

X10747 – DMPR3 36kW and 54kW

Three Phase Dual Mode Power Controller

Issue 5



1 Introduction

The complete enclosed three phase Dual Mode Power Regulator (DMPR3) thyristor assembly provides control of inductive/resistive loads of up to 54kW at 415V. The user selectable control modes, via the internal switches, are 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 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 30-80Hz
- Integrated High-Speed Fuses
- Adjustable ramp control 0 to 30 seconds.

4 Technical Specifications

Power / (Current) Ratings	36kW (50A); 54kW (75A) @ a typical supply of 415V RMS nominal	
Input Voltage	415V RMS +/- 10%	
Frequency	30 – 80Hz	
Control Input Options	Signal 0–5V/0–10V	
	Manual 5kΩ Potentiometer/4–20mA	
Load Type/Selectable (SW4)	Resistive or Inductive	
Adjustable Ramp Control from Power Up	0–30 seconds	
Control Limit or over current trip	0–100mV dc or 0–25V dc	
Over Current Warning	LED2/LED3 pulse alternately	
Cable Terminations (all internal)	Phase Power	M6 nut & washer stud terminal.
	Earth	M6 nut & clamp washer stud terminal.
Cable Entry (power & signal)	6 x 20mm ø cable knock-outs + 2 x 12mm holes – front side only. Cable glands not supplied.	
Terminal Torque Specs	4.5 to 5.5Nm – Power and earth terminals only.	
Fusing	36kW (63ET) 54kW (100ET) High Speed Semiconductor type fuses	
Working Temperature	65°C (maximum operational)	
Dimensions	232mm (D) x 340mm (W) x 124mm (H) – length is viewed with heatsink fins going top to bottom (see photo)	
Fixing Centres	4 x 6mm ø holes on centres 322mm (W) x 200mm (D)	
Weight	All models 5.2kg	

Note: SAFETY WARNING - Metal parts, in particular the heatsink, may get very hot when the unit is fully operational.

5 Operating Instructions

5.1 Manual Control

The FC36M firing circuit has a 5V dc output that can be used to supply the clockwise end of a 5kΩ potentiometer. The wiper is connected to the terminal marked I/P and the counter clockwise end to 0V.

5.2 Voltage Control

For control using a remote dc signal the positive input should be connected to the terminal marked I/P and the negative input to be connected to 0V. The input impedance is 10kΩ for 0–5V input and 20kΩ for 0–10V input.

5.3 Current Control

For current control connect a 4–20mA dc signal between terminals marked 4–20mA and 0V. This input can also be used as 1–5V dc input. The input impedance is 240Ω.

5.4 Phase-Angle Control

Option 1 - the switch marked SW1 should be switched to the on position. This position connects terminals A with 5V.

Option 2 – (see Soft-Starting) the switch marked SW1 can be switched to the OFF position. The OFF position isolates the inputs and disconnects terminals A from 5V. Inputs (A and C) then require an external supply between 5 and 24V dc.

5.5 Burst-Firing Control

The switch marked SW1 should be switched to the OFF position and the terminal marked B should be linked to the on board 5V supply or to an external 5–24V dc supply.

5.6 Phase-Angle to Burst-Firing Control

The switch marked SW1 should be switched to the ON position and terminals A and B should be linked together. The firing circuit will start in phase angle mode and switch to burst mode when the control signal ramps up to the set point. It will stay in the burst mode even if the signal drops below the set point. It will restart in phase angle mode when the unit is switched off or reset.

5.7 Soft-Start

When the FC36M is initially powered up the output is inhibited for 0.5 seconds, then the soft-start is automatically enabled and the firing circuit will ramp up at a rate determined by VR3 (0–30 seconds). The ramp time relates to full conduction, for example, if the ramp time is set to maximum (30 seconds) and the set point is 50% the controller will ramp to the set point in 15 seconds.



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6 Installation

6.1 Cooling Requirements

Heatsink temperature rating for standard stack assembly is calculated when naturally cooled. If mounted in an enclosure or cabinet, adequate ventilation and/or forced air-cooling should be fitted. Thermal trips are fitted on all controllers. We recommend they are wired in line with the signal, so as to disable the controller in an over temperature situation.

6.2 Load Considerations

It is always advisable to indicate 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. Transformers 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 indicated, so that appropriate slow start or larger rated units can be correctly supplied for the specific needs.

Max. Heatsink Ambient Temp (°C)	Model (kW)	Max. rms (A)	Model (kW)	Max. rms (A)
30	36	50	54	75
40	36	50	54	75
50	36	50	54	75
60	36	50	54	65

7 Fusing

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

8 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.

9 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

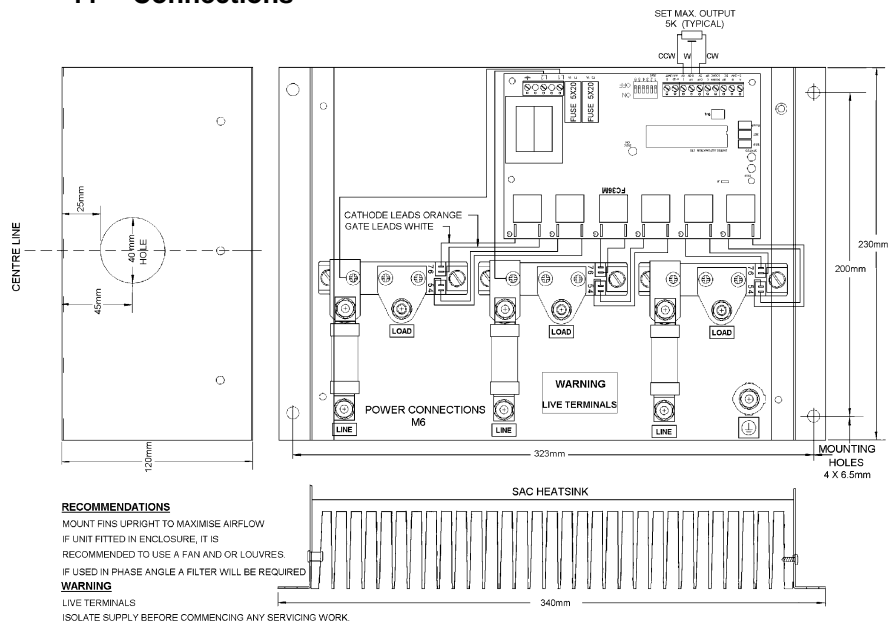
Note: It is recommended that installation and maintenance of this equipment should be carried out by suitably qualified/trained personnel with reference to the current edition of the I.E.T. wiring regulations (BS7671) The regulations contain important requirements regarding the safety of electrical equipment.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

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10 Ordering

Product Reference	Ratings V/P/I (RMS)
DMPR3-36kW	415V, 36kW, 50A
DMPR3-54kW	415V, 54kW, 75A
Optional Extras	
A403011	5kΩ potentiometer with 0.5m long lead for manual control option

11 Connections



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