

tekmar® - Wiring Brochure

tN2 Zone Expansion Module 324



W324
12/10

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Introduction

The following wiring brochure describes how to wire the tekmar tN2 Zone Expansion Module 324. The 324 is to be installed in an enclosure together with a tekmar Zone Manager. The 324 allows for up to four tekmarNet®2 Thermostats, four zone pumps or four zone valves, and one zone group pump.

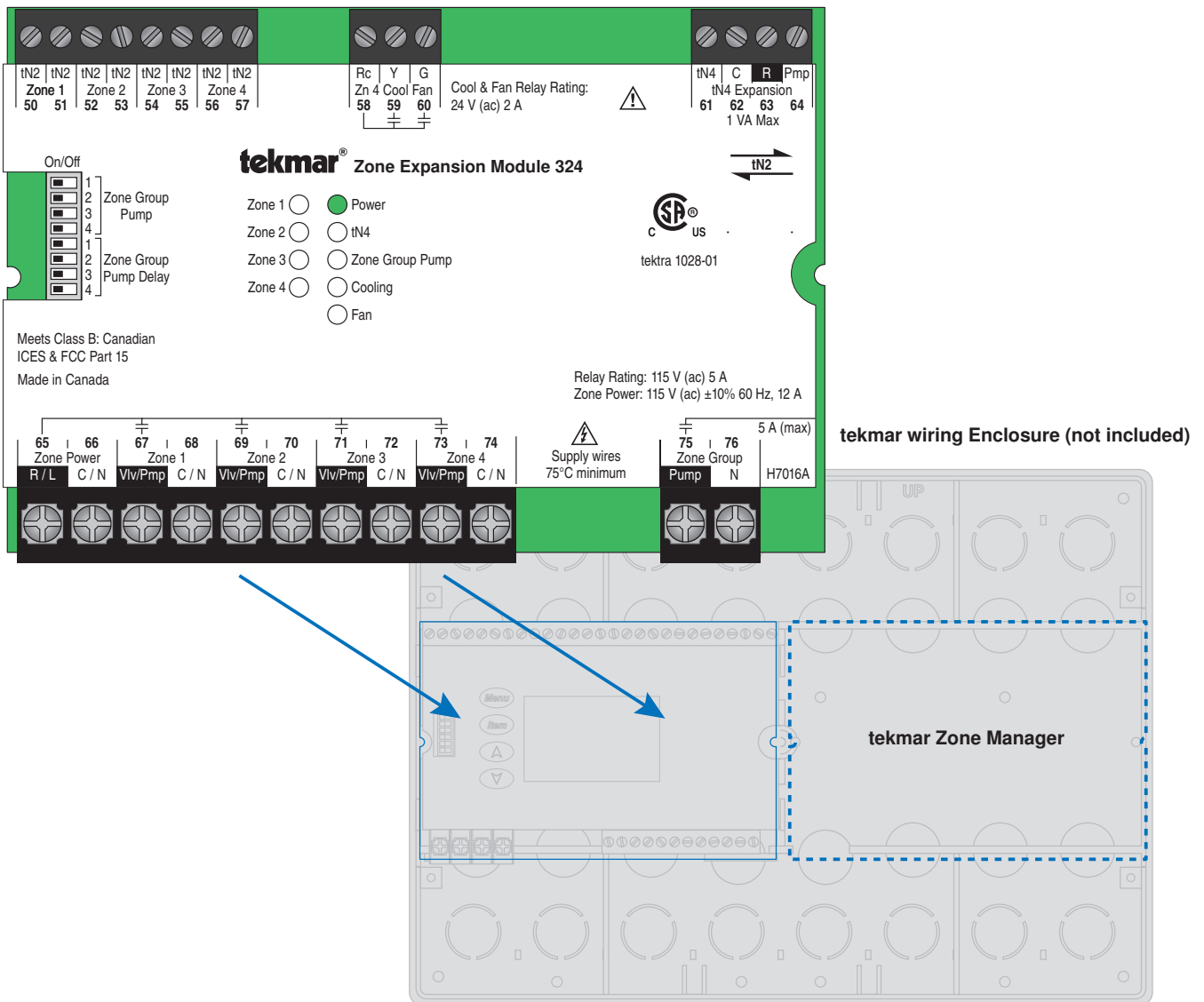







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Wiring Symbols

	Powered switch. 24-115 V (ac) power, switched output to valve, pump, etc.		Black reverse lettering denotes an internally powered output.
	tekmarNet®2		Earth ground.
	Fuse, field replaceable.		

