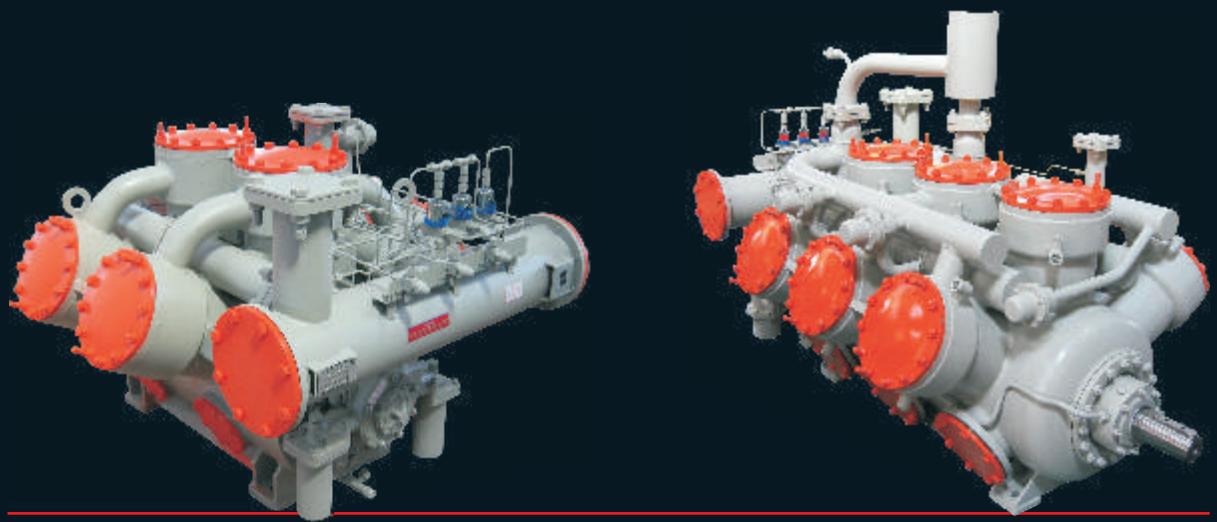
Enriching Lives

KIRLOSKAR
Heavy Duty Refrigeration Compressors

Compressor applications
Fisheries/Meat, Fruits/Vegetables, Milk/Ice cream, Beverage/Breweries, Ice Plant, Chemical/Pharma

At the heart of food & beverage processing, preservation and industrial refrigeration



About Us

Kirloskar Pneumatic Co Ltd (KPCL) is known for over 50 years (since 1958) as the leading manufacturer of a wide range of refrigeration compressors, engineered sets, packages and customised refrigeration systems in India.

KPCL is a part of the 'KIRLOSKAR Group' known as the largest engineering conglomerate in India in the field of refrigeration, gas & air-compression, fluid handling, prime movers and tansmission.

KPCL has a countrywide 'Sales & Service Network' for upkeep of every compressor it manufactures and every refrigeration package it builds.

The international network in the Middle East, South East Asia, Australia has resulted in customer satisfaction abroad through trouble free operation of KC compressors.

Over 28,000 refrigeration & air-conditioning compressors are operating round the clock in India & abroad. Our commitment to quality & reliability offers products to the customers that give the best value for money.

KPCL has its Corporate Office & manufacturing facility in Pune (just 3 hours drive from India's Business Capital - Bombay)

KPCL has developed the required infrastructure to support all its manufacturing processes. We have an in-house foundry, sophisticated testing labs, CNC machining centres, stress relieving furnaces and testing facilities.

With decades of experience and reliable performance of over 28,000 compressors world-wide, we have earned the trust of many customers. We are now leading amongst the leaders in the manufacture of reciprocating open type refrigeration compressors.

We are proud to be associated with multinationals like Pepsi, Coca-Cola, Unilever, Nestle, Reliance, UOP-Inter Americana, Lurgi, UHDE, Linde, Oil & Natural Gas Commission, National Thermal Power Stations and many more.

No wonder KPCL is a full-fledged member of International Institute of Ammonia Refrigeration (IIAR).


