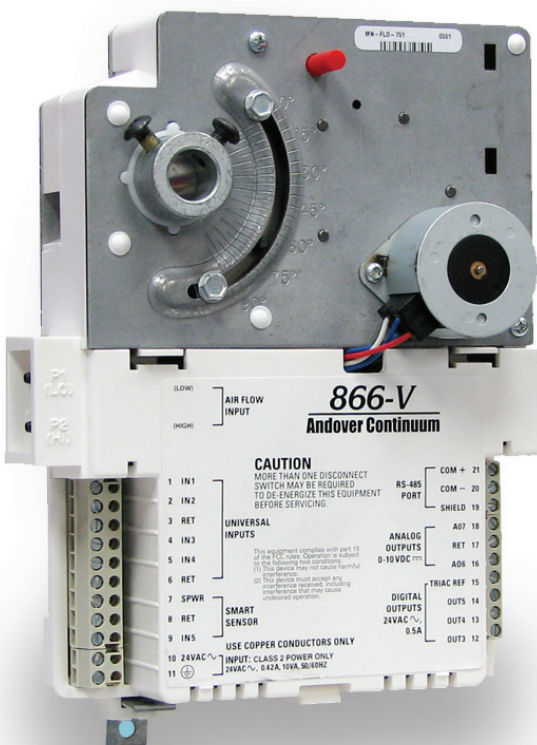# BACnet

b3865/866/885-V VAV Controllers with Built-in Actuator

The Andover Continuum™ b3865-V, b3866-V and b3885-V are native BACnet controllers that communicate on an RS-485 field bus as Master devices using the MS/TP BACnet protocol.

Schneider Electric

BACnet b3865/866/885-V VAV Controllers with Built-in Actuator Features

The controllers are highly intelligent, low-cost VAV box controllers that come equipped with a built-in actuator to streamline hardware installation and save commissioning time. Universal inputs, an airflow sensor, Form A triac-based outputs, and an integrated damper actuator make these controllers perfect for VAV applications. The b3865/866-V models feature a room sensor input, which supports our Andover Continuum Smart Sensor, or any standard room temperature sensor.

- The b3865-V is the base model with four universal inputs, an airflow sensor, three Form A triac-based outputs, and an integrated damper actuator.

- The b3866-V model is identical to the b3865-V, with the exception that it also offers damper position feedback and two analog outputs to control reheat valves, lighting ballasts, etc.

- The b3885-V has a reduced I/O point count for smaller VAV applications.

- All VAV models feature Flash memory, user memory for programs, and a fast (32-bit) processor for faster can times, with plenty of additional memory available for data logging of your critical data.

PRODUCT AT A GLANCE

- Native BACnet MS/TP communications
- Support for 18 BACnet object types, including Trends, Schedules, Calenders, and Loops
- Low-cost VAV control in compact package
- Built-in damper actuator simplifies hardware installation
- Universal inputs with Form A, Form K, and analog outputs for flexible control options
- Non-volatile Flash memory for application program and operating system storage
- Easy on-line software updates
- Local extended storage of log data
- On-board airflow sensor
- Optional Andover Continuum Smart Sensor Display
- Complies with B-AAC BACnet profile
- Support for Wireless BACnet Field Bus communications

	b3865-V	b3866-V	b3885-V
Universal Inputs	4	4	2
Airflow Sensor	Yes	Yes	Yes
Smart Sensor Input	Yes	Yes	No
Form A Triac Outputs	3	3	2
Analog Outputs	-	2	-
Integrated Actuator	Yes	Yes	Yes
Service Port	Yes	Yes	Yes
Wireless Option	Yes	Yes	Yes

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BACnet b3865/866/885-V VAV Controllers
with Built-in Actuator
Features (continued)

As native BACnet controllers, the b3865/866/885-V models can communicate with other BACnet devices on the MS/TP network, in strict accordance with ANSI/ASHRAE standard 135-2004. By connecting to the Andover Continuum bCX1, the controllers, or other MS/TP devices can share and gather data from the wider Ethernet/IP network of controllers. Among those Ethernet controllers can be Andover Continuum controllers (BACnet or Andover Continuum Infinet) or third party BACnet IP devices. All Andover devices, both BACnet and Andover Continuum Infinet, are fully compatible with the Andover Continuum CyberStation front-end software, a fully native BACnet Operator Workstation (B-OWS) application.

