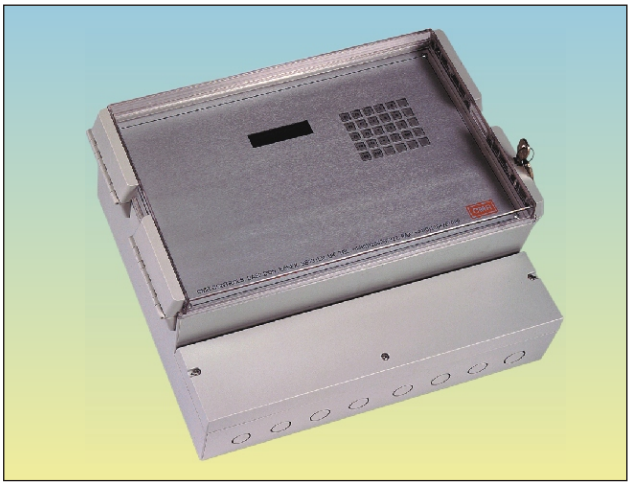
home

MPC150 PRESSURE - VOLUME CONTROL

With or without Internal Pressure-Volume P- or V-Sensors

- Ultra fine pressure or volume control
- Excellent repeatability
- Controls fan speed invertors and actuators
- Hand - Auto change over control
- Local or external actual sensor display
- Local or external position sensor display
- Internal or remote set point adjustment
- Low and High alarm thresholds and alarms
- Remote Alarm and display plates
- BMS or Scada computer interface
- After Sales Service is provided by CMR
- 24 month warranty
- 15 Years field application experience



MPC150 with built in or remote sensos, display and keyboard

GENERAL

The MPC150 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. It consists of two main and several sub control loops with a number of options such as auto or manual control and remote BMS interface. The MPC150 has built in and remote sensors and can control different actuators and 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 the 0...10V signals from the three built in CMR sensors. The sensor's actual value is displayed on an LCD Display on the front operators panel of the MPC150. 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.

THE TRANSDUCERS

The transducers are manufactured by CMR and consist 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 Transducers

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 hysterisis. 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.

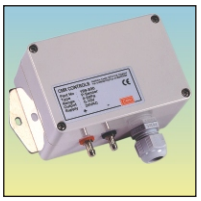
PANEL MOUNT DPM SENSORS

TheMPC150 was designed to function with all CMR measurement sensors for which data sheets are available separately. The most popular sensors are the DPM50 Pressure and the DPM55 air velocity or volume instruments. The units are normally built into a central control panel together with the MPCs.

DPM50/55 Sensor

REMOTE P-SENSORS

The P-Sensor is used for pressure sensing in remote applications. The power supply is provided by the MPC and up to eight P-Sensors can be monitored. A separate data sheet provides all the specifications of the P-Sensor. Traceable calibration certificates are supplied for all CMR sensors.



P-Sensor

CMR DAMPERS AND ACTUATORS

CMR provides a large range of dampers either circular or rectangular with a variety of actuators from 4 up 150 seconds rotation speed. 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 Venturi Valve

CMR MPC PANEL

Three MPCs can be built into a central control panel providing total control of a system. The panel is complete with isolator, power supply and fuses. The measurement sensors are built into the front door and remote sensors can be connected. The entire panel is factory tested and certified ready for operation on site. All pressure tube connections are on the top of the panel with bulk head nipples and are identified with engraving. The MPCs can communicate with BMS or Scada systems.

