



CASH VALVES™ TYPE LTC CRYOGENIC REVERSE ACTING TEMPERATURE REGULATOR INSTALLATION, OPERATION, AND MAINTENANCE INSTRUCTIONS

Before installation, these instructions must be carefully read and understood.

WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion, fire and/or chemical contamination causing property damage and personal injury or death.

Cash Valve regulators must be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations and Emerson Process Management Regulator Technologies, Inc. instructions.

If the regulator vents gas or a leak develops in the system, service to the unit may be required. Failure to correct trouble could result in a hazardous condition.

Installation, operation and maintenance procedures performed by unqualified personnel may result in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Only a qualified person shall install or service the Type LTC Temperature Regulator.

CALIFORNIA PROPOSITION 65 WARNING

This product can expose you to chemicals including lead, which is known to the State of California to cause cancer, birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

INTRODUCTION

Scope of the Manual

This manual provides instructions for the installation, adjustment and maintenance for the Type LTC Temperature Regulator.

DESCRIPTION

The Type LTC Temperature Control Valve is a double-port valve with a range of 0 to -40°F [-17 to -40°C] for low temperature cut-off. As it is subject to ambient temperature under normal conditions, it will normally be in a wide-open position. A copper well is recommended for each installation, which allows the removal of the capillary bulb without depressurizing the system.

Note: Valve seat closure may take several seconds under normal operating conditions. In addition, Type LTC fails in the closed position. Type LTC is not intended to be bubble tight on closing. It is only meant to drastically reduce flow on sensing temperature based on set.

TECHNICAL DATA

Service: Liquid or gas

Sizes: ½", ¾", 1", 1¼", 1½" and 2"

Connections: Threaded union inlet and outlet

Operating temperature range:

0 to -40°F [-17 to -40°C]

Standard valve setting: -20°F [-28°C]

Max. temperature limit: 300°F [208°C]

Min. temperature limit: -320°F [-195°C]

Max. body pressure on all sides:

400 psi - see maximum pressure differentials table on page 3

CONSTRUCTION

Brass union ends; bronze body and trim; copper capillary armor and bellows; PTFE gasket and packing; stainless steel spring; copper bulb and capillary. Copper bulb is ½" NPT x 5.82" (15 mm x 147.83 mm). All parts are commercially cleaned for oxygen service. A copper well is available as an option and is recommended for each cryogenic application.



MAXIMUM OPERATING LIMITS

Operating temperature range is 0 to -40°F [-17 to -40°C]; standard setting is -20°F [-28°C]. Maximum temperature limit is 300°F [208°C]; minimum temperature limit is -320°F [-195°C]. Maximum body pressure on all sizes is 400 psi [27.5 bar]; however, for proper operation, maximum pressure differentials as shown on page 3 must be observed.

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INSTALLATION INSTRUCTIONS

Type LTC Regulator is to be installed between the vaporizer and the service line (or final line) regulator. The valve should be installed in a horizontal position with the bellows housing upright. For other installation requirements consult the factory. For ease of operation and maintenance, it is suggested that manual shut-off valves be installed upstream and downstream from the valve. Before installing the valve, the piping should be thoroughly flushed out to remove any foreign material. Install the valve so that the arrow cast on the valve body points in the direction of flow. Use a compatible sealant on the male pipe threads and do not over tighten the valve connections. Exercise care when tightening the unions to ensure that the gaskets located in the union ends are properly positioned.

Bulb Installation

Install the thermostatic bulb at a point that is downstream from the vaporizer but upstream from the temperature regulator. When a thermometer is to be installed in the line, it should be placed directly after the bulb in the pipe line or at the same level as the bulb in a tank. The standard bulb is shown in the cut away view of the valve. A copper well is strongly recommended for each cryogenic temperature regulator installation, both for the protection of the bulb and to allow for the removal of the capillary bulb without depressurizing the system.

To install the bulb, remove the bulb bushing from the bulb. Insert the bulb and fasten by tightening the nut onto the bushing. The preferred bulb installation position is with the end of the bulb below horizontal. Although the horizontal position is permissible, care must be exercised to NEVER INSTALL THE BULB WITH THE END OF THE BULB ABOVE THE BULB FLANGE.

