

200 - 1100kW



Authorised User No. 00007

> TurboChill

Next generation chiller technology

- > Unparalleled high efficiency
- > Infinitely variable load and energy optimisation
- > Low current start
- > Super Quiet option

Typical applications

- > Close control
- > Data centre cooling
- > Comfort cooling
- > Process cooling

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TURBOCOR TECHNOLOGY
NEW!

TurboChill

The TurboChill is an air-cooled, high capacity chiller designed around revolutionary centrifugal TurboCocor compressors integrated with cutting-edge components. Brilliantly engineered, using Airedale's vast expertise in cooling technology, the TurboChill minimises environmental impact by lifting efficiency to new heights and pushing down sound levels. The intelligent, self-optimising compressors present near silent, oil-free operation and ultra efficient, infinitely variable speed control. This allows TurboChill to match load requirements exactly and enables selection of the optimum model, in terms of efficiency, sound level, footprint and price, for each individual application.



Key technical data

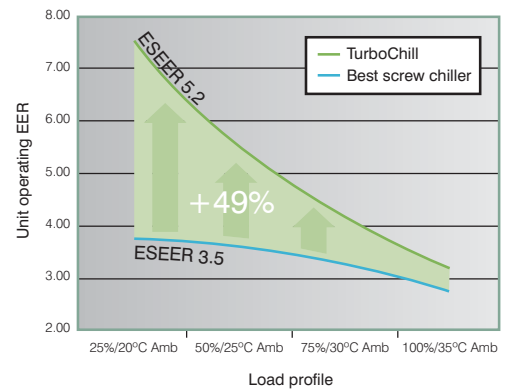
- > Modular capacity range 200 - 1100kW
- > Efficient single and dual circuit models
- > EC fans and interactive head pressure setpoint management
- > Optimised for R134a
- > Quiet and Super Quiet options

Unparalleled efficiency

The TurboChill's 'seasonal efficiency' ESEER values are virtually 50% higher than those of a traditional screw chiller and unparalleled for an air cooled chiller, greatly reducing operational costs and carbon emissions.

Due to superior energy efficient performance, selected models in the TurboChill range meet the criteria of Class A Eurovent rating and are included on the Energy Technology List thereby qualifying for the Carbon Trust ECA (Enhanced Capital Allowance) scheme - www.eca.gov.uk.

Typical seasonal efficiency:
TurboChill v 'best in class' screw chiller



Infinitely variable load and energy optimisation

The TurboChill compressor's infinitely variable speed control uses substantially less power at part load and gives accurate setpoint control and exact capacity match. See pages 3 - 4 for more details.

Super Quiet operation

The Turbochill compressor's rotor shaft and impellers levitate on a magnetic cushion eliminating friction and most vibration. This enables the compressor to run in a smooth sound spectrum and as much as 5 -7 dBA quieter than a similar sized screw compressor.



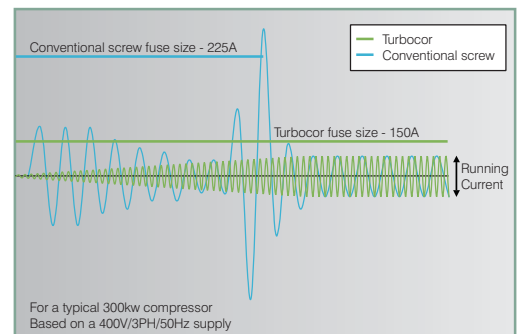
Offering two sound ranges – Quiet (70) and Super Quiet (95), the TurboChill also has the very latest low speed sickle-bladed fans with EC motors. Enclosures surrounding the compressors feature profiled, acoustic lining (pictured).

Integral, low current start (2A)

The ultimate in low current start up, electronic 'soft start' is built into the TurboChill compressor's variable speed control giving a very low starting current of just 2A.

This removes the transient starting 'spikes' of high peak currents normally associated with screw chillers of this capacity and means that electrical supply components need not be oversized on site.

