

# PHASE-A-MATIC™

## STATIC PHASE CONVERTER - PAM SERIES INSTRUCTION SHEET

**CAUTION:** Read the following carefully before attempting installation.

Using the PHASE-A-MATIC™ converter as in Method No. 1 will produce approximately 2/3 rated horsepower.

For heavily loaded applications, such as compressors, blowers, water pumps, hydraulic pumps, etc.: The motor pulley diameter must be reduced by 1/3 or a 50% larger motor must be fitted. Otherwise, method No. 2 shown on reverse side of this page could be used or, use our full power PHASE-A-MATIC™ Rotary Phase Converter.

### SELECTION:

**The horsepower range** of the PHASE-A-MATIC™ static converter is determined by the minimum and maximum starting current applied to it at any one time. The largest motor on your machine, or the idler motor, if used, must fall within the minimum and maximum horsepower range marked on the PHASE-A-MATIC™ static converter. However, after the first motor (or "idler motor") has started, motors below the minimum range may then be started and can usually be left running as the main motor is stopped and started. Do not add the horsepower of the power feed, coolant pump, etc. These rely on the generator effect of the main motor. The only time you would add the horsepower of two or more motors together would be if they always start at exactly the same time. Do not install a larger size or Heavy Duty series PHASE-A-MATIC™ static converter thinking it will give you more horsepower. A static converter that is too large will not work properly and may cause damage.

**Two-speed motors** are dual horsepower. Select the PHASE-A-MATIC™ static phase converter with minimum and maximum horsepower ratings, which fall within or very close to the minimum and maximum horsepower of the motor. For example: A 1.5 HP 3450 RPM motor is ¾ HP at 1725 RPM.

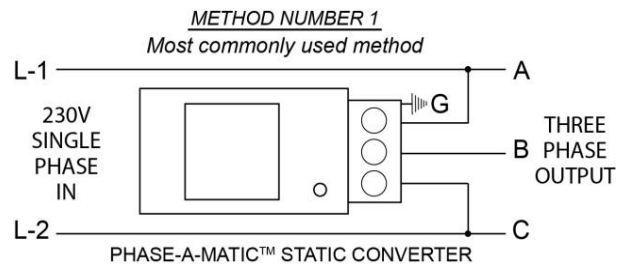
**Some European** soft-start motors draw less starting current than normal and therefore require a smaller than normal converter.

**Taiwanese and Chinese** motors generally draw greater amperage to start than normal. Therefore, for these motors we recommend model PAM-600HD for a 3 HP motor; model PAM-900HD for a 5 HP motor; model PAM-1200HD for a 7.5 HP motor, etc.

### HEAVY DUTY uses include:

**Air compressors:** However, the motor pulley diameter must be reduced by 1/3, or a 50% larger motor must be fitted. Or if the motor is delta-wound, pulley diameter must be reduced by 50%, or a 100% larger motor must be fitted.

**Long, heavy starting** cycles, frequent starting or instant reversing, unattended motors, jogging, or if there is a chance of the motor being stalled during use.



**NOTE:** Mount converter upright (vertically) with the junction box on the top. The horizontal diagram as shown here is to suit the illustration space only. It is best to mount where the red indicator light can be seen during operation of machine.

### METHOD NO.1 INSTALLATION:

Static Phase Converter used to start the load motor

- 230V single-phase** lines L-1 and L-2 are connected to the A and C terminals of the converter.
- Do not connect** 230V power or a ground or neutral wire from the utility to the B terminal of the converter as the resulting dead short would damage it instantly. The single-phase neutral wire is not required for operation of the converter.
- Properly ground** all electrical equipment for safety. Use a grounding clip/screw to attach the ground wire to the conduit box.
- Fuses** should not be used on the three-phase lines between the PHASE-A-MATIC™ static phase converter and the motor. A blown fuse still leaves two lines to conduct which can damage the converter. **Magnetic starters** are preferred. Fuses can be used on the single-phase lines L-1 and L-2 from the utility power to the converter. Single-phase wires and fuses should be sized appropriately for the rated amperage of the motor. See chart below.
- Size the breaker** on the single-phase approximately twice the amperage rating of the motor at the 230V configuration. See chart below.
- For machines with magnetic switchgear, resistive or single-phase load:** Resistive or single-phase loads and/or magnetic switchgear must be connected only to lines A and C from the converter. DO NOT connect the PHASE-A-MATIC™ static phase converter until you identify which two wires operate the magnetics. To easily locate these two wires connect 230V single-phase power to any 2 of the 3 wires on the machine and press the start button. When the correct combination is found, the magnetics will work. Connect these two wires to the outside terminals of the PHASE-A-MATIC™ converter terminals A and C, and the third wire to the center terminal (line B) disconnected. Your motors magnetic overload protection remains the same, no changes are necessary.
- For indoor use** only. Do not use in wet or damp locations.
- Do not mount** on equipment with excessive vibrations.
- Refer to NEC Code #455** for details on field installation issues.

Breaker & Wire Size - Refer to NEC Code #430 C												
HP	1	2	3	5	7.5	10	15	20	25	30	40	50
Breaker Amps	15	15	20	30	40	60	100	125	160	200	250	300
Wire Size Gauge	14	14	12	10	8	6	3	1	1/O	3/O	4/O	300 mcm
Fuses*	10	10	15	30	40	45	60	80	100	125	150	200
Conduit Size In.	1/2	1/2	1/2	1/2	1/2	1/2	3/4	1	1	1-1/4	1-1/4	1-1/2

\*Fuses, if used, are *time delay, dual element* for 1-phase lines L-1 and L-2 only; do not use on 3-phase lines to the motor.

