Titan Products installation guide

Titan BACnet Controllers

- **FCU and CCM ranges**

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TABLE OF CONTENTS

GENERAL

This document covers the mounting and wiring of Titan Products BACnet Controllers across the FCU and CCM range. It assumes that you are an engineer, technician, or service person who is qualified and fully understands control system installation.

NOTE: See controller configuration statement for details of the control functions available in the BACnet Controllers.

PREPARATION

Unpack the BACnet Controller from the recyclable cardboard packaging.

Inspect the package contents for damaged or missing components. If damaged, notify the appropriate carrier at once and return any damaged components for immediate repair or replacement.

Dispose of packaging at appropriate site for recycling.

Included in Package

The following items are included in this package:

- A BACnet Controller.
- These BACnet Controller Mounting and Wiring guide

PRECAUTIONS

This document uses the following warning and caution conventions:

1) **CAUTION:** Cautions remind the reader to be careful. They alert readers to situations where there is a chance that the reader might perform an action that cannot be undone, might receive unexpected results, or might lose data. Cautions contain an explanation of why the action is potentially problematic.

2) **WARNING: Warnings alert the reader to proceed with extreme care. They alert the user to situations where there is a chance that the user might do something that can result in personal injury or equipment damage. Warnings contain an explanation of why the action is potentially dangerous.**

Safety Precautions

The following items are warnings of a general nature relating to the installation and start-up of the BACnet Controllers. It is essential to be sure to pay attention to these warnings to prevent personal injury or equipment damage.

WARNING **The BACnet Controllers are powered by 24Vac at 50/60 Hz or 24Vdc.**
There is potential for up to 240v AC to be present at any of the Relay Output terminals (such as R1, R2, R3 & R4).
Disconnect power before installation or servicing to prevent electrical shock or equipment damage
Make all connections in accordance with national and local electrical codes. Use only copper conductors.
To reduce the risk of fire or electrical shock, install in a controlled environment relatively free of contaminants.
This device is intended for use only as a monitoring and control device. To prevent data loss or equipment damage, do not use it for any other purpose.

Static Discharge Precautions

Static charges produce voltages high enough to damage electronic components. The microprocessors and associated circuitry within a BACnet Controllers are sensitive to static discharge. Follow these precautions when installing, servicing, or operating the system:

CAUTION Work in a static-free area.
Discharge any static electricity you may have accumulated. Discharge static electricity by touching a known, securely grounded object. Do not handle the printed circuit board (PCB) for any reason.

MOUNTING

Mount the BACnet controller in a location that allows clearance for wiring, servicing and module removal.

Environmental Requirements

Note the following requirements for the BACnet controller mounting location:

- This product is intended only for indoor use. Do not expose the unit to ambient conditions outside of the range of 0…50 °C and relative humidity outside the range 5…95% non-condensing
- If mounting inside an enclosure, that enclosure should be designed to keep the unit within its required operating range considering a 20-watt dissipation by the controller, plus dissipation from any other devices installed in the same enclosure. This is especially important if the controller is mounted inside an enclosure with other heat producing equipment

Do not mount the unit:

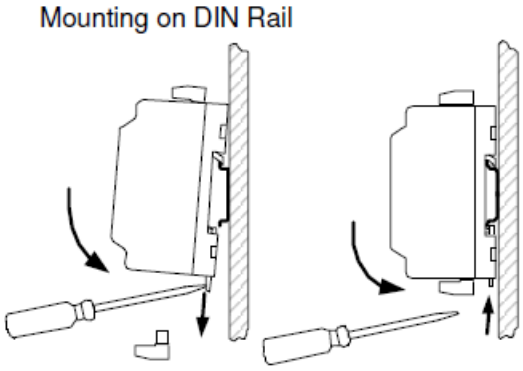
- in an area where excessive moisture, corrosive fumes, or explosive vapours are present.
- where vibration or shock is likely to occur.
- in a location subject to electrical noise. This includes the proximity of large electrical contactors, electrical machinery, welding equipment, and spark igniters, and variable frequency drives.

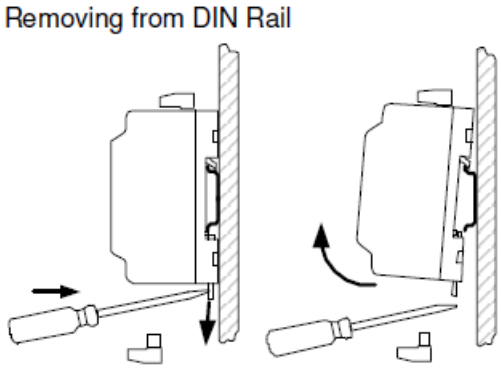
Physical Mounting

The following information applies to physically mounting the unit.

