

FCU-503 FAN COIL CONTROLLER WITH RDU-TOUCH INTERFACE



BACnet Enabled

Description

The FCU-503 is designed to provide complete control of fan coil units and / or underfloor heating circuits. The FCU-5 incorporates all the inputs and outputs to ensure that this advanced applications specific controller meets all the demands for energy efficient and flexible temperature control. The controller can be used stand-alone, in a Master/Slave group or part of a BMS system via the standard inbuilt Native BACnet MS/TP communications. The FCU-503 is fully compatible with the Titan Products RDU-Touch touch screen user interface. If underfloor heating is required, the FCU-5 can control the under floor heating valve actuator through one of the 0-10V or 24V AC triac outputs.

Features

- 24V AC / DC supply
- High Quality Touch Screen Display option
- Native BACnet communications
- Fully compatible with Titan Remote Access App
- Master/Slave grouping (shared information)
- 3 x 0-10V outputs dependant on configuration
- 4 x 24V AC Triac outputs dependant on configuration
- TPC/PWM or ON/off control on 24V AC Triac Outputs
- 4 x Digital Inputs or use as 0-10V Analogue inputs
- 2 x VF Normally Open Relays
- 1 x VF Changeover Relay
- On/Off, ECO, Fabric and High / Low Limit protection
- 3 x 10K3 temperature sensor inputs
- Extensive Applications Selection
- System valve flush regimes
- Din Rail Mounting

Specification

Supply	24V AC/DC
Power Consumption	400mA max (with RDU) excludes outputs
Triac Outputs	350mA max
0-10V Outputs	5mA max
Temperature Sensors	10K3A1
Analogue Inputs	0-10V (input impedance 10k)
Digital Inputs	Voltfree
Relay Outputs	240V 5 amp max
Communications	Native BACnet MS/TP
Network	MS/TP - RS485
Indication	Tx/Rx comms
Enclosure	DIN mounting (IP20) L94-VO
Size	106mm wide 92mm high 62mm deep

Touch Screen Display Setting Option

The FCU-503 is fully compatible with Titan Products RDU-Touch user interface. The RDU-Touch allows user selection of temperature, control modes, fan speed, ON/OFF overrides and other bespoke functions. The flexibility of the RDU-Touch screen allows Titan Products to tailor the screen design to suit application or brand requirements.

The RDU-Touch also allows (through engineers pass-code) access to amend the controller default settings and networking addressing of the FCU-503 controllers. In addition all the settings can be viewed and modified over the BACnet communications interface.

The FCU-503 is also fully compatible with the Remote Access App download available from the Apple App Store or Google Play Store. See remote access section for more details.



The RDU-Touch is available in a number of different finishes, which includes brushed stainless steel, polished chrome and polished brass as standard. We offer many other finishes to suit the aesthetics of your project for example the popular white metal RAL 9016.

Control Mode

The FCU-503 offers 4 control modes as standard which can be selected via the RDU-Touch or via the in-built BACnet communications:

Auto:	The controller will automatically open / close the relevant heating / cooling valves and modulate the fan speed against the respective heat, cool and fan proportional bands.
Heat:	The controller will inhibit the cooling control loops and automatically open / close the heating valve against the heat proportional band. The fan can be manually adjusted between Auto / Low / Medium / High and will continue to run at this speed until altered. If under floor heating is being used, the fan control will be inhibited during the heat control mode.
Cool:	The controller will inhibit the heating control loops and automatically open / close the cooling valve against the cool proportional band. The fan can be manually adjusted between Auto / Low / Medium / High and will continue to run at this speed until altered.
Off:	The controller outputs are inhibited and the controller will operate to any fabric protection settings. See unoccupied condition settings.

Application Modes

The FCU-503 can be set up to provide:

- Combined FCU heating / cooling control
- FCU Cooling / Under Floor Heating control
- FCU Cooling / Under Floor Heating / FCU Heating Boost control

Please see Application selection in control settings for more details.

Second Control Zone

The FCU-503 can be provided with a completely independent second heating output. This output will control from its own set point, dead band and proportional band parameters set within the FCU-503. The second zone of control is designed for adjacent spaces from the main control zone such as bathrooms, hallways and corridors where underfloor heating or radiator control is required. The second zone control set point is fully adjustable via the RDU-Touch.

Controller Settings

The settings listed describe a range of the standard settings, options and operational features that are available from the applications library. All settings can be accessed and modified through the RDU-Touch or over the BACnet communications interface.

