

TC62D Installation Instructions



May 2004

This TC62D has a return water low temperature limit option used with 4-way valves. Using the low limit precludes using a room sensor.

If this TC62D (VSE-2) is a replacement for or an upgrade to an older TC62 (VSE-1) or an older TC62D, the original supply and outdoor temperature sensors may be reused if they are still good. When the sensors are plugged in the controller displays an error message if they are defective. Also, the temperatures can be checked on the display.

The ESBE 3-way & 4-way valves may be installed with either clockwise or counterclockwise rotation causing an increase in heat. The controller can be programmed to turn in either direction on an increased demand for heat.

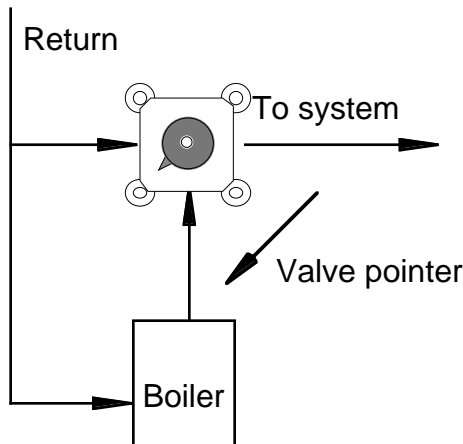
Do not remove the cover from the controller.

Determine valve rotation

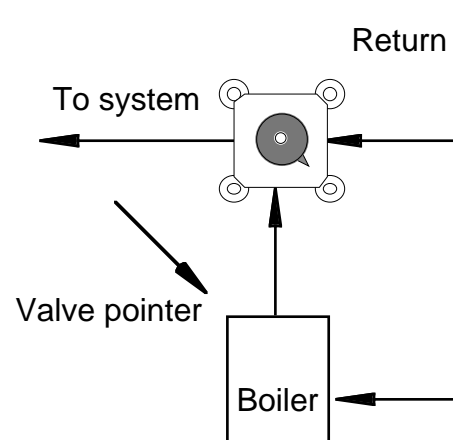
You need to know which way the valve turns for more heat to program the T62D rotation (line E).

Valve rotation for 3-way valves

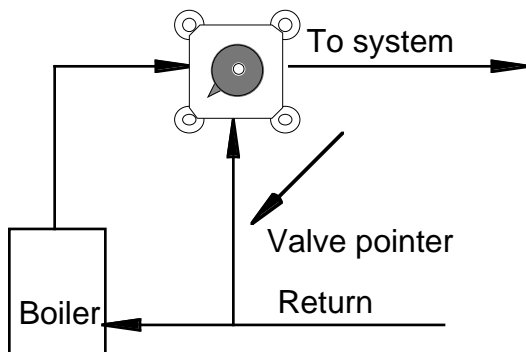
Set the valve to the half open position. The pointer on the handwheel of the 3-way valves points to the closed port as does the flat on the stem when you remove the handwheel. Halfway open is when the pointer on the handwheel points to the screw hole between the inlet from the boiler and the inlet from the system return port. If a 45° turn clockwise puts the pointer on the return inlet then the valve turns clockwise for more heat.



