CP Power & Automation Ltd
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STATIC CONVERTERS
1P3P-STC

In a home workshop, farm, garage or small business environment there is often a requirement for the operation of machinery driven by three phase induction motors where only a single phase electricity supply is available.

The 1P3P-STC Converter provides an artificial means by which a three-phase motor can be operated from a single-phase supply thereby offering a cost-effective solution to this dilemma. In most instances, no modification to the machine is necessary.

The Static Converter is designed to operate three phase motors with starting characteristics and duty cycles as generally experienced on machine tool applications (i.e. light to medium duty and relatively constant load conditions). This style of converter is typically used in single operator environments where only one machine is used at a time.

The use of a Rotary Converter is recommended for multi-operator and/or multi-motor working environments. Please consult the separate Rotary Converter sales leaflet.

Currently, eight sizes of Static Converter are available designed to operate single motor loads between 0.37kW (0.5hp) and 7.5kW (105hp) and multi-motor loads between 1.1kW (1.5hp) and 11kW (15hp). Both single-phase 220/240-volt and split-phase 440/480-volt electricity supplies can be accommodated.

For applications with single motors in excess of 7.5kW (10hp) or combinations of motors in excess of 11kW, please seek further advice. Enquiries are invited from machinery manufacturers wishing to incorporate custom-built assemblies into their equipment.

For specific single motor applications where equipment has a heavy starting load or is subjected to an

abnormal surge current or duty cycle a heavy duty static converter is recommended. Compressors, Pumps, Extractor Fans and Vehicle Hoists fall into this category. It should be noted that converters are designed for applications with a cyclic duty (i.e. maximum 12 hour duty in any 24 hour period). Please seek advice for continuous duty applications.

The Static Converter is a passive device that depends upon an interaction between the converter and the driven motor(s) to induce an artificial third phase.

Static Converter Rating
Each size of Static Converter has a minimum load, a maximum single-motor load (for starting reasons) and an overall multi-motor capacity. The minimum load corresponds to the smallest size of motor capable of operating independently from the Static Converter. Not every motor can induce a satisfactory electrical condition across the three phases. The maximum single motor load is approximately 60-70% of the overall capacity of the converter. This is a reflection of the starting losses incurred by the artificial supply.

Power Regulating Switch
The Static Converter incorporates a power-regulating switch below the on/off switch. The operator is invited to select the optimum power level to suit the particular motor or combination of motors in circuit. This switch controls both the starting and running modes of the motor.

Single or Multi-Motor operation
Any number of motors can be operated simultaneously from a Static Converter provided the converter rating is not exceeded, either on a single motor or multi-motor basis. When considering a Static Converter for the operation of a multi-motor application the use of a three-phase distribution board or similar is recommended. In such instances it is imperative that the largest motor is started first and switched off last. Note also that the setting of the power regulating switch may have to be adjusted in line with increases and decreases in load. If this is impractical, the use of a Rotary Converter is recommended. Please consult the separate Rotary Converter sales leaflet.

The converter output takes the form of an industrial-style socket/plug (three-phase, neutral and earth). The output neutral facilitates the use of 240-volt control circuits and small auxiliary loads.

Starting Surge
All of our converters automatically control the motor starting surge, maintaining the surge until the motor has attained its full running speed irrespective of time taken. The operator need not leave the driven machine to reset the converter for starting.

Voltmeter
The 1P3P-STC Static Converter incorporates a voltmeter indicating the voltage induced on the “artificial” phase. This helps greatly when commissioning and operating the driven equipment.

Special Applications
The use of a Rotary Converter is often recommended for three-phase applications with small motors, motors of unusual magnetic characteristics (i.e. multi-speed) or motors subjected to abnormal short term overload conditions such as guillotines, power presses and hydraulically driven machines. This style of converter should also be considered for applications where the motor is frequently stopped and

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started or where the direction of the motor is constantly changed (e.g. screw-cutting). Please consult the separate Rotary Converter sales leaflet.

Fractional Horsepower Motors

Where machinery incorporates ancillary motors of a fractional horsepower nature (e.g. suds/coolant pump; table traverse/feed; table rise/fall) these motors are likely to fall below the minimum load of a Static Converter. Under such circumstances, it is imperative that these motors are operated in conjunction with and not independently of the main drive motor. If this is impractical, the use of a Rotary Converter is recommended. Please consult the separate Rotary Converter sales leaflet.

TECHNICAL DATA

The converter offers no inherent overload protection to either the circuit cable or the driven machinery. Adequate overload protection for both the motors in the driven machinery and the supply circuit to the converter is the responsibility of the customer. The customer should also ensure that the electricity system and cable supplying the converter is of sufficient capacity to allow the motor to start without causing undue supply disturbances as a consequence of voltage drop.

