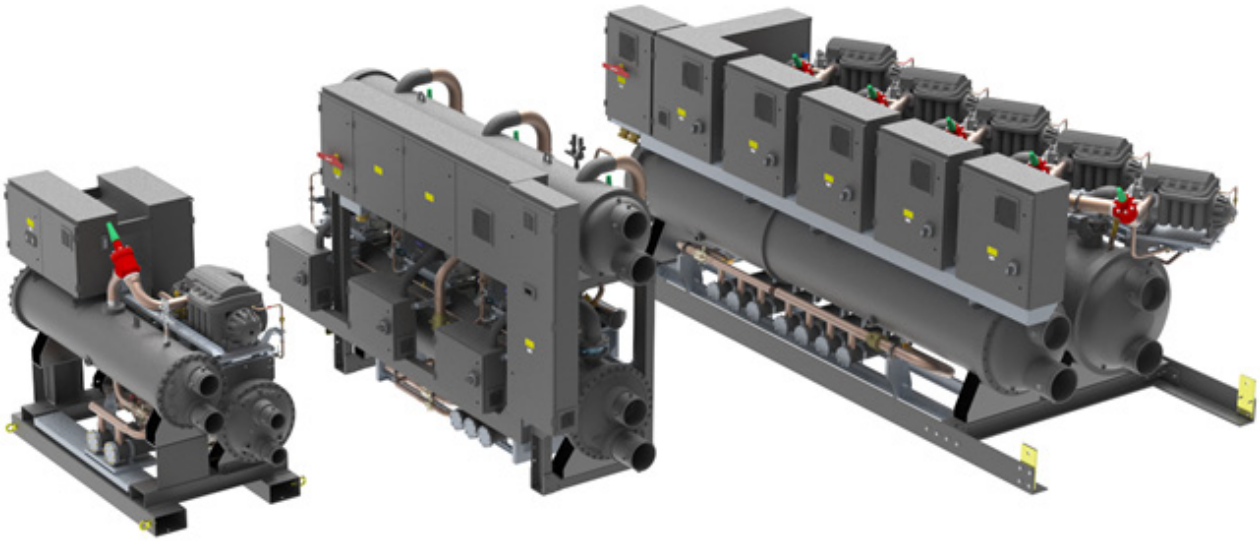
TurboChill™ Hydro
Water Cooled Chiller
200kW to 3000kW
R134a
R513A



Technical Manual

Original Instructions

ecoDesign COMPLIANT

CE

bsi. ISO 9001 Quality Management FM00542

ISO 14001 Environmental Management EMS52086

Customer Services

Warranty, Commissioning & Maintenance

As standard, Airedale guarantees all non consumable parts only for a period of 12 months, variations tailored to suit product and application are also available; please contact Airedale for full terms and details.

To further protect your investment in Airedale products, Airedale can provide full commissioning services, comprehensive maintenance packages and service cover 24 hours a day, 365 days a year (UK mainland).

For a free quotation contact Airedale or your local Sales Engineer.

All Airedale products are designed in accordance with EU Directives regarding prevention of build up of water, associated with the risk of contaminants such as Legionella.

For effective prevention of such risk it is necessary that the equipment is maintained in accordance with Airedale recommendations.

ChillerGuard™

In addition to commissioning, a 24 hour, 7 days a week on-call service is available throughout the year to UK mainland sites. This service will enable customers to contact a duty engineer outside normal working hours and receive assistance over the telephone. The duty engineer can, if necessary, attend site, usually within 24 hours or less.

CAUTION⚠	Warranty cover is not a substitute for maintenance. Warranty cover is conditional to maintenance being carried out in accordance with the recommendations provided during the warranty period. Failure to have the maintenance procedures carried out will invalidate the warranty and any liabilities by Airedale International Air Conditioning Ltd.

Full details will be forwarded on acceptance of the maintenance agreement.

Spares

A spares list for 1, 3 and 5 years will be supplied with every unit and is also available from our Spares department on request.

Training

As well as our comprehensive range of products, Airedale offers a modular range of Refrigeration and Air Conditioning Training courses, for further information please contact Airedale.

Customer Services

For further assistance, please e-mail: connect@airedale.com or telephone:

UK Sales Enquiries	+ 44 (0) 113 239 1000	connect@airedale.com
International Enquiries	+ 44 (0) 113 239 1000	connect@airedale.com
Spares Hot Line	+ 44 (0) 113 238 7878	spares@airedale.com
Airedale Service	+ 44 (0) 113 239 1000	service@airedale.com
Technical Support	+ 44 (0) 113 239 1000	tech.support@airedale.com
Training Enquiries	+ 44 (0) 113 239 1000	training@airedale.com

For information, visit us at our Web Site: www.airedale.com

Health and Safety

IMPORTANT

The information contained in this manual is critical to the correct operation and maintenance of the unit and should be read by all persons responsible for the installation, commissioning and maintenance of this Airedale unit.

Safety

The equipment has been designed and manufactured to meet international safety standards but, like any mechanical / electrical equipment, care must be taken if you are to obtain the best results.

CAUTION ⚠	When working with any air conditioning units, ensure that the electrical isolator is switched off prior to servicing or repair work and that there is no power to any part of the equipment. Ensure that there are no other power feeds to the unit such as fire alarm circuits, BMS circuits etc. Electrical installation commissioning and maintenance work on this equipment should be undertaken by competent and trained personnel in accordance with local relevant standards and codes of practice.

A full hazard data sheet in accordance with COSHH regulations is available should this be required.

Refrigerant Warning

These Airedale units use either R513A or R134a refrigerant which require careful attention to proper storage and handling procedures. Airedale chillers using R513A and R134a refrigerants should be stored and handled in accordance with EN378-3:2016+A1:2020. The correct manifold gauges should be used for the corresponding refrigerant.

Service Equipment

All service personnel must have refrigerant handling training. They must use only manifold gauge sets designed for use with refrigerants. Use only refrigerant recovery units and cylinders designed for the pressure category of the refrigerants. The refrigerants used in this range of products are classified under the COSHH regulations as an irritant, with set Workplace Exposure Levels (WEL) for consideration if this plant is installed in confined or poorly ventilated areas. A full hazard data sheet in accordance with COSHH regulations is available should this be required. Refrigerants must only be charged in the liquid state and must be stored in a clean, dry area away from sunlight. The refrigerant must never be stored above 50°C.

Global Warming Potential

R513A refrigerant has a GWP of 631 (Based on EN 378-1:2016+A1:2020, 100 year life).
R134a refrigerant has a GWP of 1430 (Based on EN 378-1:2016+A1:2020, 100 year life).

Pressure Equipment Directive

Minimum and Maximum Operation Temperature (TS) and Pressure (PS)

Refrigeration

Allowable Temperature Range (TS) Min -20°C* to Max 120°C**
Maximum Allowable Pressure (PS) High Side 20.0 Barg Low Side 11.0 Barg

*Based on the refrigerant temperature in the unit off state in the lowest permitted ambient temperature.
**Based on the maximum allowable super heated refrigerant temperature.

Waterside

Allowable Temperature Range (TS) =	Condenser: Min -20°C* to Max 60°C**
	Evaporator: -20°C* to Max 40°C**
Maximum Allowable Pressure (PS) =	Condenser: Unit Specific
	Evaporator: 10.0 Barg

*Based on the waterside temperature in the unit in the off state
**Based upon the highest permissible waterside temperature

Pressure System Safety Regulations 2000

Refrigeration assemblies/systems may constitute a Pressure System as defined in the Pressure System Safety Regulations 2000.

Ecodesign Directive 2009/125/EC

The product range within this document is designed in accordance with the European Ecodesign Directive 2009/125/EC. The Ecodesign Appendix at the end of the document details the products MEPS (Minimum Efficiency Performance Standards). Products sold outside of the EU are exempt from this directive.

Dangerous Substances and Explosive Atmospheres Regulations

The completion of a DSEAR (Dangerous Substances and Explosive Atmospheres Regulations) risk assessment must be completed as a legal requirement by the employer of the business where this equipment will be installed. This is not the responsibility of Airedale International Air Conditioning Ltd to undertake as the manufacturer of the equipment.

Personal Protective Equipment

Airedale recommends that personal protective equipment is used whilst installing, maintaining and commissioning equipment.

Manual Handling

Some operations when servicing or maintaining the unit may require additional assistance with regard to manual handling. This requirement is down to the discretion of the engineer.
Remember do not perform a lift that exceeds your ability.

CAUTION PACEMAKER WEARERS
To avoid any risk of injury, any work to be carried out on or around the compressor should be done with personnel that do not have pacemakers fitted.

CAUTION ⚠	Care must be taken when working around the discharge pipe work of the unit. High surface temperatures may exist during unit operation. The R134a refrigerant has a boiling point of -26.1°C. The R513A refrigerant has a boiling point of -29.2°C.

Electromagnetic Compatibility (EMC)

CAUTION ⚠	Units without compressor enclosures are class A group 1 products and are only intended to be used at locations where there is a distance greater than 30m between the equipment and third party sensitive radio communication equipment.

Occupancy Note - Plant Rooms

In line with EN 378-3:2016+A1:2020 please follow the guidelines for determining the maximum refrigerant charge for the installation. This calculation takes into account the level of access to the installation (general access, supervised or authorized) and the class of the installation. The class is determined by the proportion of refrigerating systems/ components that interact with an occupied space. Using this information and the properties of the refrigerant selected a calculation of the maximum permissible charge can be determined. Annex C of EN 378-3:2016+A1:2020 breaks this process down. As a consequence of this review it may be necessary to include other safety features in the installation such as emergency ventilation and leak detection. For machinery room applications EN 378-3:2016+A1:2020, 4.3 applies.

Environmental Considerations

Freeze Protection

The instructions below must be followed to protect the unit during low temperature operation in both the ON and OFF state.

An appropriate concentration of glycol(1) is required when the unit is operating with a supply water temperature set point of <=+5°C or if the evaporating temperature is <=+3°C.

Units subject to ambient temperatures lower than 0°C, a minimum of 2 of the following are required:

1. Glycol of an appropriate concentration(1) is used within the system to ensure adequate freeze protection. Please ensure that the concentration is capable of protection to at least 3K lower than the minimum ambient the chiller can be subjected to.

2. The water/glycol solution should be continuously circulated through all waterside pipework and coils to prevent static water from freezing even during shut down periods, when the ambient is within 3K of the solution freeze point(1) (i.e. if the solution freezes at 0°C, the pump must be operating at 3°C ambient).

3. Trace heating should be adequately sized and provided by others for all interconnecting water pipework between the chiller and the process.

Trace Heating

Water pipework trace heating is included as standard within the chiller. It is imperative that as soon as the chiller is filled with water that a separately fused, permanent, single phase and neutral supply is fitted to the trace heating, evaporator immersion heater and controls circuits. This circuit should be backed up in the event of a power failure to prevent a potential freeze scenario. Please reference the interconnecting wiring diagram for further information.

Maintenance

It is important that the glycol concentration is not diluted, if a pressurisation unit is present to maintain system pressure then Airedale advises that a premixed solution of glycol to the required concentration is used and not water. Airedale recommends that during prolonged cold periods or during winter months that the frequency of glycol concentration checks are increased to ensure the glycol meets the required concentration.

During any reclamation of refrigerant from the evaporator during the off state, ensure the water/glycol solution is continuously circulated to prevent static water from freezing.

If maintenance work is being carried out on the chiller preventing fluid flow whilst the ambient temperature is within 3K of the fluid freezing point then the fluid circuit must be fully drained.

Free Cooling Chillers

For free cooling chillers it is mandatory that glycol of an appropriate concentration(1) is used within the coil volume. The concentration should be capable of protection to at least 3K lower than the minimum ambient.

(1) Refer to your glycol supplier for specific details. Airedale insists that the glycol freeze point (the temperature at which ice crystals begin to form) is used rather than the burst point (the temperature the fluid freezes and becomes expansive) for all pumped systems. Failure to follow these instructions can damage pumps if slush is present and the pumps start to run.

Flow Control

For fixed flow applications, when the chiller is in operation the design water flow MUST be maintained at all times within acceptable tolerances (±5%). For variable flow systems, flow variation must not exceed 10% of the design flow per minute and both the evaporator minimum/maximum flow rates should always be respected. Care to be taken when selecting a chiller within 5% of the evaporator minimum flow rate. The end user must ensure that flow variation does not fall below this minimum as the chiller will shut down.

Operating Limits

For 100% water standard unit

Min ambient air DB	**-20°C**
Maximum ambient air DB at full load operation	**35°C**
Maximum ambient air DB at reduced load operation	**40°C**
Minimum supply water temperature evaporator	**5°C**
Maximum supply water temperature evaporator	**20**
Maximum return water temperature evaporator	**30***
Min / Max ΔT Evaporator	**3K** / 10K**
Minimum return water condenser	**10°C**
Maximum return water condenser	**55°C**
Min / Max ΔT Condenser	**5K / 10K**

* With a 10K DT

** For 1MW and below

Environmental Policy

It is our policy to:

- Take a proactive approach to resolve environmental issues and ensure compliance with regulatory requirements.
- Train personnel in sound environmental practices.
- Pursue opportunities to conserve resources, prevent pollution and eliminate waste.
- Manufacture products in a responsible manner with minimum impact on the environment.
- Reduce our use of chemicals and minimise their release to the environment.
- Measure, control and verify environmental performance through internal and external audits.
- Continually improve our environmental performance.

CE Directive

Airedale certify that the equipment detailed in this manual conforms with the following EC Directives:

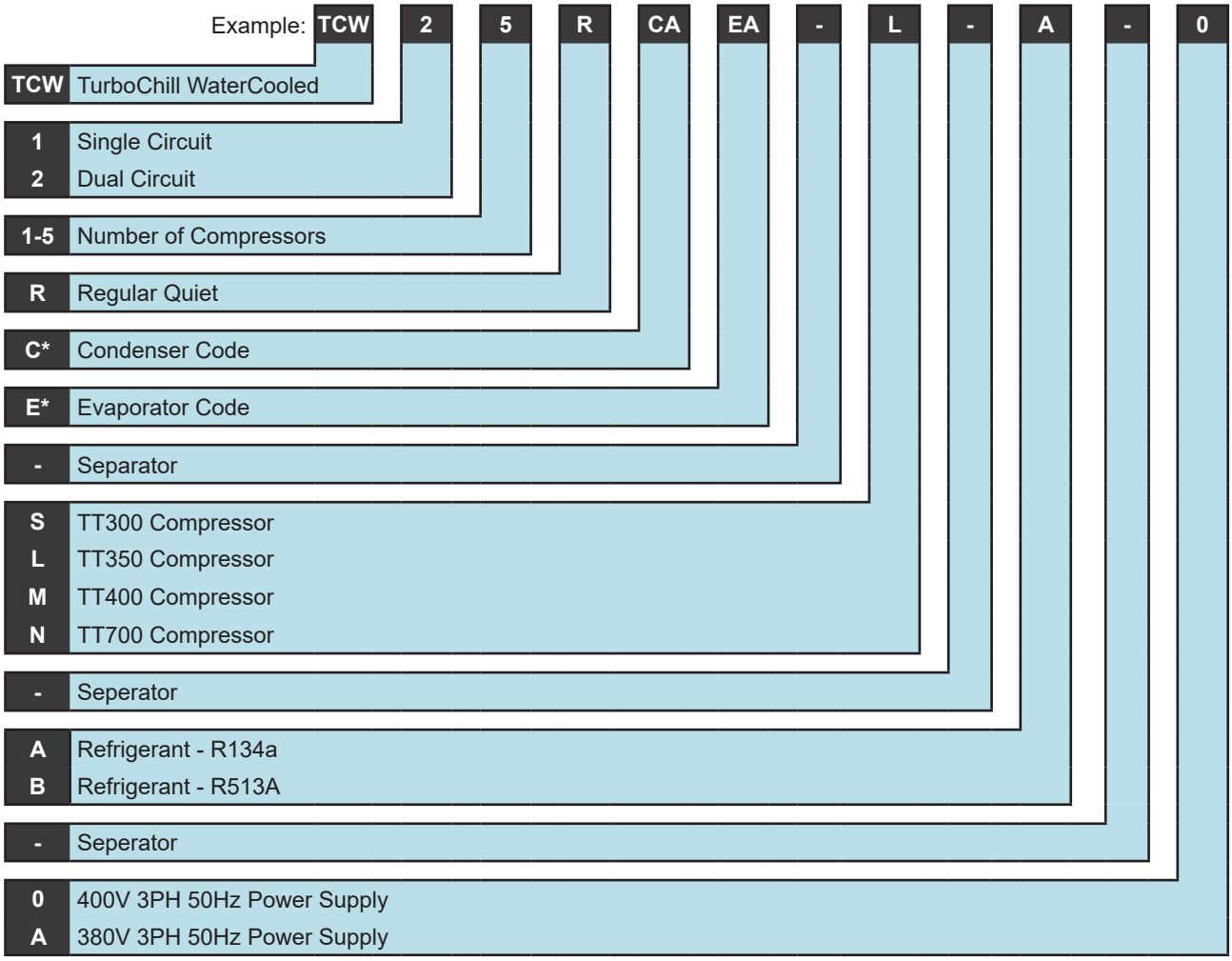
Electromagnetic Compatibility Directive (EMC)	2014/30/EU
Machinery Directive (MD)	89/392/EEC version 2006/42/EC
Pressure Equipment Directive (PED)	2014/68/EU
Ecodesign	2009/125/EC

To comply with these directives appropriate national & harmonised standards have been applied. These are listed on the Declaration of Conformity, supplied with each product.

Contents

Introduction

Nomenclature



Introduction

The Airedale TurboChill™ Hydro range of water cooled chillers uses the technologically superior TurboCor range of compressors. The range is comprised of both low and high pressure ratio optimised compressors to ensure that an optimised selection for a wide spread of conditions can be obtained. The cooling capacity ranges from 200kW to 3000kW at standard operating conditions as per EN 14825:2018 cooling tower conditions. Three unit configurations exist with a number of compressor quantity and size configurations matching customer requirements in terms of:

- Capacity
- EER/SEER (Seasonal Energy Efficiency Ratio as per EU 2016-2281 Ecodesign)
- Footprint
- Range of operation

Refrigerant

The range has been designed and optimised for operation with ozone benign R134a refrigerant or R513A refrigerant.

Construction

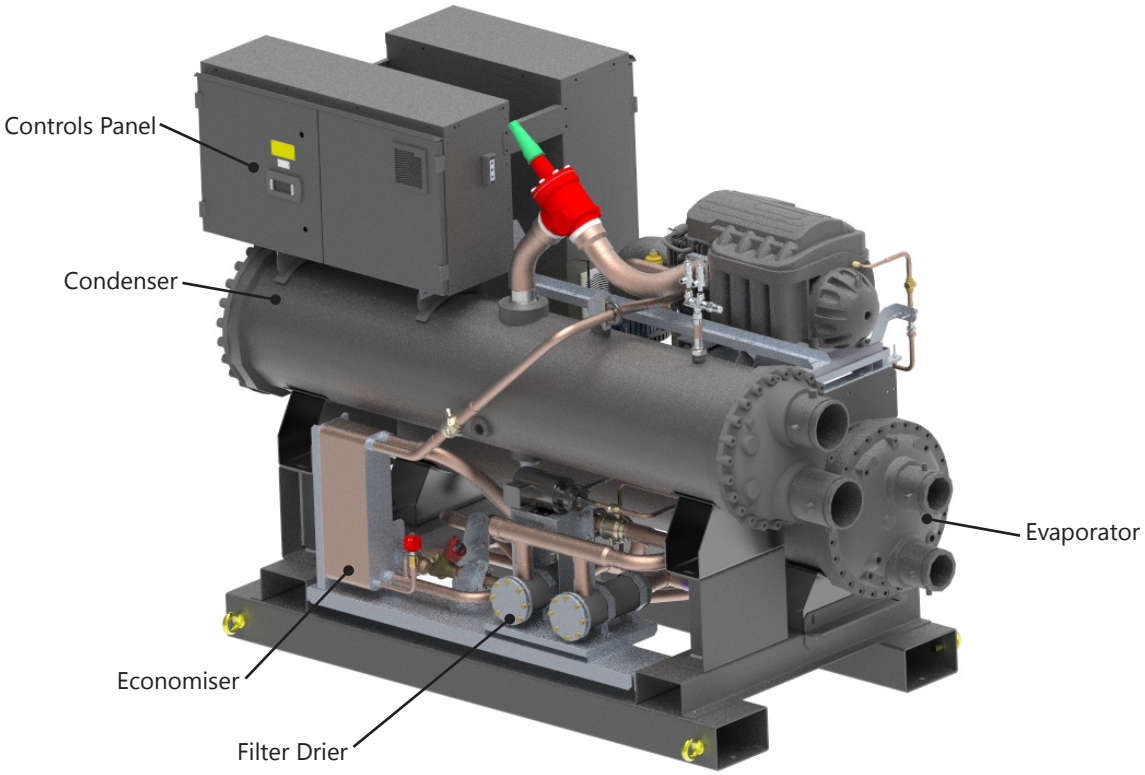
There are three main unit configurations that make up this range.

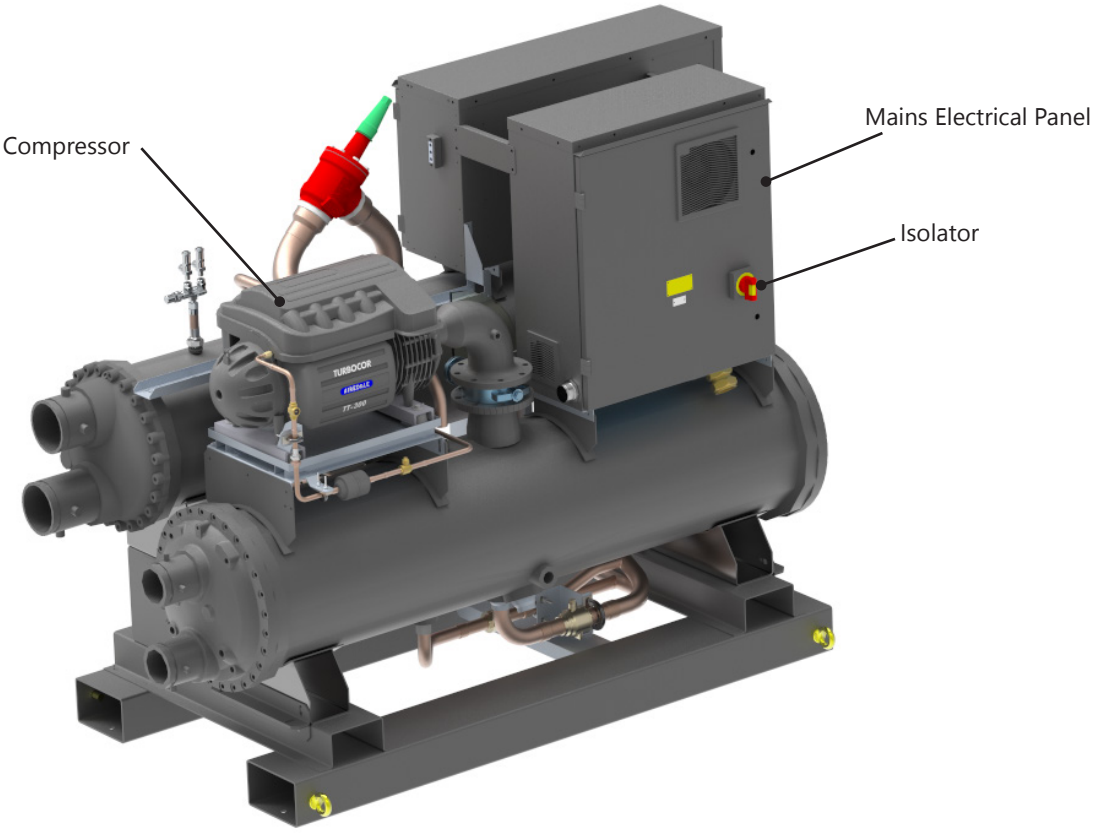
'Mini' units utilise a fabricated base frame that has been epoxy baked to provide a durable finish. This frame acts as the key lifting structure and support for the unit heat exchangers. All panels and sheet metal is galvanised and epoxy baked in a Black Grey (RAL 7021) finish. The units can be either craned or fork lifted into position.

'Midi' units use two fabricated steel section frames to support each of the heat exchangers and create an innovative compact structure helping deliver exceptional kW/m². Each frame is epoxy powder baked for durability and all control and power panels will be finished in the same Black Grey (RAL 7021) finish. The units can be either craned or fork lifted into position using optional lifting frame.

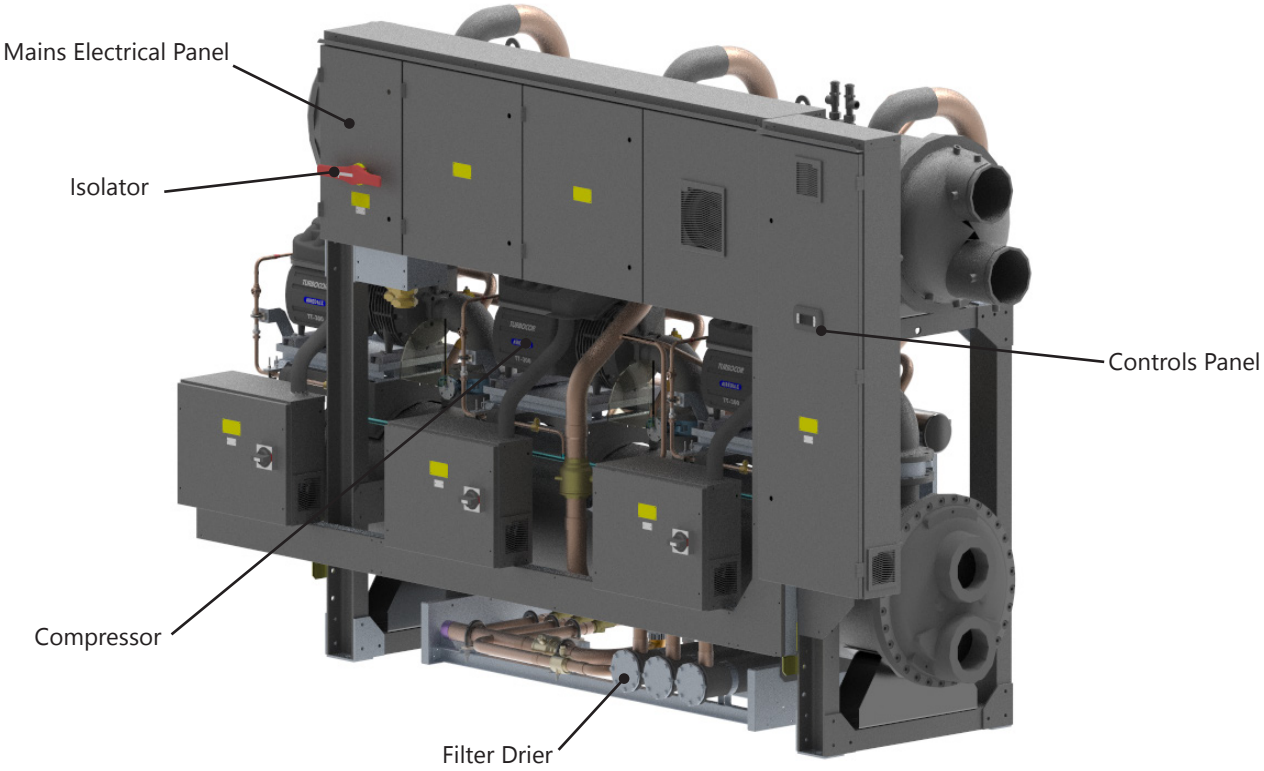
'Maxi' units represent the highest capacities within this range with large shell and tube heat exchangers to deliver maximum capacity. As such these units sit upon unequal steel sections to ensure maximum rigidity in operation and during transit. This also keeps sheet metal manufacture to a minimum in the base. All panels use Black Grey (RAL 7021) paint finish. These units can only be positioned using a crane four point lift.

