METASYS®

TC-9102 Fan Coil Unit Controller

Order No. MN-9100-2117

Introduction

The TC-9102 series of microprocessor-based DDC controllers is designed for the control of Fan Coil Units (FCUs) with a heating and cooling coil or two-stage electric heating and cooling, and a single-speed, three-speed or variable-speed fan. The controller has a comfort temperature set point and occupied and unoccupied control modes which may be modified from a TM-9100 Series Room Command Module. Window contact override and anti-freeze protection are also included.

Full standalone operation is a standard feature. The controller is factory-configured to control default operating parameters. No external setup devices are necessary.

All TC-9102 models may be connected to a communications bus to provide operating data to a Supervisory System, and for the modification of operating parameters. A software package is available for a notebook PC to enable startup and commissioning.

Winter and summer compensation may be enabled when the controller receives outdoor air temperature data via the communications bus, and modes of operation may be set by time scheduling programs or control processes in the Supervisory System.

Figure 1: TC-9102 Controller

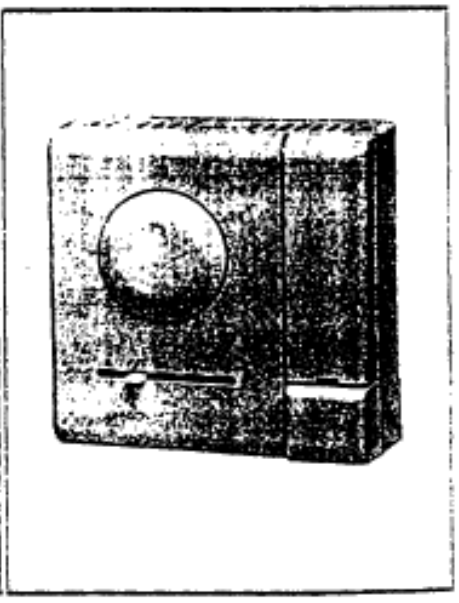


Figure 2: TM-9160 Room Command Module

Model Types

The TC-9102 Controller is available in several model types according to the type of outputs and the range of the integrated or remote set point input. Refer to "Ordering Codes" at the end of this bulletin for details.

For further information about room command modules, temperature sensors and commissioning software, refer to the corresponding technical data sheet.

Controller Functions

The controller can be connected to a Room Command Module, from which it receives the room temperature, the remote set point and other override signals. Alternatively, an NTC temperature sensor is available for mounting within the FCU and the controller is available with an integrated set point adjuster. The remote set point and fan override controls may be incorporated into a custom FCU control panel. Refer to the "Specifications and Technical Data" section of this bulletin for details of the components required.

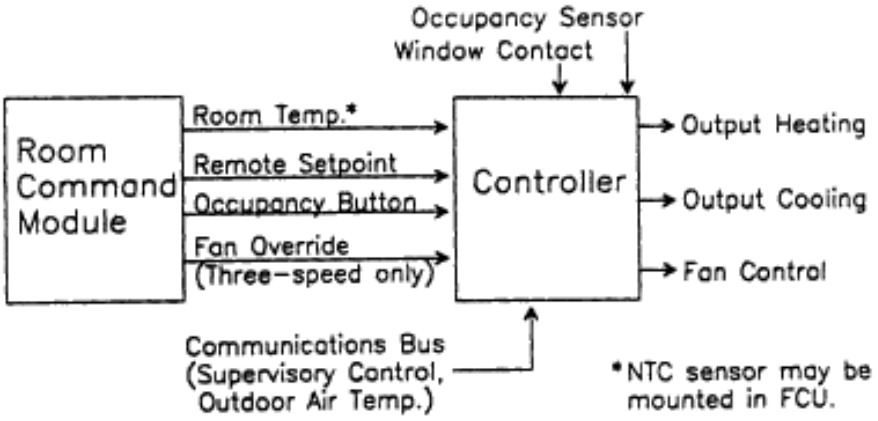


Figure 3: Controller with Room Command Module

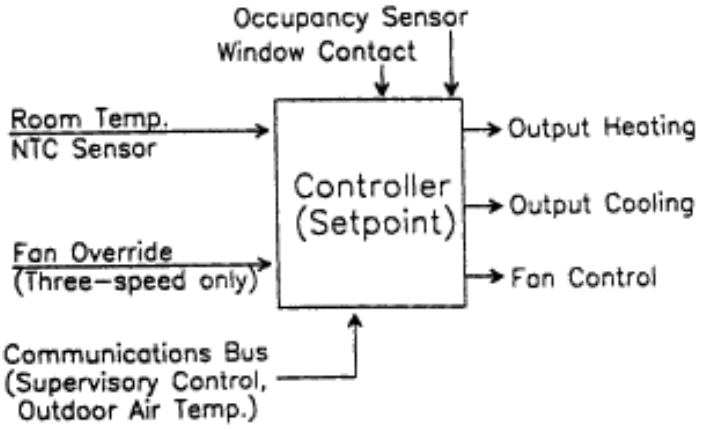


Figure 4: Controller with Integrated Setpoint Adjuster

Standalone Mode

The controller operates in standalone mode when it is ***not*** connected to a Supervisory System via the communications bus. In standalone mode the controller may operate in one of three control modes:

- COMFORT (occupied): control at comfort set point
- STANDBY (unoccupied): control at a standby level set point
- OFF (not in use): anti-freeze control only

The control modes are set by the window contact and occupancy sensor inputs, and may be modified by the occupancy button on the Room Command Module as shown in Table 1.

Table 1: Standalone Modes

WINDOW CONTACT	OCCUPANCY SENSOR	CONTROL MODE	ALTERNATE MODE (OCCUPANCY BUTTON)
OPEN	NO ACTION	OFF	NO ACTION
CLOSED	OCCUPIED	COMFORT	STANDBY
	UNOCCUPIED	STANDBY	COMFORT

Supervisory Mode

When connected to a Supervisory System via the communications bus, the controller may operate in COMFORT, STANDBY or OFF control modes, and additionally in NIGHT mode.

NIGHT (scheduled unoccupied): control at a night level set point.

The control modes are set by the Supervisory System and are modified by the occupancy sensor input and occupancy button on the Room Command Module as shown in Table 2. The window contact input always switches the controller to OFF control mode, and a MANUAL mode is available from the Supervisory System to inhibit the action of the occupancy sensor and occupancy button.

Table 2: Supervisory Modes

WINDOW CONTACT	SUPERVISORY MODE	OCCUPANCY SENSOR	CONTROL MODE	ALTERNATE MODE (OCCUPANCY BUTTON)
OPEN	ANY MODE	NO ACTION	OFF	NO ACTION
CLOSED	OFF	OCCUPIED	OFF	OFF
		UNOCCUPIED	OFF	OFF
	NIGHT	OCCUPIED	NIGHT	COMFORT (T)
		UNOCCUPIED	NIGHT	COMFORT (T)
	STANDBY	OCCUPIED	STANDBY	COMFORT
		UNOCCUPIED	STANDBY	COMFORT (T)
	COMFORT	OCCUPIED	COMFORT	STANDBY
		UNOCCUPIED	STANDBY	COMFORT
	OFF/MANUAL	NO ACTION	OFF	NO ACTION
	NIGHT/MANUAL		NIGHT	
	STANDBY/MANUAL		STANDBY	
	COMFORT/MANUAL		COMFORT	

Controller Set Points

The set point in all control modes may be modified from the integrated set point adjuster or from the remote set point dial on the Room Command Module, according to the controller model type. The controller models with a remote set point require that a Room Command Module or an external potentiometer is connected to give the set point. The set point is decreased or increased in the STANDBY control mode by the factory-set "Standby Bias Heating" and "Standby Bias Cooling" values to reduce the heating or cooling energy required when the room is unoccupied.

