

CFR Gas Burner Control

401300 - CFR 230VAC

401400 - CFR 110VAC

PACTROL

CONTROLS

technology factfile



A compact, self-contained flame monitor for multi-burner controls and other applications. It replaces the Pactrol P05 flame monitor.

Available in two voltages:-

401300 - CFR - 230VAC

401400 - CFR - 110VAC

1. DESCRIPTION

The Pactrol CFR is a self contained flame monitor for all types of gas burner. Primarily intended for flame supervision in multi-burner applications in conjunction with the Pactrol CMM controller, it can be used in a wide variety of custom-built burner control systems.

The flame detection system used is flame rectification, but ultra-violet sensing is possible with the addition of the special Pactrol UV/UVV sensing head.

A double-break changeover contact is provided for connection to external control equipment, and a "Flame-On" indicator lamp, which also doubles as a first "Flame-Out" indicator, is fitted.

The unit is protected by an internal fuse and surge-voltage arrestor

2. CONSTRUCTION

Pactrol CFR flame monitors are double-insulated and do not require an earth connection, although burners used on flame rectification must be earthed.

The control consists of an AC filter circuit, followed by an amplifier/discriminator, and a thyristor operated 4-pole relay. All the components are mounted on a printed circuit panel which slots into the moulded outer-case, and is retained by a snap-in cover plate. The connection diagram, showing a simplified internal wiring plan, is printed on the cover plate. The edge of the printed circuit panel locates in the socket base to connect to wiring terminals. Conduit or cable entries are provided in the base, which has the provision for additional spare terminals for the connection of ancillary controls.

Technical Data

Electrical Supply - * Model dependant

voltage 401300 220(- 15%) ... 240 (+ 10%) V

voltage 401400 110(- 15%) ... 120 (+ 10%) V

Frequency 50 - 60 Hz

Consumption 1.2 VA

Internal Fuse link 1A

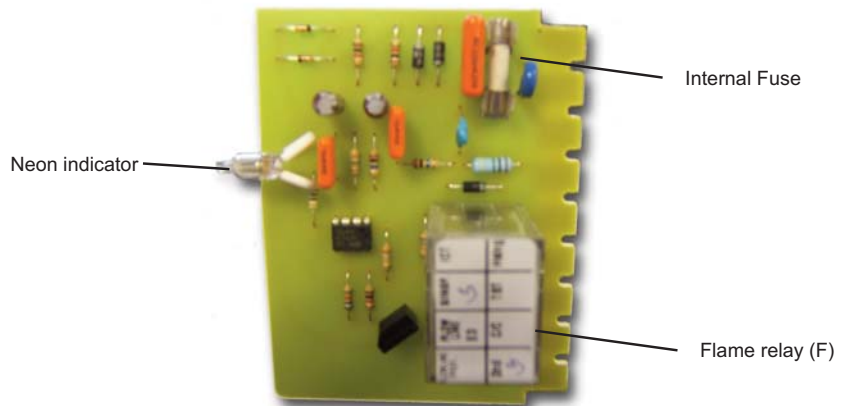
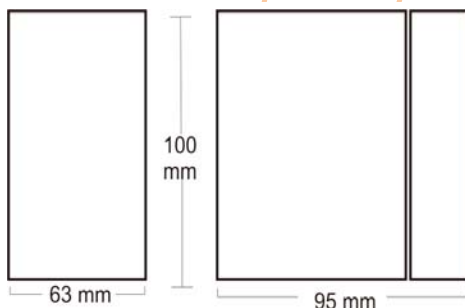
Ambient Temperature -5 /+65 Deg C
Humidity 95% RH Max
Mounting Position Any

Flame Sensing Flame Rectification
Nominal Flame Current 8 uA
Minimum Flame Current 2 uA
Response Time Flame-on 100 ms
Response Time Flame-off 75 ms
Open circuit probe Voltage 180 V
Source Impedance at 50 Hz, 4 Mohms
Short-circuit current 50 uA
Ultra Violet Pactrol UV/UVV (Optional)

Switching capacity
maximum switched load, contacts 5,6 and 7,8 at 240V, 2.0 A

External fuse rating 5.0 A

Weights:
control, with base 255g
control, without base 142g

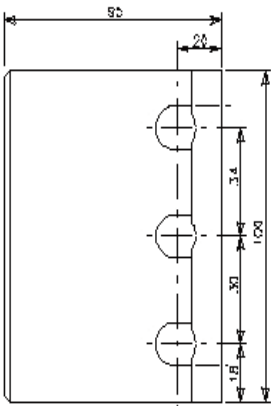


3. OPERATION

NB. When the Pactrol CFR is used for flame supervision in a burner control system, the electrical supply must be established before any ignition sequence commences. This ensures that any flame or flame simulation fault which is present prior to ignition is correctly detected by the safe-start check which must be carried out by the burner control system.

The unit senses a flame by applying a voltage between sensing probe and burner (via neutral and earth) the flame, when present, will pass an electric current which will be larger in one direction of current flow than the other. This produces a net dc voltage on the flame probe, to which the control responds. The ac component of the probe voltage is rejected by the ac filter circuit, and the dc voltage is applied to the input of a discriminator. If the applied voltage is greater than the pre-determined level, the discriminator triggers a thyristor to energise the 4 pole relay. Loss of flame causes the flame rectified dc voltage to decay until it falls below the discrimination level and the relay is switched off.

