

MULTI ✓ ISTA

**karloskar**  
Pneumatic

# KCX SERIES - HEAVY DUTY REFRIGERATION COMPRESSORS

..at the heart of Industrial Refrigeration



Dairy

Ice-Plant

Fruits & Vegetables

Cold Storage

Beverages

Fisheries-Meat

# Kirloskar Group

Kirloskar Group, a multi-billion US\$ entity, is one of the leading engineering conglomerate in India. It has more than 100 years of proven expertise in the specialist areas such as refrigeration, gas/air compression, transmission, water, power with a portfolio of world-class products and turnkey solutions. Kirloskar holds the repute in the industry for its good business values and excellent customer satisfaction. Plants of the group are accredited to ISO 9001, 2000, ISO 14001, OHSAS 18001.

## Kirloskar Pneumatic Company Limited

Founded in 1958 as a part of Kirloskar group, Kirloskar Pneumatic Company is one of the most accomplished names in the RHVAC business. Due to its technological edge, Kirloskar Pneumatic has been enjoying customer preference for almost half the century serving products and customised solutions in diverse fields, such as industrial refrigeration, marine HVAC, gas compression, air compression and transmission. Over 40,000 refrigeration compressors are operating round the clock is the testimony to this. Kirloskar Pneumatic is now leading amongst the leaders in the manufacture of reciprocating open type refrigeration compressors.

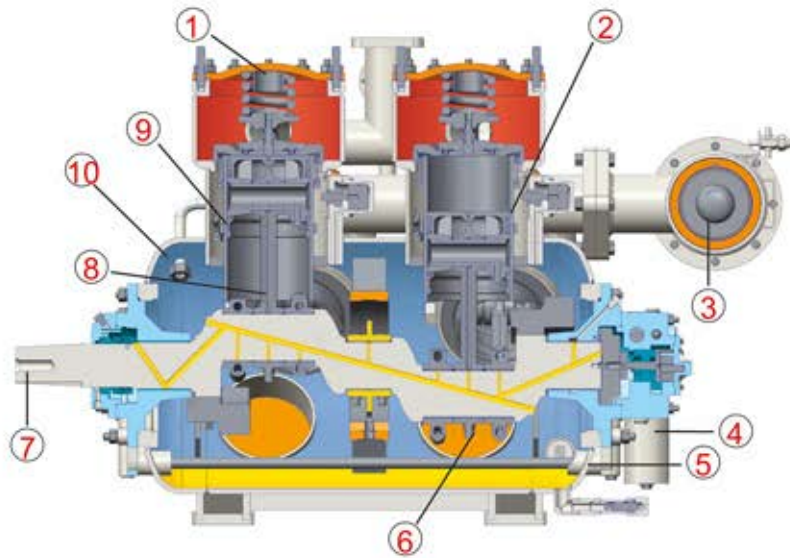
Kirloskar Pneumatic Company's wide spread Sales & Service Network supports trouble free operation. Corporate Office & manufacturing facilities are located in Pune and Saswad which houses the required infrastructure to support all its manufacturing processes. It has an in house foundry, sophisticated testing labs, CNC machining centres, stress relieving furnaces and testing. Kirloskar Pneumatic is the most preferred supplier to almost all the national and international industries for industrial refrigeration applications.



### Certification and Awards

- ISO 9001-2015, ISO 14001-2015, ISO 45001-2018.
- Award of Excellence from Cold Storage Association of India.
- CII Exim Bank Award for Strong Commitment towards Excellence.
- CII Excellence Award in Energy Management.
- CII Best Kaizen Award.
- Employer Branding Award as Best Employer Managing Health at work.

