April 2012 / **Bulletin 100-20-1**

SPORLAN

Electric Expansion Valves

SER-AA, -A

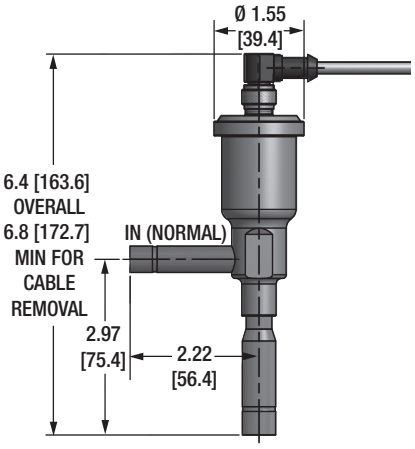
Parker

ENGINEERING YOUR SUCCESS.

SER-AA, -A ELECTRIC EXPANSION VALVES

The SER-AA and SER-A are the latest addition to the 2nd Generation SER family of Electric Expansion Valves (EEV). Ideal for subcritical CO_2 (R-744) supermarket cases, they are also perfect for your small HFC and HCFC applications. With advanced pin and port geometry and precision machined components, these bi-flow valves provide unmatched resolution under the lightest load conditions. By leveraging the unique uni-body construction of the SER-B, -C and -D, the SER-AA and SER-A can offer increased corrosion resistance, reduced leak paths, and improved mounting flexibility over competitive designs. And featuring IP67 removable M12 connections, these valves can be mounted in harsh refrigeration environments with confidence, without sacrificing serviceability or performance.

REFERENCE DIMENSIONS



SPECIFICATIONS	
Motor Type	2 phase, bipolar wet motor
Compatible refrigerant	All common HCFC and HFC refrigerants, including R-410A and subcritical R-744 (CO_2)
Compatible oil	All common mineral, polyester and alkybenzene oils
Supply voltage	12 volts DC, -5% +10% (L/R)
Cable type	IP67 removable M12 connection
Phase resistance	100 ohms ± 10%
Stepping Current	120 ma/winding (L/R)
Holding Current	Not recommended
Step rate	200/second (L/R), up to 400/second (properly configured current chopper)
Number of steps	2500 full steps
MOPD	580 psid (40 bar)
MRP	1015 psig (70 bar)
Max internal leakage	100 cc/min @ 100 psid (6.9 bar), dry air
Max external leakage	.10 oz/yr at 300 psig (2.8 gram/yr @ 20 bar)
Operating temp range	-50°F to 155°F (-45°C to 68°C)

ORDERING INSTRUCTIONS / NOMENCLATURE

SER	–	AA A	3/8"	x	3/8" 1/2"	ODF	–	10' 20' LESS CABLE	–	S
Valve Family		Valve Model	Inlet Fitting		Outlet Fitting	Fitting Type		Cable Length		Stripped and Tinned Cable Ends (Custom Connectors Available)

For more information about our products visit us at www.sporlan.com.

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

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-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-404A

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	0.35	0.40	0.45	0.49	0.53	0.57	0.60	0.63	0.33	0.38	0.42	0.46	0.50	0.54	0.57	0.60	0.31	0.36	0.40	0.44	0.47	0.50	0.53	0.56
SER-A	0.75	0.86	0.97	1.06	1.14	1.22	1.30	1.37	0.71	0.82	0.92	1.00	1.08	1.16	1.23	1.29	0.67	0.77	0.86	0.94	1.02	1.09	1.15	1.22

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	0.29	0.33	0.37	0.41	0.44	0.47	0.50	0.53	0.27	0.31	0.34	0.38	0.41	0.43	0.46	0.49
SER-A	0.62	0.72	0.80	0.88	0.95	1.02	1.08	1.14	0.58	0.66	0.74	0.81	0.88	0.94	1.00	1.05

R-407A

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	0.49	0.56	0.63	0.69	0.75	0.80	0.85	0.89	0.47	0.54	0.60	0.66	0.71	0.76	0.81	0.85	0.44	0.51	0.57	0.63	0.68	0.72	0.77	0.81	0.42	0.48	0.54	0.59	0.64	0.68	0.73	0.76
SER-A	1.06	1.22	1.36	1.49	1.61	1.72	1.83	1.93	1.01	1.16	1.30	1.42	1.54	1.64	1.74	1.84	0.96	1.10	1.24	1.35	1.46	1.56	1.66	1.75	0.91	1.05	1.17	1.28	1.38	1.48	1.57	1.65

R-407C

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-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-422D

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	0.36	0.41	0.46	0.50	0.54	0.58	0.62	0.65	0.34	0.39	0.43	0.48	0.51	0.55	0.58	0.61	0.32	0.36	0.41	0.45	0.48	0.51	0.55	0.58
SER-A	0.77	0.89	0.99	1.09	1.17	1.25	1.33	1.40	0.73	0.84	0.94	1.03	1.11	1.19	1.26	1.33	0.68	0.79	0.88	0.96	1.04	1.11	1.18	1.24

