

UNICO TURBO FL FREE: Packaged air cooled liquid chillers with free-cooling system in "A" class energy efficiency for outdoor installation, equipped with oil-free centrifugal compressors with magnetic levitation bearings, flooded evaporator and microchannel condensing coils

Cooling Capacity: 402 ÷ 1548 kW
Free-Cooling Capacity: 358 ÷ 1180 kW



unico turbo FL free

rcgroupairconditioning



MAIN FEATURES

- Air cooled liquid chiller with free-cooling system in A class energy efficiency.
- 15 models available, for a wide selection opportunity.
- Average step of 100kW.
- EER up to 3,60.
- ESEER up to 5,76.
- Oil-free centrifugal compressors with magnetic levitation bearings driven by built-in inverter.
- R134a Refrigerant charge.
- Single refrigerant circuit.
- AC Axial fans.
- Flooded evaporator.
- Microchannel condensing coils in aluminium.
- Electronic expansion valve.
- Single air circuit.
- Modular construction.
- Suitable for outdoor installation.

MAIN BENEFITS

- Up to four centrifugal compressors with magnetic levitation bearings on the refrigerant circuit for an high efficiency.
- No need of power factor correction.
- Minimum starting current (LRA)
- Low refrigerant charge.
- Very high EER and ESEER. A Class energy efficiency.
- Quiet operation.
- Availability of kit for further reduction of the noise.
- Availability of EC fans for a higher efficiency.
- Microprocessor control system with 7" touch screen display.

- Extremely easily of maintenance.
- Complete set of components dedicated to the safety of the unity.

INDIRECT FREE COOLING SYSTEM: Complete cooling of the chilled water of the existing cooling system with the outside air. The energy saving will be higher the longer the outside temperature remains below the required temperature for cooling.

A CLASS ENERGY EFFICIENCY: The best and most accurate components applied to the chillers.

WORKING LIMITS IN COOLING MODE

Chilled water outlet temperature: -10÷15°C
Ambient temperature: -10÷43°C

WORKING LIMITS IN FREE-COOLING MODE

Minimum chilled water outlet temperature: -15°C
Minimum ambient temperature: -20°C

COMPONENTS

FRAMEWORK

- Base, self supporting frame and panelling in steel plate with protective surfaces treatment in compliance with UNI ISO 9227/ASTMB117 and ISO 7253, and painted with epoxy powders.
- Colour: RAL 9002 textured.

COMPRESSORS

- Twin-turbine centrifugal compressor, oil-free type, optimized for R134a refrigerant. The term "oil-free" refers to the total absence of lubricating oil within the compressor
- Magnetic levitation bearings.
- Manometric compression ratio: 1.5 ÷ 5.0
- Stepless capacity control through integrated inverter.
- High efficiency permanent-magnet synchronous motor with integrated Soft-Start system (starting current limited to 5A).
- Power factor motor cosφ > 0.9 for a large part of the operating range
- Motor and electronic power section cooling by liquid refrigerant injection into the integrated cooling circuit.
- Electric motor thermal protection via internal winding temperature sensors.
- Electronic integrated control for operation and alarms status.
- Sensor on refrigerant discharge for temperature monitoring.
- Inner sensors for electronic components and inverter temperature control.
- Security system to protect the crankshaft and magnetic bearings in the event of failure of power supply.
- Installation with walls sound attenuators
- Degree of protection: IP54.
- Electric resistance of the suction pipe, together with activated antifreeze evaporator, to prevent the migration of refrigerant inside the compressor.

EVAPORATOR

- Flooded shell and tube evaporator, optimized for R134a refrigerant.
- Version two passes, characterized by low pressure losses on the water side.
- Water tubes with a helical rifled internal surface.
- Integrated liquid drop separator.
- Shell, header, tube sheets made of carbon steel, tubes in Cu.
- Anticondensate insulation made of polyurethane.
- Temperature sensors on water inlet and outlet.
- Water flow switch for water flow control.
- Large liquid level indicator
- Antifreeze heater.

