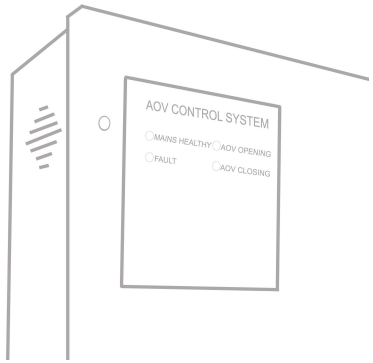
AOV SINGLE ZONE CONTROL UNIT

Models AOV-001, AOV-003, AOV-005, AOV-007

http://www.aovcontrols.com



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1. Introduction

This control unit is for use with most Automatic Opening Vents and can be used with other equipment that requires reverse voltage for closure. It can be connected to most Fire Alarm systems operating on 24v dc. The unit includes a 27.6V DC charger for use with Sealed Lead Acid Batteries sized accordingly to up to 7Ah. The output load connected to the unit should not exceed 1 Amp on AOV-001, 3 Amp on AOV-003, 5 Amp on AOV-005 and 10A on AOV007 (excluding battery charging). .

2. Supply

Supply to the unit should be 240V ac 50Hz (+/-5%) and be fed via an unswitched 5amp -fused spur outlet, fitted adjacent to the unit. The mains supply in the enclosure should be wired into the fused terminal block provided. The unit should be earthed.

3. General operation

With mains 240Vac connected the unit will charge batteries via the PSU pcb (when fitted correctly) and will give an output of 24v DC +15%/-10% when activated by Fire Alarm Control Panel or other control system.
When reset is effected at the Fire Panel the unit will reverse the polarity of the output. Care must be taken that any equipment connected will not be damaged by this operation.
Note: When reset is effected there will be timed reverse polarity output irrespective of whether a trigger input from a Fire Panel or other device is present or not.
SW1 provides a fire override feature to close the actuators, over riding any trigger input.
This unit also has a fault-monitoring relay on the psu PCB. The relay is energised when the unit is operating under normal (fault free) conditions and gives a set of voltage free contacts at the ‘Fault Relay Output’. The relay will operate in tandem with the main lid fault LED. These contacts can be used to signal faults to a remote monitoring system or to control a remote indicator or audible unit if required

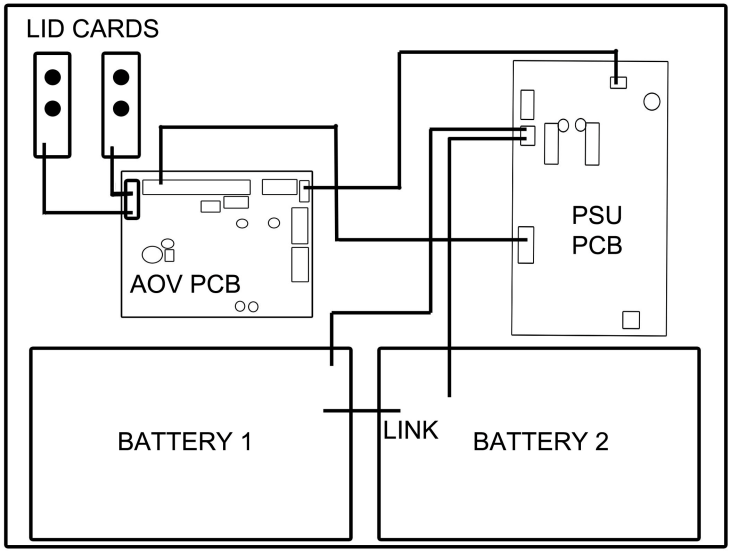
4. Specification

Input Voltage	240v AC 50Hz (+5% / -5%)
Output Voltage	24v DC (+20% / -10%)
Output Rating	AOV-001 : 1amp AOV-003 : 3amp AOV-005 : 5amp AOV-007 : 10amp
Battery Charge Current	AOV-001 : 0.25amp AOV-003 : 0.50amp AOV-005 : 0.75amp AOV-007 : 2.0amp
Battery Type	Sealed Lead Acid
Enclosure Colour	Grey RAL 7035
Enclosure Size	400mmW x 300mmH x 110mmD
Weight	7kgs – 9kgs
Optional items	Break Glass Call Point Smoke Detectors Temperature sensors Chain and Linear Actuators.

