

SER SEI SEH

ELECTRIC EXPANSION VALVES

SER



SEI-50



SEH-100



10 FEATURES AND BENEFITS

- Step motor operated for precise control
- High resolution drive assembly - 0.0000783 inches (.02 mm) per step (.00012 for SER)
- Tight seating
- Corrosion resistant materials used throughout
- Field proven reliability
- Low power consumption - 4 watts
- Unique built-in sightglass available - indicates valve operation, moisture levels and refrigerant quality (SEHI only)
- Compatibility tested with most CFC, HCFC, and HFC refrigerants and oils
- Self lubricating materials used for long life
- High linear force output



The **SER**, **SEI** and **SEH** are Electronically Operated Step Motor flow control valves, intended for the precise control of liquid refrigerant flow. Synchronized signals to the motor provide discrete angular movement, which translates into precise linear positioning of the valve pis-

ton. Valve pistons and ports are uniquely characterized, providing improved flow resolution and performance. The **SER**, **SEI** and **SEH** valves are easily interfaced with microprocessor based controllers, including Sporlan supplied controllers.

THE VALVES

Sporlan Electric Expansion Valves (EEVs) are currently available in nominal R-22 capacities from 1-1/2 to 175 tons (5.3 to 615 kW). Therefore, they are applicable on all the same types of systems found in the air conditioning and refrigeration industry as thermostatic expansion valves.

All Sporlan electric valves are designed for compatibility with all current halocarbon refrigerants, including CFCs, HCFCs and HFCs including R-410A. Specific system conditions will dictate which product is necessary to control the application. Specific details can be reviewed with the Sporlan Sales Engineer.

VALVE OPERATION

The SER, SEI and SEH valves modulate by the electronically controlled rotation of a step motor. The step motor drives a gear train and lead screw to position a piston. The piston is used to modulate flow through a port, refer to Figure 1.

The motor is a two phase type driven in the bi-polar mode. Two discrete sets of motor stator windings are powered in sequence to rotate the rotor 3.6 degrees per step. Polarity of the drive signal reverses for each step. SER valves are also available in unipolar versions.

The sequencing is accomplished electronically through the bi-polar drive circuit shown in Figure 2. The drive transistors, Q1 through Q8, are electronically biased in pairs by the controller as shown in table below.

The SER valves have a stroke of .189" (4.8mm) and 1596 steps of resolution. Each step yields .00012" (.03mm) of travel. Large SEI and SEH valves have an operating stroke of 0.500 inches (12.7 mm) and 6386 steps of control, therefore each step translates into 0.0000783 inches (.02 mm) of travel. When used with one of the Sporlan Valve Company controllers, the valves provide unsurpassed accuracy in resolution of flow and repeatability of position.

External parts of the valve are brass and copper and meet or exceed 2000 hour salt spray tests per ASTM B-117.

The SEI/SEH motor housing is equipped with a hermetic cable connection to the motor and a 10 foot (3 meter) motor lead is supplied as standard length. The lead can be supplied in a variety of lengths to suit specific customer requirements, both with or without connectors installed. The SER is equipped with a removeable cable.

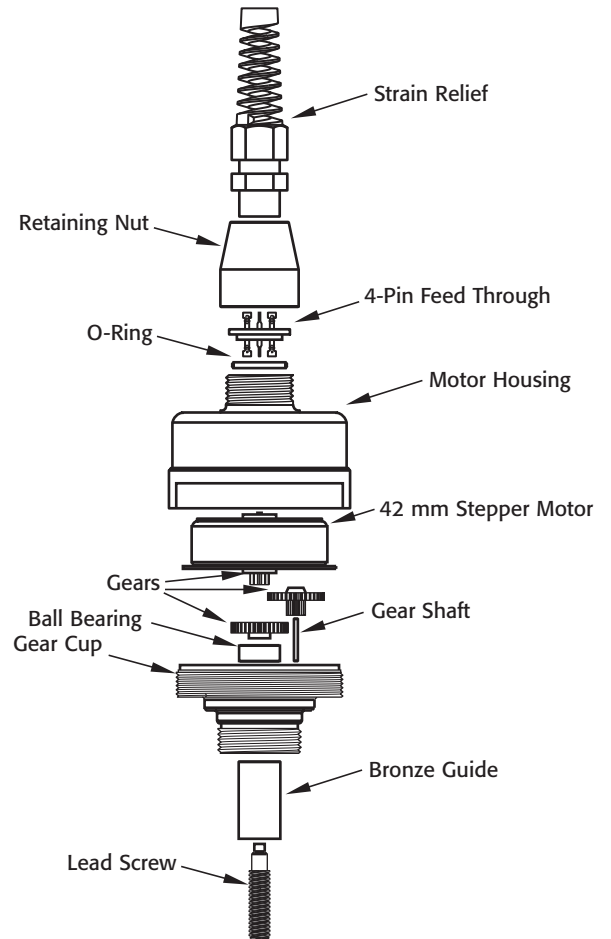
Total power consumption is 4 watts when operating a rate of 200 steps per second with standard L/R type drive circuitry. Refer to motor specifications shown on page 5. Faster step rates may be obtained with proper current limited chopper type drives. Please contact Sporlan Valve Company for more information.

The SER valves are rated at 700 psig (48 bar) MRP while the SEI and SEH valves have a safe working pressure of 620 psig (42 bar). Operating ambient temperature range is -50°F to 140°F (-45°C to 60°C) but temperatures of up to 250°F (120°C) may be used for dehydration.

BIPOLAR DRIVE SEQUENCE				
STEP	Q1-Q4	Q2-Q3	Q5-Q8	Q6-Q7
1	ON	OFF	ON	OFF
2	ON	OFF	OFF	ON
3	OFF	ON	OFF	ON
4	OFF	ON	ON	OFF
1	ON	OFF	ON	OFF

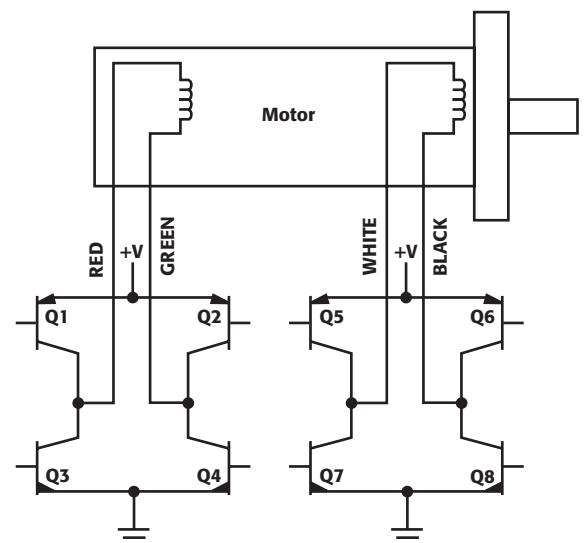
↓ CLOSE
↑ OPEN

Figure 1



NOTE: Exploded view for illustration only, motor housing is hermetic and can not be dis-assembled.

Figure 2



APPLICATION

Sporlan is not responsible for system design, any damage arising from faulty system design, or for misapplication of its products. If these valves are applied in any manner other than as described in this bulletin, the Sporlan warranty is void. Please contact your Sporlan Sales Engineer for assistance with your specific application. General drive circuitry is shown in Figure 2 on page 3. It is the responsibility of the controller manufacturer to provide suitable drive circuitry

and power supply. Sporlan Valve Company will assist where necessary, but accepts no liability for improper control of the valve. It is strongly suggested that power be disabled to the valve when not actively stepping. Conventional initialization routines, which include overdriving the motor to ascertain the zero step position, are acceptable and Sporlan suggests 7500 steps be used. Both L/R and chopper drives may be used, contact Sporlan for more information.

SELECTION PROCEDURE

Electric Expansion Valves (EEVs) are one part of a *system* used for refrigerant flow control in air conditioning or refrigeration applications. The other parts of the system are sensors and an electronic controller.

The EEV controls the flow of refrigerant entering the direct expansion (DX) evaporator in response to signals sent by the controller.

These signals are calculated by the controller from sensor inputs. A set of sensors, either two temperature sensors or a pressure transducer and a temperature sensor, are used to measure superheat. Typical control is based on superheat setpoint but an additional temperature sensor may be used to measure discharge water or air temperature. This air or water temperature is controlled directly, as long as superheat remains at a level to prevent floodback.

The ability of the EEV to control the amount of refrigerant in the evaporator to allow reaching discharge setpoint while preventing floodback makes the EEV the ideal expansion device for most air conditioning, chiller, environmental chamber and refrigeration applications. Some EEV controllers can be programmed to follow unique control algorithms making the EEV especially useful for many diverse applications.

The actual selection of SER, SEI and SEH valves should be based on information generally required for any expansion valve. The following procedure should be used when selecting a Sporlan EEV.

