tekmar® - Wiring Brochure

Zone Expansion Module 325

tN4

W325
12/08

Overview

The following wiring brochure describes how to wire the tekmar Zone Expansion Module 325. The 325 is to be installed in an enclosure together with a tekmar Zone Manager. The 325 controls up to six tekmarNet®4 (tN4) thermostats, six 24 V (ac) zone valves, and one 115 V (ac) Zone Group Pump. The wiring of tekmarNet®4 (tN4) components is simple and cost effective.

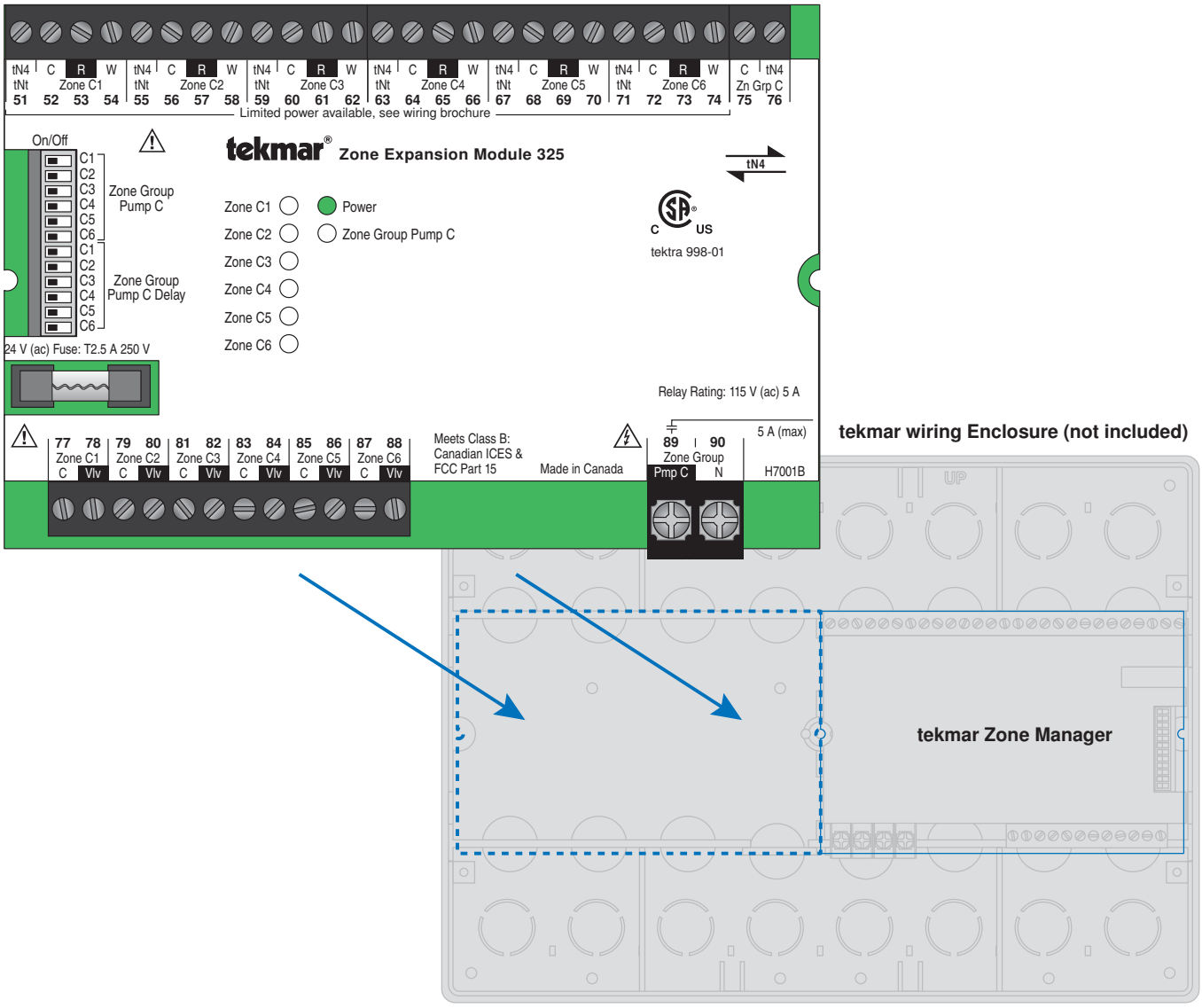

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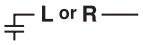
Table of Contents