CONDENSING COIL

- Microchannel condensing coil in aluminium.
- Single row
- Low air side pressure drop
- High efficiency of heat exchange.
- Special protective surface treatment - acrylic painting TK-PRO that achieves a high resistance to atmospheric agents, while maintaining the same conditions of heat exchange capacity. (contact the Commercial RC GROUP).
- Reduced internal volume capable of containing the total refrigerant charge.
- High performance also in low noise structure, in combination of the fans listed below.
- Frame in galvanized steel.

FREE-COOLING COIL

- Heat exchanger coil with copper tubes and high efficiency aluminium fins, specifically developed to provide high heat transfer and lower pressure drops. The combination of two factors, special tubes and fins, allow to optimally combine the following aspects:
 - Maximum capacity relative to the size of the exchanger.
 - Reduction of the air flow required for the heat exchange.
- Frame in galvanized steel.
- Motorized valves for free-cooling water circuit control.
- Temperature sensor on ambient air.

FANS SECTION

- Axial fans with sickle-shaped blades, fan guard and optimized for low noise levels.

- External rotor AC type electric motor with stepless variable speed for condensing pressure control.
- IP54 enclosure class.

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.
- Valve by-pass for start-up.
- Electronic by-pass valve for compressor start.
- Non return valve on by-pass line for compressor start.
- Economizer for model 560 T2E, 810 T2E, 1070 T4E, 1120 T4E, 1200 T3E, 1500 T4E.

The system includes:

- Copper brazed plate type with cover plates, plates and connections in AISI 316 stainless steel.
- Anticondensate insulation made of polyurethane.
- Intermediate electronic expansion valve.
- Sight glass.
- Filter dryer on liquid line.
- Service valve on liquid line.
- Service valve on gas discharge.
- Non return valve 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.
- 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 and cooling line of the compressor
- R134a refrigerant charge.

ELECTRICAL PANEL

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

- Main switch with door lock safety.
- Fuses for each compressor.
- Magnetothermic switches for fans or water pumps (if scheduled).
- Contactors for each load.
- Transformer for auxiliary circuit and microprocessor supply.
- Panel with machine controls.
- Power supply 400/3/50.

CONTROL SYSTEM

- Microprocessor system with "Touch Screen" 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

- The heat exchangers' threaded hydraulic connections are available up to a diameter of 3 " included, and correspond to ISO 228/1 – G M.
- The pipes' threaded hydraulic connections are available up to a diameter of 3 " included, and correspond to ISO 7/1 – R.
- The hydraulic connections with flange (FL) are supplied as standard with counter flange.
- The hydraulic connections with grooved end are supplied as standard with flexible joint and adapter pipe.

OPTIONAL ACCESSORIES

UNICO TURBO FL FREE	410 T2 VT4	490 T2 VT4	560 T2E VT5	680 T2 VT6	740 T3 VT6	810 T2E VT7	820 T3 VT7	900 T3 VT8	980 T4 VT8	1070 T4E VT9	1120 T4E VT10
SIZE											
150 - LNO kit (noise reduction)	●	●	●	●	●	●	●	●	●	●	●
Active filters for containment of the harmonic distortion	●	●	●	●	●	●	●	●	●	●	●
172 - Rubber support (kit)	●	●	●	●	●	●	●	●	●	●	●
101 - EC fan	●	●	●	●	●	●	●	●	●	●	●
79 - Heating system for electrical panel	●	●	●	●	●	●	●	●	●	●	●
351 - Free cooling coils with pre-painted fins	●	●	●	●	●	●	●	●	●	●	●
1005 - Power supply analyzer	●	●	●	●	●	●	●	●	●	●	●
1003 - Analogic flowmeter	●	●	●	●	●	●	●	●	●	●	●
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	●	●	●	●	●	●	●	●	●	●	●
889 - Master plant SEQUENCER	●	●	●	●	●	●	●	●	●	●	●
962 - Kit modem GSM	●	●	●	●	●	●	●	●	●	●	●
957 - Plantwatch without modem	●	●	●	●	●	●	●	●	●	●	●
930 - Remote graphic terminal kit	●	●	●	●	●	●	●	●	●	●	●

