

CADAMP LTD

OPERATING MANUAL
ELECTRIC HEATER BATTERY CONTROLLER
ESC RANGE

Model no. _____

Serial no. _____

THIS OPERATING MANUAL SHOULD BE LEFT WITH THE CONTROLLER

CADAMP LTD
WHARFEDALE HOUSE, GREAT PASTURE LANE
BURLEY IN WHARFEDALE, WEST YORKSHIRE
LS29 7DB

TEL: 01943 863884 FAX: 01943 862630

CONTROLS PHILOSOPHY

The ESC range provides an all in one controls package for Electric Heater Batteries. Temperature control is achieved by step control circuitry which switches (via contactors) the required number of elements to maintain the temperature setpoint.

ESC Range Standard Features

Door interlocking isolator

Auto/Hand selector switch

Off/Fan/Heat selector switch

Visual indication of Power, Fan run, Heat on, Fail

Individual MCB's fitted for control circuit, fan(s) and heater elements

Thermal overload protection for fan(s)

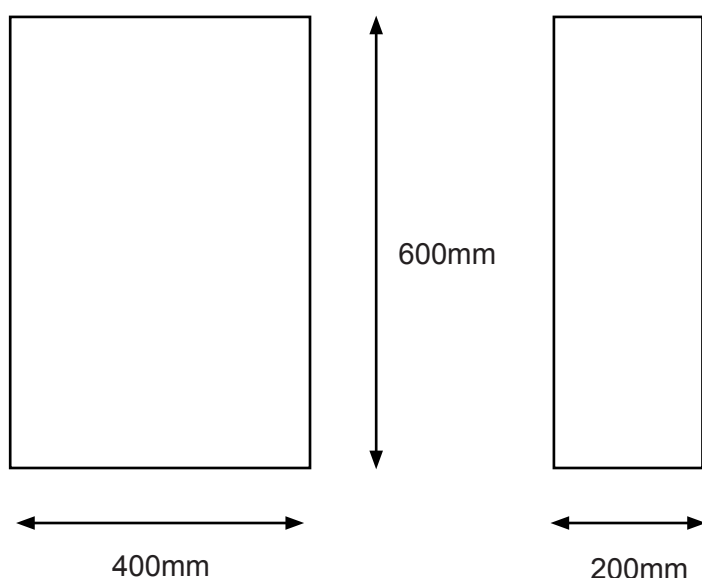
Run on timer to dissipate residual heat after switch off

Enclosure

The ESC range of control panels are supplied in a steel enclosure with a polyester epoxy powder finish in grey RAL7035

Dimensions:

Size may vary dependent upon number of heating stages & optional extras fitted: Appearance may vary for bespoke panels.



INSTALLATION

The control panel should be located so as to allow easy access for the user. Fix the enclosure to the wall using the 4 corner holes provided in the enclosure. The gland plate should be removed for drilling.

Wire up the panel in accordance with current applicable regulations.

No modifications are to be made to the panel without authorization from the manufacturer as this will invalidate the warranty

ENSURE THE FOLLOWING CABLES ARE CONNECTED

See notes on next page for further information

Electrical supply

Heater battery elements

Supply fan

Extract fan (If applicable)

External timeclock or volt free contacts to enable panel in auto mode (If applicable)

Duct or room temperature sensor

Airflow proving device

Filter pressure switch (If applicable)

High temperature limit thermostats for heater battery (1 x manual reset, 1 x automatic reset)

Any other devices E.g. damper motor, fire relay

WIRING INFORMATION

Electrical Supply

Ensure the correct electrical supply is connected.

Heater Battery Elements

Ensure the heater battery supplied is compatible with the control panel I.E Kw/Steps/Electrical Supply.

Supply fan

Ensure the supply fan is correctly matched for the control panel I.E. Electrical supply/ Full Load Current.

Extract fan (If fitted)

Ensure the extract fan is correctly matched for the control panel I.E. Electrical supply/ Full Load Current.

