

# DPC150 PRESSURE - VOLUME CONTROL

With Internal Pressure-Volume P- or V-Sensor

- Ultra fine pressure or volume control
- Controls fan speed invertors and actuators
- Hand - Auto and BMS change over control
- Local or external BMS actual sensor display
- Local or external BMS position sensor display
- Internal or remote BMS set point adjustment
- Door switch control freeze with timer
- Low and High alarm thresholds and alarms
- Volt free alarm contact for remote BMS.
- Excellent repeatability
- After Sales Service is provided by CMR
- 24 month warranty
- 20 Years field application experience

## GENERAL

The DPC150 was designed to provide accurate air volume and room pressure control especially in clean room environments but over the years it has found a multitude of uses in all kinds of control systems. The principle of the control is simple and easily adopted by any controls engineer. It consists of one control loop with a number of options such as auto or manual control and remote BMS interface. The DPC150 has a built in sensor and can control damper motors or fan speed invertors. It provides constant air volume control in ventilation systems or accurate room pressure control especially in pharmaceutical production and research areas. It has an option for local and remote alarm outputs and has BMS and Scada monitoring systems connectivity. Full calibration certificates traceable to National Standards can be supplied to make the CMR control system conform to validation procedures.

## BUILT IN MEASUREMENT TRANSDUCER

The Controller can read in a 0...10V signal from the built in CMR sensor. The sensor's actual value is displayed on an LCD Display on the front operators panel of the DPC150. The LCD Display is normally scaled 0...100% of the 0...10V but can be scaled to different engineering units i.e. Pa, mBar, m/s etc.

## AUTO CONTROL SET POINT

A set point adjustment dial is provided for the user to select an operating set point. The dial is available either as 0...100% or -100%...0...+100% depending on type ordered.

## CONTROL OUTPUT OPEN-OFF-CLOSE OR 0...10V / 4...20mA

The DPC can drive all fast acting CMR motors which have a 24VAC synchronous motor to drive open, off or close. Because of the high speeds, the controller has all built in facilities to control in all applications without hunting.

The DPC is also available with 0...10V output normally used for fast acting Invertor Fan Speed Controls or specialist damper actuators.

## MANUAL HAND CONTROL

A Hand-Auto switch is provided. When selecting the Hand option, the manual set point dial is made active and the user can select a manual operating set point to drive the invertor or damper into any position. This is ideal for commissioning or emergency actions. The dial is scaled to 0...100% as standard.

The actual speed of the Fan Invertor i.e. 0...100% of the Hz output or the position of the actuator i.e. 0...100% of the damper angle is continuously monitored. This value is available as 0...10V signal to the BMS and the LCD display.

## POWER SUPPLY

The DPC150 can be supplied for various power supplies such as 24V AC, 110V AC and 230V AC.



DPC150 Controller with built in sensor, Type 'G' display and alarm

## THE TRANSDUCER

The transducer is manufactured by CMR and consists of precision engineered components, high quality metals and SMD electronics. The principle of the transducer is the measurement of the displacement of the linear diaphragm by means of a push and pull variable reluctance transducer which is not affected by Humidity, hence it can be used in many Industrial and Chemical applications even using high concentration of Formaldehyde.



CMR Transducer

There are no mechanical connections to any of the sensing coils and the diaphragm, hence extreme low pressures can be measured at excellent repeatability and minimal hysteresis. The movement of the diaphragm is so small that no air volume is required to measure the air pressures over a distance of 200m.

The zero drift is uniquely minimized by the measuring coils which provide excellent self compensation. One coil measures positive and the other negative drift and therefore balances any excessive drift between two tolerance limits in its life cycle. The CMR Transducers are temperature compensated in a computerised climate chamber and have a proven track record of over 20 years.

## CMR DAMPERS AND ACTUATORS

CMR provides a large range of dampers either circular or rectangular with a variety of actuators from 4 up to 150 seconds rotation speed for 0...90°. The DPC150 can control all these actuators accurately and without hunting. It is recommended to use CMR dampers and actuators as the mechanical strength and torque of the actuator is critical when operating at very high speeds.



CMR Extract Valve

## FAN SPEED INVERTOR CONTROL

The DPC150 is ideal to control any Fan Speed Invertor from small to large applications either on static pressures or fan volumes using the CMR fan inlet ring measuring probes. It is of great advantage where an independent control loop is required to provide fail safe operation. The DPC150 can run the fan in auto or manual mode and provides override capability for the BMS.



Invertor 0-100Hz

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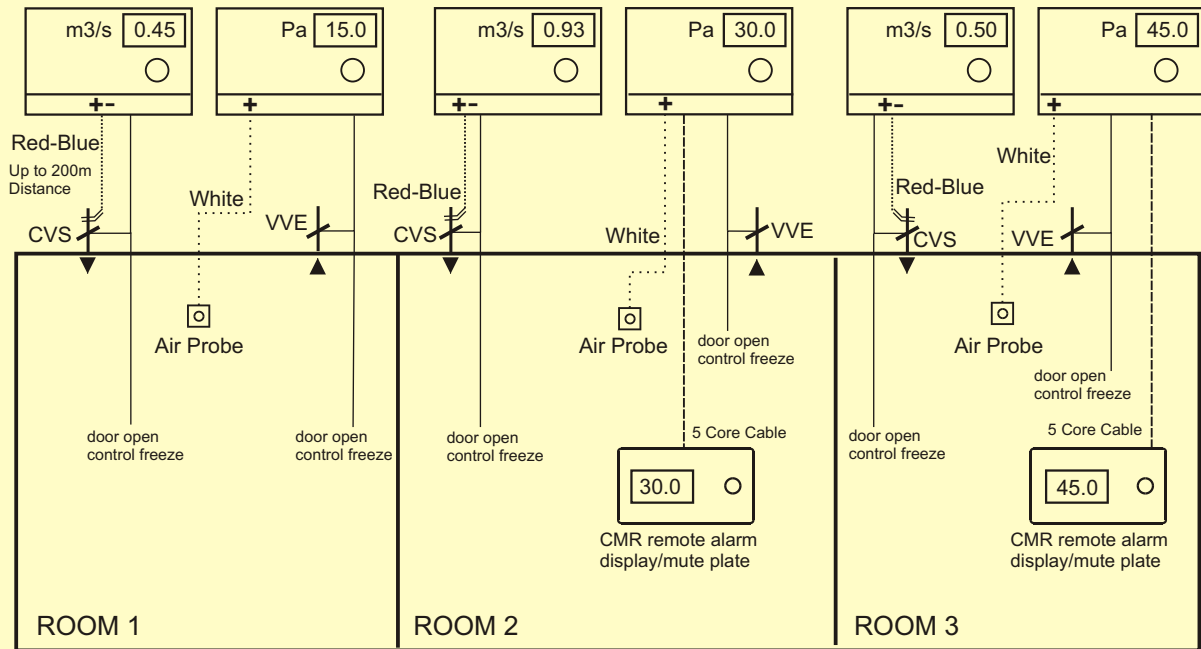


# DPC150 LOCAL CLEAN ROOM CONTROL

## CONSTANT SUPPLY (CVS) AND VARIABLE VOLUME EXTRACT (VVE) CONTROL

### DPC150 COMPACT AIR PRESSURE - VOLUME CONTROLLERS

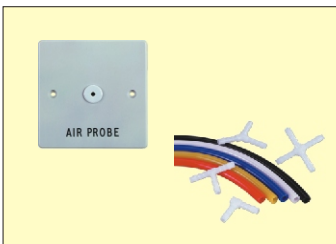
The reference (-) port of the controller is left open on the VVE controllers to the plant room.



Typical clean rooms with individual DPC150 controllers. The Supply DPC is set up to be a volume controller measuring the differential pressure on the CMR venturi valve. The red and blue PVC tube is run from the venturi to the DPC controller and up to 200m distance can be achieved without losing the accuracy of the signal. The transducer within the DPC converts this signal into a volume. The extract DPC measures the room pressure via an air probe plate fitted to the ceiling.

White PVC tube is run to the DPC. The DPC transducer converts the pressure into Pa and displays the value on the DPC and remote alarm plate and generates a local alarms. Both DPCs have adjustable set points for the supply volume and room pressure and once adjusted, the DPC drives the CMR dampers or air valves to achieve the room conditions. Door interlock switches are fitted to freeze the damper in its last position. On door closure, it has a timed release.

### TYPICAL ROOM PRESSURE AND VOLUME CONTROL WITH INDIVIDUAL DPC150s



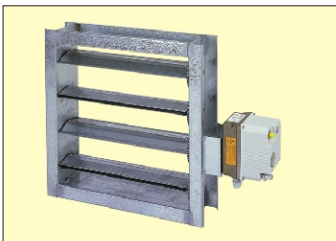
CMR Air Probe which is normally fitted to the ceiling and connected with CMR PVC tube to the DPC150.



