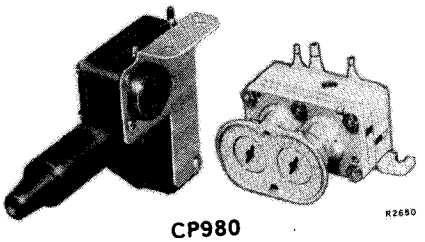
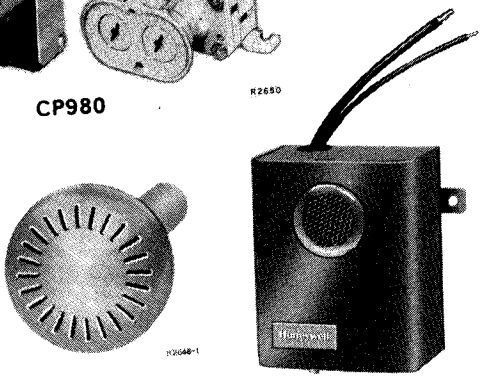
Honeywell

Engineering Data

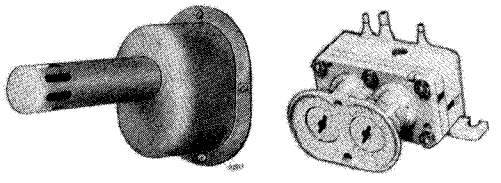
VELOCITROL CONTROLLER LABORATORY APPLICATIONS



CP980



CP981



CP983

INTRODUCTION

The Honeywell Velocitrol Sensor-Controller is a control system combining an ultrasensitive air velocity sensor with a pneumatic controller to accurately detect and effectively control air flow.

The Velocitrol controller has unique characteristics which make it well suited to special laboratory applications.

1. It is a true velocity sensor and does not depend on velocity pressure for operation;
2. It can accurately control velocities in the 100 feet/minute (0.5 m/sec) range which matches desired hood velocities; and
3. It is sensitive and repeatable at low air velocities.

When used in lab space pressurization applications, the Velocitrol controller senses air flow through a small fixed opening between two areas of different pressures. The pressure differential between the two areas can be controlled to as low as 0.004 in. H_2O.

FUME HOODS

! WARNING !

The use of automatic controls of any kind do not make fume hoods any more or any less safe, and do not relieve persons using fume hoods from following safe operating practice.

Fume hoods provide safe working conditions when working with dangerous materials or procedures. A hood working area is exhausted to remove contaminants. Hoods have movable doors (sashes) to allow access to the working area. The exhaust air volume is set to provide a maximum safe face velocity at maximum sash openings. This wastes energy and causes excessive face velocities at sash openings less than full open.

NOTE: Face velocity is the velocity of the air entering the hood through the sash opening.

A CP983 Velocitrol controller installed in a fume hood, as shown in Figures 1 and 2, maintains the optimum face velocity for sash openings from wide open to closed. The CP983 output can control a damper as shown.

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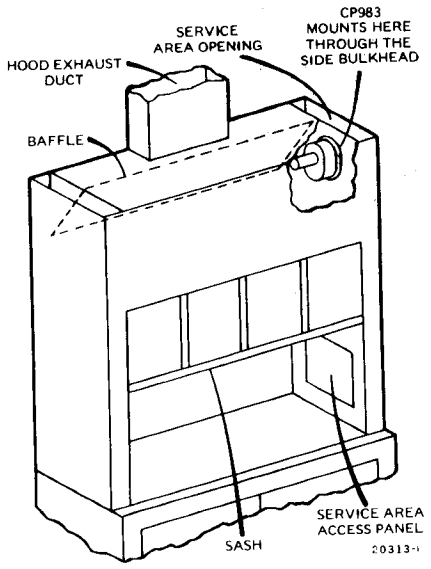

Fig. 1. Fume Hood Sensor Mounting Location.

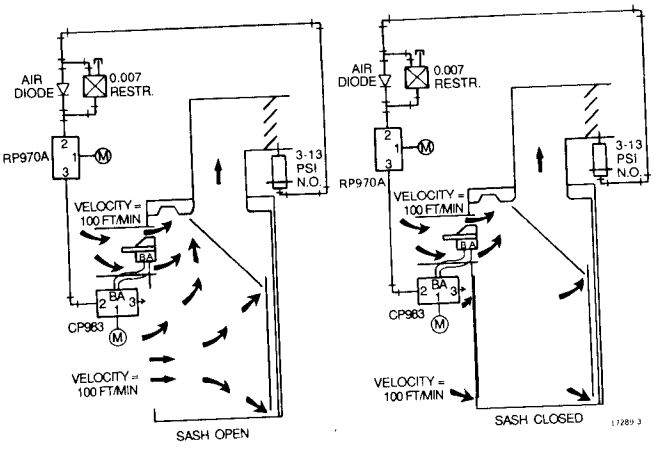

Fig. 2. Velocitrol Controller with Sash Open or Closed.

