37HS
Universal Variable Air Volume Control Package

Installation Instructions

CONTENTS

Page

INTRODUCTION 1

INSTALLATION 2

General 2

- VARIABLE AIR VOLUME CONTROLS — 37HS1 UNIT WITH 23-IN. DIFFUSER
- VARIABLE AIR VOLUME CONTROLS — 37HS1 UNIT WITH 47-IN. DIFFUSER AND 37HS2 UNIT
- VARIABLE AIR VOLUME CONTROLS — 37HS4 UNIT
- INTERCONNECTING TUBING, ALL MODELS

AIRFLOW ADJUSTMENT 9

Maximum Airflow (Cfm) Adjustment 9

Minimum Airflow (Cfm) Adjustment 9

INTRODUCTION

These instructions describe the installation and adjustment of the universal variable air volume (VAV) control package. This package contains all necessary control devices and hardware for mounting the system-powered controls on 37HS1, 37HS2 and 37HS4 Moduline® units.

Note that for certain applications, additional control packages are required and must be ordered separately. These include wall thermostats, warm-up valves, changeover valves and electric warm-up valves. Separate installation instructions are provided in these packages.

This package supplements the individual VAV control packages offered for specific Moduline models. Table 1 shows the control packages available for specific models and the universal VAV package. Note that the constant volume control package applies to all 37HS models. Figure 1 shows the contents of the universal VAV control package.

Table 1 — Volume Control Package Numbers

UNIT	VARIABLE AIR VOLUME*	CONSTANT AIR VOLUME or WALL THERMOSTAT APPLICATIONS
	Package Number	
37HS1	37HS900001	37HS900003
37HS2	37HS900002	37HS900003
37HS4	37HS900004	37HS900003

*The same volume controller is used for all 37HS models; however, other components in the VAV control packages differ.

UNIT	UNIVERSAL VARIABLE AIR VOLUME CONTROL PACKAGE—DIFFUSER THERMOSTAT
	Package Number
37HS1 37HS2 37HS4	37HS900005

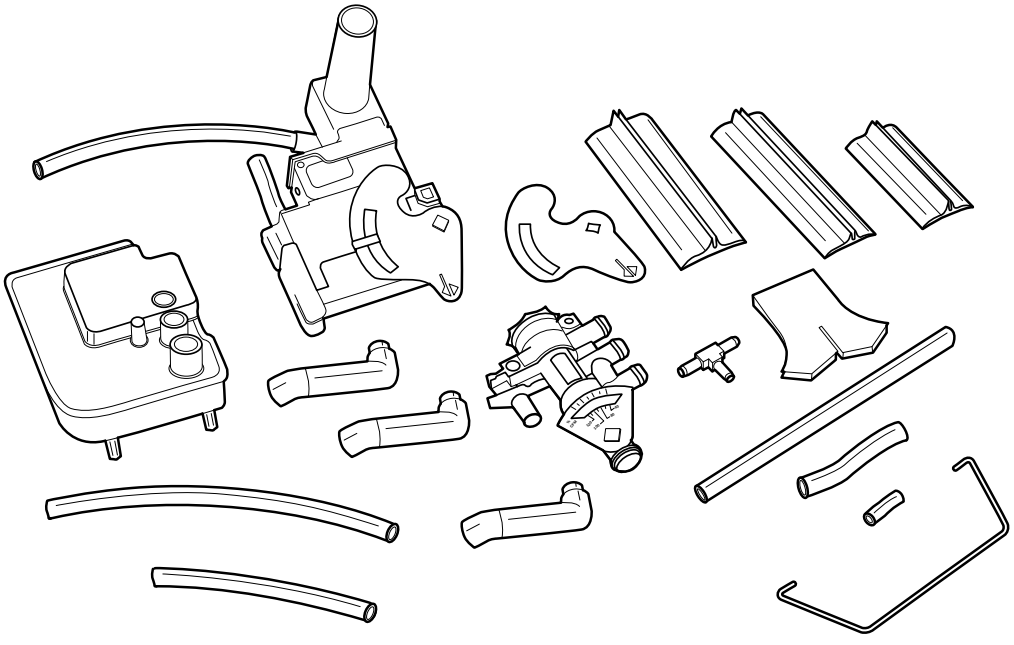


Fig. 1 — Contents of the Universal VAV Control Package

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

INSTALLATION

General — Controls may be installed in the unit before or after the unit is hung or placed in the ceiling grid. However, if warm-up switches or changeover valves are used, the controls should be installed before the unit is placed in the ceiling structure.

VARIABLE AIR VOLUME CONTROLS — 37HS1 UNIT WITH 23-in. DIFFUSER

From the universal control package, select the following components (See Fig.2):

- filter assembly
- pneumatic tubing, 11⁄16 in. long
- volume controller
- diffuser baffle, narrow, 2⅜ in. long
- thermostat/aspirator assembly
- rubber thermostat supply tube, with spring installed, 5⅜ in. long
- 3 elbow connectors
- clear plastic tube, 4⅜ in. long
- brass tee
- thermostat mount spring clip

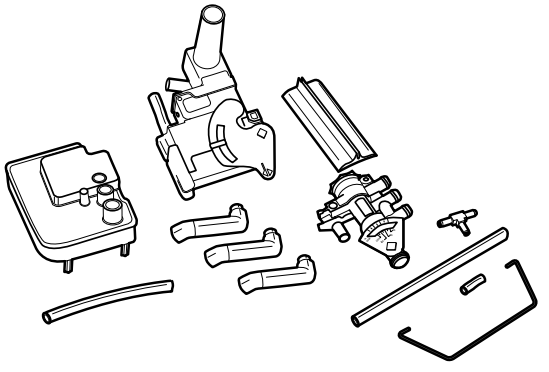


Fig. 2 — Components Selected From Universal Control Package for Installation on 37HS1 with 23-in. Diffuser

Control Installation, 37HS1 Unit with 23-in. Diffuser

1. Remove the plugs from the high-pressure and low-pressure ports located at the control block of the unit.
2. Remove cap from bellows fitting and install 11⁄16-in. long piece of ¼-in. OD pneumatic adapter tubing onto the bellows fitting (push on full length of fitting). See Fig. 3.
3. Push the diffuser baffle into the space between side diffusers and down onto the center diffuser at the end away from the unit. Then push down the end close to the unit. The baffle will form around the legs of the diffuser spacer and lock onto the center diffuser. See Fig. 4. Baffle should fill space between side diffusers between unit end and thermostat.
4. To prepare the control filter for installation, be sure that the bellows chamber filter plug is pushed tightly into the correct connection. Figure 5 shows the connection ports on both sides of the filter. The lower bellows port on the unit side and the small bellows pressure connection on the control side should be capped or plugged before installation.
5. Install the 3 elbow connectors to the filter. Figure 6 shows the correct orientation of the elbows.