1. Determine pressure drop across 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; (3) static pressure loss (gain) due to the vertical lift (drop) of the liquid line; and (4) pressure drop across a refrigerant distributor, if used. Refer to Bulletin 20-10 for further information on refrigerant distributors.

2. Determine the liquid temperature of the refrigerant entering the valve - The EEV capacity tables are based on a liquid temperature of 100°F (38°C) for R-22, R-134a, R-404A/R-507 and R-407C. For other liquid temperatures, apply the correction factor given in the tables for each refrigerant.

3. Select valve from the capacity tables - Select a valve based on the design evaporating temperature and the available pressure drop across the valve. Due to improved ability to follow load, Sporlan EEV's provide 20% to 110% of nominal capacity listed in the capacity tables. Be sure to apply the appropriate liquid temperature correction factor to the valve ratings shown in the tables. Once the desired valve capacity has been located, determine the nominal capacity of the valve from the first column of the tables. On multiple evaporator systems, select each valve on the basis of individual evaporator capacity.

REFRIGERANT	*AVERAGE PRESSURE DROP ACROSS DISTRIBUTOR
12, 134a	25 psi
22, 404A, 502, 507	35 psi

*See Sporlan Bulletin 20-10 for pressure drop data as related to percent loading.

SELECTION EXAMPLE:

Refrigerant: R-22
Condensing Temperature: 105°F
Liquid Temperature: 80°F
Evaporator Temperature: 40°F
Liquid Line Loss: 7 psi
ΔP Distributor and Tubes: 35 psi
Evaporator Load: 35 tons

Condensing Pressure (psig): 211
Liquid Line Loss (Estimates): - 7
Distributor and Tubes: -35
Evaporator Pressure (psi): -69
ΔP across EEV: 100

R-22, 80°F Liquid Correction Factor from table: 1.12
35 Tons x 1.12 = 39.2 corrected tons required.

Select an **SEI 50** from capacity table.

SPECIFICATIONS

Motor Type: 2 phase permanent magnet, 2 coil bipolar

Supply Voltage: 12 VDC, -5% + 10%, measured at the valve leads

Connections: 4 lead, 18 AWG, PVC insulation jacketed cable

Phase Resistance: 75 ohms per winding \pm 10%

Current Range: .131 to .215 amps/winding; .262 to .439 amps with 2 windings energized

Maximum Power: 4 watts

Inductance Per Winding: 62 \pm 20% mH

Required Step Rate: 200 steps per second, other rates must be tested and approved

Number of Steps: SER - 1596, SEI 30 - 3064, all others 6386

Resolution: SER - .000118 inches/step (.03mm/step), SEI & SEH - .0000783 inches/step (.02 mm/step)

Total Stroke: SER - .189 inches (4.8mm), SEI & SEH - .50 inches (12.7 mm)

Maximum Allowable Internal Leakage: less than 50 cc/min at 100 psi

Maximum Allowable External Leakage: less than .10 oz./year at 300 psig (.2 gr/yr at 20 bar)

Maximum Rated Pressure (MRP): SER - 700, SEI & SEH - 620

Operating Temperature Range: -50°F to 140°F (-45°C to 60°C)

Maximum Dehydration Temperature: 250°F (120°C)

Compatibility: all common CFC, HCFC and HFC refrigerants except ammonia; all common Mineral, Polyolester and Alkylbenzene oils

Materials of Construction: copper - fittings; brass - valve body, motor housing, and adaptors; synthetic materials - seating and seals

ORDERING INSTRUCTIONS:

The SER and SEI 30 are available in angle configurations. The SEI 50, SEH 100 and 175 are available in straight through configurations as shown below. The SEH valves are also available with an optional sightglass built-in. The sight-

glass indicates the moisture levels of the refrigerant, flash gas present at the valve, and provides a visual confirmation of valve piston movement. This unique feature is useful for system refrigerant charging and service.

SEH	(I)	-	175	1-1/8	X	2-1/8	ODF	-	10	-	S
Valve Model	Indicating Sightglass optional		Valve Nominal Capacity	Inlet Fitting 7/8", 1-3/8" and 1-5/8" available*		Outlet Fitting 1-3/8", 1-5/8" and 2-1/8" available*	Fitting type ODF only		Cable Length 10' standard, 30' and 40' available		Stripped and Tinned cable ends, Packard WeatherPak™ also available

* Not all fitting sizes are available on all valves - see table below and on page 6.

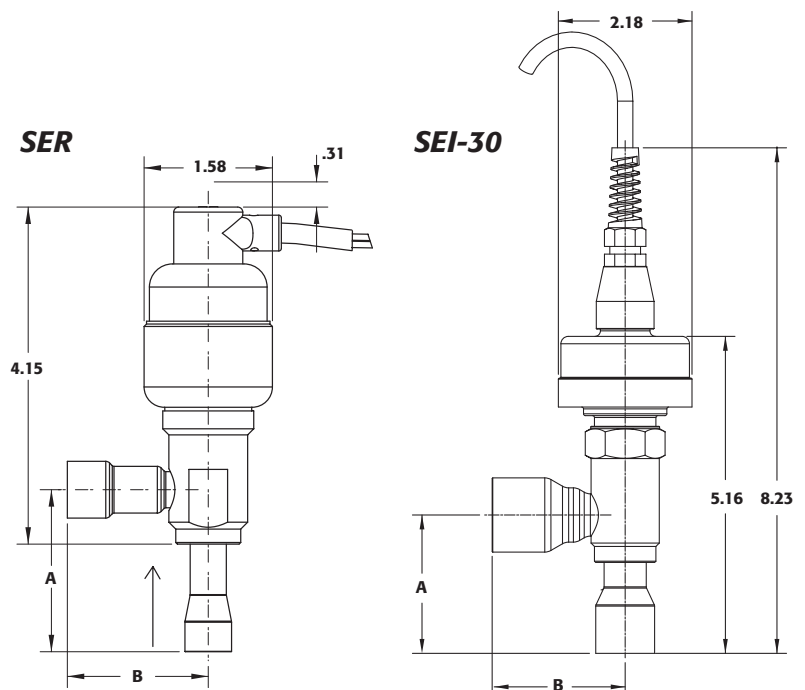
SER & SEI-30

DIMENSIONS:

VALVE TYPE	"A"	"B"
SER 1.5	2.0	1.7
SER 6	2.0	2.3
SER 11	2.5	2.3
SER 20	2.6	2.4
SEI 30	2.2	2.8

AVAILABLE CONNECTIONS:

VALVE TYPE	INLET	OUTLET
SER 1.5, 6, 11	3/6, 1/2, 5/8, 7/8 ODF	1/2, 5/8, 7/8, 1-1/8 ODF
SER 20	1/2, 5/8, 7/8, 1-1/8 ODF	5/8, 7/8, 1-1/8, 1-3/8 ODF
SEI 30	5/8, 7/8, 1-1/8 ODF	5/8, 7/8, 1-1/8 ODF



SPECIFICATIONS continued

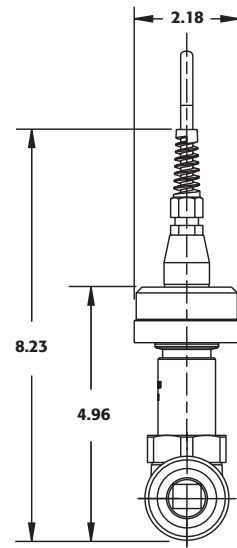
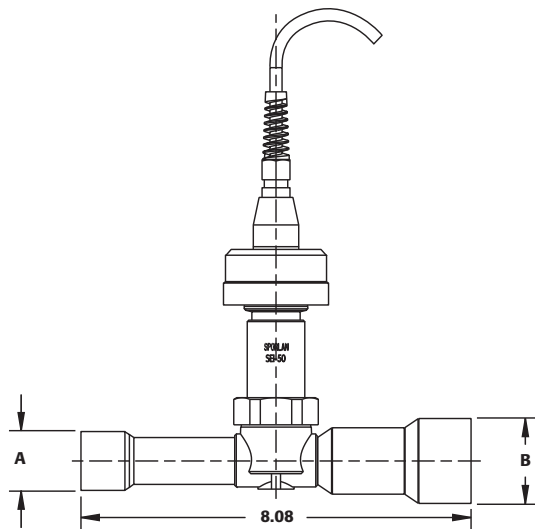
SEI-50

DIMENSIONS:

FITTING SIZE Inches	"A"	"B"
7/8 ODF	.878/.880	---
1-1/8 ODF	1.128/1.1315	---
1-3/8 ODF	---	1.378/1.382
1-5/8 ODF	---	1.628/1.633

AVAILABLE CONNECTIONS:

INLET	OUTLET
7/8, 1-1/8, 1-3/8 ODF	7/8, 1-1/8, 1-3/8, 1-5/8 ODF



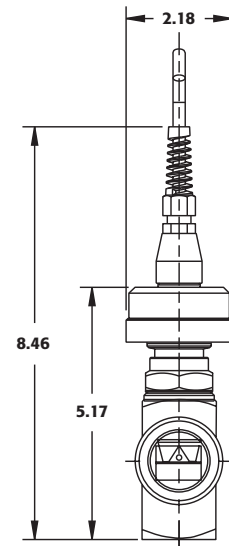
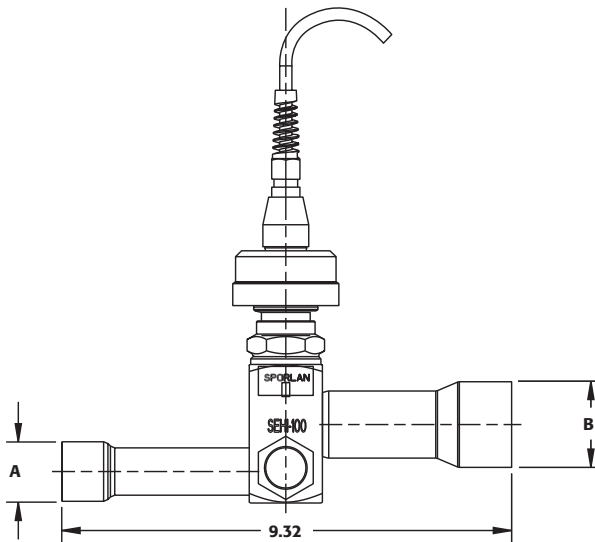
SEH-100

DIMENSIONS:

FITTING SIZE Inches	"A"	"B"
1-1/8 ID	1.128/1.1315	---
1-3/8 ID	1.378/1.382	1.378/1.382
1-5/8 ID	---	1.628/1.633

AVAILABLE CONNECTIONS:

INLET	OUTLET
1-1/8, 1-3/8 ODF	1-3/8, 1-5/8 ODF



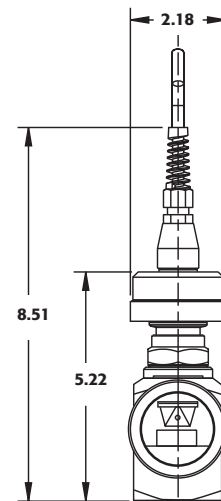
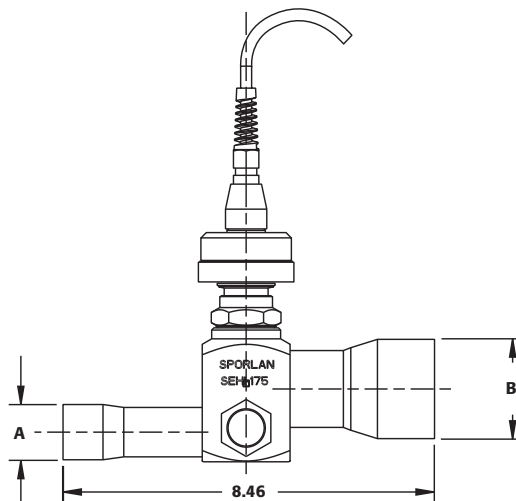
SEH-175

DIMENSIONS:

FITTING SIZE Inches	"A"	"B"
1-1/8 ID	1.128/1.1315	---
1-3/8 ID	1.378/1.3815	---
1-5/8 ID	1.628/1.633	---
2-1/8 ID	---	2.128/2.133

AVAILABLE CONNECTIONS:

INLET	OUTLET
1-1/8, 1-3/8, 1-5/8 ODF	2-1/8 ODF



OF CAPACITY RATINGS

TONS at EVAPORATOR TEMPERATURE (Based on 100°F Liquid)

R-22 & R-134A

LIQUID TEMPERATURE CORRECTION FACTORS

°F	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
	-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/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-407C	1.33	1.30	1.28	1.25	1.22	1.19	1.16	1.12	1.09	1.04	1.00	0.95	0.90	0.84	0.77
R-410A	1.79	1.71	1.63	1.55	1.47	1.40	1.32	1.24	1.16	1.08	1.00	0.92	0.83	0.73	0.62

NOTE: Correction factor closest to actual system liquid temperatures may be used, e.g. 5°C actual liquid use 4°C factor. Based on 0°F evaporator, variation across evaporating range of -40°F to 40°F (-40°C to 5°C) is insignificant.

R-22

VALVE TYPE	40°F															20°F															0°F																																
	-20°F															-40°F																																															
	50	75	100	125	150	175	200	250	300	350	400	450	500	550	600	650	50	75	100	125	150	175	200	250	300	350	400	450	500	550	600	650	50	75	100	125	150	175	200	250	300	350	400	450	500	550	600	650	50	75	100	125	150	175	200	250	300	350	400	450	500	550	600
SER 1-1/2	1.1	1.3	1.5	1.7	1.8	2.0	2.1	1.0	1.3	1.5	1.6	1.8	1.9	2.1	2.1	1.1	1.3	1.5	1.6	1.8	1.9	2.1	2.1	1.2	1.4	1.6	1.7	1.9	2.0	2.1	1.1	1.3	1.5	1.6	1.8	1.9	2.1	2.1	1.2	1.4	1.6	1.7	1.9	2.0	2.1	1.1	1.3	1.5	1.6	1.8	1.9	2.1	2.1	1.2	1.4	1.6	1.7	1.9	2.0	2.1			
SER 6	4.2	5.2	6.0	6.7	7.3	7.9	8.5	4.1	5.1	5.8	6.5	7.2	7.7	8.3	8.5	4.2	5.2	6.0	6.7	7.3	7.9	8.5	8.5	4.9	5.7	6.4	7.0	7.5	8.0	8.5	4.2	5.2	6.0	6.7	7.3	7.9	8.5	8.5	4.9	5.7	6.4	7.0	7.5	8.0	8.5	4.2	5.2	6.0	6.7	7.3	7.9	8.5	8.5	4.9	5.7	6.4	7.0	7.5	8.0	8.5			
SER 11	7.8	9.5	11.0	12.3	13.5	14.6	15.6	7.6	9.3	10.7	12.0	13.1	14.2	15.2	15.6	7.8	9.5	11.0	12.3	13.5	14.6	15.6	15.6	9.0	10.4	11.6	12.8	13.8	14.7	15.6	7.8	9.5	11.0	12.3	13.5	14.6	15.6	15.6	9.0	10.4	11.6	12.8	13.8	14.7	15.6	7.8	9.5	11.0	12.3	13.5	14.6	15.6	15.6	9.0	10.4	11.6	12.8	13.8	14.7	15.6			
SER 20	14.1	17.3	20.0	22.4	24.5	26.5	28.3	13.8	16.9	19.5	21.8	23.9	25.8	27.6	28.4	14.1	17.3	20.0	22.4	24.5	26.5	28.3	28.3	16.4	18.9	21.2	23.2	25.1	26.8	28.4	14.1	17.3	20.0	22.4	24.5	26.5	28.3	28.3	16.4	18.9	21.2	23.2	25.1	26.8	28.4	14.1	17.3	20.0	22.4	24.5	26.5	28.3	28.3	16.4	18.9	21.2	23.2	25.1	26.8	28.4			
SEI 30	24.7	30.3	35.0	39.1	42.9	46.3	49.5	24.1	29.5	34.1	38.1	41.8	45.1	48.2	49.7	24.7	30.3	35.0	39.1	42.9	46.3	49.5	49.5	28.7	33.1	37.1	40.6	43.8	46.9	49.7	24.7	30.3	35.0	39.1	42.9	46.3	49.5	49.5	28.7	33.1	37.1	40.6	43.8	46.9	49.7	24.7	30.3	35.0	39.1	42.9	46.3	49.5	49.5	28.7	33.1	37.1	40.6	43.8	46.9	49.7			
SEI 50	35.2	43.1	49.8	55.7	61.0	65.9	70.4	34.3	42.0	48.5	54.3	59.4	64.2	68.6	70.7	35.2	43.1	49.8	55.7	61.0	65.9	70.4	70.4	40.8	47.2	52.7	57.8	62.4	66.7	70.7	35.2	43.1	49.8	55.7	61.0	65.9	70.4	70.4	40.8	47.2	52.7	57.8	62.4	66.7	70.7	35.2	43.1	49.8	55.7	61.0	65.9	70.4	70.4	40.8	47.2	52.7	57.8	62.4	66.7	70.7			
SEH 100	70.7	86.6	100	111	122	132	141	68.9	84.4	97.5	109	119	128	137	142	70.7	86.6	100	111	122	132	141	141	82.0	94.7	105	116	125	133	142	70.7	86.6	100	111	122	132	141	141	82.0	94.7	105	116	125	133	142	70.7	86.6	100	111	122	132	141	141	82.0	94.7	105	116	125	133	142			
SEH 175	123	151	174	195	213	230	246	120	147	170	190	208	225	240	247	123	151	174	195	213	230	246	246	143	165	184	202	218	233	247	123	151	174	195	213	230	246	246	143	165	184	202	218	233	247	123	151	174	195	213	230	246	246	143	165	184	202	218	233	247			

