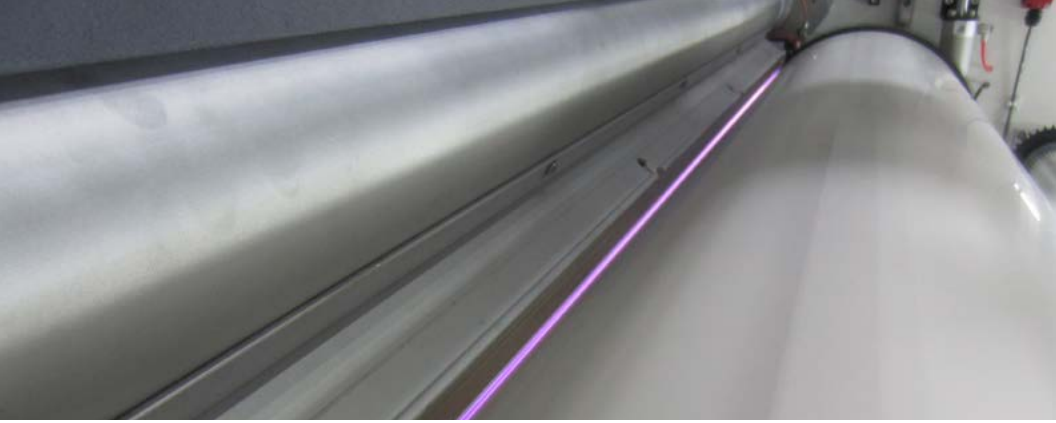
Surface Treating Handbook

APPLICATIONS | MAINTENANCE | PARTS



Our experts are here to help you find an answer.

Enercon's team of applicaton & technical support engineers are ready to answer your questions.

Have an issue and need to talk with someone immediately? Enercon offers 24/7 support to our customers. Please be prepared with your system's serial number and call us at +1.262.255.6070 and one of our support engineers will assist you.

Visit our support site for help or create a support case.
https://enerconindustries.my.site.com/helpcenter/s/

Enercon Manufactures Several Types of Electrodes!

Before you replace the electrodes in your Enercon corona treater make sure you have the correct style. Installing any electrode other than the one specifically designed and manufactured by Enercon for your system can lead to improper treatment and/or system damage! Contact Enercon Customer Service if you have any questions.

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Looking for a complete parts breakdown? Scan the QR code to the left to download the full PDF.

Ordering / Returning Parts

The information on this page is provided to answer some of the more frequent questions we receive when our customers contact us for replacements parts or to return parts or equipment.

Use the breakdown diagrams in this Handbook, as well as the diagrams in your Enercon equipment manuals to determine the names and part numbers of the components you need to replace.

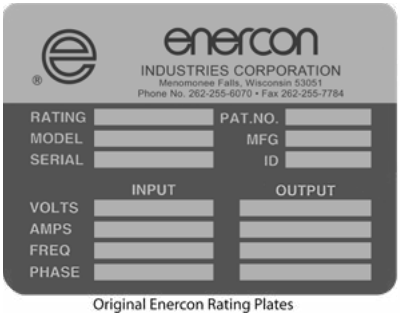
The model number and serial number of your equipment will help us determine if the part numbers you find here are accurate for your equipment, or if an older / newer part number is required.

To order replacement parts, call (262) 250-3140. For your convenience, Fax Order Forms are also available upon request.

For technical assistance or troubleshooting tips call (262) 255-6070.

When ordering parts, please specify the following:

1. The model number of the equipment as shown on the rating plate.
2. The serial number of the equipment as shown on the rating plate.
3. The part number as shown in the parts breakdown drawings and tables and the quantity needed.



Original Enercon Rating Plates

Current Enercon Rating Plates

When returning parts, please do the following:

1. Ensure you request and receive a **Return Material Authorization (RMA)** for parts or equipment being returned for repair or credit.
2. Write the **RMA** CLEARLY on the outside of all packaging and all associated paperwork.

Enercon Customer Service Department

Phone Numbers:
Parts - (262) 250-3140
Technical Assistance - (262) 255-6070
Fax Number: (262) 255-7784

Parts E-mail: parts@enerconmail.com
Service E-Mail: service@enerconmail.com
Website: www.enerconind.com

24hr Customer Service is available

For a complete parts breakdown visit the link in the QR code.

Service Options

Start Up Made Easy
Enercon has in place a discounted Start Up service for our customers with brand new equipment who are unfamiliar with the installation and operation of surface treating equipment.

As part of the service, an experienced Enercon Field Service Engineer will review your treater installation, making sure that everything has been done correctly. Or, if you prefer, the Field Service Engineer can supervise your installation of the surface treating system.

Once your surface treating system is up and running, the Service Engineer will provide hands on training for your operators, as well as routine care and trouble shooting for your maintenance personnel.

Preventive Maintenance
Routine Preventive Maintenance is at the heart of every successful manufacturing operation. Over the years, our experience has shown that an aggressive preventive maintenance program is the best insurance against downtime and scrap. Solid periodic maintenance will also prolong the life of your equipment. We have in place a preventive maintenance program, our PMV service, which is designed to give you that insurance.

For customers who have signed up for this service, we will supply, at a discounted rate, a Field Service Engineer who will review all of your Enercon equipment. In addition to insuring that your Enercon surface treating systems are tuned up and performing correctly, our Engineer will provide hands-on training for your operators and maintenance personnel. He will also identify critical spare parts, which should be a part of your maintenance inventory, and help you refine your ongoing maintenance program.

Field Service
In conjunction with our Start Up and PMV services, Enercon also provides emergency field service that gets consistently high ratings from our customers in the converting and extruding industries. When a problem cannot be resolved by your maintenance department, we will provide a Field Service Engineer to come to your plant and properly diagnose your equipment.

With extensive hands-on experience and direct access to our Engineering Department, our Engineer will be able to ensure that the problem you are experiencing is resolved. They will also be able to determine if anything else in the system may require repair.

Contacting Customer Service
In addition to the Start Up, Preventive Maintenance and Field Service options, Enercon also provides outstanding phone support to answer your questions on the application and troubleshooting of your equipment. For any of these services, you can contact Enercon's Service Team either by phone at (262) 255-6070, or e-mail at service@enerconmail.com, 24 hours/day.

NOTE:
When contacting customer service, please specify the equipment model number and serial number as displayed on the equipment rating plate(s). Refer to Ordering / Returning Parts for rating plate details.

Laboratory Equipment & Capabilities

Enercon offers complimentary lab trials to help you determine if corona, plasma or flame treating is best for your application.

Equipment:

Unwind and Rewind Stands
Treater Stations (Corona, Atmospheric Plasma and Flame)
Narrow Web Stations (Corona and Atmospheric Plasma)
Power Supplies
Sheet Treater

Capabilities & Requirements

Line Handling Capabilities

Line Speed:	10-800 fpm (3-244 mpm)
Treatment:	1 or 2 Sides
Distance Unwind & Rewind	75 feet (23 meters)

Wide Web Sample Requirements

Core Diameters:	3" or 6" (75-150mm)
Maximum Roll Diameter:	30 inches (760mm)
Maximum Roll Width:	60 inches (1500mm)
Minimum Thread Length Required:	75 feet (23 meters)
Thickness:	Up to 0.1000" (2.5mm)
Minimum Sample Length Required:	1000 ft. minimum (300 meters)

Narrow Web Sample Requirements

Core Diameters:	3" (75mm)
Maximum Roll Diameter:	18 inches (457mm)
Maximum Roll Width – Corona Station:	22 inches (559mm)
Maximum Roll Width – P3 Atmospheric Plasma Station:	17 inches (432mm)
Minimum Thread Length Required:	15 feet (23 meters)
Thickness:	Up to 0.1000" (2.5mm)
Minimum Sample Length Required:	100 ft. minimum (2.54 meters)

Sheet Treating Sample Requirements

Hand Sheet Size:	Consult Enercon.
Minimum Hand Sheets Required:	25 sheets.

Accessory Equipment:

Ion Systems Anti-Static System
Watt Density Controller
Nip Roll Capability

Testing Capabilities:

Contact Angle Test
Dyne Level Test
Peel Testing

Testing Equipment:

Krüss Contact Angle Meter – Used to perform contact angle measurement test.
Thwing-Albert 180º Friction / Peel Tester – Used to perform ink adhesion / peel test.
ASTM Dyne Solutions – Used to perform dyne level tests.
Enercon Dyne Pens – Used to perform dyne level tests.

Safety Inspection

Safety Checks	Requirements
Safety Labels	Verify that all Enercon safety labels are in place and readable. If customer has installed their own covers anywhere in the system ensure they are labeled with an appropriate Safety Label.
High Voltage Covers	Verify that all High Voltage covers were securely in place upon arrival and that each removable cover has a High Voltage Danger label in place. If removed for inspection / testing ensure they are reinstalled properly.
Remote High Voltage Transformer HV Wireways	Verify that the wireways from remotely mounted High Voltage Transformers are secure and meet the requirements specified in the system manuals and drawing lists. Verify customer has installed appropriate Safety Labels on all covers and access points.
Remote & Local High Voltage Transformer(s) Grounded	Verify that all High Voltage transformers have an Earth ground wire securely attached to the ground stud on the transformer body. All Remote HV Transformer grounds must be at the same ground potential as the station and power supply grounds.
High Voltage Wiring	Verify that all high voltage wiring within the station plenum, or remote high voltage transformers, has a minimum physical clearance of 1" (25mm) from all other wiring and conductive surfaces within Enercon enclosures, or 2" within Non-Enercon enclosures.
System Grounds and Ground Brushes	Verify that the Station Frame, Power Supply, and all optional equipment have their own Earth ground wires securely attached to appropriate ground points, and that the station Ground Brush is making good contact with the end of the roll or the roll shaft. System grounds must all be at the same ground potential with each other and any remote high voltage transformer grounds.
Interconnection Wiring	Verify that all interconnection wiring is the correct wire type and gauge as noted in the system's connection diagram. Also verify that high frequency output wiring is routed as noted in the system's connection diagram.
Electrode Assy Shroud	Inspect electrode shroud for severe damage or missing components. Verify that the outer edges of the shroud are no greater than the factory default settings from the roll face.
Electrode Position Interlock(s)	The electrode position interlock(s) stops the power supply when any electrode assembly is rotated out of the treat position. With all other interlocks satisfied, open each assembly, one at a time, and verify that the power supply does not start.
Zero Speed Interlock(s)	The zero speed interlock(s) stops the power supply when the ground roll slows or stops. With the ground roll idle, or only one roll turning on a two roll system, verify that the power supply does not start. Repeat this test with the 2nd roll when required.
Air Flow Interlock(s)	The air flow interlock(s) stops the power supply when the blower is turned off. With the blower off, or only one running on a 2 blower system, verify that the power supply does not start. Repeat this test with the 2nd blower when required.
Optional Equipment Interlock(s)	Some system options, such as High Voltage Switching, include interlocks that are connected to your power supply. Refer to the Optional Equipment Section of your power supply manual and perform the interlock tests called out for any options that are included with your system.
Customer Installed Interlock(s)	If installed, test all customer interlocks to verify that they stop the power supply, or prevent it from starting when the interlock condition is not satisfied. If not installed, remove the jumper to test the interlock circuit.

Maintenance

Production Information

Material	Gap	kW Out	Prod. Speed	Min/Max. Speed	WD	Prop Speed/Power

Maintenance List

Station

Weekly Checks

Electrode Assembly Gap
Ground Roll / Bearings / Ground Brush Inspection
Test Pneumatics (If Applicable)
Check / Adjust Electrode Air Gap

Monthly Checks

Check Station and Optional Interlocks
Inspect / Lubricate Roll Bearings

Quarterly Checks

Inspect Internal Conditions in Station Plenums

Power Supply

Weeky Checks

Power Supply Cabinet / Cooling Fans
External and Internal connections

Monthly Checks

Check Power Supply and Optional Interlocks
Test Options and Inventory Spare Parts

Quarterly Checks

Inspect Internal Conditions of Power Supply Cabinet

Note: Ensure that all maintenance is performed in accordance with the appropriate manuals and recorded in the manual's Maintenance Record tables.

Why do I need corona treating and how does it work?

Corona treating increases the surface energy of plastic films, foils and paper to improve wettability and adhesion of inks, coatings and adhesives. Treating works best when a substrate is treated at the time of extrusion and in-line prior to converting. Corona treating increases quality and productivity through improved print quality, faster press speeds and less scrap.

Why do I need it?
Polymer films have chemically inert and non-porous surfaces with low surface tensions causing them to be non-receptive to bonding with substrates, printing inks, coatings, and adhesives.

Pretreated films, that is films that have been surface treated at the time they were produced, exhibit a higher surface energy that is crucial to producing quality printed, coated or laminated products.

Film that is not treated at the time of production will not accept printing, coating or lamination well. The opposite is not always true. Even if film is treated at the time of production, it will not always guarantee that printing, coating or laminating will be easily accomplished at any future time.

Each film type has an inherent surface energy (dyne level) that can be increased through corona treatment at the time of production. This level of treatment diminishes over time. So, film that can be easily printed and coated immediately after production can, within a few days or weeks, lose sufficient surface energy to become unprintable and uncoatable.

Since it's nearly impossible to guarantee that the film you receive will be converted within the required time limit, retreating in-line is often a necessity. It's important to note that treating in-line cannot replace primary treatment at the time of production. In fact many films, especially polyolefins (Polyethylene and Polypropylene) are almost untreatable when they set after production.

To ensure consistent quality, use films that have been treated at the time of production and retreat in-line. In order to make a product that is of acceptable quality to the converter and to the end customer, the substrate must be corona treated twice: at the time of production & prior to converting.

How does it work?
A corona treating system is designed to increase the surface energy of plastic films, foils and paper in order to allow improved wettability and adhesion of inks, coatings and adhesives. As a result, the materials treated will demonstrate improved printing and coating quality, and stronger lamination strength.

A corona treating system consists of two major components: the power supply and the treater station.

The power supply accepts standard 50/60 Hz utility electrical power and converts it into single phase, higher frequency (nominally 10 to 30 kHz) power that is supplied to the treater station.

The treater station applies this power to the surface of the material, through an air gap, via a pair of electrodes at high potential and roll at ground potential which supports the material. Only the side of the material facing the high potential electrode should show an increase in surface tension. (If treatment is applied to the other side of the material it is
referred to as backside treatment.)

A corona treating system in its simplest form can be portrayed as a capacitor. Voltage is applied to the top plate which, in the case of a corona treating system, would be the electrode. The dielectric portion of the capacitor would be made up of some type of roll covering, air, and substrate in the corona treater.

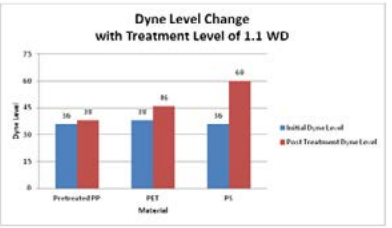
The final component, or bottom plate, takes the form of an electrically grounded roll. In the corona treating system, the voltage buildup ionizes the air in the air gap, creating a corona, which will increase the surface tension of the substrate passing over the electrically grounded roll.

Why All Films Don't Treat the Same

To understand why all films don't treat the same we must first understand what a corona treater actually does. Although it has the capacity to make films wettable for converting, it is not an all powerful black box that magically transforms all film types equally.

A corona treater is essentially a capacitor that creates a field of ionized air without regard for the type of film that is passing through it. Corona does a number of things to a surface. It forms low molecular weight material on the film surface, it oxidizes the film surface, and forms positive and negative sites by adding and deleting electrons. It also rids the film of organic and inorganic contaminants that can interfere with adhesion. We also know from ESM imaging techniques that corona treatment can microscopically change and increase the surface area of films which increases the chances for successful adhesion.

The most common way to measure the effectiveness of treatment is to take a dyne level reading which measures the surface energy of the film. Generally speaking higher dyne levels are better for adhesion, and higher levels of corona treatment produce higher dyne levels. However, all films start out at a different dyne level, have an inherent responsiveness to corona treatment, and often have a multitude of additives that migrate to its surface which impedes adhesion. An example of these variations are shown in the graph to the right.



Document your treating recipes

To manage these variations in fil It is up to your operation to establish and document how incremental levels of treatment affect the ultimate success of your adhesion goals. For surface treating think in terms of the following: material specification (material supplier, age of film, storage conditions of film etc…) line speed, watt density or kW setting, air gap, web width, initial dyne level, & post treatment dyne level. Additionally, look at your recipe for success with your post treatment converting operation.

Corona Treater Profile		
Date:	**Line:**	**Job #:**
Application & Treater Information		
Record specific information about the treater and line being used in this application.		
Manufacturer Serial Number:		
Treat Width:		
Line Speed:		
Kilowatt Setting:		
Watt Density:		
Measured Input Voltage:		
Treating 1 or 2 sides:		
Material & Supplier:		
Application:		
Measure of Treatment Effectiveness:		
Electrode & Roll Cleaning Schedule: **(i.e. once a week, once a month...)**		

Watt Density

Enercon's Surface Treating Systems are available with Watt Density Control either as a standard or optional mode of operation. Below is information on how to calculate and verify the Watt Density for your system.

Calculating Watt Density

The Watt Density setpoint represents the watts per square foot required to treat a specific product, and is calculated using the following formulas:

Imperial Units:

$$\textbf{WD} = \frac{\text{Watts}}{\text{[Treat width (Feet) X Line Speed (FPM) X Number of Sides Treated]}}$$

Metric Units:

$$\textbf{WD} = \frac{\text{Watts}}{\text{[Treat width (Meters) X Line Speed (MPM) X Number of Sides Treated]}}$$

This number normally ranges from 1 to 3 in English Units, or 10 to 30 in Metric Units, but it may be higher at times for some difficult films or special customer request.

Watt Density Verification

Under certain conditions, the calculated Watt Density number may not give you the treatment results you are expecting. Keep in mind that the calculated Watt Density number is a starting point when determining your watt density requirements and could require adjustment up or down.

Before you begin to make adjustments to the WD Setpoint, you should verify if the system is interpreting the Watt Density number correctly. Using the currently entered Watt Density number, the output power level can be calculated by using the following formulas:

Imperial Units:

Power = [Watt Density Number X Treat Width (Feet) X Current Line Speed (FPM) X Number of Sides Treated]

Metric Units:

Power = [Watt Density Number X Treat Width (Meters) X Current Line Speed (MPM) X Number of Sides Treated]

If the Actual KW does not match the calculated output power level ensure that the units of measure and system parameters are entered properly.

If the Actual KW is correct then you may need to increase or decrease the WD Setpoint in small increments until you achieve the treatment results you are expecting for your product.

NOTE:

Your system may include variables, such as adjustable treat width electrodes or non standard materials, which will need to be taken into consideration when calculating the Watt Density. Please contact Customer Service if you are unfamiliar with the use of Watt Density Control.

Proportional Speed & Power

Enercon's Surface Treating Systems are available with Proportional Speed Control either as a standard or optional mode of operation. Proportional Speed Control produces a control signal that will increase or decrease the output of the power supply proportional to your line speed. The ratio between line speed and output power is fixed by the Proportional Speed Mode settings. Below is a generic description of how to program Proportional Speed for your system.

In Proportional Speed Mode you will need to enter the line speed and proportional output power level that best fits your production requirements. These values are then used to determine the speed/power ratio used by the system.

Example:
In this example we will assume that you have a 5kW power supply and a maximum line speed of 500 fpm. We will also assume that your typical production line speed is 250 fpm, and that you get the best treatment results with an output power level of 2.5kW at that speed.

In this scenario, you would use 250 fpm as the speed setting, and 2.5kW as the power setting.

When you are running production, the system monitors the actual line speed being sent from the station encoder or speed sensor, and then using the speed/power ratio the power supply automatically adjusts the output power level to stay proportional to the actual line speed.

If your line speed is below 250 fpm, the output power level will be below 2.5kW.

If your line speed is at 250 fpm, the output power level will be 2.5kW.

If your line speed is above 250 fpm, the output power level will be above 2.5kW.

NOTES:
Regardless of your proportional speed and power settings the maximum output power level will still be limited to the maximum output power rating of your power supply.

Proportional speed and proportional power are only available together on the Compak™ 2000 Deluxe and Touchscreen power supplies, and the Compak™ 9000 Touchscreen power supplies.

Testing Methods For Surface Tension

Non-porous substrates need to have their surface ener¬gies increased for use in a number of packaging applications. There are two commonly accepted methods for determining the surface tension level of a treated substrate. These methods are dyne solution testing and contact angle testing. The following is a brief description of each of these methods.

Dyne Solution Testing

The generally accepted solution to verify dyne levels or surface energy is a mixture of Ethyl Cellosolve and Formamide (Dyne Solution). This solution contains a dye to make it eas¬ier to see. When using these wetting tension solutions, all safety precautions as listed on the labels should be observed. These solutions also have a shelf life of only around six months, so they should be properly dated at time of initial use and replaced when the expiration date has been reached. If this isn't done, false dyne information could result, along with a rejection of treated material by the customer.

There are three methods that are generally used to check the surface energy of a substrate using Ethyl Cellosolve and Formamide (Dyne Solution). They are the cotton-swab applicator method, the dyne-pen method, and the draw-down test method. All three of these methods can be performed at the production line, allowing a real time measurement of surface tensions.

Contact Angle Testing

This is a method of measuring the surface tension of a non-porous substrate using a contact angle tester (Kruss Device) and a drop of water. In this test a drop of water is placed on the substrate and measured by projecting the drop onto a background chart and measuring the angle on the chart. Due to the variety of manufacturers of contact angle testing equipment, each manufacturer's testing procedure should be followed on their equipment. Due to the equipment involved, this test is usually performed in a lab environment. Peel tests may be conducted to measure peel strength.

Both of these testing methods are accurate, but they do not translate to each other directly. In other words, a specific contact angle does not equal a specific dyne level. These tests should each be performed as a stand alone test and not as a comparison against each other.

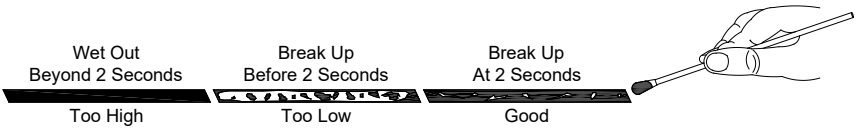
Enercon Dyne Pens are available for purchase on-line.

Application Methods For Dyne Solutions

For all of the application methods listed below Dyne Solutions of various levels are placed on the substrate until a solution is found that wets out properly.

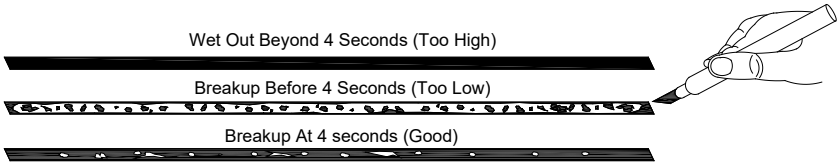
The Cotton Applicator Method:

Place a few drops of a calibrated Dyne Solution onto the tip of a clean cotton applicator, or lightly immerse the applicator tip into the Dyne Solution container. Be aware that if a clean applicator is not used contamination of the solution may result. The solution is spread lightly over approximately one square inch of the test material. Compare your results with the results shown below. Repeat the procedure until a solution is found that breaks up properly on the surface of the material. This method has been a standard for years but is still somewhat subjective and inconsistent because of the variables involved in the application of the fluid to the substrate.



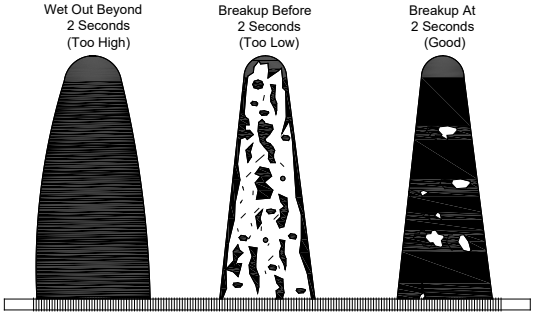
The Dyne-Pen Method:

This method is typically used by the operator as a quick check of the treat level of a substrate. The Pens, resembling felt-tip markers, are pulled across the entire web in a straight line. Compare your results with the results shown below. Repeat the procedure until a solution is found that breaks up properly on the surface of the material. This method can also quickly determine which side is treated or if there is any back-side treatment. This method can be somewhat subjective and inconsistent mainly due to the possible contamination of the pen tip with incorrect use.



The Draw-Down Test Method:

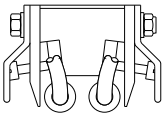
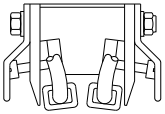
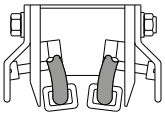
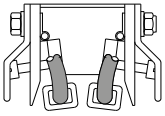
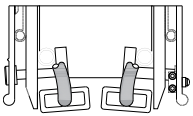
This is the most accurate of the surface-energy mea¬surement tests. Cut a substrate sample, approximately 8 ½ x 11 inches, and clamp it to a clipboard. Horizontally across the top of the sample place single drops of three different level dyne solutions that brack¬et the desired treat level. A wire wound metering rod is placed just above the drops and pulled down. The tester will look for the proper breakup results of all 3 as described previously. This test tends to be more accurate because the metering rod lays the solutions down at the same relative thickness. The rod must be thoroughly cleaned after each use to ensure accuracy of this application method.



Enercon Ceramic Electrodes Best Practices

Enercon ceramic electrodes are configured as part of an integrated system including your power supply, ground roll and exhaust system. Operating the corona treater without the correct type, size and length of electrodes properly installed and active in each electrode assembly will lead to improper treatment and prematurely failed electrodes.

Use the chart below to verify the type of electrode included with your system.

Power Capacity low to high	Electrode Shape Not to scale	Wire Color Look for the name for genuine Enercon electrodes	Shroud
Round	 tabbed	 white	
V	 tabbed	 white	
PV	 tabbed	 purple	
EV	 continuous backbone	 purple	 reversed
E^2	 continuous backbone	 purple	

Use only genuine Enercon electrodes.

White wire

AWM STYLE 3239 150C 40KVDC VW-1 ROWE IND 16 AWG enercon

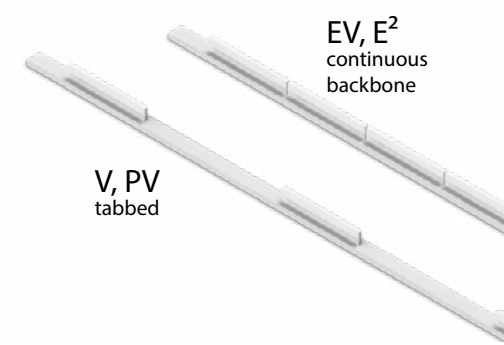
Standard Electrodes - Standard Applications

Purple wire

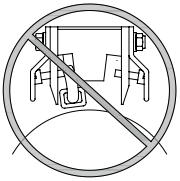
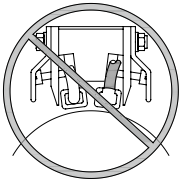
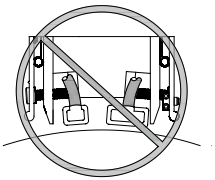
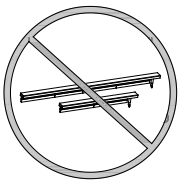
AWM STYLE 3239 150C 40KVDC VW-1 ROWE IND 16 AWG enercon

"PV" Electrodes - High Power Applications

Enercon electrodes manufactured prior to 2010 appear as above without the Enercon logo.



Problems Associated with Improper Ceramic Electrode Usage

Unauthorized	Scenario	Result	Reason
	Damaged electrode removed to continue operation.	Premature failure and stress on the remaining electrodes.	Overpower - Power rating of remaining electrode is exceeded. Overheat - Proper exhaust cooling air pattern is disrupted.
	Electrodes with different power ratings, are mixed into a treater station.	Premature failure of either style of electrode.	Overpower - Power rating of either electrode can be exceeded due to a power imbalance. PV electrodes designed to handle high power levels. V electrodes, or 3rd party electrodes have a lower power rating.
	Enercon with different shapes (or styles) are mixed into a treater station.	Premature failure of either style of electrode.	Overpower - Power rating of either electrode can be exceeded due to a power imbalance. Overheat - Proper exhaust cooling air pattern is disrupted.
	Shorter electrodes are mixed into a treater station.	Premature failure of existing proper length electrode, or shorter length electrode	Overpower - Power rating of either electrode can be exceeded due to a power imbalance. Overpower - Power rating of remaining electrodes is exceeded.

⚠WARNING!

Enercon never recommends replacing our electrodes with a 3rd party product due to inconsistencies in design, manufacturing techniques, and materials used. Enercon uses only the highest quality components and consistent, repeatable manufacturing techniques in the design and production of our electrodes.

Electrode Air Gap Adjustment and Alignment Procedure

Air Gap Adjustment and Electrode Alignment

1. Lock Out and Tag-Out your system. Wait 2 minutes to allow voltages to discharge before attempting to work on the system.
2. Verify the air gap is even across the entire length of the electrodes by inserting a .060" (1.5mm), or desired thickness, flexible feeler gauge between the electrode and ground roll along the electrode length **(Figure 1)**. Do not slide the feeler gauge across the face of the ground roll as this may scratch the roll surface.
3. If the air gap is either too loose or too tight, loosen the end plate bolts on each end of the electrode assembly to adjust the air gap **(Figure 1)**.
4. For a loose gap, turn the adjustment bolt CCW until the electrode comes in contact with feeler gauge.
5. For a tight gap, turn the air gap adjustment bolt CW until the gauge fits into the gap. Perform Steps 4 and 5 on both ends of the assembly.
6. Once the gap is set, tighten the end plate bolts on each side of the electrode assembly.
7. If there is an uneven gap between electrodes, adjust the electrode assembly stop bolt to achieve an even air gap between each electrode and the ground roll **(Figure 2)**.
8. If necessary, loosen the interlock ring set screws and rotate the ring so that the V-notch aligns with the position switch roller when the assembly is in the treat position **(Figure 3)**. Retighten the set screws.

