

# tekmar® - Data Brochure

## tekmarNet®4 Setpoint Control 162

tN4

D162

08/07

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

## Introduction

The Setpoint Control 162 is a single stage heat or cool setpoint control that can operate on an On / Off differential or can operate on Pulse Width Modulation. The control includes a second relay contact to operate a system pump. The control includes special modes for hot tub, indirect domestic hot water tank, radiant floor, and pool applications.

## Features

- tN4 Compatible
- On / Off Differential
- Pulse Width Modulation
- System Pump
- Hot Tub Operation
- DHW Tank Operation
- Floor Operation
- Pool Operation
- Exercising
- Scenes
- Temperature Sensor Input
- Programmable Setback Scheduling
- One Stage Heat or Cool



## Table of Contents

Table of Contents.....	2	Mode 3 - DHW Tank .....	21
Display and DIP Switches .....	2	Mode 4 - PWM Setpoint .....	21
Dip Switches .....	2	Mode 5 - Floor .....	22
Access Levels .....	3	Mode 6 - Pool .....	22
Display and Symbol Description .....	3	Cycle Length .....	23
User Interface .....	4	Relay Minimum On and Off Time .....	23
Application Overview .....	5	Remote Enable / Disable.....	23
On / Off Differential .....	5	Sensor Input .....	24
Pulse Width Modulation .....	6	Time Clock .....	24
Display Menus .....	7	Setting the Schedule .....	24
VIEW Menu .....	7	Scenes.....	25
ADJUST Menu .....	9	Away Hold .....	26
TIME Menu .....	15	Restore Factory Defaults .....	27
SCENE Menu .....	16	Temperature Units .....	26
SCHEDULE Menu .....	17	Backlight .....	26
MISCELLANEOUS Menu .....	19	tN4 Features .....	26
Sequence of Operation .....	20	Error Messages .....	29
Mode 1 - On / Off Setpoint.....	20	Cleaning the Control .....	32
Mode 2 - Hot Tub .....	20	Warranty .....	32

## Display and DIP Switches

### DIP Switches

#### Lock / Unlock (DIP Switch #1)

Use the Lock / Unlock DIP switch to lock or unlock the Access Level of the 162.

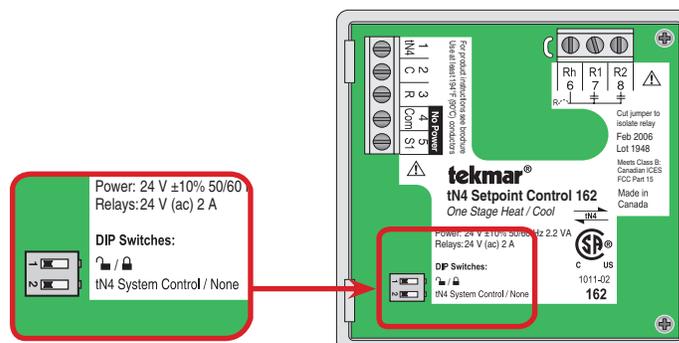
- To unlock the Access Level, set the DIP switch to the unlocked (left) position.
- To lock the Access Level, set the DIP switch to the locked (right) position. Once locked, a padlock is displayed in the lower right corner of the display and the Access Level cannot be changed.

**Note:** The tN4 System Control's Lock / Unlock DIP switch overrides the Lock / Unlock DIP switch on the 162. Set the tN4 System Control's Lock / Unlock DIP switch to the Unlock position before Access Levels can be changed on the setpoint control.

#### tN4 System Control (DIP Switch #2)

A tN4 System Control is a control, not a thermostat, that the Setpoint Control 162 connects to through the tN4 bus. All tN4 compatible Outdoor Reset Modules are tN4 System Controls.

- If the thermostat is connected to a tN4 System Control, set the tN4 System Control DIP switch to tN4 System Control (left position).
- If the thermostat is not connected to a tN4 System Control, set the tN4 System Control DIP switch to None (right position).



## Access Levels

The Access Level restricts the number of Menus, Items and Adjustments that can be accessed by the user. The Access Level setting is found in the Miscellaneous (MISC) menu. Select the appropriate access level for the people who work with the setpoint control on a regular basis.

The 162 has five Access Levels:

- **Advanced (ADV):** access to all settings
- **Installer (InST):** settings required for installation
- **User (USER):** for property owners
- **Limited (LTD):** limited temperature adjustment
- **Secure (SEC):** for commercial and public installations

In the Limited access level, the temperature can only be adjusted by +/-3°F (1.5°C) from the temperature setting entered prior to entering the Limited access level.

In the Secure access level, all settings, including the temperature, cannot be changed.

For more information, see the Miscellaneous (MISC) Menu section.

In the following menu tables, the access level the item is visible in is shown in the access column.

To adjust the Access Level:

1. Set the Unlock / Lock DIP switch to the unlock position. If a tN4 System Control is connected to the 162, the Unlock / Lock DIP switch on the tN4 System Control must be set to the unlock position.
2. Use the Menu button to select the MISC menu.
3. Use the Item button to select the Access item.
4. Use the Up and Down button to select the required Access Level.

## Display



## Symbol Description

<b>— Mode —</b> <b>HEATCOOL</b>	<b>MODE OF OPERATION</b> Displays whether the device is in heating, cooling or off mode.		<b>tN4 COMMUNICATION</b> A tN4 network is detected.
<b>R1</b>	<b>RELAY 1</b> Displays when relay contact 1 is closed.		<b>LOCK</b> The Access Levels are locked or a menu option is visible but not adjustable.
<b>R2</b>	<b>RELAY 2</b> Displays when relay contact 2 is closed.	<b>Occ 12</b>	<b>OCCUPIED</b> Displays when operating at the occupied temperature.
	<b>WARNING</b> An error is present.	<b>UnOcc 12</b>	<b>UNOCCUPIED</b> Displays when operating at the unoccupied setback temperature.
	<b>SCHEDULE MASTER</b> Indicates that the control is a schedule master.	<b>TIME Occ</b>	<b>TIME OCCUPIED</b> Displays when operating temporarily at the occupied temperature due to a remote enable or manual enable.

## User Interface

Use the User Interface available on the Liquid Crystal Display (LCD) to setup and monitor the operation of the setpoint control. Use the four push buttons below the LCD (Menu, Item, Up, Down) to select settings. As the settings are entered, record the settings in the Job Record J 162.

### Menu

The menus display in the Menu Field at the left of the LCD.

Up to 6 menus are available:

- VIEW
- ADJUST
- TIME
- SCENE
- SCHD (Schedule)
- MISC (Miscellaneous)

To select a menu, press and release the Menu button.

### Item

In each menu, a group of items can be selected. The abbreviated name of the selected item displays in the Item field of the LCD display.

- To view the next available item, press and release the Item button.
- To view the previous item, hold down the Item button and press and release the Up button.

### Adjusting a Setting

To adjust a setting:

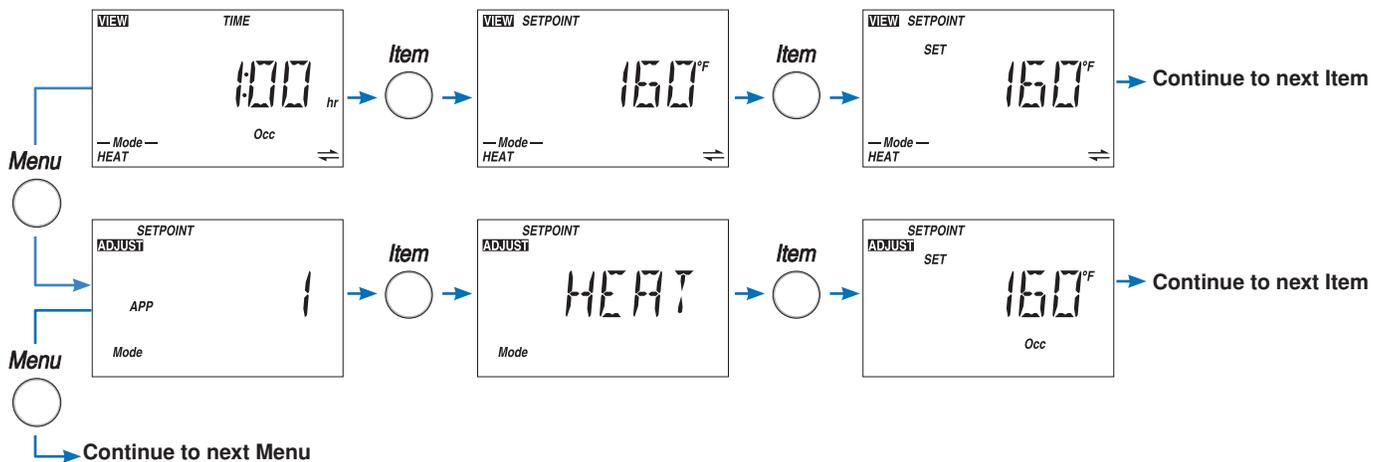
1. Use the Menu button to select the appropriate menu.
2. Use the Item button to select a menu item.
3. Use the Up or Down button to adjust the setting.

### Default Item

To set the default item in the VIEW Menu, display item for more than five seconds.

After navigating menus, the display reverts back to the default item after 60 seconds of button inactivity.

The Time can also be made the default item.



# Application Overview

The Setpoint Control 162 is designed to support six different applications. The items shown in the VIEW and ADJUST Menu change depending on the Application Mode.

Set the application mode as follows:

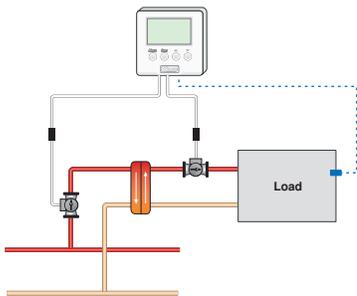
- 1) On / Off Setpoint
- 2) Hot Tub
- 3) Indirect DHW Tank
- 4) PWM Setpoint
- 5) Floor
- 6) Pool

The VIEW and ADJUST menus list which of the six application items are visible based upon the mode column.

The TIME, SCHD (Schedule) and MISC (Miscellaneous) menus are the same for the six application modes.

## Applications: On / Off Differential

### Mode 1 Setpoint (On / Off)



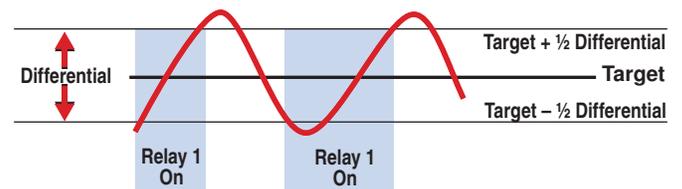
### Relay 1 On / Off Differential Operation

The On / Off Differential operates by centering a differential range around the target setpoint temperature. On / Off differentials are best suited to heating or cooling loads that quickly change temperature.

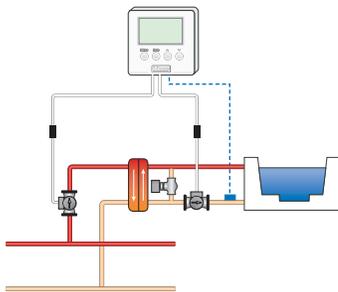
#### Heating Operation

When heating, the setpoint control turns on Relay 1 when the temperature falls to 1/2 of the differential below the setpoint and turns off Relay 1 once the temperature reaches 1/2 of the differential above the setpoint.

Heating On / Off Differential



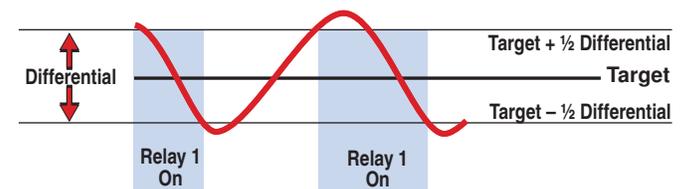
### Mode 2 Hot Tub



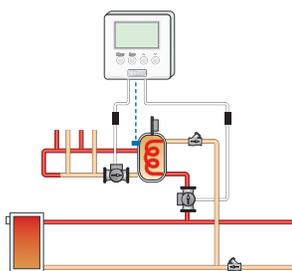
#### Cooling Operation

When cooling, the setpoint control turns on Relay 1 when the temperature rises to 1/2 of the differential above the setpoint and turns off Relay 1 once the temperature falls 1/2 of the differential below the setpoint.

