

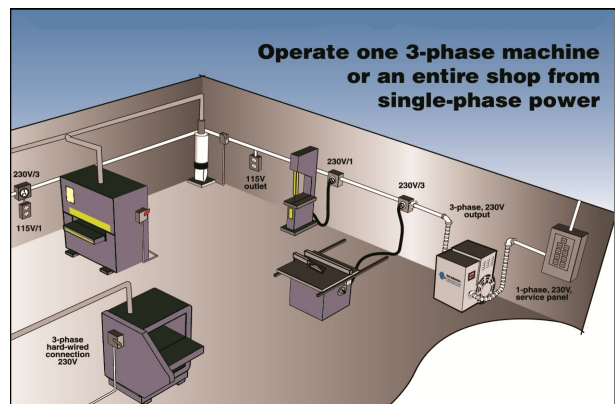
# PHASEMASTER® ROTARY PHASE CONVERTERS

## Affordable 3-Phase Power From a Single-Phase Supply



### NO 3-PHASE? NO PROBLEM!

The **Phasemaster®** rotary phase converter changes a 230 or 460 volt, 1-phase service to an equivalent 3-phase output. It will efficiently operate any 3-phase equipment from an existing 1-phase supply and will provide years of trouble-free service. The output of a **Phasemaster®** converter is just like utility 3-phase. It can power any combination of motors, heaters, rectifiers, and variable speed drives. Any machine operating on a **Phasemaster®** converter will deliver its full rated nameplate output and will perform identically as if connected to utility 3-phase, except at a fraction of the cost of a new service.



*The World Leader in Single to Three-Phase Power Conversion*

### THE LEAST COST ALTERNATIVE TO UTILITY 3PHASE

Kay Industries has applied the **Phasemaster®** converter in thousands of applications for nearly 40 years. Over 5 million horsepower of motors are now operating on **Phasemaster®** converters as well as 1000 radio and television stations worldwide. The reason for such broad acceptance is that a **Phasemaster®** converter is simply the *least expensive* way to operate 3-phase equipment wherever utility 3-phase is unavailable or too expensive to obtain. It eliminates utility charges to extend 3-phase lines. Such charges often exceed \$50,000 per mile. A converter is also much less costly than a generator or changing to 1-phase motors. Replacing motors may be a viable option up to about 3HP but above that they are very expensive and difficult to locate. It is also necessary to convert all machine controls to 1-phase: not a cheap proposition. The converter also saves the cost of a new 3-phase service panel and can be installed in a few hours compared to several weeks or even months for a new utility line extension.

### THE BENEFITS OF 3-PHASE WITHOUT THE COST

Most commercial machinery over a few horsepower is designed to operate on 3-phase power. That's because 3-phase motors are much less expensive, more readily available, run more efficiently, and last an average of 6-8 years longer than 1-phase motors. Similarly, 3-phase power supplies operate more efficiently and require less output filtering than their 1-phase counterparts. But these cost and performance advantages are only available to those with 3-phase service. The **Phasemaster®** converter effectively changes a 1-phase shop to a 3-phase location thus allowing a much wider selection of equipment for almost any application.

### TRUE 3-PHASE OUTPUT WITHOUT HARMONICS

The output of the **Phasemaster®** converter is real 3-phase 3-wire delta. Each of the phase voltages is a true sine wave separated by 120° and will deliver closely balanced currents to the load equipment. The stored energy of the unique patented construction enables it to ride through short-term line voltage transients including over-voltage spikes and the more common under-voltage sags. Further, the converter will not generate the unwanted or harmful harmonics that are characteristic of solid-state variable frequency drives or solid state converters.

### NO EFFECT ON YOUR POWER BILL

The **Phasemaster®** converter is more than 95% efficient and **will not increase** your utility bill. All loads connected to the converter develop their full nameplate output and will consume the *same* number of kilowatt-hours of energy regardless if measured on a single or 3-phase service meter. In addition to the initial savings, a phase converter may actually reduce your utility bills by eliminating the demand charges that often apply to 3-phase services. As a further bonus, the Phasemaster converter actually buffers and soft starts all motor loads thus reducing the in-rush demand on your utility service.

### THE MOST CAPACITY PER RATED HORSEPOWER

The **Phasemaster®** rotary phase converter family is available in ratings from 1-100 HP. Most sizes are available from stock or within a few days. It will start *any* load regardless of torque requirements or duty cycle and enables the load to develop full rated horsepower or KW output just as if running on utility 3-phase.

**Phasemaster®** converters are designed with the highest capacity and the most overload capability in the industry. All converters are conservatively rated to insure that you get the most output for your money. That means you don't have to buy a "20HP" converter to start a 10HP load as some brands require.