A Highly Intelligent Controller
Andover Continuum field controllers are highly intelligent and the VAV models are no exception. TAC designs the Andover Continuum field controllers to handle schedules, alarms and trends locally so there is no reliance on any supervisory controllers. Since each controller is programmable and can operate independently, the Andover Continuum is highly reliable. Furthermore, each controller is "peer-to-peer" and can share data with any Andover Continuum or third party BACnet controller.

Optional Wireless BACnet
The b3865/866/885-V BACnet controllers can also communicate using a wireless mesh BACnet network. Simply plug Andover Continuum Wireless Adapters into the service ports of the BACnet controllers with wireless compatible firmware to create a wireless mesh network that sends and receives BACnet messages. Because the native BACnet communications are used wirelessly, the bCX1 connects the entire wireless BACnet network to the wired BACnet networks in your system, regardless of manufacturer.

Increased Reliability with Flash Memory
The non-volatile Flash memory stores your operating system and application programs, so that in the event of a power loss, your application is restored when power is returned. In addition, the Flash memory allows for easy upgrades of your operating system via software downloads, eliminating the need to swap out memory chips. Each controller, except the b3885-V, includes an on-board battery to safeguard your runtime data — protecting all point data and log data

Dimension Drawing
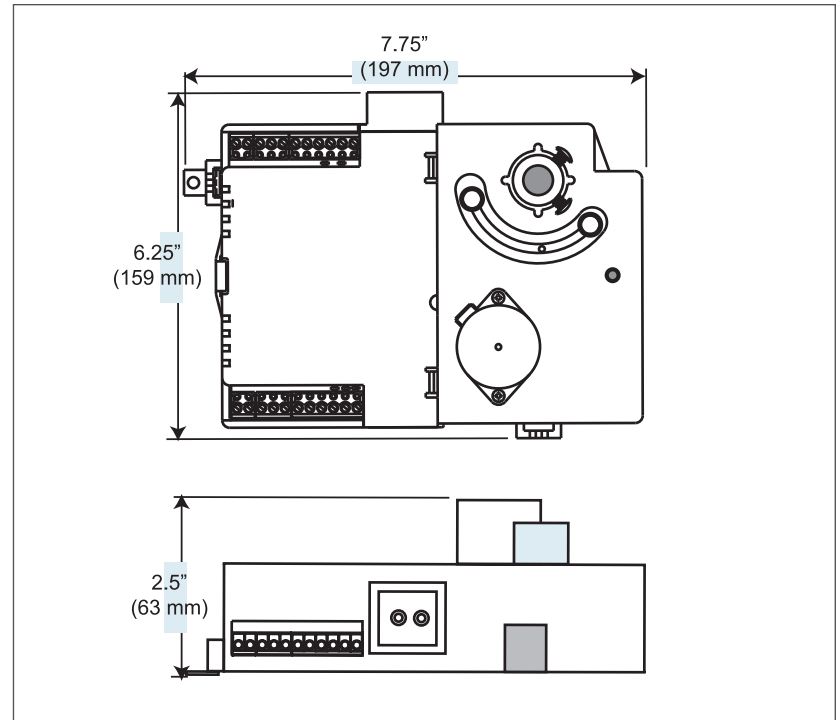
from being lost if power is removed.

Inputs
The inputs consists of two or four full-range Universal inputs that accept voltage (0-5VDC), digital (on/off), counter signals (up to 4Hz), or temperature signals, plus an on-board air flow sensor. The b3865/866-V models also offer an additional input to support the Andover Continuum Smart Sensor, or any standard room temperature sensor.

Outputs
The b3865/866-V controllers contain three Form A Triac-based outputs. The b3885-V controller contains two Form A Triac-based outputs. These outputs can be used separately for on/off or pulsed control of lighting, heat, and fan units or for bi-directional control of dampers and valves; or configured into one Form K Tri-state output and one Form A output. (Note: Any two consecutive Triac outputs can be configured as a Form K output.) Outputs are rated for AC loads only. The b3866-V controller also offers two (0-10V) analog outputs.

BACnet b3865/866/885-V VAV Controllers with Built-in Actuator
Features (continued)

Damper Actuator

The integrated damper actuator allows simple direct mounting of the controller directly over the existing damper shaft. This eliminates the need for separate mounting, wiring, and positioning of the damper motor. Also, the actuator has a built-in clutch button to temporarily disengage the direct-drive gears during commissioning. The controller actuator may be preset for a limited range of motion using the mechanical "stops" provided.

