Airedale by MODINE

CONDENSERS
50Hz - 60Hz
R410A
12kW - 165kW

Technical Manual
Original Instructions

bsi. ISO 9001 Quality Management FM00542 ISO 14001 Environmental Management EMS52086

Special Precautions

The guidance in this manual must be followed to provide safe, efficient and trouble-free operation. In addition, particular care must be exercised regarding the special precautions listed below. Failure to properly address these critical areas could result in property damage or loss, personal injury or death. These instructions are subject to any additional restrictive local or national codes.

Hazard Intensity Levels

1. DANGER: Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.
2. WARNING: Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.
3. CAUTION: Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.
4. IMPORTANT: Indicates a situation which, if not avoided, MAY result in a potential safety concern.
5. NOTE: Indicates information that is not a safety concern but may invalidate warranty if not adhered to.

⚠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.
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. Also ensure that there are no other power feeds to the unit such as fire alarm circuits, BMS circuits etc.
A vertical air discharge unit is recommended for installation in windy locations or wherever a horizontal airflow would be obstructed.
Check the unit is as ordered, discrepancies or transit damage should be reported to Airedale immediately. Care should be taken to ensure the unit does not sustain damage before it is lifted into final position.
It is strictly prohibited to use the connections, which are delicate parts of the Coil, as anchoring points when lifting or handling the unit. This would cause serious damage to the Coil and serious risks for the safety of persons and goods.
Take care that the service connections are correctly made and in particular do not invert the inlet and outlet connections.
The charge should be checked to indicate if leaks are present prior to evacuation. If the charge appears to be either partially or totally lost then the unit should be carefully checked for signs of physical damage.
The weight of pipework must not be supported by the unit. Three planes of movement must be allowed between the coil and the first pipe clamp If this is not possible, a vibration eliminator must be fitted.
Pressure testing can be dangerous if not properly conducted; personnel undertaking pressure testing MUST be technically competent and suitably qualified.
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.
Each unit requires an independently fused and isolated power supply.
Please ensure all documents have been completed correctly and return to Airedale Technical Support immediately to validate warranty.
Before carrying out any work, ensure that the isolator is switched off.
ALL maintanance work MUST be carried out by technically trained competent personnel.
Do not use steam for cleaning condenser coils otherwise damage or danger may result from excessive internal pressures.

⚠IMPORTANT
Only 2 units may be stacked together.
To ensure the unit isolator and fan speed controller are in the correct orientation for vertical air discharge please specify at order.
All fans are supplied pre-programmed to a head pressure setpoint of 26 barg and proportional band setpoint of 6 barg. For alternative settings, please specify at order.
Unit diagrams can be supplied on request. The legs attached to the top of the horizontal unit are for lifting and stacking and may be removed and stored safely if not required. Only 2 units may be stacked together.
Ensure relevant F-Gas Regulation checks are carried out at the appropriate period.

⚠NOTE
Calculations provide an approximate refrigerant charge. An additional 15% of the total calculated charge should be made available during the commissioning of the units to allow for optimisation of the system refrigerant charge. This is required to accommodate for a range of possible variations in the volume of the system.

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

⚠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.

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

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.

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. Also 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.

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.

Refrigerant Warning

The Airedale unit uses R410A refrigerant which requires careful attention to proper storage and handling procedures. Use only manifold gauge sets designed for use with R410A refrigerant. Use only refrigerant recovery units and cylinders designed for high pressure refrigerants.
R410A must only be charged in the liquid state to ensure correct blend makeup.
The refrigerant must be stored in a clean, dry area away from sunlight. The refrigerant must never be stored above 50°C.

Pressure Equipment Directive (2014/68/EU)

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

Refrigeration

AllowableTemperature Range (TS) = Min -20°C* to Max 120°C**
Maximum Allowable Pressure (PS) = High Side 40.7 Barg, Low Side 30Barg

*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

AllowableTemperature Range (TS) = Min -20°C* to Max 40°C**
Maximum Allowable Pressure (PS) = 10 Barg

*Based on the waterside temperature in the unit off state in the lowest permitted ambient temperature.
**Based on the waterside temperature in the unit off state in the highest permitted ambient temperature.

Pressure System Safety Regulations 2000

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

Global Warming Potential

The R410A refrigerant has a GWP of 2088 (based on EN378-1:2016, 100 year life)

Ecodesign Directive 2009/125/EC

The product range within this document is designed in accordance to the European Ecodesign Directive 2009/125/EC. The appendix at the rear section of the manual gives the product compliancy metrics. Products sold outside of the EU are exempt from this directive.

