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The technical parameters shall be subject to order contract or technical appendix of the contract.

RefComp

Reciprocating Compressor

SPS Series Semi-hermetic Subcritical CO₂ Reciprocating Compressor



Commercial
Reciprocating
Advanced
Technology

Originated from Italy,
advanced screw &
reciprocating compressor
technologies.

Global Service Hotline
400-109-6660



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Structural Diagram of SPS Series Semi-hermetic Reciprocating Compressor

The SPS series compressor is a CO₂-specific compressor, suitable for CO₂ subcritical compression cycles, and is an ideal choice for CO₂ refrigeration and heat pump systems. This series of compressors features a cylindrical body design and offers high pressure resistance, low vibration, and low noise characteristics. The capacity range is 1.5 to 48.5 m³/h (@50Hz), providing a sustainable development solution for fields such as food processing, pharmaceuticals, and cold chain logistics.

Motor protection

- Equipped with an INT69B2 motor protection module and multiple PTC thermistors in series.
- Dynamic monitoring and tracking of system operation information to achieve predictable alerts and safety protection.



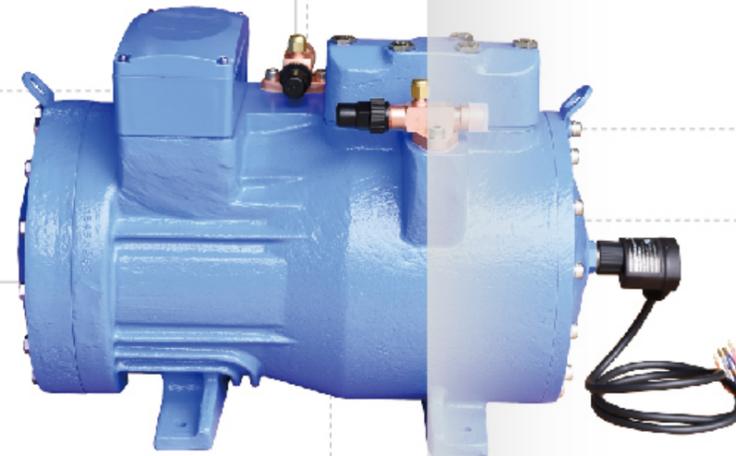
Safety valve

- The machine body features an integrated safety valve design, connecting the high and low-pressure sides to dynamically adjust internal pressure in real-time and precisely maintain it within the preset safety value.
- Highly sensitive and sealed structure operation, opening fully, stabilizing discharge, and promptly reseating.



Compressor body

- The designated pressure is 60 bar with advanced design philosophy, high strength casting mental so as to meet the needs.
- The low pressure drop design reduces the air intake resistance.



Bearings

- Equipped with sliding bearings and thrust sleeve assemblies that support the crankshaft to rotate stably in both radial and axial directions. The tolerance design and the use of composite materials ensure smooth crankshaft rotation.



Suction filter

- Internal delicate suction filter effectively filters the impurities from the refrigerant gases and protects the motor with convenient replacement and maintenance.



Valve plate

- Reliable valve plate design, using impact-resistant spring steel valve plates, ensuring quick gas exchange, reliability, and long service life.



Crankshaft, connecting rods and piston

- Reliable valve plate design, using impact-resistant spring steel valve plates, ensuring quick gas exchange, reliability, and long service life.
- Connecting rods and piston are casted from wear-resistant, high-strength aluminum alloy, capable of withstanding high-intensity impact loads during operation. Meanwhile, the lightweight structural design ensures smoother compressor operation.



Motor

- The motor is specially designed to generate more drive. Based on different voltage, the motor is capable of meeting various needs with various operating voltage and frequency.



1. Utilizing the environmentally friendly refrigerant CO₂ it offers significant advantages when used in situations with high safety and environmental protection requirements.
2. With a compact structure and high efficiency, the SPS series compressor can achieve the same cooling capacity as a conventional compressor in a smaller volume.

