Penn TC Series Refrigeration and Defrost Controller North American Product Bulletin

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Description

The TC Series controllers are a range of energy efficient, microprocessor-based, multifunctional, programmable temperature controls for self-contained refrigeration systems that operate with both on-off switches and variable speed compressors. Depending on the model you choose, TC Series controllers can also manage alarms, active or passive defrost cycles, evaporator fan functions, and case lighting.

A large, red LED display is standard for all TC Series controllers. If you order more than a minimum quantity, you can order controllers with white, blue, or green LED displays. The TC Series are panel-mount controllers. They use EVTPN Temperature Sensors so that you can remotely mount the display unit. All TC Series controllers have a variety of optional inputs and output relays to perform compressor, defrost, evaporator fan, lighting control, and alarm management control. TC Series controllers consist of three groups of controllers: TC3B, TC3, and TC3X.

Figure 1: TC Series controller



TC3B Series

The TC3B Series provides temperature, alarm, and optional defrost cycle management. The TC3B Series facilitates defrost management for hot gas or electric heat defrost, with time-based or temperature-based defrost termination. The series can replace a temperature control, a digital temperature readout, and a defrost timer. Some TC3B models can also control an evaporator fan and lighting. The TC3B Series also includes a model with pulse-width modulation (PWM) output to drive a variable speed compressor.

TC3 Series

The TC3 Series provides temperature, alarm, defrost, evaporator fan management, lighting control, and alarm buzzer capabilities. The TC3 Series facilitates defrost management for hot gas or electric heat defrost, with time-based or temperature-based defrost termination. The series combines the functions of a temperature control, a digital temperature readout, a defrost cycle timer, and a defrost termination device. Optionally, the TC3 Series can control an evaporator fan and lighting. You can order models with built-in RS485 Modbus communications or models with the option to add communications with a TCIF adapter.

TC3X Series

The TC3X Series is a compact temperature controller. The controller is ideal for applications that require a reduced panel mount depth of 39.5 mm (1 9/16 in.). Typical applications include bottle coolers, refrigerated tables, and pizza counters.

Features and benefits

Capacitive touch keys

The patented capacitive touch UI provides the controller with a modern and elegant design. You can easily clean the controller's flat front surface. The capacitive touch keys provide reliable, long-life operation and eliminate a common point of failure with electromechanical keys that many competitive devices contain.

Variable speed compressor

The TC3B Series includes a model that drives Tecumseh®, Embraco®, and Secop® variable speed compressors.

IP65 rating

The capacitive touch UI achieves an IP65 rating. The water resistant UI minimizes the risk of damage due to water and moisture entering the controller.

Adaptive defrost

The controller monitors the heat transfer performance of the evaporator coil to start defrost at the time that the environment requires. If you optimize the defrost cycle based on the system demand, you increase energy efficiency, along with the quality and shelf life of refrigerated products.

Compressor protection

The controller monitors the active power line to ensure that the compressor cycles on only at the optimal point.

TC3KEY programming key

Use the TC3KEY programming key to automatically program devices. You can store and replicate programmed device configurations on another TC3 device. Integrated LEDs indicate progress and completion status.

Reduced depth option

TC3X series controllers are ideal for applications that require a reduced panel-mount depth of 39.5 mm (1 9/16 in.).

Optional RS485 communications adapter

Some TC3 models are compatible with optional TTL to RS485 serial adapters for Modbus RS485 communications. You can use DIP switches or software parameters to configure the Modbus address.

Note: TC3B and TC3X models do not have a TTL connection and are not compatible with the RS485 communications adapters.

Optional communications adapter real-time clock

The TCIF23 model RS485 communications adapter includes a real-time clock. The clock ensures that the controller performs daily defrost schedules at the correct time of day, and stores all logging samples accurately with a time and a date stamp to facilitate accurate Hazard Analysis and Critical Control Point (HACCP) reporting.

Optional color display

The standard TC display is red. If you order more than a minimum quantity, you can order controllers with white, blue, or green LED displays.