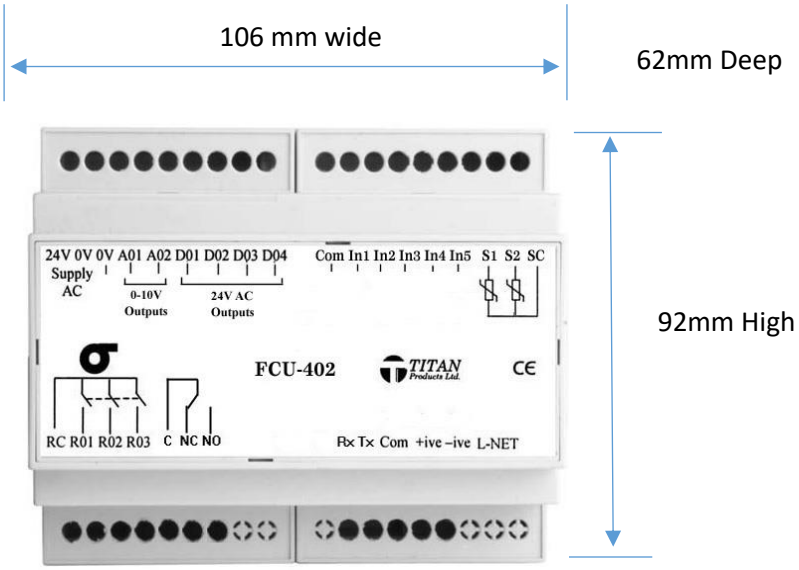
- You can mount the TITAN BACnet controller in any orientation. But preferably horizontally allowing access to the bottom mounting clip. It is not necessary to remove the top cover before mounting.
- The BACnet controller has a moulded DIN rail slot and locking clip for direct mounting onto a DIN top hat rail size 35mm.
- Mounting on a DIN rail ensures accurate alignment of terminals between all devices.

DIN Rail Mounting





Mounting Dimensions (same for all FCU and CCM BACnet controllers)



Titan BACnet Controller Layout and Terminal Identification

The BACnet controllers are Applications Specific Controllers (ASC) and are powered by 24Vac 50/60Hz or 24vDC. The Inputs and out puts are preconfigured to match the control application.

Analogue Outputs (AO):

The 0-10V outputs are labelled AO1 to AO4 (dependent on the type) these are normally factory configured to the required control regime or they can be configured at the controller setup to provide PI control of heat or cool actuators or an EC 0-10V fan control
See settings information for all analogue control options.

Triac Outputs (DO):

The number of Triac outputs available is dependent on BACnet controller type and these can be used for On/Off control, Three Point Floating Control or PWM of Heat or Cool actuators.
See settings information for all Triac (DO) control options

FCU-4 and FCU-503/R Interlocked Relay Outputs (Relays R1, R2, R3):

The volt free relay contacts are rated up to 240v AC 5 Amps inductive
R1, R2 and R3 are interlocked to provide 3 speed Fan Control. (Check with Fan Manufacturer before connection)

Changeover Relays:

Changeover relays rated at 240V AC 5 Amps inductive and this relay can be used for a number of control functions.
See settings information for all Relay Output control options.

Universal Inputs (IN1 to IN8)

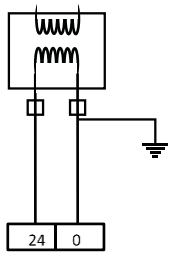
Depending on the controller type up to 8 Universal Inputs can be configured as Analogue 0-10v or Digital Volt free

Thermistor Inputs (S1 to S4)

Dependant on the controller type there can be up to 4 temperature sensor inputs configured for NTC Thermistor 10K3AI which can be used for temperature control/monitoring (with averaging), low / high limit control functions. See individual controller types for the settings and control options of S1 – S4.

Power Supply terminals

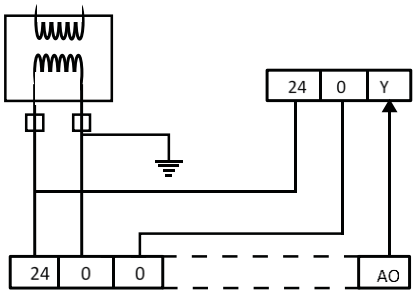
The BACnet controller is powered by 24Vac 50/60Hz. The operational power supply is based on a common 0V ground. The installer must ensure that all associated devices such as Master/Slave controllers and active measurement sensors/devices are using the same polarity with reference to 0V ground.



2 amp max Fuse on the
secondary input supply
To controller

Analogue Output terminals

Outputs AO1, AO2, AO3, AO4 (number of AO dependant on controller type).

