

CP980C, D, E and F Velocitrol Velocity Sensor-Controller

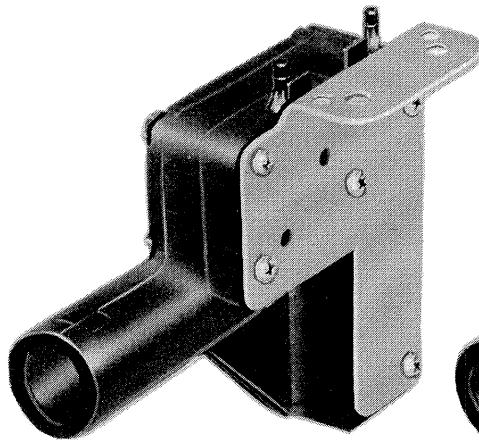
Installation Instructions

Before Installation

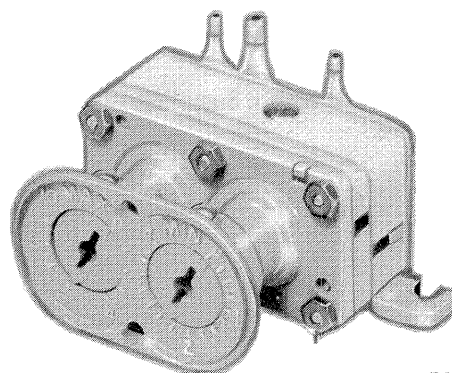
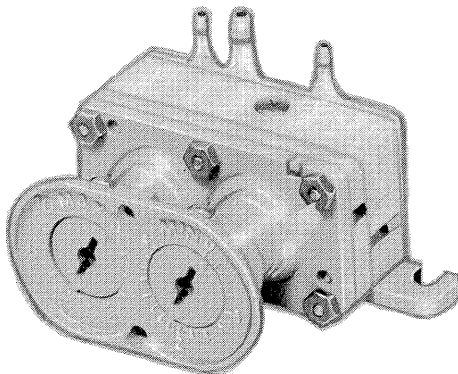
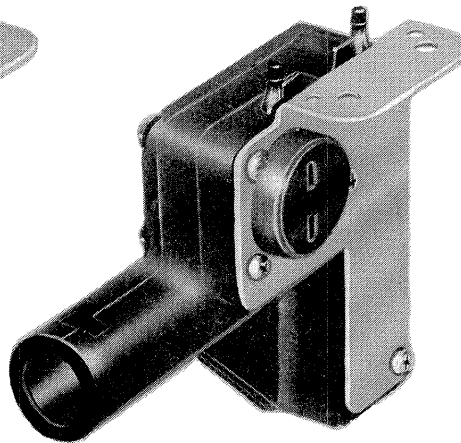
The CP980 Velocitrol Sensor-controller combines an ultra-sensitive air velocity sensor with one of two pneumatic controllers to accurately detect and effectively control air flow in air terminal units, regardless of system static pressure. The CP980 actually senses velocities as low as 100 feet/min (0.50 m/s), producing an output signal capable of operating standard pneumatic operators (5 to 10 lb/in² [34 to 69 kPa] operators recommended). The Velocitrol controller is field adjustable by resetting dials only or by replacing an orifice and resetting dials. Calibration is the same for all models.

NOTE: The sensor and controller are a calibrated control combination and should not be separated. (The sensor and controller have matching serial numbers to identify sets if accidentally mixed). The controller should be connected to a normally closed damper if reverse acting and to a normally open damper if direct acting.

REVERSE ACTING



DIRECT ACTING



R2263

Installation

Before installing the sensor, be certain that the proper flow limiting orifice accompanies the sensor, see Table 1. If an orifice is added in the field, insert the large opening end into the sampling tube of the sensor. A rib on the orifice aligns with a groove in the sensor. Push the orifice into the tube until it snaps into place. See Fig. 1.

