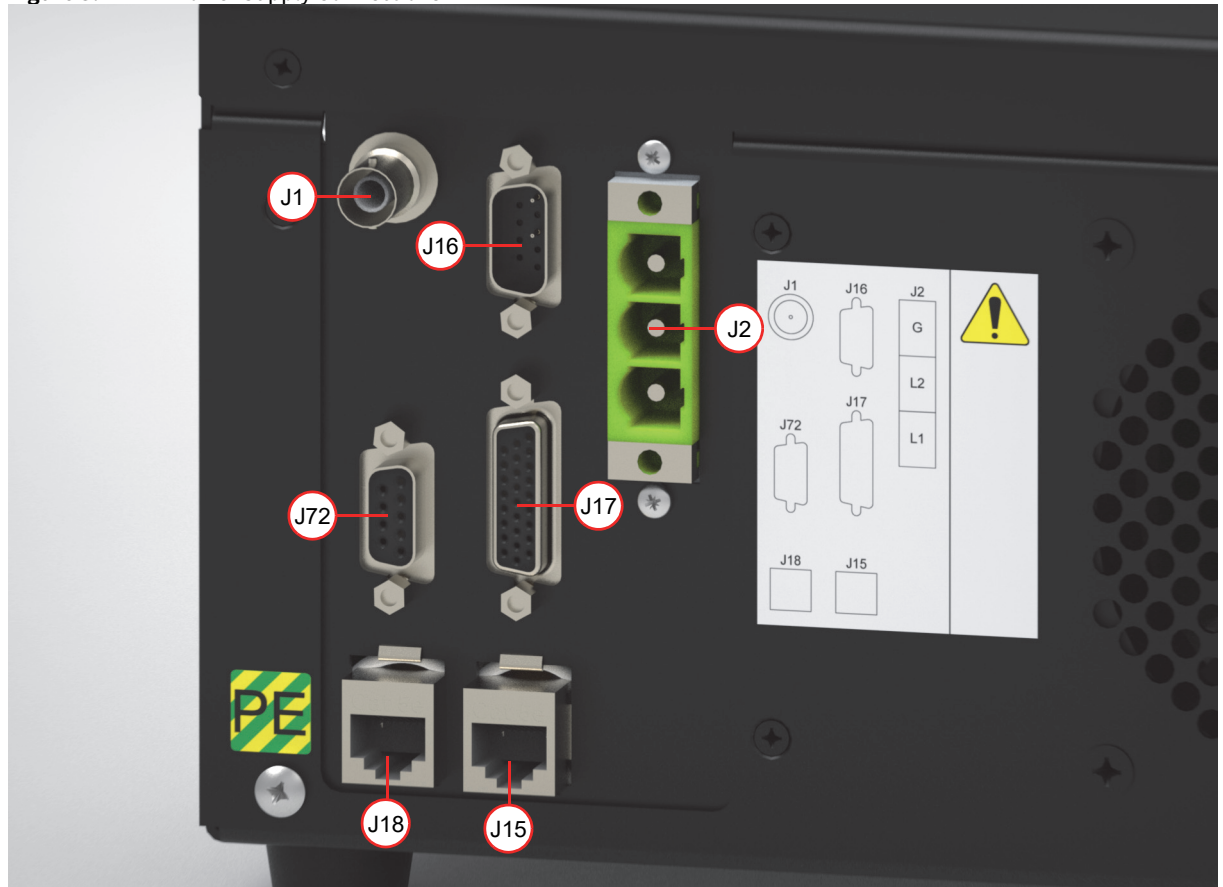


Table 3.3 Power Supply Connections

Connection Point	Description	Cable Required/Notes
J1	RF Out	RF SHV Cable Actuator J1–Power Supply J1
J2	Main Supply Voltage Input	Power Supply Line Cord Power Supply J2–230 VAC
J15	Actuator–Power Supply Communication	Actuator–Power Supply Communication Cable Power Supply J15–Actuator J904
J16	HMI Power	HMI Power Cable Power Supply J16–HMI 24 VDC Power Input
J17	User I/O	User I/O Cable to External PLC Power Supply J17–External PLC
J18	Power Supply–HMI Communication	Power Supply–HMI Communication Cable Power Supply J18–HMI J10
J72	Actuator Power	Actuator Power Cable Power Supply J72–Actuator J906

3.2.3 HMI

Figure 3.5 HMI Connections

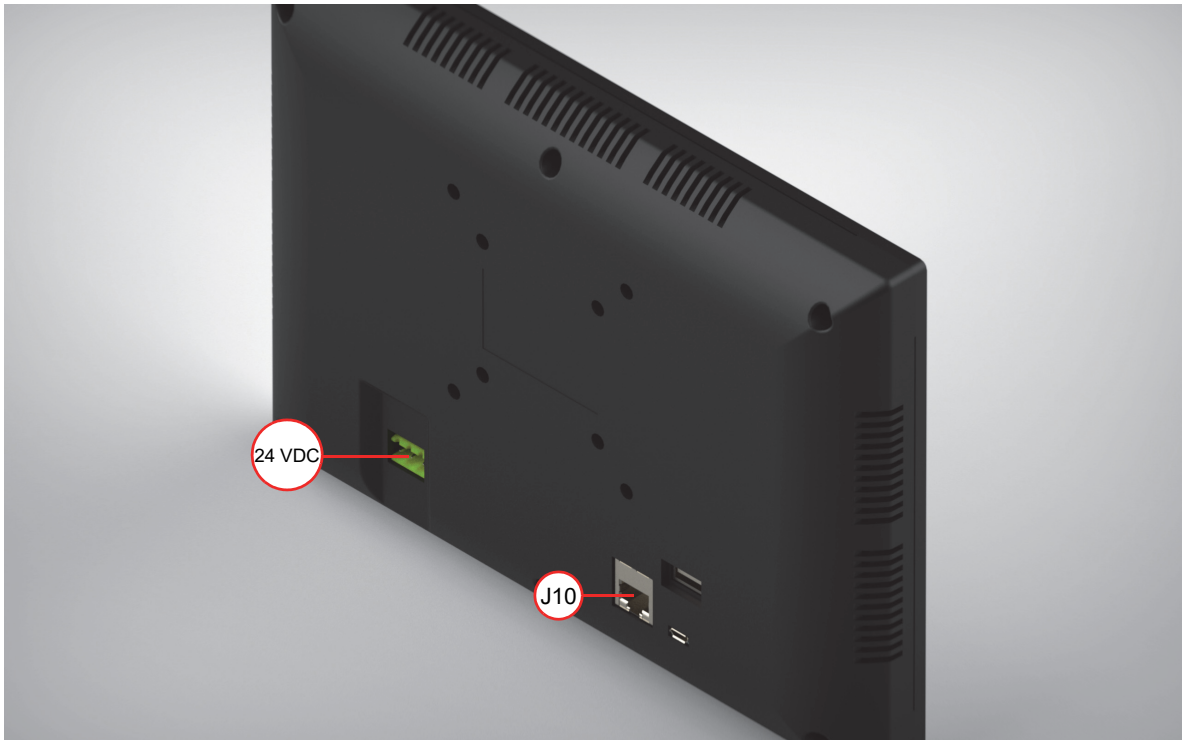


Table 3.4 HMI Connections

Connection Point	Description	Cable Required/Notes
24 VDC	24 VDC Power Input	HMI Power Cable Power Supply J16–HMI 24 VDC Power Input
J10	Power Supply–HMI Communication	Power Supply–HMI Communication Cable Power Supply J18–HMI J10

3.3 Air Inlet

Polaris actuators are equipped with a standard 6 mm outer diameter (OD) pneumatic tubing connection at the air inlet. To ensure safe and reliable operation, use only 6 mm OD tubing and fittings rated for pressures above 690 kPa (100 psig).

The air inlet is located on the top rear of the actuator and is designed for connection using plastic pneumatic tubing.

User must provide an external air filter assembly capable of:

- Supporting at least 690 kPa (100 psig)
- Filtering particulate matter ≥ 5 microns in size.

This air filter is essential to protect internal components and maintain consistent actuator performance.