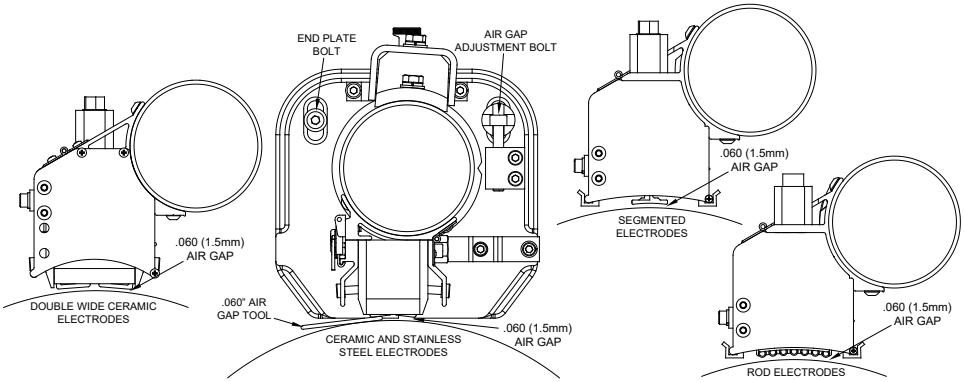


Figure 1

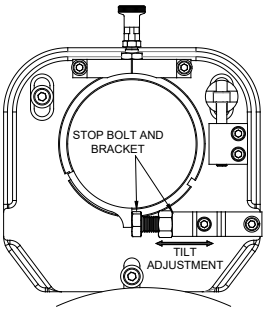


Figure 2

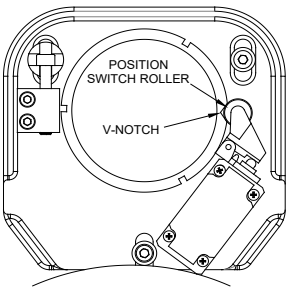


Figure 3

Electrode Assembly Inspection and Cleaning

Turn off, disconnect, and lock out main input voltage and compressed air to the power supply and station. Wait for 2 minutes to ensure all voltages are safely discharged.

Rotate each electrode assembly into its maintenance position and engage the locking pin to secure the assembly, **Figure 1.**

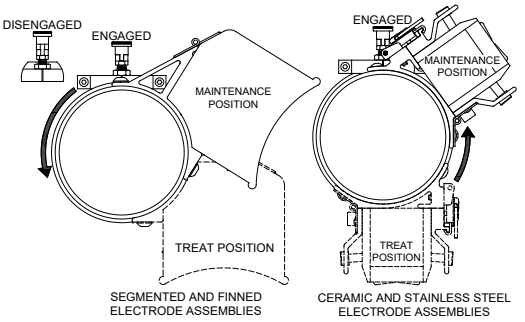


Figure 1

Open the assembly(s) by releasing the captive screws or twist latches and inspect the cooling air ports, insulating shroud, HV wires and the various electrode mounting components, **Figure 2.**

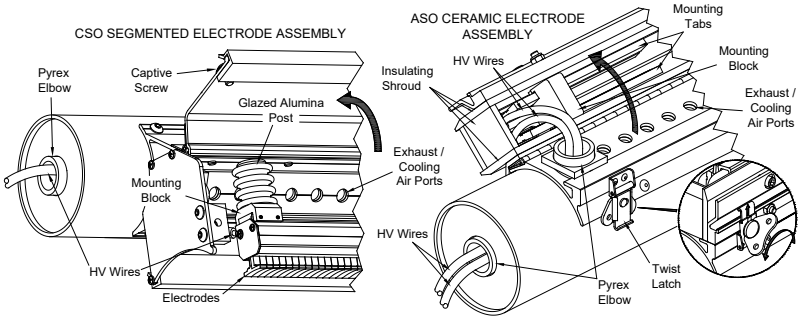


Figure 2

General Cleaning: Clean the assemblies by blowing them out with compressed air and/or a vacuum. Wipe down the shrouds, Pyrex elbow, mounting blocks, electrodes (including tabs and HV wires) and other surrounding components with isopropyl alcohol and a lint-free cloth.

Extensive Cleaning: If your electrode assembly(s) shows signs of air port blockage, excessive dirt buildup, HV arcing, or carbon tracking you will need to perform a more extensive cleaning of the assembly(s). Use a bore style stiff bristled brush to clear the exhaust / cooling air ports. Use a standard stiff bristled brush for any hard to remove contaminates on the exhaust tube surface, **Figure 3.**

Scrub any stubborn buildup from the shrouds, Pyrex elbow, mounting blocks, electrodes (including tabs and HV wires) and other surrounding components with isopropyl alcohol and a Scotch Brite™ pad, then wipe down these components and wipe down the surfaces with isopropyl alcohol and a lint free cloth.

If any severe damage was discovered while cleaning your assembly(s), refer to the Maintenance Section of your station manual for details on cleaning and repairing the components within your assembly(s).

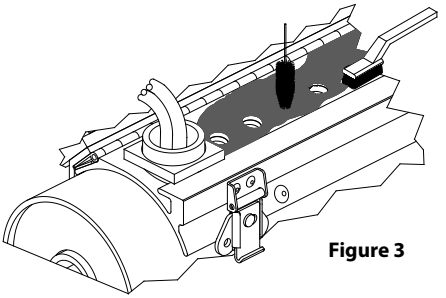
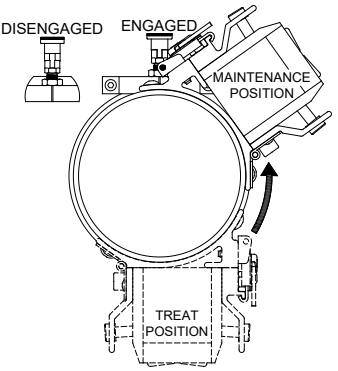


Figure 3

Ceramic and Stainless Steel Electrode Removal

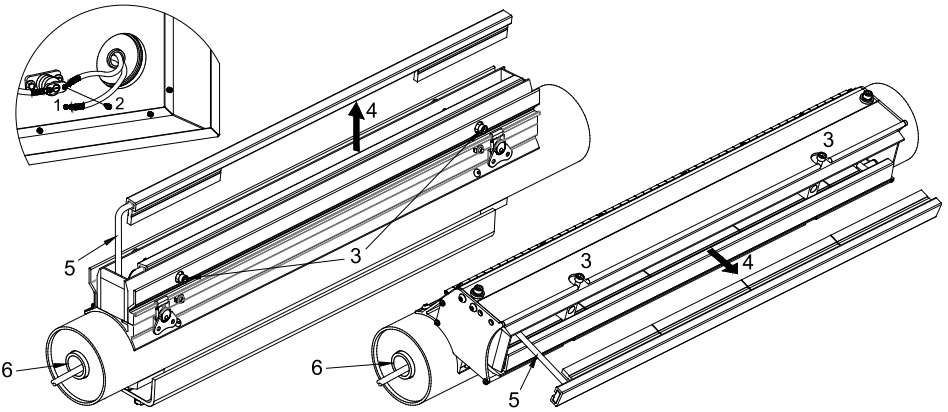
At some point you may need to remove an electrode(s) for cleaning, repair, or replacement. Use the following steps to remove the electrodes from each assembly.



CERAMIC AND STAINLESS STEEL ELECTRODE ASSEMBLIES

Removal Procedure

1. Lock Out and Tag-Out your system. Wait 2 minutes to allow voltages to discharge before attempting to remove and electrode.
2. Rotate the electrode assembly into the Maintenance position and engage the locking pin to lock it in place.
3. Remove the access cover on the High Voltage end of the station to gain access to the HV Terminal Block within the enclosure.
4. Remove the affected electrode's HV wire (1) from the HV terminal block (2).
5. Loosen all of the electrode mounting screws (3) along the full length of your electrode assembly.



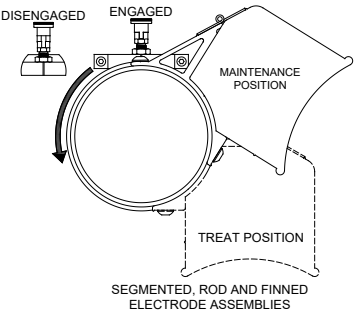
6. Carefully lift the electrode up and out (4) of the assembly, taking care to gently pull the HV wire (1) free of the Pyrex tube. If needed, repeat this for the remaining electrode.

Reinstallation Procedure

1. Ensure the electrode assembly is still in the maintenance position (See Removal Step 2 if needed) and that your system is still Locked Out and Tagged Out.
2. Reinstall the electrode by carefully placing the electrode (5) into the assembly, aligning the electrode mounting tabs into the electrode mounting blocks. Ensure the electrode mounting tabs are fully inserted into the assembly mounting blocks and aligned the electrode within the assembly.
3. Tighten the electrode mounting screws (3) and torque them to 3 in-lbs. (34 N-cm). Ensure that there is no movement of the electrode once it is installed.
4. Carefully feed the HV wire (1) through the Pyrex elbow and into the station enclosure and reconnect the HV wire to the HV terminal block (2). Ensure the screw is tight and that the HV wire does not move on the terminal block.
5. Reinstall the access cover onto the station enclosure. Disengage the locking pin and rotate the electrode assembly back into the treat position. Do Not lock assembly in treat position.

Segmented, Rod and Finned Electrode Removal

At some point you may need to remove an electrode(s) for cleaning, repair, or replacement. Use the following steps to remove the electrodes from each assembly.

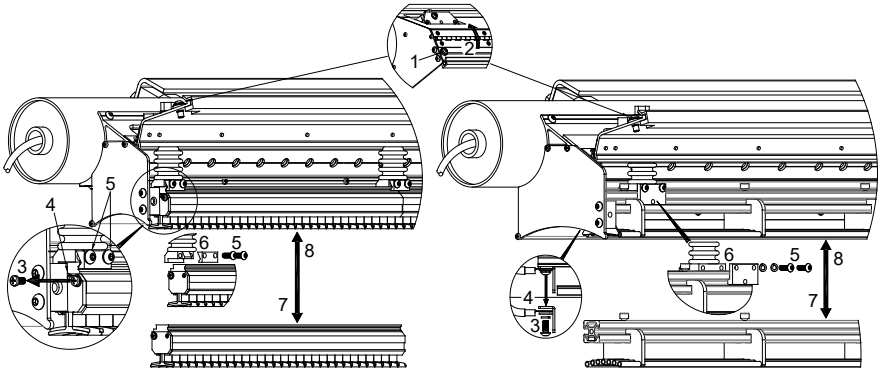


SEGMENTED, ROD AND FINNED ELECTRODE ASSEMBLIES

Note: Finned Electrode Removal is similar to Rod Electrode Removal, refer to your manual.

Removal Procedure

1. Lock Out and Tag-Out your system. Wait 2 minutes to allow voltages to discharge before attempting to remove electrode(s).
2. Rotate the electrode assembly into the Maintenance position and engage the locking pin.
3. Disengage the captive screws (**1**) on both ends of the assembly and lift the shroud out of the way (**2**).
4. Remove the screw (3) and HV wire (**4**) from the end of the assembly.
5. For segmented electrodes, firmly support the electrode and loosen the screws (5) and clamp block (6) for the electrode being removed. For rod electrodes, firmly support the full length of the electrode and loosen the screws (**5**) and clamp block (**6**) along the full electrode length.



6. Keeping a firm grasp on the electrode, pull the electrode clear of the clamp blocks.
7. Once the electrode is clear of the clamp block, lower it away from the assembly (**7**) taking care not to allow the electrode to come into contact with the ground roll.

Reinstallation Procedure

1. Ensure the electrode assembly is still in the maintenance position and that your system is still Locked Out and Tagged Out.
2. Keeping a firm grip on the electrode, lift the electrode (**8**) into the clamp blocks (**6**), reassemble the blocks and snug the hardware but do not tighten it at this point (**5** & **6**).
3. Ensure the electrode extrusion is fully inserted into the assembly mounting blocks and align the electrode within the assembly.
4. Tighten the hardware and ensure that there is no movement of the electrode within the assembly.
5. Reconnect the HV wire (**4**) using the previously removed screw (**3**). Ensure the screw is tight and that the HV wire does not move on the block.
6. Close the shroud (**2**) and reengage the captive screws (**1**) at both ends.
7. Disengage the locking pin and rotate the electrode assembly back into the treat position. Do Not lock assembly in treat position.

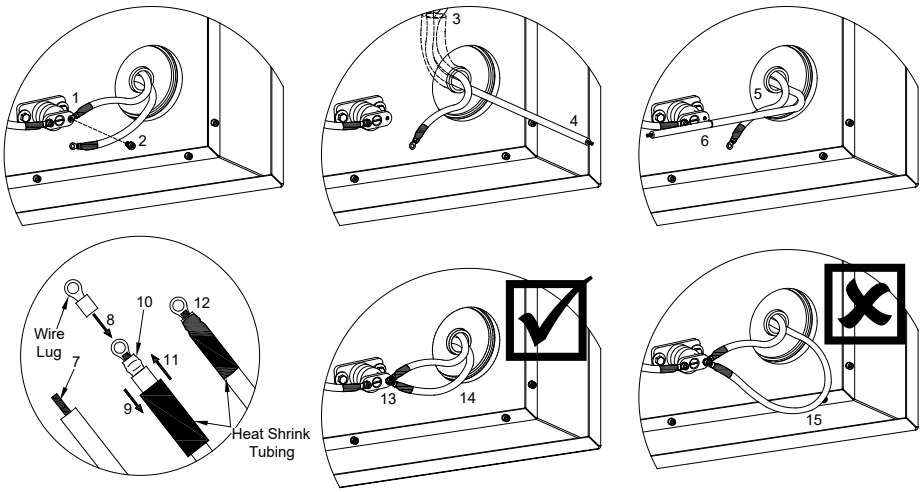
Proper Termination of High Voltage Wire

When installing a new electrode, or replacing the HV wire on a segmented or finned electrode assembly, you will need to ensure that the HV wire is the proper length, correctly terminated and connected. In many cases the electrode HV Wire will be cut to the proper length and terminated when it is built. If the HV wire on your electrode was not terminated in this manner, use the following procedure to properly shorten and terminate the HV wire.

1. Lock Out and Tag-Out your system. Wait 2 minutes to allow voltages to discharge before attempting to work on the system.
2. You will need to rotate the assembly into its maintenance position, refer to pages 16 & 17.
3. Disconnect the HV wire (**1**) of the damaged/old electrode from the HV terminal block (**2**), and remove the electrode, refer to electrode removal on page 16.
4. Install the new electrode and carefully route the HV wire through the Pyrex elbow (**3**) ensuring the full length of the HV wire is fed through the elbow (**4**).
5. For both Ceramic and Stainless Steel electrodes, unlatch and open the electrode shroud to ensure you do not cut the HV wires too short.
6. Route the HV wire to the HV terminal block ensuring the wire run is as short as possible (**5**) but with enough slack to allow it to be connected properly.

NOTE:
High voltage wiring must be kept clear of control wiring, surrounding metal and grounded surfaces by a minimum of 1" (25.4mm) within an Enercon enclosure, or 2" (50.8mm) within a 3rd party enclosure.

7. Align the HV wire over the screw hole on the terminal block (**6**) and cut the wire to this length.
8. Terminate the HV wire using an appropriate sized wire lug and a short length of heat shrink tubing. Strip approximately 3/8" of insulation from the end of the HV wire (**7**) and install the lug (**8**) and shrink tubing (**9**) onto the wire. Securely crimp the wire lug (**10**) and slide the shrink tubing over the lug (**11**) and shrink it into place using a heat gun (**12**).
9. Connect the HV wires to the terminal (**13**) ensuring wire does not move on the terminal block, then close and latch the electrode shroud and check that there is not too much slack in the HV wire (**14**). If too much slack is left in the HV wire, or if you do not shorten the HV wire (**15**), the wire will be prone to arcing to the metal in the station and will most likely fail in a short amount of time.



Ground Roll Inspection and Cleaning

Enercon produces 3 main types of corona treating stations; Bare Roll – Metal Ground Roll w/Ceramic Electrodes, Universal Roll – Conductive Covered Roll w/Ceramic Electrodes, and Covered Roll – Non-Conductive Covered Ground Roll w/Metal Electrodes. In each of these configurations, the ground roll provides the support for your substrate and completes the circuit for the high voltage on the electrodes that ionizes the air which results in the corona discharge that treats your substrate as it passes over the ground roll and through the corona.

If contaminates are allowed to buildup on the face of your ground roll they can have adverse affects upon the proper treatment of your substrate. The most common issue is backside treatment, resulting in inconsistent treatment across your web, but over time it can also deteriorate the roll face of a covered ground roll, resulting in poor treatment and possibly even failure of the coating.

Inspection (All Stations)
A weekly visual inspection of your station, in particular the ground roll and its components, is a good practice and will help to identify any build-up of contaminates on the roll and any signs of deterioration of roll coverings. Lock Out and Tag-Out your system. Wait 2 minutes to allow voltages to discharge before attempting to work on the system. Clean the ground roll in accordance with the appropriate instructions listed below.

Cleaning Of Bare Rolls

Aluminum
1. General Cleaning – mild soap and water.
2. Removal of Oxidation – Isopropyl alcohol and a Scotch-Brite™ pad.
3. Do not use caustic solutions.

Electroless Nickel Plating
1. General Cleaning – Any non-caustic cleaner can be used.
2. Remove Oxidation – Any commercial silver cleaner/tarnish remover.

Cleaning Of Universal Rolls
Do Not Use: 1, 1, 1 Trichloroethane, (MEK's) or xylene and similar products.

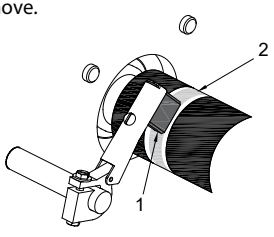
Ceramic Roll – General Cleaning
1. For light dust and dirt, use water, a mild soap and a clean cloth.
2. For grease and oil, use Simple Green™ liquid all-purpose cleaner. It is water-based, contains no petroleum, and is non-flammable.
3. For tougher stains, mix a liquid ceramic cleaner and powdered kitchen cleanser (like Comet™) into a paste and scrub with a Scotch-Brite™ pad. Then wipe the surface clean with isopropyl alcohol.

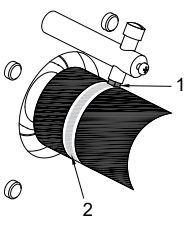
Electroless Nickel Plating
4. **Do Not Use:** Strong acidic solutions such as HCL acid and sulfuric acid or any cleaning mechanism using metal, conductive material, or power tools of any kind.

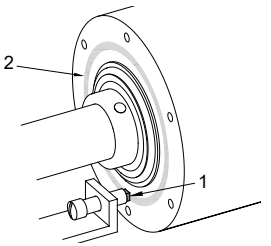
Hypalon Roll – General cleaning
Use: Soap and water or alcohol (methanol, methyl alcohol).

Silicone Roll – General Cleaning
Use: Mild soap and water.

Also ensure that the bearings are in good shape and turning freely. Clean and lubricate the bearings as needed. Inspect the ground brush and ensure it is making good contact (1) with the shaft or end of the roll. The carbon ground brush will wear over time and will leave a mark along the path of the brush (2), clean the wear mark using isopropyl alcohol and a lint free cloth, or a Scotch-Brite™ pad if the carbon mark is difficult to remove.





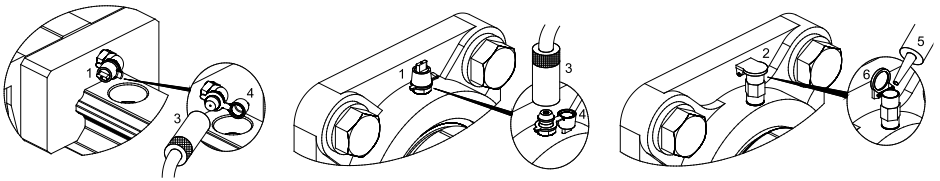


Bearing Lubrication

All station roll and guide bearings are prelubricated and should not require lubrication prior to initial operation.

NOTE: The following information does **not** apply to sealed bearings, or any bearings that do not include a zerk fitting or oil cup.

Zerk fittings [**1**] include a colored protective cap that indicates the type of lubricant required, but oil cups [**2**] have no special markings.



Grease Bearing Lubrication

Due to the location of some fittings, we recommend you use a grease gun with a flexible hose and the appropriately sized nozzle [**3**]. Open the protective cap [**4**], connect the nozzle to the fitting and add grease to the bearing.

Clean any excess grease from the zerk fitting and bearing, and close the protective cap on the fitting. Grease bearing lubrication will be identical for both roller and guide bearings that have a zerk fitting.

NOTE: An NLGI 2 lubricant may be substituted for an NLGI 3 lubricant as long as the Base Properties match. Do **not** over fill bearings, as excess lubrication may affect a bearings free spinning characteristics.

Oil Bearing Lubrication

Due to the location and size of most oil cups, we recommend you use a syringe or small plastic bottle [**5**]. The protective cap on the oil bearings is typically spring loaded, and you will need to hold the cap open [**6**] while adding oil a few drops at a time.

Bearing Lubrication Reference			
Fitting	**Lube Type**	**Grade**	**Base Properties**
Zerk w/Blue Cap	Standard Grease	NLGI 3	Lithium, Mineral
Zerk w/Red Cap	Lightweight Grease	NLGI 1	Lithium Complex
Oil Cup	Bearing or Spindle Oil	ISO VG 22	Mineral
Zerk w/Yellow Cap	Special	– –	Reference System Docs

Note: Generally, a temporary rise in operating temperature accompanies lubrication and excess lubricant will be purged at the bearing seals.

For grease lube bearings, refer to the **GREASE BEARING LUBRICATION FREQUENCY TABLE** to determine if your bearings require a modified lubrication schedule.

Bearing Lubrication Reference			
Temp °F	**Clean**	**Dirty**	**Wash Down / Extremely Dirty**
Up to 122	12 Months	6 Months	3 Months
122 to 158	6 Months	2 Months	1 Month
158 to 212	3 Months	2 Weeks	1 Week
212 to 248	6 Weeks	1 Week	3 Days
248 to 302	2 Weeks	3 Days	Daily

Lubricant Examples	
NLGI 3	Shell Gadus S2 V100 3
NLGI 1	Phillips 66 Multiplex Red
Bearing / Spindle Oil	Mobile Velocite 10 Shell Morlina 22

Oil lube bearings require more frequent monitoring and the requirements vary depending on your environment. Monitor bearing temperature regularly (180° F max) to establish the re-lube intervals specific to your operating environment.

NOTE: The supplied oil cup can be replaced with a drop feed oiler to provide regular re-lubrication as required.

Exhaust Duct Sizing Requirements

The table of recommended exhaust duct sizes is based on the following:

- Total length of duct run does not exceed specified distance (including distance from blower exit to building exit).
- Maximum number of elbows or 45° fittings indicated.
- Use of smooth wall rigid duct (non-flexible) is ideal.
- Adhering to the guidelines listed below.

	Minimum Pipe Diameter vs. Length of Exhaust Duct Run			
Exhaust Air Flow CFM (CMM)	<100' (30m) (< 6 Elbows)	<100' (30m) (6-10 Elbows)	<150' (45m) (< 10 Elbows)	<200' (60m) (<10 Elbows)
1 - 199 (.1 - 5.6)	4" (100mm)	5" (125mm)	6" (150mm)	6" (150mm)
200 - 299 (5.7 - 8.5)	5" (125mm)	6" (150mm)	6" (150mm)	8" (200mm)
300 - 499 (8.5 - 14.1)	6" (150mm)	8" (200mm)	8" (200mm)	8" (200mm)
500 - 899 (14.2 - 25.5)	8" (200mm)	10" (250mm)	10" (250mm)	10" (250mm)
900 - 1599 (25.5 - 45.3)	10" (250mm)	12" (300mm)	12" (300mm)	14" (350mm)
1600 - 2499 (45.3 - 70.8)	12" (300mm)	14" (350mm)	14" (350mm)	16" (400mm)
2500 - 3000 (70.8 - 85.0)	14" (350mm)	16" (400mm)	16" (400mm)	16" (400mm)

NOTE: *The above chart is a guideline only. Refer to qualified HVAC contractor for specific sizing and design recommendations. Customer is responsible for final duct design and installation to meet treater station exhaust requirements.*

OZONE EMISSIONS AND EXHAUST

Estimating Your Systems Ozone Emissions
To estimate the ozone emissions in pounds per hour, the following formula can be referenced:

Power Supply kW x 0.073 = Ozone in lbs./hr.*

***NOTE:**
The above formula is for estimation purposes only. Since actual ozone emissions are dependent on several other site-specific variables, field ozone measurements are REQUIRED for accurate numbers. Enercon makes no representations or warranties regarding any of the emissions characteristics for any of its products, including emissions levels of ozone or other chemicals, temperature, or moisture. Consult an environmental professional to determine how OSHA, Clean Air Act, or other legal requirements may apply to your situation.

Discharge Height Over Ground Level:
We have no specific recommendation. However, we do recommend exhausting be done through the roof.

Caution: Insure that the system exhaust discharge outlet is not located in a position where its output could be recirculated into the plant by HVAC equipment.

Maximum & Minimum Airflow:
We only specify minimum airflow (See specific airflow and water column pressure in the instructional data delivered with the specific system).

Exhaust Temperature:
Our equipment under normal operation will raise the temperature of the air taken in approximately 30° C (86° F) over ambient. Actual temperature will vary based on site-specific conditions.

Moisture Content:
Our equipment typically does not affect the moisture content of input air, therefore, the moisture content will typically be that of the plant ambient air and no more.

Exhaust Pipe Materials:
The exhaust pipes should be constructed of stainless steel, aluminum, or PVC. Do not use galvanized steel as the ozone will attack it and cause leaks within a short time.

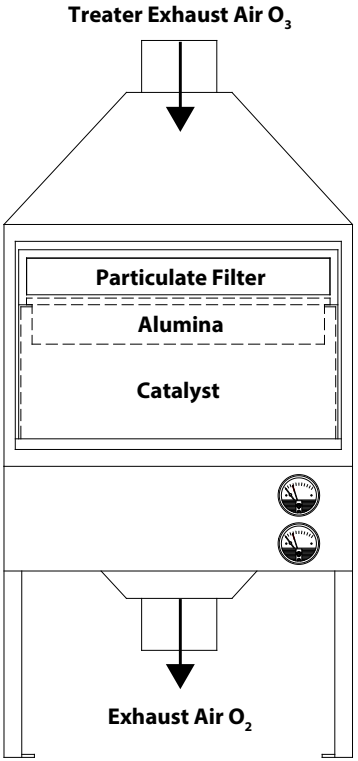
Exhaust Duct Run:
The exhaust duct run from your treater station must remain independent of all other duct runs for its entire length.

Ozone Decomposers Eliminate Ozone

All corona treaters produce ozone as a natural byproduct of the treatment process. Enercon corona treaters safely remove ozone from the work environment through the system's exhaust ducting. To ensure ozone is not released from the exhaust stream into the atmosphere, Enercon has designed Ozone Decomposers for extrusion and converting operations.

Enercon Ozone Decomposers integrate into the exhaust stream after the corona treater and before the exhaust is released into the atmosphere. The decomposer converts the captured ozone into oxygen. These systems work with all corona treater exhaust streams and are available in sizes for any application.

- Destroys ozone created from ozone generation processes
- Ensures compliance with OSHA and EPA Clean Air Act
- Permits direct release of exhaust stream to the atmosphere
- Easy integration with OEM lines



How the Decomposer will benefit your operation

- Enercon's catalytic ozone decomposer converts ozone (O3) into Oxygen (O2).
- A particle filter, pre filtered material, and metal oxide catalyst bed reduces an input ozone level of up to 150 PPM to less than the OSHA limit of 0.1 PPM at the designated flow rate.
- Systems allow direct release of the exhaust stream into the atmosphere which is in compliance of the clean air acts and laws related to ozone standards.
- Ensure operator safety by trapping gases through proper exhausting.

Technical Data:

Ozone contaminated air is input at the top of the unit and flows through the particle filter where matter and dust are removed to ensure they do not contaminate or clog the catalyst bed.

The contaminated air then passes through a pre filtered material prior to the catalyst bed for additional air stream filtration. The ozone contaminated air then moves through the bed of metal oxide pellets which converts the ozone (O3) into molecular oxygen (O2). If no other contaminant is present, the exhaust can then be vented into the atmosphere.

Ozone and other toxic gas levels must be monitored on a regular basis to confirm that no health hazards exist and to determine when the catalyst should be reactivated.

Pressure gauges indicate when it is time to replace the decomposer's filters.

Troubleshooting System Faults

This page contains brief explanations of the fault LEDs that you will find on the front panel of the Compak™ 2000 and Compak™ 2000 Deluxe Power Supplies. For more detailed information on the LEDs and what they mean, refer to your power supply manual or contact Enercon Technical Support.

Compak™ 2000

STATION INTERLOCK – 

Symptoms: The **STATION INTERLOCK LED** is lit on the membrane switch and the power supply will not start.

Possible Causes: This is typically caused by any system, customer or option interlock that is open on your treater system. Confirm that the ground roll is turning, the exhaust blower is on and the electrode assembly(s) is in the treat position. Also confirm that any customer or option interlocks are closed.

H.V. TRIP – 

Symptoms: The **H.V. TRIP** LED is lit on the membrane switch when the **START** pushbutton is pressed. It typically flashes on and off as the power supply cycles, but can be continuously lit. You may also see a bright flash at your station.

Possible Causes: This is typically caused by a high voltage arc at the station, often due to a dielectric failure or physical damage to your electrodes or ground roll. It can also be caused by arcing to ground from the high voltage wires, moisture within the station or dirt and moisture buildup within your station.

TEMP – 

Symptoms: The **TEMP** LED is lit on the membrane switch and the power supply will not start.

Possible Causes: This is typically caused by the inverter temperature exceeding 90º C caused by a dirty heat sink or failed cooling fan. Other causes: damaged sensor wiring, failed sensor or open inverter capacitor.

INVERTER FAULT – 

Symptoms: The **INVERTER FAULT** LED is lit on the membrane switch and the power supply will not start.

Possible Causes: This is typically caused by the inverter(s) failing, a control board failure, or a wiring problem between the inverter(s) and the control board.

Compak™ 2000 Deluxe

STATION INTERLOCK – 

Symptoms: Only the **STATION INTERLOCK** LED is lit on the front panel as the graphic display scrolls through a list of affected interlocks. The power supply will not start.

Possible Causes: This is typically caused by any system, customer or option interlock that is open on your treater system. Confirm that the ground roll is turning, the exhaust blower is on and the electrode assembly(s) is in the treat position. Also confirm that any customer or option interlocks are closed.

FAULT – 

Symptom #1: The **FAULT** LED is lit on the membrane switch when the **START** pushbutton is pressed. It typically flashes on and off as the power supply cycles, but will be continuously lit after the power supply cycles several times. You may also see a bright flash at your station.