Network & Application Settings

Network	Native MS/TP BACnet (1/4 load) or Stand-alone.
Unit address	This setting is for the controller's unique unit MAC address on MS/TP bus and will be in the Unit Specific menu. Range 1 to 127 for a master.
Device Object ID	This setting is for the controller's unique device object ID which is for the whole of the site installation and will be in the Unit Specific Menu. Range 0 to 4194302
Baud Rate	Set communication baud rate Range Options: 9600, 19200, 38400 or 76800

Group Control	<p>Allows individual controllers to be set-up as a Group Master or Group Slave. This sets groups of controllers to take control information and instructions such as temperature, fan speed, ON/Off etc. from a common Master (126 Slaves max). Any number of Groups can be set within the limit of 127 controllers on the MS/TP network.</p> <p>The objects to be available for Group Transfer will be defined by the type of controller.</p>
Temp Units	<p>Set °C or °F. All temperature units that are used in the controller setup menus and displayed in the user display menus will be in the format selected. Range = °C / °F Default = °C</p>
Temp/Setpoint Display	<p>When the Controller is used with a remote display setting unit (RDU-Touch), this setting allows the actual measured temperature to be displayed or hidden. Range = Yes / No Default = Yes (actual temperature is shown)</p>
Application Selection	<p>Allows selection of the following application requirements: Fan Coil Heat/Cool: Mode selections of Auto / Heat / Cool / OFF. The user has the option to select Auto / Low / Medium / High fan speeds in both heating and cooling only modes. The Fan control is controlled by the FCU-503 when Auto is selected and the fan buttons are inhibited.</p> <p>Fan Coil Cool / UF Heat: Mode selections of Auto/ Heat / Cool / OFF. In this application the fan does not operate during the Heat control mode or when heating is called for during the Auto control mode. In the Cool Mode the fan defaults to Auto and the user can select fan speeds of Auto / Low / Med / High via the RDU-Touch. If Low / Med / High is selected the fan will continue to run at this speed until the control mode is altered.</p> <p>Fan Coil Cool/UF Heat/Fan Coil Heat Boost: Mode selections of Auto/ Heat / Cool / OFF. This application runs exactly like Fan Coil Cool / UF heat as above however introduces a Fan Coil Heating boost output. See Heat Boost section.</p>
Default Control Mode	<p>This defines the control mode that the controller enters on power up. Range = Auto / Heat / Cool / OFF Default = Auto</p>
Temperature Offset Value	<p>Allows a positive or negative temperature offset to be applied to the measured control temperature. Range = -10 to +10°C in 0.1°C steps Default = 0°C</p>
Dead Band Setting	<p>Provides a dead band between the heating and cooling Control points. Range = 0 to 10°C in 0.1°C steps Default = 1°C</p>
Proportional Band Heat	<p>Sets the proportional band for the heating cycle. Range = 0.5 to 10°C in 0.1°C steps Default = 2°C</p>
Proportional Band Heat Boost	<p>Sets the proportional band for the heating boost cycle. Range = 0.5 to 10°C in 0.1°C steps Default = 2°C</p>
Proportional Band Cool	<p>Sets the proportional band for the cooling cycle. Range = 0.5 to 10°C in 0.1°C steps Default = 2°C</p>
Integral Time	<p>This setting defines the Integral action time for the P+I control function. Range = 0 to 20 minutes in 0.5 minute increments Default = 2°C</p>

Max Setpoint	This setting defines the maximum setpoint value the system user can enter. Range = 0 to 50°C in 0.5°C steps Default = 30°C
Min Setpoint	This setting defines the minimum setpoint value the system user can enter. Range = 0 to 50°C in 0.5°C steps Default = 15°C
Default Setpoint	This defines the value of the control setpoint on power up or switch on. Range = 0 to 50°C in 0.5°C steps Default = 21°C
Low Limit Setpoint (Supply Air Temperature)	This limit setting option is to prevent cold draughts in the space when the unit is operating in a cooling mode. The control action is to reduce the cooling output in a proportional manner prior to the low limit setpoint value being reached. If this value is reached the cooling input will be reduced to zero. Two settings are provided for this function; a setpoint and a low limit proportional band. Setpoint range = 10 to 21 in 0.5°C steps Default 13°C Proportional band = 1 to 5 in 0.5°C steps Default 2°C
High Limit Setpoint	This limit setting option is to prevent excessive temperatures in the supply air or underfloor heating from overheating when the controller is operating in a heating mode. The control action is to reduce the heating output in a proportional manner prior to the high limit setpoint value being reached. If this value is reached the heating output will be reduced to zero. Two settings are provided for this function; a setpoint and a high limit proportional band. Setpoint range = 25 to 50 in 0.5°C steps Default 30°C Proportional band = 1 to 5 in 0.5°C steps Default 2°C Note: - Limit setpoints can be assigned to the temperature sensor S2, S3, the normal control sensor S1 or one of the 0-10V analogue inputs.
System Flush	The system flush is designed to prevent water stagnating in the heating / cooling coils. The FCU- 503 offers a system flush which can be programmed within the FCU-503 controller with an elapse run time or over BACnet communications from a BMS. If a heating or cooling valve has been exercised open through the normal control process within the set flush elapse period, then that valve will not be subjected to a system flush operation. If working on an internal elapse timer, if any valve has been exercised with normal control in this period that valve is not subjected to a flush process. If Elapse Time is selected the System Flush can be instructed to operate on the following valves: Range = Both / Heat / Cool Default = Both
Auto Flush (Period Timer)	The period between flushes from a power cycle. Not Used when BMS System Flush selected. Range = 0-240 hrs Default = 0 (No Auto Flush)
System Flush Time	The period each valve is opened for to enable flushing. Range = 30-600 seconds Default = 180 seconds
System Flush BMS	It is possible to initiate the system flush via a BMS by writing to the relevant BACnet point (see BACnet manual). If written to, the following procedure will commence: 1) Flush Timer is started 2) Fan control output is inhibited 3) Valves selected for Flush open to 100% 4) After the Flush Timer is complete the control returns to it programmed operation. Note: The fan does not run in any Flush period.