Manufacturing Facility, Hadapsar


Manufacturing Facility, Saswad


Machining Facility


Metrology Lab

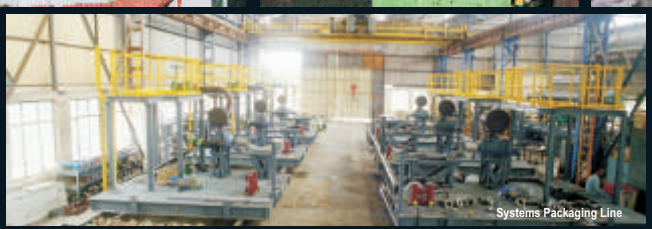

Machining Centres


CNC Machines


Heat Treatment

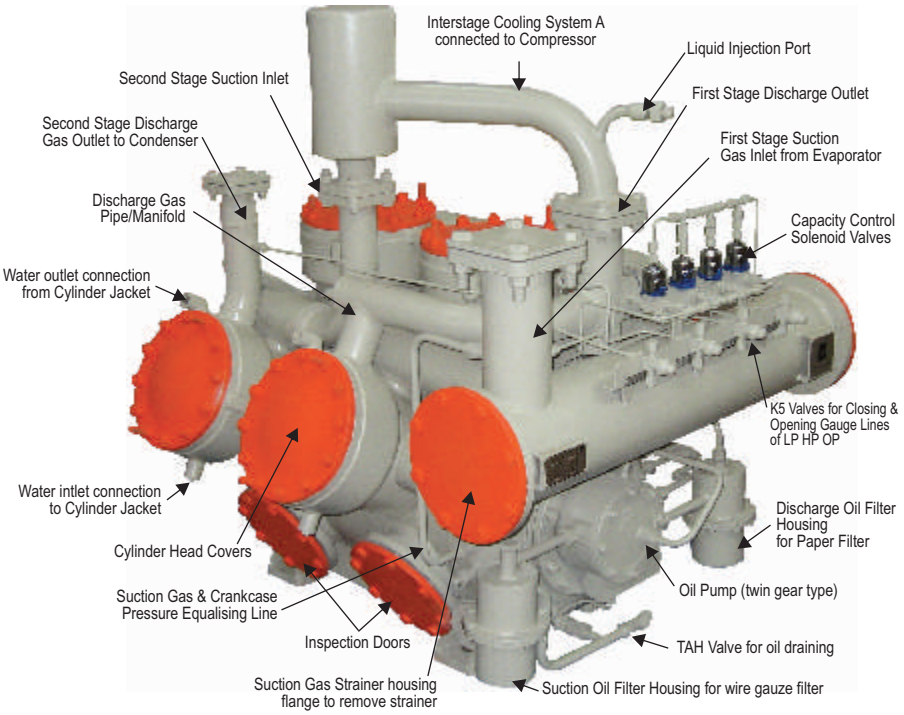

Computerised Co-ordinate Measuring Machine


In-house Foundry


Systems Packaging Line


Systems Testing Line

KC I & KC II Stage Compressor



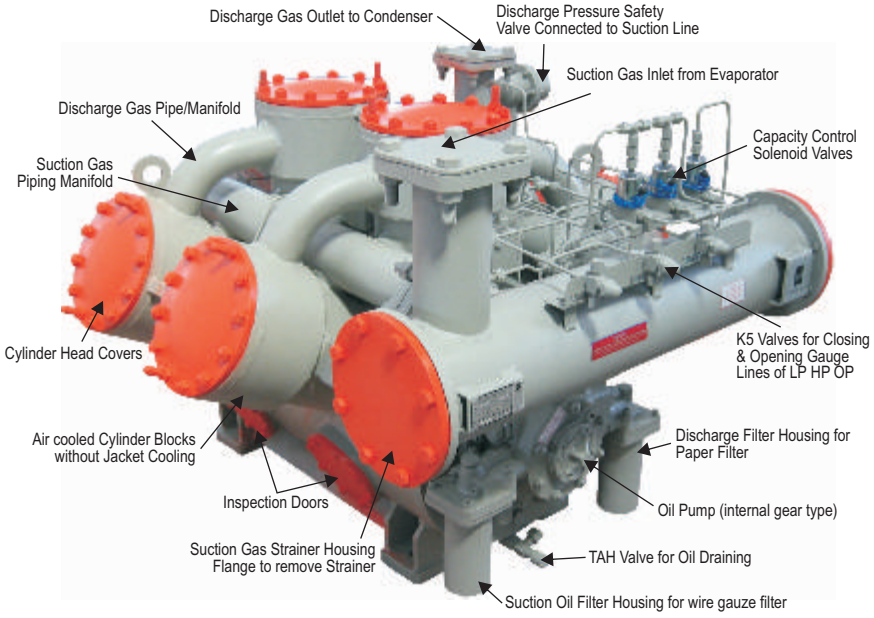
Kirloskar KC/KCX Series Compressors

KC/KCX reciprocating compressors are:

