

Clarke®

POWER



PHASE CONVERTERS

MODEL NO: PC20 • PC40 • PC60

PART Nos: 6012785 • 6012790 • 6012795

OPERATING & MAINTENANCE INSTRUCTIONS





Specifications

	PC20	PC40	PC60
Part No:	6012785	6012790	6012795
Dimensions:	260x220x335mm	385x255x380mm	385x255x380mm
Weight:	13.8kg	19.5 kg	23 kg
Input Voltage:	230 vac 50hz	230 vac 50hz	230 vac 50hz
MAX Input Current:	10amps	20amps	25amps
Input Current Fuse (supply)	10amps	20amps	32amps
Output Voltage:	3ph 400VAC	3ph 400VAC	3ph 400VAC
Max Output:	2HP	3.5 HP	5.5 HP

Please note that the details and specifications contained herein are correct at the time of going to print. However CLARKE International reserve the right to change specifications at any time without prior notice. Always consult the machines data plate



When disposing of this product, ensure it is disposed of according to all local ordinances. DO NOT dispose of with general waste.



Please read these instructions carefully before operating the Converter

Thank you for purchasing this **CLARKE** Single to 3 Phase Converter. i.e. to run 3-phase asynchronous motors **ONLY**, from a 230V single phase supply.

Please note that this device, because of its characteristics is for use primarily with constantly running motors. It is not desirable for use with stop start operations.

Before using the device, please read this manual thoroughly and carefully follow all instructions given. This is for your own safety and that of others around you, and is also to help you achieve long and trouble free service from your new product.

CLARKE GUARANTEE

This CLARKE product is guaranteed against faulty manufacture for a period of 12 months from the date of purchase. Please keep your receipt as proof of purchase.

This guarantee is invalid if the product is found to have been abused or tampered with in any way, or not used for the purpose for which it was intended.

Faulty goods should be returned to their place of purchase, no product can be returned to us without prior permission.

This guarantee does not affect your statutory rights.

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Safety

WARNING

As with all machinery, there are certain hazards involved with their operation and use. Exercising respect and caution will considerably lessen the risk of personal injury. However, if normal safety precautions are overlooked, or ignored, personal injury to the operator may result.

FAILURE TO FOLLOW THESE RULES MAY RESULT IN SERIOUS PERSONAL INJURY

Special care is taken during all stages of manufacture to ensure that your **Clarke** Converter reaches you in good condition.

IMPORTANT

Before using this equipment, it is in your own interest and others around you, that you read and comply with ALL the information given within.

NEVER open or remove any covers on this equipment while it is still connected to the mains.

NEVER operate this equipment with any panels open or removed.

NEVER attempt to repair this equipment, unless you are a qualified electrician.

If you do experience any problems which you are unable to safely resolve, contact your local dealer or **Clarke** International Service Department on:

020 8998 7400

NEVER use in wet or damp environments.

Whilst this unit has been built and tested in our factory before being dispatched to comply with current EMC regulations, the user is responsible for installing and using it according to the manufacturers instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the user to resolve the situation. In some cases it could involve constructing an electromagnetic screen enclosing the power source, and the work complete with associated input filters. In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

IMPORTANT

HEALTH AND SAFETY, AND IEE REGULATIONS MUST BE OBSERVED AT ALL TIMES.

PARTS & SERVICE TEL: 020 8988 7400

or e-mail as follows:

PARTS: Parts@clarkeinternational.com

SERVICE: Service@clarkeinternational.com

Installation

We would recommend that the installation of this equipment is carried out by a qualified electrician, who has a full understanding of industrial switching applications.

It is the users responsibility to provide adequate protection for the intended motor and to ensure that the supply and cabling is of sufficient capacity to enable the motor to start without causing undue supply disturbances due to a voltage drop.

Before installing this equipment, careful consideration must be given to the location in which it is to be used, also what machinery it is intended to run, such as drills, lathes, milling machines, circular saws etc.



WARNING



**THESE CONVERTERS ARE NOT SUITABLE FOR USE WITH CAR
HOISTS, COMPRESSORS & VACUUM PUMPS DUE TO THEIR
HIGH START UP LOADS.**

Once the location has been established, the installation may be carried out as follows on page 5.

Electrical Connection

Check details on converter rating plate are compatible with the electric supply and the machine to be driven. (machine details should be found on the motor data plate).

Note:

The converter will only supply a 3 phase, 3 line load as standard, if a neutral is required. Contact your nearest dealer or Clarke Service for advice.

IMPORTANT



Under no circumstances must the PC40 & PC60 converters be connected to the mains using a standard 13amp plug. All models must be connected via a separate isolator, and must be protected by a fuse or circuit breaker, (see fuse rating details below).