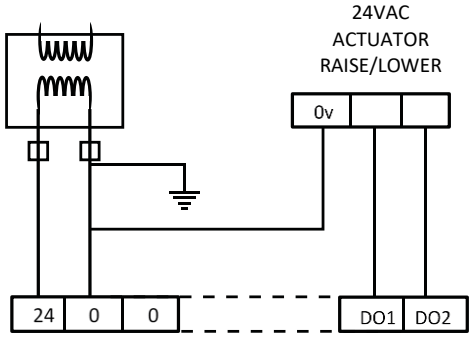


Use analogue 0V
With EC fan control
Or any 0-10V 3 wire actuator
AO load 5mA max

Triac Output terminals

Outputs DO1, DO2, DO3, DO4 (number of DO dependant on controller type).

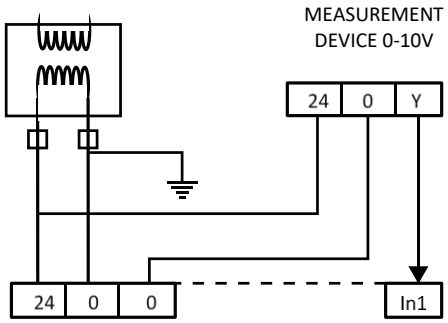
Max output rating 350mA.



Use supply 0V with any 3
wire 24V AC actuator
DO load 350mA max

Universal Input terminals (0-10V or Digital)

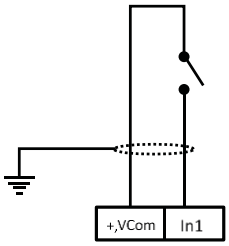
Inputs In1 to In8 (number of inputs are dependant on controller type), if used for an analogue 0-10v input.



Use analogue 0V
With 0-10V 3 wire
Measurement device.
All 0-10V input devices must
use the same common
ground 24V supply

Digital Input - Volt Free Contacts

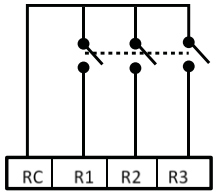
Inputs In1 to In8 (number of inputs are dependent on controller type), if used for a digital input (dry contacts)



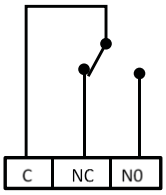
Use +V Com with DI signal
back to any input

Relay Output terminals – (Voltfree upto 240vAC 5 Amps inductive)

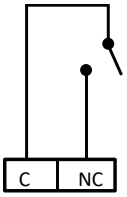
R1, R2 &R3
are interlocked for
3 stage fan control (FCU-4 and FCU-503/R only)



Changeover
Voltfree

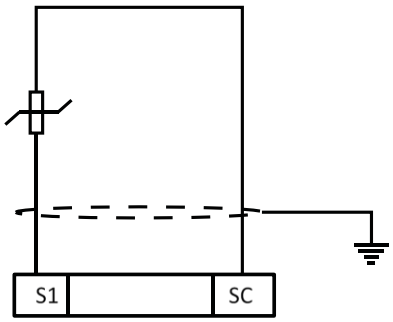


Normally open
Voltfree



Thermistor Input terminals

Inputs S1 to S4 (no of sensor inputs dependant on controller type)



Use SC- Com
For all 10k3A1 sensor
inputs

NOTE: See Wiring Specification for all recommended cable types

RJ11 Communications Socket (CCM / FCU-4 / FCU-501)

This is a dedicated RJ11 socket connection for use with the Titan Remote Display Unit (RDU-4) or the Titan field programming tool FPT601.

The RJ11 lead for the Room Display Unit (RDU-4) is supplied to required length by TITAN Products.

Part Number: RJ11/6x6/10m (Standard length is 10 metres state cable length if different. Max length is 30m)

RJ45 Communications Socket (FCU-503 / FCU-503/R)

This is a dedicated RJ45 socket connection for use with the Titan Remote Display Unit (RDU-Touch).

The RJ45 lead for the Room Display Unit (RDU-Touch) is supplied to required length by TITAN Products.

Part Number: RJ45/10m (Standard length is 10 metres state cable length if different. Max length is 100m)

BACnet RS-485 Serial Port

The Titan BACnet controllers are Applications Specific Controllers (ASC) for use with HVAC applications. The BACnet controllers incorporate open systems communications to integrate to a BMS using Native BACnet MS/TP protocol.

Network Configuration

MS/TP allows for only a daisy-chained network configuration, consisting of a single cable (3 core screened) routed between controllers. Star and Ring network topologies are not supported.