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



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**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 uses 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. Apart from any field replaceable fuse(s) 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.

Module Installation

Install the tN2 Zone Expansion Module 324 in the left side of a tekmarNet® wiring enclosure. The enclosure comes with a Zone Manager pre-installed in the right side. Review the figure below to understand the installation of the 324.

To Install the 324

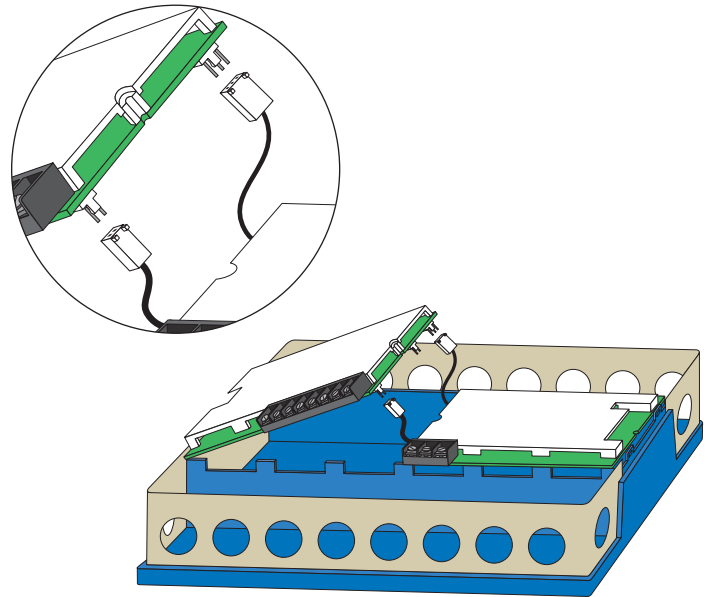
1. Remove the front cover of the wiring enclosure by removing the two screws.
2. Remove the left side blank cover by removing the center screw holding the blank cover and the Zone Manager in place. Make sure the Zone Manager stays in place.
3. Discard the blank.
4. The 324 has connector pins protruding from the underside of the board. The Zone Manager has wiring harnesses with plugs that connect to these pins.

Remove the required wiring harnesses from their retaining clips in the enclosure.


5. Carefully connect the Zone Manager's plugs onto the pins on the underside of the 324.

There is one smaller gauge connector with three pins and one larger gauge connector with 2 pins. These connectors can be installed only one way. Take care to ensure a good connection and avoid bending the pins.

6. Lower the 324 into the enclosure at an angle. Insert the two tabs on the left side of the 324 in to the corresponding slots in the left side of the wiring enclosure.
7. Lower the 324 toward the center of the enclosure until the two halves fit together. Make sure that the connector wires are placed underneath without pinching the wire.
8. Replace the center screw to hold the two controls in place.
9. Strip all wiring to a length of 3/8 in. or 10 mm for all terminals.



