

Operation and Maintenance Instructions

Actionpac EMS panels



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Scope

This manual covers all the Actionpac EM Standard (EMS) range of panels offered by Actionair. This includes the 12, 24 and 36 damper versions.

The range of Actionpac electro-mechanical Standard control panels are designed for the control and monitoring of either Mode 5 (24V) or Mode 6 (240V) PTC damper actuators in groups of 12, 24 or 36 on printed circuit boards.

Each control PCB supports 12 PTC actuators, which can be configured as two zones of up to 6 dampers each or one zone of up to 12 dampers.

The damper status LED indication is provided by the indicator PCB's fitted in the door of the panel enclosure. Each indicator PCB provides indication for 12 PTC actuators – i.e. the 12-way panel uses one indicator PCB, the 24-way uses two and the 36-way uses three.

1. On receiving the unit

- 1.1. Check that the correct system has been supplied and that it is not damaged.

2. Health and safety

The following symbols are used: -



Caution, risk of electrical shock



Caution, risk of danger. Consult this manual for explanation of the potential hazard.

If the equipment is not used as specified here, the protection provided may be impaired.

- 2.1. Care should be taken when lifting the unit (if it weighs more than 18kg two people are needed to lift and position unit.)
- 2.2. Care must be taken when drilling the gland plate and the necessary PPE worn.
- 2.3. All wiring to be undertaken by trained individuals (competent persons)
- 2.4. The unit must be connected to a single-phase supply with a protective earth.
- 2.5. For any technical queries refer to Actionair
- 2.6. Ensure compliance to Electricity at Work Regulations 1989



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3. Fixing into position



3.1. Offer the panel into place in the area where it is to be fixed to the wall. This may require two people. Ensure that the door can be opened for access without obstruction. Also ensure that the external means of isolating the panel is within easy access and not obstructed. Ensure the panel is mounted in a dry secure place, away from any source of liquid.



3.2. Unlock and open the door (hinged on right) and carefully mark through the holes provided in the back of the panel the positions where the fastenings are to be made. Take the opportunity to ensure that there is space around the unit to allow all the cable entries.

3.3. Remove the panel from the wall and drill mounting holes as required for the fixings. Do not drill through the panel holes as this will lead to spoil/swarf getting into the sensitive electronics of the unit or physical damage to the unit.

3.4. Carefully fix the panel in place using the holes provided.

4. Cable entries



4.1. Remove the gland plate from the panel and mark out and drill all the cable entries. These holes/cables must be glanded. Do not drill the gland plate if it is still fitted to the panel as this will lead to swarf getting into the sensitive electronics of the unit.

5. Removal of Backplate

5.1. Should it be necessary to remove the back plate please follow the following procedure

5.1.1. The backplate can be easily removed enabling the cabinet to be fixed to the wall, by disconnecting all ribbon cables from the damper control boards, disconnecting front panel wiring by pulling apart "Conn 1" and "Conn 2", disconnecting the earth wires from the cabinet main earth stud. The four backplate nuts can be removed and the backplate lifted out. Re-fitting is the reverse of removal. Care should be taken not to trap any cables behind the backplate. Ensure earth wires are reconnected.

6. Zone set-up



6.1. All EMS panels will be factory set to a single Alarm Input Zone (unless otherwise specified) and a single BMS Output Monitor. A protective guard covers the Monitor connections. Ensure any voltage source to the Monitor connections is switched off before removing the guard. Always ensure the guard is replaced before reapplying power.

6.2. All the control PCBs within a panel that are to share a common Alarm Input must be daisy chained together between FIREOUT "J20" and FIREIN "J16". The fire alarm must then be connected to the very first FIRE ALARM connector in the chain. E.g. for a single zone 24 damper panel, the fire alarm input is to be connected to PCB 1 (dampers 1 to 12) FIRE ALARM 1 J14. See fig 2.0.

