tekmar® - Data Brochure

Mixing Expansion Module 444

tN4

D444
04/07

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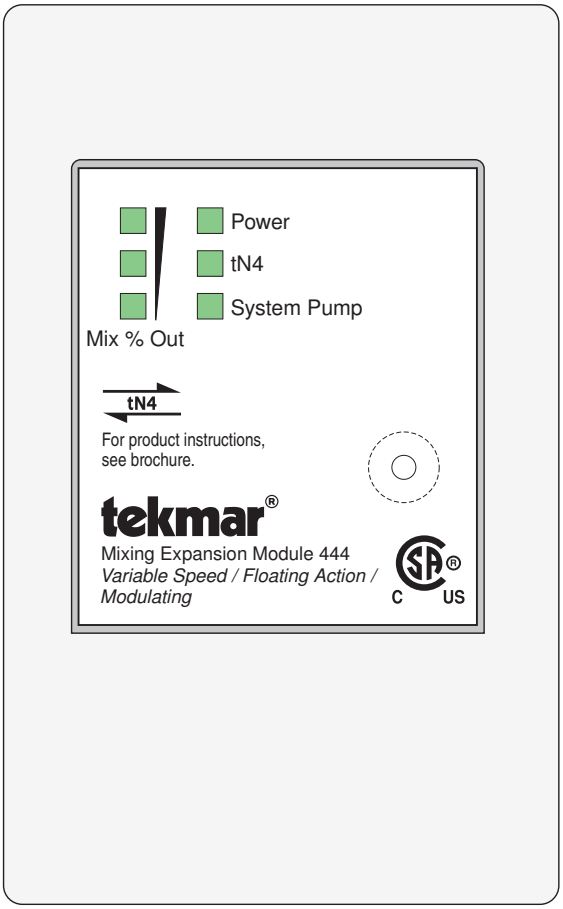
Choose controls to match application	Design your mechanical applications	Rough-in wiring instructions	Wiring and installation of specific control	Control settings and sequence of operation	Record settings & wiring details for future reference

Introduction

The Mixing Expansion Module 444 provides six options for operating a variable speed injection pump, a floating action actuator, or an analog 0-10 V (dc), 2-10 V (dc), 0-20 mA, or 4-20 mA signal. The 444 also provides an output for a system pump. The 444 cannot operate alone and requires the use of a tN4 System Control that is capable of operating a Mixing Expansion Module.

Features

- Requires a tN4 System Control
- Powered Variable Speed Injection Pump
- Powered 24 V (ac) Floating Action Output
- Analog 0-20 mA or 4-20 mA
- Analog 0-10 V (dc) or 2-10 V (dc)
- Powered 120 V (ac) System Pump
- Powered 24 V (ac) System Pump Signal
- CSA C US Certified for use in USA and Canada



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Sequence of Operation

The tN4 System Control determines the required mix supply water temperature based on its settings and the requirements of the tN4 thermostats connected to the same tN4 bus as the 444.

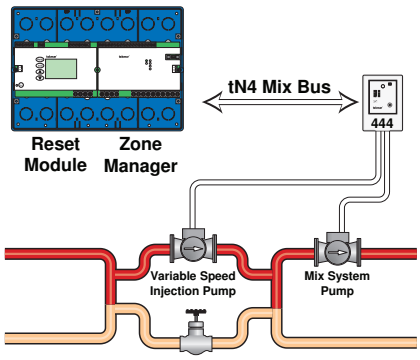
The 444 operates a mixing device to maintain the required water temperature at its Mix Supply sensor. A mixing device can include:

- Variable speed injection pump.
- Floating action actuated mixing valve.
- Analog signal actuated mixing valve.
- Analog signal to variable frequency drive (VFD) operated pump.
- Analog signal to modulating steam to hot water valve.

Variable Speed Injection

A standard wet rotor circulator can be connected to the variable speed output on the back of the module. The control increases or decreases the power output to the circulator when there is a requirement for mixing. The circulator speed varies to maintain the correct mixed supply water temperature at the mix supply sensor. For correct sizing and piping of the variable speed injection circulator, refer to essay E 021.

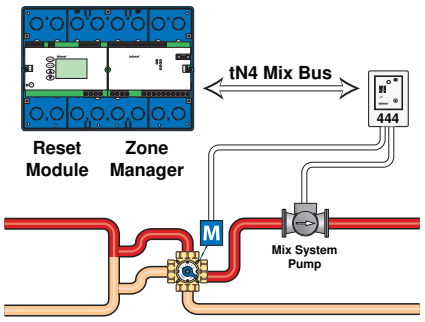
A visual indication of the current variable speed output is displayed by the Mix % Out LED bar graph.



