

X20100

POWER FACTOR CORRECTION | THYRISTOR SWITCHING

# PFC2 Series

30kVAR (50A), 50kVAR (75A), 415V  
Power Factor Switch – 2-Channel Controller



## CONTACT US:

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- 🌐 www.united-automation.com

## KEY FEATURES:

- ✓ **Enhanced Power Factor Correction** – Optimises electrical efficiency and reduces reactive power.
- ✓ **Low Inrush Current** – Eliminates high start-up currents for capacitor banks.
- ✓ **Rugged & Reliable** – High-speed semiconductor fuses and enclosed panel mounting.
- ✓ **Automatic Overtemperature Protection** – Trips at 90°C and resets at 85°C.
- ✓ **LED Status Indicators** – Monitor power, faults, signal, and capacitor discharge.
- ✓ **Alarm Relay Function** – Voltage-free relay for real-time fault detection.
- ✓ **50kVAR Fan Cooling** – Automatically activates at 55°C to ensure longevity.

## APPLICATIONS:

Ideal for **power factor correction (PFC)** in **capacitor banks**, these **solid-state controllers** are widely used in:

- Industrial power systems
- Welding plants
- Lifts & cranes
- Wind turbines
- High-power capacitive loads

The **PFC2 Series Power Factor Switches** provide **precise and efficient switching** for three-phase capacitive loads, enhancing **power factor correction** and reducing energy waste. Using the **two-leg control technique**, these controllers offer **optimised capacitor switching** with minimal inrush current. The **PFC2 30kVAR & 50kVAR models** feature **integrated semiconductor fuses**, an **automatic resetting temperature trip**, and **fan cooling** (on the 50kVAR model).

The **PFC2 Series** delivers **efficient power factor correction**, **reduced inrush current**, and **seamless switching** for high-power applications. With advanced **thermal protection**, **fault monitoring**, and **robust semiconductor fuses**, these controllers ensure **long-term reliability and energy efficiency**.

**Optimise your power system today with the PFC2 Power Factor Switch!**

## TECHNICAL SPECIFICATIONS

<b>Power/(current ratings):</b>	30kVAR (50A); 50kVAR (75A) @ a typical supply of 415V RMS
<b>Input voltage:</b>	415V RMS +/- 10%
<b>Frequency:</b>	50/60Hz
<b>External DC Supply:</b>	24VDC (250mA) – Only when fuse failure monitoring is required
<b>Control signal input:</b>	8 to 24V DC, Common 0V or Common +VE, Open Collector or Volt Free Contact
<b>Alarm relay functions:</b>	The voltage free alarm relay is rated for 125V ac @ 2A
<b>LED indicators:</b>	■Green = DC Power ON, ■Red = Fault, ■Orange = Signal enabled, ■Red/Orange = Capacitors discharging
<b>Cooling fan:</b>	24V DC (NOTE: Fan fitted on 50KVAR model only)
<b>Fan 'switch-on':</b>	50KVAR units typically 55 °C
<b>Over Temperature:</b>	Trip in temperature @ 90°C, +/- 1°C (Status LED indicator 'flashes' with ON/OFF rapid pulsing) Trip out temperature @ 85°C, +/- 1°C
<b>Phase loss detection:</b>	Phase loss or Fuse failure orange and red LEDs flash alternately
<b>Status LED Fault condition:</b>	Status LED indicator 'flashes' O N/OFF continuously at 1.5 second intervals
<b>Sensor loss detection:</b>	Status LED indicator 'flashes' ON/OFF continuously in equal intervals.
<b>Power cable terminations:</b>	Supply and Load 16mm <sup>2</sup> rising clamp terminal block Earth 16mm <sup>2</sup> rising clamp terminal block
<b>Terminal torque settings:</b>	2.5Nm (16mm <sup>2</sup> ) Power terminals only.
<b>Signal cable terminations:</b>	Remote supply Auxiliary alarm (relay) 2.5mm <sup>2</sup> rising clamp terminal block Control signal 2.5mm <sup>2</sup> rising clamp terminal block
<b>Protection:</b>	IP20
<b>Fusing 30kVAR:</b>	80ET (80A) High-Speed Semiconductor type fuse, or equivalent
<b>50kVAR:</b>	100ET (100A) High-Speed Semiconductor type fuse, or equivalent
<b>Control circuit protection</b>	F1A Control Circuit Protection fuse (On PCB next to Transformer)
<b>Working temperature:</b>	65°C (maximum operational)
<b>Dimensions:</b>	205mm (D) x 155mm (W) x 120mm (H) 30KVAR 250mm (D) x 155mm (W) x 120mm (H) 50KVAR
<b>Fixing centres:</b>	4 x 4.5mm-clear keyhole slots on fixing centres 140mm (W) x 140mm (D)
<b>Weight:</b>	(30kVAR) 3.0kg (50kVAR) 3.4kg

