

# **TETRIS 2**

## **Air/water Chillers and heat pumps**



## **Technical Manual**

# TETRIS 2 series

84 to 913 kW



## General

A generation of customised high energy efficiency chillers, with scroll compressors, designed to meet requirements in the commercial and industrial sectors

## Configurations

A and A+: High efficiency unit

LN: Low noise unit

SLN: Super low noise unit

HP: Reversible heat pump

DS: Unit with desuperheater

DC: Unit with total recovery

Unit with hydraulic module

## Strengths

- ▶ Unit in Eurovent class A
- ▶ A and A+ units with Night Shift function
- ▶ Hydraulic modules also integrated with buffer tank
- ▶ Three types of pumps: standard, oversize and for high percentages of glycol (up to 50% e.g.)
- ▶ User-side pumps with inverter available
- ▶ Multilogic
- ▶ Integrated web server

## SPECIFICATIONS

Compact, air-condensed, high energy efficiency water chiller unit with hermetic scroll compressors, axial fans and plate evaporators. Refrigerant fluid: R410A.

## STRUCTURE

The structure is modular with a load-bearing frame, made of galvanized sheet-iron coated with polyester powder RAL 5017/7035 at 180°C, which makes it highly resistant to weather conditions.

All screws and bolts are stainless steel.

## COMPRESSORS

The compressors are hermetic orbiting spiral scroll compressors, connected in parallel, and are fitted with oil level sight glass, internal klixon thermal overload protection, contactors and oil equalization line.

## SOURCE-SIDE HEAT EXCHANGER

For cooling only units, the exchangers are made with micro-channel aluminium coils, while for reversible units, finned pack coils with copper tubes and aluminium fins are used.

Thanks to continuous research in the field of metal alloys and to sophisticated production methods, microchannel coils are made using specific aluminium alloys for the tubes and for the fins. This allows the effects of galvanic corrosion to be drastically reduced to always ensure protection of the tubes that confine the refrigerant. Tubes and fins are also subjected to SilFLUX coating processes (or equivalent) or have zinc added to further increase their corrosion resistance.

If the unit has to be installed in an environment with a particularly aggressive atmosphere, e-coated microchannel coils are available as an option. This option is strongly recommended for applications in coastal or highly industrialized areas.

The use of microchannel coils compared to conventional copper/aluminium coils reduces the total weight of the unit by about 10% and gives a reduction in refrigerant charge of at least 30%.

The "V" shape arrangement of the coils makes the unit very compact and also guarantees an increase in the air suction surface, and leaves ample space for distribution of the components of the refrigerant circuit and the hydraulic circuit.

To protect the exchangers from corrosion and ensure optimal operation of the unit, we advise following the recommendations given in the user, installation and maintenance manual for cleaning the coils.

For installations within a kilometre of the coast, the use of Cu/Al coils with anti-corrosion treatment is strongly recommended for cooling only units too.

## FANS

The fans are axial fans, directly coupled to a three-phase 6-pole electric motor, with integrated thermal overload protection (klixon) and IP 54 protection rating.

The fan includes the shroud, designed to optimize its efficiency and reduce noise emission to a minimum, and the safety guard.

## USER-SIDE HEAT EXCHANGER

The exchanger is a braze-welded stainless steel plate heat exchanger, insulated with a shroud of closed-cell insulating material.

Models with two refrigerant circuits are provided with dual-circuit heat exchanger with a single hydraulic connection, whereas models with 4 refrigerant circuits are provided with dual-circuit double heat exchanger and with hydraulic connections fitted with standard manifolds.

Each evaporator is provided with a temperature probe for freeze protection. The hydraulic manifold is provided with flow switch and probe for controlling the temperature of the water returning from the system.

## REFRIGERANT CIRCUIT

Each refrigerant circuit of the basic unit (cooling only) comprises:

- shut-off valve in the liquid line
- 5/16" charging valves
- liquid sight glass
- replaceable solid cartridge dehydrator filter
- electronic expansion valve
- models from 10.2 to 16.2 (standard efficiency) are provided with high and low pressure switches and safety valves
- models from 20.3 to 93.12, from 11.2 to 70.6 (version A and SLN) and from 8.2 to 54.6 (version A+ and A/SLN) are provided with pressure transducers for the reading, by the control, of the high and low pressure values and relevant evaporating and condensing temperatures, high pressure switches and safety valves

The pipes of the circuit and the exchanger are insulated with extruded closed-cell expanded elastomer.

For all models, the solenoid valve function on the liquid line is performed by the electronic expansion valve that shuts off the liquid by closing when the circuit stops. The electronic valve can be fitted with a backup battery (option) that will guarantee it closes even without mains power.

