Honeywell
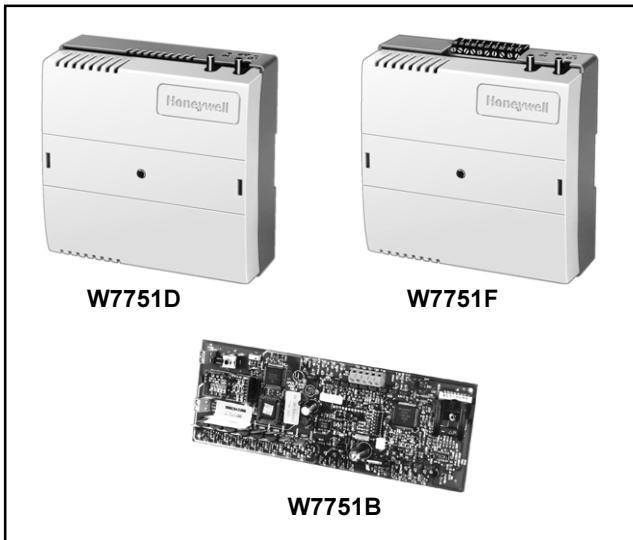
Excel 10
W7751B,D,F VAV II Controllers

EXCEL *5000* **OPEN** ™
S Y S T E M

FEATURES

- **Uses Echelon LonWorks® network (E-Bus) protocol.**
- **Free Topology Transceiver (FTT) high speed 78 kilobit communications network.**
- **Compliant with VAV Device Object Type number 8010 functional LonMark® profile.**
- **Capable of stand-alone operation, but can also use E-Bus network communications.**
- **120 controllers per Q7750A Excel 10 Zone Manager.**
- **Easy user access to the E-Bus network communications jack.**
- **Designed for Pressure Independent or Pressure Dependent Single or Dual Duct Variable Air Volume (VAV) and Constant Volume Air Terminal Unit control.**
- **Uses a Microbridge air flow sensor with patented dual integral restrictor design.**
- **Easy user access to air flow sensor inputs.**
- **Provides Proportional Integral Derivative (PID) temperature control.**
- **Energy saving setpoint reset for electrical demand limit control.**
- **Floating or modulating hot water or three-stage electric heat.**
- **Series or induction fan control.**
- **Provides patented nonlinear floating algorithm for velocity control loops.**
- **Individual zone pressurization for supply and exhaust control.**
- **Factory configured via EEPROM with critical user parameter default values.**
- **Supports motion sensor interface for enhanced energy savings.**
- **Supports Terminal Regulated Air Volume (TRAV) concept.**
- **Supports pressurize and depressurize, night purge, and morning warm-up sequences.**
- **Both plastic housing and controller module wiring subbase are UL 94-5V rated (W7751D,F).**

W7751D   **W7751F**

W7751B

GENERAL

The W7751B,D,F are Variable Air Volume (VAV) Controllers in the Excel 10 family product line. These VAV systems provide pressure independent or pressure dependent air flow control and series or induction fan control using single and dual duct applications. VAV systems generally provide cool air only to the zones. The W7751 controllers provide additional outputs that control VAV box reheat coils. The heaters can be staged electric or modulating hot water. Supply and exhaust pressurization control are provided on a zone basis.

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DESCRIPTION

The W7751B,D,F are Variable Air Volume (VAV) Controllers in the Excel 10 family product line. These VAV systems provide pressure independent or pressure dependent air flow control and series or induction fan control using single and dual duct applications. VAV systems generally provide cool air only to the zones. The W7751 controllers provide additional outputs that control VAV box reheat coils. The heaters can be staged electric or modulating hot water. Supply and exhaust pressurization control are provided on a zone basis.

SPECIFICATIONS

Models

W7751B: The W7751B is implemented on a snap track compatible Printed Wiring Board (PWB). Terminal blocks are used to make connections to the digital input terminals (13 through 17) the wall module terminals (19 through 25) and the communications terminals 29 and 30. Connection for access to E-Bus is provided by plugging the connector into the communications jack. Digital outputs, earth ground and 24 Vac power connections are made with quarter inch (6.35 mm) quick connects.

W7751D: The W7751D uses a two-piece construction controller module and an internally wired subbase. Field wiring 14 to 22 AWG (2.0 to 0.34 mm^2), through a conduit, connects to the terminal blocks on the subbase. The controller module plugs into the prewired subbase.

W7751F: The W7751F uses a two-piece construction controller module and an externally wired subbase. Field wiring 14 to 22 AWG (2.0 to 0.34 mm^2) is connected to the terminal blocks on the top and bottom external edges of the subbase. The controller module plugs into the prewired subbase. See Table 1 for Control techniques supported.