When a Supervisory System is connected, the set point can be further decreased or increased in the NIGHT control mode to further reduce energy requirements during scheduled unoccupied periods such as nights, weekends and holidays.

In the controller there are two "comfort" set points (Comfort Set Point Heating and Comfort Set Point Cooling), and the difference between these two values determines the zero energy band where neither heating nor cooling is required. The controller calculates two working set points (WSP Heating and WSP Cooling), which are the sum of the comfort set point values, the "Remote Set Point" value coming from the integrated set point adjuster or the Room Command Module, and the "Common Set Point" value. In the supervisory mode an adjustment may be made to the working set points either by changing the "Comfort Set Points," or by changing the value in the "Common Set Point" parameter of the controller which enables the Supervisory System operator to adjust the setpoints for heating and cooling at the same time without affecting the zero energy band. In summary:

Working Set Point (Heating) = Comfort Set Point (Heating) (Supervisory System)

+ Remote Set Point (integrated adjuster or Command Module dial)

+ Common Set Point (Supervisory System)

+ STANDBY or NIGHT Bias Heating (if mode is active)

Working Set Point (Cooling) = Comfort Set Point (Cooling) (Supervisory System)

+ Remote Set Point (integrated adjuster or Command Module dial)

+ Common Set Point (Supervisory System)

+ STANDBY or NIGHT Bias Cooling (if mode is active)

When the room temperature is below the working set point for heating, the heating output increases according to the proportional band and integral time parameters set for the heating control loop. When the room temperature is above the working set point for cooling, the cooling output increases according to the proportional band and integral time parameters set for the cooling control loop. Heating and cooling control is illustrated in figures 7 and 8.

Startup Mode

The Startup Mode may be set by the Supervisory System to force the controller to a 100% heating output mode with the fan at maximum speed. This mode remains in operation until the room temperature is within 1 K of the heating set point or until cancelled by the Supervisory System.

On request, the controller may be configured to force maximum cooling output in Startup Mode.

Fan Control

The on/off fan control output switches on when the room temperature is below the working set point for heating and above the working set point for cooling, and switches off when the room temperature has entered the zero energy band by the value set for the fan differential. For three-speed fan outputs, the fan stages are switched in sequence as the room temperature decreases or increases, and Speed 1 remains on in the zero energy band. For the 0 to 10 VDC output for a fan speed controller, the output increases as the room temperature falls below the working set point for heating or rises above the working set point for cooling, and maintains a minimum output (set by default at 50%) when the room temperature has entered the zero energy band. In OFF mode the fan is switched off and the heating and cooling outputs are set to the fully closed or off level. Fan control sequences are shown in figures 9, 10 and 11.

Speed Fan Override

The speed of a three-speed fan may be set manually from the Room Command Module or from an external set of switch contacts supplied within the Fan Coil Unit. In the auto "A" position the speed is set by the controller according to the room temperature. In the manual "Off-1-2-3" positions the fan runs at the selected speed except when the controller is in OFF or anti-freeze mode.

Anti-freeze Mode

The anti-freeze mode is active when the room temperature falls below the anti-freeze set point. The fan is switched on at full speed and the heating output is set to the maximum level until the room temperature rises by the anti-freeze differential value.

Winter/Summer Compensation

When the controller is connected to a Supervisory System, the winter and/or summer compensation modes may be enabled. The Supervisory System is programmed to set the outdoor air temperature via the communications bus on a periodic basis. After a power interruption the winter and summer compensation modes are temporarily disabled until a new outdoor air temperature value is received. When the outdoor temperature falls below the winter set point, the working set point of the controller will be raised or lowered in accordance with the winter authority slope. When the outdoor temperature rises above the summer set point the working set point of the controller will be raised in accordance with the summer authority slope. The effect of the winter and summer compensation on the controller set point is shown below.

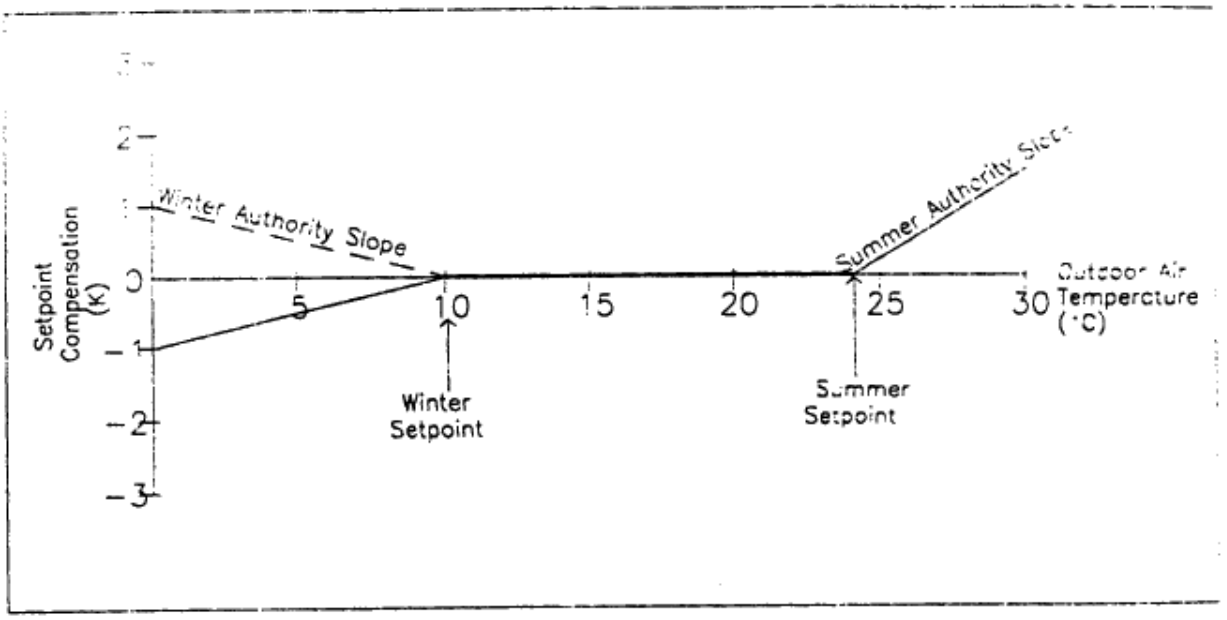


Figure 5: Winter/Summer Compensation

Output Types

The heating and cooling outputs are one of the following types, depending on the controller model code:

0 - 10 VDC

The output is an analog voltage between 0 and 10 VDC in direct proportion to the controller output from 0 to 100%.

PWM Control Signal

The output is a high frequency Pulse Width Modulated (PWM) control signal, where the width of the pulse is varied as a function of the controller output from 0 to 100%. The output is designed for use with the Power Driver Module for solenoid actuators from Johnson Controls (Ordering Code. VA-7400-8950).

D.A.T. - Duration Adjust Type

The D.A.T. output is a triac which is switched on for a duration within the set heating or cooling valve cycle time in direct proportion to the controller output from 0 to 100%. To avoid unnecessary switching of the valve actuator when the output is between 0 and 5% the triac remains off, and when the output is between 95 and 100% the triac remains on. The default cycle time is 300 seconds.

