

# ROTARY PHASE CONVERTER

220V models & 460V models available. See chart.

## RUNS THREE-PHASE EQUIPMENT FROM SINGLE-PHASE POWER SOURCE

- For long heavy starting loads, instant reversing, momentarily overloaded motors, or imported equipment, contact factory or refer to application guidelines RTN.
- **Multiple motor applications:** Due to the high in-rush current required to start a motor (5 to 10 times the normal running current), most applications require sizing the HP of the Rotary Converter 50% larger, **or more** than the horsepower of the largest motor, or any combination of motors started at exactly the same time. The first motor started, **if not running heavily loaded**, generates additional 3-phase power back into the circuit. You can then run additional motors (not heavily loaded and not all started at the same time). A maximum of up to 3 times the HP rating of the Rotary Converter can run at the same time, if not heavily loaded, and not started simultaneously. For example, a 30 HP Rotary Converter potentially could run motors totaling up to 90 HP. Contact factory for verification of sizing.

- **HEAVILY LOADED APPLICATIONS**
- **QUIET OPERATION**
- **SIMPLE INSTALLATION**
- **MULTI-MOTOR OPERATION**
- **MULTI-SPEED APPLICATIONS**
- **RESISTIVE LOAD APPLICATIONS**
- **NO CHANGING MOTORS OR SWITCH GEAR**
- **4 YEAR WARRANTY**

**USES INCLUDE:** Metalworking and woodworking equipment, farm equipment, pumps, compressors, elevators, transmitters, printing equipment, food processing equipment, computers, sewing machines, air conditioners, hoists, extractors, wheel balancers, EDM machines, rectifiers, lasers, conveyors and just about any 3-phase equipment. For CNC/PLC equipment use our CNC PACKAGE PHASE CONVERTER. Ask for our CNC PAC brochure.

Rotary Converter Models*			
220V "R" Models	460V "RH" Models	HP	Shipping Wt. Lbs.
R-1	---	1	22
R-2	---	2	40
R-3	---	3	63
R-5	RH-5	5	70
R-7	---	7.5	106
R-10	RH-10	10	120
R-15	RH-15	15	202
R-20	RH-20	20	220
R-25	---	25	290
R-30	RH-30	30	306
R-40	RH-40	40	405
R-50	RH-50	50	445
R-75	RH-75	75	665
R-100	RH-100	100	880

\*WEATHERPROOF and KW models also available.

- Causes no interference to radio, television, or computer equipment.
- For 50Hz operation consult factory
- F.O.B. Factory
- For larger sizes, contact factory



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# ROTARY PHASE CONVERTER INSTRUCTION SHEET

## CAUTION: ALWAYS START CONVERTER BEFORE APPLYING LOAD

- Magnetic controls or **single-phase** loads (including electronics, microprocessors, etc.) must always be energized by lines T1 and T2.
- Never connect a ground or neutral to line T3 (manufactured phase), which can easily be identified as the line with the highest voltage to ground with the converter running. Properly ground all electrical equipment.
- It is essential that careful consideration be given to your wiring length and size to prevent slow starting due to a voltage drop. Consult the National Electrical Code for proper wire sizing.
- Due to the high starting current (in-rush current) common to electric motors, a drop of starting torque may occur when using a converter that is too small. Because of this, it is NOT advised to size an application HP for HP. The vast majority of applications require sizing the converter 50% larger or more than the largest HP rated motor of your equipment. Contact Alfa for further details.

MODEL		LARGEST MOTOR HP <small>See #1 below</small>	MULTIPLE MOTORS LIGHTLY LOADED <small>See #2 below</small>	ROTARY CONVERTER IDLE CURRENT AMPERAGE (Approximate)		DISCONNECT SWITCH TIME DELAY FUSE AMPERAGE		NEMA STARTER SIZE		MAGNETIC STARTER THERMALS OVERLOADS AMPERAGE		MINIMUM SINGLE-PHASE SUPPLY BREAKER AMPS <small>See #3 below</small>		SHIPPING DIMENSIONS In inches
220V	460V	220V/460V	220V/460V	220V	460V	220V	460V	220V	460V	220V	460V	220V	460V	220V/460V
R-1	---	1	3 HP	1.5	---	10	---	00	---	4.8	---	15	---	15 x 10 x 10
R-2	---	2	6 HP	2	---	10	---	0	---	7.7	---	15	---	15 x 10 x 10
R-3	---	3	9 HP	2.5	---	15	---	0	---	10.4	---	20	---	19 x 12 x 13
R-5	RH-5	5	15 HP	3	1.5	30	15	1	1	15.9	8	30	15	19 x 12 x 13
R-7	---	7.5	22 HP	5	---	40	---	1	---	26	---	40	---	16 x 16 x 16
R-10	RH-10	10	30 HP	7	3.5	45	30	2	2	35	17.5	60	30	16 x 16 x 16
R-15	RH-15	15	45 HP	8	4	60	30	3	3	48	24	100	50	31 x 24 x 21
R-20	RH-20	20	60 HP	10	5	80	40	3	2	63	35	125	60	31 x 24 x 21
R-25	---	25	75 HP	11	---	100	---	3	---	80	---	160	---	31 x 24 x 21
R-30	RH-30	30	90 HP	12	6	125	60	3	3	94	48	200	100	31 x 24 x 21
R-40	RH-40	40	120 HP	13	8	150	80	4	3	117	63	250	125	31 x 24 x 24
R-50	RH-50	50	150 HP	15	9	200	100	5	3	145	78	300	150	31 x 24 x 24
R-75	RH-75	75	225 HP	29	15	300	150	5	4	235	115	375	200	31 x 24 x 24
R-100	RH-100	100	300 HP	48	24	400	200	5	4	300	150	600	300	41 x 41 x 33

