Andover Controls

Infinity

TCX 865,866 VAV Controller with Built-in Actuator

The *Infinity* TCX 865 programmable Infinet terminal controller is a unique, low-cost VAV box controller that comes equipped with a built-in damper actuator to streamline hardware installation and save commissioning time. The TCX 865, with two universal inputs; an airflow sensor; three Form A triac-based outputs; and an integrated damper actuator, is perfect for VAV applications requiring reheat control.

Infinity's true peer-to-peer communications protocol provides the TCX 865 with the ability to instantly communicate with an *Infinity* network controller such as the CX 9200, as well as the entire network of Andover Infinet field controllers. Up to 254 TCX 865s can be networked to one CX series network controller.

Metal oxide varistors and optocouplers on the TCX 865 provide 2500V isolation on each triac-based output, ensure noise-free operation and, in most cases, eliminate the need to install MOVs in the field.

The TCX 866 model adds an additional universal input, plus a room sensor input, which supports Andover's new *Smart Sensor,* or any standard room temperature sensor. The TCX 866 also adds two analog outputs to control reheat valves, lighting ballast control, etc.

FEATURES

- **Stand-alone VAV Control for System Reliability**
- **Built-in Damper Actuator Simplifies Hardware Installation**
- **Universal Inputs with Form A Outputs for Flexible VAV Control**
- **Peer-to-Peer Communications Provide Transparent Data Transfer**
- ***Plain English*® Language Simplifies Programming**
- **On-Board Pressure Transducer for Airflow Measurement**
- **Actuator Clutch Feature Saves Commissioning Time**
- **View and Modify Information with Optional Andover *Smart Sensor* Interface**

COMMUNICATIONS

Communication to the *Infinity* TCX 865 is handled via the Infinet bus, a twisted pair, half duplex RS-485 interface. Communication is accomplished with a token passing protocol which provides full transparent data transfer between all *Infinity* controllers on the network.

INPUTS

Input configuration consists of two full range Universal inputs that accept voltage, (0-5 VDC), digital (on/off), counter signals (up to 4 Hz), or temperature signals, plus an on-board air flow sensor. The TCX 866 model offers an additional universal input plus a room temperature input to support the Andover *Smart Sensor*, or any standard room temperature sensor.

OUTPUTS

The TCX 865 contains three Form A triac-based outputs for on/off or pulsed control of lighting, heat, and fan units. Two outputs can also be configured to provide one Tri-state Form K output and one Form A output, for bidirectional control of dampers and valves. Outputs are rated for AC loads only. The TCX 866 model also offers two analog outputs to control reheat valves, lighting ballast control, etc.

DAMPER ACTUATOR

The integrated Belimo® damper actuator allows simple direct mounting of the TCX 865 directly over the existing damper shaft. This eliminates the need for separate mounting, wiring, and positioning of the damper motor. All TCX 865 controllers have built in software over-drive protection which senses repeated motor limit stall conditions and helps to prevent motor damage. Also, the actuator has a built-in clutch button to temporarily disengage the direct-drive gears during commissioning. The TCX 865 actuator may be preset for a limited range of motion using the mechanical "stops" provided.

