

HANSEN TECHNOLOGIES CORPORATION



HTG1AZ
Thermostatic Expansion Valve (TXV)

INTRODUCTION

These thermostatic expansion valves (TXV) are designed for use in industrial and large commercial ammonia refrigeration systems. They regulate the rate of liquid ammonia entering an evaporator based on the superheat of the refrigerant leaving the evaporator. This regulation makes sure that only vapor, and not liquid refrigerant, is returned to the suction line.

Modular construction allows the capacity of the valve to be easily changed by installing a different cage assembly. The two-bolt construction allows quick replacement of the power assembly or cage assembly. The integral strainer can be serviced without removing the valve from the line. These valves are manufactured to Hansen Technologies specifications by ALCO Controls and are readily available from stock.

APPLICATIONS

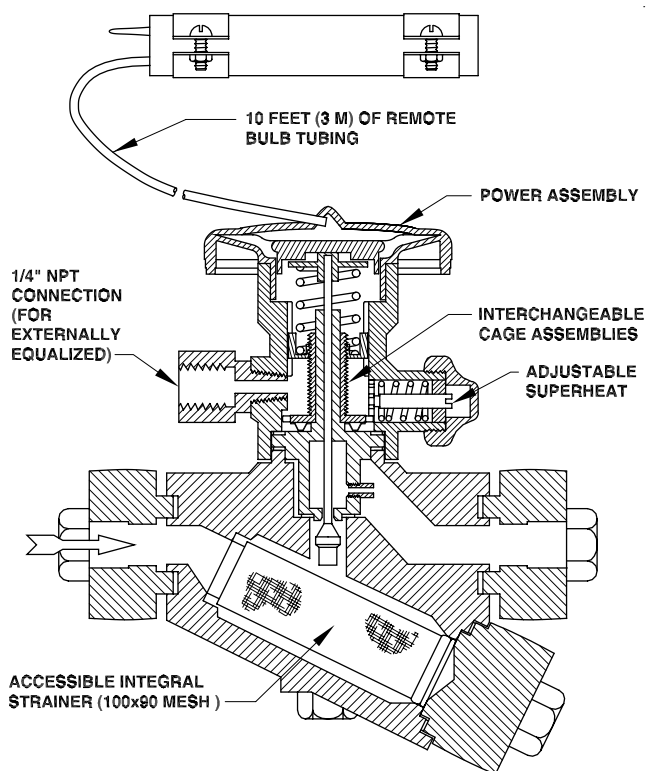
Typical applications include loading dock evaporator coils, water chillers, and plate chillers and head cooling for refrigerant-cooled compressors. These valves are also used for small systems where a minimal charge of refrigerant is desired. They are also used to control refrigerant liquid to air units operating above +32F (0°C) using air defrost, such as meat and poultry processing rooms.

Specifications, Applications, Service Instructions & Parts

THERMOSTATIC EXPANSION VALVES (TXV)

for Ammonia Refrigeration
1 to 40 Tons
(3.5 to 141 kW)

KEY FEATURES



ADDITIONAL FEATURES

Capacity of the valve can be easily changed by installing a different cage assembly.

Unique "take-apart" construction allows the valve to remain inline during strainer service.

Simple, two-bolt construction for the power assembly makes changing the power or cage assembly easy.

MATERIAL SPECIFICATIONS

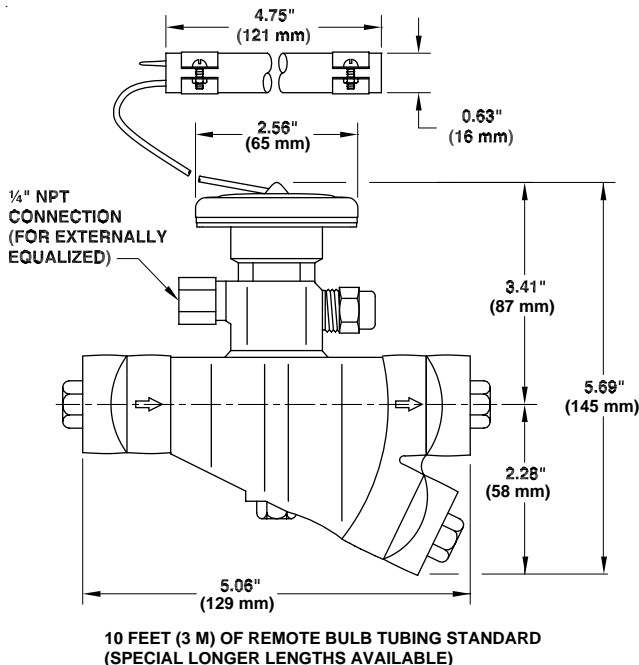
Body: Grey Iron Casting, ASTM A 48, Class 30
 Flanges: Forged Steel, ASTM A 29, Zinc-Bronze Chromate Finish
 Safe Working Pressure: 400 psig (27 bar)
 For Evaporator Operating Temperature Range: -40F to +40F (-40°C to +4.4°C)
 Superheat Adjustment: 2F to 20F (1°C to 11°C) factory set at 10F (6°C)