Figure 3.6 Air Inlet



Table 3.5 Air Inlet

Item	Description
1	6 mm outer diameter (OD) pneumatic tubing connection

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Chapter 4: Remote Start, E-Stop, Interlock

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4.1 Start Switch and E-Stop Connections



⚠WARNING

Crushing Hazard

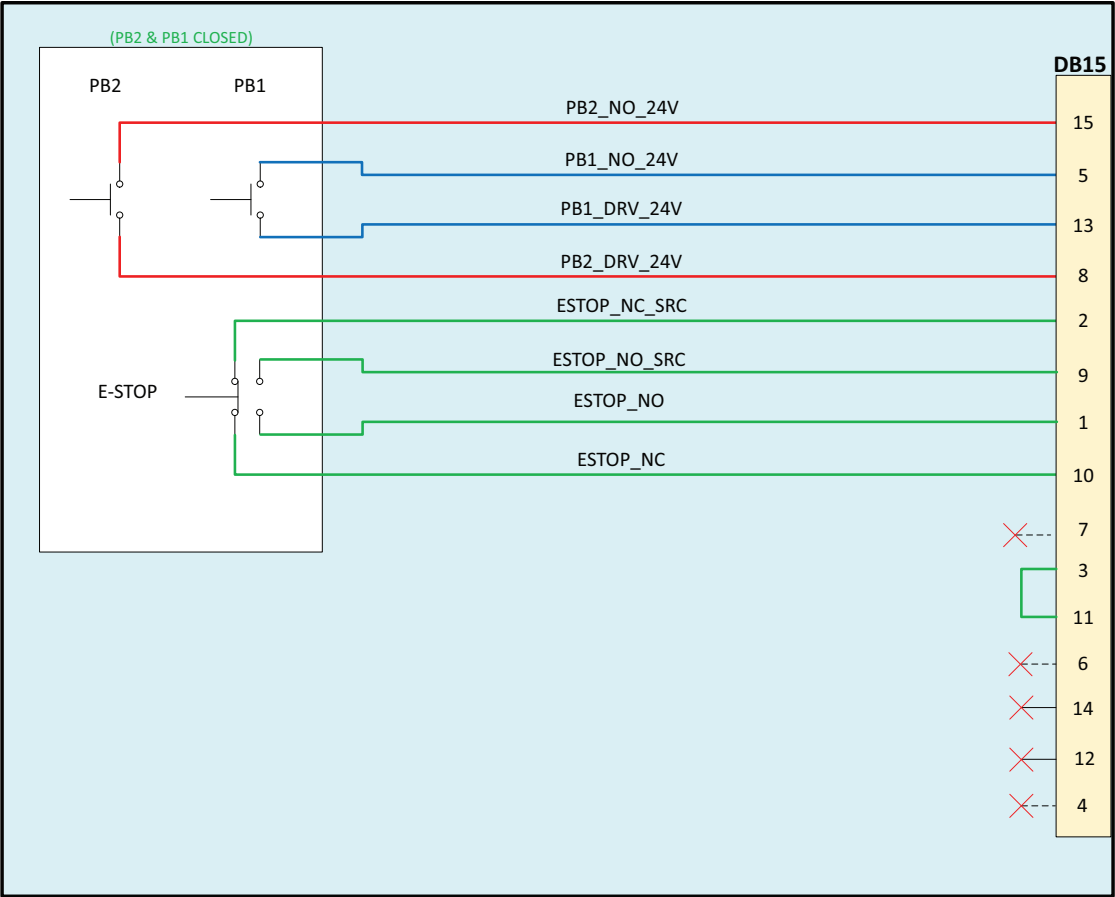
The ultrasonic welder is equipped with palm buttons for initiating operation and an emergency stop (E-Stop) button for operator safety.

If alternative start or E-Stop controls are used as part of an automated system, improper integration or use may result in hazardous conditions leading to serious injury or equipment damage.

- Before implementing any alternate control methods, the customer must sign a Branson Product Liability Agreement.
- Use only manufacturer-approved control configurations.
- Ensure all start and Emergency Stop functions are properly integrated and verified before operation.
- Failure to comply with this requirement may result in unsafe operation and void applicable liability protections.

The system requires two start switches and one emergency stop connection. The start switches and E-Stop switches need to be electrically isolated from each other to complete their circuit closure. Solid state switches may be used if the leakage current is less than 0.1mA. The start switches must be closed within 200 milliseconds of each other and must remain closed until the PB Release signal is logic high.

Figure 4.1 Start Switch and E-Stop Connections



4.2

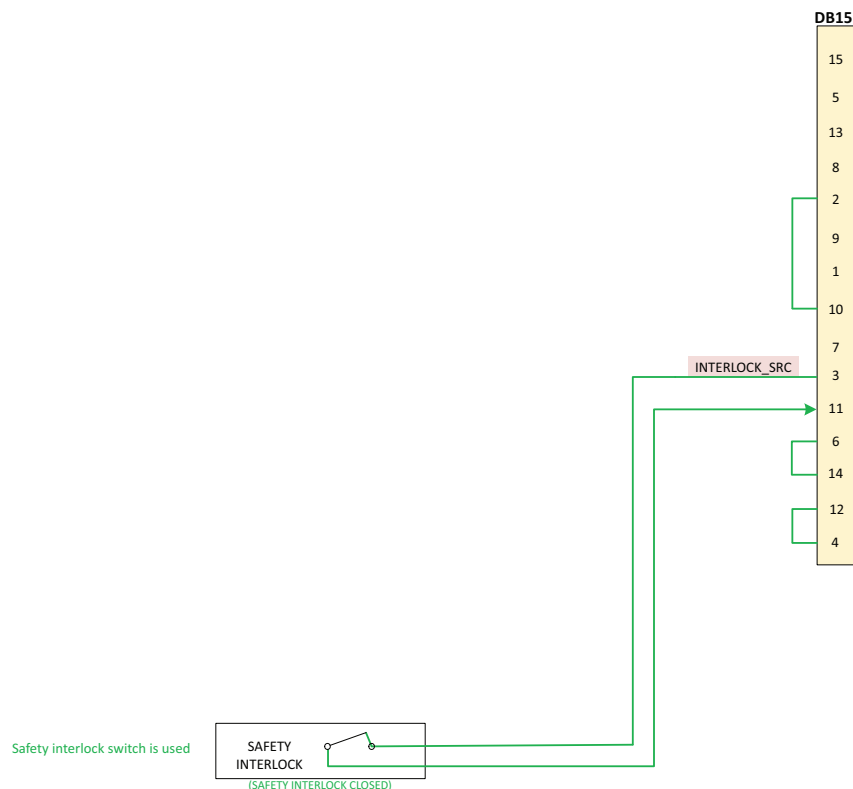
 CAUTION	
	Crushing Hazard Failure to correctly install and connect the safety interlock may allow operation of the ultrasonic system when guards or protective devices are not in place. • Connect the supplied interlock cable to a certified safety interlock switch in the safety system. • Verify that the interlock switch functions correctly before operating the ultrasonic system. • Do not operate the system if the interlock is bypassed, disconnected, or malfunctioning.

To start and operate the system, an Ethernet cable must be connected and configured to communicate via Industrial Ethernet protocols. This connection is required for system control, data exchange, and integration with automation networks.

An interlock cable is provided as part of the system. It is the customer's responsibility to connect this cable to a certified safety interlock switch within their setup. This connection is necessary to activate the ultrasonic system and to uphold safety protocols during operation.

NOTE	
	The jumpers illustrated in the diagram are already integrated into the cable assembly.

