Installation, Operation and Maintenance Manual

Smart Steam Control 289

works with nexa

⚠ WARNING

THINK SAFETY FIRST

Please read carefully before proceeding with installation. Your failure to follow any attached instructions or operating parameters may lead to the product's failure.

Keep this Manual for future reference.

tekmar®
A **WATTS** *Brand*

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Important Safety Information

⚠ WARNING

It is your responsibility to ensure that this control is safely installed according to all applicable codes and standards. tekmar® is not responsible for damages resulting from improper installation and/or maintenance.

To avoid serious personal injury and damage to the equipment:

- Read Manual and all product labels BEFORE using the equipment. Do not use unless you know the safe and proper operation of this equipment.

- Keep this Manual available for easy access by all users.
- Replacement Manuals are available at tekmarControls.com

This is a safety-alert symbol. The safety alert symbol is shown alone or used with a signal word (DANGER, WARNING, or CAUTION), a pictorial and/or a safety message to identify hazards.

When you see this symbol alone or with a signal word on your equipment or in this Manual, be alert to the potential for death or serious personal injury.

This pictorial alerts you to electricity, electrocution, and shock hazards.

Double insulated.

⚠ WARNING This symbol identifies hazards which, if not avoided, could result in death or serious injury.

⚠ CAUTION This symbol identifies hazards which, if not avoided, could result in minor or moderate injury.

NOTICE This symbol identifies practices, actions, or failure to act which could result in property damage or damage to the equipment.

⚠ WARNING

- Improper installation and operation of this control could result in damage to the equipment and possibly even personal injury or death.
- This control is not intended for use as a primary limit control. Other controls that are intended and certified as safety limits must be placed into the control circuit.

NOTICE

Do not attempt to service the control. There are no user serviceable parts inside the control. Attempting to do so voids warranty.

Radio Frequency Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with part 15 of the FCC Rules and with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The antenna used for this radio must be properly installed and maintained and must provide a separation distance of at least 7.9 inches (20 cm) from all persons.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de license. L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage, et

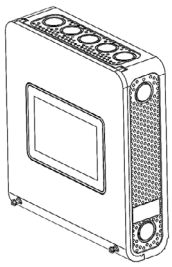
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Installation

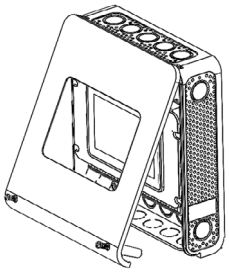
Installation Location

When choosing the location for the control, consider the following:

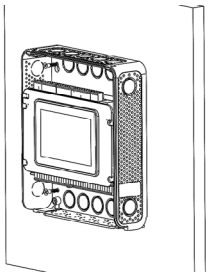
- Keep dry. Avoid potential leakage onto the control. RH ≤ 90% to 104°F (40°C). Non-condensing environment.
- Avoid contact with water and other liquids; failure to keep dry may impact control's operations.
- Do not expose to operating temperatures beyond 32-104°F (0-40°C)
- Provide adequate ventilation.
- Keep away from equipment, appliances or other sources of electrical interference.
- Provide easy access for wiring, viewing, and adjusting the display screen.
- Mount approximately 5 ft. (1.5 m) off the finished floor.
- Locate the control near pumps and/or zone valves if possible.
- Provide a solid backing to mount the enclosure to. For example: plywood, studs, etc
- Use the conduit knockouts provided on the upper, lower, back and sides of the enclosure.



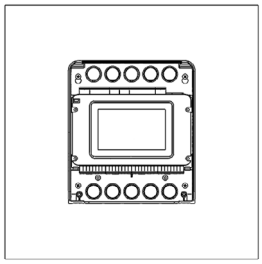
Use a Phillips screwdriver to remove the two screws on the cover.



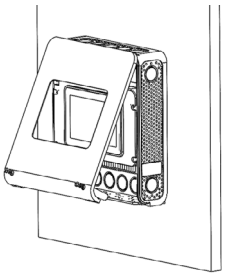
Pull the front cover towards you. The top of the cover will pivot on a hinge. Remove the cover by releasing the pivot hooks.



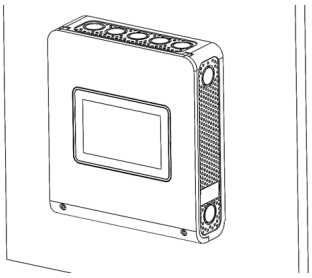
Mount the enclosure to a wall using #6 wood screws in the four mounting holes. Use screw anchors if drilling into masonry.



Use the 24 knock-outs to install connecting conduits and cabling to the control.



To install the cover, hook the top of the cover to the enclosure, then pivot the bottom to shut.



Use a Phillips screwdriver to fasten the two bottom screws.

Wiring Schematic

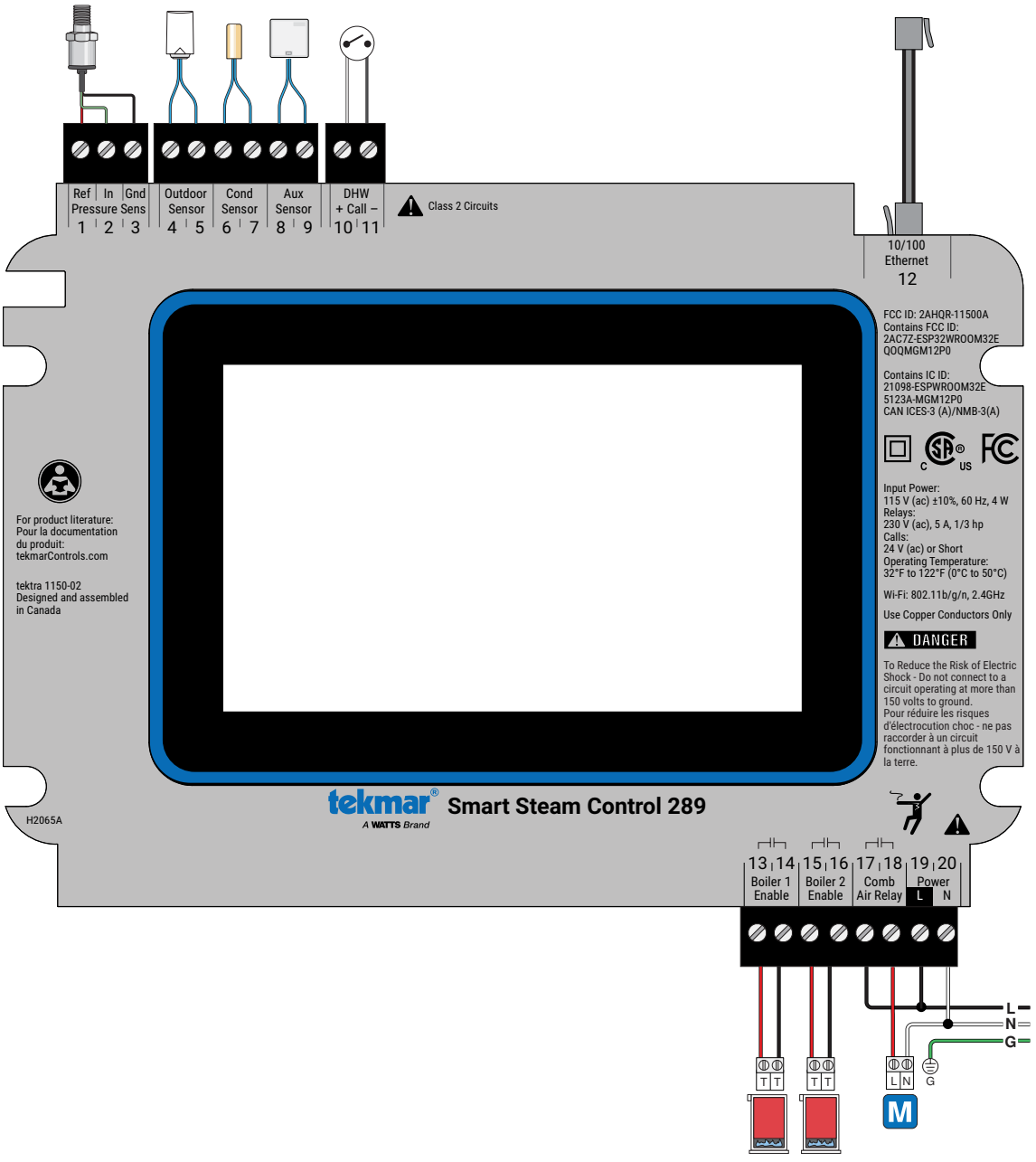
This section provides a wiring schematic for the control.

⚠ WARNING

- Before wiring, ensure all power is turned off and take all necessary precautions.
- Sensor wiring may be extended to a total length of 500 feet (152 m) using 18 AWG solid conductor wire.
- Strip all wiring to a length of ⅜ in. or 10 mm for all terminals.
- A circuit breaker or power disconnect that provides power to the control should be located nearby and clearly labeled.
- Refer to the current and voltage ratings at the back of this brochure before connecting devices to this control.
- Only qualified personnel should install or service the control.

⚠ WARNING

As with any electrical product, care should be taken to guard against the potential risk of fire, electric shock, and injury to persons.



Wiring Instructions

This section explains how to wire individual devices to the Smart Steam Control 289. Please refer to technical data table on page 36 for sensors that are included in the standard packaging of the Smart Steam Control 289.

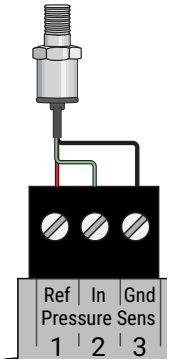
Pressure Sensor 089 (Terminals 1, 2, 3)

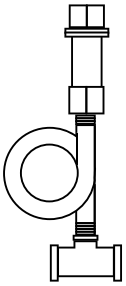
An optional Pressure Sensor 089 (sold separately) can connect to the 289 to provide staging for a second steam boiler and to monitor steam pressure up to 15 psi (104 kPa). The pressure sensor requires the installation of the following on the steam riser pipe:

- Tee with a ¼"-18 NPT port
- ¼" brass pigtail
- ¼" x ⅛" reducing elbow

Thread the 089 into the reducer coupling. The pigtail protects the sensor diaphragm from premature failure.

- Connect the Red reference voltage wire to terminal 1.
- Connect the Green pressure signal wire to terminal 2.
- Connect the Black power common wire to terminal 3.



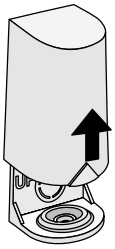


NOTICE

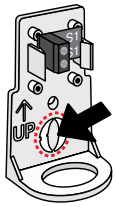
The Pressure Sensor 089 must be installed downstream of a ¼" steam gauge siphon (pigtail) to prevent premature failure.

Outdoor Sensor 070 (Terminals 4, 5)

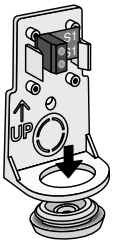
- The 070 can be mounted directly onto a wall with the wiring entering through the back or bottom of the enclosure. Do not mount the 070 with the conduit knockout facing upwards as rain could enter the enclosure and damage the sensor.
- In order to prevent heat transmitted through the wall from affecting the sensor reading, it may be necessary to install an insulating barrier behind the enclosure.
- The 070 should be mounted on a wall which best represents the heat load on the building (a northern wall for most buildings and a southern facing wall for buildings with large south facing glass areas). The 070 should not be exposed to heat sources such as ventilation or window openings.
- The 070 should be installed at an elevation above the ground that will prevent accidental damage or tampering.



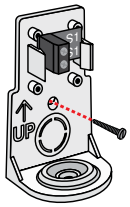
Remove cover by sliding upwards away from the base.



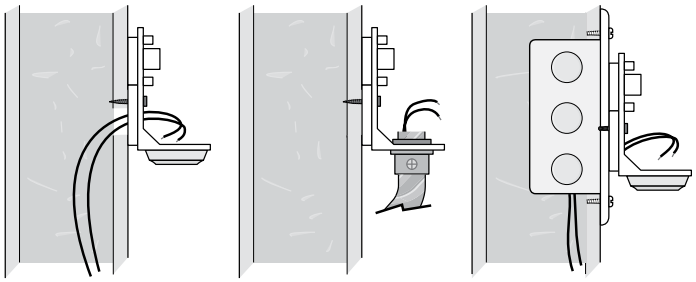
To wire from the back, remove the knock-out in the sensor base.