## ELECTRICAL CONTROL PANEL

The electrical control panel is made in a painted galvanized sheet-iron box with forced ventilation and IP54 protection rating. The electrical control panel of the basic unit comprises:

- main disconnect switch
- automatic circuit breakers for compressors with fixed calibration
- fuses to protect the fans and auxiliary circuits
- fan contactors
- thermal magnetic circuit breakers for pumps (if present)
- phase monitor
- single potential free operating contacts for compressors, fans and pumps (when present)
- summer/winter selection from digital input (only for /HP unit)
- external air temperature probe
- microprocessor control with display accessible from the

outside

All the electrical cables inside the panel are numbered and the terminal board dedicated to the customer's connections is coloured blue so that it can be quickly identified in the panel.

Standard power supply of the unit is 400V/3~/50Hz

## CONTROL

Thermoregulation of the unit controls water temperature at the inlet to the user-side heat exchanger. Outlet water temperature control is available as an option.

As standard, models from 10.2 to 16.2 (standard efficiency) use a parametric controller that allows the following functions:

- freeze protection
- compressor timings
- automatic rotation of compressor starting sequence
- management of capacity reduction due to high pressure limit
- display of alarms
- recording of log of last 100 alarms - in addition to the alarm, it shows the date, time and type of operation of the unit when the alarm occurs
- an RS485 serial port with Modbus protocol
- clock board
- sliding defrost management
- digital input for remote ON/OFF
- digital input for remote Summer/Winter selection
- digital input for remote selection of double set point
- display of hours of operation of all the compressors
- display of starts per hour of the compressors
- position a compressor or a circuit to OFF from button
- display the time left to the start of the next defrost cycle

The control has a 6-button interface with a display that can display 2 quantities and 20 icons at the same time, so as to see the unit's operating state at a glance.

Models from 20.3 to 93.12, from 11.2 to 70.6 (version A and SLN) and from 8.2 to 54.6 (version A+ and A/SLN) use the advanced controller that adds the following to the above-listed functions:

- recording of all the variables and parameters of the unit with sampling for 15 seconds - this allows a log to be kept with FIFO logic that covers about 20 days, depending on the size of machine
- an Ethernet serial port with TCP/IP protocol and Modbus over IP
- an integrated WEB server with display pages and management of preloaded pages

For models from 10.2 to 16.2 (standard efficiency) the advanced control is available as an accessory.

Both types of control have a display that allows the following to be shown:

- water inlet and outlet temperatures
- set temperature and differential set points
- description of the alarms (only for the advanced control)

- hour meter of operation and number of start-ups of the unit, the compressors and the pumps (if present)
- high and low pressure values
- condensing and evaporating temperatures (only for the advanced control)
- external air temperature
- superheating at compressor suction (only for the advanced control)

For further details on available functions and on displayed information, you can refer to the specific documentation of the control.

By default, the serial connections present as standard are enabled only for reading from BMS.

## CONTROLS AND SAFETY DEVICES

- high pressure switch with manual reset
  - high pressure safety device with automatic reset and limited tripping managed by the control
  - low pressure safety device with automatic reset and limited tripping managed by the control
  - high pressure safety valve
  - antifreeze probe at outlet of each evaporator
  - mechanical paddle flow switch already installed
- overtemperature protection for compressors and fans

## TESTING

The units are factory-tested and supplied complete with oil and refrigerant.

## VERSIONS

Alongside the basic version of the unit, there are various versions that differ in efficiency and noise levels.

### A and A+

The A and A+ version units use oversize coils compared to the basic unit, in order to increase the ratio between exchange surfaces and capacity of the compressors to make high efficiency units (A) and very high efficiency units (A+).

### SLN and A/SLN

The SLN and A/SLN version units use a soundproofed compressor compartment, oversize coils compared to the standard efficiency unit and fans with speed adjuster and reduced air flow rate. The speed reduction of the fans is such that, under nominal operating conditions, the air flow rate and noise level are lower than those of the basic version of the unit. For the A/SLN version, together with obtaining an extremely moderate noise emission level, a high efficiency machine is also obtained.

In any case, the use of the speed adjuster to reduce the air flow rate allows rotation of the fans at maximum speed when external air temperature conditions are particularly critical and therefore guarantees the same operating limits as the high efficiency versions.

Also, for SLN/HP version units working in heat pump mode, the fans always operate at 100% speed and therefore guarantee the same performance levels as the high efficiency versions.

## OPTIONS

### /HP: reversible heat pump

In addition to the basic set-up, /HP units comprise (for each refrigerant circuit):

- 4-way reversing valve
- suction separator
- fluid accumulator

For defrost management, the control of the unit uses a sliding intervention threshold, depending on the pressures inside the unit and the external air temperature. By putting together all this information, the control can identify the presence of ice on the coil and activates the defrosting sequence only when necessary, so as to maximize the energy efficiency of the unit.