MPC Central Control Panel

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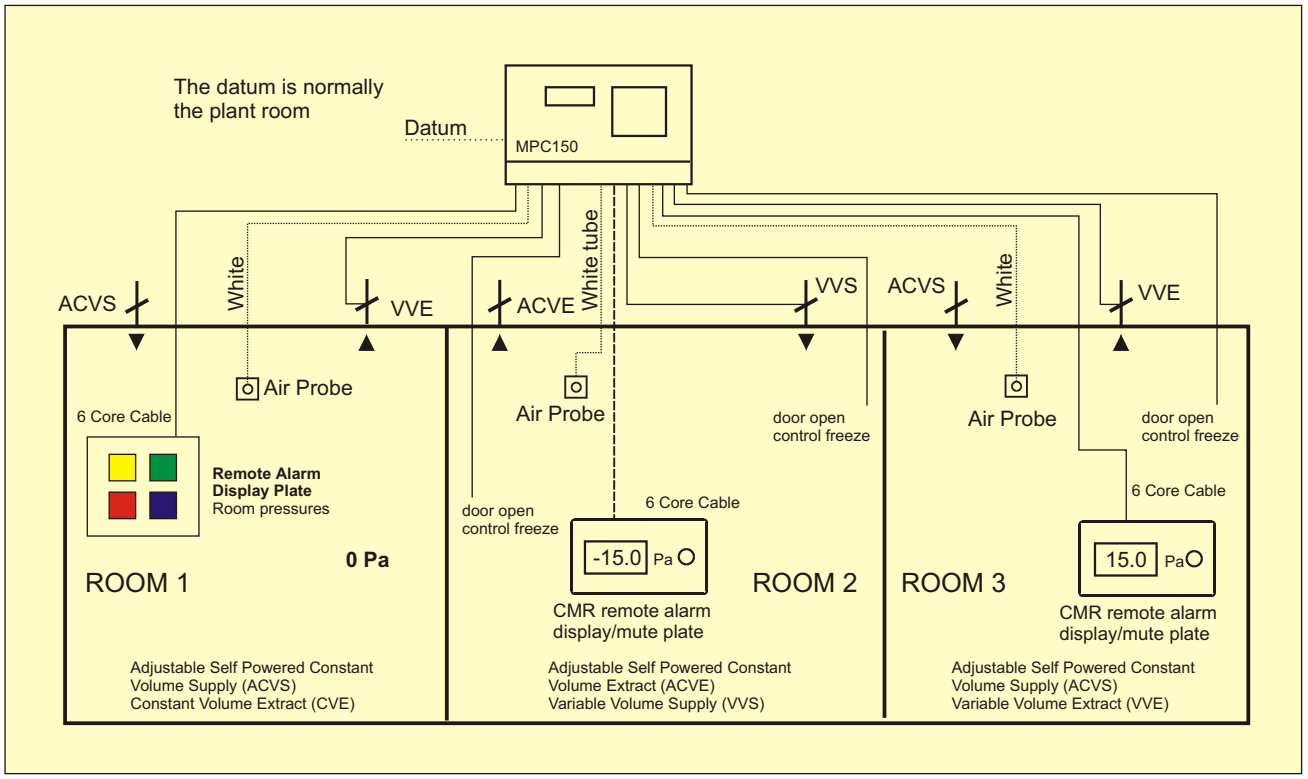
MPC150 STANDARD PRESSURE CONTROL

SELF POWERED CONSTANT VOLUME AND MOTORISED PRESSURE CONTROL



Room 1
The supply air is controlled by a self powered constant volume valve to provide the design air change rate. The room pressure is measured via an air probe plate which is connected to the MPC150 with PVC tubing. Within the MPC150 is a precision CMR P-Sensor and the room pressure is measured against a datum. A control loop output is connected to the actuator fitted to the extract valve. The room pressure set point is set to be 0 Pa and the valve shall modulate until the room pressure has reached 0 Pa.
A large room alarm Led display plate is fitted to indicate a healthy state with a green LED or an alarm state with a red LED. An amber LED shows a temperature alarm and a blue LED shows a humidity or particulate alarm. A buzzer can be added. The LEDs can be supplied in either 25mm or 50mm squares. Laser engraving is standard.

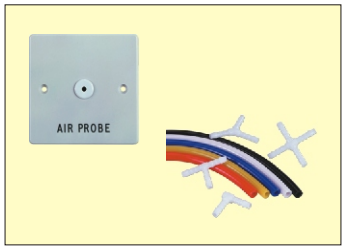
Room 2
The self powered constant volume valve is now fitted to the extract and the modulating action is on the supply. The control loop is set to achieve -15 pa in the room. Door open control freeze is standard.

Room 2
There is a room pressure alarm plate fitted within the room at a convenient location. The actual pressure is displayed on a red LED display. In case of an alarm the red light within the mute button shall illuminate and the buzzer shall sound. The buzzer can be muted by pressing the light switch. The alarms are fully adjustable from 0...100% threshold and delay timers are standard.