Single Duct Applications:
See Table 2.

Table 1. Control Techniques Supported.

Heating and Cooling	Fan
Up to three stages of electric or hot water heat	no fan
Floating hot water heat	induction fan (Parallel Temperature or Fan Flow)
Pulse Width Modulated (PWM) heat	(PWM Fan)
Floating damper output	series fan (Series Fan)
Other Important Control Features	
Three setpoint sets for heating and cooling.	
Occupied—Normal hours or if bypass invoked from wall module during unoccupied hours.	
Standby—Energy saving period during occupied hours, invoked by motion detector.	
Unoccupied—Off hours.	
Supply, exhaust pressurization control are provided on a zone basis.	

Table 2. Single Duct Application (Pressure Independent Or Pressure Dependent)

Damper Control Only
Damper Control, 1, 2, or 3 Stages Reheat
Damper Control, 1 Stage Peripheral Heat
Damper Control, Floating or PWM Reheat
Damper Control, Floating or PWM Peripheral Reheat
Damper Control, Floating or PWM Reheat Plus Floating or PWM Peripheral Heat*
Return Flow Tracking

Staged Heat Options:
    Reheat
        Standard, stepped (1, 1 and 2, 1 and 2 and 3)
        Binary (1, 2, 1 and 2)
    Peripheral Heat
    1 stage only

Fan Options**:
    Series
    (Induction fan):
    Parallel***
        Temperature
        Flow
    PWM fan
    None

Modulating Heat Options (Reheat and Peripheral)
    Floating
    Pulse Width Modulation (PWM)

* If both Reheat and peripheral heat are used in the same application:
— Both must be same output type such that both are staged, floating or staged PWM (all PWM actuators must use the same time-based mode parameters).
— The first and second stage ordering is selectable between; stage 1 - reheat, stage 2 peripheral or stage 1 - peripheral, stage 2 reheat

** All single duct applications support series fan, (Induction fan): parallel temperature and fan flow or PWM fan for operations or no fan.

NOTE: PWM fan actuator temperature controls just the opposite of a VAV damper actuator such that an increase in air flow gives a decrease in fan speed.

*** Parallel fan options:
Standard - controlled by temperature and acts as a form of reheat.
Flow - adds return air from the plenum to ensure minimum discharge flow.

Dual Duct Applications
See Table 3.

Input/Output:
See Tables 4 and 5.

Table 3. Dual Duct Applications

These applications require two VAV Controllers and two ML6161 direct-coupled damper actuators per zone
Dual Duct, Pressure Independent, with flow mixing, with cold and hot duct flow pickups (uses a satellite Excel 10 for the hot duct)
Dual Duct, Pressure Independent, without flow mixing, with cold and hot duct flow pickups (uses a satellite Excel 10 for the hot duct)
Dual Duct, Pressure Independent, constant volume, with cold and hot duct flow pickups (uses a satellite Excel 10 for the hot duct)
These applications require one VAV Controller and one or two ML6161 direct-coupled damper actuator per area supplied by the VAV box
Dual Duct, Pressure Independent, with cold duct pickup only
Dual Duct, Pressure Independent, constant volume, with discharge pickup only, Flow sensor in discharge air. The temperature control loop controls the cool damper position and the flow controls adjust the heating damper position
Dual Duct, Pressure Independent, discharge pickup, no mixing
Dual Duct, Pressure Dependent, with flow mixing
Dual Duct, Pressure Dependent, without flow mixing

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Table 4. VAV II Controller Inputs

Analog inputs - 4 total
Space temperature sensor (fixed location) - T7770A,B,C,D or T7780A Digital Display Wall Module (DDWM)
Air flow pressure sensor (fixed location) - Microbridge 0-2 inw (0 to 0.5 kPa) velocity pressure sensor

Configurable analog input options (any two unique items from the following)
    Space temperature setpoint from T7770B,D 55 to 85°F (13 to 29.5°C) - 9846 to 1290 ohms
    Discharge Air temperature sensor
        Type RTD
        Supported Sensors: C7770A1006, C7031B1033, C7031C1031, C7031D1062, C7031F1018, C7031J1050, C7031K1017
    Supply Air Temperature
        Type RTD
        Supported Sensors: C7770A1006, C7031B1033, C7031C1031, C7031D1062, C7031F1018, C7031J1050, C7031K1017

Digital inputs - 5 total
Wall Module Bypass Pushbutton- Momentary DI (fixed location)
Hardware test (fixed location)

