

tekmar® - Wiring Brochure

tekmarNet®4 Mixing Expansion Module 441



W441

12/08

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Overview

The following wiring brochure describes how to wire the tekmar Mixing Expansion Module 441. The 441 is designed to operate any of the tekmar 3-way and 4-way brass mixing valves from type 710 through to type 724. The 441 can only be used together with tekmarNet®4 systems.

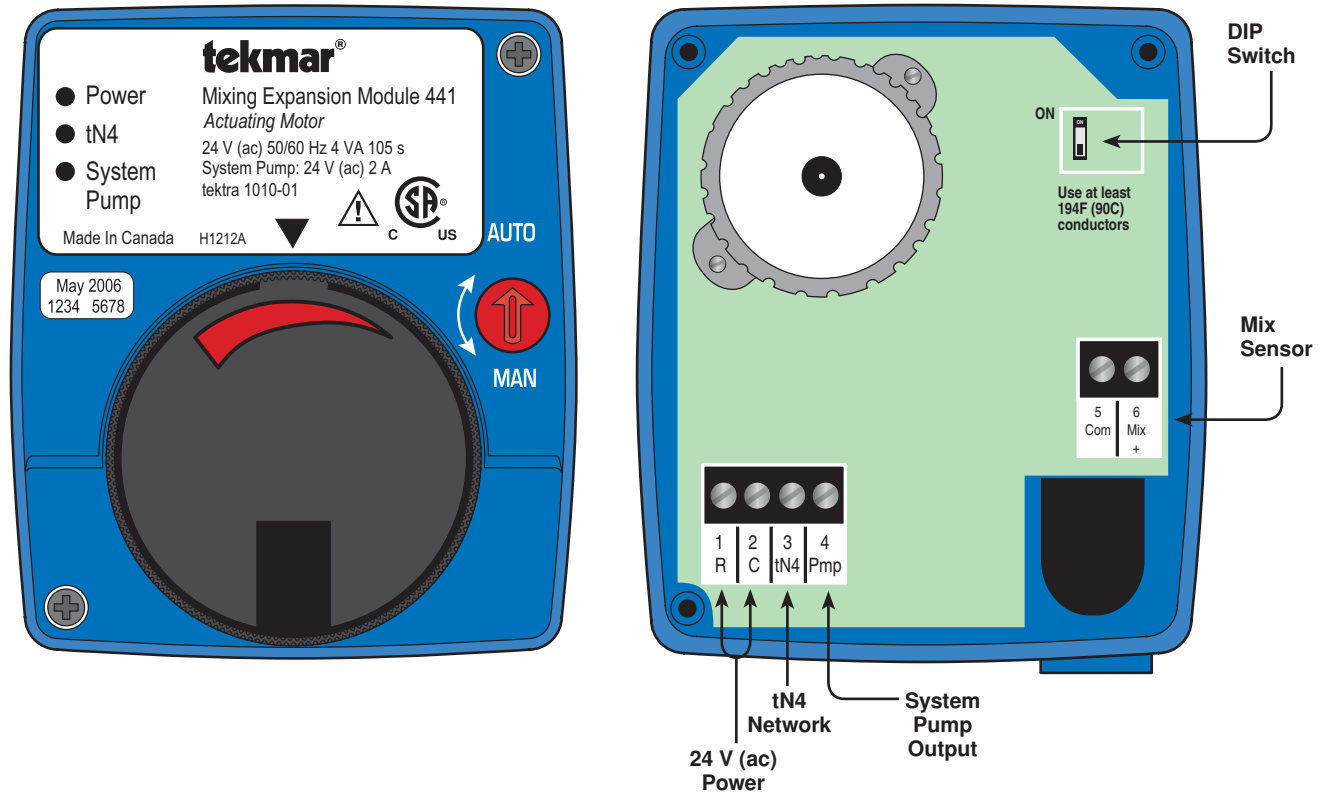

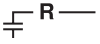



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Wiring Symbols

	Dry contact switch. Operates a device.	Do Not Apply Power	Do not apply power to these terminals. Serious control damage will result.
	Powered switch. 24 V (ac), switched output to valve, pump relay etc.		tekmarNet ⁺ 4

Definitions

The following defined terms and symbols are used throughout this manual to bring attention to the presence of hazards of various risk levels, or to important information concerning the life of the product.



