



SPORLAN

# Electric Expansion Valves

SER-AA, -A (-HP)



ENGINEERING YOUR SUCCESS.

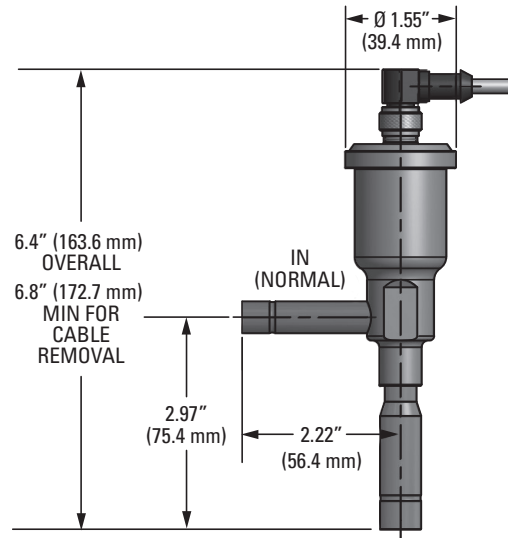
## SER-AA, -A (-HP) ELECTRIC EXPANSION VALVES

The SER-AA and -A valves are suitable for use in subcritical and transcritical CO<sub>2</sub> and other HFC refrigerant systems as electric expansion valves. The -AA and -A models are available with two distinct pressure ratings. The standard SER valves have a maximum rated pressure (MRP) of 1015 psig (70 bar). The high pressure SER-HP version has a 1305 psig (90 bar) MRP. Both the SER and SER-HP models have a maximum operating pressure differential (MOPD) of 580 psid (40 bar). This higher MRP allows the SER-HP models to be applied on transcritical CO<sub>2</sub> systems that maintain safety relief valves at pressures above 70 bar, up to 90 bar.

With advanced pin and port geometries and precision machined components, these bi-flow valves provide unmatched resolution under the lightest load conditions. The SER-HP valves utilize the existing SER body design and improves its pressure rating with newly designed copper fittings.

The SER-HP has the same robust design, corrosion resistance and mounting flexibility for which the SER valve has become known. The SER and SER-HP valves have a removable M12 style cable that is IP67 rated.

## REFERENCE DIMENSIONS



## SPECIFICATIONS

MODEL	STANDARD	HIGH PRESSURE
<b>Motor Type</b>	2 phase, bipolar wet motor	
<b>Compatible Refrigerant</b>	All common HCFC and HFC refrigerants, including R-410A and subcritical R-744 (CO <sub>2</sub> )	
<b>Compatible Oil</b>	All common mineral, polyester and alkybenzene oils	
<b>Supply Voltage</b>	12 volts DC, -5% +10% (L/R)	
<b>Cable Type</b>	IP67 removable M12 connection	
<b>Phase Resistance</b>	100 ohms ± 10%	
<b>Stepping Current</b>	120 ma/winding (L/R)	
<b>Holding Current</b>	Not recommended	
<b>Step Rate</b>	200/second (L/R), up to 400/second (properly configured current chopper)	
<b>Number of Steps</b>	2500 full steps	
<b>MOPD</b>	580 psid (40 bar)	
<b>MRP</b>	1015 psig (70 bar)	1305 psig (90 bar)
<b>Max Internal Leakage</b>	100 cc/min @ 100 psid (6.9 bar), dry air	
<b>Max External Leakage</b>	.10 oz/yr at 300 psig (2.8 gram/yr @ 20 bar)	
<b>Operating Temp. Range</b>	-50°F to 155°F (-45°C to 68°C)	

STANDARD PRESSURE RATING - 70 bar	
Description	Item Number
SER-AA 3x4 ODF Less Cable	805221
SER-A 3x4 ODF Less Cable	805237
SER-AA 3x4 ODF 10'-S	805217
SER-A 3x4 ODF 10'-S	805223
HIGH PRESSURE RATING - 90 bar	
Description	Item Number
SER-AA-HP 3x4 ODF Less Cable	805631
SER-A-HP 3x4 ODF Less Cable	805633
SER-AA-HP 3x4 ODF 10'-S	805639
SER-A-HP 3x4 ODF 10'-S	805641

### ⚠ WARNING – USER RESPONSIBILITY

**Failure or improper selection or improper use of the products described herein or related items can cause death, personal injury and property damage.**

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The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

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For safety information see the Safety Guide at [www.parker.com/safety](http://www.parker.com/safety) or call 1-800-CParker.

