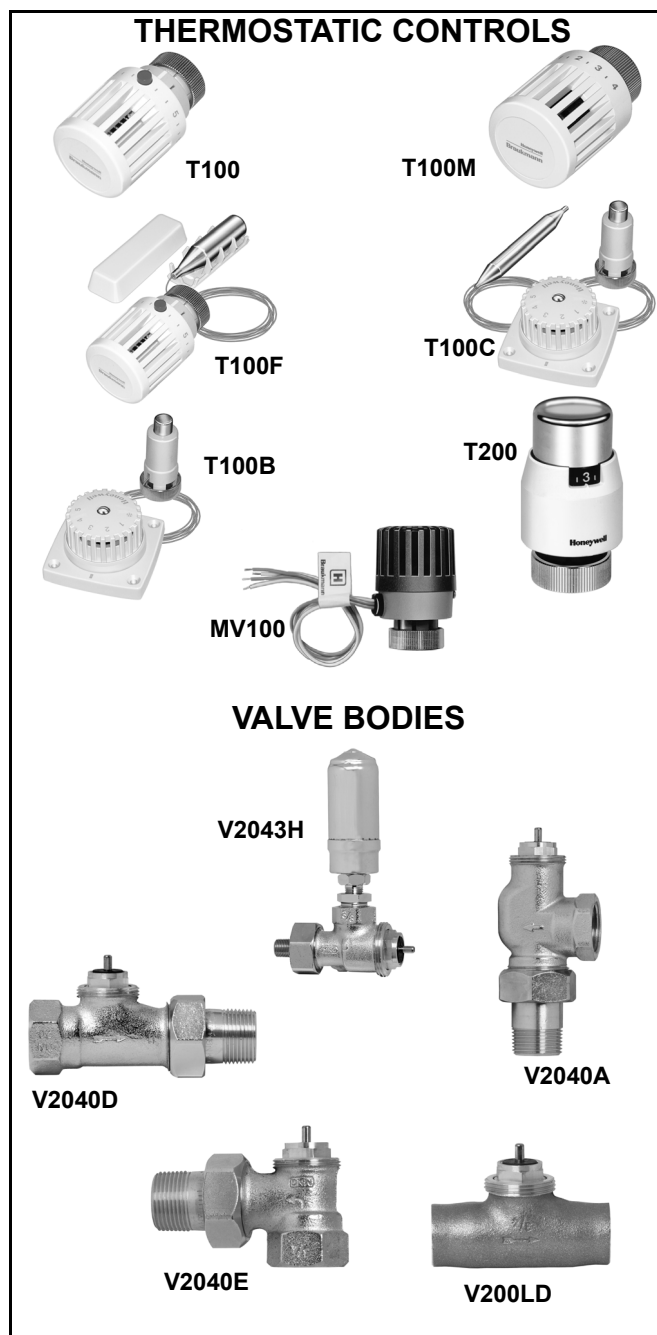


MV100 Electric Controllers T100, T200 Thermostatic Controllers and V2000 Radiator Valves

PRODUCT DATA



APPLICATION

The MV100, T100, T200 Controllers, when paired with V2000 Radiator Valves, provide automatic temperature control by modulating the flow of steam or hot water through free-standing radiators, convectors, and other heating units. They provide comfort and energy savings at affordable prices.

FEATURES

- Continually monitors and adjusts room temperature for consistent comfort and relief from underheating and overheating.
- T100, T200 Controllers include sensor, setpoint dial and valve actuator; components can be integral or connected by capillary tubing.
- T100, T200 Controllers require no electrical connections.
- T100A, F, M models have range limiting features to limit adjustment or lock at a fixed setting (can require limit pin accessory).
- EPDM valve seat disk assures tight shutoff on steam and hot water systems.
- Nickel-plated bronze cast valve body.
- Cartridge containing all working parts inserts into valve body for ease of service.
- Cartridges are replaceable while valves remain in service and under pressure (WITH accessory service tool MT100C).
- Valves remain normally open with no control mounted.
- Valves can be used with T100, T200 Thermostatic or MV100 Electric Controllers.

Contents

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SPECIFICATIONS

MV100 Electric Controller

Dimensions: See Fig. 1.

Materials:

Body: Industrial grade plastics with low thermal conductivity.
Fastening Ring: Plated brass.
Internal Parts: Brass thermostat capsule, other metals.
Thermal element: Wax-filled brass capsule.

Electrical Ratings:

Control Type: Spst switch.

Controller:

Voltage: 24 Vac, 60 Hz, or 24 Vdc.

Power Consumption: 0.125A, 3W.

End Switch: Low-voltage (24 Vac, 5A), two-position, spst, normally open switch (closes when controller powered).

Configuration (with Controller Mounted):

Normally closed (valve remains closed without power).

NOTE: Normally open model available in Canada.

Opening Time (at 78°F): Maximum: 5 minutes from cold to fully open.

Ambient Temperature Rating: Maximum: 122°F (50°C).

T100,T200 Thermostatic Controllers

Models: See Table 1.

Dimensions: See Fig. 1.

Power: Self-powered, no electrical connections.

Components: Sensor, setpoint dial and valve actuator.

Materials:

Body: Industrial grade plastic with low thermal conductivity.

Fastening Ring: Plated brass.

Internal Parts: Brass thermostat capsule, other metals.

Thermal Element:

T100A,M: Wax.

T200,T100B,C,F: Liquid Ethyl Acetate (non-toxic, flammable).