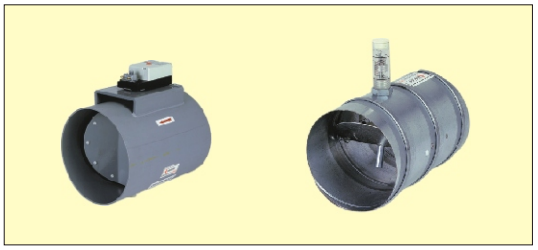
Room 3
Room 3 is identical to room 1 except that the set point is +15 pa.
The alarm is identical to room 2.

Self Powered Constant Volume Valves
The self powered constant volume valves have adjustment facilities to change the volume. Normally, they are factory set before they are installed. The valves cannot be shut and need a minimum pressure of 50 Pa to operate. These constant volume valves are ideal for standard clean rooms where the supply or the extract does not have to be shut completely.

TYPICAL COMPONENTS FOR ROOM PRESSURE AND CONSTANT VOLUME CONTROL



CMR Air Probe which is normally fitted to the ceiling and connected with CMR PVC tube to the MPC150.



CMR PPS or galvanised Air Valves without venturi air volume measurement and VMS motor (VVS or VVE). Self powered adjustable constant volume valve (ACV).

Remote audible indicating display plates with coloured LEDs, pressure display, alarm light and mute button.

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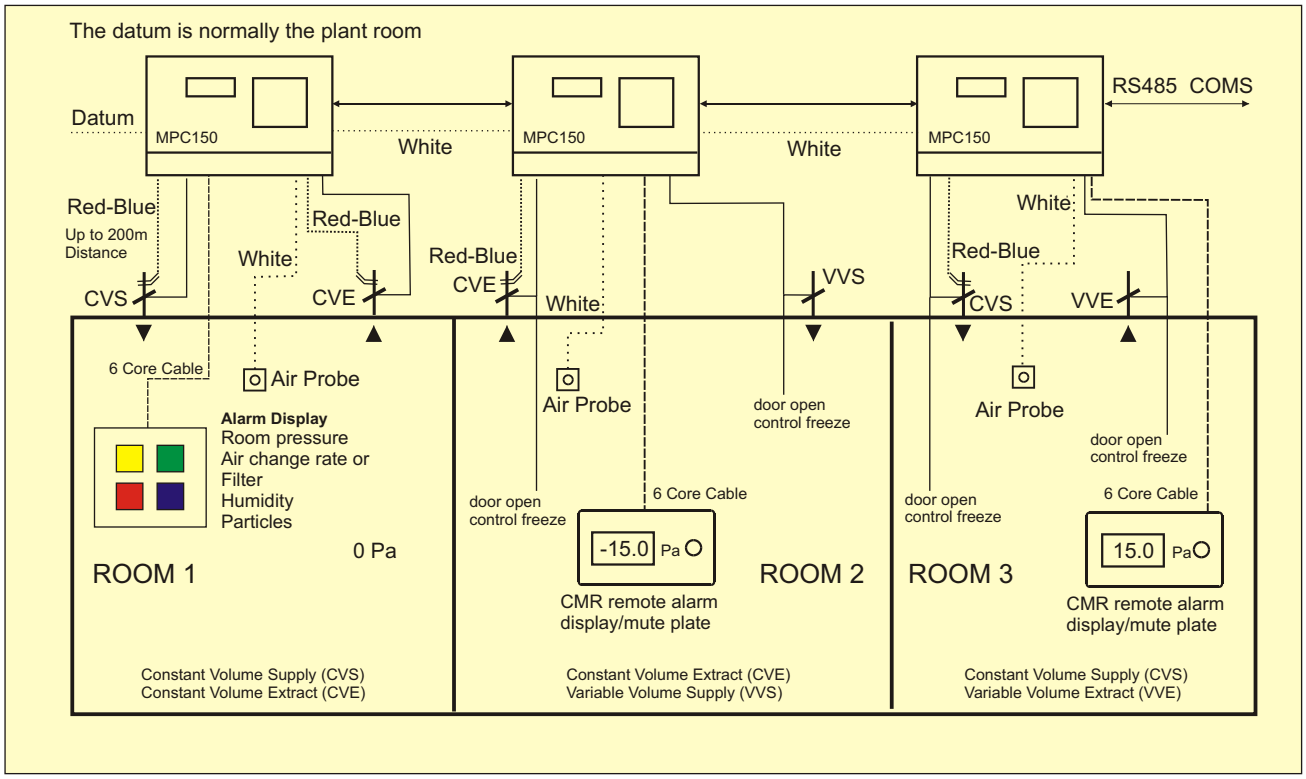
MPC150 AIR TIGHT PRESSURE CONTROL

