

tekmar® - Wiring Brochure

tN2 Zone Manager 334



W334

12/10

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Introduction

The following wiring brochure describes how to wire the tekmar tN2 Zone Manager 334. The 334 comes installed on the right side of an enclosure with a blank plastic insert on the left. The blank insert may be replaced by either a Reset Control or an Expansion Module. The 334 allows for up to four tekmarNet®2 Thermostats, four zone pumps or four zone valves, and one zone group pump.

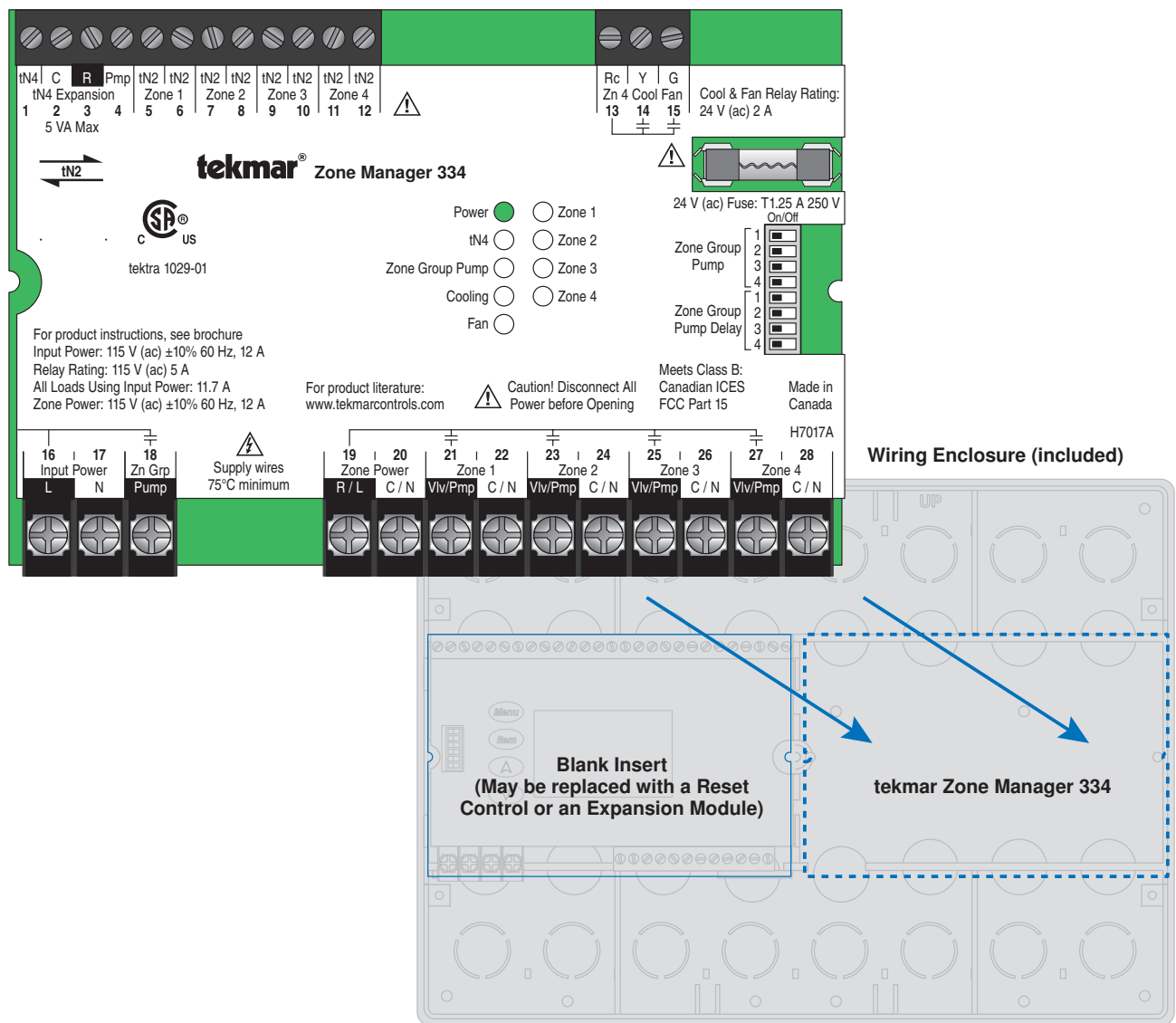







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Wiring Symbols

	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



– 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 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.

