HiRef

Innovators above the standards

SERVICES | DATA CENTER | INDUSTRY

Air condensed chillers

TVA

with inverter driven screw compressors

Range: 285.9-1367.1 kW

TVA sets a new standard for air cooled chillers, designed to ensure that processes are both energy-efficient and environment-friendly. Low environmental impact has been achieved by using new HFO refrigerants with low Global Warming Potential (GWP), while higher efficiency/footprint ratios are reached thanks to the special V-configuration of the heat exchange coils and their sizing, the largest among the chillers currently available on the market. The Free-Cooling version - where heat exchange surface areas are double the market average - ensure outstanding performance. The high thermodynamic efficiency, low Total Equivalent Warming Impact (TEWI) is combined with a special focus on maintainability and easy accessibility of the compressors contained in the removable HiRail module which reduces noise emissions.

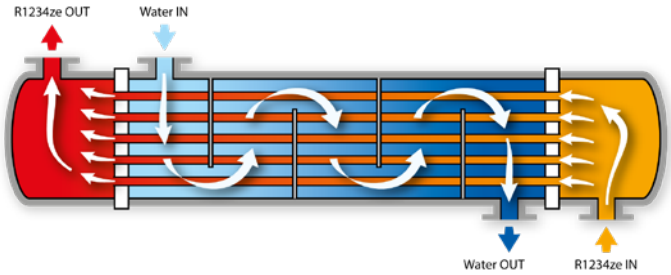
Main advantages

Inverter screw compressors

Wide load modulation capability and high efficiency at partial loads.

New refrigerant R1234ze

TVA air condensed chillers use the new HFO refrigerant with low GWP (GWPR1234ze=6) as part of a wider Green Technology approach. (Also available in version with R134a refrigerant and on request with R513A.)



New concept of heat exchange

Single pass shell and tube evaporators provide excellent levels of thermodynamic efficiency thanks to full heat exchange counter-flow.

Low noise and accessibility: HI-RAIL

The compressor hoods dramatically reduce noise thanks to the use of special soundabsorbing materials. On request, sliding rails allow them to be removed effortlessly, making all maintenance tasks much easier. The compressors can also be removed by hooking from above and lifting with a crane.

Modular and efficient

The configuration with very deep 'V' modular coils provides an extensive heat exchange surface area and therefore excellent thermal efficiency in relation to the unit footprint. The Free-Cooling version features heat exchangers sized in such a way as to allow a Total Free-Cooling Temperature (TFT) of 10°C.

Technological components

Multi-protocol communication interface

HiRef units can be integrated with the customer's external supervision Building Management System (BMS), using the most popular communication protocols, including Modbus RTU, Modbus/IP, BacNet, LonWorks, SNMP.

Screw compressors

Screw compressors are suitable for handling large volumes of refrigerant and are therefore suitable for use with low density and pressure refrigerants, while still producing a remarkable cooling effect. The internal double screw construction allows work in all conditions with less vibration and greater stability compared to single screw compressors. On request, it is possible to install compressors equipped with inverters - ensuring constant power modulation and high energy efficiency even at partial loads.

Shell and tube heat exchanger

Some chiller and heat pump product ranges are equipped with a shell and tube exchanger. These heat exchangers are ideally suitable for units to be installed in high-tech industrial sites, thanks to their high reliability and operating stability. Their large volumes also make them less sensitive to thermal stress and capable of ensuring unit operation stability. Finally, the dual-pass exchanger configuration allows both cooling and heat pump operation to be optimised. According to the range chosen, it is possible to have either dry expansion tube exchangers or flooded shell and tube exchangers with spray technology.

Fast restart

The fast restart function (on request) allows the unit to restart quickly after a mains power outage. This optional feature is available with dual power to minimise restart times.

Axial fans

In axial fans air moves in a parallel direction to the rotation axis and allows large air flows to be processed. Thanks to their low head compared to radial fans, they are used on remote condensers and on components with free outlet into the atmosphere, where there are no high pressure drops due, for example, to ducting.

Corrosion resistant material

The HiRef outdoor units are protected by a metal structure resistant to corrosion and weathering. They are also made of galvanised steel sheet, with epoxy-polyester powder coating, oven-polymerised at 180°C, to offer a C3 degree of protection. On request, it is possible to order specific paint finishing treatments or a metalwork structure built entirely in stainless steel, to obtain a higher degree of protection from high impact adverse weather events.

Class A

Internal high-tech components suitably chosen and sized allow the units to operate with outstanding levels of efficiency.

Inverter driven compressors

Inverter-driven compressors allow compressor rotation speed and efficiency to be controlled, by modulating the frequency and the supply voltage of the motor. They are driven by electronically commutated (EC) brushless permanent-magnet (BLDC) synchronous motors. The use of these motors reduces unit consumption, noise and footprint, improves the efficiency and life cycle of the system through accurate control of speed and acceleration, resulting in less heat dissipation. In addition, inrush currents and sparks are eliminated.