**Note: SAFETY WARNING** – Isolate supply before removing cover; Metal parts, in particular the case may get very hot when the unit is fully operational; **DO NOT COVER** enclosure ventilation slots.



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## INSTALLATION

If the PFC2 controllers are mounted in a control panel they should be mounted in a vertical position with the heat sink fins running top to bottom. Care must be taken to ensure that sufficient cooling is available for the PFC2 power switches; in continuous operation at maximum current the heat sink temperature can reach 90°C. Ensure that the heat sink fins are not obstructed by cables or ducting and that the controllers are not fixed directly above one another. Ensure the cabinet is cooled sufficiently to avoid the controllers tripping on over temperature, they will reset when the temperature drops below 85°C but they will be out of action for that period of time.

### Maximum dissipated heat:

- 1 x PFC2 controller 30KVAR at 400V AC, 2 x 44A is approximately 80W.
- 1 x PFC2 controller 100KVAR at 400V AC, 2 x 72A is approximately 130W.

### Load Considerations

The PFC2 series of power controllers are designed for 3-wire, 3-phase floating-star or closed delta configured capacitive loads. For further information on configured loads, see our supporting datasheet - AC Power Control Specifications and Application Circuits (APC - ref. X10322).

### Cooling requirements

This robust stack assembly has an operational temperature of 65°C when naturally cooled and has a built in 90°C over temperature trip on the heatsink as a safety feature. The unit should be mounted vertically, with heatsink fins aligned top to bottom and with sufficient surrounding air space to maximise natural convection cooling. If the unit is mounted in an enclosure or cabinet, adequate ventilation and/or forced air-cooling should be fitted. The 50kVAR controller has a fan which is normally off but automatically turns on at high heatsink temperature (see SPECIFICATIONS – Fan switch-on and over temperature.)



