X20121

THYRISTOR CONTROLLER | THREE PHASE

DMPR3 Series

86kW(120A) / 415V

3-Phase Dual Mode Power Controller

CONTACT US:

0044 (0) 1704-516 501

enquiries@united-automation.com

www.united-automation.com

KEY FEATURES:

- ✓ **Dual control modes:** phase-angle, burst-firing, or auto start in phase-angle then switch to burst
- ✓ **High power handling:** up to 86 kW (120 A) at 415 V AC
- ✓ **Fast burst options:** single-cycle and dual-cycle for precision and reduced harmonics
- ✓ **Adjustable soft-start ramp:** 0–30 seconds to limit inrush current
- ✓ **Wide input compatibility:** 0–5 V, 0–10 V, 1–5 V, 2–10 V, 0–20 mA, 4–20 mA, or 5 kΩ potentiometer
- ✓ **Comprehensive fault detection:** phase loss, sensor loss, fuse failure, mode mismatch
- ✓ LED indicators and alarm relay for status and faults
- ✓ Integrated 160 A high-speed semiconductor fuses for protection
- ✓ Compact DIN-mount enclosure with clearly marked terminals for easy installation

APPLICATIONS:

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

The **DMPR3-E-86kW Three Phase Dual Mode Power Controller** offers advanced control for both inductive and resistive heating loads in industrial environments. With a **maximum power capacity of 86kW (120A) at 415V AC**, this enclosed thyristor-based regulator allows users to select between **phase-angle**, **burst-firing**, or **hybrid control modes**. The **dual-cycle and single-cycle burst firing options** provide high-speed response, reduce flicker, and minimise harmonic distortion.

This robust controller is built for reliability, featuring **semiconductor fuses**, **cooling fans**, and a **built-in soft start ramp**. Its **user-configurable control inputs**, wide **signal compatibility**, and **intuitive LED status indicators** make it a versatile solution for demanding heating and ventilation applications.

TECHNICAL SPECIFICATIONS

Power (Current) Rating	86kW (120A)	
Input Voltage	415V RMS +/- 10%	
Frequency	50/60Hz	
Control Signal Input Options	0-5VDC, 0-10VDC, 1-5VDC, 2-10VDC, 0-20mA, 4-20mA, Manual Potentiometer Using 5 kΩ potentiometer.	
Soft Start (Ramp Speed)	0-30 seconds (adjustable)	
Alarms Relay Contact Rating	2A @ 125VAC Max.	
Power Indicator	Green Power LED	
Status indicator	Status LED indicator changes intensity during phase angle and soft start or flashes in synchronisation with bursts	
Over Temperature	Temperature trip activates @ 90°C, Alarm LED, and Status LED slow alternate flashes Temperature trip de-activates @ approximately 85°C	
Alarm Relay Default State	Relay is de-energised in no fault state, NO contact is open (disconnected from COM)	
Phase Lose Detection	Alarm LED and Status LED 'flashes' fast alternately	
Sensor Loss Detection	Alarm LED indicator 'flashes' at quarter second intervals (approx. 4Hz)	
Fuse Failure	Alarm LED indicator on solid	
Offset Failure	Alarm LED indicator 'flashes' slow pulsing (approx. 0.5Hz)	
Mode Mismatch	Alarm LED indicator 'flashes' fast pulsing (approx. 1Hz)	
Power Cable Size	86kW 35mm2	
Cable Terminations	Phase Power	35mm2 rising clamp terminal block
	Earth	35mm2 rising clamp terminal block
	Remote Supply, Alarm Relay, Inhibit, Control Signal	2.5mm2 rising clamp terminal block
Terminal Torque Settings	3.2Nm minimum, 3.7Nm Maximum (35mm2) Power terminals only	
Fusing	High-Speed semiconductor type fuses 86kW: 160EET (160A)	
Ambient Temperature	40°C without de-rating	
Dimensions (D x W x H)(mm)	277 x 300 x 130	
Fixing Centres	4 x 5.5mm ø holes on centres 277mm (W) x 200mm (D)	
Weight	6.5kg	

YOU MUST READ THIS BEFORE INSTALLATION

ELECTRICAL SAFETY

WARNING: RISK OF ELECTRIC SHOCK
Always consult the Installation & Maintenance Instructions before connecting this product to the power supply.
WARNING: Disconnect Power Before Servicing
Ensure the electrical supply is safely disconnected before connecting to any supply, load, or control terminals.

