DESCRIPTION

The CBT-3T6-5R BACnet Unitary Controller is a BTL Listed BACnet Advanced Application Controller (B-AAC) ideally suited for rooftop HVAC units, small air handling units, heat pumps, fan coil units and custom unitary equipment control.

The CBT-3T6-5R provides 3 UniPuts™ with Triac (configurable as inputs or outputs), 6 Universal Inputs, 5 Digital (Relay) outputs, and a dedicated input for the Cylon CBT-STAT intelligent room display.

The product is shipped with a unique MSTP address based on its serial number, but the address may also be set manually using a seven-way DIP switch.

APPLICATION

The CBT-3T6-5R is suitable for controlling a variety of small to medium sized HVAC equipment such as:

- Rooftop Units
- Heat Pumps
- Fan Coil Units
- Unit Ventilators
- Chilled Ceilings
- Small to medium Air Handling Units

This controller ships with a variety of powerful and flexible pre-configured strategies, which can be quickly configured to control almost any Rooftop or Heat Pump application. It also accommodates custom programming using CXpro™ programming software.

BACnet MS/TP Fieldbus

Supports the following configurable BACnet objects:
- AI/BI/AO/BO/BV, Trend Logs, and Schedules

3 UniPuts™ with Triac

Configured as analog / digital outputs or voltage inputs along with Triac functionality that can switch the low side of a 24 V AC load.

6 Universal Inputs

Can be configured as analog or digital inputs with pulse counting on the 6th input.

5 Digital (Relay) Outputs

3 outputs can switch up to 240 V AC.
2 outputs can switch up to 24 V AC.

Up to 500 Strategy Blocks

Up to 6 Trendlogs

1024 entries per Trendlog

Data Security

Strategy and setpoints backed up in Flash

No Hardware I/O Jumpers

Hardware points are automatically configured by the downloaded strategy
SPECIFICATIONS

MECHANICAL

Size (excluding terminal plugs) 5.12 x 5.17 x 1.78" (130 x 131.2 x 45 mm)
Enclosure Injection molded ABS
Mounting DIN rail
- The housing base is designed for snap-mounting on DIN rails.
- The controller should not be freely accessible after mounting.
- Unit must be oriented such that powered relay terminals are at the bottom of unit.

CONNECTION

Note: Use Copper or Copper Clad Aluminum 70 °C conductors only.

Terminals
- 24 V AC Power: Green Pluggable PCB mounted screw terminal connections.
- 240 V AC Relay: Green PCB mounted screw terminal connections. These may not be pluggable.

Conductor Area
- Max: AWG 12 (3.09 mm²)
- Min: AWG 22 (0.355 mm²)

ENVIRONMENT

Note: This equipment is intended for field installation within an enclosure.

Ambient Temperature 32 °F … 122 °F (0 °C … 50 °C) ambient.
Ambient Humidity 0% … 90% RH non-condensing
EMC Immunity EN 61326-1
EMC Emission EN 61326-1
Approvals UL Listed (CDN & US) UL916 Energy Management Equipment - File No. E176435
Safety EN 60730-1:2011 Automatic Action type i.e. Type 1.B.Y
Pollution Degree Class 2 (EN 60730-1)

ELECTRICAL

Supply Requirements 24 V AC +15 % / –20 % 50/60 Hz (SELV Power Source)
Transformer Rating Up to 10 VA
Rated Impulse Level 2,500 V
BACnet Loading ½ unit load device

PROCESSOR

Type STM32 F103ZET6 32bit processor
Clock Speed 8 MHz crystal, 72 MHz internal processor clock rate
System Memory 1024kByte flash, 64kByte SRAM internal to processor
- 1MByte external SRAM

COMMUNICATIONS

Local serial port Right angle entry RJ-45 @ 9600 Baud
- Max cable length 4 m
BACnet MS/TP port RS485 @ 9K, 19K2, 38K4 or 76K8 Baud (defaults to 38K4)
- Max cable length 1.2 km
CBT-STAT Port RS485 with a maximum cable length 500 m

SOFTWARE FEATURES

Maximum number of Strategy Blocks 500
Maximum number of Trend log Modules 6
Maximum internal Trend log capacity (standard) 1024
Data Security Strategy and Set points backed up in Flash