R-507

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

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-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-22	1.56	1.51	1.45	1.40	1.34	1.29	1.23	1.17	1.12	1.06	1.00	0.94	0.88	0.82	0.76
R-134a	1.70	1.63	1.56	1.49	1.42	1.36	1.29	1.21	1.14	1.07	1.00	0.93	0.85	0.78	0.71
R-404A	2.04	1.94	1.84	1.74	1.64	1.54	1.43	1.33	1.22	1.11	1.00	0.89	0.77	0.65	0.53
R-407A	1.76	1.68	1.61	1.53	1.46	1.39	1.31	1.24	1.16	1.08	1.00	0.92	0.83	0.74	0.64
R-407C	1.69	1.62	1.55	1.49	1.42	1.35	1.28	1.21	1.14	1.07	1.00	0.93	0.85	0.77	0.69
R-410A	1.61	1.55	1.49	1.43	1.39	1.31	1.23	1.17	1.12	1.06	1.00	0.94	0.88	0.82	0.76
R-422D	1.99	1.90	1.80	1.70	1.60	1.50	1.41	1.31	1.20	1.10	1.00	0.90	0.79	0.68	0.57
R-507	1.99	1.89	1.79	1.69	1.59	1.50	1.40	1.30	1.20	1.10	1.00	0.89	0.78	0.66	0.51
R-744	1.13	1.07	1.00	0.93	0.86	—	—	—	—	—	—	—	—	—	—

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

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

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-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-404A

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	1.07	1.31	1.51	1.69	1.85	2.00	2.13	2.26	0.99	1.21	1.40	1.57	1.72	1.86	1.98	2.10	0.94	1.15	1.32	1.48	1.62	1.75	1.87	1.99
SER-A	2.31	2.83	3.26	3.65	4.00	4.32	4.61	4.89	2.14	2.62	3.03	3.39	3.71	4.01	4.29	4.55	2.02	2.48	2.86	3.20	3.51	3.79	4.05	4.29

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	0.88	1.07	1.24	1.38	1.52	1.64	1.75	1.86	0.82	1.00	1.16	1.29	1.42	1.53	1.64	1.73
SER-A	1.89	2.32	2.68	2.99	3.28	3.54	3.78	4.01	1.77	2.16	2.50	2.79	3.06	3.31	3.53	3.75

R-407A

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	1.51	1.85	2.14	2.39	2.62	2.83	3.02	3.21	1.42	1.74	2.01	2.24	2.46	2.65	2.84	3.01	1.35	1.66	1.91	2.14	2.34	2.53	2.70	2.87	1.29	1.58	1.82	2.03	2.23	2.41	2.57	2.73
SER-A	3.27	4.00	4.62	5.16	5.66	6.11	6.53	6.93	3.07	3.76	4.34	4.85	5.31	5.74	6.13	6.50	2.92	3.58	4.13	4.62	5.06	5.47	5.84	6.20	2.78	3.40	3.93	4.39	4.81	5.20	5.56	5.90

R-407C

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-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-422D

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	1.10	1.35	1.55	1.74	1.90	2.05	2.20	2.33	1.02	1.25	1.44	1.61	1.76	1.90	2.04	2.16	0.96	1.18	1.36	1.52	1.66	1.79	1.92	2.04
SER-A	2.37	2.91	3.36	3.75	4.11	4.44	4.75	5.04	2.20	2.69	3.11	3.48	3.81	4.12	4.40	4.67	2.07	2.54	2.93	3.28	3.59	3.88	4.15	4.40

R-507

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

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-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-22	1.56	1.51	1.45	1.40	1.34	1.29	1.23	1.17	1.12	1.06	1.00	0.94	0.88	0.82	0.76
R-134a	1.70	1.63	1.56	1.49	1.42	1.36	1.29	1.21	1.14	1.07	1.00	0.93	0.85	0.78	0.71
R-404A	2.04	1.94	1.84	1.74	1.64	1.54	1.43	1.33	1.22	1.11	1.00	0.89	0.77	0.65	0.53
R-407A	1.76	1.68	1.61	1.53	1.46	1.39	1.31	1.24	1.16	1.08	1.00	0.92	0.83	0.74	0.64
R-407C	1.69	1.62	1.55	1.49	1.42	1.35	1.28	1.21	1.14	1.07	1.00	0.93	0.85	0.77	0.69
R-410A	1.61	1.55	1.49	1.43	1.39	1.31	1.23	1.17	1.12	1.06	1.00	0.94	0.88	0.82	0.76
R-422D	1.99	1.90	1.80	1.70	1.60	1.50	1.41	1.31	1.20	1.10	1.00	0.90	0.79	0.68	0.57
R-507	1.99	1.89	1.79	1.69	1.59	1.50	1.40	1.30	1.20	1.10	1.00	0.89	0.78	0.66	0.51
R-744	1.13	1.07	1.00	0.93	0.86	—	—	—	—	—	—	—	—	—	—

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

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