Honeywell

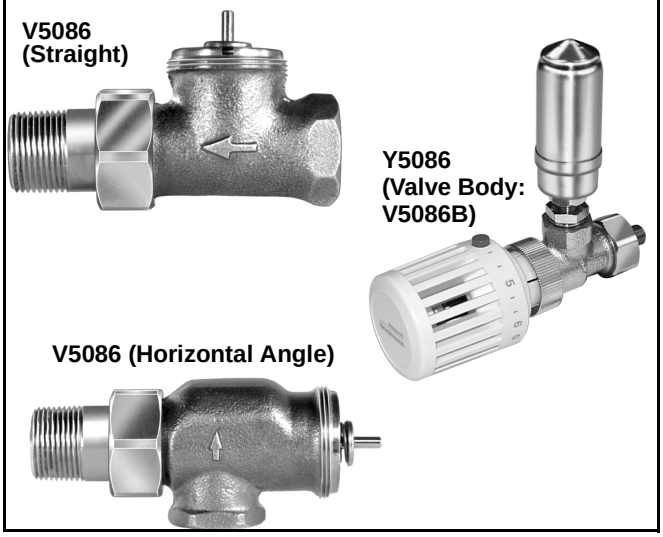
Braukmann

T5086A,B,C; V5086A,B; Y5086A Thermostatic Radiator Valves

PRODUCT DATA

THERMOSTATIC CONTROLS

VALVE BODIES



APPLICATION

Thermostatic radiator valves modulate the flow of hot water or steam through free-standing radiators, convectors or base-board units to control room temperature.

FEATURES

- **T5068A Thermostatic Actuator mounts directly on the valve body.**
- **T5086B Thermostatic Actuator sensor and setpoint adjustment are both remote-mounted.**
- **T5086C Thermostatic Actuator setpoint adjustment mounts on the valve body, sensor is remote-mounted.**
- **V5086A Valve is designed for hot water or two-pipe steam systems. Valve body replaces manual valve.**
- **Y5086A includes valve body, actuator and vent only for one-pipe steam system.**
- **Thermostatic actuator responds to small changes in room temperature.**
- **Valve cartridge can be changed without system shutdown or draindown.**
- **No electric power required.**

Contents

63-2038-3

SPECIFICATIONS

Models:
T5086A Thermostatic Actuator for direct mounting on valve body.
T5086B Thermostatic Actuator with remote-mounted sensor and setpoint. Includes 6-1/2 ft (2m) nickel-plated copper capillary.
T5086C Thermostatic Actuator with remote-mounted sensor. Setpoint mounted directly on valve body. Includes 6-1/2 ft (2m) nickel-plated copper capillary.
V5086A Valve Body for hot water and two-pipe steam systems.
Y5086A includes special T5086A Thermostatic Actuator, V5086B Valve Body and 197970 Vent only for one-pipe steam applications.

Dimensions: See Fig. 1 through 3.

T5086 Specifications:

Temperature Ratings:
Setpoint Range: 43°F to 79°F (6°C to 26°C).
Ambient Range: 40°F to 125°F (4°C to 52°C).

Scale Marking:
Range: 0 through 6 and * (see Table 1).
Minimum Setting (at * marking):
T5086A,C: 43°F (6°C).
T5086B: 55°F (13°C).

V5086 Specifications:

Body Style: Straight-through or horizontal angle. (Y5086 has only angle body.)

Body Sizes: See Table 2.

Body Fittings:
V5086A:
Inlet: NPT internal thread.
Outlet (Tail Piece): NPT union with external thread (all models) or sweat adapter (1/2 in. [13 mm] and 3/4 in. [19 mm] straight through only).
V5086B (Y5086): 1/8 in. (3 mm) NPT external thread.

Maximum Fluid Temperature: 248°F (120°C).

Material:
Fitting: Brass.
Seat and Seat Disc: EPDM.

Maximum Pressure Ratings:
Static (Water): 150 psig (1035 kPa).
Differential:
Water: 17 psi (117.3 kPa).
Steam: 15 psi (103.5 kPa).
For Quiet Water Service: 3 psi (20.7 kPa).

NOTE: Table 3 shows the capacity index (C_V and K_V) for each valve body size.