Furthermore, defrosting is done using a patented control system that also uses reverse ventilation to speed up the cleaning of the coil of condensate water.

As standard, summer/winter switching is done from digital input but, as an alternative, the possibility of doing this from the keypad, remote terminal or serial communication (BMS) can be activated.

### /DC: unit with recovery condenser

In addition to the basic set-up, the /DC units comprise:

- a recovery condenser for recovering 100% of the condensation heat on each refrigerant circuit. The exchanger is a braze-welded plate heat exchanger.

For multi-circuit units, the exchangers are to be manifolded outside the unit (by the customer).

- temperature probe at the inlet of each recovery exchanger.

For multi-circuit units, the probe is supplied with the unit and is to be positioned on the exchanger inlet manifold (by the customer).

- liquid receiver for each refrigerant circuit with system for emptying the refrigerant from the condensing coil
- potential free contact in the electrical control panel for activation of recovery.

When required by the system, through the closing of a contact, the control automatically manages activation of recovery. Recovery management is carried out through a control on the temperature of the return water.

The control also automatically manages safety deactivation of recovery if the condensing pressure becomes too high, and changes to using the condensing coils.

This option is not available for /HP units.

### /DS: unit with desuperheater

In addition to the basic set-up, /DS units comprise (for each refrigerant circuit) an exchanger for condensation heat recovery of up to 20% (depending on size, version and operating conditions), placed in series with the condensing coil. The exchanger is a braze-welded plate heat exchanger.

For multi-circuit units, the exchangers are to be manifolded outside the unit (by the customer).

To maximize the use of the accessory and optimize machine operation, combination with the speed adjuster of the fans or

with the EC fans is recommended.

This option is also available for /HP units, but in this case, provision must be made for shutting off the recovery water circuit during operation in heat pump mode to avoid taking power from the user-side heat exchanger.

### /LN: low noise unit

In the unit with /LN option, all the compressors are enclosed in a compartment that is fully soundproofed by sound absorbing material with soundproofing material in between.

### /HAT: unit for high external air temperatures

The unit fitted with this accessory adopts an electrical control panel made using specific components to withstand high temperatures, special cables and oversize protection parts. The accessory enables the unit to work with external air temperatures of over 46°C as indicated in the section on operating limits.

### Unit with hydraulic module

All units can be fitted with hydraulic module in various configurations:

- /1P: hydraulic module with one pump
- /2P: hydraulic module with two pumps
- /3P: hydraulic module with three pumps
- /1PS: hydraulic module with one pump and buffer tank
- /2PS: hydraulic module with two pumps and buffer tank
- /3PS: hydraulic module with three pumps and buffer tank

All the above-mentioned modules have pumps with standard discharge head. The following are also available:

- modules /1PM, /2PM, /3PM, /1PMS, /2PMS and /3PMS that have pumps with increased available discharge head
- modules /1PG, /2PG, /3PG, /1PGS, /2PGS and /3PGS that have pumps suitable for operating with glycol up to 50%

Hydraulic modules with one pump have:

- one pump
- a gate valve on the delivery side of the pump
- an expansion vessel

Hydraulic modules with two pumps have:

- two pumps
- a check valve on the delivery side of each pump
- a gate valve on the outlet of the delivery manifold
- an expansion vessel

Hydraulic modules with three pumps have:

- three pumps
- a check valve on the delivery side of each pump
- a gate valve on the outlet of the delivery manifold
- an expansion vessel

In the version with 2 pumps, these are always with one on standby while the other is working. Switching over between the pumps is automatic and is done by time (to balance the hours of operation of each one) or in the event of failure.

In the version with 3 pumps (each sized to 33% of the flow rate), the 3 pumps operate at the same time; if one of them fails, up to 78% of refrigeration capacity will in any case be

guaranteed.

Also, for hydraulic modules with 3 pumps, during summer starting of units provided with three pumps, when the water temperature is higher than the maximum allowed limit, the control automatically starts the unit with only two pumps. In this way, by reducing the water flow rate, the evaporating pressure, and consequently the delivery pressure, is also reduced, so preventing the unit from shutting down. The third pump begins working automatically when the temperature of the reference water returns within the set limits.

Hydraulic modules with tank also have:

- a gate valve at the inlet of the pump or the suction manifold
- a tank with drain valve and air valve

Refer to the table of configurations that are not possible to check for availability of specific set-ups.



