SMART ZONE™

VAV Electronic Diffusers

SMART ZONE™

PERFORMANCE AIR PRODUCTS, INC.

45 Commerce Ave., Unit #2
South Burlington, VT 05403
tel: 800.852.1624 fax: 802.859.0473
www.smartdiffuser.com

SMART ZONE™
SE-HC/M, Type LT, Lay-in, T-Bar, VAV
Fully Modulating Diffuser Specifications

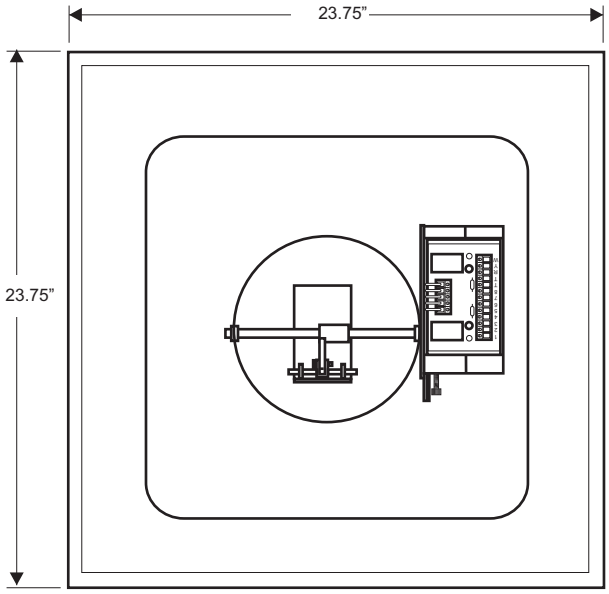
APPLICATION:

The Model SE-HC/M VAV Smart Zone™ Diffuser is used to vary the supply air volume from a wall-mounted thermostat. The diffuser is designed to maintain the coanda effect (draft free) of discharge air along the ceiling, providing a sustained discharge velocity throughout the volume range. The Smart Zone™ VAV Diffuser with a S-T, P+I zone thermostat.

AVAILABLE SIZES:

Face Size: 24" X 24" (23.75" x 23.75")

Neck Size: 6", 8" for 12" x 12" face size
6", 8", 10", 12", 14" for 24" x 24" face size



TOP VIEW

CONSTRUCTION:

Face Plate: Removable 18 gauge steel with baked white enamel finish

Back Cone: Unitary stamped 18 gauge steel

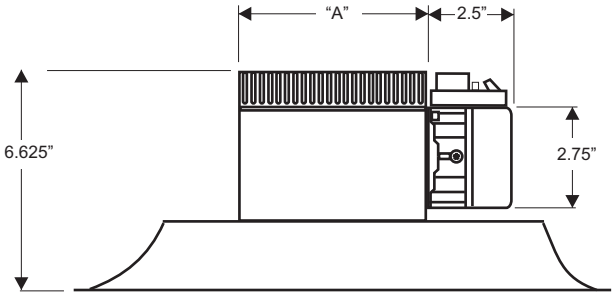
OPERATION:

Diffuser: Integral modulating disk that continually regulates supply air volume in response to thermostat control

Air Volume Range: 118 to 710 CFM

DIFFUSER ACTUATOR:

24 VAC, 2VA , 3-wire floating point actuator



SIDE VIEW

COMPONENTS:

Diffuser, actuator, PC board and discharge air sensor

AIR HANDLER CONTROL:

Space thermostat
Discharge air controller

WARRANTY:

5 Years

Drawings are intended to show general, overall product dimensions and provide guidance for installation clearance. Drawings are not to scale.
Performance Air Products, Inc. reserves the right to make product changes without notification or obligation.

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ENGINEERING DATA
SMART ZONE™ 24” x 24” SE-HC/M VAV Diffuser