Applications

You can use the TC controller for the following applications:

Table 1: TC controller applications

Model number	Application
TC3X21N5V	Upright commercial refrigerators, food prep-tables, or under-counter refrigerators
TC3B21N5V	Upright commercial refrigerators, food prep-tables, or under-counter refrigerators
TC3B22N5V	Commercial refrigerators, back-bar units, or glass-door display cases
TC3B23N5V	Upright commercial freezers, ice cream freezers, or bottle coolers
TC3B54N9V	Upright commercial freezers, ice cream freezers, or bottle coolers with variable speed compressors
TC3221N5V	Upright commercial refrigerators, food prep-tables, or under-counter refrigerators
TC3222N5V	Commercial refrigerators, saladettes, back-bar units, or glass-door display cases
TC3223N5V	Upright commercial freezers, ice cream freezers, bottle coolers, or c-store coolers and freezers
TC3224N9R	Glass-door upright freezers, refrigerated display cases, walk-in coolers and freezers, or c-store coolers and freezers

Important: Use the TC Series controller only as an operating control. Where failure or malfunction of the TC controller could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the TC controller.

Important: Utiliser ce TC Series Controller uniquement en tant que dispositif de contrôle de fonctionnement. Lorsqu'une défaillance ou un dysfonctionnement du TC Controller Régulateur risque de provoquer des blessures ou d'endommager l'équipement contrôlé ou un autre équipement, la conception du système de contrôle doit intégrer des dispositifs de protection supplémentaires. Veiller dans ce cas à intégrer de façon permanente d'autres dispositifs, tels que des systèmes de supervision ou d'alarme, ou des dispositifs de sécurité ou de limitation, ayant une fonction d'avertissement ou de protection en cas de défaillance ou de dysfonctionnement du TC Régulateur.

Dimensions

The following figures show the TC controller dimensions and the panel cut-out dimensions that you require to insert the TC controller into the panel.

Figure 2: TC3B and TC3 controller dimensions, mm (in.)

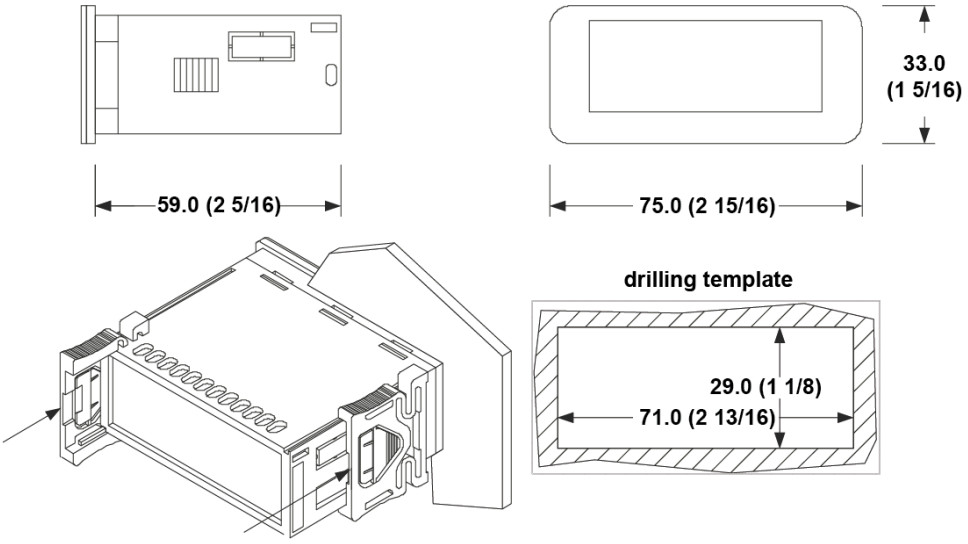
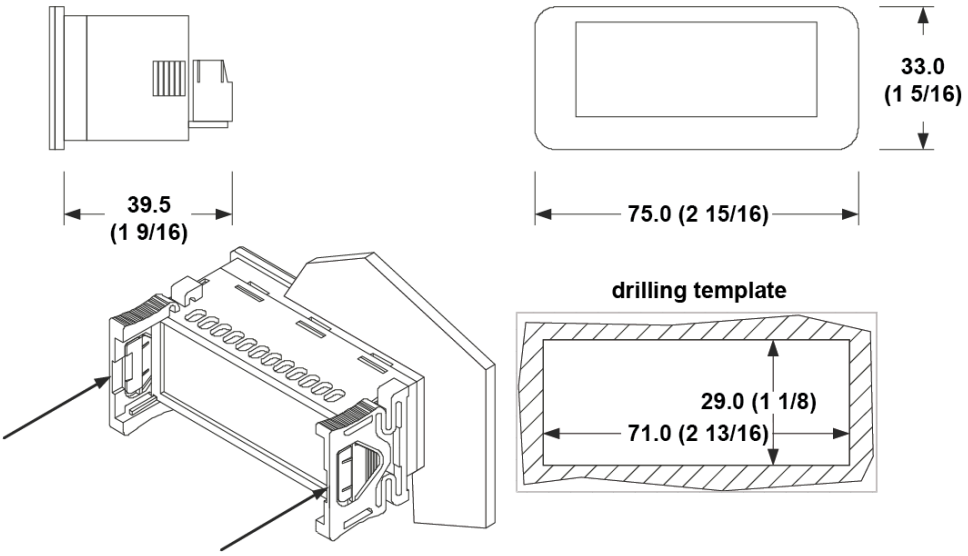