Starting characteristics: TurboCocor v conventional screw compressor



Energy saving features and options



Class A EER up to 3.5 and ESEER* up to 5.6

- > Turbocor centrifugal compressor technology:
 - Variable speed control for super efficiency, tighter setpoint control and exact capacity match
 - In-built low current start (2A)
 - Oil-free operation enhances heat exchanger efficiency
 - Intelligent onboard 'brain'
- > Up to two Turbocor compressors across a single circuit for reduced energy consumption at part load
- > Electronic expansion valves can typically double efficiency at low load/ambient
- > Intelligent compressor management by network-capable AireTronix controls
- > Single pass evaporator offers same performance as flooded evaporator but with much lower refrigerant charge
- > Large surface area condenser coils with latest fan technology
- > EC fans and interactive head pressure setpoint management
- > Selected models are ETL listed, thereby qualifying for Carbon Trust ECA scheme
- > Chiller Sequence Manager (option)
- > Automatic rescheduling of chilled water setpoint

*ESEER (European Seasonal Energy Efficiency Ratio) is based on the part load efficiency of TurboChill over the course of a year and is a better indicator of real energy draw and running costs

More features

- > Compressor acoustic enclosures
- > Latest technology sickle-bladed fans with long bellmouth for low noise and maximised airflow
- > Full operating charge of R134a
- > Redundancy back-up and quicker compressor start up to full load capacity on dual circuit models
- > Filter drier, sight glass and liquid, discharge and suction ball valves; each compressor can be individually isolated
- > Grooved water connections for simple, quick installation
- > Operation up to 35°C ambient at full load, 40°C at reduced load
- > Left/right handed water connection positions
- > Condensers can be isolated to facilitate maintenance

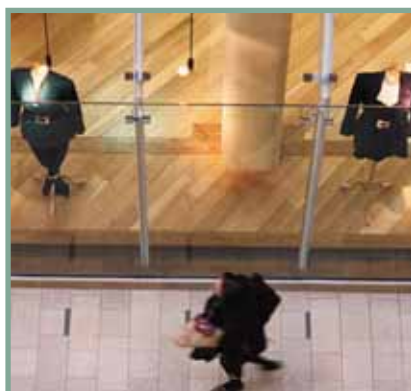
More options

- > Energy Manager is a compact, space-saving analyser which enables you to monitor the TurboChill's energy consumption locally and remotely via BMS connections
- > Leak detection system for F-gas compliance
- > Corrosion-resistant condenser coils for aggressive atmospheres
- > Coil guards to help prevent fin damage
- > Condenser fan air discharge plenum
- > Anti-vibration mounts minimise sound levels
- > Chillerguard® maintenance package to sustain optimal efficiency of the TurboChill

Typical applications



Data centre cooling



Comfort cooling



Process cooling

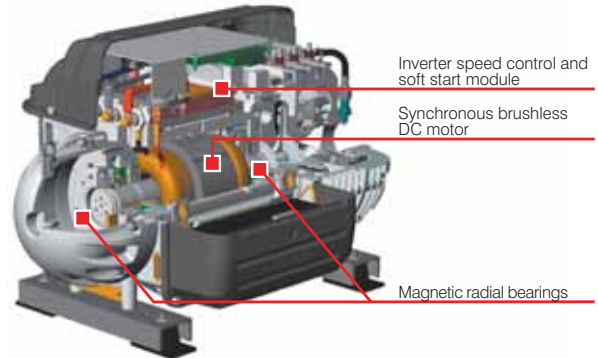
Key feature: New generation Turbocor compressors

The Turbocor centrifugal compressor heralds a new era in compressor technology and efficiency. Magnetic bearings levitate the compressor shaft and with no mechanical contact between mating surfaces, the need for lubrication of the compressor is eliminated allowing variable speed control, more efficient heat exchange and near silent compressor operation.

