



# TEMPERATURE CONTROLLERS

## Models T-12

Instruction Manual: H1



**T-12 Thermostat**



**PILOT GUARD**

### INTRODUCTION:

### SCOPE:

This instruction manual includes installation, operation, and parts information for the Kimray Thermostat and Pilot Guard. Refer to separate manuals for instructions covering actuators, controllers, maintenance, and accessories.

Only trained and qualified individuals should attempt to install, operate, or maintain any Kimray products or accessories. The following instructions should be reviewed and completely understood before attempting any installation, operation, or maintenance. If you have any concerns or questions about these instructions, contact your Kimray sales office before proceeding.

### AVAILABLE MODELS:

**Connection Size:** 1/2" NPT, 3/4" and 1" available with separable socket  
**Connection Style:** NPT  
**Actuation:** Direct or Indirect  
**Body Material:** Cast Iron, Ductile Iron, Steel, 12L-14, 303 Stainless, 316SS6 Stainless

### DESCRIPTION:

Kimray thermostats are designed to control set temperature in indirect heaters, emulsion treaters, reboilers, steam generators, heat exchangers, cooler shutter controls, and salt bath heaters. The Pilot Guard is designed to monitor the pilot flame to a burner in case the flame is extinguished.

A name tag is attached to the upper bonnet housing on each Thermostat. The name tag lists the serial number, model number, and pressure rating.

When servicing valves, always use only Kimray replacement parts. For specific model numbers, part numbers, and repair kit numbers, refer to the Kimray Catalog, Section H1, or to the packing slip which is enclosed with each valve.

### SPECIFICATIONS:

**Normal Service:** Liquid or Gas

#### Features:

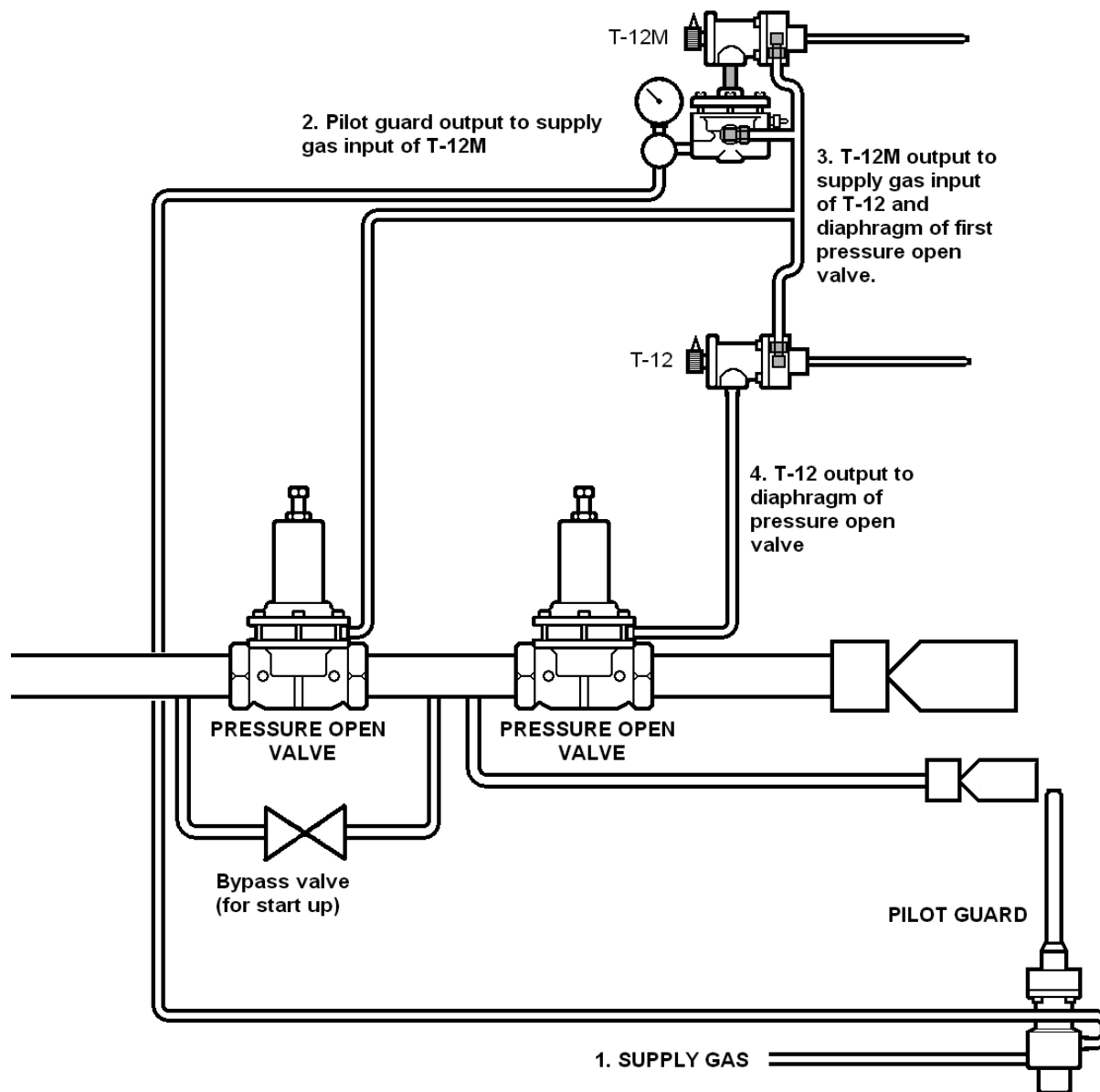
Temperature Range: -30f to 750f  
 -34c to 399c