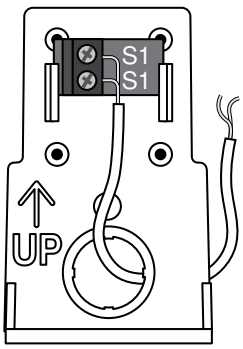
If using conduit, remove the flexible plug from the base bottom.



Attach the base to the wall, soffit or electrical box.



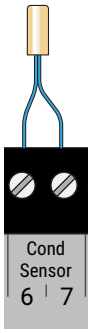
- Connect 18 AWG or similar wire to the two terminals provided in the enclosure and run the wires from the sensor to the control. Do not run the wires parallel to telephone or power cables. If the sensor wires are located in an area with strong sources of electromagnetic interference (EMI), shielded cable or twisted pair should be used or the wires can be run in a grounded metal conduit. If using shielded cable, the shield wire should be connected to the Com terminal on the control and not to earth ground.
- Replace the cover of the sensor enclosure.
- Connect the 2 wires from the outdoor sensor to the Outdoor Sensor terminals on the 289 (terminals 4 and 5).



Condensate Sensor (Terminals 6, 7)

The included Universal Sensor 071 measures the condensate return temperature. This sensor should be installed on the bottom of the return pipe on the furthest radiator or on the condensate return line in the mechanical room. A Universal Sensor Enclosure 080 (sold separately) can be installed in order to terminate rigid or flexible conduit to the sensor location.

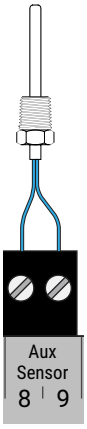
- Connect the wires to the condensate sensor terminals 6 and 7.



Boiler Flue Sensor

An optional Boiler Flue Sensor 069 can be installed on the boiler flue to measure the flue gas temperature. It is not possible to have both a flue sensor and an indoor sensor installed at the same time as they share the same auxiliary sensor input.

- Connect the wires to the Aux sensor terminals 8 and 9.



Indoor Sensor

An optional Indoor Sensor 076, 077, or 084 can be installed to measure the ambient temperature in a hallway or apartment unit. It is not possible to have both a flue sensor and an indoor sensor installed at the same time as they share the same auxiliary sensor input.

- Connect the wires to the Aux sensor terminals 8 and 9.

Testing the Sensor Wiring

A good quality test meter capable of measuring up to 5,000 kΩ (1 kΩ = 1000 Ω) is required to measure the sensor resistance. In addition to this, the actual temperature must be measured with either a good quality digital thermometer, or if a thermometer is not available, a second sensor can be placed alongside the one to be tested and the readings compared.

First measure the temperature using the thermometer and then measure the resistance of the sensor at the control. The wires from the sensor must not be connected to the control while the test is performed. Using the chart below, estimate the temperature measured by the sensor. The sensor and thermometer readings should be close. If the test meter reads a very high resistance, there may be a broken wire, a poor wiring connection or a defective sensor. If the resistance is very low, the wiring may be shorted, there may be moisture in the sensor or the sensor may be defective. To test for a defective sensor, measure the resistance directly at the sensor location.

Do not apply voltage to a sensor at any time as damage to the sensor may result.

Call customer service if you need assistance with technical details.

TEMPERATURE		RESISTANCE	TEMPERATURE		RESISTANCE	TEMPERATURE		RESISTANCE	TEMPERATURE		RESISTANCE
°F	°C	Ω	°F	°C	Ω	°F	°C	Ω	°F	°C	Ω
-50	-46	490,813	20	-7	46,218	90	32	7,334	160	71	1,689
-45	-43	405,710	25	-4	39,913	95	35	6,532	165	74	1,538
-40	-40	336,606	30	-1	34,558	100	38	5,828	170	77	1,403
-35	-37	280,279	35	2	29,996	105	41	5,210	175	79	1,281
-30	-34	234,196	40	4	26,099	110	43	4,665	180	82	1,172
-25	-32	196,358	45	7	22,763	115	46	4,184	185	85	1,073
-20	-29	165,180	50	10	19,900	120	49	3,760	190	88	983
-15	-26	139,403	55	13	17,436	125	52	3,383	195	91	903
-10	-23	118,018	60	16	15,311	130	54	3,050	200	93	829
-5	-21	100,221	65	18	13,474	135	57	2,754	205	96	763
0	-18	85,362	70	21	11,883	140	60	2,490	210	99	703
5	-15	72,918	75	24	10,501	145	63	2,255	215	102	648
10	-12	62,465	80	27	9,299	150	66	2,045	220	104	598
15	-9	53,658	85	29	8,250	155	68	1,857	225	107	553

DHW Call (Terminals 10, 11)

A call for indirect domestic hot water can come from an aquastat connected to terminals 10 and 11. The DHW Call can be volt free or up to 24 V (ac).

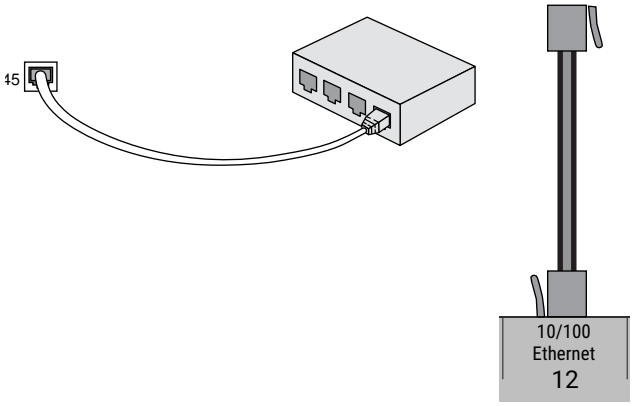
- Connect the DHW Call terminals 10 and 11 to the DHW tank aquastat.

Ethernet (Terminal 12)

The control can connect to the Internet through 10 or 100 Mbps Ethernet.

- Connect the Ethernet RJ-45 port on terminal 12 to the building Local Area Network (LAN) router or network switch using Category 5 cable.

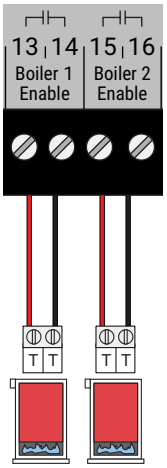
tekmar is not responsible for failure of alerts due to connectivity issues, power issues, or improper installation.



Boiler Enable (Terminals 13 to 16)

A steam boiler enable requiring up to 230 V (ac) 5 A, 1/3 hp can be enabled through the TT contacts.

- For Boiler 1 connect the Boiler Enable terminals 13 and 14 to the boiler TT contacts.
- For Boiler 2 connect the Boiler Enable terminals 15 and 16 to the boiler TT contacts.

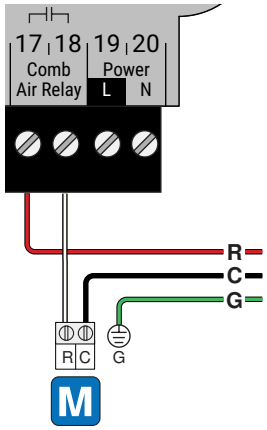


Combustion Air (C.A.) Damper (Terminals 17, 18)

A C.A. damper requiring up to 230 V (ac) 5 A, 1/3 hp can be switched through terminals 17 and 18.

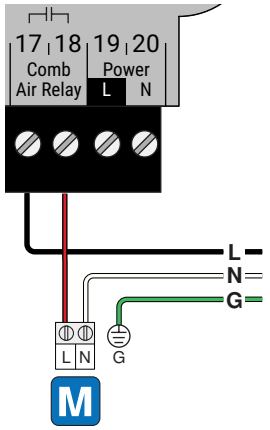
For 24 V(ac) actuators:

- Connect the power supply red (R) to terminal 17.
- Connect a wire from terminal 18 to the R on the combustion air damper.
- Connect the C on the combustion air damper to the power source common C.



For 120 V(ac) actuators:

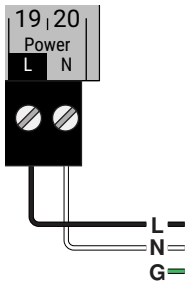
- Connect the power Line (L) to terminal 17.
- Connect a wire from terminal 18 to the Line on the combustion air damper.
- Connect the neutral (N) on the combustion air damper to the power source neutral (N).



Input Power (Terminals 19, 20

Provide a 15 Amp circuit for the input power.

- Connect the 115 V (ac) line wire (L) to terminal 19.
- Connect the neutral wire (N) to terminal 20.



User Interface

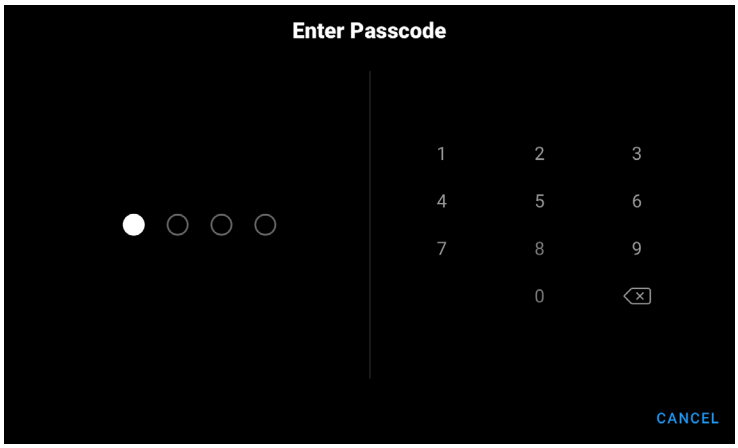
Power On

- When first powered on, the tekmar logo appears.
- If the display does not turn on, please contact your tekmar sales representative or technical support for assistance.

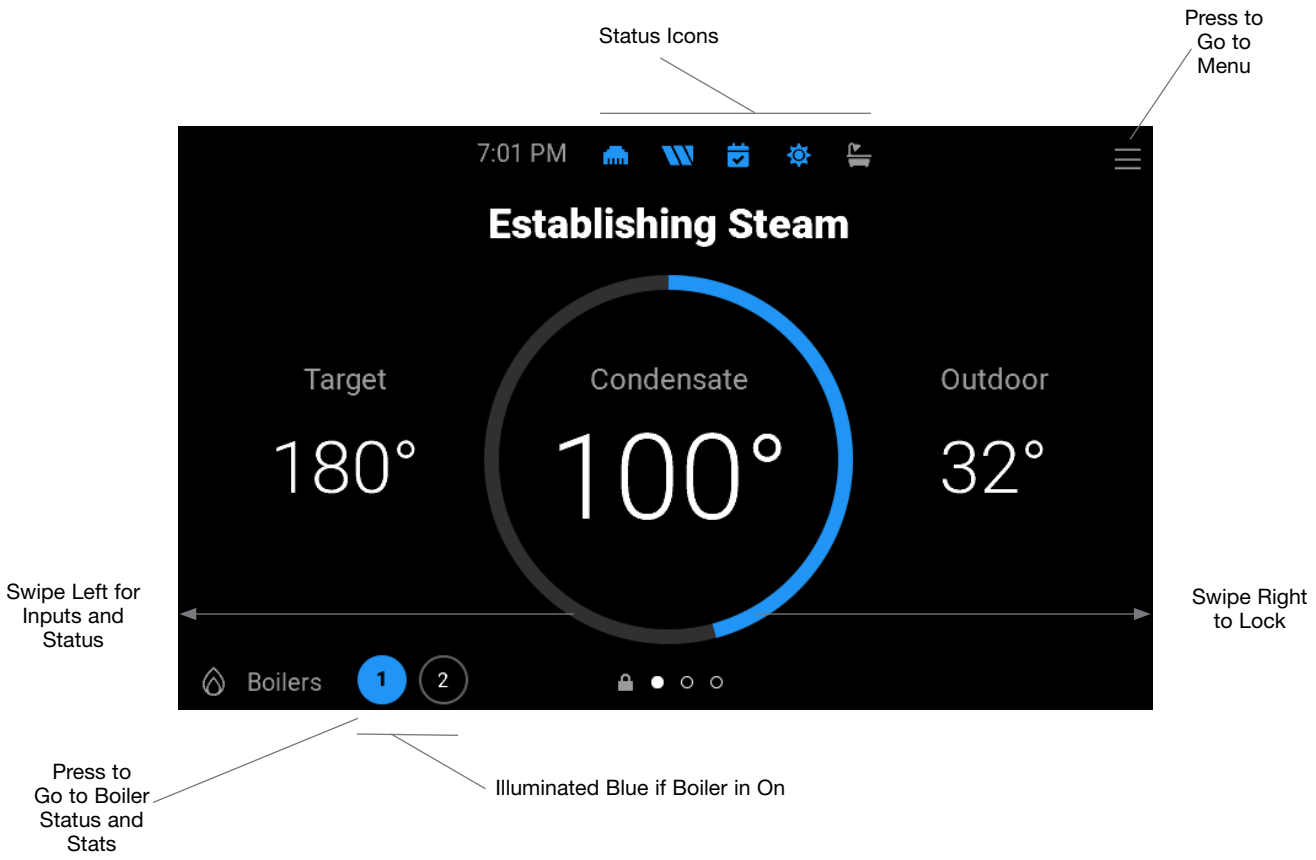
Lock Screen

- When first powered on, the tekmar logo appears followed by the lock screen.
- By default the control is not locked and does not require a passcode.
- Press “Tap to Unlock”, and enter your passcode if necessary.