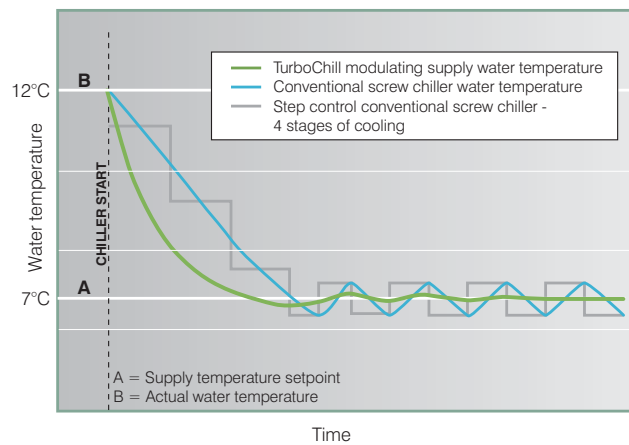
Variable speed compressor control ranging from 25 - 100%, allows the TurboChill to save substantial amounts of energy when operating at part load. Variable speed control facilitates accurate supply water setpoint control. It enables the TurboChill to react to system load fluctuations and exactly match the cooling demand. It also presents a negligible starting current of just 2A, removing the transient starting 'spikes' normally associated with screw chillers of this capacity.

The Turbocor compressor has an EER of up to 4.0 at full load and more than 10.0 at part load, representing an increase in efficiency of 10% and over 100% respectively compared with conventional screw compressors.

With virtually no vibration and fewer moving parts within the compressor, there is no operational 'wear and tear' avoiding costly bearing replacement and allowing extended equipment life and increased reliability. In the event of a power failure the compressor acts as a generator and powers itself down in a controlled manner.



Supply water temperature control:
Modulating TurboChill v staged screw chiller



Key feature: Single or dual circuit models for flexibility and efficiency

The TurboChill offers the flexibility of single or multiple compressors on either a single or dual circuit. All configurations give enhanced efficiency and the dual circuit variant also provides critical redundancy back-up.

Single circuit

The compressor's reliable, oil-free technology enables the TurboChill to operate up to two compressors on a single circuit, intelligently managed by AireTronix controls to significantly increase part load efficiencies and system efficiency. Common condenser and evaporator coils are sized for the maximum cooling required and the full area of the heat exchanger is used to enable more efficient heat exchange. For 99% of the chiller's operation the mass flow of refrigerant and the head pressure are reduced.

Dual circuit

The condenser area is split into equal sections per compressor so whenever compressors in one of the circuits are powered down, the respective fans can be turned off thereby reducing power draw. The dual circuit units also provide greater confidence in a redundancy situation. For example when combined with the discharge ball valves, coils can be isolated whilst another circuit is running. Following a compressor restart, such as after an emergency stop situation, compressors on differing circuits can be started simultaneously, resulting in a greatly reduced system time from start to 100% capacity operation. Smaller refrigerant charges per circuit on dual circuit units mean that fewer site checks are required for F Gas compliance.



Single circuit TurboChill

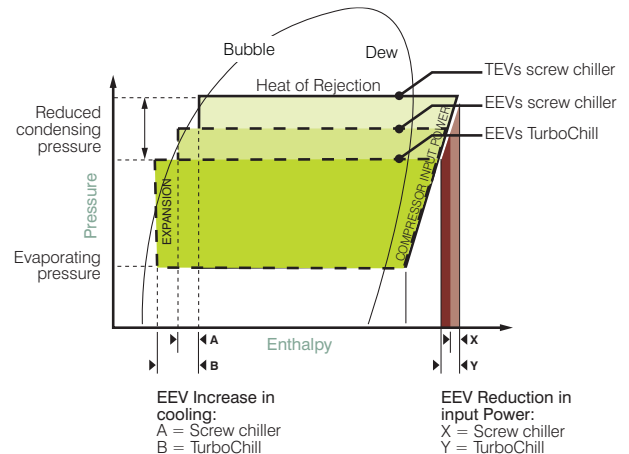


Dual circuit TurboChill

Key feature: Electronic expansion valves double EER

When used in conjunction with the Turbocor compressor, an electronic expansion valve (EEV) can increase part load EER by up to 100%. The EEV reduces the need for unnecessarily high head pressures and results in significant compressor energy savings whenever the ambient temperature and / or cooling requirement are below design conditions. The Turbocor compressor can run at a much lower compression ratio than conventional screw compressors - as low as 20°C condensing temperature when evaporating at 5°C as opposed to around 35°C condensing for a screw compressor.