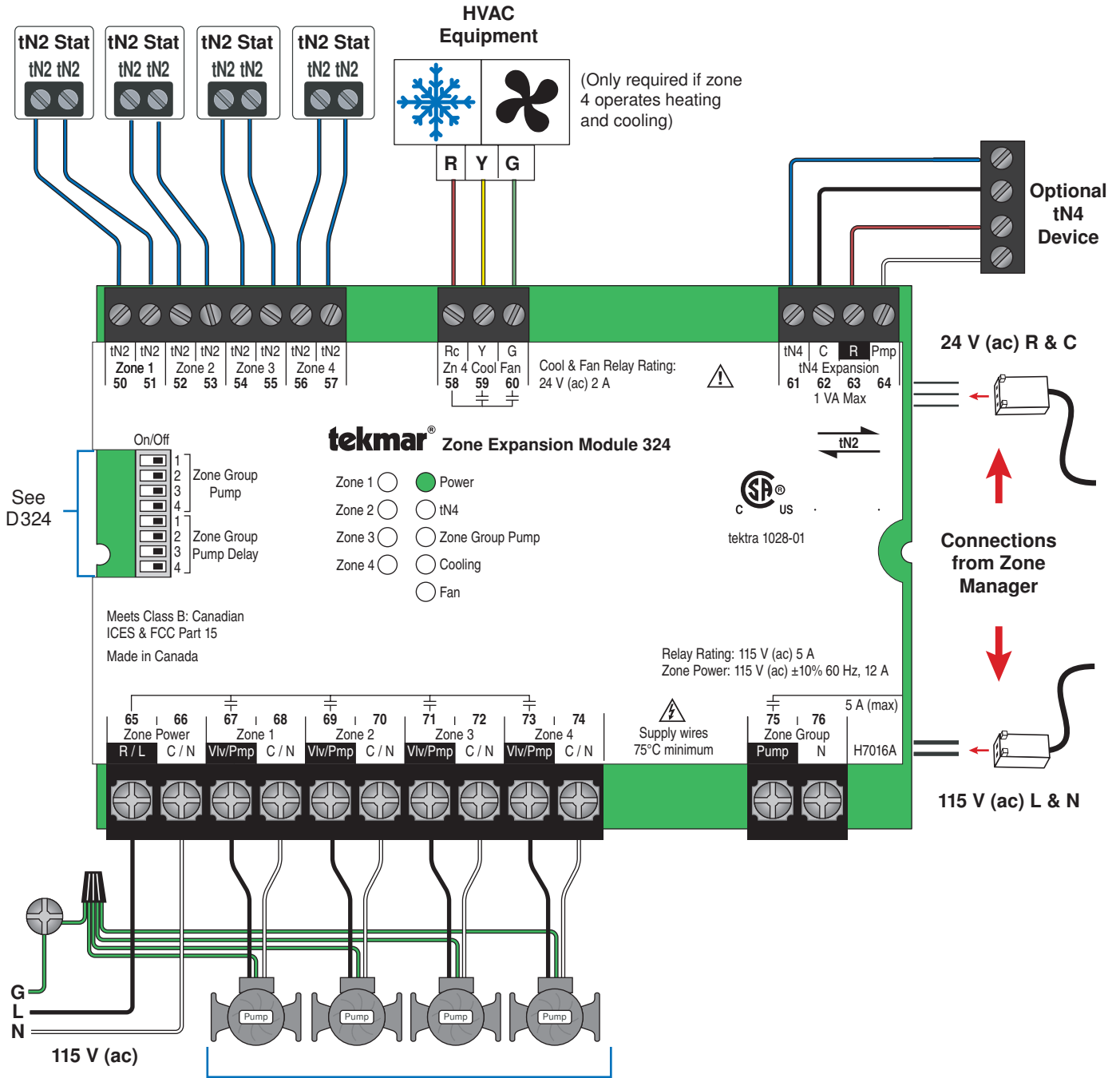
Electrical Drawings

 The electrical drawing examples on the following pages show the 324 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

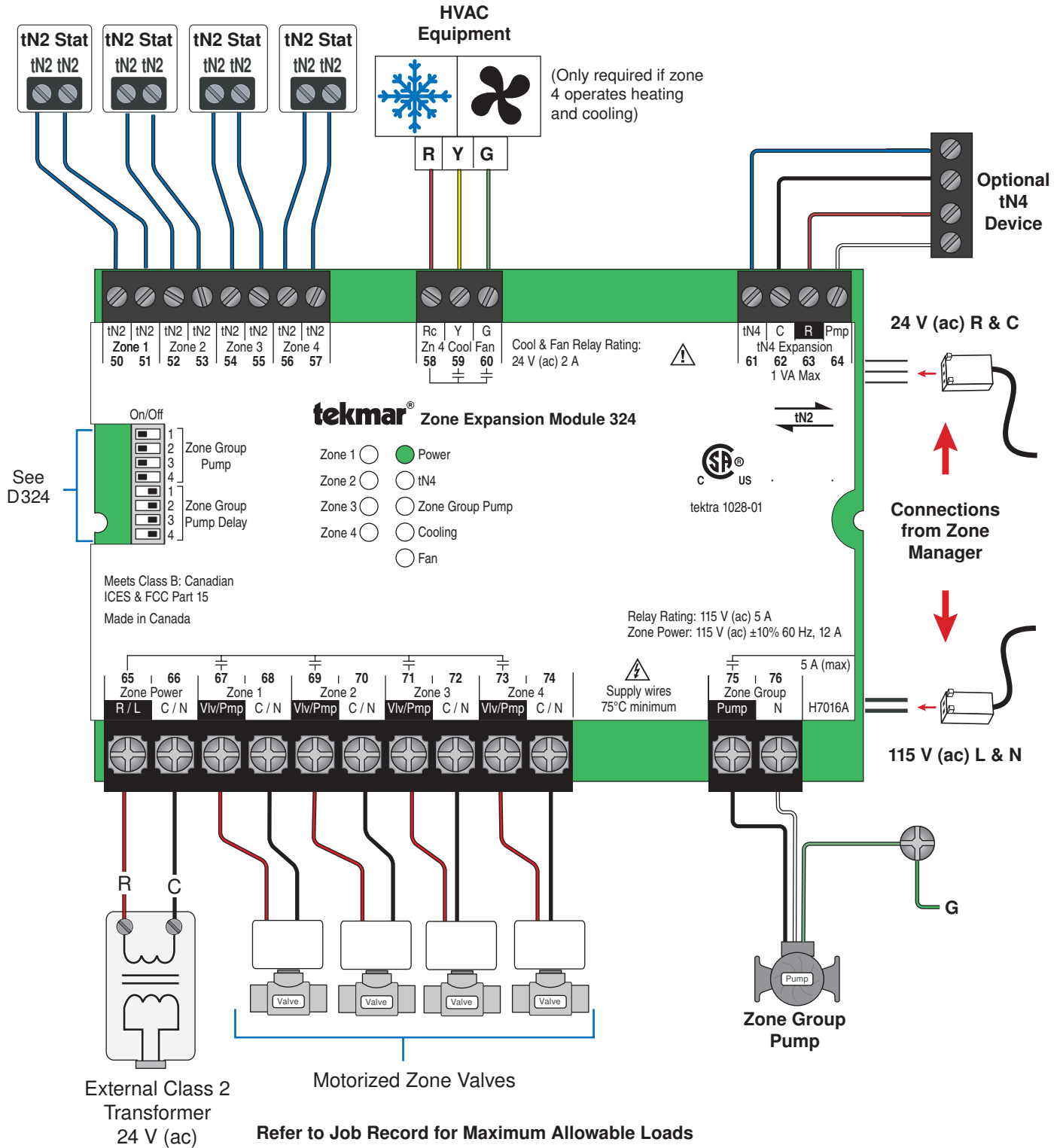
determine the necessary components for and configuration of the particular system being designed including additional equipment isolation relays (for loads greater than the controls specified output ratings) and any safety devices which in the judgment of the designer are appropriate in order to properly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

