CHECKS AND TEST

Each HEN is tested with full load. The following tests are also carried out:

- Correct components assembly
- Pressurization of the refrigeration circuit to test for leaks using helium leak–searcher;
- Hydraulic circuit pressing
- Electric tests in compliance with standard EN60204
- Protections and safety devices correctly working
- Electronic controller correctly working;
- Thermal performance and electric quantities measurement.

OPTIONS

Continuous fan(s) speed control - phase cut type (minimum ambient temperature -8.0°C)		CA
Continuous fan(s) speed control - electronic fan(s) (minimum ambient temperature -10.0°C)		CE
Electronic thermostatic valve		VE
Compressor(s) shut-off valves on suction and discharge side		VSC
Evaporator anti-freeze heater		RA1
Evaporator and pump anti-freeze heaters		RA2
Evaporator, pump and tank anti-freeze heaters	[1]	RA3
Condenser anticorrosion treatment (cataphoresis type)		OCT
Compressor(s) acoustic shield(s)		AI1
Single P3 Pump		P3
Non ferrous atmospheric water circuit (plastic water tank)		TANF
Hot water tank configuration		TPH
No tank configuration		T0
No pump configuration		P0
Additional atmospheric water tank kit (glycol charge)		TA
Double atmospheric water tank kit (glycol charge)		2TA
Disconnector tank configuration with P2 pump (pressurized carbon steel tank included)		X2
Disconnector tank configuration with P3 pump (pressurized carbon steel tank included)		X3
Disconnector tank configuration with P2 pump (non ferrous atmospheric water tank included)		X2 TANF
Disconnector tank configuration with P3 pump (non ferrous atmospheric water tank included)		X3 TANF
Mechanical water level switch		LSM
Pump shut-off valves		VSP
Water strainer shut-off valves		VSF
P2 configuration for glycol up to 50%	[2]	SP2G
P3 configuration for glycol up to 50%	[2]	SP3G
Electrical switchboard anti-condensation heater		RS
Remote Panel Kit		ER
Threaded water connections kit (GAS)	[3]	WC2
Stainless steel threaded water connections kit (GAS)	[4]	WC2I
Rubber anti-vibration mountings kit (no tank units)		FA1
Rubber anti-vibration mountings kit (units with tank)		FA2
Wheels kit		FW
Wooden base		PWB
Wooden crate		PWC

- [1] Available only with pressurized tank
- [2] Standard admissible propylene glycol mixture up to 40% with minimum outlet water temperature -10°C
- [3] Option available for HEN 052÷096 - Standard for HEN010÷046
- [4] Option available for HEN 052÷096

SOME OTHER UNITS AVAILABLE IN OUR PREMIUM LINE

QBE

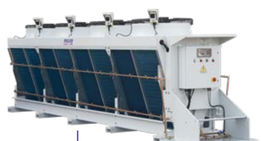
2 to 25kW
Air-cooled chillers
with rotary and scroll compressors

CFT

100 to 300 kW
Air-cooled chillers
with scroll compressors

CWV

280 to 1200 kW
Air-cooled chillers
with screw compressors



CDC

300 to 1200 kW
Drycoolers
also adiabatic system available

Архангельск (8182)63-90-72
Астана (7172)727-132
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89
Иваново (4932)77-34-06
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Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Липецк (4742)52-20-81
Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Тверь (4822)63-31-35
Томск (3822)98-41-53
Тула (4872)74-02-29
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Ярославль (4852)69-52-93

Киргизия (996)312-96-26-47
Россия (495)268-04-70
Казахстан (772)734-952-31

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FRIULAIR Chillers

HEN

REVERSIBLE AIR-COOLED SCROLL COMPRESSOR

HEAT PUMPS CHILLERS
from 10 to 96 kW in cooling mode

for wineries and breweries

HEN

DESCRIPTION

The new HEN range is specifically designed to meet the application requirements of wineries by offering precise control of refrigerated water temperature while operating over long time periods with varying load demands.
The range includes 14 models with cooling capacities from 10 to 96 kW.
It is designed for outdoor installation, with specific standard components especially indicated at low temperatures.

FRAME AND STRUCTURE

All frame and cabinet cover material is made of galvanized steel that is then powder coated, making the HEN suitable for outdoor installation and for protection in harsh environments. The compressor cabinet is separate from the fan's section and is accessible on three sides to make control and maintenance easy. The hydraulic section is also easily accessible.