The Mollier diagram shown right helps to illustrate how this exceptional increase in efficiency is achieved.



Key feature: EC (electronically commutated) fans

Fitted as standard for ultimate condenser efficiency at full and part load, the cleverly-designed axial fans use the latest electronically commutated (EC) motor technology which combines AC and DC voltages to bring the best of both technologies and give increased performance at reduced power input.

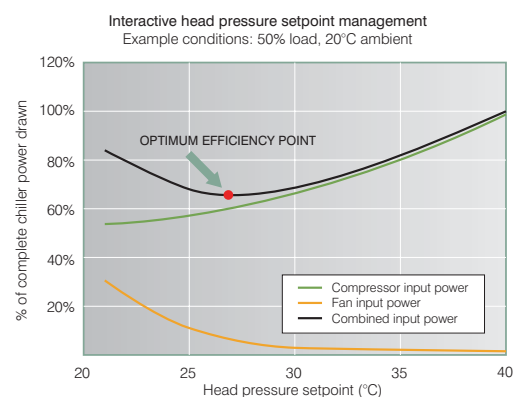
Featuring low motor temperature, the EC fan has a longer life than AC equivalent; electronic and power transformation are completely integrated within the motor and fan control is simple and precise, based on exact feedback from the motor. EC fans combined with high efficiency heat exchangers provide the ultimate in condenser efficiency.



Key feature: Interactive head pressure setpoint management

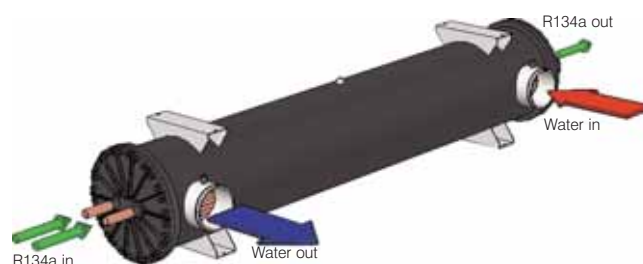
The combination of variable speed compressor, EC fan and interactive control logic allows fans to be slowed down to give the optimum head pressure setpoint in relation to combined power draw of compressor and fans. The fan speed will automatically modulate to achieve the best energy balance for all normal operating conditions.

It can be seen from the graph (right) that reducing the head pressure setpoint decreases the compressor input power at the expense of the fan input power. The optimum efficiency point is therefore where the combined input power (fan and compressor) is at its lowest, as indicated by the red spot in relation to the net chiller cooling capacity.



Key feature: Single pass evaporator

The single pass evaporator offers the same excellent performance and efficiencies as a flooded evaporator but with much lower refrigerant charge, making it easier to comply with the F Gas Regulation. A contraflow configuration allows optimum heat exchange along the whole length of the evaporator (pictured). This enables the compressor to work at a reduced compression ratio and hence more efficiently, with evaporating temperatures typically above 5°C for a 12/7°C water system and nominal EERs increased by up to 10% as a result. Constant superheat offers system stability and reliability and an optimised baffle arrangement enhances heat exchange whilst keeping pressure drop to a minimum.



AIRETronix intelligent, efficient control

The TurboChill is equipped with the very latest intelligent, network-capable AireTronix microprocessor specially developed by Airedale to facilitate automation and optimisation of the system.

The AireTronix microprocessor builds on the compressor's own sophisticated on-board electronics which can manage the compressor operation within safe limits at optimum operating points. Linked with key components within the cooling system, the fully programmable AireTronix microprocessor allows sophisticated, modulating and self-optimising control for increased energy efficiency.

User-friendly display

The AireTronix controller's in-built display allows viewing of the TurboChill's operating status and a multi-button keypad allows adjustment to control parameters by allowing the operator easy access to a menu system.



