

# tekmar® - Wiring Brochure

## Dual Zone Manager 337



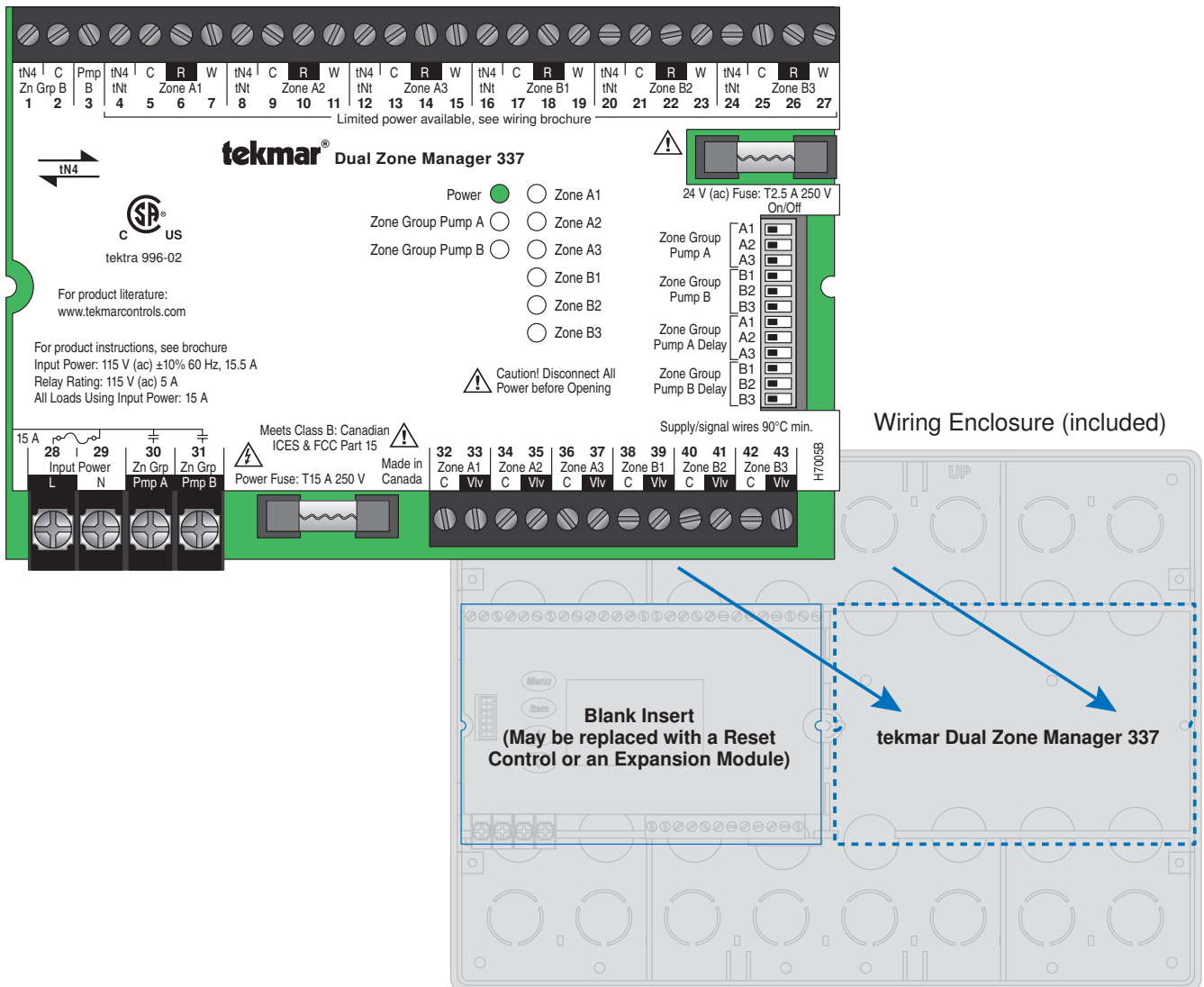
**W337**

12/08

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| <p><b>1 Information Brochure</b><br/>Choose controls to match application</p> | <p><b>2 Application Brochure</b><br/>Design your mechanical applications</p> | <p><b>3 Rough-in Wiring</b><br/>Rough-in wiring instructions</p> | <p><b>4 Wiring Brochure</b><br/>Wiring and installation of specific control</p> | <p><b>5 Data Brochure</b><br/>Control settings and sequence of operation</p> | <p><b>6 Job Record</b><br/>Record settings &amp; wiring details for future reference</p> |
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### Introduction






