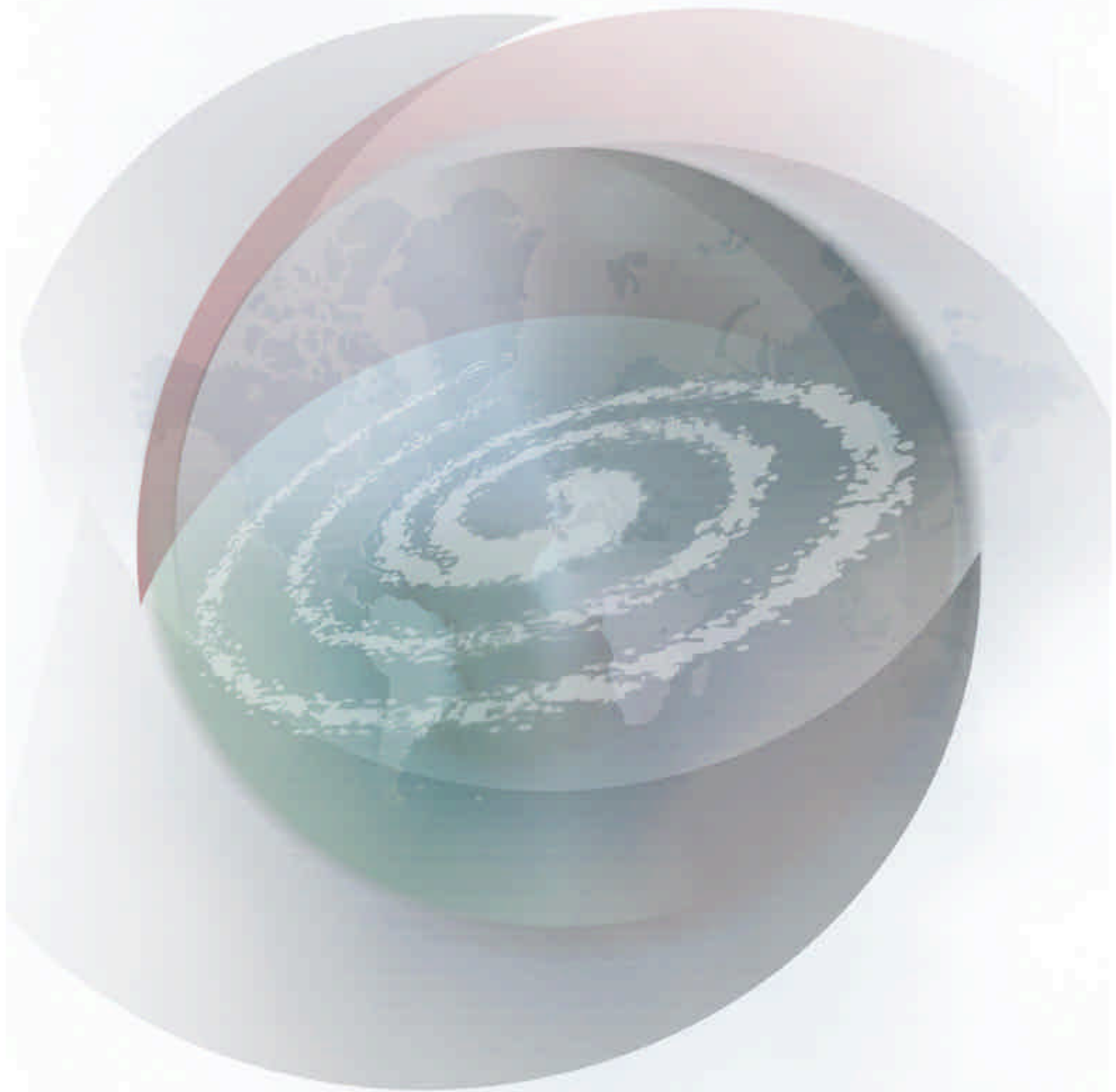


SANYO



DALIAN SANYO COMPRESSOR CO., LTD.

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1. Dalian SANYO Compressor Co., Ltd. (DSA)

The Dalian SANYO Compressor Co., Ltd. is a triple joint venture of the SANYO Electric Company of Japan (55%), Dalian Bingshan Group (40%) and the Sojitsu Corporation of Japan (5%).

The company was formed in August 1994, obtained their business certificate in September 1994 and produced the first Scroll compressor in 1998.

The Scroll factory has state-of-the-art equipment including CNC machining centers, automated test stations, clean room for assembly and the latest Quality control techniques. Each compressor receives a final run test to insure reliable operation for many years.

Over 70% of the employees have achieved secondary education level or higher. Production capacity is approximately 850,000 compressors per year.

The scroll compressors are used in air conditioning and commercial refrigeration including low, medium and high temperature applications.

Other products made at this location include semi-hermetic compressors (2-20 HP) and various types of condensing units including rotary air-cooled, Scroll and semi-hermetic air-cooled and water-cooled.

There are currently 1,600 employees in two SANYO plants that occupy approximately 1,030,000 square feet, located in Dalian City, PR China

Both factories are ISO 9001/ISO 14001/OHSAS 18001 approved and all compressors exported to USA have UL/CUL and CE approval , exported to Europe have VDE/TUV approval.



2. Scroll Compressor Operating Characteristics

The Dalian SANYO scroll compressor is designed with fixed eccentric and tip seals for axial sealing, resulting in minimal gas leakage and therefore excellent efficiency. Separation of suction gas from the discharge side reduces heat transfer, further improving efficiency. The lack of suction and discharge valves significantly reduces scroll compressor sound and vibration levels.

The diagram below describes the scroll compression process:

First orbit; SUCTION gas enters at the perimeter of the scroll elements and is sealed as the scrolls rotate approximately one revolution.

Second orbit; During the COMPRESSION process, the gas is further compressed towards the center of the scroll elements to an intermediate pressure.

Third orbit; In the DISCHARGE orbit, the gas is further compressed to discharge pressure and then exits at the center through the discharge port.

With a three step simultaneous process of suction, compression and discharge and two gas pockets in each step that are 180 degrees apart, the compression process is balanced and very smooth, resulting in high efficiency, low sound/vibration and excellent reliability.

First Orbit: SUCTION



Second Orbit: COMPRESSION



Third Orbit: DISCHARGE





3. Dalian SANYO scroll design features:

The Dalian SANYO scroll performance excels in three key areas:

1. The Lowest Sound level in the World:

- a) Sound sources are minimized – The SANYO scroll has a fixed eccentric offset, completely eliminating scroll contact in the radial direction, and the noise generated from radial scroll contact. Axial sealing is accomplished with PPS resin tip seals that are significantly quieter than the cast iron used on other scrolls.
- b) Transmission through the shell is significantly reduced - With thicker center shell, structural discharge baffle, optimized top shell design and heavy duty seam and location welds.
- c) The resulting overall sound level is 5-8 dB(A) lower than the competition on a weighted average basis.

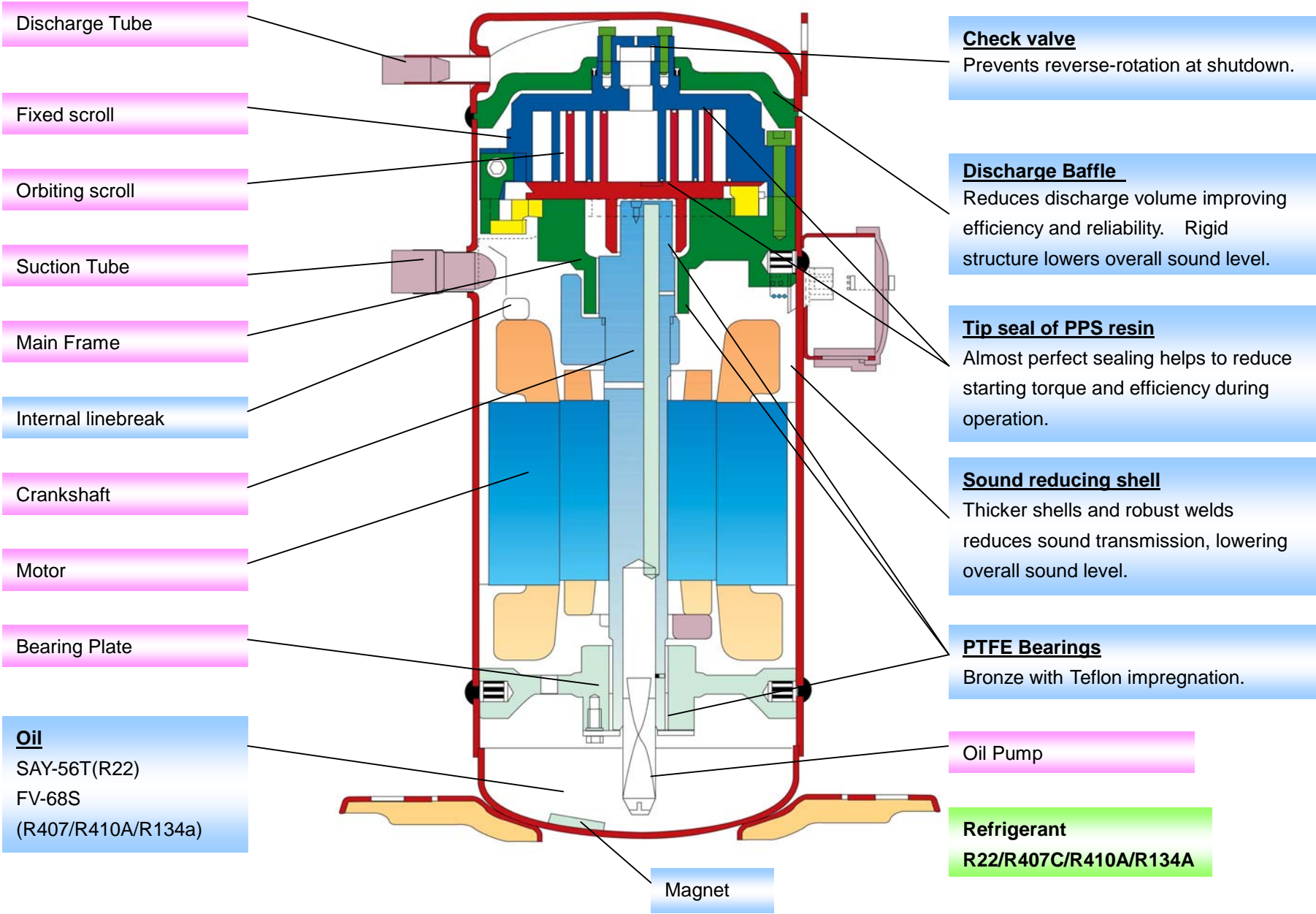
2. Excellent Quality Metrics:

- a) Factory was designed by SANYO Japan to exacting standards including TPM, documented procedures, operator methods.
- b) Very robust manufacturing process with logical layout, minimal inventory and simple equipment. Test rejects are virtually nil.
- c) Customer reject rates are <50 ppm.