Accessories:
197960 Bulb Guard for remote sensors.
197965 Valve Cartridge (requires 197966 Cartridge Changer and 197967 Service Socket).
197966 Valve Cartridge Changer.
197967 Service Socket for removing cartridges.

Table 1. T5086 Thermostatic Actuator Scale Marking Temperatures.

Knob Scale Marking	T5086A,C		T5086B	
	°F	°C	°F	°C
0	32	0	45[a]	7[a]
*	45[b]	7	55	13
1	46	8	61	16
2	54	12	64	18
3	61	16	68	20
4[c]	68	20	72	22
5	73	23	75	24
6	79	26	79[d]	26[d]

[a]Setting not marked on device; turn knob fully clockwise.
[b]The * mark represents 43°F (6°C) on the T5086A.
[c]4 is red button on knob; press button while turning dial.
[d]This setting is not marked on device.

ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Home and Building Control Sales Office (check white pages of your phone directory).
2. Home and Building Control Customer Logistics
Honeywell Inc., 1885 Douglas Drive North
Minneapolis, Minnesota 55422-4386 (612) 951-1000

In Canada—Honeywell Limited/Honeywell Limitée, 155 Gordon Baker Road, North York, Ontario M2H 3N7.
International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

Table 2. V5086 Valve Body Sizes.

Valve Family	Size in in.			
V5086A	1/2	3/4	1	1-1/4
V5086B (Y5086)	1/8	—	—	—

Table 3. Valve Capacity Index.

	Body Size in in.			
	1/2	3/4	1	1-1/4
C_V	4.6	5.8	7.0	
K_V	3.9	5.0	6.0	

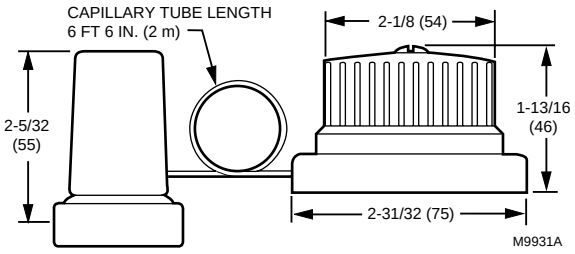
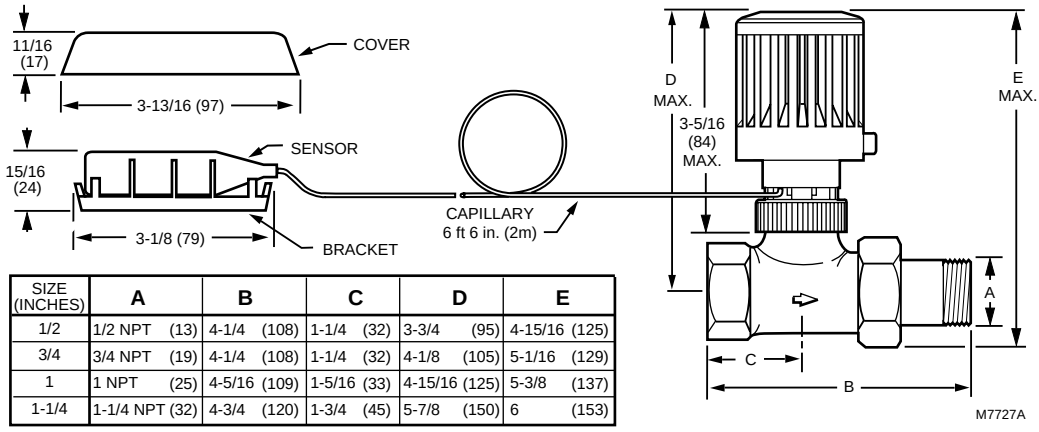


Fig. 1. T5086B remote-mounted sensor and setpoint dimensions in in. (mm).