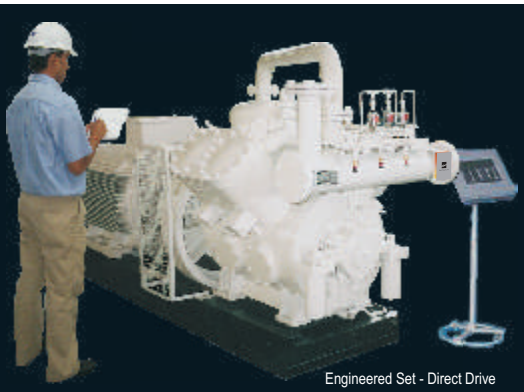
- Available in single stage as well as two stage versions
- Most suitable for industrial refrigeration and low temperature applications.
- Designed to operate with Ammonia, R22 & other HFC refrigerants.
- Ideally suitable for continuous duty, process refrigeration liquefaction plants, ice plants, cold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

KCX series compressors are available in air cooled version

KCX I Stage Compressor



Engineered Set -Belt Drive



Engineered Set - Direct Drive

Accessories

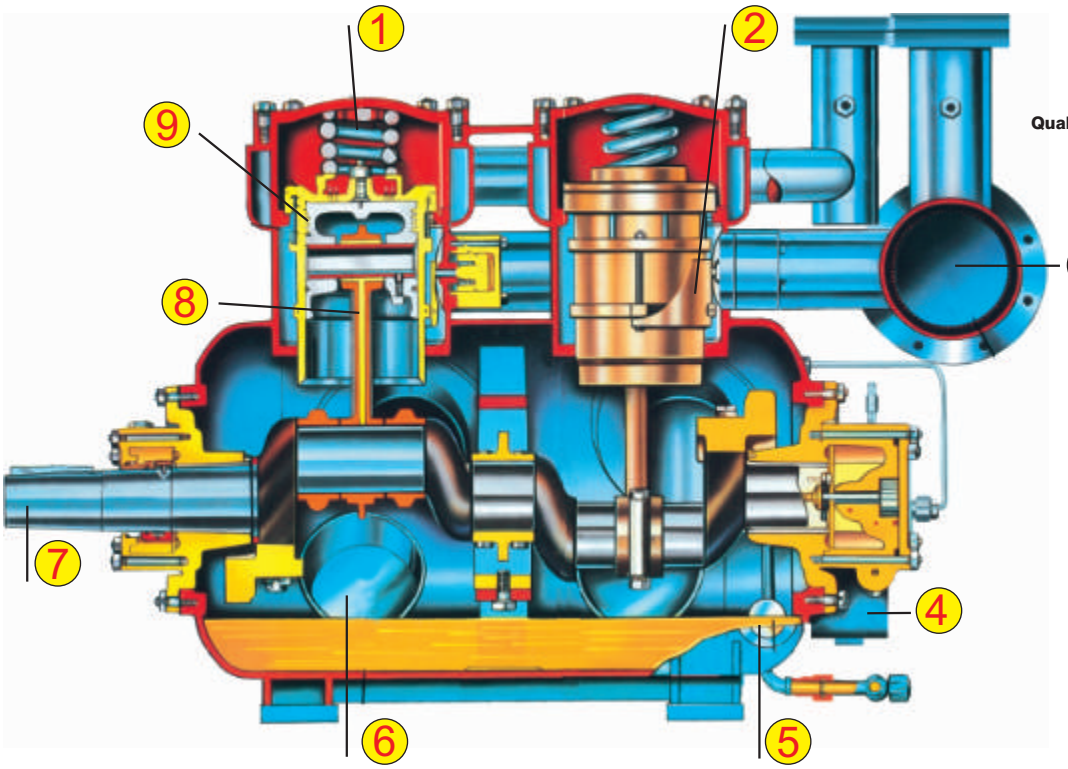
V-belt Drive | Base Frame for Compressor | Oil Separator | Shut-off Valves | Gauge/Cutout Board Assembly | Crankcase Heater

Product Range

KC 2 | KCX2 | KC 3 KC 21 | KCX3 | KC 4 KC 31 | KCX4 | KC 6 KC 51 KC 42 | KCX6 | KC 9, KC 72, KC 63 | KC 12, KC 102, KC 93, KC 84

Take a good look inside the compressor

KC Series



Safety 1
is ensured by bult-in arrangement of buffer spring which protects compressor from incidental liquid hammer.

