



CATALOGUE PRODUCTS

- **CSA**
- **CSI**
- **CSM**
- **CSS**
- **CSS2**
- **P16**
- **P19**
- **P20**
- **P25**
- **UV DETECTOR**

CSA Range

Full Sequence Control in an IP40 enclosure



technology factfile

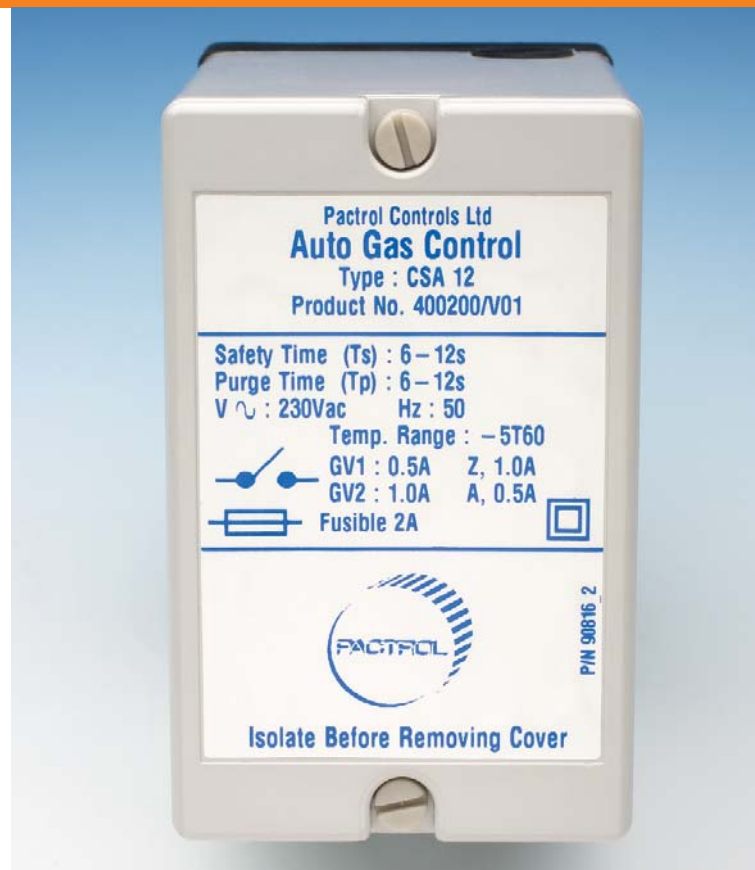
The Pactrol CSA range of full sequence controls is fully approved and proven for use on gas-fired appliances, particularly where an IP 40 enclosure is required.

The CSA range is particularly useful in many commercial and industrial appliances, where access to the control is required without the use of tools and a remote spark ignition source is in use.

The CSA range of full sequence controls is ideal for use with industrial atmospheric burners, with either single or 2-stage ignition sequences. The range offers volatile lockout and has outputs to supply a remote spark generator and 1 or 2-stage gas valves.

All types go to volatile lockout on failure to ignite or flame failure. Lockout is reset by interruption of the electrical supply for more than 5 seconds. If probe detection is not feasible, then all Pactrol's CS(X) range of controls can be used in conjunction with UV head (Part No. 401500)

The CSA range is well proven and fully meets the requirements of the European Gas Appliance Directive.



Typical applications

- Packaged burners
- Industrial furnaces and kilns
- Industrial appliances
- Commercial boilers
- Commercial air heaters
- Commercial water heaters

key features

- Fully protected IP40 enclosure
- Plug-in base with screw connections
- Simple volatile lockout
- Integral flame detector and remote ignition output
- Compatible with Pactrol's UV head
- Dual electrode operation
- Single or 2-stage ignition sequence
- Compact size
- CE certificated to EN 298

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.

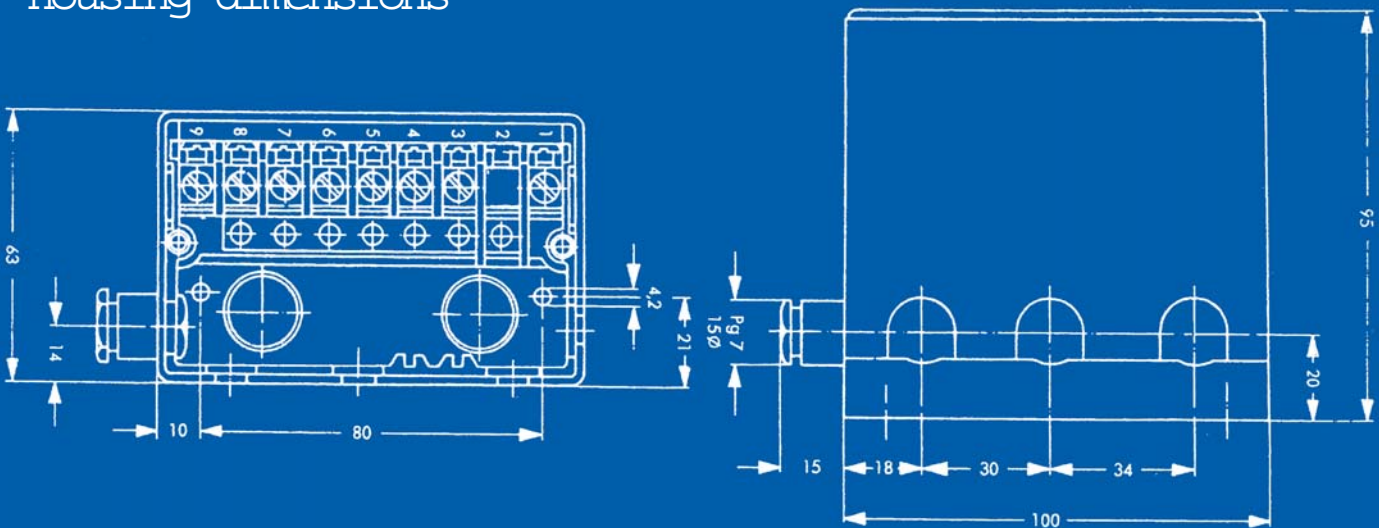
By connecting a rectifier-diode between the probe connection and earth (or neutral), with the cathode connection (marked with a band or chamfer) to earth, the flame relay will operate. The flame relay must be de-energised during the whole of the pre-purge period, at the end of which the timing relay will be energised. If a flame is not sensed during the time of operation of the timing relay,

the relay will de-energise. If the timing relay operates, but gas valves and ignition transformer do not, check the 2A fuse. This fuse protects the control against a short circuit on the valve or transformer 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 and after replacing, check the operation of the control is satisfactory and the sequence is correct.

NB The manufacturers warranty is invalidated if an incorrect fuse is fitted. Problems may be experienced with pilot burner ignition if insufficient time is allowed during the ignition safety period to establish a flame. This is usually evident if the control is operated after a long shut down, during which air will have diffused into gas pipework down stream of the valves and will require purging before ignition can take place. Provided that the requirements for maximum energy release are observed, the ignition safety time could be extended to reduce the risk of ignition failure, by substituting a control with longer timed-periods. The approval of the appropriate Test House must be sought before making such a substitution on an approved appliance.

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.

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 | 5 VA |
| Internal fuse | 20mm HRC 2 A |
| Ambient temperature | -5... +65°C |
| Humidity | maximum, 95 % RH |
| Mounting position | any |
| Timing: CSA6: | |
| Pre-purge (Tp) | nominal, at 240V, 5 s |
| Ignition safety (Ts) | 4.5 ± 1.5 s |
| Timing: CSA12: | |
| Pre-purge (Tp) | nominal, at 240V, 10 s |
| Ignition safety (Ts) | 9 ± 3 s |
| Timing: CSA24: | |
| Pre-purge (Tp) | nominal, at 240V, 20 s |
| Ignition safety (Ts) | 18 ± 6 s |
| Flame sensing: | |
| nominal flame current | flame-rectification |
| minimum flame current | 5 µA |
| response time | 2 µA |
| response time | flame-on, 100 ms |
| open-circuit probe voltage | flame-off, 1 s |
| source impedance | 180 V |
| short-circuit current | at 50 Hz, 4 Mohms |
| Ultra-violet: | 50 µA |
| Switching capacity: | Pactrol UV head (optional) |
| Start-gas valve (GV1) | 0.5A |
| Ignition transformer (Z) | 1.0A |
| Main-gas valve (GV2) | 1.0A |
| Warning-lamp (A) | 0.5A |
| Associated controls and external fuse | 5A |
| Weights: | |
| control with base | 290gm |
| control without base | 177gm |

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

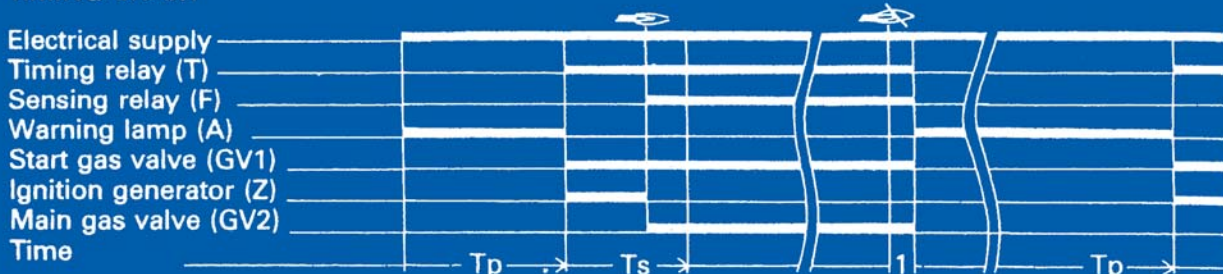
operation

To start the ignition sequence, the electrical supply is connected to the control. The sequence commences with a pre-purge period (Tp) during which both relays are de-energised and the warning-lamp output (A) is switched on. Provided that the flame relay (F) remains de-energised throughout, the pre-purge period ends with the timing relay (T) being energised, and the ignition safety period (Ts) commences. The operation of the timing relay switches off the warning lamp 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 off the ignition transformer, switches on the main-gas valve, and holds the timing relay energised. If ignition has not taken place by

the end of the ignition safety time, the timing relay will be de-energised, switching off the start-gas valve and ignition transformer, and switching on the warning lamp. Another ignition attempt will only be made if the electrical supply is interrupted for at least 1 second.

If the flame is extinguished after the end of the ignition safety time, both relays will be de-energised, closing both gas valves, and switching on the warning-lamp. Re-ignition will not take place unless the electrical supply is interrupted for at least 1 second.

TIMING CHART



installation instructions

NB Before installing or replacing any control, check that the type number is correct for the applications. Never use a control which provides a longer ignition safety time than the one with which the appliance was approved.

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 two M4 clearance holes. Do not over tighten 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

'Comfort' controls such as thermostats should be connected in the Line supply to terminal 9. This supply should be fused at 5A and must be of the correct voltage and polarity with the respect to Neutral, Overheat or other 'limit' controls may, if desired be connected between the control and the start-gas valve (GV1) or in the common return from both gas valves, to lock-out the control in the event of a limit condition. It is not recommended that the control is wired for permanent-pilot operation with 'comfort' controls operating the main gas valve. The valve controlling start-gas (either to a pilot, or the main burner at reduced gas rate) is connected to the GV1 position, with the main or full-rate gas valve

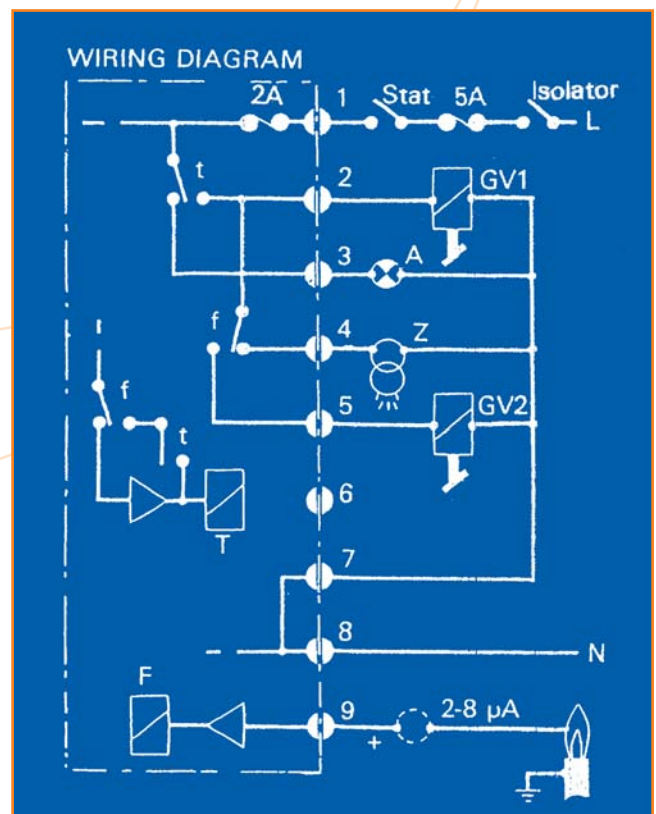
at GV2. If the main burners is to be ignited directly at full gas rate, the gas valve will be connected in the GV1 position.