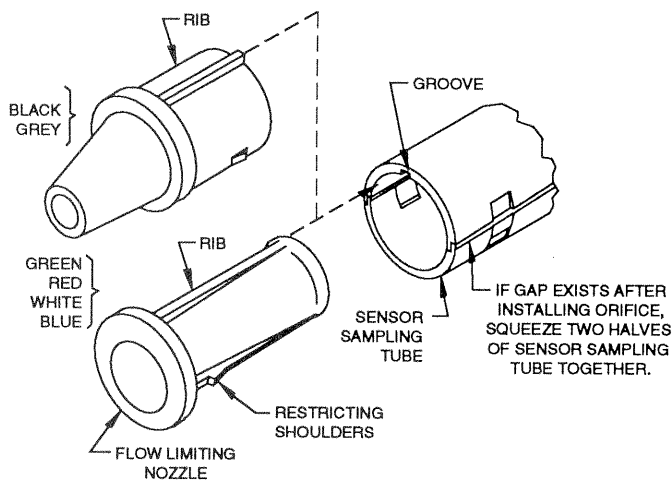
CAUTION

Attempting to remove an orifice may result in orifice damage.

Table 1. Sensor Velocity Rating.

Velocity Rating ft/min (m/s)	Orifice Color
500 (2.5)	No orifice required
750 (3.7)	Green
1250 (6.3)	Red
1500 (7.6)	White
2000 (10.1)	Blue
2500 (12.6)	Black
3500 (17.7)	Grey

NOTE: Velocity rating corresponds to a 10 setting on the controller's maximum dial.



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Fig. 1. Inserting the Orifice into the Sensor Sampling Tube.

Mounting the Sensor

The sensor has an integral mounting bracket with holes sized for No. 8 screws, see Figure 2. Locate the sensor inside an air duct or air terminal unit in a position allowing a representative velocity to pass through the sampling tube at all times. Usually, the best location is near the inlet of an air terminal unit, upstream from the damper. Mount the sensor as close as possible to the center of the duct using a fabricated sheet metal bracket. Orient the sensor with orifice upstream or to agree with arrow on sensor body. When mounting, avoid corners or other areas inside the duct that might affect the representative air velocity. See Fig. 3 for a typical terminal unit mounting illustration.

Duct Mounting the Sensor (Refer to Fig. 4.)

Mount the Velocitrol sensor in a straight section of duct. Section should be as long as possible, up to nine diameters, for best results. Locate the sensor in the center of the duct about one diameter from the downstream end of the straight section. Sensor can be located either upstream or downstream of the terminal unit (or damper) but if location is close to damper an upstream location is recommended.

If there are no access ports near the selected Velocitrol location, cut a hole. Use a blank 4 in. by 4 in. electrical box cover plate as a template to locate and punch mounting screw holes and to outline the hole to be cut. Cut the hole slightly smaller than the outline and inside the punched holes. For convenience, mount the controller on the 4 in. by 4 in. electrical box cover plate. Fabricate a sheet metal bracket long enough to place the controller in the center of the duct and attach it to the other side of the cover plate. Mount the sensor on the bracket and complete piping.