Model Description

Compressor				SPS	2	1	-	6.5
Series								
SPS	Semi-hermetic Subcritical CO ₂ Reciprocating Compressor							
Cylinder number								
2	2-cylinder							
4	4-cylinder							
Type of Machine Body								
1	Category 1							
2	Category 2							
Discharge volumem ³ /h (50Hz)								
1.5~48.5								

Technical Parameters

model	discharge volume 50Hz m ³ /h	cylinder number /	connection size				electrical parameters				weight Kg	
			suction valve		discharge valve		power supply specifications	maximum operating current	maximum power	start current		
			mm	inch	mm	inch	/	A	kW	A		
SPS21-1.5	1.5	2	16	5/8	12	1/2	A / Y A: 220-240V - 3-50Hz, 265-290V - 3-60Hz Y: 380-420V - 3-50Hz, 440-480V - 3-60Hz	4.2/2.4	1.1	16.4/9.4	47	
SPS21-2	1.8	2	16	5/8	12	1/2		4.8/2.8	1.2	16.4/9.4	47	
SPS21-2.5	2.3	2	16	5/8	12	1/2		6.0/3.4	1.5	26.4/15.2	48	
SPS21-3	2.8	2	16	5/8	12	1/2		6.8/3.9	1.9	26.4/15.2	48	
SPS21-3.5	3.6	2	16	5/8	12	1/2		8.5/4.9	2.5	43.5/25.0	50	
SPS21-4.5	4.5	2	16	5/8	12	1/2		9.9/5.7	3.1	43.5/25.0	50	
SPS21-5.5	5.5	2	16	5/8	12	1/2		13.3/7.6	4.0	66.6/38.2	52	
SPS21-6.5	6.7	2	16	5/8	12	1/2		16.1/9.3	4.8	66.6/38.2	52	
SPS22-8	7.8	2	22	7/8	16	5/8		17.5/10.1	5.5	79.2/45.8	78	
SPS22-9	9.2	2	22	7/8	16	5/8		20.1/11.5	6.4	96.1/55.5	80	
SPS22-11	11.2	2	22	7/8	16	5/8		24.7/14.2	7.8	123.7/71.5	84	
SPS41-13	13.0	4	28	1-1/8	16	5/8		29.6/17.0	8.8	161.7/93.5	97	
SPS41-15	15.6	4	28	1-1/8	16	5/8		33.7/19.4	10.7	203.8/117.8	98	
SPS41-18	18.4	4	28	1-1/8	22	7/8		39.3/22.6	12.7	235.2/136	103	
SPS41-22	22.3	4	28	1-1/8	22	7/8		47.6/27.4	15.5	235.2/136	103	
SPS42-29	28.7	4	28	1-1/8	22	7/8		PM (YYY) 380-420V - 3-50Hz 440-480V - 3-60Hz	33.3	19.5	121/198	158
SPS42-35	34.7	4	35	1-3/8	28	1-1/8			40.4	23.7	162/265	162
SPS42-41	41.3	4	35	1-3/8	28	1-1/8			49.4	28.4	185/303	172
SPS42-48	48.5	4	35	1-3/8	28	1-1/8	57.4		33.6	215/352	175	

Technical Features

- Developed specifically for CO2 applications with engine design principles for stable and reliable compressors;
- Reliable valve plate design with impact-resistant spring steel valve plates for quick gas exchange and long service life;
- High-efficiency PW motor with a maximum condensing temperature of 15°C;
- Built-in INT6982 motor protection module for dynamic monitoring to ensure safe compressor operation;
- Uses natural refrigerant CO2, offering significant advantages in areas with high environmental and safety requirements;
- Applicable for CO2 subcritical refrigeration cycles, CO2 cascade refrigeration systems, and CO2 heat pump heating applications.