Temperature Ratings:

Range: 43°F to 79°F (6°C to 26°C).

Maximum: 125¼F (52¼C).

V2000 Valves

Models: See Table 2.

Dimensions: See Fig. 2 and 3.

Materials:

Body: Bronze.

V2040A (1/2 in.): Brass.

Union: Brass.

Stem Seal: Double EPDM seal.

Cartridge: Brass and stainless steel with EPDM seat disk.

NOTE: Apply 25 ft.-lb. (30 N•m) torque when installing the valve cartridge.

Maximum Temperature Rating: 266°F (130°C).

Maximum Pressure Ratings:

System:

Water: 145 psi (10 bar).

Steam: 15 psi (103 kPa).

Differential:

With MV100 Controller: 36 psi (248 kPa).

With T100 or T200 Controller: 14.5 psi (1 bar).

For Low Noise: 2.9 psi (20 kPa).

Sizes:

V2024H: 1/8 in.

V200LD: 1/2 in., 3/4 in.

V2040D,E,A: 1/2 in., 3/4 in., and 1 in.

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 Honeywell Automation and Control Products Sales Office (check white pages of your phone directory).
2. Honeywell Customer Care
1885 Douglas Drive North
Minneapolis, Minnesota 55422-4386

In Canada—Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Scarborough, Ontario M1V 4Z9.

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.

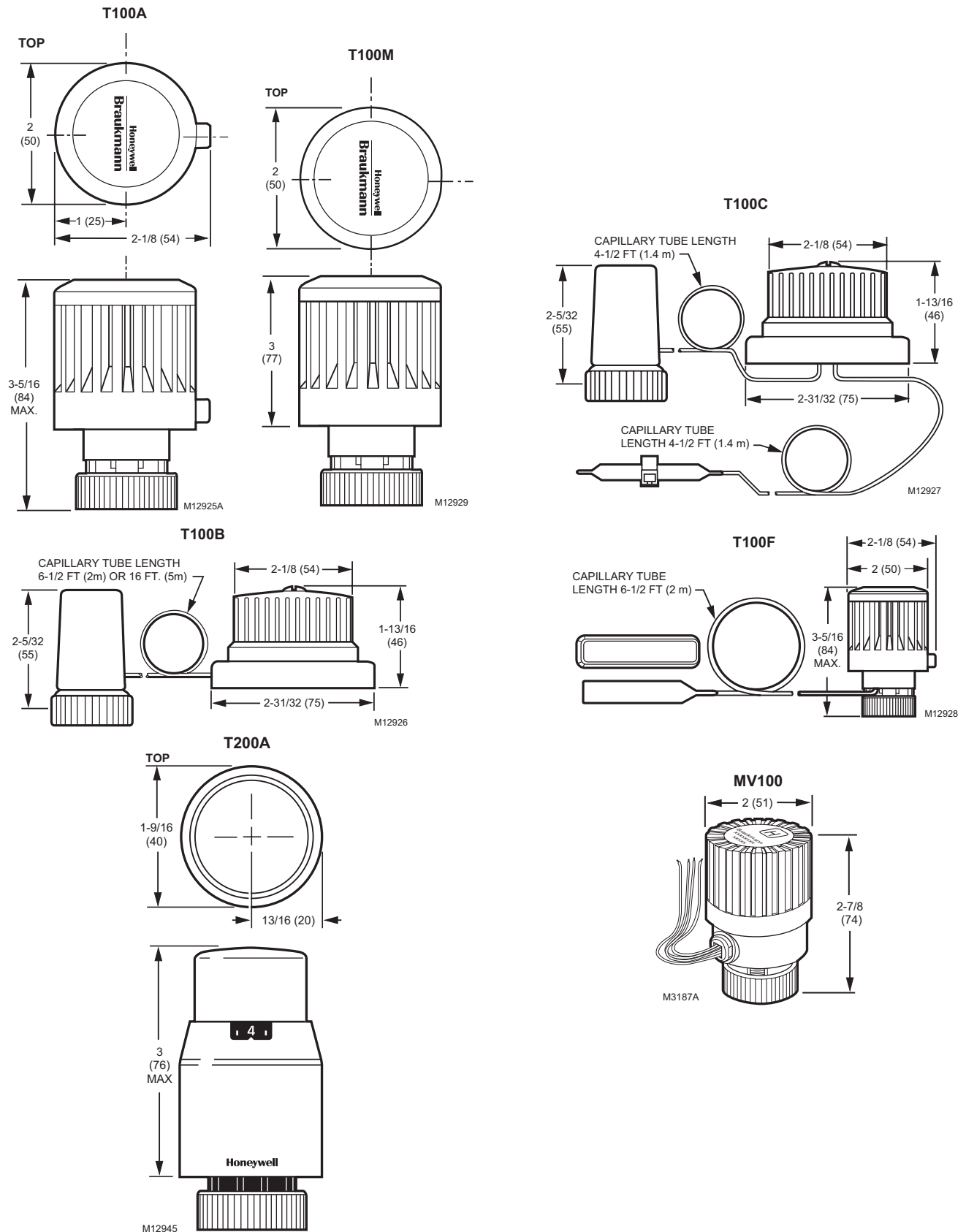


Fig. 1. MV100, T100 and T200 dimensions in in. (mm).