Floating Action

A floating action actuator motor can be connected to the control on the Opn and Cls terminals. The module pulses the actuator motor with 24 V (ac) to open or close the valve in order to maintain the correct supply water temperature at the mix supply sensor when there is a requirement for mixing. The mixing valve that the actuator is connected to can be either a 2-way, 3-way or 4-way valve.

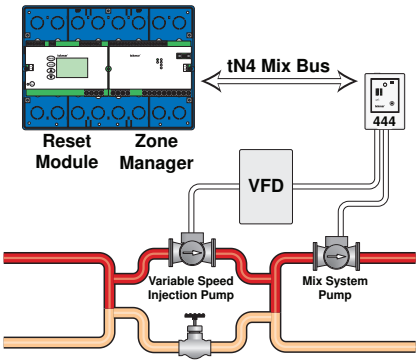
A visual indication of the current variable speed output is displayed by the Mix % Out LED bar graph.



Analog Signal

An analog 0-10 V (dc), 2-10 V (dc), 0-20 mA, or 4-20 mA signal can be provided by the modulating output on the control. The analog signal can be used to operate a modulating mixing valve, a modulating steam to hot water valve, or a variable frequency drive (VFD) which in turn operates a pump.

A visual indication of the analog output is displayed by the Mix % Out LED bar graph.



System Pump Operation

The system pump contact operates based on the settings of the tN4 thermostats connected to the same tN4 bus as the 444.

When a tN4 Thermostat calls for the first stage of heat, and the Mixing Expansion Module is connected to the same tN4 bus, then the “Heat 1 Pump” and the “Heat 1 Pump Delay” settings affect the Mixing Expansion Module’s system pump operation.

The system pump turns on together with the thermostat call for heat when “Heat 1 Pump” is set to On and “Heat 1 Pump Delay” is set to Off.

The system pump turns on after a 3 minute delay from the thermostat call for heat when “Heat 1 Pump” is set to On and “Heat 1 Delay” is set to On.

In cases where the tN4 Thermostat calls for the second stage of heat, and the Mixing Expansion Module is located on the second stage tN4 bus, then the “Heat 2 Pump” and the “Heat 2 Pump Delay” settings affect the Mixing Expansion Module’s system pump operation.

DIP Switch Settings

Remove the module cover to locate the DIP switches.

Actuator / Variable

Select the Actuator / Variable DIP switch to Variable to operate a variable speed injection pump. Select the Actuator / Variable DIP switch to Actuator to operate a floating action mixing valve or provide an analog signal output 0-10 V (dc), 2-10 V (dc), 0-20 mA, 4-20 mA.

0-10 V (dc) / 2-10 V (dc)

This DIP switch only applies if the Actuator / Variable DIP switch is set to Actuator. This DIP switch position does not apply when using a floating action motor.

Select the 0-10 V (dc) / 2-10 V (dc) DIP switch to 0-10 V (dc) to operate a 0-10 V (dc) device. (Cut jumper for a 0-20 mA device).

Select the 0-10 V (dc) / 2-10 V (dc) DIP switch to 2-10 V (dc) to operate a 2-10 V (dc) device. (Cut jumper for a 4-20 mA device).

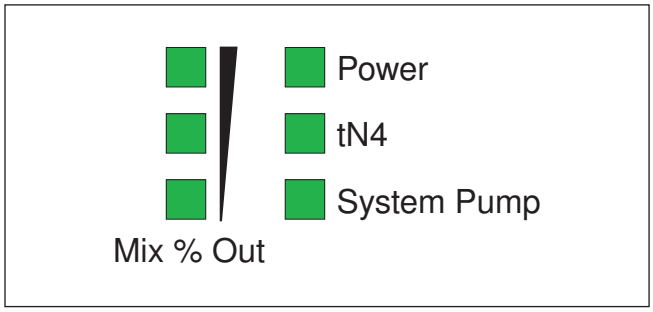
LED Status Indicators

Power LED

- **Green:** Normal operation.
- **Off:** No power to the Mixing Expansion Module.

tN4 LED

- **Solid Green:** The Mixing Expansion Module established tN4 communication to a tN4 System Control.
- **Flashing Green:** Attempting to establish communication with tN4 System Control. This is normal for the first 3 minutes after power is turned on.
- **Off:** There is no tN4 communication to a tN4 system control.



System Pump LED

- **Green:** The system pump relay is on.
- **Off:** The system pump relay is off.

Mix % Out Bar Graph LEDs

The number of bar graph LEDs flashing or on solid indicate the mixing device output.

Mix % Output	0-33 %	34-66 %	67-99%	100%
LED 3	Off	Off	Flash	On
LED 2	Off	Flash	On	On
LED 1	Flash	On	On	On

Cleaning the Module

The module's exterior can be cleaned using a damp cloth. Moisten the cloth with water and wring out prior to wiping the module. Do not use solvents or cleaning solutions.