Quality adaptable to varying operating conditions 2
Each cylinder is equipped with a hydraulically operated valve lifting mechanism giving absolutely reliable capacity control and 100% unloaded starting.

Easy cleaning 3
of the suction gas strainer is another example of easy maintenance philosophy behind KC series compressors. Inside gauze strainer element can be easily removed.

Trouble-free long running life 4
due to highly effective oil purification by two filters.

Extra safety 5
is ensured by built-in sight glass, making oil return flow visible.

Quick maintenance 6
Parts subjected to wear are easily accessible through large service doors with minimum special tools.

Quick operation 7
is guaranteed by the use of dynamically balanced crankshaft, resulting in smooth, vibration-free running.

Easy maintenance 8
as piston/connecting rod assembly can be removed without removing the cylinder liner.

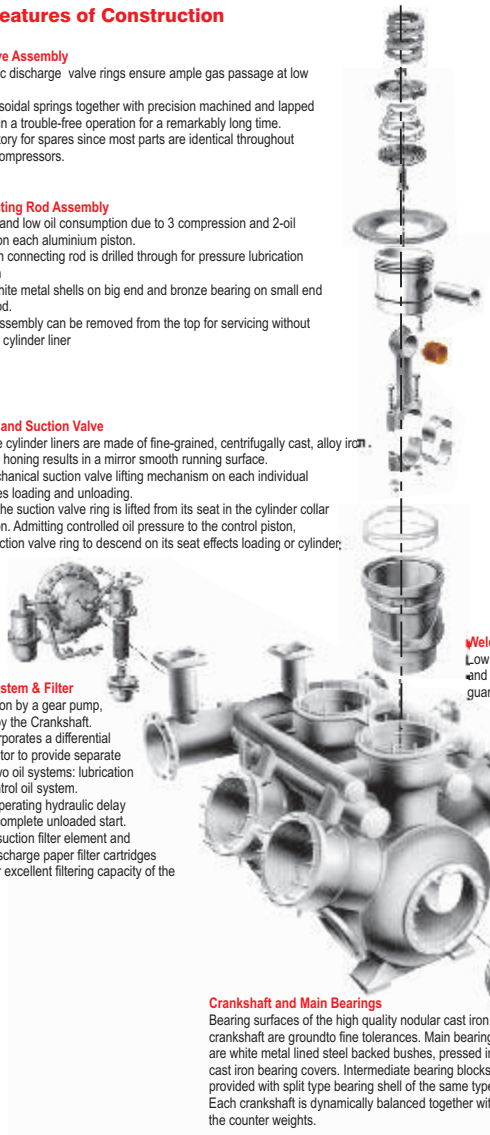
Minimum oil consumption 9
is ensured by providing three compression rings & two oil scraper rings per piston - thus minimising oil through discharge gas line

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 KC-series compressors.

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

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;



Lubrication System & Filter
Forced lubrication by a gear pump, driven directly by the Crankshaft.
The Pump incorporates a differential pressure regulator to provide separate pressures for two oil systems: lubrication system and control oil system.
Automatically operating hydraulic delay valve ensures complete unloaded start.
A metal gauze suction filter element and a throwaway discharge paper filter cartridges are provided for excellent filtering capacity of the lubricating oil

Welded Steel Crankcase
Low in weight, Rapid heat dissipation, Gas tight and impact proof Smooth internal surfaces guarantee the good oil condition.

Crankshaft and Main Bearings
Bearing surfaces of the high quality nodular cast iron crankshaft are groundto 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.

Kirloskar Genuine Spares and User Friendly Spares Kits in Blue preprinted Cartons & Pouches with 3D Hologram

Kirloskar Genuine Spares with 3D hologram.

Take a good look inside the compressor

KCX Series

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of the suction gas strainer is another example of easy maintenance philosophy behind KC series compressors. Inside gauze strainer element can be easily removed.

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due to highly effective oil purification by two filters.

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Parts subjected to wear are easily accessible through large service doors with minimum special tools.