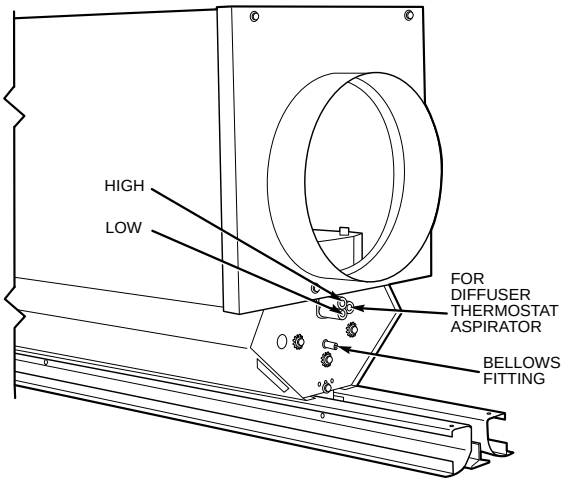


Fig. 3 — Typical 37HS Air Terminal Before Installation of Controls

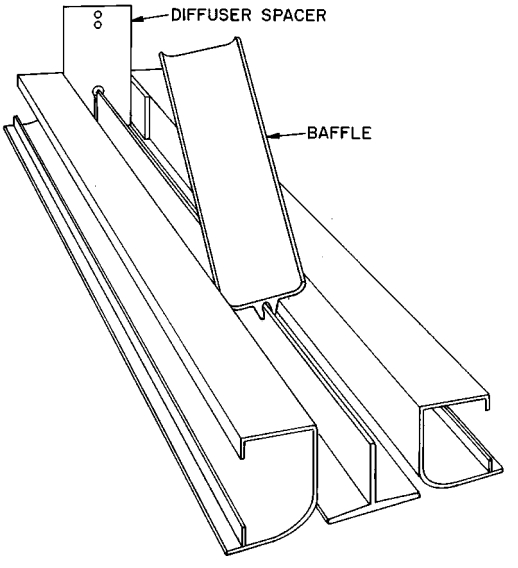


Fig. 4 — Diffuser Baffle Assembly

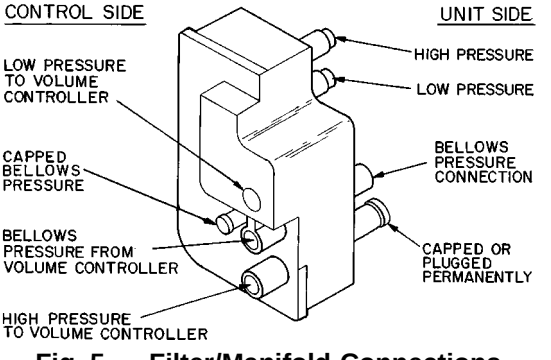


Fig. 5 — Filter/Manifold Connections

Fig. 6 — Elbow Connections Installed on Filter

6. Moisten the 2 O-rings with water, then push the filter into the unit control block and onto bellows connection until the standoffs rest on the unit end plate. See Fig. 7.
7. Remove cap on thermostat port of volume controller. Pull shim down until released from port and then pull shim out from body of volume controller. Discard shim. Figure 8 shows the volume controller and Fig. 9 shows the shim removal.
8. Install the 5⅜-in. tube, with spring inserted, to the thermostat port of the volume controller.
9. Moisten the O-rings of the volume controller with water and push the controller directly into the filter elbow connections. See Fig. 10.
10. Install the thermostat on the center diffuser, then snap spring clip over thermostat and onto the side diffusers to hold thermostat in place. Make sure that thermostat lever will rotate.
11. Connect the thermostat to the volume controller with the rubber tube with spring.
12. Remove cap from the aspirator supply port on the unit control block. Remove 5½-in. plastic tube attached to the aspirator and replace it with 4⅜-in. length. Connect the aspirator supply tube to the control block connection. Figure 11 shows the completed installation.

    The brass tee is used for slave unit connection where 3 or more units are used in air series. See Interconnecting Tubing, All Models, page 8.

