
PHASE
CHANGE
CONVERTERS
AUSTRALIA'S SMARTEST
3 PHASE POWER CONVERTERS

WHO WE ARE

Mark Bridgman began manufacturing and selling single phase to 3 phase converters in Australia in 2004 from a backyard shed in rural Victoria with one employee and a single advertisement running in a weekly newspaper. Seeing great potential in the market and the benefits converters would be to customers, the market was slowly educated to this new technology, and the business grew. In 2006 Phase Changer Pty Ltd was formed with Ian Jackson as Technical Director. Phase Changer has continued to expand nationally and also into numerous international markets. With a permanent office and workshop in rural Victoria, Phase Changer continues to supply 'Australia's Best Converters' to businesses and individuals allowing them to get the most out of their single phase power supply infrastructure, and to operate businesses and equipment in situations where is has not been possible, practically or financially, in the past.

APPLICATIONS WE HAVE DONE. ANY MACHINE. ANY APPLICATION.

- Car Hoists: Hydraulic and Screw Based
- Tyre Balancing and Tyre Changing Machines
- Air Compressors
- Cheese Factories- Moulding Machines, Stretchers, Pasteurizers and Packaging Machinery.
- Printing- Various Printing and Paper Folding Machines
- Saw Mill- Docking Saws
- Chain Wire Fence Manufacturing Machine
- Lathes and Milling Machines- from very small to large CNC
- Metal Cutting Cold Saws
- Pressure Washers
- Horticulture: Computer Controlled Potting and Seeding Machines
- Air-conditioning Systems
- Refrigerated Trucks and Shipping Containers
- Water Pumps, including Submersible
- Oil Fired Boiler Controls and Pumps for Heating Hot-Houses
- Stone Masonry: Cutting, Grinding and Polishing Machinery
- Surface Grinders
- High Pressure Water Cutting (Hydraulic) Machine
- Agriculture: Pivot and Linear Irrigators; Drive Wheels Control System
- Saw Blade Sharpening and Automatic 'RF' Tip Brazing Machine
- Wine Bottling and Labelling Machines

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WANT 3 PHASE?

Have you ever wanted to run a three phase powered machine, but you only have a single phase power supply available?

The Phase-Changer 3-phase converter changes a 240V or 480V single phase supply into an equivalent 415 volt 3-phase output, which is just like a utility 3 phase supply. It will efficiently operate any 3 phase equipment.

Any machine operating on a Phase-Changer will deliver its full rated nameplate output and will perform as if it were connected to a utility 3-phase supply, normally at a fraction of the cost ofa new utility service. Please note that 480V single phase supply is commonly referred to as a dual phase or two phase supply

Any machine and any application. Provided you have adequate single phase power available, there is always a Phase-Changer 3 phase converter solution that will reliably power any 3 phase machine.

Workshop equipment, welders, compressors, pumps, computer controlled machines, air conditioners — in fact anything that requires 3 phase power can be operated by a Phase-Changer converter. Even big ‘hard to start’ loads will start & run reliably with power from a Phase-Changer.

Your local electrician simply connects the input to your single phase supply via a new circuit breaker. And just like standard utility 3 phase, the output is connected to your machinery.

That’s it! you’re ready to go!
Compare the cost of a Phase-Changer to the cost of connecting to a utility power supply, and in most cases the Phase-Changer will cost far less. And you own it. It can be relocated or resold if your circumstances ever change.

Phase Changer 2

"I had a lot of problems finding reliable solutions to keep kangaroo carcasses cool out in the bush with there being a high risk of ruining the meat for sale if it's not stored properly… We were using diesel powered Thermo King units that cost in excess of $500-$700 per week to keep the meat cool... This investment has had a positive impact on the way I run my operation."

Tony Gyss, Rosedale Meats

ALL THE BENEFITS OF 3-PHASE POWER WITHOUT THE COST

Most commercial machinery over a few kilowatts is designed to operate on 3 phase power. That's because 3 phase motors are more reliable, much less expensive, more readily available, have a much better starting capability, run more efficiently (eg. 90% compared to 70%), and last many years longer than their single phase counterparts. Simply put, single phase motors are expensive, inefficient and unreliable when compared to a 3 phase motor. The requirement for larger machinery often means that 3 phase connection is the only option.

In many cases, machine manufacturers do not offer single phase solutions. Having 3 phase power available opens up a whole new world of alternatives to the machinery shopper. A large variety of 3 phase machinery is available from both new and used machinery dealers - and it is usually cheaper and more readily available.

