INSTALLATION AND
OPERATION MANUAL

HEAT-TIMER® CORPORATION

GENESIS HEAT-TIMER®

LIGHT COMMERCIAL INTERNET BASE CONTROL

FOR STEAM OR HYDRONIC HEATING SYSTEMS

059705–00 REV. B

⚠ WARNING

The Genesis Heat-Timer® is strictly an operating control. It can CANNOT be used as a limit control. All boilers must have all safety and limit controls required by code. It is the responsibility of the installer to verify that all the safety and limits are working properly.

This control must be installed by a licensed electrician.

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OVERVIEW

The Genesis Heat-Timer® control is design to operate a single boiler or valve in either a steam or hydronic heating application. The Genesis Heat-Timer® control can provide outdoor reset where the heating output is automatically adjusted based on the outdoor air temperature and the space temperature feedback.

The unique control of the Genesis Heat-Timer® allows the installer the flexibility to choose between steam or hydronic heating, each with the ability to provide outdoor reset with space temperature feedback. The control also flexibility to control an ON/OFF boiler or a modulating boiler (hydronic only) with a current voltage output. If the application is a valve, either a 2-way control valve in a steam heating application or a 3-way mixing valve in a hydronic heating application, the Genesis Heat-Timer® will provide either a floating output signal or a current voltage modulation signal to the valve actuator.

The Genesis Heat-Timer® control is supplied with 3 space temperature sensors that are wireless and provide feedback to the controller on the current interior building temperature. This space temperature feedback is used to automatically adjust the outdoor reset setting of the controller. Combining the benefits of outdoor reset with the space temperature feedback the Genesis Heat-Timer® could potentially provide up to 30% in fuel efficiency while maintaining tenant comfort.

The Genesis Heat-Timer® control can be remotely accessed through the Internet using Heat Timer's web based program ICMS—Internet Control Management System. Access to ICMS requires an active account with BuildingNet® and an annual access fee. This access fee provides the account owner unlimited user access, which users can be given Full or Read Only rights of remote access to the Genesis Heat-Timer® control.

ICMS also provides additional benefits and features other than remote access to the Genesis Heat-Timer® control. The account user can create various alarm notifications via email and/or text, create and send various data reports based on the history of sensor data and gather fuel and preventative maintenance information.

APPLICATIONS

RADIANT HEATING

The Genesis Heat-Timer® can control a 3-way mixing valve to regulate the temperature of the water entering the radiant tubing.

STEAM TO WATER HEAT-EXCHANGERS

The Genesis Heat-Timer® can control a 2-way steam valve to regulate the temperature of the heating water at a precise temperature.

BURNER CONTROL

The Genesis Heat-Timer® can control a burner on a steam or hot water boiler with either an ON/OFF enable signal or Current Voltage Modulation signal (hydronic boiler only).

DISTRICT STEAM

The Genesis Heat-Timer® can control a 2-way control valve to regulate the volume of steam for precise heating.

STEAM HEATING

Whether the Genesis Heat-Timer® is controlling a boiler or a 2-way valve, the Genesis Heat-Timer® can be applied to any of the following heating applications:

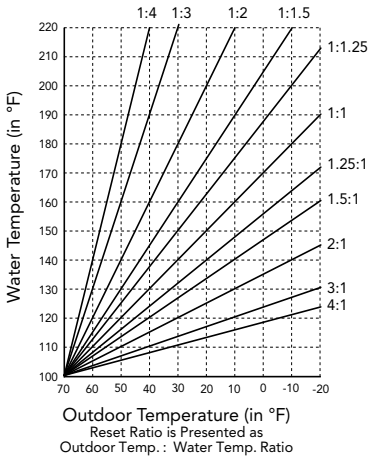
- One pipe steam—motorized valve or direct burner operation.
- Two pipe steam—motorized valve or direct burner operation.

UNDERSTANDING OPERATION CONCEPT

The Genesis Heat-Timer® operating mode for hydronic systems will change the System Set Point based on outdoor temperature (Outdoor Reset) as this is the most efficient method of heating a building. The Genesis Heat-Timer® **DOES NOT** operate as a Setpoint controller.

In Outdoor Reset, the Genesis Heat-Timer® controls a hot water heating system (boiler or 3-way mixing valve) to provide a building with comfortable/even heat levels. The Genesis Heat-Timer® varies the temperature of the circulating heating water in response to changes in the outdoor temperature and on the space temperature feedback from building sensors.

The Genesis Heat-Timer® also controls the system circulating pump with an adjustable Outdoor start. When the outdoor temperature is above Outdoor start, the pump is off and no heating water is circulated through the system. When the outdoor temperature drops below the Outdoor start, the system pump relay is activated and the heating water circulates through the system. The temperature of the heating water is controlled by the Reset Ratio, Water Offset, changes with Outdoor temperature and feedback from building space sensors.



RESET RATIO/OUTDOOR RESET

When a building is being heated, heat escapes through the walls, doors, and windows to the colder outside air. The colder the outside temperature, the more heat escapes. If you can input heat into the building at the same rate that it is lost out of the building, then the building temperature will remain constant. The Reset Ratio is an adjustment that lets you achieve this equilibrium between heat input and heat loss.

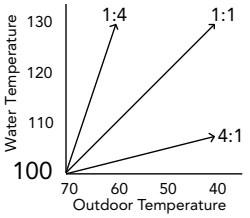
The starting point for most systems is the 1.00 (OD) : 1.00 (SYS) (Outdoor Temperature: Heating Water Temperature) ratio. This means that for every degree the outdoor temperature drops, the temperature of the heating water will increase one degree. The starting point of the curve is adjustable, but comes factory selected at 70°F Outdoor Temp. and 100°F Water Temp. For example with a 1.00 (OD) : 1.00 (SYS) ratio, if the outdoor temperature is 50°F, this means the outdoor temperature has fallen 20° from the starting point of 70°F. Therefore, the system water temperature will increase 20° to 120°F.

Each building has different heat loss characteristics. A very well insulated building will not lose much heat to the outside air, and may need a Reset Ratio of 2.00 (OD) : 1.00 (SYS) (Outdoor:Water). This means the outdoor temperature would have to drop 2 degrees to increase the system water temperature 1 degree. On the other hand, a poorly insulated building with insufficient radiation may need a Reset Ratio of 1.00 (OD) : 2.00 (SYS). This means that for each degree the outdoor temperature drops the system water temperature will increase 2 degrees. The Genesis Heat-Timer® has a full range of Reset Ratios to match any buildings heat loss characteristics.

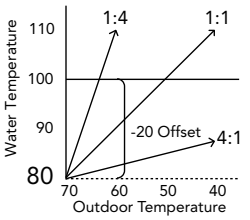
A heating curve that relies not only on Outdoor temperature but also on type of radiation will improve heat comfort. The following are suggested initial settings for different types of radiation based on average building insulation and heat loss. The contractor can fine tune these adjustments based on the specific building need.

Reset Ratio Curves

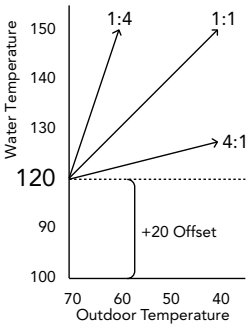
With a 0° Offset, the Reset curves begin at 100° Water Temperature.



With a -20° Offset, the Reset curves begin at 80° Water Temperature.



With a +20° Offset, the Reset curves begin at 120° Water Temperature.



TYPE OF RADIATION IN BUILDING	RESET RATIO	OFFSET
Radiators (Steel & Cast Iron)	1.00 (OD) : 1.00 (SYS)	0˚F
Baseboard (Finned copper tube& Cast Iron)	1.00 (OD) : 1.00 (SYS)	0˚F
Radiant (High Mass/Concrete)	4.00 (OD) : 1.00 (SYS)	–10˚F
Radiant (Low Mass/Joists)	2.00 (OD) : 1.00 (SYS)	–10˚F
Fan Coils & Air Handlers	1.00 (OD) : 1.00 (SYS)	20˚F

⚠ WARNING ⚠

When controlling a non condensing boiler directly without the use of a mixing valve, minimum boiler water temperature must be set to boiler manufacturer specifications. In that case, system temperature must not go below such temperature.

HYDRONIC HEATING FEATURES

SYSTEM TEMPERATURE OFFSET

The Offset value moves the starting point of the Reset Ratio curves. Therefore, any change made to the Offset will immediately change the value of the Calculated system water temperature by the same amount. For example, if the Calculated system water temperature were 150°F based on the specific outdoor temperature and Reset Ratio, then increasing the Offset from 0°F to 10°F would increase the Calculated system water temperature to 160°F.

In a new installation, start with a Offset value of 0°. Adjust the Offset value in mild weather. If the ambient building temperature is too warm in the warm weather, decrease the Offset. If the ambient building temperature is too cold in the mild weather, increase the Offset. The rule of thumb for baseboard radiation is to change the Offset by 4°F for every 1°F degree you wish to change the building temperatures. For radiant heat applications, change the Offset by 1° or 2° for every degree you wish to change the building temperature. The Offset can be set from –40 to 40°F.

NIGHT (SLEEP) SETBACK

Whenever the Outdoor temperature (OD) falls below the Outdoor start (CUT), the system pump is activated and the Genesis Heat-Timer® regulates the heating system to hold the Target Water temperature (TGT). As the Outdoor temperature (OD) changes, the Genesis Heat-Timer® adjusts the actual water temperature (SYS) to hold a constant or Day (NORMAL) heat level. The Day heat level is for when occupants are present and active.

The Genesis Heat-Timer® can also hold a lower or Night (SLEEP) setback heat level. This lower level of heat is for when the building is unoccupied, or tenants are sleeping. The Genesis Heat-Timer® has the capability of programming (2) Day (WAKE/RETURN) and (2) Night (AWAY/SLEEP) times for each day of the week. When the building comes out of Night (SLEEP) setting, there is an factory default optional Boost setting to quickly bring the building up to comfortable temperatures.

BOOST AND EARLY SHUTDOWN

The Boost is designed to return the building to its Day (WAKE) heat level after Night (SLEEP) heat level. It does it by increasing the temperature of the Calculated Water Temperature (TGT) by a set amount of degrees set by the Boost Adjustment for a period of time that is based on outside temperature.

Early Shutdown is a feature that allows a building, usually commercial, to start Night Setback earlier than the last Night (SLEEP) schedule setting for that day. The Genesis Heat-Timer® calculates the time period from the last Night (SLEEP) schedule setting for that day based on Outdoor temperature (OD). The warmer it is outside the earlier the Genesis Heat-Timer® will shift to Night (SLEEP).
At 65°F Outdoor Temperature (OD) the Early Shutdown is the longest of 90 minutes. At 0°F Outdoor Temperature (OD) there is no Early Shutdown or Early Shutdown is 0 minutes.

NOTE

The BOOST and EARLY SHUTDOWN features are only accessible online through ICMS (Internet Control Management System).

SYSTEM PUMP RUN-ON

This allows the Genesis Heat-Timer® to run the System Pump for a longer period of time after the boiler has been turned off. Consequently, dissipating the excess heat from the boiler combustion chamber. That way the boiler should not over heat and activate its high limit.

SCHEDULES

- By setting an operating Schedule and Night Setback, you can save energy while providing comfortable heat to the building. The setting allows the Genesis Heat-Timer® to reduce Target temperature (TGT) by a specific number of degrees set by the Sleep Setback during the night (SLEEP) or when building is unoccupied (AWAY), i.e. office buildings and schools.
- During the day, Day Time (WAKE and RETURN) settings will change Target temperature (TGT) based on Outdoor temperature (OD), Water Offset, Reset Ratio. A Night Time setting will reduce the Target temperature by the Night Setback number of degrees. Each week day can has (2) Day (WAKE/RETURN) and (2) Night (AWAY/SLEEP) settings. Each schedule period can have an individual desired building temperature setting.

UNDERSTANDING OPERATION CONCEPT

The Genesis Heat-Timer® is a microprocessor-based control designed to manage a low-pressure steam heating system. The control can operate a steam boiler or a two-way steam valve using a "cycle" concept to provide the desired amount of heat to the building.

THE "CYCLE" CONCEPT

The "cycle" concept was created by Heat-Timer specifically to allow steam heating systems to overcome the inabilities of standard thermostatic controls to cope with the unique challenges of low-pressure steam heating. Unlike water and air systems, steam systems take time to build up a "head of steam". Moreover, after the system starts heating up, it has momentum that takes time to dissipate. This makes it difficult to control its temperature.

CYCLE LENGTH BASED ON OUTDOOR TEMPERATURE

By monitoring the outdoor temperature, the Genesis Heat-Timer® is able to anticipate the building heating needs. Each cycle period (usually 60 minutes long, but adjustable depending on the type of radiation units) consists of a Cycle-ON segment and a Cycle-OFF segment. The length of the Cycle-ON segment will vary with the outdoor temperature. The colder it is outdoor, the longer the Cycle-ON segment.

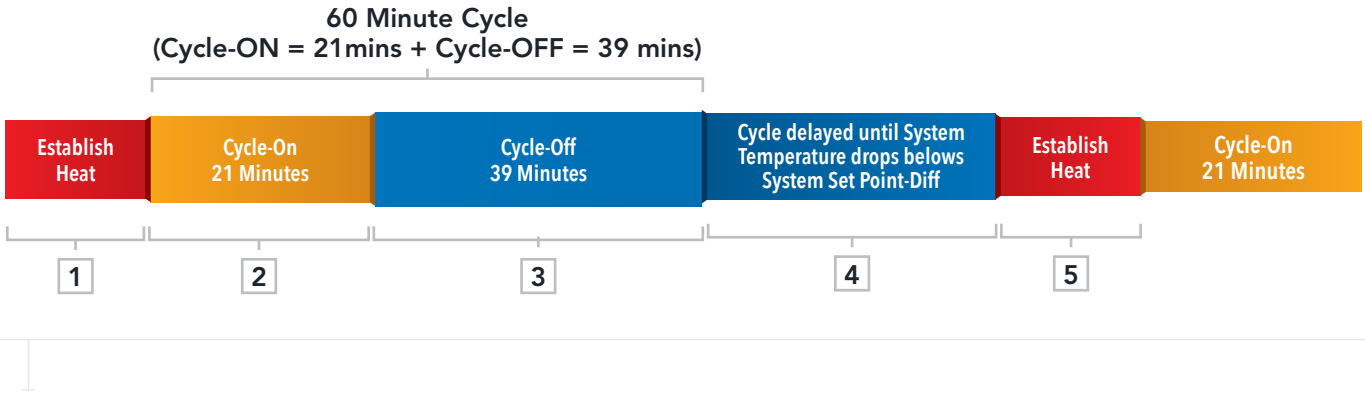


FIGURE 1

EXAMPLE 60 MINUTE CYCLE

The Genesis Heat-Timer® constantly checks the outdoor temperature by means of an outdoor sensor located on the exterior of the building. At the same time, it monitors the heating system of the building by means of a heating system sensor. This heating system sensor tells the control when steam has reached the furthest location in the building (or the hardest to heat area, *(see "Piping Diagrams" on page 72)*. Based on this combined data, the Genesis Heat-Timer® calculates the length of the ON cycle and begins the steam cycle.

The Genesis Heat-Timer® also provides two adjustable outdoor temperature cutoff settings, one for daytime operation and one for nighttime operation. When the outdoor temperature rises above one of the cutoff settings, the Genesis Heat-Timer® will not call for any heat.

When the outdoor temperature drops below the cutoff, the Genesis Heat-Timer® will automatically begin controlling the heating cycle. After the heating system is active, the heating system sensor will register when heat has reached throughout the building. The combined effect of the outdoor and heating sensors is to provide an even, comfortable level of heat throughout the building.

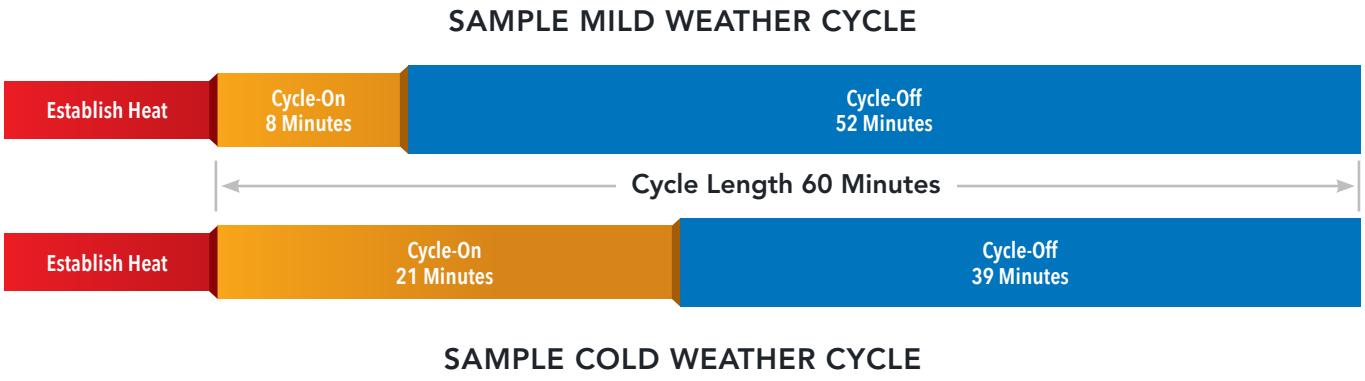


FIGURE 2

EXAMPLE CYCLES BASED ON WEATHER CONDITIONS

CYCLE LENGTH

The duration of the Cycle-ON period (when the heat source is activated) depends on four factors:

- Outdoor temperature
- Outdoor start temperature
- Heat Adjustment setting
- Cycle length

When the outdoor temperature is above the Outdoor start, the Genesis Heat-Timer® will not call for heat. When the outdoor temperature is below the Outdoor start, the length of the Cycle-ON segment is adjusted by the Day and Night Heat Adjustment settings. "1" is the shortest heat duration, "16" is the longest duration.