Cooling On / Off Differential

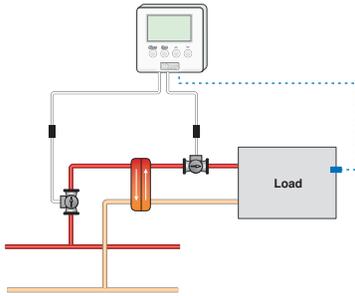


### Mode 3 DHW Tank

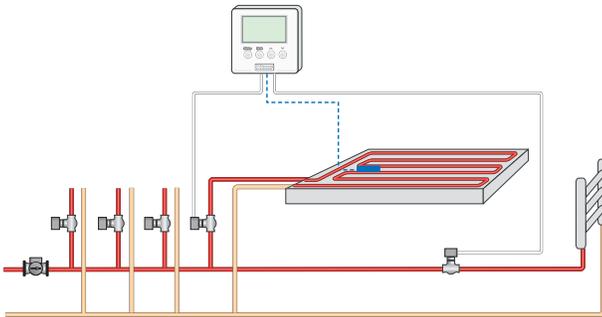


## Applications: Pulse Width Modulation

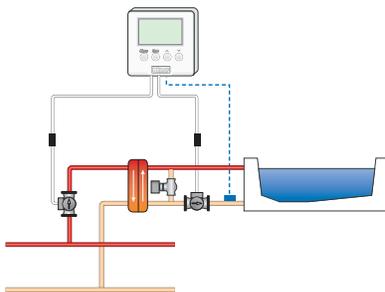
### Mode 4 Setpoint (PWM)



### Mode 5 Floor



### Mode 6 Pool

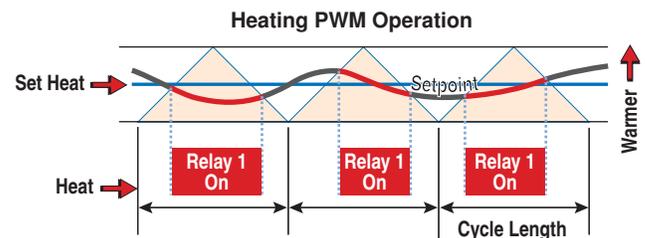


### Relay 1 Pulse Width Modulation (PWM) Operation

PWM operates by centering the throttling range around the target setpoint temperature. PWM is best suited for large heating or cooling loads that do not change rapidly in temperature. The Differential setting in the ADJUST menu changes the throttling range while in Application Mode 4 (Setpoint). The throttling range is not adjustable in Application Modes 5 (Floor) or 6 (Pool).

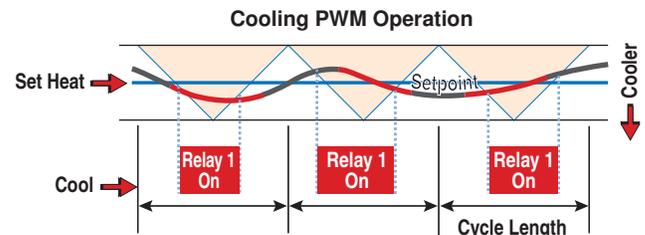
#### Heating Operation

When the temperature is at the setpoint, Relay 1 is on for 50% of a cycle and off for 50% of a cycle. When the temperature is 1/2 of the throttling range below the setpoint, Relay 1 is on for 100% of a cycle. When the temperature is 1/2 of the throttling range above the setpoint, Relay 1 is off for 100% of a cycle. For ranges within the throttling range, Relay 1's on time increases linearly as temperature falls.



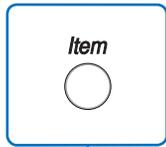
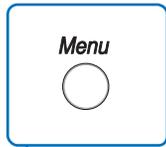
#### Cooling Operation

When the temperature is at the setpoint, Relay 1 is on for 50% of a cycle and off for 50% of a cycle. When the temperature is 1/2 of the throttling range below the setpoint, Relay 1 is off for 100% of a cycle. When the temperature is 1/2 of the throttling range above the setpoint, Relay 1 is on for 100% of a cycle. For ranges within the throttling range, Relay 1's on time increases linearly as temperature rises.



# Display Menus

## VIEW Menu (1 of 2)



The VIEW menu items display the current operating temperatures and status information of the system.

VIEW MENU

Mode	Item Field	Range	Access	Description
1 2 4 5		0:01 to 24:00 hr	LTD USER InST ADV	<b>OCCUPIED TIME</b> <i>SECTION B, E, I</i> Displays the amount of time left on the manual override. The setpoint device operates at the Occupied temperature and then reverts back Scheduled temperature. Time counts down to 0:00 hours. Cancel the override by pressing the Up and Down buttons together at the same time or through the user switch or gateway. <b>Note:</b> This item is only available when a programmable setback schedule or normally unoccupied has been selected.
1 4		-31 to 266°F (-35.0 to 130.0°C)	SEC LTD USER InST ADV	<b>SETPOINT</b> <i>SECTION A, D</i> Displays the measured setpoint sensor temperature.
2		-31 to 266°F (-35.0 to 130.0°C)	SEC LTD USER InST ADV	<b>HOT TUB</b> <i>SECTION B</i> Displays the measured hot tub temperature.
3		-31 to 266°F (-35.0 to 130.0°C)	SEC LTD USER InST ADV	<b>DHW TANK</b> <i>SECTION C</i> Displays the measured indirect domestic hot water tank temperature.
5		-31 to 266°F (-35.0 to 130.0°C)	SEC LTD USER InST ADV	<b>FLOOR</b> <i>SECTION E</i> Displays the measured floor temperature.
6		-31 to 266°F (-35.0 to 130.0°C)	SEC LTD USER InST ADV	<b>POOL</b> <i>SECTION F</i> Displays the measured pool temperature.

Continued on next page.

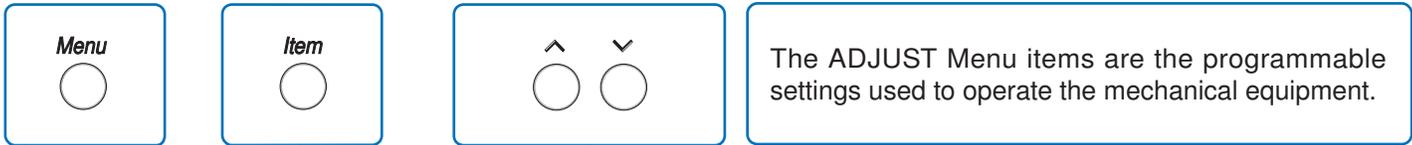
## VIEW Menu (2 of 2)

VIEW MENU

Mode	Item Field	Range	Access	Description
1		OFF, -4°F (-20.0°C) to Setpoint Maximum (variable)	USEr InST ADV	<b>SET SETPOINT (ON / OFF)</b> <i>SECTION A</i> Display the desired temperature.
2		OFF, -4°F (-20.0°C) to Hot Tub Maximum (variable)	USEr InST ADV	<b>SET HOT TUB</b> <i>SECTION B</i> Display the desired temperature.
3		OFF, -4°F (-20.0°C) to DHW Maximum (variable)	USEr InST ADV	<b>SET DHW</b> <i>SECTION C</i> Display the desired temperature.
4		OFF, -4°F (-20.0°C) to Setpoint Maximum (variable)	USEr InST ADV	<b>SET SETPOINT (PWM)</b> <i>SECTION D</i> Display the desired temperature.
5		OFF, -4°F (-20.0°C) to Floor Maximum (variable)	USEr InST ADV	<b>SET FLOOR</b> <i>SECTION E</i> Display the desired temperature.
6		OFF, -4°F (-20.0°C) to Pool Maximum (variable)	USEr InST ADV	<b>SET POOL</b> <i>SECTION F</i> Display the desired temperature.
1 2 3 4 5 6		-31 to 266°F (-35.0 to 130.0°C)	SEC LTD USEr InST ADV	<b>OUTDOOR</b> <i>SECTION R</i> Displays the measured outdoor temperature. <b>Note:</b> This item is only available when the setpoint control is connected to a tN4 bus and the Outdoor item in the ADJUST menu is set to On.
1 2 3 4 5 6		-31 to 266°F (-35.0 to 130.0°C)	InST ADV	<b>SUPPLY TEMP OF tN4 BUS</b> <i>SECTION R</i> Actual water temperature of the tN4 bus for heating. <b>Note:</b> This item is only available when the setpoint control is connected to a tN4 System Control, DIP switch 2 is set to tN4 System Control, and the Heat Source item in the ADJUST menu is set to hydronic (HYDr).

After the last item, the control returns to the first item in the menu.

ADJUST Menu (1 of 6)



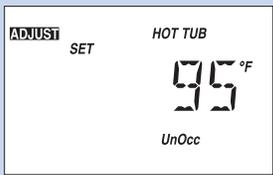
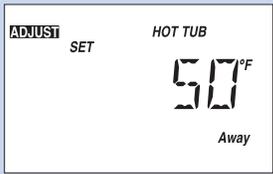
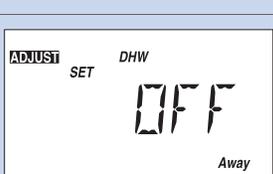
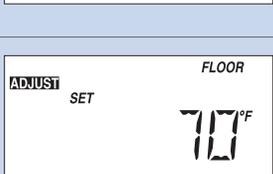
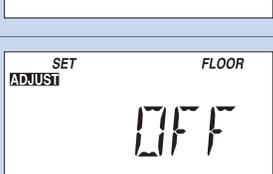
ADJUST MENU

Mode	Item Field	Range	Access	Description
1 2 3 4 5 6		1, 2, 3, 4, 5, 6 Default = 1	InST ADV	<b>APPLICATION MODE</b> <i>SECTION A - F</i> Select the application for the setpoint control. 1 = On / OFF Setpoint (Heat and Cool) 2 = Hot Tub (Heat only) 3 = DHW Tank (Heat only) 4 = PWM Setpoint (Heat and Cool) 5 = Floor (Heat only) 6 = Pool (Heat only)
1 4		COOL, HEAT Default = HEAT	InST ADV	<b>MODE OF OPERATION</b> <i>SECTION A, D</i> Select the mode of operation of the setpoint control. Choose between Heat or Cool.
2 6		HEAT, OFF Default = HEAT	USEr InST ADV	<b>MODE OF OPERATION</b> <i>SECTION B, F</i> Select to either heat or turn off the hot tub or pool.
1 4		OFF, -4°F (-20°C) to Setpoint Maximum Default = 160°F (71.0°C)	LTD USEr InST ADV	<b>SET SETPOINT OCCUPIED</b> <i>SECTION A, D</i> Select the setpoint temperature for the occupied period. <b>Note:</b> In the Limited Access Level, the temperature can only be adjusted by +/-3°F (1.5°C) from the temperature setting entered prior to entering the Limited access level.
1 4		OFF, -4°F (-20°C) to Setpoint Maximum Default = OFF	USEr InST ADV	<b>SET SETPOINT UNOCCUPIED</b> <i>SECTION A, D</i> Select the setpoint temperature for the unoccupied period. <b>Note:</b> This item is only available when a programmable setback schedule has been selected.
1 4		OFF, -4°F (-20°C) to Setpoint Maximum Default = OFF	USEr InST ADV	<b>SET SETPOINT AWAY</b> <i>SECTION A, D</i> Select the setpoint temperature for the away period. <b>Note:</b> This item is only available when scenes are set to On.
2		OFF, 40°F (4.5°C) to Hot Tub Maximum Default = 102°F (39.0°C)	LTD USEr InST ADV	<b>SET HOT TUB OCCUPIED</b> <i>SECTION B</i> Select the hot tub temperature for the occupied period. <b>Note:</b> In the Limited Access Level, the temperature can only be adjusted by +/-3°F (1.5°C) from the temperature setting entered prior to entering the Limited access level.

Continued on next page.

