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# Thermostatic and Automatic Expansion Valves

Catalog E-1, October 2007



ENGINEERING YOUR SUCCESS.

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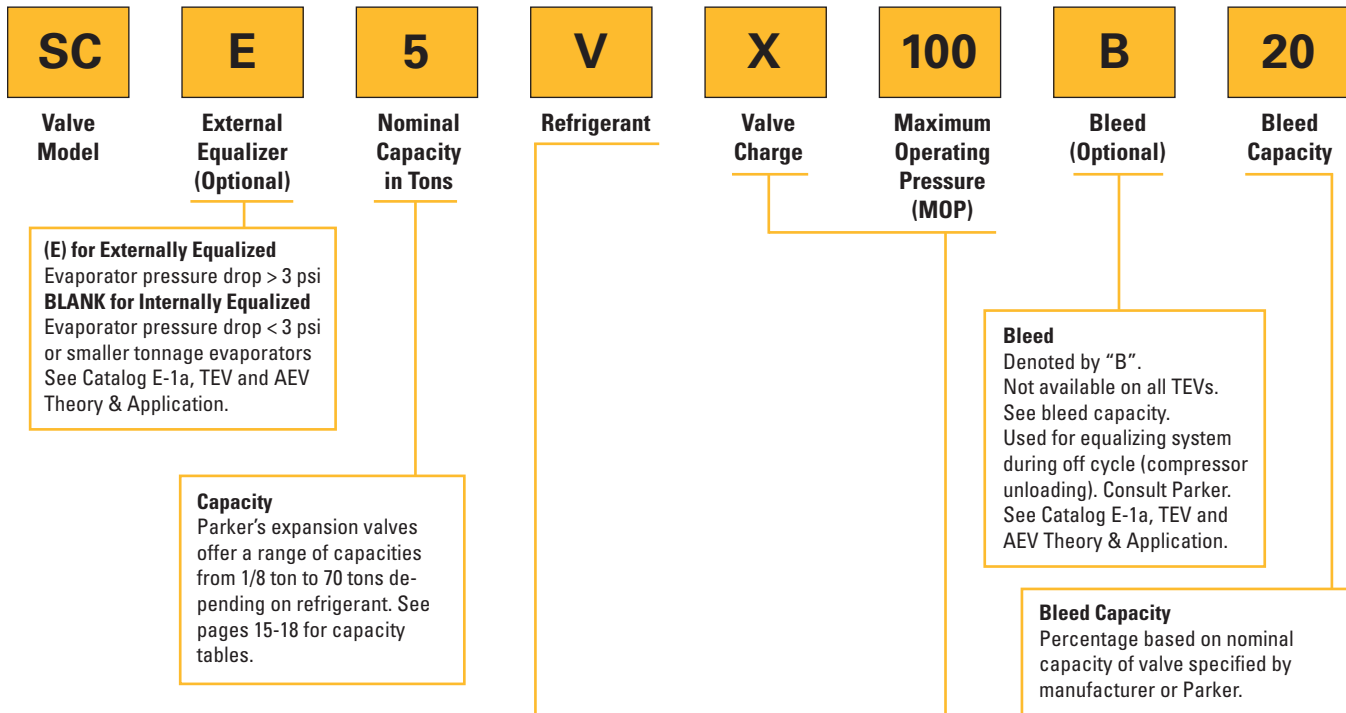
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Freeze Protection,  
Refrigerant Reclaim,  
Vending, Ice Machines

# TEV Model Number Selection Guide

## Nomenclature (Example) – N, C(E), SC(E), EC(E) Valves



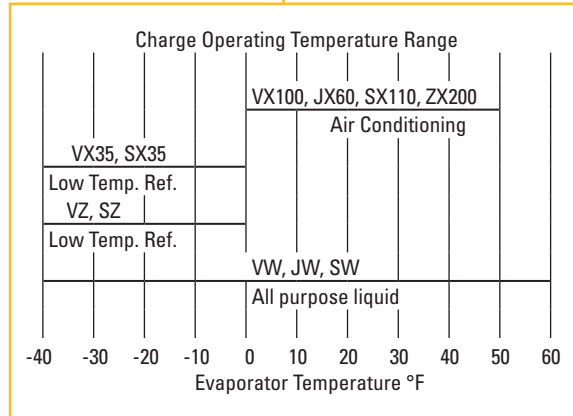
### Rainbow Charge™ Refrigerant Designation

<b>Z</b>	R-410A
<b>J</b>	R-134a, R-401A (MP39), R-401B (MP66)
<b>V</b>	R-407C (AC9000), R-22
<b>S</b>	R-125, R-404A (HP62), R-402A (HP80), R-402B (HP81), R-507 (AZ50)

### Refrigerant

#### Color Code

R-12 - yellow  
R-22 - green  
R-134a - light blue  
R-404A - orange  
R-407C - light brown  
R-410A - rose  
R-502 - purple  
HP80 - canary  
HP81 - olive



### †Charge Type

"W" (all-purpose) liquid charge maintains nearly flat superheat control over a -40°F to +60°F (-40°C to +15°C) evaporator temperature range.

"Z" (low temperature) charge provides fast pulldown benefits like a gas charge with the non-migrating benefits of a liquid charge; usable over a -40°F to 0°F (-40°C to -20°C) evaporator temperature range.

"X" (damped response) gas charge provides a pressure limiting (MOP) charge with anti-hunt characteristics over a -40°F to +60°F (-40°C to +15°C) evaporator temperature range.

**Notes:** M.O.P. not available on "W" or "Z" charge.

1. Maximum operational pressure 500 psig (35 bar) high side and 275 psig (19 bar) low side.
2. Maximum storage temperature 130°F (55°C).
3. Consult Parker for pressure and temperature exceptions.
4. Do not use "W" or "Z" liquid charges in applications where bulb temperatures can exceed 130°F (55°C).  
For these applications use type "X" MOP gas charge **only**.

# N Series

This small flare brass valve series is ideally suited where space is at a premium. Its stainless steel power element and compact body has always made it the first choice for installation in commercial refrigeration systems. External equalized models are provided with a 30" capillary and 1/4" SAE flare nut, eliminating the need to run a separate equalizer line. Medium, low & MOP "X" charges are available as noted below.



## Applications

- Low Profile Coolers
- Beverage Dispensers
- Beverage Boxes
- Small Chillers
- Ice Machines
- Small Freezers

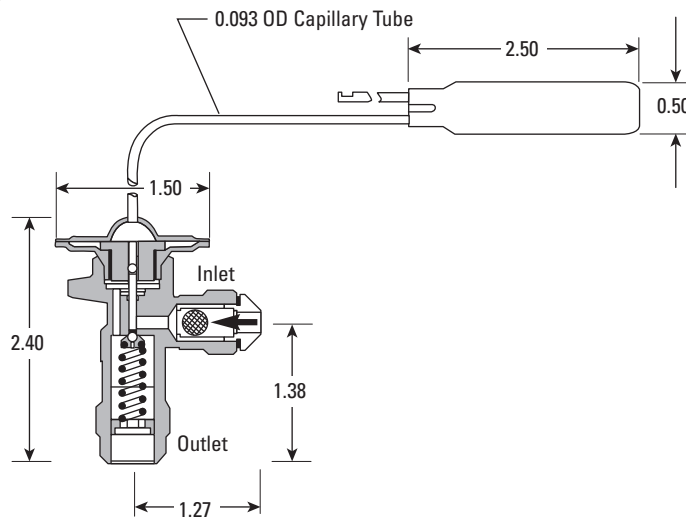
## Features and Benefits

- Compact body
- Inlet strainer
- Factory set superheat
- Accurate and stable control
- Right angle configuration
- 30" capillary tube
- Weight: 5.0 oz. / .14 kg

## Specifications

Refrigerant	Refrigerant Designation	Nominal Capacity (Tons)	Internally Equalized	Externally Equalized	Rainbow Charges™	Inlet Connection (Inches)	Outlet Connection (Inches)
R-12 R-134a R-401A R-401B	J	1/4 1/2 2	N-1/4-J N-1/2-J N-2-J	— — NE-2-J	W, X60	1/4 SAE 3/8 SAE	1/2 SAE
R-402A R-402B R-404A R-502 R-507	S	1/2 1/4 2	N-1/2-S N-1/4-S N-2-S	— — NE-2-S	W, Z, X110	1/4 or 3/8 SAE 1/4 SAE 3/8 SAE	1/2 SAE
R-22 R-407C	V	1/4 1/2 1 3	N-1/4-V N-1/2-V N-1-V N-3-V	— — — NE-3-V	W, Z, X100	1/4 SAE 1/4 or 3/8 SAE 3/8 SAE	1/2 SAE

## Dimensions – Inches



# C(E) Series

The C(E) series incorporates an angle style brass body with SAE flare fittings using balanced port construction, allowing operation over varying load conditions. Designed for use on small refrigeration and or air conditioning systems, the external equalized models are provided with a 1/4" SAE male connection.

