

FRIGO SCREW HR: Packaged water cooled liquid chillers for indoor installation, equipped with screw compressors, shell and tube heat exchangers and total heat recovery system (HR)

Cooling Capacity: 393 ÷ 1506 kW

Heating Capacity: 440 ÷ 1756 kW



FRIGO SCREW HR

rcgroupairconditioning



MAIN FEATURES

- Water cooled liquid chiller.
- 14 models available, for a wide selection opportunity.
- Average step of 80kW.
- EER up to 4,99.
- Twin-screw compressors.
- Double refrigerant circuit.
- R134a Refrigerant charge.
- Electronic expansion valve.
- Shell and tube heat exchangers.
- Total heat recovery system.
- Suitable for indoor installation.

MAIN BENEFITS

- High EER.
- Availability of kit for the reduction of the noise.
- Easily of maintenance.

INDOOR INSTALLATION

The machines are designed for indoor installation.

ELECTRONIC EXPANSION VALVE

The electronic expansion valves are synonymous of a higher energy efficiency and stability of the system.

TOTAL HEAT RECOVERY SYSTEM

The condensers of the units are equipped with a double hydraulic circuit, the first circuit for the condensation of the refrigerant gas and the second for the total recovery of the condensing heat.

WORKING LIMITS IN COOLING MODE

Evaporator chilled water outlet temperature: $-11 \pm 15,5^{\circ}\text{C}$

Condenser outlet water temperature: $21 \pm 49^{\circ}\text{C}$

COMPONENTS

FRAMEWORK

- Base and self supporting frame in steel plate with protective surfaces treatment in compliance with UNI ISO 9227/ASTMB117 and ISO 7253, and painted with epoxy powders.
- Colour: RAL 9005

COMPRESSORS

- Twin screw semi-hermetic compressors with highly efficient screw profile and high peripheral speed, optimized for R134a refrigerant.
- Integrated discharge check valve.
- Flanged-on oil separator.
- Integrated overpressure valve.
- Replaceable cartridge type oil filter.
- Oil flow switch.
- Valves for oil filling and discharge.
- Sight glass
- Electronic protection device that includes:
 - Electric motor thermal protection via internal winding temperature sensors.
 - Phase sequence electronic relay
 - Sensor on refrigerant discharge for temperature monitoring,
- 2-pole 3-phase electric motor with Part-Winding starting for models 410 V2 / 460 V2 / 510 V2 / 540 V2 / 610 V2
- 2-pole 3-phase electric motor with Star / Delta starting for all other machines.
- Stepless capacity control, 50÷100% for each compressor.
- Crankcase heater.
- Terminal box with IP54 enclosure class.
- Rubber supports.

EVAPORATOR

- Shell and tube evaporator optimized for R134a refrigerant.
- Tubes with a helical rifled internal surface.
- Intermediate baffles positioned to ensure optimum speed of the fluid and low pressure drops.
- Single circuit on water side and independent circuits, one for each compressor, on refrigerant side.
- Shell, header, tube sheets, made of carbon steel, tubes in Cu.
- Anticondensate insulation made of polyurethane.
- Temperature sensors on water inlet and outlet.
- Hydraulic connection with grooved end complete with flexible joint and adapter pipe for solder connection.

CONDENSER

One condenser for each refrigerant circuit:

- Shell and tube condenser optimized for R134a refrigerant.
- Shell, header, tube sheets made of carbon steel, tubes in Cu.
- Hydraulic connection with grooved end complete with flexible joint and adapter pipe for solder connection.

TOTAL HEAT RECOVERY HEAT EXCHANGER

One heat exchanger for each refrigerant circuit:

- Shell and tube condenser optimized for R134a refrigerant.
- Shell, header, tube sheets made of carbon steel, tubes in Cu.
- Hydraulic connection with grooved end complete with flexible joint and adapter pipe for solder connection.