Description: tN2 Zone Expansion Module 324; Four tN2 Thermostats, and Four Zone Pumps (separate power).

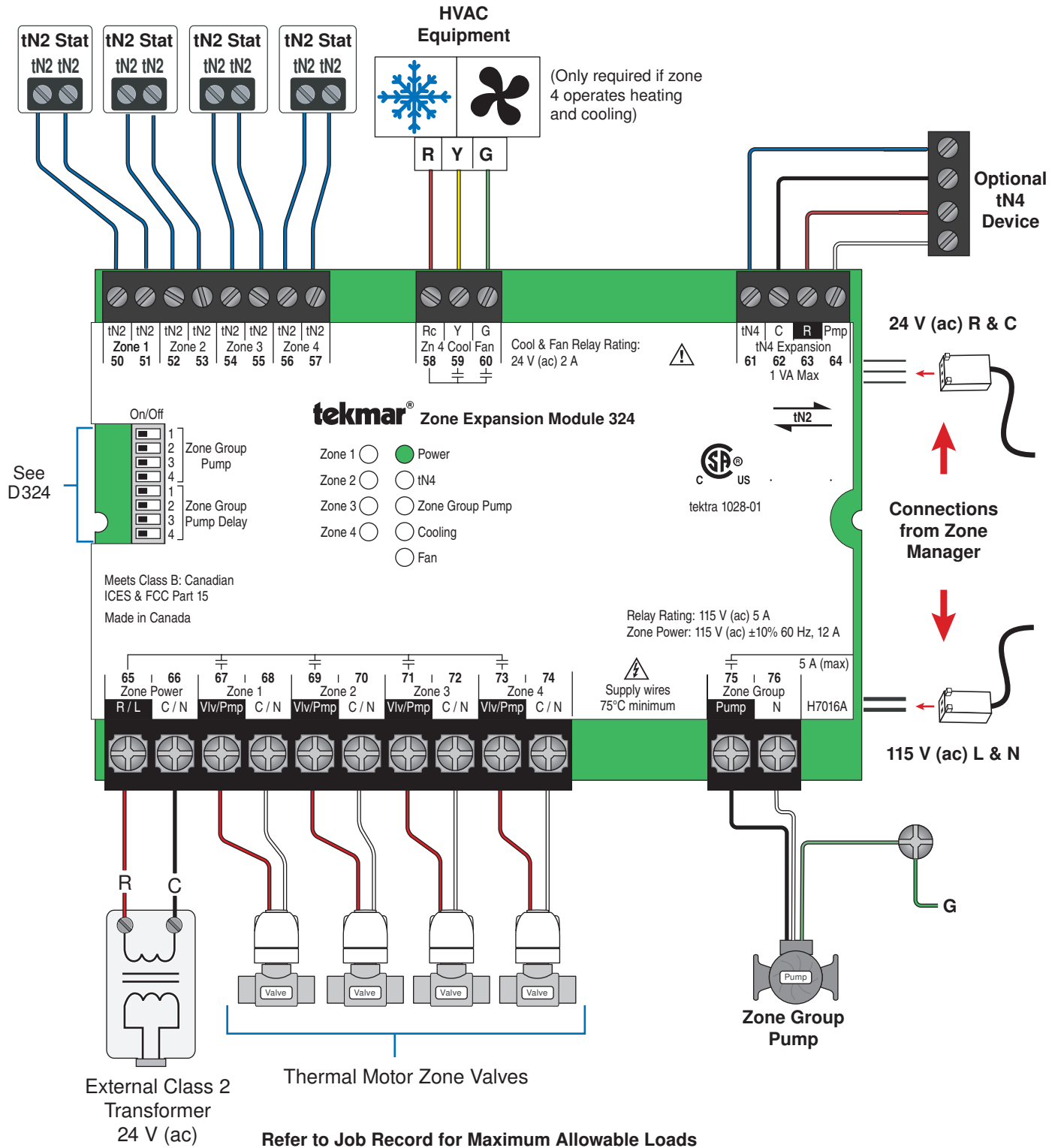


Refer to Job Record for Maximum Allowable Loads

Description: tN2 Zone Expansion Module 324; Four tN2 Thermostats, Four Zone Valves (separate power), Zone Group Pump.



Description: tN2 Zone Expansion Module 324; Four tN2 Thermostats, Four Thermal Motor Zone Valves (separate power), Zone Group Pump.



⚠ This section explains how to wire individual devices to the tN2 Zone Expansion Module 324. For step by step wiring refer to the terminal number on the right of the page.

- Before wiring ensure all power is turned off and take all necessary precautions.
- Install the supplied wiring compartment barriers by sliding them into the grooves provided to isolate the low and high voltage wiring.

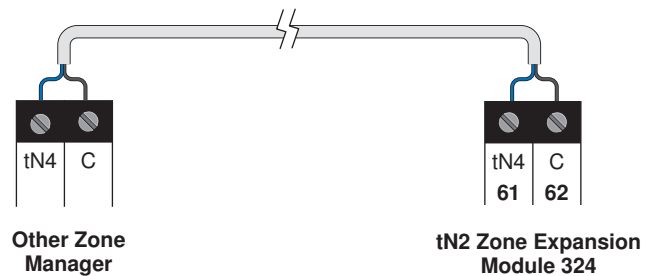
- Strip all wiring to a length of 3/8 in. or 10 mm for all terminals.
- Refer to the current and voltage ratings at the back of this brochure before connecting devices to this control.

⚠ Wiring tekmarNet®4 (tN4) between Zone Managers

Terminals 61 and 62 provide a tN4 connection for tN4 devices on the tN4 bus. Connect terminals 61 (tN4) and 62 (C) to the corresponding terminals on the tN4 devices that are to be connected to the tN4 bus.

Polarity is important.

Ensure that terminal 61 (tN4) is connected to the tN4 terminal on the tN4 device and that terminal 62 (C) is connect to the C terminal on the tN4 device.

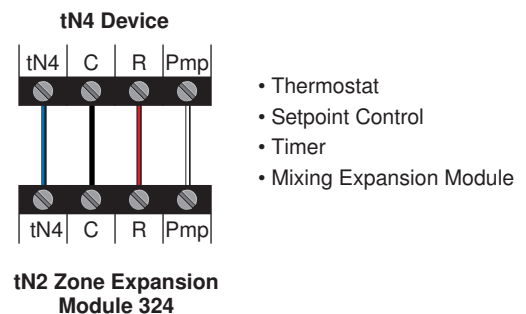


⚠ Wiring tekmarNet®4 (tN4) to tN4 Devices

Terminals 61, 62, 63, and 64 can be wired to tN4 thermostats, tN4 setpoint controls, tN4 timer or to mixing expansion modules.

- Connect the tN4 terminal 61 on the 324 to the tN4 terminal on the device.
- Connect the C terminal 62 on the 324 to the C terminal on the device.
- Connect the R terminal 63 on the 324 to the R terminal on the device.
- Connect the Pmp terminal 64 on the 324 to:
 - The W or W1 terminal on a thermostat (or W2 in the case of second stage heat).

- The R1 terminal on a setpoint control (or R2 for recirculation pump)
- The Pmp terminal on a Mixing Expansion Module.