## Applications

- Small Refrigeration Systems
- Slush Machines
- Air Conditioning Units
- Freezers
- Walk-in Coolers
- Refrigerated Cases
- Rail & Transport Refrigeration

## Features and Benefits

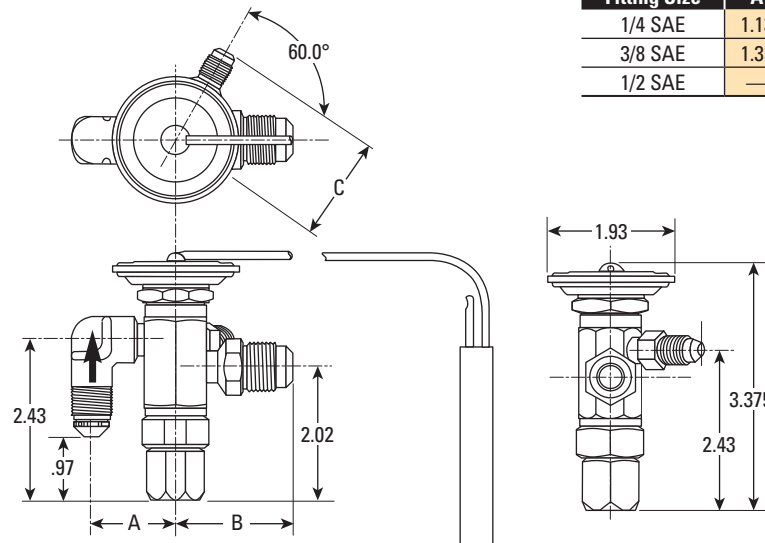
- Balanced port design
- Removable power element
- Inlet strainer – 100 mesh
- 60" capillary tube
- Field adjustable superheat
- 1/4" SAE external equalizer
- Weight: 1.0 lbs / 0.45 kg



## Specifications – Element Size No. 46

Refrigerant	Refrigerant Designation	Orifice Designation	Nominal Capacity (Tons)	Internally Equalized	Externally Equalized	Rainbow Charges™	Inlet Connection (Inches)	Outlet Connection (Inches)	Equalizer Connection (Inches)
R-12 R-134a R-401A R-401B	J	AA A B C D	1/8 to 1/2 1/2 to 1 1 to 2 1-1/2 to 3 3-1/2 to 5	C-AA-J C-A-J C-B-J C-C-J N/A	CE-AA-J CE-A-J CE-B-J CE-C-J CE-D-J	W, X60	1/4 SAE (3/8 optional)	1/2 SAE	1/4 SAE
R-402A R-402B R-404A R-502 R-507	S	AA A B C D	1/8 to 1/2 1/2 to 1 1-1/2 to 2-1/2 3 to 4 5 to 6	C-AA-S C-A-S C-B-S C-C-S N/A	CE-AA-S CE-A-S CE-B-S CE-C-S CE-D-S	W, Z, X35	1/4 SAE (3/8 optional)	1/2 SAE	1/4 SAE
R-22 R-407C	V	AA A B C D	1/8 to 1/2 1/2 to 1-1/2 2 to 3 3-1/2 to 5 5 to 6	C-AA-V C-A-V C-B-V C-C-V N/A	CE-AA-V CE-A-V CE-B-V CE-C-V CE-D-V	W, Z, X100 X35	1/4 SAE (3/8 optional)	1/2 SAE	1/2 SAE

## Dimensions – Inches



Fitting Size	A	B	C
1/4 SAE	1.13	—	1.54
3/8 SAE	1.35	—	—
1/2 SAE	—	1.80	—

# SC(E) Series

The SC(E) series refrigeration right angle brass body expansion valve incorporates a removable inlet strainer that may be replaced or cleaned without removing the valve from the system, and is an ideal choice for commercial refrigeration and supermarket applications.

## Applications

- Supermarket Cases
- Self-contained Cases
- Walk-in Coolers/Freezers
- Ice Machines
- Salad Bars
- Transport Refrigeration

## Features and Benefits

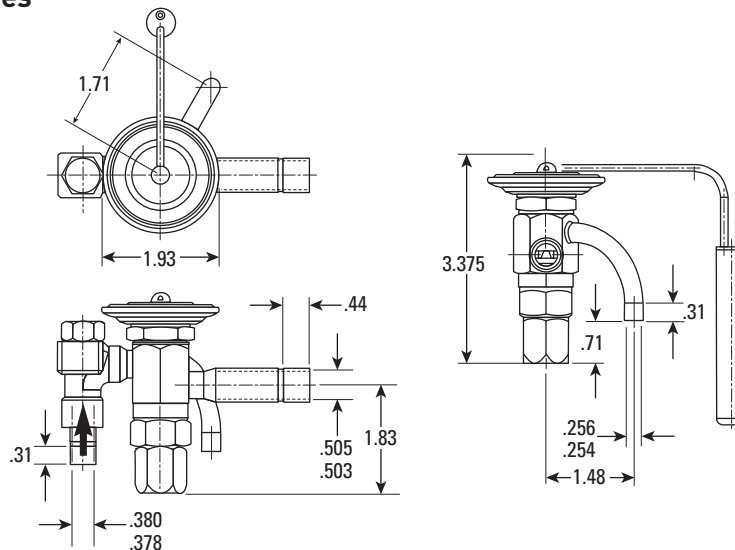
- Removable power element
- 60" capillary tube
- Removable inlet strainer – 100 mesh
- Field adjustable superheat
- 1/4" ODF external equalizer
- "W", "Z" or MOP "X" charges available
- Weight: 1.0 lbs / 0.45 kg



## Specifications – Element Size No. 46

Refrigerant	Refrigerant Designation	Orifice Designation	Nominal Capacity (Tons)	Internally Equalized	Externally Equalized	Rainbow Charges™	Inlet Connection (Inches)	Outlet Connection (Inches)	Equalizer Connection (Inches)
R-12 R-134a R-401A R-401B	J	AA A B C D	1/8 to 1/2 1/2 to 1 1 to 2 1-1/2 to 3 3-1/2 to 5	SC-AA-J SC-A-J SC-B-J SC-C-J N/A	SCE-AA-J SCE-A-J SCE-B-J SCE-C-J SCE-D-J	W, X60	3/8 ODF	1/2 ODF	1/4 ODF
R-402B R-404A R-402A R-502 R-507	S	AA A B C D	1/8 to 1/2 1/2 to 1 1-1/2 to 2-1/2 3 to 4 5 to 6	SC-AA-S SC-A-S SC-B-S SC-C-S N/A	SCE-AA-S SCE-A-S SCE-B-S SCE-C-S SCE-D-S	W, Z, X35	3/8 ODF	1/2 ODF	1/4 ODF
R-22 R-407C	V	AA A B C D	1/8 to 1/2 1/2 to 1-1/2 2 to 3 3-1/2 to 5 5 to 6	SC-AA-V SC-A-V SC-B-V SC-C-V N/A	SCE-AA-V SCE-A-V SCE-B-V SCE-C-V SCE-D-V	W, Z, X35, X100	3/8 ODF	1/2 ODF	1/4 ODF

## Dimensions – Inches



# EC(E) Series

The EC(E) series features extended ODF solder connections, brass body and balanced port design. It is suited for both refrigeration and air conditioning applications.