Figure 4.2 Safety Interlock Diagram



4.3 I/O Specifications

Figure 4.3 I/O Pin Number and Equivalent Circuit

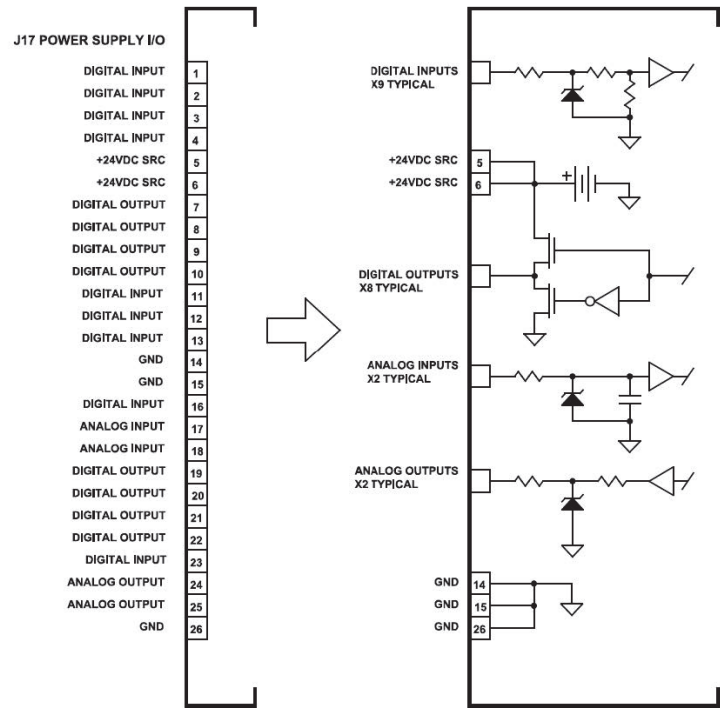


Figure 4.4 Typical Connection to PLC/Controller

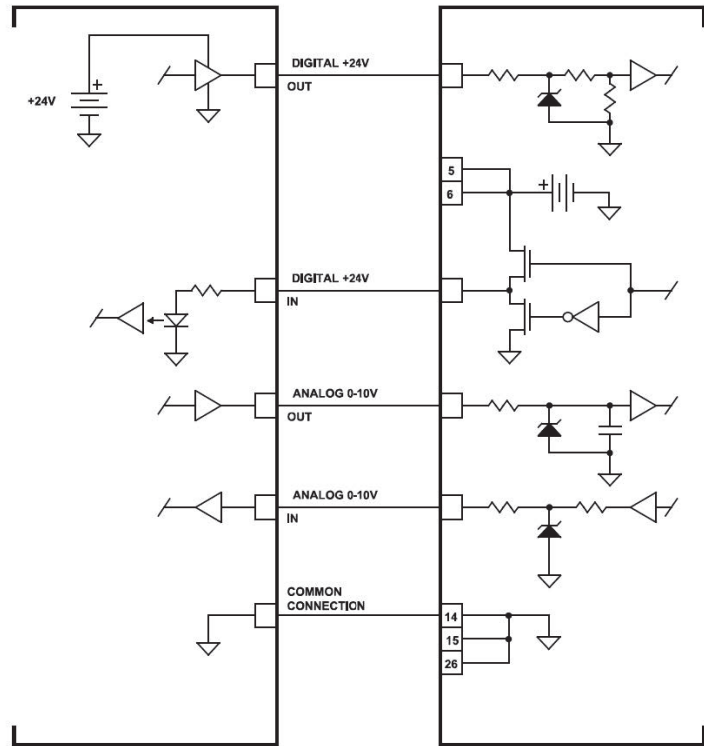


Table 4.1 Digital I/O Specifications

Inputs		Outputs	
Description	Value	Description	Value
Number of Inputs	9 (Sink)	Number of Outputs	8 (Source/Sink)
Wiring	PNP	Wiring	PNP/NPN
Input Voltage Range	15-30 VDC	ON Output Voltage	24 VDC
Input Impedance	13 k Ω	OFF Output Voltage	0 VDC
Maximum Input Current	1.8 mA @ 24 VDC	Source Output Impedance	110 m Ω @ 25°C
	2.0 mA @ 27 VDC	Sink Output Impedance	1 Ω @ 25°C
ON Voltage Level	> 15 VDC	Maximum Source Current	25 mA @ 25°C
Off Voltage Level	< 5 VDC	Maximum Sink Current	25 mA @ 25°C
Protection	Over/Under Voltage	Protection	Thermal/Over Current/ Inductive-Kick
Common Points	Ground Pins - 3	Common/Source Points	Ground Pins - 3
			24 VDC Source Pins - 2

Table 4.2 Analog I/O Specifications

Inputs		Outputs	
Description	Value	Description	Value
Number of Inputs	2	Number of Outputs	2
Input Voltage Range	0-10 V	Output Voltage Range	0-10 V
Input Impedance	>10 M Ω @ 25°C	Source Output Impedance	100 M Ω @ 25°C
Bandwidth	4 kHz	Bandwidth	1.5 kHz
Protection	Over Voltage	Protection	Short Circuit
Common/Source Points	Ground Pins - 3	Common/Source Points	Ground Pins - 3

Table 4.3 +24 VDC Source

Description	Value
Number of Output Pins	2
Maximum Current	.42 A Total
Protection	Internal Resettable Fuse
Common Points	Ground Pins - 3

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Chapter 5: Mounting & Dimensions

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5.1 Enclosure Mounting Considerations

Depending on the weld cycle rate and total weld power used, the ultrasonic Power Supply can generate a large amount of internal heat.

Cooling and heat management need to be considered when selecting and designing an enclosure to house the Power Supply. Select an enclosure that is specifically designed for electrical control equipment. The enclosure should be sized and laid out to allow adequate air flow and heat dissipation. Enclosure fans for ventilation or air conditioning may be necessary depending on the application and the number of Polaris components installed in a single enclosure. The internal temperature of the enclosure should not exceed 40°C.

Figure 5.1 Air flow paths and clearances needed

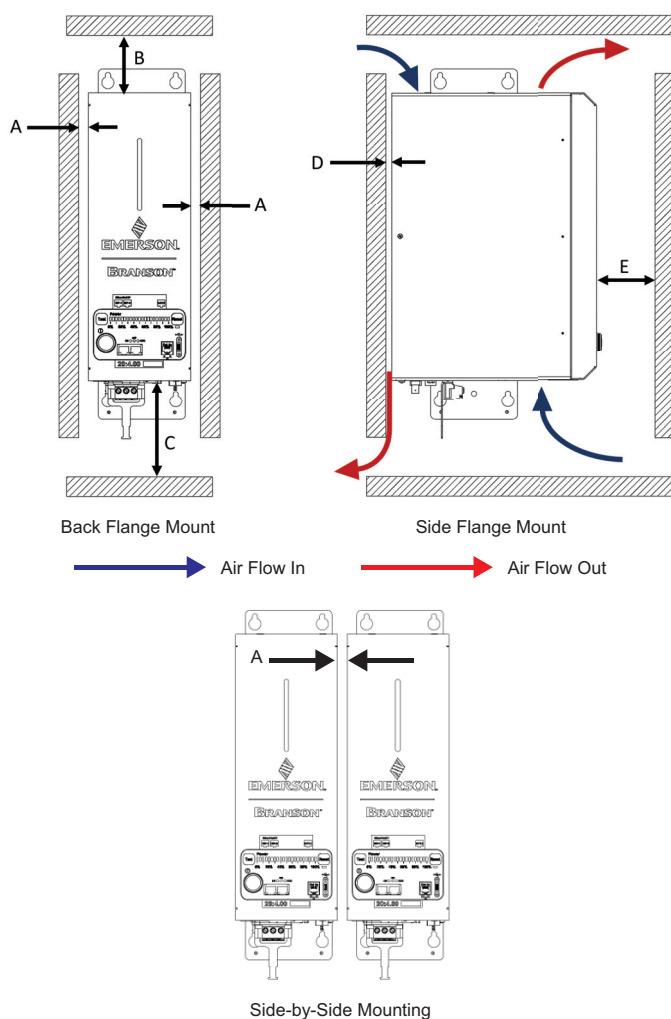


Table 5.1

Reference	Min. Distance
A	13 mm (.5 in)
B	76 mm (3 in)
C	127 mm (5 in)
D	8 mm (0.3 in)
E	76 mm (3 in)

Heat loss generated by the Power Supply

- **Dynamic Loss:** The internal heat generated in Watts during the ultrasonic on phase of a cycle.
- **Static Loss:** The quiescent power loss in Watts due to the normal operation of the system controller and other related circuits. This value is about 10 W for the Polaris Power Supply.
- **Total Loss:** The Total Loss is the sum of the Dynamic and Static Losses.

Formula for estimating the Dynamic Loss generated by the Power Supply

- **Dynamic Loss (W)** = $(1.85 \cdot 10^{(-6)}) \cdot (PP) \cdot (U/S \text{ Time}) \cdot (CR)$
- **PP (W)** = Peak Power. The power meter display in Watts after a weld cycle. This is the peak power of a weld. Peak power can also be calculated by multiplying the power supply's maximum power rating in Watts by the peak power percent during a weld. For example, if the power supply's maximum power rating is 2500 W and the peak power percent meter reads 50%, the peak power is: $PP(W) = 2500 \times 50\% = 1250 \text{ W}$.
- **U/S Time (mS)** = Ultrasonic on time. The time in milliseconds that the ultrasonics are on.
- **CR (Cycles/Min)** = Cycle rate. The expected cycles per minute rate during normal operation.

Example of heat loss calculation for the Power Supply

Table 5.2 Information on the Polaris model and measured and expected weld characteristics

Maximum Power Rated (Watts)	2500
Ultrasonic On Time (milliseconds)	100
Hold Time (milliseconds)	200
Cycle Rate (Cycle/Minute)	60
Peak Power (W)	1250

- **Dynamic Loss** = $1.85 \cdot 10^{(-6)} \cdot (1250) \cdot (100) \cdot (60) = 14 \text{ W}$
 - **Static Loss** = 10 W
 - **Total Loss** = 14 W + 10 W = 24 W
- The total heat generated by the Power Supply is 24 W

5.2 Round Column and Mounting Hub

Select a mounting location that can adequately support the combined weight and operating forces of the column and actuator. The customer is responsible for providing the mounting hardware. Four mounting holes are located at the corners of the hub casting and accommodate either M10 or 3/8 in fasteners. Install flat washers between the fasteners and the casting to prevent damage to the mounting surface.

	NOTE
	The hub must be oriented so that its front faces the same direction as the front of the actuator. The hub clamping bolts used to secure the column are located on the rear of the hub.