Possible Causes: See the causes listed under Compak™ 2000 H.V. Trip.

Symptom #2: The **FAULT** LED is continuously lit.

Possible Causes: Record the information listed on the display screen and contact Enercon.

STATION INTERLOCK – 

& FAULT – 

Symptoms: Both the **STATION INTERLOCK** and **FAULT** LEDs are lit.

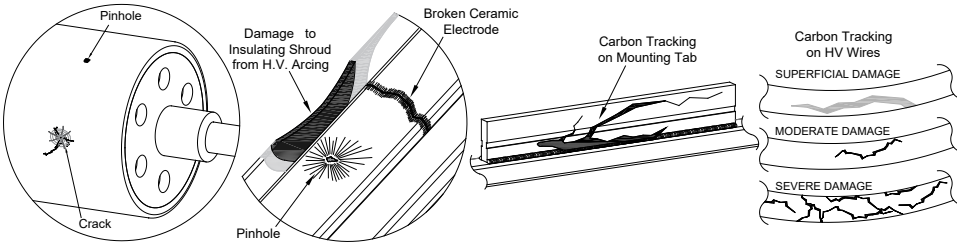
Possible Causes: This is typically caused by an interlock that opens while the power supply is running. Refer to the causes listed under **STATION INTERLOCK**.

HV Trip Troubleshooting

If your system is experiencing a H.V. Trip (GEN) the power supply will typically cycle on and off, and the trip indication on your control interface will flash on and off. If the H.V. Trip (GEN) indication is a solid display, contact customer service for troubleshooting assistance to resolve this H.V. Trip issue.

Perform the following:

1. Reduce the selected output power (kW) setpoint to minimum and attempt to restart the power supply.
   a. If the H.V. Trip occurs immediately you most likely have a failed electrode or roll covering.
   b. If the power supply does not trip, slowly raise the output power setpoint until the H.V. trip occurs or the power supply reaches its full output.
      i. If the H.V. Trip does not reoccur, you may be dealing with a moisture issue within the station that may be resolved by starting and running at minimum for a few minutes.
      ii. If the H.V. Trip reoccurs you may have a station cleanliness issue or a wiring issue resulting in H.V. arcing once the output power level reaches a level that will allow the H.V. to arc.
2. Locate the arcing within your station.
   a. Remove the access covers on the station to allow visual inspection of the H.V. plenum. Ensure the H.V. wiring is in good shape and are of the proper length, refer to Page 18.
   b. With an observer near the station, start the power supply and allow the H.V. Trip to cycle the power supply while the observer looks over the station. Do not place hands or objects within the station frame or plenum while the system is attempting to run!
   c. Whether you see flashing or not in the station, shut off the power supply and stop your product line. Lock and tag out your treater system to allow safe inspection of the station.
      i. If a flash was visible within the station or plenum, perform a visual inspection of the station or plenum in the area of the flash to determine what is causing the arc. Look for signs of dirt buildup, carbon tracking on any of the surfaces, broken or pinholed electrodes, and pinholes or cracking of the ground roll surface.
      ii. If no flash was detected, or if the exact location could not be pinpointed, you will want to do a more thorough inspection of the station frame and plenum which should include opening and inspecting the electrode assemblies.
      iii. If no evidence of arcing was found during your inspection, contact customer service.



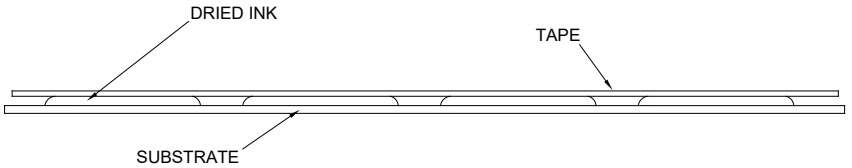
3. Clean, Repair or Replace.
   a. If the damage from the H.V. arcing is superficial, and is being caused by a buildup of dirt or debris, you will only need to clean the station and ensure that any blackening caused by the arcing is completely removed.
   b. If the damage is moderate or if the arcing is being caused by wiring that is too long or out of position you should be able to repair most of the assembly components that have moderate damage. The wiring can often be shortened, rerouted or moved back to their original position.
   c. If the damage is severe you will need to replace the damaged components.

Backside / Low Treatment Testing

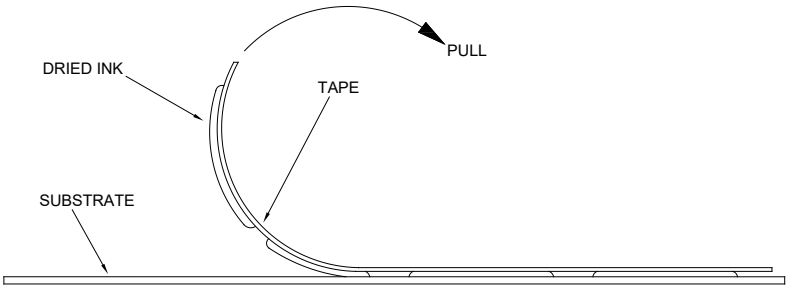
Low treatment levels often cause problems with the adhesion of inks and laminates for the entire length and width of the web. Backside treatment will often cause spotty adhesion problems occurring randomly across the entire length and width of the web.

Laminates often do not adhere to the surfaces or delaminate easily in product testing when the treatment level is low. Backside treatment can cause the final product to look spotty when delamination occurs at the point where backside treatment has occurred, often showing air pockets between the laminated layers. Visual inspection and performing a pull test of the laminated layers is often the best way to test for either of these problems.

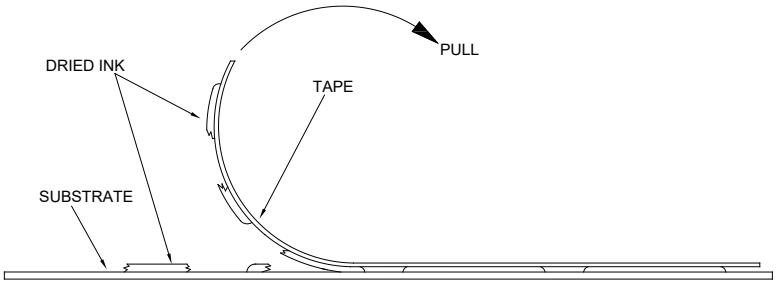
Inks can bead up during the printing process, or will pull away from the substrate after they have dried. Low treatment levels will often cause the ink to bead or pull away across the entire web, but backside treated areas will often only pull away in the spots that have been exposed to backside treatment. A pull test can aid in determining if a product has a low treatment level or has been exposed to backside treatment. This is done by placing tape across the web on top of the dried ink.



Once the tape is firmly attached across the web, pull the tape off of the substrate and observe the results of the test.



Low Treatment Level

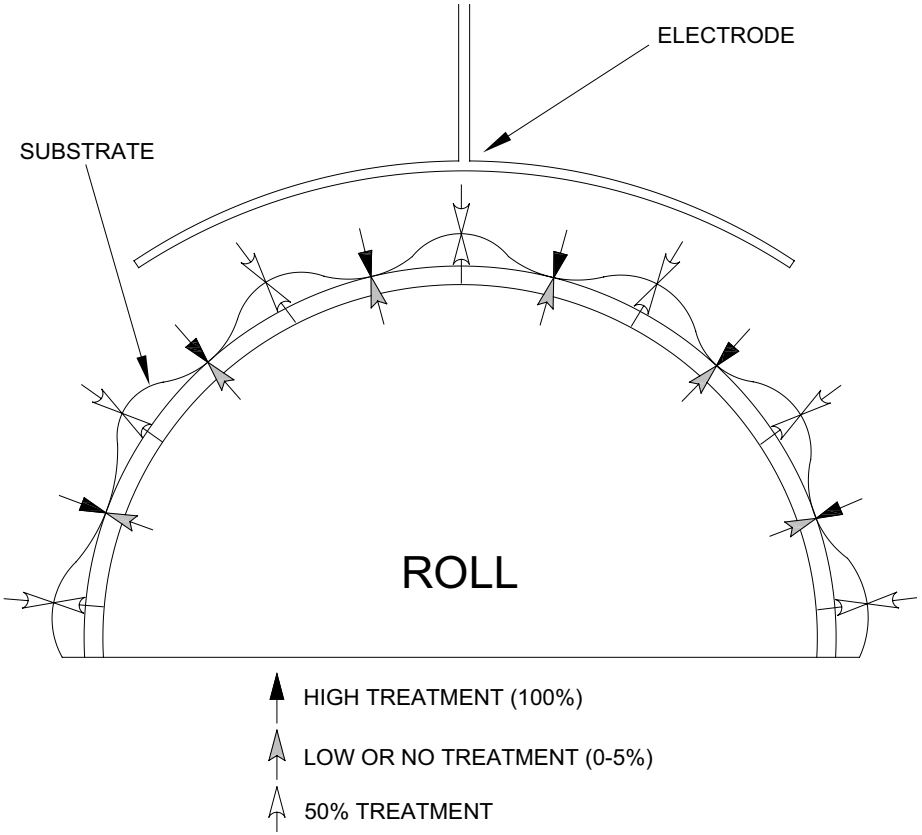


Backside Treatment

If you observe low treatment level results, increasing your output appropriately should take care of this problem. If you observe backside treatment results see page 26 for a more detailed explanation of possible causes and how to correct them. If the tape is pulled away clean then the treatment is at a good level.

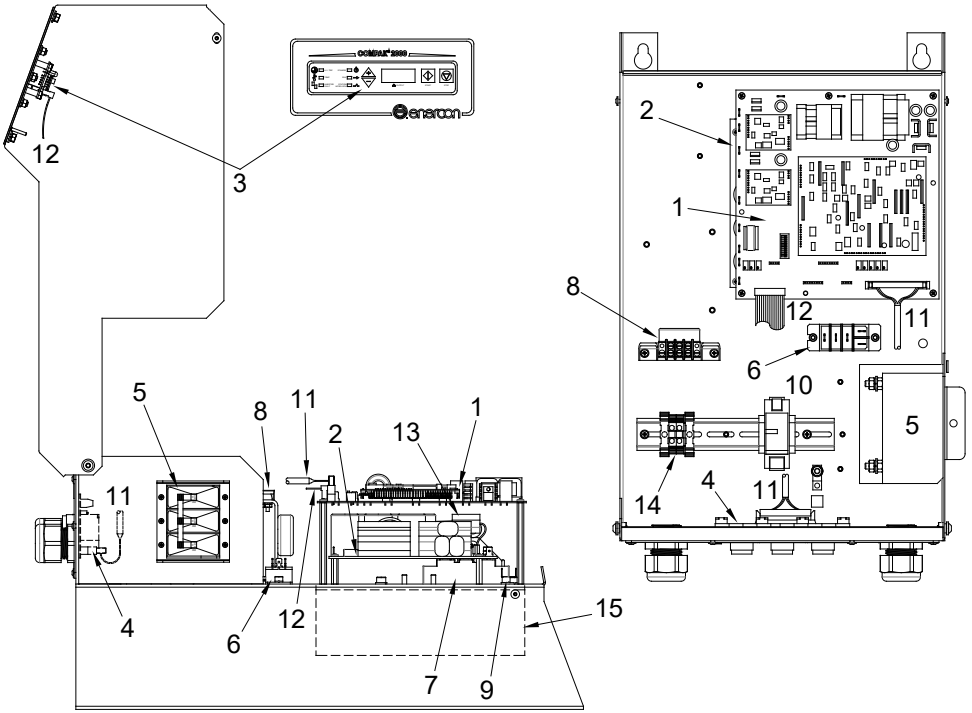
Backside Treatment Troubleshooting

Backside Treatment occurs when air is trapped between the backside of the web and the ground roll. The air beneath the web is ionized and the backside of the web is corona treated. This condition not only treats the backside of the web, but decreases the treatment to the front side of the web. Several conditions may cause air to be trapped behind the web, see the table below for troubleshooting tips.



Causes	Solutions
Wrinkles In Film	1. Nip the web on entry into the ground roll. 2. Increase the wrap of web around ground roll.
Line Speed Too Fast	1. Decrease your line speed.
Dirty Ground Roll	1. Clean the ground roll. 2. Include cleaning of the ground roll on your company's maintenance program.
Low Web Tension	1. Ensure the web is threaded properly. 2. Increase the number of idler rolls in the web path to increase web tension.

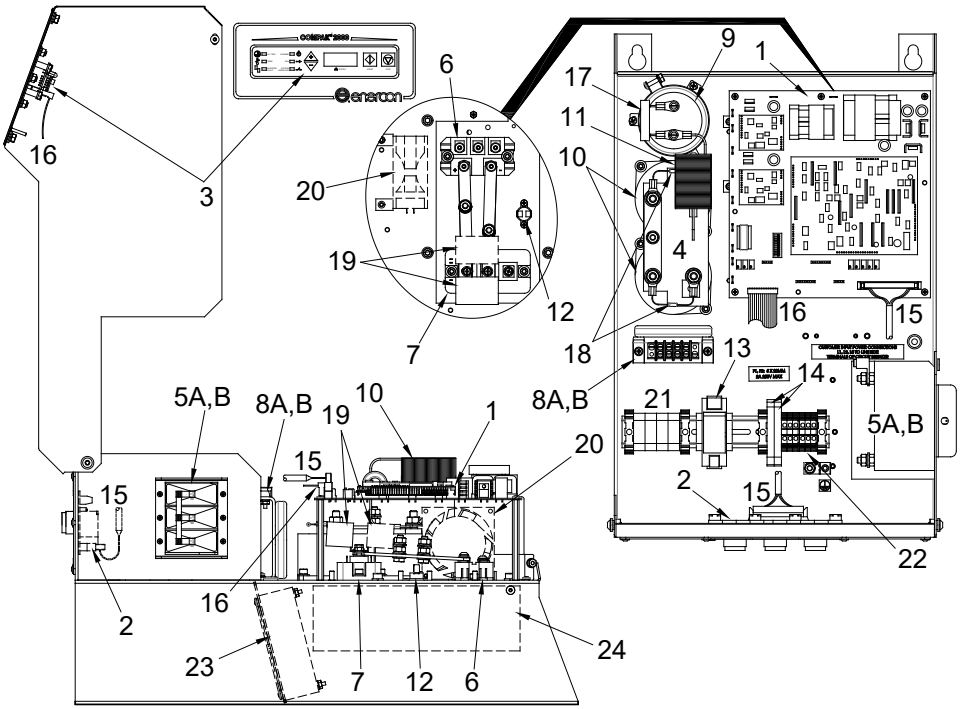
1-3 kW Compak™ 2000 Parts



Item #	Part #	Description	Qty.
1	LM4027-xx	Control Board	1
2	LM3415-xx	Power Board	1
3	LM3497-06	Membrane Assembly	1
4	LM3958-xx	Modular 2000 Treater I/O Module	1
5	CB0275	Circuit Breaker	1
6	BR0013	Rectifier	1
7	LM3589-02	Inverter Power Module	1
8	LM4167-01	Current Transformer	1
9	SE0158	Temperature Sensor Switch, TASI	1
10	EM0256	24V DC Power Supply	1
11	CA1050	Ribbon Cable (40 Pin)	1
12	CA1014	Ribbon Cable (13 Pin)	1
13	LM4041-01	Snubber Capacitor Assembly	1
14	TB0537	Output Terminal Block	2
15	FD5373-03	Power Supply Heat Sink	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

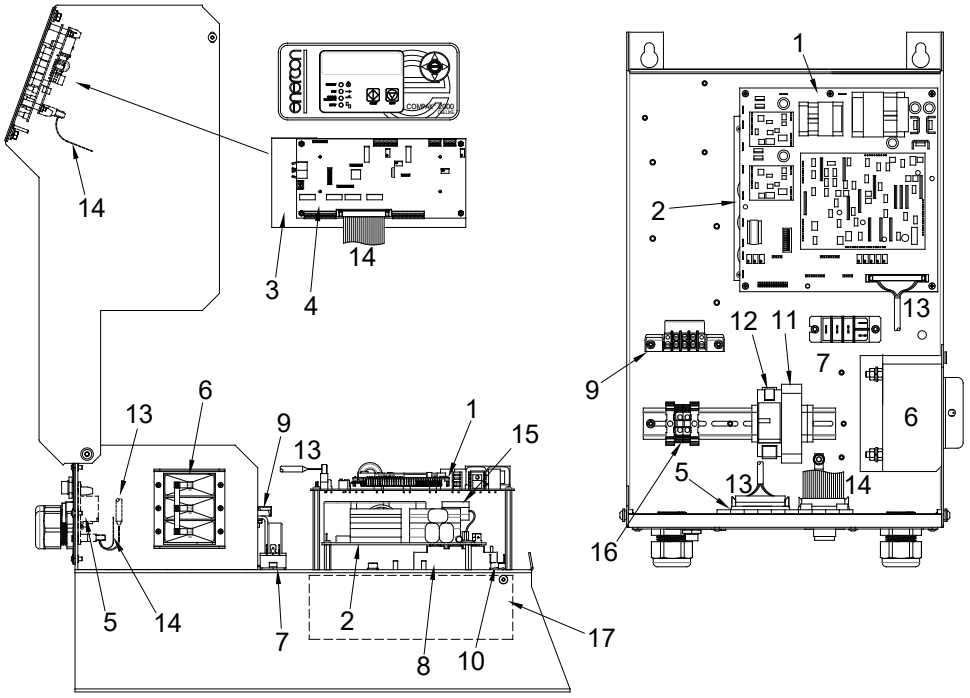
4-10 kW Compak™ 2000 Parts



Item #	Part #	Description	Qty
1	LM4027-xx	Control Board	1
2	LM3958-xx	Modular 2000 Treater I/O Module	1
3	LM3497-06	Membrane Switch Assembly	1
4	LM5756-01	Capacitor Trip Board	1
5A	CB0278	Circuit Breaker (4 - 5KW)	1
5B	CB0276	Circuit Breaker (7.5 - 10KW)	1
6	BR0015	Bridge Rectifier	1
7	LM3751-03	Inverter Power Module	1
8A	LM1982-17	Output CT – Multi-Tap (4-7.5KW)	1
8B	LM1982-33	Output CT – Multi-Tap (10KW)	1
9	CP1282	DC Bus Capacitor	1
10	CP0200	Capacitor 100uf 800 VDC	2
11	FD5339-04	Inductor Coil	1
12	SE0158	Temperature Sensor Switch, TASI	1
13	EM0256	24V DC Power Supply	1
14	TB0110	Fused Terminal Block, 250V 2 Amp	2
15	CA1050	Ribbon Cable (40 Pin)	1
16	CA1014	Ribbon Cable (13 Pin)	1
17	LM4043-02	Bleeder Resistor Assembly	1
18	RE0735	Resistor	2
19	CP0070	Snubber Capacitor	1 (4-7.5) / 2 (10)
20	FA0086	Cooling Fan (10KW Only)	1
21	TB0546	Output Terminal Blocks	4
22	– –	Terminal Blocks	Varies
23	FA0030	Cooling Fan	1
24	FD5373-03	Power Supply Heat Sink	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

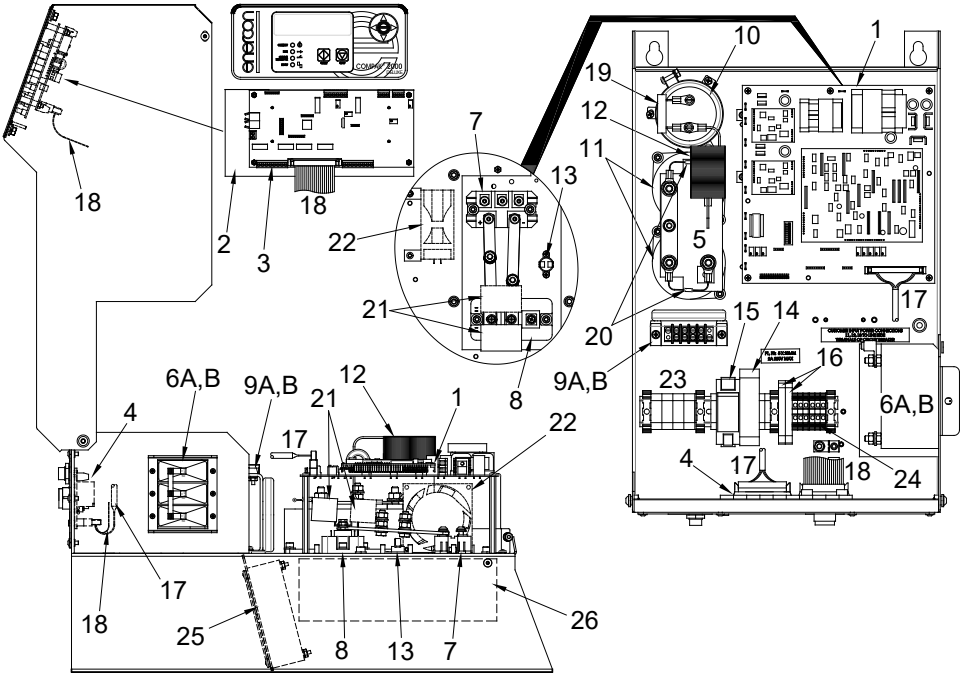
1-3 kW Compak™ 2000 Deluxe Parts



Item #	Part #	Description	Qty.
1	LM4027-xx	Control Board	1
2	LM3415-05	Power Board	1
3	LM4867-01	Keypad Board	1
4	LM4823-xx	HF Display Board	1
5	LM5095-01	Deluxe 2000 Treater I/O Module	1
6	CB0275	Circuit Breaker	1
7	BR0013	Rectifier	1
8	LM3589-02	Inverter Power Module	1
9	LM4167-01	Current Transformer	1
10	SE0158	Temperature Sensor Switch, TASI	1
11	EM0054	5V DC power Supply	1
12	EM0256	24V DC Power Supply	1
13	CA1050	Ribbon Cable (40 Pin)	1
14	CA1005	Ribbon Cable (34 Pin)	1
15	LM4041-01	Snubber Capacitor Assembly	1
16	TB0537	Output Terminal Blocks	2
17	FD5373-03	Power Supply Heat Sink	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

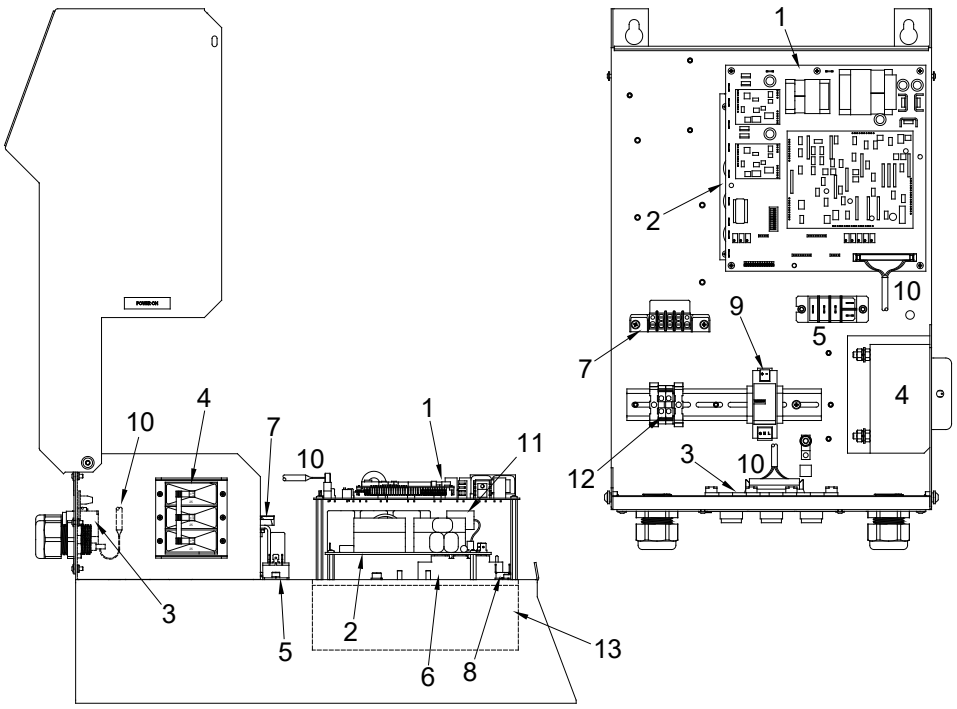
4-10 kW Compak™ 2000 Deluxe Parts



Item #	Part #	Description	Qty
1	LM4027-xx	Control Board	1
2	LM4867-01	Keypad Board	1
3	LM4823-xx	HF Display Board	1
4	LM5095-01	Deluxe 2000 Treater I/O Module	1
5	LM5756-01	Capacitor Trip Board	1
6A	CB0278	Circuit Breaker (4-7.5KW)	1
6B	CB0276	Circuit Breaker (10KW)	1
7	BR0015	Bridge Rectifier	1
8	LM3751-03	Inverter Power Module	1
9A	LM1982-32	Output CT – Multi-Tap (4-7.5KW)	1
9B	LM1982-33	Output CT – Multi-Tap (10KW)	1
10	CP1282	DC Bus Capacitor	1
11	CP0200	Capacitor 100uf 800 VDC	2
12	FD5339-04	Inductor Coil	1
13	SE0158	Temperature Sensor Switch, TASI	1
14	EM0054	5V DC power Supply	1
15	EM0256	24V DC Power Supply	1
16	TB0110	Fused Terminal Block, 250V 2 Amp	2
17	CA1050	Ribbon Cable (40 Pin)	1
18	CA1005	Ribbon Cable (34 Pin)	1
19	LM4043-02	Bleeder Resistor Assembly	1
20	RE0735	Resistor	2
21	CP0070	Snubber Capacitor	1 (4-7.5) / 2 (10)
22	FA0086	Cooling Fan (10KW Only)	1
23	TB0546	Output Terminal Blocks	4
24	– –	Terminal Blocks	As Required
25	FD5373-03	Power Supply Heat Sink	1
26	FA0030	Heat Sink Cooling Fan	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

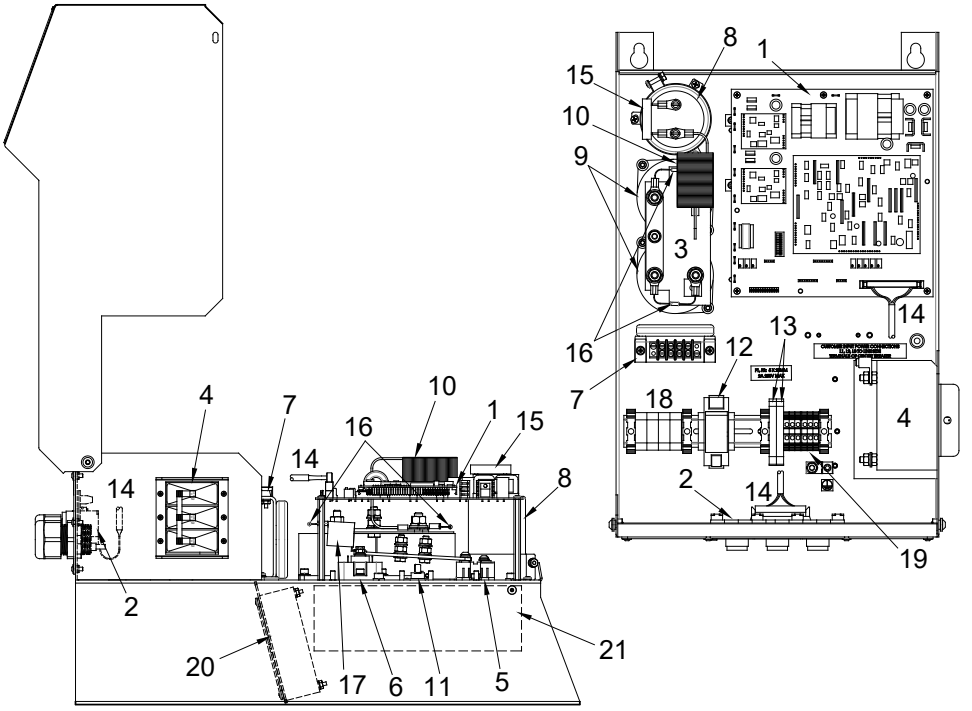
1-3 kW CoronaFlex™ Power Supply Parts



Item #	Part #	Description	Qty.
1	LM4027-xx	Control Board	1
2	LM3415-05	Power Board	1
3	LM3958-06	2000 Treater I/O Module	1
4	CB0275	Circuit Breaker	1
5	BR0013	Rectifier	1
6	LM3589-02	Inverter Power Module	1
7	LM4167-01	Current Transformer	1
8	SE0158	Temperature Sensor Switch, TASI	1
9	EM0256	24V DC Power Supply	1
10	CA1050	Ribbon Cable (40 Pin)	1
11	LM4041-01	Snubber Capacitor Assembly	1
12	TB0537	Output Terminal Blocks	2
13	FD5373-03	Power Supply Heat Sink	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