– Caution: Refer to accompanying documents.



– Caution: Refer to accompanying documents.

**INSTALLATION
CATEGORY II**

– Local level appliances.

Caution

Improper installation and operation of this control could result in damage to the equipment and possibly even personal injury or death. It is your responsibility to ensure that this control is safely installed according to all applicable codes and standards. This electronic control is not intended for use as a primary limit control. Other controls that are

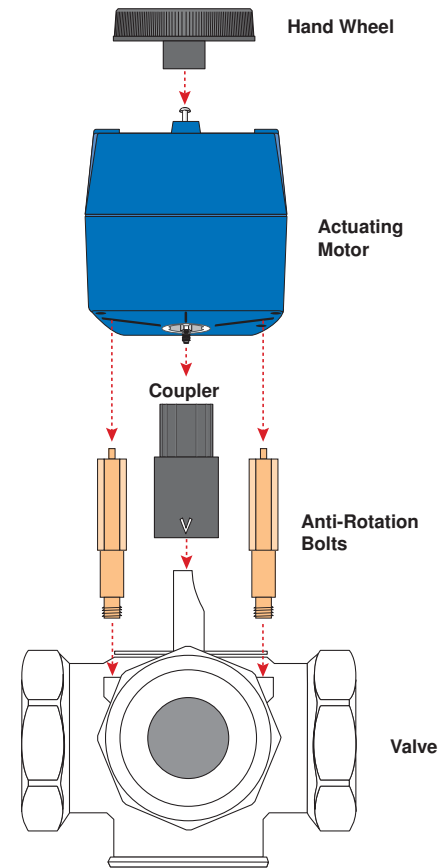
intended and certified as safety limits must be placed into the control circuit. Do not attempt to service the control. Refer to qualified personnel for servicing. There are no user serviceable parts. Attempting to do so voids warranty and could result in damage to the equipment and possibly even personal injury or death.

Installation

- Remove the manual valve handle from the mixing valve.
- Thread the two anti-rotation bolts to the two top holes on the valve body.
- Use the following chart to select the proper coupler:

Type	Coupler Arrow Color
710, 711, 712, 713, 714	White
720, 721, 722, 723, 724	Red

- The arrow on the coupler points towards the valve body. Place the coupler onto the valve shaft.
- Set the actuating motor's automatic / manual selector to the manual setting.
- Place the actuating motor onto the coupler. Ensure that the actuating motor's rotation range matches that of the mixing valve. Manually rotate the valve using the actuator hand wheel.
- Ensure the actuating motor's hand wheel position indicator (clear plastic film with red stripe) indicates the proper direction to open the valve. If required, the clear position indicator can be reversed.
- Remove the hand wheel and fasten the actuating motor to the mixing valve using the screw under the hand wheel. Replace the hand wheel when finished.
- Set the actuating motor's automatic / manual selector to the automatic setting.