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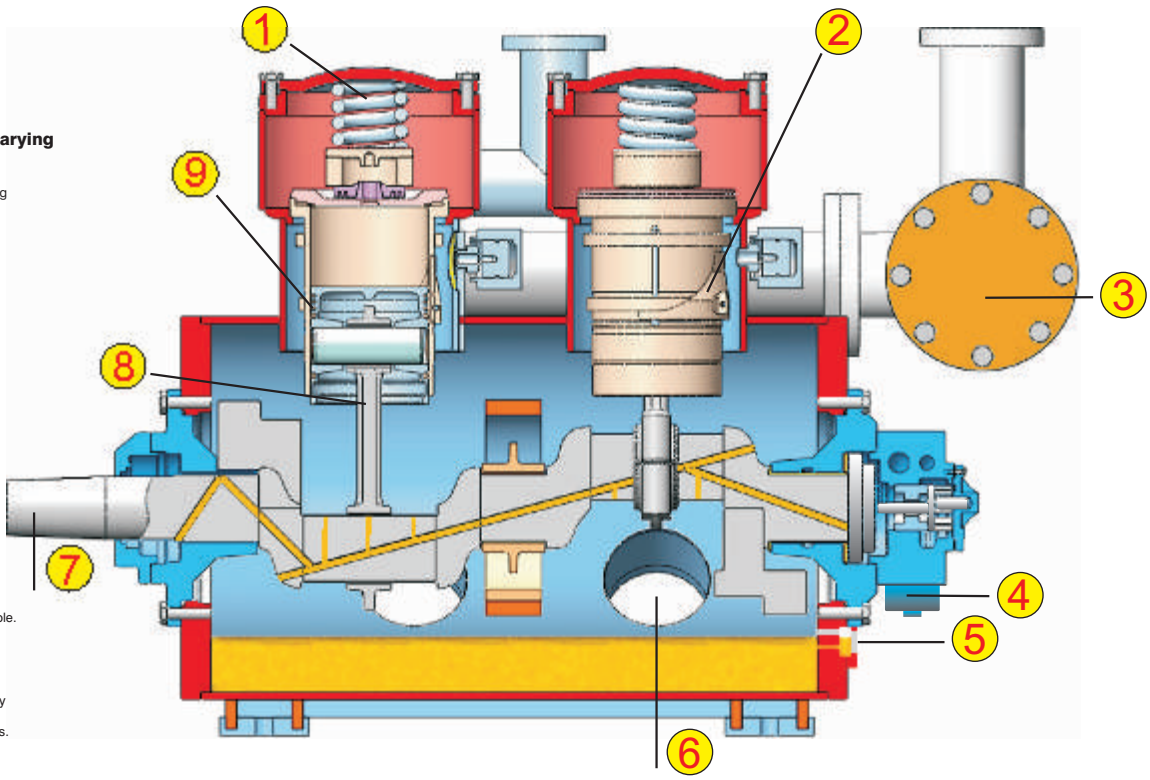

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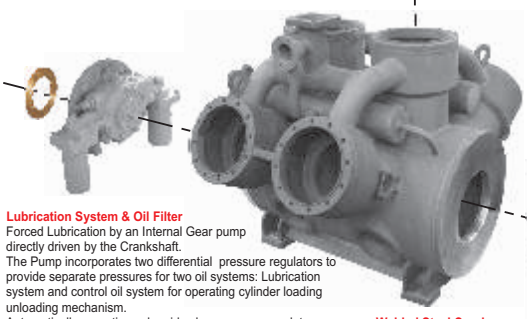

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Each crankshaft is dynamically balanced together with the counter weights.

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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.

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Gas tight and impact proof
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Kirloskar Genuine Spares and User Friendly Spares Kits in Blue preprinted Cartons & Pouches with 3D Hologram

Technical Data for Single Stage Compressors

Compressor Model		KC2/KCX2	KC3/KCX3	KC4/KCX4	KC6/KCX6	KC9	KC12
Cylinder Arrangement		1XV	1XW	2XV	2XW	3XW	4XW
Number of Cylinders		2	3	4	6	9	12
Cylinder Bore	mm	160	160	160	160	160	160
Piston Stroke	mm	110	110	110	110	110	110
Permissible Speed		Belt Drive from 400 to 1000 rpm in steps of 50					
Swept Volume at 1000 rpm	m^3/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	2 1	21	2 1
Oil Charge Capacity	L	9	10	12	13	20	32
Cooling Water Flow for each Cylinder Jacket (for KC series only)		8 LPM/Cyl at water inlet temp. 30°C., 15 LPM/Cyl at water inlet temp. 40°C.					
Weight of Compressor (Without Flywheel)	kg	435/445	535/545	665/675	900/910	1245	1585
Moment of Inertia GD^2 of crank mechanism	$kg.m^2$	0.356	0.422	0.446	0.594	0.829	1.045
Ice (block) Making Capacity* with Ammonia (Tonnes/day)	TPD	19.5	29.3	39.0	58.5	87.8	117.1
Power Consumption	kW	40.5	59.4	78.5	116.2	172.9	229.5

*At -15°C/+40°C, 0°C Subcooling, 0°C Superheating and 1000 rpm. Make up temperature at 24°C maximum.