Configurable digital input options (up to three unique items from following)
    Window open- (contact closed = window closed)
    Occupancy switch- (contact closed = room occupied; contact open = room unoccupied)
    Heat/cool change over- (contact closed = heat)
    Monitoring input- (contact closed = input on or closed-reportable on network)

Table 5. VAV II Controller Digital outputs

Configurable digital output options (8 total):
Floating damper open
Floating damper closed

Reheat types:
    Reheat (floating) valve open
    Reheat (floating) valve closed
    PWM**
Three stage binary control:
    *Stage 1 (output 1)
    *Stage 2 (output 2)
    *Stage 3 (both outputs 1 and 2)

Peripheral heating types
    Peripheral heat (floating) valve open
    Peripheral heat (floating) valve closed
    PWM**
    Stage 1

Fan
    Series
    (Induction fan):
        Parallel
            Temperature
            Flow
        PWM fan

Auxiliary contact (On when occupied, Off when unoccupied or Standby)
    Normal (On/Off digital)
    Pulsed (requires one pair open and closed)

Network (up to 2 outputs commanded from the network)
    Normal (On/Off digital)
    Pulsed (requires two outputs)

 * Staged reheat coils are disabled if air flow is less than one half of reheat air flow setpoint.
** All PWM actuators must use the same time-based mode parameters.

Triac Outputs:
Power ratings: 20 Vac to 30 Vac at 25mA MIN to 500mA MAX current for any voltage, W7751B has a MAX current of 400mA.

NOTE: Triacs sink current to the 24 Vac common (terminal 10 on the W7751B model or terminals 2 and 4 on the W7751D,F models. The controller and all Triac loads must be wired to the same 24 Vac source.

IMPORTANT
If non-Honeywell motors, actuators, or transducers are to be used with Excel 10 Controllers, Triac compatibility must be verified (see previous NOTE).

Power Supply:
24 Vac with a valid range of 20 to 30 Vac at 50/60 Hz.

Power Consumption (no load):
10 VA maximum at both 50 and 60 Hz.

CPU:
Motorola or Toshiba 3150 Neuron® processor, containing three eight bit CPUs. Each Neuron has a unique 48-bit network identification number.

Memory Capacity:
The W7751B,D,F VAV Controllers uses a 64K by 8 ROM/PROM, 512 bytes of EEPROM and 2K of RAM.

Differential Pressure Range:
0 to 2.0 inw (0 to 0.5 kPa) maximum for the onboard flow sensor.

Specified Sensing Temperature Range:
20 Kohm NTC sensor temperature range of 45 to 99°F (7 to 37°C) with an allowable control setpoint range from 50 to 90°F (10 to 32°C) when initiated from the network and 55 to 85°F (13 to 29°C) when configured and connected to a T7770, T7780A DDWM or C7770A Air temperature Sensor.

Status Information
See Table 6.

Table 6. W7751 Controller LED Status Information.

LED Status	Controller Status
Off	No power to processor
On	Non-operational or (not configured)
Slow Blink	Operational (communicating in normal state)
Fast Blink	An alarm is present or in (Manual Test Mode)

Communications:
The W7751 uses an FTT transformer-coupled communications port with manchester encoded data being presented to controllers and devices on the E-Bus at 78 kilobits per second (kbs) via Echelon® communication protocol. Using the transformer-coupled communications interface offers a much higher degree of common mode-noise rejection while assuring dc isolation. The E-Bus is insensitive to polarity, eliminating installation errors due to miswiring.

The maximum E-Bus network length up to 5000 ft (1524m). For E-Bus network lengths greater than 5000 ft (1524m),see form 74-2865 E-Bus Wiring Guidelines.

The maximum number of nodes per E-Bus segment is 60.

Approved cable type for E-Bus communications wiring is Level IV 22 AWG (0.34mm²) plenum or nonplenum rated unshielded, twisted pair, solid conductor wire.

LonMark Functional Profile

W7751 Controllers support the LonMark Functional Profile number 8010 VAV Controller, version 1.0 (see Fig. 1).

Mounting Options:
The W7751B is a snaptrack compatible PWB.

The W7751D Subbase can be mounted to standard four by four inch and five by five inch junction boxes and also be snapped to 35 by 7.5 mm (1-3/8 by 9/32 in.) EN 50 022 DIN rail.

The W7751F Subbase can be mounted in a ring cabinet or wall mounted and also be snapped to 35 by 7.5 mm (1-3/8 by 9/32 in.) EN 50 022 DIN rail.