The following wiring brochure describes how to wire the tekmar Dual Zone Manager 337. The 337 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 337 allows for up to six tekmarNet®4 (tN4) thermostats, six 24 V (ac) zone valves and two zone group pumps. The wiring of tekmarNet®4 (tN4) components is simple and cost effective.



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## Wiring Symbols

	Powered switch. 24-115 V (ac) power, switched output to valve, pump, etc.		Black reverse lettering denotes powered output.
	tekmarNet®4		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 88 °F (31 °C), down to 50% from 104 to 122 °F (40 to 50 °C). Non-condensing environment.
- Do not expose to temperatures beyond 32-122 °F (0-50 °C)
- Provide adequate ventilation.

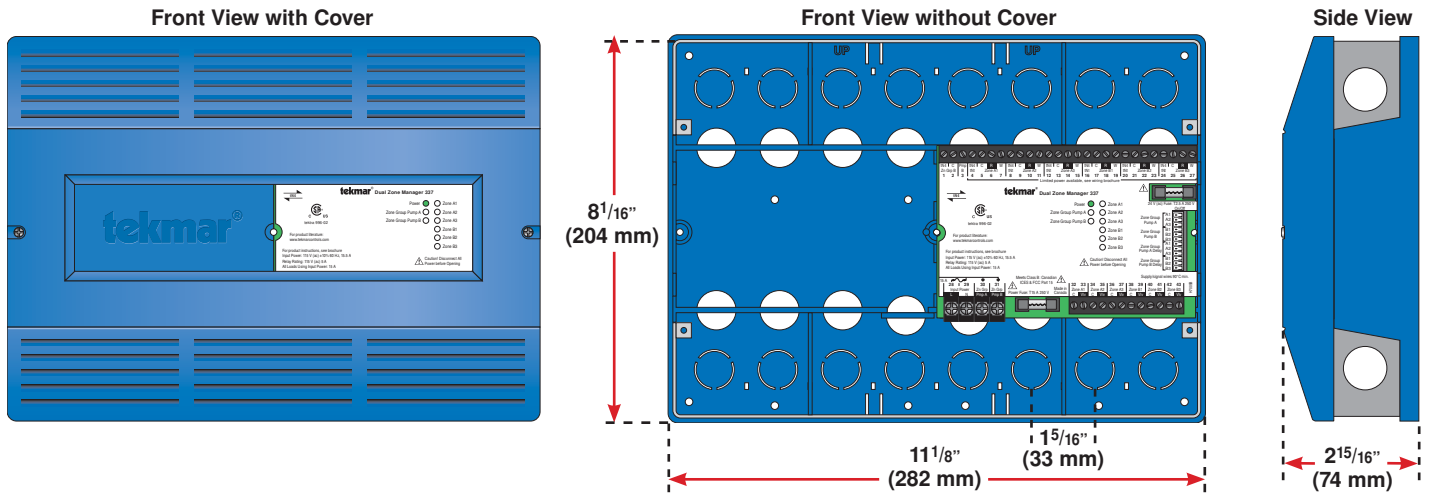
- Keep away from equipment, appliances or other sources of electrical interference.
- Provide easy access for wiring, viewing, and adjusting the display screen.
- Mount approximately 5 ft. (1.5 m) off the finished floor.
- Mount close to the zones and any equipment being controlled.
- Mount the enclosure 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, and 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 bushings and jumpers to provide a continuous path to ground.