Figure 3: TC3X controller dimensions, mm (in.)



Ordering information

The following tables contain product codes and descriptions for the TC controller models.

Note: The function of the K2 relay depends on the model. You can configure the K2 or K4 relays on certain models. For more information, see the following table.

Table 2: TC controller feature matrix

Information			Product code																	
			TC3221N5V	TC3221N7V	TC3222N5V	TC3222N7V	TC3223N5V	TC3223N7V	TC3224N9R	TC3B21N5V	TC3B21N7V	TC3B22N5V	TC3B22N7V	TC3B23N5V	TC3B23N7V	TC3B54N9V	TC3X21N5V	TC3X21N7V
Temperature	Low temperature				x		x		x			x		x		x		
	Medium temperature		x		x					x		x				x	x	
Power	115 VAC (N5)		x		x		x			x		x		x			x	
	230 VAC (N7)			x		x		x			x		x		x			x
	Universal 115 VAC to 230 VAC (N9)								x							x		
Terminals	Screw down		x		x		x			x		x		x		x	x	
	Plug-in screw								x									
Inputs	Room and case temperature only		x		x		x		x	x		x		x		x	x	
	Configurable temperature input				x		x					x		x				
	Configurable temperature or switch input		x				x		x	x						x	x	
	Door switch only								x							x		
	Evaporator temperature only								x							x		
Outputs	K1 relay	Compressor only	x		x		x		x	x		x		x			x	
		Configurable														x		
	K2 relay	Defrost only					x		x					x				
		Evaporator fan, defrost, or configurable			x							x				x		
	K3 relay	Evaporator fan only					x		x					x				
		Configurable														x		
	K4 relay	Cabinet light or configurable							x									
		Configurable														x		
	PWM triac output															x		
Communications	TTL Modbus		x		x		x		x									
	RS485 Modbus		TCIF22 Adapter		TCIF22 Adapter		TCIF22 Adapter		Built-in									
	Real-time clock and HACCP and RS485 Modbus		TCIF23 Adapter		TCIF23 Adapter		TCIF23 Adapter		Built-in									