## TECHNICAL SPECIFICATIONS - TETRIS 2

Unit Size			10.2	12.2	13.2	15.2	16.2	20.3	24.3	27.4	29.4	32.4	33.4	37.4	41.4
<b>TETRIS 2</b>															
<b>Cooling (A35; W7)</b>															
Refrigeration capacity	(1)	kW	108	118	126	139	159	194	229	262	280	305	334	368	407
Absorbed power	(1)	kW	36	42	48	54	60	75	85	97	112	121	135	135	148
EER	(1)		3,00	2,79	2,59	2,56	2,63	2,58	2,70	2,68	2,50	2,52	2,48	2,73	2,75
ESEER			3,91	3,61	3,53	3,52	3,52	3,75	3,90	4,00	3,68	3,88	3,89	4,02	4,07
Eurovent efficiency class			B	C	D	D	D	D	D	D	D	D	E	C	C
<b>TETRIS 2 /HP</b>															
<b>Cooling (A35; W7)</b>															
Refrigeration capacity	(1)	kW	105	114	122	135	155	189	222	254	272	296	324	357	395
Absorbed power	(1)	kW	36	42	48	54	60	75	85	97	112	121	134	135	148
EER	(1)		2,91	2,71	2,52	2,48	2,56	2,51	2,62	2,61	2,43	2,45	2,41	2,66	2,67
ESEER			3,81	3,51	3,44	3,43	3,43	3,65	3,79	3,90	3,58	3,78	3,80	3,91	3,97
Eurovent efficiency class			B	C	D	E	D	D	D	D	E	E	E	D	D
<b>Heating (A7; W45)</b>															
Heating capacity	(2)	kW	108	119	129	146	163	193	231	257	282	308	341	356	401
Absorbed power	(2)	kW	38	43	48	51	58	70	86	93	99	107	119	127	137
COP	(2)		2,84	2,77	2,71	2,85	2,82	2,74	2,69	2,76	2,84	2,88	2,87	2,80	2,92
Eurovent efficiency class			C	D	D	C	C	D	D	D	C	C	C	C	C
<b>Compressors</b>															
Quantity/Refrigerant circuits		n°/n°	2/1	2/1	2/1	2/1	2/1	3/1	3/1	4/2	4/2	4/2	4/2	4/2	4/2
Minimum capacity reduction step		%	50%	44%	50%	45%	50%	33%	33%	25%	23%	25%	23%	25%	25%
Refrigerant charge (CH)	(5)	kg	13	13	13	17	17	22	24	26	28	31	39	47	50
Refrigerant charge (HP)	(6)	kg	25	25	30	30	30	42	42	64	64	64	78	90	90
<b>Fans</b>															
Quantity		n°	2	2	2	2	2	3	3	4	4	4	5	6	6
Air flow rate TETRIS 2		m³/h	42.000	42.000	42.000	42.000	42.000	63.000	63.000	84.000	84.000	84.000	105.000	126.000	126.000
Air flow rate TETRIS 2 /HP		m³/h	40.000	40.000	40.000	40.000	40.000	60.000	60.000	80.000	80.000	80.000	100.000	120.000	120.000
<b>User-side heat exchanger</b>															
Quantity			1	1	1	1	1	1	1	1	1	1	1	1	1
Water flow rate TETRIS 2	(1)	m³/h	18,7	20,4	21,7	24,0	27,5	33,6	39,5	45,2	48,4	52,6	57,6	63,6	70,2
Head losses TETRIS 2	(1)	kPa	46	51	52	50	50	46	46	42	36	41	35	38	38
Water flow rate TETRIS 2 /HP	(1)	m³/h	18,2	19,8	21,1	23,3	26,7	32,6	38,4	43,8	47,0	51,1	56,0	61,7	68,1
	(2)	m³/h	18,4	20,3	22,0	24,9	27,9	33,0	39,5	44,0	48,4	52,7	58,5	61,0	68,7
Head losses TETRIS 2 /HP	(1)	kPa	44	48	49	47	47	43	43	39	34	39	33	36	36
	(2)	kPa	45	51	53	54	51	44	46	40	36	41	36	35	37
<b>Hydraulic module</b>															
Volume of the buffer tank		l	300	300	300	300	300	300	300	300	300	300	300	300	300
Volume of the expansion vessel		l	18	18	18	18	18	18	18	18	18	18	18	18	18
Pump model (STD 1P/2P)			P3	P6	P6	P6	P6	P7	P10	P10	P10	P10	P10	P10	P10
Pump model (STD 3P)			-	-	-	-	-	-	-	P3	P3	P3	P7	P7	P7
Available discharge head (1P)	(1)	kPa	154	143	130	144	135	160	219	219	212	193	214	203	248
Available discharge head (2P)	(1)	kPa	136	128	110	133	122	138	190	-	-	-	-	-	-
Available discharge head (3P)	(1)	kPa	-	-	-	-	-	-	-	154	150	135	243	234	213
Pump model (OVS 1P/2P)			P7	P8	P8	P8	P8	P10	P13	P13	P13	P13	P13	P13	P15
Pump model (OVS 3P)			-	-	-	-	-	-	-	P5	P5	P5	P8	P8	P8
Available discharge head (1P)	(1)	kPa	233	287	274	277	267	235	282	288	287	274	299	290	276
Available discharge head (2P)	(1)	kPa	214	263	244	265	254	214	252	-	-	-	-	-	-
Available discharge head (3P)	(1)	kPa	-	-	-	-	-	-	-	285	274	249	312	303	281
<b>Noise levels</b>															
Sound power level (-)	(3)	dB(A)	89	89	89	89	89	92	92	95	95	96	97	97	97
Sound pressure level (-)	(4)	dB(A)	57	57	57	57	57	60	60	63	63	64	65	65	65
Sound power level (LN)	(3)	dB(A)	86	86	86	86	86	87	88	89	90	91	92	93	93
Sound pressure level (LN)	(4)	dB(A)	54	54	54	54	54	55	56	57	58	59	60	61	61
<b>Basic dimensions</b>															
Length	(7)	mm	1.148	1.148	1.148	1.148	1.148	2.297	2.297	2.297	2.297	2.297	3.856	3.856	3.856
Depth		mm	2.256	2.256	2.256	2.256	2.256	2.256	2.256	2.256	2.256	2.256	2.256	2.256	2.256
Height		mm	2.443	2.443	2.443	2.443	2.443	2.443	2.443	2.443	2.443	2.443	2.443	2.443	2.443

