

# SUCTION LINE ACCUMULATORS

The primary function of a Suction Line Accumulator is to prevent a sudden surge of liquid refrigerant, or oil, from returning down the suction line and into a compressor. The suction line accumulator is a temporary reservoir for liquid refrigerant and oil.

The accumulator is designed to meter both the liquid refrigerant and oil back to the compressor at a controlled rate. This prevents compressor damage. By metering the liquid refrigerant and oil back to the compressor, the accumulator also helps maintain system efficiency and proper crankcase oil levels. Heat Exchanger (HE) models are also available.

### Applications

Suction line accumulators are installed in air conditioning and refrigeration systems where a sudden return of liquid down the suction line is possible. The product range is designed for use with HCFC, HFC and CO<sub>2</sub> refrigerants, along with their associated oils. S-70 series models up to and including S-7061 units are also suitable for use with A2L refrigerants.

### How it works

Refrigerant vapour from the evaporator enters the suction line accumulator, along with any liquid refrigerant or oil. The outlet side of each accumulator is designed to allow refrigerant vapour to return to the compressor. Vapour return is achieved by a special U tube arrangement. On certain models, a tube within a tube arrangement is used as an alternative. Liquid is held at the bottom of the accumulator ready for metering back to the compressor.

Liquid is metered to the compressor via a screened orifice at the bottom of the tube. The vapour carries the metered liquid back to the compressor. Metering of liquid only occurs when the compressor is running.

### Main features

- Prevents liquid slugging
- Controlled liquid return
- Large flow capacity
- Low pressure drop
- Screen protected orifice
- Heat exchanger option
- SA models UL listed

### Technical Specification

**SA-70, S-704, S-705 & S-706 series:**

MWP = 31 bar (-30°C to +50°C)

**S-772 & S-773 series:**

MWP = 31 bar (-10°C to +80°C), 10 bar (-25°C to < -10°C)

**S-774 series:**

MWP = 27.6 barg (-10°C to +80°C), 10 bar (-25°C to < -10°C)

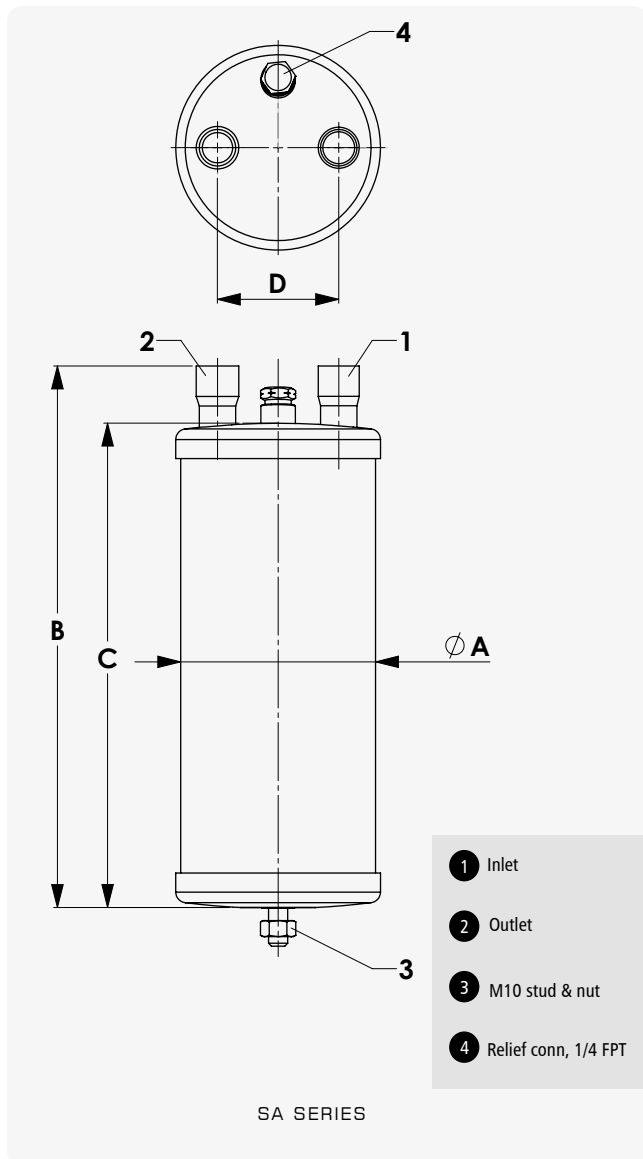
### Materials of Construction

The shell and end caps are made from carbon steel. Branch connections are made from steel or copper (SA-70 & S-70 series).