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# PFC2 Series

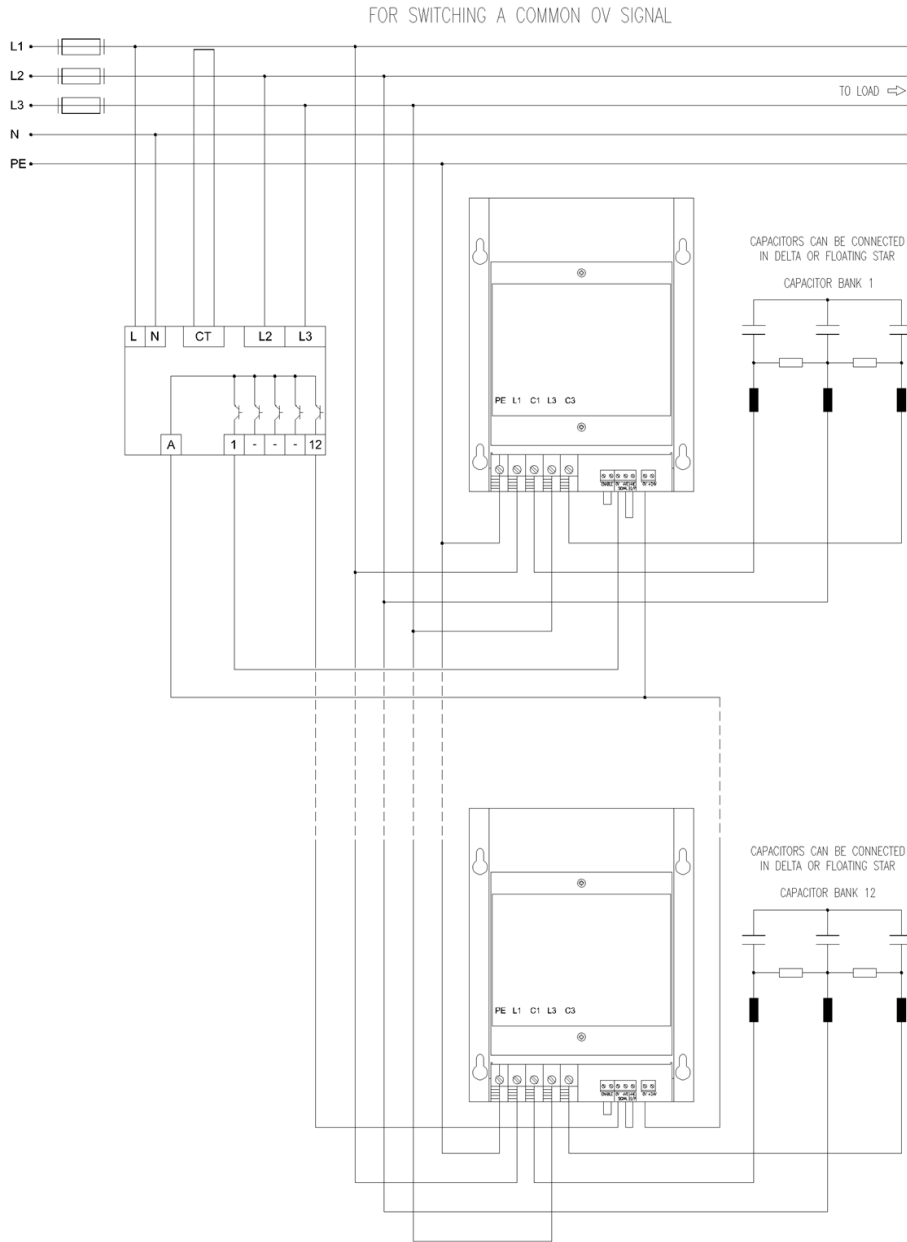
30kVAR (50A), 50kVAR (75A), 415V | Power Factor Switch – 2-Channel Controller

## CONNECTIONS

This unit has clamp type connectors for all auxiliary-wiring requirements.

**NOTE:** The controller is factory set for an internal power supply. For alternative ‘voltage free’ alarm supply details see Functions section. Please contact our Technical support for further details.