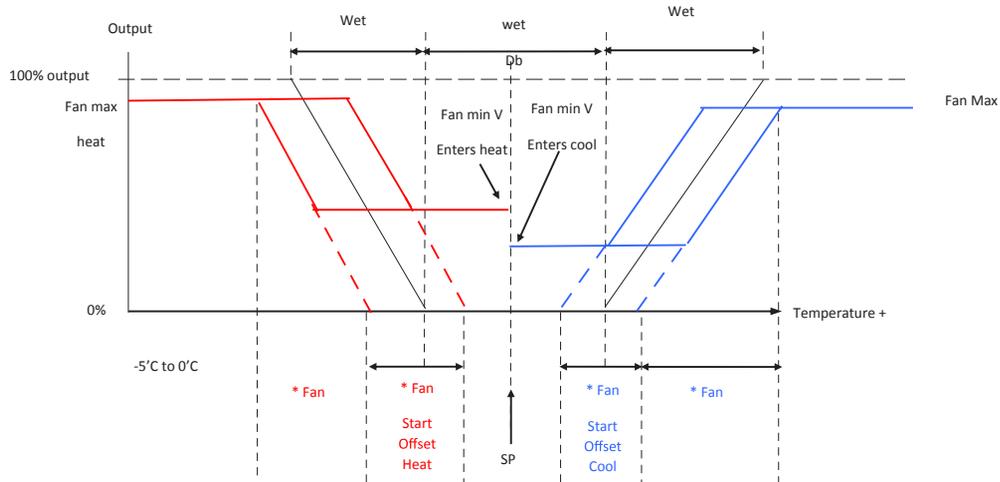
Fan Settings & Options

Fan Control Type	0-10V Fan Speed control is used for EC fans.
Fan Speeds	This sets the number of manual fan speeds required across the 0-10V fan output. The actual output value for each fan speed is subject to the Fan V min and Fan V Max settings: Range = 1-3 Default = 3
Auto Fan Speed	If set, the fan automatically increases/decreases the variable speeds on the 0-10V fan control output dependent on the temperature deviation from the controller set point during manual heat/cool modes only. If set to no, there will be no option for auto fan mode in manual heat/cool control modes. Range = Yes / No Default = Yes
Auto Fan Off in Db	Option to have the fan running through the dead band or stop when in the dead band. Note this only applies when the fan is running in an auto condition. Auto Fan Db = Yes / No Default = No (Fan off in Db)
Default Fan Speed Heat / Cool	This defines the default fan speed on entering manual Heat / Cool control modes. Range = Auto / Low / Medium / High Default = Auto
MAX Fan Output	The Maximum Voltage Output the controller will use to drive the EC Fan Motor in the heating and cooling cycles Range = 0-10V Default = 10V
MIN Fan Output (Heat)	The Minimum Voltage Output the controller will use to drive the EC Fan Motor in the heating cycle. Range = 0-10V Default = 0V
MIN Fan Output (Cool)	The Minimum Voltage Output the controller will use to drive the EC Fan Motor in the cooling cycle. Range = 0-10V Default = 0V
Fan Offset (Heat)	This is the fan PB start point before (+) or after (-) the start point of the heat vale opening Range = -5 to 5°C Default = 0°C
Fan Offset (Cool)	This is the fan PB start point before (+) or after (-) the start point of the cool vale opening Range = -5 to 5°C Default = 0°C
Fan PB (Heat)	This is the proportional band for the fan during the heat cycle. This is the number of °C away from the fan start point where the fan will be at its Max Output. Range = 0.1 to 10°C Default = 2°C
Fan PB (Cool)	This is the proportional band for the Fan during the cool cycle. This is the number of °C away from the fan start point where the fan will be at its Max Output. Range = 0.1 to 10° Default = 2°C

Fan PB and Offset Explained:

Example shows different Fan PB settings for the heat and cool cycle. By the altering the fan and wet (valve) PB settings with the fan start offset the fan auto modulation can be set to cross the wet modulation at a determined point.