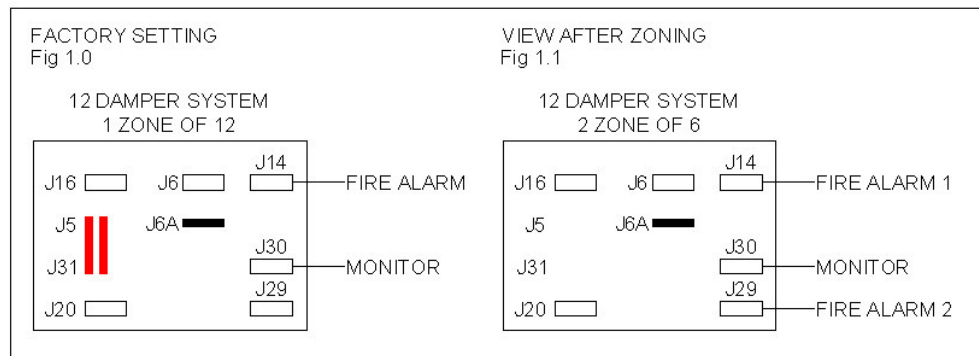
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Note: Fire alarm daisy chaining between the 2 zones on each control PCB is achieved by removable links and between the individual PCBs by cable links.

- 6.3. All the control PCBs within the panel share a common BMS Monitor Signal and must be daisy chained together between J30 (Normal/Fault/Common) and J6. The BMS must then be connected to the very last Output Monitor connected in the chain. E.g. for a single zone 24 damper panel, the BMS Monitor Signal is to be connected to PCB 2 (dampers 13 to 24) J30. See fig 2.0. The BMS Signal is then taken from the very last J30 connections in the chain.

Note: BMS monitor daisy chaining between the PCBs is achieved by cable links.

- 6.4. 12 Damper System - Fire Alarm Inputs.
- 6.4.1. Single Zone. Ensure the 2 red links between J5 and J31 are in place and connect Fire Alarm Input to PCB 1 J14. See Fig 1.0
- 6.4.2. Two Zones. Remove the two red pull out links between J5 and J31. Connect the Fire Alarm Input 1 to PCB 1 J14 and Input Fire Alarm Input 2 to PCB 1 J29. See Fig 1.1
- 6.5. 12 Damper System – BMS monitoring
- 6.5.1. Connect the BMS Monitor Signal to PCB 1 J30. See Fig 1.0

