



## THERMO® EXPANSION VALVE QUICK SELECT GUIDE: 1/4 TO 20 TONS

APPLICATION	FEATURE	MODEL	NOMINAL CAPACITY R-22 (IN TONS)	PAGE
<b>SUPERMARKET CASES WALK-IN COOLERS ICE MACHINES</b>	Interchangeable Cages, Flexibility	<b>TI</b>	1/3 thru 5	53
	Serviceability, Balanced Port, Premium Performance	<b>HF</b>	1/4 thru 20	19
	Economy, SAE only	<b>AFA</b>	1/2 thru 5	6
	Economy, ODF	<b>AA</b>	1/2 thru 5	2
	Stepper Motor Driven – Electronic	<b>ESV</b>	1 thru 10	66
<b>COMMERCIAL HVAC</b>	Serviceability, Balanced Port, Premium Performance	<b>HF</b>	1/4 thru 20	19
	Economy Performance, Hermetic	<b>AA</b>	1/2 thru 5	2
	Take-A-Part, Flexibility	<b>TCL</b>	1/2 thru 12	36
<b>RESIDENTIAL A/C</b>	Economy Performance, Hermetic	<b>AA</b>	1/2 thru 5	2
	Economy Performance, Non-Adjustable	<b>AN</b>	1/2 thru 5	
<b>HEAT PUMP</b>	Reverse Flow, Internal Check	<b>ANC</b>	1/2 thru 5	4
	Bi-Flow Expansion, Hermetic, Economy	<b>BA/BN</b>	1/2 thru 5	11
	Bi-Flow Expansion, Serviceable, Premium Performance	<b>HF</b>	1 thru 5-1/2	19
	Bi-Flow Expansion, Serviceable, Premium Performance	<b>TFE</b>	7-1/2 thru 12	51
<b>TRANSPORT REFRIGERATION</b>	Serviceability, Balanced Port, Premium Performance	<b>HF</b>	1/2 thru 20	19
	Take-A-Part, Flexibility, Adjustable Superheat	<b>TCL</b>	1/2 thru 12	36
	Take-A-Part, Flexibility, Non-Adjustable Superheat	<b>TLE</b>	1/2 thru 12	46
	Stepper Motor Driven – Electronic	<b>ESV</b>	1 thru 10	66
<b>AMMONIA</b>	Take-A-Part, Flexibility	<b>TG</b>	1 thru 20	59
<b>ULTRA-LOW TEMP</b>	Take-A-Part, Flexibility	<b>ZZ</b>	3/4 thru 8	55
<b>DESUPERHEATING LIQUID INJECTION</b>	Economy, Hermetic, Temperature/Pressure Responsive	<b>LA</b>	SEE CATALOG PAGE	62
	Take-A-Part, Flexibility, Temperature/Pressure Responsive	<b>LCL</b>	SEE CATALOG PAGE	64
<b>ELECTRONIC</b>	Stepper Motor Driven, Hermetic	<b>ESV</b>	1 thru 10	66

## THERMO® EXPANSION VALVE QUICK SELECT GUIDE: OVER 20 TONS

APPLICATION	FEATURE	MODEL	NOMINAL CAPACITY R-22 (IN TONS)	PAGE
<b>ROOFTOP HVAC INDUSTRIAL REFRIGERATION</b>	Take-A-Part, Serviceability, Flexibility, Performance	<b>TER</b>	22 thru 45	36
		<b>TIR</b>	55	
		<b>THR</b>	70 and 85	
		<b>TMR</b>	100	
<b>CHILLERS</b>	Premium Performance	<b>TRAE</b>	10 thru 70	29
	Wide Range Control Flange Mount, Solenoid Shut-Off	<b>POS</b>	20 thru 450	33
	Take-A-Part, Serviceability, Flexibility, Performance	<b>TER</b>	22 thru 45	36
		<b>TIR</b>	55	
		<b>THR</b>	70 and 85	
		<b>TMR</b>	100	
	Premium Performance	<b>TRAE</b>	10 thru 70	29
Electronic Stepper Driver	<b>ESV</b>	1 thru 10	66	
<b>AMMONIA</b>	Take-A-Part, Serviceability, Flexibility	<b>TG</b>	1 thru 40	59

# A-SERIES THERMO® EXPANSION VALVE

"A" Series Thermo Expansion Valves are used for heat pump, air conditioning, food service and commercial applications. "A" Series valves provide stable and accurate control over a wide range of operating conditions.

## FEATURES

- ☆ New HAA wide range charge allows two valves ( 2 1/2 and 5 ton, R-22) to cover all capacities from 1 to 5 tons on most residential systems (*see below*)
- ☆ New ZW155 charge available for R-410A systems
- ☆ Available adjustable or non-adjustable superheat for application flexibility
- ☆ SAE or ODF connections for easy installation
- ☆ Hermetic construction eliminates external leakage
- ☆ Compact size allows installation in limited spaces
- ☆ Mass spectrometer tested to ensure less than 0.10 oz/year external leakage rate
- ☆ Available external or internal equalizer to satisfy the broadest possible range of applications
- ☆ Stainless steel power element eliminates corrosion and prevents valve failure
- ☆ Available internal check valve allows reverse flow heat pump applications, eliminating the need for external piping and external check valve, thus reducing installation costs (ANC Series)
- ☆ Bleed type pressure equalization available to accommodate PSC type compressors



- ☆ Wrench flats on inlets and outlets (SAE only) for easy installation
- ☆ Available chatleff or aeroquip connections to suit any application

## SPECIFICATIONS

Maximum working pressure: 600 psig  
Compatible with new refrigerants

## THERMO® VALVE APPLICATION

For best performance, the Thermo® Expansion Valve should be applied as close to the evaporator as possible. Equally important, make sure the valve is placed so that it can be easily serviced or adjusted. Use a Venturi type distributor and apply the valve as close to the distributor as possible.

## NOMENCLATURE/SELECTION

AA	C	E	B	2	H	C
<b>Valve Series</b> AA = Adjustable AN = Non-Adjustable	<b>Check Valve</b> (optional)	<b>External Equalizer</b> (optional)	<b>Bleed</b> (optional)	<b>Capacity</b> Nominal Rating in Tons	<b>Refrigerant Code</b> H = R22 M = R134a N = R407C S = R404A P = R507 Z = R410A	<b>Charge Code</b> C = med temp CA = heat pump W = MOP (if needed) Z = low temp AA = wide range

**NEW!**

## UNIVERSAL REPLACEMENT HAA WIDE RANGE CHARGE FOR HVAC APPLICATIONS

- ☆ The new HAA charge is a special high stability charge designed for R-22 HVAC applications and is used by leading original equipment manufacturers.
- ☆ The HAA is a wide range charge providing greater superheat stability, allowing in most cases two valves to cover a wide range of capacities from 1 to 5 tons.
- ☆ The HAA charge also offers customers the benefit of inventory reduction by replacing several valves with two HAA wide range valves, while continuing to meet system performance needs.
- ☆ The HAA charge is now available for "A" series expansion valves for R-22 applications. With the addition of an integral check valve, four expansion valves can meet the majority of residential HVAC, light commercial and heat pump applications as shown in Table 1.

TABLE 1

PCN	DESCRIPTION	R-22 CAPACITY RANGE
064102	AACE 2 1/2 HAA ODF EE 30" 3/8 x 1/2 ODF S/T 6A	1 TO 3 TONS
064103	AACE 5 HAA ODF EE 30" 3/8 x 1/2 ODF S/T 6A	3 1/2 TO 5 TONS
014091	AACE 2 1/2 HAA CAP TUBE EE w/NUT 30" CHATLEFF X CHATLEFF S/T 6A	1 TO 3 TONS
014092	AACE 5 HAA CAP TUBE EE w/NUT 30" CHATLEFF X CHATLEFF S/T 6A	3 1/2 TO 5 TONS

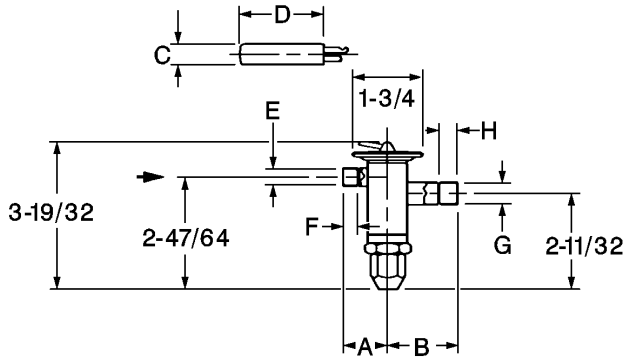
**AN SERIES — NON-ADJUSTABLE**  
**ANC SERIES — INTERNAL CHECK VALVE**

SEE PAGES 7 AND 8 FOR EXTENDED CAPACITIES. FOR ORDERING INFORMATION, SEE PAGES 9 AND

# A-SERIES THERMO® EXPANSION VALVES

## AA(E) DIMENSIONAL DIAGRAM

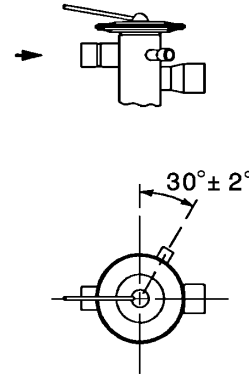
ODF CONNECTIONS, STRAIGHT-THRU CONFIGURATION ONLY



## REMOTE BULB TUBING LENGTH 30" OR 5' STANDARD

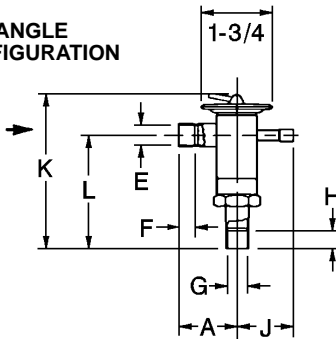
AA(E) & AN(E) Remote Bulb Dimensions		
REFRIGERANT CHARGE	D (LENGTH)	C (DIAMETER)
ZW 155, HCA, NCA, HAA	2-5/16	3/4
MC, MZ, MW (MOP), RW (MOP)	2-3/32	1/2
RC, SC, SZ, SW (MOP),		
PC, PZ, PW (MOP)		

## AA(E) & AN(E) EXTERNAL EQUALIZER CONFIGURATION VIEW



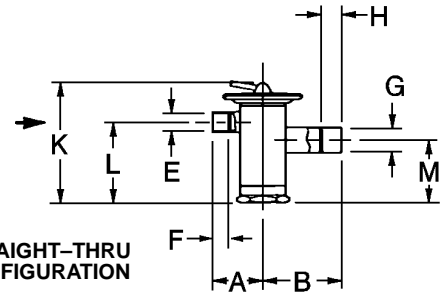
AA(E) DIMENSIONAL DATA								
TYPE	INLET	OUTLET	A	B	E	F	G	H
AA(E) STRAIGHT THRU ODF	1/4	3/8	1-45/64	1-47/64	1/4	5/16	3/8	5/16
	3/8	3/8	1-47/64	1-47/64	3/8	5/16	3/8	5/16
	3/8	1/2	1-47/64	1-47/64	3/8	5/16	1/2	3/8
	1/2	1/2	1-47/64	1-47/64	1/2	3/8	1/2	3/8
	1/2	5/8	1-47/64	1-3/4	1/2	3/8	5/8	1/2
	5/8	5/8	1-3/4	1-3/4	5/8	1/2	5/8	1/2
	1/4	5/8	1-45/64	1-3/4	1/4	5/16	5/8	1/2
	3/8	5/8	1-47/64	1-3/4	3/8	5/16	5/8	1/2
	1/4	1/2	1-45/64	1-47/64	1/4	5/16	1/2	3/8
	1/2	7/8	1-47/64	1-47/64	1/2	3/8	7/8	3/4
	3/8	7/8	1-47/64	1-47/64	3/8	5/16	7/8	3/4
	5/8	7/8	1-3/4	1-47/64	5/8	1/2	7/8	3/4

### ANGLE CONFIGURATION



## AN(E) & ANC(E) DIMENSIONAL DIAGRAMS

ODF CONNECTIONS  
ANGLE OR  
STRAIGHT-THRU CONFIGURATION



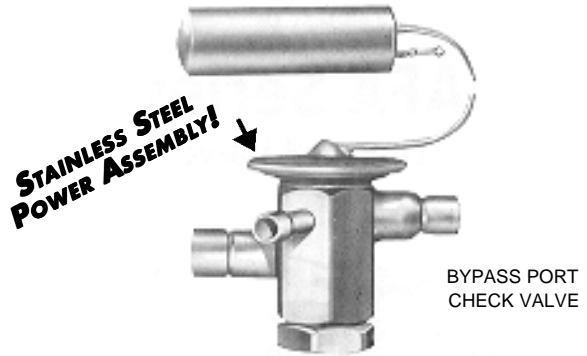
DIMENSIONAL DATA												
TYPE	INLET	OUTLET	A	B	E	F	G	H	K	L	M	
STRAIGHT THRU ODF	1/4	3/8	1-45/64	1-47/64	1/4	5/16	3/8	5/16	2-5/8	1-3/4	1-23/64	
	3/8	3/8	1-47/64	1-47/64	3/8	5/16	3/8	5/16				
	3/8	1/2	1-47/64	1-47/64	3/8	5/16	1/2	3/8				
	1/2	1/2	1-47/64	1-47/64	1/2	3/8	1/2	3/8				
	1/2	5/8	1-47/64	1-3/4	1/2	3/8	5/8	1/2				
	5/8	5/8	1-3/4	1-3/4	5/8	1/2	5/8	1/2				
	1/4	5/8	1-45/64	1-3/4	1/4	5/16	5/8	1/2				
	3/8	5/8	1-47/64	1-3/4	3/8	5/16	5/8	1/2				
	1/4	1/2	1-45/64	1-47/64	1/4	5/16	1/2	3/8				
	1/2	7/8	1-47/64	1-47/64	1/2	3/8	7/8	3/4				
	3/8	7/8	1-47/64	1-47/64	3/8	5/16	7/8	3/4				
	5/8	7/8	1-3/4	1-47/64	5/8	1/2	7/8	3/4				

DIMENSIONAL DATA										
TYPE	INLET	OUTLET	A	E	F	G	H	J	K	L
ANGLE ODF	1/4	3/8	1-45/64	1/4	5/16	3/8	5/16	1-45/64	3-1/32	2-11/64
	3/8	3/8	1-47/64	3/8	5/16	3/8	5/16		3-1/32	2-11/64
	3/8	1/2	1-47/64	3/8	5/16	1/2	3/8		3-37/64	2-23/32
	1/2	1/2	1-47/64	1/2	3/8	1/2	3/8		3-37/64	2-23/32
	1/2	5/8	1-47/64	1/2	3/8	5/8	1/2		3-7/32	2-23/64
	5/8	5/8	1-3/4	5/8	1/2	5/8	1/2		3-7/32	2-23/64
	1/4	5/8	1-45/64	1/4	5/16	5/8	1/2		3-7/32	2-23/64
	3/8	5/8	1-47/64	3/8	5/16	5/8	1/2		3-7/32	2-23/64
	1/4	1/2	1-45/64	1/4	5/16	1/2	3/8		3-7/64	2-23/32
	1/2	7/8	1-47/64	1/2	3/8	7/8	3/4		3-19/32	2-47/64

SEE PAGES 7 AND 8 FOR EXTENDED CAPACITIES. FOR ORDERING INFORMATION, SEE PAGES 9 AND 10.

# ANC THERMO® VALVE WITH INTERNAL CHECK

ANC Series Thermo Expansion Valves are used for heat pump and air conditioning applications. ANC valves provide stable and accurate system control over a wide range of operating conditions.



## FEATURES

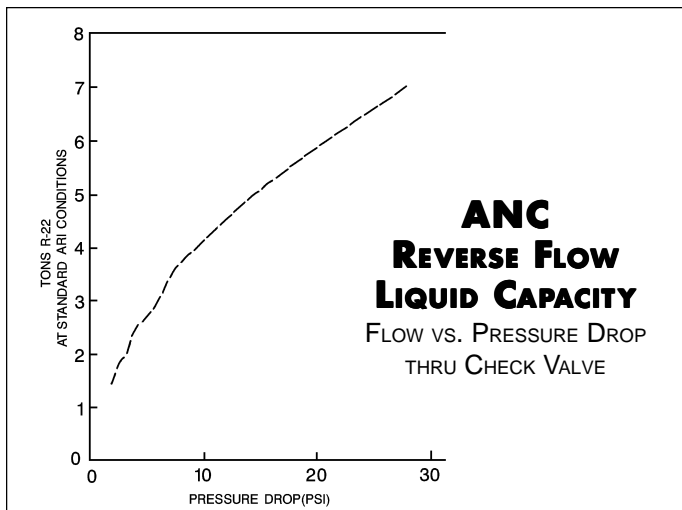
- ☆ New HCA charge meets compressor manufacturer's superheat requirements for both heat pump and air conditioning service. Other charges available for your system
- ☆ Bleed type pressure equalization to accommodate PSC type compressors available on special order
- ☆ Factory-set superheat prevents unwanted or unauthorized field tampering
- ☆ Compact integral design with straight-thru connections adapts to your installation needs
- ☆ SAE flare or ODF solder connections
- ☆ Reverse-flow capability for heat pumps
- ☆ Internal check valve construction shown above was designed specifically for heat pump applications and provides superior control during heating or cooling cycles
- ☆ Negligible pressure drop in reverse flow
- ☆ External equalizer standard

The ANC was designed specifically for heat pump systems. The internal check valve feature allows reverse flow to occur, making the ANC the best choice for your heat pump applications.

## SPECIFICATIONS

Maximum working pressure: 600 psig

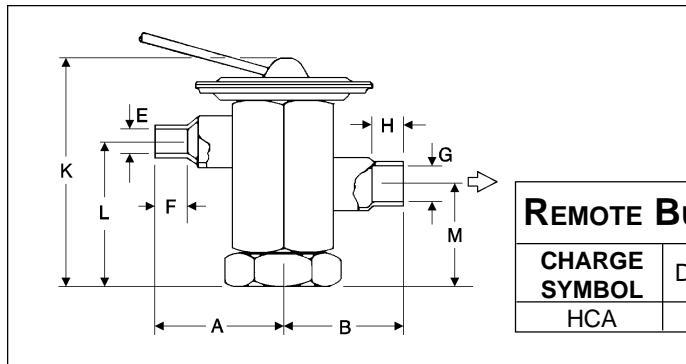
VALVE NOMENCLATURE						
AN	C	E	2	H	CA	1/2 x 1/2 ODF
Valve Series	Internal Check	External Equalizer	Nominal Capacity	Refrigerant Code H = R22 N = R407C Z = 410A	Charge Code	Connection size & style
Example above: ANC(E) 2 HCA 1/2 x 1/2 ODF						



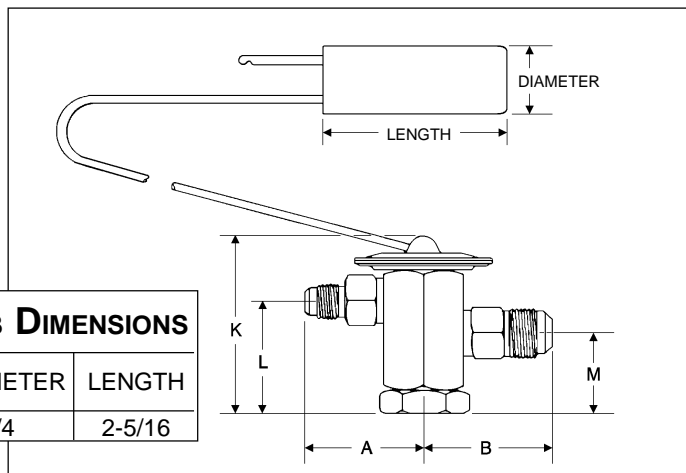
SEE PAGES 7 AND 8 FOR EXTENDED CAPACITIES. FOR ORDERING INFORMATION, SEE PAGE 10.

# ANC DIMENSIONAL DATA

## REMOTE BULB TUBING LENGTH 30" OR 5' STANDARD



**ANC SERIES**  
**ODF CONNECTIONS**  
**STRAIGHT – THRU CONFIGURATION**



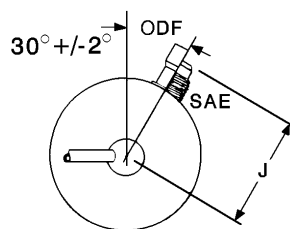
**ANC SERIES**  
**SAE CONNECTIONS**  
**STRAIGHT – THRU CONFIGURATION**

REMOTE BULB DIMENSIONS		
CHARGE SYMBOL	DIAMETER	LENGTH
HCA	3/4	2-5/16

## ANC DIMENSIONS

STRAIGHT-THRU	INLET	OUTLET	A	B	E DIA.	F MIN.	G DIA.	H MIN.	K	L	M
SAE	3/8	3/8	1-41/64	1-23/32							
	3/8	1/2	1-41/64	1-23/32							
	1/2	1/2	1-23/32	1-23/32	—	—	—	—	2-1/4	1-25/64	1
	1/2	5/8	1-23/32	1-63/64							
	5/8	5/8	1-63/64	1-63/64							
ODF	3/8	3/8	1-3/16	1-3/16	.3790	.320	.3790	.320			
	3/8	1/2	1-3/16	1-3/16	.3790	.380	.3790	.320			
	1/2	1/2	1-3/16	1-3/16	.5040	.500	.5040	.380	2-1/4	1-25/64	1
	1/2	5/8	1-3/8	1-3/8	.6290	.320	.6290	.500			
	5/8	5/8	1-3/8	1-3/8							

For connection sizes not shown consult your ALCO representative or ALCO's Applications Engineering Department.



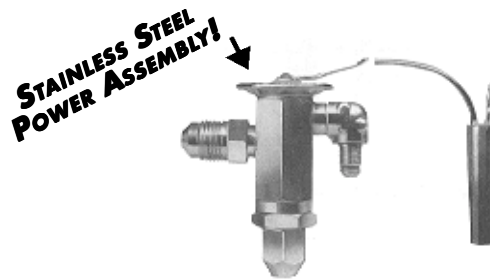
### EXTERNAL EQUALIZER FITTING

TYPE	I.D.	J	SOCKET DEPTH
1/4 SAE	—	1-9/32	—
1/4 ODF	.2540 + .0020 - .9915	1-13/32	1/4 ± 1/64

SEE PAGES 7 AND 8 FOR EXTENDED CAPACITIES. FOR ORDERING INFORMATION, SEE PAGE 10.

# AFA(E) THERMO® EXPANSION VALVE

ALCO's AFA series Thermo® Expansion Valve is designed for air conditioning and commercial refrigeration applications. The AFA is ideal for those applications requiring compact size combined with stable and accurate control over wide load and evaporator temperature ranges.

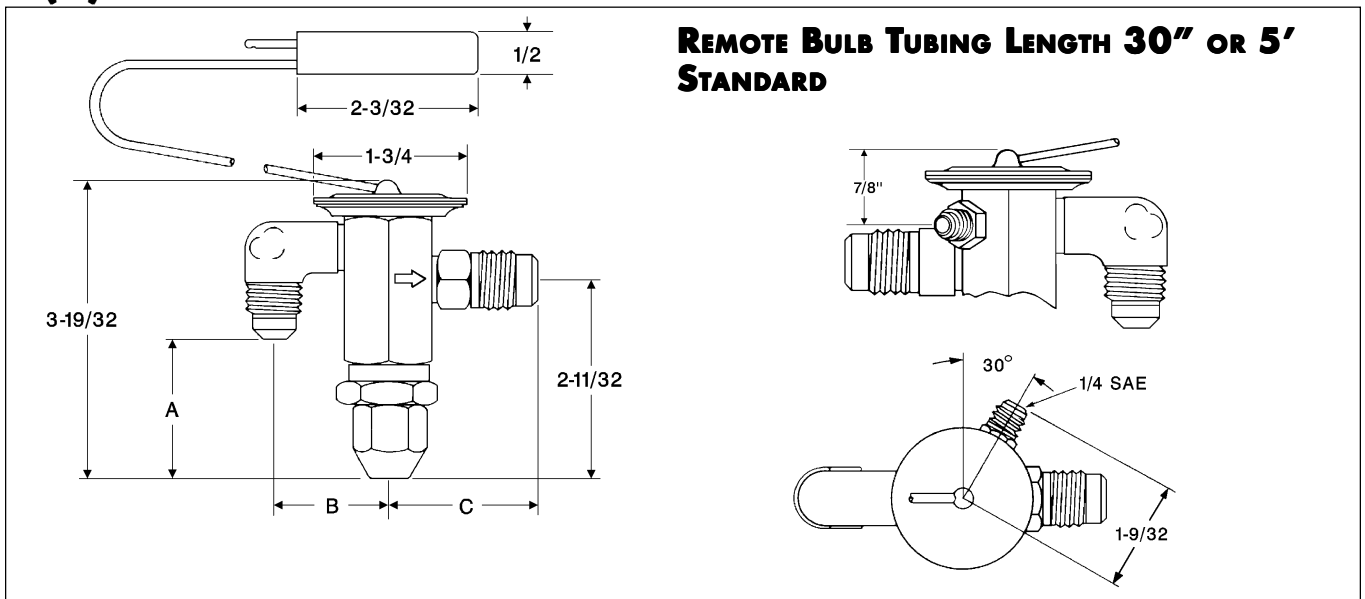


## FEATURES

- ☆ Outstanding performance and reliability
- ☆ Longest diaphragm life of any TEV
- ☆ Designed for use on R134a, R22, R404A & R507
- ☆ External superheat adjustment
- ☆ Replaceable inlet strainer
- ☆ Maximum working pressure of 600 psig
- ☆ SAE connections only

VALVE NOMENCLATURE					
AFA	E	1/2	H	C	3/8 x 1/2
Valve Series	External Equalizer If necessary	Nominal Capacity	Refrigerant Code H = R22 M = R134a S = R404A P = R507	Charge Code	SAE connection size
Example above: AFA(E)1/2FC 3/8 x 1/2 SAE					

## AFA(E) DIMENSIONAL DATA



**REMOTE BULB TUBING LENGTH 30" OR 5' STANDARD**

AFA(E) CONNECTIONS				
TOLERANCE		± 5/32	± 1/32	± 3/64
INLET	OUTLET	A	B	C
1/4 elbow	3/8	1-49/64	1-3/32	1-41/64
	1/2			1-23/64
	5/8			1-63/64
	3/8 - 1/2			1-47/64
3/8 elbow	3/8	1-41/64	1-5/16	1-41/64
	1/2			1-23/64
	5/8			1-63/64
	3/8 - 1/2			1-47/64

SEE PAGES 7 AND 8 FOR EXTENDED CAPACITIES. FOR ORDERING INFORMATION, SEE PAGE 10.

# A-SERIES EXTENDED CAPACITIES IN TONS

R134a EXTENDED CAPACITY TABLE IN TONS	EVAPORATOR TEMP.																	
	+ 50°F						+ 40°F						+ 20°F					
	PRESSURE DROP ACROSS VALVE – PSI																	
	60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175
1/8M*	0.14	0.16	0.18	0.20	0.22	0.22	0.14	0.16	0.18	0.20	0.22	0.23	0.13	0.15	0.17	0.19	0.21	0.22
1/4M	0.24	0.28	0.32	0.35	0.39	0.42	<b>0.24</b>	0.28	0.31	0.35	0.38	0.41	0.23	0.26	0.30	0.33	0.36	0.39
1/2M	0.43	0.49	0.55	0.62	0.68	0.73	<b>0.42</b>	0.48	0.54	0.60	0.66	0.72	0.40	0.46	0.52	0.58	0.63	0.68
3/4M	0.68	0.79	0.88	0.99	1.08	1.17	<b>0.67</b>	0.77	0.87	0.97	1.06	1.14	0.64	0.74	0.83	0.93	1.01	1.09
1M	0.98	1.13	1.26	1.41	1.55	1.67	<b>0.96</b>	1.11	1.24	1.38	1.51	1.64	0.92	1.06	1.18	1.32	1.45	1.56
1-1/2M	1.44	1.66	1.85	2.07	2.27	2.45	<b>1.41</b>	1.62	1.82	2.03	2.22	2.40	1.34	1.55	1.74	1.94	2.13	2.30
2M	2.02	2.33	2.60	2.91	3.19	3.45	<b>1.98</b>	2.28	2.55	2.85	3.12	3.37	1.89	2.18	2.44	2.73	2.99	3.23
2-1/2M	2.47	2.85	3.19	3.56	3.90	4.22	<b>2.42</b>	2.79	3.12	3.49	3.82	4.13	2.31	2.67	2.98	3.34	3.66	3.95
3M	2.93	3.39	3.79	4.24	4.64	5.01	<b>2.87</b>	3.32	3.71	4.15	4.54	4.91	2.75	3.17	3.55	3.96	4.34	4.69
4M	4.01	4.63	5.18	5.79	6.34	6.85	<b>3.93</b>	4.53	5.07	5.67	6.21	6.71	3.75	4.34	4.85	5.42	5.94	6.41

R134a EXTENDED CAPACITY TABLE IN TONS	EVAPORATOR TEMP.																	
	0°F						– 20°F						– 40°F					
	PRESSURE DROP ACROSS VALVE – PSI																	
	60	80	100	125	150	175	80	100	125	150	175	200	80	100	125	150	175	200
1/8M*	0.12	0.13	0.15	0.17	0.18	0.20	0.09	0.10	0.11	0.12	0.13	0.14	0.06	0.06	0.07	0.08	0.09	0.10
1/4M	0.20	0.23	0.26	0.29	0.32	0.35	0.16	0.18	0.20	0.22	0.23	0.25	0.10	0.11	0.13	0.14	0.15	0.16
1/2M	0.35	0.41	0.46	0.51	0.56	0.60	0.28	0.31	0.35	0.38	0.41	0.44	0.18	0.20	0.22	0.24	0.26	0.28
3/4M	0.57	0.65	0.73	0.82	0.90	0.97	0.44	0.49	0.55	0.61	0.65	0.70	0.29	0.32	0.36	0.39	0.42	0.45
1M	0.81	0.93	1.04	1.17	1.28	1.38	0.63	0.71	0.79	0.86	0.93	1.00	0.41	0.46	0.51	0.56	0.60	0.65
1-1/2M	1.19	1.37	1.53	1.72	1.88	2.03	0.93	1.04	1.16	1.27	1.37	1.47	0.60	0.67	0.75	0.82	0.89	0.95
2M	1.67	1.93	2.15	2.41	2.64	2.85	1.30	1.46	1.63	1.78	1.93	2.06	0.84	0.94	1.05	1.15	1.24	1.33
2-1/2M	2.04	2.36	2.64	2.95	3.23	3.49	1.60	1.78	1.99	2.18	2.36	2.52	1.03	1.15	1.29	1.41	1.52	1.63
3M	2.43	2.80	3.13	3.50	3.84	4.15	1.90	2.12	2.37	2.59	2.80	3.00	1.22	1.37	1.53	1.68	1.81	1.94
4M	3.32	3.92	4.28	4.79	5.25	5.67	2.59	2.90	3.24	3.55	3.83	4.10	1.67	1.87	2.09	2.29	2.47	2.65

R22 EXTENDED CAPACITY TABLE IN TONS	EVAPORATOR TEMP.																	
	+ 50°F						+ 40°F						+ 20°F					
	PRESSURE DROP ACROSS VALVE – PSI																	
	60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175
1/5H*	0.15	0.17	0.19	0.21	0.24	0.25	0.15	0.17	0.19	0.21	0.23	0.25	0.14	0.17	0.19	0.21	0.23	0.25
1/4H	0.26	0.30	0.34	0.38	0.41	0.45	0.26	0.30	<b>0.33</b>	0.37	0.41	0.44	0.25	0.29	0.33	0.36	0.40	0.43
1/2H	0.46	0.53	0.59	0.66	0.72	0.78	0.45	0.52	<b>0.58</b>	0.65	0.71	0.77	0.44	0.51	0.57	0.64	0.70	0.75
1H	0.73	0.84	0.94	1.06	1.16	1.25	0.72	0.84	<b>0.93</b>	1.04	1.14	1.24	0.71	0.81	0.91	1.02	1.11	1.20
1-1/2H	1.05	1.21	1.35	1.51	1.65	1.79	1.03	1.19	<b>1.33</b>	1.49	1.63	1.76	1.01	1.16	1.30	1.45	1.59	1.72
2H	1.54	1.77	1.98	2.22	2.43	2.62	1.52	1.75	<b>1.96</b>	2.19	2.40	2.59	1.48	1.71	1.91	2.14	2.34	2.53
2-1/2H	2.16	2.49	2.78	3.11	3.41	3.68	2.13	2.46	<b>2.75</b>	3.08	3.37	3.64	2.08	2.40	2.68	3.00	3.28	3.55
3H	2.64	3.05	3.41	3.81	4.17	4.51	2.61	3.01	<b>3.37</b>	3.77	4.13	4.46	2.54	2.94	3.28	3.67	4.02	4.34
4H	3.14	3.62	4.05	4.53	4.96	5.36	3.10	3.58	<b>4.00</b>	4.47	4.90	5.29	3.02	3.49	3.90	4.36	4.78	5.16
5H	4.29	4.95	5.53	6.19	6.78	7.32	4.24	4.89	<b>5.47</b>	6.12	6.70	7.24	4.13	4.77	5.33	5.96	6.53	7.05

R22 EXTENDED CAPACITY TABLE IN TONS	EVAPORATOR TEMP.																	
	0°F						– 20°F						– 40°F					
	PRESSURE DROP ACROSS VALVE – PSI																	
	60	80	100	125	150	175	80	100	125	150	175	200	80	100	125	150	175	200
1/5H*	0.13	0.15	0.17	0.19	0.21	0.22	0.10	0.12	0.13	0.14	0.15	0.16	0.07	0.08	0.09	0.09	0.10	0.11
1/4H	0.23	0.26	0.29	0.33	0.36	0.39	0.18	0.20	0.23	0.25	0.27	0.29	0.12	0.14	0.15	0.17	0.18	0.19
1/2H	0.40	0.46	0.52	0.58	0.63	0.68	0.32	0.36	0.40	0.44	0.47	0.51	0.21	0.24	0.27	0.29	0.31	0.34
1H	0.64	0.74	0.82	0.92	1.01	1.09	0.51	0.57	0.64	0.70	0.76	0.81	0.34	0.38	0.42	0.47	0.50	0.54
1-1/2H	0.91	1.05	1.18	1.32	1.44	1.56	0.73	0.82	0.91	1.00	1.08	1.16	0.49	0.54	0.61	0.66	0.72	0.77
2H	1.34	1.55	1.73	1.93	2.12	2.29	1.07	1.20	1.34	1.47	1.59	1.70	0.71	0.80	0.89	0.98	1.05	1.13
2-1/2H	1.88	2.17	2.43	2.72	2.98	3.21	1.51	1.69	1.88	2.06	2.23	2.38	1.00	1.12	1.25	1.37	1.48	1.58
3H	2.30	2.66	2.98	3.33	3.64	3.94	1.85	2.06	2.31	2.53	2.73	2.92	1.23	1.37	1.53	1.68	1.81	1.94
4H	2.74	3.16	3.53	3.95	4.33	4.68	2.19	2.45	2.74	3.00	3.24	3.47	1.46	1.63	1.82	1.99	2.15	2.30
5H	3.74	4.32	4.83	5.40	5.92	6.39	3.00	3.35	3.75	4.10	4.43	4.74	1.99	2.22	2.49	2.72	2.94	3.15

**\* WARNING - A UK OR ALF FILTER-DRIER MUST BE INSTALLED DIRECTLY AHEAD OF THIS VALVE.  
NOTE: FOR R407C, USE R22 EXTENDED CAPACITIES.**

Nominal capacities shown are based on 40°F evaporator temperature and 100°F vapor-free liquid refrigerant entering the valve. For actual capacities at other evaporator temperatures, see the liquid correction factor table and extended capacity tables included in this bulletin to select A Series valves.

# A-SERIES EXTENDED CAPACITIES IN TONS

R404A/R507 EXTENDED CAPACITY TABLE IN TONS	EVAPORATOR TEMP.																	
	+ 50°F						+ 40°F						+ 20°F					
	PRESSURE DROP ACROSS VALVE – PSI																	
	60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175
1/8"	0.10	0.11	0.13	0.14	0.16	0.17	0.10	0.11	<b>0.13</b>	0.14	0.15	0.17	0.09	0.11	0.12	0.13	0.15	0.16
1/4	0.30	0.35	0.39	0.43	0.47	0.51	0.29	0.34	<b>0.38</b>	0.42	0.46	0.50	0.28	0.32	0.36	0.40	0.44	0.47
1/2	0.48	0.55	0.62	0.69	0.76	0.82	0.47	0.54	<b>0.61</b>	0.68	0.74	0.80	0.44	0.51	0.57	0.64	0.70	0.76
1	0.69	0.79	0.89	0.99	1.09	1.17	0.67	0.77	<b>0.86</b>	0.97	1.06	1.14	0.58	0.66	0.74	0.83	0.91	0.98
1-3/4	1.42	1.63	1.83	2.04	2.24	2.42	1.38	1.59	<b>1.78</b>	1.99	2.18	2.36	1.31	1.51	1.69	1.89	2.07	2.23
2	1.73	2.00	2.24	2.50	2.74	2.96	1.69	1.95	<b>2.18</b>	2.44	2.67	2.89	1.60	1.85	2.07	2.31	2.53	2.73
2-1/2	2.06	2.38	2.66	2.97	3.26	3.52	2.01	2.32	<b>2.59</b>	2.90	3.18	3.43	1.90	2.20	2.46	2.75	3.01	3.25
3-1/2	2.81	3.25	3.63	4.06	4.45	4.81	2.74	3.17	<b>3.54</b>	3.96	4.34	4.69	2.60	3.00	3.36	3.75	4.11	4.44

R404A/R507 EXTENDED CAPACITY TABLE IN TONS	EVAPORATOR TEMP.																	
	0°F						– 20°F						– 40°F					
	PRESSURE DROP ACROSS VALVE – PSI																	
	60	80	100	125	150	175	80	100	125	150	175	200	80	100	125	150	175	200
1/8"	0.08	0.10	0.11	0.12	0.13	0.14	0.07	0.07	0.08	0.09	0.10	0.10	0.04	0.05	0.05	0.06	0.06	0.07
1/4	0.25	0.29	0.33	0.36	0.40	0.43	0.20	0.22	0.25	0.27	0.29	0.31	0.13	0.14	0.16	0.18	0.19	0.20
1/2	0.40	0.47	0.52	0.58	0.64	0.69	0.32	0.35	0.40	0.43	0.47	0.50	0.21	0.23	0.26	0.28	0.31	0.33
1	0.58	0.66	0.74	0.83	0.91	0.98	0.45	0.51	0.57	0.62	0.67	0.72	0.29	0.33	0.37	0.40	0.44	0.47
1-3/4	1.19	1.37	1.53	1.71	1.88	2.03	0.93	1.05	1.17	1.28	1.38	1.48	0.61	0.68	0.76	0.83	0.90	0.96
2	1.45	1.68	1.88	2.10	2.30	2.48	1.14	1.28	1.43	1.57	1.69	1.81	0.74	0.83	0.93	1.02	1.10	1.18
2-1/2	1.73	1.99	2.23	2.49	2.73	2.95	1.36	1.52	1.70	1.86	2.01	2.15	0.88	0.99	1.11	1.21	1.31	1.40
3-1/2	2.36	2.73	3.05	3.41	3.73	4.03	1.86	2.08	2.32	2.54	2.75	2.94	1.21	1.35	1.51	1.66	1.79	1.91

**\* WARNING - A UK OR ALF MUST BE INSTALLED DIRECTLY AHEAD OF THIS VALVE.**

R410A EXTENDED CAPACITY TABLE IN TONS	EVAPORATOR TEMP.												0°F					
	+ 40°F						+ 20°F											
	PRESSURE DROP ACROSS VALVE – PSI																	
	120	160	200	240	280	320	120	160	200	240	280	320	120	160	200	240	280	320
AA(E) 1/4	0.38	0.40	0.45	0.49	0.53	0.56	0.34	0.39	0.44	0.48	0.51	0.55	0.30	0.35	0.39	0.43	0.46	0.49
AA(E) 1/2	0.66	0.70	0.78	0.85	0.92	0.99	0.59	0.68	0.76	0.88	0.90	0.96	0.54	0.62	0.69	0.76	0.82	0.87
AA(E) 1	1.05	1.12	1.25	1.37	1.48	1.58	0.95	1.09	1.22	1.33	1.44	1.54	0.87	1.0	1.12	1.22	1.32	1.41
AA(E) 1-1/2	1.5	1.6	1.79	1.95	2.11	2.26	1.37	1.57	1.76	1.92	2.07	2.21	1.24	1.42	1.59	1.73	1.87	2.0
AA(E) 2	2.22	2.36	2.64	2.88	3.12	3.33	2.0	2.31	2.59	2.82	3.05	3.26	1.83	2.1	2.35	2.56	2.77	2.96
AA(E) 3	3.12	3.32	3.72	4.05	4.25	4.68	2.82	3.24	3.63	3.95	4.28	4.57	2.57	2.95	3.3	3.6	3.89	4.16
AA(E) 4	3.82	4.06	4.55	4.95	5.36	5.72	3.45	3.97	4.45	4.84	5.24	5.6	3.14	3.61	4.04	4.4	4.77	5.09
AA(E) 5	4.53	4.82	5.4	5.88	6.36	6.8	4.0	4.70	5.26	5.73	6.2	6.63	3.72	4.28	4.79	5.22	5.65	6.03

R410A EXTENDED CAPACITY TABLE IN TONS	EVAPORATOR TEMP.											
	– 10°F						– 20°F					
	PRESSURE DROP ACROSS VALVE – PSI											
	120	160	200	240	280	320	120	160	200	240	280	320
AA(E) 1/4	0.26	0.30	0.34	0.37	0.40	0.42	0.21	0.24	0.27	0.29	0.32	0.34
AA(E) 1/2	0.45	0.52	0.58	0.63	0.69	0.73	0.37	0.43	0.48	0.52	0.57	0.61
AA(E) 1	0.72	0.83	0.93	1.0	1.1	1.17	0.60	0.69	0.77	0.84	0.91	0.97
AA(E) 1-1/2	1.04	1.19	1.33	1.45	1.57	1.68	0.85	0.98	1.10	1.20	1.29	1.38
AA(E) 2	1.53	1.76	1.97	2.15	2.32	2.48	1.26	1.45	1.62	1.77	1.91	2.04
AA(E) 3	2.15	2.47	2.77	3.0	3.26	3.48	1.77	2.03	2.27	2.48	2.68	2.86
AA(E) 4	2.63	3.02	3.38	3.68	3.99	4.26	2.17	2.49	2.79	3.04	3.29	3.51
AA(E) 5	3.12	3.59	4.0	4.38	4.74	5.06	2.58	2.96	3.32	3.61	3.91	4.17

Nominal capacities shown are based on 40°F evaporator temperature and 100°F vapor-free liquid refrigerant entering the valve. For actual capacities at other evaporator temperatures, see the liquid correction factor table and extended capacity tables included in this catalog to select A-Series valves.

## REFRIGERANT LIQUID TEMPERATURE CORRECTION FACTORS

	Refrigerant Liquid Temperature °F														
	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
<b>R12 Correction Factor</b>	1.60	1.54	1.48	1.42	1.36	1.30	1.24	1.18	1.12	1.06	1.00	.94	.88	.82	.75
<b>R134a Correction Factor</b>	1.70	1.63	1.56	1.49	1.42	1.36	1.29	1.21	1.14	1.07	1.00	.93	.85	.78	.71
<b>R22 Correction Factor</b>	1.56	1.51	1.45	1.40	1.34	1.29	1.23	1.17	1.12	1.06	1.00	.94	.88	.82	.76
<b>R404A/R507 Correction</b>	2.00	1.90	1.80	1.70	1.60	1.50	1.40	1.30	1.20	1.10	1.00	.90	.80	.70	.50

These factors include corrections for liquid refrigerant density and net refrigerating effect and are based on an average evaporator temperature of 0°F. However, they may be used for any evaporator temperature from -40°F to +40°F since the variation in the actual factors across this range is insignificant.

