

EYLANDER ELECTRIC INC

PRODUCT LIST 2004-2005

MTs

PHASE ADDER



1-800-932-8986

*EYLANDER ELECTRIC INC.,
WARRANTY DISCLAIMER*

Eylander Electric Inc., shall have no liability for and expressly disclaims any warranty or affirmation of fact, express or implied, other than as set forth in this agreement, including, without limitation (I) the implied warranties of merchantability and fitness for a particular purpose; (II) any warranty or affirmation of fact related to misuse, improper selection, recommendation, or misapplication of any product; and (III) any warranty or affirmation of fact that the catalogs, literature and websites it provides accurately illustrate and describe products.

BEFORE YOU ORDER YOUR CONVERTER

CALL US AT 1-800-932-8986

We will help you size your converter because all motors and loads are not the same; we need to know what kind of load the motor is pulling:

LIGHT HP DUTY: is intended for motors that run idle empty until the load is applied. This includes RADIAL ARM SAWS, CUT OFF SAWS, LIGHT DUTY LATHES, etc.

REGULAR HP DUTY: is intended for AMERICAN MADE LATHES & POWER TOOLS, CONVEYERS, HYDRAULIC ELEVATORS & LIFTS, ABOVE GROUND WATER PUMPS, SEWAGE LIFT STATIONS or any other loads that do not run full load amps continuously.

HEAVY HP DUTY: is intended for MILLING MACHINES, IRON WORKERS, HYDRALIC PRESSES, PAPER CUTTERS, FANS FOREIGN MADE LATHES and equipment that is intended to 220 volt, 50 cycle and the nameplates changed for U.S. 240 volt, 60 cycle, and any motors which start against head of load, including DEEP WELL PUMPS.

SPECIAL HP DUTY: NC MACHINES, CABLE HOISTS STARTING DEAD WEIGHT, and/or machines that cannot have over 5% voltage tolerance. SPECIAL HP DUTY should not have any other loads connected to the converter at the same time because the voltage will become temporarily unstable when another machine is in the starting mode. All the power for the converted leg is generated in the converter. It takes five times the power to start a motor than it does to run a motor.

Typically a Light Duty machine will require a converter 1.5X horsepower of load; Regular Duty 2X; Heavy Duty 3X; Special Duty 4X+.

DO NOT TRY TO RUN A HEAVY DUTY LOAD ON A LOWER RATING: We have spent over 30 years building and testing our converters. When you spend thousands of dollars to purchase a machine, it pays to spend a few hundred dollars extra to operate the machine correctly. Your machine is no better than the converter which runs it.

VOLTAGE REGULATORS AND BOOSTERS: We now build all of our phase converters to be within +/-10% of the utility voltage on the converted leg. With this design, you can run the smallest motors and the largest motors from the same converter. The boosters simply 'plug in' to the converted system and keep the voltage up during the times when heavy loads are applied. The voltage regulator keeps the voltage up and amperage down, creating power savings during heavy loads. NOTE: Do not use voltage regulators or start boosters on CNC's, computers, or other voltage sensitive equipment.

WELDERS AND RESISTIVE LOADS: We are conservative in our claims of KVA ratings of our converters when used on welders or resistive loads. Welders and resistive loads 'sap' the energy from the converted leg. Welders and resistive loads work very well on our converters, but while they are being used, they may affect the start up operation of electric motors. The rule is "Do not try to start heavy duty start motors while welding" unless you have a large enough converter.

WARRANTY

All 'PHASE ADDERS', 'PHASE SPLITTERS', and 'POWER INTERRUPTERS' are warranted to purchasers for resale or use in business for one year from the date of purchase from EYLANDER ELECTRIC. For users who purchase equipment that takes a period of time for the installation, a copy of the invoice, with date of purchase, together with the returned warranty, dated and signed by the Electrical Inspector or a representative of the serving utility as to their acceptance of the installation, will be sufficient for an extension of warranty. The maximum length of warranty shall be eighteen months from date of purchase.

LIMITATION OF WARRANTY

Any part that is determined by EYLANDER ELECTRIC to be defective in material or workmanship and is returned to us, shipping costs prepaid by the sender, will be repaired or replaced as the exclusive remedy at our option. If the converter was purchased from an Electrical Distributor or Machinery Dealer, then the end user must apply for warranty at the source of purchase. The maximum amount of the warranty is the amount paid for the converter.

- a. Spikes are not uncommon when phase converters are used to manufacture the 3rd leg for three-phase; however, there are many spikes coming from the utility power and no utility will claim to have 'clean power'.
- b. Whenever electronic equipment, computers, process control equipment etc., is going to be used in the building, a power conditioner or surge suppresser should be installed at the service or else a U. P. S. System should be ahead of any critical equipment.

ADDITIONAL PARTS WARRANTY

There is an additional five-year warranty on all run capacitors and a five-year warranty on the motors that we use for rotors. We use rotors built by LINCOLN ELECTRIC because they provide the best phase balance for our formula for building our PHASE ADDERS.

CONVERTERS MUST BE SIZED ACCORDING TO LOAD

The 'S' and 'SB' PHASE SPLITTER models are built for single motor operation only. They are not to be connected to a larger or smaller motor than the nameplate rating. If they are hooked up to a smaller motor, it may destroy the windings; if they are hooked up to a larger motor, then the motor may lack power to start and pull the load. No converter should have over 15 starts per hour.

Eylander Electric disclaims any IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Also, the PHASE ADDER rotary converters are to be sized according to load, to insure proper performance of motors.

LIGHT START DUTY: Yields maximum 80% of HP load. REGULAR START DUTY: Yields maximum 90% of HP load. HEAVY START DUTY: Yields maximum 100% of HP load. MOTORS ABOVE CODE LETTER 'F', use one size larger than heavy-duty rating.

A CNC machine should have its own converter dedicated to it, sized 'EXTRA HIGH TORQUE'.

Hydraulic presses, paper cutters, deep well pumps, heat pumps or any other load that may have a hard start on full load, in order to get the service factor rating of the motor, should use the Heavy Start Duty Rating. For foreign made equipment that uses 'DIRECT DRIVE' in the higher speed ranges, air compressors, or dead weight start hoists, uses the 'EXTRA HIGH TORQUE' formula.

SPECIAL PARTS REPLACEMENT PROGRAM

All parts used in the Phase Converters should be available from a local electrical supply company. WE USE ALL STANDARD NAME PARTS IN OUR CONVERTERS. All phase converter parts are available in stock from Eylander Electric and can be purchased from us if you are unable to get the parts locally.