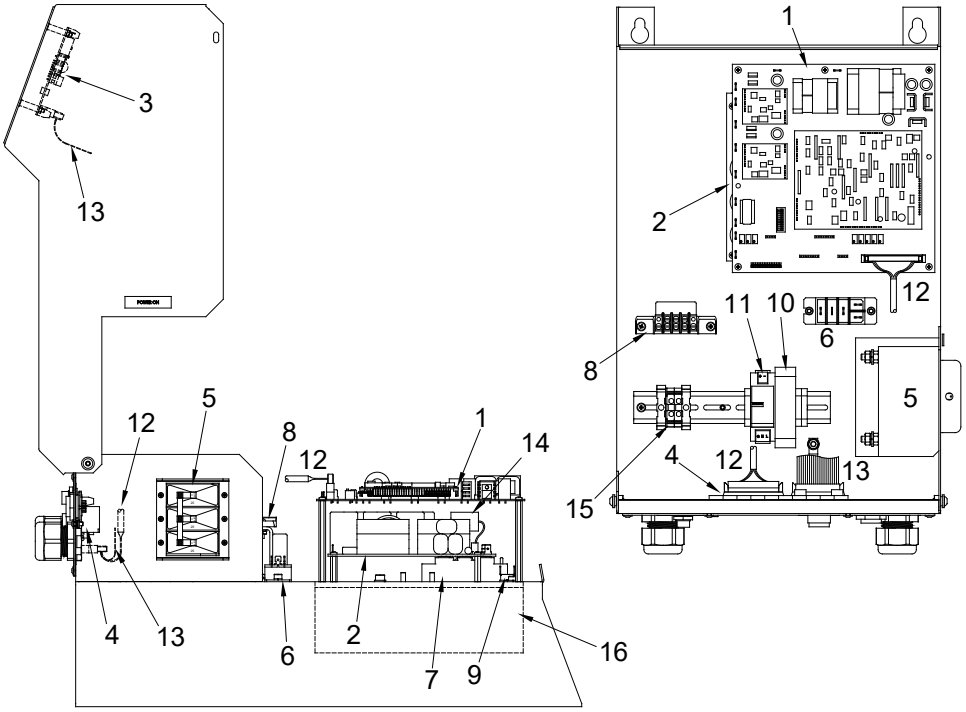
4-5 kW CoronaFlex™ Power Supply Parts



Item #	Part #	Description	Qty
1	LM4027-xx	Control Board	1
2	LM5095-01	2000 Treater I/O Module	1
3	LM5756-01	Capacitor Trip Board	1
4	CB0278	Circuit Breaker	1
5	BR0015	Bridge Rectifier	1
6	LM3751-03	Inverter Power Module	1
7	LM1982-32	Output CT – Multi-Tap	1
8	CP1282	DC Bus Capacitor	1
9	CP0200	Capacitor 100uf 800 VDC	2
10	FD5339-04	Inductor Coil	1
11	SE0158	Temperature Sensor Switch, TASI	1
12	EM0256	24V DC Power Supply	1
13	TB0110	Fused Terminal Block, 250V 2 Amp	2
14	CA1050	Ribbon Cable (40 Pin)	1
15	LM4043-02	Bleeder Resistor Assembly	1
16	RE0735	Resistor	2
17	CP0070	Snubber Capacitor	1
18	TB0546	Output Terminal Blocks	4
19	– –	Terminal Blocks	As Required
20	FA0030	Heat Sink Cooling Fan	1
21	FD5373-03	Power Supply Heat Sink	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

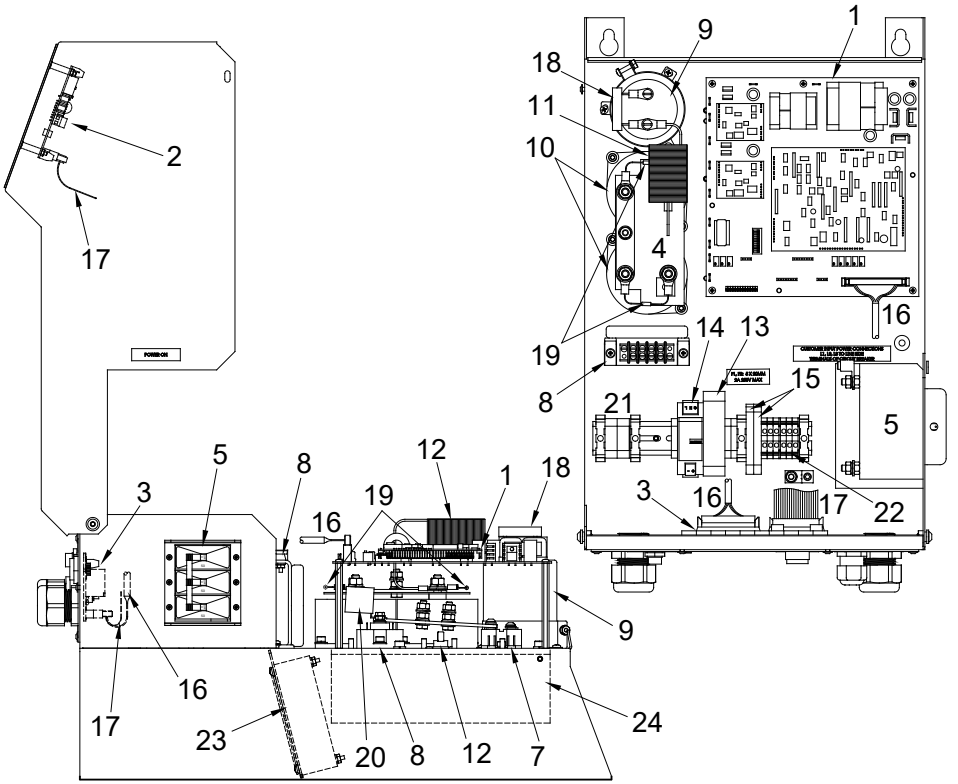
1-3 kW CoronaFlex™ Deluxe Power Supply Parts



Item #	Part #	Description	Qty.
1	LM4027-xx	Control Board	1
2	LM3415-05	Power Board	1
3	LM4823-xx	HF Display Board	1
4	LM5095-01	Deluxe 2000 Treater I/O Module	1
5	CB0275	Circuit Breaker	1
6	BR0013	Rectifier	1
7	LM3589-02	Inverter Power Module	1
8	LM4167-01	Current Transformer	1
9	SE0158	Temperature Sensor Switch, TASI	1
10	EM0054	5V DC power Supply	1
11	EM0256	24V DC Power Supply	1
12	CA1050	Ribbon Cable (40 Pin)	1
13	CA1005	Ribbon Cable (34 Pin)	1
14	LM4041-01	Snubber Capacitor Assembly	1
15	TB0537	Output Terminal Blocks	As Required
16	FD5373-03	Power Supply Heat Sink	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

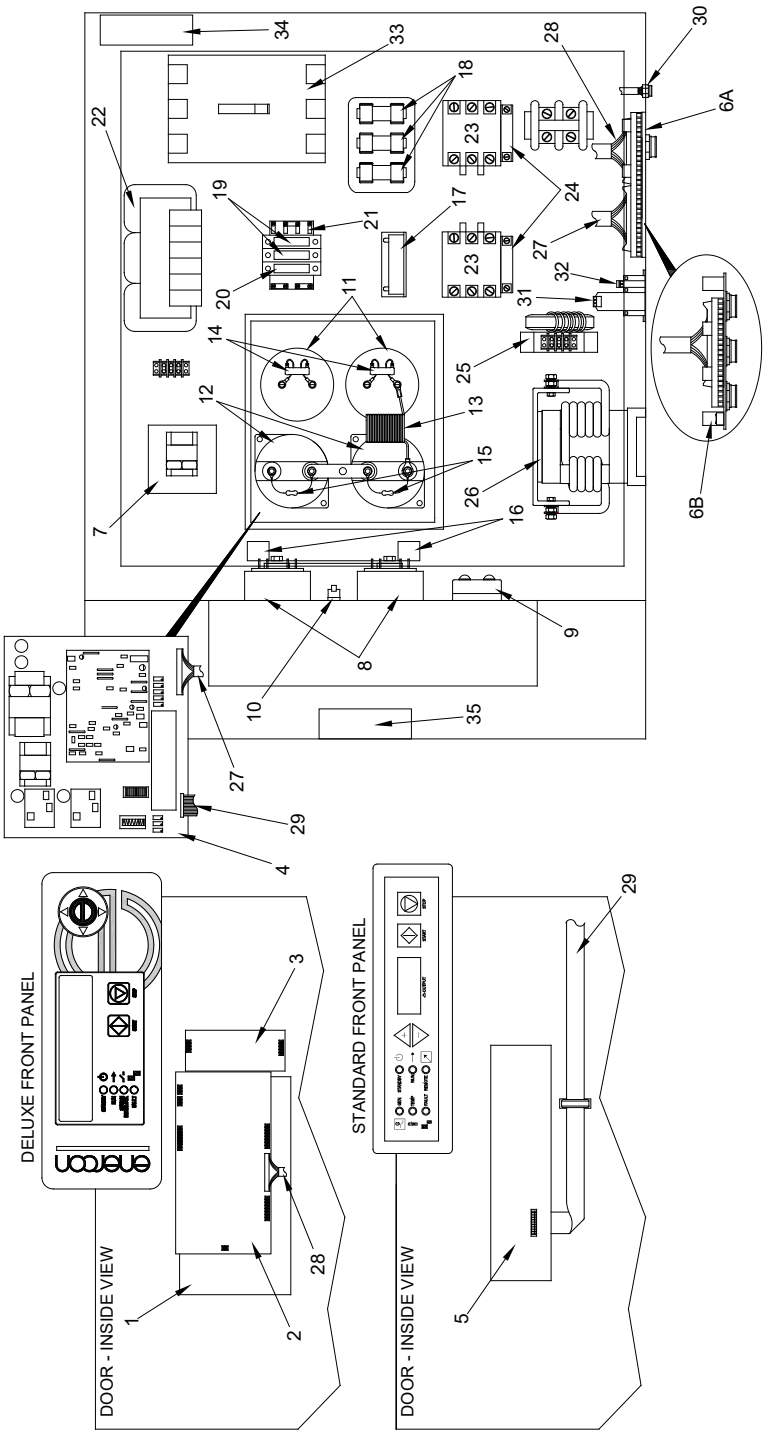
4-5 kW CoronaFlex™ Deluxe Power Supply Parts



Item #	Part #	Description	Qty
1	LM4027-xx	Control Board	1
2	LM4823-xx	HF Display Board	1
3	LM5095-01	Deluxe 2000 Treater I/O Module	1
4	LM5756-01	Capacitor Trip Board	1
5	CB0278	Circuit Breaker	1
6	BR0015	Bridge Rectifier	1
7	LM3751-03	Inverter Power Module	1
8	LM1982-32	Output CT – Multi-Tap	1
9	CP1282	DC Bus Capacitor	1
10	CP0200	Capacitor 100uf 800 VDC	2
11	FD5339-04	Inductor Coil	1
12	SE0158	Temperature Sensor Switch, TASI	1
13	EM0054	5V DC power Supply	1
14	EM0256	24V DC Power Supply	1
15	TB0110	Fused Terminal Block, 250V 2 Amp	2
16	CA1050	Ribbon Cable (40 Pin)	1
17	CA1005	Ribbon Cable (34 Pin)	1
18	LM4043-02	Bleeder Resistor Assembly	1
19	RE0735	Resistor	2
20	CP0070	Snubber Capacitor	1
21	TB0546	Output Terminal Blocks	4
22	– –	Terminal Blocks	As Required
23	FD5373-03	Power Supply Heat Sink	1
24	FA0030	Heat Sink Cooling Fan	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

12-15 kW Compak™ 2000 Parts

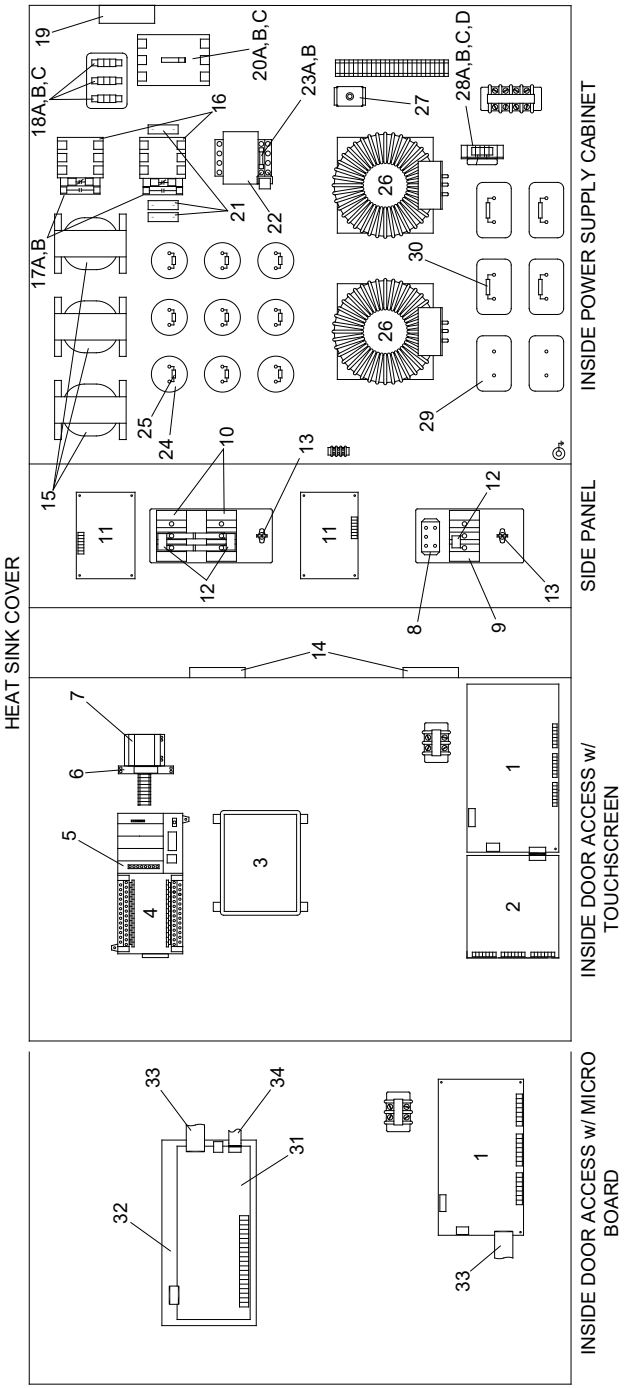


12-15 kW Compak™ 2000 Parts

Index #	Part #	Description	Qty
1	LM4867-01	Keypad Board (Deluxe 2000 Only)	1
2	LM4823-06	HF Display Board (Deluxe 2000 Only)	1
3	EM0053	5V DC power Supply (Deluxe 2000 Only)	1
4	LM4027-**	Control Board	1
5	LM3497-06	Membrane Switch Assembly (Standard 2000 Only)	1
6A	LM5095-01	Deluxe 2000 I/O Board	1
6B	LM3958-03	Standard 2000 I/O Board	1
7	LM4106-02	Soft Start Board	1
8	LM3936-**	Inverter	1
9	BR0015	Rectifier	1
10	SE0158	Temperature Sensor	1
11	CP1282	DC Bus Capacitor	2
12	CP0200	Output Capacitor	2
13	FD5339-05	Inductor Coil	1
14	LM4043-02	Bleeder Resistors	2
15	RE0735	Resistor	2
16	CP0070	Snubber Capacitor	2
17	RE4902	Soft Start Resistors	3
18	FU0586	Fuse 40A, 600V	3
19	FU0361	Fuse 2A	2
20	FU0360	Fuse 1.5A	1
21	TF0146	Control Transformer	1
22	LF0020	Line Choke	1
23	*Contact Enercon	Contactor	2
24	*Contact Enercon	Auxiliary Contactor	2
25	LM1982-11	Output CT	1
26	LM4682-**	Output Reactor – Not included in all Power Supplies	1
27	CA1050	Ribbon Cable 40-pin 17" Long	1
28	CA1068	Ribbon Cable 34-pin 48" Long (Deluxe 2000 Only)	1
29	CA1018	Ribbon Cable 13-pin 32" Long (Standard 2000 Only)	
30	LM5260-08	Remote Control Connector (Deluxe 2000 Only)	1
31	EM0256	24V DC Power Supply (Deluxe 2000 Only)	1
32	RL0065	Relay module, N.O. Contact (Deluxe 2000 Only)	1
33	CB0092	Circuit Breaker	1
34	FA0080	Cooling Fan	1
35	FA0050	Cooling Fan	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

10-30 kW Compak™ 9000 Parts



The Compak™ 9000 is no longer manufactured, and many parts may no longer be available. Contact Enercon for support details, or a quote for replacement equipment.

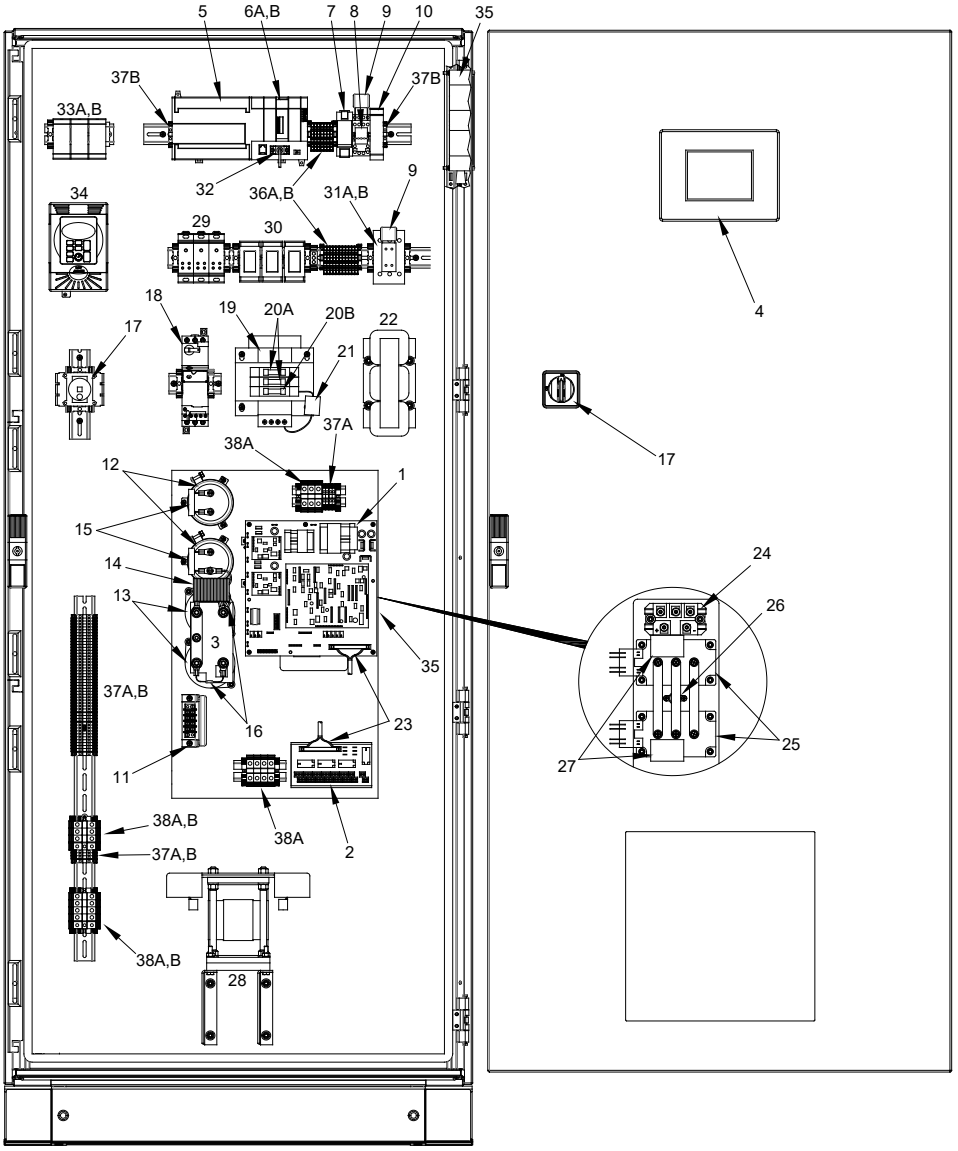
10-30 kW Compak™ 9000 Parts

Index #	Description	10-20kW	25-30kW
1	Auto/PLL Control Board	Contact Enercon	Contact Enercon
2	Power Regulator Board (Touch Screen Only)	LM5160-01	LM5160-01
3	Front Panel Touchscreen (Touch Screen Only)	EM0331	EM0331
4	PLC (Touch Screen Only)	EM0310	EM0310
5	Analog Card (Touch Screen Only)	EM0319	EM0319
6	Relay Module (Touch Screen Only)	RL0065	RL0065
7	24VDC Power Supply (Touch Screen Only)	EM0072	EM0072
8	Bridge Rectifier	BR0015	BR0016
9	Chopper Device	– –	LM3936-01
10	Inverter Device	– –	LM3935-01
11	Satellite Driver Board / Driver Board	Not Used	LM3629-**
12	Snubber Capacitor	CP0070	CP0070
13	Temperature Switch	SE0158	SE0158
14	Cooling Fan	FA0050	FA0050
15	DC Choke	DC0171	DC0171
16	Contactor	Contact Enercon	Contact Enercon
17A	Auxiliary Contactor N.O.	Contact Enercon	Contact Enercon
17B	Auxiliary Contactor N.C.	Contact Enercon	Contact Enercon
18A	Fuse 30 Amp	FU0584 (10kW)	N/A
18B	Fuse 40 Amp	FU0586 (15-20kW)	N/A
18C	Fuse 60 Amp		FU0587
19	Cooling Fan	FA0080	FA0080
20A	Circuit Breaker	CB0087 (10kW)	N/A
20B	Circuit Breaker	CB0092 (15-20kW)	N/A
20C	Circuit Breaker	N/A	CB0200
21	Resistor – 50 OHM	RE4902	RE4902
22	Control Transformer	TF0142	TF0142
23A	Fuse – 2A	FU0500	FU0500
23B	Fuse – 5A (Touch Screen Only)	FU0138	FU0138
24	DC Filter Capacitor	CP1280	CP1280
25	Bleeder Resistor	LM4043-01	LM4043-01
26	Tank Reactor	– –	– –
27	Voltage Sensing Relay	RL0100	RL0100
28A	Output CT	LM1982-05 (10kW)	N/A
28B	Output CT	LM1982-13 (15kW)	N/A
28C	Output CT	LM1982-06 (20kW)	N/A
28D	Output CT	N/A	LM1982-02
29	Inverter Capacitor	CP2552	CP2552
30	Bleeder Resistor	RE0735	RE0735
31	Microprocessor Board (Micro Bd Systems Only)	LM3388-xx	LM3388-xx
32	Membrane Switch Assembly (Micro Bd Systems Only)	SW0105-01	SW0105-01
33	Ribbon Cable (Micro Bd Systems Only)	CA1015	CA1015
34	Ribbon Cable (Micro Bd Systems Only)	CA0264	CA0268

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

The Compak™ 9000 is no longer manufactured, and many parts may no longer be available. Contact Enercon for support details, or a quote for replacement equipment.

5-15 kW Compak™ 2000 Touchscreen Parts

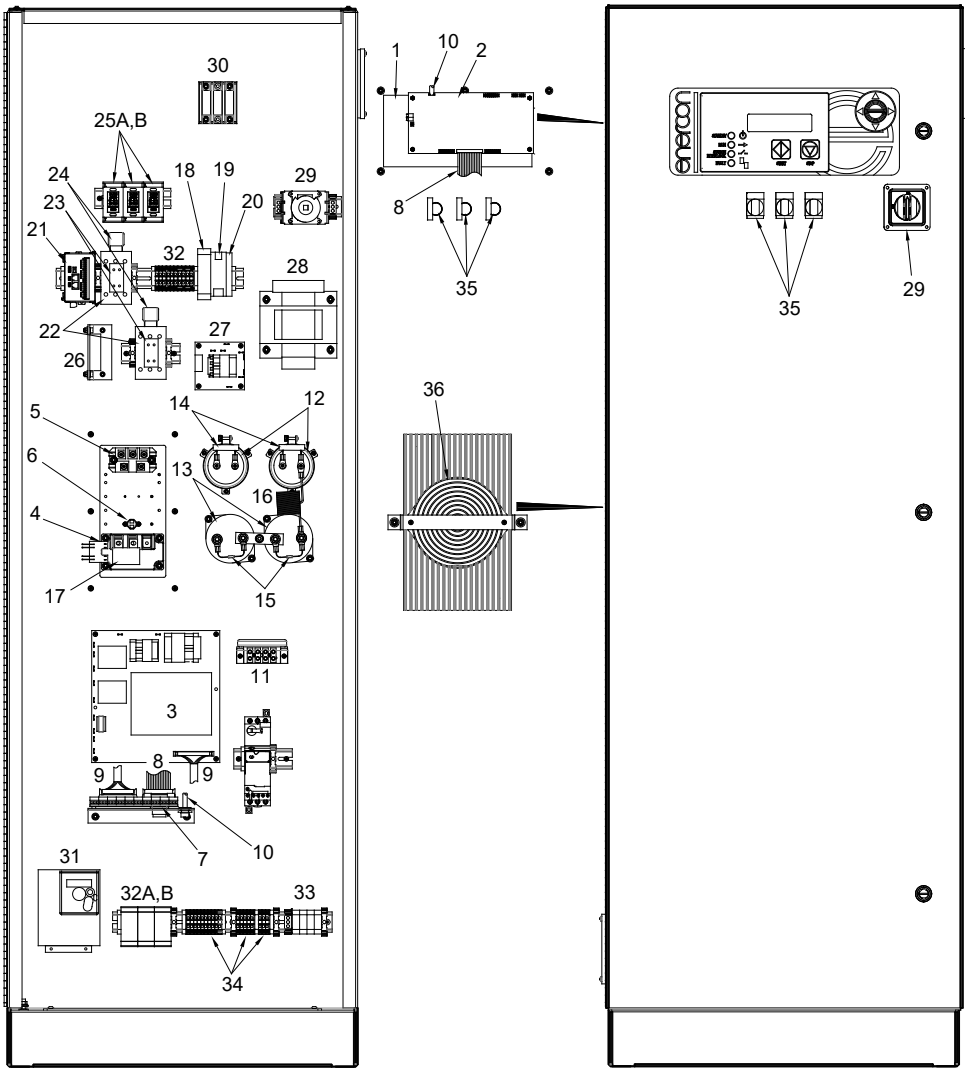


5-15 kW Compak™ 2000 Touchscreen Parts

Item #	Part #	Description	Qty
1	LM4027-04	Control Board	1
2	LM3958-03	I/O Board	1
3	LM5756-01	Capacitor Trip Board	1
4	EM0331	Touchscreen	1
5	EM0310	PLC	1
6A	EM0311	Analog Card 2 IN, 2 OUT, Voltage	1
6B	EM0319	Analog Card 4 IN, 2 OUT, Voltage (used w/AC Drive)	1
7	EM0256	24 VDC Power Supply	1
8	RL0062	120VAC Relay	1
9	RE5101	Quench Arc	2
10	EM0198	Safety Relay	1
11	LM1982-xx	Output CT – Part Numbers Will Vary	1
12	CP1282	DC Bus Capacitors	2
13	CP0200	Inverter Capacitors	2
14	FD5339-06	HF Inductor	1
15	LM4043-02	Bleeder Resistors	2
16	RE0735	2W 150k Ohm Carbon Resistor (1 hidden)	2
17	SW0175	Disconnect Switch Handle and Body	1
18	EM0086	Motor Starter Control	1
19	TF0204	Control Transformer	1
20A	FU0366	Fuse, 3 Amp, Rejection Type	2
20B	FU0367	Fuse, 5 Amp, Non-Rejection Type	1
21	LM4044-01	Snubber Capacitor Assembly	1
22	LF0020	Line Choke	1
23	CA1050	Ribbon Cable 40-pin 17” Long	1
24	BR0016	Bridge Rectifier	1
25	LM3936-04	Inverter	2
26	SE0158	Temperature Sensor	1
27	CP0070	Snubber Capacitor	2
28	LM4682-04	Output Reactor (480 VAC Power Supplies)	1
29	TB0154	Distribution Block	3
30	– –	Input Fuses – Fuse Sizes & Part Numbers Will Vary	3
31A	CN3070	Contactor 40A	1
31B	CN3071	Auxiliary Contactor	1
32	EM0332A	PLC To Touchscreen Cable	1
33A	FB0211	AC Drive Fuse Block (Optional)	3
33B	FU0526	AC Drive Fuses 10A, 600V (Optional)	3
34	MC0006-02	AC Drive 1HP 380-500V 50/60Hz (Optional)	1
35	FA0050	Cooling Fan (Heat Sink Cooling Fan Hidden)	2
36A	TB7100	Terminal Block	As Required
36B	TB7103	Terminal Block – Ground	As Required
37A	TB7201-020	Terminal Block, 20 Amp	As Required
37B	TB7201-020-G	Ground Terminal Block, 20 Amp	As Required
38A	TB7201-080	Terminal Block, 80 Amp	As Required
38B	TB7201-080-G	Ground Terminal Block, 80 Amp	As Required

