

Fan Coil Unit Controller

The TC-9102 Series Fan Coil Unit Controller is designed for digital control of fan coil units with heating and/or cooling coils, and a single-speed, three-speed or variable-speed fan. The comfort set point and occupancy mode may be adjusted from the TM-9100 Series Room Command Module, which can also provide manual override of fan speed in three-speed fan applications. The intelligent room command module also provides local weekly time scheduling control. The controller is designed for field installation or for use by original equipment manufacturers. The fan coil unit controller can operate in standalone mode with local room override control, or it can communicate on the Metasys® N2 Bus, allowing monitoring and facility-wide control applications on the network.



Figure 1: TC-9102 Controller

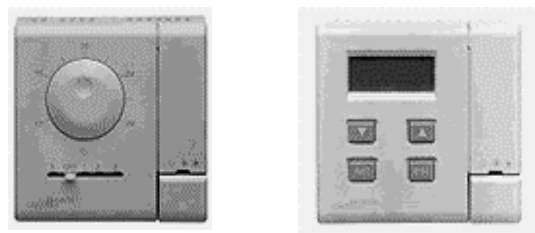


Figure 2: TM-9160 and TM-9180 Series Room Command Modules

Features and Benefits	
<ul style="list-style-type: none"> <input type="checkbox"/> Range of models designed for field and factory installations <input type="checkbox"/> Relay outputs for fan control <input type="checkbox"/> Choice of output types for heating and cooling control 	Low-cost installation for a wide range of fan coil unit applications
<ul style="list-style-type: none"> <input type="checkbox"/> Software configuration tool <input type="checkbox"/> Library of configurations for all models 	Ease of configuration and commissioning
<ul style="list-style-type: none"> <input type="checkbox"/> Multiple modes of operation for various occupancy conditions 	Comfort with economy
<ul style="list-style-type: none"> <input type="checkbox"/> Setpoint adjustment and mode override from room command module <input type="checkbox"/> Local display of room temperature and set point in intelligent room command module <input type="checkbox"/> Weekly time schedule option in intelligent room command module 	Local control by occupants
<ul style="list-style-type: none"> <input type="checkbox"/> N2 Bus communications for supervisory network <input type="checkbox"/> Dynamic Data Access™ networking software capabilities 	Facility-wide control efficiency and cost-effective information sharing
<ul style="list-style-type: none"> <input type="checkbox"/> Standalone operation <input type="checkbox"/> Nonvolatile memory (EEPROM) 	System reliability

