

powrmatic
ATMOSPHERIC
GAS-FIRED HEATERS

Natural Gas Only

COMMISSIONING and MAINTENANCE
INSTRUCTIONS

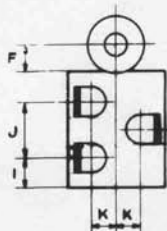
MODEL NUMBERS: CA-AG 100, 150, 200, 300 & 400

contents

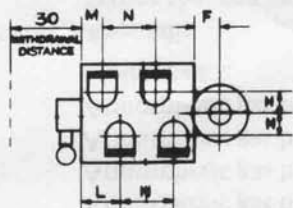
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specifications

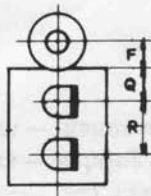
NB. ON A CA 200 AND CA 150 5-WAY HEADS 2 OF THE HEADS MUST BE ON THE L.H. SIDE.



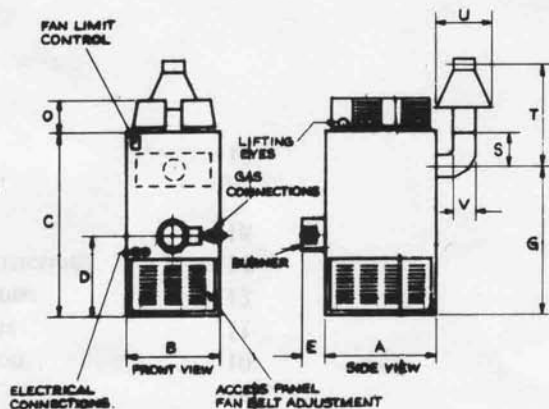
PLAN X



PLAN Y



PLAN Z



Dimensions in Imperial

Unit dimensions	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	Head Nos. & size	Head positions	Shipping weight
CA-AG 100	28 3/4	23 3/4	64 3/4	30 3/4	8	10 3/4	54 3/4	—	—	—	—	—	—	—	11 1/4	—	8 1/2	12	11	30 1/2	17 1/2	7	2-10 x 10	Plan 'Z'	336 lbs.
CA-AG 150	28 3/4	23 3/4	64 3/4	30 3/4	8	10 3/4	54 3/4	—	—	—	—	—	—	—	11 1/4	—	8 1/2	12	11	30 1/2	17 1/2	7	2-10 x 10	Plan 'Z'	364 lbs.
CA-AG 200	31 1/4	24 3/4	71 3/4	34 1/4	8	12 3/4	60 3/4	5 3/4	7 1/2	17	4 3/4	11 3/4	6 1/2	13 3/4	11 1/4 9 1/2	—	—	—	18	40	20	8	3-10 x 10 4-8 x 8	Plan 'X' Plan 'Y'	392 lbs.
CA-AG 300	33 3/4	28 3/4	81 3/4	41 3/4	8	11	71 3/4	—	7 1/2	18 1/2	6 3/4	—	—	—	13 1/4 11 1/4	—	9 1/2	15	33	57 1/2	22 1/2	9	2-12 x 12 3-10 x 10	Plan 'Z' Plan 'X'	672 lbs.
CA-AG 400	41 3/4	35 3/4	92 3/4	43 3/4	10	10	81	7 3/4	—	—	—	16 3/4	9 3/4	15 1/2	18 14	—	—	—	11	35	25	10	2-16 x 16 4-12 x 12	Plan 'Z' Plan 'Y'	840 lbs.

installation — flues

Stainless Steel flue pipe is recommended, the size for each heater being given in the table below. The Heater should have a minimum of 4' 0" of Vertical flue, or the equivalent after the Draught Divertor. Right angle bends should be avoided where possible, and joints should be sealed to prevent rain and moisture from entering the system. A recommended flue installation is shown in Fig. 1. Wherever possible, horizontal runs should be avoided, but where this is unavoidable, every 1ft of horizontal flue must be followed by 3ft of vertical.

After installing the heater, a check must be made to ensure that there are no products of combustion spilling from the draught diverter. This can be done by applying a lighted match to the skirt of the draught diverter. The flame should be sucked into the skirt, showing that the flue is operating satisfactorily.

The heater should be allowed to run for a few minutes before this check is made.

The primary flue and draught diverter supplied, must be fitted directly to the heater.

Where a flue passes through a combustible roof, floor, ceiling or partition, the pipe should be surrounded by an asbestos cement or metal sleeve, the diameter of which should be sufficient to provide an annual space of not less than one inch between the flue pipe and the sleeve when the pipe is in position.

Flue Size

CA-AG 100	7" Dia.
CA-AG 150	7" Dia.
CA-AG 200	8" Dia.
CA-AG 300	9" Dia.
CA-AG 400	10" Dia.

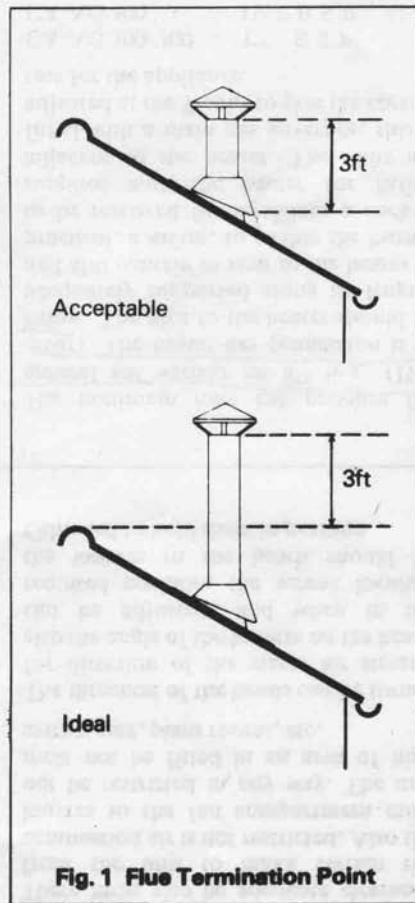


Fig. 1 Flue Termination Point

installation – positioning the unit

The heater should be positioned on a level floor or base.