DPC150 with a single or double LCD display and set point adjuster. A hand-auto switch puts the DPC on manual and the damper can be set to any angle 0...90°.



A remote alarm plate with display of the pressure, alarm Light, buzzer and mute can be wired to the DPC.



CMR air tight control damper with AST fast acting actuator is driven by the DPC150.



CMR Air Valves are either galvanised sheet metal or polypropylene (PPS), with or without venturi volume measurements. Suitable for fast or slow operation.



CMR rectangular volume control damper with venturi. Suitable for all CMR actuators and DPC150s.

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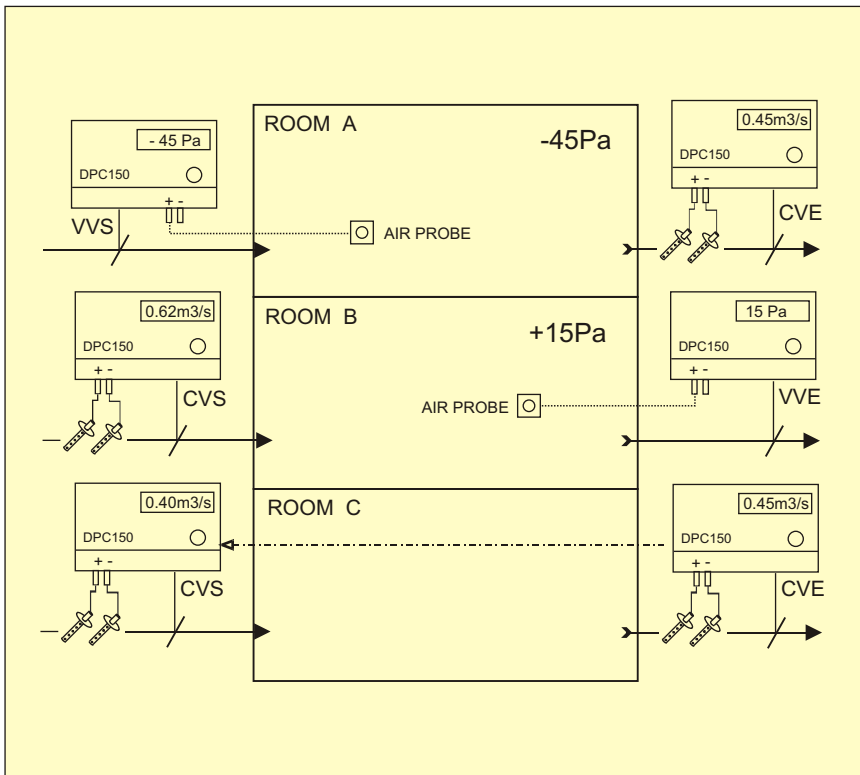
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# DPC150 AIR CONTROL APPLICATIONS

## TYPICAL ROOM PRESSURE CONTROL AND VOLUME TRACKING



### DPC150 AIR CONTROLS

#### ROOM A

The extract is set up as constant volume extract (CVE) to maintain 0.45m<sup>3</sup>/s. The supply air is set up to be variable volume supply (VVS). The room pressure is measured via the air probe and the supply air is controlled to maintain -45Pa in the room.

#### ROOM B

The supply air is set up to be a constant volume supply (CVS) to maintain 0.62m<sup>3</sup>/s.

The extract is set up as variable volume extract (VVE). The room pressure is measured via the air probe and the extract air is controlled to maintain +15Pa in the room.

#### ROOM C

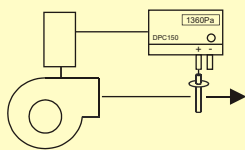
The supply is set up as constant volume supply (CVS) and the extract is set up as constant volume extract (CVE). The volume can be offset by external means i.e. BMS and both CVE or CVS can track each other. The DPC is adjustable to achieve either over or under pressure in the controlled space. The schematic shows the extract volume sets the supply volume.

The above schematic shows typical applications for the DPC150 controllers. The DPC150 is normally used for small installations where there are only a small number of controllers used. For large installations we suggest to use the DPC200s with DPM instruments fitted into central control panels, which makes calibration and validation easier. PVC tubing can be run up to 200m in length to any of the above constant volume venturi valves and the room pressure air probe plates. The DPC150 is a standard controller which can be configured to provide constant supply, constant extract, variable volume supply or variable volume extract. It has the necessary interfaces to be set up as a tracking controller which means either supply or extract can follow each other with an adjustable offset.

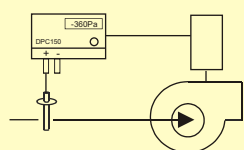
It is recommended to use the CMR dampers and valves with CMR actuators, as the mechanical connections and the gearboxes have been designed for continuous high speed action all year round. All DPCs can be connected to remote MPCs, BMS or Scada computers systems to read in the pressures, volumes and set points. The DPC can also receive remote set points and be controlled to be in automatic or manual mode. In case of computer failure, the DPC reverts back to its default set points, a vital advantage in critical manufacturing processes. All DPCs have control freeze and timed release when clean room doors are opened and closed. The DPC150 can be supplied with traceable calibration certificates to National Standards and site certification can be carried out on request.

## TYPICAL STATIC PRESSURE AND CONSTANT FAN SPEED AND VOLUME DAMPER CONTROL APPLICATIONS

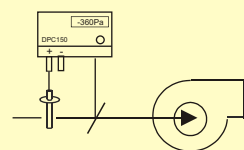
### STATIC PRESSURE CONTROL



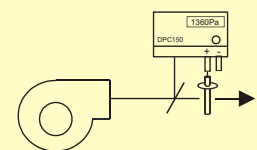
Supply Fan Speed Control



Extract Fan Speed Control

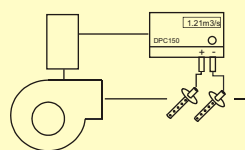


Extract Damper Control

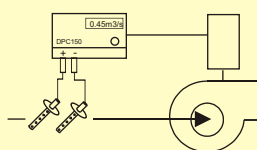


Supply Damper Control

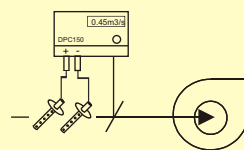
### CONSTANT VOLUME CONTROL



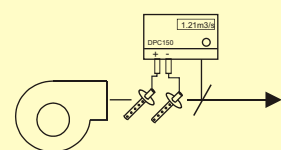
Supply Volume Fan Control



Extract Volume Fan Control



Extract Volume Damper Control



Supply Volume Damper Control

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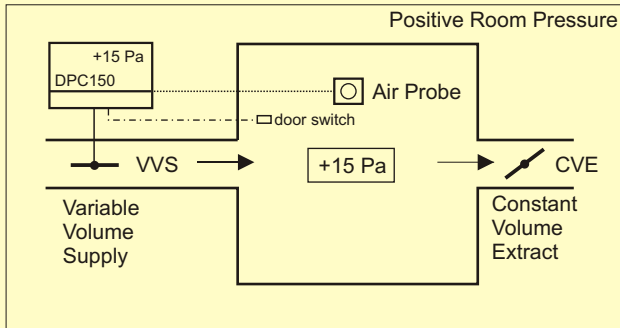


# DPC150 DAMPER CONTROL METHODS

## TYPICAL AIR PRESSURE OR AIR VOLUME DAMPER CONTROLS USING DPC150 CONTROLLERS.

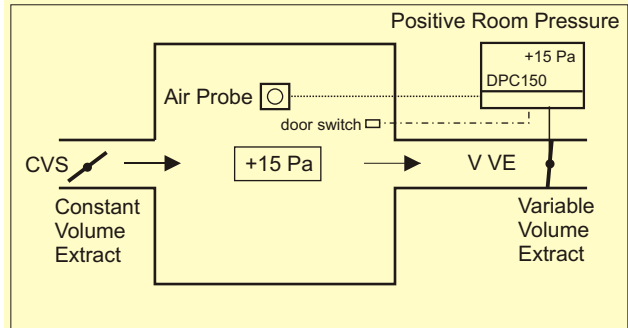
Damper Actuators can either be the OPEN-OFF-CLOSE or the 0-10V Type

### Mode 'A'



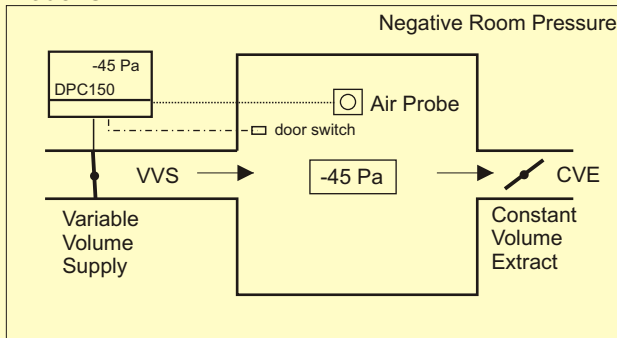
The room must be controlled at 15Pa positive pressure using variable volume supply and manual constant extract. On start up, the supply damper must be open and starts closing if the room pressure is greater than 15Pa. The damper motor stops when a door is opened and re-starts after a time out when closed again.