Supply range: 5 to 30 psi  
 .3 to 2 bar

Safety: Shut down of fuel gas, with manual reset  
 Pilot flame monitoring

### Construction Materials:

Body T-12	Cast Iron	Ductile Iron	Steel
Body Pilot Guard	12L-14	316SS6	
Body Sep Socket	Carbon Steel	316SS6	
Sensing Element	304 Stainless		
Elastomers	Nitrile	Viton	Aflas



**INSTALLATION:**

**CONCEPT:**

Before starting the installation of a burner control system, it is important to understand what the equipment is for and why it will be installed. Above is a typical temperature control installation, notice the redundancy. This is for YOUR SAFETY and the SAFETY of the equipment. If one component in the loop fails then the entire system is shut down.

1. Supply Gas- Usually 30 psi is required to operate the pilots and valves in the system. At any time, interrupting the flow of supply gas will shut the entire system down.
2. Pilot Guard - Everything starts with monitoring the pilot flame. Supply gas to the entire system must run through the pilot guard. If the pilot guard detects the flame, it will allow supply gas to pass

to the T-12M. If the flame goes out, the pilot guard will block supply gas to the entire system and shut it down.

3. T-12M - The T-12M monitors the high temperature set point of the system. When the temperature of the system is in operating range, supply gas is allowed to pass through to the T-12 and the first pressure open valve. If the temperature climbs above set point in the system, the T-12M will stop supply gas to the T-12 and also to the first valve on the burner main line, causing the entire system to shut down.
4. T-12- When the system is within operating range, the T-12 will have supply gas to operate from the T-12M, then the T-12 will throttle the valve that controls the burner flame to maintain a constant temperature.



### INSTALLATION CONT:

#### BEFORE INSTALLATION:

Be sure you fully understand the application, operation, and connection of the device before installing.

#### WARNING:

Only trained personnel should install or service a control valve or control device. Control valves and other control devices should be installed, operated, and maintained in accordance with international codes and regulations, manufacturer's instructions, and proven best practices.

Personal injury, equipment damage, property damage, leakage, or bursting of pressure-containing parts may result if the valve is overpressured or installed where service conditions could exceed the limits given in the SPECIFICATIONS section.

Overpressure protection should also be provided if the valve inlet pressure may exceed the safe working pressure of the equipment downstream.

To avoid injury or damage, install pressure-relieving or pressure limiting devices to prevent service conditions from exceeding those limits. Consult the appropriate code, regulations, or standards.

Consideration should be given to the potential risk of injury or property damage due to escaping fluid. To avoid such risks, install the regulator in a safe location.

#### Separable Socket:

1. Inspect the openings in the vessel for foreign material and clean the connection ports to remove scale, chips, and debris.
2. Kimray always recommends installing thermostats with separable sockets. Install the separable socket using good piping practice. Be sure to use TFE tape or pipe thread sealant on external pipe threads.

**A person should never stand directly over or in front of a valve or controller when the system is pressurized.**

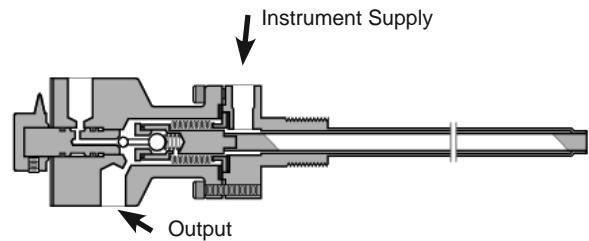
3. Make sure the separable socket is completely submerged in liquid or flow stream. Partial submersion will give erratic temperature transfer to thermostat.
4. Pack separable socket full with high temp bearing grease. This helps in heat transfer and prevents air space.