Product Supply

standard supply

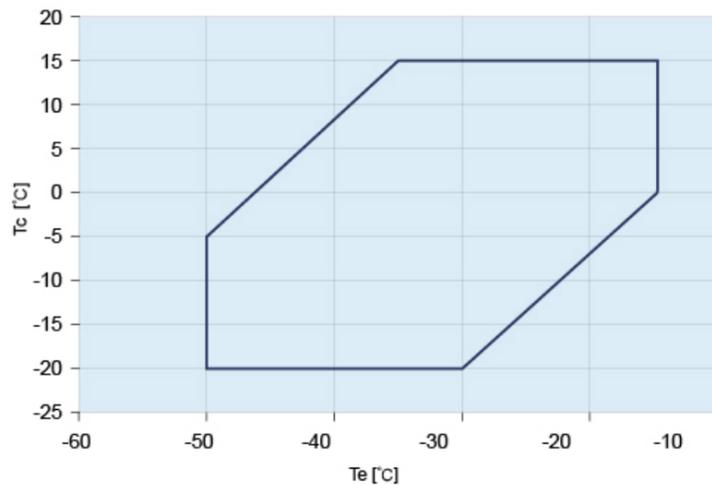
- SPS21/SPS22/SPS41 series star-connected motor (400V/3/50Hz) or delta-connected motor (230V/3/50Hz).
- SPS42 series partial winding start motor(400V/3/50Hz or 460V/3/60Hz);
- crankcase heater;
- discharge shut-off valve;
- suction shut-off valve;
- rubber vibration damper;
- direct on-line (DOL);
- safety valve;
- oil sight glass;
- oil charge;
- PTC protective thermistor;
- SPS21/SPS22 INT69 protection module (230V/1/50-60Hz);
- SPS41/SPS42 INT69B2 protection module (230V/1/50-60Hz);
- IP54 terminal box;
- nitrogen purging.

Optional Accessories

- Refrigeration oil:
Standard refrigeration oil is S006. If used in series with SPT compressors, the same refrigeration oil as the SPT compressor should be selected.
- Motors with special voltages.
- Photoelectric oil level switch assembly (only applicable to splash-lubricated compressors):
The standard electrical configuration for the compressor's electronic accessories (electronic protection modules, crankcase heaters) is 230V AC 50/60Hz.

Application

Based on 20K superheat at suction



Performance Parameters

Model	Tc°C	Te°C											
		-25		-30		-35		-40		-45		-50	
		Q0	Pta	Q0	Pta	Q0	Pta	Q0	Pta	Q0	Pta	Q0	Pta
SPS21-1.5	-20	-	-	3.9	0.3	3	0.4	2.3	0.4	1.8	0.4	1.3	0.4
	-10	4	0.5	3.2	0.5	2.5	0.6	1.9	0.5	1.4	0.5	1	0.5
	0	3.3	0.7	2.6	0.7	2	0.7	1.5	0.6	1.1	0.6	-	-
SPS21-2	-20	-	-	4.8	0.4	3.8	0.5	2.9	0.5	2.2	0.6	1.6	0.5
	-10	4.9	0.6	3.9	0.7	3.1	0.7	2.3	0.7	1.7	0.6	1.2	0.6
	0	4.1	0.8	3.2	0.8	2.5	0.8	1.8	0.8	1.3	0.7	-	-
SPS21-2.5	-20	-	-	6.2	0.5	4.9	0.6	3.8	0.7	2.9	0.7	2.2	0.7
	-10	6.4	0.8	5.2	0.9	4.1	0.9	3.1	0.9	2.3	0.8	1.7	0.8
	0	5.3	1.1	4.2	1.1	3.3	1.1	2.5	1	1.8	0.9	-	-
SPS21-3	-20	-	-	7.7	0.7	6.1	0.8	4.7	0.9	3.6	0.9	2.7	0.9
	-10	8	0.9	6.4	1.1	5	1.1	3.8	1.1	2.9	1	2.1	1
	0	6.6	1.4	5.2	1.4	4.1	1.3	3.1	1.3	2.2	1.2	-	-
SPS21-3.5	-20	-	-	9.4	0.9	7.5	1.1	5.9	1.2	4.5	1.2	3.4	1.2
	-10	10	1.2	8.1	1.4	6.4	1.5	4.9	1.5	3.8	1.4	2.8	1.3
	0	8.5	1.8	6.7	1.8	5.3	1.8	4	1.8	3	1.7	-	-
SPS21-4.5	-20	-	-	12.2	1.1	9.8	1.3	7.8	1.4	6	1.4	4.6	1.4
	-10	12.9	1.5	10.5	1.7	8.3	1.8	6.5	1.8	4.9	1.7	3.7	1.6
	0	10.8	2.2	8.7	2.3	6.8	2.2	5.2	2.1	3.9	2	-	-
SPS21-5.5	-20	-	-	15.1	1.3	12.2	1.5	9.7	1.7	7.6	1.7	5.8	1.7
	-10	16	1.8	13	2.1	10.4	2.2	8.2	2.2	6.3	2.1	4.7	2
	0	13.5	2.7	10.8	2.8	8.6	2.7	6.6	2.6	5	2.4	-	-