External timeclock or volt free contacts

If an external timeclock is connected ensure that the wiring is as follows

ESC control panel connection	Timeclock connection
1	Live
2	Neutral
3	Switched live

Duct or Room temperature sensor

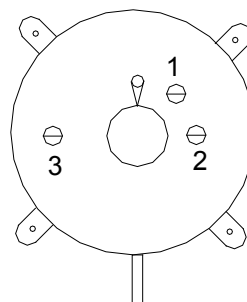
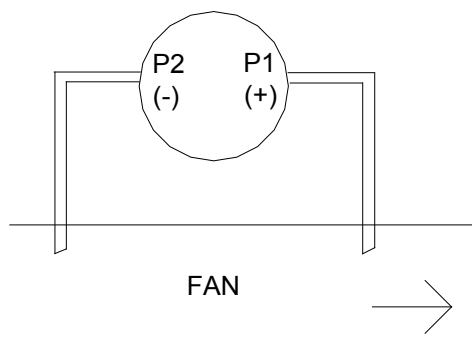
If a duct temperature sensor is been used this should be mounted in the supply duct approx 3 metres downstream of the heater. If a room temperature sensor is been used care should be taken not to mount this adjacent to heat sources e.g. direct sunlight.

Airflow proving device

An airflow proving device **MUST** be wired back to the control panel. This is used to ensure supply airflow is present before the heating is enabled. The Airflow proving device is wired using the normally open contacts that close on airflow presence.

Pressure switch used as an Airflow proving device (Typ 930.80)

If a pressure switch is used as an airflow proving device refer to diagram below for port and electrical connections. The pressure switch should be mounted vertically with the ports pointing downwards.



1:Normally closed
2:Normally open
3:Common

Use Common & Normally Open for airflow proving

Paddle switch used as an Airflow proving device (Type EAA-1)

Mounting:

If a paddle switch is used as an airflow proving device ensure the arrow on the housing points in the direction of the airflow. Mount away from elbows, bends and other restrictions likely to cause turbulence. Do not mount on the side of a horizontal duct as the paddle weight will affect the switching.

Electrical connections

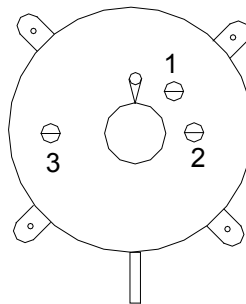
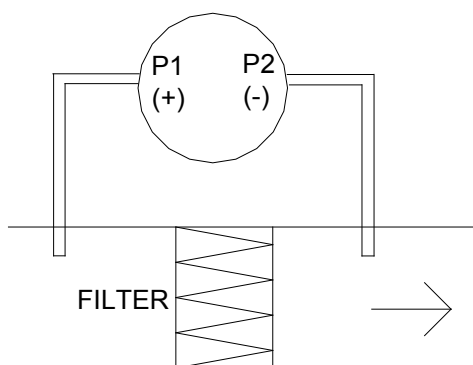
Use connections that are normally open and close on airflow presence

Filter pressure switch (If used)

If used a filter pressure switch will disable the heating when the set differential pressure is reached I.E The filter is blocked. If a filter dirty lamp is fitted to the panel this lamp will light when the set differential pressure is reached. If a filter pressure switch is not used ensure the factory fitted link between terminals 15-17 is in place (this link is to be removed only when using a filter pressure switch)

Pressure switch used for filter status monitoring (Typ 930.80)

If a pressure switch is used filter status monitoring refer to diagram below for port and electrical connections. The pressure switch should be mounted horizontally



- 1: Normally closed
- 2: Normally open
- 3: Common

Use Common & Normally Closed for filter status monitoring.

Normally open connection only used when filter dirty lamp is fitted

High temperature limit thermostat for heater battery

The high temperature cut-outs (1 x manual reset, 1 x automatic reset) for the heater battery must be wired back to the control panel. In event of the temperature at the limit thermostat exceeding the set point of the limit thermostat the heating will be disabled.

