Titus
Redefine your comfort zone.™

vav diffusers

energy solutions

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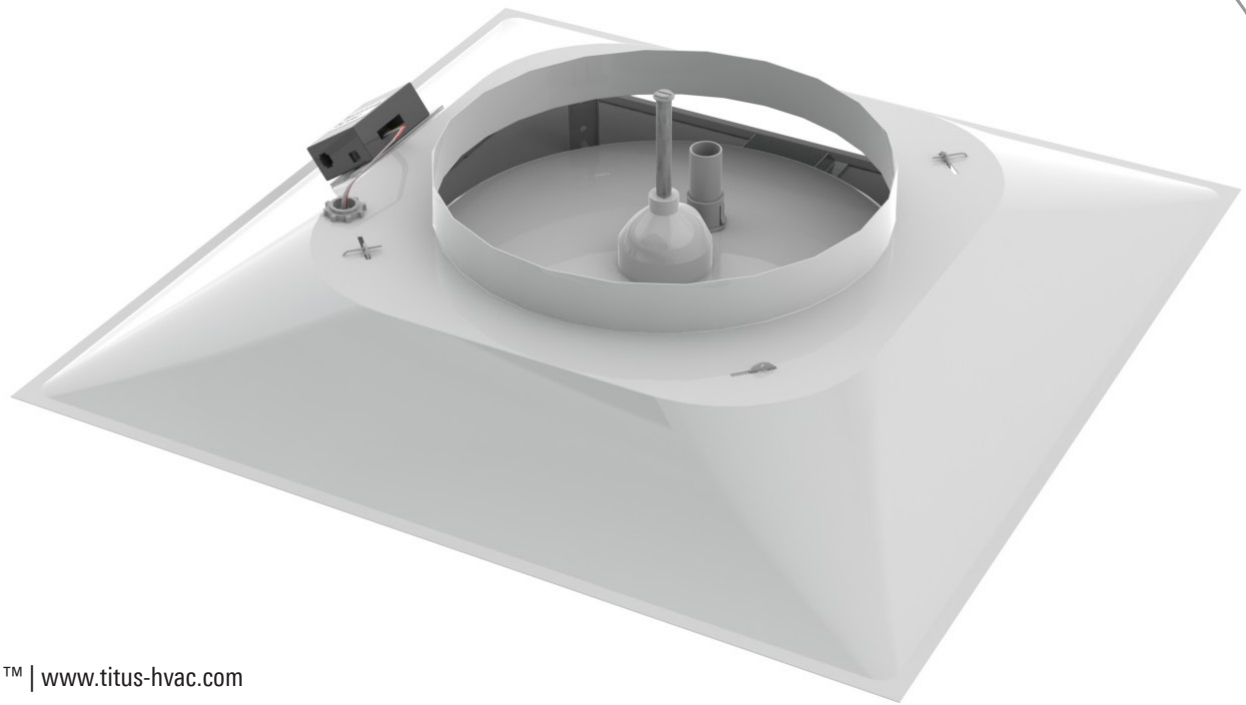

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vav diffusers

T_3SQ-4

THERMAL VAV DIFFUSERS

Configurations

- T_3SQ-4 - heating/cooling

Features

- Thermally powered VAV control
- Center induction
- Minimum airflow adjustment
- Enhanced pattern controllers for easy adjustment

T_3SQ-2

DIGITAL VAV DIFFUSERS

Configurations

- T_3SQ-2 - heating/cooling

Features

- DDC stand-alone VAV control
- DDC BACnet VAV control
- DDC LonWorks VAV control
- Optional inlet heater

T_3SQ-0

NON-VAV DIFFUSERS

Configurations

- T_3SQ-0 - non-VAV supply/return

Features

- Designed to match the T_3SQ-4 thermal VAV diffusers

APPLICATION ICONS KEY

contributes toward energy savings by reducing operating costs of air distribution devices

energy solutions

DESIGN FEATURES

PERSONALIZED VAV SYSTEMS

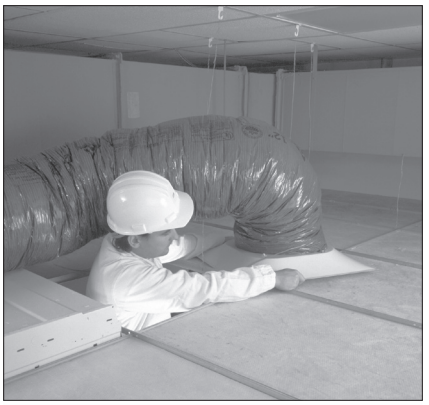
Titus brings both accuracy and flexibility to the variable air volume (VAV) market with T_3SQ VAV diffusers. The T_3SQ combines the functions of a VAV terminal and a high performance diffuser in one. The T_3SQ modulates the air volume delivered to a zone to accurately control cooling and heating conditions. The unique variable geometry design results in maximum air distribution effectiveness at any airflow for superior comfort conditions.

T_3SQ adds application flexibility by being able to operate stand-alone with thermal or digital controls.

In addition to a superior performance VAV unit, the T_3SQ is solidly constructed with 18-gauge steel. Available in many frame styles, the T_3SQ can be installed in almost any ceiling as easily as a standard diffuser. The architecturally pleasing design coordinates with any office environment.

For applications that require system simplicity, proven technology and superior comfort, specify the Titus T_3SQ series of VAV diffusers.