The wet control DB is still used for the fan control hysteresis unless the fan offset is inside the wet DB. In this scenario the switch point will be the fan start point. If the fan start point equals the SP then a fixed 0.5°C value from the set point is used to prevent fan hunting if there are different min speed settings for the Auto fan in the heating and cooling cycles.



Fan Enable

This allows the use of one of the three on board relays to switch power to the fan when required. *Note: Relay rated at 5amp Max @ 240V*

Fan Start Up

This provides an option to start up the fan at full speed whenever it is switched from an OFF to an ON condition. If selected the fan will receive full power for 10 seconds on start-up and after the initial 10 seconds has expired the fan speed will reduce to the selected default value.

Range = 0 - 10 Default = 0 seconds

Fan Overrun

When enabled this feature sets a fan overrun time after any switch-off. If selected, and when the controller is in the Fan Overrun period the Fan will default to low speed for the duration of the overrun period.

Range = 0 - 15 minutes in 1 minute steps Default = 0 minutes

Fan ON Delay setting

This setting provides an option to delay the start of the fan when the controller is enabled or powered ON from an OFF condition. This is to prevent the possibility of cold draughts if thermal actuators are being used or to allow time for an HIU to warm up. The delay period allows the thermal actuator / HIU to warm up after a prolonged OFF period. The delay will only run in the heating cycle.

Operation of Fan Start Delay

The delay start time is dependent on the period of OFF time. If the OFF period is less than the set delay time (the valve run time) then no delay is given. If it is greater than the set delay time, the delay will run for 50% of the set time ensuring the heating valve is 50% open before the fan runs.

> If OFF for less than set delay time – No Delay

> If OFF for more set delay time – Delay Runs for 50% of the set time

Range = 0 to 180 seconds in 30 seconds steps Default = 0 minutes

Occupancy Timed Override

This option provides a timed override ON to the system. If any value other than 0 is set then the override can be started using the RDU-Touch, if programmed.

Range = 0 to 180 minutes in 30 minute steps Default = 0 minutes

Valve and Control Settings

0-10V Valve Control Outputs	<p>The 0-10V outputs can be configured to control the heating and/or cooling valves.</p> <p>Dual Output: 2 x 0-10V for individual control of heating and cooling. Single Output: heating and cooling are single 0-10V signals with 5V acting as the balance setpoint. The heating has a span of 5 - 10V and the cooling has a span of 5 - 0V.</p> <p>MIN/MAX V Settings: Both the Heat and Cool 0-10V outputs can be assigned individual MIN and MAX V settings. When applied, the Heat and Cool proportional bands will automatically re-scale to fit the V range between the V MIN and V MAX settings.</p>
24VAC Valve Control Outputs	<p>The 4 x triac 24V AC outputs can be configured to control the heating and/or cooling valves. The options include PWM, TPC or ON/OFF 24VAC control:</p> <p>PWM Pulse width modulation: Use two triac outputs to provide heating and cooling control. TPC Time proportional control: Use four triac outputs to provide positional control of both heating and cooling valves. On/Off control: Use one or two triac outputs to switch the heating and/or cooling load. Alternatively, the 24V AC triac outputs can be configured to provide up to 4 stages of heating (via load relays) or DX cooling.</p> <p>If not used for heating control then any Triac 24V AC switched output can be configured to switch auxiliary/associated plant such as Heat / Cool / Fan enable.</p>
PWM Control (24VAC)	<p>The PWM time operates on a mark/space ratio that is determined by the temperature deviation from the set point across the proportional band setting. PWM control is fully on when the temperature is outside the PB setting. The temperature input resolution is 0.1°C therefore the incremental adjustment due to temperature change is stated as 10 per 1°C. The PWM time in seconds will be determined by the Proportional Band (Pb) setting. For example: Pb set at 1.0°C gives a PWM time of 10 seconds Pb set at 1.5°C gives a PWM time of 15 seconds Pb set at 2.0°C gives a PWM time of 20 seconds</p> <p>Range = 10 to 360 seconds Default = 30 seconds If PWM control is selected, the controller provides an option to select an Intermittent Pre-Heat time for use with thermal actuators. The purpose of this is to keep inactive thermal actuators warm to achieve a close level of control.</p>
TPC Control (24V AC)	<p>Time Proportional Control (TPC) is for 24VAC Open and Close (Raise / Lower) actuators. The setting should match the full run time of the actuator from fully closed to fully open. When TPC is used, the controller has the option to automatically synchronise the position of the actuators on switch OFF and every 24 hours on a continuously running system.</p> <p>Range = 10 to 360 seconds Default = 150 seconds</p>
On/Off Control (24V AC)	<p>If ON/OFF control of the heating and or cooling circuits is used then the proportional band setting equals the On/Off differential and the controller uses the assigned triac outputs for heat and cool control. The value of the Dead band setting is also used in On/Off control and represents the temperature value between the OFF point (heat or cool) and the switch ON point (cool or heat).</p>
HIU Enable	<p>This allows the use of one of the 3 on board relays or any unallocated Triac to enable/disable the HIU when required. The HIU enable is triggered when the measured temperature falls into a heat cycle. Some applications require a delay on enable whilst the</p>

heating valve opens to relieve back pressure on the circulating pump. HIU enable is setup in the configuration and allocated to the specific output. The Delay Enable Settings:

Delay = 0 to 30 secs

Note: Relay rated at 5amp Max @ 240V / Triacs 24V AC 350mA max

CIU Enable

This allows the use of one of the 3 on board relays or any of the unallocated triac outputs to enable/disable the Cooling Interface Unit when required. The CIU enable is triggered when the measured temperature increases into a cool cycle. Some applications require a delay on enable whilst the cooling valve opens to relieve back pressure on the circulating pump. CIU enable is setup in the configuration and allocated to the specific output. The Delay Enable Settings are:

Delay = 0 to 30 secs

Note: Relay rated at 5amp Max @ 240V / Triacs 24V AC 350mA max

Condensate Pump Enable

This allows the use of one of the 3 on board relays or any of the unallocated triac outputs to activate a condensate pump if one of the FCU-5 digital inputs is allocated to condensate input and activated. Alternatively the output can be set to run on an intermittent time base whenever the FCU cooling valve is active.

Range = Yes / No

Note: Relay rated at 5amp Max @ 240V / Triacs 24V AC 350mA max

Unoccupied Settings & Options

These setting defines the action to be taken when the controller is switched OFF to an unoccupied mode via an allocated DI, the RDU-Touch or from the BMS.

Off Heat/Cool outputs off, Fan is switched off, or goes to overrun then off.

Low Temp Fabric Protection

This selection allows for a minimum low temperature fabric and frost protection operation. Should the measured temperature fall to the low temperature set point then the controller is enabled, any associated plant is enabled and the fan will run at the default low fan speed with the heating valve opening to its min %. Should the temperature continue to fall then the Fan & Valve will modulate to 100% across the Low Temp Protection proportional band. As the temperature increases the Fan Speed and Valve will modulated down to Min % value and remain there until the measured temperature rises 1.5°C above the Low Temperature SP.

Low Temp (start) = 0 to 20°C

Low Temp Pb (100% ON) = 0 to 10°C

Low Temp Heat Valve Min % = 0 to 100%

High Temp Fabric Protection

This selection allows for a high temperature fabric protection operation. Should the measured temperature increase to the high temperature set point then the controller is enabled, any associated plant is enabled and the fan will run at the default low fan speed with the cooling valve opening to its min %. Should the temperature continue to increase then the Fan & Valve will modulate to 100% across the High Temp Protection proportional band. As the temperature decreases the Fan Speed and Valve will modulated down to Min % value and remain there until the measured temperature decreases by 1.5°C below the High Limit Temperature SP.

High Temp (start) = 25 to 50°C

High Temp Pb (100% ON) = 0 to 10°C

High Temp Heat Valve Min % = 0 to 100%

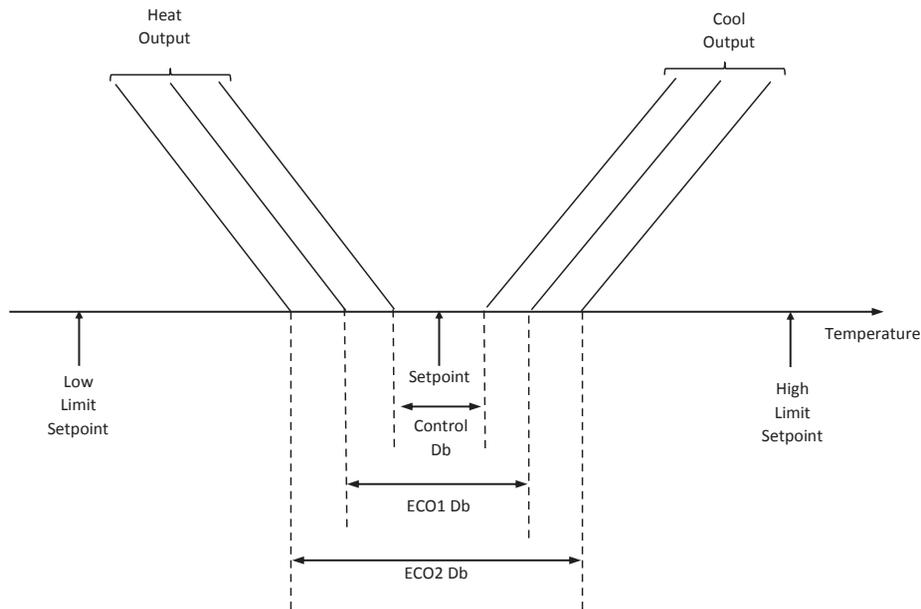
ECO 1 Dead Band

The ECO 1 economy setting replaces the controller default dead band thereby decreasing the heating set point and increasing the cooling set point by the value selected. Range 1 to 20°C.