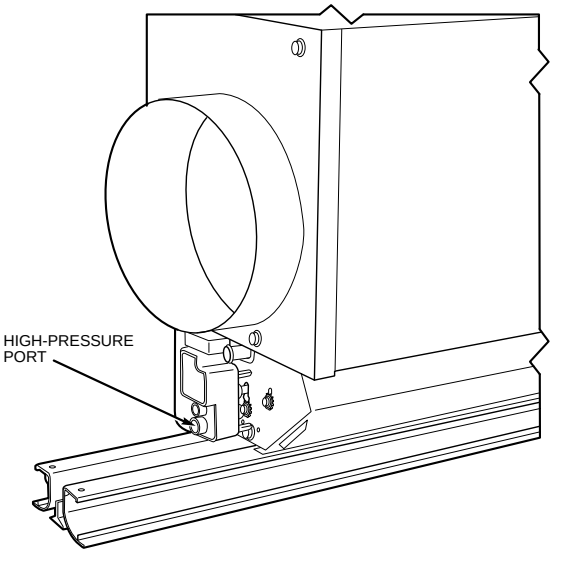


Fig. 7 — Control Filter Installed

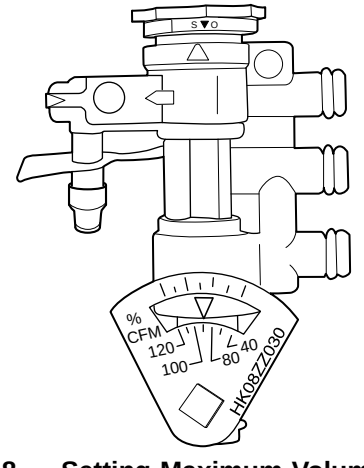


Fig. 8 — Setting Maximum Volume — 37HS Controller

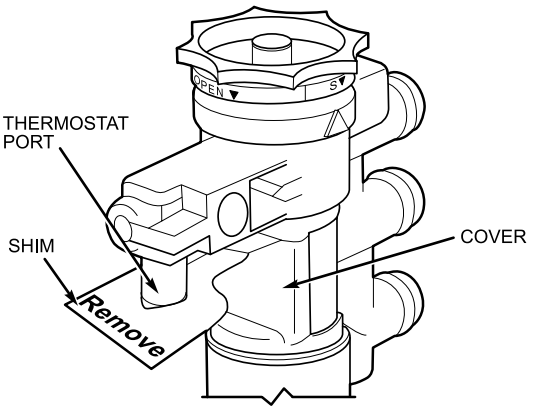


Fig. 9 — Shim Removal

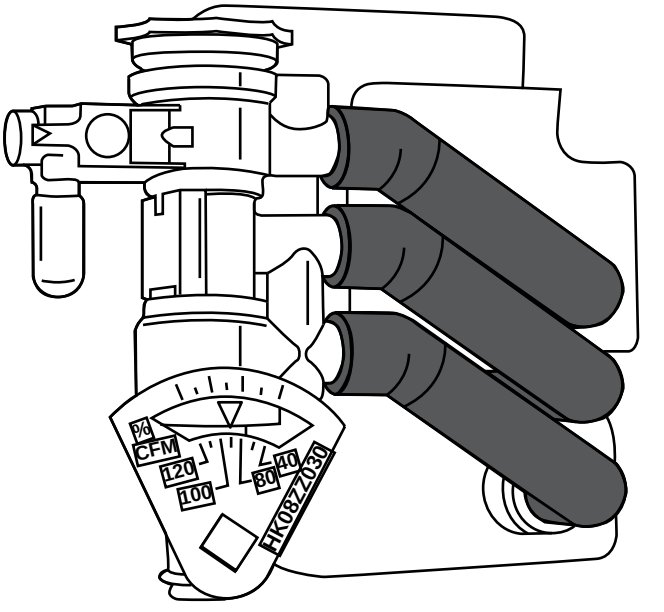


Fig. 10 — Volume Controller Connected to Filter

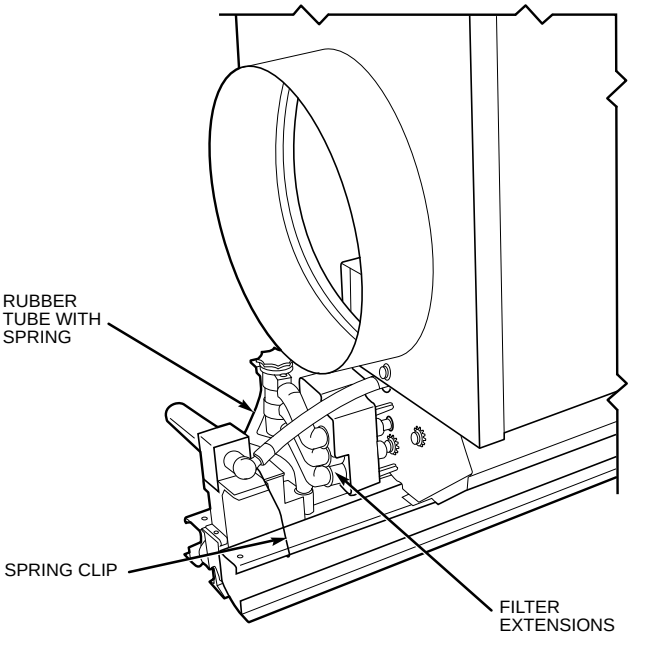


Fig. 11 — 37HS Variable Air Volume Control Installation

VARIABLE AIR VOLUME CONTROLS — 37HS1 unit with 47-in. Diffuser and 37HS2 unit

From the universal control package, select the following components (see Fig. 12):

- filter assembly
- pneumatic tubing, 11⁄16 in. long
- volume controller
- diffuser baffle, narrow, 3⅝ in. long
- thermostat/aspirator assembly with 5½-in. long clear plastic tube
- brass tee
- thermostat mount spring clip

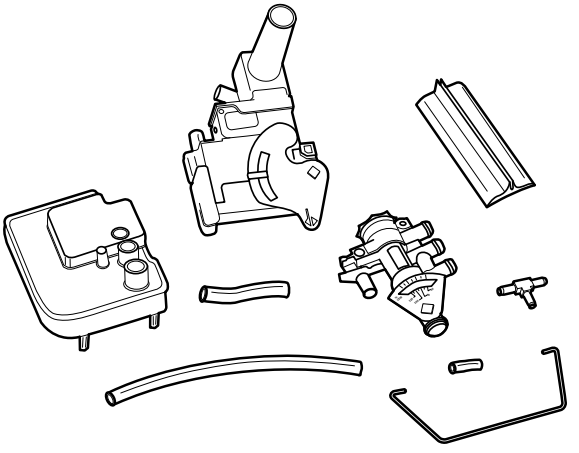


Fig. 12 — Components Selected From Universal Control Package for Installation on 37HS1 with 47-in. Diffuser or 37HS2.

Control Installation, 37HS1 unit with 47-in. Diffuser and 37HS2 unit

1. Remove the plugs from the high-pressure and low-pressure ports located at the control block of the unit.
2. Remove cap from bellows fitting and install 11⁄16-in. long piece of ¼-in. OD pneumatic adapter tubing onto the bellows fitting (Push on full length of fitting). See Fig. 13.
3. Push the diffuser baffle into the space between side diffusers and down onto the center diffuser at the end away from the unit. Then push down the end close to the unit. The baffle will form around the legs of the diffuser spacer and lock onto the center diffuser. See Fig. 14. Baffle should fill space between side diffusers between unit end and thermostat.
4. To prepare the control filter for installation, be sure that the bellows chamber filter plug is pushed tightly into the correct connection. Figure 15 shows the connection ports on both sides of the filter. The lower bellows port on the unit side and the small bellows pressure connection on the control side should be capped or plugged before installation.
5. Moisten the 2 O-rings with water, then push the filter into the unit control block and onto bellows connection until the standoffs rest on the unit end plate.

