



# Refrigeration Screw Compressors and Chilling Units

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## Refrigeration Screw Compressors and Chilling Units

Colt screw compressors are state-of-the-art new generation twin-screw oil injected machines with open-drive specially designed & developed for refrigeration & Air-conditioning applications. Compression is obtained by intermeshing rotors of asymmetric profile, the rotors turn in an outward direction forcing the male & female flutes to un-mesh allowing the gas to enter the top of the machine. The gas will travel around the outside of the rotor until it reaches the bottom where compression actually occurs; the gas is released through the opening in the discharge port. The Rotor used in Colt compressors is of 4+6 SRM asymmetric profile.

### Lubricating System

- Oil separation system-efficient multi stage coalescing system is separate from the compressor. Serviceable without removing compressor, chiller, condenser. The oil carries over is maximum 5 PPM
- Integral built in oil heater maintains oil temperature for start up
- Rotary oil pumps ensure positive lubrication to bearings for start up

### Compressor

Open drive positive displacement oil injected, twin Rotary suitable for low evaporating temperature up to minus 50 degree centigrade.

### Casting

Made from graded gray iron, Stress relieved & machined on CNC Machines.

### Rotors

Machined from High tensile carbon steel, on imported Rotor cutting machines. dynamically balanced.

### Bearings

Generously oversized cylindrical roller bearings on the suction end for radial loads and double row taper roller bearings on discharge end for radial and axial thrust.

### Shaft Seal

Mechanical balanced, face type with Rotating Carbon Steel and oil Lubricated. The shaft seal is replaceable without removing the compressor or Motor.

### Capacity Control

A built-in slide below the rotors provides steeples capacity control down to 10%, of full load capacity, which results in considerable saving on power. The slides move to and fro by an inbuilt hydraulic cylinder. Automatic control adjusts the position of the slide to reduce/increase the capacity of the compressor to match with the varying requirements.



### Oil Cooling

- Water Cooling of Lub. oil is standard with shell and tube type heat exchanger.
- Liquid Refrigerant Injection system available on demand.

### Choice of Refrigerant

Flexibility in meeting environment requirements, R22/R717 are the most commonly used refrigerants.

Suitable for other new generation Refrigerants like R-134a/R404a and other refrigerants also.



## Compressor/Motor drive Couplings

Spacer type two-piece flexible coupling with metallic elements allows for in place replacement of coupling & compressor seal.

## Drive Motor

Two pole, SPDP or TEFC 3 phase 50 cycles 415 volts class 'F' insulation foot mounted as per IS-325

## Economizer

These compressors also have a side port for Economizer or sub cooling Circuits Used for low & ultra-low temperature applications. This option allows for Increased capacity with a small increase in power input at these temperatures. This feature is only available in Screw compressors. Refer chart.

## Boosters

For low temperatures a combination of two screw compressors is used wherein the first compressor is known as booster compressor. The discharge of this compressor approximately at 25 psi, is intercooled & sent to the High stage compressor. The Boosters are good power savers & are widely used in tunnel freezers or Blast freezers.

## Controls

Easy to use microprocessor controls. Single function keypad with a large character backlit displays exactly the data you need. Algorithms that provide improved protection against motor overloading, high ampere draw, low suction pressure, high discharge pressure, freeze protect low oil psi & unsafe suction. The Microprocessor controller will keep the system running at its most optimum level. Electromechanical controls can be provided too.

## Colt 128 Screw Compressor Unit with oil separation & cooling system

### Ability to Handle Liquid

An important feature oil screw compressor is the ability to handle volume's of liquid without any damage to machine, matched neither by the reciprocating nor by centrifugal compressors



Dimensions of CSI Screw Compressor with Oil Separation System

MODEL	LENGTH	BREADTH	HEIGHT
CSI 102	1800	1000	1600
CSI 120	2300	1200	1800
CSI 163	2700	1400	2100

### Piping

Oversized suction & discharge stop & check valves. Suction strainer-60-mesh-ensures low pressure drop. Take - apart Thermal Expansion Valves, Solenoid valves & liquid line filter/driers allow ease of maintenance. All piping as per ASME B 31.5, Pressure tested, evacuated & charged with refrigerant.

### Evaporator & Condensor

- For R22- Shell & tube type with removable heads allow total maintenance. ASME Section VIII Div. I Construction. Tubes are Roll expanded in to tube sheets. Suitable for R-22, R-717 & other gases.
- Condenser: 3/4" OD Tubes are cleanable & removable, Integral fin design maximizes condensing performance.
- Evaporator: 1/2" to 3/4" tubes are used with turbulators for high efficiency. Choice of Shell, baffle, tubes, turbulators & headers material available to customer preference & design requirements.
- The condenser & Evaporators are mounted on the skid for compactness & saving of space.