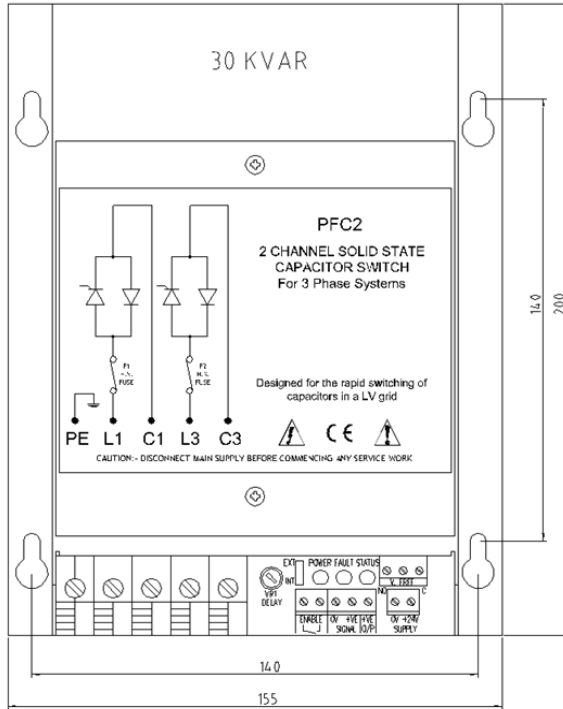
Connection Diagram – Fig. 1



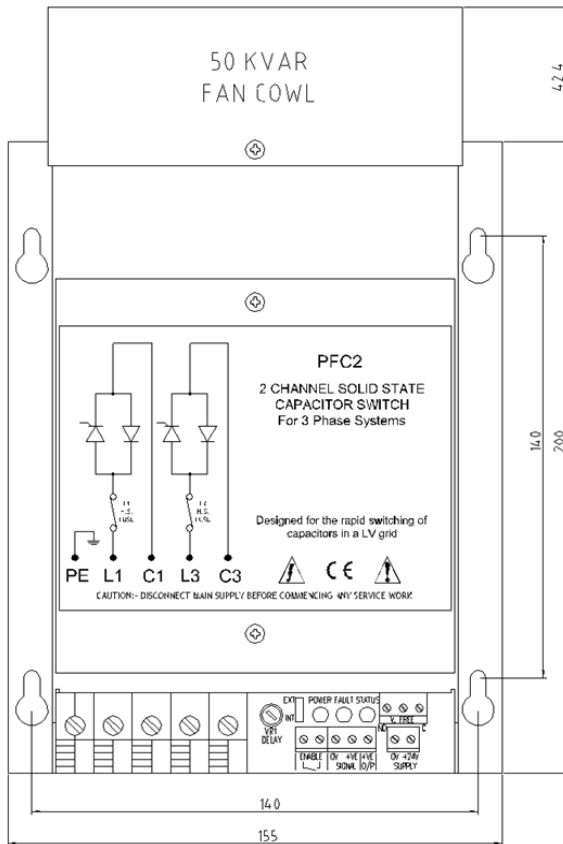
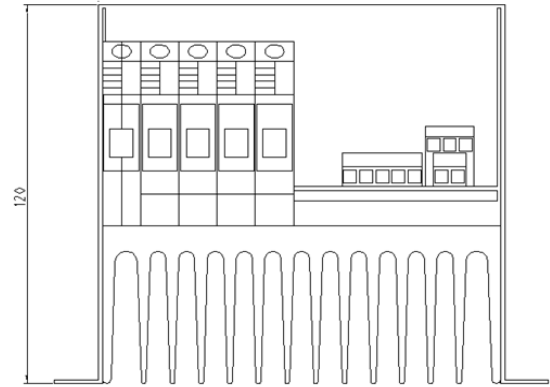
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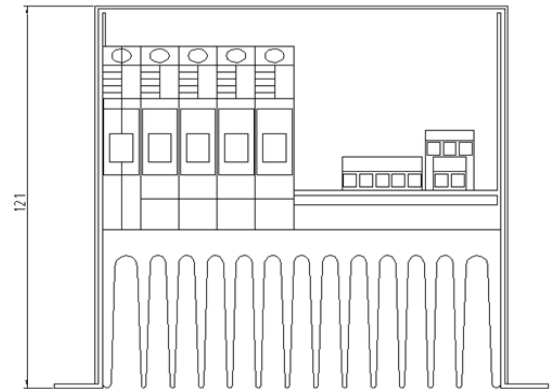
Mechanical Drawings Fig. 2