The flame sensing probe should be 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 a 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 to 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 separate from other wiring. Co-axial screened cable is not recommended.

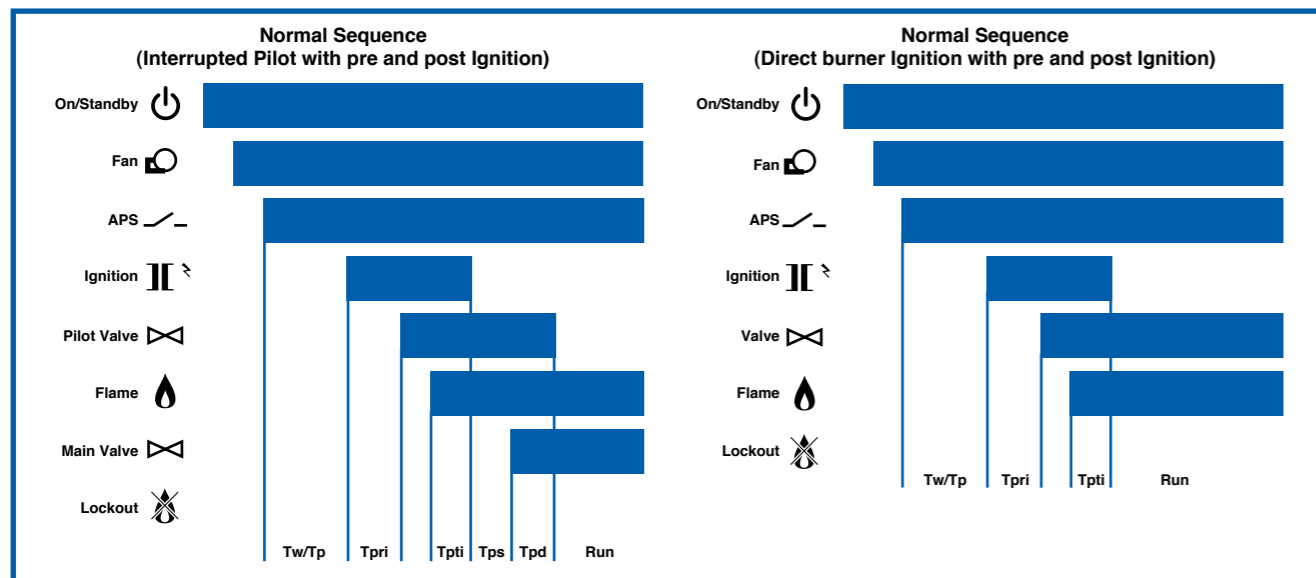
NB Under no circumstances should the ignition spark be allowed to jump to the sensing probe, and there must be no possibility of tracking between the high-voltage wiring and sensing probe wiring.

wiring instructions

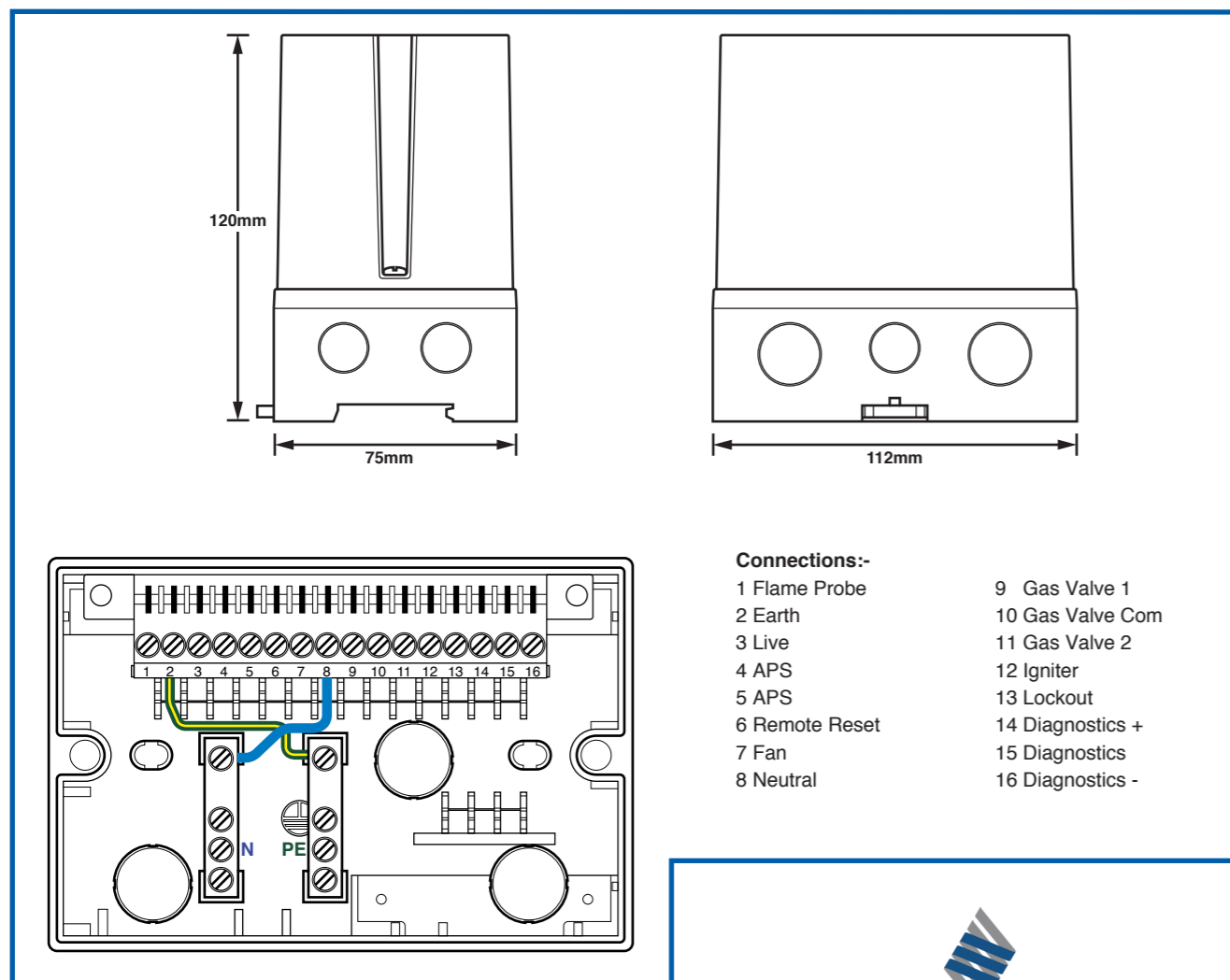
| Terminal | Function |
|----------|--------------------------|
| 1 | Live input |
| 2 | Gas Valve GV1 output |
| 3 | Alarm output |
| 4 | Ignition output |
| 5 | Gas Valve GV2 output |
| 6 | Not connected |
| 7 | Neutral valve connectors |
| 8 | Neutral input |
| 9 | Flame probe input |



SYSTEM OPERATION SEQUENCE (CONTINUED)



MECHANICAL DETAILS



Pactrol Controls Limited reserve the right to change the specification of this product range without notice.

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CSI SERIES

A RANGE OF ADVANCED FULL SEQUENCE CONTROLLERS FOR INDUSTRIAL APPLICATIONS

Certified to EN298:2003

TYPICAL APPLICATIONS

The CSI range of controls is designed to meet the exacting standards of all industrial users, where safety, performance, reliability, and robust construction are paramount. Pactrol's proven record in safe and reliable digital design has been combined with a comprehensive array of options. Packaged in a sturdy housing, the control units are suitable for a wide range of industrial applications including:

- Large ovens
- Industrial process dryers
- Kilns
- Furnaces

KEY FEATURES

- Suitable for Continuous and non-Continuous Operation
- Self Checking Flame Detector
- Non-phase sensitive
- Intermittent Pilot, Interrupted Pilot or Direct Burner Ignition
- Multiple Ignition Attempts
- Digital Timing
- Atmospheric or Fanned (with or without air proving)
- Air Proving (single pole contact)
- Volatile or Non-volatile Lockout
- Alarm Output
- Remote Reset (reset via switched neutral allowing several units to be connected to a common reset line)
- Front panel status (on/standby, lockout, flame)
- Front Panel On/Standby selector
- Front panel Reset
- IP44 housing
- -15 to +70°C operating range
- Separate base with wiring terminals
- CE Approval

OPTIONS

- UV flame sensor
- USB Diagnostics interface
- Integral spark generator
- Other options available on request

HOUSING

The CSI is supplied in a two part housing, the base is detachable and includes all the connections needed to wire the control to the appliance. The housing dimensions are H 120mm X L 112mm X W 75mm. The housing offers IP44 protection when installed with suitable cable glands/seals.

The base includes four M12 (Pg9) and three M16 (Pg11) gland knockouts around the edge and three cable entry knockouts in the bottom. The control can be mounted using an integral DIN rail clip or using two screws through knockout holes in the base. Slotted mounting holes with allow easy replacement of existing controls (70...80mm centres).



PACTROL
CONTROLS

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PACTROL
CONTROLS

TECHNICAL SPECIFICATION

| | | |
|--------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------|
| Supply | Voltage Options | • 230V~ +10%/-15% • 120V~ +10%/-15% |
| | Frequency | 50/60Hz |
| | Consumption | < 1W (Standby) |
| | Fuse | 4A T HRC (ceramic slow-blow) |
| Ambient | Temperature | -15°C...+70°C, |
| | Humidity | 0...95%RH (Condensing when installed with suitable cable glands) |
| Housing | Dimensions | H 120mm, L = 115mm, W = 75mm |
| | IP rating | IP44 (when installed with suitable cable glands) |
| | Mounting | Flush or DIN clip |
| Ignition | External | • Switched live 0.5A output |
| | Internal Spark Sequence | • >25kV, >8mJ (30pF load) Pre and post ignition sequence timers |
| Flame Detector | Probe Type | Flame ionisation (measurement range 0...10µA) |
| | Sensitivity options | • 0.4µA • 2µA • 4µA The flame detector is self checking (suitable for continuous operation) |
| Burner | Valving Type | • Pilot (intermittent) • Pilot (Interrupted) • Direct (1 stage) • Atmospheric • Fanned (with APS) • Fanned (no APS) |
| | Sequence | Ignition attempts Programmable (up to 5) Timings All timings are factory programmable |
| Loads | Total Load | 230V~ 4A |
| | Fan | 230V~ 2A |
| | Gas valves | Pilot = 230V~ 2A, Main = 230V~ 2A |
| | Lockout | 230V~ 1A |
| Lockout | Type | • Non-volatile • Volatile |
| | Reset options | • Local pushbutton • Remote (switched N, max cable length 100m) |
| Standard features | Diagnostics | Local (via front panel) Service/repair diagnostic port (access to base required) |
| | Optional features | USB Computer interface (option kit) UV sensor kit |

SYSTEM OPERATION SEQUENCE (NORMAL IGNITION)

Intermittent Pilot

With power applied to the control, switch from standby to on via the pushbutton on the front pane (the indicator turns from red to green). Note that the control latches the on/standby status and, in the event of loss of power, restoring the supply will return the control to the last state.

The APS (on fanned models) is safe-start tested before the fan is energised. Air flow is then proved via the APS contact before the combustion chamber is purged (Tp). At the end of the purge time the igniter is energised for the pre-ignition time (Tpi). The pilot valve is opened after the Tpi has expired and a trial for ignition is made. On successful ignition the igniter remains energised for the post ignition time (Tpti). After the post ignition period a pilot stabilisation timer (Tps) delays the opening the main valve to ensure the pilot flame is stable.

During the ignition sequence several flame guard checks take place to ensure that the flame status is correct.

Interrupted Pilot

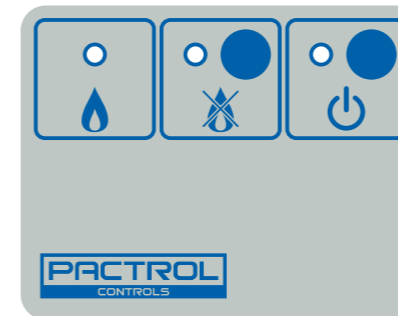
The sequence is as for the intermittent pilot until the post ignition timer (Tps) has finished, at this point the main valve opens and a Pilot delay timer Tpd period is entered, after which the pilot valve is turned off.

Direct Burner Ignition

For direct burner ignition pilot valve output is used for the main valve. The main valve output is not present.

Atmospheric Burners

The sequence is as shown but the fan and APS are not fitted and there is a delay between switching on and the sequence starting (Tw).



Fascia

The fascia has three status LEDs (Power, Lockout and flame) and two pushbuttons (On/standby and Lockout Reset).

Pressing the Power pushbutton will toggle between ON and STANDBY. In standby mode the Power indicator is red, in ON mode the indicator is green.

If the control is in lockout then the Lockout indicator will illuminate red. Lockout can be reset either via the pushbutton or via the remote reset terminal (switched neutral).

A flame indicator (blue) flashes during ignition and illuminates when the burner lights.