Control and Enclosure Location

Placement of the controls is important. To enable proper wiring during rough in, select an appropriate location for the controls early in the construction process. Consider the following:

- Keep dry. Avoid potential leakage onto the control. RH 80% to 87°F (31°C), down to 50% at 104°F (40°C). Non-condensing environment.
- Do not expose to temperatures beyond 32 - 109°F (0 - 43°C)
- Provide adequate ventilation.

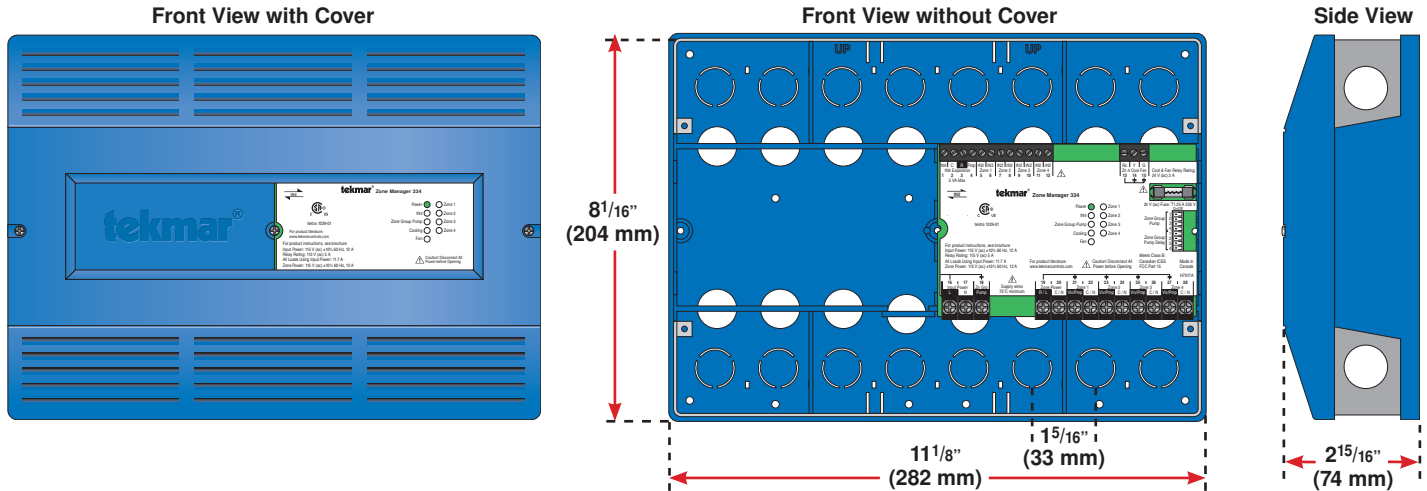
- Keep away from equipment, appliances or other sources of electrical interference.
- Provide easy access for wiring and viewing the indicator lights.
- Mount approximately 5 ft. (1.5 m) off the finished floor.
- Mount close to the zones and any equipment being controlled.
- Mount the enclosure to a solid backing.

The wiring enclosure allows for easy wiring of devices as the upper and lower chambers provide ample room for wiring.

- Use the conduit knockouts provided on the upper, lower, back and sides of the enclosure.

- Thermostat wiring enters through the upper half of the enclosure.
- Power, zone group pump, zone pump and/or zone valve wiring enters through the lower half of the enclosure.

WIRING ENCLOSURE



Mounting the Enclosure

To mount the wiring enclosure:

- Remove the front cover of the enclosure by removing the two screws in the cover.
- Place the enclosure in the location decided upon during the rough-in wiring stage. Wiring will enter through either the top and bottom knockouts or through the back upper and lower knockouts. See figures 1 and 2.

- There are twelve holes in the back of the enclosure that allow for mounting.
- Using screws, ensure that the enclosure is securely fastened in place.

Note: The nonmetallic conduit entries in the back of the enclosure do not provide grounding between conduit connections. Use bonding brushings and jumpers to provide a continuous path to ground.