INSTALLATION

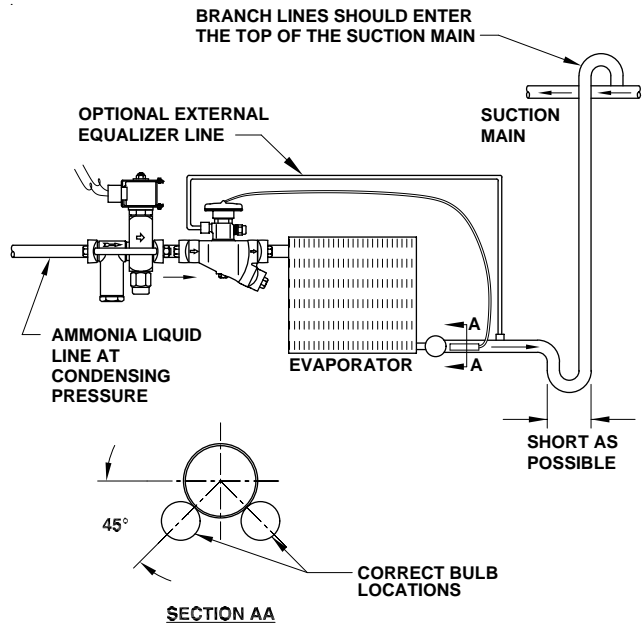
Protect the valve from moisture and dirt during storage. The arrow on the valve body should be in the direction of normal refrigerant flow. These valves are normally installed in horizontal pipe lines with the power assembly on top. The valve should be located as close to the evaporator inlet or distributor as possible. Protect against excessive vibration which may cause a break in the capillary tubing. Install any shut-off valves necessary for isolating the thermostatic expansion valve (TXV) and external equalizer line. The remote bulb of the thermostatic expansion valve (TXV) should be attached at the outlet of the evaporator using the supplied mounting clips (2). This allows the pressure inside the remote bulb and power assembly to correspond to the saturation pressure of the refrigerant gas at the temperature leaving the evaporator. To minimize the effects of ambient temperature, insulate the bulb and at least 9" (225 mm) of pipe both upstream and downstream of the bulb.

For evaporators having distributors or excessive pressure drop, greater than 2F (1°C), use an externally equalized TXV. If an orifice type distributor is used, remove the discharge tube from the cage assembly by carefully turning it counterclockwise. The external equalizer line should be connected to the suction line at the evaporator outlet. This allows true measurement of superheat. Always make the connection at the top of the line to avoid oil lodging in the external equalizer line.

INSTALLATION DIMENSIONS



TYPICAL APPLICATION

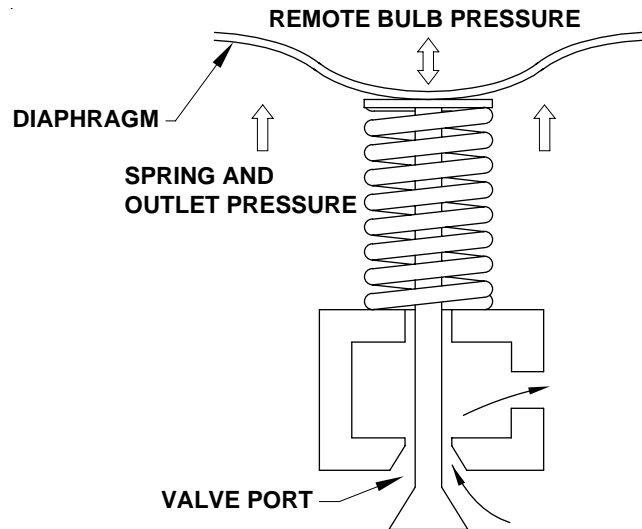


GOOD CONTACT BETWEEN THE REMOTE BULB AND THE LINE IS ESSENTIAL FOR PROPER HEAT TRANSFER. DO NOT LOCATE THE BULB WHERE LIQUID IS TRAPPED.