## Applications

- Small Chillers
- Heat Pump Units
- Air Conditioning Units
- Freezers
- Walk-in Boxes
- Refrigerated Cases
- Mobile Refrigeration

## Features and Benefits

- Extended ODF connections
- Balanced port design
- 60" capillary tube
- Removable power element
- Field adjustable superheat
- 1/4" ODF external equalizer
- Weight: 1.0 lbs / 0.45 kg

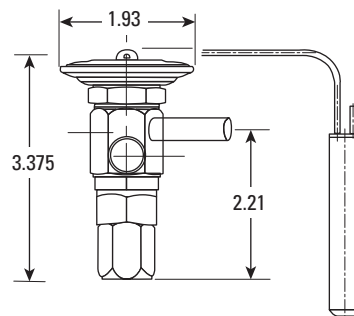
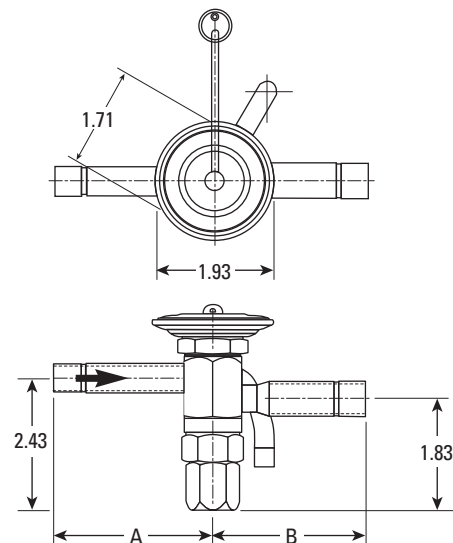


## Specifications – Element Size No. 46

Refrigerant	Refrigerant Designation	Orifice Designation	Nominal Capacity (Tons)	Internally Equalized	Externally Equalized	Rainbow Charges™	Inlet Connection (Inches)	Outlet Connection Inches (Optional)	Equalizer Connection (Inches)
R-12 R-134a R-401A R-401B	J	AA A B C D	1/8 to 1/2 1/2 to 1 1 to 2 1-1/2 to 3 3-1/2 to 5	EC-AA-J EC-A-J EC-B-J EC-C-J N/A	ECE-AA-J ECE-A-J ECE-B-J ECE-C-J ECE-D-J	W, X60	3/8 ODF (1/2)	1/2 ODF (5/8 ODF) (7/8 ODF)	1/4 ODF
R-402A R-402B R-404A R-502 R-507	S	AA A B C D	1/8 to 1/2 1/2 to 1 1-1/2 to 2-1/2 3 to 4 5 to 6	EC-AA-S EC-A-S EC-B-S EC-C-S N/A	ECE-AA-S ECE-A-S ECE-B-S ECE-C-S ECE-D-S	W, Z, X35	3/8 ODF (1/2)	1/2 ODF (5/8 ODF) (7/8)	1/4 ODF
R-22 R-407C	V	AA A B C D	1/8 to 1/2 1/2 to 1-1/2 2 to 3 3-1/2 to 5 5 to 6	EC-AA-V EC-A-V EC-B-V EC-C-V N/A	ECE-AA-V ECE-A-V ECE-B-V ECE-C-V ECE-D-V	W, Z, X100 X35	3/8 ODF (1/2)	1/2 ODF (5/8 ODF) (7/8)	1/4 ODF

**Note:** Optional connections not available on all models.

## Dimensions – Inches



Dimensions (Inches)		
Fitting	Inlet	Outlet
3/8	2.50	—
1/2	2.43	2.50
5/8	2.43	2.50
7/8	—	2.49



# H Series and HC Series

The H series balanced port valve is designed specifically for air conditioning and heat pumps used in both air or water source systems. It offers features such as bleed ports and a variety of connection styles for the inlet, outlet and external equalizer.

The HC series adds a built-in 5 ton check valve for R-22, R-407C and R-410A heat pump applications with either factory set or field adjustable superheat.

## Applications

- Air Conditioning Systems
- Heat Pump Systems
- Bi-flow (package) Heat Pump Systems

## Features and Benefits

- Stainless steel power element
- Bleed ports available
- Bi-directional metering available
- Weight: 10.7 oz. (.30 kg)
- Factory set or field adjustable
- Low pressure drop internal check valve

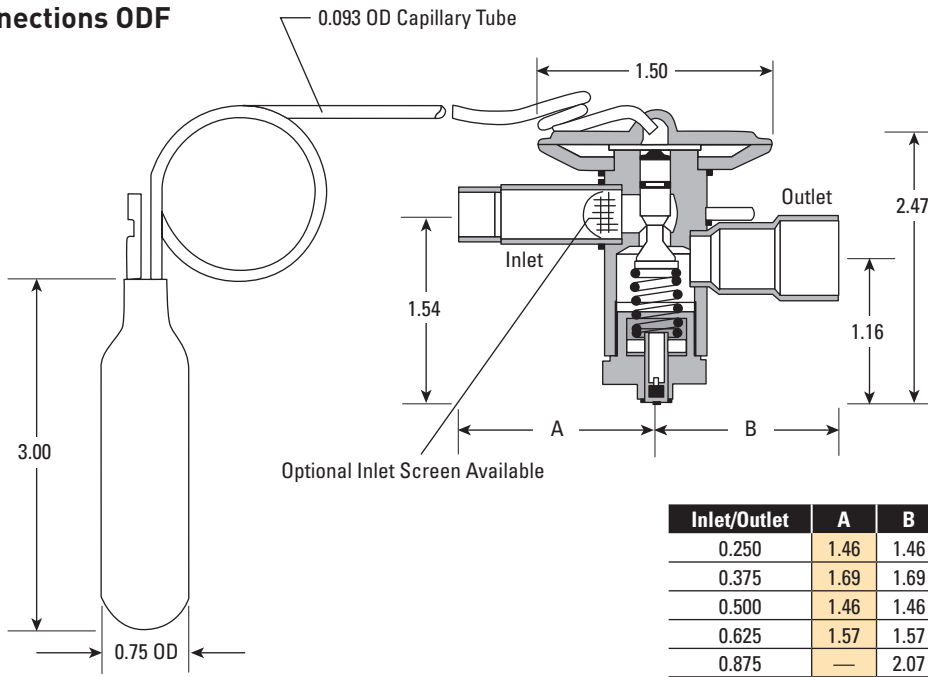


## Specifications

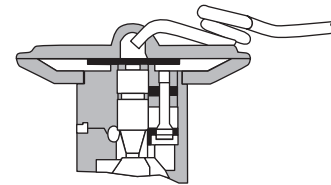
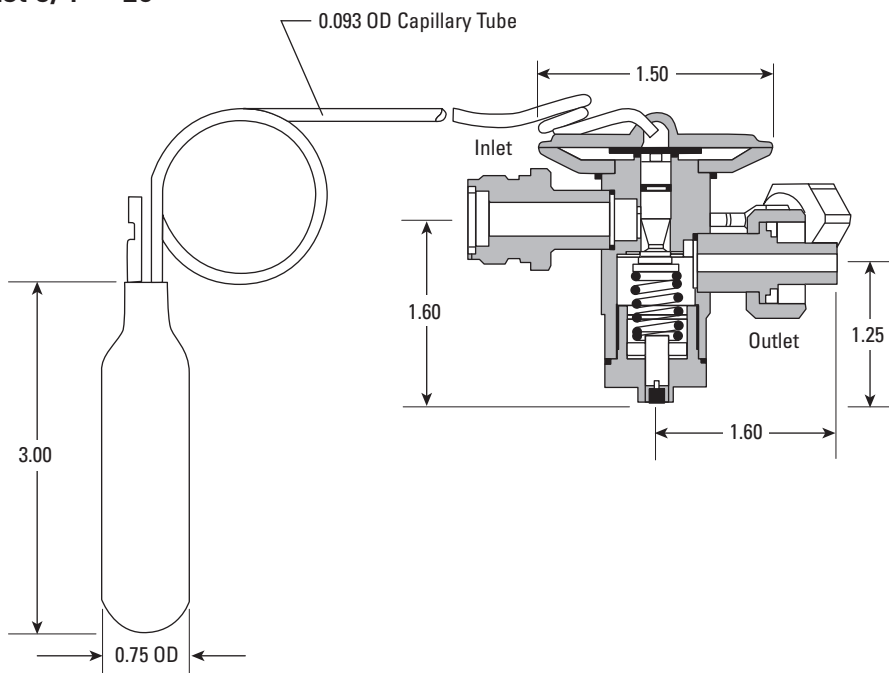
Refrigerant	Refrigerant Designation	Nominal Capacity (Tons)	Internally Equalized	Externally Equalized	Rainbow Charges™	Bleed Port for Off Cycle Operation (Optional)	Inlet Connections (Inches)	Outlet Connections (Inches)		
R-22 R-407C	V	1-1/2	HA 1-1/2V	HAE 1-1/2V	X100	B	1/4, 3/8, 1/2 & 5/8 ODF flo-rater	3/8, 1/2, 5/8 & 7/8 ODF flo-rater		
		3	HA 3V	HAE 3V						
		5	HA 5V	HAE 5V						
		<b>models with internal check valves - "C" designation</b>								
				1-1/2	HCA 1-1/2V	HCAE 1-1/2V	X100	B	1/4, 3/8, 1/2 & 5/8 ODF flo-rater	3/8, 1/2, 5/8 & 7/8 ODF flo-rater
				3	HCA 3V	HCAE 3V				
		5	HCA 5V	HCAE 5V						
R-410A	Z	1-1/2	HA 1-1/2Z	HAE 1-1/2Z	X200	B	1/4, 3/8, 1/2 & 5/8 ODF flo-rater	3/8, 1/2, 5/8 & 7/8 ODF flo-rater		
		3	HA 3Z	HAE 3Z						
		5	HA 5Z	HAE 5Z						
		<b>specific models with internal check valves - "C" designation</b>								
				1-1/2	HCA 1-1/2Z	HCAE 1-1/2Z	X200	B	1/4, 3/8, 1/2 & 5/8 ODF flo-rater	3/8, 1/2, 5/8 & 7/8 ODF flo-rater
				2	HCA 2Z	HCAE 2Z				
		3	HCA 3Z	HCAE 3Z						
		5	HCA 5Z	HCAE 5Z						