There should be sufficient clearance for access, for the adjustment of the fan belt, burner, and flue system. The space in which the heater is situated must be adequately ventilated, the following table gives the minimum ventilation area at high and low levels:—

Model	High level area sq in	Low level area sq in
CA-AG 100	50	100
CA-AG 150	75	150
CA-AG 200	100	200
CA-AG 300	150	300
CA-AG 400	200	400

When the air is drawn from the outside of the building, these areas may be halved.

There must also be adequate clearance from the unit to make certain the combustion air is not restricted. Also the louvres to the fan compartment must not be restricted in any way. The unit must not be fitted in an area of high extract rate, plant rooms, etc.

The direction of the heads can be turned for direction of the warm air stream, also the angle of the louvres on the heads can be adjusted, and when in the required position, the screws locating the louvres to the heads should be tightened to hold them in position.

installation – gas pipe connection

The minimum inlet gas pressure for natural gas should be 8" w.g. (19.9 mbar). The heater gas connection is as below. The pipe to the heater should be adequately supported along its length, and also contain as near to the heater as practical, a union, to enable the burner to be removed for servicing, a cock is supplied with the heater for fitting adjacent to the heater. The units are fitted with a main gas governor; this is adjusted at the Works to give the correct rate for the appliance.

CA-AG	Heat input		Burner pressure		Jet size mm	HRC fuse ratings
	Btu/h	kW	"wg	mbars		
100	132,000	38.7	5.0	12.5	.189-4.8	1ph-15 amp
150	200,000	58.6	6.5	16.2	.204-5.2	1ph-30 amp
200	270,000	79.1	6.0	15.0	.250-6.35	1ph-30 amp
300	385,600	113.0	6.0	15.0	.291-7.4	1ph-30 amp
400	517,600	151.7	6.2	15.4	.346-8.8	3ph-10 amp

CA-AG 100/300 = 1" B.S.P.
CA-AG 400 = 1½" B.S.P.

installation — electrical connections

The Electric supply position is located on the Front Panel of the Heater.

On the CA-AG 100 to 300 the standard unit is supplied for 220/240 volts single phase, but 380/440 three phase can be supplied. For the latter, the neutral line must exist as the gas control operates on 240 volts. On the CA 400 the standard unit is supplied for 380/440 volts 3ph. A neutral line must exist as the gas control operates on 240 volts. Circuit diagrams are attached in the inside of the lower front panel. The appliance must be earthed and the electric supply run in rigidly fixed conduits to the cable entry position on Front Panel.

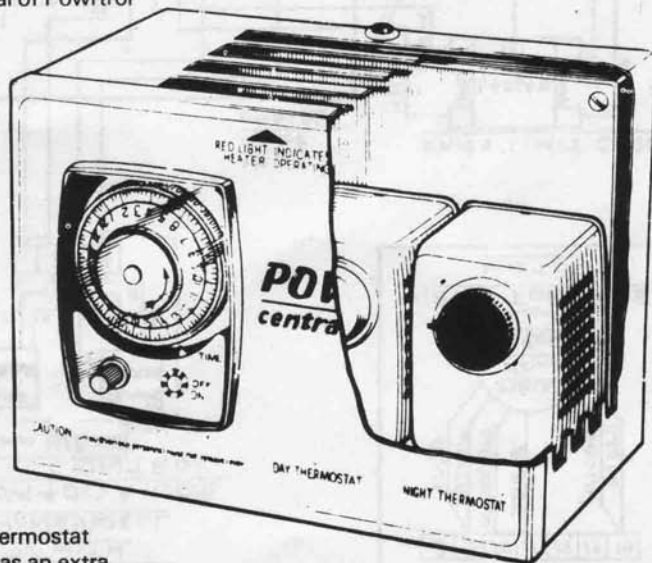
It is of course essential that when these units are set up on three phase supply that they are in fact blowing the air through the unit, i.e. that the motor is running in the correct rotation. The unit is supplied with a Powtrol containing the room thermostat and time clock. This is wired so that all that is required is to feed the main to the heater and connect the Powtrol to the unit. Care must be taken to select the position of

this control. This is very important as the incorrect siting could make or mar a complete installation. On no account must the unit warm air discharge directly onto the control, or it be placed in direct

sunlight or in draught. These conditions can cause heat gradients, and could give uncomfortable limits.