TABLE 1: CYCLE LENGTH TABLE

OUTDOOR START MINUS OUTDOOR TEMPERATURE (ALL TEMPERATURES IN °F)																				
*	95	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5	1
1	45	41	37	33	29	25	22	18	15	13	10	8	5	3	2	0	0	0	0	0
2	57	51	46	41	37	33	28	25	21	18	15	12	9	7	5	3	1	0	0	0
3	C	59	54	48	43	38	33	29	25	21	18	15	12	9	7	5	3	1	0	0
4	C	C	C	55	49	43	38	34	29	25	21	17	14	11	9	6	4	2	1	0
5	C	C	C	C	55	49	43	38	33	28	24	20	17	13	10	8	6	4	2	1
6	C	C	C	C	C	55	49	43	37	32	27	23	19	15	12	9	7	5	3	2
7	C	C	C	C	C	C	54	48	42	36	31	26	22	18	14	11	8	6	4	3
8	C	C	C	C	C	C	C	53	47	40	35	29	25	20	16	13	10	7	5	4
9	C	C	C	C	C	C	C	59	52	45	39	33	27	23	18	15	11	9	6	5
10	C	C	C	C	C	C	C	C	58	50	43	37	31	25	21	16	13	10	7	6
11	C	C	C	C	C	C	C	C	C	56	48	41	34	28	23	19	15	11	8	7
12	C	C	C	C	C	C	C	C	C	C	53	45	38	32	26	21	16	13	9	7
13	C	C	C	C	C	C	C	C	C	C	59	51	43	35	29	23	18	14	11	8
14	C	C	C	C	C	C	C	C	C	C	C	56	47	39	32	26	20	16	12	9
15	C	C	C	C	C	C	C	C	C	C	C	C	53	44	36	29	23	17	13	10
16	C	C	C	C	C	C	C	C	C	C	C	C	59	49	40	32	25	19	15	12
MINUTES ON (BASED ON 60 MINUTE CYCLE LENGTH) C= CONTINUOUS OPERATION																				

*Heat Adjustment Setting—*See "Heat Adjustment—Hot Water" on page 56.*

EXAMPLE

To determine the ON cycle length, use the example values below:

- Outdoor temperature = 30°F
- Outdoor start = 55°F
- Heat Adjustment = 7

1. Subtract the outdoor temperature from the Outdoor start (55–30 = 25°F).
2. Refer to Table 1 where the Heat Adjustment row "7" intersects with the 25°F column. The Cycle-ON time is 14 minutes (for a 60 minute cycle).

NOTE

For different cycle lengths based on the conditions of the above example, refer to the table below:

CYCLE LENGTH	DIVIDE BY	CYCLE-ON
20	3	5
30	2	7
90	2/3	21

SEQUENCE OF BURNER/VALVE OPERATION

- The Genesis Heat-Timer® will turn on the boiler or open the steam valve when the outside temperature falls below the outdoor sensor cutoff (factory set at 55°F for Day and 55°F for Night, but fully adjustable).
- The Genesis Heat-Timer® will continue to call for heat, keeping the steam source active, until the heating system sensor reaches its adjustable Set Point. This indicates that steam has gotten entirely through the system, or that "heat is established".
- Once "heat is established", the Cycle-ON segment of the cycle will begin.
- During the Cycle-ON period, the Genesis Heat-Timer® will keep the steam source activated. The length of the ON part of the cycle is dependent on the outdoor temperature and the Day/Night setting.
- Once the Cycle-ON part has ended, the Cycle-OFF part of the cycle will begin. The Genesis Heat-Timer® will turn off the boiler or close the steam valve for the remainder of this cycle.
- When the Cycle-OFF part is over, the Genesis Heat-Timer® will once again activate the steam source unless either the outside temperature has risen above the cutoff, or the thermal lockout is active, or Space Lockout is active.
- With the thermal lockout, the heating system sensor temperature must fall below the Set Point through an adjustable differential before the heating source can be reactivated. This allows residual heat in the pipes to continue to heat the building. Once the pipes have cooled sufficiently, a new cycle can begin.
- The Genesis Heat-Timer® control checks for Space Lockout and adjusts the heat setting as needed before staring another cycle.

SEQUENCE OF DISTRICT STEAM OPERATION

- The Genesis Heat-Timer® will open the steam valve when the outside temperature falls below the outdoor sensor cutoff (factory set at 55°F for Day and 55°F for Night, but fully adjustable).
- The Genesis Heat-Timer® will continue to call for heat, keeping the steam source active, until the District Steam Delay period has timed out. This District Steam Delay period should be long enough to ensure steam has gotten entirely through the system, or that "heat is established".
- Once "heat is established", the Cycle-ON segment of the cycle will begin.
- During the Cycle-ON period, the Genesis Heat-Timer® will keep the steam valve open The length of the ON part of the cycle is dependent on the outdoor temperature and the Day/Night setting.
- Once the Cycle-ON part has ended, the Cycle-OFF part of the cycle will begin. The Genesis Heat-Timer® will close the steam valve for the remainder of this cycle.
- When the Cycle-OFF part is over, the Genesis Heat-Timer® will once again open the steam valve unless either the outside temperature has risen above the cutoff, or Space Lockout is active.
- The Genesis Heat-Timer® control checks for Space Lockout and adjusts the heat setting as needed before staring another cycle.

NOTE

The Thermal Lockout feature is not available when using the District Steam heating mode.

STEAM HEATING FEATURES

STEAM OUTDOOR RESET

- The Genesis Heat-Timer® regulates the amount of steam sent to the building based on the outdoor temperature. It uses the Cycle concept based on the Day and Night Heat Adjustment and Outdoor start to regulate the heat. The colder it gets, the longer the Cycle-On runs.

NIGHT (SLEEP) SETBACK

- Whenever the outdoor temperature falls below the Outdoor start, the Genesis Heat-Timer® adjusts the Cycle-ON and Cycle-OFF ratio to hold a constant Day or Night heat level. The Night heat level is for when the building is unoccupied or tenants are sleeping.

DAY AND NIGHT SCHEDULES

- The Genesis Heat-Timer® has 2 Day (WAKE AND RETURN) and 2 Night (AWAY AND SLEEP) Schedule Period settings for each day of the week. By setting a Schedule, Day and Night Heat Adjustments, and Outdoor start, you can save energy while providing comfortable heat to the building. The Night (AWAY/SLEEP) settings allow the Genesis Heat-Timer® to reduce the length of the steam Cycle-ON portion during the night or when building is unoccupied. Each schedule period can have an individual desired building temperature setting.

SYSTEM OUTPUT

- The system output relay connects to and operates a combustion air-damper or other boiler room equipment and it will energize whenever there is a call for the boiler.

BOOST AND EARLY SHUTDOWN

- The Boost is designed to return the building to its Day (WAKE) heat level after Night (SLEEP) heat level. It does it by running the burner or valve output for a period of time that depends on the outside temperature.
- The Early Shutdown is a feature that shifts the Day schedule to Night Setback before the last Night (SLEEP) setting for that day. The Early Shutdown varies based on Outdoor temperature (OD). The warmer the Outdoor temperature the earlier the Genesis Heat-Timer® Heat-Timer® shifts to Night Setback.

NOTE

The BOOST and EARLY SHUTDOWN features are only accessible online through ICMS (Internet Control Management System).

UNDERSTANDING OPERATION CONCEPT

The Genesis Heat-Timer® is design to accept space temperature feedback from the 3 space sensors included with the controller. These sensors are preprogrammed to specifically communicate to the Genesis Heat-Timer® control. Additional sensors may be programmed to the Genesis Heat-Timer® control and provide additional space temperature feedback.

Using the web based program ICMS—Internet Control Management System, the user is able to designated a desirable/adjustable building temperature setting similar to the thermostat setting found in residential heating applications. The data retrieved from the space sensors is then averaged and transmitted to the Genesis Heat-Timer® control. The Genesis Heat-Timer® control then uses this data to determine what, if any, changes are required to the outdoor reset setting currently being used. This space temperature feedback is available for both steam and hydronic heating.

SPACE TEMPERATURE FEEDBACK—HYDRONIC HEATING

In hydronic heating applications, the addition of space temperature feedback is more straightforward to understand. The space temperature feedback has 2 functions depending on the average space temperature and its relationship to the desired building temperature.

If the average space temperature exceeds the building target temperature, the Genesis Heat-Timer® control will shutdown the boiler or in a 3-way mixing valve application, close the valve. This will continue until the average space temperature falls below the building target temperature. The Genesis Heat-Timer® program will then adjust the reset ratio accordingly so that the adjusted system temperature is lower when the boiler or valve is returned to heating function.

If the average space temperature is below the building target temperature, the Genesis Heat-Timer® program will recognize this and automatically adjust the outdoor reset ratio to increase the system water temperature.

This self learning logic of the Genesis Heat-Timer® allows the installer to select a random ratio setting and allow the program logic to adjust accordingly without worrying about the tenant comfortable level being compromised.

SPACE TEMPERATURE FEEDBACK—STEAM HEATING

In addition to the various stages of the Steam Cycle as detailed in the previous section, the Space Temperature Feedback adds another layer to the OFF portion of the cycle. At the end of the OFF cycle the Genesis Heat-Timer® control looks at the Heating System sensor to see if the system temperature has dropped below the System Set point minus the adjustable differential before it begins a new heating cycle. This period is referred to as Thermal Lockout. With Space Sensor feedback, the Genesis Heat-Timer® control also looks at the desired building temperature setting and compares that setting with the current average space temperature. If the average measured space temperature is above the target building temperature, the Genesis Heat-Timer® control will delay starting a new heating cycle. This will occur even if the system sensor temperature has fallen below the differential setting that would normally start a new heating cycle. This period is referred to as Space Lockout.

Through the logic of the Genesis Heat-Timer® program, depending on whether the average building temperature is above or below the desired building target temperature, the heating setting will automatically adjust accordingly. This self-learning concept of the Genesis Heat-Timer® ensures the heating of the building matches the changing outdoor temperatures and the heat loss of the building.

MAKE SURE YOU HAVE THE RIGHT CONTROL

If you need the Genesis Heat-Timer® to do additional tasks that are either not listed or you do not know how to configure them, contact Heat-Timer Corp. Technical Support either by Phone **(973) 575-4004**, Fax **(973) 575-4052**, or by E-mail **support@heat-timer.com**.

HEATING SYSTEM SENSOR

The Genesis Heat-Timer® is designed to connect to the provided Heat-Timer heating system sensor (P/N 904220–00).

In a steam heating application the heating system sensor is located where it will show that heat has reached the furthest location in the building either on the condensate return going back to the boiler or on the furthest radiator. The Genesis Heat-Timer® uses the temperature information from the heating system sensor combined with the outdoor temperature sensor to control the heat level in the building.

In a hydronic heating application the heating system sensor is located on the main supply header at least 10 feet (if applicable) from the boiler and before any take-offs. The Genesis Heat-Timer® uses the temperature information from the heating system sensor combined with the outdoor temperature sensor to control the heat level in the building.

OUTDOOR TEMPERATURE SENSOR

The Genesis Heat-Timer® is designed to connect to the provided Heat-Timer temperature sensor (P/N 904220–00).

The outdoor temperature sensor is located on the exterior of the building. The Genesis Heat-Timer® uses the temperature information from the outdoor temperature sensor combined with the system temperature sensor to control the heat level in the building.

AUX 1, AUX 2 AND AUX 3

The Genesis Heat-Timer® is designed to accept either a temperature sensor (P/N 904220–00) or a wired space sensor (P/N 904001–00) or a switch closure as an auxiliary input signal. The type of signal must configured through the ICMS program and can only be monitored through the ICMS program.

DHW CALL

The Genesis Heat-Timer® is designed to accept a switch closure for enabling the domestic hot water function when doing hydronic heating only. The DHW Call enable signal must be initiated from an external control or device and the enable signal must be a dry contact.

VALVE ACTUATOR

The Genesis Heat-Timer® is designed to connect to a motorized valve actuator. Using the inputs from the outdoor temperature sensor and the system temperature sensor, the Genesis Heat-Timer® controls the heating system by opening and closing the motorized valve actuator. The valve can be either a 2-way valve for a steam to water exchanger application or a 3-way mixing valve for a low temp radiant application or a 2-way valve for a district steam heating application.

For valve actuators requiring a proportional/modulating signal, the Genesis Heat-Timer® can provide a current voltage signal. In this configuration the Genesis Heat-Timer® controls the heating system by modulating the valve from 0% to 100%.

BOILER BURNER

The Genesis Heat-Timer® is designed to connect to the boiler burner. Using the inputs from the outdoor temperature sensor and the system temperature sensor, the Genesis Heat-Timer® controls the heating system by turning the boiler burner ON or OFF.

BURNER MODULATION

The Genesis Heat-Timer® is designed to provide the boiler burner in a hot water application, a current voltage modulation signal. Using the inputs from the outdoor temperature sensor and the system temperature sensor, the Genesis Heat-Timer® controls the heating system by modulating the boiler burner from 0% to 100%.

SYSTEM PUMP—HYDRONIC

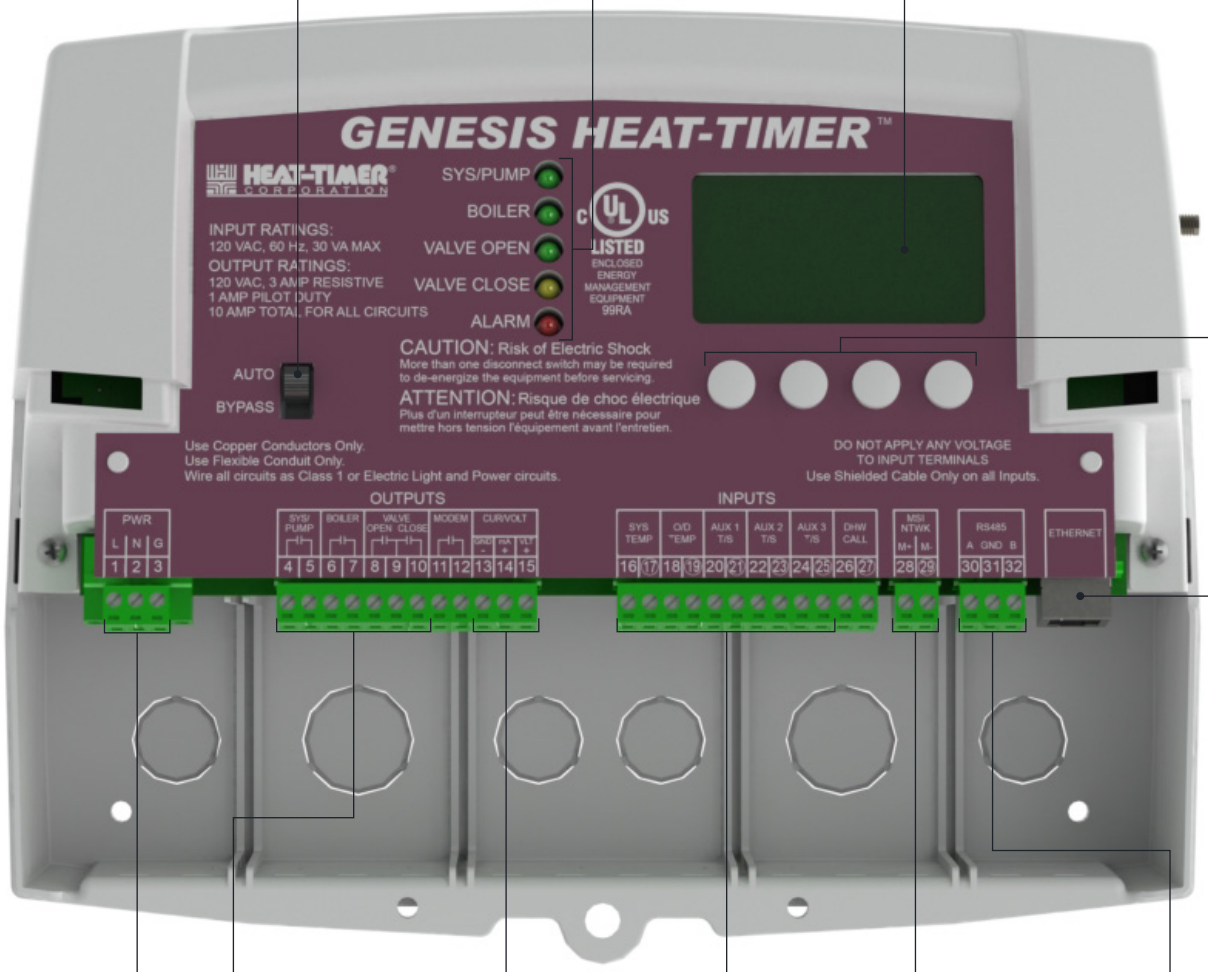
The System Pump output relay will energize when the outdoor temperature drops below the Outdoor start or whenever the boiler output is active.

SYSTEM PUMP (OUTPUT)—STEAM

The system output relay connects to and operates a combustion air-damper or other boiler room equipment and it will energize whenever there is a call for the boiler.

MODEM

The Genesis Heat-Timer® is designed to reset the communication modem. In the event Internet communication has been lost for more than a hour, the Genesis Heat-Timer® will reset the modem power connection by opening the relay contact.



LED indicates the associated relay status

Buttons function is presented on Bottom Row of display

The digital display shows the system status, set point, To view and adjust settings, press the appropriate buttons

AUTO/By-Pass Switch

120VAC Power

Modulation output can be 0–5V, 0–10V, 1–5V, 2–10V or 4–20mA

MSI Network for Internet/RINET components

Future use

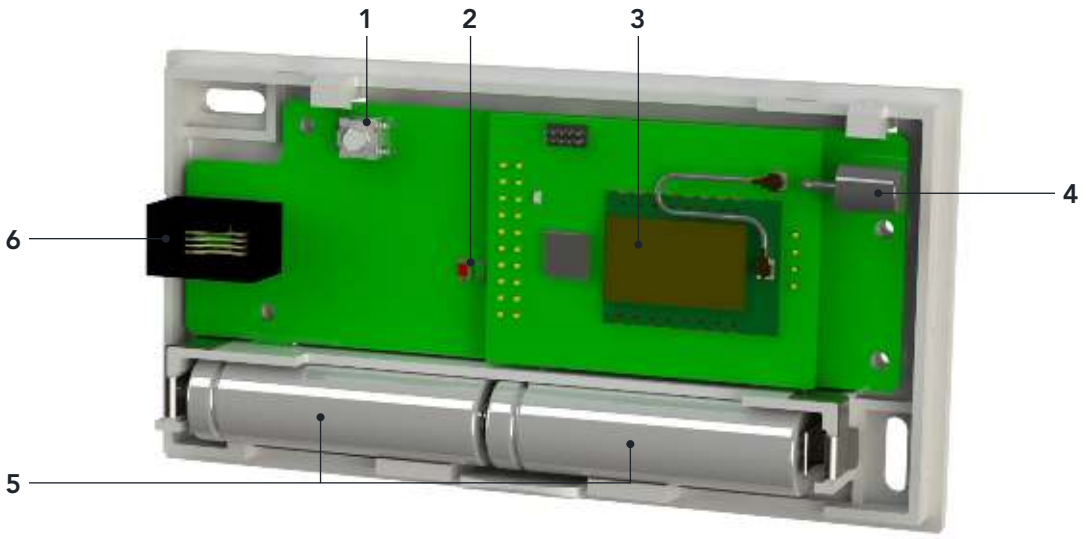
Output Relays—System Pump, Boiler Enable, Valve and Modem

When connecting Outdoor and System Sensors, no Polarity is observed

Ethernet Connection for Internet/RINET communication

GENESIS HEAT-TIMER® CONTROL

Voltage Input	120VAC, 60 Hz
Maximum Input Rating	30VA
Dimensions (W x H x D)	11" x 9" x 3¾" (279.4mm x 228.6mm x 95.25mm)
Weight	2.5Lbs (1.13kg)
Output Relays	System/Pump I Boiler I Valve I Modem
Output Relays Rating	120VAC, 3 Amp Resistive 1 Amp Pilot Duty 120VAC, 1 Amp Resistive (Modem)
Inputs	System Temperature Outdoor Temperature DHW Call (3) Optional Temp or Switch Inputs
User Interface	Digital Display Display Units: Temperature (°F and °C) Status Indicators (3 LEDs) Variable-Function Buttons (4)
Modulating Output Types	4–20mA, 0–5V, 0–10V, 1–5V, 2–10V



ITEM	DESCRIPTION
1	Transmit Button. Use to send the Wireless SNR data to a destination device.
2	Status Indicators (LEDs). • Green "main" LED blinks when data reception by a destination device has been acknowledged. • Red "RF" LED will blink with the Green LED when the Wireless SNR is not programmed. If both LEDs are blinking, no System ID has been configured.

