

## **Pre-Installation Instructions**

### **Bulletin #125 9/99**

#### **INSPECTION**

Upon receiving the Roto-Phase, inspect for damage or missing parts and report such losses to the carrier and to the factory; always quoting the Roto-Phase model and serial number.

#### **INSTALLATION**

The Roto-Phase is suitable for mounting in any position, horizontal or vertical. Care must be taken when mounting to wall, rafters, or wood floors to make sure that normal Roto-Phase vibration is not transmitted with sounding board amplification.

#### **AVOIDING MAINTENANCE**

The Roto-Phase is an essentially reliable machine and requires little maintenance; in fact they tend to suffer from over attention more than inattention. Avoid whenever possible.

1. Moisture and Chemicals
2. Airborne materials that may cause blocked ventilation, which leads to excessive heat. Cooling air temperatures must not exceed 40 degrees Celcius (104 Degrees Farenheit).

#### **LUBRICATION**

All models (since 1976) have double shielded bearings and do not need lubrication.

## INSTALLATION INSTRUCTIONS

### GENERAL HOOK-UP, FOLLOW ALL LOCAL, STATE & NATIONAL ELECTRIC CODES

- A. Connect L1 & L2 through a separate protective device to Roto-Phase Terminal Block T1 & T2. (For wire sizes see "Roto-Phase Input" chart).
- B. Connect Roto-Phase lead T3 (mfg.phase) through the separate protective device to the 3-phase distribution panel and/or 3 phase motors.
- C. Connect L1 & L2 (single phase) to 3-phase distribution panel and/or 3 phase motors.
- D. If your Roto-Phase contains an auxiliary capacitor panel with connection circuits B & E, refer to connection diagram for proper installation.

### PRECAUTIONS

- A. Do **not** connect any single-phase load or magnetic controls to T3 (mfg.phase). T3 can be readily identified by the line with the highest phase to ground voltage.
- B. Properly ground all electrical equipment.
- C. Always start Roto-Phase before energizing motors.
- D. Because properly maintained voltages on motor starts is very important, wire sizings must be carefully followed and wire distances should also be carefully studied.

### SPECIAL INSTRUCTIONS

Non-PCB capacitors are standards established by Federal Regulation

The no-load amperage readings are typical of normal operations. They may vary approximately 10% with variation of line voltage. Reasonably close readings insure correct Roto-Phase electrical performance.

T1 = Line current

T2 = Line current

T3 = Capacitor current

At the time of original installation, record the Roto-Phase no-load amperage (no motors running) as well as the capacitor amperage. To read capacitor amperage, it will be necessary to read the capacitor circuits in the capacitor panel, which will require removing the panel cover.

Save this record and periodically (at least once a year) have a qualified electrician take new readings, comparing these new readings with the original readings.

If capacitor amperage is lower than originally, it means that a capacitor has probably failed and should be replaced.

Phase converters cannot be made to work equally well on all motors, even though the horsepower and voltage ratings are the same. Motors of different make and designed for different purposes, vary considerably in their electrical characteristics. Therefore, it is not always possible to make a universally applicable converter for motors with a given horsepower and voltage rating.

## HELPFUL HINTS

**NOTE: All ROTO-PHASE models should be up to full speed within 3 – 4 seconds.**

If nothing starts:

- A. Check voltage supply source with voltmeter.
- B. Check protection-reset breaker or replace fuses.
- C. Check for loose connections.

If ROTO-PHASE will not start or comes up to speed slowly:

- A. Check single phase input lines (L1 & L2) for misconnection. (L1 & L2 must connect to ROTO-PHASE T1 & T2).
- B. Capacitors may be disconnected from circuit or defective.
- C. Check for wrong supply voltage: Example: 46 VAC unit connect to 230 VAC supply.
- D. Check for locked bearing(s).

If fuses blow or circuit breaker trips:

- A. Check to be sure fuses are "TIME DELAY" (Dual Element) and correct size.
- B. Check to be sure circuit breakers are designed to handle starting currents, "HVAC" design.