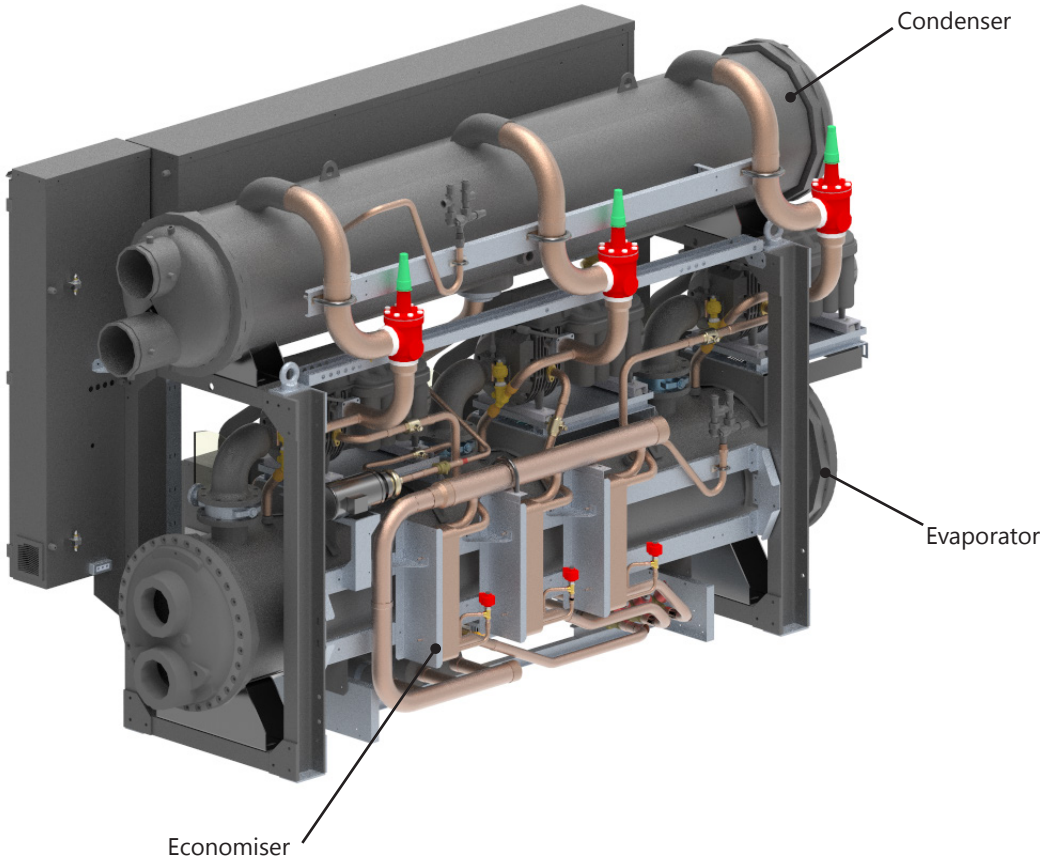
Overview - Mini Units



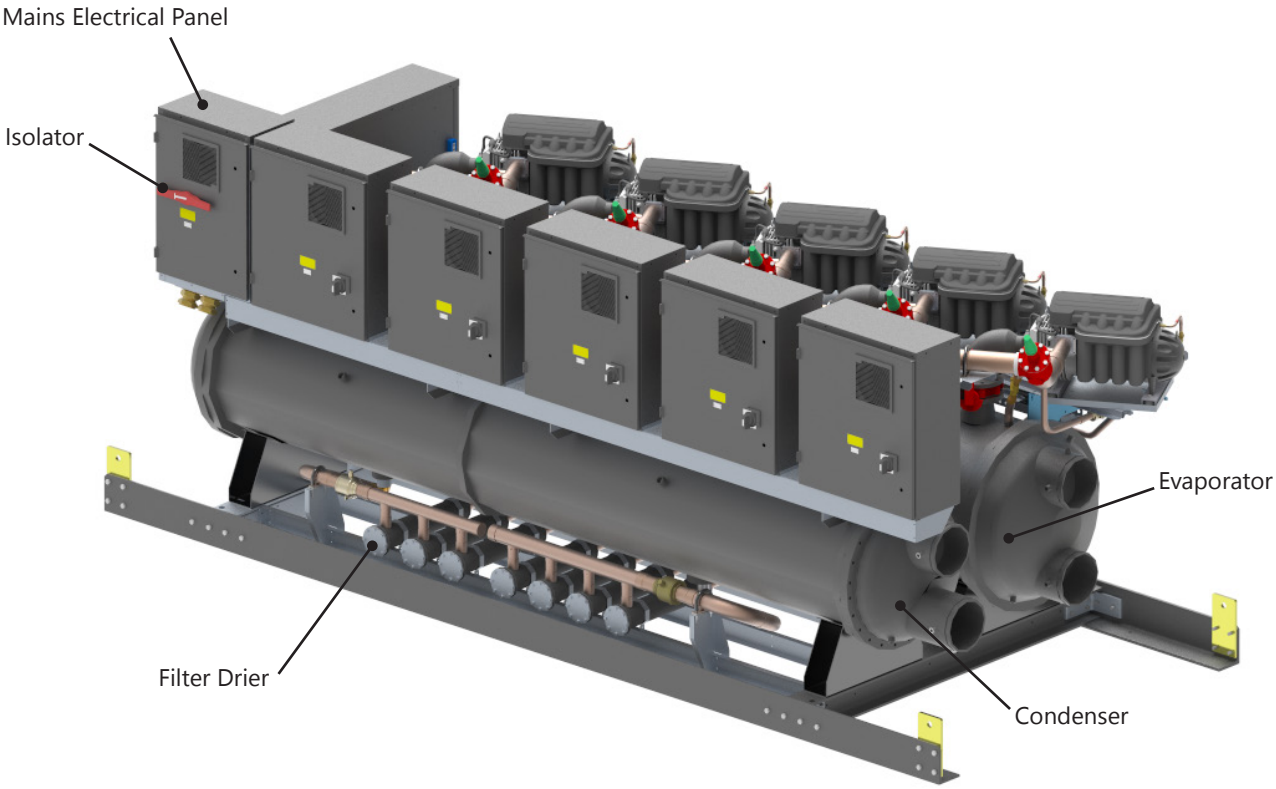


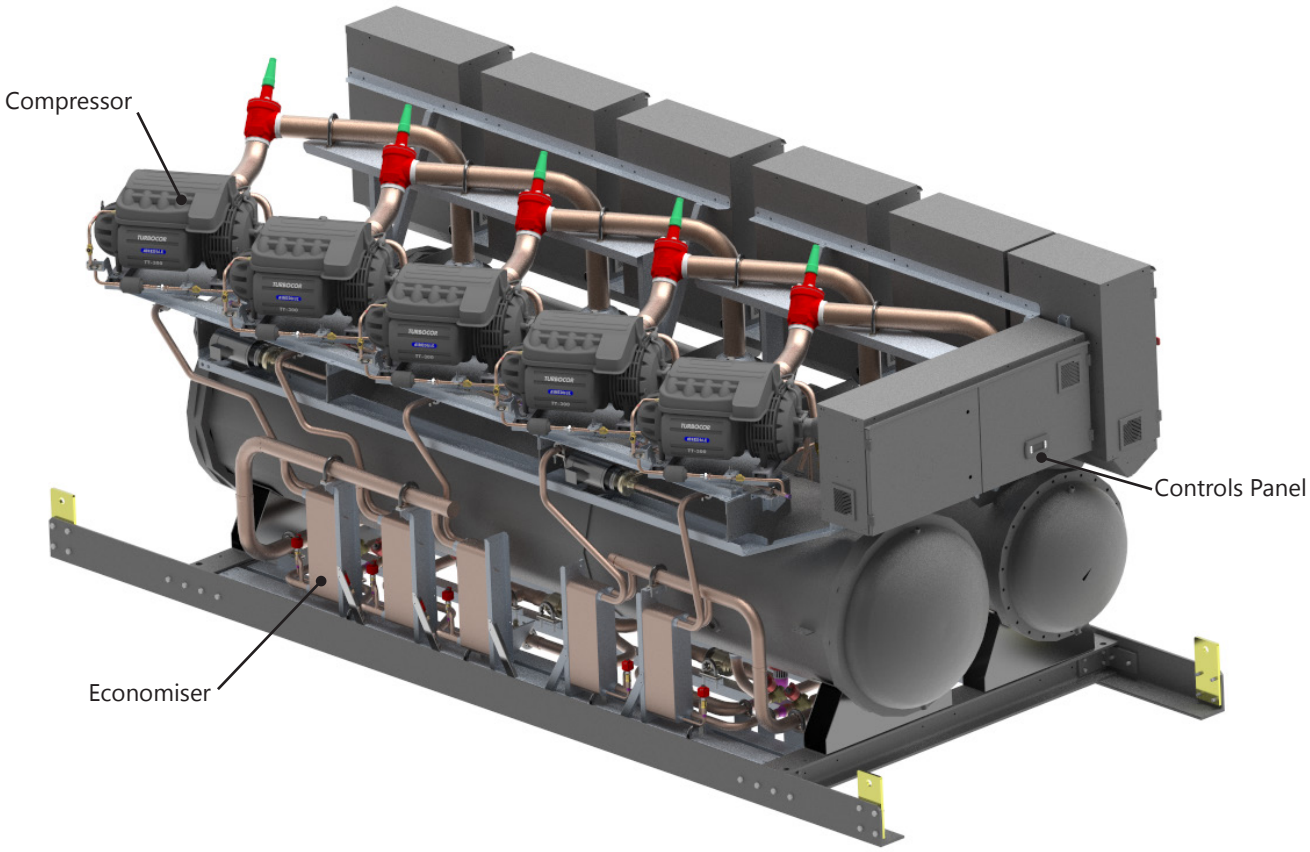
Overview - Midi Units





Overview - Maxi Units





Standard Features

The TurboChill™ Hydro range shall be supplied complete with:

- TurboCor oil free compressor
- Helix controls system
- Shell and tube spray flooded evaporator
- Shell and tube flooded condenser
- Single or dual refrigerant circuit, depending upon unit
- Subcool efficiency control
- Maintainable dual pressure relief valves on evaporator and condenser
- Electronic expansion valve/s
- Grooved water connections
- Three phase mains isolator

Refrigeration

This range has been designed and optimised for operation with ozone benign R134a or R513A refrigerant. Both refrigerants allow optimised selection options for a number of different customer requirements.

The refrigeration circuit is supplied with the following:

- A full operating charge of R134a or R513A refrigerant
- A liquid injection cooling circuit fitted to each compressor complete with sight glass, filter drier and ball valve
- Discharge line check valves with isolation functionality for enhanced maintainability
- Liquid line shut off valves
- Filter driers with replaceable cores
- Evaporator and liquid line sight glass
- 1 high pressure switch with manual reset per compressor
- Liquid pressure transducer
- A spray bypass actuator fitted to maximize unit efficiency in full and part load

Refrigerant Leak Detection System

A factory calibrated leak detection system, sensitive to the selected refrigerant, shall be fitted as standard.

Water/Glycol

Each water/glycol circuit shall be supplied with differential pressure sensors across the evaporator and condenser, and strategically placed drain valves.

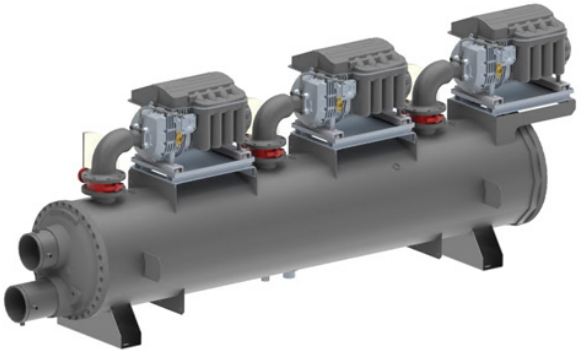
Refrigeration

		System Configuration			
		S	L	M	N
Refrigeration	Spray Shell and Tube Evaporator	●	●	●	●
	Flooded Shell and Tube Condenser	●	●	●	●
	TurboCor Compressor(s)	●	●	●	●
	R513A Refrigerant	●	●	●	●
	R134a Refrigerant	●	●	●	●
	Compressor Starting Valve(s)	●	●	●	●
	Electronic Expansion Valve(s)	●	●	●	●
	Discharge Stop Check Valve(s)	●	●	●	●
	HP Transducer(s) and Switch(es)	●	●	●	●
	Suction Line Isolation Valve(s)	●	●	●	●
	Liquid Line Injection Motor Cooling	●	●	●	●
	Liquid Refrigerant Pump(s)	○	○	○	○
	Filter Drier(s)	●	●	●	●
	Economiser Circuit	○	○	○	○
	Evaporator Dual Pressure Relief Valve Assembly	●	●	●	●
	Condenser Dual Pressure Relief Valve Assembly	●	●	●	●
	Premium Leak Detection	●	●	●	●

● Standard Feature ○ Optional Feature ━ Feature Not Available

Spray Evaporator

Spray flooded evaporator technology is used to dramatically reduce unit refrigerant charge by up to 50% compared with a traditional flooded evaporator, whilst maintaining similar efficiencies. This reduction in refrigerant charge within the evaporator means that capacitive liquid level technology is no longer required to regulate evaporator efficiency. To further maximise efficiency of the heat exchanger in part load, a spray bypass valve has also been fitted to maintain effective distribution of refrigerant within the heat exchanger, maximising part load efficiency. The heat exchanger is insulated with closed cell polyurethane foam which is to class “O” fire rating and the material is UV resistant. Two immersion heaters and thermostat protect the evaporator against freeze up in low water temperature conditions. In compliance with Airedale freeze protection policy, always ensure appropriate glycol concentration.



Shell and Tube Flooded Condenser

Flooded condensers are used throughout this range to ensure maximum industry efficiency to help keep head pressures as low as possible. All heat exchangers have internal distributors to ensure even tube coverage to maximise condensation and ensure only subcooled refrigerant is fed to the rest of the circuit. Two immersion heater(s) and a thermostat protect the condenser against freeze up in low water temperature conditions. In compliance with Airedale freeze protection policy, always ensure appropriate glycol concentration.

Compressor Starting Valves
Another use for these valves within this range is to control the start-up and shut down of the Turbocor compressor. These valves allow a smooth transition of discharge gas from the bypass line into the evaporator back into the condenser and vice versa. This functionality is critical to ensure that the compressors don't surge during start and stop conditions particularly in high pressure ratio conditions.

Electronic Expansion Valves (EEV)
The TurboChill™ Hydro range uses the latest in expansion valve technology to ensure that the system is continually operating at peak efficiency. Electronic expansion valves differ from thermostatic variants such as they can allow the system to maintain a series of parameters such as suction pressure and subcool. Given the programmable nature of these devices they can also be used to mitigate failure mode scenarios minimising the risk associated with high pressure and low pressure operation. None of this functionality was possible previously with mechanical type valves.

During unit operation the system controller will continuously monitor the control variables of the system and open or close the valve to stay within predefined parameters that have been determined through extensive testing. This precise control translates into stable system cooling output and compressor stability. This range takes this technology one step further to ensure precise control even at part load conditions and places refrigerant flow only in active heat exchangers on a common circuit to maximise heat transfer.

Discharge Stop Check Valves
A combined isolation and check valve is installed per compressor in every chiller within this range. These valves offer low operational pressure drops and associated temperature losses whilst maintaining good flexibility for ongoing maintenance and reduced leakage risks. The valves also come with internal damping to minimise the effect of pulsations in low load conditions with minimal flow required to fully open the valve.

HP Transducers and Switches
HP transducers and switches are fitted to the unit to protect against high pressures. High pressure switches are auto reset.

Liquid Line Ball Valves
Liquid line ball valves are fitted to ensure ease of maintenance during shut down periods.

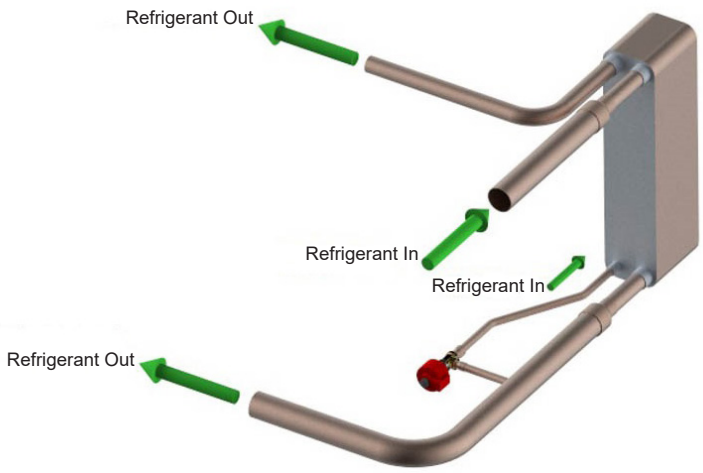
Sight Glass
A liquid line sight glass is provided on the expansion valve to ensure that subcooled refrigerant is reaching the valve and sustaining efficient operation of the chiller. Each sight glass also includes a moisture indicator, so that the level of moisture within each circuit can be observed. If the indicator turns yellow the level of moisture in the system is too high so the filter driers should be changed.

Liquid Refrigerant Pump
To enable operation of the compressor in extremely low pressure ratio applications, when condenser water temperatures are low, a liquid refrigerant pump can be installed. This pump ensures the return of subcooled liquid refrigerant back to the compressors to sustain adequate inverter and motor cooling. The greatest benefit associated with this option is the reduced power consumption of the compressor when operating at these low pressure ratio conditions. Where no liquid pump is installed, condenser water flow will be regulated to ensure head pressure does not fall below the minimum required for sustained cooling. Condenser water flow is regulated using either the optional condenser bypass valve assembly or pump speed regulation of condenser flow. When specified, the liquid refrigerant pump is installed per circuit.

Filter Driers
Filter driers are fitted to ensure that the expansion device is protected from any potential contaminants and to absorb any unwanted moisture in the system. This can be serviced with changeable inner cores.

Economiser Circuit

All unit variants have the option to be further optimised by adding an economiser circuit. The addition of an economiser circuit provides increased cooling and can enhance EER, in full and part load operation. Sub cooled liquid is expanded using a dedicated EEV (electronic expansion valve) to medium pressure and passed through one side of a plate heat exchanger. Through the other side flows the 'normal' pressure liquid. The result is that the sub cooling of the liquid entering the system EEV is increased, which improves evaporator performance and at the same time the suction pressure within the compressor body is lifted, improving compressor efficiency. The TurboChill™ Hydro range further builds upon this technology by aligning one economiser plate per compressor. By managing the system in this way we can always ensure that the refrigerant mass flow is passed to active plate heat exchangers, optimising their efficiency.



Leak Detection

A factory calibrated and fitted leak detection system shall raise an alarm when a level exceeding the alarm threshold is detected. These detectors are positioned at ground level due to the refrigerant being more dense than air.

Compressor

		System Configuration S	L	M	N
Compressor	Vibration Isolating Rubber Mounts	●	●	●	●
	Line Reactor	●	●	●	●
	EMI/EMC Filter	●	●	●	●

● Standard Feature ○ Optional Feature ━ Feature Not Available

Turbocor Compressor

Each installed compressor comes with the following components:

- Suction and discharge shut off valves
- Combined isolation and check valve
- Line reactor
- EMI/EMC filter
- AC-DC rectifier
- DC capacitors
- DC-AC (IGBT) converter
- Motor/bearing management system and incorporated surge protection
- Soft start module
- Magnetic bearing system
- Vibration reducing isolating rubber mounts

Linear capacity modulation is provided by a variable frequency drive.

Key benefits of TurboCor compressor technology:

- Oil free operation
- More efficient use of heat exchangers
- No oil entrainment issues – pipework can be optimised for performance not oil return
- Variable speed operation, offering exact capacity match and optimum part load performance
- Magnetic bearing system constantly optimises shaft / impeller position
- Small and light, compressors are between 123.4kg and 163.7kg (please contact Airedale for more information)
- No mechanical contact, very quiet operation
- Very low start current, only 2A
- The intelligent, self optimising compressor offers near silent, oil free operation and ultra efficient variable speed control
- Turbocor compressor shaft and impellers levitate on a magnetic cushion, eliminating friction and vibration resulting in the compressor running at a smooth and reduced sound spectrum.

IMPORTANT ⚠	Ensure single phase power supply is connected permanently to ensure that the system will isolate refrigerant. A UPS permanent supply is required.

Waterside

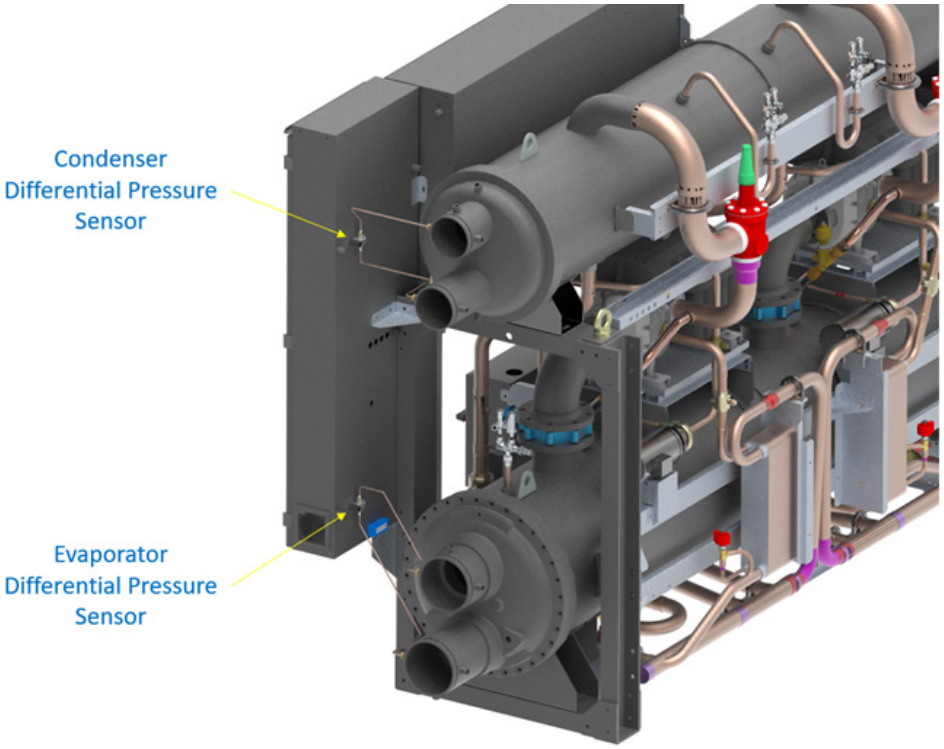


Image for illustration purposes only.

		System Configuration			
		S	L	M	N
Waterside	Flow Proving Device*	○	○	○	○
	Remote Pump Interlock*	●	●	●	●
	Water Flow Switch* Condenser and Evaporator	○	○	○	○
	Grooved and Clamped Unit Terminations	●	●	●	●
	Condenser Bypass Flow Control Valves	○	○	○	○
	Condenser Variable Water Flow	●	●	●	●
	Evaporator Differential Pressure Switch	●	●	●	●
	Condenser Differential Pressure Switch	●	●	●	●
	Evaporator Water Temperature Sensors	●	●	●	●
	Condenser Water Temperature Sensors	●	●	●	●
	Evaporator Dual Pressure Relief Valves	●	●	●	●
	Condenser Dual Pressure Relief Valves	●	●	●	●

● Standard Feature ○ Optional Feature ━ Feature Not Available

CAUTION ⚠	*Each feature is a flow proving device and 2 out of the 3 should be fitted to any unit to validate warranty.

Flow Proving Device*

Evaporator and condenser differential pressure sensors facilitate low flow limiting and pressure drop monitoring via the microprocessor which shall be fitted to ensure correct unit water flow.

Pump Interlock*

Provision for a pump interlock is available within the control panel.

Water Flow Switch*

If selected, a water flow switch shall be fitted ensuring the integrity of the cooling solution flow. The flow switch shall protect the chiller against low water flow conditions on both the evaporator and condenser. When applied with variable flow care must be taken to ensure that the selected flow switch doesn't give nuisance trips in low flow conditions on the evaporator. The same principal applies to condenser flow control when this is regulated using pump speed, not the optional valve assembly. Please see Airedale for confirmation.

Water Connections

Water inlet and outlet connections are of a grooved and clamped type construction, enabling easy pipework termination. Water inlet and outlet are located at the end of the unit for both the condenser and evaporator as shown on the general arrangement drawing.

Evaporator Variable Water Flow

This range allows the flow to be modulated through the chiller within acceptable limits for the purposes of primary pump energy savings when aligned with an appropriate building management system. As cooling demand reduces the primary flow through the chiller/s can be reduced to maintain a fixed temperature differential across the evaporator. This flow can reduce until the minimum flow limit of the heat exchanger is reached. Below this flow velocity the efficiency of the heat exchanger and fouling factor will be compromised.

When operating the system in this way a maximum rate of change of no more than 10% of the design flow per minute is acceptable. Varying the flow at higher rates than this may result in unstable unit operation and loss of cooling control. Particular attention must also be paid to the unloading and loading of chillers when previously isolated on the network to avoid large transient flows as a result of the system flow rate being 'shared' between active chillers. All chillers within the TurboChill™ Hydro range will give an alert once the minimum flow limit has been reached to ensure further flow reduction is avoided.

Condenser Bypass Flow

To ensure sustained unit operation across varying loads and conditions in some instances it may be necessary to modulate the flow through the condenser to maintain system control variables. If there is no flow regulation of the condenser water circuit permissible then this must be done using the optional condenser bypass valve assembly. This valve assembly will help the system manage the system envelope by bypassing flow away from the condenser should it not be needed. This way system operation can be sustained throughout the year and the system can remain within safe operating parameters. When bypassing the flow these valves are configured to replicate the system pressure drop characteristic at various bypass positions allowing network flow rates to the chiller to be maintained.

In addition to the sustained control of the system the condenser bypass valve assembly will also function to maintain safe system pressures in the event of high and low head pressures.

Condenser Variable Water Flow

If the system application is such that the chiller will have control of the circulatory pump for condenser flow, a signal can be sent from the chiller to the circulating pump to achieve all of the features described in the condenser flow bypass section above. This feature can however only be applied if the variation of condenser water flow won't impact upon other installed units.

CAUTION ⚠	When chillers are in the off state, please maintain flow to the condenser within accpetable temperature limits to minimise the effects of refrigerant migration.

Maintainable Dual Pressure Relief Valve

An auto resetting pressure relief valve assembly shall be provided per evaporator and condenser circuit, opening on pressure rise above pre-set limits. The dual shut-off valve assembly incorporates 2 pressure relief valves which can be individually shut off via a 3 way valve. This allows the maintenance of individual pressure relief valves without any requirement for refrigerant evacuation. Rupture discs are also fitted on systems with a circuit refrigerant charge larger than 300kg in line with EN 378-2:2016 clause 6.2.6.5. In accordance with EN 13136:2013+A1:2018, pressure relief valves have been sized to ensure that in the event of fire they can prevent excessive build-up of pressure within the evaporator. EN 13136:2013+A1:2018 section 6.2.1 has been used to size valves accordingly.

External Fire

Fire is a hazard that these units have not been designed to operate under. However, the inclusion of various safety devices ensures that any damage due to fire is limited via the release of pressure in the form of gas discharge.

If concerns of the ability of the pressure relief valve to discharge in the event of a fire >107°C exist, then it is the responsibility of the end user to protect the pressure relief valve assembly from excessive external temperatures. This must however allow the pressure relief valve to discharge effectively and not act as a 'choke' (offer any resistance) when discharging.

Electrical

		System Configuration S	L	M	N
Electrical	Mains Electric Isolator	●	●	●	●
	Ultracap Power Backup	●	●	●	●
	Control Panel Ventilation	●	●	●	●
	Phase Rotation Relay	●	●	●	●
	Energy Manager/Power Meter	●	●	●	●

● Standard Feature ○ Optional Feature ━ Feature Not Available

Electrical

Electrical power and controls panels are fitted to the unit containing:

- Individual mains power isolator for the compressor(s)
- Emergency interlock mains isolator handle
- Fully accessible controls compartment, allowing adjustment of control setpoints whilst the unit is operational
- Circuit breakers for protection of all major unit components
- Phase rotation relay incorporating phase loss protection.

The electrical power and control panel is wired to the latest European standards and codes of practice. Mains supply is 3 phase, a neutral is only required for permanent supply (L4). Separate 230V permanent supply (L4) is required for the controls and safety features.

This system has been designed to be connected to a TN type distribution system. For alternate distribution type systems, contact Airedale.

IMPORTANT ⚠	TurboChill™ Hydro units are designed for indoor use only and must not be installed outside.

Mains Electric Isolator

The mains electric isolator ensures complete unit isolation of the electrical panel during service and maintenance. A door interlocking isolator is provided as standard.

Ultracap

Unit controls are maintained by an Ultracap. The Ultracap module is an external backup device for the controller. The module guarantees temporary power to the controller in the event of power failures and allows for enough time to keep the controller running with time to change power supplies.

The capacitors are used to maintain the controller's main functions and to close the electronic valves in the event of mains power failures. Power will be maintained until mains power is reinstated for a maximum period of approx. 1.5 minutes.

The module is made using Ultracap storage capacitors (EDLC = Electric Double Layer Capacitor), which are recharged independently by the module.

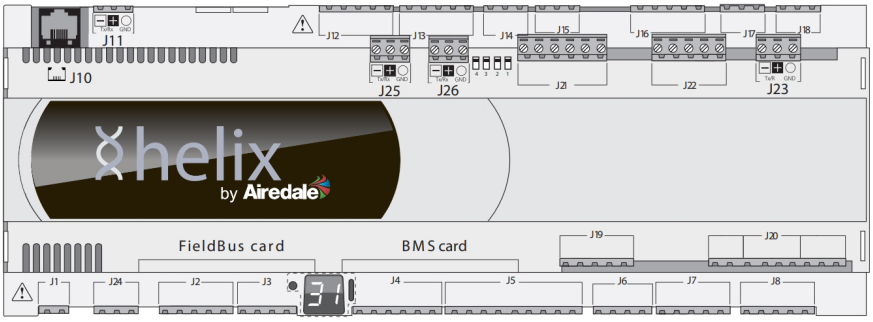
These ensure reliability in terms of much longer component life than a module made with lead batteries; the life of the Ultracap module is at least 10 years.

CAUTION ⚠	Following mains isolation, please allow the UltraCAPS to discharge for 5 minutes before carrying out any maintenance work.

Energy Manager

Analysis of system energy consumption can be monitored via a dedicated LCD display. Unit parameters can be adjusted via the unit microprocessor control to affect energy usage in line with the system need.

Controls



		System Configuration			
		S	L	M	N
Controls	Helix Controller with Built-in Display	●	●	●	●
	PGD1 Door Mounted Display	●	●	●	●
	Ethernet BMS Connectivity	●	●	●	●
	Modbus & Carel RS485, LON, pCOWEB & BACNET interface cards	○	○	○	○
	Run/Standby unit networking	●	●	●	●

● Standard Feature ○ Optional Feature ━ Feature Not Available

Helix Controller

The TurboChill™ Hydro is fitted with the next generation Helix controls system to achieve efficient operation and temperature control. The Helix controller comes fitted as standard with an integrated dual ethernet port for interfacing with building management systems. The facility to connect to other BMS protocols can be added via an additional BMS card upon request. The controller also monitors system health and alerts of any issues via a range of alarms which are logged for maintenance purposes.

