

Silicon Expansion Valve

DATASHEET



OVERVIEW

The Microstaq Silicon Expansion Valve (SEV) is a two-stage proportional control expansion valve ideally suited for electronic refrigerant control systems. It utilizes Microstaq's patented Ventilum™ silicon Micro-Electro-Mechanical Systems (MEMS) technology to provide precise fluid control in today's industry-standard HVAC and refrigeration applications

BENEFITS

The SEV offers the following benefits:

- ◆ The installation and operation of the SEV is simpler and hassle-free
- ◆ The SEV is compatible with most halocarbon refrigerants and can be easily controlled using industry standard control methods
- ◆ Small system footprint
- ◆ High efficiency and reliability through the use of Ventilum™ MEMS technology

PRINCIPLE OF OPERATION

The SEV consists of two major functional components: a pilot valve and a spool valve. The pilot valve is an electronically actuated proportional MEMS silicon valve. This valve receives an electrical signal and provides a proportional command pressure to the spool valve.

The spool feedback pressure is used to balance the pilot command pressure, thus determining spool position. Therefore, the spool moves with the pilot, replicating its linear motion. The spool thus varies directly with the position of the pilot. If at any time, the feedback pressure deviates from the pilot command, the spool will move, either increasing or decreasing the spool opening, until the feedback pressure equalizes with the command pressure. This way the valve is self-correcting, and remains unaffected by perturbations in feedback pressure.

VALVE APPLICATION

The SEV is available in eleven different models to cover the typical capacity range for refrigeration and HVAC systems. Selecting the correct valve for an application is very important, to ensure optimized efficiency since the valves in different ranges will have different control resolution. The tables on the following pages show the various capacity ranges for the eleven valve models. If you know the capacity requirements of your application, the capacity rating tables can help determine the correct valve model (See pages 3, 5, and 6). For unique applications, systems out of the published ranges, or systems on the borderline of ranges, we recommend that you perform a test before you determine the optimal valve model for the application. Microstaq constantly works on improving designs and hence, its products can accommodate a large array of systems. Due to the versatility of the valve and the resiliency of silicon, the valves are capable of a wider range of applications than the ones mentioned in this document. Moreover, Microstaq professionals can assist you in determining the optimal range and valve model for your application.

For more information on SEV installation and application information, please visit www.microstaq.com.

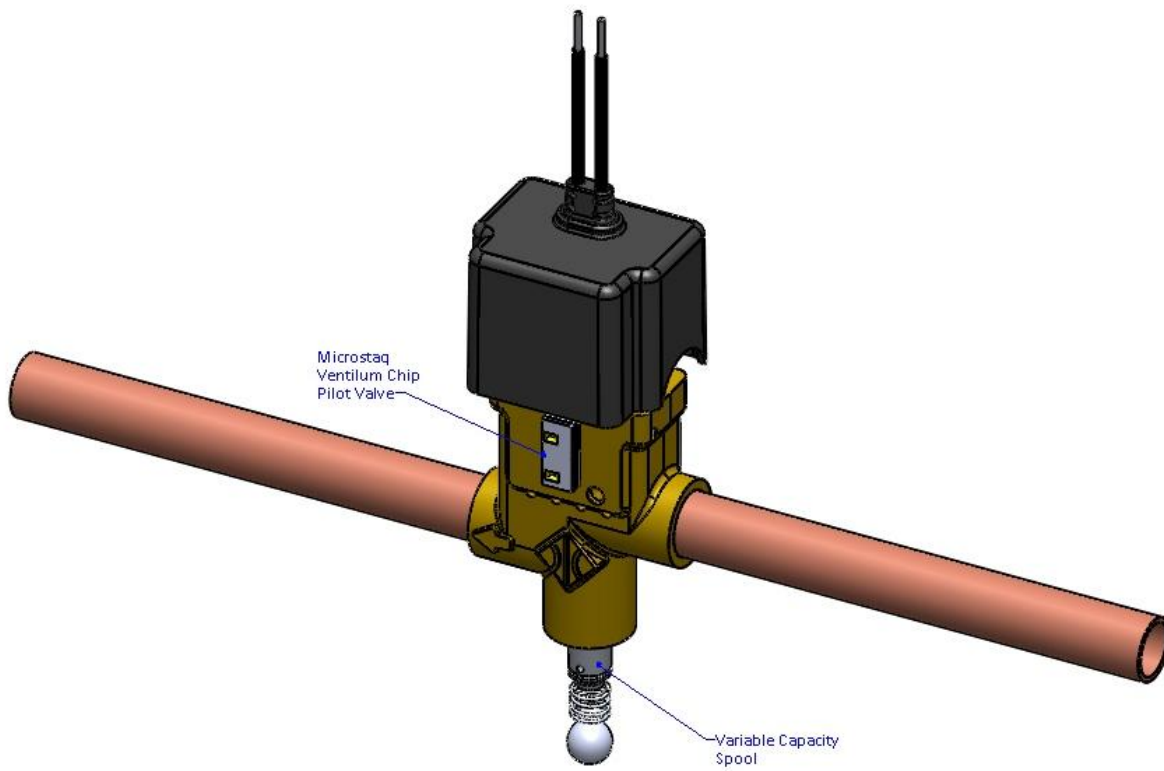
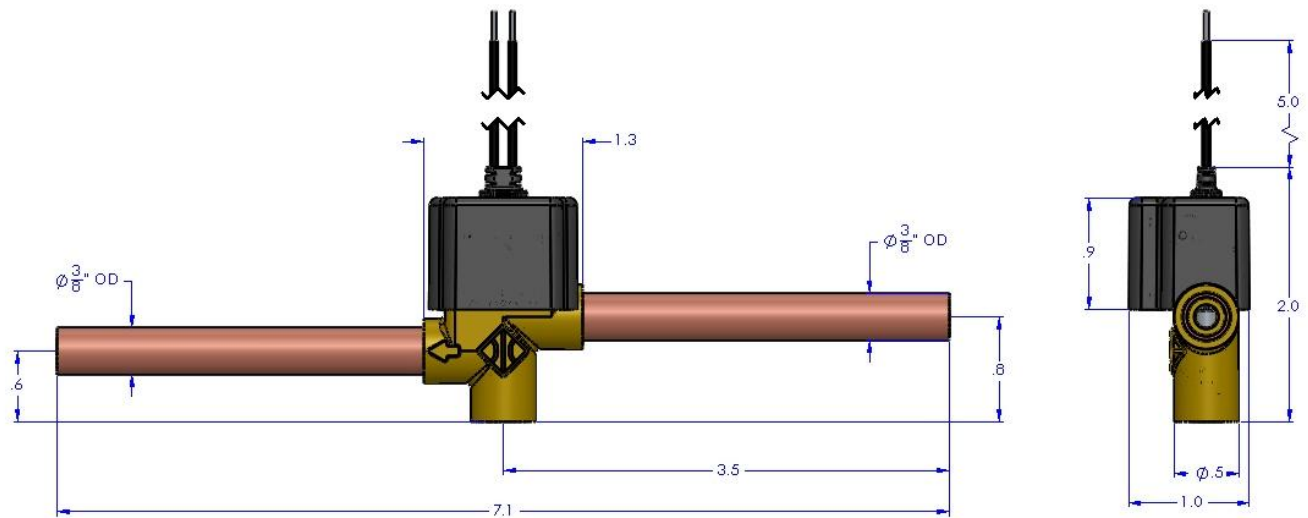
FEATURES