Software Capabilities

The dynamic memory of the b3865/866/885-V controllers can be allocated for any combination of programs, scheduling, alarming, and data logging using the powerful Andover Plain English programming language. Our object-oriented Plain English language with intuitive keywords provides an easy method to tailor the controller to meet your exact requirements. Programs are entered into the controller using Andover Continuum CyberStation. Programs are then stored and executed by the controller. Programming multiple b3865/866/885-V controllers is inherently easy with Plain English. A complete copy of one controller's programs can be loaded directly into other controllers without changing any point names or programs.

Smart Sensor Interface

The b3865/866-V controllers provide a built-in connection for an Andover Continuum Smart Sensor. The Smart Sensor provides a two-character LED display and a six-button programmable keypad that enables operators and occupants to change setpoints, balance VAV boxes, monitor occupancy status, and turn equipment on and off. An enhanced version of the Smart Sensor is also available with a four-digit custom LCD that provides the following icons: PM, %, °, Setpoint, Cool, Heat, CFM, Fan, OA, and SP.

Connection Labels
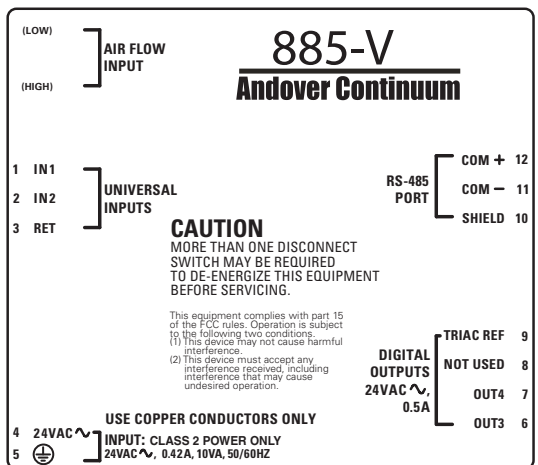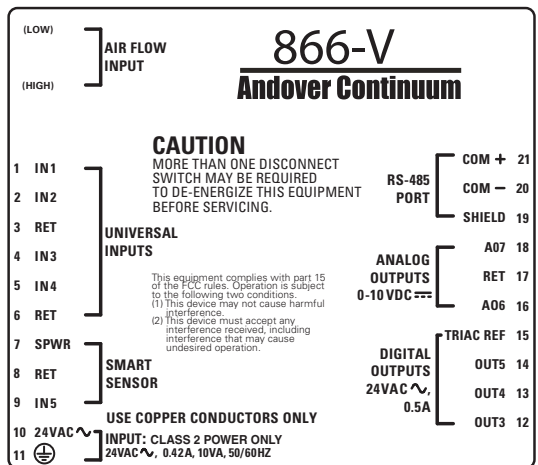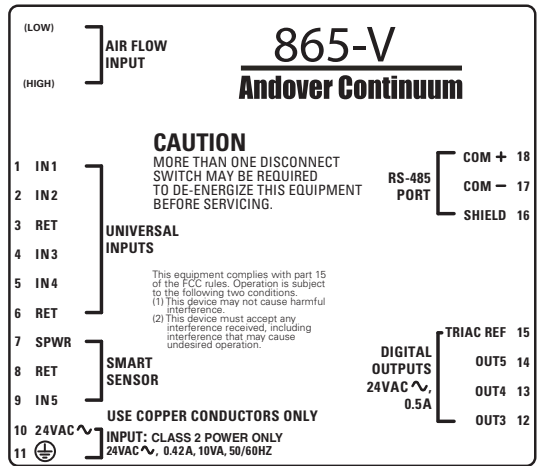
865-V
Andover Continuum

866-V
Andover Continuum

885-V
Andover Continuum

BACnet b3865/866/885-V VAV Controllers with Built-in Actuator Specifications

b3865/866/885-V Controller

Electrical

Power
24 VAC, +10%-15%, 50/60 Hz,
Class 2 Limited Power

Power Consumption
Less than 10 VA

Overload Protection
Fused, MOV protected

Mechanical

Operation Environment
32° to 122°F (0-50°C),
10 - 90% RH (non-condensing)

Dimensions
7.75″ W x 6.25″ L x 2.5″ H
(197 mm W x 159 mm L x 63 mm H)

Weight
2.50 lbs (1.04 kg)

Battery

Replaceable, rechargeable battery.
Provides 30 days typical accumulated
power failure backup of RAM memory.
All data stored in Flash on power loss.