- A custom passcode can be set through the Security menu. This is an optional feature.
- If the custom passcode is lost, the master passcode is 0289.



Home Screen



Status Icons

	ETHERNET Blue indicates connection to Ethernet.		**SUN** When displayed, it indicates the schedule is in the occupied period.
	WI-FI Blue indicates connection to Wi-Fi.		**MOON** When displayed, it indicates the schedule is in the unoccupied period.
	NEXA Blue indicates connection to the Nexa cloud service.		**DHW** Blue indicates that there is a domestic hot water call.
	SCHEDULE Blue indicates the programmable schedule is on.		**NOTIFICATIONS** When displayed, it indicates an error or warning notification is present.

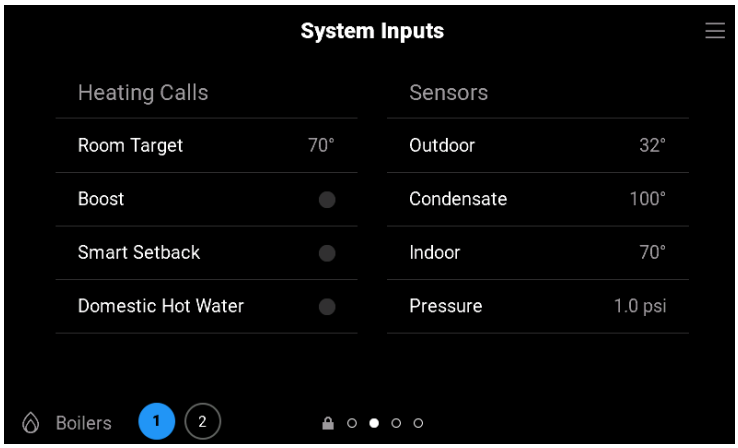
System Inputs Screen

Heating Calls

- The Room Target displays the desired room temperature when an indoor sensor is available.
- Early Start is in effect when the dot is green. This is available when an indoor sensor is available.
- Boost is in effect when the dot is green. This is available when there is no indoor sensor.
- Smart Setback is in effect when the dot is green.
- Domestic Hot Water dot is green when there is a DHW heating call.

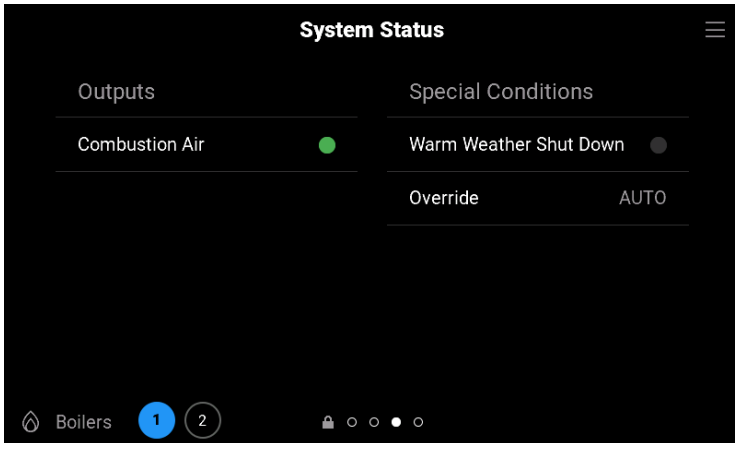
Sensors

- The outdoor temperature is used to calculate the heat on time of the steam boiler using outdoor air reset.
- The optional condensate return temperature is used to determine when steam is established at the furthest radiator.
- The optional indoor temperature is used to provide indoor temperature feedback for the heat on time.
- The optional pressure sensor is used for monitoring and operating the second stage boiler.



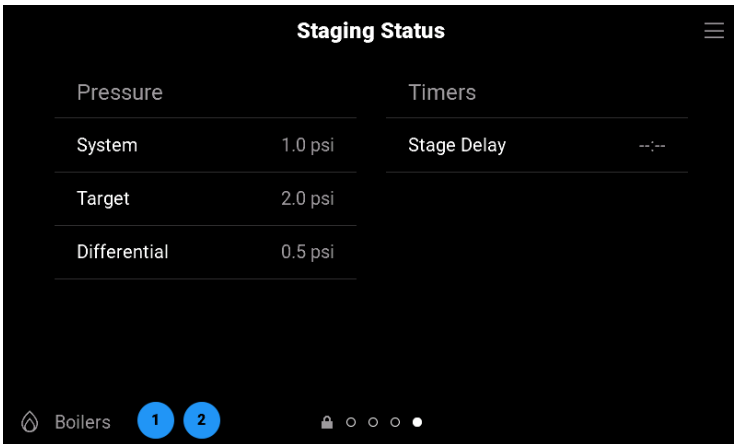
System Outputs Screen

- When an output is turned on (relay closed), the dot is green.
- When an output is turned off (relay open), the dot is gray.
- When Warm Weather Shut Down (WWSD) is in effect, the dot is green.
- Manual override are displayed. In normal operation the override will display “AUTO”.



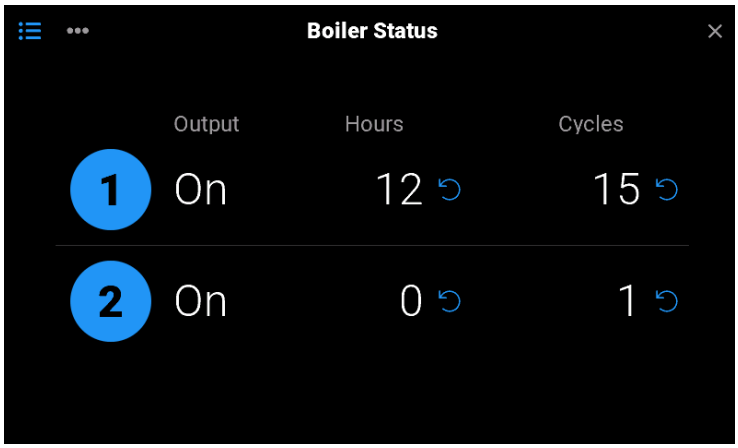
Staging Status

- The staging status is only available when the control is configured to operate two boilers.
- The system pressure displays the pressure sensor reading.
- The pressure target is the setpoint that the second steam boiler is shut off.
- The pressure differential is amount of pressure drop from the target at which the second boiler turns on.
- The stage delay is a timer that must elapse before the second boiler is turned on once the pressure differential condition has been met.



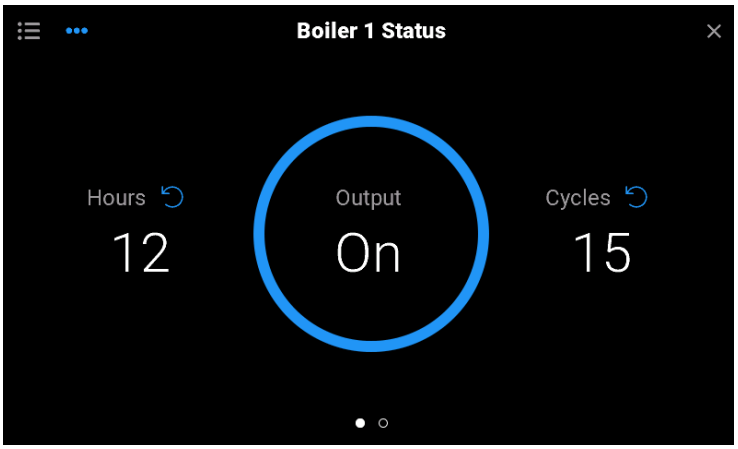
Boiler Status List Screen

- Press . . . ellipsis to go to the Boiler Status Carousel screen
- The circle in blue indicates that the boiler is firing. An empty circle indicates off.
- The boiler run time hours is displayed. Press the ↺ button to zero the hours.
- The boiler on-off cycles are displayed. Press the ↺ button to zero the cycle count.



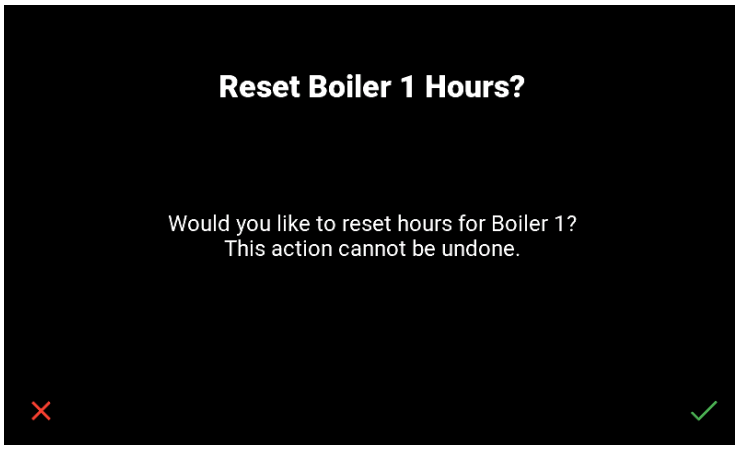
Boiler Status Carousel Screen

- Press ☰ to go to the Boiler Status List Screen
- Swipe left to view higher number boilers
- Swipe right to view lower number boilers
- Press . . . ellipsis to go to the Boiler Status Carousel screen
- The circle in blue indicates that the boiler is firing. An empty circle indicates off.
- The boiler run time hours is displayed. Press the ↺ button to zero the hours.
- The boiler on-off cycles are displayed. Press the ↺ button to zero the cycle count.

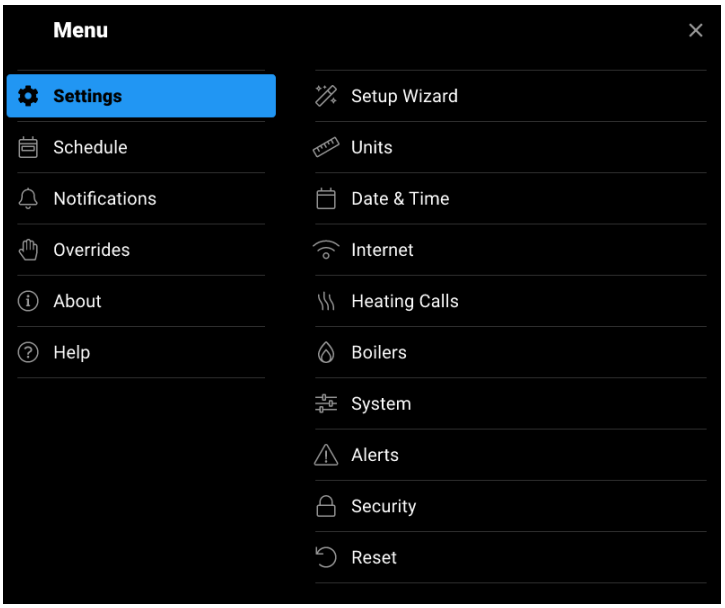


Reset Boiler Hours or Cycles Screen

- Press check mark to zero the hours or cycle count.
- Press X to cancel.



