

# Suction Accumulators

The refrigeration compressor is designed to compress vapour only. A suction line accumulator prevents compressor damage from a sudden surge of liquid refrigerant and oil which could enter the compressor from the suction line. The suction line accumulator is a temporary reservoir for this mixture, designed to meter both the liquid refrigerant and oil back to the compressor at an acceptable rate. This prevents damage to the reed valves, pistons, rods, and crank shafts.

## Features

- Designed for maximum flow and minimal pressure drop.
- Optimised metering device orifice for maximum mass flow.
- A 30 mesh screen fitted to the orifice of the metering device.
- U-tube inlet positioned is separated from the vessel inlet.
- Stamped inlet position.
- Powder coated finish.

## Benefits

- Negligible loss in system efficiency.
- Positive oil return with controlled liquid injection
- Reduced chance of orifice blocking.
- Reduced risk of high velocity liquid carry over.
- Ensures correct installation orientation.
- Exceeds 500 hours ASTM salt spray tests.

## Technical Specification

Manufactured in accordance with AS 2971, AS 1210 or UL207

### Standard Suction Accumulators

Safe Working Pressure: 2,500 kPa

Minimum Burst Pressure: 12,500 kPa

### SA-7 Series Suction Accumulators

Safe Working Pressure: 3,100 kPa

Minimum Burst Pressure: 15,500 kPa

The Design Temperature range of all suction accumulators is -30°C to 50°C. Copper tubing and fittings in accordance with AS 1571-1995 or ASTM B28. Vessel Classification (As 2971) is Class 2 Tier 1. Contents Hazard level: Non-Harmful.

Note: Henry Tech Suction Accumulators have the inlet connector clearly identified to avoid incorrect installation. If connected in the wrong orientation oil and/or liquid refrigerant will become trapped inside the accumulator resulting in catastrophic compressor failure from oil starvation to the compressor or slugging back to the compressor.



## Accumulator Selection

Selection of a suction accumulator should be made based on the following:

1. The accumulator should have an adequate liquid holding capacity, which can vary with the system. Normally this should not be less than 50% of the system charge (for TXV systems).
2. The system designer must ensure that the refrigeration capacity is within the capacity of the suction accumulator.

## Accumulator Location

Position the suction accumulator between the evaporator and the compressor. Installing at the same level of the compressor and as close to the compressor as possible will ensure the shortest pipe run between the outlet of the suction accumulator and the compressor service valve.

## Effects Of Liquid “Slugging” On A Compressor

Liquid slugging occurs when a sudden surge of liquid refrigerant (or oil) is allowed to return to the compressor from the suction line.

If this sudden surge of liquid enters the compressor this could result in damage to the reed valves, pistons, rods, and crank shafts resulting in compressor failure.

**New Refrigerants**

New generation refrigerants & oils can be immiscible at lower temperatures and can actually separate into layers in the base of an accumulator. The Henry Tech suction accumulator provides active mixing through a combination of inlet flow direction, outlet U-tube positioning and dedicated metering device location.

**Field Replacement**

Henry Tech recommends to replace an accumulator after a compressor failure. System contaminants and “old” oil inside the vessel can significantly reduce the life span of the replacement compressor.

**Effects of Pressure drop on system capacity on suction lines:**

When sizing piping and components for refrigeration systems, there is a balance between costs imposed for larger piping and components, versus efficiency considerations due to pressure drop and oil entrainment.

Pressure drop in suction lines can cause a dramatic reduction in system capacity as Table 1 demonstrates.

Table 1.

Approximate Effect of Gas Line Pressure Drops on R-22 Compressor Capacity and Power *		
Line Loss, K Suction Line	Capacity %	Energy % **
0	100	100
1	96.8	104.3
2	93.6	107.3

\* For an evaporating temperature of 5°C and 40°C condensing

\*\* Energy rated @ kW power/kW cooling effect

Recommended system practices for Halocarbon refrigerants according to the ASHRAE Handbook R02 – Refrigeration, takes into consideration economic factors such as costs of materials and system efficiency. Pressure drop calculations for each segment of the system are based on change in saturation temperature of the refrigerant in suction lines the total drop should be limited to 1 K in equivalent pressure loss.