**WARNING:** if hazardous or flammable gas is being used for instrument gas, and the pilot is in an enclosed area, personal injury or property damage could result from accumulated gas being released through the vent. To avoid potential risk provide adequate ventilation or pipe away vented gas.

#### Thermostat:

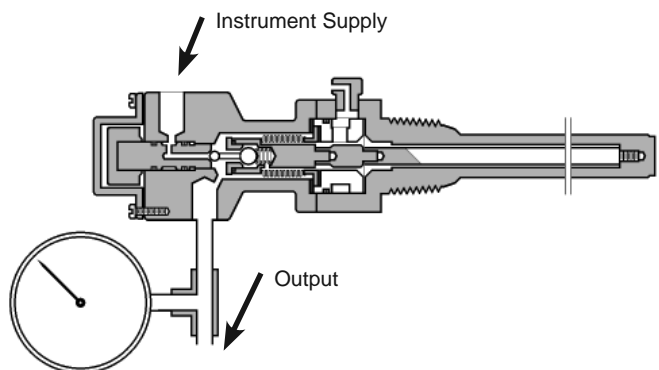
1. Remove all plastic plugs from the 1/4" NPT openings. 1/4" tubing (not provided) must be installed.

2. Install thermostat into separable socket (recommended) being sure to use proper piping practices. Be sure to use TFE tape or pipe thread sealant on external pipe threads.
3. Install tubing from source of instrument gas, designated **Instrument Supply**
4. Install tubing to the diaphragm housing of the control valve being operated or when applicable the next controller, designated **Output**.



#### Pilot Guard:

1. Remove all plastic plugs from the 1/4" NPT openings. 1/4" tubing (not provided) must be installed.
2. Install Pilot Guard into the proper opening so that the tip of the sense rod will be in the pilot flame. The entire probe does not need to be emerged in the flame. Be sure to use TFE tape or pipe thread sealant on the external pipe threads.
3. Install tubing from source of instrument gas, designated **Instrument Supply**
4. Install tubing to the diaphragm housing of the control valve being operated or when applicable the next controller, designated **Output**.





### START-UP & TEST:

#### WARNING:

Before performing any service, be sure that the thermostat is fully isolated and that all pressure upstream and downstream has been relieved. Use bypass valves or fully shut off the process.

**WARNING: When handling fire always be aware of your companies fire safety rules and understand the burner manufactures start up procedures.**

Never assume that a check valve is fully blocking the downstream line.

Never tighten any fitting or the main connections to the thermostat while there is pressure on the line.

1. Open the bypass valve around the safety valve. If the bypass valve is omitted, proceed to step 2.
2. Adjust the Pilot Guard for an output gauge pressure reading of approximately 50% of the supply pressure. (Counterclockwise to increase pressure and clockwise to decrease pressure).
3. Light the pilot light according to the standard procedures taking all the necessary safety precautions.
4. Watch the output gauge. As the temperature increases, the pressure on the output gauge will rise upward. As this occurs, readjust the Pilot Guard control knob to maintain an output pressure of approximately 50% of the supply pressure. (Adjust the knob clockwise to decrease the output pressure).
5. Continue the process in step 4 until little change in the pressure reading on the output gauge is observed. (This time interval could be 15-20 minutes or longer). This process adjusts the Pilot Guard to the maximum pilot flame temperature and insures a rapid system shut down if the pilot flame goes out.
6. When the output pressure stabilizes, the control knob can be turned counterclockwise for the 100% output pressure, the Pilot Guard is now set. Close the bypass valve.
7. The burner system should now be cycled. Occasionally, drafting occurs during the burner cycle and cools down the Pilot Guard enough for shutdown. If this occurs, turn the control knob counterclockwise approximately 1/8 of a turn at a time, until drafting will not cause a system shutdown.
8. Should the system ever shutdown, it is necessary to determine what caused the shutdown. if a cooling effect, due to drafting occurred, readjust the control knob counterclockwise approximately 1/8 of a turn at a time, until drafting will not cause a system shutdown.
9. To restart after shutdown, open the bypass valve and light the pilot. When the output pressure of the Pilot Guard reaches 100% of the supply pressure, the system is operating and the bypass valve must be closed. If the bypass valve has been omitted, repeat steps 2-8.
10. Once the Pilot Guard is stable, proceed to the T-12M. The next steps require that a temperature gauge be installed in the system.
11. On the T-12M and T-12 turn the control knobs clockwise until they stop. On the T-12m turn control knob counterclockwise to desired shut down temperature. ( Turning more then 1 1/4 revolutions will take the thermostat out of calibration).