Table 3: TC defrost controller bulk pack ordering information

Product code	Summary
TC3221N5V-000D	Two inputs, one output, power supply 115 VAC, TTL Modbus. Bulk pack, quantity of 20. Temperature sensors not included.
TC3221N7V-000D	Two inputs, one output, power supply 230 VAC, TTL Modbus. Bulk pack, quantity of 20. Temperature sensors not included.
TC3222N5V-000D	Two inputs, two outputs, power supply 115 VAC, TTL Modbus. Bulk pack, quantity of 20. Temperature sensors not included.
TC3222N7V-000D	Two inputs, two outputs, power supply 230 VAC, TTL Modbus. Bulk pack, quantity of 20. Temperature sensors not included.
TC3223N5V-000D	Two inputs, three outputs, power supply 115 VAC, TTL Modbus. Bulk pack, quantity of 20. Temperature sensors not included.
TC3223N7V-000D	Two inputs, three outputs, power supply 230 VAC, TTL Modbus. Bulk pack, quantity of 20. Temperature sensors not included.
TC3224N9R-000D	Two inputs, four outputs, universal power supply 115 VAC to 230 VAC, built-in RS485 Modbus. Bulk pack, quantity of 20. Temperature sensors not included.
TC3B21N5V-000D	Two inputs, one output, power supply 115 VAC, no communication. Bulk pack, quantity of 20. Temperature sensors not included.
TC3B21N7V-000D	Two inputs, one output, power supply 230 VAC, no communication. Bulk pack, quantity of 20. Temperature sensors not included.
TC3B22N5V-000D	Two inputs, two outputs, power supply 115 VAC, no communication. Bulk pack, quantity of 20. Temperature sensors not included.
TC3B22N7V-000D	Two inputs, two outputs, power supply 230 VAC, no communication. Bulk pack, quantity of 20. Temperature sensors not included.
TC3B23N5V-000D	Two inputs, three outputs, power supply 115 VAC, no communication. Bulk pack, quantity of 20. Temperature sensors not included.
TC3B23N7V-000D	Two inputs, three outputs, power supply 230 VAC, no communication. Bulk pack, quantity of 20. Temperature sensors not included.
TC3B54N9V-000D	Two inputs, four relay outputs, one PWM output, universal power supply 115 VAC to 230 VAC, no communication. Bulk pack, quantity of 20. Temperature sensors not included.
TC3X21N5V-000D	Two inputs, one output, power supply 115 VAC, compact size, no communication. Bulk pack, quantity of 50. Temperature sensors not included.
TC3X21N7V-000D	Two inputs, one output, power supply 230 VAC, compact size, no communication. Bulk pack, quantity of 50. Temperature sensors not included.

Table 4: TC defrost controller single pack ordering information

Product code	Summary
TC3221N5V-000C	Two inputs, one output, power supply 115 VAC, TTL Modbus. One EVTPN615F200-1C sensor included.
TC3221N7V-000C	Two inputs, one output, power supply 230 VAC, TTL Modbus. One EVTPN615F200-1C sensor included.
TC3222N5V-000C	Two inputs, two outputs, power supply 115 VAC, TTL Modbus. Two EVTPN615F200-1C sensors included.
TC3222N7V-000C	Two inputs, two outputs, power supply 230 VAC, TTL Modbus. Two EVTPN615F200-1C sensors included.
TC3223N5V-000C	Two inputs, three outputs, power supply 115 VAC, TTL Modbus. Two EVTPN615F200-1C sensors included.
TC3223N7V-000C	Two inputs, three outputs, power supply 230 VAC, TTL Modbus. Two EVTPN615F200-1C sensors included.
TC3224N9R-000C	Two inputs, four outputs, universal power supply 115 VAC to 230 VAC, built-in RS485 Modbus. Two EVTPN615F200-1C sensors included.
TC3B21N5V-000C	Two inputs, one output, power supply 115 VAC, no communication. One EVTPN615F200-1C sensor included.
TC3B21N7V-000C	Two inputs, one output, power supply 230 VAC, no communication. One EVTPN615F200-1C sensor included.
TC3B22N5V-000C	Two inputs, two outputs, power supply 115 VAC, no communication. Two EVTPN615F200-1C sensors included.
TC3B22N7V-000C	Two inputs, two outputs, power supply 230 VAC, no communication. Two EVTPN615F200-1C sensors included.

Table 4: TC defrost controller single pack ordering information

Product code	Summary
TC3B23N5V-000C	Two inputs, three outputs, power supply 115 VAC, no communication. Two EVTPN615F200-1C sensors included.
TC3B23N7V-000C	Two inputs, three outputs, power supply 230 VAC, no communication. Two EVTPN615F200-1C sensors included.
TC3B54N9V-000C	Two inputs, four relay outputs, one PWM output, universal power supply 115 VAC to 230 VAC, no communication. Two EVTPN615F200-1C sensors included.
TC3X21N5V-000C	Two inputs, one output, power supply 115 VAC, compact size, no communication. One EVTPN615F200-1C sensor included.
TC3X21N7V-000C	Two inputs, one output, power supply 230 VAC, compact size, no communication. One EVTPN615F200-1C sensor included.