Figure 5.2 Round Column and Mounting Hub

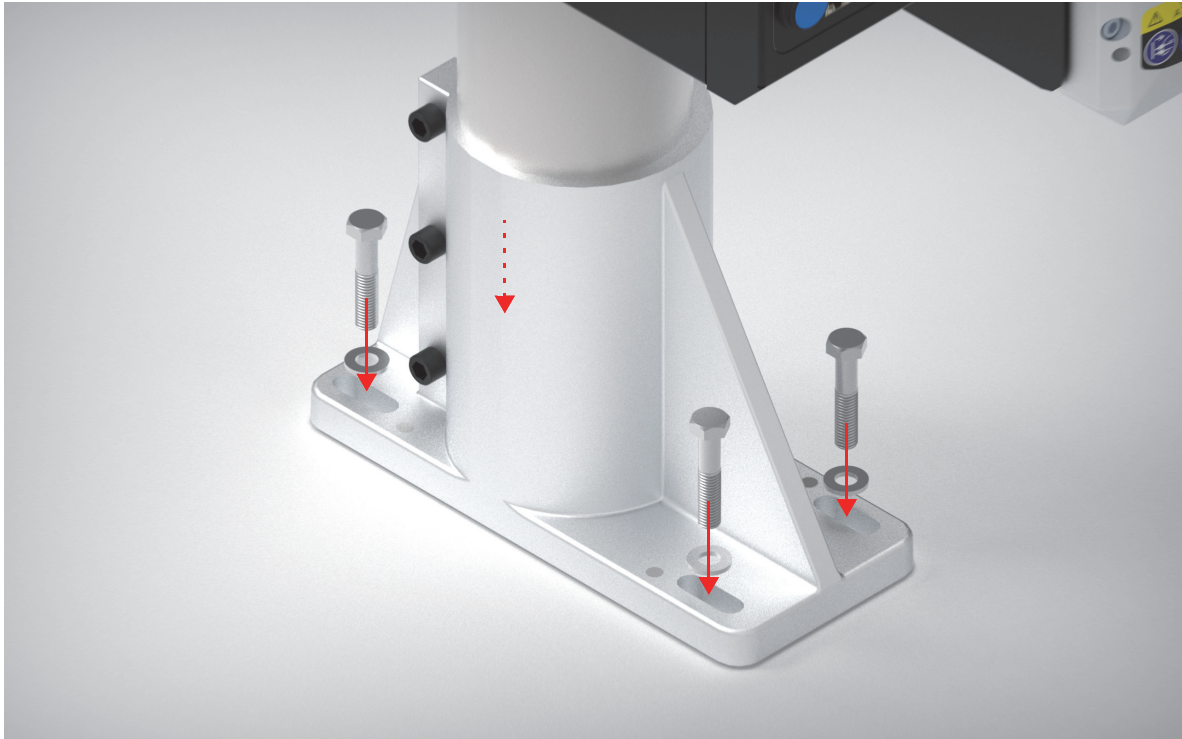
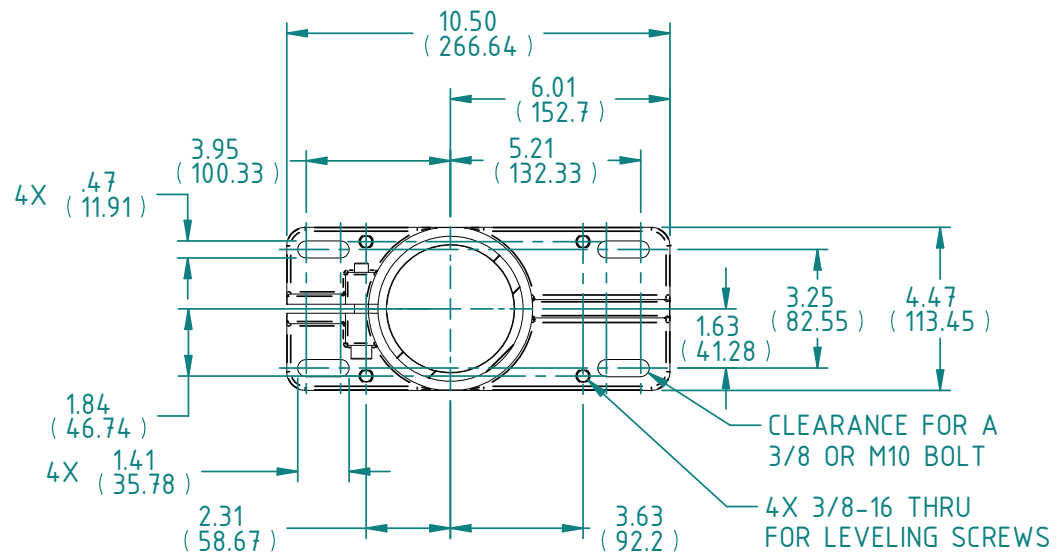


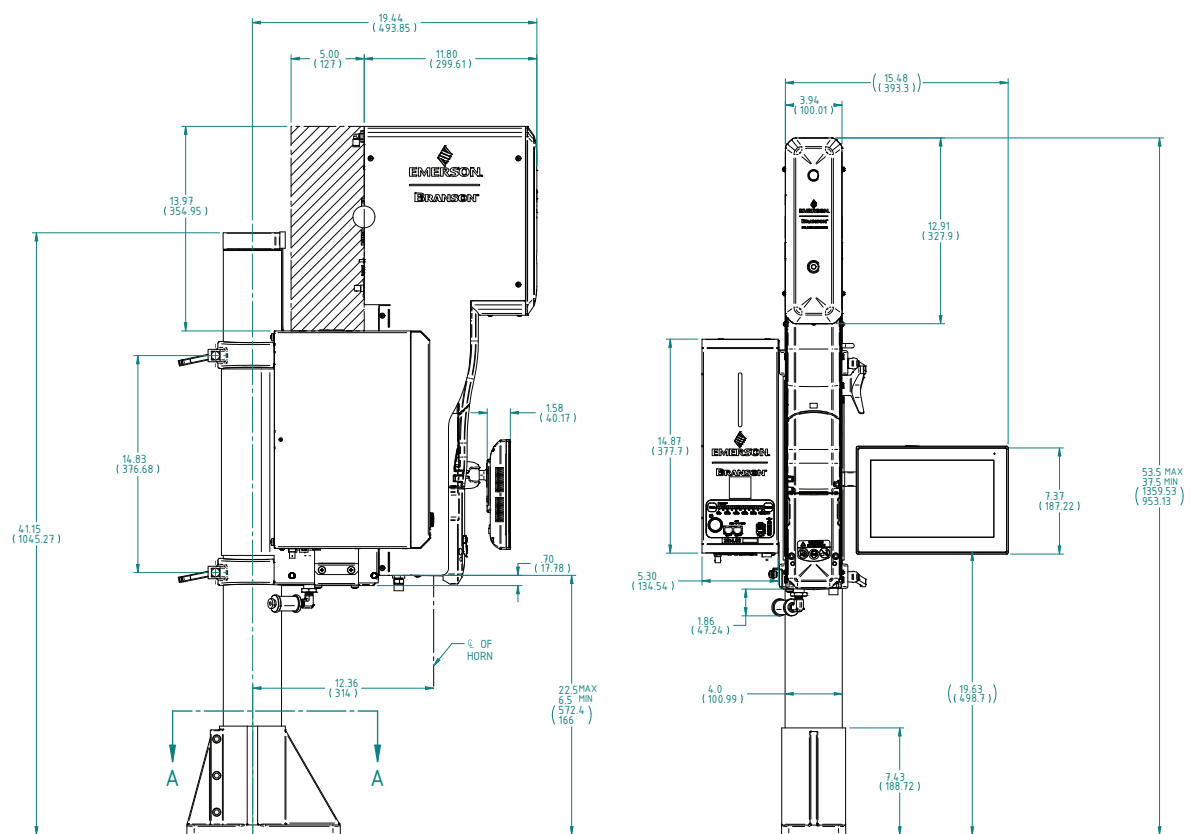
Table 5.3 Round Column and Mounting Hub

Step	Instructions
1	Position the hub at the desired mounting location. Ensure that no overhead or side obstructions will interfere with the operation, maintenance, or use of the system. NOTE Secure the hub to the mounting surface using four customer-supplied bolts with an M10 (3/8 in) shank diameter. Install flat washers between the bolt heads and the hub casting to prevent damage to the casting.
2	Carefully lift the actuator and column assembly, and lower the column into the hub. Rotate the assembly as needed to align the flat face of the spring swivel with the front of the actuator. Tighten the hub clamping bolts to secure the column in place.
3	Use the jack screws to fine-tune the system level. Adjust the 3/8-16 × 19 mm (3/4 in) jack screws using a 3/16 in Allen wrench.

