

X10594

HVAC | HEATER BATTERY CONTROLLER

PR3-E Series

86kW (120A), 105kW (146A), 415V
Three Phase Burst Fire Power Controller



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KEY FEATURES:

- ✓ **Versatile Control:** Supports DC signal and 5kΩ potentiometer manual control.
- ✓ **Advanced Burst Firing:** Minimises flicker and RFI with fast pulse zero-voltage switching.
- ✓ **Safety Features:** Auto-reset temperature trip, semiconductor fuses, and heatsink.
- ✓ **User-Friendly:** Easy access to terminals for simple installation.
- ✓ **Robust Performance:** Ideal for 3-phase resistive loads in HVAC and industrial applications.

APPLICATIONS:

- **Heating, Ventilating, and Air Conditioning (HVAC):** Perfect for air curtain systems, ensuring consistent and efficient heating.
- **Industrial Heating:** Ideal for use in furnaces, ovens, dryers, and hot plates where precise temperature control is essential.

The **PR3-E Series** is a robust range of 3-phase burst fire power controllers designed for seamless control of resistive loads in HVAC systems and other high-demand applications. Available in 86kW and 105kW models, these thyristor stacks provide precise, reliable power management using advanced two-thirds control techniques. Ideal for air curtains, furnaces, ovens, and more, the PR3-E Series ensures optimal performance with minimal interference, thanks to fast pulse zero-voltage switching technology.

The **PR3-E Series 3-Phase Burst Fire Power Controllers** are engineered for durability and efficiency, offering a powerful solution for managing high-capacity resistive loads in demanding environments. Whether for HVAC or industrial heating applications, this range provides precise control, easy installation, and reliable operation, ensuring your systems run smoothly and safely.

TECHNICAL SPECIFICATIONS

Power/Current Rating	86kW (120A); 105kW (146A) @ a typical supply of 415V RMS	
Input Voltage	400V RMS ± 10%	
Frequency	50/60Hz	
Control Input Options	Signal (using SW3): 0 to 10V DC (set as standard)/0 to 5V	
	Manual: using 5kΩ potentiometer	
	For 4-20mA Signal: set S/W I/V to "ON", fit 270Ω (0.25W) across SIG ± and set SW3 to 0-5V	
Burst Fire Control Options	Slow Burst: 1 second proportional time base	Fast Burst: variable and un-time base
Alarm Relay Functions	The voltage-free alarm circuit is rated for 125V AC @ 2A	
Alarm Relay Status Options	SW1 = "OFF" – Relay is continuously energised (normally closed); trips in fault condition	
	SW1 = "ON" – Relay is de-energised (normally open); closes in fault condition	
Status Indicator	(Tracking control signal) status LED indicator changes intensity	
Cooling Fan	None fitted	
Over Temperature	Trip in temperature @ 90°C ± 1°C (Status LED indicator 'flashes' with ON/OFF rapid pulsing)	
	Trip out temperature @ 85°C ± 1°C	
Phase Loss Detection	Status LED indicator 'flashes' ON/OFF continuously in slow 1.5 second intervals	
Sensor Loss Detection	Status LED indicator 'flashes' ON/OFF continuously in equal intervals	
Cable Terminations	Phase Power & Earth	35mm ² Rising Clamp Terminal Block
	Reference Phase (L2)	10mm ² Rising Clamp Terminal Block
	Remote supply Auxiliary alarm (relay)	2.5mm ² Rising Clamp Terminal Blocks
	Control signal	2.5mm ² Rising Clamp Terminal Blocks
Terminal Torque Specs	3.2 to 3.7Nm – Power an Earth terminals. 2.0Nm-Reference (L2) Terminal.	
Fusing	86kW	160EET (160A) High-speed Semiconductor type fuse
	105kW	200EET (200A) High-speed Semiconductor type fuse
Working Temperature	65°C (maximum operational)	
Dimensions	272mm (D) x 250mm (W) x 130mm (H) 36kW – length is viewed with heatsink fins going top to bottom (see photo)	
Fixing Centres	4 x 6mm holes on centres 227mm (W) x 200mm (D)	
Weight	(all models) 5.2kg	



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INSTALLATION

Cooling Requirements

The PR3 series power controller operates efficiently at temperatures up to 65°C with natural cooling. It features a built-in over-temperature trip at 90°C on the heatsink for added safety. For optimal cooling, mount the unit vertically with the heatsink fins oriented top to bottom, ensuring adequate air space around the unit to maximise natural convection. If the unit is installed in an enclosure or cabinet, proper ventilation or forced air-cooling is necessary to maintain performance and prevent overheating.