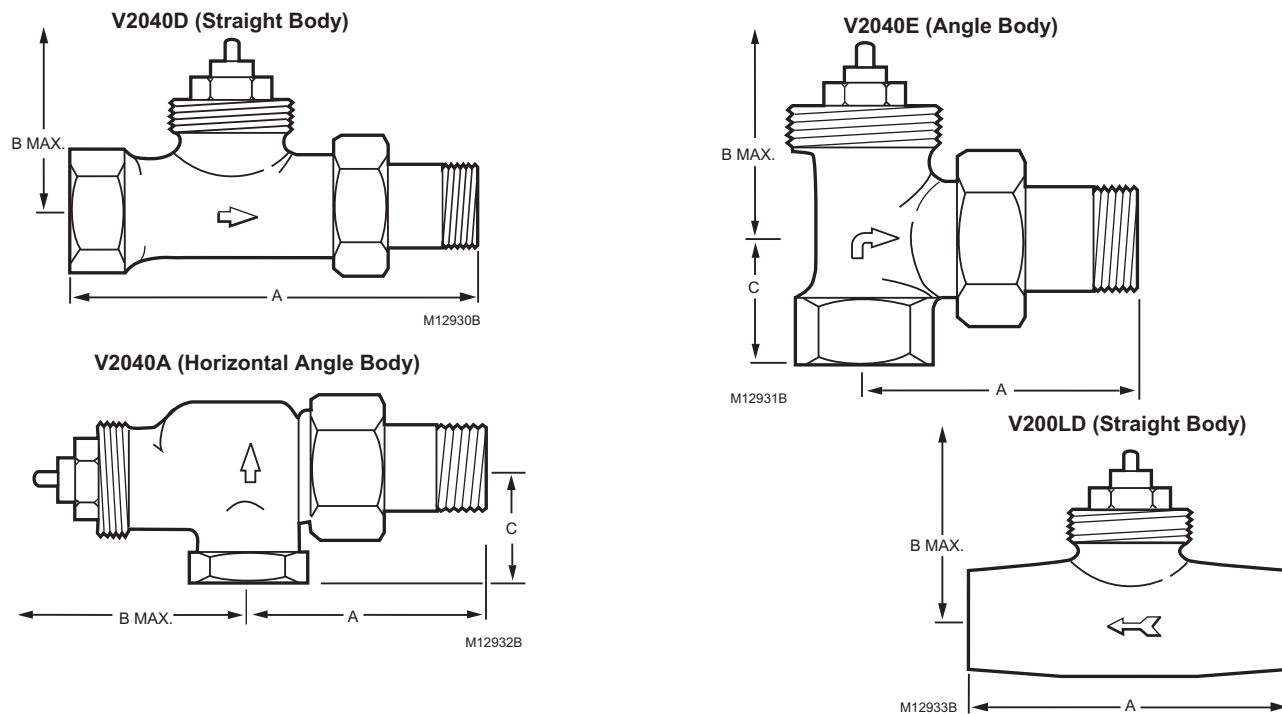
Table 1. T100,T200 Models.

Model	Control Range	Mounting	Capillary	Description
T100A	43°F to 79°F (6°C to 26°C)	Direct ^a	None	Components are in one unit.
T100B	48°F to 79°F (9°C to 26°C)	Remote	One 6-1/2 ft (2 m) or 16 ft (5 m)	Sensor and setpoint dial combined and remote from valve actuator.
T100C		Remote	Two 4-1/2 ft (1.4 m)	Components mount remotely from each other.
T100F	43°F to 79°F (6°C to 26°C)	Direct with remote sensor.	One 6-1/2 ft (2 m)	Sensor is remote from combination setpoint dial and valve actuator.
T100M		Direct ^a	None	Components are in one tamper-resistant unit.
T200A		Direct ^a	None	White body with chrome-plated end.

^a Mount the unit horizontally on the valve body for accurate temperature regulation.

Table 2. V2000 Models.

Model	Body Pattern	Connection		Application
		Inlet	Outlet	
V2040D	Straight	NPT Threaded	Union Nut with NPT Threaded or Sweat	Use where manual valves were not originally installed.
V2040E	Angle			Typically used with remote temperature sensing controllers.
V2040A	Horizontal Angle			Typically used with direct-mount controllers (T100A,M; T200A)
V200LD	Straight	Sweat	Sweat	Use with copper tubing installations.
V2042H/ V2043H	One-Pipe	18 in. NPT	1/8 in NPT for SA123A Vent	Use in single-pipe steam applications.

**Fig. 2. V2000 dimensions.**

NOTE: Refer to Table 3 for detailed valve dimensions for each valve size.

Table 3. Valve Dimensions.

Valve	Size in in.	A in in. (mm)	B Max ^a in in. (mm)	C in in. (mm)
V2040D	1/2	3-3/4 (95)	4-1/16 (104)	—
	3/4	4-3/16 (106)	4-1/16 (104)	—
	1	4-1/2 (114)	4-1/2 (114)	—
V2040E	1/2	2-5/16 (58)	3-3/16 (98)	1 (26)
	3/4	2-5/8 (66)	3-13/16 (98)	1-1/8 (29)
	1	2-15/16 (74)	4-5/16 (110)	1-5/16 (34)
V2040A	1/2	2-1/8 (54)	4-1/2 (115)	1-1/8 (28)
	3/4	2-1/2 (64)	5-3/16 (132)	1-3/16 (31)
	1	2-15/16 (74)	5-3/16 (132)	1-7/16 (37)
V200LD	1/2	2-5/8 (66)	4-1/16 (104)	—
	3/4	2-15/16 (74)	4-1/16 (104)	—
V2042H	3/8	1-11/16 (43)	3-13/16 (98)	1-3/16 (31)

^aB Max dimension is with T100A control installed, except for the V2042H, for which it is without the steam/air vent installed.