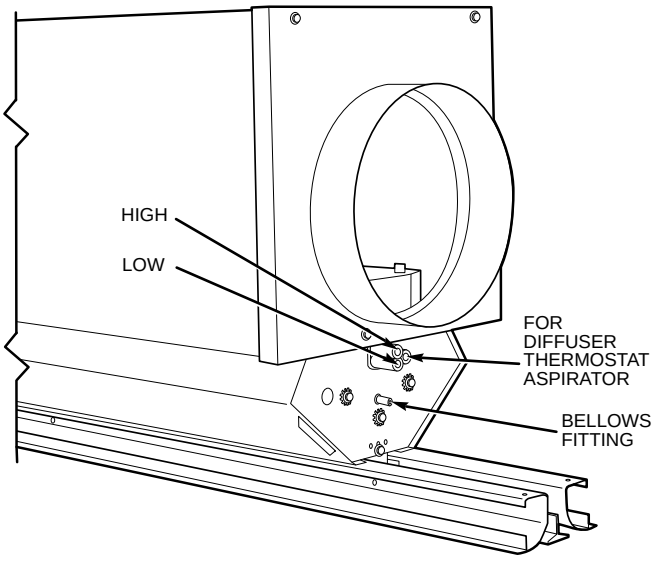


Fig. 13 — Typical 37HS Air Terminal Before Installation of Controls

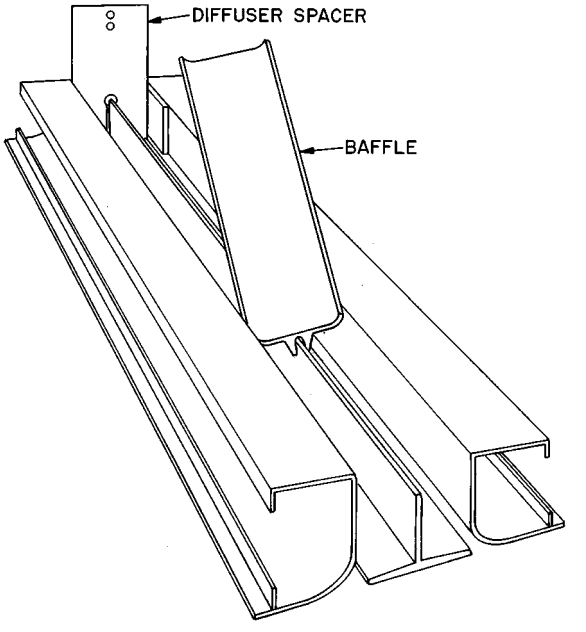


Fig. 14 — Diffuser Baffle Assembly

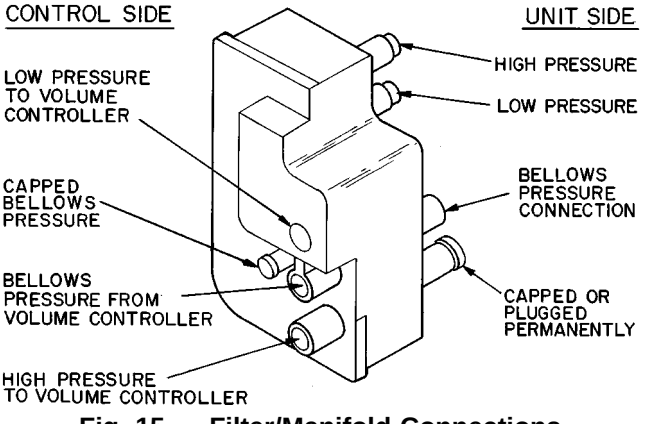


Fig. 15 — Filter/Manifold Connections

6. Remove cap on thermostat port of volume controller. Pull shim down until released from port and then pull shim out from body of volume controller. Discard shim. Figure 16 shows the volume controller and Fig. 17 shows the shim removal.
7. Push preformed tube attached to thermostat onto port of the volume controller. Figure 18 shows the correct orientation of the tube on the thermostat and Fig. 19 shows the assembly of the 2 parts.
8. Moisten the O-rings of the volume controller with water and push the controller directly into the filter.
9. Install the thermostat on the center diffuser, then snap spring clip over thermostat and onto the side diffusers to hold thermostat in place. See Fig. 20. Make sure that thermostat lever will rotate.
10. Remove cap from the aspirator supply port on the unit control block. Connect the clear, 5½ in. aspirator supply tube to the control block connection.

Figure 20 shows the completed installation. The brass tee is used for slave unit connection where 3 or more units are used in air series. See Interconnecting Tubing, All Models, page 8.