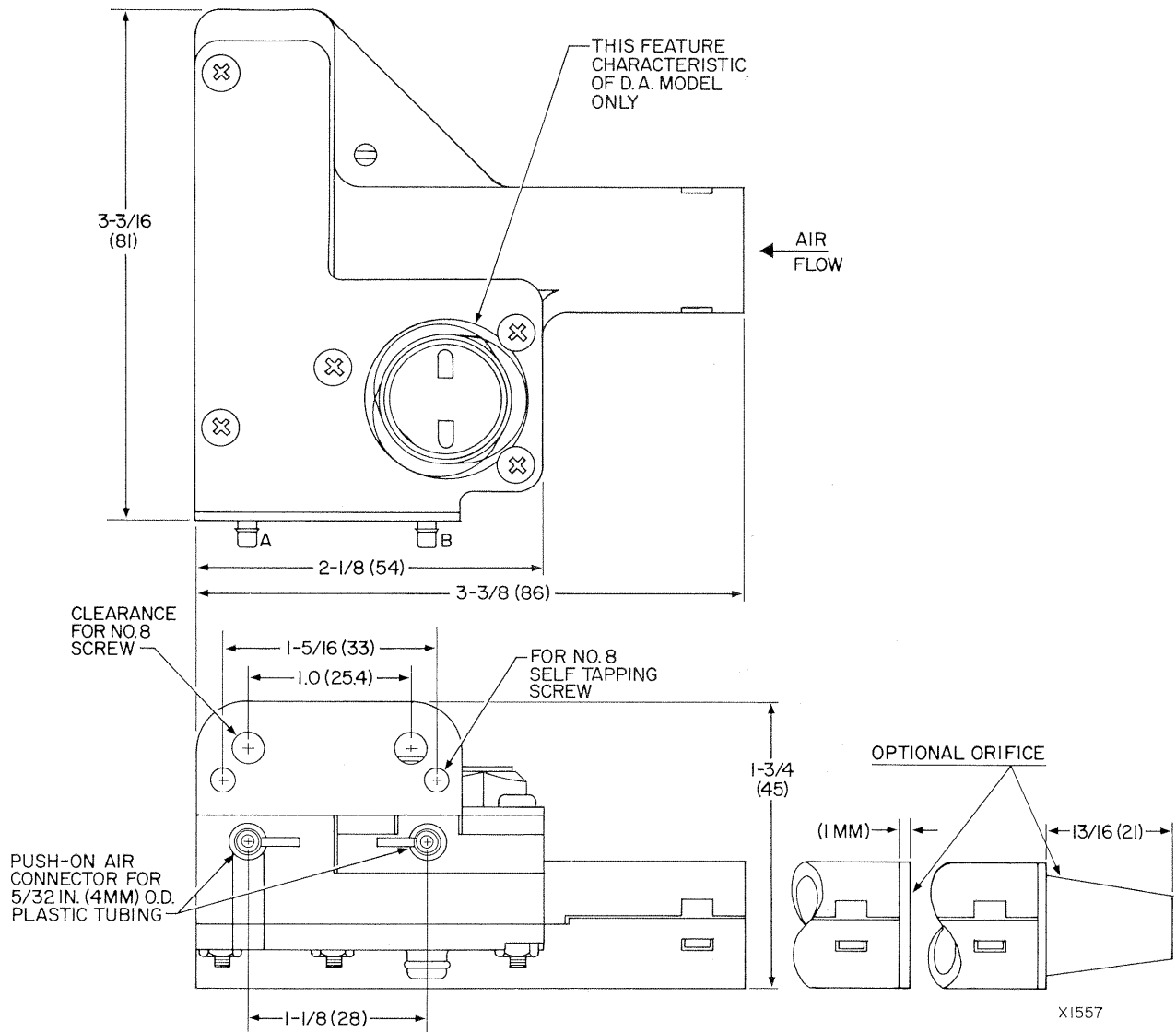


Fig. 2. Approximate Sensor Dimensions in Inches (mm).

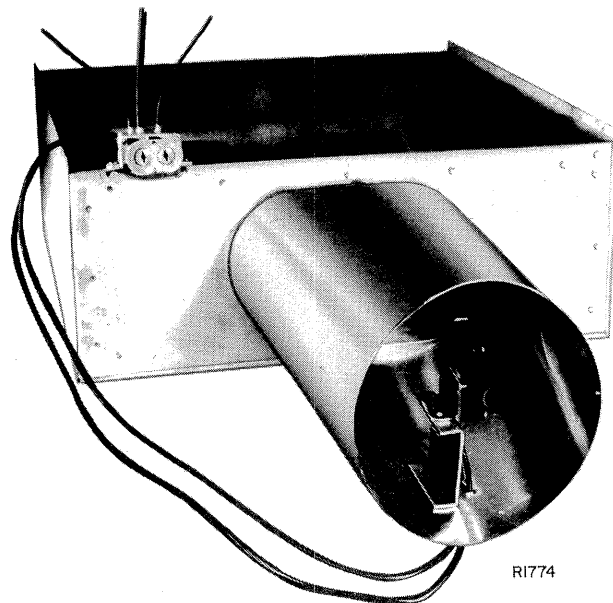


Fig. 3. Typical Installation of Sensor-Controller.