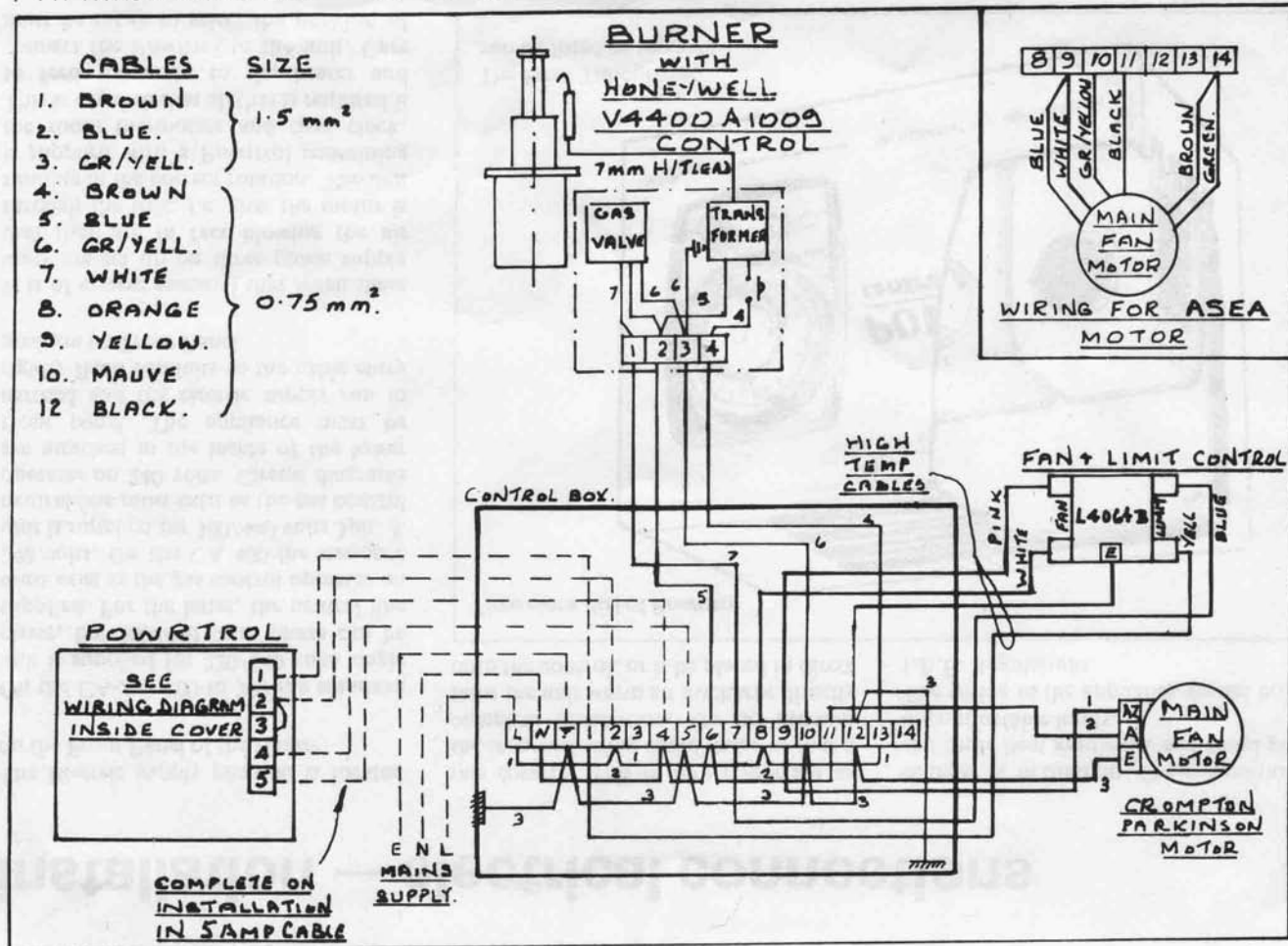
The wiring to the appliance should be to I.E.E. Regulations.