Fire relay connections (If fitted)

If the control panel has connections for a fire alarm relay then this relay is to be configured so as to give a set of normally closed contacts that open under a fire condition. When the contacts are closed the panel will function as detailed under "commissioning", when the contacts open then the panel will shut down and only the POWER lamp will remain lit

Damper motor connections (If fitted)

If the control panel has connections for a damper motor then the damper will open when the fan(s) are running and will close when the fans are not running. The damper motor will remain open during the fan run on period

Summer/Winter switch for bypass damper motor

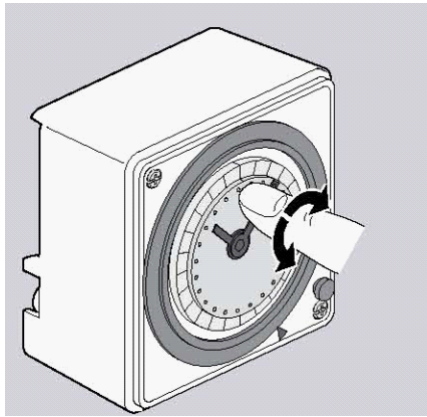
If the control panel has a summer/winter switch then this switch will dictate the position (I.E open or closed) of a bypass damper as follows:

Summer: The bypass damper will be open

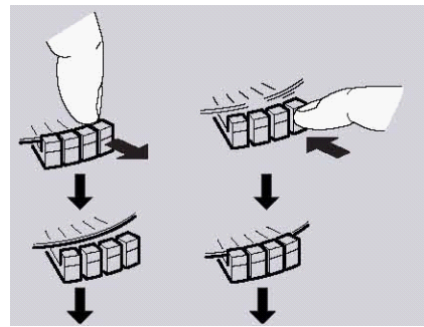
Winter: The bypass damper will be closed

Internal Timeclock (Sangamo Analogue Type)

Where an internal timeclock is fitted see diagrams below for setting



Set clock to show correct time



ON

OFF

Move tappets outwards (to reveal red segments) to set ON period. Move tappets inwards (to conceal red segments) to set OFF period.

Panel Lamps

The ESC range of controllers has visual indication for the following

Power: This lamp will illuminate when the door interlocking is in the ON position

Fan run: This lamp will illuminate when the fan contactor(s) are energized

Heat On: This lamp will illuminate when the first heating stage contactor is energized

Fail: This lamp will illuminate under the following circumstances

Tripping of supply fan or (if fitted) extract fan thermal overload

Loss of airflow as detected by airflow proving device

If a filter pressure switch is used to monitor the filter the fail lamp will light when the set differential pressure is reached.

If either of the heater battery high temperature limit thermostats trip (go open circuit) the fail lamp will light.

Filter Dirty (if fitted): If a filter pressure switch is used to monitor the filter the filter dirty lamp will light when the set differential pressure is reached.

Commissioning

Place front panel selector switches to HAND and OFF

Switch on electrical supply

Power lamp should be lit

Place OFF/FAN/HEAT switch in FAN position. The fan run lamp should light and the fan(s) should start running

Place OFF/FAN/HEAT switch to OFF position. The fan(s) should continue to run for a further 3 minutes (approx)

Place OFF/FAN/HEAT switch in HEAT position. The fan(s) should start running and the heating contactors should sequentially switch on when the temperature set point knob on the printed circuit board is rotated between 10-40 deg c. The HEAT on lamp will light when the first step of the heating comes on.

Run the system and check air temperature adjusting temperature set point for exact temperature requirement.

While the system is running observe the switching of the heating contactors. If these repeatedly switch all on /all off (termed hunting) adjust the proportional control (VR1) on the printed circuit board to a position greater than 4 (factory standard pre-set level). If the system is sluggish I.E. The temperature does not hold reasonably to the set point adjust the VR1 to a position less than 4.

As a final check ensure that the safety controls on the system E.G. airflow switch operate and shut the heating down.

If applicable set the time clock.

Ensure the system is left electrically safe with the enclosure locked.

Operation/switch settings

HAND: The panel will function as dictated by the position of the OFF/FAN/HEAT switch

AUTO: The panel will function as dictated by the position of the OFF/FAN/HEAT switch IF there is a time clock fitted within the panel or connected to the panel AND the time clock has reached an ON period

OFF: Neither the fan(s) nor the heating will run

FAN: The fan(s) will run

HEAT: The fan(s) will run and the heating stage(s) will switch on/off as dictated by temperature