1-800-932-8986

QUESTIONS WE HAVE BEEN ASKED:

- Q *Why do other Rotary Converter Manufacturers show a higher total converted HP load than your 'Phase Adder'? For example, I noticed that some other manufactures show that their rotary converters will start a 5 hp regular start motor and will run a total of 20 hp and your model RS-10 will only run a total of 10 hp?*
- A Our Converters are UL listed with power input amps that determine the total connected HP load. Due to the efficiency standards of modern motors and the fact that many new motors classify as a medium or heavy-duty load, phase converters may be limited in their practical rating. However, if multiple light and medium duty motor loads were running on our RS-10, you could perhaps get as much as 15 hp. It has a 100 amp power input which limits it to a 15 hp load. When the converter is overloaded, the voltage on the converted leg drops too low for all the motors running on that converter so that you do not get the proper power from your motors without boosters.
- Q *I have a 10 hp compressor that starts OK with a Rotary Converter, which is not your brand. I purchased a second. 10 hp compressor and it will not start when there is pressure in the tank; I contacted the factory and they wanted me to install a booster. Is your 'Phase Adder' any better than the converter that I have now?*
- A Probably not. If we sold you one of our converters rated "Apples to Apples", with the model of converter that you now have, it would have the same problems. We try to sell you the converter that is adequate for your loads without using a booster. All motors of the same HP do not yield the same starting torque. Some require 'Full Power' on the manufactured leg. In using a Rotary Converter you do not have the power of the utility company's substation on the manufactured leg, but only have the power manufactured by the run capacitors coupled with the windings of the rotor. If you have a starting problem with some motors, we have boosters available that are compatible with our 'Phase Adders' (Do not use booster packs and capacitor-switching voltage regulators on computerized or voltage-sensitive equipment.). We have, in the past, had the same problems with some motors not having enough power to start under load. We now rate all of our converters, 'Light Start Duty', 'Regular Start Duty', 'Heavy Start Duty', and 'Special Start Duty'. Some manufactures' converters are actually only equal to our light start duty. Some are equal to our regular start duty and some build an extra heavy duty, which is equal to our heavier duty rating. We rate each of our converters to the four start duties. It covers all sizes and types of motors. We also have a KVA rating on our nameplate for non-inductive loads. If you have an air compressor, refrigeration unit, heat pumps, hydraulic compactors or presses, electric hoists, deep well pumps or any heavy starting loads, then choose the heavy start duty HP rating of our converters. By choosing the right converter, you should not have any problems starting and running your equipment. However, in some cases you may have to install a booster on some higher code rated motors.
- Q Why do you have your capacitors mounted in a box on the wall instead of on the rotor like the other brands of converters? How does this make your converter better?

QUESTIONS CONTINUED

A We used to build ours the same way; capacitors mounted in a box on the rotor that was mounted on the floor; but the vibration telegraphing through the rotor made too much noise. So we separated the rotor and control box. Also, in order to run very small motors on large phase converters, we added a start circuit to eliminate the unacceptably high voltage on the artificial leg. When a small motor was run by itself on a large converter, it would run hot and then the overload would trip and shut down. The starting circuit provides the correct capacitance for both the start and run modes. We also incorporated an electrical panel into the system so you can have a complete pre-wired system complete with disconnect, overloads, and even a three-phase panel package.

Q *Will you sell me the components for a phase converter with instructions for assembly?*

A No, our products are UL listed as complete units. We have been called out to see what was wrong with a converter that someone else had built. The problem was that it did not have enough power to start a 30 hp flat saw properly. When we got out to the plant, we found that someone had attempted to copy our model RC-50 and had used a rotor that was not compatible with the converter. We sold them the proper rotor to match their converter that would give them proper starting torque for their flat saw. Three months before we quoted the individual about \$4,000.00 for our converter. The individual in the end paid \$6,000.00 plus the price of the proper rotor, to have a converter built that was a copy of ours. It always costs more to buy the parts separately than it does for a complete unit.

Q *why are there different voltages and amps between the legs going to motors from a phase converter?*

A Seldom can you get equal voltage and amps from a phase converter. When we build our 'Phase Adder' Rotary Converters we balance the voltage to be approximately 8 percent above the utility supplied voltage at no load on the converter and 5% above utility for CNC's. We also provide extra capacitors to raise the voltage and load capabilities for the converted leg, if the voltage drops below 10 percent of the utility supplied voltage when the largest motor connected is on the line running at full load. If you are operating only one motor, for example a deep well pump or a CNC Machine, or any other motor that requires constant voltage for proper operation, we suggest that you measure the voltage after the motor is running to see if it is still within 8 – 10 percent of utility supplied voltage. If the voltage has dropped; then hook-up one capacitor at a time until you have reached the best voltage. The amperage on the different legs will vary as the load is applied.

BOOSTERS

We build our 'Phase Adders' so that the voltage between the manufactured leg is less than 10 % higher than the utility supplied power. When the first motor comes on line, it doesn't sustain high-voltage on the artificial phase and yet when the converter is fully loaded with all motors online, the artificial leg's voltage is still high enough to properly operate your machines.

When all the motors running at the same time causes the voltages to be below utility, it generally does not create any problems if the total horsepower that is connected does not drop the voltages lower than 10% below utility voltage. (Our converters bare the Underwriters Laboratories Inc. labels with input amperage ratings which govern the total connected load).

When the converter is overloaded, the voltage on the converted leg drops to perhaps 10-15% below utility or more. This means that every motor in the system that is connected to the converter now is running with low voltage on the converted leg, not just the last one to come on line.

To solve this problem, we build boosters that will compensate for the low voltage drop. Each booster that is used should be connected to the load side of the motor controller. When 'Boosters' are connected to the largest motors in the system, the voltage will remain close to the utility supplied voltage.

We build three types of boosters:

BRC Models

These are run capacitor boosters used to balance the voltage and the amperage by absorbing some of the largest motor's load against the converter. They also increase your energy savings. They should be installed on the larger motors in the system.

BSC Models

These are start-capacitor boosters controlled by a voltage regulator for heavy starting loads on a converter that is perhaps not rated for heavy starts. The heavy start motor makes the voltage drop so low on the converted leg that the motor will not start properly under load. The BSC booster automatically gives it the needed boost to get the motor started and drops off the line when the motor gets up to speed.

Note: Do not use on computers, CNC's or other voltage sensitive equipment.

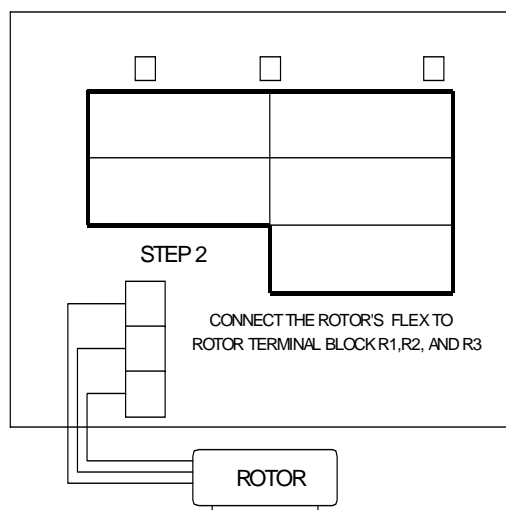
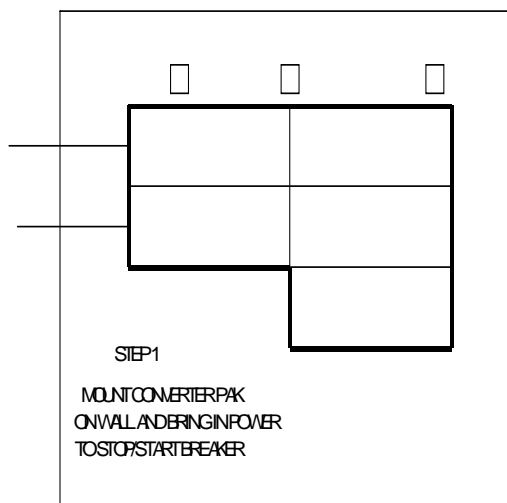
BSRC Models

These are combination start and run capacitor boosters. They assist hard start loads on air compressors, refrigeration units, foreign made lathes in high speed mode when there is no clutch, etc. and keeps the voltage balanced while the motor is running.

Note: Do not use on computers, CNC's or other voltage sensitive equipment.