Rating Chart for Single Stage Compressors

Compressor Model	Refrigerant	R-22				NH3			
	Evaporating Temp.	Condensing Temperature				Condensing Temperature			
		35°C		40°C		35°C		40°C	
	in °C	Qo kW	Pe kW	Qo kW	Pe kW	Qo kW	Pe kW	Qo kW	Pe kW
KC2/KCX2	5	250.58	51	237.56	55.3	283.6	46.3	271.86	51.8
	0	208.6	48.7	197.09	52.7	230.81	45.1	220.81	49.8
	-5	171	46.3	161.3	49.8	186.4	43.1	177.33	47
	-10	139.77	43.6	130.81	46.6	147.67	40.4	139.42	43.3
	-15	111.98	40.6	104.19	43	114.53	36.8	105.1	38.6
	-20	88.14	37.1	81.28	38.7	89.5	31.8	--	--
KC3/KCX3	5	375.93	75.5	356.28	82	424.53	68.5	407.79	76.7
	0	312.91	72.1	295.58	78	346.28	66.6	331.28	73.8
	-5	257.56	68.4	242.44	73.7	279.53	63.7	265.93	69.6
	-10	209.65	64.4	196.28	69	221.51	59.6	209.19	63.9
	-15	168.02	59.9	156.4	63.5	171.74	54.2	158.5	54.7
	-20	132.21	54.7	121.98	57.1	132.03	47.5	--	--
KC4/KCX4	5	501.28	100	475.12	108.6	566.05	90.6	543.72	101.6
	0	417.21	95.5	394.19	103.4	461.74	88.2	441.74	97.7
	-5	343.49	90.6	323.26	97.7	372.79	84.3	354.65	92.1
	-10	279.53	85.2	261.74	91.3	295.35	78.8	278.84	84.6
	-15	224.07	79.2	208.49	84	229.07	71.5	210.7	75
	-20	176.4	72.2	162.67	75.4	177.1	62.1	--	--
KC6/KCX6	5	751.98	148.9	712.67	161.8	849.07	134.8	815.7	151.3
	0	625.81	142.1	591.28	154	692.67	131.1	662.67	145.4
	-5	515.23	134.8	485	145.4	559.19	125.3	531.98	137
	-10	419.3	126.7	392.67	135.8	443.02	117.1	418.37	125.8
	-15	336.16	117.7	312.79	124.9	343.6	106.2	316.6	111.5
	-20	264.53	107.2	244.04	112.1	265.4	92.3	--	--
KC9	5	1127.91	222.3	1069.07	241.7	1273.6	201.2	1223.6	226
	0	938.72	212.1	886.98	229.9	1039.07	195.7	993.95	217.1
	-5	772.91	201.1	727.44	217	838.84	186.9	798.02	204.5
	-10	629.07	189.1	589.07	202.7	664.65	174.6	627.56	187.6
	-15	504.19	175.5	469.19	186.3	515.35	158.3	474.3	165.8
	-20	396.86	159.8	366.16	167.1	396.9	137.2	--	--
KC12	5	1503.95	295.7	1425.35	321.6	1698.26	267.6	1631.4	300.6
	0	1251.63	282.1	1182.56	305.8	1385.35	260.2	1325.35	288.8
	-5	1030.58	267.4	970	288.7	1118.37	248.5	1063.95	271.9
	-10	838.72	251.4	785.47	269.5	886.16	232.1	836.74	249.5
	-15	672.33	233.3	625.58	247.6	687.21	210.3	633.3	221.2
	-20	529.19	212.4	488.14	222	529.7	182.1	–	–