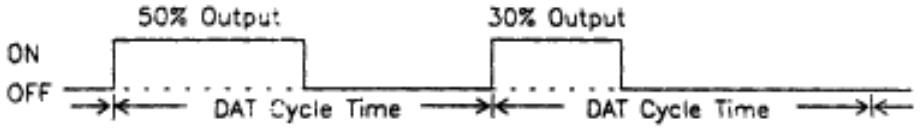


Figure 6: DAT Output

P.A.T. - Position Adjust Type

The P.A.T. output is a pair of triacs which are switched on to open and close an incrementally driven heating or cooling valve. The duration of switching is directly proportional to the change in the controller output and related to the full stroke time of the valve such that a 100% change will completely open or close the valve. At the 0% or 100% position the duration of switching is increased to ensure that the valve is completely at its end position and the appropriate triac is switched on for the full stroke time every two hours to ensure that the valve remains at its end position. To prevent unnecessary wear on the actuator, the triac output will only be switched when the output change exceeds 1% in the same direction as the previous change or 2% if the direction of change is reversed. The default full stroke time is 60 seconds.

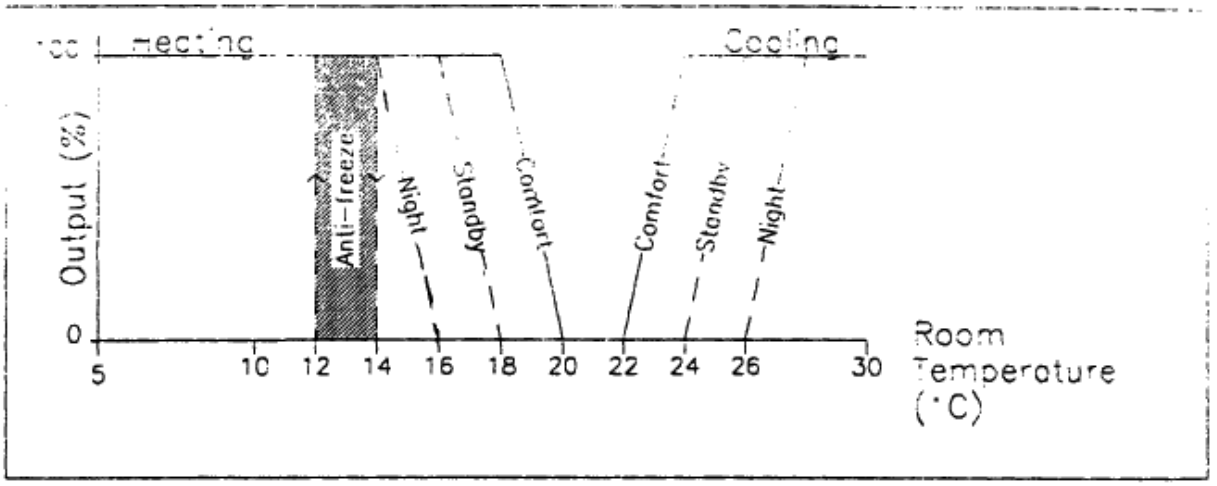


Figure 7: Heating/Cooling Control 0-10 VDC, PWM, DAT, PAT

Two-Stage On/Off

The output is a pair of triacs which are switched on in sequence as the controller output increases. The first stage triac is switched as soon as the output is above 0% and the second stage triac is switched when the output is equal to the set load rating for the first stage which is defaulted to 50%. The switching differential is fixed at 5%. The control diagram is shown below.

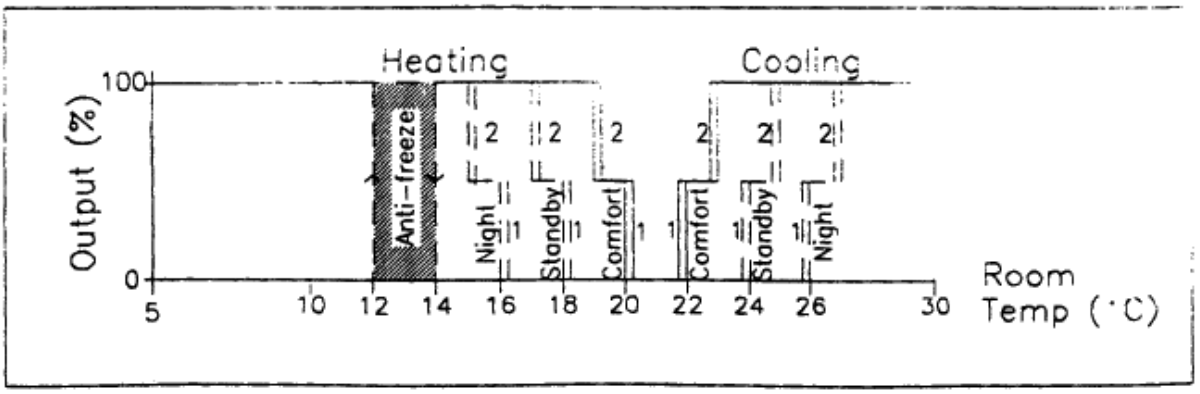


Figure 8: Heating/Cooling Control - Two-Stage On/Off

Fan Output Types

Fan On/Off

The output is a normally open relay contact which closes when the fan is required to run. Terminals are provided to connect the fan supply voltage to the controller in order to facilitate the wiring to the fan motor. The fan supply voltage is not used within the controller.

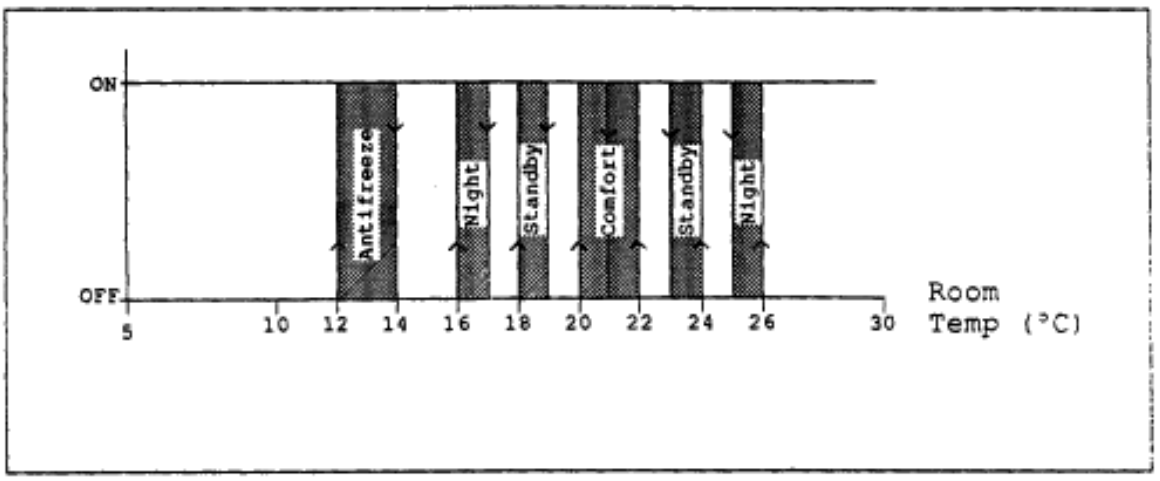


Figure 9: On/Off Fan Control - Switch Points

Three-Speed Fan Control

The output is a set of interlocked relay contacts, one contact for each speed which closes when that speed is selected to run. Terminals are provided to connect the fan supply voltage to the controller in order to facilitate the wiring to the fan motor. The fan supply voltage is not used within the controller.