If ROTO-PHASE is "noisy":

- A. Check for loose panel or panel lid.
- B. Be sure unit is mounted on level floor.
- C. Sometimes grease in bearings can make intermittent noise, which sounds like a bearing, but is not and usually, smoothes out after a short run period – (10 to 15 minutes).

If motor does not come up to full speed:

- A. Excessive single-phase voltage drop is evident. Voltage should not drop below 215 VAC on motor starting from a 230 VAC supply. A 20 VAC drop may indicate the wire size is too small (undersized), or utility company's transformer is too small.
- B. Starting torque required is too great:
  - 1. Mechanical problems with motor equipment.
  - 2. In case of compressors, the unloading device may be inoperative, starting against head pressure.

RECORD FOR NO-LOAD ROTO-PHASE ELECTRICAL READINGS

DATE OF INSTALLATION: \_\_\_\_\_

Roto-Phase Model Number: \_\_\_\_\_

Roto-Phase Serial Number: \_\_\_\_\_

Phase 1 to Ground: \_\_\_\_\_ Volts

Phase 2 to Ground: \_\_\_\_\_ Volts

Phase 3 to Ground: \_\_\_\_\_ Volts

Phase 1 to Phase 2: \_\_\_\_\_ Volts

Phase 1 to Phase 3: \_\_\_\_\_ Volts

Phase 2 to Phase 3: \_\_\_\_\_ Volts

Phase 1 Amperage: \_\_\_\_\_

Phase 2 Amperage: \_\_\_\_\_

Phase 3 Amperage: \_\_\_\_\_ Capacitor Wires

**Model Specifications:**

[Standard Roto-Phase I](#)

[Heavy Duty Roto-Phase II](#)

[Light Duty Roto-Phase III](#)

[Center Pivot Roto-Phase](#)

[CNC Roto-Phase](#)

[HDH Roto-Phase](#)

[Automatic Roto-Phase](#)

[SP Series Roto-Phase](#)

[Current Limiting Roto-Phase](#)

[Passenger and Freight Elevator Roto-Phase](#)

[TM Series Roto-Phase](#)

[Computer Load Roto-Phase](#)

### Standard Duty Roto-Phase I

	Wire Size T1-T2-T3		Fuse Size		Overload Protection		Magnetic Starter		No-Load Amperage		Capacitor Amperage	
	Voltage		Voltage		Voltage		Voltage		Avg. Voltage		Avg. Voltage	
<b>Model:</b>	230	460	230	460	230	460	230	460	230	460	230	460
<b>MF</b>	12	12	10	5	10	5	0	0	2.5	1.25	3.9	1.95
<b>MG</b>	12	12	10	5	10	5	0	0	2.5	1.25	8.5	4.25
<b>M</b>	12	12	15	8	15	8	0	0	3	1.5	13	6.5
<b>A</b>	8	12	30	15	30	15	1	0	4	2	22	11
<b>R</b>	8	10	40	20	40	20	2	1	7	3.5	33	16.5
<b>B</b>	6	10	50	25	45	22	2	1	7	3.5	40	20
<b>C</b>	4	8	80	40	60	30	3	2	11	5.5	61	30.5
<b>G</b>	3	6	100	50	80	40	3	2	16	8	80	40
<b>P</b>	2	6	125	60	100	50	3	2	18	9	110	55
<b>PKT</b>	2	6	125	60	100	50	3	2	18	9	110	55
<b>PKO</b>	2	6	125	60	100	50	3	2	18	9	110	55
<b>K2G*</b>	3*	6	100*	50*	80*	40*	3*	2*	16*	8*	80*	40*
<b>Y2P*</b>	2*	6*	125*	60*	100*	50*	3*	2*	18*	9*	110*	55*
<b>L2S*</b>	1/0*	4*	150*	75*	125*	60*	4*	2*	23*	11.5*	128*	64*
<b>W3P*</b>	2*	6*	125*	60*	100*	50*	3*	2*	18*	9*	110*	55*

\*Indicates units in electrical parallel. Data represents requirements for each unit.