### Mode 'B'



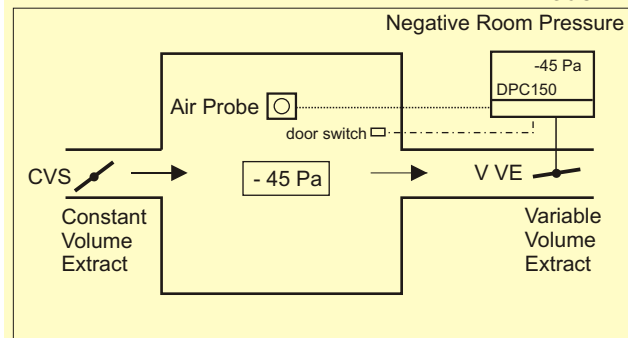
The room must be controlled at 15Pa positive pressure using variable volume extract and manual constant supply. On start up, the extract damper must be closed and starts opening up if the room pressure is greater than 15Pa. The damper motor stops when a door is opened and re-starts after a time out when closed again.

### Mode 'C'



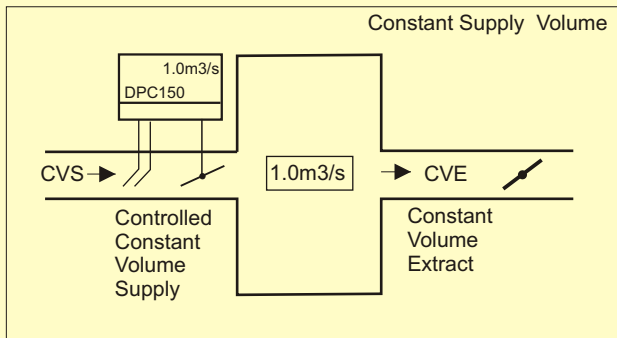
The room must be controlled at -45Pa negative pressure using variable volume supply and manual constant extract. On start up, the supply damper must be closed and starts opening if the room pressure is more negative than -45Pa. The damper motor stops when a door is opened and re-starts after a time out when closed.

### Mode 'D'



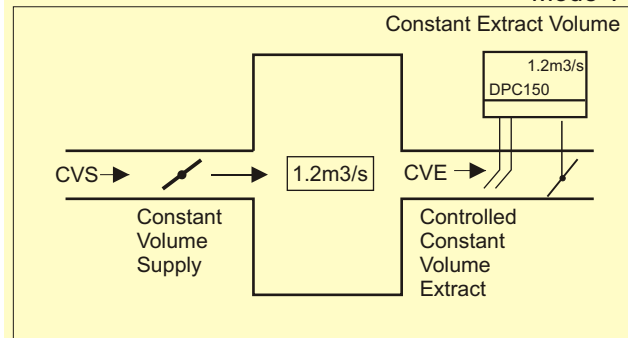
The room must be controlled at -45Pa negative pressure using variable volume extract and manual constant supply. On start up, the extract damper must be open and starts closing if the room pressure is more negative than -45Pa. The damper motor stops when a door is opened and re-starts after a time out when closed.

### Mode 'E'



The room must be controlled at 1.0m3/s constant supply volume. On start up, the supply damper must be open and if the volume is more than the set point the damper starts closing to achieve the required constant volume. The controller has an adjustable set point to vary the supply at any time. The DPC can be linked to an extract DPC controller if fitted to provide supply to extract tracking.

### Mode 'F'



The room must be controlled at 1.2m3/s constant extract volume. On start up, the extract damper must be open and if the volume is more than the set point the damper starts closing to achieve the required constant volume. The controller has an adjustable set point to vary the extract at any time. The DPC can be linked to a supply DPC controller if fitted to provide extract to supply tracking.

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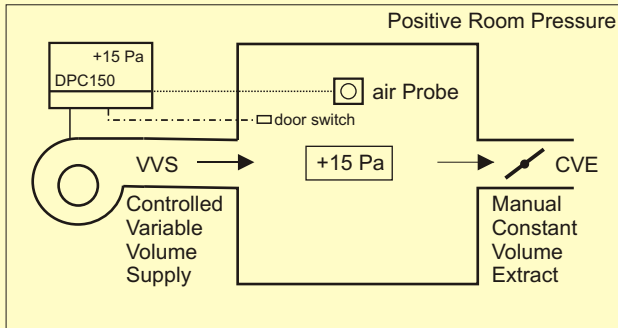
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# DPC150 FAN SPEED CONTROL METHODS

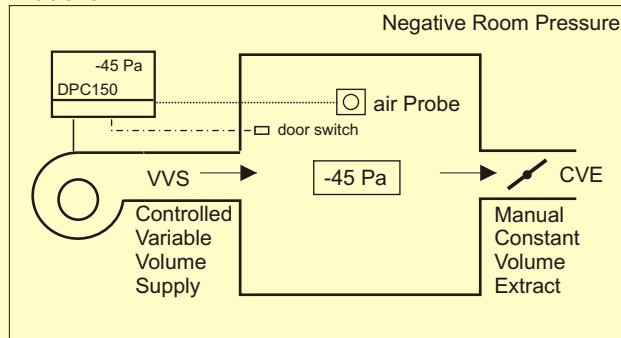
TYPICAL AIR PRESSURE OR AIR VOLUME FAN SPEED CONTROL USING DPC150 CONTROLLERS.

## Mode 'G'



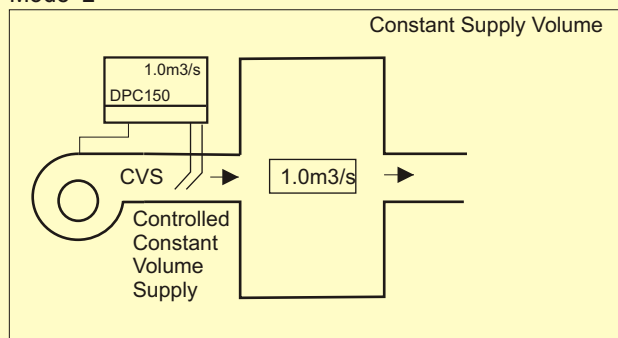
The room must be controlled at 15Pa positive pressure using variable volume supply and manual constant extract. On start up, the supply fan must speed up and starts reducing speed if the room pressure is greater than 15Pa. The fan speed locks when a door is opened and re-starts after a time out when closed again.

## Mode 'J'



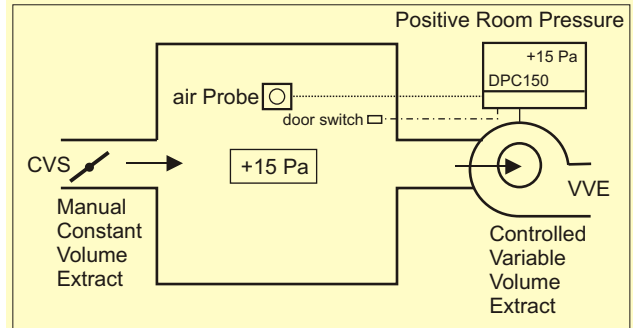
The room must be controlled at -45Pa negative pressure using variable volume supply and manual constant extract. On start up, the supply fan must reduce speed and starts speeding up if the room pressure is more negative than -45Pa. The fan speed locks when a door is opened and re-starts after a time out when closed.

## Mode 'L'



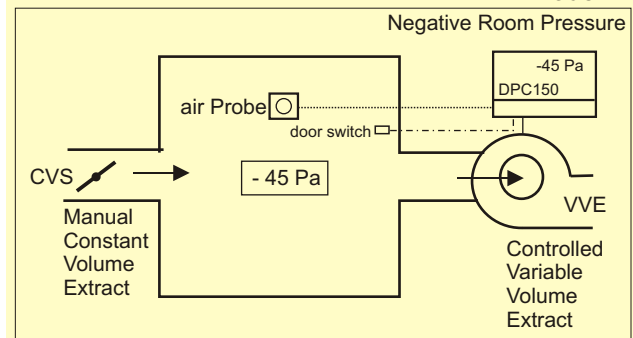
The room must be controlled at 1.0m³/s constant volume supply. On start up, the supply fan must speed up and if the volume is more than the set point the fan speed starts reducing to achieve the required constant volume. The controller has an adjustable set point to vary the supply volume if required. The DPC can be linked to the extract fan to provide supply to extract tracking.

