

DPM-210 AIR PRESSURE AIR VOLUME

- Ultra low pressure and volume measurement
- Traceable Calibration Certificate is included
- High accuracy and repeatability
- Linear pressure and volume flow output
- Both measuring and PID control output
- Two modbus for monitoring and remote display
- Two control or Alarm Triac outputs
- Auto Zero and Overload protection
- Operator keyboard display for all functions
- Two Modbus rtu, 0..10V and 4..20mA output
- Enclosure with easy mount panel clamps
- 24 month warranty
- 30 Years field application experience



DPM Panel Mount Sensor with Keyboard and LED display

GENERAL

The DPM-210 is a panel mount ultra low pressure transmitter which provides 0..10V and 4..20mA as well as Modbus communication over the selected range. The display can be adjusted via the keyboard to show the measured value in Pa, hPa, kPa, m/s, l/s, m3/s, m3/h and ACR (air change rate).

A PID control output can be selected, but still having one output for monitoring the pressure or volume.

The pressure ranges can be adjusted via the keyboard, but the base range is factory calibrated and certified i.e. 25, 50, 100, 250 and going up to 7500 Pa. All ranges can be adjusted to +/- ie. +/-25Pa.

Power supply 24Vac isolated is standard.

CMR TRANSDUCER

The transducer is manufactured by CMR with high precision engineered components. The principle is the measurement of the displacement of the diaphragm by means of a push and pull variable reluctance circuit which is not affected by humidity and hence it can be used in any industrial or commercial environment. There are no mechanical connections to any of the sensing coils and the diaphragm.



CMR Transducer

Extremely low pressures can be measured with excellent repeatability and minimal hysteresis. The diaphragm displacement is so small that no air volume is required to measure the air pressure which means measurement tubing can be connected in excess of 200m throughout the building without losing accuracy or measurement speed.

The zero drift is minimized by the measuring copper coils which are matched to 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 Transducer has a proven field track record of over 30 years. All CMR Sensors are temperature compensated in a computerised climate chamber.



CMR Climate Chamber

KEYBOARD DISPLAY

A combined keyboard and LED Display is fitted to the front of unit and is connected to the DPM board with a molex plug. All parameters can be accessed via the key pad. The display can also be programmed to switch off after a time and by touching a key to light up again. Normally it is always on.

PARAMETER CONFIGURATION

The duct width and height can be entered as well as the density and (mf) magnification (K) factors to scale Fan Inlet Rings, Flowgrids, Veloprobes, Oval Flowprobes, Venturis or any other velocity pressure producing probes. The volume can be linearized over 8 points to provide extremely high accuracy in measurement.

The range can be changed from i.e. -10 Pa to 30 Pa or -20 to 120 Pa. The output signals can be changed to i.e. 2..10V, 1..5V or 5..19mA. The DPM-210 has two configurable 24Vac Triacs for control or for high or low alarm with timers.

The auto zero function is built in, which is of great advantage at very low velocity pressure measurement i.e. 0.3 Pa to have an accurate base point at all times. The auto zero can be turned off where it is not required.

The overload protection can be switched on and is ideal to protect the low pressure diaphragm. It is active whenever the sensor is powered up.

One of the outputs can be configured to be a PID control to drive fan inverters or modulating dampers and the other can be used for the actual pressure or air volume measurement for the BMS or PLC system. The set point can be sent from the BMS via modbus.

The signals can be individually smoothed. The control output can be fast but the measurement output can be dampened.

A calibration mode can be selected so that all of the parameters remain the same as commissioned and only the base sensor shall be calibrated and displayed in Pa.

MODBUS rtu COMMUNICATION

The modbus communication can be used to read and write all parameters by the remote Host which can be the BMS, PLC or PC.

REMOTE ALARM DISPLAY

A remote display DIS110 without alarm or DIS125 with alarm and mute button can be connected via Modbus if the modbus is not used for the BMS. The alarm button has green and red Led light rings to show healthy or alarm status. A buzzer is also fitted. A separate power supply can be wired to the display.