3. Reliability to last a lifetime:

- a) Initial compressor design from Japan, supported by Abusive Reliability Testing at Dalian to monitor factory process.
- b) Rigorous customer application approval process assures reliable system designs.
- c) First year reliability < 0.08%

C-SB Model 4-7 Tons for Air conditioning and Heat Pump



Discharge Tube

Fixed scroll

Orbiting scroll

Suction Tube

Main Frame

Internal linebreak

Crankshaft

Motor

Bearing Plate

Oil
SAY-56T(R22)
FV-68S
(R407/R410A/R134a)

Check valve
Prevents reverse-rotation at shutdown.

Discharge Baffle
Reduces discharge volume improving efficiency and reliability. Rigid structure lowers overall sound level.

Tip seal of PPS resin
Almost perfect sealing helps to reduce starting torque and efficiency during operation.

Sound reducing shell
Thicker shells and robust welds reduces sound transmission, lowering overall sound level.

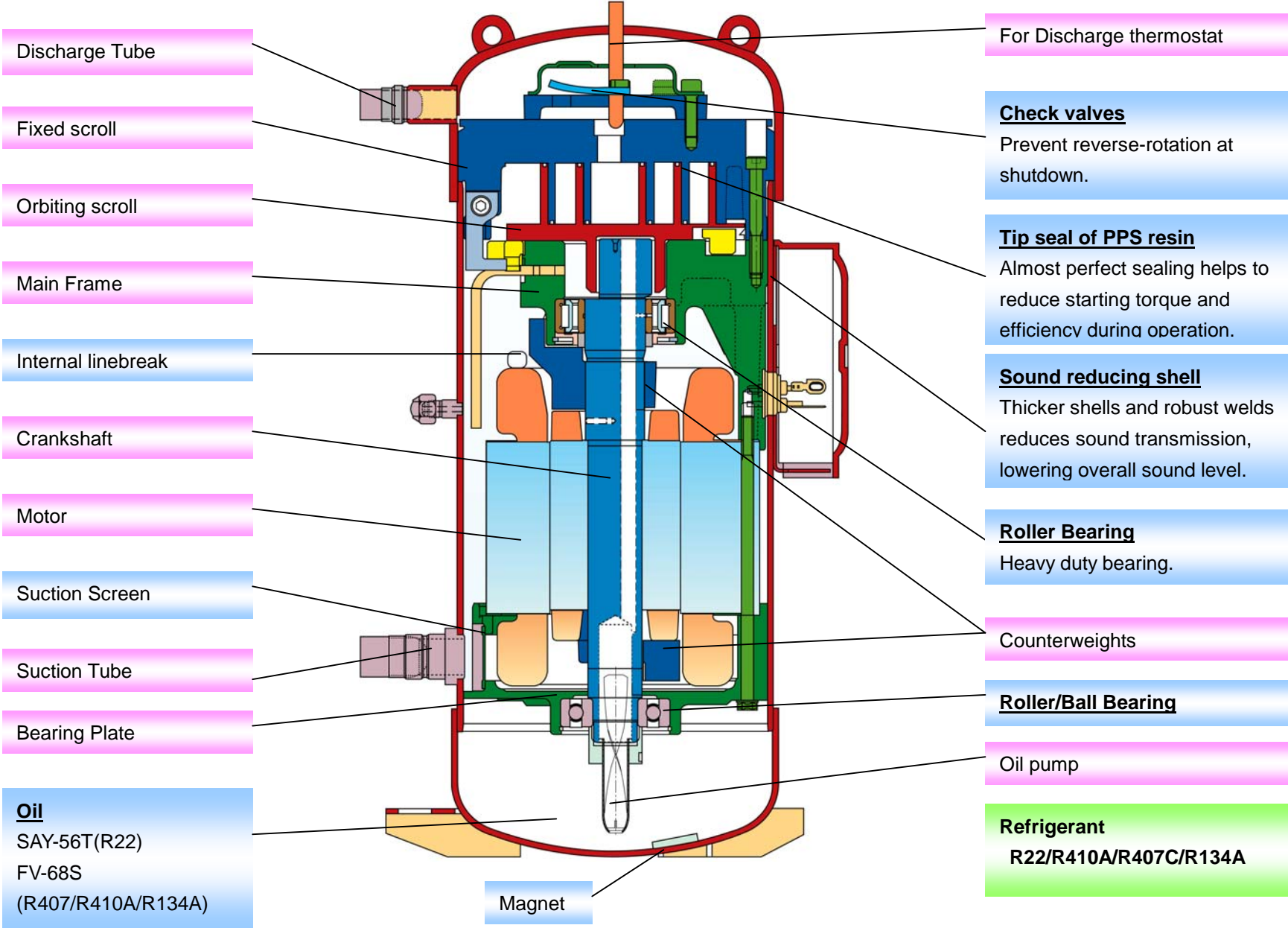
PTFE Bearings
Bronze with Teflon impregnation.

Oil Pump

Refrigerant
R22/R407C/R410A/R134A

Magnet

C-SC Model 8-10 Tons for Air Conditioning and Heat Pump



Discharge Tube

Fixed scroll

Orbiting scroll

Main Frame

Internal linebreak

Crankshaft

Motor

Suction Screen

Suction Tube

Bearing Plate

Oil
 SAY-56T(R22)
 FV-68S
 (R407/R410A/R134A)

For Discharge thermostat

Check valves
 Prevent reverse-rotation at shutdown.

Tip seal of PPS resin
 Almost perfect sealing helps to reduce starting torque and efficiency during operation.

Sound reducing shell
 Thicker shells and robust welds reduces sound transmission, lowering overall sound level.

Roller Bearing
 Heavy duty bearing.

Counterweights

Roller/Ball Bearing

Oil pump

Refrigerant
 R22/R410A/R407C/R134A

Magnet



4. Model Number Nomenclature Compressor Code

<u>809</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	
						Voltage
						3: 50Hz 200V/60Hz 200,220V
						5: 50Hz 220,230,240V
						6: 60Hz 208,230V
						8: 50Hz 380,415V/60Hz,440,460V
						9: 60Hz 380V
						Phase
						4: 1Phase, High Back Pressure
						8: 3Phase, High Back Pressure
						Design
						0~9
						Output
						4: 4HP
						5: 5HP
						6: 6HP
						8: 8HP
						0: 10HP
						2: 12HP
						Series
						8: C-SB Series Compressor (R-22)
						9: C-SB Series Compressor (R-407C/410A)
						2: C-SC Series Compressor (R-22)
						1: C-SC Series Compressor (R-407C/410A)
						Type
						809: Scroll Compressor

Compressor Model

<u>C-XXX</u>	<u>AA</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	
						Design
						A~
						Voltage
						3: 50Hz 200V/60HZ 200,220V
						5: 50Hz 220,230,240V
						6: 60Hz 208,230V
						8: 50Hz 380,415V/60Hz,440,460V
						9: 60Hz 380V
						Application
						H: High Back Pressure
						Phase
						1: 1Phase
						3: 3Phase
						Output
						AA×100W
						Type
						C-SB: C-SB Series Compressor (R-22)
						C-SBN: C-SB Series Compressor (R-407C/410A)
						C-SC: C-SC Series Compressor (R-22)
						C-SCN: C-SC Series Compressor (R-407C/410A)

5.Scroll Compressor Technical Data

R410A 50Hz Models

Compressor Model	Displacement		Performance Data @45/130					Electrical Data			Electrical Components		Weight (with oil)		Oil			Oil Balance Port for Tandem
			Capacity		Power	COP/EER		RLA	MCC	LRA	Run Capacitor	Start Capacitor			Oil Type	Initial Charge		
	cm ³ /rev	in ³ /rev	W	Btu/h	W	W/W	Btu/Wh	A	A	A	MFD/V	MFD/V	kg	lb		ml	fl.oz	
3Phase 50Hz 380~415V																		
C-SBN263H8D	37.5	2.29	8,850	30,200	3,550	2.49	8.5	7.7	10.8	48	n/a	n/a	38.0	83.8	PVE	1,700	58	n/a
C-SBN303H8D	39.9	2.43	9,800	33,400	3,650	2.68	9.2	7.9	11.1	48	n/a	n/a	38.0	83.8	PVE	1,700	58	n/a
C-SBN303H8H	39.9	2.43	9,800	33,400	3,650	2.68	9.2	7.9	11.1	48	n/a	n/a	38.0	83.8	PVE	1,700	58	●
C-SBN353H8D	51.8	3.16	13,000	44,400	4,650	2.80	9.5	9.7	13.6	63	n/a	n/a	39.0	86.0	PVE	1,700	58	n/a
C-SBN353H8H	51.8	3.16	13,000	44,400	4,650	2.80	9.5	9.7	13.6	63	n/a	n/a	39.0	86.0	PVE	1,700	58	●
C-SBN373H8D	55.7	3.40	14,100	48,100	4,750	2.97	10.1	10.1	14.1	63	n/a	n/a	40.0	88.2	PVE	1,700	58	n/a
C-SBN373H8H	55.7	3.40	14,100	48,100	4,750	2.97	10.1	10.1	14.1	63	n/a	n/a	40.0	88.2	PVE	1,700	58	●
C-SBN453H8D	66.8	4.08	16,400	56,000	5,750	2.85	9.7	11.9	16.7	66	n/a	n/a	40.0	88.2	PVE	1,700	58	n/a
C-SBN453H8H	66.8	4.08	16,400	56,000	5,750	2.85	9.7	11.9	16.7	66	n/a	n/a	40.0	88.2	PVE	1,700	58	●
C-SBN523H8D	77.4	4.72	19,200	65,500	6,750	2.84	9.7	14.1	19.7	73	n/a	n/a	39.0	86.0	PVE	1,700	58	n/a
C-SBN523H8H	77.4	4.72	19,200	65,500	6,750	2.84	9.7	14.1	19.7	73	n/a	n/a	39.0	86.0	PVE	1,700	58	●
C-SCP270H38A	89.2	5.44	22,400	76,400	7,400	3.03	10.3	-	-	96	n/a	n/a	69.0	152.1	PVE	2,800	95	n/a
C-SCP270H38B	89.2	5.44	22,400	76,400	7,400	3.03	10.3	-	-	96	n/a	n/a	69.0	152.1	PVE	2,800	95	●
C-SCP315H38A	104.1	6.35	26,000	88,700	8,600	3.02	10.3	-	-	96	n/a	n/a	70.0	154.4	PVE	2,800	95	n/a
C-SCP315H38B	104.1	6.35	26,000	88,700	8,600	3.02	10.3	-	-	96	n/a	n/a	70.0	154.4	PVE	2,800	95	●
C-SCP360H38A	120.2	7.34	29,800	101,700	9,900	3.01	10.3	-	-	96	n/a	n/a	71.0	156.6	PVE	2,800	95	n/a
C-SCP360H38B	120.2	7.34	29,800	101,700	9,900	3.01	10.3	-	-	96	n/a	n/a	71.0	156.6	PVE	2,800	95	●
C-SCP400H38A	131.9	8.05	32,800	111,900	10,900	3.01	10.3	-	-	96	n/a	n/a	71.0	156.6	PVE	2,800	95	n/a
1Phase 50Hz 220~ 240V																		
C-SBN231H5E	35.0	2.14	8,600	29,300	-	-	-	-	-	-	60/440	100~140/330	37.5	82.7	PVE	1,700	58	n/a
C-SBN261H5D	37.5	2.29	9,150	31,200	3,700	2.47	8.4	-	-	97	60/440	100~140/330	38.5	84.9	PVE	1,700	58	n/a
C-SBN301H5D	39.9	2.43	9,350	31,900	3,750	2.49	8.5	-	-	97	60/440	100~140/330	38.5	84.9	PVE	1,700	58	n/a