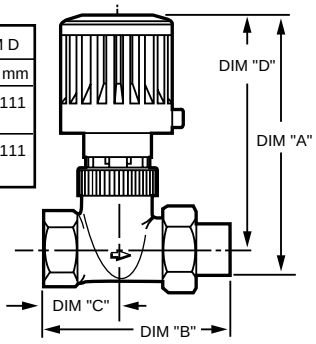


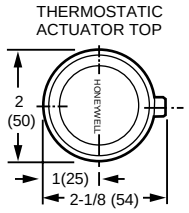
SIZE (INCHES)	A	B	C	D	E
1/2	1/2 NPT (13)	4-1/4 (108)	1-1/4 (32)	3-3/4 (95)	4-15/16 (125)
3/4	3/4 NPT (19)	4-1/4 (108)	1-1/4 (32)	4-1/8 (105)	5-1/16 (129)
1	1 NPT (25)	4-5/16 (109)	1-5/16 (33)	4-15/16 (125)	5-3/8 (137)
1-1/4	1-1/4 NPT (32)	4-3/4 (120)	1-3/4 (45)	5-7/8 (150)	6 (153)

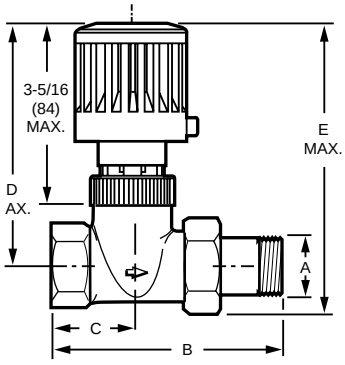
Fig. 2. T5086C remote-mounted sensor and direct mounted setpoint dimensions in in. (mm).

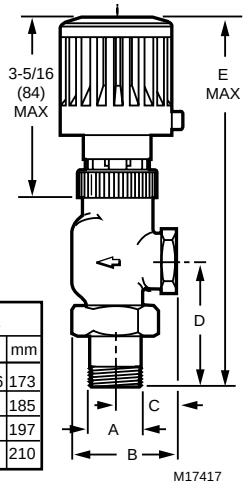
SWEAT STRAIGHT-THROUGH

VALVE SIZE	DIM A		DIM B		DIM C		DIM D	
	in.	mm	in.	mm	in.	mm	in.	mm
1/2 (SWEAT)	4-3/4	121	3-1/4	83	1-1/4	32	4-3/8	111
3/4 (SWEAT)	4-7/8	124	3-9/16	90	1-3/8	35	4-3/8	111









NPT STRAIGHT-THROUGH

VALVE SIZE	A		B		C		D		E	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
1/2	1/2 NPT	13	4-14	108	1-14	32	3-3/4	95	4-15/16	125
3/4	3/4 NPT	19	4-14	108	1-1/4	32	4-1/8	105	5-1/16	129
1	1 NPT	25	4-5/16	109	1-5/16	33	4-15/16	125	5-3/8	137
1-1/4	1-1/4 NPT	32	4-34	120	1-3/4	45	5-7/8	150	6	153

NPT ANGLE BODY

VALVE SIZE	A		B		C		D		E	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
1/2	1/2 NPT	13	1-7/8	48	1	25	2-1/4	57	6-13/16	173
3/4	3/4 NPT	19	1-7/8	48	1-1/8	29	2-9/16	65	7-1/4	185
1	1 NPT	25	2-1/4	57	1-3/16	30	2-15/16	75	7-3/4	197
1-1/4	1-1/4 NPT	32	3-7/16	87	2-3/16	56	3-1/2	89	8-1/4	210

Fig. 3. T5086A and V5086 straight-through and angle pattern valve body dimensions in in. (mm).

INSTALLATION

When Installing this Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

Location

When selecting a location for the valve body, avoid locations that subject the thermostatic sensor to drafts, direct sunlight, radiant heat from pipes or radiator units, or areas covered with drapes.

In two-pipe systems, install the valve on the inlet side of the radiation unit (see Fig. 4).

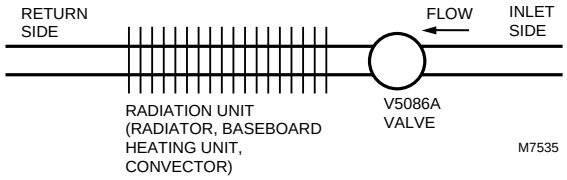


Fig. 4. V5086A Valve location for single radiation unit control.