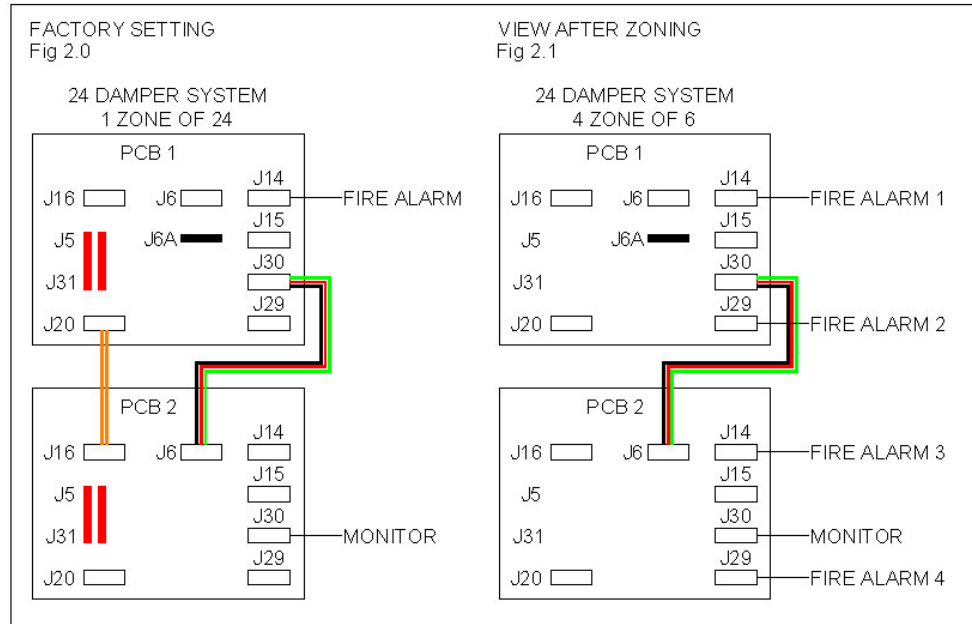


- 6.6. 24 Damper System - Fire Alarm Inputs
- 6.6.1. Single Zone. Ensure the orange and red wires between PCB1 J20 FIREOUT and PCB 2 J16 FIREIN and the 2 red links on PCB 1 & PCB 2 between J5 and J31 are in place. Connect the Fire Alarm Input to PCB 1 J14. See Fig 2.0
- 6.6.2. Four Zones. Remove the orange and red wires between PCB 1 J20 FIREOUT and PCB 2 J16 FIREIN. Remove the 2 red pull out links on both PCB 1 & PCB 2 between J5 and J31. Connect the Fire Alarm Input 1 to PCB 1 J14, Fire Alarm Input 2 to PCB 1 J29, Fire Alarm Input 3 to PCB 2 J14 and Fire Alarm Input 4 to PCB 2 J29. See Fig 2.1

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6.7. 24 damper system – BMS monitoring

- 6.7.1. Ensure the green, red and black wires between PCB1 J30 (Normal/Fault/Common) and PCB 2 J6 MONITOR input are in place. The BMS signal is then taken from PCB 2 J30. See Fig 2.0