**Description**

Suction line accumulators are installed in air conditioning and refrigeration systems where a sudden return of liquid down the suction line is possible. They are installed immediately before the compressor.

The suction accumulator is designed to allow only refrigerant vapour to return to the compressor. This is achieved by utilising a U-tube design incorporated in the outlet of the vessel.

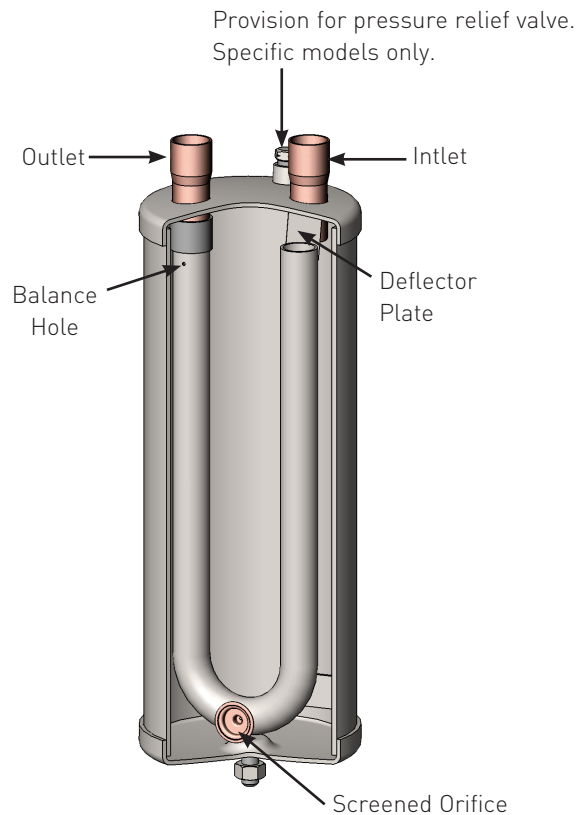
This design allows vapour to be drawn off even when the accumulator is almost completely full of liquid refrigerant.

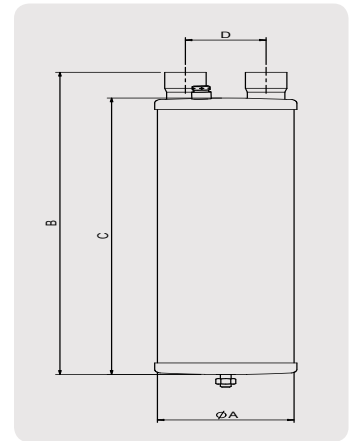
A screened orifice fitted to the lowest point of the U-tube allows any liquid (oil or refrigerant) to be metered back into vapour suspension to be returned safely to the compressor.

A vent hole positioned at the top of the U-tube prevents a flooded accumulator from “slugging” at system start-up. Flooding of the suction accumulator can occur during the off-cycle. Improved system balance can also be achieved with the installation of a correctly selected suction accumulator.

The suction accumulator also act as a storage vessel for any liquid refrigerant returning from the evaporator as a result of condenser or evaporator load variations as well as provide protection from liquid migration to the compressor during its off-cycle.

The Henry Tech suction accumulators come in a range of refrigeration capacities, holding volumes and connection sizes. The range is suitable for all popular refrigerants including R410A and CO<sup>2</sup>.