# H Series and HC Series

## Dimensions – Inches Connections ODF



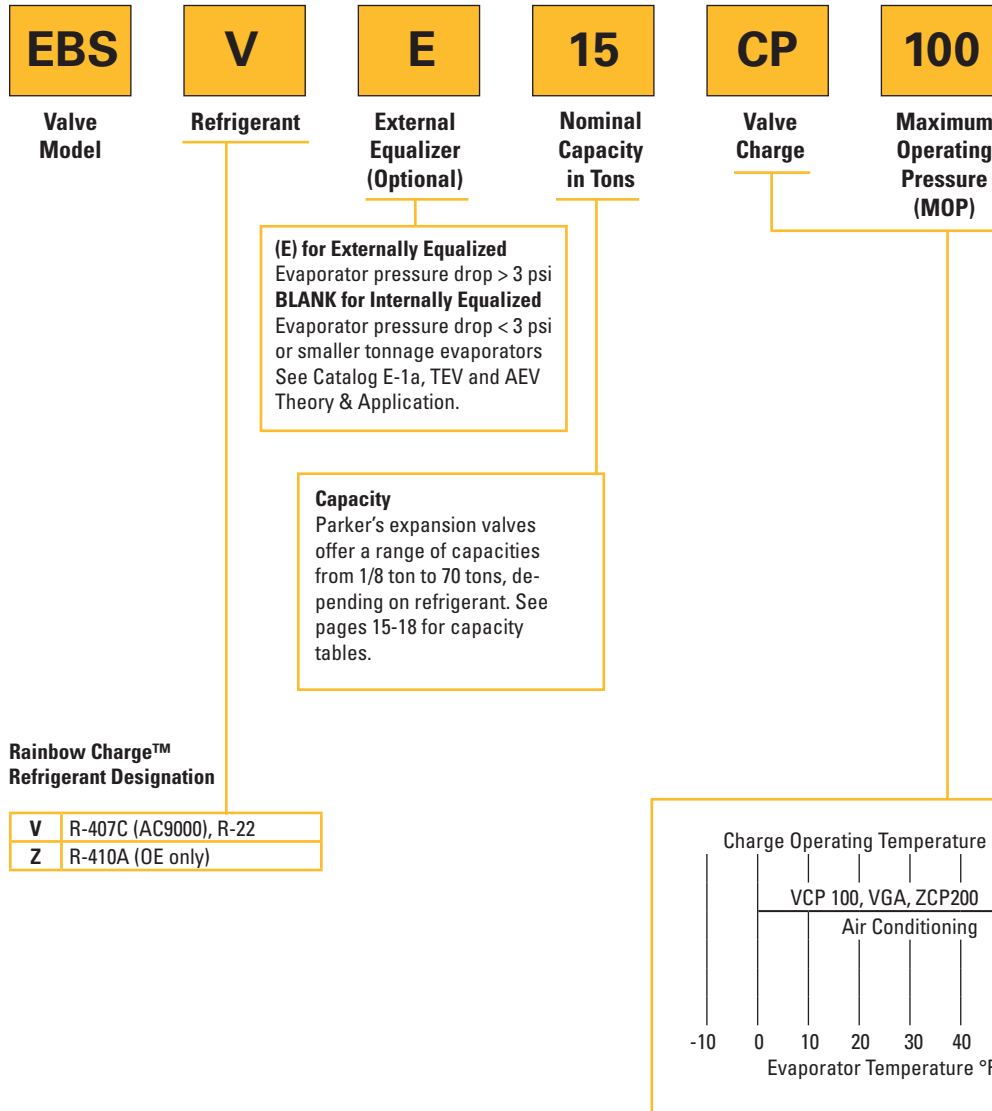
## Dimensions – Inches Connections – flo-rater Inlet 3/4" – 20 Outlet 3/4" – 20



Check valve section  
Allows reverse flow in heating mode.

# TEV Model Number Selection Guide

## Nomenclature (Example) – EBS, OE Valves



### †Charge Type

"W" (all-purpose) liquid charge maintains nearly flat superheat control over a -40°F to +60°F (-40°C to +15°C) evaporator temperature range.

"Z" (low temperature) charge provides fast pulldown benefits like a gas charge with the non-migrating benefits of a liquid charge; usable over a -40°F to 0°F (-40°C to -20°C) evaporator temperature range.

"X" (damped response) gas charge provides a pressure limiting (MOP) charge with anti-hunt characteristics over a -40°F to +60°F (-40°C to +15°C) evaporator temperature range.

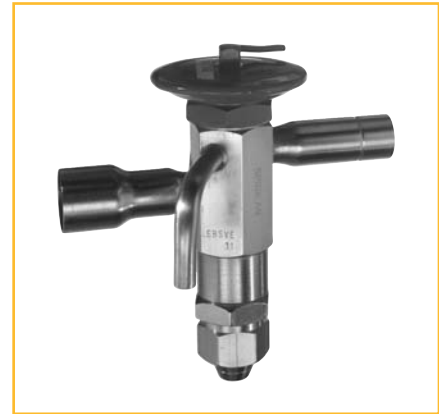
**Notes:** M.O.P. not available on "W" or "Z" charge.

\*May not be used on systems in which bulb temperature will exceed 130°F (i.e. defrost). Contact Parker for pressure and temperature.

1. Maximum operational pressure 500 psig (35 bar).
2. Maximum storage temperature 130°F (55°C).
3. Consult Parker for pressure and temperature exceptions.
4. Do not use "W" or "Z" liquid charges in applications where bulb temperatures can exceed 130°F (55°C).  
For these applications use type "X" MOP gas charge *only*.

# EBS Series

The EBS series valve is a brass bar body valve for R-22 and R-407C. The Type EBS features a balanced port construction and extended ODF connections. The thermostatic element is replaceable. The balanced port construction makes this valve ideally suited for air conditioning applications which operate over widely varying conditions.