Standard microprocessor features

- > 134 x 64 pixel backlit display
- > 14 MHz 16 bit CPU
- > 2 MB FLASH program memory
- > 256 KB RAM data memory
- > Remote on / off capability
- > Compressor anti-cycle control
- > Compressor rotation
- > Compressor hours run log and reset
- > Visual alarm display
- > Password protection

Remote supervision

Airedale BMS

Airedale BMS is an intelligent, latest technology BMS software programme which links multi-unit systems managed by AireTronix controllers and located on one or more sites, into a single, proactive control platform. With the click of a button, information can be pulled back automatically and used for remote monitoring and control, including 24/7 alarm indication, time scheduling and adjustment of temperature setpoints for increased energy efficiency.

Integration

The network-capable AireTronix controller can be integrated with a wide range of BMS protocols.

pCOWeb Ethernet solution

pCOWeb supervisory plug-in cards make communicating with the TurboChill purely a matter of logging onto the office Intranet or the web. Based on Ethernet TCP/IP secure technology and SNMP features, pCOWeb requires no proprietary cabling or monitoring software, little or no set-up on site and is pre-programmed with an IP address.

Modbus®

ECHELON
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TREND

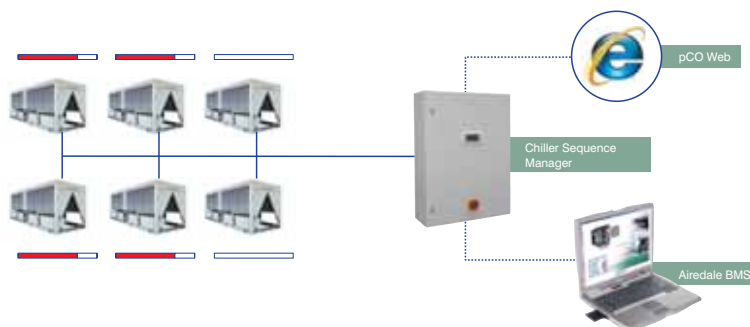


Airedale Controls - additional services

- > Software program design that will manage everything in the air conditioning system, fine-tuning it for energy efficiency
- > Remote Monitoring Centre – an internet-based bureau service for customers with critical sites
- > After-Sales including chiller sequencing, network setup and integration
- > Live Demonstration and Training Centre

Key option: Chiller Sequence Manager

A super-intelligent control system, the Chiller Sequence Manager can integrate up to six TurboChill units into a single operating system pre-programmed to run as master/slave or run/standby. The master controller will manage the cooling system for the most energy-efficient solution ensuring equal wear on compressors. It allows remote or time zone set point adjustment across the sequence and will react immediately to critical alarms and network failure.



TurboChill unit identification

As the TurboChill product range can exactly match cooling capacity to application, the conventional chiller selection process and capacity breakdown of the chiller range no longer applies. Instead, the unit nomenclature reflects the physical make-up of the product rather than the actual specified performance.

	Example	TTC	1	2	B1	10x	95	L
TTC	TurboChill centrifugal chiller							
1 - 2	Number of refrigeration circuits							
1 - 4	Number of compressors							
xy	Internal heat exchanger reference							
6 to 20	Number of fans							
70 / 95	Maximum fan speed x 10rpm							
L / R	Left / right handed water connections							

Please contact Airedale with your specific requirements and we will be pleased to provide you with an individually tailored selection and technical detail that achieves your optimum model in terms of efficiency, sound level, footprint and price, for each application. For instance in the following table, three optimum models, each with the same cooling capacity have been selected for the same application, at the same operating conditions but with different priorities: model a) is selected for maximum efficiency (as reflected in the high EER/ESEER values); b) for best footprint and c) for best sound level.

Optimisation criteria	Model selected	Nominal cooling (kW) ¹	EER ²	ESEER ³	Sound pressure @ 10m (dBA)	Dimensions (H x W x L)(mm)	Operating weight (kg)
(a) Best EER	TTC12B212X95R	500	3.31	5.44	57	2600 x 2200 x 6675	6730
(b) Best footprint	TTC12B108X95R	500	3.04	5.10	56	2600 x 2200 x 4675	5730
(c) Best sound level	TTC12B108X70R	500	2.81	5.04	53	2600 x 2200 x 4675	5730

For your further guidance, in the table below, a number of units from 200kW to 1100kW at nominal conditions and at both 950 and 700rpm fan speeds have been pre-selected from over 150 model variants.