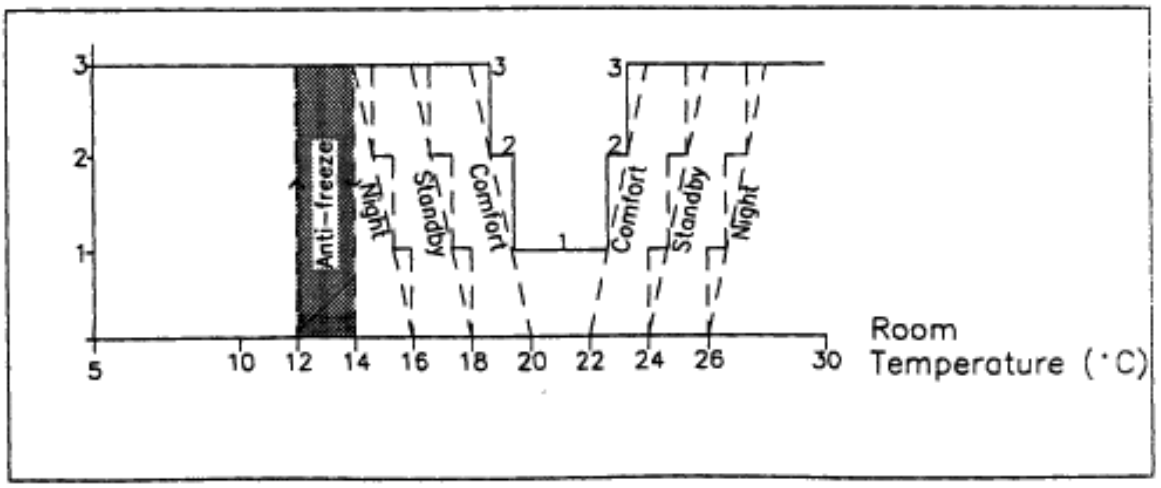


Figure 10: Three-Speed Fan Control - Switch Points

0 to 10 VDC Control Signal

The output is a control signal for driving a fan speed controller with an opto-isolated 0 to 10 VDC input. As the output voltage increases, the fan speed controller must increase the speed of the fan from the minimum speed of the fan motor to its maximum speed. When the output is below the voltage required from the minimum speed, the fan must be switched off.

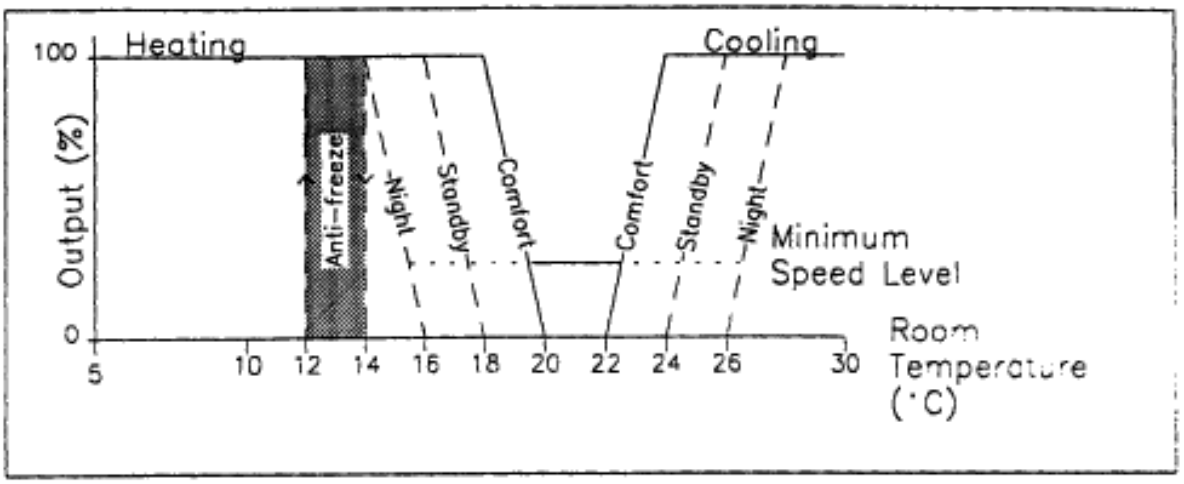


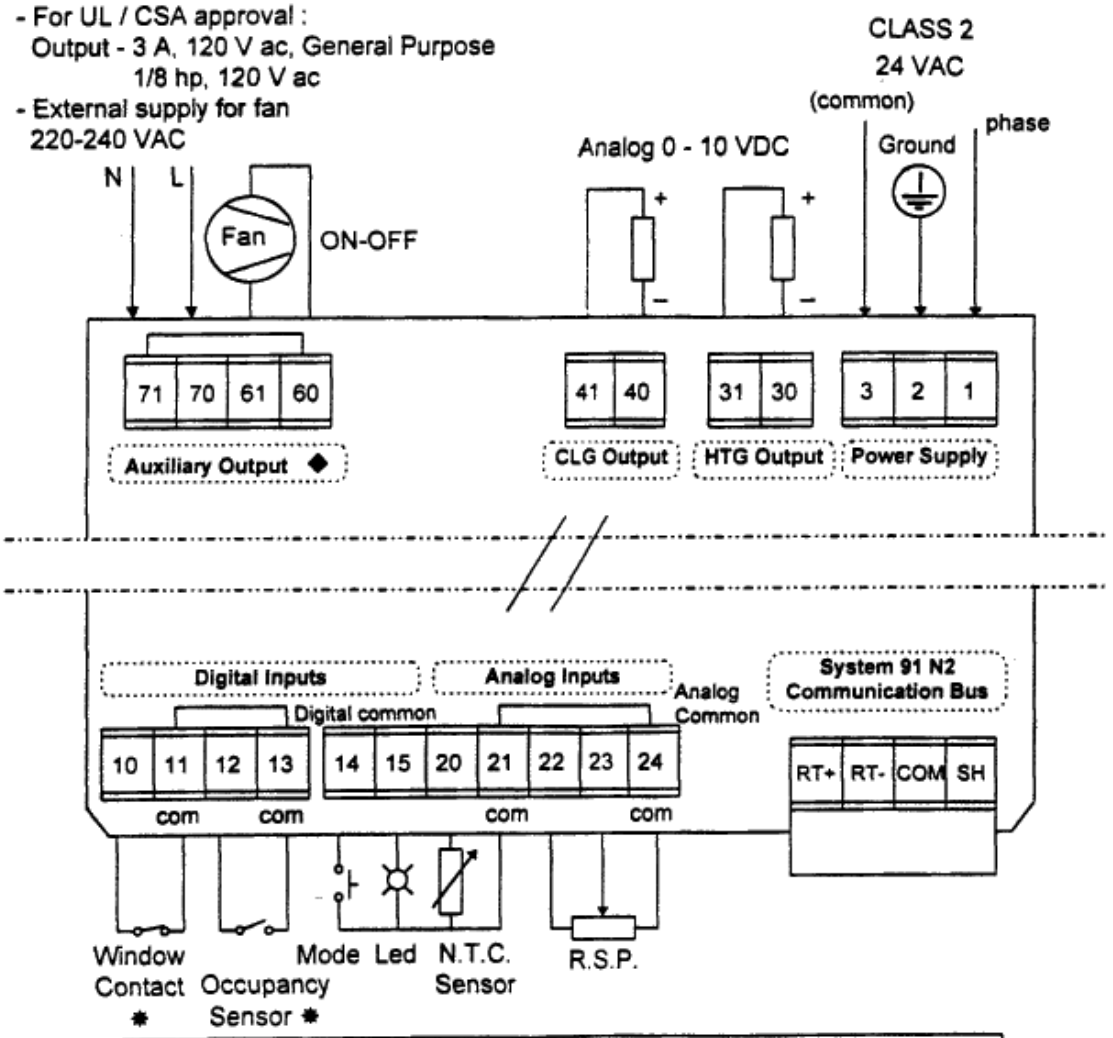
Figure 11: 0 to 10 VDC Fan Control Signal