Sensors and accessories

The following tables contain accessories and sensors that you can order for the controllers. For more information about the communications accessories that you can use with each controller, see Table 2.

Table 5: Accessories for the TC controller

Product code	Description
TC3KEY	Programming key: A cloning tool to download configuration settings from a controller, and upload the settings to other identical controllers.
TCCBL100	Connecting cable: A cable to connect a TC controller to a PC's USB port. Length: 1 m (3.28 ft).
TCIF22TSX	TTL to RS485 Modbus serial communications interface: Connects to an RS485 Modbus network.
TCIF23TSX	TTL to RS485 Modbus serial communications interface and real-time clock: Connects to an RS485 Modbus network. Adds a real-time clock to the controller for scheduled defrost and HACCP data reporting.

Figure 4: TC Series accessories TC3KEY (left) and TCIF22TSX/TCIF23TSX (right)

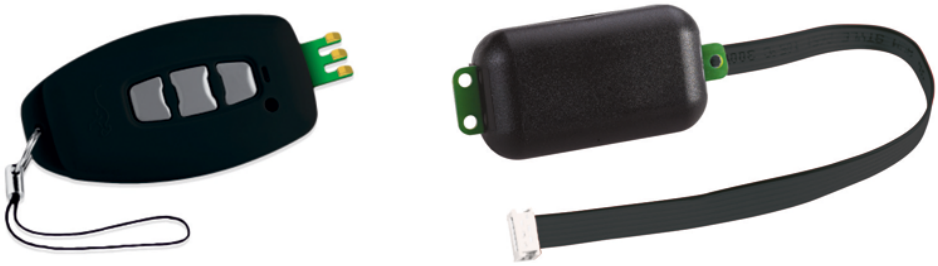


Table 6: Sensors for the TC controller

Product code	Description
EVTPN615F200-1C	10K ohm NTC sensor. IP67 protection level, overmolded thermoplastic material, 1.5 m (4.9 ft) cable length. Single pack, quantity of 1.
EVTPN615F200-1D	10K ohm NTC sensor. IP67 protection level, overmolded thermoplastic material, 1.5 m (4.9 ft) cable length. Bulk pack, quantity of 100.
EVTPN630F200-1C	10K ohm NTC sensor. IP67 protection level, overmolded thermoplastic material, 3.0 m (9.8 ft) cable length. Single pack, quantity of 1.
EVTPN630F200-1D	10K ohm NTC sensor. IP67 protection level, overmolded thermoplastic material, 3.0 m (9.8 ft) cable length. Bulk pack, quantity of 100.

Table 6: Sensors for the TC controller

Product code	Description
EVTPNW15F200-1C	10K ohm NTC sensor. IP68 water resistant protection level, overmolded thermoplastic material, 1.5 m (4.9 ft) cable length. Single pack, quantity of 1.
EVTPNW15F200-1D	10K ohm NTC sensor. IP68 water resistant protection level, overmolded thermoplastic material, 1.5 m (4.9 ft) cable length. Bulk pack, quantity of 100.
EVTPNW30F200-1C	10K ohm NTC sensor. IP68 water resistant protection level, overmolded thermoplastic material, 3.0 m (9.8 ft) cable length. Single pack, quantity of 1.
EVTPNW30F200-1D	10K ohm NTC sensor. IP68 water resistant protection level, overmolded thermoplastic material, 3.0 m (9.8 ft) cable length. Bulk pack, quantity of 100.

Electrical ratings

The following tables show the electrical ratings for single-pole, single-throw (SPST) and single-pole, double-throw (SPDT) control relays in the TC controller.