R410A 60Hz Models

Compressor Model	Displacement		Performance Data @45/130					Electrical Data			Electrical Components		Weight (with oil)		Oil			Oil Balance Port for Tandem
			Capacity		Power	COP/EER		RLA	MCC	LRA	Run Capacitor	Start Capacitor			Oil Type	Initial Charge		
	cm ³ /rev	in ³ /rev	W	Btu/h	W	W/W	Btu/Wh	A	A	A	MFD/V	MFD/V	kg	lb		ml	fl.oz	
3Phase 60Hz 440-460V																		
C-SBN263H8D	37.5	2.29	11,600	39,600	4,200	2.76	9.4	7.7	10.8	52	n/a	n/a	38.0	83.8	PVE	1,700	58	n/a
C-SBN303H8D	39.9	2.43	12,200	41,600	4,250	2.87	9.8	7.9	11.1	52	n/a	n/a	38.0	83.8	PVE	1,700	58	n/a
C-SBN303H8H	39.9	2.43	12,200	41,600	4,250	2.87	9.8	7.9	11.1	52	n/a	n/a	38.0	83.8	PVE	1,700	58	●
C-SBN353H8D	51.8	3.16	16,200	55,300	5,450	2.97	10.1	9.7	13.6	69	n/a	n/a	39.0	86.0	PVE	1,700	58	n/a
C-SBN353H8H	51.8	3.16	16,200	55,300	5,450	2.97	10.1	9.7	13.6	69	n/a	n/a	39.0	86.0	PVE	1,700	58	●
C-SBN373H8D	55.7	3.40	17,100	58,300	5,600	3.05	10.4	10.1	14.1	69	n/a	n/a	40.0	88.2	PVE	1,700	58	n/a
C-SBN373H8H	55.7	3.40	17,100	58,300	5,600	3.05	10.4	10.1	14.1	69	n/a	n/a	40.0	88.2	PVE	1,700	58	●
C-SBN453H8D	66.8	4.08	20,300	69,300	6,750	3.01	10.3	11.9	16.7	72	n/a	n/a	40.0	88.2	PVE	1,700	58	n/a
C-SBN453H8H	66.8	4.08	20,300	69,300	6,750	3.01	10.3	11.9	16.7	72	n/a	n/a	40.0	88.2	PVE	1,700	58	●
C-SCP270H38A	89.2	5.44	27,200	92,800	8,900	3.06	10.4	-	-	101	n/a	n/a	69.0	152.1	PVE	2,800	95	n/a
C-SCP270H38B	89.2	5.44	27,200	92,800	8,900	3.06	10.4	-	-	101	n/a	n/a	69.0	152.1	PVE	2,800	95	●
C-SCP315H38A	104.1	6.35	31,400	107,100	10,400	3.02	10.3	-	-	101	n/a	n/a	70.0	154.4	PVE	2,800	95	n/a
C-SCP315H38B	104.1	6.35	31,400	107,100	10,400	3.02	10.3	-	-	101	n/a	n/a	70.0	154.4	PVE	2,800	95	●
C-SCP360H38A	120.2	7.34	35,900	122,500	11,900	3.02	10.3	-	-	101	n/a	n/a	71.0	156.6	PVE	2,800	95	n/a
C-SCP360H38B	120.2	7.34	35,900	122,500	11,900	3.02	10.3	-	-	101	n/a	n/a	71.0	156.6	PVE	2,800	95	●

R407C 50Hz Models

Compressor Model	Displacement		Performance Data @45/130					Electrical Data			Electrical Components		Weight (with oil)		Oil			Oil Balance Port for Tandem
			Capacity		Power	COP/EER		RLA	MCC	LRA	Run Capacitor	Start Capacitor			Oil Type	Initial Charge		
	cm ³ /rev	in ³ /rev	W	Btu/h	W	W/W	Btu/Wh	A	A	A	MFD/V	MFD/V	kg	lb		ml	fl.oz	
3Phase 50Hz 380~415V																		
C-SBN263H8A	55.7	3.40	9600	32,800	3350	2.87	9.8	7.3	10.2	48	n/a	n/a	36.5	80.5	PVE	1,700	58	n/a
C-SBN303H8A	66.8	4.08	11600	39,600	3800	3.05	10.4	7.9	11.1	48	n/a	n/a	37.5	82.7	PVE	1,700	58	n/a
C-SBN303H8G	66.8	4.08	11600	39,600	3800	3.05	10.4	7.9	11.1	48	n/a	n/a	37.5	82.7	PVE	1,700	58	●
C-SBN353H8A	77.4	4.72	13400	45,700	4600	2.91	9.9	9.6	13.4	48	n/a	n/a	38.0	83.8	PVE	1,700	58	n/a
C-SBN373H8A	83.2	5.08	14500	49,500	4950	2.93	10.0	10.1	14.1	48	n/a	n/a	38.0	83.8	PVE	1,700	58	n/a
C-SBN373H8G	83.2	5.08	14500	49,500	4950	2.93	10.0	10.1	14.1	48	n/a	n/a	38.0	83.8	PVE	1,700	58	●
C-SBN453H8A	100.0	6.10	17600	60,100	5800	3.03	10.4	10.4	14.5	66	n/a	n/a	39.5	87.1	PVE	1,700	58	n/a
C-SBN453H8G	100.0	6.10	17600	60,100	5800	3.03	10.4	10.4	14.5	66	n/a	n/a	39.5	87.1	PVE	1,700	58	●
C-SCN603H8H	137.0	8.36	24500	83,600	7750	3.16	10.8	15.9	22.2	80	n/a	n/a	66.5	146.6	PVE	2,800	95	n/a
C-SCN603H8K	137.0	8.36	24500	83,600	7750	3.16	10.8	15.9	22.2	80	n/a	n/a	66.5	146.6	PVE	2,800	95	●
C-SCN753H8H	171.2	10.45	29900	102,000	9350	3.20	10.9	19.1	26.7	96	n/a	n/a	69.5	153.2	PVE	2,800	95	n/a
C-SCN753H8K	171.2	10.45	29900	102,000	9350	3.20	10.9	19.1	26.7	96	n/a	n/a	69.5	153.2	PVE	2,800	95	●
C-SCN903H8H	205.4	12.53	34900	119,100	11300	3.09	10.5	21.6	30.2	96	n/a	n/a	70.5	155.5	PVE	2,800	95	n/a
C-SCN903H8K	205.4	12.53	34900	119,100	11300	3.09	10.5	21.6	30.2	96	n/a	n/a	70.5	155.5	PVE	2,800	95	●
1Phase 50Hz 220~240V																		
C-SBN261H5A	55.7	3.40	9700	33,100	3400	2.85	9.7	19.0	26.6	100	60/440	100~140/330	38.5	84.9	PVE	1,700	58	n/a
C-SBN301H5A	66.8	4.08	11800	40,300	4000	2.95	10.1	23.2	32.5	122	60/440	100~140/330	39.0	86.0	PVE	1,700	58	n/a
C-SBN351H5A	77.4	4.72	13500	46,100	4750	2.84	9.7	27.0	37.8	115	70/440	n/a	39.0	86.0	PVE	1,700	58	n/a
C-SBN371H5A	83.2	5.08	14700	50,200	5050	2.91	9.9	28.4	39.7	115	70/440	n/a	39.5	87.1	PVE	1,700	58	n/a
3Phase 50Hz 220~240V																		
C-SBN303H5A	66.8	4.08	11500	39,200	3850	2.99	10.2	16.7	23.4	85	n/a	n/a	37.5	82.7	PVE	1,700	58	n/a
C-SBN373H5A	83.2	5.08	14700	50,200	5050	2.91	9.9	19.1	26.8	97	n/a	n/a	38.0	83.8	PVE	1,700	58	n/a
C-SBN453H5A	100.0	6.10	17700	60,400	5900	3.00	10.2	23.9	33.5	121	n/a	n/a	39.5	87.1	PVE	1,700	58	n/a
C-SCN603H5H	137.0	8.36	24200	82,600	7700	3.14	10.7	29.9	41.9	152	n/a	n/a	66.5	146.6	PVE	2,800	95	n/a
C-SCN753H5H	171.2	10.45	29900	102,000	9400	3.18	10.9	36.4	50.9	184	n/a	n/a	69.5	153.2	PVE	2,800	95	n/a
C-SCN903H5H	205.4	12.53	34800	118,700	11300	3.08	10.5	42.4	59.4	215	n/a	n/a	70.5	155.5	PVE	2,800	95	n/a

