

# 12kW, 18kW and 27kW HVAC RANGE 3-PHASE BURST FIRE POWER CONTROLLER INSTALLATION INSTRUCTIONS

**PR3-E  
SERIES**

X10592

## INTRODUCTION

The PR3 range of thyristor stacks provides full seamless control of three phase resistive loads, using two thirds control technique. Signal control is by a dc signal or manual control via a 5kΩ potentiometer. These burst firing control stacks use fast pulse zero volts switching technology, to minimise flicker and eliminate RFI problems. They also incorporate an automatic resetting temperature trip, integral semiconductor fuses and heatsink. The three models in this build includes the 27kW model, which is forced-air cooled. All have easy access to signal & power terminals for simple

## APPLICATIONS

Suitable for 3-wire, 3-phase floating-star or closed-delta configured resistive loads. This includes the Heating, Ventilating and Air Conditioning (HVAC) market for air curtain applications, but also for furnaces, ovens, dryers and hot plates.

## FUNCTIONS

### Alarm relay functions (3-way terminal – V/free alarm “NO\_NC\_C”)

The alarm circuit has voltage free relay contacts and are rated up to 2A @ 125V ac (RMS) load.

The internal supply to the relay is obtained from the transformer via two 20mm 1A fuses. These are connected to the L1 and L2 phases and therefore the relay and LED can only energise when there is an over-temperature condition, a sensor fault, or a L3 phase loss.

### Over temperature protection

When a heatsink temperature of above 90°C is detected by the sensor, the alarms relay changes state and the LED pulses rapidly. The power to the load will be disconnected and will not return until the temperature drops to 85°C.

### Temperature sensor loss

LED status changes to ON/OFF (fast pulsing) if the sensor fails.

### Phase loss with auxiliary supply

When any one of the three phase inputs are missing, the relay changes state and the LED flashes with ON/OFF bursts of 1.5 seconds. This is only functional with a remote supply (see below).

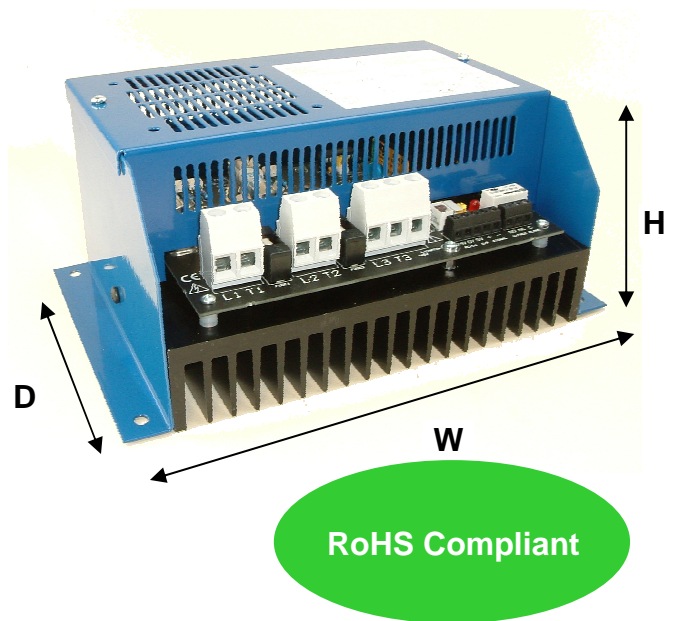
### Fault condition

The default setting of DIL switch (SW1) is in the ON position, the alarm relay will be energised under a fault condition. Changing SW1 to the off position will energise the alarm relay continuously until a fault condition occurs.

### Remote supply

The unit will be factory set for an internal supply (SUPPLY Switch SW3 in the “INT” position). If there is a requirement for the alarm relay and LED to energise when a phase fault condition occurs, then there is provision for an external 24V ac or dc supply (SUPPLY switch SW3 in the “EXT” position).