Remote Display Plate

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Precision Air Pressure and Volume Sensors

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DPM-210 PRESSURE VOLUME CONTROL

ROOM PRESSURE AND AIR VOLUME CONTROL AND MEASUREMENT WITH DPM PRESSURE TRANSMITTERS



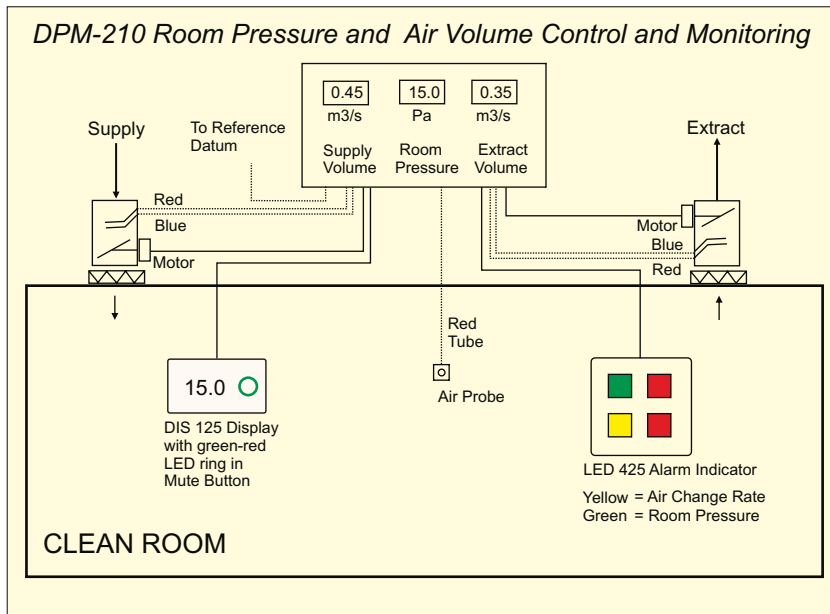
Tubes + Fittings



Ceiling Air Probe



Air Probe Plate



DIS 110 Display



DIS 125 Display



LED 225 Display

The above schematic shows a typical clean room. The supply air volume is measured, alarmed and controlled continuously with a DPM-210

The air probes are connected to the DPM with red CMR PVC Tubing. The room pressure is measured against a reference datum and is indicated on the remote display. The DPM-210 controls the room pressure via the extract valve.

The supply, extract air and room pressure can be alarmed.

Large alarm indicator leds and a common sounder is there to alert the operators. Each DPM-210 has 0-10V, 4-20mA, 2 off Triac and modbus rtu outputs for PID control or monitoring functions by remote SCADA, BMS and industrial PLC control systems.

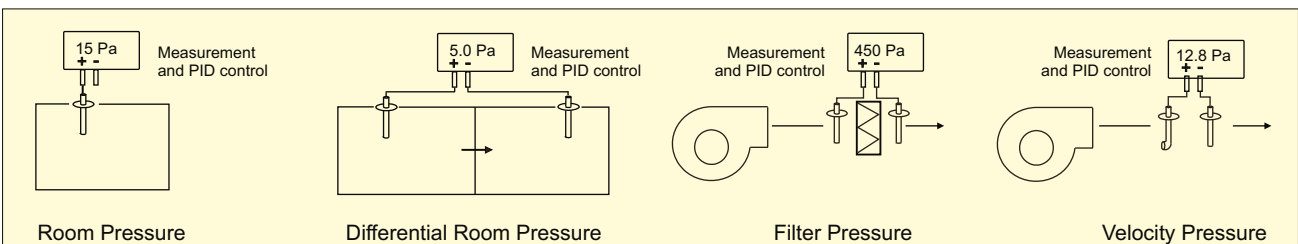
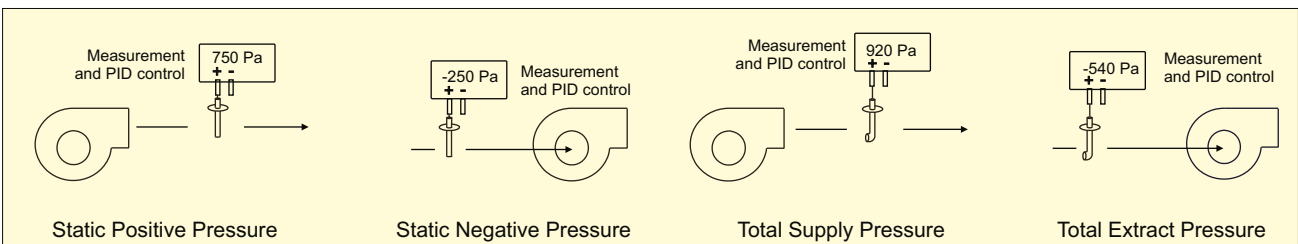
The DPM is a true Low Differential Air Pressure Transmitter and can be used for Static Pressure, Vacuum Pressure and Velocity Pressure Measurements in positive or negative areas. The LED Display and operator keyboard is fitted to front face as standard, and shall display the actual pressure and is designed for panel mount installations.