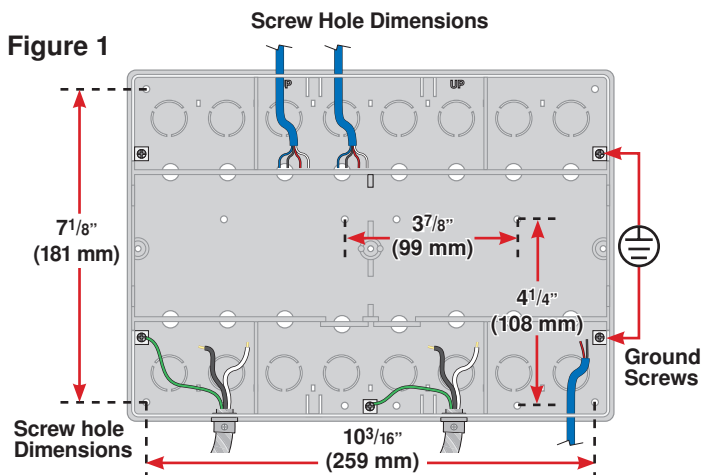
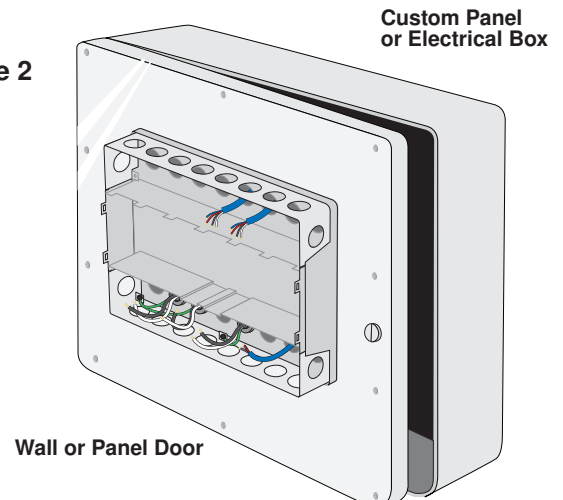


Figure 2



Electrical Drawings

⚠ The electrical drawing examples on the following pages show the 334 in common applications. These drawings have a brief explanation of what is being operated in each system. Choose the components in your system and use the drawings as a guide to aid in wiring your system.

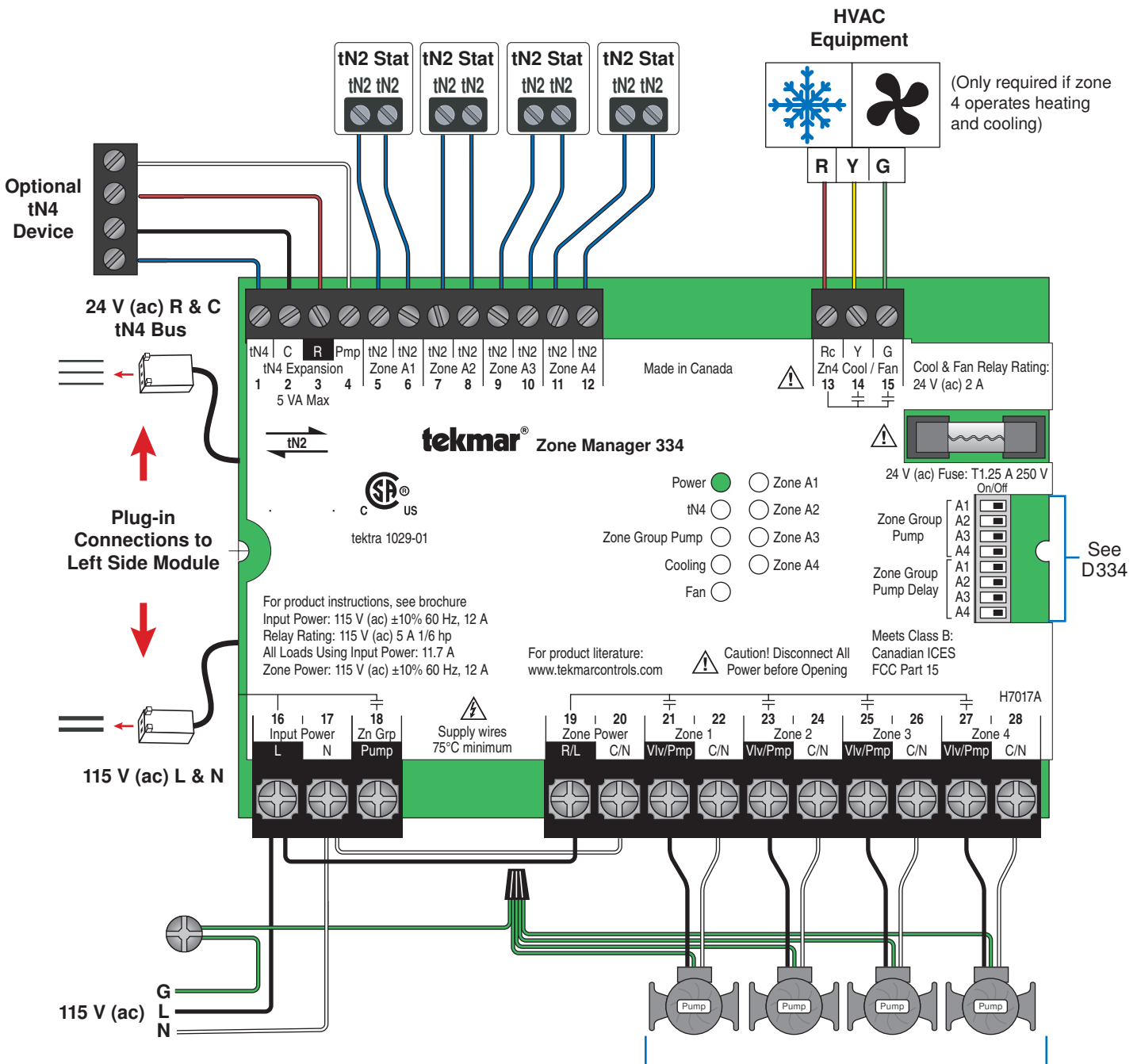
These are only concept drawings, not engineered drawings. They are not intended to describe a complete system nor any particular system. It is up to the system

