

### Type A – FPT Flange Connections

The R/S Type A valve is an externally adjustable valve with a gray cast iron body and either FPT or socket weld flange connections. The thermostatic element is replaceable. An optional 8004 (1/2" FPT) or 8006 (3/4" FPT) strainer may be ordered with this valve.



The nominal 20 and 30 ton Type A valves are identical with the exception of their discharge tubes. One of these valves can be converted to the other by exchanging their discharge tubes. The nominal 75 and 100 ton Type A valves do

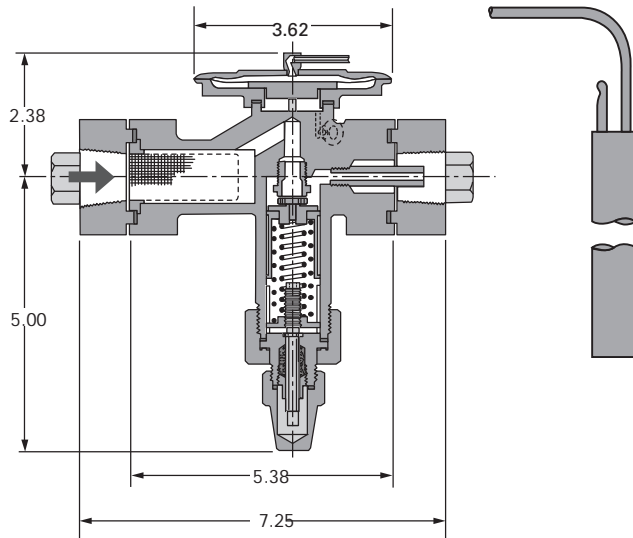
not employ a discharge tube, nor are their outlets tapped to receive one.

Refrigerant distributors that will mate directly to this valve are listed below. Note: The discharge tube must be removed from the nominal 20, 30, and 50 ton Type A valves when a refrigerant distributor is applied.

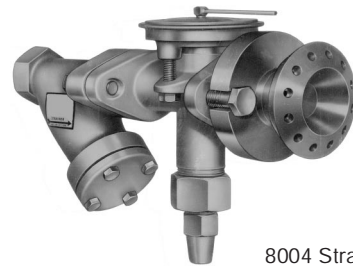
Outlet Connections  
"A" flange

Distributors  
1138, 1185 (aluminum)

SPECIFICATIONS — ELEMENT SIZE NO. 12, GASKET JOINT											
TYPE		NOMINAL CAPACITY Tons of Refrigeration	Port Size Inches	Discharge Tube Orifice Inches	Thermostatic Charges Available	Bold figures are standard and will be furnished unless otherwise specified.		Flange Ring Size OD x ID Inches	Net Weight – Lbs.	Shipping Weight – Lbs.	
Internal Equalizer	External Equalizer 1/8" FPT					Std. Tubing Length – Ft.	CONNECTIONS — Inches FPT or SW				
							INLET				OUTLET
AA-20	AAE-20	20	5/16	1/8	L Only	10 15	1/2, 3/4, or 1	1.75 x 1.25	10	11	
AA-30	AAE-30	30	5/16	5/32							
AA-50	AAE-50	50	3/8	3/16							
AA-75	AAE-75	75	3/8	—							
AA-100	AAE-100	100	7/16	—							



BULB SIZES — Inches	
CHARGE	REFRIGERANT
L - Only	717 — Ammonia 0.88 OD x 6.00



8004 Strainer –  
AA Thermostatic  
Expansion Valve  
& 1185 Aluminum  
Distributor

MATERIALS & DETAILS OF CONSTRUCTION								
VALVE TYPE	BODY	SEAT	PIN	PIN CARRIER	PUSHROD(S)	TYPE of JOINTS	CONNECTIONS	INLET STRAINER
A	Gray Iron Casting	Stainless Steel	20 & 30 Ton: Tungsten Carbide 50, 75, & 100 Ton: Stainless Steel	Stainless Steel	Stainless Steel	Gasket	FPT or SW	Removable Strainer Screen

### Thermostatic Expansion Valve Capacities – Tons of Refrigeration

These ratings are based on vapor free 86°F liquid refrigerant entering the TXV, a maximum opening superheat of 7°F, and a standard factory air test setting.