## Mode 'H'



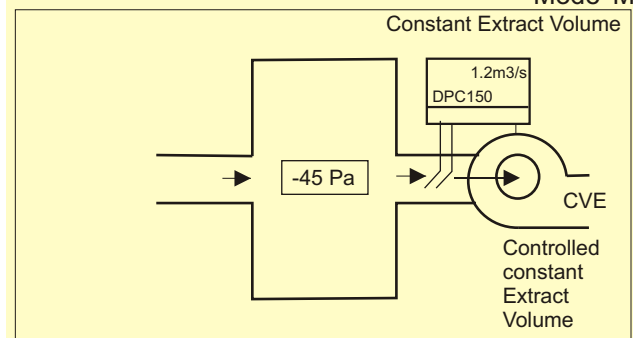
The room must be controlled at 15Pa positive pressure using variable volume extract and manual constant supply. On start up, the extract fan must reduce and starts speeding up if the room pressure is greater than 15Pa. The fan speed locks when a door is opened and re-starts after a time out when closed again.

## Mode 'K'



The room must be controlled at -45Pa negative pressure using variable volume extract and manual constant supply. On start up, the extract fan must speed up and starts reducing speed if the room pressure is more negative than -45Pa. The fan speed locks when a door is opened and re-starts after a time out when closed again.

## Mode 'M'



The room must be controlled at 1.2m³/s constant extract volume. On start up, the extract fan must speed up and if the volume is more than the set point the fan speed starts reducing to achieve the required constant volume. The controller has an adjustable set point to vary the extract volume if required. The DPCs can be linked to the supply fan to provide extract to supply tracking.

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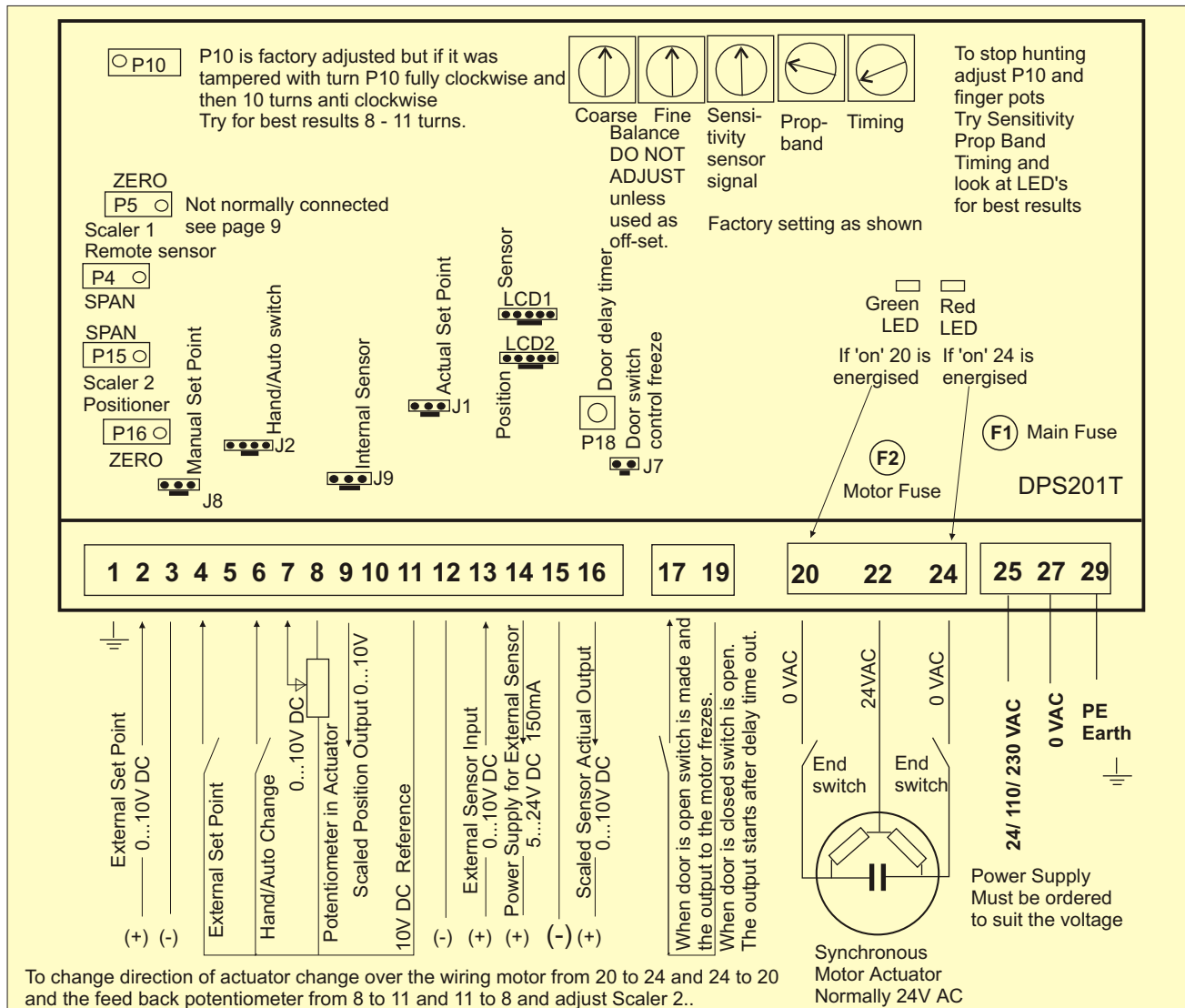
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# DPC150 AST-VMS/L MOTOR CONTROL

DPC150 CONTROL BOARD WITH OPEN-OFF-CLOSE OUTPUT TO DRIVE SYNCHRONOUS MOTORS



## COMMISSIONING DAMPER ACTUATOR MOTION

### Control method: Damper must be open on start up.

With no pressure or volume applied to the sensor and the setpoint set to +50% the green LED must be on and the damper must drive to open position on 20. If not, change over motor wires from 20 to 24 and 24 to 20 to change direction of motor. Adjust the end limit switch in the motor to give maximum opening position.

Apply pressure to (+) port of the sensor so that the signal is higher than the set point and the damper should drive to closed position. The red LED and 24 should be on. Adjust the closed limit switch to fully closed position. Repeat this process a few times until correct.

### Control method : Damper must be closed on start up.

With no pressure or volume applied to the sensor and the setpoint set to +50% the green LED must be on and the damper must drive to closed position on 20. If not, change over motor wires from 20 to 24 and 24 to 20 to change direction of motor. Adjust the end limit switches in the motor to give fully closed position.

Apply pressure to (+) port of the sensor so that the signal is higher than the set point, the red LED must be on and the damper should drive to open position 24. Adjust the open limit switch to fully open position. Repeat this process a few times until correct.

## COMMISSIONING DAMPER ACTUATOR POSITION

### Control method: Damper must be open on start up.

The scaler 2 is the actuator position potentiometer scaling. The potentiometer is connected to 11 (10V) and 8 (GND) the output wiper is connected to 7. When the damper is fully open adjust span (P15) to 10V measured on 9. Close the damper as described on the left. Adjust the zero (P16) to be 0V on 9.

If the damper works incorrectly change over 8 to 11 and 11 to 8 to inverse the potentiometer function and repeat above process until correct.

### Control method: Damper must be closed on start up.

The scaler 2 is the actuator position potentiometer scaling. The potentiometer is connected to 11 (10V) and 8 (GND) the output wiper is connected to 7. When the damper is fully closed adjust span (P15) to 10V measured on 9. Open the damper as described on the left. Adjust the the zero (P16) to be 0V on 9.

If the damper works incorrectly change over 8 to 11 and 11 to 8 to inverse the potentiometer function and repeat above process until correct.

