

# CASH VALVES CRYOGENIC VALVES AND CONTROLS

## LOW TEMPERATURE CUT-OFF VALVES

The temperature control valve between the vaporizer and service line regulator is designed to cut off the gas flow if the gas temperature drops below a pre-determined point, usually -20°F (144.4K), often caused by a rapid or quick gas draw. If the temperature drops below the temperature control valve's setting, the valve closes to prevent excessively cold gas from reaching the service end of the system. In particular, the cold gas is prevented from contacting the final-line regulator, which is not constructed or intended for such low-temperature conditions. The valve opens automatically when gas temperature rises above the set point.

The Type LTC temperature control valve is a double-port valve with a range of 0°F to -40°F (255K to 233K) 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.



## LTC REVERSE-ACTING TEMPERATURE REGULATOR FOR CRYOGENIC SERVICE

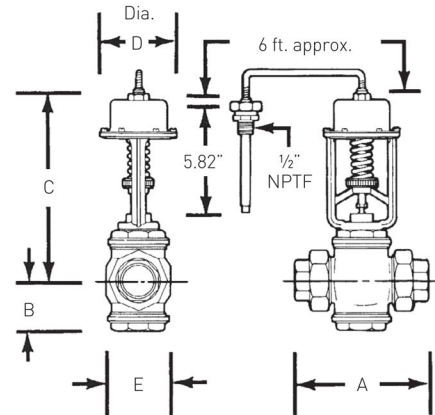
### Construction

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 1/2" 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°F to -40°F (255K to 233K); standard setting is -20°F (244K). Maximum temperature limit is 300°F (408K); minimum temperature limit is -320°F (78K). Maximum body pressure on all sizes is 400 psi (28.12 kg/cm<sup>2</sup>); however, for proper operation, maximum pressure differentials as shown on page 21 must be observed.



## DIMENSIONS

Size		Dimensions									
		A		B		C		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 - ask for part number 17960.  
Thermal system repair kit - ask for part number 18052.

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## TYPE LTC MAXIMUM PRESSURE DIFFERENTIALS

Valve size		Temperature setting					
		0°F	(255°K)	-20°F	(244.4°K)	-40°F	(233°K)
inches	(mm)	psi	(kg/sq cm)	psi	(kg/sq cm)	psi	(kg/sq cm)
½ - ¾	(15-20)	400	[28.12]	400	[28.12]	400	[28.12]
1	(25)	275	[19.33]	400	[28.12]	400	[28.12]
1¼ - 1½	(32-40)	275	[19.33]	350	[24.61]	350	[24.61]
2	(50)	275	[19.33]	275	[19.33]	300	[21.09]

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

## TYPE LTC CAPACITY INFORMATION (SCFH) OXYGEN SERVICE - 50 PSI AND 100 PSI LEVELS

Size	C <sub>v</sub>	50 psi level				100 psi level			
		1 psid	2 psid	5 psid	10 psid	1 psid	2 psid	5 psid	10 psid
½"	9.0	4109	5788	9044	12530	5480	7734	12147	16986
¾"	9.0	4109	5788	9044	12530	5480	7734	12147	16986
1"	13.0	5935	8361	13064	18100	7916	11171	17546	24535
1¼"	37.5	17122	24119	37684	52211	22835	32223	50612	70775
1½"	37.5	17122	24119	37684	52211	22835	32223	50612	70775
2"	52.5	23970	33767	52757	73095	31969	45113	70857	99085

## TYPE LTC CAPACITY INFORMATION (SCFH) OXYGEN SERVICE - 150 PSI AND 200 PSI LEVELS

Size	C <sub>v</sub>	150 psi level				200 psi level			
		1 psid	2 psid	5 psid	10 psid	1 psid	2 psid	5 psid	10 psid
½"	9.0	6572	9280	14605	20495	7506	10602	16705	23485
¾"	9.0	6572	9280	14605	20495	7506	10602	16705	23485
1"	13.0	9492	13404	21096	29603	10842	15315	24129	33922
1¼"	37.5	27382	38665	60853	85394	31274	44177	69604	97853
1½"	37.5	27382	38665	60853	85394	31274	44177	69604	97853
2"	52.5	38334	54130	85195	119552	43784	61847	97445	136994

**Note:** psid values are pressure drops across valve.

## TO DETERMINE CAPACITY

Determine operating pressure level at the valve and the maximum allowable pressure drop across the valve. Then refer to table above reading down the appropriate column to the selected pipe size. As an example: you are operating at a 150 psi pressure level and the maximum allowable pressure drop across the valve is 2 psi. Look at the second table under the 150 psi level and 2 psid column. For a 1¼" pipe size, the capacity would be 38,665 SCFH. Note: the values shown in the table are for oxygen gas; all capacity figures are standard cubic feet per hour. To determine capacity figures for other gases, consult the conversion chart below and multiply the chart capacities by the factor given.

## GAS CONVERSION FACTORS

Gas	Oxygen	Nitrogen	Hydrogen	Helium	Argon
Factor	1.000	1.075	4.000	2.860	0.893

# CASH VALVES CRYOGENIC VALVES AND CONTROLS

## TYPE LTC SELECTION GUIDE

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