

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: **394 ÷ 1505 kW**
 Heating Capacity: **443 ÷ 1755 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 5,06.
- 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.
- Eurovent Certification.

INDOOR INSTALLATION

The machines are designed for indoor installation.

ELECTRONIC EXPANSION VALVE

The electronic expansion valves are synonymous of an 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: $-11 \div 15,5^{\circ}\text{C}$
 Condenser outlet water temperature: $21 \div 49^{\circ}\text{C}$

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.
- Threaded hydraulic connections or with grooved end arranged for flexible joint (the flexible joint and the adapter pipe are optional accessories).

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.
- Threaded hydraulic connections or with grooved end arranged for flexible joint (the flexible joint and the adapter pipe are optional accessories).

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.
- Threaded hydraulic connections or with grooved end arranged for flexible joint (the flexible joint and the adapter pipe are optional accessories).

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.

HYDRAULIC CONNECTIONS OF HEAT EXCHANGERS

- Heat exchangers threaded hydraulic connections ISO 228/1 – G M, available up to a diameter of 3" included.
- Pipes threaded hydraulic connections ISO 7/1 – R, available up to a diameter of 3" included.
- The hydraulic connections with flange (FL) are not supplied with counter flange.
- The hydraulic connections with grooved end are not supplied with flexible joint (optional accessory).

OPTIONAL ACCESSORIES

FRIGO SCREW HR	410 V2	460 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	-	•	•	•	•	•	•	•	•	•	•	•	•	•
119 - Kit brine B	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Evaporator flexible joint with adapter pipe (solder type)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Evaporator flexible joint with adapter for flange connection	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Condenser flexible joint with adapter pipe (solder type)	-	-	-	-	-	-	-	-	-	•	•	•	•	•
Condenser flexible joint with adapter for flange connection	-	-	-	-	-	-	-	-	-	•	•	•	•	•
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	•	•	•	•	•	•	•	•	•	•	•	•	•	•
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	•	•	•	•	•	•	•	•	•	•	•	•	•	•
889 - Master plant SEQUENCER	•	•	•	•	•	•	•	•	•	•	•	•	•	•
962 - Kit modem GSM	•	•	•	•	•	•	•	•	•	•	•	•	•	•
957 - Plantwatch without modem	•	•	•	•	•	•	•	•	•	•	•	•	•	•
930 - Remote graphic terminal kit	•	•	•	•	•	•	•	•	•	•	•	•	•	•

• available accessory; - not available accessory

TECHNICAL DATA FRIGO SCREW HR

FRIGO SCREW HR		410 V2	460 V2	510 V2	540 V2	610 V2	700 V2	790 V2	940 V2	
STANDARD	Only Cooling (1)									
	Cooling capacity	kW	394	443	494	551	603	656	740	880
	Unit power input	kW	82,4	92,5	102,9	108,9	134,0	143,9	163,0	196,0
	Evaporator water flow rate	m³/h	70,0	78,6	87,0	92,6	104,0	120,0	136,0	160,0
	Evaporator pressure drop	kPa	12	18	19	21	24	16	13	19
	Condenser water flow rate	m³/h	84,6	94,9	105,0	112,0	126,0	145,0	164,0	193,0
	Condenser pressure drop	kPa	10	13	16	19	22	21	25	19
	Cooling + Total Heat Recovery (2)									
	Cooling capacity	kW	348	391	435	486	547	594	671	799
	Heating capacity	kW	443	496	552	611	701	761	859	1025
	Unit power input	kW	94,2	105,0	117,0	125,0	155,0	167,0	188,0	226,0
	Max unit operating current (FLA)	A	154	180	197	205	253	279	307	342
	Heat recovery water flow rate	m³/h	76,9	86,3	96,0	106,0	122,0	132,0	149,0	178,0
	Heat recovery pressure drop	kPa	8	11	13	13	13	18	19	12
	Compressors		twin-screw	twin-screw	twin-screw	twin-screw	twin-screw	twin-screw	twin-screw	twin-screw
	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	77,8	185,2	185,2	185,2	185,2	170,6	163,1
	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 unit operating current (FLA)	A	185,8	194,4	219,6	238,4	271,8	310,8	347,8	391,4
	Unit starting current (LRA)	A	372,6	396,1	483,8	644,9	377,9	457,2	476,6	577,2
	EER (1)	kW/kW	4,78	4,79	4,80	5,06	4,50	4,56	4,54	4,49
	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 [Lpm] (4)	dB(A)	74,0	74,0	74,0	79,0	79,0	79,0	82,0	82,0
	Net weight	kg	3237	3268	3498	3498	3590	3720	3967	4071
	Hydraulic connections									
	Evaporator IN/OUT - OD (5)	Ø mm	168,3	168,3	168,3	168,3	168,3	168,3	219,1	219,1
OPT	Compressor soundproof box									
	Sound power level [Lw] (3)	dB(A)	85,8	85,8	85,8	90,8	90,8	91,6	94,6	94,6
	Average sound pressure level [Lpm] (4)	dB(A)	68,0	68,0	68,0	73,0	73,0	73,0	76,0	76,0