Wiring Symbols

	Demand, signals control to operate. Requires a power and neutral connection. Use 24 to 260 V (ac), usually switched externally. **Example:** DHW Demand		Fuse, field replaceable.
	Dry contact switch. Operates a device. **Example:** Boiler	Do Not Apply Power	**Do not apply power** to these terminals. Serious control damage will result.
	Powered switch. 24-115 V (ac) power, switched output to valve, pump, etc.		Earth ground
	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

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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

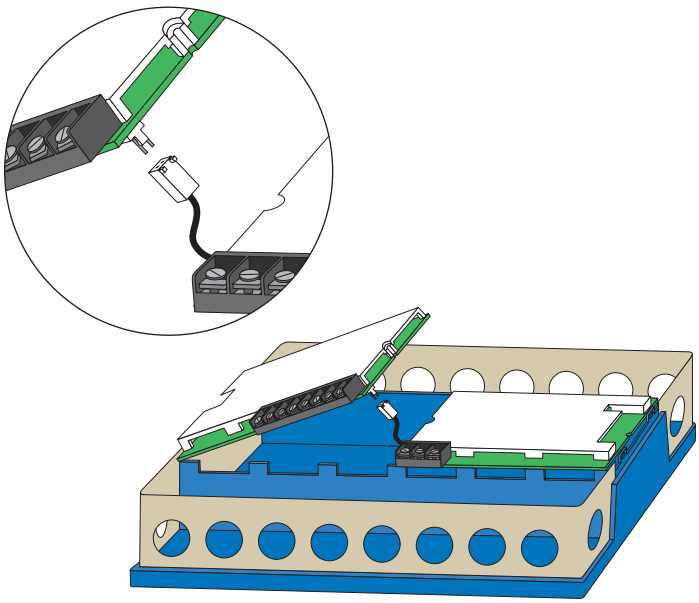
Install the Zone Expansion Module 325 in the left side of a tekmarNet®4 (tN4) wiring enclosure. The enclosure comes with a Zone Manager pre-installed in the right side. Review the figure below to understand the installation of the 325:

To Install the 325

1. Remove the front cover of the wiring enclosure by removing the two screws.
2. Remove the left side blank by removing the center screw holding the blank and the Zone Manager in place. Make sure the Zone Manager stays in place.
3. Discard the blank.
4. The 325 has connector pins protruding from the underside of the board. The Zone Manager has two wiring harnesses with plugs. Remove the larger gauge wiring harness from its retaining clip in the enclosure. The smaller one is not required.
5. Carefully connect the Zone Manager's free plug onto the pins on the underside of the 325.

- Take care to ensure a good connection and avoid bending the pins.

6. Lower the 325 into the enclosure at an angle. Insert the two tabs on the left side of the 325 in to the corresponding slots in the left side of the wiring enclosure.
7. Lower the 325 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 325 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 judgement 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.