# SUCTION LINE ACCUMULATORS

Part No	Conn Size (inch)	Dimensions (mm)				Weight (kg)	CE Cat
		Ø A	B	C	D		
SA-7044	1/2 ODS	102	163	138	63.5	2	SEP
SA-7043	5/8 ODS	102	167	138	63.5	2	SEP
SA-7045	5/8 ODS	102	278	249	63.5	2.9	Cat I
SA-7046	3/4 ODS	102	281	249	63.5	2.9	Cat I
SA-7056	3/4 ODS	127	252	222	70	3.6	Cat I
SA-7057S	7/8 ODS	127	256	222	70	3.6	Cat I
SA-7057	7/8 ODS	127	378	344	70	5.1	Cat I
SA-7051	1 1/8 ODS	127	476	438	70	6.3	Cat I
SA-7053	1 3/8 ODS	127	479	438	75	6.3	Cat I
SA-7065	1 5/8 ODS	152	678	633	75	13	Cat II



Part No	Conn Size (inch)	Dimensions (mm)					Mounting details	HE Coil Conn Size (inch)	Drawing Reference	Weight (kg)	CE Cat	
		Ø A	B	C	D	E (Ø)						
S-7043	-	5/8 ODS	102	167	63.5	N/A	N/A	M10 stud & nut	N/A	fig.1	2	SEP
S-7044	-	1/2 ODS	102	260	63.5	N/A	N/A	M10 stud & nut	N/A	fig.1	2.7	SEP
S-7045	-	5/8 ODS	102	264	63.5	N/A	N/A	M10 stud & nut	N/A	fig.1	2.8	Cat I
-	S-7045HE	5/8 ODS	102	264	63.5	63.5	N/A	M10 stud & nut	3/8 ODS	fig.1	3.5	Cat I
S-7046	-	3/4 ODS	102	273	63.5	N/A	N/A	M10 stud & nut	N/A	fig.1	2.8	Cat II
-	S-7046HE	3/4 ODS	102	273	63.5	63.5	N/A	M10 stud & nut	3/8 ODS	fig.1	3.2	Cat II
S-7057	S-7057HE	7/8 ODS	127	330	70	70	N/A	M10 stud & nut	1/2 ODS	fig.1	4.5, 5.1 (HE)	Cat II
S-7061	S-7061HE	1 1/8 ODS	152	381	75	73	N/A	M10 stud & nut	5/8 ODS	fig.1	7.8, 8.5 (HE)	Cat II
S-7063	S-7063HE	1 3/8 ODS	152	630	75	73	N/A	M10 stud & nut	5/8 ODS	fig.1	12.4, 12.9 (HE)	Cat II
S-7065	S-7065HE	1 5/8 ODS	152	630	75	73	N/A	M10 stud & nut	3/4 ODS	fig.1	12.2, 13.1 (HE)	Cat II
S-7721	-	2 1/8 ODS	219	588	89	N/A	283	3 Ø14mm x 22mm slots	N/A	fig.2	23	Cat II
-	S-7721HE	2 1/8 ODS	219	588	89	140	283	3 Ø14mm x 22mm slots	7/8 ODS	fig.3	27	Cat II
S-7725	-	2 5/8 ODS	273	578	118	N/A	338	3 Ø14mm x 22mm slots	N/A	fig.2	33.5	Cat II
-	S-7725HE	2 5/8 ODS	273	578	118	140	338	3 Ø14mm x 22mm slots	1 3/8 ODS	fig.3	39.5	Cat II
S-7731-CE	-	3 1/8 ODS	324	635	140	N/A	388.4	3 Ø14mm x 22mm slots	N/A	fig.2	47	Cat III
-	S-7731HE-CE	3 1/8 ODS	324	635	140	149	388.4	3 Ø14mm x 22mm slots	1 3/8 ODS	fig.3	52	Cat III
S-7732-CE	-	3 1/8 ODS	324	635	140	N/A	388.4	3 Ø14mm x 22mm slots	N/A	fig.2	47	Cat III
-	S-7732HE-CE	3 1/8 ODS	324	635	140	149	388.4	3 Ø14mm x 22mm slots	1 3/8 ODS	fig.3	52	Cat III
S-7741-CE	S-7741HE-CE	4 1/8 ODS	406	902	279	368	470	3 Ø14mm x 22mm slots	2 5/8 ODS	fig.4	102	Cat III
S-7742-CE*	-	4 1/8 ODS	508	1130	330	N/A	457	4 x Ø16.3mm holes on square base	N/A	fig.4*	130	Cat IV