Ignition Options

A pre-ignition timer allows the igniter to be switched on before opening the gas valve, a post-ignition timer keeps the igniter on after a flame is detected to allow the flame to stabilise.

Internal Spark Igniter

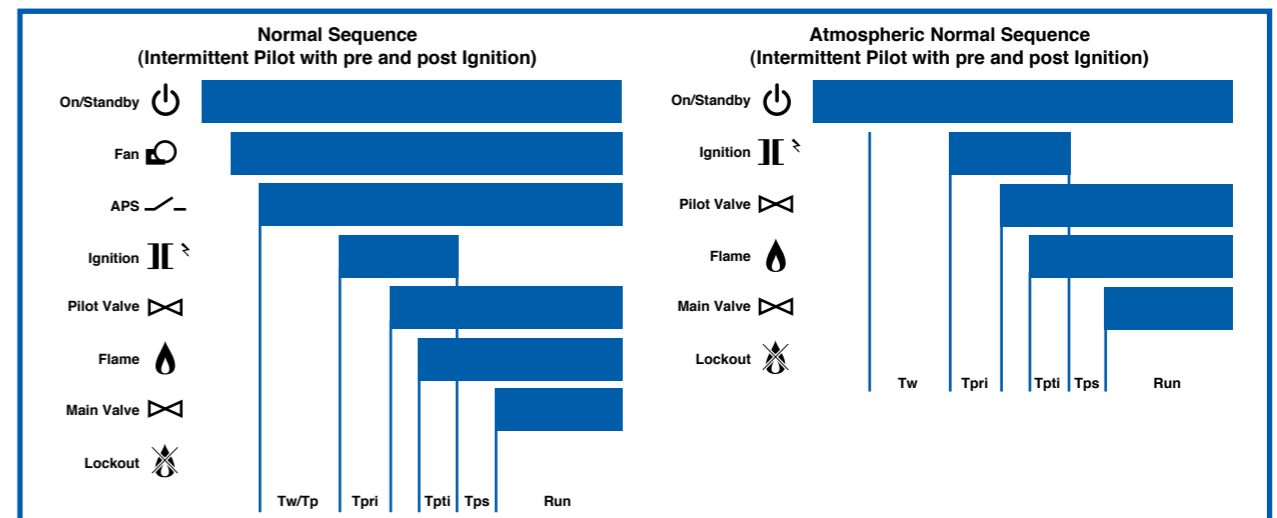
An optional internal spark igniter is available

CONTINUOUS DEVELOPMENT

New models are continuously under development. For further information visit our Website www.pactrol.com or contact the sales team sales@pactrol.com

Pactrol Controls reserve the right to change the specification of this product range without notice.

SYSTEM OPERATION SEQUENCE



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

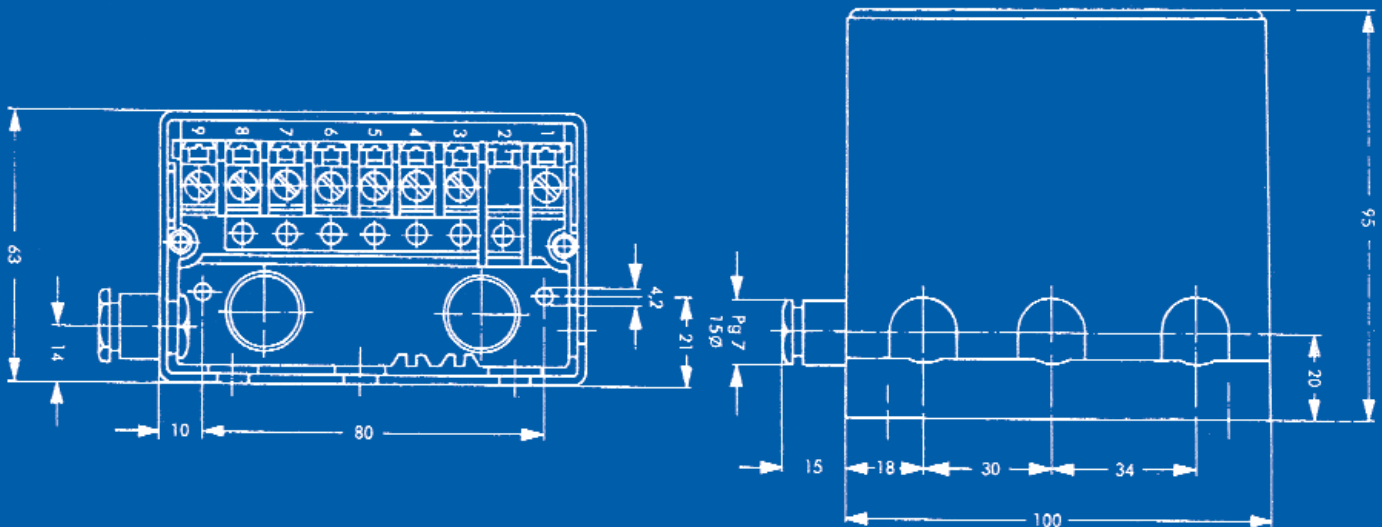
relay must be de-energised before the load-relay can be energised. If the load-relay will not operate when the START button is pressed, check the internal fuse. This fuse protects the control against a short-circuit on the valve or ignition outputs, and these and the associated wiring should be carefully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



A division of White-Rodgers



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 |
| warning-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

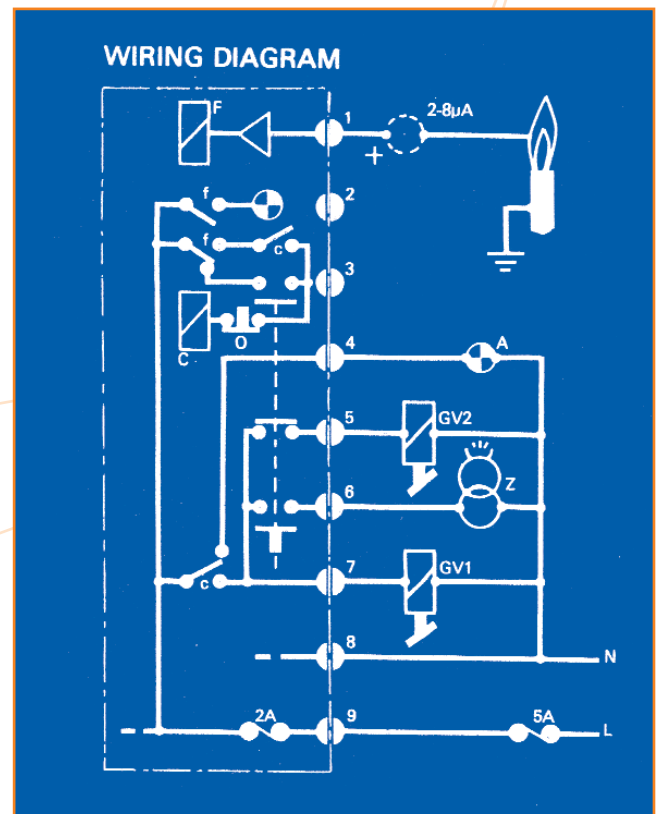
should be in the junction of pilot and main burner flames, and both burners must be earthed. The flame current can be measured with dc microammeter, and is normally about 3 to 5 microamps with a pilot flame, and 5 to 8 microamps with a main flame. The control will sense currents of 1 or 2 microamps, 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

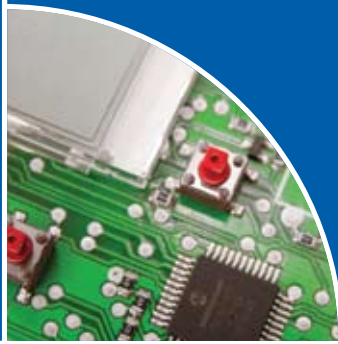
| Terminal | Function |
|----------|------------------------|
| 1 | Flame probe input |
| 2 | Not connected |
| 3 | Not connected |
| 4 | Alarm output |
| 5 | Gas Valve GV2 output |
| 6 | Ignition supply output |
| 7 | Gas Valve GV1 output |
| 8 | Neutral input |
| 9 | Live input |



CSS 2 SERIES

FULL SEQUENCE CONTROLLERS FOR
THE IGNITION AND MONITORING OF
ATMOSPHERIC GAS BURNERS

Certified to EN298:2003



TYPICAL APPLICATIONS

The **CSS 2** family of advanced, cost-effective, gas safety controls is designed to satisfy the exacting control needs of a wide range of commercial appliances, where a fully enclosed, IP40 construction is essential. Pactrol's proven record digital design has been applied to this comprehensive range of commercial controls units, suitable for a wide range of applications including:

- Catering appliances
- Commercial boilers
- Space heaters

KEY FEATURES

- Intermittent Pilot or Direct Burner Ignition
- Digital Timing
- Phase sensitive flame detector
- Integral spark generator
- Single or dual probe operation
- Volatile or Non-volatile Lockout
- Alarm Output
- Remote Reset (switched neutral allowing common reset line)
- Front panel status (flame/diagnostics)
- Separate base with wiring terminals
- CE Approval

OPTIONS

- UV flame sensor
- Other options available on request

HOUSING

The CSS 2 is supplied in a two part housing, the base is detachable and includes all the connections needed to wire the control to the appliance.

The housing dimensions are H 120mm X L 112mm X W 75mm.

The housing offers IP40 protection.

The base includes four M12 (Pg9) and three M16 (Pg11) gland knockouts around the edge and three cable entry knockouts in the bottom.

The control can be mounted using an integral DIN rail clip or using two screws through knockout holes in the base (slotted mounting holes allow 70...80mm centres for easy replacement of existing control).



PACTROL
CONTROLS

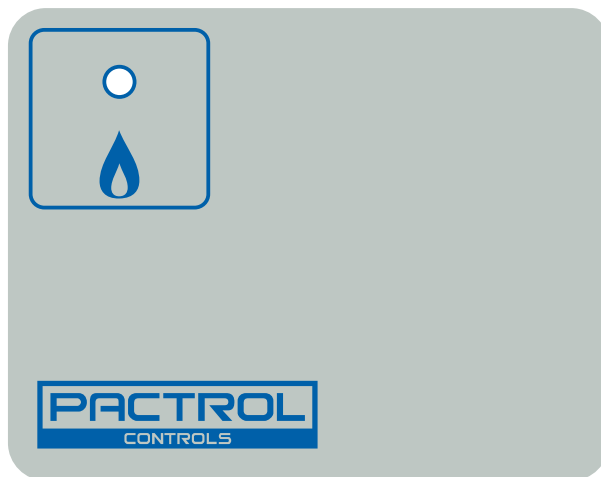
SYSTEM OPERATION SEQUENCE (NORMAL IGNITION)

Intermittent Pilot

With power applied to the control the system enters a wait period (Tw). At the end of the wait period sparking commences, the pilot valve energises and a trial for ignition is made. On successful ignition the sparks stop and the main valve opens.

Direct Burner Ignition

For direct burner ignition pilot valve output is used for the main valve. The main valve output is not present.



Fascia

The fascia has a single LED. This LED flashes during the wait period and illuminates when the burner lights.

Internal Spark Igniter

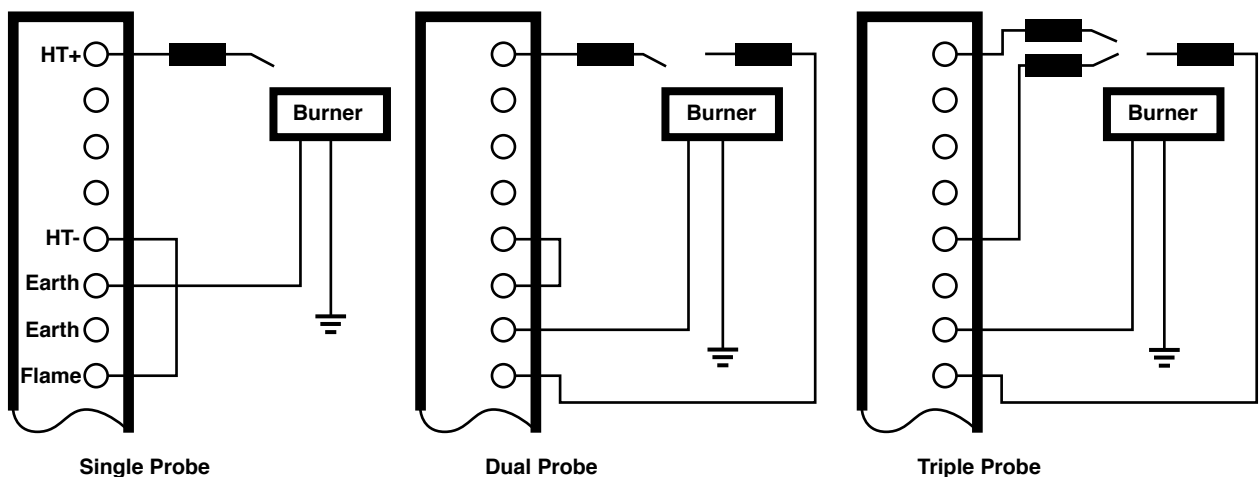
The spark rate can be factory specified (1...50 sparks/s).