EASY MAINTENANCE

The HEN series has been designed and built to facilitate inspection and maintenance. The canopy is easily removable and allows immediate access to the components inside. The clear arrangement of the components, the simplicity of the refrigerant and hydraulic circuit and the identified cabled in the electrical system, assist the users normal operating schedule.

REFRIGERATION CIRCUIT

It is manufactured from top quality materials and comply with the 2014/68/EU Directive. It includes dehydrator filter, liquid solenoid valve, liquid sight glass flow, thermostatic expansion valve sized to satisfy water setpoint 7°C / -8°C, high pressure safety switch with manual reset and low pressure transducer with semi-automatic reset, HP and LP refrigerant gauges, pressure plugs.

	HEN	010		014		019		025		027		033		038		046		052		056		063		076		088		096	
PERFORMANCES [1]	Ambient temperature [°C]	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0
	Evaporator inlet water temperature [°C]	12,0	-5,0	12,0	-5,0	12,0	-5,0	12,0	-5,0	12,0	-5,0	12,0	-5,0	12,0	-5,0	12,0	-5,0	12,0	-5,0	12,0	-5,0	12,0	-5,0	12,0	-5,0	12,0	-5,0	12,0	-5,0
	Evaporator outlet water temperature [°C]	7,0	-8,0	7,0	-8,0	7,0	-8,0	7,0	-8,0	7,0	-8,0	7,0	-8,0	7,0	-8,0	7,0	-8,0	7,0	-8,0	7,0	-8,0	7,0	-8,0	7,0	-8,0	7,0	-8,0	7,0	-8,0
	Ethylene glycol percentage ---	0%	40%	0%	40%	0%	40%	0%	40%	0%	40%	0%	40%	0%	40%	0%	40%	0%	40%	0%	40%	0%	40%	0%	40%	0%	40%	0%	40%
	Cooling capacity [kW]	10.42	5.95	15.19	8.72	18.71	10.96	25.13	14.82	27.02	15.98	33.01	19.16	37.68	22.05	46.48	27.37	51.81	30.33	55.90	32.80	62.66	36.46	74.57	43.03	88.21	50.87	95.74	55.60
	Compressors power input [kW]	3.62	3.23	5.27	4.60	7.48	6.27	9.05	8.02	10.47	9.26	11.02	9.78	13.48	11.92	17.89	15.85	17.08	15.26	19.72	17.55	21.51	19.21	25.31	22.53	29.44	26.26	34.59	30.73
	Total power input [kW]	4.87	4.48	6.77	6.10	8.98	7.77	11.48	10.45	12.90	11.69	13.45	12.21	16.03	14.47	20.91	18.87	19.80	17.98	22.44	20.27	24.23	21.93	29.21	26.43	33.75	30.57	38.90	35.04
	Total absorbed current [A]	9.06	8.36	12.31	11.52	16.40	15.16	19.44	17.93	21.84	20.08	22.87	21.06	27.63	25.42	35.06	32.09	32.58	29.92	37.09	33.97	40.16	36.82	49.10	45.22	56.59	52.07	64.36	58.78
	Energy efficiency [3] EER	2.37	1.49	2.52	1.62	2.27	1.56	2.37	1.55	2.25	1.48	2.63	1.69	2.51	1.64	2.39	1.57	2.83	1.84	2.67	1.75	2.75	1.78	2.74	1.76	2.82	1.81	2.63	1.71
	Water flow [l/h]	1 793	1 945	2 613	2 851	3 218	3 583	4 323	4 844	4 647	5 222	5 678	6 263	6 480	7 207	7 994	8 946	8 912	9 913	9 614	10 720	10 778	11 915	12 825	14 062	15 172	16 623	16 468	18 171
	Available pressure [kPa]	160	143	205	175	179	140	198	152	181	127	149	94	194	123	197	135	217	172	195	142	156	93	140	106	218	182	197	152
PERFORMANCES [2]	Ambient temperature [°C]	7,0		7,0		7,0		7,0		7,0		7,0		7,0		7,0		7,0		7,0		7,0		7,0		7,0		7,0	
	Evaporator inlet water temperature [°C]	40,0		40,0		40,0		40,0		40,0		40,0		40,0		40,0		40,0		40,0		40,0		40,0		40,0		40,0	
	Evaporator outlet water temperature [°C]	45,0		45,0		45,0		45,0		45,0		45,0		45,0		45,0		45,0		45,0		45,0		45,0		45,0		45,0	
	Ethylene glycol percentage ---	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
	Heating capacity [kW]	10.37		15.32		19.37		27.81		32.51		34.26		40.93		50.37		55.21		60.35		69.06		80.03		93.41		102.68	
