

SINGLE PHASE 12kW and 20kW RANGE TWO PHASE 22kW and 30kW DUAL MODE POWER CONTROLLER

DMPR1 SERIES

X10746

INTRODUCTION

The complete enclosed single phase Dual Mode Power Regulator (DMPR) thyristor assembly provides control of inductive/resistive loads of up to 30kW at 400V 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.

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

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% 400V rms +/- 10% Phase to Phase
Supply frequency:	Note: 110V rms option available on request. 4 to 400Hz active tracking
Control input signal:	0 to 5V dc up to a maximum of 24V dc or manual – 5kΩ potentiometer (SW1 position 3 off) 0-20mA/4-20mA (SW1 position 3 on)
Alarm 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, zeroes 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 (unit dependent) 10mm ² (12/22kW); 16mm ² (20/30kW) - rising clamp terminal blocks 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) / 400V: 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 5mm Ø holes on centres 140mm (W) x 140mm (L)
Product 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.

FUNCTIONS

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.

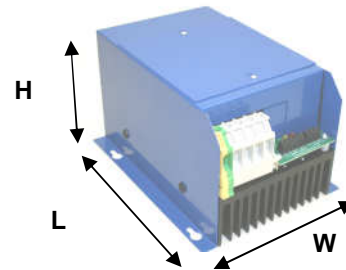
Over temperature protection

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.

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.

Picture shows: DMPR1-E-30kW, 75A, 400V



Features

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

RoHS Compliant

INSTALLATION

Cooling requirements

This robust stack assembly has an operational temperature of 60°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.

Load Considerations

It is always best to detail the type of load when ordering. For industrial reliability, based on long experience, the DMPR range has considerable current overload capacity on the power devices used. The rated currents are maximum continuous rms values for use within the temperature guidelines as shown in the table below.

Unusual heating loads such as molybdenum, platinum or tungsten, have a typical 10 to 1, hot to cold, resistance ratio and therefore, when cold, draw larger currents than normal. Transformer and other inductive loads have surge starting currents and require the correct type of phase angle firing circuit. These and similar types of surge loads should be advised so that appropriate slow start or larger rated units can be correctly supplied to the specific needs.

Connections

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

Fusing

It is recommended that fast acting semiconductor type fuses (as supplied) be used for protection. See SRA datasheet X10255 for further information.

CE Marking

This family carries a "CE" marking. In burst fire mode the controllers do not normally require a remote filter. For more information contact our sales desk. A Declaration of Conformity available on request.

RECOMMENDATIONS

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, Earth 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. (formally 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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ORDERING

Product Reference

Ratings V/P/I (RMS)

DMPR1-E-12kW-230V	230V, 12kW, 52A
DMPR1-E-20kW-230V	230V, 20kW, 87A
DMPR1-E-22kW-400V	400V, 22kW, 55A
DMPR1-E-30kW-400V	400V, 30kW, 75A
DMPR1-F-E-30kW-400V	400V, 30kW, 75A

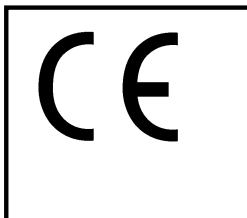
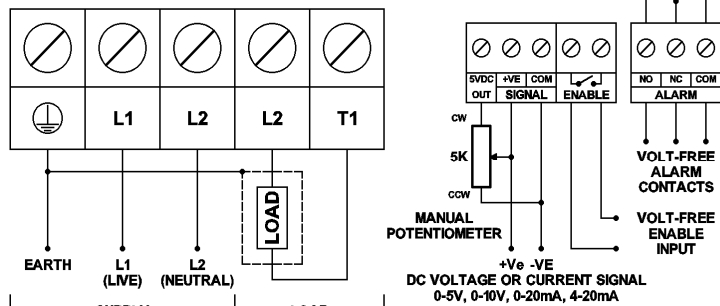
OPTIONAL EXTRAS

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.

CONNECTIONS Example shown with Heater Bank



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