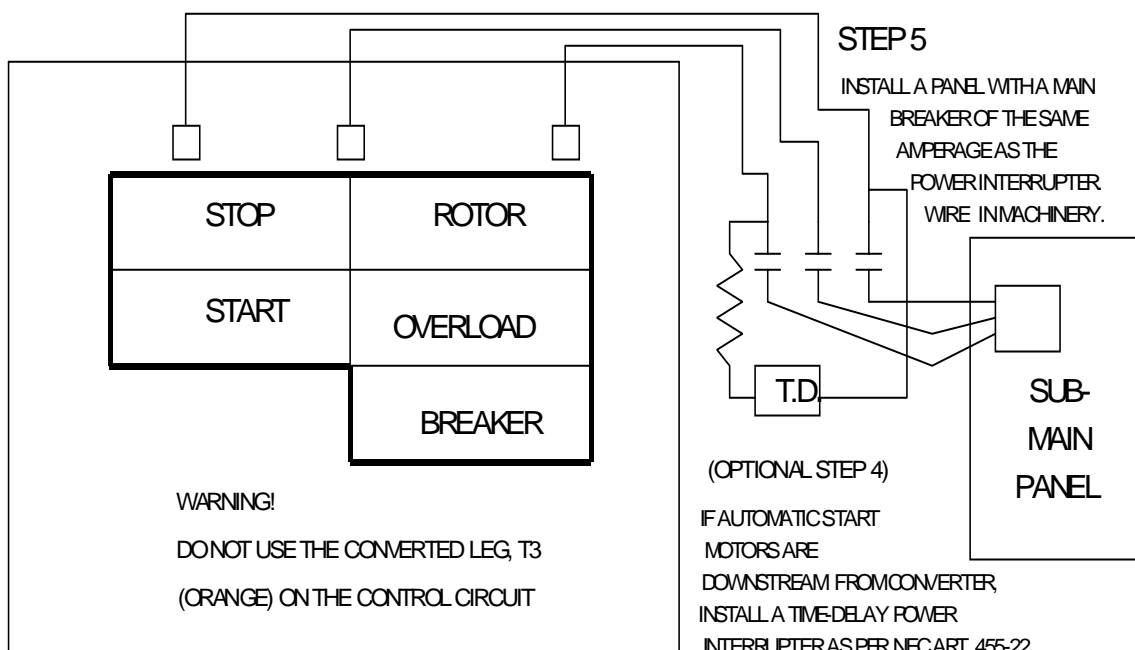
MOTOR HP	RUN-BOOST MODEL	MOTOR HP	START-BOOST MODEL	MOTOR HP	START-RUN MODEL
3	BRC-3	3	BSC-3	3	BSRC-3
5	BRC-5	5	BSC-5	5	BSRC-5
7-1/2	BRC-7 1/2	7-1/2	BSC-7 1/2	7-1/2	BSRC-7 1/2
10	BRC-10	10	BSC-10	10	BSRC-10
15	BRC-15	15	BSC-15	15	BSRC-15
20	BRC-20	20	BSC-20	20	BSRC-20
25	BRC-25	25	BSC-25	25	BSRC-25
30	BRC-30	30	BSC-30	30	BSRC-30

INSTALLATION INSTRUCTIONS FOR RS MODELS

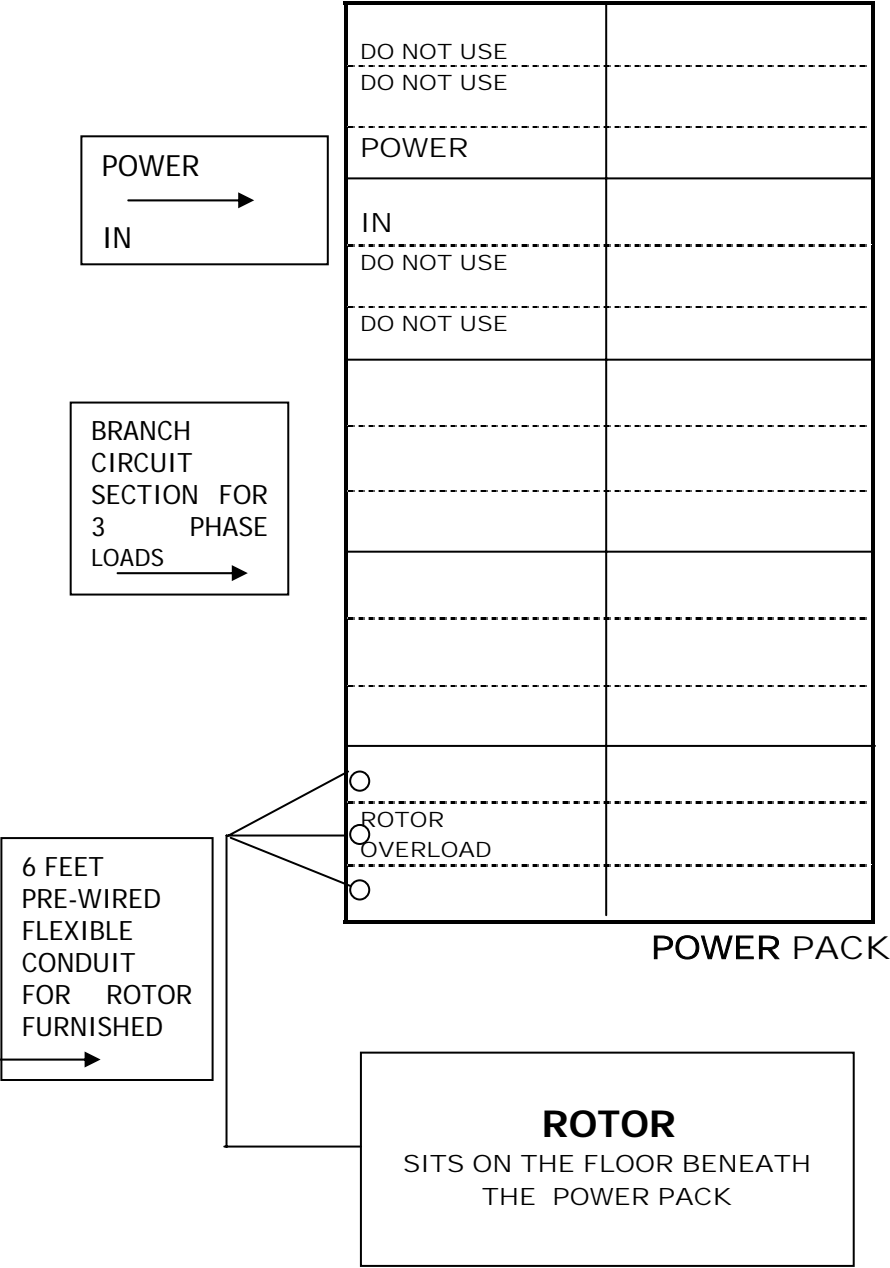


STEP 3

FROM T1, T2, AND T3, RUN WIRE TO DISCONNECT AT MACHINE OR TO A SUB-MAIN PANELBOARD.