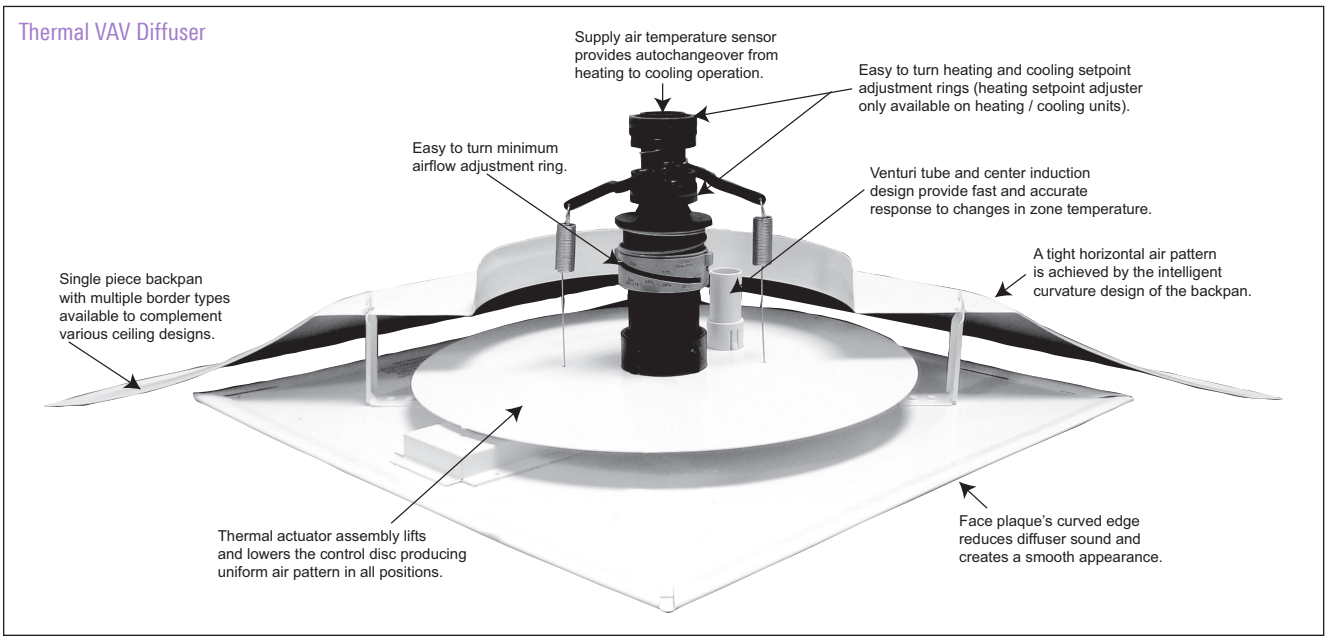
- Variable geometry diffuser design maintains jet velocity at all flow rates, varying air flow pattern for optimal performance
- Separate cooling and heating setpoints on thermal T_3SQ
- Supply air temperature provides automatic cooling/heating changeover on configurations -4 and -2
- T_3SQ-2, digital, can control up to 14 drones
- Optional electric inlet heater for applications requiring supplemental heat (T_3SQ-2 only)
- Provides accurate, personal environmental temperature control to improve productivity in the office environment



Installation and relocation are made easy

- Superior air distribution performance provides greater entrainment, higher Air Diffusion Performance Index (ADPI) and better ventilation effectiveness for Indoor Air Quality (IAQ)
- Lower cost per zone of control than typical VAV terminal with separate diffusers
- Renovate existing offices or add zones in problem areas to solve individual comfort problems
- Constant volume systems can easily become multi-zoned VAV systems for "big building comfort" on a small building budget
- Easy and inexpensive to relocate zones, ideal for use where office space may be reconfigured periodically
- Easy to install and operate
- Unique center induction on thermal T_3SQ-4 ensures accurate readings even at low flows

Thermal VAV Diffuser



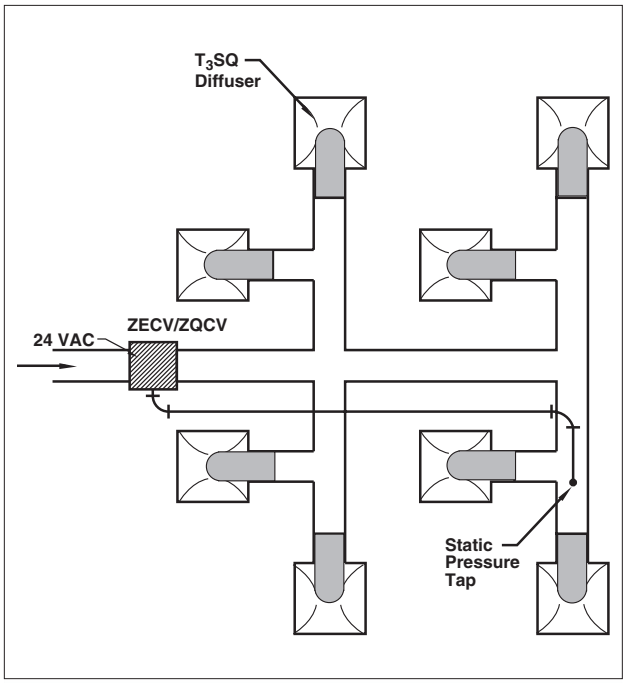
CONSTANT VOLUME SYSTEM APPLICATION OPTION

The Titus T_3SQ system is ideal for use with a constant volume system. The T_3SQ gives all the advantages of a VAV system at low pressure conditions and reduced installation cost. The T_3SQ is a low pressure, pressure dependent, variable air volume (VAV) system. The T_3SQ is designed to operate around 0.15"- 0.20" inlet pressure. This system provides zoned comfort, which is not always possible with a typical constant volume system.