- ◆ Two-stage design with MEMS pilot valve
- ◆ PWM duty cycle control
- ◆ Compact package: Design-in flexibility
- ◆ More than 1 million cycles with no degradation
- ◆ Light-weight design
- ◆ Rapid response: 250 ms from open to close
- ◆ Rapid cool down capability with precise superheat control
- ◆ Compatible with all HCFC and HFC refrigerants
- ◆ Reversible and non-reversible designs
- ◆ CE, FCC, and IP 67 Certified

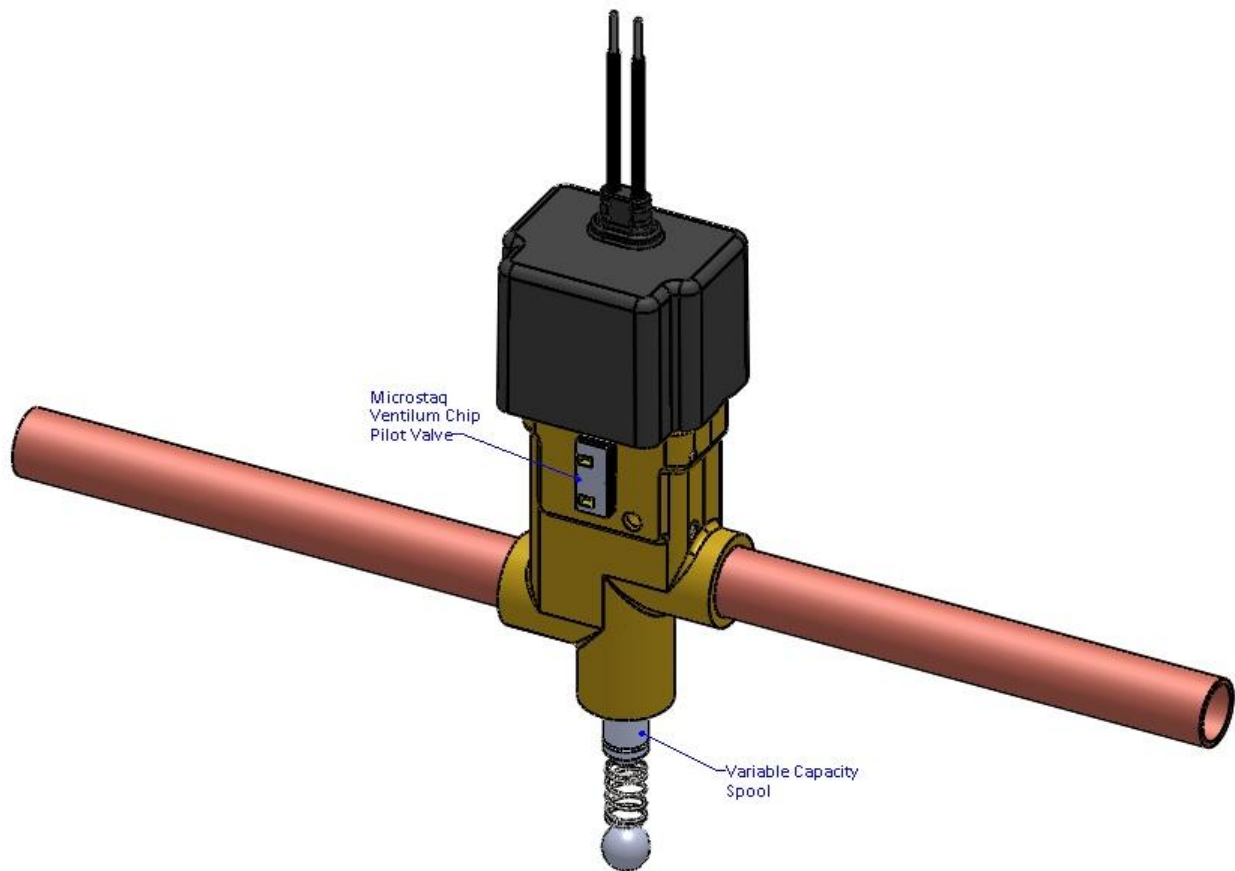
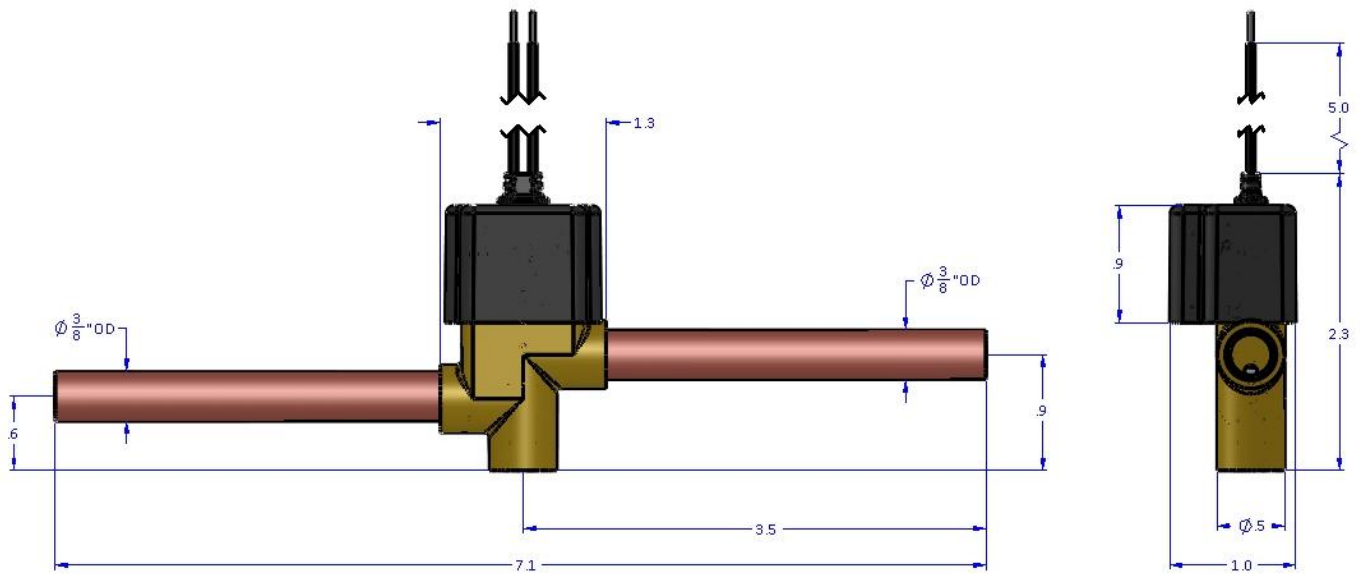
SEV CROSS SECTION AND TECHNICAL DATA

This section shows technical details of the SEV.