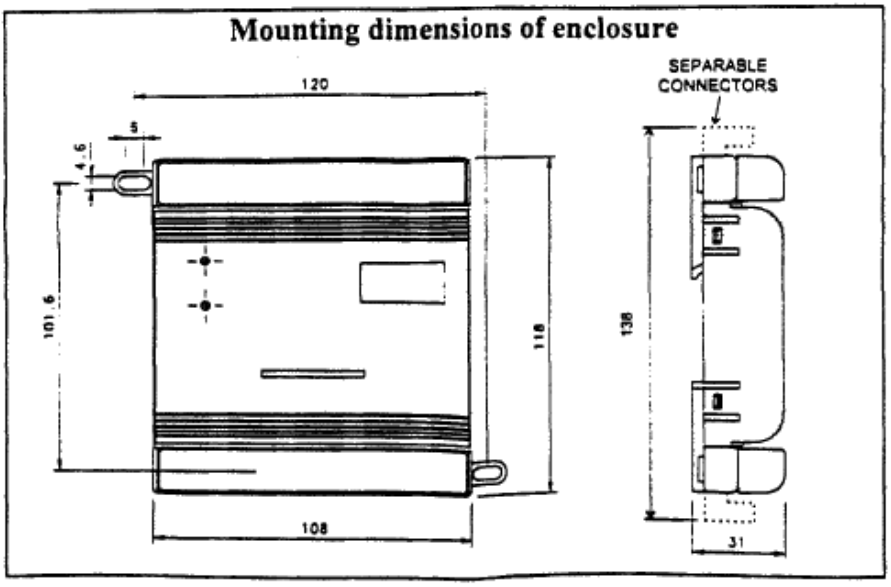
JOHNSON CONTROLS

INSTALLATION INSTRUCTIONS

Wiring Connection for : TC-9102-0221 / 1221
TC-9102-0226 / 1226

- For UL / CSA approval :
  Output - 3 A, 120 V ac, General Purpose
  1/8 hp, 120 V ac
- External supply for fan
  220-240 VAC





◆ Apply a maximum torque of 4 lb. in. to line voltage field wiring terminals.

✸ Digital Inputs of instrument are factory jumpered.
Scrap jumpers when Window Contact and / or Occupancy sensor are connected.

P/N 24-85638-242 Rev. A

Installation

The TC-9102 series controller is designed to be mounted within the Fan Coil Unit housing or within a control cabinet. The mounting location must be clean and dry, and not subject to extreme heat or cold. The installation and electrical wiring must conform to local codes and should be carried out by authorized personnel only. Users should ensure that all Johnson Controls' products are used safely and without risk to health or property.

Mounting

For surface mounting, slide the two mounting brackets into the slots at opposite corners of the controller base behind the terminals. Fix to the surface using the [illegible] screws.

For DIN rail mounting, place the [illegible] on the upper edge of the rail and press the controller firmly against the rail until the spring loaded clip engages the lower edge of the rail. To remove the controller, insert a screw driver into the clip at the base of the controller and pull the clip downwards to release.

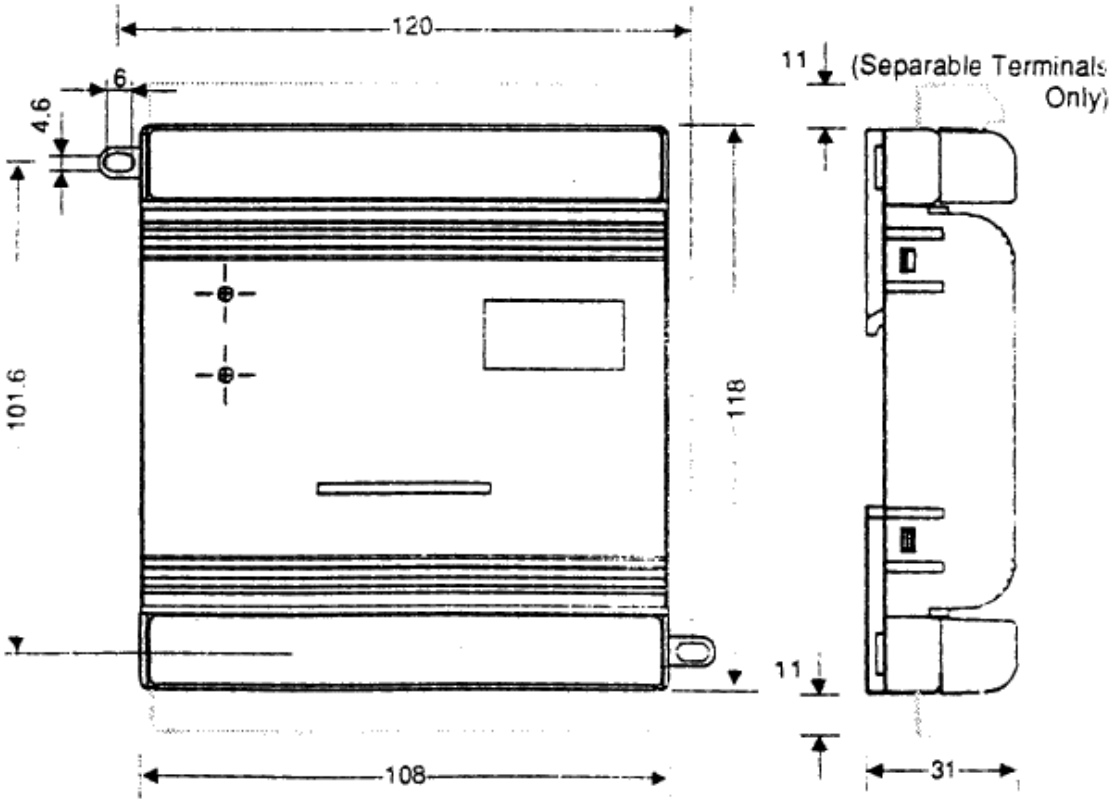


Figure 12: TC-9102 Controller Dimensions in mm

Note: A minimum of 25 mm of space is required above and below the controller for the removal of separable terminals.

Wiring

Before connecting or disconnecting any wires, ensure that all power supplies have been switched off and all wires are potential-free to prevent equipment damage and avoid electrical shock.

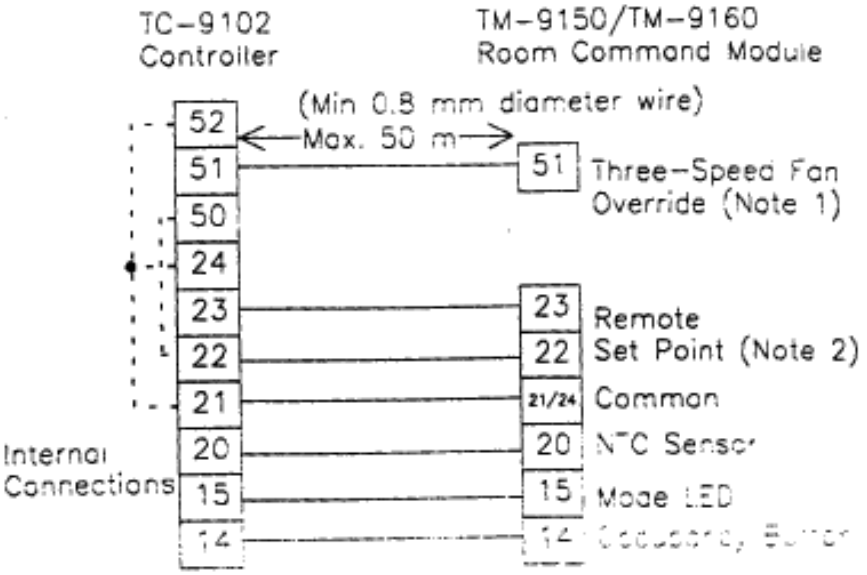
Terminations are made on the terminal blocks, at the top and bottom of the controller, which accept up to 1.5mm^2 wires. Follow the wiring diagram shown in figures 13 to 16.

When the TC-9100 model with separable terminal blocks is being wired, it is recommended that the removable parts of the blocks be unplugged before terminating the wires, and that they are not plugged in again until the wiring has been fully checked.