R-134A

VALVE TYPE	40°F															20°F															0°F																																
	40	60	80	100	120	140	160	200	250	300	350	400	450	500	550	600	40	60	80	100	120	140	160	200	250	300	350	400	450	500	550	600	40	60	80	100	120	140	160	200	250	300	350	400	450	500	550	600	40	60	80	100	120	140	160	200	250	300	350	400	450	500	550
SER 1-1/2	0.9	1.1	1.3	1.4	1.5	1.7	1.8	1.0	1.2	1.3	1.5	1.6	1.7	1.8	1.8	0.9	1.1	1.3	1.4	1.5	1.7	1.8	1.8	1.0	1.1	1.3	1.4	1.5	1.6	1.7	0.9	1.1	1.3	1.4	1.5	1.7	1.8	1.8	1.0	1.1	1.3	1.4	1.5	1.6	1.7	0.9	1.1	1.3	1.4	1.5	1.7	1.8	1.8	1.0	1.1	1.3	1.4	1.5	1.6	1.7			
SER 6	3.5	4.3	5.0	5.6	6.1	6.6	7.1	4.1	4.8	5.3	5.9	6.3	6.8	7.2	7.2	3.5	4.3	5.0	5.6	6.1	6.6	7.1	7.1	4.5	5.1	5.6	6.0	6.4	6.8	3.5	4.3	5.0	5.6	6.1	6.6	7.1	7.1	4.5	5.1	5.6	6.0	6.4	6.8	3.5	4.3	5.0	5.6	6.1	6.6	7.1	7.1	4.5	5.1	5.6	6.0	6.4	6.8						
SER 11	6.5	7.9	9.2	10.3	11.2	12.1	13.0	7.6	8.8	9.8	10.7	11.6	12.4	13.1	13.1	6.5	7.9	9.2	10.3	11.2	12.1	13.0	13.0	7.2	8.3	9.3	10.2	11.0	11.8	12.5	6.5	7.9	9.2	10.3	11.2	12.1	13.0	13.0	7.2	8.3	9.3	10.2	11.0	11.8	12.5	6.5	7.9	9.2	10.3	11.2	12.1	13.0	13.0	7.2	8.3	9.3	10.2	11.0	11.8	12.5			
SER 20	11.8	14.4	16.7	18.6	20.4	22.1	23.6	13.8	15.9	17.8	19.5	21.1	22.5	23.9	24.0	11.8	14.4	16.7	18.6	20.4	22.1	23.6	23.6	13.1	15.2	16.9	18.6	20.1	21.4	22.7	11.8	14.4	16.7	18.6	20.4	22.1	23.6	23.6	13.1	15.2	16.9	18.6	20.1	21.4	22.7	11.8	14.4	16.7	18.6	20.4	22.1	23.6	23.6	13.1	15.2	16.9	18.6	20.1	21.4	22.7			
SEI 30	20.6	25.3	29.2	32.6	35.8	38.6	41.3	24.1	27.9	31.2	34.1	36.9	39.4	41.8	42.0	20.6	25.3	29.2	32.6	35.8	38.6	41.3	41.3	23.0	26.5	29.7	32.5	35.1	37.5	39.8	20.6	25.3	29.2	32.6	35.8	38.6	41.3	41.3	23.0	26.5	29.7	32.5	35.1	37.5	39.8	20.6	25.3	29.2	32.6	35.8	38.6	41.3	41.3	23.0	26.5	29.7	32.5	35.1	37.5	39.8			
SEI 50	29.4	36.0	41.5	46.4	50.9	54.9	58.7	34.4	39.7	44.3	48.6	52.5	56.1	59.5	59.8	29.4	36.0	41.5	46.4	50.9	54.9	58.7	58.7	32.7	37.7	42.2	46.2	49.9	53.4	56.6	29.4	36.0	41.5	46.4	50.9	54.9	58.7	58.7	32.7	37.7	42.2	46.2	49.9	53.4	56.6	29.4	36.0	41.5	46.4	50.9	54.9	58.7	58.7	32.7	37.7	42.2	46.2	49.9	53.4	56.6			
SEH 100	59.0	72.2	83.4	93.2	102	110	118	69.0	79.6	89.0	97.5	105	112	119	120	59.0	72.2	83.4	93.2	102	110	118	118	65.6	75.8	84.7	92.8	100	107	113	59.0	72.2	83.4	93.2	102	110	118	118	65.6	75.8	84.7	92.8	100	107	113	59.0	72.2	83.4	93.2	102	110	118	118	65.6	75.8	84.7	92.8	100	107	113			
SEH 175	102	126	145	162	178	192	205	120	139	155	170	183	196	208	211	102	126	145	162	178	192	205	205	114	132	147	162	174	187	198	102	126	145	162	178	192	205	205	114	132	147	162	174	187	198	102	126	145	162	178	192	205	205	114	132	147	162	174	187	198			

OF CAPACITY RATINGS

TONS at EVAPORATOR TEMPERATURE (Based on 100°F Liquid)

R-410A & R-407C

VALVE TYPE	40°F												20°F												0°F											
	PRESSURE DROP ACROSS VALVE (psi)												PRESSURE DROP ACROSS VALVE (psi)												PRESSURE DROP ACROSS VALVE (psi)											
	50	75	100	125	160	175	200	250	100	125	160	175	200	250	100	125	160	175	200	250	100	125	160	175	200	250										
SER 1-1/2	1.0	1.2	1.4	1.6	1.8	1.9	2.0	2.1	1.3	1.4	1.6	1.7	1.8	1.9	2.0	1.2	1.4	1.5	1.8	1.8	2.0	1.3	1.5	1.7	1.8	1.9	2.0									
SER 6	4.0	4.9	5.7	6.4	7.0	7.5	8.0	8.3	3.9	4.8	5.5	6.2	7.0	7.3	7.8	4.7	5.4	6.0	7.3	7.8	8.6	9.9	11.0	12.5	13.1	14.0	14.8									
SER 11	7.4	9.0	10.4	11.6	12.8	13.8	14.7	15.4	7.2	8.8	10.2	11.4	12.9	13.4	14.4	8.6	9.9	11.0	13.4	14.4	15.5	18.0	20.1	22.7	23.8	25.4	26.9									
SER 20	13.4	16.4	18.9	21.2	23.2	25.1	26.8	28.0	13.1	16.0	18.5	20.7	23.4	24.5	26.1	15.5	18.0	20.1	24.5	26.1	27.2	31.4	35.1	39.8	41.6	44.4	47.1									
SEI 30	33.4	28.7	33.2	37.1	41.9	43.9	46.9	46.9	22.9	28.0	32.4	36.2	40.9	42.8	45.8	27.2	31.4	35.1	45.8	45.8	38.7	44.7	50.0	56.6	59.1	63.2	67.1									
SEI 50	66.9	40.9	47.2	52.7	57.8	62.4	66.7	66.7	32.6	39.9	46.0	51.5	58.2	60.9	65.1	38.7	44.7	50.0	65.1	65.1	38.7	44.7	50.0	56.6	59.1	63.2	67.1									
SEH 100	66.9	82.0	94.7	106	116	125	134	134	65.4	80.0	92.4	103	117	122	131	77.8	89.8	100	114	122	77.8	89.8	100	114	119	127	135									
SEH 175	117	143	165	184	202	218	233	233	114	139	161	180	203	213	227	135	156	175	203	213	135	156	175	198	207	221	234									
VALVE TYPE	-20°F												-40°F																							
SER 1-1/2	1.3	1.5	1.6	1.7	1.8	2.0	2.1	2.1	1.3	1.4	1.6	1.7	1.8	1.9	2.0																					
SER 6	5.2	5.8	6.6	6.9	7.4	7.8	8.2	8.2	5.0	5.6	6.3	6.6	7.1	7.5	7.9																					
SER 11	9.6	10.7	12.1	12.6	13.5	14.3	15.1	15.1	9.2	10.3	11.6	12.2	13.0	13.8	14.5																					
SER 20	17.4	19.4	22.0	23.0	24.6	26.0	27.5	27.5	16.7	18.7	21.1	22.1	23.6	25.1	26.4																					
SEI 30	30.4	34.0	38.4	40.2	43.0	45.6	48.1	48.1	29.3	32.7	37.0	38.7	41.4	43.9	46.3																					
SEI 50	43.2	48.3	54.7	57.2	61.2	64.9	68.4	68.4	41.6	46.6	52.7	55.1	58.9	62.5	65.8																					
SEH 100	86.8	97.1	109.8	114.9	123	130	137	137	83.6	93.5	106	111	118	125	132																					
SEH 175	151	169	191	200	214	227	239	239	146	163	184	192	206	218	230																					

