

X10746 – DMPR1 Series Dual Mode Power Controller

Single Phase 12kW/20kW and Two Phase 22kW/30kW

Issue 5



1 Interaction/Introduction

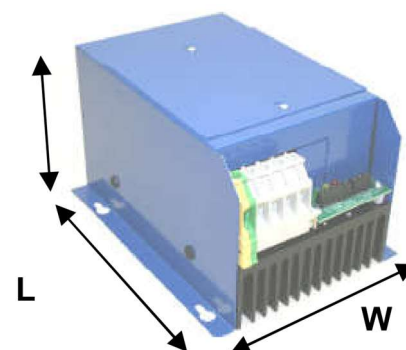
The complete enclosed single phase Dual Mode Power Regulator (DMPR) thyristor assembly provides control of inductive/resistive loads of up to 30kW at 415V AC. The user selectable control modes, via the internal switches offer either phase angle, burst firing or a combination of the two i.e. start up in phase angle and then continue in burst firing. The controllers also come with frequency tracking allowing the unit to be installed in many applications where the supply is unstable. There are a number of signal control options to meet most industrial requirements. All are housed in a bespoke enclosure and have easy access to internal signal & power terminals for simple installation. With Integral semiconductor fuses and heatsink, the controller offers a solution for many applications requiring single or dual mode control.

2 Applications

Suitable for furnaces, ovens, dryers, air curtains, hot plates and many other heating and ventilation applications. Also suitable for inductive loads such as transformers

3 Features

- Phase-angle/burst-fire control or combination of both
- Frequency tracking 4-400Hz
- Integrated high speed fuse
- Adjustable ramp control 1 to 30 second



RoHS Compliant

4 Technical Specifications

Power / Current Ratings	12kW (52A): 20kW (87A) @ a nominal supply of 230V rms 22kW (55A): 30kW (75A) @ a nominal supply of 400V rms	
Input Voltage	230V RMS +/- 10% 415V RMS +/- 10% Phase to Phase Note: 110V rms option available on request	
Supply Frequency	4 to 400Hz active tracking	
Control Input Options	0 to 5V dc up to a maximum of 24V dc or Manual: using 5kΩ Potentiometer 0-20mA/4-20mA (SW1 position 3 on)	
Alarms Relay Rating	125V ac @ 2A	
LED Indicator	Power LED (Green) – Illuminates when the on board 5V dc supply is present Status LED (Yellow) - Brightness increases in phase angle mode and pulses on a one second time base with a variable mark space (on-off) ratio determined by the control signal in burst fire mode. Fault LED (Red) - Continuously pulses when heatsink temperature rises to 90 °C and is fully on if the internal high-speed fuse fails	
Over-temperature	Trip in temperature @ 90°C +/- 1°C (LED indicator 'flashes' continuous fast pulsing) Fixed level of 55°C brings on fan (when fitted) Level of 90°C shuts down power and alarm relay de-energises	
Zero Settings	Sets the minimum output level, zeros the output with signal of up to 2V	
Span Setting	Sets the maximum output with input signals of up to 24V dc	
Soft Start	0-30 seconds initiated at power up. Also initiated when enable is used.	
Current Limit	Built in and user resettable (SW1 position 4 and VR1)	
Switch Options	Phase-angle, burst fire, V/I signal and current limit enabled or disabled.	
Cable Terminations	Phase Power & Earth (unit dependent)	10mm ² (12/22kW); 16mm ² (20/30kW) - Rising Clamp Terminal Blocks
	Remote Supply Auxiliary Alarm (relay)	1.5mm ² Rising Clamp Terminal Block
	Control Signal	1.5mm ² Rising Clamp Terminal Block
Terminal Torque Settings	4Nm (for power terminals 10mm ² & 16mm ²)	
Fusing	230V: 80ET (12kW), 100ET (20kW)	
	415V: 80ET (22kW), 100ET (30kW) Semiconductor type, lug fuses	
Working Temperature	60°C (maximum operational)	
Ingress Protection (IP) Rating	IP20 (Protection against solid bodies greater than 12mm; no protection against liquid)	
Dimensions	205mm (L) x 155mm (W) x 120mm (H); with Fan Cowl: 250mm (L) x 155mm (W) x 120mm (H)	
Fixing Centres	4 x 5 Ø holes on centres 1400mm (W) x 140mm (L)	
Weight	12kW: (2.8kg) 20kW (3.5kg) with Fan Cowl: add 0.52kg 22kW: (2.8kg) 30kW (3.5kg)	

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

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5 Functions

5.1 Alarm relay

The alarm circuit has voltage free relay contacts, rated up to 2A @ 125V ac (RMS) load and is energised on power up. De-energises if the heatsink temperature rises to 90°C or if the internal high-speed fuse fails.