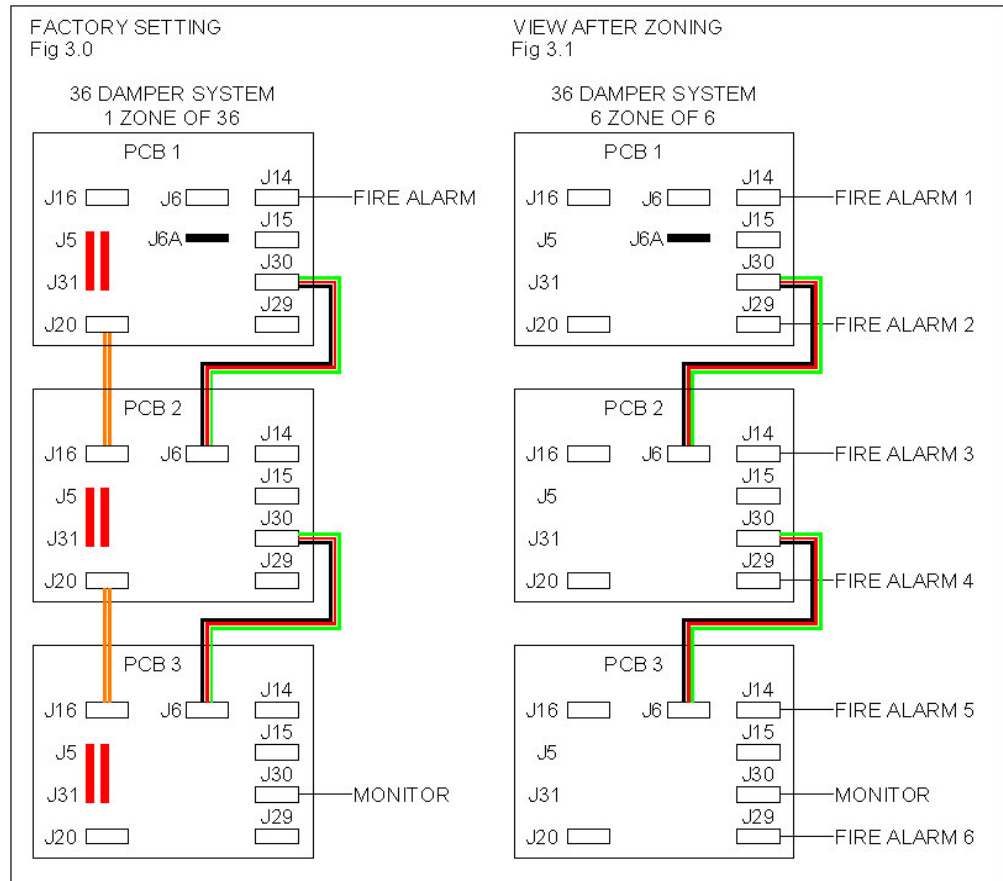
6.8. 36 damper system Fire Alarm Inputs

- 6.8.1. Single Zone. Ensure the orange and red wires between PCB1 J20 FIREOUT and PCB 2 J16 FIREIN, PCB 2 J20 FIREOUT and PCB 3 J16 FIREIN and the 2 red links on PCB 1, PCB 2 & PCB 3 between J5 and J31 are in place. Connect the Fire Alarm Input to PCB 1 J14. See Fig 3.0
- 6.8.2. Six Zones. Remove the orange and red wires between PCB 1 J20 FIREOUT and PCB 2 J16 FIREIN, PCB2 J20 FIREOUT and PCB 3 J16 FIREIN. Remove the 2 red pull out links on PCB 1, PCB 2 & PCB 3 between J5 and J31. Connect the Fire Alarm Input 1 to PCB 1 J14, Fire Alarm Input 2 to PCB 1 J29, Fire Alarm Input 3 to PCB 2 J14, Fire Alarm Input 4 to PCB 2 J29, Fire Alarm Input 5 to PCB 3 J14 and Fire Alarm Input 6 to PCB 3 J29. See Fig 3.1

6.9. 36 damper system – BMS monitoring

- 6.9.1. Ensure the green, red and black wires between PCB1 J30 Normal/Fault/Common and PCB 2 J6 MONITOR INPUT and PCB2 J30 Normal/Fault/Common and PCB 3 J6 MONITOR INPUT are in place. Connect the BMS Output monitor to PCB 3 J30. See Fig 3.0

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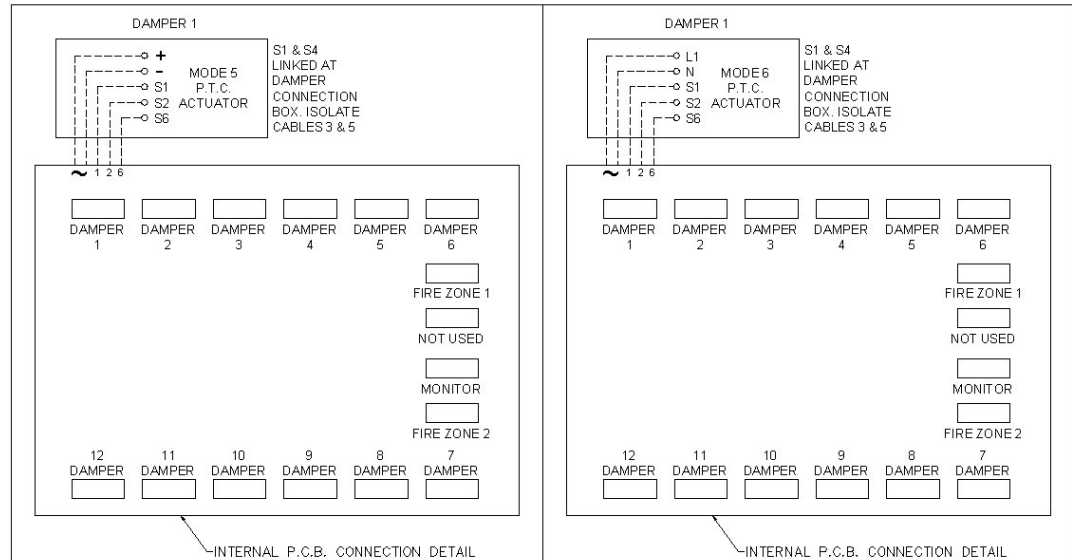
7. Damper connections

- 7.1. The Damper Control printed circuit boards provide for screw less terminal blocks for all external connections to the Actuators. Each PCB has 5 terminal connections. Connect the Actuator power cables to the orange and blue terminals (marked \sim). For the Mode 5 units these terminals provide 24V AC supply. For the Mode 6 units these terminals provide 230V AC supply. See Fig 4.0. Check that the correct mode of damper actuators are being used with the correct type of panel.