Electrical Drawings

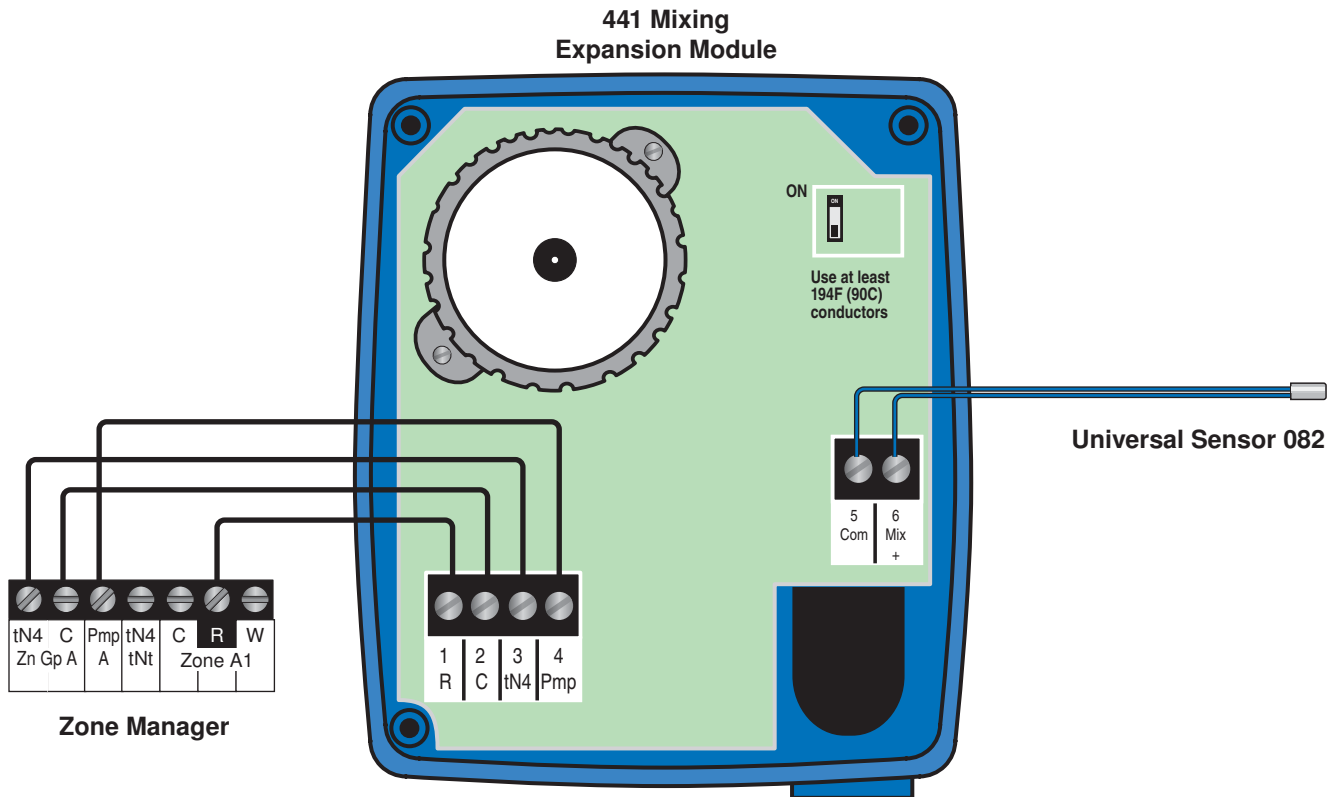
⚠ The electrical drawing examples on the following pages show the 441 in common applications. Choose the drawing that most accurately depicts the components in your system and use that drawing as a guide to aid in wiring your system.

These are only concept drawings, not engineered drawings. They are not intended to describe a complete system nor any particular system. It is up to the system designer to

determine the necessary components for and configuration of the particular system being designed including additional equipment isolation relays (for loads greater than the controls specified output ratings) and any safety devices which in the judgment of the designer are appropriate in order to properly size, configure and design that system and to ensure compliance with building and safety code requirements.

Description:

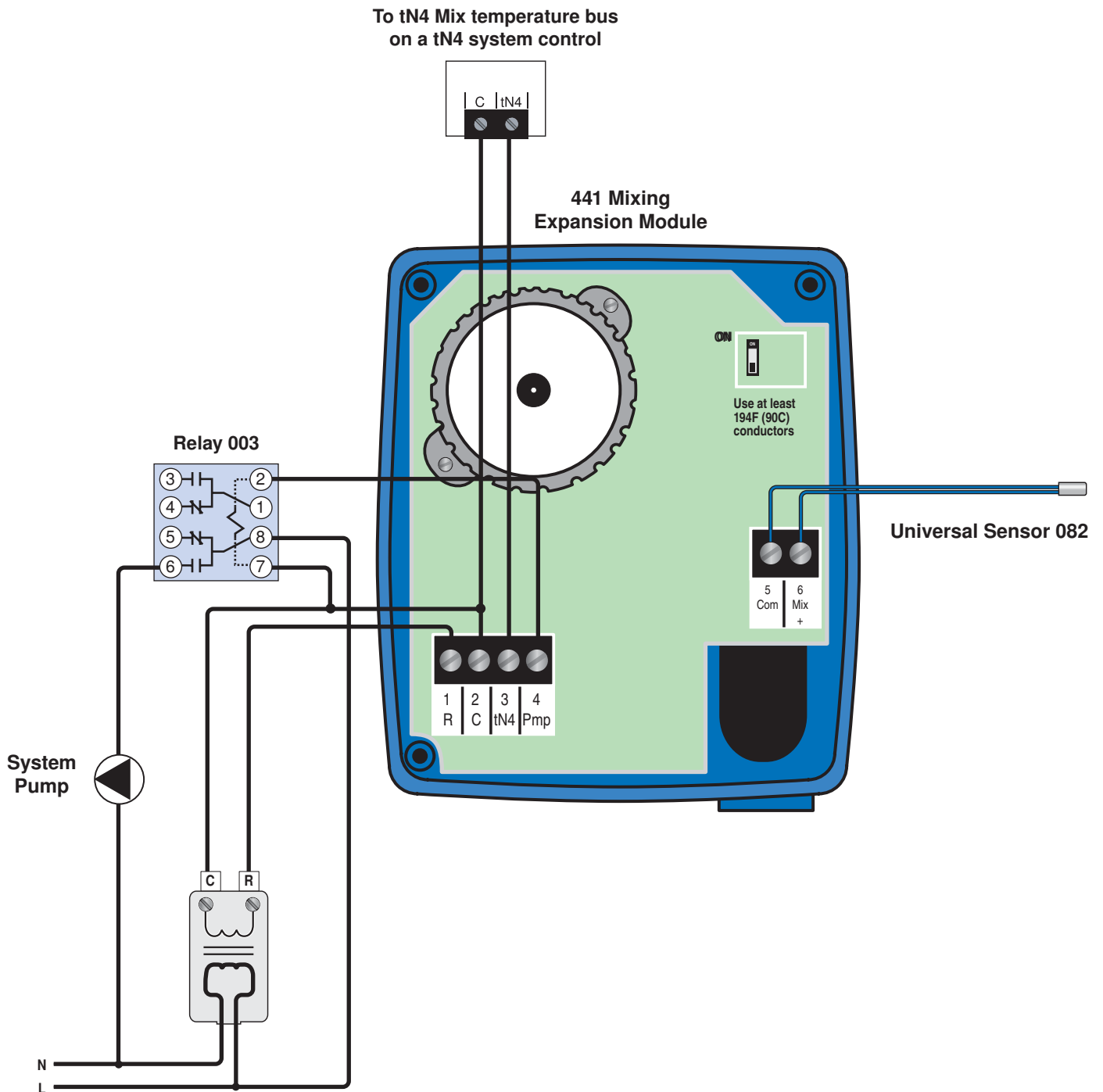
The Mixing Expansion Module 441 connects to a Zone Manager 335, 336 or 337 which in turn is connected to a tN4 system control. The 441 controls the supply water temperature of the tN4 bus that it is connected to.



Note: The Zone Manager must connect to a tN4 mix temperature bus on a tN4 system control.

Description:

The Mixing Expansion Module 441 connects to a tN4 device such as a thermostat which in turn is connected to a tN4 system control. An external transformer provides 24 V (ac) power, and a Relay 003 is used to switch the system pump.



Wiring the Control

- Use a Phillips screwdriver to remove the two screws on the top of the actuating motor to remove the wiring cover.
- All electrical wiring enters the actuating motor through the 1/2" (13 mm) conduit hole on the bottom. Standard 18 AWG solid wire is recommended for all connections to the motor terminals.
- When using conduit, a conduit wye is required to allow the separation of the sensor wires from the R, C, tN4 and Pump wires.
- Strip all wiring to a length of 3/8 in. or 10 mm for all terminals.
- Refer to the current and voltage ratings at the back of this brochure before connecting devices to this control.

⚠ Caution: The mixing expansion module 441 is not suitable for use with rigid conduit.

⚠ 24 V (ac) Power

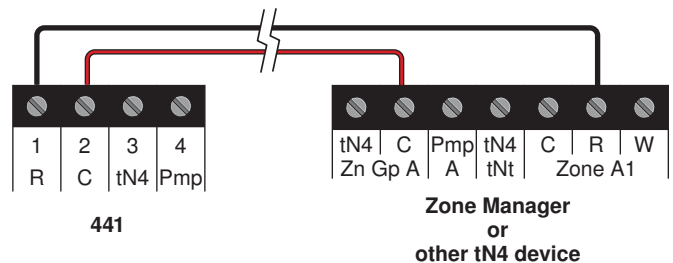
Wire 24 V (ac) to terminals C and R.