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

4-10 kW Compak™ 2000 Deluxe Parts

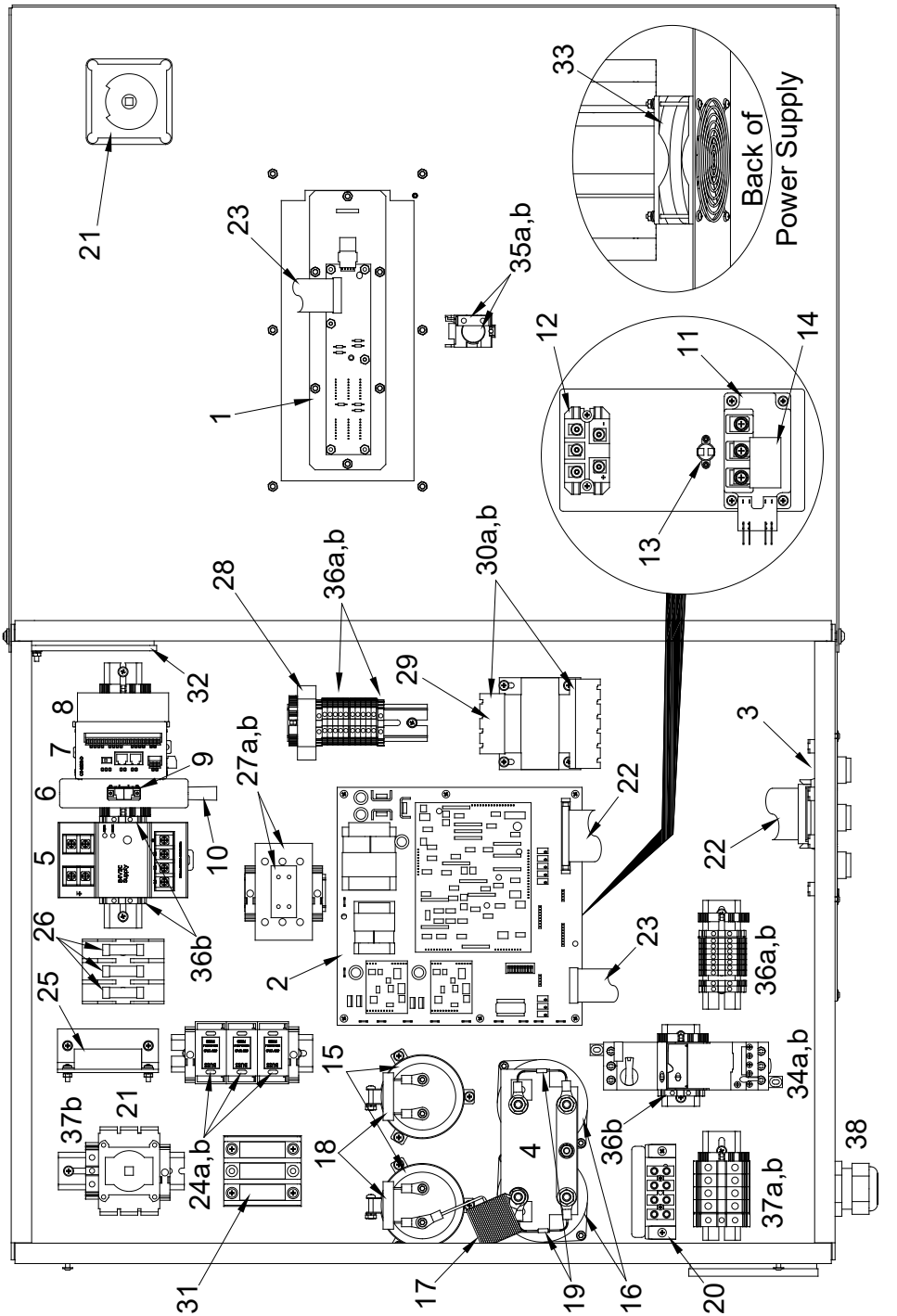


4-10 kW Compak™ 2000 Deluxe Parts

Item #	Part #	Description	Qty
1	LM4867-01	Keypad Board	1
2	LM4823-xx	HF Display Board	1
3	LM4027-04	Control Board	1
4	LM5756-02	Capacitor Trip Board	1
5	LM5095-01	Deluxe 2000 I/O Board	1
6	LM3936-04	Inverter	1
7	BR0015	Bridge Rectifier	1
8	SE0158	Temperature Sensor	1
9	CA1071	Ribbon Cable 34-pin 114” Long	1
10	CA1050	Ribbon Cable 40-pin 17” Long	1
11	LM5260-17	Deluxe Display Communication Cable (Profinet)	1
11A	LM5260-07	Remote Control Connection Cable (Remote Control Box)	1
12	LM5260-16	RS232 Network Communicator Cable (Profinet)	1
13	LM1982-xx	Output CT	1
14	CP1282	DC Bus Capacitor	1
15	CP0200	Inverter Capacitors	2
16	LM4043-02	Bleeder Resistor	2
17	LM5267-01	Resistor Assembly	2
18	FD5339-05	HF Inductor	1
19	CP0070	Snubber Capacitor	1
20	EM0054	5V DC power Supply	1
21	EM0256	24V DC Power Supply	1
22	RL0065	24V DC N.O. Relay Module	1
23	EM0387	Modbus RTU To Profinet Converter (Optional)	1
24	EM0395	Splice Control Micro PLC (Optional)	1
25	CN3070	Contactor	2
26	CN3071	Auxiliary Contactor	2
27	RE5101	Quench Arc	2
28A	FB0210	Fuse Block 60A	3
28B	FU0522	Fuse 35 Amp	3
29	RE4902	Bleeder Resistor 50 Ohm	3
30	TF0204	Control Transformer	1
31A	FU0163	1.25A, 250V Fuse	2
31B	FU0357	3A, 250V Fuse	1
32	LM4106-02	Soft Start Circuit Board	1
33	SW0171	Disconnect Switch	1
34	FA0050	Cooling Fan 212 CFM	1
35	TB0158	3-Pole Distribution Block	1
36	MC0012	1HP AC Drive (Optional)	1
37A	FB0211	Fuse Holder 30 Amp (Optional - w/AC Drive)	3
37B	FU0526	Fuse 10 Amp (Optional - w/AC Drive)	3
38	EM0099	Motor Starter (Optional)	1
39	SW0235	2 Position Selector Switches (Optional)	1 or 2
40	TB0546	Terminal Blocks	As required
41	– –	Terminal Blocks	As required

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

4-10 kW Compak™ 2000 Flex Parts

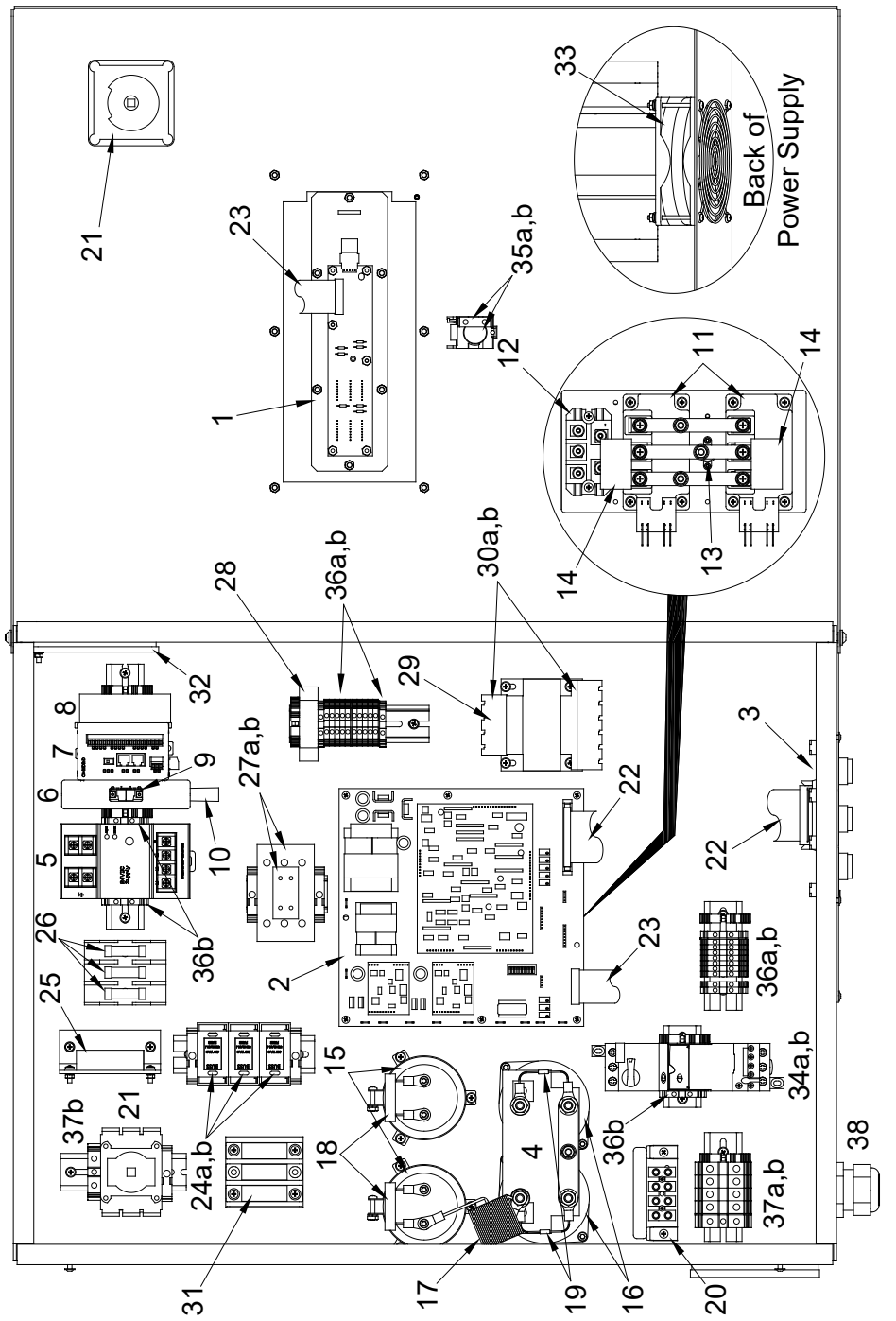


4-10 kW Compak™ 2000 Flex Parts

Item #	Part #	Description	Qty
1	LM3497-06	Membrane Switch Assembly	1
2	LM4027-xx	Control Board	1
3	LM3958-xx	Modular 2000 Treater I/O Module	1
4	LM5756-02	Capacitor Trip Board	1
5	EM0640	24VDC Power Supply	1
6	– –	Network Interface Module (Optional)	1
7	EM0304	Micro PLC (Optional)	1
8	EM0399	Expansion Module (Optional)	1
9	EM0702	Female Connector for Field Termination (Optional)	1
10	LM5260-16	RS232 Network Communicator Cable (Optional)	1
11	LM3936-xx	Inverter	1
12	BR0016	Rectifier	1
13	SE0158	90° C Temperature Sensor	1
14	CP0070	1µf 1000V Inverter Snubber Capacitor	1
15	CP1282	DC Bus Capacitor	2
16	CP0200	Output Capacitor	2
17	FD5339-05	Inductor Coil	1
18	LM4043-02	12W 20k Ω Bleeder Resistor Assembly	2
19	LM5267-01	2W 150k Ω Resistor Assembly	2
20	LM1982-xx	Output CT	1
21	SW0171	Disconnect Switch	1
22	CA1050	Ribbon Cable 40-pin 17” Long	1
23	CA1018	Ribbon Cable 13-pin 32” Long	1
24a	FB0210	Fuse Holder - CE Safety J - 60A	3
24b	FU0522	Fuse, 600V, 35A	3
25	RE4902	50 Ohm Soft Start Resistor	3
26	FU0366	Fuse, 3A	3
27a	CN3082	Contactor	1
27b	CN3071	Auxiliary Contactor	1
28	RL0114	Relay, Time-On Delay	1
29	TF0207	Control Transformer	1
30a	FU0364	Fuse 0.25A	2
30b	FU0374	Fuse 0.5A	1
31	TB0158	175A 3 Pole Distribution Block	1
32	FA0090	Cooling Fan	1
33	FA0089	Cooling Fan	1
34a	– –	Motor Starter Control Unit (Optional)	1
34b	– –	Motor Starter Power Base (Optional)	1
35a	PB0329	Contact Block N.O. Contact	1
35b	SW0235	2 Position Selector Switch	1
36a	TB7201-020	Terminal Block 20A	18
36b	TB7201-020-G	Ground Terminal Block 20 Amp	6 - 7
37a	TB7201-080	Terminal Block 80A	4
37b	TB7201-080-G	Ground Terminal Block 80 Amp	2
38	CD0525	Cord Grip	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

12-15 kW Compak™ 2000 Flex Parts

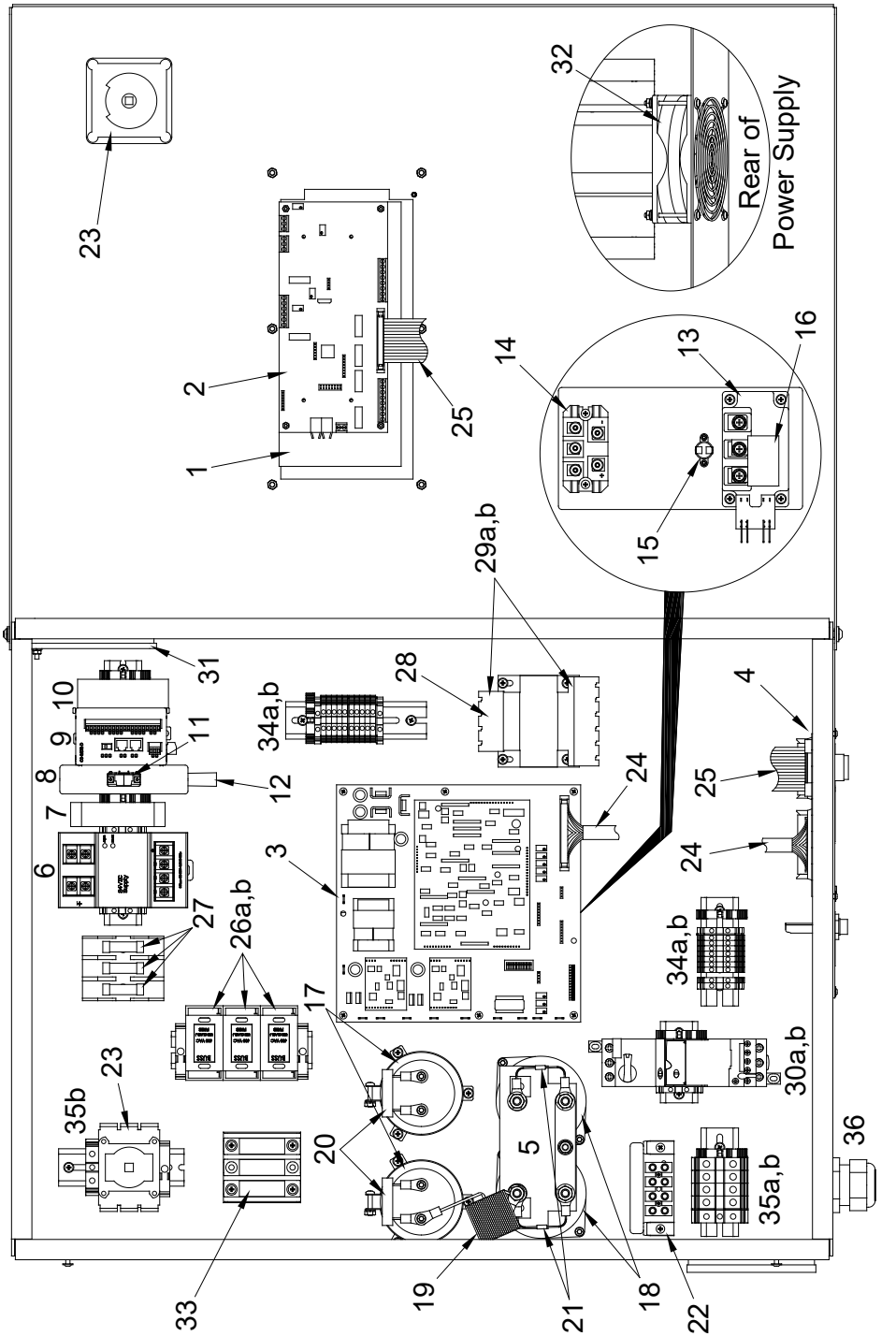


12-15 kW Compak™ 2000 Flex Parts

Item #	Part #	Description	Qty
1	LM3497-06	Membrane Switch Assembly	1
2	LM4027-xx	Control Board	1
3	LM3958-xx	Modular 2000 Treater I/O Module	1
4	LM5756-02	Capacitor Trip Board	1
5	EM0640	24VDC Power Supply	1
6	– –	Network Interface Module (Optional)	1
7	EM0304	Micro PLC (Optional)	1
8	EM0399	Expansion Module (Optional)	1
9	EM0702	Female Connector for Field Termination (Optional)	1
10	LM5260-16	RS232 Network Communicator Cable (Optional)	1
11	LM3936-xx	Inverter	2
12	BR0016	Rectifier	1
13	SE0158	90° C Temperature Sensor	1
14	CP0070	1µf 1000V Inverter Snubber Capacitor	2
15	CP1282	DC Bus Capacitor	2
16	CP0200	Output Capacitor	2
17	FD5339-05	Inductor Coil	1
18	LM4043-02	12W 20k Ω Bleeder Resistor Assembly	2
19	LM5267-01	2W 150k Ω Resistor Assembly	2
20	LM1982-xx	Output CT	1
21	SW0171	Disconnect Switch	1
22	CA1050	Ribbon Cable 40-pin 17” Long	1
23	CA1018	Ribbon Cable 13-pin 32” Long	1
24a	FB0210	Fuse Holder - CE Safety J - 60A	3
24b	FU0522	Fuse, 600V, 35A	3
25	RE4902	50 Ohm Soft Start Resistor	3
26	FU0366	Fuse, 3A	3
27a	CN3082	Contactor	1
27b	CN3071	Auxiliary Contactor	1
28	RL0114	Relay, Time-On Delay	1
29	TF0207	Control Transformer	1
30a	FU0364	Fuse 0.25A	2
30b	FU0374	Fuse 0.5A	1
31	TB0158	175A 3 Pole Distribution Block	1
32	FA0090	Cooling Fan	1
33	FA0089	Cooling Fan	1
34a	– –	Motor Starter Control Unit (Optional)	1
34b	– –	Motor Starter Power Base (Optional)	1
35a	PB0329	Contact Block N.O. Contact	1
35b	SW0235	2 Position Selector Switch	1
36a	TB7201-020	Terminal Block 20A	18
36b	TB7201-020-G	Ground Terminal Block 20 Amp	6 - 7
37a	TB7201-080	Terminal Block 80A	4
37b	TB7201-080-G	Ground Terminal Block 80 Amp	2
38	CD0525	Cord Grip	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

4-10 kW Compak™ 2000 Flex Deluxe Parts

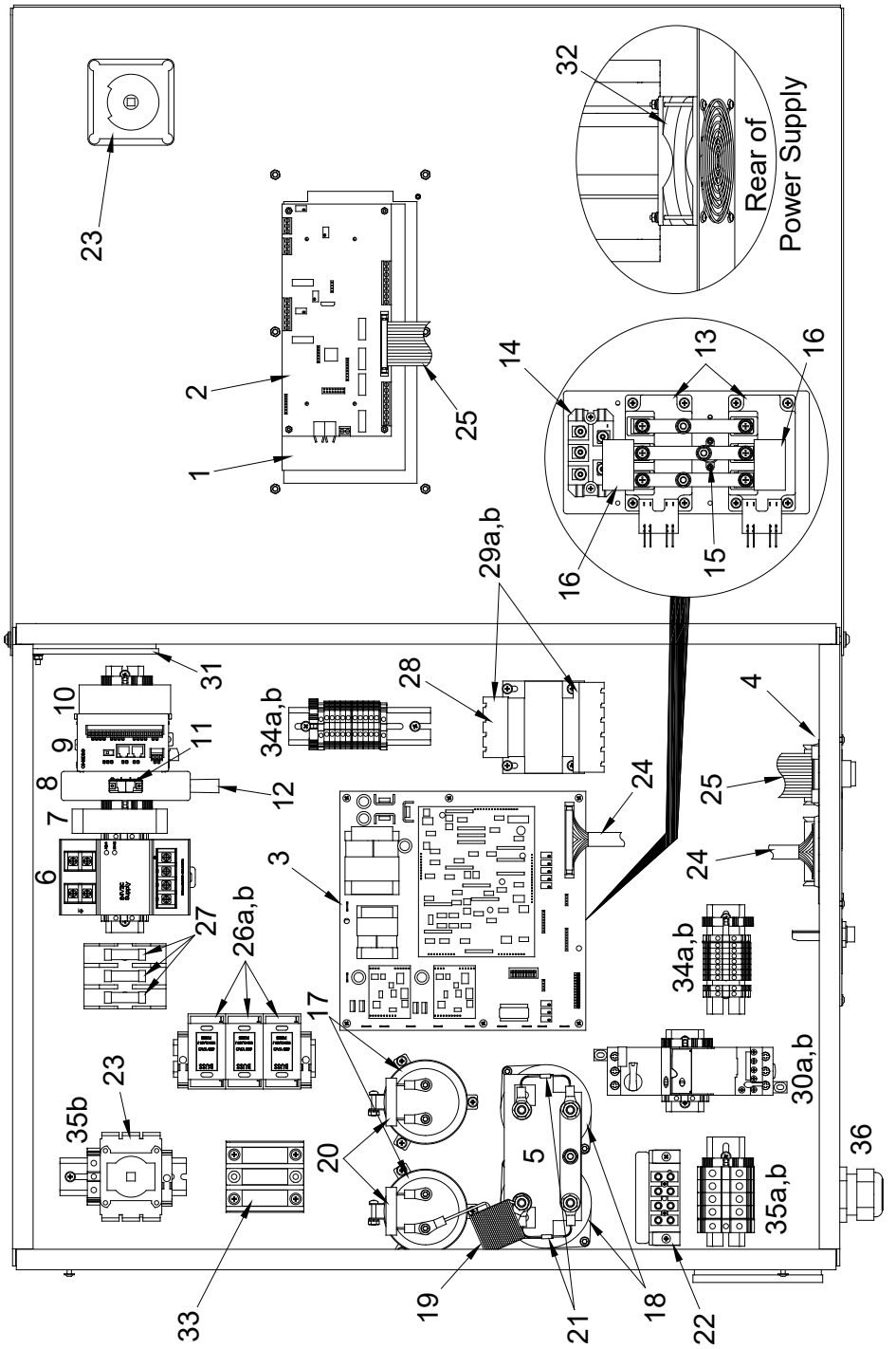


4-10 kW Compak™ 2000 Flex Deluxe Parts

Item #	Part #	Description	Qty
1	LM4867-01	Keypad Board	1
2	LM4823-xx	HF Display Board	1
3	LM4027-xx	Control Board	1
4	LM5095-01	Deluxe 2000 I/O Board	1
5	LM5756-02	Capacitor Trip Board	1
6	EM0640	24VDC Power Supply	1
7	EM0054	5VDC Power Supply	1
8	– –	Network Interface Module (Optional)	1
9	EM0304	Micro PLC (Optional)	1
10	EM0399	Expansion Module (Optional)	1
11	EM0702	Female Connector for Field Termination (Optional)	1
12	LM5260-16	RS232 Network Communicator Cable (Optional)	1
13	LM3936-xx	Inverter	1
14	BR0016	Rectifier	1
15	SE0158	90° C Temperature Sensor	1
16	CP0070	1µf 1000V Inverter Snubber Capacitor	1
17	CP1282	DC Bus Capacitor	2
18	CP0200	Output Capacitor	2
19	FD5339-05	Inductor Coil	1
20	LM4043-02	12W 20k Ω Bleeder Resistor Assembly	2
21	LM5267-01	2W 150k Ω Resistor Assembly	2
22	LM1982-xx	Output CT	1
23	SW0171	Disconnect Switch	1
24	CA1050	Ribbon Cable 40-pin 17" Long	1
25	CA1071	Ribbon Cable 34-pin 114" Long	1
26a	FB0210	Fuse Holder - CE Safety J - 60A	3
26b	FU0522	Fuse, 600V, 35A	3
27	RE4902	50 Ohm Soft Start Resistor	3
28	FU0366	Fuse, 3A	3
29a	CN3082	Contactor	1
29b	CN3071	Auxiliary Contactor	1
30	RL0114	Relay, Time-On Delay	1
31	TF0207	Control Transformer	1
32a	FU0364	Fuse 0.25A	2
32b	FU0374	Fuse 0.5A	1
33	TB0158	175A 3 Pole Distribution Block	1
34	FA0090	Cooling Fan	1
35	FA0089	Cooling Fan	1
36a	PB0329	Contact Block N.O. Contact	1
36b	SW0235	2 Position Selector Switch	1
37a	– –	Motor Starter Control Unit (Optional)	1
37b	– –	Motor Starter Power Base (Optional)	1
38a	TB7201-020	Terminal Block – 20 Amp	18
38b	TB7201-020-G	Ground Terminal Block	6 - 7
39a	TB7201-080	Terminal Block – 80 Amp	4
39b	TB7201-080-G	Ground Terminal Block	2
40	CD0525	Cord Grip	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

12-15 kW Compak™ 2000 Flex Deluxe Parts

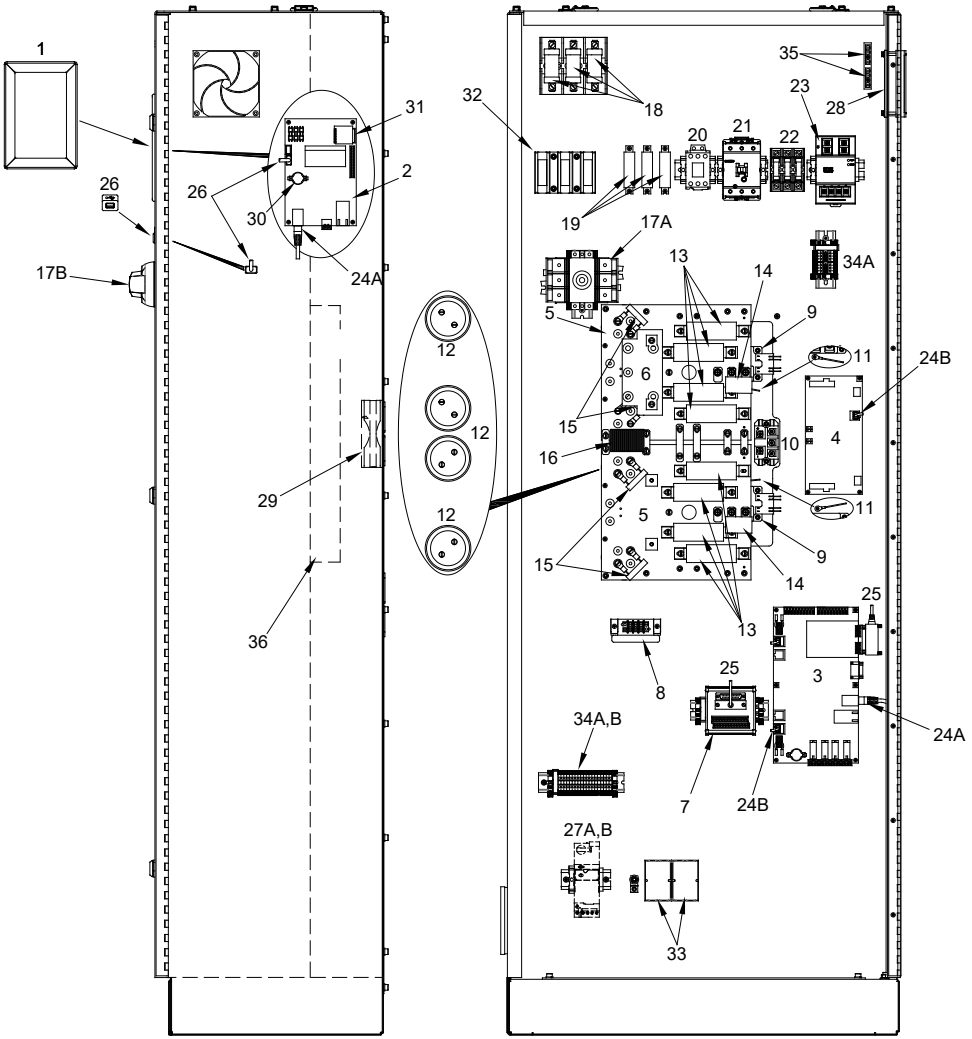


12-15 kW Compak™ 2000 Flex Deluxe Parts

Item #	Part #	Description	Qty
1	LM4867-01	Keypad Board	1
2	LM4823-xx	HF Display Board	1
3	LM4027-xx	Control Board	1
4	LM5095-01	Deluxe 2000 I/O Board	1
5	LM5756-02	Capacitor Trip Board	1
6	EM0640	24VDC Power Supply	1
7	EM0054	5VDC Power Supply	1
8	– –	Network Interface Module (Optional)	1
9	EM0304	Micro PLC (Optional)	1
10	EM0399	Expansion Module (Optional)	1
11	EM0702	Female Connector for Field Termination (Optional)	1
12	LM5260-16	RS232 Network Communicator Cable (Optional)	1
13	LM3936-xx	Inverter	2
14	BR0016	Rectifier	1
15	SE0158	90° C Temperature Sensor	1
16	CP0070	1µf 1000V Inverter Snubber Capacitor	2
17	CP1282	DC Bus Capacitor	2
18	CP0200	Output Capacitor	2
19	FD5339-05	Inductor Coil	1
20	LM4043-02	12W 20k Ω Bleeder Resistor Assembly	2
21	LM5267-01	2W 150k Ω Resistor Assembly	2
22	LM1982-xx	Output CT	1
23	SW0171	Disconnect Switch	1
24	CA1050	Ribbon Cable 40-pin 17” Long	1
25	CA1071	Ribbon Cable 34-pin 114” Long	1
26a	FB0210	Fuse Holder - CE Safety J - 60A	3
26b	FU0522	Fuse, 600V, 35A	3
27	RE4902	50 Ohm Soft Start Resistor	3
28	FU0366	Fuse, 3A	3
29a	CN3082	Contactor	1
29b	CN3071	Auxiliary Contactor	1
30	RL0114	Relay, Time-On Delay	1
31	TF0207	Control Transformer	1
32a	FU0364	Fuse 0.25A	2
32b	FU0374	Fuse 0.5A	1
33	TB0158	175A 3 Pole Distribution Block	1
34	FA0090	Cooling Fan	1
35	FA0089	Cooling Fan	1
36a	PB0329	Contact Block N.O. Contact	1
36b	SW0235	2 Position Selector Switch	1
37a	– –	Motor Starter Control Unit (Optional)	1
37b	– –	Motor Starter Power Base (Optional)	1
38a	TB7201-020	Terminal Block – 20 Amp	18
38b	TB7201-020-G	Ground Terminal Block	6 - 7
39a	TB7201-080	Terminal Block – 80 Amp	4
39b	TB7201-080-G	Ground Terminal Block	2
40	CD0525	Cord Grip	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