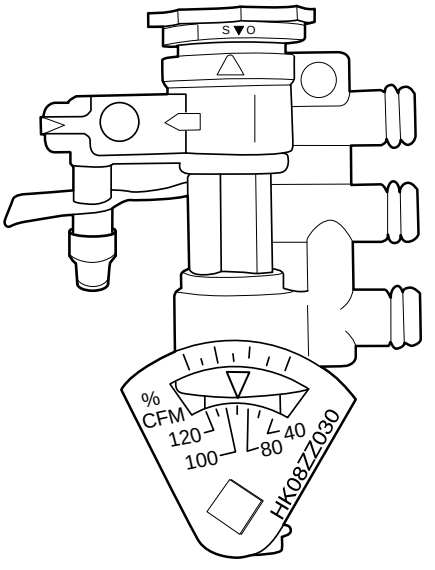


Fig. 16 — Setting Maximum Volume — 37HS Controller

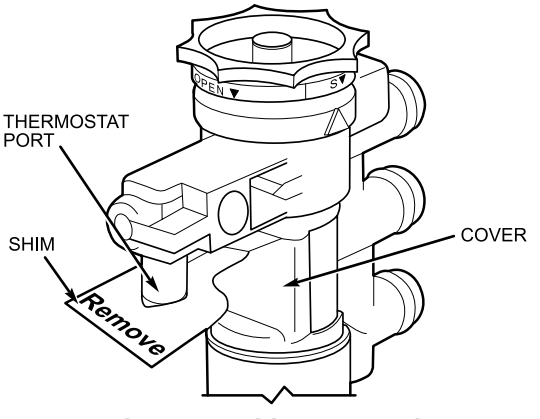


Fig. 17 — Shim Removal

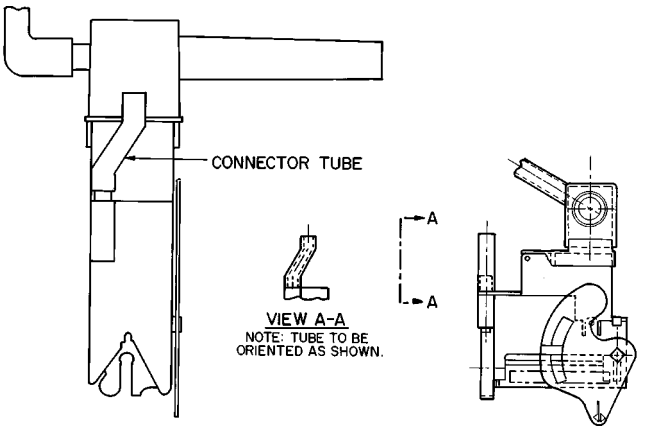


Fig. 18 — Correct Orientation of Connector Tube

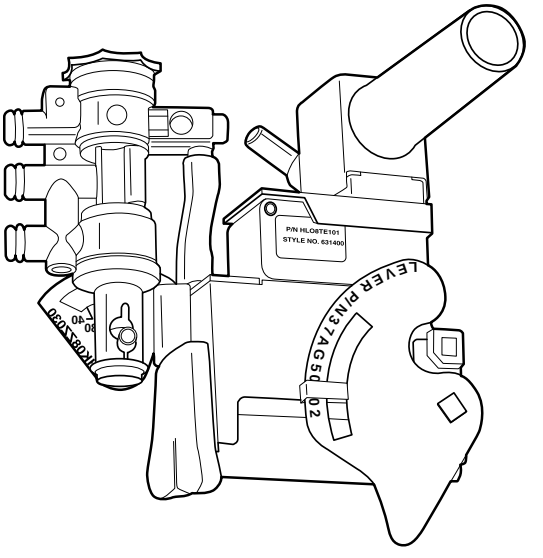


Fig. 19 — Assembly of Thermostat and Volume Controller

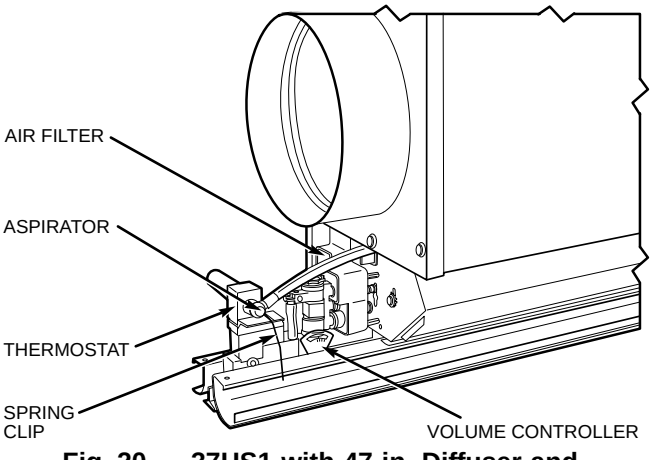


Fig. 20 — 37HS1 with 47-in. Diffuser and 37HS2 VAV Control Installation

VARIABLE AIR VOLUME CONTROLS — 37HS4 UNIT

From the universal control package, select the following components (see Fig. 21):

- filter assembly
- pneumatic tubing, 11⁄16 in. long
- volume controller
- diffuser baffle, wide, 3⅝ in. long
- thermostat/aspirator assembly
- thermostat lever, no. 37AH501182
- clear plastic tube, 5¾ in. long
- white foam thermostat gasket
- 2-in. offset rubber tube
- brass tee
- thermostat mount spring clip

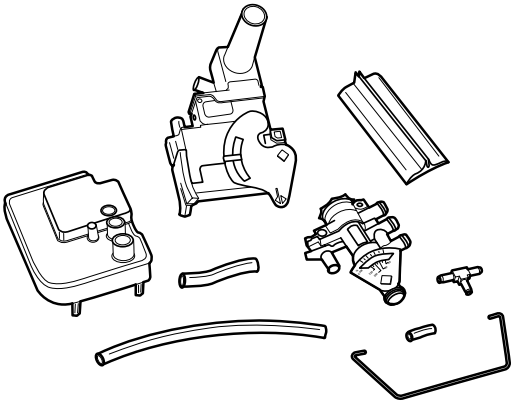


Fig. 21 — Components Selected From Universal Control Package for Installation on 37HS4

Control Installation, 37HS4 Unit

1. Remove the plugs from the high-pressure and low-pressure ports located at the control block of the unit.
2. Remove cap from bellows fitting and install 11⁄16-in. long piece of ¼-in. OD pneumatic adapter tubing onto the bellows fitting (push on full length of fitting). See Fig. 22.
3. Push the diffuser baffle into the space between side diffusers and down onto the center diffuser at the end away from the unit. Then push down the end close to the unit. The baffle will form around the legs of the diffuser spacer and lock onto the center diffuser. See Fig. 23. Baffle should fill space between side diffusers between unit end and thermostat.
4. To prepare the control filter for installation, be sure that the bellows chamber filter plug is pushed tightly into the correct connection. Figure 24 shows the connection ports on both sides of the filter. The lower bellows port on the unit side and the small bellows pressure connection on the control side should be capped or plugged before installation.
5. Moisten the 2 O-rings with water, then push the filter into the unit control block and onto bellows connection until the standoffs rest on the unit end plate.