- External air temperature 35°C; user-side heat exchanger inlet-outlet water temperature 12-7°C. Values compliant with standard EN 14511
- External air temperature 7°C DB, 6°C WB; user-side heat exchanger inlet-outlet water temperature 40-45°C. Values compliant with standard EN 14511
- Sound power levels calculated according to ISO 3744
- Sound pressure levels measured at a distance of 10 metres from the unit in free field and directivity factor Q=2
- The reading refers to the basic unit with microchannel coils
- The reading refers to the basic unit with Cu/Al coils
- The reading refers to the unit without pumps, tank or recovery Refer to the specific dimensional drawing if the unit is configured

## ELECTRICAL SPECIFICATIONS - TETRIS 2

Unit Size		10.2	12.2	13.2	15.2	16.2	20.3	24.3	27.4	29.4	32.4	33.4	37.4	41.4
<b>TETRIS 2</b>														
Max. absorbed power	kW	53,8	59,6	65,4	72,7	80,0	98,1	120,0	130,8	145,4	160,0	174,0	186,0	200,4
Max. absorbed current	A	81,6	89,7	97,8	112,5	127,2	146,7	190,8	195,6	225,0	254,4	287,9	311,0	332,6
Max. inrush current	A	270	317	325	363	378	374	442	423	476	505	504	507	554
Max. inrush current with soft-starter	A	180	208	216	239	254	265	318	314	352	381	389	400	435
Rated power of standard fan	n° x kW	2 x 2,0	2 x 2,0	2 x 2,0	2 x 2,0	2 x 2,0	3 x 2,0	3 x 2,0	4 x 2,0	4 x 2,0	4 x 2,0	5 x 2,0	6 x 2,0	6 x 2,0
Rated current of standard fan	n° x A	2 x 4,3	2 x 4,3	2 x 4,3	2 x 4,3	2 x 4,3	3 x 4,3	3 x 4,3	4 x 4,3	4 x 4,3	4 x 4,3	5 x 4,3	6 x 4,3	6 x 4,3
Rated power of EC fan	n° x kW	2 x 1,9	2 x 1,9	2 x 1,9	2 x 1,9	2 x 1,9	3 x 1,9	3 x 1,9	4 x 1,9	4 x 1,9	4 x 1,9	5 x 1,9	6 x 1,9	6 x 1,9
Rated current of EC fan	n° x A	2 x 2,9	2 x 2,9	2 x 2,9	2 x 2,9	2 x 2,9	3 x 2,9	3 x 2,9	4 x 2,9	4 x 2,9	4 x 2,9	5 x 2,9	6 x 2,9	6 x 2,9
Rated power of EC OVS fan	n° x kW	2 x 3,0	2 x 3,0	2 x 3,0	2 x 3,0	2 x 3,0	3 x 3,0	3 x 3,0	4 x 3,0	4 x 3,0	4 x 3,0	5 x 3,0	6 x 3,0	6 x 3,0
Rated current of EC OVS fan	n° x A	2 x 4,5	2 x 4,5	2 x 4,5	2 x 4,5	2 x 4,5	3 x 4,5	3 x 4,5	4 x 4,5	4 x 4,5	4 x 4,5	5 x 4,5	6 x 4,5	6 x 4,5
Power supply	V/ph/Hz	400/3~/50												
Power supply for auxiliary circuits	V/ph/Hz	230-24/1~/50												