10-25 kW ProFlex™ Parts

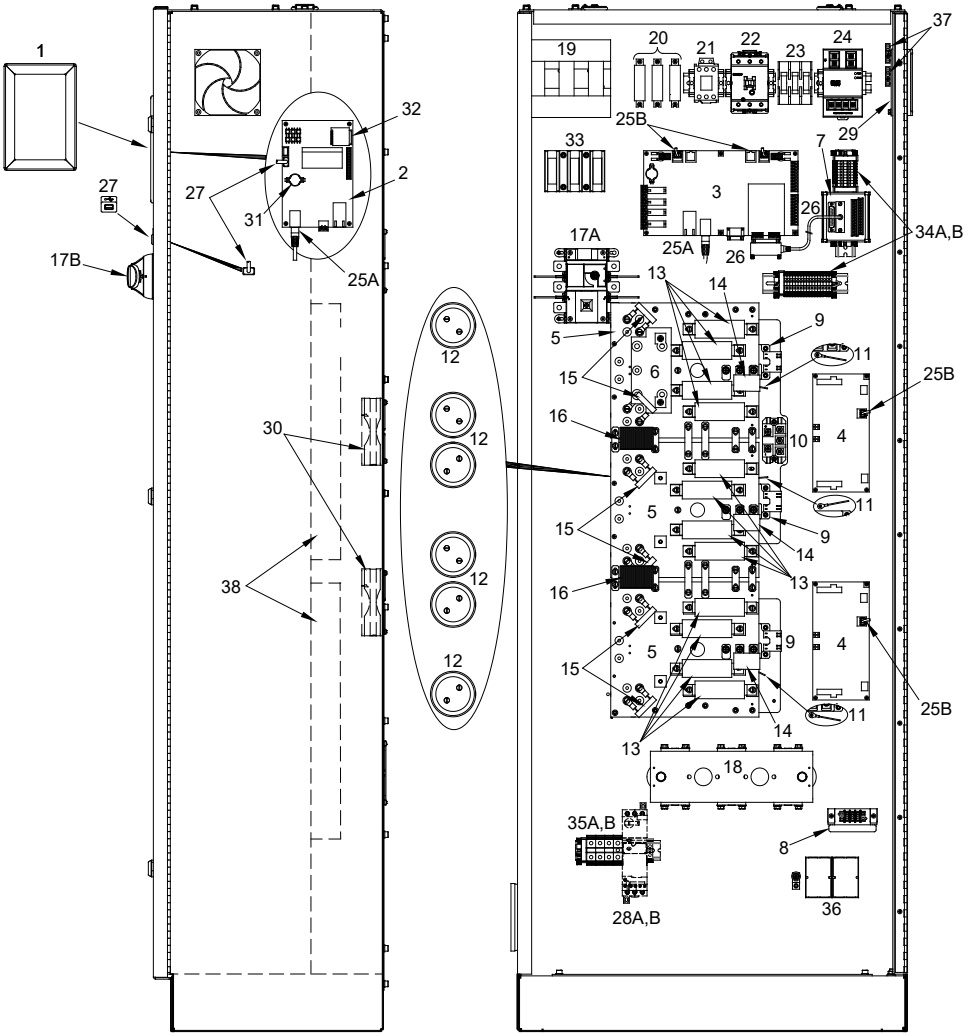


10-25 kW ProFlex™ Parts

Item #	Part #	Description	Qty			
			10kW	15kW	20kW	25kW
1	EM0421	LCD Touchscreen	1	1	1	1
2	LM5697-03	Touchscreen Display Control Board	1	1	1	1
3	LM5696-02	Main Control Board	1	1	1	1
4	LM5688-01	IGBT Driver Board	1	1	1	1
5	LM5680-01	Power Board	1	2	2	2
6	LM5756-03	Open Capacitor Detection Board	1	1	1	1
7	EM0136	DB 25 Feed Through Module	1	1	1	1
8	LM1982-xx	Output CT (Part Number Varies by Size)	1	1	1	1
9	LM3936-xx	Inverter Module	1	2	2	2
10	BR0015	Bridge Rectifier	1	1	1	1
11	SE0241	Thermistor	1	2	2	2
12	CP1282	Capacitor, Electrolytic 400V, 3300 uF	2	4	4	4
13	CP1800	Capacitor, 15uF 800 VDC	4	6	8	10
14	CP0070	1 uF, 1000V, Snubber Cap	1	2	2	2
15	LM4043-02	Bleeder Resistor Assembly	2	4	4	4
16	FD5339-03	Inductor Coil	1	1	1	2
17A	SW0350-060	Disconnect Switch	1	1	1	1
17B	SW0352-BB	Disconnect Switch Handle	1	1	1	1
18	– –	Input Fuse (Part Number Varies by Size)	3	3	3	3
19	RE4902	50 OHM Soft Start Resistor	3	3	3	3
20	CN3074	Contactor 9A 24VDC	1	1	1	1
21	CN3082	Contactor 50A 480V, 24VDC Coil	1	1	1	1
22	FU0366	Fuse 3A	3	3	3	3
23	EM0640-02	24VDC Power Supply	1	1	1	1
24A	CA0756-SH-RA	Ethernet Cable	1	1	1	1
24B	CA0753-SH-RA	Ethernet Cable	1	1	1	1
25	CA0531	DB-25 Cable	1	1	1	1
26	CA1200	USB Panel Mount Cable Assembly	1	1	1	1
27A	EM0099	Motor Starter Control 12 Amp (Optional)	0 to 1	0 to 1	0 to 1	0 to 1
27B	SR0025	Motor Starter Power Base 12 Amp (Optional)	0 to 1	0 to 1	0 to 1	0 to 1
28	FA0090	Fan, 24VDC, 100 CFM	1	1	1	1
29	FA0089	Fan, 24VDC, 243 CFM	1	1	1	1
30	EM0346	Lithium Ion Battery	1	1	1	1
31	EM0347	SD Card – 128MB	1	1	1	1
32	TB0258	175A 3 Pole Distribution Block 1 IN/4 OUT	1	1	1	1
33	TB0142	Output Terminal Block	1	2	2	2
34A	TB7201-020	Terminal Block	26	26	26	26
34B	TB7201-020-G	Ground Terminal Block	1	1	1	1
35	SW0025	Grounding Kit	2	2	2	2
36	FD4302-16	Heat Sink	1	1	1	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

30 kW ProFlex™ Parts

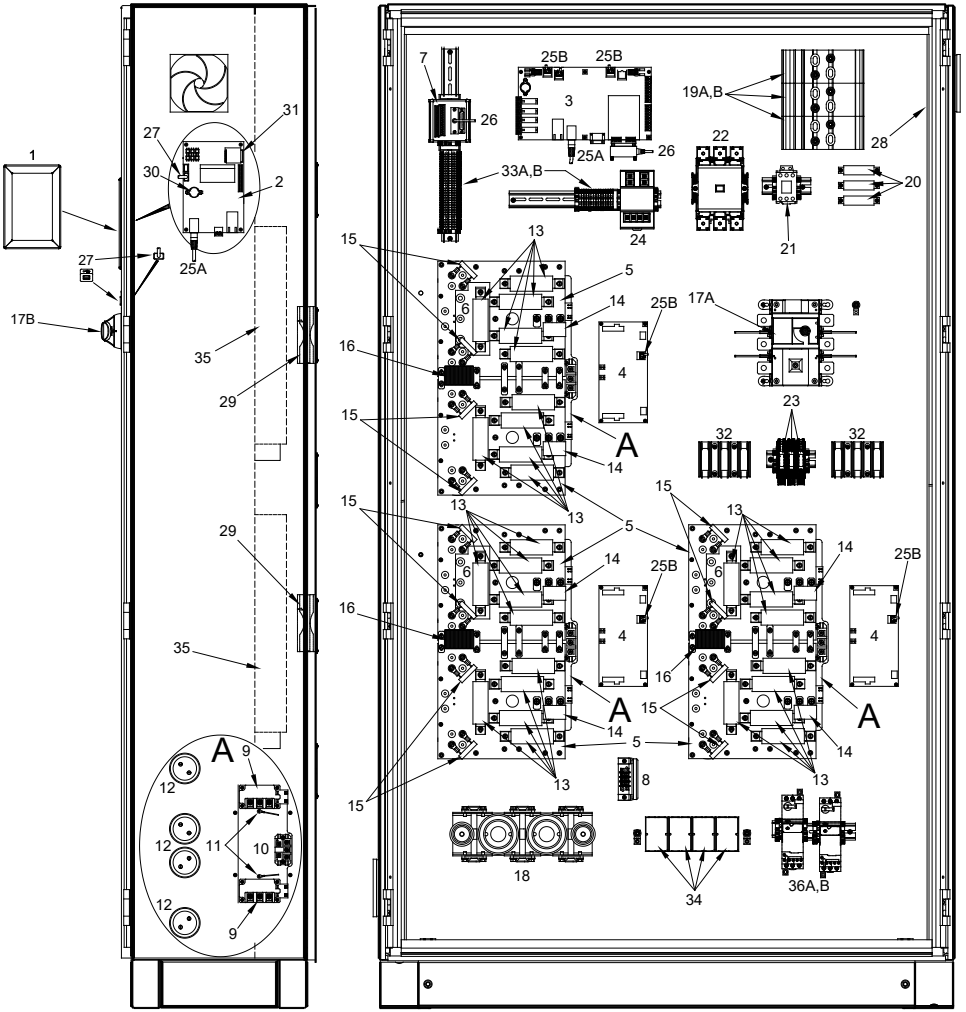


30 kW ProFlex™ Parts

Item #	Part #	Description	Qty
1	EM0421	LCD Touchscreen	1
2	LM5697-03	Touchscreen Display Control Board	1
3	LM5696-02	Main Control Board	1
4	LM5688-01	IGBT Driver Board	2
5	LM5680-01	Power Board	3
6	LM5756-03	Open Capacitor Detection Board	1
7	EM0136	DB 25 Feed Through Module	1
8	LM1982-42	Output CT	1
9	LM3936-05	Inverter Module	3
10	BR0015	Bridge Rectifier	1
11	SE0241	Thermistor	3
12	CP1282	Capacitor, Electrolytic 400V, 3300 uF	6
13	CP1800	Capacitor, 15uF 800 VDC	12
14	CP0070	1 uF, 1000V, Snubber Cap	3
15	LM4043-02	Bleeder Resistor Assembly	6
16	FD5339-03	Inductor Coil	2
17A	SW0360-100	Disconnect Switch	1
17B	SW0362-BB	Disconnect Switch Handle	1
18	LM4837-03	Sharing Transformer	1
19	FU0162	Fuse, 600V, 70A	3
20	RE4902	50 OHM Soft Start Resistor	3
21	CN3074	Contactor 9A 24VDC	1
22	CN3089	Contactor 80A 480V, 24VDC Coil	1
23	FU0366	Fuse 3A	3
24	EM0640-02	24VDC Power Supply	1
25A	CA0756-SH-RA	Ethernet Cable	1
25B	CA0753-SH-RA	Ethernet Cable	2
26	CA0531	DB-25 Cable	1
27	CA1200	USB Panel Mount Cable Assembly	1
28A	EM0099	Motor Starter Control 12 Amp (Optional)	0 to 1
28B	SR0025	Motor Starter Power Base 12 Amp (Optional)	0 to 1
29	FA0090	Fan, 24VDC, 100 CFM	1
30	FA0089	Fan, 24VDC, 243 CFM	2
31	EM0346	Lithium Ion Battery	1
32	EM0347	SD Card – 128MB	1
33	TB0258	175A 3 Pole Distribution Block 1 IN/4 OUT	1
34A	TB7201-020	Terminal Block	24
34B	TB7201-020-G	Terminal Block	2
35A	TB7201-115	Terminal Block	3
35B	TB7201-115-G	Terminal Block	1
36	TB0153	175A 2 Pole Distribution Block 1 IN/4 OUT	2
37	SW0025	Grounding Kit	2
38	FD4302-16	Heat Sink	2

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

60 kW ProFlex™ Parts

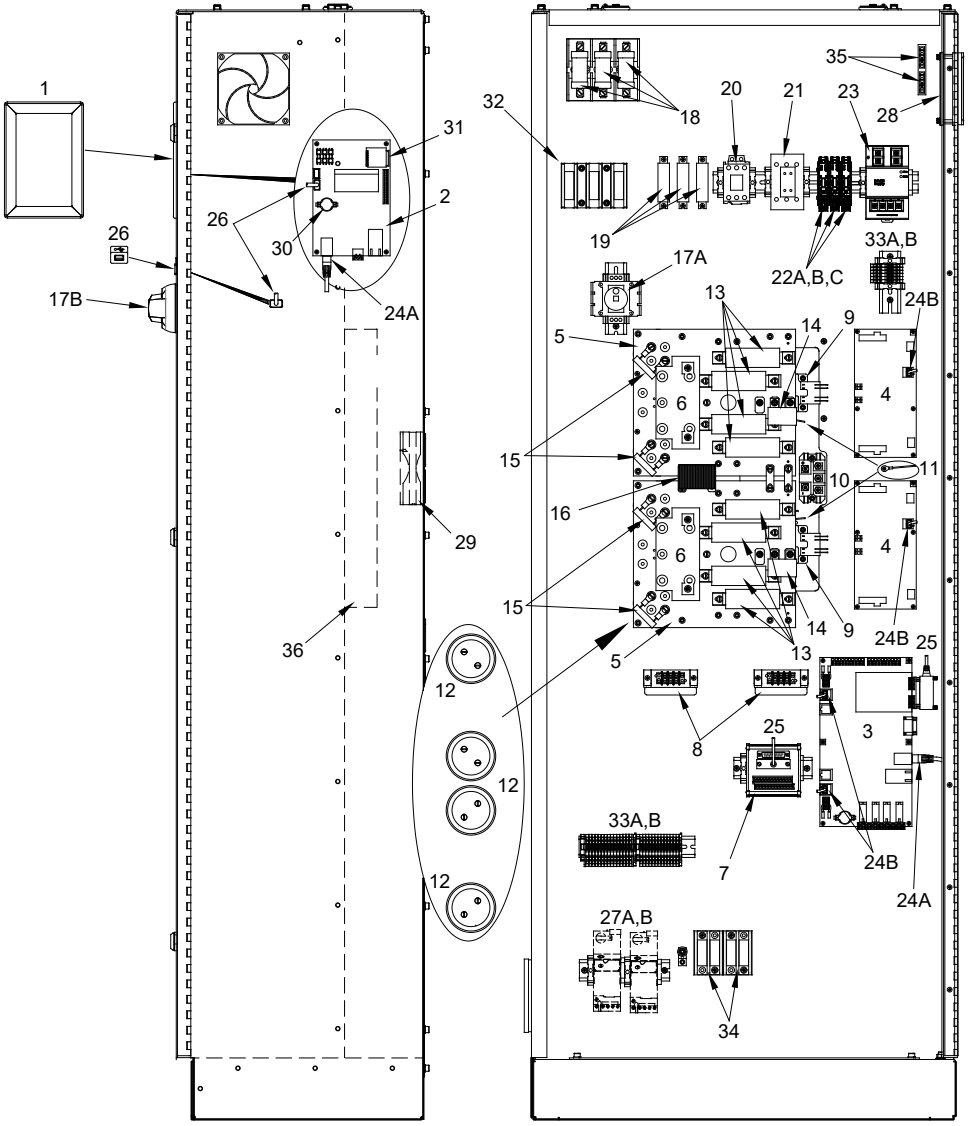


60 kW ProFlex™ Parts

Item #	Part #	Description	Qty
1	EM0421	LCD Touchscreen	1
2	LM5697-03	Touchscreen Display Control Board	1
3	LM5696-02	Main Control Board	1
4	LM5688-01	IGBT Driver Board	2
5	LM5680-01	Power Board	3
6	LM5756-03	Open Capacitor Detection Board	1
7	EM0136	DB 25 Feed Through Module	1
8	LM1982-42	Output CT	1
9	LM3936-05	Inverter Module	6
10	BR0015	Bridge Rectifier	3
11	SE0241	Thermistor	6
12	CP1282	Capacitor, Electrolytic 400V, 3300 uF	12
13	CP1800	Capacitor, 15uF 800 VDC	30
14	CP0070	1 uF, 1000V, Snubber Cap	6
15	LM4043-02	Bleeder Resistor Assembly	12
16	FD5339-03	Inductor Coil	3
17A	SW0360-200	Disconnect Switch	1
17B	SW0362-BB	Disconnect Switch Handle	1
18	LM4837-03	Sharing Transformer	1
19	FU0430	Fuse, 150A, 600V	3
20	RE4902	50 OHM Soft Start Resistor	3
21	CN3074	Contactor 9A 24VDC	1
22	CN3089	Contactor 150A 480V, 24VDC Coil	1
23	FU0366	Fuse 3A	3
24	EM0640-02	24VDC Power Supply	1
25A	CA0756-SH-RA	Ethernet Cable	1
25B	CA0753-SH-RA	Ethernet Cable	3
26	CA0531	DB-25 Cable	1
27	CA1200	USB Panel Mount Cable Assembly	1
28	FA0090	Fan, 24VDC, 100 CFM	1
29	FA0089	Fan, 24VDC, 243 CFM	2
30	EM0346	Lithium Ion Battery	1
31	EM0347	SD Card – 128MB	1
32	TB0258	175A 3 Pole Distribution Block 1 IN/4 OUT	2
33A	TB7201-020	Terminal Block	32
33B	TB7201-020-G	Terminal Block	3
34	TB0153	175A 2 Pole Distribution Block 1 IN/4 OUT	4
35	FD4302-16	Heat Sink	3
36A	EM0099 / EM0094	Motor Starter Control 12 Amp / 32 Amp (Optional)	0 to 2
36B	SR0025 / SR0026	Motor Starter Power Base 12 Amp / 32 Amp (Optional)	0 to 2

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

5-12 kW Twin ProFlex™ Parts

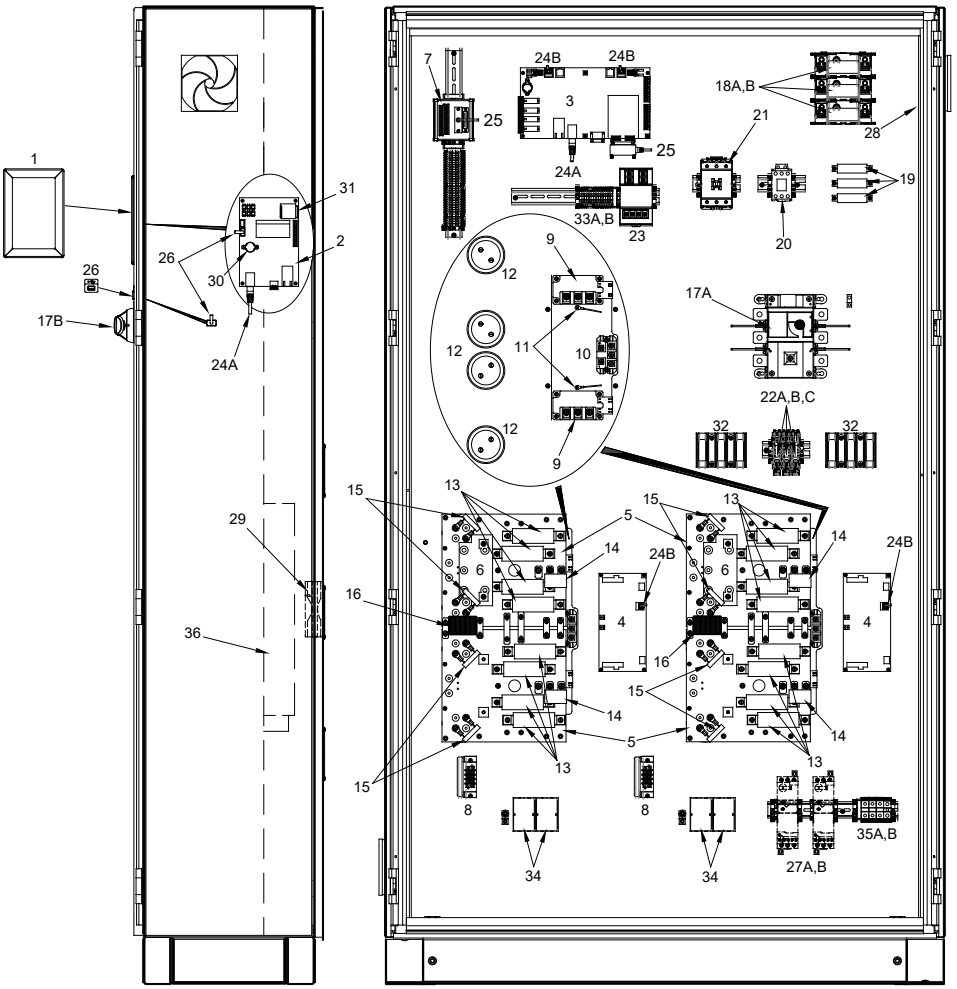


5-12 kW Twin ProFlex™ Parts

Item #	Part #	Description	Qty			
			5 kW	7.5 kW	10 kW	12 kW
1	EM0421	LCD Touchscreen	1	1	1	1
2	LM5697-03	Touchscreen Display Control Board	1	1	1	1
3	LM5696-02	Main Control Board	1	1	1	1
4	LM5688-01	IGBT Driver Board	2	2	2	2
5	LM5680-01	Power Board	2	2	2	2
6	LM5756-03	Open Capacitor Detection Board	2	2	2	2
7	EM0136	DB 25 Feed Through Module	1	1	1	1
8	LM1982-xx	Output CT	2	2	2	2
9	LM3936-xx	Inverter Module	2	2	2	2
10	BR0015	Bridge Rectifier	1	1	1	1
11	SE0241	Thermistor	2	2	2	2
12	CP1282	Capacitor, Electrolytic 400V, 3300 uF	4	4	4	4
13	CP1800	Capacitor, 15uF 800 VDC	4	6	8	10
14	CP0070	1 uF, 1000V, Snubber Cap	2	2	2	2
15	LM4043-02	Bleeder Resistor Assembly	4	4	4	4
16	FD5339-03	Inductor Coil	1	1	1	1
17A	SW0350-060	Disconnect Switch	1	1	1	1
17B	SW0352-BB	Disconnect Switch Handle	1	1	1	1
18	– –	Input Fuse	3	3	3	3
19	RE4902	50 OHM Soft Start Resistor	3	3	3	3
20	CN3074	Contactor 9A 24VDC	1	1	1	1
21	CN3082	Contactor 50A 480V, 24VDC Coil	1	1	1	1
22A	FB0148	Fuse Block, 3 Pole, 600 VAC, 30A	3	3	3	3
23B	FB0149	Fuse Block Cover, 3 Pole	3	3	3	3
23C	FU0366	Fuse 3A	3	3	3	3
23	EM0640-02	24VDC Power Supply	1	1	1	1
24A	CA0756-SH-RA	Ethernet Cable	1	1	1	1
24B	CA0753-SH-RA	Ethernet Cable	2	2	2	2
25	CA0531	DB-25 Cable	1	1	1	1
26	CA1200	USB Panel Mount Cable Assembly	1	1	1	1
27A	EM0099	Motor Starter Control 12 Amp (Optional)	0 to 2	0 to 2	0 to 2	0 to 2
27B	SR0025	Motor Starter Power Base 12 Amp (Optional)	0 to 2	0 to 2	0 to 2	0 to 2
28	FA0090	Fan, 24VDC, 100 CFM	1	1	1	1
29	FA0089	Fan, 24VDC, 243 CFM	1	1	1	1
30	EM0346	Lithium Ion Battery	1	1	1	1
31	EM0347	SD Card – 128MB	1	1	1	1
32	TB0258	175A 3 Pole Distribution Block 1 IN/4 OUT	1	1	1	1
33A	TB7201-020	Terminal Block	Varies	Varies	Varies	Varies
33B	TB7201-020-G	Ground Terminal Block	Varies	Varies	Varies	Varies
34	TB0142	Output Terminal Block	2	2	2	2
35	SW0025	Grounding Kit	2	2	2	2
36	FD4302-16	Heat Sink	1	1	1	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

15-25 kW Twin ProFlex™ Parts

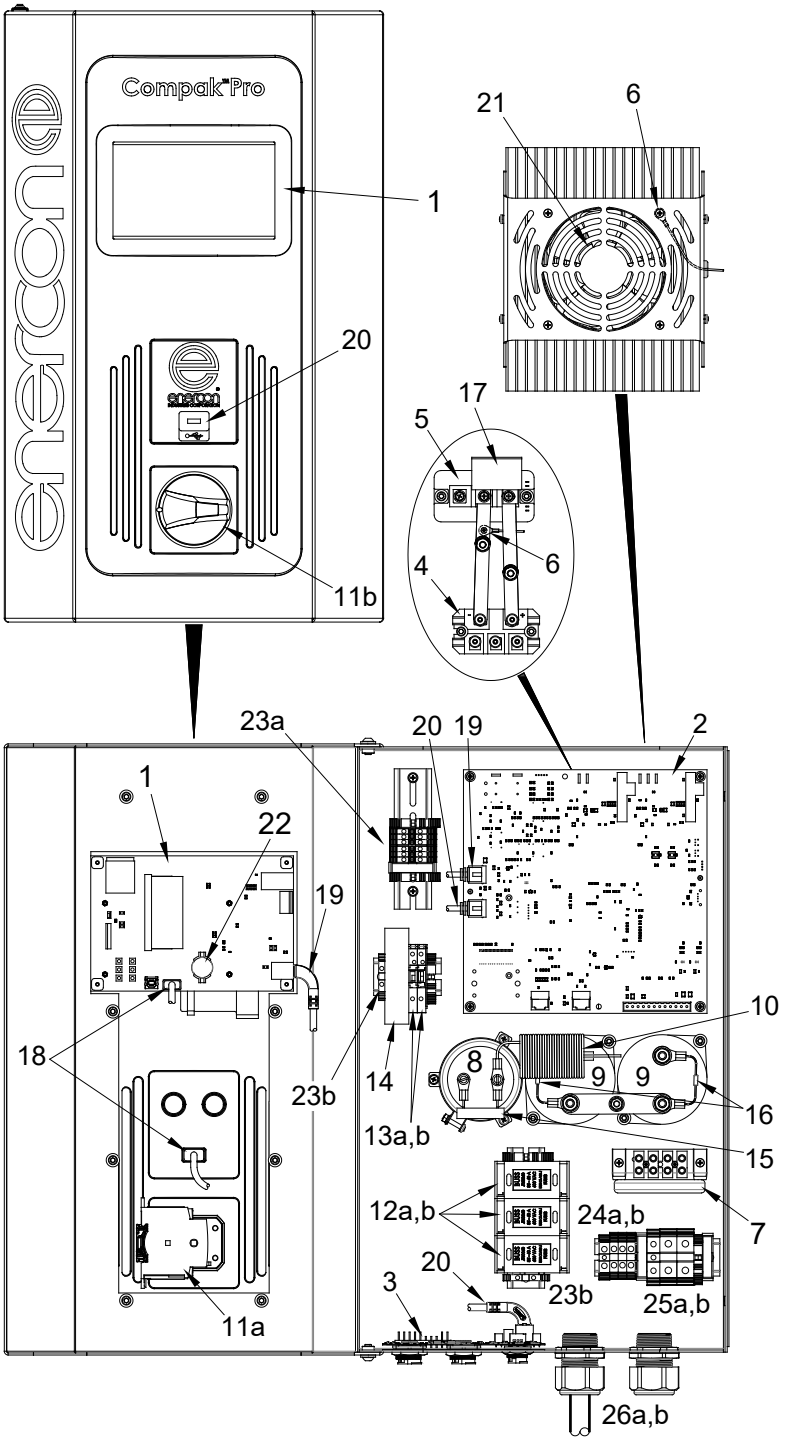


15-25 kW Twin ProFlex™ Parts

Item #	Part #	Description	Qty		
			15kW	20kW	25kW
1	EM0421	Touchscreen Display Assembly	1	1	1
2	LM5697-03	Touchscreen Display Control Board	1	1	1
3	LM5696-02	Main Control Board	1	1	1
4	LM5688-01	IGBT Driver Board	2	2	2
5	LM5680-01	Power Board	4	4	4
6	LM5756-03	Open Capacitor Detection Board	2	2	2
7	EM0136	DB 25 Feed Through Module	1	1	1
8	LM1982-xx	Output CT	2	2	2
9	LM3936-xx	Inverter Module	4	4	4
10	BR0015	Bridge Rectifier	1	1	1
11	SE0241	Thermistor	2	2	2
12	CP1282	Capacitor, Electrolytic 400V, 3300 uF	8	8	8
13	CP1800	Capacitor, 15uF 800 VDC	12	16	20
14	CP0070	1 uF, 1000V, Snubber Cap	4	4	4
15	LM4043-02	Bleeder Resistor Assembly	8	8	8
16	FD5339-03	Inductor Coil	2	2	4
17A	SW0360-100	Disconnect Switch	1	1	1
17B	SW0362-BB	Disconnect Switch Handle	1	1	1
18A	FB0160	Fuse Holder	1	1	1
18B	FU0162	Input Fuse	3	3	3
19	RE4902	50 OHM Soft Start Resistor	3	3	3
20	CN3074	Contactor 9A 24VDC	1	1	1
21	CN3086	Contactor 80A 480V, 24VDC Coil	1	1	1
22A	FB0148	Fuse Block, 3 Pole, 600 VAC, 30A	1	1	1
22B	FB0149	Fuse Block Cover, 3 Pole	1	1	1
22C	FU0366	Fuse 3A	3	3	3
23	EM0640-02	24VDC Power Supply	1	1	1
24A	CA0756-SH	RJ45 Cable	4	4	3
24B	CA0753	RJ45 Cable	1	1	1
25	CA0531	DB-25 Cable	1	1	1
26	CA1200	USB Panel Mount Cable Assembly	1	1	1
27A	EM0099	Motor Starter Control 12 Amp (Optional)	0 to 2	0 to 2	0 to 2
27B	SR0025	Motor Starter Power Base 12 Amp (Optional)	0 to 2	0 to 2	0 to 2
28	FA0090	Fan, 24VDC, 100 CFM	1	1	1
29	FA0089	Fan, 24VDC, 243 CFM	2	2	2
30	EM0346	Lithium Ion Battery	1	1	1
31	EM0347	SD Card – 128MB	1	1	1
32	TB0258	175A 3 Pole Distribution Block	2	2	2
33A	TB7201-020	Terminal Block, 20 AMP, 26-12 AWG	Varies	Varies	Varies
33B	TB7201-020-G	Ground Terminal Block, 26-12 AWG	Varies	Varies	Varies
34	TB0153	175A 2 Pole Distribution Block	4	4	4
35A	TB7201-115	Terminal Block, 115 Amp, 12-2 AWG	3	3	3
35B	TB7201-115-G	Ground Terminal Block, 12-2 AWG	1	1	1
36	FD4302-16	Heat Sink	2	2	2