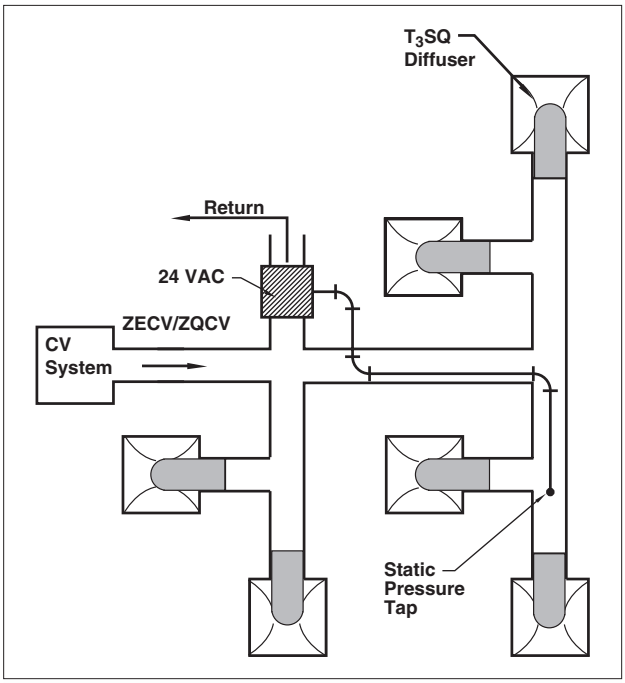
1. It is recommended that a static pressure controller such as the Titus ZECV/ZQCV be installed into a constant volume system when more than 30 percent of the system airflow is put under the control of T_3SQ diffusers. This minimizes the possibility of delivering excess air when a portion of the T_3SQ are operating at part load conditions.

2. When an entire constant volume system uses T_3SQ zone control, a ZECV/ZQCV box should be implemented. The Titus ZECV/ZQCV pressure control terminal should be sized for 80 percent of the total supply flow, less the airflow of the smallest zone.

3. Care must be taken when sizing and installing a ZECV/ZQCV. The unit should be installed as far downstream from the fan as is practical to maximize supply and return air mixing. This reduces the risk of the unit cycling on high or low.



Typical static pressure control by throttling supply air using a ZECV/ZQCV terminal



Typical static pressure control by bypassing supply air using a ZECV/ZQCV terminal

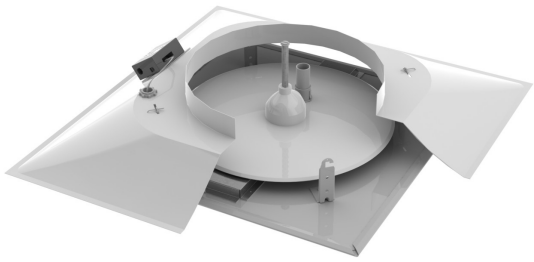
VARIABLE AIR VOLUME SYSTEM APPLICATION OPTION

The Titus T_3SQ system is ideal for use in buildings where the advantages of zoned variable air volume (VAV) systems normally cannot be used due to budget issues or plenum space constraints.

Special care should be taken when determining the static pressure of a VAV system with T_3SQ units.

For more information on ZECV and ZQCV, please refer to the Miscellaneous Terminals section of the catalog

Digital VAV Diffuser



MASTER / DRONE

T_3SQ-2 diffusers are all shipped as drone units. Determination of master units is made through plug and play cable connections to the thermostat. The units connected to the thermostat are the master units. All units daisy chained from the master are drones. Drone diffusers must be connected to a master diffuser in order to operate. One power module is required for every 15 diffusers with or without optional electric reheat. Power module requires 120, 208, 240, 277 VAC line voltage input.

The 4-pin mini-fit cables provide 24VAC power and communication between diffusers. This cable should be used between the power module and the first diffuser and also to connect a master unit to a drone unit.

Blue RJ-45 8-pin cables provide 24VAC power and control signal between diffusers. RJ-45 cables should be used between diffuser and master controller/thermostat and between master and drone units.

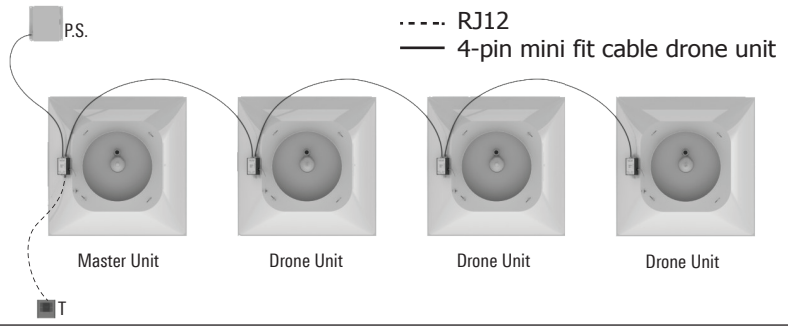
The Master Communications Module is a central data collection and distribution point for up to 60 VAV field diffusers. The device features four diffuser channel inputs, which can accommodate up to 15 diffusers each. This allows the users to interface with 60 diffusers per communication module through a building management system. The interface software also has a server application which allows all communication modules on site to be accessed through the building management system from the IP address of each module. Master communication modules are available in the following communication protocols:

- Standard Master Communication module (Stand-Alone)
- Master Communications module with Lonworks gateway
- Master Communications module with BACnet gateway

Master/Drone Wiring

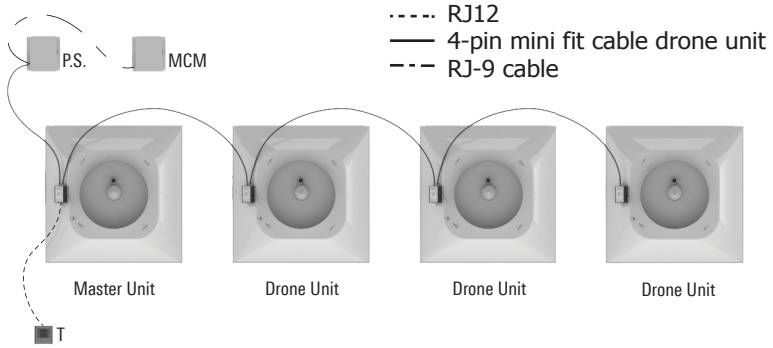
One master unit can control up to 14 drone units.