INSTALLATION REQUIREMENTS

WARNING: Installation by Qualified Personnel Only
This product must only be installed or fitted by a competent, qualified installer familiar with the relevant electrical standards and installation practices.

USER RESTRICTIONS

WARNING: Not for Use by Vulnerable Individuals
This product is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they are supervised or instructed by a person responsible for their safety.

USAGE ENVIRONMENT

WARNING: Industrial Use Only
This is an industrial-grade product and is not intended for household use.

HOT SURFACE WARNING

WARNING: Hot Surfaces
On certain models, surfaces marked with this symbol become hot during use. Avoid direct contact and follow all thermal safety precautions.

DMPR3 Series

86kW (120A) / 415V | **3-Phase Dual Mode Power Controller**

FUNCTION/TROUBLESHOOTING

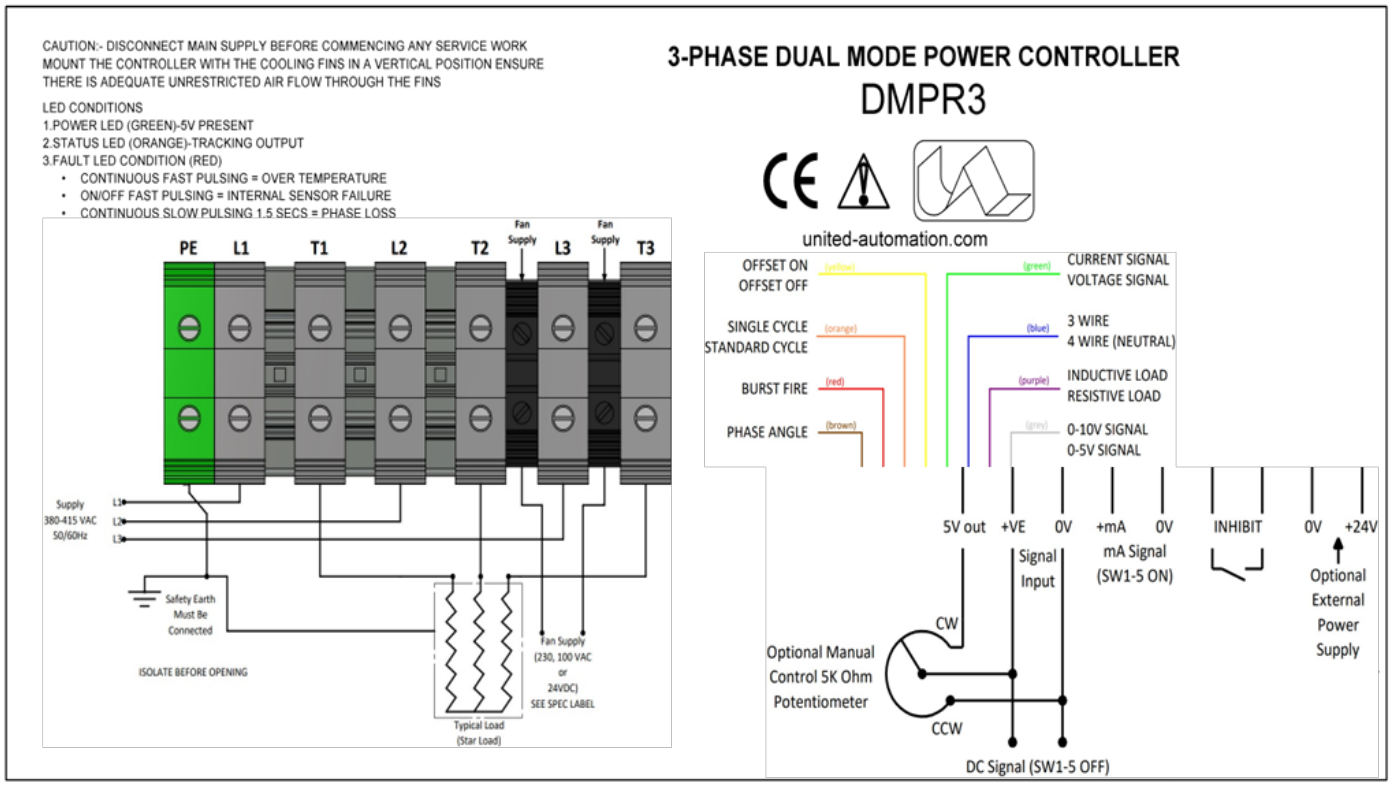
Condition	Description
Trip/Inhibit Input	This input should be driven by a volt-free contact. When the contact is closed, the power to the load will be disconnected, the relay changes state, and the alarm LED will be illuminated for as long as the inhibit input is closed
Over Temperature Protection	When a heatsink temperature of over 90°C is detected by the sensor, the alarm relay changes state, and the alarm LED will flash alternatively every half second. The power to the load will be disconnected and will not be re-enabled until the heatsink temperature drops to approximately 85°C
Phase Loss with Auxiliary Supply Only	When any one of the three phase inputs is not present, the relay changes state and will not be re-enabled until a current of voltage signal is detected, the alarm LED will pulse ON/OFF every two seconds and the alarm relay state changes
Offset Failure	If there is no current signal (4-20mA), power to the load will be disconnected and will not be re-enabled until a current or voltage signal is detected, the Alarm LED will pulse ON/OFF every two seconds and the alarm relay state changes.
Mode Mismatch	If an incompatible mode has been selected, the Alarm LED will pulse ON/OFF every quarter second and the alarm relay state changes.
Alarm Relay Fault Indication	The alarm relay will be de-energised with no fault present and hence the NO contact will be open and disconnected from the COM terminal, the relay state toggles when an alarm condition is detected.
Remote Supply	If there is a requirement for the alarm relay and Alarm LED to energise when a phase fault condition occurs an external 24V dc supply should be used.