## ADJUST Menu (2 of 6)

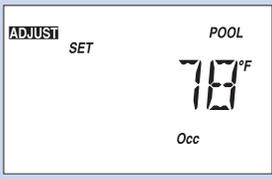
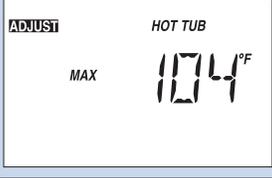
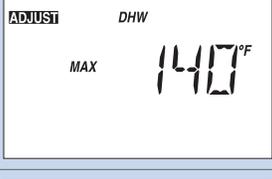
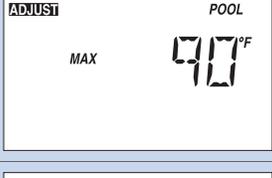
ADJUST MENU

Mode	Item Field	Range	Access	Description
2		OFF, 40°F (4.5°C) to Hot Tub Maximum Default = 95°F (35.0°C)	USER InST ADV	<b>SET HOT TUB UNOCCUPIED</b> <a href="#">SECTION B</a> Select the hot tub temperature for the unoccupied period. <b>Note:</b> This item is only available when a programmable setback schedule has been selected.
2		OFF, 40°F (4.5°C) to Hot Tub Maximum Default = 50°F (10.0°C)	USER InST ADV	<b>SET HOT TUB AWAY</b> <a href="#">SECTION B</a> Select the hot tub temperature for the away period. <b>Note:</b> This item is only available when scenes are set to On.
3		OFF, 40°F (4.5°C) to DHW Maximum Default = 130°F (54.5°C)	LTD USER InST ADV	<b>SET DHW TANK OCCUPIED</b> <a href="#">SECTION C</a> Select the indirect domestic hot water tank temperature for the occupied period. <b>Note:</b> In the Limited Access Level, the temperature can only be adjusted by +/-3°F (1.5°C) from the temperature setting entered prior to entering the Limited access level.
3		OFF, 40°F (4.5°C) to DHW Maximum Default = 110°F (43.5°C)	USER InST ADV	<b>SET DHW TANK UNOCCUPIED</b> <a href="#">SECTION C</a> Select the indirect domestic hot water tank temperature for the unoccupied period. <b>Note:</b> This item is only available when a programmable setback schedule has been selected.
3		OFF, 40°F (4.5°C) to DHW Maximum Default = OFF	USER InST ADV	<b>SET DHW TANK AWAY</b> <a href="#">SECTION C</a> Select the indirect domestic hot water tank temperature for the away period. <b>Note:</b> This item is only available when scenes are to set to On.
5		OFF, 40°F (4.5°C) to Floor Maximum Default = 80°F (26.5°C)	LTD USER InST ADV	<b>SET FLOOR OCCUPIED</b> <a href="#">SECTION E</a> Select the floor temperature for the occupied period. <b>Note:</b> In the Limited Access Level, the temperature can only be adjusted by +/-3°F (1.5°C) from the temperature setting entered prior to entering the Limited access level.
5		OFF, 40°F (4.5°C) to Floor Maximum Default = 70°F (21.0°C)	USER InST ADV	<b>SET FLOOR UNOCCUPIED</b> <a href="#">SECTION E</a> Select the floor temperature for the unoccupied period. <b>Note:</b> This item is only available when a programmable setback schedule has been selected.
5		OFF, 40°F (4.5°C) to Floor Maximum Default = OFF	USER InST ADV	<b>SET FLOOR AWAY</b> <a href="#">SECTION E</a> Select the floor temperature for the away period. <b>Note:</b> This item is only available when scenes are set to On.

Continued on next page.

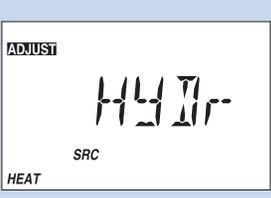
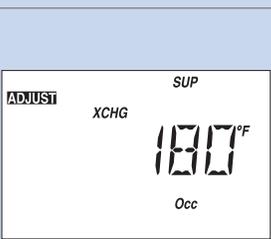
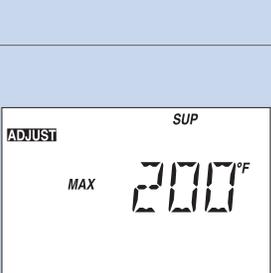
## ADJUST Menu (3 of 6)

## ADJUST MENU

Mode	Item Field	Range	Access	Description
6		OFF, 40°F (4.5°C) to Pool Maximum Default = 78°F (25.5°C)	LTD USER InST ADV	<b>SET POOL OCCUPIED</b> <i>SECTION F</i> Select the pool temperature during the occupied period. <b>Note:</b> In the Limited Access Level, the temperature can only be adjusted by +/-3°F (1.5°C) from the temperature setting entered prior to entering the Limited access level.
1 4		50 to 239°F (10.0 to 115.0°C) Default = 200°F (93.5°C)	ADV	<b>SETPOINT MAXIMUM</b> <i>SECTION A, D</i> Select the maximum setpoint temperature range adjustment. <b>Note:</b> This item is only available when the mode of operation is set to Heat.
2		50 to 104°F (10.0 to 40.0°C) Default = 104°F (40.0°C)	ADV	<b>HOT TUB MAXIMUM</b> <i>SECTION B</i> Select the maximum hot tub temperature range adjustment.
3		50 to 200°F (10 to 93.5°C) Default = 140°F (60.0°C)	ADV	<b>DHW MAXIMUM</b> <i>SECTION C</i> Select the maximum indirect domestic hot water tank temperature range adjustment.
5		50 to 110°F (10.0 to 43.5°C) Default = 85°F (29.5°C)	ADV	<b>FLOOR MAXIMUM</b> <i>SECTION E</i> Select the maximum floor temperature range adjustment.
6		50 to 120°F (10 to 49.0°C) Default = 90°F (32.0°C)	ADV	<b>POOL MAXIMUM</b> <i>SECTION F</i> Select the maximum pool temperature range adjustment.
4 5 6		CTRL, SYNC, 5 to 30 minutes Default = CTRL	InST ADV	<b>CYCLE LENGTH</b> <i>SECTION G</i> Select the heating or cooling cycle length in minutes for PWM applications.
1 2 3 4		1 to 40°F (0.5 to 22.0°C) Default = 10°F (5.5°C)	InST ADV	<b>DIFFERENTIAL</b> Select the differential to cycle on and off around the setpoint temperature.

Continued on next page.

## ADJUST Menu (4 of 6)

Mode	Item Field	Range	Access	Description
1 2 3		0 to 20:00 min in 10 sec increments Default = 0:30	ADV	<b>MINIMUM ON</b> <a href="#">SECTION H</a> Select the minimum on time of relays R1 and R2. This helps prevent short cycling.
1 2 3		0 to 20:00 min in 10 sec increments Default = 0:30	ADV	<b>MINIMUM OFF</b> <a href="#">SECTION H</a> Select the minimum off time of relays R1 and R2. This helps prevent short cycling.
1 2 3 4 5 6		HYDr, OTHr Default = HYDr	InST ADV	<b>HEAT SOURCE</b> <a href="#">SECTION R</a> Select whether the heat source is hydronic (HYDr) or other (OTHr) when the setpoint control is connected to a tN4 System Control. <b>Note:</b> This item is only available when DIP switch 2 is set to tN4 System Control and the mode of operation is set to Heat.
1 2 3 4 5 6		60 to 220°F (15.5 to 104.5°C) Default = 180°F (82.0°C)	InST ADV	<b>EXCHANGE SUPPLY OCCUPIED</b> <a href="#">SECTION R</a> Select the desired supply water temperature required on the tN4 bus to heat the setpoint load during the occupied period. <b>Note:</b> This item is only available when DIP switch 2 is set to tN4 System Control, the mode of operation is set to Heat, and the Heat Source item in the ADJUST menu is set to hydronic (HYDr).
1 2 3 4 5 6		80 to 220°F (26.5 to 104.5°C) Default = 200°F (93.5°C)	ADV	<b>MAXIMUM SUPPLY</b> <a href="#">SECTION R</a> Select the maximum exchange supply water temperature allowed on the tN4 bus to heat the setpoint load. <b>Note:</b> This item is only available when DIP switch 2 is set to tN4 System Control, the mode of operation is set to Heat, and the Heat Source item in the ADJUST menu is set to hydronic (HYDr).
1 2 3 4 5 6		STAT, OFF, LO, MED, HI Default = OFF	InST ADV	<b>PRIORITY</b> <a href="#">SECTION R</a> Select the priority level of the setpoint control over other devices on the tN4 system. <b>Note:</b> This item is only available when DIP switch 2 is set to tN4 System Control, the mode of operation is set to Heat, and the Heat Source item in the ADJUST menu is set to hydronic (HYDr). <b>Note:</b> STAT, OFF, LO, MED, HI are available when the control is connected to a boiler bus. STAT and OFF are available when the control is connected to a mix bus.

ADJUST MENU

Continued on next page.

## ADJUST Menu (5 of 6)

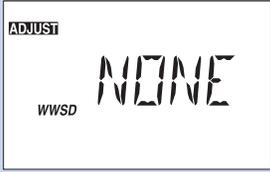
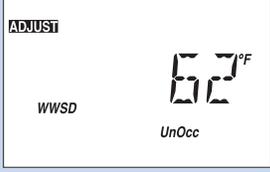
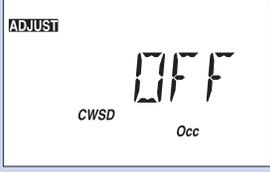
ADJUST MENU

Mode	Item Field	Range	Access	Description
1 2 3 4 5 6	<p>ADJUST On PMP F2</p>	OFF, On Default = On	InST ADV	<b>RELAY 1 PUMP</b> <i>SECTION R</i> Select whether a system pump from a tN4 system control should operate whenever relay 1 is closed. <b>Note:</b> This item is only available when DIP switch 2 is set to tN4 System Control, the mode of operation is set to Heat, and the Heat Source item in the ADJUST menu is set to hydronic (HYDr).
1 4 5	<p>ADJUST OFF PMPDLY F2</p>	OFF, On Default = OFF	InST ADV	<b>RELAY 1 PUMP DELAY</b> <i>SECTION R</i> Select whether a system pump is delayed from operating whenever relay 1 is closed. The delay allows a thermal motor zone valve to fully open. The delay is 3 minutes. <b>Note:</b> This item is only available when DIP switch 2 is set to tN4 System Control, the mode of operation is set to Heat, and the Heat Source item in the ADJUST menu is set to hydronic (HYDr).
2 6	<p>ADJUST ON OFF PMP F2</p>	OFF, 12:00 AM to 11:50 PM or OFF to 23:50 Default = OFF	ADV	<b>RELAY 2 PUMP ON</b> <i>SECTION B, F</i> Select the time of day at which Relay 2 turns on for daily hot tub or pool filtration. <b>Note:</b> This item is only available when a programmable setback schedule is selected.
2 6	<p>ADJUST TIME 8:00 hr PMP RUN F2</p>	OFF, 0:30 to 24:00 Default = 8:00 hr	ADV	<b>RELAY 2 PUMP RUN TIME</b> <i>SECTION B, F</i> Select the amount of time Relay 2 should operate for daily hot tub or pool filtration. <b>Note:</b> This item is only available when a programmable setback schedule and Relay 2 Pump On is set to a time.
2	<p>ADJUST ON SAMP F2</p>	OFF, On Default = On	ADV	<b>RELAY 2 SAMPLE</b> <i>SECTION B</i> Select whether Relay 2 must cycle the Hot Tub pump during the unoccupied and away periods to sample the water temperature. <b>Note:</b> This item is only available when DIP switch 2 is set to tN4 System Control and the Heat Source item is set to hydronic (HYDr).
1 2 4 5	<p>SETPOINT ADJUST 1 DEV</p>	OFF, 1 to 12 Default = 1	ADV	<b>SETPOINT DEVICE ENABLE</b> <i>SECTION I</i> Select the Setpoint Device Enable number to allow a remote device such as a User Switch to activate the Time Occupied override. The control then maintains the occupied temperature for a preset amount of time. <b>Note:</b> This item is only available when the setpoint control has tN4 communication.
1 2 3 4 5 6	<p>ADJUST OUT OFF</p>	OFF, On Default = OFF	ADV	<b>OUTDOOR</b> <i>SECTION R</i> Select whether the outdoor temperature is to be shown in the VIEW menu. <b>Note:</b> This item is only available when the control is connected to a tN4 system and an outdoor sensor is connected to one of the devices in the tN4 system.