Figure 1

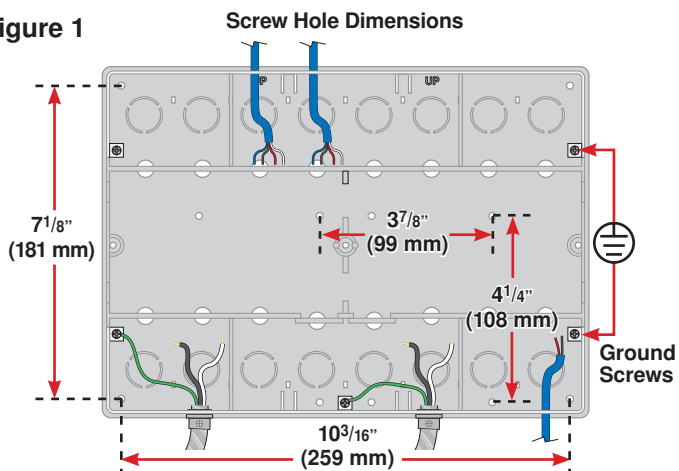
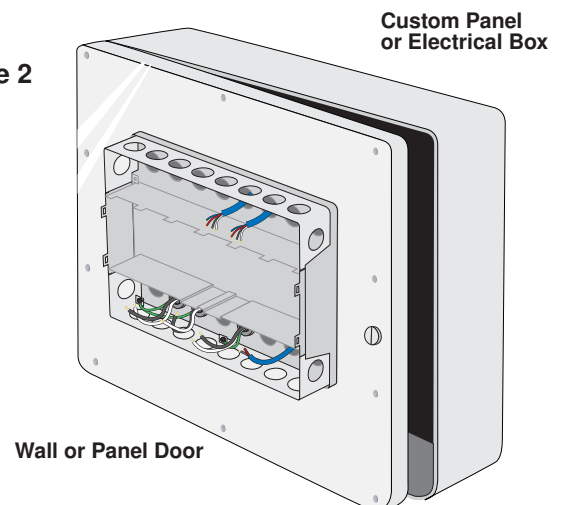