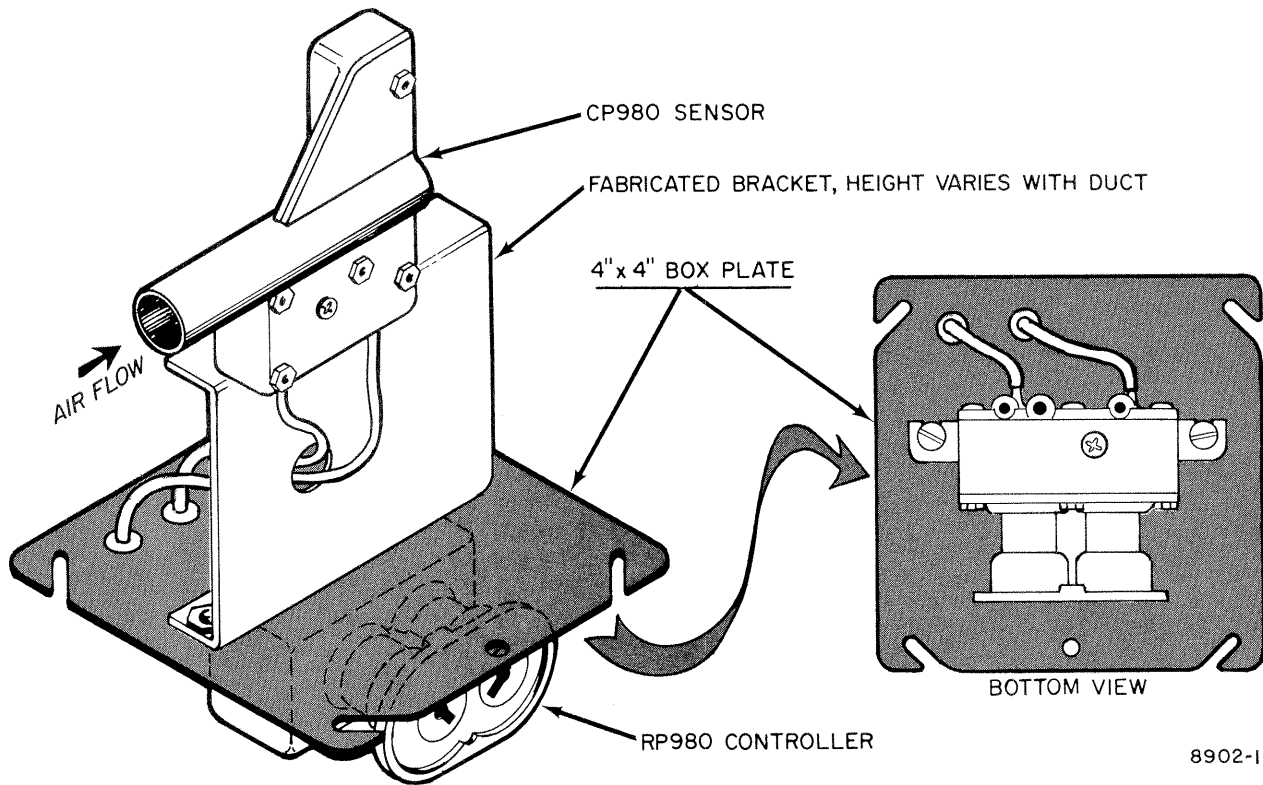


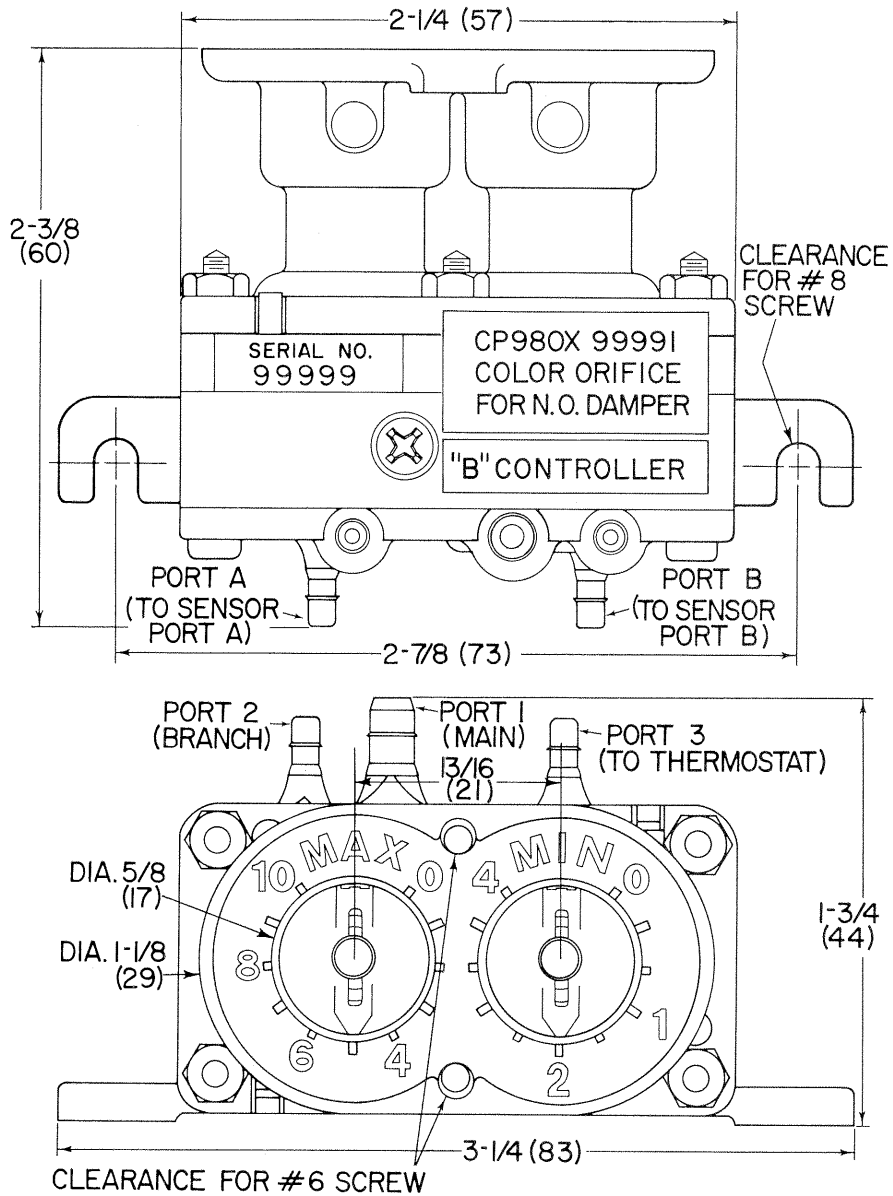
Fig. 4. Field Mounting.