Technical Data for Two Stage Compressors

Compressor Model		KC21	KC31	KC42	KC51	KC63	KC72	KC93	KC102
Cylinder Arrangement		1XW	2XV	2XW	2XW	3XW	3XW	4XW	4XW
Number of Cylinders - LP/HP		2/1	3/1	4/2	5/1	6/3	7/2	9/3	10/2
Cylinder Bore- LP & HP	mm	160	160	160	160	160	160	160	160
Piston Stroke LP & HP	mm	110	110	110	110	110	110	110	110
Permissible Speed		Belt Drive from 400 to 1000 rpm in steps of 50							
Swept Volume (LP CYL) at 1000 rpm	m^3/hr	265.4	398.1	530.8	663.5	796.2	928.9	1194.3	1327.0
Direction of Rotation		Anti-Clockwise looking from flywheel end							
Maximum Discharge Pressure	bar	21	21	21	21	21	2 1	21	2 1
Oil Charge Capacity	L	1 0	1 2	1 3	1 3	20	20	32	32
Cooling Water Flow for each Cylinder Jacket		8 LPM/Cyl at water inlet temp. 30°C & 15 LPM Cyl. at water inlet temp. 40°C.							
Weight of Compressor (Without Flywheel)	kg	535	665	900	900	1245	1245	1585'	1585
Moment of Inertia GD^2 of Crank mechanism	$kg.m^2$	0.422	0.446	0.594	0.594	0.829	0.829	1.045	1.045

Rating Chart for Two Stage Compressors (injection interstage gas cooling - System C)

Compressor Model	Refrigerant	R-22				NH3			
	Evaporating Temp. in °C	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
KC21	-20	–	–	–	–	122.3	41.4	121.4	44.4
	-25	97.3	45.4	96	48.3	97.5	37.4	96.8	40.3
	-30	81.1	41.4	80	44.1	76.8	33.8	76.1	36.3
	-35	67	37.6	66	40.1	59.7	30.2	59.1	32.2
	-40	54.6	34.1	53.8	36.3	45.7	26.6	45.4	27.8
	-45	44	30.7	43.3	32.6	34.3	23.4	–	–
	-50	34.9	27.4	34.3	29	–	–	–	–
	-55	27.3	24.1	26.7	25.4	–	–	–	–
	-60	20.9	20.8	20.4	21.7	–	–	–	–
KC31	-25	–	–	–	–	134.5	51.5	133.8	55
	-30	109	56.8	107.2	60	106.2	45.9	105.2	49.1
	-35	90.2	50.9	88.7	53.8	82.7	40.7	81.9	43.4
	-40	73.7	45.5	72.5	48.2	63.5	35.8	62.7	38.1
	-45	59.5	40.6	58.5	43	47.9	31.1	46.4	33.4
	-50	47.4	36	46.5	38.1	35	26.5	–	–
	-55	37.1	31.7	36.3	33.4	–	–	–	–
	-60	28.5	27.6	27.8	28.9	–	–	–	–
KC42	-20	–	–	–	–	244.6	80.2	242.8	86.8
	-25	194.5	88.6	191.9	94.5	195.1	72.8	193.5	78.6
	-30	162.3	80.6	160	86	153.6	65.5	152.3	70.5
	-35	133.9	73.1	132	78.1	119.3	58.3	118.2	62.4
	-40	109.3	66.1	107.6	70.5	91.3	51.1	90.2	54.2
	-45	88	59.3	86.6	63.2	68.6	43.7	–	–
	-50	69.8	52.7	68.6	55.9	–	–	–	–
	-55	54.5	46.2	53.5	48.7	–	–	–	–
	-60	41.8	39.5	40.9	41.3	--	--	--	--
KC51	-35					120.3	60.6	118.9	64
	-40	103.4	67.9	101.3	70.09	92.7	52.5	91.5	55.4
	-45	83.7	59	82	61.7	70.2	45.2	69.1	47.6
	-50	66.8	51.2	65.3	53.6	52.1	38.5	51.2	40.4
	-55	52.4	44.3	51.2	46.3	37.9	32.3	37.3	33.6
	-60	40.4	38.1	39.4	39.8	27.3	26.6	--	--
KC63	-20	–	–	–	–	367	119.2	364.2	129.1
	-25	291.8	131.9	287.9	140.7	292.6	108.1	290.3	116.8
	-30	243.4	119.9	240.1	128	230.4	97.2	228.4	104.7
	-35	200.9	108.7	198	116.1	179	86.4	177.3	92.5
	-40	163.9	98.1	161.4	104.7	137	75.5	135.8	79.9
	-45	132	87.9	129.8	93.7	103	64.2	–	–
	-50	104.8	78	102.9	82.9	–	–	–	–
	-55	81.8	68.2	80.2	72	–	–	–	–
	-60	62.7	58.2	61.3	60.9	–	–	–	–
KC72	-30	–	–	–	–	238.7	101.7	236.4	108.5
	-35	200.5	113.2	197.1	119.4	186.2	89.5	184.2	95.4
	-40	164.1	100.2	161.2	105.8	143	78.3	141.3	83.2
	-45	132.6	88.5	130.1	93.6	108.1	67.7	106.5	71.5
	-50	105.6	77.9	103.5	82.3	80.1	57.5	78.6	59.9
	-55	82.8	68.1	81	71.8	57.2	47.7	–	–
	-60	63.6	58.8	62.1	61.7	–	–	–	–
KC84	-20	–	–	–	–	489.3	158.3	485.6	171.5
	-25	389.1	175.2	383.8	186.9	390.1	143.5	387	155.1
	-30	324.6	159.1	320.1	170	307.2	129	304.5	138.9
	-35	267.9	144.2	264	154.1	238.7	114.5	236.4	122.7
	-40	218.5	130.1	215.2	138.9	182.7	100	181	106.3
	-45	176	116.5	173.1	124.3	137.3	85.8	–	–
	-50	139.7	103.4	137.2	109.8	–	–	–	–
	-55	109.1	90.3	107	95.3	–	–	–	–
	-60	83.6	76.9	81.7	80.5	–	–	–	–
KC93	-25	–	–	–	–	403.5	150.1	399.9	160.8
	-30	326.9	166.2	321.7	175.8	318.6	133.4	315.6	142.9
	-35	270.5	148.4	263.8	157.2	248.2	117.9	245.6	126
	-40	221.2	132.2	217.5	140.2	190.5	103.2	188.2	109.9
	-45	178.6	117.2	175.4	124.6	143.8	89.1	141.7	94.4
	-50	142.1	103.7	139.4	109.9	106.5	75.6	–	–
	-55	111.3	90.8	108.9	96	–	–	–	–
	-60	85.4	78.4	83.4	82.4	–	–	–	–
KC102	-35	–	–	–	–	240.6	119.2	237.8	125.8
	-40	206.7	133.7	202.7	139.7	185.3	102.9	182.9	108.6
	-45	167.4	116	164	121.3	140.4	88.3	138.3	93
	-50	133.6	100.4	130.7	105.1	104.3	75	102.5	78.6
	-55	104.9	86.6	102.4	90.6	75.8	62.6	74	65
	-60	80.8	74.2	78.7	77.4	54.1	50.7	–	–