Continued on next page.

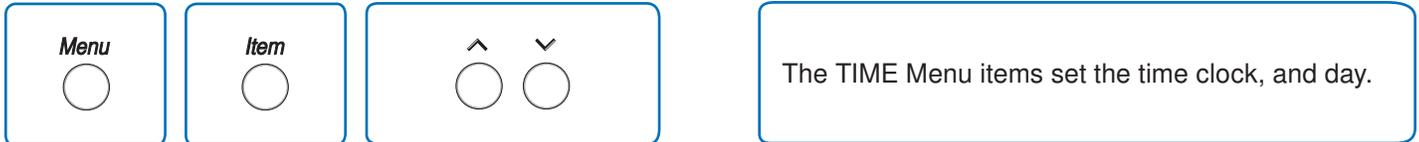
## ADJUST Menu (6 of 6)

## ADJUST MENU

Mode	Item Field	Range	Access	Description
1 2 4 5 6		NONE, ZONE, CTRL Default = NONE	ADV	<b>WWSAD</b> <span style="float: right;"><a href="#">SECTION R</a></span> Select the type of Warm Weather Shut Down desired. When the outdoor temperature rises above the WWSAD, heating is disabled. <b>Note:</b> This item is only available when the control is connected to a tN4 system, an outdoor sensor is connected to one of the devices in the tN4 system, and Mode of Operation is set to Heat.
1 2 4 5 6		40 to 100°F, OFF (4.5 to 38.0°C, OFF) Default = 70°F (21.0°C)	ADV	<b>WWSAD OCCUPIED</b> <span style="float: right;"><a href="#">SECTION R</a></span> Select the outdoor temperature at which the Warm Weather Shut Down occurs for the occupied period. Heating is disabled when the outdoor temperature rises above the WWSAD. <b>Note:</b> This item is only available when Mode of Operation is set to Heat and WWSAD is set to Zone.
1 2 4 5		40 to 100°F, OFF (4.5 to 38.0°C, OFF) Default = 62°F (16.5°C)	ADV	<b>WWSAD UNOCCUPIED</b> <span style="float: right;"><a href="#">SECTION R</a></span> Select the outdoor temperature at which the Warm Weather Shut Down occurs for the unoccupied period. Heating is disabled when the outdoor temperature rises above the WWSAD. <b>Note:</b> This item is only available when the Mode of Operation is set to Heat, WWSAD is set to Zone, and a programmable setback schedule has been selected.
1 4		OFF, 30 to 100°F (OFF, -1.0 to 38.0°C) Default = OFF	ADV	<b>CWSD OCCUPIED</b> <span style="float: right;"><a href="#">SECTION R</a></span> Select the outdoor temperature at which the Cold Weather Shut Down occurs for the occupied period. Cooling is disabled when the outdoor temperature falls below the CWSD. <b>Note:</b> This item is only available when the control is connected to a tN4 system, an outdoor sensor is connected to one of the devices in the tN4 system, and Mode of Operation is set to Cool.
1 4		OFF, 30 to 100°F (OFF, -1.0 to 38.0°C) Default = OFF	ADV	<b>CWSD UNOCCUPIED</b> <span style="float: right;"><a href="#">SECTION R</a></span> Select the outdoor temperature at which the Cold Weather Shut Down occurs for the unoccupied period. Cooling is disabled when the outdoor temperature falls below the CWSD. <b>Note:</b> This item is only available when the control is connected to a tN4 system, an outdoor sensor is connected to one of the devices in the tN4 system, Mode of Operation is set to Cool, and a programmable setback schedule has been selected.

After the last item, the control returns to the first item in the menu.

**TIME Menu (1 of 1)**

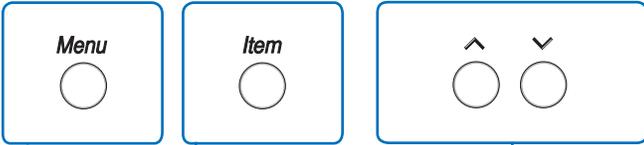


**TIME MENU**

Item Field	Range	Access	Description
		USER InST ADV	<b>CURRENT TIME AND DAY</b> <i>SECTION K</i> Displays the current time and day of the week. The time and date flash if the time is not set.
	0 to 59 Default = 00	USER InST ADV	<b>CLOCK MINUTES</b> <i>SECTION K</i> Set the minutes.
	12 AM to 11 PM or 00 to 23 Default = 12 AM	USER InST ADV	<b>CLOCK HOURS</b> <i>SECTION K</i> Set the hours.
	Su, Mo, Tu, We, Th, Fr, Sa Default = Su	USER InST ADV	<b>DAY OF THE WEEK</b> <i>SECTION K</i> Set the day of the week.
	12 hr or 24 hr Default = 12 hr	ADV	<b>MODE</b> <i>SECTION K</i> Select whether time should be displayed using a 12 or 24 hour clock.

• After the last item, the control returns to the first item in the menu.

**SCENE Menu (1 of 2)** Note: The SCENE menu is not available when the Application Mode is set to Pool (6)



The SCENE Menu items set the current scene as well as the scene settings.

SCENE MENU

Item Field	Range	Access	Description
	Occ, Away, PERM 1, PERM Away 2, PERM UnOcc 3, PERM 4, PERM 5, TMPY Occ 6, TMPY 7, TMPY 8 Default = Occ PERM 1	USEr InST ADV	<b>SELECT</b> <span style="float: right;">SECTION M</span> Select the scene for the building. <b>Note:</b> Only Occupied and Away are available when a programmable setback schedule is not selected. <b>Note:</b> This item is only available when SCENE menu is set to On.
	INF, 1 to 180 days Default = INF	USEr InST ADV	<b>AWAY HOLD</b> <span style="float: right;">SECTION M</span> Set the number of days for the Away 2 scene. When the scene is selected, the tN4 system remains in that scene for the set number of days then reverts to the last permanent scene. <b>Note:</b> This item is only available when SCENE menu is set to On.
	Schd, UnOcc, Occ, Away Default = Schd	InST ADV	<b>SET PERMANENT 1</b> <span style="float: right;">SECTION M</span> Select an action for the Permanent 1 scene. <b>Note:</b> This item is only available when SCENE menu is set to On and a programmable setback schedule is selected.
	Schd, UnOcc, Occ, Away Default = Schd	InST ADV	<b>SET PERMANENT 4</b> <span style="float: right;">SECTION M</span> Select an action for the Permanent 4 scene. <b>Note:</b> This item is only available when SCENE menu is set to On and a programmable setback schedule is selected.
	Schd, UnOcc, Occ, Away Default = Schd	InST ADV	<b>SET PERMANENT 5</b> <span style="float: right;">SECTION M</span> Select an action for the Permanent 5 scene. <b>Note:</b> This item is only available when SCENE menu is set to On and a programmable setback schedule is selected.
	Schd, UnOcc, Occ, Away Default = Schd	InST ADV	<b>SET TEMPORARY 7</b> <span style="float: right;">SECTION M</span> Select an action for the Temporary 7 scene. <b>Note:</b> This item is only available when SCENE menu is set to On and a programmable setback schedule is selected.
	Schd, UnOcc, Occ, Away Default = Schd	InST ADV	<b>SET TEMPORARY 8</b> <span style="float: right;">SECTION M</span> Select an action for the Temporary 8 scene. <b>Note:</b> This item is only available when SCENE menu is set to On and a programmable setback schedule is selected.

Continued on next page.

**SCENE Menu (2 of 2)** Note: The SCENE menu is not available when the Application Mode is set to Pool (6)

Item Field	Range	Access	Description
<p>TIME SCENE 1:00 hr RUN Occ</p>	<p>OFF, 0:05 to 24:00 hr, On (in 5 min. increments) Default = 1:00</p>	<p>LTD USER InST ADV</p>	<p><b>RUN TIME OCCUPIED</b> SECTION B, E, I Select the amount time for the setpoint control to operate at the occupied temperature when a Setpoint Device Enable is provided. <b>Note:</b> This item is only available in Application Mode 2 (Hot Tub) or 5 (Floor) if a programmable setback schedule is selected. <b>Note:</b> This item is only available in Application Mode 1 and 4 (Setpoint) if a programmable setback schedule is selected and the Setpoint Device Enable setting in the ADJUST menu is set from 1 through 12.</p>
<p>SCENE OFF</p>	<p>OFF, On Default = OFF</p>	<p>InST ADV</p>	<p><b>SCENE MENU</b> SECTION M Select whether or not to use the scene feature on the setpoint control. When set to OFF, this item displays first in the Scene Menu.</p>

SCENE MENU

After the last item, the control returns to the first item in the menu.

**SCHD (Schedule) Menu (1 of 2)**



The SCHEDULE menu items set the schedule type, the number of events per day, and the event times.

Item Field	Range	Access	Description
<p>SCHD NONE Schd</p>	<p>NONE, ZONE, MST1, MST2, MST3, MST4, Mbr1, Mbr2, Mbr3, Mbr4, UnOc Default = NONE</p>	<p>InST ADV</p>	<p><b>HEAT OR COOL SCHEDULE</b> SECTION L Selects the schedule used by the setpoint control. If a schedule is not required, select NONE. If the schedule is only used by this setpoint control, select ZONE. If the schedule is shared with other thermostats or setpoint controls, select MST1 to MST4. If the schedule is set on another thermostat or setpoint control, select Mbr1 to Mbr4. UnOc is not available in Mode 3. <b>Note:</b> This item can be viewed in the USER and INST (Installer) access levels but can only be adjusted in the ADV (Advanced) access level.</p>
<p>SCHD 5-11 Schd TYPE</p>	<p>24 hr, 5-2, 5-11, 7dAY Default = 5-11</p>	<p>InST ADV</p>	<p><b>SCHEDULE TYPE</b> SECTION L Select the type of schedule. <b>Note:</b> This item is only available when the Heat or Cool Schedule is set to ZONE or MST1 to MST4.</p>
<p>SCHD 4 Mode Schd</p>	<p>2 (Occ, UnOcc), 4 (Occ 1, 2, UnOcc 1, 2) Default = 4</p>	<p>InST ADV</p>	<p><b>SCHEDULE MODE</b> SECTION L Select the number of events per day. <b>Note:</b> This item is only available when the Heat or Cool Schedule is set to ZONE or MST1 to MST4.</p>

SCHEDULE MENU

Continued on next page.