If a Zone Manager is used:

- Connect C on the 441 to C on the Zone Manager.
- Connect R on the 441 to R on the Zone Manager.

If a 24 V (ac) transformer is used:

- Connect C on the 441 to C on the transformer.
- Connect R on the 441 to R on the transformer.



⚠ tN4 Communication

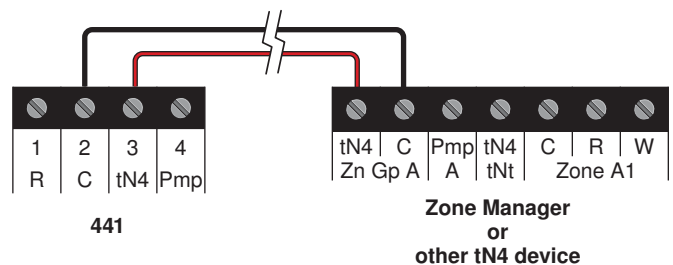
Wire the tN4 communication to terminals tN4 and C on the desired tN4 mix temperature bus.

If a Zone Manager is used:

- Connect tN4 on the 441 to Zone Group A or B tN4 on the Zone Manager. The C terminal is already connected.

If a Zone Manager is not used:

- Connect tN4 on the 441 to tN4 on another tN4 device on the same mix tN4 bus.
- Connect C on the 441 to C on another tN4 device on the same mix tN4 bus.



⚠ System Pump

The 441 provides a 24 V (ac) powered signal to activate a system pump. The system pump is powered off either a Zone Manager Zone Group Pump or off a 24 V (ac) coil Relay 003.

When connecting to a Zone Manager 335:

- Connect the Pump terminal on the 441 to terminal 3 labeled Pmp A on the 335. This activates Zone Group Pump A.

When connecting to a Zone Manager 336:

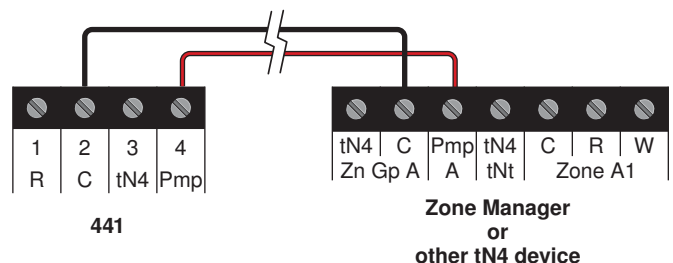
- Connect the Pump terminal on the 441 to terminal 3 labeled Pmp A on the 336. This activates Zone Group Pump A.

When connecting to a Zone Manager 337:

- Connect the Pump terminal on the 441 to terminal 3 labeled Pmp B on the 337. This activates Zone Group Pump B.

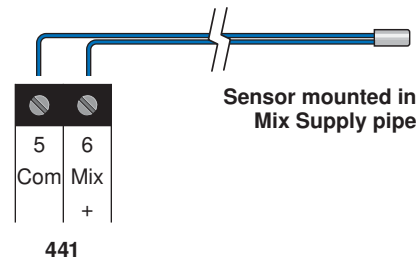
When using a Relay 003:

- Connect the Pump terminal on the 441 to terminal 2 on the Relay 003.
- Connect C on the 441 to terminal 7 on the Relay 003.
- Line voltage is connected to terminal 8 on the Relay 003.
- Switched line voltage for the pump is available on terminal 6 on the Relay 003.



⚠ Mix Sensor (tekmar 082)

Connect the two wires from the Mix Supply Sensor to the Com and Mix terminals. The Mix Supply Sensor is used by the control to measure the mix supply temperature.