ITEM	DESCRIPTION
3	RF Module. Transmit/receive radio signals to/from other devices.
4	Internal Antenna.
5	Batteries. Provide power for the Wireless SNR (2) AA 1.5V lithium batteries.
6	RS485 Connector. (Future use)

SPECIFICATIONS

Power Input	2 AA (1.5V)
Transmission/Reception	Built-in Antenna
Reading	Space Temperature
LED	2 LED for Status Display
Programming Interface	Wireless
Temperature Range	40°F to 150°F Degree
Dimensions	4–¾" x 2–⅝" x 1–¼"
Mounting	Wall Mount

10 INSTALLATION INSTRUCTIONS

The Genesis Heat-Timer® installation process consists of the following basic steps:

1. Initial installation—Design Considerations.
2. Mounting the Genesis Heat-Timer® control *(see page 22)*.
3. Locating and installing the sensors.
4. Connecting the Genesis Heat-Timer® wiring *(see "Wiring" on page 26)*.
    - Power wiring
    - Output wiring
    - Input wiring
5. Completing programming of the Genesis.
    - Hot Water Applications *(see page 33)*.
    - Steam Applications *(see page 33)*.

SUPPLIED MATERIALS

The following materials are supplied with the control:

- Genesis Heat-Timer® control 926842–GENLT.
- Two Temperature Sensors with Enclosures (P/N 904220–00.)
- Three Wireless Space Temperature Sensors (P/N 904395–00.)
- Wall Anchors and Screws.
- Installation and Operation Manual (P/N 059705–00.)
- Warranty Card (P/N 059115–00.)

REQUIRED MATERIALS (NOT SUPPLIED)

The following materials/tools are required for installation, but are not supplied:

- General tool kit (screwdrivers, wire strippers, power drill, etc.)
- 18 AWG cable (Heat-Timer P/N 703001–01 or equivalent #18/2 cable).

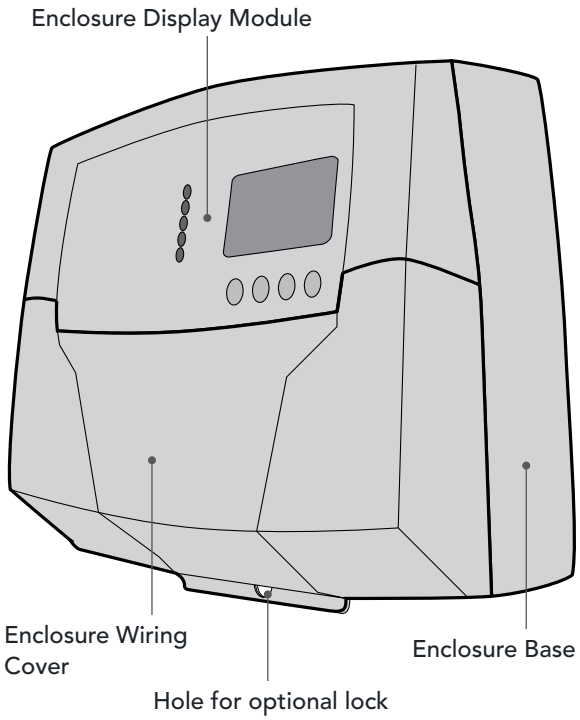
DESIGN CONSIDERATIONS

When installing the system, certain design considerations must be taken into account. These include:

- Genesis Heat-Timer® control Location.
- Outdoor Temperature Sensor Location.
- Heating System Sensor Location.
- Output Control: Burner or Motorized Valve.

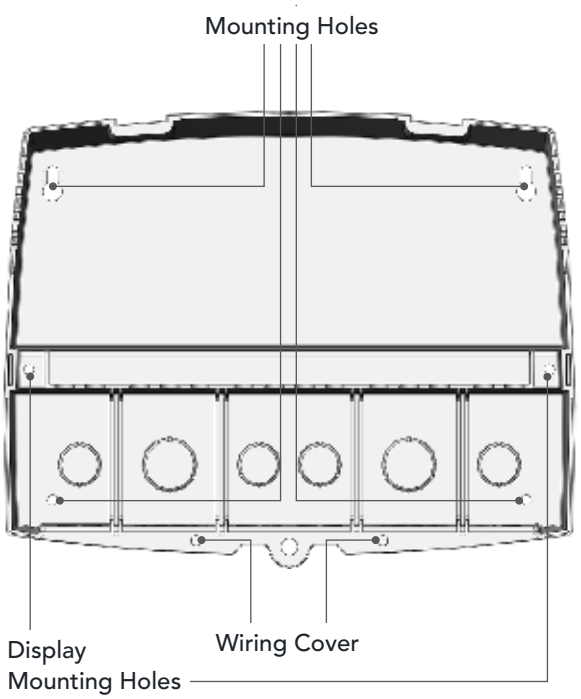
The Genesis Heat-Timer® control consists of three primary enclosure components.

- **The Enclosure Display Module:** Contains the display, buttons, LEDs and electric wiring terminals. It has two screws to hold it to the base. A By-Pass switch, used to place the boiler in manual operation, is located above the terminals. Wiring terminals are of the plug-in type to ease installation and removal.
- **The Enclosure Base:** Contains the holes to mount and hold the control against the wall or any flat surface. All other enclosure components mount on the base. The bottom section of the Enclosure Base contains the wiring chamber with knockouts on the bottom to easy installation.
- **The Enclosure Wiring Cover:** Seals the wires from the external environment. It has two screws to hold it the base and a hole to secure a lock on the wiring enclosure. A plastic plate that separates the wiring chamber into high and low volt sections has been provided.



MOUNTING THE ENCLOSURE

- Select a location near the equipment to be controlled.
- The surface should be flat and sufficiently wide and strong to hold the Genesis Heat-Timer® control.
- Keep the control away from extreme heat, cold, or humidity. Ambient operating temperature is from 20 to 120°F.
- Remove the Enclosure Wiring Cover from the control enclosure by removing the two bottom screws.
- Remove the Enclosure Display Module by removing the middle 2 screws.
- Screw the Enclosure Base to the surface through the upper and lower mounting holes on the back of the enclosure.

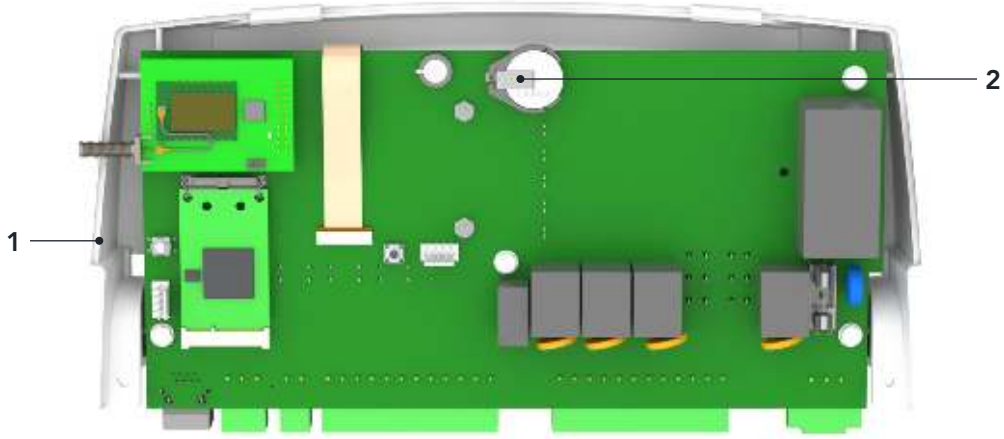


MOUNTING THE DISPLAY MODULE

1 Turn the Genesis Heat-Timer® display module (1) over to reveal the battery (2) on the back of the circuit board. Remove the plastic tab to activate the battery. Ensure the battery is properly seated and has not dislodged when removing the plastic tab.

NOTE

The battery is a coin lithium battery (CR2032—Heat Timer P/N 020012–00) that is used to maintain the control's date and time during power outages. The battery can maintain the clock for up to a total of 100 days.



⚠ CAUTION ⚠

Do not remove the battery plastic tab unless you plan to keep the control continuously powered. If the control has no power, the battery will lose its charge in 100 days.

2 Position the Display Module into the base and secure it in place using the middle 2 screws removed in the previous steps outlined in the Mounting The Enclosure.

NOTE

Do not replace the Enclosure Wiring Cover until all wiring is completed.

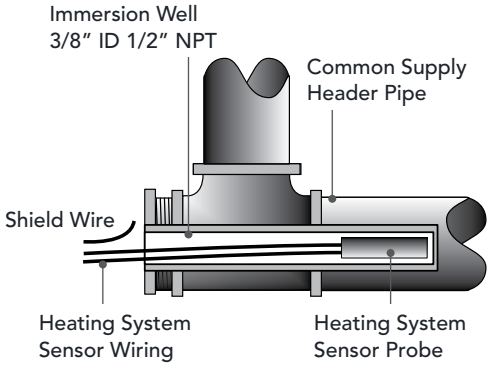
3 Continue with *"Wiring" on page 26*.

HEATING SYSTEM SENSOR (HSS) INSTALLATION

HEATING SYSTEM SENSOR HSS—HYDRONIC HEATING

- Install the Heating System sensor approximately 10’ feet past the boiler on the supply header but before any major takeoffs.
- The sensor must be located where it sees the output of the boiler.
- Only use the temperature sensor with enclosure (HT #904220–00) provided with the Genesis Heat-Timer® control.
- The sensor wires can be extended up to 500’ using a shielded 2-conductor cable (Belden #8760 or equivalent). Do not ground the shield at the sensor but at the panel using one of the terminals marked with an “O”.
- Do not run sensor wires in conduit with line voltage wiring.
- Install a 3/8” ID 1/2” NPT immersion well (HT #904011–00 or equivalent).
- Insert the sensor probe of the supplied sensor into the well.

IMMERSION HEATING SYSTEM SENSOR



⚠ ALERT ⚠

If the HSS can not sense the correct heating system water temperature being supplied to the building, the Genesis Heat-Timer® will not provide comfortable heat levels. Be sure the HSS is located on a main supply pipe which can not easily be isolated from the system.

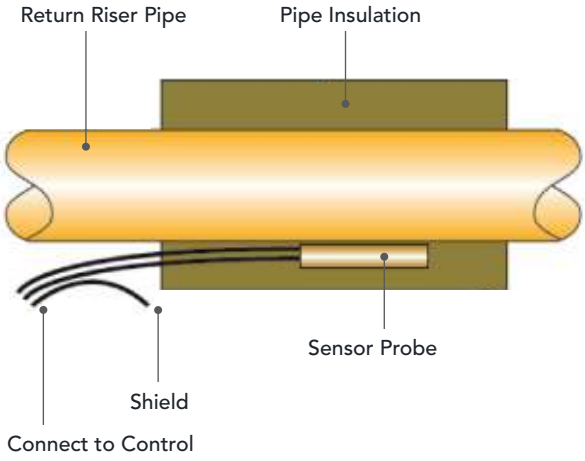
HEATING SYSTEM SENSOR HSS—STEAM HEATING

⚠ CAUTION ⚠

Determining the proper location for the heating system sensor is very important. If the heating system sensor cannot sense the system is full of steam, the Genesis Heat-Timer® will not provide comfortable heat levels. Be sure the heating system sensor is located on a properly vented pipe that cannot easily be isolated from the system.

NEVER install the heating system sensor between the condensate receiver and the boiler.

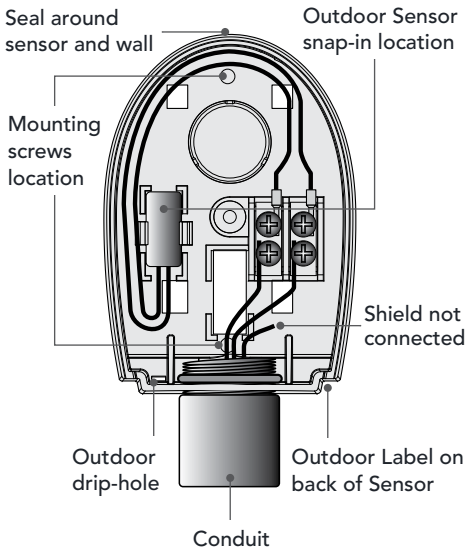
- Only use the temperature sensor with enclosure (HT #904220–00) provided with the Genesis Heat-Timer® control.
- The ideal location for the heating system sensor is on the furthest radiator in the system. This radiator is usually the hardest to heat.
- The sensor may also be located on the furthest return riser. However, the sensor MUST be above the boiler water line (on a dry return). *See “Piping Diagrams” on page 72.*
- Strap the heating system sensor to the pipe using the tie-wraps provided with the sensor. Then wrap insulation around the sensor and pipe to achieve the highest accuracy.
- The sensor wires can be extended up to 500 feet (152.4 meters) using shielded 2-conductor (#18/2) cable (Heat Timer P/N 703001–01).
- Do not ground the shield at the sensor but at the panel using one of the terminals marked with an “O”.



OUTDOOR SENSOR INSTALLATION

- Only use the Heat-Timer sensor included with the unit (HT# 904220–00).
- Locate the sensor in the shade on the north side of the building. The sensor should never be in direct sunlight.
- Be sure the location is away from doors, windows, exhaust fans, vents, or other possible heat sources.
- The sensor should be mounted approximately 10’ feet above ground level.
- Adhere the Outdoor Label provided to the back of the sensor base.
- Use the Enclosure Base bottom knockout for the conduit. Use the locknut to hold the conduit and enclosure base together. Screw the cover to the base.
- If screws are used to affix the enclosure to the wall, make sure to seal around the sensor and wall except from the bottom.
- The sensor wires can be extended up to 500’ using shielded 2-conductor cable (#18/2). Do not ground the shield at the sensor but at the control using the terminal marked with an “O”.
- Do not run sensor wires in conduit with line voltage wiring.

OUTDOOR SENSOR



⚠ ALERT ⚠

Determining the proper location of the outdoor sensor is very important. The Genesis Heat-Timer® will base the heat output on the outdoor temperature information it receives from this location. If the sensor is in the sun, or covered with ice, its reading will be different from the actual outdoor temperature (OD).

POWER INPUT WIRING

⚠ WARNING ⚠

ELECTRICAL SHOCK HAZARD! For your safety, to avoid the risk of electric shock, disconnect electrical power to the device before servicing or making any electrical connections. DO NOT re-connect electrical power until ALL wiring is completed. Failure to do so may result in severe personal injury or death.

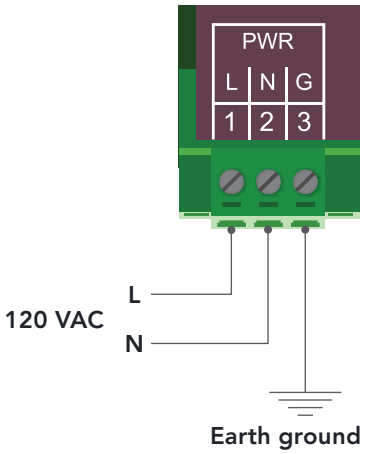
Use a separate circuit breaker for the Genesis Heat-Timer® control. Do not share the control power with other major equipment, pumps, or motors. Heat-Timer recommends the installation of a surge suppressor and a power switch before the power line connection.

Follow all local and state electrical codes when installing this unit. All wiring must meet or exceed local, state, or federal codes and requirements.

1. De-energize the circuit that will provide power to the Genesis Heat-Timer® control by turning off the appropriate circuit breaker.
2. Run the 120Vac power wiring through one of the knockouts located on the bottom of the Genesis Heat-Timer® enclosure.

⚠ CAUTION ⚠

The input power wires must be N.E.C. Class 1. Class 1 voltage wiring must use a different enclosure knockout and conduit than any sensor wiring.

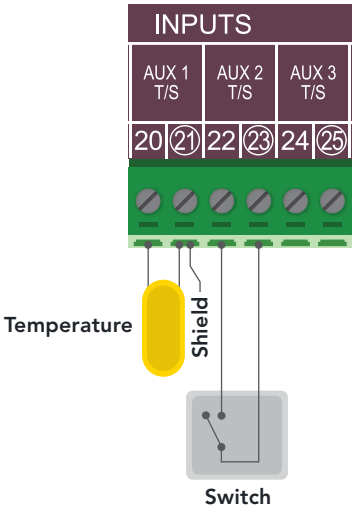


3. Connect the Hot line to terminal 1 on the Genesis Heat-Timer®.
4. Connect the Neutral line to terminal 2 on the Genesis Heat-Timer®.
5. Connect terminal 3 on the Genesis Heat-Timer® to earth ground. **DO NOT** use the Neutral line as the earth ground.

WIRING AUX INPUT TERMINALS (TERMINALS 20, 21 AND 22, 23 AND 24, 25)

The AUX input terminals will accept a temperature sensor or switch closure. The AUX input must be configured on ICMS.

Each Aux terminal can connect to only one temperature sensor or one switch closure. When wiring a temperature sensor, use Heat Timer temperature sensor P/N 904220–00 for measuring system temperatures or Heat-Timer Wired Room Sensor P/N 904001–00 for measuring space temperature.



POWER OUTPUT WIRING

NOTE

Output relays do not source power. A separate power source must be used when needed. Use the output relay to enable or disable equipment.

⚠ WARNING ⚠

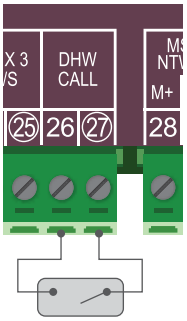
ELECTRICAL SHOCK HAZARD! To avoid the risk of electric shock, DO NOT re-connect electrical power until ALL wiring to the Genesis Heat-Timer® control is completed. Failure to do so may result in severe personal injury or death.

⚠ CAUTION ⚠

Class 2 voltage wiring (low-voltage sensor wires) must use a different enclosure knockout and conduit than any Class 1 voltage wiring.