Menu Screen



Navigation

←	**BACK** Go back a level without saving	**SKIP**	**SKIP** Skip step in Setup Wizard or Wi-Fi Setup
X	**HOME** Go to Home screen without saving	**BEGIN**	**BEGIN** Begin the Setup Wizard.
SAVE	**SAVE** Saves the new setting value	**NEXT**	**NEXT** Go to the next step
CLEAR	**CLEAR** Clears the boiler hours or cycles to 0		

Menus

Home Screen

Parameter	Range	Description
HOME SCREEN		
CONDENSATE	-31 to 266°F (-35.0 to 130.0°C)	The condensate return temperature.
OUTDOOR	-67 to 149°F (-55.0 to 65.0°C)	The outdoor air temperature.
TARGET	100 to 220°F (38.0 to 104.5°C)	The condensate return must reach the steam established target to start the Heat On cycle.
PRESSURE	0.0 to 15.0 psi (0 to 105 kPa)	The steam system pressure.
TIME REMAINING (HEAT ON)	00:00:00 to 02:00:00	The time that the boiler is on during the heating cycle.
TIME REMAINING (HEAT OFF)	00:00:00 to 02:00:00	The time that the boiler is off during the heating cycle.
SYSTEM INPUTS		
ROOM TARGET	35 to 100°F (1.5 to 38.0°C)	The desired room temperature when an indoor sensor is installed.
BOOST	Off or On	Dot is green when Boost is active.
EARLY START	Off or On	Dot is green when Early Start is active.
SMART SETBACK	Off or On	Dot is green when Smart Setback is active.
DOMESTIC HOT WATER	Off or On	Dot is green when DHW call is active.
OUTDOOR	-67 to 149°F (-55.0 to 65.0°C)	The outdoor air temperature.
CONDENSATE	-31 to 266°F (-35.0 to 130.0°C)	The condensate return temperature.
INDOOR	35 to 100°F (1.5 to 38.0°C)	The indoor sensor temperature.
FLUE	32 to 392°F (0.0 to 200.0°C)	The boiler flue sensor temperature.
PRESSURE	0.0 to 15.0 psi (0 to 105 kPa)	The steam system pressure.
SYSTEM STATUS		
COMBUSTION AIR	Off or On	Dot is green when combustion air damper is open.
WARM WEATHER SHUT DOWN	Off or On	Dot is green when warm weather shut down is in effect.
OVERRIDE	Auto, Hand, Max Heat, Off	The manual override status.

Parameter	Range	Description
STAGING STATUS		
SYSTEM	0.0 to 15.0 psi (0 to 105 kPa)	The system steam pressure.
TARGET	0.1 to 15.0 psi (7 to 105 kPa)	The pressure that shuts off the second boiler.
DIFFERENTIAL	0.1 to 5.0 psi (7 to 35.0 kPa)	The pressure below the target to turn on the second boiler.
STAGE DELAY	0.0 to 40.0 minutes	The time delay must elapse to 0.0 to turn on the second boiler.
BOILER STATUS		
BOILER 1 OR 2 HOURS	0 to 999999 hours	The number of hours the boiler has fired.
BOILER 1 OR 2 CYCLES	0 to 999999 cycles	The number of boiler on/off cycles.

Settings (1 of 5)

Parameter	Range	Description
UNITS		
TEMPERATURE	°F or °C Default: °F	Units for display of temperature.
PRESSURE	psi or kPa Default: psi	Units for display of pressure.
DATE AND TIME		
24-HOUR TIME	Off or On Default: Off	Selects a 24 hour time clock.
SET AUTOMATICALLY	Off or On Default: On	Automatically synchronizes the time with the Internet.
TIME ZONE	North American Time Zones Default: Eastern	Select from Newfoundland, Atlantic, Eastern, Central, Mountain, Pacific, Alaska, Hawaii time zones.
DATE	Month, Day, Year	Set the current date. Available when setting time manually.
TIME	Hours, Minutes, AM/PM	Set the current time. Available when setting time manually.
DAYLIGHT SAVINGS	Off or On Default: On	Select if daylight savings time is locally observed.
INTERNET		
CONNECTION TYPE	Off, Ethernet, Wi-Fi Default: Off	Select the Internet connection.
WI-FI NETWORK	Scans for all available networks	Select the desired Wi-Fi network SSID. Then enter the Wi-Fi password.
WI-FI SECURITY TYPE	None, WPA2-Personal, WPA2-Enterprise Default: WPA2-Personal	Select the type of Wi-Fi security. WPA2-Enterprise requires a RADIUS authentication server using PEAPv0/EAP-MSCHAPv2. This is available when setting the Wi-Fi manually.
WI-FI USER	32 character name	User the WPA2-Enterprise user name. Available when configuring Wi-Fi to use WPA2-Enterprise.

Settings (2 of 5)

Parameter	Range	Description
WI-FI PASSWORD	32 character password	Enter the Wi-Fi password. Available when configuring a Wi-Fi network.
NEXA	Register or Deregister	Register the control with Nexa to use the web or mobile apps.
IP CONFIGURATION	DHCP or Static Default: DHCP	Select if the control should receive an automatic IP address from the router DHCP server or use a static IP address.
IP ADDRESS	0.0.0.0 to 255.255.255.255 Default: 192.168.0.1	Set the static IP address. Available when IP Configuration is Static.
SUBNET MASK	0.0.0.0 to 255.255.255.255 Default: 255.255.255.0	Set the static IP address. Available when IP Configuration is Static.
ROUTER	0.0.0.0 to 255.255.255.255 Default: 192.168.1.1	Set the router or gateway IP address. Available when IP Configuration is Static.
DNS 1	0.0.0.0 to 255.255.255.255 Default: 0.0.0.0	Set the control's primary DNS. 0.0.0.0 uses the factory default DNS servers.
DNS 2	0.0.0.0 to 255.255.255.255 Default: 0.0.0.0	Set the control's secondary DNS. 0.0.0.0 uses the factory default DNS servers.

Parameter	Description
INTERNET INFO	
At the top of the Internet menu, press the info icon ⓘ to access the Internet Info screen. Use this menu to troubleshoot connectivity to the local area network and Internet.	
TIME	Coordinated Universal Time
SSID	Wi-Fi network name
BSSID	Router's ID number
SECURITY	None, WPA2 Personal, WPA2 Enterprise
SIGNAL STRENGTH	Wi-Fi signal strength
MAC	MAC address of Wi-Fi or Ethernet adapter
IP ADDRESS	Control's IP address
SUBNET MASK	Control's IP subnet
GATEWAY	Router's IP address
DNS1	Control's DNS
DNS2	Control's DNS
INTERNET	Internet connectivity status
IOT	Watts cloud status
ID	Control's ID number

Settings (3 of 5)

Parameter	Range	Description
HEATING CALLS > CENTRAL HEATING		
ROOM OCCUPIED	35 to 100°F (2.0 to 38.0°C) Default: 70°F (21.0°C)	Set the desired room air temperature during the occupied periods.
ROOM UNOCCUPIED	35 to 100°F (2.0 to 38.0°C) Default: 65°F (18.5°C)	Set the desired room air temperature during the unoccupied periods. This item is only available when Schedule > Device Schedule is On.
BOILER START PERCENTAGE	0 to 50% Default: 0%	Set the starting boiler run time percent for the heating curve.
BOILER DESIGN PERCENTAGE	0 to 100% Default: 100%	Set the boiler run time percentage on the coldest day of the year.
OUTDOOR START TEMPERATURE	35 to 100°F (2.0 to 38.0°C) Default: 70°F (21.0°C)	Set the starting outdoor temperature for the heating curve.
OUTDOOR DESIGN TEMPERATURE	-60 to 45°F (-51.0 to 7.0°C) Default: 10°F (-12.0°C)	Set the outdoor air temperature for the heating curve for the coldest day of the year.
AUTO CYCLE	Off or On Default: Off	Select if the control should automatically determine the cycle length. Requires an Indoor Sensor to be installed.
MANUAL CYCLE	20 to 100 minutes Default: 60 minutes	Manually set the cycle length. Available when Auto Cycle is Off.
WARM WEATHER SHUT DOWN	Off or On Default: Off	Select if the control should shut down the central heating based on the outdoor air temperature.
WARM WEATHER SHUT DOWN OCCUPIED	35 to 100°F (2.0 to 38.0°C) Default: 70°F (15.5°C)	Set the outdoor air temperature at which the central heating is shut off during the occupied period. Available when Warm Weather Shut Down is on.
WARM WEATHER SHUT DOWN UNOCCUPIED	35 to 100°F (2.0 to 38.0°C) Default: 60°F (21.0°C)	Set the outdoor air temperature at which the central heating is shut off during the unoccupied period. Available when the Warm Weather Shut Down is on and the Schedule is on.
HEATING CALLS > DOMESTIC HOT WATER		
DHW HEATING	Off or On Default: On	Select if the control responds to domestic hot water heating calls.
DHW UNOCCUPIED	Off or On Default: Off	Select if the DHW tank is heated during the unoccupied period. Available when the Schedule is on.
BOILER MENU (SAME FOR BOILER 1 AND 2)		
BOILER AVAILABLE	Off or On Default: Boiler 1 On, Boiler 2 Off	Select if the boiler is available as part of the firing sequence. The boiler should be set Off if not in use or the boiler is off line for maintenance.
FIRE DELAY	10 to 180 seconds Default: 30 seconds	Set the fire delay time. This is the time duration from when the control provides an enable signal to when the boiler completes ignition.
BOILER HIGH OUTPUT	10 to 9990 MBTU/h Default: 250 MBTU/h	Set the boiler burner's BTU output at full fire. Units are in thousands of BTUs per hour.
BOILER FUEL	NG Gas, LP Gas, Oil, Electric, Wood Default: NG Gas	Set the boiler's fuel type.

Settings (4 of 5)

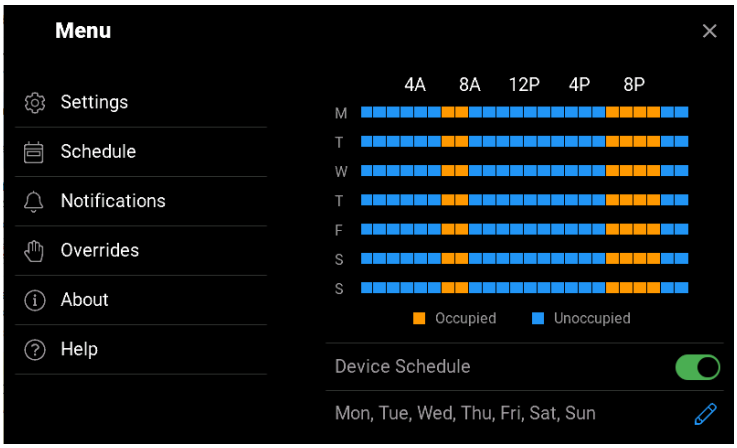
Parameter	Range	Description
	SYSTEM MENU	
CONDENSATE SENSOR	Off or On Default: On	Select if a condensate return sensor is installed.
STEAM ESTABLISHED	100 to 220°F (38.0 to 104.5°C) Default: 180°F (82.0°C)	Set the condensate return temperature at which steam reaches the furthest radiator. Requires a Condensate Sensor to be installed.
AUTO COOL DOWN	Off or On Default: On	Select if the radiators should cool down before starting the next heating cycle. Requires a Condensate Sensor to be installed.
COOL DOWN DIFFERENTIAL	5 to 110°F (3.0 to 61.0°C) Default: 25°F (14.0°C)	Select the amount of temperature drop on the condensate return sensor below the steam established temperature before starting the next heating cycle. Requires a Condensate Sensor to be installed.
MINIMUM ON TIME	0 to 50 minutes Default: 0 minutes	Select the minimum run time to establish steam if a condensate return sensor is not installed.
AUXILIARY SENSOR	Off, Indoor, Flue Default: Off	Select the type of sensor connected to the auxiliary sensor input. Indoor: Measures ambient room temperature. Flue: Measures the boiler flue vent temperature.
EARLY START	Off or On Default: Off	The control learns the heat up rate of the building and advances the heating before the occupied period. Requires an indoor sensor and schedule.
BOOST	Off or On Default: Off	Select the extra run time after the unoccupied period ends to recover the temperature of the building. Requires a schedule and an indoor sensor is not installed.
BOOST TIME	20 to 480 minutes Default: 120 minutes	Select the maximum Boost extra run time after a unoccupied period. Requires a schedule and an indoor sensor is not installed.
SMART SETBACK	Off or On Default: Off	Select if the scheduled unoccupied period is skipped if the boiler run time percent is more than 85% of the heating cycle.
PRESSURE SENSOR	Off or On Default: Off	Select if a pressure sensor is installed.
PRESSURE TARGET	0.0 to 15.0 psi (0 to 105 kPa) Default: 5.0 psi (35 kPa)	When staging two boilers, select the pressure to turn off the second boiler.
STAGE 2 DIFFERENTIAL	0.1 to 5.0 psi (7 to 35 kPa) Default: 2.0 psi (14 kPa)	When staging two boilers, select the pressure differential to turn on the second boiler.
STAGE DELAY	0.0 to 40.0 minutes Default: 0 minutes	Select the time delay when staging the second boiler.
COMBUSTION AIR DELAY	0 to 360 seconds Default: 0 seconds	Set the time that the combustion air damper is open before turning on the first boiler.
BOILER ROTATION	Off or On Default: Off	Select if equal runtime rotation is used on the boilers.
OUTDOOR SENSOR	Control, Internet Default: Control	Set the source of the outdoor air sensor reading. Internet is only available when connected to the Internet through Ethernet or Wi-Fi.