Nominal Capacity kW @ +5°C set & 30°C sct, pressure drop = 7 kPa										
Part No.	Connection Size ID (Inch)	Volume (L)	R404A	R134a	R410A	Dimensions (mm)				Weight (kg)
						Dia. A	B	C	D	
3100-083007	1/2	0.7	3.1	1.6	3.1	76	200	172	41.2	1.10
3100-084015	1/2	1.5	3.1	1.6	3.1	102	250	214	52	1.5
3100-104016P	5/8	1.6	7.4	6.2	7.4	102	218	194	43.5	1.90
3100-104019	5/8	1.9	7.4	6.2	7.4	102	305	270	52	2.60
3100-124016P	3/4	1.6	13.4	11.2	13.4	102	244	220	43.5	2.20
3100-125024P	3/4	2.4	13.4	11.2	13.4	127	215	186	43.5	2.80
3100-125029P	3/4	2.6	13.4	11.2	13.4	127	255	222	43.5	3.20
3100-145034P	7/8	3.4	19.0	15.8	19.0	127	285	245	43.5	3.50
3100-145040	7/8	4.0	19.0	15.8	19.0	127	368	328	70	3.80
3100-185040	1 1/8	4.0	31.4	16.3	31.4	127	360	315	70	3.80
3100-185559	1 1/8	5.9	31.4	16.3	31.4	140	430	385	75	6.20
3100-186055P	1 1/8	5.5	31.4	16.3	31.4	159	390	340	60.5	5.90
3100-186063P	1 1/8	6.3	31.4	16.3	31.4	159	470	420	60.5	6.80
3100-186572	1 1/8	7.2	31.4	16.3	31.4	180	442	397	85	7.0
3100-226071P	1 3/8	7.1	95	49.3	95	160	460	406	60.5	7.40
3100-226563	1 3/8	6.3	95	49.3	95	160	350	305	85	6.20
3100-226596	1 3/8	9.6	95	49.3	95	159	569	524	85	8.1
3100-266510	1 5/8	10.5	201	109	201	160	575	525	85	9.30
3100-346013P	2 1/8	13.0	201	109	201	160	874	820	70.5	14.00
3100-348615	2 1/8	15.0	201	109	201	219	533	499	123	13.30
3100-348626	2 1/8	26.0	201	109	201	219	879	836	89	23

Nominal Capacity kW @ +5°C set & 30°C sct, pressure drop = 7 kPa										
Part No.	Conn. Size ID (Inch)	Volume (L)	R404A	R134a	R410A	Dimensions (mm)				Weight (kg)
						Dia. A	B	C	D	
SA-7044	1/2	1.0	3.1	1.6	3.1	102	168	143	63.5	1.27
SA-7045	5/8	1.0	7.4	6.2	7.4	102	165	143	63.5	1.27
SA-7045S	5/8	1.7	7.4	6.2	7.4	102	279	254	63.5	2.10
SA-7046	3/4	1.7	13.4	11.2	13.4	102	284	254	63.5	2.10
SA-7056	3/4	2.4	13.4	11.2	13.4	127	246	216	70	2.30
SA-7057S	7/8	2.4	19.0	15.8	19.0	127	251	216	70	2.90
SA-7057	7/8	3.7	19.0	15.8	19.0	127	374	340	70	3.22
SA-7051	1 1/8	4.8	31.7	31.1	31.7	127	466	429	70	3.80
SA-7053	1 3/8	4.8	42.2	38.9	42.2	127	470	430	70	3.80
SA-7065	1 5/8	11.0	102.0	87.3	102.0	160	680	635	75	10.30