CONTROL OPTIONS GUIDE

Description	Switch	Action
Phase Angle Option	SW1-1 – Brown	When this switch is ON, the output is enabled to phase angle mode. The ramp speed is set by VR2 (0-30 Secs). The Status LED will proportionally increase in brightness as the control input signal is increased.
Burst Firing Option	SW1-2 – Red	When this switch is ON, the output is enabled in burst fire mode. The Status LED will mimic the output pulses to the load as the control input signal is increased.
Phase-Angle to Burst-Firing Control	SW1-1 – Brown SW1-2 – Red	The switch marked SW1-1 and SW1-2 should be switched to the ON position. 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.
Rapid Burst Fire	SW1-3 – Orange	When switch SW1-3 is in the OFF position, standard burst fire is used. When in standard burst fire mode, the TIME BASE trimmer (VR1) is used to set the time base. The time base is the ON/OFF cycle time, this is variable from 1-30 seconds. When switch SW1-3 is in the ON position, rapid burst fire mode is selected. Two types of rapid burst fire are supported, single and dual cycle. Single cycle is selected when Burst Rate trimmer (VR1) is fully anticlockwise. Dual cycle is selected when Burst Rate trimmer (VR1) is fully clockwise.
Offset Option	SW1-4 – Yellow	When SW1-4 is in the off position no offset is selected for the voltage and current input control signals. When SW1-4 is in the ON position an offset is introduced, this option is selected for 1-5V, 2-10V and 4-20mA control signals.
Voltage or Current Option	SW1-5 – Green	When switch SW1-5 is in the OFF position this selects a voltage control input signal (0-5V, 1-5V, 0-10V, 2-10V). When switch SW1-5 is in the ON position this selects a current control signal (0-20mA, 4-20mA
3-wire or 4-wire	SW1-6 – Blue	When switch SW1-6 is in the ON position the controller is set for a 3-Wire configured load (Closed-Delta or Floating-Star), where there is no Neutral connection. When switch SW1-6 is in the OFF-position controller is set for 4-Wire configured load (Star to Neutral), where there is a Neutral connection to the Star Point.
Inductive Load	SW1-7 – Purple	When switch SW1-7 in the OFF position, the firing circuit is configured to control resistive and some slightly inductive loads. When switch SW1-7 is in the ON position, the firing circuit should be used on inductive (transformer and coil) type loads.
0-5V/0-10V Signal Option	SW1-8 – Grey	When switch SW1-8 is in the OFF position the control voltage is selected to be 0-5V When switch SW1-8 is in the ON position the control voltage range is selected to be 0-10V or 1-10V, depending on the Offset Option switch (SW1-4).