Settings (5 of 5)

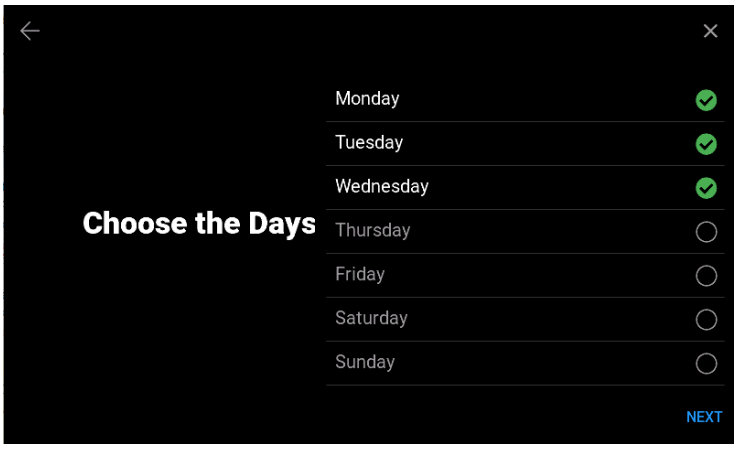
Parameter	Range	Description
	ALERTS	
BOILER PLANT NO HEAT ALERT ENABLE	Off or On Default: Off	Select if an alert is triggered if the condensate return temperature does not increase. Requires a condensate sensor to be installed.
BOILER PLANT NO HEAT ALERT	5.0 to 80.0 minutes Default: 60.0 minutes	Set the amount of time of no temperature change while boilers are firing after which the control triggers a boiler plant no heat alert notification. Requires a condensate sensor to be installed.
HIGH PRESSURE ALERT	0.0 to 15.0 psi (0 to 105 kPa) Default: 15.0 psi (105 kPa)	Set the threshold above which the control triggers a high pressure alert notification.
FLUE TEMPERATURE ALERT	100 to 392°F (38.0 to 200.0°C) Default: 392°F (200.0°C)	Set the threshold above which the control triggers a flue temperature alert notification.
INDOOR TEMPERATURE COLD ALERT ENABLE	Off or On Default: Off	Select if an alert is triggered if the indoor temperature falls below the threshold. Requires an indoor sensor to be installed.
INDOOR TEMPERATURE COLD ALERT	32 to 100°F (0.0 to 38.0°C) Default: 38°F (3.5°C)	Set the threshold below which the control triggers an indoor temperature cold alert notification. Requires an indoor sensor to be installed.
INDOOR TEMPERATURE HOT ALERT ENABLE	Off or On Default: Off	Select if an alert is triggered if the indoor temperature exceeds the threshold. Requires an indoor sensor to be installed.
INDOOR TEMPERATURE HOT ALERT	32 to 100°F (0.0 to 38.0°C) Default: 78°F (25.5°C)	Set the threshold above which the control triggers an indoor temperature hot alert notification. Requires an indoor sensor to be installed.
BOILER 1 SERVICE HOURS ALERT	1000 to 25000 hours Default: 5000 hours	Set the number of boiler running hours above which the control triggers a boiler service alert notification. Available when Boiler 1 is on.
BOILER 1 SERVICE CYCLES ALERT	1 to 25000 cycles Default: 25000 cycles	Set the number of boiler on/off cycles above which the control triggers a boiler service alert notification. Available when Boiler 1 is on.
BOILER 2 SERVICE HOURS ALERT	1000 to 25000 hours Default: 5000 hours	Set the number of boiler running hours above which the control triggers a boiler service alert notification. Available when Boiler 2 is on.
BOILER 2 SERVICE CYCLES ALERT	1 to 25000 cycles Default: 25000 cycles	Set the number of boiler on/off cycles above which the control triggers a boiler service alert notification. Available when Boiler 2 is on.
	SECURITY	
STEP 1	N/A	Set a personal passcode. This is required when a passcode has already been set.
STEP 2	N/A	Confirm the personal passcode. This is required when a passcode has already been set.
REQUIRE PASSCODE	Off or On Default: Off	Select if a passcode is required to enter the Home screen.
PASSCODE	N/A	Select to change the personal passcode. Redirects user to Steps 1 and 2.

Schedule Menu

The control can follow an internal schedule to provide energy savings during unoccupied periods.



When creating a new schedule, choose the days that share the same occupied and unoccupied time periods.

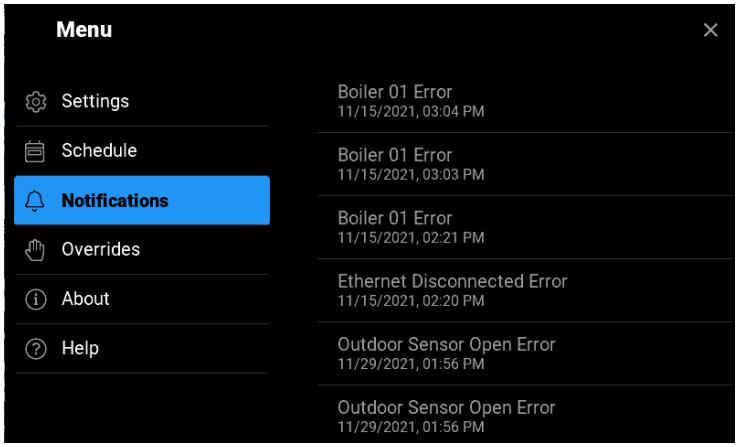


Parameter	Range	Description
OCCUPIED 1 TIME	12:00 am to 12:50 pm (0:00 to 23:50) Default: 6:00 am (6:00)	Set the occupied 1 time. Select “SKIP” to ignore the occupied 1 time event.
UNOCCUPIED 1 TIME	12:00 am to 12:50 pm (0:00 to 23:50) Default: 8:00 am (8:00)	Set the unoccupied 1 time. Select “SKIP” to ignore the unoccupied 1 time event.
OCCUPIED 2 TIME	12:00 am to 12:50 pm (0:00 to 23:50) Default: 6:00 pm (18:00)	Set the occupied 2 time. Select “SKIP” to ignore the occupied 2 time event.
UNOCCUPIED 2 TIME	12:00 am to 12:50 pm (0:00 to 23:50) Default: 10:00 am (22:00)	Set the unoccupied 2 time. Select “SKIP” to ignore the unoccupied 2 time event.

Notifications Menu

The control keeps track of the last 30 errors and alert notifications.

Refer to the Troubleshooting section for corrective action.

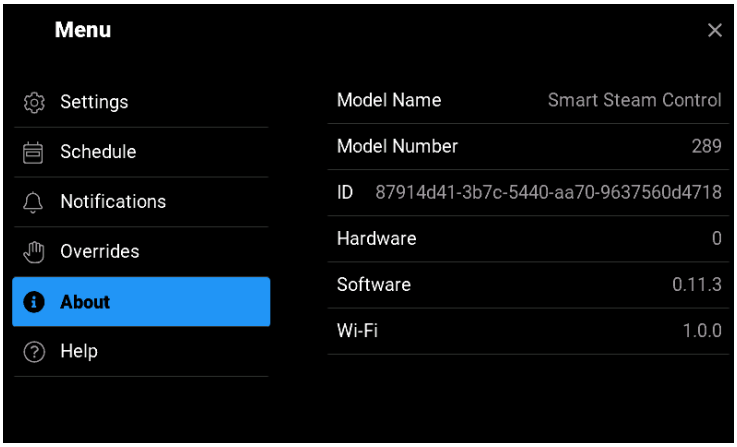


Overrides Menu

Parameter	Range	Description
OPERATION	Automatic, Hand, Max Heat, Off Default: Automatic	Set the manual override. Automatic reverts to normal operation. Hand allows each output to be turned on or set manually. Max Heat operates the heating system at the boiler maximum setting. Off places the control into a standby state and the boilers are not operated.
COMBUSTION AIR DAMPER	Off or On Default: Off	Select to turn on the combustion air damper. Available in Hand override.
BOILER 1 ENABLE	Off or On Default: Off	Set on to fire the boiler. Available in Hand override when Boiler 1 Enable is on. Available in Hand override.
BOILER 2 ENABLE	Off or On Default: Off	Set on to fire the boiler. Available in Hand override when Boiler 2 Enable is on. Available in Hand override.
BOILER MAX HEAT PERCENTAGE	5% to 100% Default: 100%	Select the boiler run time percentage of the heating cycle. Available when set to Max Heat Override.

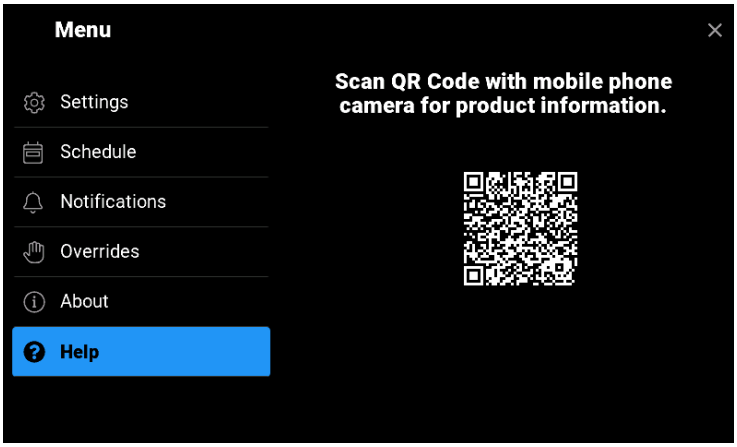
About Menu

The About menu lists all details about the control. This information may be required when contacting tekmar for support.



Help Menu

Scan the QR code with your mobile phone to be directed to the product website to find specifications, manuals, and videos.



Registering to Nexa

Go to the Settings > Internet menu

Connect the control

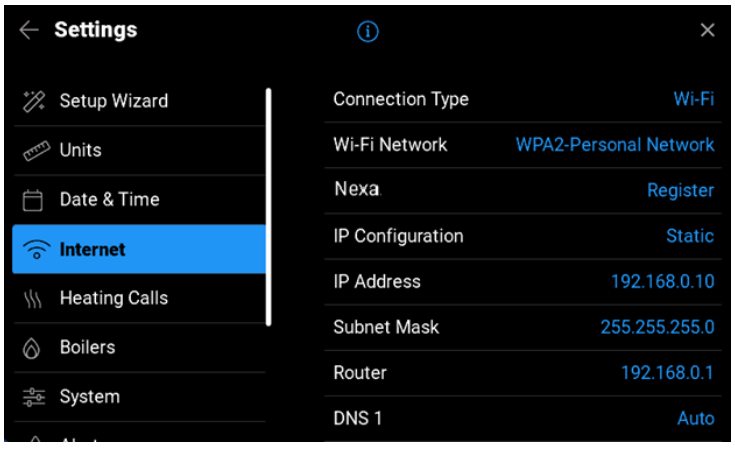
Select Nexa.