IMPORTANT

1. *When mounting, orient the valve and actuator to minimize radiant heat effect:*
   a. *On straight-through models, do not install the thermostatic actuator directly above the valve.*
   b. *Assemble angle-body models with thermostatic actuator on the valve side farthest from heating surfaces.*
   c. *Do not install temperature sensing heads on top or inside a heated enclosure. To sense return air temperature, locate remote sensor at the bottom of the convector.*
   d. *At the selected location, do not expose the T5086 to drafts, direct sunlight, or cover it with curtains. For valve/sensor correct location, see Fig. 5.*
2. *When a zone space thermostat controls one-pipe steam boiler cycling, application of a radiator valve to the radiator in that zone results in improper control.*
3. *Install an air vent with each one-pipe steam system radiator valve.*
4. *Properly functioning steam radiators with automatic control valves do not get as hot as models without automatic control valves.*
5. *When installing the valve body, ensure that the arrow (cast into the body) points in the direction of the flow.*

NOTE: Do not use the V5086 Valve to control more than one radiation unit because it results in poor temperature control. Use the V8043 Two-Position Valve and a T87F Low Voltage Thermostat to control multiple radiation units. See V8043 Specifications (form 60-2133) for details.

Valve Body Installation

⚠ CAUTION

Valve Damage Hazard.
Soldering the valve with the cartridge or actuator attached can damage the device.
Prior to attaching valve to piping, remove actuator and cartridge from potential exposure to heat.

⚠ CAUTION

Equipment Damage Hazard.
Excessive force can distort and damage valve.
Do not overtighten the union nut.

IMPORTANT

1. *Do not use silver solder because of the high heat required.*
2. *Apply heat to both the tubing and to the valve body to ensure secure joint formation.*

In single-pipe steam systems, install the V5086A One-Pipe Steam Adapter Assembly between the radiator steam vent opening and the steam air vent. See the Single Pipe Steam Applications section.

For valve bodies with NPT threads, use new, properly-reamed, chip-free pipes. Valve distortion or malfunction can result from excess pipe within the valve body.

Direct Mounting of T5086A

After proper valve body installation, use the following instructions to direct-mount the thermostatic head:

1. Horizontally mount the T5086A Thermostatic Actuator for accurate temperature regulation. If you cannot mount the T5086A horizontally, due to space limitations, use a T5086C Thermostatic Actuator with remote sensor. See Fig. 5.
2. Position the actuator head on the valve and attach to the valve body with the threaded ring. Be sure to securely hand-tighten the actuator. Improper mounting could cause overheating or a calibration shift.
3. Turn setpoint to minimum setting.

Remote Wall Mounting

NOTES:

1. Do not crimp or cut the capillary.
2. Do not wrap excess capillary tubing around the piping or store it in a high temperature location.
3. Route capillary inside the wall, if desired. Cut two holes in the wall large enough to pass the actuator. Actuator disassembly causes calibration loss.