The software in the TurboChill™ Hydro has been developed for the next generation Helix controls platform. This bespoke implementation draws from many years working with Turbocor compressor technology to provide more stable operation and vastly improved fast restart times. Additionally, the TurboChill™ Hydro benefits from a number of new, ground-breaking controls functions. These include intelligent compressor loading, automatic economiser management and dynamic subcool control; allowing for improved compressor turndown, stability and efficiency at part load conditions.

BMS Interface Cards

BMS Interface Cards can be factory fitted and interfaced with most BMS. A wide range of protocols can be accommodated through the use of interface devices, with ModBus/Jbus and Carel available as standard options. BMS Interface Cards can be set up and connected by following the setup guides supplied with the unit. Please contact Airedale to discuss the licensing requirements for other interfaces such as SNMP, LonWorks, Metasys and BACnet. Airedale's own supervisory plug-in BMS card, pCOWEB, is also available and is based on Ethernet TCP/IP secure technology with SNMP features. It requires no proprietary cabling or monitoring software and can be supplied preprogrammed with an IP address for ease of set up. Cables to the BMS to be supplied by others.

User Interface

The standard user interface on the Hydro is a 6-button alphanumeric LCD display mounted to the control panel door.

	ALARM	When more than one alarm is active the ALARM button will illuminate red. Pressing the ALARM button once will indicate information regarding any active alarms. Pressing the ALARM button twice will reset any active alarms.
	PROGRAM	Pressing the PRG button will select the main navigation menu.
	ESC	Pressing the ESC button will return the user to the main display screen showing unit status.
	UP	Pressing the UP button can either: Scroll through the various display screens, providing the cursor is in the top left position. Increase the value of a setpoint adjustment.
	DOWN	Pressing the DOWN button can either: Scroll through the various display screens, providing the cursor is in the top left position. Decrease the value of a setpoint adjustment.
	ENTER	Pressing the ENTER button will confirm any setpoint adjustments and move the cursor to the next available setpoint.

For more detailed information and instructions about the user interface, see the TurboChill™ Hydro controls manual – available on request.

External

		System Configuration			
		S	L	M	N
	Lifting Eye Bolts/Lugs (where applicable)	●	●	●	●
	Anti-Vibration Mounts (pad type)	○	○	○	○
	Anti-Vibration Mounts (spring type)	○	○	○	○
	Fork Lift Frame (Midi units only)	○	○	○	○

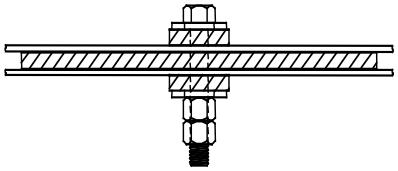
● Standard Feature ○ Optional Feature ━ Feature Not Available

Lifting Eye Bolts/Lifting Lugs

Lifting eye bolts/lifting lugs shall be fitted for use with either slings or shackles.

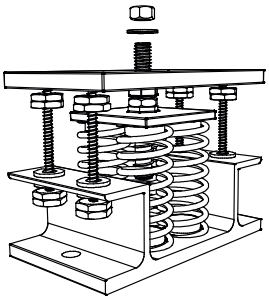
Anti Vibration Mounts - Pad Type

Pad vibration isolators can be supplied loose for on-site fitting to the base frame of each unit. The isolators are suitable for fitting to structural steelwork providing the surface is level and of sufficient strength, where a moderate degree of vibration elimination is required.



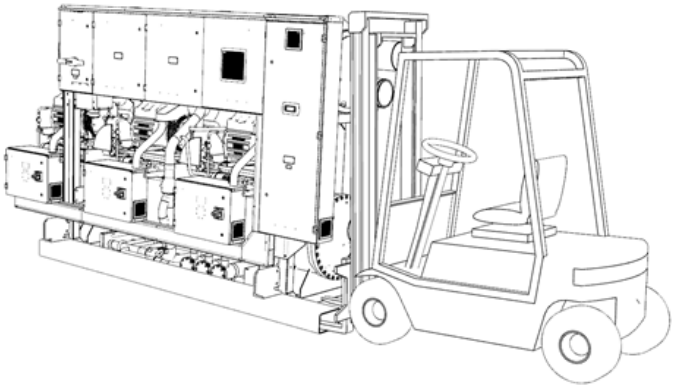
Anti Vibration Mounts - Spring Type

Specially selected spring vibration isolators shall be supplied loose for on-site fitting to the base frame of each unit. The isolators shall be suitable for fitting to structural steelwork providing the surface is level and of sufficient strength, where a high level of vibration elimination is required.



Optional Fork Lift Frame

For Midi units that need shipping in a container it is beneficial to specify the fork lift frame option. This frame allows the chiller to be safely manoeuvred into position without the need for a crane. Mini units have the ability to be manoeuvred using fork lift slots built into the base frame design as standard.



Technical Data

Mechanical Data - R134a

	Notes	Units	TCW11RCAEA-S-A-0	TCW11RCBEB-L-A-0	TCW11RCCEC-M-A-0	TCW11RCDED-N-A-0	TCW12RCEEE-S-A-0	TCW12RCFEF-L-A-0	TCW12RCGEG-M-A-0	TCW13RCHEH-L-A-0	TCW13RCIEI-M-A-0	TCW13RCJEJ-N-A-0
Capacity												
Maximum Duty	(1)	kW	300	400	500	650	600	850	1030	1300	1510	1970
Nominal Duty		kW	210	360	450	585	420	595	721	910	1057	1379
Nominal Input			37.3	65.2	85.9	115.6	74.6	103.4	120.0	154.7	180.4	249.3
EER	(2)		5.63	5.52	5.24	5.06	5.63	5.75	6.01	5.88	5.86	5.53
ESEER	(3)		7.97	8.16	8.50	7.98	8.58	8.81	9.09	9.09	9.31	9.36
SEER	(4)		8.16	8.39	8.62	9.03	8.12	8.75	8.51	8.87	9.12	9.36
Dimensions	(5)											
Height		mm	1780	1780	1870	1870	2307	2307	2307	2307	2307	2035
Width		mm	1150	1150	1150	1150	1264	1270	1284	1271	1284	2052
Length		mm	2624	2624	2584	2590	2950	1950	3543	3850	3850	4410
Machine Weight		kg	1445.1	1812.1	1949.6	2126.8	2471.0	3021.7	3355.9	3919.7	4106.1	5459.1
Operating Weight		kg	1541.4	1947.1	2121.1	2361.0	2685.1	3333.6	3727.7	4368.9	4636.0	6207.1
Evaporator												
Total Min. Water Flow		l/s	8.3	11.4	14.6	17.9	17.2	23.3	20.1	25.1	29.2	42.0
Total Max. Water Flow		l/s	25.0	34.2	43.8	53.6	51.7	69.8	60.3	75.3	87.5	125.9
Condenser												
Total Min. Water Flow		l/s	8.6	12.8	14.4	22.0	18.4	26.8	26.0	31.9	38.8	53.1
Total Max. Water Flow		l/s	25.9	38.5	43.1	66.1	55.2	80.5	78.0	95.6	116.4	159.2
Compressor												
Quantity			1	1	1	1	2	2	2	3	3	3
Refrigerant												
Number of Circuits			1	1	1	1	1	1	1	1	1	1
Charge (Total)	(6)	kg	70	85	107	129	142	185	250	255	264	325
CO_2 Tonnes Equivalent			100	122	152	185	203	264	358	365	378	465
Water System - Evaporator												
Water Volume		l	50.6	63.4	92.5	106.2	103.5	152.5	181.4	212.4	237.6	350.9
Min. System Water Volume		l	1026	1888	3204	2855	1021	1891	2307	1896	1935	2886
Max. System Pressure		Barg	10	10	10	10	10	10	10	10	10	10
Flow Rate		l/s	10.0	17.1	21.4	27.8	20.0	28.3	34.3	43.3	50.3	65.6
Pressure Drop		kPa	16.7	25.8	24.7	27.7	15.7	17.2	41.4	42.3	27.8	22.7
Water System - Condenser												
Water Volume		l	45.6	71.7	79.0	127.9	110.7	159.4	190.4	236.9	292.3	397.1
Min. System Water Volume		l	1027	1891	3209	2859	1023	1894	2310	1899	1938	2890
Max. System Pressure		Barg	10	10	10	10	10	10	10	10	10	10
Flow Rate		l/s	11.8	20.3	25.6	33.5	23.7	33.4	40.2	50.8	59.2	78.3
Pressure Drop		kPa	18.0	23.8	30.3	22.1	16.0	14.9	31.4	33.2	30.6	28.8

(1) Based on unit performance at 12/7°C evaporator, 100% water and 30/35°C condenser return/supply temperatures.
(2) EER = Cooling duty/compressor input power.
(3) ESEER based upon operating conditions as defined by the Eurovent Certification Company for water cooled chillers with fixed flow.
(4) SEER parameter calculated in accordance with EN 14825:2018.
(5) Nominal dimensions do not include optional condenser bypass assemblies.
(6) Charge specified is without economiser option.

Technical Data

Mechanical Data - R134a

	Notes	Units	TCW22RCKEK-S-A-0	TCW22RCLEL-L-A-0	TCW22RCMEM-M-A-0	TCW22RCNEN-N-A-0	TCW23RCOEO-L-A-0	TCW23RCPEP-M-A-0	TCW23RCQEQ-N-A-0	TCW24RCRER-L-A-0	TCW24RCSES-N-A-0	TCW25RCTET-L-A-0	TCW25RCUEU-N-A-0
Capacity													
Maximum Duty	(1)	kW	600	850	1030	1300	1300	1520	2020	1730	2710	2180	3000
Nominal Duty		kW	420	680	824	1170	910	1064	1414	1211	1897	1526	2100
Nominal Input			73.0	117.9	143.1	226.2	155.1	178.6	255.5	206.3	339.5	260.2	379.9
EER	(2)		5.76	5.77	5.76	5.17	5.87	5.96	5.53	5.87	5.59	5.86	5.53
ESEER	(3)		8.58	8.60	8.96	8.71	8.87	9.14	9.01	9.10	9.35	9.00	9.20
SEER	(4)		7.71	8.04	8.24	8.25	8.73	8.94	8.97	8.84	9.15	8.78	9.18
Dimensions	(5)												
Height		mm	2307	2307	2307	2307	2307	2006	2057	2057	2133	2108	2158
Width		mm	1276	1283	1284	1284	1284	2052	2052	2052	2192	2052	2195
Length		mm	3592	3532	3543	3543	3850	5500	5500	5500	5500	5500	5500
Machine Weight		kg	2497.8	3000.5	3416.1	3572.0	4016.3	4869.9	6183.9	6418.5	8098.0	6738.2	8547.5
Operating Weight		kg	2695.7	3304.5	3796.0	4054.3	4475.0	5519.7	7117.3	7218.7	9370.4	7706.3	10052.8
Evaporator													
Total Min. Water Flow		l/s	11.2	17.2	21.0	26.6	26.2	29.3	42.2	33.8	56.3	42.2	65.2
Total Max. Water Flow		l/s	33.7	51.6	62.9	79.8	78.5	87.8	126.5	101.5	168.8	126.5	195.6
Condenser													
Total Min. Water Flow		l/s	15.7	22.0	26.4	35.6	32.3	34.6	47.5	42.0	64.6	51.3	77.2
Total Max. Water Flow		l/s	47.2	66.1	79.3	106.7	96.9	103.8	142.5	126.0	193.8	153.9	231.5
Compressor													
Quantity			2	2	2	2	3	3	3	4	4	5	5
Refrigerant													
Number of Circuits			2	2	2	2	2	2	2	2	2	2	2
Charge (Total)	(6)	kg	62 + 62	99 + 99	120 + 120	118 + 118	170 + 85	237 + 119	319 + 159	232 + 232	277 + 277	290 + 194	395 + 263
CO_2 Tonnes Equivalent			89 + 89	142 +142	172 + 172	169 + 169	243 + 121	340 + 170	456 + 228	332 + 332	396 + 396	415 + 277	565 + 377
Water System - Evaporator													
Water Volume		l	86.1	139.2	186.8	221.8	219.2	301.3	442.5	373.0	606.4	442.5	708.1
Min. System Water Volume		l	1001	1897	3003	2880	1896	1936	2955	1895	2959	1895	2941
Max. System Pressure		Barg	10	10	10	10	10	10	10	10	10	10	10
Flow Rate		l/s	20.0	32.4	39.2	55.7	43.3	50.6	67.3	57.6	90.3	72.6	99.9
Pressure Drop		kPa	44.0	48.8	48.2	59.4	38.6	36.8	31.7	35.8	32.0	36.5	29.4
Water System - Condenser													
Water Volume		l	111.8	164.8	193.1	260.5	239.6	348.5	490.8	427.2	666.0	525.6	797.3
Min. System Water Volume		l	1002	1900	3008	2884	1899	1939	2960	1897	2964	1897	2946
Max. System Pressure		Barg	10	10	10	10	10	10	10	10	10	10	10
Flow Rate		l/s	23.6	38.1	46.3	66.8	50.8	59.4	80.1	67.6	107.5	85.2	118.9
Pressure Drop		kPa	29.2	37.8	38.7	44.1	31.9	35.0	33.6	30.7	32.7	32.6	28.0

(1) Based on unit performance at 12/7°C evaporator, 100% water and 30/35°C condenser return/supply temperatures.
(2) EER = Cooling duty/compressor input power.
(3) ESEER based upon operating conditions as defined by the Eurovent Certification Company for water cooled chillers with fixed flow.
(4) SEER parameter calculated in accordance with EN 14825:2018.
(5) Nominal dimensions do not include optional condenser bypass assemblies.
(6) Charge specified is without economiser option.

Technical Data

Mechanical Data - R513A

	Notes	Units	TCW11RCAEA-S-B-0	TCW11RCBEB-L-B-0	TCW11RCCEC-M-B-0	TCW11RCDED-N-B-0	TCW12RCEEE-S-B-0	TCW12RCFEF-L-B-0	TCW12RCGEG-M-B-0	TCW13RCHEH-L-B-0	TCW13RCIEI-M-B-0	TCW13RCJEJ-N-B-0
Capacity												
Maximum Duty	(1)	kW	300	400	500	650	600	850	1030	1300	1510	1970
Nominal Duty		kW	300	360	450	585	420	595	721	1040	1057	1379
Nominal Input			62.5	66.2	87.7	118.0	75.7	104.9	123.5	186.2	185.3	257.3
EER	(2)		4.80	5.44	5.13	4.96	5.55	5.67	5.84	5.59	5.70	5.36
ESEER	(3)		7.80	8.00	8.35	7.80	8.46	8.64	8.86	8.87	9.08	9.10
SEER	(4)		7.14	8.22	8.48	8.82	8.02	8.64	8.35	8.57	8.94	9.16
Dimensions	(5)											
Height		mm	1780	1780	1870	1870	2307	2307	2307	2307	2307	2035
Width		mm	1150	1150	1150	1150	1264	1270	1284	1271	1284	2052
Length		mm	2624	2624	2584	2590	2950	1950	3543	3850	3850	4410
Machine Weight		kg	1445.1	1812.1	1949.6	2126.8	2471.0	3021.7	3355.9	3919.7	4106.1	5459.1
Operating Weight		kg	1541.4	1947.1	2121.1	2361.0	2685.1	3333.6	3727.7	4368.9	4636.0	6207.1
Evaporator												
Total Min. Water Flow		l/s	8.3	11.4	14.6	17.9	17.2	23.3	20.1	25.1	29.2	42.0
Total Max. Water Flow		l/s	25.0	34.2	43.8	53.6	51.7	69.8	60.3	75.3	87.5	125.9
Condenser												
Total Min. Water Flow		l/s	8.6	12.8	14.4	22.0	18.4	26.8	26.0	31.9	38.8	53.1
Total Max. Water Flow		l/s	25.9	38.5	43.1	66.1	55.2	80.5	78.0	95.6	116.4	159.2
Compressor												
Quantity			1	1	1	1	2	2	2	3	3	3
Refrigerant												
Number of Circuits			1	1	1	1	1	1	1	1	1	1
Charge (Total)	(6)	kg	70	85	107	129	142	185	250	255	264	325
CO_2 Tonnes Equivalent			44	54	67	81	89	117	158	161	167	205
Water System - Evaporator												
Water Volume		l	50.6	63.4	92.5	106.2	103.5	152.5	181.4	212.4	237.6	350.9
Min. System Water Volume		l	1026	1888	3204	2855	1021	1891	2307	1896	1935	2886
Max. System Pressure		Barg	10	10	10	10	10	10	10	10	10	10
Flow Rate		l/s	14.3	17.1	21.4	27.8	20.0	28.3	34.3	49.5	50.3	65.6
Pressure Drop		kPa	33.5	25.8	24.7	27.7	15.7	17.2	41.4	54.0	27.8	22.7
Water System - Condenser												
Water Volume		l	45.6	71.7	79.0	127.9	110.7	159.4	190.4	236.9	292.3	397.1
Min. System Water Volume		l	1027	1891	3209	2859	1023	1894	2310	1899	1938	2890
Max. System Pressure		Barg	10	10	10	10	10	10	10	10	10	10
Flow Rate		l/s	17.3	20.3	25.7	33.6	23.7	33.4	40.3	58.4	59.3	78.5
Pressure Drop		kPa	38.4	23.9	30.4	22.2	16.0	14.9	31.5	42.6	30.7	29.0

(1) Based on unit performance at 12/7°C evaporator, 100% water and 30/35°C condenser return/supply temperatures.
(2) EER = Cooling duty/compressor input power.
(3) ESEER based upon operating conditions as defined by the Eurovent Certification Company for water cooled chillers with fixed flow.
(4) SEER parameter calculated in accordance with EN 14825:2018.
(5) Nominal dimensions do not include optional condenser bypass assemblies.
(6) Charge specified is without economiser option.

Technical Data

Mechanical Data - R513A

	Notes	Units	TCW22RCKEK-S-B-0	TCW22RCLEL-L-B-0	TCW22RCMEM-M-B-0	TCW22RCNEN-N-B-0	TCW23RCOEO-L-B-0	TCW23RCPEP-M-B-0	TCW23RCQEQ-N-B-0	TCW24RCRER-L-B-0	TCW24RCSES-N-B-0	TCW25RCTET-L-B-0	TCW25RCUEU-N-B-0
Capacity													
Maximum Duty	(1)	kW	600	850	1030	1300	1300	1520	2020	1730	2710	2180	3000
Nominal Duty		kW	420	595	721	1040	910	1064	1414	1211	1897	1526	2100
Nominal Input			74.9	104.3	123.8	206.8	159.6	180.6	259.4	208.6	344.4	263.2	385.1
EER	(2)		5.61	5.70	5.82	5.03	5.70	5.89	5.45	5.80	5.51	5.80	5.45
ESEER	(3)		8.31	8.21	8.50	8.23	8.67	8.98	8.84	8.96	9.18	8.85	9.08
SEER	(4)		7.55	7.90	8.16	8.14	8.53	8.83	8.84	8.75	9.03	8.68	9.07
Dimensions	(5)												
Height		mm	2307	2307	2307	2307	2307	2006	2057	2057	2133	2108	2158
Width		mm	1276	1283	1284	1284	1284	2052	2052	2052	2192	2052	2192
Length		mm	3592	3532	3543	3543	3850	5500	5500	5500	5500	5500	5500
Machine Weight		kg	2497.8	3000.5	3416.1	3572.0	4016.3	4869.9	6183.9	6418.5	8098.0	6738.2	8547.5
Operating Weight		kg	2695.7	3304.5	3796.0	4054.3	4475.0	5519.7	7117.3	7218.7	9370.4	7706.3	10052.8
Evaporator													
Total Min. Water Flow		l/s	11.2	17.2	21.0	26.6	26.2	29.3	42.2	33.8	56.3	42.2	65.2
Total Max. Water Flow		l/s	33.7	51.6	62.9	79.8	78.5	87.8	126.5	101.5	168.8	126.5	195.6
Condenser													
Total Min. Water Flow		l/s	15.7	22.0	26.4	35.6	32.3	34.6	47.5	42.0	64.6	51.3	77.2
Total Max. Water Flow		l/s	47.2	66.1	79.3	106.7	96.9	103.8	142.5	126.0	193.8	153.9	231.5
Compressor													
Quantity			2	2	2	2	3	3	3	4	4	5	5
Refrigerant													
Number of Circuits			2	2	2	2	2	2	2	2	2	2	2
Charge (Total)	(6)	kg	62 + 62	99 + 99	120 + 120	118 + 118	170 + 85	237 + 119	319 + 159	232 + 232	277 + 277	290 + 194	395 + 263
CO_2 Tonnes Equivalent			39 + 39	63 + 63	76 + 76	75 + 75	107 + 54	150 + 75	201 + 101	146 + 146	175 + 175	183 + 122	249 + 166
Water System - Evaporator													
Water Volume		l	86.1	139.2	186.8	221.8	219.2	301.3	442.5	373.0	606.4	442.5	708.1
Min. System Water Volume		l	1001	1897	3003	2880	1896	1936	2955	1895	2959	1895	2941
Max. System Pressure		Barg	10	10	10	10	10	10	10	10	10	10	10
Flow Rate		l/s	20.0	28.3	34.3	49.5	43.3	50.6	67.3	57.6	90.3	72.6	99.9
Pressure Drop		kPa	44.0	38.3	37.8	47.8	38.6	36.8	31.7	35.8	32.0	36.5	29.4
Water System - Condenser													
Water Volume		l	111.8	164.8	193.1	260.5	239.6	348.5	490.8	427.2	666.0	525.6	797.3
Min. System Water Volume		l	1002	1900	3008	2884	1899	1939	2960	1897	2964	1897	2946
Max. System Pressure		Barg	10	10	10	10	10	10	10	10	10	10	10
Flow Rate		l/s	23.6	33.3	40.3	59.6	51.0	59.4	80.1	67.6	107.5	85.2	118.9
Pressure Drop		kPa	29.3	29.8	30.2	35.7	32.1	34.9	33.7	30.6	32.8	32.6	28.0

(1) Based on unit performance at 12/7°C evaporator, 100% water and 30/35°C condenser return/supply temperatures.
(2) EER = Cooling duty/compressor input power.
(3) ESEER based upon operating conditions as defined by the Eurovent Certification Company for water cooled chillers with fixed flow.
(4) SEER parameter calculated in accordance with EN 14825:2018.
(5) Nominal dimensions do not include optional condenser bypass assemblies.
(6) Charge specified is without economiser option.

Technical Data

Electrical Data - 400V

	Notes	Units	TCW11-S	TCW11-L	TCW11-M	TCW11-N	TCW12-S	TCW12-L	TCW12-M	TCW13-L	TCW13-M	TCW22-S
Unit Data												
Full Load Amps	(1)	A	145	210	170	196	290	420	340	630	510	290
Maximum Start Amps		A	2	2	2	2	147	212	172	422	342	147
Mains Supply		VAC	400V (±10%) 3PH 50Hz									
Rec Mains Fuse Size		A	160	250	200	200	315	450	355	670	560	315
Max Mains Incoming Cable Size		mm²	70	185	185	185	240	2x300	240	2x300	2x300	240
Max torque rating		Nm	9	14	14	14	20	20	20	20	20	20
Permanent Supply		VAC	230V 1PH 50Hz (±10%)									
Rec Permanent Fuse Size		A	16									
Max Permanent Incoming Cable Size		mm²	6mm² / 8 AWG									
Control Circuit		VAC	24 VAC & 230VAC (±10%)									
Evaporator												
Immersion Heater Rating		W	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2
Condenser												
Immersion Heater Rating		W	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2
Compressor												
Quantity			1	1	1	1	2	2	2	3	3	2
Motor Rating		kW	87	129	105	124	87	129	105	129	105	87
Full Load Amps	(1)	A	145	210	170	196	145	210	170	210	170	145
Start Amps		A	2	2	2	2	2	2	2	2	2	2
Type Of Start			Electronic Soft Start									

(1) Based on full load conditions.

CAUTION ⚠	A separately fused, locally isolated, permanent single phase and neutral supply is required for the evaporator trace heating and control circuits.

Technical Data

Electrical Data - 400V

	Notes	Units	TCW22-L	TCW22-M	TCW22-N	TCW23-L	TCW13-N	TCW23-M	TCW23-N	TCW24-L	TCW24-N	TCW25-L	TCW25-N
Unit Data													
Full Load Amps	(1)	A	420	340	392	630	588	510	588	840	784	1050	980
Maximum Start Amps		A	212	172	198	422	394	342	394	632	590	842	786
Mains Supply		VAC	400V (±10%) 3PH 50Hz										
Rec Mains Fuse Size		A	450	355	400	670	630	560	630	1000	800	1250	1000
Max Mains Incoming Cable Size		mm²	2x300	240	2x300	2x300	240	2x300	2x300	4x185	2x300	4x185	4x185
Permanent Supply		VAC	230V 1PH 50Hz (±10%)										
Rec Permanent Fuse Size		A	16										
Max Permanent Incoming Cable Size		mm²	6mm² / 8 AWG										
Control Circuit		VAC	24 VAC & 230VAC (±10%)										
Evaporator													
Immersion Heater Rating		W	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	250 x2	250 x2	250 x2	250 x2
Condenser													
Immersion Heater Rating		W	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	250 x2	250 x2	250 x2	250 x2
Compressor													
Quantity			2	2	2	3	3	3	3	4	4	5	5
Motor Rating		kW	129	105	124	129	124	105	124	129	124	129	124
Full Load Amps	(1)	A	210	170	196	210	196	170	196	210	196	210	196
Start Amps		A	2	2	2	2	2	2	2	2	2	2	2
Type Of Start			Electronic Soft Start										

(1) Based on full load conditions.

CAUTION ⚠	A separately fused, locally isolated, permanent single phase and neutral supply is required for the evaporator trace heating and control circuits.

Technical Data

Electrical Data - 380V

	Notes	Units	TCW11-S	TCW11-L	TCW11-M	TCW11-N	TCW12-S	TCW12-L	TCW12-M	TCW13-L	TCW13-M	TCW22-S
Unit Data												
Full Load Amps	(1)	A	145	210	170	206	290	420	340	630	510	290
Maximum Start Amps		A	2	2	2	2	147	212	172	422	342	147
Mains Supply		VAC	400V (±10%) 3PH 50Hz									
Rec Mains Fuse Size		A	160	250	200	250	315	450	355	670	560	315
Max Mains Incoming Cable Size		mm²	70	185	185	185	240	2x300	240	2x300	2x300	240
Permanent Supply		VAC	230V 1PH 50Hz (±10%)									
Rec Permanent Fuse Size		A	16									
Max Permanent Incoming Cable Size		mm²	6mm² / 8 AWG									
Control Circuit		VAC	24 VAC & 230VAC (±10%)									
Evaporator												
Immersion Heater Rating		W	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2
Condenser												
Immersion Heater Rating		W	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2
Compressor												
Quantity			1	1	1	1	2	2	2	3	3	2
Motor Rating		kW	87	129	105	124	87	129	105	129	105	87
Full Load Amps	(1)	A	145	210	170	206	145	210	170	210	170	145
Start Amps		A	2	2	2	2	2	2	2	2	2	2
Type Of Start			Electronic Soft Start									

(1) Based on full load conditions.

CAUTION ⚠	A separately fused, locally isolated, permanent single phase and neutral supply is required for the evaporator trace heating and control circuits.

Technical Data

Electrical Data - 380V

	Notes	Units	TCW22-L	TCW22-M	TCW22-N	TCW23-L	TCW13-N	TCW23-M	TCW23-N	TCW24-L	TCW24-N	TCW25-L	TCW25-N
Unit Data													
Full Load Amps	(1)	A	420	340	618	630	412	510	618	840	824	840	1030
Maximum Start Amps		A	212	172	414	422	208	342	414	632	620	632	826
Mains Supply		VAC	400V (±10%) 3PH 50Hz										
Rec Mains Fuse Size		A	450	355	450	670	630	560	630	1000	1000	1250	1250
Max Mains Incoming Cable Size		mm²	2x300	240	2x300	2x300	240	2x300	2x300	4x185	2x300	4x185	4x185
Permanent Supply		VAC	230V 1PH 50Hz (±10%)										
Rec Permanent Fuse Size		A	16										
Max Permanent Incoming Cable Size		mm²	6mm² / 8 AWG										
Control Circuit		VAC	24 VAC & 230VAC (±10%)										
Evaporator													
Immersion Heater Rating		W	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2
Condenser													
Immersion Heater Rating		W	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2	170 x2
Compressor													
Quantity			2	2	2	3	3	3	3	4	4	5	5
Motor Rating		kW	129	105	124	129	124	105	124	129	124	129	124
Full Load Amps	(1)	A	210	170	206	210	206	170	206	210	206	210	206
Start Amps		A	2	2	2	2	2	2	2	2	2	2	2
Type Of Start			Electronic Soft Start										

(1) Based on full load conditions.

CAUTION ⚠	A separately fused, locally isolated, permanent single phase and neutral supply is required for the evaporator trace heating and control circuits.

Technical

Sound Data

Measurement of Sound Data

All sound data quoted has been measured in the third-octave band limited values, using a Real Time Analyser calibrated sound intensity meter in accordance with EN ISO 9614 Part 1:2009. The Overall sound data quoted is valid for noise emitted in the horizontal plane in all directions.

All Sound Power Levels quoted are calculated from measured sound intensity according to EN ISO 9614 Part 1: 2009.

Sound Pressure Levels are calculated from sound power using the expanded parallelepiped method according to EN ISO 11203:2009+A1:2020.

Resultant performance figures obtained from test will be proven to not differ from the claimed figures by more than the allowable deviations specified in Table 25 of section A.I.6 of Eurovent ECP-3 LCP-HP 2021 (A-weighted sound power; +3dBA). Acoustic data is representative of the unit running at the nominal duty and conditions, under steady state operation.