## Applications

- Air Conditioning

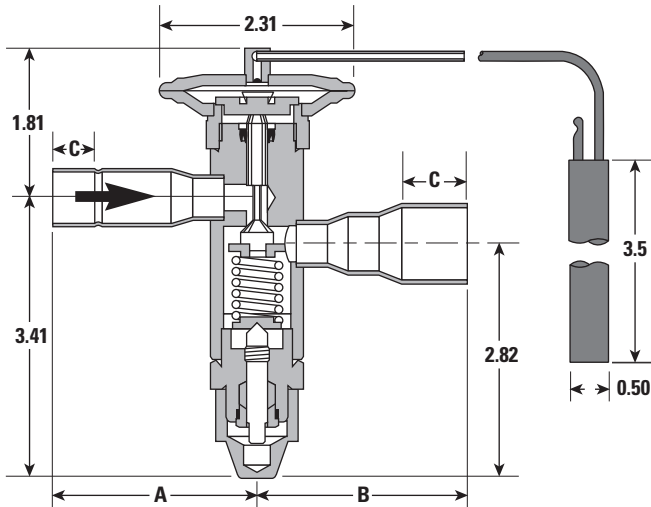
## Features and Benefits

- Balanced port design
- Removable power element
- Field adjustable superheat
- 1/4" sweat external equalizer

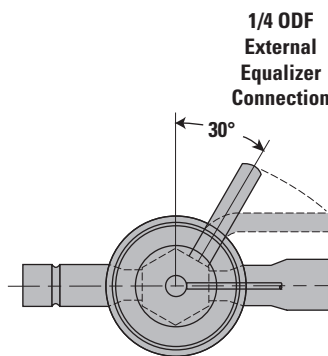
## Element Size Number 83

Refrigerant	Refrigerant Designation	Type	Thermostatic Charge	Standard Tubing Length (Feet)	Nominal Capacity (Tons)	Connections (Inches) Extended ODF Solder		
		Externally Equalized				Inlet	Outlet	External Equalizer (pointing down parallel to body)
R-22 R-407C	V	EBSVE-8	CP100	5	8	5/8	7/8	1/4
		EBSVE-11			11	5/8	7/8	1/4
		EBSVE-15			15	7/8	1-1/8	1/4
		EBSVE-20			20	7/8	1-3/8	1/4

## Dimensions – Inches



Fitting Size	A	B	C
5/8	2.46	—	.50
7/8	2.46	2.53	.75
1-1/8	—	2.53	.81
1-3/8	—	3.04	.97



# OE Series

The OE series valve utilizes balanced port construction to provide optimum operation on medium to large tonnage air conditioning systems. Two brass body styles with copper ODF connections and a removable thermostatic power element provide the stability and control required in a variety of applications, especially where there are wide changes in load conditions. Body Style 1 has an R-22 nominal capacity up to 30 tons, while Body Style 2 extends the capacity range to 70 tons.



## Applications

- Air Conditioning
- Process Chillers

## Features and Benefits

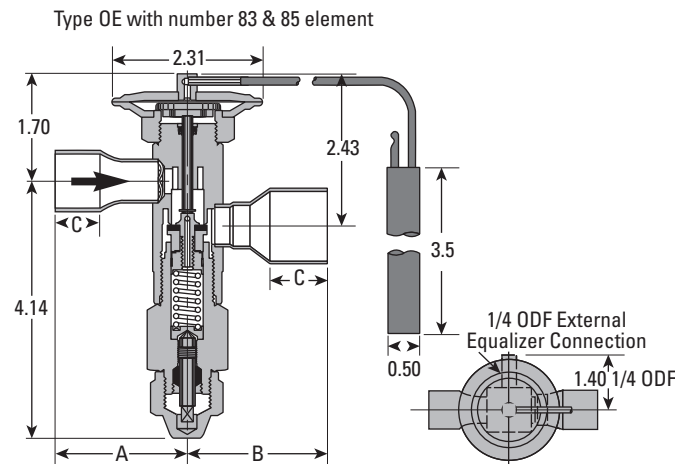
- Balanced port design
- Removable power element
- Field adjustable superheat
- 1/4" sweat external equalizer
- Wt: Body Style 1 to 1.7 lbs. / .77 kg Body Style 2 to 2.5 lbs. / 1.13 kg
- 60" capillary tube (120" optional)

## Specifications

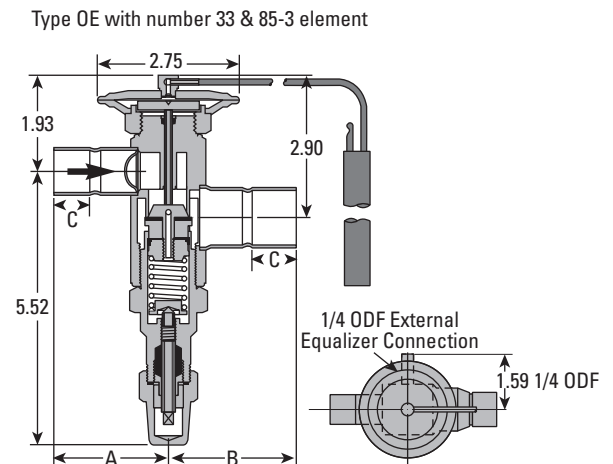
Element Size Numbers 83, 85, 85-3 and 33, Knife Edge Joint

Refrigerant	Refrigerant Designation	Type	Nominal Capacity (Tons)	Element Size No.	Thermostatic Charges Available	Standard Tubing Length (Feet)	Connections (Inches) ODF Solder		Net Weight (Lbs.)	Shipping Weight (Lbs.)
							Inlet	Outlet		
R-22	V	OVE-15	15	83	CP100	5	7/8	1-1/8	2	3
		OVE-20	20					1-3/8		
		OVE-30	30							
		OVE-40	40	33			1-1/8	1-3/8 or 1-5/8	4	5
		OVE-55	55							
OVE-70	70									
R-410A	Z	OZE-20	20	85	GA	5	7/8	1-1/8	2	3
		OZE-25	25					1-3/8		
		OZE-35	35							
		OZE-50	50	85-3			1-1/8	1-3/8 or 1-5/8	4	5
		OZE-60	60							

## Dimensions - Inches



Straight Thru ODF Solder	A	B	C
7/8	2.09	—	0.75
1-1/8	2.21	2.23	0.91
1-3/8	—	2.39	0.97



Straight Thru ODF Solder	A	B	C
7/8	2.09	—	0.78
1-1/8	2.69	—	0.91
1-3/8	—	2.84	0.97
1-5/8	—	3.12	1.09



# Capacity Tables

## R-134a Capacities in Tons (R-401A, R-409A Refrigerant & Liquid Temperature Correction Factor below)

Valve Type	Orifice	Nominal Capacity (Tons)	Evaporator Temperature °F																					
			40°F						20°F						0°F									
			Pressure Drop (PSI)																					
			40	60	80	100	120	140	160	180	40	60	80	100	120	140	160	180	40	60	80	100	120	140
C(E), SC(E), EC(E)	AA	1/2	0.37	0.45	0.52	0.58	0.63	0.68	0.73	0.78	0.85	0.91	0.97	1.03	1.09	1.15	1.21	1.27	1.33	1.39	1.45	1.51	1.57	1.63
C(E), SC(E), EC(E)	A	1	1.03	1.26	1.46	1.63	1.79	1.93	2.06	2.19	2.31	2.43	2.55	2.67	2.79	2.91	3.03	3.15	3.27	3.39	3.51	3.63	3.75	3.87
C(E), SC(E), EC(E)	B	2	1.89	2.31	2.67	2.98	3.27	3.53	3.78	4.00	4.18	4.35	4.52	4.69	4.86	5.03	5.20	5.37	5.54	5.71	5.88	6.05	6.22	6.39
C(E), SC(E), EC(E)	C	2-1/2	2.48	3.03	3.50	3.92	4.29	4.64	4.96	5.26	5.57	5.87	6.16	6.45	6.74	7.03	7.32	7.61	7.90	8.19	8.48	8.77	9.06	9.35
C(E), SC(E), EC(E)	D	4	3.54	4.33	5.01	5.60	6.13	6.62	7.08	7.51	7.93	8.35	8.77	9.18	9.59	10.00	10.41	10.82	11.23	11.64	12.05	12.46	12.87	13.28

These ratings are based on vapor free 100°F liquid refrigerant entering the expansion valve, and a maximum of 7°F change in superheat.