TYPICAL SEV ASSEMBLY



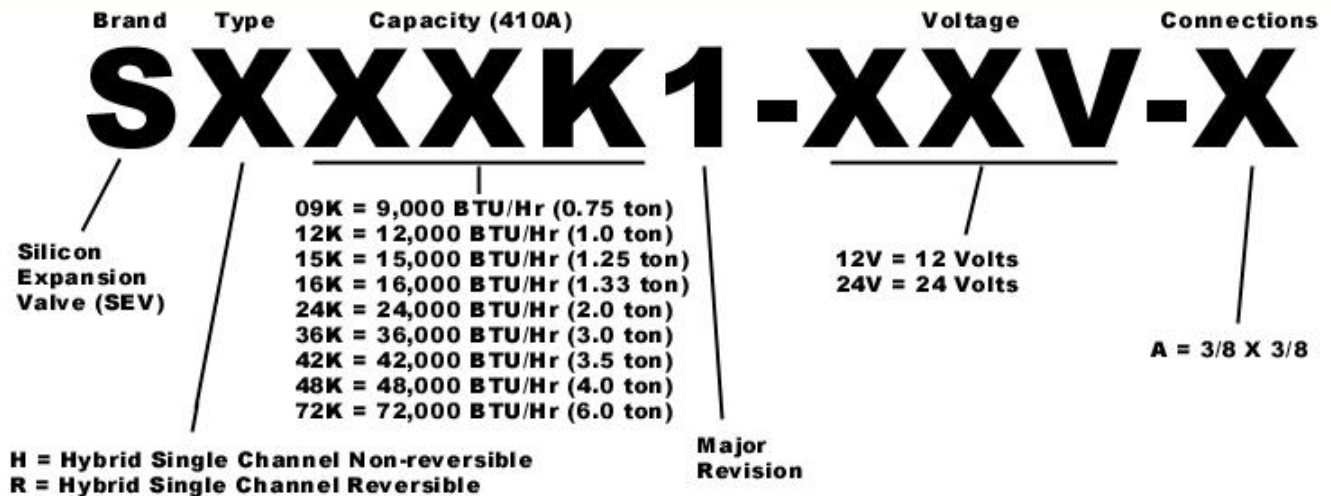
TYPICAL REVERSIBLE SEV ASSEMBLY



Technical Data

Compatible Refrigerants	R410A; R407C; R404A; R134A; R22
Compatible Oils	Polyolester, Alkylbenzene, Mineral
Response Time	0.25 seconds
Power Consumption	12 watts; 6 watts at steady state (in N2)
Voltage	12VDC or 24VAC/DC
Maximum Differential Pressure	500 Psig (34.7 Bar)
Maximum Working Pressure	650 Psig (44.8 Bar)
Burst Pressure	1500 Psig (105 Bar)
Life Cycle	Minimum 1 million cycles
Resolution Range (2 ton+)	0.5 PWM step from 25% to 85%
Resolution Range (< 2 ton)	0.5 PWM step from 25% to 55%
Valve Shutoff Leakage	< 7L/m at 100Psig nitrogen
Refrigerant Temperature	-40°F to 155°F (-40°C to 70°C)

SEV MODEL NOMENCLATURE



NOMINAL CAPACITY TABLE

Valve Model	Capacity, Tons (KW)				
	R-410a	R-22	R-134a	R-407c	R-404a
SH09K1	0.8(2.6)	0.6 (2.2)	0.4 (1.6)	0.6 (2.1)	0.4 (1.4)
SH15K1	1.3 (4.4)	1.0 (3.6)	0.7 (2.6)	1.0 (3.6)	0.7 (2.3)
SH24K1	2.3 (8.0)	1.9 (6.6)	1.4 (4.8)	1.9 (6.5)	1.2 (4.2)
SH36K1	3.0 (10.6)	2.5 (8.7)	1.8 (6.3)	2.5 (8.6)	1.6 (5.6)
SH42K1	3.5 (12.4)	2.9 (10.2)	2.1 (7.4)	2.9 (10.1)	1.9 (6.5)
SH48K1	4.5 (16.0)	3.7 (13.1)	2.7 (9.5)	3.7 (12.9)	2.4 (8.4)
SH72K1	6.5 (22.7)	5.3 (18.7)	3.8 (13.5)	5.2 (18.4)	3.4 (11.9)
SR16K1	1.3 (4.7)	1.1 (3.8)	0.8 (2.8)	1.1 (3.8)	0.7 (2.5)
SR24K1	2.0 (7.0)	1.6 (5.8)	1.2 (4.2)	1.6 (5.7)	1.0 (3.7)
SR36K1	3.0 (10.6)	2.5 (8.7)	1.8 (6.3)	2.5 (8.6)	1.6 (5.6)
	Pressure Drop Across Valve (psi)	Evaporator Temp (°F)			
R-410a	160	40			
R-22	100	40			
R-134a	60	40			
R-407c	100	40			
R-404a	100	40			