Part Number and Neck Size	Neck Velocity (FPM)	300	400	500	600	700	800	900	1000	1200	1400
	Velocity Pressure	0.006	0.01	0.016	0.022	0.031	0.04	0.051	0.062	0.09	0.122
SE-HC-06-M 6” Ak = 0.19	Airflow (CFM)	60	80	100	120	140	160	180	200	240	280
	Total Pressure	0.009	0.011	0.017	0.025	0.034	0.044	0.057	0.070	0.100	0.135
	Horizontal Throw	1-1-2	1-1-4	1-2-4	1-3-5	2-3-6	2-4-7	3-4-8	3-4-9	4-5-11	4-6-11
	Noise Criteria	<15	<15	<15	<15	<15	<15	17	21	28	34
SE-HC-08-M 8” Ak=0.26	Airflow (CFM)	105	140	175	210	245	280	315	350	420	490
	Total Pressure	0.011	0.018	0.028	0.040	0.055	0.072	0.091	0.112	0.162	0.220
	Horizontal Throw	1-2-4	2-3-6	2-4-7	3-4-9	3-5-10	4-6-12	4-6-12	5-7-13	6-9-14	7-10-15
	Noise Criteria	<15	<15	<15	<15	<15	17	21	25	32	38
SE-HC-10-M 10” Ak=0.34	Airflow (CFM)	165	220	275	330	385	440	495	550	660	770
	Total Pressure	0.017	0.029	0.043	0.060	0.082	0.108	0.136	0.168	0.243	0.331
	Horizontal Throw	2-3-7	3-4-8	3-5-10	4-6-12	5-7-13	5-8-14	6-9-15	7-10-16	8-12-18	10-13-19
	Noise Criteria	<15	<15	<15	<15	15	20	24	28	35	41
SE-HC-12-M 12” Ak=0.40	Airflow (CFM)	240	310	390	470	550	630	710	790	940	1100
	Total Pressure	0.023	0.037	0.059	0.085	0.115	0.151	0.191	0.237	0.338	0.461
	Horizontal Throw	2-4-7	4-5-11	5-7-14	5-8-15	6-9-16	7-11-17	8-12-18	9-14-19	11-15-21	13-16-23
	Noise Criteria	<15	<15	<15	<15	18	23	27	31	38	43
SE-HC-14-M 14” Ak=0.51	Airflow (CFM)	320	430	530	640	750	860	960	1070	1280	1500
	Total Pressure	0.031	0.050	0.078	0.114	0.155	0.202	0.256	0.316	0.453	0.619
	Horizontal Throw	3-4-8	4-7-13	6-8-16	7-10-17	8-12-19	9-13-20	10-15-21	11-16-23	13-17-25	15-19-27
	Noise Criteria	<15	<15	<15	<15	20	25	29	33	40	45

Notes:
1. Tests conducted in accordance with ANSI/ASHRAE 70-1991 at isothermal conditions.
2. Tests conducted with a straight rigid inlet condition. Other inlet conditions may alter performance.
3. Units: Total Pressure = in. wc; Velocity Pressure -= in. wc; Effective Area (Ak) = ft.².
4. Throw - feet at 150 fpm, 100 fpm and 50 fpm terminal velocities.
5. NC is based upon 10dB room absorption (Re: 10^{-12} watts) evaluated at 125 thru 4000 Hz octave bands.
6. Flow hoods are recommended for system balancing.

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SMART ZONE™ S-T SMART THERMOSTAT MODULATING ZONE THERMOSTAT WITH AUTO CHANGEOVER

DISASSEMBLING THERMOSTAT

Insert a small coin (dime) into the release slot located on the bottom of the thermostat. Gently twist the coin to release the thermostat from the subbase. Avoid twisting the case as this may stress the LCD and cause it to crack or bend the wiring terminal connection pins.

SWITCH FUNCTIONS

There are eight dip switches located on the thermostat PC board. Only dip switches 1, 2 and 3 are active.

SWITCH 1 - Switch 1 is used to lock the thermostat after setup is completed. When the thermostat is locked (ON position) a padlock icon will show on the LCD. When locked, only setpoint changes and status functions can be accessed by the user. **Do not set Switch 1 in the ON position until all SETUP functions are completed.**

SWITCH 2 - Switch 2 is used to display the space temperature and setpoint in Celsius (ON position) or Fahrenheit (OFF position). Select Celsius or Fahrenheit before proceeding to the thermostat SETUP menu.

SWITCH 3 - Switch 3 is used to select two-position (ON) or fully modulating (OFF) damper control to best suit the specific application requirement.

KEY FUNCTIONS

ON/OFF KEY - When the S-T is not locked, this key allows the thermostat to be turned ON or OFF. When in the OFF position, the damper is also driven closed

STATUS KEY - Pressing the STATUS key displays the UNIT number, ZONE number, DUCT temperature and DAMPER position.

UP/DOWN KEYS - These keys are used to increase or decrease the setpoint as well as change thermostat setup values.