Mounting Controller (Refer to Fig. 5.)

Mount the controller by using the two mounting slots at the controller base sized for No. 8 screws. The controller can be mounted inside or outside an air duct, up to six feet (2m) from

the sensor. Mount the controller such that dials are easily read and adjustable. See Fig. 3 and 4 for typical examples.

Refer to label on controller for proper damper/operator linkage.



NOTE: PORT 1 IS SIZED FOR 1/4 INCH (6mm) TUBING.
 ALL OTHER CONNECTIONS ARE SIZED FOR 5/32 INCH (4mm) TUBING.

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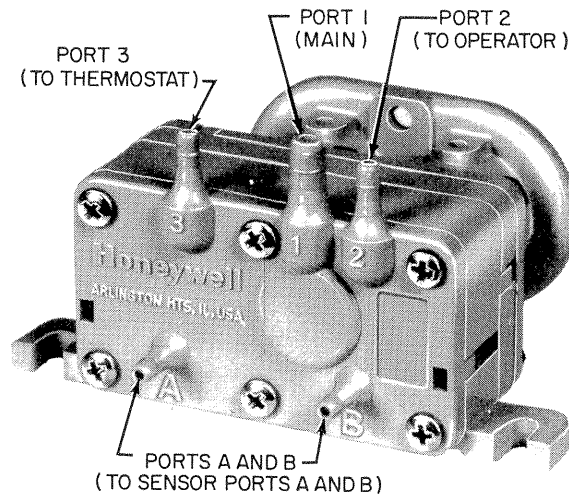
Fig. 5. Approximate Controller Dimensions in Inches (mm).

Piping (See Fig. 6.)

All pneumatic connections on the sensor-controller are sharp bar type. The sensor has two 5/32-inch (4 mm) connections marked "A" and "B". The controller has a total of five ports. Two ports, marked "A" and "B", are 5/32-inch (4 mm) ports that connect with those on the sensor (A to A; B to B). Port 1 is a 1/4-inch (6 mm) main air supply port. Ports 2 and 3 are 5/32-inch (4 mm) ports connected to the pneumatic operator and the thermostat respectively.

The Type B controller's thermostat branch line connection (port 3) provides the air supply for a one-pipe bleed type thermostat. A separate main supply and restriction for the thermostat are not required. For constant volume applications, cap port 3 (use Barb-Cap, 14003567-001) on the type B controller and use the maximum (MAX) dial.

The type C controller (two-pipe) requires a thermostat with a separate main.



NOTE: PORT 1 IS SIZED FOR $\frac{1}{4}$ IN. (6mm) TUBING. OTHER PORTS ARE SIZED FOR $\frac{5}{32}$ IN. (4mm) TUBING.