\*S-7742-CE features a square mounting plate - not mounting brackets

Notes (to be read in conjunction with drawing legend):

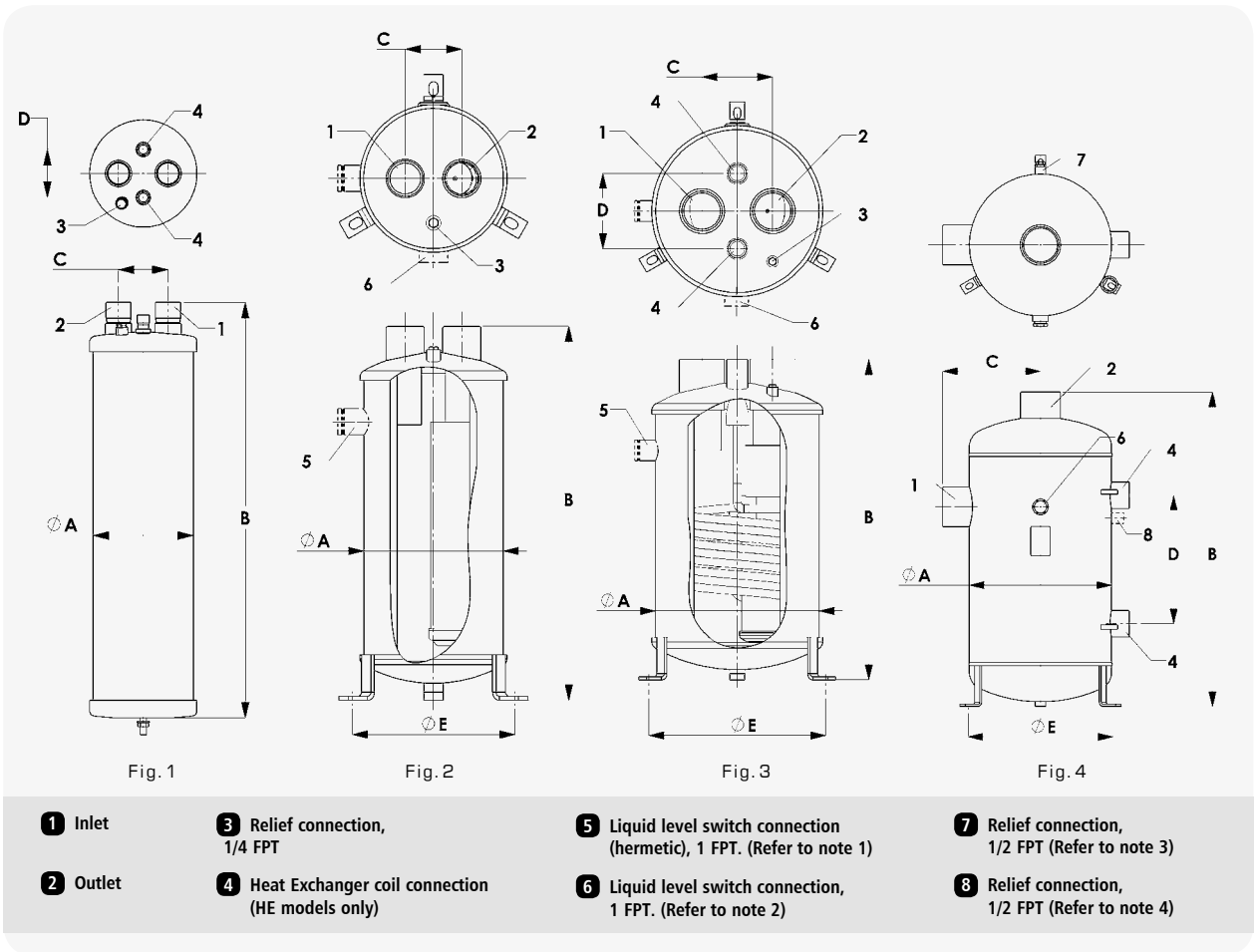
For liquid level switch and relief valve connection positions, see notes below for relevant models