5. Preparation

After unpacking, the unit should be prepared for installation.
The lid is fixed to the body with 4 bolts and after removing these bolts the lid can be lifted from the unit. There are no interconnecting cables between the lid and the back-box, however, when the lid is finally refitted the earth cable between the body and lid should be fitted.
The lid and screws should be carefully stored for refitting on completion of the installation.

6. Internal layout

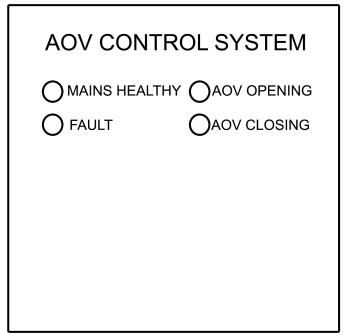


7. Installing

The unit should be fitted in an upright position on a solid surface using the fixing holes provided. The unit mounting location should be selected to allow space around the unit to aid heat dissipation. It should not be mounted adjacent to any other source of excessive heat. There are 5 mounting points available in the enclosure with a top central keyhole to allow the unit to hang whilst marking the other mounting points as required.
The back-box also has rear “dimples” to allow for imperfect wall levels as well as to create space for air circulation.
Screws and anchor fixings should be sufficient to support the unit according to the structure to which it is affixed.
Cabling of suitable rating should be used along with the appropriate termination glands and securely fixed via the knockouts provided.

8. Indicators – Lid facia

Green = Mains Healthy Green = AOV opening
Amber = Fault Amber = AOV closing



When the Green light only is illuminated, the unit is operating normally with supply to the load and the batteries (when fitted) are receiving charge current. When the Amber light is illuminated at the same time as the Green light there is a fault on either or both of the output supply and the charge supply. If the Green light is NOT illuminated, the mains supply is not present

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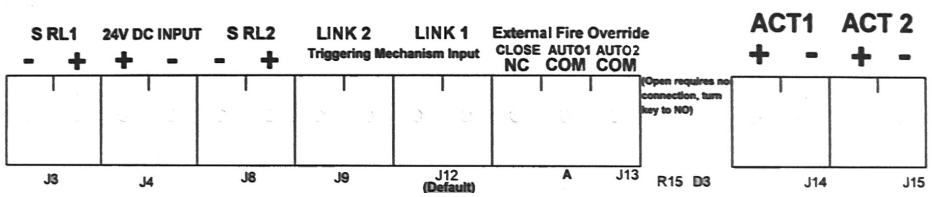
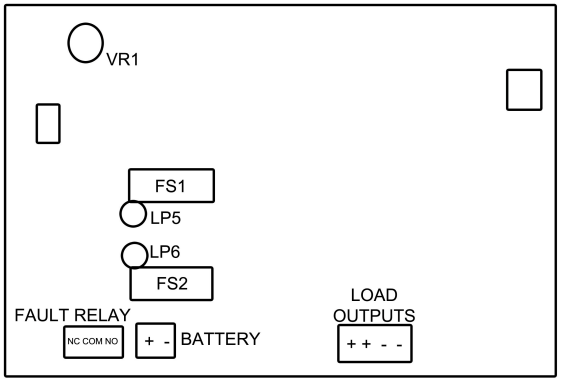
9. AOV distribution PCB connections



SRL1 – 24 v dc out only on closing 0 volts at all other times
24V DCINPUT – Input from Power Supply unit – observe polarity
SRL2 – 24vdc out continuously in quiescent 0 volts out on opening
LINK2 – Break closed link to get output volts from ACT 1 & ACT 2 Remake reverses.
LINK1 – Break closed link to get output volts from ACT 1 & ACT 2 Remake reverses.
EXT FIRE OVERRIDE – Connection for "Fireman's" control if required

ACT1 +/- 24vdc output to actuator on system activation reverse voltage on reset
ACT2 +/- 24vdc output to actuator on system activation reverse voltage on reset

10. Power Supply – **PSF-243 (3Amp) & PSF-245 (5 Amp)**



Lid Indicators Green Green = Supply Healthy Amber = Fault
When the Green light only is illuminated, the unit is operating normally with supply to the load and the batteries (when fitted) are receiving charge current. When the Amber light is illuminated at the same time as the Green light there is a fault on either or both of the output supply and the charge supply. If the Green light is NOT illuminated, the mains supply is not present or the main "overload" fuse has blown.