The CMR PVC tubing can be run up to 200m from the room to the panel without losing accuracy of the measurement.

The Pressure signal can be transmitted via modbus rtu or analogue signals to remote standard or custom made display fascia plates.

Calibration Certificates traceable to national and international Standards (UKAS) are supplied with all DPMs.

TYPICAL PRESSURE APPLICATIONS



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Precision Air Pressure and Volume Sensors

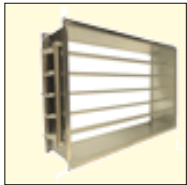
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DPM-210 AIR VOLUME MEASUREMENTS

AIR VOLUME AND PRESSURE MEASUREMENT AND CONTROL WITH DPM TRANSMITTERS



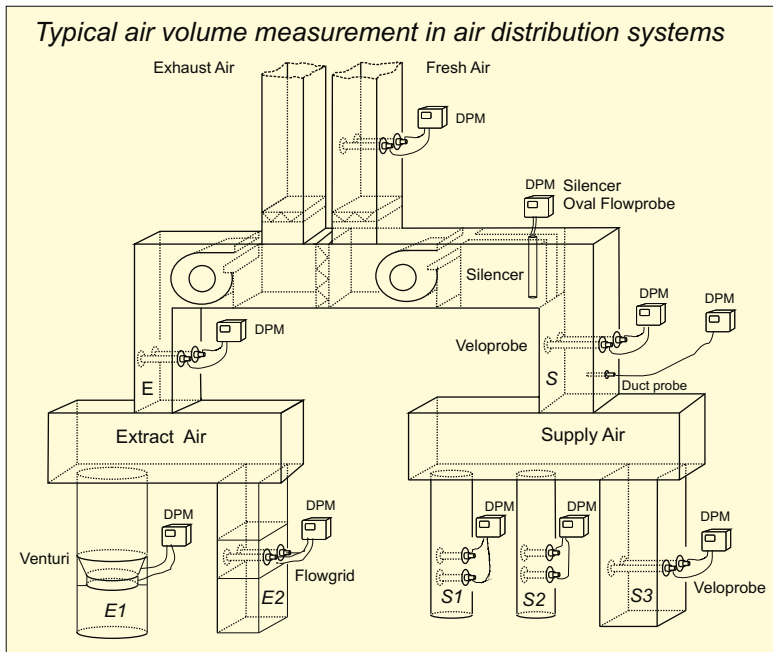
FGG Flowgrid



VVM Venturi



PVC Tube Fittings



CMR Veloprobes



Duct Probes



Oval Flowprobe

The CMR DPM-210 is an ultra low high precision Velocity Pressure Transmitter which has been designed to accurately measure air volumes in Ventilation Ducts . The built in Square Root Extraction and Magnification Factor Scaling makes the DPM an extremely versatile measurement instrument.

The DPM is used for monitoring and also controlling Volume Flow in Commercial or Process Applications and is designed to be connected to any CMR Veloprobes, Duct Probes, Flowgrids, Venturis and Fan Inlet Rings. It can also be used with any existing or custom made duct Flow Measurement Device.