ECO 2 Dead Band

This ECO setting acts in the same manner as ECO2 above but is specific to the hotel application to provide an "Occupied Standby" mode of operation. Range 1 to 20°C.

The ECO DB settings are illustrated in the below diagram.



FCU-503 Physical I/O

Analogue or Digital Inputs

Each of the 4 x inputs, In1 to In4, can be used as either analogue (0-10V) inputs or used as digital volt-free switched inputs.

Analogue Inputs

When used as 0-10V analogue inputs each input can be configured for any of the following functions:

Temperature Reset input: If the RDU-Touch is not used, a 0-10V input can be used to provide a control Set Point adjustment with a variable range selectable in 1°C stages from +/-2°C to +/- 10°C with 5V = to 0°C of reset.

Monitoring: Any spare inputs can be used for remote BMS monitoring of 0-10V or Digital Inputs status conditions

Digital Inputs

When used as Digital Inputs the volt-free switched contacts can operate on open or closed contacts. Examples of the configuration options are as follows:-

ON/OFF – This is used to switch the controller ON (occupied) or OFF (unoccupied) from a remote switch. If an RDU-Touch is used, "Off" will be displayed on the touch screen display.

Window Interlock – For applications with a window contact to switch OFF the FCU-5. If used in conjunction with the RDU-Touch, "WINDOW OPEN" will be displayed on the touch screen display.

Summer/Winter – Used when the system employs a common single valve for heating and cooling. When the allocated DI is activated, the heating control output is changed to a cooling control output. This action can be transmitted globally when used as in a Master/Slave configuration or by the BMS system using BACnet communications. If used on a single valve system the controller can be configured to provide an auxiliary heat control output from a spare analogue or triac output.

Fan Proving – Used with an Air Differential Pressure Switch to identify that the fan is running before the heating or cooling control outputs are activated.

Condensate Detection – Used to reset both heating and cooling or cooling only control actions to close if condensation is detected. The fan control can be programmed to either stop or continue to run during the detection of condensation.

Occupancy Extension – Uses a Momentary Push Button to start/stop the controller for a set time period outside the normally occupancy run time.

System Flush – The system flush can be configured to be activated when a digital input, via a momentary push button, is detected.

High Temperature Cut Out – The controller will inhibit the heating output if a HTCO digital input is activated. The fan will continue to run to purge any residual heat.

Fire Detection Input – The controller close all control outputs if a fire digital input is detected.

Status Monitoring – All inputs can be monitored via a BMS using BACnet communications.

Temperature sensor Inputs

3 x 10K3A1 Temp sensor inputs (S1, S2 & S3) can be allocated to

- Control Sensor with option of averaging between the 3 + RDU sensor
- Limit Sensor (supply air)
- External Sensor
- Resistive Remote Set Point Adjuster

The RDU-Touch can also be supplied with an in-built temperature control sensor if required.

Temperature SP Adjust

If the RDU-Touch is not used, a 0-10V input or a 1k-11K resistive input can be used to provide a control setpoint adjustment with a variable range selectable in 1°C stages from +/-2°C to +/- 10°C with 5V = to 0°C of reset

0-10V Analogue Outputs

The 3 x 0-10V outputs can be configured to provide the following control options:

- Heating Valve Control
- Cooling Valve Control
- Heating and Cooling (single output control from one 0-10V output)
- Cooling or Heating changeover (Summer/Winter control from 1 x 0-10V output)
- Fan Control (0-10V control 1 to 3 stages with min and max output settings)
- 0-10V On/Off condition

Note: 0-10V outputs rated at 5mA.

Triac 24V AC Outputs

The 4 x 24VAC digital outputs can be configured to provide the following control options:

- Heating Valve Control (PWM, TPC or On/Off)
- Cooling Valve Control (PWM, TPC or On/Off)
- Cooling or Heating (Summer/Winter control)

- HIU / CIU enable
- Fan enable
- System Fault indication (E.g. High Temp Cut Out, Fan Proving)

Note: 24VAC outputs rated at 350mA. Loading relay may be required.

On-board

Relays 2 x NO Contacts and 1 x Changeover contact independent volt-free relays can be configured to operate under the following options:

Auxiliary Plant – Used to start up common circuits such as enabling under floor heating wiring centres, heating and cooling interface units on demand. This option includes a fixed switching hysteresis to prevent short cycling and an optional delay ON time with a range of 0-60 seconds to ensure the HIU / CIU secondary circulation pump is not pumping against a closed valve.

Fan Enable – The operation of the relays can be used to switch power to the fan when required.

Note: on-board relays rated at 5amp MAX @ 240V.

