

INDUCTION CAP SEALER
SUPER SEAL™ SERIES

ML0071-601-06

OWNERS REFERENCE MANUAL



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TABLE OF CONTENTS

SECTION 1 – INTRODUCTION	1
SAFETY AND WARNINGS	1
SAFETY PRECAUTIONS	2
UNDERSTANDING INDUCTION SEALING	3
GENERAL	3
MATERIAL VARIATIONS.....	3
MULTIPLE LAYER LINERS (Figure 1).....	3
SINGLE PIECE LINERS (Figure 2).....	3
THE SEALING PROCESS.....	3-4
UNPACKING AND INSPECTION	4
DOCUMENTATION.....	4
OPTIONAL EQUIPMENT.....	4
INDUCTION CAP SEALER FEATURES (Figure 3)	5
INFORMATION AND SAFETY LABELS (Figure 4).....	6
SECTION 2 – INSTALLATION.....	7
GENERAL.....	7
SCREW ADJUSTABLE MOUNT OPERATION (Figures 5 & 6)	7
FLOOR MOUNT INSTALLATION (Figure 7).....	7
POWER SUPPLY MOUNTING YOKE INSTALLATION (Figures 8 & 9)	8
MOUNT PLACEMENT AND INSTALLATION (Figures 10 & 11).....	8
ATTACHING POWER SUPPLY TO MOUNT (Figures 12 & 13)	9
MOBILE CART SYSTEM INSTALLATION (Figures 14 - 16).....	9-10
SYSTEM ALIGNMENT OVER CONTAINER.....	10
THE SEALING HEAD AND SURROUNDING METAL	10
CONTAINER PATH (Figure 17)	10-11
SEALING HEAD CENTERING (Figure 18)	11
SETTING THE CONTAINER AND SEALING HEAD GAP (Figure 19).....	11
DETAILED SEALING HEAD ALIGNMENT.....	11
STANDARD FLAT SEALING HEAD (Figure 20).....	11
STANDARD TUNNEL SEALING HEAD (Figure 21)	11-12
DEEP TUNNEL SEALING HEAD (Figure 22)	12
ALIGNMENT AND ADJUSTMENT "1" SEALING HEAD (Figure 23).....	12
SYSTEM REQUIREMENTS.....	12
TEMPERATURE	12
INPUT VOLTAGE REQUIREMENTS.....	12-13
GROUNDING REQUIREMENTS	13
BASIC UNIT - CABLE PROVISIONS (Figure 24).....	13
INSTALLATION - CONTROL PROVISIONS.....	13
EXTERNAL INTERLOCK.....	13
USING THE REMOTE START / INTERLOCK CABLE.....	13
USING THE DEFEAT CONNECTOR.....	13
STALLED BOTTLE DEFEAT CONNECTOR	13-14
LOSS OF SEALING INDICATOR (LSI).....	14
SECTION 3 – PRINCIPLES OF OPERATION	15
GENERAL	15
CONTROL FUNCTIONS (Figure 25)	15
SEQUENCE OF OPERATION	16
LOCAL OPERATION (Figure 26).....	16
SEALING WINDOW SETUP	16-17
ADJUSTING THE LOSS OF SEAL INDICATOR ALARM SETPOINT	17-19
REMOTE START OPERATION	19
AUTO CONTROL.....	19
SECTION 4 – OPTIONAL EQUIPMENT	20
GENERAL	20
OPTIONS AVAILABLE	20
MOBILE CART (Figure 27).....	20
STACK LIGHT (Figure 28)	20-21
MOTION / FOIL DETECTION GROUP	21
MOTION / FOIL DETECTION GROUP INTALLATION (Figure 29).....	21
MOTION DETECTION ONLY (STALLED BOTTLE)	21-22
STALLED BOTTLE SENSOR INSTALLATION (Figure 30).....	22
STALLED BOTTLE SENSOR SETTINGS AND ADJUSTMENTS (Figure 31)	22
SENSITIVITY ADJUSTMENT	22
DELAY OFF	22

DELAY ON	22
SENSOR ADJUSTMENT PROCEDURE	22-23
FOIL LINER DETECTOR ONLY (Figure 32)	23
FOIL LINER DETECTOR INSTALLATION (Figure 33)	23
FOIL LINER DETECTOR CONTACTS CABLE (Figure 34)	23-24
FOIL LINER DETECTOR ALIGNMENT AND ADJUSTMENT (Figure 35)	24
BEAM SENSOR LED OPERATION	24
BEAM SENSOR SENSITIVITY ADJUSTMENT (Figure 36)	24
BEAM AND PROXIMITY SENSOR LED OPERATION	24
PROXIMITY SENSOR SENSITIVITY ADJUSTMENT (Figure 37)	24-25
AUTO MODE (Figure 38)	25
EJECTOR SYSTEM	25
EJECTOR INSTALLATION (Figure 39)	25-26
SPARE PART KITS AVAILABLE	26
SECTION 4 – MAINTENANCE	27
GENERAL	27
ROUTINE INSPECTION AND SERVICING	27
VISUAL INSPECTION	27
EXTERNAL CONNECTIONS	27
SEALING HEAD INSPECTION	27
COOLING FANS AND BASE PLATE INSPECTION (Figure 40)	27-28
INTERNAL CONNECTIONS	28
MAINTENANCE RECORD	28
SECTION 5 – TROUBLESHOOTING	29
GENERAL	29
REMOVE/INSTALL THE POWER SUPPLY COVER	29
FRONT PANEL 'F' INDICATIONS	29
F00 - OVER CURRENT TRIP	29-30
F02 AND TEMP - CAP TRIP OR OVER-TEMPERATURE (Figures 41 & 42)	30-32
F03 - INTERLOCK FAULT	32-33
F04 - UNDER VOLTAGE TRIP	33
F05 - UNDER FREQUENCY TRIP	33-34
FRONT PANEL BLANK	34-35
FAULT	35
PUSHBUTTONS DO NOT FUNCTION	35-36
OUTPUT STUCK AT MINIMUM	36
AUTO MODE AT MINIMUM	37
DISPLAY FLICKERS	37-38
RUN NOT LIT OR BLINKING	38
INVERTER OHM CHECK PROCEDURE	39
BRIDGE RECTIFIER OHM CHECK PROCEDURE	39
APPLICATION TROUBLESHOOTING	40-43
SECTION 6 – PARTS LISTS	44
GENERAL	44
HOW TO USE THIS PARTS LIST	44
HOW TO ORDER PARTS	44
SHIPPING INSTRUCTIONS FOR RETURNS	44
SCREW ADJUSTABLE FLOOR MOUNT PARTS BREAKDOWN (Figure 43)	45
MOUNTING BRACKET PARTS BREAKDOWN (Figure 44)	46
STANDARD POWER SUPPLY PARTS BREAKDOWN (Figure 45)	47
CE POWER SUPPLY PARTS BREAKDOWN (Figure 46)	48
FAN AND SEALING HEAD MOUNTING PARTS BREAKDOWN (Figure 47)	49
FRONT PANEL PARTS BREAKDOWN (Figure 48)	50
OPTIONAL STALLED BOTTLE SENSOR PARTS BREAKDOWN (Figure 49)	51
OPTIONAL FOIL LINER DETECTOR PARTS BREAKDOWN (Figure 50)	52
OPTIONAL STACK LIGHT PARTS BREAKDOWN (Figure 51)	53
OPTIONAL MOBILE CART PARTS BREAKDOWN (Figure 52)	54
SECTION 8 – MISCELLANEOUS	55
MAINTENANCE RECORD	55-56
PRODUCTION INFORMATION	57-58
NOTES	59-60

SECTION 1 – INTRODUCTION



WARNING!


Please read this manual carefully before installing, operating, or servicing.

DO NOT OPERATE THIS EQUIPMENT IN A HAZARDOUS ENVIRONMENT!

THIS EQUIPMENT PRODUCES A ELECTROMAGNETIC FIELD TO FACILITATE THE INDUCTION SEALING PROCESS. THE ELECTROMAGNETIC FIELD QUICKLY HEATS ANY METAL WITHIN THE FIELD AND MAY, UNDER CERTAIN CONDITIONS, IGNITE THE METAL OR SURROUNDING MATERIALS. PERSONNEL SHOULD REFRAIN FROM PLACING JEWELRY, SUCH AS RINGS AND WATCHES BENEATH OR WITHIN THE SEALING HEAD'S ELECTROMAGNETIC FIELD!

HIGH VOLTAGE is present within this equipment. As with any piece of **ELECTRICAL** equipment, one should become familiar with the manual before applying power. Proper connections and operation are required for safe use. **FOLLOW INSTRUCTIONS** for safety of personnel when operating or maintaining this equipment. **INSTALLATION** of this equipment must be done in accordance with this manual, Enercon installation drawings and local codes to ensure the safety of personnel in the area and in the building.

SAFETY AND WARNINGS

 Before placing this equipment into operation, we strongly recommend that you take the time to read this manual carefully in its entirety to ensure you understand all the safety and operational requirements for using this equipment.

The heating capability of this equipment and the presence of high voltage have the potential to cause severe personal injury or property damage. To avoid ignition of product liners from excessive heat, do ***not*** exceed your established production output level, or product dwell time, for a given application. Do ***not*** operate this equipment if any of the wiring or connections are exposed or damaged.

Before starting, operating, or making adjustments; identify the components of the Induction Cap Sealer, using this manual as a guide.

Personnel should use common sense and good working practices while operating and maintaining this equipment. All codes and operational guidelines should be followed and the starting and stopping sequence should be understood. Check all safety devices and follow the procedures contained in this manual.

Maintenance should only be performed by qualified personnel, adequately equipped with the proper tools. Follow the maintenance schedules as outlined in the manual to ensure problem-free operation after startup.

Safety instructions in this manual are called out in colored safety boxes with bold-faced text for emphasis. The signal words **CAUTION**, **WARNING**, and **DANGER** are used to indicate hazard seriousness levels as follows:

CAUTION!

CAUTION is used to indicate the presence of a potentially hazardous situation which, if not avoided may result in minor personal injury or property damage.

WARNING!

WARNING is used to indicate a potentially hazardous situation which, if not avoided, can result in serious injury or death.

DANGER!

DANGER is used to indicate an imminently hazardous situation which, if not avoided, will result in serious injury or death.

SAFETY PRECAUTIONS

DANGER!

The use of high voltage is necessarily employed in the operation of this equipment. Precautions have been taken in the design of this equipment to make it as safe as possible for both operator and service personnel. However, since no amount of interlocks and safety devices can be absolutely infallible, precautionary measures must always be taken when working on this equipment.

Do **not** reach into the equipment or any electrical enclosure without first removing the input voltage. Never apply input voltage to the unit without the cover on and securely in place.

Capacitors Store Charge: **Never** trust a capacitor to be bled off completely. A meter or ground strap should be used to check each stud or lead before handling. Some capacitor studs, including those not tied to bus work (not used), may build up a considerable static charge. **GROUND BEFORE HANDLING!**

Do **not** stand in water or on grounded surfaces or touch grounded surfaces while reaching in any system enclosure. A piece of wood or other insulating material will act as an additional barrier to stand on.

WARNING!

Do **not** operate this equipment in a hazardous environment! The presence of High Voltage within this equipment may result in explosion or fire when operated near flammable vapors, fuels, or other combustibles.

With the exception of your conveyor body, do **not** permanently mount metal objects within the sealing head's electromagnetic field! These objects will be heated as long as the electromagnetic field is on and can create a burn hazard!

Do **not** attempt to seal products with damaged or improperly applied liners, as they may overheat causing the liner and container contents to ignite.

Do **not** Tamper With Safety Interlocks: The use of safety interlocks is optional with your induction cap sealing equipment. If safety interlocks are required for your system, then under no circumstances should any of these safety interlocks be defeated nor should any of the interlocks be relied upon for removal of voltage from the equipment.

Lockout / Tag Out: To ensure that the input voltage cannot be applied to the equipment, remove the input voltage and use the appropriate Lockout / Tag Out procedures prior to removing any access covers, panels, or entering the equipment in any manner. ***ALWAYS use safety as the first step.***

CAUTION!

Familiarize Yourself Thoroughly with the Equipment.

Never attempt to work on this equipment unless you are completely familiar with it.

Never assume that a circuit is dead, **MAKE SURE!!!**

Always Wear Appropriate Protective clothing and Eyewear while working within the enclosure.

Do **not** connect any external control or monitoring equipment, with the exception of appropriate test equipment, to the internal circuits of this equipment. Connecting external equipment in this manner may cause failure of this equipment and create a potential hazard to personnel.

The Sealing Head may be heavy! Always use support blocks when removing the sealing head for maintenance or troubleshooting.

CONTACT:

Enercon Customer Service Department
Phone Number: (262) 255-6070
Fax Number: (262) 255-2462
E-Mail Address: service@enerconmail.com
Website: www.enerconind.com
24hr Customer Service is available.

UNDERSTANDING INDUCTION SEALING

General

Induction Sealing is a process used to seal containers hermetically by using an electromagnetic field to heat a heat-sealable foil liner located within a closure. The Super Seal™ Induction Cap Sealer converts a line voltage (240 VAC 1Ø or 3Ø / 50/60 Hz) to a high-frequency electromagnetic field in the sealing head. This electromagnetic field heats your liner by inducing currents into the metal of the foil liner located within the closures of your containers. High sealing speeds can be obtained using this process making it well suited for both production lines and laboratory applications.

Material Variations

Depending on the type of polymer used, an induction seal can meet FDA requirements for “tamper evident” packaging, or may simply provide leakage protection and shelf life extension, often referred to as a “freshness seal”. Many varieties of inner seal polymers have been developed and are available from a number of suppliers. Suppliers can assist you in the selection of the proper liner for the multitude of products and packaging methods used in the packaging industry.

Multiple Layer Liners

A multiple layer liner (Figure 1) typically consists of a pulp board layer (A), a wax layer (B), and a layer of aluminum foil (C) coated with a polymer (D).

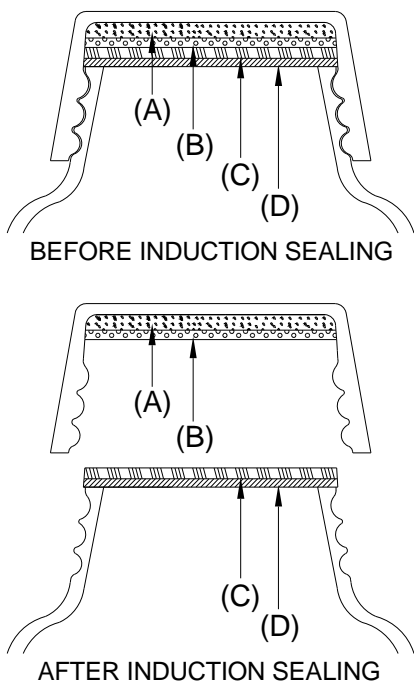


Figure 1

The polymer (D) must be compatible with your container material and capable of producing the seal strength and removal force required by your application.

Single Piece Liners

A single piece foil liner (Figure 2) typically consists of a layer of aluminum foil (A) coated with a polymer (B) inside a closure.

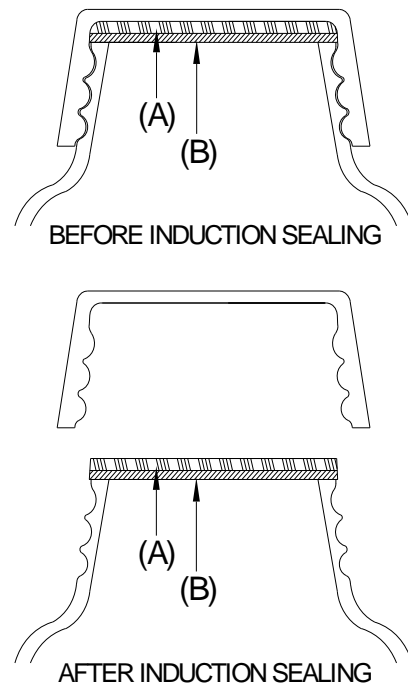


Figure 2

The polymer (B) must be compatible with your container material and capable of producing the seal strength and removal force required by your application.

! WARNING!

DO NOT attempt to induction seal damaged or improperly applied liners as they may overheat causing the liner and container contents to ignite.

The Sealing Process

When the closure is placed onto the container and placed within the electromagnetic field produced by the sealing head, several things occur.

1. An electrical current, called an eddy current, is induced into the aluminum foil, resulting in a resistance-type heating effect.

2. The polymer coating melts and flows around the lip of the container.
3. In Multiple Layer Liners the wax bond holding the foil liner to the backing material is melted and the wax is absorbed into the backing material.

When the electromagnetic field is shut off the polymer cools and hardens, bonding the foil to the container lip. When the closure is removed from the container the metal foil will remain bonded to the lip of the container and any backing materials (Multiple layer liners only) will remain inside the closure.

NOTE:

A fundamental requirement for induction cap sealing is to have the proper amount of torque on the cap, which exerts a downward force when sealing. Consult your cap supplier for the recommended torque of your cap. A rule of thumb is to equate half the liner's millimeter size (diameter) to inch-pounds of torque. For example, a 53mm liner would require 27 inch-pounds of torque. Also refer to the Torque Requirement Table on **Page 43** of this manual.

UNPACKING AND INSPECTION

IMPORTANT: The carrier accepted responsibility for this shipment when the carrier signed the Bill of Lading at the origin of shipment. If external damage to the packaging was detected, it should have been noted on the freight bill before signing it to acknowledge receipt. If you give the carrier a clear receipt for goods that have been damaged or lost in transit, you do so at your own risk and expense. If concealed loss or damage is discovered after delivery, notify your carrier at once and request an inspection. This is absolutely necessary for the carrier to consider your claim. The carrier agent should make an inspection and issue a loss or damage report.

Your *Super Seal™ Induction Cap Sealing System* may have been shipped in more than one container, so compare the items received with the packing slip to ensure all items that shipped were received. All packages and crating should be carefully opened and all items thoroughly inspected for damage.

NOTE:

Be extra careful if using a sharp instrument when removing the protective wrapping from the equipment. File a claim with the freight carrier for any damage incurred during shipping. Enercon Industries should also be contacted as soon as possible to expedite the shipment of replacement parts.

CONTACT:

<p>Enercon Customer Service Department Phone Number: (262) 255-6070 Fax Number: (262) 255-2462 E-Mail Address: service@enerconmail.com Website: www.enerconind.com 24hr Customer Service is available.</p>

<p>Enercon Parts Department Phone Number: (262) 255-6070 Fax Number: (262) 255-2462 E-Mail Address: parts@enerconmail.com</p>
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DOCUMENTATION

A system folder containing your printed System Drawings, System and Safety Documentation, and Miscellaneous Specification was provided with your system. A CD-ROM was also provided with digital copies of your system manuals, system drawings, and the documents mentioned above.

OPTIONAL EQUIPMENT

Several options were available for purchase with your *Super Seal™* and the same care should be used when opening these boxes. For installation and setup of options included with your system refer to **SECTION 4 – OPTIONAL EQUIPMENT** in this manual.

INDUCTION CAP SEALER FEATURES

Item #	Description	Item #	Description
1	See Section 3 – Principles of Operation	4	Sealing Head
2	See Section 2 – Installation	5	Screw Adjustable Floor Mount
3	Rear of Power Supply		

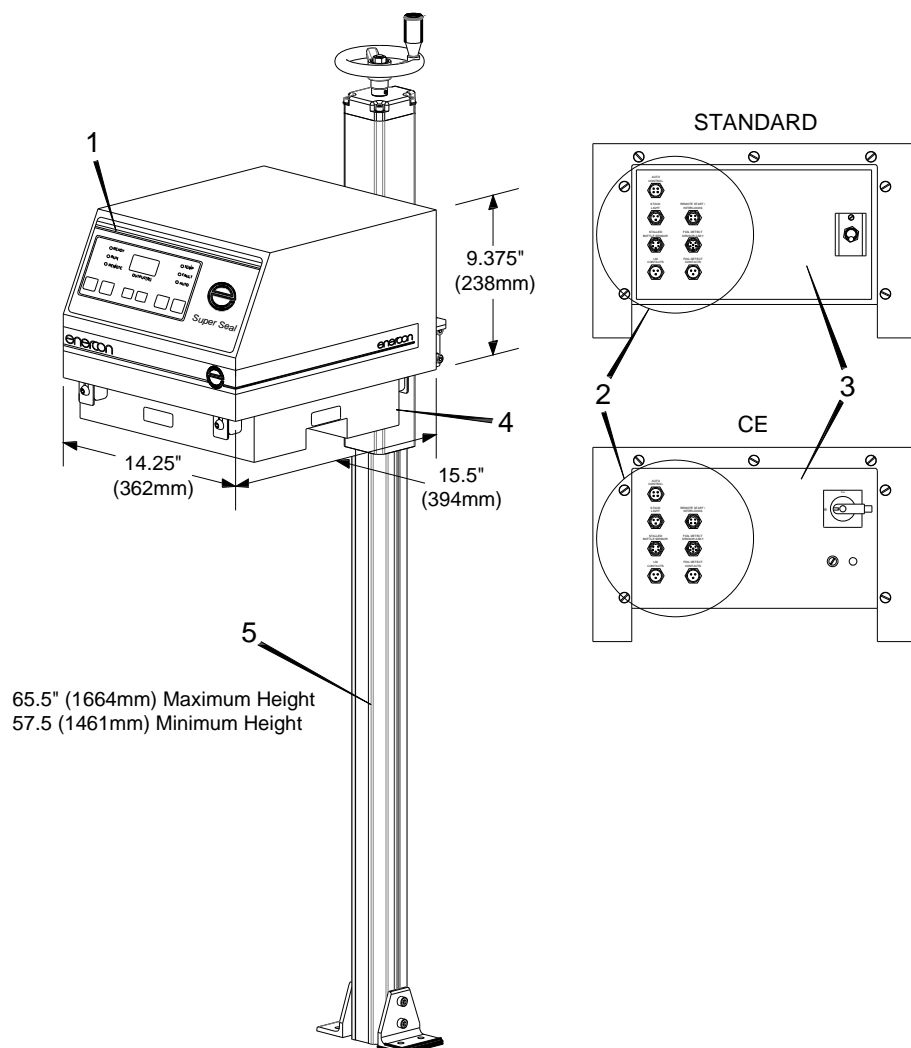


Figure 3

Features		Sealing Heads – Quick Change		
1	2	Part Number	Type Of Head	Cap Range
1	Completely Air Cooled			
2	Electrical Rating: ♦ 208 or 240 VAC ± 10%, 50/60 Hz 1Ø SS50 – SS100 * ♦ 208 or 240 ± 10%, 50/60 Hz 3Ø SS100 3Ø (Non CE) *	LM4555-02 LM4555-102	“1” COIL	24 to 120mm
3	Stainless Steel Cabinet w/NEMA 4 rating.	LM4033-32	WIDE FLAT	53 to 120mm
4	Screw Adjustable Floor Mount – Lockable.	LM4033 -132		
5	Standard Control Features:	LM4033-31	WIDE TUNNEL	28 to 53mm
	START/STOP	LM4033-131		
	Output Adjustment / Digital Output % Meter	LM4033-38	NARROW TUNNEL	24 to 38mm
	Built In Diagnostic Display	LM4033-138		
	Remote Start Capabilities	LM4033-238		
	Capable of Interlocking with other equipment.	Consult Factory for Other Available Sealing Heads.		