R-410A

VALVE TYPE	40°F												20°F												0°F											
	PRESSURE DROP ACROSS VALVE (psi)												PRESSURE DROP ACROSS VALVE (psi)												PRESSURE DROP ACROSS VALVE (psi)											
	50	75	100	125	160	175	200	250	100	125	160	175	200	250	100	125	160	175	200	250	100	125	160	175	200	250										
SER 1-1/2	1.0	1.2	1.4	1.5	1.7	1.8	2.0	2.0	0.9	1.1	1.3	1.5	1.7	1.8	1.9	1.1	1.3	1.4	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3										
SER 6	3.9	4.8	5.5	6.2	6.8	7.3	7.8	7.8	3.7	4.6	5.3	5.9	6.7	7.0	7.5	4.4	5.1	5.7	6.4	6.7	7.2	7.7	8.2	8.7	9.2											
SER 11	7.2	8.8	10.1	11.3	12.4	13.4	14.3	14.3	6.9	8.4	9.7	10.9	12.3	12.8	13.7	8.0	9.3	10.4	11.7	12.3	13.1	13.9	14.7	15.5	16.3											
SER 20	13.0	15.9	18.4	20.6	22.5	24.3	26.0	26.0	12.5	15.3	17.6	19.7	22.3	23.3	25.0	14.6	16.9	18.8	21.3	22.3	23.8	25.3	26.8	28.3	29.8											
SEI 30	22.8	27.9	32.2	36.0	40.7	42.6	45.5	45.5	21.8	26.7	30.9	34.5	39.1	40.9	43.7	25.5	29.5	33.0	37.3	39.0	41.7	44.3	47.0	49.7	52.4											
SEI 50	32.4	39.7	45.8	51.2	56.1	60.6	64.8	64.8	31.1	38.1	43.9	49.1	55.6	58.1	62.1	36.4	42.0	46.9	53.1	55.5	59.4	63.0	66.6	70.2	73.8											
SEH 100	65.0	79.6	92.0	102	112	121	130	130	62.4	76.4	88.2	98.6	111	116	124	73.0	84.3	94.2	106	111	119	126	133	140	147											
SEH 175	113	139	160	179	196	212	226	226	108	133	154	172	194	203	217	127	147	164	186	194	208	220	232	244	256											
VALVE TYPE	-20°F												-40°F																							
SER 1-1/2	1.2	1.3	1.5	1.6	1.7	1.8	1.9	1.9	1.1	1.3	1.4	1.5	1.6	1.7	1.8																					
SER 6	4.8	5.4	6.1	6.4	6.8	7.2	7.6	7.6	4.6	5.1	5.8	6.0	6.4	6.8	7.2																					
SER 11	8.8	9.9	11.2	11.7	12.5	13.2	13.9	13.9	8.4	9.3	10.6	11.1	11.8	12.5	13.2																					
SER 20	16.0	17.9	20.3	21.2	22.7	24.1	25.4	25.4	15.2	17.0	19.2	20.1	21.5	22.8	24.0																					
SEI 30	28.1	31.4	35.5	37.1	39.7	42.1	44.4	44.4	26.6	29.7	33.6	35.2	37.6	39.9	42.1																					
SEI 50	39.9	44.7	50.5	52.8	56.5	59.9	63.1	63.1	37.8	42.3	47.9	50.1	53.5	56.8	59.8																					
SEH 100	80.2	89.7	101	106	113	120	126	126	76.0	85.0	96.1	100	107	114	120																					
SEH 175	139	156	177	185	197	209	221	221	132	148	167	175	187	198	209																					

R-407C

NOTE: Liquid Temperature Correction Factors are listed on page 7.

OF CAPACITY RATINGS

TONS at EVAPORATOR TEMPERATURE (Based on 100°F Liquid)

R-404A & R-507C

VALVE TYPE	40°F										20°F										0°F									
	PRESSURE DROP ACROSS VALVE (psi)										PRESSURE DROP ACROSS VALVE (psi)										PRESSURE DROP ACROSS VALVE (psi)									
	50	75	100	125	150	160	175	200	250		50	75	100	125	150	160	175	200	250		50	75	100	125	150	160	175	200	250	
SER 1-1/2	0.7	0.9	1.0	1.1	1.1	1.3	1.3	1.4	0.7	0.8	0.9	1.1	1.1	1.2	1.2	1.2	1.3	1.3	0.8	0.9	1.0	1.1	1.1	1.2	1.2	1.3	1.3			
SER 6	2.8	3.4	4.0	4.4	4.4	4.9	5.2	5.6	2.7	3.3	3.8	4.2	4.2	4.8	5.0	5.3	5.3	3.1	3.5	4.0	4.5	4.5	4.7	5.0	5.3	5.3				
SER 11	5.1	6.3	7.3	8.1	8.9	9.6	10.3	10.3	4.9	6.0	6.9	7.7	7.7	8.7	9.1	9.8	9.8	5.6	6.5	7.3	8.2	8.6	9.2	9.7	9.7					
SER 20	9.4	11.5	13.2	14.8	16.2	17.5	18.7	18.7	8.9	10.9	12.5	14.0	15.9	16.6	17.7	10.2	11.8	13.2	14.9	15.6	16.7	17.7	17.7	17.7						
SEI 30	16.4	20.0	23.1	25.9	29.3	30.6	32.7	32.7	15.5	19.0	21.9	24.5	27.8	29.0	31.0	17.9	20.6	23.1	26.1	27.3	29.2	31.0	31.0							
SEI 50	23.3	28.5	32.9	36.8	40.3	43.6	46.6	46.6	22.1	27.0	31.2	34.9	39.5	41.3	44.2	25.4	29.4	32.8	37.2	38.9	41.5	44.1	44.1							
SEH 100	46.8	57.3	66.1	73.9	81.0	87.5	93.5	93.5	44.3	54.3	62.7	70.1	79.3	82.9	88.7	51.1	59.0	65.9	74.6	78.0	83.4	88.5	88.5							
SEH 175	81.6	100	115	129	141	152	163	163	77.4	94.7	109	122	138	144	154	89.1	102	115	130	136	145	154	154							
VALVE TYPE	-20°F										-40°F										-40°F									
SER 1-1/2	0.8	0.9	1.0	1.1	1.2	1.2	1.3	1.3	0.8	0.9	1.0	1.0	1.1	1.1	1.1	1.2	1.2													
SER 6	3.3	3.7	4.2	4.4	4.7	5.0	5.2	3.1	3.4	3.9	4.1	4.3	4.3	4.6	4.8	4.8														
SER 11	6.1	6.8	7.7	8.0	8.6	9.1	9.6	5.6	6.3	7.1	7.4	7.9	8.4	8.9	8.9															
SER 20	11.0	12.3	13.9	14.6	15.6	16.5	17.4	10.2	11.4	12.9	13.5	14.4	15.3	16.1	16.1															
SEI 30	19.3	21.6	24.4	25.5	27.3	28.9	30.5	17.9	20.0	22.6	23.6	25.3	26.8	28.3	28.3															
SEI 50	27.4	30.7	34.7	36.3	38.8	41.1	43.4	25.4	28.4	32.2	33.6	36.0	38.1	40.2	40.2															
SEH 100	55.1	61.6	69.7	72.9	77.9	82.6	87.1	51.1	57.1	64.6	67.5	72.2	76.6	80.7	80.7															
SEH 175	96.1	107	121	127	135	144	152	89.1	99.6	112	117	126	133	140	140															