Probe Arrangements

The control can be configured as either single, dual or triple probe.

To ensure correct single probe operation the spark rate must be less than 10 sparks/s.

Probe Configuration



TECHNICAL SPECIFICATION

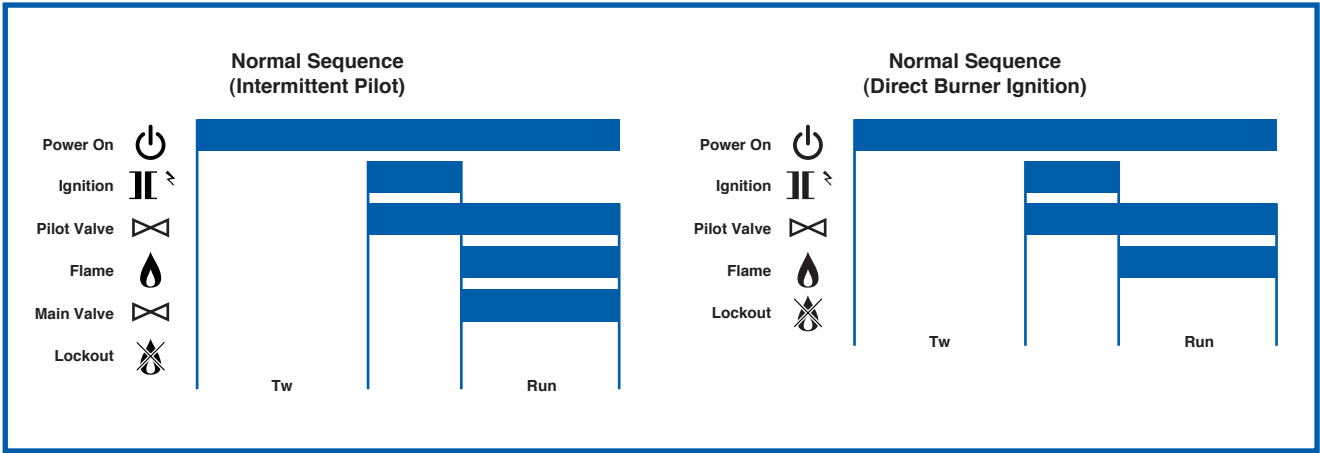
| | | |
|--------------------------|---------------------|-------------------------------------------------------------------------------------------------------------|
| Supply | Voltage | 230V~ +10%/-15% |
| | Frequency | 50/60Hz |
| | Consumption | < 1W (Standby) |
| | Fuse | 1A T HRC (ceramic slow-blow) |
| Ambient | Temperature | -10°C...+60°C, |
| | Humidity | 0...90%RH (Non-condensing) |
| Housing | Dimensions | H 120mm, L = 115mm, W = 75mm |
| | IP rating | IP40 (when installed with suitable cable glands) |
| | Mounting | Flush or DIN clip |
| Ignition | Internal Spark | >25kV, >4mJ (30pF load) |
| | Spark rate | 1....50 sparks/s (factory programmable) |
| Flame Detector | Probe Type | Flame ionisation (measurement range 0....10µA) |
| | Sensitivity options | • 0.4µA • 1µA • 2µA The flame detector is self checking (suitable for continuous operation) |
| Burner | Valving | • Pilot (intermittent) • Direct (1 stage) |
| Sequence | Timings | All timings are factory programmable |
| Loads | Total Load | 230V~ 1A |
| | Gas valves | Pilot = 230V~ 0.5A, Main = 230V~ 0.5A |
| | Lockout | 230V~ 0.5A |
| Lockout | Type | • Non-volatile • Volatile |
| | Reset options | • Local pushbutton • Remote (switched N, max cable length 100m) |
| Standard features | Burner Indicator | Via front panel |

CONTINUOUS DEVELOPMENT

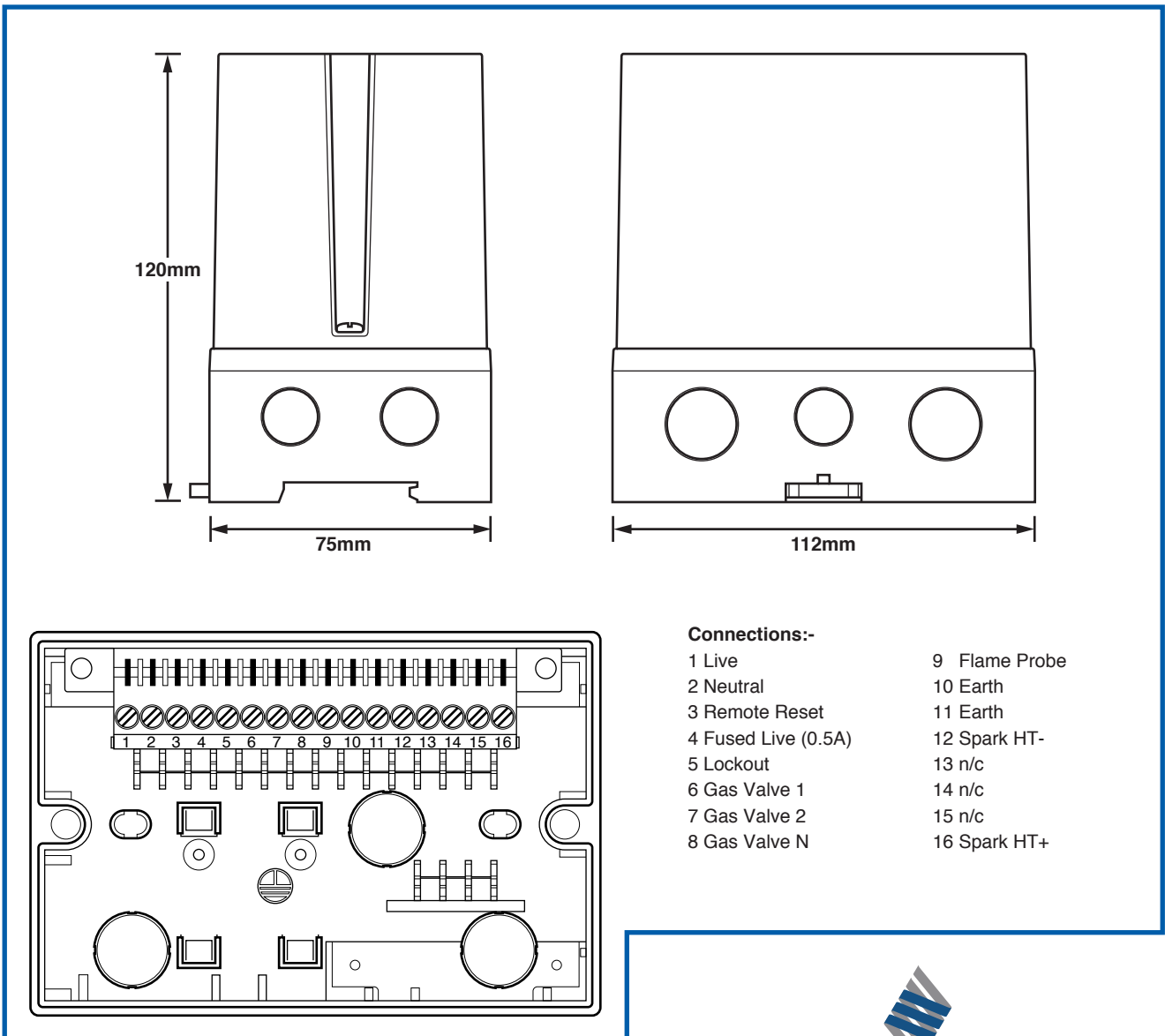
New models are continuously under development.
For further information visit our
Website www.pactrol.com or
contact the sales team sales@pactrol.com

Pactrol Controls reserve the right to change the
specification of this product range without notice.

SYSTEM OPERATION SEQUENCE



MECHANICAL DETAILS



Pactrol Controls Limited reserve the right to change the specification of this product range without notice.



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 Climate Technologies

PACTROL
 CONTROLS

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CSS Range

Full Sequence Control in an IP40 enclosure with integral spark generator



technology factfile

The Pactrol CSS range of full sequence controls, with integral spark generator, is fully approved and proven for use on gas-fired appliances, particularly where an IP40 enclosure is required. The range includes a wide selection of variants offering different timings and flame detection sensitivities.

The CSS range is particularly relevant to many commercial appliances where access to the control is required without the use of tools.

The CSS range of full sequence controls is ideal for use with atmospheric burners, with either single or 2-stage ignition sequences. The range offers volatile lockout and has an integral spark ignition generator for operation in dual or single electrode applications. 1 or 2-stage ignition is standard with various options available for both timings and flame detector sensitivities.

All versions lockout on failure to ignite, and recycle following a flame failure condition in the run state. Lockout is reset by interruption of the electrical supply for more than 5 seconds. If probe detection is not feasible, then all Pactrol's CS(X) range of controls can be used in conjunction with its UV head (Part No. 401500).

The CSS range is well proven for use in many commercial applications and, over the years, has become an industry standards, with its high-impact, flame retardant, IP40 housing, screw connectors and a wide variety of options.



Typical applications

- Commercial Boilers
- Commercial Air Heaters
- Radiant plaque heaters
- Commercial Water Heaters
- Packaged Burners
- Small furnaces

key features

- Fully protected IP40 enclosure
- Plug-in base with screw connections
- Simple volatile lockout
- Integral spark and flame detector
- Compatible with Pactrol's UV head
- Single or dual electrode operation
- Single or 2- stage ignition sequence
- Compact size
- CE certificated to EN 298

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.

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.

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 others 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 during the whole of the pre-purged period, at the end of which the timing relay will be energised. If the flame is not sensed during the time of operation of the timing relay, the relay will de-energise. If the timing relay operates, but gas valves do not, check the fuse.

This fuse protects the control against a short-circuit on the valve outputs, and these and the associated wiring should be carefully checked before replacing. Replacement fuses must be of the

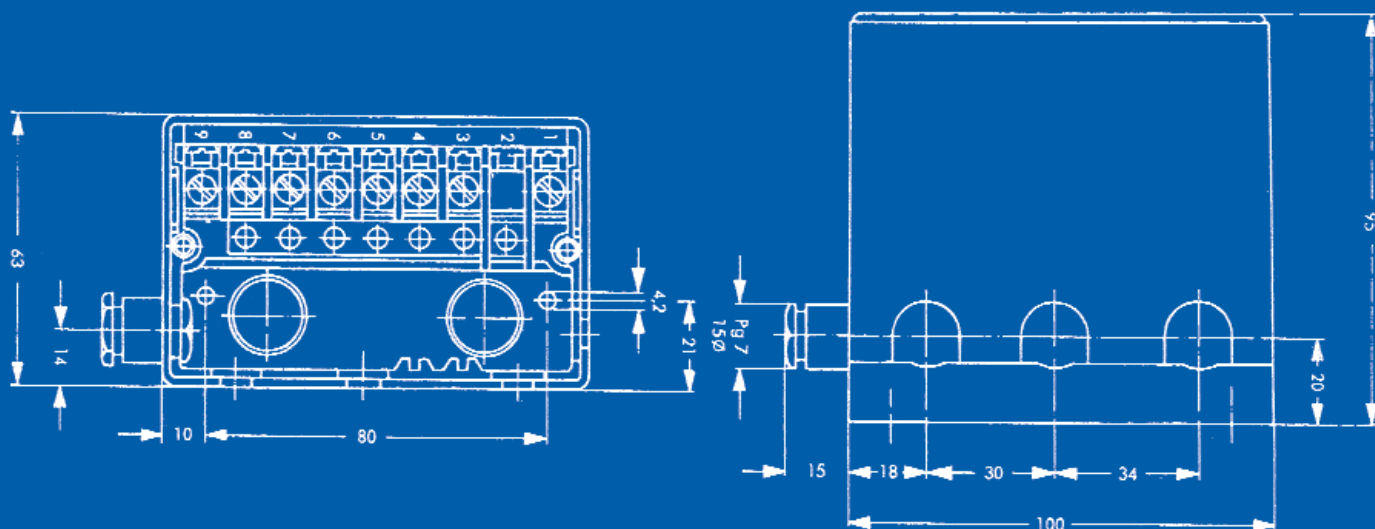
correct type and rating, and after replacing, check that the operation of the control is satisfactory and the sequence is correct.

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

Problems may be experience with pilot burner ignition if insufficient time is allowed during the ignition safety period to establish a flame. This is usually evident if the control is operated after a long shut-down, during which air will have diffused into gas pipework downstream of the valves and will require purging before ignition can take place. Provided that the requirements for maximum energy release are observed, the ignition safety time could be extended to reduce the risk of ignition failure, by substituting a control with longer timed periods. The approval of the appropriate Test House must be sought before making a substitution on an approved appliance.

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.

housing dimensions



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.