Notes:

1.Qo = Refrigeration Effect (Cooling Capacity) in kW/hr
2. Pe = Power required at compressor shaft in kW
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 R-22
6. Capacity is at 5°C non useful superheat gained in suction line for NH_3
7. Interpolation of ratings is permissible.
8. For any condition outside the range given above please refer to us

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.

Extrapolation for the ratings for further 5°C possible, however care is to be taken to ensure that discharge gas temperature does not exceed above 140°C. Please contact KPCL for further assistance. For booster compressor ratings please contact KPCL.

Commitment to our planet earth

There is widespread anxiety today concerning damage to the environment due to industrial and commercial activities. In particular, there is a global awareness about the destruction of the earth's protective shield i.e. the Ozone layer, caused by Chlorofluoro Carbons (CFCs) & similar other man-made gases, some of which are used as refrigerants in Refrigerating System.

However, at Kirloskar the future is indeed in safe hands since we ensure that environment friendly processes are adhered to from designing, manu-facturing to commissioning of a refrigeration system. Further, over the years, it has become our undeclared policy to promote Ammonia as refrigerant, which is the most eco-friendly refrigerant having zero global warming potential (GWP) and zero ozone depletion potential (ODP). We sometimes use R-22 which has a relatively low ODP (0.05) but we are committed to discontinue its use as specified by the Montreal Protocol.

At present, Ammonia is a preferable refrigerant since it is a natural substance. There is a downside though. Firstly Ammonia is toxic and secondly it is combustible. Due to its pungent smell, Ammonia is a self-warning refrigerant in case of minor leaks too. By wearing protective mask and gloves during maintenance work the possibility of health hazard can be totally eliminated. Further number of accidents on account of using Ammonia as refrigerant, as supported by official records, is very low.

At Kirloskar, we know that with our good design, careful selection of components, safety devices, proper installation and service procedures none of the above obstacles are insurmountable.

Thus, we always remain committed to a safer and healthier world for all of us.

The International Sales and Service network in Middle East, South East Asia, Australia, Europe, UK has resulted in Customer Satisfaction abroad through trouble free of KC/KCX operation.

WORLDWIDE ACCEPTANCE

ISO 9001:2000
ISO 14001:2004
OHSAS 18001:2007

Kirloskar Refrigeration

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