*See Rating Plate for Input Voltage Requirements. Failure to provide the input voltage shown on the system rating plate may cause system failure

INFORMATION AND SAFETY LABELS

This page contains representative examples of the typical placement of the labels that appear on your *Super Seal™ Induction Cap Sealing System*. These labels are designed to provide technical, functional, and safety information required for operation of this equipment. If for any reason a label is removed, defaced, painted over or underlying parts are replaced, we recommend you obtain a replacement label from Enercon and re-apply them in the locations shown.

 enercon INDUSTRIES CORPORATION Menomonee Falls, Wisconsin 53051 Phone No. 262-255-6070 • Fax 262-255-7784			
RATING	_____	PAT #	_____
MODEL	_____	MFG	_____
SERIAL	_____	ID	_____
INPUT		OUTPUT	
VOLTS	_____		_____
AMPS	_____		_____
FREQ	_____		_____
PHASE	_____		_____

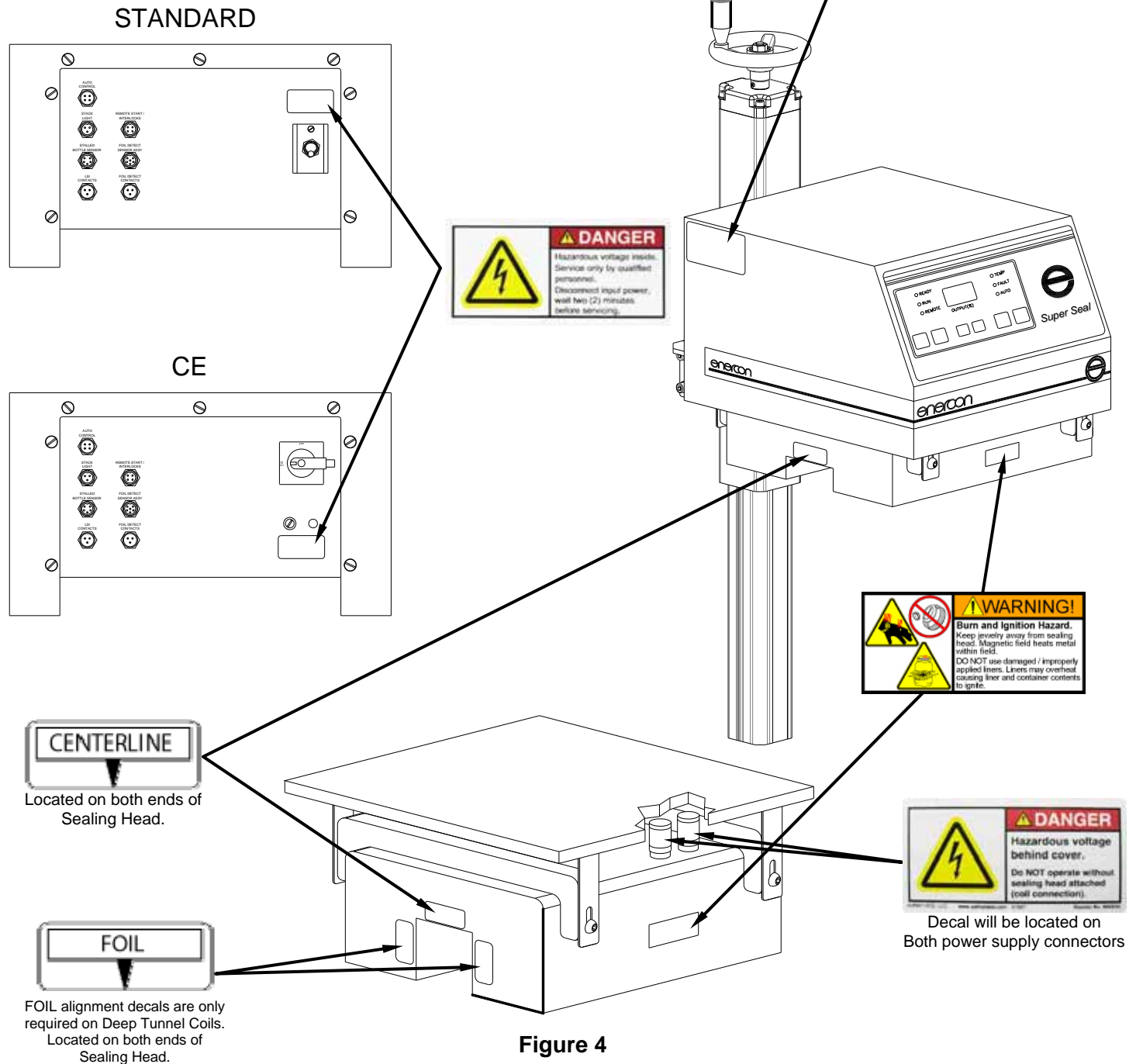


Figure 4

SECTION 2 – INSTALLATION

GENERAL

The basic *Super Seal™ Induction Cap Sealing Systems* consist of a Power Supply, Sealing Head (attached), Floor Mount, or optional Mobile Cart Mounting System, and all required interconnection cables. The system is designed to mount easily over your conveyor using either the standard floor mount or optional mobile cart, and this manual covers the installation and setup of both types of mounting systems. Your system may have been ordered with some special, or optional, items that may have requirements that deviate from standard. Therefore, it is important to reference the system drawings and paperwork to identify these items as well as to understand any deviation from the standard requirements listed in this manual.

SCREW ADJUSTABLE MOUNT OPERATION

The Screw Adjustable Mount is an assembly designed to aid personnel in adjusting the power supply height over the conveyor. With the sealing head centered over the conveyor, the mount adjusts to achieve the required gap between sealing head and container by rotating the hand wheel either CCW to raise, or CW to lower, the sealer over the conveyor. Once the gap is set, a clamping system is used to aid in maintaining the position of the mount. A locking knob is used to loosen or tighten the clamp. The locking knob rotates CCW to loosen, allowing height to be adjusted, and CW to tighten once the height is correctly set (**Figure 5**).

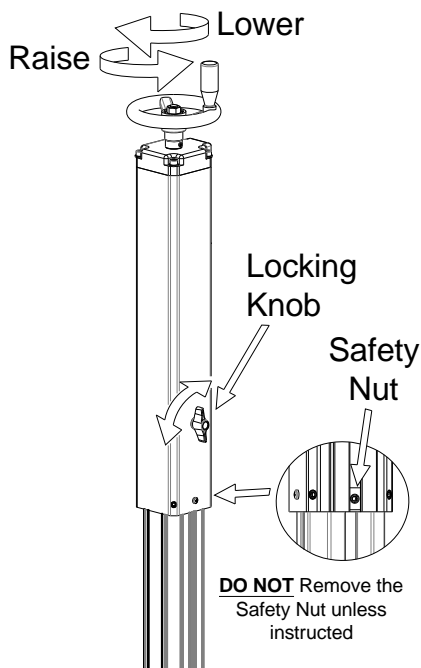


Figure 5

CAUTION!

Loosen the clamp before adjusting the mount height.

Ensure that the safety nut located at the bottom of the extrusion track is securely in place.

All other visible screws on the mount, such as the nylon tipped corner set screws, should not be field adjusted as they are factory set.

The nuts used for mounting hardware and accessories onto the screw adjustable mount may slide within the extrusion track (**Figure 6**). If possible, ensure the affected track is parallel to the floor when removing bolts.

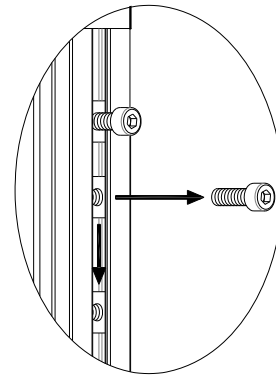


Figure 6

FLOOR MOUNT INSTALLATION

Once the floor mount has been unpacked the conveyor mounting brackets will need to be repositioned. Lay the mount on its side and remove the lower bolt (1) and loosen the upper bolt (2) on each bracket and rotate the bracket (3) into the position shown. Reinstall the lower bolt (4) and tighten the upper bolt (5). Repeat for the second bracket (**Figure 7**).

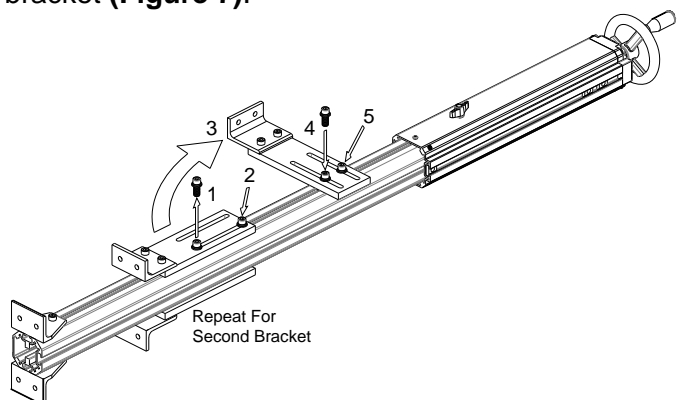


Figure 7

**POWER SUPPLY MOUNTING YOKE
INSTALLATION**

Remove the 4 yoke mounting bolts from beneath the power supply and slide the mounting bracket out (Figure 8).

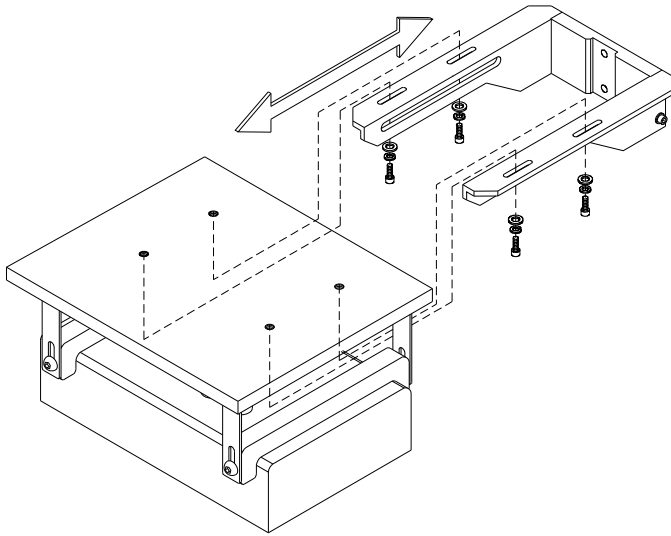


Figure 8

NOTE:

If the Optional Stack Light is included with your system it should be installed at the same time as the Power Supply Mounting Yoke.

When installing the yoke onto the mount, take into account the dimensions of the power supply, sealing head, and container when choosing its placement on the mount. Ensure the yoke is at a height that will allow your container to pass easily beneath the sealing head. Place the optional stack light at the highest point on the channel to allow the greatest visibility. Remove the mounting bolts and affix the yoke and stack light onto the mount (Figure 9).

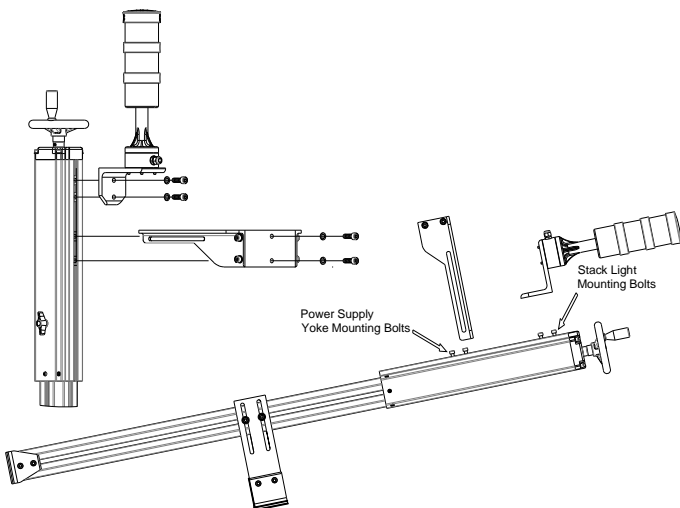


Figure 9

MOUNT PLACEMENT AND INSTALLATION

Next find a suitable location along the conveyor that allows sufficient space for installing the power supply and any options that mount to the conveyor. Place the mount against the conveyor and measure from the center of your conveyor to the center of the floor mounting brackets 11 1/4" (Figure 10).

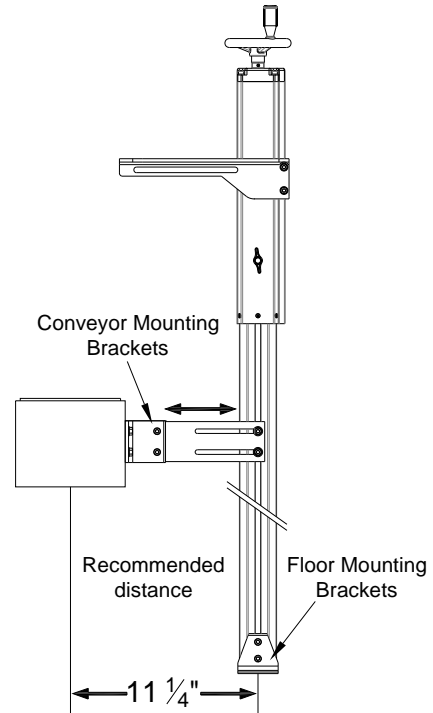


Figure 10

Drill holes in the conveyor and floor to secure the mount, and bolt the mount in place (Figure 11).

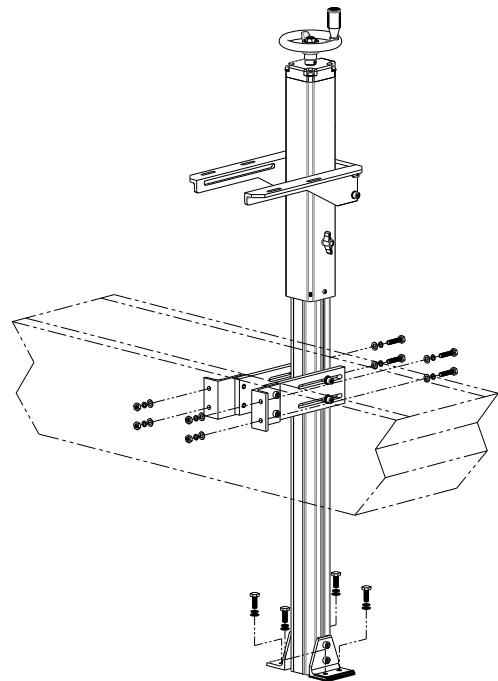


Figure 11

ATTACHING POWER SUPPLY TO MOUNT

It is recommended that the sealing head be removed for ease of installation of the power supply. Remove the 4 bolts from the 2 mounting brackets. The power supply can be lifted up off of the sealing head by raising the mount, or the head can be pulled straight down from the power supply (**Figure 12**).

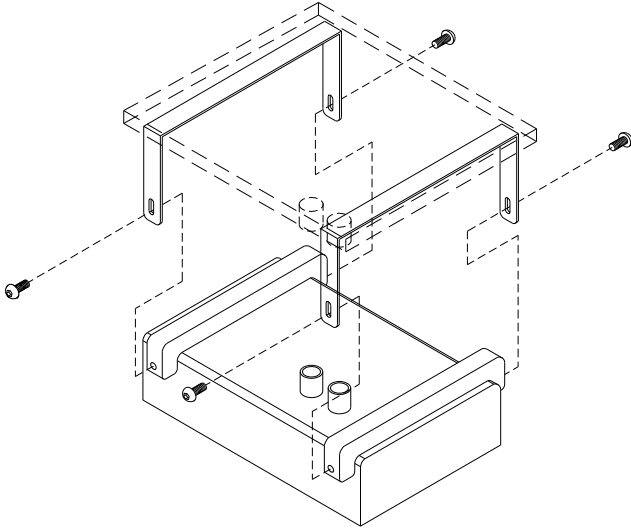


Figure 12

Install the power supply by lowering it onto the yoke and aligning the Baseplate holes with the holes in the yoke. Secure the power supply to the yoke using the power supply mounting bolts removed earlier (**Figure 13**). Once the power supply is secure, reinstall the sealing head (**Figure 12**).

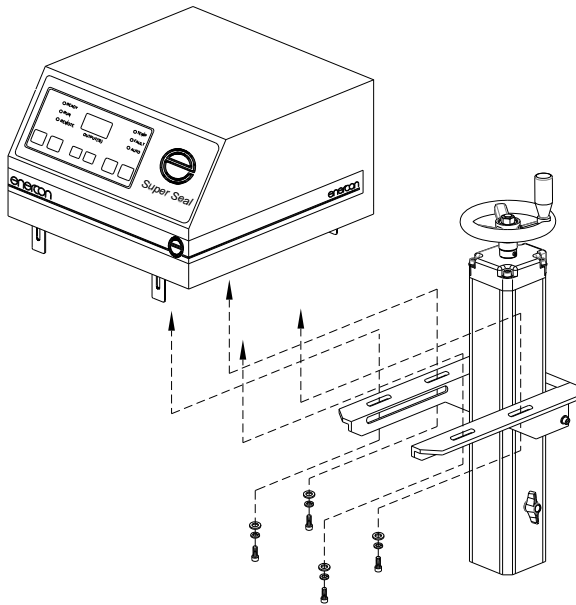


Figure 13

NOTE:

The sealing head should be reinstalled to the lowest points in the slots on the mounting brackets to help ensure the most consistent gap.

MOBILE CART SYSTEM INSTALLATION

When the cart system has been removed from its crating, locate the leveling pads and remove them from their packaging. Remove the protective yellow sleeves and thread the pads into the mobile cart base far enough that they do not contact the floor (**Figure 14**).

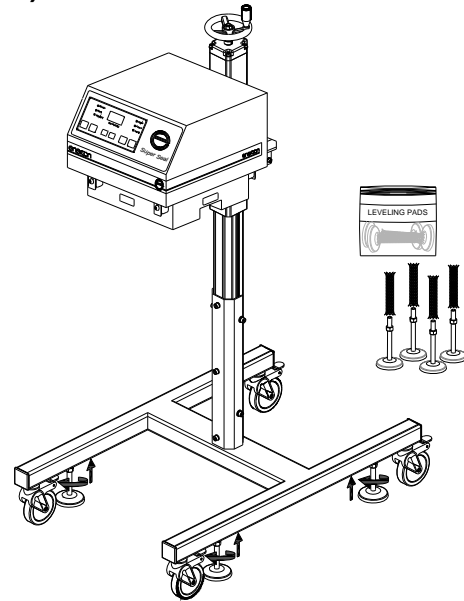


Figure 14

Next find a suitable location along the conveyor that allows sufficient space for installing the cart and power supply and any options that mount to the conveyor. Unlock the casters and roll the system up to the conveyor. Center the sealing head over the conveyor, or product path, and lock all 4 casters. Level the power supply to the conveyor by lowering the leveling pads as required. Once set, tighten each leveling pad's lock nut (**Figure 15**).

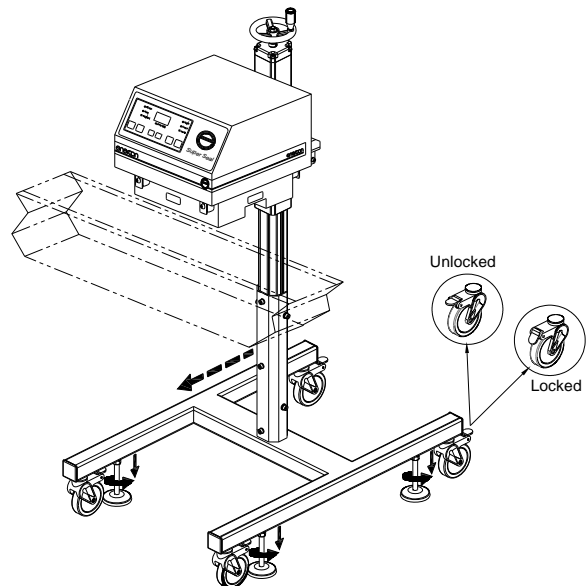


Figure 15

NOTE:

If the Optional Stack Light is included with your system it will have been factory installed.

Depending upon the combined height of your conveyor and container, it may be necessary to adjust the rough height of the power supply. Due to the weight, the power supply will need to be securely supported before loosening the yoke mounting bolts. Once the power supply is securely supported, adjust the height by raising or lowering the mount within the yoke's channel. Once the adjustment has been made ensure all hardware is retightened (**Figure 16**).

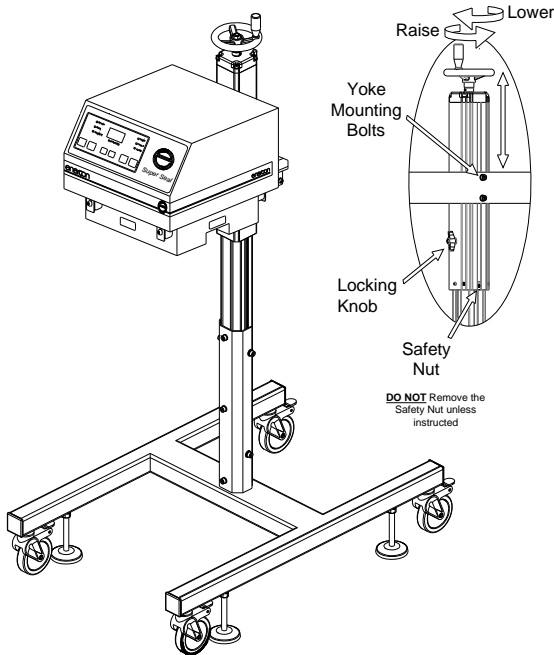


Figure 16

⚠ CAUTION!

Loosen the clamp before adjusting the mount height.

Ensure that the safety nut located at the bottom of the extrusion track is securely in place.

All other visible screws on the mount, such as the nylon tipped corner set screws, should not be field adjusted as they are factory set.

SYSTEM ALIGNMENT OVER CONVEYOR

It is important that each end of the sealing head be equal in height and alignment in relation to the conveyor. This will be critical for ensuring the containers are entering and exiting at the same gap and centering on the sealing head. The better the liner is positioned within the sealing head's electromagnetic field, the more efficiently the liner will be heated as it passes.

⚠ WARNING!

The sealing head produces a electromagnetic field that quickly heats any metal within the field.

With the exception of the metal frame of your conveyor, DO NOT mount any metal objects within 6" (15cm) of the sealing head.

The Sealing Head and Surrounding Metal

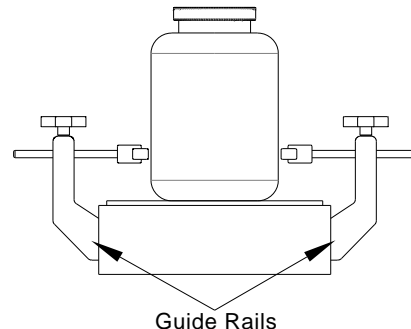
Due to the nature of induction heating, the sealing head will induct into all metal objects that are mounted within range of its electromagnetic field. The electromagnetic field weakens as it moves away from the sealing head until it dissipates at a distance of approximately 6" (15cm) at the farthest. Even at its weakest point the electromagnetic field will inductively heat metal objects, though the rate of heating will be slower.

Smaller metal objects, such as screws or brackets, which are mounted within the sealing head's electromagnetic field will be continually heated whenever the electromagnetic field is active. This scenario has the potential to create a severe burn hazard and should be eliminated if possible.

Larger metal objects, such as your conveyor's metal frame, which are located within the electromagnetic field, tend not to show signs of heating due to the mass of these objects. The only adverse affect typically associated with large metal objects is a slight change in the performance of the sealer, which in most cases is not noticeable due to the insignificance of the change. This scenario is considered normal in most production atmospheres and is safe to both operators and the equipment.

Container Path

The container path beneath the sealing head must be as consistent as possible, and this can be achieved with the use of guide rails. If guide rails are used, ensure that the metal rails beneath the sealing head are removed, or at least 6 inches (15cm) below the sealing head (**Figure 17**).



Guide Rails

Figure 17

Sealing Head Centering

Raise the system height, if needed, by loosening the locking knob and rotating the hand wheel counter-clockwise, and then retighten the locking knob. Loosen the power supply mounting bolts on each side to allow free movement of the power supply over the container. Align both the input and exit side centerline labels to the center of the container's cap. Retighten the mounting bolts (**Figure 18**).

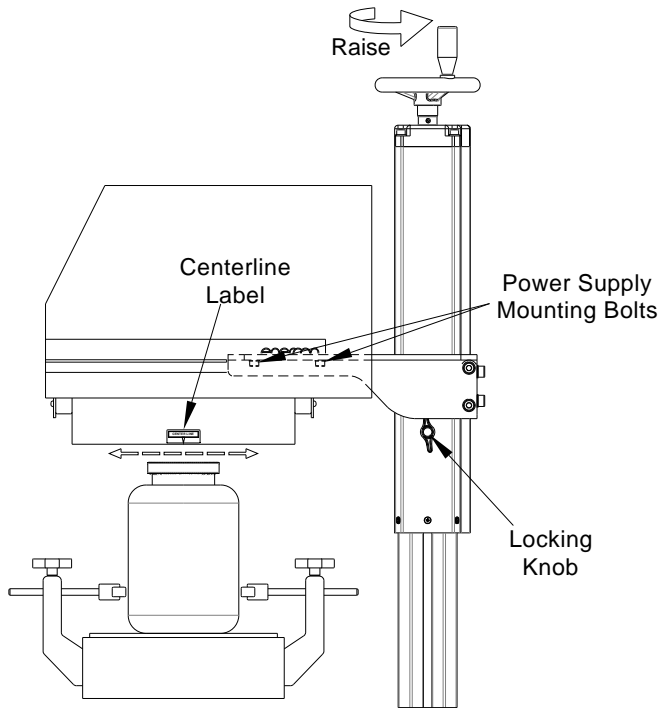


Figure 18

Setting the Container and Sealing Head Gap

Use the 1/8 inch (3mm) thick gap gauge provided by Enercon to set the gap between the container and sealing head (**Figure 19**).

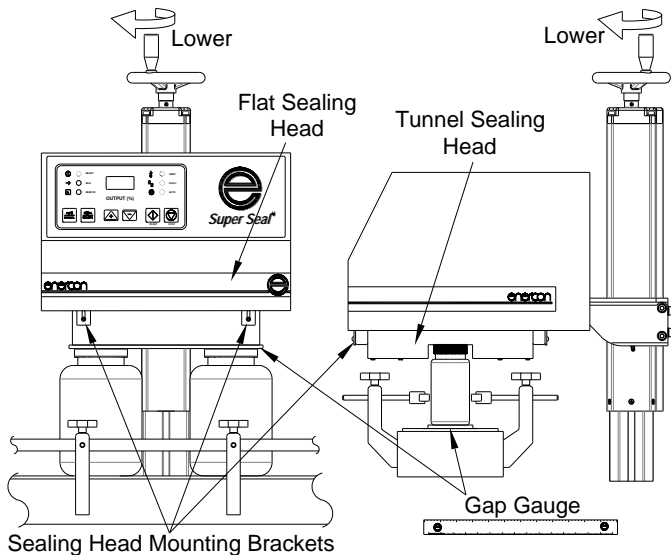


Figure 19

As shown, the gap gauge placement will depend upon the type of sealing head supplied with the system. Once the gap gauge is in place, loosen the locking knob and lower the system by rotating the hand wheel clockwise until the bottom of the flat head or the top of the tunnel touches the gauge or cap. Ensure the gap is equal on both ends of the sealing head. Retighten the locking knob and remove the gap gauge.