KEY:
 Q0=cooling capacity [kW]
 PA=input power[kW]
 Te=evaporating temperature[°C, DEW]
 Tc=condensing temperature
 50 Hz frequency
 sub cooling 5K

Performance Parameters

Model	Tc°C	Te°C											
		-25		-30		-35		-40		-45		-50	
		Q0	Pta										
SPS21-6.5	-20	-	-	18.1	1.6	14.7	1.8	11.8	2	9.3	2.1	7.3	2
	-10	19.2	2.2	15.7	2.4	12.7	2.6	10.1	2.6	7.8	2.6	5.9	2.4
	0	16.3	3.3	13.2	3.4	10.5	3.4	8.2	3.3	6.3	3.1	-	-
SPS22-8	-20	-	-	21.4	1.7	17.3	2.1	13.9	2.3	10.9	2.4	8.4	2.4
	-10	22.8	2.5	18.6	2.8	15	3	11.9	3	9.2	2.9	7	2.8
	0	19.5	3.7	15.8	3.8	12.6	3.8	9.9	3.7	7.6	3.5	-	-
SPS22-9	-20	-	-	25.2	2	20.5	2.4	16.4	2.7	12.9	2.8	10	2.7
	-10	26.9	2.9	22	3.3	17.7	3.5	14.1	3.5	11	3.4	8.4	3.3
	0	23	4.4	18.7	4.5	14.9	4.5	11.7	4.4	9	4.1	-	-
SPS22-11	-20	-	-	30.5	2.4	24.8	2.9	19.9	3.2	15.7	3.3	12.2	3.3
	-10	32.5	3.5	26.6	4	21.5	4.2	17.1	4.3	13.3	4.2	10.2	3.9
	0	27.8	5.3	22.6	5.5	18.1	5.4	14.2	5.3	11	4.9	-	-
SPS41-13	-20	-	-	34.6	2.9	28.1	3.4	22.4	3.6	17.6	3.8	13.4	3.7
	-10	37.1	4	30.3	4.5	24.4	4.8	19.3	4.8	14.8	4.7	11.1	4.5
	0	31.8	6	25.8	6.2	20.5	6.2	16	6	12.2	5.7	-	-
SPS41-15	-20	-	-	41.9	3.4	34	4	27.1	4.4	21.3	4.5	16.4	4.5
	-10	44.9	4.9	36.6	5.4	29.5	5.7	23.3	5.8	18.1	5.7	13.7	5.4
	0	38.4	7.2	31.1	7.5	24.8	7.4	19.4	7.2	14.8	6.8	-	-
SPS41-18	-20	-	-	49.8	4	40.3	4.7	32.2	5.2	25.4	5.4	19.7	5.3
	-10	53.3	5.8	43.5	6.4	35	6.8	27.7	6.9	21.6	6.7	16.5	6.4
	0	45.5	8.6	36.9	8.9	29.5	8.8	23.1	8.6	17.8	8.1	-	-