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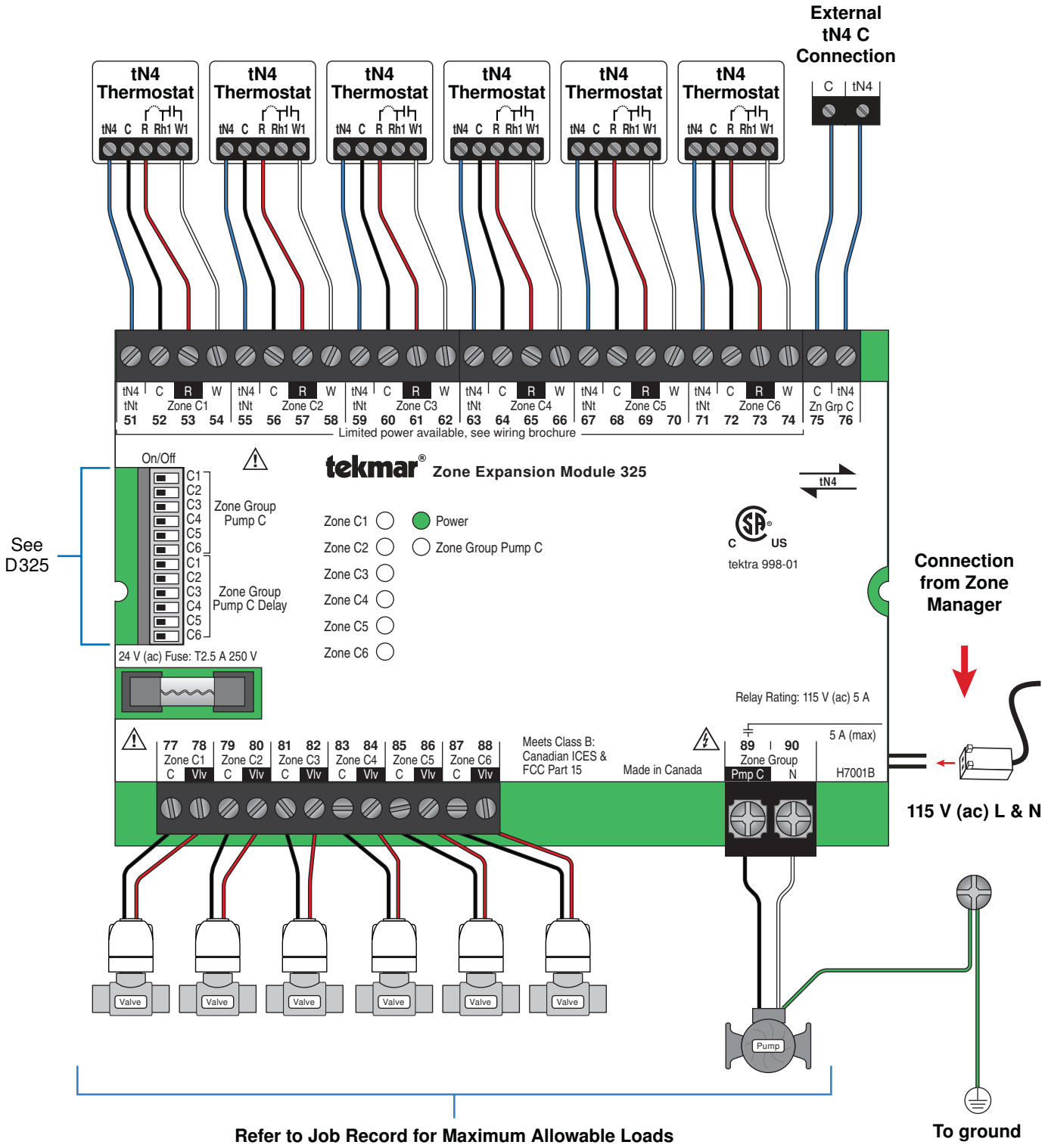
Description: tekmarNet®4 Zone Expansion Module 325, six tekmarNet®4 Thermostats, six zone valves, zone group pump.