R407C 60Hz Models

Compressor Model	Displacement		Performance Data @45/130					Electrical Data			Electrical Components		Weight (with oil)		Oil			Oil Balance Port for Tandem
			Capacity		Power	COP/EER		RLA	MCC	LRA	Run Capacitor	Start Capacitor			Oil Type	Initial Charge		
	cm ³ /rev	in ³ /rev	W	Btu/h	W	W/W	Btu/Wh	A	A	A	MFD/V	MFD/V	kg	lb		ml	fl.oz	
3Phase 60Hz 440~460V																		
C-SBN263H8A	55.7	3.40	11800	40,300	4100	2.88	9.8	7.3	10.2	51	n/a	n/a	36.5	80.5	PVE	1,700	58	n/a
C-SBN303H8A	66.8	4.08	14600	49,800	4600	3.17	10.8	7.9	11.1	51	n/a	n/a	37.5	82.7	PVE	1,700	58	n/a
C-SBN303H8G	66.8	4.08	14600	49,800	4600	3.17	10.8	7.9	11.1	51	n/a	n/a	37.5	82.7	PVE	1,700	58	●
C-SBN353H8A	77.4	4.72	16500	56,300	5600	2.95	10.1	9.6	13.4	52	n/a	n/a	38.0	83.8	PVE	1,700	58	n/a
C-SBN373H8A	83.2	5.08	17800	60,700	5960	2.99	10.2	10.1	14.1	52	n/a	n/a	38.0	83.8	PVE	1,700	58	n/a
C-SBN373H8G	83.2	5.08	17800	60,700	5960	2.99	10.2	10.1	14.1	52	n/a	n/a	38.0	83.8	PVE	1,700	58	●
C-SBN453H8A	100.0	6.10	21300	72,700	7000	3.04	10.4	10.4	14.5	72	n/a	n/a	39.5	87.1	PVE	1,700	58	n/a
C-SBN453H8G	100.0	6.10	21300	72,700	7000	3.04	10.4	10.4	14.5	72	n/a	n/a	39.5	87.1	PVE	1,700	58	●
C-SCN603H8H	137.0	8.36	29100	99,300	9450	3.08	10.5	15.9	22.2	84	n/a	n/a	66.5	146.6	PVE	2,800	95	n/a
C-SCN603H8K	137.0	8.36	29100	99,300	9450	3.08	10.5	15.9	22.2	84	n/a	n/a	66.5	146.6	PVE	2,800	95	●
C-SCN753H8H	171.2	10.45	35900	122,500	11500	3.12	10.7	19.1	26.7	101	n/a	n/a	69.5	153.2	PVE	2,800	95	n/a
C-SCN753H8K	171.2	10.45	35900	122,500	11500	3.12	10.7	19.1	26.7	101	n/a	n/a	69.5	153.2	PVE	2,800	95	●

R22 50Hz Models

Compressor Model	Displacement		Performance Data @45/130					Electrical Data			Electrical Components		Weight (with oil)		Oil			Oil Balance Port for Tandem
			Capacity		Power	COP/EER		RLA	MCC	LRA	Run Capacitor	Start Capacitor			Oil Type	Initial Charge		
	cm ³ /rev	in ³ /rev	W	Btu/h	W	W/W	Btu/Wh	A	A	A	MFD/V	MFD/V	kg	lb		ml	fl.oz	
3Phase 50Hz 380~415V																		
C-SB263H8B	51.8	3.16	9150	31,200	2950	3.10	10.6	7.9	11.0	42	n/a	n/a	36.5	80.5	Mineral	1,700	58	n/a
C-SB263H8C	51.8	3.16	9150	31,200	2950	3.10	10.6	7.9	11.0	42	n/a	n/a	36.5	80.5	Mineral	1,700	58	n/a
C-SB263H8A	55.7	3.40	9600	32,800	3100	3.10	10.6	8.1	11.3	42	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
C-SB303H8A	66.8	4.08	11800	40,300	3650	3.23	11.0	8.1	11.3	48	n/a	n/a	37.5	82.7	Mineral	1,700	58	n/a
C-SB303H8G	66.8	4.08	11800	40,300	3650	3.23	11.0	8.1	11.3	48	n/a	n/a	37.5	82.7	Mineral	1,700	58	●
C-SB353H8A	77.4	4.72	13500	46,100	4250	3.18	10.8	9.6	13.5	52	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
C-SB373H8A	83.2	5.08	14500	49,500	4540	3.19	10.9	9.6	13.5	52	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
C-SB373H8G	83.2	5.08	14500	49,500	4540	3.19	10.9	9.6	13.5	52	n/a	n/a	38.0	83.8	Mineral	1,700	58	●
C-SB373H8F	85.5	5.22	15000	51,200	4700	3.19	10.9	9.9	13.8	52	n/a	n/a	38.5	84.9	Mineral	1,700	58	n/a
C-SB453H8A	100.0	6.10	17700	60,400	5430	3.26	11.1	10.1	14.2	66	n/a	n/a	39.5	87.1	Mineral	1,700	58	n/a
C-SB453H8G	100.0	6.10	17700	60,400	5430	3.26	11.1	10.1	14.2	66	n/a	n/a	39.5	87.1	Mineral	1,700	58	●
C-SC583H8H	131.9	8.05	23600	80,500	7150	3.30	11.3	14.4	20.2	80	n/a	n/a	66.5	146.6	Mineral	2,800	58	n/a
C-SC583H8K	131.9	8.05	23600	80,500	7150	3.30	11.3	14.4	20.2	80	n/a	n/a	66.5	146.6	Mineral	2,800	95	●
C-SC603H8H	137.0	8.36	24500	83,600	7400	3.31	11.3	14.3	20.0	80	n/a	n/a	66.5	146.6	Mineral	2,800	95	n/a
C-SC603H8K	137.0	8.36	24500	83,600	7400	3.31	11.3	14.3	20.0	80	n/a	n/a	66.5	146.6	Mineral	2,800	95	●
C-SC673H8H	148.8	9.08	26500	90,400	8050	3.29	11.2	13.7	19.2	80	n/a	n/a	68.0	149.9	Mineral	2,800	95	n/a
C-SC673H8K	148.8	9.08	26500	90,400	8050	3.29	11.2	13.7	19.2	80	n/a	n/a	68.0	149.9	Mineral	2,800	95	●
C-SC753H8H	171.2	10.45	30600	104,400	9050	3.38	11.5	18.2	25.5	96	n/a	n/a	69.5	153.2	Mineral	2,800	95	n/a
C-SC753H8K	171.2	10.45	30600	104,400	9050	3.38	11.5	18.2	25.5	96	n/a	n/a	69.5	153.2	Mineral	2,800	95	●
C-SC863H8H	199.1	12.15	35200	120,100	10600	3.32	11.3	18.6	26.0	96	n/a	n/a	70.5	155.5	Mineral	2,800	95	n/a
C-SC903H8H	205.4	12.53	36100	123,200	10900	3.31	11.3	18.2	25.5	96	n/a	n/a	70.5	155.5	Mineral	2,800	95	n/a
C-SC903H8K	205.4	12.53	36100	123,200	10900	3.31	11.3	18.2	25.5	96	n/a	n/a	70.5	155.5	Mineral	2,800	95	●
C-SBX165H38A	76.0	4.64	13500	46,100	4050	3.33	11.4	9.5	13.3	52	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
C-SBX180H38A	81.0	4.94	14300	48,800	4300	3.33	11.3	9.6	13.5	52	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
C-SBX180H38C	83.7	5.11	14700	50,200	4450	3.30	11.3	9.6	13.5	52	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a

Compressor Model	Displacement		Performance Data @45/130					Electrical Data			Electrical Components		Weight (with oil)		Oil			Oil Balance Port for Tandem
			Capacity		Power	COP/EER		RLA	MCC	LRA	Run Capacitor	Start Capacitor			Oil Type	Initial Charge		
	cm ³ /rev	in ³ /rev	W	Btu/h	W	W/W	Btu/Wh	A	A	A	MFD/V	MFD/V	kg	lb		ml	fl.oz	
1Phase 50Hz 220~240V																		
C-SB261H5B	51.8	3.16	9100	31,000	3100	2.94	10.0	17.9	25.0	100	60/440	100~140/330	38.5	84.9	Mineral	1,700	58	n/a
C-SB261H5A	55.7	3.40	9700	33,100	3250	2.98	10.2	18.7	26.2	100	60/440	100~140/330	38.5	84.9	Mineral	1,700	58	n/a
C-SB301H5A	66.8	4.08	12000	40,900	3800	3.16	10.8	22.4	31.4	122	60/440	100~140/330	39.0	86.0	Mineral	1,700	58	n/a
C-SB351H5A	77.4	4.72	13600	46,400	4450	3.06	10.4	25.6	35.8	115	70/440	n/a	39.0	86.0	Mineral	1,700	58	n/a
C-SB371H5A	83.2	5.08	14700	50,200	4650	3.16	10.8	26.4	37.0	115	70/440	n/a	39.5	87.1	Mineral	1,700	58	n/a
3Phase 50Hz 220~240V																		
C-SB303H5A	66.8	4.08	11700	39,900	3700	3.16	10.8	16.1	22.5	81	n/a	n/a	37.5	82.7	Mineral	1,700	58	n/a
C-SB373H5A	83.2	5.08	14700	50,200	4650	3.16	10.8	17.7	24.8	90	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
C-SB453H5A	100.0	6.10	17800	60,700	5500	3.24	11.0	22.2	31.1	113	n/a	n/a	39.5	87.1	Mineral	1,700	58	n/a
C-SC603H5H	137.0	8.36	24200	82,600	7350	3.29	11.2	28.6	40.1	145	n/a	n/a	66.5	146.6	Mineral	2,800	95	n/a
C-SC753H5H	171.2	10.45	30600	104,400	9100	3.36	11.5	35.2	49.3	178	n/a	n/a	69.5	153.2	Mineral	2,800	95	n/a
C-SC903H5H	205.4	12.53	36000	122,800	10900	3.30	11.3	40.9	57.2	207	n/a	n/a	70.5	155.5	Mineral	2,800	95	n/a

R22 60Hz Models

Compressor Model	Displacement		Performance Data @45/130					Electrical Data			Electrical Components		Weight (with oil)		Oil			Oil Balance Port for Tandem
			Capacity		Power	COP/EER		RLA	MCC	LRA	Run Capacitor	Start Capacitor			Oil Type	Initial Charge		
	cm ³ /rev	in ³ /rev	W	Btu/h	W	W/W	Btu/Wh	A	A	A	MFD/V	MFD/V	kg	lb		ml	fl.oz	
3Phase 60Hz 440~460V																		
C-SB263H8B	51.8	3.16	11200	38,200	3500	3.20	10.9	7.9	11.0	44	n/a	n/a	36.5	80.5	Mineral	1,700	58	n/a
C-SB263H8C	51.8	3.16	11200	38,200	3500	3.20	10.9	7.9	11.0	44	n/a	n/a	36.5	80.5	Mineral	1,700	58	n/a
C-SB263H8A	55.7	3.40	11800	40,300	3700	3.19	10.9	8.1	11.3	44	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
C-SB303H8A	66.8	4.08	14400	49,100	4400	3.27	11.2	8.1	11.3	51	n/a	n/a	37.5	82.7	Mineral	1,700	58	n/a
C-SB303H8G	66.8	4.08	14400	49,100	4400	3.27	11.2	8.1	11.3	51	n/a	n/a	37.5	82.7	Mineral	1,700	58	●
C-SB353H8A	77.4	4.72	16700	57,000	5090	3.28	11.2	9.6	13.5	55	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a