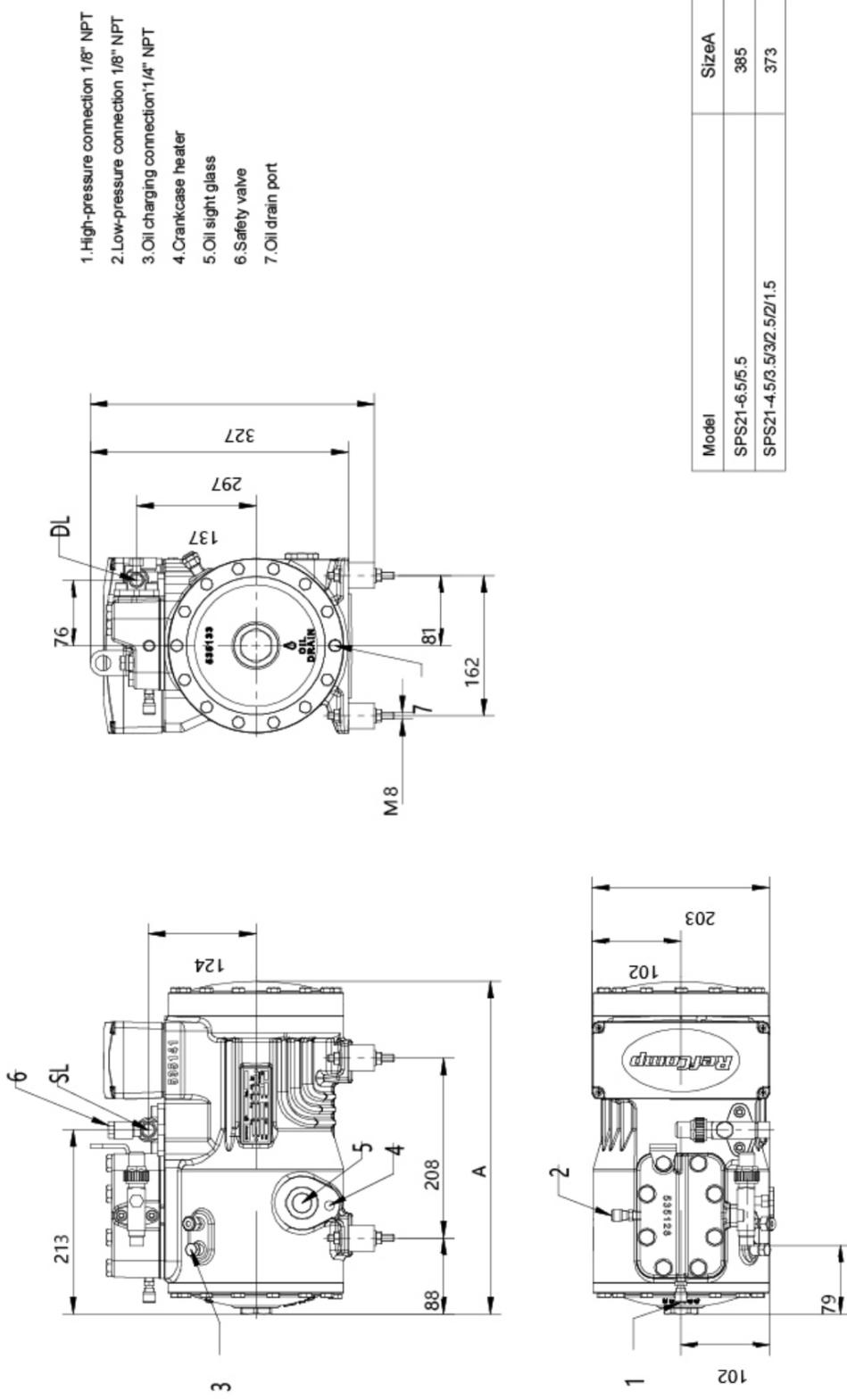
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 sub cooling 5K