5.2 Over temperature protection

When the heat sink temperature rises above 55°C (detected by the heat sink sensor) the cooling fan is switched on, if fitted. Should the heat sink temperature reach 90°C, the power to the load will be disabled and will not return until the temperature drops to 85°C. During this period the alarm relay is de-energised and fault LED flashes continuously.

5.3 Control options

Phase – angle (SW1 position 1 ON)

Burst-fire (SW1 position 2 ON)

Combination of phase-angle and burst-fire (SW1 position 1 and 2 ON). i.e. output starts up in phase angle mode and then switches to burst fire mode when the control has ramped up to the set point.

6 Installation

6.1 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 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 27kW unit has a built-in fan that switches on when the heatsink gets hot (see SPECIFICATIONS).

6.2 Load considerations

The PR3 series of power controllers are designed for 3-wire, 3-phase floating-star or closed delta configured resistive loads. The PR3 series are 2-leg thyristor controllers and therefore unsuitable for 4-wire, 3-phase with star point to neutral configured loads. For further information on configured loads, see the 'Application circuits' section of our supporting datasheet – APC (ref. X10322).

Unusual heating loads such as Molybdenum, Platinum or Tungsten have a typical, 10:1, hot to cold, resistance ratio and therefore, when cold, draw larger currents than normal.

6.3 Connections

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

Note: It is factory set for an internal power supply. For alternative volts 'free alarm' supply details see *Functions* section. Please contact our technical support for further details.

7 Recommendations & Safety Requirements

These supporting documents, which may be appropriate for your application, are available on request:

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
X10322	APC	AC Power Control – Three phase application circuits
X10617		Wiring connection details are attached to the inside of the lid
P01.1	COS	UAL Conditions of Sale

Note: It is recommended that installation and maintenance of this equipment should be done with reference to the current edition of the I.E.T. (formerly I.E.E.) regulations (BS7671) by suitably qualified/trained personnel. The regulations contain important requirements regarding installation and safety of electrical equipment. Specific installers should refer to local and national regulations.

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8 Ordering Code

Product Description	Rating
DMPR1-E-12Kw-230V	230V, 12kW, 52A
DMPR1-E-20Kw-230V	230V, 20kW, 87A
DMPR1-E-22Kw-415V	415V, 22kW, 55A
DMPR1-E-30Kw-415V	415V, 30kW, 75A
DMPR1-F-E-30Kw-415V	415V, 30kW, 75A

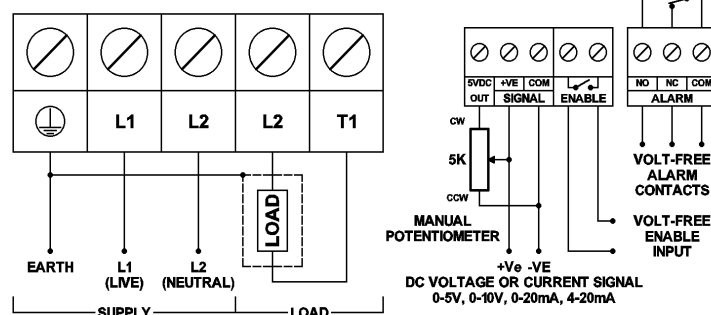
OPTIONAL EXTRAS

Manual control option: A403011 - 5K, 1W potentiometer with 0.5m leads.

Supply voltage variation: 110V AC available on request.

High ambient Temperatures: DMPR1-F – additional fan & cowl option for 30kW model where ambient temperatures could get above 40°C.

9 Connections



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