Connections:

Inlets Available:

Internally threaded.

Sweat (1/2 in. and 3/4 in. only).

Outlets Available:

Union nut with threaded tailpiece.

Sweat (1/2 in. and 3/4 in. only).

Union nut with sweat tailpiece (1/2 in. and 3/4 in. only).

Capacity:

Cv (gpm at 1 psi drop across fully-open valve):

1/2 in.: 2.0.

3/4 in.: 2.2.

1 in.: 2.3.

Btuh (Btu/hr at 7 psi drop across fully-open valve):

1/2 in.: 59,100.

3/4 in.: 63,800.

1 in.: 70,500.

Accessories:

203225 Replacement Bulb Guard for T100F.

272844 Locking Cap and Limit Pins for T100M.

272873 MT100C Cartridge Tool Driver Upgrade Kit.

A104F Limit Pins for T100A,F.

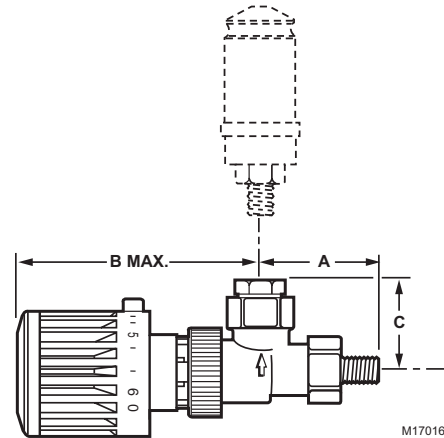
VS1200SL01 Replacement Valve Cartridge.

G111B Bulb Guard to protect T100C sensor when wall-mounted.

VA8200A001 Valve Cartridge Replacement Tool for system under pressure (V2000).

Q110D Inlet Strainer Inserts for NPT V100 (models available for 1/2 in. and 3/4 in. valves).

SA123A Steam/Air Vent for V2042HSL10 One-pipe Steam Valve.

**Fig. 3. V2042H (Body)/V2043H (Body with Airstream Vent) Dimensions.**

NOTE: Refer to Table 3 for detailed valve dimensions for each valve size.

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.

**CAUTION**

Equipment Damage Hazard.

Excessive force can distort and damage valve.

Do not overtighten the union nut.

**CAUTION**

Equipment Damage Hazard.

Driving an unmounted MV100 can damage the actuator beyond repair.

Mount the MV100 before applying power to the actuator.

**CAUTION**

Sweat Valve Damage Hazard.

Soldering the valve with the cartridge or controller attached can damage the device.

Prior to attaching valve to piping, remove controller and cartridge from potential exposure to heat.

IMPORTANT

When installing the valve body, ensure that the arrow (cast into the body) points in the direction of the flow.

Pre-setting and Balancing Flow Through Valve Body.

Close valve with straight blade screwdriver by turning black pre-setting ring clockwise.

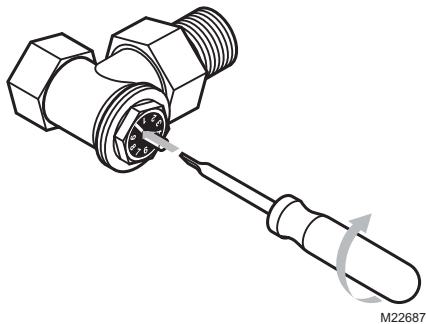


Fig. 4. Closing valve.

When closed, the position of the screwdriver slot equals pre-setting zero. Mark the position of the slot with a felt tip pen.

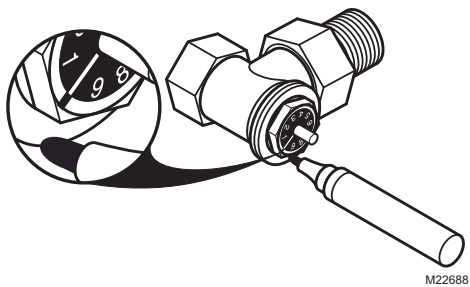


Fig. 5. Mark zero position of screwdriver slot.

Take required value from Table 4. Turn presetting ring counterclockwise with a straight blade screwdriver to this position.

Chose value has to be congruent with marking.

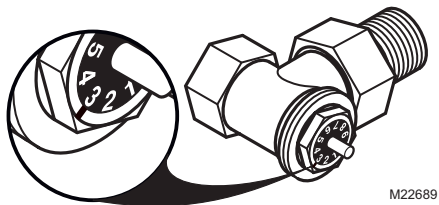


Fig. 6. Set pre-setting ring to correct value.

One complete revolution of the black pre-setting ring equals a pre-setting of 10 (Fig. 7).

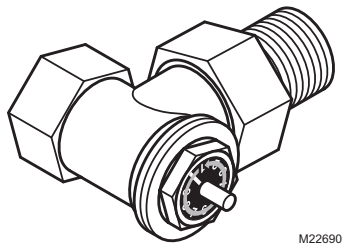


Fig. 7. One complete revolution equals a pre-setting of 10.

Table 4. CV Values.

Pre-setting	1	2	3	4	5	6	7	Open
3/8 in.	0.29	0.58	0.87	1.16	1.45	1.68	1.80	2.00
1/2 in.								2.15
3/4 in., 1 in.								2.26

NOTE: Pressure drop (psi) = (flow[gpm]/cv)².