Figure 2



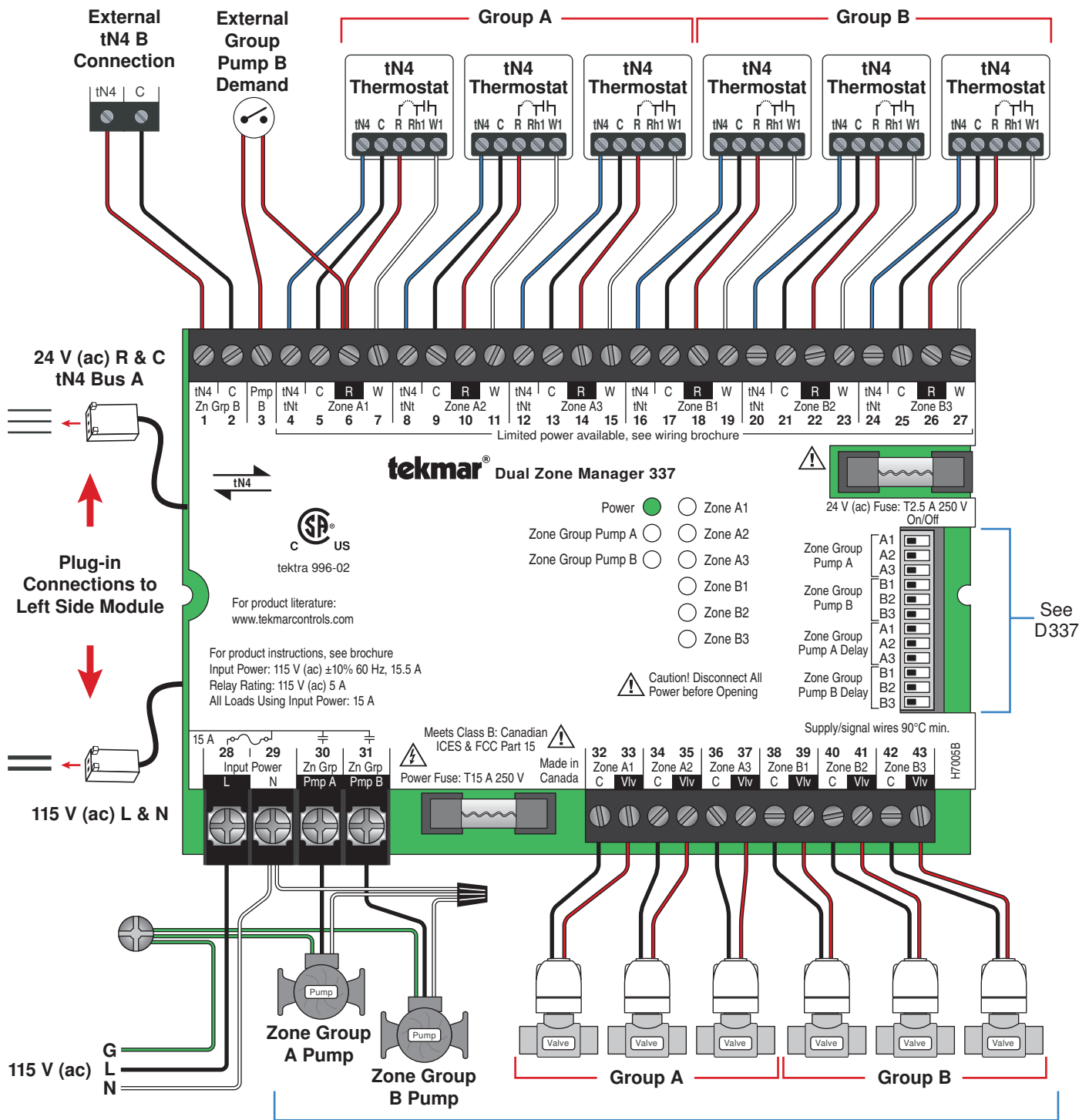
## Electrical Drawings

⚠ The electrical drawing examples on the following pages show the 337 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.

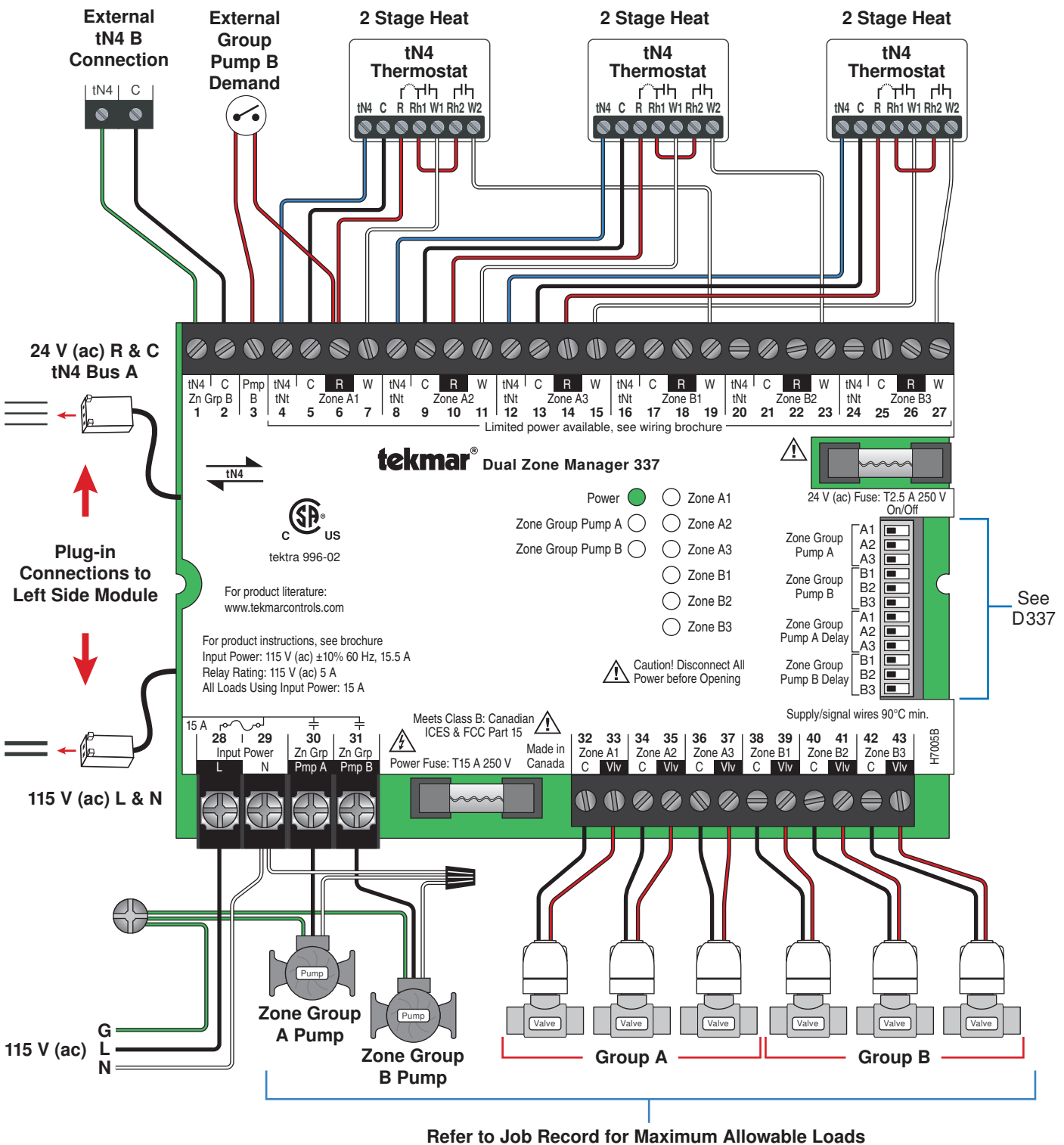
These are only concept drawings, not engineered drawings. They are not intended to describe a complete system nor any particular system. It is up to the system designer to