The above drawing is of a fictional refrigeration system. This drawing should *not* be used for design or construction.

OPERATION

The remote bulb and tubing contain a liquid and gas charge. As the temperature of the remote bulb changes, the pressure of the gas charge inside the bulb also changes. This, in turn, either increases or decreases the pressure on the diaphragm in the power assembly. The spring in the cage assembly plus the outlet pressure counteracts the force exerted by the diaphragm. As the temperature (superheat) of the bulb increases, the pressure inside the bulb forces the diaphragm down, opening the port, and allowing more refrigerant flow into the evaporator. As the temperature of the bulb decreases, the pressure inside the bulb decreases, allowing the spring force to close the port, restricting refrigerant flow through the valve port.



SUPERHEAT ADJUSTMENT

Superheat is the temperature increase of the refrigerant gas above the saturation temperature at a given pressure. To determine the superheat of the refrigerant vapor, measure the pressure and temperature at the outlet of the evaporator. Compare the measured temperature to the saturation temperature at the measured pressure. The difference between the measured temperature and the saturation temperature is the superheat.

The factory superheat setting is 10F (6°C). Normally, the factory setting should not be changed. However, if the evaporator is not filling with liquid (too much superheat) or liquid is flooding out of the evaporator (too little superheat), the setting can be changed. After the seal cap is removed, turn the adjusting stem using a screwdriver. One full turn of the adjusting stem will change the superheat setting approximately 0.5F (0.28°C). To increase the superheat, turn the adjusting stem clockwise. To decrease the superheat, turn the adjusting stem counterclockwise. Then, allow the system to operate for at least 10 minutes before remeasuring the temperature and pressure at the evaporator outlet. Make additional adjustments as necessary until the desired superheat is achieved. Replace the seal cap after the final adjustment.

SERVICE AND MAINTENANCE

Before servicing the thermostatic expansion valve, make sure it is isolated from the system and the internal pressure is safely reduced to zero. See also the Caution section in this bulletin. Always wear safety eye goggles when working on a refrigeration system. It is not necessary to remove

the valve from the line when servicing the power assembly, cage assembly, or strainer. Power assemblies, cage assemblies, discharge tubes, and gaskets are interchangeable with ALCO parts.

The TXV consists of three major components—the power assembly, the cage assembly, and the valve body. The strainer is integral with the valve body. To remove the power or cage assembly, first loosen and remove the body cap screws opposite the power assembly from the valve body. The power assembly can then be lifted from the valve body. If necessary, remove the cage assembly by lifting it out of the valve body. Take extra care to make sure no foreign material enters the valve when the power assembly is not in place. To check the power assembly, press against the diaphragm inside. If the diaphragm moves easily, replace the power assembly.

The TXV can be changed from internally to externally equalized by installing an externally equalized cage assembly, removing the plug on the power assembly, and installing an external equalizing line. To change to internally equalized, install an internally equalized cage assembly and plug the external equalizing line on the power assembly. Note: Internally equalized cage assemblies have the equalizer hole drilled through the cage flange.

To reassemble, insert the cage assembly into the valve body making sure that the three gaskets are in place. Next, place the power assembly onto the valve body and reinstall the body cap screws. Do not use oil or thread compound. Torque the cap screws to 330–360 in.lbs. (37–41 Nm).