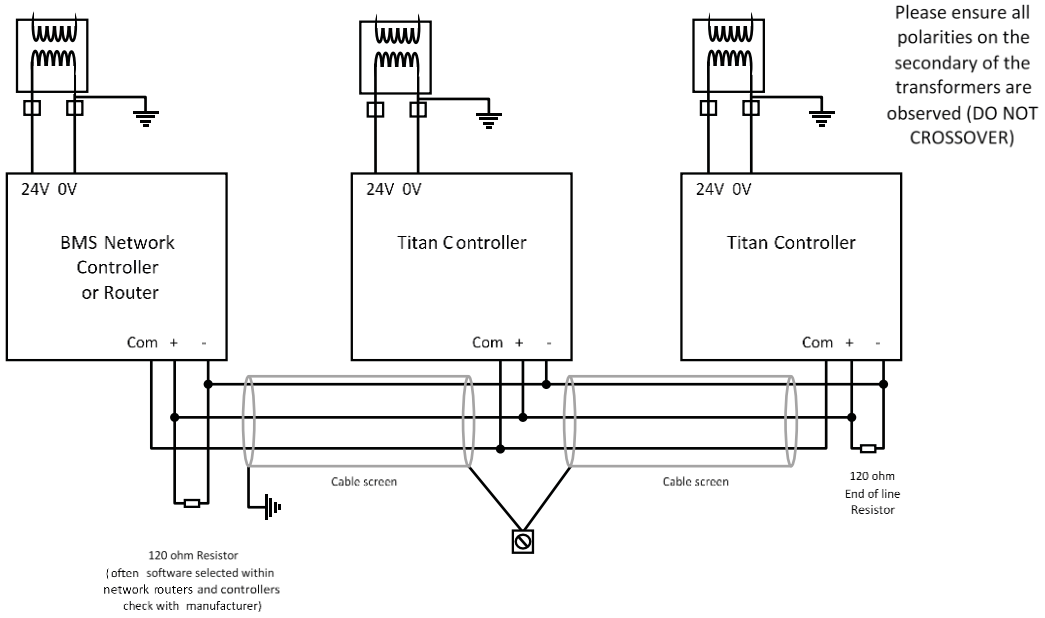
The MS/TP communications is also used for Master/Slave inter-controller operation.

Whilst the MS/TP network allows for up to 127 device address's consideration must be given to the amount of network communications traffic and router capacities/capabilities it is therefore recommended that the maximum number of nodes/controllers per MSTP segment should be restricted to 32

A termination resistance of 120 ohms should be connected at each of the two ends of the RS485 segment medium. Most Modern Routers have the 120 ohm resistor internal which can be option selectable. Check the Router specification data sheet.

Check separate BACnet Manual documentation for Network and BMS Settings

BACnet Network Diagram



Wiring Specification for all Titan Products BACnet Controllers

Item	Cable Spec & Reference	Requirements
BACnet Communications to BMS Router and between Master - Slave Controllers	Belden 3106A or 9841 (0.2mm2) Twisted Pair with Drain wire and foil wrap or equivalent **Must Be suitable for RS485 Standard**	Daisy Chain Network Configuration Only The cable shield must be connected to Earth ground at the network router end only. **A termination resistor of 120 ohms should be connected at each of the end devices.**
Plug In lead between CCM, FCU4 & FCU501 to RDU4	Flat 6 way FCC Cable with Crimped RJ11 6P6C Plugs **Note: TITAN can supply premade leads to length**	Plugs crimped straight through. Max Cable length 30m
Plug In lead between FCU503 & RDU-Touch	RJ45 Cable: Straight through type **Note: TITAN can supply premade leads to length**	Plugs crimped straight through. Max Cable length 100m
Resistive 2 Wire Temperature Sensors	2 Core twin twisted screened:- 0.75mm -1mm Belden 8760 (0.82mm2) or Equivalent	Screen Earthed at Controller end only
24VAC ON/OFF Actuators and HIU / CIU / Fan Enable connections (24V & VF connections)	2 Core twin twisted screened:- 0.75mm -1mm Belden 8760 (0.82mm2) or Equivalent	Screen Earthed at Controller end only
0-10V EC Fan	2 Core twin twisted screened:- 0.75mm -1mm Belden 8760 (0.82mm2) or Equivalent	Screen Earthed at Controller end only
0-10V Valve and Damper Actuators	4 Core Screened:- 2 x Twisted Pair:- 0.75mm - 1mm Belden (0.82mm2) or Equivalent **Note: This depends on the type and number of actuators being used. Check requirements with Actuator manufacturer before installation**	Screen Earthed at Controller end only
Digital inputs (if used) :- PIR's / Condense Sensor / Fan prove/ On-Off Switch	2 Core twin twisted screened:- 0.75mm -1mm Belden 8760 (0.82mm2) or Equivalent	Screen Earthed at Controller end only

- All Low voltage cables must be segregated from any mains carrying conductors and they should not be run in the same containment system
- All low voltage cables must not run in close proximity to any mains AC inductive loads such as florescent fittings and electric motors
- All cable connections into Titan Products controllers should use ferrules to prevent short circuits.