Product Selection

1. Select the installation diagram (from Fig. 4 through 16) that most accurately represents your equipment and piping configuration.
2. Use Table 4 to select the combination of controller and valve that is most suitable based on:
 - a. Equipment and pipe configuration, see Tables 1 and 2.
 - b. Flow capacity requirement, see Specifications section.

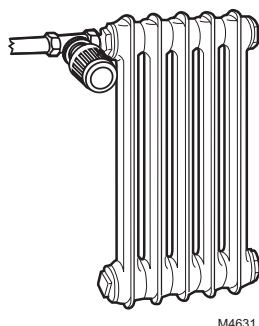
IMPORTANT

The T100 and T200 are modulating, not manual shut-down, valve actuators. Do not use them for hand shutoff valves.

Typical Applications

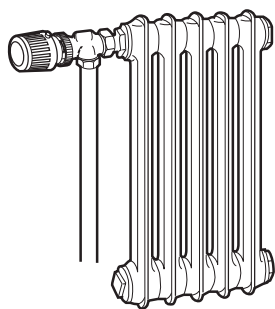
Table 5. Figure References to Typical Applications.

Application Figure No.	Controller	Valve
8	T100A, T100M, T200, MV100	V2040D
9	T100A, T100M, T200, MV100	V2040A
10	T100A, T100M, T200, MV100	V2040E
11	T100A, T100M, T200, MV100	V2042H
12	T100M, MV100	V2040A
13	T100F, MV100	V2040E
14	T100F, MV100	V200LD
15	T100F, MV100	V2040D
16	T100F, MV100	V2042H
17	T100B, MV100	V2040D
18	T100B, MV100	V2040E
19	T100C, MV100	V2040D
20	T100C, MV100	V200LD



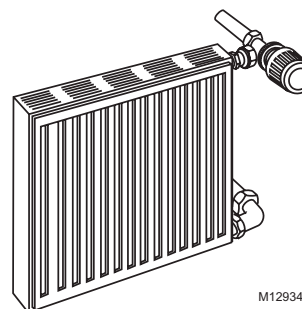
M4631

Fig. 8.



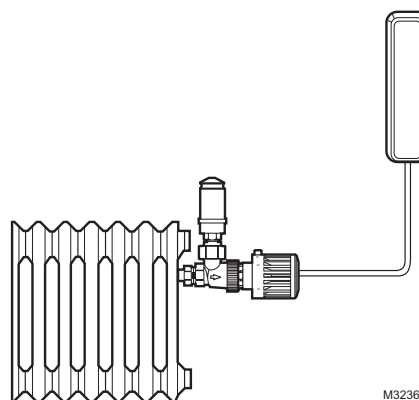
M4632

Fig. 9.



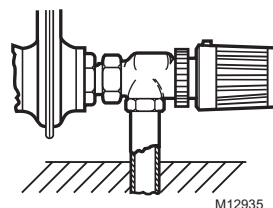
M12934

Fig. 10.



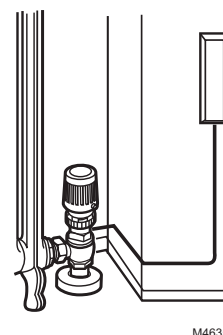
M3236

Fig. 11. One-pipe steam system.



M12935

Fig. 12.



M4635

Fig. 13.

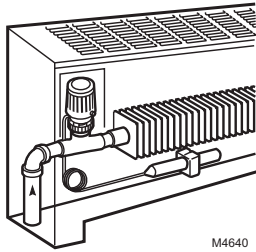


Fig. 14.

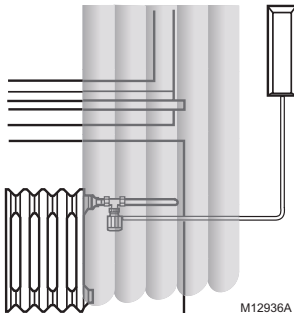


Fig. 15.

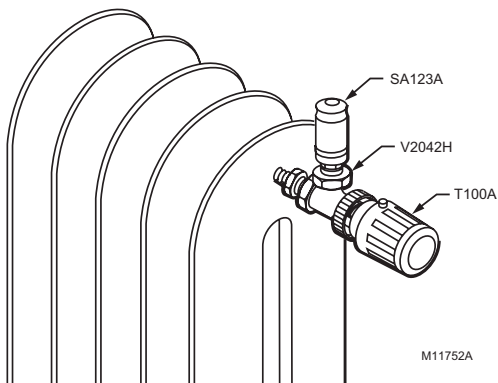


Fig. 16.

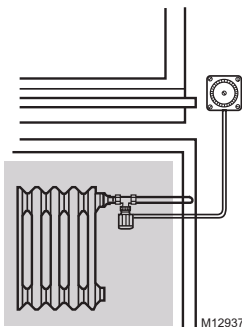


Fig. 17.

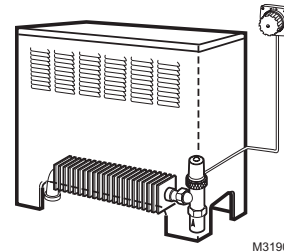


Fig. 18.

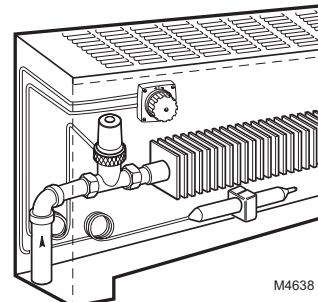


Fig. 19.