1. S-7721, S-7721HE, S-7725 & S-7725HE models

2. S-7732, S-7732HE, S-7741, S-7741HE & S-7742 models

3. S-7741HE-CE model

4. S-7741 & S-7742 models



## SUCTION LINE ACCUMULATORS

### Selection Guidelines

The accumulator should have adequate holding capacity. Normally, this should not be less than 50% of the total system charge.

The system designer should check that the minimum and maximum system refrigeration capacities are within the limits of the accumulator.

The maximum kW capacities are based on accumulator pressure loss and oil return. The pressure loss is equivalent to a maximum of 1/2°C. The minimum kW capacities are to ensure proper oil return.

### Example: SA Series

Refrigerant R404A

System maximum refrigerant capacity = 12 kW

Evaporating temperature = -18°C

System charge = 8 kg

Recommended accumulator is model SA-7051 with a refrigerant holding capacity of 5.4 kg and a maximum rating of 13.2 kW.

### Additional Selection Information

Two accumulators can be piped in series to increase holding capacity. Oil will be metered from one accumulator to the next to ensure proper oil flow to the compressors. Adding a second identical accumulator will effectively double the holding capacity of a single accumulator.

Piping two identical accumulators in parallel will double the kW capacity. Two identical accumulators must be used.

On low temperature systems (-18°C and below) a heater band should be installed to help boil off the liquid refrigerant and aid oil flow. Do not add too much heat or there is a risk of overheating the compressors.

### Installation - Main Issues

1. Install the accumulator after the suction line filter.
2. A pressure relief device connection is fitted at the top of the vessel. The user must ensure that the vessel is protected from over-pressure.
3. Heater bands should be installed at the bottom of the accumulator.