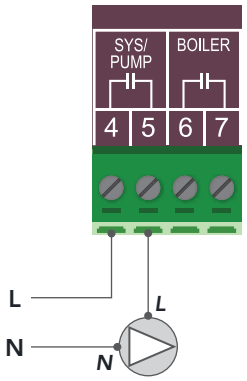
WIRING THE DOMESTIC HOT WATER CALL DHW (HOT WATER SYSTEMS ONLY) (TERMINALS 26, 27)

- DHW can be used to raise System Set Point temperature to the DHW Set Point temperature. DHW with (Priority) or without Priority (Normal) must be selected in the Startup Menu. *See "Domestic Hot Water (DHW) Priority" on page 50.*
- DHW Call terminals are dry contact N.O. terminals.
- Wire an aquastat or other controls to provide closure on the DHW Call terminals.
- The DHW function is only available in Hot Water applications.



DHW Signal

WIRING THE SYSTEM PUMP (OUTPUT) (TERMINALS 4, 5)



System Pump
or Pump Starter

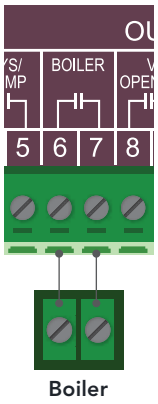
HOT WATER APPLICATIONS

- The SYSTEM PUMP output relay will energize whenever the outdoor temperature is below the Outdoor start.
- The SYSTEM PUMP will remain constantly energized while the outdoor temperature is below the Outdoor start.
- When the outdoor temperature rises 2°F above the Outdoor start, the SYSTEM PUMP output will remain energized for the period set by the Run-On.
- The SYSTEM PUMP output has one normally OPEN (N.O) relay contact rated for a 1/8HP pump.
- The N.O. contacts are dry contacts only. They do not source any voltage.
- Class 1 voltages must enter the enclosure through a different opening from any Class 2 voltage wiring.
- The System Pump N.O. contact is capable of switching 3 A resistive at 120VAC.

STEAM APPLICATIONS

- The Genesis Heat-Timer® is equipped with a System output to operate additional equipment. The most common use for this output is operating a combustion air-damper.
- The SYSTEM PUMP (Output) terminals are 4 and 5. These terminals do not source any power. Wire these terminals directly to the combustion air-damper activation terminals.
- The contacts can switch a 6A resistive at 120VAC load.
- A good practice is to use an external relay contact (by others) wired in series with the burner ENABLE terminals 6 and 7 with the relay coil wired in series to the combustion air-damper End Switch. This will prevent the Genesis Heat-Timer® from activating the boiler before fully opening the damper. For additional assistance on this wiring, contact Heat-Timer's technical support department.
- The System Pump (Output) relay remains energized for the System Run-On period before de-energizing.

WIRING THE BOILER OUTPUT (TERMINALS 6, 7)

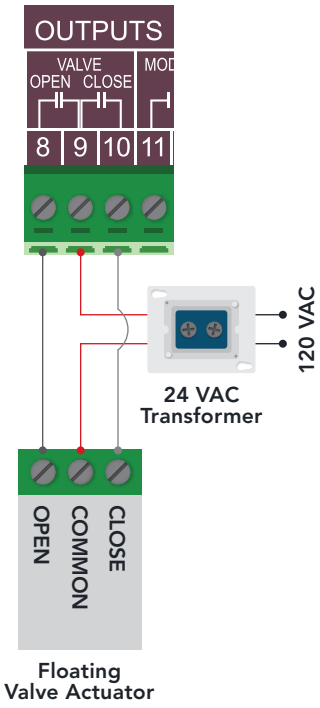


NOTE

The Genesis Heat-Timer® does not source power to the boiler terminals. Wire the BOILER output in series with the boiler limit circuit or the boiler or burner T-T/ENABLE contacts if applicable.

1. Run the BOILER enable signal wires through a knockout located on the bottom of the Genesis Heat-Timer® enclosure.
2. Connect the boiler or burner enable terminals to terminals 6 and 7 on the Genesis Heat-Timer®.

WIRING THE MOTORIZED VALVE OUTPUT—FLOATING (TERMINALS 8, 9, 10)

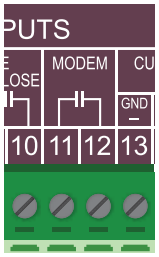


NOTE

The Genesis Heat-Timer® does not source power to the motorized valve terminals. An external 24Vdc power source is required and must be connected in series, as shown in the diagram.

1. Run the motorized valve signal wiring through a knockout located on the bottom of the Genesis Heat-Timer® enclosure.
2. Connect the motorized valve CLOSE terminal to terminal 10 on the Genesis Heat-Timer®.
3. Connect the motorized valve OPEN terminal to terminal 8 on the Genesis Heat-Timer®.
4. Connect a 24Vac transformer power source.
   a. Run a transformer wire through a knockout located on the bottom of the Genesis Heat-Timer® enclosure and connect terminal 9 on the Genesis Heat-Timer® to a transformer 24Vac terminal.
   b. Connect the motorized valve COMMON terminal to a transformer 24Vac terminal.

WIRING THE MODEM OUTPUT (TERMINALS 11, 12)



NOTE

The Genesis Heat-Timer® does not source power to the modem terminals. Wire the modem output in series with the power supply circuit for the modem.

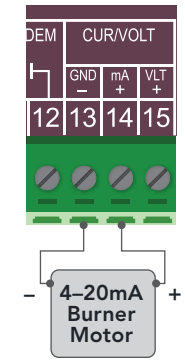
1. Run the modem power supply wires through a knockout located on the bottom of the Genesis Heat-Timer® enclosure.
2. Connect the modem power supply wires to terminals 11 and 12 on the Genesis Heat-Timer®.

WIRING TO MODULATING OUTPUT (TERMINALS 13, 14, 15)

The Genesis Heat-Timer® can modulate any Current Voltage burner motor (hot water application only) or valve actuator. The Output Type must be selected properly before connecting any output wires to avoid damage components. *See "Outputs" on page 17*.

WIRING A 4–20MA MODULATING BURNER/ACTUATOR (TERMINALS 13, 14)

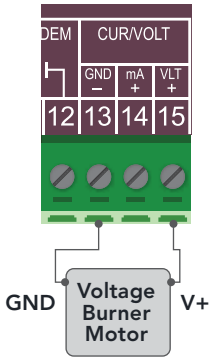
- The Genesis Heat-Timer® can operate a 4–20mA modulating burner or actuator.
- The Genesis Heat-Timer® sources 24VDC excitation voltage for the 4–20mA signal.
- Wire the (–) from the modulating burner or actuator to the terminal on the Genesis Heat-Timer® marked (GND)—terminal 13.
- Wire the (+) from the modulating burner or actuator to the boiler terminal on the Genesis Heat-Timer® marked (mA)—terminal 14.



Boiler 4–20mA Modulation Output

WIRING THE VOLTAGE MODULATING BURNER/ACTUATOR (TERMINALS 13, 15)

- The Genesis Heat-Timer® can operate a 0–5V, 0–10V, 1–5V, or 2–10V modulating burner or valve actuator.
- Wire the (GND) from the modulating burner or actuator to the terminal on the Genesis Heat-Timer® marked (GND)—terminal 13.
- Wire the (V+) from the modulating burner or actuator to the terminal on the Genesis Heat-Timer® marked (VLT+)—terminal 15.



Boiler Voltage Modulation Output

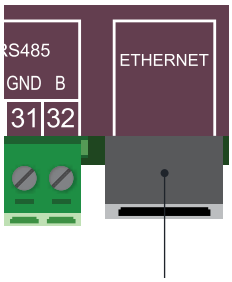
COMMUNICATIONS WIRING (ETHERNET)

The Genesis Heat-Timer® is designed for remote communication through an Internet connection and to be accessible through ICMS.

INTERNET (RINET) COMMUNICATIONS WIRING

To connect the Genesis Heat-Timer® to the Internet:

1. Run a CAT5 cable from the modem or router through a knockout located on the bottom of the Genesis Heat-Timer® enclosure.
2. Connect the CAT5 cable to the Ethernet connector on the Genesis Heat-Timer® control.



Modem or Router

MSI COMPONENT WIRING

The Genesis Heat-Timer® can be expanded to accept one MSI component such as a Boiler Feed Meter, or Stack Sensor or Pressure and Vacuum Sensor using MSI interface. These components are viewed remotely through ICMS web page.

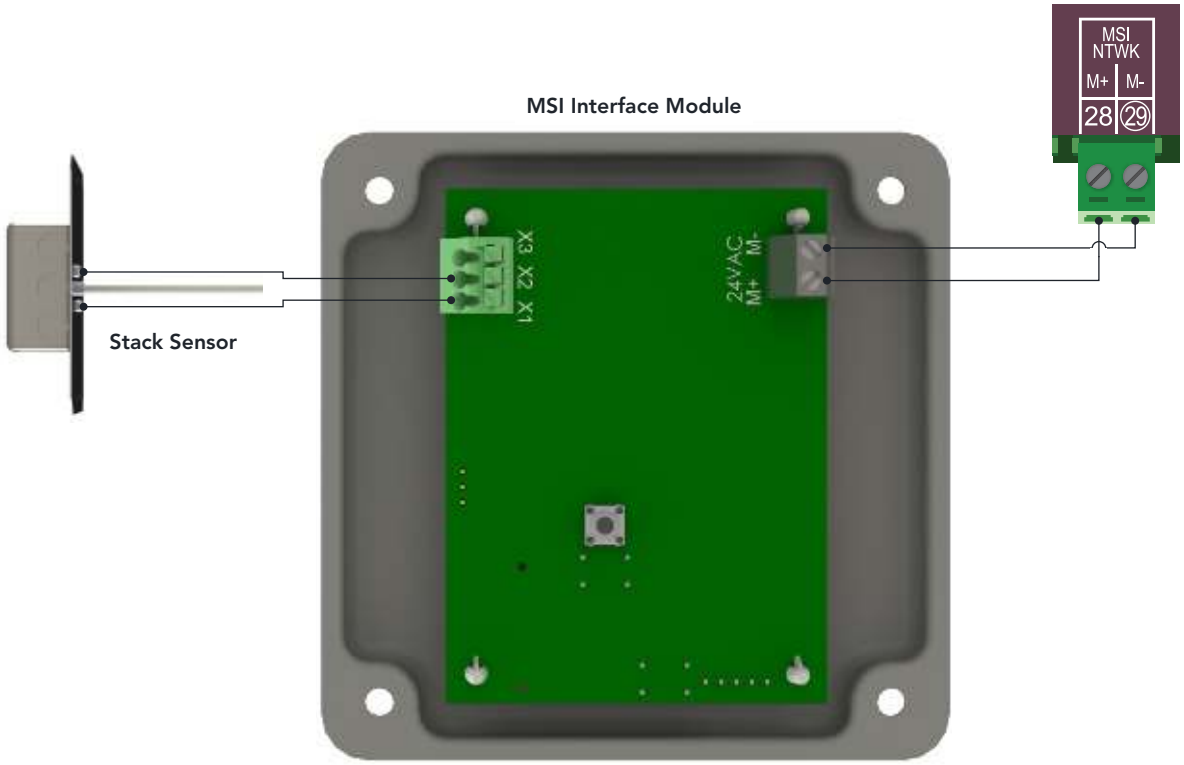
MSI COMPONENTS INTERFACE WIRING (TERMINALS 28, 29)

NOTE

Reference the proper MSI component Installation and Operation Manual for additional wiring information of the sensor.

1 Run an 18 AWG multi-conductor, shielded or twisted-pair cable (Heat-Timer P/N 703001–01 or equivalent #18/2 cable) through a knockout on the MSI sensor interface Enclosure to the Genesis Heat-Timer® module. Ensure the wires are routed through the knockouts on the Genesis enclosure and are separated from high voltage wiring.

- Connect the MSI Interface terminal M+ to the Genesis Heat-Timer® terminal M+ (28).
- Connect the MSI Interface terminal M– to the Genesis Heat-Timer® terminal M– (29).



1 Apply power to the Genesis Heat-Timer® once all wiring has been completed.

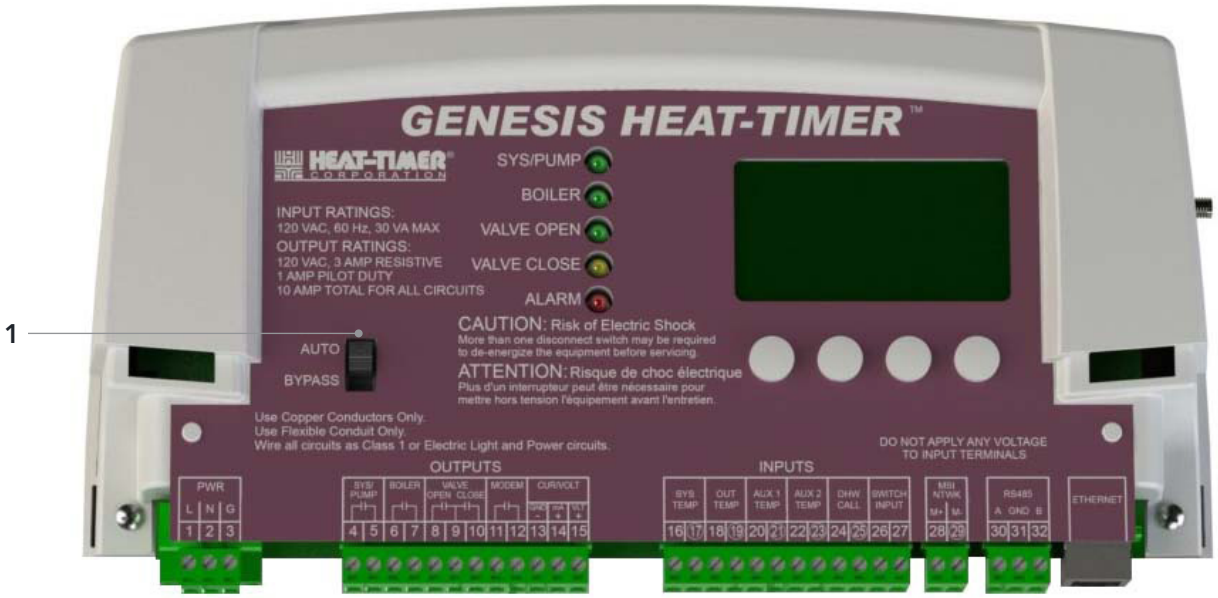
2 Perform initial programming of the Genesis Heat-Timer®. *See "Initial Programming of the Genesis Heat-Timer® " on page 38.*

AUTO/BYPASS SWITCH

- The BYPASS switch (1) must be in the AUTO position for the Genesis Heat-Timer® to control the heating system.
- The BYPASS position overrides all automatic control of the Genesis Heat-Timer® control.
- If the Genesis Heat-Timer® has power and is operational, switching to BYPASS automatically activates the Motorized Valve, the Burner, and the System output.
- Switching the control to BYPASS manually during a power outage, activates the Motorized Valve, Burner, and System outputs.

⚠ ALERT ⚠

Switching the Genesis Heat-Timer® into BYPASS overrides all automatic operation. In BYPASS, the boiler will run constantly on its own limits or the valve will be fully open.



COMPLETING THE INSTALLATION

After the Genesis Heat-Timer® is powered-on and the initial programming is complete:

1 Replace the Genesis Heat-Timer® enclosure wiring cover and secure it in place with two screws.

2 Optionally secure the enclosure using a padlock with a maximum shank diameter of 1/8".

GENESIS HEAT-TIMER™ CONTROL STATUS LEDS

The Genesis Heat-Timer® has five status LEDs:

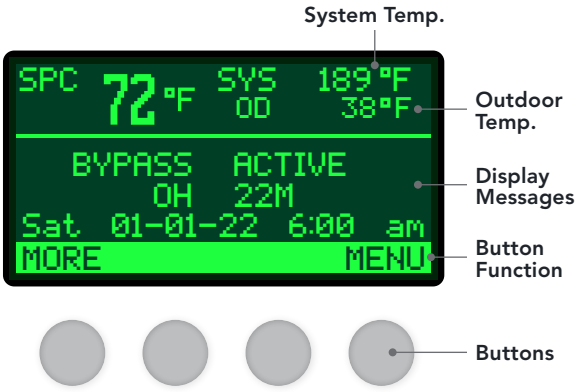
LED	DESCRIPTION
SYS PUMP	Green LED that indicates the System Pump relay output is energized.
BOILER	Green LED that indicates the Boiler relay output is energized.
Valve OPEN	Green LED that when flashing indicates the valve output is being powered OPEN. A steady Green LED indicates the valve is fully open.
Valve CLOSE	Orange LED that when flashing indicates the valve output is being powered CLOSED. A steady Orange LED indicates the valve is fully closed.
ALARM	Red LED that indicates the Genesis Heat-Timer® control is in ALARM mode due to a potential sensor failure.

DISPLAY AND VARIABLE—FUNCTION BUTTONS

STEAM APPLICATIONS

The Genesis Heat-Timer® display shows the system sensor temperature (when Heating System = Boiler/Valve) or District Steam Delay (when the Heating System = District Steam), the Average Space Sensor temperature and the outdoor temperature and appropriate operation messages.

The area above the variable-function buttons displays the current function for each button.



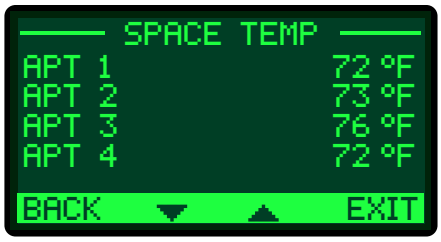
HOT WATER APPLICATIONS

The Genesis Heat-Timer® display shows the system sensor temperature, the Average Space Sensor temperature and the outdoor temperature and appropriate operation messages.

The area above the variable-function buttons displays the current function for each button.

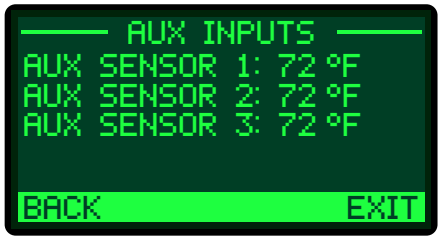
SPACE SENSOR TEMPERATURES

The Genesis Heat-Timer® display shows the individual space sensor temperatures by pressing the left button MORE below the display.



AUX INPUTS

The Genesis Heat-Timer® display shows the individual AUX inputs by pressing the right button MORE below the display.