REFRIGERANT CIRCUIT

Components for each refrigerant circuit:

- Electronic expansion valve that allows high performance and system efficiency thanks to a timely and accurate response to changes in temperature and pressure.
- Sight glass.
- Filter dryer on liquid line.
- Service valves on liquid line.
- Service valves on gas discharge.
- Safety valve on low pressure side.
- Safety valve on high pressure side.
- Pressure transducers with indication, control and protection functions, on low and high refrigerant pressure and oil pressure.
- High pressure safety switch with manual reset.
- Refrigerant circuit with copper tubing with anticondensate insulation of the suction line.
- Plastic capillary hoses for pressure sensors connection.
- R134a refrigerant charge.

ELECTRICAL PANEL

In accordance with EN60204-1 norms, suitable for indoor installation, complete with:

- Main switch with door lock safety.
- Fuses for each compressors.
- Contactors for each compressors (2 contactors for Part-Winding start system – 3 contactors for Star / Delta start system).
- Compressor Part-Winding start system for model 410 V2 / 460 V2 / 510 V2 / 540 V2 / 610 V2
- Compressor Star / Delta start system for all other machines.
- Transformer for auxiliary circuit and microprocessor supply.
- Panel with machine controls.
- Power supply: 400/3/50.

CONTROL SYSTEM

- MP.COM microprocessor system with graphic display for control and monitor of operating and alarms status. The system includes:
 - Voltage free contact for remote general alarm.
 - Main components hour-meter.
 - Integrated "Data logger" function for the recording of events and alarms.
 - Nonvolatile "Flash" memory for data storage.
 - Menu with protection password.

OPTIONAL ACCESSORIES

FRIGO SCREW HR	410 V2	510 V2	540 V2	610 V2	700 V2	790 V2	940 V2	1050 V2	1110 V2	1140 V2	1310 V2	1460 V2	1610 V2
171 - Rubber antivibration holders (kit)	•	•	•	•	•	•	•	•	•	•	•	•	•
118 - Kit brine A (for glycol solution production up to -6°C)	•	•	•	•	•	•	•	•	•	•	•	•	•
119 - Kit brine B (for glycol solution production up to -12°C)	•	•	•	•	•	•	•	•	•	•	•	•	•
731 - Safety water flow switch	•	•	•	•	•	•	•	•	•	•	•	•	•
650 - Compressor thermal relay	•	•	•	•	•	•	•	•	•	•	•	•	•
605 - Compr. power factor capacitor - 0,9	•	•	•	•	•	•	•	•	•	•	•	•	•
550 - Stop valve on compressor suction line	•	•	•	•	•	•	•	•	•	•	•	•	•
780 - Noise absorption box	•	•	•	•	•	•	•	•	•	•	•	•	•
83 - Compressor operation indicator	•	•	•	•	•	•	•	•	•	•	•	•	•
85 - Demand limit	•	•	•	•	•	•	•	•	•	•	•	•	•
88 - Analog set point compensation	•	•	•	•	•	•	•	•	•	•	•	•	•
960 - Free contact enable plant pump	•	•	•	•	•	•	•	•	•	•	•	•	•
963 - Free contact enable source pump	•	•	•	•	•	•	•	•	•	•	•	•	•
1003 - Analogic flowmeter	•	•	•	•	•	•	•	•	•	•	•	•	•
1005 - Power supply analyzer	•	•	•	•	•	•	•	•	•	•	•	•	•
1009 - Multimeter kit	•	•	•	•	•	•	•	•	•	•	•	•	•
919 - Clock card	•	•	•	•	•	•	•	•	•	•	•	•	•
923 - RC-Com MBUS/JBUS Serial board	•	•	•	•	•	•	•	•	•	•	•	•	•
926 - LON Serial board	•	•	•	•	•	•	•	•	•	•	•	•	•
931 - BACnet Ethernet - SNMP - TCP/IP Serial board	•	•	•	•	•	•	•	•	•	•	•	•	•
932 - BACnet MS/TP Serial board	•	•	•	•	•	•	•	•	•	•	•	•	•
942 - Serial card for GSM Modem	•	•	•	•	•	•	•	•	•	•	•	•	•
943 - Data Logger	•	•	•	•	•	•	•	•	•	•	•	•	•
962 - Kit modem GSM	•	•	•	•	•	•	•	•	•	•	•	•	•
957 - Plantwatch without modem	•	•	•	•	•	•	•	•	•	•	•	•	•
930 - Remote graphic terminal kit	•	•	•	•	•	•	•	•	•	•	•	•	•
889 - Master plant SEQUENCER	•	•	•	•	•	•	•	•	•	•	•	•	•
RC CLOUD PLATFORM	•	•	•	•	•	•	•	•	•	•	•	•	•