The relay contacts are arranged to provide a double break changeover, by connecting two poles back to back, and to switch the neon indicator lamp between the supply (which is flame sensed) and the remote indicator line (with no flame) The remote indicator line is used in multi-burner applications, in conjunction with the Pactrol CMM control, to provide an "all-flames present" signal to the controller, and a "first flame out" indication on the CFR. This line, which is common to all flame monitors is connected to a dc supply within the CMM control. When the indicator on any CFR unit is connected to it, that indicator will be illuminated, but at the same time, drops the dc voltage on the line below the striking voltage of the other indicators, and extinguishes the lamp of the CMM. Thus, whichever indicator is first switched to the remote line remains glowing to indicate the unit which first detected the loss of flame.



4 INSTALLATION

NB. Before installing or replacing any control, check that the type number is correct for the application. When Pactrol CFR units are used in conjunction with the Pactrol CMM control, make sure that these two units are not inadvertently interchanged.

To separate the control and base, fully loosen the two securing screws, and carefully pull the control and base apart. The base should be mounted on a flat surface by means of the two M4 clearance holes. Do not overtighten the mounting screws. There are two knock-outs in the bottom of the base for cable entry, and one or more of the rubber grommets may be removed for side entry.

The supply to the Pactrol CFR should be fused at 5A, and be of the correct voltage and polarity with respect to neutral. When used in conjunction with the Pactrol CMM control on multi-burner installations, the wiring instructions in the CMM data-sheet must be observed.

When the flame monitor is used in customer designed systems, the normally closed contacts of the relay (terminal 7 and 8) should be connected so that the load-relay of the external control equipment is energised through them, prior to ignition. The normally open contacts (terminals 5 and 6) are used to hold the load-relay energised once the flame has been sensed.

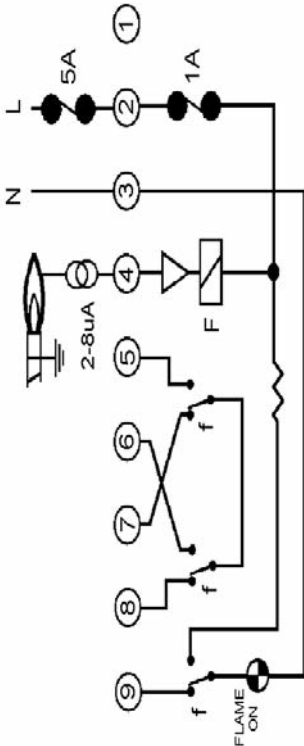
The remote indicator line (terminal 9) is not normally used.

5. TROUBLE-SHOOTING

NB. Isolate from the electrical supply before removing the control. With the cover removed, the control presents potentially live connections, and operation in this condition should only be attempted by suitably qualified personnel.

Because there is no earth connection to the control, the flame sensing circuit relies on the connection normally provided between neutral and earth on single phase supplies. It is therefore important for the proper operation of the control that the supply has an established neutral to earth relationship, and that the burner(s) is earthed to the supply. If an isolated (2-Phase) supply is all that is available, a resistor (of at least 1 megohm 400 V rating) can be connected between the neutral terminal and earth to provide a return path for the flame current. Do not rely on pipework to provide an earth connection to the burner. Thread tape or jointing compound can effectively insulate a burner. If the flame does not have a large area of contact with the burner, sensing may be affected by the voltage from the ignition transformer. Reversing the input connections to the transformer or substituting an electronic spark generator may help in this case.

WIRING DIAGRAM



Ultra violet sensing can only be accomplished by the addition of the Pactrol UV/VUVV head. Other makes of UV head are not suitable for use with Pactrol controls, nor are Pactrol UV heads suitable for use with other makes of control. Although the control will operate with reduced supply voltage, the UV head requires the supply to be within 15% of nominal.

It is possible to plug the printed circuit panel into the base, with the outer cover removed. In this way, operation of the relay can be observed. By connecting a rectifier-diode between the probe connection and earth (or neutral) with the cathode connection (marked with a band or chamfer) to earth, the flame relay will operate. The flame relay must be energised before any ignition attempt is made.

If the control fails to respond to the diode "flame", check the internal fuse. This will only blow in the event of component failure, and the control must, therefore be replaced. Do not attempt to repair a blown fuse, as this will invalidate the manufacturers warranty.

Frequent removal of the control from its base can result in the base-contact springs failing to make good contact with the edge of the printed circuit panel. Increasing the bow in the spring by carefully pressing down on the top edge should cure this problem.

Controls which are suspected of being faulty should be returned to the supplier for examination.

It is helpful if brief details can be supplied regarding the suspected fault, and the application.

to take advantage of any warranty, controls must be returned in good condition and must not have been tampered with.

The optional UV sensing head is available as follows:-

- 401400 - UV Sensor - 240V
- 401500 - UV/V Sensor - 110V

Contact Pactrol for pricing and availability or visit www.pactrolsolutions.com to purchase online

**White
Rodgers**

EMERSON
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New models are continuously under development.
For further information visit our Website www.pactrol.com or contact the sales team at sales@pactrol.com Pactrol Controls reserve the right to change the specification of this product range without notice.

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