The display button functions vary based on the current screen displayed, as described in the following table:

SCREEN	BUTTON			
	LEFT	▲	▼	RIGHT
Default	**MORE** Space Sensor Temperatures	Has no function		**MENU** Enters the menu mode
Space Temp	**BACK** Goes back one menu step	Scrolls through the menu		**MORE** AUX Inputs Status
Menu	**BACK** Goes back one menu step	Scrolls through the menu		**SELECT** Selects current menu item
Setting	**BACK** Goes back one menu step	Changes the current setting value		**SAVE** Saves current setting

SETTING THE DISPLAY CONTRAST

1. At the default screen, press and hold the left-most button for 3 seconds or more. Release for setting adjustment.
2. Use the up and down buttons to change the contrast setting (1–30, default = 25).
3. Select SAVE once the desired setting is reached.

RESETTING TO FACTORY DEFAULT

To set the Genesis Heat-Timer® back to its original factory default settings:

1. Remove power from the Genesis Heat-Timer®.
2. Press and hold the two right-most buttons on the Genesis Heat-Timer® while powering the control on.
3. Release the buttons when instructed to do so on the display. A message displays stating the operating parameters are reset, and then the Genesis Heat-Timer® will go to the Startup menu *(see "System Startup Menu" on page 39)*.

DISPLAY MESSAGES—STEAM

The Genesis Heat-Timer® normal display layout includes message indications. The following is a list of the most common Message Display Line information:

- **BYPASS: 0D 0H 15M** — The control is switched to Bypass for the amount of time indicated. *See "AUTO/BYPASS Switch" on page 32.*
- **Cycle ON: 1/5 min** — The Genesis Heat-Timer® is in the Cycle-ON period for a minute out of a total Cycle-ON of 5 minutes.
- **Cycle OFF: 6/60 min** — The Genesis Heat-Timer® is in the Cycle-OFF period. Only 6 Cycle-ON minutes out of the Cycle 60 minutes has elapsed.
- **Est. Heat at: 125°F** — The Genesis Heat-Timer® is energizing Output relay to establish heat before starting a heating cycle.
- **Boost 25/30 min** — The Genesis Heat-Timer® has started a Boost function in a Cycle Operation Mode. 25 minutes have elapsed of the 30 Manual Boost minutes.
- **Sensor Fault** — Either the Outdoor or the System sensor is reading Short or Open. The Output relay will be energized or de-energized based on the Sensor Fault setting. *See "Sensor Fault" on page 66*.
- **Space L/O: 71°F** — In Cycle Operation Mode the MPC Platinum is in Space Lockout (utilizing space sensors) until the space average drops below 71°F. *See "Space Lockout" on page 15*.
- **Steam Time 12/15 min** — District Steam is the Operating Mode choice. The control activated the output relay for 12 out of 15 minutes before starting the cycle. *See "Heating System—Steam" on page 47*.
- **Summer** — The control is set to Summer. No heat is active. *See "Season" on page 53*.
- **Thermal Lockout: 125°F** — In Cycle Operation Mode the Genesis is in Thermal Lockout until the System Sensor Temperature drops below the System Set Point less the Differential. *See "Thermal Lockout" on page 63*.
- **No Call for Heat** — The outdoor temperature is above the Outdoor Cutoff. *See "Wake and Sleep Outdoor Start" on page 52*.
- **Sys Run-On: 2/5 min** — The Output relay has turned off and the System relay has been running for 2 minute and will need to run for a total of 5 minutes. *See "System Run-On" on page 63*.

DISPLAY MESSAGES—HOT WATER

The Genesis Heat-Timer® normal display layout includes message indications. The following is a list of the most common Message Display Line information:

- **BYPASS: 0D 0H 15M** — The control is switched to Bypass for the amount of time indicated. *See "AUTO/BYPASS Switch" on page 32.*
- **Boost 25/30 min** — The Genesis Heat-Timer® has started a Boost function in a Cycle Operation Mode. 25 minutes have elapsed of the 30 Manual Boost minutes.
- **Sensor Fault** — Either the Outdoor or the System sensor is reading Short or Open. The Output relay will be energized or de-energized based on the Sensor Fault setting. *See "Sensor Fault" on page 66*.
- **Summer** — The control is set to Summer. No heat is active. *See "Season" on page 53*.
- **No Call for Heat** — The outdoor temperature is above the Outdoor Cutoff. *See "Wake and Sleep Outdoor Start" on page 52*.
- **Pump Run-On: 1:36** — The System Pump relay has turned off and has 1 minute and 36 seconds left until the Pump Run-On times out. *See "System Run-On" on page 63*.
- **MANUAL Open/On** — The boiler or valve is in MANUAL mode and is activated ON or OPEN.
- **TGT = 160°F** — Genesis Heat-Timer® has activated the boiler or valve and the calculated System temperature is 160°F.
- **DHW Call = 140°F** — Genesis Heat-Timer® has receive a DHW Call for Heat input on terminals 26 and 27. The DHW Setpoint temperature is 140°F.

INITIAL PROGRAMMING OF THE GENESIS HEAT-TIMER®

When the Genesis Heat-Timer® is first powered-on and initialization is complete, the System Startup menu screens appear.

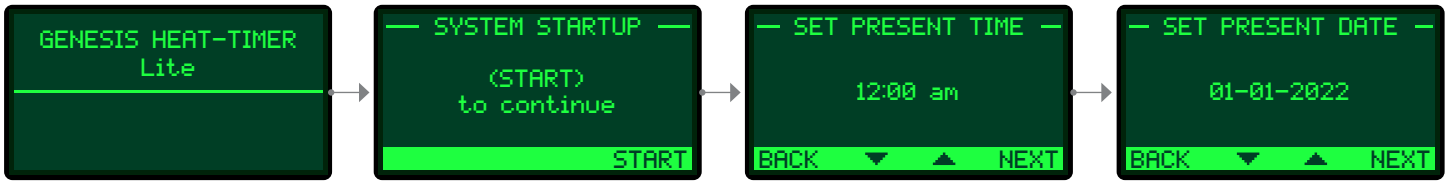
NOTE

If the System Startup menu screens does not appear, the Genesis Heat-Timer® has already been configured. To check the configuration or to make changes, select System Startup from the Advance/Installer menu. To access the Advance/Installer menu press the MENU button for 5 seconds or more and release.

1. Follow the System Startup menu screens to program the unit (see below).
2. Configure the Basic Heat settings, including: Type of Heating System, minimum and maximum water temperature (if applicable), domestic hot water function (if applicable), schedule, space target temperature, and day/night cutoff temperature.
3. Set the day/night schedule times *(see "Schedules Menu" on page 57)*.

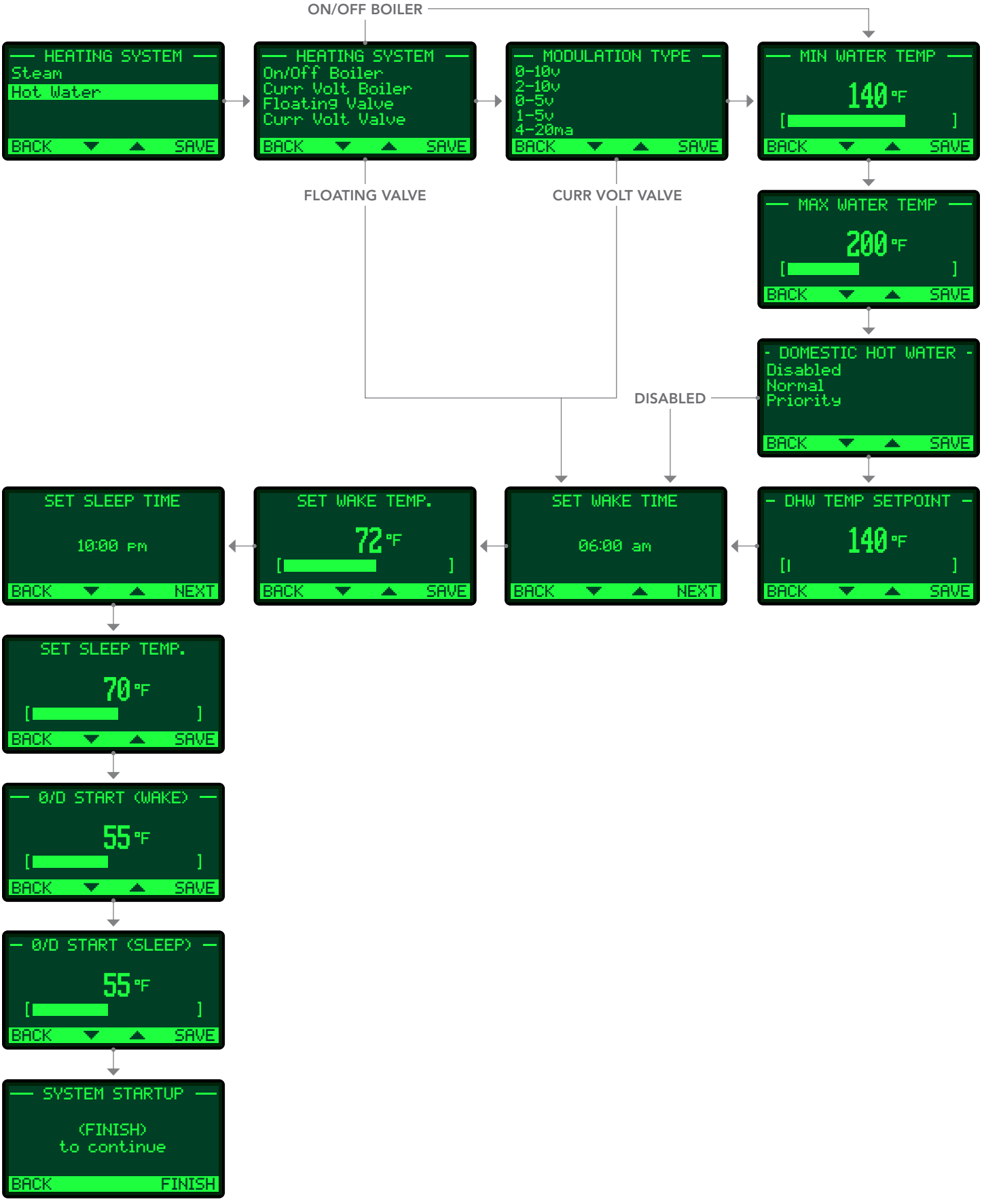
SYSTEM STARTUP MENU

The System Startup menu provides the options used to configure basic settings for the Genesis Heat-Timer®. This includes: Date/Time settings, sensor fault and the type of heating system (steam or hot water).



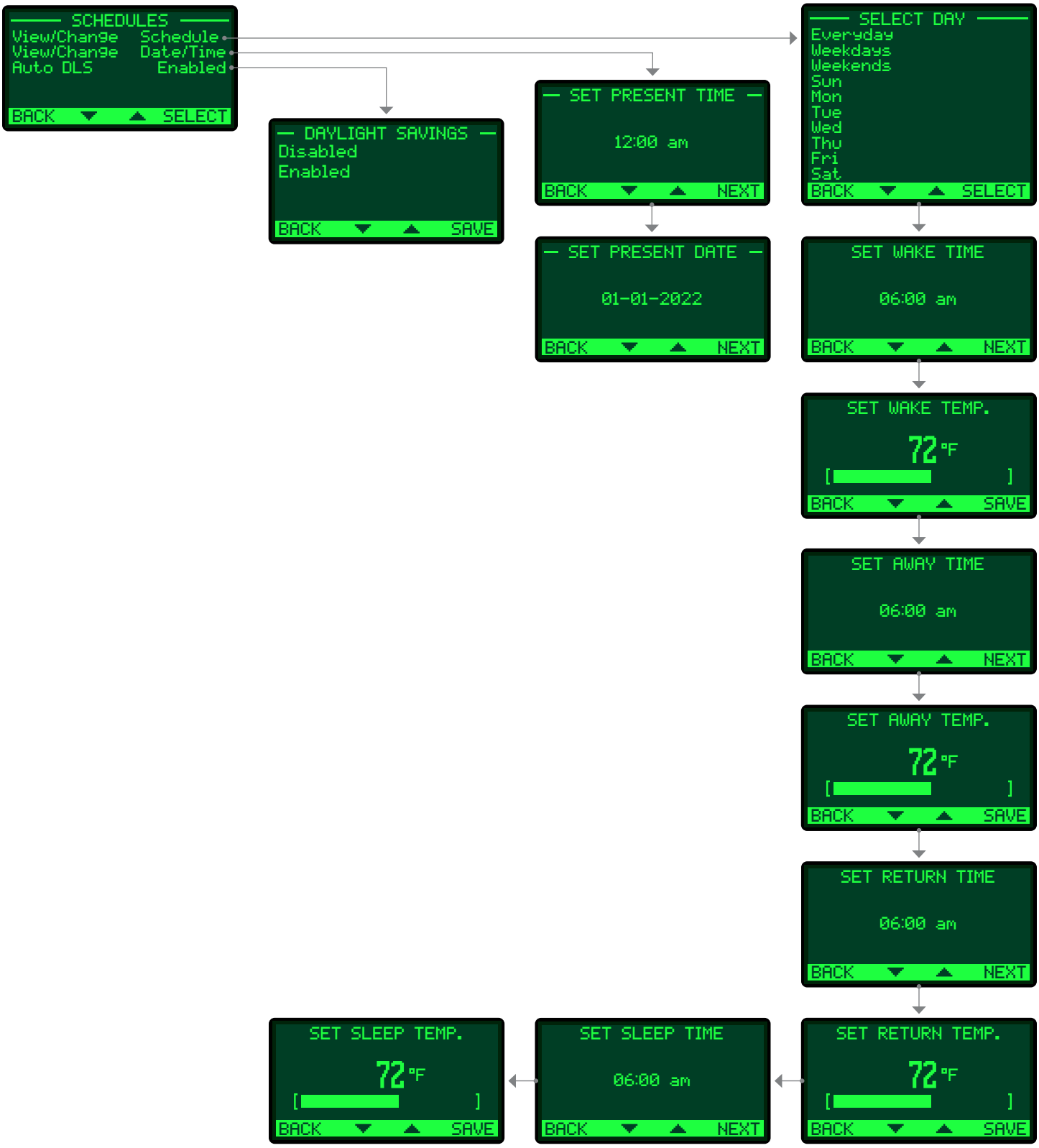
SELECTING: STEAM

SELECTING: HOT WATER

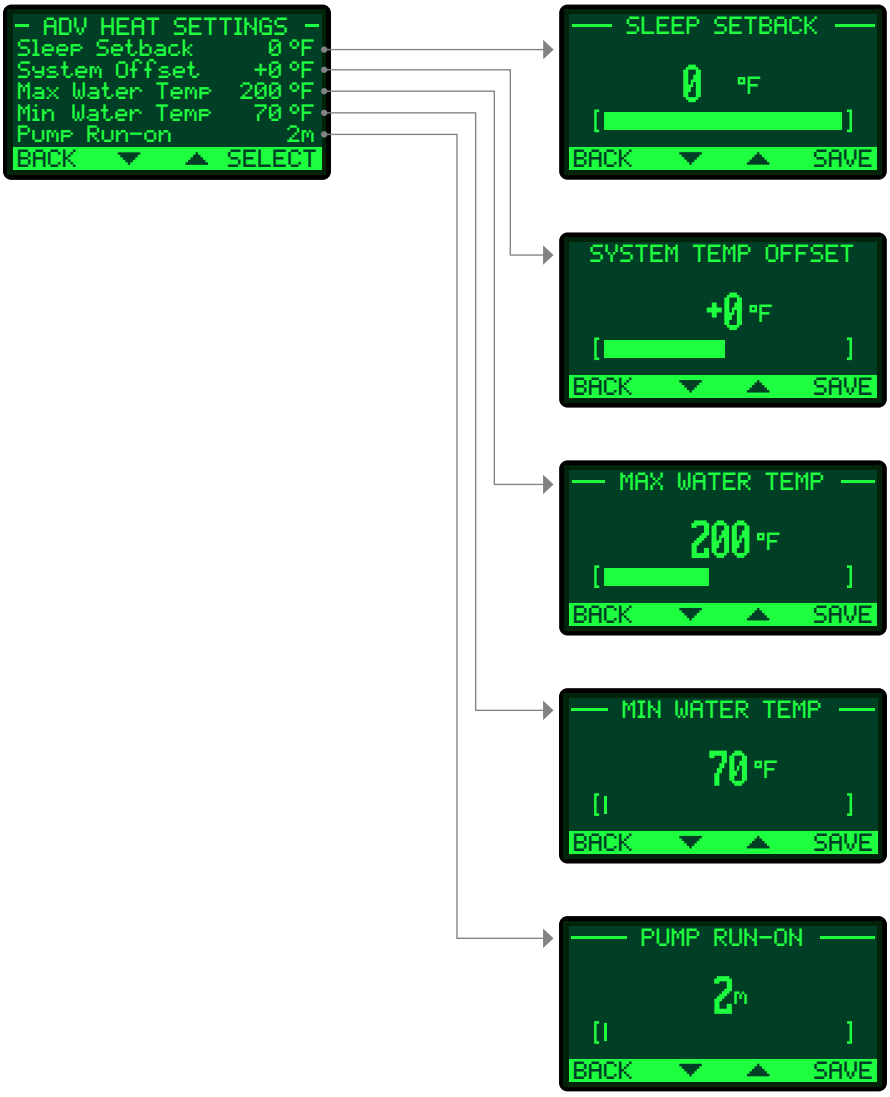


SELECTING: SETTINGS

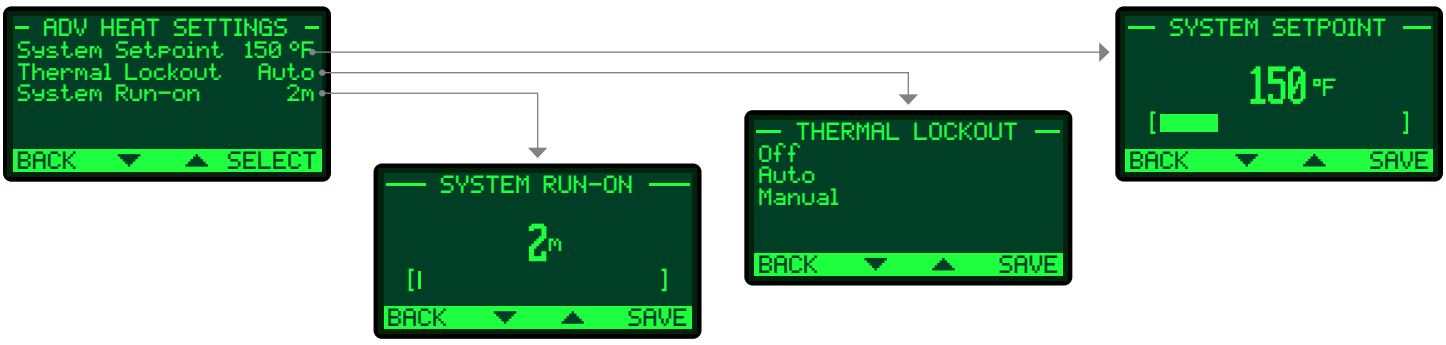
SELECTING: BASIC HEAT SETTINGS > SCHEDULES



SELECTING: ADVANCED HEAT SETTINGS—HOT WATER



SELECTING: ADVANCED HEAT SETTINGS—STEAM



SELECTING: SETTINGS > MAINTENANCE

SELECTING: MAINTENANCE > SYSTEM SETTINGS > BOILER SETTINGS

THIS SECTION APPLIES TO APPLICATIONS WHERE THE HEATING SYSTEM HOT WATER SELECTION IS CURR VOLT BOILER.