THE REAL COST ALTERNATIVE TO UTILITY 3-PHASE

The Phase-Changer is simply the least expensive way to operate 3 phase equipment wherever utility 3 phase is unavailable or is too expensive to obtain. It eliminates the utility charges to extend 3 phase power lines and the cost of new supply transformers and power metering. It also saves the cost of a new 3 phase switchboard and can usually be installed in less than an hour compared with weeks or even months for a utility line extension. Phase-Changers can be used on Single Wire Earth Return (SWER) power supplies. Standard model sizes range from 2.2KW to 37KW and suit any application. The only limiting factor is the size of the single phase supply available. A Phase-Changer is much less costly than a generator to own and operate and it is much quieter. Phase-Changers are 'stand alone' converters that you own and can be relocated or sold if you ever decide to move to a new property.

PHASE-CHANGERS: AFFORDABLE QUALITY 3-PHASE

- Australian Designed & Made with Local Support and a 3 Year Guarantee
- Suitable for ANY 3 Phase Application with 2.2 to 37KW (3HP to 50HP) models as standard.
- New Industrial Micro-Processor Controlled Technology, Custom Designed in Australia for the World Market
- Micro-Controlled 9 Stage Automatic Output Voltage & Balance Control For Stable Voltages Over the Full Load Range
- 'Stress Free' Solid State Capacitor Switching using Industrial High-Power Thyristors - Means No Ongoing Maintenance Issues
- Extremely Reliable with true 3 Phase 415V output
- High 95% Efficiency & Maintenance Free
- Automatic Hard Start and Boost Standard
- Delayed Output / Load Contactor Standard
- Balances Incoming Supply Power Factor
- Designed to Not Increase Your Power Bill
- Low Cost
  (when compared to a utility 3 phase connection)

GETTING TECHNICAL:
HOW THE PHASE-CHANGER WORKS

Phase-Changers are based on the proven technique of a rotary conversion which has been extensively used for the last 50 years — however we've added some very important new technology improvements.

Traditional converters are quite simple, and basically use single phase power, a transformer and a few fixed value capacitors to create a phase shift in order to make a pilot 3 phase motor rotate. Once this pilot motor is spinning the start capacitors are disconnected and the motor also becomes a generator, creating the missing phases. Fairly crude 3 phase power can then be drawn off it to power other equipment.

LED Display is Standard

All multistage Phase-Changers are fitted with a digital display which indicates the power level that your Phase-Changer is running at, as a numerical number from 0 through to 8. A 'zero' indicates an idle state while a '7' indicates maximum load A 'boost' event appears as '8'.

Traditional rotary converters have always had performance limitations that cannot be reliably overcome with traditional control techniques such as mechanical switching. To compensate, rotary converters have needed to have a dramatically oversized pilot motor to cope with the high starting currents of external loads and to provide some level of output voltage stability.

Typically, voltages between phases can become quite unbalanced as the size of the connected load varies. This can lead to motor vibration, motor noise, poor machine performance, motor heating, excessive & inefficient power consumption and even motor and machine failure.

Voltage outputs can be changed by varying the capacitance in the circuit, however the standard approach of using contactors or relays to switch in and out capacitor banks is destined to rapid failure. Capacitors store very large amounts of electrical energy—contactors & relays are mechanical switches that turn on randomly at any part of the AC sine wave cycle. Connecting the capacitors to the converter circuit at the wrong time of a cycle will create massive arching & damage across the contacts of the contactor and creates stress on the capacitors themselves, shortening their life.

SO WHAT MAKES THE PHASE-CHANGER DIFFERENT?

Phase-Changers are based on the rotary converter technique, it is well known and proven, despite it's performance limitations. What we have done is added the 'smarts'. By using the best current micro-controller technology available, we have dramatically enhanced the performance of the rotary converter. By continually monitoring the output of the converter, the microcontroller controls the value of the capacitors required for 'ideal tracking'. Using high voltage industrial solid state switches called thyristors, capacitor banks are switched in and out quickly and silently as determined by the microcontroller in 9 distinct levels. All switching is done with precision while the AC sine wave is at zero volt potential ensuring there is no stress to either the capacitors or to the thyristors themselves.

In the real world of the connected load, this means that the quality of the generated 3 phase is comparable or in some cases better than that of a utility 3 phase power supply. The ability to reconnect any capacitor bank automatically based on real world load conditions, means that a Phase-Changer can access this stored energy at anytime to hardstart or boost machines with heavy mechanical loads.

The Phase-Changer 8 in the background supplies the 3 phase power to operates a MIG welder, a punch & shear machine, a hydraulic folder & a 10HP guillotine.

PHASE-CHANGER APPLICATION EXAMPLES

LARGE AIR CONDITIONER

These two 3-Phase Dakin Air Conditioning systems operate from a single 22Kw converter unit at a farmhouse many miles from the nearest 3-Phase utility power.