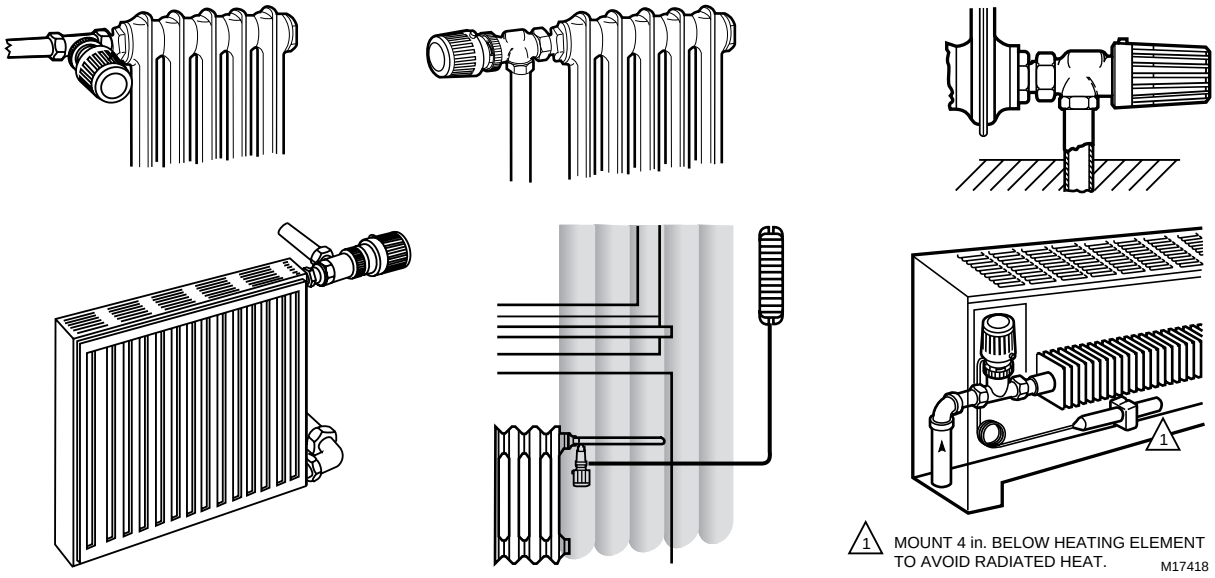


Fig. 5. Typical locations for thermostatic radiator valves.

T5086B

The T5086B sensor and setpoint are remote-mounted. To mount the V5086 Valve and T5086B Thermostatic Actuator, see Fig. 6 and use the following procedure:

1. Install the valve body as outlined in the Valve Body Installation section.
2. Using the sensor and setpoint housing as a template, drill four holes in the wall at the selected location.
3. Fasten the remote sensor and setpoint to the wall with four screws (not provided).
4. Use fasteners as shown in Fig. 6 to secure the capillary from the remote sensor/setpoint location to the valve body location. The capillary loop shown in Fig. 6 provides strain relief; the capillary loop must be free to move.
5. Assemble the thermostatic actuator onto the valve body.

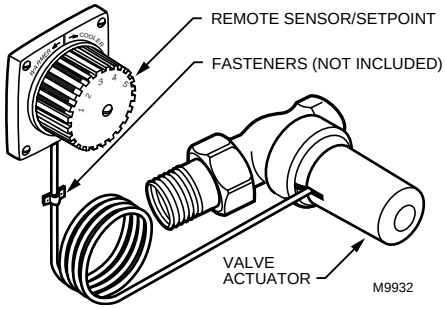


Fig. 6. Remote mounting T5086B Thermostatic Actuator head.

T5086C

The T5086C Thermostatic Actuator sensor is remote-mounted. The setpoint mounts directly to the valve body:

1. Install the valve body as outlined in the Valve Body Installation section.
2. Using the sensor mounting bracket as a template, drill two holes in the wall at the selected location.
3. Fasten the remote sensor to the wall with the two screws provided in the accessory bag. Use the two dry-wall anchors provided in the accessory bag, if needed.
4. Use fasteners and nails provided in the accessory bag to secure the capillary from the remote sensor/setpoint location to the valve body location. The capillary loop shown in Fig. 7 provides strain relief to allow the capillary loop freedom to move.
5. Assemble the thermostatic actuator onto the valve body.

OPERATION

The T5086A,B,C Thermostatic Actuator head contains temperature-sensitive material that expands on temperature rise.

When the temperature rises above the setpoint, pressure from the expanding material closes the valve, preventing the flow of water or steam through the radiation unit.

When room temperature drops below setpoint, the valve opens and water or steam flow resumes through the radiation unit.

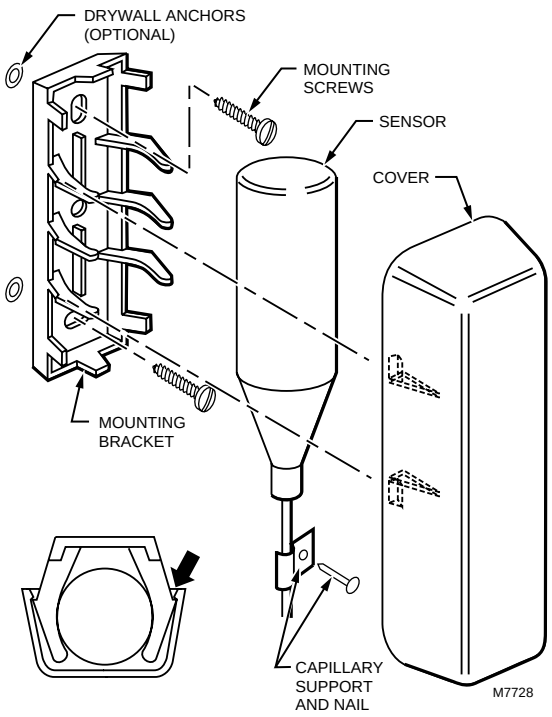


Fig. 7. Remote mounting of T5086C Thermostatic Actuator sensor.