Compressor Model	Displacement		Performance Data @45/130					Electrical Data			Electrical Components		Weight (with oil)		Oil			Oil Balance Port for Tandem
			Capacity		Power	COP/EER		RLA	MCC	LRA	Run Capacitor	Start Capacitor			Oil Type	Initial Charge		
	cm ³ /rev	in ³ /rev	W	Btu/h	W	W/W	Btu/Wh	A	A	A	MFD/V	MFD/V	kg	lb		ml	fl.oz	
C-SB373H8A	83.2	5.08	17900	61,100	5550	3.23	11.0	9.6	13.5	55	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
C-SB373H8G	83.2	5.08	17900	61,100	5550	3.23	11.0	9.6	13.5	55	n/a	n/a	38.0	83.8	Mineral	1,700	58	●
C-SB373H8F	85.5	5.22	18400	62,800	5750	3.20	10.9	9.9	13.8	55	n/a	n/a	38.5	84.9	Mineral	1,700	58	n/a
C-SB453H8A	100.0	6.10	21500	73,400	6640	3.24	11.0	10.1	14.2	72	n/a	n/a	39.5	87.1	Mineral	1,700	58	n/a
C-SB453H8G	100.0	6.10	21500	73,400	6640	3.24	11.0	10.1	14.2	72	n/a	n/a	39.5	87.1	Mineral	1,700	58	●
C-SC583H8H	131.9	8.05	28500	97,200	8750	3.26	11.1	14.4	20.2	84	n/a	n/a	66.5	146.6	Mineral	2,800	58	n/a
C-SC583H8K	131.9	8.05	28500	97,200	8750	3.26	11.1	14.4	20.2	84	n/a	n/a	66.5	146.6	Mineral	2,800	95	●
C-SC603H8H	137.0	8.36	29600	101,000	9000	3.29	11.2	14.3	20.0	84	n/a	n/a	66.5	146.6	Mineral	2,800	95	n/a
C-SC603H8K	137.0	8.36	29600	101,000	9000	3.29	11.2	14.3	20.0	84	n/a	n/a	66.5	146.6	Mineral	2,800	95	●
C-SC673H8H	148.8	9.08	32000	109,200	9800	3.27	11.1	13.7	19.2	84	n/a	n/a	68.0	149.9	Mineral	2,800	95	n/a
C-SC673H8K	148.8	9.08	32000	109,200	9800	3.27	11.1	13.7	19.2	84	n/a	n/a	68.0	149.9	Mineral	2,800	95	●
C-SC753H8H	171.2	10.45	36900	125,900	11100	3.32	11.3	18.2	25.5	101	n/a	n/a	69.5	153.2	Mineral	2,800	95	n/a
C-SC753H8K	171.2	10.45	36900	125,900	11100	3.32	11.3	18.2	25.5	101	n/a	n/a	69.5	153.2	Mineral	2,800	95	●
C-SBX165H38A	76.0	4.64	16300	55,600	4900	3.33	11.4	9.5	13.3	55	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
C-SBX180H38A	81.0	4.94	17300	59,000	5200	3.33	11.4	9.6	13.5	55	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
C-SBX180H38C	83.7	5.11	17800	60,700	5400	3.30	11.2	9.6	13.5	55	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
3Phase 60Hz 380V																		
C-SB263H9B	51.8	3.16	10900	37,200	3600	3.03	10.3	7.8	10.9	38	n/a	n/a	36.5	80.5	Mineral	1,700	58	n/a
C-SB263H9C	51.8	3.16	10900	37,200	3600	3.03	10.3	7.8	10.9	38	n/a	n/a	36.5	80.5	Mineral	1,700	58	n/a
C-SB263H9A	55.7	3.40	11800	40,300	3960	2.98	10.2	8.4	11.8	55	n/a	n/a	36.5	80.5	Mineral	1,700	58	n/a
C-SB303H9A	66.8	4.08	14200	48,500	4400	3.23	11.0	9.6	13.5	58	n/a	n/a	37.5	82.7	Mineral	1,700	58	n/a
C-SB303H9G	66.8	4.08	14200	48,500	4400	3.23	11.0	9.6	13.5	58	n/a	n/a	37.5	82.7	Mineral	1,700	58	●
C-SB353H9A	77.4	4.72	16600	56,600	5100	3.25	11.1	11.2	15.7	63	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
C-SB373H9A	83.2	5.08	17800	60,700	5500	3.24	11.0	12.1	16.9	63	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
C-SB373H9G	83.2	5.08	17800	60,700	5500	3.24	11.0	12.1	16.9	63	n/a	n/a	38.0	83.8	Mineral	1,700	58	●
C-SB453H9A	100.0	6.10	21200	72,300	6550	3.24	11.0	14.3	20.0	72	n/a	n/a	39.5	87.1	Mineral	1,700	58	n/a
C-SB453H9G	100.0	6.10	21200	72,300	6550	3.24	11.0	14.3	20.0	72	n/a	n/a	39.5	87.1	Mineral	1,700	58	●
C-SC603H9H	137.0	8.36	29600	101,000	9000	3.29	11.2	20.1	28.1	101	n/a	n/a	66.5	146.6	Mineral	2,800	95	n/a
C-SC603H9K	137.0	8.36	29600	101,000	9000	3.29	11.2	20.1	28.1	101	n/a	n/a	66.5	146.6	Mineral	2,800	95	●

Compressor Model	Displacement		Performance Data @45/130					Electrical Data			Electrical Components		Weight (with oil)		Oil			Oil Balance Port for Tandem
			Capacity		Power	COP/EER		RLA	MCC	LRA	Run Capacitor	Start Capacitor			Oil Type	Initial Charge		
	cm ³ /rev	in ³ /rev	W	Btu/h	W	W/W	Btu/Wh	A	A	A	MFD/V	MFD/V	kg	lb		ml	fl.oz	
C-SC753H9H	171.2	10.45	37300	127,300	11100	3.36	11.5	24.4	34.2	124	n/a	n/a	69.5	153.2	Mineral	2,800	95	n/a
C-SC753H9K	171.2	10.45	37300	127,300	11100	3.36	11.5	24.4	34.2	124	n/a	n/a	69.5	153.2	Mineral	2,800	95	●
1Phase 60Hz 208~230V																		
C-SB261H6C	51.8	3.16	11200	38,200	3600	3.11	10.6	21.9	30.6	140	50/440	100~140/330	38.5	84.9	Mineral	1,700	58	n/a
C-SB261H6A	55.7	3.40	12100	41,300	3750	3.23	11.0	22.9	32.0	140	50/440	100~140/330	38.5	84.9	Mineral	1,700	58	n/a
C-SB261H6B	55.7	3.40	11800	40,300	3850	3.06	10.5	22.6	31.6	130	50/440	n/a	38.5	84.9	Mineral	1,700	58	n/a
C-SB301H6B	66.8	4.08	14500	49,500	4450	3.26	11.1	26.8	37.5	130	50/440	n/a	39.0	86.0	Mineral	1,700	58	n/a
C-SB351H6A	77.4	4.72	16700	57,000	5350	3.12	10.7	31.8	44.5	141	70/440	100~140/330	39.0	86.0	Mineral	1,700	58	n/a
C-SB351H6B	77.4	4.72	16700	57,000	5300	3.15	10.8	29.8	41.7	149	70/440	n/a	39.0	86.0	Mineral	1,700	58	n/a
C-SB371H6A	83.2	5.08	18000	61,400	5750	3.13	10.7	34.6	48.5	155	70/440	100~140/330	39.5	87.1	Mineral	1,700	58	n/a
3Phase 60Hz 208~230V																		
C-SB263H6C	51.8	3.16	11100	37,900	3550	3.13	10.7	15.0	21.0	115	n/a	n/a	36.5	80.5	Mineral	1,700	58	n/a
C-SB263H6B	55.7	3.40	11900	40,600	3700	3.22	11.0	15.0	21.0	115	n/a	n/a	36.5	80.5	Mineral	1,700	58	n/a
C-SB303H6B	66.8	4.08	14400	49,100	4400	3.27	11.2	17.1	24.0	115	n/a	n/a	37.5	82.7	Mineral	1,700	58	n/a
C-SB303H6G	66.8	4.08	14400	49,100	4400	3.27	11.2	17.1	24.0	115	n/a	n/a	37.5	82.7	Mineral	1,700	58	●
C-SB353H6B	77.4	4.72	16800	57,300	5100	3.29	11.2	18.6	26.0	134	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
C-SB353H6C	77.4	4.72	16800	57,300	5100	3.29	11.2	18.6	26.0	134	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
C-SB373H6B	83.2	5.08	18100	61,800	5450	3.32	11.3	20.7	29.0	134	n/a	n/a	38.0	83.8	Mineral	1,700	58	n/a
C-SB373H6G	83.2	5.08	18100	61,800	5450	3.32	11.3	20.7	29.0	134	n/a	n/a	38.0	83.8	Mineral	1,700	58	●
C-SB453H6B	100.0	6.10	21300	72,700	6550	3.25	11.1	22.9	32.0	153	n/a	n/a	39.5	87.1	Mineral	1,700	58	n/a
C-SB453H6G	100.0	6.10	21300	72,700	6550	3.25	11.1	22.9	32.0	153	n/a	n/a	39.5	87.1	Mineral	1,700	58	●
C-SC583H6H	131.9	8.05	27900	95,200	8750	3.19	10.9	32.6	45.7	205	n/a	n/a	66.5	146.6	Mineral	2,800	95	n/a
C-SC603H6H	137.0	8.36	29600	101,000	8950	3.31	11.3	32.5	45.5	205	n/a	n/a	66.5	146.6	Mineral	2,800	95	n/a
C-SC603H6K	137.0	8.36	29600	101,000	8950	3.31	11.3	32.5	45.5	205	n/a	n/a	66.5	146.6	Mineral	2,800	95	●
C-SC753H6H	171.2	10.45	37000	126,200	11000	3.36	11.5	38.9	54.5	240	n/a	n/a	69.5	153.2	Mineral	2,800	95	n/a
C-SC753H6K	171.2	10.45	37000	126,200	11000	3.36	11.5	38.9	54.5	240	n/a	n/a	69.5	153.2	Mineral	2,800	95	●



6. Operational Limits:

Scrolls are one the most reliable compressor type and can yield years of troublefree operation when correctly applied in an air conditioning system. However, there are several key considerations in designing and building a reliable system. The most critical issue is the handling of liquid refrigerant. Application criteria for usage of crankcase heaters and suction accumulators is included in the Application Guide in section 7.0. Maintaining suction sump superheat and discharge gas temperatures within specified limits are also key factors in system application of scroll compressors. Operation within the specified envelope of temperatures and pressures will assure excellent reliability for many years to come. The following temperature limits are recommended for SANYO scroll compressors with R22/ R407C/R410A/R134a.