UNICO TURBO FL FREE	1200 T3E VT10	1360 T4 VT11	1380 T4 VT12	1500 T4E VT12
SIZE				
150 - LNO kit (noise reduction)	●	●	●	●
Active filters for containment of the harmonic distortion	●	●	●	●
172 - Rubber support (kit)	●	●	●	●
101 - EC fan	●	●	●	●
79 - Heating system for electrical panel	●	●	●	●
351 - Free cooling coils with pre-painted fins	●	●	●	●
1005 - Power supply analyzer	●	●	●	●
1003 - Analogic flowmeter	●	●	●	●
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	●	●	●	●
889 - Master plant SEQUENCER	●	●	●	●
962 - Kit modem GSM	●	●	●	●
957 - Plantwatch without modem	●	●	●	●
930 - Remote graphic terminal kit	●	●	●	●

● available accessory; - not available accessory

TECHNICAL DATA UNICO TURBO FL FREE

	UNICO TURBO FL FREE SIZE	410 T2 VT4	490 T2 VT4	560 T2E VT5	680 T2 VT6	740 T3 VT6	810 T2E VT7	820 T3 VT7	900 T3 VT8
STANDARD	Cooling capacity (1) Unit power input	kW kW	402 111,7	510 153,6	597 177,7	716 219,0	852 263,0	771 215,4	856 253,3
	Free-Cooling capacity (2) Total water flow rate	kW m³/h	358 71,9	392 91,3	479 107,0	575 128,0	675 152,0	589 138,0	676 153,0
	Total pressure drop	kPa	92	144	128	128	132	146	134
	Compressors		centrifugal	centrifugal	centrifugal	centrifugal	centrifugal	centrifugal	centrifugal
	Quantity	n.	2	2	2	2	3	2	3
	Cooling capacity control	%	37...100%	33...100%	28...100%	30...100%	25...100%	26...100%	23...100%
	Axial fans	n.	8	8	10	12	12	14	14
	Total air flow	m³/h	170360	170360	212950	255540	298130	255540	298130
	Air circuits	n.	1	1	1	1	1	1	1
	Refrigerant		R134a	R134a	R134a	R134a	R134a	R134a	R134a
LNO KIT 100%	Total refrigerant charge (optional excluded)	kg	123	143	149	208	215	208	215
	Gas circuits	n.	1	1	1	1	1	1	1
	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
	Max unit operating current (FLA)	A	310,2	310,2	318	466,8	464,8	474,6	472,6
	Unit starting current (LRA)	A	41,2	41,2	49	56,8	61,8	64,6	69,6
	EER (1)	kW/kW	3,60	3,32	3,36	3,27	3,24	3,58	3,38
	ESEER		5,07	5,05	5,15	5,35	5,47	5,34	5,03
	Sound power level [Lw] (3)	dB(A)	94,8	94,8	95,6	96,4	97,0	96,5	97,1
	Average sound pressure level [L _{PM}] (4)	dB(A)	74,8	74,8	75,1	75,4	75,6	75,5	76,1
	Net weight	kg	3768	4063	4705	5681	5866	6341	6471
LNO KIT 85%	Hydraulic connections								
	Evaporator IN/OUT - OD (5)	Ø mm	168,3	168,3	168,3	168,3	168,3	168,3	168,3
	Cooling capacity (1) Unit power input	kW kW	402 111,7	510 153,6	597 177,7	716 219,0	852 263,0	771 215,4	856 253,3
	Free-Cooling capacity (2) Total air flow	kW m³/h	358 170360	392 170360	479 212950	575 255540	675 298130	589 255540	676 298130
	EER (1)	kW/kW	3,60	3,32	3,36	3,27	3,24	3,58	3,38
	Sound power level [Lw] (3)	dB(A)	93,7	93,7	94,5	95,3	95,9	95,4	96,0
	Average sound pressure level [L _{PM}] (4)	dB(A)	73,7	73,7	74,0	74,3	74,5	74,4	75,0
	Cooling capacity (1)	kW	376	484	562	683	805	770	813
	Unit power input	kW	105,9	151,3	172,4	211,5	263,1	227,8	247,9
	Free-Cooling capacity (2)	kW	348	385	468	565	661	589	664
LNO KIT 70%	Total air flow	m³/h	144806	144806	181007	217209	253410	217209	253410
	EER (1)	kW/kW	3,55	3,20	3,26	3,23	3,06	3,38	3,28
	Sound power level [Lw] (3)	dB(A)	92,6	92,6	93,4	94,2	94,8	94,3	94,9
	Average sound pressure level [L _{PM}] (4)	dB(A)	72,6	72,6	72,9	73,2	73,4	73,3	73,5
	Cooling capacity (1)	kW	380	446	520	626	737	713	754
	Unit power input	kW	109,8	142,0	162,5	195,0	233,2	216,1	233,4
	Free-Cooling capacity (2)	kW	349	374	454	546	639	574	645
	Total air flow	m³/h	119252	119252	149065	178878	208691	178878	208691
	EER (1)	kW/kW	3,46	3,14	3,20	3,21	3,16	3,30	3,23
	Sound power level [Lw] (3)	dB(A)	90,9	90,9	91,7	92,5	93,1	92,6	93,2
	Average sound pressure level [L _{PM}] (4)	dB(A)	70,9	70,9	71,2	71,5	71,7	71,6	72,2