Sound Data

R134a	Sound Measurement	Units	Frequency (Hz) 63	125	250	500	1000	2000	4000	8000	Overall [dB(A)]
TCW11RCAEA-S-A-0	Power	dB	60.3	60.3	76.4	72.8	68.5	70.6	72.2	66.3	77.8
	Pressure @ 10m		33.6	33.6	49.7	46.1	41.8	44.0	45.5	39.6	51.2
TCW11RCBEB-L-A-0	Power	dB	64.4	64.4	79.2	74.3	80.8	74.5	75.3	69.6	83.6
	Pressure @ 10m		37.7	37.7	52.6	47.7	54.1	47.8	48.7	42.9	57.0
TCW11RCCEC-M-A-0	Power	dB	57.1	69.1	75.1	77.1	83.2	81.7	81.2	82.5	88.6
	Pressure @ 10m		30.4	42.4	48.4	50.4	56.5	55.0	54.5	55.8	61.9
TCW11RCDED-N-A-0	Power	dB	61.1	73.1	76.5	76.7	81.8	80.4	81.8	83.5	88.4
	Pressure @ 10m		34.4	46.4	49.8	50.0	55.2	53.7	55.2	56.8	61.7
TCW12RCEEE-S-A-0	Power	dB	63.3	63.3	79.4	75.8	71.5	73.6	75.2	69.3	80.8
	Pressure @ 10m		36.3	36.3	52.4	48.8	44.5	46.6	48.2	42.3	53.9
TCW12RCFEF-L-A-0	Power	dB	67.4	67.4	82.2	77.3	83.8	77.5	78.3	72.6	86.6
	Pressure @ 10m		40.4	40.4	55.2	50.3	56.8	50.5	51.3	45.6	59.6
TCW12RCGEG-M-A-0	Power	dB	67.4	67.4	82.2	77.3	83.8	77.5	78.3	72.6	86.6
	Pressure @ 10m		40.3	40.3	55.1	50.2	56.7	50.3	51.2	45.5	59.5
TCW13RCHEH-L-A-0	Power	dB	69.1	69.1	84.0	79.1	85.6	79.2	80.1	74.4	88.4
	Pressure @ 10m		42.0	42.0	56.8	51.9	58.4	52.0	52.9	47.2	61.2
TCW13RCIEI-M-A-0	Power	dB	69.1	69.1	84.0	79.1	85.6	79.2	80.1	74.4	88.4
	Pressure @ 10m		42.0	42.0	56.8	51.9	58.4	52.0	52.9	47.2	61.2
TCW13RCJEJ-N-A-0	Power	dB	61.8	73.9	79.9	81.8	88.0	86.4	85.9	87.3	93.4
	Pressure @ 10m		34.5	46.5	52.5	54.5	60.6	59.1	58.6	59.9	66.0
TCW22RCKEK-S-A-0	Power	dB	63.3	63.3	79.4	75.8	71.5	73.6	75.2	69.3	80.8
	Pressure @ 10m		36.1	36.1	52.2	48.7	44.4	46.5	48.0	42.2	53.7
TCW22RCLEL-L-A-0	Power	dB	67.4	67.4	82.2	77.3	83.8	77.5	78.3	72.6	86.6
	Pressure @ 10m		40.3	40.3	55.1	50.2	56.7	50.3	51.2	45.5	59.5
TCW22RCMEM-M-A-0	Power	dB	60.1	72.1	78.1	80.1	86.2	84.7	84.2	85.5	91.6
	Pressure @ 10m		33.0	45.0	51.0	53.0	59.1	57.6	57.1	58.4	64.5
TCW22RCNEN-N-A-0	Power	dB	64.1	76.1	79.5	79.7	84.9	83.4	84.9	86.5	91.4
	Pressure @ 10m		37.0	49.0	52.4	52.6	57.7	56.3	57.7	59.4	64.3
TCW23RCOEO-L-A-0	Power	dB	69.1	69.1	84.0	79.1	85.6	79.2	80.1	74.4	88.4
	Pressure @ 10m		42.0	42.0	56.8	51.9	58.4	52.0	52.9	47.2	61.2
TCW23RCPEP-M-A-0	Power	dB	69.1	69.1	84.0	79.1	85.6	79.2	80.1	74.4	88.4
	Pressure @ 10m		41.6	41.6	56.4	51.5	58.0	51.6	52.5	46.8	60.8
TCW23RCQEQ-N-A-0	Power	dB	61.8	73.9	79.9	81.8	88.0	86.4	85.9	87.3	93.4
	Pressure @ 10m		34.2	46.3	52.3	54.2	60.4	58.8	58.3	59.7	65.8
TCW24RCRER-L-A-0	Power	dB	70.4	70.4	85.2	80.4	86.8	80.5	81.3	75.6	89.6
	Pressure @ 10m		42.8	42.8	57.6	52.8	59.2	52.9	53.7	48.0	62.0
TCW24RCSES-N-A-0	Power	dB	67.1	79.1	82.5	82.7	87.9	86.5	87.9	89.5	94.4
	Pressure @ 10m		39.4	51.5	54.9	55.1	60.2	58.8	60.2	61.9	66.8
TCW25RCTET-L-A-0	Power	dB	71.4	71.4	86.2	81.3	87.8	81.4	82.3	76.6	90.6
	Pressure @ 10m		43.7	43.7	58.6	53.7	60.2	53.8	54.7	49.0	63.0
TCW25RCUEU-N-A-0	Power	dB	64.1	76.1	82.1	84.1	90.2	88.7	88.2	89.5	95.6
	Pressure @ 10m		36.4	48.4	54.4	56.4	62.5	61.0	60.5	61.8	67.9

(1) dB(A) is the overall sound level, measured on the A scale.

(2) All sound data measured at nominal conditions: Water in/out 12/7°C at 30/35°C condenser water.

CAUTION ⚠	The sound pressure data quoted is only valid in free field conditions, where the unit is installed on a reflective base. If the equipment is placed adjacent to a reflective wall, values may vary to those stated, typically increasing by 3dB for each side added.

Sound Data

R513A	Sound Measurement	Units	Frequency (Hz) 63	125	250	500	1000	2000	4000	8000	Overall [dB(A)]
TCW11RCAEA-S-B-0	Power	dB	64.4	64.4	79.2	74.3	80.8	74.5	75.3	69.6	83.6
	Pressure @ 10m		37.7	37.7	52.6	47.7	54.1	47.8	48.7	42.9	57.0
TCW11RCBEB-L-B-0	Power	dB	64.4	64.4	79.2	74.3	80.8	74.5	75.3	69.6	83.6
	Pressure @ 10m		37.7	37.7	52.6	47.7	54.1	47.8	48.7	42.9	57.0
TCW11RCCEC-M-B-0	Power	dB	57.1	69.1	75.1	77.1	83.2	81.7	81.2	82.5	88.6
	Pressure @ 10m		30.4	42.4	48.4	50.4	56.5	55.0	54.5	55.8	61.9
TCW11RCDED-N-B-0	Power	dB	61.1	73.1	76.5	76.7	81.8	80.4	81.8	83.5	88.4
	Pressure @ 10m		34.4	46.4	49.8	50.0	55.2	53.7	55.2	56.8	61.7
TCW12RCEEE-S-B-0	Power	dB	63.3	63.3	79.4	75.8	71.5	73.6	75.2	69.3	80.8
	Pressure @ 10m		36.3	36.3	52.4	48.8	44.5	46.6	48.2	42.3	53.9
TCW12RCFEF-L-B-0	Power	dB	67.4	67.4	82.2	77.3	83.8	77.5	78.3	72.6	86.6
	Pressure @ 10m		40.4	40.4	55.2	50.3	56.8	50.5	51.3	45.6	59.6
TCW12RCGEG-M-B-0	Power	dB	67.4	67.4	82.2	77.3	83.8	77.5	78.3	72.6	86.6
	Pressure @ 10m		40.3	40.3	55.1	50.2	56.7	50.3	51.2	45.5	59.5
TCW13RCHEH-L-B-0	Power	dB	69.1	69.1	84.0	79.1	85.6	79.2	80.1	74.4	88.4
	Pressure @ 10m		42.0	42.0	56.8	51.9	58.4	52.0	52.9	47.2	61.2
TCW13RCIEI-M-B-0	Power	dB	69.1	69.1	84.0	79.1	85.6	79.2	80.1	74.4	88.4
	Pressure @ 10m		42.0	42.0	56.8	51.9	58.4	52.0	52.9	47.2	61.2
TCW13RCJEJ-N-B-0	Power	dB	61.8	73.9	79.9	81.8	88.0	86.4	85.9	87.3	93.4
	Pressure @ 10m		34.5	46.5	52.5	54.5	60.6	59.1	58.6	59.9	66.0
TCW22RCKEK-S-B-0	Power	dB	63.3	63.3	79.4	75.8	71.5	73.6	75.2	69.3	80.8
	Pressure @ 10m		36.1	36.1	52.2	48.7	44.4	46.5	48.0	42.2	53.7
TCW22RCLEL-L-B-0	Power	dB	67.4	67.4	82.2	77.3	83.8	77.5	78.3	72.6	86.6
	Pressure @ 10m		40.3	40.3	55.1	50.2	56.7	50.3	51.2	45.5	59.5
TCW22RCMEM-M-B-0	Power	dB	67.4	67.4	82.2	77.3	83.8	77.5	78.3	72.6	86.6
	Pressure @ 10m		40.3	40.3	55.1	50.2	56.7	50.3	51.2	45.5	59.5
TCW22RCNEN-N-B-0	Power	dB	64.1	76.1	79.5	79.7	84.9	83.4	84.9	86.5	91.4
	Pressure @ 10m		37.0	49.0	52.4	52.6	57.7	56.3	57.7	59.4	64.3
TCW23RCOEO-L-B-0	Power	dB	69.1	69.1	84.0	79.1	85.6	79.2	80.1	74.4	88.4
	Pressure @ 10m		42.0	42.0	56.8	51.9	58.4	52.0	52.9	47.2	61.2
TCW23RCPEP-M-B-0	Power	dB	69.1	69.1	84.0	79.1	85.6	79.2	80.1	74.4	88.4
	Pressure @ 10m		41.6	41.6	56.4	51.5	58.0	51.6	52.5	46.8	60.8
TCW23RCQEQ-N-B-0	Power	dB	61.8	73.9	79.9	81.8	88.0	86.4	85.9	87.3	93.4
	Pressure @ 10m		34.2	46.3	52.3	54.2	60.4	58.8	58.3	59.7	65.8
TCW24RCRER-L-B-0	Power	dB	70.4	70.4	85.2	80.4	86.8	80.5	81.3	75.6	89.6
	Pressure @ 10m		42.8	42.8	57.6	52.8	59.2	52.9	53.7	48.0	62.0
TCW24RCSES-N-B-0	Power	dB	67.1	79.1	82.5	82.7	87.9	86.5	87.9	89.5	94.4
	Pressure @ 10m		39.4	51.5	54.9	55.1	60.2	58.8	60.2	61.9	66.8
TCW25RCTET-L-B-0	Power	dB	71.4	71.4	86.2	81.3	87.8	81.4	82.3	76.6	90.6
	Pressure @ 10m		43.7	43.7	58.6	53.7	60.2	53.8	54.7	49.0	63.0
TCW25RCUEU-N-B-0	Power	dB	64.1	76.1	82.1	84.1	90.2	88.7	88.2	89.5	95.6
	Pressure @ 10m		36.4	48.4	54.4	56.4	62.5	61.0	60.5	61.8	67.9

(1) dB(A) is the overall sound level, measured on the A scale.
(2) All sound data measured at nominal conditions: Water in/out 12/7°C at 30/35°C condenser water.

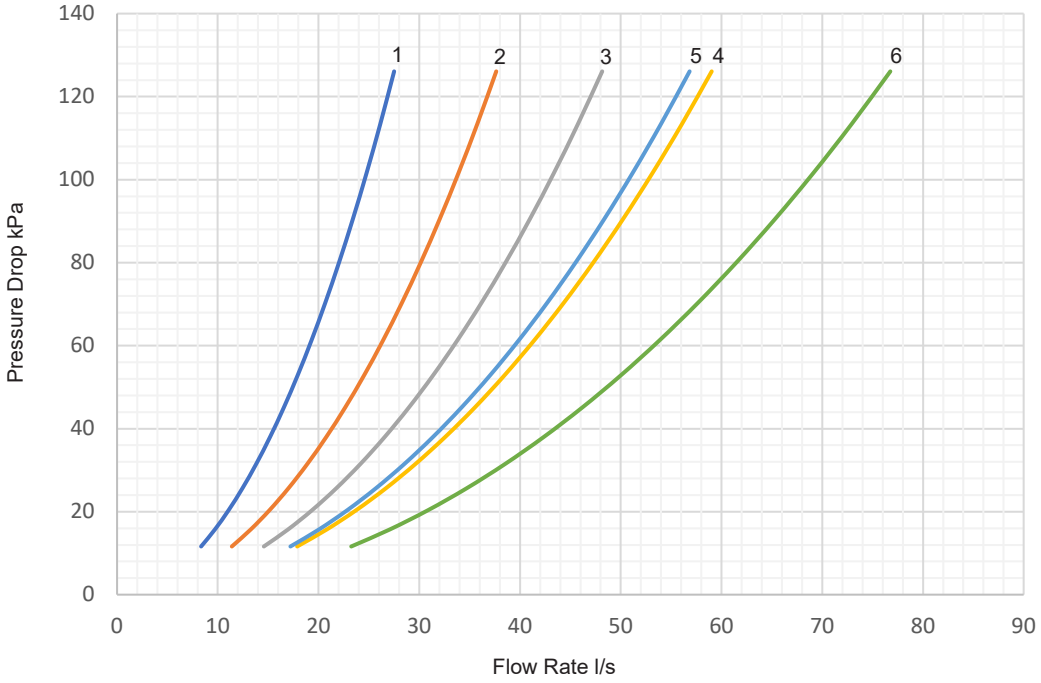
CAUTION ⚠	The sound pressure data quoted is only valid in free field conditions, where the unit is installed on a reflective base. If the equipment is placed adjacent to a reflective wall, values may vary to those stated, typically increasing by 3dB for each side added.

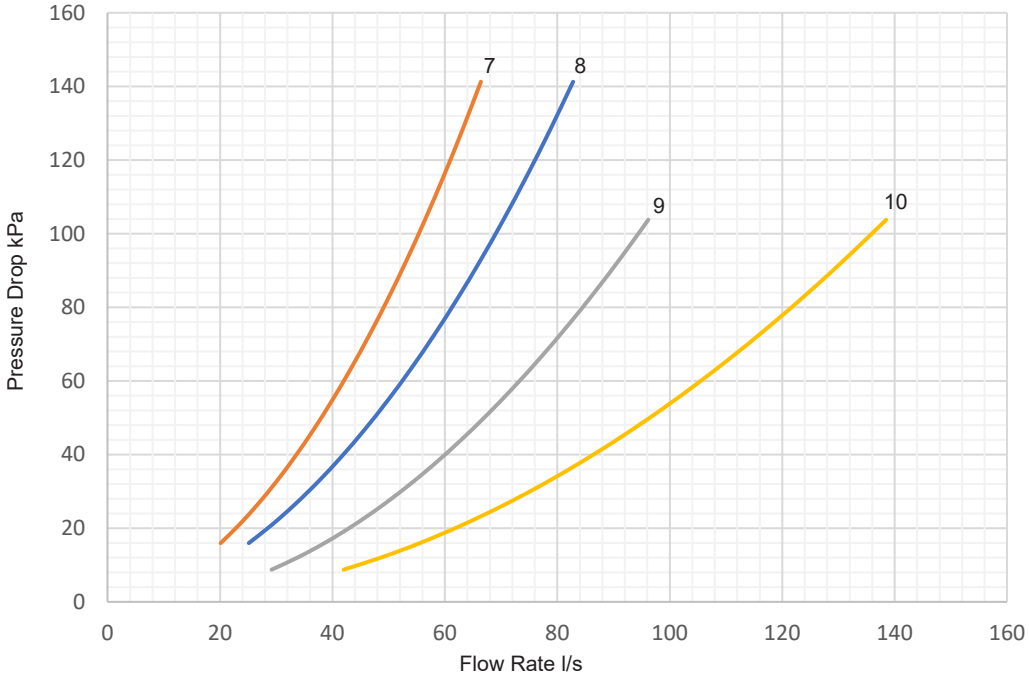
Hydronic Data

Evaporator Pressure Drop - Single Circuit

Unit	Evaporator Number
TCW11RCAEA-S-A-0	1
TCW11RCAEA-S-B-0	
TCW11RCBEB-L-A-0	2
TCW11RCBEB-L-B-0	
TCW11RCCEC-M-A-0	3
TCW11RCCEC-M-B-0	
TCW11RCDED-N-A-0	4
TCW11RCDED-N-B-0	
TCW12RCEEE-S-A-0	5
TCW12RCEEE-S-B-0	

Unit	Evaporator Number
TCW12RCFEF-L-A-0	6
TCW12RCFEF-L-B-0	
TCW12RCGEG-M-A-0	7
TCW12RCGEG-M-B-0	
TCW13RCHEH-L-A-0	8
TCW13RCHEH-L-B-0	
TCW13RCIEI-M-A-0	9
TCW13RCIEI-M-B-0	
TCW13RCJEJ-N-A-0	10
TCW13RCJEJ-N-B-0	





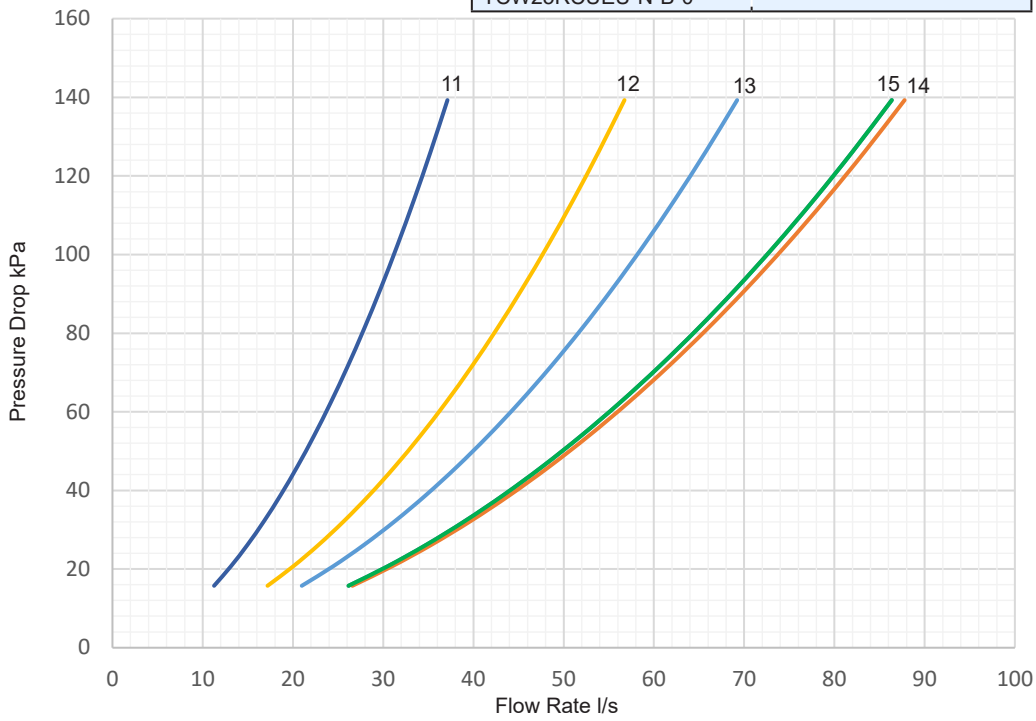
Graphs represent performance at 100% water.

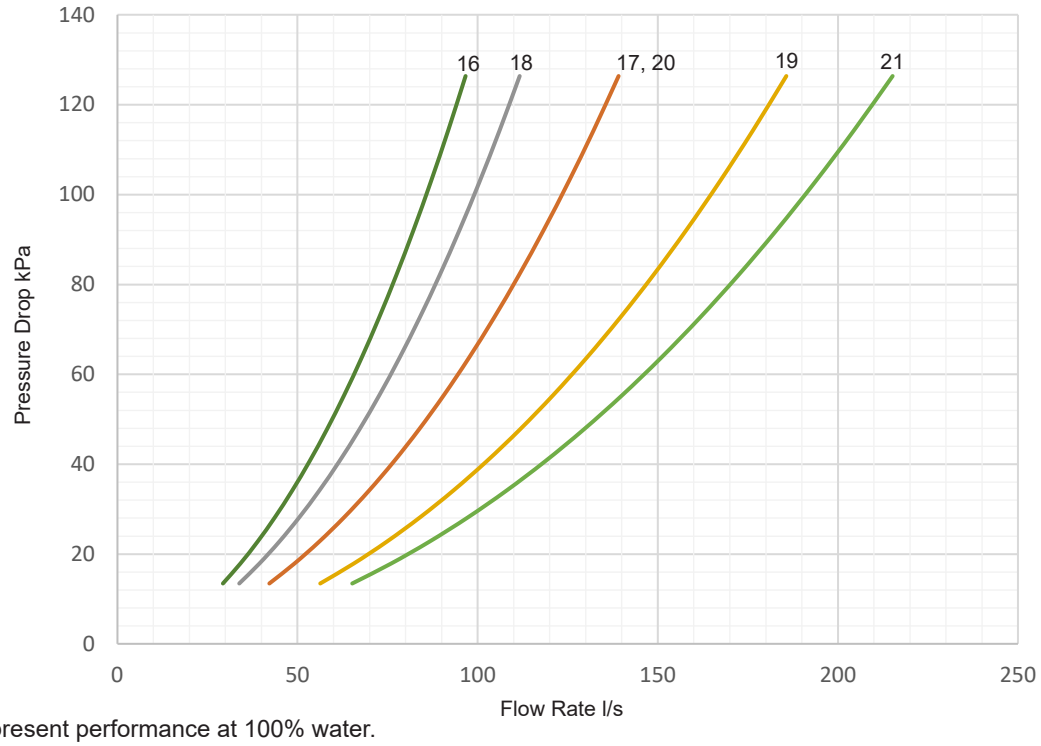
Hydronic Data

Evaporator Pressure Drop - Dual Circuit

Unit	Evaporator Number
TCW22RCKEK-S-A-0 TCW22RCKEK-S-B-0	11
TCW22RCLEL-L-A-0 TCW22RCLEL-L-B-0	12
TCW22RCMEM-M-A-0 TCW22RCMEM-M-B-0	13
TCW22RCNEN-N-A-0 TCW22RCNEN-N-B-0	14
TCW23RCOEO-L-A-0 TCW23RCOEO-L-B-0	15

Unit	Evaporator Number
TCW23RCPEP-M-A-0 TCW23RCPEP-M-B-0	16
TCW23RCQEQ-N-A-0 TCW23RCQEQ-N-B-0	17
TCW24RCRER-L-A-0 TCW24RCRER-L-B-0	18
TCW24RCSES-N-A-0 TCW24RCSES-N-B-0	19
TCW25RCTET-L-A-0 TCW25RCTET-L-B-0	20
TCW25RCUEU-N-A-0 TCW25RCUEU-N-B-0	21





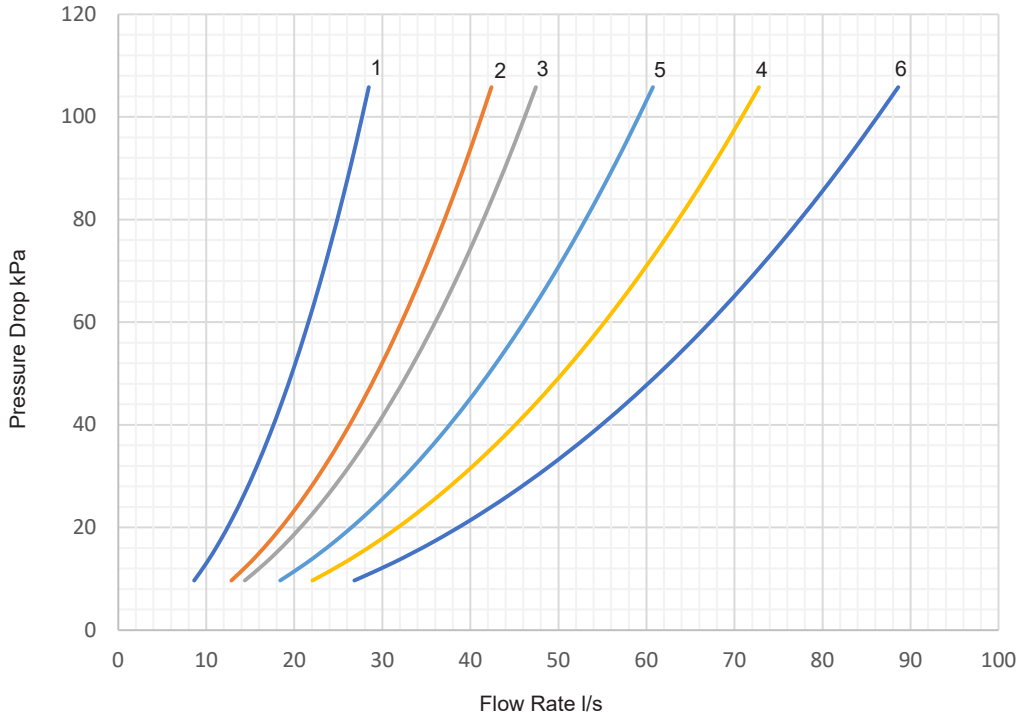
Graphs represent performance at 100% water.

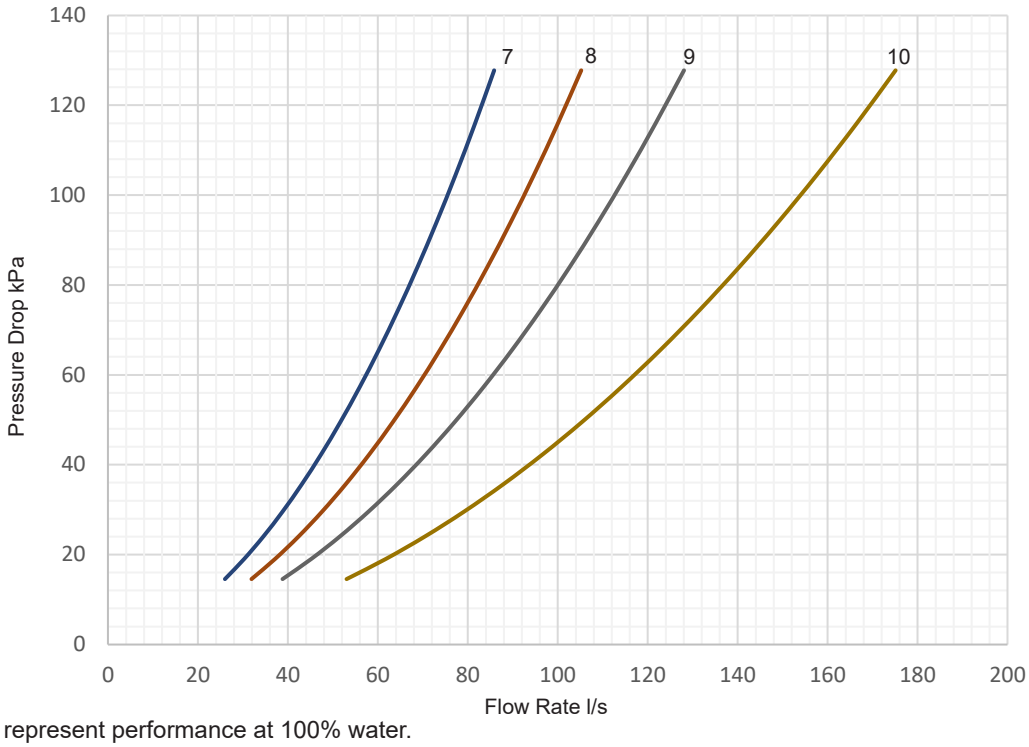
Hydronic Data

Condenser Pressure Drop - Single Circuit

Unit	Condenser Number
TCW11RCAEA-S-A-0 TCW11RCAEA-S-B-0	1
TCW11RCBEB-L-A-0 TCW11RCBEB-L-B-0	2
TCW11RCCEC-M-A-0 TCW11RCCEC-M-B-0	3
TCW11RCDED-N-A-0 TCW11RCDED-N-B-0	4
TCW12RCEEE-S-A-0 TCW12RCEEE-S-B-0	5

Unit	Condenser Number
TCW12RCFEF-L-A-0 TCW12RCFEF-L-B-0	6
TCW12RCGEG-M-A-0 TCW12RCGEG-M-B-0	7
TCW13RCHEH-L-A-0 TCW13RCHEH-L-B-0	8
TCW13RCIEI-M-A-0 TCW13RCIEI-M-B-0	9
TCW13RCJEJ-N-A-0 TCW13RCJEJ-N-B-0	10





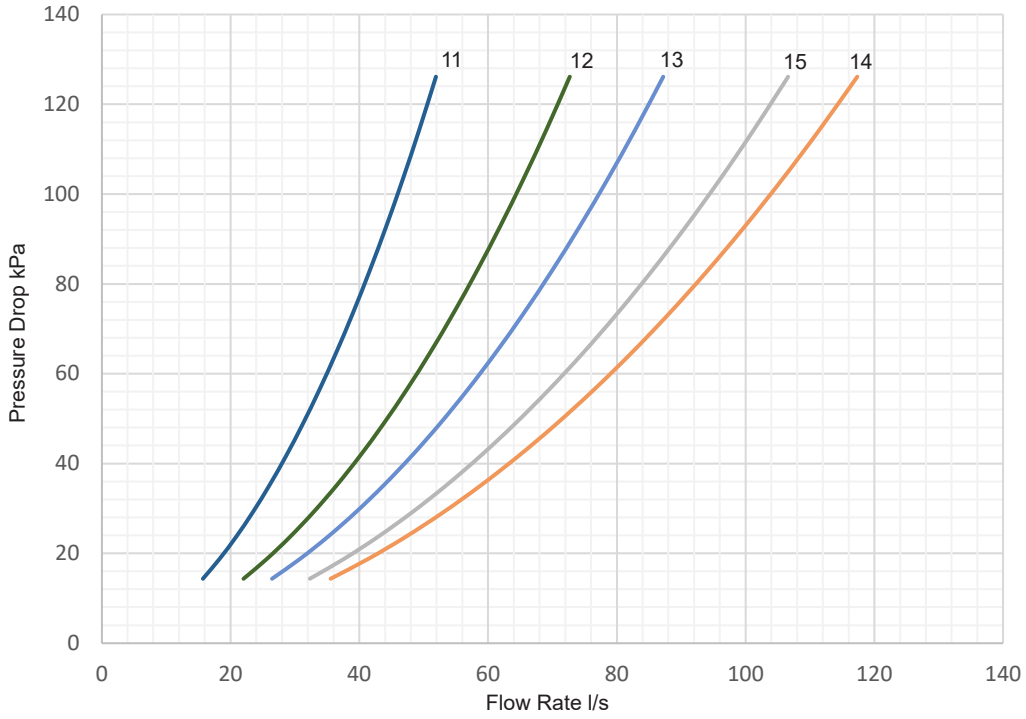
Graphs represent performance at 100% water.