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.

Electrical Application

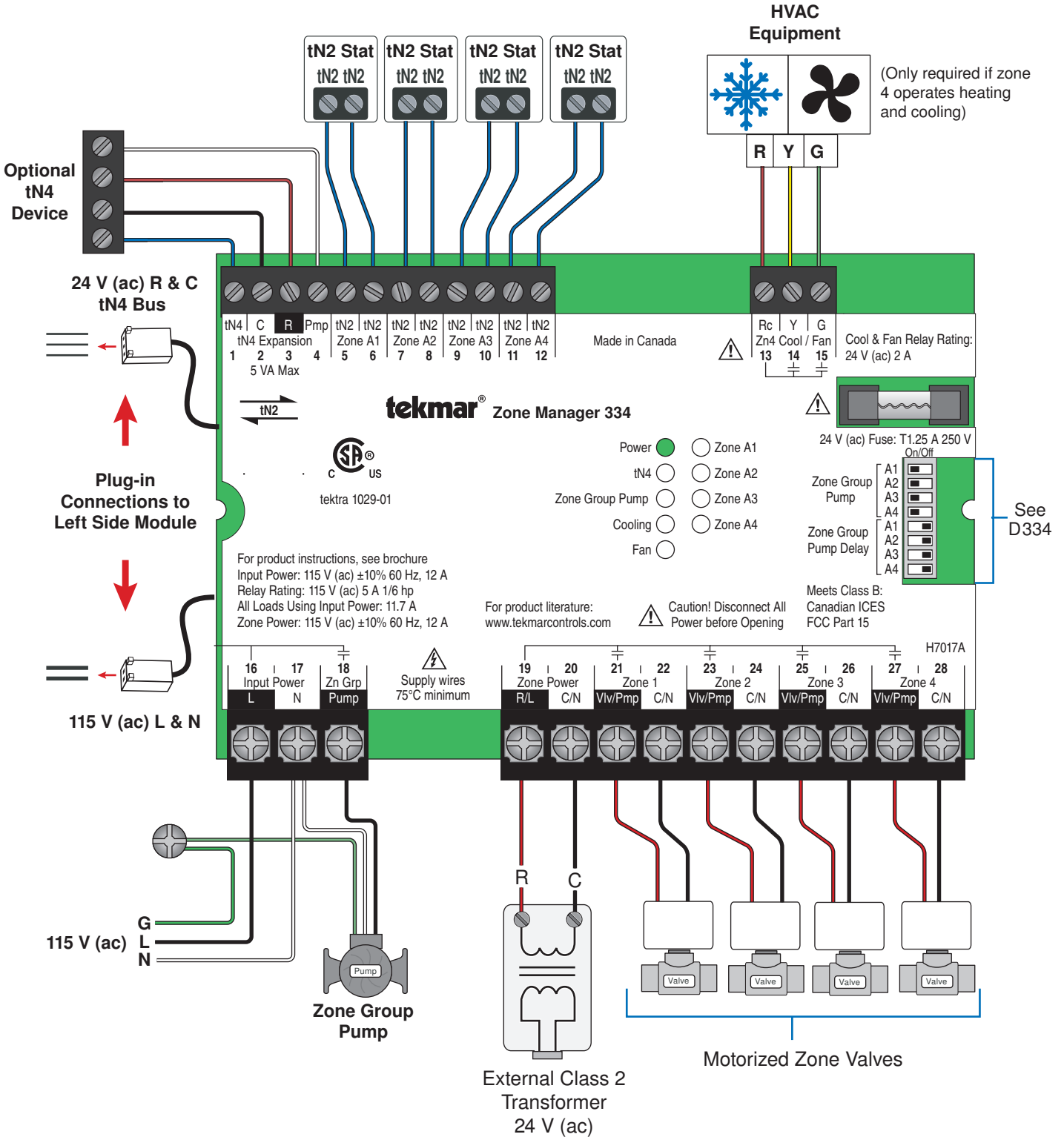
334 E1

Description: tN2 Zone Manager 334; Four tN2 Thermostats, Four Zone Pumps.