Technical specifications							
Model no.	Sound Level	Nominal cooling (kW) ¹	EER ²	ESEER ³	Sound pressure @ 10m (dBA)	Dimensions (H x W x L)(mm)	Operating weight (kg)
Single circuit							
TTC11A106X95R	Quiet	250	3.16	4.55	55	2600 x 2200 x 3675	4510
TTC12B108X95R		450	3.10	5.17	56	2600 x 2200 x 4675	5730
TTC12B212X95R		500	3.25	5.49	57	2600 x 2200 x 6675	6730
TTC12C112X95R		600	3.17	5.38	57	2600 x 2200 x 6675	6880
TTC11A106X70R	Super Quiet	250	3.16	4.55	52	2600 x 2200 x 3675	4510
TTC12B110X70R		450	3.17	5.37	53	2600 x 2200 x 5675	6210
TTC12B212X70R		500	3.25	5.49	53	2600 x 2200 x 6675	6720
TTC12B212X70R		550	3.23	5.46	53	2600 x 2200 x 6675	6890
Dual circuit							
TTC22B210X95R	Quiet	450	3.21	4.73	56	2600 x 2200 x 5675	6160
TTC23C214X95R		650	3.10	4.93	58	2600 x 2200 x 8100	7810
TTC23D316X95R		800	3.10	4.96	58	2600 x 2200 x 9100	8380
TTC24D220X95R		1000	3.08	4.90	59	2600 x 2200 x 11100	9530
TTC22B212X70R	Super Quiet	450	3.25	4.95	53	2600 x 2200 x 6675	6680
TTC23C216X70R		650	3.14	5.15	54	2600 x 2200 x 9100	8270
TTC23D316X70R		750	3.09	5.01	54	2600 x 2200 x 9100	8380
TTC24D220X70R		950	3.07	4.95	56	2600 x 2200 x 11100	9550

1. Nominal cooling capacity at 7/12°C water and 35°C ambient temperature
2. EER at 7/12°C water and 35°C ambient temperature, based on TOTAL input power of compressors and fans
3. ESEER based on Eurovent standard calculation method

To follow: TurboChill FreeCool

Pending the release of the TurboChill FreeCool chiller, the Ultima FreeCool chiller is still available.

Airedale energy efficiency



At Airedale we work with our customers to deliver quality, reliable, energy-efficient cooling solutions that are right for each application and the environment. Dedicated research and innovative design combined with a vast pool of knowledge and a state-of-the-art Test Centre mean that Airedale technology never stands still and is continually moving forward. Our committed team of engineers are constantly developing new products for improved performance balanced with even better energy efficiency.



ChillerGuard Service Plan – maintaining your chiller's efficiency

The TurboChill is a highly efficient chiller. To make sure its full efficiency is realised after leaving our factory, we provide as standard, a first year ChillerGuard Service Plan with every TurboChill. An Airedale commissioning engineer will set the chiller to work on site and optimise the control settings in order to meet the user's original specification and the environment into which the unit has been installed.

Once commissioned the ChillerGuard Service Plan provides a planned, preventative maintenance package to sustain the optimum efficiency of the TurboChill and enable the user to see real savings in energy costs and reduced carbon emissions.

A priority, 24/7 emergency helpline; professional support and call-out service is on hand throughout the year with guaranteed response by a fully qualified Airedale engineer. ChillerGuard also ensures you are F Gas compliant and incorporates a full parts and labour warranty for the first 12 months.



For more information visit www.airedale.com



For customers outside the UK, our international distributors trained by Airedale would be pleased to offer service on Airedale units.



- > For the latest information on our products please visit: www.airedale.com
- > Please refer to the technical manuals for more detailed information

Your nearest Airedale distributor is:



ISO 14001
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air conditioning for every environment

**Airedale International
Air Conditioning Limited**

Leeds Road, Rawdon
Leeds, LS19 6JY, England

T : +44 (0) 113 239 1000
F : + 44 (0) 113 250 7219
E : enquiries@airedale.com
W : www.airedale.com

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