<b>R410A LIQUID CORRECTION</b>														
140°F	130°F	120°F	110°F	100°F	90°F	80°F	70°F	60°F	50°F	40°F	30°F	20°F	10°F	0°F
.62	.71	.83	.91	1.0	1.08	1.15	1.23	1.30	1.38	1.43	1.50	1.56	1.62	1.67



# ORDERING INFORMATION FOR A-SERIES VALVES

VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN BY CHARGE						CAP TUBE
			FC	HC	MC	MZ	SC	SZ	
			<small>R-12/R-134a Med. Temp.</small>	<small>R-22 Med. Temp.</small>	<small>R-134a Med. Temp.</small>	<small>R-134a Low Temp.</small>	<small>R-404A Med. Temp.</small>	<small>R-404A Low Temp.</small>	
AA	1/4	1/4 x 3/8 ODF S/T	048986						5 FT.
	1/4	1/4 x 3/8 - 1/2 SAE S/T	049820						5 FT.
	1/4	1/4 x 3/8 ODF S/T		056315					5 FT.
	1/2	3/8 x 1/2 SAE S/T		057828					5 FT.
	1/2	3/8 x 3/8 ODF S/T		056547					30 IN.
	1/2	1/4 x 3/8 SAE S/T			058985				30 IN.
	1/2	1/4 x 3/8 SAE S/T				058986			30 IN.
	1	3/8 x 1/2 SAE S/T		057985					5 FT.
	1	1/4 x 1/2 ODF S/T					061827		30 IN.
	1	1/4 x 1/2 ODF S/T						059682	30 IN.
	2 1/2	3/8 x 1/2 SAE S/T		056682					5 FT.
3	3/8 x 1/2 SAE S/T		056683					5 FT.	
VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN CHARGE			CAP TUBE			
			HC	HCA					
			<small>R-22 Med. Temp.</small>	<small>R-22 HEAT PUMP</small>					
AAEB	3	3/8 x 1/2 ODF S/T (B032)		059603		30 IN.			
	3	3/8 x 1/2 SAE S/T (B032)		059602		30 IN.			
	4	1/2 x 1/2 ODF S/T (B035)		059605		30 IN.			
	4	1/2 X 1/2 SAE S/T (B035)		059604		30 IN.			
	5	1/2 x 7/8 ODF S/T (B040)		064036		5 FT.			
	5	1/2 x 1/2 ODF S/T (B040)		059607		30 IN.			
	5	1/2 x 5/8 SAE S/T (B040)		061243		30 IN.			
VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN CHARGE			CAP TUBE			
			HC	HCA	HAA				
			<small>R-22 Med. Temp.</small>	<small>R-22 HEAT PUMP</small>	<small>R-22 Wide Range</small>				
AAE	1/2	3/8 x 1/2 SAE S/T	057987			5 FT.			
	1	1/4 x 3/8 ODF S/T	059582			30 IN.			
	2	3/8 x 3/8 ODF S/T	059583			30 IN.			
	2	3/8 x 1/2 ODF S/T		049632		30 IN.			
	2	3/8 x 1/2 SAE S/T		059609		30 IN.			
	2 1/2	CHATLEFF			013938	30 IN.			
	2 1/2	3/8 x 1/2 ODF S/T		049633		30 IN.			
	2 1/2	3/8 x 1/2 ODF S/T			063648	30 IN.			
	3	3/8 x 1/2 SAE S/T	056686			5 FT.			
	3	1/2 x 5/8 ODF S/T		060643		30 IN.			
	3	3/8 x 1/2 ODF S/T		049634		30 IN.			
	3	3/8 x 1/2 SAE S/T		059611		30 IN.			
	4	1/2 x 5/8 ODF S/T	061960			5 FT.			
	4	1/2 x 5/8 ODF S/T		057270		30 IN.			
	4	3/8 x 1/2 ODF S/T		049638		30 IN.			
	4	1/2 x 1/2 ODF S/T		061247		30 IN.			
	4	1/2 x 1/2 SAE S/T		059612		30 IN.			
	5	1/2 x 5/8 ODF S/T	059565			5 FT.			
	5	5/8 x 7/8 ODF S/T	061805			30 IN.			
	5	1/2 x 5/8 ODF S/T		059683		30 IN.			
	5	3/8 x 1/2 ODF S/T (ODF EE)		054024		30 IN.			
	5	1/2 x 5/8 SAE S/T		061246		30 IN.			
	5	3/8 x 1/2 ODF S/T (SAE EE)		055120		30 IN.			
	5	3/8 x 1/2 ODF S/T			063649	30 IN.			
5	CHATLEFF			013939	30 IN.				

# ORDERING INFORMATION FOR A-SERIES VALVES

VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN BY CHARGE						REFRIG.
			INTERNAL EQUALIZED			EXTERNAL EQUALIZED			
			MC <small>R-134a MED. TEMP.</small>	MZ <small>R-134a LOW TEMP.</small>	MW35 <small>R-134a MOP</small>	MC <small>R-134a MED. TEMP.</small>	MZ <small>R-134a LOW TEMP.</small>	MW35 <small>R-134a MOP</small>	
AFA(E)	1/4	1/4 x 1/2 SAE	057607	058622		063898			R-134a
	1/2	1/4 x 1/2 SAE	057606			057853			
	1/2	3/8 x 1/2 SAE	059625			061904			
	1	3/8 x 1/2 SAE				057613			
	1 1/2	3/8 x 1/2 SAE				060865			
	2	3/8 x 1/2 SAE				061906			
	2 1/2	3/8 x 1/2 SAE				061907			
3	3/8 x 1/2 SAE				061908				
VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN BY CHARGE						REFRIG.
			INTERNAL EQUALIZED			EXTERNAL EQUALIZED			
			HC <small>R-22 MED. TEMP.</small>	HZ <small>R-22 LOW TEMP.</small>	HW35 <small>R-22 MOP</small>	HC <small>R-22 MED. TEMP.</small>	HZ <small>R-22 LOW TEMP.</small>	HW35 <small>R-22 MOP</small>	
AFA(E)	1/4	1/4 x 1/2 SAE	057261	059575					R-22
	1/2	1/4 x 1/2 SAE	057260	055828		063434	057007		
	1	3/8 x 1/2 SAE	054231	057555		054246	058929	058924	
	1 1/2	3/8 x 1/2 SAE	054232	058480		054247	057950		
	2	3/8 1/2 SAE	054233	058481		054258	057951		
	3	3/8 x 1/2 SAE	062058			054249	057556		
	5	3/8 x 1/2 SAE	062059			054250	058484		
VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN BY CHARGE						REFRIG.
			INTERNAL EQUALIZED			EXTERNAL EQUALIZED			
			SC <small>R-404A MED. TEMP.</small>	SZ <small>R-404A LOW TEMP.</small>	SW45 <small>R-404A MOP</small>	SC <small>R-404A MED. TEMP.</small>	SZ <small>R-404A LOW TEMP.</small>	SW45 <small>R-404A MOP</small>	
AFA(E)	1/4	1/4 x 1/2 SAE	064072						R-404A
	1/2	1/4 x 1/2 SAE	064073						
	1	3/8 x 1/2 SAE				061912	063464	061307	
	1 1/2	3/8 x 1/2 SAE				063702	063465	061308	
	2	3/8 x 1/2 SAE				061914	061646		
	3 1/2	3/8 x 1/2 SAE				061917	063466	063386	
VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN CHARGE			CAP TUBE			
			FC <small>R-12/R-134a MED. TEMP.</small>	HCA <small>R-12/R-134a HEAT PUMP</small>	HW100 <small>R-12/R-134a MOP</small>				
AN	1/4	1/4 x 3/8 - 1/2 SAE ANG	046285			30 IN.			
	1/4	3/8 x 3/8 - 1/2 SAE ANG	047165			30 IN.			
ANE	2	CHATLEFF				013186	30 IN.		
	3	CHATLEFF				013187	30 IN.		
	4	1/2 x 5/8 SAE S/T		054602			5 FT.		
	4	CHATLEFF				013188	30 IN.		
	5	CHATLEFF				013189	30 IN.		
ANEB	1	1/4 x 1/2 ODF ANG (B024)		053307			30 IN.		
	1	3/8 x 1/2 ODF ANG (B018)		049527			30 IN.		
	2	3/8 x 1/2 ODF S/T (B024)		055847			30 IN.		
	3	1/2 x 5/8 ODF S/T (B026)		056666			5 FT.		
ANCE	1	3/8 x 1/2 ODF S/T		058506			5 FT.		
	2	3/8 x 1/2 ODF S/T		056490			5 FT.		
	2 1/2	3/8 x 1/2 ODF S/T		056491			5 FT.		
	3	3/8 x 1/2 ODF S/T		056492			5 FT.		
	4	3/8 x 1/2 ODF S/T		056493			5 FT.		
	5	3/8 x 1/2 ODF S/T		059221			30 IN.		
ANCEB	1 1/2	3/8 x 1/2 ODF S/T (B020)		056842			5 FT.		
	2	3/8 x 1/2 ODF S/T (B024)		056768			5 FT.		
	2 1/2	3/8 x 1/2 ODF S/T (B028)		056769			5 FT.		
	3	3/8 x 1/2 ODF S/T (B032)		058824			5 FT.		
	4	3/8 x 1/2 ODF S/T (B035)		056770			5 FT.		
	5	3/8 x 1/2 ODF S/T (B040)		057939			5 FT.		

# BA/BN THERMO® EXPANSION VALVE

BA(E)/BN(E) Series Thermo Expansion Valves featuring balanced port construction are used for Bi-Flow applications. BA/BN valves provide stable and accurate control over a wide range of operating conditions.

**STAINLESS STEEL  
POWER ASSEMBLY!**



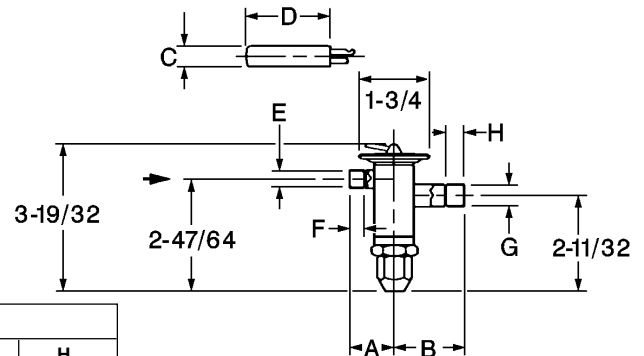
## FEATURES

- ☆ Hermetic construction eliminates external leakage
- ☆ Compact size allows installation in limited spaces
- ☆ Mass spectrometer tested to ensure less than 0.10 oz/year external leakage rate
- ☆ Available external or internal equalizer to satisfy the broadest possible range of applications
- ☆ Stainless steel power element eliminates corrosion and prevents valve failure
- ☆ Bi-Flow capability allows one valve to control the superheat in both cooling and heating modes for heat pump applications
- ☆ Balanced port construction compensates for changes in operating pressures due to varying ambients, gas defrost, heat reclaim, or widely varying evaporator loads
- ☆ Bleed type pressure equalization available to accommodate PSC type compressors
- ☆ Bi-Flow capability ideal for packaged heat pump applications (external equalizer required)
- ☆ SAE or ODF connections for easy installation
- ☆ Wrench flats on inlets and outlets (SAE only) for easy installation
- ☆ Available adjustable or non-adjustable superheat for application flexibility
- ☆ Available chatleff or aeroquip connections to suit any application
- ☆ Straight-thru configuration designed to fit most common applications

## NOMENCLATURE/SELECTION

B	A	(E)	1/2	HCA	ODF	5'
Valve Type	Style A = Adjustable N = Non-Adjustable	Externally Equalized (omit for internal)	Capacity Tons 1/4, 1/2, 1 1-1/2, 2, 2-1/2, 3 4, 5	Charge H = R22 M = R134a S = R404A P = R507	Connection ODF or SAE Straight Thru Only	Cap Tube 30" or 5' Standard

## BA/BN DIMENSIONAL DATA



BA(E) DIMENSIONAL DATA								
TYPE	INLET	OUTLET	A	B	E	F	G	H
BA(E) STRAIGHT THRU ODF	1/4	3/8	1-45/64	1-47/64	1/4	5/16	3/8	5/16
	3/8	3/8	1-47/64	1-47/64	3/8	5/16	3/8	5/16
	3/8	1/2	1-47/64	1-47/64	3/8	5/16	1/2	3/8
	1/2	1/2	1-47/64	1-47/64	1/2	3/8	1/2	3/8
	1/2	5/8	1-47/64	1-3/4	1/2	3/8	5/8	1/2
	5/8	5/8	1-3/4	1-3/4	5/8	1/2	5/8	1/2
	1/4	5/8	1-45/64	1-3/4	1/4	5/16	5/8	1/2
	3/8	5/8	1-47/64	1-3/4	3/8	5/16	5/8	1/2
	1/4	1/2	1-45/64	1-47/64	1/4	5/16	1/2	3/8
	1/2	7/8	1-47/64	1-47/64	1/2	3/8	7/8	3/4
	3/8	7/8	1-47/64	1-47/64	3/8	5/16	7/8	3/4
	5/8	7/8	1-3/4	1-47/64	5/8	1/2	7/8	3/4

### BA(E) DIMENSIONAL DIAGRAM

ODF CONNECTIONS, STRAIGHT-THRU  
CONFIGURATION ONLY

SEE PAGES 15 AND 16 FOR EXTENDED CAPACITIES. FOR ORDERING INFORMATION, SEE PAGES 17 AND 18.

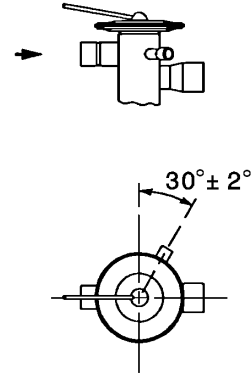
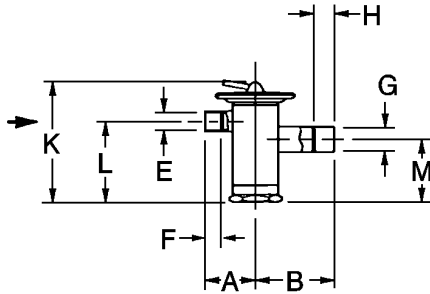
# BA/BN DIMENSIONAL DATA (CONT'D)

**REMOTE BULB TUBING LENGTH 30" OR 5' STANDARD**

BA(E) & BN(E) Remote Bulb Dimensions		
REFRIGERANT CHARGE	D (LENGTH)	C (DIAMETER)
HCA, NCA, HAA	2-5/16	3/4
MC, MZ, MW (MOP), RW (MOP)	2-3/32	1/2
RC, SC, SZ, SW (MOP),		
PC, PZ, PW (MOP)		

## BN(E) DIMENSIONAL DIAGRAM

ODF CONNECTIONS  
STRAIGHT-THRU CONFIGURATION ONLY

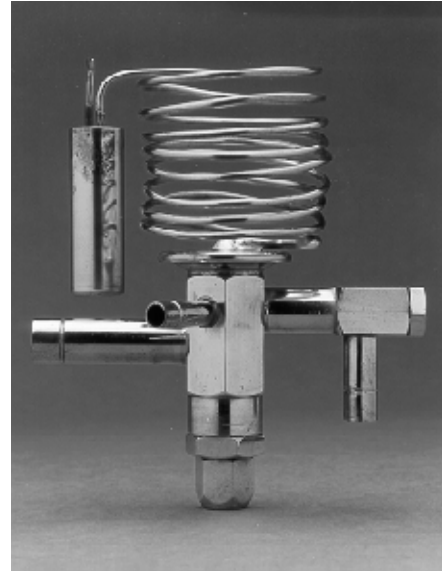


**BA(E) & BN(E)**  
EXTERNAL EQUALIZER  
CONFIGURATION VIEW

BN(E) DIMENSIONAL DATA											
TYPE	INLET	OUTLET	A	B	E	F	G	H	K	L	M
STRAIGHT THRU ODF	1/4	3/8	1-45/64	1-47/64	1/4	5/16	3/8	5/16	2-5/8	1-3/4	1-23/64
	3/8	3/8	1-47/64	1-47/64	3/8	5/16	3/8	5/16			
	3/8	1/2	1-47/64	1-47/64	3/8	5/16	1/2	3/8			
	1/2	1/2	1-47/64	1-47/64	1/2	3/8	1/2	3/8			
	1/2	5/8	1-47/64	1-3/4	1/2	3/8	5/8	1/2			
	5/8	5/8	1-3/4	1-3/4	5/8	1/2	5/8	1/2			
	1/4	5/8	1-45/64	1-3/4	1/4	5/16	5/8	1/2			
	3/8	5/8	1-47/64	1-3/4	3/8	5/16	5/8	1/2			
	1/4	1/2	1-45/64	1-47/64	1/4	5/16	1/2	3/8			
	1/2	7/8	1-47/64	1-47/64	1/2	3/8	7/8	3/4			
3/8	7/8	1-47/64	1-47/64	3/8	5/16	7/8	3/4				
5/8	7/8	1-3/4	1-47/64	5/8	1/2	7/8	3/4				

# BAES/BNES THERMO® EXPANSION VALVE

BAES/BNES Series Thermo Expansion Valves feature balanced port construction providing stable and accurate control over a wide range of operating conditions. The BAES/BNES also features a removable inlet strainer for added versatility.



## FEATURES

- ☆ Removable inlet strainer assembly
- ☆ Balanced port design
- ☆ Adjustable (BAES) and non-adjustable (BNES) configurations available
- ☆ Hermetic, leak free construction
- ☆ Stainless steel power element
- ☆ Solid copper ODF connections, angle style only

## SPECIFICATIONS

Maximum Working Pressure: 450 psig  
 Ratings from 1/2 to 6 tons  
 Standard 30" and optional 5' capillary tube length

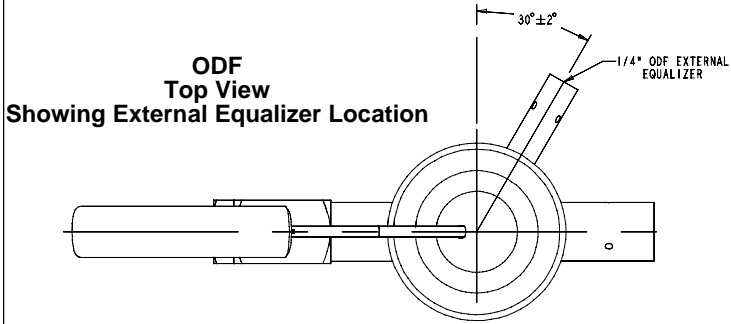
## NOMENCLATURE/SELECTION

<b>B</b>	<b>A</b>	<b>E</b>	<b>S</b>	<b>1/2</b>	<b>HCA</b>	<b>ODF</b>	<b>5'</b>
Valve Type	Style A = Adjustable N = Non-Adjustable	Externally Equalized (omit for internal)	Removable Strainer	Capacity Tons	Charge H = R22 M = R134a S = R404A P = R507	Connection ODF Angle	Cap Tube 30" Standard or 5' Optional

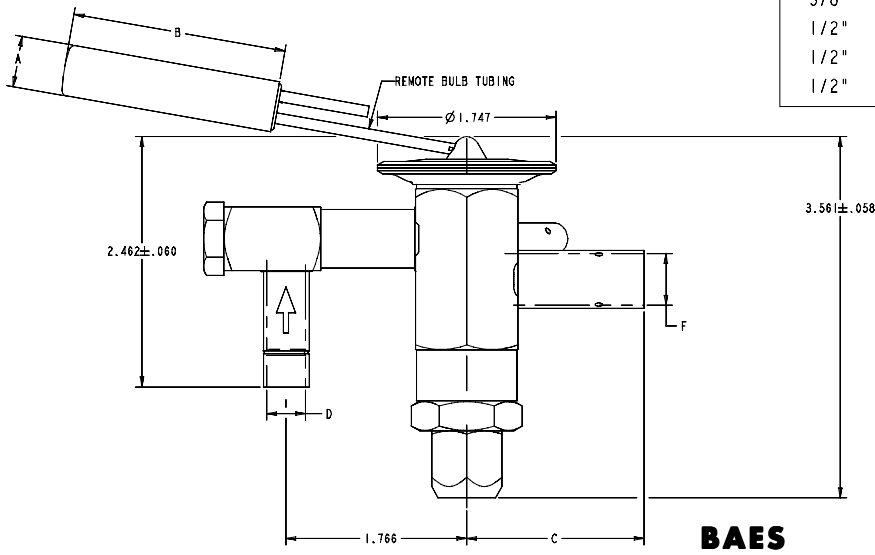
SEE PAGES 15 AND 16 FOR EXTENDED CAPACITIES. FOR ORDERING INFORMATION, SEE PAGES 17 AND 18.

# BAES/BNES DIMENSIONAL DATA

## ODF CONNECTIONS, ANGLE STYLE ONLY

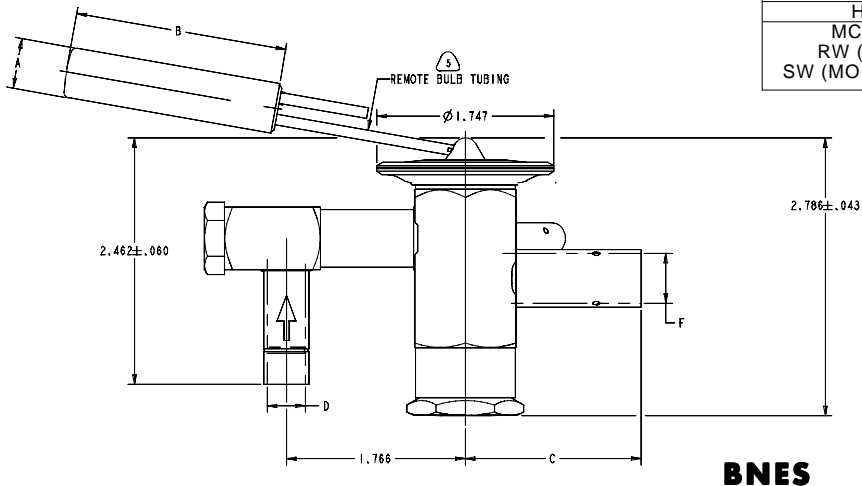


CONNECTIONS				
ODF INLET	ODF OUTLET	C	D	F
1/4"	3/8"	1.734	.254	.379
1/4"	1/2"	1.734	.254	.504
1/4"	5/8"	1.750	.254	.629
3/8"	3/8"	1.734	.379	.379
3/8"	1/2"	1.734	.379	.504
3/8"	5/8"	1.750	.379	.629
3/8"	7/8"	1.734	.379	.879
1/2"	1/2"	1.734	.504	.504
1/2"	5/8"	1.750	.504	.629
1/2"	7/8"	1.734	.504	.879



### REMOTE BULB TUBING LENGTH 30" OR 5' STANDARD

BAES & BNES Remote Bulb Dimensions		
REFRIGERANT CHARGE	A (DIAMETER)	B (LENGTH)
HCA, NCA, HAA	3/4	2 3/8
MC, MZ, MW (MOP), RW (MOP) RC, SC, SZ, SW (MOP), PC, PZ, PW (MOP)	1/2	2 1/8



## B-SERIES EXTENDED CAPACITIES IN TONS FOR R-134a

VALVE	EVAPORATOR TEMP.																							
	+ 40°F								+ 20°F								+ 0°F							
	PRESSURE DROP ACROSS VALVE - PSI																							
	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225
BA/BN 1/2M	.36	.41	.46	.52	.57	.61	.66	.69	.34	.40	.44	.50	.54	.59	.63	.69	.30	.35	.39	.44	.48	.52	.55	.59
BA/BN 3/4M	.68	.79	.88	.98	1.08	1.16	1.24	1.32	.65	.75	.84	.94	1.03	1.11	1.19	1.26	.58	.67	.74	.83	.91	.98	1.05	1.12
BA/BNE 1M	1.06	1.23	1.37	1.53	1.68	1.81	1.94	2.06	1.02	1.17	1.31	1.47	1.61	1.73	1.85	1.97	.90	1.04	1.16	1.30	1.42	1.53	1.64	1.74
BAE/BN 1-1/2M	1.42	1.64	1.83	2.05	2.25	2.43	2.59	2.75	1.36	1.57	1.75	1.96	2.15	2.32	2.48	2.63	1.20	1.39	1.55	1.73	1.90	2.05	2.19	2.32
BA/BN 2M	1.79	2.07	2.32	2.59	2.84	3.06	3.28	3.47	1.72	1.98	2.21	2.48	2.71	2.93	3.13	3.32	1.52	1.75	1.96	2.19	2.40	2.59	2.77	2.94
BA/BN 2-1/4M	2.17	2.51	2.81	3.14	3.44	3.71	3.97	4.21	2.08	2.40	2.68	3.00	3.29	3.55	3.80	4.03	1.84	2.12	2.37	2.65	2.90	3.14	3.35	3.56
BA/BN 3M	2.81	3.25	3.63	4.06	4.45	4.80	5.14	5.45	2.69	3.11	3.47	3.88	4.25	4.59	4.91	5.21	2.38	2.74	3.07	3.43	3.76	4.06	4.34	4.60
BA/BN 3-1/2M	3.56	4.11	4.60	5.14	5.63	6.08	6.50	6.89	3.40	3.93	4.39	4.91	5.38	5.81	6.21	6.59	3.01	3.47	3.88	4.34	4.76	5.14	5.49	5.82
BA/BN 4-1/4M	4.43	5.11	5.72	6.39	7.00	7.56	8.08	8.58	4.23	4.89	5.47	6.11	6.69	7.23	7.73	8.20	3.74	4.32	4.83	5.40	5.92	6.39	6.83	7.24

VALVE	EVAPORATOR TEMP.																							
	- 10°F								- 20°F								- 40°F							
	PRESSURE DROP ACROSS VALVE - PSI																							
	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225
BA/BN 1/2M	.25	.29	.32	.36	.40	.43	.46	.49	.20	.24	.26	.30	.32	.35	.37	.40	.13	.15	.17	.19	.21	.23	.24	.26
BA/BN 3/4M	.48	.55	.61	.69	.75	.81	.87	.92	.39	.45	.50	.56	.62	.67	.71	.75	.25	.29	.32	.36	.40	.43	.46	.49
BA/BN 1M	.74	.86	.96	1.07	1.17	1.27	1.35	1.44	.61	.70	.78	.88	.96	1.04	1.11	1.17	.39	.45	.51	.57	.62	.67	.72	.76
BA/BN 1-1/2M	.99	1.15	1.28	1.43	1.57	1.69	1.81	1.92	.81	.94	1.05	1.17	1.28	1.39	1.48	1.57	.52	.61	.68	.76	.83	.90	.96	1.02
BA/BN 2M	1.25	1.45	1.62	1.81	1.98	2.14	2.29	2.43	1.02	1.18	1.32	1.48	1.62	1.75	1.87	1.98	.66	.76	.85	.96	1.05	1.13	1.21	1.28
BA/BN 2-1/4M	1.52	1.75	1.96	2.19	2.40	2.59	2.77	2.94	1.24	1.43	1.60	1.79	1.96	2.12	2.27	2.41	.80	.93	1.04	1.16	1.27	1.37	1.47	1.55
BA/BN 3M	1.96	2.27	2.54	2.84	3.11	3.36	3.59	3.80	1.61	1.86	2.07	2.32	2.54	2.74	2.93	3.11	1.04	1.20	1.34	1.50	1.64	1.77	1.90	2.01
BA/BN 3-1/2M	2.49	2.87	3.21	3.59	3.93	4.25	4.54	4.81	2.03	2.35	2.63	2.93	3.22	3.47	3.71	3.94	1.31	1.52	1.70	1.90	2.08	2.24	2.40	2.54
BA/BN 4-1/4M	3.09	3.57	3.99	4.46	4.89	5.28	5.65	5.99	2.53	2.92	3.27	3.65	4.00	4.32	4.62	4.90	1.63	1.89	2.11	2.36	2.58	2.79	2.98	3.16

## B-SERIES EXTENDED CAPACITIES IN TONS FOR R-22

VALVE	EVAPORATOR TEMP.																							
	+ 40°F								+ 20°F								+ 0°F							
	PRESSURE DROP ACROSS VALVE - PSI																							
	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225
BA/BN 1/2H	.39	.45	.50	.56	.61	.66	.71	.75	.38	.44	.49	.54	.60	.64	.69	.73	.34	.39	.44	.49	.54	.58	.62	.66
BA/BN 1H	.74	.85	.95	1.06	1.16	1.26	1.34	1.42	.72	.83	.93	1.03	1.13	1.22	1.31	1.39	.65	.75	.84	.94	1.03	1.11	1.19	1.26
BA/BN 1-1/2H	1.15	1.32	1.48	1.65	1.81	1.96	2.09	2.22	1.12	1.29	1.44	1.61	1.77	1.91	2.04	2.16	1.01	1.17	1.31	1.46	1.60	1.73	1.85	1.96
BA/BN 2H	1.53	1.77	1.98	2.21	2.42	2.62	2.80	2.97	1.49	1.73	1.93	2.16	2.36	2.55	2.73	2.89	1.35	1.56	1.75	1.95	2.14	2.31	2.47	2.62
BA/BN 2-1/2H	1.94	2.24	2.50	2.79	3.06	3.31	3.53	3.75	1.89	2.18	2.44	2.72	2.98	3.22	3.45	3.65	1.71	1.97	2.21	2.47	2.70	2.92	3.12	3.31
BA/BN 3H	2.35	2.71	3.03	3.39	3.71	4.01	4.28	4.54	2.29	2.64	2.95	3.30	3.62	3.91	4.18	4.43	2.07	2.39	2.68	2.99	3.28	3.54	3.78	4.01
BA/BN 4H	3.04	3.51	3.92	4.38	4.80	5.18	5.54	5.88	2.96	3.42	3.82	4.27	4.68	5.05	5.40	5.73	2.68	3.10	3.46	3.87	4.24	4.58	4.90	5.19
BA/BN 5H	3.84	4.44	4.96	5.54	6.07	6.56	7.01	7.44	3.74	4.32	4.83	5.40	5.92	6.39	6.84	7.25	3.39	3.92	4.38	4.90	5.36	5.79	6.19	6.57
BA/BN 6H	4.78	5.52	6.17	6.90	7.55	8.16	8.72	9.25	4.66	5.38	6.01	6.72	7.36	7.95	8.50	9.02	4.22	4.87	5.45	6.09	6.67	7.21	7.70	8.17

VALVE	EVAPORATOR TEMP.																							
	- 10°F								- 20°F								- 40°F							
	PRESSURE DROP ACROSS VALVE - PSI																							
	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225
BA/BN 1/2H	.29	.33	.37	.41	.45	.49	.52	.55	.24	.27	.31	.34	.37	.40	.43	.46	.16	.18	.20	.23	.25	.27	.29	.30
BA/BN 1H	.54	.63	.70	.78	.86	.93	.99	1.05	.45	.52	.58	.65	.71	.77	.82	.87	.30	.35	.39	.43	.47	.51	.55	.58
BA/BN 1-1/2H	.85	.98	1.09	1.22	1.34	1.45	1.55	1.64	.70	.81	.91	1.01	1.11	1.20	1.28	1.36	.47	.54	.60	.67	.74	.80	.85	.90
BA/BN 2H	1.13	1.31	1.46	1.64	1.79	1.94	2.07	2.19	.94	1.08	1.21	1.36	1.48	1.60	1.71	1.82	.62	.72	.80	.90	.99	1.06	1.14	1.21
BA/BN 2-1/2H	1.43	1.65	1.85	2.07	2.26	2.44	2.61	2.77	1.19	1.37	1.53	1.71	1.87	2.02	2.16	2.30	.79	.91	1.02	1.14	1.24	1.34	1.44	1.52
BA/BN 3H	1.73	2.00	2.24	2.50	2.74	2.96	3.17	3.36	1.44	1.66	1.86	2.07	2.27	2.45	2.62	2.78	.95	1.10	1.23	1.38	1.51	1.63	1.74	1.85
BA/BN 4H	2.24	2.59	2.90	3.24	3.55	3.83	4.10	4.35	1.86	2.15	2.40	2.68	2.94	3.18	3.39	3.60	1.23	1.43	1.59	1.78	1.95	2.11	2.25	2.39
BA/BN 5H	2.84	3.28	3.67	4.10	4.49	4.85	5.18	5.50	2.35	2.72	3.04	3.40	3.72	4.02	4.29	4.56	1.56	1.80	2.02	2.25	2.47	2.67	2.85	3.02
BA/BN 6H	3.53	4.08	4.56	5.10	5.58	6.03	6.45	6.84	2.93	3.38	3.78	4.22	4.63	5.00	5.34	5.67	1.94	2.24	2.51	2.80	3.07	3.32	3.55	3.76

**NOTE: FOR R407C, USE R22 EXTENDED CAPACITIES.**

Nominal capacities shown are based on 40°F evaporator temperature and 100°F vapor-free liquid refrigerant entering the valve per ARI 750-94.

## B-SERIES EXTENDED CAPACITIES IN TONS FOR R-404A

VALVE	EVAPORATOR TEMP.																							
	+ 40°F								+ 20°F								+ 0°F							
	PRESSURE DROP ACROSS VALVE - PSI																							
	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225
BA/BN 1/4S	.26	.29	.33	.37	.40	.44	.47	.49	.24	.28	.31	.35	.38	.41	.44	.47	.22	.25	.28	.32	.35	.37	.40	.42
BA/BN 1/2S	.49	.56	.63	.70	.77	.83	.89	.94	.46	.53	.59	.66	.73	.78	.84	.89	.42	.48	.54	.60	.66	.71	.76	.80
BA/BN 1S	.76	.87	.98	1.09	1.20	1.29	1.38	1.46	.71	.83	.92	1.03	1.13	1.22	1.31	1.38	.65	.75	.84	.93	1.02	1.10	1.18	1.25
BA/BN 1-1/4S	1.01	1.17	1.31	1.46	1.60	1.73	1.85	1.96	.96	1.10	1.23	1.38	1.51	1.63	1.75	1.85	.87	1.00	1.12	1.25	1.37	1.48	1.58	1.68
BA/BN 1-1/2S	1.28	1.47	1.65	1.84	2.02	2.18	2.33	2.47	1.21	1.39	1.56	1.74	1.91	2.06	2.20	2.34	1.09	1.26	1.41	1.58	1.73	1.87	2.00	2.12
BA/BN 2S	1.55	1.79	2.00	2.23	2.45	2.64	2.83	3.00	1.46	1.69	1.89	2.11	2.31	2.50	2.67	2.83	1.32	1.53	1.71	1.91	2.09	2.26	2.42	2.56
BA/BN 2-1/2S	2.00	2.31	2.58	2.89	3.17	3.42	3.66	3.88	1.89	2.19	2.44	2.73	2.99	3.23	3.46	3.67	1.71	1.98	2.21	2.47	2.71	2.93	3.13	3.32
BA/BN 3S	2.53	2.93	3.27	3.66	4.01	4.33	4.63	4.91	2.40	2.77	3.09	3.46	3.79	4.09	4.37	4.64	2.17	2.50	2.80	3.13	3.43	3.70	3.96	4.20
BA/BN 4S	3.15	3.64	4.07	4.55	4.98	5.38	5.75	6.10	2.98	3.44	3.85	4.30	4.71	5.09	5.44	5.77	2.70	3.11	3.48	3.89	4.26	4.61	4.92	5.22

VALVE	EVAPORATOR TEMP.																							
	- 10°F								- 20°F								- 40°F							
	PRESSURE DROP ACROSS VALVE - PSI																							
	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225
BA/BN 1/4S	.18	.21	.23	.26	.29	.31	.33	.35	.15	.17	.19	.21	.23	.25	.27	.29	.10	.11	.12	.14	.15	.16	.18	.19
BA/BN 1/2S	.34	.40	.44	.50	.54	.59	.63	.67	.28	.33	.36	.41	.45	.48	.51	.55	.18	.21	.24	.26	.29	.31	.33	.35
BA/BN 1S	.54	.62	.69	.77	.85	.92	.98	1.04	.44	.51	.57	.63	.69	.75	.80	.85	.28	.33	.37	.41	.45	.49	.52	.55
BA/BN 1-1/4S	.72	.83	.93	1.03	1.13	1.22	1.31	1.39	.59	.68	.76	.85	.93	1.00	1.07	1.14	.38	.44	.49	.55	.60	.65	.69	.74
BA/BN 1-1/2S	.91	1.05	1.17	1.31	1.43	1.55	1.65	1.75	.74	.86	.96	1.07	1.17	1.27	1.35	1.44	.48	.55	.62	.69	.76	.82	.88	.93
BA/BN 2S	1.10	1.27	1.42	1.58	1.73	1.87	2.00	2.12	.90	1.04	1.16	1.30	1.42	1.54	1.64	1.74	.58	.67	.75	.84	.92	.99	1.06	1.13
BA/BN 2-1/2S	1.42	1.64	1.83	2.05	2.24	2.42	2.59	2.75	1.16	1.34	1.50	1.68	1.84	1.99	2.12	2.25	.75	.87	.97	1.09	1.19	1.29	1.38	1.46
BA/BN 3S	1.80	2.07	2.32	2.59	2.84	3.07	3.28	3.48	1.47	1.70	1.90	2.12	2.33	2.51	2.69	2.85	.95	1.10	1.23	1.38	1.51	1.63	1.74	1.85
BA/BN 4S	2.23	2.58	2.88	3.23	3.53	3.82	4.08	4.33	1.83	2.11	2.36	2.64	2.89	3.13	3.34	3.55	1.19	1.37	1.53	1.71	1.87	2.03	2.16	2.30

## B-SERIES EXTENDED CAPACITIES IN TONS FOR R-507

VALVE	EVAPORATOR TEMP.																							
	+ 40°F								+ 20°F								+ 0°F							
	PRESSURE DROP ACROSS VALVE - PSI																							
	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225
BA/BN 1/4P	.25	.29	.32	.36	.40	.43	.46	.49	.24	.27	.31	.34	.38	.41	.43	.46	.22	.25	.28	.31	.34	.37	.39	.42
BA/BN 1/2P	.48	.55	.62	.69	.75	.81	.87	.92	.45	.52	.58	.65	.71	.77	.82	.87	.41	.47	.53	.59	.65	.70	.75	.79
BA/BN 1P	.74	.86	.96	1.07	1.17	1.27	1.36	1.44	.70	.81	.91	1.02	1.11	1.20	1.28	1.36	.64	.74	.82	.92	1.01	1.09	1.17	1.24
BA/BN 1-1/4P	.99	1.15	1.28	1.43	1.57	1.70	1.81	1.92	.94	1.09	1.21	1.36	1.49	1.61	1.72	1.82	.85	.99	1.10	1.23	1.35	1.46	1.56	1.65
BA/BN 1-1/2P	1.25	1.45	1.62	1.81	1.98	2.14	2.29	2.43	1.19	1.37	1.53	1.72	1.88	2.03	2.17	2.30	1.08	1.25	1.39	1.56	1.71	1.84	1.97	2.09
BA/BN 2P	1.52	1.76	1.96	2.19	2.40	2.60	2.78	2.94	1.44	1.66	1.86	2.08	2.28	2.46	2.63	2.79	1.31	1.51	1.69	1.89	2.07	2.23	2.39	2.53
BA/BN 2-1/2P	1.97	2.27	2.54	2.84	3.11	3.36	3.59	3.81	1.86	2.15	2.41	2.69	2.95	3.18	3.40	3.61	1.69	1.95	2.18	2.44	2.67	2.89	3.09	3.28
BA/BN 3P	2.49	2.87	3.21	3.59	3.93	4.25	4.54	4.82	2.36	2.72	3.04	3.40	3.73	4.03	4.30	4.57	2.14	2.47	2.76	3.09	3.38	3.66	3.91	4.14
BA/BN 4P	3.19	3.57	4.00	4.47	4.89	5.29	5.65	5.99	2.93	3.39	3.79	4.23	4.64	5.01	5.35	5.68	2.66	3.07	3.44	3.84	4.21	4.55	4.86	5.16

VALVE	EVAPORATOR TEMP.																							
	- 10°F								- 20°F								- 40°F							
	PRESSURE DROP ACROSS VALVE - PSI																							
	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225
BA/BN 1/4P	.18	.21	.23	.26	.28	.31	.33	.35	.15	.17	.19	.21	.23	.25	.27	.28	.10	.11	.12	.14	.15	.16	.17	.19
BA/BN 1/2P	.34	.39	.44	.49	.54	.58	.62	.66	.28	.32	.36	.40	.44	.48	.51	.54	.18	.21	.23	.26	.29	.31	.33	.35
BA/BN 1P	.53	.61	.68	.77	.84	.91	.97	1.03	.44	.50	.56	.63	.69	.74	.79	.84	.28	.33	.37	.41	.45	.48	.52	.55
BA/BN 1-1/4P	.71	.82	.92	1.02	1.12	1.21	1.29	1.37	.58	.67	.75	.84	.92	.99	1.06	1.13	.38	.44	.49	.55	.60	.65	.69	.73
BA/BN 1-1/2P	.90	1.03	1.16	1.29	1.42	1.53	1.63	1.73	.74	.85	.95	1.06	1.16	1.26	1.34	1.42	.48	.55	.62	.69	.76	.82	.87	.93
BA/BN 2P	1.09	1.25	1.40	1.57	1.72	1.85	1.98	2.10	.89	1.03	1.15	1.29	1.41	1.52	1.63	1.73	.58	.67	.75	.84	.92	.99	1.06	1.12
BA/BN 2-1/2P	1.40	1.62	1.81	2.03	2.22	2.40	2.56	2.72	1.15	1.33	1.49	1.66	1.82	1.97	2.11	2.23	.75	.87	.97	1.08	1.19	1.28	1.37	1.45
BA/BN 3P	1.78	2.05	2.29	2.56	2.81	3.03	3.24	3.44	1.46	1.68	1.88	2.11	2.31	2.49	2.66	2.83	.95	1.10	1.23	1.37	1.50	1.62	1.73	1.84
BA/BN 4P	2.21	2.55	2.85	3.19	3.49	3.77	4.03	4.28	1.81	2.10	2.34	2.62	2.87	3.10	3.31	3.51	1.18	1.36	1.52	1.70	1.87	2.02	2.16	2.29

NOTE: Flow capacities are the same for reverse flow applications.

Nominal capacities shown are based on 40°F evaporator temperature and 100°F vapor-free liquid refrigerant entering the valve per ARI 750-94.



# ORDERING INFORMATION FOR B-SERIES VALVES

VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN CHARGE			CAP TUBE
			MC <small>R-134a Med. Temp.</small>	HCA <small>R-22 Heat Pump</small>	HW100 <small>R-22 MOP</small>	
BAE	3/4	3/8 x 1/2 ODF S/T	062754			30 IN.
	1	3/8 x 1/2 ODF S/T		063200		30 IN.
	1	3/8 x 1/2 ODF S/T	061967			30 IN.
	1 1/2	3/8 x 1/2 ODF S/T		061954		30 IN.
	1 1/2	3/8 x 1/2 ODF S/T			062831	30 IN.
	1 1/2	3/8 x 1/2 ODF S/T	063129			30 IN.
	2	1/2 x 1/2 ODF S/T		063018		5 FT.
	2	3/8 x 1/2 ODF S/T		061955		30 IN.
	2	3/8 x 1/2 ODF S/T	062830			30 IN.
	2 1/2	1/2 x 5/8 ODF S/T		061962		30 IN.
	2 1/2	3/8 x 1/2 ODF S/T		061956		30 IN.
	2 1/2	3/8 x 1/2 ODF S/T			062616	30 IN.
	3	1/2 x 5/8 ODF S/T		063019		5 FT.
	3	1/2 x 5/8 ODF S/T		062279		30 IN.
	3	3/8 x 1/2 ODF S/T		061957		30 IN.
	3	3/8 x 1/2 ODF S/T			062372	30 IN.
	3	3/8 x 1/2 ODF S/T	063201			30 IN.
	4	5/8 x 5/8 ODF S/T		063020		5 FT.
	4	1/2 x 5/8 ODF S/T		061963		30 IN.
	4	3/8 x 1/2 ODF S/T		061958		30 IN.
	4	3/8 x 1/2 ODF S/T			062373	30 IN.
	4 1/4	1/2 x 7/8 ODF S/T	063202			30 IN.
	5	1/2 x 1/2 ODF S/T		062852		5 FT.
	5	1/2 x 5/8 ODF S/T		061964		5 FT.
	5	1/2 x 7/8 ODF S/T		061965		5 FT.
	5	3/8 x 1/2 ODF S/T		062839		5 FT.
	5	5/8 x 5/8 ODF S/T		062838		5 FT.
	5	1/2 x 7/8 ODF S/T		061966		30 IN.
	5	3/8 x 1/2 ODF S/T			062374	30 IN.
	6	1/2 x 1/2 ODF S/T		062853		5 FT.
6	1/2 x 5/8 ODF S/T		062736		5 FT.	
VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN CHARGE			CAP TUBE
BAEB	1	3/8 x 1/2 ODF S/T (B0145)	HC <small>R-22 Med. Temp.</small>	HCA <small>R-22 Heat Pump</small>	HW100 <small>R-22 Wide Range</small>	30 IN.
	1	3/8 x 1/2 ODF S/T (B016)	062419	062820		30 IN.
	1 1/2	1/2 x 1/2 ODF S/T (B028)		063006		30 IN.
	1 1/2	3/8 x 1/2 ODF S/T (B020)		062789		30 IN.
	1 1/2	3/8 x 1/2 ODF S/T (B026)		063014		30 IN.
	2	3/8 x 1/2 ODF S/T (B023)		062790		30 IN.
	2 1/2	1/2 x 1/2 ODF S/T (B030)		063016		30 IN.
	2 1/2	3/8 x 1/2 ODF S/T (B027)		062791		30 IN.
	2 1/2	1/2 x 1/2 ODF S/T (B033)			063124	5 FT.
	3	1/2 x 1/2 ODF S/T (B041)		062632		5 FT.
	3	1/2 x 1/2 ODF S/T (B038)		063015		30 IN.
	3	3/8 x 1/2 ODF S/T (B030)		061968		30 IN.
	3	3/8 x 3/8 ODF S/T (B028)		063012		30 IN.
	3	3/8 x 1/2 ODF S/T (B030)			062558	30 IN.
	4	1/2 x 1/2 ODF S/T (B029)		061969		5 FT.
	4	1/2 x 1/2 ODF S/T (B046)		063010		5 FT.
	4	5/8 x 5/8 ODF S/T (B046)			061978	30 IN.
	5	1/2 x 1/2 ODF S/T (B033)		061970		5 FT.
	5	1/2 x 1/2 ODF S/T (B055)		062634		5 FT.
	5	3/8 x 1/2 ODF S/T (B039)		061980		5 FT.
	5	3/8 x 1/2 ODF S/T (B052)		063013		5 FT.
	5	1/2 x 1/2 ODF S/T (B039)		063128		30 IN.
	5	1/2 x 1/2 ODF S/T (B052)		063126		30 IN.
	6	1/2 x 7/8 ODF S/T (B046)		063011		5 FT.
6	1/2 x 5/8 ODF S/T (B046)			062875	5 FT.	

## ORDERING INFORMATION FOR B-SERIES VALVES (CONT'D)

VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN CHARGE HCA (R-22 HEAT PUMP)	CAP TUBE
BNE	3	1/2 x 1/2 ODF S/T	062289	5 FT.
	4	3/8 x 1/2 ODF S/T	061971	30 IN.
	4	3/8 x 3/8 ODF S/T	063132	30 IN.
	5	1/2 x 1/2 ODF S/T	062290	5 FT.
	5	1/2 x 7/8 ODF S/T	062832	30 IN.

## REFRIGERANT LIQUID TEMPERATURE CORRECTION FACTORS

	Refrigerant Liquid Temperature °F														
	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
<b>R12 Correction Factor</b>	1.60	1.54	1.48	1.42	1.36	1.30	1.24	1.18	1.12	1.06	1.00	.94	.88	.82	.75
<b>R134a Correction Factor</b>	1.70	1.63	1.56	1.49	1.42	1.36	1.29	1.21	1.14	1.07	1.00	.93	.85	.78	.71
<b>R22 Correction Factor</b>	1.56	1.51	1.45	1.40	1.34	1.29	1.23	1.17	1.12	1.06	1.00	.94	.88	.82	.76
<b>R404A/R507 Correction</b>	2.00	1.90	1.80	1.70	1.60	1.50	1.40	1.30	1.20	1.10	1.00	.90	.80	.70	.50

These factors include corrections for liquid refrigerant density and net refrigerating effect and are based on an average evaporator temperature of 0°F. However, they may be used for any evaporator temperature from -40°F to +40°F since the variation in the actual factors across this range is insignificant.