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 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.

**Description:** tekmarNet®4 Dual Zone Manager 337; Six tekmarNet®4 Thermostats, Six Zone Valves, Three Group A, Three Group B, Zone Group Pump A & B.



**Description:** tekmarNet®4 Dual Zone Manager 337; Three tekmarNet®4 Thermostats (2-stage), Three Group A & Three Group B Zone Valves, Zone Group Pump A & B, optional tN4 A and Group Pump B demand.



⚠ This section explains how to wire individual devices to the Dual Zone Manager 337. 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.

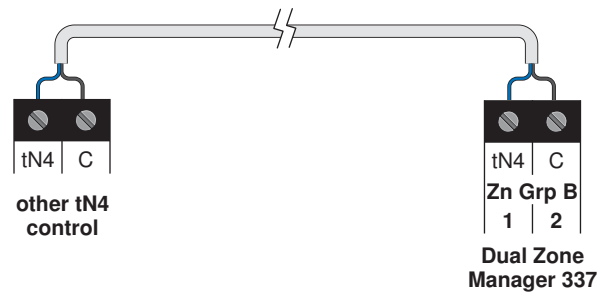
**⚠ Wiring tekmarNet®4 (tN4) between Devices**

*Terminals 1, 2*

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

Polarity is important.

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

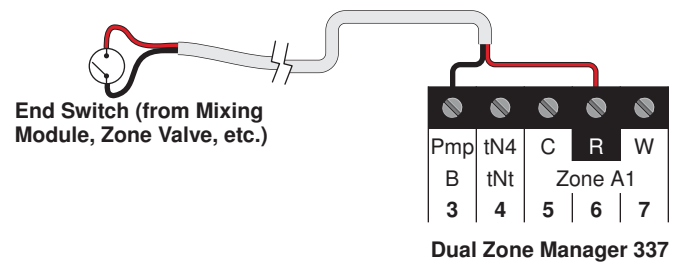


**⚠ Wiring the Zone Group B Pump Demand**

*Terminals 3, 6*

To operate the Zone Group Pump B externally, wire a switch between terminals 3 (Pmp B) and 6 (R).

