OPTIONS / QBE MODELS

		002	003÷007	008÷025
Leaving water temperature accuracy (+/- 0,1 K) electronic hot gas by-pass valve	VBE	NA	O	O
Leaving water temperature accuracy (+/- 1 K) mechanical hot gas by-pass valve	VBM	NA	O	O
P3 Pump	P3	NA	STD	O
P5 Pump	P5	NA	O	O
Automatic water bypass valve	BA	NA	O	O
Refrigerant gauges	GR	NA	O	STD
Compressor(s) cranckase heater(s)	RC	NA	O	O
Outdoor installation (min. ambient temperature +10°C)	FE	NA	O / STD 3ph	STD
Pressurized water tank with brazed plates evaporator	TP EXP	NA	O	O
Non ferrous pressurized water tank with brazed plates evaporator (stainless steel tank)	TPI EXP	NA	O	O
Additional atmospheric water tank kit (glycol charge) [1]	TA	NA	NA	O
Without pump	P0	NA	O	O
Without tank with brazed plates evaporator	T0 EXP	NA	O	O
Continuous fan(s) speed control - phase cut type (minimum ambient temperature - 8.0°C)	CA	O	O / NA 3ph	O
Continuous fan(s) speed control - electronic fan(s) (minimum ambient temperature -10.0°C)	CE	NA	NA / O 3ph	O
Low ambient temperature kit (minimum ambient temperature -15°C)	CL	NA	NA / O 3ph	O
Ductable axial electronic fan(s)	ZAP	NA	NA	O
Condenser(s) air filter(s)	FP	O	O	STD
Water heaters	RH	NA	[2]	[2]
Water pre-heating setting	PH	NA	O	O
Automatic water filling kit for units with atmospheric water tank	WFA	NA	NA	O
Brine kit: thermal insulation of hydraulic pipes and of pumps for low leaving water temperatures	BK	NA	[2]	[2]
Electrical switchboard anti-condensation heater	RS	NA	NA	O
Wind baffles kit	FWB	NA	NA / O 3ph	O
Wheels kit	FW	O	O	O
RS485 serial port converter kit	EMB	NA	O	O
Water check valve and interlocked solenoid valve [3]	VCI	O	O	O
Wooden Crate	PWC	O	O	O

O Optional
STD Standard
NA Not available
[1] To be combined with pressurized water tank only (TP/TPI)
[2] Contact our company
[3] Available only with standard tank configuration, not available with TP/TPI/TA options

TECHNICAL DETAILS

COMPRESSORS

Hermetic rotary, scroll and reciprocating represent the highest level of technology in this product range. They are extremely reliable, efficient and widely used in the refrigeration industry. The scroll compressor is known for its quietness, the almost total absence of vibration and no backflow phenomena. They are also protected by an electronic device which controls the phase sequences (only in three-phase models), to avoid the possibility of reversed rotation.

FANS

Axial with sickle-shaped blades directly coupled to external rotor motors. They are equipped with internal thermal protection.

CONDENSER

This compact and efficient aluminium micro-channel condenser enables a more compact design, better performance and lighter units. This type of condenser allows a significant reduction in refrigerant charge (- 35% compared to units with traditional solutions). All QBE's condensers are protected by an epoxy coating that ensures a high resistance level to corrosion even in aggressive environments. The aluminium structure makes these condensers free from galvanic corrosion risks. From QBE008 model the condenser is protected by a washable air filter (optional for the smaller sizes)

EVAPORATOR

From QBE002 to 007 models the evaporator is a copper coaxial one, which is highly reliable even when dealing with contaminated fluids. From QBE008 to QBE025 models the evaporator is made of brazed plate AISI 316 stainless steel. They are compact, with a highly efficient heat exchange between refrigerant and fluid to be cooled. The antifreeze function of the electronic controller continuously measures the water temperature at the evaporator outlet to prevent the evaporator from freezing. For QBE008÷025 models a differential pressure switch protects the evaporator from a lack of water flow.

ELECTRICAL PANEL

Manufactured according to the EN 60204 standard, the cabinet is made of galvanized steel with a polyester powder coated surface. It includes: main switch with door-lock (QBE008÷025) (which prevents access to the panel when it is under voltage) and watertight door to access the electronic control. All cables are identified.

OPERATING LIMITS

According to the compressor type and to the specific chiller configuration, QBE operating limits vary within the following temperature ranges:

- ambient temperature: -15°C / +45°C
- water outlet temperature: -3°C (with glycol mixture) / +25°C

Please contact our sales offices for more information: sales.chiller@friulair.com

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
Ижевск (3412)26-03-58
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

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Россия (495)268-04-70
Казахстан (772)734-952-31