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

1-8 kW Compak™ Pro 200 Series Parts

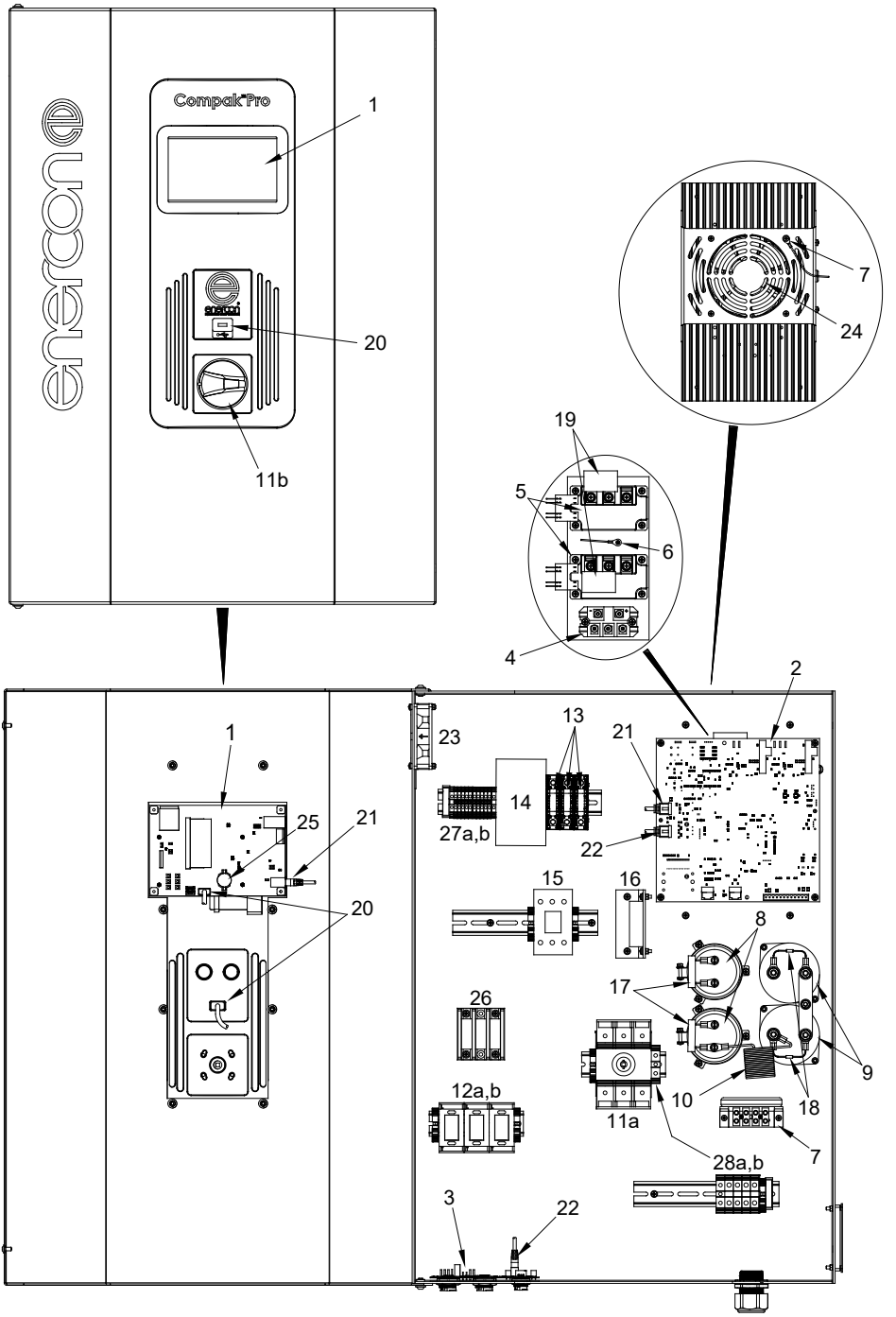


1-8 kW Compak™ Pro 200 Series Parts

Item #	Part #	Description	Qty			
			1–3kW	4kW	5kW	8kW
1	LM5704-05	Touchscreen Assembly	1	1	1	1
2	LM5999-01	Control Board	1	1	1	1
3	LM5992-01	I/O Board	1	1	1	1
4	BR0015	Bridge Rectifier	1	1	1	1
5	LM3751-03	Inverter	1	1	1	1
6	LM5781-01	Thermistor	2	2	2	2
7	LM1982-xx	Output CT	1	1	1	1
8	CP1282	3300uf Electrolytic Capacitor, 400V	1	1	1	1
9	CP0200	100uf Capacitor, 800VDC, 90A RMS	2	2	2	2
10	FD5339-xx	Inductor	1	1	1	1
11a	SW0350-xxx	Disconnect Switch	1	1	1	1
11b	SW0352-BB	Disconnect Switch Handle	1	1	1	1
12a	FB0210	Fuse Holder	3	3	3	3
12b	FU0522	Fuse, Class J 600V, 35A	3	3	3	3
13a	TB7201-F06	Fused Terminal Block	2	2	2	2
13b	FU0124	Fuse 2A	2	2	2	2
14	EM0256	24VDC Power Supply	1	1	1	1
15	LM4043-02	Bleeder Resistor Assembly	1	1	1	1
16	LM5267-01	Resistor Assembly	2	2	2	2
17	CP0070	IGBT Snubber Cap	1	1	1	1
18	CA1200	USB Panel Mount Cable Assembly	1	1	1	1
19	CA0755-SH-RA	Straight Cable RJ45 to RJ45 – 5 ft. Right Angle	1	1	1	1
20	CA0753-SH-LA	Straight Cable RJ45 to RJ45 – 3 ft. Left Angle	1	1	1	1
21	FA0089	Heat Sink Cooling Fan	1	1	1	1
22	EM0346	Battery 3V	1	1	1	1
23a	TB7201-020	Terminal Block – 20 Amp	6	6	6	6
23b	TB7201-020-G	Ground Terminal Block – 20 Amp	2	2	2	2
24a	TB7201-050	Terminal Block – 50 Amp	3	3	3	3
24b	TB7201-050-G	Ground Terminal Block – 50 Amp	1	1	1	1
25a	TB7201-080	Terminal Block – 80 Amp	4	4	4	4
25b	TB7201-080-G	Ground Terminal Block – 80 Amp	2	2	2	2
26a	CD0241	8 AWG, 4 Conductor Tray Cable	1	1	1	1
26b	CD0514	Cord Grip – 1" NPT	2	2	2	2

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

1-16 kW Compak™ Pro 400 Series Parts

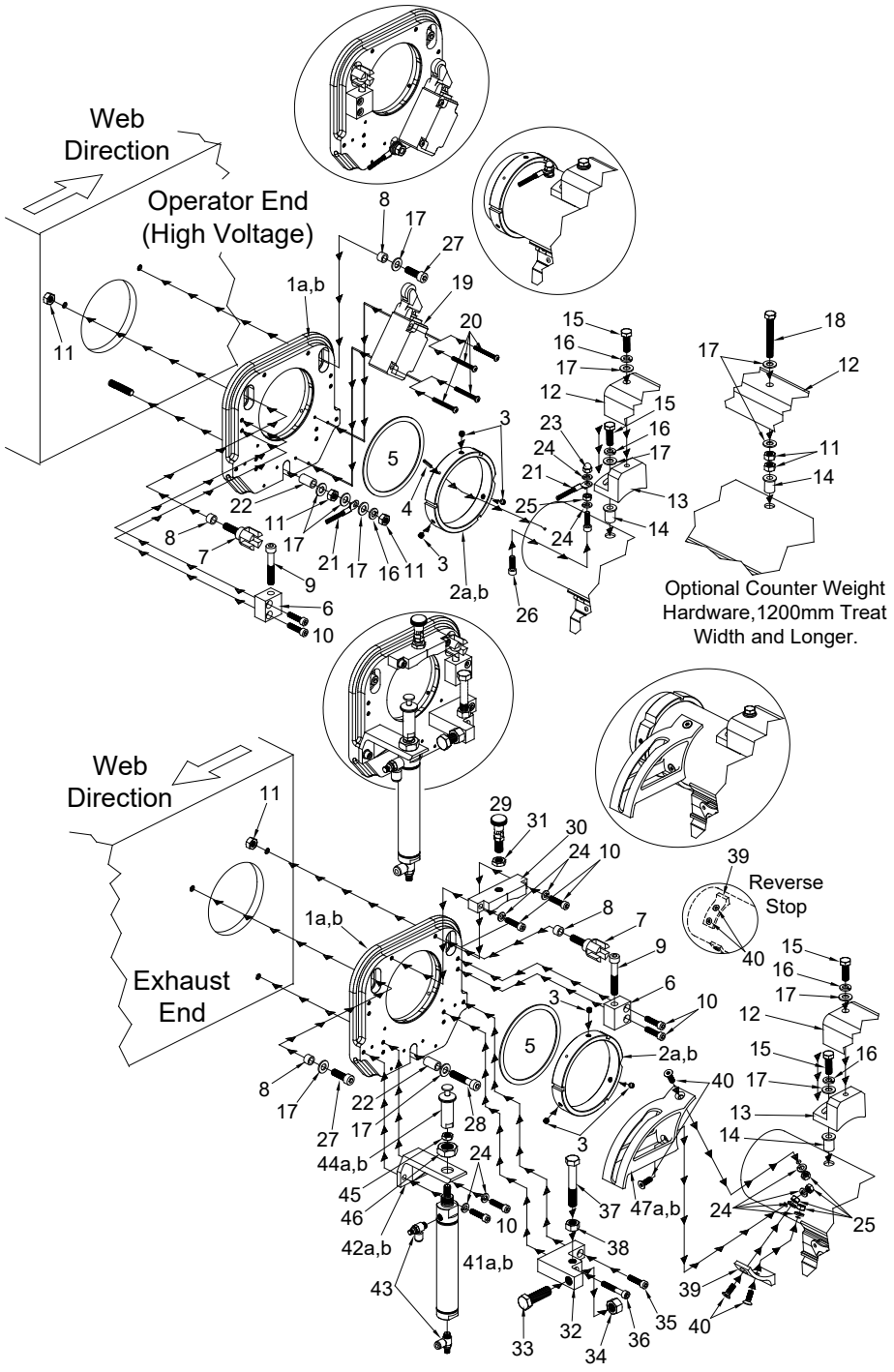


1-16 kW Compak™ Pro 400 Series Parts

Item #	Part #	Description	Qty			
			1–8kW	10kW	12kW	16kW
1	LM5704-05	Touchscreen Assembly	1	1	1	1
2	LM5999-01	Control Board	1	1	1	1
3	LM5992-01	I/O Board	1	1	1	1
4	BR0016	Bridge Rectifier	1	1	1	1
5	LM3936-04	Inverter	1	1 – 2	2	2
6	LM5781-01	Thermistor (Hidden Beneath Fan on Heat Sink)	2	2	2	2
7	LM1982-xx	Output CT	1	1	1	1
8	CP1282	3300uf Electrolytic Capacitor, 400V	2	2	2	2
9	CP0200	100uf Capacitor, 800VDC, 90A RMS	2	2	2	2
10	FD5339-05	Inductor	1	1	1	1
11a	SW0350-xxx	Disconnect Switch	1	1	1	1
11b	SW0352-BB	Disconnect Switch Handle	1	1	1	1
12a	FB0210	Fuse Holder	3	3	3	3
12b	FU0522	Fuse, Class J 600V, 35A	3	3	3	3
13	FU0366	Fuse 3A	3	3	3	3
14	EM0640-02	24VDC Power Supply	1	1	1	1
15	CN3082	Contactor	1	1	1	1
16	RE4902	Resistor 50 Ohm	3	3	3	3
17	LM4043-02	Bleeder Resistor Assembly	2	2	2	2
18	LM5267-01	Resistor Assembly	2	2	2	2
19	CP0070	IGBT Snubber Cap	1	1 – 2	2	2
20	CA1200	USB Panel Mount Cable Assembly	1	1	1	1
21	CA0753-SH-LA	Straight Cable RJ45 to RJ45 – 3 ft. Left Angle	1	1	1	1
22	CA0755-SH-RA	Straight Cable RJ45 to RJ45 – 5 ft. Right Angle	1	1	1	1
23	FA0096	Cabinet Cooling Fan	1	1	1	1
24	FA0089	Heat Sink Cooling Fan	1	1	1	1
25	EM0346	Battery 3V	1	1	1	1
26	TB0158	175A, 3 Pole Distribution Block – 1 IN / 4 OUT	1	1	1	1
27a	TB7201-020	Terminal Block – 20 Amp	10	10	10	10
27b	TB7201-020-G	Ground Terminal Block – 20 Amp	2	2	2	2
28a	TB7201-080	Terminal Block – 80 Amp	4	4	4	4
28b	TB7201-080-G	Ground Terminal Block – 80 Amp	2	2	2	2

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

Electrode Assembly Common Parts

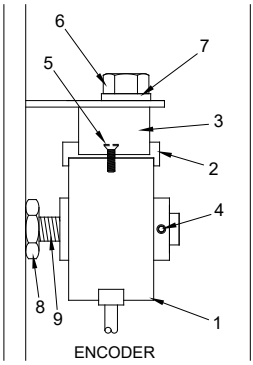


Electrode Assembly Common Parts

Item #	Part #	Description	Qty
1a	LM4728-04	Plastic Bearing Replacement Kit	2
1b	LM4791-03	Plastic Bearing Retrofit Kit (Includes item 1a and item 5)	- -
2a	FD3914-01	Aluminum Ring With Notch	2
2b	LM5693-01	Aluminum Ring Assembly (Includes 1 of item 2a & 3 of item 3)	- -
3	MS7420	Socket Head Set Screw	6
4	SP0052	Spring Pin 1/8 x 3/4"	1
5	FD5975-01	Bushing Ring	2
6	FD4109-04	Adjustment Block	2
7	FD4110-04	Adjustment Stud	2
8	FD4027-01	Bearing Housing Spacer	4
9	MM080-125S050S-0	Socket Head Screw M8 x 1.25P x 50	2
10	MM060-100S025S-0	Socket Head Screw M6 x 1.0P x 25 (Standard – Optional Qty)	6 – 8
11	NU2001	Hex Nut M8 x 1.25P (Standard – Optional Qty)	4 – 6
12	FD6389-xxxx	Counter Weight (Lengths Vary)	1
13	FD5611-06	Counterweight Adjustment Block	2
14	NU7379	Rivet Nut M8 x 1.25P (Standard – Optional Qty)	2 – 3
15	MM080-125H025S-0	Hex Head Screw M8 x 1.25P x 25	4
16	WA1600	Lock Washer	5
17	WA4056	Flat Washer (Standard Qty – Optional Qty)	10 – 12
18	MM080-125H060S-0	Hex Head Cap Screw M8 x 1.25P x 60 (Optional)	1
19	SW7010	Interlock Switch	1
20	MM040-070P040S-0	Fillister Screw M4 x 0.7P x 40	4
21	LM3772-01	Ground Strap	1
22	FD4027-02	Bearing Housing Spacer	2
23	NU0030	Acorn Nut M6 x 1.0P	1
24	WA1555	Lock Washer (Standard – Optional Qty)	8 – 12
25	NU2000	Hex Nut M6 x 1.0P (Standard – Optional Qty)	3 – 5
26	MM060-100S020S-0	Socket Head Screw M6 x 1.0P x 20	3
27	MM080-125S025S-0	Socket Head Screw M8 x 1.25P x 25	2
28	MM080-125S040S-0	Socket Head Screw M8 x 1.25P x 40	1
29	HW7090	Locking Pin Indexing Plunger	1
30	FD4761-01	Locking Pin Holder	1
31	HW7092	Indexing Plunger Jam Nut M10 x 1.0P	1
32	FD4108-26	Electrode Assembly Stop Bracket (Frame)	1
33	MM120-175H040S-0	Hex Head Cap Screw, M12 x 1.75P x 40	1
34	NU7321	Hex Nut M12 x 1.75P	1
35	MM060-100S030S-0	Socket Head Screw M6 x 1.0P x 30mm	1
36	MM060-100S040S-0	Socket Head Screw M6 x 1.0P x 40mm	1
37	MM100-150H065S-0	Hex Head Cap Screw, M10 x 1.5P, 65mm (With Reverse Stop Only)	1
38	NU2020	Hex Nut M10 x 1.5P (With Reverse Stop Only)	1
39	FD4107-01	Electrode Assembly Stop Bracket (Tube "Standard – Reverse Stop")	1 – 2
40	MM060-100F018S-0	Flat Socket Head Cap Screw M6 x 1.0P (Standard / Reverse Stop / Optional Qty)	2 – 6
41a	PN7027	Air Cylinder – 90° Option (Pneumatics Option - Shown)	1
41b	PN7016	Air Cylinder – Standard (Pneumatics Option - Not Shown)	1
42a	FD3984-xx	Mounting Bracket – 90° Option (Pneumatics Option - Shown)	1
42b	FD3984-xx	Mounting Bracket – Standard (Pneumatics Option - Not Shown)	1
43	PN1500	Flow Control 1/8 NPT TO 1/4" (Pneumatics Option Only)	2
44a	LM5465-02	Rod Fitting – 90° Option (Pneumatics Option - Shown)	1
44b	FD3590-01	Rod Fitting – Standard (Pneumatics Option - Not Shown)	1
45	NU7022	Jam Nut 5/16 x 24 (Pneumatics Option)	1
46	NU0141	Low Profile Nut 5/8 x 18 (Pneumatics Option)	1
47a	FD4283-xx	Lift Bracket – 90° Option (Pneumatics Option - Shown)	1
47b	FD4213-xx	Lift Bracket – Standard (Pneumatics Option - Not Shown)	1

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

Miscellaneous Station Parts



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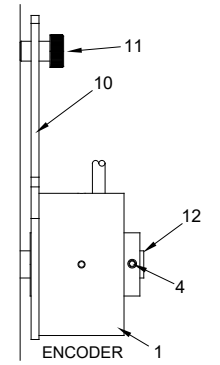

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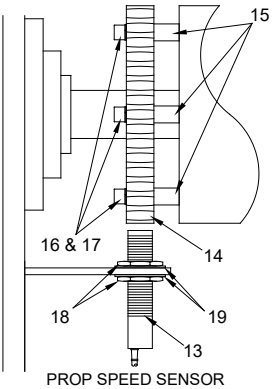
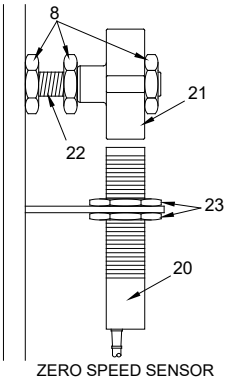
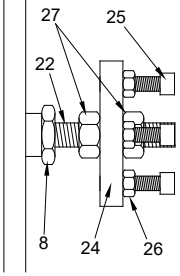


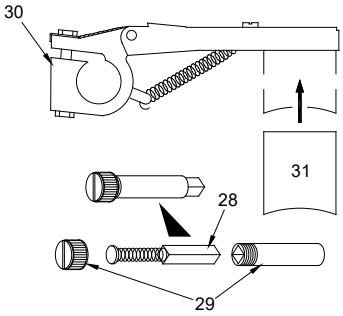
PROP SPEED SENSOR
WITH 60 TOOTH GEAR

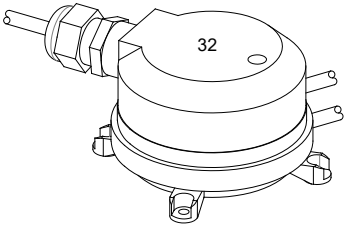


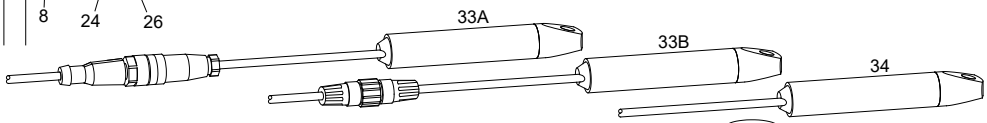
ZERO SPEED SENSOR
WITH CAM

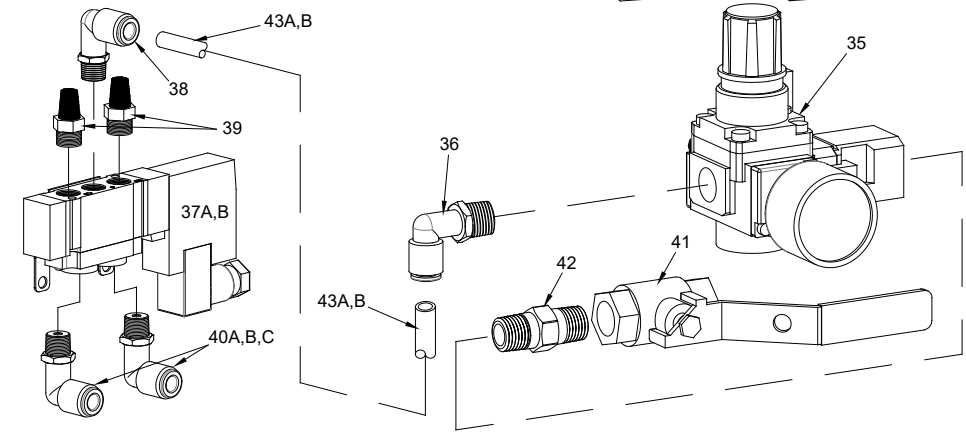
ZERO SPEED
4 BOLT TAGET









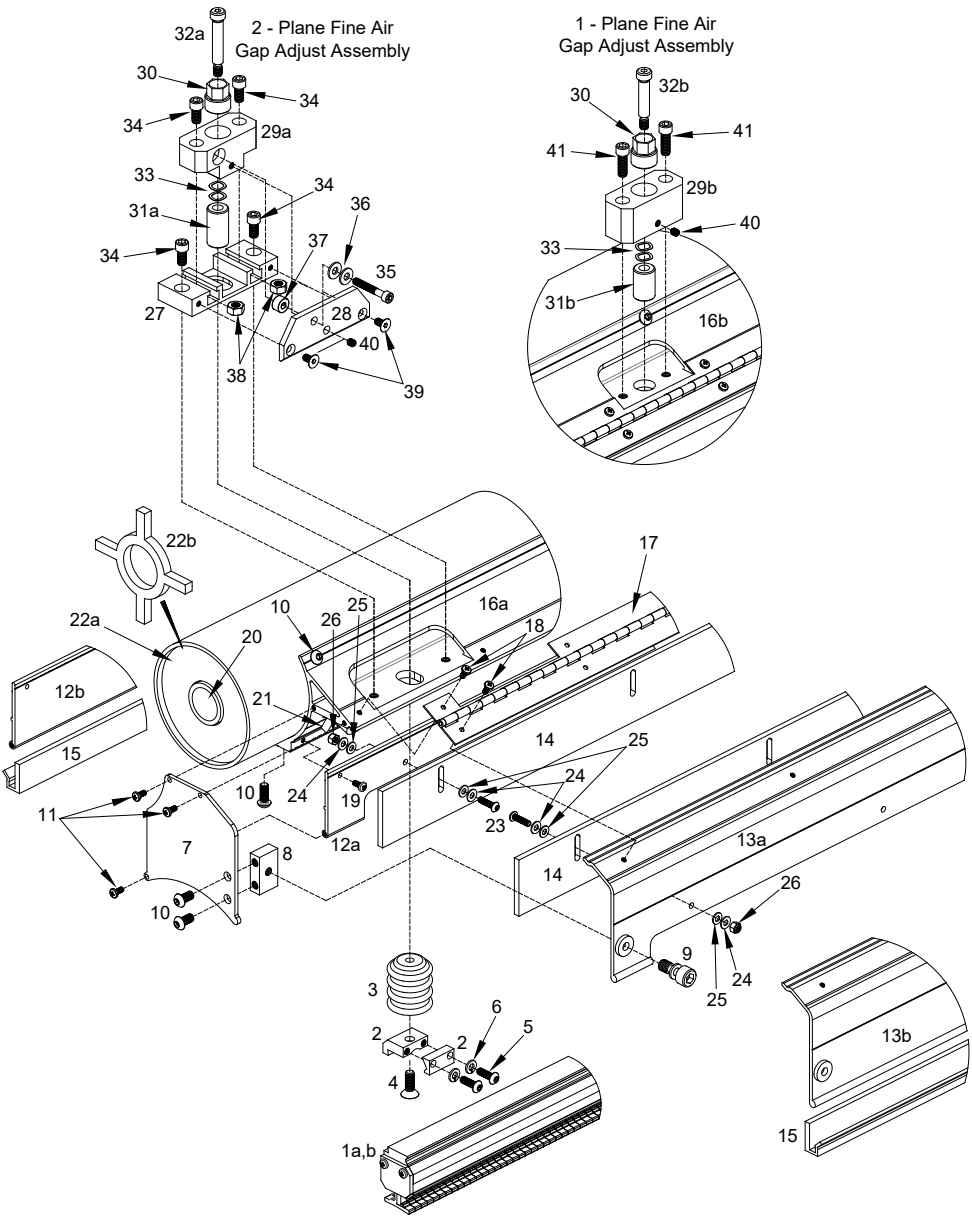


Miscellaneous Station Parts

Item #	Part #	Description	Qty.
1	SE7011	Encoder	1
2	FD5260-02	Mounting Yoke	1
3	FD5260-04	Mounting Yoke	1
4	– –	6 – 32 Set Screw – Supplied with Item #1	1
5	MS004-40F0438S-0	4 – 40 x 7/16" Flat head Machine Screw	1
6	MS044-14H0750S-0	7/16 – 14 x 3/4" Hex Head Cap Screw	1
7	WA1611	7/16" Lock Washer	1
8	NU7020	M10 Jam Nut	As Required
9	FD5259-01	Shaft Adapter	1
10	FD3526-21	Encoder Mounting Arm	1
11	MS7725	Shoulder Bolt, M6 x 1.0P x 8mm	1
12	FD5259-22	Shaft Adapter	1
13	SE7021	Proportional Speed Sensor	1
14	FD4344-xx	60 Tooth Gear	1
15	FD4027-02	Aluminum Spacers	4
16	MS025-20S20005-0	1/4 – 20 x 2" LG Socket Head Cap Screw	4
17	WA1555	1/4" Lock Washer	4
18	WA7070	3/8" Nylon Washer	2
19	– –	Supplied with Item #13	2
20	SE7022	Zero Speed Sensor	1
21	FD4217-01	Zero Speed Cam	1
22	RD6001	M10 Threaded Rod	1
23	– –	Supplied with Item #20	2
24	FD3314-01	Ground Disc	1
25	MM060-100S025S-0	M6 Socket Head Cap Screw	4
26	NU2000	M6 Hex Nut	4
27	NU7270	M10 Hex Nut	2
28	BH7000	Ground Brush	1
29	BH7390	Ground Brush Holder	1
30	BH7001	Ground Brush Holder	1
31	BH7002	Ground Brush	1
32	SWxxxx	Differential Pressure Switch (Size Requirement Varies)	As Required
33A	LM3921-xx	Station Mounted Air Flow Sensor	As Required
33B		Remote Mounted Air Flow Sensor	As Required
34	SE7027	Air Flow Sensor	As Required
35	PN7055	Regulator w/Gauge, Bracket and Port Adapter	1
36	FT3051	Elbow ¼" NPT to ¼" Tube	1
37A	PN7120-01	120V Solenoid Valve	1
37B	PN7120-02	24V Solenoid Valve	1
38	FT3050	Elbow, ⅛" NPT to ¼" Tube	1
39	PN0051	Exhaust Silencer, ⅛" NPT	2
40A	FT3050	11V Station: Elbow, ⅛" NPT to ¼" Tube	2
40B	FT3100	21V Station: Male Run Tee, ⅛" NPT to ¼" Tube	2
40C	FT7390	31V or Greater Station: Manifold	2
	FT3050	Elbow, ⅛" NPT to ¼" Tube	2
41	PN7002	Lockout Valve	1
42	FT0025	Hex Nipple, ¼" NPT	1
43A	TU7090	Black Polyethylene Tube, ¼"	As Required
43B	TU7094	White Polyethylene Tube, ¼"	As Required

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

CSO Segmented Electrode Assembly Parts



CSO Segmented Electrode Assembly Parts

Item #	Part #	Description	Qty.
1A	LM4096-xxx	Electrode Sub Assembly – 1/4" Segments	Varies
1B	LM4164-xxx	Electrode Sub Assembly – 1/2" Segments	Varies
2	LM6007-01	CSO Clamp Block Assembly (Includes Items 5 & 6)	Varies
3	IN0012-02	Glazed Alumina Post	Varies
4	MS025-20F0625S-0	Flat Head Cap Screw, 1/4"–20 x 5/8"	Varies
5	MM050-080B016S-0	SS Button Head Screw M5 x 0.8P x 16	Varies
6	WA1550	SS Lock Washer	Varies
7	FD5212-01	Side Plate, Offset Shroud	2
8	FD5263-01	Shroud Clamp Block	2
9	HW7036	Captive Panel Screw Assembly	2
10	MS025-20B0500S-0	Button Head Cap Screw, 1/4"–20 x 1/2"	Varies
11	MS006-32P0313S-0	Pan Head Machine Screw, #6–32 x 5/16"	6
12a	FD5556-xxxx	Aluminum Shroud, Offset Leg, Short – Modified for Shroud Ext.	1
12b	AL7146-03	Aluminum Shroud, Offset Leg, Short	1
13a	FD5555-xxxx	Aluminum Shroud, Offset Leg, Long – Modified for Shroud Ext.	1
13b	AL7146-02	Aluminum Shroud, Offset Leg, Long	1
14	FD5299-138-2122-02	Adjustable Shroud Extension (Supplied w/Items 12a & 13a)	2
15	IN0059	Wear Strip (Supplied w/Items 12b & 13b)	2
16a	FD6210-xxx	Offset Shroud Base, 2-Plane Fine Air Gap Adjust Assy	1
16b	FD5534-xxx	Offset Shroud Base, 1-Plane Fine Air Gap Adjust Assy	1
17	HW7000	Piano Hinge	Varies
18	MS006-32P0188S-0	Pan Head Machine Screw, #6–32 x 3/16"	Varies
19	MS006-32P0250S-0	Pan Head Machine Screw #6–32 x 1/4"	Varies
20	FD4997-04	Pyrex Elbow	1
21	FD5700-01	Pyrex Elbow Insulator	1
22a	IN7210-03	Round Insulator for Pyrex Tube	1
22b	IN7140-03	Star Insulator for Pyrex Tube	1
23	MM040-070B016S-0	SS Button Head Screw, M4 x 0.7P x 16mm	Varies
24	WA4045	SS Flat Washer SAE .171" x .375" x .031"	Varies
25	WA0069	M4 PTFE Flat Washer, 4.3mm ID x 9.0mm OD x 0.8mm THK	Varies
26	NU2056	SS Lock Nut, M4 x 0.7P w/Nylon Insert	Varies
27	FD5658-04	Adjustment Mount Block (2-Plane Fine Air Gap Adjust Assy)	1 per Assy
28	FD5658-05	Adjustment Plate (2-Plane Fine Air Gap Adjust Assy)	1 per Assy
29a	FD5658-06	Adjustment Block (2-Plane Fine Air Gap Adjust Assy)	1 per Assy
29b	FD5658-01	Adjustment Block (1-Plane Fine Air Gap Adjust Assy)	1 per Assy
30	FD5658-02	Fine Adjust Screw (Both Fine Air Gap Adjust Assy)	1 per Assy
31a	FD5658-07	Fine Adjust Spacer (2-Plane Fine Air Gap Adjust Assy)	1 per Assy
31b	FD5658-03	Fine Adjust Spacer (1-Plane Fine Air Gap Adjust Assy)	1 per Assy
32a	MS2802	SS Socket Head Shoulder Bolt 1/4-20, 5/16 OD x 1-1/2 (2-Plane)	1 per Assy
32b	MS0099	SS Socket Head Shoulder Bolt 1/4-20, 5/16 OD x 1-1/4 (1-Plane)	1 per Assy
33	WA0027	Wave Washer (Both Fine Air Gap Adjust Assy)	2 per Assy
34	MS025-20S0500S-0	SS Socket Head Screw 1/4-20 x 1/2 (2-Plane Fine Air Gap Adjust Assy)	4 per Assy
35	MS010-32S1250S-0	SS Socket Head Screw #10-32 x 1-1/4 (2-Plane Fine Air Gap Adjust Assy)	1 per Assy
36	WA4050	SS Flat Washer (2-Plane Fine Air Gap Adjust Assy)	2 per Assy
37	HW0186	3/16" ID Shaft Clamp (2-Plane Fine Air Gap Adjust Assy)	1 per Assy
38	NU2050	Nut 1/4-20 Hex SS (2-Plane Fine Air Gap Adjust Assy)	2 per Assy
39	MS010-32F0375S-0	18-8 SS Flat Head Cap Screw #10-32 x 3/8 (2-Plane Fine Air Gap Adjust Assy)	2 per Assy
40	MS0101	Set Screw w/Nylon Tip #10-32 x 3/16	1 per Assy
41	MS025-20S0750S-0	SS Socket Head Screw 1/4-20 x 3/4 (1-Plane Fine Air Gap Adjust Assy)	2 per Assy