Note: Suction Accumulators are to be mounted vertically

Part No	Conn Size (inch)	Dimensions (mm)					Mounting details	HE Coil Conn Size (inch)	Drawing Reference	Weight (kg)	CE Cat		
		A	B	C	D	E (Ø)							
S-7043	-	-	5/8 ODS	102	168	48	N/A	N/A	M10 stud & nut	N/A	fig.1	2	SEP
S-7044	-	S-7044-HP	1/2 ODS	102	264	48	N/A	N/A	M10 stud & nut	N/A	fig.1	2.5	SEP
S-7045	-	S-7045HP	5/8 ODS	102	264	48	N/A	N/A	M10 stud & nut	N/A	fig.1	2.5	SEP
-	S-7045HE	-	5/8 ODS	102	264	64	64	N/A	M10 stud & nut	3/8 ODS	fig.1	2.5	SEP
S-7046	-	S-7046HP	3/4 ODS	102	270	48	N/A	N/A	M10 stud & nut	N/A	fig.1	2.5	SEP
-	S-7046HE	-	3/4 ODS	102	270	64	64	N/A	M10 stud & nut	3/8 ODS	fig.1	2.5	SEP
S-7057-CE	S-7057HE-CE	S-7057HP-CE	7/8 ODS	152	252	57	70	N/A	M10 stud & nut	1/2 ODS	fig.1	6, 7 (HE)	Cat I
S-7061-CE	S-7061HE-CE	S-7061HP-CE	1 1/8 ODS	152	382	76	73	N/A	M10 stud & nut	5/8 ODS	fig.1	8, 9 (HE)	Cat I
S-7063-CE	S-7063HE-CE	S-7063HP-CE	1 3/8 ODS	152	629	76	73	N/A	M10 stud & nut	5/8 ODS	fig.1	11.5, 13.5 (HE)	Cat II
S-7065-CE	S-7065HE-CE	S-7065HP-CE	1 5/8 ODS	152	639	76	73	N/A	M10 stud & nut	3/4 ODS	fig.1	11.5, 13.5 (HE)	Cat II
S-7721-CE	-	-	2 1/8 ODS	219	588	89	140	282	3 Ø14mm x 22mm slots	N/A	fig.2	23	Cat II
-	S-7721HE-CE	-	2 1/8 ODS	219	588	89	140	282	3 Ø14mm x 22mm slots	7/8 ODS	fig.3	27	Cat II
S-7722-CE	-	-	2 1/8 ODS	219	588	89	140	282	3 Ø14mm x 22mm slots	N/A	fig.2	23	Cat II
-	S-7722HE-CE	-	2 1/8 ODS	219	588	89	140	282	3 Ø14mm x 22mm slots	7/8 ODS	fig.3	27	Cat II
S-7725-CE	-	-	2 5/8 ODS	273	578	118	140	337.4	3 Ø14mm x 22mm slots	N/A	fig.2	33.5	Cat II
-	S-7725HE-CE	-	2 5/8 ODS	273	578	118	140	337.4	3 Ø14mm x 22mm slots	1 3/8 ODS	fig.3	39.5	Cat II
S-7726-CE	-	-	2 5/8 ODS	273	578	118	140	337.4	3 Ø14mm x 22mm slots	N/A	fig.2	33.5	Cat II
-	S-7726HE-CE	-	2 5/8 ODS	273	578	118	140	337.4	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	149	388.4	3 Ø14mm x 22mm slots	N/A	fig.2	47	Cat IV
-	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 IV
S-7732-CE	-	-	3 1/8 ODS	324	635	140	149	388.4	3 Ø14mm x 22mm slots	N/A	fig.2	47	Cat IV
-	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 IV
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-7722, S-7722HE & S-7726 models
2. S-7726HE, S-7732, S-7732HE, S-7741, S-7741HE & S-7742 models
3. S-7741HE model
4. S-7741 & S-7742 models