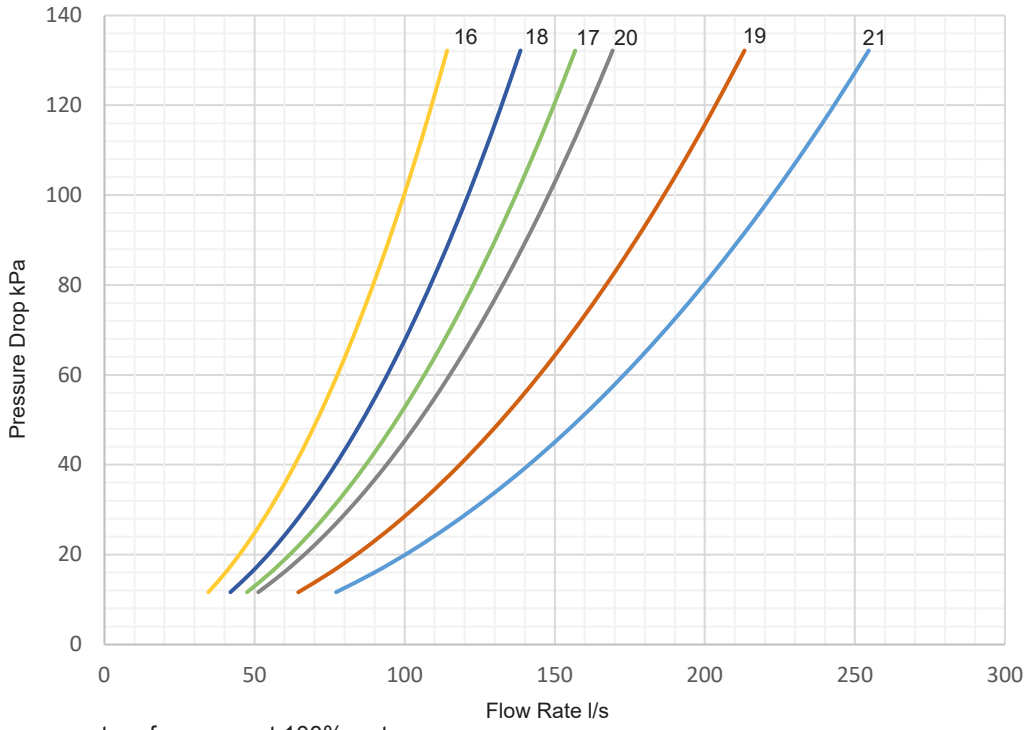
Hydronic Data

Condenser Pressure Drop - Dual Circuit

Unit	Condenser Number
TCW22RCKEK-S-A-0 TCW22RCKEK-S-B-0	11
TCW22RCLEL-L-A-0 TCW22RCLEL-L-B-0	12
TCW22RCMEM-M-A-0 TCW22RCMEM-M-B-0	13
TCW22RCNEN-N-A-0 TCW22RCNEN-N-B-0	14
TCW23RCOEO-L-A-0 TCW23RCOEO-L-B-0	15

Unit	Condenser Number
TCW23RCPEP-M-A-0 TCW23RCPEP-M-B-0	16
TCW23RCQEQ-N-A-0 TCW23RCQEQ-N-B-0	17
TCW24RCRER-L-A-0 TCW24RCRER-L-B-0	18
TCW24RCSES-N-A-0 TCW24RCSES-N-B-0	19
TCW25RCTET-L-A-0 TCW25RCTET-L-B-0	20
TCW25RCUEU-N-A-0 TCW25RCUEU-N-B-0	21

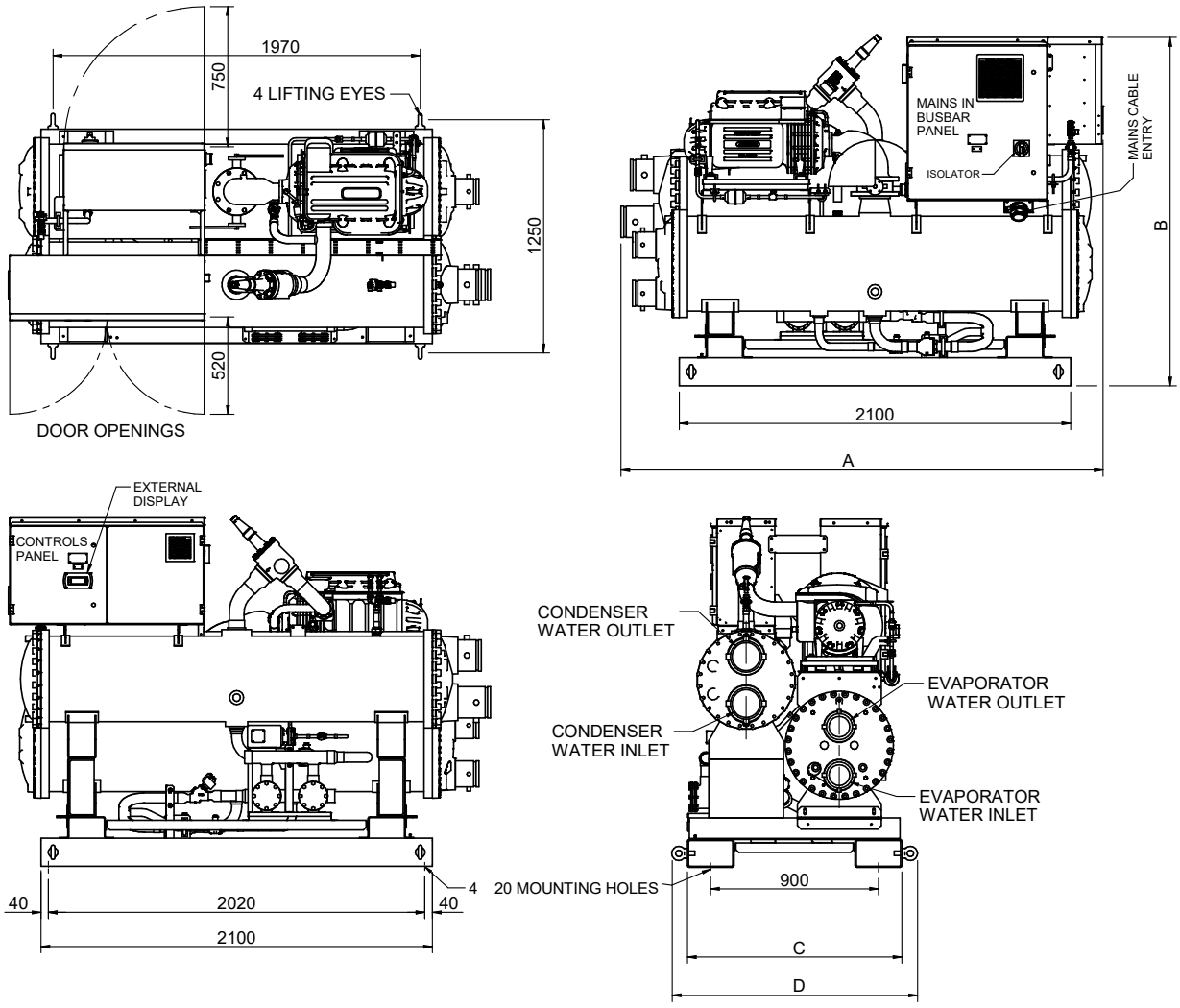




Graphs represent performance at 100% water.

Installation

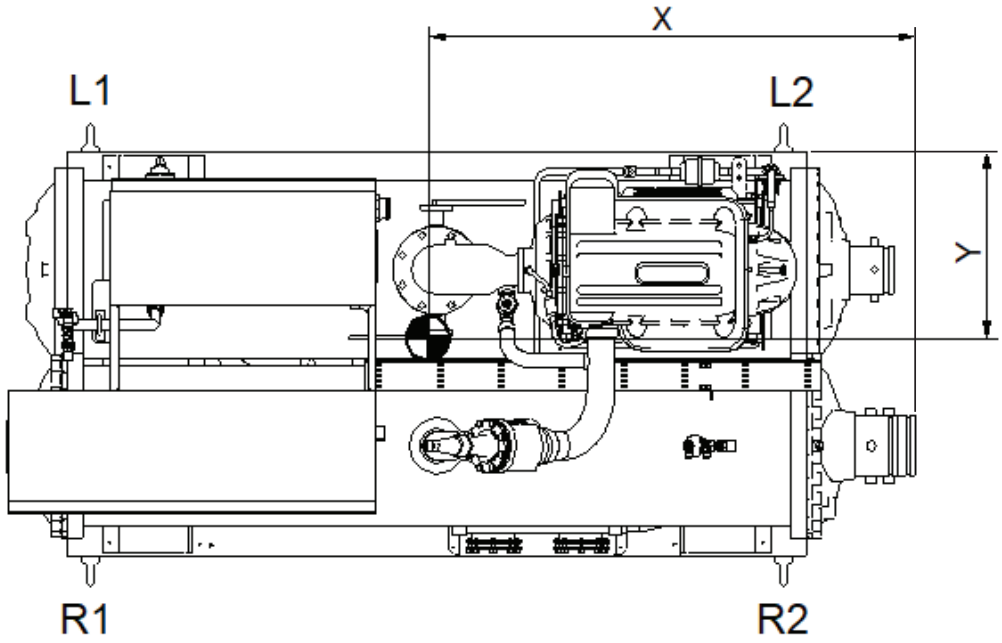
Mini Unit Layout



Please note that this an indication of the standard unit only. For unit specific information, and the inclusion of optional features, please request a unit specific GA from Airedale.

	A (mm)	B (mm)	C (mm)	D (mm)
TCW11RCAEA-S-A-0 TCW11RCAEA-S-B-0	2624	1780	1150	1319
TCW11RCBEB-L-A-0 TCW11RCBEB-L-B-0	2624	1780	1150	1319
TCW11RCCEC-M-A-0 TCW11RCCEC-M-B-0	2590	1870	1150	1319
TCW11RCDED-N-A-0 TCW11RCDED-N-B-0	2590	1870	1150	1319

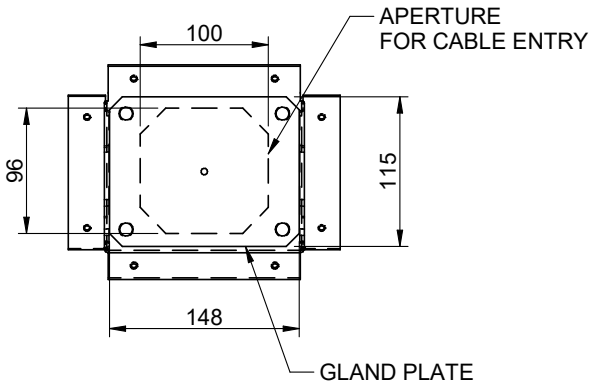
Mini Unit Mass and Centre of Gravity



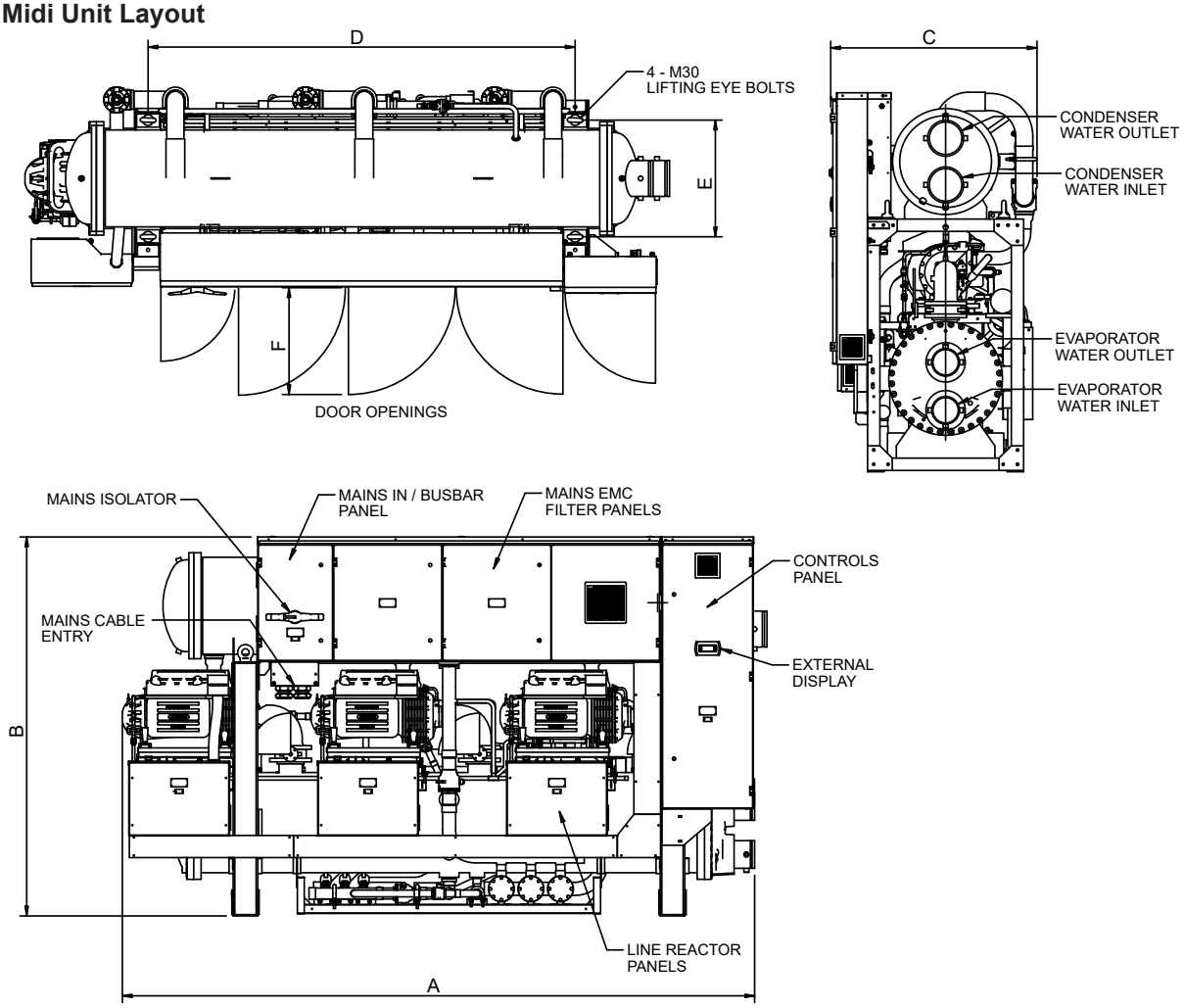
	Lifting Mass (kg)	Operating Mass* (kg)	L1 (kg)	L2 (kg)	L3 (kg)	L4 (kg)	R1 (kg)	R2 (kg)	R3 (kg)	R4 (kg)	CofG X (mm)	CofG Y (mm)
TCW11RCAEA-S-A-0 TCW11RCAEA-S-B-0	1464	1561	353	330	-	-	452	426	-	-	508	1449
TCW11RCBEB-L-A-0 TCW11RCBEB-L-B-0	1826	1961	501	480	-	-	501	480	-	-	575	1434
TCW11RCCEC-M-A-0 TCW11RCCEC-M-B-0	1968	2139	527	505	-	-	565	543	-	-	556	1432
TCW11RCDED-N-A-0 TCW11RCDED-N-B-0	2141	2375	605	585	-	-	603	582	-	-	576	1427

*Operating Mass includes water/glycol mix.

Mini Unit Mains Gland Entry



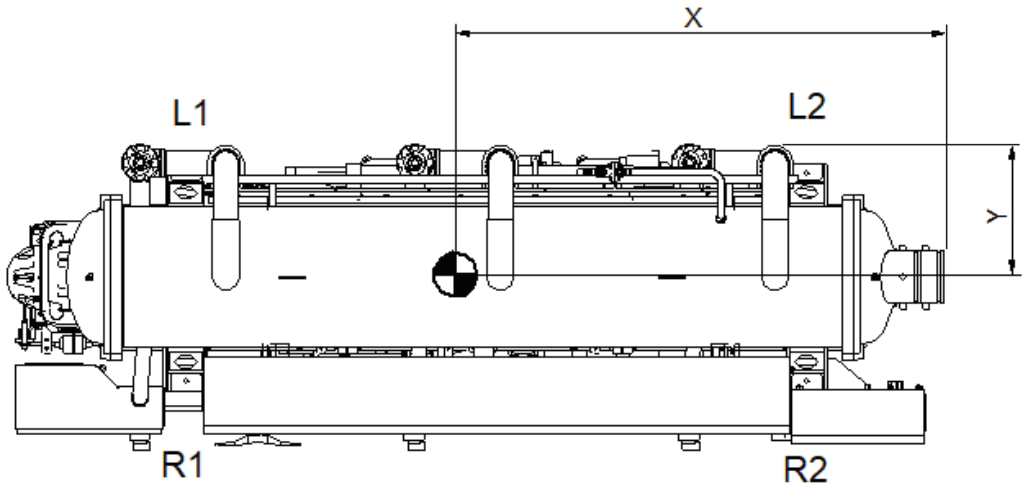
Midi Unit Layout



Please note that this an indication of the standard unit only. For unit specific information, and the inclusion of optional features, please request a unit specific GA from Airedale.

	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
TCW12RCEEE-S-A-0 TCW12RCEEE-S-B-0	2960	2307	1264	1710	1710	710
TCW12RCFEF-L-A-0 TCW12RCFEF-L-B-0	3057	2307	1270	1710	1710	710
TCW12RCGEG-M-A-0 TCW12RCGEG-M-B-0	3643	2307	1284	2720	2720	710
TCW13RCHEH-L-A-0 TCW13RCHEH-L-B-0	3950	2307	1271	2600	2600	710
TCW13RCIEI-M-A-0 TCW13RCIEI-M-B-0	3950	2307	1284	2600	2600	710
TCW22RCKEK-S-A-0 TCW22RCKEK-S-B-0	3592	2307	1276	2720	2720	710
TCW22RCLEL-L-A-0 TCW22RCLEL-L-B-0	3532	2307	1283	2720	2720	710
TCW22RCMEM-M-A-0 TCW22RCMEM-M-B-0	3643	2307	1284	2720	2720	710
TCW22RCNEN-N-A-0 TCW22RCNEN-N-B-0	3643	2307	1284	2720	2720	710
TCW23RCOEO-L-A-0 TCW23RCOEO-L-B-0	3910	2307	1283	2600	2600	710

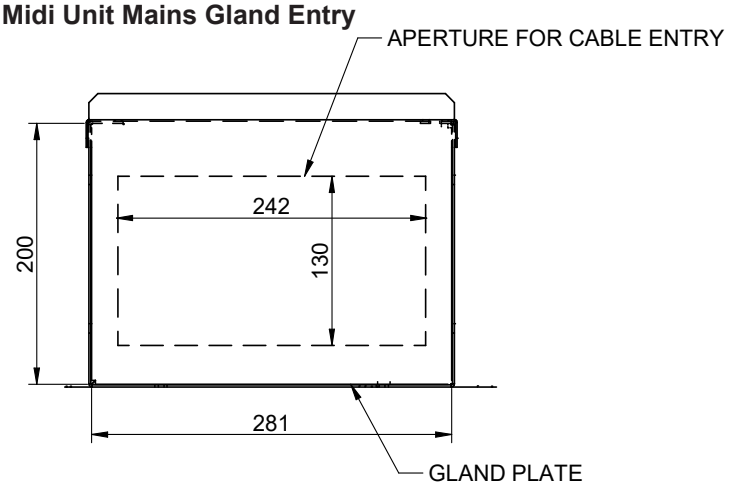
Midi Unit Mass and Centre of Gravity



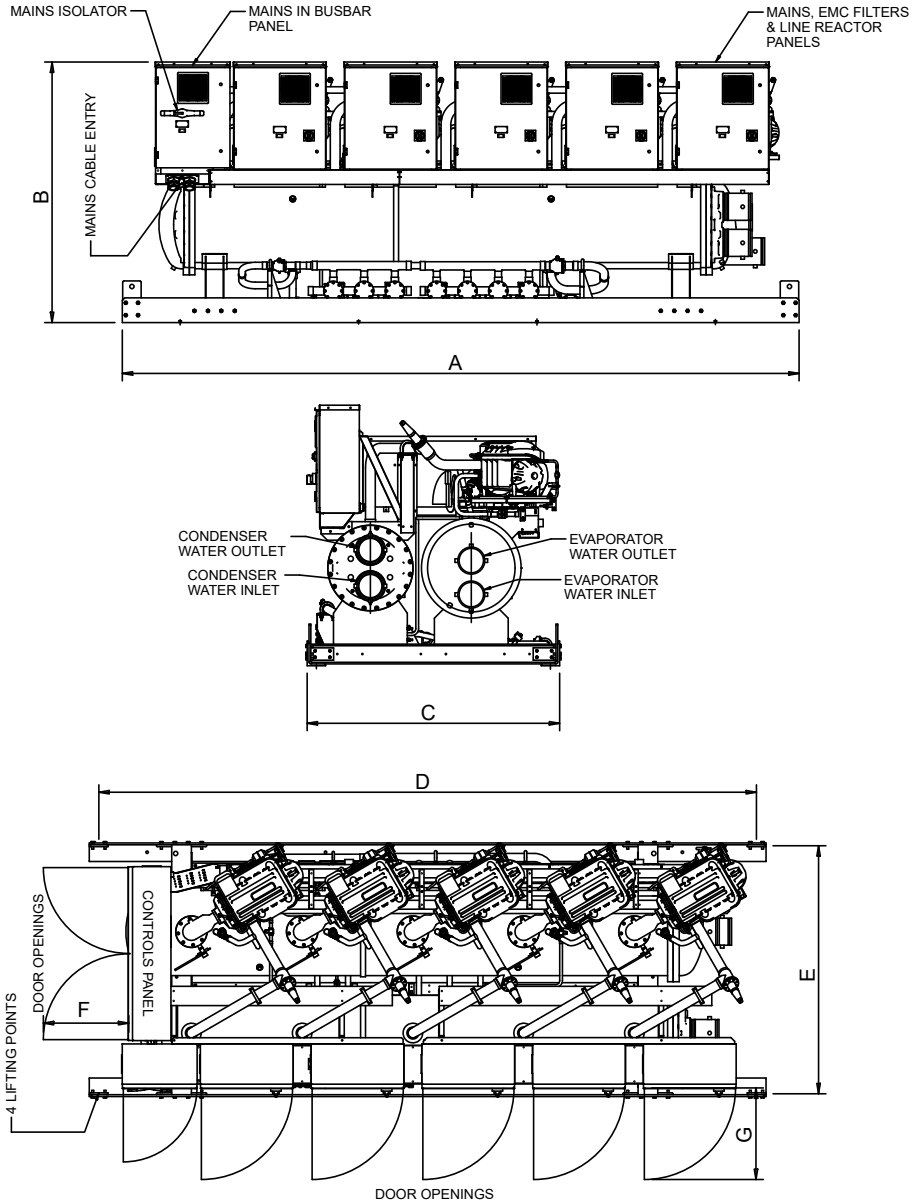
	Lifting Mass (kg)	Operating Mass* (kg)	L1 (kg)	L2 (kg)	L3 (kg)	L4 (kg)	R1 (kg)	R2 (kg)	R3 (kg)	R4 (kg)	CofG X (mm)	CofG Y (mm)
TCW12RCEEE-S-A-0 TCW12RCEEE-S-B-0	2480	2694	678	678	-	-	736	667	-	-	590	1477
TCW12RCFEF-L-A-0 TCW12RCFEF-L-B-0	3025	3337	823	756	-	-	915	842	-	-	583	1459
TCW12RCGEG-M-A-0 TCW12RCGEG-M-B-0	3352	3724	896	868	-	-	995	965	-	-	597	1893
TCW13RCHEH-L-A-0 TCW13RCHEH-L-B-0	3927	4376	1110	1010	-	-	1180	1076	-	-	603	1927
TCW13RCIEI-M-A-0 TCW13RCIEI-M-B-0	4118	4648	1143	1045	-	-	1283	1177	-	-	609	1920
TCW22RCKEK-S-A-0 TCW22RCKEK-S-B-0	2532	2730	665	652	-	-	713	700	-	-	604	1926
TCW22RCLEL-L-A-0 TCW22RCLEL-L-B-0	3036	3339	836	769	-	-	902	832	-	-	604	1893
TCW22RCMEM-M-A-0 TCW22RCMEM-M-B-0	3449	3829	917	893	-	-	1022	996	-	-	596	1888
TCW22RCNEN-N-A-0 TCW22RCNEN-N-B-0	3605	4087	976	955	-	-	1089	1067	-	-	596	1882
TCW23RCOEO-L-A-0 TCW23RCOEO-L-B-0	4041	4499	1161	1058	-	-	1192	1088	-	-	613	1925

*Operating Mass includes water/glycol mix.

Midi Unit Mains Gland Entry



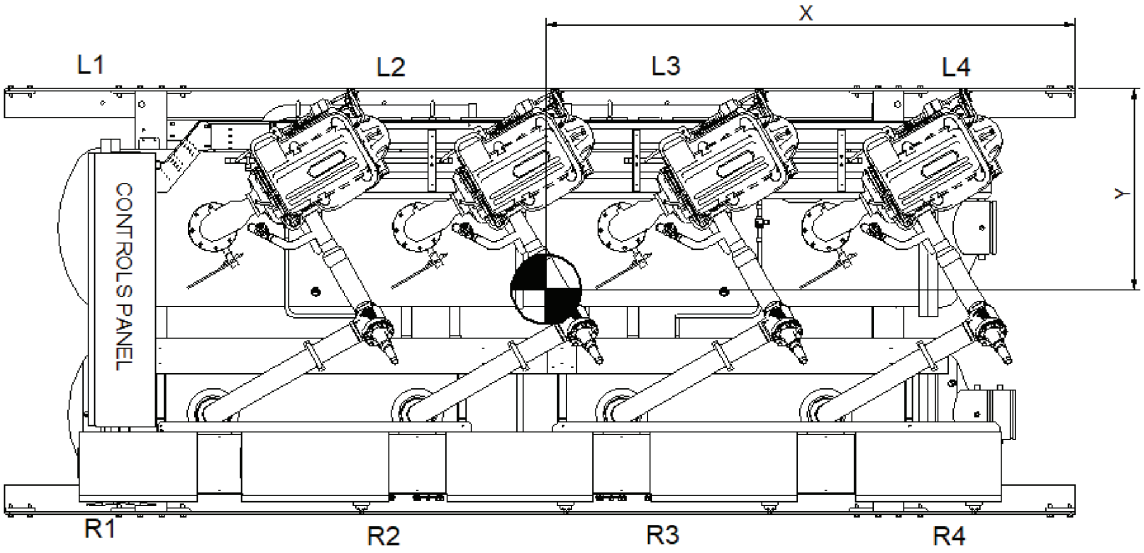
Maxi Unit Layout



Please note that this an indication of the standard unit only. For unit specific information, and the inclusion of optional features, please request a unit specific GA from Airedale.