Note: The flexible armored capillary tubing connecting the bulb and valve must not be cut, kinked, mashed or twisted. It may, however, be bent on a 4" radius or larger. During installation the tubing can be fastened permanently to a rigid location, however, never connect the capillary tubing to steam pipes, cold water lines or other locations where the tubing would be subject to extreme temperatures. It is recommended that a single coil of tubing be made next to the regulator to absorb vibrations occurring in the pipe lines.

OPERATING INSTRUCTIONS

Temperature Adjustment

The temperature regulator can be set to cut-off the flow of gas at any temperature from 0 to -40°F (-17 to -40°C) temperature range. To adjust the cut-off temperature turn the temperature adjustment wheel (10) in a counter-clockwise direction to set the regulator at a higher temperature. Turn the wheel in a clockwise direction to set the regulator at a lower temperature. The wheel is mounted on ball bearings to eliminate friction and ensure easy operation.

MAINTENANCE INSTRUCTION

CAUTION

Before attempting to replace any spare parts, be sure to shut off all pressure connections to the valve. With the valve closed however, system pressure could still be locked between the shut off valve and the inlet and/or outlet sides of the regulator. Before proceeding with any valve service, be certain to relieve the pressure from both sides of the regulator.

When properly applied and correctly installed the Type LTC Temperature Regulator should require very little attention or maintenance. However, the Type LTC, like every mechanical device, deserves some care to ensure continued dependability and to protect the long service life for which it was designed. When attention is required use only genuine Cash Valve replacement parts. Refer to the Type LTC Regulator cut away view for parts identification during maintenance procedures.

Servicing The Valve Pull Rod Packing (16)

The valve yoke nut should be kept tight. Should it become necessary to replace the pull rod packing proceed as follows:

1. Remove the yoke assembly (9) from the valve body (19) by removing the yoke nut (13).
2. Remove the spacer (14), female adapter (15), the two worn packing seals (16), and the male adapter (17).
3. Replace the packing seals and reassemble in reverse order. Tighten the yoke nut securely.

Servicing the Thermal System

The thermal system used on the Type LTC Temperature Regulator is serviced only as a complete assembly except for the bulb bushing (2) and the bulb gasket (3). The thermal system is set at the factory to operate only at the temperature range stamped on the nameplate which is affixed to the bellows housing. If it is necessary to install a new thermal system, the procedure listed below should be followed.

1. Shut off the vaporizer system.
2. Completely loosen the bushing nut (5), then take the bulb (1) out of the bulb bushing (2).
3. Turn the temperature adjustment wheel (10) to its lowest position (counter-clockwise).
4. Remove the screws (8) retaining the bellows housing (7) to the yoke (9), then lift the housing from the yoke.

Note: The bellows housing (7) may be under slight spring tension. Exercise care when removing the housing.

5. Position the new bellows housing (7) on top of the spring, aligning the screw holes in the housing with those in the yoke.
6. Using three 10-32 x 1" screws inserted in alternate holes in the bellows flange, tighten the screws evenly to draw the bellows housing (7) down until it contacts the yoke (9). Install the shorter standard screws (8) in the remaining holes, then replace the 10-32 x 1" slave screws with the standard screws.

Note: An alternative method of installing the new bellows housing to the yoke would be to cool the thermal bulb to approximately -40°F (-40°C) allowing the bellows to contract and thereby permitting the standard screws to be installed.

7. Install the new thermal system bulb (1) in its original position and lighten the bulb bushing nut (5).
8. Turn the temperature adjustment wheel clockwise to its original position or approximately .675 inches above the lowest position.

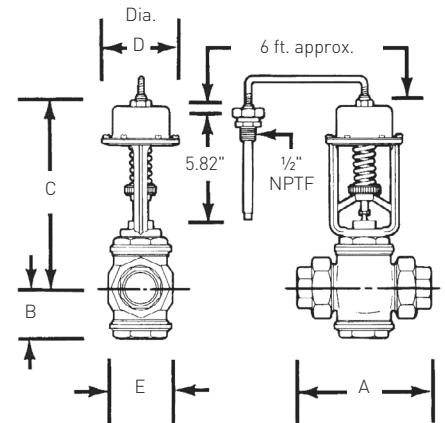
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MAXIMUM PRESSURE DIFFERENTIALS

Valve size inches mm	Temperature setting						
	0°F psi	-17°C bar	-20°F psi	-28°C bar	-40°F psi	-40°C bar	
1/2 - 3/4	15-20	400	27.5	400	27.5	400	27.5
1	25	275	18.9	400	27.5	400	27.5
1 1/4 - 1 1/2	32-40	275	18.9	350	24.1	350	24.1
2	50	275	18.9	275	18.9	300	20.6

Note: It requires approximately 15°F change in temperature to fully close valve.