Table 7: K1 compressor relay ratings

		cULus (UL 60730)		CE (EN 60730)
Applied voltage at 60 Hz		120 VAC	240 VAC	240 VAC
Resistive amperes	TC3Bxx	12 A	12 A	10 A
	TC3Xxx	10 A	10 A	10 A
	TC32xx	12 A	12 A	12 A
Inductive amperes		—	—	2 A
Full load amperes		10 A	10 A	—
Locked rotor amperes		60 A	60 A	—

Table 8: K2 defrost, evaporator fan, or configurable relay ratings

	cULus (UL 60730)		CE (EN 60730)
Applied voltage at 60 Hz	120 VAC	240 VAC	240 VAC
Resistive amperes	8 A	8 A	5 A
Inductive amperes	—	—	2 A
Full load amperes	4.4 A	2.9 A	—
Locked rotor amperes	26.4 A	17.4 A	—

Table 9: K3 evaporator fan relay ratings

	cULus (UL 60730)		CE (EN 60730)
Applied voltage at 60 Hz	120 VAC	240 VAC	240 VAC
Resistive amperes	5 A	5 A	5 A
Inductive amperes	—	—	1 A
Full load amperes	1.5 A	1.5 A	—
Locked rotor amperes	9 A	9 A	—

Table 10: K4 cabinet light or configurable relay ratings

	cULus (UL 60730)		CE (EN 60730)
Applied voltage at 60 Hz	120 VAC	240 VAC	240 VAC
Resistive amperes	5 A	5 A	5 A
Inductive amperes	—	—	1 A
Full load amperes	1.5 A	1.5 A	—
Locked rotor amperes	9 A	9 A	—

Terminal contact numbers for relays

The following tables show the terminal contact numbers on the controller that you can use with each relay. See Ordering information for information about all TC controller relay functions. Refer to your controller's installation guide for information about your model's relay functions.

Table 11: K1 relay terminal numbers

TC controller	Common	SPST or SPDT N.O.	SPDT N.C.
TC3221	2	3	n/a
TC3222	2	3	n/a
TC3223	2	3	n/a
TC3224	2	6	n/a
TC3B21	2	3	n/a

Table 11: K1 relay terminal numbers

TC controller	Common	SPST or SPDT N.O.	SPDT N.C.
TC3B22	2	3	n/a
TC3B23	2	3	n/a
TC3X21	7	8	6

Table 12: K2 relay terminal numbers

TC controller	Common	SPST or SPDT N.O.	SPDT N.C.
TC3222	5	6	7
TC3223	5	6	7
TC3224	6	3	n/a
TC3B22	5	6	7
TC3B23	5	6	7

Table 13: K3 relay terminal numbers

TC controller	Common	SPST N.O.
TC3223	2	1
TC3224	6	1
TC3B23	2	1

Table 14: K4 relay terminal numbers

TC controller	Common	SPST N.O.
TC3224	6	5

Technical specifications

Table 15: TC Series controller models

Specification		Description	
Purpose of the control device		Function controller	
Construction of the control device		Built-in electronic device	
Container		Black, self-extinguishing	
Category of heat and fire resistance		D	
Mounting methods for the control device		Fits a panel, snap-in brackets provided	
Degree of protection provided by the covering		IP65 (front)	
Connection method		Fixed screw terminal blocks for wires up to 2.5 mm^2	
Maximum length for power supply, input and output cables		10 m (32.8 ft)	
Operating temperature		From 0°C to 55°C (from 32°F to 131°F)	
Storage temperature		From -25°C to 70°C (from -13°F to 158°F)	
Operating humidity		Relative humidity without condensate from 10% to 90%	
Pollution status of the control device		2	
Compliance		North America: United States: cURus Recognized; File SA516 CCN SDFY2; FCC Compliant to CFR47, Part 15, Subpart B, Class A limits Canada: cURus Recognized; File SA516 CCN SDFY8; Industry Canada (IC) compliant to Canadian ICES-003, Class A limits	
CE		Europe: CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive, Low Voltage Directive, and RoHS Directive	
Power supply		N5 models	115 VAC (+10% -15%), 50/60 Hz (±3 Hz), maximum 2 VA
		N7 models	230 VAC (+10% -15%), 50/60 Hz (±3 Hz), maximum 2 VA
		N9 models	115 VAC to 230 VAC (+10% -15%), 50/60 Hz (±3 Hz), maximum 3.2 VA
Grounding methods for the control device		None	
Rated impulse-withstand voltage		4 KV	
Over-voltage category		III	
Software class and structure		A	
Analog inputs		1 for NTC cabinet probes	
NTC probes	Sensor type	ß3435 (10 kW at 25°C, 77°F)	
	Measurement field	From -40°C to 105°C (from -40°F to 221°F)	
	Resolution	0.1°C (1.0°F)	