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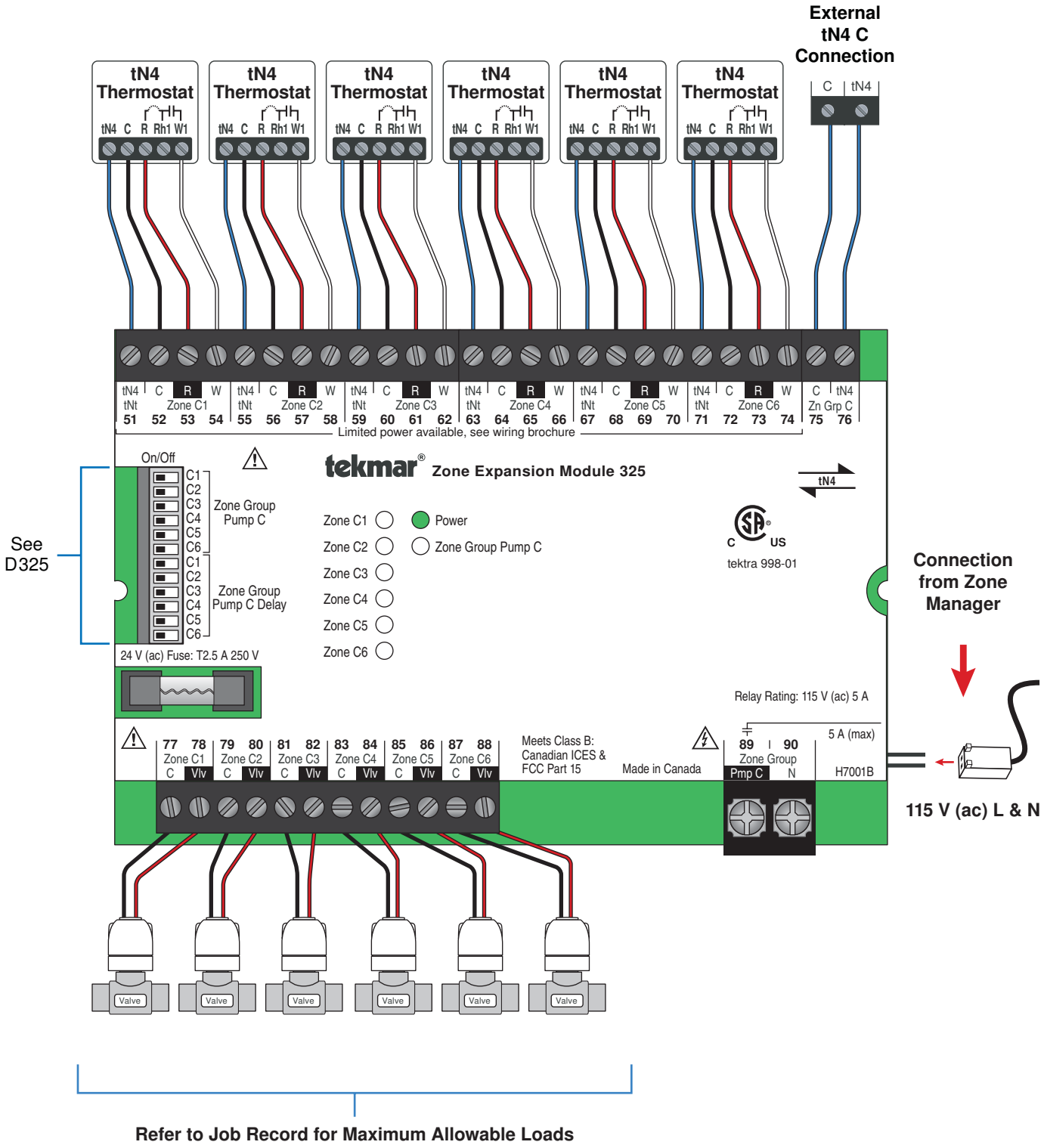

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Wiring the Control — *Terminals 51-90*

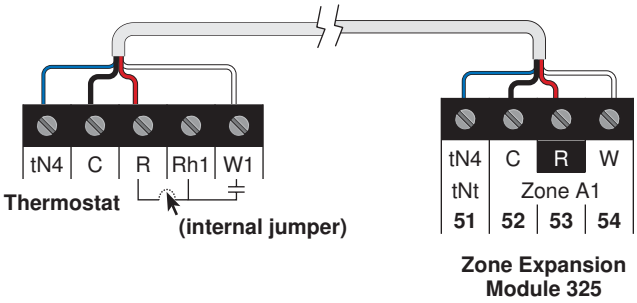
⚠ This section explains how to wire individual devices to the Zone Expansion Module 325. For step by step wiring refer to the terminal number on the right of the page.

- 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 the Thermostats (tN4) — *Terminals 51-74*

Up to six tekmarNet®4 (tN4) thermostats may be wired to the 325. Four terminals are provided for each thermostat. For each of the thermostats,

- Connect the tN4 terminal on the Zone Expansion Module to the tN4 terminal on the thermostat.
- Connect the C terminal on the Zone Expansion Module to the C terminal on the thermostat.
- Connect the R terminal on the Zone Expansion Module to the R terminal on the thermostat.
- Connect the W terminal on the Zone Expansion Module to the W or W1 terminal on the thermostat (or W2 in the case of second stage heat).