DETAILED SEALING HEAD ALIGNMENT

To ensure repeatability of your sealing process, proper alignment of the sealing head is critical. Use the following steps to help achieve proper alignment.

Standard Flat Sealing Head

The standard Flat Sealing Head is typically used on larger containers between 53mm and 120mm. The sealing head must be centered over the cap with a 1/8" (3mm) air gap between the bottom of the sealing head and the top of the cap (**Figure 20**). The 1/8" (3mm) gap will allow the highest line speeds with the most consistent seal results.

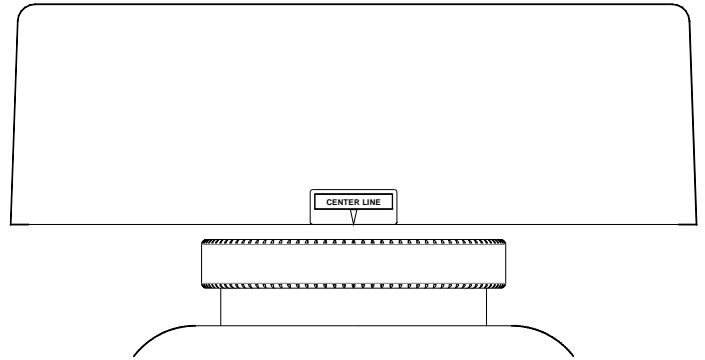


Figure 20

Standard Tunnel Sealing Head

The Standard Tunnel Sealing Head is typically used on containers 53mm and smaller. The sealing head must be centered over the cap with a 1/8" (3mm) air gap between the top of the sealing heads tunnel and the top of the cap (**See Figure 21**). The 1/8" (3mm) gap will allow the highest line speeds with the most consistent seal results.

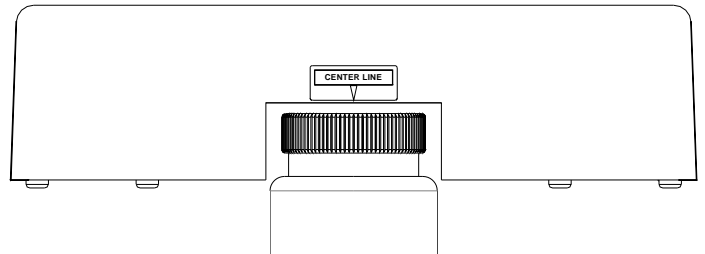


Figure 21

Deep Tunnel Sealing Head

The Deep Tunnel Head is typically used on special applications where the cap or container will not allow the product to fit within the standard tunnel head. Deep tunnel head have a centerline indicator at the top of the tunnel and foil indicators on both sides of the tunnel. In these applications, the center alignment should be set with the cap in place but the sealing head height should be set with the cap removed. Align the foil indicators to the lip of the container where the foil liner rests. If cap or container dimensions prevent the lip of the container from reaching the centering marks then position the container lip into the tunnel as far as possible (**Figure 22**).

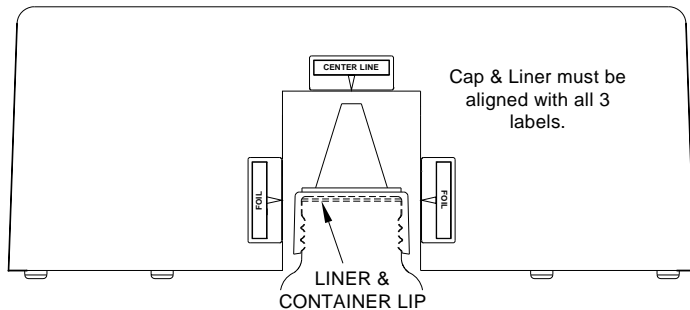


Figure 22

Alignment And Adjustment “1” Sealing Head

In many instances, multiple cap sizes will be run on the same power supply. The “1” Sealing Head and Pivot Kit allows for moving the sealing head to accommodate various size caps without having to exchange the sealing head. The “1” sealing head can be pivoted in approximately seven (7) degree increments to four different positions (**Figure 23**).

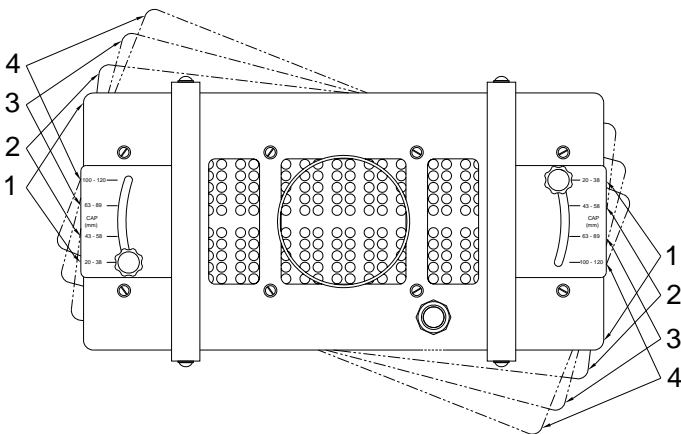


Figure 23

The table that follows indicates the desired pivot position for the listed liner sizes. The pivot assembly brackets serve to guide the sealing head rotation, providing the proper pivot angle for the liner sizes you are sealing. The knurled locking knobs serve to lock the sealing head in place.

NOTE:

No tools are required to change the position of the sealing head. Loosen both of the knurled locking knobs, one at each end of the sealing head. Rotate the sealing head to the proper position for the cap size in use. Center the proper indicator line on the locking knobs at each end of the sealing head and hand tighten the locking knobs.

Item #	Description
1	20 – 38mm Position
2	43 – 58mm Position
3	63 – 89mm Position
4	100 – 120mm Position

Proper alignment of the “1” Sealing Head is critical, use the following steps for proper set up.

1. First align the power supply and sealing head over the conveyor with the sealing head in the #1 position. The mount / cart must be secure.
2. Align and gap the product to the sealing head using the same criteria used for a Flat Sealing Head (**See Figure 20**) ensuring that it runs centered along the entire length of the sealing head.
3. Choose the proper position for the caps size to be run and pivot the sealing head to that position, Refer to table above.

NOTE:

Check alignment whenever the pivot angle is to be changed to ensure proper sealing.

SYSTEM REQUIREMENTS

Temperature

The Super Seal™ has been designed to operate in an ambient air temperature range of 32°-104° F (0°-40° C) @ 80% relative humidity, non-condensing.

Input Voltage Requirements

The Super Seal™ requires a specific input voltage to function properly. The required input voltage is listed on the rating plate on the side of the power supply (**See Figure 4 on Page 6**), and in the drawing list provided with your system. The standard voltages required are 208 or 240 VAC ± 10%, 1Ø / 3Ø, 50/60 hertz.

! WARNING!

The power supply should not be operated without the grounded line cord connected to a grounded receptacle.

DO NOT bypass the ground terminal.

Grounding Requirements

All system components must be connected to a good earthen ground point using the green ground wire

provided in the power cord. Local codes will dictate the means of terminating the ground wire. A fused disconnect switch must be located between the input voltage source and the power supply.

BASIC SYSTEM

Each *Super Seal™* is supplied with 2 standard cables and 2 defeat connectors. The two cables provided are the Remote Start / Interlocks Cable (1) and the Alarm Connector Cable (2). The 2 defeat connectors are for the **REMOTE START / INTERLOCKS** circuit (1) and **STALLED BOTTLE SENSOR** circuit (3). Both the cables and defeat connectors will connect to the rear panel of the power supply (**Figure 24**).

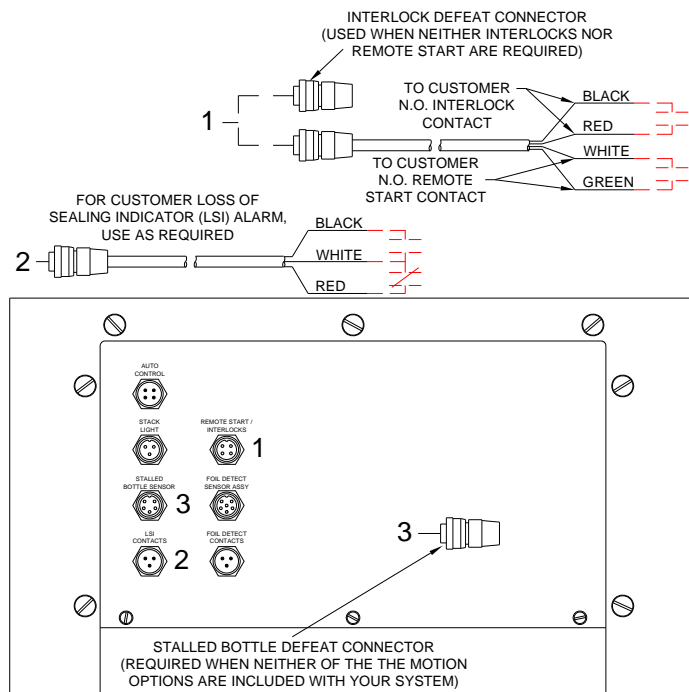


Figure 24

BASIC INTERCONNECTIONS

Using The Remote Start / Interlocks Cable

A cable is provided to extend the wiring of the Remote Start / Interlock cable to external contacts as shown in **Figure 24**. Connect the Remote Start / Interlock cable securely to the rear panel of the power supply and run the open end of the cable to your N.O. dry contacts. Ensure you use the Black and Red wires for the Interlock function and the White and Green wires for the Remote Start function. The Remote Start function is tied to the **LOCAL/REMOTE** pushbutton located on the front panel of the unit.

External Interlock

The *Super Seal™* comes standard with provisions for interlocking the control circuits. The two interlock wires must be connected to a normally open contact that closes when the interlock is met for the unit to

start. This “closed circuit” may be accomplished in a number of different ways but is absolutely necessary for the unit to start and run. Do **not** apply any voltage across these wires.



WARNING!

Applying voltage to the interlock control circuits may result in a failure of circuit components.

DO NOT APPLY VOLTAGE ACROSS THE INTERLOCKS!

Remote Start

The *Super Seal™* comes standard with provisions for starting and stopping the power supply remotely. The two remote start wires must be connected to a normally open contact and the contact must be closed to start the power supply and open to stop it (Refer to **REMOTE START OPERATION** on **Page 19**). Do **not** apply any voltage across these wires.

USING THE DEFEAT CONNECTORS

Remote Start / Interlocks

A defeat connector is included to provide the required closed circuit for the interlocks when the interlock and remote start functions are not used. This simply requires connecting the defeat connector to the **REMOTE START / INTERLOCKS** connector on the rear panel of the power supply. The jumper wire inside the defeat connector allows the unit to start without providing an external closed contact.

Stalled Bottle Sensor

A second defeat connector is included to provide the required closed circuit for the Stalled Bottle Sensor circuit when none of the Motion options is included with your system. This simply requires connecting the defeat connector to the **STALLED BOTTLE SENSOR** connector on the rear panel of the power supply. The jumper wire inside the defeat connector allows the unit to start without having the optional stalled bottle sensor connected to the power supply. Refer to **SECTION 4 – OPTIONS** for further details on the Motion Options that are available.

NOTE:

Even if you are not using either of the defeat connectors, ensure you do **not** discard either of them. Keep them in a safe place, as they may be required to substitute for the **Remote Start / Interlocks** cable or the **Stalled Bottle Sensor**, if they are damaged, or for troubleshooting these circuits.

LOSS OF SEALING INDICATOR ALARM (LSI)

The Loss of Sealing Indicator Alarm provides you with a set of dry contacts that will allow you to drive an external alarm, or monitor the power supply's output status using a monitoring circuit of your choice.

The alarm circuit is programmable from the power supply front panel, giving you the ability to quickly and easily customize the alarm setpoint for a wide variety of products.

As shown in **Figure 24** on **Page 13**, a contact cable is provided to extend the alarm contacts to your alarm or monitoring circuit. The alarm contacts consist of a Common (COM), Normally Open (N.O.) and a Normally Closed (N.C.) contact. The contact cable connects to the LSI CONTACTS connector on the rear panel of the power supply and the open end of the contact cable can be run to your external alarm or monitoring circuit.

Typically the N.C contact will be used for triggering your alarm circuit, as this is the non-powered state of the relay contacts. The relay will only change state when the power supply is running and the output percentage is greater than the programmed trip setpoint; see **ADJUSTING THE LOSS OF SEAL INDICATOR ALARM SETPOINT** on **Pages 17-18**.

When using the alarm contacts to an alarm circuit, ensure the supplied voltage does not exceed the contacts rating of 24 VDC, 2 Amps.



DANGER!

The contact cable is provided to extend the dry contacts of the alarm circuit only.

All necessary precautions should be taken when wiring the contact cable to powered external circuitry.

When the contact cable is connected to external powered circuits, proper lockout / tag out procedures should be observed for the external circuits.

This must be done before disconnecting the connector cable from the power supply to prevent the cable from being energized when disconnected.

SECTION 3 – PRINCIPLES OF OPERATION

GENERAL

⚠ Before operating this equipment, we recommend reading this section in its entirety to ensure you understand all the safety and operational requirements for using this equipment. Also, please refer to **SECTION 1 – INTRODUCTION, Pages 1 and 2**, to become familiar with all safety requirements and precautions.

⚠ WARNING!

DO NOT operate this equipment in a hazardous environment.

Operating this equipment near flammable vapors, fuels, or combustibles; including atmospheric product dust or particulates, may result in explosion or fire, causing serious injury or death.

CONTROL FUNCTIONS

The power supply utilizes a Digital Output Meter to represent its output level as a percent of available output, colored LED's to represent control and fault status, and pushbuttons to control the power supply's output and operational modes (**Figure 25**).



Figure 25

Front Panel Indicators

The power supply front panel includes the following indicators to represent its control and fault status.

Control Display Lamps

		READY	Green; breaker/switch energized - input voltage applied.
		RUN	Green; output current applied to the sealing head, and regulated.
		REMOTE	Amber; Remote Start Mode Selected.
		AUTO	Amber; AUTO Mode Selected.

Fault Display Lamps

		TEMP	Red; Temperature Fault.
		FAULT	Red; Power Supply Failure.

Digital Output Meter



The Output Meter displays power supply's output in percentage of available output. The Output Meter will flash the selected output level setpoint when the circuit breaker or disconnect switch is placed in the ON position. Once the START command is applied, the number displayed on the Output Meter will stop flashing. This is the actual output level of the power supply.

Front Panel Push Pushbuttons

START		Starts Power Supply locally.
STOP		Stops Power Supply locally, Resets Faults.
UP		For adjusting output level up.
DOWN		For adjusting output level down (<i>Limited at minimum setting</i>).
LOCAL/REMOTE		For selecting either LOCAL or REMOTE Start Mode.
AUTO/MANUAL		For selecting either AUTO or MANUAL power control Mode.

⚠ WARNING!

The sealing head produces an electromagnetic field that quickly heats any metal within the field. **DO NOT** pass metal objects, other than appropriate liner materials, beneath the sealing head.

Personnel should keep jewelry, such as rings and watches, from placement beneath or within the sealing head's electromagnetic field.

⚠ WARNING!

Never allow the liners to reach a temperature sufficient to ignite the liner or container contents. Ensure the dwell time beneath the sealing head is correct and **DO NOT** allow containers to stop within the electromagnetic field.

Failure to observe these requirements may lead to fire or explosion.

⚠ WARNING!

DO NOT attempt to induction seal damaged or improperly applied liners as they may overheat causing the liner and container contents to ignite.

SEQUENCE OF OPERATION

LOCAL OPERATION

A **Circuit Breaker** or **Disconnect Switch** is provided on the rear panel of the power supply for applying the input voltage to the power supply (Figure 26).

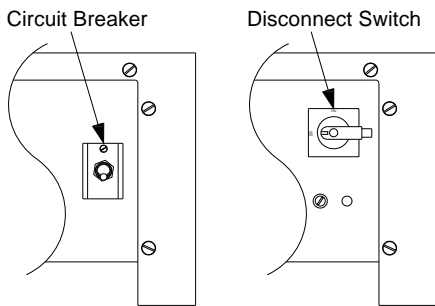










Figure 26

Placing the circuit breaker or disconnect switch into the ON position will apply the input voltage, and all of the LEDs on the front panel will initially be lit and the output meter will flash **888**. After the initial startup, all of the LEDs except the **READY** LED will go out, and the output meter will revert to flashing the last selected output level setpoint. If the power supply was in either the **REMOTE** or **AUTO** modes when the input voltage was last removed, the corresponding LED will also be lit.

If either of the fault LEDs is lit, press the **STOP**  pushbutton to reset the fault. If the fault will not reset, refer to **SECTION 5 – TROUBLESHOOTING**.


If either the **REMOTE** or **AUTO** LEDs are lit, press the **LOCAL/REMOTE**  pushbutton to allow **LOCAL** start control, and/or the **AUTO/MANUAL**  pushbutton to allow **MANUAL** power control.

With the power supply in **LOCAL** and **MANUAL** modes with no faults indicated, use the **UP**  / **DOWN**  arrows to increase or decrease the output level until the desired output level setpoint is displayed. Press the **START**  pushbutton to start the power supply.

Once the power supply is running, the **RUN**  LED will be lit and the Output Meter will stop blinking and display the actual output level as a solid number .

NOTE:


The Output Level can be adjusted while the output meter is blinking and when the power supply is running.

Press the **STOP**  pushbutton to stop the power supply. When the **STOP** pushbutton is pressed, only

the **READY** lamp should be lit and the number on the output meter will again be flashing the output level setpoint.

Ensure you always **STOP** the power supply prior to placing the circuit breaker or disconnect switch into the OFF position. This will remove the input voltage from the power supply and all of the LEDs and the output meter will go out. Failure to **STOP** the power supply may result in damage to the power supply components.

NOTE:

If the **RUN** LED is not lit  when the power supply is running, output meter is not flashing, the Loss of Seal Indicator Alarm setpoint is above the output level you are running at. (Refer to **ADJUSTING THE LOSS OF SEAL INDICATOR ALARM SETPOINT** on Pages 17-18).

SEALING WINDOW SETUP

In the induction sealing process there are several variables that make almost every application unique. Keep in mind that rarely is one set up solution right for every application. Most applications will have their own unique variables for the perfect seal and each variance must be given consideration when determining the output level for a given application.

WARNING!

Never allow the liners to reach a temperature sufficient to ignite the liner or container contents.

Ensure the dwell time beneath the sealing head is correct and DO NOT allow containers to stop within the electromagnetic field.

Failure to observe these requirements may lead to fire or explosion.

WARNING!

DO NOT attempt to induction seal damaged or improperly applied liners as they may overheat causing the liner and container contents to ignite.

NOTE:




An application consists of the **package** (container, liner, cap), **product** (type, temperature, fill level), **dwell time** (length of time the liner is in the inductive field), sealing head **alignment** (gap, centering, level) and the **induction sealer** (inductive field strength and frequency) being used. For more detailed application information, refer to "**APPLICATION**

“TROUBLESHOOTING” in SECTION 6 – TROUBLESHOOTING.

Once the system is running it is recommended that you attempt to determine the sealing window of the products that will be sealed by this power supply. This test will require several containers, caps, and liners and should be performed at the line speed each product will be run at during actual production.

NOTE:

The initial output level chosen for this test can be a level determined by the testing results of your product samples by Enercon, or an output level of your own choosing. If no samples were sent for testing, it is recommended that the initial output level be 50% or lower. For the following examples, we will be using 50% as the initial output level.

With the circuit breaker or disconnect switch ON, press the **UP**  / **DOWN**  arrows until the desired output level setpoint is reached. Press the **START**  pushbutton and ensure the unit starts and is running at the output level you selected.

Run a single container under the sealing head at your production line speed. Once through the sealer, wait at least 30 seconds for the liner to cool and then remove the cap and inspect the liner condition.

NOTE:

Do **not** perform this test on a container that has been previously run, as this can give inaccurate test results. A new container, liner, and cap should be used each time the test requires a container to be run.

No Seal

If no seal was achieved, raise the output in 5% increments and continue running a single container until the liner begins to adhere. Continue the test, raising the output by 1% or 2%, until the liner seals around the entire lip of the container. This is the lower limit of the sealing window. Continue the test, raising the output by 1%, until the liner shows signs of overheating then lower the output by 1% and this is the upper limit of the sealing window. Choose the output level, within this window, that gives the desired strength and peelability as your production output level.

Burned Liner


If the initial test results in a burned liner, lower the output in 5% increments and continue running a single container until the burning subsides. Continue the test, lowering the output by 1% or 2%, until the liner shows no signs of overheating. This is the upper limit of the sealing window. Continue the test,

lowering the output by 1%, until the liner no longer seals the entire lip of the container. Raise the output by 1% and this is the lower limit of the sealing window. Choose the output level, within this window, that gives the desired strength and peelability as your production output level.

Good Seal

If a good seal was achieved, note the output level, then lower the output 1% and continue running a single container until the liner no longer seals the entire lip of the container. Raise the output by 1% and this is the lower limit of the sealing window. Reset the output to the level noted after the initial test. Continue the test raising the output by 1% until the liner shows signs of overheating. Lower the output by 1% and this is the upper limit of the sealing window. Choose the output level, within this window, that gives the desired strength and peelability as your production output level.

Production Test

When the sealing window and production output % have been determined, a production test should be run. Set up a group of containers that is at least twice the length of the sealing head. The grouping should be back to back to simulate a worst case scenario. Press the **START**  pushbutton and verify the unit is running at your production output level determined in the previous steps. Run the containers at your production line speed and then verify that all containers sealed properly.

If not all of the containers sealed, double check the results of the sealing window setup and refer to “**APPLICATION TROUBLESHOOTING**” in **SECTION 6 – TROUBLESHOOTING** of this manual.

If all of the containers sealed properly, then the system is ready to be put into production.

ADJUSTING THE LOSS OF SEAL INDICATOR ALARM SETPOINT

The Loss of Sealing Indicator Alarm (LSI) is programmable to allow setting the power supply's lower output limit, or threshold, for the alarm circuit operation. If, for any reason, the output displayed on the output meter falls below this programmed alarm setpoint the alarm relay contacts will change state. Refer to **LOSS OF SEALING INDICATOR ALARM (LSI)** on **Page 14** for more information.

The default alarm setpoint is 60%, and is set during the testing phase of the power supply. You will be able to adjust the alarm setpoint to any level through the full output range of your power supply.

The full output range for the Super Seal™ power supplies are as follows:



SS50 = 55% – 100%

SS75 = 40% – 100%

SS100 1Ø = 35% – 100%

SS100 3Ø = 35% – 100%

NOTE:




If your current production output level is below 60% and you have not adjusted the alarm setpoint, the **RUN** LED will not be lit   **RUN**, but the output meter will display a solid output percentage and the power supply will seal properly.




The alarm setpoint you choose will depend on how you would like the alarm to perform. This will be dictated by your company's policies on what constitutes a failed induction seal or sealing process. The following instructions cover how to determine and set the alarm setpoint when being used as either a Loss of Seal alarm, or as an output level ON/OFF alarm to indicate if the power supply is running.

NOTE:




The following information explains how to program your alarm setpoint and any setpoint values given are examples only.

Verifying The Current Alarm Setpoint


With the input voltage applied to the power supply, press the **START**  pushbutton and the number on the output meter will become solid and the **RUN**   **RUN** LED should be lit.

If the **RUN** LED *is lit*, then the alarm setpoint is lower than the output level displayed. Press the **DOWN**  arrow repeatedly to lower the output level in 1% increments, continue until the **RUN**   **RUN** LED goes out. The current alarm setpoint is 1% higher than the output level displayed when this occurred.

Example: If the **RUN** LED goes out at 69%, then the actual alarm setpoint is 70%.

If the LED *is not lit*, then the alarm setpoint is higher than the output percentage displayed. Press the **UP**  arrow repeatedly to raise the output level in 1% increments until the **RUN**   **RUN** LED comes on. The output level displayed when the **RUN** LED comes on is the actual alarm setpoint.

Example: If the **RUN** LED comes on at 70% then the actual alarm setpoint is 70%.

Once you know the current alarm setpoint, press the **STOP**  pushbutton to stop the power supply.

Setting Your Alarm As An On/Off Indication

If you wish to use the Loss of Seal Alarm as an On/Off alarm, then you only need to select the lowest output level for your power supply as the alarm setpoint.

Setting Your Alarm Setpoint For Loss Of Seal

To properly set your alarm setpoint to indicate a loss of seal, you will need to know the power supply's production output level and sealing window of your product. If you do not know this information, perform the **SEALING WINDOW SETUP** before proceeding.

In some applications, selecting the lower output level of the sealing window as your alarm setpoint will be fine.

Example: If your product's sealing window is between 71% and 76% then select 71% as the alarm setpoint.


In applications where you cannot accept any variation from the production output level, you will want to select the actual production output level as the alarm setpoint.




Example: If 74% is your production output level, set 74% as the alarm setpoint.


Alarm Setup Procedure

Once you have determined the desired alarm setpoint, use the following steps to program the alarm setpoint.



NOTE:

When performing this procedure, the power supply must *not* be running. If the power supply is running, press the **STOP**  pushbutton.

Ensure that the input voltage is applied to the power supply and verify that the output meter is flashing. Use the **UP**  / **DOWN**  arrows to select the output level required for the alarm setpoint. Once the correct output level is displayed, **press** and **hold** the **STOP**  pushbutton.