Load Considerations

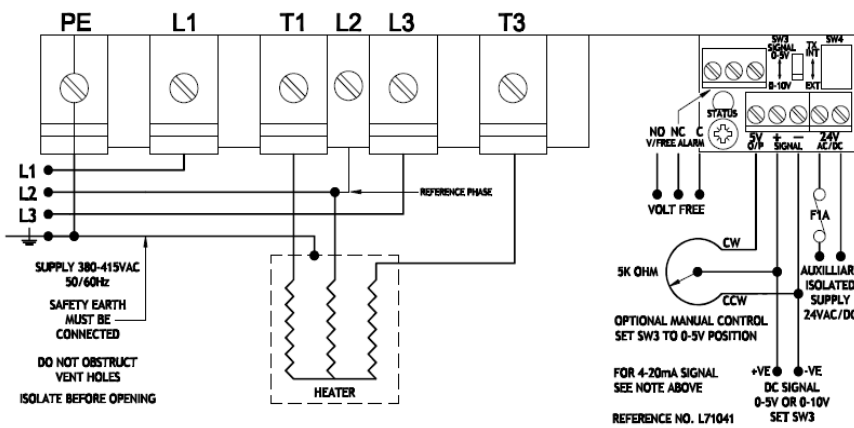
The PR3 series power controllers are designed for 3-wire, 3-phase floating-star or closed-delta configured resistive loads. These controllers are 2-leg thyristor models, making them unsuitable for 4-wire, 3-phase systems with a star point to neutral configuration. For more detailed information on configured loads, refer to the 'Application Circuits' section of our supporting datasheet (APC ref. X10322). Please note that unusual heating loads, such as those using materials like Molybdenum, Platinum, or Tungsten, may have a high hot-to-cold resistance ratio (up to 10:1), resulting in a significantly higher current draw when cold.

Fusing and Over-Temperature Protection

To ensure optimal protection, it is recommended to use fast-acting semiconductor fuses, as supplied. For further details, refer to the SRA Datasheet X10255. Additionally, it is advisable to install a load break switch and a contact breaker in the load supply. The power supply to the contactor coil should be interrupted by an over-temperature thermostat located in the heater battery and also upon detection of airflow loss.

CONNECTIONS

The PR3 series features robust power terminals and simple clamp-type connectors for all auxiliary wiring needs. The unit is factory set for an internal power supply. For alternative 'voltage-free' alarm supply configurations, please consult the Functions section or contact our Technical Support team for further assistance.



For 105KW model a solid conductor needs to be used (50mm² cross section)

Safety Warning:

IMPORTANT: Isolate the power supply before removing the cover. Be aware that metal parts, especially the heatsink, may become extremely hot during operation. **DO NOT COVER** the enclosure's ventilation slots.

Essential Precautions:

- Install a load break switch and a contact breaker in the load supply for safety.
- Ensure that the power supply to the contactor coil is interrupted by an over-temperature thermostat located in the heater battery and upon detecting airflow loss.



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FUNCTIONS

Function	Description
Alarm relay functions (3-way terminal – V/free alarm “NO NC C”)	The alarm relay circuit features voltage-free relay contacts rated up to 2A @ 125V AC (RMS). Connections are made via the PCB terminal. For alarm relay status options, refer to the SPECIFICATIONS section. The relay and status LED are powered by the internal supply from the transformer via two 20mm 1A fuses. The relay and LED can only be energized in the event of an over-temperature condition, sensor fault, or phase loss on the L1 phase. For details on remote supply options, consult the relevant section.
Over-Temperature Protection	When the heatsink temperature exceeds 90°C, the sensor triggers the alarm relay to change state, and the status LED indicator flashes rapidly. The power supply to the load is disconnected and will not resume until the temperature drops to 85°C.
Temperature Sensor Loss	If the temperature sensor fails, the Status LED indicator will pulse continuously in equal ON/OFF intervals, signaling the fault.
Phase Loss with Auxiliary Supply	If any of the three-phase inputs fail, the relay changes state, and the LED flashes ON/OFF in slow 1.5-second intervals. This function is only active with a remote supply.
Fault Condition	The default setting of DIL switch (SW1) is ON, which means the alarm relay is energised under fault conditions. Changing SW1 to the OFF position will keep the alarm relay continuously energised until a fault occurs.
Remote Supply	The unit is factory-set for internal power supply (SW4 in the “INT” position). If a remote 24V AC or DC supply is required for the alarm relay and LED to function during a phase fault, set SW4 to the “EXT” position. Note that the main supply (L1, L2, and L3) must be active before the remote supply is switched on.

Control Options Guide

Burst Fire Control (SW2):

- **Fast Burst Control (Flicker Inhibited Mode):** Set SW2 DIL switch to the “ON” position.
- **Slow Burst Control (Basic Burst Firing Mode):** Set SW2 DIL switch to the “OFF” position.

Control Input Options (SW3 & SW “I/V”)

Control input options are connected via the 5V output and “+” and “-” signal terminals. Ensure correct polarity as shown in the CONNECTIONS section.

- **SW3:** For input voltage signals of 0-5V or 0-10V DC, connect to the “+” and “-” SIGNAL terminals.
- **SW3:** For manual control using a 5kΩ, 1W potentiometer, use all three terminals: 5V-O/P, “+”, and “-” SIGNAL terminals.
- **SW “I/V”:** For a 4-20mA input current signal, set DIL switch SW-I/V to “ON,” fit a 270Ω, 0.25W resistor across the “+” and “-” SIGNAL terminals, and set SW3 to 0-5V. Note that SW-I/V is internal, and the cover must be removed to set it, only after disconnecting the power.

The default factory setting is 0-10V (see CONNECTIONS and SPECIFICATIONS sections).



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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.

OPTIONAL EXTRAS

Product Code	Product Description
T30201	Auxiliary transformer for Failsafe alarm 0/240/415 10-0-10V 2VA
A403011	5kΩ, 1W Potentiometer with 0.5m long leads for manual control option
Available on request	Spare HS fuses: 160EET (160A) or 200EET (200A), SCR-type

PRODUCT CODE AND RELATED PRODUCT CODE

Product Code	Product Description
A447412-HV-A	PR3-E-86kW, 120A, 415v, 2/3rds control - Three Phase
A447432-HV-A	PR3-E-105kW, 146A, 415v, 2/3rds control - Three Phase

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