MODERN MIG WELDER

Pictured here is one of many modern MIG welder units operating from a PC6 converter. These welders can provide very fine control of up to 300 amps for the biggest jobs!

TRUCK WHEEL POLISHER

This specialised machine is used for quickly polishing large truck wheels. A PC11 converter runs this plant in a country workshop where utility power was unavailable.

PIVOT IRRIGATION SYSTEM

Large diameter Pivot Irrigators require several 3-phase motors to work together as the immense boom rotates to water crops. A Phase Change Converter unit put 3-Phase power right where it was needed at the central pivot.

ORCHARD PUMP

At this remote site they could never get their single phase pump to start properly. Now with a PC8 and a 3- phase pump the sprinklers can operate at any time!

TRADITIONAL MIG WELDER

This older style 3-Phase MIG welder has no problem in operating from one of our smaller converter units for lightmedium steel work.

CABINET MAKER WITH PC8

This 3-Phase saw bench and sawdust extraction system uses one of our PC8 converters to keep the machines going. This cabinet maker now builds kitchens for new homes in a large garage - workshop.

METALWORK SHOP

All kinds of metal working machinery such as guillotines presses and folders will work flawlessly from a power converter unit. One central converter can operate an entire workshop.

FAST TO INSTALL

The fruit picking season would not wait several months for a 3-Phase service to be connected. This large fruit sorting machine was operational in just a couple of days using a Power Converter unit.

"The Phase Change Converter literally saved our livelihood and would without a doubt probably be the best piece of equipment we have ever purchased."

Peter Weller, Complete Feeds Stanhope, Australia

MODEL RANGE: PHASE-CHANGER SERIES
SINGLE TO THREE PHASE POWER CONVERTERS

ELECTRICAL DATA

Model	Total Output kw / HP	Auto Hard Start & Boost	Nine Stage Voltage control & Boost +/- 5%	Multi Motor & Electronic Loads	240V input	480V input	Max Starting Load & Running Load kw/HP	Supply Circuit breaker / fuse Current @ 240 / 480v	Max Continuous Current / Phase Output
PC2	2.2/3	√	√	√	√		2.2/3	10A/N/A	4.7
PC3	3/4	√	√	√	√		3/4	16A/N/A	6.6
PC4	4/5.5	√	√	√	√	√	4/5.5	20A/10A	8
PC6	6/7.5	√	√	√	√	√	6/7.5	30A/15A	11
PC8	8/10	√	√	√	√	√	8/10	40A/20A	14.5
PC11	11/15	√	√	√	√	√	11/15	60A/30A	20.5
PC15	15/20	√	√	√		√	15/20	N/A/40A	28
PC18	18/25	√	√	√		√	18/25	N/A/45A	34
PC22	22/30	√	√	√		√	22/30	N/A/50A	40
PC30	30/40	√	√	√		√	30/40	N/A/65A	54
PC37	37/50	√	√	√		√	37/50	N/A/80A	66

C-tick approval on all Phase Changer units

MODEL RANGE: PHASE-CHANGER SERIES
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MECHANICAL DATA

Model	Pilot Motor Position	Enclosure Dimensions L x W x H (mm) *Does not include motor dimensions	Weight Kg	Input Connection	3 Phase Outlet, 5pin 10Amp
PC2	Internal	670 x 360 x 540	76	10A, 240V plug-in	√
PC3	Internal	670 x 360 x 540	86	15A, 240V plug-in	√
PC4	Internal	670 x 360 x 540	105	Hardwired	option
PC6	Internal	670 x 360 x 840	150	Hardwired	option
PC8	Internal	670 x 360 x 840	165	Hardwired	option
PC11	Internal	670 x 360 x 540*	215	Hardwired	N/A
PC15	Internal	670 x 360 x 540*	245	Hardwired	N/A
PC18	Internal	670 x 360 x 540*	-	Hardwired	N/A
PC22	Internal	670 x 360 x 540*	-	Hardwired	N/A
PC30	Internal	670 x 360 x 540*	-	Hardwired	N/A
PC37	Internal	670 x 360 x 540*	-	Hardwired	N/A

OPTIONAL EXTRA'S

Phase Changer can customize converters to best suit your application, we can fit or supply additional 3 Phase outlets, 3 Phase plugs, extension leads, motor rated (D-Curve) circuit breakers, digital or manual timers, soft starters and our remote start option for pumping and refrigeration equipment. Just ask one of our helpful sales staff for a quote on any modifications required. Phase-Changer's can also be manufactured to suit a genuine 415V 2 phase input which is occasionally found in some rural areas.

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