Error Messages

Power LED	tN4 LED	Error Condition
ON	OFF	**tN4 Bus open or short circuit.** • Check wiring for loose or broken wires. • Check for a short circuit between tN4 and C. • Check polarity on the R and C wires.
ON	FLASHING	**Flashing tN4 LED is normal on power up. If flashing tN4 LED continues for more than 3 minutes:** • Ensure there is a tN4 System Control on the tN4 bus. • Ensure the Mixing Expansion Module is on a mix tN4 bus and NOT on a boiler tN4 bus. • Ensure there are not multiple Mixing Expansion Modules on the same mix tN4 bus. • tN4 System Control will display error message. See tN4 System Control and literature for troubleshooting.

Limited Warranty and Product Return Procedure

Limited Warranty ***The liability of tekmar under this warranty is limited. The Purchaser, by taking receipt of any tekmar product ("Product"), acknowledges the terms of the Limited Warranty in effect at the time of such Product sale and acknowledges that it has read and understands same.***

The tekmar Limited Warranty to the Purchaser on the Products sold hereunder is a manufacturer's pass-through warranty which the Purchaser is authorized to pass through to its customers. Under the Limited Warranty, each tekmar Product is warranted against defects in workmanship and materials if the Product is installed and used in compliance with tekmar's instructions, ordinary wear and tear excepted. The pass-through warranty period is for a period of twenty-four (24) months from the production date if the Product is not installed during that period, or twelve (12) months from the documented date of installation if installed within twenty-four (24) months from the production date.

The liability of tekmar under the Limited Warranty shall be limited to, at tekmar's sole discretion: the cost of parts and labor provided by tekmar to repair defects in materials and/or workmanship of the defective product; or to the exchange of the defective product for a warranty replacement product; or to the granting of credit limited to the original cost of the defective product, and such repair, exchange or credit shall be the sole remedy available from tekmar, and, without limiting the foregoing in any way, tekmar is not responsible, in contract, tort or strict product liability, for any other losses, costs, expenses, inconveniences, or damages, whether direct, indirect, special, secondary, incidental or consequential, arising from ownership or use of the product, or from defects in workmanship or materials, including any liability for fundamental breach of contract.

The pass-through Limited Warranty applies only to those defective Products returned to tekmar during the warranty period. This Limited Warranty does not cover the cost of the parts or labor to remove or transport the defective Product, or to reinstall the repaired or replacement Product, all such costs and expenses being subject to Purchaser's agreement and warranty with its customers.

Any representations or warranties about the Products made by Purchaser to its customers which are different from or in excess of the tekmar Limited Warranty are the Purchaser's sole responsibility and obligation. Purchaser shall indemnify and hold tekmar harmless from and against any and all claims, liabilities and damages of any kind or nature which arise out of or are related to any such representations or warranties by Purchaser to its customers.

The pass-through Limited Warranty does not apply if the returned Product has been damaged by negligence by persons other than tekmar, accident, fire, Act of God, abuse or misuse; or has been damaged by modifications, alterations or attachments made subsequent to purchase which have not been authorized by tekmar; or if the Product was not installed in compliance with tekmar's instructions and/or the local codes and ordinances; or if due to defective installation of the Product; or if the Product was not used in compliance with tekmar's instructions.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, WHICH THE GOVERNING LAW ALLOWS PARTIES TO CONTRACTUALLY EXCLUDE, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, DURABILITY OR DESCRIPTION OF THE PRODUCT, ITS NON-INFRINGEMENT OF ANY RELEVANT PATENTS OR TRADEMARKS, AND ITS COMPLIANCE WITH OR NON-VIOLATION OF ANY APPLICABLE ENVIRONMENTAL, HEALTH OR SAFETY LEGISLATION; THE TERM OF ANY OTHER WARRANTY NOT HEREBY CONTRACTUALLY EXCLUDED IS LIMITED SUCH THAT IT SHALL NOT EXTEND BEYOND TWENTY-FOUR (24) MONTHS FROM THE PRODUCTION DATE, TO THE EXTENT THAT SUCH LIMITATION IS ALLOWED BY THE GOVERNING LAW.

Product Warranty Return Procedure All Products that are believed to have defects in workmanship or materials must be returned, together with a written description of the defect, to the tekmar Representative assigned to the territory in which such Product is located. If tekmar receives an inquiry from someone other than a tekmar Representative, including an inquiry from Purchaser (if not a tekmar Representative) or Purchaser's customers, regarding a potential warranty claim, tekmar's sole obligation shall be to provide the address and other contact information regarding the appropriate Representative.

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