## HF/HFE EXTENDED PRODUCT INFORMATION TXV SUPERHEAT CHARGE

Listed below are superheat charges per turn for the listed refrigerants in °F.

**HF ≤ 5 1/2 tons R-22**

**HF ≤ 3 1/2 tons R-502**

### Approximate Superheat charge per turn @ 20°F

Charge Type	R404A	R507	R22	R12	R502	R134a
C,Z	1.5 - 2.0	1.5 - 2.0	2 - 2.5	3 - 4	1.5 - 2	3 - 4

### Approximate Superheat charge per turn @ -20°F

Charge Type	R404A	R507	R22	R502
C,Z	3 - 3.5	3 - 3.5	4 - 4.5	3 - 3.5

HF valves typically have between 9 and 11 turns of adjustment depending on tolerances from full lower stop to upper stop.

**HF > 5 1/2 tons R-22**

**HF > 3 1/2 tons R-502**

### Approximate Superheat charge per turn @ 20°F

Charge Type	R404A	R507	R22	R12	R502	R134a
C,Z	3.5 - 4	3.5 - 4	3.5 - 4	6 - 6.5	3.5 - 4	6 - 6.5

### Approximate Superheat charge per turn @ -20°F

Charge Type	R404A	R507	R22	R502
C,Z	6 - 6.5	6 - 6.5	7 - 7.5	6 - 6.5

HF extended valves typically have between 4 and 6 turns of adjustment depending on tolerances from full lower stop to upper stop.

# HF BALANCED PORT THERMO® EXPANSION VALVE

Super HF thermostatic expansion valves feature a balanced port construction which provides stable and accurate superheat control over a wide range of operating conditions. Replace conventional TEV's with ALCO's new Super HF. Whether your application is commercial refrigeration or HVAC, ALCO's HF will increase your system's stability. Super HF features make it the only valve for your system!

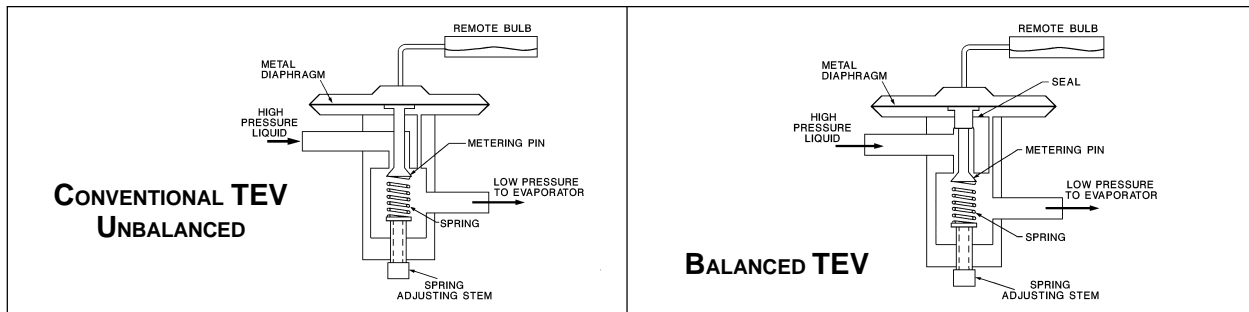
## FEATURES

Compared to conventional TEV's, under varying system conditions with wide pressure drops, the balanced port Super HF improves superheat control, system operation and valve stability.

- ☆ External superheat adjustment
- ☆ Internal or external equalizer
- ☆ Replaceable power element for added flexibility
- ☆ Optional, removable 100 mesh strainer feature allows the strainer to be cleaned and/or replaced without removing the valve from the line—HFESC Series only
- ☆ Field-proven internal seal construction
- ☆ Tailored bulb charges for specific applications
- ☆ Interchangeable with conventional TEV's
- ☆ SAE or ODF connections for easy installation



- ☆ Bleed type pressure equalization available to accommodate PSC type compressors
- ☆ Bi-Flow capability up to 5-1/2 tons R22 allows one valve to control the superheat in both cooling and heating modes for package unit heat pump applications
- ☆ Balanced port construction compensates for changes in operating pressures due to varying ambients, gas defrost, heat reclaim, or widely varying evaporator loads
- ☆ Wrench flats on inlets and outlets (SAE only) for easy installation



## APPLICATION/OPERATION

The Super HF valve is currently replacing conventional TEV's on air conditioning and refrigeration systems with any combination of the following system operating conditions:

1. Widely varying evaporator loads.
2. Widely varying head pressures.
3. Widely varying pressure drop available across the thermostatic expansion valve and refrigerant distributor.

Severe conditions are those which drastically increase a conventional expansion valve's maximum capacity: high head pressures for example, also, low liquid temperatures that would be experienced on a system with mechanical subcoolers during summer operation. Super HF high system performance is possible because the large diaphragm allows the valve to operate with the valve pin controlling very close to the seat. This provides stable control at minimum changes in stroke, enabling a large port to handle small loads. Compared to a standard TEV, the HF's larger port will improve system pull-down.

Problems can occur with refrigeration systems during both high and low ambient conditions when the condensing temperature is allowed to follow the ambient. As the evaporator temperature remains reasonably constant, this results in extreme pressure drop changes across the valve. These pressure drop changes can result in

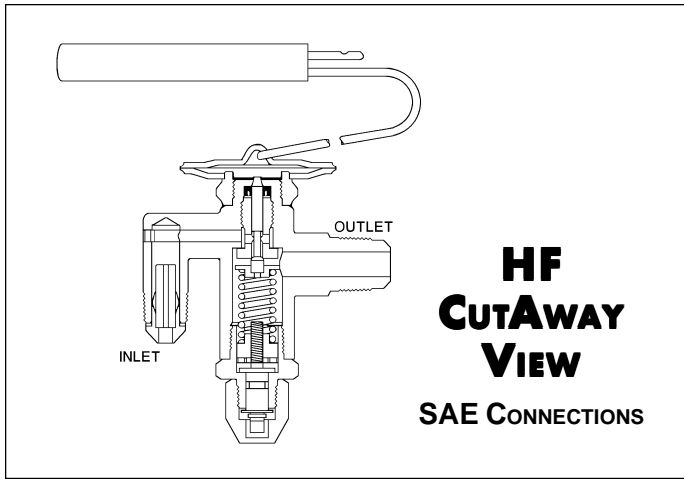
a conventional valve not maintaining a constant superheat at the evaporator outlet. These superheat changes can result in the evaporator starving in low ambient conditions and flooding in the higher ambient, depending on the valve design. Another variable factor for this situation is how low the head pressure is allowed to decrease. This of course depends on whether heat reclaim is utilized for heating purposes, or if hot gas will be used for evaporator defrost.

In conventional expansion valves, when the pressure drop across the valve port changes due to changes in head pressure and/or suction pressure—operating superheat of the expansion valve varies due to this "unbalance".

Depending on the operating conditions under which the superheat was originally set, this "unbalance" can in some situations result in compressor flooding or evaporator starvation. A unique design concept called balanced port cancels the effect of this pressure unbalance, permitting the expansion valve to operate at a relatively constant superheat over a wide range of operating conditions.

Any refrigeration system which experiences changes in operating pressures due to varying ambients, gas defrost, heat reclaim, or swings in evaporator load will benefit from using the Super HF balanced port Thermo® expansion valve.

# HF BALANCED PORT TEV



HF NOMINAL CAPACITY RANGES IN TONS				
R12	R134A	R22	R502, R404A, R507	CONNECTIONS AVAILABLE
1/8	1/4	1/4	1/8	SAE or ODF
1/4	1/2	1/2	1/4	
1/2	3/4	1	1/2	
1	1	1-1/2	1	
—	1-1/2	2	—	
1-1/2	1-3/4	2-1/2	1-1/2	
2	2-1/2	3	2	ODF only
3-1/2	4	5-1/2	3-1/2	
5	6	8	5	
6	7-1/2	10	7	
9*	11	15*	10*	
12	14	20	13	

\*Largest size available: HFESC Series only.

## SELECTION PROCEDURE

To apply the proper HF valve on a system, these design conditions must be available: maximum evaporator load, evaporator temperature, maximum and minimum condensing and liquid temperatures, and refrigerant.

The conditions from above along with the following considerations will determine if the specific valve has enough capacity for the evaporator being considered:

- Determine pressure drop across the valve — using both the maximum and minimum condensing pressures, subtract evaporating pressure from each to obtain the total high to low side pressure drop. From these values, subtract the other possible pressure losses — piping and heat exchanger friction losses; pressure drop through accessories; vertical lift pressure drop; and the pressure drop across the refrigerant distributor. The last item listed is very important to obtain proper refrigerant distribution under all operating conditions. The example below illustrates the factors involved in the HF selection process.

- Consider the maximum and minimum liquid temperatures of the refrigerant entering the valve and select the correction factors for those temperatures from the liquid correction factor table. Determine the corrected capacity requirement by dividing the maximum evaporator load in tons by the liquid correction factors. These values allow the final selection to be made.
- Select the valve from the appropriate capacity table for the evaporator temperature, pressure drop available, and corrected capacity requirement. If the valve has less capacity than required, contact your ALCO Sales Engineer or Alco Controls for assistance.
- Select the proper thermostatic charge based on the evaporator temperature, refrigerant and whether a MOP type charge is required.
- Determine the appropriate connections and whether an externally equalized model is required. Always use an externally equalized valve when a refrigerant distributor is used. SEE THE SELECTION EXAMPLE PROVIDED BELOW.

### SELECTION PROCEDURE EXAMPLE

DATA OBTAINED	COIL #1	COIL #2
REFRIGERANT TYPE	R22	R22
EVAPORATOR TEMP.	+20°F	+20°F
PRESSURE DROP ACROSS VALVE	125 psi	150 psi
REQUIRED TONNAGE	18,000 btu	12,000 btu
LIQUID TEMP. AT VALVE INLET	100°F	100°F
PRESSURE LIMIT. VALVE & SETTING	NO	NO

Given the data obtained and the table values shown, the following selection is made:

	COIL #1	COIL #2
<b>CORRECT SELECTION</b>	<b>HFE 1-1/2 HC</b>	<b>HFE 1 HC</b>

For further selection assistance see the Selection Procedure section above.

USING DATA OBTAINED (ABOVE) AND ABBREVIATED TABLES BELOW, VALVE SELECTION IS DERIVED (SEE HIGHLIGHTED BOXES WITHIN THE TABLES).

### REFRIGERANT LIQUID TEMPERATURE CORRECTION FACTORS (R22 ONLY)

	Refrigerant Liquid Temperature °F														
	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
<b>R22 Correction Factor</b>	1.56	1.51	1.45	1.40	1.34	1.29	1.23	1.17	1.12	1.06	1.00	.94	.88	.82	.76

### HF EXTENDED CAPACITIES IN TONS R22 (ABBREVIATED TABLE)

VALVE	+ 50°F								EVAPORATOR TEMP. + 40°F								+ 20°F							
	PRESSURE DROP ACROSS VALVE – PSI																							
	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225
HF 1/4 H	0.22	0.26	0.29	0.32	0.35	0.38	0.41	0.43	0.22	0.25	<b>0.28</b>	0.32	0.35	0.38	0.40	0.43	0.21	0.25	0.28	0.31	0.34	0.37	0.39	0.41
HF 1/2 H	0.42	0.48	0.51	0.60	0.66	0.71	0.76	0.81	0.41	0.48	<b>0.53</b>	0.60	0.65	0.71	0.75	0.80	0.40	0.47	0.52	0.58	0.64	0.69	0.74	0.78
HF 1 H	0.74	0.86	0.96	1.08	1.18	1.27	1.36	1.44	0.74	0.85	<b>0.95</b>	1.06	1.16	1.26	1.34	1.43	0.72	0.83	0.93	1.04	<b>1.13</b>	1.23	1.31	1.39
HF 1-1/2 H	1.14	1.31	1.47	1.64	1.80	1.94	2.08	2.20	1.12	1.30	<b>1.45</b>	1.62	1.75	1.92	2.05	2.18	1.10	1.26	1.41	<b>1.58</b>	1.73	1.87	2.00	2.12
HF 2 H	1.53	1.76	1.97	2.20	2.42	2.61	2.79	2.96	1.51	1.74	<b>1.95</b>	2.18	2.39	2.58	2.76	2.92	1.47	1.70	1.90	2.12	2.33	2.51	2.69	2.85

# HF BALANCED PORT TEV

## TAILORED BULB CHARGES

The use of ALCO tailored charges makes the HF valve reliable for HVAC, refrigerated display cases, walk-in coolers, reach-in coolers, and all other small refrigeration systems — both low and medium temperature.

The thermostatic charge is selected on the basis of the evaporator temperature only, as indicated in table 2.

## SPECIFICATIONS

Maximum Working Pressure: 450 psig.

Operating Temperature: -40°F to 50°F.

Standard 5' capillary tube length.

Extended copper ODF line connections:

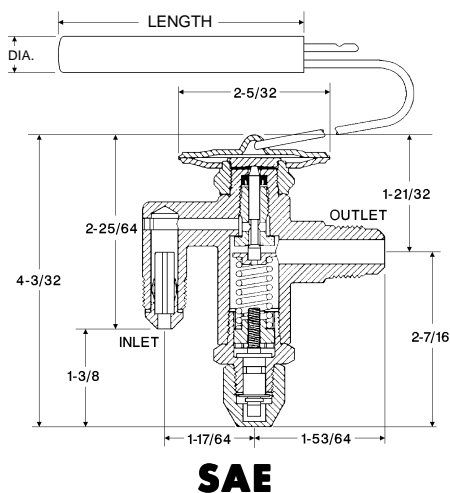
Straight-thru Configurations	
Inlet	Outlet
3/8	1/2
1/2	5/8
5/8	7/8
7/8	1-1/8
Angle Configuration	
90° Elbow – 3/8 Inlet ONLY	

SAE line connections:

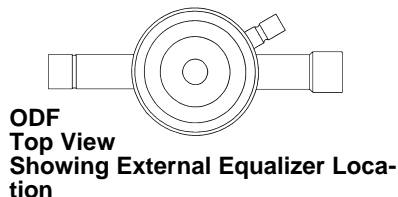
Inlet	Outlet
1/4	1/2
3/8	1/2

## HF DIMENSIONAL DIAGRAMS

### REMOTE BULB TUBING LENGTH 5' STANDARD



Remote Bulb Dimensions		
Refrigerant Charge	Length	Dia.
C, G, L, Z	3-1/2	1/2
CA	2-15/16	3/4



Evaporator Temperature	Refrigerant			
	R12	R134a	R22	R502, R404A, R507
Med temp (-20 to +50°F)	FC	MC	HC	*C
Low temp (-50 to +10°F)	FZ	MZ	HZ	*Z
MOP low temp (-50 to 0°F)	FW15	MW15	HW35	*W45
MOP med temp (0 to +25°F)	-	MW35	HW65	*W65

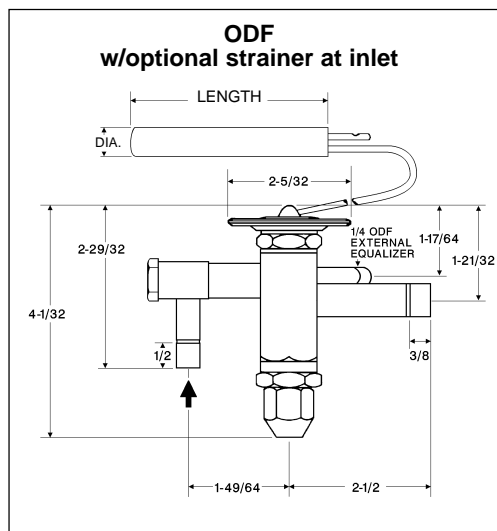
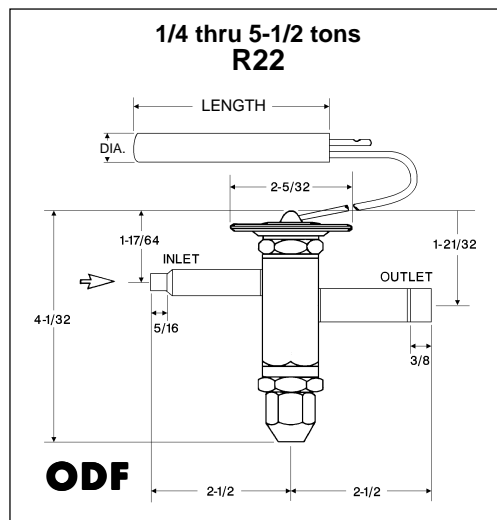
\* Add refrigerant code: "R" for R502, "S" for R404A, "P" for R507.

### REPLACEMENT PARTS — FOR SAE INLET

PART NUMBER	INLET SIZE	DESCRIPTION
X-11176-1	3/8	FILTER SCREEN
KT-20003	3/8 - 1/4	INLET ADAPTER
X-13342-4	NA	SEAL CAP

### REPLACEMENT PARTS — HFSC & HFSC ONLY

REPAIR KIT	DESCRIPTION
KT20264	Includes seal cap, gasket O-ring, screen, spring



# HF BALANCED PORT TEV

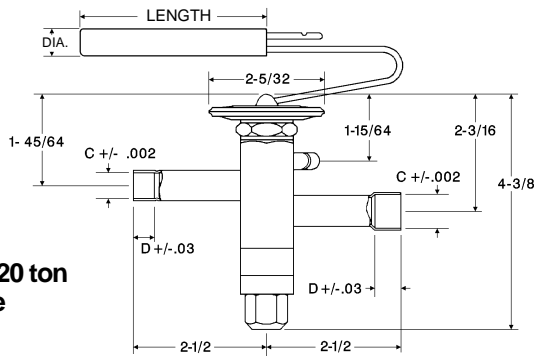
HF NOMENCLATURE						
HF	E	S	C	2	H	C
Valve Series	External Equalizer (omit for internal) <small>N = NonAdjustable</small>	ODF Copper Connections (omit for SAE)	Removable Strainer (optional) ODF only	Capacity Nominal Rating in Tons	Refrigerant Code M = R134a H = R22, R = R502 P = R507 S = R404A	Charge Code C = med temp Z = low temp W = MOP (if needed)

REPLACEMENT POWER ASSEMBLIES		
R12 POWER ASSEMBLY	R22 POWER ASSEMBLY	R502 POWER ASSEMBLY
X26300-FC-1	X26300-HC-1	X26300-RC-1
X26300-FZ-1	X26300-HZ-1	X26300-RZ-1
X26300-FW15-1	X26300-HW35-1	X26300-RW45-1
X26300-FW35-1	X26300-HW65-1	X26300-RW65-1

Torque Power Element 300-360 inch pounds.

POWER ELEMENT CROSS REFERENCE		
COMMERCIAL TEMP. APPLICATIONS	ORIGINAL POWER ELEMENT	REPLACEMENT POWER ELEMENT
R134a	M	F
R401A	X	F
R402A	L	R
R402B	J	R
R407C	N	H
<b>LOW TEMP.</b>		
R402A	L	R
R402B	J	R
R404A	S	R
R507	P	R
R407C	N	H

## HF DIMENSIONAL DIAGRAM



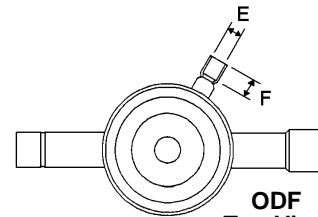
**ODF**  
8, 10, 15 & 20 ton  
R-22 Valve

INLET/OUTLET CONNECTIONS		
SIZE ODF	C ± .002	D ± .03
1/2	.504	.37
5/8	.629	.50
7/8	.879	.76
1-1/8	1.129	.90
1-3/8	1.379	.97

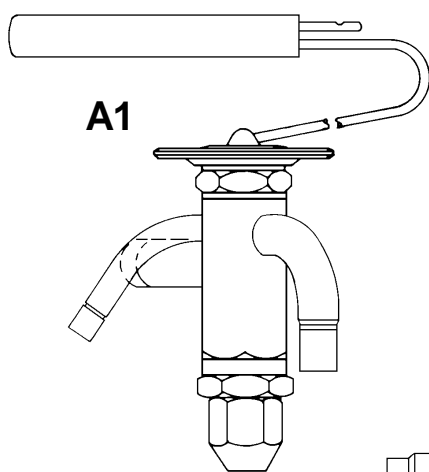
External Equalizer	E	F
3/16 ODF	.192 ± .002	.31 ± .03
1/4 ODF	.254 ± .002	.33 ± .03

### REMOTE BULB TUBING LENGTH 5' STANDARD

Refrigerant Charge	Tube Length	Length dimension	Dia. dimension
CA	10 FT.	2-5/16	3/4
C, L, Z, G - WMOP	5 FT. 10 FT.	3-1/2	1/2

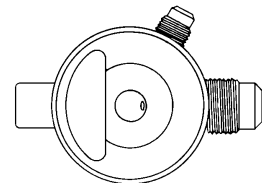


**ODF Top View**  
Showing External Equalizer Location

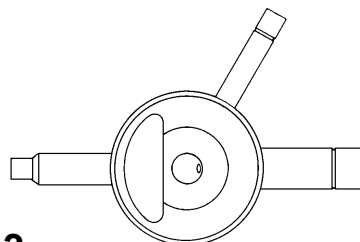


**A1**

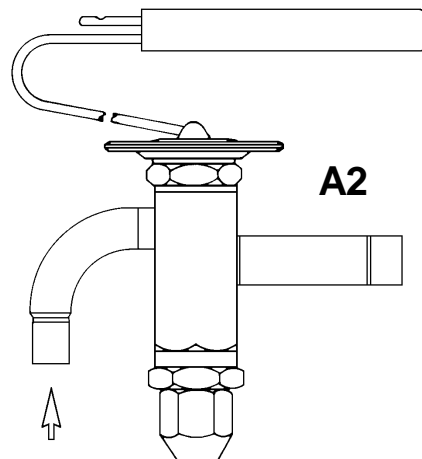
## HF OPTIONAL CONFIGURATIONS



**A4 SAE**



**A3 ODF Straight - Thru**



**A2**

# HF BALANCED PORT TEV

## REFRIGERANT LIQUID TEMPERATURE CORRECTION FACTORS

	Refrigerant Liquid Temperature °F														
	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
<b>R12 Correction Factor</b>	1.60	1.54	1.48	1.42	1.36	1.30	1.24	1.18	1.12	1.06	1.00	.94	.88	.82	.75
<b>R134a Correction Factor</b>	1.70	1.63	1.56	1.49	1.42	1.36	1.29	1.21	1.14	1.07	1.00	.93	.85	.78	.71
<b>R22 Correction Factor</b>	1.56	1.51	1.45	1.40	1.34	1.29	1.23	1.17	1.12	1.06	1.00	.94	.88	.82	.76
<b>R404A/R507 Correction</b>	2.00	1.90	1.80	1.70	1.60	1.50	1.40	1.30	1.20	1.10	1.00	.90	.80	.70	.50

These factors include corrections for liquid refrigerant density and net refrigerating effect and are based on an average evaporator temperature of 0°F. However, they may be used for any evaporator temperature from -40°F to +40°F since the variation in the actual factors across this range is insignificant.  
 EXAMPLE: Actual capacity of a HFE 1-1/2 H valve at -20°F, 150 psi pressure drop and 60°F liquid temperature = 1.09 tons x 1.23 = 1.34 tons.

## HF EXTENDED CAPACITIES IN TONS R12

VALVE	EVAPORATOR TEMP.																	
	+ 50°F						+ 40°F						+ 20°F					
	PRESSURE DROP ACROSS VALVE – PSI																	
	60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175
HF 1/8 F	0.17	0.20	0.22	0.25	0.27	0.30	<b>0.17</b>	0.20	0.22	0.25	0.27	0.29	0.16	0.19	0.21	0.24	0.26	0.28
HF 1/4 F	0.33	0.38	0.42	0.47	0.52	0.56	<b>0.32</b>	0.37	0.41	0.46	0.51	0.55	0.31	0.35	0.40	0.44	0.48	0.52
HF 1/2 F	0.58	0.67	0.75	0.84	0.92	0.99	<b>0.57</b>	0.66	0.74	0.82	0.90	0.97	0.55	0.63	0.70	0.79	0.86	0.93
HF 1 F	0.89	1.03	1.15	1.28	1.40	1.52	<b>0.87</b>	1.00	1.12	1.26	1.38	1.49	0.83	0.96	1.08	1.20	1.32	1.42
HF 1-1/4 F	1.19	1.38	1.54	1.72	1.89	2.04	<b>1.17</b>	1.35	1.51	1.69	1.85	2.00	1.12	1.29	1.45	1.62	1.77	1.91
HF 1-1/2 F	1.53	1.77	1.98	2.21	2.42	2.61	<b>1.50</b>	1.73	1.94	2.17	2.37	2.56	1.44	1.66	1.86	2.07	2.27	2.45
HF 2 F	2.02	2.33	2.61	2.92	3.19	3.45	<b>1.98</b>	2.29	2.56	2.86	3.13	3.38	1.90	2.19	2.45	2.74	3.00	3.24
HF 3-1/2 F	3.59	4.15	4.64	5.18	5.68	6.13	<b>3.52</b>	4.06	4.54	5.08	5.57	6.01	3.37	3.89	4.35	4.87	5.33	5.76
HF 5 F	5.00	5.77	6.46	7.22	7.91	8.54	<b>4.90</b>	5.66	6.33	7.07	7.75	8.37	4.69	5.42	6.06	6.78	7.42	8.02
HF 6 F	6.33	7.31	8.17	9.13	10.00	10.80	<b>6.20</b>	7.16	8.00	8.95	9.80	10.59	5.94	6.86	7.67	8.57	9.39	10.14
HF 9 F	9.39	10.84	12.12	13.55	14.84	16.03	<b>9.20</b>	10.62	11.88	13.28	14.55	15.71	8.81	10.18	11.38	12.72	13.94	15.05
HF 12 F	12.35	14.26	15.95	17.83	19.53	21.10	<b>12.11</b>	13.98	15.63	17.47	19.14	20.67	11.60	13.39	14.97	16.74	18.34	19.81

VALVE	EVAPORATOR TEMP.																	
	0°F						- 20°F						- 40°F					
	PRESSURE DROP ACROSS VALVE – PSI																	
	60	80	100	125	150	175	80	100	125	150	175	200	80	100	125	150	175	200
HF 1/8 F	0.14	0.17	0.19	0.21	0.23	0.25	0.11	0.13	0.14	0.15	0.17	0.18	0.07	0.08	0.09	0.10	0.11	0.12
HF 1/4 F	0.27	0.31	0.35	0.39	0.43	0.46	0.21	0.24	0.27	0.29	0.31	0.34	0.14	0.15	0.17	0.19	0.20	0.22
HF 1/2 F	0.48	0.56	0.62	0.70	0.77	0.83	0.38	0.42	0.47	0.52	0.56	0.60	0.25	0.27	0.31	0.34	0.36	0.39
HF 1 F	0.74	0.85	0.95	1.07	1.17	1.26	0.58	0.65	0.72	0.79	0.86	0.91	0.38	0.42	0.47	0.51	0.56	0.59
HF 1-1/4 F	0.99	1.15	1.28	1.43	1.57	1.69	0.78	0.87	0.97	1.06	1.15	1.23	0.50	0.56	0.63	0.69	0.75	0.80
HF 1-1/2 F	1.27	1.47	1.64	1.84	2.01	2.17	1.00	1.12	1.25	1.37	1.48	1.58	0.65	0.72	0.81	0.89	0.96	1.02
HF 2 F	1.68	1.94	2.17	2.43	2.66	2.87	1.32	1.47	1.65	1.80	1.95	2.08	0.85	0.95	1.07	1.17	1.26	1.35
HF 3-1/2 F	2.99	3.45	3.86	4.31	4.72	5.10	2.34	2.62	2.93	3.21	3.46	3.70	1.52	1.70	1.90	2.08	2.25	2.40
HF 5 F	4.16	4.80	5.37	6.00	6.58	7.10	3.26	3.64	4.07	4.46	4.82	5.15	2.11	2.36	2.64	2.89	3.13	3.34
HF 6 F	5.26	6.08	6.79	7.60	8.32	8.99	4.12	4.61	5.15	5.65	6.10	6.52	2.67	2.99	3.34	3.66	3.96	4.23
HF 9 F	7.81	9.02	10.08	11.27	12.35	13.34	6.12	6.84	7.65	8.38	9.05	9.67	3.97	4.44	4.96	5.43	5.87	6.27
HF 12 F	10.28	11.87	13.27	14.83	16.25	17.55	8.05	9.00	10.06	11.02	11.91	12.73	5.22	5.84	6.53	7.15	7.72	8.26

## HF EXTENDED CAPACITIES IN TONS R134a

VALVE	EVAPORATOR TEMP.											
	+ 50°F						+ 40°F					
	PRESSURE DROP ACROSS VALVE – PSI											
	60	80	100	125	150	175	60	80	100	125	150	175
HF 1/4	0.21	0.24	0.27	0.30	0.33	0.35	<b>0.20</b>	0.23	0.26	0.29	0.32	0.35
HF 1/2	0.39	0.45	0.51	0.56	0.62	0.67	<b>0.38</b>	0.44	0.49	0.55	0.61	0.65
HF 3/4	0.70	0.80	0.90	1.01	1.10	1.19	<b>0.68</b>	0.79	0.88	0.98	1.08	1.17
HF 1	1.06	1.23	1.37	1.54	1.68	1.82	<b>1.04</b>	1.20	1.34	1.50	1.65	1.78
HF 1-1/2	1.43	1.65	1.85	2.06	2.26	2.44	<b>1.40</b>	1.62	1.81	2.02	2.21	2.39
HF 1-3/4	1.83	2.12	2.37	2.65	2.90	3.13	<b>1.80</b>	2.07	2.32	2.59	2.84	3.07
HF 2-1/2	2.42	2.80	3.13	3.49	3.83	4.13	<b>2.37</b>	2.74	3.06	3.42	3.75	4.05
HF 4	4.30	4.97	5.56	6.21	6.80	7.35	<b>4.21</b>	4.87	5.44	6.08	6.66	7.20
HF 6	5.99	6.92	7.73	8.65	9.47	10.23	<b>5.87</b>	6.77	7.57	8.47	9.27	10.02
HF 7-1/2	7.58	8.75	9.79	10.94	11.98	12.94	<b>7.42</b>	8.57	9.58	10.71	11.74	12.68
HF 11	11.25	12.99	14.52	16.23	17.78	19.21	<b>11.01</b>	12.72	14.22	15.90	17.41	18.81
HF 14	14.80	17.09	19.11	21.36	23.40	25.28	<b>14.49</b>	16.73	18.71	20.92	22.91	24.75

VALVE	EVAPORATOR TEMP.											
	+ 20°F						0°F					
	PRESSURE DROP ACROSS VALVE – PSI											
	60	80	100	125	150	175	60	80	100	125	150	175
HF 1/4	0.19	0.22	0.25	0.28	0.31	0.33	0.17	0.20	0.22	0.25	0.27	0.29
HF 1/2	0.37	0.42	0.47	0.53	0.58	0.63	0.32	0.37	0.42	0.47	0.51	0.55
HF 3/4	0.65	0.75	0.84	0.94	1.03	1.11	0.58	0.67	0.74	0.83	0.91	0.98
HF 1	1.00	1.15	1.29	1.44	1.57	1.70	0.88	1.02	1.14	1.27	1.39	1.50
HF 1-1/2	1.34	1.55	1.73	1.93	2.12	2.29	1.18	1.37	1.53	1.71	1.87	2.02
HF 1-3/4	1.72	1.98	2.22	2.48	2.71	2.93	1.52	1.75	1.96	2.19	2.40	2.59
HF 2-1/2	2.27	2.62	2.93	3.27	3.58	3.87	2.00	2.31	2.59	2.89	3.17	3.42
HF 4	4.03	4.65	5.20	5.82	6.37	6.88	3.56	4.11	4.60	5.14	5.63	6.08
HF 6	5.61	6.48	7.24	8.10	8.87	9.58	4.96	5.72	6.40	7.15	7.84	8.46
HF 7-1/2	7.10	8.19	9.16	10.24	11.22	12.12	6.27	7.24	8.10	9.05	9.91	10.71
HF 11	10.53	12.16	13.59	15.20	16.65	17.98	9.30	10.74	12.01	13.43	14.71	15.89
HF 14	13.86	16.00	17.89	20.00	21.91	23.66	12.24	14.14	15.81	17.67	19.36	20.91



# HF BALANCED PORT TEV

## HF EXTENDED CAPACITIES IN TONS R22

VALVE	EVAPORATOR TEMP.																							
	+ 50°F								+ 40°F								+ 20°F							
	PRESSURE DROP ACROSS VALVE – PSI																							
	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225
HF 1/4 H	0.22	0.26	0.29	0.32	0.35	0.38	0.41	0.43	0.22	0.25	<b>0.28</b>	0.32	0.35	0.38	0.40	0.43	0.21	0.25	0.28	0.31	0.34	0.37	0.39	0.41
HF 1/2 H	0.42	0.48	0.51	0.60	0.66	0.71	0.76	0.81	0.41	0.48	<b>0.53</b>	0.60	0.65	0.71	0.75	0.80	0.40	0.47	0.52	0.58	0.64	0.69	0.74	0.78
HF 1 H	0.74	0.86	0.96	1.08	1.18	1.27	1.36	1.44	0.74	0.85	<b>0.95</b>	1.06	1.16	1.26	1.34	1.43	0.72	0.83	0.93	1.04	1.13	1.23	1.31	1.39
HF 1-1/2 H	1.14	1.31	1.47	1.64	1.80	1.94	2.08	2.20	1.12	1.30	<b>1.45</b>	1.62	1.75	1.92	2.05	2.18	1.10	1.26	1.41	1.58	1.73	1.87	2.00	2.12
HF 2 H	1.53	1.76	1.97	2.20	2.42	2.61	2.79	2.96	1.51	1.74	<b>1.95</b>	2.18	2.39	2.58	2.76	2.92	1.47	1.70	1.90	2.12	2.33	2.51	2.69	2.85
HF 2-1/2 H	1.96	2.26	2.53	2.83	3.10	3.35	3.58	3.80	1.94	2.24	<b>2.50</b>	2.80	3.06	3.31	3.54	3.75	1.89	2.18	2.44	2.73	2.99	3.23	3.45	3.66
HF 3 H	2.59	2.99	3.34	3.73	4.09	4.42	4.72	5.01	2.56	2.95	<b>3.30</b>	3.69	4.04	4.37	4.67	4.95	2.49	2.88	3.22	3.60	3.94	4.26	4.55	4.83
HF 5-1/2 H	4.60	5.31	5.94	6.64	7.27	7.86	8.40	8.91	4.55	5.25	<b>5.87</b>	6.56	7.19	7.77	8.30	8.80	4.43	5.12	5.72	6.40	7.01	7.57	8.09	8.58
HF 8 H	6.40	7.39	8.27	9.24	10.12	10.94	11.69	12.40	6.33	7.31	<b>8.17</b>	9.14	10.01	10.81	11.56	12.26	6.17	7.12	7.96	8.90	9.75	10.54	11.26	11.95
HF 10 H	8.10	9.36	10.46	11.69	12.81	13.84	14.79	15.69	8.01	9.25	<b>10.34</b>	11.56	12.66	13.68	14.62	15.51	7.81	9.01	10.08	11.27	12.34	13.33	14.25	15.12
HF 15 H	12.02	13.88	15.52	17.35	19.01	20.53	21.95	23.28	11.88	13.72	<b>15.34</b>	17.15	18.79	20.30	21.70	23.01	11.58	13.37	14.95	16.72	18.31	19.78	21.15	22.43
HF 20 H	15.82	18.27	20.42	22.83	25.01	27.02	28.88	30.63	15.64	18.06	<b>20.19</b>	22.57	24.72	26.71	28.55	30.28	15.24	17.60	19.68	22.00	24.10	26.03	27.83	29.51

VALVE	EVAPORATOR TEMP.																							
	0°F								– 20°F								– 40°F							
	PRESSURE DROP ACROSS VALVE – PSI																							
	80	100	125	150	175	200	225	250	80	100	125	150	175	200	225	250	80	100	125	150	175	200	225	250
HF 1/4 H	0.22	0.25	0.28	0.31	0.33	0.35	0.38	0.38	0.16	0.17	0.19	0.21	0.23	0.25	0.26	0.27	0.10	0.12	0.13	0.14	0.15	0.16	0.17	0.18
HF 1/2 H	0.42	0.47	0.53	0.58	0.62	0.67	0.71	0.72	0.29	0.33	0.37	0.40	0.43	0.46	0.49	0.50	0.19	0.22	0.24	0.27	0.29	0.31	0.33	0.33
HF 1 H	0.75	0.84	0.94	1.03	1.11	1.19	1.26	1.28	0.52	0.58	0.65	0.71	0.77	0.82	0.87	0.90	0.35	0.39	0.43	0.47	0.51	0.55	0.58	0.59
HF 1-1/2 H	1.15	1.28	1.43	1.57	1.70	1.81	1.92	1.97	0.79	0.89	0.99	1.09	1.18	1.26	1.33	1.37	0.53	0.59	0.66	0.72	0.78	0.83	0.88	0.91
HF 2 H	1.54	1.72	1.93	2.11	2.28	2.43	2.58	2.71	1.07	1.19	1.33	1.46	1.58	1.69	1.79	1.88	0.71	0.79	0.89	0.97	1.05	1.12	1.19	1.24
HF 2-1/2 H	1.98	2.21	2.47	2.71	2.92	3.12	3.31	3.39	1.37	1.53	1.71	1.88	2.03	2.17	2.30	2.35	0.91	1.02	1.14	1.25	1.35	1.44	1.53	1.56
HF 3 H	2.61	2.92	3.26	3.57	3.86	4.12	4.37	4.47	1.81	2.02	2.26	2.48	2.68	2.86	3.03	3.10	1.20	1.34	1.50	1.64	1.78	1.90	2.01	2.05
HF 5-1/2 H	4.64	5.18	5.80	6.35	6.86	7.33	7.78	7.95	3.22	3.59	4.02	4.40	4.76	5.08	5.39	5.52	2.13	2.39	2.67	2.92	3.16	3.38	3.58	3.65
HF 8 H	6.46	7.22	8.07	8.84	9.55	10.21	10.83	11.1	4.48	5.00	5.60	6.13	6.62	7.08	7.51	7.70	2.97	3.32	3.71	4.07	4.40	4.70	4.98	5.10
HF 10 H	8.17	9.13	10.21	11.18	12.08	12.91	13.70	14.0	5.66	6.33	7.08	7.76	8.38	8.95	9.50	9.70	3.76	4.20	4.70	5.15	5.56	5.95	6.31	6.40
HF 15 H	12.12	13.55	15.15	16.60	17.93	19.16	20.33	20.8	8.40	9.40	10.51	11.51	12.43	13.29	14.09	14.4	5.58	6.24	6.97	7.64	8.25	8.82	9.36	9.50
HF 20 H	15.95	17.83	19.94	21.84	23.59	25.22	26.75	28.2	11.06	12.36	13.82	15.14	16.36	17.49	18.55	19.55	7.34	8.21	9.18	10.05	10.86	11.61	12.31	13.0

## HF EXTENDED CAPACITIES IN TONS R404A/R507

VALVE	EVAPORATOR TEMP.																									
	+ 50°F								+ 40°F								+ 20°F									
	PRESSURE DROP ACROSS VALVE – PSI																									
	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	250	275
HF 1/8	0.15	0.17	0.19	0.21	0.23	0.25	0.27	0.28	0.14	0.16	<b>0.18</b>	0.21	0.23	0.24	0.26	0.28	0.14	0.16	0.18	0.20	0.22	0.23	0.25	0.26	0.27	0.29
HF 1/4	0.27	0.32	0.35	0.40	0.43	0.47	0.50	0.53	0.27	0.31	<b>0.35</b>	0.39	0.42	0.46	0.49	0.52	0.26	0.30	0.33	0.37	0.41	0.44	0.47	0.50	0.53	0.56
HF 1/2	0.49	0.56	0.63	0.70	0.77	0.83	0.89	0.95	0.48	0.55	<b>0.62</b>	0.69	0.76	0.82	0.87	0.93	0.46	0.53	0.59	0.66	0.72	0.78	0.83	0.88	0.92	0.98
HF 1	0.75	0.86	0.96	1.08	1.18	1.27	1.36	1.44	0.73	0.84	<b>0.94</b>	1.05	1.15	1.25	1.33	1.41	0.70	0.80	0.90	1.01	1.10	1.19	1.27	1.35	1.42	1.50
HF 1-1/4	1.00	1.16	1.29	1.45	1.58	1.71	1.83	1.94	0.98	1.13	<b>1.27</b>	1.42	1.55	1.67	1.79	1.90	0.94	1.08	1.21	1.35	1.48	1.60	1.71	1.81	1.90	2.00
HF 1-1/2	1.28	1.48	1.66	1.85	2.03	2.19	2.35	2.49	1.26	1.45	<b>1.62</b>	1.82	1.99	2.15	2.30	2.44	1.20	1.39	1.55	1.73	1.90	2.05	2.19	2.33	2.45	2.60
HF 2	1.70	1.96	2.19	2.45	2.68	2.90	3.10	3.28	1.66	1.92	<b>2.14</b>	2.40	2.63	2.84	3.03	3.22	1.58	1.83	2.05	2.29	2.51	2.71	2.89	3.07	3.22	3.40
HF 3-1/2	3.02	3.48	3.89	4.35	4.77	5.15	5.50	5.84	2.95	3.41	<b>3.81</b>	4.26	4.67	5.04	5.39	5.72	2.82	3.25	3.64	4.07	4.46	4.81	5.14	5.46	5.73	6.10
HF 5	4.20	4.85	5.42	6.06	6.64	7.17	7.66	8.13	4.11	4.74	<b>5.31</b>	5.93	6.50	7.02	7.50	7.96	3.92	4.53	5.06	5.66	6.20	6.70	7.16	7.60	8.00	8.40
HF 7	5.31	6.13	6.86	7.67	8.40	9.07	9.70	10.28	5.20	6.00	<b>6.71</b>	7.50	8.22	8.88	9.49	10.07	4.96	5.73	6.41	7.16	7.85	8.48	9.06	9.61	10.1	10.7
HF 10	7.88	9.10	10.17	11.37	12.46	13.46	14.39	15.26	7.72	8.91	<b>9.96</b>	11.14	12.20	13.18	14.09	14.94	7.36	8.50	9.51	10.63	11.64	12.58	13.45	14.26	15.0	14.81
HF 13	10.37	11.97	13.39	14.97	16.40	17.71	18.93	20.08	10.15	11.72	<b>13.11</b>	14.65	16.05	17.34	18.54	19.66	9.69	11.19	12.51	13.99	15.32	16.55	17.69	18.77	19.7	20.8

VALVE	EVAPORATOR TEMP.																													
	0°F								– 20°F								– 40°F													
	PRESSURE DROP ACROSS VALVE – PSI																													
	60	80	100	125	150	175	200	225	275	300	60	80	100	125	150	175	200	225	275	300	60	80	100	125	150	175	200	225	275	300
HF 1/8	0.14	0.16	0.18	0.20	0.21	0.23	0.24	0.26	0.27	0.29	0.10	0.11	0.12	0.14	0.15	0.16	0.17	0.18	0.19	0.20	0.06	0.07	0.08	0.09	0.10	0.10	0.11	0.12	0.13	0.13
HF 1/4	0.27	0.30	0.34	0.37	0.40	0.43	0.45	0.49	0.51	0.54	0.19	0.21	0.23	0.25	0.28	0.29	0.31	0.34	0.36	0.37	0.12	0.14	0.15	0.17	0.18	0.19	0.21	0.22	0.23	0.24
HF 1/2	0.48	0.54	0.60	0.66	0.71	0.76	0.81	0.87	0.91	0.96	0.33	0.37	0.41	0.45	0.49	0.52	0.56	0.60	0.63	0.66	0.22	0.24	0.27	0.30	0.32	0.34	0.37	0.39	0.41	0.43
HF 1	0.74	0.82	0.92	1.01	1.09	1.16	1.23	1.33	1.40	1.46	0.51	0.57	0.63	0.69	0.75	0.80	0.85	0.93	0.98	1.02	0.33	0.37	0.42	0.46	0.49	0.53	0.56	0.60	0.63	0.66
HF 1-1/4	0.99	1.11	1.24	1.35	1.46	1.56	1.66	1.76	1.85	1.94	0.68	0.76	0.85	0.93	1.01	1.08	1.14	1.20	1.26	1.32	0.45	0.50	0.56	0.61	0.66	0.71	0.75	0.79	0.83	0.87
HF 1-1/2	1.27	1.42	1.59	1.74	1.88	2.01	2.13	2.29	2.40	2.52	0.87	0.98	1.09	1.19	1.29	1.38	1.46	1.60	1.68	1.76	0.57	0.64	0.72	0.78	0.85	0.91	0.96	1.05	1.10	