SYSTEM STARTUP

SET PRESENT DATE AND TIME

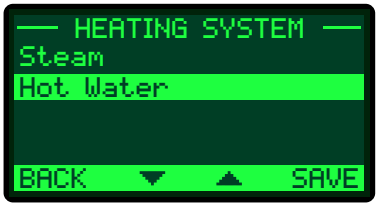
Description: Sets the present date and time on the control. The date and time are used to regulate the Schedule.

The Genesis Heat-Timer® battery is used to maintain the date and time during power outages.

HEATING SYSTEM MENU

Selections: **Steam Hot Water** Default: **Hot Water**

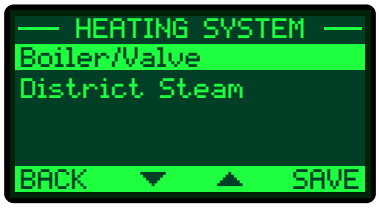
Description: Sets the type of application the Genesis Heat-Timer® will be controlling—STEAM or HOT WATER. *Startup menu reference page 49*.



HEATING SYSTEM—STEAM

Selections: **Boiler/Valve**
District Steam

Default: **Boiler/Valve**



Description: When selecting the Heating System, the time required for the heating system to fill with steam depends on several factors in most buildings. For example, using direct burner operation (Boiler/Valve), the time it takes to generate steam depends on the boiler OFF time length. With a valve (Boiler/Valve), the amount of time also depends on the status of the heating plant and may additionally vary depending on the balance of the heating zones' valve position. However, in cases where steam is distributed from a local power authority (district steam) or other sources where the steam is always available at a constant pressure, the time required to fill the heating system with steam will be relatively constant. If the steam source is of the later type, you may decide to select the District Steam option. With the District Steam option, the Heating System Sensor is not used. The Genesis Heat-Timer® uses a timer to start the Cycle-ON. Selecting the District Steam option may result in overheating and unnecessary energy expenses as the Thermal Lockout feature will not be available.

When selecting the District Steam option for Heating System the Genesis Heat-Timer® uses a timer to start the Cycle-ON. In the District Steam application a 2-way valve with 100% shut-off is used to control the volume of steam entering the building. The Genesis Heat-Timer® will provide control to this 2-way valve.

NOTE

Selecting the District Steam option may result in overheating and unnecessary energy expenses as the Thermal Lockout feature will not be available.

NOTE

If Heating System of BOILER/VALVE is selected, continue Startup Menu—Steam with ***SET WAKE TEMP on page 51*****.**

If Heating System is DISTRICT STEAM continue the Startup Menu—Steam with ***DISTRICT STEAM DELAY on page 48*****.**

DISTRICT STEAM DELAY

Selections: **0 to 30 minutes** Default: **10 minutes**

- The District Steam Delay setting only applies when STEAM and Heating System of DISTRICT STEAM is selected.
- In most district steam applications, the condensed steam is not recycled back. In these applications the heating system sensor cannot be used.
- The Genesis Heat-Timer® uses this time setting to determine the beginning of the steam cycle.
- No system sensor is required in the District Steam mode.
- Since no system temperature is used, the energy saving feature Thermal Lockout is not available.
- To find the appropriate District Steam Delay for your building, use the following procedure:

1. Turn the heating system off and wait until the radiators are cool.
2. Have another person located at the furthest radiator (in terms of longest piping distance) or to a radiator in a location known to get heat last.
3. Manually, switch the control to Bypass to open the District Steam valve. At the same time start to count the time.
4. Wait until the radiator begins to get warm. Then record the amount of elapsed time.
5. Set the District Steam Delay to the time noted in Step 4.
6. Switch the control back to Auto operation.

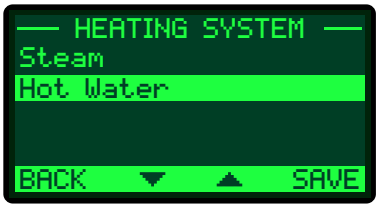
NOTE

Continue Startup Menu—Steam with *SET WAKE TEMP on page 51***.**

HEATING SYSTEM MENU

Selections: **Steam, Hot Water** Default: **Hot Water**

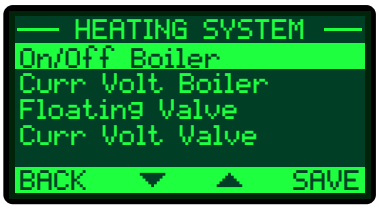
Description: Sets the type of application the Genesis Heat-Timer® will be controlling—STEAM or HOT WATER.



HEATING SYSTEM—HOT WATER

Selections: **On/Off Boiler**
Curr Volt Boiler
Floating Valve
Curr Volt Valve

Default: **On/Off Boiler**



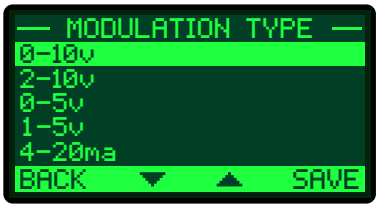
Description: The Genesis Heat-Timer® can provide a simple ENABLE output for any burner that is ON-OFF operation. The Genesis Heat-Timer® can also provide a modulating input for a burner that requires a current voltage input such as 4–20mA, 0–10V, 2–10V and 0–5V.

For applications in which the Genesis Heat-Timer® controls a 3-way mixing valve, the Genesis Heat-Timer® can provide a SPDT output for valves with a floating actuator. For valves with a proportional actuator, the Genesis Heat-Timer® can provide a current voltage output of 4–20mA, 0–10V, 2–10V 1–5V and 0–5V.

MODULATING TYPE

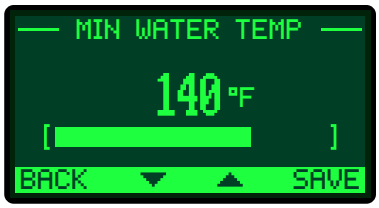
Selections: **0–10V**
2–10V
0–5V
1–5V
4–20mA

Default: **0–10V**



Description: Select the current or voltage output signal to match the burner or valve modulation. This selection is only available if the Heating System is Hot Water Curr Volt Boiler or Curr Volt Valve.

MINIMUM WATER TEMPERATURE

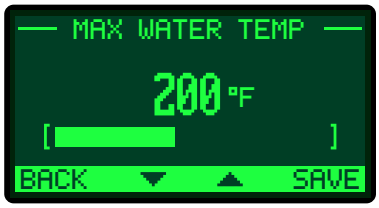


Selections: **70°F–170°F** Default: **140°F**

Description: If controlling a motorized valve set the Minimum Water Temperature to 70°F. This will allow the Genesis Heat-Timer® to calculate the Target water temperature (TGT) based on the Outdoor temperature (OD), the Reset Ratio, and the Offset value.

If controlling a boiler directly the Minimum Water Temperature must be set to the boiler manufacturer's specification. The Genesis Heat-Timer® control will calculate the Target temperature (TGT) based on the Outdoor temperature (OD), the Reset Ratio, and the Offset value. The Genesis Heat-Timer® will control the boiler to hold either the calculated temperature, or the temperature of the Minimum Water Temperature, whichever is higher.

MAXIMUM WATER TEMPERATURE



Selections: **170°F–240°F** Default: **200°F**

Description: When using the Genesis Heat-Timer® to regulate water temperature for a radiant heat system set the Maximum Water Temperature to the radiant tubing manufacturer spec. This will allow the Genesis Heat-Timer® to calculate the Target water temperature (TGT) based on the Outdoor temperature (OD), the Reset Ratio, and the Offset value without exceeding the Maximum Water Temp. thus, protecting the tubing from excessive heat.

DOMESTIC HOT WATER

Selections: **Disable, Normal, Priority** Default: **Normal**

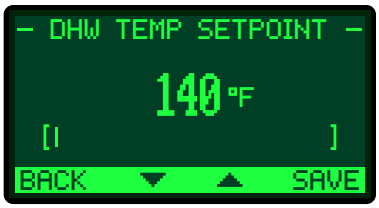
Description: A DHW call can be initiated by shorting the DHW input terminals, 24 and 25. By selecting NORMAL or PRIORITY will determine how Genesis Heat-Timer® will control the System Pump output terminals 4 and 5.

When DISABLE is selected, the Domestic Hot Water function on the Genesis Heat-Timer® control is OFF.

When NORMAL is selected on a DHW call, the Genesis Heat-Timer® will raise the system water temperature to an adjustable water temperature or the Maximum water temperature setting, which ever is lower. The System Pump output will remain energized. In the summer time when the System Pump is deengerized, a Domestic Hot Water call will energize the System Pump output.

When PRIORITY is selected on a DHW call, the Genesis Heat-Timer® will raise the system water temperature to an adjustable water temperature or the Maximum water temperature setting, which ever is lower. The System Pump output will deengerize for a period of 1 hour. If after the priority period the DHW did not expire, the System Pump output relay will energize providing heat to the building and the temperature target will remain at the DHW Set Point. After the DHW call expires, the set point will drop to satisfy the reset ratio target temperature. In the summer time when the System Pump is deengerized, a Domestic Hot Water call will not energize the System Pump output.

DHW TEMP SETPOINT



Selections: **140°F–200°F** Default: **140°F**

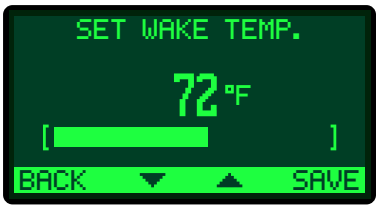
Description: On a DHW call, the Genesis Heat-Timer® will raise the System target temperature to the DHW Temp Set Point until the DHW call expires.

SET WAKE TIME

Selections: **1:00–12:00 am/pm** Default: **6:00 am**

Description: The Genesis Heat-Timer® has two levels of heat. The Day (WAKE/RETURN) level is used when a building is occupied and people are active. The Night (AWAY/SLEEP) level is used when a building is not occupied, or when people are sleeping. Additional Day (WAKE/RETURN) periods can be set in the Schedule menu, providing each day period a Day (WAKE) time setting and a Day (RETURN) time setting.

SET WAKE TEMP



Selections: **51°F–90°F** Default: **72°F**

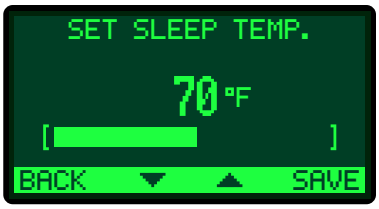
Description: The Wake Temp is the desired building space temperature when the building is occupied and people are active. The Genesis Heat-Timer® will adjust the system temperature based on the outdoor temperature as required to achieve this target building space temperature. This setting is a basic initial setting, additional desired Wake temp settings along with Return temp settings can be made in the Schedule menu.

SET SLEEP TIME

Selections: **1:00–12:00 am/pm** Default: **10:00 pm**

Description: The Genesis Heat-Timer® has two levels of heat. The Day (WAKE) level is used when a building is occupied and people are active. The Night (SLEEP) level is used when a building is not occupied, or when people are sleeping. Additional Night (SLEEP) periods can be set in the Schedule menu, providing each day period a Night (AWAY) time setting and a Night (SLEEP) time setting.

SET SLEEP TEMP



Selections: **51°F–90°F** Default: **70°F**

Description: The Sleep Temp is the desired building space temperature when the building is unoccupied or when people are inactive or asleep. The Genesis Heat-Timer® will adjust the system temperature based on the outdoor temperature as required to achieve this target building space temperature. This setting is a basic initial setting, additional desired Sleep temp settings along with Away temp settings can be made in the Schedule menu.

O/D START (WAKE)

Selections: **20°F–100°F** Default: **55°F**

Description: When the outdoor temperature falls to the adjustable Outdoor start temperature, the Genesis Heat-Timer® will control the boiler or valve to maintain the calculated system temperature. When the outdoor temperature rises to the O/D Start (WAKE) plus a 2°F differential, the Genesis Heat-Timer® will turn off the boiler or close the valve. The System Pump relay will remain energized for the Run-On delay and then de-energize.

This setting is for the Day level (WAKE/RETURN) of heating when the building is occupied and people are active.

O/D START (SLEEP)

Selections: **20°F–100°F** Default: **55°F**

Description: When the outdoor temperature falls to the adjustable Outdoor start temperature, the Genesis Heat-Timer® will control the boiler or valve to maintain the calculated system temperature. When the outdoor temperature rises to the O/D Start (SLEEP) plus a 2°F differential, the Genesis Heat-Timer® will turn off the boiler or close the valve. The System Pump relay will remain energized for the Run-On delay and then de-energize.

This setting is for the Night level (AWAY/SLEEP) of heating when the building is unoccupied and people are inactive or asleep.

The Basic Heat Setting Menu is accessed by pressing the right button under Menu once.

BASIC HEAT SETTINGS

SEASON

Selections: **Winter—Summer** Default: **Winter**

Description: The Genesis Heat-Timer® will turn the boiler off or close the valve when it is in Summer setting.

When in Winter, the Genesis Heat-Timer® will activate the System Pump relay whenever the Outdoor temperature (OD) falls to or below the Outdoor start setting.
In addition, it will begin heating whenever the System temperature (SYS) falls below the calculated temperature. When the heating season is over, it is a good practice to switch the Genesis Heat-Timer® to SUMMER setting.

O/D START (WAKE)

Selections: **20°F–100°F** Default: **55°F**

Description: *See Page 52* for a complete description of Outdoor Start setting for Day (WAKE).

O/D START (SLEEP)

Selections: **20°F–100°F** Default: **55°F**

Description: *See Page 52* for a complete description of Outdoor Start setting for Night (SLEEP).

HEAT ADJUSTMENT—STEAM

Selections: **1–16** Default: **5**

Description:

- Heat Adjustments control the duration of Cycle-On based on the outdoor temperature.
- An "1" setting gives the least duration of Cycle-On at any given outside temperature. A "16" setting gives the longest Cycle-On.
- The Genesis Heat-Timer® has two heat levels, Day (WAKE) and Night (SLEEP). The Day heat level is for when the building is occupied and people are active. The Night heat level holds a lower ambient temperature, and is for when the building is unoccupied or people are sleeping. The Day and Night Heat Adjustment are individually set.
- The length of the Cycle-ON is based on the Outdoor Cutoff temperature. Therefore, if you set both the Day and Night Heat Adjustments to the same value, you will get less heat at Night. For example, with both Heat Adjustments set to 7 and the Outdoor Cutoffs of 55°F for Day and 40°F for Night, when the outdoor temperature is 25°F the ON part of the cycle will last for 18 minutes in Day, and only 8 minutes at Night.
- If the building is too cold, adjust the appropriate setting up a number (Day Heat Adjust if it is too cold in the Day (WAKE) heat level time and Night Heat Adjust if it is too cold in the Night (SLEEP) heat level time). For example; from 6 to 7. Then wait at least 24 hours before evaluating the new adjustment. Otherwise, adjust it up another number and wait an additional day for the results.
- Similarly, if the building is too warm, reduce the Heat Adjustment one number and wait for 24 hours before making any additional adjustments.

NOTE

The Heat Adjustment setting is only a starting point as the Genesis Heat-Timer® will automatically adjust the Reset/Heat Adjustment setting based on the feedback of the building space sensors.

If the average space temperature exceeds the building target temperature, the Genesis Heat-Timer® control will shutdown the boiler or in a District Steam application, close the valve. This will continue until the average space temperature falls below the building target temperature. The Genesis Heat-Timer® control will then adjust the Heat Adjustment setting accordingly so that the calculated ON Cycle time is lower.

If the average space temperature is below the building target temperature, the Genesis Heat-Timer® control program will recognize this and automatically adjust the Heat Adjustment setting to increase the calculated ON Cycle time. This self learning logic of the Genesis Heat-Timer® control allows the installer to select a random ratio Heat Adjustment setting and allow the program logic to adjust accordingly without worrying about the tenant comfortable level being compromised.

TABLE 1A: STEAM CYCLE LENGTH TABLE

OUTDOOR START MINUS OUTDOOR TEMPERATURE (ALL TEMPERATURES IN °F)																				
*	95	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5	1
1	45	41	37	33	29	25	22	18	15	13	10	8	5	3	2	0	0	0	0	0
2	57	51	46	41	37	33	28	25	21	18	15	12	9	7	5	3	1	0	0	0
3	C	59	54	48	43	38	33	29	25	21	18	15	12	9	7	5	3	1	0	0
4	C	C	C	55	49	43	38	34	29	25	21	17	14	11	9	6	4	2	1	0
5	C	C	C	C	55	49	43	38	33	28	24	20	17	13	10	8	6	4	2	1
6	C	C	C	C	C	55	49	43	37	32	27	23	19	15	12	9	7	5	3	2
7	C	C	C	C	C	C	54	48	42	36	31	26	22	18	14	11	8	6	4	3
8	C	C	C	C	C	C	C	53	47	40	35	29	25	20	16	13	10	7	5	4
9	C	C	C	C	C	C	C	59	52	45	39	33	27	23	18	15	11	9	6	5
10	C	C	C	C	C	C	C	C	58	50	43	37	31	25	21	16	13	10	7	6
11	C	C	C	C	C	C	C	C	C	56	48	41	34	28	23	19	15	11	8	7
12	C	C	C	C	C	C	C	C	C	C	53	45	38	32	26	21	16	13	9	7
13	C	C	C	C	C	C	C	C	C	C	59	51	43	35	29	23	18	14	11	8
14	C	C	C	C	C	C	C	C	C	C	C	56	47	39	32	26	20	16	12	9
15	C	C	C	C	C	C	C	C	C	C	C	C	53	44	36	29	23	17	13	10
16	C	C	C	C	C	C	C	C	C	C	C	C	59	49	40	32	25	19	15	12
MINUTES ON (BASED ON 60 MINUTE CYCLE LENGTH) C= CONTINUOUS OPERATION																				

*Heat Adjustment Setting—*See "Heat Adjustment—Steam" on page 54*.