The W7751D,F Subbases provide the slotted hole pattern for the R7450 series IRC devices (118 by 87 mm).
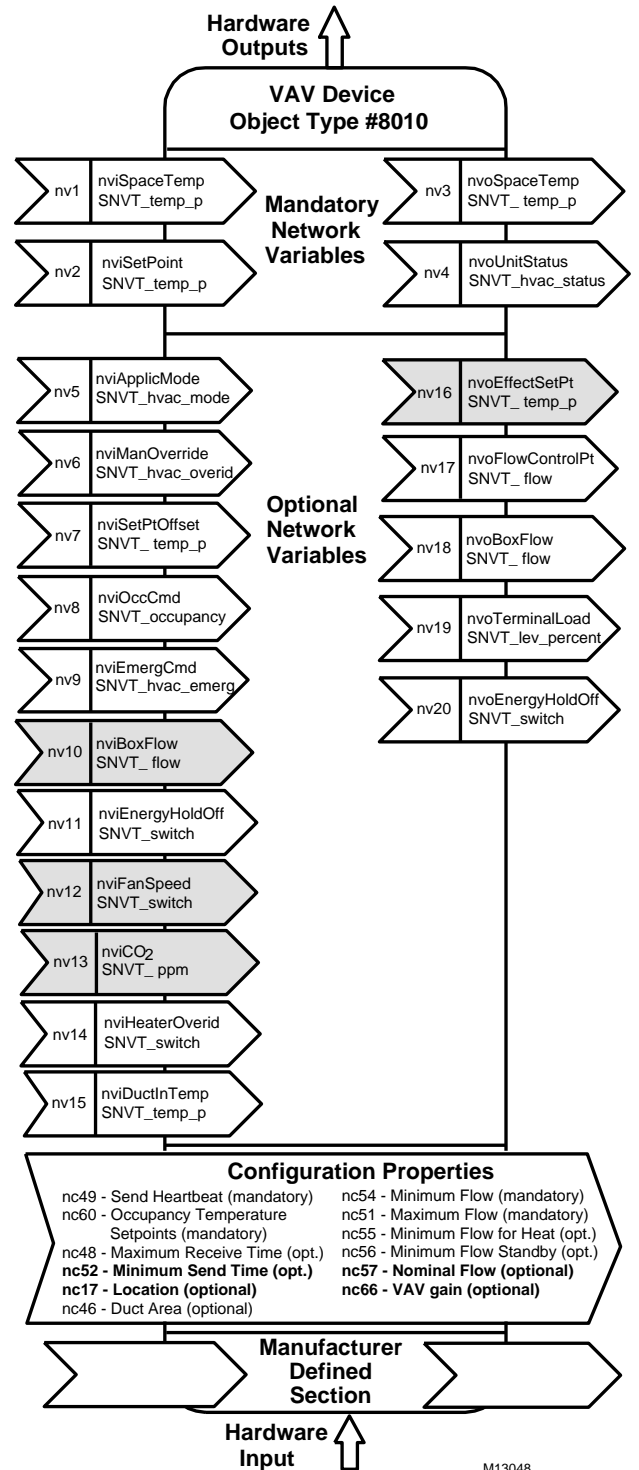
Fig. 1. Functional profile of LonMark VAV object details (variables not implemented in Excel 10 VAV Controllers are greyed, or are in bold print in Configuration Properties).

Dimensions (H/W/D):
 W7751B: 3-1/4 x 9.0 in. (83 x 229 mm).
 W7751D,F: 5-21/32 x 5-21/32 x 2-11/32 in.
  (144 x 144 x 60 mm).

Environmental Ratings:
 Operating Temperature: 32 to 125°F (0 to 51.7°C).
 Shipping Temperature: -40 to 150°F (-40 to 65.5°C).

Relative Humidity:
5% to 95% noncondensing.

Vibration:
Rated V2 Level compliant

Approval Bodies:
The W7751 is listed under UL 916 (E87741) and is also
listed by cUL (E87741). The W7751B,D,F models meet FCC
part 15 class B requirements (the W7751B meets class B
with a ferrite clamp-on). Without the ferrite clamp-on the
W7751B meets Class A requirements. The W7751B must be
enclosed in a metal cabinet to meet class A and B
requirements.

For CE requirements the W7751B,D,F models meet
CISPR22B (the W7751B meets CISPR22B with a ferrite
clamp-on and must be enclosed in a metal cabinet).

Accessories:
• Excel 10 T7770 Wall Modules.
• T7780A DDWM.
• Excel 10 C7770A Air Temperature Sensor.
• Excel 10 Q7750A FTT Zone Manager.
• Excel 10 Q7751A,B Router.
• Excel 10 Q7752A,B Serial Interface Adapter.
• Excel 10 Connector Cable 205979 from the Excel 10
 Q7752A Serial Interface Adapter to Excel 10 Controller or
 Wall Module.
• 209541B Excel 10 Termination Module.

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