### Typical Applications

Air conditioning, Heat pumps, Bulk drug plants, Pharmaceuticals and Chemicals, Petrochemicals and Fertilizers, Cold Storage, Ice Rinks, Cooling Plants, Water Chilling, Refrigeration Plants for Food Freezing, Marine Refrigeration, Milk Dairies.

The Chart below gives the capacity (TR) to input power (KW) required TR/KW at various evaporating temperatures for R-22 & R-717. (These machines are suitable up to minus 50° C evaporating temperature also contact the manufacturer for details.

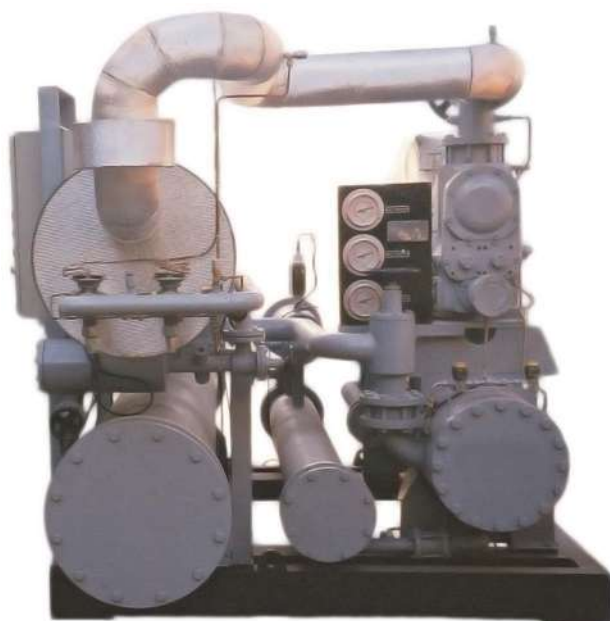
## GAS R-22

MODEL	Eva. T.°C	5	2	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
CSI-163 F	Cap.TR	278	253	231	200	168	137	110	90	70	57	44	33
	BKW	179	175	172	170	163	160	152	147	140	136	125	120
CSI-163 M	Cap.TR	182	168	149	134	106	88	76	59	47	37	29	22
	BKW	114	112	112	111	110	108	103	100	92	87	82	81
CSI-128 F	Cap.TR	130	118	110	92	77	63	51	42.5	33	26	20	15
	BKW	88	86.5	84	83	82	79	72	71	68	64	62	60
CSI-128 M	Cap.TR	82.4	77	71	59	48	40	33	26.5	21.3	16.8	12.2	9.2
	BKW	58	57.5	57	56.5	56	53	50	47	45	43	40	38
CSI-102 LF	Cap.TR	65	59	55	46	38.5	31.5	25.5	21	16.5	13	10	7.5
	BKW	45	43.5	42	41.5	41	39.5	36	35	34	32	31	30
CSI-102 LM	Cap.TR	41	38.5	35.5	29	24	20	16.5	13.2	10.5	8.4	6	4.6
	BKW	29	28.5	27.5	28	28	26.5	25	23.5	22.5	21	20	19

## GAS R-717

MODEL	Eva. T.°C	5	2	0	-5	-10	-15	-20	-25	-30	-35	-40
CSI-163 F	Capacity	299	280	258	221	173	142	115	93	72	57	42
	BKW	182	181	180	170	165	156	150	140	130	121	113
CSI-163 M	Capacity	199	179	167	137	114	93	74	59	47	36	28
	BKW	122	121	120	115	112	105	100	95	87	83	78
CSI-128 F	Capacity	139	124	117	96	80	63	51	40	33	24	18
	BKW	92	91	90	88	85	78	74	69	65	62	60
CSI-128 M	Capacity	90	82	77	61	50	41	32	25	20	15	11
	BKW	61	60	60	59	58	53	50	47	44	43	40
CSI-102 F	Capacity	70	62	59	48	40	31.5	25.5	20	16.5	12	9
	BKW	46	45.5	45	44	42.5	39	37	34.5	32.5	31	30
CSI-102 M	Capacity	45	41	38.5	30.5	25	20.5	16	12.5	10	7.5	5.5
	BKW	30.5	30	30	29.5	29	26.5	25	23.5	22	21.5	20

Above capacities of CSI screw compressors are at 35° condensing



Complete package units prewired, prepiped, pressure tested, run tested ready to install.

Custom fabrication of disassembled packages for easier assembly into place due to space constraints or easier rigging into place onboard vessel.