MOTORISED SUPPLY AND EXTRACT VOLUME OR PRESSURE CONTROL

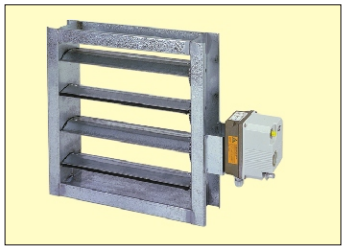


Room 1
The supply air is controlled by a motorised constant volume venturi valve (CVS). The extract air is also controlled by a motorised constant volume venturi Valve (CVE). In both cases the velocity pressure of the venturi valve is connected via red and blue PVC tube which can run up to 200m to the MPC. Within the MPC is the CMR V-Sensor to convert the measured value into air volume. The MPC has adjustable volume set points for both supply and extract and the valves are positioned to provide constant volumes automatically.
The room pressure is measured via an air probe plate which is connected to the MPC150 with PVC tubing. Within the MPC150 is a precision CMR P-Sensor and the room pressure is measured against a datum. A control loop can offset either the supply or extract volume to achieve room pressure. This option is normally not recommended as a more direct control is more accurate as shown in Room 2 and Room3.
A large room alarm Led display plate is fitted to indicate a healthy state with a green LED or an alarm state with a red LED. An amber LED shows a temperature alarm and a blue LED shows a humidity or particulate alarm. A buzzer is standard .

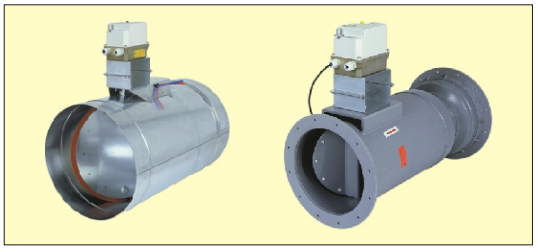
Room 2 and 3
Constant air volume is controlled either by a (CVE) constant volume extract or (CVS) constant volume supply venturi valve. All control and measurement is carried out by the remote MPC which has adjustable set points for the air volumes.
An air probe measures the pressure in the room against a datum and the MPC converts the measurement into Pa. Adjustable set points controls the room pressure to any value from negative to positive room pressure by adjusting the position of the variable volume supply (VVS) or the variable volume extract (VVE) valves. Room 2 is controlled to -15Pa and Room3 is controlled to +15Pa. Door open freeze is standard.

Alarm Monitoring
Alarm monitoring with local display complete with light, buzzer and mute facility can be fitted into standard electrical back boxes recessed into the wall. The front plates are normally made of stainless steel laser engraved. The actual pressure is displayed on LED displays. In case of alarm a light illuminates and the buzzer sounds. The mute button can be pressed to silence the buzzer.

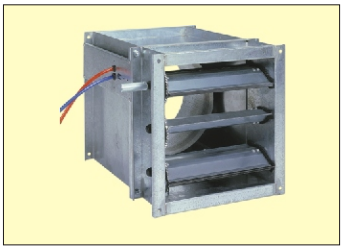
TYPICAL COMPONENTS FOR ROOM PRESSURE AND VOLUME CONTROL WITH INDIVIDUAL MPC150s



CMR air tight control damper with AST fast acting actuator is driven by the MPC150.



CMR Galvanised or PPS air tight Valves with or without venturi air volume measurement device, flanges and fast acting heavy duty AST actuator or VMS economy motor.



CMR rectangular volume control damper with venturi. Suitable for all CMR actuators and MPC150s.

