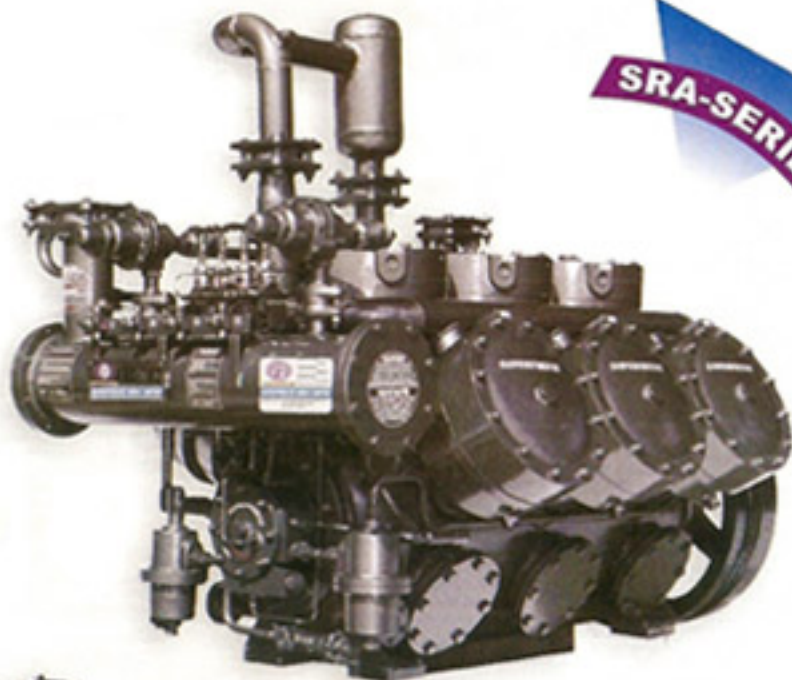




**SUPERFREEZE**

# Heavyduty Refrigeration Compressors



**SRA-SERIES**



POWER SAVERS

*A New Generation of Refrigeration Equipment...from*

# **SUPERFREEZE**

*An ISO-9001:2000 COMPANY*

## APPLICATIONS

**SUPERFREEZE** SRA-Series Heavy Duty Refrigeration Compressors cover a wide range of duties from high to low temperature in general applications such as cold storage, quick freezing, ice-making and air-conditioning. Additionally, they are particularly suitable for special applications in breweries, steel works, and chemical and research establishments.

## SPECIFICATIONS

'SRA-Series' compressors are well designed and robust machines capable of running continuously for prolonged periods with the minimum of attention. They are suitable for all normal applications and operating conditions.

## COMPRESSORS' COMPONENTS

**CRANKCASE AND CYLINDER HOUSING** - These are iron casted. Easy access to the interior of the compressors for inspection, cleaning or adjustment of motion work can be gained by removing the back-end cover, or a single hand hole cover provided for this purpose. All models are fitted with an oil level sight glass and drain plug.

**CRANKSHAFT** - The two-throw type crankshaft is forged of special alloy steel, accurately machined and with fine ground finish bearing surfaces. The shaft is dynamically balanced to minimise vibration. It is carried on two wrapped bimetallic bushes within the crankcase. When necessary this type of bearing can easily be replaced. Crankshaft thrust washers are fitted to one end of the crankcase. These are also easily renewable.

**CRANKSHAFT GLAND SEAL** - The crankshaft is gas sealed at the gland end by a flexible multi spring precision seal, which is continuously lubricated and cooled by oil from the pressure feed system while the compressor is running. The Sealing faces are Tungston carbide and Bronze.

**CYLINDER LINERS** - The liners are of high tensile cast iron with a fine ground external and honed internal finish.

**CONNECTING RODS** - The connecting rods are H section steel stampings fitted with slip-in steel backed white-metal lined big end bearing, and bronze small end bushes.

**PISTONS** - The pistons are made of an aluminium alloy. They are fitted with 3 compression and 2 oil scraper rings to provide efficient gas sealing and good oil control.

**VALVES** - The ring plate type suction and delivery valves are made of special alloy steel. The suction valve is arranged to seat on the flanged head of the cylinder liner. The delivery valve and seat form part of the safety head assembly. Both valves are spring loaded for positive action.