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# PHASE-A-MATIC™

## STATIC PHASE CONVERTER INSTRUCTION SHEET for PAM SERIES

### OPERATION

**For multiple motor applications**, the largest motor must always start first and it must be at least 50% larger than any other motor starting on the same converter. If they start simultaneously, the combined horsepower of all the motors must fall within the rating of the converter.

**Always start a machine** out of gear or in lowest spindle speed at initial hook-up to reduce load. The PHASE-A-MATIC™ static converter has a built-in weak link which is designed to fail rapidly if hooked to a higher horsepower motor. On lower horsepower motors, the light could stay on after the motor is running causing rapid failure of the PHASE-A-MATIC™ converter thus providing protection against possible motor damage.

**The red indicator light** should only come on when the motor is starting and should go out once the motor has reached operating speed. The light should never stay on longer than 3-5 seconds since the converter could be damaged. When testing the static converter for the first few times after installation, keep your hand near the off switch of the machine ready to turn it off to prevent damage to the converter due to a wrong or loose connection.

**Power** may be left on the converter without the load applied. Current draw is approximately 8mA (.008 amp). The converter operates best when mounted vertically with the junction box on top. Installation should be performed by a qualified electrician. Refer to local codes for proper wire sizing. Wires and fuses should be sized as appropriate for the motor's rated amperage. See chart on side 1. This unit is not recommended for use with phase-loss monitors.

### TROUBLESHOOTING

- A. **If the motor fails to start** and/or any of the following symptoms occur: clicking noises from the PHASE-A-MATIC™ static converter, light flashes on and off and motor just hums or buzzes, motor starts intermittently and light goes off before motor reaches operating speed; this could indicate that either the motor is wired for 460V or the PHASE-A-MATIC™ static converter being used is too high in horsepower for the motor, and a smaller size converter should be tried. Also, check for proper connection of magnetics (see paragraph #6 on side 1) or improper overload heaters in magnetics.
- B. **No voltage** when measured across lines B and C without motor running: Normal indication.
- C. **Converter occasionally** hums when motor is off: Normal.
- D. **Motor runs backwards**: Reverse lines A & C between the converter and the motor.
- E. **For further assistance** contact the factory weekdays at 661-947-8485 Monday through Friday.

### METHOD NO. 2 INSTALLATION:

Static Phase Converter used to start an Idler Motor, Idler Motor to power the load motor.

**Full or close to full horsepower** (HP) can usually be obtained by powering the load motor through a 3-phase motor that runs on single-phase. A PHASE-A-MATIC™ static phase converter is used to start the idler motor. The idler motor windings act as a rotary transformer or generator and consume little power when running unloaded. Used motors are inexpensive and readily available. A single machine or complete shop can be operated with great flexibility using this method. The idler motor should be at least 50% larger than the largest motor you want to run to accommodate the higher starting current. A good quality 3450 RPM, Y-wound, 3 phase, 230V motor is the best choice. A 1725 RPM motor can be used on applications not heavily loaded.

1. Wire the PHASE-A-MATIC™ static phase converter to the idler motor as described in Method No. 1, side 1.
2. Size fuses and wires on the single-phase side as appropriate for the motor's rated amperage. Once running, the idler motor can then power the load motor. Wire the load motor in parallel to the idler motor as per Method No. 2 diagram below. Size fuses and wires on the 3-phase side as appropriate for the motor's rated amperage.
3. Resistive or single-phase loads and/or magnetic switch gear must be energized only by lines A and C from the converter.
4. Always start idler motor before starting your equipment.

### Extra Precautions for Idler Motor System

**Heavy starting load motor(s)** may cause the output voltage of the idler motor on line B to drop sufficiently to cause the static converter to return to the start-up mode. At this point, the converter's start circuit has the combined horsepower of the idler motor and load motor(s). This will be indicated by the light on the converter coming on when the load motor is started. If the combined HP is greater than the converter's maximum HP range, DAMAGE TO THE CONVERTER MAY OCCUR.

**To prevent damage** to the converter, install a heavy-duty single-pole switch on line B between the PHASE-A-MATIC™ static phase converter and the 3-pole switch - refer to Method No. 2 diagram below. The switch should be rated the same amperage as the idler motor or greater. The switch must be in the "ON" (closed) position before the idler motor is started and turned to the "OFF" (open) position after the light on the converter has gone out. This will prevent the converter from switching to the start-up mode and from being damaged by an overload. Never turn the single-pole switch to the "ON" position while the Idler Motor is running. Doing so could do damage to the converter.

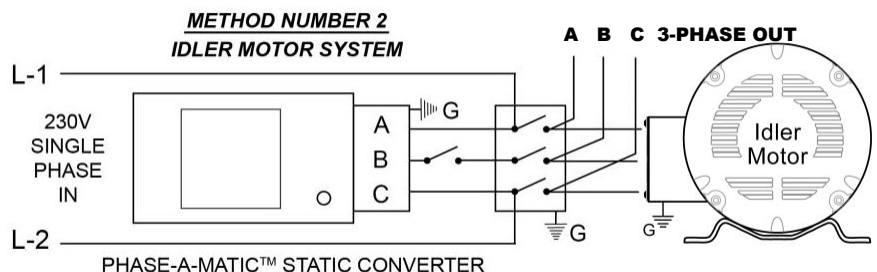
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