Separate extra low voltage (safe) wiring from power line voltage wiring. A distinctive colour such as white or pink is recommended for low voltage wiring. Keep all cables as short as possible and tie in position. Do not run cables close to transformers or high frequency generating equipment.

The 24 V supply must be stable and not shared with other switched inductive loads. When multiple loads are connected to one transformer, wire each load from the transformer separately so that any possible disturbances from one load will have minimal effect on other loads.

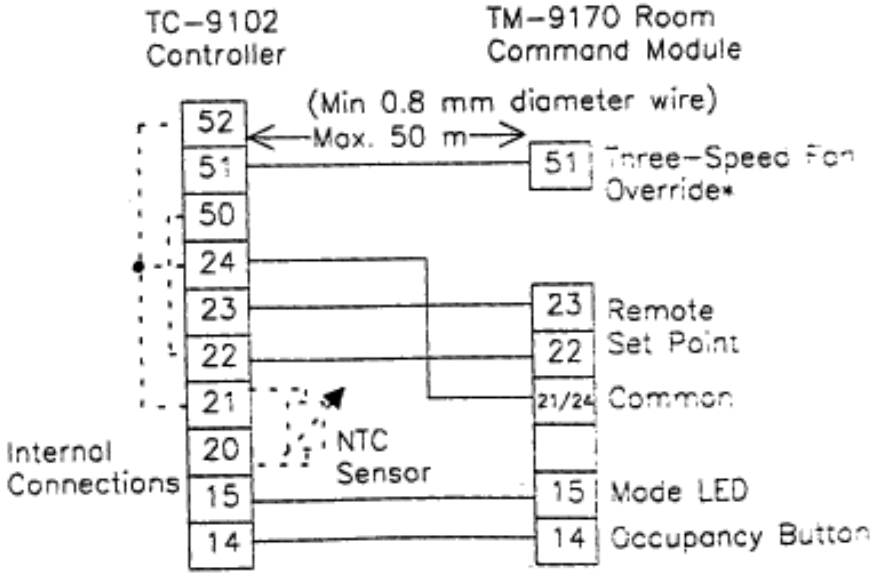
Complete and verify all wiring connections before continuing with the installation procedure.



Note 1: Only for modules with three-speed fan override (see ordering codes).

Note 2: Model TM-9160 only.

Figure 16: TC-9102 Controller Wiring to Room Command Module with NTC Sensor



*Only for modules with three-speed fan override (see ordering codes).

Figure 17: TC-9102 Controller Wiring to Room Command Module without NTC Sensor

Jumper and Switch Selections

To reach the jumpers and switches, open the controller by gripping the cover with thumb and finger on both sides above center and pull the cover off using the lower edge as a hinge. Replace the cover by resting the lower edge of the cover against the base and then pressing the cover firmly to engage all four retaining lugs.

Remove the **Gain Jumper (RED)** to reduce the proportional band to half of the factory setting (gain x 2).

Remove the **Integral Time Jumper (BLUE)** to set the factory set integral time to zero. Insert the jumper to obtain the factory set default value of four minutes (0.25 repeats per minute).

Address Switches and Zone Jumpers

If the controller is connected to a communications bus, a network address must be set. Refer to the project documentation for the address setting for the controller. Addresses 0 to 63 can be set on the address switches. The zone jumpers allow addressing up to 255 as follows:

Zone 1 Jumper	Zone 2 Jumper	Address Switch	Network Address
OUT	OUT	0 to 63	0 to 63
IN	OUT	0 to 63	64 to 127
OUT	IN	0 to 63	128 to 191
IN	IN	0 to 63	192 to 255

The setting on the Address Switches is in binary format:

Switch Number:	1	2	3	4	5	6
Decimal Equivalent:	1	2	4	8	16	32

Example (Address 43):

Switch Number:		1	2	3	4	5	6
Switch Position:		ON	ON	OFF	ON	OFF	ON
Decimal Equivalent:	43 =	1 +	2 +	0 +	8 +	0 +	32

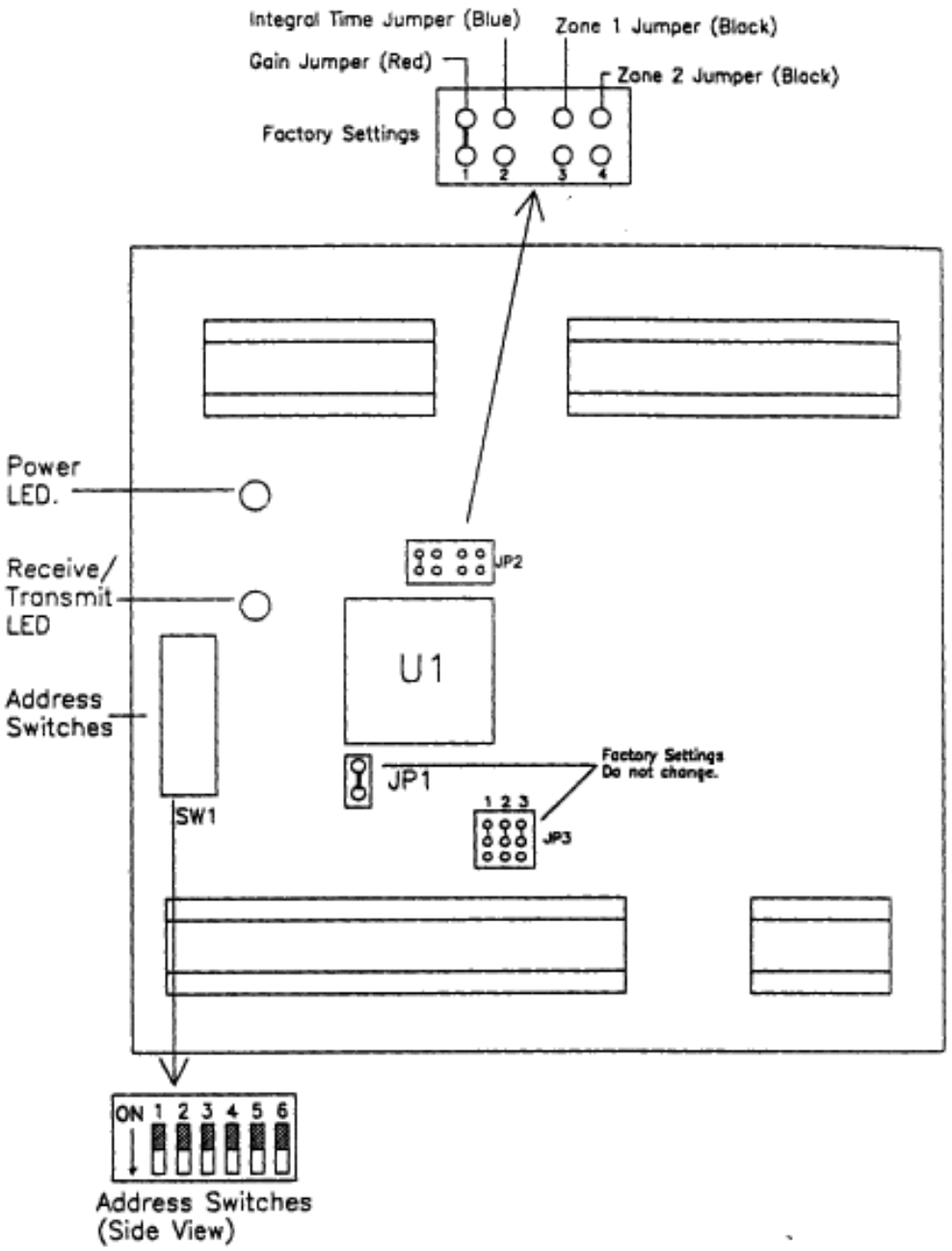


Figure 18: TC-9102 Controller Jumpers and Switches

Startup

When all jumpers and address switches haqe been set, and all connections have been made and verified, 24 VAC power may be applied. The Power LED should be lit. If the communications bus is active the R/T LED will flash. If the Power LED is not lit, check the 24 V supply.