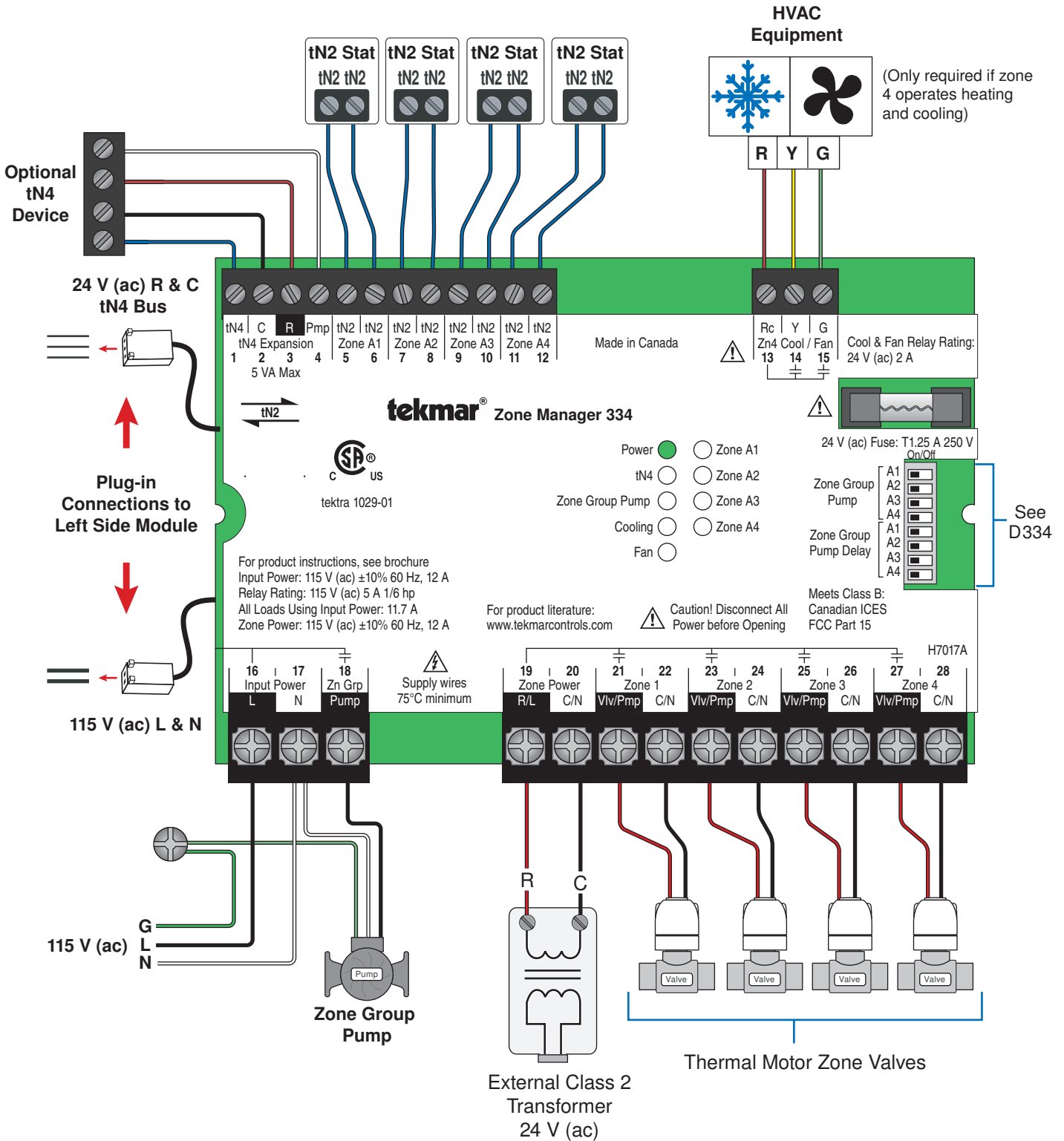
Refer to Job Record for Maximum Allowable Loads

Description: tN2 Zone Manager 334; Four tN2 Thermostats, Four Zone Valves (separate power), Zone Group Pump.