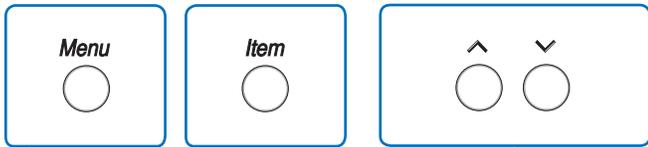
SCHD (Schedule) Menu (2 of 2)

SCHEDULE MENU

Item Field	Range	Access	Description
<p>MoTuWeThFrSaSu</p> <p>SCHD    --:--:--</p> <p>UnOcc12</p> <p>Occupied 1</p> <p>Unoccupied 1</p> <p>Occupied 2</p> <p>Unoccupied 2</p>	<p>--:--:-- ,</p> <p>12:00 AM to 11:50 PM</p> <p>or</p> <p>--:--:-- ,</p> <p>00:00 to 23:50</p> <p>Default = --:--:--</p>	<p>USER</p> <p>InST</p> <p>ADV</p>	<p><b>ALL DAYS OF THE WEEK</b>      <a href="#">SECTION L</a></p> <p>Select the times for the scheduled events.</p> <p><b>Note:</b> This item is only available when the Heat or Cool Schedule is set to Zone or to a Schedule Master and the Schedule Type is set to 24 hr.</p>
<p>MoTuWeThFr</p> <p>SCHD    --:--:--</p> <p>Schd UnOcc12</p> <p>Occupied 1</p> <p>Unoccupied 1</p> <p>Occupied 2</p> <p>Unoccupied 2</p>	<p>--:--:-- ,</p> <p>12:00 AM to 11:50 PM</p> <p>or</p> <p>--:--:-- ,</p> <p>00:00 to 23:50</p> <p>Default = --:--:--</p>	<p>USER</p> <p>InST</p> <p>ADV</p>	<p><b>MONDAY THROUGH FRIDAY</b>      <a href="#">SECTION L</a></p> <p>Select the time for the scheduled events.</p> <p><b>Note:</b> This item is only available when the Heat or Cool Schedule is set to Zone or to a Schedule Master and Schedule Type is set to 5-2 or 5-11.</p>
<p>SaSu</p> <p>SCHD    --:--:--</p> <p>Schd UnOcc12</p> <p>Occupied 1</p> <p>Unoccupied 1</p> <p>Occupied 2</p> <p>Unoccupied 2</p>	<p>--:--:-- ,</p> <p>12:00 AM to 11:50 PM</p> <p>or</p> <p>--:--:-- ,</p> <p>00:00 to 23:50</p> <p>Default = --:--:--</p>	<p>USER</p> <p>InST</p> <p>ADV</p>	<p><b>SATURDAY AND SUNDAY</b>      <a href="#">SECTION L</a></p> <p>Select the times for the scheduled events.</p> <p><b>Note:</b> This item is only available when the Heat or Cool Schedule is set to Zone or to a Schedule Master and the Schedule Type is set to 5-2.</p>
<p>Sa</p> <p>SCHD    --:--:--</p> <p>Schd UnOcc12</p> <p>Occupied 1</p> <p>Unoccupied 1</p> <p>Occupied 2</p> <p>Unoccupied 2</p>	<p>--:--:-- ,</p> <p>12:00 AM to 11:50 PM</p> <p>or</p> <p>--:--:-- ,</p> <p>00:00 to 23:50</p> <p>Default = --:--:--</p>	<p>USER</p> <p>InST</p> <p>ADV</p>	<p><b>SATURDAY TO FRIDAY</b>      <a href="#">SECTION L</a></p> <p>Select the times for the scheduled events for Saturday, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday.</p> <p><b>Note:</b> This item is only available when Heat or Cool Schedule is set to Zone or to a Schedule Master and the Schedule Type is set to 7 day.</p>

After the last item, the control returns to the first item in the menu.

MISC (Miscellaneous) Menu (1 of 1)



The Miscellaneous menu items set display and control options such as access level and temperature units.

MISC MENU

Item Field	Range	Access	Description
	SEC, LTD, USEr, InST, ADV Default = USEr	SEC LTD USEr InST ADV	<b>ACCESS LEVEL</b> The access level of the setpoint control. The access column shows which items are visible in each access level. <b>Note:</b> This item is only available when DIP switch 1 is set to the Unlock position and the tN4 system control DIP switch is set to the Unlock position.
	°F, °C Default = °F	USEr InST ADV	<b>UNITS</b> <span style="float: right;">SECTION P</span> Select Fahrenheit or Celsius as the temperature units.
	ON, TMPY, OFF Default = TMPY	InST ADV	<b>BACKLIGHT</b> <span style="float: right;">SECTION Q</span> Select whether the backlight displays permanently, temporarily, or is off. The temporary backlight lasts for 30 seconds.
	---, 1 to 24	ADV	<b>NUMBER OF DEVICES</b> <span style="float: right;">SECTION R</span> Number of tN4 devices connected to this tN4 bus. <b>Note:</b> This item is only available when the setpoint control has tN4 communication.
	bus#:01 to bus#:24, AUTO Default = AUTO	SEC LTD USEr InST ADV	<b>ADDRESS</b> <span style="float: right;">SECTION R</span> The tN4 bus address of this setpoint control. Auto allows the tN4 system to automatically assign an address to the setpoint control. To manually set the address, use the Up or Down buttons while in the ADV (Advanced) or InST (Installer) access level. <b>Note:</b> This item is only available when the setpoint control has tN4 communication.
		InST ADV	<b>RESTORE DEFAULTS</b> Press the Up and Down buttons together to load the factory defaults. The SELECT icon appears and then the display shows DONE when the factory defaults have been completed.
	162, Software Version	SEC LTD USEr InST ADV	<b>TYPE</b> Product number of this setpoint control. Hold the Up button to view the software version.

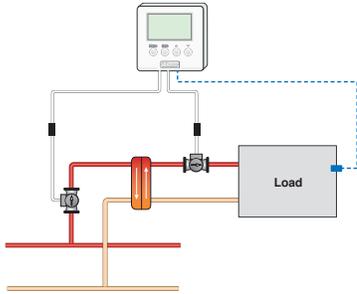
After the last item, the control returns to the first item in the menu.

# Sequence of Operation

## Application Mode 1 - On / Off Setpoint

### SECTION A

Application Mode 1 is a generic setpoint control operation using an on/off differential for heating or cooling. The sensor is required to be located at the temperature control point. The setpoint control can have an occupied, unoccupied, and away temperature setting.



### Relay 1 Operation

Relay 1 operates using an on/off differential to maintain the load at the Occupied, Unoccupied, or Away temperatures depending on the schedule and scene.

### Relay 2 Operation

Relay 2 operates continuously while in the occupied period to provide constant circulation and reduce temperature swing.

Relay 2 operates together with Relay 1 while in the unoccupied and away periods.

### Setting the Setpoint Off

The setpoint temperature can be set to Off. When set to Off, Relay 1 and 2 will not turn on. If the heating area is outdoors, or the heating system has the potential to freeze, it is recommended that the setpoint always be set to a temperature and not set to Off.

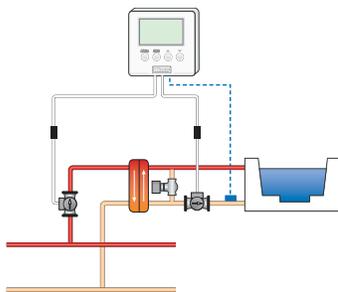
The setpoint can be set to Off if the heating system can be drained or the pump should remain off.

The setpoint control power should never be shut off, otherwise an error message will appear on the rest of the tN4 system.

## Application Mode 2 - Hot Tub

### SECTION B

Application Mode 2 is designed specifically to heat hot tubs using an on/off differential. A sensor must be located in a temperature well on the recirculation pipe. The hot tub can have an occupied, unoccupied, and away temperature setting.



### Relay 1 Operation

Relay 1 operates using an on/off differential to maintain the load at the Occupied, Unoccupied, or Away temperatures depending on the schedule and scene.

### Hot Tub Filtration

The hot tub application includes special logic to operate the pump controlled by Relay 2. The Relay 2 Pump On setting in the Adjust menu allows installers to choose a time at which Relay 2 starts a pump for filtration of the hot tub. The Relay 2 Pump Run Time setting in the Adjust menu determines how long Relay 2 should run the pump for filtration.

The Hot Tub Filtration feature can only be used when a programmable setback schedule is set to Zone, Schedule Master, Schedule Member, or set to Unoccupied.

### Temperature Sampling

When the setpoint control is connected to a tN4 System and the hot tub pump operated by Relay 2 is off during the unoccupied and away periods, the setpoint sensor may not accurately read the hot tub temperature due to a lack of flow past the sensor. In order to accurately sample the hot tub temperature, the Relay 2 Sample setting can be set to On. Relay 2 then turns on the hot tub pump for approximately one minute at the end of each heating cycle to allow the control to accurately measure the hot tub temperature.

### Relay 2 Operation

Relay 2 operates continuously while in the occupied period to provide constant circulation and reduce temperature swing.

Relay 2 operates together with Relay 1 while in the unoccupied and away periods.

Relay 2 can optionally operate to provide Hot Tub Filtration.

When connected to a tN4 system control, Relay 2 can optionally operate to provide temperature sampling of the hot tub.

### Mode of Operation

The hot tub mode of operation can be set to either Heat or Off. While set to Off, Relay 1 and Relay 2 remain off. The Off setting should only be used when the hot tub is drained or when there is no possibility of freezing. Power should never be removed from the setpoint control as this will result in an error message on the tN4 system.

## Occupied Time

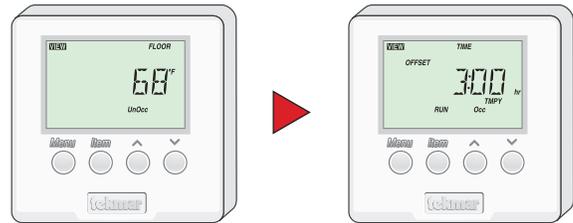
The setpoint control can temporarily override the scheduled temperature and operate at the occupied temperature on a timer.

Press the Up or Down buttons while in the View menu to set the amount of time that the occupied temperature should remain in effect.

To use this feature, a programmable schedule must be set or the schedule be set to normally operate at the unoccupied setting. When the schedule is set to unoccupied, the setpoint control operates at the unoccupied setting until activated.

The length of time the setpoint remains at the occupied temperature is preset by the Run Time Occupied item located in the Scene menu.

To cancel the temporary occupied time, press and hold the Down button until the display shows OFF, at which point, the setpoint control returns to the schedule.

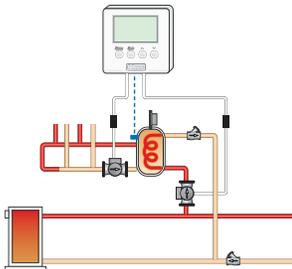


**Pressing the UP button while in the VIEW menu starts operation of the Hot Tub for the time set. To Stop operation press the DOWN button until the time shows OFF.**

## Application Mode 3 - DHW Tank

### SECTION C

Application Mode 3 is designed specifically to operate a domestic hot water (DHW) tank using an on/off differential. A sensor must be located in a temperature well inside the DHW tank. The DHW tank can have an occupied, unoccupied, and away temperature setting.



### Relay 1 Operation

Relay 1 operates using an on/off differential to maintain the load at the Occupied, Unoccupied, or Away temperatures depending on the schedule and scene.

### Relay 2 Operation

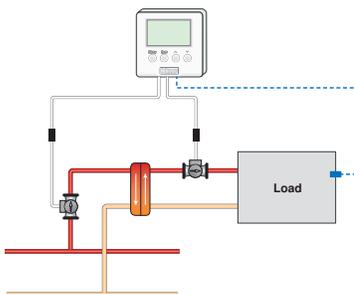
Relay 2 operates a DHW recirculation pump continuously during the occupied period.

Relay 2 remains off during the unoccupied and away periods.

## Application Mode 4 - PWM Setpoint

### SECTION D

Application Mode 4 is a generic setpoint control operation using pulse width modulation for heat or cooling. The sensor is required to be located at the temperature control point. The setpoint control can have an occupied, unoccupied, and away temperature setting.



### Relay 1 Operation

Relay 1 operates using pulse width modulation to maintain the load at the Occupied, Unoccupied, or Away temperatures depending on the schedule and scene.

### Relay 2 Operation

Relay 2 operates continuously while in the occupied period to provide constant circulation and reduce temperature swing.

Relay 2 operates together with Relay 1 while in the unoccupied and away periods.

### Setting the Setpoint Off

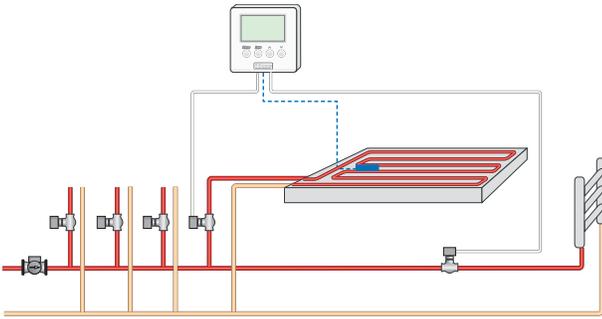
The setpoint temperature can be set to Off. When set to Off, Relay 1 will not turn on. If the heating area is outdoors, or the heating system has the potential to freeze, it is recommended that the setpoint always be set to a temperature and not set to Off.

The setpoint can be set to Off if the heating system can be drained or the pump should remain off.

The setpoint control power should never be shut off, otherwise an error message will appear on the rest of the tN4 system.

## Application Mode 5 - Floor

Application Mode 5 configures the setpoint control for floor warming and floor heating applications using pulse width modulation. Floor warming is not necessarily designed to heat the room, but to make the floor feel warm to the touch. This is common especially in bathrooms. For bathroom applications, Relay 2 can also heat a towel warmer radiator while in the occupied period. A sensor must be located within the slab between the heating pipes. The setpoint control allows a Floor temperature to be set for the occupied, unoccupied, and away events.