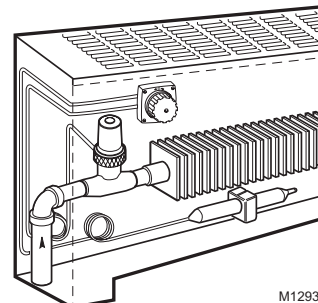


Fig. 20.

Location and Mounting

Because these controls are thermostats that have sensors that measure air temperature in the immediate vicinity, it is critical to select an appropriate installation location.

These devices are adversely affected by radiant heat, solar heat or airflow obstructions such as curtains or enclosures. Two essential considerations for choosing the correct controller/valve body combination for a particular installation are:

- Adequate dimensional clearances.
- Proper sensor positioning.

IMPORTANT

Install built-in sensor type controllers in a horizontal position to prevent air warmed by the hot valve body from influencing the sensor.

NOTE: The most common misapplication of these valves and controllers is the use of a horizontal-body valve (V2040E) with a direct-mount controller (T100A, M or T200A). See Fig. 17.

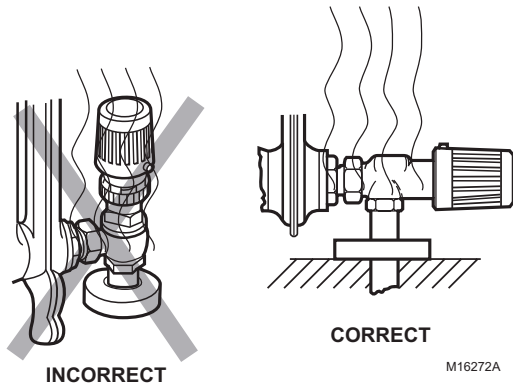


Fig. 21. Horizontal-body V2000 application.

Install controllers with external sensors in any position. The sensor can easily be mounted in a position to measure and control the room air temperature.

NOTE: When temperature of medium exceeds 190°F (88°C), mount the MV100 horizontally.

WIRING (MV100 ONLY)

Wire the MV100 according to Fig. 18.



CAUTION

Equipment Damage Hazard.
Can short equipment circuitry.
Disconnect all power supplies before installation.



CAUTION

Equipment Damage Hazard.
Connecting improper voltage can damage the device beyond repair.
Connect only 24 Vac or 24 Vdc to the MV100.

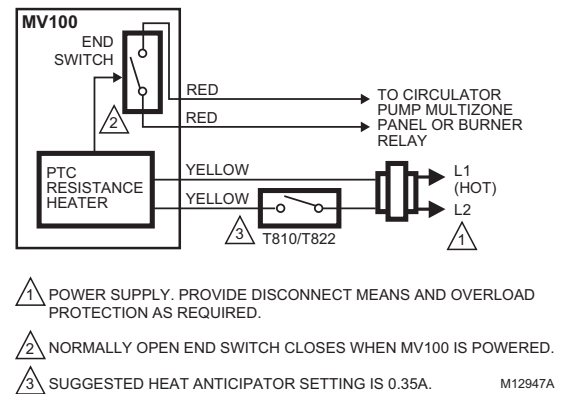


Fig. 22. MV100 internal schematic and wiring connections.

OPERATION

The T100 and MV100 Controllers contain temperature-sensitive capsules that expand or contract in reaction to temperature changes.

- When the capsule expands, pressure from the expanding material closes the valve, preventing flow through the radiation unit.
- When the capsule contracts, the valve opens and flow resumes through the radiation unit.

T100

The T100 temperature-sensitive capsule expands when the temperature rises above the setpoint.

MV100

When signalled by the thermostat, an electric element in the MV100 heats the capsule causing it to expand.

NOTE: For normally open MV100 models, the capsule cools when signalled by the thermostat.

SETTINGS AND ADJUSTMENTS

When installation is complete, rotate the setpoint dial to the desired setting.

NOTE: The setpoint varies with the location of the sensor. A floor level sensor controls at a setpoint different from the wall level sensor.

Normally, correction of an overheating or underheating condition requires only small changes. See Table 5 for dial markings and corresponding temperature settings. After changing the setting, allow the valve at least 30 minutes to stabilize.

Table 6. T100 and T200 Settings and Corresponding Temperatures in °F (°C).

	0	*	1	2	3	4	5	6
T100A,F	32 (0)	43 (6)	46 (8)	54 (12)	61 (16)	68 (20)	73 (23)	79 (26)
T100B,C	—	55 (13)	61 (16)	64 (18)	68 (20)	72 (22)	75 (24)	79 (26) ^a
T100M	—	43 (6)	61 (16)	64 (18)	68 (20)	72 (22)	75 (24) ^a	79 (26) ^a
T200	—	43 (6)	52 (11)	57 (14)	63 (17)	68 (20)	73 (23)	79 (26)

^a Setting not marked on dial.

NOTE: Torque cartridge to 25 ft-lb.

Setpoint Locking or Limiting (T100A,F,M only)

A single temperature or range-limiting lock is available for the T100A,F,M. See Accessories in the Specifications section. Refer to the T100A,F,M Installation Instructions for procedural details.

Cartridge Replacement

With the appropriate tools, the V2000 cartridge can be replaced while under pressure.

WARNING

Severe Scalding Hazard.

Contact with hot liquid can lead to severe injury or cause death.

For a pressurized valve, only open with Valve Cartridge Replacement Tool.