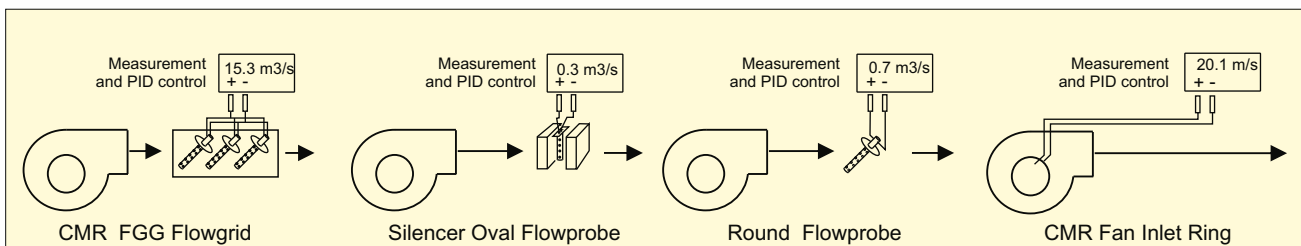
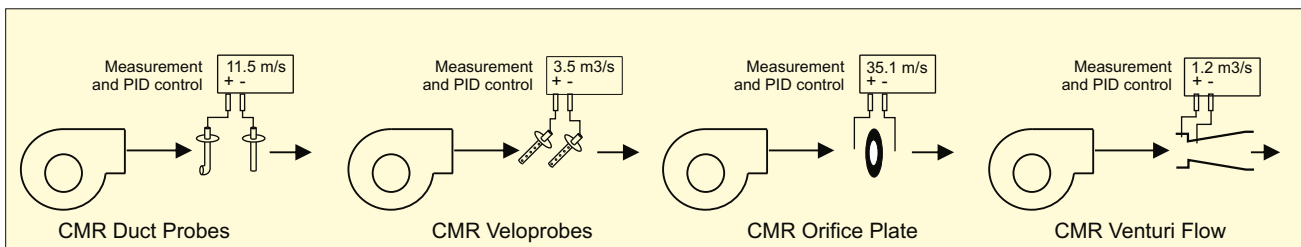
It can display the actual volume in m3/s. Other Units such as m3/h, litres/s or ACR (Air change rate) can be selected via the keyboard. Any imperial measurement units i.e. CFM are available on request .

The measured values can be transmitted to remote display plates, SCADA, BMS control systems or industrial PLCs through the output signals of 0..10V, 4...20mA and modbus.

The CMR PVC tubing can be run up to 200m from the sensing station to the DPM without losing the accuracy of the measurement.

Calibration Certificates traceable to National and International Standards (UKAS) are supplied with all DPMs.

TYPICAL CMR AIR VOLUME MEASUREMENT APPLICATIONS



CMR CONTROLS Ltd
Precision Air Pressure and Volume Sensors

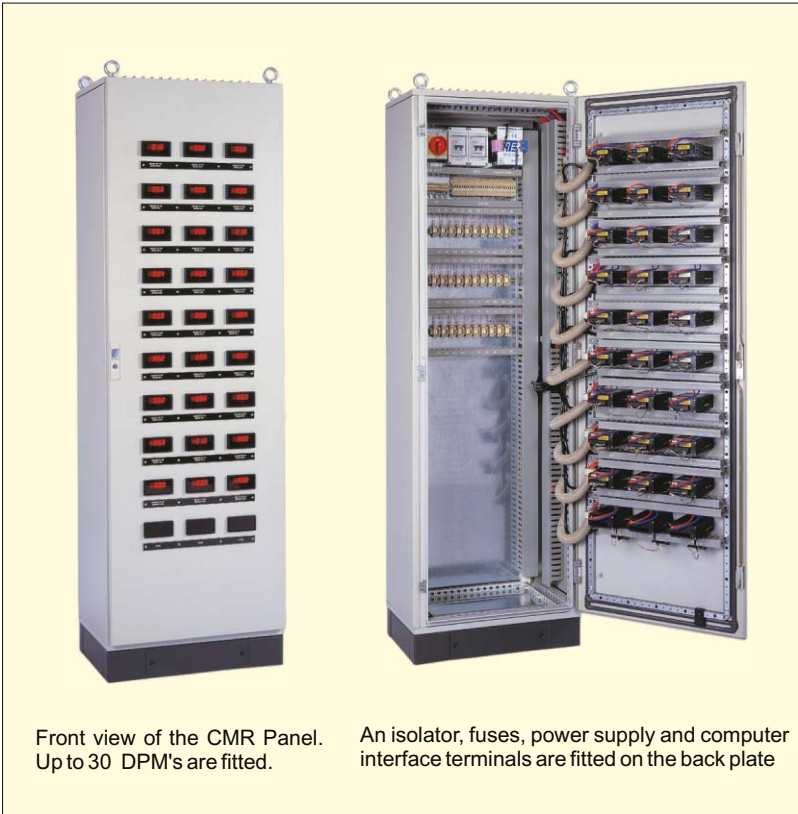
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DPM-210 MONITORING CONTROL PANEL

Typical DPM Pressure-Volume Measurement and Monitoring Panel



The pictures on the left show a complete DPM Instrument panel which is used to centralize the pressure and air volume measurements for easy maintenance.