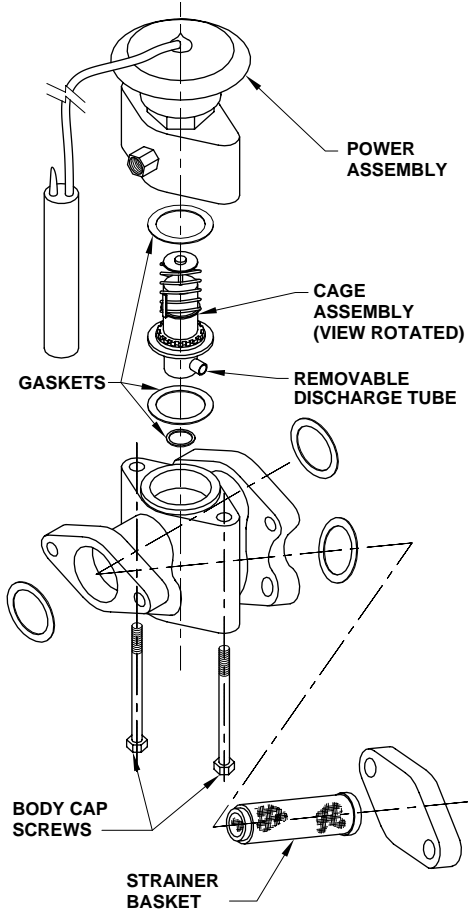
AMMONIA CAPACITIES IN TONS (kW)

EVAP. TEMP	PRESSURE DROP ACROSS VALVE PSI (BAR)	THERMOSTATIC EXPANSION VALVES										
		HTG1AZ	HTG2AZ	HTG3AZ	HTG5AZ	HTG7½AZ	HTG10AZ	HTG15AZ	HTG20AZ	HTG25AZ	HTG40AZ	
+40F +4.4°C	80 (5.4)	0.77 (2.7)	1.54 (5.4)	2.3 (8.1)	3.9 (14)	5.8 (20)	7.7 (27)	11.6 (41)	15.4 (54)	19.3 (68)	30.9 (109)	
	100 (6.8)	0.86 (3.0)	1.72 (6.0)	2.6 (9.1)	4.3 (15)	6.5 (23)	8.6 (30)	12.9 (45)	17.2 (61)	21.6 (76)	34.5 (121)	
	120 (8.2)	0.94 (3.3)	1.89 (6.6)	2.8 (10)	4.7 (17)	7.1 (25)	9.5 (33)	14.2 (50)	18.9 (67)	23.6 (83)	37.8 (133)	
	140 (9.5)	1.02 (3.6)	2.0 (7.0)	3.1 (11)	5.1 (18)	7.7 (27)	10.2 (36)	15.3 (54)	20.4 (72)	25.5 (90)	40.8 (143)	
+20F -6.7°C	100 (6.8)	0.85 (3.0)	1.71 (6.0)	2.6 (9.1)	4.3 (15)	6.4 (23)	8.5 (30)	12.8 (45)	17.1 (60)	21.3 (75)	34.1 (120)	
	120 (8.2)	0.94 (3.3)	1.87 (6.6)	2.8 (10)	4.7 (17)	7.0 (25)	9.4 (33)	14.0 (49)	18.7 (66)	23.4 (82)	37.4 (132)	
	140 (9.5)	1.01 (3.6)	2.0 (7.0)	3.0 (11)	5.1 (18)	7.6 (27)	10.1 (36)	15.1 (53)	20.2 (71)	25.2 (89)	40.4 (142)	
	160 (10.9)	1.08 (3.8)	2.2 (7.7)	3.2 (11)	5.4 (19)	8.1 (29)	10.8 (38)	16.2 (57)	21.6 (76)	27.0 (95)	43.2 (152)	
+5F -15°C	100 (6.8)	0.85 (3.0)	1.69 (5.9)	2.5 (8.8)	4.2 (15)	6.3 (22)	8.5 (30)	12.7 (45)	16.9 (59)	21.1 (74)	33.8 (119)	
	120 (8.2)	0.93 (3.3)	1.85 (6.5)	2.8 (10)	4.6 (16)	6.9 (24)	9.3 (33)	13.9 (49)	18.5 (65)	23.1 (81)	37.0 (130)	
	140 (9.5)	1.0 (3.5)	2.0 (7.0)	3.0 (11)	5.0 (18)	7.5 (26)	10.0 (35)	15.0 (53)	20.0 (70)	25.0 (88)	40.0 (141)	
	160 (10.9)	1.07 (3.8)	2.1 (7.4)	3.2 (11)	5.3 (19)	8.0 (28)	10.7 (38)	16.0 (56)	21.4 (75)	26.7 (94)	42.8 (151)	
-10F -23°C	120 (8.2)	0.79 (2.8)	1.57 (5.5)	2.4 (8.4)	3.9 (14)	5.9 (21)	7.9 (28)	11.8 (42)	15.7 (55)	19.7 (69)	31.5 (111)	
	140 (9.5)	0.85 (3.0)	1.7 (6.0)	2.6 (9.1)	4.3 (15)	6.4 (23)	8.5 (30)	12.8 (45)	17.0 (60)	21.3 (75)	34.0 (120)	
	160 (10.9)	0.91 (3.2)	1.82 (6.4)	2.7 (9.5)	4.5 (16)	6.8 (24)	9.1 (32)	13.6 (48)	18.2 (64)	22.7 (80)	36.3 (128)	
	180 (12.2)	0.96 (3.4)	1.92 (6.8)	2.9 (10)	4.8 (17)	7.2 (25)	9.6 (34)	14.5 (51)	19.3 (68)	24.1 (85)	38.6 (136)	