Supply - 230 Volts				
Model	MAX HP	kW	Fuse (A)	Cable (mm)
PC20	2	1.5	13 amp	1.5mm
PC40	3.5HP	2.6kW	20 amp	1.5mm
PC60	5.5HP	4.0kW	32 amp	2.5mm

Notes:

- Cable sizes above are the minimum sizes for up to 20 metres. For cables over this length, refer to the current IEE regulations.
- Models PC40 & PC60 are provided with a 2M (minimum) length of 3-core cable for connection to the power supply.
- Model PC20 is provided with 2M (minimum) of 3-core cable fitted with a 13amp plug, for use with a standard, domestic 13 amp supply.


IMPORTANT: The wires in the mains lead are coloured in accordance with the following code:

Green & Yellow Earth

Blue Neutral

Brown Live

As the colours of the flexible cord of this appliance may not correspond with the coloured markings identifying terminals in your plug, proceed as follows:

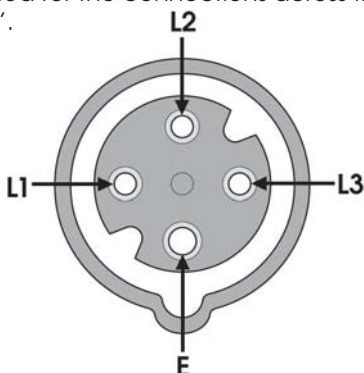
- Connect GREEN & YELLOW cord to plug terminal marked with a letter "E" or Earth symbol , or coloured GREEN or GREEN & YELLOW.
- Connect BROWN cord to plug terminal marked letter "L" or coloured RED.
- Connect BLUE cord to plug terminal marked letter "N" or coloured BLACK.

CONNECTING THE OUTPUT

The output is plugged into the socket (E, Fig. 2), using a 4-pin -plug (not provided but which can be purchased from your Clarke dealer).

The illustration below shows the socket configuration. The plug should be wired ensuring pins L1 and L3 are used for the connections across the motors windings, i.e. these are the 'hot phases'.

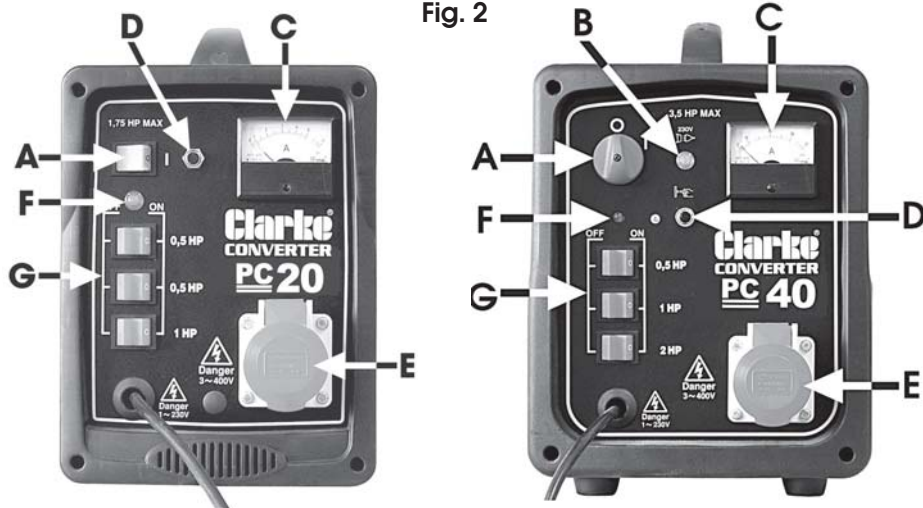
Fig. 1



If you are unsure as to how to wire the plug, you should consult a qualified technician

Operation

Fig. 2



1. Before inserting the output plug, switch all three switches (G) to OFF. Then switch the converter ON, using the ON/OFF switch (A) on the front panel. In this condition the lamp (B) will illuminate. In the case of the PC20, the rocker switch A will illuminate.

Check to ensure the ammeter(C) is set to zero. If necessary adjust using the small adjustment screw located at the bottom centre of the ammeter so that it reads zero.

3. Switch OFF the converter and connect the plug from the motor to the output socket (E).
4. Using the three switches (G), set the output so that it is equivalent to the HP of the motor to be driven. This value should be found on the motors' data plate.

The charts below show the switch settings for the required outputs.

3. With the switches set, and the output plugged in, switch ON the converter and proceed to start the motor/machine. Note that indicator lamp (F) will illuminate when the switches (G) are set.