R22 Operating Limits	Minimum	Maximum
Evaporating Temp	-13 F	59 F
Condensing Temp	86 F	154 F
Maximum Discharge (C-SB)	n/a	266 F
Maximum Discharge (C-SC)	n/a	275 F

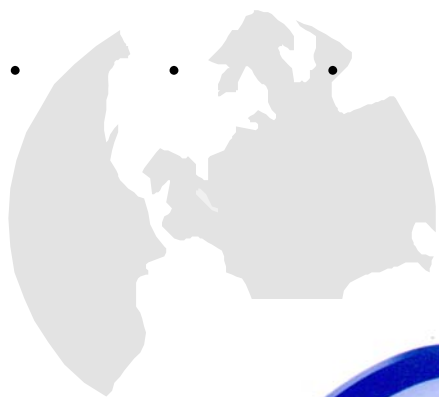
R407C/R410A Operating Limits	Minimum	Maximum
Evaporating Temp	-13 F	59 F
Condensing Temp	86 F	149 F
Maximum Discharge (C-SBN)	n/a	266 F
Maximum Discharge (C-SCN/P)	n/a	275 F

R134a Operating Limits	Minimum	Maximum
Evaporating Temp	5 F	59 F
Condensing Temp	86 F	167 F
Maximum Discharge (C-SBN)	n/a	240 F
Maximum Discharge (C-SCN)	n/a	240 F

7. Application Manual

SANYO

Dalian Sanyo Scroll Compressor



Application Manual For Air Conditioning Systems

Dated: Jan 2007



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1.0 Performance Selection Criteria

1.1 Capacity – Compressor capacity is shown in the model sheets in Btu/hr and W at the ARI condition of 45 F(7.2 C) evaporating, 130 F(54.4 C) condensing, 115 F (46.1 C)liquid and 65 F (18.3 C)return gas resulting in 20 F(11.1 K) of superheat and 15 F(8.3 K) of subcooling. The tables indicate performance at other conditions within the operating range in increments of 5-10 F(2.5-5 C) and you may interpolated between conditions in a linear fashion. When selecting a compressor for your application, select the closest model to the desired capacity.

1.2 EER (Energy Efficiency Ratio) – Is shown in Btu/W-hr and W/W and may be interpolated.

1.3 Sound Level – Sound levels are in section 3.2 of this application guide.

1.4 Refrigerant – Product offerings include R22, R407C,R134a and R410A.

2.0 Physical Requirements

2.1 Mounting – Standard 4 foot mounting with 7.5” (190.5 cm) between mounting holes.

2.2 Height – Maximum and mounting height dimensions are in the specifications.

2.3 Weight – Compressor weights are shown on the specifications in section 1.0.

2.4 Piping – Discharge and suction tube diameters are standard industry sizes and similar to ALL competitive scroll compressor models. All dimensions are in specifications.

3.0 System Design Considerations

3.1 General Information - Scroll compressors are designed to operate for many years when correctly applied in a well designed air conditioning system. Key considerations are detailed in this application guide, most critical are electrical supply characteristics, handling of liquid refrigerant during normal operation and off time, adequate start gear, protection against reverse rotation and prevention of excessive temperatures/pressures.

3.1.1 Dielectric Strength/Insulation Resistance

Each compressor motor is tested at the factory to the latest UL specifications. Dielectric strength and insulation resistance all comply with UL requirements. Sanyo scroll compressors are configured with the motor below the pump assembly located at the top of the shell. As a result, the motor is partially immersed in refrigerant and oil. The presence of refrigerant around the motor windings will result in lower resistance values and higher leakage current readings. These readings are



not cause for concern, simply run the system for a short period of time to redistribute the refrigerant and retest the compressor to obtain the proper readings.

3.1.2 Residual moisture

Each compressor is dehydrated, evacuated and charged with dry Nitrogen at the factory prior to shipment. Maximum residual moisture levels in the compressor are 300 ppm for C-SB models and 500 ppm for C-SC models.

3.1.3 Oil Charge levels

The compressors are charged with SAY-56T Mineral oil for R22 models and FV68S PVE oil for R407C/R134a/R410A models in the quantities indicated in the models sheets.

3.1.4 Internal Motor Protection

Almost all Sanyo scrolls are protected by internal linebreaks on the motor windings for single phase and three phase models. Internal linebreaks respond to overcurrent, high temperature and a combination of both. Only B3 models (for Japan market) are protected by internal thermostats with external breakers. The internal thermostats respond only to high temperature, so a overload relay is required to protect overcurrent. Internal linebreaks will reset automatically when the compressor/motor has cooled sufficiently. These devices will respond to a variety of fault conditions such as failure to start, running overload and fan failure. In three phase compressors they protect against secondary single phasing.

3.2 Sound Level – Scroll compressors in general have a very low overall sound level, when compared to other types of compressors. The SANYO scroll has the lowest sound level of any competitive scroll compressor in the market.

During normal operation, scroll compressors are quieter than reciprocating types, but have a slightly different sound. When starting, they may be somewhat louder, but this is no cause for alarm.

Model	Average	Maximum
C-SB	52 dB(A)	55 dB(A)
C-SC	58 dB(A)	61 dB(A)

The above levels are Sound Pressure measured @ 10 feet and four locations at 60 Hz.

3.3 Voltage Range – Proper voltage at the compressor terminals will assure years of troublefree operation. Voltage ranges should be +/-10% for both single and three phase models. For three phase applications the voltage measurements must be within +/- 2% of the average for all phases. Acceptable voltage ranges for each electrical offering are shown in the table below. Voltage should be checked on the compressor load side of the system contactors. **DO NOT CHECK VOLTAGE AT COMPRESSOR TERMINALS!**



Voltage Code	Nameplate Voltage (V)	Minimum(V)	Maximum(V)
B6 (60Hz)	208/230	187	253
B5 (50Hz)	220/240	198	264
B8 (50Hz)	440/460	396	506
B8 (60Hz)	380/415	342	456
B9 (60Hz)	380	342	418
B3 (50Hz)	200	180	220
B3 (60Hz)	200/220	180	242

3.4 Operating Temperature Range – Scroll compressors must be operated within safe evaporating and condensing temperature ranges, with adequate suction superheat and reasonable discharge temperatures. The temperature ranges for steady state operation with C-SB and C-SC series are indicated in the table below. Operating envelopes for each refrigerant are shown in the specifications.

R22 Operating Limits	Minimum	Maximum
Evaporating Temp	-13 F(-25 C)	59 F(15 C)
Condensing Temp	86 F(30 C)	154 F(68 C)
Maximum Discharge (C-SB)	n/a	266 F (130 C)
Maximum Discharge (C-SC)	n/a	275 F (135 C)

R407C/R410A Operating Limits	Minimum	Maximum
Evaporating Temp	-13 F(-25 C)	59 F(15 C)
Condensing Temp	86 F(30 C)	149 F(65 C)
Maximum Discharge (C-SBN)	n/a	266 F(130 C)
Maximum Discharge (C-SCN/P)	n/a	275 F(135 C)

R134a Operating Limits	Minimum	Maximum
Evaporating Temp	5 F(-15 C)	59 F(15 C)
Condensing Temp	86 F(30 C)	167 F(75 C)
Maximum Discharge (C-SBN)	n/a	240 F(115 C)
Maximum Discharge (C-SCN)	n/a	240 F(115 C)

3.5 Maximum Discharge Gas Temperature – Safe operating temperature ranges for steady state operation are shown above. Maximum discharge gas temperature is maintained with a Discharge Gas temperature sensor. For the C-SB series it is located on the discharge line within 4”(10 cm) of the compressor shell and must not exceed 266 F(130 C). The C-SC series has a sensor well on the top shell and that temperature must not exceed 275 F(135 C). To maintain these limits, trip settings of 265 +/- 10 F(130+/-5 C) and reset of 205 +/- 20 F (95 +/-11 C)for C-SB models , trip settings of 275 +/- 10 F(135+/-5 C) and reset of 187 +/- 27 F (86 +/-15 C)for C-SC models are recommended.



3.6 Minimum Sump Superheat – In order to prevent flooding the compressor with excessive liquid refrigerant, a minimum sump superheat of 20 F(11 K) must be maintained under all conditions.

3.7 On/Off Cycling – A re-start delay timer is recommended to limit compressor cycling to once in ten minutes. Compressor must be on for a minimum of 7 minutes and off for a minimum of 3 minutes. Compressor should be off until oil returns to the center of lower bearing, this can be checked with a sightglass compressor if necessary.

3.8 Maximum Angle of Inclination – From vertical plane shall not exceed 5 degrees.

3.9 Maximum Operating Condition – The maximum load conditions for long term operation are listed below.

Refrigerant	Suction Pressure	Discharge Pressure
R22	100psig (0.69Mpa G)	403psig (2.78Mpa G)
R407C	106psig (0.73Mpa G)	418 psig (2.88Mpa G)
R410A	167psig (1.15Mpa G)	606 psig (4.18Mpa G)
R134a	57psig (0.39Mpa G)	328 psig (2.26Mpa G)

3.10 Residual Moisture – System residual moisture should be less than 300 ppm on C-SB models and less than 500 ppm on C-SC models.

3.11 Low Pressure Switch – Sanyo scrolls require a system low pressure switch to protect against loss of refrigerant charge. The recommended settings are listed below.

Refrigerant	Cut-Off setting
R22	4.3 psig (0.03Mpa G)
R407C	7.3 psig (0.05Mpa G)
R410A	22 psig (0.15Mpa G)
R134a	4.3 psig (0.03Mpa G)

3.12 Crankcase Heater – SANYO recommends that crankcase heaters be used on ALL systems to ensure long lasting reliability. A crankcase heater with 35 Watts of power is recommended for C-SB series and with 88 Watts of power for C-SC series.

3.13 High Pressure Switch – Sanyo scrolls require a system high pressure switch in order to protect the compressor during blocked fan or fan failure conditions. The recommended settings are listed below.