12. Making sure the T-12 is set to a higher temperature then the T-12M, push down on the reset lever of the T-12m. At this time burner valves should open and ignite the burner flame.
13. Monitor burner temperature until it reaches your required safety shut off temperature. Turn T-12M control knob counterclockwise until output pressure to T-12 and first control valve stops. This will be your shut off temperature, make sure the temperature on your temperature gauge matches the temperature indicator on the T-12M.
14. At this time all valves should be closed and the entire system shut down. The system will need to cool below T-12M set point before setting the T-12 thermostat.
15. Once the system has cooled down, pilot light start up procedure has been repeated and burner flame is lighted the T-12 thermostat can be set.
16. The T-12 thermostat will control the main burner valve and maintain a constant temperature in the vessel. Once the burner flame is active, the temperature can be increased by turning the control knob clockwise to increase temperature or counterclockwise to decrease temperature. ( Turning T-12 thermostat more then 1 1/4 turn counterclockwise will take it out of calibration).

### TROUBLE SHOOTING:

SYMPTOM	POSSIBLE CAUSE
Erratic temperature changes	Bent sensing element (element should be centered in base and should "ring") Incomplete immersion of probe Oversized burner valve
Continuous venting	Dirty pilot plug seat Hole in diaphragm Weak pilot plug spring Faulty O-ring

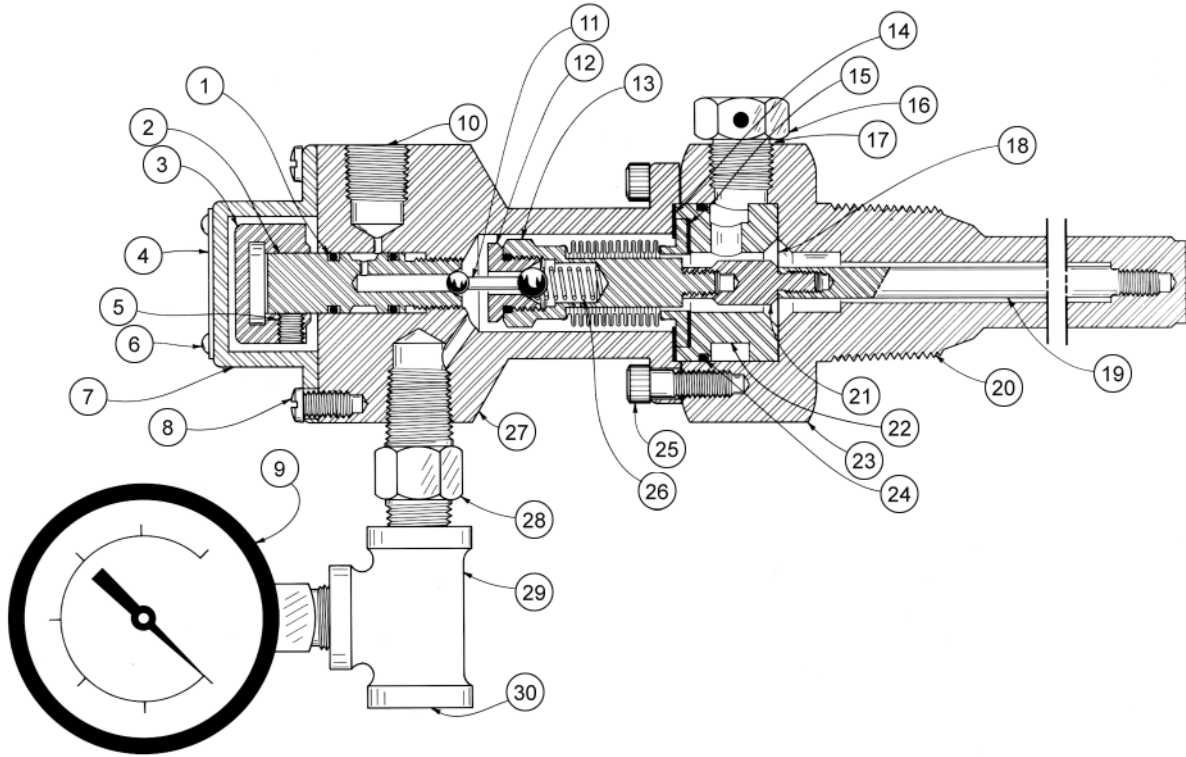
### MAINTENANCE:

Maintenance should be performed on a regular basis. An initial inspection interval of 12 months is recommended. Depending on the service conditions of the thermostat, the inspection interval may be decreased or increased.