Table 15: TC Series controller models

Specification	Description	
Dry contact	Contact type	5 VDC, 1.5 mA
	Power supply	None
	Protection	None
PWM signal output	Power supply	12 VDC (+16%, -12%), 20 mA maximum
	Frequency	0 Hz to 150 Hz
	Protection	None
Type 1 or Type 2 actions	Type 1	
Additional features of Type 1 or Type 2 actions	C	
Displays	3 digits custom display, with function icons	

Table 16: TC Series accessory TC3KEY

Specification	Description
Container	Black, self-extinguishing
Category of heat and fire resistance	D
Measurements:	33.0 mm x 73.5 mm x 13.0 mm (1 5/16 in. x 2 7/8 in. x 1/2 in.)
Degree of protection provided by the covering	IP00
Connection method	Clamp connector
	Female Micro-B USB connector
Operating temperature	From 0°C to 55°C (from 32°F to 131°F)
Storage temperature	From -25°C to 70°C (from -13°F to 158°F)
Operating humidity	Relative humidity without condensate from 10% to 90%
Compliance	North America: United States: FCC Compliant to CFR47, Part 15, Subpart B, Class A limits Canada: Industry Canada (IC) compliant to Canadian ICES-003, Class A limits
CE	Europe: CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and RoHS Directive
Power supply	USB power supply
Software class and structure	A
Displays	Upload/download status LED

Table 17: TC Series accessories TCIF22TSX and TCIF23TSX

Specification	Description
Container	Black, self-extinguishing
Category of heat and fire resistance	D
Measurements	176.0 mm x 30.0 mm x 25.0 mm (6 15/16 in. x 1 3/16 in. x 1 in.)
Mounting methods for the control device	On rigid support, with cable tie (not provided)
Degree of protection provided by the covering	IP00
Connection method	Pico-Blade connector for TTL input from the controller
	Fixed screw terminal block for wires up to 2.5 mm^2 (14 AWG) for RS-485 output
Maximum permitted length for connection cables	RS-485 Modbus port: 1,000 m (328 ft)
Operating temperature	From 0°C to 55°C (from 32°F to 131°F)
Storage temperature	From -25°C to 70°C (from -13°F to 158°F)
Operating humidity	Relative humidity without condensate from 5% to 95%

Table 17: TC Series accessories TCIF22TSX and TCIF23TSX

Specification	Description
Compliance CE	Europe: CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and RoHS Directive
Power supply	The device is powered by the TTL Modbus port of the controller
Software class and structure	A
Displays	TTL Modbus and RS485 Modbus communication status LED
Communications ports:	1 TTL Modbus subordinate port
	1 RS485 Modbus subordinate port
TC Series accessory TCIF23TSX only	
Clock	Secondary lithium battery
Clock drift	Less than 60 seconds per month at 25°C (77°F)
Clock battery autonomy in the absence of a power supply	Over 6 months at 25°C (77°F)
Clock battery charging time	24 hours, battery charged by the power supply of the device

North American emissions compliance

United States

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning (Part 15.21)

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Canada

This Class (B) digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe (B) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Industry Canada Statement(s)

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage, et
2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Repair information

Do not attempt to repair the TC controller. If you have a defective or improperly functioning controller, contact your nearest authorized Johnson Controls® or PENN® distributor or sales representative with the TC controller model and product code number.

Product warranty

This product is covered by a limited warranty, details of which can be found at www.johnsoncontrols.com/buildingswarranty.

Software terms

Use of the software that is in (or constitutes) this product, or access to the cloud, or hosted services applicable to this product, if any, is subject to applicable end-user license, open-source

software information, and other terms set forth at www.johnsoncontrols.com/techterms. Your use of this product constitutes an agreement to such terms.

Single point of contact

APAC	EU	UK	NA/SA
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