R-404A

VALVE TYPE	40°F										20°F										0°F									
	PRESSURE DROP ACROSS VALVE (psi)										PRESSURE DROP ACROSS VALVE (psi)										PRESSURE DROP ACROSS VALVE (psi)									
	50	75	100	125	150	160	175	200	250		50	75	100	125	150	160	175	200	250		50	75	100	125	150	160	175	200	250	
SER 1-1/2	0.7	0.8	1.0	1.1	1.2	1.3	1.4	1.4	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.3	0.8	0.9	1.0	1.1	1.1	1.2	1.2	1.3						
SER 6	2.7	3.4	3.9	4.3	4.8	5.1	5.5	2.6	3.2	3.7	4.1	4.5	4.9	5.2	5.2	3.0	3.5	3.9	4.2	4.6	4.9	5.2	5.2							
SER 11	5.0	6.2	7.1	8.0	8.7	9.4	10.1	4.8	5.8	6.8	7.5	8.3	8.9	9.5	9.5	5.5	6.4	7.1	7.8	8.4	9.0	9.5	9.5							
SER 20	9.2	11.2	13.0	14.5	15.9	17.1	18.3	8.7	10.6	12.3	13.7	15.0	16.2	17.4	10.0	11.6	12.9	14.2	15.3	16.3	17.3	17.3								
SEI 30	16.0	19.6	22.7	25.3	27.8	30.0	32.1	15.2	18.6	21.5	24.0	26.3	28.4	30.4	17.5	20.2	22.6	24.8	26.8	28.6	30.3	30.3								
SEI 50	22.8	27.9	32.3	36.1	39.5	42.7	45.6	21.6	26.5	30.6	34.2	37.4	40.4	43.2	24.9	28.8	32.2	35.2	38.1	40.7	43.2	43.2								
SEH 100	45.8	56.1	64.8	72.4	79.3	85.7	91.6	43.4	53.1	61.4	68.6	75.2	81.2	86.8	50.0	57.8	64.6	70.8	76.4	81.7	86.7	86.7								
SEH 175	79.9	97.9	113	126	138	149	159	75.7	92.7	107	119	131	141	151	87.3	100	112	123	133	142	151	151								
VALVE TYPE	-20°F										-40°F										-40°F									
SER 1-1/2	0.8	0.9	1.0	1.1	1.1	1.2	1.3	1.3	0.8	0.8	0.9	1.0	1.1	1.1	1.1	1.2	1.2													
SER 6	3.2	3.6	4.0	4.3	4.6	4.9	5.1	3.0	3.4	3.7	4.0	4.3	4.5	4.8	4.8															
SER 11	5.9	6.7	7.3	7.9	8.4	8.9	9.4	5.5	6.2	6.8	7.3	7.8	8.3	8.7	8.7															
SER 20	10.8	12.1	13.2	14.3	15.3	16.2	17.1	10.1	11.2	12.3	13.3	14.2	15.1	15.9	15.9															
SEI 30	18.9	21.2	23.2	25.0	26.8	28.4	29.9	17.6	19.7	21.6	23.3	24.9	26.4	27.8	27.8															
SEI 50	26.9	30.1	33.0	35.6	38.1	40.4	42.6	25.0	28.0	30.7	33.1	35.4	37.6	39.6	39.6															
SEH 100	54.1	60.5	66.2	71.5	76.5	81.1	85.5	50.3	56.2	61.6	66.5	71.1	75.4	79.5	79.5															
SEH 175	94.4	105	115	124	133	141	149	87.7	98.1	107	118	124	131	138	138															

R-507C

NOTE: Liquid Temperature Correction Factors are listed on page 7.

°C CAPACITY RATINGS

kW at EVAPORATOR TEMPERATURE (Based on 38°C Liquid)

R-22 & R-134A

LIQUID TEMPERATURE CORRECTION FACTORS

°F	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
	-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/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-407C	1.33	1.30	1.28	1.25	1.22	1.19	1.16	1.12	1.09	1.04	1.00	0.95	0.90	0.84	0.77
R-410A	1.79	1.71	1.63	1.55	1.47	1.40	1.32	1.24	1.16	1.08	1.00	0.92	0.83	0.73	0.62

NOTE: Correction factor closest to actual system liquid temperatures may be used, e.g. 5°C actual liquid use 4°C factor. Based on 0°F evaporator, variation across evaporating range of -40°F to 40°F (-40°C to 5°C) is insignificant.

R-22

VALVE TYPE	5°C																-10°C																-20°C															
	4				6				8				10				12				14				16				18				20															
	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86								
SER 1-1/2	5.2	5.8	6.3	6.9	7.3	7.8	8.2	8.7	9.1	9.5	9.9	10.3	10.7	11.1	11.5	11.9	12.3	12.7	13.1	13.5	13.9	14.3	14.7	15.1	15.5	15.9	16.3	16.7	17.1	17.5	17.9	18.3	18.7	19.1	19.5	19.9	20.3	20.7	21.1	21.5								
SER 6	20.7	23.2	25.4	27.4	29.3	31.1	32.8	34.5	36.1	37.8	39.4	41.1	42.7	44.3	45.9	47.5	49.1	50.7	52.3	53.9	55.5	57.1	58.7	60.3	61.9	63.5	65.1	66.7	68.3	69.9	71.5	73.1	74.7	76.3	77.9	79.5	81.1	82.7	84.3	85.9								
SER 11	38.0	42.5	46.6	50.3	53.8	57.0	60.1	63.1	66.1	69.1	72.1	75.1	78.1	81.1	84.1	87.1	90.1	93.1	96.1	99.1	102.1	105.1	108.1	111.1	114.1	117.1	120.1	123.1	126.1	129.1	132.1	135.1	138.1	141.1	144.1	147.1	150.1	153.1	156.1	159.1								
SER 20	69.1	77.3	84.7	91.4	97.8	104	109	115	121	127	133	139	145	151	157	163	169	175	181	187	193	199	205	211	217	223	229	235	241	247	253	259	265	271	277	283	289	295	301	307								
SEI 30	121	135	148	160	171	181	191	201	211	221	231	241	251	261	271	281	291	301	311	321	331	341	351	361	371	381	391	401	411	421	431	441	451	461	471	481	491	501	511	521								
SEI 50	173	193	212	229	244	259	273	287	301	315	329	343	357	371	385	399	413	427	441	455	469	483	497	511	525	539	553	567	581	595	609	623	637	651	665	679	693	707	721	735								
SEH 100	346	386	423	457	489	518	547	576	605	634	663	692	721	750	779	808	837	866	895	924	953	982	1011	1040	1069	1098	1127	1156	1185	1214	1243	1272	1301	1330	1359	1388	1417	1446	1475	1504								
SEH 175	601	672	737	796	851	902	951	1000	1049	1098	1147	1196	1245	1294	1343	1392	1441	1490	1539	1588	1637	1686	1735	1784	1833	1882	1931	1980	2029	2078	2127	2176	2225	2274	2323	2372	2421	2470	2519	2568								

R-134a

VALVE TYPE	5°C																-10°C																-20°C															
	4				6				8				10				12				14				16				18				20															
	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86								
SER 1-1/2	3.7	4.6	5.3	5.9	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	21.5	22.0	22.5	23.0	23.5	24.0								
SER 6	15.0	18.3	21.2	23.7	25.9	28.0	29.9	31.7	33.5	35.3	37.1	38.9	40.7	42.5	44.3	46.1	47.9	49.7	51.5	53.3	55.1	56.9	58.7	60.5	62.3	64.1	65.9	67.7	69.5	71.3	73.1	74.9	76.7	78.5	80.3	82.1	83.9	85.7	87.5	89.3								
SER 11	27.4	33.6	38.8	43.4	47.5	51.3	54.8	58.3	61.8	65.3	68.8	72.3	75.8	79.3	82.8	86.3	89.8	93.3	96.8	100.3	103.8	107.3	110.8	114.3	117.8	121.3	124.8	128.3	131.8	135.3	138.8	142.3	145.8	149.3	152.8	156.3	159.8	163.3	166.8	170.3								
SER 20	49.9	61.1	70.5	78.8	86.4	93.3	99.7	105.7	111.7	117.7	123.7	129.7	135.7	141.7	147.7	153.7	159.7	165.7	171.7	177.7	183.7	189.7	195.7	201.7	207.7	213.7	219.7	225.7	231.7	237.7	243.7	249.7	255.7	261.7	267.7	273.7	279.7	285.7	291.7	297.7								
SEI 30	87.3	107	123	138	151	163	175	187	199	211	223	235	247	259	271	283	295	307	319	331	343	355	367	379	391	403	415	427	439	451	463	475	487	499	511	523	535	547	559	571								
SEI 50	125	153	176	197	216	233	249	265	281	297	313	329	345	361	377	393	409	425	441	457	473	489	505	521	537	553	569	585	601	617	633	649	665	681	697	713	729	745	761	777								
SEH 100	249	305	353	394	432	466	499	532	565	598	631	664	697	730	763	796	829	862	895	928	961	994	1027	1060	1093	1126	1159	1192	1225	1258	1291	1324	1357	1390	1423	1456	1489	1522	1555	1588								
SEH 175	434	531	613	686	751	812	868	924	980	1036	1092	1148	1204	1260	1316	1372	1428	1484	1540	1596	1652	1708	1764	1820	1876	1932	1988	2044	2100	2156	2212	2268	2324	2380	2436	2492	2548	2604	2660	2716								

°C CAPACITY RATINGS
 kW at EVAPORATOR TEMPERATURE (Based on 38°C Liquid)