# ORDERING INFORMATION FOR HF SERIES VALVES

VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN CHARGE						REFRIG.
			INTERNAL			EXTERNAL			
			MC <small>R-134a Med. Temp.</small>	MZ <small>R-22 Low Temp.</small>	MW35 <small>R-134a MOP</small>	MC <small>R-134a Med. Temp.</small>	MZ <small>R-134a Low Temp.</small>	MW35 <small>R-134a MOP</small>	
HF(E)	1/4	3/8 x 1/2 SAE ANG	057618	059421	--	057860	--	--	R-134a
		3/8 x 1/2 ODF S/T	--	--	--	--	--	--	
		3/8 x 1/2 ODF ANG	058545	--	--	058544	--	--	
	1/2	3/8 x 1/2 SAE ANG	057620	--	--	057616	--	--	
		3/8 x 1/2 ODF S/T	--	--	--	--	--	--	
		3/8 x 1/2 ODF ANG	--	--	--	--	--	062076	
	3/4	3/8 x 1/2 SAE ANG	057879	--	--	--	--	--	
		3/8 x 1/2 ODF S/T	--	--	--	059422	064034	--	
		3/8 x 1/2 ODF ANG	--	--	--	057784	--	--	
	1	3/8 x 1/2 SAE ANG	057619	--	--	057617	058916	--	
		3/8 x 1/2 ODF S/T	--	--	--	--	--	--	
		3/8 x 1/2 ODF ANG	--	--	--	058546	--	--	
1 1/2	3/8 x 1/2 SAE ANG	--	--	--	057895	058918	--		
	3/8 x 1/2 ODF S/T	--	--	--	--	--	--		
	3/8 x 1/2 ODF ANG	--	--	--	058543	--	--		
1 3/4	3/8 x 1/2 SAE ANG	--	--	--	057896	--	--		
	3/8 x 1/2 ODF S/T	--	--	--	058152	--	--		
	3/8 x 1/2 ODF ANG	--	--	--	059618	--	--		
2 1/2	3/8 x 1/2 SAE ANG	--	--	--	057622	061800	--		
	3/8 x 1/2 ODF S/T	--	--	--	--	--	--		
	3/8 x 1/2 ODF ANG	--	--	--	058154	--	--		
4	3/8 x 1/2 SAE ANG	--	--	--	057897	--	--		
	3/8 x 1/2 ODF S/T	--	--	--	--	--	--		
	3/8 x 1/2 ODF ANG	--	--	--	058153	--	--		
6	5/8 x 7/8 ODF S/T	--	--	--	057903	--	--		
	5/8 x 7/8 ODF ANG	--	--	--	--	--	--		
7 1/2	5/8 x 7/8 ODF S/T	--	--	--	057904	--	--		
	5/8 x 7/8 ODF ANG	--	--	--	--	--	--		
11	5/8 x 7/8 ODF S/T	--	--	--	057906	--	--		
	7/8 x 1 1/8 ODF S/T	--	--	--	058681	--	--		
14	5/8 x 7/8 ODF S/T	--	--	--	063999	--	--		
	7/8 x 1 3/8 ODF S/T	--	--	--	064000	--	--		

VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN CHARGE						REFRIG.
			INTERNAL			EXTERNAL			
			HC <small>R-22 Med. Temp.</small>	HZ <small>R-22 Low Temp.</small>	HW35 <small>R-22 MOP</small>	HC <small>R-22 Med. Temp.</small>	HZ <small>R-22 Low Temp.</small>	HW35 <small>R-22 MOP</small>	
HF(E)	1/4	3/8 x 1/2 SAE	054921	054922	054923	054924	054925	054926	R-22
		3/8 x 1/2 ODF S/T	055633	056169	--	055927	055869	--	
		3/8 x 1/2 ODF ANG	055493	--	--	055841	--	056072	
	1/2	3/8 x 1/2 SAE	054135	054364	054362	054361	054365	054363	
		3/8 x 1/2 ODF S/T	054136	056188	--	055927	055889	056036	
		3/8 x 1/2 ODF ANG	054723	058450	056065	054838	056247	056070	
	1	3/8 x 1/2 SAE	054927	054928	054929	054930	054931	054932	
		3/8 x 1/2 ODF S/T	055928	--	--	055708	055872	057376	
		3/8 x 1/2 ODF ANG	055702	--	056718	055494	055937	054938	
	1 1/2	3/8 x 1/2 SAE	054933	054934	054935	054936	054937	054938	
		3/8 x 1/2 ODF S/T	056018	--	--	055863	055908	--	
		3/8 x 1/2 ODF ANG	055969	--	056035	055495	055842	055980	
2	3/8 x 1/2 SAE	054939	054940	054941	054942	054943	054944		
	3/8 x 1/2 ODF S/T	056007	--	--	055706	--	055856		
	3/8 x 1/2 ODF ANG	054945	--	--	054946	055938	056118		
2 1/2	3/8 x 1/2 SAE	054947	054948	054949	054950	054951	054952		
	3/8 x 1/2 ODF S/T	--	--	--	055931	056857	056117		
	3/8 x 1/2 ODF ANG	--	--	--	056042	057865	--		
3	3/8 x 1/2 SAE	053316	053908	054954	053317	053191	053141		
	3/8 x 1/2 ODF S/T	053915	--	--	053916	055924	053971		
	3/8 x 1/2 ODF ANG	054836	--	--	054756	054843	058094		

# ORDERING INFORMATION FOR HF SERIES VALVES (CONT'D)

VALVE SERIES REFRIG.	CAPACITY TONS	CONNECTIONS	PCN CHARGE							REFRIG.	
			INTERNAL			EXTERNAL					
			HC	HZ	HW35	HC	HZ	HW35	HCA		
HF(E)S	5 1/2	3/8 x 1/2 SAE	R-22 Med. Temp. --	R-22 Low Temp. --	R-22 MOP --	R-22 Med. Temp. 054140	R-22 Low Temp. 054777	R-22 MOP 054955	R-22 Heat Pump --	R-22	
		3/8 x 1/2 ODF S/T	--	--	--	054141	054780	--	--		
		1/2 x 5/8 ODF S/T	--	--	--	054778	054781	--	--		
		1/2 x 7/8 ODF S/T	--	--	--	055187	--	--	--		
	8	5/8 x 7/8 ODF S/T	--	--	--	054779	054782	--	--		
		1/2 x 5/8 ODF S/T	--	--	--	057312	--	059231	--		
		1/2 x 7/8 ODF S/T	--	--	--	--	--	--	056818		
		5/8 x 7/8 ODF S/T	--	--	--	057313	057305	062557	056819		
	10	7/8 x 1 1/8 ODF S/T	--	--	--	057314	--	057912	--		
		1/2 x 5/8 ODF S/T	--	--	--	057315	--	059232	--		
		5/8 x 7/8 ODF S/T	--	--	--	057256	058578	--	056820		
		5/8 x 1 1/8 ODF S/T	--	--	--	--	--	--	056821		
	12	7/8 x 1 1/8 ODF S/T	--	--	--	057316	--	--	--		
		5/8 x 7/8 ODF S/T	--	--	--	062737	--	--	--		
	15	7/8 x 1 1/8 ODF S/T	--	--	--	--	--	--	--		
		5/8 x 7/8 ODF S/T	--	--	--	057317	--	--	056823		
	20	7/8 x 1 1/8 ODF S/T	--	--	--	057318	--	--	056825		
		7/8 x 7/8 ODF S/T	--	--	--	058781	--	--	--		
			7/8 x 1 1/8 ODF S/T	--	--	--	062055	--	--		058490
	VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN CHARGE							REFRIG.
HF(E)S	1/8	3/8 x 1/2 SAE	R-502 Med. Temp. 054956	R-502 Low Temp. 054957	R-502 MOP 054958	R-502 Med. Temp. 054959	R-502 Low Temp. 054960	R-502 MOP 054961	R-502		
		3/8 x 1/2 ODF S/T	--	--	--	--	--	--			
	1/4	3/8 x 1/2 ODF ANG	--	--	--	--	--	--			
		3/8 x 1/2 SAE	054137	054369	054962	054366	054370	054963			
		1/4 x 3/8 ODF S/T	--	055792	--	--	--	--			
	1/2	3/8 x 1/2 ODF S/T	056010	056228	056015	056026	--	056027			
		3/8 x 1/2 ODF ANG	055490	056006	055986	055092	055491	055995			
		3/8 x 1/2 SAE	054964	054965	054966	054967	054968	054969			
	1	3/8 x 1/2 ODF S/T	055701	056008	056014	056022	056224	--			
		3/8 x 1/2 ODF ANG	055702	055874	055987	055992	055497	055996			
		3/8 x 1/2 SAE	054976	054977	054978	054979	054980	054981			
	1 1/2	3/8 x 1/2 ODF S/T	056016	056057	056017	056029	056225	055948			
		3/8 x 1/2 ODF ANG	054982	055875	055988	054983	055496	055997			
		3/8 x 1/2 SAE	054984	054986	054987	054988	054989	054990			
	2	3/8 x 1/2 ODF S/T	056019	--	056020	056031	056226	056032			
		3/8 x 1/2 ODF ANG	055985	--	055984	955657	055498	055991			
		3/8 x 1/2 SAE	053061	053064	054991	053070	053071	054992			
	3 1/2	3/8 x 1/2 ODF S/T	053269	--	--	053270	053271	055947			
		3/8 x 1/2 ODF ANG	054837	--	--	054768	054844	--			
		3/8 x 1/2 SAE	055936	057009	056323	054142	054145	054993			
5	3/8 x 1/2 ODF S/T	--	--	--	054143	054784	--				
	1/2 x 5/8 ODF S/T	--	--	--	054783	054785	058907				
	1/2 x 5/8 ODF S/T	--	--	--	--	--	055776				
7	5/8 x 7/8 ODF S/T	--	--	--	054312	054786	--				
	3/8 x 1/2 ODF S/T	--	--	--	058875	--	--				
	1/2 x 5/8 ODF S/T	--	--	--	--	061196	061696				
10	5/8 x 7/8 ODF S/T	--	--	--	058608	--	058305				
	1/2 x 5/8 ODF S/T	--	--	--	--	--	--				
	5/8 x 7/8 ODF S/T	--	--	--	058607	059291	059271				
13	7/8 x 1 1/8 ODF S/T	--	--	--	--	--	--				
	5/8 x 7/8 ODF S/T	--	--	--	--	059212	062457				
	7/8 x 1 1/8 ODF S/T	--	--	--	--	--	--				
		7/8 x 1 3/8 ODF S/T	--	--	--	--	--	058897			

# ORDERING INFORMATION FOR HF SERIES VALVES (CONT'D)

VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN CHARGE						REFRIG.
			INTERNAL			EXTERNAL			
			MC <small>R-134a Med. Temp.</small>	MZ <small>R-22 Low Temp.</small>	MW35 <small>R-134a MOP</small>	MC <small>R-134a Med. Temp.</small>	MZ <small>R-134a Low Temp.</small>	MW35 <small>R-134a MOP</small>	
HF(E)SC	1/4	3/8 x 1/2 ODF ANG	057573	--	--	057572	--	--	R-134a
	1/2	3/8 x 1/2 ODF ANG	058067	--	--	058069	063853	063946	
	3/4	3/8 x 1/2 ODF ANG	058301	--	--	058070	063856	--	
	1	3/8 x 1/2 ODF ANG	057571	--	--	057570	063858	063947	
	1 1/2	3/8 x 1/2 ODF ANG	057569	--	--	057568	063864	--	
	1 3/4	3/8 x 1/2 ODF ANG	063641	--	--	058262	--	--	
	2 1/2	3/8 x 1/2 ODF ANG	--	--	--	058421	--	--	
	4	3/8 x 1/2 ODF ANG	--	--	--	059087	--	--	
	6	1/2 x 5/8 ODF ANG	--	--	--	--	--	--	
	7 1/2	1/2 x 5/8 ODF ANG	--	--	--	--	--	--	
		5/8 x 7/8 ODF ANG	--	--	--	--	--	--	
	11	5/8 x 7/8 ODF ANG	--	--	--	--	--	--	
	5/8 x 1 1/8 ODF ANG	--	--	--	--	--	--		
14	5/8 x 7/8 ODF ANG	--	--	--	--	--	--		
	5/8 x 1 1/8 ODF ANG	--	--	--	--	--	--		

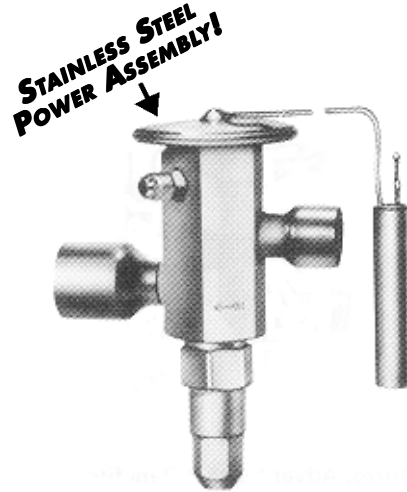
VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN CHARGE						REFRIG.
			INTERNAL			EXTERNAL			
			HC <small>R-22 Med. Temp.</small>	HZ <small>R-22 Low Temp.</small>	HW35 <small>R-22 MOP</small>	HC <small>R-22 Med. Temp.</small>	HZ <small>R-22 Low Temp.</small>	HW35 <small>R-22 MOP</small>	
HF(E)SC	1/4	3/8 x 1/2 ODF ANG	057467	057481	057473	057409	057428	057413	R-22
	1/2	3/8 x 1/2 ODF ANG	057293	057482	057479	057291	057429	057414	
	1	3/8 x 1/2 ODF ANG	057468	057483	057477	057410	057430	057416	
	1 1/2	3/8 x 1/2 ODF ANG	057469	--	057480	057292	057321	057419	
	2	3/8 x 1/2 ODF ANG	057470	--	--	057294	057433	057421	
	2 1/2	3/8 x 1/2 ODF ANG	057471	--	--	057411	057434	057414	
	3	3/8 x 1/2 ODF ANG	057472	--	--	057412	057748	057426	
	5 1/2	3/8 x 1/2 ODF ANG	--	--	--	057781	--	--	
	8	1/2 x 7/8 ODF ANG	--	--	--	063421	--	--	
		5/8 x 7/8 ODF ANG	--	--	--	058609	--	--	
		5/8 x 1 1/8 ODF ANG	--	--	--	--	061233	--	
	10	5/8 x 7/8 ODF ANG	--	--	--	--	--	--	
	5/8 x 1 1/8 ODF ANG	--	--	--	--	--	--		
15	5/8 x 7/8 ODF ANG	--	--	--	--	--	--		
	5/8 x 1 1/8 ODF ANG	--	--	--	--	--	--		

VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN CHARGE						REFRIG.
			INTERNAL			EXTERNAL			
			RC <small>R-502 Med. Temp.</small>	RZ <small>R-502 Low Temp.</small>	RW35 <small>R-502 MOP</small>	RC <small>R-502 Med. Temp.</small>	RZ <small>R-502 Low Temp.</small>	RW35 <small>R-502 MOP</small>	
HF(E)SC	1/8	3/8 x 1/2 ODF ANG	--	--	--	--	--	--	R-502
	1/4	3/8 x 1/2 ODF ANG	057487	057484	057492	057436	057454	057442	
	1/2	3/8 x 1/2 ODF ANG	057488	057485	057493	057437	057455	057443	
	1	3/8 x 1/2 ODF ANG	057489	057486	057496	057438	057456	057446	
	1 1/2	3/8 x 1/2 ODF ANG	057490	--	057499	057439	057322	057448	
	2	3/8 x 1/2 ODF ANG	057491	--	--	057440	057457	057451	
	3 1/2	3/8 x 1/2 ODF ANG	--	--	--	057441	057458	057453	
	5	3/8 x 1/2 ODF ANG	--	--	--	058595	--	062063	
		5/8 x 7/8 ODF ANG	--	--	--	--	059654	--	
	7	5/8 x 7/8 ODF ANG	--	--	--	--	058603	058775	
10	5/8 x 7/8 ODF ANG	--	--	--	--	--	058765		

# TRAE THERMO® EXPANSION VALVE

TRAE Thermo Valves are a large capacity series for chiller, refrigeration, and air conditioning applications. Its balanced port design provides stable and accurate control over wide load and evaporator temperature ranges.



## FEATURES

- ☆ Suitable for Bi-Flow applications.
- ☆ External superheat adjustment.
- ☆ Integral body with straight-thru connections.
- ☆ TRAE's balanced port design improves valve operation & stability under low load conditions.
- ☆ Solid copper connections.
- ☆ Large diaphragm provides superior stability.
- ☆ HCA charge designed especially for R22 air conditioning applications.

VALVE NOMENCLATURE					
<b>TRA</b>	<b>E</b>	<b>50</b>	<b>H</b>	<b>C</b>	<b>7/8 x 1-1/8 ODF</b>
Valve Series	External Equalizer	Nominal Capacity	Refrigerant Code H = R22	Charge Code	ODF connection size
Example above: TRAE50HC 7/8 x 1-1/8 ODF					

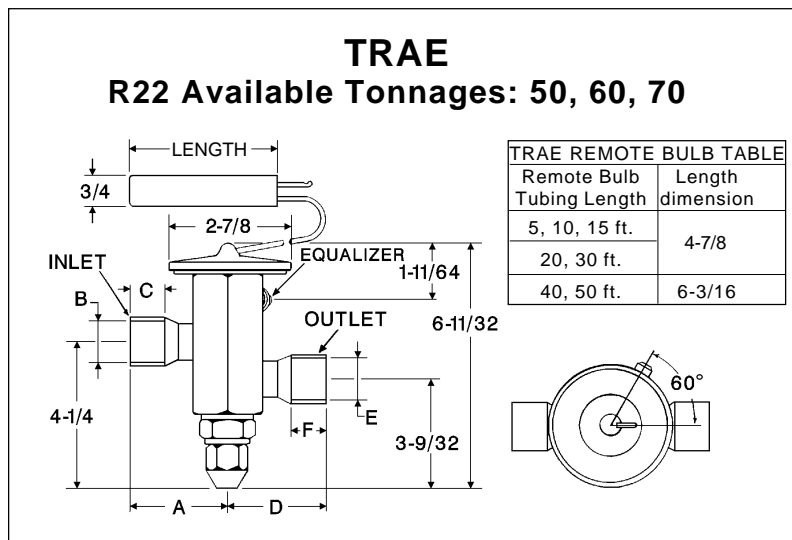
## SPECIFICATIONS

Ratings from 50 to 70 tons.  
Maximum working pressure: 450 psig.

SEE PAGE 31 FOR EXTENDED CAPACITIES. FOR ORDERING INFORMATION, SEE PAGE 32.

## TRAE DIMENSIONAL DATA

### REMOTE BULB TUBING LENGTH 10' STANDARD



TRAE VALVE TYPE	NOMINAL SIZES (ODF)		INLET		OUTLET	
	INLET-B	OUTLET-E	A	C	D	F
TRAE	7/8	7/8	2-1/16	3/4	2-1/16	3/4
		1-1/8			2-1/2	29/32
		1-3/8			2-11/16	31/32
	1-1/8	1-1/8	2-1/2	29/32	2-1/2	29/32
1-3/8	1-3/8	2-11/16	31/32	2-19/32	31/32	

# TRAE+ THERMO® EXPANSION VALVE

Alco's **TRAE Plus** thermostatic expansion valve (TXV) is a large capacity series designed for refrigeration and air conditioning applications. The new series introduces a new replaceable stainless steel power element, a fully interchangeable cage assembly and a square body.

This valve type features double balanced port design, which provides stable and accurate control over wide loads and evaporator temperature ranges. Furthermore, a permanent inlet strainer and external adjustment are standard on every valve.



## FEATURES

- ☆ Removable power element and cage assembly for full serviceability.
- ☆ Stainless steel power element for enhanced corrosion resistance
- ☆ Double balanced port design improves valve operation and stability under low load conditions.
- ☆ Integral square body with straight-thru connections.
- ☆ Solid copper connections.
- ☆ External superheat adjustment.
- ☆ Large diaphragm provides superior stability
- ☆ HCA charge designed especially for R22 air conditioning applications.

## SPECIFICATIONS

Ratings from 10 to 40 tons.  
Maximum working pressure: 450 psig

## NOMENCLATURE

Example: TRAE+30 HCA 7/8 x 1-1/8 ODF

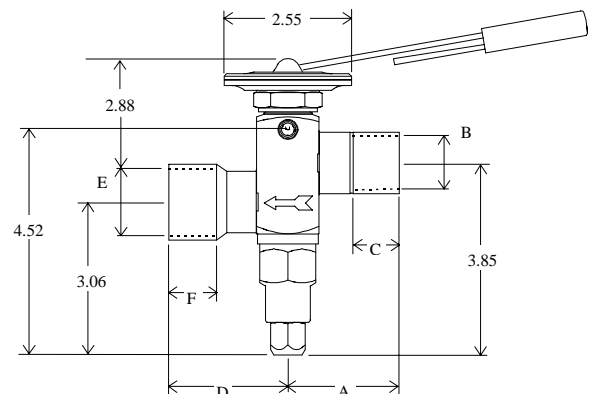
<b>TRAE</b>	<b>+</b>	<b>30</b>	<b>H</b>	<b>W100</b>	<b>7/8 x 1-1/8 ODF</b>
Valve Series	Replaceable Power Element	Nominal Capacity	Refrigerant Code H= R22	Charge Code	ODF Connection Size

## DIMENSIONAL DATA

TRAE Valve Type	Nominal Inlet (B)	Sizes (ODF) Outlet (E)	Inlet		Outlet	
			A	C	D	F
TRAE+ 10-40 TONS	5/8	7/8	1.57	0.50	2.09	0.75
	5/8	1-1/8	1.57	0.50	2.21	0.91
	7/8	7/8	2.09	0.75	2.09	0.75
	7/8	1-1/8	2.09	0.75	2.21	0.91
	7/8	1-3/8	2.09	0.75	2.39	0.97
	1-1/8	1-1/8	2.21	0.91	2.21	0.97
1-1/8	1-3/8	2.21	0.91	2.39	0.97	
1-1/8	1-3/8	2.21	0.91	2.39	0.97	

**REMOTE BULB TUBING LENGTH**  
**10' STANDARD**

FOR ORDERING INFORMATION, SEE PAGE 32.



# TRAE+/TRAE EXTENDED CAPACITIES IN TONS

R-134a	EVAPORATOR TEMP.																							
	+40°F								+20°F								0°F							
	PRESSURE DROP ACROSS VALVE - PSI																							
VALVE	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225
TRAE+9M	8.86	10.23	11.44	12.79	14.01	15.13	16.17	17.15	8.47	9.78	10.93	12.23	13.39	14.47	15.46	16.40	7.48	8.64	9.66	10.80	11.83	12.78	13.66	14.49
TRAE+13M	12.93	14.93	16.69	18.66	20.44	22.08	23.60	25.04	12.36	14.27	15.96	17.84	19.55	21.11	22.57	23.94	10.92	12.61	14.10	15.77	17.27	18.65	19.94	21.15
TRAE+14M	14.37	16.59	18.55	20.73	22.71	24.53	26.23	27.82	13.74	15.86	17.73	19.82	21.72	23.46	25.08	26.60	12.14	14.01	15.67	17.52	19.19	20.73	22.16	23.50
TRAE+22M	21.79	25.16	28.13	31.45	34.45	37.21	39.78	42.19	20.83	24.05	26.89	30.07	32.94	35.58	38.03	40.34	18.41	21.26	23.76	26.57	29.10	31.44	33.61	35.65
TRAE+30M	29.93	34.56	38.64	43.20	47.32	51.11	54.64	57.95	28.61	33.04	36.94	41.30	45.24	48.87	52.24	55.41	25.28	29.20	32.64	36.50	39.98	43.18	46.16	48.96
TRAE+40M	40.50	46.70	52.20	58.40	64.00	69.10	73.90	78.40	38.70	44.70	49.90	55.80	61.20	66.10	70.60	74.90	34.20	39.50	44.10	49.30	54.10	58.40	62.40	66.20
TRAE+45M	44.10	50.90	56.90	63.60	69.70	75.20	80.40	85.30	42.10	48.60	54.40	60.80	66.60	71.90	76.90	81.60	37.20	43.00	48.00	53.70	58.80	63.60	68.00	72.10
TRAE50M	52.40	60.50	67.70	75.70	82.90	89.50	95.70	101.5	50.10	57.90	64.70	72.40	79.30	85.60	91.50	97.10	44.30	51.20	57.20	63.90	70.00	75.70	80.90	85.80

R-22	EVAPORATOR TEMP.																							
	+50°F					+40°F					+20°F					0°F								
	PRESSURE DROP ACROSS VALVE - PSI																							
VALVE	75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150	175	200	100	125	150	175	200	225
TRAE+10H	10.3	11.9	13.3	14.6	15.8	16.9	10.2	11.8	13.2	14.5	15.6	16.7	10.0	11.5	12.9	14.8	15.2	16.3	10.4	11.6	12.7	13.7	14.7	15.6
TRAE+15H	15.1	17.4	19.5	21.3	23.0	24.6	14.9	17.2	19.2	21.1	22.8	24.3	14.5	16.8	18.7	20.5	22.2	24.3	15.1	16.9	18.5	20.0	21.4	22.7
TRAE+20H	16.8	19.4	21.7	23.8	25.7	27.5	16.6	19.2	21.5	23.5	25.4	27.2	16.2	18.7	20.9	22.9	24.8	26.5	16.9	18.9	20.7	22.4	23.9	25.4
TRAE+30H	25.5	29.4	32.9	36.1	38.9	41.6	25.2	29.1	32.5	35.6	38.5	41.2	24.6	28.4	31.7	34.7	37.5	40.1	25.6	28.6	31.4	33.9	36.2	38.4
TRAE+40H	35.0	40.5	45.2	49.6	53.5	57.2	34.6	40.0	44.7	49.0	52.9	56.6	33.8	39.0	43.6	47.8	51.6	55.2	35.2	39.4	43.1	46.6	49.8	52.8
TRAE50H	47.3	54.6	61.1	66.9	72.3	77.3	46.8	54.0	60.4	66.1	71.4	76.4	45.6	52.6	58.8	64.4	69.6	74.4	47.5	53.1	58.2	62.9	67.2	71.3
TRAE60H	51.6	59.6	66.6	73.0	78.8	84.3	51.0	58.9	65.9	72.1	77.9	83.3	49.7	57.4	64.2	70.3	75.9	81.2	51.8	58.0	63.5	68.6	73.3	77.8
TRAE70H	61.4	70.9	81.0	86.9	93.8	100.3	60.7	70.1	78.4	85.9	92.7	99.1	59.2	68.3	76.4	83.7	90.4	96.6	61.7	69.0	75.6	81.6	87.3	92.6

R-22	EVAPORATOR TEMP.																							
	-10°F					-20°F					-30°F					-40°F								
	PRESSURE DROP ACROSS VALVE - PSI																							
VALVE	125	150	175	200	225	250	125	150	175	200	225	250	150	175	200	225	250	275	150	175	200	225	250	275
TRAE+10H	9.6	10.5	11.3	12.1	12.9	13.6	8.0	8.7	9.4	10.1	10.7	11.3	7.2	7.7	8.3	8.8	9.3	9.7	5.8	6.2	6.6	7.0	7.4	7.8
TRAE+15H	14.0	15.3	16.5	17.7	18.8	19.8	11.6	12.7	13.8	14.7	15.6	16.5	10.4	11.3	12.1	12.8	13.5	14.1	8.4	9.1	9.7	10.3	10.8	11.4
TRAE+20H	15.6	17.1	18.5	19.7	20.9	22.1	13.0	14.2	15.4	16.4	17.4	18.4	11.7	12.6	13.5	14.3	15.1	15.8	9.4	10.1	10.8	11.5	12.1	12.7
TRAE+30H	23.6	25.9	28.0	29.9	31.7	33.4	19.6	21.6	23.3	24.9	26.4	27.8	17.7	19.1	20.4	21.6	22.8	23.9	14.2	15.3	16.4	17.4	18.3	19.2
TRAE+40H	32.5	35.6	38.5	41.1	43.6	46.0	27.1	29.6	32.0	34.2	36.3	38.3	24.3	26.2	28.0	29.7	31.4	32.9	19.5	21.1	22.5	23.9	25.2	26.4
TRAE50H	43.9	48.1	51.9	55.5	58.9	62.1	36.5	40.0	43.2	46.2	49.0	51.7	32.8	35.4	37.9	40.2	42.3	44.4	26.4	28.5	30.4	32.3	34.0	35.7
TRAE60H	47.9	52.4	56.6	60.6	64.2	67.7	39.9	43.7	47.2	50.4	53.5	56.4	35.8	38.6	41.3	43.8	46.2	48.4	28.4	31.0	33.2	35.2	37.1	38.9
TRAE70H	57.0	62.4	67.4	72.1	76.4	80.6	47.4	52.0	56.1	60.0	63.6	67.1	42.6	46.0	49.1	52.1	54.9	57.6	34.2	37.0	39.5	41.9	44.2	46.3

R-404A/ R-507	EVAPORATOR TEMP.																							
	+50°F						+40°F						+20°F						0°F					
	PRESSURE DROP ACROSS VALVE - PSI																							
VALVE	100	125	150	175	200	225	100	125	150	175	200	225	125	150	175	200	225	250	150	175	200	225	250	275
TRAE+8	8.5	9.5	10.4	11.2	12.0	12.7	8.3	9.3	10.2	11.0	11.7	12.5	8.8	9.7	10.5	11.2	11.9	12.5	9.2	9.9	10.6	11.2	11.8	12.4
TRAE+12	12.4	13.8	15.1	16.4	17.5	18.6	12.1	13.5	14.8	16.0	17.1	18.2	12.9	14.1	15.2	16.3	17.3	18.2	13.3	14.4	15.4	16.3	17.2	18.1
TRAE+14	13.8	15.4	16.9	18.3	19.5	20.7	13.5	15.1	16.5	17.9	19.1	20.3	14.4	15.7	17.0	18.2	19.3	20.3	14.9	16.1	17.2	18.2	19.2	20.2
TRAE+20	21.0	3.4	25.7	27.7	29.6	31.4	20.5	22.9	25.1	27.1	29.0	30.8	21.8	23.9	25.8	27.6	29.3	30.9	22.6	24.4	26.1	27.7	29.2	30.6
TRAE+30	28.7	32.1	35.2	38.0	40.6	43.1	28.1	31.4	34.4	37.2	39.7	42.2	29.9	32.8	35.4	37.8	40.1	42.3	31.0	33.5	35.8	38.0	40.0	42.0
TRAE+35	38.8	43.4	47.6	51.4	54.9	58.3	38.0	42.5	46.5	50.3	53.7	57.0	40.5	44.3	47.9	51.2	54.3	57.2	41.9	45.3	48.4	51.3	54.1	56.7
TRAE+40	42.3	47.3	51.8	56.0	59.8	63.5	41.4	46.3	50.7	54.8	58.5	62.1	44.1	48.3	52.1	55.7	59.1	62.6	45.7	49.3	52.7	55.9	58.9	61.8
TRAE50	50.4	56.3	61.7	66.7	71.3	75.6	49.3	55.1	60.4	65.2	69.7	74.0	52.5	57.5	62.1	66.4	70.4	74.2	54.4	58.7	62.8	66.6	70.2	73.6

R-404A/ R-507	EVAPORATOR TEMP.																							
	-10°F						-20°F						-30°F						-40°F					
	PRESSURE DROP ACROSS VALVE - PSI																							
VALVE	150	175	200	225	250	275	175	200	225	250	275	300	175	200	225	250	275	300	175	200	225	250	275	300
TRAE+8	8.3	9.0	9.6	10.2	10.8	11.3	7.5	8.0	8.5	9.0	9.4	9.9	6.4	6.8	7.2	7.6	8.0	8.4	5.3	5.7	6.0	6.3	6.6	6.9
TRAE+12	12.2	13.1	14.0	14.9	15.7	16.5	11.0	11.7	12.4	13.1	13.7	14.4	9.3	9.9	10.5	11.1	11.7	12.2	7.7	8.2	8.7	9.2	9.7	10.1
TRAE+14	13.6	14.7	15.7	16.6	17.5	18.4	12.2	13.1	13.9	14.6	15.3	16.0	10.4	11.1	11.8	12.4	13.0	13.6	8.6	9.2	9.8	10.3	10.8	11.3
TRAE+20	20.6	22.3	23.8	25.2	26.6	27.9	18.6	20.2	21.1	22.2	23.3	24.3	15.8	16.8	17.9	18.8	19.8	20.6	13.1	14.0	14.8	15.6	16.4	17.1
TRAE+30	28.3	30.5	32.6	34.6	36.5	38.3	25.5	27.3	28.9	30.5	31.9	33.4	21.6	23.1	24.5	25.8	27.1	28.3	17.9	19.2	20.3	21.4	22.5	23.5
TRAE+35	38.2	41.3	44.1	46.8	49.3	51.7	34.4	36.8	39.1	41.2	43.2	45.1	29.2	31.2	33.1	34.9	36.6	38.2	24.2	25.9	27.5	29.0	30.4	31.7
TRAE+40	49.6	53.5	57.2	60.7	64.0	67.1	44.7	47.8	50.7	53.4	56.0	58.5	37.9	40.5	43.0	45.3	47.5	49.6	31.4	33.6	35.7	37.6	39.4	41.2
TRAE50	49.6	53.5	57.2	60.7	64.0	67.1	44.7	47.8	50.7	53.4	56.0	58.5	37.9	40.5	43.0	45.3	47.5	49.6	31.4	33.6	35.7	37.6	39.4	41.2

# ORDERING INFORMATION FOR TRAE SERIES VALVES

VALVE SERIES	PCN CHARGE	CAP TUBE LENGTH	CONNECTIONS	PCN
TRAE+ 10	HC*	5 FT.	5/8 x 7/8 ODF S/T	062718
TRAE+ 15	HC*	10 FT.	7/8 x 1 1/8 ODF S/T	062721
TRAE+ 20	HC*	10 FT.	7/8 x 1 3/8 ODF S/T	063650
TRAE+ 20	HC*	10 FT.	7/8 x 1 1/8 ODF S/T	062724
TRAE+ 30	HC*	10 FT.	7/8 x 1 1/8 ODF S/T	062727
TRAE+ 30	HC*	10 FT.	1 1/8 x 1 3/8 ODF S/T	062728
TRAE+ 40	HC*	10 FT.	1 1/8 x 1 3/8 ODF S/T	062733
TRAE 50	HC*	10 FT.	1 1/8 x 1 3/8 ODF S/T	061700
TRAE 60	HC*	10 FT.	1 1/8 x 1 3/8 ODF S/T	061865
TRAE 70	HC*	10 FT.	1 1/8 x 1 3/8 ODF S/T	061866

(+) REPLACEABLE POWER ASSEMBLY

\* R-22 MEDIUM TEMPERATURE

## REFRIGERANT LIQUID TEMPERATURE CORRECTION FACTORS

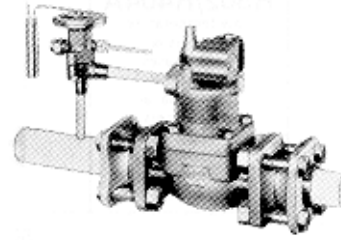
	Refrigerant Liquid Temperature °F														
	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
<b>R12 Correction Factor</b>	1.60	1.54	1.48	1.42	1.36	1.30	1.24	1.18	1.12	1.06	1.00	.94	.88	.82	.75
<b>R134a Correction Factor</b>	1.70	1.63	1.56	1.49	1.42	1.36	1.29	1.21	1.14	1.07	1.00	.93	.85	.78	.71
<b>R22 Correction Factor</b>	1.56	1.51	1.45	1.40	1.34	1.29	1.23	1.17	1.12	1.06	1.00	.94	.88	.82	.76
<b>R404A/R507 Correction</b>	2.00	1.90	1.80	1.70	1.60	1.50	1.40	1.30	1.20	1.10	1.00	.90	.80	.70	.50

These factors include corrections for liquid refrigerant density and net refrigerating effect and are based on an average evaporator temperature of 0°F. However, they may be used for any evaporator temperature from -40°F to +40°F since the variation in the actual factors across this range is insignificant.



# PO/POS THERMO® EXPANSION VALVE

POS Thermo Valves are designed for large capacity applications where the evaporator has been designed for TEV control from the superheat of the suction gas. The POS is ideal for those applications in the air conditioning temperature range (above 35°F), such as chillers. Ratings from 20 to 450 tons — R22.



## FEATURES

- ☆ Take-A-Part construction for easy field service.
- ☆ The POS series valve is piloted by any "T" series Thermo Valve and is controlled by an integral solenoid to provide positive liquid shut-off.
- ☆ Pilot-operated principle provides smooth modulation over the widest possible load range, maintaining positive control with loads reduced as low as 25% of nominal valve capacity.
- ☆ Recommended for refrigeration systems having some form of compressor capacity reduction, such as compressor cylinder unloading.
- ☆ Maximum working pressure: 450 psig.
- ☆ Minimum evaporator temperature: +32°F.

## SPECIFICATIONS

**NOTE:** The POS valve size is determined by the required capacity in tons of refrigeration and the pressure drop across the valve. The pressure drop across the valve will be the difference between discharge and suction pressures at the compressor, less the pressure drop in the liquid line and less the pressure drop through the evaporator, distributor and suction line.

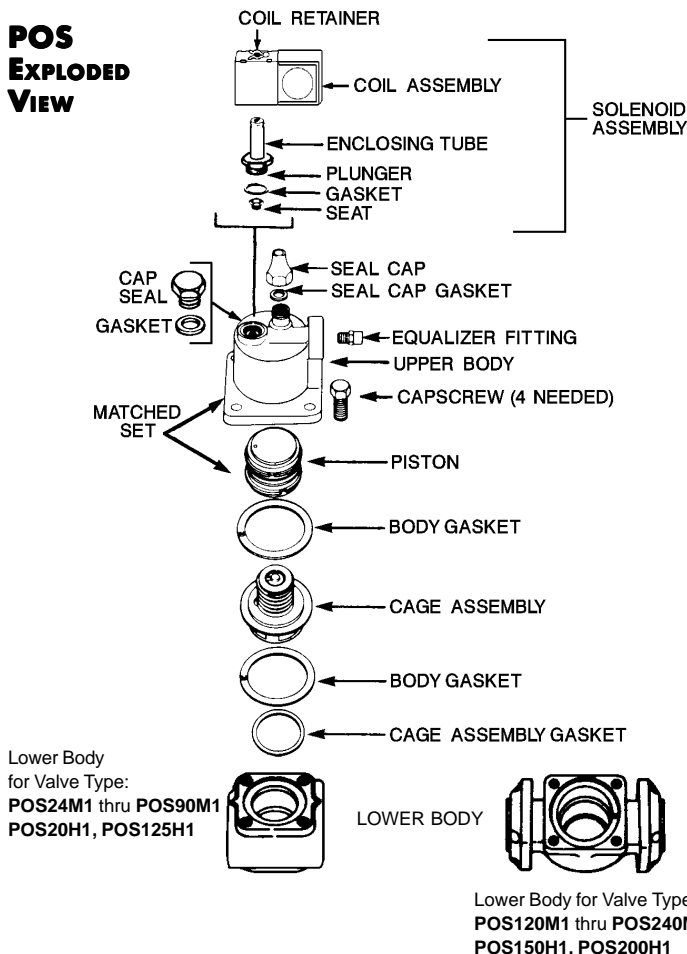
To complete the POS valve type number, select the required solenoid valve voltage and frequency from the tables on pages 117-118 and add to the POS valve type number.

The pilot Thermo Valve selected depends only on the system refrigerant. A suitable ALCO liquid line filter-drier should be selected for the system.

Contact ALCO Technical Service Department for rapid response or other types of charges.

VALVE NOMENCLATURE		
<b>POS</b>	<b>20</b>	<b>H</b>
Valve Series	Nominal Capacity	Refrigerant Code H = R22
Example above: POS-20H		

## POS EXPLODED VIEW



## POS VALVE REPAIR KITS

**UPPER BODY & PISTON ASSEMBLY KIT** consists of: Manual Stem Assembly, Pilot Plug, Capscrews (4), Gaskets, and matched set of Upper Body and Piston Assembly.

VALVE	PART#
PO(S)24M1, 36M1, 48M1	X8506-3
PO(S)60M1, 90M1	X8507-3
PO(S)120M1, 150M1	X8508-4
PO(S)180M1	X8509-2
PO(S)240M1	X8510-5
PO(S)20H1, 30H1, 40H1, 50H1	X8506-9
PO(S)75H1, 100H1, 125H1	X8507-7
PO(S)150H1, 200H1	X8508-8

**CAGE ASSEMBLY KIT** consists of: Cage Assembly and Gaskets

VALVE	PART#	VALVE	PART#
PO(S)24M1	X7361-1	PO(S)20H1	X7361-15
PO(S)36M1	X7361-2	PO(S)30H1	X7361-16
PO(S)48M1	X7361-3	PO(S)40H1	X7361-17
PO(S)60M1	X5651-12	PO(S)50H1	X7361-18
PO(S)90M1	X5651-11	PO(S)75H1	X5651-1
PO(S)120M1	X5653-6	PO(S)100H1	X5651-10
PO(S)150M1	X5653-4	PO(S)125H1	X5651
PO(S)180M1	X5660	PO(S)150H1	X5653-1
PO(S)240M1	X6146	PO(S)200H1	X5653-5
PO(S)360M1	X10020-5	PO(S)300H1	X9995-5
PO(S)350H1	X10020-1	PO(S)450H1	X10020-7

## POS VALVE KITS

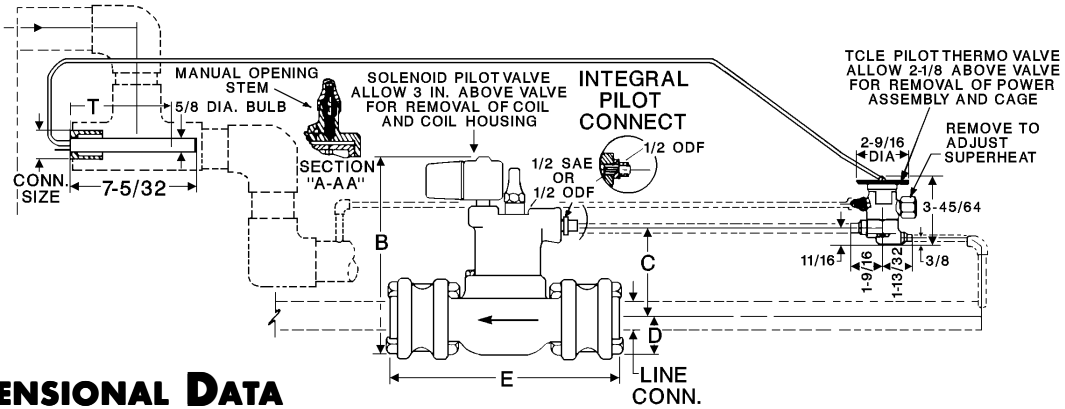
### POS FLANGE SET consists of:

Inlet and Outlet Flanges, Inlet and Outlet Adaptors, Flange Gaskets (2) and required amount of flange bolts and nuts.

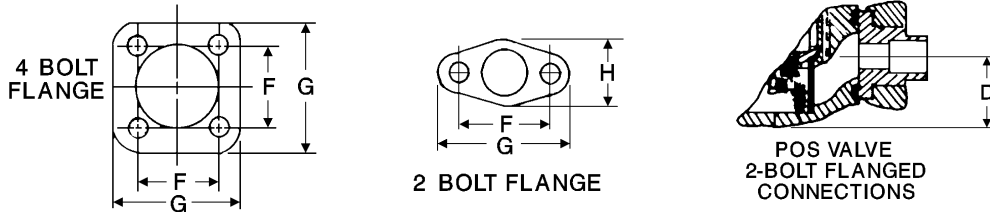
### POS GASKET KIT consists of:

All Necessary Gaskets (see exploded view on page 26).

VALVE	PART#	PCN
PO(S)20H1-40H1	KG10006	036746
PO(S)75H1, 100H1, 125H1	KG10007	034471
PO(S)150H1, 200H1	KG10008	037551
PO(S)300H1-450H1	KG10010	037553



## POS DIMENSIONAL DATA



VALVE SERIES		PILOT CONNECTION	LINE CONNECTIONS	B	C	D	E	F	G	H	WIDTH OF BODY	V	W ODP	W 1/2 SAE	
TONS-R134a	TONS-R22														
POS 24M1	POS 20H1	1/2 ODF (INTEGRAL)	<b>RX174*</b> 1-1/2 ODF (2-BOLT, FLANGED)	8-1/8	3-17/32	1-7/16	6-3/32	2-11/16	3-15/16	2-1/8	3-13/16	1-3/8	2-3/16	2-13/16	
POS 36M1	POS 30H1		1/2 MALE FLARE	<b>RX140*</b> 1-3/8 ODF (2-BOLT, FLANGED)	8-15/16	3-15/16	1-15/32	7-3/32	3-3/16	4-9/16	2-9/16	4-9/16	1-7/32	2-3/8	3
POS 48M1	POS 40H1			POS 50H1	1/2 ODF (FLANGED)	<b>RX183*</b> 1-5/8 ODF (4-BOLT, FLANGED)	9-25/32	4-11/32	1-7/8	10-25/32	2-7/16	3-13/16	—	3-3/4	1-1/16
POS 60M1	POS 75H1	1/2 MALE FLARE	2-1/8 ODF (4-BOLT, FLANGED)**	10-5/16		4-25/32	2	11-23/32	2-5/8	4	—	4	1-1/16	3-27/64	4-3/64
POS 90M1	POS 100H1		1/2 ODF (FLANGED)	<b>RX191*</b> 2-5/8 ODF (4-BOLT, FLANGED)	11-19/32	5-21/32	2-13/32	13-7/8	3-1/8	4-1/2	—	5-1/8	1-1/16	3-63/64	4-39/64
POS 120M1	POS 150H1	1/2 MALE FLARE													
POS 150M1	POS 200H1														
POS 180M1	POS 250H1														
POS 240M1	POS 300H1														
POS 300M1	POS 350H1														
POS 360M1	POS 450H1														

\* Recommended Flange.

\*\* Recommended Flange is RX167.

## POS EXTENDED CAPACITY TABLES (IN TONS)

R134a	EVAPORATOR TEMP. +40°F					
	PRESSURE DROP ACROSS VALVE - PSI					
	60	80	100	125	150	175
VALVE						
POS 24M	24	28	31	35	38	41
POS 36M	36	41	46	52	57	62
POS 48M	48	55	62	69	76	82
POS 60M	60	69	77	86	95	103
POS 90M	90	104	116	130	142	154
POS 120M	120	138	155	173	190	205
POS 150M	150	173	194	216	237	257
POS 180M	180	207	232	259	284	308
POS 240M	240	258	310	346	379	410
POS 300M	300	345	387	432	474	513
POS 360M	360	414	464	518	569	616

R22	EVAPORATOR TEMP. +40°F				
	PRESSURE DROP ACROSS VALVE - PSI				
	100	125	150	175	200
VALVE					
POS 20H	20	22	25	26	28
POS 30H	30	34	37	40	42
POS 40H	40	45	49	53	57
POS 50H	50	56	61	66	71
POS 75H	75	84	92	99	106
POS 100H	100	112	123	132	141
POS 125H	125	140	153	165	177
POS 150H	150	168	184	198	212
POS 200H	200	224	245	264	283
POS 250H	250	280	306	330	354
POS 300H	300	336	367	396	424
POS 350H	350	392	429	462	495
POS 450H	450	504	551	594	636

**NOTE:**  
For R407C, USE  
R22 EXTENDED CAPACITIES

All capacities are based on 40°F evaporating temperature and 100°F vapor free refrigerant liquid entering the valve.