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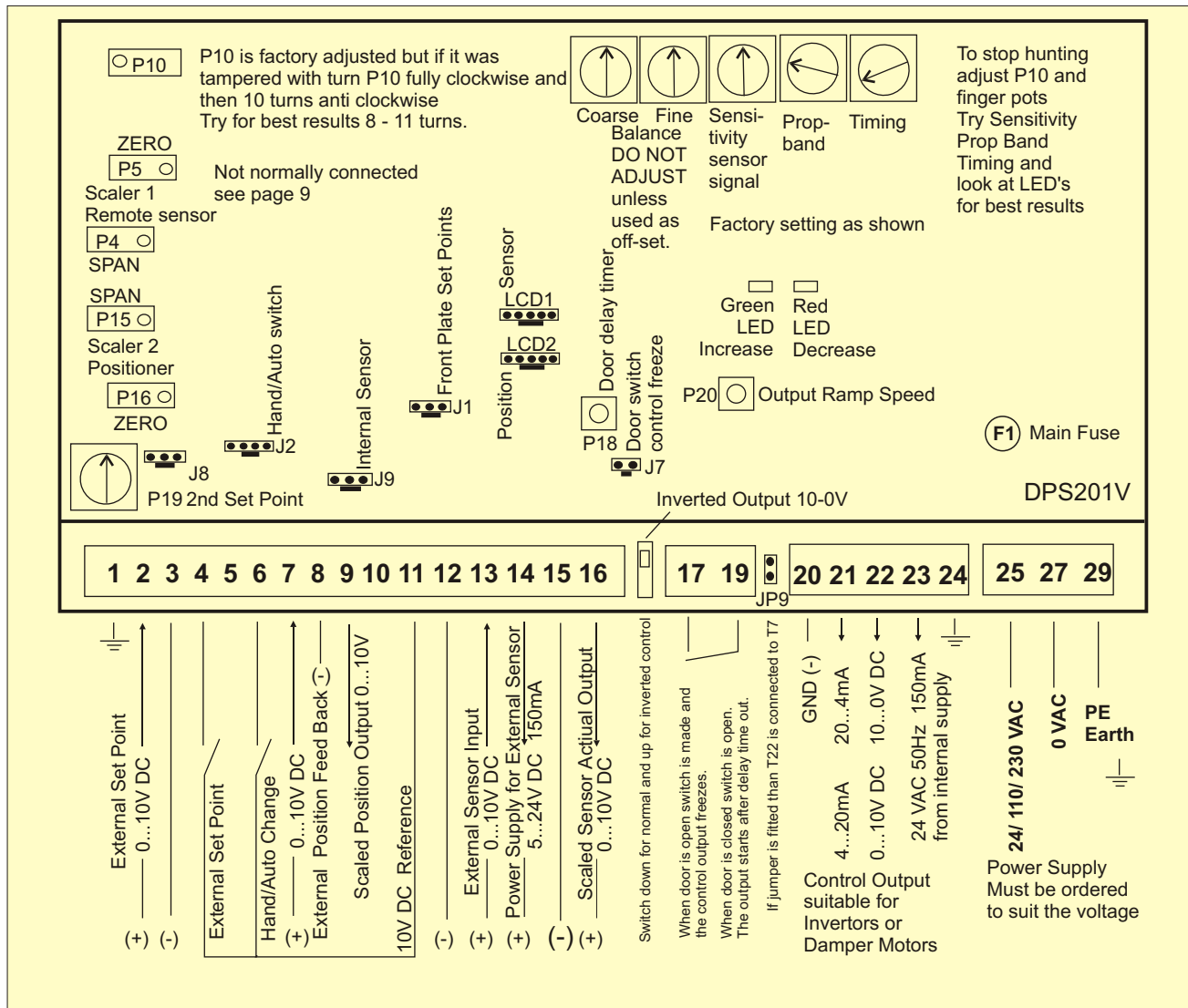
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# DPC150 CONTROLLER 0-10V OR 4-20mA

DPC150 CONTROLLER WITH 0...10V/4...20mA OUTPUT TO DRIVE FAN SPEEDS OR DAMPER MOTORS



## COMMISSIONING A

### On start up the fan must speed up or the damper opens

With no pressure or volume applied to the sensor and the set point set to +50% the green LED must be on and 0...10V drives the fan up or damper open. If not, change over the inverter switch to normal position to change direction of the output signal. Adjust any top end limits on the external equipment if required. Apply a pressure or flow to (+) port of the sensor so that the signal is higher than the set point and the Fan should reduce speed or the damper closes. The red LED must be on and 0V drives the fan down. Adjust any end limits on the external equipment if required. Repeat this process a few times until correct.

The scaler 2 is the feed back positioner scaling circuit..

The feed back voltage from the Invertor or damper motor should preferably be 0...10V. The signal is fed into 7. If the fan is in low speed position adjust zero (P16) to read 0V on 9. If the fan is in full speed position adjust span (P15) to read 10V on 9. Try the controller on manual control by changing the set point. Repeat this process a few times until correct.

## COMMISSIONING B

### On start up the fan must reduce speed or the damper closes.

With no pressure or volume applied to the sensor and the set point set to +50% the green LED must be on and 10 ... 0V drives the fan down or closes the damper. If not, change over the inverter switch to inverted output position to change direction of the output signal. Adjust any top end limits on the external equipment if required. Apply a flow to (+) port of the sensor so that the signal is higher than the set point and the Fan should speed up. The red LED must be on and 10V drives the fan up or the damper opens. Adjust any end limits on the external equipment if required. Repeat this process a few times until correct.

It is essential that the external equipment can invert the feed back signal otherwise the DPC270 cannot function. Consult CMR in case of difficulties.

The scaler 2 is the feed back positioner scaling circuit..

The feed back voltage from the Invertor or damper motor should preferably be 10...0V. The signal is fed into 7. If the fan is in low speed position adjust span (P15) to read 10V on 9. If the fan is in full speed position adjust zero (P16) to read 0V on 9. Try the controller on manual control by changing the set point. Repeat this process a few times until correct.

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# DPC150 CONTROL BOARD FUNCTION

THE LINK SETTINGS ARE FACTORY SET AND TESTED TO WORK WITH A DPC150 AS ORDERED

## POTENTIOMETERS

**P1** Sets the external sensor power supply voltage on 14 from 5 to 24VDC.

**P2** Set P3 fully clockwise to have maximum output on 11 then adjust P2 to have 10V on 11.

**P3** follow P2

**P4** If the Jumper on JP7 scaler1 has been set to up position then P4 is the span adjustment for the external sensor signal coming in on 13.

**P5** see P4. P5 is the zero adjustment for scaler1.

**P15** if Jumper on JP7 scaler2 has been set to up position then P15 is the span adjustment for the feed back of the external position sensor on 7.

**P16** see P15. P16 is the adjustment for the zero for scaler2.

## LINK SETTINGS

### Sensor input on 13

**JP7 1-3** 2-4 scaler 1 connected  
**JP7 3-5** 4-6 scaler 1 not connected  
 The sensor has a square root option so that the DPC square rooter is not used

### Position Sensor on 7

**JP7 7- 9** 8-10 scaler 2 connected  
**JP7 9-11** 10-12 scaler 2 not connected

### External Set Point on 2

Standard factory setting  
**JP8 3-5** 9- 11 scaler 2 not connected

For tracking of volumes use CMR DPM55 or V-Sensors. If only pressure sensors are available then use DPC Square Rooter and scaler2 option and feed in the external volume signal into T2 external set point and link as follows:

**JP8 8-9** square root connected  
**JP7 9-11** 10-12 scaler2 not on 7  
**JP8 1- 3** 7- 9 scaler 2 connected to 2  
**Link T14 to T4**

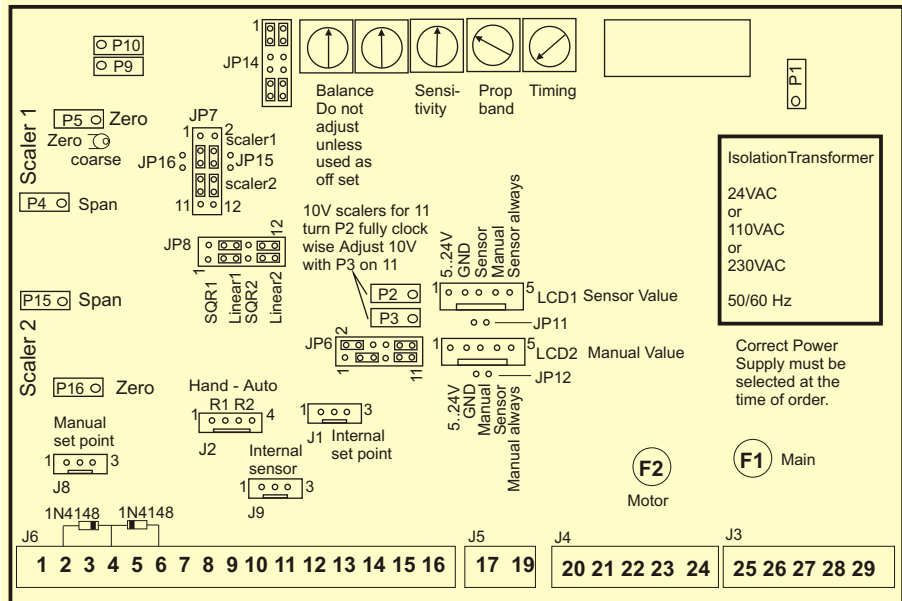
### Internal Set Point P3 connection

If a plain plate has been ordered and no potentiometer can be connected to the board then P3 is the internal set point. In order to make it function link:

**JP6 1-3**  
 P3 is now internal set point  
 To commission P3 turn P3 fully clockwise, measure on 10 and adjust P2 until 10.00 V is achieved. Then turn P3 from 0-100% = 0...10V internal set point.