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Technical specification

| | |
|---------------------------------------------------|-------------------------------|
| Electrical Supply | |
| Voltage | 230 V +10% -15% |
| Frequency | 50/60Hz |
| Consumption | 5VA |
| Internal fuse | 20mm 2 Amp HRC |
| Operating Conditions | |
| Ambient temperature | -5 to +60°C |
| Humidity | maximum 95% RH |
| Mounting position | any |
| Timings | |
| CSS 01-12 | (Part No.404700) |
| Prepurge (Tp) | Nominal at 240 V 9 s |
| Ignition safety (Ts) | 9 ± 3 s |
| CSS 01-24 | (Part No.406700) |
| Prepurge (Tp) | Nominal at 240 V 18 s |
| Ignition safety (Ts) | 18 ± 6 s |
| Flame sensing | Flame rectification |
| Nominal flame current | 6µA |
| Minimum flame current | 2µA |
| Response time | Flame on 100ms |
| Response time | Flame off less than 1 s |
| Open-circuit probe voltage | 180 v |
| source impedance (at 50Hz) | 4 Mohms |
| Short circuit probe current | 50µA |
| Ignition | |
| Type | integral electronic generator |
| Open circuit voltage | Peak, at 240 V, 15kV |
| Energy (WHITB) | At 240 V, 4mJ |
| Spark gap | 2.5 to 4.0 mm |
| HT lead length | maximum 1 m |
| Repetition rate At 50 Hz 50 sps (sparks per sec.) | |
| Switching capacity | |
| Start gas valve (GV1) | 0.5 A |
| Main gas valve (GV2) | 0.5 A |
| Warning lamp (A) | 0.5 A |
| Associated control and external fuse | 5A |
| Weights: | |
| Control with base | 345gm |
| Control without base | 235gm |

Note - please contact Pactrol for details of available options and variants

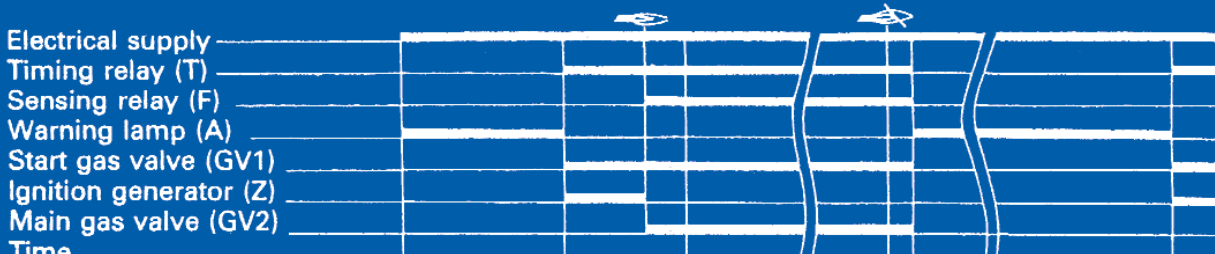
operation

To start the ignition sequence, the electrical supply is connected to the control. The sequence commences with a pre-purge period (Tp) during which both relays are de-energised and the warning-lamp (A) is switched on. Provided that the flame relay (F) remains de-energised throughout, the pre-purge period ends with the timing relay (T) being energised, and the ignition safety period (Ts) commences. The operation of the timing relay switches off the warning lamp and switches on the start-gas valve (GV1) and the integral ignition spark generator. 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 off the ignition transformer, switches on the main-gas

valve, and holds the timing relay energised. If ignition has not taken place by the end of the ignition safety time, the timing relay will be de-energised, switching off the start-gas valve and ignition transformer, and switching on the warning lamp. Another ignition attempt will only be made if the electrical supply is interrupted for at least 5 seconds.

If the flame is extinguished after the end of the ignition safety time, both gas valves are switched off, the warning-lamp switched on, and the control will make a re-ignition attempt following the normal pre-purge period.

TIMING CHART



installation instructions

NB Before installing or replacing any control, check that the type number is correct for the applications. Never use a control which provides a longer ignition safety time than the one with which the appliance was approved.

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 two M4 clearance holes. Do not over tighten 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

'Comfort' controls such as thermostats should be connected in the Line supply to terminal 9. This supply should be fused at 5A and must be of the correct voltage and polarity with the respect to Neutral, Overheat or other 'limit' controls may, if desired be connected between the control and the start-gas valve (GV1) or in the common return from both gas valves, to lock-out the control in the event of a limit condition. It is not recommended that the control is wired for permanent-pilot operation with 'comfort' controls operating the main gas valve. The valve controlling start-gas (either to a pilot, or the main burner at reduced gas rate) is connected to the GV1 position, with the main or full-rate gas valve

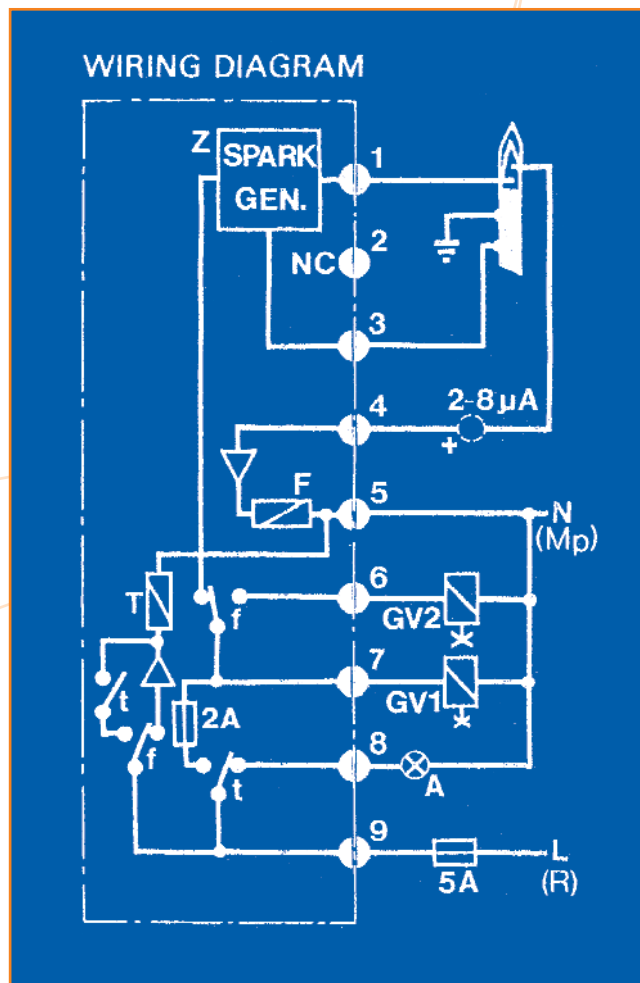
at GV2. If the main burners is to be ignited directly at full gas rate, the gas valve will be connected in the GV1 position.

The flame sensing probe should be well insulated electrode of heat resisting steel. It should be placed with the tip within the outer visible edge of 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 a 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 to 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 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.

wiring instructions

| Terminal | Function |
|----------|----------------------|
| 1 | Spark ignition |
| 2 | Not connected |
| 3 | Earth input |
| 4 | Flame probe input |
| 5 | Neutral input |
| 6 | Gas Valve GV2 output |
| 7 | Gas Valve GV1 output |
| 8 | Alarm output |
| 9 | Live input |



P16 Range

Fully proven Full Sequence Controls



technology factfile

The P16 range is a complete family of fully proven, full sequence controls designed to meet the needs of appliance manufacturers. All controls are fully approved to EN 298 and meet all the essential requirements of the Gas Appliance Directive.

The P16 range of full sequence controls is ideal for use in atmospheric and forced draught appliances, with either single or 2 stage ignition sequences. The family consists of both volatile and non-volatile lockout versions and has an integral spark ignition generator for operation in dual or single electrode applications.

The P16 range has a well proven track record and, over the years, has become an industry standard, with its high-impact, flame retardant housing, screw connectors and wide variety of variants.



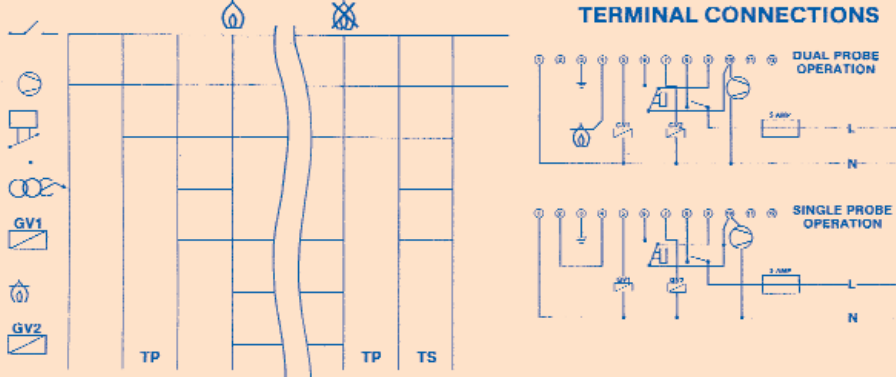
Typical applications

- Combination Boilers
- Condensing Boilers
- Heating Boilers
- Water Heaters
- Warm Air Heaters
- Radiant Tube Heaters

key features

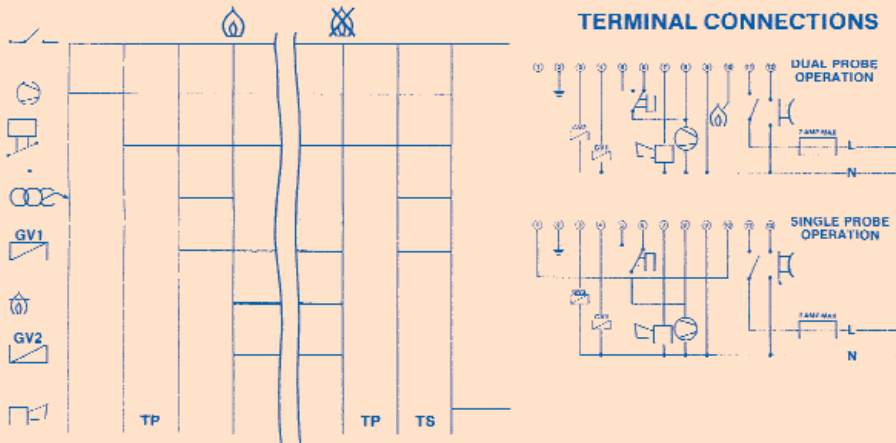
- CE Certified to EN298
- Well-proven range of controls
- Integral spark and flame detection
- Single or dual electrode operation
- Volatile or non-volatile lockout functions
- Atmospheric or fanned applications
- Single or 2 stage ignition sequences
- Strong, flame retardant enclosure
- Non-reversible, screw based connector

P16D Dual Stage Ignition, Air Pressure Switch Proving, Electrical Reset Lockout












Note: The sequence chart for P16DI and P16DIS is as shown above. Wiring for P16DI is as dual probe operation P16D only. Wiring for P16DIS is as single probe operation P16D only

P16F Dual Stage Ignition, Air Pressure Switch Proving, Manual Reset Lockout



Note: The sequence chart for P16F1 is as shown above. Wiring for P16F1 is as dual probe operation P16F only

SIGN CONVENTIONS

-  LIVE IN
-  SPARK GENERATOR
-  1st STAGE GAS VALVE
-  2nd STAGE GAS VALVE
-  FLAME PRESENT
-  FAN
-  AIR PRESSURE SWITCH
-  ALARM
-  FUSE