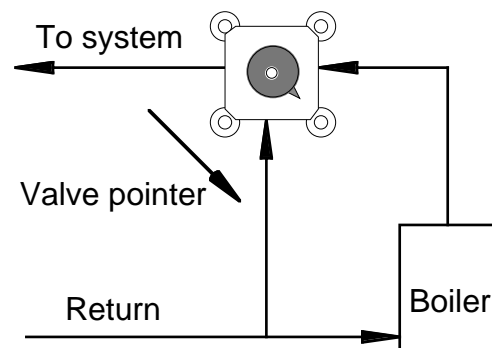
Clockwise for more heat



Counterclockwise for more heat



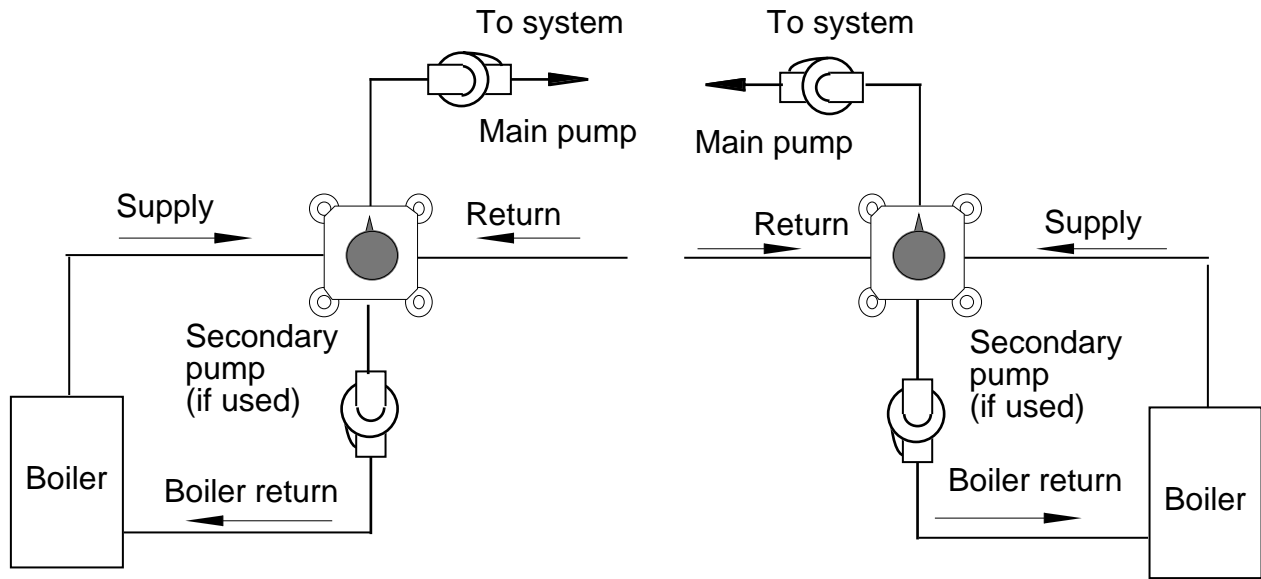
Counterclockwise for more heat



Clockwise for more heat

Valve rotation for 4-way valves

Set the pointer on the handwheel facing the supply line to the heating system (half open). If turning the handwheel clockwise moves it toward the return from the system the valve turns clockwise for more heat.



Clockwise for more heat

Counterclockwise for more heat

Actuator Installation

Put the valve in the mid-position and remove the handwheel while keeping the valve in the center.

Push the stem extender (1) onto the valve all the way.

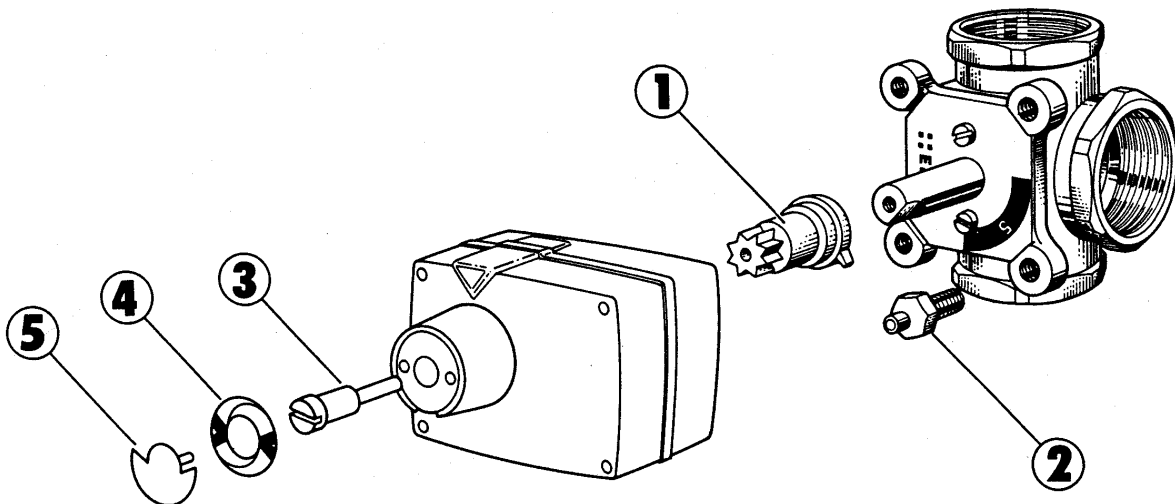
Screw the stop screw (2) into the lower right corner of the valve face.

Make sure the actuator is in the mid-position. If it is not, push the hand knob in and turn it until the actuator is in the mid position.

