

Dual Duct Variable Air Volume Terminal (Model TDS)

Model TDS terminals provide Variable Air Volume (VAV) control beyond the typical dual duct box. They are specifically designed for precise air delivery throughout the entire operating range, regardless of the installed inlet conditions. These units can be ordered with or without a direct digital controller. This controller can operate stand-alone, on a Johnson N2 trunk, or on a LON trunk.

TDS terminals take advantage of typical benefits provided by dual duct units, while performing at extremely low sound levels. This is critical in today's buildings, where occupants are placing more emphasis on indoor acoustics.

The ability to provide comfort to the occupant is the measurement of quality for any Variable Air Volume (VAV) terminal. Comfort is achieved through quiet and precise control of airflow to the occupied space.

The TDS terminal is manufactured and assembled with two airflow sensors. These sensors provide a signal to each respective controller allowing it to quietly and precisely measure airflow. Accurate airflow measurement is the basis for airflow control.

Bundled with the TDS terminal is a digital controller from the Variable Air Volume Modular Assembly (VMA) Series or the Metasys LN Series. Each model in the VMA1400 Series and the LN Series combines a controller, pressure sensor, and/or actuator housed in one preassembled unit.

As a standard, the controller/actuator is installed on the cold deck, and an M9104-AGS-2N on the hot deck. This actuator has a differential pressure transmitter to provide the hot deck flow signal to the controller.

The TDS Terminal Series is available:

- Heating & Cooling with Mixing (Constant Volume)
- Heating & Cooling with Mixing (Variable Volume)
- Heating & Cooling with Reheat (Optional)

Note: For LON applications the TDS Box utilizes the Metasys LN Series VAVC-0 controller and an M9106. See Figure 3 for the physical appearance of LN-VAVC-0.



Figure 1: Model TDS



Figure 2: VMA 1420



Figure 3: Metasys LN-VAVC-0

Features and Benefits	
<input type="checkbox"/> Flexible Selection and Layout	Provides flexibility in system design, giving the designer the versatility to place units directly above occupied spaces
<input type="checkbox"/> Enhanced Air Mixing	Baffle in the discharge side of the terminal prevents stratification of the hot and cold air streams.
<input type="checkbox"/> Energy Efficient	Facilitates lower operating costs by providing quiet and accurate temperature control
<input type="checkbox"/> Agency Certified	Wired in compliance with all applicable National Electrical Code (NEC) requirements.
<input type="checkbox"/> Easy Maintenance and Service	Requires no periodic maintenance and provides trouble-free operation
<input type="checkbox"/> Integrated Module	Includes controller, pressure sensors, and/or actuator, preassembled to reduce installation time
<input type="checkbox"/> Operational Options	Includes the option of either constant volume or variable volume operation. The hot deck size must be the same as the cold deck, one size smaller, or two sizes smaller.
<input type="checkbox"/> Automated Commissioning	Uses Proportional Adaptive (P-Adaptive) and Pattern Recognition Adaptive Control (PRAC) for continuous loop tuning. (VMA Series)
<input type="checkbox"/> Advanced Diagnostics	Offers damper stall detection, starved box detection, actuator motor duty cycle, VAV box flow test, and other diagnostics on most models
<input type="checkbox"/> Network Communications	Enables integration into a Building Automation System (BAS)
<input type="checkbox"/> Easy Configuration	Provides simple question/answer software format for quick selection of project-specific applications
<input type="checkbox"/> Software Addressing	Allows remote addressing and identification from a configuration tool

Model TDS Terminals

Flexibility

Selection and Layout

The TDS provides flexibility in system design. The compact cabinet design and quiet operation give the system designer the versatility to place units directly above occupied spaces. It is not necessary to locate the unit in the crowded space above a hall or corridor, which reduces lengthy and expensive discharge duct runs. The flow sensor ensures accurate control, even when space constraints do not permit long straight inlet duct runs to the terminal.

Sizes

Model TDS cold deck and hot deck air valves are available in 8 unit sizes to handle airflow capacities between 45 and 4100 Cubic Feet per Minute (CFM).