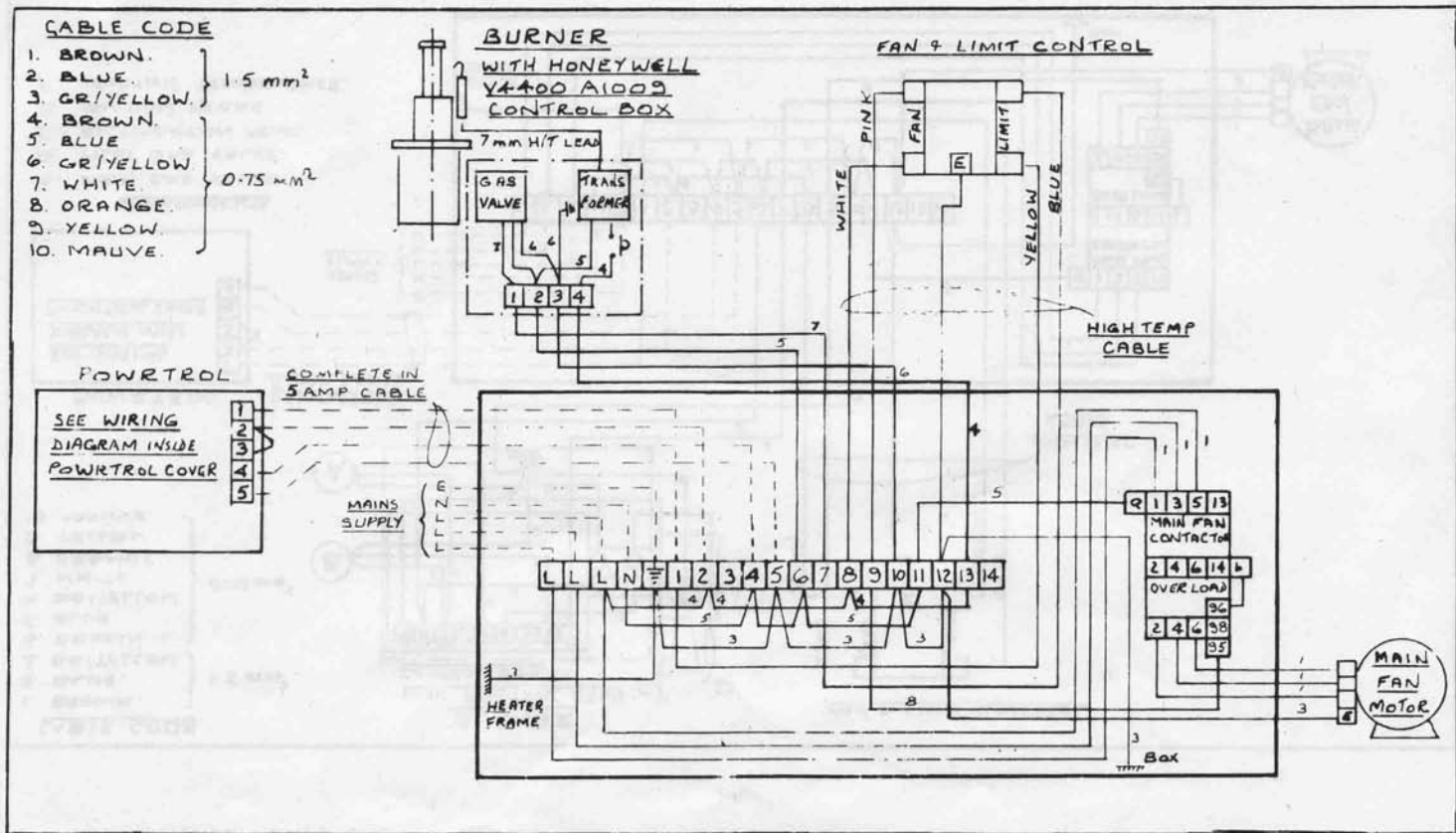
Time clock dial of Powtrol



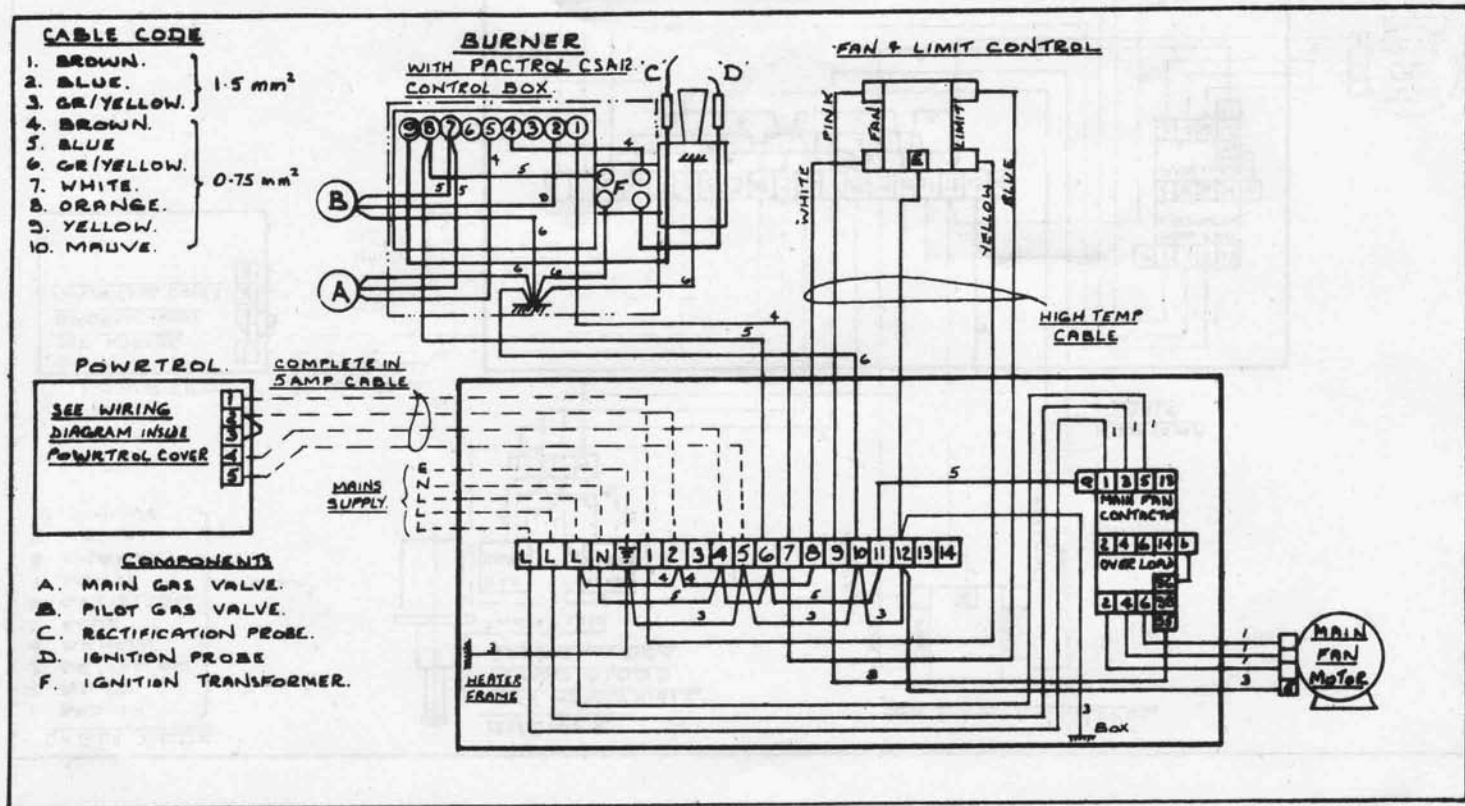
The Frost Thermostat can be fitted as an extra