P.S. = Power Supply
T = Room Sensor



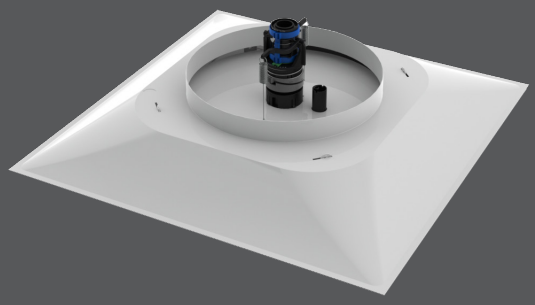
Master/Drone Wiring With MCM (Master Communication Module)

P.S. = Power Supply
T = Room Sensor
MCM = Master Communication Module



T3SQ-4

- The T_3SQ-4 is a thermal variable volume diffuser. The diffuser maintains space temperature by varying the volume of air delivered to the space. The amount of air delivered will depend on the Supply Air Temperature (SAT) (-4 only), the room temperature setpoint, and the room temperature.
- Available in heating/cooling (-4) configuration
- As the volume of air is decreased by the control disc, the velocity of air is increased thereby maintaining the longest throw and best entrainment ensuring superior air distribution at all damper positions
- The curvature of the backpan works with the formed edges of the face panel to deliver a tight horizontal air pattern without excessive noise or pressure drop over the full range of operation
- The T_3SQ-4 uses a center induction plug to accurately measure the room temperature. This eliminates the need for a wall-mounted thermostat or sensor and provides the most accurate way of measuring the room air temperature.
- Adjustment of the room temperature setpoint is achieved by rotating the blue (cooling) only adjustment ring



T_3SQ-4

AVAILABLE MODEL:

T_3SQ-4 / Heating & Cooling

FINISH

Standard Finish - #26 White

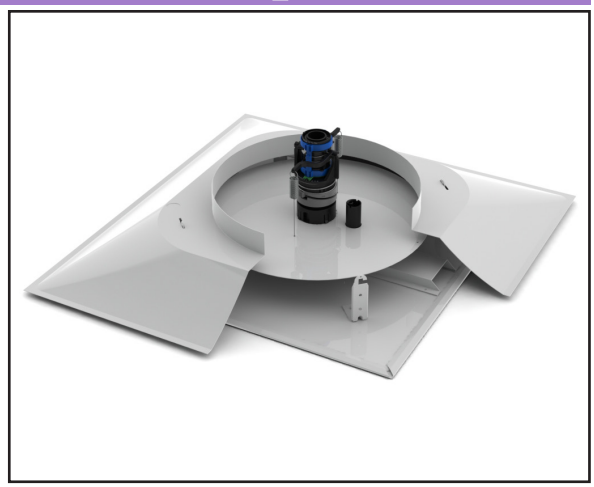
OVERVIEW

The T_3SQ-4 works in both heating and cooling applications. The curvature of the backpan works with the formed edges of the face panel to deliver a tight horizontal air pattern without excessive noise or pressure drop over the full range of operation. As the volume of air is decreased by the control disc, the velocity of air is increased, thus maintaining the longest throw and best entrainment. This ensures superior performance at all damper positions.

ADDITIONAL FEATURES

- Adjustment of the green tab offset creates a temperature deadband for heating and cooling setpoints
- Adjustment of minimum airflow is achieved by rotating the grey minimum airflow adjustment ring
- The face panel and backpan are constructed from 18-gauge steel. The formed outer edge also assures a straight and level surface.

