

X20109

HVAC | HEATER BATTERY CONTROLLER

PR3-E SERIES – SPM

30kW (42A), 36kW (50A), 415V

Three Phase Burst Fire Power Controller

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KEY FEATURES:

- ✓ **Seamless Three-Phase Control:** Provides smooth and precise control of resistive loads.
- ✓ **Advanced Technology:** Utilises fast pulse, zero volts switching to reduce flicker and RFI.
- ✓ **Safety Features:** Includes an automatic resetting temperature trip and integral semiconductor fuses.
- ✓ **Easy Installation:** Designed with accessible signal and power terminals.
- ✓ **Flexible Control Options:** Offers both DC signal and manual control options.

APPLICATIONS:

The PR3-E Series is suitable for 3-wire, 3-phase floating-star or closed-delta configured resistive loads.

Ideal for the **Heating, Ventilating, and Air Conditioning (HVAC)** market, especially for air curtain applications, it is also perfect for furnaces, ovens, dryers, and hot plates.

The **PR3-E S/SP/SPM** range of thyristor stacks provides full, seamless control of three-phase resistive loads using a two-thirds control technique. Power levels can be controlled either by a DC signal or manually using a 5kΩ potentiometer. The PR3-E burst firing control stacks utilise fast pulse, zero volts switching technology to minimise flicker and eliminate RFI problems. These controllers feature an automatically resetting temperature trip, integral semiconductor fuses, and an integral volt-free trip/enable input for external thermal trip wiring. Available in two power ratings, 30kW and 36kW, the SPM (Standard Plus Monitoring) version includes HS fuses, an internal power supply, and SCR/HS Fuse monitoring. All models offer easy access to signal and power terminals for straightforward installation.

The **PR3-E Series SPM** models are the ideal solution for managing high-power HVAC systems and other industrial heating applications, ensuring reliability, efficiency, and safety.

TECHNICAL SPECIFICATIONS

Power (Current) Ratings	30kW (42A); 36kW (50A); @ 415V RMS nominal	
Input Voltage	400V RMS ± 10%	
Frequency	50/60 Hz	
Control Signal Input Options	0 – 5V or Manual using 5kΩ Potentiometer: SW1-3: OFF, SW1-5: OFF, SW1-6: OFF	
	1 – 5V: SW1-3: ON, SW1-5: OFF, SW1-6: OFF	
	0 – 10V: SW1-3: OFF, SW1-5: OFF, SW1-6: ON	
	2 – 10V: SW1-3: ON, SW1-5: OFF, SW1-6: ON	
	0-20mA: SW1-3: OFF, SW1-5: ON, SW1-6: OFF	
Alarms Relay Contact Rating	2A @ 125V AC Max.	
	Power LED	
Status Indicator	Status LED – indicator changes intensity during phase angle soft start or flashes in synchronisation with bursts	
Over-temperature	Temperature Trip Activates @ 90°C ±1°C, fault LED indicator flashes continuous fast pulsing	
	Temperature Trip De-activates @ 85°C ±1°C	
Alarm Relay Default State	SW1-4: OFF – Relay is energised in no fault state, NO contact is closed (connected to COM)	
	SW1-4: ON – Relay is de-energised in no fault state, NO contact is open (disconnected from COM)	
Phase Loss Detection	Fault LED indicator 'flashes' continuous slow pulsing	
Sensor Loss Detection	Fault LED indicator 'flashes' fast pulsing	
SCR/Fuse Fault	Fault LED and Status LED alternately flash (SPM model only)	
Cable Terminations	Phase Power	10mm ² Rising Clamp Terminal Block
	Earth	10mm ² Rising Clamp Terminal Block
	Remote supply, Alarm relay, Enable, Control signal	2.5mm ² Rising Clamp Terminal Block
Terminal Torque Spec	1.2Nm (10mm ²) Power Terminals only	
Fusing	30kW	56ET (56A) High-Speed Semiconductor type fuse, or equivalent
	36kW	63ET (63A) High-Speed Semiconductor type fuse, or equivalent
Ambient Temperature	45°C without de-rating	
Dimensions	152mm (D) x 241mm (W) x 115mm (H)	
Fixing Centres	4 x 5.5mm Ø holes on centres 220mm (W) x 130mm (D)	
Weight	2.6kg Max. (all models)	

YOU MUST READ THIS BEFORE INSTALLATION

 ELECTRICAL SAFETY	 INSTALLATION REQUIREMENTS	 USER RESTRICTIONS	 USAGE ENVIRONMENT	 HOT SURFACE WARNING
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.	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.	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.	WARNING: Industrial Use Only This is an industrial-grade product and is not intended for household use.	WARNING: Hot Surfaces On certain models, surfaces marked with this symbol become hot during use. Avoid direct contact and follow all thermal safety precautions.

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INSTALLATION

The robust stack assembly of the PR3-E series operates effectively in ambient temperatures up to 45°C with natural cooling and includes a built-in 90°C over-temperature trip on the heatsink for safety. Ensure the unit is mounted vertically with the heatsink fins oriented top to bottom, providing ample surrounding air space to maximise natural convection cooling. If installed in an enclosure or cabinet, adequate ventilation or forced air-cooling is required.

Load Considerations

The PR3-E series power controllers are designed for 3-wire, 3-phase floating-star or closed delta resistive loads. These 2-leg thyristor controllers do not support 3-phase, 4-wire star, star point to neutral loads. For detailed information on configured loads, refer to the 'Application Circuits' section of our supporting datasheet – APC (ref. X10322).

Special consideration is needed for heating loads such as Molybdenum, Platinum, or Tungsten, which have a typical 10:1 hot-to-cold resistance ratio. These loads draw larger currents when cold, so enabling the Soft-Start feature is recommended.