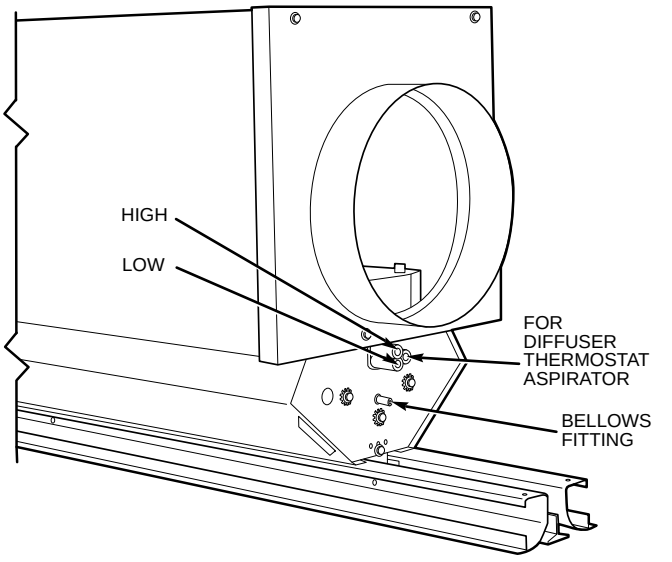


Fig. 22 — Typical 37HS Air Terminal Before Installation of Controls

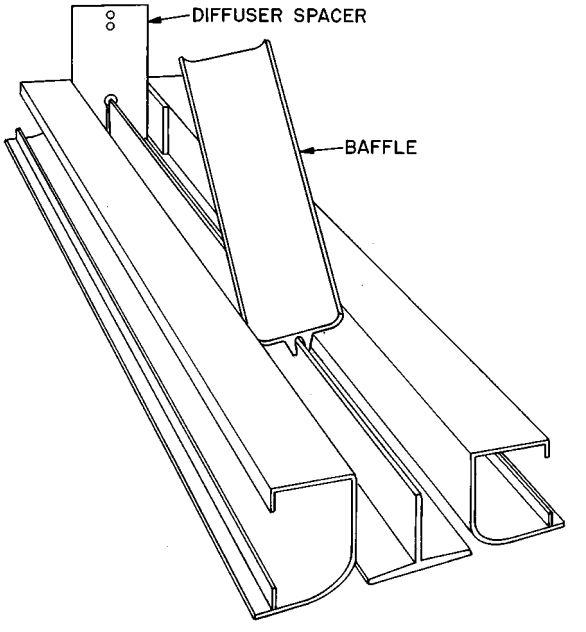


Fig. 23 — Diffuser Baffle Assembly

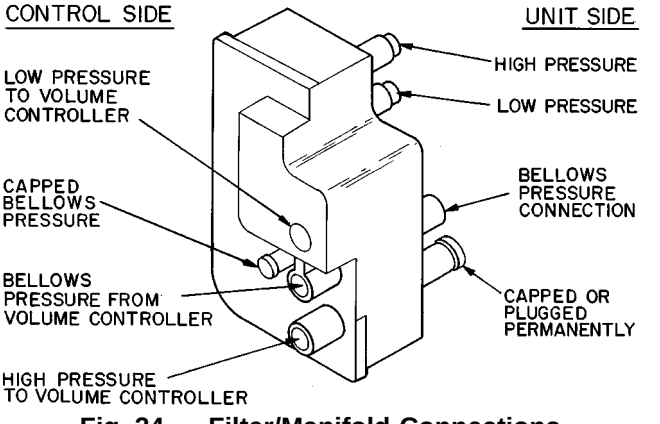


Fig. 24 — Filter/Manifold Connections

6. Remove cap on thermostat port of volume controller. Pull shim down until released from port and then pull shim out from body of volume controller. Discard shim. Figure 25 shows the volume controller and Fig. 26 shows the shim removal.
7. Remove short, preformed rubber tube from thermostat. Replace it with the 2-in. long preformed tube and attach tube to volume controller. Figure 27 shows the correct orientation of the tube on the thermostat and Fig. 28 shows the assembly of the 2 parts.
8. Remove thermostat lever 37AG501302 and replace it with lever 37AH501182. Snap lever over die-cast stud, taking care to lock lever slot on the thermostat case hook.
9. Remove the 5½-in. long clear plastic tube from thermostat and replace it with the 5¾-in. long tube.
10. Remove straight-side white foam thermostat gasket and replace it with larger, curved-side foam gasket. Figure 29 shows the correct location for the gasket.