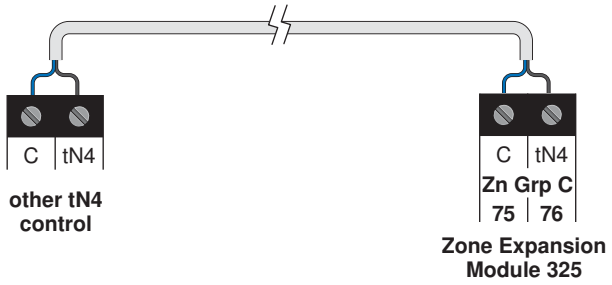


⚠ Wiring tekmarNet®4 (tN4) between Devices — *Terminals 75, 76*

Terminals 75 and 76 provide a tN4 connection for tN4 devices on the tN4 bus. Connect terminals 75 (C) and 76 (tN4) to the corresponding terminals on the tN4 devices that are to be connected.

Polarity is important.

Ensure that terminal 75 (C) is connected to the C terminal on the tN4 device and that terminal 76 (tN4) is connected to the tN4 terminal on the tN4 device.



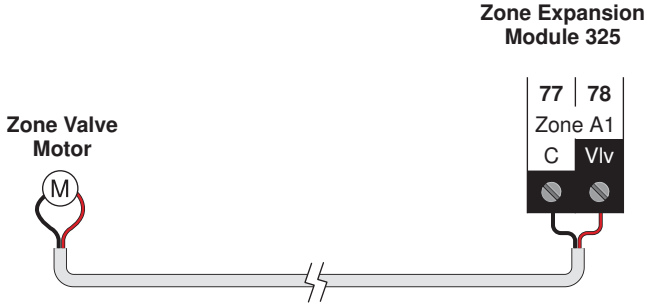
⚠ Wiring the Zone Valve Outputs — *Terminals 77-88*

Up to six 24 V (ac) zone valves may be wired to the 325.

The maximum load for each zone valve is determined by the relay rating of the thermostat operating that zone.

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 Zone Manager to one wire of the zone valve motor.
- Connect the Vlv terminal on the Zone Manager to second wire on the zone valve motor.

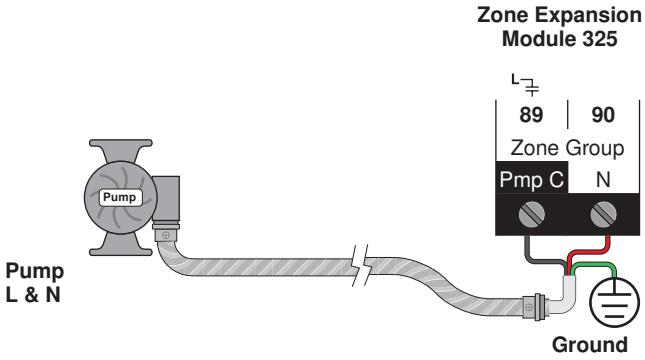


⚠ Wiring the Zone Group Pump

The 325 operates one Zone Group Pump.

- If a Zone Group Pump C is used, the pump is wired directly to terminals 89 and 90.
- The pump's 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.