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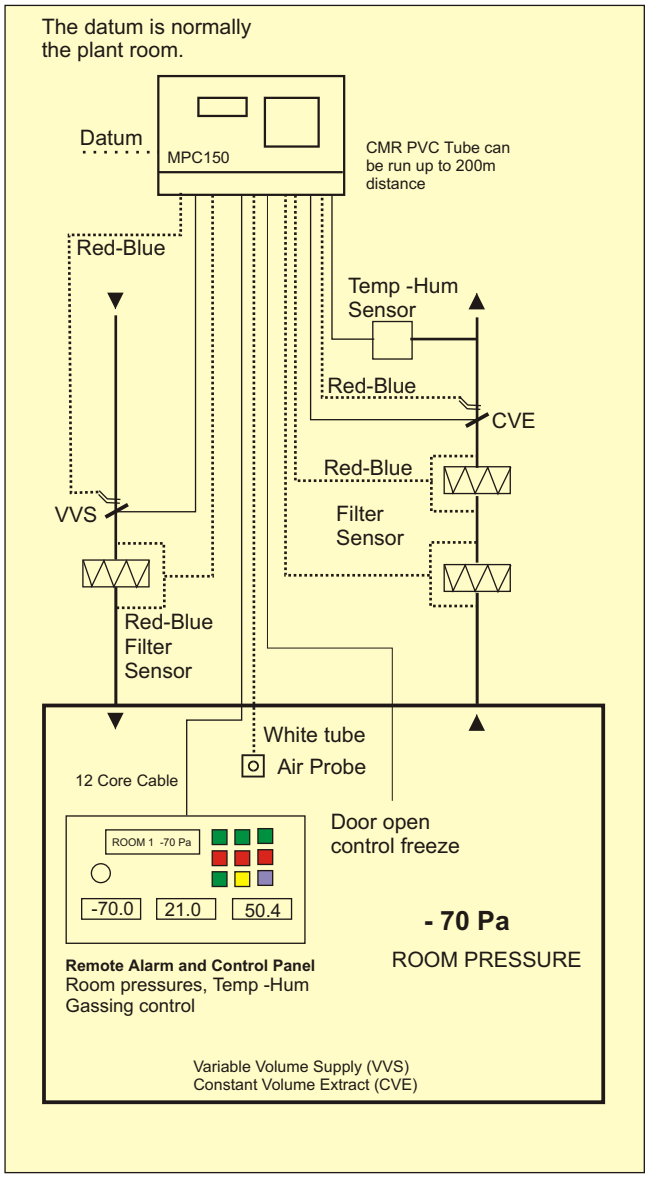
MPC150 NEGATIVE PRESSURE CONTROL

CONSTANT VOLUME EXTRACT AND VARIABLE VOLUME SUPPLY CONTROL



The above schematic shows a typical critical room that has to be at negative room pressure of -70 Pa at all times and should never go positive. Operator alarms and operational displays are provided.

Room Volume Extract Volume Control
The room shall be controlled at -70 Pa and must never go into positive pressure. To achieve this an MPC150 is used to control the extract at constant volume using either PPS or galvanised sheet metal venturi valves depending on application. The MPC measures the volume and controls the extract against an adjustable set point.

Negative Room Pressure Control
As the room is sucked more negative by the extract valves the MPC measures the room pressure via the air probe and a built in precision low pressure P-Sensor and controls the supply air to a set point of -70 Pa. Should the extract fail, the supply valve shuts automatically as the room pressure would go more positive than -70 Pa.

Remote Alarm Display Plate
A remote alarm display plate shall be fitted either within the room or at a convenient remote location. The MPC shall monitor, display and provide visual and audible alarm with mute facility for the room pressure, room temperature, humidity and dirty filter. The stainless steel plate fits standard electrical back boxes. Special laser engraving is provided for easy user operation.

Room Gassing
The MPC includes a gassing control. A key switch on the remote display plate shall shut the supply and extract valves and end switches within the motors shall signal a ready for gassing light. A signal output is provided to start the gassing kettle sockets. The user must still tape up the room so that no gas can escape as per his usual procedure. After gassing the extract starts up first and the supply follows automatically and the whole area can purge.

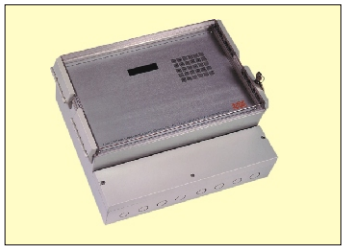
Power Failure
In case of power failure, the valve motors would remain in the last position and upon start up the sequence is starting the extract constant volume first and the room pressure adjusts itself.