Refrigerant	Liquid Temperature Entering TEV							
	0°F	20°F	40°F	60°F	80°F	100°F	120°F	140°F
	Correction Factor							
R-134a	1.69	1.56	1.42	1.29	1.14	1.00	0.85	0.71
R-401A	1.75	1.62	1.49	1.36	1.23	1.09	0.95	0.81
R-409A	1.65	1.54	1.42	1.31	1.19	1.06	0.94	0.81

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

**TEV Capacity = TEV Rating x CF Liquid Temperature** – Example: Actual capacity of an SCE-B using R-409A at a 20°F evaporator, 120 psi pressure drop across the TEV, and a 80°F liquid temperature entering the TEV = 3.12 (from rating chart) x 1.19 (CF liquid temperature) = 3.72 tons

## R-134a Capacities in Kilowatts (R-401A, R-409A Refrigerant & Liquid Temperature Correction Factor below)

Valve Type	Orifice	Nominal Capacity (kW)	Evaporator Temperature °C																							
			5°C						-5°C						-15°C											
			Pressure Drop (BAR)																							
			2.5	4.0	5.5	7.0	8.5	10.0	11.5	13.0	2.5	4.0	5.5	7.0	8.5	10.0	11.5	13.0	2.5	4.0	5.5	7.0	8.5	10.0	11.5	13.0
C(E), SC(E), EC(E)	AA	1.8	1.22	1.55	1.82	2.05	2.26	2.45	2.63	2.79	1.17	1.49	1.74	1.97	2.17	2.35	2.52	2.68	1.06	1.34	1.57	1.77	1.95	2.11	2.27	2.41
C(E), SC(E), EC(E)	A	3.5	3.46	4.37	5.12	5.78	6.37	6.91	7.41	7.88	3.32	4.19	4.92	5.55	6.11	6.63	7.11	7.56	2.98	3.77	4.42	4.99	5.50	5.96	6.40	6.80
C(E), SC(E), EC(E)	B	7.0	6.32	7.99	9.37	10.6	11.6	12.6	13.6	14.4	6.06	7.67	8.99	10.1	11.2	12.1	13.0	13.8	5.45	6.90	8.09	9.12	10.1	10.9	11.7	12.4
C(E), SC(E), EC(E)	C	8.8	8.29	10.5	12.3	13.9	15.3	16.6	17.8	18.9	7.96	10.1	11.8	13.3	14.7	15.9	17.1	18.1	7.16	9.05	10.6	12.0	13.2	14.3	15.3	16.3
C(E), SC(E), EC(E)	D	14.1	11.8	15.0	17.6	19.8	21.8	23.7	25.4	27.0	11.4	14.4	16.9	19.0	21.0	22.7	24.4	25.9	9.49	12.0	14.1	15.9	17.5	19.0	20.4	21.6

These ratings are based on vapor free 40°C liquid refrigerant entering the expansion valve, and a maximum of 4°C change in superheat.

Refrigerant	Liquid Temperature Entering TEV							
	-10°C	0°C	10°C	20°C	30°C	40°C	50°C	60°C
	Correction Factor							
R-134a	1.64	1.52	1.39	1.26	1.13	1.00	0.87	0.73
R-401A	1.70	1.59	1.46	1.34	1.22	1.09	0.96	0.83
R-409A	1.61	1.50	1.40	1.29	1.18	1.07	0.95	0.83

These factors include corrections for liquid refrigerant density and net refrigerating effect, and are based on an evaporator temperature of -15°C. However, they may be used for any evaporator temperature from -15°C to 5°C since the variation in the actual factors across this range is insignificant.

**TEV Capacity = TEV Rating x CF Liquid Temperature** – Example: Actual capacity of an SCE-B using R-409A at a -5°C evaporator, 8.5 bar pressure drop across the TEV, and a 30°C liquid temperature entering the TEV = 11.2 (from rating chart) x 1.18 (CF liquid temperature) = 13.2 kW

# Capacity Tables

## R-404A Capacities in Tons (R-507 Refrigerant & Liquid Temperature Correction Factor below)

Valve Type	Orifice	Nominal Capacity (Tons)	Evaporator Temperature °F															
			40°F								20°F							
			Pressure Drop (PSI)															
75	100	125	150	175	200	225	250	75	100	125	150	175	200	225	250			
C(E), SC(E), EC(E)	AA	1/2	0.31	0.36	0.40	0.44	0.47	0.50	0.54	0.56	0.29	0.34	0.38	0.41	0.45	0.48	0.51	0.53
C(E), SC(E), EC(E)	A	1	1.00	1.16	1.29	1.42	1.53	1.64	1.74	1.83	0.95	1.10	1.23	1.34	1.45	1.55	1.65	1.73
C(E), SC(E), EC(E)	B	1-1/2	1.32	1.52	1.70	1.86	2.01	2.15	2.28	2.41	1.25	1.44	1.61	1.77	1.91	2.04	2.16	2.28
C(E), SC(E), EC(E)	C	3-1/2	2.86	3.31	3.70	4.05	4.38	4.68	4.96	5.23	2.71	3.13	3.51	3.84	4.15	4.43	4.70	4.96
C(E), SC(E), EC(E)	D	6	4.58	5.29	5.92	6.48	7.00	7.48	7.94	8.37	4.34	5.02	5.61	6.14	6.64	7.09	7.52	7.93

Valve Type	Orifice	Nominal Capacity (Tons)	Evaporator Temperature °F															
			0°F								-10°F							
			Pressure Drop (PSI)															
75	100	125	150	175	200	225	250	75	100	125	150	175	200	225	250			
C(E), SC(E), EC(E)	AA	1/2	0.25	0.29	0.33	0.36	0.39	0.41	0.44	0.46	0.22	0.25	0.28	0.31	0.33	0.36	0.38	0.40
C(E), SC(E), EC(E)	A	1	0.82	0.95	1.06	1.16	1.26	1.34	1.42	1.50	0.53	0.61	0.68	0.75	0.81	0.86	0.91	0.96
C(E), SC(E), EC(E)	B	1-1/2	1.08	1.25	1.40	1.53	1.65	1.77	1.87	1.97	0.71	0.82	0.91	1.00	1.08	1.15	1.22	1.29
C(E), SC(E), EC(E)	C	3-1/2	2.35	2.71	3.03	3.32	3.59	3.84	4.07	4.29	1.48	1.71	1.92	2.10	2.27	2.42	2.57	2.71
C(E), SC(E), EC(E)	D	6	3.76	4.34	4.85	5.31	5.74	6.14	6.51	6.86	1.9	2.2	2.46	2.69	2.91	3.11	3.3	3.48

These ratings are based on vapor free 100°F liquid refrigerant entering the expansion valve, and a maximum of 7°F change in superheat.

Refrigerant	Liquid Temperature Entering TEV							
	0°F	20°F	40°F	60°F	80°F	100°F	120°F	140°F
	Correction Factor							
R-404A	2.04	1.84	1.64	1.43	1.22	1.00	0.77	0.53
R-507	1.95	1.76	1.56	1.37	1.18	0.98	0.76	0.50

These factors include corrections for liquid refrigerant density and net refrigerating effect, and are based on an evaporator temperature of 0°F. However, they may be used for any evaporator temperature from -10°F to 40°F since the variation in the actual factors across this range is insignificant.

**TEV Capacity = TEV Rating x CF Liquid Temperature** – Example: Actual capacity of an SCE-B using R-507 at a 20°F evaporator, 175 psi pressure drop across the TEV, and a 80°F liquid temperature entering the TEV = 1.91 (from rating chart) x 1.18 (CF liquid temperature) = 2.25 tons

## R-404A Capacities in Kilowatts (R-507 Refrigerant & Liquid Temperature Correction Factor below)

Valve Type	Orifice	Nominal Capacity (kW)	Evaporator Temperature °C															
			5°C								-5°C							
			Pressure Drop (BAR)															
4	6	8	10	12	14	16	18	4	6	8	10	12	14	16	18			
C(E), SC(E), EC(E)	AA	1.8	0.95	1.17	1.35	1.51	1.65	1.78	1.91	2.02	0.91	1.11	1.29	1.44	1.57	1.70	1.82	1.93
C(E), SC(E), EC(E)	A	3.5	3.10	3.79	4.38	4.90	5.36	5.79	6.19	6.57	2.95	3.62	4.17	4.67	5.11	5.52	5.90	6.26
C(E), SC(E), EC(E)	B	5.3	4.07	4.98	5.75	6.43	7.05	7.61	8.14	8.63	3.88	4.75	5.49	6.13	6.72	7.26	7.76	8.23
C(E), SC(E), EC(E)	C	12.3	8.85	10.8	12.5	14.0	15.3	16.5	17.7	18.8	8.43	10.3	11.9	13.3	14.6	15.8	16.9	17.9
C(E), SC(E), EC(E)	D	21.1	14.2	17.3	20.0	22.4	24.5	26.5	28.3	30.0	13.5	16.5	19.1	21.3	23.4	25.2	27.0	28.6

Valve Type	Orifice	Nominal Capacity (kW)	Evaporator Temperature °C															
			-15°C								-25°C							
			Pressure Drop (BAR)															
4	6	8	10	12	14	16	18	4	6	8	10	12	14	16	18			
C(E), SC(E), EC(E)	AA	1.8	0.81	0.99	1.15	1.28	1.40	1.52	1.62	1.72	0.65	0.79	0.92	1.03	1.12	1.21	1.30	1.38
C(E), SC(E), EC(E)	A	3.5	2.63	3.22	3.72	4.16	4.55	4.92	5.26	5.58	1.56	1.92	2.21	2.47	2.71	2.93	3.13	3.32
C(E), SC(E), EC(E)	B	5.3	3.46	4.23	4.89	5.46	5.99	6.46	6.91	7.33	2.04	2.49	2.88	3.22	3.53	3.81	4.07	4.32
C(E), SC(E), EC(E)	C	12.3	7.51	9.20	10.6	11.9	13.0	14.1	15.0	15.9	4.40	5.39	6.22	6.96	7.62	8.23	8.80	9.33
C(E), SC(E), EC(E)	D	21.1	12.0	14.7	17.0	19.0	20.8	22.5	24.0	25.5	5.54	6.78	7.83	8.76	9.59	10.4	11.1	11.7

These ratings are based on vapor free 40°C liquid refrigerant entering the expansion valve, and a maximum of 4°C change in superheat.