Model PC20			
Motor HP	SW 1 0.5 HP	SW 2 0.5 HP	SW 3 1 HP
0.5	ON	OFF	OFF
0.5	OFF	ON	OFF
1	ON	ON	OFF
1	OFF	OFF	ON
1.5	ON	OFF	ON
1.5	OFF	ON	ON
2	ON	ON	ON

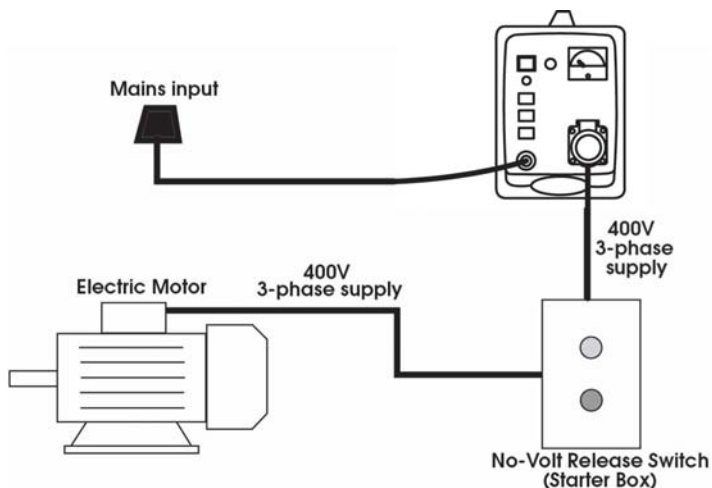
Model PC40			
Motor HP	SW 1 0.5 HP	SW 2 1 HP	SW 3 2 HP
0.5	ON	OFF	OFF
1	OFF	ON	OFF
1.5	ON	ON	OFF
2	OFF	OFF	ON
2.5	ON	OFF	ON
3	OFF	ON	ON
3.5	ON	ON	ON

Model PC60			
Motor HP	SW 1 1 HP	SW 2 1.5 HP	SW 3 3 HP
1	ON	OFF	OFF
1.5	OFF	ON	OFF
2.5	ON	ON	OFF
4	ON	OFF	ON
4.5	OFF	ON	ON
5.5	ON	ON	ON

THERMAL OVERLOAD

Should the unit overheat for any reason, the thermal overload will trip, shutting off supply to the motor/machine. In this event, switch OFF the converter and wait for at least 5 minutes to allow it to cool, before pressing the Reset Button (D, Fig.2), and restarting.

You should also investigate the reason for overheating and take the necessary steps to avoid this reoccurring. If necessary, consult a qualified engineer.



Typical Wiring Diagram for 230V to 400V Phase Converter
Standard on-line starting.

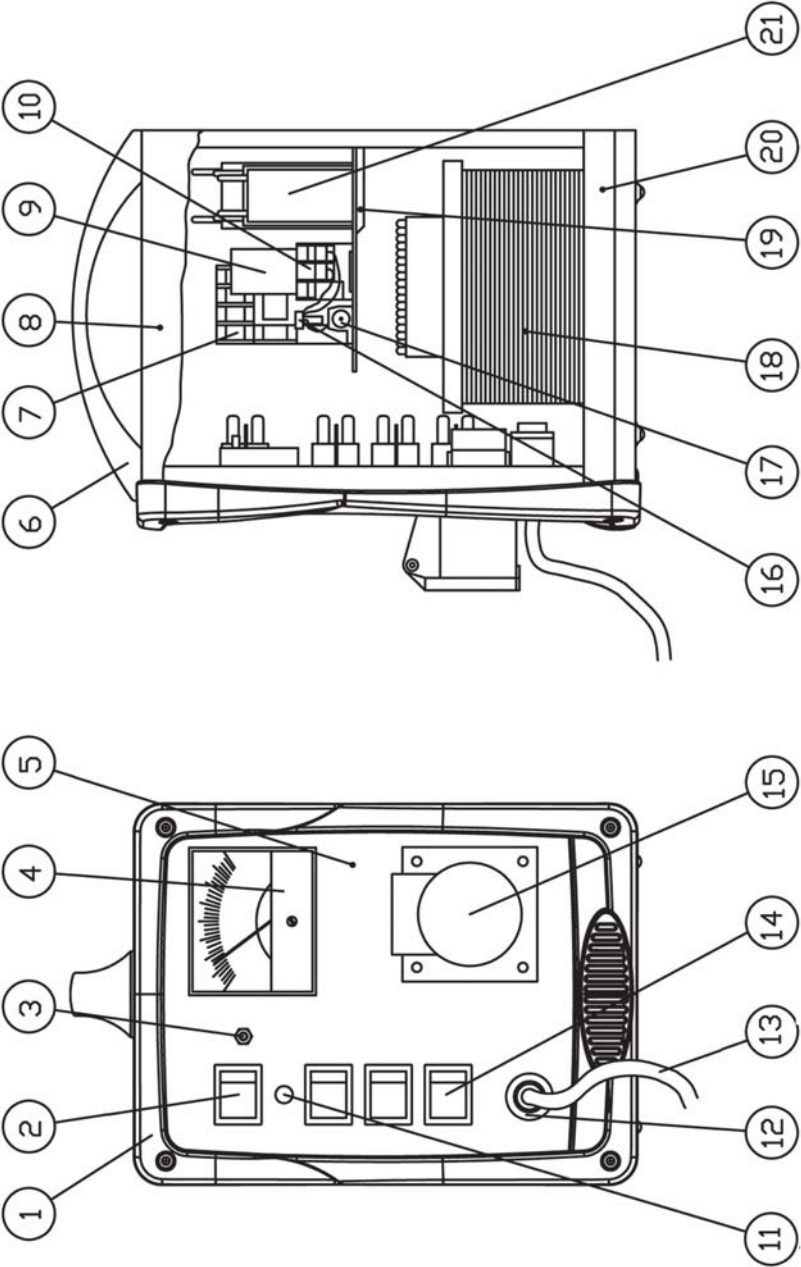
NOTES:

- *Please take into account the various losses which are incurred in the conversion from single to three phase supply. It will be necessary to select an output from the Converter which is greater than the rated power of the motor being driven. Ensure also the wiring to the motor is of sufficient size so as not to incur losses.*
- *If the machine, which is to be fed from the converter, has a contactor starter, it should be noted that the control circuit should be fed from the two live phases (pins 'L1' and 'L3' in the socket). Should the contactor chatter or not operate at all, this indicates that the control circuit is not fed from lines 'L1' and 'L3'.*
- *If the control circuit is designed for 230 volts AC, a separate feed for the control circuit must be provided. Consult a qualified technician if in doubt.*
- *When using the converter with multispeed machines, care must be taken to allow the machine to slow down before switching from high to low speeds, if this procedure is not followed, the excess motor, back E.M.F. could damage both the converter and motor.*
- *When reversing motors, ensure that the motor has stopped fully before doing so.*
- *For some applications of small motors, or motors of unusual magnetic characteristics, it may be necessary to provide a pilot motor to obtain a balance of phases. Generally the pilot motor should be a 2 pole (2800 rpm) motor and as a general guide should be at least twice as big as the motor to be driven.*

If necessary, consult a qualified technician

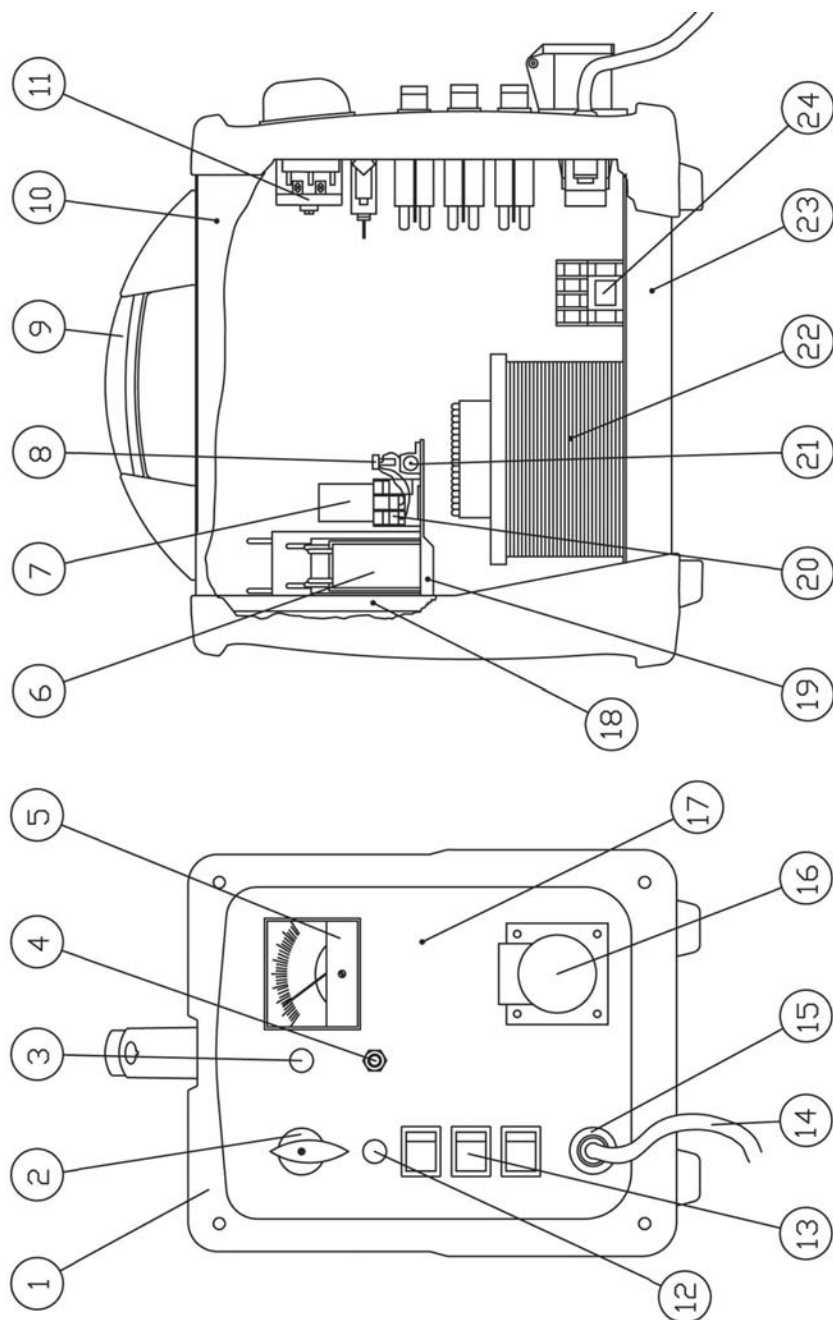
Parts Lists and Diagrams

PC20



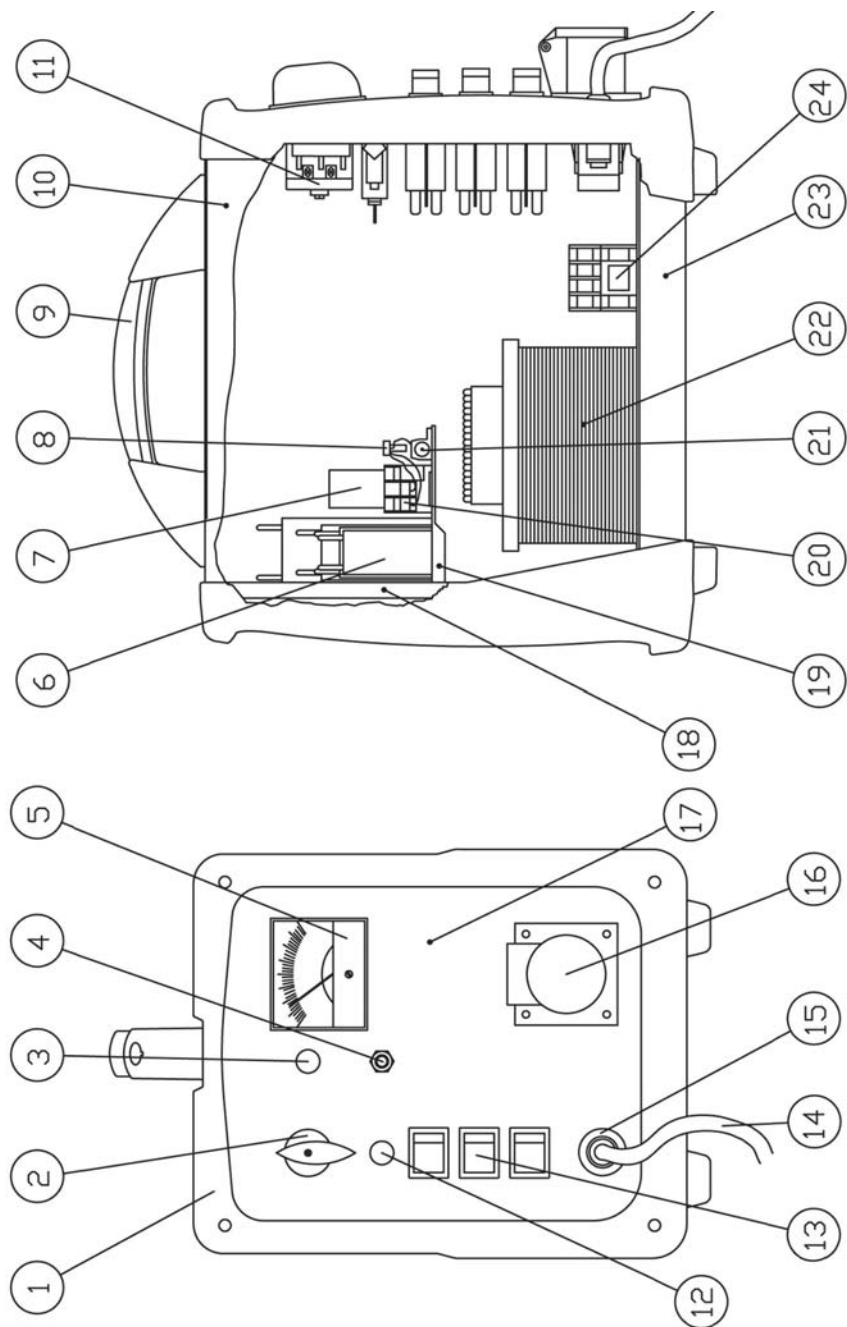
PC20

No:	Description	Qty	Part No:
1	Frame For Starter	1	EM21690441
2	Green Pilot Light Switch 16A-250V	1	EM22200039
3	Circuit Breaker 10A	1	EM22210005
4	Ammeter 8A F516	1	EM 22600045
5	Front Panel For Small Converter	1	EM 33710372
6	Handle	1	EM 21600045
7	Contactor 220V 10A	1	EM 22225006
8	Cover Panel	1	EM 33705460
9	Relay LY2 24VDC	1	EM 22225318
10	Socket For LY2 Relay PTF 80A	1	EM 22225319
11	Orange Pilot Lamp 220V+Rules L=500	1	EM 22610013
12	Cable Clamp For Cable Diam.6+ Screw	1	EM 04600233
13	Input Cable 3x1,5 M2,5 W/UK Plug +Fuse 13A	1	EM 20220068
14	Double Pole Black Switch	3	EM 22200043
15	CEE 16A 380V 3PH Socket + Panel Earth	1	EM22105067
16	Capacitor 4.7mf-63V 5x11 P-2	1	EM26000005
16	W10 Rectifier	1	EM 26014005
17	6k8 Ohm 50W Armoured Resistance	1	EM26031001
18	Auto transformer For Converter PC 20	1	EM 44145002
19	Capacitors Support For Converter PC20	1	EM 33640256
20	Lower Panel For Converter PC20	1	EM33700265
21	Capacitor MKM 5MF 450V 35x48	1	EM22315025