Then while continuing to hold **STOP**, quickly **press** and **release** the **DOWN**  arrow and then release the **STOP** pushbutton. The alarm setpoint is now programmed.

NOTE:

If you hold **STOP**  and **DOWN**  too long, the output level on the meter will begin to drop, changing the alarm setpoint.

The output level displayed on the output meter is now the alarm setpoint, but you can verify this by starting the power supply and adjusting the output

level below the output level displayed, and the Run LED should extinguish at 1% below this level.

DANGER!

When the alarm contact cable is connected to external powered circuits, those circuits must be de-energized and locked out when the cable is disconnected from the power supply.



REMOTE START OPERATION

All Super Seal™ power supplies come standard with Remote Start capability. Running the power supply in **REMOTE** start mode will allow you to start, and stop, the power supply from a remote location.

To use the **REMOTE** start mode, you will need to install the Remote Start/Interlocks Cable to the **REMOTE START / INTERLOCKS** connector on the rear panel of the power supply (Refer to **Figure 24** on **Page 13**). You will then need to run the Green and White wires of the cable to the Normally Open (N.O.), dry contact that you will use as your start contact.

NOTE:


When using the Remote Start/Interlocks Cable, the Black and Red interlock wires must either be run to an external interlock contact, or electrically tied together, in a safe manner, to satisfy the power supply's interlock requirement.

Press the **LOCAL/REMOTE**  pushbutton place the power supply in **REMOTE** start mode (Refer to **Figure 25** on **Page 15**), and the **REMOTE**  LED will be lit on the front panel.

In **LOCAL** start mode, which is conventional, the front panel of the Super Seal™ has full control of the Start/Stop functions. In **REMOTE** start mode, the power supply will require a local prime signal and a N.O. dry contact that will close to start the power supply, and hold to keep the power supply running.




As shown on **Figure 24** the optional interlock defeat connector may be applied to **REMOTE START / INTERLOCKS** connector, satisfying the interlock requirement and allowing the unit to be stopped and started locally.

When in **REMOTE** mode it is necessary to interface the unit to an external dry contact using the cable provided. **Figure 24** illustrates the cable provided and how to connect to the **REMOTE START / INTERLOCKS** connector. This will allow interfacing with the external dry contacts for both interlock and remote start.

The interlock wires, black and red, must be in a normally closed state for the unit to start. Before the remote start wires, white and green, will start the unit, it is necessary to press the **START**  pushbutton on the membrane panel. This will precondition the unit for remote start by activating the control circuit enabling it to receive the remote start signal.

NOTE:

Once the interlock wiring is external, opening the interlock wiring will cause the power supply to stop.

It will be necessary to correct the cause for the interlock opening and reapply a closed or connected state across the black and red wires. It will also be required to again press the **START**  pushbutton to recondition the unit for a new remote start command. With the above conditions met, the white and green wires shown in **Figure 24** for the remote start contact may be used to start and stop the unit. In addition, if any fault is detected within the Super Seal™ Unit, the fault must be corrected and the membrane panel **STOP**  pushbutton pressed for reset of the fault condition. This will also require the **START**  pushbutton to be pressed prior to receiving a new remote start command.

AUTO CONTROL

Auto Control is an option that will allow the raising and lowering of the Output level by providing an isolated 0–10VDC signal. See **SECTION 4 – OPTIONAL EQUIPMENT** for a detailed description of **AUTO CONTROL** Mode.

SECTION 4 – OPTIONS

GENERAL

⚠ Before installing or operating any options provided with your system, we recommend reading this section in its entirety to ensure you understand all the safety and operational requirements for using this equipment. Also, please refer to **SECTION 1 – INTRODUCTION / INSTALLATION, Pages 1 and 2**, to become familiar with all safety requirements and precautions.

A number of options are made available when purchasing the Super Seal™ Series. Options should be requested when placing the original order with Enercon. Some options may require changes to the power supply or its attachments.

OPTIONS AVAILABLE

- Mobile Cart
- Stack Light
- Motion/Foil Detection Group
- Motion Detection (Stalled bottle)
- Foil Liner Detector
- AUTO/MANUAL
- Eject System
- Standard and Deluxe Spare Parts Kits

MOBILE CART

The optional mobile cart provides portability and ease of installation for the Super Seal™ (Figure 27).

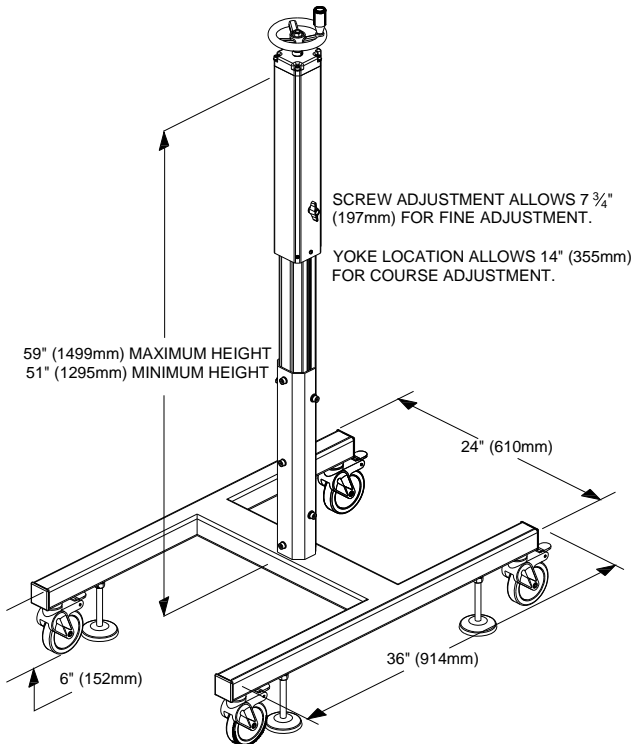


Figure 27

The mobile cart includes a screw adjustable mount, mobile cart frame, four locking casters, and 4 leveling pads. The low profile frame permits positioning the unit under a typical conveyor. The height of the mount is shorter than the floor mount version by approximately 6 inches; this keeps the adjustment wheel at a reasonable height. If your conveyor is higher than normal it is possible to special order a longer floor mount or an extension kit.

⚠ CAUTION!

The leveling pads should be raised and the brakes released before moving the cart. Ensure both are reset once the cart is in place.

The caster brakes should be unlocked and the leveling pads raised sufficiently to avoid damage when the cart is moved. Lock the casters and lower the leveling pads when the cart is in place under your conveyor. Always loosen the locking knob when adjusting the power supply height and tighten the knob once the adjustment is complete. When moving the cart it is advised to lower the unit to maintain a low center of gravity. The other visible screws on the mount are factory set and should **NOT** be adjusted.

STACK LIGHT

The Optional Stack Light may be ordered to provide a visual indication of the operating status of the Super Seal™ (Figure 28).

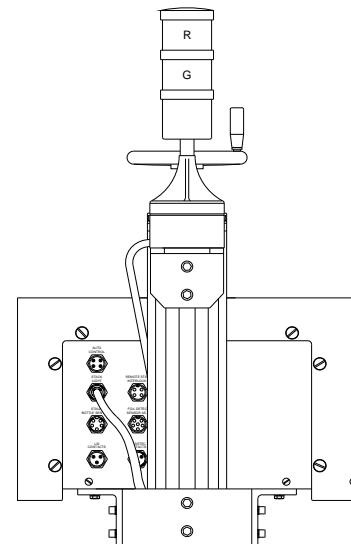


Figure 28

The Stack Light is pole mounted on a bracket at the top of the adjustable mount, making it visible from a

considerable distance. The two lights provided are Green and Red. The solid Green light indicates that the power supply is running at, or above, the loss of seal indicator alarm setpoint and the flashing Red light indicates that the power supply is below the loss of seal indicator alarm setpoint, or has no output at all (Refer to **ADJUSTING THE LOSS OF SEAL INDICATOR ALARM SETPOINT** in **SECTION 3 – PRINCIPLE OF OPERATION**). When running in **REMOTE** mode, the Red light will not flash if the power supply is primed and is not running due to removal of the stop command, and this indicates that the power supply is not running, but is ready for the remote Start command.

A contact cable is furnished as standard equipment for external monitoring purposes (refer to **LOSS OF SEALING INDICATOR ALARM (LSI)** in **SECTION 2 – INSTALLATION**).

24V DC is supplied by the Super Seal™ power supply to provide the power for the Stack Light. This 24V DC supply is also used by other options. The green light will be lit, and remain steady, when output is applied to the sealing head. The red light will flash to indicate that no output is being delivered to the sealing head. Circuitry is provided in the 24 volt DC supply to flash the red light. When the **Loss of Seal Indicator Alarm** is set, **Pages 16-18**, and the power supply is operating below the alarm setpoint, the red light will also flash. The green light will be energized with normal output to the sealing head.

MOTION / FOIL DETECTION GROUP

The Motion / Foil Detection Group is a combination of the Stalled Bottle Detector and Foil Liner Detector options. The Motion / Foil Detection Group option provides sets of contacts that are used to stop the power supply when a stalled bottle occurs and activate an alarm or eject signal when the foil liner is missing on your product.

The Motion / Foil Group cables conveniently connect to the back panel of the power supply. They will connect to the **STALLED BOTTLE SENSOR, FOIL DETECT SENSOR ASSY** and **FOIL DETECT CONTACTS** connectors. Power for the sensors is supplied by the power supply through the **STALLED BOTTLE SENSOR, FOIL DETECT SENSOR ASSY** connectors, but the **FOIL DETECT CONTACTS** connector has no voltage present.

MOTION / FOIL DETECTION GROUP INSTALLATION

Mounting brackets and hardware (1) are furnished for mounting the Beam Sensor (2) and Proximity Sensor (3) to the power supply mounting bracket,

and for mounting the Stalled Bottle Sensor (4) to your conveyor (Figure 29).

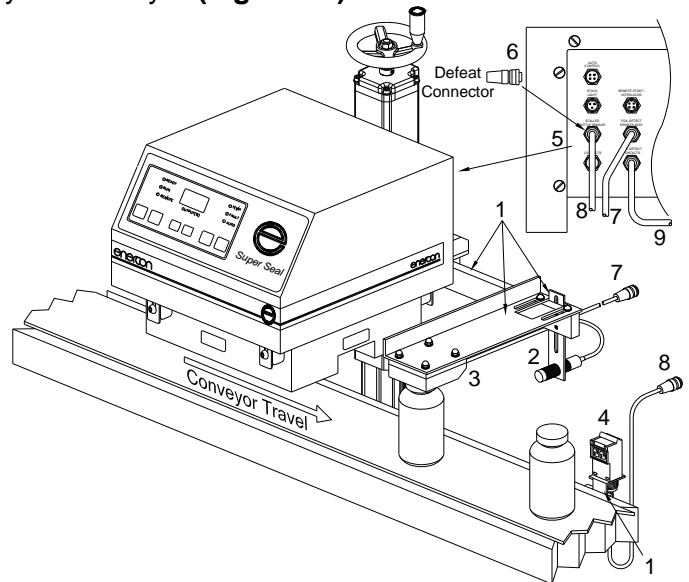


Figure 29

Once the Sensor Group is securely mounted, the cables must be plugged into the rear panel of the power supply (5). If the Defeat Connector (6) is installed in the **STALLED BOTTLE SENSOR** connector it will need to be removed and stored in a safe location. Do **not** lose the defeat connector, as it may be required for testing or troubleshooting the stalled bottle circuits. The Foil Liner Detector cable (7) will be plugged into the **FOIL DETECT SENSOR ASSY** connector, and the Motion / Back Up sensor cable (8) will be plugged into the **STALLED BOTTLE SENSOR** connector. The Foil Detector Output Cable (9) will need to be plugged into the **FOIL DETECT CONTACTS** connector. For detailed installation, alignment, and adjustment of the Stalled Bottle Sensor and Foil Liner Detector; refer to the appropriate descriptions that follow in this section.

MOTION DETECTION ONLY (STALLED BOTTLE)

The Stalled Bottle Sensor is provided to STOP the power supply whenever a stalled container is detected in front of the sensor. This prevents containers from overheating and/or igniting beneath the sealing head when they accumulate due to a back up downstream of the sealing head.

NOTE:

The Stalled Bottle Sensor or Defeat Connector must be properly connected to the **STALLED BOTTLE SENSOR** connector for the power supply to start. Both provide a normally closed condition that is in series with the interlock circuit.

When the Stalled Bottle sensor is connected and a stalled container is detected in front of the sensor, the normally closed contact opens, stopping the

power supply. The backup must be cleared to reset the sensor before resuming operation.

STALLED BOTTLE SENSOR INSTALLATION

Mounting brackets and hardware (1) are furnished for mounting the Stalled Bottle Sensor (2) to your conveyor (Figure 30).

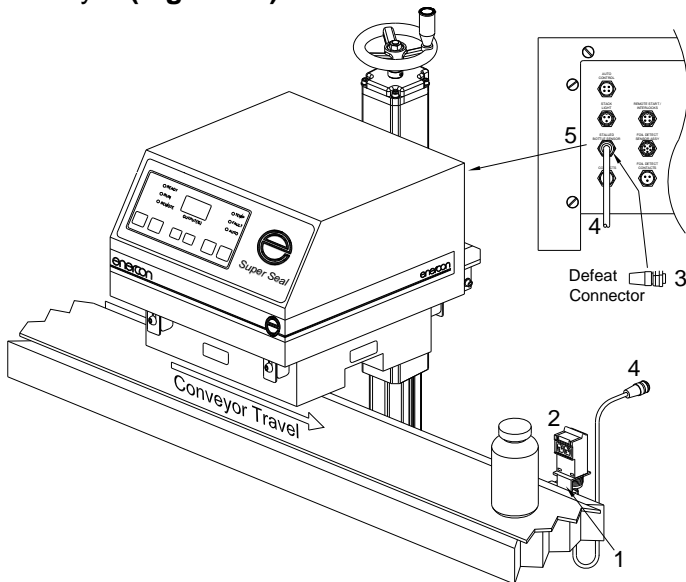


Figure 30

Mount the sensor to the conveyor approximately 3 to 6 ft downstream of the sealing head. If the Defeat Connector (3) is installed in the **STALLED BOTTLE SENSOR** connector it will need to be removed and stored in a safe location. Do **not** lose the defeat connector, as it may be required for testing or troubleshooting the stalled bottle circuits. The Stalled Bottle Sensor cable (4) must be plugged into the **STALLED BOTTLE SENSOR** connector on the rear panel of the power supply (5).

STALLED BOTTLE SENSOR SETTINGS AND ADJUSTMENTS

The following settings are required for the Enercon Stalled Bottle Sensor (Figure 31).

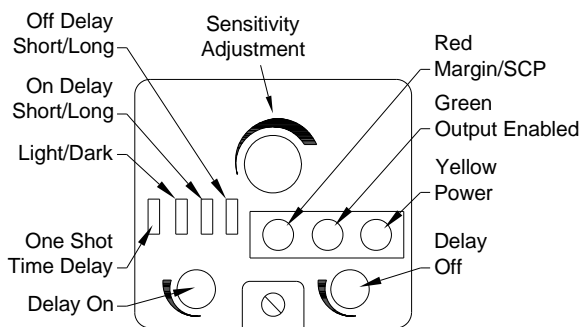


Figure 31

NOTE:

Sensor power is supplied by the Power Supply and it must be energized for the Stalled Bottle Sensor to function, but does not need to be running.

One Shot/Time Delay set to time delay.

Light/Dark set to light.

On Delay set to short.

Off Delay set to short.

The following adjustments are factory set but may be adjusted if the stalled bottle circuit is not functioning as expected.

SENSITIVITY ADJUSTMENT

The sensitivity adjustment controls the sensors detection range. If this setting is too sensitive, objects beyond the container might be detected and cause false Stalled Bottle Trips.

DELAY OFF

This setting determines the time required for the sensor to recover once a Stalled Bottle trip has occurred.

DELAY ON

This setting determines the time an object must be in front of the sensor before a Stalled Bottle trip is triggered (indicated by the green LED being lit). This setting must be long enough that normal flow of containers will not trigger a stalled bottle trip, but short enough that the trip will occur before containers back up under the sealing head.

SENSOR ADJUSTMENT PROCEDURE

Initial Adjustments

1. Sensitivity CCW
2. Delay Off CCW
3. Delay On – Mid-Range

Sensitivity

With a container in front of the sensor verify whether the Red LED is illuminated or not. If the initial adjustment were performed properly the LED should be extinguished (Figure 31).

If the LED is on, adjust the Sensitivity CCW until the LED does go out. If the LED never extinguishes, contact Enercon Customer Service.

When the LED is off, adjust the sensitivity CW until the LED just comes on.

Remove the container and verify the LED goes out. If the LED does not go out, verify that nothing else along the conveyor is within the range of the sensor. Make a slight CCW adjustment and the LED should go out. Place the container back in front of the sensor and the LED should come back on.

Setting Delay On

With a container in front of the sensor, adjust the Delay On potentiometer for the desired delay time. The delay can be adjusted from no delay to 2.5 seconds in the Short Mode. When the delay times

out, the green Output Enabled LED will come on and the Stalled Bottle relay will change state. Remove the bottle and both red and green LEDs should go out and the relay should again change state.

NOTE:


Your line speed will be the most critical factor in determining what your Delay On setting should be.

Setting Delay Off

The Delay Off setting can remain fully CCW as this will allow the fastest reset time for the sensor, which may be very critical in high speed sealing operations.

NOTE:

Sensor has a built in short circuit protection. If a short occurs to the sensor, power must be removed from the sensor to reset, this can be accomplished by turning the power supply off at the circuit breaker or disconnect switch located on the rear of the cabinet.

(Always press **STOP**  to shut off the power supply prior to turning off the circuit breaker or disconnect switch.)

FOIL LINER DETECTOR ONLY

The Foil Liner Detector detects the presence of a foil liner within your closure (**Figure 32**). If the foil liner is missing, a contact closure is provided to activate a customer provided alarm device or eject mechanism. A cable is provided to connect from the **FOIL DETECT CONTACTS** connector to their circuits.

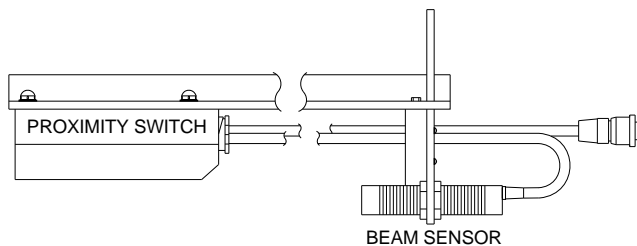


Figure 32

NOTE:

The detection of a missing foil will not shut down, or otherwise influence the performance of the power supply.

The Foil Liner Detector conveniently plugs into the rear panel of the power supply and is supplied from the factory pre-adjusted for immediate use once installed and connected.

In the past, Foil Liner Detectors of this type have required three sensors to function properly when sealing F style containers, containers in boxes and other nonstandard packaging. This is not the case with the Foil Liner Detector used with the Super Seal™. The conventional arrangement of two sensors will function for all types of containers and

packaging methods. This is due to the DC power supply circuitry provided for these sensors by the Super Seal™.

⚠ CAUTION!

Power to the foil detect contacts should be limited to 24 VDC 2 Amps.

When connecting this cable into external circuits, proper tag-out/lock-out procedures are to be followed by the customer when the cable is disconnected.

FOIL LINER DETECTOR INSTALLATION

Mounting brackets and hardware (1) are furnished for mounting the Proximity Sensor (2) and Beam Sensor (3) to the power supply mounting bracket (**Figure 33**).

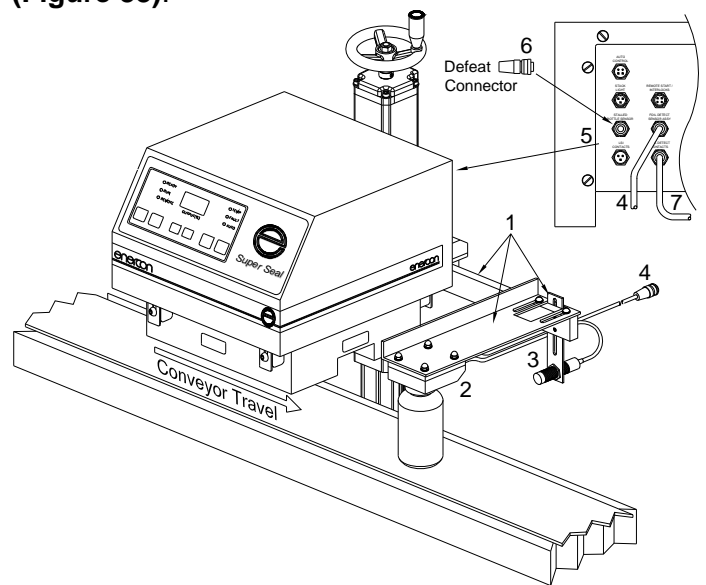


Figure 33

Once the Foil Liner Detector is securely mounted, the cable (4) must be plugged into the **FOIL DETECT SENSOR ASSY** connector on the rear panel of the power supply (5). If the Foil Liner Detector is used without the Stalled Bottle Sensor, the Defeat Connector (6) must be installed in the **STALLED BOTTLE SENSOR** connector to allow the power supply to operate. The Foil Detector Contacts Cable will need to be plugged into the **FOIL DETECT CONTACTS** connector (7).

FOIL DETECTOR CONTACTS CABLE

A 20ft. 3-pin Foil Detector Contacts Cable is provided to connect the foil detect contacts of the power supply to an Enercon Ejector system or an ejection system of your choice. The cable will connect to the **FOIL DETECT CONTACTS** connector on the rear panel of the power supply (**See Figure 34**).

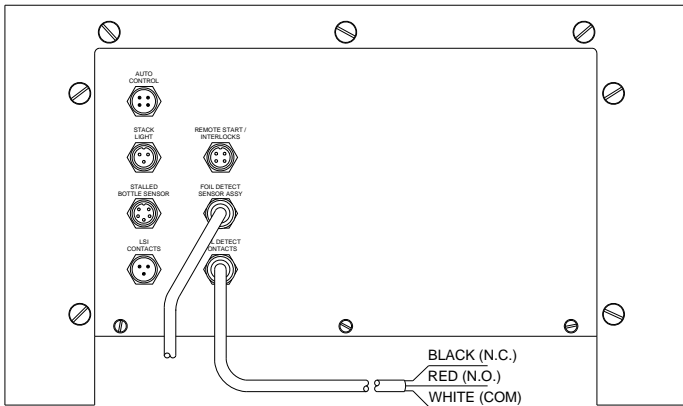


Figure 34

The cable wiring is; Black – Normally Closed (N.C.), Red – Normally Open (N.O.), and White – Common (COM). The contacts will change state whenever a missing liner is detected.

FOIL LINER DETECTOR ALIGNMENT AND ADJUSTMENT

It is recommended that you align the beam sensor to the container cap to ensure there is a definite separation between containers, but avoid aligning the beam sensor with the neck of the container. If you determine that you will need to align the sensor to the container body you will need to ensure there is sufficient spacing between containers to allow the detector to reset between containers. Use a container and cap with the foil liner removed to test sensor alignment (**Figure 35**).

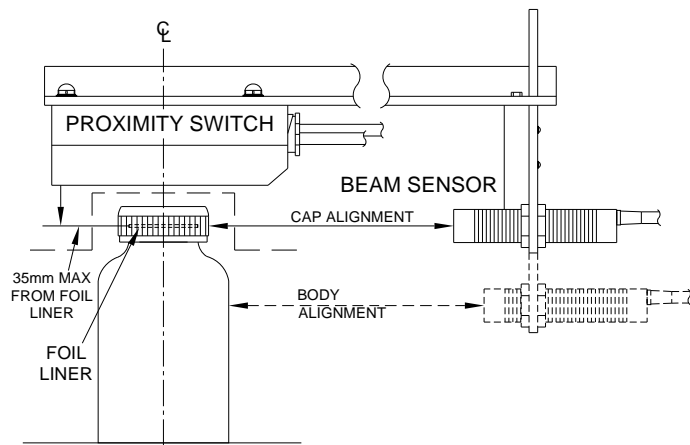


Figure 35

To test the Foil Detector setup, run three containers (with no spacing between them) at normal line speed. Use a container with no foil in the middle position. The Foil Detector provides a momentary contact closure to be used by the customer. If the proximity switch is set too sensitive, it will not detect the missing foil. It will sense the foil of the previous (and/or the foil of the following) containers. If it is not sensitive enough, it will give a constant alarm.

BEAM SENSOR LED OPERATION

The following is a simplified list of LED operational parameters that will aid in understanding the operational indications of the Beam Sensor.

If the Beam Sensor senses an object in its beam, the **LED** will be **ON**. If the Beam Sensor does not sense an object in its beam, the **LED** will be **OFF**.

BEAM SENSOR SENSITIVITY ADJUSTMENT

- The small pot on the barrel of the beam sensor (**Figure 36**) may be adjusted about mid range before proceeding. It has a one-turn range.
- When seeing the object, the LED will energize.
- The cap should pass under the center of the proximity sensor for normal operation.
- If required, adjust the pot on the beam sensor so it detects the bottle or object. The LED on the beam sensor will energize. Increasing the distance between the object and beam sensor for this adjustment by moving the object off center from the proximity sensor on the barrel of the beam sensor (about one inch), will provide assurance of seeing each and every bottle. The LED should energize for each object passing in front of the beam sensor.