Note: if P3 is used as set point 11 cannot be used as reference 10V. Use 14 instead and adjust P1 to 10V on 14.

## DPC150 LINK - FRONT PLATE CONNECTORS AND POTENTIOMETER SETTINGS



### 24VAC POWER SUPPLY

The standard power supply is 24VAC on J3 with fuse F1 (1A). With the 24VAC version the damper motor is connected directly to the external power supply linked under the board to J3 via a separate fuse F2 (1A). Any 24VAC motor can be connected to J4 provided the external power supply is large enough to drive one 24VAC synchronous motor up to 1A.

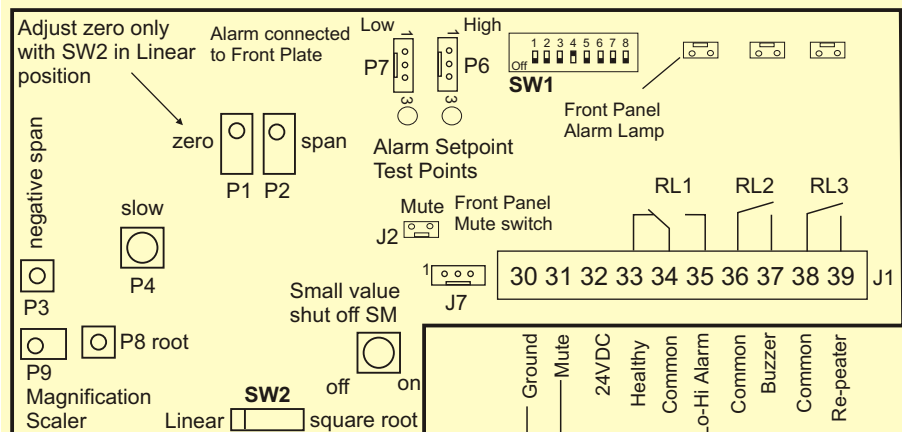
### 110V-230VAC POWER SUPPLY

The optional power supply is 110V or 230VAC on J3 with fuse F1 (315mA). With this version the 24VAC is produced by the on-board isolation transformer and a maximum of 350mA can be connected to J4. In this case the board must be configured to internal 24VAC supply to J4. Do not exceed the maximum power available from the board. Consult CMR.

## FC203 P-SENSOR AND ALARM CONNECTIONS AND SETTINGS

The sensor is factory calibrated and comes with certificate. To check calibration of the P-Sensor remove all tubes, switch SW2 to Linear and measure on T13 and adjust zero (P1) to 0.00V if the sensor range is i.e. 0-100Pa or 5.00V if the sensor range is (-)100.. (+)100Pa. Pump up sensor to 75% of range i.e. 0-100Pa sensor would be 75Pa and measure on T13

and adjust span (P2) to 7.50V or pump up range (-)100.. (+)100Pa to 75% of positive range 75Pa and measure on T13 and adjust span (P2) to 8.75V. Repeat a few times. Dampening is available on P4 (slow). To obtain m/s or m3/s switch SW2 to square root. The SM stops the small value on square root.



SW1	1 Test RL1	4 off - 5 off	0s Alarm Delay
	2 Test RL2	4 off 5 on	10s Alarm Delay
	3 On=Flashing	4 on 5 off	30s Alarm Delay
	4-5 Timer	4 on 5 on	60s Alarm Delay

6	On=Latching Alarm
7	On=Re-Alarm Timer set
8	Off=RL3 repeater no flash
	On=RL1=low alarm output
	RL3=high alarm output

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# DPC150 OPERATOR FRONT PANEL

## FRONT PANEL EXPLANATION

1. LCD displays the actual sensor value in %
2. Control set point in 0...100% or -100..100 %.
3. Low Alarm set point 0...100% or -100 ..100 %.
4. High Alarm set point 0...100% or -100..100 %.
5. Alarm light switches on after time out of alarm.
6. If the Mute button is switched to off position, then the buzzer shall switch on after the time out of any alarm. In on position, the buzzer is always muted.
7. In auto the controller follows the sensor set point. In hand operation the controller follows the manual set point.
8. LCD displays manual position of the actuator or the feed back of the inverter in %.
9. Control set point for the Manual positioner.
10. When switching the CAL to on, the control output freezes and the sensor can be calibrated

## CHOICE OF FRONT PANELS

TYPE 'A' Fully populated with alarms, hand - auto and LCDs for actual sensor and position feed back. The sensor range is 0...100% suitable for positive range only.

TYPE 'B' Same as Type 'A' but sensor range is -100%-0-+100% suitable for positive and negative range.

TYPE 'C' Same as Type 'A' but without alarm.

TYPE 'D' Same as Type 'B' but without alarm.

TYPE 'E' Same as Type 'C' but without manual LCD and without manual set point.

TYPE 'F' Same as Type 'D' but without manual LCD and without manual set point.

TYPE 'G' Same as Type 'A' but with digital set point adjusters instead of dial.

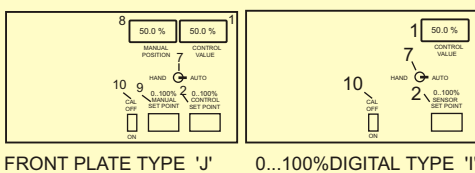
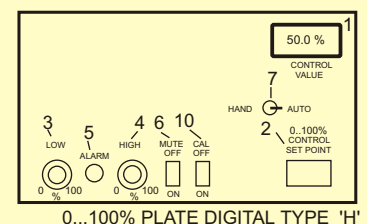
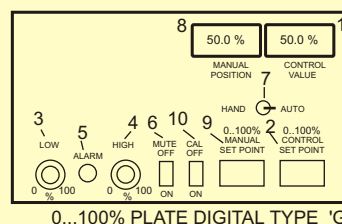
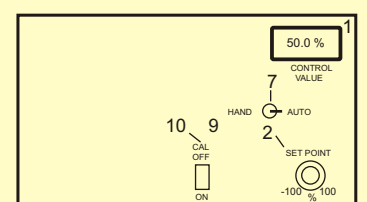
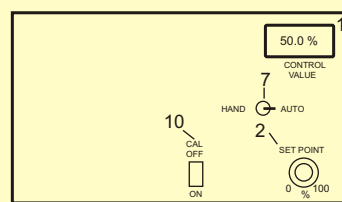
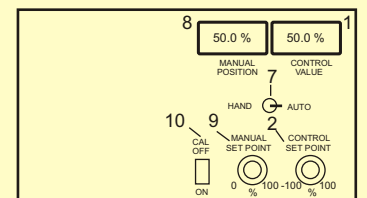
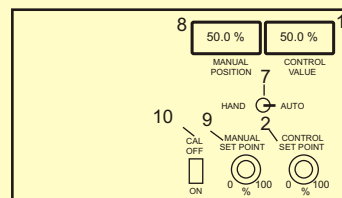
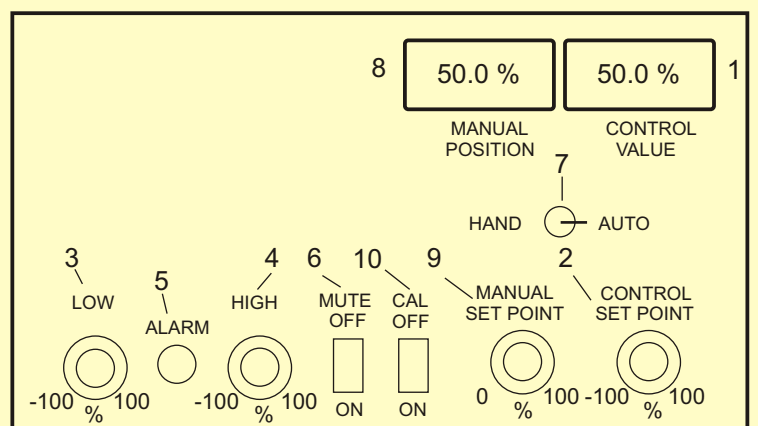
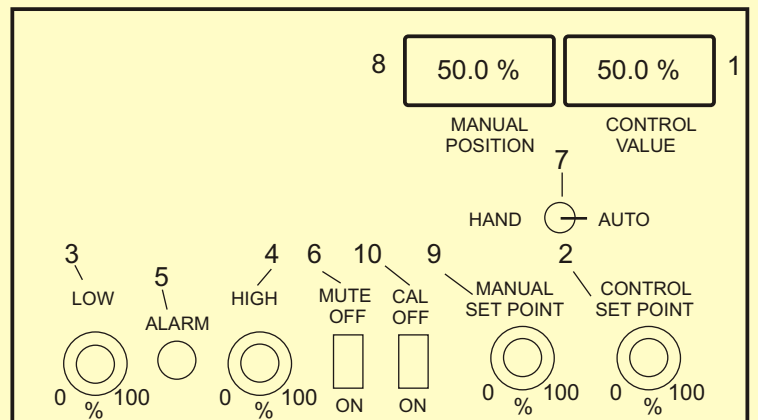
TYPE 'H' Same as Type 'G' but without manual LCD and without manual set point.