Refrigerant	Liquid Temperature Entering TEV							
	-10°C	0°C	10°C	20°C	30°C	40°C	50°C	60°C
	Correction Factor							
R-404A	1.98	1.79	1.60	1.41	1.21	1.00	0.79	0.56
R-507	1.89	1.71	1.53	1.35	1.17	0.98	0.78	0.53

These factors include corrections for liquid refrigerant density and net refrigerating effect, and are based on an evaporator temperature of -15°C. However, they may be used for any evaporator temperature from -25°C to 5°C since the variation in the actual factors across this range is insignificant.

**TEV Capacity = TEV Rating x CF Liquid Temperature** – Example: Actual capacity of an SCE-B using R-507 at a -5°C evaporator, 12 bar pressure drop across the TEV, and a 30°C liquid temperature entering the TEV = 6.72 (from rating chart) x 1.17 (CF liquid temperature) = 7.86 kW



# Capacity Tables

## R-410A Capacities in Tons

Valve Type	Nominal Capacity (Tons)	Evaporator Temperature °F																	
		40°F						20°F						0°F					
		Pressure Drop (PSI)																	
		120	160	200	240	280	320	120	160	200	240	280	320	120	160	200	240	280	320
HC(E)	1-1/2	1.30	1.50	1.68	1.84	1.98	2.12	1.27	1.47	1.64	1.80	1.94	2.08	1.22	1.41	1.58	1.73	1.87	1.99
HC(E)	3	2.60	3.00	3.35	3.67	3.97	4.24	2.55	2.94	3.29	3.60	3.89	4.16	2.44	2.82	3.15	3.45	3.73	3.99
HC(E)	5	4.33	5.00	5.59	6.12	6.61	7.07	4.24	4.90	5.48	6.00	6.48	6.93	4.07	4.70	5.25	5.76	6.22	6.65
OZE	20	17.1	19.7	22.1	24.2	26.1	27.9	16.7	19.3	21.6	23.7	25.6	27.3	15.8	18.2	20.4	22.3	24.1	25.8
OZE	25	20.5	23.7	26.5	29.0	31.3	33.5	20.1	23.2	25.9	28.4	30.7	32.8	19.0	21.9	24.5	26.8	29.0	31.0
OZE	35	28.2	32.6	36.4	39.9	43.1	46.1	27.6	31.9	35.6	39.0	42.2	45.1	26.1	30.1	33.6	36.9	39.8	42.6
OZE	50	42.7	49.3	55.2	60.4	65.3	69.8	41.8	48.3	54.0	59.1	63.9	68.3	39.5	45.6	51.0	55.8	60.3	64.5
OZE	60	51.3	59.2	66.2	72.5	78.3	83.7	50.2	57.9	64.8	71.0	76.7	82.0	47.4	54.7	61.2	67.0	72.4	77.4

Refrigerant	Liquid Temperature Entering TEV							
	0°F	20°F	40°F	60°F	80°F	100°F	120°F	140°F
	Correction Factor, CF Liquid Temperature							
R-410A	1.79	1.63	1.47	1.32	1.16	1.00	0.83	0.62

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

**TEV Capacity = TEV Rating x CF Liquid Temperature** – Example: Actual capacity of an HCE-3 using R-410A at a 40°F evaporator, 160 psi pressure drop across the TEV, and a 80°F liquid temperature entering the TEV = 3.00 (from rating chart) x 1.16 (CF liquid temperature) = 3.48 tons

## R-410A Capacities in Kilowatts

Valve Type	Nominal Capacity (kW)	Evaporator Temperature °C																	
		5°C						-5°C						-15°C					
		Pressure Drop (BAR)																	
		8	11	14	17	20	23	8	11	14	17	20	23	8	11	14	17	20	23
HC(E)	5	4.49	5.27	5.94	6.55	6.55	7.62	4.40	5.16	5.82	6.41	6.41	7.46	4.29	5.02	5.67	6.25	6.25	7.27
HC(E)	11	8.98	10.5	11.9	13.1	13.1	15.2	8.80	10.3	11.6	12.8	12.8	14.9	8.57	10.0	11.3	12.5	12.5	14.5
HC(E)	18	15.0	17.6	19.8	21.8	21.8	25.4	14.7	17.2	19.4	21.4	21.4	24.9	14.3	16.7	18.9	20.8	20.8	24.2
OZE	70	59.8	70.1	79.1	87.1	94.5	101	58.5	68.6	77.4	85.2	92.5	99.2	55.7	65.3	73.7	81.2	88.1	94.5
OZE	88	71.7	84.1	94.9	105	113	122	70.2	82.3	92.8	102	111	119	66.9	78.4	88.5	97.5	106	113
OZE	123	98.6	116	130	144	156	167	96.5	113	128	141	153	164	92	108	122	134	145	156
OZE	176	149	175	198	218	236	253	146	171	193	213	231	248	139	163	184	203	220	236
OZE	211	179	210	237	261	284	304	175	206	232	256	277	297	167	196	221	244	264	283

Refrigerant	Liquid Temperature Entering TEV							
	-10°C	0°C	10°C	20°C	30°C	40°C	50°C	60°C
	Correction Factor, CF Liquid Temperature							
R-410A	1.73	1.59	1.44	1.30	1.15	1.00	0.84	0.65

These factors include corrections for liquid refrigerant density and net refrigerating effect, and are based on an evaporator temperature of -15°C. However, they may be used for any evaporator temperature from -15°C to 5°C since the variation in the actual factors across this range is insignificant.

**TEV Capacity = TEV Rating x CF Liquid Temperature** – Example: Actual capacity of an HCE-3 using R-410A at a 5°C evaporator, 11 bar pressure drop across the TEV, and a 30°C liquid temperature entering the TEV = 10.5 (from rating chart) x 1.15 (CF liquid temperature) = 12.1 kW

# A Series Constant Pressure (Automatic) Valves

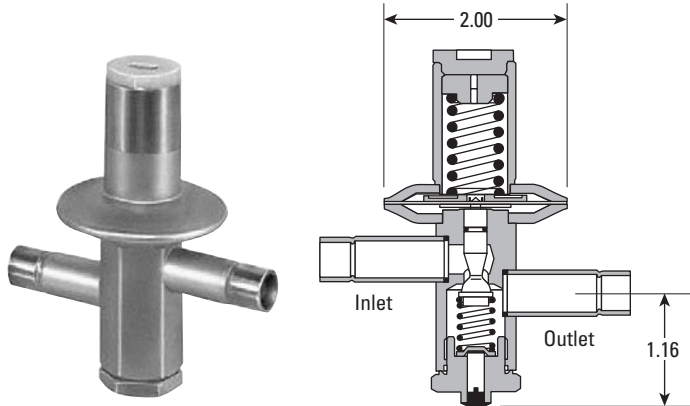
## Specifications

- 0-90 psig adjustment range
- Bypass bleeds available
- Construction: Brass, copper and stainless steel
- Optional external equalizer
- U.L. recognized for maximum operating pressure of 500 psig high side, 225 psig low side

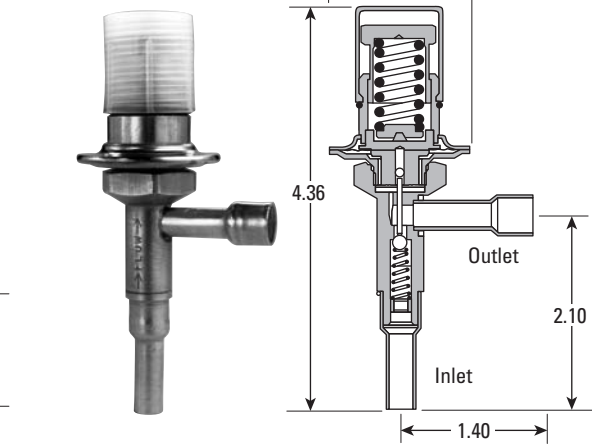
Model No.	Equalizer	Connections (Inches)	
		Inlet	Outlet
A1	Internal	1/4 SAE	1/4 NPTF
A2*	Internal	1/4 SAE	1/2 SAE
A3	Internal	3/8 SAE	1/2 SAE
A4	Internal	1/4 SAE	1/2 SAE
AS	Internal	1/4 ODF	3/8 ODF
A7	Internal	3/8 ODF	3/8 ODF
AT	Internal	1/4 SAE 1/4 ODF 8 mm ODF	1/4 NPTF 8 mm ODF

\* 1/2" x 3/8" SAE flare adaptor available.