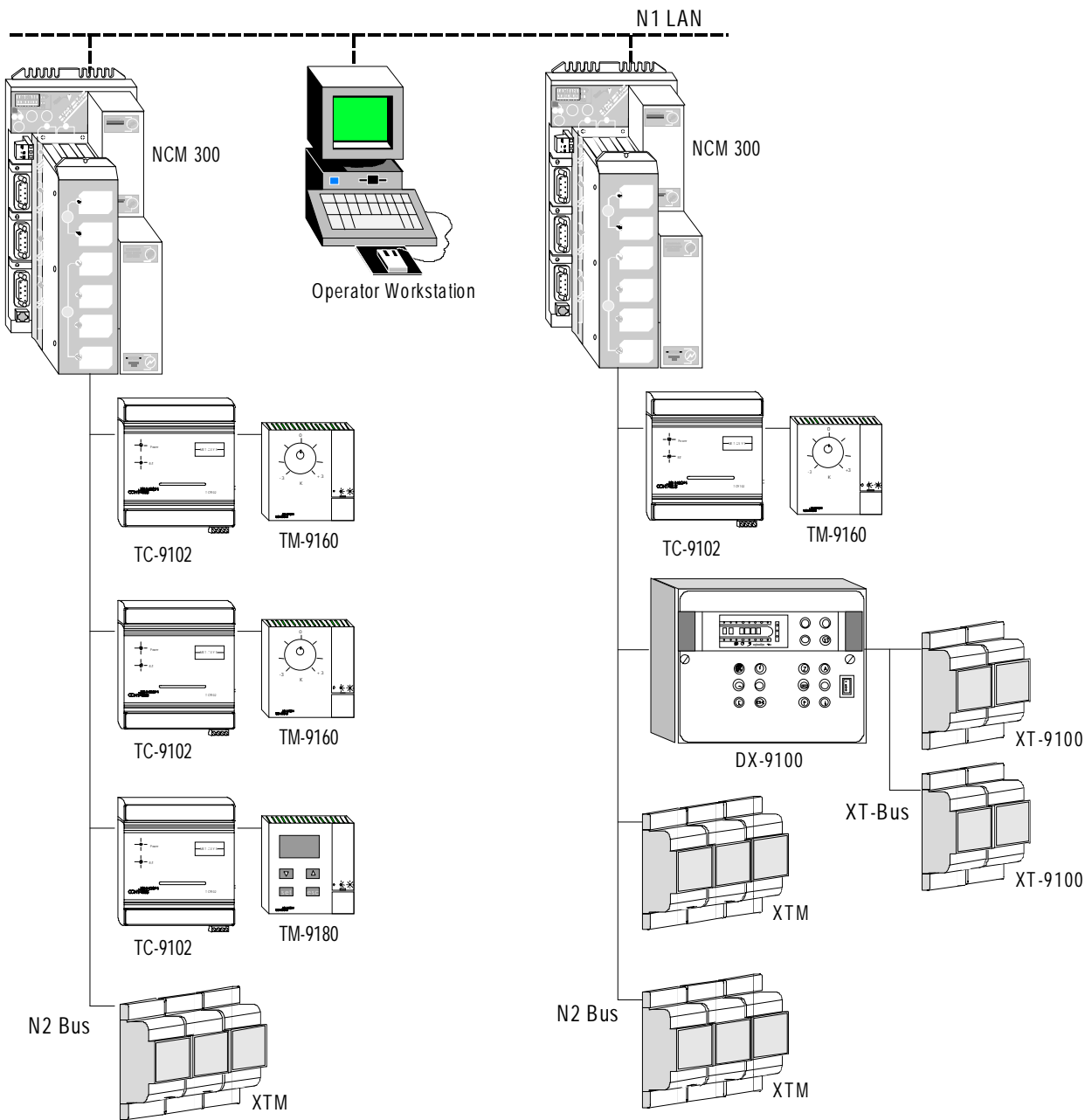


Figure 3: Fan Coil Unit Controller on the Metasys Network

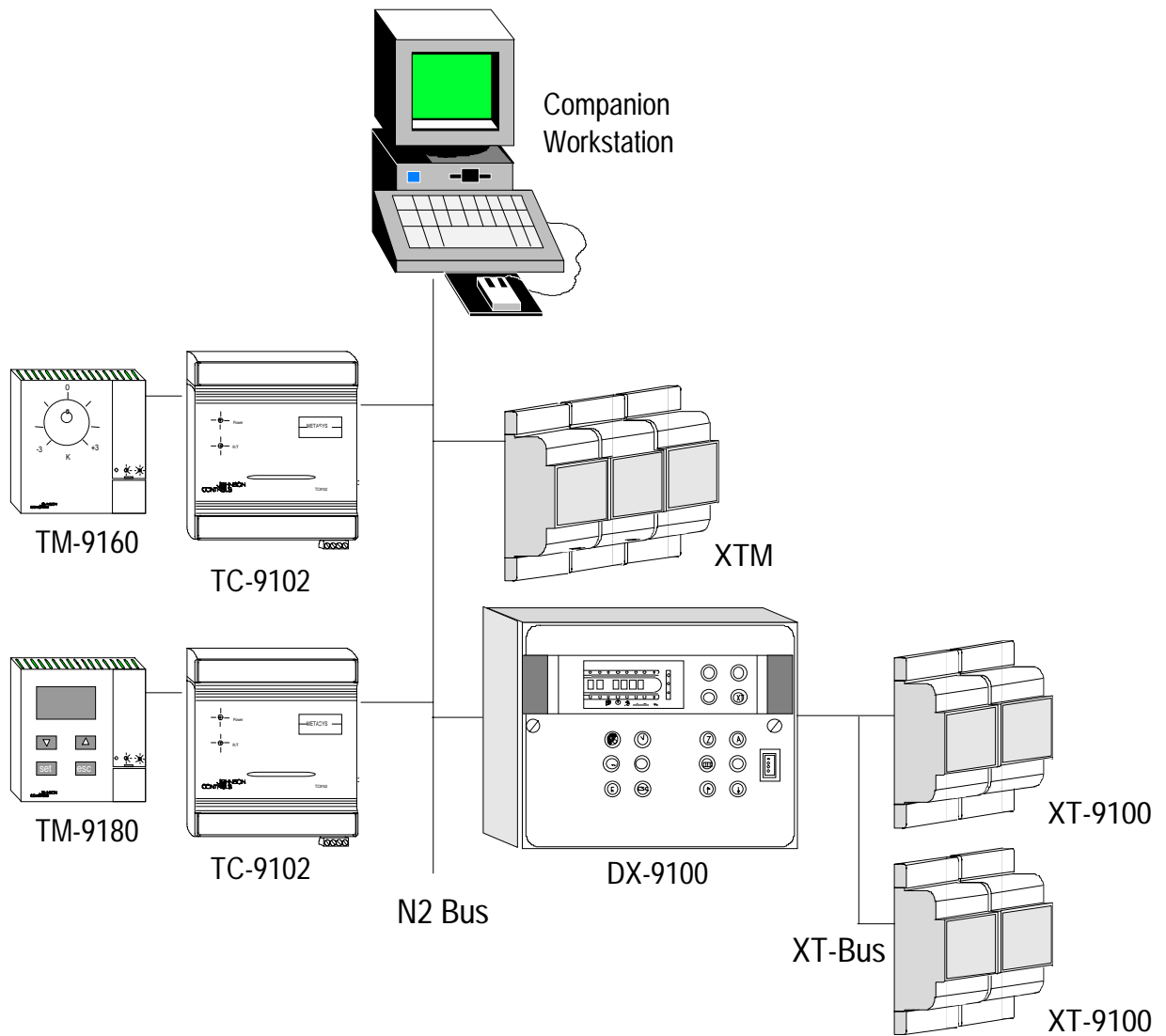


Figure 4: Metasys Companion with Fan Coil Unit Controller

Occupancy Comfort with Economy and Flexibility

The fan coil unit controller offers three modes of operation -- comfort, standby and night -- which can be set from an operator workstation on a Metasys network, or controlled by the local room occupants with override possibilities from the supervisory network.

In the simplest and most economical option, a room command module provides the occupant with set point control and a button to switch between comfort and standby modes. Set point adjustment can be restricted within a certain range to allow occupants control over their environment, but not to compromise energy savings. A second option uses an intelligent room command module which has a digital display and shows the current room temperature, set point, time of day and mode of operation. The occupant may adjust the set point and override the mode of operation and fan speed. The intelligent room command module may also be equipped with a time schedule which allows the occupant to enter a weekly schedule for comfort, standby and night modes and to manually set the controller to any

mode, overriding the time schedule. This option gives maximum flexibility to the occupant and allows maximum energy savings when there is no supervisory network installed.

Whatever local options are chosen, the controller operating mode can be taken over by the supervisory network and local control is automatically restored if the supervisory network becomes unavailable for any reason.

A "window open" sensor may be connected to the controller to switch it to off mode to avoid energy loss. The off mode may also be set by the supervisory network when the space is not in use.

Every controller has a low limit function as a standard feature which will operate when a low room temperature is detected, and override any automatic, time schedule, or manual mode of the controller.

Winter/Summer Compensation Feature

When the controller is connected to a network and is receiving the outdoor air temperature reading, the room set point may be automatically adjusted on cold winter days or hot

summer days to reduce energy consumption yet maintain occupancy comfort. In winter the set point temperature may be increased to offset the effect of cold surfaces in exterior zones.

Hardware Configuration to Match Applications

Various controller hardware models are available to match a wide range of fan coil unit control applications. Each model provides a specific combination of outputs to control heating, cooling and the fan.

All models accept inputs for the local control of occupancy mode, temperature set point, fan speed override and shutoff from a window contact. The temperature sensor may be mounted in the fan coil unit or in the room command module.