TYPE 'I' Same as Type 'H' but without alarms.

TYPE 'J' Same as Type 'G' but without alarms.

TYPE 'K' Plain plate without any controls.  
Note: The layout may change . Consult CMR.

## CHOICE OF FRONT PANELS WITH OR WITHOUT ALARM



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# DPC150 ORDER DESCRIPTION

## DPC150 PRESSURE - VOLUME CONTROLLER WITH INTERNAL P- or V-SENSOR

### GENERAL

CMR manufactures a large range of DPC150 wall or panel mount pressure or volume controllers to suit many applications. Because of the variety of control outputs and power supplies it has been necessary to design an easy to use selection table for anybody to make up a DPC150 controller specification to satisfy a requirement. You will find all specifications available with the associated ordering Code on the DPC150 Controller Selection Table (Page 11). In order to select the correct part we have made up a sample selection below:

### DPC150 PART NUMBER

The DPC150 Part Number starts with the selection of the controller type of enclosure without Lid, with Lid or with Lid and key lock. DPC150 enclosure, 6mm nipple without Lid has the Code '64A'. DPC150 enclosure, 6mm nipple with Lid has the Code '64B'. DPC150 enclosure, 6mm nipple with Lid and key lock has the Code '64C'. The DPC is available with 3mm nipples and the part nos have the ending 64D, 64E and 64F.

As an example, we have chosen the Code 'A'.  
The Part Number starts therefore with '64A'.

### NEGATIVE PRESSURE RANGE

The Negative Range is specified as (-)Pa. If the application requires to measure a negative pressure against a reference, i.e. a room has to be at negative pressure compared with the corridor then the room has to be connected to the Red or (+) nipple. The blue (-) nipple shall be connected to the reference in this case the corridor. The negative room pressure shall suck on the red (+) nipple and the DPC produces an output signal equivalent of the negative pressure measured. If the DPC150 must only measure in the positive Range i.e. 0-25Pa then the Negative Range will always be selected as 0Pa. The same applies if the measurement is in velocity pressure and needs to be square rooted. The Code is always '000'.

In the Example we have chosen -25 Pa which has the Code '010'.  
The Part Number extends to '64A 010'.

### POSITIVE PRESSURE RANGE

If the negative range has been selected to be -25Pa then it is suggested to use +25 Pa as the Positive Pressure Range. Note that 0 Pa Pressure is now in the middle of the Sensor Range. This means the DPC can measure from -25 Pa to 0 and to +25 Pa. If velocity pressure has to be measured then 25Pa becomes 6.45m/s but you will have to order the last column, which is Sensor Type to be square root.

In the example we have chosen Positive Range +25 Pa which has the Code '010'.  
The Part Number extends to '64A 010 010'.

### OPERATOR FRONT PANEL

The operator panel is an anodized aluminium panel which has various options as shown on page 9. The choice of plate is expressed as Plate Type as follows:  
Type 'B' has all functions and the sensor control set point is a dial -100%...100%. The order Code is 'B'. All types can be ordered by selecting the type code. In the example we have chosen Type 'B'.  
The Part Number extends to '64AB010 010 A'.

### POWER SUPPLY

The DPC150 can be ordered for 24VAC with Code '3', 110VAC with Code '4' and 230VAC with Code '5'.

We have chosen 24VAC which has the Code '3'.  
The Part Number extends to '64A 010 010 B 3'.

### CONTROL MODE

Page 4 and 5 shows various control modes. The mode selection is important to set up the controller's output. Look at the sketches and select the desired mode or ask CMR for assistance.  
In the example we have chosen Mode 'G'.  
The Part Number extends to '64A 010 010 B 3 G'.

### CONTROL OUTPUT

The Industry Standard for Output Signals is 0...10V which has the order Code 'A'. The Control output signal can also be inverted to provide 10...0V. This is required, when a fan must be at high speed at no pressure feed back. The Code is 'B'. Refer to Page 5.  
The Control output for CMR damper motors as described on Page 4 is a triac output to drive synchronous motors to open-off-close position. The output is generated by the isolation transformer built into the DPC, which means the output is named 24VAC I (internal) and has the code 'C'. This means no matter what the power supply is i.e. 24VAC, 110VAC or 230VAC by choosing code 'C' the control output is always 24VAC Internal but it is limited to 350mA.  
If AC X (external) Code 'D' is ordered, then the control output is the same as the power supply i.e. 24VAC, 110VAC or 230VAC non isolated. Consult CMR what actuator is to be powered to make sure the power supply is strong enough to drive it.  
We have chosen 0...10V as control output which has the Code 'A'.  
The Part Number extends to '64A 010 010 B 3 G A'.

### SCALED UNITS

The range is printed on the product label fixed to the lid of the controller. Normally, the range is printed as Pa or Pa(m/s) but other ranges can be selected under this order code. If an LCD or LED is required then the set point dials are always in %. The 3 1/2 digit LCDs are factory scaled to suit the front plate ordered. If the front plate is Type 'A' then the LCD is calibrated as 0-100.0%. If the front plate Type 'B' then it is scaled to -100% to +100% over the range. The Sensor LCD can also be ordered with other engineering unit calibrations and full details of range must be specified during order stage.  
The order code for % scaling is '1'. Pa (Pascals) is Code '2'. mBar is Code '3'. Pa (m/s) is Code '4' and m3/s is Code '5'.  
In the example we have chosen the Code '1'.  
The Part Number extends to '64A 010 010 B 3 G A 1'.

### DECIMAL PLACES

If no LCD is fitted then this is N/A (not applicable).  
The 3 1/2 digit LCD can only display 1999, 199.9, 19.99 or 1.999 all depending on the decimal place setting.  
No decimal place is Code 'A' which displays 000.  
Code 'B' displays 00.0, 'C' displays 0.00 - 'D' displays .000  
We have chosen the standard setting 00.0 which is Code 'B'.  
The Part Number extends to '64A 010 010 B 3 G A 1 B'.

### ALARM FUNCTION (BUILT IN AS STANDARD)

The DPC150 has low/high alarm relay and a buzzer relay. A low and high threshold set point adjuster is on the front panel or on board. If the sensor signal is below or above the threshold, a timer can be programmed to switch on the alarm and buzzer relay. The buzzer can be muted. A repeater relay is available for remote BMS input.

### LINEAR PRESSURE OR SQUARE ROOT VELOCITY

The DPC150 can be supplied either as pressure controller or velocity or volume controller. The LINEAR or SQUARE ROOT switch must be set. Linear has the Order Code '1'. Square Root is Code '2'.  
We have chosen Code '1'.  
The Part Number extends to '64A 010 010 B 3 G A 1 B 1'.

### FINAL PART NUMBER

The Part Number to order is '64A010010B3GA1B1'.

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# DPC150 ORDER SELECTION TABLE

THE SELECTION TABLE IS FOR A DPC150 CONTROLLER WITH BUILT IN INTERNAL P- OR V-SENSOR

The selection Table has been prepared to make ordering easy. Each Column contains a number of different options which are available and a Part Number can be established by yourself depending on your specific requirements.

The Example Part Number 64A 010 010 B 3 G A 1 B 1 which is printed above the Selection Table can be identified as being a DPC150 Pressure - Volume Controller.

The controller has no Lid and has a built in internal CMR Sensor. The Negative Range is -25Pa and Positive Range is +25Pa. The front plate is fully populated Type 'B' with (-)100%-(+)100% sensor set point dial. The power supply is 24VAC, the control mode is Type'G' driving a supply damper motor in positive pressure mode. The control output is 0-10V. The LCD is scaled to -100%...+100.0% with one decimal place. The Sensor Type is selected as Linear.

