

Technical Instruction Document

AM Boiler + Tekmar 294 Instructions

Supplemental Documents for AM Boiler
and Tekmar 294 instructions:

- Instruction No. 62403818 - AM Series IOM Manual Space Heating/Closed Loop Applications (included with AM Boiler)
- IOM-T-294 - Installation, Operation and Maintenance Manual for Smart Boiler Control 294 (included with Tekmar 294)



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SECTION 1: INTRODUCTION

The **Tekmar Smart Boiler Control 294** controls up to four (4) **AM Series** Boilers. This document provides instructions for installation and operation of **AM Boiler** with the **Tekmar 294**.

For additional information and instructions please also consult:

- Instruction No. 62403818 - AM Series IOM Manual Space Heating/Closed Loop Applications (included with AM Boiler);
- IOM-T-294 - Installation, Operation and Maintenance Manual for Smart Boiler Control 294 (included with Tekmar 294).



Figure 1-1: Tekmar Smart Boiler Control 294

Part Number 64207 is comprised of:

- Tekmar Smart Boiler Control 294
- TID-0243 (AM Boiler + Tekmar 294 Instructions)

WARNING: Installer: Read the manual for the appliance(s), including this manual, before installing. Perform steps in the order given.

User: This manual is for use only by a qualified heating installer. Failure to comply with these provisions can lead to a dangerous situation and/or damage to property and equipment.

Installation and Alterations: Only a Qualified installer must carry out the installation and calibration of the appliance(s).

WARNING: Prior to appliance installation and/or maintenance, disconnect the appliance's electrical power supply and shut off the inlet gas valve. Failure to follow these instructions could result in severe personal injury or death.

SECTION 2: INSTALLATION

2.1 Piping Installation

NOTE: Figure 2-1 shows only one possible piping configuration example. Contact AERCO technical support for information concerning alternative configurations.