# Inside The KCX Series Compressor



1. **Safety** is ensured by built-in arrangement of buffer spring which protects compressor from incidental liquid hammer.
2. **Quality adaptable to varying operating conditions** Each cylinder is equipped with a hydraulically operated valve lifting mechanism giving absolutely reliable capacity control and 100% unloaded starting.
3. **Easy cleaning** of the suction gas strainer is another example of easy maintenance philosophy behind KCX series compressors. Inside gauze strainer element can be easily removed.
4. **Trouble-free long running life** due to highly effective oil purification by two filters.
5. **Extra safety** is ensured by built-in sight glass, making oil return flow visible.
6. **Quick maintenance** Parts subjected to wear are easily accessible through large service doors with minimum special tools.
7. **Quick operation** is guaranteed by the use of dynamically balanced crankshaft, resulting in smooth, vibration-free running.
8. **Easy maintenance** as piston/connecting rod assembly can be removed without removing the cylinder liner.
9. **Minimum oil consumption** is ensured by providing 3 compression rings & 2 oil scraper rings per piston - thus minimising oil through discharge gas line.
10. **Breather** to equalise suction and crankcase pressure.

## Salient Features of Construction

### Discharge Valve Assembly

- » Three concentric discharge valve rings ensure ample gas passage at low lifting height.
- » The use of sinusoidal springs together with precision machined and lapped surface results in a trouble-free operation for a remarkably long time.
- » Minimum inventory for spares since most parts are identical throughout the KCX-series compressors.

### Cylinder Liner and Suction Valve

- » Interchangeable cylinder liners are made of fine-grained, centrifugally cast, alloy iron.
- » Fine boring and honing results in a mirror smooth running surface.
- » A hydraulic mechanical suction valve lifting mechanism on each individual cylinder achieves loading and unloading.
- » For unloading, the suction valve ring is lifted from its seat in the cylinder collar by spring tension. Admitting controlled oil pressure to the control piston, allowing the suction valve ring to descend on its seat effects loading or cylinder.

### Piston/Connecting Rod Assembly

- » Perfect sealing and low oil consumption due to 3 compression and 2-oil scrapper rings on each aluminium piston.
- » The nodular iron connecting rod is drilled through for pressure lubrication of the piston pin
- » Steel backed white metal shells on big end and bronze bearing on small end of connecting rod.
- » The complete assembly can be removed from the top for servicing without withdrawing the cylinder liner.

### Welded Steel Crankcase

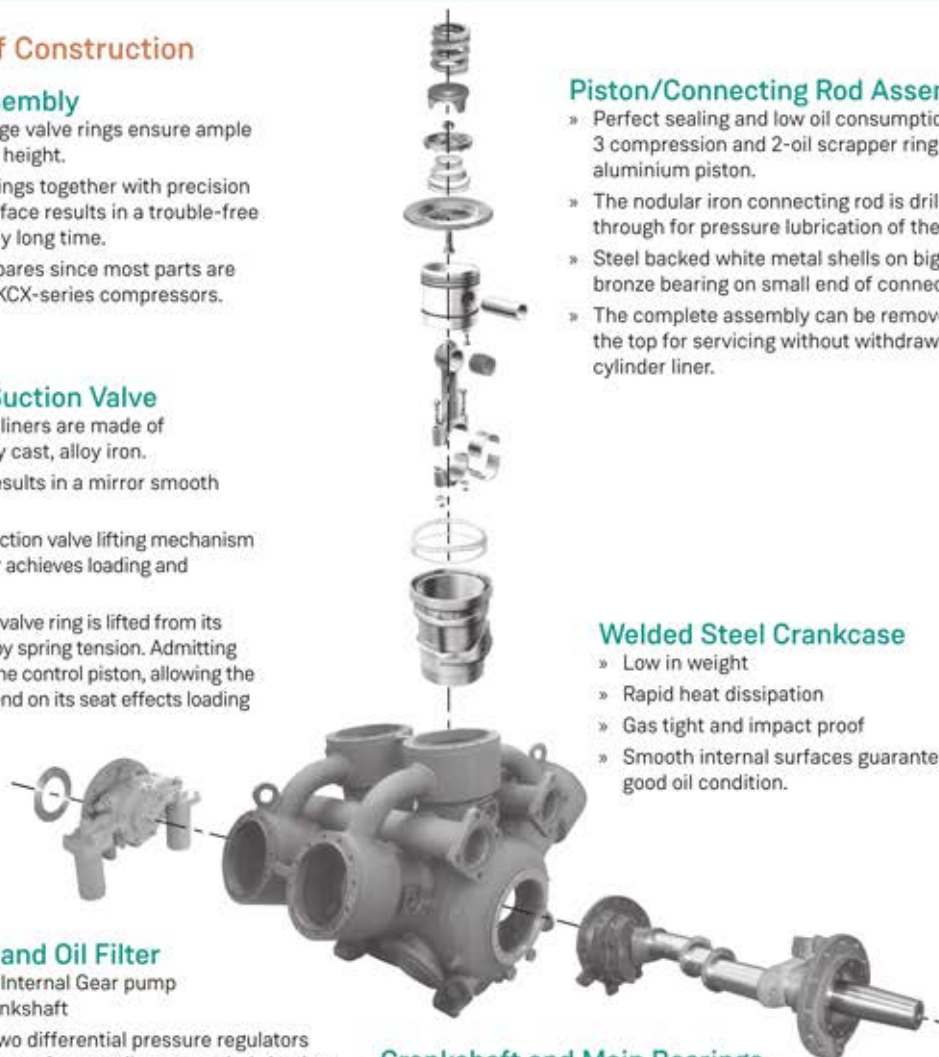
- » Low in weight
- » Rapid heat dissipation
- » Gas tight and impact proof
- » Smooth internal surfaces guarantee good oil condition.