Part No	Refrigerant Holding Capacity (kg at -18°C)			Recommended kW of refrigerant at Suction Evaporating Temp (°C)												
	R134a	R407F	R404A	R134a				R407F				R404A/R507				
				5°	-7°	-18°	-29°	5°	-7°	-18°	-29°	5°	-7°	-18°	-29°	
SA-7044	1	1	0.9	MAX	1.6	1.2	0.8	0.5	5.8	3.9	2.6	1.6	3.1	2.2	1.5	0.9
				MIN	0.3	0.2	0.2	0.2	1.7	1.1	0.7	0.5	0.5	0.3	0.3	0.2
SA-7043	1	1	0.9	MAX	3.2	2.3	1.5	1	10.5	7.1	4.7	2.9	6.3	4.3	2.8	1.8
				MIN	0.7	0.6	0.5	0.4	2.4	1.6	1	0.7	0.9	0.7	0.6	0.5
SA-7045	2.1	2	1.9	MAX	3.2	2.3	1.5	1	10.5	7.1	4.7	2.9	6.3	4.3	2.8	1.8
				MIN	0.7	0.6	0.5	0.4	2.4	1.6	1	0.7	0.9	0.7	0.6	0.5
SA-7046	2.1	2	1.9	MAX	4.5	3.1	2.1	1.4	14.4	9.7	6.4	4	8.7	5.9	3.8	2.5
				MIN	0.9	0.7	0.6	0.5	3.2	2.2	1.4	0.9	1.3	1	0.8	0.6
SA-7056	2.8	2.7	2.5	MAX	4.5	3.1	2.1	1.4	14.4	9.7	6.4	4	8.7	5.9	3.8	2.5
				MIN	0.9	0.7	0.6	0.5	3.2	2.2	1.4	0.9	1.3	1	0.8	0.6
SA-7057S	2.7	2.6	2.4	MAX	7.7	5.4	3.6	2.3	24.2	16.3	10.7	6.7	14.9	10.2	6.5	4.2
				MIN	1.3	1.1	0.9	0.7	4.9	3.3	2.2	1.4	1.8	1.5	1.2	1
SA-7057	4.6	4.4	4.1	MAX	7.7	5.4	3.6	2.3	24.2	16.3	10.7	6.7	14.9	10.2	6.5	4.2
				MIN	1.3	1.1	0.9	0.7	4.9	3.3	2.2	1.4	1.8	1.5	1.2	1
SA-7051	6.1	5.8	5.4	MAX	16.3	11.4	7.3	4.8	49.8	33.4	22.1	13.8	31.4	21.7	13.2	8.6
				MIN	2.1	1.8	1.5	1.2	7.5	5	3.3	2.1	2.9	2.4	2	1.6
SA-7053	6.1	5.8	5.4	MAX	27.8	18.8	12	7.6	82.1	55.1	36.4	22.8	53.9	35.9	21.8	13.8
				MIN	4.4	3.7	3.1	2.5	15.8	10.6	7	4.4	6	4.9	4	3.2
SA-7065	13.1	12.4	11.5	MAX	49.3	33.8	21.1	13.4	145	97.4	64.4	40.2	95	64.1	38	24.3
				MIN	7.6	6.3	5.3	4.4	28.7	19.3	12.7	8	10.3	8.4	7	5.7