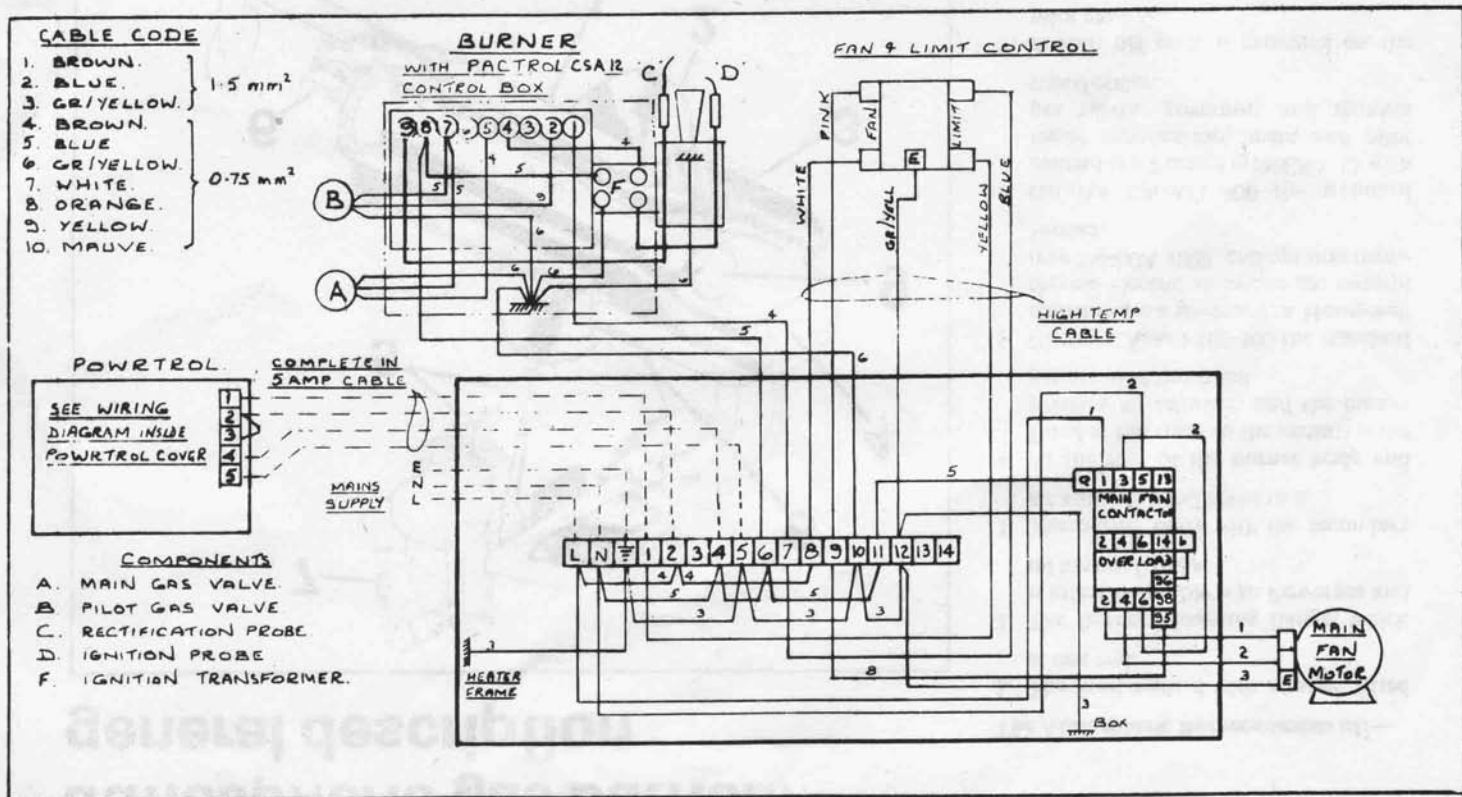
1 PH ATMOSPHERIC GAS CA 100-300



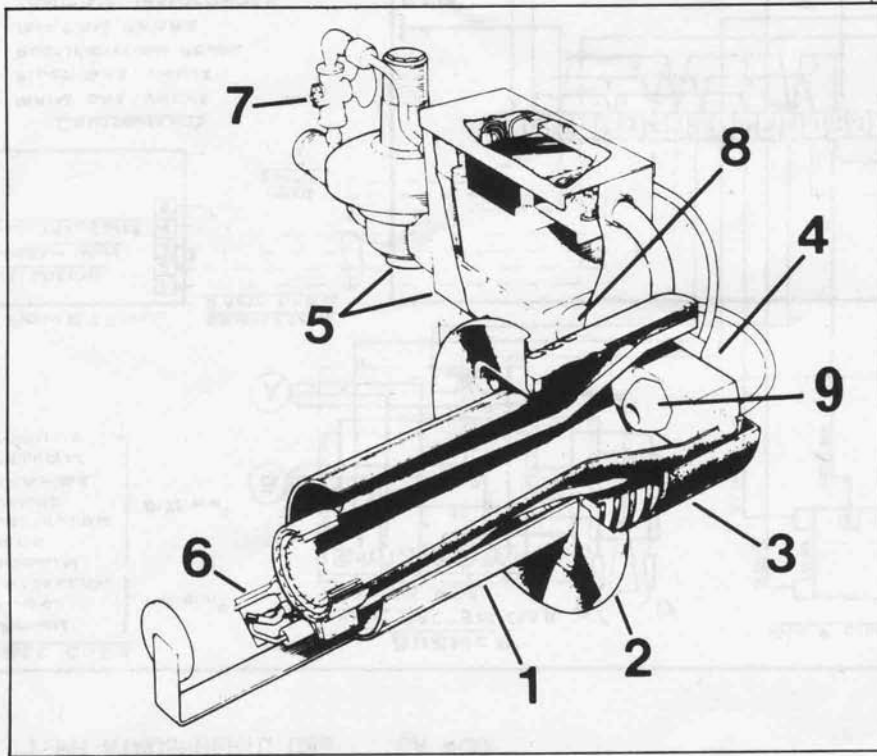


3 PH ATMOSPHERIC GAS CA 400





atmospheric gas burners — general description



The Atmospheric Burner consists of:—

1. The Steel venturi with a target fitted at one end.
2. The Burner Mounting flange, which is interchangeable with Powergas and oil burner fixings.
3. The burner body with the secondary air adjuster band fitted to it.
4. At the rear of the burner body and fitted at the entry to the venturi is the primary air adjuster, and the burner gas pressure test point.
5. On the CA-AG 100-300 the standard controls are a governor, a Honeywell thermo-electric all in one gas control type V4400A 1009, and ignition transformer.
6. On the CA-AG 400 the standard control is a Pactrol type CSA 12 with flame rectification, main and pilot gas valves, governors and ignition transformer.
7. A shut off cock is provided on the pilot gas line.
8. Gas burner tap.
9. Mains Gas Jet.

atmospheric gas burners — users instructions

On the CA-AG 100 to CA-AG 300

The burner is fitted with a permanent pilot, and once this is lit, the unit will work fully automatically on response to the time clock, room thermostat or frost protection thermostat. It is not recommended that the pilot is shut down for short periods, but only at the end of the heating season.

On the CA-AG 400

The burner is fitted with an automatic control, and the unit will work fully automatically on response to the power control, containing the room thermostat, time clock, etc.

Also located on the top of the front panel is a Unit thermostat, the movable indicator with the positions adjacent to it, "Manual" or "Automatic" should be in the "Automatic" position for the winter use of the unit.

If in the summer it is required that the unit fan is to be used for air circulation, the indicator is then set to the "Manual" setting. This should be set to "Automatic" for winter operation.