LABORATORY PRESSURIZATION

POSITIVE PRESSURE

Positive pressure is generally used in clean room applications to prevent infiltration of contaminants. Maintaining a positive pressure in an area can be accomplished by limiting the exhaust air volume to less than the supply volume. Figure 3 shows a positive pressure room control system. When static pressure changes due to a door opening, filter resistance increasing, or HVAC system changes, the damper adjusts the exhaust flow to maintain the desired room static pressure.

The optional system is used when there is the probability of a large or sudden upset in the exhaust duct static pressure. The CP980C or D Velocitrol controller in the duct reacts quickly to upsets and is reset by the CP981 to maintain room static pressure. This controller is recommended where exhaust of several clean rooms is ducted together.

The CP981 Laboratory Space Pressure Controller mounts in the wall between the room to be controlled and a corridor. The CP981 contains a check valve to permit sensing air flow in one direction only. Positive pressure applications measure airflow from the room to the adjacent area.

NEGATIVE PRESSURE

Negative pressure is generally used in toxic materials laboratories to prevent contaminants from escaping from the laboratory. A negative pressure is maintained in the opposite way from positive pressure. Figure 4 shows a negative pressure control system. When static pressure varies, the damper adjusts the supply flow to maintain

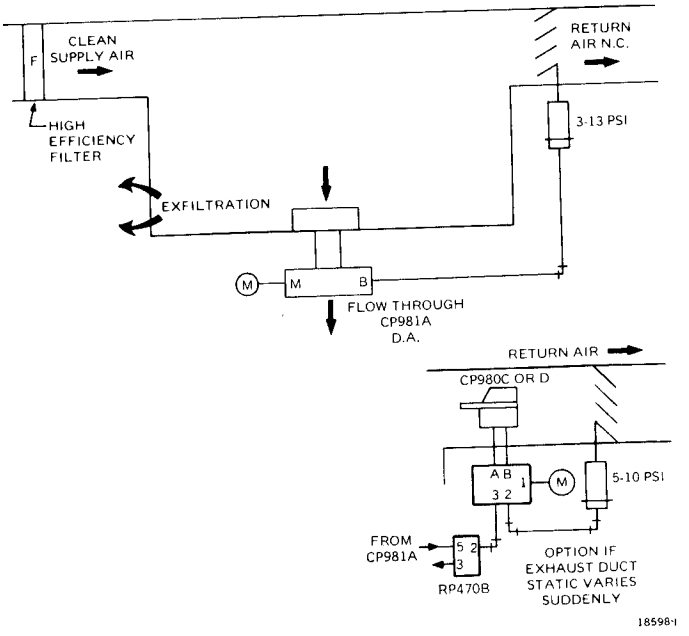

Fig. 3. Positive Pressure Room Control.

the desired room static pressure. The optional control system is used when the supply pressure is subject to large sudden upsets, such as several supply dampers opening or closing at once. The Velocitrol controller in the duct reacts quickly to upsets and is reset by the CP981 to maintain room static pressure.

For negative pressure applications the CP981 measures airflow from adjacent areas into the room.

COMBINED SYSTEMS

Hood control, temperature control, and laboratory pressurization can be combined to provide maximum savings and control.

Figure 5 shows these systems combined in a typical negative pressure laboratory. The fume hoods are controlled by separate CP983 Velocitrol controllers to maintain optimum face velocity. The CP981 Velocitrol controller resets the supply Velocitrol controller to maintain desired room static pressure. The TP979 Dual Zero Energy Band thermostat controls room temperature through the pneumatic valve and the return air damper. When room temperature is in the Zero Energy Band, the exhaust (or return) air damper is closed or in a minimum position, as determined by the original adjustment of the damper linkage. If the temperature increases, the damper starts opening to allow more conditioned air into the room. If the temperature decreases, the reheat valve starts opening. Upon a further decrease in temperature, the exhaust damper starts opening, providing additional air through the reheat coil.