Part No	Refrigerant Holding Capacity (kg at -18°C)				Recommended kW of refrigerant at Suction Evaporating Temp (°C)																
	R448A/R449A	R450A	R407C	R407A	R448A/R449A				R450A				R407C				R407A				
					5°	-7°	-18°	-29°	5°	-7°	-18°	-29°	5°	-7°	-18°	-29°	5°	-7°	-18°	-29°	
SA-7044	1	1	1	1	MAX	5.8	3.9	2.6	2	3.3	2.2	1	0.9	5.2	3.5	2.3	1.4	5.6	3.8	2.5	1.6
					MIN	1.7	1.1	0.7	0.5	1	0.6	0.4	0.2	1.5	1	0.7	0.4	1.6	1.1	0.7	0.4
SA-7043	1	1	1	1	MAX	10.5	7.1	4.7	3	6.1	4	2.6	1.6	9.5	6.4	4.2	2.6	10.2	6.9	4.5	2.8
					MIN	2.4	1.6	1.1	0.7	1.4	0.9	0.6	0.4	2.1	1	0.9	0.6	2.3	1.5	1	0.6
SA-7045	2	2	2	2	MAX	10.5	7.1	4.7	3	6.1	4	2.6	1.6	9.5	6.4	4.2	2.6	10.2	6.9	4.5	2.8
					MIN	2.4	1.6	1.1	0.7	1.4	0.9	0.6	0.4	2.1	1	0.9	0.6	2.3	1.5	1	0.6
SA-7046	2	2	2	2	MAX	14.4	9.8	6.4	4.1	8.3	5.5	3.5	2.2	13	8.8	5.7	3.6	13.9	9.4	6.1	3.9
					MIN	3.2	2.2	1	0.9	1.9	1.2	0.8	0.5	2.9	2	1.3	0.8	3.1	2.1	1.4	0.9
SA-7056	2.6	2.8	2.7	2.7	MAX	14.4	9.8	6.4	4.1	8.3	5.5	3.5	2.2	13	8.8	5.7	3.6	13.9	9.4	6.1	3.9
					MIN	3.2	2.2	1	0.9	1.9	1.2	0.8	0.5	2.9	2	1.3	0.8	3.1	2.1	1.4	0.9
SA-7057S	2.5	2.7	2.6	2.6	MAX	24.2	16.4	10.8	6.8	14	9.3	6	3.7	21.9	14.7	9.6	6	23.5	15.8	10.3	6.5
					MIN	4.9	3.3	2.2	1.4	2.8	1.9	1.2	0.7	4	3	1.9	1.2	4.7	3.2	2.1	1.3
SA-7057	4.3	4.5	4.5	4.4	MAX	24.2	16.4	10.8	6.8	14	9.3	6	3.7	21.9	14.7	9.6	6	23.5	15.8	10.3	6.5
					MIN	4.9	3.3	2.2	1.4	2.8	1.9	1.2	0.7	4	3	1.9	1.2	4.7	3.2	2.1	1.3
SA-7051	5.7	5.9	5.9	5.8	MAX	49.8	33.8	22.2	14.1	28.9	19.2	12.3	7.5	45	30.3	19.7	12.3	48.3	32.5	21.1	13.4
					MIN	7.5	5.1	3.3	2.1	4.3	2.9	1.8	1.1	6.8	4.6	3	1.9	7.3	4.9	3.2	2
SA-7053	5.7	5.9	5.9	5.8	MAX	82.1	55.7	36.6	23.2	47.6	31.6	20.2	12.4	74.2	50	32.5	20.3	79.6	53.6	34.8	22
					MIN	15.8	10.7	7.1	4.5	9.2	6.1	3.9	2.4	14.3	9.6	6.3	3.9	15.3	10.3	6.7	4.2
SA-7065	12.1	12.7	12.6	12.4	MAX	145	98.4	64.7	41	84.1	55.8	35.7	21.9	131	88.2	57.4	35.9	141	94.7	61.5	39
					MIN	28.7	19.5	12.8	8.1	16.6	11	7.1	4.3	25.9	17.5	11.4	7.1	27.8	18.7	12.2	7.7