DMPR3 Series

86kW (120A) / 415V | **3-Phase Dual Mode Power Controller**



INSTALLATION

This robust stack assembly will operate in an ambient temperature of up to 40°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

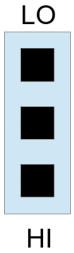
It is always advisable to indicate the type of load when ordering. For industrial reliability, based on long experience, the DMPR range has considerable current overload capacity on the power devices used. The rated currents are maximum continuous rms values for use within the temperature guidelines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

CONNECTIONS

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

POWER SUPPLY

Three-way internal jumper J1 selects the internal power supply input voltage to either 420v or 460v ac rms, phase to phase. If the jumper link is fitted across HI-COM, 460v is selected with the jumper link fitted across COM-LO, 420v is selected. The jumper header is labelled as shown below:



For operation with an external power supply the jumper link should be removed from J1.

FUSING

It is recommended that high speed semiconductor type fuses (as supplied) be used for protection. See SRA Data sheet X10255 for further information. Other external supplies should be fused accordingly.

DMPR3 Series

86kW (120A) / 415V | **3-Phase Dual Mode Power Controller**

SAFETY WARNINGS

Isolate supply before removing cover; Metal parts, the heatsink, may get very hot when the unit is fully operational; DO NOT COVER enclosure ventilation slots. **It is essential that a load break switch and contact breaker is installed in the supply**. The supply to the contactor coil should be interrupted by an over-temperature thermostat located in the heater battery and by detection of airflow loss.

RECOMMENDATIONS

Additional supporting documents, which may be appropriate for your application, are available on request (see X10593).

FUSING

It is recommended that high speed semiconductor type fuses (as supplied) be used for protection. See SRA Data sheet X10255 for further information. Other external supplies should be fused accordingly.

CE MARKING

This product family carries a “CE” marking. These burst firing type controllers do not require a filter. For information see recommendation section and contact our sales desk. See the Declaration of Conformity.

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
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

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.

OPTIONAL EXTRAS

Product Code	Product Description
A403001	Manual (5K) Potentiometer Knob and Leads

PRODUCT CODE AND RELATED PRODUCT CODE

Product Code	Product Description
A481851	DMPR3-E-86kW, 120A, 415V, Dual Mode 3-Phase Power Controller

© These products are protected by unregistered design with United Automation Limited, Southport, UK

BMF House - Wight Moss Way,
Southport Business Park
Southport PR8 4HQ
ENGLAND, UNITED KINGDOM

Contact Us:
0044 (0) 1704-516 501
enquiries@united-automation.com
www.united-automation.com

unitedautomationltd UA_Limited