Low GWP refrigerant

The Global Warming Potential (GWP) index is a numerical indicator that identifies the environmental impact of a substance. It measures the extent to which a gas contributes to the greenhouse effect, in relation to carbon dioxide (CO_2) whose baseline value is equal to 1. This parameter is used to determine the amount in kilograms of CO_2 corresponding to the environmental impact of the release of a refrigerant gas into the atmosphere. The use of low GWP refrigerants, such as R513A, R454B, R1234ze, CO_2, allows the environmental impact of air conditioning systems to be significantly reduced.

Available versions

COOLING ONLY

FREE-COOLING

Types of system

AIR/WATER

Additional benefits

- Refrigerant R1234ze
- Also available with R134a refrigerant and on request with R513A
- EC Fans
- Capacity modulation: with slide valve or with inverters on both compressors or on one compressor only
- Electronically controlled expansion valve
- HI-NODE Supervision
- Monitoring and limitation of the maximum absorbed power

Technical table

TVA		0311F	0331F	0361F	0381F	0421F	0451F	0481F	0531F	0581F	0621F	0661F	0721F	0801F	0831F	0901F	0971F	1041F	1101F	1161F
USER WATER TEMPERATURE 12/7°C 20% ETHYLENE GLYCOL, OUTSIDE AIR 35°C, 40% R.H.																				
COOLING CAPACITY	kW	285.9	296.7	329.9	362.4	394.2	420.3	438.8	478.4	513	579	596.9	660.7	719.1	749.1	790.8	847.2	929.2	979.7	1059.1
TOTAL POWER INPUT	kW	90.2	92.9	98.2	105.9	113.1	121.5	126.7	131.3	146.3	165.4	171.6	193.4	200.7	216.8	233.9	248.7	273.6	298.7	315.5
EER	-	3.17	3.19	3.36	3.42	3.49	3.46	3.46	3.64	3.51	3.5	3.48	3.42	3.58	3.46	3.38	3.41	3.4	3.28	3.36
SOUND POWER LEVEL	dB	92		93		94			95	96	97	98		99					100	
DIMENSIONS [LxHxD]	mm	5404 x2650 x2255		6655 x2650 x2255		7906x2650x2255			9722 x2650 x2255		11100x2650x2255			12854x2650x2255			13355x2650x2255			

Data declared with use of R134a refrigerant | Also available with 60 Hz power supply

TVA		0381C	0401C	0451C	0481C	0531C	0581C	0621C	0661C	0721C	0801C	0831C	0901C	0971C	1041C	1101C	1161C	1231C	1291C	1351C	1421C
USER WATER VALUES 12/7°C, 35°C OUTSIDE AIR, 40% U.R.																					
COOLING CAPACITY	kW	354.5	386	423.1	464.1	500.3	520	568.3	609.4	699.7	751.7	802.4	865.5	877	958.3	1007	1065.1	1121.2	1178.4	1247.6	1367.1
TOTAL POWER INPUT	kW	112.3	123.4	132.9	146.9	156.1	165.7	180.4	190.8	224.1	238.1	251.1	277.9	280.7	306.3	319.5	333.9	351	375.4	388.2	417.5
EER	-	3.16	3.13	3.18	3.16	3.21	3.14	3.15	3.19	3.12	3.16	3.2	3.11	3.12	3.13	3.15	3.19	3.19	3.14	3.21	3.27
SEPR	-	5.4	5.45	5.52	5.91	5.9	5.83	5.52	5.99	5.54	5.59	6.05	6.04	5.67	5.64	5.81	6.02	5.75	5.75	5.96	6.46
SEER	-	4.43	4.43	4.53	4.57	4.53	4.52	4.5	4.62	4.51	4.5	4.65	4.57	4.44	4.52	4.59	4.64	4.66	4.65	4.54	4.92
ESEER	-	4.11	4.14	4.22	4.28	4.26	4.24	4.19	4.35	4.18	4.18	4.36	4.27	4.14	4.23	4.31	4.34	4.33	4.31	4.26	4.5
SOUND POWER LEVEL	dB	92		95	96	97	96		100	99		102	101	99		102	104	100		103	105
DIMENSIONS [LxHxD]	mm	5404x2650x2255				6655x2650x2255				7906x2650x2255				9722x2650x2255				11100 x2650 x2255		12854 x2650 x2255	

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TVA		0311F	0331F	0361F	0381F	0421F	0451F	0481F	0531F	0581F	0621F	0661F	0721F	0801F	0831F	0901F	0971F	1041F	1101F	1161F
UTILITY WATER TEMPERATURE 12/7°C, ETHYLENE GLYCOL 20%																				
FULL FREE-COOLING TEMPERATURE	°C	1.1	1	1.8	1.4	2	1.8	1.5	1.9	1.7	1.8	1.7	1.2	1.4	1.2	0.9	1.2	0.7	0.3	-1.3
SOUND POWER LEVEL	dB	92		93		94			95	96	97	98		99					100	
DIMENSIONS [LxHxD]	mm	5404 x2650 x2255		6655 x2650 x2255		7906x2650x2255			9722 x2650 x2255		11100x2650x2255			12854x2650x2255			13355x2650x2255			

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