CAPACITY TABLES

		R-410A (100°F Liquid)																					
Valve Model	Nominal Capacity (tons)	Pressure Drop Across Valve (ΔP) (psi)																					
		Evap. Temperature 50°F						Evap. Temperature 40°F						Evap. Temperature 20°F									
		80	120	160	200	240	280	320	80	120	160	200	240	280	320	80	120	160	200	240	280	320	
SH09K1	3/4	0.5	0.7	0.8	0.8	0.9	1.0	1.1	0.5	0.6	0.8	0.8	0.9	1.0	1.1	0.5	0.6	0.7	0.8	0.9	1.0	1.0	
SH15K1	1 1/4	0.9	1.1	1.3	1.4	1.5	1.7	1.8	0.9	1.1	1.3	1.4	1.5	1.7	1.8	0.9	1.1	1.2	1.4	1.5	1.6	1.7	
SR16K1	1 1/3	0.9	1.2	1.3	1.5	1.6	1.8	1.9	0.9	1.2	1.3	1.5	1.6	1.8	1.9	0.9	1.1	1.3	1.5	1.6	1.7	1.8	
SH24K1	2	1.6	2.0	2.3	2.6	2.8	3.0	3.2	1.6	2.0	2.3	2.5	2.8	3.0	3.2	1.6	1.9	2.2	2.5	2.7	3.0	3.2	
SR24K1	2	1.4	1.7	2.0	2.2	2.5	2.7	2.8	1.4	1.7	2.0	2.2	2.4	2.6	2.8	1.4	1.7	2.0	2.2	2.4	2.6	2.8	
SH36K1	3	2.2	2.6	3.1	3.4	3.7	4.0	4.3	2.1	2.6	3.0	3.4	3.7	4.0	4.3	2.1	2.6	3.0	3.3	3.6	3.9	4.2	
SR36K1	3	2.1	2.6	3.0	3.4	3.7	4.0	4.3	2.1	2.6	3.0	3.4	3.7	4.0	4.2	2.1	2.5	2.9	3.3	3.6	3.9	4.2	
SH42K1	3 1/2	2.5	3.1	3.6	4.0	4.4	4.7	5.0	2.5	3.1	3.5	4.0	4.3	4.7	5.0	2.5	3.0	3.5	3.9	4.2	4.6	4.9	
SH48K1	4	3.2	4.0	4.6	5.1	5.6	6.1	6.5	3.2	3.9	4.5	5.1	5.6	6.0	6.4	3.2	3.9	4.5	5.0	5.5	5.9	6.3	
SH72K1	6	4.6	5.6	6.5	7.3	8.0	8.6	9.2	4.6	5.6	6.5	7.2	7.9	8.6	9.1	4.5	5.5	6.3	7.1	7.8	8.4	9.0	
		Evap. Temperature 0°F						Evap. Temperature -10°F															
SH09K1	3/4	0.5	0.6	0.7	0.8	0.9	0.9	1.0	0.5	0.6	0.7	0.8	0.9	0.9	1.0								
SH15K1	1 1/4	0.8	1.0	1.2	1.3	1.5	1.6	1.7	0.8	1.0	1.2	1.3	1.4	1.6	1.7								
SR16K1	1 1/3	0.9	1.1	1.3	1.4	1.6	1.7	1.8	0.9	1.1	1.3	1.4	1.5	1.7	1.8								
SH24K1	2	1.5	1.9	2.2	2.4	2.7	2.9	3.1	1.5	1.9	2.1	2.4	2.6	2.8	3.0								
SR24K1	2	1.4	1.7	1.9	2.1	2.3	2.5	2.7	1.3	1.6	1.9	2.1	2.3	2.5	2.7								
SH36K1	3	2.0	2.5	2.9	3.2	3.5	3.8	4.1	2.0	2.5	2.9	3.2	3.5	3.8	4.0								
SR36K1	3	2.0	2.5	2.9	3.2	3.5	3.8	4.1	2.0	2.5	2.9	3.2	3.5	3.8	4.0								
SH42K1	3 1/2	2.4	2.9	3.4	3.8	4.1	4.5	4.8	2.4	2.9	3.3	3.7	4.1	4.4	4.7								
SH48K1	4	3.1	3.8	4.3	4.9	5.3	5.8	6.1	3.0	3.7	4.3	4.8	5.3	5.7	6.1								
SH72K1	6	4.4	5.4	6.2	6.9	7.6	8.2	8.8	4.3	5.3	6.1	6.8	7.5	8.1	8.6								

R-22 (100°F Liquid)																						
Valve Model	Nominal Capacity (tons)	Pressure Drop Across Valve (ΔP) (psi)																				