When the switch closes, Zone Group Pump B turns on.

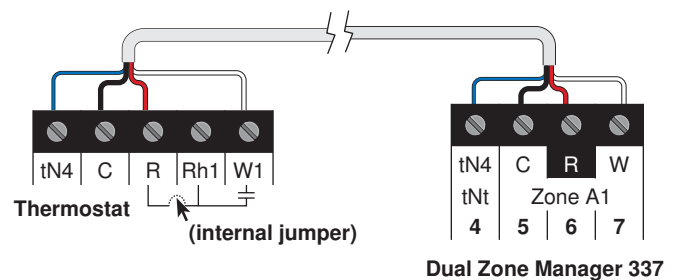


**⚠ Wiring the Thermostats (tN4): (Group A and B)**

*Terminals 4-27*

Up to six tekmarNet®4 (tN4) thermostats may be wired to the 337. The six thermostats are split into two groups of three zones. Zones A1, A2, A3 and B1, B2, B3. Four terminals are provided for each thermostat. For each of the thermostats,

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



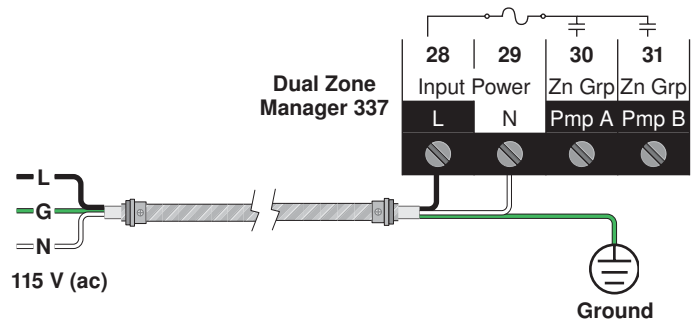
## ⚠ Wiring the Input Power

Terminals 28-29

Provide a 20 Amp circuit for the power input.

Wire 115 V (ac) power to terminals 28 and 29.

- Connect 115 V hot (L) to terminal 28.
- Connect 115 V neutral (N) to terminal 29.
- Connect the ground wire to one of the ground screws provided in the wiring chamber.



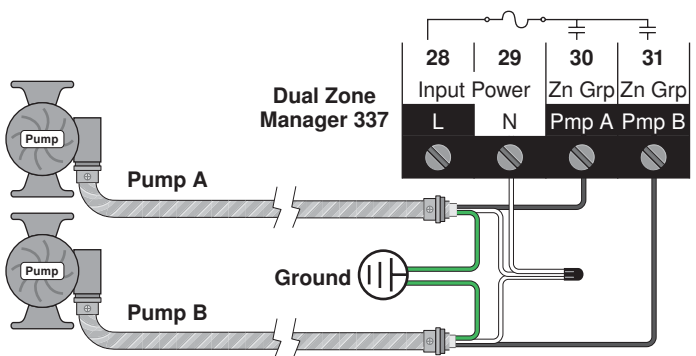
## ⚠ Wiring the Zone Group Pumps

Terminals 30-31

The 337 operates two Zone Group Pumps. Zone Group Pump A and Zone Group Pump B.

- If a Zone Group Pump A is used, the pump is wired directly to terminals 29 and 30.
- If a Zone Group Pump B is used, the pump is wired directly to terminals 29 and 31.
- Use a wire nut to connect the pump neutrals together and wire a single connection to terminal 29 if necessary.
- The pumps' 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 Valve Outputs: (Group A and B)

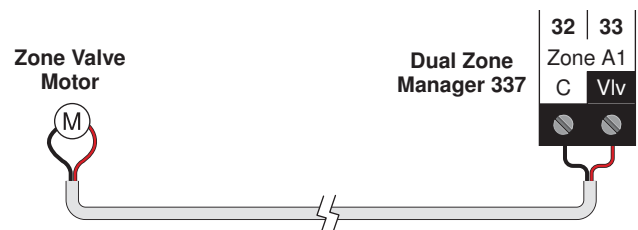
Terminals 32-43

Up to six 24 V (ac) zone valves may be wired to the 337.