PCB Fuses F.1. Battery = 3Amp quick blowF.2. = 3Amp quick blow

PCB Indicators

Amber (LP5) = Short circuit fault/supply fault.
Amber (LP6) = Charge output fault.
LP5 illuminated is either a short circuit in the wiring, or an excessive load.
LP6 illuminated is blown fuse (adj relay) in the battery charge output (i.e. Short circuit of the battery leads) or by output supply short circuit. It is essential the battery is not fitted "REVERSE POLARITY" as this will cause damage to the charging circuit which may be irreparable.

Battery Connections

Two batteries (typical types to be used are Yuasa NP12-7) in equal state of charge are required to make up 24V. The supplied leads should be used.

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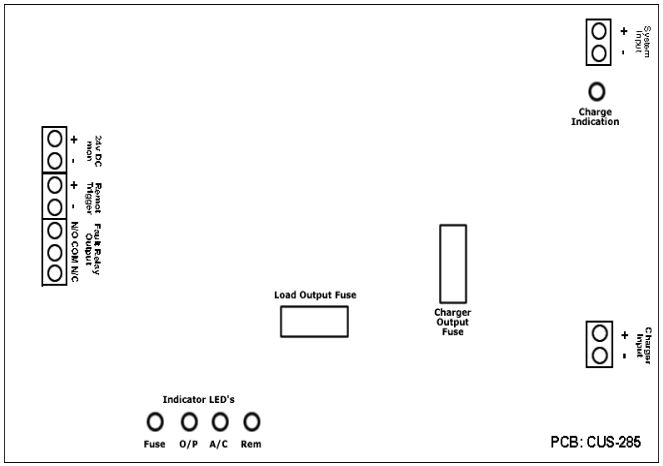
Battery Cut-Out

During A.C. failure the system will switch to battery standby, the output voltage level will follow that of the batteries down to approximately 19V. At this point the cut-out circuit for battery protection will disconnect power altogether. Should A.C. not be available when testing with healthy batteries, a quick short on J11 pins will activate the battery cut-in to power the load. (if there is sufficient charge in the batteries)

Fault Relay

The fault relay output will go from normal to fault state when A.C. power is removed or when there's a fault in the unit as indicated by LP5 or LP6..

11. Power Supply Connections - **PSF-249 (10 Amp)**



Indicator Green = Supply Healthy Amber = Fault

When the Green light only is illuminated, the unit is operating normally with supply to the load and the batteries (when fitted) are receiving charge current. When the Amber light is illuminated at the same time as the Green light there is a fault on either or both of the output supply and the charge supply. If the Green light is NOT illuminated, the mains supply is not present.

PCB Fuse: FS.2. = 2 Amp (20mm x 5mm**)** Output Fuse: Standard automotive =10Amp

PCB Indicators:
Amber LED 5 = when lit indicates battery not connected or mains fail
Green LED 6 = when lit indicates 'real' battery charging in progress
Green LED 2 = when lit indicates the output is present.
Green LED 3 = when lit indicates the mains supply is present.
Amber LED 1 = when lit indicates there is an output fault/blown fuse.
Red LED 4 = when lit indicates there is a remote trigger input.

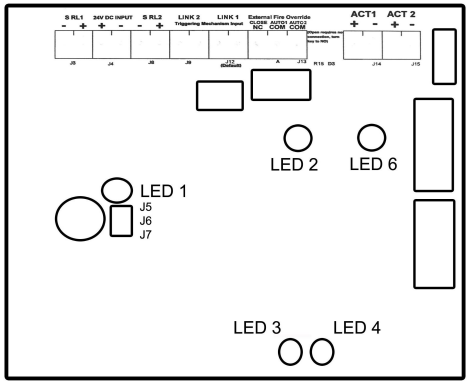
Battery Connections
Two batteries (typical types to be used are Yuasa NP12-7) in equal state of charge are required to make up 24V. The supplied leads should be used.

Battery Cut-Out
During A.C. failure the system will switch to battery standby, the output voltage level will follow that of the batteries down to approximately 19V. At this point the cut-out circuit for battery protection will disconnect power altogether. Should A.C. not be available when testing with healthy batteries, a quick short on J11 pins will activate the battery cut-in to power the load. (if there is sufficient charge in the batteries)

Fault Relay
The fault relay output will go from normal to fault state when A.C. power is removed or when there's a fault in the unit as indicated by LP5 or LP6..