On the Front Panel of the Heater is a technical Data Plate giving the following information:—

- Model No.
- Serial No.
- Heat input Btu/h (KW)
- Heat output Btu/h (KW)
- Burner pressure Ins. w.g. (mbar)
- Main injector size Ins. (mm)
- Pilot injector type
- Burner type
- Voltage and phase
- Current rating Amperes

atmospheric gas burner CA-AG 100-300

1. Check that the gas service tap, burner gas tap, pilot gas tap and electricity supply are off.
2. Turn the room thermostat stat to its lowest setting.
3. Turn on the gas service tap and electricity supply.
4. Turn on the pilot tap, remove the red screw from the lid of the gas control and raise the lid.
5. Fully depress the white button on the gas control, which operates the integral ignition switch and lights the pilot (observe pilot flame through rear of burner).
6. Once pilot is alight, keep white button depressed for further 30 seconds.
7. Release white button after 30 seconds has elapsed and check pilot remains alight. If pilot has gone out, repeat sequences 5 and 6.
8. Turn on burner gas tap and raise room stat to highest setting; burner should now light.
9. Set room stat to desired temperature, close lid on control and replace screw.

Warning

If the gas supply is inadvertently turned off while the heater is operating, do not under any circumstances turn on the gas supply or attempt to light the pilot until at least three minutes have elapsed.

To Shut Down

For short periods — turn the thermostat to its lowest setting.

For long periods — Depress the red button on the gas control, turn off all gas taps and electricity supply to heater.

atmospheric gas burner CA-AG 400

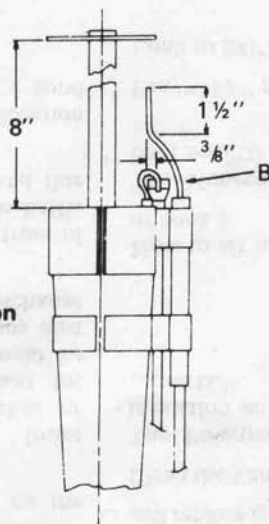
Lighting Instructions — Units with
Honeywell V4400 gas control

1. Turn off the gas service tap, pilot and burner taps and the electricity supply.
2. Turn the room thermostat to a low setting and ensure that the clock is not in an "ON" period.
3. Turn on the gas service tap.
4. Turn on the pilot tap.
5. Turn room thermostat to a high setting and put the clock to an "ON" period.

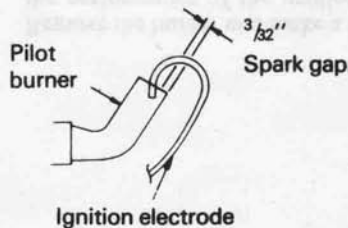
After four seconds the ignition should light the pilot. If this is satisfactory turn on the main burner tap slowly and it should light.

6. If the main burner does not light, turn off the electricity, turn room thermostat to a minimum setting and switch clock to an "OFF" period. Note if pilot is still alight, if so repeat (vi) above.
7. Should the pilot have gone out, turn pilot tap off and leave unit for three minutes before repeating (vi) above.

CA-AG 400 Ignition
Assembly



Part view on 'B'



atmospheric gas burners — maintenance instructions

A maintenance check should be carried out annually. The checks should be for safe and reliable operation of the burner and flue system, and any wear likely to take place on switches and moving components.

Before commencing maintenance isolate the unit from electric supply.

The main fan motor should have three drops of oil annually in both the lubrication oilers "Shell Voluta 27" or equivalent. Check and clean the main fan and housing, and see that it is not impinging on the housing.

Examine main fan bearing for wear, check the tightness of the fan belt. Pulleys — check the pulley grooves for wear, if any wear exists, the pulley must be replaced.

Pulley should be withdrawn with a pulley extractor.

Examine the fan for end play on the shaft.

Examine the electrics for loose connections, any sign of cracked or weak insulating, and all contacts for oxidation. The main fan should be cleaned, also the housing and any dust or fluff removed from the heat exchange and air outlets heads.

Remove the access panel on the front of the heat exchanger and remove baffle plates and clean the flue-way and flue system.

Replace the asbestos rope on location studs as in sketch, to ensure a good joint.

Remove the burner and make a check on the performance of the ignition system and replace ignitor if required.

Clean the Venturi if required.

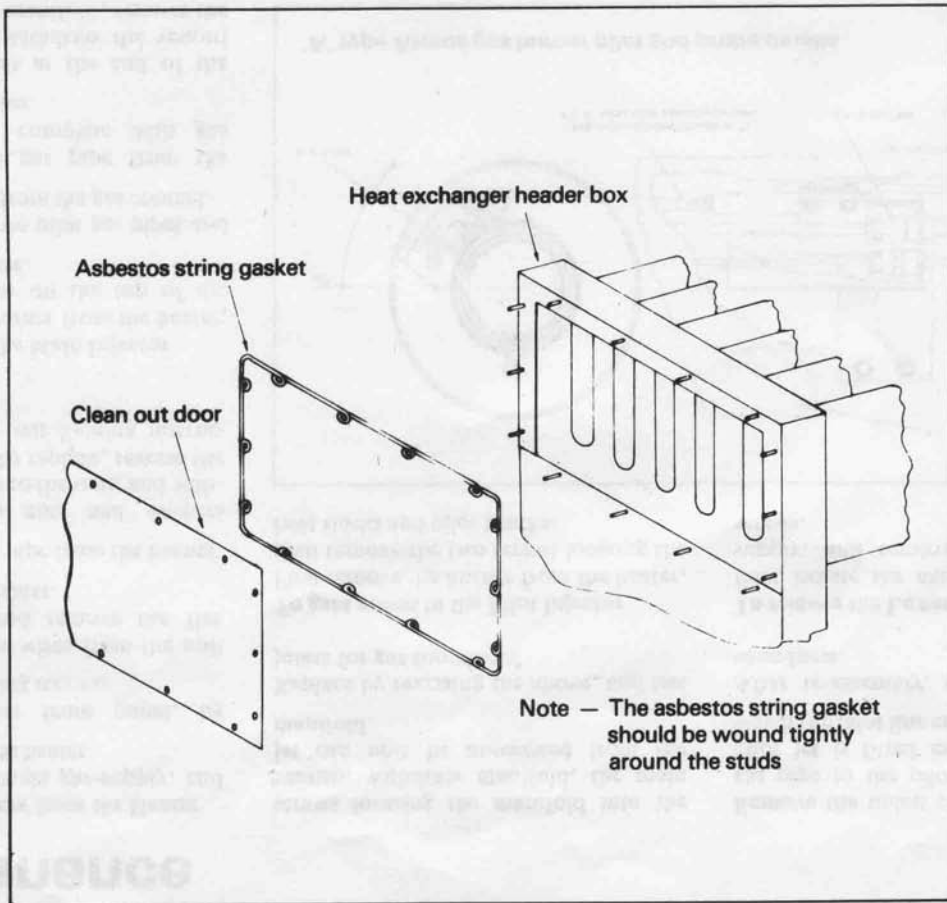
The Powrtrol should be checked for insulation and oxidation of electrical contacts.