STATIC CONVERTER Part Number	STATIC CONVERTER Minimum Load Single Motor	STATIC CONVERTER Maximum Load Single Motor	STATIC CONVERTER Maximum Load Multi Motor	SINGLE PHASE SUPPLY 220/240V Fuse or Circuit Breaker	SINGLE PHASE SUPPLY 220/240V Cable*
1P3P-STC1.1HD	0.37kW/0.5hp	0.75kW/1hp	1.1kW/1.5hp	13A	2.5mm
1P3P-STC1.5HD	0.37kW/0.5hp	1.1kW/1.5hp	1.5kW/2hp	13A	2.5mm
1P-3PSTC2.2HD	0.37kW/0.5hp	1.5kW/2hp	2.2kW/3hp	13A	2.5mm
1P3P-STC3HD	0.55kW/0.75hp	2.2kW/3hp	3.0kW/4hp	20A	2.5mm
1P3P-STC4HD	0.55kW/0.75hp	3.0kW/4hp	4.0kW/5.5hp	25A	2.5mm
1P3P-STC5.5HD	0.75kW/1hp	4.0kW/5.5hp	5.5kW/7.5hp	32A	4.0mm
1P3P-STC7.5HD	0.75kW/1hp	5.5kW/7.5hp	7.5kW/10hp	40A	6.0mm
1P3P-STC11HD	1.1kW/1.5hp	7.5kW/10hp	11.0kW/15hp	63A	10.0mm

*Minimum cable size for run of up to 20 metres. For longer cable runs consult current edition of BS7671/AS300 amend. 2

The full load running current (f.l.c.) of an induction motor operating on a single-phase supply is approximately four amps per hp. When operated in conjunction with a TRANSWAVE Converter, the starting current of a three-phase motor is limited to approximately 3 times its f.l.c. This is significantly lower than the motor starting current of an equivalent sized single-phase motor, which would typically draw between 6-8 times its f.l.c.

As the starting characteristics of a three-phase motor supplied by a converter are similar in nature to Star/Delta starting on a three-phase supply, significant reductions in starting torque are experienced when compared with direct on line starting on a three-phase supply.

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Generally, when machinery is operated in conjunction with a TRANSWAVE Converter direct on line starting is recommend. For machinery fitted with a Star/Delta starter, the period in the star connection should be set as short as possible to ensure a successful start. This is not the case when machinery is operated on a mains three-phase supply.

DIMENSIONS

Part Number	Converter Rating	Height mm	Width Mm	Depth mm	Weight kg
1P3P-STC1.1HD	1.1kW/01.5hp	300	460	310	15
1P3P-STC1.5HD	1.5kW/02.0hp	300	460	310	17
1P-3PSTC2.2HD	2.2kW/03.0hp	300	460	310	25
1P3P-STC3HD	3.0kW/04.0hp	300	460	310	25
1P3P-STC4HD	4.0kW/05.5hp	300	460	310	30
1P3P-STC5.5HD	5.5kW/07.5hp	350	510	350	40
1P3P-STC7.5HD	7.5kW/10.0hp	350	510	350	40
1P3P-STC11HD	11.0kW/15.0hp	350	510	350	50

PROVEN EXAMPLES OF EQUIPMENT OPERATED IN CONJUNCTION WITH TRANSWAVE CONVERTERS

WOODWORKING MACHINERY

Saws: Circular; Band; Re-saws; Rip; Cross-Cut; Panel; Wall; Radial-Arm; Surface Planers; Planer/Moulders; Feed Units; Planer/Thicknessers; Four-Sided Planers; Spindle Moulders; Single-End Tenoners; Chisel Mortisers; Chain Mortisers; Woodturning Lathes; Copy Lathes (Electronic); Copy Lathes (Hydraulic); Sanders: Single-Belt; Wide-Belt; Speed; Pad; Disc; Edge & Profile; Routers; Borers; Multi-Borers; Edgbanders*.

METALWORKING MACHINERY

Lathes; Milling Machines; Pedestal Drills; Surface Grinders; Band Saws; Power Hacksaws; Polishers; Shapers; Deburring Machines; Guillotines; Metalworkers; Power Presses.

AGRICULTURAL & HORTICULTURAL MACHINERY

Produce Conveyors; Grading Equipment; Rolling Mill/Mixing Equipment; Potting/Compost Machinery.

GARAGE EQUIPMENT & MISCELLANEOUS APPLICATIONS

Compressors; Vehicle Hoists (Electro-Mechanical & Hydraulic); Brake Testing Equipment; Spray Booths; Printing Presses; Guillotines; Cutting Presses; Wine Presses; Looms & Weaving Machinery; Pugmills; Shoe Repair Machinery; Window Making Machinery; Glass & uPVC Cutting Machinery; Masonry Saws; Food Processing Equipment; Welding Equipment *. (* Modification necessary to converter or machine)

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