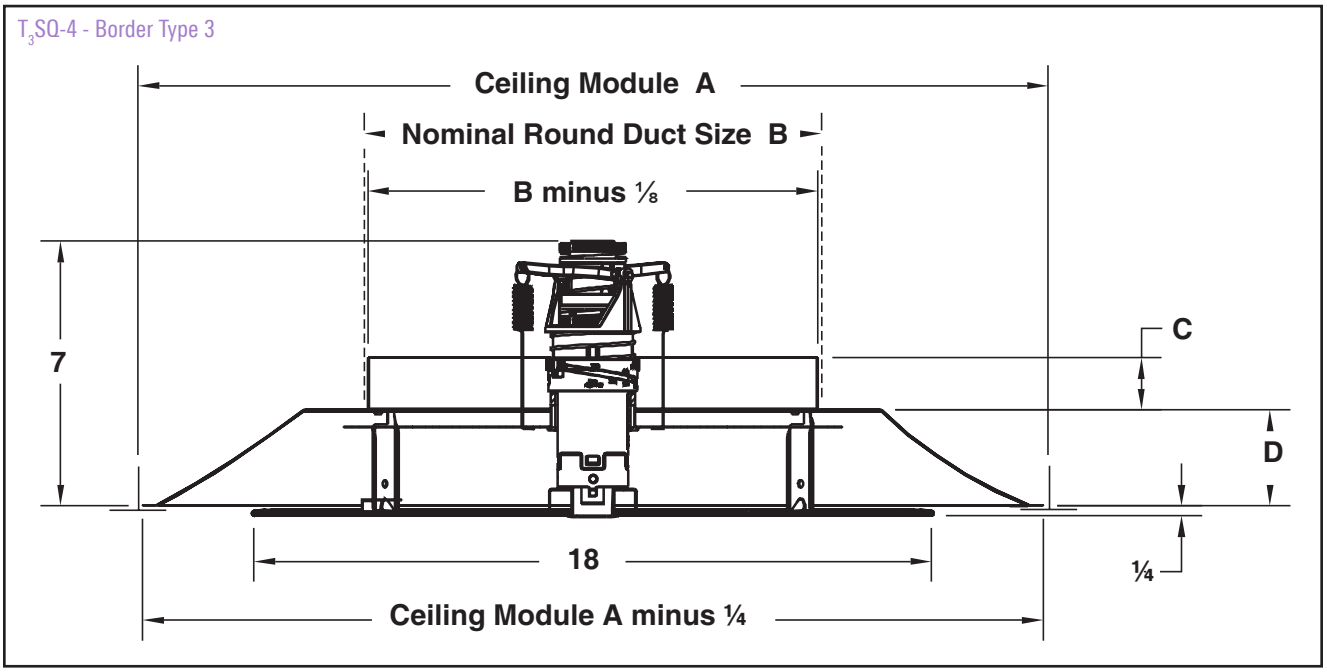
See website for Specifications



Cutaway view of T_3SQ-4 Diffuser

T_3SQ-4 UNIT DIMENSIONS

T_3SQ-4 - Border Type 3



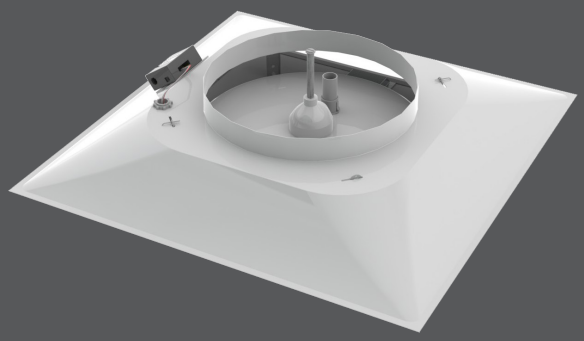
Ceiling Module A	Nominal Round Duct Sizes B	C	D
24	6	1⅛	3⅝
	8	1¼	3¾
	10, 12	1⅜	3⅞

Ceiling Module A	Face Size	Nominal Round Duct Size	Border Type
24 x 24	24 x 24	6, 8, 10, 12	1, 2, 3, 4, NT

All dimensions are in inches

T3SQ-2

- The T_3SQ-2 is an electronic variable volume diffuser. The diffuser maintains space temperature by varying the volume of air delivered to the space. The amount of air delivered will depend on the Supply Air Temperature (SAT) (-4 only), the room temperature setpoint, and the room temperature.
- As the volume of air is decreased by the control disc, the velocity of air is increased thereby maintaining the longest throw and best entrainment. This ensures superior air distribution at all damper positions.
- The curvature of the backpan works with the formed edges of the face panel to deliver a tight horizontal air pattern without excessive noise or pressure drop over the full range of operation
- T_3SQ-2 master diffusers are created by connecting the diffuser to a wall mounted controller/thermostat using the RJ-12 control cable
- T_3SQ-2 drone diffusers are created by connecting the diffuser to a master unit using the 4-pin mini-fit control cable
- Up to fifteen T_3SQ-2 diffusers can be powered by a single power module using the 4-pin mini-fit power cable



T_3SQ-2

energy solutions

See website for Specifications

AVAILABLE MODEL:

T_3SQ-2 / Heating & Cooling

FINISH

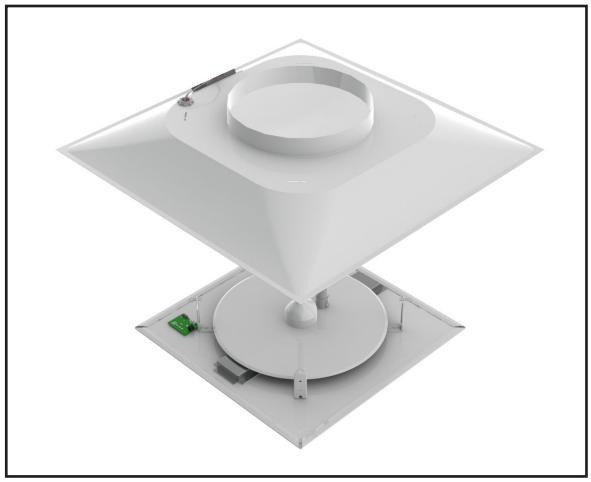
Standard Finish - #26 White

OVERVIEW

The Digital T_3SQ-2 is the most energy efficient VAV diffuser on the market. It requires 10 times less power than the competitor's model. The communication modules allow for interfacing with building management systems for all major communication protocols. With user friendly software to control and commission diffusers, the Digital T_3SQ -2 is the next level of VAV diffusers on the market.

ADDITIONAL FEATURES

- The position of the control disc is varied by a linear drive actuator mounted on the control disc
- The face panel and backpan are constructed from 18-gauge steel. The formed outer edge also assures a straight and level surface.

