

PRODUCT APPLICATIONS **MACHINE SHOPS**



MACHINE SHOPS

Recommended Product

PHASE PERFECT®

\$1,204.74

PROJECTED ANNUAL SAVINGS



YOUR SHOP SHOULDN'T BE LIMITED BY AVAILABLE POWER

More and more machine shops are being started in rural and other non-industrial areas where three-phase power is not available or is prohibitively expensive. Whether you're setting up in a pole barn, garage, or remote commercial space, the power infrastructure shouldn't limit your machining capabilities or force you to compromise on equipment quality.

THE SOLUTION: PHASE PERFECT®

The Phase Perfect® was specifically designed to address the unique power needs of machine shops. Just feed single-phase into the unit and get utility-quality three-phase back out.

Unlike other types of phase converters, Phase Perfect® offers:

- ▶ **Low standby power consumption:** Reducing ongoing operational costs
- ▶ **Utility-grade, true three-phase output:** Ensuring perfect balance for sensitive electronics
- ▶ **Support for multiple simultaneous loads:** Run your entire shop, not just one machine
- ▶ **No moving parts:** Maintenance-free operation



THE CHALLENGE: LIMITATIONS OF CONVENTIONAL CONVERSION METHODS

While rotary and static converters offer alternatives to utility three-phase power, they come with significant drawbacks due to poor voltage balance:

- ▶ **Premature Motor Failure:** Other phase conversion methods cannot maintain good voltage balance, causing motors to run hotter—significantly reducing motor life even when temperatures appear acceptable.
- ▶ **Expensive Drive Damage:** Unbalanced power forces rectifier diodes in VFD, spindle, and servo drives to carry excessive current, leading to premature failures and costly complete drive replacements.
- ▶ **Inconsistent Machining Results:** Spindle and drive motor speeds could become unstable during heavy cuts, which can create chatter, poor surface finish and the loss of motor torque can cause unexpected stalling during machining operations.
- ▶ **Frustrating Downtime:** Drives can trip or fault with "DC bus" or "phase loss" errors due to phase imbalance, interrupting production and workflow.
- ▶ **Compromised Precision:** High-precision operations become increasingly difficult due to thermal distortion from unbalanced heating in spindle assemblies—directly affecting part accuracy.

Modern CNC equipment and even conventional machines with electronic controls require significantly better voltage balance than rotary or static converters can provide. Without it, you're compromising not just your equipment longevity, but your shop's productivity and part quality.



WHY MACHINE SHOPS CHOOSE PHASE PERFECT®

1. True Three-Phase Power

Provides clean, balanced, and stable three-phase power that meets the tight voltage balance tolerances required by CNCs and sensitive electronics—unlike rotary or static converters.

2. Power For Hard-Starting Loads

Ensures dependable operation of high-inertia machines like lathes, mills, and air compressors.

3. Easy Installation

Install inside or outside. No programming required.

4. Reliable & Efficient

No noisy rotary motors or regular maintenance.

5. Scalable for Any System

Supports systems rated at hundreds of Amperes of three-phase making it suitable for large machine shops.

TECHNICAL DETAILS: DESIGNED FOR VERSATILITY

Transformer Friendly

In many cases, machine shop equipment requires 208 V delta configured three-phase power. A Phase Perfect® is easily paired with relatively inexpensive buck/boost transformers to lower voltage to 208 V from 240 V if required or can be used with a Delta to Wye transformer for applications requiring a neutral.

Reliability

With over 20 years of refinement, our solid-state converters are built to last:

No moving parts = less maintenance, fewer failures.

Phase Perfect ensures uninterrupted operation, lower energy costs, and longer equipment life.