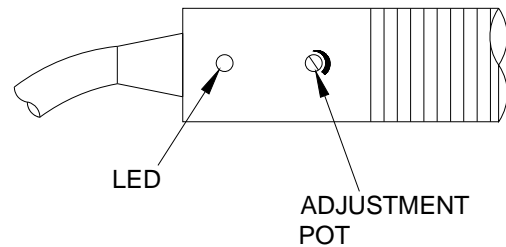


Figure 36

BEAM AND PROXIMITY SENSOR LED OPERATION

The following is a simplified list of LED operational parameters that will aid in understanding operational indications of the Proximity Sensor and Beam Sensor.

- If the Proximity Sensor senses foil in its field, the LED will be ON.
- If the Proximity Sensor does not sense foil in its field, the LED will be OFF.
- If the Beam Sensor senses an object in its beam, the LED will be ON.
- If the Beam Sensor does not sense an object in its beam, the LED will be OFF.

PROXIMITY SENSOR SENSITIVITY ADJUSTMENT

- Remove the beam switch from mounting bracket (if installed already) and verify it is not sensing any objects (LED off).

- b) Remove the sensitivity adjustment pot cover screw (**Figure 37**).
- c) With a container (and foil-lined cap) under the proximity sensor, verify that the LED is ON. If LED is OFF go to Step (e).
- d) Turn the sensitivity adjustment CW (clockwise) until the LED just turns OFF. In some cases, the LED will not turn OFF. If not, proceed to Step (f).
- e) Turn the sensitivity CCW (counter clockwise) until the LED just turns ON.

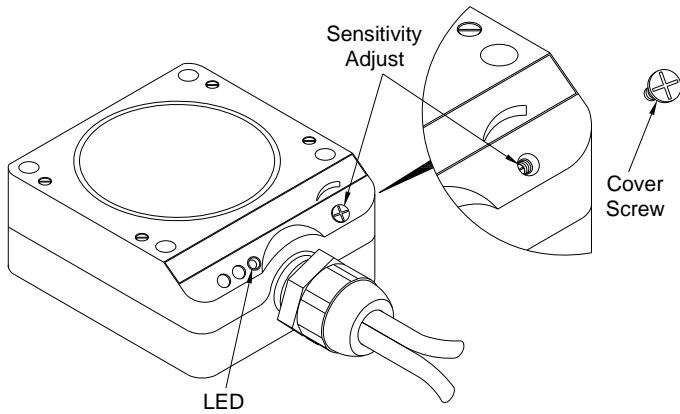


Figure 37

- f) Remove the container and the LED should turn off.
- g) Turn the potentiometer CCW (counting the number of turns) until the LED just turns ON.
- h) Back off half the number of turns counted in Step (g).
- i) The LED should now be OFF. Sensitivity should now be set at optimum.

AUTO MODE

The AUTO Mode Option is offered with the Super Seal™ power supply as a way to automatically control the power supply output from an external source. This option allows the raising and lowering of the Output level using an isolated 0–10 VDC signal that you provide. The unit also provides a 0-10 VDC output signal for monitoring of the output level. A three wire cable is provided to connect to the **AUTO CONTROL** connector on the rear panel of the power supply (**Figure 38**). The cable wiring is **white** / 0-10 VDC input signal, **red** / 0-10 VDC output signal, **black** / common and a **shield**.

To enter **AUTO MODE** the **AUTO/MANUAL** pushbutton on the front of the power supply must be pressed. The **AUTO** LED should be lit. It is required to press the **START** pushbutton on the membrane panel to start the unit.

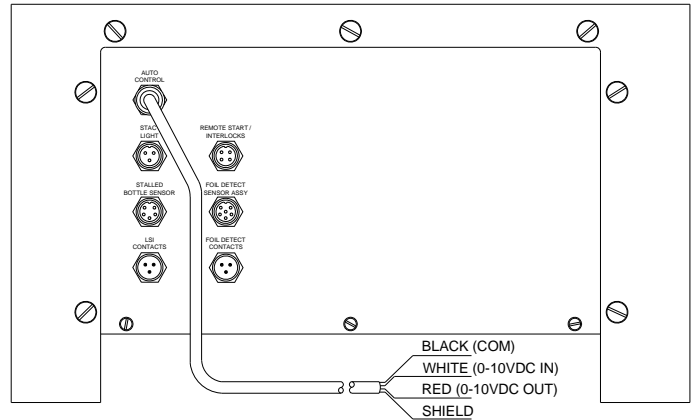


Figure 38

Raising and lowering the 0-10 VDC being fed to the unit will raise and lower the output of the power supply. Maintain the minimum output level as discussed under **ADJUSTING THE LOSS OF SEAL INDICATOR ALARM SETPOINT** on **Pages 17-18**, for the model power supply being used.

NOTE:

Slightly less than 10 VDC may achieve 100% Output, limit voltage to achieve 100% maximum on Output Meter.

⚠ DANGER!

When the AUTO Mode Cable is connected to external circuits, these circuits must be de-energized and locked out when the cable is disconnected at the power supply.

EJECTOR SYSTEM

The Enercon Eject System was designed to provide a simple ejection system to remove rejected containers off your conveyer. The Eject System can be used with the Motion/Foil Detection Group, Foil Liner Detector only, or other container inspection systems that provide a dry contact closure when a reject is detected. The system accepts the contact closure and once timed out, the Eject System is activated, causing the plunger to eject the container off the conveyer. Refer to Ejector Manual (**ML0068-001-XX**) and Drawings supplied with the Eject System for more detailed information.

EJECTOR INSTALLATION

Mounting brackets and hardware are (1) furnished for mounting the Ejector (2) to your conveyer (**See Figure 39**). The Ejector is designed to work with the Optional Enercon Foil Liner Detector and should be mounted downstream of the detector in a location that will allow the ejected containers to be collected.

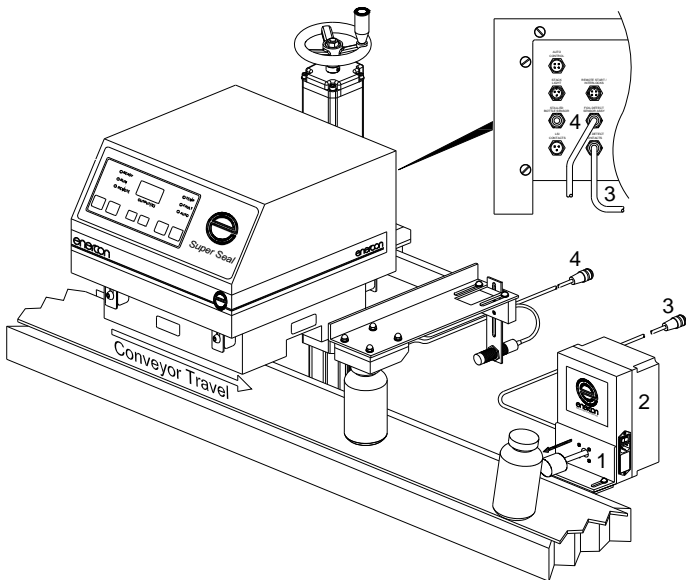


Figure 39

Once the **Ejector** is securely mounted, the cable must be plugged into the **FOIL DETECT CONTACTS** connector (3) on the rear panel of the power supply. If the Optional Foil Liner Detector is used the detector cable must be plugged into the **FOIL DETECT SENSOR ASSY** connector (4) on the rear panel of the power supply.

SPARE PART KITS AVAILABLE

Enercon offers both a Basic Spare Parts Kit and a Deluxe Spare Parts Kit for your Super Seal™ Induction Cap Sealer.

BASIC SPARE PARTS KIT – LM5460-01

The Basic Spare Parts Kit Consist of:

- Bridge Rectifier (1)
- Inverter Module (1)
- Capacitors (4)
- External Cooling Fan (1)

DELUXE SPARE PARTS KIT

Kit Part # For:	208 VAC	240 VAC
SS50	LM5593-81	LM5593-01
SS75	LM5593-82	LM5593-02
SS100	LM5593-83	LM5593-03

The Deluxe Spare Parts Kit Consist of:

- The Basic Spare Parts Kit Components
- Control Board (1)
- Power/Connector Board (1)

To order a spare parts kit, contact:

Enercon Parts Department
Phone Number: (262) 255-6070
Fax Number: (262) 255-2462
E-Mail Address: parts@enerconmail.com

SECTION 5 – MAINTENANCE

GENERAL

⚠ Before performing maintenance on this equipment, please read this section completely. Also, please refer to **SECTION 1 – INTRODUCTION, Pages 1 and 2**, to become familiar with all safety requirements and precautions for this equipment.

The Enercon *Super Seal™* Induction Cap Sealer System is designed to require minimal maintenance. However, to ensure long-term reliability, it is a good practice to have a planned maintenance program. This section will include recommended preventive and corrective maintenance procedures.

ROUTINE INSPECTION AND SERVICING

Enercon's Induction Cap Sealing Power Supplies are designed to survive the rugged use that may be imposed upon them by your production environment. However, a preventive maintenance program will play an important role in the durability and long life of the equipment if implemented and followed.

⚠ DANGER!

Ensure the input voltage is disconnected and locked out from the power supply before removing the cover for any maintenance or troubleshooting procedures.

VISUAL INSPECTION

A weekly visual inspection is a good practice that will often identify issues before they affect the equipment. One should check for dust and corrosive buildup on the system and its hardware. Some equipment may be located in corrosive environments that make a daily inspection necessary.

EXTERNAL CONNECTIONS

Inspect any cables or connectors attached to the back of your system for damage or deterioration. Also inspect the unused connectors to ensure the covers are still intact and the connectors are free of any corrosion or build up.

Compressed air can be used in most instances for removing contaminants that may have accumulated on the system. If using compressed air is not an option, or fails to remove the contamination, then wiping or washing the exterior of the system should be performed instead.

NOTE:

The *Super Seal™* enclosure is rated Nema 4 (IP65). This rating prevents moisture intrusion in a wash

down environment, but does not prevent intrusion of water if applied at high pressure. Do **not** expose the *Super Seal™* to a high pressure wash down!

SEALING HEAD INSPECTION

The sealing head will need to be removed for inspection. Remove the 4 bolts from the 2 mounting brackets and the power supply can be lifted up off of the sealing head by raising the mount or the head can be pulled straight down from the power supply (Refer to **Figure 12 on Page 9**). Depending upon the design of your sealing head, it will either have an open top or a cooling vent design. Inspect the sealing head for any dirt buildup or blocked vent holes and use compressed air to remove any dirt or debris. If the buildup cannot be removed with compressed air contact Enercon Customer Service before attempting to clean the sealing head further.

NOTE:

The sealing head can weigh over ten pounds and has electrical connections. **Use caution and support blocks when removing the sealing head.** Avoid dropping the sealing head as both external and internal damage may occur.

COOLING FANS AND BASE PLATE INSPECTION

The power supply and sealing head is cooled by fans located between the sealing head and power supply base plate. Two fans are employed and blow cooling air in different directions. One directs airflow up to cool the base plate and the second directs airflow down to cool the sealing head. Ensure that the fans are clean and the direction of rotation is correct and up to speed (**Figure 40**).

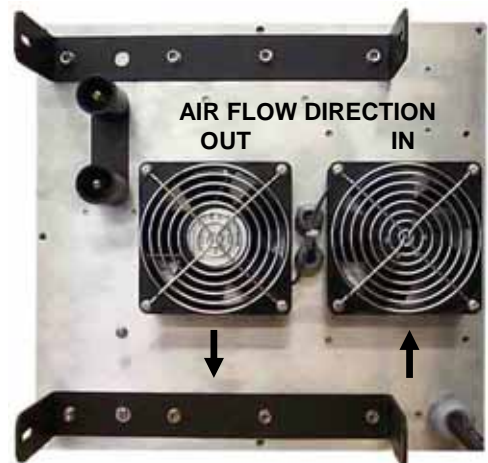


Figure 40

Some applications expose the *Super Seal™* to a wash down environment; therefore it is built utilizing

external wash down fans. In order for the fans to operate properly in a wet environment they must remain running. Allowing the fans to stop while wet increase the chance of seizing. If the fans are exposed to a wash down, keep the circuit breaker on to ensure the fans are kept turning until the system is dry. This will help prevent damage or premature failure of the fans' moving parts.

Reinstall the sealing head after all inspections are complete.

INTERNAL CONNECTIONS


To access internal connections, the cover will need to be carefully removed from the power supply base and the ribbon cable disconnected from the control board. Power and bus connections should remain tight. Loose connections may often be recognized by discoloration of the bus work or parts. Do ***not*** over-torque connections.

MAINTENANCE RECORD

A table is provided for the logging of maintenance for this equipment in **SECTION 8 - MISCELLANEOUS**. Regularly record the maintenance performed on this equipment in this table, including any issues found and their resolution.

SECTION 6 – TROUBLESHOOTING

GENERAL

 Before performing troubleshooting on this equipment, please read this section completely. Also, please refer to **SECTION 1 – INTRODUCTION, Pages 1 and 2**, to become familiar with all safety requirements and precautions for this equipment.

The *Enercon Super Seal™ Induction Cap Sealer* is designed for reliable and trouble-free operation. If any issues should occur, the information in this Section is provided in order to save time and expense to both the customer and manufacturer.

This Section can aid in the quick resolution of your problem, but only as long as the appropriate spare parts are available. Enercon recommends that you keep at least a basic spare parts kit stocked at your facility, but to reduce down time it is a good idea to have a full inventory of spare parts, including spare boards. Contact Customer Service or our Parts Department with any questions.

It is a natural tendency to wish to adjust internal settings when electronic equipment is not functioning properly. **AVOID THIS TEMPTATION!** The *Enercon Super Seal™ Induction Cap Sealer* is specifically designed to eliminate the requirement of making any internal adjustments, and any adjustments made without unless specifically instructions, may result in irreparable damage to the equipment.

DANGER!

Before doing any work within the Power Supply, remove and secure all input voltage using your company's approved Lock Out / Tag Out procedures.

Many performance issues that you may experience with your *Super Seal™ Induction Cap Sealer* system can be caused by a low input voltage. Before attempting any of the following troubleshooting steps, it is a good idea to check your input voltage and verify that it is within the recommended $\pm 10\%$ of the input voltage listed on the rating plate of the power supply (Refer to **Figure 4** on **Page 6**).

REMOVE/INSTALL THE POWER SUPPLY COVER

Several of the following troubleshooting procedures will require the removal of the power supply cover to gain access to the interior of the power supply. Use the following step to remove and reinstall the power supply cover.

Removal

1. Secure the input voltage to the power supply using your company's approved Lock Out / Tag Out procedure.

2. Remove the 7 screws holding the back panel to the cover and the 7 screws holding the cover to the base plate.
3. Carefully lift the cover until you can reach in and disconnect the ribbon cable and power wires 1 & 2 from the Power/Connector Board.
4. Finish removing the cover and lay it aside in a safe location.

Reinstallation

1. Place the cover over the power supply and reconnect the ribbon cable and wires 1 & 2.
2. Lower the cover into place, ensuring it is aligned properly with the back cover and base plate.
3. It is strongly recommended that you reapply the input voltage and ensure that the power supply runs before reinstalling the cover screws.
4. If the power supply runs properly, reinstall the 7 back panel screws and the 7 base plate screws.

FRONT PANEL 'F' INDICATIONS

The front panel display shows an 'F' value (**F00, F02 – F05**) when either the input voltage is applied, or when the **START** pushbutton is pressed. The power supply will not start whenever an 'F' value is displayed. The following troubleshooting will address each of the possible 'F' indications you may see.

F00 – Over Current Trip

Symptoms:

The output meter displays an F00 when the **START** pushbutton is pressed. The power supply does not start.

Possible Causes:

1. Failed sealing head, power supply connectors.
2. Damaged internal wiring.
3. Failed Control / Display board, or a failed Power / Connector board.

Solutions:

1. **Sealing head and power supply connectors**
 - a. Secure the input voltage to the power supply using your company's approved Lock Out / Tag Out procedure.
 - b. Remove the sealing head from the power supply (Refer to **Figure 12** on **Page 9**) and inspect the sealing head and power supply connectors, repair or replace as needed.
 - c. Reapply the input voltage and test the system to ensure the issue is resolved.
2. **Damaged internal wiring**
 - a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.

- b. Inspect the condition of the internal wiring and components. Refer to your system drawings to confirm or repair any internal wiring issues.
 - c. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
 - d. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, continue troubleshooting.
3. **Failed Control / Display Board Or A Failed Power / Connector Board**

The following can only be performed if you have spare boards on hand.

- a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
- b. Replace the boards one at a time and continue with Step 3c after replacing each board. Refer to your system drawings to ensure the boards are reconnected correctly.

NOTE:

When replacing the Control/Display board, take care to ensure the pushbuttons align correctly with the front cover cutouts.

- c. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
- d. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, replace the remaining board and continue troubleshooting.

If none of these steps resulted in a resolution of your problem, contact Enercon Customer Service for information on Repair or Service.

F02 AND  – CAP TRIP OR OVER-TEMPERATURE

Symptoms:

The output meter will display an **F02** and the **TEMP** LED will be lit at the same time. The manner in which this fault is displayed will help you determine which fault to troubleshoot.

- 1. If **F02** and **TEMP** are displayed when the **START** pushbutton is pressed, proceed to **CAPACITOR ISSUE** for troubleshooting.
- 2. If **F02** and **TEMP** are displayed when the input voltage is applied to the power supply, and does not reset when Stop is pressed, proceed to **TEMPERATURE ISSUE** for troubleshooting.

CAPACITOR ISSUE

Possible Causes:

- 1. Damage Output Cables
- 2. Failed Output Capacitor(s) and failed Capacitor Trip Board.

Solutions:

1. **Damaged Output Cables**

- a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
- b. Inspect the output cables that run between the output capacitor bank, Inverter, and the output connectors.
- c. If there is no sign of damage to the output cables, proceed to Step 2.
- d. If there is damage to the output cables, replace the cables, as well as any other components that show signs of damage from the output cable(s).
- e. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
- f. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, continue troubleshooting.

2. **Failed Or Damage Output Capacitor(s) And Capacitor Trip Board**

The following can only be performed if you have spare capacitors and cap trip board on hand.

- a. If the cover is still removed from Step 1, skip this step. Otherwise, remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.

NOTE:

Unless some other explanation is found to explain the F02 and TEMP indication, you will need to replace all of the output capacitors and the capacitor trip board. This is due to the fact that an output capacitor failure often fails the board, and stresses the remaining capacitors. If only a single capacitor or the board is replaced, the issue may not be resolved, or the failure may reoccur in a short amount of time.

The output capacitors are located inside of the power supply in a bank of either 2 or 4 capacitors. Refer to **Figures 41 & 42** to perform the following steps.

- b. Remove the output cable and jumper wire* (2), and the feedback jumpers (3 & 4) from the capacitors (1) by removing the bolts (5) securing the board to the capacitors. Note the cable locations on the capacitors.

- c. Remove the control wires 10 & 11 from terminals 1 & 2 of the Capacitor Trip board (7).
- d. Remove the mounting bolts (6) and the mounting bolt supports (9) to allow removal of the capacitors and capacitor trip board.
- e. Ensure the mounting surface is clean to provide a good ground for the capacitors.

*The jumper is only installed on the 2 capacitor bank.

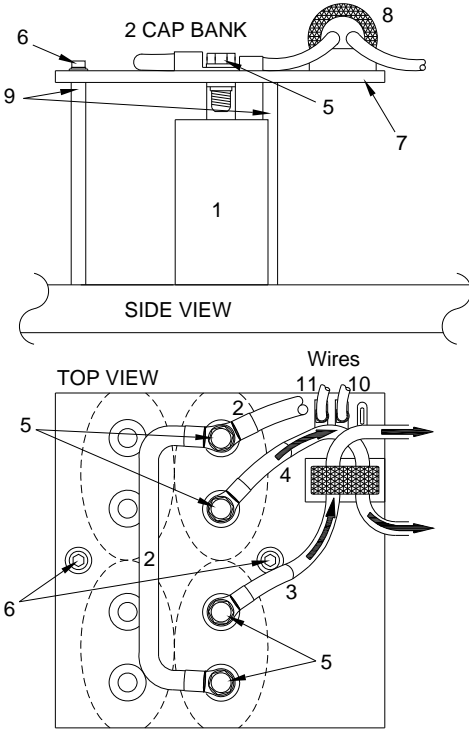


Figure 41

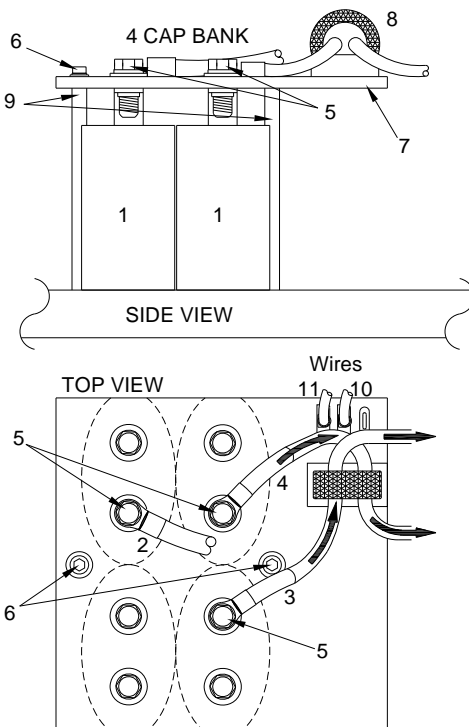


Figure 42

- f. Loosely install the new Capacitor Trip board onto the new Output Capacitors using the existing capacitor hardware.

NOTE:

Once the board and capacitors are reinstalled you will need to remove and reinstall the appropriate bolts to reinstall the output, jumper, and feedback cables.

- g. Place the new output capacitors and board back into the power supply and align the mounting holes in the board with the holes on the power supply base plate and reinstall the supports (9) and mounting bolts (6). Do **not** tighten the mounting bolts at this time.
- h. Reinstall the output cable (2), and if you have a 2 capacitor bank, reinstall the jumper cable*.
- i. Run the feedback cables (3 & 4) through the CT (8), and ensure that each feedback cable is threaded through the CT as shown.
- j. Ensure the board is mounted tightly to the capacitors.
- k. Reinstall the control wires; wire 11 to terminal 1 and wire 10 to terminal 2.
- l. Tighten the holding bolts (6) and ensure that the entire assembly does not move. Do **not** over tighten the holding bolts.
- m. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
- n. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, contact Enercon Customer Service for information on Repair or Service.

TEMPERATURE ISSUE

Possible Causes

- 1. Excessive Ambient Temperature.
- 2. Cooling Fan and Heat Sink.
- 3. Damaged Internal Wiring.
- 4. Failed Temperature Sensor.
- 5. Failed Power/Connector Board.

Solutions:

1. Excessive Ambient Temperature

Verify whether the ambient temperature is above 104° F (40° C). If the temp is too high, provide forced air cooling until the ambient temp no longer exceeds 104° F (40° C).

2. Cooling Fan And Heat Sink

- a. Ensure that both cooling fans, and the base plate, are clean and free of debris. Clean as required.

- b. Ensure the fans are turning in the correct direction and at the correct speed. Reorient or replace the cooling fans as needed.
3. **Damaged Internal Wiring**
- a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
 - b. Inspect the wiring between the temperature sensor and the Power/Connector Board. Repair or replace as required. Refer to your system drawings to confirm and repair any internal wiring issues.
 - c. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
 - d. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, continue troubleshooting.
4. **Failed Temperature Sensor**
- a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
 - b. Test the sensor by placing a jumper across E12 and E13 on the Power/Connector Board.
 - c. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure, but do not secure the cover.
 - d. Reapply the input voltage to see if the **TEMP** LED and **F02** go out.
 - e. If they go out, proceed to Step 4f, if they are still lit go to Step 5.
 - f. Remove the cover and then remove jumper across E12 and E13 on the Power/Connector Board. Perform an ohm check on the temperature sensor, the sensor should read 0 ohms.
 - ❖ If open, replace the temperature sensor.
 - ❖ If shorted, replace the wiring between the sensor and the Power/Connector Board.
 - c. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
 - d. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, continue troubleshooting.

5. **Failed Power/Connector Board**

The following can only be performed if you have spare boards on hand.

- a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
- b. Replace the Power/Connector Board. Refer to your system drawings to ensure the board is reconnected correctly.
- c. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
- d. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, contact Customer Service.

If none of these steps resulted in a resolution of your problem, contact Enercon Customer Service for information on Repair or Service.

F03 – Interlock Fault

Symptoms:

The output meter displays an F03 when the START pushbutton is pressed. The power supply does not start.

Possible Causes:

- 1. Interlock issue.
- 2. Stalled Bottle Issue.
- 3. Failed Control / Display board, or a failed Power / Connector board.

Solutions:

1. **Interlock Issue**

Defeat Connector:

Either the interlock defeat connector is damaged or not connected to the **REMOTE START/INTERLOCKS** connector on the rear of the power supply. Reinstall or replace as required.

Remote Start/Interlocks Cable:

- a. The Remote Start/Interlocks cable is damaged or not properly connected to **REMOTE START/INTERLOCKS** connector on the rear of the power supply. Reinstall or replace as required.
- b. The Remote Start/Interlocks cable is connected to the power supply, but the interlock wires, or the interlock contact, are open. Short the interlock wires together to close the interlock circuit, or address the condition that is causing the open interlock contact.

2. **Stalled Bottle Issue**

Defeat Connector:

Either the stalled bottle defeat connector is damaged or not properly connected to the **STALLED BOTTLE SENSOR** connector on the rear of the power supply. Reinstall or replace as required.