CAUTION

Hot Surface Hazard.

Contact with hot valve body can cause severe burning.

Service cartridge only when valve body is cool.

CAUTION

Hazardous Splashing Fluids.

Can injure, burn, or blind.

Wear safety glasses or goggles.

Under Pressure

Replacing the V100 Cartridge with the system under pressure requires the Valve Cartridge Replacement Tool (see Accessories in the Specifications section). See Pressurized Valve Cartridge Replacement section for details.

Not Under Pressure

Replacing the cartridge without the Valve Cartridge Replacement Tool requires one of the following:

- Isolation of valve from system pressure.
- System shutdown and drain to valve level.

Once the valve is not pressurized:

1. Using a 3/4 in. (19 mm) hex (6- or 12-point) socket wrench, remove and discard the cartridge.
2. Clean the inside of valve and cartridge sealing surfaces. Install a new cartridge.

SINGLE-PIPE STEAM APPLICATIONS

Many older buildings original heating systems were single-pipe steam. The advantage of single-pipe steam systems is lower initial cost, resulting from the use of less piping and elimination of radiator steam traps.



CAUTION

Boiler Flooding Hazard.

Loss of system control and boiler damage can result.

For a one-pipe steam system radiator, install valve only at the vent location.

IMPORTANT

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 on resumption of steam.

Refer to Fig. 12 for installing the one-pipe steam radiator adapter assembly.

Single-Pipe Steam Systems

T100/V2043H (with vent) operation to provide temperature control for a formerly uncontrolled single-pipe steam system follows:

1. The boiler is off (zero steam pressure); radiators are filled with air; the vent is open.
2. The T100 calls for heat, opening the valve.
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 V2042H and out through the vent.
5. Once the air is exhausted, the steam heats the thermostatic element of the vent, causing it to close.
6. The steam cools forming condensation. Condensation flows out of the radiator making room for more steam to enter.
7. The T100 is eventually satisfied (temperature equals the setpoint) and it closes the V2042H.
8. The air in the system (introduced by the vacuum breakers) begins to fill the radiator. The air in the radiator prevents steam from coming in and the radiator cools.
9. The boiler cycles off by command of components external to the T100/V2042H and the steam pressure returns to zero.

NOTE:

- While the T100 is satisfied, the V2042H is closed and the radiator remains airlocked. Thus, no steam can enter the radiator. The airlocked condition remains until the T100 calls for heat, at which point the system operates as described in steps 1 through 6.
- An improperly cycled boiler causes either excessive heating or lack of heat, depending on the system time constant.

Bringing the Steam Pressure to Zero psig

To assure the 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 timing 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:
 - a. Turn the boiler off and allow the total steam pressure in the system to drop to zero.

IMPORTANT

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

- 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.

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

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. 19).
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.

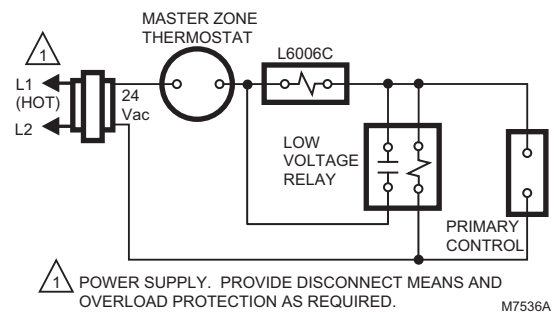


Fig. 23. Holding circuit for use with L6006 when verifying zero psig steam pressure.

TROUBLESHOOTING

Refer to Table 6 for troubleshooting details.

Table 7. T100/V2000 Troubleshooting.

Symptom	Possible Cause	Solution
Not all sections of the radiator are heating.	Many radiators are oversized and not all sections heat to maintain the desired temperature.	System is operating properly.
Underheating	Sensor in the wrong location.	Change the sensor location or change the control type. See Installation Instructions.
	T100A,M Controller mounted in a vertical position above the hot pipe.	Mount the T100A,M horizontally, or switch controller to a T100F.
	Excess capillary tubing coiled above or too close to the heat source.	Coil excess capillary tubing below or away from the heat source.
	Flow through the valve is in the wrong direction.	Check the arrow on the valve body. It should be in the direction of the flow. Change the valve direction or flow direction.
	Inadequate system temperature or pressure.	Check boiler operating and limiting controls, circulating pump, and isolating valves.
	Defective steam traps.	Repair or replace the traps.
	Airlock in the hot water system.	Fully open the valve to allow air to pass. Install vents.
	Scale or debris blocks flow.	Flush the system. Do not use oil-based additives. Clean strainer insert in steam applications.
	Heating cabinet dampers are closed.	Open or remove the dampers.
Overheating	Single-pipe: Blocked vent.	Remove and inspect vent. Replace if necessary.
	Sensor in the wrong location.	Change sensor location or change control type.
	Control not properly installed.	Check for bosses and grooves, reset actuator on valve and tighten knurled ring to valve body.
	Capillary tube broken, kinked or bent sharply.	Replace control.
	Dirt or scale under the seat prevents tight shutoff.	Remove the control from the valve body, allowing valve to open fully and flush away scale and debris. Reinstall control. Turn fully clockwise. If the valve does not close fully, remove the control and cartridge (see Cartridge Replacement section). Always use a strainer insert in steam applications.
	Flow through the valve is in the wrong direction, damaging the valve seat.	Check the arrow on the valve body. It should correspond to the flow direction. Change the valve direction or flow direction. Remove valve cartridge and inspect seat disk for damage.
	Defective steam traps.	Repair or replace traps.
	Excessive differential pressure forces the valve open (hot water systems).	Install differential pressure regulator (D146A) to maintain less than 15 psi (103 kPa) differential between the supply and return pipes.
	Single-pipe: Insufficient air in system.	Check boiler cycling and system vacuum breakers. Repair or replace breakers as necessary.
Chattering or knocking.	Flow through the valve in the wrong direction.	Check the arrow on the valve body. It should correspond to the flow direction. Change the valve direction or flow direction.
	Vacuum in the system.	Steam—check traps and vents. Hot water—check expansion tank operation and location.
	Excessive differential pressure.	Install differential pressure regulator (D146A) to maintain less than 15 psi (103 kPa) differential between the supply and return pipes.
	Bent piping.	Ensure adequate space for piping.