ENTER KEY - This key is used to enter changes as well as exit the setup menu. **(Refer to Installation / Operation Manual for complete setup instructions)**

OPERATION

The duct sensor wired to the S-T is designed to select the mode of operation of the damper. If the discharge air temperature is above 72° F, the damper will open on a call for heating. If the discharge air temperature is below 72° F, the damper will open on a call for cooling

TERMINAL DESIGNATIONS

C	24 Vac (Common)
R	24 Vac (Hot)
PO	Power Open
PC	Power Close
DS (2)	Duct Sensor
Y	Cooling Relay
W	Heating Relay
A / B	Modbus Communications

FACTORY DEFAULT SETTINGS

Minimum Heating Damper Position	10%
Minimum Cooling Damper Position	10%
Maximum Damper Position	100%
Unit Number	00
Zone Number	00
Heating Limit	76° F
Cooling Limit	68° F
Actuator Speed	90
Modbus Address	01
Temperature Calibration Offset	0

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SMART ZONE™
SE-HC/S, Type LT, Lay-in, T-Bar, VAV
Fully Modulating Auxiliary Diffuser Specifications

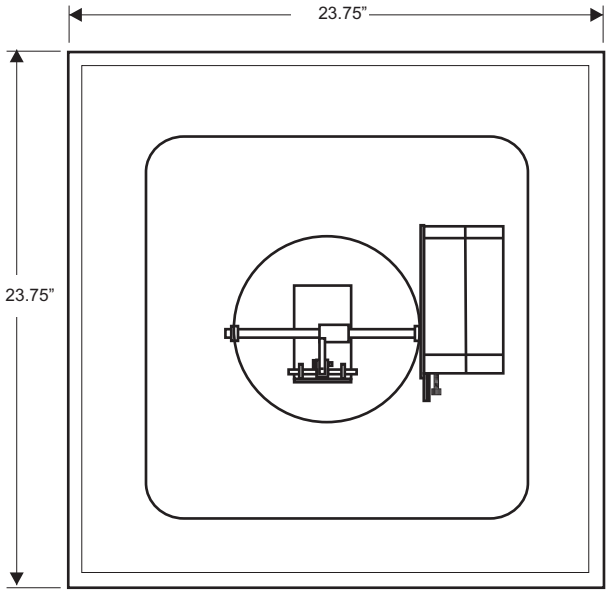
APPLICATION:

The Model SE-HC/S VAV Smart Zone™ Diffuser includes a diffuser and modulating actuator. The SE-HC/S can be used as an auxiliary damper when wired to a SE-HC/S diffuser actuator in applications where more than one diffuser is required in a single zone.

AVAILABLE SIZES:

Face Size: 24" X 24" (23.75" x 23.75")

Neck Size: 6", 8" for 12" x 12" face size
6", 8", 10", 12", 14" for 24" x 24" face size



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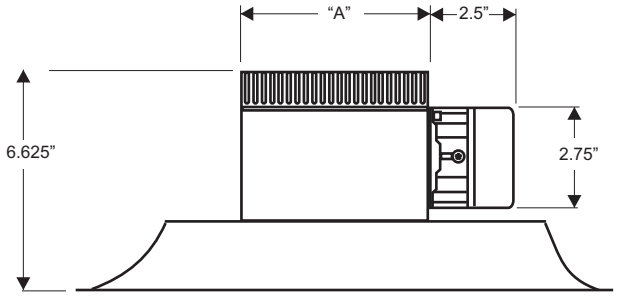

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COMPONENTS:

Diffuser and actuator

AIR HANDLER CONTROL:

Space thermostat
Discharge air controller

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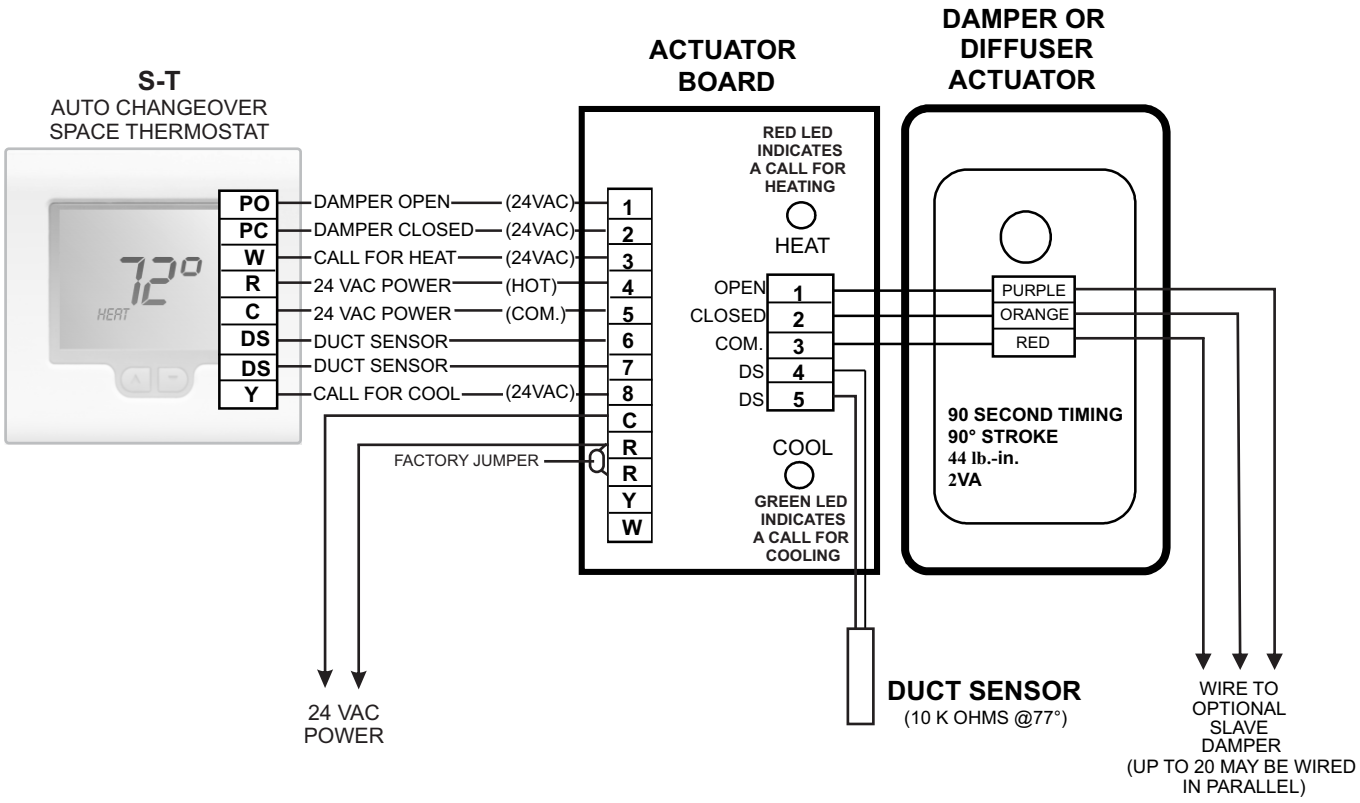
SMART ZONE™ MODULATING
STAND-ALONE ZONE DAMPER ASSEMBLY



SEQUENCE OF OPERATION:

The automatic changeover duct sensor (located on the Smart Zone™ damper) senses whether there is warm air or cool air in the duct. If the S-T Smart Thermostat is calling for cooling and the duct sensor determines there is cool air in the duct, the damper will modulate open. If the S-T Smart Thermostat is calling for heating and the duct sensor determines there is warm air in the duct, the damper will modulate open.

The green LED located on the actuator board indicates when the space temperature is 1.5° F above the thermostat setpoint and the thermostat is calling for cooling. The red LED located on the actuator board indicates when the space temperature is 1.5 below the thermostat setpoint and the thermostat is calling for heating.

APPLICATION AND INSTALLATION NOTES:

Use standard 18 gauge thermostat wire.
A 24 VAC 40 VA transformer will power a single Smart Zone™ system and up to 20 actuators.
The actuator board is located on the side of the actuator.
If the duct temperature is above 72° F, the zone damper will open on a call for heating.
If the duct temperature is below 72° F, the zone damper will open on a call for cooling.
If a single Smart Zone™ system or multiple Smart Zone™ systems are used to zone more than 30% of the total CFM served by the HVAC system, a bypass damper may be required to maintain constant system static pressure.
The HVAC system should be controlled by its own space thermostat or discharge air controller. If a space thermostat is used to control the HVAC system, it must never be located in an area served by a Smart Zone™.
A suction line freeze stat (FS-38) should be installed when zoning more than 30% of the total CFM served by the HVAC system to protect the equipment in the event the suction line temperature drops too low (Wire in series with the cooling control circuit).