TYPICAL INSTALLATIONS FOR RSB (60-125) AMP MODELS

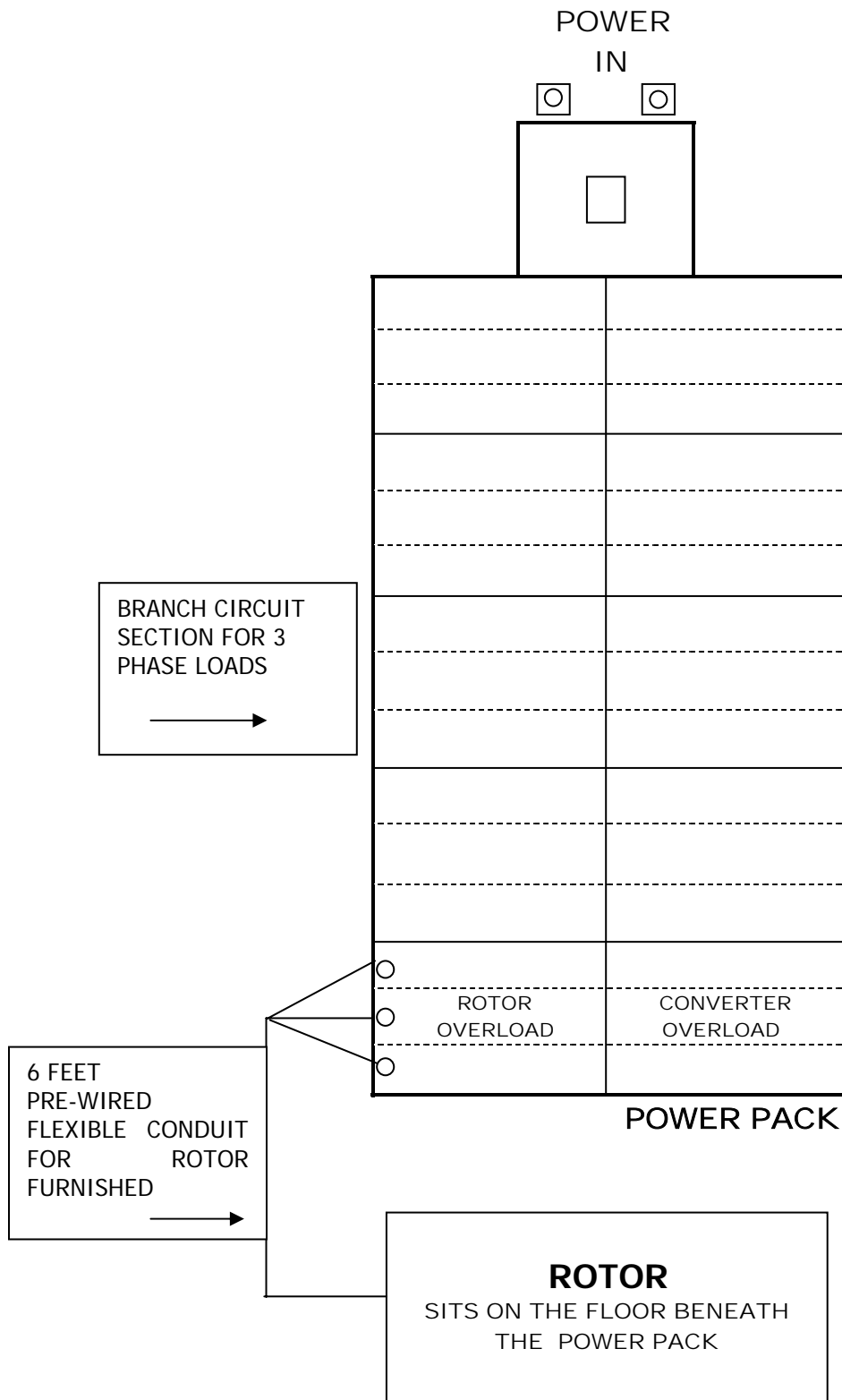


1. MOUNT POWER PACK ON WALL.
2. CONNECT ROTOR WITH FLEX CONDUIT AND WIRES.
3. BRING SINGLE PHASE POWER TO MAIN BREAKER (PHASES A&C).
4. TURN ON AND TEST CONVERTER (CALL FACTORY IF ANY QUESTIONS).
1-800-932-8986
5. WIRE AND PLUG IN THE MACHINERY.

WARNING!
DO NOT USE SINGLE PHASE OR CONTROL CIRCUITS ON THE ARTIFICIAL LEG (ORANGE "B" PHASE).

CHECK VOLTAGES PHASE TO PHASE ON CONVERTER UNDER MAXIMUM LOAD IMMEDIATELY AFTER INSTALLATION.

TYPICAL INSTALLATION FOR RSB (200-225 AMP) MODELS



1. MOUNT POWER PACK ON WALL.
2. CONNECT ROTOR WITH FLEX CONDUIT AND WIRES.
3. BRING SINGLE PHASE POWER TO MAIN BREAKER (PHASES A & C).
4. TURN ON AND TEST CONVERTER (CALL FACTORY IF ANY QUESTIONS).
1-800-932-8986
5. WIRE AND PLUG IN THE MACHINERY.

WARNING!
DO NOT USE SINGLE PHASE OR CONTROL CIRCUITS ON THE ARTIFICIAL LEG (ORANGE "B" PHASE).

CHECK VOLTAGES PHASE TO PHASE ON CONVERTER UNDER MAXIMUM LOAD IMMEDIATELY AFTER INSTALLATION.

PHASE SPLITTER PHASE CONVERTER

EYLANDER ELECTRIC, INC.
EVERETT, WASHINGTON

Q. What is Eylander's Static Model "PHASE SPLITTER"?

A. A static phase converter that externally changes a three-phase motor to a capacitor-start, capacitor-run single-phase motor; running at approximately the same amperage as a single-phase motor of the same horsepower.

Q. How does a single-phase capacitor start, capacitor run motor operate?

A. The single-phase capacitor start, capacitor run motor has two windings. The start winding determines the direction the motor will turn and the run winding keeps the motor going in that direction. The start capacitor gives the motor the starting torque that is needed to get the motor up to speed. Then the start capacitor drops off the line and the run capacitor stays in the circuit of the starting winding; giving the motor the total horsepower using both the start and run windings.

Q. How does the Eylander Static Model Phase Splitter operate on a three-phase motor?

A. It operates nearly the same way, using the third-phase of the motor for the start winding. Switching any two leads going to the motor will change the rotation of the motor. The start capacitors give the motor the starting torque that is needed to bring the motor up to speed and then drops out and the run capacitors stay in circuit, giving the motor approximately 80 percent constant hp of the nameplate rating of the motor for continuous operation. The static phase splitter will also give the motor up to 90 percent of its nameplate hp rating on intermittent duty such as bench grinders, table saws, cut-off saws, non-CNC machines, and some lathes.

The single-phase draw of a three-phase motor on our Phase Splitter is 1 1/2 times the three-phase nameplate amps. Since the motor will only produce 80 percent continuous duty, the overload heaters should not exceed 125 percent of the full load three-phase amps of the motor to which it is connected if the heaters and magnetic starter are installed ahead of the Phase Splitter.

Example- 5 hp, three-phase, 240 volt motor draw 15 amps
Multiply the amperage by 125 percent 18.75 amps

Result- Use 18.75 amp heaters in the motor starter, ahead of the static phase splitter.

You can also install the Splitter itself ahead of the magnetic starter and motor. In this case you would size your heaters to match the 3-phase FLA of the motor since the overload protection device would be "sensing" on the 3-phase side of the converter rather than only through 2 poles on the single phase side.

SPECIAL INSTRUCTIONS:

When using our Static Model Phase Splitter:

Air Compressor: reduce pulley on motor by 25 percent. If full volume of air is required; install the next size larger motor and splitter, using the same pulley size.