Place the actuator over the stem extender and push it into place with the locator pin over the stop screw.

Fasten the controller to the valve with the screw (3) in the center of the handwheel.

Select the red/blue scale (4) so that in the full heat position the widest part of the red band is beneath the pointer. Then, snap the cover (5) onto the handwheel.



Wiring

The temperature sensors do not need to be shielded. If the code or specifications require them to be installed in conduit, do not put other wiring in the same conduit as the sensor, not even the 24 volt AC power wiring to the TC62D.

Three sensors are included with the TC62D. Each is attached to a cable that plugs directly into the TC62D.

Outdoor Sensor

Find a location for the outdoor sensor on a north wall, if possible. Avoid exposure to direct sunlight or sources of heat such as dryer vents. Drill a 3/8" (10 mm) hole through the wall, push the sensor through from the inside, fasten it to the wall and then run the cable back to the controller. Coil up any excess cable and plug it into the jack labeled "OUTDOOR" or with this symbol:



Supply Water Sensor

Install the supply water temperature sensor at least 18" (50 cm) from the valve preferably on the top of the pipe in a horizontal run. Make sure the pipe is clean and strap the sensor securely and tightly to the pipe. Insulate over the sensor for at least 6 inches (15 cm) in both directions from the sensor. Coil up any excess cable and plug it into the jack labeled "PIPE" or with this symbol:



Return Water Sensor (Optional)

If you use the return water sensor install it about 8 inches from the boiler return water inlet and insulate at least 6 inches from it in both directions. Some return sensor has a telephone type jack and others have an audio jack (like the supply and outdoor sensors). Do not cut the cable. Coil up any excess cable and plug the jack into the controller.

If you are attempting to install a low limit in an existing TC62D, verify that it will work. Pull the power plug and plug it back in. The screen should display "P03" and then "1.21" or higher. If the display is "1.13" the controller will not accept a return water low limit.

Power Wiring

Connect the open end of the power cable to a 24 volt transformer. Plug the other end into the jack labeled "24 VAC".

Room Sensor (Optional)

A room sensor is not included with the TC62D. When you use one plug it in place of the return water low limit. If you choose to add a room sensor later, check the type of input jack for the sensor.

Programming

The menu has 23 programming lines; the first 5, A through E, can be reached simply by pressing the Menu Scroll Buttons; the remaining 18 lines are accessed by pressing both Menu buttons for about 5 seconds and then scrolling with the buttons.

You can scroll forward and backwards through the program lines and can change any value at any time except the temperature scale.

Program settings hold indefinitely; power failures do not cause memory loss. You can completely program the TC62D before you install it. You should have sensors plugged in while you are programming; without the supply and outdoor sensors the screen continuously flashes error messages. You can't program some room sensor functions unless one is plugged in.

The display shows the program line and the value for that line. If the line and its value are more than 3 characters the display alternates between displaying the line and displaying its value.

When you first turn on the TC62D the display flashes some numbers for a few seconds and then stops at the default display value, which is usually line A. The display will read A20 if the scale is in Celsius or A68 if the scale is in Fahrenheit.

The TC62D can be programmed in either Celsius or Fahrenheit, but the scale isn't indicated in the display. If the number in the display isn't 68 for Fahrenheit or 20 for Celsius, it has been changed. The range is 5° - 30° C or 40° - 90° F So if the displayed setting is 40 or higher the controller is set in Fahrenheit.

If you want to change or be certain of the temperature scale used do it first. Changing the scale also resets the controller to the default values so that any previous settings you made will be lost.

Press both menu buttons simultaneously and hold them until the display changes. Scroll to either 6 C to change to Celsius or 7 F to change to Fahrenheit and push either the increase or decrease button.

Function	Line	Default	Range	
Room Temperature	A	20° C or 68° F	5 - 30° C	40 - 90° F

If you are not using a room sensor ignore this setting; otherwise set it at the room temperature you want. Adjusting the dial on the room sensor also changes the setpoint. The value you program will be the setpoint at whatever point the room sensor dial is set. Changes in the room temperature or the room temperature setting displace the reset curve. The amount of displacement is determined by the Room Sensor Authority setting.