		75	100	125	150	175	200	225	75	100	125	150	175	200	225	75	100	125	150	175	200	225
		Evap. Temperature 50°F							Evap. Temperature 40°F							Evap. Temperature 20°F						
SH09K1	1/2	0.6	0.6	0.7	0.8	0.8	0.9	1.0	0.5	0.6	0.7	0.8	0.8	0.9	0.9	0.5	0.6	0.7	0.7	0.8	0.8	0.9
SH15K1	1	0.9	1.1	1.2	1.3	1.4	1.5	1.6	0.9	1.0	1.1	1.3	1.4	1.5	1.5	0.9	1.0	1.1	1.2	1.3	1.4	1.5
SR16K1	1	1.0	1.1	1.3	1.4	1.5	1.6	1.7	0.9	1.1	1.2	1.3	1.4	1.5	1.6	0.9	1.1	1.2	1.3	1.4	1.5	1.6
SH24K1	2	1.7	1.9	2.2	2.4	2.6	2.7	2.9	1.6	1.9	2.1	2.3	2.5	2.6	2.8	1.6	1.8	2.0	2.2	2.4	2.6	2.7
SR24K1	1 1/2	1.5	1.7	1.9	2.1	2.2	2.4	2.5	1.4	1.6	1.8	2.0	2.2	2.3	2.5	1.4	1.6	1.8	2.0	2.1	2.3	2.4
SH36K1	2 1/2	2.2	2.6	2.9	3.1	3.4	3.6	3.9	2.2	2.5	2.8	3.0	3.3	3.5	3.7	2.1	2.4	2.7	3.0	3.2	3.4	3.6
SR36K1	2 1/2	2.2	2.5	2.8	3.1	3.4	3.6	3.8	2.1	2.5	2.8	3.0	3.3	3.5	3.7	2.1	2.4	2.7	2.9	3.2	3.4	3.6
SH42K1	3	2.6	3.0	3.4	3.7	4.0	4.2	4.5	2.5	2.9	3.2	3.6	3.8	4.1	4.4	2.5	2.8	3.2	3.5	3.7	4.0	4.2
SH48K1	3 1/2	3.3	3.9	4.3	4.7	5.1	5.5	5.8	3.2	3.7	4.2	4.6	4.9	5.3	5.6	3.1	3.6	4.1	4.5	4.8	5.1	5.5
SH72K1	5	4.8	5.5	6.1	6.7	7.3	7.8	8.2	4.6	5.3	5.9	6.5	7.0	7.5	8.0	4.5	5.2	5.8	6.3	6.8	7.3	7.8
		Evap. Temperature 0°F							Evap. Temperature -10°F							Evap. Temperature -40°F						
SH09K1	1/2	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.5	0.6	0.6	0.7	0.8	0.8	0.9	0.5	0.5	0.6	0.7	0.7	0.8	0.8
SH15K1	1	0.8	1.0	1.1	1.2	1.3	1.4	1.5	0.8	1.0	1.1	1.2	1.3	1.4	1.4	0.8	0.9	1.0	1.1	1.2	1.3	1.4
SR16K1	1	0.9	1.0	1.2	1.3	1.4	1.5	1.6	0.9	1.0	1.1	1.2	1.3	1.4	1.5	0.8	1.0	1.1	1.2	1.3	1.4	1.5
SH24K1	2	1.5	1.8	2.0	2.2	2.3	2.5	2.7	1.5	1.7	1.9	2.1	2.3	2.5	2.6	1.4	1.7	1.8	2.0	2.2	2.3	2.5
SR24K1	1 1/2	1.3	1.6	1.7	1.9	2.1	2.2	2.3	1.3	1.5	1.7	1.9	2.0	2.2	2.3	1.3	1.4	1.6	1.8	1.9	2.0	2.2
SH36K1	2 1/2	2.0	2.4	2.6	2.9	3.1	3.3	3.5	2.0	2.3	2.6	2.8	3.1	3.3	3.5	1.9	2.2	2.5	2.7	2.9	3.1	3.3
SR36K1	2 1/2	2.0	2.4	2.6	2.9	3.1	3.3	3.5	2.0	2.3	2.6	2.8	3.1	3.3	3.5	1.9	2.2	2.5	2.7	2.9	3.1	3.3
SH42K1	3	2.4	2.7	3.1	3.4	3.6	3.9	4.1	2.3	2.7	3.0	3.3	3.6	3.8	4.1	2.2	2.6	2.9	3.1	3.4	3.6	3.9
SH48K1	3 1/2	3.1	3.5	3.9	4.3	4.7	5.0	5.3	3.0	3.5	3.9	4.3	4.6	4.9	5.2	2.9	3.3	3.7	4.0	4.4	4.7	4.9
SH72K1	5	4.4	5.0	5.6	6.2	6.6	7.1	7.5	4.3	4.9	5.5	6.1	6.5	7.0	7.4	4.1	4.7	5.3	5.8	6.2	6.6	7.0