DT8492 is a standard POS without manual stem. Use the same capacity as the POS for replacement. For applications below 32°F evaporator temperature, contact Alco Controls' Application Engineering Department.

# ORDERING INFORMATION FOR POS SERIES VALVES

PCN	DESCRIPTION R-12	PCN	DESCRIPTION R-22
046016	<b>POS20F1</b>	032047	<b>POS20H1</b>
035018	<b>POS30F1</b>	032258	<b>POS30H1</b>
033545	<b>POS40F1</b>	032048	<b>POS40H1</b>
		032357	<b>POS50H1</b>
038291	<b>POS50F1</b>	060114	<b>POS75H1</b>
098246	<b>POS75F1</b>	032049	<b>POS100H1</b>
		032718	<b>POS125H1</b>
025523	<b>POS100F1</b>	032749	<b>POS150H1</b>
042594	<b>POS125F1</b>	033139	<b>POS200H1</b>
038292	<b>POS150F1</b>		
032488	<b>POS200F1</b>	029293	<b>POS300H1</b>
047251	<b>POS250F2</b>	034481	<b>POS250H1</b>
033605	<b>POS300F1</b>	037449	<b>POS450H1</b>

**NOTE:**

\* Use AMG, DMG,  
or AMC Coils

**Pilots:**

R-134a uses TCLE 2 FC } 100 ton and below  
R-22 uses TCLE 3 HC }

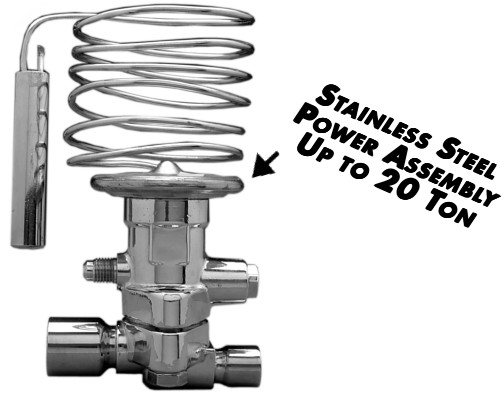
R134a—TCLE 5-1/2 MC 3/8 x 1/2 ODF S/T } 150 ton and  
R22—TCLE 5 HC, SAE EE, 5', 3/8 x 1/2 } above  
ODF S/T or ANG }

POS FLANGE SETS TABLE			
PCN	DESCRIPTION	FOR USE WITH	
027227	<b>RX 174 1-1/8 ODF</b>	POS20F1	POS20H1
		POS30F1	POS30H1
		POS40F1	POS40H1
			POS50H1
026745	<b>RX 140 1-3/8 ODF</b>	POS50F1	POS75H1
		POS75F1	POS100H1
			POS125H1
027228	<b>RX 183 1-5/8 ODF</b>	POS100F1	POS150H1
		POS125F1	POS200H1
026759	<b>RX 167 2-1/8 ODF</b>	POS150F1	
026778	<b>RX 191 2-5/8 ODF</b>	POS200F1	POS300H1
		POS250F2	
		POS300F1	POS450H1

# T-SERIES TAKE-A-PART THERMO® VALVE

ALCO Take-A-Part Series TEVs, with adjustable superheat and replaceable, interchangeable components are ideal for original equipment and field replacements in air conditioning, heat pump, and refrigeration applications. Each is equipped with a standard ALCO "C" charge which functions for evaporation temperatures from 50°F to -20°F, MOP charges are available upon request. Other charges available to -40°F.

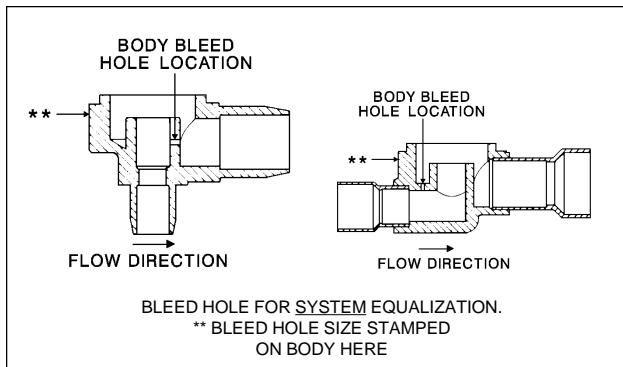
**Note:** For applications below -40°F evaporator temperatures, use ALCO's ZZ Thermo Valve.



## FEATURES

- ☆ Take-A-Part construction for easy field service
- ☆ Interchangeable, replaceable cages for TEV versatility (1/4 to 100 tons capacity)
- ☆ External superheat adjustment
- ☆ Interchangeable body flanges for any connection you need
- ☆ Interchangeable power heads for R134a, R22, R404A, & R507 refrigerants
- ☆ Charges for all applications
- ☆ Maximum working pressure: 450 psig
- ☆ Contoured, durable power element for long life
- ☆ Bi-Flo capability
- ☆ Bi-Flo model TLE available to OEMs for heat pump and air conditioning applications

VALVE NOMENCLATURE						
TCL	E	5	H	W	35	SAE EE
Valve Series	External Equalizer (optional)	Nominal Capacity	Refrigerant F = R12 M = R134a H = R22 P = R507 S = R404A	Charge Code	MOP (optional)	External equalizer style - if specified
<b>3/8 x 1/2 ODF</b>		<b>S/T</b>		<b>5'</b>		<b>6A</b>
Connection Size & Style		Connection configuration S/T = Straight-thru ANG = Angle		Capillary Tube Length		Factory Superheat Setting
example above: TCL5 HW35 SAE EE 3/8 x 1/2 ODF S/T 5' 6A						



The "T" Series has unlimited versatility with thousands of valve combinations to fit all applications (from heat pumps and air conditioners to commercial refrigeration). If service is required, the removal of the two cap screws disassembles the valve without requiring that the line connections to the body flange be broken.

Field-proven for over 50 years, ALCO Take-A-Part valves provide dependable, economical service. The external equalizer version is an excellent "reverse flow" heat pump thermostatic expansion valve.

The T series can also be charged for use with refrigerants other than those listed in this catalog. Consult ALCO Applications Engineering Department for your valve charge selection.

## SINGLE OUTLET "T" SERIES BODY FLANGES WITH BLEED HOLE FOR USE WITH PSC COMPRESSORS

VALVE TYPE			BLEED HOLE DIAMETER <sup>1</sup> FOR % CAPACITY BYPASS											
			10%		15%		20%		25%		30%		40%	
R12	R22	R502	DIA. IN.	DRILL SIZE	DIA. IN.	DRILL SIZE	DIA. IN.	DRILL SIZE	DIA. IN.	DRILL SIZE	DIA. IN.	DRILL SIZE	DIA. IN.	DRILL SIZE
TCL1/4F	TCL1/2H	TCL1/2R	-	-	.0156	1/64	.018	77	.020	76	.022	74	.025	72
TCL1/2F	TCL1H	TCL1/2R	.018	77	.021	75	.024	73	.026	71	.0292	69	.035	65
TCL1F	TCL2H	TCL1R	.026	71	.0312	1/32	.036	64	.040	60	.0465	56	.052	55
TCL2F	TCL3H	TCL2R	.028	70	.035	65	.040	60	.043	57	.0468	3/4	.055	54
TCL3F	TCL5H	TCL3R	.035	65	.043	57	.052	55	.055	54	.0625	1/16	.070	50
TCL4F	TCL7-1/2H	TCL4-1/2R	.043	57	.052	55	.0595	53	.067	51	.076	48	.086	44
TCL6-1/2F	TCL10H	TCL7R	.052	55	.0595	53	.070	50	.0785	47	.086	44	.0995	39
TCL7-1/2F	TCL12H	TCL8R	.052	55	.0595	53	.070	50	.0785	47	.086	44	.0995	39

<sup>1</sup> Bleed hole sizes shown above are based on a percent of full effective port area of the valve. This does not necessarily indicate the percent of valve capacity that will be bypassed. The hole sizes shown above should be used for reference only. Normal industry practice is to equalize systems 3 to 5 minutes.

### BOLT TORQUE

The cap screws on all ALCO Take-A-Part TEVs require 300 inch pound bolt torque.

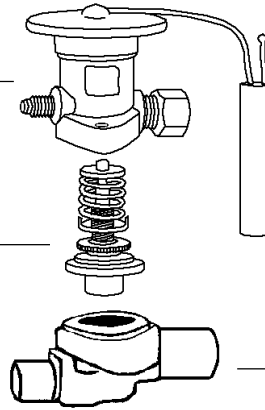
### FIELD REPLACEMENT OF VALVE TYPES TL(E), TLX

For field replacement of valve types TLX & TL(E), substitute a valve type TCL(E) of equivalent tonnage and re-use the old body flange. This substitution provides a valve equal in performance with provision for external superheat adjustment and eliminates the need to remove the old flange.

# T-SERIES TAKE-A-PART TEV

Interchangeable Power Assemblies for R134a, R22, R404A and R507 refrigerants

Interchangeable Cages for 1/4 to 12 ton capacity. Single port construction shown here.



Selective Charges for All Applications

Consult ALCO for special refrigerants.

Interchangeable Body Flanges for any connection you need.

## T-SERIES VALVE SPECIFICATIONS

R-134a VALVE TYPE <sup>①</sup>	R-134a Tons @ 60 psi ΔPressure	R-12 VALVE TYPE <sup>①</sup>	R-12 Tons @ 60 psi ΔPressure	R-22 VALVE TYPE <sup>①</sup>	R-22 Tons @ 100 psi ΔPressure	R-404A/R-507 VALVE TYPE <sup>①</sup>	R-404A/R-507 Tons @ 100 psi ΔPressure	Equalizer Type	Cage Assembly Part No.	Power Assembly Part No.
TCLE1/4M	1/4	TCLE1/4F	1/4	TCLE1/2H	1/2	TCLE1/4R	1/4	Internal equalizer or 1/4" SAE	X22440-B1*	XB1019** Standard Bulb
TCLE3/4M	3/4	TCLE1/2F	1/2	TCLE1H	1	TCLE1/2R	1/2		X22440-B2*	
TCLE1-1/2M	1-1/2	TCLE1F	1	TCLE2H	2	TCLE1R	1	external equalizer standard	X22440-B3*	Standard Bulb
TCLE2-1/2M	2-1/2	TCLE2F	2	TCLE3H	3	TCLE2R	2		X22440-B4*	
TCLE3-1/2M	3-1/2	TCLE3F	3	TCLE5H	5	TCLE3R	3	1/4" ODF and 1/4" SAE elbow available on special order.	X22440-B5*	X8019** Rapid Response Bulb
TCLE5-1/2M	5-1/2	TCLE4F	4	TCLE7-1/2H	7-1/2	TCLE4-1/2R	4-1/2		X22440-B6*	
TCLE7-1/2M	7-1/2	TCLE6-1/2F	6-1/2	TCLE10H	10	TCLE7R	7	1/4" SAE external equalizer	X22440-B7*	X8019** Rapid Response Bulb
TCLE9M	9	TCLE7-1/2F	7-1/2	TCLE12H	12	TCLE8R	8		X22440-B8*	
TJLE9M	9	TJLE7F	7	TJLE11H	11	TJLE7R	7	1/4" SAE external equalizer	XC724-B4B	XC726
TJLE11M	11	TJLE8F	8	TJLE14H	14	TJLE9R	9		XC724-B5B	
TJR11M	11	TJR8F	8	TJR14H	14	TJR9R	9	1/4" SAE external equalizer	X11873-B4B	X7726 Rapid Response Bulb
TJR13M	13	TJR11F	11	TJR18H	18	TJR12R	12		X11873-B5B	
TER16M	16	TER13F	13	TER22H	22	TER14R	14	1/4" SAE external equalizer	X9117-B6B	X7726 Rapid Response Bulb
TER19M	19	TER15F	15	TER26H	26	TER16R	16		X9117-B7B	
TER25M	25	TER20F	20	TER35H	35	TER21R	21	1/4" SAE external equalizer	X9117-B8B	X7726 Rapid Response Bulb
TER31M	31	TER25F	25	TER45H	45	TER27R	27		X9117-B9B	
TIR45M	45	TIR35F	35	TIR55H	55	TIR37R	37	1/4" SAE external equalizer	X9166-B10B	X9144-B11B
THR55M	55	THR45F	45	THR75H	75	THR48R	48		X9144-B13B	
THR68M	68	THR55F	55	THR100H	100	THR60R	60	1/4" SAE external equalizer	X9144-B13B	X9144-B13B
TMR 68M	66	TMR55F	55	TMR100H	100	TMR60R	60		X9144-B14B	

① TCLE, TJL are single ported valves for normal load conditions.

TER, THR, TIR, TJR and TMR are balanced, double ported valves for low load conditions if needed.

② Other lengths are available on special order.

③ Add: "A" for internal or "B" for external equalizer.

\*\* Add: Refrigerant: F = R12; H = R22; R = R502; MOP if required  
 Charge Code: C = med temp; Z = low temp; W = MOP (if needed)  
 Tubing Length: 1 = 5'; 2 = 10'; 3 = 15'; etc.  
 Equalizer Code: A = internal; B = external  
 Motor overload protection, if required (MOP)  
 Equalizer Code: B = 1/4" SAE external

**NOTE:** Standard or optional Rapid Response Remote Bulbs are available.

Standard Remote Bulb Tube Length is 5' for TCL, TJL & TJR Series. Standard Length is 10' for TER, TIR, THR & TMR Series.

**NOTE:** Nominal capacities shown here are based on 40°F evaporator temperature and 100°F vapor-free liquid refrigerant entering the valve.

E in valve type denotes external equalizer, omit for internally equalized valve.

### TCL(E) Old vs. New Nomenclature

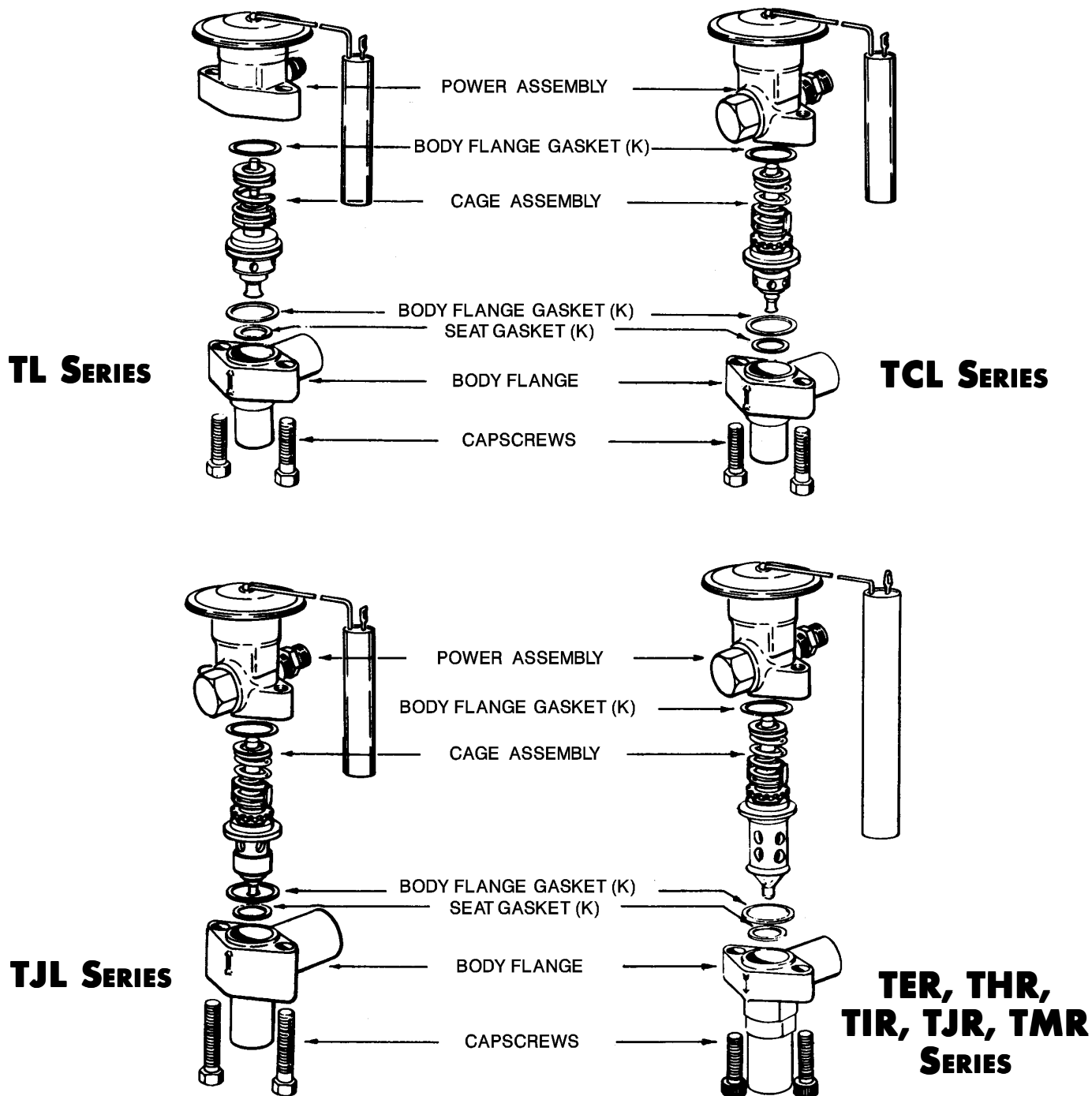
New cage assemblies are interchangeable with the old versions. To modernize our product, minor changes have been made in the construction of cage assemblies. The new constructions have been identified by a new cage assembly part number and a new valve type number.

OLD STYLE				NEW STYLE			
VALVE TYPE			CAGE ASSY. PART NO.	VALVE TYPE			CAGE ASSY. PART NO.
R-12	R-22	R-502		R-12	R-22	R-502	
TCLE25F	TCLE50H	TCLE25R	XC709-B7*	TCLE1/4F	TCLE1/2H	TCLE1/4R	X22440-B1*
TCLE50F	TCLE100H	TCLE50R	XC709B000*	TCLE1/2F	TCLE1H	TCLE1/2R	X22440-B2*
TCLE100F	TCLE200H	TCLE100R	XC709-B00*	TCLE1F	TCLE2H	TCLE1R	X22440-B3*
TCLE200F	TCLE300H	TCLE200R	XC709-B0*	TCLE2F	TCLE3H	TCLE2R	X22440-B4*
TCLE250F	TCLE400H	TCLE250R	XC709-B6*	TCLE3F	TCLE5H	TCLE3R	X22440-B5*
TCLE300F	TCLE500H	TCLE300R	XC709-B1*	TCLE3F	TCLE5H	TCLE3R	X22440-B5*
TCLE400F	TCLE700H	TCLE450R	XC709-B4*	TCLE4F	TCLE7-1/2H	TCLE4-1/2R	X22440-B6*
TCLE600F	TCLE900H	TCLE650R	XC709-B2*	TCLE6-1/2F	TCLE10H	TCLE7R	X22440-B7*
TCLE650F	TCLE1000H	TCLE700R	XC709-B3*	TCLE6-1/2F	TCLE10H	TCLE7R	X22440-B7*
TCLE750F	TCLE1200H	TCLE800R	XC709-B5*	TCLE7-1/2F	TCLE12H	TCLE8R	X22440-B8*

\* Add equalizer code letter "A" for internal or "B" for external to make the cage assembly part number complete.

NOTE: Delete the letter "E" from valve type for internally equalized valve.

# T-SERIES PARTS DATA

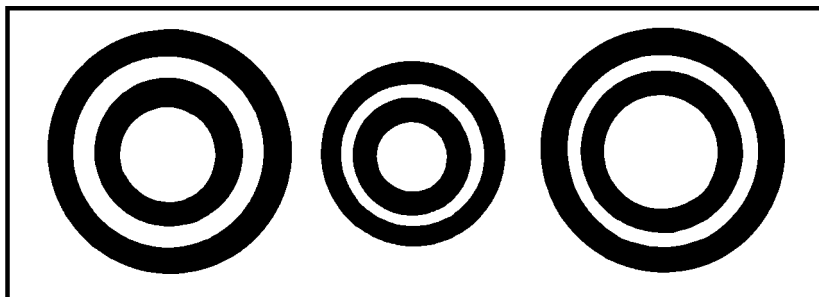


(K) – Indicates part supplied with Power Assembly and/or Cage.  
 See next page for Power Assembly, Cage & Flange Interchangeability Tables.

**BOLT TORQUE = 300 IN. LBS.**

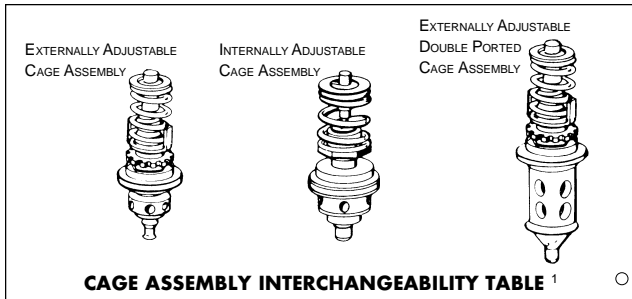
**GASKET STRIP X13455-1  
 FOR T-SERIES VALVES**

Gasket Strip X13455-1 replaces  
 all older T-Series gasket kits.



# T-SERIES TAKE-A-PART TEV

## T-SERIES INTERCHANGEABILITY TABLES



**CAGE ASSEMBLY INTERCHANGEABILITY TABLE 1**

VALVE TYPE	CAGE ASSEMBLY		NOMINAL CAPACITY-TONS		
	OLD	NEW	R134a	R22	R404A/R507
TCL TCLE	XC709B7*	X22440B1*	1/4	1/2	1/4
	XC709B000*	X22440B2*	3/4	1	1/2
	XC709B00*	X22440B3*	1-1/2	2	1
	XC709B0*	X22440B4*	2-1/2	3	2
	XC709B6*	X22440B5*	3-1/2	5	3
	XC709B1*	X22440B5*			
	XC709B4*	X22440B6*	5-1/2	7-1/2	4-1/2
	XC709B2*	X22440B7*	7-1/2	10	7
	XC709B3*	X22440B7*			
XC709B5*	X22440B8*	9	12	8	
TJLE	—	XC724B4B	9	11	7
	—	XC724B5B	11	14	9
TJR	—	X11873B4B	11	14	9
	—	X11873B5B	13	18	12
TER	—	X9117B6B	16	22	14
	—	X9117B7B	19	26	16
	—	X9117B8B	25	35	21
	—	X9117B9B	31	45	27
TIR	—	X9166B10B	45	55	37
THR	—	X9144B11B	46	70	42
	—	X9144B13B	56	85	51
TMR	—	X9144B14B	66	100	60

①Gaskets included.

\* Add "A" for internal or "B" for external equalizer.

POWER ASSEMBLY WITH STANDARD EXTERNAL BULB & EXTERNAL SUPERHEAT ADJUSTMENT

POWER ASSEMBLY WITH RAPID RESPONSE "S" (SMALL) EXTERNAL BULB & EXTERNAL SUPERHEAT ADJUSTMENT

VALVE TYPE	POWER ASSEMBLY NUMBER	REFRIGERANT CHARGE CODE	TUBING LENGTH CODE <sup>②</sup>	EQUALIZER CODE
TCL	XB1019*	F = R12	1 = 5'	A = Internal B = 1/4 SAE external C = 1/4 ODF external
TCLE		H = R22	2 = 10'	
TJLE		M = R134a	3 = 15'	
TJR		P = R507 S = R404A	4 = 20'	
TER	XC726*	F = R12	1 = 5'	B = 1/4 SAE external
TIR		H = R22	2 = 10'	
THR		M = R134a	3 = 15'	
TMR		P = R507 S = R404A	4 = 20'	

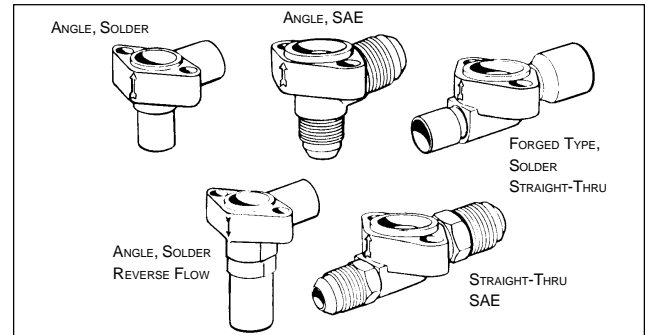
①Gaskets included

②Standard tubing length supplied by valve series is:

TCL, TCLE, TJLE, TJR = 5' capillary tubing standard.

TER, TIR, THR, TMR = 10' capillary tubing standard.

\*Add refrigerant charge (MOP if required) remote bulb tubing length code and type of equalizer. Example: XB1019-FZ1B.

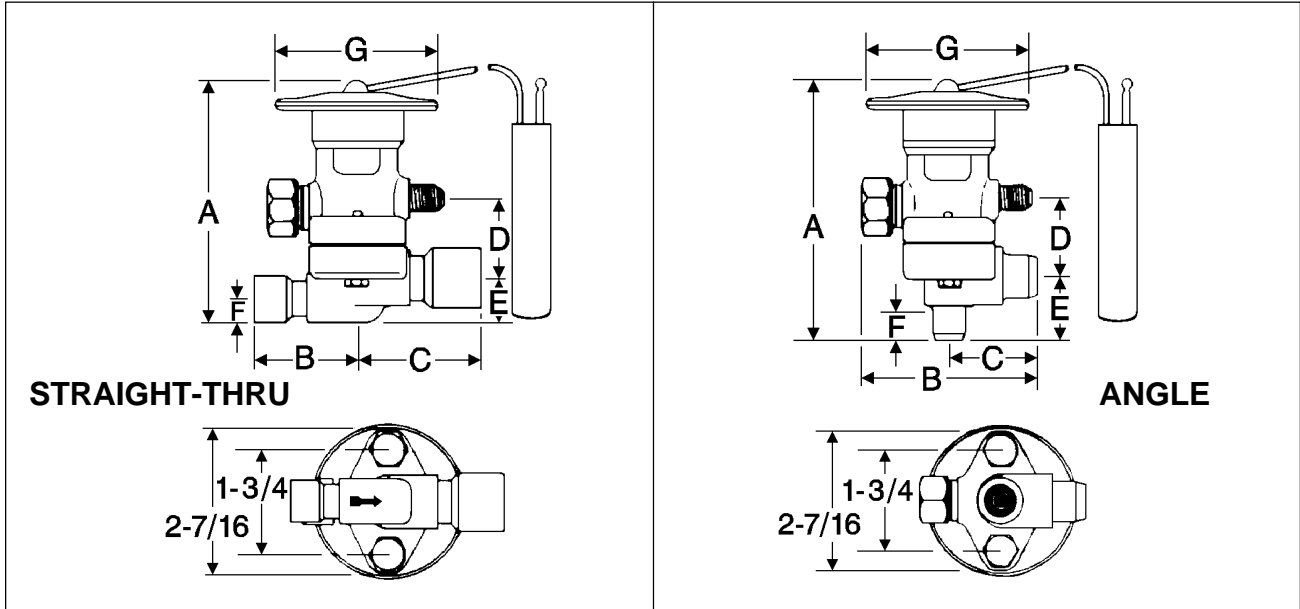


**FLANGE INTERCHANGEABILITY & CONNECTIONS TABLE**

ANGLE CONFIGURATION				
VALVE TYPE	SIZE & STYLE CONNECTIONS		BODY FLANGE PART NUMBER	CAP SCREW PART NUMBER
	INLET	OUTLET		
TCL	3/8 SAE	1/2 SAE	C500-4	PS286-5
	3/8 SAE	5/8 SAE	C500-5	
	1/2 SAE	5/8 SAE	C500-6	
TCLE	1/4 ODF	3/8 ODF	C501-1	
	3/8 ODF	1/2 ODF	C501-4	
TL	3/8 ODF	5/8 ODF	C501-5	
	1/2 ODF	5/8 ODF	C501-7	
TLE	5/8 ODF—	7/8 ODF—	A576	PS168-5
	7/8 ODM	1--1/8 ODM		
TJLE	5/8 ODF—	7/8 ODF—	B504	PS514-5
TJR	7/8 ODM	1--1/8 ODM	10331	PS259
	1-1/8 ODM	1--1/8 ODM		
TER	7/8 ODF—	7/8 ODF—	9153	PS259
TIR	1-1/8 ODM	1--1/8 ODM	9151	PS370
	7/8 ODF—	7/8 ODF—		
THR	1-1/8 ODM	1-1/8 ODM	9149	PS370
TMR	1-1/8 ODM	1-1/8 ODF	9149-1	PS370
STRAIGHT-THRU CONFIGURATION				
TCL TCLE TL TLE	3/8 SAE	1/2 SAE	X6669-4	PS286-5
	3/8 SAE	5/8 SAE	X6669-1	
	1/2 SAE	1/2 SAE	X6669-5	
	1/2 SAE	5/8 SAE	X6669-2	
	3/8 ODF	1/2 ODF	9761-5	
	3/8 ODF	5/8 ODF	9761-3	
	1/2 ODF	1/2 ODF	9761-6	
	1/2 ODF	5/8 ODF	9761-4	
	1/2 ODF	7/8 ODF	9761-2	
	5/8 ODF	5/8 ODF	X6346-16	
TJLE	5/8 ODF	7/8 ODF	X6346-17	
	5/8 ODF	1-1/8 ODF	X6346-18	
	7/8 ODF	1-1/8 ODF	X6346-34	
	7/8 ODF	1-1/8 ODF	X6347-2	
TJR	7/8 ODF	1-1/8 ODF	X6347-6	PS517-5
	7/8 ODF	1-3/8 ODF	X6347-7	
TJR	7/8 ODF—	7/8 ODF—	10332	PS259
TER	1-1/8 ODM	1-1/8 ODM	9152	PS259
	7/8 ODF—	7/8 ODF—		
TIR	1-1/8 ODM	1-1/8 ODM	9150	PS370
	7/8 ODF—	7/8 ODF—		
THR	1-1/8 ODM	1-1/8 ODM	9148	PS370
TMR	1-1/8 ODM	1-1/8 ODM	9148-1	PS370

# T-SERIES TAKE-A-PART TEV

## TCL(E) DIMENSIONAL DIAGRAMS & TABLES



### TCL(E) REMOTE BULB DIMENSIONS

CAPILLARY TUBING LENGTH	STANDARD REMOTE BULB		RAPID RESPONSE BULB <sup>2</sup>	
	DIA.	LENGTH	DIA.	LENGTH
5'	5/8	3-1/16	3/8	1-3/16
10'		3-9/16		
15 or 20'		4-13/16		
30'		6-1/16		
40 or 50'	3/4	6-3/16	—	—

<sup>2</sup>Rapid response bulb available only with 5' or 10' capillary tubing.

### TCL(E) ROUGHING-IN DIMENSIONS

STANDARD CONNECTIONS <sup>1</sup>	STRAIGHT-THRU STYLE DIMENSIONS							SOCKET DEPTH				
	A	B	C	D	E	F	G	INLET	OUTLET			
3/8 x 1/2 SAE	3-45/64	1-25/32	1-63/64	1-13/64	11/16	3/8	2-9/16 DIA.	5/16	3/8			
3/8 x 5/8 SAE			2-5/32									
1/2 x 1/2 SAE			1-9/16									
3/8 x 1/2 ODF	3-11/16	1-13/32	1-37/64					43/64	23/64	3/8	1/2	
3/8 x 5/8 ODF			1-5/8									
1/2 x 1/2 ODF	3-45/64	1-9/16	1-9/16					11/16	3/8	3/8	3/8	
1/2 x 5/8 ODF	3-11/16	1-5/8	1-5/8					43/64	23/64	1/2		
5/8 x 5/8 ODF	3-45/64	1-19/32	1-5/8					11/16	3/8	1/2	3/4	
5/8 x 7/8 ODF			1-15/16									
5/8 x 1-1/8 ODF			2-3/8									
7/8 x 1-1/8 ODF			2-3/8									
3-13/16	1-15/16	2-3/8	2-3/8	3/4	29/32							
ANGLE STYLE												
3/8 x 1/2 SAE	4-9/64	3-1/16	1-1/2	1-13/64	15/16	7/16	2-9/16 DIA.	1-1/16	1			
3/8 x 5/8 SAE										1-1/8		
1/2 x 5/8 SAE	3-3/16	1-5/8	1-3/8									
1/4 x 3/8 ODF	3-61/64	2-29/32	1-11/32							1-11/32	1-11/16	13/16
3/8 x 1/2 ODF	4-7/64	3-1/32	1-15/32							1-1/16	9/16	
3/8 x 5/8 ODF										1-1/16		
1/2 x 5/8 ODF	4-13/64	3-5/32	1-19/32							1-3/16	11/16	
5/8 x 7/8 ODF (7/8 x 1-1/8 ODM)										3-9/16	2	1-11/32

<sup>1</sup>Connections shown are standard sizes, consult ALCO for non-standard sizes.  
Allow 2-1/8" above valve for removal of power assembly.



# T-SERIES TAKE-A-PART TEV

## TER, TIR, THR, TMR, TJLE & TJR DIMENSIONAL DIAGRAMS & TABLES

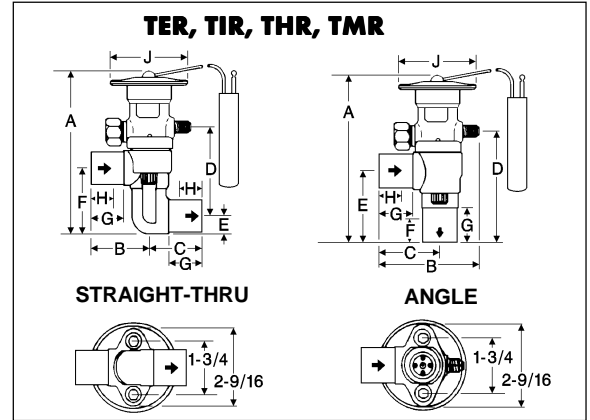
### TER, TIR, THR, TMR ROUGHING-IN DIMENSIONS

TER STRAIGHT-THRU STYLE										
TER VALVE <sup>1</sup>		DIMENSIONS								
INLET	OUTLET	A	B	C	D	E	F	G	H	J (DIA.)
ODF:ODM 7/8:1-1/8	ODF:ODM 7/8:1-1/8	5-25/64	2	1-25/32	2-15/16	19/32	2-13/64	1-1/8	3/4	2-7/8
TER ANGLE STYLE										
ODF:ODM 7/8:1-1/8	ODF:ODM 7/8:1-1/8	5-1/2	3-3/8	2	3-21/32	2-5/16	3/4	1-1/8	3/4	2-7/8
TIR STRAIGHT-THRU STYLE										
TIR VALVE <sup>1</sup>		DIMENSIONS								
INLET	OUTLET	A	B	C	D	E	F	G	H	J (DIA.)
ODF:ODM 7/8:1-1/8	ODF:ODM 7/8:1-1/8	5-29/64	2	1-25/32	3	19/32	2-17/64	1-1/8	3/4	2-7/8
TIR ANGLE STYLE										
ODF:ODM 7/8:1-1/8	ODF:ODM 7/8:1-1/8	6	3-3/8	2	4-5/32	2-13/16	3/4	1-1/8	3/4	2-7/8
THR STRAIGHT-THRU STYLE										
THR, TMR VALVE <sup>1</sup>		DIMENSIONS								
INLET	OUTLET	A	B	C	D	E	F	G	H	J (DIA.)
ODM 1-1/8	ODM 1-1/8	5-29/64	2	1-25/32	3	19/32	2-17/64	—	—	2-7/8
THR ANGLE STYLE										
ODM 1-1/8	ODM 1-1/8	6	3-3/8	2	4-5/32	2-13/16	—	1-1/8	—	2-7/8

### TER, TIR, THR & TMR Remote Bulb Dimensions

CAPILLARY TUBING LENGTH	STANDARD REMOTE BULB		RAPID RESPONSE BULB <sup>2</sup>	
	DIA.	LENGTH	DIA.	LENGTH
5'	3/4	4-7/8	3/8	2-1/16
10'			—	—
15 or 20'				
30'				
40 or 50'	6-3/16	—	—	

<sup>2</sup>Rapid response bulb available only with 10' capillary tubing.



### TJL(E) Roughing-In Dimensions

TJLE STRAIGHT-THRU STYLE										
TJLE VALVE <sup>3</sup>		DIMENSIONS								
INLET	OUTLET	A	B	C	D	E	F	G	H	J
5/8	1-1/8	4-55/64	1-5/8	2-1/2	1-11/32	1-23/32	45/64	17/32	29/32	—
7/8	1-1/8		1-15/16	2-1/2				3/4	29/32	
7/8	1-3/8		2-11/16	2-11/16				31/32		
TJLE ANGLE STYLE										
ODF:ODM 5/8:7/8	ODF:ODM 7/8:1-1/8	5-1/32	3-15/32	2	1-11/32	1-27/32	13/16	1-1/16	1	1-1/8

### TJR Roughing-In Dimensions

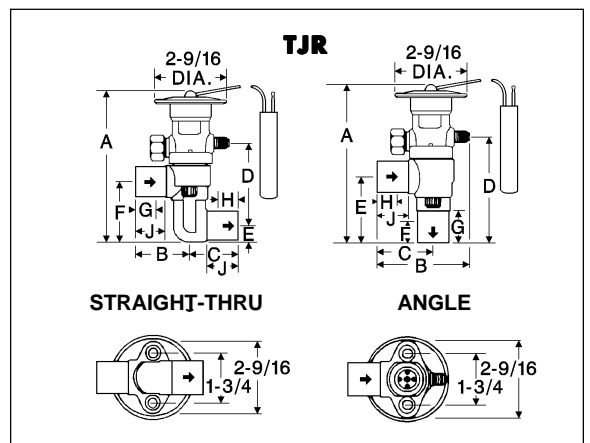
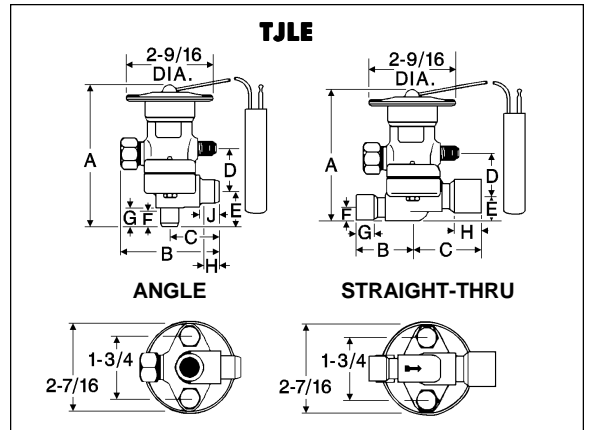
TJR STRAIGHT-THRU STYLE										
TJR VALVE <sup>3</sup>		DIMENSIONS								
INLET	OUTLET	A	B	C	D	E	F	G	H	J
ODF:ODM 7/8:1-1/8	ODF:ODM 7/8:1-1/8	5-23/64	2	1-25/32	2-15/16	19/32	2-13/64	3/4	3/4	1-1/8
TJR ANGLE STYLE										
ODF:ODM 7/8:1-1/8	ODF:ODM 7/8:1-1/8	5-1/2	3-3/8	2	3-21/32	2-5/16	3/4	1-1/8	3/4	1-1/8

<sup>3</sup>Connections shown are standard sizes, consult ALCO for non-standard sizes.  
Allow 2-1/8" above valve for removal of power assembly.

### TJL(E) & TJR Bulb Dimensions

CAPILLARY TUBING LENGTH	STANDARD REMOTE BULB		RAPID RESPONSE BULB <sup>2</sup>	
	DIA.	LENGTH	DIA.	LENGTH
5'	5/8	3-1/16	3/8	1-3/16
10'		3-9/16		
15 or 20'		4-13/16	—	—
30'		6-1/16		
40 or 50'	3/4	6-3/16	—	—

<sup>2</sup>Rapid response bulb available only with 5' or 10' capillary tubing.