Convenience

Quality

All TDS terminals are thoroughly inspected during each step of the manufacturing process, including a comprehensive pre-ship inspection, to assure the highest quality product available. All TDS terminals are packaged to minimize damage during shipment.

Quick Installation

A standard single point electrical main power connection is provided with all electronic controls and electrical components located on the same side of the casing for quick access, adjustment, and troubleshooting.

The flow sensor ensures accurate airflow measurement, regardless of the field installation conditions. A calibration label and wiring diagram is located on the terminal for quick reference during start-up.

The terminal is constructed to allow installation with standard metal hanging straps. Optional hanger brackets for use with all-thread support rods or wire hangers are also available.

Value and Security

Quality

All metal components are fabricated from premium grade G90 galvanized, chromate finished steel. Unlike most manufacturers' terminals, the TDS is capable of withstanding a 125-hour salt spray test without showing any evidence of red rust.

Energy Efficiency

In addition to quiet and accurate temperature control, the building owner will benefit from lower operating costs. The highly amplified velocity pressure signal from the FlowStar inlet sensor allows precise airflow control at low air velocities.

The flow sensor's airfoil shape provides minimal noise and pressure drop across the terminal. This allows the central fan to run at a lower pressure and with less brake horsepower.

Agency Certification

Model TDS terminals with electronic controls and/or electric heat are listed with ETL as an assembly, and bear the ETL label.

TDS terminals and accessories are wired in compliance with all applicable NEC requirements.

Maintenance and Service

TDS terminals require no periodic maintenance and provide trouble-free operation. Controls are located on the outside of the unit casing for easy access by maintenance personnel.

Standard Features

Construction

- 22-gauge galvanized steel casing and valve
- 3/4" 4 lb.ft³ skin, dual density fiberglass insulation
- large access opening allowing removal of complete fan assembly for all heating coil options

Cold Deck & Hot Deck Air Valves

- embossed rigidity rings
- non-thermal conducting damper shaft with position indicator
- mechanical stops for open and closed position
- center-averaging airflow sensor
- brass balancing tees
- plenum-rated sensor tubing

Hot Water Coils (Optional)

- 1-, 2-, 3-, 4-row coils
- tested at a minimum of 350 PSIG under water

Electrical

- cETL listed for safety compliance
- NEMA Type 1 wiring enclosure

Optional Features

Construction

- 20-gauge galvanized steel construction
- 1" insulation
- foil-faced, scrim-backed insulation and double wall construction with 22-gauge liner
- 1" filter rack with throwaway filter

Electrical

- full unit toggle disconnect and inline motor fusing
- primary and secondary transformer fusing

Electric Heat

- proportional (SSR) heater control
- mercury contactors
- door interlocking disconnect switches

Controls

- factory-provided controls
- Direct Digital Controls (DDC)

VMA 1400 Series Controllers

Actuator Enhancements

The VMA1410 and 1420 use an actuator with a fast response stepper motor, which is quiet (<35 dBA) and precise (23 K resolution). The stepper motor drives the damper from full open to full close in 30 seconds. This significantly reduces the time to commission and balance a VAV terminal box. The stepper motor quickly and accurately adjusts the damper position in response to new conditions, minimizing position hunting and motor runtime.

Applications

The VMA1400 Series controllers can be configured for most dual duct VAV applications. The VMA1420 requires an additional damper actuator with Differential Pressure Transducer (DPT) sensor for supply/exhaust applications.

Standard applications for the VMA1410 and 1420 reside in the HVAC PRO library. See Table 1 for more detailed application and control options. Also refer to the *Variable Air Volume Modular Assembly (VMA) 1400 Series Application Note (LIT-6375125)*.

Metasys LN Series Controllers

LN-VAVC-0

Includes the enclosure with actuator, differential pressure sensor, 8 I/O (4UI, 3 Triac DO, 1 AO) and LNS plug-in.

Applications

The LN-VAVC-0 Series controllers can be configured for most dual duct VAV applications. The LN-VAVC-0 requires an additional damper actuator and Differential Pressure Transducer (DPT) sensor for supply/exhaust applications.