R-410A & R-407C

VALVE TYPE	5°C										-10°C										-20°C									
	PRESSURE DROP ACROSS VALVE (bar)										PRESSURE DROP ACROSS VALVE (bar)										PRESSURE DROP ACROSS VALVE (bar)									
	4	6	8	10	12	14	16	18	20	24	4	6	8	10	12	14	16	18	20	24	4	6	8	10	12	14	16	18	20	24
SER 1-1/2	3.8	4.7	5.4	6.0	6.6	7.1	7.6	8.1	8.6	9.1	3.7	4.5	5.2	5.8	6.4	6.9	7.4	7.9	8.4	8.9	3.6	4.4	5.1	5.7	6.2	6.7	7.2	7.6	8.1	8.6
SER 6	15.2	18.6	21.5	24.0	26.3	28.4	30.4	32.4	34.4	36.4	14.7	18.0	20.8	23.2	25.5	27.5	29.4	31.3	33.2	35.1	14.6	17.5	20.2	22.6	24.8	26.8	28.6	30.4	32.2	34.0
SER 11	27.9	34.1	39.4	44.0	48.3	52.1	55.7	59.3	62.9	66.5	27.0	33.0	38.1	42.6	46.7	50.4	53.9	57.4	60.9	64.4	26.9	32.1	37.1	41.5	45.4	49.1	52.5	55.7	58.9	62.1
SER 20	50.6	62.0	71.6	80.1	87.7	94.8	101.3	107.8	114.3	120.8	49.0	60.0	69.3	77.5	84.9	91.7	98.0	104.3	110.6	116.9	48.9	58.4	67.5	75.4	82.6	89.2	95.4	101	107.3	113.6
SEI 30	88.6	109	125	140	154	166	177	188	199	210	86	105	121	136	149	160	172	183	194	205	85.9	102	118	132	145	156	167	177	188	199
SEI 50	127	155	179	200	219	237	253	269	285	301	123	150	173	194	212	229	245	261	277	293	122	146	169	189	207	223	238	253	269	285
SEH 100	253	310	358	400	439	474	506	538	570	602	245	300	347	387	424	458	490	522	554	586	244	292	337	377	413	446	477	506	535	564
SEH 175	441	540	623	697	763	824	881	938	995	1052	426	522	603	674	739	798	853	908	963	1018	425	508	587	656	719	776	830	880	930	980
VALVE TYPE	-30°C										-40°C																			
VALVE TYPE	PRESSURE DROP ACROSS VALVE (bar)										PRESSURE DROP ACROSS VALVE (bar)																			
VALVE TYPE	8	10	12	14	16	18	20	24	28	32	8	10	12	14	16	18	20	24	28	32										
SER 1-1/2	4.9	5.5	6.0	6.5	6.9	7.4	7.8	8.3	8.8	9.3	4.7	5.3	5.8	6.3	6.7	7.1	7.5	8.0	8.4	8.9										
SER 6	19.6	21.9	24.0	26.0	27.8	29.4	31.0	32.6	34.2	35.8	19.0	21.2	23.2	25.1	26.8	28.4	30.0	31.6	33.2	34.8										
SER 11	36.0	40.2	44.1	47.6	50.9	54.0	56.9	59.8	62.7	65.6	34.8	38.9	42.6	46.0	49.2	52.2	55.0	57.8	60.6	63.4										
SER 20	65.4	73.1	80.1	86.5	92.5	98.1	103	108.1	113.1	118.1	63.2	70.7	77.4	83.6	89.4	94.8	100	105.2	110.4	115.6										
SEI 30	114	128	140	151	162	172	181	191	200	209	111	124	135	146	156	166	175	184	193	202										
SEI 50	164	183	200	216	231	245	259	273	287	301	158	177	194	209	224	237	250	264	277	291										
SEH 100	327	366	401	433	463	491	517	543	569	595	316	353	387	418	447	474	500	526	552	578										
SEH 175	569	636	697	753	805	854	900	946	992	1038	550	615	674	728	778	825	870	916	962	1008										

R-410A

VALVE TYPE	5°C										-10°C										-20°C									
	PRESSURE DROP ACROSS VALVE (bar)										PRESSURE DROP ACROSS VALVE (bar)										PRESSURE DROP ACROSS VALVE (bar)									
	4	6	8	10	12	14	16	18	20	24	4	6	8	10	12	14	16	18	20	24	4	6	8	10	12	14	16	18	20	24
SER 1-1/2	3.7	4.5	5.2	5.8	6.4	6.9	7.4	7.8	8.3	8.8	3.5	4.3	4.9	5.5	6.0	6.5	7.0	7.5	8.0	8.5	3.4	4.1	4.7	5.3	5.8	6.3	6.7	7.1	7.6	8.1
SER 6	14.8	18.1	20.9	23.3	25.5	27.6	29.5	31.4	33.3	35.2	14.0	17.1	19.8	22.1	24.2	26.1	27.9	29.7	31.5	33.3	13.9	16.4	18.9	21.2	23.2	25.1	26.8	28.4	30.1	31.8
SER 11	27.0	33.1	38.2	42.8	46.8	50.6	54.1	57.6	61.1	64.6	25.6	31.4	36.2	40.5	44.3	47.9	51.2	54.5	57.8	61.1	25.5	30.1	34.7	38.8	42.5	45.9	49.1	52.1	55.1	58.1
SER 20	49.2	60.2	69.5	77.7	85.2	92.0	98.3	104.6	110.9	117.2	46.6	57.0	65.8	73.6	80.6	87.1	93.1	99.1	105.1	111.1	46.5	54.7	63.1	70.6	77.3	83.5	89.3	94.7	100.1	105.5
SEI 30	86.0	105	122	136	149	161	172	183	194	205	81.5	99.8	115	129	141	152	163	174	185	196	81.4	96.0	110	124	135	146	156	166	177	188
SEI 50	123	151	174	194	213	230	246	261	277	292	116	143	165	184	202	218	233	248	263	278	115	137	158	176	193	209	223	237	251	265
SEH 100	246	301	348	389	426	460	492	524	556	588	233	285	329	368	403	435	466	497	528	559	232	273	316	353	387	418	446	473	504	535
SEH 175	428	524	605	676	741	800	856	912	968	1024	405	496	573	640	702	758	810	866	922	978	404	476	549	614	673	726	777	824	871	918
VALVE TYPE	-30°C										-40°C																			
VALVE TYPE	PRESSURE DROP ACROSS VALVE (bar)										PRESSURE DROP ACROSS VALVE (bar)																			
VALVE TYPE	8	10	12	14	16	18	20	24	28	32	8	10	12	14	16	18	20	24	28	32										
SER 1-1/2	4.5	5.1	5.5	6.0	6.4	6.8	7.2	7.6	8.0	8.4	4.3	4.8	5.3	5.7	6.1	6.5	6.8	7.2	7.6	8.0										
SER 6	18.1	20.2	22.2	23.9	25.6	27.1	28.6	30.1	31.6	33.1	17.2	19.3	21.1	22.8	24.4	25.9	27.3	28.8	30.3	31.8										
SER 11	33.2	37.1	40.6	43.9	46.9	49.8	52.5	55.2	57.9	60.6	31.6	35.3	38.7	41.8	44.7	47.4	50.0	52.6	55.2	57.8										
SER 20	60.3	67.4	73.9	79.8	85.3	90.5	95.4	100.3	105.2	110.1	57.5	64.3	70.4	76.0	81.3	86.2	90.9	95.6	100.3	105.0										
SEI 30	106	118	129	140	149	158	167	176	185	194	101	112	123	133	142	151	159	168	177	186										
SEI 50	151	169	185	200	213	226	238	250	262	274	144	161	176	190	203	216	227	240	253	266										
SEH 100	302	337	369	399	427	452	477	502	527	552	287	321	352	380	406	431	454	479	504	529										
SEH 175	525	587	643	694	742	787	830	874	918	962	500	559	612	661	707	750	791	835	879	923										

R-407C

NOTE: Liquid Temperature Correction Factors are listed on page 10.

°C CAPACITY RATINGS
 kW at EVAPORATOR TEMPERATURE (Based on 38°C Liquid)