## EXAMPLE PART NUMBER SELECTION (The code after the (=) sign is used i.e. No Lid = 64A)

64A	010	010	B	3	G	A	1	B	1
DPC150	Negative	Positive	Front	Power	Control	Control	Scaled	Decimal	Sensor
Part No.	Range	Range	Plate	Supply	Mode	output	Units	Places	Type
6mm Nipple	0 Pa = 000	0 Pa = 000	T = A	24 VAC = 3	N/A = 0	0...10V = A	% = 1	N/A = N	LIN = 1
No Lid = 64A	-25 Pa = 010	25Pa (6.45m/s) = 010	T = B	110 VAC = 4	Mode = A	10...0V = B	Pa = 2	000 = A	SQR = 2
With Lid = 64B	-50 Pa = 015	50Pa (9.12m/s) = 015	T = C	230 VAC = 5	Mode = B	24VAC I = C	mBar = 3	00.0 = B	
With Key = 64C	-60 Pa = 020	60Pa(10.00m/s) = 020	T = D		Mode = C	AC X = D	m/s = 4	0.00 = C	
	-100 Pa = 025	100Pa(12.91m/s) = 025	T = E		Mode = D		m3/s = 5	.000 = D	
3mm Nipple	-125 Pa = 030	125Pa(14.43m/s) = 030	T = F		Mode = E				
No Lid = 64D	-150 Pa = 035	150Pa(15.81m/s) = 035	T = G		Mode = F				
With Lid = 64E	-200 Pa = 040	200Pa(18.25m/s) = 040	T = H		Mode = G				
With Key = 64F	-250 Pa = 045	250Pa(20.41m/s) = 045	T = I		Mode = H				
	-300 Pa = 050	300Pa(22.36m/s) = 050	T = J		Mode = I				
	-400 Pa = 055	400Pa(25.82m/s) = 055	T = K		Mode = J				
	-500 Pa = 060	500Pa(28.86m/s) = 060			Mode = K				
	-750 Pa = 065	750Pa(35.35m/s) = 065			Mode = L				
	-1000 Pa = 070	1000Pa(40.82m/s) = 070			Mode = M				
	-1500 Pa = 075	1500Pa(50.00m/s) = 075							
	-2000 Pa = 080	2000Pa(57.73m/s) = 080							
	-2500 Pa = 085	2500Pa(64.55m/s) = 085							
	-3000 Pa = 090	3000Pa(70.71m/s) = 090							
	-4000 Pa = 095	4000Pa(81.65m/s) = 095							
	-5000 Pa = 100	5000Pa(91.28m/s) = 100							
	-6000 Pa = 105	6000Pa(100.00m/s) = 105							
	-7000 Pa = 110	7000Pa(108.01m/s) = 110							
	-8000 Pa = 115	8000Pa(115.47m/s) = 115							
	-9000 Pa = 120	9000Pa(122.47m/s) = 120							
	-10000 Pa = 125	10000Pa(129.10m/s) = 125							

## HOW TO ORDER

Make up your own DPC150 Pressure Volume Controller selection below using the empty cells

--	--	--	--	--	--	--	--	--	--

### EXAMPLE

A wall mount pressure controller is required of the type DPC150

The DPC150 shall have a Lid with a key lock

The negative pressure range must be 0Pa or 0m/s.

The positive pressure range must be (+100Pa) 12.91m/s Velocity.

The front plate must have two dial set points for hand/auto with two LCDs and Alarms.

The power supply must be 24V AC

The control mode should be CVS to control positive pressure ( Mode 'L')

The control output must be 0...10V to drive a Fan Invertor on the Supply

The scaled units must be in %

The indication must be 100.0% with one decimal place

An Alarm contact must be provided

Call CMR for assistance at any time

The part Number for this DPC150 is 64C 000 025 A 3 L A 1 B 2

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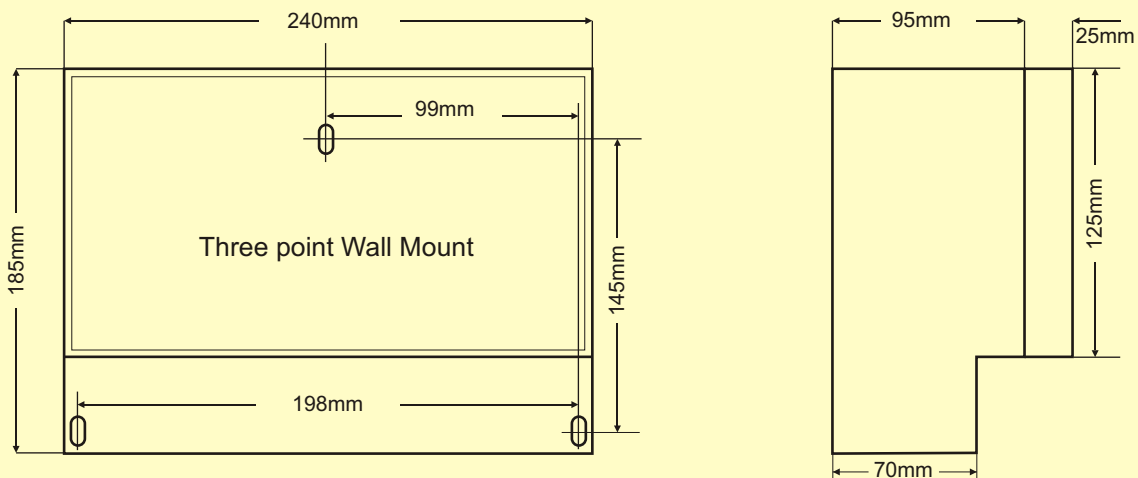
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# DPC150 TECHNICAL SPECIFICATION

Measurement Range	See Order Selection Table DPC150
Optional Range	Any Range from 25Pa (6.45m/s) up to 10 000Pa (129.10m/s)
Overload Capacity	Ranges 25Pa - 150Pa up to max 1400Pa. Ranges from 200 - 10000Pa 10 times of range
Media	Non Corrosive Gases such as Air,N <sub>2</sub> ,O <sub>2</sub> ,CO <sub>2</sub> ,N <sub>2</sub> O, inert Gases
Diaphragm Unit	Bronze Beryllium Copper suitable for high concentration of Formaldehyde - All Stainless on request.
AC Power Supplies	24 VAC 50/60Hz Fuse 1.0 A Wickmann
	110VAC 50/60Hz Fuse 315 mA Wickmann
	230VAC 50/60Hz Fuse 315 mA Wickmann
AC Control Output	24 VAC I (internal power from isolation transformer) max 350mA (Fused 1A Wickmann)
	24VAC (1A), 110VAC (200mA), 230VAC (100mA) output bridged directly to Input Terminals. Fused
DC Control Output	0-10V (0...100%) or 10...0V (100%...0%) switchable ( RL = 5kOhm min.) or 4..20/20...4mA
Sensor Output Voltage RL = 5kOhm min	0-10V (0...100% of Range) 0..12.91m/s in square root mode - Scaler 1 can be connected
	The output voltage is the result of square rooting the linear pressure i.e 100 Pa.
	100 Pa square rooted = 10 m/s . Multiply the 10 m/s by the density of air x 1.291 = 12.91m/s
Hysteresis/Repeatability	0.1% Typical of Full Scale
Linearity (Accuracy)	1.0% of Full Scale in Pressure Mode
Zero Drift	0.05%K (+10°C to +50°C)
Hand - Auto switch	Digital input on T4 external set point switch T6 change over from auto to hand min. 0.8V to 31V
External Set Point	0...10V on T2 - scaler2 can be connected
Position Input	0...10V on T7 - scaler 2 can be connected
Alarm Threshold Voltage	0...10V on low and high alarm set point.
Control Function	Off-Set - Sensitivity - Proportional Band - Timing / Integral - Ramp Speed - Door Freeze
Alarm Relays	1A 24VDC / AC Low/High Alarm single pole change over - Buzzer and repeater single pole on-off.
Operating Temperature	+10°C to +70°C
Mounting Position	Vertical
Weight	1.7 kg
Electrical Connections	4 x PG13 1 x PG11 Gland Internal Plugs with Screw Connections
Air Tube Connections	Positive and Negative Pressure Barbed Nipple 6.5mm O/D x 15mm long standard for PVC tube
	Positive and Negative Pressure Straight Nipple 3.0mm O/D x 15mm long special for small silicone tube
Enclosure	ABS Grey with clear front Lid lockable with key Protection Class IP65. Without Lid IP44
Conformity	EN61326-1 EMC EN61010-1 SAFETY
Calibration Certificate	Supplied with Certificate traceable to National Standards

## ENCLOSURE DIMENSIONS



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