### Lubrication System and Oil Filter

- » Forced Lubrication by an Internal Gear pump directly driven by the Crankshaft
- » The Pump incorporates two differential pressure regulators to provide separate pressures for two oil systems: Lubrication system and control oil system for operating Cylinder loading unloading mechanism.
- » Automatically operating solenoid valve ensures complete unloaded start of compressor.
- » A Metal gauze suction filter element and a throwaway discharge paper filter cartridges are provided for excellent filtering capacity of the lubricating oil.

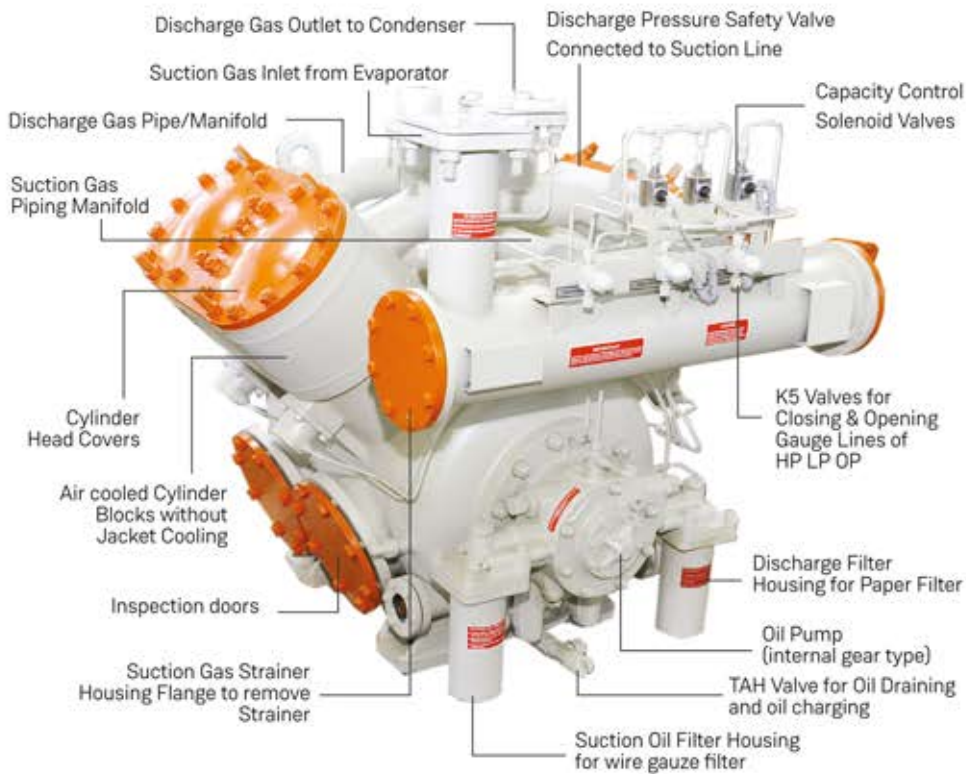
### Crankshaft and Main Bearings

- » Bearing surfaces of the high quality nodular cast iron crankshaft are ground to fine tolerances.
- » Main bearings are white metal lined steel backed bushes, pressed into the cast iron bearing covers. Intermediate bearing blocks are provided with split type bearing shell of the same type.
- » Each crankshaft is dynamically balanced together with the counter weights.