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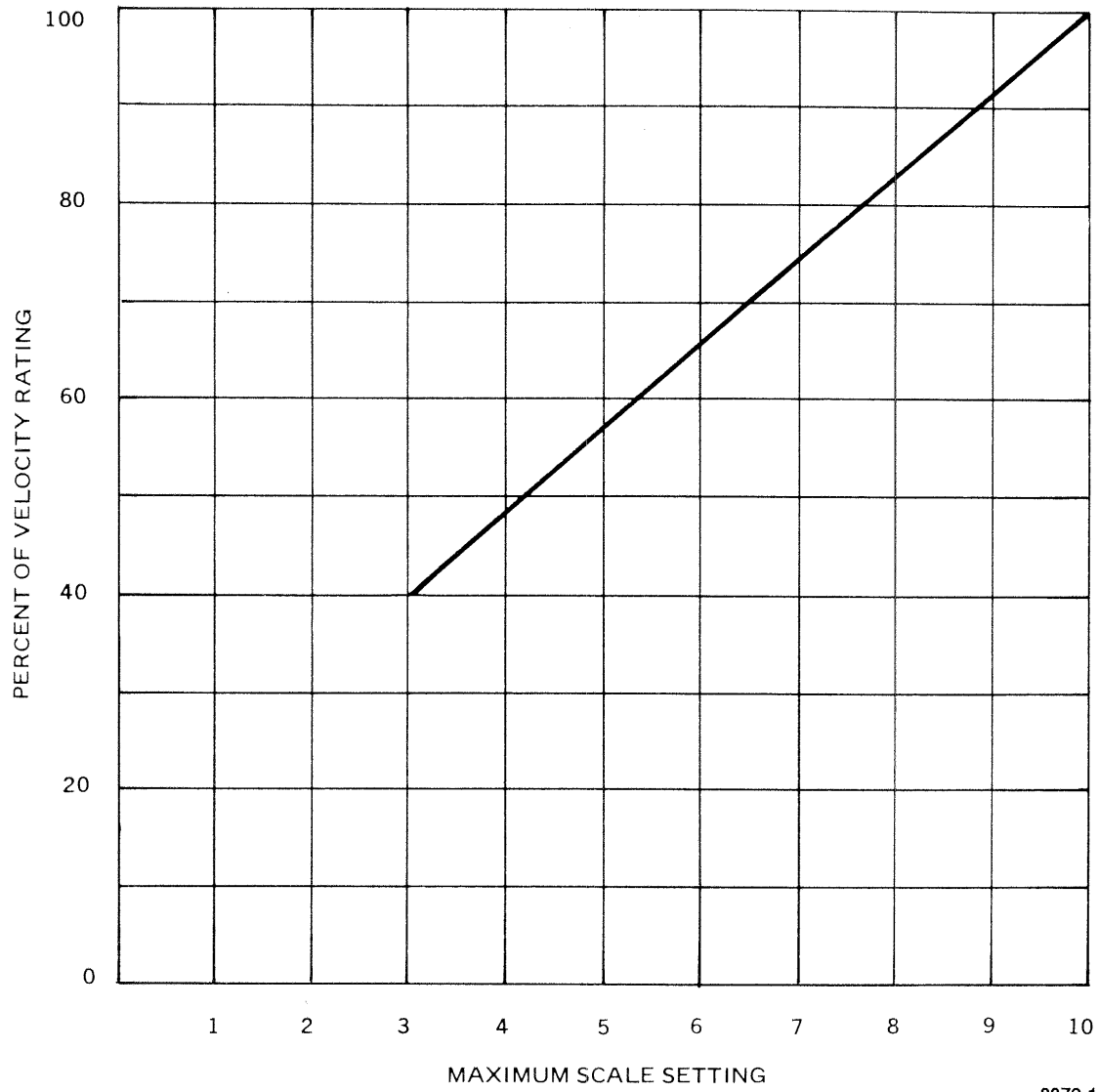
Fig. 6. Controller Piping Connections.

Adjustments

The maximum velocity limit is adjustable from 100 percent down to 40 percent of its rating. A minimum velocity limit is adjustable from zero up to 50 percent of its rating. If the two limits conflict, the maximum adjustment provides the predominant limit in this overlap.

1. Divide the required flow values for minimum and maximum by the duct area to determine required velocity.

2. Refer to Table 1 to calculate % of velocity rating.
3. Select an orifice as close to 70% of velocity rating for maximum as possible. This provides optimum adjustment of the maximum scale.
4. Refer to Figures 7 and 8 for dial settings. For minimum set at shut off, select a setting of "0".