Above Ground Water Pumps: Use a valve to control the flow of the water. Start with nearly closed valve. After starting the pump; open the valve until the amperage on the single-phase input reaches 125 percent of the three-phase nameplate amps of the pump and use overload protection rate at 125 percent of the three-phase amps.

Belt Driven Refrigerators and Freezers: reduce pulley size on motor by 20 percent and use overload protection rated at 125 percent of the three-phase amps.

Scaled Refrigerators and Freezers: Generally, the thermal overload is a thermal in the winding. Use our SPD Model and balance the voltage and amps by rearranging the capacitor bank to get the best voltage and amperage of each leg.

RESULTS WHEN TESTED ON OUR STANDARD “S” MODEL:

The following tests were made with a 5hp, 230 volt, three-phase motor on our dynamometer, which produced 18 feet pounds at 15 amps, three-phase.

FEET POUNDS	START-UP 1 PH. AMPS	RUN AMPS L1 & L2	AMPS T-3	AMPS T-4	AMPS T-5	PERCENT OF LOAD
0	56	4.3	1.9	9.4	10.5	0
5	59	7.1	6.5	5.5	10.0	28
10	59	12.5	11.6	7.0	9.3	56
15	60	18.5	18.5	12.8	8.3	83
18	60	22.0	21.5	16.2	7.8	100

***Note: The amps on leg T-3 was the lowest and leg T-5 (the converted leg), was the highest when running the motor with no load, and the amperage rises on T-3 and lowers on T-5 as the load is applied. T-4 consistently rises as the full load is applied to about the full load amps of the three-phase motor.

* "Note: T-3 is higher amperage when running from 50 percent to 100 percent load.

It has been our experience that when a motor is run at about 80 percent power on the static splitter, it will run for years with no problems.

PLEASE NOTE: All general use motors manufactured after October of 1997 and some motors before, are EPA rated according to the Energy Policy Act of 1992 for efficiency standards mandated by the U.S. Government. With these load motors, it is not recommended to run them on a static phase converter. They should be run on a rotary converter. Unfortunately, it is not clear on the nameplate of the the motor whether it is EPA rated. If you think the motor is manufactured after 1995, then we recommend a rotary converter.

PHASE SPLITTER
 EYLANDER ELECTRIC, INC.
 3601 EVERETT AVE. - P.O. BOX 1479
 EVERETT, WA 98206
 PH. 425-259-1601 * FAX 425-252-2459
 1-800-932-8986

PHASE SPLITTERS
CAPACITOR START-CAPACITOR RUN
ECONOMY MODEL PHASE CONVERTERS

Our PHASE SPLITTERS use start capacitors to start the motor and run capacitors to match the winding of the designated horsepower of the motor. It changes the three-phase motor to a single-phase capacitor-start capacitor-run motor yielding 80% to 90% of the rated horsepower of the motor.

Most motors only require approximately 80% of their rating for the load they are pulling. The PHASE SPLITTER works well on Table Saws, Radial Arm Saws, Bench Grinders, some Lathes, Milling Machines, some Water Pumps and almost any type of operation that does not require continuous full load amps of the motor.

For Air Compressors, Heat Pumps and Refrigeration Equipment, they work very well if the pulley size on the motor of the compressors is reduced by 25% to get satisfactory long life out of the motor. THESE PHASE SPLITTERS ARE NOT INTENDED TO TAKE THE PLACE OF THE PHASE ADDER ROTARY PHASE CONVERTERS. THEY ARE NOT TO BE USED ON DEEP WELL PUMPS, TWO SPEED MOTORS, HYDRAULIC PRESS UNITS, HARD STARTING LATHES, MACHINERY THAT REQUIRES INSTANT REVERSE OR ANY OTHER THREE-PHASE EQUIPMENT THAT REQUIRES A HEAVY STARTING, HEAVY DUTY RUNNING LOAD. See our listing of the 'PHASE ADDER' rotary converters. They are the best on the market when you size them according to our directions.

Please note however, all general use motors manufactured after October of 1997 and some motors before, are EPACT rated according to the Energy Policy Act of 1992 for efficiency standards mandated by the U.S. Government. With these load motors, it is not recommended to run them on a static phase converter. They should be run on a rotary converter. Unfortunately, it is not clear on the nameplate of the the motor whether it is EPACT rated. If you think the motor is manufactured after 1995, then we recommend using a rotary converter.

We have prepared a chart for you to choose a 'PHASE SPLITTER' for the size of motor, showing momentary start-up amps, full load running amps on your single phase power side, and size of copper wire for the conductors and fusing.

MODEL	HP	3 PHASE FLA	1 PHASE FLA	LOCKED ROTOR AMPS	75 DEG. C COPPER CONDUCTOR SIZE	MAXIMUM TD FUSE OR BREAKER
S-1/2	1/2	2.0	3.0	9	14	6
S-3/4	3/4	2.8	4.2	11	14	10
S-1	1	3.6	4.8	14	14	10
S-1 1/2	1 1/2	5.2	7.8	20	12	15
S-2	2	6.8	10.2	27	12	17.5
S-3	3	9.6	14	38	12	25
S-5	5	15	22	60	10	40
S-7 1/2	7 1/2	22	33	87	8	60
S-10	10	28	42	111	6	90
S-15	15	42	63	166	4	110
S-20	20	54	81	214	2	150
S-25	25	68	102	269	1	175
S-30	30	80	120	360	1/0	200
S-40	40	104	156	412	3/0	275
S-50	so	130	195	514	PARALLEL 250 MCM	350
S-60	60	154	231	610	PARALLEL 350 MCM	400

To compensate for voltage drop for F.L.A. start, increase the wire one size for every 100 feet of distance from the power source.

LOADS CALCULATION FOR STATIC CONVERTERS

Our SPD Models generally come with more capacitors than are needed to run the motor at full load amps. Some capacitors can be disconnected or added to raise or lower the voltage between legs, or increase or decrease the amperage draw on the different legs. All motors are not wound the same way, so we cannot determine what the voltage and amperages will be between the different legs-, so we rate them to produce 80 to 90 percent power from the motor. The motor must have the proper overload protection. Motors with no service factor are to be calculated at 80 percent of the name plate rating.

TO DETERMINE THE SIZE OF THE CONDUCTORS NEEDED TO RUN THE THREE-PHASE MOTOR

ON SINGLE-PHASE: multiply the full load amperage times 150 percent; then multiply the 150 percent times 125 percent for conductor size. According to Table 430-22(E), motors that run continuously should have conductors rated at 140 percent of the full load amps of the motor.

TO DETERMINE THE SIZE OF THE OVERLOAD HEATERS ON SINGLE-PHASE SIDE: multiply the full load amps of the three-phase motor at 240 volts times 150 percent.

< Example: 10-hp motor

Full load amps of motor 240 volts 3 phase		28 amps
	x	150 percent
Single-phase amps of motor		42 amps
For overload heaters	x	80 percent
Calculate heaters to trip at		33.6 amps

Overload heaters are generally calculated to trip at 115 percent to 125 percent of their rated amps, which will trip if the amperage reaches the 42 amps. ***Note-. If the motor has no service factor, then multiply the single-phase amps of the motor by 70 percent.