Refer to Job Record for Maximum Allowable Loads

Description: tN2 Zone Manager 334; Four tN2 Thermostats, Four Thermal Motor Zone Valves (separate power), Zone Group Pump.



Refer to Job Record for Maximum Allowable Loads

⚠ This section explains how to wire individual devices to the tN2 Zone Manager 334. 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.

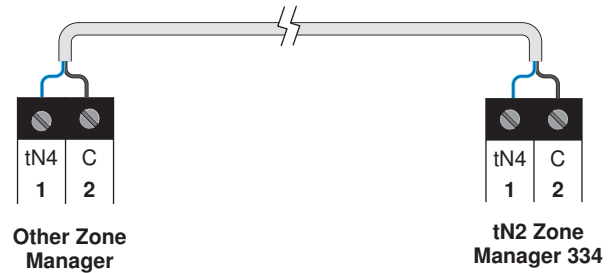
- Strip all wiring to a length of 3/8 in. or 10 mm for all terminals.
- Refer to the current and voltage ratings at the back of this brochure before connecting devices to this control.

⚠ Wiring tekmarNet®4 (tN4) between Zone Managers

Terminals 1 and 2 provide a tN4 connection for tN4 devices on the tN4 bus. Connect terminals 1 (tN4) and 2 (C) to the corresponding terminals on the tN4 devices that are to be connected to the tN4 bus.

Polarity is important.

Ensure that terminal 1 (tN4) is connected to the tN4 terminal on the tN4 device and that terminal 2 (C) is connected to the C terminal on the tN4 device.

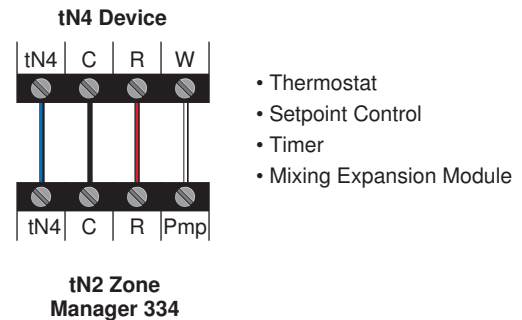


⚠ Wiring tekmarNet®4 (tN4) to tN4 Devices

Terminals 1, 2, 3, and 4 can be wired to tN4 thermostats, tN4 setpoint controls, tN4 timer or to mixing expansion modules.

- Connect the tN4 terminal 1 on the 334 to the tN4 terminal on the device.
- Connect the C terminal 2 on the 334 to the C terminal on the device.
- Connect the R terminal 3 on the 334 to the R terminal on the device.
- Connect the Pmp terminal 4 on the 334 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.



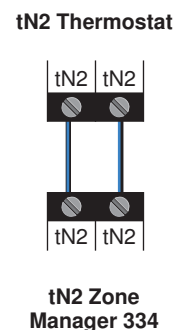
- Thermostat
- Setpoint Control
- Timer
- Mixing Expansion Module

⚠ Wiring tekmarNet®2 (tN2) to tN2 Thermostats

Up to four tekmarNet®2 (tN2) thermostats may be wired to the 334 on Zone 1, 2, 3, and 4.

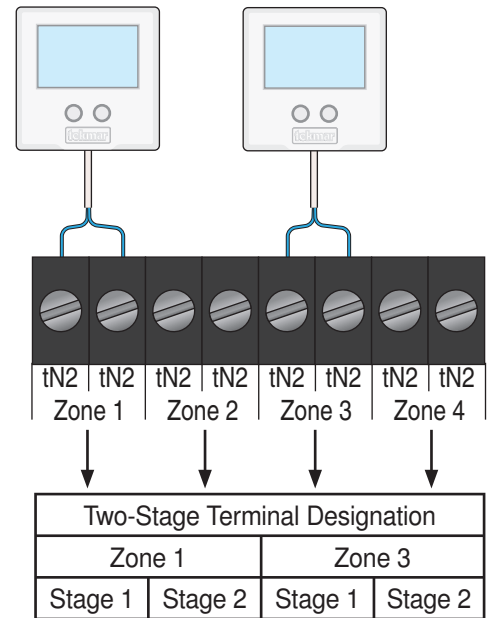
Connect each of the tN2 terminals on the 334 to the tN2 terminals on the tN2 thermostat.