# Our Offerings

## KCX Single Stage Compressor

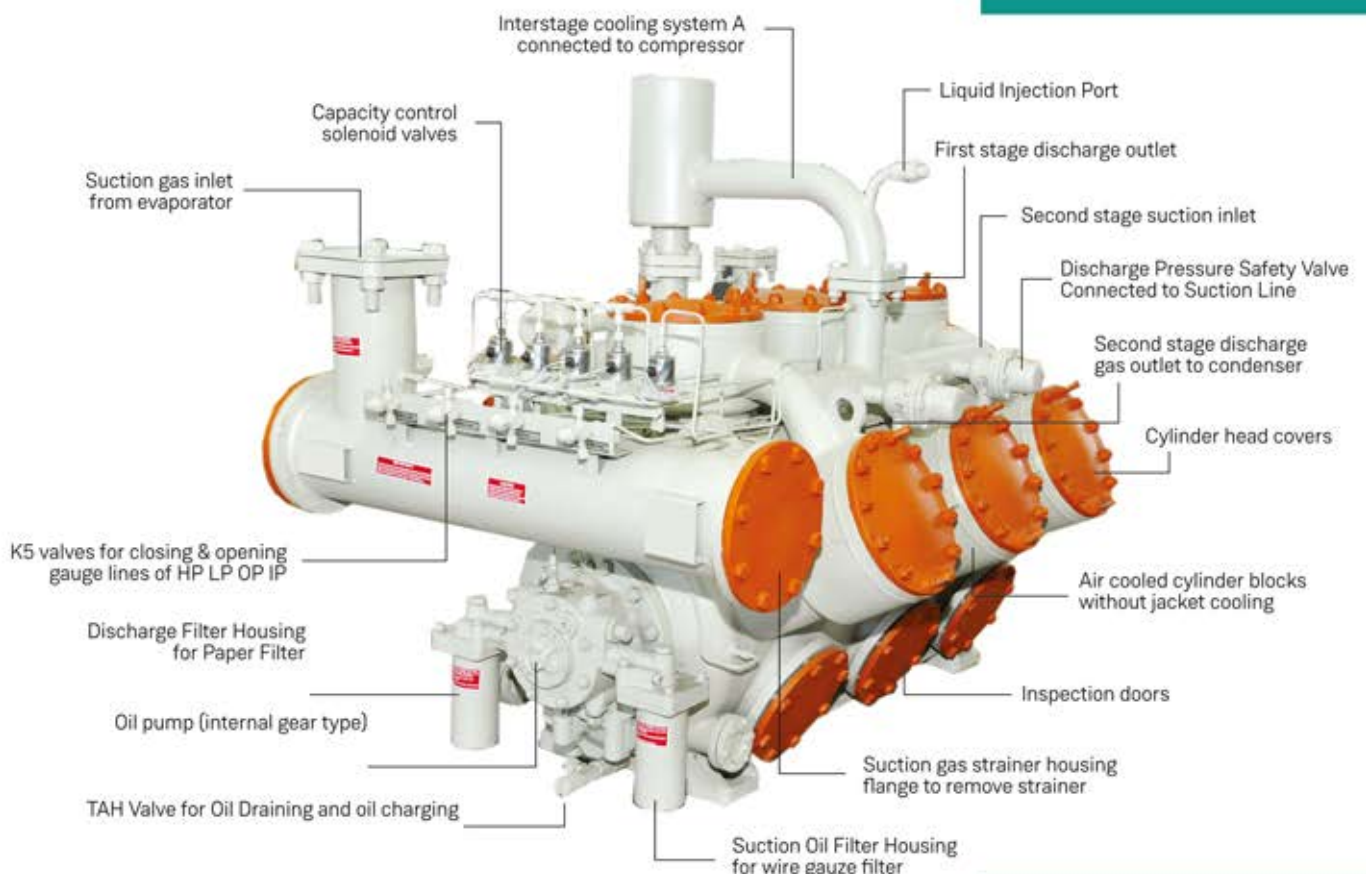


## Kirloskar KCX Series Compressors

KCX reciprocating compressors are:

- » Available in single stage as well as two stage versions.
- » Most suitable for industrial refrigeration and low temperature applications.
- » Designed to operate with Ammonia, R22 & other HFC refrigerants.
- » Ideally suitable for continuous duty process refrigeration liquefaction plants, ice plants, cold storages, etc.

## KCX Two Stage Compressor



# Refrigeration Compressor Belt/ Direct Driven

## Scope of Supply

- » Compressor with Drive Set
- » Suction and Discharge Stop Valves
- » Oil Separator
- » Common base frame for Compressor & Motor
- » Belt Guard/Coupling Guard
- » Gauges and Cutouts Board
- » A Set of Special Tools, Gaskets and Oil Filter Kit
- » Tubing and Ferrule
- » 2 Nos. Stop Valves for oil return line
- » 1 No. Y type Strainer for oil return line
- » Refrigerant Piping from Compressor to Oil Separator
- » Oil Piping from Oil Separator to Compressor
- » Piping for Capacity Control & Gauge Tubing
- » Swing Check Valve with Flanges & Bolts
- » Motor



## Product Range



KCX2



KCX3/  
KCX21



KCX4/  
KCX31



KCX6/KCX42/  
KCX51



KCX9/KCX72/  
KCX63