Capacities are based on +86F (+30°C) condensing temperature, vapor-free liquid at the inlet.

Refer to evaporator manufacturer recommendations for direct expansion ammonia feed sizing and derating of capacities for suction temperatures below 0F (-17.8°C).

PARTS LIST



Part Number	Description
30-XB1049AZN2*	Power Assembly with Gasket Kit (see below)
30-XA-1633-1	Strainer Basket**
30-X-13455-1	Gasket Kit (includes all internal gaskets)
30-A-650-43	Flange Gasket Kit
30-1101	Flange Kit, 1/2" FPT
30-1102	Flange Kit, 1/2" Socket Weld
30-XC-741-B0*	Cage Assembly 1 ton (3.5 kW)
30-XC-741-B1*	Cage Assembly 2 ton (7 kW)
30-XC-741-B5*	Cage Assembly 3 ton (10 kW)
30-XC-741-B2*	Cage Assembly 5 ton (17 kW)
30-XC-741-B2 1/2*	Cage Assembly 7.5 ton (26 kW)
30-XC-741-B3*	Cage Assembly 10 ton (35 kW)
30-XC-741-B6*	Cage Assembly 15 ton (52 kW)
30-XC-741-B4*	Cage Assembly 20 ton (70 kW)
30-XC-741-B7B†	Cage Assembly 25 ton (87 kW)
30-XC-741-B8B†	Cage Assembly 40 ton (140 kW)

Power assemblies, cage assemblies, discharge tubes, and gaskets are interchangeable with equivalent ALCO parts.

**Does not include gaskets; order Gasket Kit 30-X-13455-1.

*Add suffix A for internally equalized or B for externally equalized. Example: 30-XC-741-B0B for an externally equalized 1 ton cage assembly. The part number is stamped on top of the cage assembly.

†Externally equalized only.

CAUTION

These thermostatic expansion valves are for ammonia refrigeration systems only. These instructions and related safety precautions must be read completely and understood before selecting, using, or servicing these valves. Only knowledgeable, trained refrigeration technicians should install, operate, or service refrigeration components. Stated temperature and pressure limits should not be exceeded. Refrigeration components should not be removed from the system or opened unless the system has been evacuated to zero pressure. See also the Safety Precautions in the current List Price Bulletin and the Safety Precautions Sheet supplied with the product. Escaping refrigerant can cause injury, especially to the eyes and lungs.

WARRANTY

These valves and components are guaranteed against defective materials or workmanship for one year F.O.B. our plant. No consequential damages or field labor is included.

ORDERING INFORMATION, THERMOSTATIC EXPANSION VALVES

CATALOG NUMBER		NOMINAL CAPACITIES (AMMONIA)	
INTERNAL	EXTERNAL	TONS	kW
HTG1AZ	HTG1AZE	1.0	3.5
HTG2AZ	HTG2AZE	2.0	7.0
HTG3AZ	HTG3AZE	3.0	10.6
HTG5AZ	HTG5AZE	5.0	17.6
HTG7 1/2AZ	HTG7 1/2AZE	7.5	26.4
HTG10AZ	HTG10AZE	10.0	35.2
HTG15AZ	HTG15AZE	15.0	52.8
HTG20AZ	HTG20AZE	20.0	70.3
—	HTG25AZE	25.0	87.9
—	HTG40AZE	40.0	140.7

Available flanges: 1/2" FPT or 1/2" socket weld.

The strap-on-type remote sensing bulb comes standard with 10 feet (3 m) of tubing. Other lengths of tubing up to 50 feet (15 m) are available. Contact the factory.

To Order: Specify catalog number and flange connection size and style.

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