Figure 5.3



SECTION A-A



5.3 Square Column and Mounting Hub

Select a mounting location that can adequately support the combined weight and operating forces of the column and actuator. The customer is responsible for providing the mounting hardware. Four mounting holes are located at the corners of the hub casting and accommodate either M10 or 3/8 in fasteners. Install flat washers between the fasteners and the casting to prevent damage to the mounting surface.

Figure 5.4 Square Column and Mounting Hub

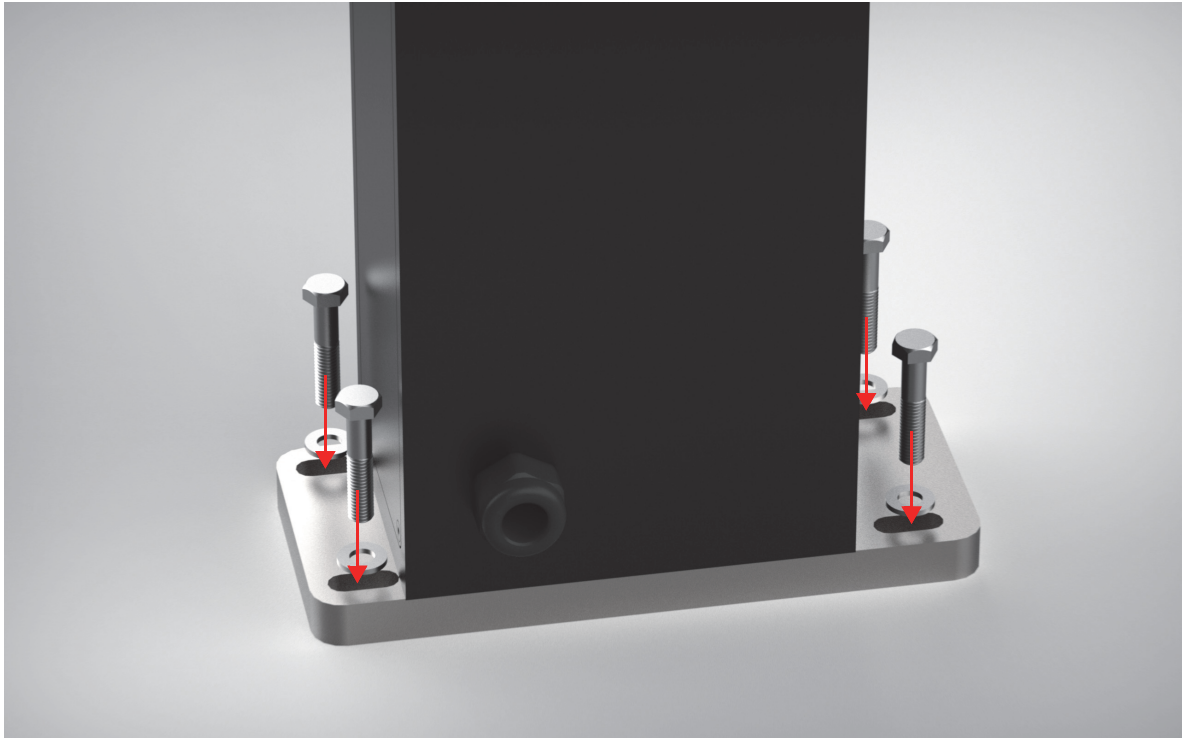
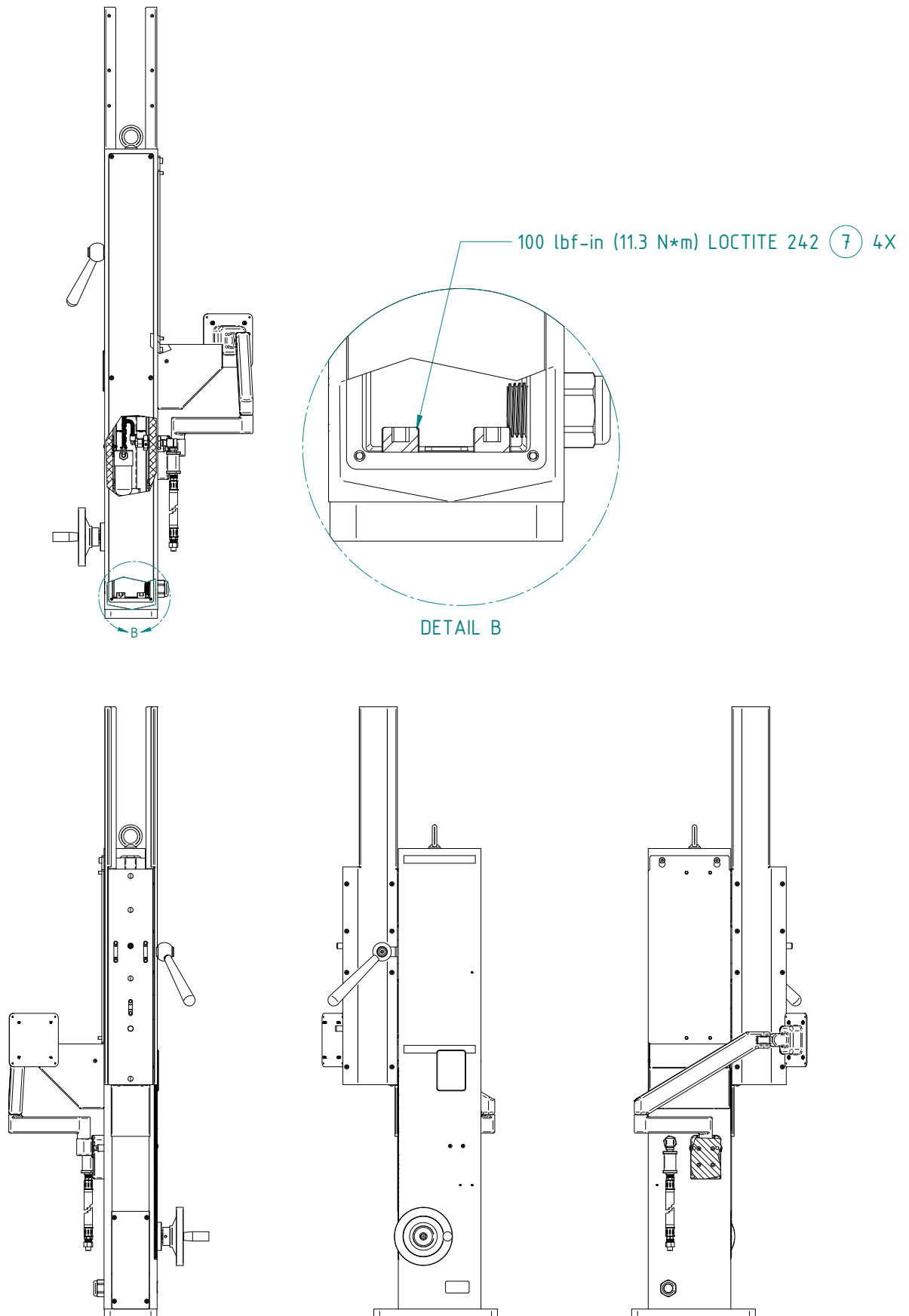


Table 5.4 Square Column and Mounting Hub

Step	Instructions
1	Position the hub at the desired mounting location. Ensure that no overhead or side obstructions will interfere with the operation, maintenance, or use of the system. NOTE Secure the hub to the mounting surface using four customer-supplied bolts with an M10 (3/8 in) shank diameter. Install flat washers between the bolt heads and the hub casting to prevent damage to the casting.

Figure 5.5



5.4 Actuator

Mount the actuator to an I-Beam or other rigid structure using four M10x1.5 bolts. Use dowel pins to aid with insertion and alignment (customer provided hardware).

NOTICE	
	Mounting bolts must not extend more than 10 mm into the actuator.