DIMENSIONS

Size in. mm	Dimension										
	A		B		C		D		E		
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	
1/2	15	6.04	153.42	2.08	52.84	9.80	248.92	4.31	109.48	2.50	63.50
3/4	20	6.04	153.42	2.08	52.84	9.80	248.92	4.31	109.48	2.50	63.50
1	25	6.04	153.42	2.08	52.84	9.80	248.92	4.31	109.48	2.50	63.50
1 1/4	32	7.61	193.30	2.75	69.85	10.47	265.94	4.31	109.48	3.56	90.43
1 1/2	40	7.61	193.30	2.75	69.85	10.47	265.94	4.31	109.48	3.56	90.43
2	50	8.58	217.43	3.12	79.25	10.84	275.34	4.31	109.48	4.31	109.48

Note: Also available: Separable well - contact factory for more information.
Thermal system repair kit - contact factory for more information.

TYPE LTC SELECTION GUIDE

Example:	LTC	C	S	-	01	A
Model	LTC					
LTC	LTC Valve					
Valve size						
C	1/2"					
D	3/4"					
E	1"					
F	1 1/4"					
G	1 1/2"					
H	2"					
Connection type						
S	NPT threaded union ends					
B	BSPT threaded union ends					
Design revision						
(-)	Indicates original design					
Variation						
01	Catalog standard					
02	With Thermowell					
Temperature range						
A	-40 to 0°F					

HOW TO ORDER

To order repair parts, refer to the cut away view of the Type LTC Regulator to identify the part required. When ordering, please use the part names listed and provide the valve serial number stated on the metal identification tag attached to the bellows housing. Also state the following:

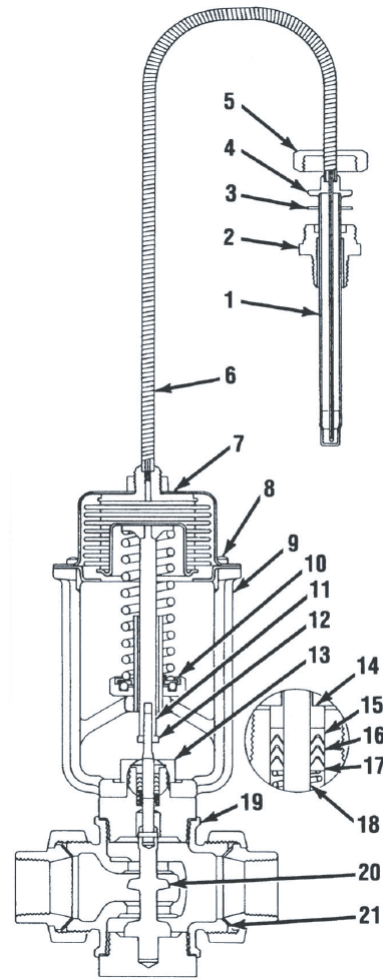
1. Valve size
2. Service
3. Temperature range
4. Maximum working pressure
5. Valve temperature setting
6. Part description
7. Quantity of each part
8. Valve assembly or serial number

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PARTS LIST

Item	Description
1.	Thermostatic Bulb
2.	Bulb Bushing
3.	Bulb Gasket
4.	Bulb Flange
5.	Bulb Bushing Nut
6.	Armored Capillary Tubing
7.	Bellows Housing
8.	Housing Screws (6)
9.	Yoke
10.	Temperature Adjustment Wheel
11.	Gasket, seat
11.	Upper Pull Rod
12.	Pull Rod Lock Nut
13.	Yoke Nut
14.	Spacer
15.	Female Adapter
16.	Seal (2)
17.	Male Adapter
18.	Lower Pull Rod
19.	Valve Body
20.	Double Ported Plug
21.	Teflon Gasket



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