Reset Curve	b.	40° C or 100° F	22 - 90C	70 - 200° F
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This is the supply water temperature at 32° F (0° C) outside. See the chart (last page) for the effect that changing this setting will have at other outdoor temperatures. The reset curves have been selected to be especially applicable to most radiant heating systems. The last 6 lines of programming, 8, 9, h, J, L, & n, allow you to modify the reset curve for particular conditions if the b setting needs adjustment. When you change this setting, the controller does not immediately change internally; it slowly moves the setpoint to where you want it, taking about 5 minutes to change 10° F.

	Line	Default	Range	
Minimum Supply Temperature	C	10° C or 50° F	10 - 90° C	50 - 200° F
Maximum Supply Temperature	d	70° C or 160° F	10 - 90° C	50 - 200° F
Rotation	E	Clockwise to increase supply water temperature		

The indicator spins in the direction the actuator turns to increase heat. To turn counterclockwise to increase heat, press and hold the Minus button until the indicator spins counterclockwise. For clockwise motion use the Plus button.

To adjust the remaining settings press both Menu buttons at the same time and hold them for about 5 seconds. Menu lines 0, 1, & 2 are indication only. They display temperatures in the scale you selected.

Supply Temperature	0	Displays actual supply water temperature		
Calculated Supply Temperature	1	Displays what the supply temperature should be		
Outdoor Temperature	2	Displays outdoor temperature		

Function	Line	Default	Range	
Outdoor Cutoff Temperature	3	17° C or 60° F	0 - 40° C	30 - 99° F

Above this temperature the valve closes to heat; only recirculation occurs in the heating loop.

Function	Line	Default	Range
Integral Time Amplification	4	5	1 - 10
Default Menu Row	5	A	A

This is the permanent display whenever the controller isn't being programmed. When you finish making adjustments, the display reverts to this line in about 30 seconds. Line A shows the room temperature setpoint. Another line may be inserted in place of A such as line 2, the outside temperature, or line 0, the supply water temperature.

Temperature Scales	6 & 7
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This is also the Clear Programming Function; if you change this now all of your programming will be erased and the controller will revert to the default values.

Curve Adjustment	8, 9, h, J, L, & n
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You can modify the shape of the reset curve you selected in line "b". At each of these outdoor temperature points you may modify the reset curve by +/- 10° C or 20° F.

Line	Out. Temp C	Out. Temp F	Line	Out. Temp C	Out Temp F
8	-30	-22	J	0	32
9	-20	-4	L	6	43
h	-10	14	n	12	54

Function	Line	Default	Range
Third Sensor Function	P	2	0, 1, or 2
0		no 3rd sensor	
1		Third sensor is in the controlled space.	
2		Third sensor is in the boiler return.	

Third Sensor Display

r

This is the temperature at the third sensor, room temperature if the sensor is in the controlled space, or the boiler return if the sensor is located there.

Boiler Return Water Low Limit	t	90° F or 30° C	90° - 140° F	30° - 60°C
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This is active only if the third sensor function is set for boiler return low limit.

Differential	U	5°	1° - 10° (F or C)
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The boiler return water temperature must increase by this amount above the value set in "t" before the reset control function takes control.

Room Sensor Authority	t	4°	0° - 4° (F or C)
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This is the amount 1 degree change in room temperature will change the supply water temperature in the opposite direction. This function is only active when you use a room sensor and set the third sensor function at 1.

Troubleshooting

If the TC62D doesn't work properly, the problem is usually easy to fix.

Sometimes, when changes are made rapidly, the TC62D does not seem to respond correctly. Disconnect the power for a few seconds and the reconnect it. Your last set of instructions remain in the controller and it should respond correctly.

Check to make sure the voltage is correct; it must be 24 volts AC ±10%. If the control transformer powers other devices the voltage may be drawn down below the acceptable limit.