The duration of the Cycle-ON (when the heat source is activated) depends on the following four factors:

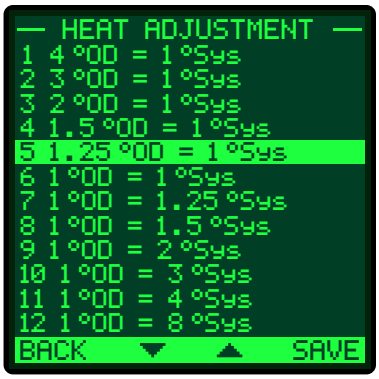
1. Outside temperature
2. Outdoor start temperature
3. Heat Adjustment settings
4. Cycle length
   - When the outside temperature is above the Outdoor Cutoff, the Genesis panel will not call for heat. Below the Cutoffs, the length of Cycle-ON is adjusted by the Heat Adjustment Settings. "1" gives the shortest duration of heat while "16" gives the longest duration of heat as shown by the chart.

EXAMPLE

Heat Adjustment:	7
Outside Temp:	30°F
Outdoor start:	55°F
Outdoor start	55°F
–Outdoor Temp.	30°F
Select Highlighted Vertical Column	**25°F**

CYCLE LENGTH	CYCLE-ON	DIVIDE BY
20	5	3
30	7	2
60	14	1
90	21	2/3

HEAT ADJUSTMENT—HOT WATER



Selections: **1–12** Default: **5**

Description: The Heat Adjustment or Reset Ratio determines how the System water temperature (SYS) will vary with Outside temperature (OD). With any of the ratios, the colder it becomes outside, the hotter the temperature of the system water. The ratios are adjustable from 4.00 (OD):1.00 (SYS) to 1:00 (OD):8.00 (SYS). *(See Understanding Operation Concept on page 10)*.

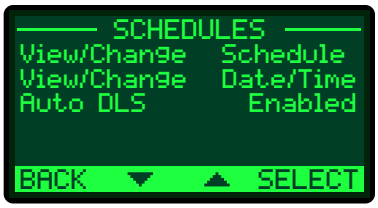
With a 1.00 (OD):4.00 (SYS) ratio, the System water temperature (SYS) will increase rapidly as the outside temperature falls, hitting the maximum of 240°F at 24°F outside temperature. With a 4.00 (OD):1.00 (SYS) ratio, the System water temperature (SYS) will increase slowly as the outside temperature falls. Even at –30°F, the system water will only be 125°F, and at 24°F outside, the system water will be 112°F. Such a low Reset Ratio might be used with radiant floor heating applications.

With most baseboard heating applications, a 1.00 (OD):1.00 (SYS) setting is a good place to start. With a 1.00 (OD):1.00 (SYS) ratio, for every degree the outside temperature falls, the system water temperature is increased one degree.

The Heat Adjustment setting is only a starting point as the Genesis Heat-Timer® will automatically adjust the Reset Ratio based on the feedback of the building space sensors. If the average space temperature exceeds the building target temperature, the Genesis Heat-Timer® control will shutdown the boiler or in a 3-way mixing valve application, close the valve. This will continue until the average space temperature falls below the building target temperature. The Genesis Heat-Timer® control will then adjust the reset ratio accordingly so that the adjusted system temperature is lower.

If the average space temperature is below the building target temperature, the Genesis Heat-Timer® program will recognize this and automatically adjust the outdoor reset ratio to increase the system water temperature. This self learning logic of Genesis Heat-Timer® allows the installer to select a random ratio setting and allow the program logic to adjust accordingly without worrying about the tenant comfortable level being compromised.

SCHEDULES/SPACE TGT



Description: The Genesis Heat-Timer® has two levels of heat. The Day Time level is used when a building is occupied, and people are active. The Night Time (SETBACK) level is used when a building is not occupied, or when people are sleeping.

Within each day the Genesis Heat-Timer® allows for 2 periods of Day Time heating—Wake and Return for those times where the building is occupied. The Genesis Heat-Timer® also allows 2 periods of Night Time heating—Sleep and Away for those times where the building is unoccupied or people are asleep.

This allows the Genesis Heat-Timer® to adjust the level of heat based on how the building is utilized. For example in an apartment building application the Wake period is the start of the Day heating mode. When people may leave the building for work, Genesis Heat-Timer® can switch to Away period for the start of a Night heating mode, ending the Day heating mode. This is also known as a Setback period. When people return home, Genesis Heat-Timer® can begin the Return period, resetting back to Day heating mode. Once people begin to retire for the night, Genesis can begin the Sleep period, using a Night heating mode.

VIEW/CHANGE SCHEDULE

Description: This menu allows the individual time settings for the 4 periods per day—Wake, Away, Return, Sleep. The Day (WAKE) desired building space temperature and the Night (SLEEP) desired building space temperature can also be set.

To reduce the need to set each individual day of the week, there are several options that allow the settings to be copied over various days.

EVERYDAY—the 4 periods of settings will applied all days during the week

WEEKDAYS—the 4 periods of setting will apply to Monday through Friday. The Weekend or Saturday setting will begin on the Wake period for Saturday.

WEEKEND—the 4 periods of settings apply to Saturday and Sunday. The periods begin on the Saturday Wake setting and ends on Monday's Wake setting.

INDIVIDUAL DAYS—the 4 periods of settings apply to the specific day. The periods begin on the Wake setting for that specific day and ends on the Wake period of the following day.

VIEW/CHANGE DATE/TIME

Description: In the Startup Menu of the Genesis Heat-Timer®, the present Date and Time will need to set. If the DATE or TIME needs to be adjusted, this area of the menu will allow that. Adjust the TIME by pressing NEXT and scrolling up or down. By pressing NEXT will save the entry. Selecting the DATE allows you to set the month, the day and finally the year. Press NEXT to save the setting and use the up/down arrows to scroll through the settings.

SCHEDULE EXAMPLE

SCHEDULE	DAY OF WEEK						
	MON	TUE	WED	THU	FRI	SAT	SUN
Wake Time	6:00 AM	6:00 AM	6:00 AM	6:00 AM	7:00 AM	**:**	**:**
Away	10:00 PM[2]	10:00 PM[2]	10:00 PM[2]	10:00 PM[2]	11:00 AM	**:**	**:**
Return	**:**	**:**	**:**	**:**	4:00 PM	8:00 AM[1]	**:**
Night Time	**:**	**:**	**:**	**:**	10:00 PM	4:00 PM[2]	**:**

[1]No Boast functions will take effect.

[2]Early shut down ends. Night schedule begin.

Wake Time—Day Heating level settings

Away—Night Heating level settings

Return—Day heating level settings

Night Time—Night Heating level settings

Monday through Thursday:

- **Boost** begins before 6 am and ends at 6 AM.
- **Wake** period begins with a Day heating level settings and a building space temperature target of 68°F. This building space temperature is maintained from 6 AM till before 10 PM.
- **Early Shutdown** starts before 10 PM and ends at 10 PM.
- **Sleep** period begins with a Night heating level and a building space temperature target of 60°F. This building space temperature is maintained from 10 PM until the Boost the following morning.

Friday:

- **Boost** begins before 7 AM and ends at 7 AM.
- **Wake** period begins with a Day heating level settings and a building space temperature target of 68°F. This building space temperature is maintained from 7 AM till before 11 AM.
- **Away** period begins with a Night heating level and a building space temperature target of 60°F. This building space temperature is maintained from 11 AM to 4 PM.
- **Return** period begins with a Day heating level and a building space temperature target of 72°F. This building space temperature is maintained from 4 PM to 10 PM.
- **Early Shutdown** starts before 10 PM and ends at 10 PM.
- **Sleep** period begins with a Night heating level and a building space temperature target of 62°F. This building space temperature is maintained from 10 PM to 8 AM when the next Day heating level begins.

Saturday:

- **No Boost** is activated because the Wake Time period is not programmed. To start the Day Heating level without a Boost begin the period as Return.
- **Return** period begins with a Day heating level and a building space temperature target of 72°F. This building space temperature is maintained from 8 AM to 4 PM.
- **Early Shutdown** starts before 4 PM and ends at 4 PM.
- **Sleep** period begins with a Night heating level and a building space temperature target of 62°F. This building space temperature is maintained from 10 PM to 8 AM when the next Day heating level begins.

Sunday:

- **Night**—The Night Heating level and desired building space temperature of 62°F is maintained all day Sunday, ending at the Boost Monday morning at 6:00 AM.

AUTO DLS

Selections: **Enable, Disable** Default: **Enable**

Description: This setting is found under the SCHEDULES/SPACE TGT menu selection. This setting allows the Genesis Heat-Timer® control to automatically adjust the Time settings of the Schedule to the Day Light Savings Schedule.

The Advance HEAT Setting Menu is accessed by pressing the right button under Menu and **holding for 5 seconds**.

ADVANCED HEAT SETTINGS—HOT WATER

SLEEP SETBACK

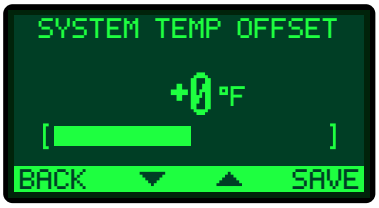
Selections: **(–)80°F–0°F** Default: **0°F**

Description: The Sleep Setback can be used to provide the Genesis Heat-Timer® with a lower calculated system temperature during the Night heating mode when less load is required. The lower System Temperature will appear on the main display indicating this condition.

A typical use for Setback is to provide less system temperature to a building during the night or on the weekends when building is not occupied, but heat is still required.

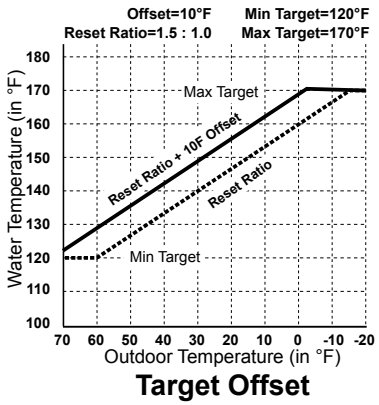
The amount of Setback selected is subtracted from the calculated System Temperature when the Night heating mode begins. This is during scheduled periods of AWAY and SLEEP.

SYSTEM OFFSET



Selections: **(–)40°F–40°F** Default: **+0°F**

Description: The System Offset setting allows you to adjust the starting points of the Reset Ratio curves. This means that, regardless of the Outdoor Temperature (OD) or the Reset Ratio that has been selected, when the Offset setting is changed, that change is directly added to or subtracted from the calculated temperature. For example, if the calculated system temperature was 130°F and the Offset was changed from 0° to 10° (an increase of 10°), then the revised/offsetted system temperature would increase to 140°F



Target Offset

The Offset setting does not change the ratio selection. For instance, with 1.00 (OD):1.00 (SYS) Reset Ratio, the System water temperature (SYS) will always increase one degree for each degree change in the Outdoor temperature (OD). What the Offset does is add or subtract a constant temperature value to the calculated system temperature.

If required: **Adjust the Water Offset in mild weather**. If the ambient building temperatures are too warm in mild weather, decrease the Water Offset. If the ambient building temperatures are too cold in mild weather, increase the Water Offset. The rule of thumb for baseboard radiation is to change the Offset 4°F for every 1°F you wish to change the building temperatures. In radiant heat applications, change the Offset 1°F or 2°F for every 1°F you wish to change the building temperature.

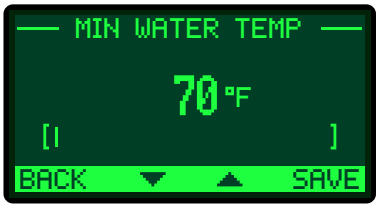
MAXIMUM WATER TEMPERATURE

Selections: **170°F–240°F** Default: **200°F**

Description: *See page 50* for a full description.

MINIMUM WATER TEMPERATURE

Selections: **70°F–170°F** Default: **70°F**



PUMP RUN-ON

Selections: **0–360 minutes** Default: **2 minutes**

Description: The System Pump relay will energize whenever the Outdoor temperature is below the Outdoor start setting. When the outdoor temperature increases 2°F above the Outdoor start after Genesis Heat-Timer® has either shutdown the boiler or closed the valve, the System Pump relay will stay on for a period of time set by the Pump Run-On. This allows the system pump to dissipate the residual heat within the system back into the building.

The Pump Run-On time should be set based on the size and type of the boiler or system. A boiler or system with low water content will require a longer Pump Run-On than a boiler or system with larger water content.

ADVANCED HEAT SETTINGS—STEAM

SYSTEM SETPOINT

Selections: **125°F to 250°F** Default: **150°F**

Description: The System Set Point is the temperature noted when the heat has gotten all the way through the building's radiation system. Above this temperature, all the radiators in the building are considered hot.

To find the appropriate System Set Point for your building, you may need two individuals to use the following procedure:

1. Turn the heating system off and wait until the radiators are cool.
2. Have another person located at the furthest radiator (in terms of longest piping distance) or to a radiator in a location known to get heat last.
3. Manually, switch the control to Bypass to start the boiler or open the steam valve.
4. When the last radiator is hot, record the System temperature (displayed next to SYS on the fourth line of the main display).
5. Set the System Set Point to the temperature noted in Step 4.
6. Switch the control back to Auto operation.

⚠ ALERT ⚠

The Heat Establish period cannot exceed six hours If during the Heat Establishing period the HSS does not reach the Set Point, the Cycle-ON will start after six hours of Heat Establish.

⚠ ALERT ⚠

The System Set Point must be set correctly, as described above. Otherwise, the Genesis Heat-Timer® may consistently under or overheat the building, especially in mild weather when fuel savings should be the greatest.

THERMAL LOCKOUT

Selections: **Off, Auto, Manual** Default: **Auto**

Description: The Thermal Lockout is an energy saving feature that prevents a cycle from starting when the heating system is hot. When a cycle is over, the pipes and radiators may still be very warm. Therefore, they continue to heat the ambient air. If more steam is added during that time, the ambient space will begin to overheat. The Thermal Lockout prevents this from occurring as it allows the system pipe temperatures to fall through the Heating System Differential before reactivating the heat source.

The Thermal Lockout should be set to AUTO unless the system dissipates heat very quickly, as might occur with air handling units.

To adjust the factory default Heating System Differential of 20°F, select MANUAL and adjust to the desired Heating System Differential setting. The range of the Heating System Differential is 0°F to 75°F.

The Heating System Differential is the temperature range through which the HSS must fall below the System Set Point before another cycle can begin. The selected starting value for the System Differential depends on the value of the System Set Point. The higher the System Set Point, the higher the Differential value can be set. As an initial setting, set the heating system to restart at approximately 125°F. At this temperature most of the residual heat in the radiators has dissipated, but enough heat remains to keep the ambient temperatures warm during the time it takes the Genesis Heat-Timer® to establish heat.

For example, if the System Set Point is 170°F, then set the Heating System Differential to 45°F, so the Set Point less the Differential is 125°F. If the System Set Point is 140°F, then set the Differential to 15°F. If the space temperature becomes too cold between cycles, reduce the amount of the Heating System Differential.

If the building is overheating, especially in mild weather, check the System Set Point. If the System Set Point setting is correct, then increase the System Differential.
See "System SetPoint" on page 62.

Once the Heating System Differential is adjusted to the desired setting, place the Thermal Lockout setting to AUTO before exiting the menu.

SYSTEM RUN-ON

Selections: **0–360 minutes** Default: **2 minutes**

Description: The System Run-On setting controls the length of time the System Pump (Output) relay remains energized after the Boiler Output relay turns off.

If the System output is used to control a combustion-air damper, the run-on allows the damper to bring more fresh air to the room for the next boiler initiation.

COMMUNICATIONS

INTERNET PORT

Selections: **Auto—Custom** Default: **8082**

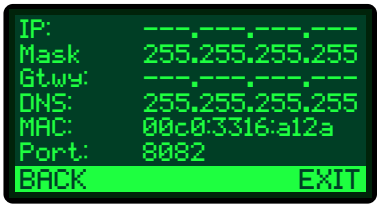
Description: To determine if a Port Forward setting is applicable it must be first determine if the firewall capability of transferring any data coming from a WAN port to a LAN port to a specific LAN computer. The LAN computer must have a Static LAN IP. The Genesis Heat-Timer® requires a Port forwarding of port 8082 if behind a Firewall. The port can be changed by selecting a different Internet Port setting (8082 thru 8113). Genesis Heat-Timer® will also allow AUTO and Custom settings if the Port Forward port in unknown or not applicable.

AUTO setting is used when the control is connected directly to the Internet using a cable modem without a firewall. The Genesis Heat-Timer® will acquire its Internet information directly from the cable modem. Since no local firewall exists, no port forwarding shall be required.

PORT FORWARD setting is used when the control is behind an Internet Router, a modem with a built-in DHCP server, or a network server, the firewall port forwarding must be configured. The DHCP server must be configured to not provide an Internet IP that matches the control local static IP.

CUSTOM setting is primarily used when the Internet connection on the WAN side is Static, when the DHCP server is not activated, or when using a local Static IP. Thus, allows the user to manually configure the Internet connection by entering the IP, Subnet Mask, Gateway, and DNS information. All the configuration of the IP, Subnet Mask, Gateway, and DNS information must be provided by the ISP or the network administrator.

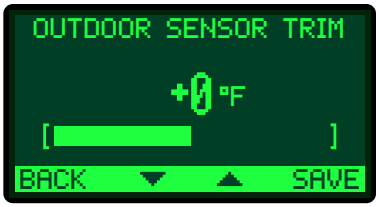
NETWORK INFO



Description: Allows the installer to view the Genesis Heat-Timer® control Internet IP information that it currently has. The IP information includes the IP address, SubNet Mask, Gateway and DNS information.

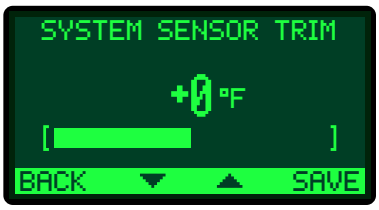
MAINTENANCE

OUTDOOR SENSOR TRIM



Selections: **(–)5°F–5°F** Default: **0**

SYSTEM SENSOR TRIM



Selections: **(–)5°F–5°F** Default: **0**

Description: The Heat-Timer thermistor type sensors are very accurate and normally require no calibration. However, sometimes it may be desirable to make small adjustments to the display valve for either Outdoor temperature of System temperature. The Trim setting can adjust the display value by (–)5°F to 5°F.

Do not use the Trim setting to make the Outdoor temperature sensor match the temperature reported on the radio or TV. Outdoor temperatures can vary widely over a broadcast range. Only trim the outdoor sensor based on accurate thermometer reading taken where the sensor is located.

PASSWORD

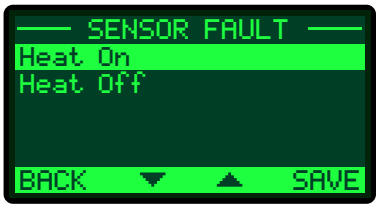
Selections: **Disable—Enable** Default: **Disable**

Description: The Password is a security measure to prevent unauthorized local control users from making changes to the Genesis Heat-Timer® settings. It consist of 4 letters.