## GAS R-22

Ratings of CSI Screw compressors with economizer

MODEL	Eva. T. <sup>°C</sup>	-10	-15	-20	-25	-30	-35	-40	-45
<b>CSI-163 F</b>	<b>Capacity</b>	<b>181</b>	<b>153.5</b>	<b>126.5</b>	<b>106</b>	<b>85.4</b>	<b>71.25</b>	<b>57.2</b>	<b>43.8</b>
	BKW	167	166	160	156	150.5	147.5	136.9	132
<b>CSI-163 M</b>	<b>Capacity</b>	<b>114.5</b>	<b>98.5</b>	<b>87.4</b>	<b>69.6</b>	<b>57.3</b>	<b>46.25</b>	<b>37.75</b>	<b>29.5</b>
	BKW	112.6	112	108.7	106	99	94.4	89.8	89
<b>CSI-128 F</b>	<b>Capacity</b>	<b>83</b>	<b>70.5</b>	<b>58.6</b>	<b>50</b>	<b>40.2</b>	<b>32.5</b>	<b>26</b>	<b>20</b>
	BKW	84	82	76	75.2	73	69.4	67.9	66
<b>CSI-128 M</b>	<b>Capacity</b>	<b>52</b>	<b>45</b>	<b>38</b>	<b>31.3</b>	<b>26</b>	<b>21</b>	<b>16</b>	<b>12.3</b>
	BKW	57.5	55	53	50	48.4	48.7	44	42
<b>CSI-102 F</b>	<b>Capacity</b>	<b>41.5</b>	<b>35</b>	<b>29</b>	<b>24.8</b>	<b>20</b>	<b>16.25</b>	<b>13</b>	<b>10</b>
	BKW	42	41	38	37	36.5	35	34	33
<b>CSI-102 M</b>	<b>Capacity</b>	<b>26</b>	<b>22.4</b>	<b>19</b>	<b>15.6</b>	<b>12.8</b>	<b>10.5</b>	<b>7.8</b>	<b>6.2</b>
	BKW	28.7	27.5	26.5	25	24	22.8	22	21



## GAS R-717

MODEL	Eva. T.°C	-10	-15	-20	-25	-30	-35	-40
<b>CSI-163 F</b>	<b>Capacity</b>	<b>187</b>	<b>159</b>	<b>132</b>	<b>110</b>	<b>88</b>	<b>71.25</b>	<b>54.6</b>
	BKW	169	162	158	148.5	139.8	131.3	124
<b>CSI-163 M</b>	<b>Capacity</b>	<b>123</b>	<b>104</b>	<b>85</b>	<b>70</b>	<b>57.3</b>	<b>45</b>	<b>36.4</b>
	BKW	114.7	109	105.5	101	93.5	90	85.4
<b>CSI-128 F</b>	<b>Capacity</b>	<b>86.4</b>	<b>70.5</b>	<b>58.6</b>	<b>47.2</b>	<b>40.2</b>	<b>30</b>	<b>23.5</b>
	BKW	87	81	78	73	69.9	67.3	65.7
<b>CSI-128 M</b>	<b>Capacity</b>	<b>54</b>	<b>46</b>	<b>37</b>	<b>29.5</b>	<b>24.4</b>	<b>18.75</b>	<b>14.3</b>
	BKW	59.4	55	52.5	50	47.3	46.65	43.8
<b>CSI-102 LF</b>	<b>Capacity</b>	<b>43</b>	<b>35</b>	<b>29.3</b>	<b>23.6</b>	<b>20</b>	<b>15</b>	<b>11.7</b>
	BKW	43.6	40.5	39	36.5	35	33.6	32.9
<b>CSI-102 M</b>	<b>Capacity</b>	<b>27</b>	<b>23</b>	<b>18.4</b>	<b>14.8</b>	<b>12.2</b>	<b>9.4</b>	<b>7.15</b>
	BKW	29.7	27.5	26.4	25	23.6	23.3	22

Above capacities of Economised CSI screw compressors are at condensing 35°

## SCREW CHILLER PACKAGE FOR AIR-CONDITIONING

Colt Screw chiller packages are pre-wired, pre-piped, pressure tested, run tested ready to install. The capacities of the various models are indicated in the chart below. These units come with Microprocessor Controls which are Easy to use. Single function keypad with a large character backlit displays exactly the data you need. Algorithms that provide improved protection against motor overloading, high ampere draw, low suction pressure, high discharge pressure, freeze protect low oil psi & unsafe suction. The Microprocessor controller will keep the system running at its most optimum level. Dynamic adjustments are made based on low suction psi, high motor amps, high discharge psi, high oil temperature, low ambient, high discharge temperature etc. An extremely fast WINDOWS based support system provides complete status on all operations both locally & remotely. History, static and dynamic graphing is standard to aid in commissioning, trouble shooting and evolution. The chart below gives the capacity of the CSI Screw chillers used for air conditioning on R-22. The water Temperature into the chiller has been taken as 120 C & out from the chiller at 80 C. The Colt Screw compressors can also use R-134 a, R-717 & other New generation gases, the capacity & power consumption will change, Refer Colt for data on other gases.

MODEL	163F	163M	128F	128M	102F	102M
<b>Tonnage</b>	<b>278</b>	<b>182</b>	<b>130</b>	<b>82</b>	<b>65</b>	<b>41</b>
<b>BKW</b>	<b>179</b>	<b>114</b>	<b>88</b>	<b>58</b>	<b>45</b>	<b>29</b>

Manufactured by:



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