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Adding Extra VA

⚠ Wiring an External Transformer

Terminal 72

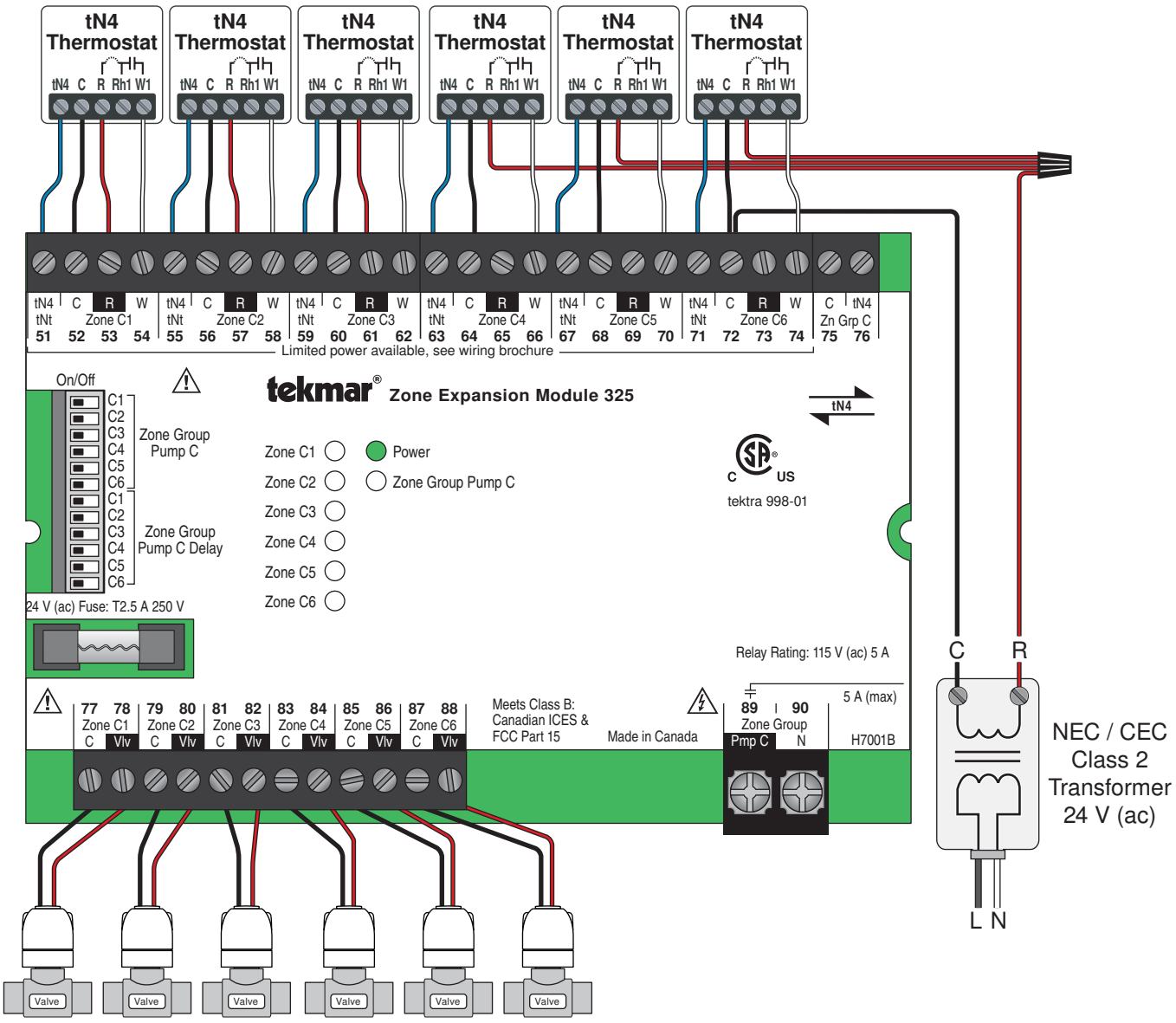
Use the supplied Job Records to determine if an external 24 V (ac) transformer is required.

If the combined total 24 V (ac) load exceeds 53 VA, an external NEC / CEC Class 2 transformer is required.

1. Determine the number of zones (thermostats and zone valves) that require an external transformer.
2. Choose a transformer with a VA rating sufficient to operate these zones. (Thermostats and Zone Valves)
3. Mount and wire the external transformer according to the manufacturer's instructions.
4. For each of the selected zones, connect the thermostat's R wire to the external transformer's 24 V (ac) R output. (Do not use the 325's R terminals)
5. Connect the C terminal of the external transformer's 24 V (ac) output to terminal 60 (C) on the Zone Expansion Module.

Note: For each zone using this external transformer, only the tN4, C and W terminals from the thermostat are connected to the Zone Expansion Module.