Unit Size		43.6	47.6	50.7	53.8	58.8	62.8	67.9	70.9	74.10	78.10	80.12	87.12	93.12
<b>TETRIS 2</b>														
Max. absorbed power	kW	218,1	240,0	250,8	261,6	290,8	320,0	338,1	360,0	370,8	400,0	392,4	436,2	480,0
Max. absorbed current	A	337,5	381,6	386,4	391,2	450,0	508,8	528,3	572,4	577,2	636,0	586,8	675,0	763,2
Max. inrush current	A	588	632	637	619	701	760	779	823	828	887	814	926	1.014
Max. inrush current with soft-starter	A	464	508	513	510	577	636	655	699	704	763	705	802	890
Rated power of standard fan	n° x kW	6 x 2,0	6 x 2,0	7 x 2,0	8 x 2,0	8 x 2,0	8 x 2,0	9 x 2,0	9 x 2,0	10 x 2,0	10 x 2,0	12 x 2,0	12 x 2,0	12 x 2,0
Rated current of standard fan	n° x A	6 x 4,3	6 x 4,3	7 x 4,3	8 x 4,3	8 x 4,3	8 x 4,3	9 x 4,3	9 x 4,3	10 x 4,3	10 x 4,3	12 x 4,3	12 x 4,3	12 x 4,3
Rated power of EC fan	n° x kW	6 x 1,9	6 x 1,9	7 x 1,9	8 x 1,9	8 x 1,9	8 x 1,9	9 x 1,9	9 x 1,9	10 x 1,9	10 x 1,9	12 x 1,9	12 x 1,9	12 x 1,9
Rated current of EC fan	n° x A	6 x 2,9	6 x 2,9	7 x 2,9	8 x 2,9	8 x 2,9	8 x 2,9	9 x 2,9	9 x 2,9	10 x 2,9	10 x 2,9	12 x 2,9	12 x 2,9	12 x 2,9
Rated power of EC OVS fan	n° x kW	6 x 3,0	6 x 3,0	7 x 3,0	8 x 3,0	8 x 3,0	8 x 3,0	9 x 3,0	9 x 3,0	10 x 3,0	10 x 3,0	12 x 3,0	12 x 3,0	12 x 3,0
Rated current of EC OVS fan	n° x A	6 x 4,5	6 x 4,5	7 x 4,5	8 x 4,5	8 x 4,5	8 x 4,5	9 x 4,5	9 x 4,5	10 x 4,5	10 x 4,5	12 x 4,5	12 x 4,5	12 x 4,5
Power supply	V/ph/Hz	400/3~/50												
Power supply for auxiliary circuits	V/ph/Hz	230-24/1~/50												

## ELECTRICAL SPECIFICATIONS - TETRIS 2A TETRIS 2 SLN

Unit Size		11.2	17.2	23.2	28.4	34.4	38.4	43.4	47.4	50.6	57.6	64.6	70.6
<b>TETRIS 2A - TETRIS 2 SLN</b>													
Max. absorbed power	kW	53,8	74,7	102,2	128,5	149,4	164,0	185,2	204,4	224,1	248,0	278,8	306,6
Max. absorbed current	A	81,6	116,8	170,6	198,4	233,6	263,0	307,3	341,2	350,4	398,8	463,1	511,8
Max. inrush current	A	270	368	392	449	484	514	529	563	601	650	684	733
Max. inrush current with soft-starter	A	180	244	273	325	360	390	409	443	477	526	565	614
Rated power of standard fan	n° x kW	2 x 2,0	3 x 2,0	4 x 2,0	5 x 2,0	6 x 2,0	6 x 2,0	7 x 2,0	8 x 2,0	9 x 2,0	10 x 2,0	11 x 2,0	12 x 2,0
Rated current of standard fan	n° x A	2 x 4,3	3 x 4,3	4 x 4,3	5 x 4,3	6 x 4,3	6 x 4,3	7 x 4,3	8 x 4,3	9 x 4,3	10 x 4,3	11 x 4,3	12 x 4,3
Rated power of EC fan	n° x kW	2 x 1,9	3 x 1,9	4 x 1,9	5 x 1,9	6 x 1,9	6 x 1,9	7 x 1,9	8 x 1,9	9 x 1,9	10 x 1,9	11 x 1,9	12 x 1,9
Rated current of EC fan	n° x A	2 x 2,9	3 x 2,9	4 x 2,9	5 x 2,9	6 x 2,9	6 x 2,9	7 x 2,9	8 x 2,9	9 x 2,9	10 x 2,9	11 x 2,9	12 x 2,9
Rated power of EC OVS fan	n° x kW	2 x 3,0	3 x 3,0	4 x 3,0	5 x 3,0	6 x 3,0	6 x 3,0	7 x 3,0	8 x 3,0	9 x 3,0	10 x 3,0	11 x 3,0	12 x 3,0
Rated current of EC OVS fan	n° x A	2 x 4,5	3 x 4,5	4 x 4,5	5 x 4,5	6 x 4,5	6 x 4,5	7 x 4,5	8 x 4,5	9 x 4,5	10 x 4,5	11 x 4,5	12 x 4,5
Power supply	V/ph/Hz	400/3~/50											
Power supply for auxiliary circuits	V/ph/Hz	230-24/1~/50											