### OFFER OF SALE

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### FOR USE ON REFRIGERATION and/or AIR CONDITIONING SYSTEMS ONLY

Bulletin 100-20-1, September 2016 supersedes Bulletin 100-20-1, April 2012 and all prior publications. For more information about our products visit us at [www.sporlan.com](http://www.sporlan.com).

## ORDERING INSTRUCTIONS / NOMENCLATURE

<b>SER</b>	-	<b>AA A</b>	-	<b>HP</b>		<b>3/8"</b>	x	<b>3/8" 1/2"</b>	<b>ODF</b>	-	<b>10' 20' LESS CABLE</b>	-	<b>S</b>
Valve Family		Valve Model		High MRP Designation		Inlet Fitting		Outlet Fitting	Fitting Type		Cable Length		Stripped and Tinned Cable Ends (Custom Connectors Available)

## CAPACITY - Full Stroke Capacity in Tons (at Evaporator Temperature °F)

R-134a	Valve Type	40°F								20°F								0°F							
		Pressure Drop Across Valve (psid)																							
		40	60	80	100	120	140	160	180	40	60	80	100	120	140	160	180	40	60	80	100	120	140	160	180
SER-AA	0.36	0.44	0.50	0.56	0.62	0.67	0.71	0.76	0.34	0.42	0.48	0.54	0.59	0.64	0.68	0.72	0.32	0.40	0.46	0.51	0.56	0.60	0.65	0.68	
SER-A	0.77	0.94	1.09	1.22	1.33	1.44	1.54	1.63	0.73	0.90	1.04	1.16	1.27	1.37	1.47	1.56	0.70	0.85	0.99	1.10	1.21	1.30	1.39	1.48	

R-22	Valve Type	40°F								20°F								0°F							
		Pressure Drop Across Valve (psid)																							
		75	100	125	150	175	200	225	250	75	100	125	150	175	200	225	250	75	100	125	150	175	200	225	250
SER-AA	0.52	0.60	0.67	0.74	0.80	0.85	0.90	0.95	0.51	0.59	0.66	0.72	0.78	0.83	0.88	0.93	0.49	0.57	0.64	0.70	0.76	0.81	0.86	0.90	
SER-A	1.13	1.30	1.46	1.60	1.72	1.84	1.96	2.06	1.10	1.27	1.42	1.56	1.68	1.80	1.91	2.01	1.07	1.24	1.38	1.51	1.63	1.75	1.85	1.95	

R-407A/C/F	Valve Type	40°F								20°F								0°F								-20°F							
		Pressure Drop Across Valve (psid)																															
		75	100	125	150	175	200	225	250	75	100	125	150	175	200	225	250	75	100	125	150	175	200	225	250	75	100	125	150	175	200	225	250
SER-AA	0.48	0.56	0.62	0.68	0.73	0.79	0.83	0.88	0.46	0.53	0.60	0.65	0.70	0.75	0.80	0.84	0.44	0.51	0.57	0.62	0.67	0.72	0.76	0.80	0.42	0.48	0.54	0.59	0.64	0.69	0.73	0.77	
SER-A	1.04	1.20	1.34	1.47	1.59	1.70	1.80	1.90	1.00	1.15	1.29	1.41	1.52	1.63	1.73	1.82	0.95	1.10	1.23	1.35	1.45	1.55	1.65	1.74	0.91	1.05	1.17	1.28	1.39	1.48	1.57	1.66	

R-448A/449A	Valve Type	40°F								20°F								0°F							
		Pressure Drop Across Valve (psid)																							
		75	100	125	150	175	200	225	250	75	100	125	150	175	200	225	250	75	100	125	150	175	200	225	250
SER-AA	0.48	0.56	0.62	0.68	0.74	0.79	0.84	0.88	0.47	0.54	0.60	0.66	0.71	0.76	0.81	0.85	0.45	0.52	0.58	0.63	0.69	0.73	0.78	0.82	
SER-A	1.05	1.21	1.35	1.48	1.60	1.71	1.81	1.91	1.01	1.17	1.30	1.43	1.54	1.65	1.75	1.84	0.97	1.12	1.25	1.37	1.48	1.58	1.68	1.77	