**1. LARGEST MOTOR HP:** Almost all machines require sizing the converter 50% larger or more than the largest HP motor of your machine. See #4 above.

**2. MULTIPLE MOTORS LIGHTLY LOADED:** HP shown in chart reflects maximum HP allowable under specific conditions. Example: Multiple machinery, not started at the same time, and that is running lightly loaded. For larger sizes contact Alfa.

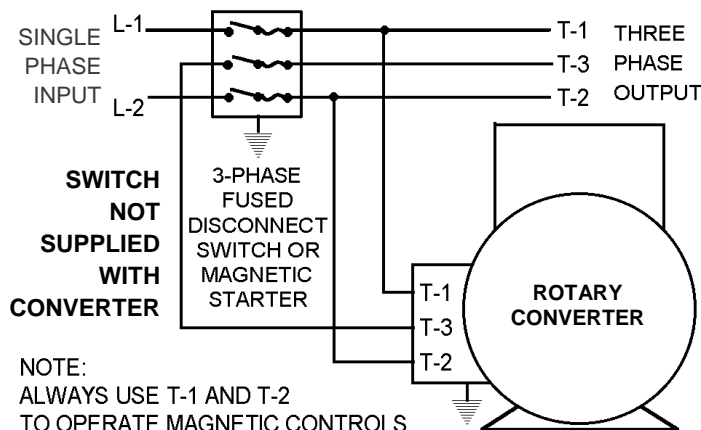
**3. MINIMUM SINGLE-PHASE SUPPLY:** Single-phase supply shown is for absolute maximum output of the Rotary Converter. Most of the time the converter is oversized to provide the high starting current for the motor. It is not always necessary to size the single-phase breakers this large. Contact Alfa for smaller single-phase breaker qualifications.

**IMPORTANT: This chart is simplified and cannot reflect the many types of applications possible.** Contact Alfa to verify your phase converter requirements.

**Larger horsepower** phase converter systems may be obtained by connecting multiple Rotary Converters in parallel. This is necessary for models that are larger than 100 HP. Contact Alfa for wiring illustration for multiple units banked together.

- Table shows approximate idle current at 230V for 220V models, 460V for 460V models. Higher line voltage will cause idle current to increase. Excessive amperage could also be caused by incorrect installation.
- Lubricate every 12 months for normal operation, or every 6 months for continuous (24-hour) operation. Use high-temp bearing grease: "Exxon POLYREX®EM" polyurea grease or equivalent, available from Alfa.
- Voltage sensitive equipment (CNC/PLC, 3-phase powered electronics, etc.) may require a Voltage Stabilizer designed to reduce reduce phase voltage imbalance. Contact Alfa for more information.
- Converter should reach full speed within 2 to 3 seconds.
- Voltage is 220V single-phase in and 220V three-phase out on 220V models; 460V single-phase in and 460V three-phase out on 460V models.

**CAUTION:** Converters are intended for use in clean, dry locations with access to an adequate supply of cooling air. In addition, there should be protection from, or avoidance of, flammable or combustible materials in the area of converters as they can eject flame and/or metal in the event of an insulation failure.