KCX12/KCX84/  
KCX93/KCX102

## Accessories



V-belt Drive



Base Frame for  
Compressor



Oil  
Separator



KRMS for  
Compressor



Gauge/Cutout  
Board assembly



Crankcase  
Heater



Shut-off  
Valves

## Kirloskar Genuine Spares and Kits



Crank Shaft  
Bearing Kit



Shaft Seal Kit



Discharge Valve



Oil Pump Gear



O Ring Set



Piston Ring



Gasket Set



Filter Kit



Cylinder  
Maintenance Kit



Liner Assembly



Piston



Connecting Rod  
Assembly

## Technical Data for Single Stage Compressors

Compressor model		KCX2	KCX3	KCX4	KCX6	KCX9	KCX12
Cylinder arrangement	Nos	1xV	1 xW	2xV	2xW	3xW	4xW
No of cylinders	Nos	2	3	4	6	9	12
Cylinder Bore (mm)	mm	160	160	160	160	160	160
Piston Stroke (mm)	mm	110	110	110	110	110	110
Permissible speed	rpm	Belt drive from 400 to 1000 rpm in steps of 50					
Swept volume at 1000 rpm, (m <sup>3</sup> /hr)	m <sup>3</sup> /hr	265.4	398.1	530.8	796.2	1194.3	1592.4
Direction of rotation		Anti-clockwise looking from flywheel end					
Maximum discharge pressure	bar	21	21	21	21	21	21
Oil charge capacity	L	10.5	11.5	13.5	14.5	22	32
Bare compressor weight (Kg)	kg	490	565	702	940	1255	1590
Moment of inertia GD <sup>2</sup> of crank mechanism (w/o flywheel)	kg.m <sup>2</sup>	0.356	0.422	0.446	0.594	0.829	1.045