- It does not protect against any remote changes. Remote Internet changes have a web login screen with a different password for each user.
- On the web, only the Internet account Owner can view and change the Password.
- Setting up the Password feature makes servicing more difficult and can disable the system if management or ownership should change.
- The Password feature is not active unless a user enables it. If you choose to enable the Password, DO NOT forget the Password. Write it down and store it in a safe location known to at least one other authorized user.
- When you set the Password Enabled to Yes, none of the settings, except, Auto/Bypass switch, and Schedules can be changed without entering the Password.
- When you try to change a protected control setting, the login screen will show upon trying to change a setting.
- To enter the Password, toggle up or down to the desired letter. Then, press the NEXT to move on to the next letter. Once the Password is complete, you can make multiple changes. The Password will expire after 5 minutes of no activity.

MAINTENANCE—SYSTEM SETTINGS MENU

SENSOR FAULT



Selections: **Heat ON—Heat OFF** Default: **Heat ON**

Description: This section determines the status of the Boiler or Motorized Valve Outputs when either the Outdoor sensor or the System sensor is at fault. When a sensor fault occurs the sensor display will blink with either OPEN or SHORT and the red ALARM LED will be lit.

When the setting is HEAT ON and a sensor is at fault, the System Pump relay in addition to the Boiler ENABLE relay or the Valve OPEN relay will energized. This will allow the boiler to run on its own limits.

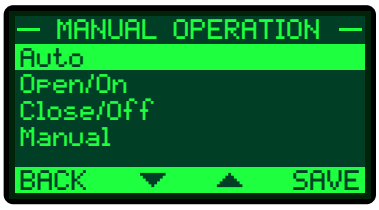
When the setting is HEAT OFF and a sensor is at fault, the System Pump relay and the Valve CLOSE relay will energized. The boiler will not be ENABLE in this configuration.

MEASUREMENT UNITS

Selections: **°F–°C** Default: **°F**

Description: This option changes the sensors' display and all temperature settings standard to Fahrenheit or Celsius.

MANUAL OP (OPERATION)



Selections: **Auto, Open/ON, Close/OFF, Manual** Default: **Auto**

Description: This function allows the installer to manually place the boiler or valve in a position for maintenance or system testing using the Genesis Heat-Timer® control. This function is for maintenance or testing only, therefore it should always be placed in AUTO for daily operation.

Auto—this is the default selection and should always be used for proper daily function of the Genesis Heat-Timer® control.

Open/ON—this selection should be used for maintenance or system testing purposes only. In this selection the System Pump, Boiler output and Valve OPEN output are energized. The Outdoor start setting or the Summer setting does not affect these output from being energized.

Close/OFF—this selection should be used for maintenance or system testing purposes only. In this selection Valve CLOSE output is energized. The Outdoor start setting or the Summer setting does not affect this output from being energized. The Boiler output is not energized in this selection. If the System Pump output was energized prior to the manual CLOSE/OFF selection, it will de-enegerize once the Run-On setting has expired.

Manual—this selection only applies to an application using a proportional (current voltage) valve. In this selection it allows the installer to place the valve in a specific position by setting the percentage of valve opening. In this selection the Valve Open output and Boiler output are energized.

MAINTENANCE—WIRELESS SENSORS MENU

ADD WIRELESS SENSORS

Description: The Genesis Heat-Timer® control comes from the factory with 3 wireless sensors preprogrammed for a specific Genesis Heat-Timer® control. An additional 2 wireless sensors may be added to the Genesis Heat-Timer® control to pair additional sensors to the Genesis Heat-Timer® control.

1. Remove the cover of the additional wireless space sensor.
2. On the Genesis Heat-Timer® control go to Add wireless Sensors and press START to bigin the pairing process. *Menu > Maintenance > Wireless Sensors > Add Wireless Sensors*.
3. Insert the batteries into the wireless space sensor. If the sensors have not been pre-programmed from the factory the green and red LED will blink every second.

> **NOTE**
>
> **If the the Genesis Heat-Timer® control is in pairing mode it is possible you will not see the LEDs blink.**

4. The Genesis Heat-Timer® control will find and detect the wireless sensor and display the device ID on the screen.

> **NOTE**
>
> **If the Device ID does not show up on the screen press the button once and check the Genesis Heat-Timer® displayed and confirm it showed.**

5. Once a sensor is properly programmed and detected by the Genesis Heat-Timer® control, the Green and Red LED's will blink only when data is transmitted.
6. Replace the cover on the wireless space sensor once the sensor is programmed and detected by the Genesis Heat-Timer® control.
7. If the Genesis Heat-Timer® control does not detect the wireless sensor, check the sensor LEDS. If the Green and Red LED's are blinking every second, the sensor is not programmed. Please go to step one to reattempt the pairing.

CHANGE WIRELESS ID

Description: The Genesis Heat-Timer® control will allow the installer to enter a custom wireless system ID. If the installer opts to enter a customer wireless ID, the wireless sensors must all be reprogrammed with that specific Genesis Heat-Timer® control as described under the ADD WIRELESS SENSOR menu.

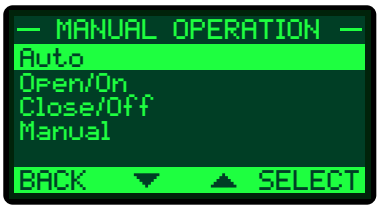
> **NOTE**
>
> *Reference CONFIGURING THE WIRELESS SPACE SENSOR on page 70* **for additional information regarding the pairing of the Genesis controller with pre-programmed wireless space sensors provided with the control.**

MAINTENANCE—BOILER SETTINGS MENU

NOTE

This section applies to applications where the Heating System selection is HOT WATER Curr Volt Boiler.

MODE



Selections: **Auto, Manual, Off** Default: **Auto**

Description: *See page 66* for MANUAL OP menu description.

IGNITION START

Selections: **0% to 100%** Default: **0%**

Description: The Ignition % is the minimum modulation percent for the boiler to be activated. The Ignition % is maintained during the Purge Delay of the boiler. For most modern power draft boilers, the Ignition % can be set to 1%. Other units or atmospheric units may require their modulating to be from 20–50% before the stage can be active Check with the equipment manufacturer for the minimum firing rate required.

SOFT-OFF DELAY

Selections: **0 to 60 seconds** Default: **45 seconds**

Description: When the boiler is no longer needed for heat, the Soft-Off Delay keeps that boiler at low fire prior to turning it off. This helps reduce the boiler from short cycling.

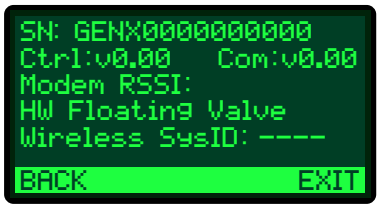
If during the Soft-Off Delay period, the control needs the boiler to fire, the boiler is released from the Soft-Delay and will resume normal operation.

The Genesis Heat-Timer® control will display a blinking Ignition % to indicate that the boiler is in Soft-Off Delay.

INFO

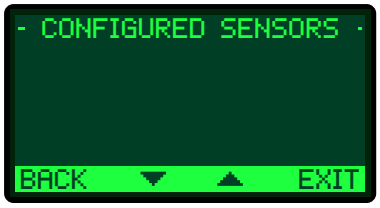
GENERAL INFO

Description: The General Info menu provides access to display the current configuration of the Genesis Heat-Timer®. Available information includes: software version, serial number, startup settings, communication settings, and Wireless System ID.



CONFIGURED SENSORS

Description: The Configured Sensors menu provides access to display the current configuration of Space Sensors linked to the Genesis Heat-Timer® control.



23 CONFIGURING THE WIRELESS SPACE SENSOR

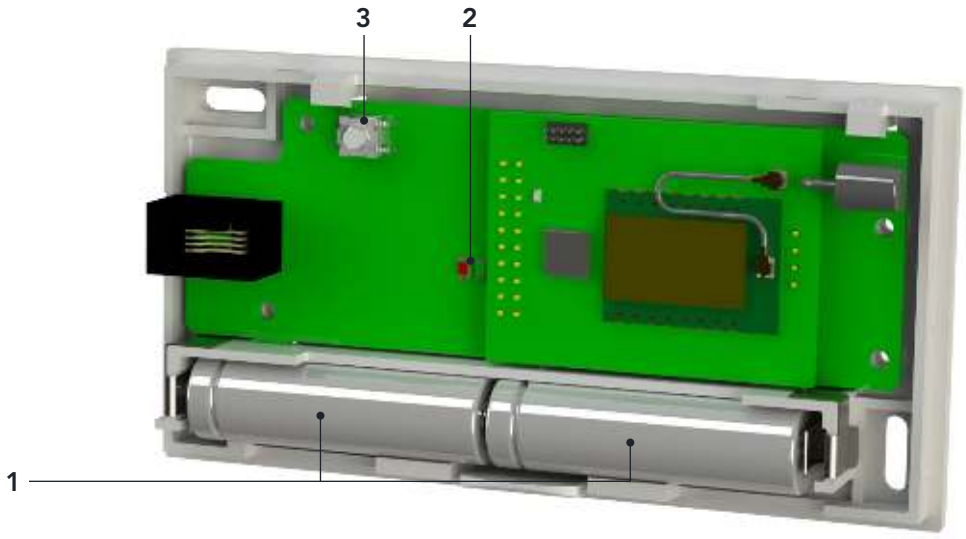
NOTE

The Space Sensors provided with Genesis Heat-Timer® package are pre-programmed by the factory for that particular Genesis Heat-Timer® control. There is no need for programming the Space Sensors prior to installation.

1 Insert two AA lithium 1.5V batteries (1) (Heat Timer P/N 020008–00).

NOTE

Ensure to install the batteries in the proper direction.



2 Observe the Wireless Space sensor status indicators (2). The Green LED should blink when data reception by Genesis Heat-Timer® is received.

If both (RED, GREEN) LEDs are blinking every second after installing the batteries, the System ID is not set for the Genesis Heat-Timer® control. *Reference ADD WIRELESS SENSOR section on page 67*.

NOTE

If the LEDs are not blinking, verify the batteries are good and are installed correctly. If the batteries are good and the LEDs are not blinking, ensure the space sensors are configured with the Genesis Heat-Timer® control.

TESTING THE SENSORS

The Genesis Heat-Timer® sensors (Outdoor and Heating System) record the temperature where they are located. Before assuming a sensor is not working, it is important to get an accurate reading at the sensor location. If the outdoor sensor is affected by sun, exhaust fans, open doors, or windows, the reading may vary significantly from the actual outdoor temperature. Similarly, if the heating system sensor (HSS) does not appear to be reading correctly, check if it is located correctly.

To perform the test, you will need a digital multi-meter capable of reading resistances. The Heating System Sensor and Outdoor Sensor temperatures are constantly displayed on the Genesis Heat-Timer®. Remove the outdoor sensor wires from the OUT Temp terminals (18 and 19), or the heating system sensor wires from SYS Temp terminals (16 and 17). Use the multi-meter to take a resistance reading across the detached wires going to the sensor. If the reading shows:

- OPEN or resistance is higher than the values on the adjacent chart—Check the wires going to the sensor. They may have been broken or become disconnected. If the wires are fine, check the resistance at the sensor itself. If the resistance is still open, the sensor has been damaged and needs to be replaced.
- SHORT or resistance is lower than the values on the adjacent chart—Check the wires going to the sensor. They may have become shorted together in the run of the wire. If not, check the resistance at the sensor itself. If there still is no resistance, the sensor has been damaged and needs to be replaced.
- Resistances from 187 ohms to 117720 ohms—Find the temperature that corresponds to the resistance value on the chart. If the sensor appears to be outputting correctly, check that the wires were properly connected to the Genesis Heat-Timer® inputs. If the sensor is not outputting correctly, take another reading at the sensor itself. If this is correct, the problem is in the wiring between the sensor and the Genesis Heat-Timer®. Otherwise, the sensor has been damaged, and should be replaced.

TEMPERATURE SENSOR CHART

TEMPERATURE (IN DEGREES °F)	VALUE (IN OHMS)
-30	117720
-20	82823
-10	59076
0	42683
10	31215
20	23089
25	19939
30	17264
35	14985
40	13040
45	11374
50	9944
55	8714
60	7653
70	5941
80	4649
90	3667
100	2914
110	2332
120	1879
130	1524
140	1243
150	1021
160	842
170	699
180	583
190	489
200	412
210	349
220	297
230	253
240	217
250	187

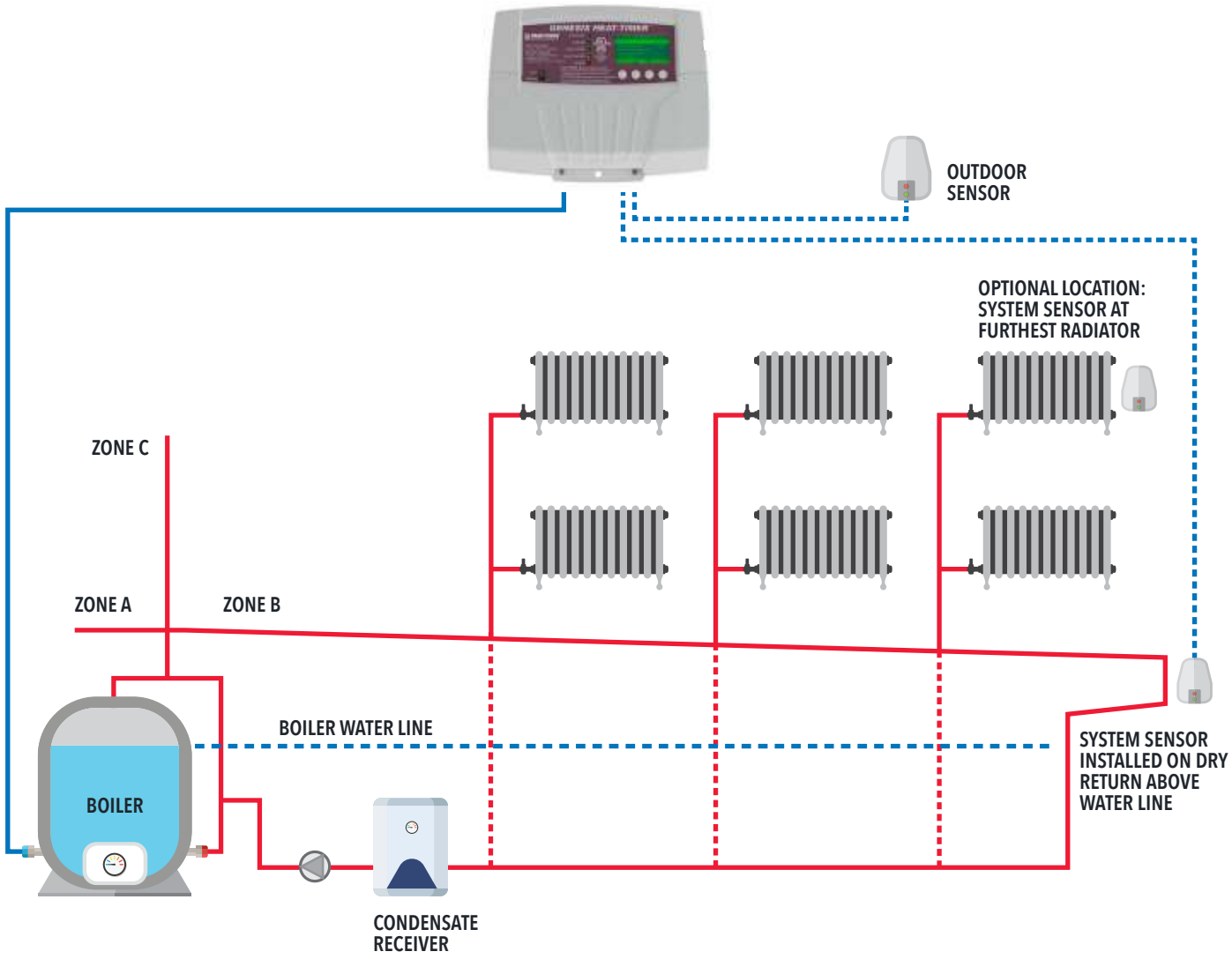


FIGURE 3

GENESIS HEAT-TIMER® CONTROL OPERATING A BOILER IN A ONE-PIPE STEAM SYSTEM

⚠ ALERT ⚠

Since each installation is unique, Heat-Timer Corp. is not responsible for any installation related to any electrical or piping diagram generated. The provided illustrations are to demonstrate the control operating concept only.

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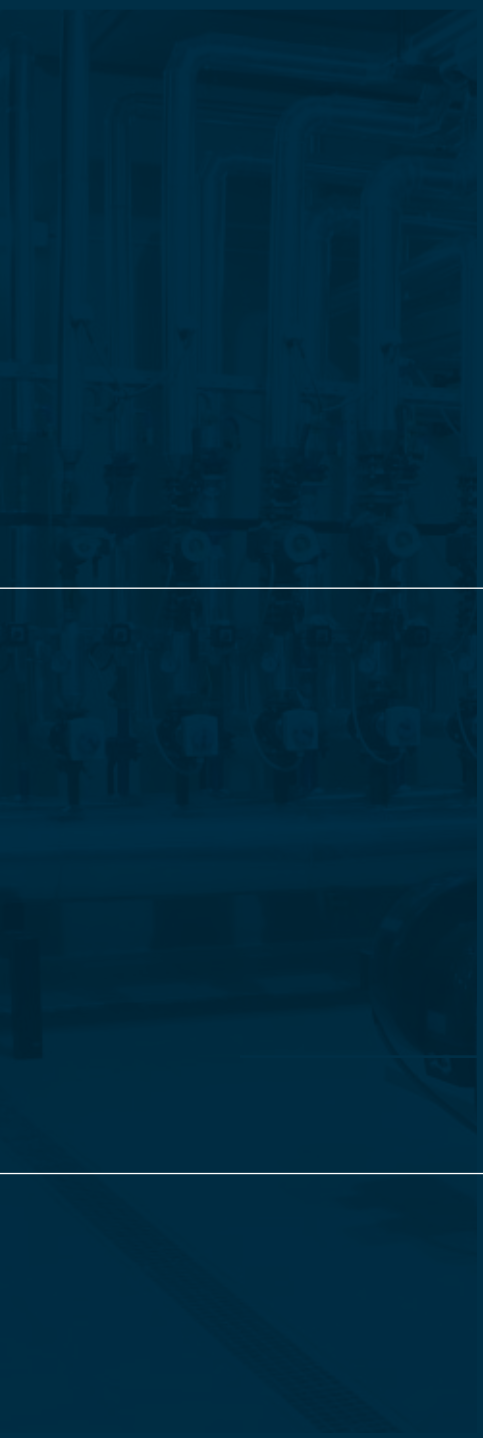

HEAT-TIMER® CORPORATION

20 NEW DUTCH LANE,
FAIRFIELD, NJ 07004

PHONE: **973-575-4004**

FAX: **973-575-4052**

HEAT-TIMER.COM