Communications

**RS-485 port for implementing
BACnet MS/TP connection, including:**
Three-position removable screw terminal
Standard service port, four-position
shrouded connector
LEDs:
    TD = Transmit Enable
    RD = Received Data

Wired/Wireless Field Bus
RS-485 port for implementing
Wireless BACnet connection, including:
Standard service port, four-position
shrouded connector

User LEDs

Status Indicator LEDs:
CPU CPU Active
      Green = Active

Airflow Input

Range
0 to 1″ W.C. (0-250 Pa)

Resolution
0.0013″ W.C. (0.33Pa) @ 73°F (23°C)

Accuracy
± 0.05″ W.C. (12.50 Pa) @ 73°F (23°C)

Damper Shaft Mounting Screws

Torque Minimum
Varies according to shaft material

Torque Maximum
30 inch-pounds (3.4 Nm)

Hex Screws
10-32 (with supplied hex wrench)

Damper Actuator Motor

Shaft Diameter
1/2" (with a 3/8" adapter)
12.6 mm (with a 9.45 mm adapter)

Shaft Torque
53 inch-pounds (5.989 Nm)

Damper Speed
180 sec. @ 60 Hz and 216 sec @ 50 Hz:
for 90° adjustable end limits with two
set screws

Motor
Type: 24 VAC synchronous
Motor Protection: Mechanical clutch
Manual clutch override with a
push-button release
Hardware position feedback
(model b3866-V only)

Universal Inputs

Connections
Model b3865-V: Four inputs and
two returns
Model b3866-V: Four inputs and
two returns
Model b3885-V: Two inputs and
one return

Input Voltage Range
0 to 5.115 VDC

Input Impedance
10K ohm to 5.120 V

Input Voltage Resolution
5.0 mV

Digital Resolution
10 bits

Input Voltage Accuracy
± 15mV

Temperature Range
-30° to 230°F (-34° to 110°C)

Temperature Accuracy
± 1° F from -10° to 150°F
(± 0.56°C from -23° to +66°C)

Counter Frequency
4 Hz @ 50% duty cycle

Input Protection
± 1000 V transients

Input Filter
16 Hz with one pole RC filter

Connector
Removable, 5 mm screw terminal

BACnet b3865/866/885-V VAV Controllers
with Built-in Actuator
Specifications (continued)

b3865/866/885-V Controller

Smart Sensor Interface

Connections

Model b3865-V: One input,
SPWR, and return

Model b3866-V: One input,
SPWR, and return

Model b3885-V: Not available

Digital Outputs

Connections

Model b3865-V: Three triac outputs
and one reference

Model b3866-V: Three triac outputs
and one reference

Model b3885-V: Two triac outputs
and one reference

SPST Accuracy

0.1 second for pulse width modulation

Contact Ratings

0.5 A Maximum, 24 VAC

Connector

Removable, 5mm screw terminal

Analog Outputs

Connections

Model b3865-V: Not available

Model b3866-V: Two analog outputs
and one return

Model b3885-V: Not available

Analog Output Channels Required

Two, voltage only

Voltage Output Range

0 – 10 V

Output Source Current

5 mV Maximum

Voltage Output Load

2K ohm Minimum Impedance

Voltage Output Resolution

50 mV

Digital Resolution

8 bits

Output Voltage Accuracy

100 mV

Connector

Removable, 5mm screw terminal

Agency Listings

FCC Rules and Regulations CFR 47,
Part 15, Class A, ICES-003,
AS/NZS 3548, European Union (EU)
Directive 2002/96/EC

Models

b3865-V

BACnet 865-V VAV Controller

b3866-V

BACnet 866-V VAV Controller

b3885-V

BACnet 885-V VAV Controller

b3865-V-WL

Wireless BACnet 865-V VAV Controller

b3866-V-WL

Wireless BACnet 866-V VAV Controller

b3885-V-WL

Wireless BACnet 885-V VAV Controller

On October 1st, 2009, TAC became the Buildings Business of its parent company Schneider Electric. This document reflects the visual identity of Schneider Electric, however there remains references to TAC as a corporate brand in the body copy. As each document is updated, the body copy will be changed to reflect appropriate corporate brand changes.