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.





## Adding Extra VA

### ⚠ Wiring an External Transformer

Terminal 25

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

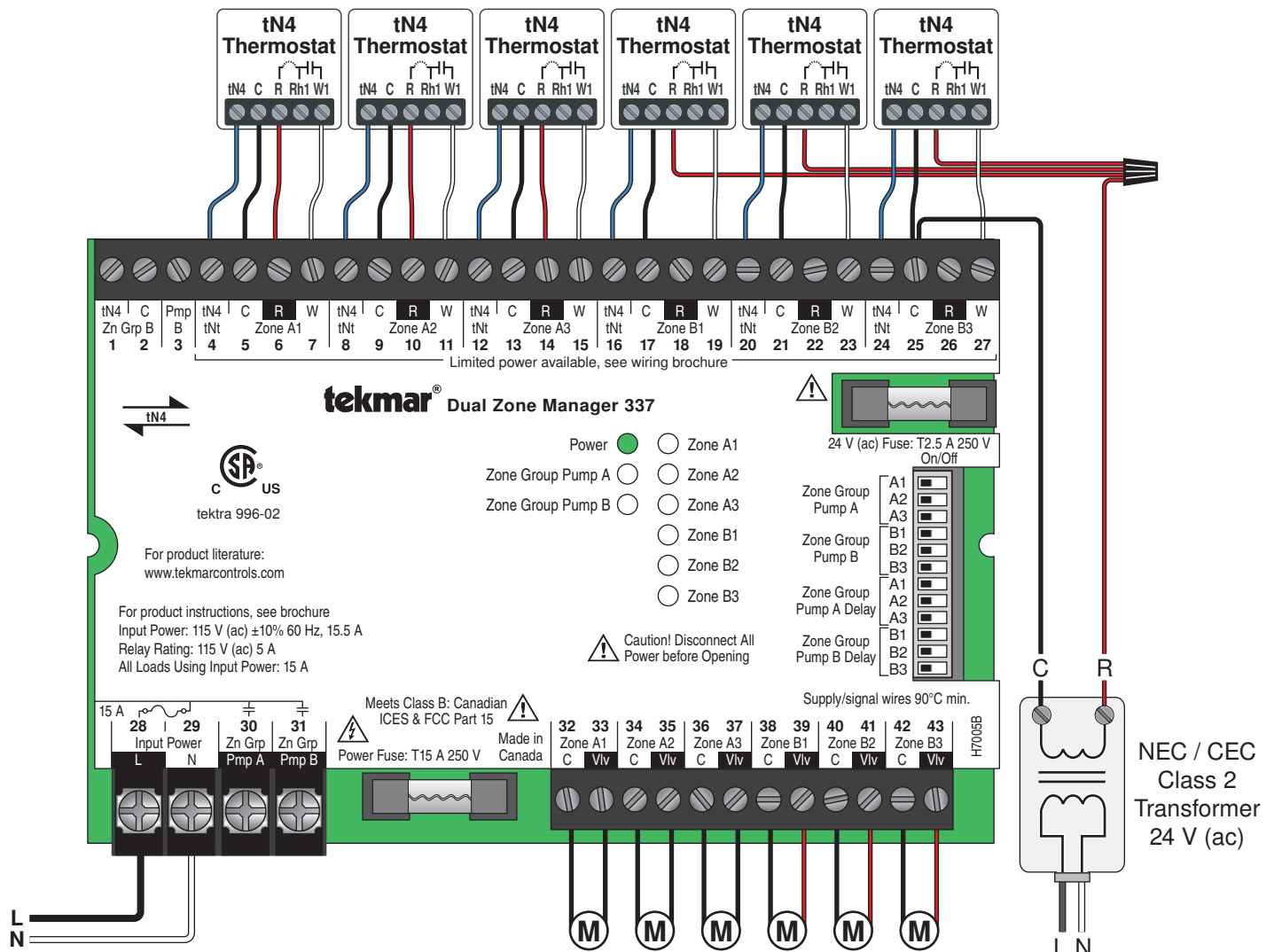
If the combined total 24 V (ac) load exceeds 50 VA, an external NEC / CEC Class 2 transformer is required.