Figure 5.6

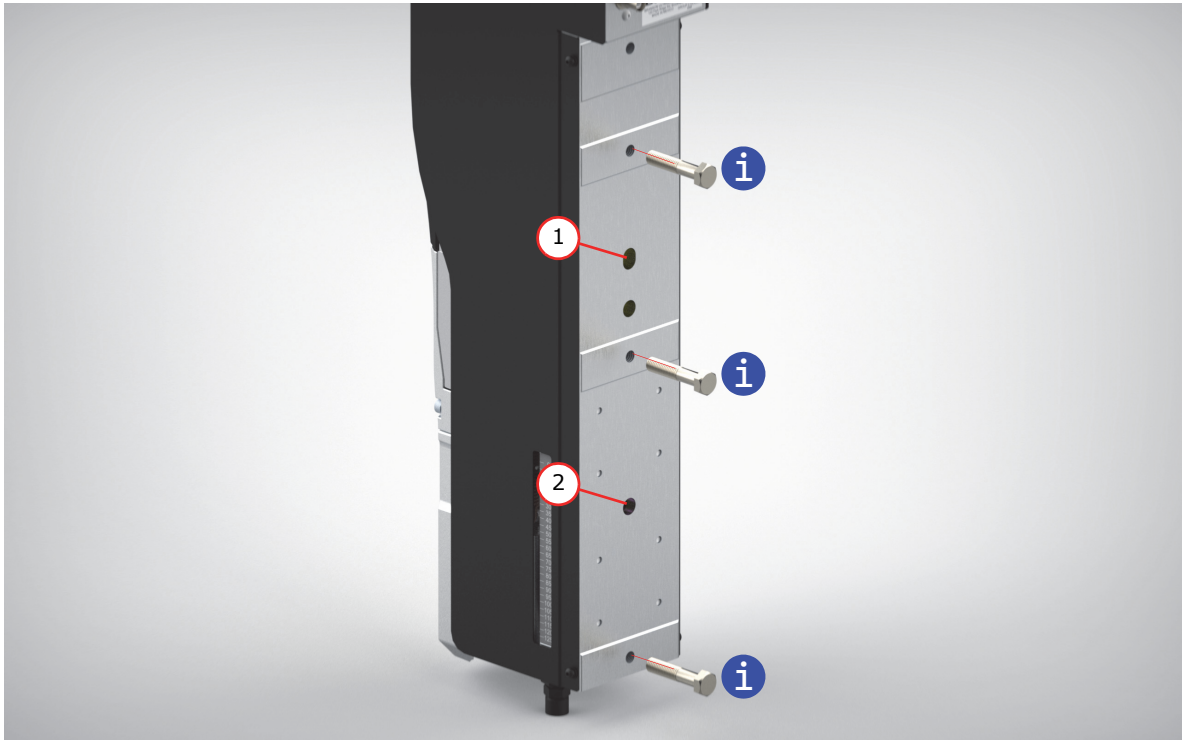
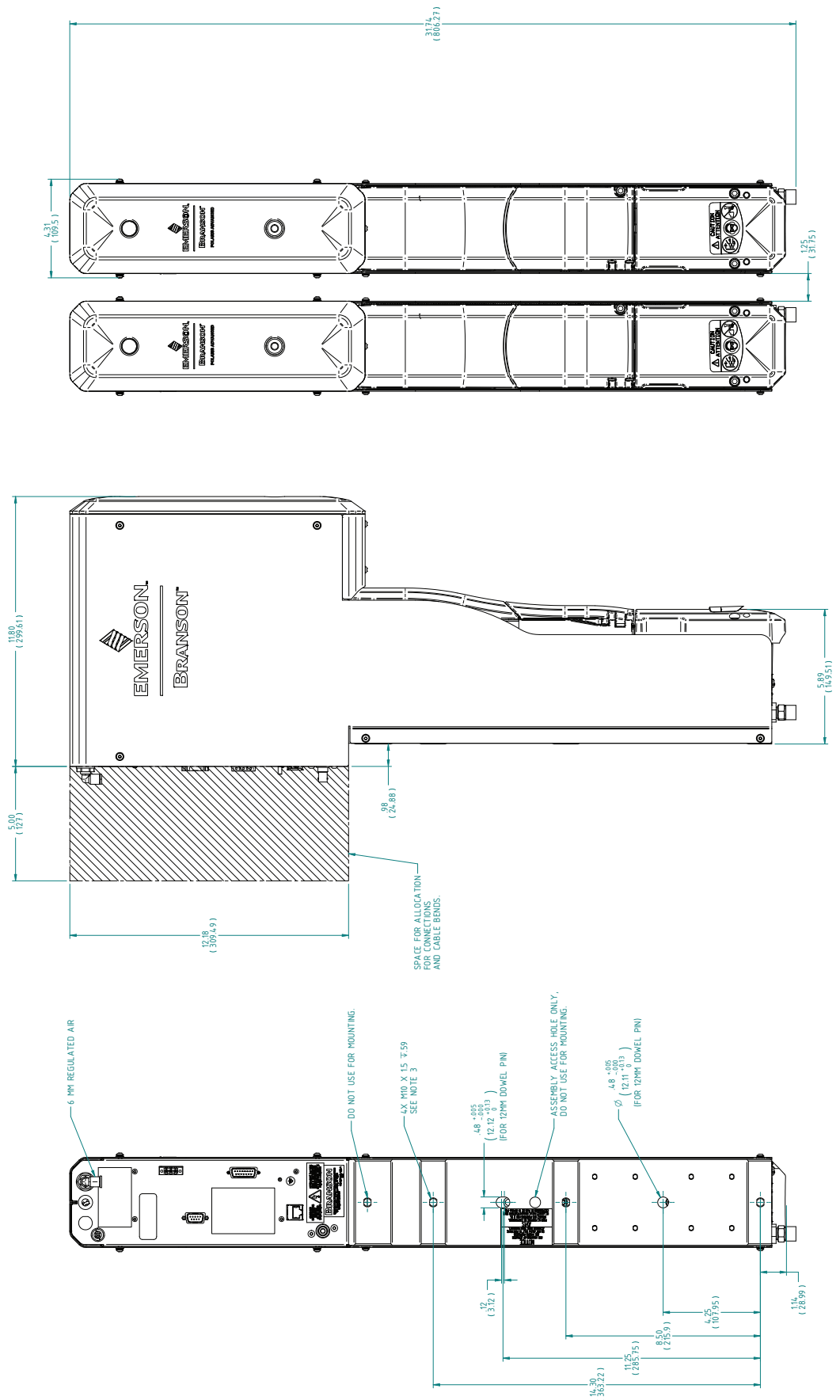


Table 5.5

Item	Description
1	Slot for 12 mm Dowel Pin
2	Hole for 12 mm Dowel Pin

Figure 5.7



SIDE-BY-SIDE MOUNTING

5.5 Power Supply

Power supplies are available with rear exit or bottom exit connection configurations. See [2.3.2 Power Supply Configurations](#) for more information.

Power supplies are designed for horizontal placement on a workbench. Ensure the rubber feet are positioned at the bottom to maintain stability and airflow.

Additionally, power supplies may be rear-mounted or side-mounted using the provided bracket system.

NOTE	
	Only power supplies with bottom exit connections are compatible with rear mounting.

5.5.1 Workbench Placement

Place the power supply horizontally on a clean, flat surface such as a workbench. Ensure the rubber feet are facing downward, making contact with the surface.

Figure 5.8



5.5.2 Rear Mounting

Attach the mounting brackets to the power supply using the included four M6 bolts and washers.

Figure 5.9



Mount the power supply to an electrical cabinet using four M6 bolts with lock washers against its metal plate (customer provided hardware).

Figure 5.10



5.5.3 Side Mounting

Attach the mounting brackets to the power supply using the included four M6 bolts and washers.

Figure 5.11 Power supply with bottom exit connections



Figure 5.12 Power supply with rear exit connections



Mount the power supply to an electrical cabinet using four M6 bolts with lock washers against its metal plate (customer provided hardware).