## Rating Chart for single Stage Compressors

Compressor Model	Refrigerant Evaporating Temp In °C	R22				NH3			
		Condensing Temperature				Condensing Temperature			
		35°C		40 °c		35°C		-40 °c	
	Qo kW	Pe kW	Qo kW	Pe kW	Qo kW	Pe kW	Qo kW	Pe kW	
KCX2	5	250.58	51	237.56	55.3	290	46.3	278.6	51.8
	0	208.6	48.7	197.09	52.7	236.9	45.1	226.6	49.8
	-5	171	46.3	161.3	49.8	190.8	43.1	181.5	47
	-10	139.77	43.6	130.81	46.6	151.2	40.4	142.8	43.3
	-15	111.98	40.6	104.19	43	117.2	36.8	109.8	38.7
	-20	88.14	37.1	81.28	38.7	88.3	32.3	-	-
KCX3	5	375.93	75.5	356.28	82	435	68.5	417.9	76.7
	0	312.91	72.1	295.58	78	355.3	66.6	340	73.8
	-5	257.56	68.4	242.44	73.7	286.3	63.7	272.3	69.6
	-10	20.65	64.4	196.28	69	226.9	59.6	214.2	63.9
	-15	168.02	59.9	156.4	63.5	175.8	54.2	164.7	57
	-20	132.21	54.7	121.98	57.1	132.4	47.4	-	-
KCX4	5	501.28	100	475.12	108.6	568.5	90.6	557.2	101.6
	0	417.21	95.5	394.19	103.4	473.8	88.2	453.4	97.7
	-5	343.49	90.6	323.26	97.7	381.7	84.3	363.1	92.1
	-10	279.53	85.2	261.74	91.3	302.4	78.8	285.6	84.6
	-15	224.07	79.2	208.49	84	234.5	71.5	219.5	75.3
	-20	176.4	72.2	162.67	75.4	176.5	62.5	-	-
KCX6	5	751.98	148.9	712.67	161.8	870.1	134.8	835.9	151.3
	0	625.81	142.1	591.28	154	710.8	131.1	680	145.4
	-5	515.23	134.8	485	145.4	572.7	125.3	544.8	137
	-10	419.3	126.7	392.67	135.8	453.7	117.1	428.4	125.8
	-15	336.16	117.7	312.79	124.9	351.7	106.2	329.3	111.9
	-20	264.53	107.2	244.04	112.1	264.8	92.7	-	-
KCX9	5	1127.91	222.3	1069.07	241.7	1305.2	201.2	1253.8	226
	0	938.72	212.1	886.98	229.9	1066.3	195.7	1020	217.1
	-5	772.91	201.1	727.44	217	859	186.9	817.2	204.5
	-10	629.07	189.1	589.07	202.7	680.6	174.6	642.7	187.6
	-15	504.19	175.5	469.19	186.3	527.7	158.3	494	166.8
	-20	396.86	159.8	366.16	167.1	397.2	138	-	-
KCX12	5	1503.95	295.7	1425.35	321.6	1740.3	267.6	1671.9	300.6
	0	1251.63	282.1	1182.56	305.8	1421.7	260.2	1360.1	288.8
	-5	1030.58	267.4	970	288.7	1145.3	248.5	1089.7	271.9
	-10	838.72	251.4	785.47	269.5	907.4	232.1	856.9	249.5
	-15	672.33	233.3	625.58	247.6	703.6	210.3	658.6	221.8
	-20	529.19	212.4	488.14	222	529.5	183.3	-	-

### Notes

1. Qo = Refrigeration effect (Cooling Capacity)
2. Pe = Power required at compressor shaft
3. Capacity is at 1000 rpm
4. Power Consumption and Capacities are proportional to the speed.
5. Capacity is at 5°C useful superheat for R22
6. Capacity is at 0°C non useful superheat gained in suction line for NH<sub>3</sub>
7. Interpolation of ratings is permissible.
8. For any condition outside the range given above please refer to us.

