

CSM Control

Semi-automatic,
industrial gas control



technology factfile

Pactrol's CSM controls are designed to provide ignition of a gas burner under remote, manual control, while providing automatic shutdown and lockout in the event of any subsequent flame failure.

These controls are particularly applicable to industrial processes, having approval for use with both 230VAC and 110VAC power supplies.

These controls are suitable for use with direct main-burner ignition or pilot burner ignition systems, providing that the requirements for maximum energy release are observed. Ignition can be via a high energy, high voltage generator or lighting torch.

The control has push buttons for START and STOP functions, and a "flame on" indicator light. Flame supervision is by flame rectification, with the option of ultra-violet sensing by the addition of Pactrol's UV head. The control is intended for applications where the burner is not left running unattended for long periods. It is not suitable for permanent pilot systems.

These controls have BG Approval for use in the UK.



Typical applications

- Industrial Kilns
- Industrial furnaces
- Industrial ovens

key features

- Semi-automatic control
- Well-proven controls
- Integral flame detection
- Dual electrode operation
- Non-volatile lockout function
- Single or 2-stage ignition sequences
- Strong, flame retardent enclosure
- Non-reversible, screw-based connector

troubleshooting

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 2 megohm, 1250v 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.

Ultra-violet sensing can only be accomplished by the addition of the Pactrol UV 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.

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

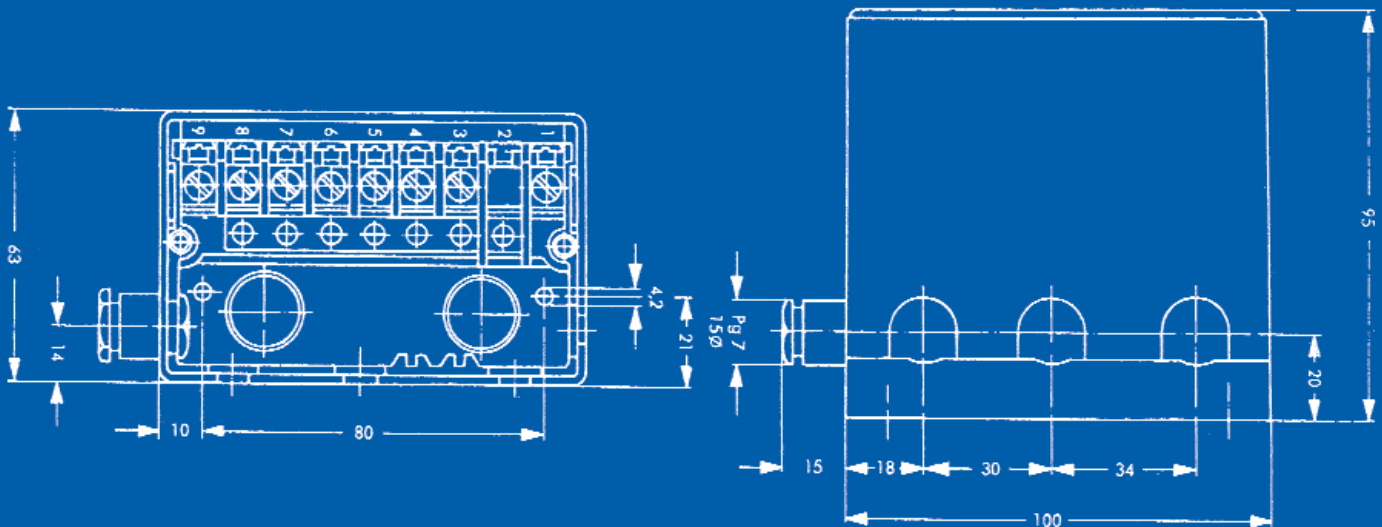
relay must be de-energised before the load-relay can be energised. If the load-relay will not operate when the START button is pressed, check the internal fuse. This fuse protects the control against a short-circuit on the valve or ignition outputs, and these and the associated wiring should be carefully checked before replacing the fuse. Replacement fuses must be of the correct type and rating.