• available accessory; - not available accessory

TECHNICAL DATA FRIGO SCREW HR

FRIGO SCREW HR		410 V2	510 V2	540 V2	610 V2	700 V2	790 V2	940 V2	1050 V2
Only Cooling (1)									
Cooling capacity	kW	393	492	550	602	656	740	880	974
Unit power input	kW	83,4	104,7	110,2	136,5	146,1	165,5	199,1	221,4
Evaporator water flow rate	m³/h	67,4	84,5	94,5	103,0	113,0	127,0	151,0	167,0
Evaporator pressure drop	kPa	6	14	19	21	14	12	17	22
Condenser water flow rate	m³/h	82,3	103,0	114,0	127,0	139,0	156,0	186,0	206,0
Condenser pressure drop	kPa	10	15	1	23	18	22	17	18
Cooling + Total Heat Recovery (2)									
Cooling capacity	kW	346	434	485	546	594	671	799	885
Heating capacity	kW	440	551	610	700	761	859	1025	1136
Heat recovery water flow rate	m³/h	76,5	95,7	106,0	122,0	132,0	149,0	178,0	197,0
Heat recovery pressure drop	kPa	8	13	2	13	18	19	12	12
Compressors									
Quantity	n.	2	2	2	2	2	2	2	2
Capacity control	%	25 ... 100%	25 ... 100%	25 ... 100%	25 ... 100%	25 ... 100%	25 ... 100%	25 ... 100%	25 ... 100%
Refrigerant		R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Total refrigerant charge (optional excluded)	kg	77,8	185,2	185,2	185,2	185,2	170,6	163,1	155,5
Gas circuits	n.	2	2	2	2	2	2	2	2
Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Max operating current (MOC)	A	211,8	274,8	268	313,2	359,6	426,8	481,8	545,2
Max unit operating current (FLA)	A	262,5	336,0	304,5	378,0	415,8	464,1	594,3	661,5
Unit starting current (LRA)	A	403,9	542,4	622,0	590,6	709,8	800,4	676,9	737,6
EER (1)	kW/kW	4,71	4,70	4,99	4,41	4,49	4,47	4,42	4,40
Sound power level [Lw] (3)	dB(A)	91,8	91,8	91,8	96,8	96,8	97,6	100,6	100,6
Average sound pressure level [Lp _m] (4)	dB(A)	74,0	74,0	74,0	79,0	79,0	79,0	82,0	82,0
Net weight	kg	3237	3498	3498	3590	3720	3967	4071	4835
Hydraulic connections									
Evaporator IN/OUT - OD (5)	Ø mm	168,3	168,3	168,3	168,3	219,1	219,1	219,1	219,1
Condenser IN/OUT - ISO 228/1	n x Ø	2"	2"	2"	2"	2"	3"	-	-
Condenser IN/OUT - OD (4)	Ø mm	-	-	-	-	-	-	114,3	114,3
Compressor soundproof box									
Sound power level [Lw] (3)	dB(A)	88,8	88,8	93,8	93,8	94,6	97,6	97,6	98,2
Average sound pressure level [Lp _m] (4)	dB(A)	71,0	71,0	76,0	76,0	76,8	79,0	79,0	79,6

1. Referred to chilled water temperature 12/7°C – 0% glycol solution; water temperature to the condenser 30/35°C – 0% glycol solution.
2. Referred to chilled water temperature 12/7°C – 0% glycol solution; water temperature heat recovery 40/45°C – 0% glycol solution; Fouling factor of the exchangers 0,043 m²K/kW.
3. Sound power level [Lw] according to ISO EN 9614 - 2
4. Average sound pressure level [Lp_m] 1m far according to ISO EN 3744.
5. Hydraulic connection with grooved end complete with flexible joint and adapter pipe for solder connection.