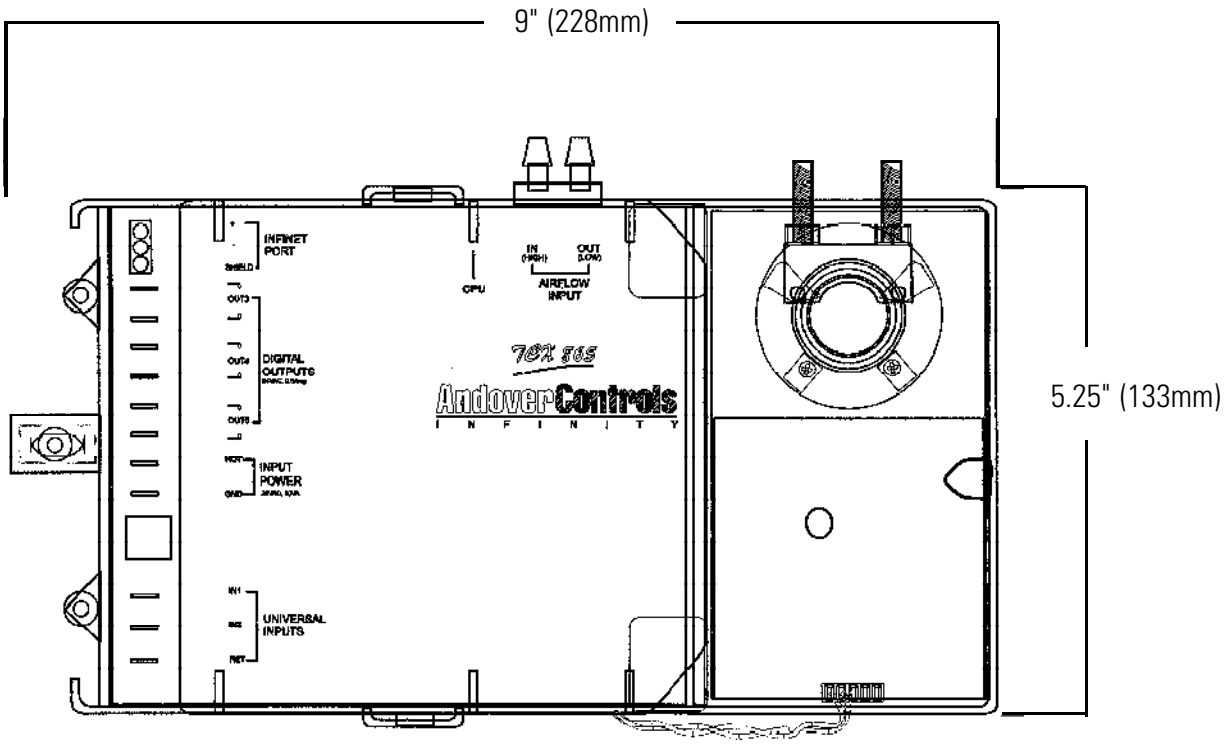
PROGRAMMING

Every TCX 865 can be configured to meet the exact distributed control requirements of your application using Andover Controls' powerful *Plain English*® programming language. Programs can be activated within individual TCX 865s or any network controller. Programs are entered into a TCX 865 using an SX 8000 workstation, the LSX 280 Lap-Top Service Tool, or network controller. The program is then stored in, and executed by, the TCX 865. The on-board replaceable lithium battery keeps the TCX 865's programs and real-time clock backed up in the event of a power failure.

Programming multiple TCX 865s is inherently easy with *Plain English*. A complete copy of one TCX 865's programs can be loaded directly into other TCX 865s without changing any point names or programs. The SX 8000 workstation makes this process even easier with its unique drag-and-copy feature.

SOFTWARE CAPABILITIES

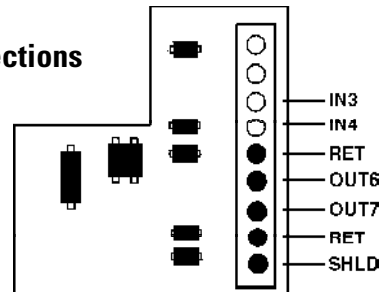
The dynamic memory of the TCX 865 can be allocated for any combination of *Plain English* control programs, scheduling, alarming, and data logging. Andover's object-oriented language with intuitive keywords provides easy operation and programming. In addition, *Plain English*'s pre-defined and customized functions and powerful math capabilities reduce programming time for repetitive applications.



Depth 2.5"
(63.5mm)

TCX 865 Dimensional Drawing

TCX 866 Extra I/O Connections



SPECIFICATIONS

ELECTRICAL

Power:	24 VAC, 50/60 Hz **Note: Individual transformer at each controller required (not included).**
Power Consumption:	10 VA
Overload Protection:	Fused with 2 amp pico fuse. MOV protected.
Real-Time Clock:	Battery-backed quartz clock, synchronized through Infinet by CX or CMX Network Controller.