NB The manufacturers warranty is invalidated if an incorrect fuse is fitted.

Frequent removal of a 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.

housing dimensions



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To keep abreast of current developments, controls may be subject to change without notice. Such changes may affect the accuracy of information contained in this data-sheet, and the manufacturers advice should be sought if any problems arise.

Technical specification

Electrical Supply:

Voltage	230(-15%)...240(+ 10%) V
Frequency	50...60Hz
Consumption	3 VA
Internal fuse	20mm HRC 2 A
Ambient temperature	-5... +65°C
Humidity	maximum, 95 % RH
Mounting position	any

Flame sensing:	flame-rectification
nominal flame current	5 μ A
minimum flame current	2 μ A
response time	flame-on, 100 ms
response time	flame-off, 1 s
open-circuit probe voltage	180 V
source impedance	at 50 Hz, 4 Mohms
short-circuit current	50 μ A
Ultra-violet:	Pactrol UV head (optional)

Switching capacity:	
start-gas valve (GV1)	0.5A
ignition transformer (Z)	1.5A
main-gas valve (GV2)	1.5A
warming-lamp (A)	0.5A
Associated controls and external fuse	5A

Weights:

control, with base	374gm
control, without base,	261gm

Note: Please contact Pactrol for details of available options and variants.

operation

NB The electrical supply must be established before the START button is pressed.

Operation of the START button (I) energises the load-relay (C) provided that the flame-sensing relay (F) is not already energised. Energising the load-relay switches off the warning-lamp (A) and switches on the start-gas valve (GV1) and ignition transformer (Z). When the gas is ignited, the flame provides a rectifying path between the flame-sensing electrode and the earthed burner. The dc voltage produced by this flame-rectification is amplified to operate the flame-relay. This switches on the flame indicator-lamp, and holds the load-relay energised. The START button is then released, switching off the ignition transformer and switching on the main-gas valve (GV2), leaving the load-relay held via the flame-relay.

If the flame is extinguished or the STOP button (O) is pressed,

both relays will be de-energised, switching off the gas valves and flame indicator-lamp, and switching on the warning-lamp. The START button should not be operated again until sufficient time has been given to allow any unburnt gases to disperse.

For applications in which a lighting-torch is used in place of an ignition transformer, the torch should be applied to the burner just after the START button is pressed. If the button is released before ignition has taken place, the torch should be drawn clear of the sensing electrode before another attempt is made.

As the duration of pre-purge and ignition safety times are under the operator, operating instructions must be given which take into account the time required to clear the combustion chamber of any gas, and the maximum permitted energy release before ignition.

installation instructions

NB Before installing or replacing any control, check that the type number is correct for the application.

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.

WIRING

The supply should be fused at 5A and must be of the correct voltage and polarity with respect to Neutral.

Temperature controls should be wired between the control and main gas valve (GV2).

The flame sensing probe should be a well insulated electrode of heat resisting steel. It should be placed with the tip within the outer visible mantle above the flame. For pilot-burner systems, the probe

should be in the junction of pilot and main burner flames, and both burners must be earthed. The flame current can be measured with dc microammeter, and is normally about 3 to 5 microamps with a pilot flame, and 5 to 8 microamps with a main flame. The control will sense currents of 1 or 2 microamps, but as the current will fluctuate, loss-of-flame shutdowns may be frequent. The wiring between the control and sensing probe should have good quality insulation suitable for the temperature encountered. Long cable runs should be made in a conduit separate from other wiring. Co-axial screened cable is not recommended.

NB Under no circumstances should the ignition spark be allowed to jump to the sensing probe, and there must be no possibility of tracking between the high-voltage wiring and sensing probe wiring.

NB: If a UV flame viewing head is used with this control it is important that the head is sited in a position where it cannot "see" the source of ignition.

wiring instructions

Terminal	Function
1	Flame probe input
2	Not connected
3	Not connected
4	Alarm output
5	Gas Valve GV2 output
6	Ignition supply output
7	Gas Valve GV1 output
8	Neutral input
9	Live input