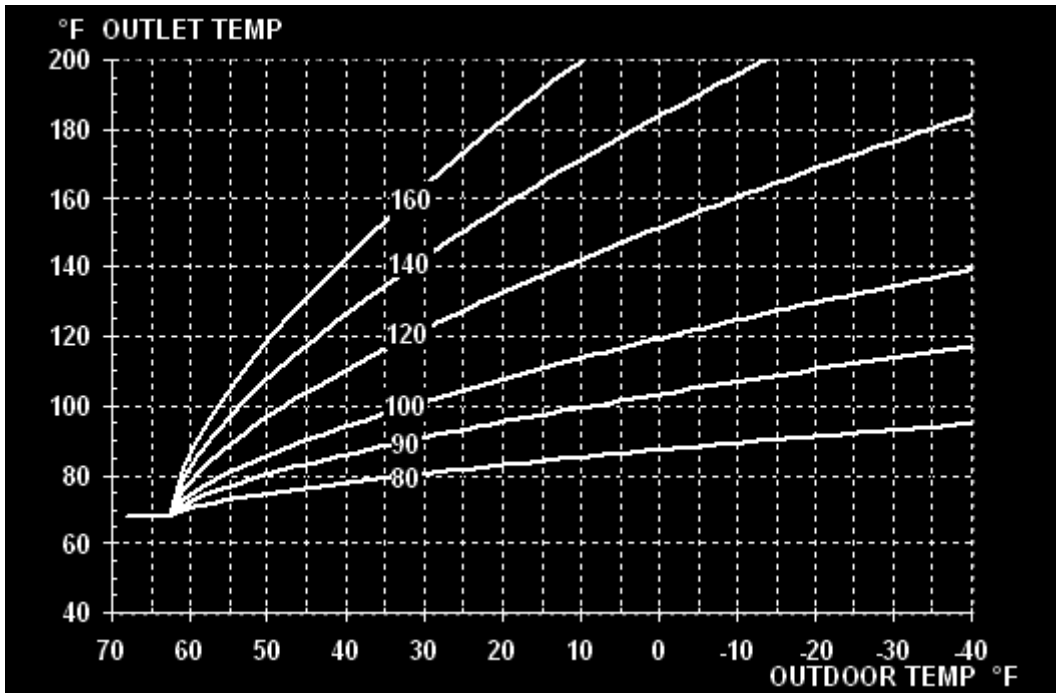
Make sure the supply and outdoor sensor wires aren't reversed.

Double check the valve and actuator assembly. There are no stops in the valve; if the controller is installed in the wrong position the valve may go past the closed position and begin to open.

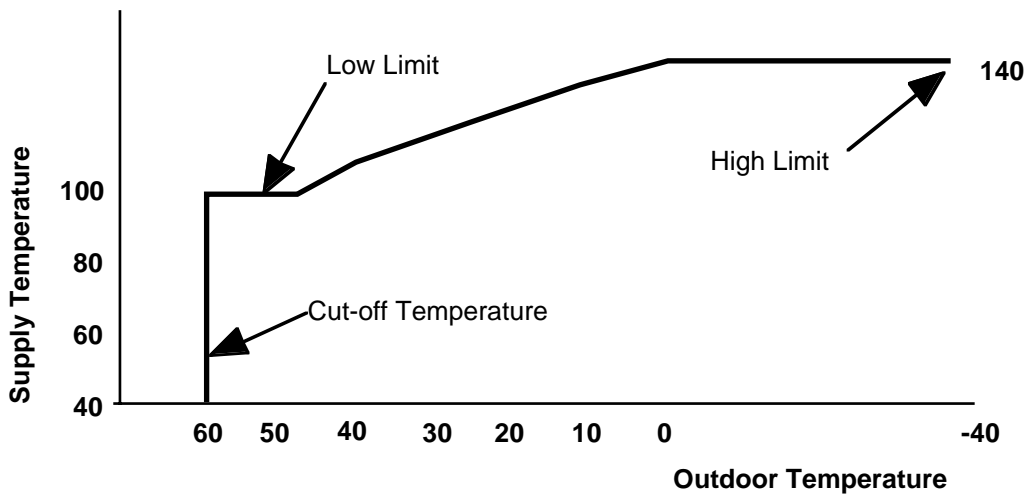
Check the rotation. If the TC62 is programmed with the wrong rotation the valve will be driven to one end position or the other and will stay there.

The screen can display 7 different error codes and, in most cases, the controller takes a specific action when the error occurs

ERR 1	Outside temperature sensor is shorted.	The controller assumes it is 32° F outside.
ERR 2	Outside sensor is open or not connected	The controller assumes it is 32° F outside.
ERR 3	Supply water temperature sensor is shorted.	The controller drives the valve half open.
ERR 4	Supply water sensor is open or not connected.	The controller drives the valve half open.
ERR 5	The room temperature sensor is shorted.	The controller functions without the sensor.
ERR 6	The room sensor is out of range.	The controller functions without the sensor.
ERR 7	There is an internal problem.	No controller action; replace it.



The reset curve shown at 100° F is the default value. If you set **b** at 110°, the controller follows a reset curve between the samples at 100° and 120°.



A sample reset curve with high limit, low limit and cut-off settings applied