TECHNICAL DATA FRIGO SCREW HR

FRIGO SCREW HR		1110 V2	1140 V2	1310 V2	1460 V2	1610 V2
STANDARD	Only Cooling (1)					
	Cooling capacity	kW	1031	1073	1224	1365
	Unit power input	kW	232,2	240,0	273,2	302,7
	Evaporator water flow rate	m³/h	177,0	184,0	210,0	234,0
	Evaporator pressure drop	kPa	23	19	24	30
	Condenser water flow rate	m³/h	218,0	227,0	259,0	288,0
	Condenser pressure drop	kPa	23	20	16	17
	Cooling + Total Heat Recovery (2)					
	Cooling capacity	kW	937	974	1112	1241
	Heating capacity	kW	1200	1246	1422	1583
STANDARD	Heat recovery water flow rate	m³/h	209,0	217,0	247,0	275,0
	Heat recovery pressure drop	kPa	16	12	8	11
	Compressors		twin-screw	twin-screw	twin-screw	twin-screw
	Quantity	n.	2	2	2	2
	Capacity control	%	25 ... 100%	25 ... 100%	25 ... 100%	25 ... 100%
	Refrigerant		R134a	R134a	R134a	R134a
	Total refrigerant charge (optional excluded)	kg	155,5	144,5	215,6	210,6
	Gas circuits	n.	2	2	2	2
	Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50
	Max operating current (MOC)	A	545,2	633,4	688,4	776,0
OPT	Max unit operating current (FLA)	A	661,5	747,6	896,7	867,3
	Unit starting current (LRA)	A	737,6	902,7	994,2	1193,0
	EER (1)	kW/kW	4,44	4,47	4,48	4,51
	Sound power level [Lw] (3)	dB(A)	101,2	101,2	101,2	103,6
	Average sound pressure level [Lpm] (4)	dB(A)	82,0	82,0	82,0	84,0
	Net weight	kg	4949	5031	5549	6407
	Hydraulic connections					
	Evaporator IN/OUT - OD (5)	Ø mm	219,1	219,1	273,0	273,0
	Condenser IN/OUT - ISO 228/1	n x Ø	-	-	-	-
	Condenser IN/OUT - OD (4)	Ø mm	114,3	114,3	114,3	139,7
OPT	Compressor soundproof box					
	Sound power level [Lw] (3)	dB(A)	98,2	98,2	100,6	100,6
	Average sound pressure level [Lpm] (4)	dB(A)	79,0	79,0	81,4	81,0

1. Referred to chilled water temperature 12/7°C – 0% glycol solution; water temperature to the condenser 30/35°C – 0% glycol solution.
2. Referred to chilled water temperature 12/7°C – 0% glycol solution; water temperature heat recovery 40/45°C – 0% glycol solution; Fouling factor of the exchangers 0,043 m²K/kW.
3. Sound power level [Lw] according to ISO EN 9614 - 2
4. Average sound pressure level [Lpm] 1m far according to ISO EN 3744.
5. Hydraulic connection with grooved end complete with flexible joint and adapter pipe for solder connection.

DIMENSIONS (mm)

FRIGO SCREW HR	a	b	c
410 V2	3390	960	1670
510 V2	3390	960	1670
540 V2	3390	960	1670
610 V2	3390	960	1670
700 V2	3390	960	1670
790 V2	3600	1170	2150
940 V2	3600	1170	2150
1050 V2	3600	1170	2150
1110 V2	4200	1500	2150
1140 V2	4200	1500	2150
1310 V2	4200	1500	2150
1460 V2	4900	1500	2250
1610 V2	4900	1500	2250