	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)
TCW13RCJEJ-N-A-0 TCW13RCJEJ-N-B-0	4410	2035	2052	500	1050	694	741
TCW23RCPEP-M-A-0 TCW23RCPEP-M-B-0	5500	2006	2052	500	1450	694	741
TCW23RCQEQ-N-A-0 TCW23RCQEQ-N-B-0	5500	2057	2052	500	1450	694	741
TCW24RCRER-L-A-0 TCW24RCRER-L-B-0	5500	2057	2052	500	1450	694	741
TCW24RCSES-N-A-0 TCW24RCSES-N-B-0	5500	2133	2192	500	1450	694	741
TCW25RCTET-L-A-0 TCW25RCTET-L-B-0	5500	2108	2052	500	1450	694	741
TCW25RCUEU-N-A-0 TCW25RCUEU-N-B-0	5500	2158	2192	500	1450	694	741

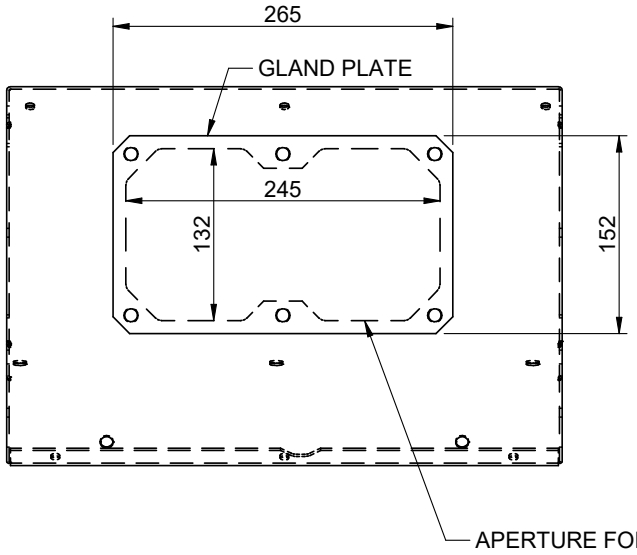
Maxi Unit Mass and Centre of Gravity



	Lifting Mass (kg)	Operating Mass* (kg)	L1 (kg)	L2 (kg)	L3 (kg)	L4 (kg)	R1 (kg)	R2 (kg)	R3 (kg)	R4 (kg)	CofG X (mm)	CofG Y (mm)
TCW13RCJEJ-N-A-0 TCW13RCJEJ-N-B-0	5477	6225	741	943	955	770	608	783	792	633	1121	2279
TCW23RCPEP-M-0 TCW23RCPEP-M-B-0	4901	5550	651	862	862	649	540	724	724	538	1115	2830
TCW23RCQEQ-N-A-0 TCW23RCQEQ-N-B-0	6211	7145	810	1078	1079	815	717	962	963	721	1084	2816
TCW24RCRER-L-A-0 TCW24RCRER-L-B-0	6448	7248	818	1093	1100	835	719	971	977	735	1161	2792
TCW24RCSES-N-A-0 TCW24RCSES-N-B-0	8118	9390	1058	1409	1412	1067	946	1270	1274	954	1152	2812
TCW25RCTET-L-A-0 TCW25RCTET-L-B-0	6746	7714	851	1147	1162	887	767	1042	1056	801	1148	2787
TCW25RCUEU-N-A-0 TCW25RCUEU-N-B-0	8519	10024	1144	1533	1548	1180	970	1317	1330	1003	1179	2804

*Operating Mass includes water/glycol mix.

Maxi Unit Mains Gland Entry



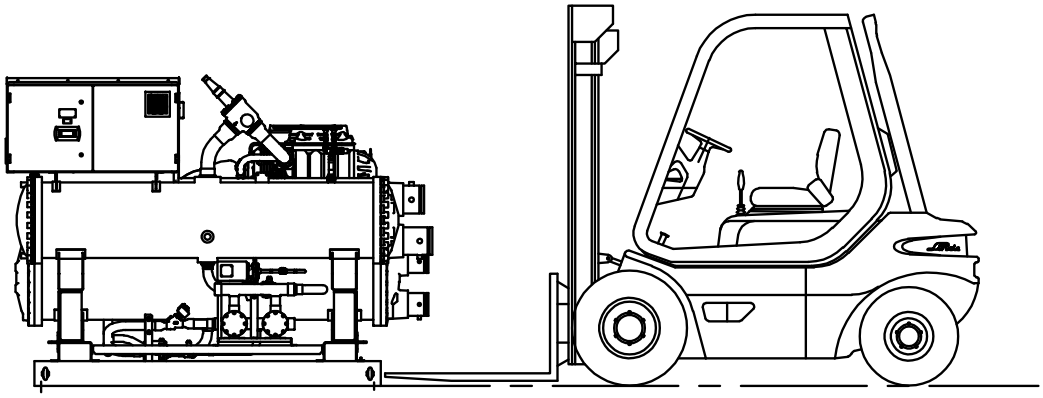
Lifting

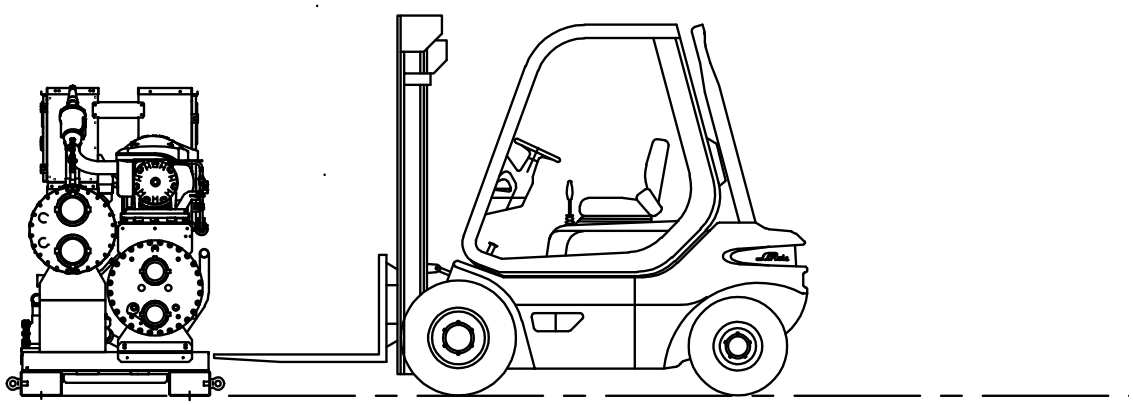
Fork Lift Truck Lifting

Mini units can be lifted from all sides with a fork lift truck.

CAUTION ⚠	Lifting and manoervering the unit should only be carried out by trained personnel. Lift from the end using a fork lift truck requires the removal of the lifting eye bolts.

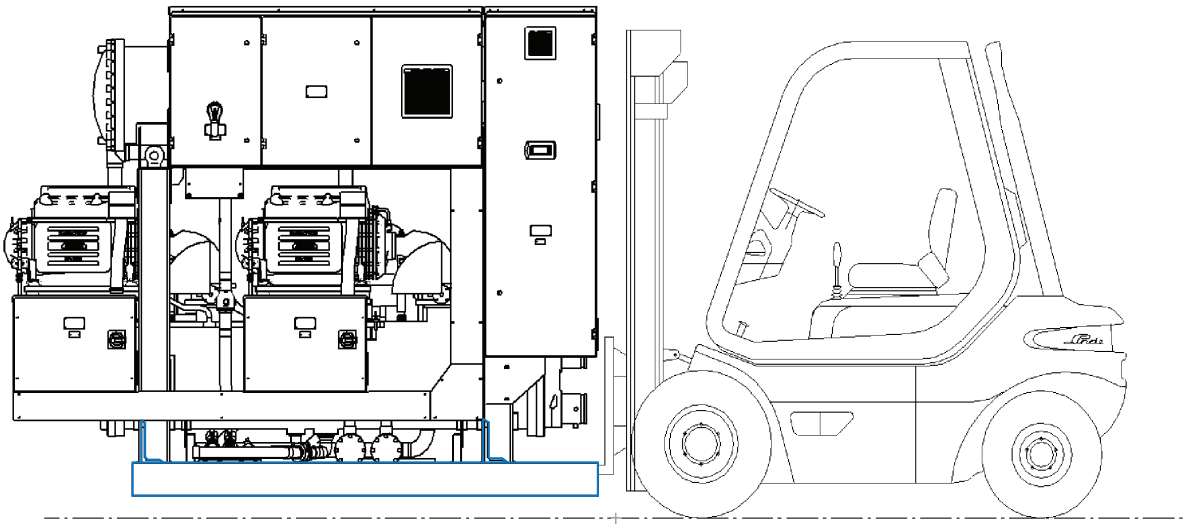
Fork spacing from the end requires 900mm.

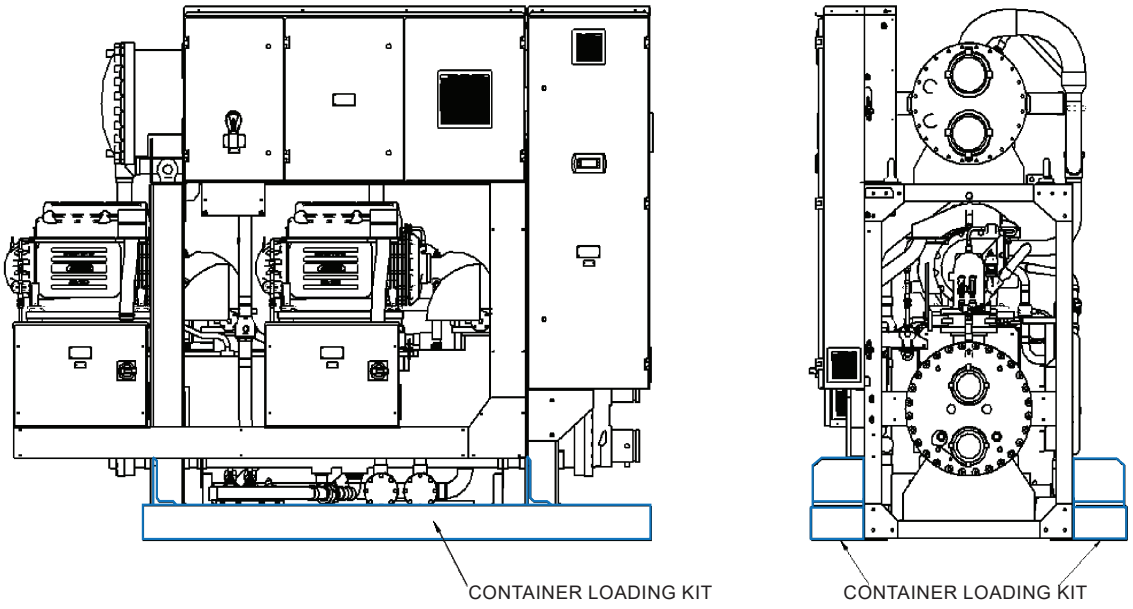




Container Loading Kit

Midi configuration with container loading kit fitted - this option is removable when the unit is on site.

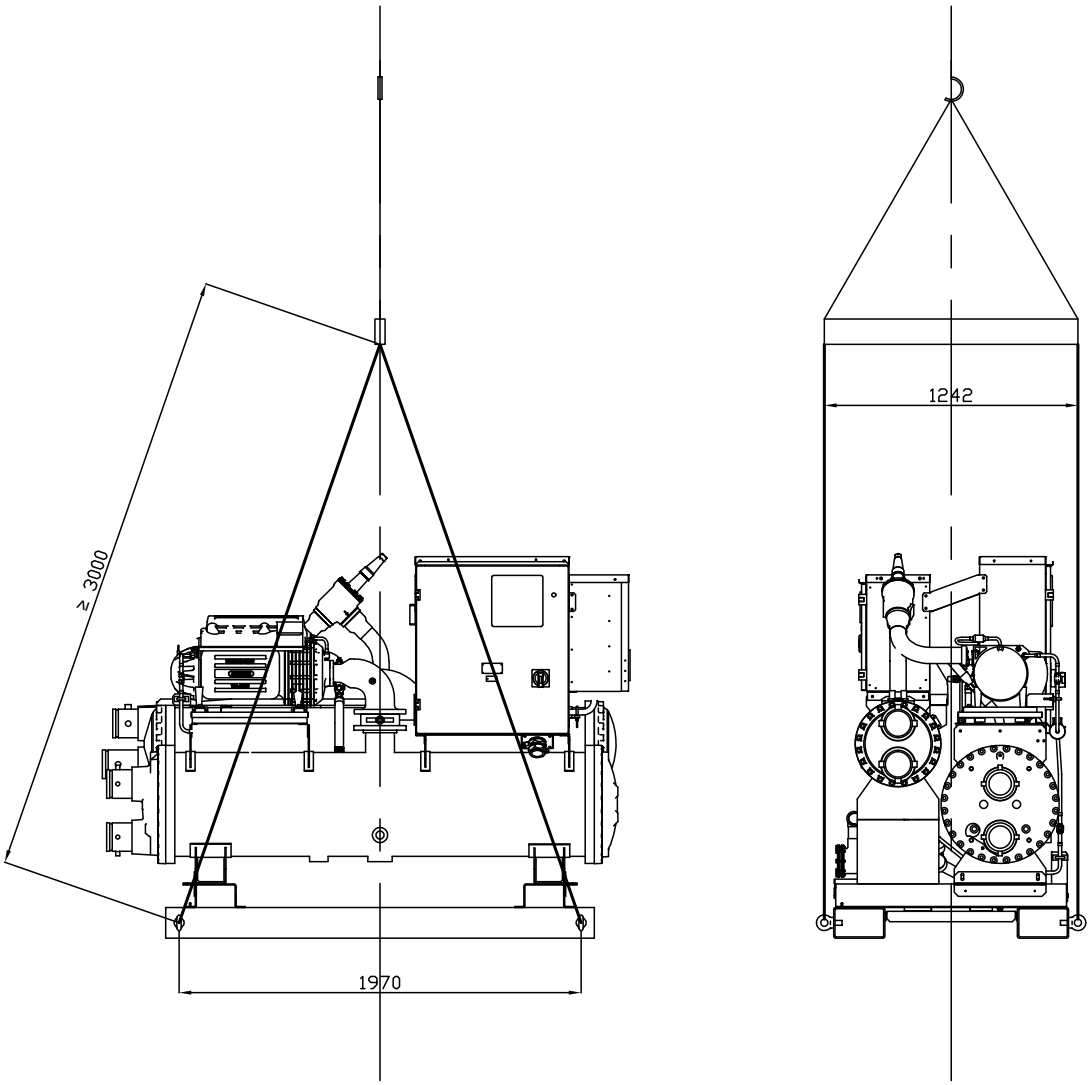




Unit Lifting

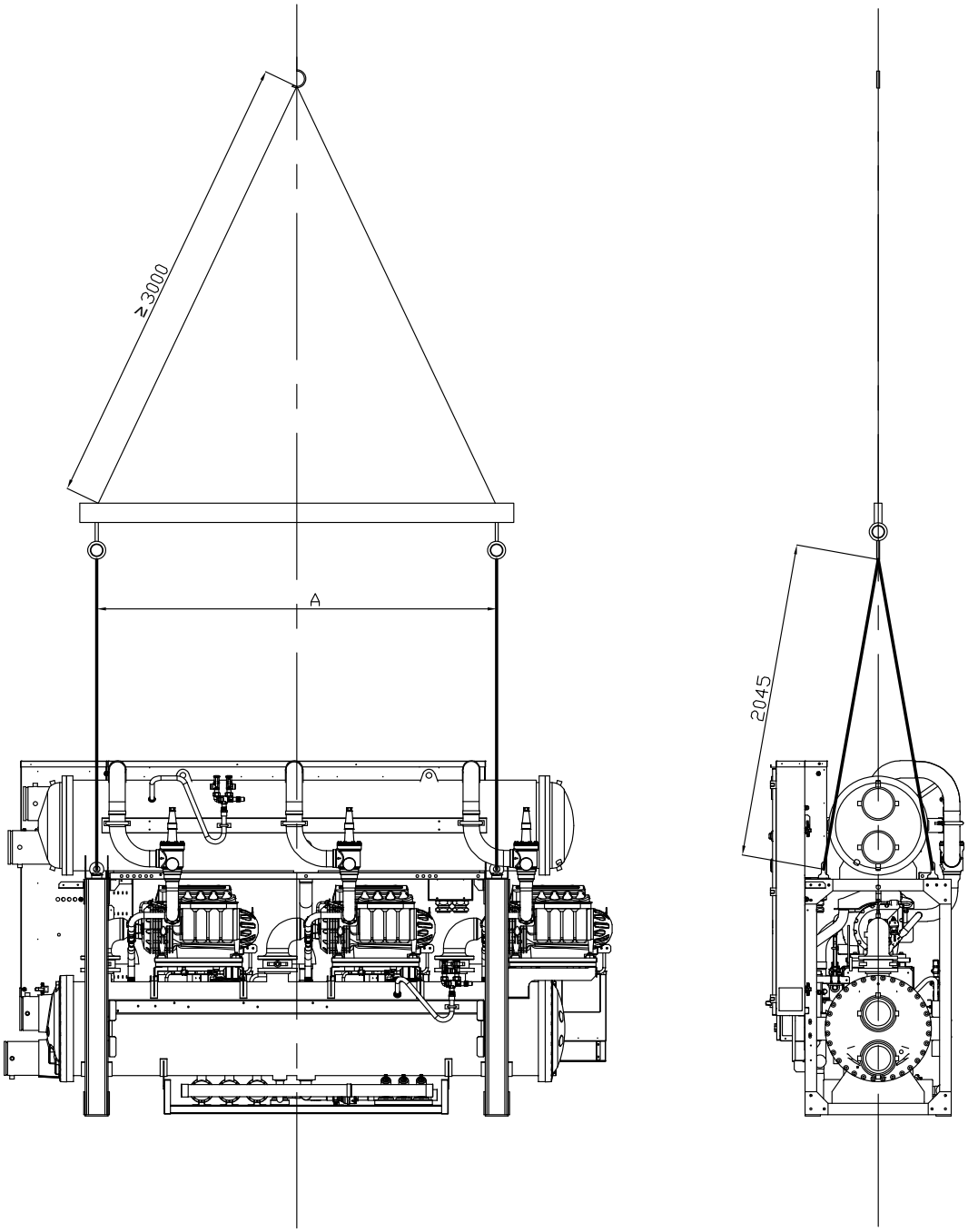
- Employ lifting specialists
- Local codes and regulations relating to the lifting of this type of equipment should be observed
- Use the appropriate spreader bars/lifting slings (provided by others) with the eye bolts/lugs provided
- Attach individual lifting chains to each of the lifting eye bolts/lifting lugs provided; each individual chain must be capable of lifting the whole unit
- Lifting eye bolt/lug dimension: 40mm

Mini Unit Lifting



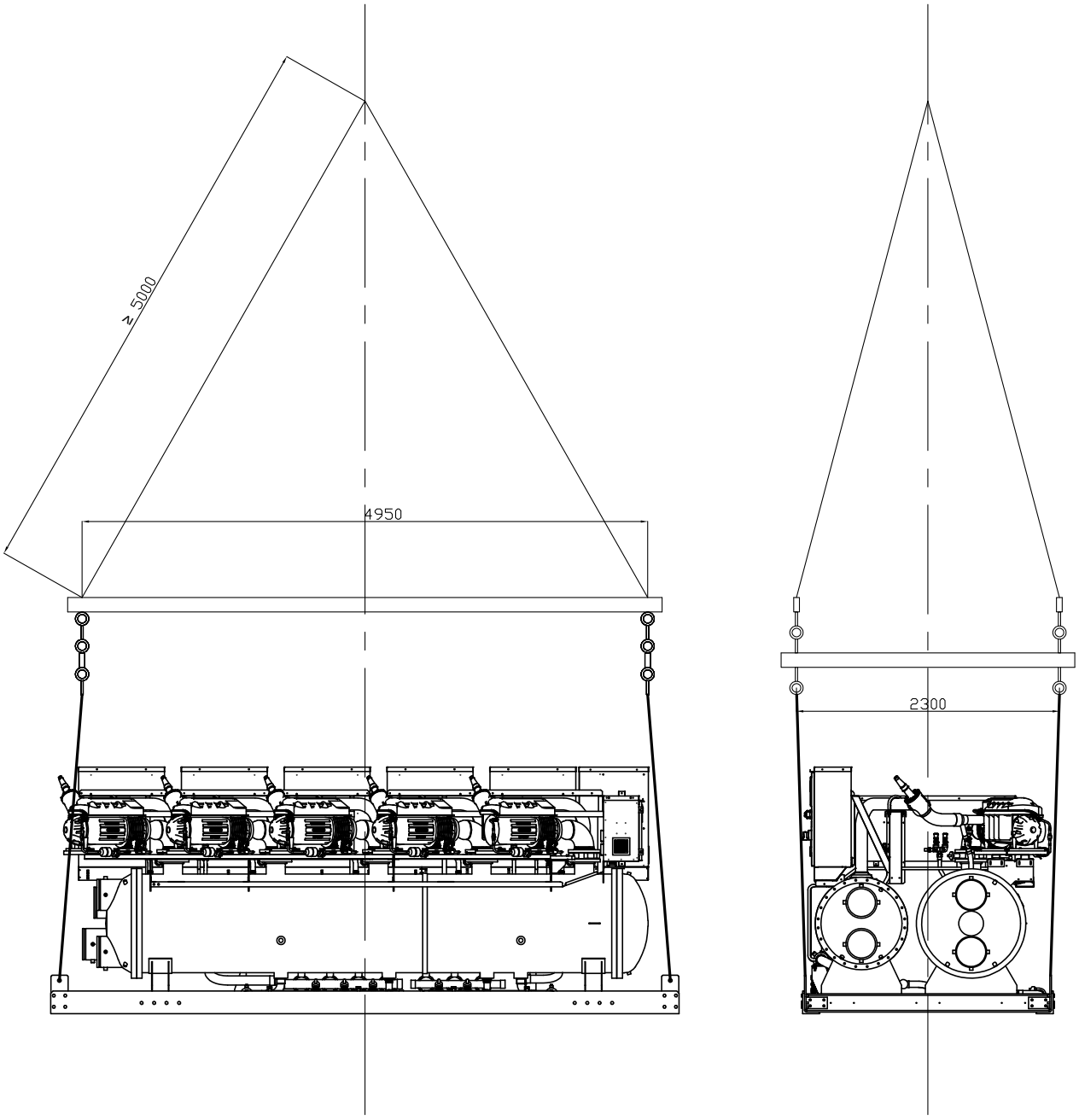
Unit	Eye Bolt Size
TCW11RCxEx-x-x-x	M24 (35mm Hole)

Midi Unit Lifting



Unit	Eye Bolt Size	A (mm)
TCW12RCEEE-S-x-x	M30 (44mm Hole)	1710
TCW12RCFEF-L-x-x	M30 (44mm Hole)	1710
TCW12RCGEG-M-x-x	M30 (44mm Hole)	2720
TCW13RCHEH-L-x-x	M30 (44mm Hole)	2600
TCW13RCIEI-M-x-x	M30 (44mm Hole)	2600
TCW22RCKEK-S-x-x	M30 (44mm Hole)	2720
TCW22RCLEL-L-x-x	M30 (44mm Hole)	2720
TCW22RCMEM-M-x-x	M30 (44mm Hole)	2720
TCW22RCNEN-N-x-x	M30 (44mm Hole)	2720
TCW23RCOEO-L-x-x	M30 (44mm Hole)	2600

Maxi Unit Lifting



Unit	Eye Bolt Size
TCW13RCJEJ-N-x-x	35mm
TCW23RCPEP-N-x-x	35mm
TCW23RCQEQ-N-x-x	35mm
TCW24RCxEx-x-x-x	35mm
TCW25RCxEx-x-x-x	35mm

Installation

Positioning

The installation position should be selected with the following points in mind:

- Position on a stable and even base, levelled to ensure that the compressor operates correctly
- Levelling should be to +/- 5mm over length of unit
- Where vibration transmission to the building structure is possible, fit spring anti-vibration mounts and flexible water connections
- Observe maintenance clearances
- Pipe work and electrical connections are readily accessible
- Increase maintenance clearances for side-enclosed or multiple unit applications
- If the unit is installed in particularly windy locations, the provision of wind breaks may be required. For such applications a vertical discharge unit is recommended or where horizontal airflow could be obstructed.

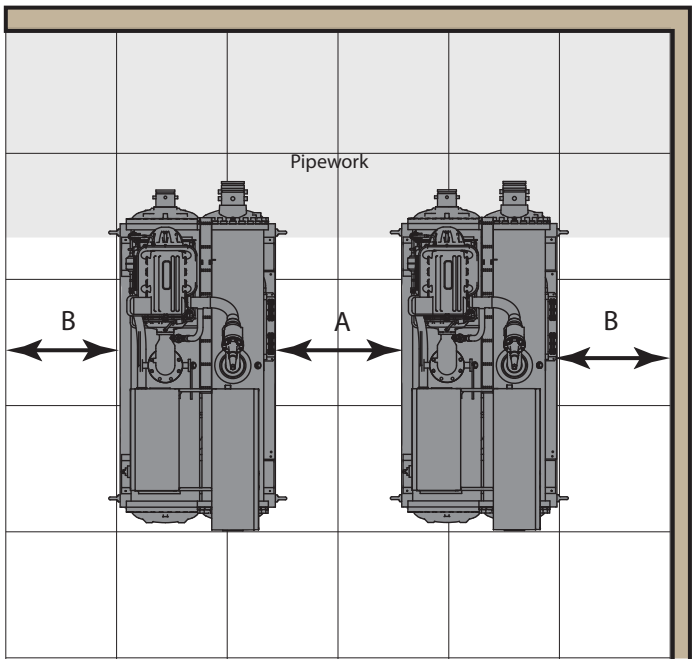
CAUTION ⚠	Prior to connecting services, ensure that the equipment is installed and completely level. The unit should be installed in compliance with EN 378-3:2016+A1:2020. See page 4 for further details.

Clearance

The following minimum clearance is required:

A - Clearance between units - 1000mm

B - Clearance between unit and external walls - 800mm



The following provision above the unit for maintenance purposes is required as a minimum:

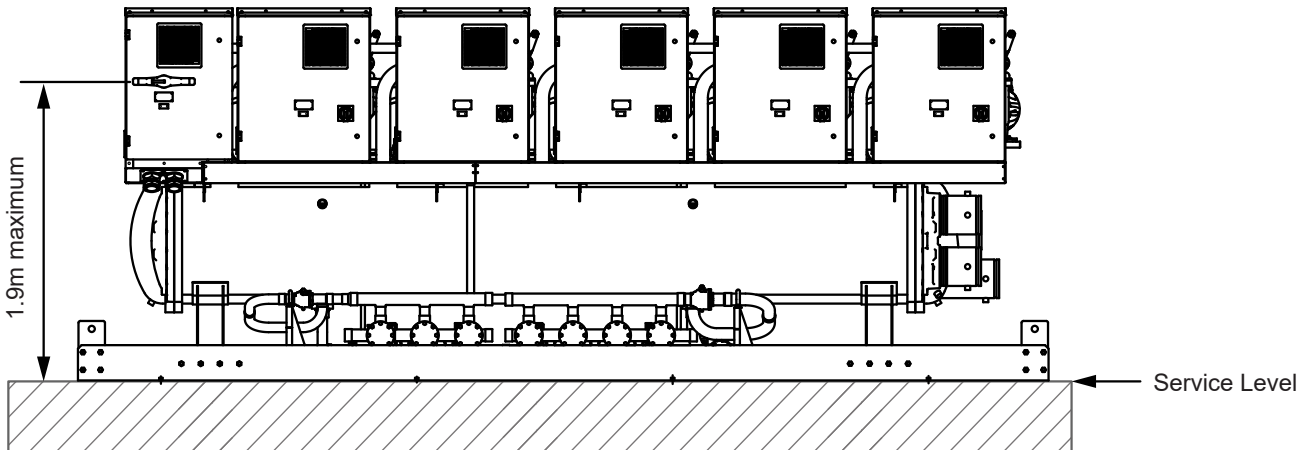
Mini and Maxi units - 1000mm

Midi units - 500mm

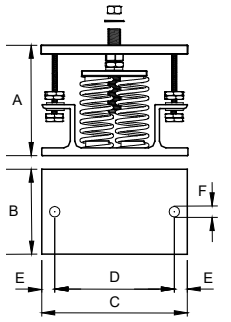
Mains Isolation

The isolator must be easily accessible and, in compliance with the Safety of Machinery – Electrical Equipment Machines Standard (BS EN 60204-1:2018), the isolator handles shall be no higher than 1.9m above the service level.

If the unit is mounted on a raised plinth, the upper limit of 1.9m must be observed and a permanently fixed service platform must be installed to maintain the 1.9m maximum height allowance. Suitable access to the isolator must be provided and maintained from the point of power being applied to the unit prior to commissioning. If service level access or permanently fixed access cannot be provided at this point, a suitable temporary platform needs to be in position before the unit can be switched on or commissioned and should remain in place until a suitable permanent solution is available.



Installation Data



Anti Vibration Mounting (Optional)

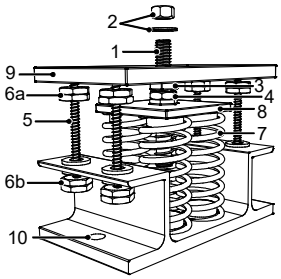
Spring Type

Each mount is coloured to indicate the different loads, refer to instructions supplied for correct allocation.

Dimensions

	A(1)	B	C	D	E	F
mm	162	130	225	186	20	16

(1) Unloaded dimension



Components

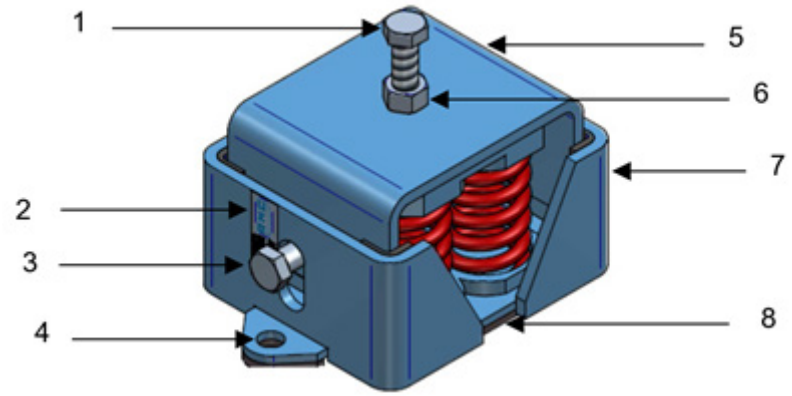
1	Locating screw.	6b	Lower retaining nuts.
2	Retaining nut & washer.	7	Spring assembly.
3	Levelling screw.	8	Pressure plate.
4	Levelling lock nut.	9	Top plate.
5	Retaining studs.	10	Fixing holes.
6a	Upper retaining nuts.		