How to set up the time clock. (See rear of book.)

The Honeywell combination fan and limit settings are fan "ON" pointer to 135°F.

Fan "OFF" pointer to 100°F.

Limit to 200°F.



maintenance

To remove the burner from the Heater

First turn off the main gas-supply, and electric supply to the heater.

Remove the lower front panel, by removing the locating screws.

Remove the burner wires from the unit terminal block, and remove the flex conduit from the heater.

Disconnect the gas pipe from the burner.

Remove the two nuts and washers locating the burner to the unit, and withdraw the burner. To replace, reverse the above, then carry out lighting instructions.

To gain access to the Main Injector

First remove the burner from the heater, then the red screw on the top of the burner control cover.

Next remove the two pilot gas pipes and the thermocouple from the gas control.

Now remove the gas pipe from the burner manifold complete with gas control and governor.

Remove the screws at the end of the burner body and withdraw the venturi complete with the manifold, remove the

screws locating the manifold into the venturi, withdraw manifold, the main jet can now be unscrewed from the manifold.

Replace by reversing the above, and test joints for gas soundness.

To gain access to the Pilot Injector

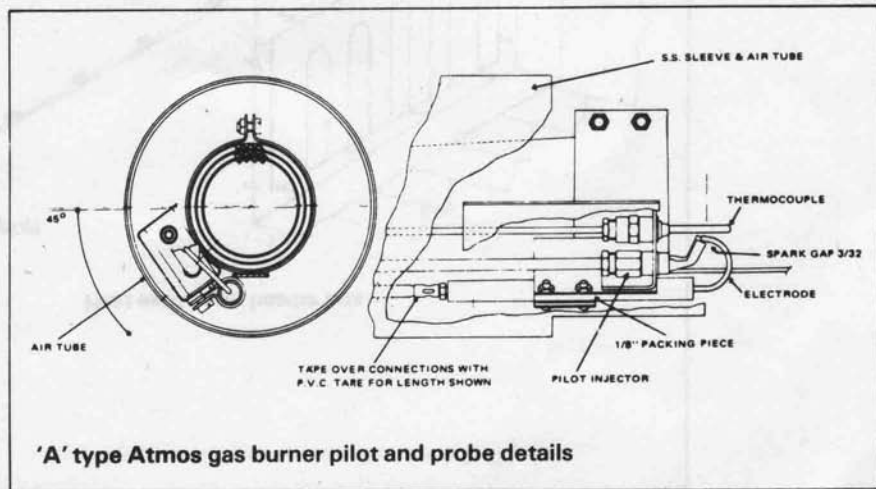
First remove the burner from the heater, then remove the two screws locating the heat shield and pilot bracket.

Remove the union connecting the pilot gas pipe to the pilot bracket, and the pilot jet is fitted in the aperture into which the pilot line engages.

After re-assembly, test joints for gas soundness.

To remove the Lower Front Panel

First isolate the external main electric supply, and remove the panel fixing screws.



'A' type Atmos gas burner pilot and probe details

maintenance

To gain access to the fan and motor

First isolate the external main electric supply, and remove the Lower Front Panel and Right Hand Lower Front Panel, both held by locating screws.

The motor only can be serviced by removal of the Lower Front Panel.

To remove and replace the Gas Control

First remove the burner from the heater, then the red screw located on the top of the burner control cover.

Next remove the two pilot gas pipes and thermocouple from the gas control. Also the electric supply to the gas control.

Remove the screws holding the base of the control cover and lift cover clear of the control. Remove the control from the gas pipe.

To replace reverse the above/after assembly repeat the Lighting Instructions.

Test all joints for gas soundness.

To remove and replace the Main Governor

Turn off the main gas cock and remove the pilot line from the main gas control. The governor can now be removed by unscrewing from gas pipe.

Repeat as above for replacement, carry out the lighting instructions and check on the burner pressure and re-adjust if required. (Burner pressure is on the Data Plate). Also test for gas soundness.

To Remove and replace the Fan Belt

First carry out instructions for removal of the Lower Front Panel. Then loosen the motor platform bolts and by adjusting the belt tension bolt, slide the motor as near to the fan as possible. Remove and replace the belt or belts. The correct tension should allow $\frac{1}{2}$ " of movement when the belts are pressed together between thumb and forefinger.

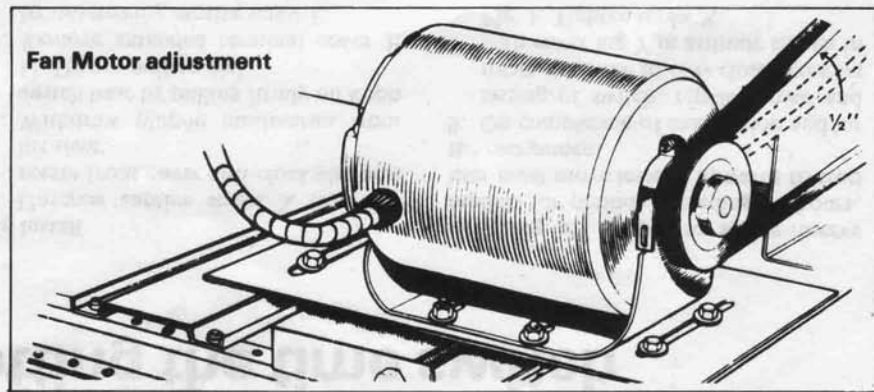
Reverse the above but make certain the bolt is tensed as in sketch.