The control will display an 8-digit registration code. The code is valid for 30 minutes.

Scan the QR Code.

Or go to https://app.nexaplatform.com/welcome and follow the instructions on the screen to register your device to Nexa.

Nexa is designed to replicate all usability as on the control. For more specific tutorials, go to the help section on the web /mobile app to access more information.



Sequence of Operation

Central Heating Operation

The control operates either one or two steam boilers to heat a building using an Outdoor Reset algorithm to progressively run the steam boiler longer when the outdoor air temperature is colder. In this way the building heat loss is replaced by heat from the boilers.

The central heating operates on a cycle that consists of four phases:

1. Establishing Steam
2. Heat On
3. Heat Off
4. Cool Down

The cycle repeats until the central heating system is shut off when the outdoor air temperature exceeds the Warm Weather Shut Down (WWSD) setting. The Cool Down phase requires the installation of a condensate return sensor and this phase will be skipped when not installed.

Establishing Steam

In steam heating systems, there is a time delay between when the steam boiler or steam valve is turned on and when the steam reaches the furthest radiator in the system. It is important for the control to determine this time delay to ensure proper heating in all rooms. The control uses either a condensate return sensor or a minimum run time to complete the Establishing Steam phase.

Condensate Return Sensor

The best method to determine establishing steam is to measure the condensate return temperature when steam enters the furthest radiator in the building. If possible, install the condensate return sensor on the return pipe of the furthest radiator. Alternatively, the condensate return sensor may be installed in the boiler room. It is important that the Universal Sensor 071 be strapped to the bottom of the return pipe in order to measure the condensate return temperature.

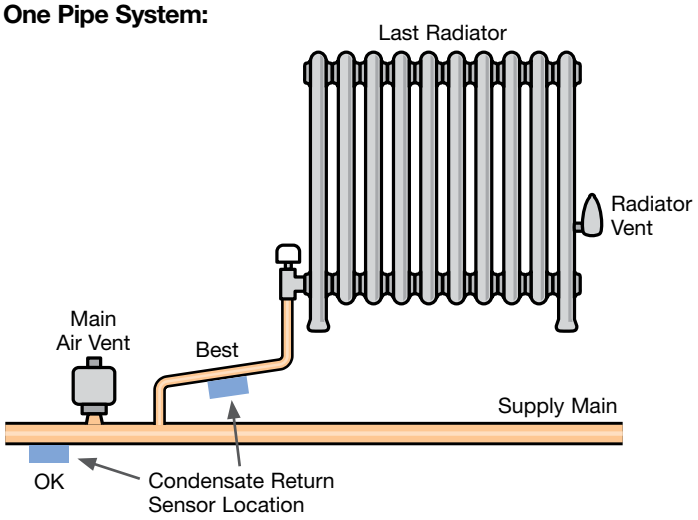
To set the Establishing Steam setting, use the Max Heat Override at 100% output to operate the system. Record the Condensate sensor reading when steam reaches the furthest radiator. Then exit the Max Heat Override, and enter the recorded condensate return temperature into the Establishing Steam setting in the System menu.

Minimum on Time

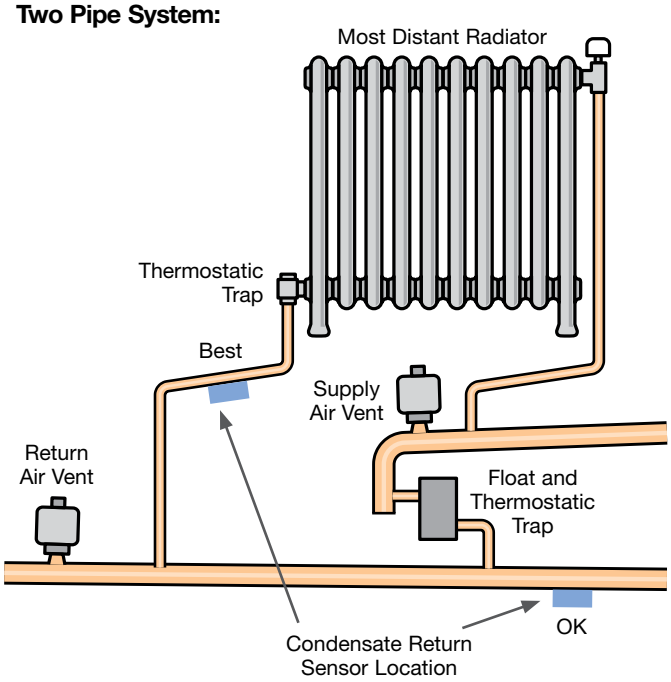
In cases where a condensate return sensor cannot be installed, a Minimum On Time can be set to account for the establishing steam time period. Setting a Minimum On Time for a steam system can be problematic because a system takes more time to reach operating temperature from a cold start than when it is hot from a previous cycle.

To set the Minimum On Time setting, use the Max Heat Override at 100% output to operate the system. At the same time, start a stopwatch timer. Measure the amount of time required for steam to reach the furthest radiator. Then exit the Max Heat Override and enter the recorded time as the Minimum On Time setting in the System menu.

One Pipe System:



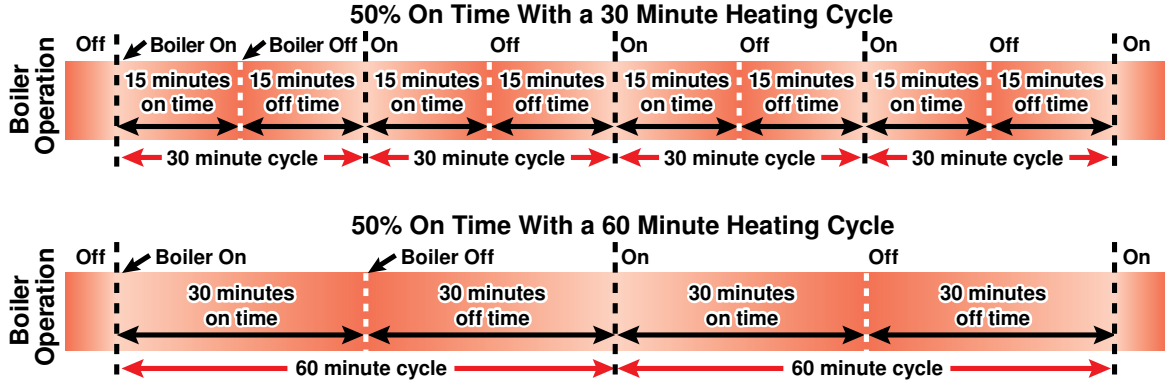
Two Pipe System:



Cycle Length

The Cycle Length determines the amount of time that the system repeats the heating cycle. The factory default is 60 minutes. Depending on the construction and mass of the building, the cycle length can be adjusted either longer or shorter to match the building. A brick building has a high mass and may benefit from a longer cycle length. A wood frame building has a low mass and may benefit from a short cycle length.

When an indoor sensor is installed, the control has the option to automatically change the cycle length to reduce ambient air temperature swing.

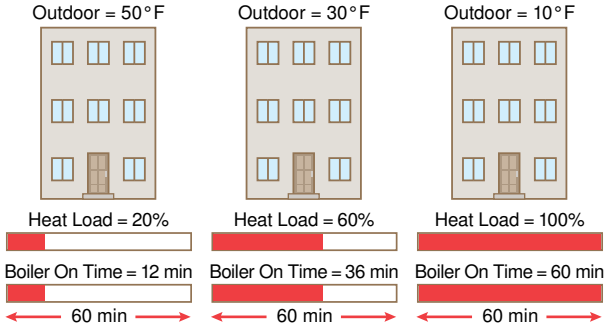


Heating Cycle – Heat On and Heat Off

Outdoor Reset

Outdoor reset is a method of operating a heating system based on the principle that the rate at which a building loses heat to the outdoor environment is mostly dependent on the surrounding outdoor air temperature. As the outdoor temperature gets colder, the heat loss of the building increases at a proportional rate. This relationship between heat loss and colder outdoor temperatures is called a heating curve.

In order to calibrate the control to the heat loss rate of a particular building, the installer is required to enter the following heating curve settings.

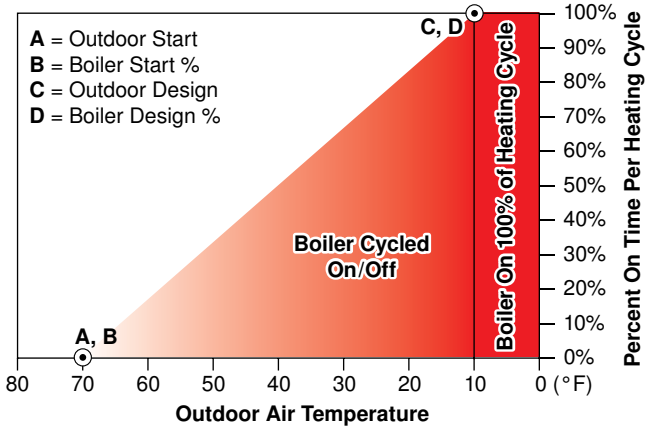


Outdoor Start Temperature

The Outdoor Start temperature sets the starting point of the heating curve. This is typically set to start at 70°F (21°C).

Outdoor Start Percentage

The Outdoor Start Percentage sets the starting point of the heating curve. This is the amount of heating required when the outdoor air temperature is at the Outdoor Start Temperature. This is typically set to operate the boiler at 0% on time.



Outdoor Design

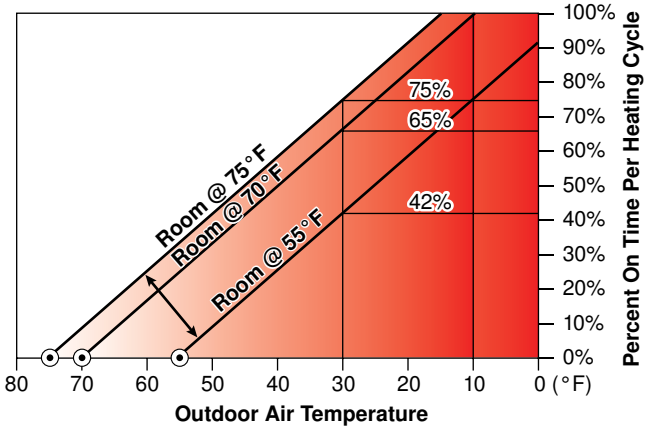
The Outdoor Design sets the end point of the heating curve. The Outdoor Design should be set to the average coldest annual temperature recorded in the building area. When the measured outdoor air temperature matches the Outdoor Design setting, the control calculates the boiler on time to be at the Boiler Design % setting.

Boiler Design Percentage

The Boiler Design Percentage is the percent output capacity of the boiler or steam system required to heat the building when the measured outdoor air temperature matches the Outdoor Design setting. The factory default is 100%. If the building envelope has been upgraded to improve the building insulation, the existing steam boiler or steam system may be oversized for the building. In these cases, the Boiler Design Percentage can be reduced to fine tune the heating curve.

Room Occupied and Unoccupied

The Room setting is the desired temperature of the building. When a programmable schedule is used, there are both Room Occupied and Room Unoccupied settings available. When the programmable schedule is turned off, only the Room Occupied setting is available.



Indoor Sensor

Installation of an optional Indoor Sensor will provide better temperature control compared to no indoor sensor installations. When installed, the control automatically adjusts the heating curve up or down to so that the ambient air temperature reaches the Room Target. If the ambient temperature exceeds the Room Target by 1°F (0.5°C), the control sets the Heat On time to zero and turns off the steam boilers.

Indoor Sensor Options

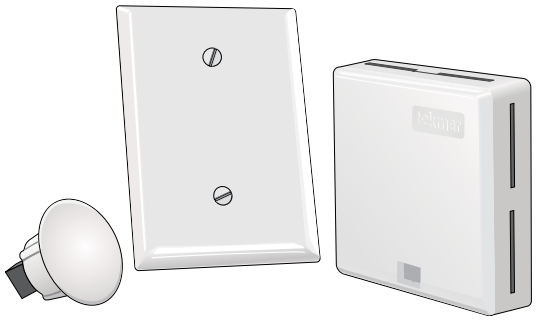
The control is compatible with indoor sensor models 076, 077 and 084.