*NOTE – If the remote supply is utilised, the main (L1, L2 and L3) supply must come on before this supply is switched on.*



## CONNECTIONS

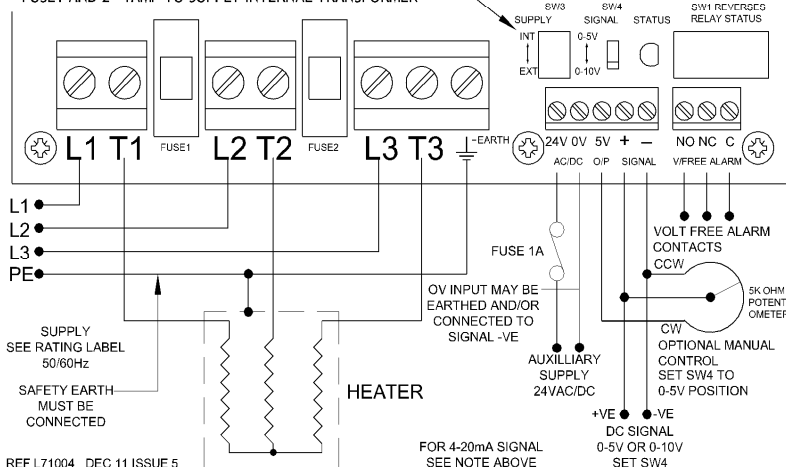
CAUTION:- DISCONNECT MAIN SUPPLY BEFORE COMMENCING ANY SERVICE WORK  
MOUNT THE CONTROLLER WITH THE COOLING FINS IN A VERTICAL POSITION  
ENSURE THERE IS ADEQUATE UNRESTRICTED AIR FLOW THROUGH THE FINS

### STATUS LED CONDITIONS

- VARIABLE BRIGHTNESS, TRACKING CONTROL SIGNAL
- CONTINUOUS SLOW PULSING 1.5 SECS.= PHASE LOSS
- CONTINUOUS FAST PULSING = OVER TEMPERATURE
- ON/OFF FAST PULSING= INTERNAL SENSOR FAILURE

SW3 IN 'INT' POSITION USES INTERNAL 24V TRANSFORMER  
SWITCH TO 'EXT' POSITION FOR EXTERNAL 24V SUPPLY  
FUSE1 AND 2 =1AMP TO SUPPLY INTERNAL TRANSFORMER

RELAY STATUS  
SW1 ON = STANDARD SW1 OFF = REVERSE  
SW2 ON = FAST BURST SW2 OFF=SLOW  
SW - I V CURRENT OR VOLTAGE SIGNAL  
I ON = 4-20mA FIT 270R ACROSS SIG + /-  
AND SET SW4 TO 0-5V  
V ON = 0-5V OR 0-10V DC SIGNAL



## CONTROL OPTIONS GUIDE

### Burst fire control options (SW2)

There are two methods which can be selected to suit specific applications.

With the SW2 DIL switch in the “ON” position it gives fast burst control which is the ‘inhibited flicker’ mode.

With the SW2 DIL switch in the “OFF” position it gives slow burst control, which is basic burst firing mode.

### Control input options (SW4 & SW“I/V”)

These are connected via the terminals 5V o/p and “+” and “-” signal. Ensure correct polarity, as shown in CONNECTIONS section.

[SW4] For input voltage signals of 0-5V or 0-10V dc, use the “+” and “-” SIGNAL terminals.

[SW4] For manual control using a 5kΩ, 1W potentiometer, use all 3 terminals 5V-O/P, and “+” and “-” SIGNAL terminals.

[SW “I/V”] For input current signal of 4-20mA, set DIL switch SW-I/V to “ON”, fit a 270Ω, 0.25W resistor across the “+” and “-” SIGNAL terminals and set SW4 to 0-5V.

**Note:** For 4-20mA signal, a 270Ω resistor is supplied. Factory-set ‘default’ setting is 0-10V.

(See CONNECTIONS and SPECIFICATIONS sections)

## INSTALLATION

### Cooling requirements

This robust stack assembly has an operational temperature of 65°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. The 27kW unit has a built-in fan that switches on when the heatsink gets hot (see SPECIFICATIONS).

### Load considerations

The PR3 series of power controllers are designed for 3-wire, 3-phase floating-star or closed delta configured resistive loads. The PR3 series are 2-leg thyristor controllers and therefore unsuitable for 4-wire, 3-phase with star point to neutral configured loads. For further information on configured loads, see the 'Application circuits' section of our supporting datasheet – APC (ref. X10322).