R134a (100°F Liquid)																						
Valve Model	Nominal Capacity (tons)	Pressure Drop Across Valve (ΔP) (psi)																				
		40	60	80	100	120	140	160	40	60	80	100	120	140	160	40	60	80	100	120	140	160
		Evap. Temperature 50°F							Evap. Temperature 40°F							Evap. Temperature 20°F						
SH09K1	1/3	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.4	0.4	0.5	0.6	0.6	0.7	0.7	0.3	0.4	0.5	0.5	0.6	0.7	0.7
SH15K1	3/4	0.6	0.8	0.9	1.0	1.1	1.2	1.2	0.6	0.7	0.9	1.0	1.1	1.1	1.2	0.6	0.7	0.8	0.9	1.0	1.1	1.2
SR16K1	3/4	0.7	0.8	0.9	1.0	1.1	1.2	1.3	0.6	0.8	0.9	1.0	1.1	1.2	1.3	0.6	0.8	0.9	1.0	1.1	1.2	1.2
SH24K1	1 1/2	1.1	1.4	1.6	1.8	2.0	2.1	2.3	1.1	1.4	1.6	1.7	1.9	2.1	2.2	1.1	1.3	1.5	1.7	1.8	2.0	2.1
SR24K1	1 1/4	1.0	1.2	1.4	1.6	1.7	1.8	2.0	1.0	1.2	1.4	1.5	1.7	1.8	1.9	0.9	1.1	1.3	1.5	1.6	1.7	1.8
SH36K1	1 3/4	1.5	1.8	2.1	2.4	2.6	2.8	3.0	1.5	1.8	2.1	2.3	2.5	2.7	2.9	1.4	1.7	2.0	2.2	2.4	2.6	2.8
SR36K1	1 3/4	1.5	1.8	2.1	2.3	2.6	2.8	3.0	1.5	1.8	2.1	2.3	2.5	2.7	2.9	1.4	1.7	2.0	2.2	2.4	2.6	2.8
SH42K1	2	1.8	2.1	2.5	2.8	3.0	3.3	3.5	1.7	2.1	2.4	2.7	3.0	3.2	3.4	1.6	2.0	2.3	2.6	2.8	3.1	3.3
SH48K1	2 1/2	2.2	2.8	3.2	3.6	3.9	4.2	4.5	2.2	2.7	3.1	3.5	3.8	4.1	4.4	2.1	2.6	3.0	3.3	3.6	3.9	4.2
SH72K1	3 1/2	3.2	3.9	4.5	5.1	5.5	6.0	6.4	3.1	3.8	4.4	5.0	5.4	5.9	6.3	3.0	3.7	4.2	4.7	5.2	5.6	6.0
		Evap. Temperature 0°F							Evap. Temperature -10°F													
SH09K1	1/3	0.3	0.4	0.5	0.5	0.6	0.6	0.7	0.3	0.4	0.5	0.5	0.6	0.6	0.6							
SH15K1	3/4	0.6	0.7	0.8	0.9	1.0	1.0	1.1	0.5	0.7	0.8	0.9	0.9	1.0	1.1							
SR16K1	3/4	0.6	0.7	0.8	0.9	1.0	1.1	1.2	0.6	0.7	0.8	0.9	1.0	1.1	1.1							
SH24K1	1 1/2	1.0	1.2	1.4	1.6	1.7	1.9	2.0	1.0	1.2	1.4	1.5	1.7	1.8	2.0							
SR24K1	1 1/4	0.9	1.1	1.2	1.4	1.5	1.6	1.8	0.9	1.1	1.2	1.4	1.5	1.6	1.7							
SH36K1	1 3/4	1.3	1.6	1.9	2.1	2.3	2.5	2.7	1.3	1.6	1.8	2.1	2.3	2.4	2.6							
SR36K1	1 3/4	1.3	1.6	1.9	2.1	2.3	2.5	2.7	1.3	1.6	1.8	2.1	2.3	2.4	2.6							
SH42K1	2	1.6	1.9	2.2	2.5	2.7	2.9	3.1	1.5	1.9	2.2	2.4	2.6	2.8	3.0							
SH48K1	2 1/2	2.0	2.5	2.8	3.2	3.5	3.7	4.0	2.0	2.4	2.8	3.1	3.4	3.7	3.9							
SH72K1	3 1/2	2.9	3.5	4.0	4.5	4.9	5.3	5.7	2.8	3.4	3.9	4.4	4.8	5.2	5.6							