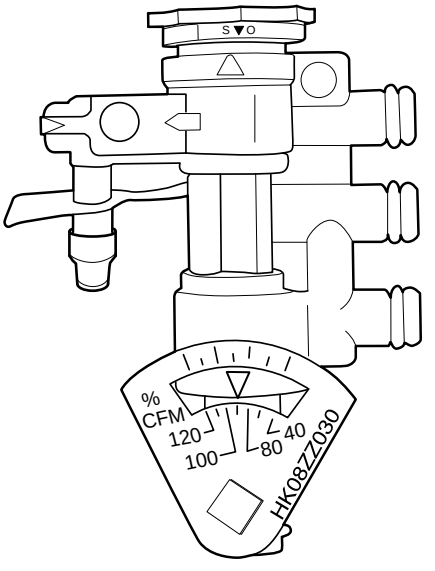


Fig. 25 — Setting Maximum Volume — 37HS Controller

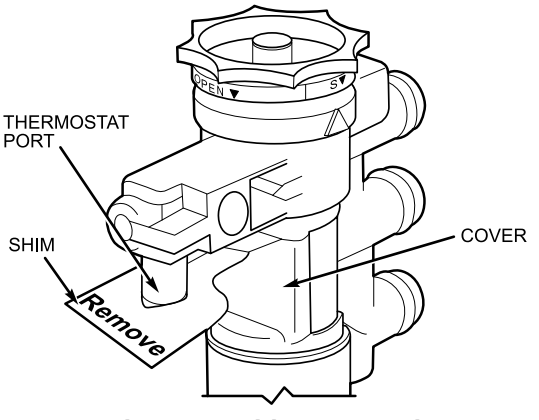


Fig. 26 — Shim Removal

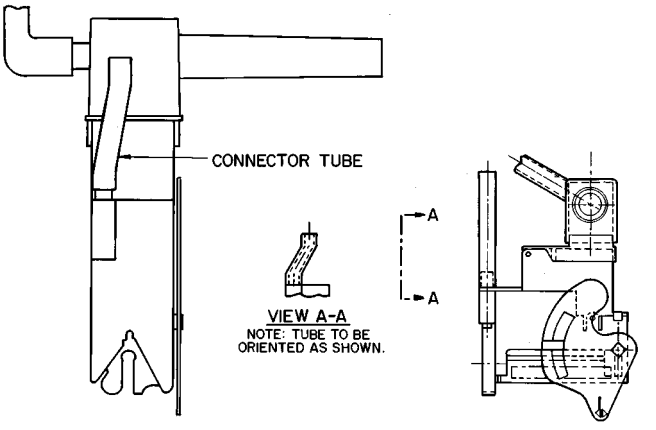


Fig. 27 — Correct Orientation of Connector Tube

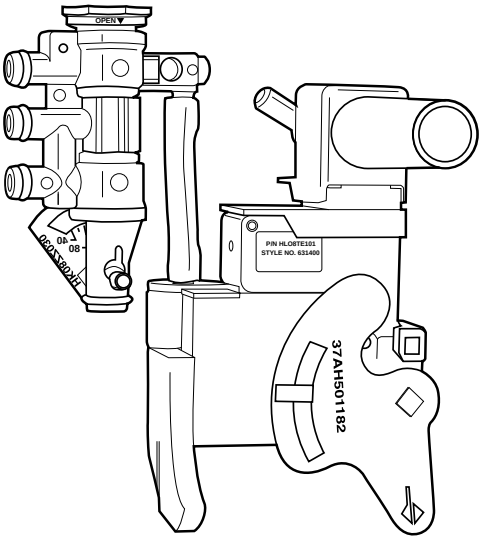


Fig. 28 — Assembly of Thermostat and Volume Controller

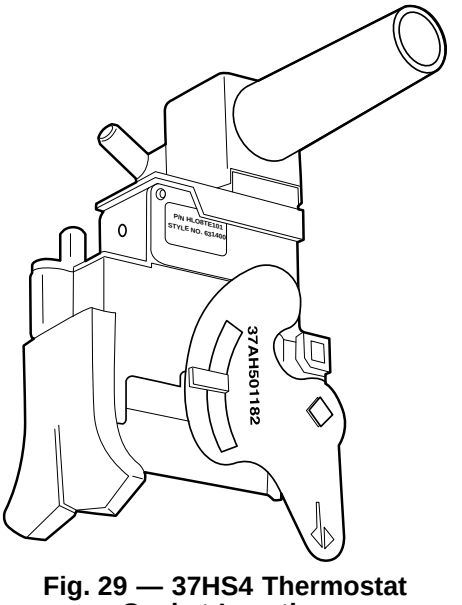


Fig. 29 — 37HS4 Thermostat Gasket Location

11. Moisten the O-rings of the volume controller with water and push the controller directly into the filter.
12. Install the thermostat on the center diffuser, then snap spring clip over thermostat and onto the side diffusers to hold thermostat in place. See Fig. 30. Make sure that thermostat lever will rotate.
13. Remove cap from the aspirator supply port on the unit control block. Connect the clear, 5¾-in. long aspirator supply tube to the control block connection. Figure 30 shows the completed installation.

    The brass tee is used for slave unit connection where 3 or more units are used in air series. See Interconnecting Tubing, All Models, on this page.

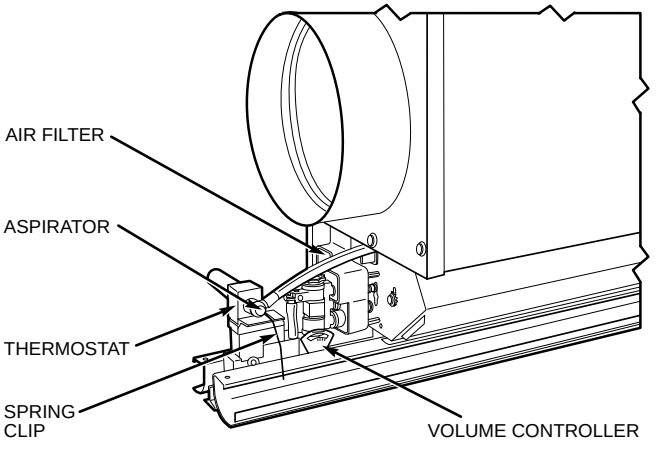


Fig. 30 — 37HS4 VAV Control Installation

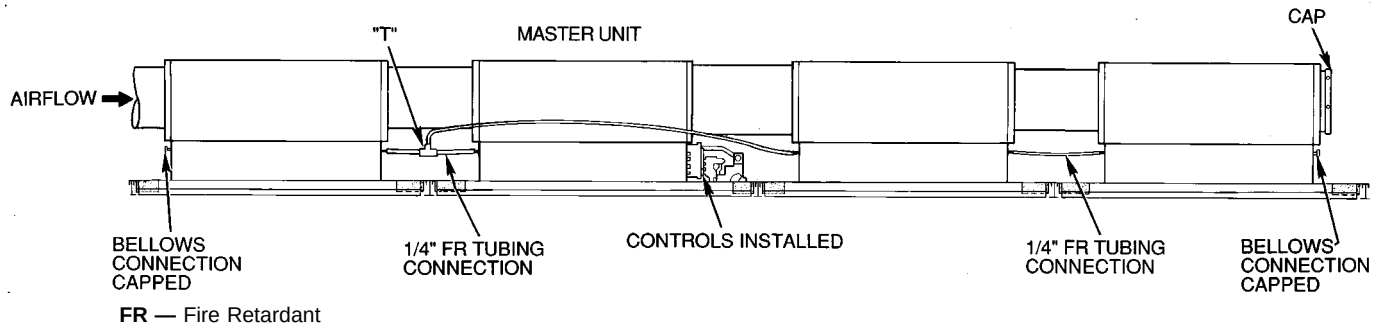
INTERCONNECTING TUBING, ALL MODELS See Fig. 31.

For 2 units controlled by a single volume controller —

1. Use ¼-in. OD FR tubing. Connect tubing to the unit bellows connection on end of the master unit *opposite* the control end. *Do not connect tubing to capped filter bellows connection.*
2. Connect tubing to slave unit.

For 3 or more units controlled by a single volume controller —

1. Using brass tee, connect ¼-in. OD FR tubing from the master unit to the 2 slave units on each side of the master unit.
2. Attach interconnecting tubing from these 2 slave units in the air series.



FR — Fire Retardant

Fig. 31 — Control Arrangements — Master Units with Slaves

AIRFLOW ADJUSTMENT

Each 37HS volume controller is equipped with a maximum cfm lever for setting the required unit airflow in the field. The lever is located at the bottom of the controller. See Fig. 32. The controller has a star wheel located at the top of the controller for setting the minimum airflow. The star wheel is also shown in Fig. 32.

Maximum Airflow (Cfm) Adjustment — The 37HS maximum airflow adjustment lever is common to all sizes and is divided into levels of percent cfm. Table 2 shows the approximate unit airflow that will be obtained by each lever setting for each unit size.

Table 2 — Maximum Airflow Settings

LEVER SETTING (% CFM)	UNIT AIRFLOW (CFM)		
	37HS1	37HS2	37HS4
120	120	240	480
100	100	200	400
80	80	160	320
40	40	80	160

The maximum cfm is the unit airflow obtained when the thermostat is calling for full cooling in a VAV system; it is the design cfm for the space conditioned by the unit or units regulated by one controller.

The variation in maximum airflow for a given setting of the lever is a function of the unit plenum size, the model and the number of units in an air series on one controller. See Tables 3 and 4.