Power Supply

Three-way internal jumper JP2 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:



The SPM model has an internal power supply, the units are factory set for 420v rms (COM-LO) supply. For operation with an external power supply the jumper link should be removed from JP2.

Contact Us:

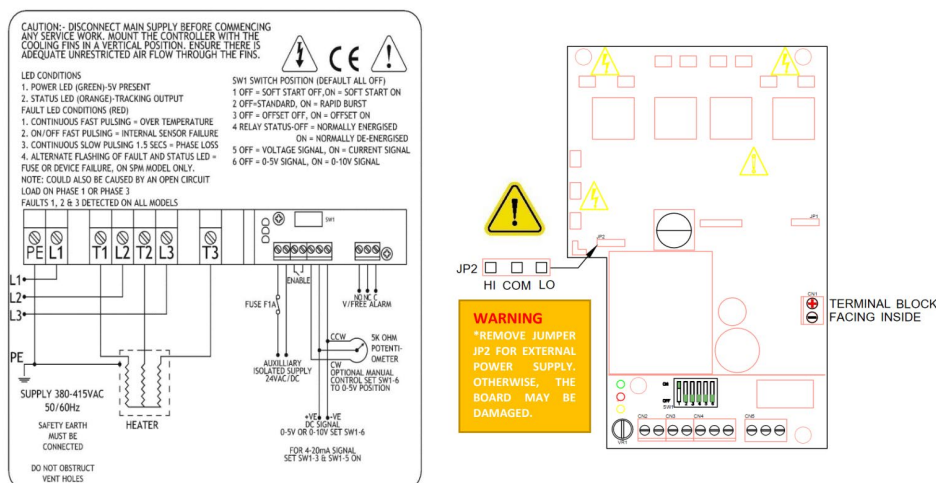
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CONNECTIONS

The unit is equipped with simple clamp-type connectors for all auxiliary wiring requirements, facilitating straightforward installation.



FUNCTIONS

Function	Description
Trip/Enable Input	This input should be driven by a volt free contact. When the contact is closed, the unit is enabled to supply power to the load. When the contact is open this disables the power to the load. If this input is not used a wire link must be fitted to enable the unit.
Alarm Relay Output (3-way terminal – Volt Free Contacts, Normally Open (NO), Normally Closed (NC), Common (COM))	The alarm circuit has voltage free relay contacts which have a 2A@125 V AC RMS rating. The alarm conditions which are detected are phase loss (L1, L2, L3), fuse failure (L1, L3), device failure (L1, L3), over temperature and temperature sensor error. The power to drive the alarm relay coil is obtained from the board power supply, which can be either internal or external. L2 & L3 are used to power the internal, transformer-based power supply, therefore when internally powered the loss of phase L2 and L3 condition cannot be indicated as this results in a loss of power to the controller card.
Over Temperature Protection	When a heatsink temperature of above 90°C is detected by the sensor, the alarms relay changes state and the Fault LED pulses rapidly. The power to the load will be disconnected and will not be re-enabled until the temperature drops to 85°C.
Temperature Sensor Loss	If the temperature sensor fails or becomes disconnected, the Fault LED changes to ON/OFF (fast pulsing) and the alarm relay state changes.
Phase Loss with Auxiliary Supply	When any one of the three phase inputs is not present, the relay changes state and the Fault LED flashes with ON/OFF bursts of 1.5 seconds. This is only functional with a remote supply (see below).
SCR/Fuse Monitoring	Fault and Status LED flash alternately and the alarm relay will change state. This condition indicates that either a HS fuse has failed, or a SCR open or short circuit failure has been detected. NOTE: The fuse or device fault indication can also be caused by an open circuit load on Phase 1 or Phase 3. Alarm Relay Fault Indication
Alarm Relay Fault Indication	If DIL switch SW1-4 is in the OFF position, the alarm relay will be energised with no fault present and hence the NO contact will be closed and connected to the COM terminal. If DIL switch SW1-4 is in the ON position, the alarm relay will be deenergised when no fault is present and hence the NO contact will be disconnected from the COM terminal. For either state of SW1-4, the relay state toggles when an alarm condition is detected.
Remote Supply	If there is a requirement for the alarm relay and Fault LED to energise when a phase fault condition occurs, the SPM model must be specified, and an external 24V dc supply should be used.

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Control Options Guide

Option	Switch	Description
Soft Start Option	SW1-1	When this switch is ON, the output ramps up to required power level using phase angle and then switches to burst fire mode.
Rapid Burst Fire	SW1-2	When switch SW1-2 is in the OFF position, standard burst fire is used. When in standard burst fire mode, the Burst Rate 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 SW1-2 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	SW1-3	When SW1-3 is in the off position no offset is selected for the voltage and current input control signals. When SW1-3 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	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).
10V Signal Option	SW1-6	When switch SW1-6 is in the OFF position the control voltage is selected to be 0-5V or 1-5V, depending on the Offset Option switch (SW1-3). When switch SW1-6 is in the ON position the control voltage range is selected to be 0-10V or 2-10V depending on the Offset Option switch SW1-3.

RECOMMENDATIONS

FUSING

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

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.



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OPTIONAL EXTRAS

Product Code	Product Description
A403011	Potentiometer with 0.5m long leads for manual control option
Available on request	Spare HS fuses: 56ET (56A) or 63ET (63A) SCR-type

PRODUCT CODE AND RELATED PRODUCT CODE

Product Code	Product Description
A437420-HV	PR3-E-30kW-SPM, 42A, 415V, 2/3rds control - Three Phase
A437483-HV	PR3-E-36kW-SPM, 50A, 415V, 2/3rds control - Three Phase

WHERE OUR PRODUCTS FIT