21	Capacitor MKM 8MF 450V 30x78	2	EM22315026
21	Capacitor MKM 16MF 450V 45x80	2	EM22315028
21	Capacitor MKM 20MF 450V 45x80	1	EM22315029



PC40

No:	Description	Qty	Part No:
1	Front Frame	2	EM21690425
2	D.38 Knob For Red Switch + Indicator	1	EM04600268
3	Green Pilot-lamp 220V+Rules L=230	1	EM22610006
4	Circuit Breaker 20A	1	EM22210018
5	Ammeter 20A F540	1	EM22600046
6	Capacitor MKM 5MF 450V 35x48	1	EM22315025
6	Capacitor MKM 8MF 450V 30x78	1	EM22315026
6	Capacitor MKM 10MF 450V	1	EM22315027
6	Capacitor MKM 16MF 450V 45x80	2	EM22315028
6	Capacitor MKM 40MF 450V	1	EM22315031
7	Relay LY2 24VDC	1	EM22225318
8	Capacitor 4.7mf-63V SX11 P-2	1	EM26000005
8	W10 Rectifier	1	EM26014005
9	Plastic Handle	1	EM21600030
10	Cover Panel For Big Converter	1	EM33705461
11	Switch 12A ON/OFF	1	EM22205009
12	Orange Pilot Lamp 220V	1	EM22610013
13	Double Pole Black Switch	3	EM22200043
14	Input Cable 3x1,5 M2,5	1	EM20220014
15	Cable Clamp D.10+ Screw	1	EM04600234
16	CEE 16A 380V 3pH Socket + Panel Earth	1	EM22105067
17	Front Panel For Big Converter	1	EM33710373
18	Back Panel For Big Converter	1	EM33715123
19	Capacitors Support	1	EM33640257
20	Socket For LY2 Relay PTF 80A	1	EM22225319
21	6k80hm 50W Armoured Resistance	1	EM26031001
22	Auto Transformer	1	EM44145003
23	Lower Panel	1	EM33700252
24	Contacteur 220V 10A	1	EM22225006