Figure 5.13 Power supply with bottom exit connections



Figure 5.14 Power supply with rear exit connections



Figure 5.15

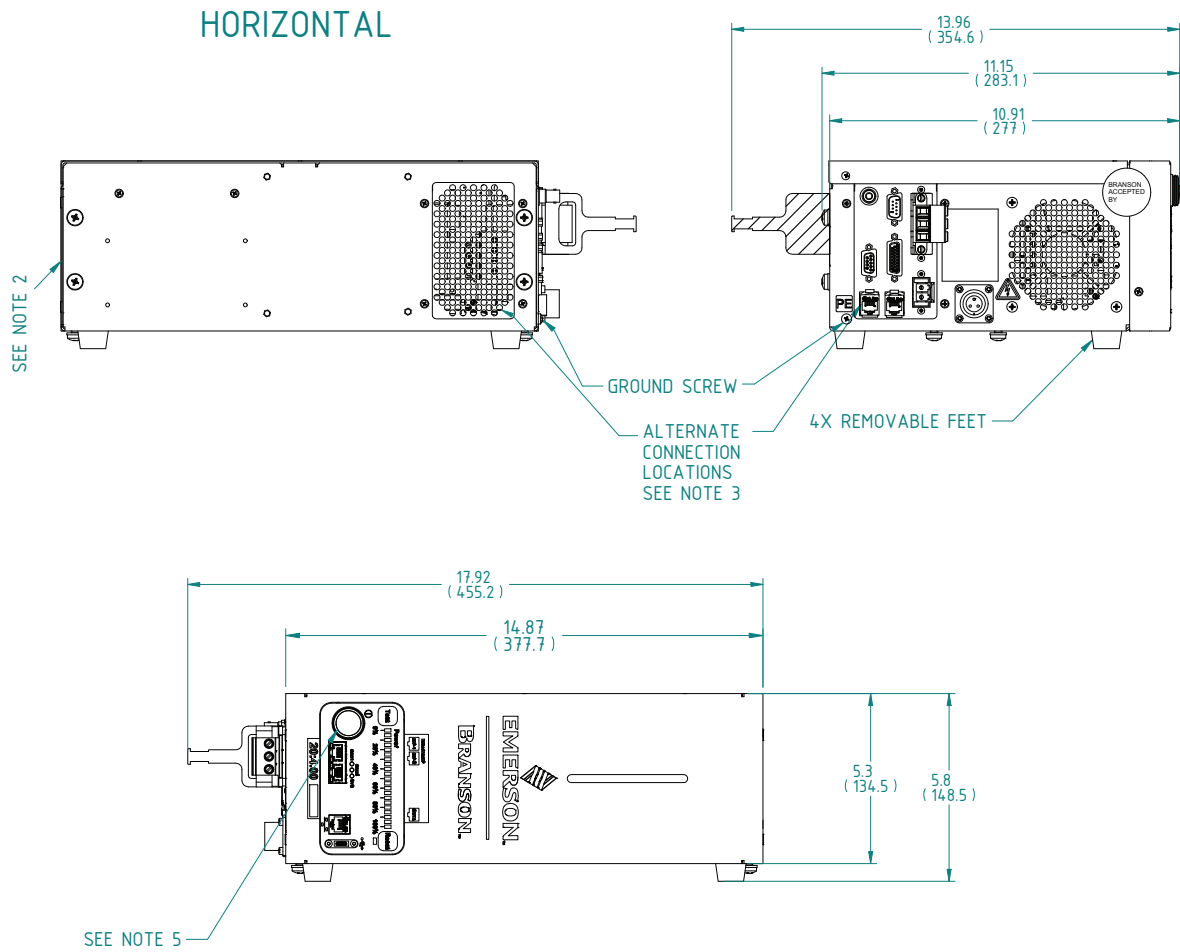
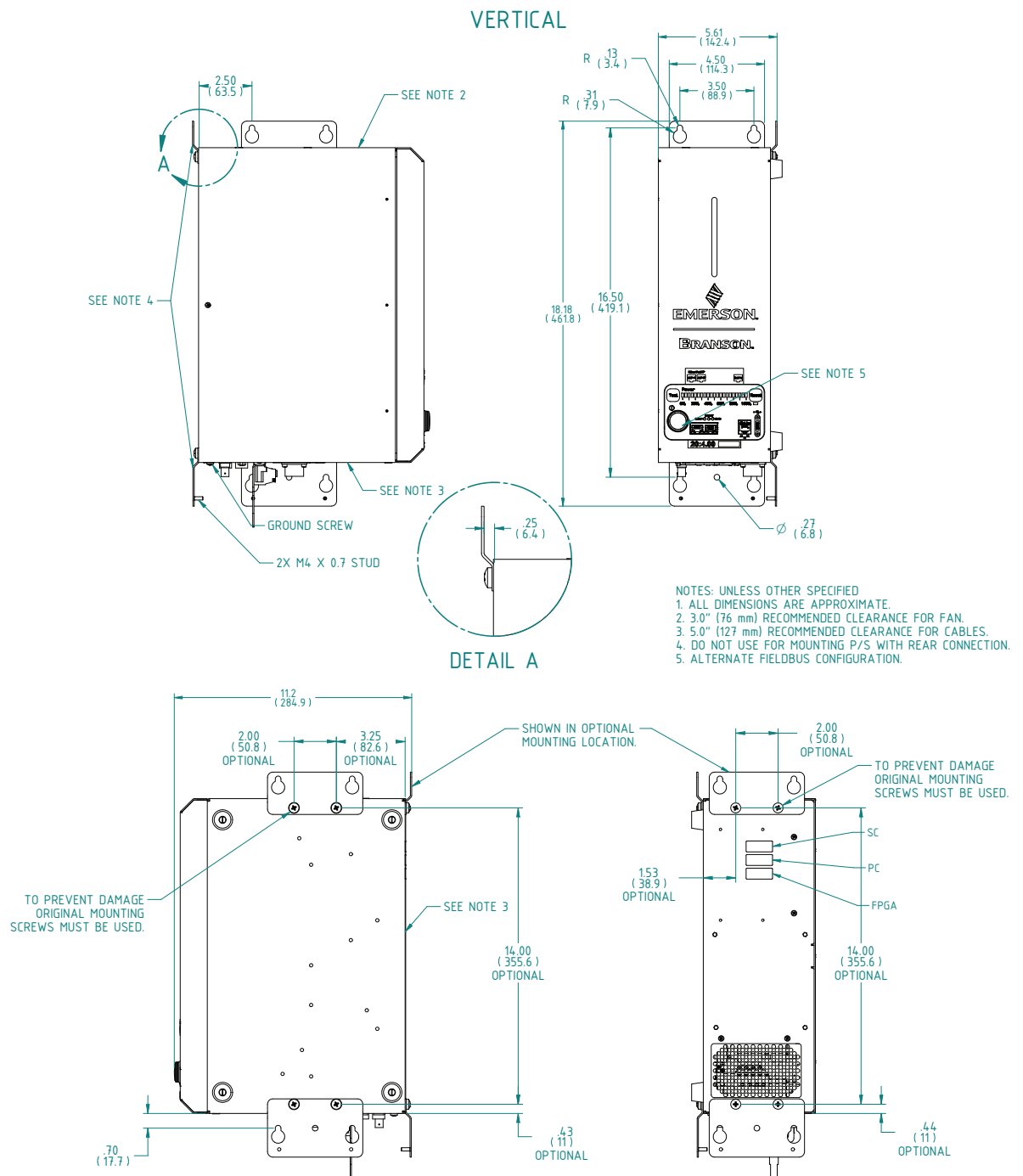


Figure 5.16



5.6 HMI

The HMI can be mounted to the VESA mounting arm provided with the optional round or square column assemblies.

If the HMI is ordered without a column, the mounting arm is not included. In this configuration, the HMI can be mounted using a customer-supplied mounting device compatible with the standard VESA 75 mm mounting pattern.

Figure 5.17 VESA 75 Mounting Pattern



5.6.1 Round Column

5.6.1.1 Attaching HMI to Mounting Plate

Table 5.6 Attaching HMI to Mounting Plate

Step	Action
1	Unpack the HMI and lay it face-down on a soft, clean surface to avoid damage.
2	Identify the four threaded holes on the back of the HMI arranged in a 75x75 mm square pattern.
3	Position the mounting plate so that its holes align with the HMI's mounting holes. The ball should face outward, away from the HMI.
4	Using M4 screws, attach the mounting plate to the HMI. Tighten each screw evenly using a 3 mm hex wrench. Do not overtighten to avoid damaging the HMI.
5	Ensure the mounting plate is securely mounted and flush against the HMI. The mounting plate should be firmly attached and ready to connect to the socket arm.

Figure 5.18 Attaching HMI to Mounting Plate



Table 5.7 Attaching HMI to Mounting Plate

Item	Description
1	Mounting plate
2	HMI

5.6.1.2 Mounting & Connecting the HMI

Table 5.8 Mounting & Connecting the HMI

Step	Action
1	Loosen the knob on the double socket arm until both sockets are wide enough to accept the ball ends.
2	Place the ball attached to the mounting plate into one end of the socket arm.
3	Place the ball of the adapter post into the opposite end of the socket arm.
4	Rotate and angle the arm to the desired position. The double socket arm allows for a wide range of motion and tilt.
5	Once the desired position is set, tighten the knob on the socket arm firmly by hand.
6	Find the 24 VDC power input on the HMI. Take the pre-assembled 24 VDC connector block and align it with the HMI's power terminal. Insert the connector block into the terminal until it is fully seated.
7	Find the RJ45 Ethernet port on the HMI. Plug the Ethernet cable into the port until it clicks securely into place.