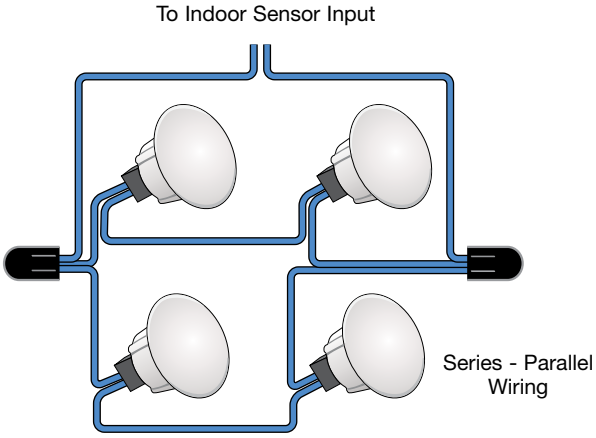
The temperature accuracy within the building can be improved by installing a square number (4, 9, 16, 25) of sensors wired in series-parallel to the auxiliary sensor input.

Indoor Sensor Not Installed

When an indoor sensor is not connected to the control, the Room setting operates as a parallel shift of the heating curve. This allows fine tuning of the heating system. If the Room setting is set above the Indoor Design setting, the entire heating curve is shifted higher, resulting in longer heat on times being calculated. Similarly, if the Room setting is set below the Indoor Design setting, the entire heating curve is shifted lower, resulting in shorter heat on times being calculated.

Indoor Sensors 084, 077 and 076

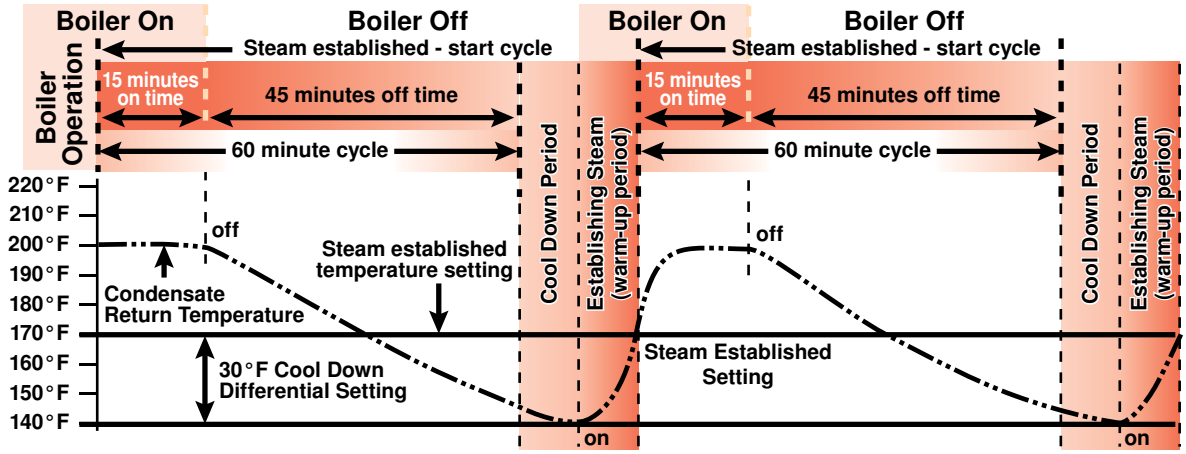




Cool Down

The Cool Down phase increases the efficiency of the system by allowing the latent heat of the steam remaining in the radiators to condense to water and radiate heat into the rooms after the burner is shut off. Once the radiators have cooled down, the control is ready to start the next heating cycle. The Cool Down feature requires the installation of a condensate return sensor.

To set the Cool Down Differential setting, it is recommended to start at 25°F (14.0°C) and make adjustments up or down based upon the system performance. If the building tends to overheat, increase the Cool Down Differential. If the building tends to underheat, then decrease the Cool Down Differential.



Warm Weather Shut Down (WWSD)

The Warm Weather Shut Down (WWSD) feature automatically shuts off the central heating system to provide energy savings based upon the outdoor air temperature. When using a programmable schedule, there are WWSD thresholds for both the occupied and unoccupied time periods. The WWSD goes into effect when the outdoor air temperature exceeds the WWSD by 1°F (0.5°C) and resumes central heating when the outdoor air temperature falls 1°F (0.5°C). below the WWSD.

Time and Date

The control includes a time and date clock. The time can be set to either 12 or 24-hour time format and can be set to automatically adjust for daylight savings time.

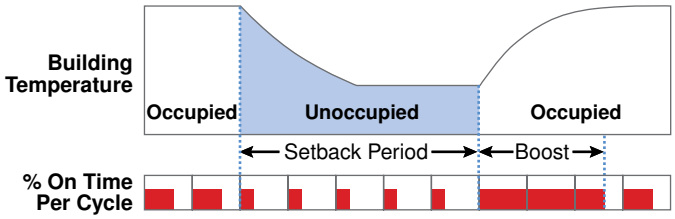
When manually set, the time is backed up for a minimum of 4 hours in the event of a power interruption. When connected to the Internet, the time clock can be set to automatically set the time and date based upon the time zone.

Schedule

Boost

The boost feature is available when an indoor sensor is not installed, and a programmable schedule is in use.

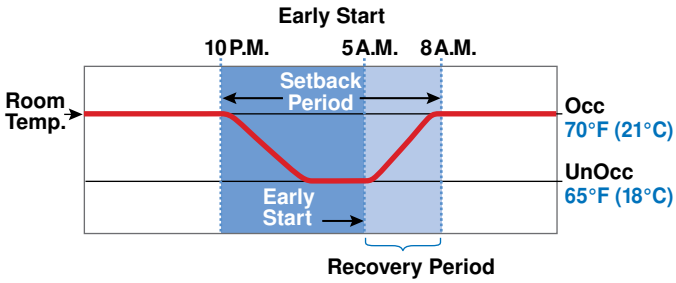
When a programmable schedule is used to lower the building temperature at night, there is a time delay to increase the building temperature from the Unoccupied to Occupied temperature. The control shortens the recovery time by determining how long the steam boiler needs to operate at 100% on time of a heating cycle and the boost can continue through multiple heating cycles. The length of the boost is determined by the temperature difference between Occupied and Unoccupied and the duration of the unoccupied time period. The Boost setting allows the installer to set the maximum amount of time that Boost can remain in effect. Boost is shown on the system inputs screen while boost is in effect.



Early Start

The Early Start feature is available when an indoor sensor is installed, and a programmable schedule is in use.

When a programmable schedule is used to lower the building temperature at night, there is a time delay to increase the building temperature from the Unoccupied to the Occupied temperature. When early start is on, the control uses the indoor sensor to learn the heat up rate of the building. The control can then accurately predict when the control should increase the heating cycle on time so that the building reaches the Occupied temperature at the scheduled time. Early Start is shown in the system inputs screen while early start is in effect.



Smart Setback

When the heating cycle reaches 85% on time, the Smart Setback feature prevents the programmable schedule Unoccupied period from going into effect to avoid long recovery times. If the control is already using unoccupied setpoints and the outdoor temperature drops so that the heating cycle on time exceeds 85%, the control will switch to using the occupied setpoints.

When Smart Setback is off, the control continues to operate on the occupied/unoccupied programmable schedule, regardless of the heating cycle on time.

Domestic Hot Water Operation

The control is compatible with boilers that include a domestic hot water tankless coil. When the aquastat on the DHW tankless calls for heat, the control fires boiler 1. Boiler 2 is not operated for DHW calls. When a programmable schedule is used, the DHW Unoccupied setting selects whether to respond to DHW calls for heat.

Combustion Air Damper Operation

Combustion Air Damper

The combustion air damper relay closes when a heating cycle is started or a DHW call is received and the control has determined that one or more boilers need to be turned on.

Combustion Air Delay

The control waits until the combustion air damper delay elapses before staging on any boilers.

Combustion Air Post Purge

There is a fixed 15 second post purge of the Combustion Air Damper relay after the last boiler has turned off.

Boiler Operation

Boiler Available

Select the boiler available to On to allow the boiler to be part of the staging sequence. Select Off if the boiler is being serviced or that boiler output is not used.

Boiler Fuel

Select the type of fuel used by the boiler.

Fire Delay

The Fire Delay is the ignition delay time of the boiler, from when the boiler enable contact is closed until when a flame is established. The Fire Delay can be found in the boiler manual or can be timed with a watch.

Boiler High Output

The control tracks the approximate amount of energy used. The maximum boiler output is entered in units of MBTU/hr. 1 MBTU / hr = 1,000 Btu per hour. The range is from 10 to 9990 MBTU/hr.

Single Boiler Operation

The control turns on boiler 1 whenever in the Establishing Steam or Heat On phases of a heating cycle or when there is a DHW call.

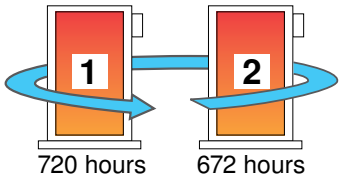
Two Boiler Operation

The lead boiler turns on whenever in the Establishing Steam or Heat On phases of a heating. The lag boiler operates based upon the system steam pressure. The lag boiler:

- Turns on when the pressure falls the Stage 2 Differential below the Pressure Target and the Stage Delay elapses
- Turns off when the pressure reaches the Pressure Target

Rotation

The Rotate feature changes the firing order of the boilers whenever one boiler accumulates 48 hours more run time than any other boiler. After each rotation, the boiler with the least running hours is the first to fire and the boiler with the most running hours is the last to fire. This function ensures that the boilers receive equal amounts of use. When Rotation is Off, the firing sequence always begins with boiler 1.



Troubleshooting

It is recommended to complete all wiring to ensure trouble-free operation. Should an error occur, simply follow these steps:

1. **Find:** If a banner is on the screen, it indicates a problem on the system.
2. **Identify:** Press the ☰ icon on the top right corner to enter the menus and press notifications. The latest error notification will appear at the top of the list.
3. **Solve:** The notification description provides the instructions on the corrective action required to clear the error.

Errors and Alerts (1 of 3)

Error or Alert Title	Description
Control Memory Error	A memory error has been detected. The control will not operate the boilers until all settings have been reviewed. You may also reload factory defaults and use the Setup Wizard to configure the control. If the memory error keeps recurring after a power outage, the control may require replacement. Consult technical support for assistance.
Outdoor Sensor Short Error	A short circuit is detected on the outdoor air temperature sensor input. The control operates the central heating system at the boiler design temperature until this fault is corrected. To correct, remove the wires from the outdoor air sensor terminals, then use an electrical multimeter to measure the resistance. The resistance should be proportional to the temperature lookup table in the Installation and Operation Manual. If the resistance is short circuit, check the wires for damage. If the wires are OK, then replace the Outdoor Sensor 070. Once the fault is corrected, the error clears automatically.
Outdoor Sensor Open Error	An open circuit is detected on the outdoor air temperature sensor input. The control operates the central heating system at the boiler design temperature until this fault is corrected. To correct, remove the wires from the outdoor air sensor terminals, then use an electrical multimeter to measure the resistance. The resistance should be proportional to the temperature lookup table in the Installation and Operation Manual. If the resistance is open circuit, check the wires for loose wiring connections. If the wires are OK, then replace the Outdoor Sensor 070. Once the fault is corrected, the error clears automatically.
Condensate Sensor Short Error	A short circuit is detected on the condensate return temperature sensor input. As a result, the control does not operate the establishing steam or cool down periods. To correct, remove the wires from the condensate return sensor terminals, then use an electrical multimeter to measure the resistance. The resistance should be proportional to the temperature lookup table in the Installation and Operation Manual. Check the wires for damage. If the wires are OK, then replace the Universal Sensor 071. Once the fault is corrected, the error clears automatically.
Condensate Sensor Open Error	An open circuit is detected on the condensate return temperature sensor input. As a result, the control does not operate the establishing steam or cool down periods. The condensate sensor is optional, and the setting may be incorrectly turned on. Check if a sensor is installed. If not installed, set Condensate Sensor to off. If installed, remove the wires from the condensate return sensor terminals, then use an electrical multimeter to measure the resistance. The resistance should be proportional to the temperature lookup table in the Installation and Operation Manual. If the resistance is open circuit, check the wires for loose wiring connections. If the wires are OK, then replace the Universal Sensor 071. Once the fault is corrected, the error clears automatically.
Indoor Sensor Short Error	A short circuit is detected with the indoor sensor on the Aux sensor input. To correct, remove the wires from the Aux sensor terminals, then use an electrical multimeter to measure the resistance. The resistance should be proportional to the temperature lookup table in the Installation and Operation Manual. Check the wires for damage. If the wires are OK, then replace the Indoor Sensor 076, 077, or 084. Once the fault is corrected, the error clears automatically.