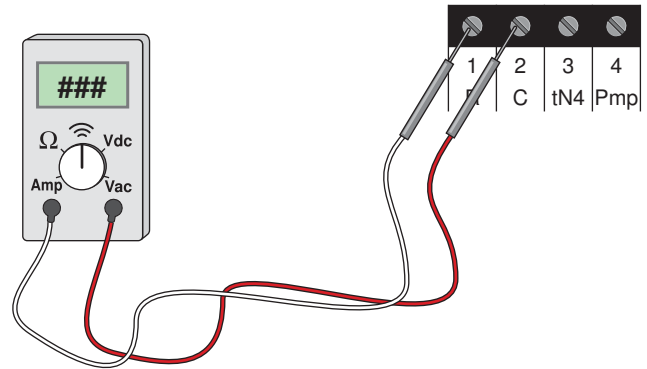
Troubleshooting the Wiring

⚠ General

The following tests are to be performed using standard testing practices and procedures and should only be carried out by properly trained and experienced persons.

A good quality electrical test meter, capable of reading from at least 0-300 V (ac), 0-30 V (dc), 0-2,000,000 Ohms, and testing for continuity is essential to properly test the wiring and sensors.

For an explanation on the use of the Test Button, the 'Test' sequence or any error messages, refer to the Data Brochure of the tN4 System Control.



Testing the Control

⚠ Testing the Power

The Power LED is green when 24 V (ac) is applied to the R and the C terminals. Use a voltmeter to check for 24 V (ac) +/- 10% on terminals R and C.

⚠ Testing the tN4 Communication

The tN4 Bus LED is green when the 441 detects communication. If the tN4 Bus LED is off, ensure that the tN4 and C wires are properly terminated on the 441 and at the device on the other end of the wires. The tN4 and C wires are polarity sensitive.

To check the tN4 and C wires, disconnect the wires on one end and connect them together using a wire nut. Then measure the other end of the wires using the continuity check on a digital multimeter.

⚠ Testing the System Pump

The System Pump LED is green when the Pump contact is energized. Use a voltmeter to check for 24 V (ac) +/- 10% between the Pump and the C terminal.

⚠ Testing tekmar Sensors

To test the sensors, the actual temperature at each sensor location must be measured.

- Use a good quality digital thermometer with a surface temperature probe for ease of use and accuracy. Where a digital thermometer is not available, strap a spare sensor alongside the one to be tested and compare the readings.
- Disconnect each sensor from the control.
- Test the sensors resistance according to the instructions in the sensor Data Brochure D 082.

Technical Data

tekmarNet[®]4 Mixing Expansion Module 441 Actuating Motor	
Control	Microprocessor PID control; This is not a safety (limit) control
Packaged Weight	1.53 lb. (694 g)
Enclosure	Blue PPO plastic
Dimensions	3-1/2" H x 3" W x 3-1/2" D (90 x 75 x 90 mm)
Approvals	CSA C US, CSA/UL 61010-1, meets Class B: ICES and FCC Part 15
Ambient Conditions	Indoor use only, 32 to 122 °F (0 to 50 °C) 92% RH up to 104 °F (40 °C), 50% RH if > 104 °F (40 °C) Altitude <9840 feet (3000 m), Installation Category II, Pollution Degree 2
Power Supply	24 V (ac) 50/60 Hz, 4 VA
Control Signal	tN4 Bus
System Pump Relay	24 V (ac), 2 A
Angle of Rotation	90 ° rotation, non-adjustable
Running Time	105 seconds (60 Hz), 126 seconds (50 Hz)
Maximum Torque	6 N•m (53 in•lb)
Sensor	NTC thermistor, 10 kΩ @ 77 °F (25 °C ± 0.2 °C) β = 3892
	– Included 1 of Universal Sensor 082
Other	– Included 2 of anti-rotation stops 1 of coupler with white arrow 1 of coupler with red arrow 1 of hand wheel with red stripe

The installer must ensure that this control and its wiring are isolated and/or shielded from strong sources of electromagnetic noise. Conversely, this Class B digital apparatus complies with Part 15 of the FCC Rules and meets all requirements of the Canadian Interference-Causing Equipment Regulations. However, if this control does cause harmful interference to radio or television reception, which is determined by turning the control off and on, the user is encouraged to try to correct the interference by re-orientating or relocating the receiving antenna, relocating the receiver with respect to this control, and/or connecting the control to a different circuit from that to which the receiver is connected.

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



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