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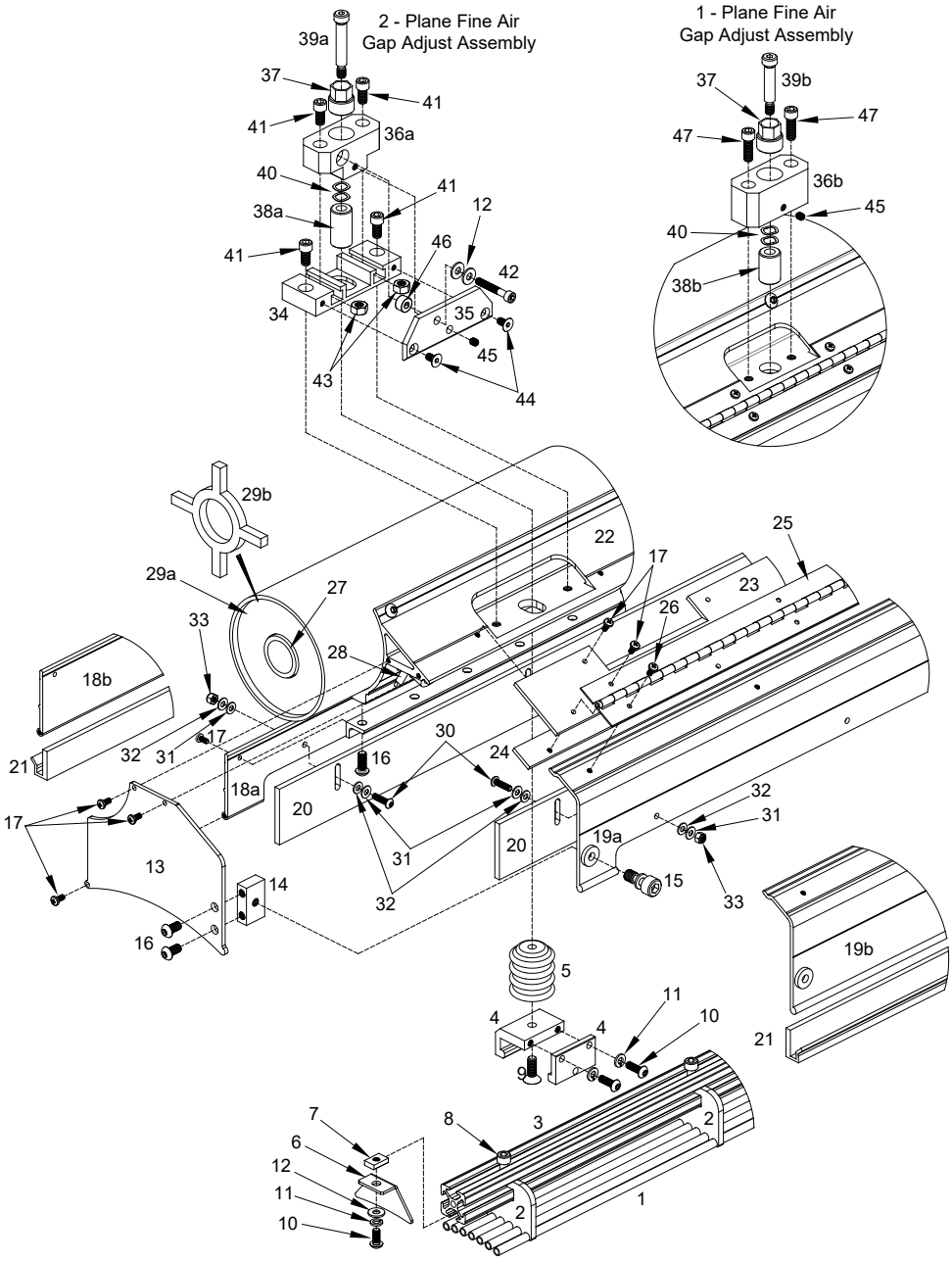
CSO Rod Electrode Assembly Parts



CSO Rod Electrode Assembly Parts

Item #	Part #	Description	Qty.
1	FD5745-xxxx	SS Electrode Tube	7 - 9
2	FD6287-xxx	SS Electrode Tube Holder	Varies
3	FD6696-xxxx	1.0" Square Aluminum Extrusion Electrode Support	1
4	LM6007-02	CSO Clamp Block Assembly (Includes Items 10 & 11)	Varies
5	IN0012-02	Glazed Alumina Post	Varies
6	FD3265-1066	Tube Stop	2
7	FD6719-01	SS M5 T-Nut	2
8	MM060-100S020S-0	SS Socket Head Screw, M6 x 1.0P x 20mm	Varies
9	MS0025-20F0625S-0	SS Flat Head Cap Screw, 1/4"–20 x 5/8"	Varies
10	MM050-080B016S-0	SS Button Head Screw, M5 x 0.8P x 16	Varies.
11	WA1550	SS Lock Washer	Varies
12	WA4050	SS Flat Washer	Varies
13	FD5212-04	Side Plate, Offset Shroud	2
14	FD5263-01	Shroud Clamp Block	2
15	HW7207	Captive Panel Screw Assembly	2
16	MM060-100B012S-0	SS Button Head Screw, M6 x 1.0P x 12mm	Varies
17	MM035-060P008S-0	SS Phillips Head Screw, M3.5 x 0.6P x 8mm	Varies
18a	FD5556-xxxx	Aluminum Shroud, Offset Leg, Short – Modified for Shroud Ext.	1
18b	AL7146-03	Aluminum Shroud, Offset Leg, Short	1
19a	FD5555-xxxx	Aluminum Shroud, Offset Leg, Long – Modified for Shroud Ext.	1
19b	AL7146-02	Aluminum Shroud, Offset Leg, Long	1
20	FD5299-138-2122-02	Adjustable Shroud Extension (Supplied w/Items 18a & 19a)	2
21	IN0059	Wear Strip (Supplied w/Items 18b & 19b)	2
22	FD6186-2032-03	Aluminum Shroud Offset Base	1
23	AL0035-xxxx	2 x 1/8" Aluminum Rectangle	1
24	AL7007-xxxx	3/4 x 1/8" Aluminum Rectangle	1
25	HW7000-xxxx	Piano Hinge	1
26	MM035-060P005S-0	SS Phillips Head Screw, M3.5 x 0.6P x 5mm	Varies
27	FD4997-xxx-xxx	Pyrex Elbow	1
28	FD5700-01	Pyrex Elbow Insulator	1
29a	IN7210-03	Round Insulator for Pyrex Tube	1
29b	IN7140-03	Star Insulator for Pyrex Tube	1
30	MM040-070B016S-0	SS Button Head Screw, M4 x 0.7P x 16mm	Varies
31	WA4045	SS Flat Washer SAE .171" x .375" x .031"	Varies
32	WA0069	M4 PTFE Flat Washer, 4.3mm ID x 9.0mm OD x 0.8mm THK	Varies
33	NU2056	SS Lock Nut, M4 x 0.7P w/Nylon Insert	Varies
34	FD5658-04	Adjustment Mount Block (2-Plane Fine Air Gap Adjust Assy)	1 per Assy
35	FD5658-05	Adjustment Plate (2-Plane Fine Air Gap Adjust Assy)	1 per Assy
36a	FD5658-06	Adjustment Block (2-Plane Fine Air Gap Adjust Assy)	1 per Assy
36b	FD5658-01	Adjustment Block (1-Plane Fine Air Gap Adjust Assy)	1 per Assy
37	FD5658-02	Fine Adjust Screw (Both Fine Air Gap Adjust Assy)	1 per Assy
38a	FD5658-07	Fine Adjust Spacer (2-Plane Fine Air Gap Adjust Assy)	1 per Assy
38b	FD5658-03	Fine Adjust Spacer (1-Plane Fine Air Gap Adjust Assy)	1 per Assy
39a	MS2802	SS Socket Head Shoulder Bolt 1/4-20, 5/16 OD x 1-1/2 (2-Plane)	1 per Assy
39b	MS0099	SS Socket Head Shoulder Bolt 1/4-20, 5/16 OD x 1-1/4 (1-Plane)	1 per Assy
40	WA0027	Wave Washer (Both Fine Air Gap Adjust Assy)	2 per Assy
41	MS025-20S0500S-0	SS Socket Head Screw 1/4-20 x 1/2 (2-Plane Fine Air Gap Adjust Assy)	4 per Assy
42	MS010-32S1250S-0	SS Socket Head Screw #10-32 x 1-1/4 (2-Plane Fine Air Gap Adjust Assy)	1 per Assy
43	WA4050	SS Flat Washer (2-Plane Fine Air Gap Adjust Assy)	2 per Assy
44	HW0186	3/16" ID Shaft Clamp (2-Plane Fine Air Gap Adjust Assy)	1 per Assy
45	NU2050	Nut 1/4-20 Hex SS (2-Plane Fine Air Gap Adjust Assy)	2 per Assy
46	MS010-32F0375S-0	18-8 SS Flat Head Cap Screw #10-32 x 3/8 (2-Plane Fine Air Gap Adjust Assy)	2 per Assy
47	MS0101	Set Screw w/Nylon Tip #10-32 x 3/16	1 per Assy

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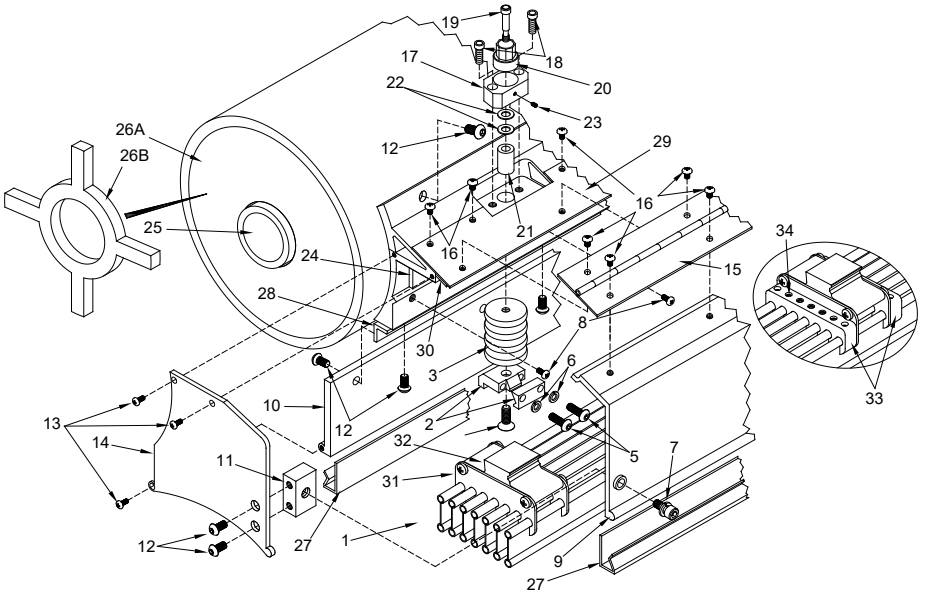
CSO Finned Electrode Assembly Parts



Item #	Part #	Description	Qty
1	FD6089- xxxx	Finned Electrode	As Req.
2	LM6007-01	CSO Clamp Block Assembly (Includes Items 5 & 6)	As Req.
3	IN0012-02	Glazed Alumina Post	As Req.
4	MS0025-20F0625S-0	Flat Head Cap Screw, 1/4"–20 x 5/8"	As Req.
5	MM050-080B016S-0	SS Button Head SCREW M5 x 0.8P x 16	As Req.
6	WA1550	SS Lock Washer	As Req.
7	HW7036	Captive Panel Screw Assembly	2
8	MS0006-32P0250S-0	Pan Head Machine Screw #6–32 x 1/4"	As Req.
9	AL7146-02	Aluminum Shroud, Offset Leg, Long	1
10	AL7146-03	Aluminum Shroud, Offset Leg, Short	1
11	FD5263-01	Shroud Clamp Block	2
12	MS0025-20B0500S-0	Button Head Cap Screw, 1/4"–20 x 1/2"	As Req.
13	MS0006-32P0313S-0	Pan Head Machine Screw, #6–32 x 5/16"	6
14	FD5212-04	Side Plate, Offset Shroud	2
15	HW7000	Piano Hinge	As Req.
16	MS006-32P0188S-0	Pan Head Machine Screw, #6–32 x 3/16"	As Req.
17	FD5658-01	Fine Air Gap Adjustment Block	As Req.
18	MS025-20S0750S-0	Socket head Cap Screw 1/4"–20 x 1/2"	As Req.
19	MS0099	Bolt 5/16" x 1-1/4 SH SS Shoulder 1/4"–20	As Req.
20	FD5658-02	Fine Adjustment Screw	As Req.
21	FD5658-03	Fine Adjust Spacer	As Req.
22	WA0027	Washer, Wave	As Req.
23	MS0101	Screw #10–32 x 3/16" Set SH SS Flat Pt Nylon Tip	As Req.
24	FD5700-01	Pyrex Elbow Insulator	1
25A	FD4997-04	Pyrex Elbow	1
25B	IN7210-03	Round Insulator for Pyrex Tube	1
26	IN7140-03	Star Insulator for Pyrex Tube	1
27	IN0059	Wear Strip	As Req.
28	AL0010	Aluminum Angle	As Req.
29	AL0035	2 x 1/8" Aluminum Rectangle	As Req.
30	AL7007	3/4 x 1/8" Aluminum Rectangle	As Req.
31	FD6059-500	Fin Electrode Holder	As Req.
32	FD6075-01	Fin Electrode Mount Block	As Req.

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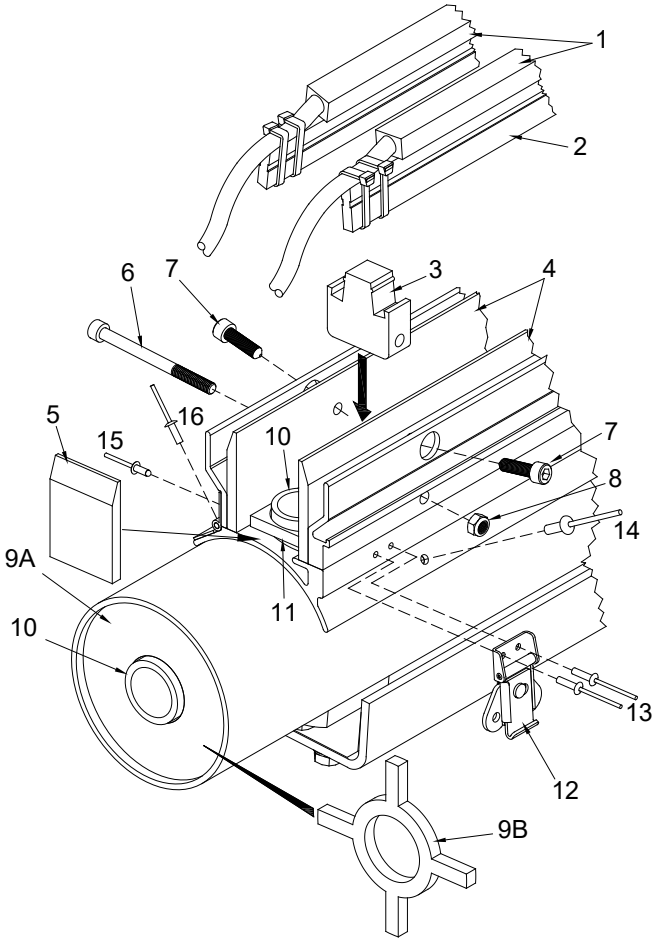
CSO Stainless Steel Electrode Assembly Parts



Item #	Part #	Description	Qty
1	SS2120-xxx	Electrode	2
2	FD4150-03	Electrode Mounting Tab (Included with Electrode)	As Req.
3	FD4104-01	Standard Electrode Mounting Block	As Req.
4	– –	Standard Insulating Shroud	2
5	FD5376-0040	Insulating Shroud End Piece (One at each end)	2
6	MM060-100S075S-0	M6 Hex. Head. Cap Screw	As Req.
7	MS7900	Electrode Mounting Screw	As Req.
8	NU2054	M6 Locknut w/Nylon Insert	As Req.
9A	IN7210-03	Round Insulator for Pyrex Tube	1
9B	IN7140-03	Star Insulator for Pyrex Tube	1
10	FD4997-xx	Pyrex Elbow	1
11	FD5700-01	Pyrex Elbow Insulator	1
12	HW7060	Twist Latch	As Req.
13	RV0125-376-500	Blind Rivet, 1/8, .376-.500 Grip, Closed End	As Req.
14	RV0188-126-250	Blind Rivet, 3/16, .126-.250 Grip, Closed End	As Req.
15	RV0125-032-062	Blind Rivet, 1/8, .032-.062 Grip	As Req.
16	RV0125-126-187	Blind Rivet, 1/8, .126-.187 Grip, Closed End	As Req.

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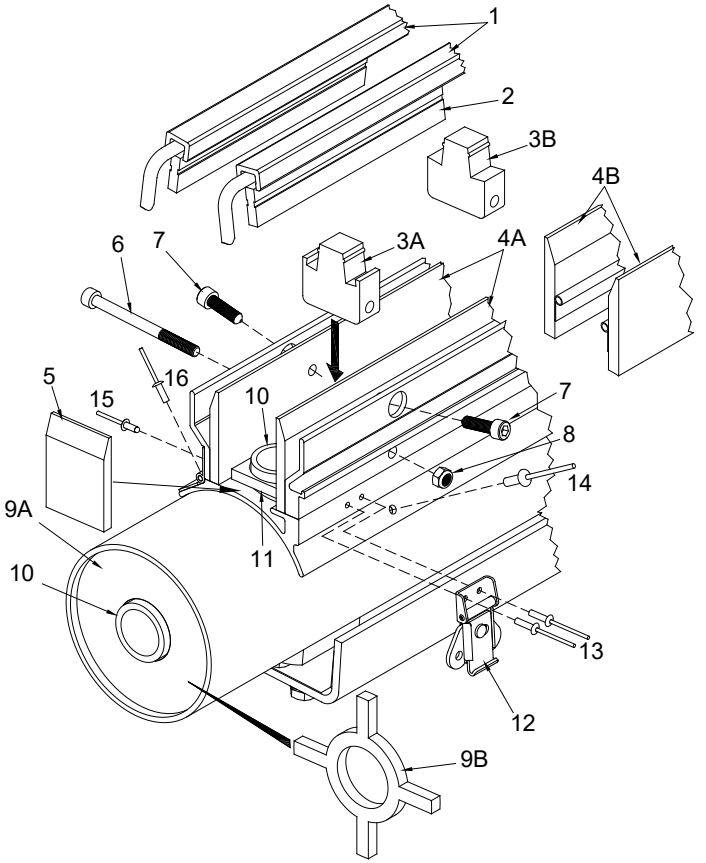
ASO / ESO Ceramic Electrode Assembly Parts



Item #	Part #	Description	Qty
1	– –	Electrode (Electrodes will be either V, PV or EV Style only - No Mixing)	2
2	FD4150-01	Electrode Mounting Tab (Included with Electrode)	As Req.
3A	FD4104-01	ASO Assembly Electrode Mounting Block	As Req.
3B	FD4104-06	ESO Assembly Electrode Mounting Block	As Req.
4A	– –	ASO Assembly Insulating Shroud	2
4B	– –	ESO Assembly Insulating Shroud	2
5	FD5376-0040	Insulating Shroud End Piece (One at each end)	2
6	MM060-100S075S-0	M6 Hex. Head. Cap Screw	As Req.
7	MS7900	Electrode Mounting Screw	As Req.
8	NU2054	M6 Locknut w/Nylon Insert	As Req.
9A	IN7210-03	Round Insulator for Pyrex Tube	1
9B	IN7140-03	Star Insulator for Pyrex Tube	1
10	FD4997-xx	Pyrex Elbow	1
11	FD5700-01	Pyrex Elbow Insulator	1
12	HW7060	Twist Latch	As Req.
13	RV0125-376-500	Blind Rivet, 1/8, .376-.500 Grip, Closed End	As Req.
14	RV0188-126-250	Blind Rivet, 3/16, .126-.250 Grip, Closed End	As Req.
15	RV0125-032-062	Blind Rivet, 1/8, .032-.062 Grip	As Req.
16	RV0125-126-187	Blind Rivet, 1/8, .126-.187 Grip, Closed End	As Req.

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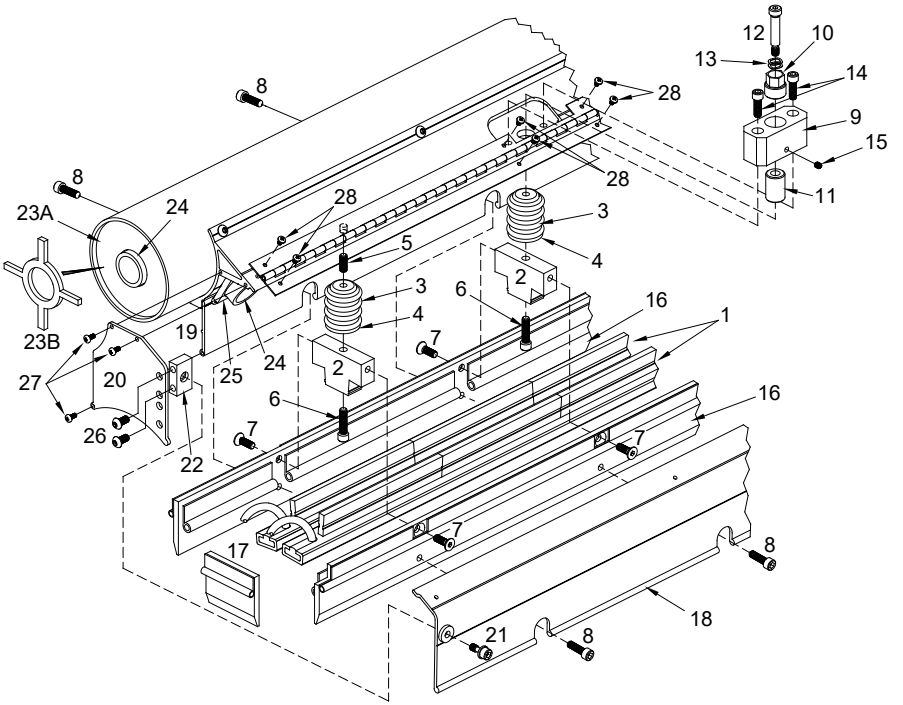
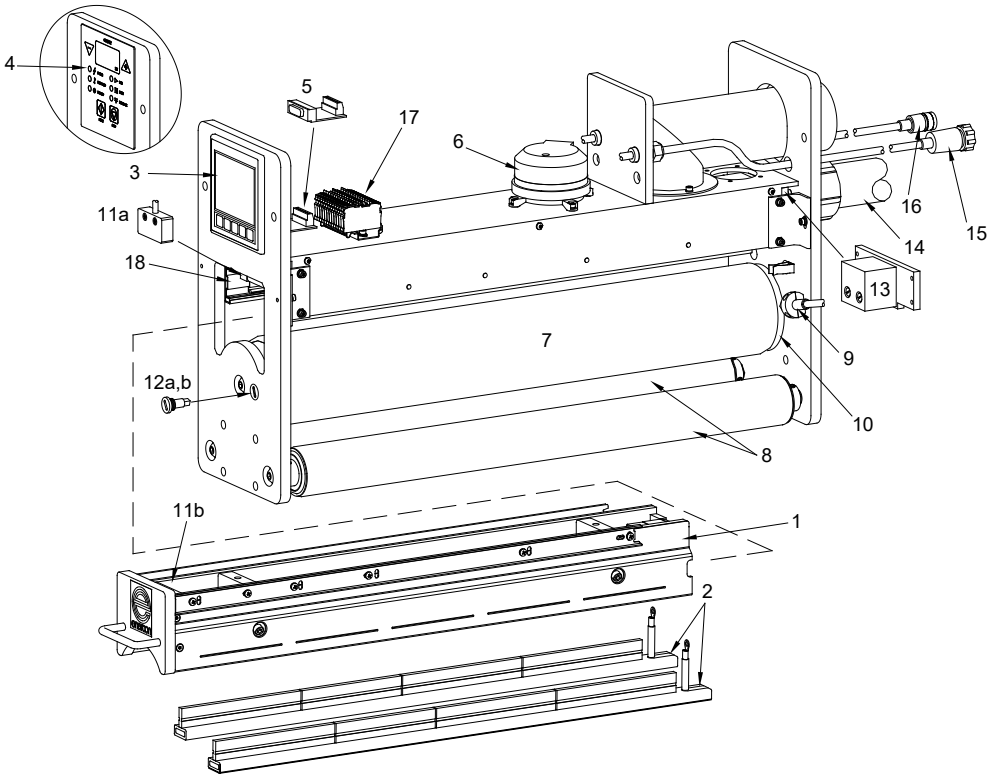
ESO E ² Ceramic Electrode Assembly Parts



Item #	Part #	Description	Qty.
1	LM5405-xx	E² Electrode	2
2	FD4105-06	Electrode Mounting Block	As Req.
3	IN0012-02	Glazed Alumina Post	As Req.
4	FD5255-11	Electrode Mounting Spacer	As Req.
5	FD1127-63	Threaded Rod, Brass	As Req.
6	MS025-20S0875S-0	SS Socket Head Cap Screw 1/4-20 x 7/8	As Req.
7	MM060-100F018S-0	SS Flat Socket Head Cap Screw M6 x 1P	As Req.
8	MS0079	Electrode Mounting Screw	As Req.
9	FD5658-01	Fine Adjustment Mount Block	As Req.
10	FD5658-02	Fine Adjustment Screw	As Req.
11	FD5658-03	Fine Adjustment Spacer	As Req.
12	MS0099	SS Socket Head Shoulder Bolt 1/4-20 x 5/16 x 1-1/4	As Req.
13	WA0027	Wave Washer	As Req.
14	MS025-20S0750S-0	SS Socket Head Screw 1/4-20 x 3/4	As Req.
15	MS0101	SS Set Screw Flat Point Nylon Tip 10-32 x 3/16	As Req.
16	FD5376-xx	Insulating Shroud	2
17	FD5376-xx	Insulating Shroud End	2
18	AL7146-02-xx	Alum Shroud Offset Leg, Long	1
19	AL7146-03-xx	Alum Shroud Offset Leg, Short	1
20	FD5212-06	Side Plate Offset Shroud	2
21	FD5263-03	Shroud Clamp Block	2
22	HW7207	Captive Panel Screw Assy	2
23A	IN7210-xx	Round Insulator Pyrex Elbow	2
23B	IN7140-xx	Star Insulator Pyrex Elbow	1
24	FD4997-xx	Pyrex Elbow	1
25	FD5700-01	Insulator For Pyrex Elbow	1
26	MM060-100B012S-0	SS Button Head Screw M6 x 1.0P x 12	4
27	MM035-060P008S-0	SS Pan Head Screw M3.5 x 0.6P x 8	6
28	MM035-060P005S-0	SS Pan Head Screw M3.5 x 0.6P x 5	As Req.

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

CoronaFlex™ Station Parts



Item #	Part #	Description	Qty.
1	LM5801-xx	Electrode Assembly Drawer	1
2	– –	Electrodes	2
3	EM0385	4″ Color Touch Screen (CoronaFlex™ Deluxe)	1
4	LM5794-01	Membrane Switch Assembly (CoronaFlex™)	1
5	EM0381	15 Pin D-Sub Port Adapter for RS485	1
6	SW0291	Differential Pressure Switch	1
7	– –	Ground Roll	1
8	– –	Idler Roll	1
9	SE7019	Speed Sensor	2
10	SE0175	Magnet Wheel	4
11a	SW0470-SW	Universal Reed Switch – Switch Mechanism (Hidden Inside Drawer)	2
11b	SW0470-ACT	Universal Reed Switch – Magnetic Actuator	1
12a	LM3289-113	Ground Brush Assembly	1
12b	BH7004	Ground Brush	1
13	LM5807-01	High Voltage Connection Assembly	1
14	LM5199-xx	Flexible High Voltage Conduit	1
15	LM5243-xx	System Interface / Interlock Cable	1
16	LM5263-xx	Remote Control Cable	1
17	– –	Terminal Blocks	Varies
18	– –	Electrode Drawer Slide	2

NOTE: *To insure the correct parts are supplied please have the model and serial number of the system available.*

Notes

Notes

Enercon Global Manufacturing Operations

Enercon Industries Corporation United States

Enercon Industries Ltd.
United Kingdom

Enercon Asia Pacific
India

Major Enercon Operating Centers

USA
Enercon Industries Corporation
N120 W19349 Freistadt Rd.
Germantown, WI 53022
tel + 1 262 255 6070

EUROPE
Enercon Industries, Ltd./UK
64 Edison Road
Aylesbury
BUCKINGHAMSHIRE
HP19 8UX
tel + 44 1296 330542
info@enerconind.co.uk

INDIA
Enercon Asia Pacific
#23/10, Elluvapalli, Nallur (P.O),
Bagalur Road - Hosur - Pin 635103
tel +91 9629 000358
info@enerconasiapacific.com

CHINA
Enercon/Wealthy Printing
tel + 86 22 345 0710

Looking for a complete parts breakdown? Scan the QR code to the left to download the full PDF.

enercon®
INDUSTRIES CORPORATION

N120 W19349 Freistadt Rd.,
Germantown, WI 53022

+1 (262) 255-6070
www.enerconind.com/treating

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