Dirty Filter Monitoring
A CMR Pressure Sensor is fitted across the supply hepa filter and across both extract filters. In case of dirty filters, a threshold is set within the MPC and a dirty filter alarm light and buzzer shows this condition on the alarm plate. A mute button is provided on the plate.

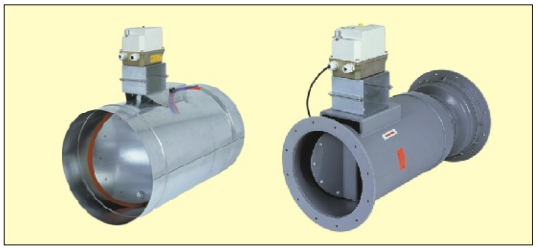
Remote Monitoring
The MPC150 has two RS485 network connections and one RS232 port to connect any PC directly to it. The MPC150 can communicate to any BMS or Scada monitoring software provided the protocols have been agreed. 255 MPC150 can be connected to one network, which provides a powerful control solution.

Permanent Memory
All set points and parameters are stored in permanent memory and even if the MPC electronic board is changed, the parameters do not have to be re-programmed as the eeprom is on the termination board.

TYPICAL COMPONENTS USED TO CONTROL ROOM PRESSURE AND CONSTANT AIR VOLUMES



MPC150 compact controller ready to monitor and control a laboratory with interface for a local operator panel.



CMR Air Valves are either galvanised sheet metal or poly propylene (PPS), with venturi volume measurements and AST actuators with feed back of fully air tight position.

CMR Air Tight Damper with AST fast acting heavy duty actuator. Venturi volume measurement is optional.