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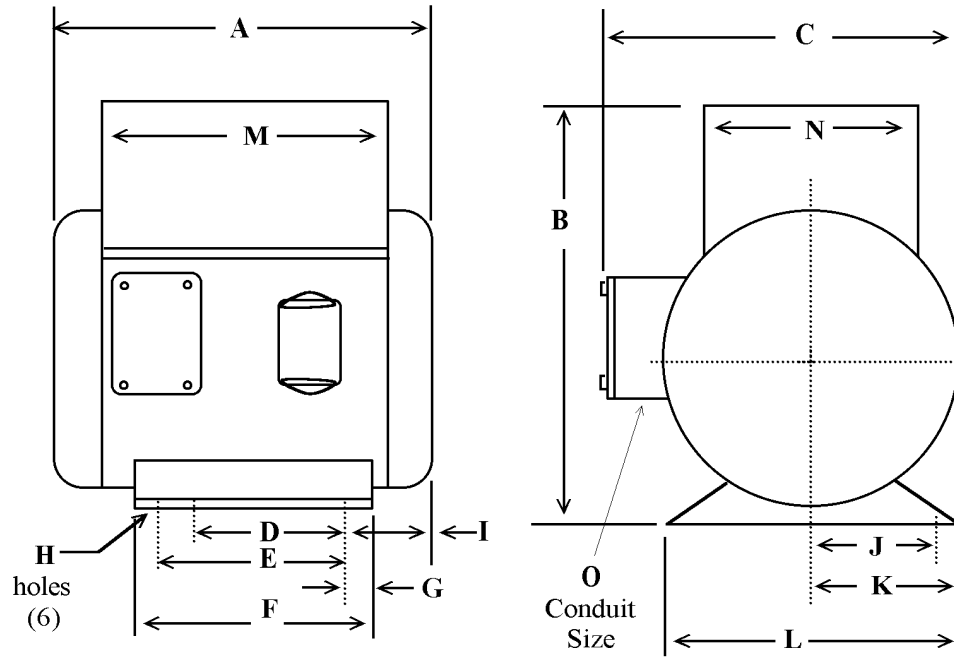
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## ROTARY CONVERTER DIMENSIONS

DRAWING NO: TD211 - A

DATE: 1-1-2012



### Dimensions shown in inches

220V MODEL	460V MODEL	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	SHIP. DIM.
R-1	----	8 ½	9 ¼	8 5/8	4	5	6	½	11/32	1 ¾	2 ¾	3 ¼	6 ½	5 ¾	4 ¼	¾	15 x 10 x 10
R-2	----	9 ½	9 ¼	8 5/8	4	5	6	½	11/32	2 ¼	2 ¾	3 ¼	6 ½	5 ¾	4 ¼	¾	15 x 10 x 10
R-3	----	10 11/16	11	9 5/8	4 ½	5 ½	6 ½	½	13/32	2 19/32	3 ¾	4 5/16	8 5/8	7 ½	5 ½	¾	19 x 12 x 13
R-5	----	11 ½	11	9 5/8	4 ½	5 ½	6 ½	½	13/32	3	3 ¾	4 5/16	8 5/8	7 ½	5 ½	¾	19 x 12 x 13
R-7	----	13 9/16	13	12 ¼	5 ½	7	8	½	13/32	3 9/32	4 ¼	4 ¾	9 ½	9 ½	6	¾	21 x 14 x 14
R-10	----	13 9/16	13	12 ¼	5 ½	7	8	½	13/32	3 9/32	4 ¼	4 ¾	9 ½	9 ½	6	¾	21 x 14 x 14
R-15		17 1/8	17 ½	14 ¾	8 ¼	10	11 ¼	5/8	17/32	3 9/16	5	5 5/8	11 ¼	11	6 ¾	1	31 x 24 x 21
R-20	<b>RH-20</b>	17 1/8	17 ½	14 ¾	8 ¼	10	11 ¼	5/8	17/32	3 9/16	5	5 5/8	11 ¼	11	6 ¾	1	31 x 24 x 21
R-25	----	20 3/8	18 ¼	19	9 ½	11	12 ¼	5/8	17/32	4 11/16	5 ½	6 1/8	12 ¼	12 ½	8 7/8	1 ½	31 x 24 x 21
R-30	<b>RH-30</b>	20 3/8	18 ¼	19	9 ½	11	12 ¼	5/8	17/32	4 11/16	5 ½	6 1/8	12 ¼	12 ½	8 7/8	1 ½	31 x 24 x 21
R-40	<b>RH-40</b>	22 ¾	20 1/8	21	9	12	13 ½	¾	21/32	4 ¾	6 ¼	7	14	13	10 7/8	2	32 x 24 x 24 ½
R-50	<b>RH-50</b>	22 ¾	20 1/8	21	9	12	13 ½	¾	21/32	4 ¾	6 ¼	7	14	13	10 7/8	2	32 x 24 x 24 ½
R-75	<b>RH-75</b>	23.13	21.75	23.13	11.25	12.25	14	.88	.66	4.94	7	7.88	15.75	13.25	10 7/8	2.5	32 x 24 x 28
R-100	<b>RH-100</b>	25.41	23.75	25.41	12.25	13.75	16.62	2.05	.81	6.44	8	9.25	18.49	16	10 7/8	3.5	42 x 34 x 32