TO DETERMINE THE SIZE OF THE OVERLOAD HEATERS ON THREE-PHASE SIDE: Set heaters at FLA of 3-phase motor. The heaters will trip at 115 to 125% of their setting. The motor running at 80% FLA

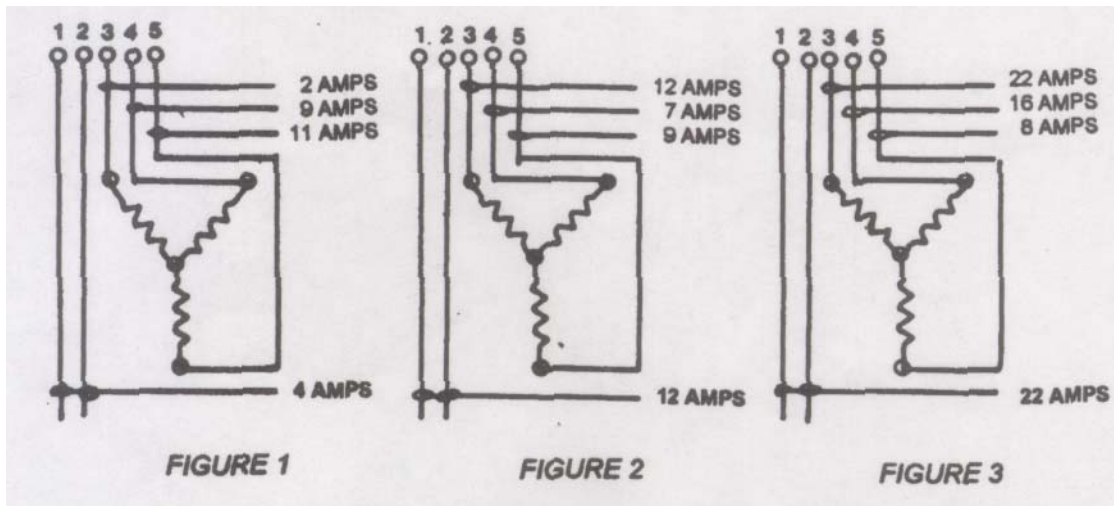
FOR WATER PUMPS: restrict the flow of water so that the single-phase amp-draw is 80 percent of the calculated full load amps.

FOR AIR COMPRESSORS: reduce the pulley size on the motor to 75 percent. The reason for this is that most air compressor manufactures use the 1.15 service factor to get the volume from the pumps. If you want to get the same volume of air from the motor then increase the motor to the next rated hp using the same pulley.

TO ADJUST THE AMPERAGE AND VOLTAGE FROM THE CONVERTER:

- Black and red (line 1 & line 2) are the voltage supplied by the utility.
- Power out lines 3, 4 and 5 are lines to the motor.
- Lines 3 and 4 (black & red) are utility voltage.
- If voltage is too high between 3 (black) and 5 (orange); disconnect a black wire from a silver run capacitor and tape off.
- If voltage is too high between 4 (red) and 5 (orange); disconnect a red wire from the silver run capacitor and tape.
- Keep adjusting until you get the best voltage and amperage balance.
- Generally, line 5 (orange) will have floating amperage, depending on the load applied to the motor from the lowest to full load amps single-phase.

Tests Results on 5hp three-phase motor with our 'S' Model Static Converter



***Note: Figure 1: On the single-phase power in on L1 and L2 when a motor is running at no load, it only requires 4 amps, 240 volt single-phase to run motor.

Figure 2: At 50% load the amperage increases to 12 amps
and at full load it increases to 22 amps.

When there is no load on the motor:

- L-1 and L-2 power in draws 4 amps
- T-3 draws 2 amps
- T-4 draws 9 amps

When 60% load is applied:

- L1 and L2 power-in draws 12 amps single-phase
- T-3 draws 12 amps
- T-4 draws 7 amps
- T-5 the converted leg produces 9 amps

When 100% load is applied:

- L1 and L2 power-in draws 22 amps single-phase
- T-3 draws 22 amps
- T-4 draws 16 amps
- T-5 the converted leg produces 8 amps

With a Static (solid-state) Converter the amperage floats on the phases as the load is applied. We do not recommend running a three-phase motor at 100% on our Phase Splitters. We recommend that the overloads be set at 80% of the single-phase full load amps.

WE BUILD OUR PHASE CONVERTERS TO MEET THE NATIONAL CODE

We now build over 100 models of phase converters which bear the UL label and are factory pre-wired with all the necessary controls and overloads to meet the NATIONAL ELECTRIC CODE.

As far as we know, we are the only phase converter manufacturer that builds this type of equipment in it's complete form; ready for the electrician to simply connect the 'power in' conductors to the terminals and the 'power out' to the loads.

Let's take each article of the Electric Code.

ARTICLE 455 - ITEMS 1 AND 2 - SCOPE AND DEFINITION

A phase converter is an electrical device that converts single-phase electrical power to three- phase for operation of equipment that normally operates from three-phase electric supply. Phase converters are of two types: (1) static, with no moving parts, and (2) rotary, with an internal rotor that is required to be rotating before the load is applied.

Eylander Electric builds both type of converters.

ARTICLE 455-4. MARKINGS

Each phase converter shall be provided with a permanent nameplate indicating (1) manufacturer's name; (2) rated input and output voltage; (3) frequency, (4) rated single-phase input full load amperes; (5) rated minimum and maximum single load in KVA or horsepower.

Eylander Electric's nameplate marking includes all of the above and includes all of the above and also both the maximum horsepower rating and the KVA rating when used with welders and heat resistance loads. Our converter labels have both the maximum single phase amperes for when the converter is going to be fully loaded; plus the lowest input rating for when the converter *will* only be running a single load. Example: An RSB-25 model can have a total of 25 HP connected to it and would require a 200 amp feeder to supply it. If only 15 HP or less is the connected load; it only requires 100 amps for the supply feeders.

ARTICLE 455-5. EQUIPMENT GROUNDING

A means for attachment of an equipment grounding conductor termination in accordance with Section 250-8 shall be provided..

Eylander Electric provides grounding terminals sufficient for all 'power in and 'power out' loads.

ARTICLE 455-7. OVERCURRENT PROTECTION

The single-phase supply conductor of the phase converter shall be protected from overcurrent at not more than 125% of the phase converter nameplate single-phase input full-load amperes.

Eylander Electric builds all of its RS and SB models with overload protection for both the full-load input amperes and the overload protection for the rotors. The RSB models have space to simply plug in the proper size circuit breakers for the various loads downstream from the converter. All RS, SB and RSB models have main breaker service disconnects as an integral part of the phase converters and most are suitable for service equipment.

ARTICLE 455-8. DISCONNECTING MEANS

Means shall be provided to disconnect simultaneously all ungrounded single-phase supply conductors to the phase converter.

Eylander Electric builds the disconnecting means as an integral part of the RS, SB and RSB models. All RC, RSS, RSH and RHSS models must have a disconnecting means within sight of the converter, supplied and installed by the electrician making the installation.

ARTICLE 455-9. CONNECTION OF SINGLE-PHASE LOADS

When single-phase loads are connected on the load side of the phase converter, they shall not be connected to the derived (manufactured) phase.

Eylander Electric identifies the derived phase (converted leg) of the phase converter with the color code orange, as per Article 408-3 (e) NEC with phase arrangement ABC with 'B' phase as the converted "wild" leg. This leg is not to be used with single-phase loads. The electrician separates the phases in the machines, which have three-phase motors and the loads that are single-phase.

ARTICLE 455-20. DISCONNECTING MEANS

Means shall be provided to disconnect simultaneously all ungrounded single-phase supply conductors to the phase converter.

Eylander Electric builds the disconnecting means as an integral part of the SB model static converters, which also serves as the overload protection for the converter.

ARTICLE 455-21. START-UP & ARTICLE 455-22. POWER INTERRUPTION.