R-404A & R-507C

VALVE TYPE	5°C												-10°C												-20°C																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
	PRESSURE DROP ACROSS VALVE (bar)												PRESSURE DROP ACROSS VALVE (bar)												PRESSURE DROP ACROSS VALVE (bar)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114	116	118	120	122	124	126	128	130	132	134	136	138	140	142	144	146	148	150	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	186	188	190	192	194	196	198	200	202	204	206	208	210	212	214	216	218	220	222	224	226	228	230	232	234	236	238	240	242	244	246	248	250	252	254	256	258	260	262	264	266	268	270	272	274	276	278	280	282	284	286	288	290	292	294	296	298	300	302	304	306	308	310	312	314	316	318	320	322	324	326	328	330	332	334	336	338	340	342	344	346	348	350	352	354	356	358	360	362	364	366	368	370	372	374	376	378	380	382	384	386	388	390	392	394	396	398	400	402	404	406	408	410	412	414	416	418	420	422	424	426	428	430	432	434	436	438	440	442	444	446	448	450	452	454	456	458	460	462	464	466	468	470	472	474	476	478	480	482	484	486	488	490	492	494	496	498	500	502	504	506	508	510	512	514	516	518	520	522	524	526	528	530	532	534	536	538	540	542	544	546	548	550	552	554	556	558	560	562	564	566	568	570	572	574	576	578	580	582	584	586	588	590	592	594	596	598	600	602	604	606	608	610	612	614	616	618	620	622	624	626	628	630	632	634	636	638	640	642	644	646	648	650	652	654	656	658	660	662	664	666	668	670	672	674	676	678	680	682	684	686	688	690	692	694	696	698	700	702	704	706	708	710	712	714	716	718	720	722	724	726	728	730	732	734	736	738	740	742	744	746	748	750	752	754	756	758	760	762	764	766	768	770	772	774	776	778	780	782	784	786	788	790	792	794	796	798	800	802	804	806	808	810	812	814	816	818	820	822	824	826	828	830	832	834	836	838	840	842	844	846	848	850	852	854	856	858	860	862	864	866	868	870	872	874	876	878	880	882	884	886	888	890	892	894	896	898	900	902	904	906	908	910	912	914	916	918	920	922	924	926	928	930	932	934	936	938	940	942	944	946	948	950	952	954	956	958	960	962	964	966	968	970	972	974	976	978	980	982	984	986	988	990	992	994	996	998	1000																																																																																																																																																																																																																																																																																																																																														
R-404A	2.7	3.2	3.8	4.2	4.6	5.0	5.3	5.7	6.1	6.5	6.9	7.3	7.7	8.1	8.5	8.9	9.3	9.7	10.1	10.5	10.9	11.3	11.7	12.1	12.5	12.9	13.3	13.7	14.1	14.5	14.9	15.3	15.7	16.1	16.5	16.9	17.3	17.7	18.1	18.5	18.9	19.3	19.7	20.1	20.5	20.9	21.3	21.7	22.1	22.5	22.9	23.3	23.7	24.1	24.5	24.9	25.3	25.7	26.1	26.5	26.9	27.3	27.7	28.1	28.5	28.9	29.3	29.7	30.1	30.5	30.9	31.3	31.7	32.1	32.5	32.9	33.3	33.7	34.1	34.5	34.9	35.3	35.7	36.1	36.5	36.9	37.3	37.7	38.1	38.5	38.9	39.3	39.7	40.1	40.5	40.9	41.3	41.7	42.1	42.5	42.9	43.3	43.7	44.1	44.5	44.9	45.3	45.7	46.1	46.5	46.9	47.3	47.7	48.1	48.5	48.9	49.3	49.7	50.1	50.5	50.9	51.3	51.7	52.1	52.5	52.9	53.3	53.7	54.1	54.5	54.9	55.3	55.7	56.1	56.5	56.9	57.3	57.7	58.1	58.5	58.9	59.3	59.7	60.1	60.5	60.9	61.3	61.7	62.1	62.5	62.9	63.3	63.7	64.1	64.5	64.9	65.3	65.7	66.1	66.5	66.9	67.3	67.7	68.1	68.5	68.9	69.3	69.7	70.1	70.5	70.9	71.3	71.7	72.1	72.5	72.9	73.3	73.7	74.1	74.5	74.9	75.3	75.7	76.1	76.5	76.9	77.3	77.7	78.1	78.5	78.9	79.3	79.7	80.1	80.5	80.9	81.3	81.7	82.1	82.5	82.9	83.3	83.7	84.1	84.5	84.9	85.3	85.7	86.1	86.5	86.9	87.3	87.7	88.1	88.5	88.9	89.3	89.7	90.1	90.5	90.9	91.3	91.7	92.1	92.5	92.9	93.3	93.7	94.1	94.5	94.9	95.3	95.7	96.1	96.5	96.9	97.3	97.7	98.1	98.5	98.9	99.3	99.7	100.1	100.5	100.9	101.3	101.7	102.1	102.5	102.9	103.3	103.7	104.1	104.5	104.9	105.3	105.7	106.1	106.5	106.9	107.3	107.7	108.1	108.5	108.9	109.3	109.7	110.1	110.5	110.9	111.3	111.7	112.1	112.5	112.9	113.3	113.7	114.1	114.5	114.9	115.3	115.7	116.1	116.5	116.9	117.3	117.7	118.1	118.5	118.9	119.3	119.7	120.1	120.5	120.9	121.3	121.7	122.1	122.5	122.9	123.3	123.7	124.1	124.5	124.9	125.3	125.7	126.1	126.5	126.9	127.3	127.7	128.1	128.5	128.9	129.3	129.7	130.1	130.5	130.9	131.3	131.7	132.1	132.5	132.9	133.3	133.7	134.1	134.5	134.9	135.3	135.7	136.1	136.5	136.9	137.3	137.7	138.1	138.5	138.9	139.3	139.7	140.1	140.5	140.9	141.3	141.7	142.1	142.5	142.9	143.3	143.7	144.1	144.5	144.9	145.3	145.7	146.1	146.5	146.9	147.3	147.7	148.1	148.5	148.9	149.3	149.7	150.1	150.5	150.9	151.3	151.7	152.1	152.5	152.9	153.3	153.7	154.1	154.5	154.9	155.3	155.7	156.1	156.5	156.9	157.3	157.7	158.1	158.5	158.9	159.3	159.7	160.1	160.5	160.9	161.3	161.7	162.1	162.5	162.9	163.3	163.7	164.1	164.5	164.9	165.3	165.7	166.1	166.5	166.9	167.3	167.7	168.1	168.5	168.9	169.3	169.7	170.1	170.5	170.9	171.3	171.7	172.1	172.5	172.9	173.3	173.7	174.1	174.5	174.9	175.3	175.7	176.1	176.5	176.9	177.3	177.7	178.1	178.5	178.9	179.3	179.7	180.1	180.5	180.9	181.3	181.7	182.1	182.5	182.9	183.3	183.7	184.1	184.5	184.9	185.3	185.7	186.1	186.5	186.9	187.3	187.7	188.1	188.5	188.9	189.3	189.7	190.1	190.5	190.9	191.3	191.7	192.1	192.5	192.9	193.3	193.7	194.1	194.5	194.9	195.3	195.7	196.1	196.5	196.9	197.3	197.7	198.1	198.5	198.9	199.3	199.7	200.1	200.5	200.9	201.3	201.7	202.1	202.5	202.9	203.3	203.7	204.1	204.5	204.9	205.3	205.7	206.1	206.5	206.9	207.3	207.7	208.1	208.5	208.9	209.3	209.7	210.1	210.5	210.9	211.3	211.7	212.1	212.5	212.9	213.3	213.7	214.1	214.5	214.9	215.3	215.7	216.1	216.5	216.9	217.3	217.7	218.1	218.5	218.9	219.3	219.7	220.1	220.5	220.9	221.3	221.7	222.1	222.5	222.9	223.3	223.7	224.1	224.5	224.9	225.3	225.7	226.1	226.5	226.9	227.3	227.7	228.1	228.5	228.9	229.3	229.7	230.1	230.5	230.9	231.3	231.7	232.1	232.5	232.9	233.3	233.7	234.1	234.5	234.9	235.3	235.7	236.1	236.5	236.9	237.3	237.7	238.1	238.5	238.9	239.3	239.7	240.1	240.5	240.9	241.3	241.7	242.1	242.5	242.9	243.3	243.7	244.1	244.5	244.9	245.3	245.7	246.1	246.5	246.9	247.3	247.7	248.1	248.5	248.9	249.3	249.7	250.1	250.5	250.9	251.3	251.7	252.1	252.5	252.9	253.3	253.7	254.1	254.5	254.9	255.3	255.7	256.1	256.5	256.9	257.3	257.7	258.1	258.5	258.9	259.3	259.7	260.1	260.5	260.9	261.3	261.7	262.1	262.5	262.9	263.3	263.7	264.1	264.5	264.9	265.3	265.7	266.1	266.5	266.9	267.3	267.7	268.1	268.5	268.9	269.3	269.7	270.1	270.5	270.9	271.3	271.7	272.1	272.5	272.9	273.3	273.7	274.1	274.5	274.9	275.3	275.7	276.1	276.5	276.9	277.3	277.7	278.1	278.5	278.9	279.3	279.7	280.1	280.5	280.9	281.3	281.7	282.1	282.5	282.9	283.3	283.7	284.1	284.5	284.9	285.3	285.7	286.1	286.5	286.9	287.3	287.7	288.1	288.5	288.9	289.3	289.7	290.1	290.5	290.9	291.3	291.7	292.1	292.5	292.9	293.3	293.7	294.1	294.5	294.9	295.3	295.7	296.1	296.5	296.9	297.3	297.7	298.1	298.5	298.9	299.3	299.7	300.1	300.5	300.9	301.3	301.7	302.1	302.5	302.9	303.3	303.7	304.1	304.5	304.9	305.3	305.7	306.1	306.5	306.9	307.3	307.7	308.1	308.5	308.9	309.3	309.7	310.1	310.5	310.9	311.3	311.7	312.1	312.5	312.9	313.3	313.7	314.1	314.5	314.9	315.3	315.7	316.1	316.5	316.9	317.3	317.7	318.1	318.5	318.9	319.3	319.7	320.1	320.5	320.9	321.3	321.7	322.1	322.5	322.9	323.3	323.7	324.1	324.5	324.9	325.3	325.7	326.1	326.5	326.9	327.3	327.7	328.1	328.5	328.9	329.3	329.7	330.1	330.5	330.9	331.3	331.7	332.1	332.5	332.9	333.3	333.7	334.1	334.5	334.9	335.3	335.7