**WARNING: If the thermostat leaks fluid, it indicates that service is required. Failure to take the thermostat out of service immediately may create a hazardous condition.**

Detailed repair instructions are available for your specific thermostat.

Repair Kits are available. Consult the Kimray Catalog, Section H, or the packing slip which is enclosed with each valve for the correct Repair Kit number.



This is a general representation of a Pilot Guard. For specific parts and their orientation refer to the Kimray Catalog or the packing slip which is enclosed with each regulator.

**Key Description**

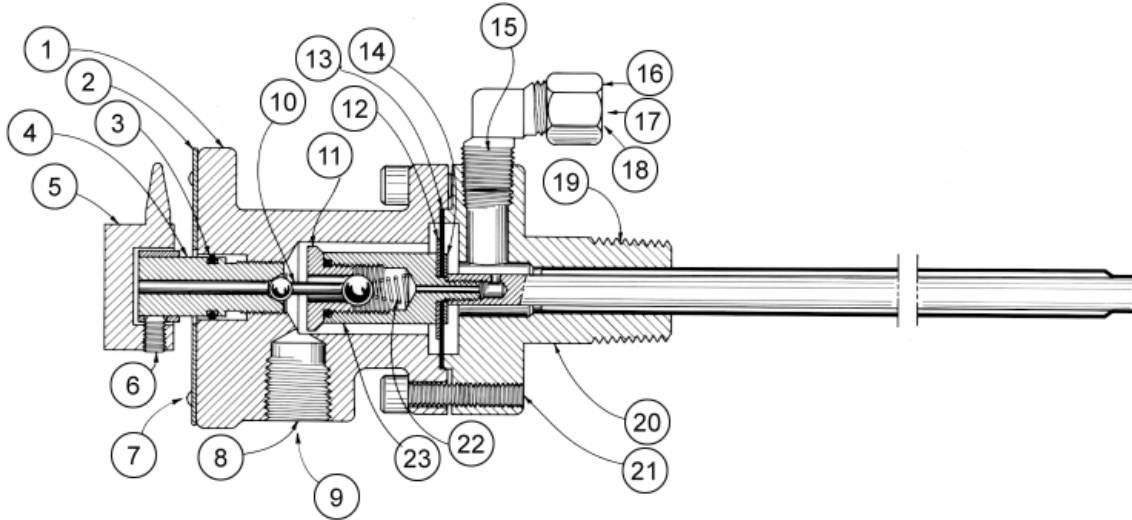
- 1. O ring
- 2. Seat
- 3. Adjusting Knob
- 4. Name plate
- 5. Set screw
- 6. Drive screw
- 7. Cap
- 8. Screw
- 9. Gauge
- 10. Supply Connection

**Key Description**

- 11. Pilot Plug
- 12. Seat
- 13. Bellow Assembly
- 14. Gasket
- 15. Gasket
- 16. Breather Plug
- 17. 1/4" NPT
- 18. Metal Diaphragm
- 19. Sensing Rod
- 20. 1" NPT

**Key Description**

- 21. Sensing rod extension
- 22. Spool
- 23. Base Assembly
- 24. O ring
- 25. Screw
- 26. Spring
- 27. Bonnet
- 28. Nipple
- 29. Tee
- 30. Output



This is a general representation of a Pilot Guard. For specific parts and their orientation refer to the Kimray Catalog or the packing slip which is enclosed with each regulator.

**Key Description**

- 1. Bonnet
- 2. Dial
- 3. O ring
- 4. Seat
- 5. Pointer
- 6. Set screw
- 7. Drive screw
- 8. 1/4" NPT

**Key Description**

- 9. Output connection
- 10. Pilot plug
- 11. Seat
- 12. Upper plate
- 13. Diaphragm
- 14. Lower plate
- 15. 1/8" NPT
- 16. Elbow

**Key Description**

- 17. 1/4" OD Tubing
- 18. Supply connection
- 19. 1/2" NPT
- 20. Base
- 21. Screw
- 22. Spring
- 23. Housing