Example: Zones C1, C2, C3 operate off internal 325 transformer.
Zones C4, C5, C6 operate off external 24 V (ac) NEC / CEC Class 2 transformer.

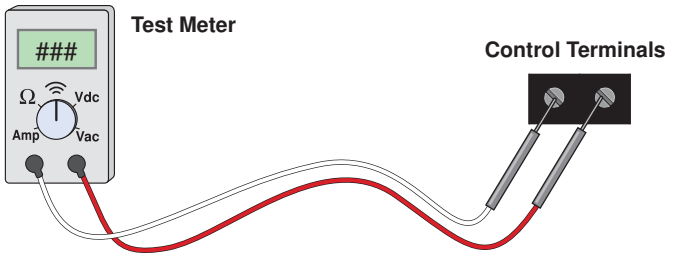


Troubleshooting the Control

⚠ 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.



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

⚠ Testing the Thermostat Connections

Terminals 51-74

tN4, C, R, and W terminals are provided for each thermostat connected to the Zone Expansion Module. (Example - Zone C1 terminals 51, 52, 53, 54).

Perform the following tests for each thermostat connected to the Zone Expansion Module using an electrical test meter.

1. Remove the front cover from the control.
2. Measure the (ac) voltage between the R and C terminals.

- The reading should be 24 V (ac) + / – 10% and the 'Power' LED should be lit green.
- If power is not present and the 'Power' LED is lit amber, then the transformer's field replaceable fuse is blown. Determine the cause of the failure before replacing the fuse.
- If power is not present and the 'Power' LED is not lit, check the power supply of the Zone Manager. Also check the plug connection on the back of the Zone Expansion Module.

3. To test the tN4 Network, check the tN4 and C wires for continuity.

- Disconnect the tN4 and C wires from the Zone Expansion Module and connect them together.
- Go to the thermostat and disconnect the tN4 and C wires.
- Using an electrical test meter, check for continuity.
- Reconnect the wires to the proper terminals.

4. To test the call for Heat (W), measure the (ac) voltage between the C and the W terminals.

- When the thermostat is not calling for heat, the reading should be 0 V (ac) and the zone light should be off.
- When the thermostat calls for heat, the reading should be 24 V (ac) + / – 10% and the zone light should be on.

⚠ Testing the tN4 Network

Terminals 75, 76

To test the tN4 Network, check the wires for continuity.

1. Remove the front cover from the control.
2. Disconnect the two wires (tN4 and C) at one end and connect them together.
3. Go to the other end of the wires and disconnect them.
4. Using an electrical test meter, check for continuity.
5. Reconnect the wires to the proper terminals.

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⚠ Testing the Zone Valve Outputs

Terminals 77-88

1. Remove the front cover from the control.
2. Use an electrical test meter to measure the (ac) voltage between the C and the Vlv terminals for each zone valve output.

- When the Zone light is off, the reading should be 0 V (ac) and the valve should be closed.
- When the Zone light is on, the reading should be 24 V (ac) + / – 10% and the valve should be open.

3. If power is not present:

- Check the power supply to the Zone Manager and the field replaceable fuse for the transformer on the Zone Expansion Module.
- If the power light is amber instead of green the transformer fuse is blown. Determine the cause of the failure before replacing the fuse.

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

⚠ Testing the Zone Group Pump C Output

Terminals 89, 90

1. Remove the front cover from the control.
2. Use an electrical test meter to measure the (ac) voltage between the Zone Group Pump C terminals (89, 90).

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

Notes

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Technical Data

Zone Expansion Module 325; *Six Zone Valves*	
Control	Microprocessor PID control; This is **not a safety (limit) control**
Packaged weight	1.15 lb. (521 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 122°F (0 to 50°C)
	RH ≤ 80% to 88°F (31°C), down to 50% from 104 to 122°F (40 to 50°C)
	Altitude <6560 feet (2000 m), Installation Category II, Pollution Degree 2
Power Supply	Provided by interconnected Zone Manager
Transformer	24 V (ac) 53 VA, fuse T2.5 A 250 V
Zone Group Pump C Relay	115 V (ac) 5 A
Combined Relay Load	5 A Maximum

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.

tekmar® Control Systems

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