**SAFETY HEAD** - The safety head in each cylinder is held down by a heavy coil spring against which it can lift to relieve undue pressure.

**GAS STRAINER** - The gas strainer is conveniently housed on the suction connection of the machine and can be removed for cleaning without difficulty. A felt filter is provided for fitting inside the strainers during the compressors running-in period to trap scale and other impurities scoured from the system by the refrigerant.

**DELIVERY MANIFOLD** - The delivery manifold is a common header into which gas from the several cylinders is discharged. The manifold is so designed to prevent the minimum heat exchange surface between suction and delivery gas passages. The feature assumes importance when the machine is used as an ammonia compressor.

**LUBRICATION** - Oil under pressure is supplied to all bearings and the crankshaft seat by means of a gear pump driven directly from the end of the crankshaft. Oil in the sump is drawn into the pump suction through a fine mesh strainer and delivered to the bearings by way of a 'felt element' oil filter. A magnet is also provided to trap any magnetic particles. A crank case oil level sight glass is fitted. Oil contained in the refrigerant returning to the compressors suction is separated from the gas in a low velocity suction chamber. This oil drains back into the sump Chamber which allows the crankcase to vent but prevents loss of oil. The compressor is protected against oil failure by a differential oil switch, which causes the compressors to stop should the pressure fall below a predetermined minimum.

**UNLOADING EQUIPMENT** - (Oil operated) Manual or automatic unloading equipment built into the cylinders are provided to give light load start and capacity reduction, or light load start only. Loading or unloading of the cylinders is achieved by a hydraulic mechanical suction valve lifting mechanism on each individual cylinder. For unloading the suction valve ring is lifted from its seat in the cylinder collar by spring tension. Loading of cylinder is effected by admitting control oil pressure to the control piston allowing the suction valve ring to descend on its seat.

**CYLINDER HEAD COOLING** - Compressors operating on ammonia refrigerant are fitted with cylinder heads and covers suitable for water cooling.

## SPECIAL ACCESSORIES

- Drive set comprising of V-belt, motor pulley and flywheel, for a wide range of speeds
- Bare components-Base frame for compressor with foundation bolts.  
Shut-off valves for suction and discharge lines.
- Electrically operated solenoid valves for capacity control.
- Pressure gauges, safety pressure cut-out, oil safety cut-off with or without mounting panel.
- Crankcase heater and oil separator.
- Equaliser connections for parallel operating compressors.
- Interstage cooling system to suit two stage compressors.
- Built-in cooling water manifold.
- Special oil separators, combined base frames for compressor and motor for marine applications.

## FINISH ON COMPRESSORS

Chemically de-greased. Three coats of paint applied, two undercoats and a finishing coat.

## TESTS

After machining, each crankcase and cylinder body is subjected to hydraulic submerged air pressure tests. When assembled each machine is given a free air running test and capacity evaluation tests as per standards.

