

# 6kW HVAC 3-PHASE BURST FIRE POWER CONTROLLER INSTALLATION INSTRUCTIONS

**PR3-E  
SERIES  
X10788**

## INTRODUCTION

This PR3 range of thyristor stack 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 5k $\Omega$  potentiometer. This burst firing control stacks use fast pulse zero volts switching technology, to minimise flicker and eliminate RFI problems, it also incorporates an auto-reset temperature trip, integral semiconductor fuses and heatsink. This model, which is naturally air cooled and has easy access to signal & power terminals for simple installation.

## 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 the switch 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, the switch 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.

## 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.

[**SW3**] For input voltage signals of 0-5V or 0-10V dc, use the “+” and “-” **SIGNAL** terminals.

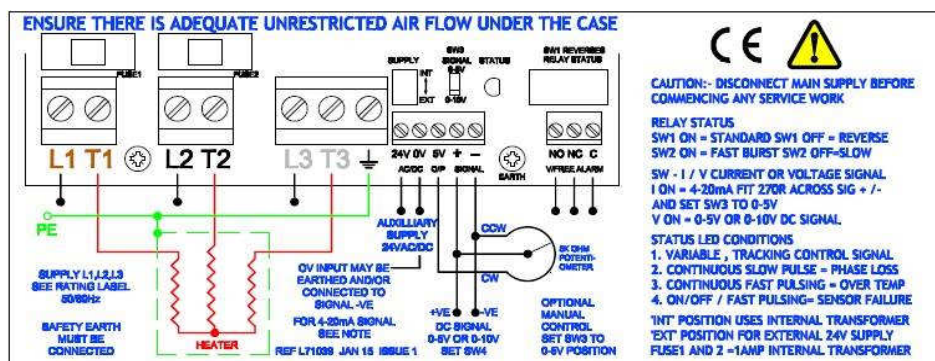
[**SW3**] For manual control using a 5k $\Omega$ , 1W potentiometer, use all 3 terminals **5V-O/P**, and “+” and “-” **SIGNAL** terminals.

[**SW “I/V”**] For input current signal of 4-20mA, set DIL switch **SW-I/V** to “ON”, fit a 270 $\Omega$ , 0.25W resistor across the “+” and “-” **SIGNAL** terminals and set **SW3** to 0-5V.

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

(See **CONNECTIONS** and **SPECIFICATIONS** sections)

## CONNECTIONS



## 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. This unit has a built in thermal trip that turns the power off when the heatsink gets too 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 large 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>	6kW (8A) controlling 2 phases of 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 SW3): 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>SW3</b> to 0-5V.
<b>Alarms relay circuit rating:</b>	2A @ 125V ac Max.
<b>Fan 'switch-on' Temp.:</b>	Typically 55 °C (For 27kW model only)
<b>Status indicator:</b>	(Tracking control signal) LED indicator changes <b>intensity</b>
<b>Over temperature:</b>	Trip in temperature @ 90°C, +/- 1°C (LED indicator ' <b>flashes</b> ' continuous fast pulsing) Trip out temperature @ 85°C, +/- 1°C SW1 = OFF - Relay is continuously energised (normally closed); trips in fault condition. SW1 = ON - Relay is de-energised (normally open); closes in fault condition.
<b>Phase loss detection:</b>	LED indicator ' <b>flashes</b> ' continuous slow 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 6kW:</b>	16A, High-Speed Semiconductor type, ferrule fuse (6mm ø x 32mm long)
<b>Working temperature:</b>	65°C (maximum operational)
<b>Dimensions:</b>	105mm (D) x 193mm (W) x 68mm (H)
<b>Fixing centres:</b>	2 x 5mm ø holes on horizontal centre line at 178mm (W)
<b>Weight:</b>	770grammes

**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).

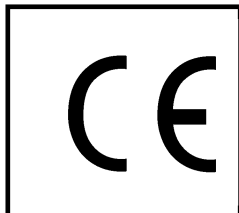
**NOTE:** It is recommended that installation and maintenance of this equipment should be done with reference to the current edition of the I.E.T. (formally I.E.E.) regulations (BS7671) by suitably qualified/trained personnel. The regulations contain important requirements regarding installation and 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
A437405-HV	PR3-E-6kW	3-phase, 6kW, 8A@415V, 2/3rds control
T30201	Auxiliary transformer for 'Failsafe' alarm	0V-240V-415V / 10V-0V-10V (2VA)
A403011	Potentiometer with 0.5m long leads for manual control option	5kΩ, 1W
Available on request	Spare fuses	16A SCR-type



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