Power to the utilization equipment shall not be supplied until the rotary phase converter has been started.

Eylander Electric builds the 'RS' models to use its main breaker to stop and start the converter. A time delay should be installed on the magnetic coils for automatic start equipment. Set it at about 5 seconds apart so that no two motors will start at the same time when the converter is turned on or if there happens to be a power interruption and the converter comes back on when it is unattended.

ARTICLE 455-23. CAPACITORS

Eylander Electric builds booster packs out of capacitors as optional equipment to keep the voltage stable when heavy loads are applied to the phase converter.

UL FILE NUMBER E161929
PROJECT NUMBER 94TC13806

WE HAVE PREPARED THE FOLLOWING TABLES TO HELP YOU SELECT A CONVERTER

RC, RS, RSS MODELS 240 VOLT & RSH, RHSS MODELS 480 VOLT	LIGHT START DUTY HP	REGULAR START DUTY HP	HEAVY START DUTY HP	SPECIAL START DUTY HP	WELDER AND RESISTIVE LOAD KVA 240 VOLT	MAXIMUM CONNECTED HP WITHOUT VOLTAGE REGULATOR	MAXIMUM CONNECTED HP WITH VOLTAGE REGULATOR
3	2	1 ½	1	-	2	3	
5	3	2 ½	2	1	3	5	10
7	5	3 ½	2 ½	1 ½	4	7 ½	10
10	7 ½	5	3	2	7	10	15
15	12	7 ½	6	5	11	15	30
20	15	10	6	5	14	15	30
25	15	12 ½	7 ½	6	18	15	30
30	20	15	10	7 ½	22	20	30
40	25	20	13	10	30	25	40
50	30	25	15	12 ½	35	30	50
60	40	30	20	15	45	40	60
75	50	40	25	20	60	50	75
200	75	50	30	25	100	75	100
SS 125	75	60	40	30	125	75	110
SS 150	100	75	50	40	125	75	100
SS200 480 VOLT	125	100	60	50	125	75	200
SS250 480 VOLT	150	125	75	60	125	75	200

NOTE: TO AVOID VOLTAGE PROBLEMS WE RECOMMEND THAT BOOSTERS BE INSTALLED ON THE LOAD SIDE OF THE CONTACTORS OF THE LARGER MOTORS.

MAXIMUM TOTAL HP CONNECTED LOAD ON MODELS RSS, RSH, AND RHSS CAN BE INCREASED BY ORDERING 600A MAIN LUGS, THEREBY INCREASING THE TOTAL CONNECTED LOAD TO 300 AMPS, 3 PHASE, USING VOLTAGE REGULATORS OR BOOSTERS.

UL FILE NUMBER E161929
PROJECT NUMBER 94TC13006

240 VOLT MODELS SHOWING LOADS AND FEEDERS

240 VOLT RS, RC, RSS MODELS	CONNECTED HP LOAD	3 PHASE AMPS	X1 ½ = 1 PHASE AMPS	APPROX. IDLE AMPS OF ROTOR	TOTAL 1 PHASE AMPS	X1.25= MINIMUM FEEDER AMPS	MAXIMUM FEEDER AMPS
3	3	10	15	5	20	25	30
5	5	15	23	6	29	37	50
7	7 ½	22	33	9	42	53	60
10	10	28	42	10	52	66	100
15	15	42	63	12	75	96	100
20	20	54	81	14	95	119	200
25	25	68	102	18	120	150	200
30	30	80	120	20	140	175	250
40	40*	104	156	25	181	226	300
50	50*	130	195	30	225	271	300
60	60*	154	226	36	262	328	350
RSS 75	75*	192	288	43	331	414	600
RSS 100	100*	248	376	63	439	549	600
RSS 125	110*	276	414	70	474	593	600
RSS 150	100*	248	372	80	452	565	600

*VOLTAGE REGULATOR OR BOOSTERS MAY BE NEEDED TO BALANCE PHASES ON FULL LOADS.

LOWER INPUT RATING FOR SMALLER LOADS

240 VOLT	CONNECTED HP LOAD	3 PHASE AMPS	X1 ½ = 1 PHASE AMPS	APPROX. IDLE AMPS OF ROTOR	TOTAL 1 PHASE AMPS	X 1.25 MINIMUM FEEDER AMPS
RC 20	15	42	63	14	77	95
RC 25	18	52	76	18	94	118
RC & RSS 30	15	42	63	20	83	105
RC & RSS 40	30	80	120	25	145	183
RC & RSS 50	30	80	120	30	150	188
RC & RSS 60	30	80	120	36	156	193
RC & RSS 75	60	154	226	43	269	336
RC & RSS 100	60	154	226	63	289	361
RSS 125	60	154	226	70	296	370
RSS 150	60	154	226	80	306	378

UL FILE NUMBER E161929
PROJECT NUMBER 94TC13006

480 VOLT MODELS SHOWING LOADS AND FEEDERS

480 VOLT RSH, RHSS MODELS	CONNECTED HP LOAD	3 PHASE AMPS	X1 ½ = 1 PHASE AMPS	APPROX. IDLE AMPS OF ROTOR	TOTAL 1 PHASE AMPS	X1.25= MINIMUM FEEDER AMPS	MAXIMUM FEEDER AMPS
3	3	5	8	3	11	14	20
5	5	7 ½	11	3	14	18	30
7	7 ½	11	16	5	21	26	30
10	10	14	21	5	26	33	50
15	15	21	32	6	38	47	60
20	20	27	41	7	48	60	100
25	25	34	51	9	60	75	100
30	30	40	60	10	70	88	125
40	40*	52	78	13	91	114	200
50	50*	65	98	15	113	142	200
60	60*	72	108	18	126	158	200
RHSS 75	70*	92	138	22	160	200	300
RHSS 100	100*	124	186	32	218	272	400
RHSS 125	125*	156	234	34	268	335	400
RHSS 150	150*	180	270	30	302	373	500
RHSS 200	200*	240	360	22	388	485	600

LOWER INPUT RATING FOR SMALLER LOADS

480 VOLT RSH & RHSS MODELS	CONNECTED HP LOAD	3 PHASE AMPS	X1 ½ = 1 PHASE AMPS	APPROX. IDLE AMPS OF ROTOR	TOTAL 1 PHASE AMPS	X 1.25 MINIMUM FEEDER AMPS
RSH 30	15	21	32	10	42	53
RSH 40	30	40	60	13	73	91
RSH, RHSS 50	30	40	60	15	76	95
RSH, RHSS 60	40	52	78	18	96	120
RSH, RHSS 75	50	65	98	22	120	150
RSH, RHSS 100	60	72	108	32	140	175
RHSS 125	75	124	186	34	220	275
RHSS 150	100	124	186	30	302	373
RHSS 200	100	124	186	22	208	260

*BY INCREASING THE FEEDER SIZE, MORE TOTAL HP CAN BE USED BY USING A VOLTAGE REGULATOR OR AN INDIVIDUAL BOOSTER.

START-UP LOCKED ROTOR AND IDLE RUNNING AMPS

TO: INSTALLERS, ENGINEERS AND UTILITY COMPANIES

We have prepared information of the approximate 'locked out' START-UP amps and the idle running amps of our rotary phase converters tested at approximately 240+ volts. The locked rotor and running amps will vary slightly if the incoming voltage is higher or lower.