Table 1: Controller Output Options

Heating and Cooling Outputs	0 to 10 VDC analog (10 mA) Pair of triacs (24 VAC, 0.5 mA) for: <ul style="list-style-type: none"> • incremental control (Position Adjust Type) • duration adjust on time cycle • two-stage on/off
Fan Control Outputs	Single relay contact for on/off fan (230V 3A) Three relay contacts for three-speed fan (230V 3A) 0 to 10 VDC analog (10 mA) for fan speed controller

Table 2: Controller Inputs

Room Temperature	NTC sensor (in room command module or mounted in fan coil unit)
Set Point Adjust	12 to 28°C or +/-3 K from room command module
Occupancy Mode Override	Comfort/Standby
Three-Speed Fan Override	Auto/Off/1/2/3 (in comfort mode)
Window Sensor	Volt-free contact (closed = window closed)
Occupancy Sensor	Volt-free contact (closed = occupied)

Convenient Configuration Setup

The fan coil unit controller is delivered with the appropriate software and hardware configuration and with factory-set parameters such that no on-site programming is necessary to set the fan coil unit into operation.

A software tool is available, however, which runs on a laptop or notebook PC, to enable the installer to adjust operating parameters such as standby mode and night mode set points and control loop tuning parameters, if required, and to provide online data for the verification of the control sequence. A record of all parameter changes can be stored in memory or on diskette.

Once configured, commissioned, and connected to a network, the controller's operating parameters may be changed from a Metasys operator workstation.

The controller has additional capabilities to help manage your facility. For example, the user can assign high and low alarm limits to analog inputs, which will alert an operator at the Metasys operator workstation when a problem occurs, such as a room temperature exceeding comfort or safety limits.

Networking Capabilities

As powerful as the controller is by itself, your facility will benefit even more when fan coil unit controllers are part of a larger Metasys network. Each fan coil unit controller can be connected to the Metasys N2 Bus. Either a network control module (NCM) or workstation can be programmed to provide added energy management and supervisory control capabilities, such as optimal start, demand limiting, trend log, run-time totalization, and more.

The Metasys Dynamic Data Access networking software, available from the network control

module, makes all information from each controller available throughout the facility. This makes it possible, for example, to reset supply water temperatures based on the load demands of the fan coil unit controllers, and to adjust the room set points based on a common outdoor air temperature for the building or each zone of the building. Dynamic Data Access also makes sensor values, operating status, and any other parameters in the controller available to operators anywhere in your facility.

Precise, Flexible Control

As a member of the fully integrated system or as a standalone controller, the fan coil unit controller represents the best way to fully optimize the operation of your distributed HVAC

equipment. It combines ease of setup and operation, flexibility of application, and precise control for comfort and energy management.

Notes

Specifications

TC-9102 Fan Coil Unit Controller

Product	<i>TC-9102 Series Fan Coil Unit Controller</i> TC-9102 Series for remote set point TC-9112 Series with integral setpoint Available with fixed or separable terminals
Power Requirements	24 VAC, ±15%, at 50/60 Hz, 3 VA (not including actuating devices)
Ambient Operating Conditions	0° to 50°C / 32° to 120°F 10 to 90% RH Noncondensing
Ambient Storage Conditions	-20° to 70°C / 0° to 160°F 10 to 95% RH
Dimensions (H x W x D)	108 x 118 x 31 mm / 4.3 x 4.7 x 1.2 in.
Shipping Weight	0.3 kg / 11 oz

TM-9100 Series Room Command Modules

Product	<i>TM-9100 Series Room Command Modules</i> TM-9150 Series Without set point dial TM-9160 Series With set point dial and optional fan speed override TM-9170 Series As TM-9160, but without NTC Room Temperature Sensor TM-9180 Series Intelligent room command module with digital display and weekly time scheduling control TE-9100-8501 Unit Mount NTC Room Temperature Sensor
Supply Voltage	Power from TC-9102 Series Controller
Ambient Operating Conditions	0° to 40°C / 32° to 104°F 10 to 90% RH Noncondensing
Ambient Storage Conditions	-20° to 70°C / 0° to 160°F 10 to 95% RH
Dimensions (H x W x D)	80 x 80 x 33 mm / 3.2 x 3.2 x 1.3 in.
Shipping Weight	0.15 kg / 6 oz

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

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