Performance Parameters

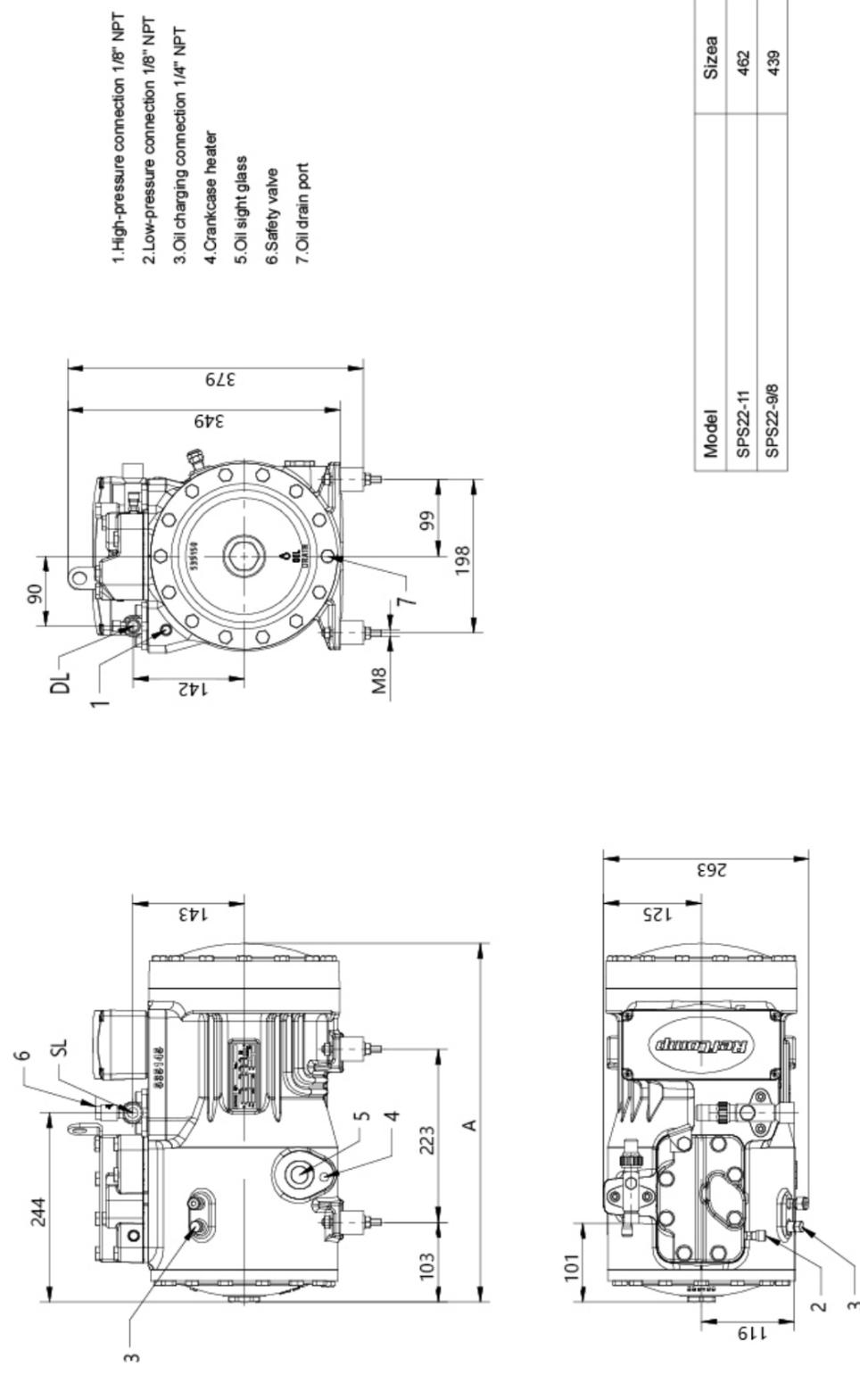
Model	Tc°C	Te°C											
		-25		-30		-35		-40		-45		-50	
		Q0	Pta	Q0	Pta	Q0	Pta	Q0	Pta	Q0	Pta	Q0	Pta
SPS41-22	-20	-	-	60.8	4.8	49.2	5.7	39.3	6.3	31.1	6.5	24.4	6.4
	-10	65.2	7	53.1	7.8	42.7	8.3	33.9	8.4	26.5	8.2	20.5	7.7
	0	55.6	10.5	44.9	10.8	35.9	10.8	28.2	10.4	21.9	9.8	-	-
SPS42-29	-20	-	-	77.1	6.3	62.6	7.4	50	8	39.2	8.3	30	8.2
	-10	82.6	8.9	67.5	9.9	54.4	10.5	42.9	10.7	33.1	10.4	24.8	9.9
	0	70.9	13.2	57.5	13.6	45.8	13.6	35.8	13.2	27.2	12.4	-	-
SPS42-35	-20	-	-	94	7.6	76.3	8.9	61	9.7	47.9	10.1	37	9.9
	-10	100.7	10.8	82.3	12.1	66.2	12.8	52.4	12.9	40.7	12.7	30.8	12
	0	86.2	16.1	69.9	16.6	55.8	16.5	43.7	16	33.4	15.2	-	-
SPS42-41	-20	-	-	112.7	9	91.3	10.6	73	11.6	57.5	12	44.7	11.9
	-10	120.6	12.9	98.4	14.4	79.3	15.2	62.9	15.4	49	15.1	37.4	14.3
	0	103.1	19.2	83.6	19.8	66.8	19.8	52.5	19.2	40.4	18.1	-	-
SPS42-48	-20	-	-	133.4	10.4	108	12.5	86.4	13.7	68.3	14.1	53.6	13.9
	-10	143.2	15.2	116.7	17	93.9	17.9	74.5	18.2	58.3	17.7	45.2	16.8
	0	122.1	22.8	98.8	23.5	78.9	23.4	62.1	22.6	48.2	21.4	-	-