USE M5  
FIXING  
SCREWS



USE M5  
FIXING  
SCREWS



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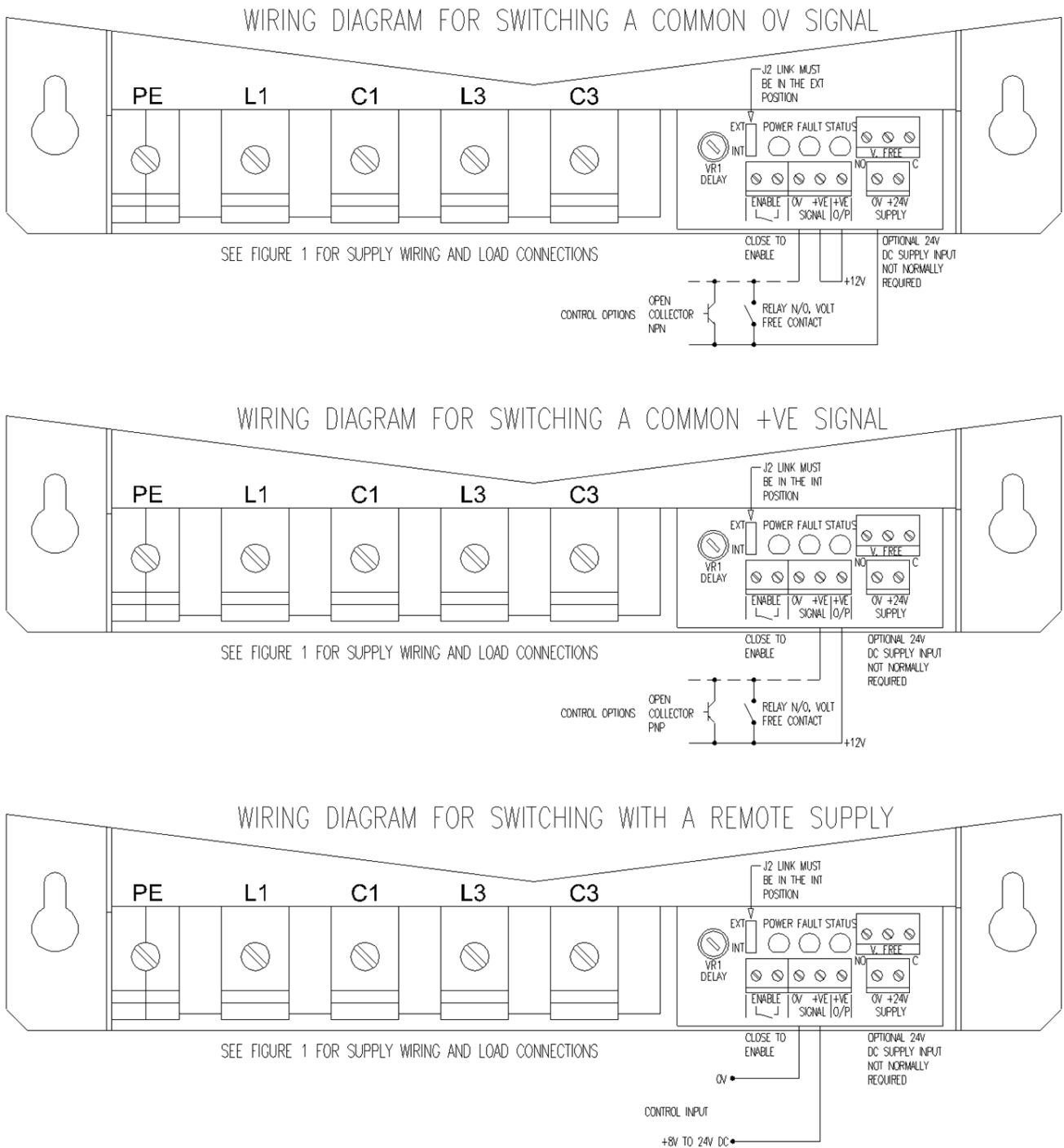
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Control Options – Fig. 3



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## FUNCTIONS

### Operation

These solid state capacitor switches are comprised of two anti-parallel thyristor diode modules with appropriate transient protection connected across them. These modules are mounted on a heat sink and are controlled by a microprocessor based trigger module which determines the precise time to trigger the thyristor so as to eliminate any high current switching transients.