# TCL(E) EXTENDED CAPACITIES IN TONS

<b>R12</b>	EVAPORATOR TEMP.																							
	+ 50°F						+ 40°F						+ 20°F						0°F					
	PRESSURE DROP ACROSS VALVE – PSI																							
VALVE	40	60	80	100	125	150	60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175
TCL(E)1/4F	.25	.31	.36	.40	.45	.49	.30	.35	.39	.43	.47	.51	.29	.33	.37	.42	.46	.50	.21	.23	.26	.29	.32	.34
TCL(E)1/2F	.46	.57	.66	.74	.82	.90	.56	.65	.72	.81	.89	.96	.54	.62	.70	.78	.85	.92	.38	.44	.49	.55	.60	.65
TCL(E)1F	.96	1.2	1.4	1.5	1.7	1.9	1.2	1.3	1.5	1.7	1.8	2.0	1.1	1.3	1.4	1.6	1.8	1.9	.77	.89	1.0	1.1	1.2	1.3
TCL(E)2F	1.8	2.1	2.5	2.8	3.1	3.4	2.1	2.4	2.7	3.0	3.3	3.6	2.0	2.3	2.6	2.9	3.2	3.4	1.4	1.6	1.8	2.0	2.2	2.4
TCL(E)3F	2.5	3.1	3.6	4.0	4.5	4.9	3.0	3.5	3.9	4.4	4.8	5.2	2.9	3.4	3.8	4.2	4.6	5.0	2.0	2.4	2.6	2.9	3.2	3.5
TCL(E)4F	3.7	4.5	5.2	5.8	6.5	7.1	4.4	5.1	5.7	6.4	7.0	7.5	4.2	4.9	5.5	6.1	6.7	7.2	3.0	3.4	3.8	4.3	4.7	5.1
TCL(E)6-1/2F	5.1	6.2	7.2	8.0	8.9	9.8	6.1	7.0	7.8	8.8	9.6	10.4	5.8	6.7	7.5	8.4	9.2	9.9	4.1	4.7	5.3	5.9	6.5	7.0
TCL(E)7-1/2F	6.1	7.5	8.6	9.6	10.8	11.8	7.3	8.5	9.5	10.6	11.6	12.5	7.0	8.1	9.1	10.1	11.1	12.0	4.9	5.7	6.4	7.1	7.8	8.4

<b>R134a</b>	EVAPORATOR TEMP.																							
	+ 50°F						+ 40°F						+ 20°F						0°F					
	PRESSURE DROP ACROSS VALVE – PSI																							
VALVE	80	100	125	150	175	200	80	100	125	150	175	200	80	100	125	150	175	200	80	100	125	150	175	200
TCL(E)1/4M	.20	.22	.25	.27	.29	.31	.16	.18	.20	.22	.24	.25	.14	.16	.18	.20	.21	.23	.13	.14	.16	.17	.19	.20
TCL(E)1/2M	.37	.41	.46	.50	.54	.58	.30	.34	.38	.42	.45	.48	.26	.29	.32	.36	.38	.41	.23	.26	.29	.32	.34	.37
TCL(E)1F	.75	.84	.94	1.0	1.1	1.2	.63	.70	.78	.86	.93	.99	.54	.60	.67	.73	.79	.85	.47	.52	.58	.64	.69	.74
TCL(E)2F	1.4	1.5	1.7	1.9	2.0	2.2	1.1	1.3	1.4	1.6	1.7	1.8	1.0	1.1	1.2	1.4	1.5	1.6	.86	.96	1.1	1.2	1.3	1.4
TCL(E)3F	2.0	2.2	2.5	2.7	2.9	3.1	1.7	1.9	2.1	2.3	2.5	2.6	1.4	1.6	1.8	1.9	2.1	2.2	1.2	1.4	1.5	1.7	1.8	2.0
TCL(E)4F	2.9	3.2	3.6	3.9	4.2	4.5	2.4	2.7	3.0	3.3	3.6	3.8	2.1	2.3	2.6	2.8	3.0	3.2	1.8	2.0	2.3	2.5	2.7	2.8
TCL(E)6-1/2M	3.9	4.4	4.9	5.4	4.8	6.2	3.3	3.7	4.2	4.5	4.9	5.3	2.8	3.2	3.5	3.9	4.2	4.5	2.5	2.8	3.1	3.4	3.7	3.9
TCL(E)7-1/2M	4.8	5.3	5.5	6.5	7.0	7.5	4.0	4.5	5.0	5.5	5.9	6.3	3.4	3.8	4.3	4.7	5.1	5.4	3.0	3.3	3.7	4.1	4.4	4.7

<b>R22</b>	EVAPORATOR TEMP.																							
	+ 50°F						+ 40°F						+ 20°F						0°F					
	PRESSURE DROP ACROSS VALVE – PSI																							
VALVE	75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150	175	200	100	125	150	175	200	225
TCL(E)1/2H	.45	.51	.57	.62	.67	.72	.43	.50	.56	.61	.66	.71	.42	.49	.55	.60	.65	.69	.40	.45	.49	.53	.57	.60
TCL(E)1H	.82	.95	1.1	1.2	1.3	1.3	.81	.94	1.1	1.2	1.2	1.3	.80	.92	1.0	1.1	1.2	1.3	.74	.83	.91	.98	1.1	1.1
TCL(E)2H	1.7	2.0	2.2	2.4	2.6	2.8	1.7	1.9	2.2	2.4	2.6	2.7	1.4	1.9	2.1	2.3	2.5	2.7	1.5	1.7	1.9	2.0	2.2	2.3
TCL(E)3H	3.1	3.6	4.0	4.4	4.7	5.1	3.1	3.5	4.0	4.3	4.7	5.0	3.0	3.4	3.9	4.2	4.6	4.9	2.8	3.1	3.4	3.7	4.0	4.2
TCL(E)5H	4.5	5.2	5.8	6.3	6.8	7.3	4.4	5.1	5.7	6.3	6.8	7.2	4.3	5.0	5.6	6.1	6.6	7.0	4.0	4.5	4.9	5.3	5.7	6.1
TCL(E)7-1/2H	6.5	7.5	8.4	9.2	9.9	10.6	6.4	7.4	8.3	9.1	9.8	10.5	6.2	7.2	8.1	8.8	9.5	10.2	5.9	6.5	7.2	7.7	8.3	8.8
TCL(E)10H	8.9	10.3	11.5	12.6	13.7	14.6	8.8	10.2	11.4	12.5	13.5	14.4	8.6	9.9	11.1	12.2	13.2	14.1	8.1	9.1	9.9	10.7	11.4	12.1
TCL(E)12H	10.8	12.5	13.9	15.3	16.5	17.6	10.7	12.3	13.8	15.1	16.3	17.4	10.4	12.0	13.4	14.7	15.9	17.0	9.7	10.9	11.9	12.9	13.8	14.6

## TCL(E) EXTENDED CAPACITIES IN TONS

R404A/ R507	EVAPORATOR TEMP.																							
	+ 50°F						+ 40°F						+ 20°F						0°F					
	PRESSURE DROP ACROSS VALVE - PSI																							
VALVE	100	125	150	175	200	225	100	125	150	175	200	225	125	150	175	200	225	250	150	175	200	225	250	275
TCL(E)1/4	.35	.39	.43	.46	.49	.53	.34	.38	.42	.45	.48	.51	.36	.39	.42	.45	.48	.51	.37	.40	.43	.45	.48	.50
TCL(E)1/2	.64	.72	.78	.85	.91	.96	.63	.70	.77	.83	.89	.95	.67	.73	.79	.85	.90	.95	.68	.73	.78	.83	.87	.92
TCL(E)1	1.3	1.5	1.6	1.8	1.9	2.0	1.3	1.4	1.6	1.7	1.8	1.9	1.4	1.5	1.6	1.7	1.9	2.0	1.4	1.5	1.6	1.7	1.8	1.9
TCL(E)2	2.4	2.7	3.0	3.2	3.4	3.6	2.4	2.7	2.9	3.1	3.4	3.6	2.5	2.8	3.0	3.2	3.4	3.6	2.6	2.8	3.0	3.1	3.3	3.5
TCL(E)3	3.5	3.9	4.3	4.6	4.9	5.2	3.4	3.8	4.2	4.5	4.8	5.1	3.6	4.0	4.3	4.6	4.9	5.1	3.7	4.0	4.2	4.5	4.8	5.0
TCL(E)4-1/2	5.1	5.7	6.2	6.7	7.2	7.6	5.0	5.5	6.1	6.6	7.0	7.4	5.3	5.8	6.2	6.7	7.1	7.5	5.3	5.8	6.2	6.5	6.9	7.2
TCL(E)7	7.0	7.8	8.5	9.2	9.9	10.5	6.8	7.6	8.4	9.0	9.6	10.2	7.3	8.0	8.6	9.2	9.7	10.3	7.4	7.9	8.5	9.0	9.5	10.0
TCL(E)8	8.4	9.4	10.3	11.1	11.9	12.6	8.2	9.2	10.1	10.9	11.6	12.4	8.8	9.6	10.4	11.1	11.8	12.4	8.9	9.6	10.2	10.9	11.5	12.0

R404A/ R507	EVAPORATOR TEMP.																							
	- 10°F						- 20°F						- 30°F						- 40°F					
	PRESSURE DROP ACROSS VALVE - PSI																							
VALVE	150	175	200	225	250	275	175	200	225	250	275	300	175	200	225	250	275	300	175	200	225	250	275	300
TCL(E)1/4	.35	.38	.41	.43	.45	.48	.36	.38	.41	.43	.45	.47	.29	.31	.33	.35	.36	.38	.23	.25	.26	.27	.29	.30
TCL(E)1/2	.66	.71	.76	.81	.85	.89	.68	.73	.77	.81	.85	.89	.54	.58	.61	.65	.68	.71	.43	.46	.49	.51	.54	.56
TCL(E)1	1.3	1.5	1.6	1.6	1.7	1.8	1.4	1.5	1.6	1.7	1.7	1.8	1.1	1.2	1.3	1.3	1.4	1.5	.90	1.0	1.0	1.1	1.1	1.2
TCL(E)2	2.5	2.7	2.9	3.0	3.2	3.4	2.5	2.7	2.9	3.0	3.2	3.3	2.0	2.2	2.3	2.4	2.6	2.7	1.6	1.7	1.9	2.0	2.0	2.1
TCL(E)3	3.6	3.8	4.1	4.4	4.6	4.8	3.7	3.9	4.2	4.4	4.6	4.8	2.9	3.1	3.3	3.5	3.7	3.8	2.4	2.5	2.7	2.8	3.0	3.1
TCL(E)4-1/2	5.2	5.6	6.0	6.3	6.7	7.0	5.3	5.7	6.0	6.4	6.7	7.0	4.3	4.6	4.8	5.1	5.3	5.6	3.4	3.7	3.9	4.1	4.3	4.5
TCL(E)7	7.1	7.7	8.2	8.7	9.2	9.6	7.3	7.8	8.3	8.8	9.2	9.6	5.9	6.3	6.6	7.0	7.4	7.7	4.7	5.0	5.3	5.6	5.9	6.2
TCL(E)8	8.6	9.3	9.9	10.5	11.1	11.6	8.8	9.4	10.0	10.6	11.1	11.6	7.1	7.6	8.0	8.5	8.9	9.3	5.7	6.1	6.4	6.8	7.1	7.4

## T-SERIES EXTENDED CAPACITY TABLES

### TJLE & TJR EXTENDED CAPACITIES IN TONS R12

	EVAPORATOR TEMP.																							
	+ 50°F						+ 40°F						+ 20°F						0°F					
	PRESSURE DROP ACROSS VALVE - PSI																							
VALVE	40	60	80	100	125	150	60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175
TJLE7F	5.4	6.6	7.6	8.6	9.6	10.5	6.5	7.5	8.4	9.4	10.3	11.1	6.2	7.2	8.0	9.0	9.9	10.6	4.4	5.0	5.7	6.3	6.9	7.5
TJLE8F	6.9	8.4	9.7	10.9	12.2	13.3	8.3	9.6	10.7	11.9	13.1	14.1	7.9	9.2	10.2	11.5	12.5	13.5	5.6	6.4	7.2	8.0	8.8	9.5
TJR8F	7.3	9.0	10.3	11.5	12.9	14.1	8.8	10.1	11.3	12.6	13.8	14.9	8.4	9.7	10.8	12.1	13.3	14.3	5.9	6.8	7.6	8.5	9.3	10.0
TJR11F	8.7	10.7	12.3	13.8	15.4	16.9	10.5	12.1	13.5	15.1	16.6	17.9	10.1	11.6	13.0	14.5	15.9	17.2	7.0	8.1	9.1	10.2	11.1	12.0

	EVAPORATOR TEMP.																							
	- 10°F						- 20°F						- 30°F						- 40°F					
	PRESSURE DROP ACROSS VALVE - PSI																							
VALVE	80	100	125	150	175	200	80	100	125	150	175	200	80	100	125	150	175	200	80	100	125	150	175	200
TJLE7F	4.2	4.7	5.3	5.8	6.2	6.7	3.5	4.0	4.4	4.9	5.2	5.6	3.0	3.4	3.8	4.1	4.4	4.8	2.7	3.0	3.3	3.7	3.9	4.2
TJLE8F	5.4	6.0	6.7	7.4	8.0	8.5	4.5	5.1	5.7	6.2	6.7	7.2	3.9	4.3	4.8	5.3	5.7	6.1	3.4	3.8	4.2	4.6	5.0	5.3
TJR8F	5.7	6.4	7.1	7.8	8.4	9.0	4.8	5.4	6.0	6.6	7.1	7.6	4.1	4.6	5.1	5.6	6.0	6.5	3.6	4.0	4.5	4.9	5.3	5.6
TJR11F	6.8	7.6	8.5	9.3	10.1	10.8	5.7	6.4	7.2	7.9	8.5	9.1	4.9	5.5	6.1	6.7	7.2	7.7	4.3	4.8	5.3	5.9	6.3	6.8

### TJLE & TJR EXTENDED CAPACITIES IN TONS R134a

	EVAPORATOR TEMP.																							
	+ 50°F						+ 40°F						+ 20°F						0°F					
	PRESSURE DROP ACROSS VALVE - PSI																							
VALVE	60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175
TJLE9M	8.0	9.2	10.3	11.5	12.6	13.6	7.8	9.0	10.1	11.2	12.3	13.3	7.4	8.6	9.6	10.7	11.8	12.7	6.6	7.6	8.5	9.5	10.4	11.2
TJLE11M	10.2	11.7	13.1	14.7	16.0	17.3	9.9	11.5	12.8	14.3	15.7	17.0	9.5	11.0	12.3	13.7	15.0	16.2	8.4	9.7	10.8	12.1	13.3	14.3
TJR11M	10.8	12.4	13.9	15.5	17.0	18.4	10.5	12.2	13.6	15.2	16.7	18.0	10.1	11.6	13.0	14.5	15.9	17.2	8.9	10.3	11.5	12.9	14.1	15.2
TJR13M	12.8	14.8	16.6	18.5	20.3	21.9	12.6	14.5	16.2	18.1	19.9	21.5	12.0	13.9	15.5	17.4	19.0	20.5	10.6	12.3	13.7	15.3	16.8	18.1

	EVAPORATOR TEMP.																							
	- 10°F						- 20°F						- 30°F						- 40°F					
	PRESSURE DROP ACROSS VALVE - PSI																							
VALVE	80	100	125	150	175	200	80	100	125	150	175	200	80	100	125	150	175	200	80	100	125	150	175	200
TJLE7M	6.3	7.0	7.8	8.6	9.3	9.9	5.1	5.7	6.4	7.0	7.6	8.1	4.2	4.6	5.2	5.7	6.1	6.6	3.3	3.7	4.1	4.5	4.9	5.2
TJLE11M	8.0	9.0	10.0	11.0	11.9	12.7	6.6	7.3	8.2	9.0	9.7	10.4	5.3	5.9	6.6	7.3	7.8	8.4	4.2	4.7	5.3	5.8	6.3	6.7
TJR11M	8.5	9.5	10.6	11.6	12.6	13.4	7.0	7.8	8.7	9.5	10.3	11.0	5.6	6.3	7.0	7.7	8.3	8.9	4.5	5.0	5.6	6.2	6.6	7.1
TJR13M	10.1	11.3	12.7	13.9	15.0	16.0	8.3	9.3	10.4	11.4	12.3	13.1	6.7	7.5	8.4	9.2	9.9	10.6	5.4	6.0	6.7	7.3	7.9	8.5

NOTE: Flow capacities are the same for reverse flow applications.

## T-SERIES EXTENDED CAPACITY TABLES

### TJLE & TJR EXTENDED CAPACITIES IN TONS R22

	EVAPORATOR TEMP.																							
	+ 50°F						+ 40°F						+ 20°F						0°F					
	PRESSURE DROP ACROSS VALVE – PSI																							
VALVE	75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150	175	200	100	125	150	175	200	225
TJLE11H	9.6	11.0	12.3	13.5	14.6	15.6	9.4	10.9	12.2	13.4	14.4	15.4	9.2	10.6	11.8	13.0	14.1	15.0	8.6	9.7	10.6	11.4	12.2	12.9
TJLE14H	12.2	14.1	15.7	17.2	18.6	19.9	12.0	13.9	15.5	17.0	18.4	19.7	11.7	13.6	15.2	16.6	17.9	19.2	11.0	12.3	13.5	14.5	15.5	16.5
TJR14H	12.9	14.8	16.6	18.2	19.6	21.0	12.7	14.7	16.4	18.0	19.5	20.8	12.4	14.3	16.0	17.6	19.0	20.3	11.6	13.0	14.2	15.4	16.4	17.4
TJR18H	15.4	17.8	20.0	21.8	23.6	25.2	15.2	17.6	19.7	21.6	23.3	24.9	14.9	17.2	19.2	21.0	22.7	24.3	13.9	15.5	17.0	18.4	19.7	20.9

	EVAPORATOR TEMP.																							
	– 10°F						– 20°F						– 30°F						– 40°F					
	PRESSURE DROP ACROSS VALVE – PSI																							
VALVE	125	150	175	200	225	250	125	150	175	200	225	250	125	150	175	200	225	250	125	150	175	200	225	250
TJLE11H	8.1	8.9	9.6	10.3	10.9	11.5	6.9	7.5	8.1	8.7	9.2	9.7	5.7	6.3	6.8	7.3	7.7	8.1	4.8	5.3	5.7	6.1	6.4	6.8
TJLE14H	10.3	11.3	12.2	13.1	13.9	14.6	8.7	9.6	10.3	11.1	11.7	12.4	7.3	8.0	8.7	9.3	9.8	10.3	6.1	6.7	7.3	7.8	8.2	8.7
TJR14H	10.9	12.0	12.9	13.8	14.7	15.5	9.2	10.1	10.9	11.7	12.4	13.1	7.7	8.5	9.2	9.8	10.4	10.9	6.8	7.4	8.0	8.6	9.1	9.6
TJR18H	13.1	14.3	15.5	16.6	17.6	18.5	11.1	12.1	13.1	14.0	14.8	15.6	9.3	10.1	11.0	11.7	12.4	13.1	7.8	8.5	9.2	9.8	10.4	10.9

### TJLE & TJR EXTENDED CAPACITIES IN TONS R404A/R507

	EVAPORATOR TEMP.																							
	+ 50°F						+ 40°F						+ 20°F						0°F					
	PRESSURE DROP ACROSS VALVE – PSI																							
VALVE	100	125	150	175	200	225	100	125	150	175	200	225	125	150	175	200	225	250	150	175	200	225	250	275
TJLE7	7.5	8.3	9.1	10.0	10.5	11.2	7.3	8.2	8.9	9.6	10.3	10.9	7.8	8.5	9.2	9.8	10.4	11.0	7.9	8.5	9.1	9.7	10.1	10.6
TJLE9	9.5	10.6	11.6	12.6	13.4	14.3	9.3	10.4	11.4	12.3	13.2	14.0	9.9	10.8	11.7	12.5	13.3	14.0	10.0	10.8	11.6	12.3	12.9	13.6
TJR9	10.1	11.2	12.3	13.3	14.2	15.1	9.9	11.0	12.0	13.0	14.0	14.7	10.5	11.5	12.4	13.2	14.0	14.8	10.6	11.4	12.2	13.0	13.7	14.3
TJR12	12.0	13.5	14.7	15.9	17.0	18.0	11.8	13.2	14.4	15.6	16.7	17.7	12.5	13.7	14.8	15.9	16.8	17.7	12.7	13.7	14.7	15.5	16.4	17.2

	EVAPORATOR TEMP.																							
	– 10°F						– 20°F						– 30°F						– 40°F					
	PRESSURE DROP ACROSS VALVE – PSI																							
VALVE	150	175	200	225	250	275	175	200	225	250	275	300	175	200	225	250	275	300	175	200	225	250	275	300
TJLE7	7.6	8.2	8.8	9.3	9.8	10.3	7.8	8.4	8.8	9.4	9.8	10.2	6.3	6.7	7.1	7.5	7.9	8.2	5.0	5.4	5.7	6.0	6.3	6.6
TJLE9	9.7	10.5	11.2	11.9	12.5	13.1	10.0	10.7	11.3	11.9	12.5	13.1	8.0	8.6	9.1	9.6	10.0	10.5	6.4	6.9	7.3	7.7	8.0	8.4
TJR9	10.3	11.1	11.8	12.6	13.2	13.9	10.6	11.3	12.0	12.6	13.2	13.8	8.5	9.0	9.6	10.1	10.6	11.1	6.8	7.3	7.7	8.1	8.5	8.9
TJR12	12.3	13.3	14.2	15.0	15.9	16.6	12.6	13.5	14.3	15.1	15.8	16.5	10.1	10.8	11.5	12.1	12.7	13.3	8.1	8.7	9.2	9.7	10.2	10.6

### TER, TIR, THR & TMR EXTENDED CAPACITIES IN TONS

<b>R12</b>	EVAPORATOR TEMP.																							
	+ 50°F						+ 40°F						+ 20°F						0°F					
	PRESSURE DROP ACROSS VALVE – PSI																							
VALVE	40	60	80	100	125	150	60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175
TER13F	10.8	13.3	15.3	17.1	19.1	21.0	13.0	15.0	16.8	18.8	20.6	22.2	12.5	14.4	16.1	18.0	19.7	21.3	8.7	10.1	11.3	12.6	13.8	14.9
TER15F	12.5	15.3	17.7	19.8	22.1	24.2	15.0	17.3	19.4	21.7	23.7	25.6	14.4	16.6	18.6	20.8	22.7	24.6	10.1	11.6	13.0	14.6	15.9	17.2
TER20F	16.6	20.4	23.5	26.3	29.4	32.2	20.0	23.1	25.8	28.9	31.6	34.2	19.2	22.2	24.8	27.7	30.3	32.8	13.4	15.5	17.4	19.4	21.3	23.0
TER25F	20.8	25.5	29.4	32.9	36.8	40.3	25.0	28.9	32.3	36.1	39.5	42.7	24.0	27.7	31.0	34.6	37.9	41.0	16.8	19.4	21.7	24.3	26.6	28.7
TIR35F	29.1	35.7	41.2	46.1	51.5	56.4	35.0	40.4	45.2	50.5	55.3	59.8	33.6	38.8	43.3	48.5	53.1	57.3	23.5	27.2	30.4	34.0	37.2	40.2
THR45F	32.1	39.3	45.4	50.7	56.7	62.1	38.5	44.5	49.7	55.6	60.9	65.7	37.0	42.6	47.7	53.3	58.4	63.1	25.9	29.9	33.4	37.3	40.9	44.2
THR55F	38.9	47.7	55.1	61.5	68.9	75.4	46.8	54.0	60.4	67.5	74.0	79.8	44.9	51.8	57.9	64.8	70.9	76.6	31.5	36.3	40.5	45.3	49.6	53.6
TMR55F	45.8	56.1	64.8	72.4	81.0	88.7	55.0	63.5	71.0	79.4	87.0	93.9	52.8	60.9	68.1	76.2	83.4	90.1	37.0	42.7	47.7	53.3	58.4	63.1

<b>R12</b>	EVAPORATOR TEMP.																							
	– 10°F						– 20°F						– 30°F						– 40°F					
	PRESSURE DROP ACROSS VALVE – PSI																							
VALVE	80	100	125	150	175	200	80	100	125	150	175	200	80	100	125	150	175	200	80	100	125	150	175	200
TER13F	8.4	9.4	10.6	11.6	12.5	13.3	7.1	7.9	8.9	9.7	10.5	11.2	6.1	6.8	7.6	8.3	9.0	9.6	5.3	5.9	6.6	7.3	7.8	8.4
TER15F	9.7	10.9	12.2	13.3	14.4	15.4	8.2	9.4	10.3	11.2	12.1	13.0	7.0	7.8	8.8	9.6	10.4	11.1	6.1	6.8	7.6	8.4	9.0	9.7
TER20F	13.0	14.5	16.2	17.8	19.2	20.5	10.9	12.2	13.7	15.0	16.2	17.3	9.3	10.4	11.7	12.8	13.8	14.7	8.2	9.1	10.2	11.2	12.1	12.9
TER25F	16.2	18.2	20.3	22.2	24.0	25.7	13.7	15.3	17.1	18.7	20.2	21.6	11.7	13.0	14.6	16.0	17.2	18.4	10.2	11.4	12.8	14.0	15.1	16.1
TIR35F	22.7	25.4	28.4	31.1	33.6	35.9	19.1	21.4	23.9	26.2	28.3	30.2	16.3	18.3	20.4	22.4	24.2	25.8	14.3	16.0	17.8	19.5	21.1	22.6
THR45F	25.0	27.9	31.3	34.2	37.0	39.6	21.1	23.5	26.3	28.8	31.2	33.3	18.0	20.1	22.5	24.6	26.6	28.4	15.7	17.6	19.6	21.5	23.2	24.9
THR55F	30.3	33.9	38.0	41.6	44.9	48.0	25.6	28.6	32.0	35.0	37.8	40.4	21.8	24.4	27.3	29.8	32.3	34.5	19.0	21.3	23.8	26.1	28.2	30.2
TMR55F	35.7	39.9	44.7	48.9	52.8	56.5	30.1	33.6	37.6	41.2	44.5	47.5	25.7	28.7	32.1	35.1	38.0	40.6	22.4	25.1	28	30.7	33.2	35.5

# TER, TIR, THR & TMR EXTENDED CAPACITIES IN TONS

<b>R134a</b>	EVAPORATOR TEMP.																							
	+ 50°F					+ 40°F					+ 20°F					0°F								
	PRESSURE DROP ACROSS VALVE – PSI																							
VALVE	60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175
TER16M	15.9	18.4	20.5	22.9	25.1	27.1	15.6	18.0	20.1	22.5	24.6	26.6	14.9	17.2	19.2	21.5	23.5	25.4	13.2	15.2	17.0	19.0	20.8	22.5
TER19M	18.3	21.2	23.7	26.5	29.0	31.3	18.0	20.7	23.2	25.9	28.4	30.7	17.2	19.8	22.2	24.8	27.2	29.3	15.2	17.5	19.6	21.9	24.0	25.9
TER25M	24.5	28.2	31.6	35.3	38.7	41.8	23.9	27.7	30.9	34.6	37.9	40.9	22.9	26.4	30.0	33.0	36.2	39.1	20.2	23.4	26.1	29.2	32.0	34.6
TER31M	30.6	35.3	39.5	44.1	48.3	52.2	29.9	34.6	38.6	43.2	47.3	51.1	28.6	33.0	36.9	41.3	45.2	48.9	25.3	29.2	32.6	36.5	40.0	43.2
TIR45M	42.8	49.4	55.2	61.8	67.7	73.1	41.9	48.4	54.1	60.5	66.2	71.6	40.1	46.3	51.7	57.8	63.3	68.4	35.4	40.9	45.7	51.1	56.0	60.5
THR55M	47.0	54.3	60.8	68.0	74.4	80.4	46.1	53.2	59.5	66.5	72.9	78.7	44.1	50.9	56.9	63.6	69.7	75.3	38.9	44.9	50.3	56.2	61.6	66.5
THR68M	57.1	66.0	73.8	82.5	90.4	97.6	55.9	64.6	72.3	80.8	88.5	95.5	53.6	61.8	69.1	77.3	84.6	91.4	47.3	54.6	61.0	68.3	74.8	80.8
TMR68M	67.2	77.6	86.8	97.1	106.3	114.8	65.8	76.0	85.0	95.0	104.1	112.4	63.0	72.7	81.3	90.9	99.5	107.5	55.6	64.2	71.8	80.3	88.0	95.0

<b>R134a</b>	EVAPORATOR TEMP.																							
	– 10°F					– 20°F					– 30°F					– 40°F								
	PRESSURE DROP ACROSS VALVE – PSI																							
VALVE	80	100	125	150	175	200	80	100	125	150	175	200	80	100	125	150	175	200	80	100	125	150	175	200
TER16M	12.6	14.0	15.7	17.2	18.6	19.8	10.3	11.5	12.8	14.1	15.2	16.2	8.3	9.3	10.4	11.4	12.3	13.1	6.6	7.4	8.3	9.1	9.8	10.5
TER19M	14.5	16.2	18.1	19.8	21.4	22.9	11.8	13.2	14.8	16.2	17.5	18.7	9.6	10.7	12.0	13.1	14.2	15.1	7.7	8.6	9.6	10.5	11.3	12.1
TER25M	19.3	21.6	24.1	26.4	28.6	30.5	15.8	17.7	19.7	21.6	23.4	25.0	12.8	14.3	16.0	17.5	18.9	20.2	10.2	11.4	12.8	14.0	15.1	16.1
TER31M	24.1	27.0	30.2	33.1	35.7	38.2	19.7	22.1	24.7	27.0	29.2	31.2	16.0	17.9	20.0	21.9	23.6	25.2	12.8	14.3	15.9	17.5	18.9	20.2
TIR45M	33.8	37.8	42.2	46.3	50.0	53.4	27.6	30.9	34.5	37.8	40.9	43.7	22.3	25.0	27.9	30.6	33.1	35.3	17.9	20.0	22.3	24.4	26.4	28.2
THR55M	37.2	41.6	46.5	50.9	55.0	58.7	30.4	34.0	38.0	41.7	44.9	48.1	24.6	27.5	30.7	33.7	36.3	38.9	19.7	22.0	24.6	26.9	29.1	31.1
THR68M	45.1	50.5	56.4	61.8	66.7	71.3	36.9	41.3	46.2	50.6	54.6	58.4	29.8	33.4	37.3	40.9	44.1	47.2	23.9	26.7	29.8	32.6	35.3	37.7
TMR68M	53.1	59.4	66.4	72.7	78.5	83.9	43.4	48.6	54.3	59.5	64.2	68.7	35.1	39.3	43.9	48.1	51.9	55.5	28.1	31.4	35.1	38.4	41.5	44.4

<b>R22</b>	EVAPORATOR TEMP.																							
	+ 50°F					+ 40°F					+ 20°F					0°F								
	PRESSURE DROP ACROSS VALVE – PSI																							
VALVE	75	100	125	150	175	200	75	100	125	150	175	200	75	100	125	150	175	200	100	125	150	175	200	225
TER22H	19.3	22.3	24.9	27.3	29.4	31.5	19.1	22.0	24.6	26.9	29.1	31.1	18.6	21.4	24.0	26.3	28.4	31.1	17.4	19.4	21.3	23.0	24.6	26.1
TER26H	22.8	26.3	29.4	32.2	34.8	37.2	22.5	26.0	29.1	31.8	34.4	36.8	21.9	25.3	28.3	31.0	33.5	35.8	20.5	23.0	25.2	27.2	29.0	30.8
TER35H	30.7	35.4	39.6	43.4	46.8	50.1	30.3	35.0	39.1	42.9	46.3	49.5	29.5	34.1	38.1	41.8	45.1	48.2	27.6	30.9	33.9	36.6	39.1	41.5
TER45H	39.4	45.5	50.9	55.8	60.2	64.4	39.0	45.0	50.3	55.1	59.5	63.6	38.0	43.9	49.0	53.7	58.0	62.0	35.5	39.7	43.5	47.0	50.3	53.3
TIR55H	48.2	55.6	62.2	68.2	73.6	78.7	47.6	55.0	61.5	67.4	72.8	77.8	46.4	53.6	59.9	65.6	70.9	75.8	43.5	48.6	53.2	57.5	61.4	65.2
THR75H	61.3	70.8	86.7	93.7	100.2	103.0	60.6	70.0	78.3	85.8	92.6	99.0	59.1	68.2	76.3	83.5	90.2	96.5	55.3	61.8	67.7	73.2	78.2	83.0
THR100H	74.5	86.0	105.3	113.7	121.6	125.1	73.6	85.0	95.0	104.1	112.5	120.2	71.7	82.8	92.7	101.4	109.6	117.1	67.2	75.1	82.2	88.8	94.9	100.7
TMR100H	87.6	101.2	123.9	133.8	143.1	147.2	86.6	100.0	111.8	124.5	132.3	144.4	84.4	97.4	109.0	119.3	128.9	137.8	79.0	88.3	96.7	104.5	111.7	118.5

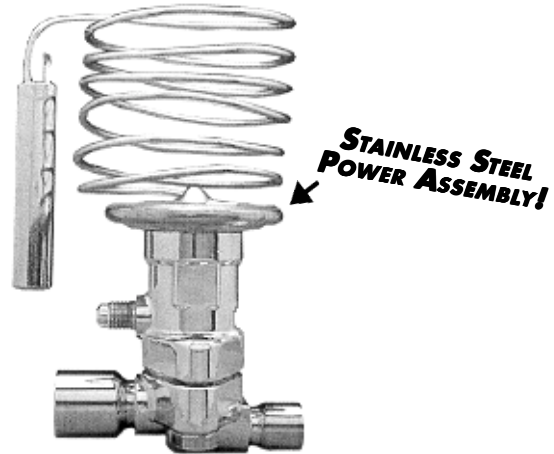
<b>R22</b>	EVAPORATOR TEMP.																							
	– 10°F					– 20°F					– 30°F					– 40°F								
	PRESSURE DROP ACROSS VALVE – PSI																							
VALVE	125	150	175	200	225	250	125	150	175	200	225	250	150	175	200	225	250	275	150	175	200	225	250	275
TER22H	16.4	17.9	19.3	20.7	21.9	23.1	13.8	15.2	16.4	17.5	18.6	19.6	12.7	13.7	14.6	15.5	16.4	17.2	10.6	11.5	12.3	13.0	13.7	14.4
TER26H	19.3	21.2	22.9	24.5	25.9	27.3	16.3	17.9	19.3	20.7	21.9	23.1	15.0	16.2	17.3	18.3	19.3	20.3	12.6	13.6	14.5	15.4	16.2	17.0
TER35H	26.0	28.5	30.8	32.9	34.9	36.8	22.0	24.1	26.0	27.8	29.5	31.1	20.2	21.8	23.3	24.7	26.0	27.3	16.9	18.3	19.5	20.7	21.8	22.9
TER45H	33.5	36.7	39.6	42.3	44.9	47.3	28.3	31.0	33.5	35.8	38.0	40.0	25.9	28.0	29.9	31.8	33.4	35.1	21.7	23.5	25.1	26.6	28.0	29.4
TIR55H	40.9	44.8	48.4	51.7	54.9	57.8	34.6	37.9	40.9	43.7	46.4	48.9	31.7	34.2	36.6	38.8	40.9	42.9	26.6	28.7	30.7	32.5	34.3	36.0
THR75H	52.1	57.0	61.6	65.8	69.9	73.6	44.0	48.2	52.1	55.7	59.0	62.2	40.3	43.5	46.6	49.4	52.1	54.6	33.8	36.5	39.0	41.4	43.6	45.8
THR100H	63.2	69.2	74.8	79.9	84.8	89.3	53.5	58.6	63.2	67.6	71.7	75.6	49.0	52.9	56.5	60.0	63.2	66.3	41.1	44.3	47.3	50.2	53.0	55.6
TMR100H	74.4	81.4	88.0	94.0	99.8	105.1	62.9	68.9	74.4	79.5	84.3	88.9	57.6	62.2	66.5	70.6	74.4	78.0	48.3	52.1	55.7	59.1	62.3	65.4

<b>R404A/ R507</b>	EVAPORATOR TEMP.																							
	+ 50°F					+ 40°F					+ 20°F					0°F								
	PRESSURE DROP ACROSS VALVE – PSI																							
VALVE	100	125	150	175	200	225	100	125	150	175	200	225	125	150	175	200	225	250	150	175	200	225	250	275
TER14R	14.3	16.0	17.5	18.9	20.2	21.5	14.0	15.7	17.1	18.5	19.8	21.0	14.9	16.3	17.6	18.9	20.0	21.1	15.1	16.3	17.4	18.5	19.5	20.4
TER16R	16.4	18.3	20.0	21.6	23.1	24.5	16.0	17.9	19.6	21.2	22.6	24.0	17.0	18.7	20.2	21.6	22.9	24.1	17.2	18.6	19.9	21.1	22.3	23.3
TER21R	21.5	24.0	26.3	28.4	30.4	32.2	21.0	23.5	25.7	27.8	29.7	31.5	22.4	24.5	26.5	28.3	30.0	31.6	22.6	24.5	26.1	27.7	29.2	30.7
TER27R	27.6	30.9	33.8	36.5	39.0	41.4	27.0	30.2	33.1	35.7	38.2	40.5	28.7	31.5	34.0	36.4	38.6	40.6	29.1	31.4	33.6	35.6	37.6	39.4
TIR37R	37.8	42.3	46.3	50.0	53.5	56.7	37.0	41.4	45.3	48.9	52.3	55.5	39.4	43.1	46.6	49.8	52.8	55.7	39.9	43.1	46.1	48.4	51.5	54.0
THR48R	42.9	48.0	52.6	56.8	60.7	64.4	42.0	47.0	51.5	55.5	59.4	63.0	44.7	49.0	50.8	56.6	60.0	63.2	45.3	48.9	52.3	55.4	58.5	61.3
THR60R	53.2	58.3	63.8	68.9	73.7	78.2	51.0	57.0	62.5	67.5	72.2	76.5	53.3	59.5	61.7	68.7	72.8	76.8	55.0	59.3	63.5	67.3	71.0	74.5
TMR60R	62.3	68.6	75.1	81.1	86.7	92.0	60.0	67.1	73.5	79.4	84.9	90.0	63.9	70.0	72.6	80.8	85.7	90.3	64.7	69.8	74.7	79.2	83.5	87.6

<b>R404A/ R507</b>	EVAPORATOR TEMP.																							
	– 10°F					– 20°F					– 30°F					– 40°F								
	PRESSURE DROP ACROSS VALVE – PSI																							
VALVE	150	175	200	225	250	275	175	200	225	250	275	300	175	200	225	250	275	300	175	200	225	250	275	300
TER14R	14.6	15.8	16.9	17.9	18.9	19.8	15.0	16.1	17.0	18.0	18.8	19.7	12.0	12.9	13.7	14.4	15.1	15.8	9.7	10.3	10.9	11.5	12.1	12.6
TER16R	16.7	18.0	19.3	20.4	21.6	22.6	17.2	18.4	19.5	20.5	21.5	2												

# TLE THERMO® EXPANSION VALVE

TLE Thermo Valves have preset factory superheat and feature Bi-Directional capability for reduced system complexity and lower operating costs. A single TLE can replace two conventional expansion valves and two check valves. Take-A-Part construction improves serviceability with replaceable/interchangeable parts. TLE valves do not have an external superheat adjustment.



## FEATURES

- ☆ Controls over wide range of applications
- ☆ Bi-Flow capability ideal for packaged heat pump applications (external equalizer required)
- ☆ Unique internal construction insures smooth and accurate superheat control with refrigerant flow in either direction through the valve
- ☆ CA charge meets compressor manufacturer's recommended superheat specifications for cooling and heating modes of heat pumps as well as straight air-conditioning service
- ☆ Nineteen bolt-on body flanges available in numerous SAE or ODF connection sizes and angle and straight-through configurations

NOTE: Capscrew Torque = 300 in. lbs.

VALVE TYPE	R-22 Tons @ 100 psi Δ Pressure	LINE CONNECTIONS	REMOTE BULB TUBING LENGTH	TYPE EXTERNAL EQUALIZER
TLE1/2HCA	1/2			
TLE1HCA	1	SAE	5'	
TLE2HCA	2	OR	STANDARD	1/4" SAE
TLE3HCA	3	ODF	OTHERS	STANDARD
TLE5HCA	5	ANGLE	AVAILABLE	
TLE7-1/2HCA	7-1/2	OR	ON	1/4" ODF
TLE10HCA	10	STRAIGHT-THRU	SPECIAL ORDER	AVAILABLE
TLE12HCA	12			

## TLE DIMENSIONAL DATA

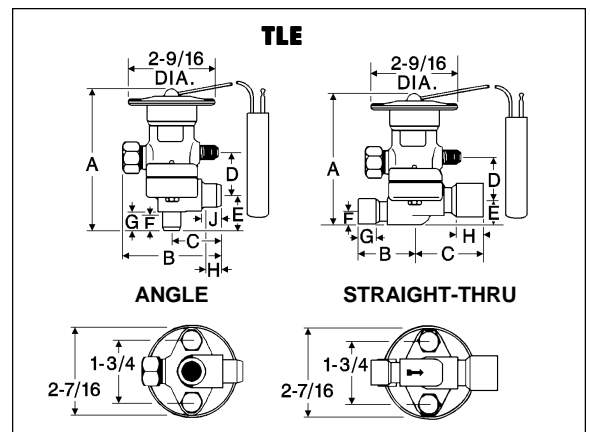
TLE STRAIGHT-THRU STYLE										
TLE VALVE®		DIMENSIONS								
INLET	OUTLET	A	B	C	D	E	F	G	H	J
5/8	1-1/8	4-55/64	1-5/8	2-1/2	1-11/32	1-23/32	45/64	17/32	29/32	—
7/8	1-1/8		2-1/2	3/4				29/32		
7/8	1-3/8		2-11/16	31/32						
TLE ANGLE STYLE										
ODF:ODM	ODF:ODM	A	B	C	D	E	F	G	H	J
5/8:7/8	7/8:1-1/8	5-1/32	3-15/32	2	1-11/32	1-27/32	13/16	1-1/16	1	1-1/8

®Connections shown are standard sizes, consult ALCO for non-standard sizes.  
Allow 2-1/8" above valve for removal of power assembly.

VALVE NOMENCLATURE				
TL	E*	5	H	CA
Valve Series	External Equalizer (optional)	Nominal Capacity	Refrigerant Code H = R22	Charge Code
Example above: TLE 5 HCA				
*External equalizer required for bi-directional applications.				

## FIELD REPLACEMENT OF VALVE TYPES TL(E), TLX

For field replacement of valve types TLX & TL(E), substitute a valve type TCL(E) of equivalent tonnage and re-use the old body flange. This substitution provides a valve equal in performance with provision for external superheat adjustment and eliminates the need to remove the old flange. The TCL(E) requires a different cage assembly than that of the TL(E) or TLX.



NOTE: For TLE extended capacity tables, refer to TCLE extended capacity tables on page 42.

## REFRIGERANT LIQUID TEMPERATURE CORRECTION FACTORS

	Refrigerant Liquid Temperature °F														
	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
<b>R12 Correction Factor</b>	1.60	1.54	1.48	1.42	1.36	1.30	1.24	1.18	1.12	1.06	1.00	.94	.88	.82	.75
<b>R134a Correction Factor</b>	1.70	1.63	1.56	1.49	1.42	1.36	1.29	1.21	1.14	1.07	1.00	.93	.85	.78	.71
<b>R22 Correction Factor</b>	1.56	1.51	1.45	1.40	1.34	1.29	1.23	1.17	1.12	1.06	1.00	.94	.88	.82	.76
<b>R404A/R507 Correction</b>	2.00	1.90	1.80	1.70	1.60	1.50	1.40	1.30	1.20	1.10	1.00	.90	.80	.70	.50

These factors include corrections for liquid refrigerant density and net refrigerating effect and are based on an average evaporator temperature of 0°F. However, they may be used for any evaporator temperature from -40°F to +40°F since the variation in the actual factors across this range is insignificant.

## ORDERING INFORMATION FOR T-SERIES VALVES

### TCL INTERNAL EQUALIZED, 5 FT CAP TUBE LENGTH (STANDARD PACK 12)

VALVE DESCRIPTION					
R-12	PCN	R-22	PCN	R-502	PCN
TCL ¼ FC	N/A	TCL ½ HC	N/A	TCL ¼ RC	N/A
TCL ½ FC	N/A	TCL 1 HC	N/A	TCL ½ RC	N/A
TCL 1 FC	N/A	TCL 2 HC	N/A	TCL 1 RC	055102
TCL 2 FC	N/A	TCL 3 HC	N/A	TCL 2 RC	N/A
TCL 3 FC	055103	TCL 5 HC	N/A	TCL 3 RC	N/A

**NOTE:**

T-Series does not include flange.

### TCLE, TJLE & TJRE EXTERNAL EQUALIZED — SAE EXTERNAL 5 FT CAP TUBE LENGTH (STANDARD PACK 12)

VALVE DESCRIPTION					
R-12	PCN	R-22	PCN	R-502	PCN
TCLE ¼ FC	N/A	TCLE ½ HC	N/A	TCLE ¼ RC	N/A
TCLE ½ FC	054413	TCLE 1 HC	062884	TCLE ½ RC	N/A
TCLE 1 FC	052940	TCLE 2 HC	061724	TCLE 1 RC	N/A
TCLE 2 FC	052941	TCLE 3 HC	054395	TCLE 2 RC	061215
TCLE 3 FC	052942	TCLE 5 HC	054399	TCLE 3 RC	055501
TCLE 4 FC	052943	TCLE 7½ HC	054401	TCLE 4½ RC	N/A
TCLE 6½ FC	052944	TCLE 10 HC	054404	TCLE 7 RC	N/A
TCLE 7½ FC	052945	TCLE 12 HC	060854	TCLE 8 RC	063501
TJLE 7 FC*	055686	TJLE 11 HC*	060855	TJLE 7 RC*	N/A
TJLE 8 FC*	055104	TJLE 14 HC*	060856	TJLE 9 RC*	N/A
TJRE 8 FC	N/A	TJRE 14 HC	060857	TJRE 9 RC	N/A
TJRE 11 FC	055105	TJRE 18 HC	060858	TJRE 12 RC	N/A

**Alternate Refrigerant Charge Codes**

Refrigerant	Code
R134a	M
R507	R
R404A	R
R402A	R
MP39	X

**\* TJLE NEW NOMENCLATURE**

	NEW	OLD
R-12	TJLE 7	TJLE 800
	TJLE 8	TJLE 1100
R-22	TJLE 11	TJLE 1400
	TJLE 14	TJLE 1800
R-502	TJLE 7	TJLE 900
	TJLE 9	TJLE 1200

### TER, TIR & THR 10 FT CAP TUBE LENGTH

VALVE DESCRIPTION					
R-12	PCN	R-22	PCN	R-502	PCN
TER 13 FC	060781	TER 22 HC	061673	TER 14 RC	N/A
TER 15 FC	055191	TER 26 HC	061674	TER 16 RC	N/A
TER 20 FC	055109	TER 35 HC	061675	TER 21 RC	N/A
TER 25 FC	055111	TER 45 HC	061676	TER 27 RC	N/A
TIR 35 FC	N/A	TIR 55 HC	061677	TIR 37 RC	N/A
THR 45 FC	N/A	THR 75 HC	N/A	THR 48 RC	N/A
THR 55 FC	055114	THR 100 HC	062036	THR 60 RC	N/A

# ORDERING INFORMATION FOR T-SERIES VALVES (CONT'D)

## NOTE

TCL/TCLE Remote Bulb Tubing Length

**R-12 (FC) = 30"**

1/4 thru 3 ton

**R-22 (HC) = 30"**

1/2 thru 3 ton

**R-502 (RC) = 30"**

1/4 thru 3 ton

**TER, TIR & THR**

**5 FT Cap Tube Length**

## NOTE:

T-Series does not include flange.

## Alternate Refrigerant Charge Codes

Refrigerant	Code
R134a	M
R507	R
R404A	R
R402A	R
MP39	X

## TCL INTERNAL EQUALIZED, 30" CAP TUBE LENGTH

(STANDARD PACK 12)

VALVE DESCRIPTION					
R-12	PCN	R-22	PCN	R-502	PCN
TCL ¼ FC	—	TCL ½ HC	—	TCL ¼ RC	—
TCL ½ FC	—	TCL 1 HC	—	TCL ½ RC	—
TCL 1 FC	—	TCL 2 HC	—	TCL 1 RC	—
TCL 2 FC	—	TCL 3 HC	—	TCL 2 RC	—
TCL 3 FC	—	—	—	TCL 3 RC	—

## TCLE EXTERNAL EQUALIZED — SAE EXTERNAL 30" CAP TUBE LENGTH

(STANDARD PACK 12)

VALVE DESCRIPTION					
R-12	PCN	R-22	PCN	R-502	PCN
TCLE ¼ FC	060765	TCLE ½ HC	060768	TCLE ¼ RC	060766
TCLE ½ FC	060767	TCLE 1 HC	060772	TCLE ½ RC	060770
TCLE 1 FC	060771	TCLE 2 HC	060775	TCLE 1 RC	060773
TCLE 2 FC	060774	TCLE 3 HC	060778	TCLE 2 RC	060776
TCLE 3 FC	060777	N/A	N/A	TCLE 3 RC	060779

## TER, TIR & THR 5 FT CAP TUBE LENGTH

VALVE DESCRIPTION					
R-12	PCN	R-22	PCN	R-502	PCN
TER 13 FC	060781	TER 22 HC	060784	TER 14 RC	060788
TER 15 FC	060782	TER 26 HC	060785	TER 16 RC	060789
TER 20 FC	060783	TER 35 HC	060786	TER 21 RC	060790
TER 25 FC	N/A	TER 45 HC	060787	TER 27 RC	060791
TIR 35 FC	060862	TIR 55 HC	060859	TIR 37 RC	N/A
THR 45 FC	060863	THR 75 HC	060860	THR 48 RC	N/A
THR 55 FC	060864	THR 100 HC	060861	THR 60 RC	N/A

## REPLACEMENT CAP SCREW KITS

PCN	DESCRIPTION	CONTAINS SCREW #	PCS. PER PKG.**
054569	KT-30021	PS-286-5	10
054570	KT-30022	PS-168-5	10
054571	KT-30023	PS-259	10
054572	KT-30024	PS-370	10
054573	KT-30025	PS-514-5	10
054574	KT-30026	PS-517-5	10

\*\* 10 PC. KITS ARE IN POLY BAGS FOR HANGING ON PEG BOARD.



# ORDERING INFORMATION FOR T-SERIES VALVES (CONT'D)

## TL(E) SERIES

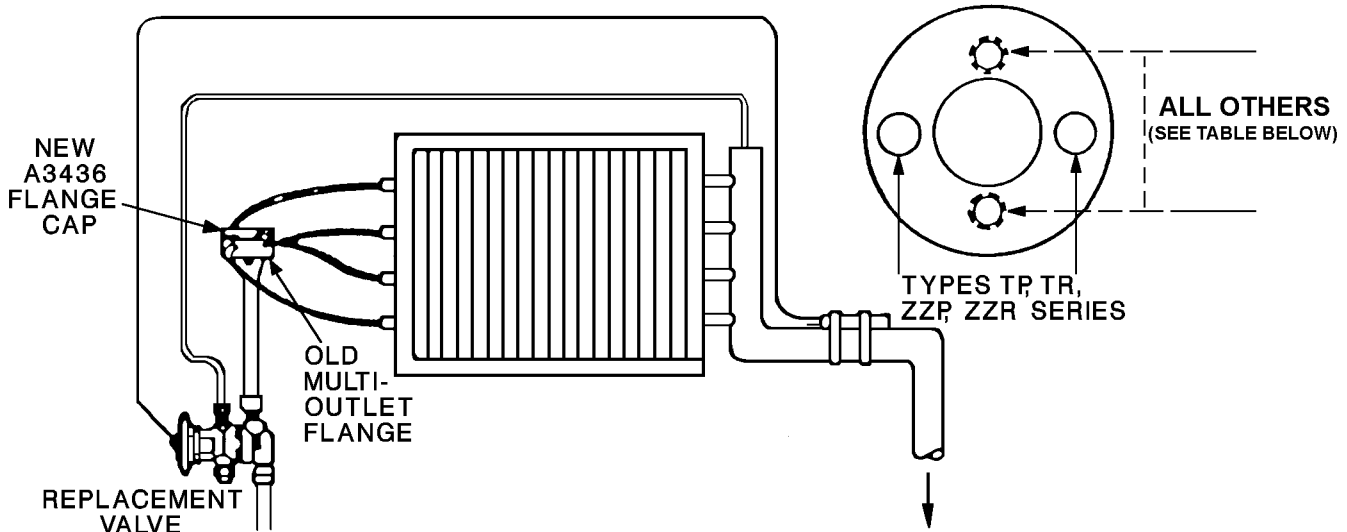
**NOTE:**  
TL(E) Series does  
not include flange.