Commissioning

The TC TOOL commissioning software running on a PC is required to verify the operation of the controller and to change parameters. Refer to the TC-9100 Commissioning Tool User's Guide (MN-9100-9102) for further information.

Ordering Codes

Table 5: Unit Mount Controller, Heating/Cooling, Ordering Codes

Ordering Code	Outputs		Set Point Range
TC-91x2-y110	2 x PWM Control Signal	0 to 10 VDC Fan Control	12 -28°C
TC-91x2-y115	2 x PWM Control Signal	0 to 10 VDC Fan Control	+/-3 K
TC-91x2-y220	2 x 0 to 10 VDC	0 to 10 VDC Fan Control	12 -28°C
TC-91x2-y225	2 x 0 to 10 VDC	0 to 10 VDC Fan Control	+/-3 K
TC-91x2-y440	2 x DAT	0 to 10 VDC Fan Control	12 -28°C
TC-91x2-y445	2 x DAT	0 to 10 VDC Fan Control	+/-3 K
TC-91x2-y550	2 x PAT	0 to 10 VDC Fan Control	12 -28°C
TC-91x2-y555	2 x PAT	0 to 10 VDC Fan Control	+/-3 K
TC-91x2-y660	2 x 2 Stage On/Off	0 to 10 VDC Fan Control	12 -28°C
TC-91x2-y665	2 x 2 Stage On/Off	0 to 10 VDC Fan Control	+/-3 K
TC-91x2-y111	2 x PWM Control Signal	On/Off Fan	12 -28°C
TC-91x2-y116	2 x PWM Control Signal	On/Off Fan	+/-3 K
TC-91x2-y221	2 x 0 to 10 VDC	On/Off Fan	12-28°C
TC-91x2-y226	2 x 0 to 10 VDC	On/Off Fan	+/-3 K
TC-91x2-y441	2 x DAT	On/Off Fan	12-28°C
TC-91x2-y446	2 x DAT	On/Off Fan	+/-3 K
TC-91x2-y551	2 x PAT	On/Off Fan	12-28°C
TC-91x2-y556	2 x PAT	On/Off Fan	+/-3 K
TC-91x2-y661	2 x 2 Stage On/Off	On/Off Fan	12-28°C
TC-91x2-y666	2 x 2 Stage On/Off	On/Off Fan	+/-3 K
TC-91x2-y112	2 x PWM Control Signal	3-Speed Fan	12-28°C
TC-91x2-y117	2 x PWM Control Signal	3-Speed Fan	+/- 3 K
TC-91x2-y222	2 x 0 to 10 VDC	3-Speed Fan	12-28°C
TC-91x2-y227	2 x 0 to 10 VDC	3-Speed Fan	+/-3 K
TC-91x2-y442	2 x DAT	3-Speed Fan	12-28°C
TC-91x2-y447	2 x DAT	3-Speed Fan	+/-3 K
TC-91x2-y552	2 x PAT	3-Speed Fan	12-28°C
TC-91x2-y557	2 x PAT	3-Speed Fan	+/-3 K
TC-91x2-y662	2 x 2 Stage On/Off	3-Speed Fan	12-28°C
TC-91x2-y667	2 x 2 Stage On/Off	3-Speed Fan	+/-3 K
Controller for remote set point: x = 0, with integrated set point: x = 1			
Controller with standard terminals: y = 0, with separable terminals: y = 1			

Table 6: Room Command Module Ordering Codes

Ordering Code	Description			
TM-9150-0000	Occupancy Button	NTC Sensor	w/o S.P. dial	
TM-9160-0000	Occupancy Button	NTC Sensor	12-28°C	
TM-9160-0005	Occupancy Button	NTC Sensor	+/- 3 K	
TM-9160-0002	Occupancy Button	NTC Sensor	12-28°C	3-Speed Fan Override
TM-9160-0007	Occupancy Button	NTC Sensor	+/- 3 K	3-Speed Fan Override
TM-9170-0000	Occupancy Button	w/o Sensor	12-28°C	
TM-9170-0005	Occupancy Button	w/o Sensor	+/- 3 K	
TM-9170-0002	Occupancy Button	w/o Sensor	12-28°C	3-Speed Fan Override
TM-9170-0007	Occupancy Button	w/o Sensor	+/- 3 K	3-Speed Fan Override

Table 7: Software and Accessories Ordering Codes

Ordering Code	Description
TM-9100-8930	Wall Mount Conduit Box for Room Command Module - Grey
TM-9100-8931	Wall Mount Conduit Box for Room Command Module - Off-White
TE-9100-8501	Unit Mount NTC Temperature Sensor (1.5-m cable)
TC-9100-TOOL	Commissioning Software (3.5" diskette)

SYSTEM 91

TC-9102 Series Controllers

The TC-9102 Terminal Controller, the latest addition to the application specific controller product line, is an electronic device for digital control of fan coil unit applications. Four controller models offer a competitive advantage for those projects that require a Direct Digital Control (DDC) fan coil application.

You can easily configure point inputs and outputs for control of the fan coil as either a standalone controller or connected to the Metasys Network through a Network Control Module (NCM), or through the Junior System.

Figure 1: TC-9102 Fan Coil Controller

Features and Benefits	
❑ **EUPRO for Windows, Release 6.00**	Easy to configure and commission
❑ **N2 Bus Communication**	Facility-wide control efficiencies
❑ **Compact Size**	Ideal for space limited installation
❑ **On/Off, 3-speed, and Proportional Speed Fan**	Maximum comfort and control
❑ **Internal Relays**	No additional relays required for motors up to and including 1/8 hp
❑ **N2 Opto-Isolation**	Minimum electrical noise
❑ **Wall-mounted Thermostat with Setpoint Dial and Occupancy Button on Cover**	User-friendly adjustment
❑ **Standalone Operation or Networking Capabilities**	Choices for application needs

TC9102 Series Cont'd

Application

The TC-9102 Terminal Controller is targeted for application specific DDC.

The TC-9102 is the perfect solution for fan coil unit applications and features four different models. The type of model used is determined by the type of fan control and heating/cooling control required. The control functions are EUPRO for Windows (Release 6.00) configurable.

The EUPRO for Windows (Release 6.00) software sets the control modes. The occupancy sensor input and the occupancy button (on the TM-9100 thermostat) modify the control modes.

A low limit temperature function is a standard feature, which overrides any automatic, time schedule, or manual mode when a low temperature is detected.

When an outdoor temperature is received from a network, the room setpoint will automatically adjust to reduce energy consumption, while maintaining occupancy comfort.

Table 1: Ordering TC-9102 Models

Points	Rating	-0221 Fan: On/Off	-0330 Fan: 0 to 10 VDC	-0331 Fan: On/Off	-0332 Fan: 3-Speed
		Heat/Cool: 0 to 10 VDC	Heat/Cool: Incremental*		
Analog Inputs: Zone Temperature Remote Setpoint Fan Override (-0332 only)	 32 to 105°F (NTC) 0 to 10K ohms (Potentiometer) 0 to 10K ohms (Potentiometer)	2	2	2	3
Binary Inputs: Window Contact Occupancy Sensor Occupancy Button on Thermostat	 <1K ohms <1K ohms <1K ohms	3	3	3	3
Analog Outputs: Heat/Cool (2-proportional) Fan	 10 mA at 10 VDC maximum 10 mA at 10 VDC maximum	2	1	0	0
Binary Outputs: Heat/Cool (4-incremental) Fan	 0.5 Amperes at 24 VAC 3 Amperes at 120/250 VAC	1	4	5	7
* 2-stage, PAT, or DAT heating/cooling control options available. Both heating/cooling must use the same option.					