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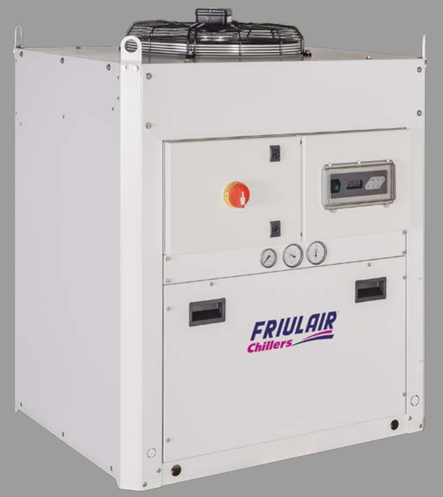
FRIULAIR Chillers



QBE

AIR-COOLED CHILLERS from 2 to 25 kW

with rotary, scroll and reciprocating compressors

QBE

DESCRIPTION

The new range of QBE chillers has been designed to specifically meet industrial requirements and provide an accurate control of the chilled water temperature with the absolute reliability of continuous operation (with the option of hot gas bypass valve). It is particularly suitable for process cooling such as plastic moulding and extrusion, laser cutting, precision engineering, pharmaceutical and food industry etc.
The range consists of 12 models with cooling capacities from 2 to 25 kW and is designed for outdoor installations (QBE002 excluded and QBE003÷007 optional). All units are equipped with:

- Hermetic rotary, scroll or reciprocating compressors
- Microprocessor controller (electronic thermostat for QBE002)
- Atmospheric pressure tank
- Water pump

STRUCTURE AND MAINTENANCE

The steel frame and panels are externally powder coated , making QBE suitable for outdoor and weather-proof installations. All fasteners are in stainless steel or electro-galvanized. The panels are easily removable allowing access, allowing access inside the unit for maintenance and repair.
The clear arrangement of the components, the simple composition of the refrigeration and hydraulic circuit and the identification of cables in the electrical system, assist the users normal operation. All models are equipped with lifting hooks. The QBE008÷025 models are equipped with lifting holes on the base and allow easy handling of the machine.
Wheels kit for all models is available on request and allow easy movement of the machine even when unpacked.

REFRIGERATION CIRCUIT

Manufactured with high quality materials and by skilled personnel according to strict procedures of brazing and conforming to Directive 2014/68/EU. It comprises:

- Rotary (QBE002÷007 models), scroll (QBE008÷025 models) or reciprocating (QBE005^{3ph}÷007^{3ph}) compressor
- Copper coaxial evaporator or stainless steel brazed plates
- Micro channel condenser in aluminium with epoxy coating
- Dehydrator filter
- Flow sight glass with moisture indicator (QBE008÷025 models)
- External equalisation thermostatic expansion valve (except for QBE002 model)
- High pressure switch with manual reset
- Low pressure switch with semi-automatic reset
- High and low pressure gauges (QBE008÷025 models)
- Pressure gauges for checks and maintenance

HYDRAULIC CIRCUIT

- Atmospheric water tank thermally insulated and made of ABS (QBE002÷007) and PVC (QBE008÷25)
- Water gauge
- Drain valve
- Calibrated water bypass (prevents incidents caused by the erroneous closure of the stop valves)
- Water filling nozzle
- Thermally insulated electric pump made with non-ferrous materials (steel, brass or plastic material, mechanical seals in NBR or in EPDM depending on the model)
- Water pipes in copper and PVC
- Water differential pressure switch (QBE008÷ 025 models)

All QBE models come for standard with a non-ferrous hydraulic circuit and non-ferrous materials, mandatory for industrial applications. All units from QBE002-007 are suitable for water glycol mixtures up to 30%, while QBE008÷025 up to 40%.

MICROPROCESSOR CONTROLLER

The microprocessor controller manages and optimizes all components and functions of the QBE chillers (QBE002 excluded, which has an electronic thermostat). It also:

- Adjusts the water temperature at the evaporator outlet
- Controls the compressor On and Off cycles depending on the water temperature and simultaneously ensures the minimum operating times to protect the compressor
- Measures and displays the water temperature
- Prevents the evaporator from freezing
- Turns the pump on and off with suitable delay for the compressor
- On-Off remote alarm available in terminal block

The integrated display with icons provides a complete view of the parameters of the machine's operation and any alarm.

ALARM CONTROL

- High and low refrigerant pressure switch
- Water differential pressure switch (QBE008÷QBE025 models)
- Level switch
- Thermal electric motor protection in three-phase power supplied chillers
- Temperature probe failure
- Antifreeze
- General alarm available via clean contact in terminal block

CHECKS AND TESTING

Each QBE unit is subject to a final full load testing. During such test the following checks are performed:

- Correct component assembly
- Pressurisation of the refrigeration circuit and leak detection using a helium leak detector
- Pressurisation of the hydraulic circuit
- Electrical tests according to the EN60204 standard
- Checks for correct protection and safety operation
- Checks for correct electronic controller operation
- Performance and electrical data measurement

OPTION

HOT GAS BYPASS VALVE FOR WATER OUTLET TEMPERATURE ACCURACY

The QBE003÷025 range could be equipped as optional with a precise adjustment system for the outlet water temperature through a hot gas bypass valve.
This configuration provides a very precise control of thermal loads that are less than the minimum capacity of the compressor itself.
This system minimizes the fluctuations of the outlet water temperature with a high precision degree in the range of +/- 0,01 K at standard working conditions.