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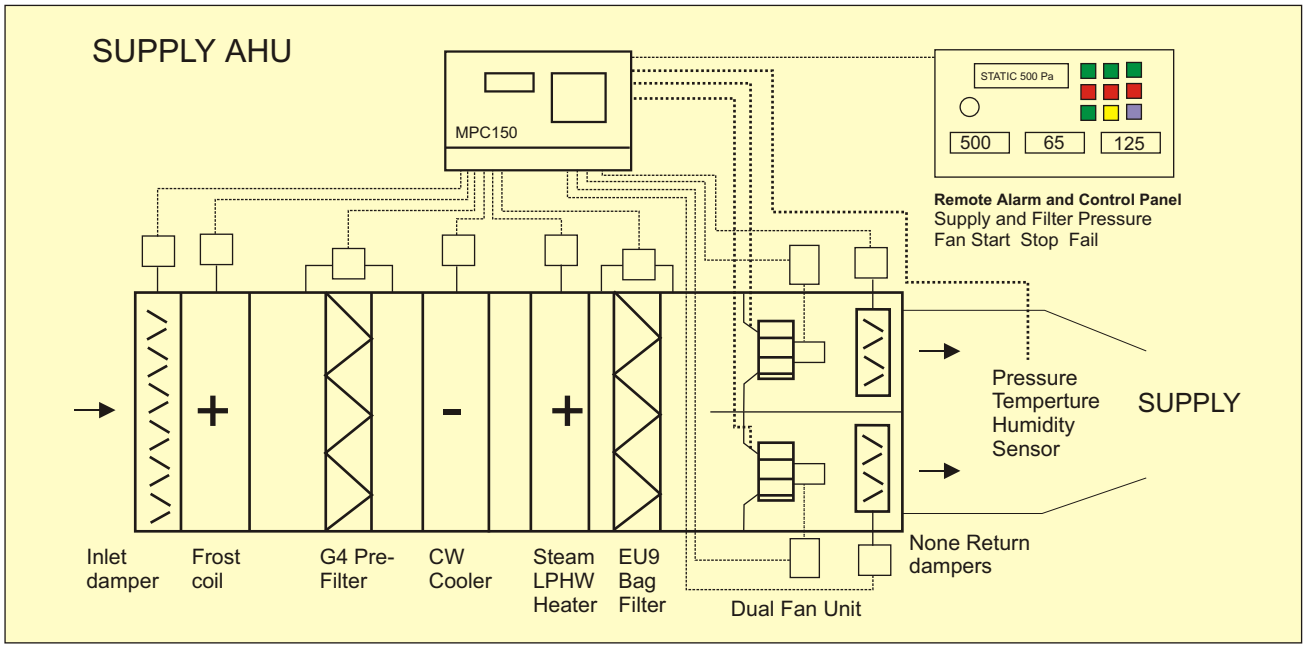
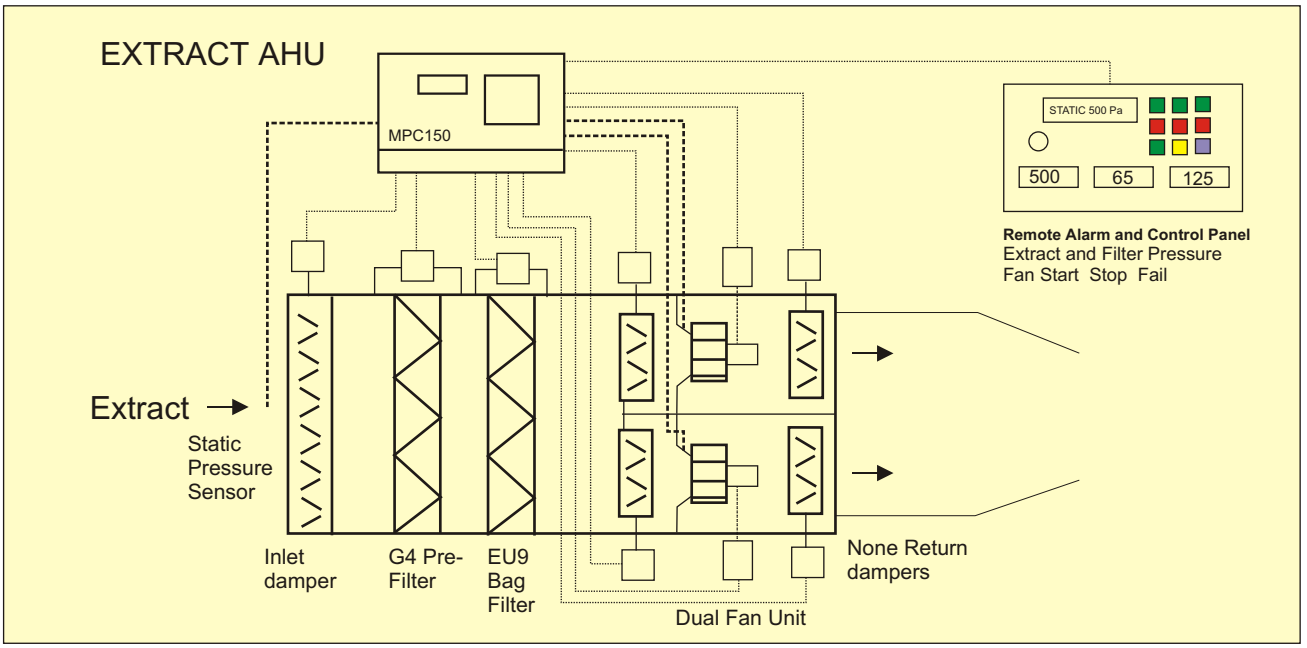
MPC150 AIR HANDLING UNIT CONTROL

COMPACT SUPPLY AND EXTRACT AIR HANDLING UNIT CONTROLLER





Supply Air AHU Control
The MPC150 controls the stop start of the two supply fans and measures the static pressure in the supply duct. Each fan is equipped with volume measurement devices fitted on the inlet eye opf the fan wheel. The MPC can measure each volume and determines if the fans run at the correct duty. The AHU supply can therefore be controlled either on static pressure or supply volume. Both fans run at half volume and in case of failure one fan shall ramp up to provide the required volume. The MPC shall also control both motorised none return dampers and the inlet damper on the fresh air intake. When the AHU stops all dampers shall close. Frost protection, heating, cooling and de-humidification is controlled by the MPC150. Humidification is normally optional. All filters are monitored.

Extract Air AHU Control
The extract air is controlled by an MPC150 and the function is identical as the supply controller except it has additional none return dampers which enables the maintenance of a fan whilst the other fan is running without shutting down the system and it does not need heating and cooling control.

Remote Alarm Display and Operator Panel
A remote operator panel is provided as optional. The panel has stop start facility. A display shows the run or stop of the fan. Dirty filter, air volumes and static pressure is monitoring as standard. The Mpc150 can be networked via the RS485 port and therefore many MPC's can be connected together for central PC monitoring.

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