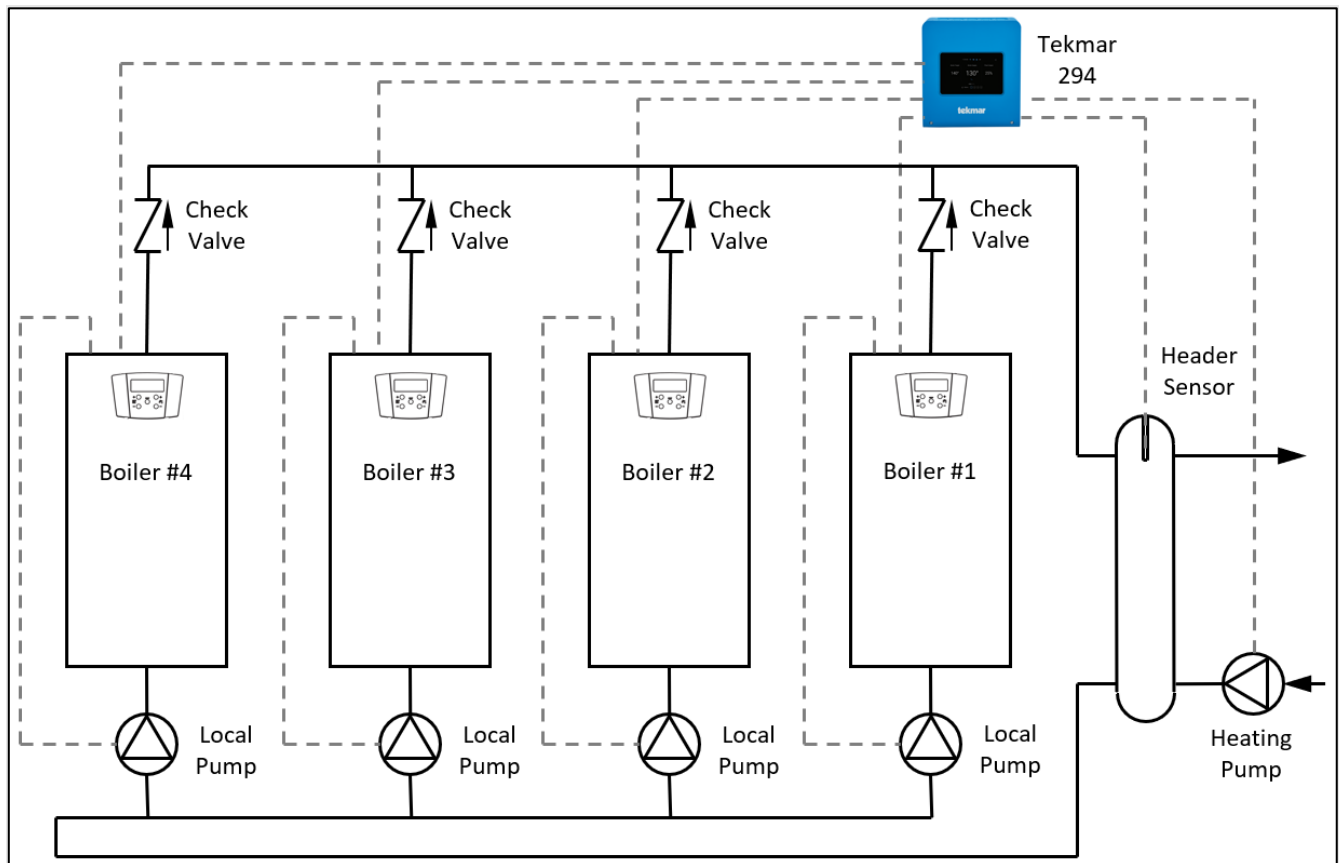


Figure 2-1: AM Boiler Piping Installation

2.2 Electrical Installation

The Header Sensor and Outdoor Air Sensor are inside the Tekmar 294 carton. The header sensor must be placed into the low loss header (see Figure 2-1). When utilizing outdoor reset controls, the outdoor air sensor should be mounted on the North side of the building, shielded from direct sunlight, and away from air intakes or outlets from the building.

Access the AM Boiler electrical junction box as shown in Figure 2-2. Use 18 AWG conductor wire to connect sensor wiring to the Tekmar 294. Installer must install all wires represented by dashed lines in Figure 2-3. The wiring connections shown are for AM Boiler space heating applications operated with the Tekmar 294. For further information and optional wiring connections for the AM Boiler and Tekmar 294, consult Instruction No. 62403818 - AM Series IOM Manual Space Heating/Closed Loop Applications (included with AM Boiler) and IOM-T-294 - Installation, Operation and Maintenance Manual for Smart Boiler Control 294 (included with Tekmar 294).