1. Referred to chilled water temperature 12/7°C and condenser water temperature 30/35°C according to Eurovent standard
2. Referred to chilled water temperature 12/7°C; condenser water temperature 40/45°C.
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. The flexible joint is an optional accessory.

TECHNICAL DATA FRIGO SCREW HR

FRIGO SCREW HR		1050 V2	1110 V2	1140 V2	1310 V2	1460 V2	1610 V2
STANDARD	Only Cooling (1)						
	Cooling capacity	kW	973	1031	1073	1224	1365
	Unit power input	kW	218,2	228,1	235,8	269,0	296,7
	Evaporator water flow rate	m³/h	179,0	190,0	195,0	224,0	249,0
	Evaporator pressure drop	kPa	26	27	23	28	36
	Condenser water flow rate	m³/h	216,0	229,0	236,0	270,0	301,0
	Condenser pressure drop	kPa	21	25	23	19	19
	Cooling + Total Heat Recovery (2)						
	Cooling capacity	kW	884	937	974	1112	1240
	Heating capacity	kW	1135	1200	1246	1422	1582
	Unit power input	kW	251,0	263,0	272,0	310,0	342,0
	Max unit operating current (FLA)	A	395	412	436	524	578
	Heat recovery water flow rate	m³/h	197,0	209,0	217,0	247,0	275,0
	Heat recovery pressure drop	kPa	12	16	12	8	11
	Compressors		twin-screw	twin-screw	twin-screw	twin-screw	twin-screw
	Quantity	n.	2	2	2	2	2
	Capacity control	%	25 ... 100%	25 ... 100%	25 ... 100%	25 ... 100%	25 ... 100%
	Refrigerant		R134a	R134a	R134a	R134a	R134a
	Total refrigerant charge (optional excluded)	kg	155,5	155,5	144,5	215,6	210,6
	Gas circuits	n.	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
OPT	Max unit operating current (FLA)	A	441,8	466,2	497,2	569,6	640,6
	Unit starting current (LRA)	A	624,6	720,4	831,2	877,6	1074,5
	EER (1)	kW/kW	4,46	4,52	4,55	4,55	4,60
	Sound power level [Lw] (3)	dB(A)	101,2	101,2	101,2	103,6	103,6
	Average sound pressure level [Lp _m] (4)	dB(A)	82,0	82,0	82,0	84,0	84,0
	Net weight	kg	4835	4949	5031	5549	6407
	Hydraulic connections						
	Evaporator IN/OUT - OD (5)	Ø mm	219,1	219,1	219,1	219,1	273
	Compressor soundproof box						
	Sound power level [Lw] (3)	dB(A)	95,2	95,2	95,2	97,6	97,6
	Average sound pressure level [Lp _m] (4)	dB(A)	76,0	76,0	76,0	78,0	78,0

1. Referred to chilled water temperature 12/7°C and condenser water temperature 30/35°C according to Eurovent standard
2. Referred to chilled water temperature 12/7°C; condenser water temperature 40/45°C.
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. The flexible joint is an optional accessory.

DIMENSIONS (mm)

FRIGO SCREW HR	a	b	c
410 V2	3390	960	1670
460 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