Installation

1. Locate and secure mount using fixing down holes (10) in base plate.
2. Ensure mounts are located in line with the unit base.
3. If applicable, remove compressor enclosure covers to allow access to mount fixing holes in the unit base.
4. Lock the upper retaining nuts (6a) to the underside of the top plate (9) before a load is applied.
5. Slacken levelling lock nut (4); the levelling screw will not move if this is not slackened.
6. Remove retaining nut and washer (2), lower the unit onto the mounts and replace retaining nut and washer.
7. Beginning with the mount with the largest deflection adjust the height of each mount using the levelling screw (3). Mountings must be adjusted incrementally in turn.
8. Do not fully adjust 1 mount at a time as this may overload and damage springs.
9. When all mounts are level, lock each into place using the levelling lock nut (4).
10. Lock all retaining nuts (6a and 6b) to the extreme ends of the retaining studs (5).

⚠**CAUTION**	Do not connect any services until all anti vibration mounts have been fully adjusted.

AMC AV Mount Fitting Instructions



1. Levelling Screw
2. Displacement Gauge
3. Anti-traction Screw
4. Mounting Holes
5. Mount Top Hot
6. Fixing Nut
7. Mount Body
8. Sylomer Base

Mounts may be supplied in either a one, two or four spring variation. All mounts are of the same height, however the spacing between mounting holes does vary as below.

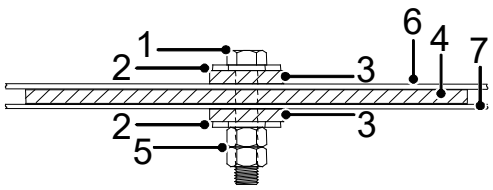
	1 Spring	2 Spring	4 Spring
Mounting Hole Spacing (mm)	157	225	225

Installation

1. Position and secure mount using mounting holes, with displacement gauge facing away from the chiller.
2. Ensure mounts are located in line with the unit base.
3. If applicable, remove compressor enclosure covers to allow access to mount fixing holes in the unit base.
4. Remove the levelling screw and fixing nut from the top housing of the mount.
5. Lower the unit onto the mounts and replace the levelling screw and nut.
6. Starting with the most deflected mount, adjust the height of each mount using the levelling screw.
7. When all mounts are level, lock each into place using the levelling lock nut.

⚠CAUTION	Mountings must be adjusted incrementally in turn. Do not fully adjust 1 mount at a time as this may overload and damage springs. Do not connect any services until all anti vibration mounts have been fully adjusted.

Pad Type

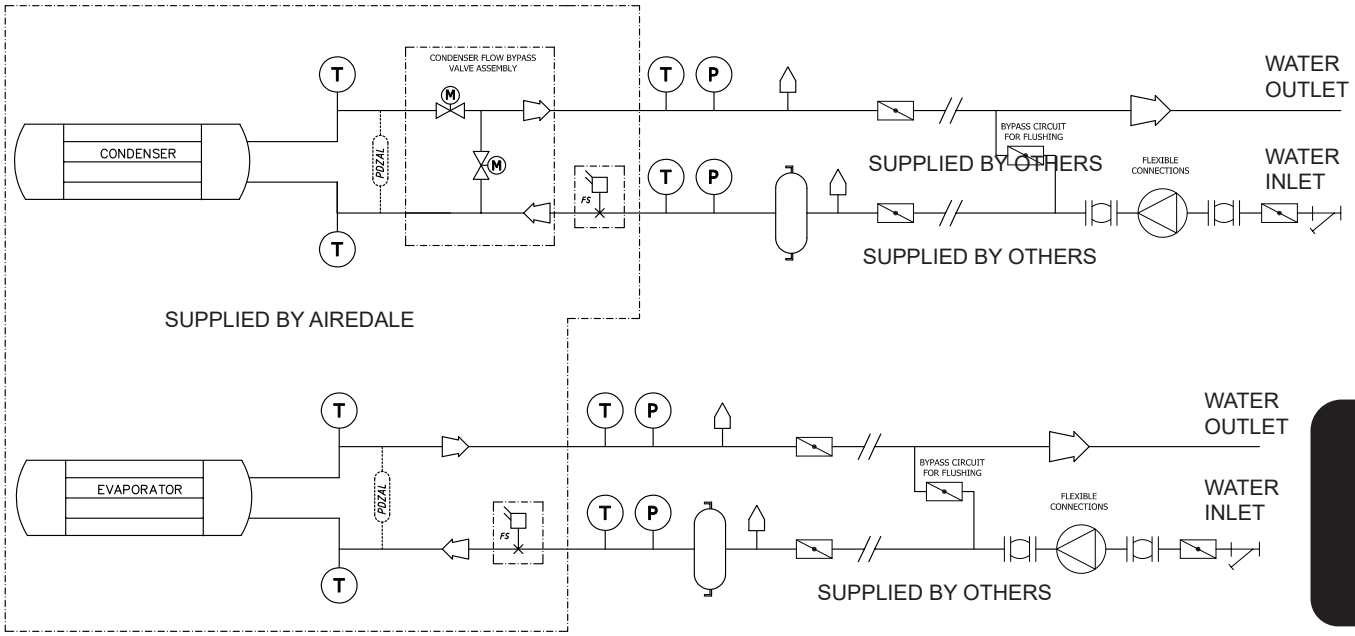


Components

1. M16 Bolt (not supplied).
2. Washer (not supplied).
3. Fixing pad 6173231.
4. Anti vibration pad 6173223.
5. 2 x M16 nut (not supplied).
6. Unit base.
7. Unit mounting plinth.

Water System
Standard Recommended Pipework Installation

CAUTION ⚠	The following installation recommendations should be adhered to. Failure to do so may invalidate the chiller warranty. Parts are supplied by others with the exception of the condenser bypass valve assembly.



Key

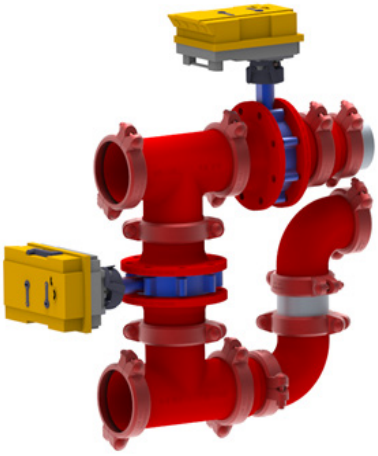
T Temperature Sensor	PDZAL Differential Pressure Sensor	M Bypass Valve
FS Flow Switch (optional)	Auto Air Vent (at highest point)	Shut Off Valve
De-Aerator (optional)	Pump	Pump Strainer

CAUTION ⚠	For fixed flow applications full design water flow MUST be maintained at all times for the evaporator only. For variable flow applications the water flow rate must be maintained within the minimum and maximum limits and the rate of change of flow must not exceed 10% of design flow per minute.

Condenser Flow Bypass Valve Assembly

To ensure proper control of the unit at full and part load conditions a condenser flow bypass valve assembly should be specified. The only circumstance where this is not required is when the chiller will have the ability to regulate the condenser water flow pump without impacting other chillers. This is the case when chillers have individual circulating pumps. The valve assembly comes in a number of sizes depending upon the size of unit and associated flow rate. The parts supplied include:

- Actuated Bypass Valve
- Actuated Flow Balancing Valve
- Grooved Pipe Construction



Water System

The recommended requirements to allow commissioning to be carried out correctly are:

- The inclusion of Binder Points adjacent to the flow and return connections, to allow temperature and pressure readings
- A differential pressure sensor or equivalent, fitted adjacent to the water outlet side of the unit
- A 20 mesh strainer fitted prior to the evaporator inlet
- A water-flow commissioning valve set fitted to the system
- Isolating valves should be installed adjacent to all major items of equipment for ease of maintenance
- Balancing valves can be installed if required to aid correct system balancing
- All chilled water pipework must be insulated and vapour sealed to avoid condensation
- If several units are installed in parallel adjacent to each other, reverse return should be applied to avoid unnecessary balancing valves

Chilled water pipework and ancillary components must be installed in accordance with:

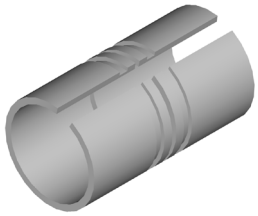
- National and local water supply company standards
- The manufacturer's instructions are followed when fitting ancillary components
- The system liquid is treated to prevent corrosion and algae forming
- In ambients of 0°C and below, where static water can be expected, or when water supply temperatures of +5°C or below is required, the necessary concentration of glycol or use of an electrical trace heater must be included
- The schematic is referred to as a guide to ancillary recommendations

CAUTION ⚠	The unit water connections are NOT designed to support external pipework, pipework MUST be supported separately.

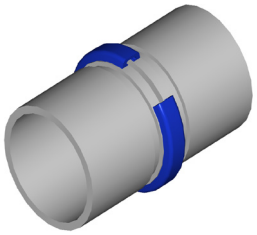
Grooved & Clamped Type Connection Assembly

In order to connect to the standard unit terminations, the following procedure should be followed:

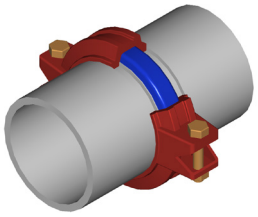
1. Place Grooved Ends Together



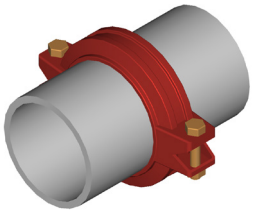
2. Locate Rubber Gasket
   - Note that an expansion gap of 1.5 mm is shown here.
   - The gasket should be checked for compatibility and damage prior to installation.
   - A thin coat of sealing lubricant should be applied to both the inside and outside mating surfaces.
   - Slip the gasket fully onto one of the pipe ends, align the second pipe and slide the gasket into place.



3. Place Clamp over Gasket
   - Wrap the 2-halves of the clamp over the gasket
   - Ensure the gasket fits snugly within the grooved recess within the inside of the clamp and that the clamp mates correctly.



4. Secure Clamp
   - Tighten the bolts incrementally and evenly at both sides until a leak free seal is formed
   - The gasket should not be visible beneath the clamp when the bolts are properly tightened.



Please note: counter pipe is not supplied with the unit.

Water Treatment Guidelines

Protecting Plant

It is important that the Airedale plant and equipment is properly protected and maintained to ensure optimal system performance.

IMPORTANT ⚠	The equipment and system should be kept clean and free of solid, scale, corrosion and biological fouling. Failure to do so may invalidate the warranty.

for the system should be determined by the water treatment specialist on a project by project, system by system basis. The table below provides a guide to the acceptable range required for Airedale plant, although hardness of water may vary depending on the location of the site.

PH (5oC – 40oC)	7.0 – 8.5	Total Hardness (mg CaCO3/L)	<200
Electrical Conductivity (µs/cm)	<800	Total Iron (mg Fe/l)	<3.0
Chloride (mg Cl/l)	<200	Soluble Iron (mg Fe/l)	<1.0
Alkalinity (mg CaCO3/l)	<100	Ammonium (mg NH4+/l)	<1.0
Sulphate ion (mg S02 4-/l)	<200	Sulphide (mg S2-/l)	<5

When completing a chemical clean or a dynamic flush and dose on the secondary system from the low loss header or buffer vessel, primary units such as chillers, condensers and air conditioning units should have a full-bore bypass installed as close to the plant as possible. The plant should be placed in bypass when carrying out the chemical clean in order to protect sensitive plant items and smaller bore pipes from blockage.

Installers should refer to BG29 2020, Pre-Commissioning cleaning of Pipework Systems for the most up to date guidelines of pre-commissioning cleaning of pipework systems and BSRIA BG50 2013, Water Treatment for Closed Heating and Cooling Systems for ongoing water quality maintenance and systems in operation. The manufacturer is not responsible for damage to or malfunctioning of equipment caused by failure to treat water or by improperly treated system water - this applies to both before and after commissioning. .

Choice of Chemicals

Below is a table of metallic and non-metallic substances found in plant items produced by Airedale.

All chemicals to be used during the water treatment process should be carefully selected by the water treatment specialist so that they do not have a detrimental effect on these items, any component within the plant and equipment or the system as a whole. Frost protection and the dosing of chemicals such as monoethylene and polypropylene should

IMPORTANT ⚠	This is not an exhaustive list and specific advice should be sought for individual items of equipment or specific applications, if required.

be carefully considered in terms of dosing levels and blended chemical compatibility. Thermal efficiency should also be considered, on a project-by-project basis.

Copper	Stainless Steel (AISI 302)	Silicon	PA66
Brass	Stainless Steel (AISI 316)	PVC	Neoprene
Cast Bronze	Nickel Plated Brass	PTFE	Nitrile-Butylene Elastomer
Cast Iron	Galvanized Iron	PPS	Ethylene Propylene Rubber
Mild Steel	VITON (Rubber/Silicone mix)	PPE	EPDM
TPE	Synthetic Fibre	PPA 40-GF	Diaphragm

Filling Stage

- Before filling plant items, a visual inspection of valves should take place to ensure that there are no open ends such as drain cocks opened after the testing phase.
- The plant items should be filled with clean water, dosed with corrosion inhibitor and biocides as required in order to prevent corrosion and biological growth. Refer to BSRIA recommendations regarding pre-filling.
- Manual or automatic air vents should be opened to release displaced air from the system during the filling process until pressurised.

Interlocks & Protection

Always electrically interlock the operation of the chiller with the pump controls and flow proving device for safety reasons.

CAUTION ⚠	Failure to install safety devices will invalidate the chiller warranty.

CAUTION ⚠	Do not rely solely on the BMS to protect the chiller against low flow conditions. An evaporator pump interlock and flow proving device MUST be directly wired to the chiller. **Failure to do this will invalidate Warranty.**

Maximum System Operating Pressure

The system can safely operate at a maximum of 10bar. Higher pressures are available upon request and approval by heat exchanger supplier.

Water System Pressure Testing

When all the pipework has been connected in the system, proceed as follows:

- Ensure all shut off and control valves are fully open
- Pressurise system to the operating pressure, hold for 1 hour (a gradual fall in pressure shown on the gauge indicates a leak)
- Leaks should be found and repaired and the unit pressure tested for a further hour
- When the pressure remains at the operating pressure for 1 hour, the system can be considered leak free

Records

CAUTION ⚠	Ensure local authority requirements for pressure testing are adhered to. The waterside test pressure on the serial plate should not be exceeded.

Record all measurements on the commissioning sheet provided and store safely for future reference.

CAUTION ⚠	In order to protect the shell and tube evaporator and condenser from serious damage, the whole system MUST be flushed prior to filling to remove debris left in the water pipework, by use of a flushing bypass as described above.

Filling

- During filling the system should be vented at all high points
- Once the system has been completely vented all vents should be closed
- To prevent air locking in the system it is advisable to fill the systems from the lowest point, i.e. drain point on pipework
- If auto air vents are used then we strongly recommend an auto pressurisation unit be fitted to the system
- Considerations must be made for glycol of the correct concentration to ensure the cooling medium is not dilute d.

Electrical Installation

IMPORTANT ⚠	Please refer to the electrical wiring diagrams provided for installation.

ALL work MUST be carried out by technically trained competent personnel.

The equipment contains live electrical and moving parts, ISOLATE prior to maintenance or repair work.

As standard the equipment is designed for 400V, 3 phase, 3 wire 50Hz and a separate permanent 230V, 1 phase, 50Hz supply, to all relevant IEE regulations, British standards and IEC requirements.
The control voltage to the interlocks is 24V, always size the low voltage interlock and protection cabling for a maximum voltage drop of 2V.

Avoid large voltage drops on cable runs, particularly low voltage wiring.
A fused and isolated electrical supply of the appropriate phase, frequency and voltage should be installed.

CAUTION ⚠	The Mains Isolator MUST NOT be used to stop the chiller other than in the event of an emergency.

Wires should be capable of carrying the maximum load current under non-fault conditions at the stipulated voltage.

Ensure correct phase rotation.

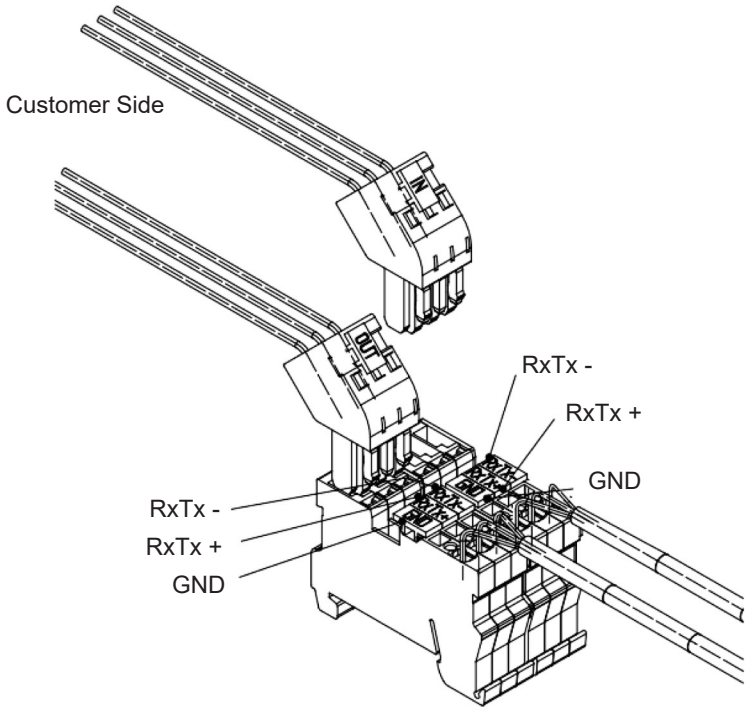
Unit controller supply is supported by an on board Ultracap to ensure the controller's main processor is maintained in the event of a system shut down in a power failure situation. Power will be maintained until mains power is reinstated for a maximum period of 10 minutes.

Interconnecting Wiring

	L1	o	←	Mains Incoming Supply 400V / 3~ / 50Hz
	L2	o	←	
	L3	o	←	
	PE	o	←	
	L4	o	←	Separate Permanent Supply 230V / 1~ / 50Hz
	N	o	←	
	PE	o	←	
	502	o	→	Evaporator Flow Switch (1)
	506	o	←	
	502	o	→	Condenser Flow Switch (1)
	513	o	←	
	502	o	→	Unit Remote On/Off
	507	o	←	
	502	o	→	Remote Pump Interlock (1)
	508	o	←	
	502	o	→	Setback Setpoint Temperature Switch
	510	o	←	
	808	o	←	Remote Setpoint Adjust
	500	o	→	
	560	o	→	Volt Free Alarm N/O
	561	o	←	Volt Free Common Alarm
	562	o	→	Volt Free Alarm N/C
	580	o	→	Volt Free Alarm N/O
	581	o	←	Volt Free Common Alarm
	582	o	→	Volt Free Alarm N/C
	Rx/Tx+	o	←	Network Connection (In)
	Rx/Tx-	o	←	
	GND	o	←	
	Rx/Tx+	o	→	Network Connection (Out)
	Rx/Tx-	o	→	
	GND	o	→	
	891	o	←→	Wired BMS connection (Optional) (ModBUS, BACNet, LON, RS485)
	892	o	←→	
	893	o	←→	
	Ethernet Port	o	←→	BMS Network Connections (Ethernet)

CAUTION⚠	(1) MUST be directly wired to the chiller to validate warranty.

Network Termination



CAUTION⚠	The plugged termination ensures that the connections are made simultaneously. Failure to attach\ the cables this this way may cause damage to the controller.

Power Quality & Harmonics

Variable Speed Drives (VSDs) are now common place due to their efficiency and versatility. Not ignoring these facts, care must be taken when installing VSD technology into new and existing installations. This is due to the effect the introduction of such technology may have on line harmonics of a building's electrical system. VSDs by their nature cause distortion of the AC line by drawing current in pulses, rather than continuously from the supply resulting in harmonic generation. The useful power to a motor is that obtained from the fundamental frequency of 50Hz. The additional currents at the higher frequencies are not useful to the appliance and are therefore transmitted back onto the line. Examples of other non-linear loads that cause harmonics are:

Single phase loads, e.g:

- Switched mode power supplies
- Personal computers
- HF fluorescent ballasts
- Compact fluorescent lamps

Three phase loads, e.g:

- Variable frequency drives
- Inverters
- Large UPS systems

The distortion of the line caused by harmonics can cause the following associated issues:

- Erroneous operation of control systems
- Nuisance tripping of circuit breakers
- Overloading of transformers
- Overloading of capacitors
- Overvoltage problems
- Excessive currents in neutral conductor

The 3rd, 5th, 7th and 9th harmonics are considered to be the predominant frequencies produced by non-linear loads. To minimize the harmonic effect, each Turbocor compressor is fitted with a 5% line reactor to help reduce the harmonics and improve the displacement power factor above 0.95(1). However, to further reduce the effects and to help meet limits for Engineering Recommendation (ER) G5/5, the following guidelines can be followed.

Current Harmonics

Harmonic currents contribute to system losses. Mitigation measures can be implemented in the following ways:

- Install passive/active harmonic filters
- Install the unit as far from the source transformer as possible

Voltage Harmonics

Harmonic voltage distortion causes disturbance to other loads and increases losses in them. Methods for harmonic voltage reduction can be achieved in the following ways:

- Increase the size of the supply transformer
- Connect the unit to a point with a high fault level (low impedance)
- Keep the unit as far from the point of common coupling (PCC) as possible

Engineering Recommendation G5/5

It is important to understand that G5/5 is effectively an “Installation Standard” and applies to the total harmonic generating equipment installed by a consumer. G5/5 identifies consumers by their PCC to the supply and applies limits at that point. G5/5 is not a product or equipment standard and therefore no single item of equipment can be said to comply.

Note: (1) Based at full load conditions.

Pressure Relief Valve (PRV) Discharge Piping

Considerations must be made when designing pipework for PRV venting. This must be designed in accordance with BS EN 378-3:2016+A1:2020 Section 5.8 Piping and ducting. Caution must be taken to ensure excessive pressure drop in the pipework is avoided in line BS EN 13136:2013+A1:2018.

All piping and ventilation ducting that passes through walls, ceiling and floors of machinery rooms, shall be sealed where it passes through the walls ceiling or floors. The seal shall have at least the same fire resistance as the walls, ceiling or floor.

Discharge pipes from relief devices may diffuse the charge into the air by adequate means but away from any air intake to the building or discharge into an adequate quantity of a suitable absorbing material. Relief devices for refrigerants in group A1 can discharge into the machinery room provided the system charge is less than the limits set in EN 378-1:2016+A1:2020, Annex C. Such discharges of refrigerant should take place so that persons and property are not endangered.

Commissioning

To be read in conjunction with the commissioning sheets provided.

Pre Commissioning Checklist

CAUTION ⚠	Please ensure all documents have been completed correctly and returned to Airedale Technical Support immediately to validate warranty.

CAUTION ⚠	ALL work MUST be carried out by technically trained competent personnel. The equipment contains live electrical and moving parts, ISOLATE prior to maintenance or repair work.

All pipework is complete and insulated where necessary.

Refrigerant Standing Pressure

The refrigerant quality is to be checked to ensure correct type of refrigerant and that no non-condensibles are present.

This is done by measuring the liquid line standing pressure and temperature. This can then be compared to refrigerant data tables or Refrigerant Comparator.

Standing pressures can only be measured in the liquid state.

Commissioning Procedure

Electrical connections	Ensure all electrical connections are tight and correctly terminated.
External fuses/ MCBs	Check that the correct electrical supply rating is available to the unit.
Electrical continuity	Before electrical power is applied to the unit. Electrical continuity checks must be carried out on the 3 phase power.
Phase rotation	Check that the electrical phase rotation is correct.
Electrical earthing	Check that the unit is correctly earthed.
Remote on/off	To ensure that the unit does not start whist doing the pre-commissioning checks the remote on/off switch should be in the OFF state.
Voltage	Measure the voltage at the following points and record on the commissioning sheet with the unit MCBs turned off: • Isolator • Permanent single phase power supply
Waterside	Ensure that the system water pipework is clean from debris. Ensure that the system is flushed prior to water entering the unit.
Water filter fitted	Ensure that the water filter is fitted and clean.
Water flow rate	Check that the design water flow rate is available to the unit and stable. Flow should never fall below the evaporator minimum flow rate.
Waterside pressure drop	Measure the evaporator and condenser waterside pressure drops, ensuring that the pumps are operating.
Glycol strength	Check and record the glycol type and strength on both the condenser and evaporator. Low levels of glycol can cause freeze up problems when operating at low temperatures or during the unit off state during cold ambient conditions. Glycol concentration is measured by use of a Refractometer.
Differential pressure sensor	Ensure that the differential pressure sensor operates satisfactorily; the best way to do this is to temporarily reduce the flow to the chiller with the compressors switched off. • From the pressure curves, determine the design flow rate / pressure drop • Make sure that any effects of glycol in the system are taken into account (flow rate and pressure drop). • Input into the controller the reduced pressure drop (kPa) value (normally 80% of design flow rate) Once this value is programmed into the controller the water flow rate should be reduced further to verify that the low flow alarm is activated. Ensure that the tubes connected to the sensor are insulated and trace heated where applicable.

Low supply water trip	To check operation of the low temperature trip, the following procedure can be carried out: With the unit running increase the low temperature limit to the supply water temperature setpoint. This will trip the unit in a safe manner without risk of freezing the evaporator. Return the low temperature limit to the correct value after test (this will allow the unit to operate correctly).
Pump interlock	The pump interlock is fitted and functioning correctly.
Controller	Record on the commissioning sheet the controller serial numbers details: • Controller type • Address • Serial number • Software version • OS version • Boot Also record any expansion valve driver serial numbers.
Controller settings	The following controller settings are to be recorded on the commissioning sheet: • Head pressure differential (Barg) • Minimum suction pressure (Barg) • Minimum supply water temperature (°C)
Compressor	Record on the commissioning sheet compressor details: • Type • Serial numbers. • Overload settings
Operating conditions	Record the following operating conditions of the unit at stable conditions: • Suction pressure (Barg) • Liquid pressure (Barg) • Discharge pressure (Barg) • Suction temperature (°C) • Condenser outlet liquid temperature (°C) • EEV input liquid temperature (°C) • Discharge temperature (°C) • Superheat (K) • Condenser outlet sub cooling (K) • EEV input sub cooling(K) • Evaporator water return temperature (°C) • Evaporator water supply temperature (°C) • Condenser water return temperature (°C) • Condenser water supply temperature (°C) The supply and return water temperatures should be taken and recorded in both full and part load conditions approximately 1m away from the unit.
Liquid line sight glass	Record the status of the liquid line sight glass and observe the following: • Clear/ flashing at the expansion valve • Wet/dry (yellow or green) observed local to the compressor on the liquid cooling line
HP/ LP trips	Check operating of HP/LP cut-out settings: • Low pressure transducer cut-out - 1.6 barg (23 psig) • Differential – 2.0bar (29 psig) • HP switch – (manual reset): High pressure switch – 17.5 barg (254 psig) • Differential – 2.0 bar (29 psig) • HP limiting function – 16.5 barg (240 psig)
Condenser bypass valve assembly	Check the pressure drop of the condenser bypass valve assembly, across the inlet and outlet connections. Pressure drop of the system in full bypass should be equivalent to the losses through the condenser and condenser out regulation valve at 60% open. Both condenser bypass valve assembly actuators must have been configured on EOLT to enable correct functionality and opening characteristics. This can be done via NFC to Bluetooth adapter.

Storage Recommendations

Airedale recommends that equipment should be stored in an ambient protected warehouse facility.

- The unit should be stored within a heated warehouse, ensuring that the temperature does not fall below 0°C.
- All water should be drained from the evaporator and condenser.
- All refrigerant valves are closed EXCEPT those on the LIQUID and EXPANSION lines.

Before turning the unit on after extended periods of storage, the following checks / procedures must be carried out over and above any commissioning checks:

Any low temperature protection devices must be turned on for a minimum of 8 hours.

These include:

- Panel heaters
- Electric trace heating

Checks must be carried out for the operation of unit components.

Waterside

- Condenser bypass valve assembly (if fitted).
- Check that flow switches operate correctly (if fitted).

Electrical

- Electrical seals and glands are in good condition and have not cracked
- All electrical terminal boxes are free from moisture
- All cable insulation is in good condition and does not have any signs of damage

Refrigeration

- Ensure all valves are open
- Carry out an F-gas inspection ensuring no refrigerant leaks

Troubleshooting

FAULT	POSSIBLE CAUSE	REMEDY/ACTION
Unit will not start	No power.	Check the power supply to the controller.
	Wired incorrectly.	Check the wire connections in accordance with the wiring diagram.
	Loose wires.	Check all wires, connections, terminals etc.
	Remote on/off.	Check that the remote on/off is at the on position.
Compressor not operating	No power to the compressor.	Check the isolator, fuses, MCBs, contactors and control circuit wiring.
	Low pressure cut-out activated (large or complete loss of refrigerant charge).	Recover refrigerant, repair, pressure test, evacuate and recharge system.
	Compressor showing a fault on the controller.	Determine fault, refer to alarm codes for further information.
Head Pressure too high / HP cut-out operated	Condenser clogged or dirty.	Clean condenser.
	Overcharge of refrigerant. Normally troublesome in warm weather.	Remove excess refrigerant from the system using correct refrigerant handling techniques.
	Air or other non-condensable gas in the system.	Evacuate the system and re-charge with new refrigerant.
	Condenser bypass valve assembly faulty.	Check the bypass valve assembly is functioning and replace if required.
Head pressure too low	Water temperature too low.	Check the condenser temperature setpoint
Suction Pressure too low	Flash gas (bubbles in sight glass) at the liquid line.	Investigate for refrigerant leaks, repair, pressure test, evacuate and re-charge system.
	Clogged filter drier (pressure/ temperature drop across it).	Replace drier cores.
No water flow	Strainer blocked.	Clean strainer
Unit not operating due to water pressure sensor low limit alarm.	Low flow alarm operating.	Check that the low flow pressure variable is set correctly. If too high the unit may have nuisance trips.
Low temp limit alarm	Partial blockage in evaporator causing low flow. The water flow is reduced however the differential pressure switch still remains healthy as the pressure would increase.	
Water/Glycol freezing up (crystallizes)	Insufficient glycol/water concentration for operating temperatures.	Check glycol concentration and add accordingly.