AC and AL THERMOSTATIC CHARGES															
VALVE TYPE	NOMINAL CAPACITY	PORT SIZE	DISCHARGE TUBE SIZE	EVAPORATOR TEMPERATURE $t_e$ F											
				40 $t_e$				20 $t_e$			5 $t_e$				
				PRESSURE DROP ACROSS VALVE — psi											
				80	100	120	140	100	120	140	160	100	120	140	160
D	1	1/16	1/32	1.08	1.21	1.32	1.43	1.02	1.12	1.21	1.29	0.85	0.93	1.00	1.07
D	2	1/16	1/16	2.16	2.41	2.64	2.86	2.05	2.24	2.42	2.59	1.69	1.85	2.00	2.14
D	5	7/64	5/64	5.40	6.03	6.61	7.14	5.12	5.61	6.05	6.47	4.23	4.63	5.00	5.35
D	10	3/16	7/64	10.8	12.1	13.2	14.3	10.2	11.2	12.1	12.9	8.45	9.26	10.0	10.7
D	15	3/16	5/32	16.2	18.1	19.8	21.4	15.4	16.8	18.2	19.4	12.7	13.9	15.0	16.0
A	20	5/16	1/8	19.3	21.6	23.6	25.5	18.8	20.6	22.2	23.7	16.9	18.5	20.0	21.4
A	30	5/16	5/32	28.9	32.3	35.4	38.2	28.1	30.8	33.3	35.6	25.4	27.8	30.0	32.1
A	50	3/8	3/16	48.2	53.9	59.0	63.7	46.9	51.4	55.5	59.3	42.3	46.3	50.0	53.5
A	75	3/8	—	72.3	80.8	88.5	95.6	70.4	77.1	83.3	89.0	63.4	69.4	75.0	80.2
A	100	7/16	—	96.4	108	118	127	93.8	103	111	119	84.5	92.6	100	107

AZ and AL THERMOSTATIC CHARGES													
VALVE TYPE	NOMINAL CAPACITY	PORT SIZE	DISCHARGE TUBE SIZE	EVAPORATOR TEMPERATURE $t_e$ F									
				-10 $t_e$				-20 $t_e$					
				PRESSURE DROP ACROSS VALVE — psi									
				120	140	160	180	120	140	160	180		
D	1	1/16	1/32	0.61	0.66	0.71	0.75	0.52	0.56	0.60	0.63		
D	2	1/16	1/16	1.06	1.14	1.22	1.29	0.89	0.96	1.03	1.09		
D	5	7/64	5/64	2.48	2.68	2.87	3.04	2.09	2.26	2.42	2.56		
D	10	3/16	7/64	5.24	5.66	6.05	6.42	4.42	4.78	5.11	5.42		
D	15	3/16	5/32	7.27	7.85	8.39	8.90	6.13	6.62	7.08	7.51		
A	20	5/16	1/8	15.9	17.2	18.4	19.5	13.6	14.7	15.8	16.7		
A	30	5/16	5/32	23.9	25.8	27.6	29.3	20.5	22.1	23.6	25.1		
A	50	3/8	3/16	39.9	43.1	46.0	48.8	34.1	36.9	39.4	41.8		
A	75	3/8	—	59.8	64.6	69.1	73.2	51.2	55.3	59.1	62.7		
A	100	7/16	—	79.7	86.1	92.1	97.7	68.2	73.7	78.8	83.6		

REFRIGERANT	LIQUID TEMPERATURE ENTERING TXV $t_l$ F											
	0 $t_l$	10 $t_l$	20 $t_l$	30 $t_l$	40 $t_l$	50 $t_l$	60 $t_l$	70 $t_l$	80 $t_l$	86 $t_l$	90 $t_l$	100 $t_l$
	CORRECTION FACTOR, CF LIQUID TEMPERATURE											
717	1.27	1.24	1.20	1.17	1.14	1.11	1.08	1.05	1.02	1.00	0.99	0.96

EXAMPLE: Actual capacity of nominal 10 ton valve at -10°F evaporator, 160 psi pressure drop and 60°F liquid temperature = 6.05 tons x 1.08 = 6.53 tons.