### FEATURES UNMATCHED IN THE FIELD

- The quietest converter you can buy, thanks to our advanced construction design and workmanship
- All converters are available with a wide range of optional built-in controls
- Dual voltage 230/460 on most ratings, at no charge.
- Clearly written and easy to understand instructions assure fast installation
- Certification, equivalent to CSA, UL
- Contains no service prone parts such as electrolytic capacitors, relays, or centrifugal switches
- No adjustments or phase balancing are required
- And it's backed by the most comprehensive warranty and the best technical support in the industry, 24-7

Every **Phasemaster®** converter is operated extensively and subjected to a rigorous series of production tests and quality inspections to verify that it meets our strict performance and workmanship requirements before it is shipped to our customers. An original signed copy of that test report is packed with every unit.

### YOU NEVER OUTGROW YOUR PHASEMASTER!

All **Phasemaster®** converters are designed to grow with your needs. That means you can order the converter you need for today's requirements without concern that it will be too small in the future. As your power needs increase, simply add another converter in parallel with the original. You are limited only by the size of your 1-phase service.



## DESIGNED FOR HIGH RELIABILITY AND LOW MAINTENANCE

The **Phasemaster®** converter is engineered for years of worry-free performance. It is a one-piece, self-contained unit, not an “erector set” of separate capacitor panels, idler motors or other external components. Capacitors are safely isolated in a top-mounted enclosure that reduces floor space requirements and vibration. No special adjustment, tap changing or phase balancing is required. The rotor does not carry thrust loads, thus assuring maximum bearing life. **Phasemaster®** converters do not use electrolytic capacitors, potential relays, brushes, slip rings or other high-maintenance parts. Inspection and annual lubrication are the only maintenance procedures required. The fine workmanship is accented with a distinctive white paint finish that tells you it's an authentic **Phasemaster®** converter.

## INSTALLATION

A **Phasemaster®** converter is designed for easy installation. It does not have to be bolted down and can be quickly connected to produce 3-phase in just a few hours. Clearly written instructions explain how to size branch circuits and supply wires to assure both user safety and compliance with the National Electric Code. Converters with built-in controls also contain terminal blocks for simple “2-wires in, 3-wires out” installation convenience.

## APPLICATIONS

Kay Industries has unmatched application experience. The following abbreviated list demonstrates the extraordinary

### Agricultural Equipment:

Dryers, augers, balers, grain drying fans, irrigation pumps

### Air Conditioning & Refrigeration:

Ice makers, ice cream machines

### Automotive equipment:

Hydraulic lifts, compressors, tire balancers, spray booths

### Battery Chargers

### Broadcast Transmitters:

AM, FM, analog and digital TV  
Compressors of all types

### Dryers & Kilns

### Dry Cleaning & Laundry Machines

### Elevators, Cranes & Hoists

### Embroidery Machines

### Environmental & Soil Remediation:

Blowers, vacuums, balers, compactors, shredders

### Food Processing Equipment:

Ovens, mixers, grinders, graters

### Heaters

### Injection Molders

### Machine tools:

Lathes, mills, CNC machines, EDM machines, shears, presses punches, saws & grinders

### Medical & Electronic Equipment:

X-ray machines, lasers

### Printing Equipment:

Presses, cutters, binders

### Pumping and Irrigation:

Pivot systems, lift stations, submersible pumps

### Saw Mills

### Stone Saws

### Welders (all types)

### Woodworking Equipment:

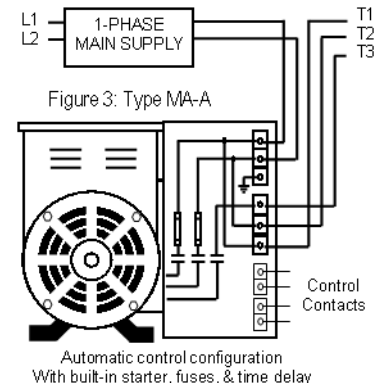
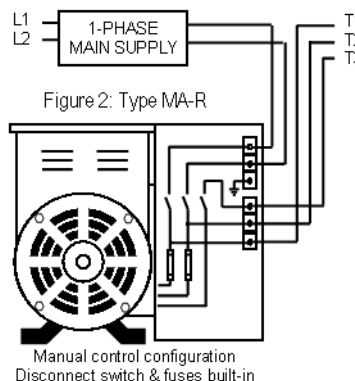
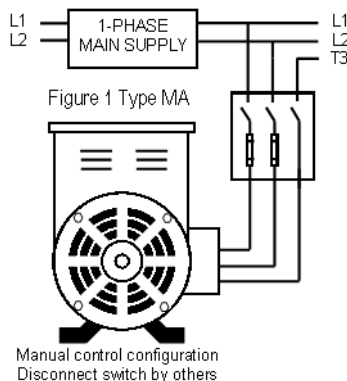
Saws, planers, shapers, dust collectors, edgebanders, lathes, routers including CNC, molders, wide belt sanders