### Heavy Duty Roto-Phase II

	Wire Size T1-T2-T3		Fuse Size		Overload Protection		Magnetic Starter		No-Load Amperage		Capacitor Amperage	
	Voltage		Voltage		Voltage		Voltage		Avg. Voltage		Avg. Voltage	
<b>Model:</b>	230	460	230	460	230	460	230	460	230	460	230	460
<b>HD2</b>	12	12	15	8	15	8	0	0	3	1.5	13	6.5
<b>HD3</b>	10	12	20	10	20	10	0	0	5	2.5	16	8
<b>HD5</b>	8	10	40	20	40	20	2	1	7	3.5	33	16.5
<b>HD7</b>	6	10	50	25	45	22.5	2	1	7	3.5	40	20
<b>HD10</b>	4	8	80	40	60	30	3	2	11	5.5	61	30.5
<b>HD15</b>	3	6	100	50	80	40	3	2	16	8	80	40
<b>HD20</b>	2	6	125	60	100	50	3	2	18	9	110	55
<b>HD25</b>	1/0	4	150	75	125	60	4	2	23	11.5	128	64
<b>HD30</b>	1/0	4	150	75	125	60	4	2	23	11.5	128	64
<b>HD40</b>	1/0	4	150	75	125	60	4	2	23	11.5	128	64
<b>HD2P*</b>	2*	6*	125*	60*	100*	50*	3*	2*	18*	9*	110*	55*
<b>HD2S*</b>	1/0*	4*	150*	75*	125*	60*	4*	2*	23*	11.5*	128*	64*
<b>HD3P*</b>	2*	6*	125*	60*	100*	50*	3*	2*	18*	9*	110*	55*
<b>HD4P*</b>	2*	6*	125*	60*	100*	50*	3*	2*	18*	9*	110*	55*

\*Indicates units in electrical parallel. Data represents requirements for each unit.

### Light Duty Roto-Phase III

	Wire Size T1-T2-T3		Fuse Size		Overload Protection		Magnetic Starter		No-Load Amperage		Capacitor Amperage	
	Voltage		Voltage		Voltage		Voltage		Avg. Voltage		Avg. Voltage	
<b>Model:</b>	230	460	230	460	230	460	230	460	230	460	230	460
<b>ST3</b>	12	12	10	5	10	5	0	0	2.5	1.25	3.9	1.95
<b>ST5</b>	10	12	20	10	20	10	0	0	5	2.5	16	8
<b>ST7</b>	8	12	30	15	30	15	1	0	4	2	22	11
<b>ST10</b>	8	10	40	20	40	20	2	1	7	3.5	33	16.5
<b>ST15</b>	6	10	50	25	45	22.5	2	1	7	3.5	40	20
<b>ST20</b>	4	8	80	40	60	30	3	2	11	5.5	61	30.5

**Center Pivot Roto-Phase**

	Wire Size T1-T2-T3		Fuse Size		Overload Protection		Magnetic Starter		No-Load Amperage		Capacitor Amperage	
	Voltage	Voltage	Voltage	Voltage	Voltage	Voltage	Avg. Voltage	Avg. Voltage	Avg. Voltage	Avg. Voltage	Avg. Voltage	Avg. Voltage
<b>Model:</b>	230	460	230	460	230	460	230	460	230	460	230	460
<b>PV0</b>	12	12	15	8	15	8	0	0	3	1.5	13	6.5
<b>PV1</b>	8	12	30	15	30	15	1	0	4	2	22	11
<b>PV2</b>	8	10	40	20	40	20	2	1	7	3.5	33	16.5
<b>PV3</b>	6	10	50	25	45	22	2	1	7	3.5	40	20
<b>PV4</b>	4	8	80	40	60	30	3	2	11	5.5	61	30.5
<b>PV5</b>	3	6	100	50	80	40	3	2	16	8	80	40
<b>PV6</b>	2	6	125	60	100	50	3	2	18	9	110	55
<b>PV7</b>	1/0	4	150	75	125	60	4	2	23	11.5	128	64
<b>PV8</b>	1/0	4	150	75	125	60	4	2	23	11.5	128	64
<b>PV9</b>	1/0	4	150	75	125	60	4	2	23	11.5	128	64
<b>PV10</b>	1/0	4	150	75	125	60	4	2	23	11.5	128	64