Remote Access

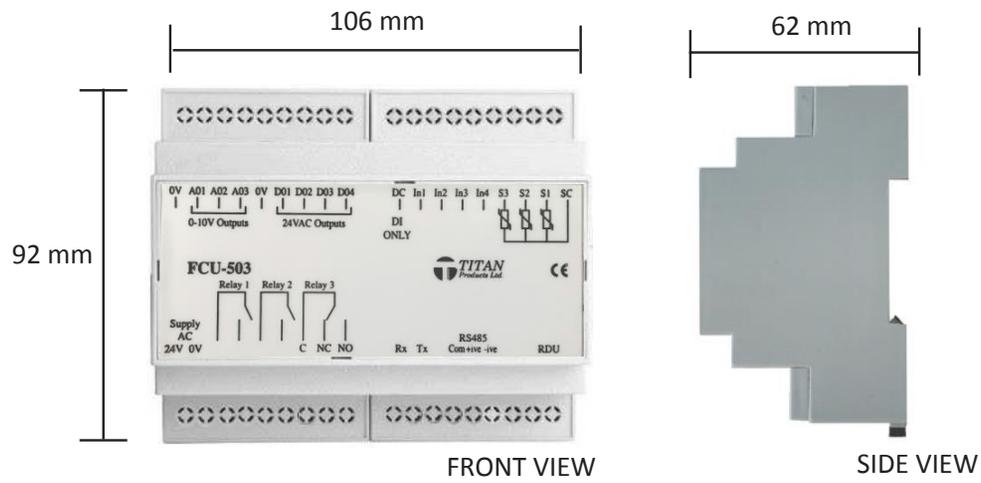
The FCU-503 is fully compatible with the TP-NM-R/2000 which, when added to a BACnet network, allows the user to interact with the FCU-503 to alter any user settings such as Temperature Setpoint, Control Mode and Fan Speed settings via a remote access download app.

The Remote Access app also allows the user to set up a flexible time schedule for each controller on the network.

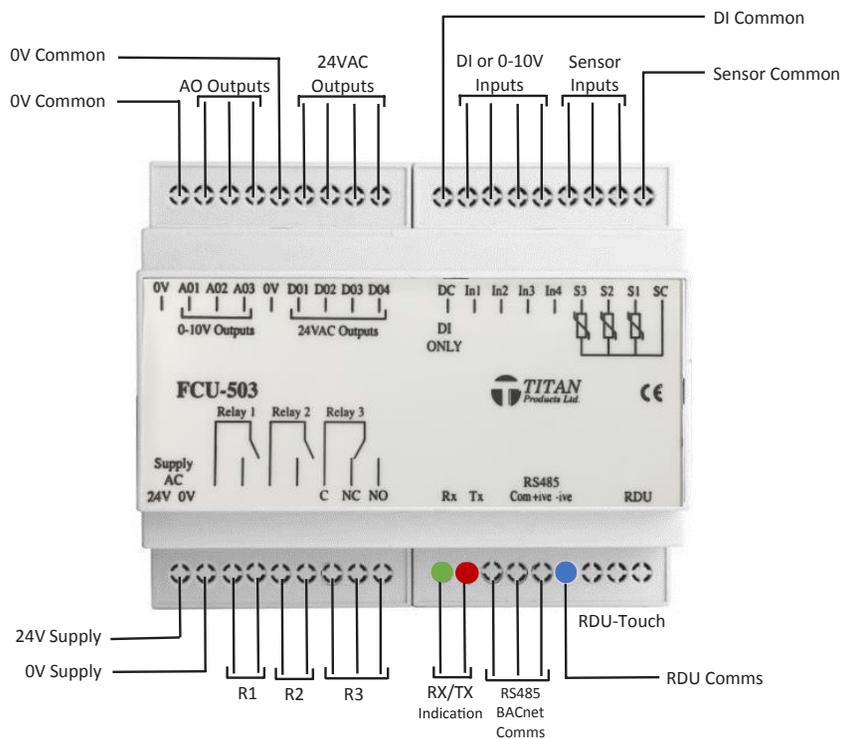
The App is downloaded via the Apple App store for IOS devices and the Google Play Store for Android devices. For more information contact Titan Products Ltd.



DIN Rail enclosure dimensions



Connections



Cable Recommendations

Item	Cable Spec & Reference	Requirements
BACnet Communications to BMS Router and between Master - Slave Controllers	Belden 9841 (0.2mm ²) Twisted Pair with Drain wire and foil wrap or equivalent. Note: Drain wire can be used to as a common connection. Note: 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. Note: Ensure a 120 ohms resistor is fitted to end of line controller.
Plug In lead between FCU503 & RDU-Touch	RJ45 CAT5 cable (unbooted recommended) Note: Titan Products can supply premade leads to length	Max Cable length 100m Straight-Through cable type.
Resistive 2 Wire Temperature Sensors	2 Core twin twisted screened:- 0.75mm -1mm Belden 8760 (0.82mm ²) or Equivalent	Screen Earthed at Controller end only
0-10V Sensors	2 Core twin twisted screened:- 0.75mm -1mm Belden 8760 (0.82mm ²) or Equivalent	Screen Earthed at Controller end only
Valve and Damper Actuators	4 Core Screened:- 2 x Twisted Pair:- 0.75mm -1mm Belden (0.82mm ²) 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 :- PIR's / Condense Sensor / Fan prove/ On-Off Switch	2 Core twin twisted screened:- 0.75mm -1mm Belden 8760 (0.82mm ²) or Equivalent	Screen Earthed at Controller end only