	Compressors power input [kW]	3.45		4.95		6.33		8.25		9.36		10.45		12.24		16.08		16.27		18.34		20.61		24.38		27.60		31.51	
	Total power input [kW]	4.70		6.45		7.83		10.68		11.79		12.88		14.79		19.10		18.99		21.06		23.33		28.28		31.91		35.82	
	Total absorbed current [A]	8.76		11.90		15.15		18.26		20.23		22.03		25.86		32.41		31.40		35.10		38.85		47.79		53.96		59.89	
	Energy efficiency [3] COP	2.46		2.68		2.73		2.84		2.98		2.86		2.97		2.86		3.15		3.08		3.16		3.05		3.17		3.08	
	Water flow [l/h]	1 784		2 635		3 332		4 784		5 591		5 893		7 039		8 664		9 496		10 381		11 878		13 765		16 066		17 660	
	Evaporator pressure drop [kPa]	155.1		193.0		157.4		159.3		137.6		118.6		125.1		183.9		183.8		151.4		89.2		117.5		190.7		160.5	
ELECTRICAL DATA [4]	Maximum power input (total) [kW]	6.20		8.24		10.53		13.84		15.26		16.76		19.16		25.20		25.54		28.38		31.39		37.13		43.10		48.67	
	Maximum absorbed current (total) [A]	10.45		15.71		18.37		22.94		25.30		27.77		32.15		41.40		41.08		45.80		50.74		60.51		70.26		78.81	
	Starting current [A]	55.70		93.10		101.10		128.00		143.00		150.00		177.40		217.10		146.14		163.50		172.97		205.75		250.23		254.50	
	Fan power [kW]	0.77		0.77		0.77		0.77		0.77		0.77		0.77		0.77		0.62		0.62		0.62		0.94		0.94		0.94	
	Fan current [A]	1.70		1.70		1.70		1.70		1.70		1.70		1.70		1.70		1.25		1.25		1.25		1.70		1.70		1.70	
	Fans quantity [#]	2		2		2		2		2		2		2		2		2		2		2		2		2		2	
	P2 Pump power input [kW]	0.48		0.73		0.73		0.89		0.89		0.89		1.01		1.48		1.48		1.48		1.48		2.02		2.43		2.43	
	P2 Pump absorbed current [A]	1.00		1.40		1.40		1.60		1.60		1.60		2.00		2.70		2.70		2.70		2.70		3.60		4.80		4.80	
	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		400/3/50		400/3/50		400/3/50		400/3/50		400/3/50		400/3/50	
	IP protection degree ---	IP54		IP54		IP54		IP54		IP54		IP54		IP54		IP54		IP54		IP54		IP54		IP54		IP54		IP54	
TECHNICAL DATA	Compressors quantity [#]	1		1		1		1		1		1		1		1		2		2		2		2		2		2	
	Sound pressure level [5] [dbA]	43,5		43,5		48,5		55		55		55,5		55,5		56		54		54		55		59,5		60		60	
	Water connections diameter [6] [inch]	1"		1"		1"		1 1/2"		1 1/2"		1 1/2"		1 1/2"		1 1/2"		2"		2"		2"		2"		2"1/2		2"1/2	
	Tank volume [dm3]	80		80		80		100		100		200		200		200		300		300		300		300		300		300	
	Expansion Vessel Capacity [dm3]	8		8		8		12		12		12		12		12		18		18		18		18		18		18	
	Width [mm]	685		685		685		925		925		925		925		925		1.380		1.380		1.380		1.380		1.380		1.380	
	Depth [mm]	1.455		1.455		1.455		1.890		1.890		1.890		1.890		1.890		2.590		2.590		2.590		2.590		3.090		3.090	
	Height [mm]	1.456		1.456		1.456		1.580		1.580		1.580		1.580		1.580		1.960		1.960		1.960		1.960		1.960		1.960	
	Net Weight - standard version [kg]	330		340		360		490		510		530		550		560		880		880		910		950		1 110		1 130	

TECHNICAL DETAILS

HYDRAULIC CIRCUIT

All units are equipped with circulation pump, ferrous pressure tank of the "cold" type, safety valve, expansion vessel, water pressure gauge, recharging valve. Thermal insulation for hydraulic pipes, fittings and pumps particularly suitable for low temperatures. Centrifugal pump P2 type, with steel impeller, 2-pole, self-ventilated, class F insulation and IP55. Suitable for working with propylene glycol up to 40% concentration and temperatures of -10 ° C. Other hydronic configurations are available in the options table.