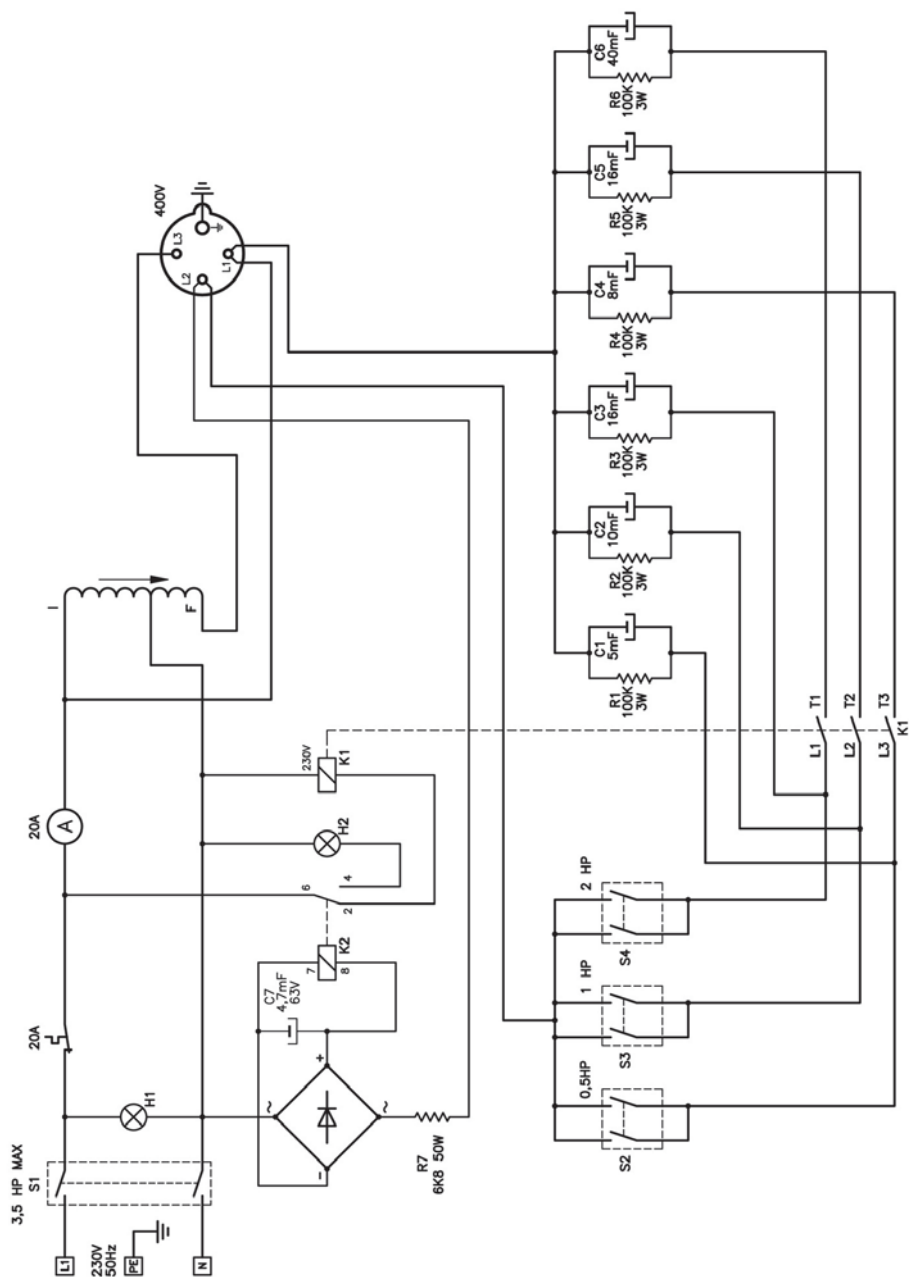


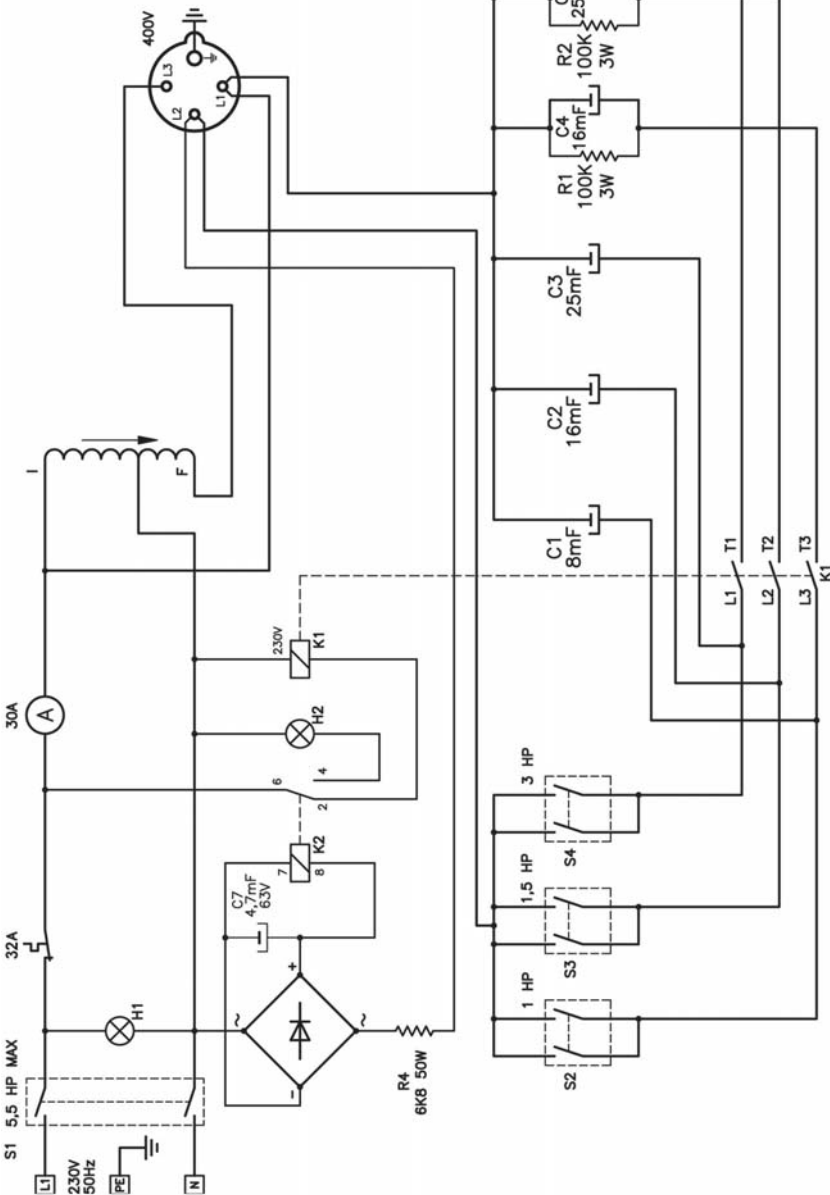
PC60

No:	Description	Qty	Part No:
1	Front Frame	2	EM21690425
2	D.38 Knob For Red Switch + Indicator	1	EM04600268
3	Green Pilot-Lamp 220V	1	EM22610006
4	Circuit Breaker 32A	1	EM22210012
5	Ammeter 30S FS60	1	EM22600051
6	Capacitor MKM 8mf 450V 30x78	1	EM22315026
6	Capacitor MKM 16mf 450V 45x80	2	EM22315028
6	Capacitor MKM 25mf 450V 45x103	2	EM22315030
6	Capacitor MKM 50mf 450V 50x128	1	EM22315032
7	Relay LY2 24VDC	1	EM22225318
8	Capacitor 4.7mf-63V 5x11 P-2	1	EM26000005
8	W10 Rectifier	1	EM26014005
9	Plastic Handle	1	EM21600030
10	Cover Panel	1	EM33705461
11	Switch 16A Sch 1602	1	EM22205021
12	Orange Pilot Lamp	1	EM22610013
13	Double Pole Black Switch	3	EM22200043
14	PVC Input Cable 3x2,5 M.2,5	1	EM20220020
15	Cable Clamp D.10 + Screw	1	EM04600234
16	CEE 16A 380V 3pH Socket + Panel Earth	1	EM22105067
17	Front Panel	1	EM33710373
18	Back Panel	1	EM33715123
19	Capacitor Support	1	EM33640257
20	Socket For LY2 Relay PTF 80A	1	EM22225319
21	6k8 ohm 50W Armoured Resistance	1	EM26031001
22	Auto transformer	1	EM44145004
23	Lower Panel	1	EM33700252
24	Contacteur 220V 10A	1	EM22225006

PC20







Clarke[®] INTERNATIONAL

This is an important document and should be retained

DECLARATION OF CONFORMITY



We declare that this product complies with the following standards/directives:

■ **73/23/EEC**

Description: **THREE PHASE CONVERTERS**

Model No: **PC20, PC40 and PC60**

Serial (Batch) No: **See Product Date Plate**

Signed: _____


Engineering Manager

Clarke[®] INTERNATIONAL
Hemnal Street, Epping, Essex CM16 4LG

A SELECTION FROM THE VAST RANGE OF

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Clarke INTERNATIONAL

For spare parts and servicing, please contact your nearest dealer, or Clarke International on

020 - 8988 - 7400

e-mail: Parts@clarkeinternational.com e-mail: Service@clarkeinternational.com

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