VALVE LESS FLANGE*	PCN	EQUALIZER TYPE	REFRIGERANT
TL ½ HW	N/A	INTERNAL	<b>R-22 MOP</b>
TL 1 HW	N/A		
TL 2 HW	N/A		
TL 3 HW	047005		
TL 5 HW	N/A		
TLE ½ HW	N/A	¼" SAE EXTERNAL	
TLE 1 HW	N/A		
TLE 2 HW	042591		
TLE 3 HW	041734		
TLE 5 HW	054793		
TLE 7½ HW	054794		
TLE 10 HW	055125		
TLE 12 HW	054795		

\* ALSO AVAILABLE WITH "HCA" CHARGE FOR HEAT PUMP AND AIR-CONDITIONING APPLICATIONS.

# EXPANSION VALVE ACCESSORIES

## REPLACEMENT FLANGE CAP FOR OBSOLETE ALCO MULTI-OUTLET VALVES



Occasionally it becomes necessary to replace out-dated or obsolete ALCO multi-outlet Thermo® Valves. Where replacements are not readily available, the following procedure may be followed.

1. Remove multi-outlet cage and power assembly, save capscrews.
2. Install flange cap A3436 and flange gasket A625-A4.
3. Move backward a few inches, cut the liquid line, and install a standard externally equalized single outlet Take-A-Part Thermo® Valve properly selected for an equivalent capacity and refrigerant to that of the old multi-outlet valve.

### REPLACEMENT FLANGE CAP FOR MULTI-OUTLET THERMO® VALVES

OBSOLETE VALVE TYPES	FLANGE CAP #	PCN
TN, TO, TOC, TU, TV, TS, TP, TR	A3436	026516
ZZU, ZZO, ZZS, ZZP, ZZR		

4. Attach the remote bulb of the new valve and connect the external equalizer in a standard manner.

The capped multi-outlet flange effectively serves as an adequate refrigerant distributor.

For additional information, contact your nearest ALCO wholesaler, ALCO representative or the ALCO Application Engineering Department.

# TF(E) THERMO® EXPANSION VALVE

TF(E) thermostatic expansion valves feature a balanced port construction which provides stable and accurate superheat control over a wide range of operating conditions. The ability to control superheat during both cooling and heating modes makes the TF(E) ideal for heat pump applications.

## FEATURES

- ☆ Replaceable power element for added serviceability
- ☆ External superheat adjustment provides greater application flexibility
- ☆ Bi-Flow capability ideal for packaged heat pump applications (external equalizer required)
- ☆ ODF connections for easy installation
- ☆ Mass spectrometer tested to ensure less than 0.10 oz/year external leakage rate
- ☆ External equalizer to satisfy the broadest possible range of applications
- ☆ Balanced port construction compensates for changes in operating pressures due to varying ambients, gas defrost, heat reclaim, or widely varying evaporator loads

**STAINLESS STEEL  
POWER ASSEMBLY!**



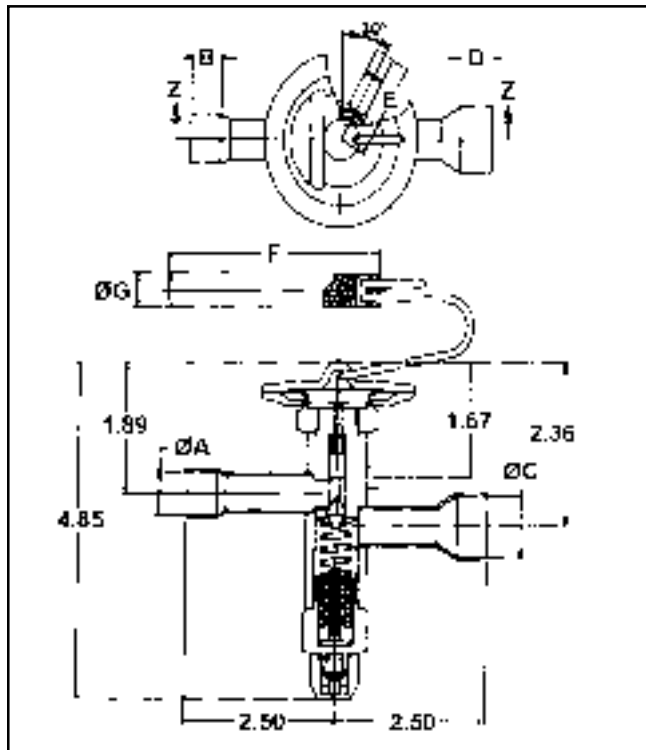
## SPECIFICATIONS

Maximum working pressure: 450 psig

R134a (M)	R22 (H)	R502, R404A, R507 (S/P)
6	8	5
8	10	7
10	12	9
15	20	14

VALVE NOMENCLATURE						
TF	E	S	10	H	CA	3/8 x 1/2
Valve Series	External Equalizer	ODF Connection	Nominal Capacity	Refrigerant Code H = R22	Charge Code	ODF connection
Example above: TFE10 HCA 3/8 x 1/2 ODF						

## TFE DIMENSIONAL DATA



CONNECTIONS		INLET		OUTLET		EQUALIZER	
INLET	OUTLET	ØA±.002	↓B MIN.	ØC±.002	↓D MIN.	E: 1/4 ODF	E: SAE
1/4 ODF	3/8 ODF	.254	.310	.379	.310	1.703	1.65
	1/2 ODF			.504	.370		
	5/8 ODF			.629	.500		
3/8 ODF	3/8 ODF	.379	.310	.379	.310		
	1/2 ODF			.504	.370		
	5/8 ODF			.629	.500		
	7/8 ODF			.879	.760		
1/2 ODF	1/2 ODF	.504	.370	.504	.370		
	5/8 ODF			.629	.500		
	7/8 ODF			.879	.760		
5/8 ODF	5/8 ODF	.629	.500	.629	.500		
	7/8 ODF			.879	.760		
	1-1/8 ODF			1.129	.906		
7/8 ODF	7/8 ODF	.879	.760	.879	.760		
	1-1/8 ODF			1.129	.906		

1/4" ODF	Ø.254±.002	↓.310 MIN.
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CHARGE	TUBING LENGTH	F	ØG
C, A, Z	2', 2-1/2', 5'	3-1/16"	.631±.008
	10'	3-9/16"	
	15', 20', 30'	4-13/16"	
	40', 50'	6-3/16"	.756±.008
CA, AA	2-1/2', 5', 10'	2-5/16"	

## TFE EXTENDED CAPACITIES IN TONS R134a

VALVE	EVAPORATOR TEMP.																							
	+ 50°F								+ 40°F								+ 20°F							
	PRESSURE DROP ACROSS VALVE – PSI																							
	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225
TFE 6 M	5.88	6.79	7.59	8.49	9.30	10.04	10.74	11.39	5.76	6.65	7.43	8.31	9.10	9.83	10.51	11.51	5.51	6.36	7.11	7.95	8.70	9.40	10.05	10.66
TFE 8 M	8.05	9.29	10.39	11.62	12.73	13.75	14.70	15.59	7.88	9.10	10.18	11.38	12.46	13.46	14.39	15.26	7.54	8.70	9.73	10.88	11.92	12.87	13.76	14.59
TFE 10 M	9.99	11.54	12.90	14.42	15.80	17.07	18.24	19.35	9.79	11.30	12.63	14.12	15.47	16.71	17.87	18.95	9.36	10.80	12.08	13.50	14.79	15.98	17.08	18.12
TFE 15 M	15.26	17.62	19.70	22.03	24.13	26.06	27.86	29.55	14.94	17.25	19.29	21.57	23.63	25.52	27.28	28.94	14.29	16.50	18.44	20.62	22.59	24.40	26.08	27.67

VALVE	EVAPORATOR TEMP.																							
	0°F								- 20°F								- 40°F							
	PRESSURE DROP ACROSS VALVE – PSI																							
	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225
TFE 6 M	4.86	5.62	6.28	7.02	7.69	8.31	8.88	9.42	3.29	3.80	4.25	4.75	5.20	5.62	6.00	6.37	2.12	2.45	2.74	3.07	3.36	3.63	3.88	4.11
TFE 8 M	6.66	7.69	8.60	9.61	10.53	11.37	12.16	12.90	4.50	5.20	5.81	6.50	7.12	7.69	8.22	8.72	2.91	3.36	3.75	4.20	4.60	4.97	5.31	5.63
TFE 10 M	8.27	9.55	10.67	11.93	13.07	14.12	15.09	16.01	5.59	6.45	7.22	8.07	8.84	9.55	10.21	10.82	3.61	4.17	4.66	5.21	5.71	6.17	6.59	6.99
TFE 15 M	12.62	14.58	16.30	18.22	19.96	21.56	23.05	24.45	8.54	9.86	11.02	12.32	13.50	14.58	15.58	16.53	5.51	6.37	7.12	7.96	8.72	9.42	10.07	10.68

## TFE EXTENDED CAPACITIES IN TONS R22

VALVE	EVAPORATOR TEMP.																							
	+ 50°F								+ 40°F								+ 20°F							
	PRESSURE DROP ACROSS VALVE – PSI																							
	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225
TFE 8 H	6.29	7.26	8.11	9.07	9.94	10.73	11.48	12.17	6.21	7.17	8.02	8.97	9.82	10.61	11.34	12.03	6.06	6.99	7.82	8.74	9.57	10.34	11.06	11.73
TFE 10 H	8.60	9.93	11.11	12.42	13.60	14.69	15.71	16.66	8.50	9.82	10.98	12.28	13.45	14.52	15.53	16.47	8.29	9.57	10.70	11.96	13.11	14.16	15.13	16.05
TFE 12 H	10.68	12.33	13.79	15.42	16.89	18.24	19.50	20.68	10.56	12.19	13.63	15.24	16.69	18.03	19.28	20.45	10.29	11.88	13.29	14.85	16.27	17.58	18.79	19.93
TFE 20 H	16.31	18.83	21.06	23.54	25.79	27.86	29.78	31.59	16.12	18.62	20.81	23.27	25.49	27.54	29.44	31.22	15.71	18.15	20.29	22.68	24.85	26.84	28.69	30.43

VALVE	EVAPORATOR TEMP.																							
	0°F								- 20°F								- 40°F							
	PRESSURE DROP ACROSS VALVE – PSI																							
	80	100	125	150	175	200	225	250	80	100	125	150	175	200	225	250	80	100	125	150	175	200	225	250
TFE 8 H	5.49	6.34	7.08	7.92	8.68	9.37	10.02	10.63	3.81	4.39	4.91	5.49	6.02	6.50	6.95	7.37	2.53	2.92	3.26	3.65	3.99	4.31	4.61	4.89
TFE 10 H	7.51	8.67	9.70	10.84	11.88	12.83	13.71	14.55	5.21	6.01	6.72	7.52	8.24	8.90	9.51	10.09	3.46	3.99	4.46	4.99	5.47	5.91	6.31	6.70
TFE 12 H	9.33	10.77	12.04	13.46	14.74	15.93	17.03	18.06	6.47	7.47	8.35	9.33	10.22	11.04	11.81	12.52	4.29	4.96	5.54	6.20	6.79	7.33	7.84	8.31
TFE 20 H	14.24	16.44	18.38	20.55	22.52	24.32	26.00	27.58	9.87	11.40	12.75	14.25	15.61	16.86	18.03	19.12	6.56	7.57	8.46	9.46	10.37	11.20	11.97	12.70

## TFE EXTENDED CAPACITIES IN TONS R404A/R507

VALVE	EVAPORATOR TEMP.																							
	+ 50°F								+ 40°F								+ 20°F							
	PRESSURE DROP ACROSS VALVE – PSI																							
	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225	60	80	100	125	150	175	200	225
TFE 5 S	4.20	4.85	5.42	6.06	6.54	7.18	7.67	8.14	4.10	4.73	5.29	5.91	6.48	7.00	7.48	7.94	3.88	4.47	5.00	5.59	6.13	6.62	7.08	7.50
TFE 7 S	5.75	6.64	7.43	8.30	9.09	9.82	10.50	11.14	5.61	6.48	7.24	8.10	8.87	9.58	10.24	10.86	5.30	6.13	6.85	7.66	8.39	9.06	9.69	10.27
TFE 9 S	7.14	8.24	9.22	10.31	11.29	12.19	13.04	13.83	6.96	8.04	8.99	10.05	11.01	11.89	12.71	13.49	6.59	7.60	8.50	9.51	10.41	11.25	12.02	12.75
TFE 14 S	10.90	12.59	14.08	15.74	17.24	18.62	19.91	21.11	10.63	12.28	13.73	15.35	16.81	18.16	19.42	20.59	10.06	11.61	12.98	14.52	15.90	17.18	18.36	19.48

VALVE	EVAPORATOR TEMP.																							
	0°F								- 20°F								- 40°F							
	PRESSURE DROP ACROSS VALVE – PSI																							
	80	100	125	150	175	200	225	250	80	100	125	150	175	200	225	250	80	100	125	150	175	200	225	250
TFE 5 S	3.51	4.05	4.53	5.06	5.55	5.99	6.40	6.79	2.38	2.75	3.07	3.44	3.76	4.07	4.35	4.61	1.54	1.78	1.99	2.23	2.44	2.63	2.82	2.99
TFE 7 S	4.80	5.54	6.20	6.93	7.59	8.20	8.76	9.30	3.26	3.76	4.21	4.70	5.15	5.57	5.95	6.31	2.11	2.44	2.72	3.05	3.34	3.60	3.85	4.09
TFE 9 S	5.96	6.88	7.69	8.60	9.42	10.18	10.88	11.54	4.05	4.67	5.22	5.84	6.40	6.91	7.39	7.83	2.62	3.03	3.38	3.78	4.14	4.48	4.78	5.07
TFE 14 S	9.10	10.51	11.75	13.14	14.39	15.54	16.62	17.62	6.18	7.13	7.98	8.92	9.77	10.55	11.28	11.96	4.00	4.62	5.17	5.78	6.33	6.83	7.31	7.75

NOTE: Flow capacities are the same for reverse flow applications.

## ORDERING INFORMATION FOR TFE VALVES

VALVE SERIES	CAPACITY TONS	CONNECTIONS	PCN CHARGE HCA	REFRIGERANT
TFES	8	1/2 x 5/8 ODF S/T 6A	061710	R-22
		5/8 x 5/8 ODF S/T 6A	061611	
		5/8 x 7/8 ODF S/T 6A ODF EE	061608	
		5/8 x 7/8 ODF S/T 6A SAE EE	062370	
	10	1/2 x 7/8 ODF S/T 6A	062124	
		5/8 x 7/8 ODF S/T 4A	062347	
		5/8 x 7/8 ODF S/T 6A ODF EE	061610	
		5/8 x 7/8 ODF S/T 6A SAE EE	062371	
12	5/8 x 7/8 ODF S/T 6A	061609		
	5/8 x 7/8 ODF S/T 12A	062460		

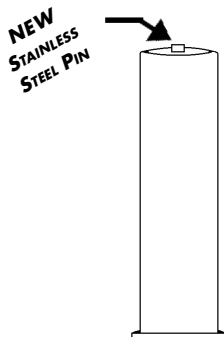
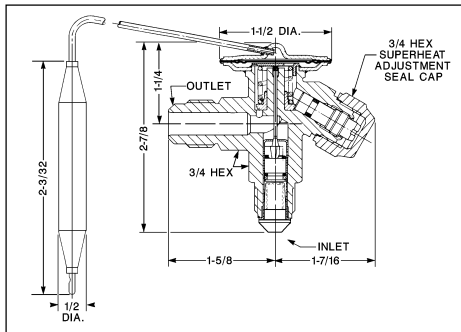
# TI THERMO® VALVE WITH INTERCHANGEABLE CARTRIDGES

TI Series Thermo Valves with interchangeable cages are designed to give the service technician a valve capable of changing capacity with the change of a cage. Simply change the easy-to-use cartridges to achieve desired capacity. The large diaphragm eliminates disturbances to the valve, while the TI controls your system's superheat.

## FEATURES

- ☆ Interchangeable cartridges
- ☆ Constant superheat across a wide application range
- ☆ Rugged stainless steel diaphragm
- ☆ Large diaphragm eliminates disturbances to the valve
- ☆ Wrench flats are provided for easy fastening or loosening of flare nuts
- ☆ Valve body is made of forged brass
- ☆ For use on Refrigerants R134a, R22, R404A & R507
- ☆ Inlet connection size is 3/8" SAE
- ☆ Outlet connection size is 1/2" SAE
- ☆ Maximum working pressure of 450 psig
- ☆ Maximum bulb temperature is 165°F
- ☆ Inlet strainer assembly

## TI DIMENSIONAL DATA



## ADJUSTMENT

TI Thermo® expansion valves are factory-set. This factory setting meets the installation requirements of most applications. The valves should be installed without altering the setting. If readjustment proves necessary (in exceptional cases, after some operating time), the setting can be changed by turning the adjustment stem:

- Turning the adjustment stem clockwise increases superheat by reducing the refrigerant flow rate
- Turning the adjustment stem counterclockwise decreases superheat by increasing the refrigerant flow rate
- The superheat will change approximately 7°F per turn of the adjustment stem

After adjusting, wait until the refrigeration system returns to stable operating conditions (a minimum of 30 minutes is preferred).

## ORDERING INFORMATION FOR TI/TIE SERIES

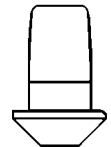
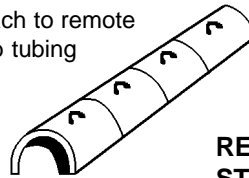
VALVE DESCRIPTION					
R-134a	PCN	R-22	PCN	R-404A/R-507	PCN
TI FC	054377	TI HC	054378	TI RC	054379

## EXTERNAL EQUALIZED

VALVE DESCRIPTION					
R-134a	PCN	R-22	PCN	R-404A/R-507	PCN
TIE FC	054380	TIE HC	054381	TIE RC	054382

## SNAP-ON CAGE IDENTIFIER

Attach to remote bulb tubing



## REPLACEABLE STRAINER

PART NO. X-22988-1

PCN	PART NUMBER	DESCRIPTION
046460	X-22988-1	TI/TIE REPLACEABLE STRAINER

**NOTE:** Not available with MOP.  
Not available with Z charge.

## TI INTERCHANGEABLE CAGES

NEW STAINLESS STEEL PIN	NEW STAINLESS STEEL PCN	OLD PLASTIC PIN	OLD PLASTIC PIN PCN	NOMINAL CAPACITY (TONS)		
				R-134a	R-22	R-404A/R-507
TIO-00X	064109	X-26740-00	N/A	1/20	1/8	1/10
TIO-000	064110	X-26740-0	054300	1/4	1/3	1/4
TIO-001	064111	X-26740-1	054301	1/2	3/4	1/2
TIO-002	064112	X-26740-2	054302	3/4	1	3/4
TIO-003	064113	X-26740-3	054303	1 1/4	2	1 1/2
TIO-004	064114	X-26740-4	054374	2	3	2
TIO-005	064115	X-26740-5	054375	2 1/2	4	2 1/2
TIO-006	064116	X-26740-6	054376	3	5	3

## TI EXTENDED CAPACITIES IN TONS R134a

VALVE CAGE		EVAPORATOR TEMP.																	
		+ 40°F						+ 20°F						0°F					
		PRESSURE DROP ACROSS VALVE – PSI																	
60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175		
TI(E)1/4M	0	.19	.22	.25	.27	.30	.32	.18	.21	.23	.26	.28	.30	.14	.16	.18	.20	.22	.24
TI(E)1/2M	1	.43	.49	.55	.62	.68	.74	.41	.47	.53	.60	.65	.70	.31	.36	.40	.45	.49	.53
TI(E)3/4M	2	.73	.84	.94	1.1	1.2	1.3	.70	.81	.90	1.0	1.1	1.2	.53	.61	.68	.76	.84	.90
TI(E)1-1/4M	3	1.2	1.4	1.5	1.7	1.9	2.1	1.2	1.4	1.5	1.7	1.9	2.1	.86	.99	1.1	1.2	1.4	1.5
TI(E)2M	4	1.9	2.2	2.5	2.7	3.0	3.2	1.8	2.1	2.3	2.6	2.8	3.1	1.4	1.6	1.8	2.0	2.2	2.4
TI(E)2-1/2M	5	2.4	2.8	3.1	3.5	2.8	4.1	2.3	2.6	3.0	3.3	3.6	3.9	1.7	2.0	2.2	2.4	2.7	2.9
TI(E)2-1/2M	6	3.1	3.6	4.0	4.5	4.9	5.3	2.6	3.0	3.4	3.7	4.1	4.4	2.0	2.3	2.6	2.9	3.2	3.4

## TI EXTENDED CAPACITIES IN TONS R22

VALVE CAGE		EVAPORATOR TEMP.																	
		+ 40°F						+ 20°F						0°F					
		PRESSURE DROP ACROSS VALVE – PSI																	
75	100	125	150	175	200	75	100	125	150	175	200	100	125	150	175	200	225		
TI(E)1/6H	0	.28	.32	.36	.40	.43	.46	.27	.31	.35	.38	.42	.45	.25	.28	.31	.34	.36	.38
TI(E)1/3H	1	.69	.80	.89	.98	1.0	1.1	.67	.78	.87	.95	1.0	1.1	.63	.70	.77	.83	.89	.94
TI(E)1/2H	2	1.2	1.3	1.5	1.6	1.8	1.9	1.1	1.3	1.4	1.6	1.7	1.8	1.0	1.2	1.3	1.4	1.5	1.6
TI(E)1H	3	1.8	2.1	2.4	2.6	2.8	3.0	1.8	2.1	2.3	2.5	2.7	2.9	1.7	1.9	2.0	2.2	2.4	2.5
TI(E)1-1/2H	4	3.0	3.5	3.9	4.3	4.6	4.9	2.9	3.4	3.8	4.2	4.5	4.8	2.7	3.0	3.3	3.6	3.9	4.1
TI(E)2H	5	3.7	4.2	4.7	5.2	5.6	6.0	3.6	4.1	4.6	5.0	5.4	5.8	3.3	3.7	4.1	4.4	4.7	5.0
TI(E)2-1/2H	6	4.2	4.9	5.5	6.0	6.5	6.9	4.1	4.8	5.3	5.8	6.3	6.7	3.8	4.3	4.7	5.1	5.4	5.8

VALVE CAGE		EVAPORATOR TEMP.																	
		– 10°F						– 20°F						– 40°F					
		PRESSURE DROP ACROSS VALVE – PSI																	
80	100	125	150	175	200	80	100	125	150	175	200	80	100	125	150	175	200		
TI(E)1/6H	0	.25	.27	.30	.32	.35	.35	.21	.23	.25	.27	.28	.30	.19	.20	.21	.23	.24	.25
TI(E)1/3H	1	.62	.67	.73	.78	.83	.87	.52	.57	.62	.66	.70	.74	.46	.50	.53	.56	.59	.62
TI(E)1/2H	2	1.0	1.1	1.2	1.3	1.4	1.4	.87	.95	1.0	1.1	1.2	1.2	.76	.82	.88	.93	.98	1.0
TI(E)1H	3	1.6	1.8	1.9	2.1	2.2	2.3	1.4	1.5	1.6	1.7	1.9	2.0	1.2	1.3	1.4	1.5	1.6	1.7
TI(E)1-1/2H	4	2.7	2.9	3.2	3.4	3.6	3.8	2.3	2.5	2.7	2.9	3.0	3.2	2.0	2.2	2.3	2.4	2.6	2.7
TI(E)2H	5	3.3	3.6	3.9	4.1	4.4	4.6	2.8	3.0	3.3	3.5	3.7	3.9	2.4	2.6	2.8	3.0	3.1	3.3
TI(E)2-1/2H	6	3.8	4.1	4.4	4.8	5.0	5.3	3.2	3.5	3.8	4.0	4.3	4.5	2.8	3.0	3.2	3.4	3.6	3.8

## TI EXTENDED CAPACITIES IN TONS R404A/R507

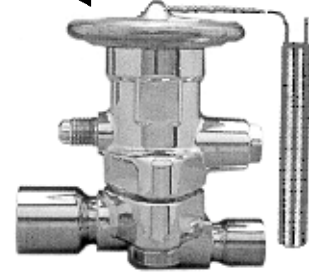
VALVE CAGE		EVAPORATOR TEMP.																	
		+ 40°F						+ 20°F						0°F					
		PRESSURE DROP ACROSS VALVE – PSI																	
100	125	150	175	200	225	125	150	175	200	225	250	150	175	200	225	250	275		
TI(E)1/6	0	.22	.24	.26	.29	.31	.33	.23	.25	.27	.29	.31	.33	.20	.21	.23	.24	.25	.27
TI(E)1/3	1	.51	.57	.62	.67	.72	.76	.54	.59	.64	.68	.73	.77	.46	.50	.53	.57	.60	.62
TI(E)1/2	2	.87	.98	1.1	1.2	1.2	1.3	.93	1.0	1.1	1.2	1.2	1.3	.79	.86	.92	.97	1.0	1.1
TI(E)1	3	1.4	1.6	1.7	1.8	2.0	2.1	1.5	1.6	1.7	1.9	2.0	2.1	1.2	1.4	1.4	1.5	1.6	1.7
TI(E)1-1/2	4	2.3	2.5	2.8	3.0	3.2	3.4	2.4	2.6	2.8	3.0	3.2	3.4	2.0	2.2	2.4	2.5	2.6	2.8
TI(E)2	5	2.8	3.1	3.4	3.6	3.9	4.1	2.9	3.2	3.5	3.7	3.9	4.2	2.5	2.7	2.9	3.1	3.2	3.4
TI(E)2-1/2	6	3.2	3.6	3.9	4.2	4.5	4.8	3.4	3.7	4.0	4.3	4.6	4.8	2.9	3.1	3.3	3.5	3.7	3.9

VALVE CAGE		EVAPORATOR TEMP.																	
		– 10°F						– 20°F						– 40°F					
		PRESSURE DROP ACROSS VALVE – PSI																	
150	175	200	225	250	275	175	200	225	250	275	300	200	225	250	275	300	325		
TI(E)1/6	0	.17	.18	.19	.20	.22	.23	.15	.16	.17	.18	.19	.20	.12	.13	.14	.14	.15	.16
TI(E)1/3	1	.39	.43	.45	.48	.51	.53	.36	.39	.41	.43	.45	.47	.29	.30	.32	.33	.35	.37
TI(E)1/2	2	.68	.73	.78	.83	.87	.92	.62	.66	.70	.74	.78	.81	.49	.52	.55	.58	.60	.63
TI(E)1	3	1.1	1.2	1.2	1.3	1.4	1.4	.98	1.0	1.1	1.2	1.2	1.3	.78	.83	.87	.92	.96	1.0
TI(E)1-1/2	4	1.8	1.9	2.0	2.2	2.3	2.4	1.6	1.7	1.8	1.9	2.0	2.1	1.3	1.4	1.4	1.5	1.6	1.6
TI(E)2	5	2.1	2.3	2.5	2.6	2.8	2.9	2.0	2.1	2.2	2.3	2.4	2.6	1.6	1.6	1.7	1.8	1.9	2.0
TI(E)2-1/2	6	2.5	2.7	2.8	3.0	3.2	3.3	2.3	2.4	2.6	2.7	2.8	3.0	1.8	1.9	2.0	2.1	2.2	2.3

# ZZ THERMO® EXPANSION VALVE FOR ULTRA LOW TEMPS

ZZ Series Thermo Valves for Ultra Low Temperature applications fit mechanical refrigeration systems used for cooling climatic environmental test chambers and cabinets (specifically where the desired evaporator temperature is below -40°F). They are used on altitude and space simulators, low-temp metallurgy cabinets, low temperature chambers, and low-temp cabinets for industrial product and biomedical testing.

**STAINLESS STEEL  
POWER ASSEMBLY!**



## FEATURES

- ☆ Take-A-Part construction for easy field service
- ☆ Interchangeable body flanges for any connection you need
- ☆ Improved internal construction extends valve life
- ☆ Contoured, durable power element for long life
- ☆ External equalizer standard
- ☆ Maximum working pressure 450 psig

VALVE NOMENCLATURE						
ZZ	C	6	B	G	125	1/2 x 5/8 ODF ANG
Valve Series	Model	Nominal Capacity (in tons)	Refrigerant Code B = R23	Charge Code	MOP	Connection size & style ODF or SAE, ANG = angle S/T = straight-thru
Example above: ZZC 6 BG125 1/2 x 5/8 ODF ANG						

- ☆ Exclusive cage bellows eliminates friction at low temperatures
- ☆ External superheat adjustment

The ZZ Series TEV is a precision device designed to regulate the flow of refrigerant liquid into an evaporator in exact proportion to the rate of evaporation of the refrigerant.

By being responsive to the temperature of the refrigerant gas leaving the evaporator (through remote bulb contact with the suction line) and the pressure in the evaporator (through the external equalizer connection), the TEV can control the refrigerant gas leaving the evaporator at a predetermined superheat with the proper superheat spring setting.

These valves are supplied only with external equalizer in order to avoid unnecessary build-up in operating superheat in low temperature applications. The ZZ external equalizer line should be connected to the suction line near the remote bulb location. When the external equalizer line is connected to a horizontal suction line, always make the connection at the

top of the suction line in order to avoid oil logging in the equalizer line.

For best performance, the ZZ valve must be selected for actual operating conditions including capacity, liquid temperature entering the valve, evaporator temperature, and pressure drop across the valve. Before making any valve selection, see ZZ extended capacity tables and dimensional diagrams.

**Ammonia Usage**—for direct expansion applications with evaporator temperatures below -40°F, Type ZZTG is used. These valves are identical to the TG Series, except the ZZTG cage assembly stem packing is replaced by a stainless steel bellows.

Contact ALCO's applications engineering department for complete selection information.

R23 VALVE TYPE	R22 VALVE TYPE	R508 VALVE TYPE	Standard Connections
ZZC 1BG	ZZC 3/4HZ	ZZC 1/4	3/8 ODF x 5/8 ODF
ZZC 2-1/2BG	ZZC 1-1/2HZ	ZZC 1/2	
ZZC 4BG	ZZC 2-1/2HZ	ZZC 1	
ZZC 6BG	ZZC 4HZ	ZZC 1-3/4	1/2 ODF x 5.8 ODF
ZZC 9BG	ZZC 6HZ	ZZC 2-1/2	
ZZC 13BG	ZZC 8HZ	ZZC 4-1/2	
ZZ ER 20BG			7/8 ODF x 1-1/8 ODM

**NOTE:** Nominal capacities shown here are based upon the following conditions:

**R23** evaporator temp = -40°F, liquid temp at valve inlet = 0°F, 150 psig pressure drop across valve

**R22** evaporator temp = -40°F, liquid temp at valve inlet = 20°F, 150 psig pressure drop across valve

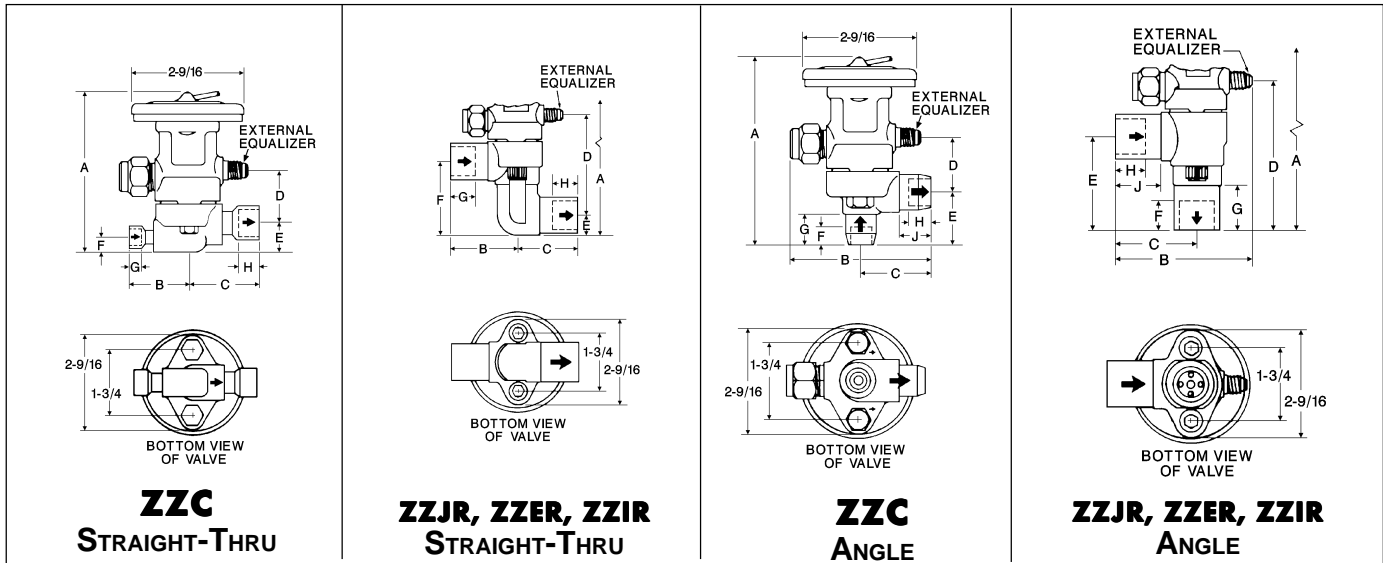
**R508** evaporator temp = -40°F, liquid temp at valve inlet = +20°F, 150 psig pressure drop across valve

Consult ALCO for special low temp refrigerants not shown here.

**NOTE:** The FW, HW, & RW charges should not be used below -10°F.

**NOTE: For valve capacities or refrigerants not listed, consult ALCO Applications Engineering Department.**

# ZZ THERMO® EXPANSION VALVES



### ZZ STRAIGHT-THRU STYLE ROUGH IN DIMENSION TABLE

ZZ VALVE STRAIGHT-THRU	LINE CONNECTIONS INLET x OUTLET	A	B	C	D	E	F	G	H	
ZZC	3/8 x 1/2 SAE	3-3/4	1-13/16	2	1-1/4	11/16	3/8	-	-	
	3/8 x 5/8 SAE		1-13/16	2-3/16						
	1/2 x 5/8 SAE		2	2-3/16						
	1/4 x 5/8 ODF	3-3/4	1-7/16	1-5/8	1-1/4	11/16	3/8	5/16	1/2	
	3/8 x 3/8 ODF			1-9/16					5/16	
	3/8 x 1/2 ODF			1-9/16					3/8	
	3/8 x 5/8 ODF			1-5/8					1/2	
	3/8 x 7/8 ODF	3-13/16	1-15/16	1-5/16	11/16	3/8	3/8	3/8	3/4	
	1/2 x 1/2 ODF	3-3/4	1-9/16	1-1/4					3/8	
	1/2 x 5/8 ODF	3-3/4	1-5/8	1-1/4					1/2	
	1/2 x 7/8 ODF	3-13/16	1-7/16	1-15/16	1-5/16	11/16	3/8	3/8	3/4	
	1/2 x 1-1/8 ODF	3-3/4	1-7/16	2-3/8	1-1/4				15/16	
	5/8 x 5/8 ODF	3-3/4	1-5/8	1-5/8	1-1/4	11/16	3/8	1/2	1/2	3/4
	5/8 x 7/8 ODF			1-15/16						15/16
	5/8 x 1-1/8 ODF			2-3/8						1
	5/8 x 1-3/8 ODF	3-13/16	1-5/8	2-9/16	1-1/4	3/4	3/8	1/2	1	1
7/8 x 1-1/8 ODF	3-3/4	1-15/16	2-3/8	1-1/4	11/16	1/2	3/4	15/16	15/16	
ZZJR	7/8 ODF - 1-1/8 ODM x 7/8 ODF - 1-1/8 ODM	5-7/16	2	1-13/16	2-15/16	9/16	2-3/16	3/4	3/4	
ZZER	7/8 ODF - 1-1/8 ODM x 7/8 ODF - 1-1/8 ODM									
ZZIR	7/8 ODF - 1-1/8 ODM x 7/8 ODF - 1-1/8 ODM									5-1/2

ALLOW 2-1/8" ABOVE VALVE FOR REMOVAL OF POWER ASSEMBLY. REMOTE BULB DIAMETER IS 3/4" AND LENGTH IS 4-7/8".

### ZZ ANGLE STYLE ROUGH IN DIMENSION TABLE

ZZ VALVE ANGLE	LINE CONNECTIONS INLET x OUTLET	A	B	C	D	E	F	G	H	J
ZZC	1/4 x 3/8 SAE	4-1/16	2-15/16	1-3/8	1-1/4	1	-	-	-	-
	3/8 x 1/2 SAE	4-3/16	3-1/16	1-1/2		1-1/8				
	3/8 x 5/8 SAE	4-3/16	3-3/16	1-5/8		1-1/8				
	1/2 x 5/8 SAE	4-7/16	3-3/16	1-5/8		1-3/8				
	1/4 x 3/8 ODF	4	2-15/16	1-3/8	1-1/4	15/16	7/16	-	9/16	-
	1/4 x 1/2 ODF	4	3-1/16	1-1/2		15/16	7/16		11/16	
	3/8 x 1/2 ODF	4-1/8	3-1/16	1-1/2		1-1/16	9/16		11/16	
	3/8 x 5/8 ODF	4-1/8	3-3/16	1-5/8		1-1/16	9/16		13/16	
1/2 x 5/8 ODF	4-1/4	3-3/16	1-5/8	1-3/16	11/16	13/16				
5/8 ODF - 7/8 ODM x 7/8 ODF - 1-1/8 ODM	4-7/8	3-9/16	2	1-3/8	1-11/16	13/16	1-1/16	1	1-1/8	
ZZJR	7/8 ODF - 1-1/8 ODM x 7/8 ODF - 1-1/8 ODM	5-1/2	3-7/16	2	3-11/16	2-5/16	3/4	1-1/8	3/4	1-1/8
ZZER	7/8 ODF - 1-1/8 ODM x 7/8 ODF - 1-1/8 ODM									
ZZIR	7/8 ODF - 1-1/8 ODM x 7/8 ODF - 1-1/8 ODM									

ALLOW 2-1/8" ABOVE VALVE FOR REMOVAL OF POWER ASSEMBLY. REMOTE BULB DIAMETER IS 3/4" AND LENGTH IS 4-7/8".



# ZZ THERMO® EXPANSION VALVES

## ZZ EXTENDED CAPACITIES IN TONS R22

VALVE	PRESSURE DROP ACROSS VALVE — PSI													
	30	50	70	90	110	130	150	170	190	210	230	250	270	290
ZZC3/4HZ	.33	.43	.51	.58	.64	.70	.75	.80	.84	.89	.93	.97	1.01	1.04
ZZC1-1/2HZ	.67	.87	1.02	1.16	1.28	1.40	1.50	1.60	1.69	1.77	1.86	1.93	2.01	2.08
ZZC2-1/2HZ	1.12	1.44	1.71	1.94	2.14	2.33	2.50	2.66	2.81	2.96	3.09	3.22	3.35	3.47
ZZC4HZ	1.79	2.31	2.73	3.10	3.42	3.72	4.00	4.26	4.50	4.73	4.95	5.16	5.37	5.56
ZZC6HZ	2.46	3.17	3.76	4.26	4.71	5.12	5.50	5.86	6.19	6.51	6.81	7.09	7.38	7.64
ZZC8HZ	3.58	4.62	5.46	6.20	6.85	7.45	8.00	8.52	9.00	9.46	9.90	10.32	10.74	11.12

The capacities for R22 are based on a vapor free liquid temperature of 20°F entering the valve, a – 40°F evaporator temperature, 150 psig pressure drop across the valve and a maximum superheat change of 7°F.

To determine the capacities for evaporator temperatures other than – 40°F, multiply the capacities listed for the available pressure drop by the correction factor shown in the R22 Corrections Factor Table below.

### ZZ CORRECTIONS FACTOR TABLE FOR R22

EVAPORATOR TEMPERATURE °F	VAPOR FREE LIQUID TEMPERATURE ENTERING VALVE °F									
	+60	+40	+20	0	– 20	– 40	– 60	– 80	– 100	
– 40	.8302	.9162	1.0000	1.0809	1.1590					
– 60	.5639	.6241	.6827	.7393	.7940	.8968				
– 80	.4031	.4475	.4907	.5324	.5727	.6118	.6494			
– 100	.2975	.3313	.3642	.3960	.4268	.4565	.4852	.5132		
– 120	.2404	.2687	.2961	.3227	.3484	.3733	.3972	.4207	.4436	

## ZZ EXTENDED CAPACITIES IN TONS R508

VALVE	PRESSURE DROP ACROSS VALVE — PSI													
	30	50	70	90	110	130	150	170	190	210	230	250	270	290
ZZC 1/4	.13	.16	.19	.22	.24	.26	.28	.30	.32	.33	.35	.36	.38	.39
ZZC 1/2	.24	.31	.37	.42	.46	.50	.54	.57	.61	.64	.67	.70	.72	.75
ZZC 1	.52	.67	.78	.89	.99	1.07	1.15	1.22	1.30	1.36	1.43	1.48	1.54	1.60
ZZC 1 3/4	.78	1.01	1.18	1.34	1.5	1.62	1.74	1.84	1.97	2.05	2.16	2.24	2.33	2.42
ZZC 2 1/2	1.14	1.47	1.73	1.96	2.18	2.36	2.54	2.69	2.87	3.0	3.15	3.28	3.40	3.53
ZZC 4 1/2	2.07	2.67	3.13	3.54	3.96	4.28	4.6	4.88	5.20	5.43	5.7	5.93	6.16	6.39

The capacities for R508 are based on a vapor free liquid temperature of 20°F entering the valve, a – 40°F evaporator temperature, 150 psig pressure drop across the valve and a maximum superheat change of 7°F.

To determine the capacities for evaporator temperatures other than – 40°F, multiply the capacities listed for the available pressure drop by the correction factor shown in the R508 Corrections Factor Table below.

### ZZ CORRECTIONS FACTOR TABLE FOR R508

EVAPORATOR TEMPERATURE °F	VAPOR FREE LIQUID TEMPERATURE ENTERING VALVE °F							
	+40	+20	0	– 20	– 40	– 60	– 80	– 100
– 40	.68	1.0	1.26	1.52				
– 60	.67	.95	1.28	1.55	1.92			
– 80	.66	.90	1.29	1.57	1.83	2.1		
– 100	.55	.85	1.11	1.36	1.59	1.83	2.1	
– 120	.49	.79	1.05	1.30	1.52	1.76	1.98	2.2

## ZZ EXTENDED CAPACITIES IN TONS R23

VALVE	PRESSURE DROP ACROSS VALVE — PSI													
	30	50	70	90	110	130	150	170	190	210	230	250	270	290
ZZC1BG	.45	.58	.68	.77	.86	.93	1.00	1.06	1.12	1.18	1.24	1.29	1.34	1.39
ZZC2-1/2BG	1.12	1.44	1.71	1.94	2.14	2.33	2.50	2.66	2.81	2.96	3.09	3.22	3.35	3.47
ZZC4BG	1.79	2.31	2.73	3.10	3.42	3.72	4.00	4.26	4.50	4.73	4.95	5.16	5.37	5.56
ZZC6BG	2.68	3.46	4.10	4.65	5.14	5.58	6.00	6.39	6.75	7.10	7.43	7.74	8.05	8.34
ZZC9BG	3.80	4.91	5.81	6.58	7.28	7.91	8.50	9.05	9.56	10.06	10.52	10.96	11.41	11.81
ZZC13BG	5.59	7.22	8.54	9.68	10.70	11.63	12.50	13.31	14.06	14.79	15.47	16.12	16.77	17.37

The capacities for R23 are based on a vapor free liquid temperature of 0°F entering the valve, a – 40°F evaporator temperature, 150 psig pressure drop across the valve and a maximum superheat change of 7°F.

To determine the capacities for evaporator temperatures other than – 40°F, multiply the capacities listed for the available pressure drop by the correction factor shown in the R23 Corrections Factor Table on page 46.