Stalled Bottle Sensor and Cable:

- a. The Stalled Bottle Sensor cable is damaged or not properly connected to **STALLED BOTTLE SENSOR** connector on the rear of the power supply. Reinstall or replace as required.
- b. The Stalled Bottle Sensor cable is connected to the power supply, but there is something on your production line that is triggering the stalled bottle sensor. Clear the blockage from your production line.
- c. The Stalled Bottle Sensor cable is connected to the power supply, but the sensor is misadjust, misaligned, or failed. Refer to the motion and stalled bottle information in **SECTION 4 – OPTIONS** and readjust, realign, or replace as required.

3. Failed Control / Display Board or Failed Power / Connector Board

The following can only be performed if you have spare boards on hand.

- a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
- b. Replace the boards one at a time and perform Step 3c after replacing each board. Refer to your system drawings to ensure the boards are reconnected correctly.

NOTE:

When replacing the Control/Display board, take care to ensure the pushbuttons align correctly with the front cover cutouts.

- c. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
- d. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, replace the remaining board and continue troubleshooting.

If none of these steps resulted in a resolution of your problem, contact Enercon Customer Service for information on Repair or Service.

F04 – Under Voltage Trip

Symptoms:

The output meter may be dim, and displays an F04 when the START pushbutton is pressed. The power supply does not start.

Possible Causes:

Low input voltage.

Solutions:

Low Input Voltage

- a. Check your input voltage and verify that it is within $\pm 10\%$ of the voltage listed on the rating plate of your power supply (**Refer to Figure 4, Page 6**). Correct any input voltage issues found.
- b. Test the system to ensure the issue is resolved.

If your input voltage is within specifications and you cannot resolve this issue, contact Enercon Customer Service for information on Repair or Service.

F05 – Under Frequency Trip

Symptoms:

The output meter displays an F05 when the START pushbutton is pressed. The power supply does not start.

Possible Causes:

1. Sealing Head not properly connected.
2. Failed Control / Display board, or a failed Power / Connector board.
3. Failed Output Capacitors.

Solutions:

1. Sealing Head Not Properly Connected

- a. Verify that the sealing head is installed properly and that the mounting screws are installed in the mounting brackets. Reinstall and secure as required.
- b. If the sealing head is installed properly, remove the head for inspection,
- c. Secure the input voltage to the power supply using your company's approved Lock Out / Tag Out procedure.
- d. Remove the sealing head from the power supply (Refer to **Figure 12** on **Page 9**) and inspect the sealing head and power supply connectors, repair or replace as needed.
- e. Test the system to ensure the issue is resolved.

2. Failed Control / Display Board or Failed Power / Connector Board

The following can only be performed if you have spare boards on hand.

- a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
- b. Replace the boards one at a time and perform Step 2c after replacing each board. Refer to your system drawings to ensure the boards are reconnected correctly.

NOTE:

When replacing the Control/Display board, take care to ensure the pushbuttons align correctly with the front cover cutouts.

- c. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
- d. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, replace the remaining board and continue troubleshooting.

If none of these steps resulted in a resolution of your problem, contact Enercon Customer Service for information on Repair or Service.

3. Failed output Capacitors

Under certain circumstances, a medium frequency Super Seal™ power supply will display the F05 indication when an output capacitor(s) has failed while running. Typically, the F05 will continue to be displayed upon attempting to restart the power supply.

- a. If the previous steps for this issue have not resolved this problem, perform the capacitor issue troubleshooting called out under **F02 AND TEMP – CAP TRIP OR OVER-TEMP** troubleshooting.

If none of these steps resulted in a resolution of your problem, contact Enercon Customer Service for information on Repair or Service.

THE FRONT PANEL IS BLANK

Symptoms:

The Output Meter and Indicator LEDs are not lit when the input voltage is applied to the power supply.

NOTE:

Depending on the cause of this issue, the cooling fans may, or may not, be turning. If the cooling fans **are not** turning, this symptom will be associated with causes 1, 2 & 3. When the cooling fans **are** turning, this symptom will be associated with causes 4 & 5.

Possible Causes:

- 1. Power Supply is disconnected from the input voltage.
- 2. The input voltage is being interrupted.
- 3. Failed power supply circuit breaker or disconnect switch.
- 4. Ribbon Cable / Wiring issue.
- 5. Failed Control / Display board, or a failed Power / Connector board.

Solutions:

The cooling fans **are not** turning.

- 1. **Power Supply Is Disconnected From The Input Voltage**

- a. Ensure that the power supply is plugged in, or properly connected to the fused disconnect.
 - b. Test to see if the front panel lights up.
2. **The Input Voltage Is Interrupted**
- a. Ensure any disconnect boxes are on and that any fuses are good. Turn disconnect boxes on or replaced failed fuses.
 - b. Check the main electrical panel and ensure the supply breaker is not tripped, or that its fuses are good. Turn the supply breaker on or replaced failed fuses.
3. **Failed Power Supply Circuit Breaker or Disconnect Switch**
- a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
 - b. Check the condition of the circuit breaker or disconnect switch, if damaged replace as required.
 - c. With the circuit breaker or disconnect switch in the ON position, ohm out the breaker or switch and replace if an open is read across any of the poles.
 - e. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
 - d. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, continue troubleshooting.

The Cooling fans **are** turning.

1. Ribbon Cable / Wiring Issue

- a. Partially remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure, but do not remove the ribbon cable and wires 1 & 2.
 - b. Inspect the ribbon cable and wires 1 & 2 at both boards. Reconnect, or replace as required.
 - c. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
 - d. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, continue troubleshooting.
2. **Failed Control / Display Board or Failed Power / Connector Board**

The following can only be performed if you have spare boards on hand.

- a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
- b. Replace the boards one at a time and perform Step 3c after replacing each board. Refer to your system drawings to ensure the boards are reconnected correctly.

NOTE:

When replacing the Control/Display board, take care to ensure the pushbuttons align correctly with the front cover cutouts.

- c. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
- d. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, replace the remaining board and continue troubleshooting.

If none of these steps resulted in a resolution of your problem, contact Enercon Customer Service for information on Repair or Service.



Symptoms:

The **FAULT** LED is lit when the START pushbutton is pressed, and the power supply will not start.

Possible Causes:

1. Failed Inverter
2. Failed Control / Display board, or a failed Power / Connector board.

Solutions:

1. Failed Inverter
 - a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
 - b. Inspect the condition of the wires around the Inverter device. Refer to your system drawings to confirm and correct any wiring issues.
 - c. Perform the Inverter Ohm check procedure on **Page 38**.
 - ◆ If the *inverter passes* the ohm check, proceed to Step 2.
 - ◆ If the *inverter fails* the ohm check, refer to your system drawings and replace the inverter and continue with Step d.
 - d. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure, but do not reinstall the hardware at this time.

- e. Test the system to ensure the issue is resolved.
- f. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, continue troubleshooting.

2. Failed Control / Display Board, or a Failed Power / Connector Board

The following can only be performed if you have spare boards on hand.

- a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
- b. Replace the boards one at a time and perform Step 3c after replacing each board. Refer to your system drawings to ensure the boards are reconnected correctly.

NOTE:

When replacing the Control/Display board, take care to ensure the pushbuttons align correctly with the front cover cutouts.

- c. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
- d. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, replace the remaining board and continue troubleshooting.

If none of these steps resulted in a resolution of your problem, contact Enercon Customer Service for information on Repair or Service.

PUSHBUTTONS DO NOT FUNCTION

Symptoms:

The symptoms you see will vary depending upon the cause of this issue.

Improperly installed, or loose, Control/Display Board: What you see depends upon which button is in contact with the cover.

The output meter may not flash upon power up of the power supply.

The output level may also run up to 100%, or down to the power supply's minimum output level.

If you press the pushbutton(s) that is in contact with the cover it, will typically not depress or spring back.

Failed Control/Display Board: In this case the symptoms will be dictated by what has failed on the board.

If a pushbutton has failed or broken, the symptoms may only affect that pushbuttons function.

If it is a component or software failure it may affect all of the pushbuttons.

Possible Causes:

1. Improperly installed, or loose, Control / Display board.
2. Failed Control/Display board.

Solutions:

1. Improperly installed, or loose, Control / Display board

- a. Press all of the front panel pushbuttons to see if they depress and release.
- b. If any of the pushbuttons do not press in, or if they press in but do not release, then the board is not properly aligned with the cutouts in the cover.
- c. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
- d. The Control/Display board is mounted to the front of the power supply cover. Remove and reinstall the board, making sure that all of the pushbuttons fit properly within their cutouts.
- e. Press all of the pushbuttons and ensure they depress and release properly. If they do not press and release properly, realign board until they do.
- f. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
- g. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, proceed to step 2.

2. Failed Control/Display board

The following can only be performed if you have spare boards on hand.

- a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
- b. Replace the Control/Display board. Refer to your system drawings to ensure the board is reconnected correctly.
- c. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
- d. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, contact customer service.

If none of these steps resulted in a resolution of your problem, contact Enercon Customer Service for information on Repair or Service.

OUTPUT STUCK AT MINIMUM 

Symptoms:

When you apply the input voltage to the power supply, the output percentage that is flashing is correct. When you press the **START** pushbutton the output drops to the power supply's minimum output level and cannot be adjusted. The minimum output level displayed will depend on the power supply size.

SS100 1Ø & 3Ø = **35%**

SS75 = **40%**

SS50 = **55%**

Possible Causes:

1. Low Input Voltage.
2. Failed Control/Display Board.

Solutions:

1. Low Input Voltage

- a. Check your input voltage and verify that it is within $\pm 10\%$ of the voltage listed on the rating plate of your power supply (**Refer to Figure 4, Page 6**). Correct any input voltage issues found.
- b. Test the system to ensure the issue is resolved.
- c. If your input voltage is within specifications and you cannot resolve this issue, contact Enercon Customer Service for information on Repair or Service.

2. Failed Control/Display board

The following can only be performed if you have spare boards on hand.

- a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
- b. Replace the Control/Display board. Refer to your system drawings to ensure the board is reconnected correctly.
- c. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
- d. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, contact customer service.

If none of these steps resulted in a resolution of your problem, contact Enercon Customer Service for information on Repair or Service.

AUTO MODE  **AT MINIMUM** 

Symptoms:

When you apply the input voltage to the power supply, the selected output level that is flashing will be at the power supply's minimum output level. When you press the **START** pushbutton the output displayed stops flashing, but remains at minimum and cannot be adjusted. The minimum output level displayed will depend on the power supply size.

SS100 1Ø & 3Ø = **35%**

SS75 = **40%**

SS50 = **55%**

Possible Causes:

1. **AUTO** mode has been selected accidentally.
2. **AUTO** mode selected but no command signal has been applied.
3. **AUTO** mode selected but the command signal is not an isolated signal.
4. Low Input Voltage.
5. Failed Control/Display Board.

Solutions:

1. **AUTO Mode Has Been Selected Accidentally**
 - a. If **AUTO** mode has been accidentally selected, simply switch back to **MANUAL** mode by pressing the **AUTO / MANUAL** pushbutton.
 - b. If the power supply does not switch back to **MANUAL** mode, perform the troubleshooting under **PUSHBUTTONS DO NOT FUNCTION**.
2. **AUTO Mode Selected, But No Command Signal Has Been Applied**
 - a. If **AUTO** mode is the operational mode you have selected, you will need to check the command signal and wiring.
 - a. Ensure that the Auto Control cable is properly connected to the **AUTO CONTROL** connector on the rear of the power supply.
 - b. Refer to **Figure 38**, and your system drawings, to ensure that the auto control wiring has been connected correctly to your 0-10VDC source. Correct the wiring as needed.
3. **AUTO Mode Selected, But The Command Signal Is Not An Isolated Signal.**
 - a. Ensure that the 0-10VDC signal you are supplying is properly isolated.
4. **Low Input Voltage**
 - a. Check the input voltage and verify that it is within $\pm 10\%$ of the voltage listed on the rating plate of your power supply (**Refer to Figure 4, Page 6**).
 - b. Test the system to ensure the issue is resolved.
 - c. If your input voltage is within specifications and you cannot resolve this issue, contact Enercon

Customer Service for information on Repair or Service.

5. Failed Control/Display Board
 - a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
 - b. Replace the Control/Display board. Refer to your system drawings to ensure the board is reconnected correctly.
 - c. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
 - d. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, contact customer service.

If none of these steps resulted in a resolution of your problem, contact Enercon Customer Service for information on Repair or Service.

DISPLAY FLICKERS WHILE RUNNING

Symptoms:

While the unit is running you see the Output Meter and Indicator LEDs flicker on and off, but the power supply continues to run.

With this fault you will typically not see any issues with your sealing results, and you will still be able to adjust the output level through the power supply's full output range.

Possible Causes:

1. Output capacitor wire #48 too close to the Control/Display Board.
2. Output capacitor bank has become isolated from ground.

Solutions:

1. **Output Capacitor Wire #48 Too Close To The Control/Display Board**
 - a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
 - b. Inspect output wiring to see if wire #48 is run too close to the Control/Display Board. If it is not too close proceed to Step 2. If it is too close, proceed to Step 1c.
 - c. Use a 10mm wrench to loosen the nut that secures wire #48 to the capacitor bank.
 - d. Rotate the wire away from the board to gain maximum clearance and retighten the nut on the capacitor bank.
 - e. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER**

procedure. Do not reinstall the cover screws until you have tested the system.

- f. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, proceed to Step 2 to continue troubleshooting.

2. Output Capacitor Bank Has Become Isolated From Ground

- a. Remove the power supply cover, following the **Removal** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure.
- b. Ohm the body of one of the output capacitors to ground to ensure the body if the capacitor is shorted to ground.
- c. If you measure a short between the body of the capacitor and ground, the cap bank is properly grounded. Contact Customer Service.
- d. If you measure any resistance the capacitors are isolated from ground and you will need to tighten the capacitor banks bracket.
- e. While continuing to ohm the body of the capacitor to ground, tighten the mounting hardware until you read a short on the meter.
- f. Reinstall the power supply cover, following the **Reinstallation** portion of the **REMOVE / INSTALL THE POWER SUPPLY COVER** procedure. Do not reinstall the cover screws until you have tested the system.
- g. If the issue is resolved, complete the power supply cover reinstallation. If the issue is not resolved, contact customer service.

If none of these steps resulted in a resolution of your problem, contact Enercon Customer Service for information on Repair or Service.

RUN **NOT LIT OR BLINKING**

Symptoms:

While the power supply is running, the output meter is displaying the correct output level, but the **RUN** LED is not lit or blinks. If your system includes a stack light, it will switch from green to flashing red whenever the **RUN** LED is not lit.

Possible Causes:

1. **The Run LED is not lit.**
2. **The RUN LED is blinking.**

Solutions:

1. **The Run LED is not lit**
 - a. Your production output level is below the Loss of Seal Indicator Alarm setpoint.
 - b. You will need to reset the Alarm setpoint to match your production output level.
2. **The RUN LED is blinking**
 - a. The power supply's output level can fluctuate slightly as it automatically adjusts its output to

accommodate the load passing beneath it. This can cause the alarm to randomly trip under heavy load conditions.

- b. You will need to reset the Alarm setpoint, but in this case you should only need to lower the setpoint by 1% to correct the problem.

To correct either of these issues, refer to **ADJUSTING THE LOSS OF SEAL INDICATOR ALARM SETPOINT** on **Pages 17-18**, to reset the alarm setpoint for your current production output level.

If the troubleshooting listed in this manual does not cover the symptoms you are experiencing, or does not result in the resolution of your issue, contact Customer Service for additional troubleshooting assistance.

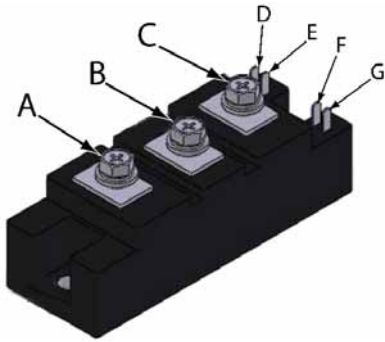
Enercon Customer Service Department
Phone Number: (262) 255-6070
Fax Number: (262) 255-2462
E-Mail Address: service@enerconmail.com
Website: www.enerconind.com
24hr Customer Service is available.

INVERTER OHM CHECK PROCEDURE

- Any “Zero” ohm reading will constitute a bad Semi-Conductor.
- Gate leads must be replaced with devices.
- Meter Required: Standard Analog VOM-or-DVOM with Diode Test.

⚠ DANGER!

Ensure the input voltage is disconnected and locked out from the power supply before performing the ohm check procedures.



⚠ CAUTION!

Always use the NEW Gate Leads supplied with the replacement Inverter Device.

Always apply an **EXTREMELY** thin layer of thermal compound to the base of the inverter before mounting it to the heat sink.

A packet of thermal compound comes attached to the inverter.

Apply a dab of thermal compound to the center of the base of the inverter and spread the compound around the entire surface of the inverter.

Wipe away any excess, as excess compound can be detrimental and may cause the inverter to fail prematurely.

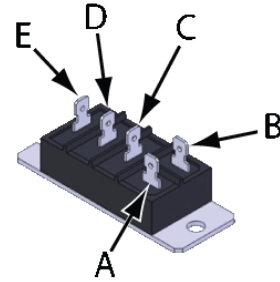
Mount the inverter securely to the heat sink and torque the bolts to 30 in/lbs (3.39 N-m).

Meter Lead Hook-Up	VOM (RX1 Scale)	DVOM (Diode Test)
(+)A to (-)B	OPEN	OPEN
(-)A to (+)B	≈ 20	.4V
(+)A to (-)C	≈ 20	.4V
(-)A to (+)C	OPEN	OPEN
(+)B to (-)C	≈ 40	.8V
(-)B to (+)C	OPEN	OPEN
* (+)D to (-)E	Slight Deflection, Then OPEN	OPEN
* (+)G to (-)F	Slight Deflection, Then OPEN	OPEN

(+)=Positive (black) meter lead. (-)=Negative (red) meter lead.
 *Measure with gate leads disconnected, meter at its highest resistance scale.

BRIDGE RECTIFIER OHM CHECK PROCEDURE

- Any “Zero” ohm reading will constitute a bad Semi-Conductor.
- Meter Required: Standard Analog VOM-OR-DVOM with Diode Test.



⚠ CAUTION!

Always apply an **EXTREMELY** thin layer of thermal compound to the base of the bridge rectifier before mounting it to the heat sink.

A packet of thermal compound comes attached to the bridge rectifier.

Apply a dab of thermal compound to the center of the base of the bridge rectifier and spread the compound around the entire surface of the bridge rectifier.

Wipe away any excess, as excess compound can be detrimental and may cause the bridge rectifier to fail prematurely.

Mount the bridge rectifier securely to the heat sink and torque the bolts to 30 in/lbs (3.39 N-m).

Meter Hook-Up	VOM (RX1 Scale)	DVOM (Diode Test)
(+) A to (-) C, (-) D & (-) E	OPEN	OPEN
(-) A to (+) C, (+) D & (+) E	≈ 10	.4V
(+) B to (-) C, (-) D & (-) E	≈ 10	.4V
(-) B to (+) C, (+) D & (+) E	OPEN	OPEN

(+)=Positive (black) meter lead. (-)=Negative (red) meter lead.

APPLICATION TROUBLESHOOTING

Application Troubleshooting Information

1. **Pressure** - Even, uniform pressure on the induction liner over the entire land area of the container is required for a good seal. Important contributors to the establishment of the appropriate amount of pressure include the amount of on-torque pressure, thread design, and closure design.
2. **Heat** - Heat is the active ingredient in the induction sealing process. Too much heat can be as counterproductive as too little. Trial and error will lead you to the appropriate output level settings for your various applications. In addition to your output level settings, selection of the proper sealing head design and the proper setup and head alignment are also very important.
3. **Time** - The induction liner must spend a sufficient amount of time within the sealing head's electromagnetic field to properly heat the foil and melt the bonding polymer properly. As a general rule, the faster your process speed, or the shorter your sealing cycle, the higher your output level setting will need to be in order to reach the proper melt temperature to create a good seal.
4. **Closures** - Closures must be designed to accommodate the type of induction liner you intend to use. The thread style and pattern on the closure must be compatible with those on the container. The closure must create an even, uniform pressure on the induction liner over the entire land area of the container. The closure should be properly sized to fit the container neck and robust enough in its construction to avoid distortion when it is applied.
5. **Containers** - The thread style and pattern on the container must be compatible with those on the closure you choose. The land area of the container must be flat and smooth. Ridges or saddles on the land area will lead to weak seals. The best seals are achieved when the land area is 85 mils (2mm) wide or wider. The neck area and the land area of the container should never be chemically treated or flame treated. Such treatment will inhibit the bonding of the liner to the container.
6. **Induction Liner** - Induction liners have been developed for almost every possible application. They have a wide range of characteristics and capabilities. Always remember that the sealing polymer on the liner must be compatible with the material your containers are made of and capable of creating the type of seal you wish to achieve.

The O.D. of the liner must be appropriate for the closure and the container you are using. The liner should be free of wrinkles or impurities and should be centered in the closure.

7. **Sealing Head** - As is true for induction liners, induction sealing heads have been developed for almost every possible application. The designs can be as simple as small hand-held sealing heads to the sophisticated, integrally mounted, high-speed production sealing heads. The function of the sealing head is to create an electromagnetic field which induces an electrical current, called an eddy current, into the foil portion of the induction liner. The eddy current heats the metal of the liner making the sealing process possible. Choosing the appropriate sealing head for your application requirements is very important.

Understanding The Results Of Induction Sealing

Easy-Peel Liners

Easy-peel liners seal tightly to the lip of the container, but allow for a clean peel from the container.



Tamper-Evident Liners

Tamper-evident liners seal tightly to the lip of the container, but leave part of the liner on the lip when opened. This is used to show evidence that the container has indeed been opened.



Good Seal

A good seal will have good adhesion for the entire circumference of the container opening and will

stand up well to pressure tests. Wrinkling of the liner will be at a minimum, and the inside of the closure will show no signs of overheating. On 2-piece liners, the liner and closure will show no signs of swirling or twisting from poor wax melt or absorption.



No Seal

A No Seal result on a container is when the container is run through a sealing cycle and the liner shows no signs of adhesion to the lip of the container.



Possible Causes

- ❖ Insufficient induction field - low output level setting.
- ❖ Insufficient exposure time – too much speed.
- ❖ Improper sealing head setup.
- ❖ Incorrect induction liner - incompatibility.
- ❖ Chemical or flame treatment of the container neck or the land area.
- ❖ Sealer not running.

Solutions

- ❖ Increase the OUTPUT (%) on the sealer.
- ❖ Decrease the line speed beneath the sealer.
- ❖ Check the gap and alignment of the sealing head.
- ❖ Check cap/liner specifications to ensure the correct liner is being used.
- ❖ Check container specifications.
- ❖ Turn On / Troubleshoot Sealer

Partial or Weak Seal

A Partial Seal result on a container is when the liner only shows signs of adhesion to a portion of the lip of the container when the closure is removed.

A Weak Seal result on a container is when the liner shows signs of full adhesion to a portion of the lip of the container, but fails under pressure tests.

These conditions can range from a seal that lets go under light pressure to a pinhole leak that exists along the lip of the container. On 2-piece liners you

may also see signs or swirling or twisting due to poor wax melt or absorption.



Possible Causes

- ❖ Insufficient induction field – low output level setting.
- ❖ Insufficient exposure time – speed too fast.
- ❖ Improper sealing head setup.
- ❖ Incorrect induction liner - incompatibility.
- ❖ Chemical or flame treatment of the container neck or the land area.
- ❖ Insufficient on-torque.
- ❖ Deformations on the land area.
- ❖ Thin or weak land area – too narrow.

Solutions

- ❖ Increase the OUTPUT (%) on the sealer.
- ❖ Decrease the line speed beneath the sealer.
- ❖ Check the gap and alignment of the sealing head.
- ❖ Check cap/liner specifications to ensure the correct liner is being used.
- ❖ Check container specifications.
- ❖ Verify the torque requirement of your container and closure.
- ❖ Inspect your containers.

Overheated or Burned Seal

An Overheated or Burned Seal result on a container is when the liner shows signs of discoloration, deterioration, and/or wrinkling. The inside of the closure may show signs of melting, and on a 2-piece liner the backing material may be discolored or burned, depending upon the severity of the overheating.



A burned smell often accompanies overheating and may possibly affect the smell or taste of your product and may be the only indication of overheating.

WARNING!

Never allow the liners to reach a temperature sufficient to ignite the liner or container contents.

Ensure the dwell time beneath the sealing head is correct and **DO NOT** allow containers to stop within the electromagnetic field.

Failure to observe these requirements may lead to fire or explosion.

NOTE:

When overheating of the liner occurs, ignition of the liner and/or container contents is possible.

Possible Causes

- ❖ Excessive induction field – high low output level setting.
- ❖ Excessive exposure time – speed too slow.
- ❖ Improper sealing head setup.
- ❖ Insufficient on-torque.
- ❖ Deformations on the land area.
- ❖ Thin or weak land area – too narrow.

Solutions

- ❖ Decrease the OUTPUT (%) on the sealer.
- ❖ Increase the line speed beneath the sealer.
- ❖ Check the gap and alignment of the sealing head.
- ❖ Verify the torque requirement of your container and closure.
- ❖ Inspect your containers.