<b>CNC Roto-Phase</b>													
	<b>Wire Size T1-T2-T3</b>		<b>Fuse Size</b>		<b>Overload Protection</b>		<b>Magnetic Starter</b>		<b>No-Load Amperage</b>		<b>Capacitor Amperage</b>		
	Voltage		Voltage		Voltage		Voltage		Avg. Voltage		Avg. Voltage		
<b>Model:</b>	230	460	230	460	230	460	230	460	230	460	230	460	
<b>CNC1</b>	12	12	15	8	15	8	0	0	5	2.5	7	3.5	
<b>CNC2</b>	8	12	30	15	30	15	1	0	6	3	11	5.5	
<b>CNC3</b>	8	10	40	20	40	20	2	1	8	4	24	12	
<b>CNC5</b>	6	10	50	25	45	22.5	2	1	10	5	26	13	
<b>CNC7</b>	4	8	80	40	60	30	3	2	12	6	28	14	
<b>CNC10</b>	3	6	100	50	80	40	3	2	16	8	60	30	
<b>CNC15</b>	1/0	4	150	75	125	60	4	2	22	11	86	43	
<b>CNC20</b>	3*	6*	100*	50*	80*	40*	3*	2*	16*	8*	60*	30*	
<b>CNC25</b>	2*	6*	125*	60*	100*	50*	3*	2*	20*	10*	78*	39*	
<b>CNC30</b>	1/0*	4*	150*	75*	125*	60*	4*	2*	22*	11*	86*	43*	

\*Indicates units in electrical parallel. Data represents requirements for each unit.

### HDH Roto-Phase

	Wire Size T1-T2-T3		Fuse Size		Overload Protection		Magnetic Starter		No-Load Amperage		Capacitor Amperage	
	Voltage		Voltage		Voltage		Voltage		Avg. Voltage		Avg. Voltage	
<b>Model:</b>	230	460	230	460	230	460	230	460	230	460	230	460
<b>HDH1</b>	12	12	15	8	15	8	0	0	3	1.5	1.5	0.75
<b>HDH2</b>	8	12	30	15	30	15	1	0	4	2	2	1
<b>HDH3</b>	8	10	40	20	40	20	2	1	7	3.5	3.5	1.75
<b>HDH5</b>	6	10	50	25	45	22.5	2	1	7	3.5	3.5	1.75
<b>HDH7</b>	4	8	80	40	60	30	3	2	11	5.5	5.5	2.75
<b>HDH10</b>	3	6	100	50	80	40	3	2	16	8	80	40
<b>HDH15</b>	1/0	4	150	75	125	60	4	2	23	11.5	128	64

**SP Series Roto-Phase**

	Wire Size T1-T2-T3		Fuse Size		Overload Protection		Magnetic Starter		No-Load Amperage		Capacitor Amperage	
	Voltage		Voltage		Voltage		Voltage		Avg. Voltage		Avg. Voltage	
<b>Model:</b>	230	460	230	460	230	460	230	460	230	460	230	460
<b>SP2</b>	10	12	20	10	20	10	0	0	5	2.5	2.5	1.25
<b>SP3</b>	8	12	30	15	30	15	1	0	4	2	2	1
<b>SP5</b>	8	10	40	20	40	20	2	1	7	3.5	3.5	1.75
<b>SP7</b>	6	10	50	25	45	22.5	2	1	7	3.5	3.5	1.75
<b>SP10</b>	4	8	80	40	60	30	3	2	11	5.5	5.5	2.75
<b>SP15</b>	2	6	125	60	100	50	3	2	18	9	9	4.5
<b>SP20</b>	1/0	4	150	75	125	60*	4	2	23	11.5	11.5	5.75
<b>SP25*</b>	3*	6*	100*	50*	80*	40*	3*	2*	16*	8*	80*	40*
<b>SP30*</b>	2*	6*	125*	60*	100*	50*	3*	2*	18*	9*	110	55*
<b>SP40*</b>	1/0*	4*	150*	75*	125*	60*	4*	2*	23*	11.5*	128*	64*
<b>SP50*</b>	2*	6*	125*	50*	100*	50*	3*	2*	18*	9*	110*	55*
<b>SP60*</b>	1/0*	4*	150*	75*	125*	60*	4*	2*	23*	11.5*	128*	64*

\*Indicates units in electrical parallel. Data represents requirements for each unit.