1. Referred to chiller water temperature 15/10°C; 20% Ethylene glycol solution; ambient temperature 35°C.

2. Referred to chiller water inlet temperature 15°C; 20% Ethylene glycol solution; ambient temperature 3°C.

3. Sound power level [Lw] according to ISO EN 9614 – 2.

4. Average sound pressure level [L_{PM}] 1m far according to ISO EN 3744.

5. Hydraulic connection with grooved end. The flexible joint is an optional accessory.

TECHNICAL DATA UNICO TURBO FL FREE

	UNICO TURBO FL FREE SIZE	980 T4 VT8	1070 T4E VT9	1120 T4E VT10	1200 T3E VT10	1360 T4 VT11	1380 T4 VT12	1500 T4E VT12
Cooling capacity (1)	kW	1261	1021	1125	1194	1429	1453	1548
Unit power input	kW	390,4	308,5	337,8	351,2	438,3	426,1	463,5
Free-Cooling capacity (2)	kW	976	784	876	958	1084	1155	1180
Total water flow rate	m ³ /h	226,0	183,0	201,0	214,0	256,0	260,0	277,0
Total pressure drop	kPa	142	144	138	128	150	130	148
Compressors		centrifugal	centrifugal	centrifugal	centrifugal	centrifugal	centrifugal	centrifugal
Quantity	n.	4	4	4	3	4	4	4
Cooling capacity control	%	16...100%	15...100%	14...100%	18...100%	15...100%	15...100%	14...100%
Axial fans	n.	16	18	20	20	22	24	24
Total air flow	m ³ /h	425900	340720	383310	425900	468490	511080	511080
Air circuits	n.	1	1	1	1	1	1	1
Refrigerant		R134a	R134a	R134a	R134a	R134a	R134a	R134a
Total refrigerant charge (optional excluded)	kg	378	365	371	378	396	402	402
Gas circuits	n.	1	1	1	1	1	1	1
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
Max unit operating current (FLA)	A	619,4	627,2	634	708	925,8	933,6	933,6
Unit starting current (LRA)	A	82,4	90,2	98	93	105,8	113,6	113,6
EER (1)	kW/kW	3,23	3,31	3,33	3,40	3,26	3,41	3,34
ESEER		5,35	5,20	5,27	5,31	5,56	5,76	5,60
Sound power level [Lw] (3)	dB(A)	98,6	97,8	98,2	98,6	99,1	99,5	99,5
Average sound pressure level [L _{PA}] (4)	dB(A)	76,2	76,1	76,1	76,2	76,4	76,5	76,5
Net weight	kg	7895	8584	9189	9056	10062	10667	10777
Hydraulic connections								
Evaporator IN/OUT - OD (5)	Ø mm	219,1	219,1	219,1	219,1	219,1	219,1	219,1
LNO KIT 100%								