The CMR DPM transmitters are located on the front panel door and all tubing is terminated on the panel roof. Up to 200m Tube can be installed from the field sensors to the panel without losing its accuracy.

The panel can be located in a convenient place in the plant room area which makes servicing and calibration very easy at required intervals.

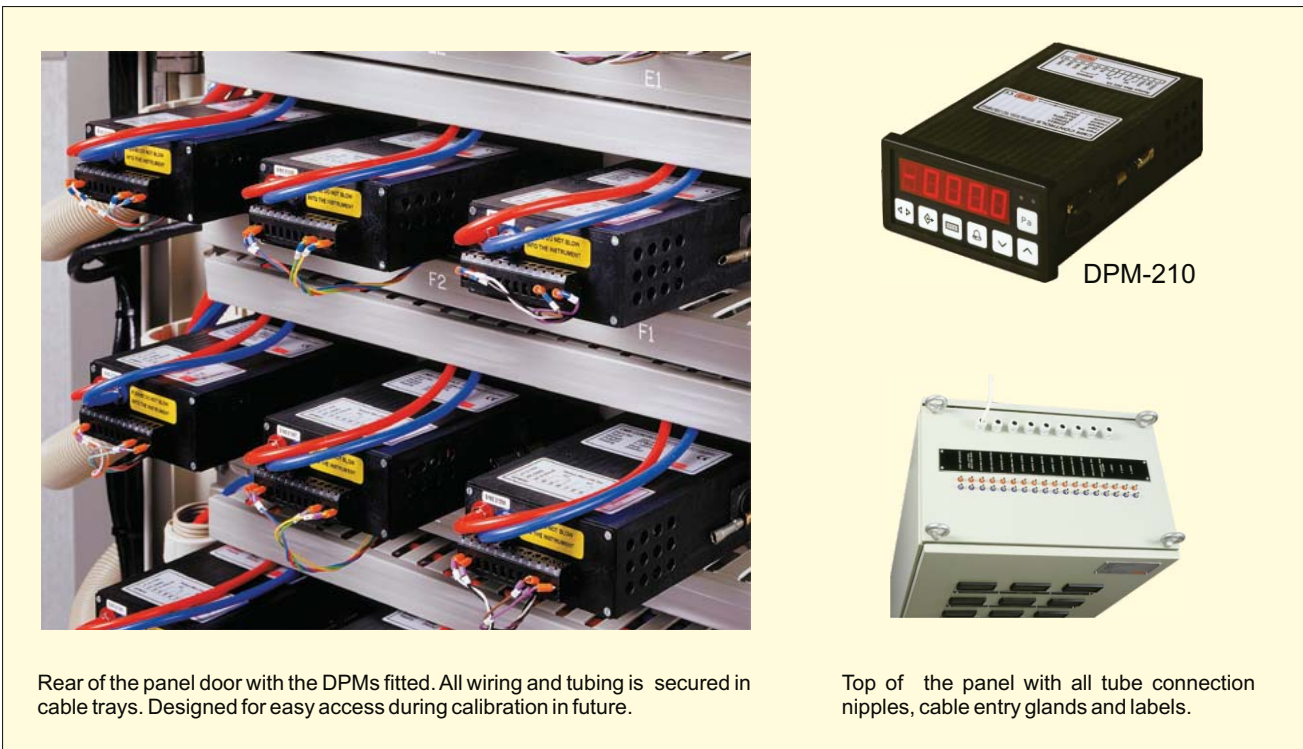
The DPMs have built in alarms, timers and mute facilities and can be scaled to the application requirements.

Remote alarm display plates as well as a buzzers can be fitted per DPM transmitter which can be terminated on the back plate of the panel.

The CMR Pressure control and monitoring Panel can have up to 30 DPM instruments on the front door. Each Instrument can have different functions i.e. Room Pressure Monitoring, Air change Rate Monitoring or Fan and Damper Control.