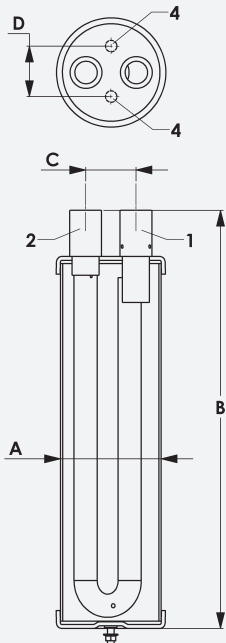


Fig.1

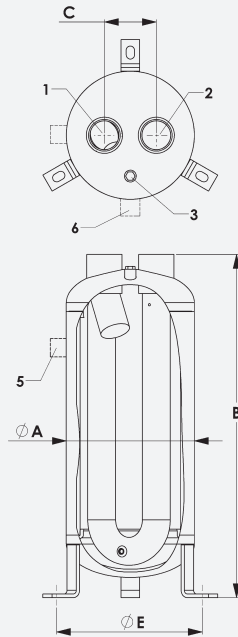


Fig.2

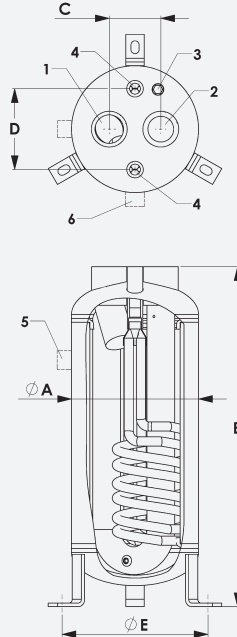


Fig.3

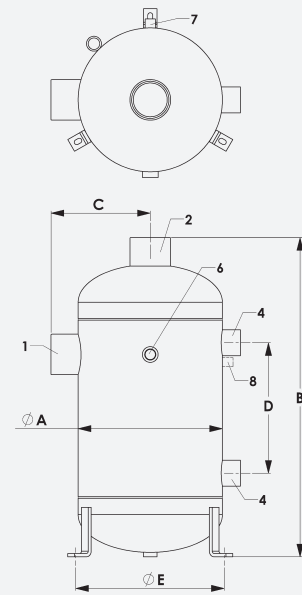


Fig.4

- |          |   |  |   |
|----------|---|--|---|
| 1 Inlet  | 3 Relief connection, 1/4 FPT                      | 5 Liquid level switch connection, 1 FPT. (Refer to note 1) | 7 Relief connection, 1/2 FPT. (Refer to note 3) |
| 2 Outlet | 4 Heat Exchanger coil connection (HE models only) | 6 Liquid level switch connection, 1 FPT. (Refer to note 2) | 8 Relief connection, 1/2 FPT. (Refer to note 4) |

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°	-40°	5°	-7°	-18°	-29°	-40°	5°	-7°	-18°	-29°	-40°						
S-7615-CE	10.6	9.7	8.8	MAX	53	35	Horizontal accumulators not suitable for applications below -10°C					145	98	Horizontal accumulators not suitable for applications below -10°C					100	57	Horizontal accumulators not suitable for applications below -10°C				
S-7621-CE	14.4	13	11.9	MAX	101	69	Horizontal accumulators not suitable for applications below -10°C					254	170	Horizontal accumulators not suitable for applications below -10°C					173	117	Horizontal accumulators not suitable for applications below -10°C				
S-7625-CE	21.2	19	17.6	MAX	176	123	Horizontal accumulators not suitable for applications below -10°C					481	323	Horizontal accumulators not suitable for applications below -10°C					328	217	Horizontal accumulators not suitable for applications below -10°C				
S-7043	1	0.9	0.7	MAX	3.2	2.3	1.5	1	0.6	10.5	7.1	4.7	2.9	1.7	6.3	4.3	2.8	1.8	1.1						
				MIN	0.7	0.6	0.5	0.4	0.3	2.4	1.6	1.1	0.7	0.4	0.9	0.7	0.6	0.5	0.4						
S-7044	2	1.9	1.7	MAX	1.6	1.2	0.8	0.5	0.6	5.8	3.9	2.6	1.6	1	3.1	2.2	1.5	0.9	0.6						
				MIN	0.3	0.2	0.2	0.1	1.7	1.1	0.7	0.5	0.3	0.5	0.3	0.3	0.2	0.2							
S-7045	2	1.9	1.7	MAX	3.2	2.3	1.5	1	0.6	10.5	7.1	4.7	2.9	1.7	6.3	4.3	2.8	1.8	1.1						
				MIN	0.7	0.6	0.5	0.4	0.3	2.4	1.6	1	0.7	0.4	0.9	0.7	0.6	0.5	0.4						
S-7046	2	1.9	1.7	MAX	4.5	3.1	2.1	1.4	0.8	14.4	9.7	6.4	4	2.4	8.7	5.9	3.8	2.5	1.5						
				MIN	0.9	0.7	0.6	0.5	0.4	3.2	2.2	1.4	0.9	0.5	1.3	1	0.8	0.6	0.5						
S-7057-CE	4.2	3.8	3.5	MAX	7.7	5.4	3.6	2.3	1.4	24.2	16.3	10.7	6.7	4	14.9	10.2	6.5	4.2	2.6						
				MIN	1.3	1.1	0.9	0.7	0.6	4.9	3.3	2.2	1.4	0.8	1.8	1.5	1.2	1	0.7						
S-7061-CE	5.8	5.5	4.9	MAX	16.3	11.4	7.3	4.8	2.9	49.8	33.4	22.1	13.8	8.2	31.4	21.7	13.2	8.6	5.2						
				MIN	2.1	1.8	1.5	1.2	1	7.5	5	3.3	2.1	1.2	2.9	2.4	2	1.6	1.2						
S-7063-CE	9.9	9	8.3	MAX	27.8	18.8	12	7.6	4.7	82.1	55.1	36.4	22.8	13.4	53.9	35.9	21.8	13.8	8.6						
				MIN	4.4	3.7	3.1	2.5	2	15.8	10.6	7	4.4	2.6	6	4.9	4	3.2	2.5						
S-7065-CE	9.9	9	8.3	MAX	49.3	33.8	21.1	13.4	8.2	145	97.4	64.4	40.2	23.7	95	64.1	38	24.3	15						
				MIN	7.6	6.3	5.3	4.4	3.5	28.7	19.3	12.7	8	4.7	10.3	8.4	7	5.7	4.4						
S-7721-CE	14.7	13.4	12.3	MAX	109	70.4	49.3	26.4	17.6	322	216	143	89.2	52.7	201	134	84.5	56.3	35.2						
				MIN	14.1	12.3	10.6	8.8	7	57.4	38.5	25.5	15.9	9.4	21.1	17.6	14.1	12.3	8.8						
S-7722-CE	14.7	13.4	12.3	MAX	109	70.4	49.3	26.4	17.6	322	216	143	89.2	52.7	201	134	84.5	56.3	35.2						
				MIN	14.1	12.3	10.6	8.8	7	57.4	38.5	25.5	15.9	9.4	21.1	17.6	14.1	12.3	8.8						
S-7725-CE	22	19.9	18.2	MAX	172	113	75.7	42.2	22.9	480	322	213	133	78.6	308	204	132	88	47.5						
				MIN	21.1	19.4	15.8	12.3	3.5	95.9	64.4	42.6	26.6	15.7	31.7	28.2	22.9	21.1	5.3						
S-7726-CE	22	19.9	18.2	MAX	172	113	75.7	42.2	22.9	480	322	213	133	78.6	308	204	132	88	47.5						
				MIN	21.1	19.4	15.8	12.3	3.5	95.9	64.4	42.6	26.6	15.7	31.7	28.2	22.9	21.1	5.3						
S-7731-CE	36.4	32.9	30	MAX	253	194	130	84.5	33.4	712	478	316	197	117	456	308	197	125	70.4						
				MIN	35.2	31.7	24.6	22.9	5.3	143	96	63.4	39.6	23.4	52.8	44	37	29.9	8.8						
S-7732-CE	36.4	32.9	30	MAX	253	194	130	84.5	33.4	712	478	316	197	117	456	308	197	125	70.4						
				MIN	35.2	31.7	24.6	22.9	5.3	143	96	63.4	39.6	23.4	52.8	44	37	29.9	8.8						
S-7741-CE	62	58.8	55	MAX	401	259	156	107	69.7	1120	752	497	310	183	757	503	320	201	116						
				MIN	109	89.4	75.7	59.8	47.2	362	243	160	100	59.2	174	113	73.9	45.8	24.6						
S-7742-CE	127	121	114	MAX	401	259	156	107	69.7	1120	752	497	310	183	757	503	320	201	116						
				MIN	109	89.4	75.7	59.8	47.2	362	243	160	100	59.2	174	113	73.9	45.8	24.6						