## ELECTRICAL SPECIFICATIONS - TETRIS 2A+ TETRIS 2A SLN

Unit Size		8.2	13.3	18.4	23.5	27.6	31.4	36.4	41.5	44.6	49.6	54.6
<b>TETRIS 2A+ - TETRIS 2A SLN</b>												
Max. absorbed power	kW	40,8	61,2	81,6	102,0	122,4	144,1	168,0	186,1	204,2	228,1	252,0
Max. absorbed current	A	69,2	103,8	138,4	173,0	207,6	223,2	271,6	291,1	310,6	359,0	407,4
Max. inrush current	A	213	248	282	317	351	474	522	542	538	610	658
Max. inrush current with soft-starter	A	143	178	213	247	282	350	398	418	429	486	534
Rated power of standard fan	n° x kW	2 x 2,0	3 x 2,0	4 x 2,0	5 x 2,0	6 x 2,0	7 x 2,0	8 x 2,0	9 x 2,0	10 x 2,0	11 x 2,0	12 x 2,0
Rated current of standard fan	n° x A	2 x 4,3	3 x 4,3	4 x 4,3	5 x 4,3	6 x 4,3	7 x 4,3	8 x 4,3	9 x 4,3	10 x 4,3	11 x 4,3	12 x 4,3
Rated power of EC fan	n° x kW	2 x 1,9	3 x 1,9	4 x 1,9	5 x 1,9	6 x 1,9	7 x 1,9	8 x 1,9	9 x 1,9	10 x 1,9	11 x 1,9	12 x 1,9
Rated current of EC fan	n° x A	2 x 2,9	3 x 2,9	4 x 2,9	5 x 2,9	6 x 2,9	7 x 2,9	8 x 2,9	9 x 2,9	10 x 2,9	11 x 2,9	12 x 2,9
Rated power of EC OVS fan	n° x kW	2 x 3,0	3 x 3,0	4 x 3,0	5 x 3,0	6 x 3,0	7 x 3,0	8 x 3,0	9 x 3,0	10 x 3,0	11 x 3,0	12 x 3,0
Rated current of EC OVS fan	n° x A	2 x 4,5	3 x 4,5	4 x 4,5	5 x 4,5	6 x 4,5	7 x 4,5	8 x 4,5	9 x 4,5	10 x 4,5	11 x 4,5	12 x 4,5
Power supply	V/ph/Hz	400/3~/50										
Power supply for auxiliary circuits	V/ph/Hz	230-24/1~/50										



## TECHNICAL SPECIFICATIONS FOR PUMPS

Model	Rated power	Rated current	Qmin	Qmax
	kW	A	m <sup>3</sup> /h	m <sup>3</sup> /h
P1	1.1	2.5	7	18
P2	1.5	3.2	7	18
P3	1.9	4.5	12	31
P4	2.2	4.6	9	24
P5	3.0	6.1	9	27
P6	2.2	4.6	18	48
P7	3.0	6.1	18	48
P8	4.0	7.6	18	48
P9	4.0	7.6	36	84
P10	5.5	10.4	36	84
P11	7.5	14.0	36	84
P12	9.2	16.8	54	126
P13	11.0	20.3	54	132
P14	11.0	20.3	90	200
P15	15.0	26.0	90	210
P16	18.5	33.2	90	210
P17	22.0	38.6	90	210