# CAPACITY RATINGS\*

## NH<sub>3</sub> (SINGLE STAGE)

Compressor Model	S.S.T (°C)	KCal/hr. SDT(+40°C)	KCal/hr. SDT(+45°C)	KW SDT(+40°C)	KW SDT(+45°C)
SRA -20	+10	1,12,800	1,07,815	22.1	25.1
	+5	93,100	89,920	21.4	24.1
	0	78,880	71,800	20.6	22.5
	-5	60,925	57,080	19.2	20.7
	-10	48,020	44,620	17.2	18.6
	-15	36,920	33,975	15.7	16.6
SRA -100	+10	1,41,850	1,36,400	27.0	30.2
	+5	1,16,900	1,11,950	26.4	29.2
	0	94,950	90,500	25.4	27.7
	-5	76,250	72,200	24.0	25.8
	-10	59,950	-	22.1	-
	-15	43,650	-	20.4	-
SRA -200	+10	2,83,700	2,72,800	53.0	59.3
	+5	2,33,800	2,23,900	51.8	57.3
	0	1,89,900	1,81,000	49.8	54.4
	-5	1,52,500	1,44,400	47.0	50.6
	-10	1,19,900	-	43.3	-
	-15	87,300	-	40.0	-
SRA -300	+10	4,25,600	4,09,200	78.5	87.9
	+5	3,50,700	3,35,900	76.7	85.0
	0	2,84,900	2,71,600	73.8	80.7
	-5	2,28,700	2,16,600	69.6	74.9
	-10	1,79,900	-	63.9	-
	-15	1,31,100	-	60.0	-
SRA -400	+10	5,67,500	5,45,600	104.1	116.6
	+5	4,67,600	4,47,900	101.6	112.6
	0	3,79,900	3,62,100	97.7	106.9
	-5	3,05,000	2,88,800	92.1	99.2
	-10	2,39,800	-	84.6	-
	-15	1,74,600	-	79.3	-
SRA -600	+10	8,51,300	8,18,500	155.0	173.8
	+5	7,01,500	6,71,900	151.3	167.8
	0	5,69,900	5,43,200	143.4	159.2
	-5	4,57,500	4,33,300	137.0	147.7
	-10	3,59,800	-	125.8	-
	-15	2,62,200	-	118.2	-
SRA -900	+10	12,77,000	12,27,700	231.4	259.6
	+5	10,52,300	10,07,900	226.0	250.7
	0	8,54,800	8,14,900	217.1	237.8
	-5	6,86,300	6,50,000	204.5	220.5
	-10	5,39,700	-	187.6	-
	-15	3,93,300	-	168.6	-

## NH<sub>3</sub> (DOUBLE STAGE)

Compressor Model	S.S.T (°C)	KCal/hr. SDT(+40°C)	KCal/hr. SDT(+45°C)	KW SDT(+40°C)	KW SDT(+45°C)
SRA -201	-15	1,12,500	1,09,600	46.5	49.8
	-20	90,900	88,500	42.5	45.5
	-25	71,100	69,200	38.2	40.8
	-30	54,900	-	34.0	-
SRA -301	-25	1,01,700	98,900	53.2	56.5
	-30	78,500	76,300	47.1	49.9
	-35	59,900	-	41.4	-
SRA -402	-15	2,25,000	2,19,300	90.8	97.5
	-20	1,81,800	1,77,100	82.9	88.8
	-25	1,42,200	1,38,400	74.4	79.4
	-30	1,09,800	-	65.9	-
SRA -501	-35	90,900	82,200	62.7	65.9
	-40	68,400	66,300	54.0	56.7
	-45	50,500	-	46.0	-
SRA -603	-15	3,37,600	3,29,000	135.2	145.3
	-20	2,72,800	2,66,700	123.3	132.2
	-25	2,13,300	2,07,700	110.5	118.1
	-30	1,64,700	-	97.9	-
SRA -702	-30	1,78,900	3,29,000	104.9	112.2
	-35	1,36,500	1,32,600	91.7	96.9
	-40	1,02,700	-	75.0	-