The tN2 wires are not polarity sensitive.



Two-Stage tN2 Thermostats

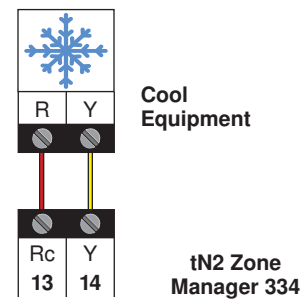
A two-stage thermostat is automatically detected when connected to Zone 1 or Zone 3. If there is no tN2 thermostat connected to Zone 2 or Zone 4, these outputs will automatically operate the heating equipment for 2nd stage heat.



⚠ 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 13 and 14.

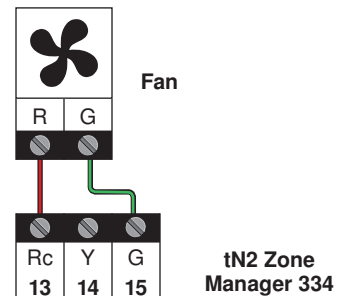
- Rc - Y is an isolated switch. No power is available from these terminals.
- Connect terminal 13 (Rc) on the thermostat to R on the cooling equipment.
- Connect terminal 14 (Y) on the thermostat to Y on the cooling equipment.



⚠ 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 13 and 15.

- Rc - G is an isolated switch. No power is available from these terminals.
- Connect terminal 13 (Rc) on the thermostat to R on the fan equipment.
- Connect terminal 15 (G) on the thermostat to G on the fan equipment.

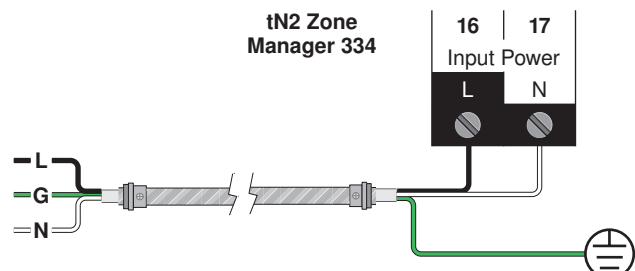


⚠ Wiring the Input Power

Provide a 15 Amp circuit for the power input.

Wire 115 V (ac) power to terminals 16 and 17.

- Connect 115 V hot (L) to terminal 16.
- Connect 115 V neutral (N) to terminal 17.
- Connect the ground wire to one of the ground screws provided in the wiring chamber.



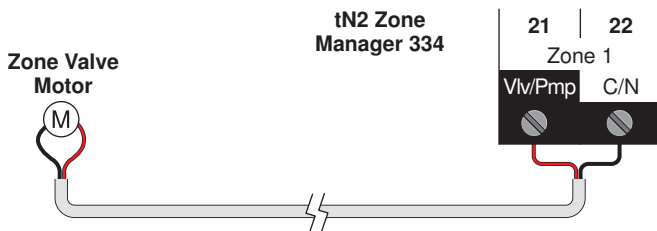
Zone Valves

Up to four 24 V (ac) zone valves may be wired to the 334. 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 334 to one wire of the zone valve motor.
- Connect the Vlv terminal on the 334 to second wire on the zone valve motor.

The zone valve end switch is not required.



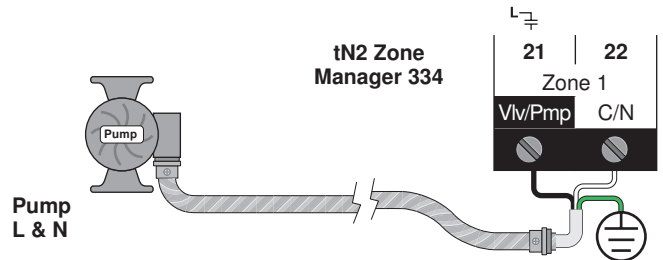
Zone Pumps

Up to four 115 V (ac) zone pumps may be wired to the 334. Each zone pump is wired to a Pmp and N terminal on the 334.

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.

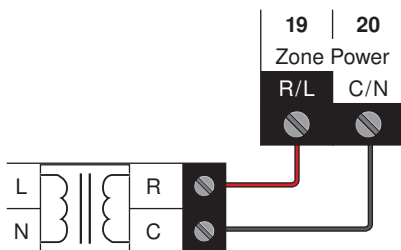
Note: For pumps larger than the control's rated capacity, an external isolation relay must be used.