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Fig. 7. Velocitrol Sensor-Controller Maximum Scale Calibration.

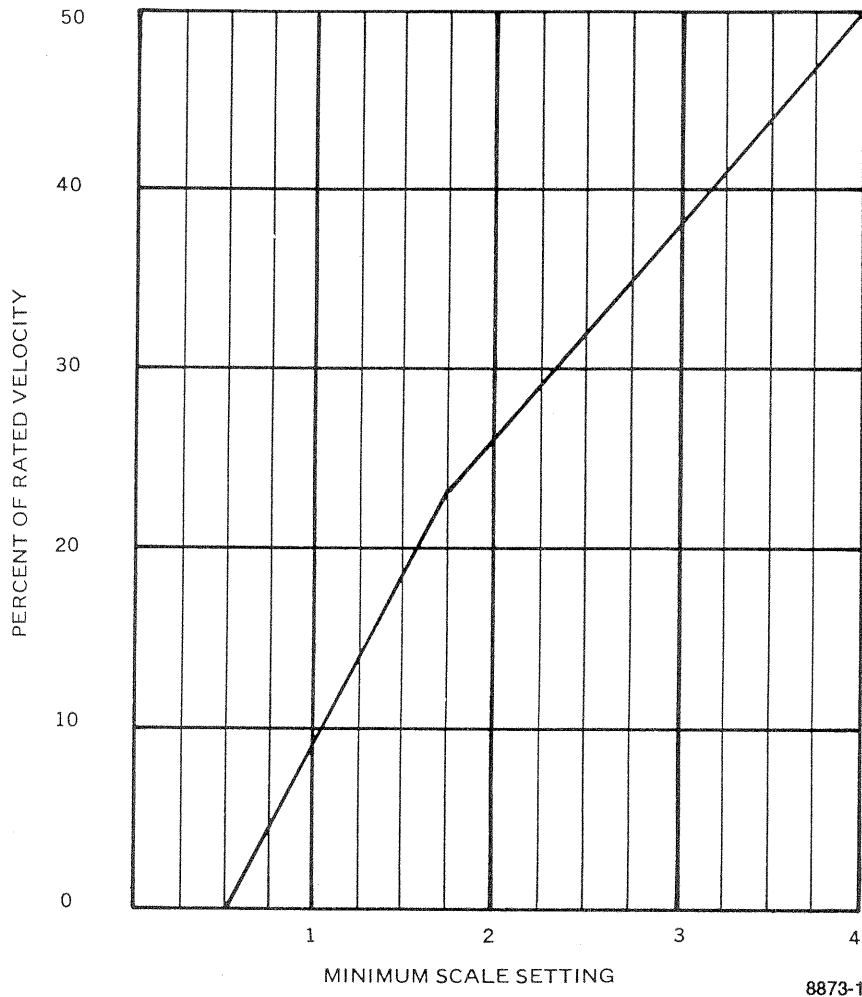


Fig. 8. Velocitrol Sensor-Controller Maximum Scale Calibration.

Checkout

- Note the maximum-minimum controller scale settings. Reset the maximum to 10 and the minimum to zero.
- With 20 lb/in² (138 kPa) main air applied to the controller, vary the thermostat setting. The operator/damper should vary the air flow to the dictates of the thermostat.

In a constant volume application, the action can be checked by uncapping the thermostat port (port 3). The flow should drop to shut-off.
- With a thermostat signal applied (or the thermostat port capped), shut off duct air flow. The damper should go wide open attempting to maintain flow.
- To eliminate thermostat related problems the thermostat line may be disconnected at port 3 of the controller. Then, with a type B controller the terminal unit should go to full volume when blocking (capping) port 3; the unit should shut off when venting port 3.

With a type C controller the unit should go to full volume with 20 lb/in² (138 kPa) supplied to port 3; the unit should shut off when venting port 3.
- If above actions do not occur, replacement of the sensor-controller model is recommended.
- Reconnect thermostat and reset controller to original scale settings.

Honeywell

Home and Building Control
Honeywell Inc.
Honeywell Plaza
P.O. Box 524
Minneapolis, MN 55408-0524

Home and Building Control
Honeywell Limited-Honeywell Limitée
740 Ellesmere Road
Scarborough, Ontario
M1P 2V9

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