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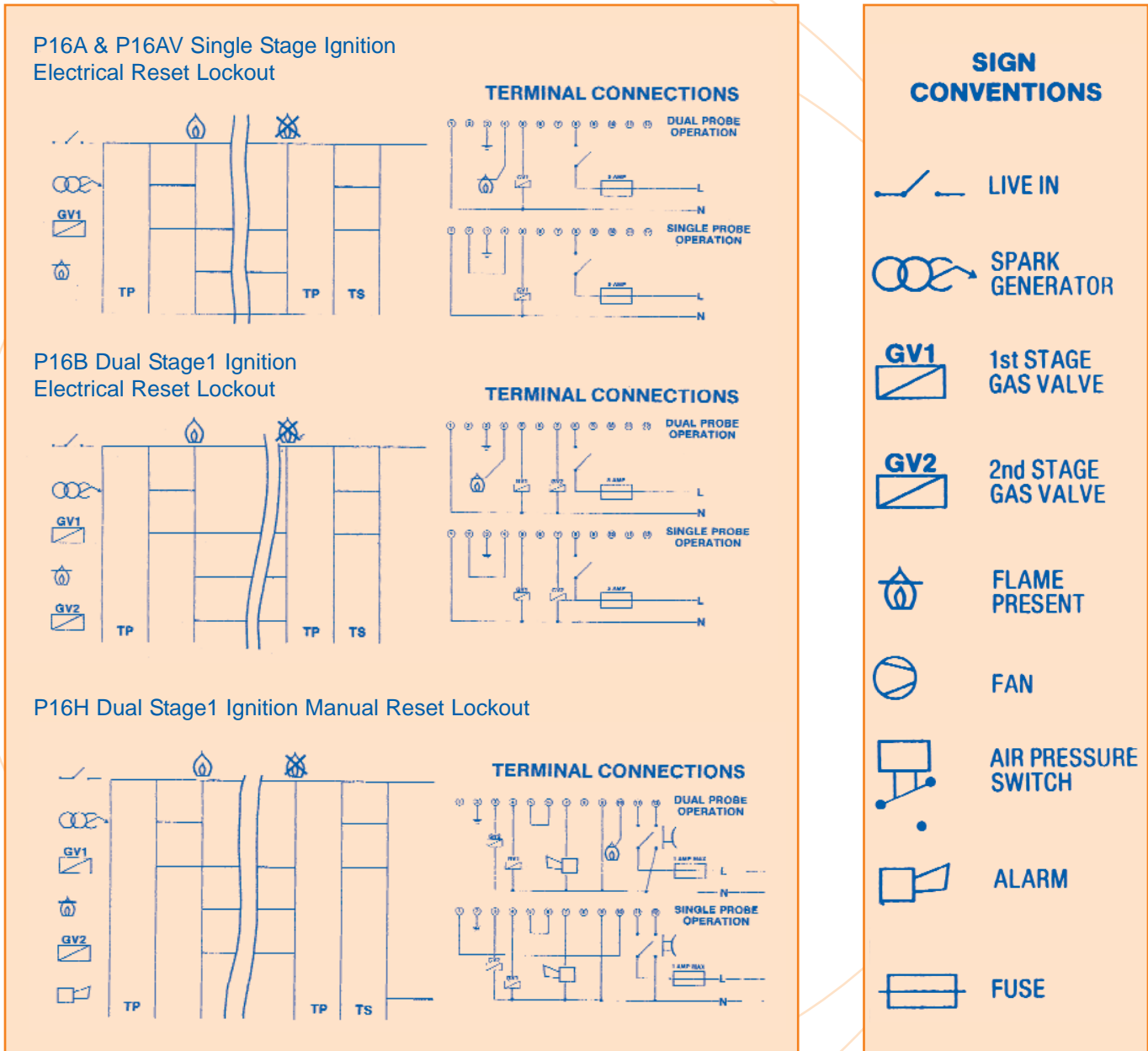


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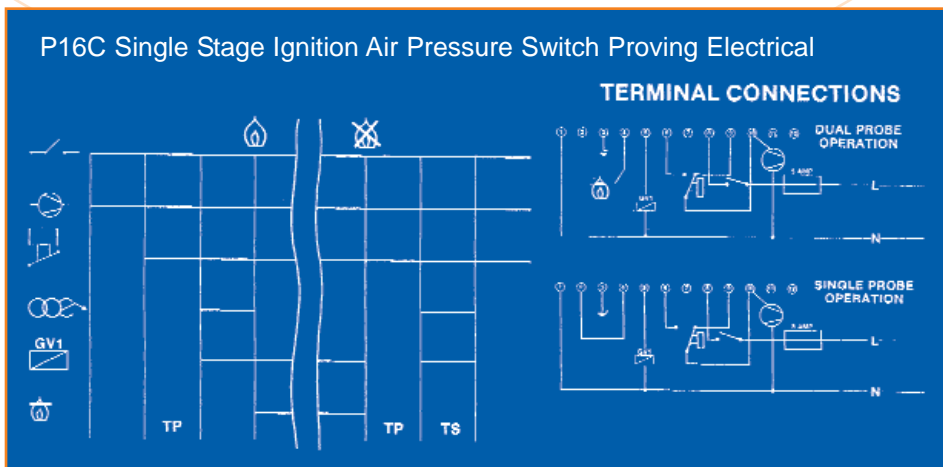
To keep abreast of current developments, controls may be subject to change without notice. Such changes may affect the accuracy of information contained in this data-sheet, and the manufacturers advice should be sought if any problems arise.

Sequence of Operation and Wiring Details for P16 Range

The following options are intended for use on atmospheric applications where air pressure switch proving is not required.



The following options have an integral air pressure switch proving relay and are intended for use on forced draught burner applications.



P19 & P20 Range

A Family of Full Sequence Controls

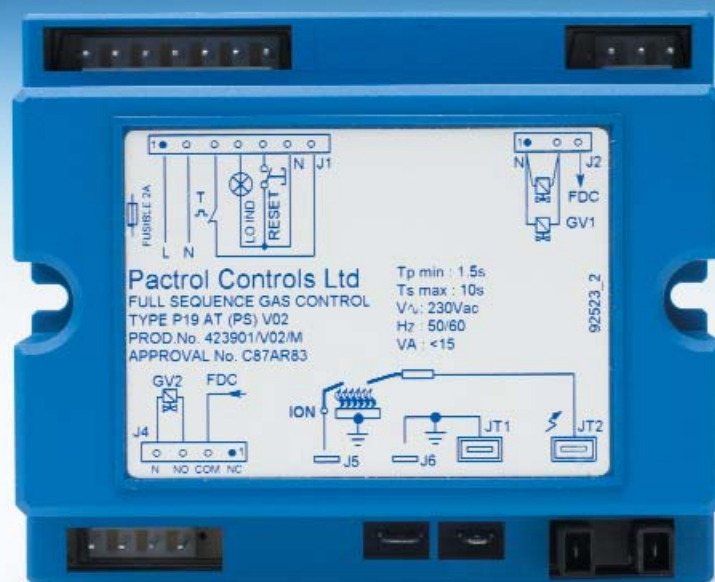


technology factfile

The P19 and P20 ranges are a complete family of low cost full sequence controls designed to meet the needs of today's appliance manufacturers. All controls are fully approved to EN 298 and meet all the essential requirements of the Gas Appliance Directive.

The compact P20 range is ideal for use on atmospheric or forced draught appliances where space is a premium. The range is designed for single stage direct main burner ignition. A range of timing options are available and all controls incorporate an in-built spark generator and ionisation flame detection.

The slightly larger P19 range offers additional features to those of the P20 range. These can include integral EMC filter and two stage ignition, allowing use on intermittent pilot or expanding main burner ignition systems.



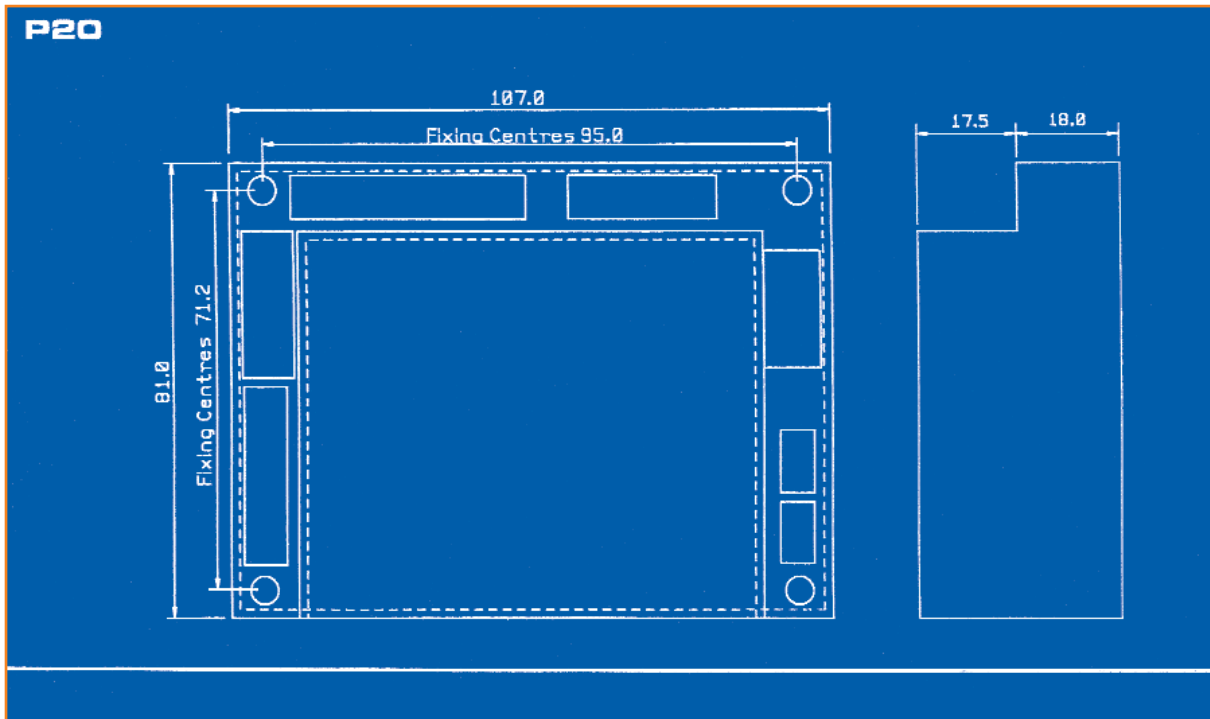
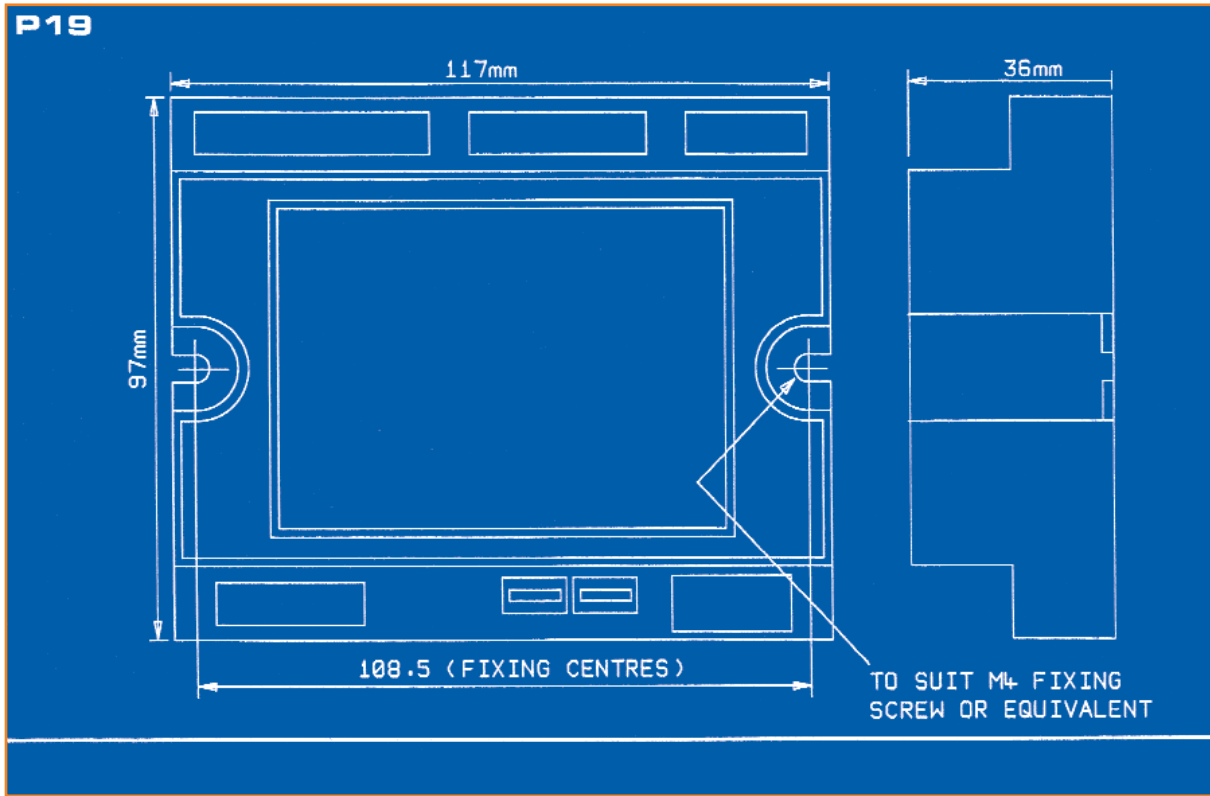
Typical applications