Table 3 — Maximum Cfm Through the Inlet Collar of a Single Unit or of Units in Air Series

MODEL	PLENUM SIZE (in.)	INLET COLLAR DIAM (in.)	MAXIMUM TOTAL AIRFLOW (Cfm)
37HS1	5 x 7	4	110
	7 x 7	6	400
	9 x 9	8	800
	11 x 11	10	1100
37HS2	7 x 7	6	400
	9 x 9	8	800
	11 x 11	10	1100
37HS4	9 x 9	8	800
	11 x 11	10	1100
	13 x 13	12	1600

Table 4 — Maximum Number of Units in an Air Series on One Control

MODEL	PLENUM SIZE (in.) FIRST UNIT IN AIR SERIES	NUMBER OF UNITS ON ONE CONTROLLER				
		Single Unit	Units in Air Series			
			2	3	4	5
37HS1	5 x 7*	X	—	—	—	—
	7 x 7	X	X	X	X	—
	9 x 9	X	X	X	X	X
	11 x 11	X	X	X	X	X
37HS2	7 x 7	X	—	—	—	—
	9 x 9	X	X	X	X	—
	11 x 11	X	X	X	X	—
37HS4	9 x 9	X	—	—	—	—
	11 x 11	X	X	X	X	—
	13 x 13	X	X	X	X	—

*The 37HS1 unit with a 5 x 7 size plenum is available with blank end only; multiple units of this size would not be used on one control.

NOTE: The conditions stated in Table 3 must be included in evaluations for selecting the number of units in an air series.

To set maximum cfm with zero minimum cfm:

1. Set diffuser or wall thermostat for maximum cooling.
2. Turn the minimum cfm star wheel counterclockwise until the internal stop is reached. Do not attempt to override stop. (Minimum cfm has been set at zero, and the unit will turn off when required.)
3. Adjust maximum cfm lever to desired percent cfm.

Minimum Airflow (Cfm) Adjustment — Some applications require both a design maximum cfm and a minimum cfm. The 37HS controller can be set to provide both airflow requirements.

To set maximum and minimum cfm:

1. Set diffuser or wall thermostat for maximum cooling.
2. Turn the minimum cfm star wheel counterclockwise until the internal stop is reached. Do not attempt to override stop.
3. Shut off unit by adjusting thermostat to zero cooling, or disconnect tube from volume controller to thermostat.
4. Place a standard airflow hood against the outlet of the master unit and slowly turn the minimum cfm star wheel on the controller clockwise until the desired minimum cfm is reached.
5. Return the thermostat to the desired setting and/or reconnect tube between volume controller and thermostat.
6. Adjust maximum cfm lever to desired percent cfm.

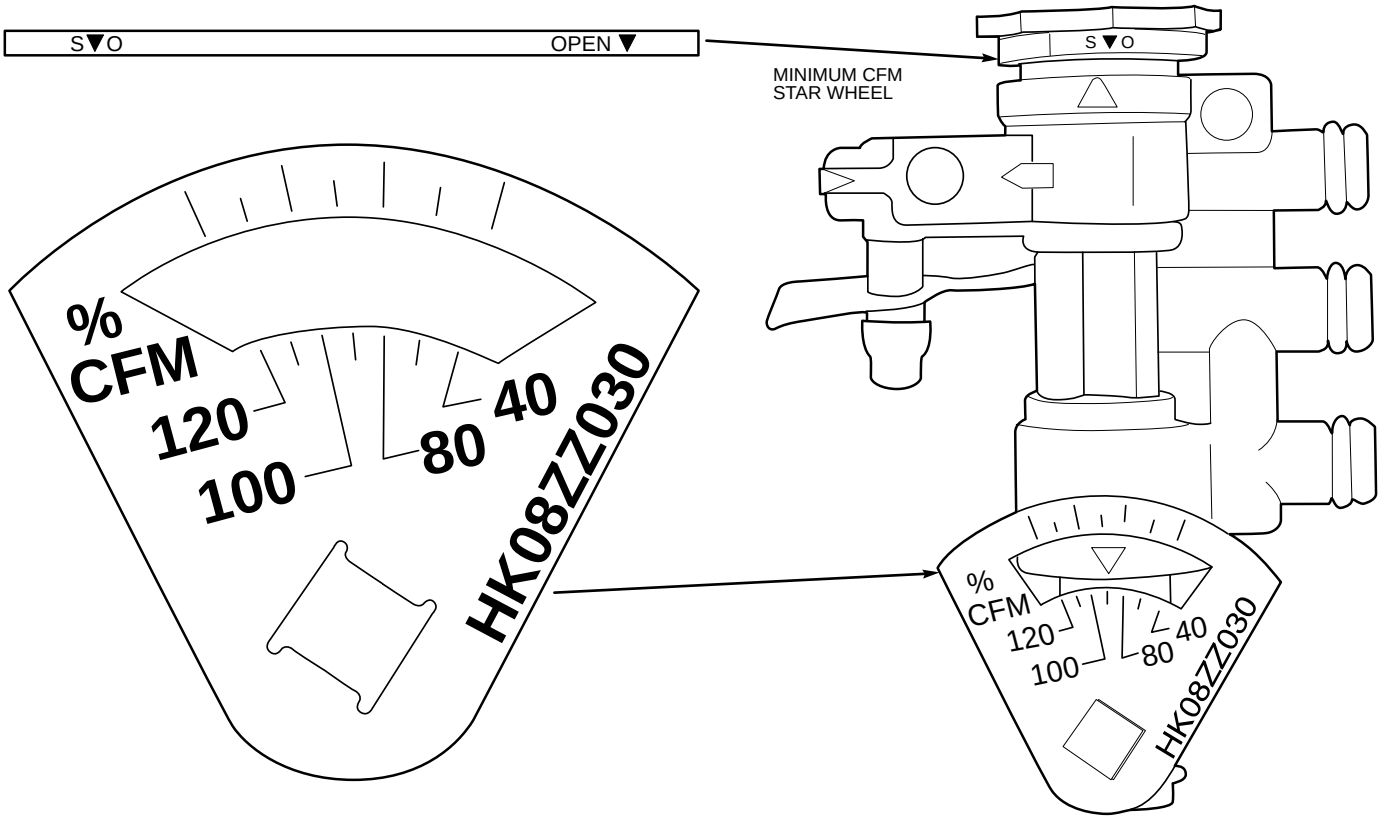


Fig. 32 — Minimum and Maximum Airflow Adjustments, 37HS Controller

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