MECHANICAL

Operating Environment:	32° - 120°F (0 - 48°C), 10-95% RH (non-condensing)
Size:	9"H x 5 1/4" W x 2 1/2"D (228mm H x 133mm W x 63mm D)
Weight:	1.78 lbs.
Enclosure:	UL open class, flammability rating of UL94-5V, IP 10. Optional terminal strip cover for NEMA-1 style, IP 20.

BATTERY

Battery Backup:	Replaceable non-rechargeable, lithium battery. Provides 3 years typical accumulated power failure backup of RAM memory and real-time clock.

COMMUNICATIONS

Communications Interface:	Through *Infinity* CX or CMX Network Controllers or LSX 280 Lap-Top Service Tool.
Communications Speed:	1200 to 19.2k baud
Bus Length:	4,000 ft. (1,220m) standard for Infinet, InfiLink amplification module allows extension to longer distances and is required after every group of 32 units on the network.
Bus Media:	Infinet: twisted, shielded pair, approved low capacitance cable
Comm. Error Checking:	International Standard CRC 16

INPUTS/OUTPUTS

Inputs:	2 universal inputs (TCX 866 has 3): Temperature -30°F to 230°F (-34°C to 110°C), Digital (on/off), Counter (up to 4Hz at 50% duty cycle, 125 ms. minimum pulse width), Voltage (0-5. 115 VDC) 1 airflow sensor (0 to 1" W.C.) 1 *Smart Sensor* or std. room sensor (32°F to 105°F) (0°C to 41°C) (TCX 866 only)
Input Voltage Range:	0 - 5.115 volts DC

SPECIFICATIONS (Cont'd)

Input Impedance:	10k ohm to 5.120V
Input Protection:	24 VAC or 24 VDC temporarily on any single channel, ± 1000V transients. Tested according to IEC 1000-4-4
Input Resolution:	5.0 mV
Input Accuracy:	± 15 mV (± 0.56°C from -23°C to +66°C or ± 1°F from -10° F to +150°F)
Airflow Input:	
Range:	0 to 1" WC (0-249 Pa)
Resolution:	0.005" WC (1.25 Pa) @ 23°C (73°F)
Accuracy:	± 0.05" WC (12.5 Pa) @ 23°C (73°F)
Outputs:	3 single pole single throw (SPST) Form A triacs; 1 integrated damper actuator 2 analog outputs (0-10V) -TCX 866
Output Rating:	
For SPST:	Maximum: 0.5A, 24 VAC, ±2000 volt transients (Tested according to IEC 1000-4-4) Minimum: 30 MA AC Optically-isolated triac outputs, DC loads not permitted
For 0-10V:	5 mA maximum, 2K Ohm minimum impedance, ±1000 volts transients (tested according to IEC 1000-4-4)
Accuracy:	
For SPST:	0.1 sec. for pulse width modulation
For 0-10V:	50 mV resolution/100mv accuracy
Damper Actuator:	
Rated Torque:	35 in-lb. (3.95 Nm)
Range of Travel:	0-95 degrees, with adjustable mechanical stops
Rotation Speed:	1.0 degree/sec nominal
Position Resolution:	0.1 degrees with a 1.0 degree min. positioner movement
Actuator Output:	1.0 sec minimum pulse duration
Shaft Accommodations:	Accepts shafts 1/4" - 5/8" diameter (6.35mm - 15.9mm)

SPECIFICATIONS (Cont'd)

CONNECTIONS

Power:	Male Spade (.250)
Inputs:	Male Spade (.250) (Additional TCX 866 inputs use screw terminals)
Outputs:	Male Spade (.250) (Additional TCX 866 outputs use screw terminals)
Damper Shaft:	1/4" - 5/8" diameter (6.35mm - 15.9mm)
Infinet Bus:	Three-position barrier strip

GENERAL

Memory:	128K EPROM, 32K RAM, 128 Bytes EEPROM
AGENCY LISTINGS	UL/CUL 916, UL864-UUKL, FCC, CE

OPTIONS

- Terminal Strip Cover for NEMA 1-style enclosure, IP 20

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