### Relay 1 Operation

Relay 1 operates using pulse width modulation to maintain the load at the Occupied, Unoccupied, or Away temperatures depending on the schedule and scene.

### Relay 2 Operation

Relay 2 operates continuously while in the occupied period to heat a towel warmer.

Relay 2 remains off during the unoccupied and away periods.

## Occupied Time

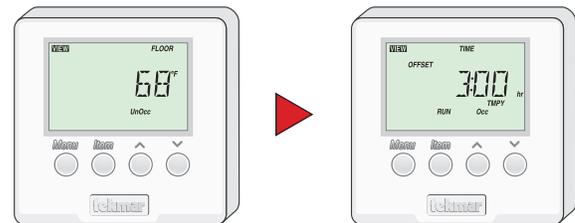
The setpoint control can temporarily override the scheduled temperature and operate at the occupied temperature on a timer.

Press the Up or Down buttons while in the View menu to set the amount of time that the occupied temperature should remain in effect.

To use this feature, a programmable schedule must be set or the schedule be set to normally operate at the unoccupied setting. When the schedule is set to unoccupied, the setpoint control operates at the unoccupied setting until activated.

The length of time the setpoint remains at the occupied temperature is preset by the Run Time Occupied item located in the Scene menu.

To cancel the temporary occupied time, press and hold the Down button until the display shows off, at which point, the setpoint control returns to the schedule.

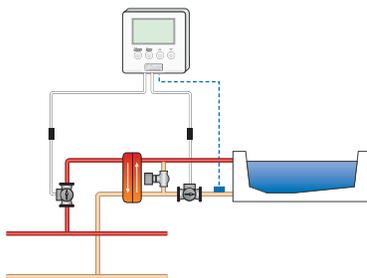


**Pressing the UP button while in the VIEW menu starts operation of the Hot Tub for the time set. To Stop operation press the DOWN button until the time shows OFF.**

## Application Mode 6 - Pool

## SECTION F

Application Mode 6 configures the setpoint control for pool heating using pulse width modulation. A sensor is located in a temperature well on the pool return recirculation pipe. The pool can have an occupied temperature. During the unoccupied and away periods, the pool is not heated.



### Relay 1 Operation

Relay 1 operates using pulse width modulation to maintain the load at the occupied temperature. Relay 1 remains off during the unoccupied and away periods.

### Relay 2 Operation

Relay 2 operates continuously while in the occupied period to provide constant circulation and reduce temperature swing.

Relay 2 remains off during the unoccupied and away periods.

Relay 2 operates to provide pool filtration.

### Pool Filtration

The pool application includes filtration logic to operate the pump controlled by Relay 2. The Relay 2 Pump On setting allows installers to choose a time at which Relay 2 starts a pump for filtration of the pool. The Relay 2 Pump Run Time setting determines how long Relay 2 should run the pump for filtration.

### Mode of Operation

The pool mode of operation can be set to either Heat or Off. While set to Off, Relay 1 and Relay 2 remain off. The OFF setting should only be used when the pool is drained or there is no possibility of freezing. Power should never be removed from the setpoint control as this will result in an error message on the tN4 system.

## Cycle Length

Select the heating or cooling cycle length in minutes for Application Modes 4 (Setpoint), 5 (Floor), and 6 (Pool). The cycle length is the total on time and off time of Relay 1. This helps prevent short cycling. The following settings are available:

**CTRL =** The cycle length is the same as the tN4 system control. This is the factory default.

**SYNC =** The cycle length synchronizes with other thermostats and setpoint controls that have also been set to the SYNC setting.

5 to 30 minutes = The cycle length is manually set.

**Note:** The factory default changes to synchronize (SYNC) when a tN4 control is not present. The factory default changes to 15 minutes when the mode of operation is set to Cool.

## Relay Minimum On and Off Time

## SECTION H

Relays 1 and 2 have adjustable Minimum On and Minimum Off time settings available in the Adjust menu only with Application Modes 1, 2, and 3 (using on-off differential).

These settings help prevent short cycling of the relays and the heating or cooling equipment.

## Remote Enable / Disable

## SECTION I

To use the Remote Enable / Disable feature, the setpoint control must be set to Mode 1 (Setpoint), 2 (Hot Tub), 4 (Setpoint), or 5 (Floor). When the setpoint control is connected to a tN4 system, a User Switch or tN4 Gateway can remotely signal a setpoint control (or multiple setpoint controls) to override the unoccupied temperature to temporarily operate at the occupied temperature. The Setpoint Control, User Switch and tN4 Gateway each have a setting called Setpoint Device Enable that can be assigned a number between 1 and 12. When devices have the same Setpoint Device Enable number, then either pressing the button on the User Switch or activating the feature on the tN4 Gateway causes the Setpoint Control to operate at the occupied temperature. Sending a second Setpoint Device Enable cancels the override and the setpoint control returns to the unoccupied temperature. A total of 12 different Setpoint Devices Enables can be configured on the tN4 system.

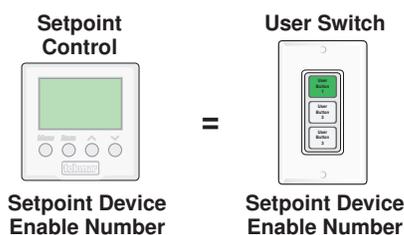
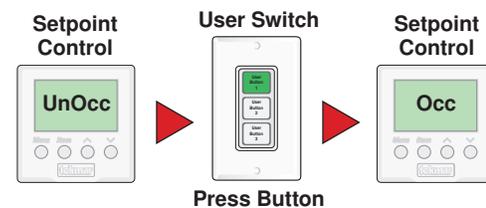
To create a Setpoint Device Enable:

- 1) DIP switch 2 must be set to tN4 system control.
- 2) A User Switch or tN4 Gateway should be connected to one of the tN4 buses.
- 3) Set the Setpoint Device Enable item in the Adjust menu to a number between 1 and 12.
- 4) Set the Setpoint Device Enable on the User Switch or tN4 Gateway to the same number between 1 and 12.

The schedule on the setpoint control must be set to either Zone, Schedule Master, Schedule Member, or to Unoccupied to allow the temporary occupied time override to operate. When the schedule is set to Unoccupied, the setpoint control operates at the unoccupied setting until activated.

The length of time the setpoint remains at the occupied temperature is preset by the Run Time Occupied item located in the Scene menu.

Remote activation of the setpoint control requires the same Setpoint Device enable number to be set on the setpoint control and on a User Switch 480 or 481 (or tN4 Gateway).



## Sensor Input

The Setpoint Control 162 requires a temperature sensor (Universal Sensor 071 included) to be connected to the sensor input on the back of the control. All tekmar sensors

are compatible. Choose the sensor type that best meets the requirements of the application. See application mode diagrams for the recommended location of the sensor.

## Time Clock

The setpoint control has a built-in time clock to allow the control to operate on a programmable schedule. A battery less backup allows the control to keep time for at least 4 hours without power.

- Use the Time menu to set the correct time.

## Setting the Schedule

To provide greater energy savings, the setpoint control can operate on a programmable schedule. The schedule is stored in memory and is not affected by loss of power to the control. A single zone or multiple devices on the tN4 system can be assigned to follow the schedule of the setpoint control.

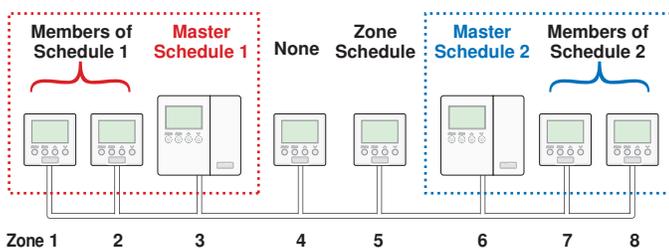
### Zone Schedule

A zone schedule only applies to the setpoint control on which the schedule is programmed. The setpoint control follows the zone schedule and the events are not communicated to other devices on the tN4 system.

### Master Schedule

If the setpoint control is connected to other devices on the tN4 system, then the setpoint control can operate on a master schedule. The master schedule stores the event times in memory and sends messages to the member thermostats when to change from one event to the next.

A maximum of four master schedules can be set up on the tN4 system. A master schedule is available to all devices on the tN4 system. Master schedules simplify installation by allowing one master schedule to be used by multiple devices.



To create a master schedule:

1. Assign the setpoint control as a master schedule by setting the Schedule item in the Schedule menu to Master (MST) 1 to 4.

If the setpoint control is a master schedule, a clock symbol appears in the display while in the View menu. This helps locate the master schedule if changes to the schedule are required.

## Schedule Member

If a Master Schedule is available on the tN4 system, the setpoint control can follow the Master Schedule as a member.

To follow a master schedule as a member:

1. Assign the setpoint control to follow a master schedule by setting the Schedule menu item in the Schedule menu to Member (MBR) 1 to 4. The number must match that of the Master.

### Normally Unoccupied

The setpoint control can be set to normally operate at the unoccupied temperature. This allows the setpoint control to temporarily be set to the occupied temperature by either pressing the Up or Down buttons in the View menu or by a remote enable.

### Schedule Types

The schedule type determines when the schedule repeats itself.

The setpoint control includes four schedule types:

- 24 Hour: Repeats every 24 hours.
- 5-2: Repeats on a weekly basis. However, it breaks the week into the weekend and weekdays. This reduces the amount of schedule event settings.
- 5-11: Repeats on a weekly basis. However, it breaks the week into Saturday and Sunday followed by the weekdays. This reduces the amount of schedule event settings.
- 7 Day: Repeats on a weekly basis and allows for separate event times for each day.

	Schedule Type			
Day	24 Hour	5-2	5-11	7 day
Sa		•	•	•
Su			•	•
Mo				•
Tu	•			•
We		•	•	•
Th				•
Fr				•

## Schedule Mode

The schedule mode can have either 4 or 2 events per day:

4 Event	2 Event
Occupied 1	Occupied
Unoccupied 1	Unoccupied
Occupied 2	
Unoccupied 2	

An event is a time at which the thermostat changes the set temperature. The event time can be set to the nearest 10 minutes. If you wish to have the thermostat skip the event, enter “- :-” as the time. The “- :-” time is found between 11:50 PM and 12:00 AM.

See the table labeled Schedule Mode, for more details regarding types of events.

Schedule Mode	Event	24hr	Sat	Sun	Mon	Tue	We	Thu	Fri
4 events per day	Occupied 1	🕒	🕒	🕒	🕒	🕒	🕒	🕒	🕒
	Unoccupied 1	🕒	🕒	🕒	🕒	🕒	🕒	🕒	🕒
	Occupied 2	🕒	🕒	🕒	🕒	🕒	🕒	🕒	🕒
	Unoccupied 2	🕒	🕒	🕒	🕒	🕒	🕒	🕒	🕒
or									
2 events per day	Occupied	🕒	🕒	🕒	🕒	🕒	🕒	🕒	🕒
	Unoccupied	🕒	🕒	🕒	🕒	🕒	🕒	🕒	🕒

## Scenes

## SECTION M

A Scene function is available on the setpoint control.

- To use the scene function, go to the Scene menu and set the Scene setting to On.

Scenes are overrides that affect devices on the tN4 system. Scenes provide a method of changing the temperature throughout an entire building from a single tN4 device. Each tN4 device is programmed to operate at either at a temperature (Occupied, Unoccupied, Away) or follow the regular setback schedule. If a programmable schedule is not used, only the occupied and away temperatures are available. A permanent scene remains in place until another scene is selected. When a temporary scene is selected (Scenes 6, 7, 8), a timer counts down and when it times out, devices return to the last permanent scene selected.

See the Scene table for details regarding the operation of Scenes. There are a total of eight Scenes available.

- Default Scene:** The default scene is Permanent 1. In a typical installation, the setpoint control is set to follow the schedule in the Permanent 1 scene.
- Factory Set Scenes:** Scenes 2, 3 and 6 are factory set and force the setpoint control to the Away, Unoccupied or the Occupied temperature respectively.
- Customized Scenes:** Scenes 1, 4, 5, 7, and 8 can be customized to either follow the scheduled event, or the temperature can be forced to the Occupied, Unoccupied, or the Away temperature.