Errors and Alerts (2 of 3)

Error or Alert Title	Description
Indoor Sensor Open Error	An open circuit is detected with the indoor sensor on the Aux sensor input. The indoor sensor is optional, and the setting may be incorrectly turned on. Check if a sensor is installed. If not installed, set Auxiliary Sensor to off. If installed, remove the wires from the Aux sensor terminals, then use an electrical multimeter to measure the resistance. The resistance should be proportional to the temperature lookup table in the Installation and Operation Manual. If the resistance is open circuit, check the wires for loose wiring connections. If the wires are OK, then replace the Indoor Sensor 076, 077 or 084. Once the fault is corrected, the error clears automatically.
Flue Sensor Short Error	A short circuit is detected with the flue sensor connected to the Aux sensor input. To correct, remove the wires from the Aux sensor terminals, then use an electrical multimeter to measure the resistance. The resistance should be proportional to the temperature lookup table in the Installation and Operation Manual. Check the wires for damage. If the wires are OK, then replace the Boiler Flue Sensor 069. Once the fault is corrected, the error clears automatically.
Flue Sensor Open Error	An open circuit is detected with the flue sensor on the Aux sensor input. The flue sensor is optional, and the setting may be incorrectly turned on. Check if a sensor is installed. If not installed, set Auxiliary Sensor to off. If installed, remove the wires from the Aux sensor terminals, then use an electrical multimeter to measure the resistance. The resistance should be proportional to the temperature lookup table in the Installation and Operation Manual. If the resistance is open circuit, check the wires for loose wiring connections. If the wires are OK, then replace the Boiler Flue Sensor 069. Once the fault is corrected, the error clears automatically.
Pressure Sensor Short Circuit Error	A short circuit is detected on the pressure sensor input. The control continues to operate normally but is unable to detect pressure changes. Inspect the pressure sensor wires for damage. If the wires are OK, use an electrical meter to measure the DC voltage between the pressure sensor Ref and Gnd terminals. This should measure 5.0 V(dc). Then check the voltage between pressure sensor In and Gnd. This voltage should measure 0.5 to 4.5 V(dc) depending on the system pressure. If either voltage reading is abnormal then replace the Pressure Sensor 089. Once the fault is corrected, the error clears automatically.
Pressure Sensor Open Circuit Error	An open circuit is detected on the pressure sensor input. The control continues to operate normally but is unable to detect pressure changes. If a pressure sensor is not installed, set the Pressure Sensor setting in the System menu to Off. If a pressure sensor is installed, inspect the wires for loose connections. If the wires are OK, use an electrical meter to measure the DC voltage between the pressure sensor Ref and Gnd terminals. This should measure 5.0 V(dc). Then check the voltage between pressure sensor In and Gnd. This voltage should measure 0.5 to 4.5 V(dc) depending on the system pressure. If either voltage reading is abnormal then replace the Pressure Sensor 089. Once the fault is corrected, the error clears automatically.
Boiler Plant No Heat Alert	The condensate return temperature did not increase within the boiler alert time. There is likely a mechanical failure with either a boiler or air vent that requires immediate attention. The control operates normally while this alert is present. To reset the alert, press the 'X' button to dismiss the error message on the home screen.
High Pressure Alert	The system pressure exceeded the High Pressure Alert threshold. There may be a problem with the boiler pressure or air vents. The control operates normally while this alert is present. The alert clears when the pressure falls 1 psi (7 kPa) below the High Pressure Alert threshold.
Flue Temperature Alert	The flue temperature has exceeded the Flue Temperature Alert temperature. The alert clears automatically once the vent temperature drops 10°F (5.5°C) below the Flue Temperature Alert threshold.
Indoor Temperature Cold Alert	The indoor temperature is below the Indoor Temperature Cold Alert threshold. This may indicate a problem with the heating system. The alert will automatically clear when the indoor temperature is 1°F (0.5°C) above the threshold.
Indoor Temperature Hot Alert	The indoor temperature has exceeded the Indoor Temperature Hot Alert threshold. This may indicate a problem with the heating system and the boilers are shut off. The alert will automatically clear when the indoor temperature is 1°F (0.5°C) below the threshold.
Boiler 1 Service Hours Alert	The boiler run time has exceeded the recommended boiler service hours alert interval. Once maintenance has been completed, the service interval can be reset in the boiler status screen.

Errors and Alerts (3 of 3)

Error or Alert Title	Description
Boiler 2 Service Hours Alert	The boiler run time has exceeded the recommended boiler service hours alert interval. Once maintenance has been completed, the service interval can be reset in the boiler status screen.
Boiler 1 Service Cycles Alert	The boiler has exceeded the recommended boiler service cycles. Once maintenance has been completed, the service interval can be reset in the boiler status screen.
Boiler 2 Service Cycles Alert	The boiler has exceeded the recommended boiler service cycles. Once maintenance has been completed, the service interval can be reset in the boiler status screen.
Internet Outdoor Sensor Error	The control has not received an outdoor temperature report from the Internet. Please check that your Router is not blocking Port 443. Please contact an IT professional if assistance is required.
Wi-Fi Disconnected Error	The Wi-Fi network could not be found. Please check that the Wi-Fi network name was entered correctly and that the Router signal is medium to high strength. If necessary, please reconfigure your Wi-Fi network.
Hardware Fault	An internal hardware fault has been detected. Please power the control off then back on. If the hardware fault reoccurs, the control may require replacement. Please contact technical support for assistance.
Internet Unavailable Error	The control is unable to communicate to the Watts cloud through the Internet. The error will automatically clear once Internet communications are established. You may also set the Internet Connection Type to Off to clear the error. To correct: 1. Check the control's Internet DNS 1 and DNS 2 settings 2. Check that the router firewall is not blocking or filtering MAC addresses 3. Check that the router firewall is not blocking outbound port 53
Nexa Error	The control is unable to connect to Nexa. Please check that your router is not blocking outbound ports 443 or 8883. Please contact an IT professional for assistance.
Ethernet Disconnected Error	The Ethernet is not connected to a network. Check the Ethernet cable connection to the control and the Router or Switch. Check that the Router or Switch is powered on and operating correctly.
Wi-Fi Invalid Password Error	The Wi-Fi Password was not accepted. Please check that the password was entered correctly. If necessary, please reconfigure your Wi-Fi network.
DHCP Address Error	The router has not assigned the control an IP address. Please check the router's configuration settings and ensure that the DHCP server is enabled and enough IP addresses are available. Please contact an IT professional for assistance.

Notes

Technical Data

Smart Steam Control 289	
Literature	Submittal, Application, Installation and Operating Manual, Job Record
Packaged weight	3.3 lb. (1500 g)
Dimensions	9" H x 8" W x 2 1/16" D (229 x 203 x 60 mm)
Display	5" color touchscreen
Enclosure	Blue ABS plastic, NEMA type 1
Approvals	CSA C US, meets FCC Part 15B, ICES-003 Class A
Ambient conditions	Indoor use only, 32 to 122°F (0 to 50°C), < 90% RH non-condensing, Altitude < 6560 feet (2000 m), Installation Category II, Pollution Degree 2
Power supply	115 V (ac) ±10%, 60 Hz, 4 W
Relays	230 V (ac), 5 A, 1/3 hp
Calls	24 V (ac) or Short
Sensors	NTC thermistor, 10 kΩ @ 77°F (25°C ±0.2°C) ß=3892
–Included	Outdoor Sensor 070, Universal Sensor 071
–Optional	tekmar type: 069, 082, 076, 077, 084, 087, 089
Communications	10/100 Ethernet, WiFi 802.11n, 2.4 GHz, WPA2 encryption

Limited Warranty and Product Return Procedure

Limited Warranty ***The liability of tekmar under this warranty is limited. The Purchaser, by taking receipt of any tekmar product ("Product"), acknowledges the terms of the Limited Warranty in effect at the time of such Product sale & acknowledges that it has read & understands same.***

The tekmar Limited Warranty to the Purchaser on the Products sold hereunder is a manufacturer's pass-through warranty which the Purchaser is authorized to pass through to its customers. Under the Limited Warranty, each tekmar Product is warranted against defects in workmanship & materials if the Product is installed & used in compliance with tekmar's instructions, ordinary wear & tear excepted. The pass-through warranty period is for a period of twenty-four (24) months from the production date if the Product is not installed during that period, or twelve (12) months from the documented date of installation if installed within twenty-four (24) months from the production date.

The liability of tekmar under the Limited Warranty shall be limited to, at tekmar's sole discretion: the cost of parts & labor provided by tekmar to repair defects in materials &/or workmanship of the defective product; or to the exchange of the defective product for a warranty replacement product; or to the granting of credit limited to the original cost of the defective product, & such repair, exchange or credit shall be the sole remedy available from tekmar, &, without limiting the foregoing in any way, tekmar is not responsible, in contract, tort or strict product liability, for any other losses, costs, expenses, inconveniences, or damages, whether direct, indirect, special, secondary, incidental or consequential, arising from ownership or use of the product, or from defects in workmanship or materials, including any liability for fundamental breach of contract.

The pass-through Limited Warranty applies only to those defective Products returned to tekmar during the warranty period. This Limited Warranty does not cover the cost of the parts or labor to remove or transport the defective Product, or to reinstall the repaired or replacement Product, all such costs & expenses being subject to Purchaser's agreement & warranty with its customers.

Any representations or warranties about the Products made by Purchaser to its customers which are different from or in excess of the tekmar Limited Warranty are the Purchaser's sole responsibility & obligation. Purchaser shall indemnify & hold tekmar harmless from & against any & all claims, liabilities & damages of any kind or nature which arise out of or are related to any such representations or warranties by Purchaser to its customers.

The pass-through Limited Warranty does not apply if the returned Product has been damaged by negligence by persons other than tekmar, accident, fire, Act of God, abuse or misuse; or has been damaged by modifications, alterations or attachments made subsequent to purchase which have not been authorized by tekmar; or if the Product was not installed in compliance with tekmar's instructions &/or the local codes & ordinances; or if due to defective installation of the Product; or if the Product was not used in compliance with tekmar's instructions.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, WHICH THE GOVERNING LAW ALLOWS PARTIES TO CONTRACTUALLY EXCLUDE, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY & FITNESS FOR A PARTICULAR PURPOSE, DURABILITY OR DESCRIPTION OF THE PRODUCT, ITS NON-INFRINGEMENT OF ANY RELEVANT PATENTS OR TRADEMARKS, & ITS COMPLIANCE WITH OR NON-VIOLATION OF ANY APPLICABLE ENVIRONMENTAL, HEALTH OR SAFETY LEGISLATION; THE TERM OF ANY OTHER WARRANTY NOT HEREBY CONTRACTUALLY EXCLUDED IS LIMITED SUCH THAT IT SHALL NOT EXTEND BEYOND TWENTY-FOUR (24) MONTHS FROM THE PRODUCTION DATE, TO THE EXTENT THAT SUCH LIMITATION IS ALLOWED BY THE GOVERNING LAW.

Product Warranty Return Procedure All Products that are believed to have defects in workmanship or materials must be returned, together with a written description of the defect, to the tekmar Representative assigned to the territory in which such Product is located. If tekmar receives an inquiry from someone other than a tekmar Representative, including an inquiry from Purchaser (if not a tekmar Representative) or Purchaser's customers, regarding a potential warranty claim, tekmar's sole obligation shall be to provide the address & other contact information regarding the appropriate Representative.