COMPRESSOR

Of hermetic scroll type. They are all equipped with heating resistance, mounted on rubber anti-vibration blocks, protected by an electronic device controlling phase sequences to avoid any contrary rotation and complete with integrated ampere-thermic protector and filled with lubricant oil.

TUBES AND FINS HEAT EXCHANGER

Plate copper tubes and aluminium fins heat-exchanger protected by easily removable and cleanable air filters. Cataphoresis anti-corrosion treatment is available as option.

FANS

Fans with 4 pole, axial motors, with curved blades to improve rotation speed and decrease noise, with protective grid. Direct drive motor with internal thermal protector and IP 54. Standard step condensation control; phase cut or electronic fan versions are available as an option.

PLATE HEAT EXCHANGER

The heat-exchanger is made of stainless steel brazed plates. It is compact and highly efficient.
All heat-exchangers ensure high efficiency of heat exchange between the refrigerant and the fluid to be cooled.
This reduces pressure losses. It allows very low temperature approaches to optimise energy efficiency.
The electronic controller antifreeze function monitors the water temperature from the heat-exchanger outlet to prevent freezing.
A differential pressure switch protects the heat exchanger from any lack of water flow, while a mechanical filter at the inlet protects the entire hydraulic circuit from dirt entering the machine.

CONTROL PANEL

Control panel complying with EN 60204 CE, with door lock disconnector (blocks access to the control panel when it is live) and watertight door to access the electronic control.
It includes circuit breaker protectors for compressors and pump, contactors, autotransformers, compressor rotation direction control devices; the cables are identified.

MICROPROCESSOR CONTROLLER

It allows to check at any time the operation parameters: condensing pressure, evaporating pressure, inlet and outlet temperatures and all digital inputs and outputs. In case of partial or total stop of the unit, the alarm history is available and allows to know which security device has tripped. The controller is standard equipped with RS485 port for modbus connections.
As option the set up for Lane / Ethernet connection is available, by means of which it is possible to connect the unit to an internet gateway.
The controller's configuration is very easy by using a usb cable. This way any firmare update and mapping could be uploaded. No converter is required.

OPERATING LIMITS

CHILLER VERSION

- Ambient temperature with standard condensation control: 0°C / +43°C (min/max)
- Ambient temperature with condensation control options: CA: -8°C / +43°C (min/max); CE: -10°C / +43°C (min/max)
- Water outlet temperature: -10°C (with glycol) / +20°C (min/max)

HEAT PUMP VERSION

- Ambient temperature: -5°C / +30°C (min/max)
- Water outlet temperature: +30°C / +52°C (min/max)

NOTE

- [1] Data referred to HEN CHILLER version with pump P2 selection
- [2] Data referred to HEN HEAT PUMP version with pump P2 selection
- [3] Data referred to the unit without pump
- [4] Data related to most the heaviest condition allowed without the intervention of the safety devices
- [5] Data referred to 10m and at an height of 1,5 m in open field
- [6] For HEN 010 ÷ 046: threaded connections
  HEN052 ÷ 096: grooved connections

FUNZIONI PRINCIPALI

- Accensione e spegnimento della pompa (opzionale)
- Funzionamento dei ventilatori
- Controllo dei cicli di accensione e spegnimento del compressore in funzione della temperatura dell'acqua richiesta
- Misura e visualizzazione delle temperature dell'acqua in ingresso ed uscita dell'evaporatore
- Misura e visualizzazione della pressione e della temperatura di condensazione e di evaporazione
- Protezione antigelo
- On-off remoto
- Cronologia degli allarmi
- Allarme generale remoto

GESTIONE DEGLI ALLARMI

- Trasduttore bassa pressione refrigerante
- Pressostato differenziale acqua
- Errata sequenza fasi
- Protezione termica compressori
- Avaria sonde di temperatura
- Avaria trasduttori di pressione
- Alta temperatura acqua
- Antigelo
- Pressostato alta pressione refrigerante
- Allarme generale con contatto disponibile in morsettiera