### ZZ CORRECTIONS FACTOR TABLE FOR R23

EVAPORATOR TEMPERATURE °F	VAPOR FREE LIQUID TEMPERATURE ENTERING VALVE °F						
	+20	0	– 20	– 40	– 60	– 80	– 100
– 40	.8526	1.0000	1.1450				
– 60	.8164	.9627	1.1070	1.2440			
– 80	.7775	.9225	1.0650	1.2020	1.3360		
– 100	.5447	.6512	.7570	.8561	.9546	1.0510	
– 120	.3603	.4346	.5084	.5777	.6463	.7144	.7820
– 140	.1945	.2370	.2793	.3189	.3582	.3972	.4359
– 160	.1205	.1486	.1765	.2030	.2288	.2546	.2804
– 180	.0724	.0905	.1085	.1256	.1422	.1588	.1755
– 200	.0459	.0583	.0706	.0824	.0938	.1053	.1166

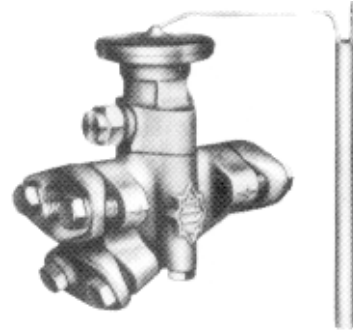
## ORDERING INFORMATION FOR ZZ-SERIES

REFRIGERANT	DESCRIPTION	CAPACITY IN TONS	CAP TUBE LENGTH	PCN
<b>R-13</b>	ZZC 1 BG125	1	10'	N/A
	ZZC 2½ BG125	2.5		N/A
	ZZC 6 BG125	6		N/A
	ZZC 9 BG125	9		N/A
	ZZC 13 BG125	13		N/A
<b>R-22</b>	ZZC ¾ HZ	.75	10'	N/A
	ZZC 1½ HZ	1.5		058840
	ZZC 2½ HZ	2.5		055185
	ZZC 4 HZ	4		N/A
	ZZC 6 HZ	6		N/A
	ZZC 8 HZ	8		N/A
<b>R-502</b>	ZZC ¾ RW35	.75	10'	055882
	ZZC 1½ RW35	1.5		055930
	ZZC 2½ RW35	2.5		054975
	ZZC 3½ RW35	3.5		N/A
	ZZC 5 RW35	5		054854
	ZZC 8 RW35	8		N/A

# TG THERMO<sup>®</sup> EXPANSION VALVE

ALCO Ammonia TG Thermo Valves have the same compact Take-A-Part design features and rugged construction used in other ALCO Thermo Valves. A discharge tube in the outlet controls valve capacity, thus preventing frosting of the valve and erosion of the pin and seat.

**Note:** For applications below – 40°F evaporator temperatures, use ALCO's ZZTG Thermo Valve.



## FEATURES

- ☆ Take-A-Part construction for easy field service
- ☆ Integral inlet strainer standard
- ☆ Internal equalizer standard
- ☆ 10' remote bulb tubing standard
- ☆ 1/4" external equalizer option available

### VALVE NOMENCLATURE

TG	1	A	Z	1/4" FPT
Valve Series	Nominal Capacity (in tons)	Refrigerant Code A = R717	Charge Code	Connection Size & Style 1/4, 3/8, & 1/2" Available
Example above: TG 1AZ 1/4" FPT				

VALVE TYPE <sup>1</sup>	Nominal Capacity In tons R717 <sup>2</sup>	Basic Cage Assembly Part No. <sup>3</sup>	Discharge Tube Part Number <sup>7</sup>	Discharge Tube Orifice Dia.	Size and Style Line Connections	Lengths Remote Bulb Tubing	Style of Remote Bulb	Equalizer
TG1A	1.0	XC741-B0	A735-1	.031	<b>ORDER SEPARATELY</b>	10' or 15' other lengths to 50' can be supplied on special order	External strap-on type <sup>6</sup>	Internal or 1/4" SAE male flare external
TG2A	2.0	XC741-B1 <sup>4</sup>	A735-1	.031				
TG3A	3.0	XC741-B5 <sup>4</sup>	A735-10	.039				
TG5A	5.0	XC741-B2 <sup>4</sup>	A735-2	.046				
TG7-1/2A	7.5	XC741-B2-1/2 <sup>4</sup>	A735-3	.062				
TG10A	10	XC741-B3 <sup>4</sup>	A735-5	.078	Flanged 1/4" FPT			
TG15A	15.0	XC741-B6 <sup>5</sup>	A735-11	.086	3/8" FPT			
TG20A	20.0	XC741-B4 <sup>5</sup>	A735-4	.093	1/2" FPT			
TG25A	25.0	XC741-B7B	None	NA				
TG40A	40.0	XC741-B8B	None	NA				

<sup>1</sup> Add power assembly charge symbol suffix "Z," or "X" to valve type. "Z" cross charge is recommended for standard installations operating at either low or high temperature.

"Z" superheat adjustment range is 2 to 20°F. **Examples:** TG1AZ, TG10AZ.

"X" charge is recommended for central station truck installations, or special applications requiring high operating superheats. "X" superheat adjustment range is 18 to 40°F.

**Example:** TG2AX, TG20AX.

<sup>2</sup> Capacities are based on 86°F condensing, +5°F evaporator, vapor-free liquid at valve inlet and 140 psi pressure drop across the valve.

<sup>3</sup> Add suffix "A" for internal equalizer or suffix "B" for external equalizer to obtain complete cage assembly part number. **Example:** XC741-B2A.

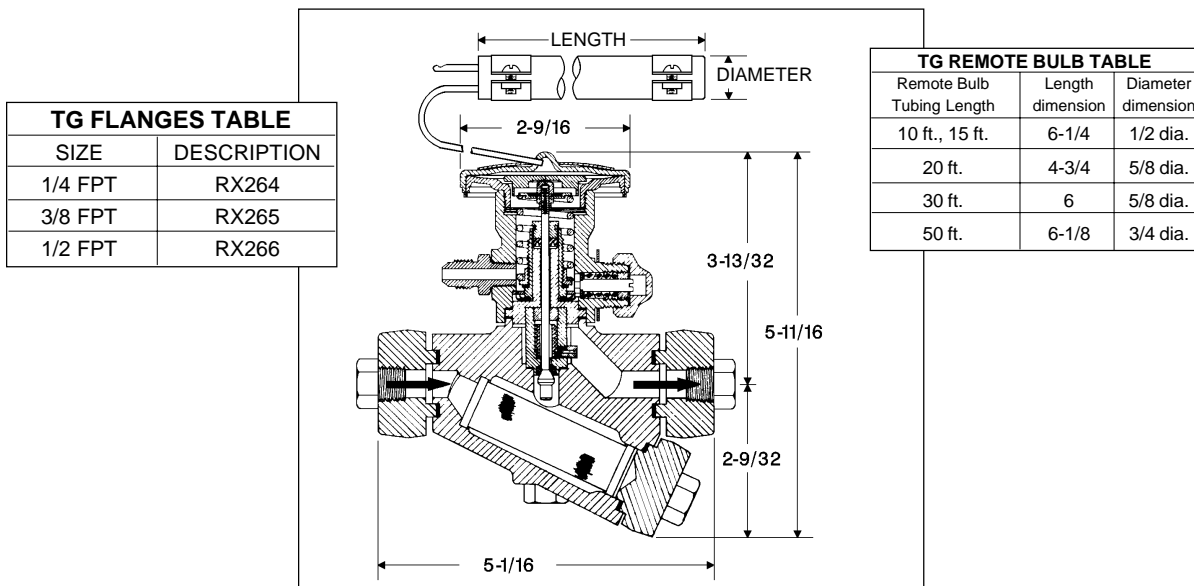
<sup>4</sup> These cage assemblies are identical except for discharge tube. Installation of proper discharge tube therefore determines capacity.

<sup>5</sup> These cage assemblies are identical except for discharge tube. Installation of proper discharge tube therefore determines capacity.

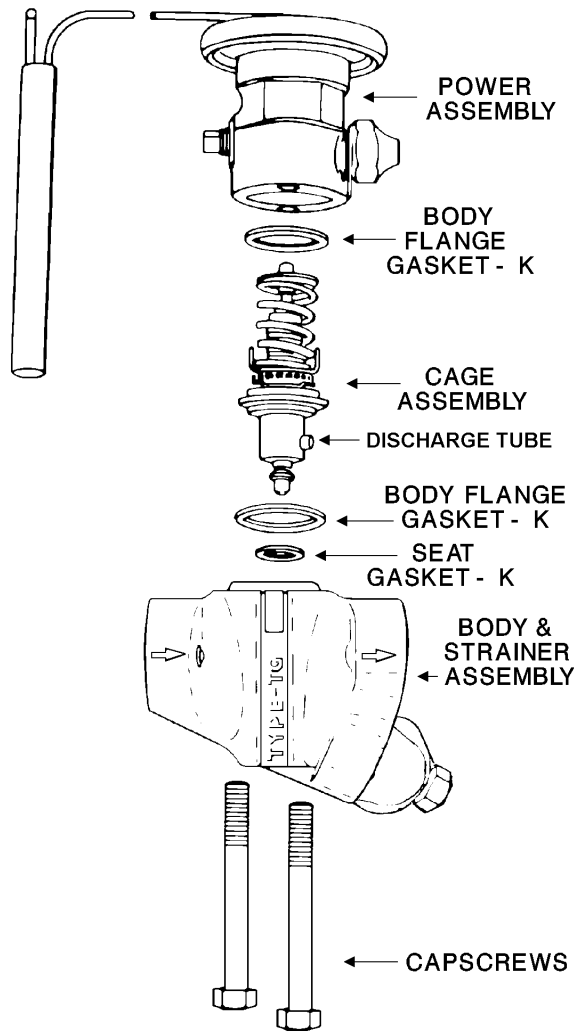
<sup>6</sup> External remote bulb may be used with remote bulb well.

<sup>7</sup> Remove discharge tube when used on system with distributors.

## TG DIMENSIONAL DATA



## TG EXPLODED VIEW



K INDICATES SUPPLIED WITH POWER ASSEMBLY AND/OR CAGE

## TG REPLACEMENT PARTS

**POWER ASSEMBLY** consists of:  
Power Assembly, gaskets and external bulb clamps.

TG VALVE	PART#
Power Assembly	XB1049*

\* Specify AZ, AL or AX refrigerant charge, remote bulb tubing length, and internal or external equalizer. Example: XB1049 AZ 2 A.

**CAGE ASSEMBLY KIT** consists of:  
Cage Assembly and Gaskets

VALVE	PART#	VALVE	PART#
TG1A	XC741-B0**	TG10A	XC741-B3**
TG2A	XC741-B1**	TG15A	XC741-B6**
TG3A	XC741-B5**	TG20A	XC741-B4**
TG5A	XC741-B2**	TG25A	XC741-B7**
TG7-1/2A	XC741-B2-1/2**	TG40A	XC741-B8**

\*\* Add "A" for internal or "B" for external equalizer.  
Example: XC741 B5 A

**GASKET SET** consists of:  
All the necessary body flange gaskets and seat gasket.

TG VALVE	PART#
Gasket Set	X13455-1

### FLANGE SETS

DESCRIPTION	PART#
1/4 FPT	RX264
3/8 FPT	RX265
1/2 FPT	RX266

### BODY CAPSCREWS (2 required)

TG VALVE	PART#
Body Capscrews	PS208

### BODY & STRAINER ASSEMBLY

XA-867

### STRAINER ASSEMBLY (not shown)

TG VALVE	PART#
Strainer Assembly	XA1633-1

## TG EXTENDED CAPACITIES IN TONS R717

VALVE	EVAPORATOR TEMP.																							
	+ 40°F				+ 20°F				5°F				- 10°F				- 25°F				- 40°F			
	80	100	120	140	100	120	140	160	100	120	140	160	120	140	160	180	120	140	160	180	140	160	180	200
TG1A	.77	.86	.94	1.02	.85	.94	1.01	1.08	.85	.93	1.00	1.07	.79	.85	.91	.96	.64	.69	.74	.78	.52	.56	.59	.62
TG2A	1.54	1.72	1.89	2.0	1.71	1.87	2.0	2.2	1.69	1.85	2.00	2.1	1.57	1.70	1.82	1.92	1.28	1.38	1.48	1.56	1.04	1.11	1.18	1.24
TG3A	2.3	2.6	2.8	3.1	2.6	2.8	3.0	3.2	2.5	2.8	3.0	3.2	2.4	2.6	2.7	2.9	1.92	2.1	2.2	2.4	1.56	1.67	1.77	1.86
TG5A	3.9	4.3	4.7	5.1	4.3	4.7	5.1	5.4	4.2	4.6	5.0	5.3	3.9	4.3	4.5	4.8	3.2	3.5	3.7	3.9	2.6	2.8	3.0	3.1
TG7-1/2A	5.8	6.5	7.1	7.7	6.4	7.0	7.6	8.1	6.3	6.9	7.5	8.0	5.9	6.4	6.8	7.2	4.8	5.2	5.5	5.9	3.9	4.2	4.4	4.7
TG10A	7.7	8.6	9.5	10.2	8.5	9.4	10.1	10.8	8.5	9.3	10.0	10.7	7.9	8.5	9.1	9.6	6.4	6.9	7.4	7.8	5.2	5.6	5.9	6.2
TG15A	11.6	12.9	14.2	15.3	12.8	14.0	15.1	16.2	12.7	13.9	15.0	16.0	11.8	12.8	13.6	14.5	9.6	10.4	11.1	11.7	7.8	8.3	8.8	9.3
TG20A	15.4	17.2	18.9	20.4	17.1	18.7	20.2	21.6	16.9	18.5	20.0	21.4	15.7	17.0	18.2	19.3	12.8	13.8	14.8	15.6	10.4	11.1	11.8	12.4
TG25A	19.3	21.6	23.6	25.5	21.3	23.4	25.2	27.0	21.1	23.1	25.0	26.7	19.7	21.3	22.7	24.1	16.0	17.3	18.4	19.6	13.0	13.9	14.7	15.5
TG40A	30.9	34.5	37.8	40.8	34.1	37.4	40.4	43.2	33.8	37.0	40.0	42.8	31.5	34.0	36.3	38.6	25.6	27.6	29.5	31.3	20.8	22.2	23.6	24.9

NOTE: TG capacities are based on 86°F vapor free liquid entering the valve. Nominal capacities are shown in the box outline column.

# ORDERING INFORMATION FOR TG VALVES

DESCRIPTION	NOMINAL CAPACITY IN TONS	PCN BY EQUALIZER TYPE		CAP TUBE LENGTH
		INTERNAL	EXTERNAL	
TG 1 AZ	1	039660	025444	10'
TG 1 AZ	1	075842	040740	15'
TG 2 AZ	2	037465	025434	10'
TG 2 AZ	2	081515	082236	15'
TG 3 AZ	3	040338	026972	10'
TG 3 AZ	3	087550	065089	15'
TG 5 AZ	5	072480	025424	10'
TG 5 AZ	5	065278	065474	15'
TG 5 AX	5	072176	071925	15'
TG 7½ AZ	7.5	029140	040270	10'
TG 10 AZ	10	039661	025421	10'
TG 15 AZ	15	040293	025417	10'
TG 20 AZ	20	N/A	040295	10'
TG 25 AZ	25	045213	040762	10'
TG 40 AZ	40	040729	041035	10'

TG CAPACITY, CAGE & DISCHARGE TUBE TABLE			
DESCRIPTION	NOMINAL CAPACITY TONS R-717	BASIC CAGE ASSEMBLY PART NO.	DISCHARGE TUBE PART NUMBER
TG 1 A	1.0	XC741-B0	A735-1
TG 2 A	2.0	XC741-B1	A735-1
TG 3 A	3.0	XC741-B5	A735-10
TG 5 A	5.0	XC741-B2	A735-2
TG 7½ A	7.5	XC741-B2½	A735-3
TG 10 A	10.0	XC741-B3	A735-5
TG 15 A	15.0	XC741-B6	A735-11
TG 20 A	20.0	XC741-B4	A735-4
TG 25 A	25.0	XC741-B7	NONE
TG 40 A	40.0	XC741-B8	NONE

**NOTE:**  
**CAGE ASSEMBLIES**  
 1. Add equalizer code letter "A" (internal) or "B" (external) to complete cage part number.

TG FLANGE SETS TABLE – WORK WITH ALL TG VALVES		
SIZE	DESCRIPTION	PCN
1/4" FPT	<b>RX264</b>	039650
3/8" FPT	<b>RX265</b>	032636
1/2" FPT	<b>RX266</b>	028947

**NOTE:** **TG AZ**  
 Superheat Adjustment Range is 2 to 20°F

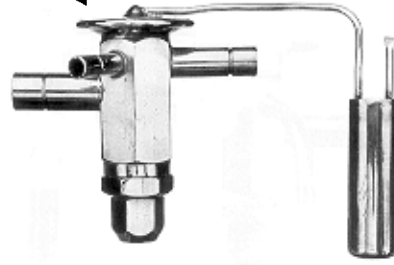
**TG AX**  
 Superheat Adjustment Range is 18 to 40°F

# LA(E)S DESUPERHEATING EXPANSION VALVE

## FEATURES

- ☆ May operate at superheat settings in excess of 20°F, allowing the valve to perform in desuperheating applications
- ☆ External superheat adjustment provides greater application flexibility
- ☆ SAE or ODF connections for easy installation
- ☆ Compact size allows installation in limited spaces
- ☆ Mass spectrometer tested to ensure less than 0.10 oz/year external leakage rate
- ☆ Available external or internal equalizer to satisfy the broadest possible range of applications
- ☆ Stainless steel power element eliminates corrosion and prevents valve failure
- ☆ Wrench flats on inlets and outlets (SAE only) for easy installation
- ☆ Replaceable inlet strainer (SAE only) protects the valve from contaminants, preventing valve malfunction

**STAINLESS STEEL  
POWER ASSEMBLY!**



See the section on Liquid Injection Applications that begins on page 335 and the Liquid Injection Valve Selection Chart on page 336.

## SPECIFICATIONS

Maximum working pressure: 450 psig.  
Compatible with those refrigerants used in desuperheating applications.

## NOMENCLATURE/SELECTION

<b>LA</b>	<b>E</b>	<b>S</b>	<b>2</b>	<b>C</b>	<b>L</b>
Valve Series	External Equalizer (optional)	ODF Connections	Capacity Nominal Rating in Tons	Refrigerant Code See chart below	Charge Code

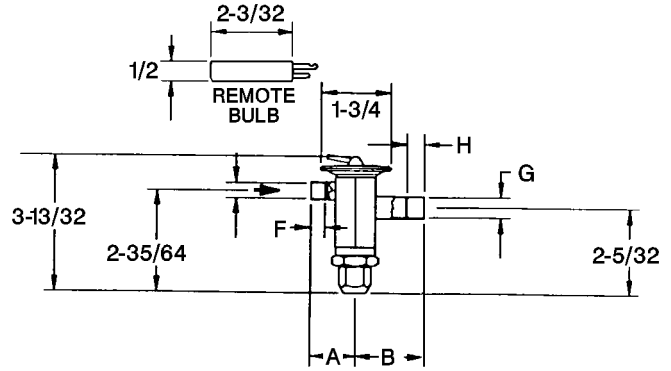
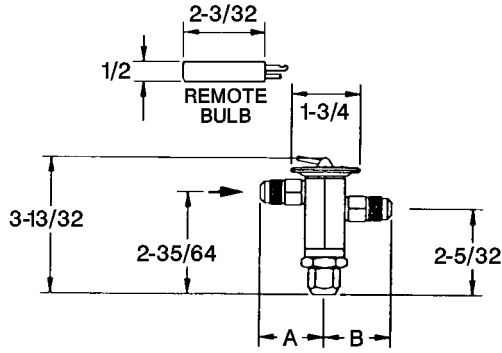
AVAILABLE IN STRAIGHT THROUGH CONNECTIONS ONLY.

### ADJUSTABLE SUPERHEAT RANGE SELECTION CHART

BASIC VALVE TYPE
LA(E)S 1/2
LA(E)S 1
LA(E)S 1-1/2
LA(E)S 2
LA(E)S 2-1/2
LA(E)S 3
LA(E)S 4
LA(E)S 5

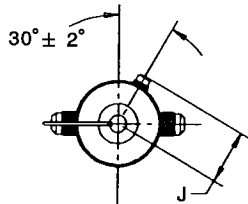
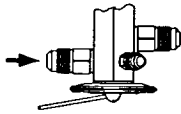
SAT'D SUCTION TEMP. °F	R134a, R12 R401A		R22		R507, R502, R404A R402A, R402B	
	REQUIRED SUCTION GAS TEMPERATURE					
	45	65	45	65	45	65
40	—	GL	—	CL	—	—
30	GL	GL	—	GL	—	CL
20			CL		—	
10	UL	UL	GL	GL	CL	GL
0					UL	UL
-10			UL	UL		
-20					UL	UL
-30	UL	UL	GL	UL		
-40					UL	UL

# LA(E)S DIMENSIONAL DATA



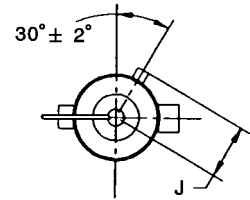
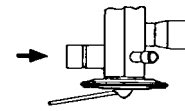
## SAE CONNECTIONS

## ODF CONNECTIONS



### EXTERNAL EQUALIZER FITTING

TYPE	I.D.	J	SOCKET DEPTH
1/4 SAE	—	1.281	—
1/4 ODF	.254 ± .002	1.406	.328 ± .015



## LA(E)S DIMENSIONS

LA(E)S VALVE TYPE	INLET	OUTLET	A ± .094	B ± .094	E ± .002	F MIN.	G ± .002	H MIN.
<b>ODF</b>	1/4	3/8	1.703	1.734	.254	.320	.379	.320
	3/8	1/2	1.734		.379		.504	.380
	1/2	5/8	1.734		.504		.629	.500
	1/4	3/8	1.703	1.734	.254	.320	.379	.320
	3/8	3/8	1.734		.379		.504	.380
	3/8	1/2	1.734		.504		.629	.500
	1/2	1/2	1.734	1.750	.504	.380	.629	.500
	1/2	5/8	1.734		.379		.320	.380
	3/8	5/8	1.734		.504		.380	.750

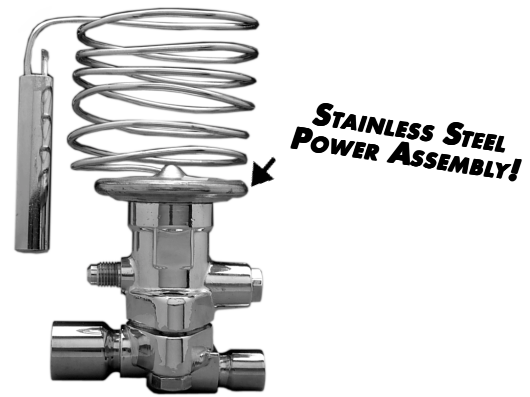
LA(E)S VALVE TYPE	INLET	OUTLET	A ± .047	B ± .047
<b>SAE</b>	1/4	3/8	1.500	1.641
	3/8	3/8	1.641	
	3/8	1/2	1.719	1.984
	1/4	1/2	1.500	
	1/4	5/8	1.641	

# LCL TAKE-A-PART DESUPERHEATING THERMO® VALVE

ALCO LCL Take-A-Part Series TEVs, with adjustable superheat and replaceable, interchangeable components are ideal for desuperheating applications.

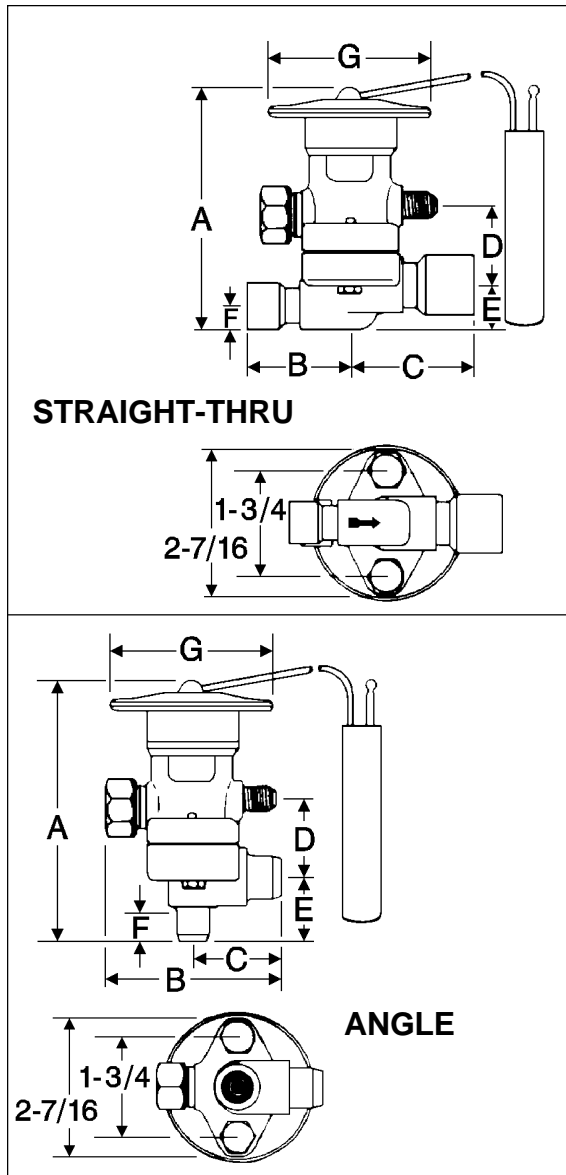
## FEATURES

- ☆ Take-A-Part construction for easy field service
- ☆ Interchangeable, replaceable cages for versatility
- ☆ External superheat adjustment
- ☆ Interchangeable body flanges for any connection you need
- ☆ Interchangeable power heads for different temperature ranges
- ☆ Charges for all applications
- ☆ Maximum working pressure: 450 psig
- ☆ Contoured, durable power element for long life



See the section on Liquid Injection Applications that begins on page 335 and the Liquid Injection Valve Selection Chart on page 336.

## LCL(E) DIMENSIONAL DIAGRAMS & TABLES



### LCL(E) REMOTE BULB DIMENSIONS

CAPILLARY TUBING LENGTH	STANDARD REMOTE BULB	
	DIA.	LENGTH
5'	5/8	3-1/16
10'		3-9/16
15 or 20'		4-13/16
30'		6-1/16
40 or 50'	3/4	6-3/16

### LCL(E) ROUGHING-IN DIMENSIONS

STANDARD CONNECTIONS <sup>1</sup>	STRAIGHT-THRU STYLE DIMENSIONS							SOCKET DEPTH				
	A	B	C	D	E	F	G	INLET	OUTLET			
3/8 x 1/2 SAE	3-45/64	1-25/32	1-63/64	1-13/64	11/16	3/8	2-9/16 DIA.	5/16	3/8			
3/8 x 5/8 SAE			2-5/32									
1/2 x 1/2 SAE		1-31/32	1-9/16									
3/8 x 1/2 ODF	3-11/16	1-13/32	1-37/64							43/64	23/64	1/2
3/8 x 5/8 ODF			1-5/8		11/16	3/8		3/8				
1/2 x 1/2 ODF	3-45/64	3-11/16	1-9/16		1-5/8	43/64		23/64	3/8	1/2		
1/2 x 5/8 ODF	3-11/16		1-5/8		43/64	23/64		1/2	3/4			
5/8 x 5/8 ODF	3-45/64	1-19/32	1-5/8		11/16	3/8			1/2	29/32		
5/8 x 7/8 ODF			1-15/16									
5/8 x 1-1/8 ODF			2-3/8									
7/8 x 1-1/8 ODF	3-13/16	1-15/16	2-3/8								3/4	29/32

ANGLE STYLE												
STANDARD CONNECTIONS <sup>1</sup>	A	B	C	D	E	F	G	INLET	OUTLET			
3/8 x 1/2 SAE	4-9/64	3-1/16	1-1/2	1-13/64	1-1/8	—	2-9/16 DIA.	—	—			
3/8 x 5/8 SAE		3-3/16	1-5/8		1-3/8							
1/2 x 5/8 SAE	4-25/64	2-29/32	1-11/32		15/16					7/16	9/16	
1/4 x 3/8 ODF	3-61/64		1-15/32		1-1/16	9/16						
3/8 x 1/2 ODF	4-7/64	3-1/32	1-15/32		1-3/16	11/16				13/16		
3/8 x 5/8 ODF		3-5/32	1-19/32									
1/2 x 5/8 ODF	4-13/64	3-91/64	2		1-11/32	1-11/16				13/16	1-1/16	1
5/8 x 7/8 ODF (7/8 x 1-1/8 ODM)	4-53/64											

<sup>1</sup> Connections shown are standard sizes, consult ALCO for non-standard sizes. Allow 2-1/8" above valve for removal of power assembly.



## ORDERING INFORMATION FOR LCL VALVES

DESCRIPTION	EQUALIZER TYPE	PCN BY CHARGE			CONNECTIONS		
		SELECT FROM TABLE BELOW					
		A	B	C			
LCL 1*	INTERNAL	022018	022017	022009	Same as TCL & TCLE		
LCL 2*		022005	021996	045527			
LCL 3*		055093	021987	021979			
LCL 4*		055094	055095	N/A			
LCL 6*		047759	021961	N/A			
LCL 7*		056105	N/A	N/A			
LCL 9*		N/A	N/A	N/A			
LCL 10*		N/A	N/A	N/A			
LCLE 1*		¼" SAE EXTERNAL	055096	022010		N/A	Same as TJLE
LCLE 2*			022003	021997		N/A	
LCLE 3*	021991		021985	N/A			
LCLE 4*	062885		061054	055097			
LCLE 6*	062886		055098	N/A			
LCLE 7*	055099		061055	055100			
LCLE 9*	N/A		N/A	N/A			
LCLE 10*	N/A		N/A	N/A			
LJLE 11*	N/A		N/A	N/A			
LJLE 12*	N/A		N/A	N/A			

\* **NOTE:** Add charge suffix symbol "A", "B" or "C" based on the following table.  
EXAMPLE: LCLE 4-A

**NOTE:** Standard remote bulb tubing is 5'.

SAT'D SUCTION TEMP.	REFRIGERANT					
	R-134a		R-22		R-404A/R-507	
	REQUIRED SUCTION GAS TEMP		REQUIRED SUCTION GAS		REQUIRED SUCTION GAS	
	45°F	65°F	45°F	65°F	45°F	65°F
40°F	—	B	—	A	—	—
30°F	B	B	—	A	—	A
20°F	B	C	A	B	—	A
10°F	B	C	B	B	A	B
0°F	C	C	B	B	A	B
- 10°F	C	C	B	C	B	B
- 20°F	C	C	B	C	B	C
- 30°F	C	C	C	C	B	C
- 40°F	C	C	C	C	B	C

**NOTE:** Valve sizes LCL5, LCL8, LCLE5 and LCLE8 are OBSOLETE.

Replace:

LCL5 with LCL6

LCL8 with LCL9

LCLE5 with LCLE6

LCLE8 with LCLE9

# ESV BI-FLO THERMO® EXPANSION VALVE

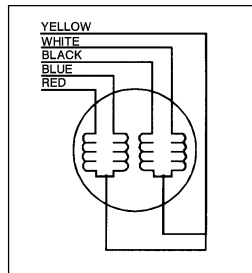
The ESV is a direct driven expansion valve that uses a stepper motor to actuate the valve pin. The stepper motor uses a voltage pulse to move the valve either open or closed, one step for each pulse. The ESV has the ability to be interfaced with a variety of control electronics. The ESV is useful in a variety of applications ranging from case control to subcooler applications, truck/trailer refrigeration, and heat pump/air conditioning applications.



UL file number MP604  
CSA file number LR3204

## FEATURES

- ☆ Hermetic construction eliminates external leakage
- ☆ Bi-Flo capability allows one valve to control the superheat in both cooling and heating modes for heat pump applications  
**(Warning: When using bottom tube as inlet, see valve specification for MOPD ratings)**
- ☆ Stepper motor moves in discrete “steps” allowing for precise digital control
- ☆ Contains only one moving part, improving valve reliability
- ☆ Voltage is required only when moving the valve increasing energy efficiency
- ☆ Removeable external connector for easy replacement
- ☆ Contains internal strainer in both the inlet and outlet connections to protect the valve from contamination in both forward and reverse flow modes
- ☆ Solenoid-tight shut off eliminates the need for both a traditional TEV and a solenoid valve in the liquid line
- ☆ Stainless steel housing minimizes corrosion over the life of the valve



## ESV OPERATION

The ESV is a direct driven expansion valve that uses a stepper motor to control the opening and closing of the valve. Table 1 contains step sequence for driving the valve. This four step sequence is then repeated as necessary for the valve to open the appropriate number of steps. **WARNING: The shaft of the valve can only change position if power is applied to it. Upon loss of power, valve will not move.**

## DRIVING THE ESV

The ESV should be driven at a step rate of  $30 \pm 5$  pulses per second. The valve reaches full open at 384 steps. When re-calibrating/re-zeroing the valve, (performed at every system start-up and first defrost) it should be stepped downward (384 steps) +5% against the valve seat (403 steps) to ensure full closure. The step count should then be set to 0. The valve does not provide a feedback of its open or closed position, control software must perform this task. It is only necessary to re-zero the valve if the control loses count of the valve steps. Full close is used as the reference point. During normal system operation, to shut-off refrigerant flow, the algorithm should drive the valve to 4 steps off the valve seat. It should be noted that voltage is required only to move the valve, voltage is not required to hold it in position. **(WARNING: Under no circumstances should the valve be opened more than 384 steps.)**

## NOMENCLATURE example: ESV-10 24

ESV	10	24
Valve Type	Valve Number	Motor Voltage

The ESV is approved for use with all CFC, HCFC, and HFC refrigerants, except R123, R406A, R410A, and those listed in ASHRAE standard 34 as A2, A3, B2, and B3. For more information concerning application, sizing, and selection contact ALCO Applications Engineering Department.

**TABLE 1 4 PHASE, 2 ON: OPENING SEQUENCE  
REVERSE SEQUENCE TO REVERSE DIRECTION**

STEP	PHASE				
	RED	BLUE	BLACK	WHITE	YELLOW
1	-		-		+
2		-	-		+
3			-	-	+
4	-			-	+

## ESV EXTENDED CAPACITIES IN TONS R134a AT 250 STEPS

VALVE	EVAPORATOR TEMP.																	
	+ 40°F						+ 20°F						0°F					
	PRESSURE DROP ACROSS VALVE – PSI																	
	60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175
ESV1	0.52	0.60	0.68	0.76	0.83	0.89	0.50	0.58	0.65	0.72	0.79	0.86	0.48	0.55	0.62	0.69	0.75	0.81
ESV2	1.18	1.36	1.52	1.70	1.86	2.01	1.13	1.30	1.45	1.62	1.78	1.92	1.07	1.24	1.38	1.55	1.69	1.83
ESV4	2.08	2.40	2.69	3.00	3.29	3.55	1.99	2.30	2.57	2.87	3.15	3.40	1.90	2.19	2.45	2.74	3.00	3.24
ESV6	2.95	3.41	3.81	4.26	4.66	5.04	2.82	3.26	3.64	4.07	4.46	4.82	2.69	3.10	3.47	3.88	4.25	4.59
ESV8	4.14	4.78	5.35	5.98	6.55	7.07	3.96	4.57	5.11	5.71	6.26	6.76	3.77	4.35	4.87	5.44	5.96	6.44
ESV10	5.27	6.08	6.80	7.60	8.33	9.00	5.04	5.82	6.50	7.27	7.96	8.60	4.80	5.54	6.19	6.92	7.58	8.19

# SPECIFICATIONS

## VALVE

Inlet/Outlet tubes sizes are 3/8 ODF with 1/2 ODF with the ESV10 only

MOPD: Side inlet 400 psid, Bottom inlet 200 psid

Maximum Working Pressure: 500 psi

Operating Temperatures:

Ambient -40°F to 150°F

Refrigerant -40°F to 140°F

Shipping Weight: 2 lbs

## MOTOR

4 phase, unipolar bifilar wound stepper motor

Two motors available: 24 or 12 VDC

23.5 (12 VDC) or 95.0 (24 VDC) ±5 ohms per phase

Step Rate:

- 30±5 steps per second.
- Full open to Full close.  
12 seconds at 32 steps/seconds.
- 384 steps full travel.

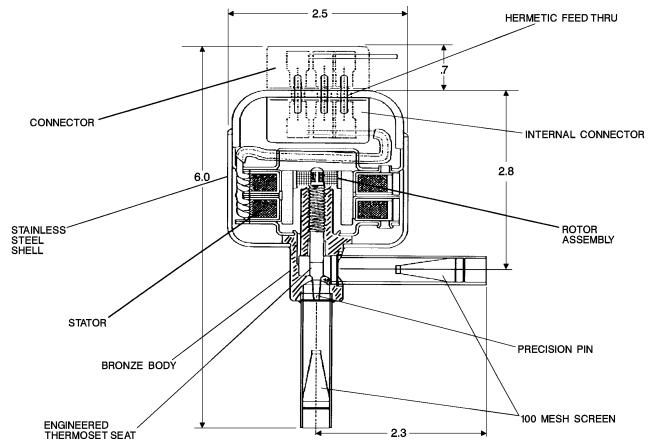
**This valve should never be opened more than the maximum 384 steps.**

Direct Drive with no hysteresis

7.5° rotation per step

Voltage tolerance: +10% and -15% of rated voltage

# ESV DIMENSIONAL DATA



ESV VALVE DESCRIPTION	
ESV-1 24V 3/8 x 3/8 ODF ANG NC	ESV-1 24V 3/8 x 1/2 ODF ANG NC
ESV-2 24V 3/8 x 3/8 ODF ANG NC	ESV-2 24V 3/8 x 1/2 ODF ANG NC
ESV-4 24V 3/8 x 3/8 ODF ANG NC	ESV-4 24V 3/8 x 1/2 ODF ANG NC
ESV-6 24V 3/8 x 3/8 ODF ANG NC	ESV-6 24V 3/8 x 1/2 ODF ANG NC
ESV-8 24V 3/8 x 3/8 ODF ANG NC	ESV-8 24V 3/8 x 1/2 ODF ANG NC
ESV-10 12V 3/8 x 3/8 ODF ANG NC	ESV-10 12V 3/8 x 1/2 ODF ANG NC
ESV-10 24V 1/2 x 1/2 ODF ANG NC	ESV-10 24V 3/8 x 1/2 ODF ANG NC

## ESV EXTENDED CAPACITIES IN TONS R22 AT 250 STEPS

VALVE	EVAPORATOR TEMP.																	
	+ 50°F						+ 40°F						+ 20°F					
	PRESSURE DROP ACROSS VALVE - PSI																	
	60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175
ESV1	0.57	0.66	0.74	0.83	0.90	0.98	0.57	0.65	0.73	0.82	0.89	0.97	0.55	0.64	0.71	0.80	0.87	0.94
ESV2	1.28	1.48	1.66	1.85	2.03	2.19	1.27	1.47	1.64	1.83	2.01	2.17	1.24	1.43	1.60	1.79	1.96	2.11
ESV4	2.27	2.62	2.93	3.28	3.59	3.88	2.25	2.59	2.90	3.24	3.55	3.84	2.19	2.53	2.83	3.16	3.46	3.74
ESV6	3.22	3.72	4.16	4.65	5.09	5.50	3.18	3.68	4.11	4.59	5.03	5.44	3.10	3.58	4.00	4.48	4.91	5.30
ESV8	4.52	5.22	5.84	6.52	7.15	7.72	4.47	5.16	5.77	6.45	7.07	7.63	4.36	5.03	5.62	6.29	6.89	7.44
ESV10	5.75	6.64	7.42	8.30	9.09	9.82	5.68	6.56	7.34	8.20	8.99	9.71	5.54	6.40	7.15	8.00	8.76	9.46

VALVE	EVAPORATOR TEMP.																	
	0°F						- 20°F						- 40°F					
	PRESSURE DROP ACROSS VALVE - PSI																	
	60	80	100	125	150	175	80	100	125	150	175	200	80	100	125	150	175	200
ESV1	0.54	0.62	0.69	0.77	0.85	0.91	0.60	0.67	0.75	0.82	0.89	0.95	0.58	0.65	0.72	0.79	0.86	0.92
ESV2	1.20	1.39	1.55	1.74	1.90	2.05	1.35	1.50	1.68	1.84	1.99	2.13	1.30	1.45	1.63	1.78	1.92	2.06
ESV4	2.13	2.46	2.75	3.07	3.36	3.63	2.38	2.66	2.97	3.26	3.52	3.76	2.30	2.57	2.87	3.15	3.40	3.64
ESV6	3.01	3.48	3.89	4.35	4.77	5.15	3.37	3.77	4.22	4.62	4.99	5.33	3.26	3.64	4.07	4.46	4.82	5.15
ESV8	4.23	4.89	5.46	6.11	6.69	7.23	4.73	5.29	5.92	6.48	7.00	7.49	4.57	5.11	5.72	6.26	6.77	7.23
ESV10	5.38	6.22	6.95	7.77	8.51	9.19	6.02	6.73	7.53	8.25	8.91	9.52	5.82	6.51	7.27	7.97	8.61	9.20

## ESV EXTENDED CAPACITIES IN TONS R404A/R507 AT 250 STEPS

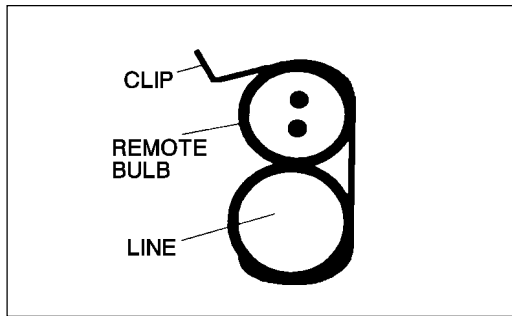
VALVE	EVAPORATOR TEMP.																	
	+ 40°F						+ 20°F						0°F					
	PRESSURE DROP ACROSS VALVE - PSI																	
	60	80	100	125	150	175	60	80	100	125	150	175	60	80	100	125	150	175
ESV1	0.37	0.43	0.48	0.54	0.59	0.64	0.35	0.41	0.46	0.51	0.56	0.60	0.33	0.38	0.43	0.48	0.52	0.57
ESV2	0.84	0.97	1.08	1.21	1.32	1.43	0.79	0.91	1.02	1.14	1.25	1.35	0.74	0.86	0.96	1.07	1.18	1.27
ESV4	1.48	1.71	1.91	2.14	2.34	2.53	1.40	1.62	1.81	2.02	2.21	2.39	1.31	1.52	1.70	1.90	2.08	2.25
ESV6	2.10	2.42	2.71	3.03	3.32	3.59	1.99	2.29	2.56	2.87	3.14	3.39	1.86	2.15	2.41	2.69	2.95	3.18
ESV8	2.95	3.40	3.80	4.25	4.66	5.03	2.79	3.22	3.60	4.02	4.41	4.76	2.62	3.02	3.38	3.78	4.14	4.47
ESV10	3.75	4.33	4.84	5.41	5.93	6.40	3.55	4.09	4.58	5.12	5.61	6.06	3.33	3.84	4.30	4.80	5.26	5.68

VALVE	EVAPORATOR TEMP.																	
	- 20°F						- 40°F											
	PRESSURE DROP ACROSS VALVE - PSI																	
	80	100	125	150	175	200	80	100	125	150	175	200						
ESV1	0.36	0.40	0.45	0.49	0.53	0.56	0.33	0.37	0.41	0.45	0.49	0.52						
ESV2	0.80	0.89	1.00	1.10	1.18	1.27	0.74	0.83	0.93	1.01	1.10	1.17						
ESV4	1.42	1.58	1.77	1.94	2.09	2.24	1.31	1.46	1.64	1.79	1.94	2.07						
ESV6	2.01	2.24	2.51	2.75	2.97	3.17	1.86	2.07	2.32	2.54	2.74	2.93						
ESV8	2.82	3.15	3.52	3.86	4.16	4.45	2.61	2.91	3.26	3.57	3.85	4.12						
ESV10	3.58	4.00	4.48	4.90	5.30	5.66	3.31	3.71	4.14	4.54	4.90	5.24						

## ORDERING INFORMATION FOR **ESV VALVES**

PCN	DESCRIPTION	CONNECTION SIZE
063987	ESV 1	12V 3/8 X 3/8 ODF ANG NC
059677	ESV 1	24V 3/8 x 3/8 ODF ANG NC
063988	ESV 2	12V 3/8 x 3/8 ODF ANG NC
057643	ESV 2	24V 3/8 X 3/8 ODF ANG NC
064008	ESV 4	12V 3/8 x 3/8 ODF ANG NC
063382	ESV 4	24V 3/8 X 1/2 ODF ANG NC
057644	ESV 4	24V 3/8 x 3/8 ODF ANG NC
057645	ESV 6	24V 3/8 x 3/8 ODF ANG NC
063435	ESV 8	12V 3/8 x 3/8 ODF ANG NC
058485	ESV 8	24V 3/8 x 3/8 ODF ANG NC
PCN	DESCRIPTION	CONNECTOR SIZE
063184	ESV EXTERNAL MOLDED CONNECTOR	12 FT.
059559	ESV EXTERNAL MOLDED CONNECTOR	30 IN.
057647	ESV EXTERNAL MOLDED CONNECTOR	60 IN.

# EXPANSION VALVE ACCESSORIES



## PRODUCT BULB CLIPS

Use the chart below as your TEV bulb diameter guide:

VALVE SERIES	REMOTE BULB DIAMETERS BY CHARGE					W (MOP)
	ALL	CA	C	L	Z	
HF (1/4 thru 5-1/2 ton)		3/4"	1/2"	1/2"	1/2"	1/2"
HF (8, 10, 15 ton)		3/4"	1/2"	1/2"	1/2"	1/2"
TCL(E) 5', 10' Capillary	5/8"	3/4"				
TJL(E) & TJR 5', 10' Capillary	5/8"	3/4"				
TER, TIR, THR 10' Capillary	3/4"					
BA/BN		3/4"	1/2"	1/2"	1/2"	1/2"
ANC		3/4"				
TRAE (10 thru 40 ton)	5/8"					
TRAE (50 thru 70 ton)	3/4"					
AA(E), AB(E), AN(E)		3/4"	1/2"	1/2"	1/2"	1/2"
Rapid Response Bulb	3/8"					

Listed below are the bulb clips currently available for use with Alco's Expansion Valves:

DESCRIPTION	BULB SIZE*	LINE SIZE*PCN	
26892-11S Bulb Clip**	1/2"	1/2"	062622
26892-12 Bulb Clip**	1/2"	5/8"	056623
26892-13 Bulb Clip**	1/2"	3/4"	056624
26892-26S Bulb Clip**	3/4"	5/8"	056626
26892-27S Bulb Clip**	3/4"	3/4"	056627
26892-28S Bulb Clip**	3/4"	7/8"	056628

\*Note: Bulb size and line size are interchangeable, clip works in either position.

\*\* Add "S" for stainless steel material.

## MAXIMUM WORKING TEMPERATURE

**NOTE: MAXIMUM WORKING TEMPERATURE DEPENDS UPON THE POWER ELEMENT CHARGE SELECTED. SEE THE MAXIMUM DEHYDRATION TEMPERATURE CHART ON PAGE 303.**