SINGLE-PIPE STEAM APPLICATIONS

The original heating systems in many older buildings were single-pipe steam. The advantage of single-pipe steam systems is lower initial cost, resulting from using less piping and eliminating radiator steam traps.

⚠ CAUTION

Boiler Flooding Hazard

Incorrect installation of the single-pipe steam valve can result in flooding, noise, and loss of control.

Install valves only on the outlet side of the radiator.

IMPORTANT

1. *Inlet side installation closes the radiator to any flow of steam. This results in: a flooded boiler due to steam back-up, noise due to pipe overpressurization, and loss of control.*
2. *Honeywell recommends consulting an experienced professional in single-pipe steam control when specifying the system.*
3. *Incorporate means of reducing steam pressure to zero psig when installing the V5086B/Y5086. See Bringing the Steam Pressure to Zero psig section.*
4. *Apply a radiator valve in one-pipe steam systems only for steam/air vents that vent to the atmosphere installed on each radiation unit.*
5. *Ensure vacuum breakers are installed on the steam system risers. If vacuum breakers (that open to the atmosphere at zero psig) are not installed, the system can develop a negative pressure and pull steam back into the radiators upon resumption of steam.*

NOTES:

1. Individual radiation units can require vacuum breakers.
2. The V5086B Valve is only one component of the single pipe steam system control.

Refer to Fig. 8 when installing the one-pipe steam radiator adapter assembly.

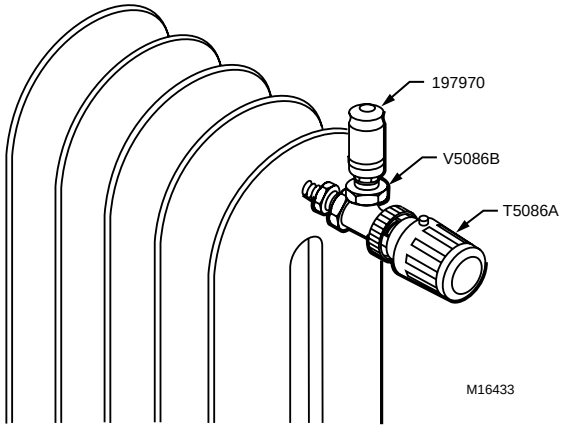


Fig. 8. Typical Y5086 installation in a one-pipe steam system.

Single-Pipe Steam Systems

The T5086/V5086/197970 sequence of operation to provide temperature control for a formerly uncontrolled single-pipe steam system:

1. Boiler is off (zero steam pressure), radiators are filled with air, vent is open.
2. T5086 calls for heat.
3. At the command of an external controller (such as a representative zone thermostat, or a timer controlled by outside temperature) the boiler cycles on and begins delivering steam to the system.
4. Steam enters the radiator, forcing air through the open V5086 and out through the vent.
5. Once the air is exhausted, steam heats the thermostatic vent element, causing it to close.
6. Steam cools, forming condensation. Condensation flows out of the radiator, making space for more steam to enter.
7. The T5086 is eventually satisfied (temperature equals the setpoint) and closes the V5086.
8. Air in the system (introduced by the vacuum breakers) begins to fill the radiator. Air in the radiator prevents steam from coming in and the radiator cools.
9. Boiler cycles off by command of components external to the T5086/V5086 and steam pressure returns to zero.

NOTES:

1. While the T5086 is satisfied, the radiator remains airlocked. Thus, no steam can enter the radiator. The airlocked condition remains until the T5086 calls for heat and the system operates as described in steps 1 through 6.
2. An improperly cycled boiler causes either excessive heating or lack of heat, depending on the system time constant.

Bringing Steam Pressure to Zero psig

To assure proper operation of any single-pipe steam system, ensure that the steam pressure is brought to zero at some time during the off-cycle. One suggested procedure follows:

1. Determine if steam is required using one of two methods:
   a. A thermostat in a representative zone controls the valve or cycles the boiler.
   b. A heat timer device cycles the boiler for varying lengths of time in response to outdoor temperature.

IMPORTANT

When cycling the boiler from a space thermostat in a zone, do not apply a radiator valve to that radiator.