Refrigerant	Cut-Off setting
R22	435 psig (3.0Mpa G)
R407C	464 psig (3.2Mpa G)
R410A	602 psig (4.15Mpa G)
R134a	348 psig (2.4Mpa G)

3.14 Mounting Hardware – Is detailed on the dimensional drawings in specification.

3.15 Deep vacuum Operation – Scroll compressors should never be used to evacuate an air conditioning or refrigeration system. Due to the high volumetric efficiency, they will achieve extremely low vacuums when the suction side is restricted, this may cause internal arcing at the electric terminal and damage and/or compressor failure.

3.16 Brief Power Interruptions – Can cause powered reverse rotation on single phase compressors. When power is reapplied, the compressor may continue to run in the reverse direction for several minutes, until the internal linebreak cycles the compressor off. After tripping the linebreak, the compressor will operate in the correct direction when power is restored. During powered reverse rotation, the compressor will sound much louder than during normal operation. To prevent this situation, an anti-short cycle timer of (3 minutes off/7 minutes on) duration is recommended. This will allow the compressor to be de-energized for at least 3 minutes after each power interruption.

3.17 Three Phase Reverse Rotation – Scroll compressors will only compress gas in one direction. This is very important with three phase compressors since these motors will run in either direction depending on supply power phase direction. Reverse rotation results in excessive noise, no suction/discharge pressure differential and warming of the suction line (rather than cooling). For three phase systems, a service mechanic should be present at initial start-up to verify incoming power is properly phased to the system, and that both compressor and fans are rotating in the correct direction. In order to prevent three-phase power source reverse, A reversal defensible relay is recommended.

3.18 High Pressure Ratio – Scroll compressors are fixed pressure-ratio machines and operate most efficiently near their designed pressure ratio. Do not exceed 6:1 pressure ratio (discharge pressure to suction pressure) for extended periods of time.

4.0 Reliability – Protecting the compressor

4.1 Handling Liquid Refrigerant: - SANYO recommends that ALL systems use a suction accumulator sized to hold 60% of the system refrigerant charge. It is also recommended that ALL systems use a crankcase heater to prevent refrigerant flooded starting.

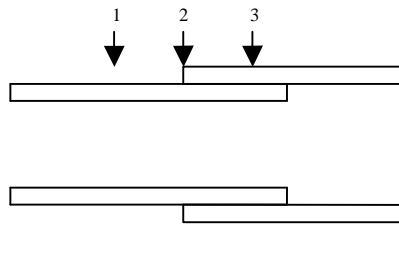


4.2 Preventing Reverse rotation: - Scroll compressors are designed to operate in one direction only and can be damaged if operated in the wrong direction for extended periods of time. To prevent reverse rotation on single phase compressors during brief power interruptions, a re-start timer (time-guard) of 5 minutes is recommended. On three phase installations, a service mechanic should be present at initial start-up to verify that the incoming power is properly phased to the system and both compressor and fans are rotating in the correct direction. Switching any two wires in a three phase system will reverse the power supply phase and rotation direction.

5.0 Assembly and Manufacturing Process Considerations

5.1 Compressor Holding Charge – Each compressor is shipped with a dry Nitrogen holding charge between 18 psig (0.12Mpa G) and 26 psig (0.18Mpa G) and sealed with rubber plugs. The plugs should be removed with care to avoid loss of oil and compressor should be installed into system within 15 minutes.

5.2 Tube Brazing Procedure – During brazing the system piping to the compressor a Nitrogen purge must be used to prevent oxidation contamination. Do not bend the discharge or suction lines or force the piping into the compressor connections since this may increase piping stress and potential failure. See figure below for recommended materials and procedure.



5.2.1. Brazing material: A copper-phosphorus brazing material is recommended for copper suction and discharge fittings. Silver-phosphorus and other silver brazing materials are also acceptable.

5.2.2. Clean the compressor tubing and system piping prior to assembly.

5.2.3. A double-tipped torch is recommended during brazing;

- Apply heat to Area 1, moving the torch up, down and around the tube in order to heat it evenly. It will become dull orange in color.
- Move the torch to area 2 until it reaches dull orange in color and heat that area evenly.
- Add braze material to the joint while moving the torch around the joint to flow braze material evenly around the circumference.
- After braze material flows around the joint, move to area 3, to draw the braze material into the joint. The time spent heating area 3 should be minimal, to keep excess braze material from entering the compressor.



5.3 System Evacuation – The system must be evacuated from high and low pressure sides and to a vacuum level of 200 microns of Mercury to remove residual moisture.

5.4 System Charging – It is recommended that system charging be done using the weighted charge method, by adding liquid refrigerant to the condenser outlet side of the system. Charging the high and low side of a system with gas simultaneously at a controlled rate is also acceptable. Do not exceed the recommended unit charge and NEVER charge liquid at the low side.

5.5 Wiring Connections – The SANYO scroll compressors will only compress gas in the counterclockwise direction when viewed from the top. Since single phase motors start and run in only one direction, reverse rotation is not a major consideration. Three phase motors will start and run in either direction, depending on the phase angles of the supplied power. This requires care during installations to ensure the compressor is operating in the proper direction. Verification of proper rotation is done by observing suction and discharge pressures when the compressor is operating. A decrease in discharge pressure and an increase in suction pressure indicate reverse rotation. After several minutes of operation the compressor internal linebreak will de-energize the compressor. In order to correct this situation, disconnect the power and switch any two power leads at the unit contactor. NEVER switch leads directly at the compressor.

Internal wiring of the compressor is consistent with the direction of rotation. As a result, once the correct phasing is determined for a specific system or installation, connecting properly phased leads to the same terminals should maintain proper rotation direction. A phase monitor can be applied to ensure correct rotation when power is initiated. Labeling for three phase models is U, V, W and for single phase C (common), S (start) and R (run). Each compressor is labeled with the appropriate sequence.

5.6 Terminal cover and clip – The terminal cover and clip should be installed prior to operation of the compressor. To ensure the cover is properly installed, check to be sure the lead wires are not pinched under it.

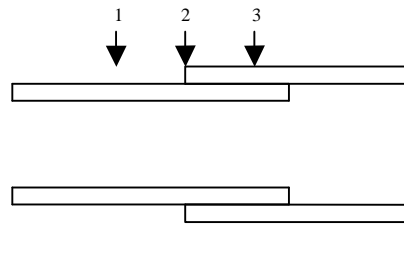
6.0 Servicing scroll compressors

6.1 System Evacuation – When evacuating a compressor in the field, it is extremely important to use a vacuum manifold set with at least 2 vacuum lines connected to the system. One line connected to the high side and the other connected to the low side of the system. This procedure is necessary to ensure the system is completely evacuated, since the scroll sets can seal under some non-energized conditions and thus isolate the high and low sides from each other. If there is refrigerant left in the system, this can create a hazard when unbrazing the piping. When compressor is replaced, the filter-dryer should also be replaced. It is a US federal violation to release refrigerant gas to the atmosphere, it must be reclaimed by an approved system.



6.2 Unbrazing System Components – The preferred method of replacing a compressor is to cut the connecting lines using a tubing cutter. However, unbrazing is also acceptable using the following precautions. Check to be sure all refrigerant has been evacuated using the procedure above in 6.1. If there is still refrigerant in the system, this when combined with the compressor oil can ignite if it comes in contact with a flame.

6.3 Brazing Procedure – See figure below for the procedure for field servicing.



To disconnect:

6.3.1. Disconnect power and remove wires from terminal box.

6.3.2. Insure ALL pressure is out of the system (check high and low sides).

6.3.3. Heat areas 2 and 3 slowly and uniformly until braze material softens and the tube can be removed from the compressor fitting.

To Reconnect:

6.3.4. Recommended brazing material is specified in section 5

6.3.5 Clean tube and fitting until shiny like a new penny.

6.3.6 Re-insert tube into fitting

6.3.7 Heat tube uniformly in Area 1, moving slowly to area 2 until it reaches dull orange in color, apply the brazing material to the joint.

6.3.8 Heat the joint uniformly by moving the torch around the joint to flow braze material evenly around the circumference.

6.3.9 Slowly move the torch to area 3 to draw the braze material into the joint.

6.3.10 Do not overheat the joint. A cherry red color indicates overheating and can weaken the joint and fittings.



6.3.11 The system must be evacuated to a vacuum level of 200 microns of Mercury to remove residual moisture.

6.3.12 It is recommended that system charging be done using the weighted charge method, by adding liquid refrigerant to the condenser outlet side of the system. Charging the high and low side of a system with gas simultaneously at a controlled rate is also acceptable. Do not exceed the recommended unit charge and NEVER charge liquid at the low side.

6.4 Compressor Functional Check – The following procedures should be followed to determine if the compressor is functioning properly:

6.4.1 Voltage of the unit should be measured and verified as correct.

6.4.2 An evaluation of the electrical system should be performed next. The motor should be checked by using continuity and short to ground testing. The internal motor protector should be given time to reset if a continuity break is found in the motor windings. External breakers and associated wiring should be checked.

6.4.3 Operation of indoor and outdoor fan/blower should be checked and verified as correct.

6.4.4 Check charge levels by connecting service gauges to the suction and liquid service valves and then turning on the compressor. Correlate the operating pressures to the system manufacturer specifications for the existing conditions under which the unit is operating.

6.4.5 On heat pump, check that the reversing valve is operating properly and verify that compressor current is within published compressor specifications at the proper operating conditions. If there is a significant deviation from current published specifications occurs (+/- 15% or more) this may indicate a defective compressor.

6.5 Compressor Replacement for Motor Burn Out – If a motor burn out is present,

6.5.1 Evacuate the system per section 6.1. follow the procedure below;

6.5.2 Remove the compressor as outlined in sections 6.2 to 6.3. and then follow proper clean-out procedures as detailed in system instructions.