Unusual heating loads such as Molybdenum, Platinum or Tungsten have a typical, 10:1, hot to cold, resistance ratio and therefore, when cold, draw larger currents than normal.

### Connections

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

**NOTE:** It is factory set for an internal power supply. For alternative volts 'free alarm' supply details see *Functions* section. Please contact our Technical support for further details.

### Fusing

It is recommended that fast acting 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 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.

## SPECIFICATIONS

<b>Power/(current ratings):</b>	12kW (17A); 18kW (25A); 27kW (38A) @ a typical supply of 415V RMS
<b>Input voltage:</b>	400V RMS +/- 10%
<b>Frequency:</b>	50/60Hz
<b>Control input options:</b>	<b>Signal:</b> (using SW4): 0 to 10V dc (set as standard) / 0 to 5V OR <b>Manual:</b> using 5K Potentiometer <b>For 4-20mA signal:</b> set <b>SW -I/V</b> to "ON", fit supplied 270R (0.25W) across SIG.+/- and set <b>SW4</b> to 0-5V. 2A @ 125V ac Max.
<b>Alarms relay circuit rating:</b>	Typically 55 °C (For 27kW model only)
<b>Fan 'switch-on' Temp.:</b>	(Tracking control signal) LED indicator changes <b>intensity</b>
<b>Status indicator:</b>	Trip in temperature @ 90°C, +/- 1°C (LED indicator ' <b>flashes</b> ' continuous fast pulsing) Trip out temperature @ 85°C, +/- 1°C
<b>Over temperature:</b>	SW1 = OFF - Relay is continuously energised (normally closed); trips in fault condition. SW1 = ON - Relay is de-energised (normally open); closes in fault condition. LED indicator ' <b>flashes</b> ' continuous slow pulsing.
<b>Phase loss detection:</b>	LED indicator ' <b>flashes</b> ' on/off fast pulsing.
<b>Sensor loss detection:</b>	LED indicator ' <b>flashes</b> ' on/off fast pulsing.
<b>Cable terminations:</b>	Phase power - 10mm <sup>2</sup> rising clamp terminal block Earth - 10mm <sup>2</sup> rising clamp terminal block Remote supply Auxiliary alarm (relay) 2.5mm <sup>2</sup> rising clamp terminal block Control signal - 2.5mm <sup>2</sup> rising clamp terminal block
<b>Terminal torque settings:</b>	1.2Nm (10mm <sup>2</sup> ) Power terminals only.
<b>Fusing 12 to 18kW:</b>	20A, 30A, High-Speed Semiconductor type, ferrule fuse (10mm ø x 38mm long)
27kW only:	40A High-Speed Semiconductor type, ferrule fuse (14mm ø x 51mm long)
<b>Working temperature:</b>	65°C (maximum operational)
<b>Dimensions:</b>	150mm (D) x 240mm (W) x 100mm (H)
<b>Fixing centres:</b>	4 x 5.5mm ø holes on centres 220mm (W) x 130mm (D)
<b>Weight:</b>	(all models) 2.6kg

**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.

It is essential that a load break switch and a contact breaker is installed in the load supply. The 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.

## RECOMMENDATIONS

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

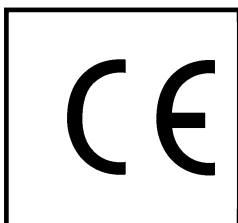
**NOTE:** It is recommended that installation and maintenance of this equipment should be done with reference to the current edition of the I.E.T. (formally I.E.E.) regulations (BS7671) by suitably qualified/trained personnel. The regulations contain important requirements regarding installation and safety of electrical equipment. Specific installers should refer to local and national regulations.

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## ORDER DETAILS

When ordering directly, please use the following stock codes:-

Manufacturer stock code	Product Description	Rating
A437407-HV	PR3-E-12kW	3-phase, 12kW, 17A@415V, 2/3rds control
A437408-HV	PR3-E-18kW	3-phase, 18kW, 25A@415V, 2/3rds control
A437409-HV	PR3-E-27kW	3-phase, 27kW, 38A@415V, 2/3rds control
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 fuses: 20A, 30A or 40A HS SCR-type	



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