R-404A (100°F Liquid)																						
Valve Model	Nominal Capacity (tons)	Pressure Drop Across Valve (ΔP) (psi)																				
		75	100	125	150	175	200	225	75	100	125	150	175	200	225	75	100	125	150	175	200	225
		Evap. Temperature 50°F							Evap. Temperature 40°F							Evap. Temperature 20°F						
SH09K1	1/3	0.3	0.4	0.5	0.5	0.5	0.6	0.6	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.3	0.4	0.4	0.5	0.5	0.5	0.6
SH15K1	3/4	0.6	0.7	0.8	0.8	0.9	1.0	1.0	0.6	0.7	0.7	0.8	0.9	0.9	1.0	0.5	0.6	0.7	0.8	0.8	0.9	0.9
SR16K1	3/4	0.6	0.7	0.8	0.9	0.9	1.0	1.1	0.6	0.7	0.8	0.9	0.9	1.0	1.0	0.6	0.7	0.7	0.8	0.9	0.9	1.0
SH24K1	1 1/4	1.1	1.2	1.4	1.5	1.6	1.7	1.8	1.0	1.2	1.3	1.5	1.6	1.7	1.8	1.0	1.1	1.3	1.4	1.5	1.6	1.7
SR24K1	1	0.9	1.1	1.2	1.3	1.4	1.5	1.6	0.9	1.0	1.2	1.3	1.4	1.5	1.6	0.9	1.0	1.1	1.2	1.3	1.4	1.5
SH36K1	1 1/2	1.4	1.6	1.8	2.0	2.1	2.3	2.4	1.4	1.6	1.8	1.9	2.1	2.2	2.4	1.3	1.5	1.7	1.8	2.0	2.1	2.3
SR36K1	1 1/2	1.4	1.6	1.8	2.0	2.1	2.3	2.4	1.4	1.6	1.8	1.9	2.1	2.2	2.4	1.3	1.5	1.7	1.8	2.0	2.1	2.2
SH42K1	2	1.6	1.9	2.1	2.3	2.5	2.7	2.8	1.6	1.9	2.1	2.3	2.5	2.6	2.8	1.5	1.8	2.0	2.2	2.3	2.5	2.6
SH48K1	2 1/2	2.1	2.4	2.7	3.0	3.2	3.4	3.7	2.1	2.4	2.7	2.9	3.2	3.4	3.6	2.0	2.3	2.5	2.8	3.0	3.2	3.4
SH72K1	3 1/2	3.0	3.5	3.9	4.3	4.6	4.9	5.2	2.9	3.4	3.8	4.2	4.5	4.8	5.1	2.8	3.2	3.6	3.9	4.3	4.6	4.8
		Evap. Temperature 0°F							Evap. Temperature -10°F							Evap. Temperature -40°F						
SH09K1	1/3	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.3	0.3	0.3	0.4	0.4	0.4	0.5
SH15K1	3/4	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.5	0.6	0.6	0.7	0.8	0.8	0.9	0.4	0.5	0.6	0.6	0.7	0.7	0.8
SR16K1	3/4	0.5	0.6	0.7	0.8	0.8	0.9	0.9	0.5	0.6	0.7	0.7	0.8	0.9	0.9	0.5	0.5	0.6	0.7	0.7	0.8	0.8
SH24K1	1 1/4	0.9	1.1	1.2	1.3	1.4	1.5	1.6	0.9	1.0	1.2	1.3	1.4	1.5	1.6	0.8	0.9	1.0	1.1	1.2	1.3	1.4
SR24K1	1	0.8	0.9	1.0	1.1	1.2	1.3	1.4	0.8	0.9	1.0	1.1	1.2	1.3	1.4	0.7	0.8	0.9	1.0	1.1	1.2	1.2
SH36K1	1 1/2	1.2	1.4	1.6	1.7	1.9	2.0	2.1	1.2	1.4	1.5	1.7	1.8	1.9	2.1	1.1	1.2	1.4	1.5	1.6	1.8	1.9
SR36K1	1 1/2	1.2	1.4	1.6	1.7	1.9	2.0	2.1	1.2	1.4	1.5	1.7	1.8	1.9	2.1	1.1	1.2	1.4	1.5	1.6	1.8	1.9
SH42K1	2	1.4	1.7	1.9	2.0	2.2	2.3	2.5	1.4	1.6	1.8	2.0	2.1	2.3	2.4	1.3	1.4	1.6	1.8	1.9	2.0	2.2
SH48K1	2 1/2	1.8	2.1	2.4	2.6	2.8	3.0	3.2	1.8	2.1	2.3	2.5	2.7	2.9	3.1	1.6	1.9	2.1	2.3	2.5	2.6	2.8
SH72K1	3 1/2	2.6	3.0	3.4	3.7	4.0	4.3	4.6	2.5	2.9	3.3	3.6	3.9	4.2	4.4	2.3	2.6	3.0	3.2	3.5	3.7	4.0