**Current Limiting Roto-Phase**

	Wire Size T1-T2-T3		Fuse Size		Overload Protection		Magnetic Starter		No-Load Amperage		Capacitor Amperage	
	Voltage		Voltage		Voltage		Voltage		Avg. Voltage		Avg. Voltage	
<b>Model:</b>	230	460	230	460	230	460	230	460	230	460	230	460
<b>HD7CL</b>	6	10	50	25	45	22.5	2	1	7	3.5	40	20
<b>HD10CL</b>	4	8	80	40	60	30	3	2	11	5.5	61	30.5
<b>HD15CL</b>	3	6	100	50	80	40	3	2	16	8	80	40
<b>HD20CL</b>	2	6	125	60	100	50	3	2	18	9	110	55
<b>HD25CL</b>	1/0	4	150	75	125	60	4	2	23	11.5	128	64
<b>HD30CL</b>	2/0	3	150	75	150	75	5	3	30	15	150	75
<b>HD40CL</b>	4/0	2	200	100	200	100	5	4	40	20	200	100
<b>HD50CL</b>	350	1/0	250	125	250	125	5	4	50	25	250	125
<b>HD60CL</b>	500	2/0	300	150	300	150	6	5	60	30	300	150
<b>HD75CL</b>	750	4/0	400	200	400	200	6	5	80	40	400	200
<b>HD100CL</b>	1250	350	500	250	500	250	6	5	100	50	500	250

Passenger and Freight Elevator Roto-Phase												
	Wire Size T1-T2-T3		Fuse Size		Overload Protection		Magnetic Starter		No-Load Amperage		Capacitor Amperage	
	Voltage		Voltage		Voltage		Voltage		Avg. Voltage		Avg. Voltage	
Model:	230	460	230	460	230	460	230	460	230	460	230	460
CHD5ELV	8	10	40	20	40	20	2	1	7	3.5	33	16.5
CHD7ELV	6	10	50	25	45	22.5	2	1	7	3.5	40	20
CHD10ELV	4	8	80	40	60	30	3	2	11	5.5	61	30.5
CHD15ELV	3	6	100	50	80	40	3	2	16	8	80	40
CHD20ELV	2	6	125	60	100	50	3	2	18	9	110	55
CHD25ELV	1/0	4	150	75	125	60	4	2	23	11.5	128	64
CHD30ELV	1/0	4	150	75	125	60	4	2	23	11.5	128	64
CHD40ELV	1/0	4	150	75	125	60	4	2	23	11.5	128	64

TM Series Roto-Phase												
	Wire Size T1-T2-T3		Fuse Size		Overload Protection		Magnetic Starter		No-Load Amperage		Capacitor Amperage	
	Voltage		Voltage		Voltage		Voltage		Avg. Voltage		Avg. Voltage	
Model:	230	460	230	460	230	460	230	460	230	460	230	460
TM5	6	10	50	25	45	22.5	2	1	10	5	26	13
TM7	6	10	50	25	45	22.5	2	1	10	5	26	13
TM10	4	8	80	40	60	30	3	2	12	6	28	14
TM15	3	6	100	50	80	40	3	2	16	8	60	30
TM20	1/0	4	150	75	125	60	4	2	22	11	86	43

**Computer Load Roto-Phase**

	Wire Size T1-T2-T3		Fuse Size		Overload Protection		Magnetic Starter		No-Load Amperage		Capacitor Amperage	
	Voltage		Voltage		Voltage		Voltage		Avg. Voltage		Avg. Voltage	
<b>Model:</b>	230	460	230	460	230	460	230	460	230	460	230	460
<b>COMP1</b>	8		30		30		1		6		11	
<b>COMP2</b>	8		40		40		2		8		24	
<b>COMP3</b>	6		50		45		2		10		26	
<b>COMP4</b>	4		80		60		3		12		28	
<b>COMP5</b>	3		100		80		3		16		60	
<b>COMP6</b>	2		125		100		3		18		110	
<b>COMP7</b>	1/0		150		125		4		23		128	