INTERFACE

Engineering Software CxproHD

INPUTS / OUTPUTS

Uniputs™ with Triac

When configured as Input:
- Analog Input
  - Range: 0 ... 10 V @ 40 kΩ
  - Resolution: 12 bit
- Digital Volt-Free contact, @ 25 mA not continuous

When configured as Output:
- Analog Output 0 ... 10 V, 10 mA, 12-bit resolution
- Active Output 1 ... 10 V for sinking 1 mA max load with 12 bit resolution.
- Digital Output 0 ... 10 V, 10 mA
- 24 V AC Triac @ 500 mA maximum. Switch neutral only.

Universal Inputs

- Analog Input
  - Range: 0 ... 10 V @ 130 kΩ
  - Resolution: 12 bit
- Temperature measurement
  - Range: 32 °F to 122 °F (0 °C … +50 °C)
  - Resolution: 12 bit
- Passive Input for a large range of temperature sensors. 10kΩ sensors are recommended.

Note: It is not recommended using Sensors with a heating dissipation constant (K factor) < 2 as this will lead to an offset error.

Current Input
- Range: 0 ... 20 mA @ 390 Ω
- Accuracy: ±0.5% full scale (100 μA)
- Digital Volt-Free contact, Dry Contact

Note: Only Universal Input 6 supports pulse counting at below 20 Hz and a minimum pulse width of 25 milliseconds.

Relay Digital Outputs

- Points 9, 10 & 11 are relay contacts with ability to switch 240 V AC (USA: Pilot Duty 120V AC, 72 VA).
- Points 12 & 13 are relay contacts with ability to switch up to 24 V AC.
- Maximum Load: 250 V AC, 2 (1) A resistive (inductive) for all relay contacts.
- Relay contacts switch single-phase only.

24 V AC output terminals
- Total current drawn from 24 V AC terminals is limited to 0.9 A.
SYSTEM ARCHITECTURE

Remote Web Browser, Mobile Applications and Tools

Cigro®

ASPECT® Enterprise
ASPECT® Studio

INTEGRA™ Supervisor

NEXUS

MATRIX

IT-8000

Modbus® RTU

BACnet® MS/TP

CBT-STAT bus

CBV-3LT6-5R SYSTEM ARCHITECTURE

Ethernet, TCP/IP, BACnet/IP, FT/Net, RXC, SMN, HART, Modbus® TCP, Unica® IP
## DIMENSIONS AND WIRING

### Important: In order for the BACnet MS/TP bus to operate reliably, the common power connection (terminal 33) must be connected to ground. It is recommended that this is done at the 24 V AC transformer.

### BACnet MS/TP Terminator
- **OFF**: (BACnet MS/TP bus not terminated at this controller)
- **ON**: (BACnet MS/TP bus terminated at this controller)

### Power 24 V AC
**Important**: The common power connection (terminal 33) must be connected to ground. It is recommended that this is done at the 24 V AC transformer.

### NOTE:
THIS UNIT MUST BE GROUNDED

### Relay digital outputs (24 V AC, 2 (1) A)
(USA: Pilot Duty 120 V AC, 72 VA)

### NOTE:
DISCONNECT SUPPLY TO POWERED RELAYS AND 24 V AC TO UNIT BEFORE WIRING.

### Universal Input (UI6 capable of pulse counting)

### UniPut™ + Triac
Service Port (RI-45) for both temporary and permanent connection.

### 7-way DIP switch. Setting this to an address between 1 and 127 and cycling the power will force the controller to update its MAC address to match the DIP settings.

### Note:
Failure to subsequently return the switch to all zeros will render the unit unable to be configured electronically or remotely.

### UniPut™ current sink enable jumpers

### Indicators
- **Red LED**: Continuous: Optional battery is healthy. Flash once a second: Indicates no battery/battery is low.
- **Yellow LED**: Off: Normal operation. On: One or more hardware points overridden by BACnet priority array setting.

### Room Display / CBT-STAT Port
- **OFF**: (Not Terminated)
- **ON**: (Terminated)

### Room Display / CBT-STAT Power supply

### Room Display / CBT-STAT RS485 connection

### Room Display / CBT-STAT Terminator