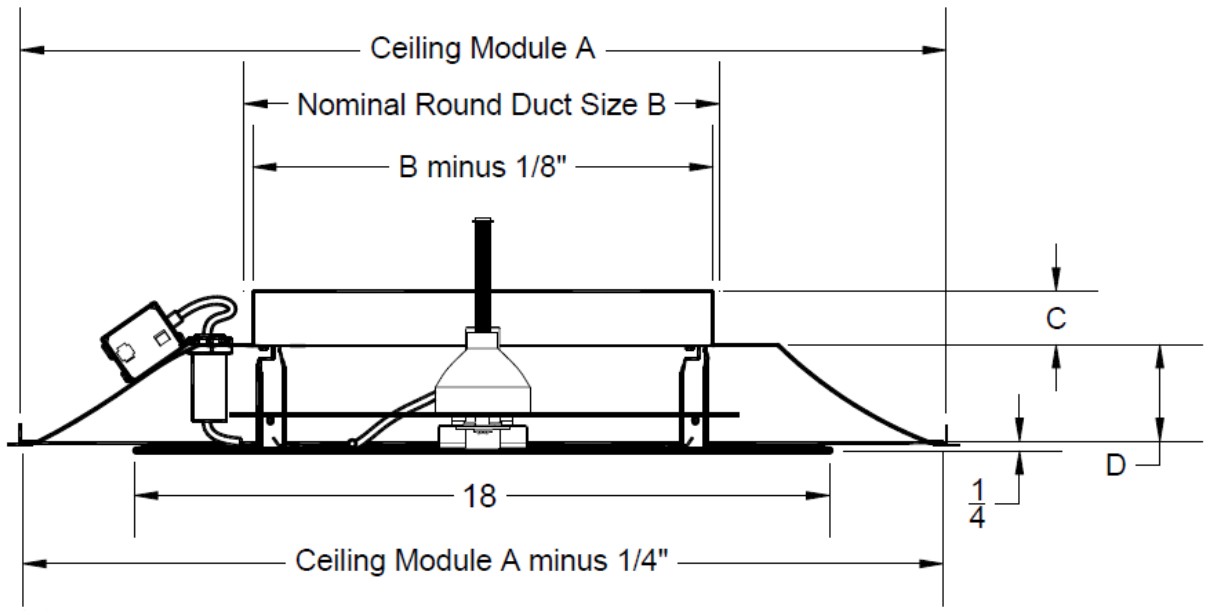


Exploded view of T_3SQ-2 diffuser

DIMENSIONS

T_3SQ-2 UNIT DIMENSIONS

T_3SQ-2 / Border Type 3



Ceiling Module A	Nominal Round Duct Sizes B	C	D
24	6	1⅛	3⅝
	8	1¼	3¾
	10, 12	1⅜	3⅞

Ceiling Module A	Face Size	Nominal Round Duct Size	Border Type
24 x 24	24 x 24	6, 8, 10, 12	1, 2, 3, 4, NT

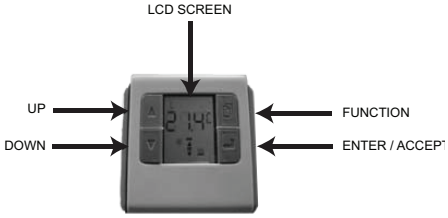
All dimensions are in inches

MASTER COMMUNICATION MODULE

- Available with Standard (Titus) communication module, BACnet, or Lonworks gateway
- MCM is the central data collection and distribution point for up to 60 VAV field diffusers per module
- Features four diffuser channel inputs which can accommodate up to 15 diffusers per channel, per communication module (MCM)
- Interface software is designed as a commissioning tool as well as for data monitoring, logging, and fault finding
- Software is supplied with each shipment

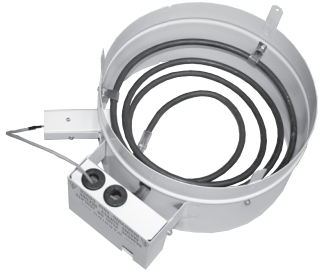
CONTROLLER/THERMOSTAT

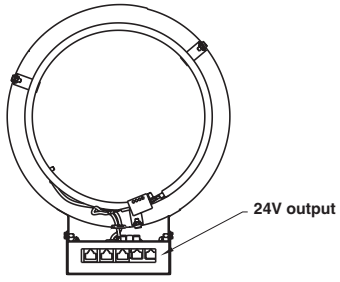
- Each master T3SQ-2 diffuser requires a controller / thermostat
- 24VAC RJ-12 control cable connection
- Room sensor with LCD display real time clock for night set-back & control disc position display
- Provides Setpoint Temperature adjustment & room temp display
- Interfaces with a USB module in order to interface with software for further functionality
- Dimensions are 3" x 3 ¼"



OPTIONAL INLET ELECTRIC HEATER

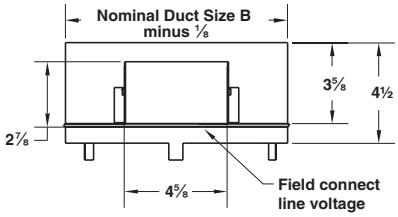
- Installs into neck of diffuser
- 120V, 208V or 277V single phase input power (field connect)
- Black heat element
- SCR modulating heater control
- Ships loose for field installation
- Integrated wiring interface box
- Automatic reset thermal cutout
- Manual reset secondary protection





Available kW:

Inlet Size	Voltage			FLA		
	120V	208V	277V	120V	208V	277V
6	0.75	0.75	0.75	6.3	3.6	2.7
8	1.00	1.00	1.00	8.3	4.8	3.6
10	1.25	1.50	1.50	10.4	7.2	5.4
12	1.25	2.00	2.00	10.4	9.6	7.2



CABLES (HEATER CONNECTION)

- Blue RJ-45 (8-pin straight through pinout) for control and power
- Modular connector that attaches the ribbon cable and RJ45 to heater

RELIEF RINGS

- Used to bypass supply air into the ceiling plenum as the diffuser turns down
- Available for both digital and thermal configurations
- Effectively reduces inlet size by 2 inches

T_3SQ-O

- The T_3SQ-O is a non-VAV supply or return diffuser with a center induction cap designed to match the T_3SQ-4 thermal VAV diffusers
- The curvature of the backpan works with the formed edges of the face panel to deliver a tight horizontal air pattern, without excessive noise or pressure drop over the full range of operation
- The T_3SQ diffuser is designed to satisfy architectural, as well as engineering criteria. The strong, clean, unobtrusive lines harmonize with the ceiling, without sacrificing performance.
- The face panel and backpan are constructed from 18-gauge steel. The formed outer edge also assures a straight and level surface.

T_3SQ-O

See website for Specifications

AVAILABLE MODEL:

T_3SQ-O / Heating & Cooling

FINISH

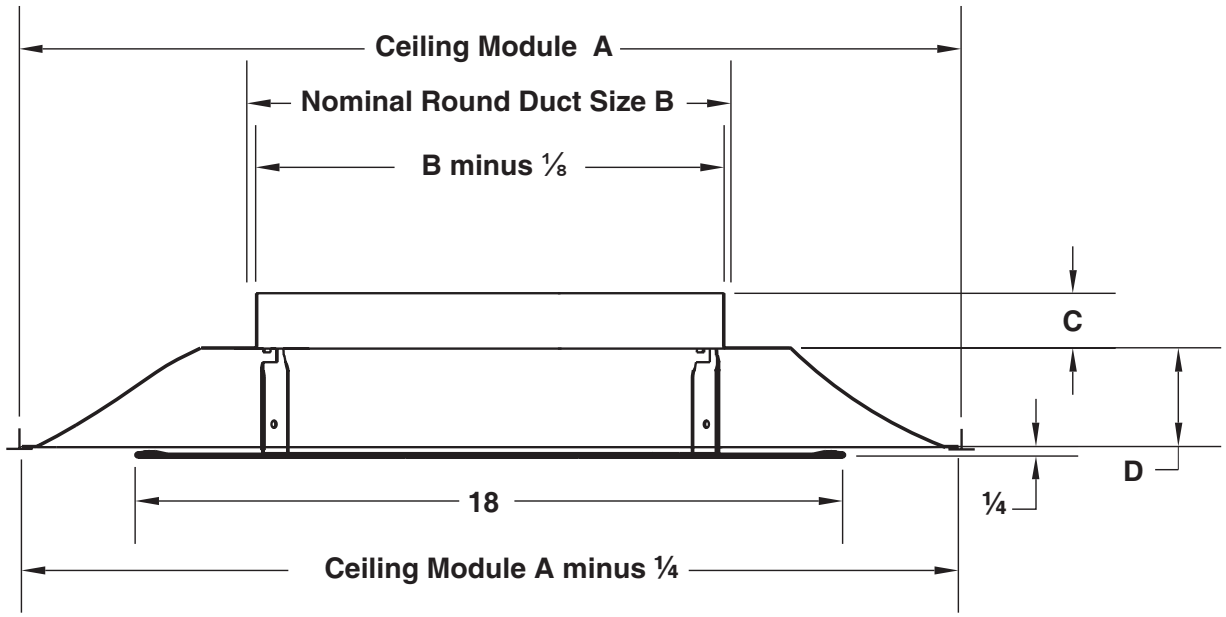
Standard Finish - #26 White

OVERVIEW

The T3SQ-O is a non-VAV supply or return diffuser with a center induction cap designed to match the T3SQ-4 thermal VAV diffusers.

T_3SQ-0 UNIT DIMENSIONS

T_3SQ-0 / Border Type 3



Ceiling Module A	Nominal Round Duct Sizes B	C	D
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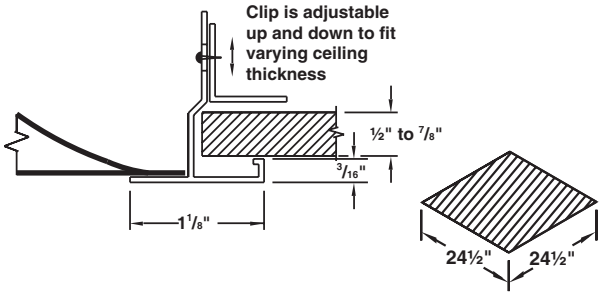
	10, 12	1⅜	3⅞

Ceiling Module A	Face Size	Nominal Round Duct Size	Border Type
24 x 24	24 x 24	6, 8, 10, 12	1, 2, 3, 4, NT

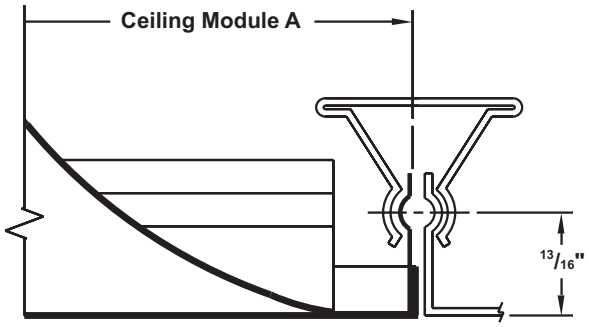
BORDER TYPES

Border Type 1 Rapid Mount Frame (for surface mounting applications)

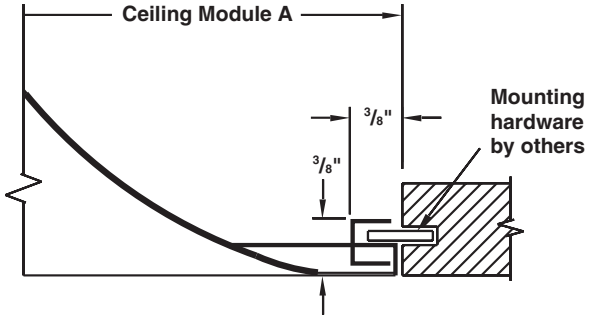
The T_3SQ series of diffusers is not available with standard Border Type 1. For surface mounting applications, the TRM optional Rapid Mount Frame can be used. Using border option TRM, the T_3SQ diffusers are shipped with Border Type 3 (lay-in). The TRM frame is shipped separately for field installation. Once the TRM is installed, the T_3SQ diffuser simply lays into the frame. This option allows access into the ceiling after installation.



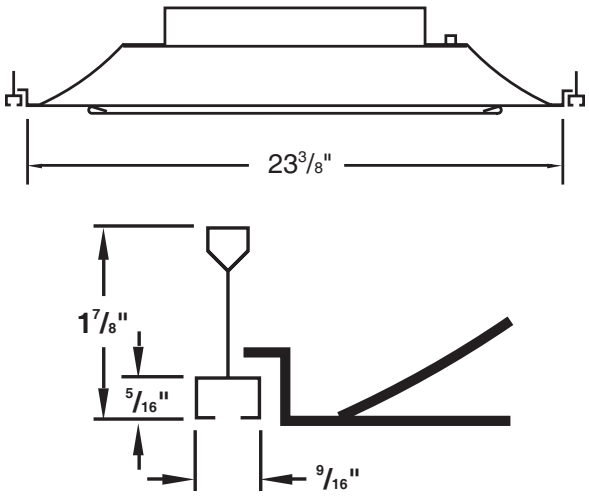
Border Type 2 (Snap-In)



Border Type 4 (Spline)