2. Turn off the steam and allow system pressure to drop to zero. Do this using one of two methods:

IMPORTANT

Before applying controls to turn a boiler on and off, check the manufacturer's recommendations.

   a. Turn the boiler off and allow total steam pressure in the system to drop to zero.

   NOTE: Install the valve on the condensation takeoff boiler side to ensure that condensation can return to the boiler.

   b. In installations where turning the boiler off at the end of each cycle is undesirable, install a control valve (such as a Honeywell V5011 Valve) on the boiler discharge line.
3. Verify that the steam pressure has returned to zero.

VERIFICATION

Verification is necessary to prove that the pressure has returned to zero. Simply turning off the boiler or shutting off the steam supply does not ensure zero steam pressure. The simplest way to check for zero pressure follows:

1. Install a strap-on Aquastat® Controller, such as the Honeywell L6006C Aquastat Controller, on the condensation return line (see Fig. 9).
2. Set the Aquastat Controller at about 150°F (66°C). With the return line at or below this temperature, the water is all condensation, and the pressure is functionally zero.
3. Wire the Aquastat Controller into the interrupting circuit to ensure that steam flow cannot resume until the condensation line is below the setpoint. The 150°F (66°C) setpoint serves as a nominal starting point and can require adjustment for individual steam systems.

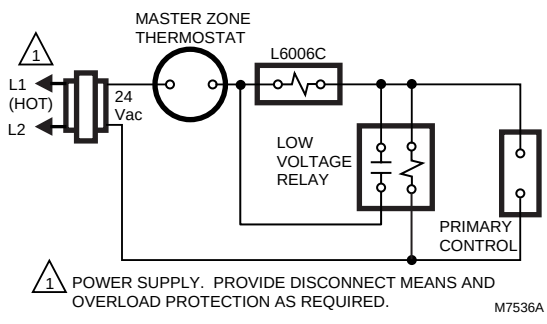


Fig. 9. Holding circuit for use with L6006 when verifying zero psig steam pressure.

SETTINGS AND ADJUSTMENTS

After completing the installation, rotate the setpoint dial until steam or water flow is detected. After room temperature stabilizes (four or five hours), reset dial to the desired setting.

NOTE: The sensor location affects the temperature sensed and, consequently, the setpoint. A floor level sensor controls at a different setpoint from a wall level sensor.

Correcting an overheating or underheating condition typically requires small changes and multiple iterations. Each division represents approximately a 6°F (3.4°C) setpoint change. After making small changes, allow the valve to stabilize for at least 30 minutes.

IMPORTANT

The T5086 are modulating, not manual shutdown, valve actuators. Do not use them as hand shutoff valves.

Steam System Considerations

Steam Supply Pressure

In most steam systems, supply pressure is much higher than actually needed for efficient system operation. Generally, the lower the supply pressure, the better the temperature control. Steam pressure should be set just high enough to supply steam to the zone farthest from the boiler. A recommended starting supply pressure is 3 psig with fine tuning from there.

Radiator Pitch

The radiators must be pitched properly to assure proper condensation drainage.

Air Vents

Air vents must be installed and operating properly for correct system operation. It is recommended that a straight-through 1/8 NPT air vent be applied to the V5086. If an angled air vent is used, be sure that condensation flows back through the valve. In most cases, this can be accomplished by tilting the valve about 45 degrees from vertical and assuring that the radiator has proper pitch.

Replacement Cartridge Assembly

The V5086 Cartridge can be replaced with the system under pressure using the valve cartridge changer. With the system shut down (no pressure), replace the cartridge using the service socket. See Accessories in the Specifications section.

Changing Limits (T5086A,C *only*)

To set limits other than those set at the factory:

1. Determine temperature range limits (see Fig. 10).
2. Lift the end (white) cap from the actuator (see Fig. 11).
3. Remove adjustment knob (light tan) from actuator base as follows (see Fig. 13):
   a. Turn knob to align red button on knob with white line on base.
   b. Push knob off base from the top or insert the screwdriver into one of two slots in the base and pry up against the knob while pressing brass button on top.