New Sensors

In order to complete your TC-9102 fan coil application, you must order the new TM-9100 thermostat. The TM-9100 has sleek styling with an adjustable dial on the thermostat face for ease of use. It also has Light Emitting Diode (LED) indicators and an occupancy button feature for mode override.

The TM-9100 uses a Negative Temperature Coefficient (NTC) sensor.

The TC-9102 is not compatible with the TE-6400 series thermostat or with the TM-9100 series thermostat.

Specifications (Cont.)

Outputs	**Heating/Cooling Control**	
	Analog	0 to 10 VDC, maximum 10 mA
	2 DAT	Triacs rated at 24 VAC, maximum 0.5A*
	2 PAT	Triacs rated at 24 VAC, maximum 0.5A*
	2-stage On/Off	Triacs rated at 24 VAC, maximum 0.5A*
		* Maximum 1 mA leakage current
	PWM	(Europe only) For solenoid valves with Power Driver Module (VA-7400-8950) only.
	Fan Control	
	On/Off	Relay contact rated at 125/250 VAC, maximum 3A maximum 1/8 hp
	3-speed	Relay contact rated at 125/250 VAC, maximum 3A maximum 1/8 hp
	Proportional	0 to 10 VDC, maximum 10 mA
Standards Compliance	IEEE 446	
	IEEE 472	
	IEEE 587 Category A	
	FCC Part 15, Subpart B, Class A	
	UL 916	
	CSA C22.2 No. 205 (Pending)	
Agency Listings	UL Listed and CSA Certified as part of the Metasys Network.	
Accessories	Order separately	
Configuration Tools 1.0 (contains EURO-PRO for Windows 6.00)	WS-EUPRO-0	
Converter	IU-9100	
Zone Sensors	TM-9100 Series	
Enclosure Kit	AS-ENC100-0 or EN-EWC10-0 or EN-EWC15-0	
Power Supply	24 VAC Trnsformer	

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

Specifications

Supply Voltage	24 VAC, -15% to +10%, 50-60 Hz		
Power Consumption	3 VA Controller and Room Command Module		
Ambient Operating Conditions	32 to 122°F (0 to 50°C) 10 to 90% RH non-condensing		
Ambient Storage Conditions	-40 to 158°F (-40 to 70°C) 10 to 90% RH non-condensing		
Terminations	Terminal block for one 1.5 mm^2 / 16 AWG (maximum) cable and 14 AWG for fan terminal block. Rated for 4 lb-in maximum torque.		
Serial Interfaces	Optically isolated RS-485 interface for N2 Bus connection; 9600 baud		
Controller Addressing	1 to 255 selectable on DIP switches (6) and jumpers (2)		
Mounting	DIN rail or surface (two brackets supplied with controller)		
Housing	Material: ABS + polycarbonate, self-extinguishing UL94 V0 Protection: IP30 (IEC529)		
Dimensions (H x W x D)	4.65 x 4.25 x 1.22 in. (118 x 108 x 31 mm) Standard Terminals Allow an extra 0.43 in. for Communications terminal.		
Shipping Weight	0.66 lb (0.3 kg)		
Inputs	Room Temperature Sensor	NTC Thermistor 32 to 105°F (0 to 40°C)	Room Command Module TM-9100
	Remote Setpoint	10K ohm potentiometer	
	3-speed Fan Override	10K ohm potentiometer	
	Occupancy Button	Momentary Contact	
	Window Contact	Closed (<1K ohm) = window closed	
	Occupancy Sensor	Closed (<1K ohm) = occupied	

Continued on next page . . .

4.3 Output Interface (Remote Alarms) Boards (4590044E and 4590036 W)

4.3.1 *Alarm outputs*

Two remote alarm boards, shown in figures 4-3 & 4-4, similar in function and differing only in their connections to the terminal blocks M1 - M3, enable the alarm signals generated within the UPS to be connected by means of volt-free change-over relay contacts to a remote monitoring device. Either board can be fitted on the bottom of the UPS cabinet door, together with the AS400 Interface Board.

Note: When using the contacts for remote alarm annunciation, the power supply for the remote indicators must be provided from an external power source. Under no circumstances should the UPS internal low voltage supplies be used for this purpose.

4.3.2 *Remote control inputs*

Both boards have facilities to accept two remote control inputs, as shown in figures 4-3 & 4-4. One remote input allows the inverter to be shut down (transferring the load to the bypass supply) and the other enables the inverter synchronisation feature to be inhibited. The inverter synchronisation inhibit feature is most often used if the UPS is powered from a standby generator when the input mains supply fails and the generator frequency is unstable.

The external control signals (12V/24V) should be connected to terminal block M2 as shown. Once again, the voltage applied to these terminals must be generated by an external power source and not taken from the UPS internal low voltage supplies.

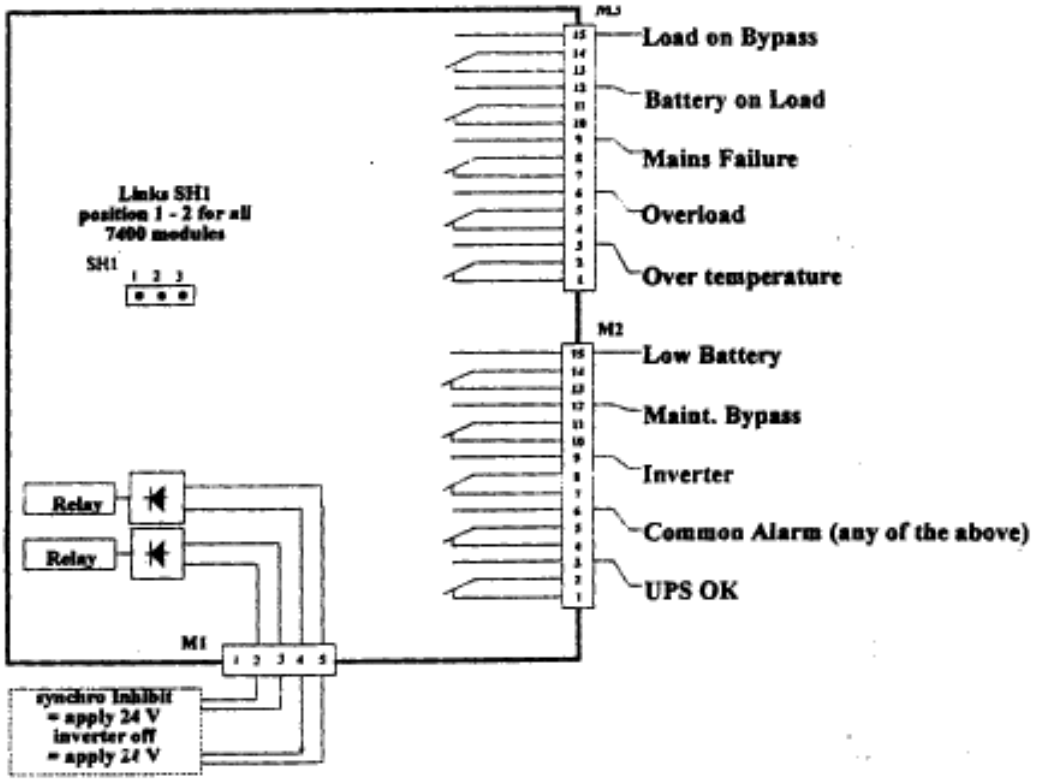


Figure 4-3 Output Interface Board Part N°4590044E