Perfect For:

- ▶ Rural or off-grid locations
- ▶ Pole buildings, barns, and shops
- ▶ Equipment change-outs where 3-phase isn't available
- ▶ Multiple simultaneous loads



THE VALUE: SAVINGS THAT ADD UP

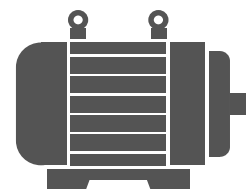
Most importantly, **WE SAVE YOU MONEY.** No costly utility upgrades, just efficient, reliable power for shop.

\$1,204.74/year

**Typical HVAC System
Installation, Estimated Annual
Savings with Phase Perfect®
versus Rotary:**



Phase Perfect®
Digital Phase Converter



Rotary
Phase Converter

Converter Horsepower Needed	50 HP	100 HP
Max Load Amperage	150 A	150 A
Standby Power Consumption	240 W	7480 W
Idle Power Cost	\$39.94	\$1,244.67

Max Load Amperage:

150 A

Amperage rating of largest or combined load that will be connected to the Phase Perfect®

Electricity Cost (Per kWh):

\$0.16

The cost in cents per kilowatt/hour your utility charges you for electricity usage. You can estimate costs for your region by looking at the [Average Price Chart on eia.gov](#).

Estimated Power On Time:

52

Weeks per Year

5

Days per Week

Number of weeks per year and days per week you anticipate needing 3 Phase power available. For example: a business with typical operating hours might be 50 weeks per year and 5 days per week, while an elevator installation would require 52 weeks per year and 7 days per week.

Estimated Standby Time:

4

Hours per Day

The number of hours per day you anticipate not drawing a significant 3 Phase load. For example: a typical business might not draw a significant load right away in the morning, during breaks, or over the lunch hour, while an elevator might be idle 20 or more hours per day.





PHASE CONVERTING | 230 V & 460 V | VOLTAGE DOUBLING
NEMA 3R OUTDOOR ENCLOSURE | 5 - 175 HP

PHASEPERFECT® DIGITAL PHASE CONVERTERS



World's Only
Digital Phase
Converter



Voltage
Doubling



Phase-to-Phase
Voltage Balance



98.7% Efficient
At Full Load



508A
Panel Shop

Phase Conversion & Voltage Doubling

Cost Savings for Long Lead Applications

Phase conversion allows three-phase output from a single-phase input, giving you access to three-phase power anywhere. Voltage doubling eliminates the need for a transformer while minimizing motor lead wire size on 460 V systems running on a 230 V source, saving you hundreds on wire costs.



Panel Shop Options

- ▶ **Quiet Model**
 - Additional inductance built-in makes these models quieter than the competition
- ▶ **MCCB Service Disconnect**
 - Breaker equipped with external, service-rated, disconnect to support easy field serviceability
- ▶ **MODBUS**
 - Allows information exchange between devices for simple communication.
- ▶ **50Hz Operation**
- ▶ **On/Off Switch**
 - Allows toggling of device power without the need to remove it from the power source
- ▶ **Strikesorb Surge Protection**
 - Protect your drive from damaging input voltage spikes with a high-quality, surge protective device

PHASE PERFECT

Features

Voltage Balance Within 2%

Phase Technologies' Digital Phase Converters offer line-to-line voltages that are balanced within 2%, improving equipment performance and lifespan. A balanced voltage is one of the most important factors when considering efficiency, power output, reliability, and longevity. Even slight voltage imbalances can increase current, leading to excessive heat and motor damage.

2X Starting Capacity

With twice the starting capacity of a rotary phase converter, a single Phase Perfect Digital Phase Converter is capable of starting motors up to their stated HP. No derate required. Typically, you would choose a Phase Perfect rated above the sum of total current drawn for all connected loads. However, Phase Perfect Digital Phase Converters can be oversized, or split into multiple units, to better accommodate the available incoming power.

Utility Grade Three-Phase Output

Phase Perfect Digital Phase Converters provide a safe, clean, utility-quality three-phase output capable of starting and stopping motors across the line while running electronics such as transformers, contactors, circuit boards, lights, and heaters.