Standard applications for the LN-VAVC-0 on dual duct terminals reside in the Standards Library.

Table 1: Applications

Applications	Control Options	VMA1400		LON	
		1410	1420	LN-VAVL	LN-VAVC
System Types	Dual duct constant volume Dual duct variable volume		x x		x x
Heating (Terminal Box)	Floating 3-Wire CD Actuator M9104-AGS-2N Floating 3-wire CD Actuator M9106-GGA-2 Differential Pressure Transmitter DPT2652R5D-AC Proportional Valve Actuator Normally Open or Normally Closed Valve		x x x		x x x x
Heating (Supplemental)	Floating 3-Wire Valve Actuator Proportional Valve Actuator Normally Open or Normally Closed Valve Single Stage Electric		x x x x		x x x x
Cooling (Terminal Box)	Stepper Motor Damper Actuator		x		x
Proportional Actuator	External Damper and Valve		x		x
Lighting	On/Off (In Relation to Occupancy Mode)		x		x
Modes	Occ/Temp Occ/Unocc		x x		x x

Automated Commissioning

Simply mount, wire, configure, download, and commission the controller. Because the VMA1420 performs loop tuning automatically, there is no need to set proportional bands and integration terms. There is no need to set any jumpers or switches. Even network addressing can be done via software, if desired.

The VMA1420 is configured to detect the damper end-stops automatically. On power up, the actuator drives to both hard stops on the VAV box and remembers these positions. These automated features get the system operating quickly.

The VMA constantly monitors the space temperature and airflow and generates alarms to alert the operator of setpoint deviations. The operator can react quickly, taking corrective action to get the system back into desired operation. This ensures occupants better comfort control.

Standard and Optional Terminal Construction

Model TDS

The TDS terminal incorporates many unique features. Most of these standard features are expensive options for other manufacturers.

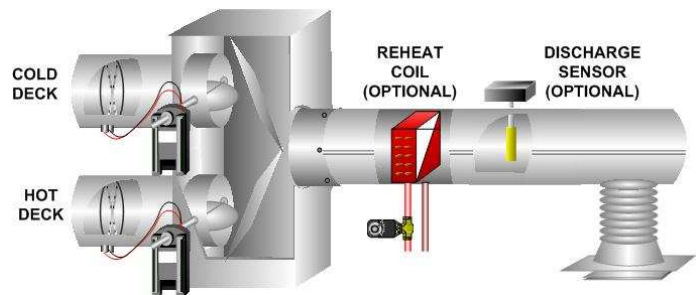


Figure 2: Model TDS – Standard Features

Model TDS – Optional Features

- double wall construction
- mounting brackets to accept all-thread hanging rods or wire hangers
- low temperature construction for use in thermal storage applications, including a thermally isolated primary air inlet and a composite damper shaft
- scrim-reinforced, foil faced-insulation meeting ASTM C1136 for mold, mildew, and humidity resistance
- factory-provided controls including DDC electronic, analog electronic, and pneumatic
- Hot water or steam heating coils are available with TDS terminals.
- mounting brackets to accept all-thread hanging rods or wire hangers

Table 2: Model TDS – Standard Features

Feature	Description
1	Product label includes tagging, airflow, and electrical information
2	Mechanical lock construction ensures lowest possible casing leakage
3	Premium grade, chromate coated, G90 galvanized steel casing withstands 125-hour salt spray test per ASTM B-117
4	Roll-formed inlet collar with integral stiffening ribs adds strength and rigidity
5	Amplifying, center-averaging airflow sensor
6	Electrical devices installed within a NEMA Type 1 Enclosure, with single point power connection
7	Units with electronic controls listed with ETL for safety compliance
8	Slip and drive discharge collar for quick field installation
9	Self-lubricating bearing to reduce friction and air leakage
10	Insulation edge covered by metal — no raw edges of insulation exposed to airstream
11	Solid composite damper shaft prevents condensation and breakage
12	Low leakage damper incorporates closed cell foam gasket
13	Mechanically fastened insulation for added security
14	1/2" thick, 4 lb.ft ³ skin, dual density insulation complying with UL 181 and NFPA 90A