**Note: For ratings with R134a, R404a and R407C refrigerants, please contact Kirloskar Pneumatic**

Please contact Kirloskar Pneumatic for further assistance. For booster compressor ratings please contact Kirloskar Pneumatic.

35°C and 40°C condensing are shown being more frequently used. For condensing temperatures outside this range ask for the selection from Kirloskar Pneumatic by writing to [acr-compressors@kirloskar.com](mailto:acr-compressors@kirloskar.com)

### Note:

**We reserve the right to modify the specifications in accordance with improved designs. Although every effort has been made to maintain accuracy in the data given, the figures are in no way binding.**

# Technical Data for Two Stage Compressors

Compressor model		KCX21	KCX31	KCX42	KCX51	KCX63	KCX72	KCX84	KCX93	KCX102
Cylinder arrangement	Nos	1xW	2xV	2xW	2xW	3xW	3xW	4xW	4xW	4xW
No of cylinders	Nos	3	4	6	6	9	9	12	12	12
Cylinder Bore (mm)	mm	160	160	160	160	160	160	160	160	160
Piston Stroke (mm)	mm	110	110	110	110	110	110	110	110	110
Permissible speed	rpm	Belt drive from 400 to 1000 rpm in steps of 50								
Swept volume at 1000 rpm, (m <sup>3</sup> /hr)	m <sup>3</sup> /hr	265.4	398.1	530.8	663.5	796.2	928.9	1194.3	1061.6	1327
Direction of rotation		Anti-clockwise looking from flywheel end								
Maximum discharge pressure	bar	21	21	21	21	21	21	21	21	21
Oil charge capacity	L	11	12	14	14	21	21	32	32	32
Bare compressor weight (Kg)	kg	613	753	940	980	1255	1255	1590	1590	1590
Moment of inertia GD <sup>2</sup> of crank mechanism (w/o flywheel)	kg.m <sup>2</sup>	0.442	0.446	0.594	0.594	0.829	0.829	1.045	1.045	1.045