Scene	Description	Setpoint Operation
1	Permanent 1	Scheduled event, Unoccupied, Occupied, Away
2	Permanent Away 2	Away
3	Permanent Unoccupied 3	Unoccupied
4	Permanent 4	Scheduled event, Unoccupied, Occupied, Away
5	Permanent 5	Scheduled event, Unoccupied, Occupied, Away
6	Temporary Occupied 6	Occupied for 3 hours
7	Temporary 7	4 hour: Schedule, Unoccupied, Occupied, or Away
8	Temporary 8	8 hour: Schedule, Unoccupied, Occupied, or Away

### Example:

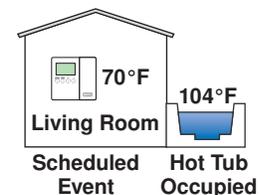
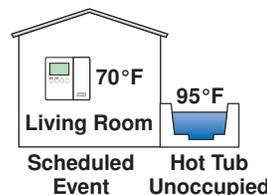
A house is normally in scene 1. There is a living room that operates on a schedule and there is a hot tub that is normally at the unoccupied temperature. When entertaining guests, the scene is changed to scene 4. Scene 4 has been pre-programmed to change the hot tub to operate at the occupied temperature.

Living room thermostat:

Scene 1 is set to Schedule.  
 Scene 4 is set to Schedule.

Hot tub setpoint control:

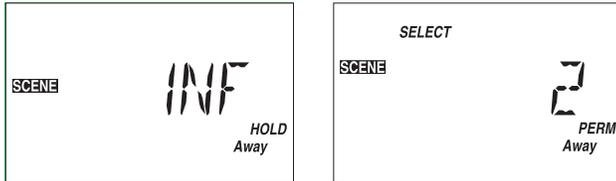
Scene Permanent 1 is set to Unoccupied.  
 Scene Permanent 4 is set to Occupied.



## Away Hold

To setback the temperature while the occupants are away, use the Permanent Away 2 scene. This scene changes all the devices on the tN4 system to the Away temperature setting.

To set the Away temperature, go to the Adjust menu and select the Setpoint (or Hot Tub, DHW, Floor) Away item. When operating a pool, the away scene no longer heats the pool. The Access Level must be set to User, Installer or Advanced.



The Away Hold feature allows you to set the number of days the Away temperature applies.

To set the number of days away, go to the Scene menu and select Away Hold.

When set to Infinite, the Away 2 scene remains until a new scene is selected. If it is known in advance how long the building occupant will be away, the Away Hold can be

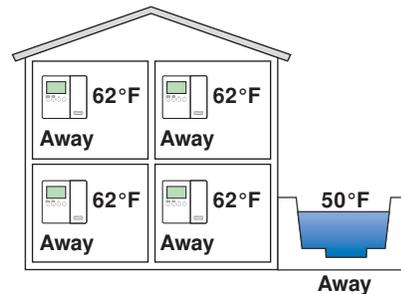
set to the number of days. Once the number of days have elapsed, the thermostat automatically changes from the Away 2 scene to the previous permanent scene.

### Example:

The home occupants are traveling for 14 days.

The occupants want the home to be at the Away temperatures for 14 days and then automatically return to the normal schedule.

- Locate the Scene Menu.
- Set the Away Hold to 14 days.
- Select Scene 2 Away.



## Restore Factory Defaults

To restore the factory defaults, locate the Default item in the Miscellaneous menu and press and hold the Up and

Down buttons for 1 second. The display will show "SELECT" and when completed it will show "DONE".

## Temperature Units

The thermostat can display temperatures in either Fahrenheit (°F) or in Celsius (°C).

- Locate the units setting in the Miscellaneous menu.

## Backlight

Use the control's backlight to increase the visibility of the display. The backlight can be set to On, Temporary, or Off. If Temporary is selected, the backlight comes on for 30 seconds when a button is pressed. By default, the

backlight is Temporary. If Off is selected the backlight remains permanently off.

- Locate the Backlite setting in the Miscellaneous menu.

## tN4 Features

When the setpoint control is connected to a tN4 system, the setpoint control has additional features not present when operating alone.

### tN4 Bus

When connecting the setpoint control to a tN4 system, there may be several tN4 busses available. The setpoint control should be connected to the tN4 bus that best represents the water temperature required for the setpoint load. Typically, the setpoint control should be connected to the boiler tN4 bus for Application Modes 2 (Hot Tub) and 3 (DHW Tank). Typically the setpoint control should be connected to a mix tN4 bus for Application Mode 5 (Floor).

### Heat Source

When the setpoint control is part of a tN4 system, the Heat Source item in the Adjust menu allows the setpoint control to inform the tN4 system control whether the heat is hydronic (HYDr) or provided by another (OTHr) heat source.

### Exchange Supply

When the setpoint control is connected to a tN4 system control and Heat Source item is set to hydronic (HYDr), the setpoint control requests that the Exchange Supply Occupied water temperature be maintained on the tN4 bus whenever Relay 1 is heating the setpoint load during

the occupied period. During the unoccupied periods, the exchange supply water temperature is lowered by the difference between the occupied and unoccupied setpoints. During the away period, the exchange supply is lowered by the difference between the occupied and the away setpoints.

## Maximum Supply

When the setpoint control is connected to a tN4 system control and the Heat Source item is set to hydronic (HYDr), the setpoint control requests an Exchange Supply water temperature on the tN4 bus. The setpoint control also includes a Maximum Supply setting. Should the water temperature on the tN4 bus exceed this water temperature, then the setpoint control discontinues heating by shutting off Relay 1.

## Relay 1 System Pump

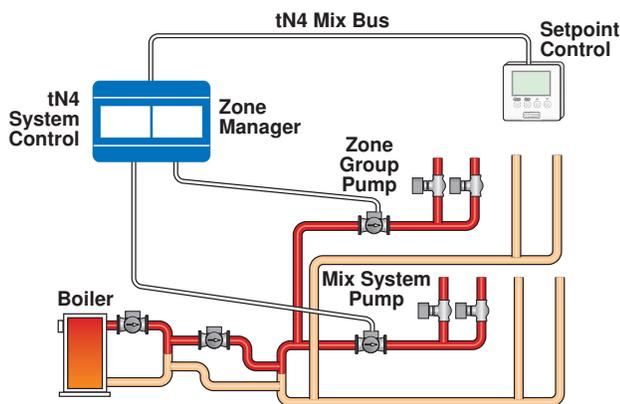
In order to accommodate many different piping and pumping configurations, the setpoint control is able to choose whether a “system” pump is required to operate at the same time as Relay 1. This allows each manifold on a water temperature to have a “system” pump when using zone valves or when using zone pumps together with primary secondary piping. Only the manifold that has zones requiring heat should have their “system” pump turned on.

When the setpoint control is connected to the tN4 boiler bus, the “system” pump is the primary pump located on the tN4 system control.

When the setpoint control is connected to a tN4 mix bus, the “system” pump is the mix system pump located on the tN4 system control or on a mixing expansion module.

To turn on the “system” pump together with Relay 1, set the Relay 1 Pump item in the Adjust menu to On. This is the factory default.

To turn on Relay 1 without the “system” pump, set the Relay 1 Pump item in the Adjust menu to Off.



## Relay 1 Delay System Pump

In applications where a thermal motor zone valve (telestat) is operated by Relay 1, a time delay is required to allow the zone valve to fully open before the “system” pump is turned on. The time delay is set using the Relay 1 Delay item in the Adjust menu. When the time delay is set to On

and Relay 1 is turned on, the “system” pump waits for 30 minutes before turning on.

When the setpoint control is connected to the tN4 boiler bus, the “system” pump is the primary pump located on the tN4 system control.

When the setpoint control is connected to a tN4 mix bus, the “system” pump is the mix system pump located on the tN4 system control or on a mixing expansion module.

## Purging

When the setpoint control is used with a tN4 system control, the setpoint control purges heat from the boiler into the setpoint zone if it is the last zone to shut off. The length of the purge is dependent on time, the temperature of the boiler, and the temperature of the setpoint load.

## Priority

When the setpoint control is used with a tN4 system control, the setpoint control has up to 5 levels of priority when connected to a tN4 boiler bus and 2 levels of priority when connected to a tN4 mixing bus. Devices are shut off in order of their tN4 address, with address ending in 24 having the lowest priority and addresses ending in 01 having the highest priority. See “tN4 Address” for more information.

Locate the Priority item in the Adjust menu.

When the setpoint control is connected to a tN4 boiler bus, the priorities are as follows:

STAT = Thermostats have priority over the setpoint control. The setpoint control no longer heats whenever any thermostat calls for heat.

OFF = All devices have equal priority.

LO = The setpoint control has priority over the thermostats. First, all mixing outputs are reduced. Second, boiler temperature second stage heating zones are shut off in order of their tN4 address from 24 to 1. Last, boiler temperature thermostat zones are shut off in order of their tN4 address from 24 to 1.

MED = The setpoint control has priority over the thermostats. First, all heating zones are shut off. If there is sufficient boiler capacity, boiler temperatures zones are turned on in order of their tN4 address from 1 to 24. Second, boiler temperature second stage heating zones are turned on in order of their tN4 address from 1 to 24. Last, all mixing outputs are increased up to normal operating levels.

HI = All thermostat heating zones are shut off whenever the setpoint control calls for heat.

When the setpoint control is connected to a tN4 mix bus, the priorities are as follows:

STAT = Thermostats have priority over the setpoint control. The setpoint control no longer heats whenever any thermostat calls for heat.

OFF = All devices have equal priority.

## Outdoor Temperature

The setpoint control can display the outdoor temperature in the View menu when connected to a tN4 bus with a device measuring the outdoor temperature. To display the outdoor temperature, set the Out item in the Adjust menu to On.

## Warm Weather Shut Down

The Warm Weather Shut Down (WWSD) feature prevents the setpoint control from heating once the outdoor temperature exceeds the WWSD occupied or WWSD unoccupied setting.

In order to use the WWSD, the setpoint control must be connected to a tN4 bus with a device measuring the outdoor temperature.

- Locate the WWSD setting in the Adjust menu.

## Cold Weather Shut Down

The Cold Weather Shut Down (CWSD) feature prevents the setpoint control from cooling once the outdoor temperature falls below the CWSD occupied or CWSD unoccupied setting.

In order to use the CWSD, the setpoint control must be connected to a tN4 bus with a device measuring the outdoor temperature.

- Locate the CWSD setting in the Adjust menu.

## tN4 Address

When connected to other tN4 devices through a tN4 bus, the setpoint control is automatically assigned a network address. The Address item in the Miscellaneous menu displays the current address of the setpoint control. A total of 24 devices can be connected to each tN4 bus.

If the 162 is operating as a member of a thermostat / setpoint only network, the address consists of a device number with no bus number. If the 162 is not connected to a tN4 network, the address item in the MISC menu is not available.

When the setpoint control is connected to a tN4 boiler bus, the address range is b:01 through to b:24.

When the setpoint control is connected to the tN4 mix 1 bus, the address range is 1:01 through to 1:24.

When the setpoint control is connected to the tN4 mix 2 bus, the address range is 2:01 through to 2:24.

When the setpoint control is connected to the tN4 mix 3 bus, the address range is 3:01 through to 3:24.

The address number determines the heating priority for each zone. A device with address number 1 has a higher priority than address number 24. The tN4 address allows the tN4 system control to shut off low priority zones when the heat source is unable to heat all zones simultaneously. In some cases, the installer may want to change the device's address in order to change the thermostat's priority relative to other devices.

**Note:** Keep track of manually set tN4 addresses. When a tN4 address is manually set, tN4 devices using the Auto address setting will automatically be assigned new addresses. If two devices are manually set to the same address, an error message will appear. The error remains until one of the addresses is manually changed to a vacant address.

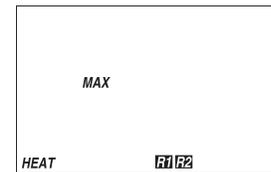
## Zone Test

The tN4 system control has a Zone Test feature, which allows each tN4 device to be individually operated for up to 5 minutes. When the setpoint control is selected, the display shows "Zn TEST" and Relay 1 and Relay 2 are turned on. When the setpoint control is not selected, the display shows "Zn TEST" and Relay 1 and Relay 2 are turned off.