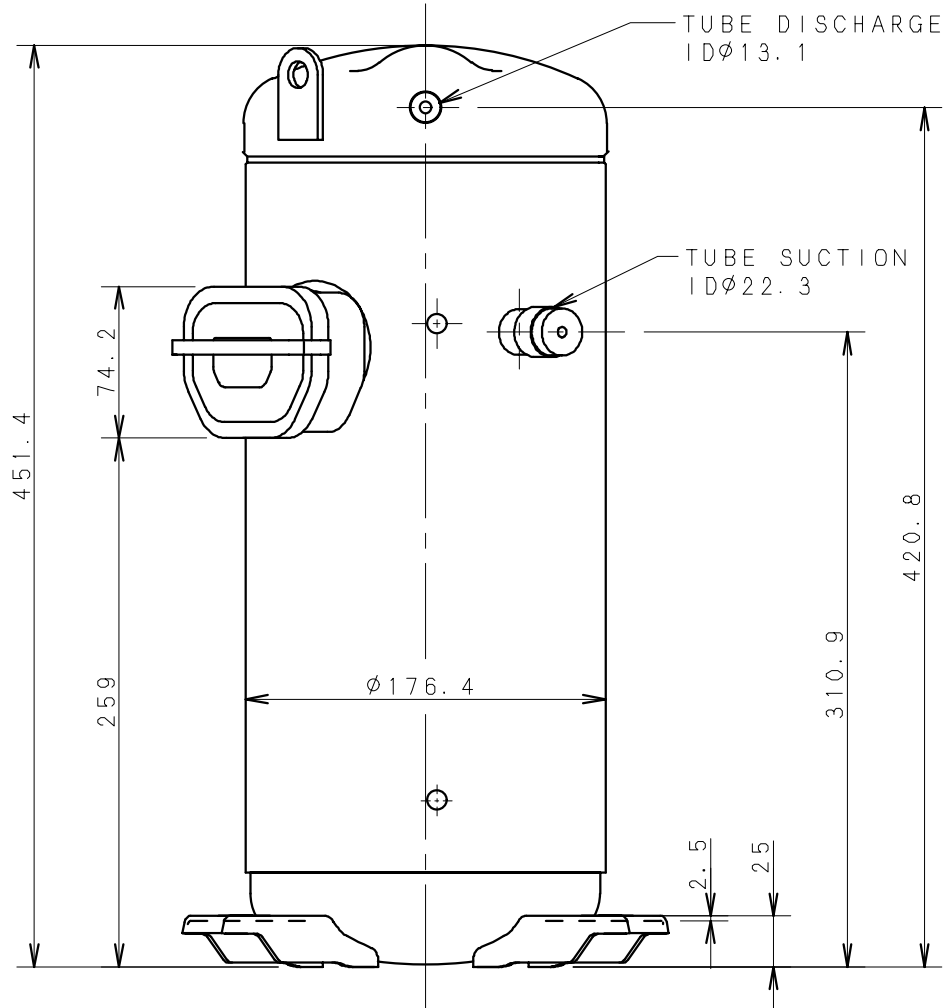
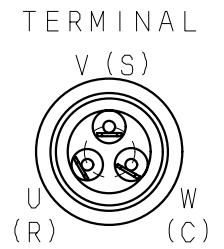
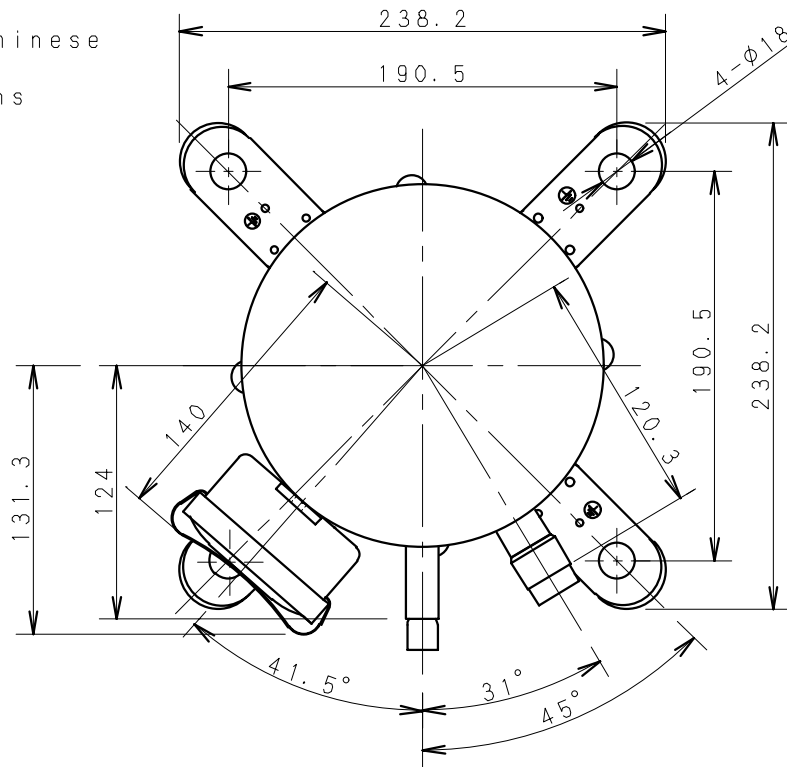
6.5.3 Replace the liquid line filter dryer and install a properly sized suction line filter dryer.

6.5.4 Run system and recheck pressure drop across suction filter dryer within 48 hours. If pressure drop is excessive, replace both the liquid line and suction line filter dryers.

8. Dimensions/Wiring Diagrams

DIMENSIONAL SKETCH

C-SB Series
 2.6-4.5kW
 European & Chinese
 power supply
 specifications
 models



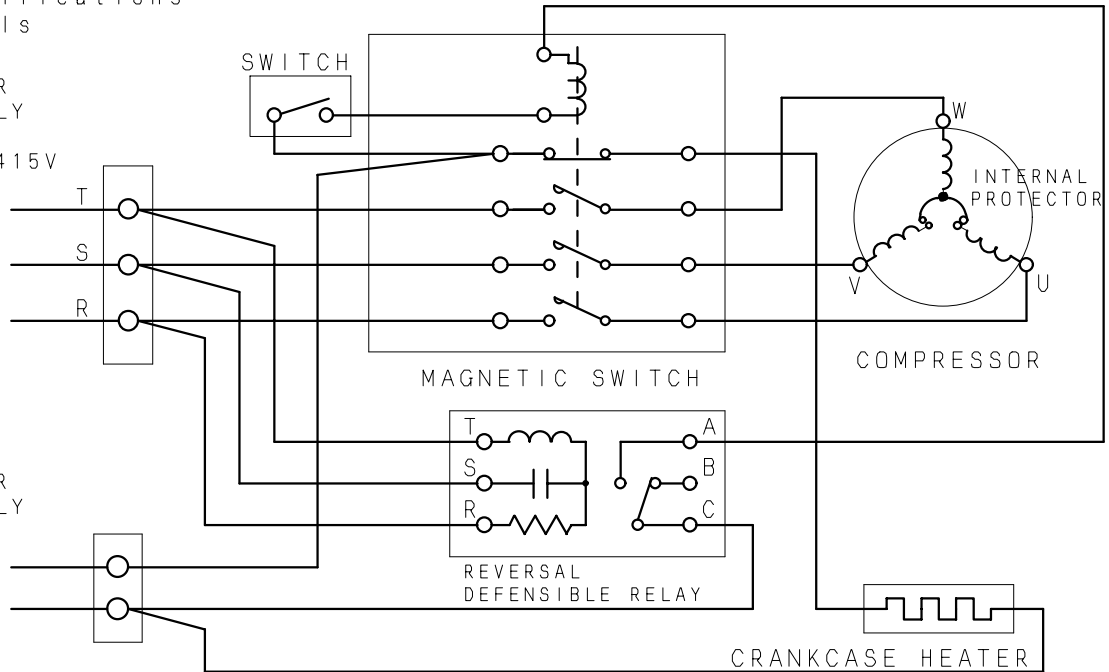
WIRING & MOUNTING SKETCH

WIRING DIAGRAM

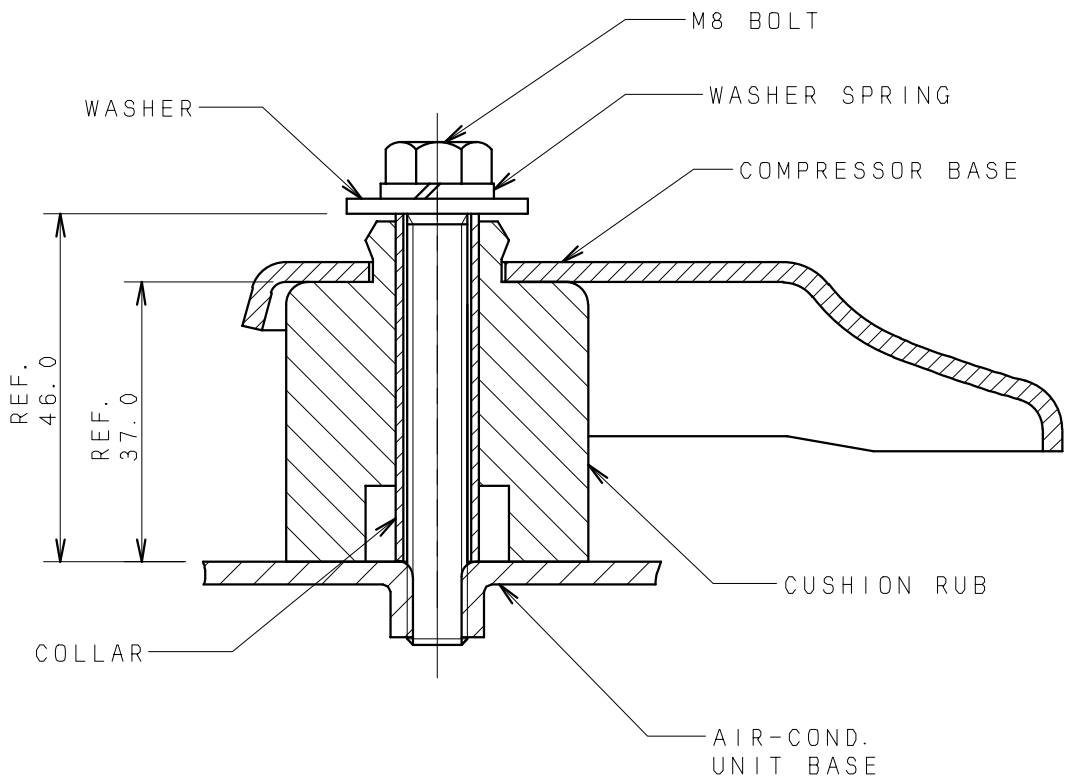
C-SB Series 3 phase
 2.6-4.5kW
 European & Chinese
 power supply
 specifications
 models

POWER
 SUPPLY
 50Hz
 380-415V

POWER
 SUPPLY
 50Hz
 220V



MOUNTING SKETCH



DIMENSIONAL SKETCH

COMPRESSOR CODE	A	B	C	D
80928*8*	538	284	486	7.9
80918*8*	[21.181]	[11.181]	[19.134]	[0.311]
80929*8*				
80920*8*				9
80910*8*	553	299	501	[0.354]
80922*8*	[21.772]	[11.772]	[19.724]	8.7
80912*8*				[0.342]