The three grey terminals numbered 1, 2 and 6 provide connections for the damper status indication limit switches. Connect core S1 of mode to terminal 1, core S2 of mode to terminal 2 and core S6 of mode to terminal 6. At the local damper connection box, link cores S1 and S4 of mode. See Fig 4.0

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Actuator connections Fig 4.0 (This shows EMS 24 Panel)



- 7.2. Each group of 12 dampers are controlled and monitored via separate printed circuit boards. These will be labelled PCB 1 for Dampers 1 to 12 and where fitted, PCB 2 for Dampers 13 to 24 and PCB 3 for Dampers 25 to 36.
- 7.3. Damper location can be recorded on a printed label fitted inside the cabinet door adjacent to the LED display PCB.

8. Alarm connections

- 8.1. Each Control PCB provides screw less terminal blocks for all external input connections, 1 or 2 Alarm inputs are available per group of 12 dampers (See zone set up for details) These inputs are Normally Closed (NC), going open circuit in alarm.
- 8.2. The terminals on each control PCB are labelled "FIRE ZONE 1" and "FIRE ZONE 2". The number of zones to be used is determined by the zone links on each board. The control PCB is factory set at 1 zone input per panel (unless otherwise specified). See zone set up section above for details of setting up multiple zones
- 8.3. Power at volt free connections is limited to 24 Volts 1Amp. The wiring to these terminals must be insulated to avoid any possibility of contact with other circuits.

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9. BMS connections



- 9.1. Each Control PCB has screw less output terminals to provide 1off volt free contact indication with a BMS per panel for BMS monitoring.
- 9.2. This output has changeover contacts, which indicate either a normal or fault condition and should be monitored separately, as required.
- 9.3. Care should be taken to set up for BMS monitoring as stated in the zone set-up (Section 6).
- 9.4. The terminals on each control PCB are labelled "MONITOR". The control PCB's are factory set at 1 Output per panel. See zone set up section for details (Section 6).
- 9.5. Monitoring voltage is limited to 230Volts AC 1A. As this voltage is supplied by an externally powered BMS system, it may be present when power to the BMS panel has been isolated. Isolate external systems before removing the safety barrier. Ensure this barrier is replaced before applying power to external systems. The wiring to these terminals must be secured to avoid any possibility of contact with other circuits.

10. Damper Indication

Each control PCB is linked internally to a corresponding indicator PCB mounted on the door of the panel i.e. control PCB one is connected to the top group of indicator LEDs, control PCB two to the second group of indicator LEDs etc, where they have been fitted.

11. Technical specification

11.1 Loading

- 11.1.1. Mode 5 dampers are powered from the control panel using the internal transformer. The site mains (230V ac) power the panel. The Mode 5 damper uses a maximum of 7W when motoring.
- 11.1.2. Mode 6 dampers are powered from the panel using the site mains (230V ac). The Mode 6 damper uses a maximum of 8W when motoring. The internal transformer is used to power the panel electronics only
- 11.1.3. Each set of one control PCB and one indicator PCB require a maximum of 20w per set.

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PANEL TYPE	DAMPERS 7W MAX	PCB SETS 20W	TOTAL POWER	CURRENT FROM SITE	POWER FROM TRANSFORMER	TRANSFORMER
MODE 5 12 DAMPERS	12	1	104W	0.5	104W	160VA
MODE 5 24 DAMPERS	24	2	208W	1	208W	250VA
MODE 5 36 DAMPERS	36	3	312W	1.5	312W	400VA

PANEL TYPE	DAMPERS 8W MAX	PCB SETS 20W	TOTAL POWER	CURRENT FROM SITE	POWER FROM TRANSFORMER	TRANSFORMER
MODE 6 12 DAMPERS	12	1	116W	0.50A	20W	100VA
MODE 6 24 DAMPERS	24	2	232W	1.0A	40W	100VA
MODE 6 36 DAMPERS	36	3	348W	1.51A	60W	100VA

11.2. Temperature

11.2.1. Operating temperature: 15 to 35°C, <75%rH, for internal use only.

11.2.2. Storage temperature: -10 to 50°C, 95%rH non-condensing

11.3. Weight

Mode 5: 12 damper 16kg,	Mode 6: 12 damper 16kg,
24 damper 23kg,	24 damper 23kg,
36 damper 30kg,	36 damper 30kg,