Appendix - Ecodesign

SEPR (Seasonal Energy Performance Ratio)

- Type of condensing - water cooled condensing
- Refrigerant fluid - R134a / R513A
- Refrigerant GWP - 1430 / 631
- Operating temperature - +7°C (outlet water)
- Operating control - variable
- Outdoor side heat exchanger - water
- Indoor side heat exchanger - water
- Type driven - vapour compression
- Driver of compressor - electric motor
- Degradation coefficient - 0.9

SSCEE (Seasonal Space Cooling Energy Efficiency)

- Capacity control - variable
- Standard rating condition - low temperature operation

Water to Water Process Chillers - (Table 23 - (EU) 2016/2281)

Rating Point	Part Load Ratio	Water-Cooled Condenser		Indoor side heat exchanger evaporator (inlet/outlet °C)
		Inlet/Outlet Temperatures (°C)	Outdoor Air Temperature (°C)	Fixed Outlet
A	100%	30/35	35	12/7
B	93%	23/(*)	25	(*)/7
C	87%	16/(*)	15	(*)/7
D	80%	9/(*)	5	(*)/7

(*) With the flow rate during "A" test for units with fixed flow rate or with fixed delta T of 5 K for units with variable flow rate

Water to Water Comfort Chillers - (Table 21 - (EU) 2016/2281)

Rating Point	Tj (°C)	Part Load Ratio	Cooling Tower or water loop application (inlet/ outlet °C)	Fan coil application inlet/ outlet water temperatures (°C)		Cooling floor application inlet/ outlet water temperatures (°C)
				Fixed Outlet	Variable Outlet	
A	35	100%	30/35	12/7	12/7	23/18
B	30	74%	26/(*)	(*)/7	(*)/8.5	(*)/18
C	25	47%	22/(*)	(*)/7	(*)/10	(*)/18
D	20	21%	18/(*)	(*)/7	(*)/11.5	(*)/18

Tj - Bin temperature (outdoor temperature °C)
(*) With the flow rate during "A" test for units with fixed flow rate or with fixed delta T of 5 K for units with variable flow rate

Technical Data

Ecodesign - R134a

	Notes	Units	TCW11RCAEA-S-A-0	TCW11RCBEB-L-A-0	TCW11RCCEC-M-A-0	TCW11RCDED-N-A-0	TCW12RCEEE-S-A-0	TCW12RCFEF-L-A-0	TCW12RCGEG-M-A-0
SEPR	1, 3, 5		8.6	10.6	9.8	9.5	8.8	10.4	9.5
SEPR Tier			Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)
Annual Electricity Consumption		kWh/a	257351.4	278538.2	376982.8	508323.2	506903.7	602877.9	802324.4
Rated Refrigerant Capacity P_A	1, 3, 5	kW	299.7	399.6	499.6	649.5	599.5	849.4	1029.1
Rated Power Input D_A		kW	63.7	79.9	111.9	134.9	125.1	176.1	222.8
Rated $EER_{DC,A}$			4.71	5.00	4.46	4.82	4.79	4.82	4.62
Rated Refrigerant Capacity P_B	1, 3, 5	kW	279.7	373.0	466.3	606.2	559.6	792.8	960.5
Rated Power Input D_B		kW	45.5	54.7	72.7	98.2	89.1	120.8	149.9
Rated $EER_{DC,B}$			6.14	6.82	6.42	6.17	6.28	6.56	6.41
Rated Refrigerant Capacity P_C	1, 3, 5	kW	259.7	346.3	433.0	562.9	519.6	736.2	891.9
Rated Power Input D_C		kW	33.1	37.0	48.1	69.4	65.1	80.4	102.6
Rated $EER_{DC,C}$			7.85	9.36	9.01	8.11	7.99	9.16	8.70
Rated Refrigerant Capacity P_D		kW	239.7	319.7	399.7	519.7	479.7	679.6	823.3
Rated Power Input D_D		kW	21.7	21.4	30.5	38.5	43.0	45.7	66.1
Rated $EER_{DC,D}$			11.04	14.93	13.09	13.50	11.14	14.87	12.46
SSCEE	2, 3, 5	%	286.8%	328.3%	333.3%	352.7%	320.5%	331.2%	323.7%
SSCEE Tier			Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)
Rated Cooling Capacity	2, 4, 5	kW	300.0	400.0	500.0	650.0	600.0	850.0	1030.0
Declared Cooling Capacity 35°C	2, 3, 5	kW	299.7	399.6	499.6	649.5	599.5	849.4	1029.1
Declared EER_d 35°C			4.71	5.00	4.46	4.82	4.79	4.82	4.62
Declared Cooling Capacity 30°C	2, 3, 5	kW	220.8	294.4	368.0	478.6	441.8	626.0	758.3
Declared EER_d 30°C			6.74	7.12	7.27	6.76	6.79	7.23	7.23
Declared Cooling Capacity 25°C		kW	142.0	189.3	236.6	307.6	283.9	402.3	487.6
Declared EER_d 25°C			9.43	9.47	9.85	10.23	9.90	9.43	9.78
Declared Cooling Capacity 20°C		kW	63.0	189.0	237.8	335.4	126.4	178.6	218.6
Declared EER_d 20°C			7.90	11.64	12.14	14.68	10.52	11.81	12.51
Sound Power Level		dB(A)	84	89	88	88	87	92	91
Water Volume		m^3/h	17	23	29	37	35	49	60
Off Mode P_{OFF}			0.24	0.24	0.24	0.24	0.33	0.33	0.33
Thermostat Off Mode P_{TO}			2.12	2.33	3.15	3.48	3.43	4.68	10.85
Standby Mode P_{SB}			0.24	0.24	0.24	0.24	0.33	0.33	0.33
Crankcase Heater Mode P_{CK}			0.00	0.00	0.00	0.00	0.00	0.00	0.00

(1) Nominal conditions as stated in EU 2016/2281 Table 23.
(2) Nominal conditions as stated in EU 2016/2281 Table 21.
(3) Performance data (Nett) is supplied in accordance with 14511-3:2018.
(4) Performance data (Gross) is supplied excluding absorbed pump power as per 14511-3:2018.
(5) All performance data based upon standard waterside configuration.

Technical Data

Ecodesign - R134a

	Notes	Units	TCW13RCHEH-L-A-0	TCW13RCIEI-M-A-0	TCW13RCJEJ-N-A-0	TCW22RCKEK-S-A-0	TCW22RCLEL-L-A-0	TCW22RCMEM-M-A-0	TCW22RCNEN-N-A-0
SEPR	1, 3, 5		10.1	9.5	10.0	8.6	10.2	9.4	9.4
SEPR Tier			Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)
Annual Electricity Consumption		kWh/a	950731.4	1173642.0	1458529.1	517620.2	615358.6	807859.4	1024183.0
Rated Refrigerant Capacity P_A	1, 3, 5	kW	1299.1	1509.1	1969.1	599.3	849.2	1029.2	1299.1
Rated Power Input D_A		kW	274.0	324.3	388.3	127.0	179.1	235.2	269.2
Rated $EER_{DC,A}$			4.74	4.65	5.07	4.72	4.74	4.38	4.83
Rated Refrigerant Capacity P_B	1, 3, 5	kW	1212.5	1408.5	1837.8	559.3	792.6	960.5	1212.5
Rated Power Input D_B		kW	189.8	218.4	276.9	91.6	122.2	154.2	196.6
Rated $EER_{DC,B}$			6.39	6.45	6.64	6.11	6.48	6.23	6.17
Rated Refrigerant Capacity P_C	1, 3, 5	kW	1125.8	1307.9	1706.6	519.4	736.0	891.9	1125.9
Rated Power Input D_C		kW	127.0	149.5	193.4	66.7	81.9	103.2	139.3
Rated $EER_{DC,C}$			8.86	8.75	8.82	7.79	8.99	8.64	8.08
Rated Refrigerant Capacity P_D		kW	1039.2	1207.3	1575.3	479.5	679.4	823.3	1039.3
Rated Power Input D_D		kW	72.1	97.3	115.0	43.6	46.9	65.7	78.2
Rated $EER_{DC,D}$			14.42	12.41	13.70	10.99	14.47	12.53	13.29
SSCEE	2, 3, 5	%	312.7%	342.9%	339.3%	287.7%	302.3%	310.3%	317.3%
SSCEE Tier			Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)
Rated Cooling Capacity	2, 4, 5	kW	1300.0	1510.0	1970.0	600.0	850.0	1030.0	1300.0
Declared Cooling Capacity 35°C	2, 3, 5	kW	1299.1	1509.1	1969.1	599.3	849.2	1029.2	1299.1
Declared EER_d 35°C			4.74	4.65	5.07	4.72	4.74	4.38	4.83
Declared Cooling Capacity 30°C	2, 3, 5	kW	957.2	1112.0	1450.9	441.6	625.8	758.4	957.2
Declared EER_d 30°C			7.09	7.15	7.00	6.71	7.10	7.24	6.76
Declared Cooling Capacity 25°C		kW	615.4	714.9	932.8	283.8	402.3	487.6	615.4
Declared EER_d 25°C			9.35	9.67	10.32	9.36	9.37	9.86	10.10
Declared Cooling Capacity 20°C		kW	273.4	317.6	414.4	126.1	178.6	216.5	273.4
Declared EER_d 20°C			11.56	15.42	12.23	9.00	9.91	10.34	10.87
Sound Power Level		dB(A)	93	93	93	87	92	91	91
Water Volume		m^3/h	75	88	113	34	49	60	75
Off Mode P_{OFF}			0.42	0.42	0.33	0.33	0.33	0.33	0.42
Thermostat Off Mode P_{TO}			13.57	13.13	14.41	6.63	8.49	10.23	11.64
Standby Mode P_{SB}			0.43	0.43	0.34	0.34	0.34	0.34	0.43
Crankcase Heater Mode P_{CK}			0.00	0.00	0.00	0.00	0.00	0.00	0.00

(1) Nominal conditions as stated in EU 2016/2281 Table 23.
(2) Nominal conditions as stated in EU 2016/2281 Table 21.
(3) Performance data (Nett) is supplied in accordance with 14511-3:2018.
(4) Performance data (Gross) is supplied excluding absorbed pump power as per 14511-3:2018.
(5) All performance data based upon standard waterside configuration.

Technical Data

Ecodesign - R134a

	Notes	Units	TCW23RCOEO-L-A-0	TCW23RCPEP-M-A-0	TCW23RCQEQ-N-A-0	TCW24RCRER-L-A-0	TCW24RCSES-N-A-0	TCW25RCTET-L-A-0	TCW25RCUEU-N-A-0
SEPR	1, 3, 5		10.1	9.5	9.4	10.3	9.6	10.1	11.0
SEPR Tier			Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)
Annual Electricity Consumption		kWh/a	950748.6	1179687.7	1593593.6	1250495.2	2087579.9	1592273.8	2015512.2
Rated Refrigerant Capacity P_A	1, 3, 5	kW	1299.1	1519.1	2019.1	1729.1	2709.1	2179.0	2999.1
Rated Power Input D_A		kW	276.9	333.6	409.9	364.4	540.7	462.5	576.6
Rated $EER_{DC,A}$			4.69	4.55	4.93	4.75	5.01	4.71	5.20
Rated Refrigerant Capacity P_B	1, 3, 5	kW	1212.5	1417.8	1884.4	1613.8	2528.4	2033.7	2799.0
Rated Power Input D_B		kW	189.9	221.9	297.3	251.1	389.9	319.4	407.6
Rated $EER_{DC,B}$			6.39	6.39	6.34	6.43	6.48	6.37	6.87
Rated Refrigerant Capacity P_C	1, 3, 5	kW	1125.9	1316.5	1749.8	1498.5	2347.7	1888.4	2599.1
Rated Power Input D_C		kW	126.7	150.6	213.4	167.3	277.3	212.6	267.1
Rated $EER_{DC,C}$			8.89	8.74	8.20	8.96	8.47	8.88	9.73
Rated Refrigerant Capacity P_D		kW	1039.3	1215.2	1615.2	1383.2	2167.1	1743.1	2399.1
Rated Power Input D_D		kW	72.2	96.9	125.7	94.3	165.9	120.5	153.3
Rated $EER_{DC,D}$			14.38	12.54	12.85	14.66	13.06	14.46	15.65
SSCEE	2, 3, 5	%	308.5%	326.5%	321.5%	320.2%	337.2%	327.0%	354.7%
SSCEE Tier			Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)
Rated Cooling Capacity	2, 4, 5	kW	1300.0	1520.0	2020.0	1730.0	2710.0	2180.0	3000.0
Declared Cooling Capacity 35°C	2, 3, 5	kW	1299.1	1519.1	2019.1	1729.1	2709.1	2179.0	2999.1
Declared EER_d 35°C			4.69	4.55	4.93	4.75	5.01	4.71	5.20
Declared Cooling Capacity 30°C	2, 3, 5	kW	957.2	1119.3	1487.7	1274.0	1996.0	1605.5	2209.7
Declared EER_d 30°C			7.09	7.19	6.77	7.13	6.90	7.11	7.24
Declared Cooling Capacity 25°C		kW	615.4	719.6	956.4	819.1	1283.2	1032.2	1420.6
Declared EER_d 25°C			9.43	9.63	10.17	9.45	10.28	9.62	10.59
Declared Cooling Capacity 20°C		kW	273.4	319.7	424.9	363.9	570.1	458.6	631.1
Declared EER_d 20°C			10.62	13.42	11.22	12.02	12.95	12.99	13.82
Sound Power Level		dB(A)	93	93	93	95	94	96	95
Water Volume		m^3/h	75	88	116	100	156	126	172
Off Mode P_{OFF}			0.42	0.42	0.42	0.51	0.51	0.60	0.60
Thermostat Off Mode P_{TO}			12.83	15.96	18.33	16.33	23.52	20.89	22.97
Standby Mode P_{SB}			0.43	0.43	0.43	0.52	0.52	0.61	0.61
Crankcase Heater Mode P_{CK}			0.00	0.00	0.00	0.00	0.00	0.00	0.00

(1) Nominal conditions as stated in EU 2016/2281 Table 23.
(2) Nominal conditions as stated in EU 2016/2281 Table 21.
(3) Performance data (Nett) is supplied in accordance with 14511-3:2018.
(4) Performance data (Gross) is supplied excluding absorbed pump power as per 14511-3:2018.
(5) All performance data based upon standard waterside configuration.

Technical Data

Ecodesign - R513A

	Notes	Units	TCW11RCAEA-S-B-0	TCW11RCBEB-L-B-0	TCW11RCCEC-M-B-0	TCW11RCDED-N-B-0	TCW12RCEEE-S-B-0	TCW12RCFEF-L-B-0	TCW12RCGEG-M-B-0
SEPR	1, 3, 5		8.5	10.4	9.6	9.2	8.6	10.2	9.2
SEPR Tier			Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)
Annual Electricity Consumption		kWh/a	262561.5	285846.6	384593.9	521841.1	516987.8	618359.9	828105.5
Rated Refrigerant Capacity P_A	1, 3, 5	kW	299.7	399.6	499.6	649.5	599.5	849.4	1029.1
Rated Power Input D_A		kW	64.7	81.2	114.8	137.6	127.0	179.1	230.5
Rated EER $_{DC,A}$			4.63	4.92	4.35	4.72	4.72	4.74	4.46
Rated Refrigerant Capacity P_B	1, 3, 5	kW	279.7	373.0	466.3	606.2	559.6	792.8	960.5
Rated Power Input D_B		kW	46.2	55.6	74.1	100.5	90.3	122.7	154.7
Rated EER $_{DC,B}$			6.05	6.70	6.29	6.03	6.20	6.46	6.21
Rated Refrigerant Capacity P_C	1, 3, 5	kW	259.7	346.3	433.0	562.9	519.6	736.2	891.9
Rated Power Input D_C		kW	33.7	37.7	48.9	71.4	66.2	81.8	105.2
Rated EER $_{DC,C}$			7.72	9.20	8.86	7.88	7.85	9.00	8.48
Rated Refrigerant Capacity P_D		kW	239.7	319.7	399.7	519.7	479.7	679.6	823.3
Rated Power Input D_D		kW	22.3	22.3	31.3	39.5	44.2	47.6	68.6
Rated EER $_{DC,D}$			10.75	14.33	12.78	13.16	10.86	14.29	12.00
SSCEE	2, 3, 5	%	282.7%	322.7%	325.6%	344.0%	316.2%	326.7%	315.5%
SSCEE Tier			Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)
Rated Cooling Capacity	2, 4, 5	kW	300.0	400.0	500.0	650.0	600.0	850.0	1030.0
Declared Cooling Capacity 35°C	2, 3, 5	kW	299.7	399.6	499.6	649.5	599.5	849.4	1029.1
Declared EER_d 35°C			4.63	4.92	4.35	4.72	4.72	4.74	4.46
Declared Cooling Capacity 30°C	2, 3, 5	kW	220.8	294.4	368.0	478.6	441.8	626.0	758.3
Declared EER_d 30°C			6.62	7.00	7.15	6.59	6.68	7.11	7.01
Declared Cooling Capacity 25°C		kW	142.0	189.3	236.6	307.6	283.9	402.3	487.6
Declared EER_d 25°C			9.24	9.29	9.64	9.99	9.71	9.24	9.43
Declared Cooling Capacity 20°C		kW	63.0	182.8	225.1	321.8	126.4	178.6	218.6
Declared EER_d 20°C			7.85	11.44	11.71	14.17	10.47	11.76	12.42
Sound Power Level		dB(A)	84	89	88	88	87	92	91
Water Volume		m^3/h	62	82	105	135	124	177	217
Off Mode P_{OFF}			0.24	0.24	0.24	0.24	0.33	0.33	0.33
Thermostat Off Mode P_{TO}			2.12	2.33	3.17	3.48	3.44	4.68	10.92
Standby Mode P_{SB}			0.24	0.24	0.24	0.24	0.33	0.33	0.33
Crankcase Heater Mode P_{CK}			0.00	0.00	0.00	0.00	0.00	0.00	0.00

(1) Nominal conditions as stated in EU 2016/2281 Table 23.
(2) Nominal conditions as stated in EU 2016/2281 Table 21.
(3) Performance data (Nett) is supplied in accordance with 14511-3:2018.
(4) Performance data (Gross) is supplied excluding absorbed pump power as per 14511-3:2018.
(5) All performance data based upon standard waterside configuration.

Technical Data

Ecodesign - R513A

	Notes	Units	TCW13RCHEH-L-B-0	TCW13RCIEI-M-B-0	TCW13RCJEJ-N-B-0	TCW22RCKEK-S-B-0	TCW22RCLEL-L-B-0	TCW22RCMEM-M-B-0	TCW22RCNEN-N-B-0
SEPR	1, 3, 5		9.7	9.4	9.7	8.3	9.8	9.1	9.0
SEPR Tier			Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)
Annual Electricity Consumption		kWh/a	995765.7	1196014.9	1507250.1	535911.8	644515.3	835302.4	1066290.9
Rated Refrigerant Capacity P_A	1, 3, 5	kW	1299.1	1509.1	1969.1	599.3	849.2	1029.2	1299.1
Rated Power Input D_A		kW	282.7	330.2	399.4	130.6	185.2	243.7	278.3
Rated $EER_{DC,A}$			4.60	4.57	4.93	4.59	4.59	4.22	4.67
Rated Refrigerant Capacity P_B	1, 3, 5	kW	1212.5	1408.5	1837.8	559.3	792.6	960.5	1212.5
Rated Power Input D_B		kW	195.5	221.9	285.9	93.9	126.0	159.7	203.5
Rated $EER_{DC,B}$			6.20	6.35	6.43	5.96	6.29	6.01	5.96
Rated Refrigerant Capacity P_C	1, 3, 5	kW	1125.8	1307.9	1706.6	519.4	736.0	891.9	1125.9
Rated Power Input D_C		kW	131.3	151.5	200.1	68.6	84.6	106.0	145.3
Rated $EER_{DC,C}$			8.58	8.63	8.53	7.57	8.70	8.41	7.75
Rated Refrigerant Capacity P_D		kW	1039.2	1207.3	1575.3	479.5	679.4	823.3	1039.3
Rated Power Input D_D		kW	77.3	99.8	118.8	45.7	50.3	68.3	81.5
Rated $EER_{DC,D}$			13.44	12.10	13.26	10.50	13.50	12.05	12.75
SSCEE	2, 3, 5	%	305.5%	334.8%	330.7%	281.5%	295.5%	302.6%	308.7%
SSCEE Tier			Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)
Rated Cooling Capacity	2, 4, 5	kW	1300.0	1510.0	1970.0	600.0	850.0	1030.0	1300.0
Declared Cooling Capacity 35°C	2, 3, 5	kW	1299.1	1509.1	1969.1	599.3	849.2	1029.2	1299.1
Declared EER_d 35°C			4.60	4.57	4.93	4.59	4.59	4.22	4.67
Declared Cooling Capacity 30°C	2, 3, 5	kW	957.2	1112.0	1450.9	441.6	625.8	758.4	957.2
Declared EER_d 30°C			6.88	7.01	6.74	6.53	6.89	7.01	6.48
Declared Cooling Capacity 25°C		kW	615.4	714.9	932.8	283.8	402.3	487.6	615.4
Declared EER_d 25°C			9.05	9.42	9.98	9.06	9.07	9.51	9.73
Declared Cooling Capacity 20°C		kW	273.4	317.6	414.4	126.1	178.6	216.5	273.4
Declared EER_d 20°C			11.50	14.89	12.19	8.96	9.86	10.28	10.83
Sound Power Level		dB(A)	93	93	93	87	92	91	91
Water Volume		m^3/h	271	319	410	124	176	217	269
Off Mode P_{OFF}			0.42	0.42	0.33	0.33	0.33	0.33	0.42
Thermostat Off Mode P_{TO}			13.65	13.19	14.50	6.65	8.53	10.30	11.70
Standby Mode P_{SB}			0.43	0.43	0.34	0.34	0.34	0.34	0.43
Crankcase Heater Mode P_{CK}			0.00	0.00	0.00	0.00	0.00	0.00	0.00

(1) Nominal conditions as stated in EU 2016/2281 Table 23.
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(5) All performance data based upon standard waterside configuration.

Technical Data

Ecodesign - R513A

	Notes	Units	TCW23RCOEO-L-B-0	TCW23RCPEP-M-B-0	TCW23RCQEQ-N-B-0	TCW24RCRER-L-B-0	TCW24RCSES-N-B-0	TCW25RCTET-L-B-0	TCW25RCUEU-N-B-0
SEPR	1, 3, 5		9.7	9.4	9.2	10.1	9.5	10.0	10.8
SEPR Tier			Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)
Annual Electricity Consumption		kWh/a	995830.1	1194789.7	1619705.4	1273631.6	2118757.0	1621162.0	2051584.8
Rated Refrigerant Capacity P_A	1, 3, 5	kW	1299.1	1519.1	2019.1	1729.1	2709.0	2179.0	2999.1
Rated Power Input D_A		kW	286.3	338.1	414.8	367.8	546.8	466.7	583.9
Rated $EER_{DC,A}$			4.54	4.49	4.87	4.70	4.95	4.67	5.14
Rated Refrigerant Capacity P_B	1, 3, 5	kW	1212.5	1417.8	1884.4	1613.8	2528.4	2033.7	2799.0
Rated Power Input D_B		kW	195.8	224.6	301.4	253.5	394.8	322.4	413.9
Rated $EER_{DC,B}$			6.19	6.31	6.25	6.36	6.40	6.31	6.76
Rated Refrigerant Capacity P_C	1, 3, 5	kW	1125.9	1316.5	1749.8	1498.5	2347.7	1888.4	2599.1
Rated Power Input D_C		kW	130.9	152.1	216.6	169.5	281.1	215.3	271.8
Rated $EER_{DC,C}$			8.60	8.66	8.08	8.84	8.35	8.77	9.56
Rated Refrigerant Capacity P_D		kW	1039.3	1215.2	1615.2	1383.2	2167.1	1743.1	2399.1
Rated Power Input D_D		kW	77.5	98.5	128.1	97.1	168.8	124.0	156.4
Rated $EER_{DC,D}$			13.42	12.34	12.61	14.24	12.84	14.05	15.34
SSCEE	2, 3, 5	%	299.5%	321.6%	317.2%	317.2%	333.0%	323.7%	349.8%
SSCEE Tier			Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)	Tier 2 (2021)
Rated Cooling Capacity	2, 4, 5	kW	1300.0	1520.0	2020.0	1730.0	2710.0	2180.0	3000.0
Declared Cooling Capacity 35°C	2, 3, 5	kW	1299.1	1519.1	2019.1	1729.1	2709.0	2179.0	2999.1
Declared EER_d 35°C			4.54	4.49	4.87	4.70	4.95	4.67	5.14
Declared Cooling Capacity 30°C	2, 3, 5	kW	957.2	1119.3	1487.7	1274.0	1996.0	1605.5	2209.7
Declared EER_d 30°C			6.88	7.10	6.65	7.05	6.78	7.03	7.12
Declared Cooling Capacity 25°C		kW	615.4	719.6	956.4	819.1	1283.2	1032.2	1420.6
Declared EER_d 25°C			9.15	9.45	9.98	9.32	10.10	9.46	10.37
Declared Cooling Capacity 20°C		kW	273.4	319.7	424.9	363.9	570.1	458.6	631.1
Declared EER_d 20°C			10.27	13.16	11.16	11.98	12.91	12.95	13.78
Sound Power Level		dB(A)	93	93	93	95	94	96	95
Water Volume		m^3/h	271	319	418	359	561	453	619
Off Mode P_{OFF}			0.42	0.42	0.42	0.51	0.51	0.60	0.60
Thermostat Off Mode P_{TO}			12.90	15.97	18.35	16.33	23.55	20.89	23.00
Standby Mode P_{SB}			0.43	0.43	0.43	0.52	0.52	0.61	0.61
Crankcase Heater Mode P_{CK}			0.00	0.00	0.00	0.00	0.00	0.00	0.00

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(5) All performance data based upon standard waterside configuration.

After Sales

Warranty

All Airedale products or parts (non consumable) supplied for installation within the UK mainland and commissioned by an Airedale engineer, carry a full 'Parts and Labour' warranty for a period of 12 months from the date of commissioning or 18 months from the date of despatch, whichever is the sooner.
Parts or Equipment supplied by Airedale for installation within the UK or for Export that are properly commissioned in accordance with Airedale standards and specification, not commissioned by an Airedale engineer; carry a 12 month warranty on non consumable 'Parts Only' from the date of commissioning or 18 months from the date of despatch, whichever is the sooner.
Parts or equipment installed or commissioned not to Airedale standards or specification invalidate all warranty.

Warranty is only valid in the event that

In the period between delivery and commissioning the equipment:

- is properly protected & serviced as per the Airedale installation & maintenance manual provided
- where applicable the glycol content is maintained to the correct level

In the event of a problem being reported and once warranty is confirmed* as valid under the given installation and operating conditions, the Company will provide the appropriate warranty coverage (as detailed above) attributable to the rectification of any affected Airedale equipment supplied (excluding costs for any specialist access or lifting equipment that must be ordered by the customer).

*Once warranty is confirmed, maintenance must be continued to validate the warranty period.
Any spare part supplied by Airedale under warranty shall be warrantied for the unexpired period of the warranty or 3 months from delivery, whichever period is the longer. To be read in conjunction with the Airedale Conditions of Sale - Warranty and Warranty Procedure, available upon request.

Procedure

When a component part fails, a replacement part should be obtained through our Spares department. If the part is considered to be under warranty, the following details are required to process this requirement. Full description of the part required, including Airedale's part number, if known. The original equipment serial number. An appropriate purchase order number.
A spares order will be raised under our warranty system and the replacement part will be despatched, usually within 24 hours should they be in stock. When replaced, the faulty part must be returned to Airedale with a suitably completed and securely attached "Faulty Component Return" (FCR) tag. FCR tags are available from Airedale and supplied with each Warranty order.
On receipt of the faulty part, suitably tagged, Airedale will pass to its Warranty department, where it will be fully inspected and tested in order to identify the reason for failure, identifying at the same time whether warranty is justified or not.
On completion of the investigation of the returned part, a full "Report on Goods Returned" will be issued. On occasion the release of this complete report may be delayed as component manufacturers become involved in the investigation. When warranty is allowed, a credit against the Warranty invoice will be raised. Should warranty be refused the Warranty invoice becomes payable on normal terms.

Exclusions

Warranty may be refused for the following reasons.

- Misapplication of product or component
- Incorrect site installation
- Incomplete commissioning documentation
- Inadequate site installation
- Inadequate site maintenance
- Damage caused by mishandling
- Replaced part being returned damaged without explanation
- Unnecessary delays incurred in return of the defective component

Returns analysis

All faulty components returned under warranty are analysed on a monthly basis as a means of verifying component and product reliability as well as supplier performance. It is important that all component failures are reported correctly.

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