Additional Application Troubleshooting Tips

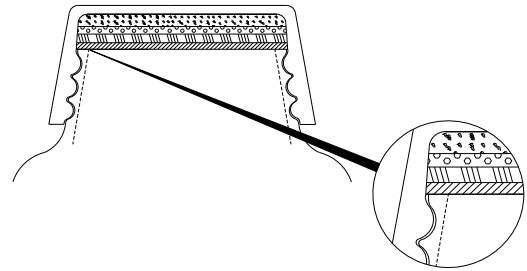
1. Excessive removal torque on a one-piece liner.
 - ❖ Excessive exposure time.
 - ❖ Excessive induction field.
 - ❖ Excessive on-torque.
 - ❖ Closure and container threads not compatible.
 - ❖ Liner too large - overhang wedged in threads.
2. Excessive removal torque on a two-piece liner.
 - ❖ Poor wax melt from insufficient exposure time.
 - ❖ Poor wax melt from insufficient induction field
 - ❖ Poor wax melt from heat sinking – product in contact with liner during sealing process.
 - ❖ Liner melted into container and closure from to overheating.
 - ❖ Excessive on-torque.
 - ❖ Liner undersized - pulp backing bonded to container.
3. Very low removal torque
 - ❖ Insufficient on-torque.
 - ❖ Excessive on-torque – threads stripped.

Cap & Container Issues

Good Container Lip/Liner Contact

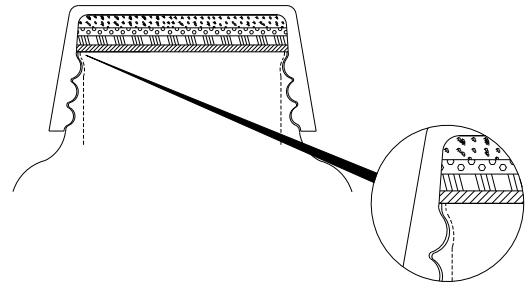
Good contact between the liner material and the container lip is very important. This goes hand in hand with the amount of torque applied, but can be a

problem even when the torque levels are good. The land area of the container should be wide enough and rigid enough to support the pressures and heating required for a good seal.



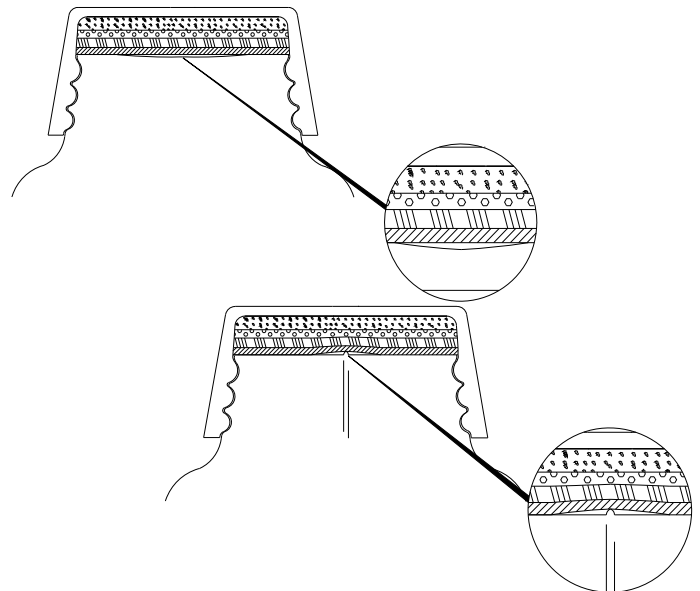
Poor Container Lip/Liner Contact

A thin or weak land area can cause poor contact between the liner material and the container lip. When the land area is too thin there may not be enough rigidity in the land area to support the pressures and heat required for a good seal.



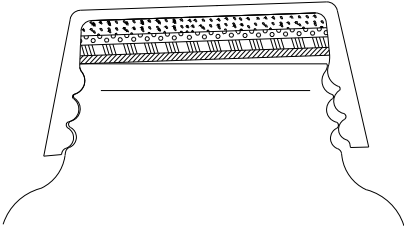
Container Lip Deformations

Gaps between the land area and liner material can be the result of any number of problems, from mold imperfections to container material issues. Regardless of the cause, any gap between the liner and container land area may cause overheating and failure of the seal. A gap caused by saddles on the land area and a gap caused by a protrusion are shown. These defects can be detected on the container land area before the container is capped.



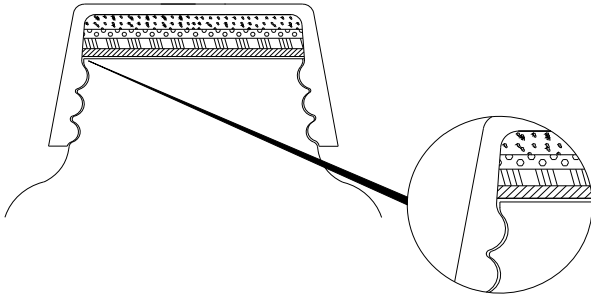
Cocked Cap

A cocked cap is usually due to a problem with the capping process or a cap or container problem. The gap created can cause overheating and the cap itself may actually jam the container under the sealing head causing the liner to overheat severely.



Torque Issues

One of the most common causes of poor or inconsistent sealing is an improperly torqued cap. Whether the torque is too low or too high, the end result is usually an air gap between the lip of the container and the liner material. This air gap will usually cause overheating of the liner, but at the very least will create a gap too large for the polymer to fill.



The following table is provided as a general rule of thumb for determining the torque required for your cap size. For exact torque requirements, contact your cap manufacturer.

Torque Requirement Table

Cap Size	Torque
15mm	6-9 in./lbs (.68-1nm)
18mm	7-10 in./lbs (.79-1.13nm)
20mm	8-12 in./lbs (.9-1.35nm)
22mm	9-14 in./lbs (1-1.58nm)
24mm	10-16 in./lbs (1.13-1.8nm)
28mm	12-18 in./lbs (1.35-2.03nm)
33mm	15-25 in./lbs (1.69-2.82nm)
38mm	17-26 in./lbs (1.92-2.93nm)
43mm	18-27 in./lbs (2.03-3.05nm)
48mm	19-30 in./lbs (2.14-3.38nm)
53mm	21-36 in./lbs (2.37-4.06nm)
58mm	23-40 in./lbs (2.59-4.51nm)
63mm	25-43 in./lbs (2.82-4.85nm)
70mm	28-50 in./lbs (3.16-5.65nm)
83mm	40-60 in./lbs (4.51-6.78nm)
89mm	45-65 in./lbs (5.08-7.34nm)
100mm	50-70 in./lbs (5.65-7.90nm)
110mm	52-73 in./lbs (5.87-8.25nm)
120mm	55-75 in./lbs (6.21-8.47nm)

Note: The listed torque levels are a general guideline only, check with your cap / liner manufacturer for specific requirements of your package.

SECTION 7 – PARTS LISTS

GENERAL

This Section of your manual contains illustrated part breakdowns of the various components that make up the *Super Seal™* Induction Cap Sealing System. If standard options are offered with your system they will be represented with parts breakdown illustrations as well, but special order options typically will not.

The illustrations, and their associated part tables, are primarily provided for replacement part identification, but can also be useful in locating items that are identified as being required for operation, or requiring maintenance or adjustment.

HOW TO USE THE PART LISTS

1. Refer to the illustrated part breakdowns to identify the desired illustration.
2. Visually locate the desired part in the illustration and identify the parts **Item #**.
3. Refer to the part table and find the **Item #** to identify the Enercon **Part #**, **Description**, and **Quantity**.

HOW TO ORDER PARTS

Due to possible changes in the part numbers and quantities in your system, we request that you have all of the following information available when placing an order. We do understand that some information may be unavailable, but be aware that this may cause delays in shipping your order.

1. Locate the **Model Number** and **Serial Number** of your unit on the system **Rating Plate**; see **Figure 4** on **Page 6** of this manual.
2. The **Part Number** and **Date** of this manual; both are located on front cover of this manual. The **Part Number** is also located in the footers on each page of the manual.
3. The **Part Number** of the desired part, the page number it was found on, and the parts **Description**.

NOTE:

All of the replacement parts provided are manufactured with the same precision as the parts supplied with the original equipment.

4. To place a part order contact:

<p>Enercon Parts Department Phone Number: (262) 255-6070 Fax Number: (262) 255-2462 E-Mail Address: parts@enerconmail.com</p>

SHIPPING INSTRUCTIONS FOR RETURNS

Enercon has 2 facilities that perform repairs and process credits. Before shipping parts or equipment back, contact Enercon's Customer Service Department for a **Return Material Authorization (RMA)** number, the proper shipping address, and any special shipping instructions.

If possible, use the original packaging material the parts or equipment were shipped with. If that is not available, use a fiberboard box and adequate packing materials to support the item's weight and prevent movement during shipping.

Ensure both the shipper and receiver addresses are clearly printed on top of package along with the **RMA** number.

Parts must be sent Prepaid.

SCREW ADJUSTABLE FLOOR MOUNT PARTS BREAKDOWN

ITEM #	PART #	DESCRIPTION	QTY.
1	LM4186-01	Screw Adjustable Mount (Entire assembly w/brackets)	1
2	HW0264	Hand Wheel	1
3	FD4321-03	Extension Bracket	2
4	FD4372-02	Mounting Angle Bracket	2
5	FD4372-04	Floor Mount Angle	2
6	HW0041	Wing Screw	1
7	MS0093	M8 – 10mm Stainless Steel Set Screw	1
8	FD5063-01	Tapped Flat M8 Nut (Some nuts are hidden)	12
9	MM080-125S025S-0	M8 x 25mm Long – Stainless Steel	6
10	WA1600	5/16 Lock Washer – Stainless Steel	4
11	WA4056	5/16 Flat Washer – Stainless Steel	8
12	MM080-125S020S-0	M8 x 20mm Long – Stainless Steel	4
13	MM080-125S016S-0	M8 x 16mm Long – Stainless Steel	4
14	MS031-18H1500S-0	5/16 – 18 x 1-1/2" (38.1mm) Large Stainless Steel	4
15	WA1555	1/4 Lock Washer – Stainless Steel	6
16	NU2060	5/16 – 18 Stainless Steel Nut	4
17	FD5062-02	Extrusion Cap	1
18	NA1023	18" (457.2mm) Guide Rule Label	1
19	FD5065-01	Lead Screw	1
20	HW0043	Shaft Collar 10mm I.D.	2
21	BG0152	Non-Metallic Bearing 10mm	2
22	FD5066-01	Extrusion Nut	1
23	MM060-100S020S-0	SCREW M6 x 20mm Stainless Steel	2
24	FD5144-01	Adjustable Mount Top Guide	1
25	HW0080	E-Ring Retaining Ring	1

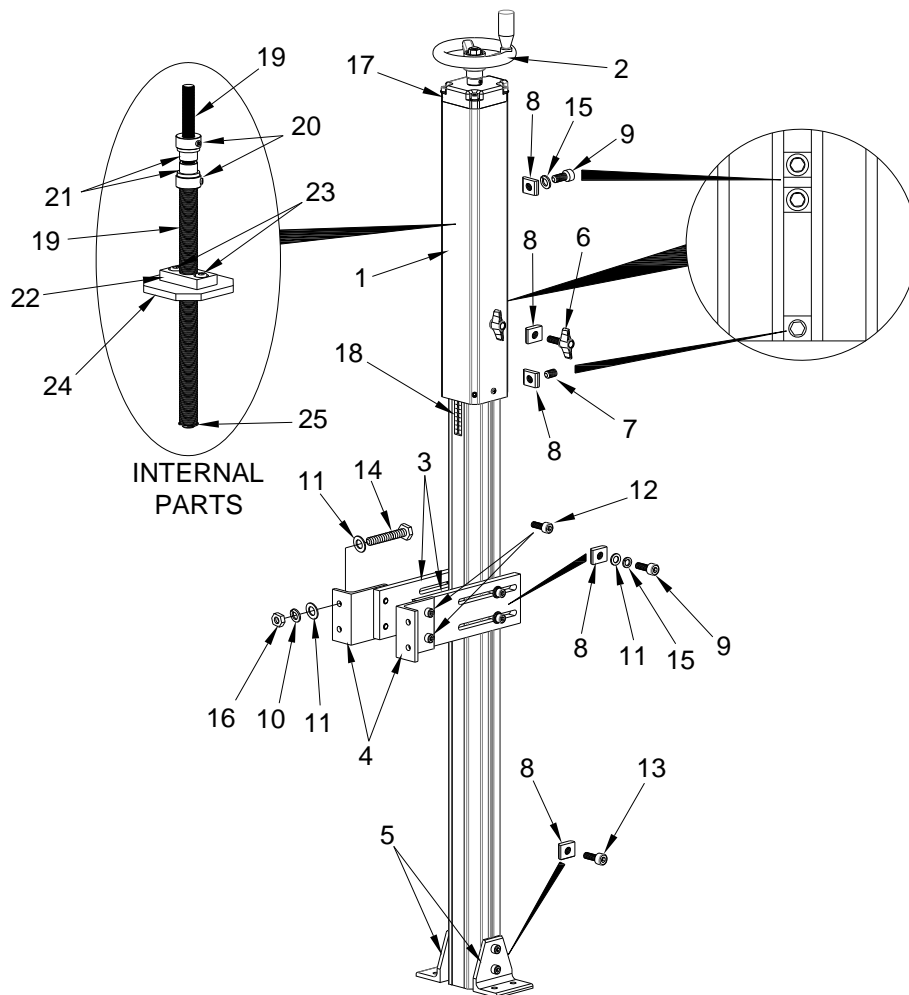


Figure 43

MOUNTING BRACKET PARTS BREAKDOWN

ITEM #	PART #	DESCRIPTION	QTY.
1	FD5361-22	Mount – Bar	1
2	FD5361-20	Mount Angle – L.H.	1
3	FD5361-21	Mount Angle – R.H.	1
4	WA1600	M8 Lock Washer - Stainless Steel	4
5	MM080-125S020S-0	Socket Head Screw M8 x 20mm Long – Stainless Steel	4
6	MM060-100B016S-0	Button Head Cap Screw M6 x 16mm - Stainless Steel	4
7	WA1620	M6 Lock Washer - Stainless Steel	4
8	WA2201	M6 Flat Washer - Stainless Steel	4

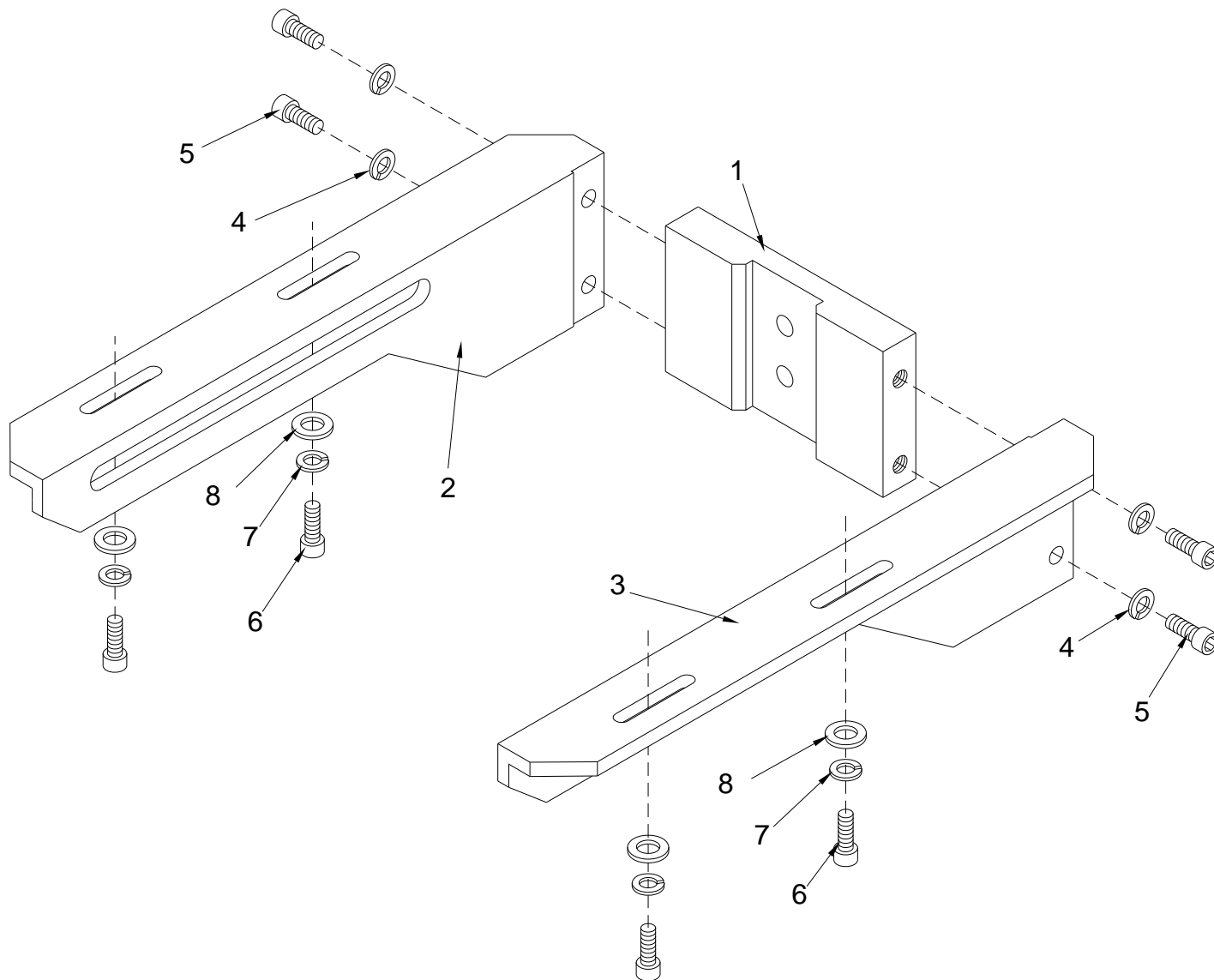


Figure 44

STANDARD POWER SUPPLY PARTS BREAKDOWN

Item #	Part #	Description	Qty.
1	LM5056-**	Power/Connector Board	1
2	LM4254-02	Inverter	1
3	BR0013	Bridge Rectifier	1
4	CP2637	Dry Capacitor, M.F. or H.F./H.V.	2 / 4
5A	CB0175	Circuit Breaker, 20A, 250V – 2 Pole	1
5B	CB0245	Circuit Breaker, 15A, 250V – 3 Pole, SS100 3 Phase	1
6	FA0086	Cooling Fan	1
7	LM2538-15-P	Output Transformer Assembly	1
8	LM4041-01	Snubber Capacitor	1
9	LM4862-04	Capacitor Bus Board	1
10	SE0158	Temperature Sensor	1

Note: The actual part numbers used may vary from unit to unit, please have your units serial number available when contacting Customer Service to ensure the proper parts are supplied.

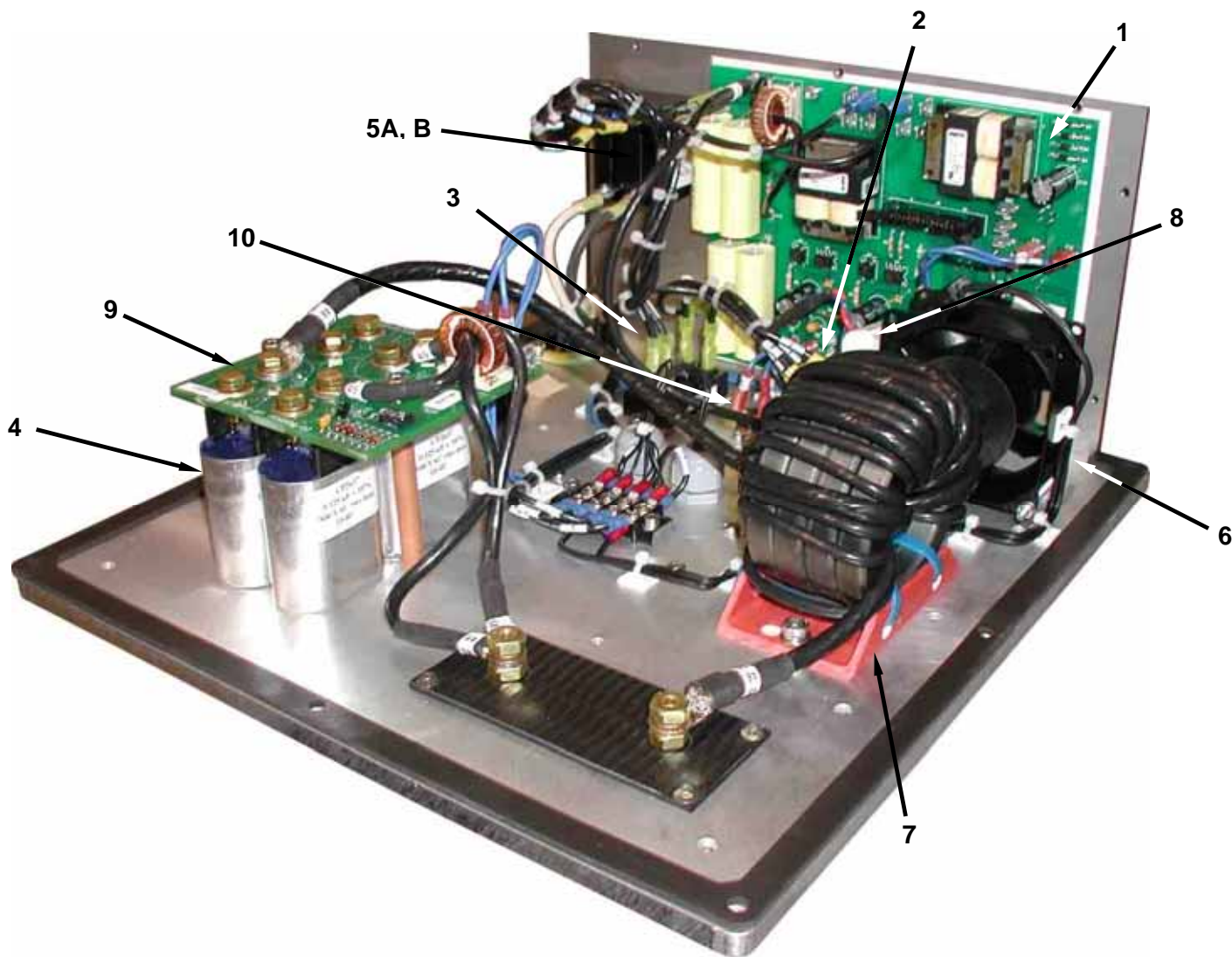


Figure 45

CE POWER SUPPLY PARTS BREAKDOWN

Item #	Part #	Description	Qty.
1	LM5056-**	Power/Connector Board	1
2	LM4254-02	Inverter	1
3	BR0013	Bridge Rectifier (Located Behind Line Filter)	1
4	CP2637	Dry Capacitor, M.F. or H.F./H.V.*	2 / 4
5	SW0191	Main Disconnect Switch 20A, 250V – 2 POLE	1
6	FA0086	Cooling Fan	1
7	LM2538-15-P	Output Transformer Assembly	1
8	LM4041-01	Snubber Capacitor	1
9	CB0050	Thermal Over Current Circuit Breaker 20A, 250V	1
10	FU0124	Fuse 2A, 250V	1
11	EM0080	Line Filter 2-Stage, 20A	1
12	LM4862-04	Capacitor Bus Board	1
13	SE0158	Temperature Sensor	1

Note: The actual part numbers used may vary from unit to unit, please have your units serial number available when contacting Customer Service to ensure the proper parts are supplied.