## R 22 (SINGLE STAGE)

Compressor Model	S.S.T (°C)	KCal/hr. SDT(+40°C)	KCal/hr. SDT(+45°C)	KW SDT(+40°C)	KW SDT(+45°C)
SRA -20	+10	90,800	85,800	34.2	36.7
	+5	75,810	71,440	32.5	34.9
	0	62,900	58,950	30.8	33.2
	-5	51,450	48,100	28.6	29.9
	-10	41,650	38,750	26.1	27.1
	-15	33,110	30,615	23.5	24.0
	-20	25,820	23,750	20.7	20.9
-25	19,160	17,285	17.8	17.9	
SRA -200	+5	2,04,300	1,92,900	55.3	59.7
	0	1,69,500	1,59,400	52.7	56.7
	-5	1,39,000	1,30,200	49.8	53.3
	-10	1,12,500	1,04,800	46.6	49.5
	-15	89,600	82,900	43.0	45.1
	-20	69,900	64,000	38.7	39.9
	-25	53,000	47,800	33.6	33.6
-30	38,700	34,100	27.5	26.0	
SRA -300	+5	3,06,400	2,89,300	82.0	88.6
	0	2,54,200	2,39,200	78.0	84.0
	-5	2,08,500	1,95,300	73.7	79.0
	-10	1,68,800	1,57,300	69.0	73.2
	-15	1,34,500	1,24,300	63.5	66.5
	-20	1,04,900	96,000	57.1	58.8
	-25	79,600	71,800	49.5	49.4
-30	58,100	51,200	40.2	38.0	
SRA -400	+5	4,08,600	3,85,800	108.6	117.5
	0	3,39,000	3,18,900	103.4	111.4
	-5	2,78,000	2,60,400	97.7	104.6
	-10	2,25,100	2,09,700	91.3	97.0
	-15	1,79,300	1,65,800	84.0	88.2
	-20	1,39,900	1,28,100	75.4	77.7
	-25	1,06,100	95,700	65.3	65.2
-30	77,500	68,300	52.9	50.0	
SRA -600	+5	6,12,900	5,78,700	161.8	175.1
	0	5,08,500	4,78,400	154.0	166.0
	-5	4,17,100	3,90,700	145.4	155.8
	-10	3,37,700	3,14,600	135.8	144.4
	-15	2,69,000	2,48,700	124.9	131.1
	-20	2,09,900	1,92,100	112.1	115.5
	-25	1,59,200	1,43,600	96.8	96.7
-30	1,16,300	1,02,500	78.3	73.9	
SRA -900	+5	9,19,200	8,67,900	242.5	262.6
	0	7,62,600	7,17,600	230.7	249.0
	-5	6,25,500	5,85,900	218.0	234.2
	-10	5,06,400	4,71,900	204.1	217.0
	-15	4,03,500	3,72,900	187.8	197.1
	-20	3,14,700	2,88,000	168.9	174.3
	-25	2,38,800	2,15,400	146.4	146.4
-30	1,74,300	1,53,600	118.9	112.1	

\* Basis for Capacity Ratings

SDT : 40°C and 45°C

Superheat : 5°C

Capacities at 1000 RPM

3020 K. Cal = 12000 BTU = ITR

Effective Power at shaft in KW

## TECHNICAL DATA FOR SINGLE-STAGE COMPRESSORS

Compressor Model	SRA-20	SRA-100	SRA-200	SRA-300	SRA-400	SRA-600	SRA-900
Cylinder arrangement	Vertical	Vertical	1xV	1xW	2xV	2xW	3xW
Number of cylinders	2	1	2	3	4	6	9
Bore & Stroke (mm)	110x85	160x110	160x110	160x110	160x110	160x110	160x110
Suction (mm)	50	50	65	80	80	100	125
Discharge (mm)	40	40	50	50	80	80	100
Swept volume of suction gas Cu.m/hr at 1000 RPM	96.9	132.7	265.4	398.1	530.8	796.2	1194.3
Max. Speed (RPM)	1500	1000	1000	1000	1000	1000	1000
Min. Speed (RPM)	600	400	400	400	400	400	400
Direction of Rotation	Anticlock-wise when viewed from shaft end						
Fly Wheel Diameter	420MM (16")	686MM (27")					
Max. Discharge Pressure	21 bar						

## TECHNICAL DATA FOR DOUBLE-STAGE COMPRESSORS

Compressor Model	SRA-201	SRA-301	SRA-402	SRA-501	SRA-603	SRA-702
Cylinder arrangement	1xW	2xV	2xW	2xW	3xW	3xW
Number of cylinders in LP	2	3	4	5	6	7
Number of cylinders in HP	1	1	2	1	3	2
Bore & Stroke (mm)	160x110	160x110	160x110	160x110	160x110	160x110
Suction (mm)	80	80	100	100	100	100
Discharge (mm)	65	65	50	50	50	50
Swept volume of suction gas Cu.m/hr at 1000 RPM	265.4	398.1	530.8	663.5	796.2	928.9
Max. Speed (RPM)	1000	1000	1000	1000	1000	1000
Min. Speed (RPM)	750	750	750	750	750	750
Direction of Rotations	Anticlock-wise when viewed from shaft end					
Fly Wheel Diameter	686mm (27")					
Max. Discharge Pressure	21 bar					

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**SUPERFREEZE**  
An ISO - 9001:2000 Company

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We reserve the right to modify specifications in accordance with improved designs. Although every effort will be made to maintain accuracy in the data given, the figures must be taken as approximate and in no way binding. The claims are as per our knowledge and for any variances we are not bound in any way.

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