The processor monitors the heat sink temperature of both the 30 and 50 kVAR models. On the 50kVAR model the cooling fan will switch on when the heat sink temperature reaches 55°C. Both models will turn off if the heat sink temperature rises above 90°C and it will reset again when the temperature drops below 85°C.

The switching of the controller is by a control signal from 8 to 24V DC, this can be from an external power supply (J2 EXT). These input signals can be either common positive or common negative.

You can also use the onboard internal DC power supply (J2 INT) which provides a +12V DC output, this can be fed back into the controller into the +VE SIGNAL input via 'volt free' contacts or semiconductor switches.

The maximum DC voltage present when the thyristors are not conducting can be 150% of the peak mains voltage, so any discharge resistors used should be rated accordingly. Discharge reactors should not be used because the continuous DC voltage that is present would destroy them. It is recommended that discharge resistors are used and that they are designed to meet the peak DC voltages which may be seen in a permanent installation.

### Fault delay timer VR1

This allows the power factor load capacitors to discharge before indicating a possible fault condition; the following table shows some recommended settings for various KVAR ratings.

POWER IN KVAR	DELAY TIME IN SECONDS	VRI SETTING
25	20	1
50	40	2

### Fan activation 50 KVAR unit

When the temperature of the heat sink reaches 55°C the cooling fan is activated and it will remain on until the heat sink temperature drops below 50°C.

### Over Temperature Alarm

If the temperature of the heat sink reaches 90°C the red fault LED will flash rapidly, the controller and the orange status LED will go off and the fault relay will energise. When the heat sink temperature drops below 85 °C the controller will reset, the status LED will come back on the red fault LED will turn off and the relay will de-energise.

### Fuse Fail Alarm – (External DC Supply Needed)

If the supply or fuse fails in either L1 or L3 inputs the red fault LED and the orange status LED will flash alternately, if the control signal is turned on during this period the red fault LED and the relay will energise and remain latched on continuously until the firing card power supply is turned off. The controller must be powered down in order to allow the controller to reset.



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## Enable input

The contacts of the enable input must be closed for the controller to operate.

## Maintenance

Generally, thyristor switches are maintenance free but the following points should be observed;

The 50kVAR controller is equipped with a fan and it should be checked every two years, if it has become defective it should be replaced with a fan of the same type.

Generally, the heat sinks should be checked regularly to ensure that the fins are not obstructed with dust or debris, it is worth checking that the thyristor terminals are also free from any pollution.

Continuous over temperature tripping will be indicated by the normally open contacts of the alarm relay closing, this may indicate that one of the above fault modes has occurred.

## RECOMMENDATIONS

### FUSING

It is recommended that fast acting semiconductor type fuses (as supplied) be used for protection. See SRA Data sheet X10255 for further information. It is recommended that supply fuses are installed in the load supply.

### CE Marking

This family carries a “CE” marking. These burst fire controllers do not normally require a remote filter. For more information contact our sales desk. A Declaration of Conformity is available on request.

## DOCUMENTS

Other documents available on request, which may be appropriate for your application:

Code	Identity	Description
X10213	ITA	Interaction: Uses for phase angle and for burst fire control
X10255	SRA	Safety Requirements: Addressing the Low Voltage Directive (LVD) including, Thermal Data/Cooling, Live Parts Warning, Earthing Requirements and Fusing Recommendations
P01.1	COS	UAL Conditions of Sale

It is recommended that installation and maintenance of this equipment should be done with reference to the current edition of the I.E.T. regulations (BS7671) by suitably qualified/trained personnel. The regulations contain important requirements regarding the safety of electrical equipment. For International standards refer STANDARDS on D of C.

## OPTIONAL EXTRAS

Product Code	Product Description
Available on request	Spare HS fuses: 80ET (80A) or 100ET (100A) SCR-type

## PRODUCT CODE AND RELATED PRODUCT CODE

Product Code	Product Description
A418301	PFC2 30kVAR, 50A, 415V, 2/3rds control - Three Phase
A418302	PFC2 50kVAR, 75A, 415V, 2/3rds control - Three Phase

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