- Combination Boilers
- Condensing Boilers
- Heating Boilers
- Water Heaters
- Warm Air Heaters
- Radiant Tube Heaters

key features

- Approved to EN 298
- Integral spark generator and flame detector
- Non-volatile lockout
- Lockout indicator and remote reset
- Non-reversible connectors
- Atmospheric and forced draught applications
- Compact size
- Integral EMC filter option (P19 range only)
- Single or dual probe operation

housing dimensions



A division of White-Rodgers



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

| | |
|-----------------------------------|---------------------------------|
| Operating voltage | 230 V (195 to 253 V) |
| Supply frequency | 50Hz (+/- 2Hz) |
| Internal fuse | 2A rapid |
| Power consumption | 7VA |
| Minimum spark voltage | 15kV @ 30pF loading |
| Spark gap | 2.5 - 4 mm |
| Spark frequency | 17Hz @ 230V (10 - 25Hz) |
| Maximum lead length | 1 metre |
| Phase sensitivity | no detection when reversed |
| Principle of operation | ionisation |
| Electrode configuration | Single or dual probe |
| Minimum flame current | 1.0 µA (+/-20%) |
| Flame response time | <1 sec. |
| Lockout type | Non-volatile |
| Reset delay from lockout | <2sec. |
| Housing protection classification | IP20 |
| Ambient temp. range | -20°C to +70°C |
| Relative humidity | 95% RH maximum (non condensing) |
| Connectors | Stelvio/Stocko or Molex |

| | | Ts, Max. seconds (+0 / -30%) | | | |
|------------------------------|-----|------------------------------|-----|-----|-----|
| | | 5 | 10 | 20 | 30 |
| Tp, Min. seconds (+50 / -0%) | 1.5 | V01 | V02 | V03 | |
| | 5 | V04 | V05 | V06 | V07 |
| | 10 | 5 | | V08 | V09 |

| Product Identification within the ranges | | |
|------------------------------------------|--------------------------------------------|-------------|
| P19 AM | Single stage, Spark until flame detected | 423300/Vxxa |
| P19 AM(PS) | Single stage, Spark throughout Safety time | 423301/Vxxa |
| P19 FM | Single stage, Spark until flame detected | 423400/Vxxa |
| P19 FM(PS) | Single stage, Spark throughout Safety time | 423401/Vxxa |
| P19 AT | Two stage, Spark until flame detected | 423900/Vxxa |
| P19 AT(PS) | Two stage, Spark throughout Safety time | 423901/Vxxa |
| P19 FT | Two stage, Spark until flame detected | 424000/Vxxa |
| P19 FT(PS) | Two stage, Spark throughout Safety time | 424001/Vxxa |

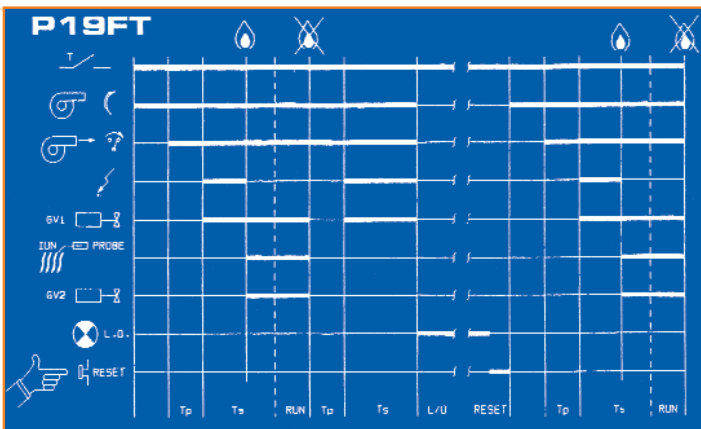
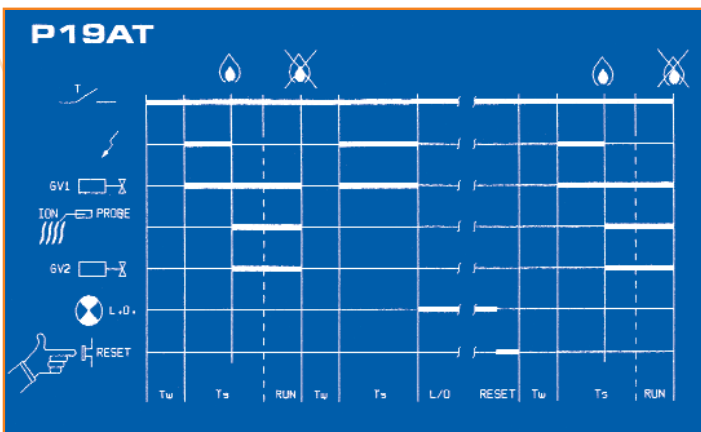
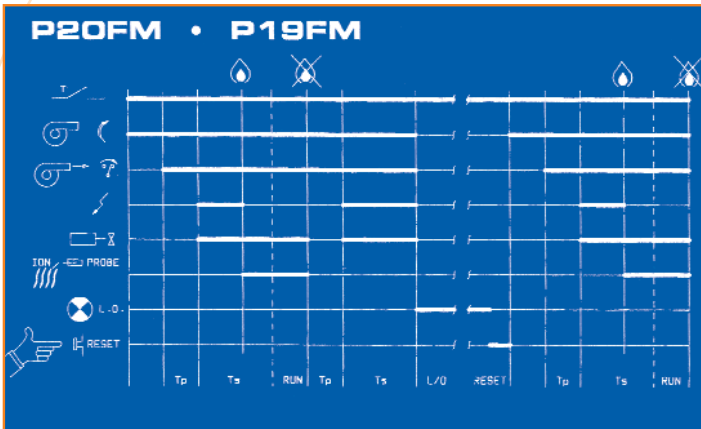
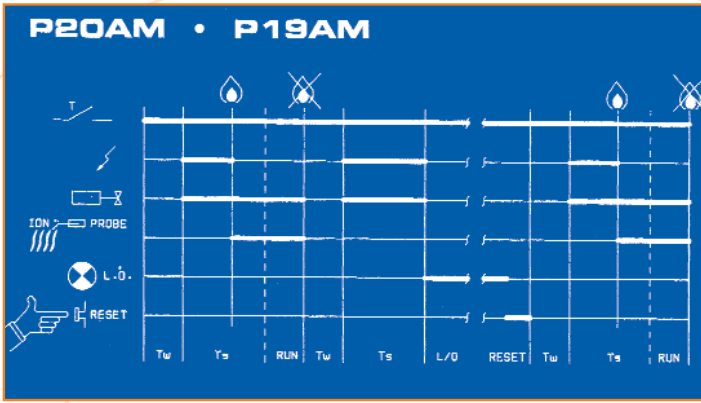
where a

is S for Stocko/Selvio connectors or M for Molex connectors

ie 423400/V05S is a single stage P19 Control with 5 second purge. 10 second Safety time, the spark will stop as soon as the flame is detected and the connectors are Stocko/Selvio

system operation

key



| | |
|--|---------------------------|
| | Function |
| | Fan |
| | Air Pressure Switch |
| | Spark |
| | 1st Stage Gas Valve (GV1) |
| | 2st Stage Gas Valve (GV2) |
| | Flame Detected |
| | Lockout |
| | Reset |
| | Flame Present |
| | Flame loss |

MicroGas™ P25 Series

A Family of Full Sequence Controls

Certified to EN 298 : 2003



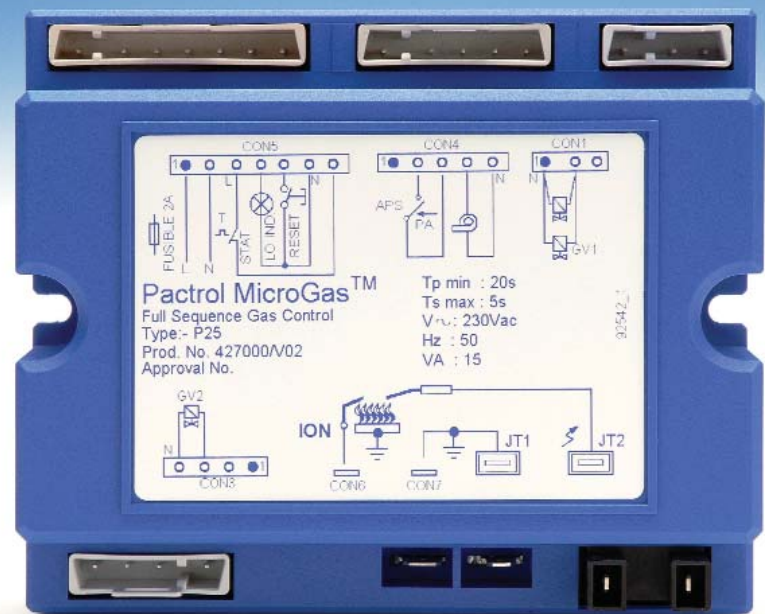
technology factfile

Microcontroller technology lies at the heart of this microgas™ range of full sequence controls, offering a large number of control and timing options not normally available from simpler units.

This compact family of control units offer safe start-up and supervision of a wide range of gas burning appliances, for domestic, commercial and industrial applications. An equally wide range of control sequences and timing options are available, all based on an integral spark ignition system.

By a combination of hardware and software selection, customers can be offered forced or atmospheric sequences, volatile or non-volatile lockout, a range of spark rates and many timing and logic functions, including multiple ignition attempts and post purge.

This 4270 series is CE Certified and fully complies with the requirements of the GAD via EN 298 : 2003.



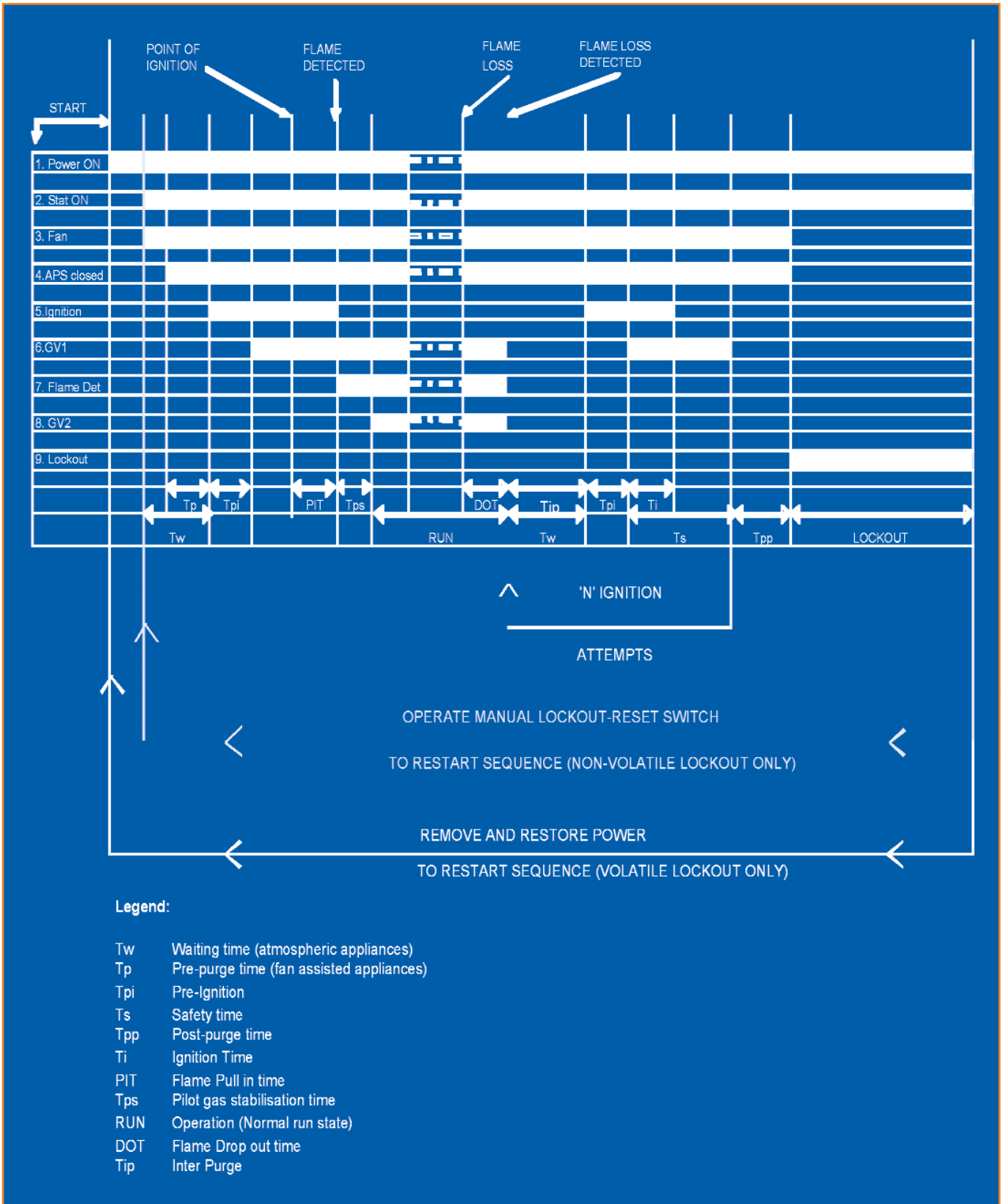
Typical applications

- Combination Boilers
- Condensing Boilers
- Heating Boilers
- Water Heaters
- Warm Air Heaters
- Radiant Tube Heaters

key features

- Programmable logic and timings
- Atmospheric or fanned application
- Integral spark and flame detection
- Multiple ignition attempts
- Volatile or non-volatile lockout
- Dual or single probe for ignition and flame detection
- Post purge
- Compact size
- Optional 'floating supply' capability for flame detector
- Dual, self-checking safety system
- CE Certification to EN 298 : 2003

system operation sequence



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 V + 10% - 15% |
| Frequency | 50 - 60Hz (+/- 3Hz) |
| Power Consumption | 15VA |
| Supply Phase Relationship | Sensitive to Live and Neutral phase reversal |
| Internal fuse | 2A HPC (20mm) |

| | |
|-----------------------------|--------------------------------|
| Contact Ratings | |
| All relay drives where used | 1A Inductive 0.6pf @230V ac |
| | Total maximum load current: 2A |

| | |
|----------------------|-----------------------------------------|
| Ignition | |
| Open circuit voltage | 15kV Minimum (30pf loading) |
| Spark energy | > 4mJ (W.H.I.T.B.) |
| Spark gap tolerance | 2.5mm to 4.5mm |
| Spark rate | as specified in description of function |

| | |
|--------------------------------|-----------------------------------------------------|
| Flame Detection | |
| Principle | Rectification |
| Electrode configuration | Dual or single probe ignition & detection |
| Flame detector response | Flame on = 1 second max |
| | Flame off = as specified in description of function |
| Minimum flame current required | 1uA @230Vac supply |

| | |
|---------------------------|----------------|
| Environmental Conditions | |
| Ambient temperature range | -10°C to 70°C |
| Humidity | 90% RH Maximum |

Hardware Options

The P25 series of controls is available with several factory selectable options. These are shown in the adjacent diagram.