R-448A/449A	Valve Type	-20°F								-40°F							
		Pressure Drop Across Valve (psid)															
		75	100	125	150	175	200	225	250	75	100	125	150	175	200	225	250
SER-AA	0.43	0.49	0.55	0.61	0.65	0.70	0.74	0.78	0.41	0.47	0.53	0.58	0.62	0.67	0.71	0.74	
SER-A	0.93	1.07	1.20	1.31	1.41	1.51	1.60	1.69	0.88	1.02	1.14	1.24	1.34	1.44	1.52	1.61	

R-404A/507A	Valve Type	40°F								20°F								0°F							
		Pressure Drop Across Valve (psid)																							
		75	100	125	150	175	200	225	250	75	100	125	150	175	200	225	250	75	100	125	150	175	200	225	250
SER-AA	0.34	0.39	0.44	0.48	0.52	0.55	0.59	0.62	0.32	0.37	0.41	0.45	0.49	0.52	0.56	0.59	0.30	0.35	0.39	0.43	0.46	0.49	0.52	0.55	
SER-A	0.73	0.85	0.94	1.04	1.12	1.20	1.27	1.34	0.69	0.80	0.89	0.98	1.06	1.13	1.20	1.27	0.65	0.75	0.84	0.92	1.00	1.07	1.13	1.19	

R-404A/507A	Valve Type	-20°F								-40°F							
		Pressure Drop Across Valve (psid)															
		75	100	125	150	175	200	225	250	75	100	125	150	175	200	225	250
SER-AA	0.28	0.33	0.36	0.40	0.43	0.46	0.49	0.51	0.26	0.30	0.34	0.37	0.40	0.43	0.45	0.48	
SER-A	0.61	0.70	0.79	0.86	0.93	1.00	1.06	1.11	0.57	0.65	0.73	0.80	0.87	0.93	0.98	1.03	

R-410A	Valve Type	40°F								20°F								0°F							
		Pressure Drop Across Valve (psid)																							
		80	120	160	200	240	280	320	360	80	120	160	200	240	280	320	360	80	120	160	200	240	280	320	360
SER-AA	0.51	0.63	0.72	0.81	0.89	0.96	1.02	1.08	0.50	0.61	0.71	0.79	0.86	0.93	1.00	1.06	0.48	0.59	0.69	0.77	0.84	0.91	0.97	1.03	
SER-A	1.10	1.35	1.56	1.75	1.91	2.07	2.21	2.34	1.08	1.32	1.52	1.70	1.87	2.02	2.15	2.29	1.05	1.28	1.48	1.66	1.81	1.96	2.09	2.22	

R-744	Valve Type	0°F					-20°F					-40°F				
		Pressure Drop Across Valve (psid)														
		100	150	200	250	300	150	200	250	300	350	200	250	300	350	400
SER-AA	0.88	1.08	1.24	1.39	1.52	1.08	1.24	1.39	1.52	1.64	1.24	1.38	1.51	1.63	1.75	
SER-A	1.90	2.32	2.68	3.00	3.29	2.33	2.69	3.00	3.29	3.55	2.67	2.98	3.27	3.53	3.78	

Liquid Temperature Correction Factors	°F	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
	R-134a	1.69	1.63	1.56	1.49	1.42	1.35	1.28	1.21	1.14	1.07	1.00	0.93	0.86	0.78	0.71
	R-22	1.57	1.51	1.46	1.40	1.34	1.29	1.23	1.18	1.12	1.06	1.00	0.94	0.88	0.82	0.76
	R-407A	1.78	1.70	1.63	1.55	1.48	1.40	1.32	1.24	1.16	1.08	1.00	0.92	0.83	0.75	0.66
	R-407C	1.72	1.65	1.58	1.51	1.44	1.37	1.30	1.22	1.15	1.08	1.00	0.92	0.85	0.77	0.69
	R-407F	1.72	1.65	1.58	1.51	1.44	1.37	1.30	1.23	1.15	1.08	1.00	0.92	0.84	0.76	0.68
	R-448A	1.78	1.70	1.63	1.55	1.48	1.40	1.32	1.24	1.16	1.08	1.00	0.92	0.83	0.75	0.66
	R-449A	1.78	1.71	1.63	1.56	1.48	1.40	1.32	1.25	1.17	1.08	1.00	0.92	0.83	0.75	0.66
	R-404A	2.01	1.92	1.82	1.72	1.62	1.52	1.42	1.32	1.22	1.11	1.00	0.89	0.78	0.66	0.54
	R-507A	2.05	1.95	1.85	1.75	1.64	1.54	1.44	1.33	1.22	1.11	1.00	0.89	0.77	0.65	0.52
	R-410A	1.77	1.70	1.62	1.55	1.48	1.40	1.32	1.25	1.17	1.09	1.00	0.92	0.83	0.73	0.63
	R-744	1.13	1.07	1.00	0.93	0.86	0.79	0.71	0.62	0.51	--	--	--	--	--	--

Capacity is calculated at full stroke, with no reserve capacity. Valve should be selected with consideration given to entire range of potential system conditions.