All output terminals have spade isolation switches and where necessary lift up fuses for each field circuit. The Power Supply and terminations are fitted on the back plate. The complete panel is factory commissioned, tested and validated.

CMR Monitoring Panel fitted with 30 DPM-210 Transmitters



DPM-210

KEYBOARD FUNCTIONS

FUNCTIONS (Use Operator Manual for full Instructions)

The DPM LED-Keyboard has been designed to simplify installation and commissioning. All adjustments can be done via the keyboard and also the calibration is simplified by the keyboard.

ZERO KEY

When pressing the zero key for 1 seconds, the DPM shall perform a zero which means the pressure is taken off the sensor internally and the diaphragm is relaxed to zero.

PASSWORD

The keyboard can be password protected so that only the display can be operated, but no adjustments can be made.

RANGE KEY

Pressing the range key very quickly once will display the sensor range i.e. if it shows 100, this means the range of the sensor has been configured to 0-100Pa for 10V/20mA output. By pressing the range key for 1 seconds it enters the configuration menu:

S	Software Version	1.5
Ad	Network Address	1-254 (0 Denotes Modbus Display)
AZ	Auto Zero	on - off
P	Positive Range	i.e. + 25
n	Negative Range	i.e. - 25
Opp	Over Pressure	1(on) 0(off)
F	Zero Offset	
t	Set Point	
Sn	Modbus smoothing	d or o
Azt	Auto Zero time interval	1-99 h
FF	Modbus float format	0-3

OUTPUT KEY

Pressing the output key very quickly once will display the sensor output configuration i.e. lin or root, which means the sensor measures pressure or airflow. By pressing the output key for 1 seconds the configuration menu can be reached:

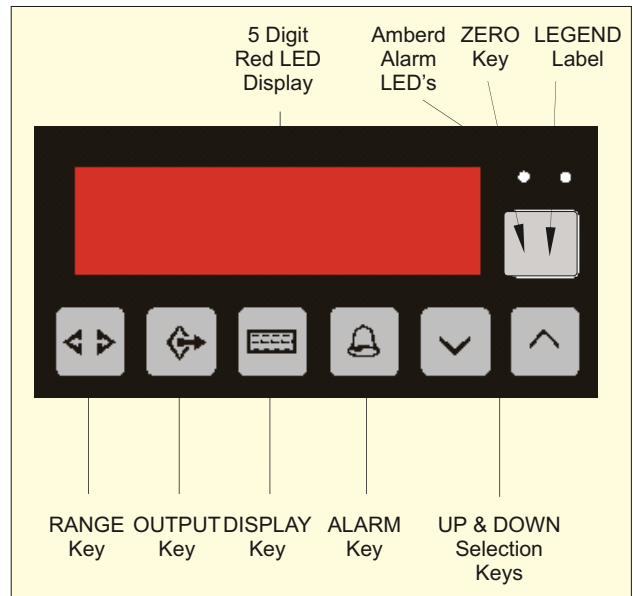
So	Output Smoothing	0-99
Lin	Output mode	linear pressure
root	Output mode	square root
e	Output scaling	F, L or Fac
F	Mag Factor	0-99.99
	Duct width	0-9999mm
I	Duct height	0-9999mm
d	Air Density Factor	0-9.99kg/m3
r	Room Size	0-9999m3
s	Small Value Shut off	0-99.99%
o	Output Re-Scaling	
bFl	Bi-Directional Flow	0 or 1

DISPLAY KEY

Pressing the display key very quickly once will display the measurement units. i.e. Pa, hPa, kPa etc, and is the units the sensor has been configured to i.e. Pa. By pressing the display key for 1 seconds it enters the configuration menu:

Sd	Display Smoothing	0-99
Pa	Pascals	
hpa	hecta Pascals	
3pa	kPa	
nnps	metres per second	
lps	litres per second	
nn3s	cubic metres per second	
nn3h	cubic metres per hour	
acr	Air Change Rate per hour	
dp	Decimal Place	0-4
pos	Display polarity (+)	
neg	Display polarity (-)	
Led	Display Activation	1 or t
b5t	Display Brightness	L or H
L2b	Leading Zero Blanking	1 - 4

DPM STANDARD LED KEYBOARD



ALARM KEY

Pressing the alarm key quickly the buzzer can be muted which is built in and remote. By pressing the alarm key for 1 seconds it enters the configuration menu.