## Rating Chart for Two Stage compressors (injection interstage gas cooling - System C for NH3 and System B for R22)

Compressor Model	Refrigerant Evaporating Temp In °C	R22				NH3			
		Condensing Temperature				Condensing Temperature			
		35 °C		40 °C		35 °C		40 °C	
	Qo kW	Pe kW	Qo kW	Pe kW	Qo kW	Pe kW	Qo kW	Pe kW	
KCX21	-20	-	-	-	-	124.9	41.1	124	44.4
	-25	97.3	45.4	96	48.3	99.6	37.4	98.8	40.3
	-30	81.1	41.4	80	44.1	78.4	33.8	77.7	36.3
	-35	67	37.6	66	40.1	60.9	30.2	60.3	32.2
	-40	54.6	34.1	53.8	36.3	46.6	26.6	-	-
	-45	44	30.7	43.3	32.6	35.6	23.4	-	-
	-50	34.9	27.4	34.3	29	-	-	-	-
-55	27.3	24.1	26.7	25.4	-	-	-	-	
KCX31	-25	-	-	-	-	137.2	51.5	136	55
	-30	109	56.8	107.2	60	108.4	45.9	107.3	49.1
	-35	90.2	50.9	88.7	53.8	84.4	40.7	83.5	43.4
	-40	73.7	45.5	72.5	48.2	64.8	35.8	64	38.1
	-45	59.5	40.6	58.5	43	48.9	31.1	47.5	33.4
	-50	47.4	36	46.5	38.1	-	-	-	-
-55	37.1	31.7	36.3	33.4	-	-	-	-	
KCX42	-20	-	-	-	-	249.8	80.2	247.9	86.8
	-25	194.5	88.6	191.9	94.5	199.1	72.8	197.5	78.6
	-30	162.3	80.6	160	86	156.8	65.5	155.5	70.5
	-35	133.9	73.1	132	78.1	121.9	58.3	120.7	62.4
	-40	109.3	66.1	107.6	70.5	93.3	51.1	91.4	54.2
	-45	88	59.3	86.6	63.2	-	-	-	-
	-50	69.8	52.7	68.6	55.9	-	-	-	-
-55	54.5	46.2	53.5	48.7	-	-	-	-	
KCX51	-35	-	-	-	-	122.7	60.6	121.2	64
	-40	103.4	67.9	101.3	70.09	94.5	52.5	93.3	55.4
	-45	83.7	59	82	61.7	71.6	45.2	70.5	47.6
	-50	66.8	51.2	65.3	53.6	53.2	38.5	52.3	40.4
	-55	52.4	44.3	51.2	46.3	38.7	32.3	-	-
KCX63	-20	-	-	-	-	374.6	119.2	371.9	129.1
	-25	291.8	131.9	287.9	140.7	298.7	108.1	296.3	116.8
	-30	243.4	119.9	240.1	128	235.3	97.2	233.2	104.7
	-35	200.9	108.7	198	116.1	182.8	86.4	181	92.5
	-40	163.9	98.1	161.4	104.7	139.9	75.5	142.4	84.8
	-45	132	87.9	129.8	93.7	-	-	-	-
	-50	104.8	78	102.9	82.9	-	-	-	-
-55	81.8	68.2	80.2	72	-	-	-	-	
KCX72	-30	-	-	-	-	243.6	101.7	241.1	108.5
	-35	200.5	113.2	197.1	119.4	190	89.5	187.9	95.4
	-40	164.1	100.2	161.2	105.8	146	78.3	144.2	83.2
	-45	132.6	88.5	130.1	93.6	110.3	67.7	108.70	71.5
	-50	105.6	77.9	103.5	82.3	81.7	57.5	85.8	64.6
	-55	82.8	68.1	81	71.8	-	-	-	-
KCX84	-20	-	-	-	-	499.5	158.3	495.8	171.5
	-25	389.1	175.2	383.8	186.9	398.3	143.5	395.1	155.1
	-30	324.6	159.1	320.1	170	313.7	129	310.9	138.9
	-35	267	144.2	264	154.1	243.7	114.5	241.3	122.7
	-40	218.5	130.1	215.2	138.9	186.5	100	186.5	109.5
	-45	176	116.5	173.1	124.3	-	-	-	-
	-50	139.7	103.4	137.2	109.8	-	-	-	-
-55	109.1	90.3	107	95.3	-	-	-	-	
KCX93	-25	-	-	-	-	411.7	150.1	408.1	160.8
	-30	326.9	166.2	321.7	175.8	325.1	133.4	322	142.9
	-35	270.5	148.4	263.8	157.2	253.3	117.9	250.6	126
	-40	221.2	132.2	217.5	140.2	194.4	103.2	192.1	109.9
	-45	178.6	117.2	175.4	124.6	146.7	89.1	148.6	98.2
	-50	142.1	103.7	139.4	109.9	-	-	-	-
-55	111.3	90.8	108.9	96	-	-	-	-	
KCX102	-35	-	-	-	-	245.4	119.2	242.5	125.8
	-40	206.7	133.7	202.7	139.7	189	102.9	186.5	108.6
	-45	167.4	116	164	121.3	143.2	88.3	141	93
	-50	133.6	100.4	130.7	105.1	106.4	75	104.6	78.6
	-55	104.9	86.6	102.4	90.6	77.3	62.6	-	-

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