**CAPACITY - Full Stroke Capacity in kW (at Evaporator Temperature °C)**

R-134a	Valve Type	5°C								-10°C								-20°C							
		Pressure Drop Across Valve (bar)																							
		2.5	4	5.5	7	8.5	10	11.5	13	2.5	4	5.5	7	8.5	10	11.5	13	2.5	4	5.5	7	8.5	10	11.5	13
SER-AA	1.19	1.51	1.77	1.99	2.20	2.38	2.55	2.72	1.12	1.41	1.66	1.87	2.06	2.23	2.39	2.55	1.06	1.35	1.58	1.78	1.96	2.13	2.28	2.43	
SER-A	2.57	3.26	3.82	4.31	4.75	5.15	5.52	5.87	2.41	3.05	3.58	4.04	4.45	4.83	5.17	5.50	2.30	2.91	3.41	3.85	4.24	4.60	4.94	5.25	

R-22	Valve Type	5°C								-10°C								-20°C							
		Pressure Drop Across Valve (bar)																							
		4	6	8	10	12	14	16	18	4	6	8	10	12	14	16	18	4	6	8	10	12	14	16	18
SER-AA	1.62	1.98	2.28	2.55	2.80	3.02	3.23	3.43	1.56	1.91	2.20	2.46	2.70	2.91	3.12	3.30	1.52	1.86	2.14	2.40	2.62	2.84	3.03	3.21	
SER-A	3.49	4.28	4.94	5.52	6.05	6.53	6.98	7.40	3.37	4.12	4.76	5.32	5.83	6.30	6.73	7.14	3.28	4.01	4.63	5.18	5.67	6.13	6.55	6.95	

R-407A/C/F	Valve Type	5°C								-10°C								-20°C								-30°C							
		Pressure Drop Across Valve (bar)																															
		4	6	8	10	12	14	16	18	4	6	8	10	12	14	16	18	4	6	8	10	12	14	16	18	4	6	8	10	12	14	16	18
SER-AA	1.48	1.82	2.10	2.35	2.57	2.78	2.97	3.15	1.40	1.71	1.98	2.21	2.42	2.62	2.80	2.97	1.34	1.64	1.90	2.12	2.32	2.51	2.68	2.84	1.28	1.57	1.82	2.03	2.22	2.40	2.57	2.72	
SER-A	3.21	3.93	4.54	5.07	5.56	6.00	6.42	6.80	3.03	3.71	4.28	4.78	5.24	5.66	6.05	6.42	2.90	3.55	4.10	4.58	5.02	5.42	5.79	6.14	2.77	3.40	3.92	4.39	4.81	5.19	5.55	5.89	

R-448A/449A	Valve Type	5°C								-10°C								-20°C							
		Pressure Drop Across Valve (bar)																							
		4	6	8	10	12	14	16	18	4	6	8	10	12	14	16	18	4	6	8	10	12	14	16	18
SER-AA	1.50	1.83	2.12	2.37	2.59	2.80	2.99	3.18	1.42	1.74	2.01	2.25	2.47	2.66	2.85	3.02	1.37	1.68	1.94	2.17	2.37	2.56	2.74	2.91	
SER-A	3.24	3.96	4.58	5.12	5.60	6.05	6.47	6.86	3.08	3.77	4.35	4.87	5.33	5.76	6.16	6.53	2.96	3.63	4.19	4.68	5.13	5.54	5.92	6.28	

R-448A/449A	Valve Type	-30°C								-40°C							
		Pressure Drop Across Valve (bar)															
		4	6	8	10	12	14	16	18	4	6	8	10	12	14	16	18
SER-AA	1.32	1.61	1.86	2.08	2.28	2.46	2.63	2.79	1.26	1.54	1.78	1.99	2.18	2.35	2.51	2.66	
SER-A	2.85	3.48	4.02	4.50	4.93	5.32	5.69	6.04	2.72	3.33	3.84	4.29	4.70	5.08	5.43	5.76	