## HOW DOES A ROTARY PHASE CONVERTER WORK?

A rotary phase converter is actually a *rotating* transformer. It consists of a *stator* with three stationary primary windings and one secondary in the form of a *rotor* mounted on bearings. When the converter runs, 1-phase power is applied to one of the stationary windings. An exact copy of that applied voltage sine wave is induced in the spinning rotor. As the rotor's magnetic field spins, it cuts across those stationary windings that were not energized from the utility line and re-induces a copy of the supply voltage. This voltage is taken out of the converter as the “manufactured” third leg. Since the rotor spins at an exact multiple of 60Hz and the three stationary windings are evenly spaced around the stator, the resulting voltages created at the converter output are shifted exactly 120°, *i.e.*, *true* 3-phase.

In a 3-phase system, the load current is distributed equally in each phase. This is the reason that motors connected to the **Phasemaster®** can develop full rated nameplate horsepower. However, any motor running at *less* than its full rated horsepower actually contributes its unused capacity back into the system as additional conversion capability. The in-rush and no-load idling currents of a converter are substantially lower than that of an electric motor of comparable size.

## Connection Arrangements





## THE PHASEMASTER® ROTARY CONVERTER FAMILY

- MA** General Purpose Converters for most motor load and heater applications
- MA-A** Same capacity as Type MA but with automatic controls for unattended or cyclical applications
- MA-R** Same capacity as Type MA but with built-in switch, fuses and terminals for fast installation and single point control
- PI** Totally enclosed converters for pivot irrigation or other severe outdoor duty applications
- T** Expressly designed for analog and digital Radio and TV Broadcast Transmitters. Refer to Kay Industries.

The table below shows typical sizing for the **TYPE MA** General Purpose **Phasemaster**. Refer to Kay Industries publication **How To Select A Phasemaster Rotary Converter** for further details on proper sizing procedures.

Model No.	Largest HP	Max HP	Approx Dimensions			
			L	W	H	Wt.
SD-60	1.5	3	10	11	12	64
MA-00	2	6	10	12	14	89
MA-0	3	9	11	12	14	108
MA-1	5	15	14	14	17	204
MA-1B	7.5	22	16	17	20	261
MA-2	10	30	18	17	22	307
MA-3	15	45	20	18	26	358
MA-4	20	60	21	21	28	423
MA-5	25	75	22	21	28	487
MA-6	30	90	23	23	30	622
MA-7	40	120	24	23	30	768
MA-8	50	150	25	27	34	885
MA-9	60	180	27	27	37	923
MA-10	75	225	29	30	38	1200



TYPE MA



TYPE MA-A



TYPE MA-R



TYPE PI

### TECHNICAL PERFORMANCE SPECIFICATIONS

- Voltage Input: 208V, 230V, 460V field changeable on most non-automatic models
- Voltage Output: Equals 3-phase equivalent of 1-phase input voltage
- Ratings: 1-100HP single units, may be paralleled up to 500HP
- % Regulation: 2-5% at full load output
- Harmonic Content: <1%
- Power Factor: .95 or greater at full load
- Operating Efficiency: >95% at full load
- Operating Reliability: MTBF 50,000 hours

### PHASE CONVERTER ACCESSORIES: Tailor your Phasemaster® converter for special requirements

#### Automatic Controls

Adds built-in fuses, magnetic starter, terminal blocks, and time delay relay to allow converter to be energized on demand by the load controller in unattended applications.

#### Primary Disconnect Switch And Fuses

Adds built-in switch, fuses and terminal blocks to speed installation and provide a single point of on-off converter control.

#### Outdoor Weatherproof Enclosures

Padmounted fiberglass enclosure for outdoor service. Pre-wired ventilating fans and provision for padlocking.

#### Reduced In-rush Current Starting

Special magnetic controls that reduce the converter starting current by 70% are "friendly" to weak utility services and limit power demand and voltage drop on the incoming service.

#### Voltage Regulation for CNC Machines

Especially designed for CNC applications and for variable frequency drives. Enables the converter to maintain balanced output voltages over a wide load range.

#### Lightning & Surge Protection

Built-in arrestors protect against severe line transients. Recommended for remote areas or high elevations subject to frequent electrical storms or line disturbances.

#### Transformers for Special Output Voltages

**Step-Up** - Used where supply voltage is 240V, 1-phase but 480V, 3-phase output is required.

**Delta-Wye** - To change the converter output from 3-wire delta output to 4-wire wye.

**Buck-Boost** - To reduce or increase input voltage by 10-15%. Change 240V supply to 208V or vice versa.

© Kay Industries, Inc 2014



Corporate Office  
P.O. Box 1323  
South Bend, IN 46624  
800-348-5257 · 574-289-5932(fax)  
www.kayind.com

Western Region Office  
Fremont, CA  
510-656-8766  
info@kayind.com