## ALLOWED FLOW RATE RANGE

TETRIS			
Water flow [m³/h]			
	Rated (1)	Min	Max
10.2	19	10	28
12.2	20	11	30
13.2	22	11	32
15.2	24	13	36
16.2	28	14	41
20.3	34	17	50
24.3	40	20	59
27.4	45	23	67
29.4	48	25	72
32.4	53	27	78
33.4	58	29	86
37.4	64	32	95
41.4	70	36	105
43.6	73	37	110
47.6	79	40	118
50.7	85	43	127
53.8	90	46	135
58.8	98	49	146
62.8	105	53	157
67.9	112	57	168
70.9	118	60	177
74.10	124	62	185
78.10	131	66	197
80.12	137	69	205
87.12	147	74	220
93.12	158	79	236

TETRIS 2A - TETRIS 2 SLN			
Water flow [m³/h]			
	Rated (1)	Min	Max
11.2	19	10	28
17.2	28	14	41
23.2	40	20	59
28.4	47	24	70
34.4	56	28	83
38.4	62	32	93
43.4	72	37	108
47.4	78	40	117
50.6	83	42	125
57.6	93	47	140
64.6	107	54	160
70.6	118	59	176

TETRIS 2A+ - TETRIS 2A SLN			
Water flow [m³/h]			
	Rated (1)	Min	Max
8.2	15	8	22
13.3	23	12	34
18.4	31	16	46
23.5	39	20	58
27.6	47	24	69
31.4	54	27	80
36.4	64	33	96
41.5	70	35	104
44.6	75	38	112
49.6	86	43	128
54.6	96	49	144

(1) Rated flow rate with 35°C air and 12/7°C water conditions

## NOISE LEVELS - TETRIS 2 /LN

MODEL	Octave bands [dB]																Total [dB(A)]	
	63 Hz		125 Hz		250 Hz		500 Hz		1000 Hz		2000 Hz		4000 Hz		8000 Hz			
	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp
10.2	86	54	82	50	84	52	84	52	82	50	74	42	66	34	59	27	86	54
12.2	86	54	82	50	84	52	84	52	82	50	74	42	66	34	59	27	86	54
13.2	86	54	82	50	84	52	84	52	82	50	74	42	66	34	59	27	86	54
15.2	87	55	83	51	85	53	85	53	82	50	75	43	67	35	60	28	86	54
16.2	87	55	83	51	85	53	85	53	82	50	75	43	67	35	60	28	86	54
20.3	88	56	85	53	86	54	86	54	83	51	76	44	69	37	62	30	87	55
24.3	89	57	87	55	87	55	87	55	84	52	76	44	69	37	62	30	88	56
27.3	90	58	87	55	88	56	88	56	85	53	77	45	70	38	63	31	89	57
29.4	91	59	87	55	89	57	88	56	86	54	77	45	70	38	63	31	90	58
32.4	92	60	88	56	90	58	90	58	87	55	79	47	72	40	65	33	91	59
33.4	93	61	89	57	91	59	91	59	88	56	80	48	73	41	66	34	92	60
37.4	93	61	89	57	91	59	91	59	88	56	80	48	73	41	66	34	92	60
41.4	94	62	90	58	92	60	92	60	89	57	81	49	74	42	67	35	93	61
43.6	94	62	90	58	92	60	92	60	89	57	81	49	74	42	67	35	93	61
47.6	94	62	90	58	92	60	92	60	89	57	81	49	74	42	67	35	93	61
50.7	95	63	91	59	93	61	93	61	90	58	82	50	75	43	68	36	94	62
53.8	96	64	92	60	94	62	94	62	91	59	83	51	76	44	69	37	95	63
58.8	96	64	92	60	94	62	94	62	91	59	83	51	76	44	69	37	95	63
62.8	96	64	92	60	94	62	94	62	91	59	83	51	76	44	69	37	95	63
67.9	97	64	93	60	95	62	95	62	93	60	84	51	77	44	70	37	96	63
70.9	97	64	93	60	95	62	95	62	93	60	84	51	77	44	70	37	96	63
74.10	98	65	94	61	96	63	96	63	92	59	85	52	78	45	70	37	97	64
78.10	99	66	95	62	97	64	97	64	93	60	86	53	79	46	71	38	98	65
80.12	100	67	96	63	98	65	98	65	94	61	87	54	80	47	72	39	99	66
87.12	100	67	96	63	98	65	98	65	94	61	87	54	80	47	72	39	99	66
93.12	100	67	96	63	98	65	98	65	94	61	87	54	80	47	72	39	99	66

Declared data with 35°C air and 12/7°C water inlet/outlet conditions

Lw: sound power value based on measurements made in accordance with ISO 3744 and the Eurovent certification programme. This certification refers specifically to the sound power level in dB(A). This is therefore the only acoustic reading to be considered binding.

Lp: mean sound pressure level, measured at 10 metres from the unit, in free field on a reflecting surface. Non binding value obtained from the sound power level