## Maximum Heat

The tN4 system control has a Maximum Heat feature, which operates all tN4 devices, including the setpoint control, at the occupied temperature setting plus 5°F (3°C). While in the maximum heat operation, the setpoint control display shows the "MAX HEAT" symbols.



## Exercising

When connected to a tN4 system control, the setpoint control exercises Relay 1 and Relay 2 for 10 seconds after 3 days of inactivity. Exercising helps prevent pump seizure. While the setpoint control is exercising, the display shows "TEST".

Exercising does not occur when:

- Mode of Operation is set to Off.
- Heat Source is set to Other.
- DIP switch 2 is set to None.

# Error Messages

## Local Errors and Device Errors

Error messages are used to indicate a problem somewhere in the system. There are two types of error messages: Local Errors and Device Errors.

A Local Error indicates an error specific to a device. For example, a thermostat with a sensor short circuit will show a Sensor Short Error on its display. No other devices will show this specific error (unless they also have a sensor short circuit).

A Device Error is used to indicate that there is a local error somewhere else on the system. For example, if a thermostat has a sensor short circuit, that thermostat will show a Local Error indicating specifically what the problem is. All other devices on the network will show Device Errors, indicating the address of the device with the Local Error. In other words, Device Errors are nothing more than pointers, showing you that there is a local error somewhere on the system and where to find it.

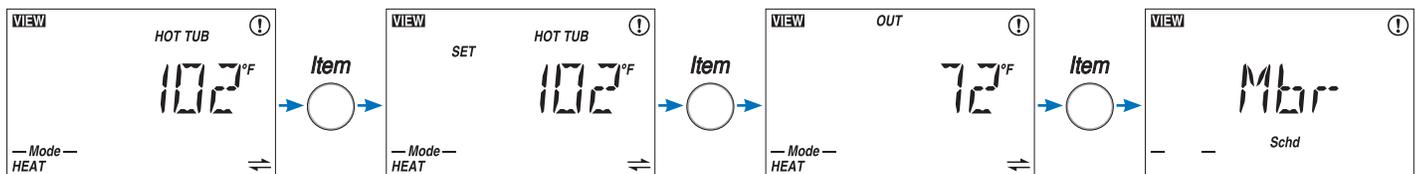
## Error Priority

Only one error can be shown on a particular device at a time. If there is more than one error on the system, the highest priority error will be the one that is shown. The table on pages 30 and 31 lists error messages in order of high priority to low priority.

## How to Locate an Error Message

If the warning symbol (flashing circle with exclamation mark) is visible on screen, this indicates that there is an error somewhere on the system. To view the error message, you must first put the control into the Advanced or Installer access level (available in MISC menu). When an error message is present, it is available as an item in the VIEW menu.

While in the View Menu, press the item button until the error message is displayed. You may have to advance through several View Menu items before the message is displayed.



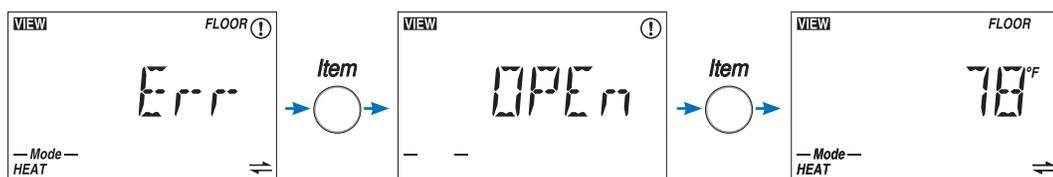
If the error message is a Device Error (if “DEV” or “DEV ERR” is shown on screen), read the address shown and go to the device with that address. That device will have a Local Error indicating specifically what the problem is. When the problem is corrected, the error message will automatically clear.

## Access Levels

In some cases, it is not desirable to let day-to-day users view error messages. In these cases, by lowering the access level of the thermostat or setpoint device to ‘User’ or lower, error messages cannot be seen in the View menu and the warning symbol only appears if there is a local error or a device error caused by a critical error on another device. If there is an error message on the system that you cannot find on a particular thermostat, make sure that the access level on that thermostat is set to Installer or Advanced.

## Sensor Temperature Errors

If a control is unable to display a temperature due to a sensor malfunction or communication problem, the word “Err” is displayed in place of the temperature. This usually indicates that there is an error somewhere on the system but is not the actual error message. Keep looking through the View menu to find the actual error message.



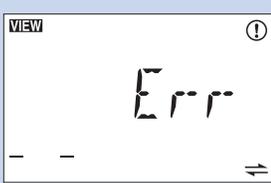
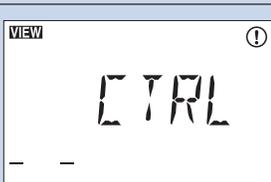
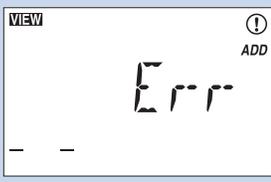
Device is attempting to show floor temperature but cannot because of sensor problem.

Keep pressing the Item button to find the actual error message

Once error is corrected, the temperature can be displayed

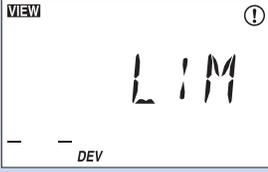
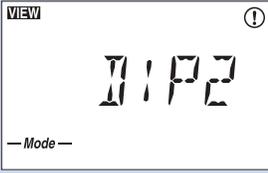
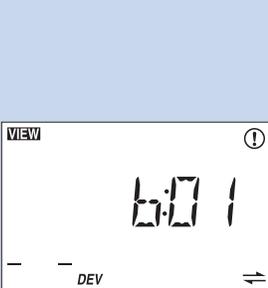
## Error Messages (1 of 2)

**Note:** Error Messages are only visible while in the Advanced or Installer access level.

Error Message	Description
 <p>VIEW <span style="float: right;">①</span> E01 - -</p>	<p><b>ADJUST ERROR</b></p> <p>The setpoint control failed to read the ADJUST menu settings from memory and has reloaded the factory default settings. Operation stops until the ADJUST menu settings are checked.</p> <p><b>Note:</b> To clear the error, the access level must be set to Advanced before checking the settings in the ADJUST menu.</p>
 <p>VIEW <span style="float: right;">①</span> E02 - -</p>	<p><b>TIME ERROR</b></p> <p>The setpoint control failed to read the TIME menu settings from memory and has reloaded the factory default settings. The setpoint control continues to operate while displaying this error.</p> <p><b>Note:</b> To clear the error, the access level must be set to Advanced before checking the settings in the TIME menu.</p>
 <p>VIEW <span style="float: right;">①</span> E03 - -</p>	<p><b>SCENE ERROR</b></p> <p>The setpoint control failed to read the SCENE menu settings from memory and has reloaded the factory default settings. The setpoint control continues to operate while displaying this error.</p> <p><b>Note:</b> To clear the error, the access level must be set to Advanced before checking the settings in the SCENE menu.</p>
 <p>VIEW <span style="float: right;">①</span> E04 - -</p>	<p><b>SCHEDULE ERROR</b></p> <p>The setpoint control failed to read the SCHEDULE menu settings from memory and has reloaded the factory default settings. The setpoint control continues to operate while displaying this error.</p> <p><b>Note:</b> To clear the error, the access level must be set to Advanced before checking the settings in the SCHEDULE menu.</p>
 <p>VIEW <span style="float: right;">①</span> E05 - -</p>	<p><b>MISCELLANEOUS ERROR</b></p> <p>The setpoint control failed to read the MISCELLANEOUS menu settings from memory and has reloaded the factory default settings. The setpoint control continues to operate while displaying this error.</p> <p><b>Note:</b> To clear the error, the access level must be set to Advanced before checking the settings in the MISCELLANEOUS menu.</p>
 <p>VIEW <span style="float: right;">①</span> Err - - <span style="float: right;">⇐</span></p>	<p><b>BUS ERROR</b></p> <p>Due to an open or short circuit, communication is lost with the tN4 bus. Check the wires for damage or loose connections. Check the wires for continuity. The error message will clear once the error condition has been corrected.</p> <p><b>Note:</b> In some cases, the setpoint control is intentionally removed from the tN4 system. Press the Up and Down buttons together to clear the address and set Dip 2 to the 'None' position. This will also clear the bus error message.</p>
 <p>VIEW <span style="float: right;">①</span> CTRL - -</p>	<p><b>NO tN4 SYSTEM CONTROL</b></p> <p>DIP switch 2 is set to tN4 System Control and the setpoint control does not detect the tN4 System Control. Once the tN4 System Control is detected, this error will clear automatically.</p> <p><b>Note:</b> If a tN4 System Control is not installed, set the tN4 System Control DIP switch 2 to None.</p>
 <p>VIEW <span style="float: right;">①</span> Err <span style="float: right;">ADD</span> - -</p>	<p><b>ADDRESS ERROR</b></p> <p>Two tN4 devices have been manually set to the same address. The setpoint control continues to operate with this error but does not communicate with the tN4 bus. To clear this error, manually select an unused address. This can be done automatically by setting the Address item to Auto.</p>

## Error Messages (2 of 2)

**Note:** Error Messages are only visible while in the Advanced or Installer access level.

Error Message	Description
	<p><b>DEVICE LIMIT</b></p> <p>There are more than 24 devices on the tN4 bus. The additional devices must be removed and reconnected to a different tN4 bus if possible.</p>
	<p><b>DIP SWITCH 2 MODE</b></p> <p>The tN4 System Control DIP switch 2 is set to None and the thermostat has detected a tN4 System Control. The thermostat does not operate until this error is corrected. The tN4 System Control DIP switch 2 must be set to tN4 System Control.</p>
	<p><b>SETPOINT SENSOR SHORT CIRCUIT</b></p> <p>Due to a short circuit, the setpoint control failed to read the sensor input. The setpoint control displays the error and stops operation until the error message is cleared. Check the wire for short circuits. Locate and repair the problem as described in the Data Brochure D 070. The error message clears automatically once the error is corrected.</p>
	<p><b>SETPOINT SENSOR OPEN CIRCUIT</b></p> <p>Due to an open circuit, the setpoint control failed to read the sensor input. The setpoint control displays the error and stops operation until the error message is cleared. Check for loose or broken wires. Locate and repair the problem as described in the Data Brochure D 070. The error message clears automatically once the error is corrected.</p>
	<p><b>SCHEDULE MASTER ERROR</b></p> <p>Two tN4 devices have been set to the same Schedule Master setting. Select a different Schedule Master setting for the setpoint control. The thermostat operates in the Occupied mode while this error message is present. The error message clears automatically once the error is corrected.</p>
	<p><b>SCHEDULE MEMBER ERROR</b></p> <p>The setpoint control can no longer detect its schedule master. Ensure that the Schedule Master number has not been changed. Check the communication connections for open or short circuits. Once the schedule master has been detected, the error message clears.</p>
	<p><b>DEVICE ERROR AT ADDRESS #:##</b></p> <p>#:## is the address of the device with the error. The bus number displays before the colon, and the device number displays after. Go to the device with the address displayed.</p> <p>Possible Addresses:</p> <ul style="list-style-type: none"> <li><b>01 to 24</b> - Device Error on Thermostat only network</li> <li><b>b:01 to b:24</b> - Device Error on Boiler Bus</li> <li><b>1:01 to 1:24</b> - Device Error on Bus 1</li> <li><b>2:01 to 2:24</b> - Device Error on Bus 2</li> <li><b>3:01 to 3:24</b> - Device Error on Bus 3</li> <li><b>CTRL</b> - Device Error on System Control</li> <li><b>MIX1</b> - Device Error on Mixing Expansion Module (See System Control for local error)</li> <li><b>MIX2</b> - Device Error on Mixing Expansion Module (See System Control for local error)</li> <li><b>MIX3</b> - Device Error on Mixing Expansion Module (See System Control for local error)</li> </ul>

## Cleaning the Control

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

## 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.

	tekmar Control Systems Ltd., Canada tekmar Control Systems, Inc., U.S.A. <b>Head Office: 5100 Silver Star Road</b> <b>Vernon, B.C. Canada V1B 3K4</b> <b>(250) 545-7749 Fax. (250) 545-0650</b> <b>Web Site: www.tekmarcontrols.com</b>	
---	--	--