11.4. Size (width x height x depth):

<u>Mode 5</u> : 12 damper: 400 x 500 x 210.	<u>Mode 6</u> : 12 damper: 400 x 500 x 210
24 damper: 600 x 600 x 210.	24 damper: 600 x 600 x 210
36 damper: 600 x 760 x 210	36 damper: 600 x 760 x 210



11.5. Supply voltage (range)/ frequency/ power (current) 207 to 243 V AC, 50/60Hz see table above for power consumption.

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11.6. Pollution degree II

11.7. Installation category (over voltage category) II

11.8. Internal circuit protection:



Mode 5: Primary MCB 2A;

Secondary MCB 24V AC power to dampers/pcb; 12 damper 8A;
24 damper 15A;
36 damper 20A.



Mode 6: Primary MCB 2A;

Damper MCB 240V AC 2A;
24V AC to PCB 2A.

11.9. Damper terminal connections: IMO type 20.3000/XX for cable up to 2.5 mm².

Screw less terminal blocks are designed for use with a standard terminal screwdriver, each panel is supplied with a terminal tool for ease of connection.



It is strongly recommended to use solid core connection cable. If using multi-strand cable, strip only 6mm and ensure all strands enter the terminal.

12. Site Wiring



12.1. External wiring should be in accordance with the installation diagram and all relevant regulations. The mains supply to the unit should be from a switched 2A time delay fused (or circuit breaker) spur, which is clearly marked as the disconnect for the panel and in close proximity to the panel.

12.2. In order to ensure that internal wires cannot become detached from their terminals blocks ensure they are routed in the cableways and exit through the openings. Always replace the cableway lid after wiring.

13. System Operation

13.1. Key switches on the front panel control the system. These are labelled "MAINS ISOLATOR" and "DAMPER CONTROL".



As this is permanently wired equipment the incoming mains supply to the switch may be live in the "off" position. To ensure the unit is completely powered off, remove the fuse from the supply spur connection.

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- 13.2. Having confirmed that all connections have been safely made and that there is power to the unit turn "MAINS ISOLATOR" to ON.
- 13.3. **NORMAL** - Providing that there is no ALARM indication, with "DAMPER CONTROL" in the "NORMAL" position, all dampers connected to the system will move to their normal operating position – i.e. SmokeShield to the OPEN position and VentShield to the CLOSED position.
- 13.4. The damper status indication will change from red to green to show dampers have RESET.
- 13.5. No LED indication means that the damper is still moving from one position to another or there is a fault, loss of supply etc. Please wait for the actuators to reach their end positions before assuming a fault at start up. This may take up to 2 minutes.
- 13.6. **ALARM** – with the "DAMPER CONTROL" set to NORMAL, if there is an ALARM condition indicated at the alarm inputs, all the dampers will move to their RELEASE position – i.e. SmokeShield to the CLOSED position and VentShield to the OPEN position.
- 13.7. **TEST** - Moving the "DAMPER CONTROL" to "TEST" causes all the dampers to release and the LEDs should indicate red after a short time.

Note: if an alarm is received when the panel is in TEST mode, no action occurs, as the dampers are all ready at their RELEASE position or moving towards it.
- 13.8. Moving the "DAMPER CONTROL" back to "NORMAL" causes all the dampers to RESET (providing that there is no ALARM input) and the LEDs should indicate green again after a maximum of 2 minutes.
- 13.9. **OVERRIDE** -With damper control in "OVERRIDE", all dampers will open and reset whatever the state of the fire alarm.
- 13.10. A FAULT indication via the MONITOR contacts will be passed to the BMS (if required) should any damper fail to reach its RESET position. (See also zone setup).
- 13.11. A lamp test push button is provided to test the front panel LEDs.

14. Disposal of packaging

- 14.1. Dispose of packaging in accordance with the 1994 European Union Directive on Packaging and Packaging Waste 94/62/EC or local requirements.
- 14.2. For guidance visit www.valpak.co.uk