PRESSURIZED VALVE CARTRIDGE REPLACEMENT

The VA8200A001 Valve Cartridge Changing Tool enables the user to remove, and clean or replace the valve cartridge while the valve remains pressurized. Boiler shutdown is not required.

WARNING

Severe Scalding Hazard.
Contact with hot liquid can lead to severe injury or cause death.
Exercise extreme caution when working with hot liquid.

CAUTION

Hazardous Splashing Fluids.
Can injure, burn, or blind.
Wear eye protection to prevent injury.

To remove the cartridge, perform the following:

1. Remove controller and loosen valve cartridge slightly using a 19mm socket wrench (A,B). See Fig. 20.
2. Tighten VA8200A Cartridge Changer to valve body (A,B), close drain cock (C), and turn tool handle ccw to unscrew cartridge (D). See Fig. 21.
3. Pull handle out to clear VA8200A ball valve (A), close ball valve (B), and open drain cock to remove excess water and steam from chamber (C). See Fig. 22.
4. Unscrew end cap (A) and remove cartridge from chamber (B). See Fig. 23.
5. Clean or replace cartridge.

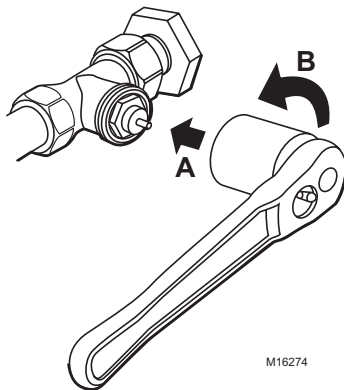


Fig. 24. Loosening valve cartridge.

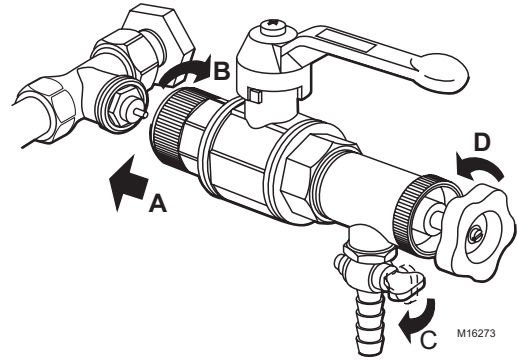


Fig. 25. Attaching VA8200A001 to valve.

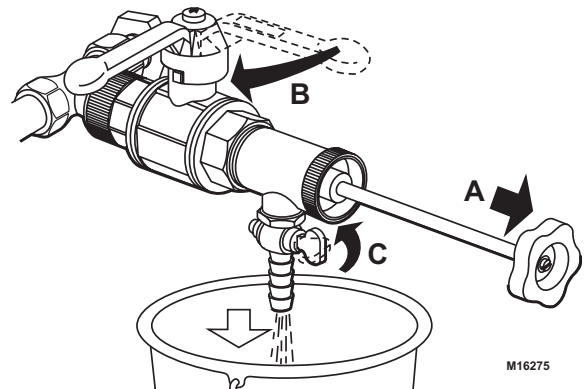


Fig. 26. Disconnecting valve cartridge and draining chamber.

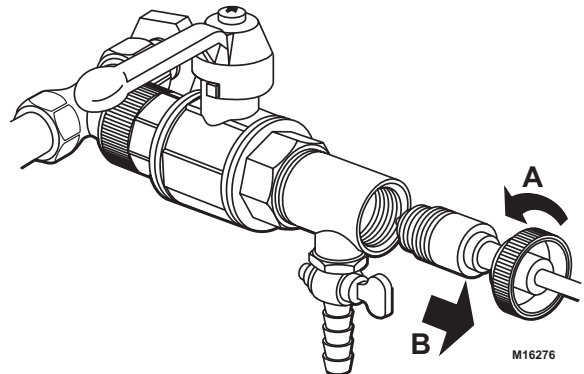


Fig. 27. Removing valve cartridge.

To reinstall cartridge into the valve, use the same process and figures. Perform steps in reverse order. All figure arrows are backwards (except Fig. 20, arrow A). Proceed as follows:

1. Replace cartridge into chamber (B) and screw end cap onto VA8200A (A). See Fig. 23.
2. Close drain cock (C), open ball valve (B), and push handle in (A). See Fig. 22.
3. Turn tool handle cw to screw in cartridge (D), open drain cock to drain chamber of remaining water and steam (C), and loosen VA8200A Cartridge Changer from valve body (B,A). See Fig. 21.
4. Tighten valve cartridge using a 19mm socket wrench (A,B) and replace controller. See Fig. 20.

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