Figure 5.19 Mounting & Connecting the HMI

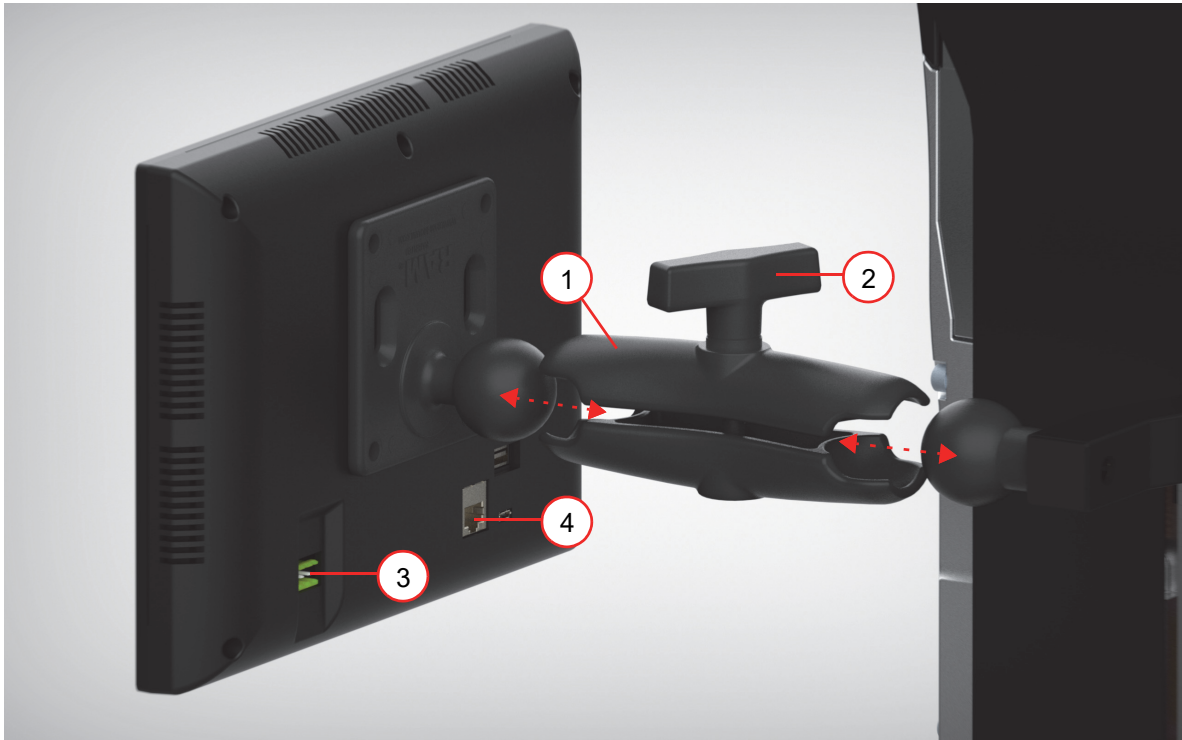


Table 5.9 Mounting & Connecting the HMI

Item	Description
1	Double socket arm
2	Knob
3	24 VDC Power Input
4	RJ45 Ethernet Port

5.6.2 Square Column

5.6.2.1 Attaching HMI to Arm

Table 5.10 Attaching HMI to Arm

Step	Action
1	Tilt the HMI back and lower onto the arm, so that the hook fits into the corresponding hole on the mounting bracket. Then rotate the bottom of the HMI back towards the arm until the tab snaps in place.
2	Find the 24 VDC power input on the HMI. Take the pre-assembled 24 VDC connector block and align it with the HMI's power terminal. Insert the connector block into the terminal until it is fully seated.
3	Find the RJ45 Ethernet port on the HMI. Plug the Ethernet cable into the port until it clicks securely into place.

Figure 5.20 Attaching HMI to Arm

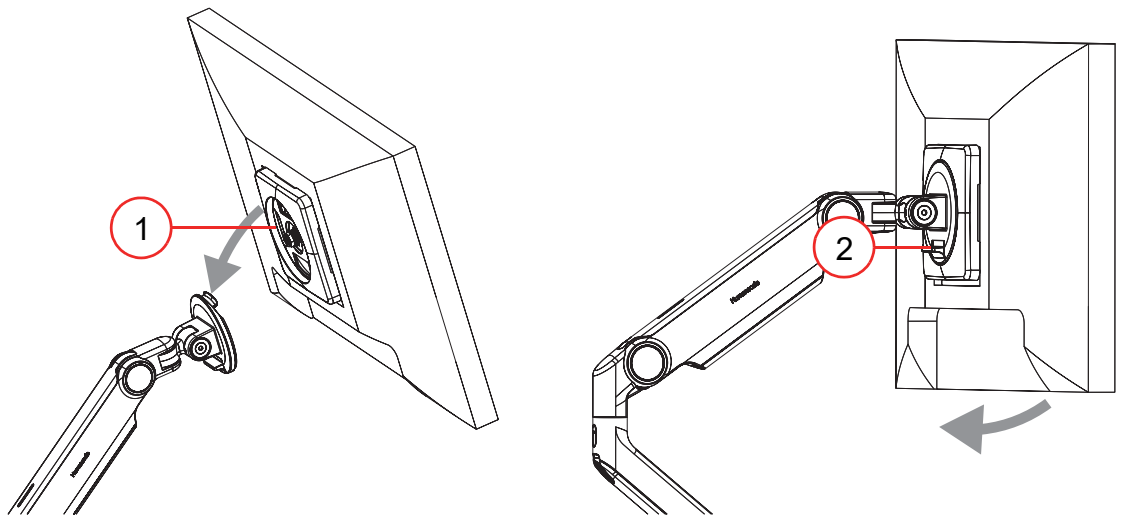


Table 5.11 Attaching HMI to Arm

Item	Description
1	Mounting bracket
2	Release tab

5.6.2.2 Arm Adjustments

The HMI should move up and down easily and stay in place once adjusted. If it is difficult to adjust or moves without assistance, it is not properly counter balanced.

Table 5.12 Arm Adjustments

Step	Action
1	Press the upper arm link downward until to you see the adjustable screw.
2	Adjust the screw with a 4 mm hex key clockwise direction (towards +) to increase load tension and anticlockwise (towards -) to reduce load tension. NOTICE Do not over-tighten the screw as it can damage the screw head or thread. Remove hex key before moving the arm to avoid damage to the hinge area.
3	Move the HMI around to ensure that movement is smooth and the arm functions as desired. If required, repeat steps 1-2 to adjust the force as needed.

Figure 5.21 Arm Adjustments

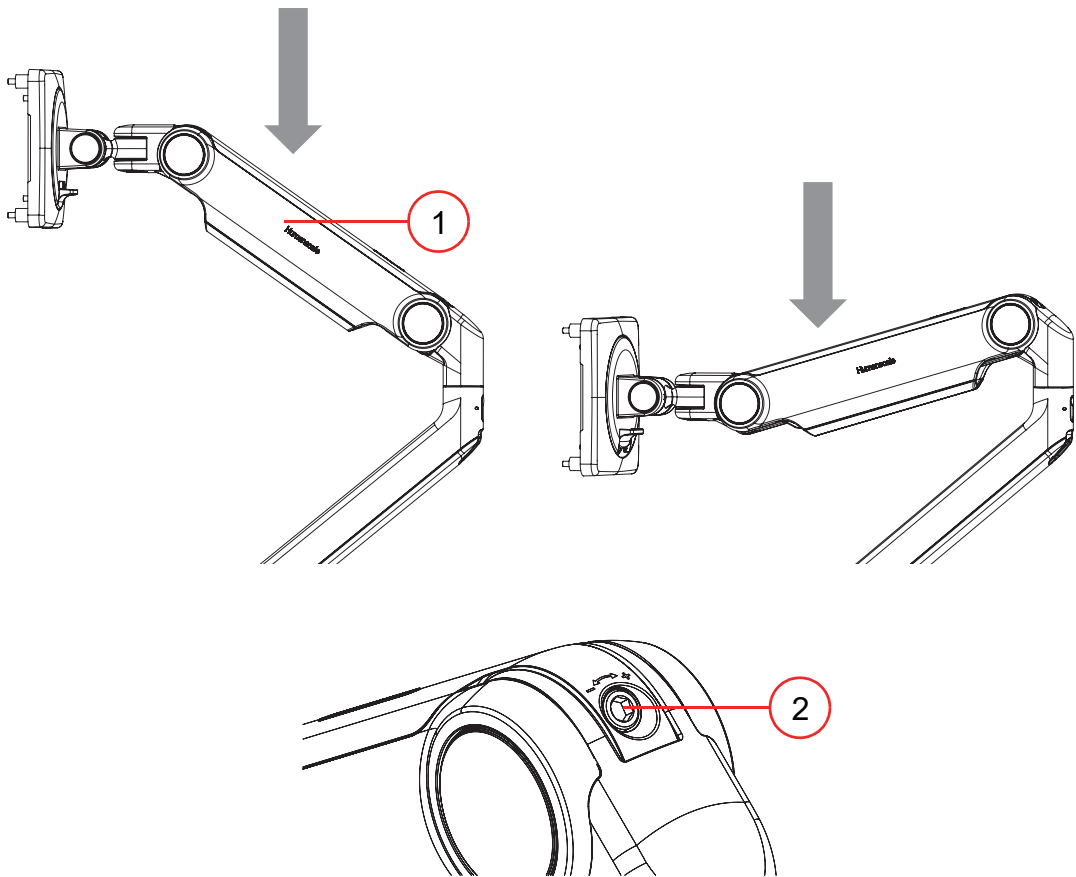


Table 5.13 Arm Screws

Item	Description
1	Upper arm link
2	Adjustable screw

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