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 50 Hz frequency
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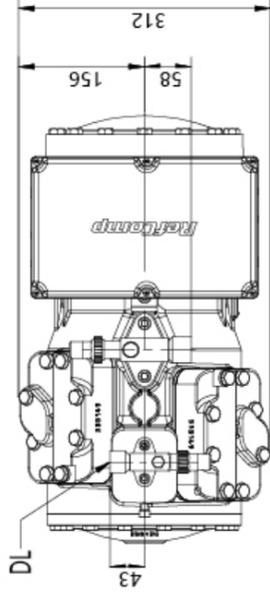
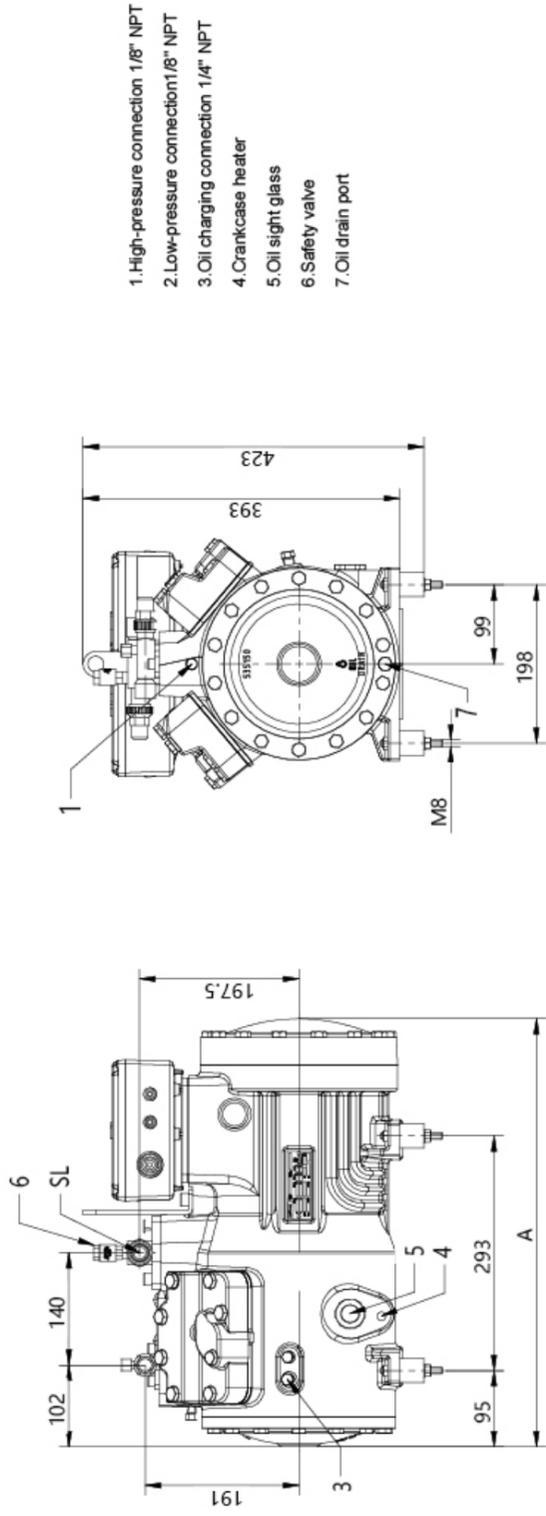
Dimension Diagram of SPS 21 Series