## RTN; Guidelines for Sizing Rotary Phase Converters

The following guidelines should be used when sizing our Rotary Converters to the application,

The Rotary Converter is designed to supply full running current to a three-phase motor, normally providing it with full running torque. However, most motors will draw five times their running current during start-up. When used at its maximum HP rating the Rotary Converter cannot deliver the full (5 times) starting current to the motor and therefore may not provide full starting torque. For heavy start-up loads a larger converter should be used.

**Note:** You can always use a larger Rotary Converter than the HP of the motor. There is no minimum load requirement for the Rotary Converter. Some customers will install a Rotary Converter larger than needed to accommodate any future additions to their equipment. Below are the minimum size recommendations for various applications:

### 1. Motor Load Types:

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#### A. Type 1 Motor Loads:

May be used up to the HP rating of the converter.\* This applies to machinery with American made motors and which start with no load such as mills with step-pulley speed change, lathes with a clutch, sewing machines, and so forth.

#### B. Type 2 Motor Loads:

Use a converter with HP rating of at least 50% larger than HP of the motor. They include domestic & European lathes without a clutch, some pumps, blowers, paper cutters, flywheel driven equipment, woodworking saws, dough mixers, meat grinders, motors rated below 1000 RPM, etc.

**NOTE:** For instant reversing (as for rigid tapping), use a converter with twice the HP rating of the motor.

#### C. Type 3 Motor Loads:

Use a converter with twice the HP rating of the motor. They include Design "E" motors, Taiwanese, Chinese, Brazilian, Mexican motors, pumps starting under load, refrigeration compressors, etc., and for any motor which is used for instant reversing, as for rigid tapping.

#### D. Type 4 Motor Loads:

Use a converter with three times the HP rating of the motor. They include laundry extractors, hoists, elevators, etc. This type of equipment can be extremely heavily loaded on start up. Consult Alfa for possibility of successfully using a converter sized less than three times on these machines.

#### E. Type 5 Motor Loads:

Often hydraulic pumps, which come under a momentary load during use, will be loaded well beyond their rated HP for the brief period of maximum PSI. Examples include bailers, compactors, paper cutters, shears, pumps, etc. The HP of the converter must be at least as high as the actual HP developed by the motor. To calculate the HP developed, you must first find the actual amperage drawn during maximum PSI. This is different from the rated amps of the motor. Next you would divide the maximum amperage by 2.8 to find the approximate HP being developed by the motor. That figure is the minimum size of converter to be used.

Example: A 10 HP compactor with a motor rated at 28 amps but draws a peak of 40 amps momentarily at maximum compression. Divide 40 by 2.8 = 14.3 approximate HP being developed; use model R-15 Rotary Converter.

## 2. Resistive Loads

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Resistive loads must use the Rotary Converter. The static converter should never be used because it would be damaged. There are two methods to determine the HP of the converter to be used. One method is to take the amperage rating of the equipment and divide by 2.8 to find the approximate equivalent HP. The other method is to take the KW rating and multiply by 1.34, or divide by .75 to find the approximate equivalent HP of the equipment.

## 3. Computer, Rectifier, Transformer Loads

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Transformers and electronic equipment can operate on the Rotary Converter. They include welders, lasers, EDM machines, CNC equipment, computers, plating rectifiers, power supplies, etc. Use the same formula as for resistive loads to determine the proper size converter to use. Divide the amperage by 2.8 to find the approximate equivalent HP. For CNC equipment a Voltage Stabilizer may be required.

**If a 4-wire wye input is required** (all lines equal voltage to ground), a three-phase delta-to-wye isolation transformer must be installed between the converter and the equipment to change the delta power to wye power.

## 4. Multiple Motor Applications

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Due to the high in-rush current required to start a motor (5 to 10 times the normal running current), most applications require sizing the HP of the Rotary Converter 50% larger, **or more** than the horsepower of the largest motor, or any combination of motors started at exactly the same time. The first motor started, **if not running heavily loaded**, generates additional 3-phase power back into the circuit. You can then run additional motors provided they do not run heavily loaded and are not started at the same time. A maximum of up to 3 times the HP rating of the Rotary Converter can run at the same time - if not heavily loaded, and not started simultaneously. For example, a 30 HP Rotary Converter potentially could run motors totaling up to 90 HP. Contact Alfa for verification of sizing.

If further technical assistance is required, please call Alfa at 479-646-1668.