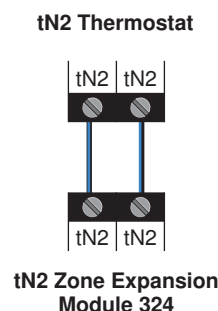


⚠ Wiring tekmarNet®2 (tN2) to tN2 Thermostats

Up to four tekmarNet®2 (tN2) thermostats may be wired to the 324 on Zone 1, 2, 3, and 4.

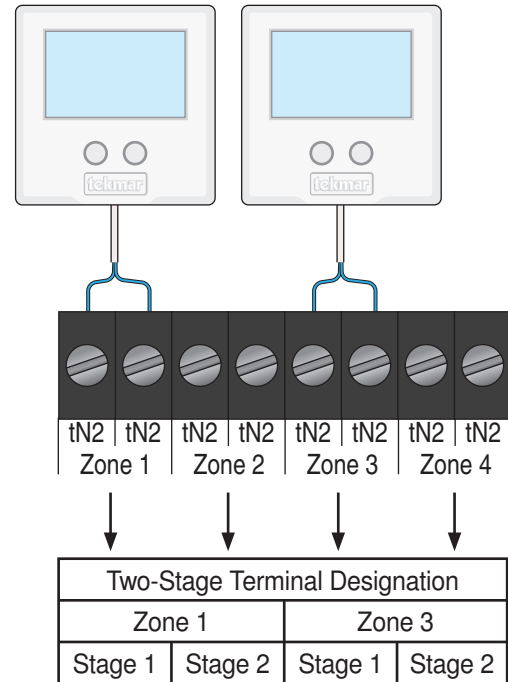
- Connect each of the tN2 terminals on the 324 to the tN2 terminals on the tN2 thermostat.

The tN2 wires are not polarity sensitive.



Two-Stage tN2 Thermostats

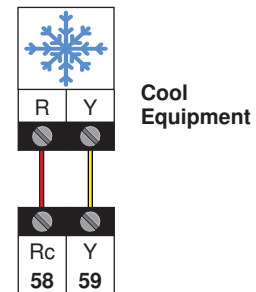
A two-stage thermostat is automatically detected when connected to Zone 1 or Zone 3. If there is no tN2 thermostat connected to Zone 2 or Zone 4, these outputs will automatically operate the heating equipment for 2nd stage heat.



⚠ Wiring the Cooling Contacts

Zone 4 can be connected to a Heat, Cool, Fan tN2 thermostat which in turn operates the Cool relay on terminals 58 and 59.

- Rc - Y is an isolated switch. No power is available from these terminals.
- Connect terminal 58 (Rc) on the thermostat to R on the cooling equipment.
- Connect terminal 59 (Y) on the thermostat to Y on the cooling equipment.

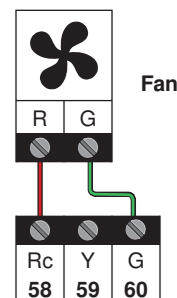


tN2 Zone Expansion Module 324

⚠ Wiring the Fan Contacts

Zone 4 can be connected to a Heat, Cool, Fan tN2 thermostat which in turn operates the Fan relay on terminals 58 and 60.

- Rc - G is an isolated switch. No power is available from these terminals.
- Connect terminal 58 (Rc) on the thermostat to R on the fan equipment.
- Connect terminal 60 (G) on the thermostat to G on the fan equipment.



tN2 Zone Expansion Module 324

⚠ Wiring the Zone Group Pump

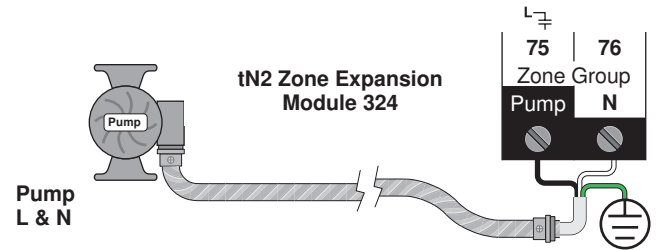
Terminals 75 - 76

The 324 can operate one Zone Group Pump.

If the Zone Group Pump is used, the pump is wired directly to terminals 75 and 76.

The pump's ground wires are connected to the ground screw provided in the wiring chamber.

Note: For pumps larger than the control's rated capacity, an external isolation relay must be used.



⚠ Wiring the Zone Power

Terminals 65 - 66

Zones 1 through Zone 4 are all powered through the Zone Power on terminals 65 and 66. The zones can all operate at 24 V (ac) for zone valves or all at 115 V (ac) for zone pumps.