Dimension Diagram of SPS 22 Series

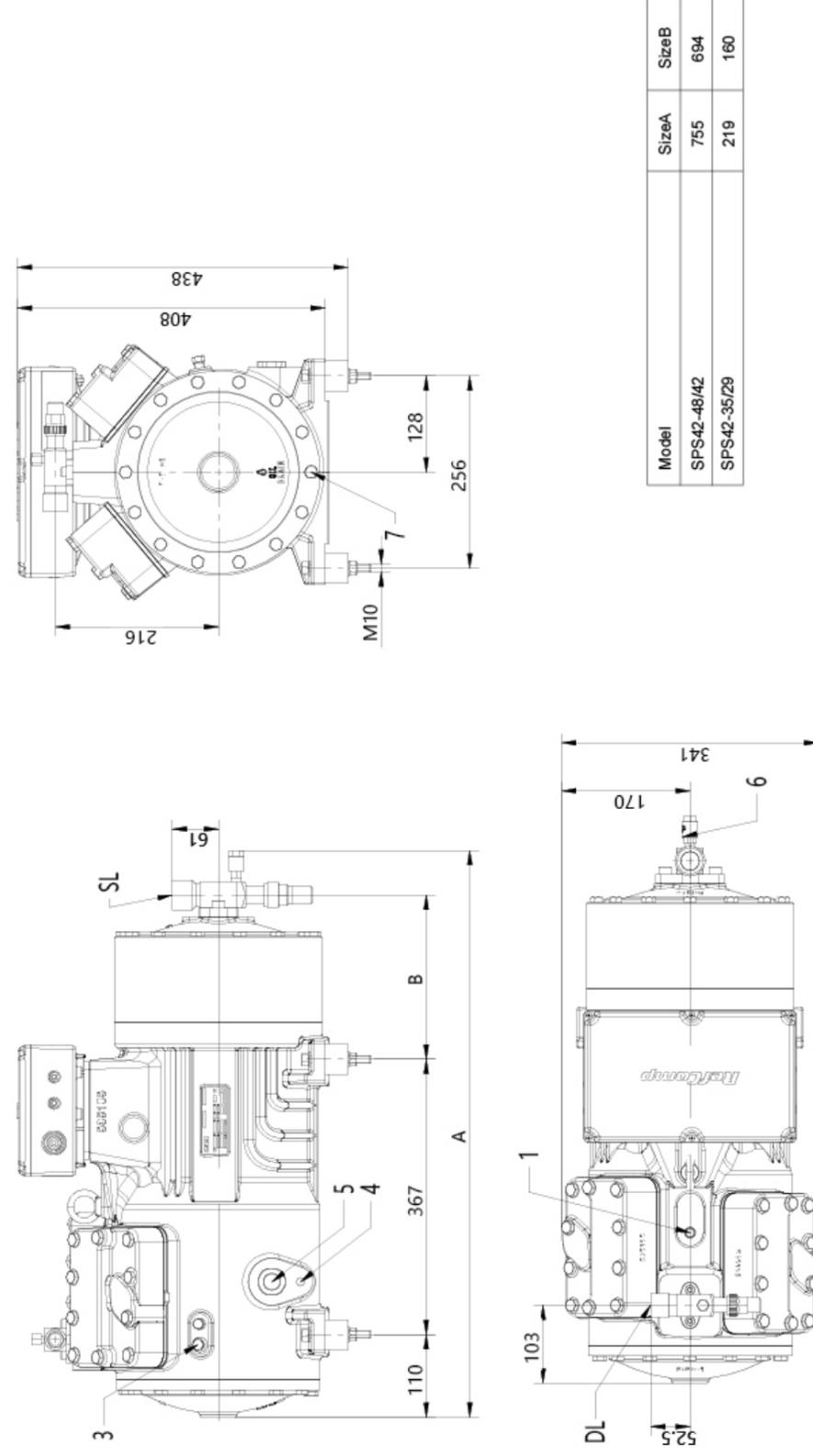


Dimension Diagram of SPS 41 Series



Model	SizeA
SPS41-22/18	534
SPS41-15/13	512

Dimension Diagram of SPS 42 Series



Model	SizeA	SizeB
SPS42-48/42	755	694
SPS42-35/29	219	160