"L" Lockout indication with reset (indication and reset are connected to CON5).

"F" Fanned with optional 2-wire APS (CON4).

"1" Single stage direct burner ignition (valves connected to CON1).

"2" Pilot + main burner (all valves connected to CON1).

"1+1" Pilot + main burner (pilot valve connected to CON1, main valve to CON3).

"X" External isolating transformer for flame detector (connected to CON3). This option can only be selected in conjunction with option "1" or "2".

If this option is not specified then a jumper link must be connected to CON3 in place of the transformer. (See below.)

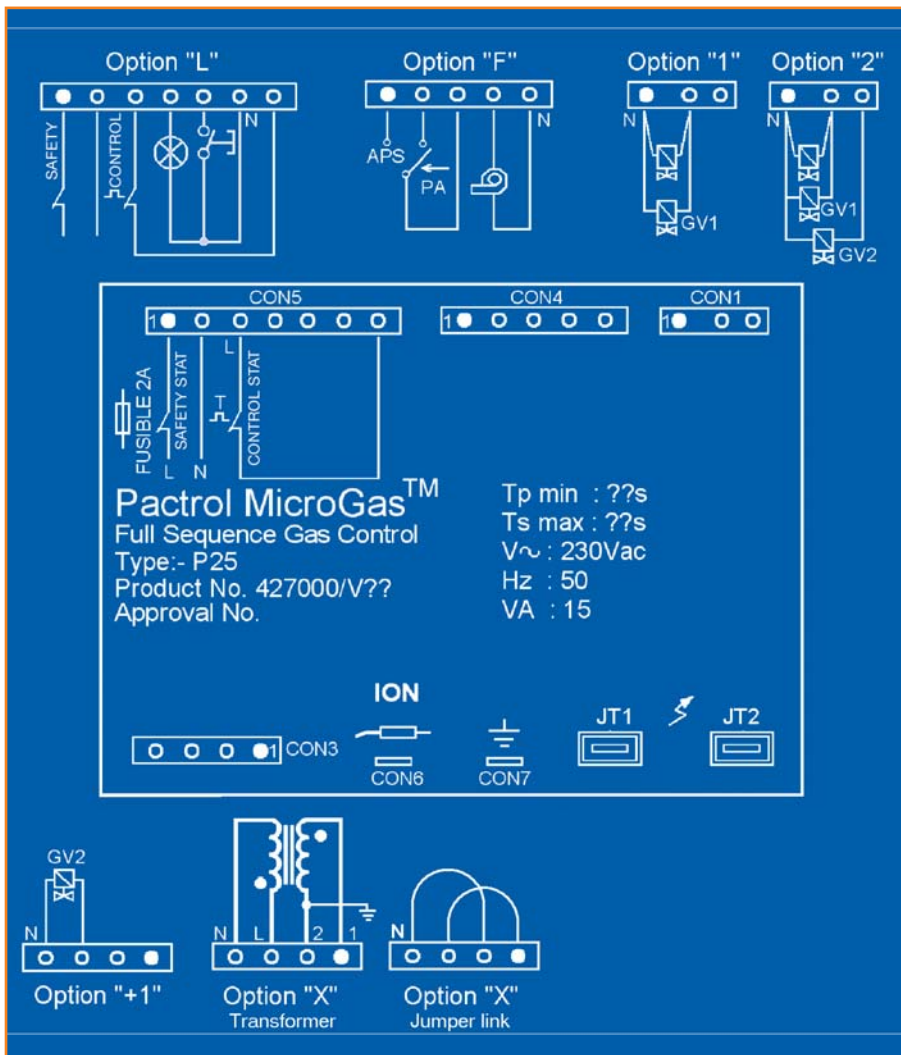
Electrical Supply Options

The control can be specified with either:

- A fixed phase-earth relationship (the earth is bonded to one of the phases in the property electrical installation). In this case the flame detector circuit is phase sensitive.
- An external 230V:230V 2VA transformer with earthed secondary. In this case the flame detector circuit is completely isolated from the mains supply and is non-phase sensitive. (This is for applications where the phase-earth relationship is floating or fixed at mid-rail).
- An external link which creates a phase-earth relationship (fitted instead of the external transformer).

operation

Connections details



Timing and Control Options

Pre-purge time: 1.5 - 50 seconds

Wait or pre-purge time for atmospheric burners, is the time from the start signal, to energisation of the ignition device.

Pre-purge time for fanned appliances, is the time from the air pressure switch closing (signaling sufficient airflow) to energisation of the ignition device.

Pre-ignition time: 1.0 - 50 seconds

Pre-ignition time is the time following the pre-purge period when the ignition device, alone, is energised.

Ignition time: 1.0 - 50 seconds

Ignition time is the time that the ignition device is energised for during ignition, whilst the flame detector signals an absence of flame.

Safety time: 1.0 - 50 seconds

Safety time is the time that GV1 is energised for during ignition, whilst the flame detector signals an absence of flame.

Safety GV1 time: 0.3 - 3.0 seconds

Safety GV1 time is the time that GV1 remains energised for, after the failure of the flame.

Post purge time: 1.5 - 50 seconds

Post purge time is the time that the fan is energised for after the control has gone into a shut down state.

Pilot Stabilisation time: 0.1 - 50 seconds

Pilot stabilisation time is the time between the pilot flame being detected and the main gas valve opening.

Lockout type volatile or non-volatile

Appliance type fanned or atmospheric

APS type 2 or 3 terminal or not present

Number of ignition attempts: 1 - 5

A number of ignition attempts can be programmed into the control to allow it to try again if the burner does not light on the first attempt.

Minimum ignition required

Tells the control to remove the means of ignition immediately a flame is detected (or to leave it energised until the end of the ignition period).

Ignition type: 3/5/12/25/50 Hz

On flame loss the following events can be programmed to occur:

Lock-out

If the control is programmed to have lock-out on flame loss, then it will immediately go to lock-out when the flame signal is lost during the Run state. Either volatile or non-volatile lock-out, as required.

Re-cycling

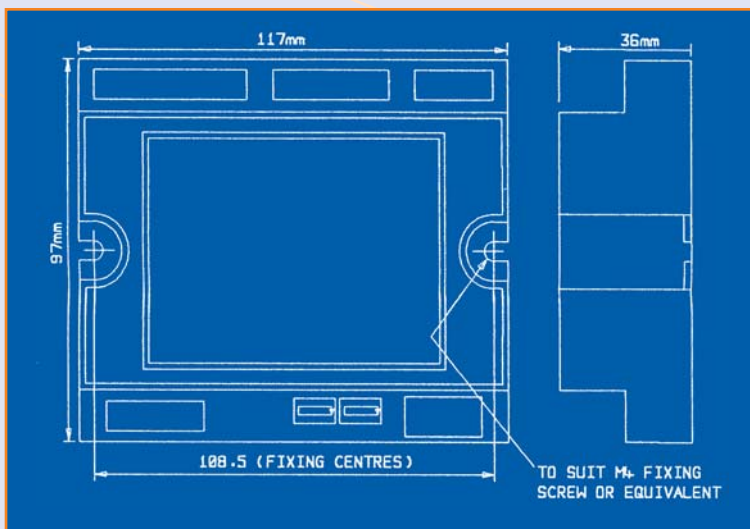
If the control is programmed NOT to go into lock-out on flame loss, then the valve(s) will be closed and at the end of post-purge time, the control will re-cycle from the start of its sequence, with a new ignition attempt. If the control fails to detect a flame, it will re-cycle for the programmed number of ignition attempts, then if it fails to detect a flame during the final ignition attempt, it will go to lock-out.

Spark restoration

If the control is programmed with spark restoration, then if there is a loss of flame signal (either, within the Safety Time or during the Run state) the control will initiate a re-ignition attempt within 1 second without closing the gas valve.

Note: In applications with pilot and main burner, then the main burner only will close.

mechanical details



Control Housing

The control defined by this data sheet is housed in a high impact, flame retardant plastic enclosure which has two fixing points and which provides a dirt free environment to protect the printed circuit board.

Control Orientation and Mounting Position

The orientation of the control is not critical, but a minimum spacing of 15mm between the HT terminal end of the control and adjacent metalwork should be ensured. The sides of the housing should also be position 3mm minimum from adjacent metalwork.

Type UV

Flame detector

PACTROL

CONTROLS

technology factfile



A compact, gas tight ultra-violet flame sensing head giving rectification compatible output. Tested and approved by BG plc, the unit is specifically designed to operate with all Pactrol burner controls in applications where probe detection is not feasible.

Description

The UV head gives a rectification compatible output enabling all Pactrol Gas Burners to be operated on either flame rectification (electrode) sensing or ultra-violet flame sensing without any modification to the Pactrol control.

Construction

The Ultra-violet sensing head and associated circuitry is housed in a robust gas tight aluminium housing. The viewing end of the housing is protected by a 2mm thick quartz window. The Ultra-violet sensing head is designed to be attached to the viewing tube or burner by means of a 1/2" BSP thread. Electrical connections are made through a 4 pin plug and socket, simplifying installation and replacement. The printed circuit board mounted voltage-multiplier enables the UV flame sensing head to be operated consistently over a wide range of mains voltages.

Technical Data

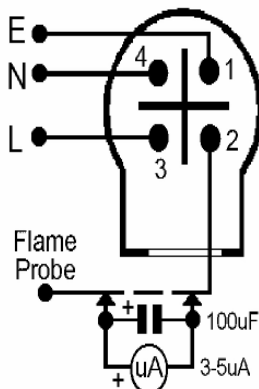
| | |
|------------------------------------|-------------------------|
| Voltage | 220 -15% 240+10% V |
| Frequency | 50...60 Hz |
| Ambiant Temperature | -5 ... +85 °C |
| Output, maximum | 5µA |
| minimum | 2.5µA |
| Flame-failure response time | 0.75 s |
| Weight | 85gm |
| Dimensions | 104 mm X 25.4 mm dia |
| Viewing end-tapped | 1/2" BSP X 12mm deep |

Installation

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

The following points must be considered when installing the Pactrol UV flame sensing head:-

- The UV head should wherever possible be directed towards the base of the flame to monitor maximum UV radiation.
- No other flames or sources of ultra-violet radiation should be within the viewing area if the UV head
- The UV head must have an uninterrupted view of the flame to be monitored



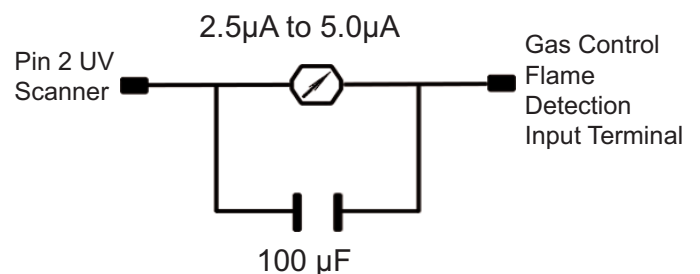
Pactrol Part Numbers

| | |
|---------------|----------|
| 401500 | UV 240V |
| 401600 | UVV 110V |

- (d) The ignition spark should not be within the viewing area of the UV head unless the control is specifically designed for spark proving, as the UV radiation from the spark will cause a lockout condition
- (e) Where possible, purging air should be passed across the viewing end of the UV head to facilitate cooling and reduce dust deposits onto the quartz window
Electrical connections should be made to the 4 pin plug using good quality 4 Core mains cable; co-axial screened cable is not recommended. Any suitable lengths of cable can be used, but intermediate terminations are not advisable. Pin 1 must be wired directly to the earth on the mains outlet as pipework earthing tends to be unreliable.

Testing

The following circuit can be used for testing the flame current. A steady current between $2.5\mu\text{A}$ and $5.0\mu\text{A}$ should be obtained. If the flame current drops below $2.5\mu\text{A}$ intermittent lockout conditions may occur.



Maintenance

For safety reasons the scanner should be replaced after 10,000 to 15,000 hours of operation, the life depending upon the operating temperature. When the scanner is used in a dusty environment the quartz window should be cleaned regularly to prevent loss of flame current. A proprietary lens cleaning tissue is suitable for cleaning the window. Scanners which are suspected to be faulty should be returned to the supplier for examination. To take advantage of any warranty, controls must be returned in good conditions and must not have been tampered with.