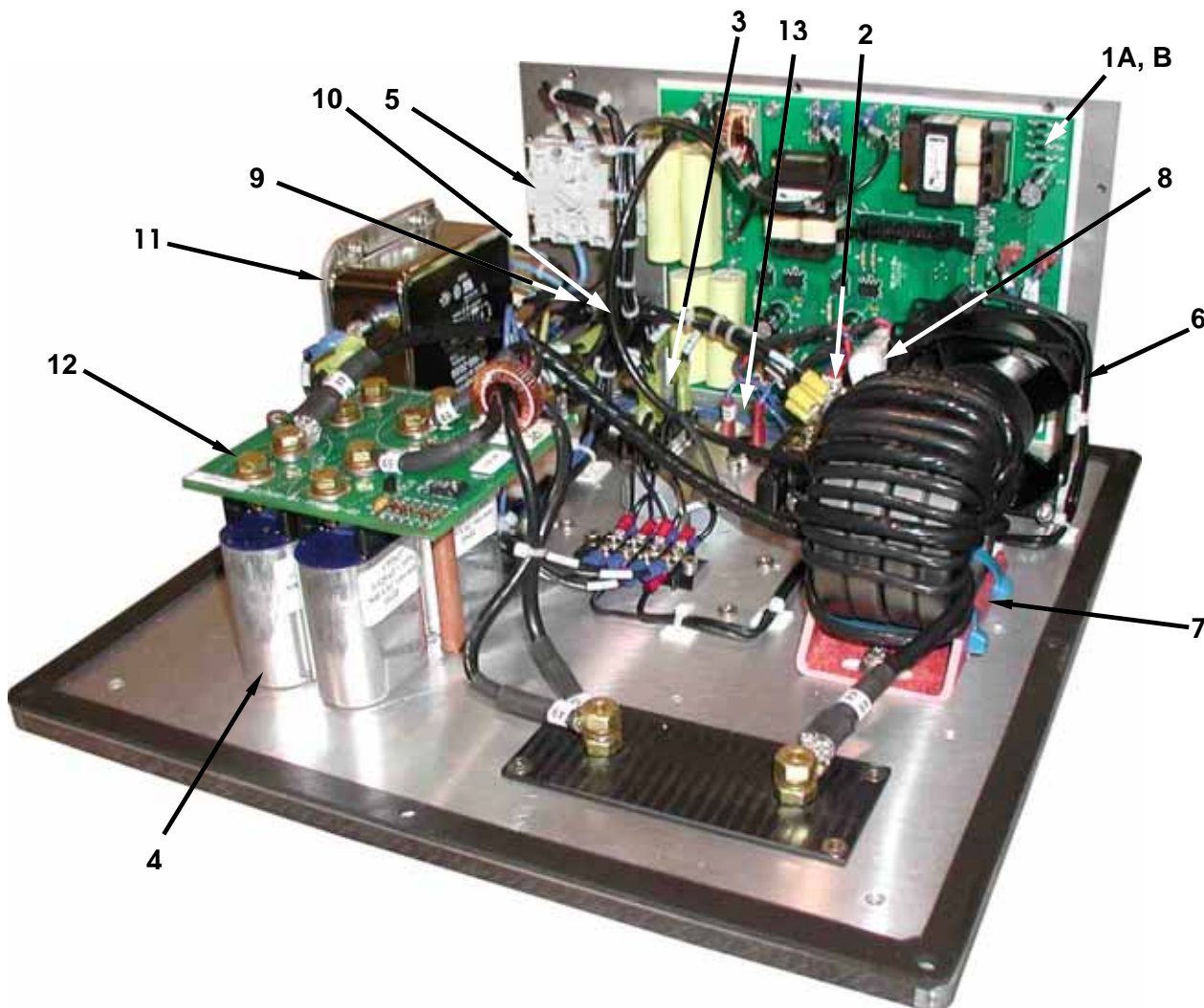


Figure 46

FAN AND SEALING HEAD MOUNTING PARTS BREAKDOWN

Item #	Part #	Description	Qty.
1	FA0024	Fan	2
2	FA1000	Fan Guard	2
3	FD5361-18	Sealing Head Mounting Bracket	2
4	LM4184-02-P	Sealing Head Connection Assembly	1



Figure 47

FRONT PANEL PARTS BREAKDOWN

Item #	Part #	Description	Qty.
1	LM5055-**	Control / Display Board	1
2	CA1075	Interface Cable	1
3	NA0503-05	Nameplate Bezel Cover	1

Note: The actual part numbers used may vary from unit to unit, please have your units serial number available when contacting Customer Service to ensure the proper parts are supplied.

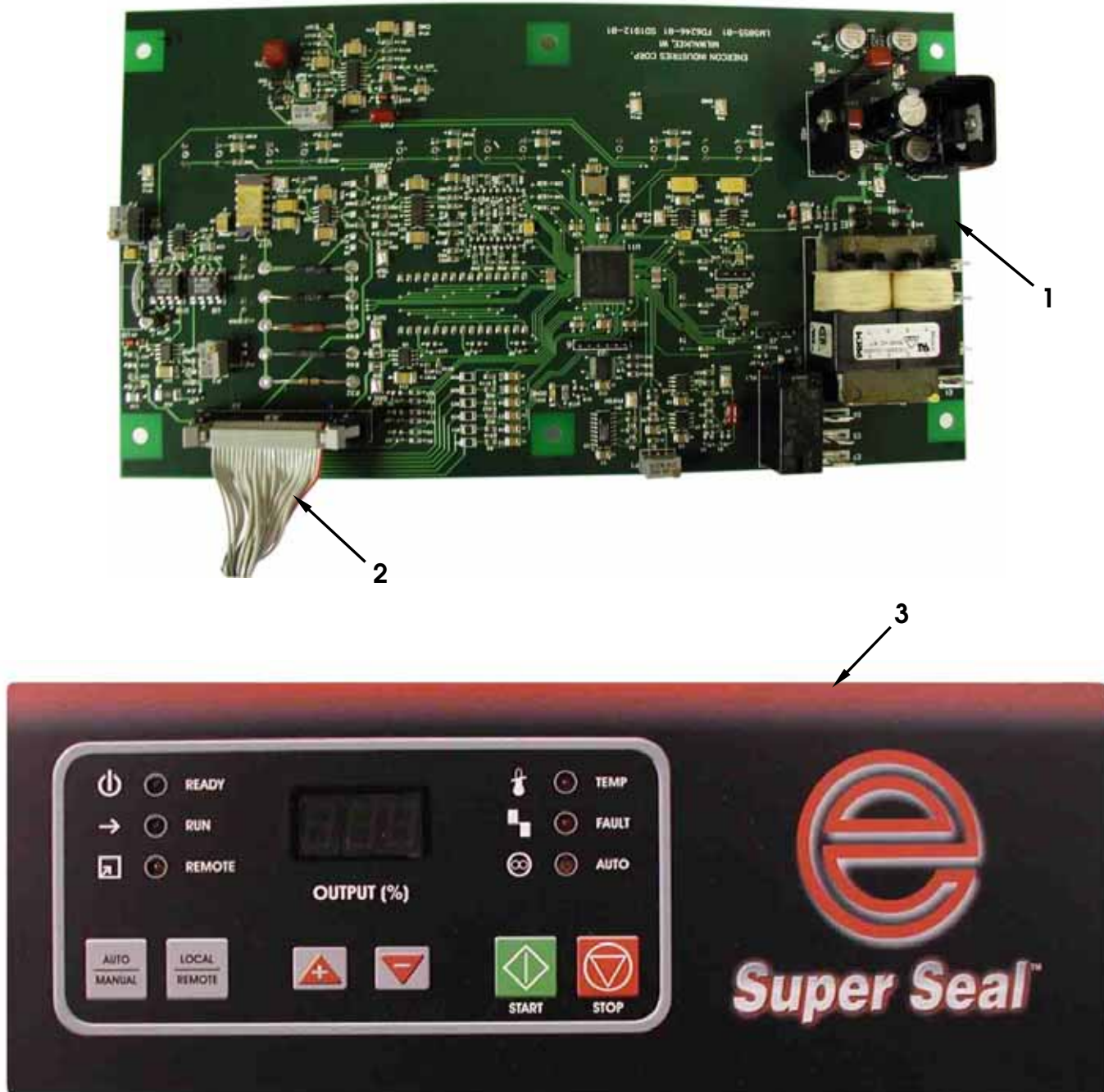


Figure 48

OPTIONAL STALLED BOTTLE SENSOR PARTS BREAKDOWN

Item #	Part #	Description	Qty.
1	LM4098-02	Stalled Bottle Sensor	1
2	FD4657-03	Stalled Bottle Detector Mounting Bracket	1
3	N/A	Lock Washer (Part of Item 1)	1
4	N/A	Lock Nut (Part of Item 1)	1
5	FD4657-01	Sensor Bracket Holder	1
6	MS010-32P0500S-0	Slot Round Head #10 – 32 x 1/2" Stainless Steel	2
7	MS010-32P1000S-0	Slot Round Head #10 – 32 x 1" Stainless Steel	2
8	WA1550	Lock Washer #10 Stainless Steel	2

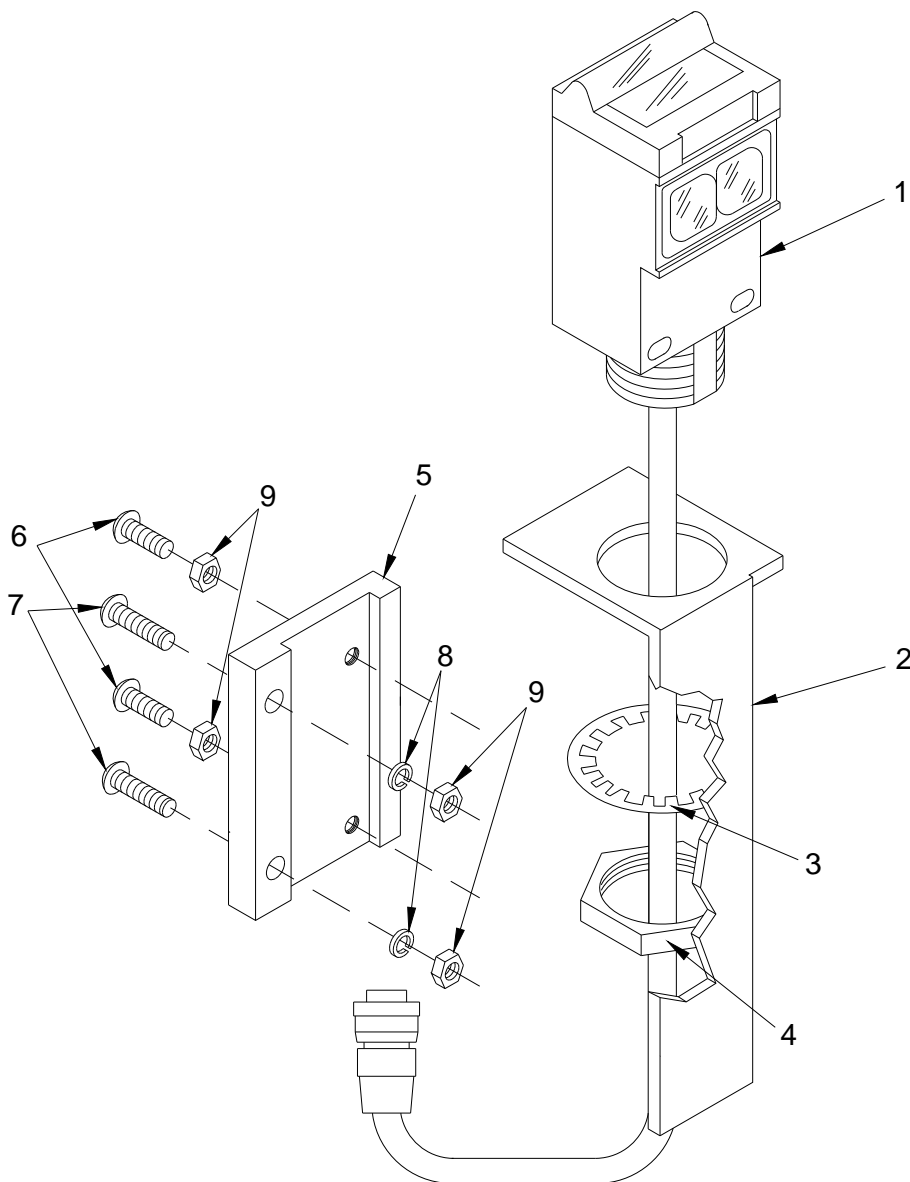


Figure 49

OPTIONAL FOIL LINER DETECTOR PARTS BREAKDOWN

Item #	Part #	Description	Qty.
1	FD4785-06	Cross Bracket	1
1A	FD4785-07	Cross Bracket (Used With '1' Coil)	1
2	FD5361-23	Angle for Sensor	1
3	FD4767-04	Mounting Bracket – Foil Sensor (Inverted When Used With '1" Coil)	1
4	FD4202-06	Mounting Bracket – Beam Sensor	1
5	LM4098-01	Foil Sensor Assembly	1
6	NU1061	Acorn Nut	4
7	MS010-32P0500S-0	Slot Round Head #10 – 32 x 1/2" Stainless Steel	2
8	MS010-32P1000S-0	Slot Round Head #10 – 32 x 1" Stainless Steel	2
9	WA1550	Lock Washer #10 Stainless Steel	8
10	WA4050	Washer #10 Stainless Steel	8
11	MM080-125H020S-0	Hex Head Screw M9 x 20mm	2
12	WA1630	M8 Lock Washer Stainless Steel	4
13	WA4090	M8 Flat Washer Stainless Steel	2
14	MM080-125S016S-0	Socket Head Screw M8 – 16 Stainless Steel	2
15	LM4074-04	Foil Detector Contact Cable	1

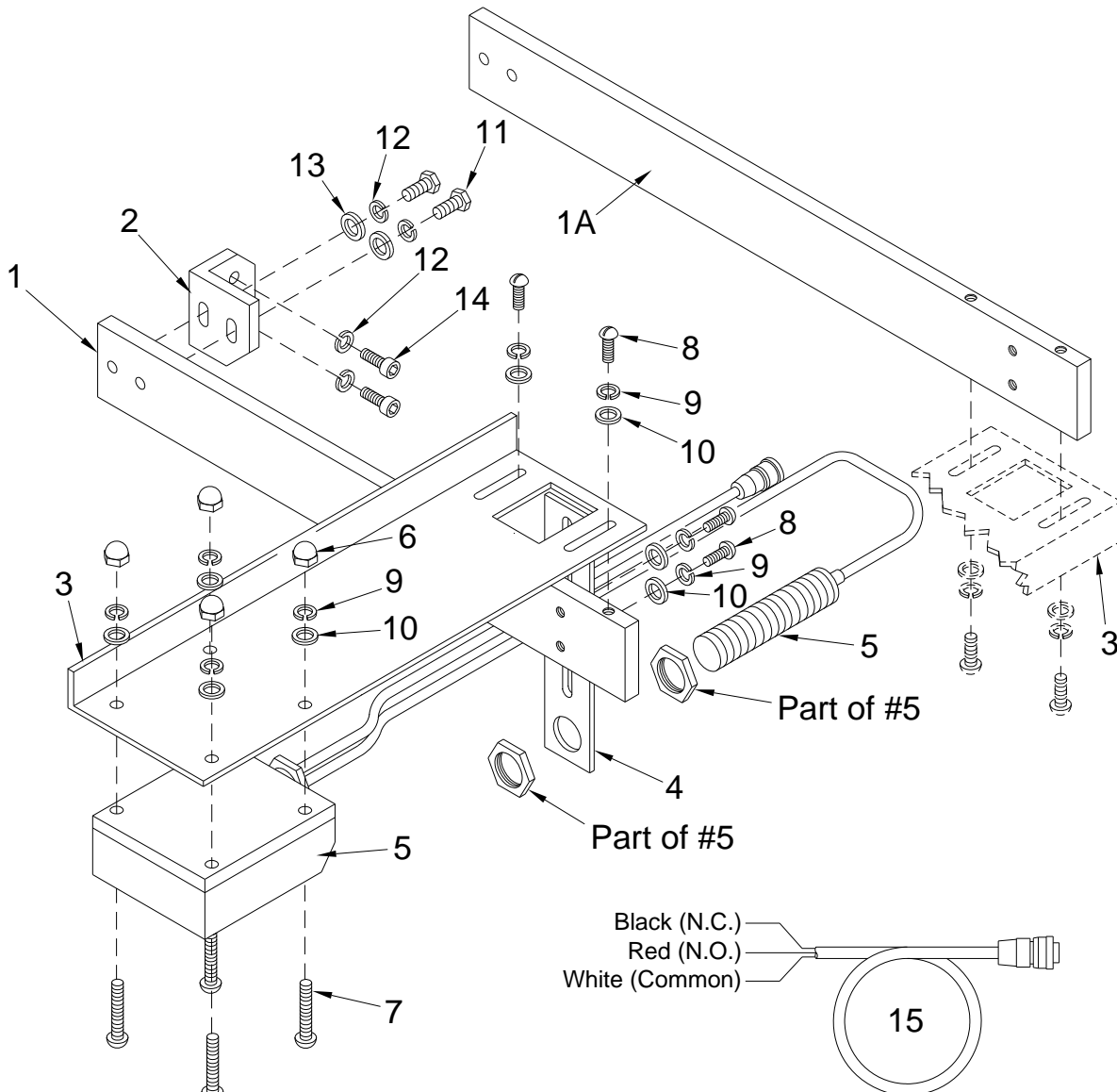


Figure 50

OPTIONAL STACK LIGHT PARTS BREAKDOWN

ITEM #	PART NO.	DESCRIPTION	QTY
1	LT0151	Light Bulb – 24V	2
2	LT0150	Red Lens	1
3	--	Gasket (Included with Item 2)	1
4	LT0144	Green Lens	1
5	--	Gasket (Included with Item 4)	1
6	LT0145	Light Base and Cover	1
7	LT0215	Mounting Tulip w/Mounting Tube – 100 mm	1
8	--	Tulip Gasket (Included with Item 7)	1
9	FD5447-01	Spacer – Stack Light	1
10	CD0512	Cord Grip	1
11	LM4074-23	Cable w/Connector	1
12	FD5215-05	Bracket – Crank Mount	1
13	MM080-125S016S-0	M8 x 16 Stainless Socket Head Screws	2
14	FD5063-01	M8 x 1.25P Nut Flat	2
15	MM050-080S050S-0	M5 x 0.8P x 50mm Long - Socket Head Cap Screw - Stainless Steel	4

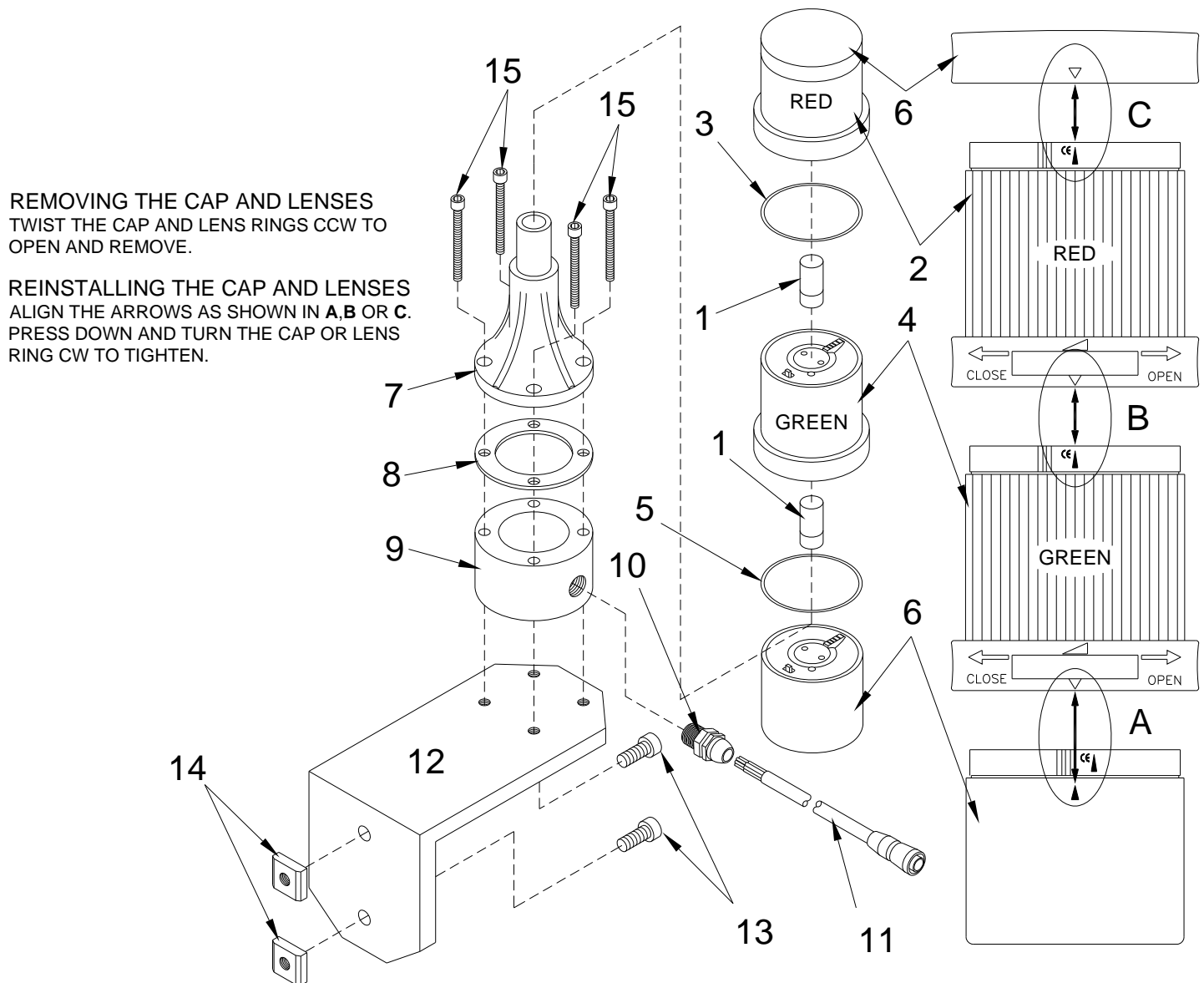


Figure 51

OPTIONAL MOBILE CART PARTS BREAKDOWN

Item #	Part #	Description	Qty.
1	LM4186-02	Screw Adjustable Mount Assembly (Less Mobile Cart Assembly)	1
2	FD5298-02	Mobile Cart Frame	1
3	CT0038	Caster, 4" (101.6mm) With Brake	4
4	HW0278	Leveling Pad	4
5	NU3132	Stainless Hex Nut – ½ x 13	4
6	NU0010	Tapped Flat	9
7	MM080-125S016S-0	M8 x 16 MM Long Socket Head Cap Screw	7
8	WA1600	Stainless Lock Washer – 5/16	7
9	PG0001	Poly Hole Plug – 2" (50.8mm) Square	4
--	LM3997-03	Mobile Cart Assembly (Less Screw Adjustable Mount)	--

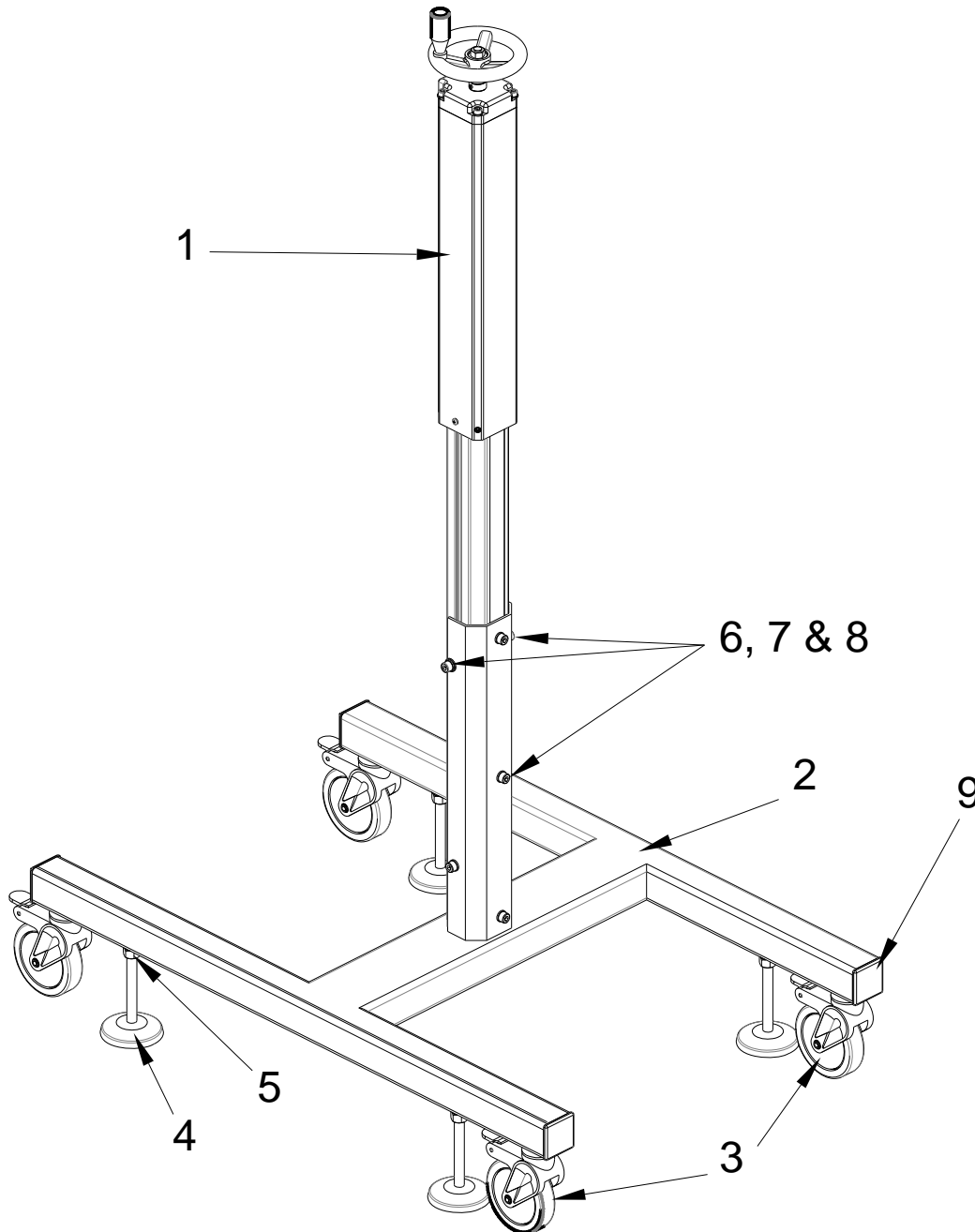


Figure 52

SECTION 8 – MISCELLANEOUS

MAINTENANCE RECORD			
Date	Issues Found	Corrective Action Required	Performed By

MAINTENANCE RECORD

Date	Issues Found	Corrective Action Required	Performed By

PRODUCTION INFORMATION

Product	Cap / Liner	Container	Gap	Line Speed	Adj. LSI Setpoint	Min. %	Max. %