Part No	Refrigerant Holding Capacity (kg at -18°C)			Recommended kW of refrigerant at Suction Evaporating Temp (°C)												
	R134a	R407F	R404A	R134a				R407F				R404A / R507				
				5°	-7°	-18°	-29°	5°	-7°	-18°	-29°	5°	-7°	-18°	-29°	
S-7043	1	0.9	0.7	MAX	3.2	2.3	1.5	1	10.5	7.1	4.7	2.9	6.3	4.3	2.8	1.8
				MIN	0.7	0.6	0.5	0.4	2.4	1.6	1.1	0.7	0.9	0.7	0.6	0.5
S-7044	2	1.9	1.7	MAX	1.6	1.2	0.8	0.5	5.8	3.9	2.6	1.6	3.1	2.2	1.5	0.9
				MIN	0.3	0.2	0.2	0.2	1.7	1.1	0.7	0.5	0.5	0.3	0.3	0.2
S-7045	2	1.9	1.7	MAX	3.2	2.3	1.5	1	10.5	7.1	4.7	2.9	6.3	4.3	2.8	1.8
				MIN	0.7	0.6	0.5	0.4	2.4	1.6	1	0.7	0.9	0.7	0.6	0.5
S-7046	2	1.9	1.7	MAX	4.5	3.1	2.1	1.4	14.4	9.7	6.4	4	8.7	5.9	3.8	2.5
				MIN	0.9	0.7	0.6	0.5	3.2	2.2	1.4	0.9	1.3	1	0.8	0.6
S-7057	4.2	3.8	3.5	MAX	7.7	5.4	3.6	2.3	24.2	16.3	10.7	6.7	14.9	10.2	6.5	4.2
				MIN	1.3	1.1	0.9	0.7	4.9	3.3	2.2	1.4	1.8	1.5	1.2	1
S-7061	5.8	5.5	4.9	MAX	16.3	11.4	7.3	4.8	49.8	33.4	22.1	13.8	31.4	21.7	13.2	8.6
				MIN	2.1	1.8	1.5	1.2	7.5	5	3.3	2.1	2.9	2.4	2	1.6
S-7063	9.9	9	8.3	MAX	27.8	18.8	12	7.6	82.1	55.1	36.4	22.8	53.9	35.9	21.8	13.8
				MIN	4.4	3.7	3.1	2.5	15.8	10.6	7	4.4	6	4.9	4	3.2
S-7065	9.9	9	8.3	MAX	49.3	33.8	21.1	13.4	145	97.4	64.4	40.2	95	64.1	38	24.3
				MIN	7.6	6.3	5.3	4.4	28.7	19.3	12.7	8	10.3	8.4	7	5.7
S-7721	14.7	13.4	12.3	MAX	109	70.4	49.3	26.4	322	216	143	89.2	201	134	84.5	56.3
				MIN	14.1	12.3	10.6	8.8	57.4	38.5	25.5	15.9	21.1	17.6	14.1	12.3
S-7725	22	19.9	18.2	MAX	172	113	75.7	42.2	480	322	213	133	308	204	132	88
				MIN	21.1	19.4	15.8	12.3	95.9	64.4	42.6	26.6	31.7	28.2	22.9	21.1
S-7731-CE	36.4	32.9	30	MAX	253	194	130	84.5	712	478	316	197	456	308	197	125
				MIN	35.2	31.7	24.6	22.9	143	96	63.4	39.6	52.8	44	37	29.9
S-7732-CE	36.4	32.9	30	MAX	253	194	130	84.5	712	478	316	197	456	308	197	125
				MIN	35.2	31.7	24.6	22.9	143	96	63.4	39.6	52.8	44	37	29.9
S-7741-CE	62	58.8	55	MAX	401	259	156	107	1120	752	497	310	757	503	320	201
				MIN	109	89.4	75.7	59.8	362	243	160	100	174	113	73.9	45.8
S-7742-CE	127	121	114	MAX	401	259	156	107	1120	752	497	310	757	503	320	201
				MIN	109	89.4	75.7	59.8	362	243	160	100	174	113	73.9	45.8