STANDARD REGULAR START CONVERTERS

REGULAR ACROSS THE LINE START

MODELS	HP OF ROTOR	APPROX. 1 PHASE 240 VOLT LRA START-UP	APPROX. 1 PHASE 240 VOLT NO LOAD IDLE AMPS	FULL LOAD AMPS CONNECTED LOAD HP	FULL LOAD AMPS CONNECTED LOAD AMPS
RS 5, RSB 5	5	58	6	8	42
RS 7, RSB 7	7 ½	92	9	8	45
RS 10, RSB 10	10	107	8	15	70
RS 15, RSB 15	15	143	10	15	72
RS 20, RSB 20	20	169	12	15	74
RS 25, RSB 25	25	269	13	30	130
RC 30, RSB 30	30	377	18	30	135
RC 40, RSB 40	40	420	18	30	135
RC 50, RSB 50	50	475	20	30	140

SOFT START MODELS – 240 VOLTS – 1 PHASE – 200 AMP RATING

RSS 25, RCSS 25	25	102	13	30	130
RSS 30, RCSS 30	30	120	18	30	135
RSS 40, RCSS 40	40	156	18	30	135
RSS 50, RCSS 50	50	195	20	30	137
RSS 60, RCSS 60	60	231	25	30	142
RSS 75	75	288	24	40	144
RSS 100	100	372	32	50	220
RSS 125	125	468	36	60	270

SOFT START MODELS – 240 VOLTS – 1 PHASE – 400 AMP RATING

RCSS 50	50	195	20	50	215
RCSS 60	60	231	25	60	260
RCSS 75	75	288	24	75	310
RCSS 100	100	372	32	75	320
RCSS 125	125	468	36	90	310

SOFT START – 480 VOLT – 1 PHASE

RHSS 60	60	115	12	60	110
RHSS 75	75	144	12	75	155
RHSS 100	100	186	16	75	160
RHSS 125	125	234	18	100	204
RHSS 150	150	280	25	100	215
RHSS 200	200	360	35	100	220
RHSS 250	250	456	35	100	225

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EYLANDER ELECTRIC, INC.

3601 EVERETT AVE., P.O. BOX 1479

EVERETT WA 98206

Phone 425-259-1601 * Fax 425-252-2459

1-800-932-8986

TO OUR VALUED CUSTOMERS:

All of our MTS Transfer Switches are UL listed to have 30 amp circuit breakers to supply the power from the generators up to 7200 watts. The listing also provides that if a generator larger than 7200 watts is to be used, then a larger breaker may be installed to match the size of the generator, at the factory. The brand and type of the breaker to be used is listed on the panel labels.

The installer is responsible to use the proper size conductors, which run from the transfer panel to the generator. They also need to match the breaker amperage of the generator main.

We submit the following UL test pages for reference:

File# E140107	T2 – 1 of 7	Issued 5-26-94
File# E140107	T2 – 2 of 7	Issued 5-26-94
File# E140107	T2 – 3 of 7	Issued 5-26-94
File# E140107	T2 – 4 of 7	Issued 5-26-94
File# E140107	T2 – 5 of 7	Issued 5-26-94
File# E140107	T2 – 6 of 7	Issued 5-26-94
File# E140107	T2 – 7 of 7	Issued 5-26-94
File# E140107	T3 – 1 of 2	Issued 7-05-95
File# E140107	T3 – 1 of 2	Issued 7-05-95

The record of the above tests should satisfy any Electrical Inspection Division in all of the United States and Canada. If any Electrical Inspector needs more information, they can call us at **1-800-932-8986** and we will forward the above mentioned pages to them.

LOAD CALCULATIONS

	RUNNING WATTS	START UP WATTS ADD		RUNNING WATTS	START UP WATTS ADD
PUMPS:			FURNACE MOTORS:		
1/3 HP 3600 RPM	800	1200	1/6 HP	500	900
1/2 HP 3600 RPM	1000	2100	1/4 HP	600	600
3/4 HP 3600 RPM	1400	2200	1/2 HP	800	1400
1 HP 3600 RPM	2000	3000	3/4 HP	1000	2100
GAS DRYER	800	1300	GARAGE DOOR	800	1700
ELECTRIC DRYER	5750	1800	VACUUM	1000	-0-
FREEZER OR REFR.	900	2100	TOASTER	1200	-0-
MICROWAVE	800	-0-	CLOTHES IRON	1200	-0-
WASHER	1200	2000	ELECTRIC RANGE		
WATER HEATER	4500	-0-	6" ELEMENT	1500	-0-
BATH FAN	100	-0-	8" ELEMENT	2100	-0-
KITCHEN FAN	300	200	BAKE ELEMENT	3000	-0-
FIREPLACE FAN	300	200	BROIL ELEMENT	3000	-0-
COFFEE MAKER	1200	-0-	T.V.	500	-0-
			LIGHT CIRCUITS	500	-0-

THREE STEPS TO CHOOSE THE PROPER TRANSFER SWITCH:

EXAMPLE

- | | |
|---|------------------|
| 1. TOTAL THE WATTS OF LIGHTS AND APPLIANCES TO BE USED | 5000 WATTS |
| 2. TO THAT AMOUNT ADD THE START-UP WATTS OF LARGEST MOTORS. | +2100 WATTS |
| | TOTAL 7100 WATTS |
| 3. ADD 25% TO THE TOTAL | +1775 |
| | 8875 WATTS |

A SMALLER GENERATOR THAN THE TOTAL CONNECTED LOAD CAN BE USED BY TURNING OFF SOME OF THE BREAKERS WHEN THE APPLIANCE OR LIGHTS ARE NOT NEEDED. ALWAYS USE A GENERATOR THAT IS AT LEAST 25% LARGER THAN MOST NECESSARY LOADS. THIS WILL ALLOW FOR SOME OF THE NON ESSENTIAL LOADS TO BE USED AT CONVENIENCE.

EYLANDER ELECTRIC

1-800-932-8986

www.eylanderelectric.com

ADVANTAGES OF THE MTS MANUAL TRANSFER SWITCH

1. THE MOST VERSATILE

Assembled from CUTLER-HAMMER CH and BR, GENERAL ELECTRIC, ITE/SIEMENS, MURRAY, SQUARE 'D' QO and HOMELINE panels. You have your choice of installing 120 or 240 volt circuit for whatever amperage you need for your loads. You can install GFI circuit breakers where it is required by code. Models available with up to 40 breaker spaces for branch circuits.

2. SUITABLE FOR USE WITH PORTABLE GENERATORS.

Most portable generators do not have a grounded neutral. The MTS panel board grounds the generator to the ground system of the building it serves.

3. SUITABLE FOR SERVICE EQUIPMENT.

The MTS panel board can be used as a main service disconnect panel on models of 60 Amps or larger.

4. SINGLE PHASE AND THREE PHASE MODELS AVAILABLE.

From 60 Amps to 200 Amps, 120/240 VAC, for residential / light commercial and up to 800 Amps, 600 VAC, for heavy commercial / industrial use.

5. EASY TO INSTALL.

As simple as installing a sub-panel. Simply install a nipple between your existing circuit breaker panel and the transfer switch. All wires between the breaker panel and the transfer switch can be in the same conduit without de-rating, if the nipple is not over 24 inches long.

6. NEAT APPEARANCE.

Surface or flush mount matches your existing circuit breaker panel. If you install the transfer switch outdoors, it is a neat appearing NEMA 3R outdoor enclosure.

7. RELIABLE.

Full five-year guarantee, Tested by Underwriters Laboratories Inc. for 10,000 cycles, simulating the interlock mechanism going from normal utility power to generator, without showing any sign of wear. The test was equal to having a power outage every day for over twenty-five years.