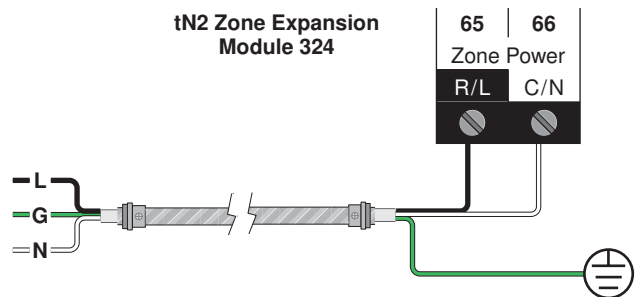
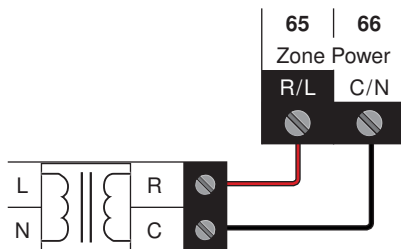
For 24 V (ac) zone valves:

- An external 24 V (ac) transformer is required. The transformer VA rating must exceed the VA total of the Zone Valves.
- Connect the 24 V (ac) transformer "R" or red wire to terminal 65.
- Connect the 24 V (ac) transformer "C" or black wire to terminal 66.

For 115 V (ac) zone pumps:

- Connect 115 V hot (L) to terminal 65.
- Connect 115 V neutral (N) to terminal 66.
- Connect the ground wire to one of the ground screws provided in the wiring chamber.

Note: For pumps larger than the control's rated capacity, an external isolation relay must be used.



⚠ Wiring the Zone Outputs

Terminals 67 - 74

Zone Valves

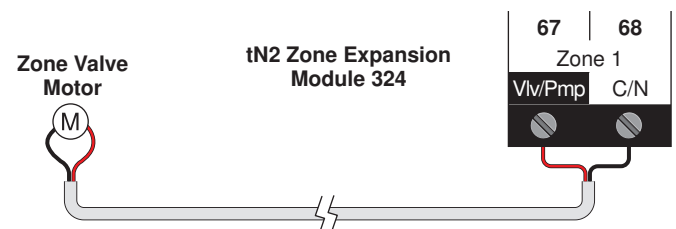
Up to four 24 V (ac) zone valves may be wired to the 324.

The maximum VA of the zone valves is limited by the VA rating of the external transformer.

Two terminals are provided for each zone valve. These two terminals provide 24 V (ac) to the zone valve.

- Connect the C terminal on the 324 to one wire of the zone valve motor.
- Connect the Vlv terminal on the 324 to the second wire on the zone valve motor.

The zone valve end switch wires are not required.



Zone Pumps

Up to four 115 V (ac) zone pumps may be wired to the 324.

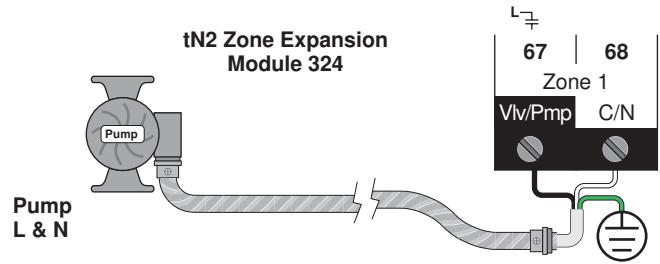
Each zone pump is wired to a Pmp and N terminal on the 324.

For each zone:

- Connect the pump L to the Pmp terminal.
- Connect the pump N to the N terminal.

The pump ground wire is connected to the ground screw provided in the wiring chamber.

Note: For pumps larger than the control's rated capacity, an external isolation relay must be used.

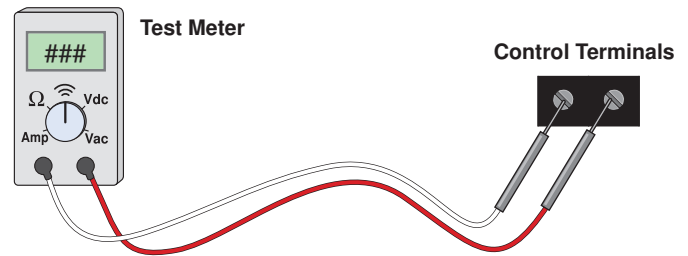


Troubleshooting the Control

⚠ 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.



⚠ Testing the tN4 Network

Terminals 61 - 62

The tN4 communication is operating correctly when the tN4 LED light is on solid.