12. Indicators – AOV pcb

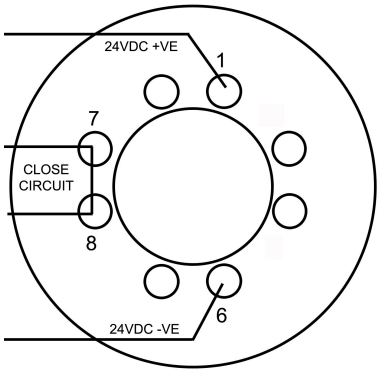
Green LED 6 - Right hand relay pcb - lit in normal operation, off when "trigger" present
Green LED 2 - Left hand relay pcb - lit when output 24v present
Green LED timer LED 1 - lit when timer is active upon actuator closure.
Green & Amber LED 3&4 – Actuator status.



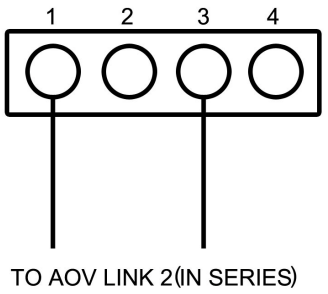
13. Actuator timing setup

Using the jumper provided, junctions J5, J6 and J7 will provide the following time scales when in reverse polarity:
J7 = 0 seconds – 1 minute
J6 = 1 minute – 2 minutes
J5 = 2 minutes – 3 minutes
Note: These time scales are adjusted using VR1