**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 recommended minimum and maximum kW capacities are listed in the table. The maximum kW capacities are based on accumulator pressure loss and oil return. The pressure loss is equivalent to 1/2° C. The minimum kW capacities are to ensure proper oil return.

Example:

Refrigerant R404A

System maximum refrigeration capacity = 170 kW

System minimum refrigeration capacity = 65 kW

Evaporating temperature = -18°C

System Charge = 55 kg

Recommended accumulator is model S-7731-CE with a refrigerant holding capacity of 30 kg and a minimum/maximum rating of 37/197 kW.

**Additional selection information**

The heat exchanger models can be used on low temperature systems to sub-cool the liquid line while helping to boil off liquid refrigerant in the accumulator by passing the liquid line through the heat exchanger coil. This can increase system efficiency while helping oil flow in the suction line. Do not use discharge gas through the heat exchange coil as there is a risk of overheating the compressors.

Heat pump systems must use the HP accumulator models. Winter heating can cause too much liquid refrigerant to slug back to the compressor. Heat pump accumulators incorporate a smaller orifice to prevent excessive liquid flow.

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.

Horizontal accumulators should not be used when the liquid refrigerant temperature is less than -10°C.

**Installation – Main issues**

1. Install the accumulator after the suction line filter.
2. A pressure relief device connection is provided at the top of the vessel. The user must ensure that the vessel is protected from over-pressure. Over-pressure will occur if the liquid refrigerant is evaporated e.g. external fire case.
3. Heater bands should be installed at the bottom of a vertical accumulator and at the outlet end of a horizontal accumulator.