Part No	Refrigerant Holding Capacity (kg at -18°C)				Recommended kW of refrigerant at Suction Evaporating Temp (°C)																
	R448A/ R449A	R450A	R407C	R407A	R448A/R449A				R450A				R407C				R407A				
					5°	-7°	-18°	-29°	5°	-7°	-18°	-29°	5°	-7°	-18°	-29°	5°	-7°	-18°	-29°	
S-7043	0.9	0.9	0.9	0.9	MAX	10.5	7.1	4.7	3	6.1	4	2.6	1.6	9.5	6.4	4.2	2.6	10.2	6.9	4.5	2.8
	MIN	2.4	1.6	1.1	0.7	1.4	0.9	0.6	0.4	2.1	1.4	0.9	0.6	2.3	1.5	1	0.6	2.3	1.5	1	0.6
S-7044	1.8	1.9	1.9	1.8	MAX	5.8	3.9	2.6	1.6	3.3	2.2	1.4	0.9	5.2	3.5	2.3	1.4	5.6	3.8	2.5	1.6
	MIN	1.7	1.1	0.7	0.5	1	0.6	0.4	0.2	1.5	1	0.7	0.4	1.5	1	0.7	0.4	1.6	1.1	0.7	0.4
S-7045	1.8	1.9	1.9	1.8	MAX	10.5	7.1	4.7	3	6.1	4	2.6	1.6	9.5	6.4	4.2	2.6	10.2	6.9	4.5	2.8
	MIN	2.4	1.6	1.1	0.7	1.4	0.9	0.6	0.4	2.1	1.4	0.9	0.6	2.3	1.5	1	0.6	2.3	1.5	1	0.6
S-7046	1.8	1.9	1.9	1.8	MAX	14.4	9.8	6.4	4.1	8.3	5.5	3.5	2.2	13	8.8	5.7	3.6	13.9	9.4	6.1	3.9
	MIN	3.2	2.2	1.4	0.9	1.9	1.2	0.8	0.5	2.9	2	1.3	0.8	3.1	2.1	1.4	0.9	3.1	2.1	1.4	0.9
S-7057	3.7	3.9	3.9	3.8	MAX	24.2	16.4	10.8	6.8	14	9.3	6	3.7	21.9	14.7	9.6	6	23.5	15.8	10.3	6.5
	MIN	4.9	3.3	2.2	1.4	2.8	1.9	1.2	0.7	4.4	3	1.9	1.2	4.7	3.2	2.1	1.3	4.7	3.2	2.1	1.3
S-7061	5.2	5.4	5.4	5.3	MAX	49.8	33.8	22.2	14.1	28.9	19.2	12.3	7.5	45	30.3	19.7	12.3	48.3	32.5	21.1	13.4
	MIN	7.5	5.1	3.3	2.1	4.3	2.9	1.8	1.1	6.8	4.6	3	1.9	7.3	4.9	3.2	2	7.3	4.9	3.2	2
S-7063	8.8	9.2	9.1	9	MAX	82.1	55.7	36.6	23.2	47.6	31.6	20.2	12.4	74.2	50	32.5	20.3	79.6	53.6	34.8	22
	MIN	15.8	10.7	7.1	4.5	9.2	6.1	3.9	2.4	14.3	9.6	6.3	3.9	15.3	10.3	6.7	4.2	15.3	10.3	6.7	4.2
S-7065	8.8	9.2	9.1	9	MAX	145	98.4	64.7	41	84	55.8	35.7	21.9	131	88.2	57.4	35.9	141	94.7	61.5	39
	MIN	28.7	19.5	12.8	8.1	16.6	11	7.1	4.3	25.9	17.5	11.4	7.1	27.8	18.7	12.2	7.7	27.8	18.7	12.2	7.7
S-7721-CE	13.1	13.7	13.6	13.3	MAX	322	218	144	90.9	186	124	79.2	48.5	291	196	127	79.6	312	210	136	86.3
	MIN	57.4	38.9	25.6	16.2	33.3	22.1	14.1	8.7	51.9	34.9	22.7	14.2	55.6	37.5	24.3	15.4	55.6	37.5	24.3	15.4
S-7725-CE	19.4	20.3	20.1	19.8	MAX	480	325	214	136	278	184	118	72.4	434	292	190	119	465	313	203	129
	MIN	95.9	65.1	42.8	27.1	55.6	36.9	23.6	14.5	86.7	58.4	38	23.8	93	62.6	40.7	25.7	86.7	58.4	40.7	25.7
S-7731-CE	32.1	33.6	33.3	32.7	MAX	712	483	318	201	413	274	175	107	643	433	282	176	690	465	302	191
	MIN	143	96.9	63.8	40.4	82.8	55	35.2	21.6	129	87	56.6	35.4	139	93.3	60.6	38.4	139	93.3	60.6	38.4
S-7732-CE	32.1	33.6	33.3	32.7	MAX	712	483	318	201	413	274	175	107	643	433	282	176	690	465	302	191
	MIN	143	96.9	63.8	40.4	82.8	55	35.2	21.6	129	87	56.6	35.4	139	93.3	60.6	38.4	139	93.3	60.6	38.4
S-7741-CE	57.5	60.2	59.6	58.6	MAX	1120	759	499	316	649	430	276	169	1012	681	443	277	1085	731	475	300
	MIN	362	245	161	102	210	139	89	54.5	327	220	143	89.5	350	236	153	97	350	236	153	97
S-7742-CE	119	124	123	121	MAX	1120	759	499	316	649	430	276	169	1012	681	443	277	1085	731	475	300
	MIN	362	245	161	102	210	139	89	54.5	327	220	143	89.5	350	236	153	97	350	236	153	97