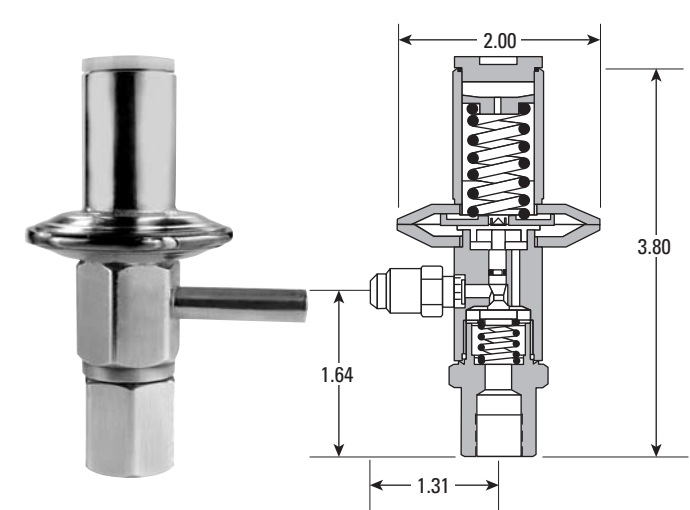
Model A7



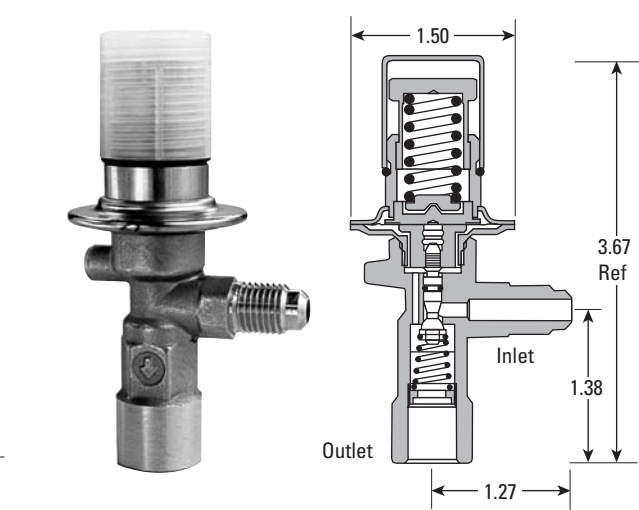
Model AS



Model AT

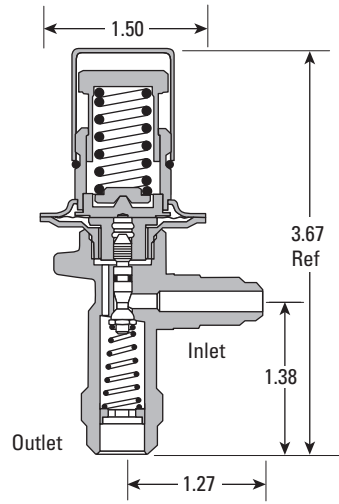
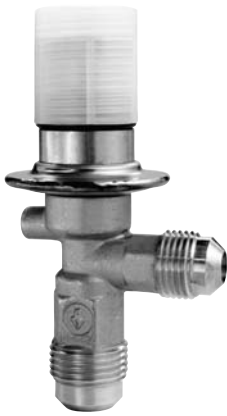


Model A1

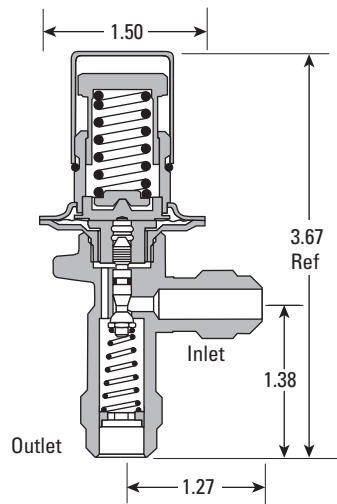


# A Series Constant Pressure (Automatic) Valves

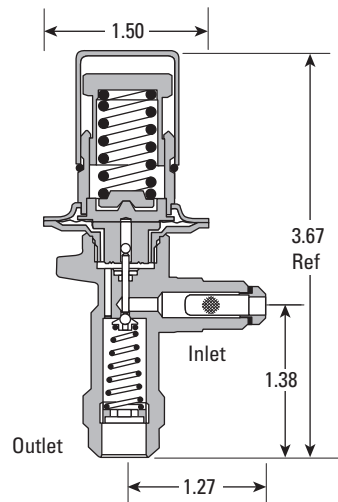
Model A2



Model A3



Model A4













## CLIMATE CONTROL

- Accumulators
- CO<sub>2</sub> controls
- Electronic controllers
- Filter-driers
- Hand shut-off valves
- Heat exchangers
- Hose & fittings
- Pressure regulating valves
- Refrigerant distributors
- Safety relief valves
- Solenoid valves
- Thermostatic expansion valves



### AEROSPACE

- Flight control systems & components
- Fluid conveyance systems
- Fluid metering delivery & atomization devices
- Fuel systems & components
- Hydraulic systems & components
- Inert nitrogen generating systems
- Pneumatic systems & components
- Wheels & brakes



### ELECTROMECHANICAL

- AC/DC drives & systems
- Electric actuators, gantry robots & slides
- Electrohydraulic actuation systems
- Electromechanical actuation systems
- Human machine interfaces
- Linear motors
- Stepper motors, servo motors, drives & controls
- Structural extrusions



### FILTRATION

- Analytical gas generators
- Compressed air & gas filters
- Condition monitoring
- Engine air, fuel & oil filtration & systems
- Hydraulic, lubrication & coolant filters
- Process, chemical, water & microfiltration filters
- Nitrogen, hydrogen & zero air generators



### FLUID & GAS HANDLING

- Brass fittings & valves
- Diagnostic equipment
- Fluid conveyance systems
- Industrial hose
- PTFE & PFA hose, tubing & plastic fittings
- Quick disconnects
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters



### HYDRAULICS

- Diagnostic equipment
- Hydraulic cylinders & accumulators
- Hydraulic motors & pumps
- Hydraulic systems
- Hydraulic valves & controls
- Power take-offs
- Quick disconnects
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters



### PNEUMATICS

- Air preparation
- Brass fittings & valves
- Manifolds
- Pneumatic actuators, grippers, valves, controls & accessories
- Quick disconnects
- Rotary actuators
- Rubber & thermoplastic hose & couplings
- Structural extrusions
- Thermoplastic tubing & fittings
- Vacuum generators, cups & sensors



### PROCESS CONTROL

- Analytical sample conditioning products & systems
- Fluoropolymer chemical delivery fittings, valves & pumps
- High purity gas delivery fittings, valves & regulators
- Instrumentation fittings, valves & regulators
- Medium pressure fittings & valves
- Process control manifolds



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- Dynamic seals
- Elastomeric o-rings
- EMI shielding
- Extruded & precision-cut, fabricated elastomeric seals
- Homogeneous & inserted elastomeric shapes
- High temperature metal seals
- Metal & plastic retained composite seals
- Thermal management

Parker Hannifin Corporation  
**Climate and Industrial Controls Group**  
 2445 South 25th Avenue • Broadview, IL 60155-3891 USA  
 phone 800 742 2681 • fax 800 241 2872  
[www.parker.com/coolparts](http://www.parker.com/coolparts)

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