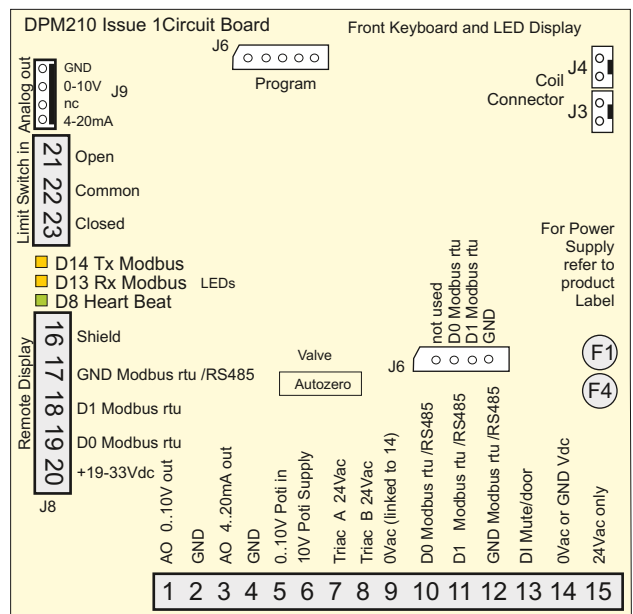
L	Low Alarm	
H	High Alarm	
t	Alarm timer 1	0-999
t.	Alarm timer 2	0-999
u.	Units	dU (Display Units) or Per (%)
af	Alarm Function	0-2
Sr	Self Reset	0-1
Er	External Reset	A or R
bu	Buzzer	-, 0, 1 or P
rb	Remote Buzzer	-, 0, 1 or P
rA	Remote Alarm Indication	-, 0, F or LH
rt	Re-alarm timer	0-999 minutes
tU	Alarm timer units	s or h

UP - DOWN KEY

The up and down keys are used to select the various parameters

OUTPUT SIGNAL

0-10V and 4-20mA are also available on J7.



DPM-210 ISSUE 1

ORDER DESCRIPTION

GENERAL

CMR manufactures the DPM to suit many low pressure and air volume measurement applications. The difference between the DPM-210 and the DPM-210 is the triac instead of relay outputs and a potentiometer feed back input from a damper motor. Because of the variety of pressure ranges, output signals and power supplies it has been necessary to design an easy to use selection table for anybody to make up a DPM specification to satisfy a requirement. On the DPM Selection Table you will find all specifications available with the associated ordering code.

DPM-210 BASE PART NUMBER

The DPM Part Number starts with a base part number of the type of sensor. Code '33' which is a DPM-210 in a Panel mount enclosure. The Part Number therefore starts with '33'.

DPM210 Board Issue No.

The DPM210 will have an update on the electronic board from time to time and to identify the issue No i.e. for software and hardware, this number might change. For Issue 1 the Code is '1'. The Part Number extends to '331'

TUBE CONNECTORS

4 mm barbed nipples to fit CMR silicone Tube are fitted as standard into the enclosure. They have the Code 'B'
6 mm barbed nipples to suit the CMR PVC Tube are also available as Code 'A'.
The example has 4 mm barbed nipples.
The Part Number therefore extends to '331B'.

NEGATIVE PRESSURE RANGE

The Negative Range is specified as (-). 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 DPM produces an output signal equivalent of the negative pressure measured.

In the Example we have chosen -25 which has the Code '0025'.
The Part Number extends to '331B0025'.

If the DPM must only measure in the positive Range i.e. 0-25 then the Negative Range will always be selected as 0 and the Code is always '0000'.