		QBE	002	003	004	005	006	007	005^{3ph}	006^{3ph}	007^{3ph}	008	009	012	014	020	025
PERFORMANCES 20/15@25	[1]																
Cooling capacity		[kW]	2.70	2.91	3.74	4.56	5.55	6.22	5.40	6.27	7.23	8.41	10.91	13.19	16.99	20.61	23.11
PERFORMANCES 12/7@35	[2]																
Cooling capacity		[kW]	1.97	2.05	2.69	3.21	3.97	4.57	3.55	4.29	4.98	5.87	7.65	9.17	12.01	14.53	16.36
Compressors power input		[kW]	0.62	0.62	0.84	1.00	1.45	1.92	1.24	1.70	2.21	1.58	2.28	3.40	3.16	4.18	5.37
Total power input		[kW]	0.77	0.78	1.00	1.16	1.61	2.07	1.43	1.89	2.40	1.89	2.59	3.71	3.93	4.95	6.14
Total absorbed current		[A]	3.62	3.65	4.71	5.55	7.76	9.55	3.10	3.67	4.78	3.53	4.60	6.67	7.06	8.95	11.07
Energy efficiency	[3]	EER	2.54	2.62	2.68	2.76	2.47	2.20	2.48	2.27	2.08	3.11	2.95	2.47	3.05	2.94	2.67
Seasonal energy performance ratio	[*] [3]	SEPR HT					*Out of ErP scope*					5.03	5.01	5.54	6.10	5.01	5.05
Water flow		[l/h]	339.08	351.93	462.25	551.55	682.60	786.01	610.44	737.46	857.30	1008.9	1316.5	1576.4	2065.8	2498.7	2813.4
Evaporator pressure drop		[kPa]	10.3	11.0	16.3	7.1	10.4	13.3	8.5	11.9	15.5	23.0	37.1	22.6	36.9	37.1	46.1
ELECTRICAL DATA	[3]																
Maximum power input (total)		[kW]	1.16	1.16	1.45	1.70	2.28	2.74	2.05	2.73	3.40	2.95	3.98	5.56	6.39	7.63	8.58
Maximum absorbed current (total)		[A]	5.38	5.38	6.81	7.95	10.78	12.04	3.88	4.82	6.24	5.48	6.97	8.68	9.32	14.29	14.86
Starting current		[A]	18.8	18.8	23.8	30.3	35.3	50.3	20.4	20.4	23.4	30.7	39.7	46.7	60.7	75.7	86,7
Fan power		[kW]	0.16	0.16	0.16	0.16	0.16	0.16	0.19	0.19	0.19	0.31	0.31	0.31	0.77	0.77	0.77
Fan current		[A]	0.80	0.80	0.80	0.80	0.80	0.80	0.40	0.40	0.40	0.70	0.70	0.70	1.70	1.70	1.70
Number of fans		[#]	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Standard pump type		[#]	P2	P3	P3	P3	P3	P3	P3	P3	P3	P2	P2	P2	P2	P2	P2
Pump power input		[kW]	0.18	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	1.00	1.00	1.00	1.00	1.34	1.34
Pump absorbed current		[A]	1.60	2.50	2.50	2.50	2.50	2.50	1.15	1.15	1.15	2.00	2.00	2.00	2.00	2.50	2.50
Power supply		[V/Ph/Hz]	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	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		---	IP40	IP40	IP40	IP40	IP40	IP40	IP44	IP44	IP44	IP44	IP44	IP44	IP44	IP44	IP44
TECHNICAL DATA																	
N° of compressors		[#]	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N° of refrigerant circuits		[#]	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Air flow		[m^3/h]	2.200	2.200	2.200	2.500	2.500	2.500	2.500	2.500	2.500	4.800	4.800	5.000	5.500	5.500	5.500
Sound pressure level	[4]	[dbA]	46	46	46	46	46	46	46	46	46	49	49	49	49	49	49
Water connections size		[inch]	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1"	1"	1"	1"	1"	1"
Tank capacity		[dm^3]	25	25	25	25	25	25	25	25	25	90	90	90	90	90	90
Width		[mm]	670	670	670	670	670	670	715	715	715	755	755	755	755	755	755
Depth		[mm]	720	720	720	720	720	720	720	720	720	1005	1005	1005	1005	1005	1005
Height		[mm]	680	680	680	680	680	680	680	680	680	1260	1260	1260	1260	1260	1260
Net Weight - standard version		[kg]	66	70	71	75	77	83	85	92	98	193	200	210	218	225	230

- [*] Data in accordance with with European Regulation (EU) 2016/2281for eco-design requirements
- [1] Data referred to: water temp. in/out: 20/15°C - Ambient air temp. 25°C
- [2] Data referred to: water temp. in/out: 12/7°C - Ambient air temp. 35°C
- [3] Data referred to the unit without pump
- [4] Data referred at 10 m in free field and 1,5 m height