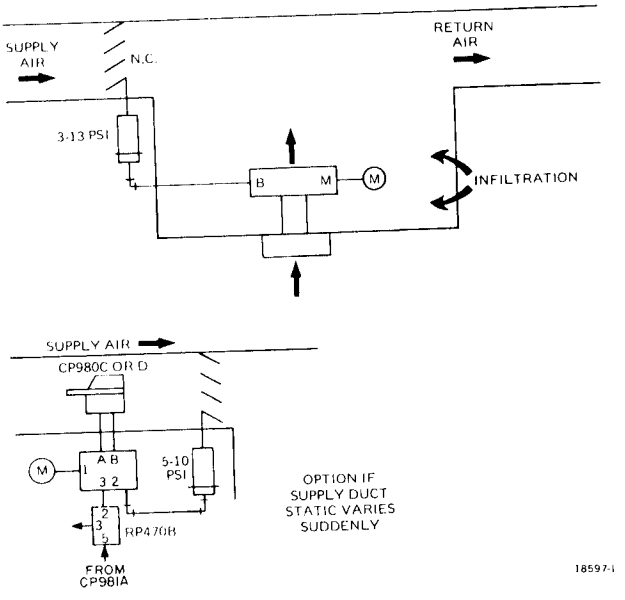

Fig. 4. Negative Pressure Room Control.

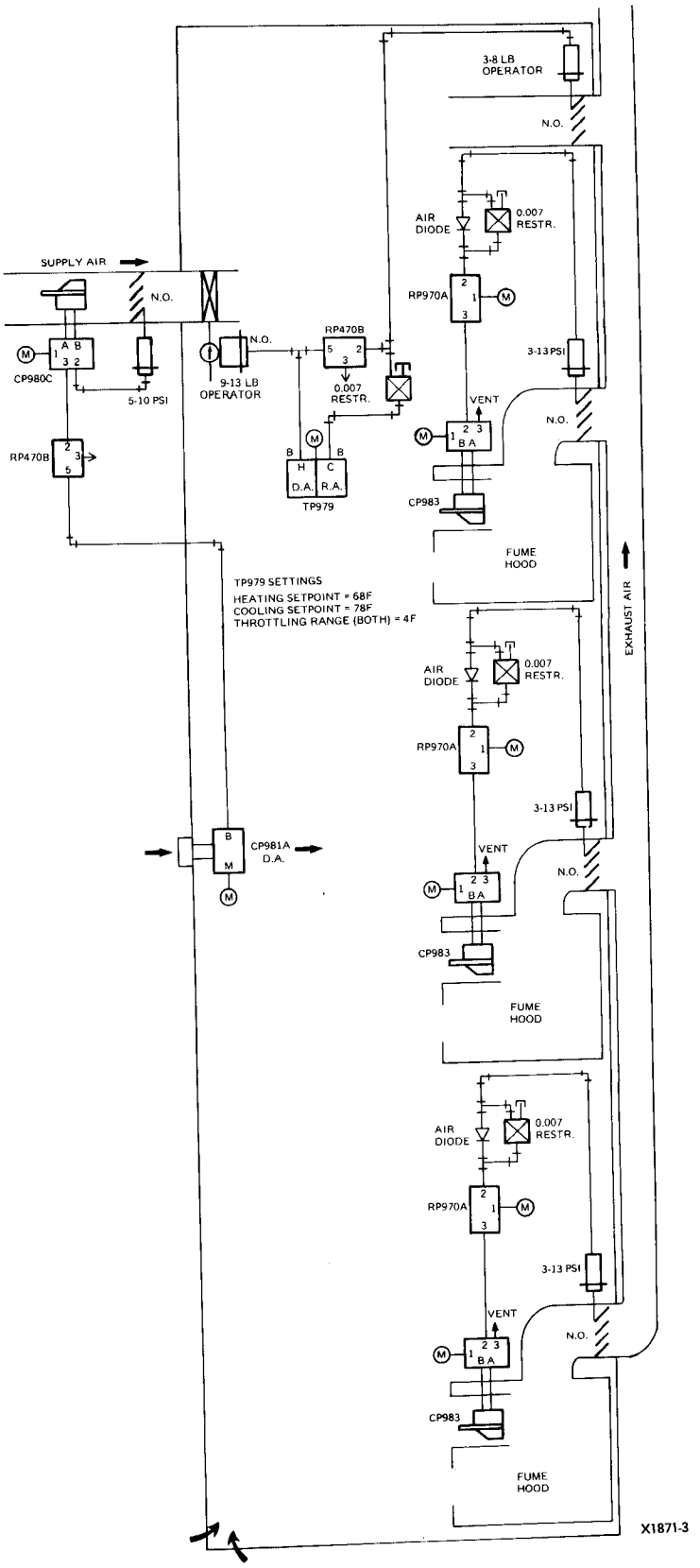

Fig. 5. Typical Laboratory Application.

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