4. Insert the limit pin (red) to provide desired temperature limits (see Fig. 12).
   Example 1: If the desired temperature range is 46°F to 73°F (8°C to 23°C), place one pin in slot 1 and one pin in slot 5.
   Example 2: If the desired temperature range is 0°F to 68°F (-18°C to 20°C), move one pin to slot 5 (•) to allow the knob to be set to 0 (off position) and the limit to 68°F (20°C).
5. For actuator recalibration, gently turn the actuator head clockwise (Fig. 13) until it stops. Turn the actuator head approximately one revolution counterclockwise until the calibration indent on the head aligns with the white line on actuator base. This is approximately 3/8 in. travel of the actuator head from the base.
6. To replace the adjustment knob, align the red button on the knob with the white line on the base and push the knob toward the base, making sure that all three arm clips snap into place at the top of the adjustment knob.
7. Replace the end cap.

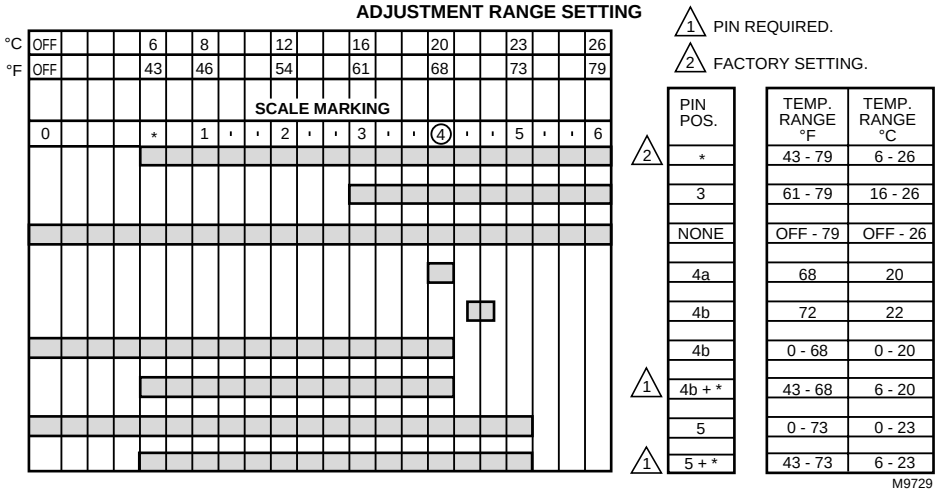


Fig. 10. T5086A,C available temperature ranges.

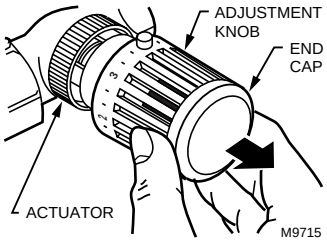


Fig. 11. Removing end cap.

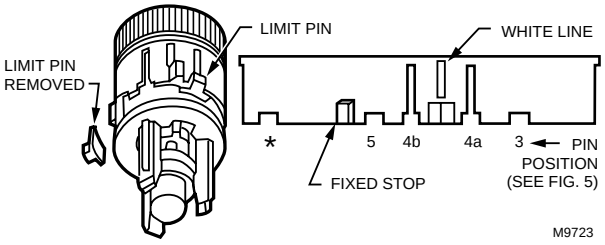


Fig. 12. Range limit stops.

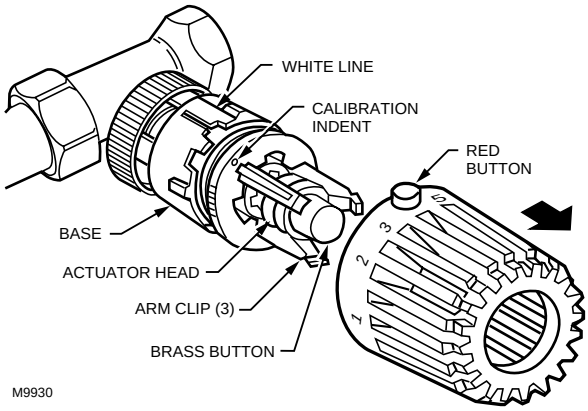


Fig. 13. Removing adjustment knob.

Honeywell

Braukmann

Home andBuilding Control
Honeywell Inc.
Honeywell Plaza
P.O. Box 524
Minneapolis, MN 55408-0524

Home and Building Control
Honeywell Limited-Honeywell Limitée
155 Gordon Baker Road
North York, Ontario
M2H 3N7