R-404A/507A	Valve Type	5°C								-10°C								-20°C							
		Pressure Drop Across Valve (bar)																							
		4	6	8	10	12	14	16	18	4	6	8	10	12	14	16	18	4	6	8	10	12	14	16	18
SER-AA	1.04	1.28	1.48	1.65	1.81	1.95	2.09	2.22	0.97	1.19	1.37	1.53	1.68	1.81	1.94	2.05	0.92	1.12	1.30	1.45	1.59	1.72	1.83	1.95	
SER-A	2.26	2.77	3.19	3.57	3.91	4.22	4.52	4.79	2.09	2.56	2.96	3.31	3.62	3.92	4.19	4.44	1.98	2.43	2.80	3.13	3.43	3.71	3.96	4.21	

R-404A/507A	Valve Type	-30°C								-40°C							
		Pressure Drop Across Valve (bar)															
		4	6	8	10	12	14	16	18	4	6	8	10	12	14	16	18
SER-AA	0.86	1.06	1.22	1.36	1.49	1.61	1.72	1.83	0.81	0.99	1.14	1.27	1.40	1.51	1.61	1.71	
SER-A	1.86	2.28	2.64	2.95	3.23	3.49	3.73	3.95	1.74	2.13	2.46	2.75	3.02	3.26	3.48	3.69	

R-410A	Valve Type	5°C								-10°C								-20°C							
		Pressure Drop Across Valve (bar)																							
		5	8	11	14	17	20	23	26	5	8	11	14	17	20	23	26	5	8	11	14	17	20	23	26
SER-AA	1.71	2.16	2.54	2.86	3.15	3.42	3.67	3.90	1.65	2.09	2.45	2.76	3.05	3.30	3.54	3.77	1.61	2.03	2.39	2.69	2.97	3.22	3.45	3.67	
SER-A	3.70	4.68	5.48	6.19	6.82	7.39	7.93	8.43	3.57	4.52	5.30	5.98	6.58	7.14	7.66	8.14	3.48	4.40	5.16	5.82	6.41	6.95	7.46	7.93	

R-744	Valve Type	-20°C				-30°C				-40°C			
		Pressure Drop Across Valve (bar)											
		8	12	16	20	12	16	20	24	16	20	24	28
SER-AA	3.34	4.09	4.73	5.29	4.09	4.73	5.28	5.79	4.70	5.25	5.75	6.22	
SER-A	7.22	8.85	10.22	11.42	8.85	10.21	11.42	12.51	10.15	11.35	12.44	13.43	

Liquid Temperature Correction Factors	°C	-18	-12	-7	-1	4	10	16	21	27	32	38	43	49	54	60
	R-134a	1.69	1.63	1.56	1.49	1.42	1.35	1.28	1.21	1.14	1.07	1.00	0.93	0.86	0.78	0.71
R-22	1.57	1.51	1.46	1.40	1.34	1.29	1.23	1.18	1.12	1.06	1.00	0.94	0.88	0.82	0.76	
R-407A	1.78	1.70	1.63	1.55	1.48	1.40	1.32	1.24	1.16	1.08	1.00	0.92	0.83	0.75	0.66	
R-407C	1.72	1.65	1.58	1.51	1.44	1.37	1.30	1.22	1.15	1.08	1.00	0.92	0.85	0.77	0.69	
R-407F	1.72	1.65	1.58	1.51	1.44	1.37	1.30	1.23	1.15	1.08	1.00	0.92	0.84	0.76	0.68	
R-448A	1.78	1.70	1.63	1.55	1.48	1.40	1.32	1.24	1.16	1.08	1.00	0.92	0.83	0.75	0.66	
R-449A	1.78	1.71	1.63	1.56	1.48	1.40	1.32	1.25	1.17	1.08	1.00	0.92	0.83	0.75	0.66	
R-404A	2.01	1.92	1.82	1.72	1.62	1.52	1.42	1.32	1.22	1.11	1.00	0.89	0.78	0.66	0.54	
R-507A	2.05	1.95	1.85	1.75	1.64	1.54	1.44	1.33	1.22	1.11	1.00	0.89	0.77	0.65	0.52	
R-410A	1.77	1.70	1.62	1.55	1.48	1.40	1.32	1.25	1.17	1.09	1.00	0.92	0.83	0.73	0.63	
R-744	1.13	1.07	1.00	0.93	0.86	0.79	0.71	0.62	0.51	--	--	--	--	--	--	

Capacity is calculated at full stroke, with no reserve capacity. Valve should be selected with consideration given to entire range of potential system conditions.