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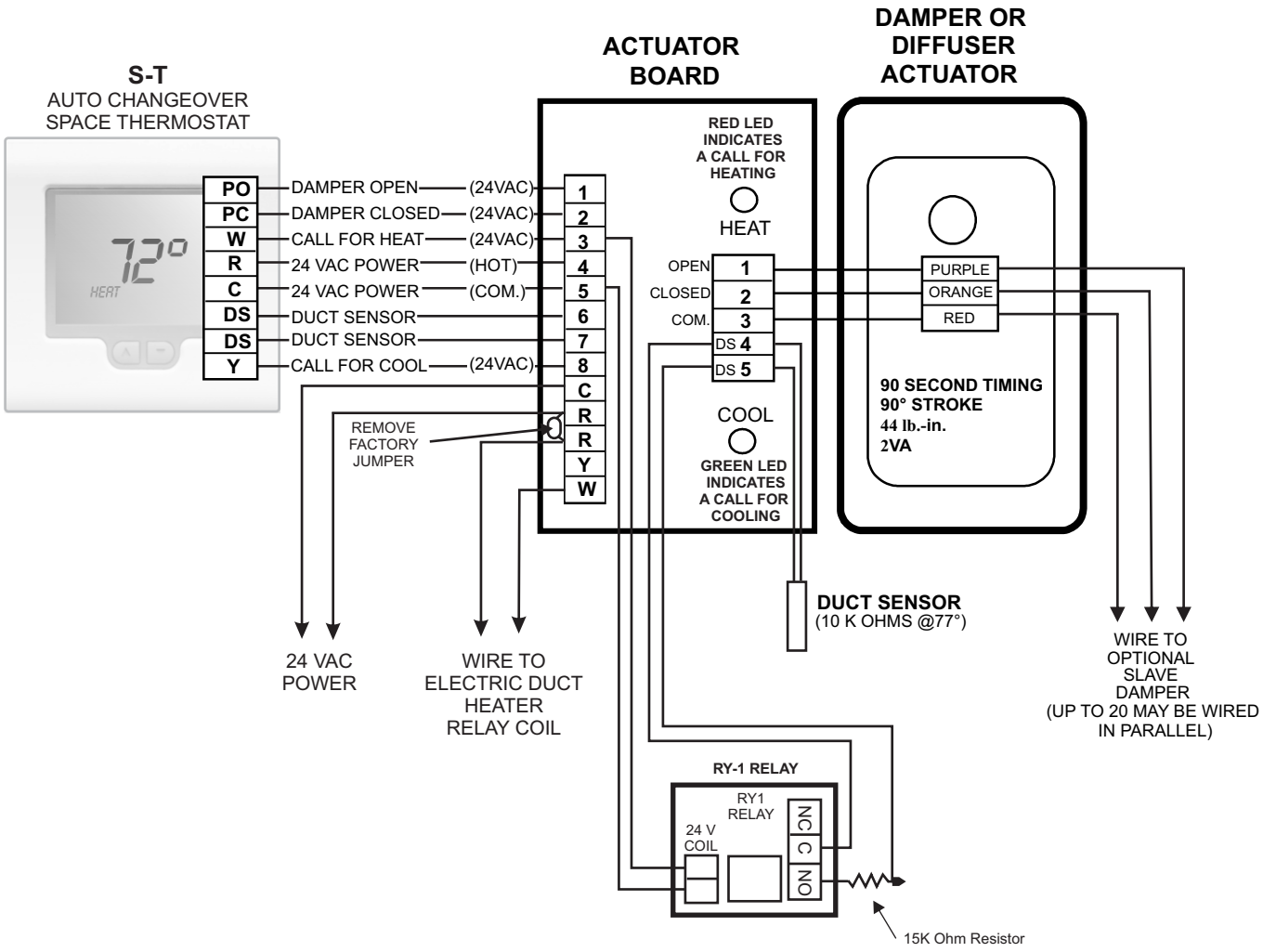
SMART ZONE™ MODULATING
STAND-ALONE ZONE DAMPER ASSEMBLY

WIRING DIAGRAM FOR ZONE HAVING AN ELECTRIC DUCT HEATER



SYSTEM NOTES:

18 gauge plenum-rated thermostat wire is recommended.

A 24 VAC 40 VA transformer is required to power thermostat and actuator.

A 15K Ohm resistor must be wired to RY-1 relay contacts and paralleled with the duct sensor. The relay coil is wired to terminals 3 and 5 on the actuator board. When the thermostat call for heating, the relay coil will be energized and the resistor will change the ohms value translating to a higher duct temperature which will drive the damper open. The electric duct heater relay coil can be wired to the actuator board R and W terminals. Remove factory jumper as illustrated.

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