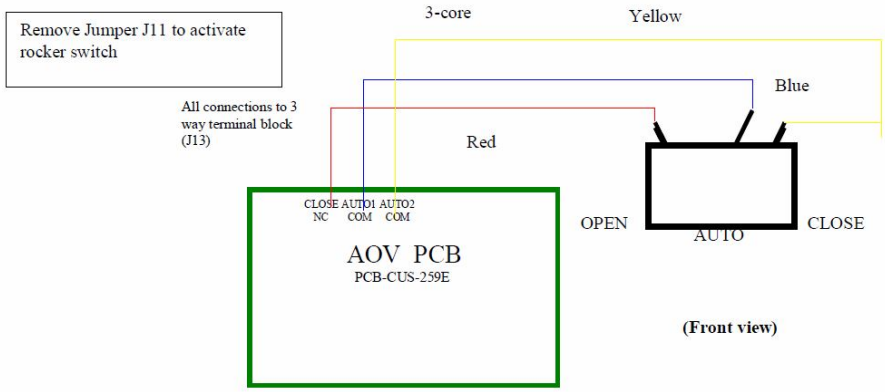
14. Detector wiring



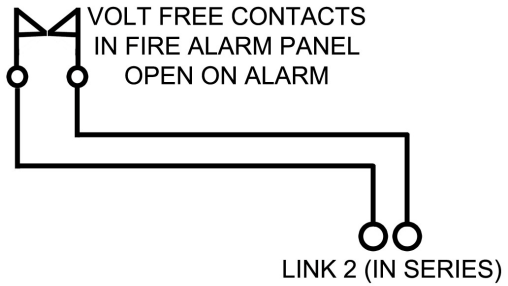
15. MCP ("Smash Glass") wiring



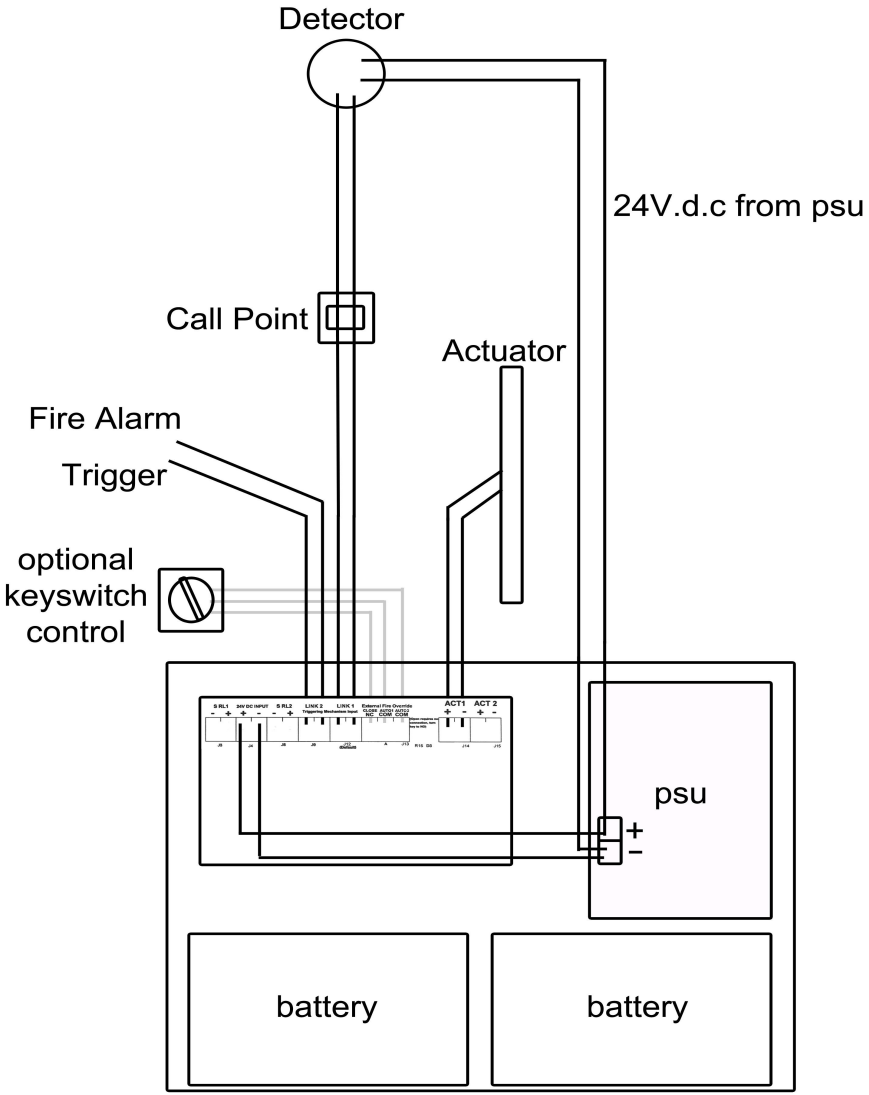
16. Connection to Firemans Switch



17. Fire Alarm input wiring



18. System schematic for single zone



19. Commissioning

1. When all parts of the system have been installed final connecting and testing can be started.
2. It is recommended that all parts of the system to be wired into the control panel are tested separately and independently before connecting into the control panel. Any parts not working correctly must be rectified before proceeding.
   (The SLA batteries to be used in the control unit can be used to test actuators for forward and reverse action before connecting into control panel. Other volt free items can be checked with a multi-meter before final connection)
3. The mains input should be connected first into the power supply mains terminal block. After checking that any bare cable ends are clear of circuit boards the unit can be switched on. When switched on the relays on both main PC boards will "click" and LEDs will light up:
   Amber on power supply PCB
   Green and amber on AOV PCB
   Green and amber on lid cards

4. After 40 to 50 seconds when the AOV timers have reset there should be:
   one green LED illuminated on AOV PCB
   one amber LED illuminated on power PCB
   Green and amber illuminated on left lid card

5. Now connect the SLA batteries 2 x 12volt in series to make a 24volt set. Then connect the battery set into the battery terminals on the PSU PCB taking particular care to get the **correct polarity.**
6. After connecting the batteries there should be only the green LED illuminated on the left lid card.
7. At this point the rest of the system components should be added one at a time testing the performance as each part is connected. If there is a problem in the wiring of one of the parts it will show up when tested and can be rectified immediately.
8. Once all of the parts are connected successfully the system as a whole can be tested:
   Check that each smoke detector operates correctly and operates the correct actuator(s).
   Check that each call point operates correctly and operates the correct actuator(s)
   Check that the "Firemans switch" operates correctly.
   Check that each actuator operates as required.
9. Once the testing has been satisfactorily completed the system should be tested again with the mains supply to the unit switched off. The system should still operate as before if the batteries are in new condition. If not then switch on mains refit the lid and leave the unit for 24 hours for the batteries to charge and then retest.

20. Maintenance

The AOV control panels do not require any specific maintenance other than replacement of the Sealed Lead Acid batteries that generally have a 4-5 year life from new.
These batteries should be performance checked annually as a minimum and tested on a regular basis for operation by switching off the mains to the unit. If the batteries are in good condition they should be able to operate the system with the mains off.
Any problem should be rectified immediately
The system should be checked regularly for continued performance by testing each of the connected parts.