To remove and replace Fan and Limit Stat

Isolate the external electric supply to the Unit. Remove the thermostat cover. Remove the electric wires from the fan and limit thermostat, and by removing the screws the thermostat can be pulled forward. Replace with a new thermostat by repeating the above and check that the setting is:—

Fan on 135°F Fan off 100°F Limit 200°F

Also the main fan will run continuously when the thermostat is in the manual setting. After the check select the setting to automatic.



APPENDIX — setting the time switch

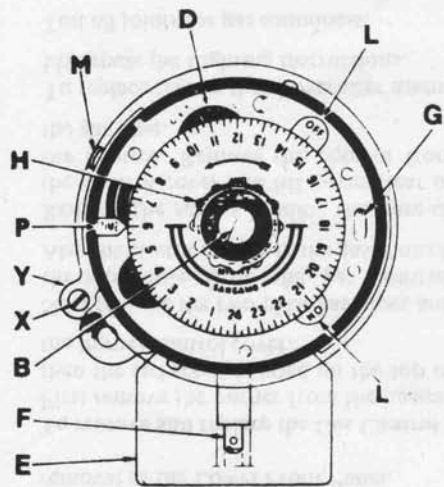


Fig. 1

S.3 Time clock

The time clock can be either Sangamo S259 or Sangamo S359 (with spring reserve). The method of setting is

Sangamo 24-hour dial time switches

Including synchronous spring reserve models

To install

1. Unscrew captive screw X (Fig. 1), rotate front cover anti-clockwise and lift clear.
2. Withdraw plug-in mechanism from switch base by pulling firmly on knob H. Do not pull on dial.
3. Remove extended terminal cover E by unscrewing captive screw F.
4. Clear Bakelite from three fixing holes provided ENSURING THAT NO PARTICLES REMAIN IN BASE. Use No. 8 wood screws or No. 2BA countersunk screws for fixing.
5. Connect switch to supply as in wiring diagram in base. (Simplified diagram shown on page 4.)
6. Plug mechanism into base.
7. Replace and secure extended terminal cover E.
8. For spring-reserve models move level G downwards to start escapement.

NOTE: Each spring-reserve model is normally supplied fully wound. If manual rewinding is necessary remove dial assembly from switch by unscrewing B. Insert screwdriver into slot provided and wind in clockwise direction. When

switching off supply to spring-reserve models for periods exceeding 30 hours, user must move level G upwards to stop the escapement.

9. On completion of installation and/or setting of switch, replace cover and rotate clockwise to fully closed position with cover lug Y in attitude shown in Fig. 1. Tighten screw X.

To set dial (Fig. 1)

1. Hold dial firmly and turn knob clockwise until levers L are easily moveable. Set levers to operating times required. Re-tighten knob H.
2. Turn dial in direction of arrow until pointer P marked 'time' indicates the time of day at the moment of setting, e.g., Fig. 1 shows dial set for 6 a.m.
3. Each small division represents $\frac{1}{4}$ of an hour.
4. Screw B should only be unscrewed if it is necessary to remove dial.
5. If dial is removed, when replacing ensure that hub below dial engages with cross-pin on spindle.
6. The accuracy to which the dial can be set is \pm three minutes.

To set day omitting device (when fitted)

1. Day Omitting Device (Fig. 2) prevents 'on' operations (or in some models 'off' operations) occurring on any chosen day or days of week.
2. To omit operations on any particular day, turn inset 1 clockwise for that day, with screwdriver, until arrow-head points outwards. For change-over switches fitted with levers marked 'A' and 'B', this device omits 'B' lever operations.

Note position of lever L (Fig. 1) which turns black disc D (Fig. 2) once every revolution of dial. If this lever has passed disc, set current day on disc to arrow marked 'day'. If, however, lever has not reached disc, then set day preceding current day on disc to arrow.

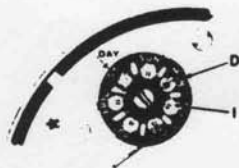
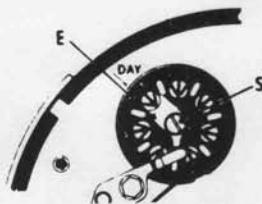


Fig. 2

Early operation device (when fitted)

Day lever E (Fig. 3) in conjunction with special hinged lever fitted to dial enable a particular switching operation to be made at an earlier pre-set time on any one day of week.

1. To set E slacken screw S and adjust lever until 'U' shaped portion is at appropriate day. Fig. 3 shows day lever set for Saturday.
2. Set special hinged lever to time required as for levers L (Fig. 1).



Minimum period between operations

Minimum setting period between levers L, marked 'on' and 'off' or 'A' and 'B', is fifteen minutes. When more than one pair of levers are fitted, minimum period between consecutive 'on', 'off', 'A' or 'B' levers is 1 3/4 hours.

For early operation switches the hinged lever must be set at least three hours after normal lever L preceding it and at least 1 3/4 hours before normal lever L following it.

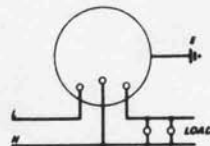
On models S258 Form 2, S259 Form 2, S358 Form 2, S359 Form 2, where two ordinary 'on' and two ordinary 'off' levers are fitted, the early operation is effective for one pair of ordinary levers only.

Manual button (when fitted)

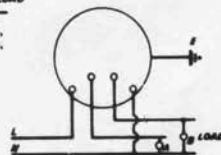
Pressing the red button M (Fig. 1) immediately opens or closes the switch contacts, anticipating the next operation. This does not affect subsequent operations of levers L.

Wiring diagrams

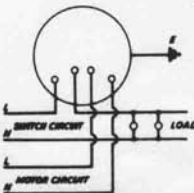
Warning: This control must be earthed. Terminals are for fixed wiring only. Provision for disconnecting the supply to the control must be made in the fixed wiring.



Models: S251, S254, S256, S258, S285, S351, S354, S356, S358, S385.



Models: S263, S264, S363, S364.



Models: S253, S255, S257, S259, S286, S353, S355, S357, S359, S386.

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