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 337's R terminals)
5. Connect the C terminal of the external transformer's 24 V (ac) output to terminal 25 (C) on the Zone Manager.

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

**Example:** Zones A1, A2, A3 operate off internal 337 transformer.  
Zones B1, B2, B3 operate off external 24 V (ac) NEC / CEC Class 2 transformer.

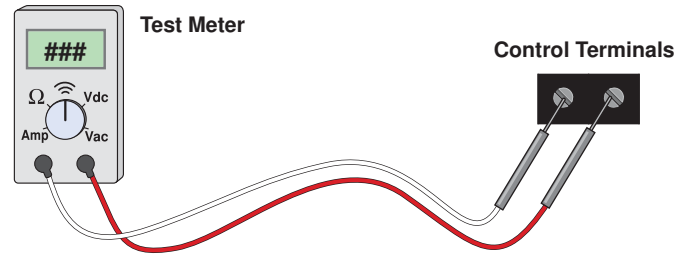


## Troubleshooting the Control

### ⚠ 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 tN4 Network

*Terminals 1, 2*

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.

### ⚠ Testing the Zone Group Pump B Demand

*Terminal 3*

1. Remove the front cover from the control.
  2. Use an electrical test meter to measure the (ac) voltage between the Pmp B and the C terminals (3 and 5)
    - When the Zone Group Pump B light is off, the reading should be 0 V (ac) and the pump should be off.
    - When the Zone Group Pump B 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 Thermostat Connections

*Terminals 4-27*

tN4, C, R, and W terminals are provided for each thermostat connected to the Zone Manager. (Example - Zone A1 terminals 4, 5, 6, 7).

Perform the following tests for each thermostat connected to the Zone Manager 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 transformers' 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.
3. To test the tN4 Network, check the tN4 and C wires for continuity.
  - Disconnect the tN4 and C wires from the Zone Manager 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 Input Power

Terminals 28, 29

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 (28 and 29). 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 Zone Manager.
4. If power is present but the 'Power' LED is lit amber:
  - Check the field replaceable transformer fuse on the Zone Manager.
  - If the fuse is blown, determine the cause of the failure before replacing the fuse.

## Testing the Zone Group Pump Outputs

Terminals 30, 31

1. Remove the front cover from the control.
2. Use an electrical test meter to measure the (ac) voltage between the Zone Group Pump A terminals (29-30).
  - When the Zone Group Pump A light is off, the reading should be 0 V (ac) and the pump should be off.
  - When the Zone Group Pump A light is on, the reading should be 115 V (ac) + / - 10% and the pump should be running.
3. Use an electrical test meter to measure the (ac) voltage between the Zone Group Pump B terminals (29-31).
  - When the Zone Group Pump B light is off, the reading should be 0 V (ac) and the pump should be off.
  - When the Zone Group Pump B light is on, the reading should be 115 V (ac) + / - 10% and the pump should be running.
4. If no power is present on either pump output and the 'Zone Group Pump' LED is on:
  - Check the field replaceable Pump power fuse on the Zone Manager.
  - If the fuse is blown, determine the cause of the failure before replacing the fuse.

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

## Testing the Zone Valve Outputs

Terminals 32-43

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 Manager.
  - 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.

## Technical Data

### Dual Zone Manager 337; Three + Three Zone Valves

Control	Microprocessor PID control; This is <b>not a safety (limit) control</b>
Packaged weight	5.47 lb. (2480 g)
Enclosure	Blue PC+ABS 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 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	115 V (ac) +/- 10% 60 Hz 15.5 A, fuse T15 A 250 V
Transformer Power Available	24 V (ac) 50 VA, fuse T2.5 A 250 V
Zone Group Pump A Relay	115 V (ac) 5 A
Zone Group Pump B Relay	115 V (ac) 5 A
Combined Load on Input Power	15 A Maximum
Group Pump B Demand	24 V (ac) < 0.1 VA

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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