Simple Installation

With two wires in and three wires out, installation of Phase Perfect Digital Phase Converters are virtually "plug-and-play." Once installed, three-phase equipment can be easily connected to the output just like they would to a utility three-phase power supply.

Regenerative (PT, PTE)

Maximize efficiency with balanced, stable voltage to the load and full regeneration on shutdown.

Voltage Doubling Output (PTE)

Eliminates the need for a transformer converting 230 V input to a 460 V output.

Product Specifications

Model / Part Number	HP	Rated Current Input (Amps)	Rated Current Output (Amps)	Input Voltage (Volts)	Output Voltage (Volts)	Output (kVA)	Standby Power Consumption (Watts)
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230V Models

PTE007	7.5	45 A	26 A	230 V	230 V	10.8 kVA	70 W
PTE010	10	62 A	36 A	230 V	230 V	14.9 kVA	74 W
PTE015	15	90 A	52 A	230 V	230 V	21.6 kVA	77 W
PTE020	20	111 A	64 A	230 V	230 V	26.6 kVA	80 W

Voltage Doubling

PTE207	7.5	45 A	13 A	230 V	460 V	10.8 kVA	200 W
PTE210	10	62 A	18 A	230 V	460 V	14.9 kVA	320 W
PTE215	15	94 A	27 A	230 V	460 V	22.4 kVA	435 W

460V Models

PTE407	7.5	22 A	13 A	460 V	460 V	10.8 kVA	52 W
PTE410	10	32 A	18 A	460 V	460 V	14.9 kVA	68 W
PTE415	15	48 A	27 A	460 V	460 V	22.4 kVA	71 W
PTE420	20	55 A	32 A	460 V	460 V	26.6 kVA	74 W

PT ENTERPRISE

230V Models

PT007	7.5	45 A	26 A	230 V	230 V	10.8 kVA	70 W
PT010	10	62 A	36 A	230 V	230 V	14.9 kVA	74 W
PT020	20	111 A	64 A	230 V	230 V	26.6 kVA	80 W
PT030	30	165 A	95 A	230 V	230 V	39.4 kVA	175 W
PT040	40	225 A	130 A	230 V	230 V	54.0 kVA	190 W
PT050	50	286 A	165 A	230 V	230 V	68.5 kVA	235 A
PT060	60	329 A	190 A	230 V	230 V	78.9 kVA	260 W
PT075	75	416 A	240 A	230 V	230 V	99.7 kVA	300 W

460V Models

PT407	7.5	22 A	13 A	460 V	460 V	10.8 kVA	52 W
PT410	10	32 A	18 A	460 V	460 V	14.9 kVA	68 W
PT415	15	47 A	27 A	460 V	460 V	22.4 kVA	71 W
PT420	20	55 A	32 A	460 V	460 V	26.6 kVA	74 W
PT430	30	80 A	46 A	460 V	460 V	38.2 kVA	87 W
PT440	40	105 A	61 A	460 V	460 V	50.7 kVA	180 W
PT450	50	134 A	77 A	460 V	460 V	64.0 kVA	190 W
PT460	60	157 A	91 A	460 V	460 V	75.6 kVA	220 W
PT475	75	185 A	107 A	460 V	460 V	88.9 kVA	270 W
PT4100	100	246 A	142 A	460 V	460 V	118.0 kVA	300 W
PT4150	150	343 A	198 A	460 V	460 V	164.4 kVA	300 W
PT4175	175	381 A	220 A	460 V	460 V	182.9 kVA	300 W

PT PERFORMANCE





**DIGITAL PHASE
CONVERTERS**

**VARIABLE
FREQUENCY
DRIVES**

**MOTOR
PROTECTION**

**SOFT
STARTER**

**508A
PANEL
SHOP**

OUR MISSION

Relentlessly seek to *provide Uncommon Value, solutions, innovation, and support for the industries that we serve.*



10-DAY
AVG. LEAD TIMES



**MADE IN THE
USA**