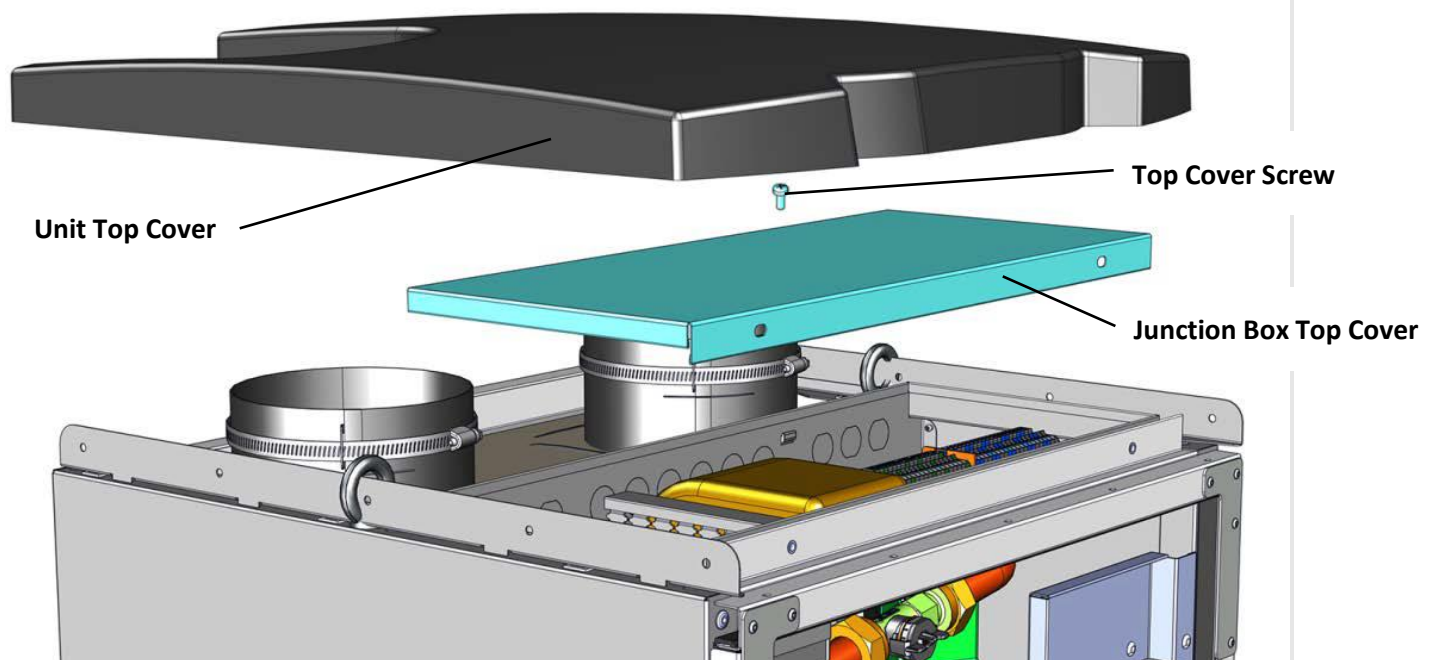


Figure 2-2: Accessing the Junction Box of the AM Boiler

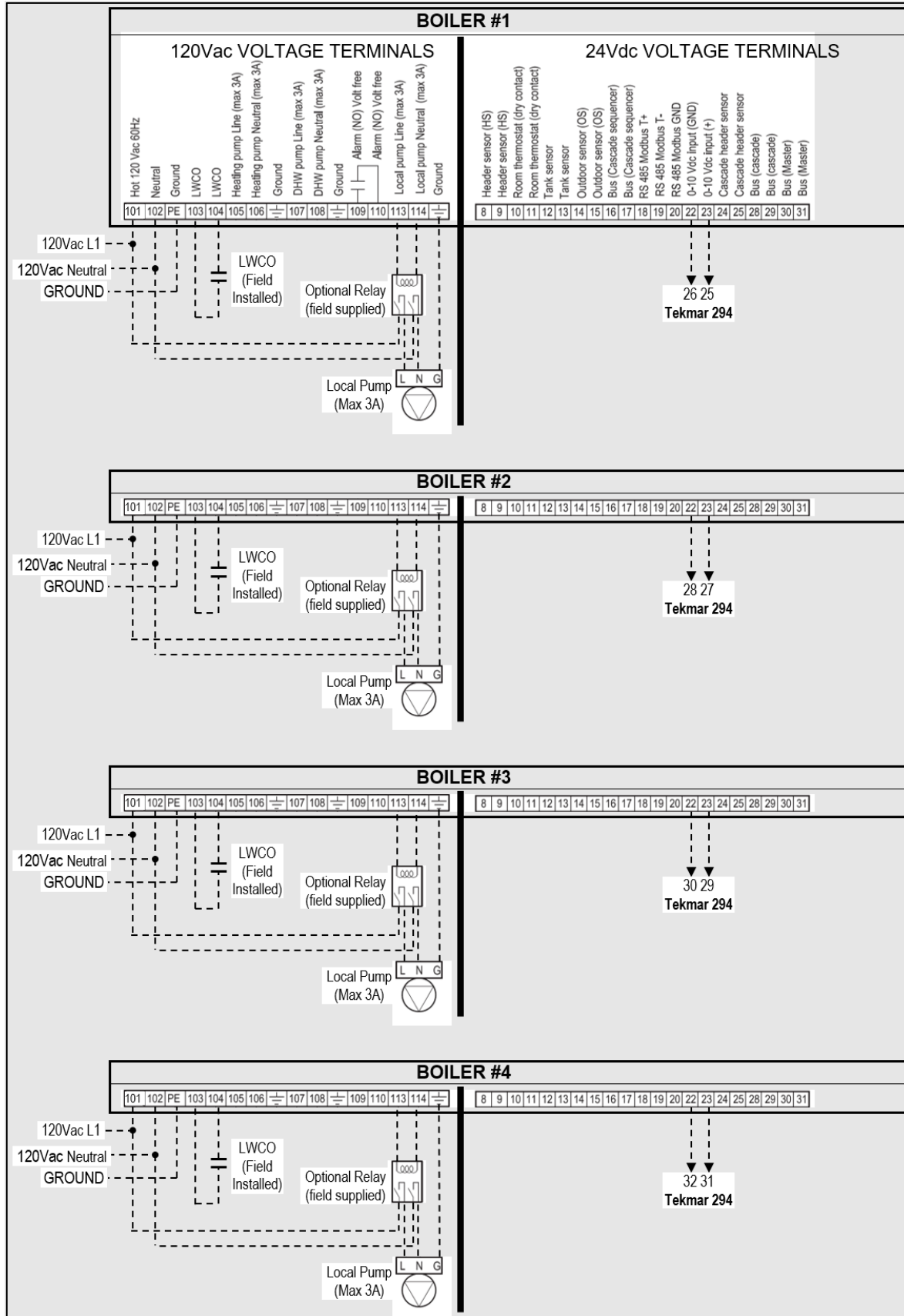


Figure 2-3: AM Boiler and Tekmar 294 Electrical Wiring

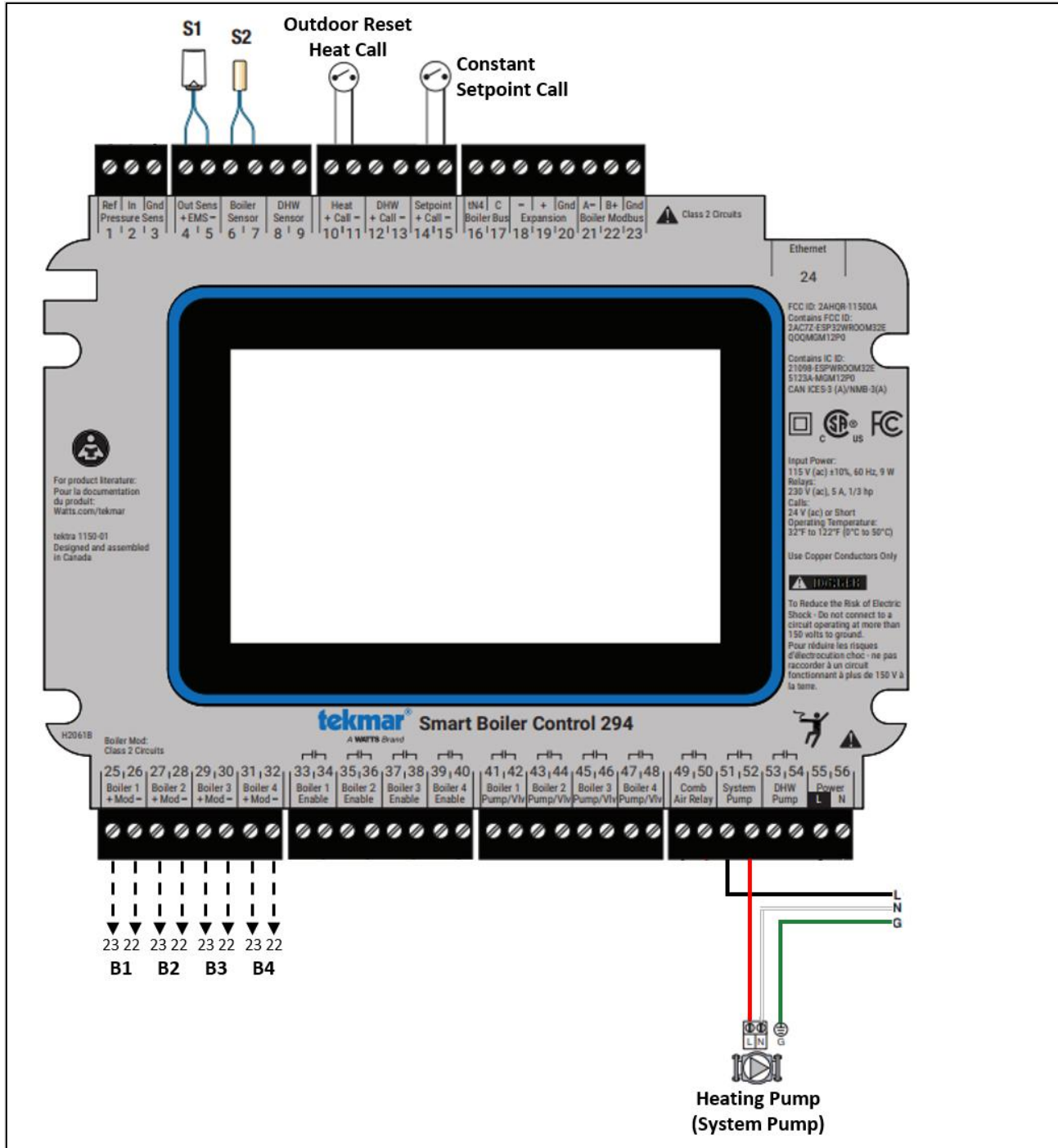


Figure 2-4: Tekmar 294 Wiring Diagram
 (See Next Page for Legend)

Legend

S1: Outdoor Air Sensor

S2: Header Sensor

Terminals 10 and 11: Jump these terminals when using Outdoor Reset function (referred to as Central Heating in the Tekmar 294 Heating Calls Menu)

Terminals 14 and 15: Jump these terminals when using Constant Setpoint function (referred to as Constant Setpoint in the Tekmar 294 Heating Calls Menu)

Terminals 25 to 32: The Tekmar 294 provides a 0-10 V (dc) output to each boiler. Observe polarity.