- All low voltage cables must be segregated from any mains carrying inductors 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

BACnet Network Configuration

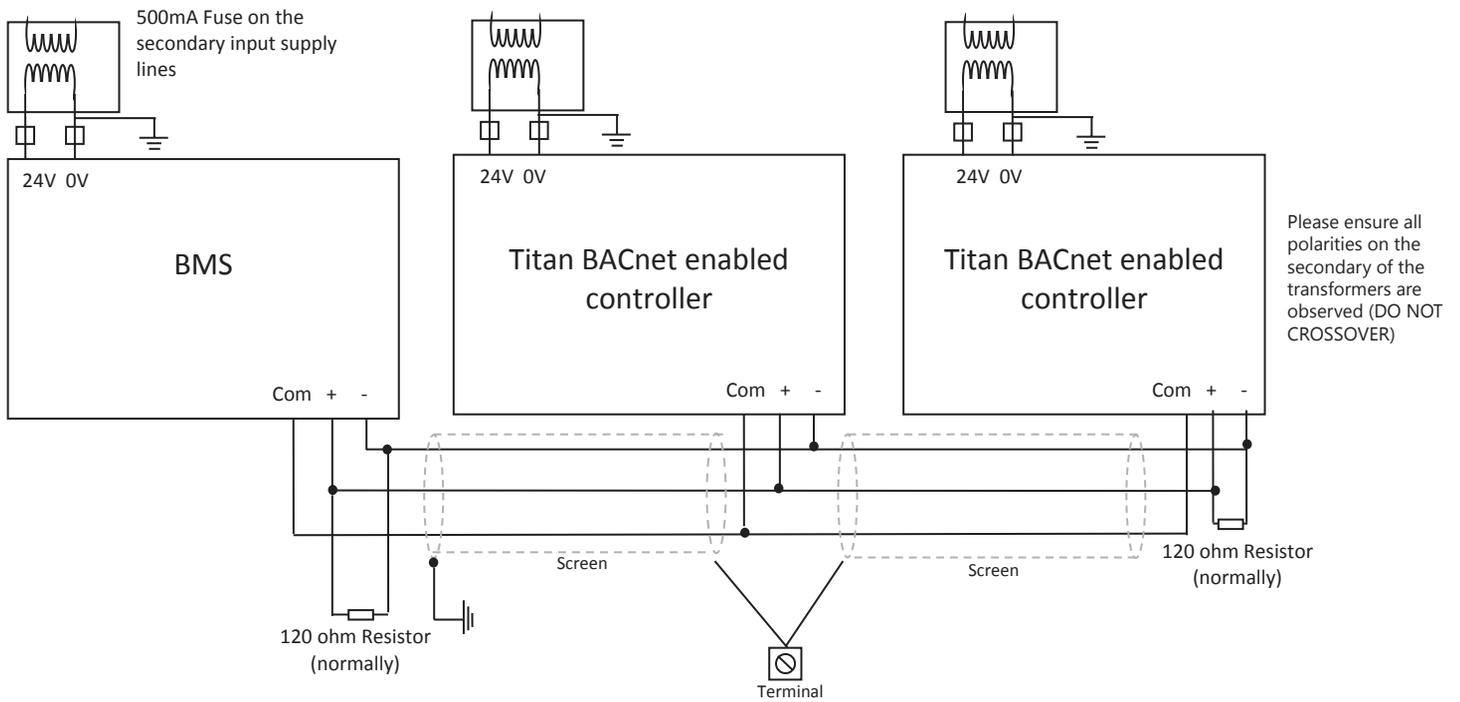
Based on the standards for RS485 networks a BACnet MS/TP network layer allows for only a daisy-chained network configuration, consisting of a single cable routed between controllers. Star and Ring network topologies are not supported.

The network electrically supports a maximum of 127 nodes, however BUS network size capability is determined by factors such as network traffic and BMS capabilities and we recommend maximum network size of 32 devices.

To comply with the EIA-485 standard, the maximum number of nodes per segment shall be 32 and any additional nodes will require the use of repeaters. If only Titan controllers are on the MS/TP network, the number of controllers may be increased but this will depend on the network traffic, the baud rate being used and the length/route of the cable.

A termination resistor of 120 ohms should be connected at each of the end devices, when a network is connected to a Router or BMS this becomes one of the end devices. Please check with the Router/BMS manufacturer if the 120 ohms end of line resistor is fitted internally.

BACnet Connections



The above diagram shows a typical 3-wire daisy chain configuration. For all BACnet standard wiring variants please consult ASHRAE wiring standards.

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