PRESSURE UNITS

The negative pressure and the positive pressure range must be expressed in units i.e. Pa or kPa. The CMR transducers are in Pascals (Pa) as standard.
In the example Pa was selected with Code 'P'.
The Part Number extends '331B0025P'

POSITIVE PRESSURE RANGE

To measure Positive Pressure against a reference it is necessary to select a positive range i.e. +25. The Code is '0025' This means the DPM selected above can measure from -25 Pa to 0 and from 0 to +25 Pa. The output Voltage would therefore be 5V or 12mA at 0 Pa.
The Part Number extends to '331B0025P0025'

LABEL UNITS

As the DPM has a fixed label next to the LED display, i.e. Pa, kPa, hPa, mB etc. It is necessary to specify the label when selecting the part number as this is all part of the validation of the instrument.
In the example Code 'P' for Pa was selected.
The Part Number extends to '331B0025P0025P'

OUTPUT SIGNAL

The Industry Standards for Output Signals are 0-10V or 4-20mA, but other signals can be adjusted via the keyboard by the operator.

If 0-10V is the Output Signal for -25 Pa to +25 Pa then 5 V is 0 Pa. From 5V to 0V the DPM measures from 0 Pa to -25 Pa i.e. -12.5 Pa would be 2.5V.

From 5V to 10V the DPM would measure positive Pressure from 0 Pa to +25 Pa i.e. +12.5 Pa would be 7.5V.

It is standard to use equal ranges -25 Pa to +25 Pa rather than -25 Pa to +50 Pa but the DPM can be adjusted via the keyboard to provide any offset.

In the Example, we have selected Dual (0-10V & 4-20mA) which has the Code '1'.

The Part Number extends to '331B0025P0025P1'

POWER SUPPLY

CMR can supply the 24Vac Isolated power supply only because of the Triac outputs. In the example we have selected the 24Vac isolated which has the Code '3'.
The Part Number extends to '331B0025P0025P13'.

FINAL PART NUMBER

The Part Number to order is '331B0025P0025P13'

Now try and select your own DPM -210 using the DPM-210 Order Selection Table.

DPM-210

TECHNICAL SPECIFICATION

Measurement Range	Any Range from 0-25Pa or +/-25Pa up to 0-7500Pa or +/-7500Pa
Overload Capacity	Ranges 25Pa - 150Pa up to max 1200Pa if over pressure protection is off.
	Ranges from 200Pa - 7500Pa up to max 10 times of range if over pressure protection is off.
Media	Non corrosive gases such as Air, N2, O2, Co2, N2O and inert gases
Diaphragm Unit	Beryllium Copper suitable for high concentration of Formaldehyde - Stainless Steel on request.
AC Power Supplies	24 Vac 50/60Hz 165mA. without remote display. Transformer isolation. Fuse 300mA Auto-Reset. 200mA with remote Display DIS-125
DC Power Supplies	Not possible with Triac Output.
Voltage Output Signal	0-10V (0 to100% of Range) RL = 5kOhm min. (2-10V) and PID loop control programmable via keyboard
Voltage Input Signal	Ref Voltage 10V and 0-10V input from Feedback of control equipment..
Current Output Signal	4-20mA (0 to100% of Range) RI = 500 Ohm max.(0-20mA) or PID control is programmable via keyboard.
2 x Triac Output 1A 24Vac	Triac 24Vac output to drive alarm lights directly or synchronous motors open/off/closed.
2 x Modbus rtu Connection	2 x Output Signal, Alarm Status, Alarm Thresholds and Alarm Timers are all readable as Modbus rtu Commands. Modbus rtu register assignments to read and write are available in the user manual.
Hysteresis/Repeatability	0.1% Typical of Full Scale.
Linearity (Accuracy)	+/- 0.25% of Full scale = > 100 Pa and 0.25Pa < 100Pa.
Zero Drift	0.05%K (+10°C to +50°C) - Automatically corrected to 0.0 if Auto-Zero function is enabled.
Operating Temperature	-10°C to +70°C.
Mounting Position	Horizontal
Weight	0.6 kg in ABS Housing.
Electrical Connections	ABS Housing: Rear removable screw terminal multiple plugs.
Air Tube Connections	ABS Housing: Positive and Negative Pressure Barbed Nipple 4mm OD x 15mm long for silicone tube. Alternatively Barbed Nipple 6mm OD x 15mm long for CMR PVC Tube on special request
Enclosure	Plastic (ABS) Black Bezel or Light Grey (RAL7035) interchangeable - Protection IP44. EN61326-1 EMC - EN61010-1 SAFETY.
Calibration Certificate	Supplied with Certificate traceable to national and international Standards (UKAS).

DPM 210 Issue 1 Dimensions & Tube / Electrical