Zones 1 through Zone 4 are all powered through the Zone Power on terminals 19 and 20. 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:

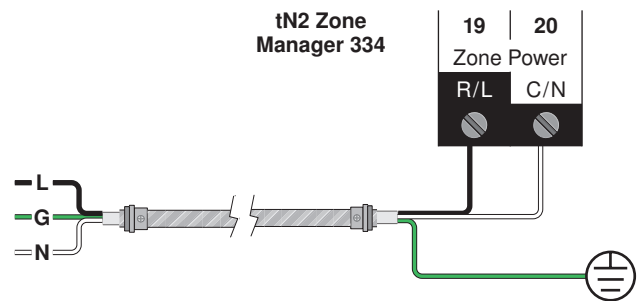
- An external 24 V (ac) transformer is required. The transformer VA rating must exceed the VA total of the Zone Valves.
- Connect the 24 V (ac) transformer "R" or red wire to terminal 19.
- Connect the 24 V (ac) transformer "C" or black wire to terminal 20.



For 115 V (ac) zone pumps:

- Connect 115 V hot (L) to terminal 19.
- Connect 115 V neutral (N) to terminal 20.
- Connect the ground wire to one of the ground screws provided in the wiring chamber.

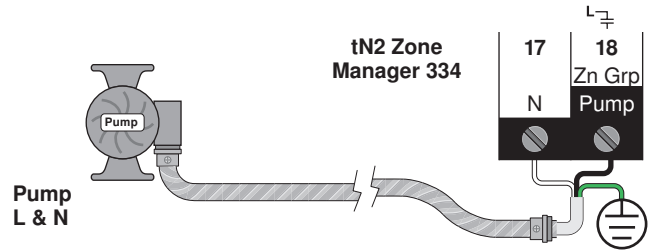
Note: For pumps larger than the control's rated capacity, an external isolation relay must be used.



The 334 can operate one Zone Group Pump.

- If the Zone Group Pump is used, the pump is wired directly to terminals 18 and 17.
- 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.

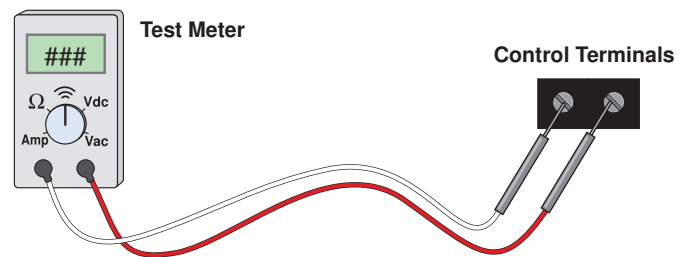


Troubleshooting the Control

⚠ 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

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

⚠ Testing the Zone Group Pump

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 (4 and 2).
 - 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

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

1. In the event that a thermostat display does not turn on:
2. Remove the tN2 wires from the affected zone on the 334.
3. Use an electrical test meter to measure DC voltage between the tN2 terminals on the 334 for 20 seconds.
4. 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 334 is operating correctly.
5. If the DC voltage remains at 0 V (dc) on the 334 for 20 seconds, there may be a fault on the 334. Contact your local tekmar sales representative for assistance.

Testing the Input Power

Terminals 16, 17

1. Remove the front cover from the control.
2. Use an electrical test meter to measure (ac) voltage between the Input Power L and N terminals (16 and 17). The reading should be 115 V (ac) + / - 10% and the 'Power' LED should be lit green.
3. If power is not present and the light is off:
 - Check the circuit that supplies power to the 334.
4. If power is present but the 'Power' LED is lit amber:
 - Check the field replaceable transformer fuse on the 334.
 - If the fuse is blown, determine the cause of the failure before replacing the fuse.

Testing the Zone Group Pump Output

Terminals 17 - 18

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 (17 and 18).
 - 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 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 21 - 28

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 13 - 15

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 13 - 15

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 Manager 334; *Four Zones, Cooling & Fan*

Control	Microprocessor PID control; This is not a safety (limit) control
Packaged weight	4.86 lb (2200 g)
Enclosure	Blue PC+ABS 94V-0 plastic with metal top and bottom conduit connection walls
Dimensions	8-1/16" H x 11-1/8" W x 2-15/16" D (204 x 282 x 74 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	115 V (ac) ± 10% 60 Hz 12 A (max with attached module)
Transformer Power Available	24 V (ac) 17 VA, fuse T1.25 A 250 V
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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