Cooling capacity (1)	kW	1261	1021	1125	1194	1429	1457	1548
Unit power input	kW	390,4	308,5	337,8	351,2	438,3	421,1	463,5
Free-Cooling capacity (2)	kW	976	784	876	958	1084	1156	1180
Total air flow	m ³ /h	425900	340720	383310	425900	468490	511080	511080
EER (1)	kW/kW	3,23	3,31	3,33	3,40	3,26	3,46	3,34
Sound power level [Lw] (3)	dB(A)	97,5	96,7	97,1	97,5	98,0	98,4	98,4
Average sound pressure level [L _{PA}] (4)	dB(A)	75,1	75,0	75,0	75,1	75,3	75,4	75,4
LNO KIT 85%								
Cooling capacity (1)	kW	1189	966	1064	1122	1359	1378	1468
Unit power input	kW	386,0	302,8	332,5	340,0	423,4	412,6	454,5
Free-Cooling capacity (2)	kW	956	769	859	936	1066	1133	1159
Total air flow	m ³ /h	362015	289612	325813	362015	398216	434418	434418
EER (1)	kW/kW	3,08	3,19	3,20	3,30	3,21	3,34	3,23
Sound power level [Lw] (3)	dB(A)	96,4	95,6	96,0	96,4	96,9	97,3	97,3
Average sound pressure level [L _{PA}] (4)	dB(A)	74,0	73,9	73,9	74,0	74,2	74,3	74,3
LNO KIT 70%								
Cooling capacity (1)	kW	1082	892	976	1037	1243	1273	1330
Unit power input	kW	347,9	284,1	310,8	319,1	376,7	381,1	446,3
Free-Cooling capacity (2)	kW	923	747	831	907	1032	1099	1118
Total air flow	m ³ /h	298130	238504	268317	298130	327943	357756	357756
EER (1)	kW/kW	3,11	3,14	3,14	3,25	3,30	3,34	2,98
Sound power level [Lw] (3)	dB(A)	94,7	93,9	94,3	94,7	95,2	95,6	95,6
Average sound pressure level [L _{PA}] (4)	dB(A)	72,3	72,2	72,2	72,3	72,5	72,6	72,6

1. Referred to chiller water temperature 15/10°C; 20% Ethylene glycol solution; ambient temperature 35°C.

2. Referred to chiller water inlet temperature 15°C; 20% Ethylene glycol solution; ambient temperature 3°C.

3. Sound power level [Lw] according to ISO EN 9614 – 2.

4. Average sound pressure level [L_{PA}] 1m far according to ISO EN 3744.

5. Hydraulic connection with grooved end. The flexible joint is an optional accessory.

DIMENSIONS (mm)

SIZE VT	a	b	c
VT3	3530	2260	2304
VT4	4650	2260	2304
VT5	5770	2260	2304
VT6	6890	2260	2304
VT7	8010	2260	2304
VT8	9130	2260	2304
VT9	10250	2260	2304
VT10	11370	2260	2304
VT11	12490	2260	2304
VT12	13610	2260	2304