- Connect control Mod (+) terminals 25, 27, 29, 31 to boilers 1, 2, 3 and 4 analog signal input (+) respectively.
- Connect control Mod (-) terminals 26, 28, 30, 32 to boilers 1, 2, 3 and 4 analog signal input (-) respectively.

Terminals 51 and 52: A system pump requiring up to 230 V (ac) 5 A, 1/3 hp can be switched through terminals 51 and 52. For simplicity in wiring and troubleshooting, a separate breaker for each pump is recommended.

- Connect the power source line wire (L) to terminal 51.
- Connect a wire from terminal 52 to the pump Line terminal.
- Connect a wire from the pump Neutral (N) back to the power source neutral.
- Ensure the system pump is connected to earth ground.

Terminals 55 and 56: Provide a 15 Amp circuit for the input power.

- Connect the 115 V (ac) line wire (L) to terminal 55.
- Connect the neutral wire (N) to terminal 56.

SECTION 3: OPERATION

NOTE: Operation of the AM Boilers and the Tekmar 294 requires basic knowledge of navigating through the menus of each device. For additional information and detailed instructions for the AM Boiler and Tekmar 294, consult the following manuals:

Instruction No. 62403818 - AM Series IOM Manual Space Heating/Closed Loop Applications (included with AM Boiler)

IOM-T-294 - Installation, Operation and Maintenance Manual for Smart Boiler Control 294 (included with Tekmar 294)

The Tekmar 294 operates the AM Boilers via remote setpoint. It determines a header setpoint (programmed as a constant setpoint or calculated from indoor/outdoor reset curve) and sends a 0-10V analog signal to the AM boilers. The AM boilers interpret the signal as an internal setpoint. The AM boiler's algorithm will manage the firing rate of the individual modules and maintain a steady boiler outlet temperature.

Set the following parameters for the AM Boilers and Tekmar 294 as shown in Tables 1 and 2.

Table 1: AM Boiler Parameters

AM Boiler Parameter	Setting	Note
2003-CH Mode	4 (CH with 0-10Vcc input) - See note in next column before setting this parameter	Before changing 2003 from 0 to 4, put the constant setpoint of the boiler to 89F (i.e., same value as 3018). This assigns a setpoint of 89F when the Tekmar 294 sends a 0V signal
3017-Maximum CH setpoint	179F (default)	Same value as Tekmar 294 parameter in its Boiler Menu: EMS Temperature Maximum
3018-Minimum CH setpoint	89F (default)	Same value as Tekmar 294 parameter in its Boiler Menu: EMS Temperature Minimum

Table 2: Tekmar 294 Parameters

Tekmar 294 Parameter	Setting	Note
Systems Menu: Boiler Minimum	78F	
Systems Menu: Boiler Maximum	180F	
Systems Menu: Condensing Group Sequencing	Parallel	
Boilers Menu: Boiler Type	Modulating Target Temp	
Boilers Menu: Fire Delay	10 seconds	
Boilers Menu: Modulation Type	0-10 V((dc)	
Boilers Menu: EMS Temperature Maximum	179F	Same value as AM Boiler parameter: 3017-Maximum CH setpoint
Boilers Menu: EMS Temperature Maximum	89F	Same value as AM Boiler parameter: 3018-Minimum CH setpoint
Boilers Menu: EMS Temperature Maximum	1V (default)	This matches the lowest analog signal on the AM Boiler analog input algorithm

Operate the Tekmar 294 using one of the following heat calls for space heating applications:

Constant Setpoint

In this operating mode, the Tekmar 294 will maintain a constant header temperature. This is set through parameter **Constant Setpoint Target** in the Heating Calls > Constant Setpoint menu. The Tekmar 294 displays this header setpoint as "Boiler Target" on the home screen and sends a 0-10V analog signal to the AM Boilers.

Central Heating (outdoor air reset)

This operating mode is outdoor air reset using an outdoor air sensor. The heating curve is generated by the following four points (parameters) in the Heating Calls > Central Heating menu.

- **Boiler Start Temperature** - minimum boiler supply water temp (header setpoint) for the heating curve.
- **Outdoor Start Temperature** - maximum outside air temperature for the heating curve.
- **Outdoor Design Temperature** – minimum outside air temperature for the heating curve
- **Boiler Design Temperature** – maximum boiler supply water temperature (header setpoint) for the heating curve

From the heating curve, the Tekmar 294 calculates a header setpoint (displayed as "Boiler Target" on the home screen) and sends a 0-10V analog signal to the AM Boilers.