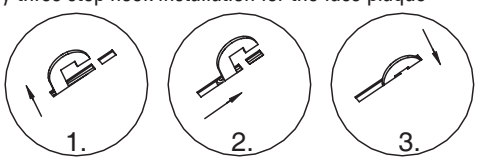
Border Type NT



Face Plaque Installation

Installation is completed by lining up the hooks on the face plaque assembly with the corresponding slot

Easy three step hook installation for the face plaque



All dimensions are in inches

T_3SQ MAXIMUM FLOW SELECTION

Inlet Size	Neck Velocity Velocity Pressure	400 0.010	500 0.016	600 0.022	700 0.031	800 0.040	900 0.050	1000 0.062
6″	Static pressure	0.016	0.024	0.037	0.048	0.064	0.082	0.100
	Total Pressure	0.026	0.040	0.059	0.079	0.104	0.132	0.162
	cfm	79	98	118	137	157	177	196
	NC	5	10	14	17	20	23	25
	Throw, ft	1-2-3	1-2-4	2-3-5	2-3-6	2-3-7	3-4-7	3-4-8
8″	Static pressure	0.021	0.032	0.047	0.063	0.083	0.106	0.130
	Total Pressure	0.031	0.048	0.069	0.094	0.123	0.156	0.192
	cfm	140	175	209	244	279	314	349
	NC	8	13	17	20	23	25	28
	Throw, ft	2-3-5	2-3-7	2-4-8	3-5-9	3-5-10	4-6-10	4-7-11
10″	Static pressure	0.030	0.047	0.069	0.093	0.122	0.155	0.190
	Total Pressure	0.040	0.063	0.091	0.124	0.162	0.205	0.252
	cfm	218	273	327	382	436	491	545
	NC	14	19	23	26	29	31	34
	Throw, ft	3-4-8	4-5-10	4-6-11	5-8-12	6-9-13	6-10-14	7-10-14
12″	Static pressure	0.048	0.075	0.109	0.147	0.192	0.244	0.301
	Total Pressure	0.058	0.091	0.131	0.178	0.232	0.294	0.363
	cfm	314	393	471	550	628	707	785
	NC	24	29	33	36	39	41	44
	Throw, ft	4-6-11	5-8-12	6-9-13	7-10-14	8-11-15	9-11-16	10-12-17

T_3SQ AHRI RATING

AHRI Rating Data				Inlet Size	6″ Inlet	8″ Inlet	10″ Inlet	12″ Inlet
Standard Ratings Sound Power Level, dB	3. Airflow, cfm				147	262	409	589
	4. Min. Operating Pressure, in H_20				0.091	0.108	0.142	0.204
	5. Max. Inlet Static Pressure @ 400 fpm Neck Velocity, in H_20				0.116	0.196	0.392	0.565
	6. Rated with Pressure Relief, yes/no				n	n	n	n
	Discharge	Standard Airflow Fully open damper 750 fpm Neck Velocity	Minimum Differential Static Pressure, in H_20	Hz Octave Band Center Frequency	125	36	38	46	53
					250	37	40	48	56
					500	34	36	42	50
					1000	30	34	39	44
					2000	21	29	32	36
					4000	+	19	23	28
	Discharge	Standard Airflow Throttled Damper 400 fpm Neck Velocity	Max. Inlet Static Pressure, in H_20		125	+	44	46	50
					250	36	52	54	55
					500	40	57	58	60
					1000	34	51	55	58
					2000	23	44	48	52
					4000	+	37	42	47

Note: Sound Power levels below values shown in this table shall be listed as below significance.
Use a plus sign (+) to indicate below significance.

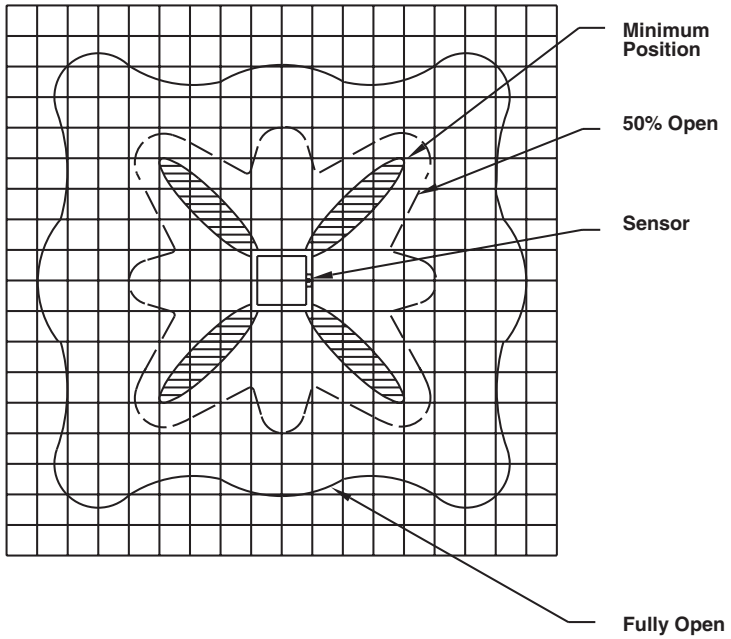
Hz Octave Band	125	250	500	1000	2000	4000
Sound Power Level, dB	36	29	26	22	19	17

Performance data is presented for the T_3SQ diffuser with the internal VAV damper in full open position

AIR DISTRIBUTION AT VARIOUS DAMPER POSITIONS

The performance of the T_3SQ diffuser is related to supply static pressure and size. If the supply static pressure is held at a constant value and the VAV diffuser damper is throttled to a closed position, the airflow pattern is changed from a square pattern to a star pattern. The isovel in the adjacent illustration demonstrates this pattern change. With the reduction of cfm, throw does not decrease as in standard diffusers. As the damper closes the discharge velocity is slightly increased, minimizing throw reduction. With a fixed inlet pressure, the sound values have very small changes of intensity as the damper is modulated.

Airflow Pattern Changes



Note: The isovel changes as the diffuser damper modulates from open to close (or any combination between) causing variations to the ariflow pattern