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 -20°F to 40°F since the variation in the actual factors across this range is insignificant.

### Selection Procedure

The following procedure should be used when selecting a R717 Ammonia TXV:

**1. Determine the pressure drop across the valve**

Subtract the evaporating pressure from the condensing pressure. The condensing pressure used in this calculation should be the minimum operating condensing pressure of the system. From this value, subtract all other pressure losses to obtain the net pressure drop across the valve. Be sure to consider all of the following possible sources of pressure drop: (1) friction losses through refrigeration lines including the evaporator and condenser; (2) pressure drop across liquid line accessories such as a solenoid valve and filter-drier; and (3) static pressure loss (gain) due to the vertical lift (drop) of the liquid line, see Table 1.

**Table 1**

REFRIGERANT	VERTICAL LIFT — FEET				
	20	40	60	80	100
	STATIC PRESSURE LOSS — psi				
717 Ammonia	5	10	15	20	25

It is not necessary to subtract the pressure drop across the refrigerant distributor when determining the pressure drop across a R/S Type D or Type A valve with a nominal rating of 50 tons or less. These valves employ a discharge tube in the valve outlet passage-way, and it should be removed when a distributor is connected to the valve. R/S distributors are normally selected to provide a 40 psi pressure drop at design load conditions for ammonia applications. Removing the discharge tube from the valve will compensate for this pressure drop.

**2. Determine the liquid temperature of the refrigerant entering the valve**

The R-717 Ammonia TXV rating tables on page six are based on a liquid temperature of 86°F. For other liquid temperatures, apply the correction factor given in

the table.

**3. Select valve from the rating tables**

Select a valve based on the design evaporating temperature and the available pressure drop across the valve. If possible, the valve rating should equal or slightly exceed the design rating of the system. Be

sure to apply the appropriate liquid temperature correction factor to the valve ratings shown in the tables. Once the desired valve rating has been located, determine the nominal capacity of the valve from the second column of the table. On multiple evaporator systems, select each valve on the basis of individual evaporator capacity.

**4. Determine if an external equalizer is required**

The amount of pressure drop between the valve outlet and bulb location will determine if an external equalizer is required. The recommendations given in Table 1 are suitable for most field installed systems. Use an externally equalized valve when pressure drop between the valve outlet and bulb location exceeds values shown in Table 2. An externally equalized valve must be used on

**Table 2**

REFRIGERANT	EVAPORATOR TEMPERATURE i F			
	40	20	0	-20
	PRESSURE DROP — psi			
717 Ammonia	3	2	1.5	1.0

evaporators, which employ a refrigerant distributor.

When the thermostatic expansion valve is equipped with an external equalizer, it must be connected. Do not cap off the equalizer connection, as it will prevent the valve from operating properly.

**5. Select the R/S Selective Thermostatic Charge**

Select the charge according to the design evaporator temperature and the valve application. The subject of R-717 thermostatic charges is discussed on page 3.

Selection Example:

- Refrigerant 717
- Application: Refrigeration, single evaporator system
- Design evaporator temperature 5°F
- Design condenser temperature 90°F
- Refrigerant liquid temperature 80°F
- Design evaporator capacity 5 tons
- Available pressure drop across TXV
- Condensing pressure (psig) 166
- Evaporator pressure (psig) -19
- 147
- Liquid line and accessories loss (psi) -7
- Distributor and tubes loss (psi) Ⓢ 0
- 140
- Refrigerant liquid correction factor 1.02

The DAE-5 has a valve capacity of: 5.00 x 1.02 = 5.10 tons at 5°F evaporator temperature, 140 psi pressure drop, and 80°F liquid temperature.

Thermostatic charge, see page 3: C

Selection: DAE-5-C

Ⓢ An externally equalized valve must be used on evaporators employing a refrigerant distributor due to the pressure drop created by the distributor. Pressure drop due to the distributor is not used in the calculation to determine pressure drop across the TXV since the valve's discharge tube will be removed. Refer to step 1 of the selection procedure.