⚠ Testing the Zone Group Pump

Terminals 62, 64

1. Remove the front cover from the control.
2. Use an electrical test meter to measure the (ac) voltage between the Pmp and the C terminals (64 and 62).

When the Zone Group Pump light is off, the reading should be 0 V (ac) and the pump should be off.

When the Zone Group Pump light is on, the reading should be 24 V (ac) + / - 10% and the pump should be running.

Note: If the pump does not operate properly, refer to any troubleshooting information supplied by the pump manufacturer.

⚠ Testing the tN2 Thermostat Connection

Terminals 50 - 57

If the thermostat display turns on this indicates that the thermostat is operating correctly and there are no electrical issues.

In the event that a thermostat display does not turn on:

1. Remove the tN2 wires from the affected zone on the 324.
2. Use an electrical test meter to measure DC voltage between the tN2 terminals on the 324 for 20 seconds.

3. If the DC voltage is 0 V (dc) for 10 seconds and then is 23 to 24 V (dc) for 5 seconds, this indicates the 324 is operating correctly.

4. If the DC voltage remains at 0 V (dc) at the 324 for 20 seconds, there may be a fault on the 324. Contact your local tekmar sales representative for assistance.

Testing the Zone Group Pump Output

Terminals 75 - 76

1. Remove the front cover from the control.
2. Use an electrical test meter to measure the (ac) voltage between the Zone Group Pump terminals (75 and 76).
3. When the Zone Group Pump light is off, the reading should be 0 V (ac) and the pump should be off.
4. When the Zone Group Pump light is on, the reading should be 115 V (ac) + / - 10% and the pump should be running.

Note: If the pump does not operate properly, refer to any troubleshooting information supplied by the pump manufacturer.

Testing the Zone Outputs

Terminals 67 - 74

1. Remove the front cover from the control.
2. Check to ensure that correct Input Power is present.
3. Use the Zone Test on the tN4 System Control to turn on each zone, one at a time.
4. When the Zone light is on, test for continuity on the corresponding zone output.
 - If continuity is present, the relay is operating correct.
 - If continuity is not present, the relay has malfunctioned.
5. When the Zone light is off, test for continuity on the corresponding zone output.
 - If continuity is not present, the relay is operating correctly.
 - If continuity is present, the relay has malfunctioned.

Testing the Cooling Contact

Terminals 58 - 59

Testing the Cooling contact requires that a Heat, Cool, Fan tN2 thermostat be connected to zone 4.

1. Set the thermostat mode to Cool.
2. Change the thermostat cooling setpoint below the current temperature in the room.
3. When the Cooling light is on, test for continuity on the Rc and Y terminals.
 - If continuity is present, the relay is operating correct.
 - If continuity is not present, the relay has malfunctioned.
4. When the Cooling light is off, test for continuity on the Rc and Y terminals.
 - If continuity is not present, the relay is operating correctly.
 - If continuity is present, the relay has malfunctioned.

Testing the Fan Contact

Terminals 58, 60

Testing the Fan contact requires that a Heat, Cool, Fan thermostat be connected to zone 4.

1. Set the thermostat mode to Vent. Alternatively set the thermostat mode to Cool.
2. Change the thermostat ventilation percent to On. Alternatively set the cooling setpoint below the current temperature in the room.
3. When the Fan light is on, test for continuity on the Rc and G terminals.
 - If continuity is present, the relay is operating correct.
 - If continuity is not present, the relay has malfunctioned.
4. When the Fan light is off, test for continuity on the Rc and G terminals.
 - If continuity is not present, the relay is operating correctly.
 - If continuity is present, the relay has malfunctioned.

Technical Data

tN2 Zone Expansion Module 324; *Four Zones, Cooling & Fan*

Control	Microprocessor PID control; This is not a safety (limit) control
Packaged weight	4.86 lb (2200 g)
Dimensions	3-5/8" H x 5-3/8" W x 9/16" D (92 x 137 x 14 mm)
Approvals	CSA C US, CSA/UL 61010-1, meets Class B: ICES and FCC Part 15
Ambient conditions	Indoor use only, 32 to 109°F (0 to 43°C)
	RH max 80% to 87°F (31 °C), down to 50% at 104°F (40°C)
	Altitude < 6560 feet (2000 m), Installation Category II, Pollution Category 2
Power Supply	Provided by interconnected Zone Manager or Power Manager
Zone Group Pump Relay	115 V (ac) 5 A
Zone Relays	115 V (ac) 5 A
Combined Load on Zone Power	12 A Maximum
Cool and Fan Relays	24 V (ac) 2 A

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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