R-407C (100°F Liquid)																						
Valve Model	Nominal Capacity (tons)	Pressure Drop Across Valve (ΔP) (psi)																				
		75	100	125	150	175	200	225	75	100	125	150	175	200	225	75	100	125	150	175	200	225
		Evap. Temperature 50°F							Evap. Temperature 40°F							Evap. Temperature 20°F						
SH09K1	1/2	0.5	0.6	0.7	0.8	0.8	0.9	0.9	0.5	0.6	0.7	0.7	0.8	0.9	0.9	0.5	0.6	0.7	0.7	0.8	0.8	0.9
SH15K1	1	0.9	1.0	1.1	1.3	1.4	1.5	1.5	0.9	1.0	1.1	1.2	1.3	1.4	1.5	0.9	1.0	1.1	1.2	1.3	1.4	1.5
SR16K1	1	0.9	1.1	1.2	1.3	1.4	1.5	1.6	0.9	1.1	1.2	1.3	1.4	1.5	1.6	0.9	1.1	1.2	1.3	1.4	1.5	1.6
SH24K1	2	1.6	1.9	2.1	2.3	2.5	2.6	2.8	1.6	1.8	2.1	2.3	2.4	2.6	2.8	1.6	1.8	2.0	2.2	2.4	2.5	2.7
SR24K1	1 1/2	1.4	1.6	1.8	2.0	2.2	2.3	2.5	1.4	1.6	1.8	2.0	2.1	2.3	2.4	1.4	1.6	1.8	1.9	2.1	2.2	2.4
SH36K1	2 1/2	2.2	2.5	2.8	3.0	3.3	3.5	3.7	2.1	2.5	2.7	3.0	3.2	3.5	3.7	2.1	2.4	2.7	2.9	3.2	3.4	3.6
SR36K1	2 1/2	2.1	2.5	2.8	3.0	3.3	3.5	3.7	2.1	2.4	2.7	3.0	3.2	3.4	3.6	2.1	2.4	2.6	2.9	3.1	3.4	3.6
SH42K1	3	2.5	2.9	3.2	3.6	3.8	4.1	4.4	2.5	2.9	3.2	3.5	3.8	4.1	4.3	2.4	2.8	3.1	3.4	3.7	3.9	4.2
SH48K1	3 1/2	3.2	3.7	4.2	4.6	4.9	5.3	5.6	3.2	3.7	4.1	4.5	4.9	5.2	5.5	3.1	3.6	4.0	4.4	4.7	5.1	5.4
SH72K1	5	4.6	5.3	5.9	6.5	7.0	7.5	8.0	4.5	5.2	5.9	6.4	6.9	7.4	7.9	4.4	5.1	5.7	6.3	6.8	7.2	7.7
		Evap. Temperature 0°F							Evap. Temperature -10°F													
SH09K1	1/2	0.5	0.6	0.6	0.7	0.8	0.8	0.9	0.5	0.6	0.6	0.7	0.7	0.8	0.8							
SH15K1	1	0.8	1.0	1.1	1.2	1.3	1.4	1.4	0.8	0.9	1.1	1.2	1.3	1.3	1.4							
SR16K1	1	0.9	1.0	1.1	1.3	1.4	1.4	1.5	0.9	1.0	1.1	1.2	1.3	1.4	1.5							
SH24K1	2	1.5	1.7	2.0	2.1	2.3	2.5	2.6	1.5	1.7	1.9	2.1	2.3	2.4	2.6							
SR24K1	1 1/2	1.3	1.5	1.7	1.9	2.0	2.2	2.3	1.3	1.5	1.7	1.8	2.0	2.1	2.3							
SH36K1	2 1/2	2.0	2.3	2.6	2.8	3.1	3.3	3.5	2.0	2.3	2.6	2.8	3.0	3.2	3.4							
SR36K1	2 1/2	2.0	2.3	2.6	2.8	3.1	3.3	3.5	2.0	2.3	2.6	2.8	3.0	3.2	3.4							
SH42K1	3	2.3	2.7	3.0	3.3	3.6	3.8	4.1	2.3	2.7	3.0	3.3	3.5	3.8	4.0							
SH48K1	3 1/2	3.0	3.5	3.9	4.3	4.6	4.9	5.2	3.0	3.4	3.8	4.2	4.5	4.8	5.1							
SH72K1	5	4.3	5.0	5.5	6.1	6.6	7.0	7.4	4.2	4.9	5.5	6.0	6.5	6.9	7.3							