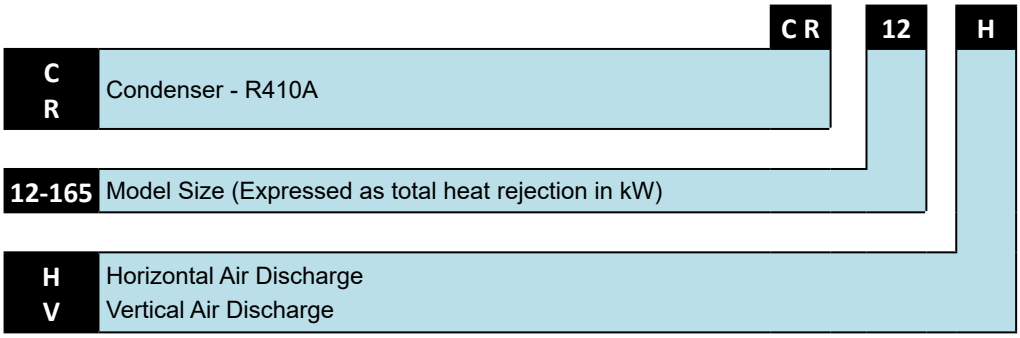
Dangerous Substances and Explosive Atmospheres Regulations

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.

Contents

General Description

Nomenclature



Introduction

This range of Air Cooled Condensers is available in 16 model sizes with total heat rejection 12 -165kW. Custom designed for a small footprint, low sound level, slimline and aesthetically pleasing appearance. Available in either horizontal or vertical air discharge orientation, please specify at order. All units are despatched following extensive leak and pressure testing and carry a holding charge of inert gas. The range has been designed and optimised for operation with ozone benign refrigerant R410A.

50Hz

This range covers condensers from CR12 - CR165

60Hz

This range covers condensers from CR12 - CR105

Construction

Unit cabinets are manufactured from galvanised sheet steel coated with epoxy baked powder paint to provide a durable finish. Standard unit colour shall be Light Grey (RAL 7035). Dual position fixing legs are supplied attached to the unit via bolts and shake proof washers.

Horizontal Air Discharge

As standard, unit legs are attached and delivered in the horizontal air discharge mode as are the isolator and fan speed controller. The legs attached to the top of the unit are for lifting and stacking and may be removed and stored safely if not required.

⚠IMPORTANT	Only 2 units may be stacked together.

Vertical Air Discharge

As standard, unit legs are attached and delivered in the horizontal air discharge mode and can be repositioned on site to offer vertical air discharge mode.

⚠IMPORTANT	To ensure the unit isolator and fan speed controller are in the correct orientation for vertical air discharge please specify at order.

Condenser

Large surface area coil is ideally positioned to optimise airflow and heat transfer, manufactured from refrigeration quality copper tube with mechanically bonded aluminium fins. The copper tube is internally rifled for improved heat transfer. Factory pressure tested to 45Bar. Sweat copper pipe for brazed connection as standard.

Fan & Motor Assembly

Axial flow fan assembly with low noise sickle type blades and bellmouth.

Alternating Current (AC) Fan Motor

The external rotor AC motor allows the use of a low power output, single phase and speed controllable motor to power the fan. The motor has in-built thermal overload protection and the assembly is supplied complete with a finger guard for protection. Available in either horizontal or vertical air discharge orientation, please specify at order.

General Description

Refrigeration

Each unit features as standard:

- Filter drier (supplied loose)
- Holding charge of inert gas

Electrical

All electrical components are rated for all year round outdoor use. All wiring is colour coded and numbered for identification. All units are wired in accordance with current local and European standards.

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

Head Pressure Control (Variable)

Matched with Airedale Indoor Unit:

Variable head pressure control is provided by the indoor unit when standard fans or optional EC fans are selected.

Unmatched Units:

Head pressure control is maintained by a modulating fan speed controller fitted to the outdoor unit. The controller is rated to IP54 for outdoor use and will operate accurately in ambient temperatures down to a minimum of -20°C.

Mains Electric Isolator

A weatherproof mains isolator is fitted to ensure complete unit isolation of the electrical panel during adjustment and maintenance.

Electronically Commutated (EC) Fan Motor

Sickle bladed fan assemblies with integral long bellmouth and fingerproof grille. Incorporates external EC rotor motor technology to provide highly accurate discreet speed control. The fans offer maximum airflow performance while keeping sound levels to a minimum.

Each fan incorporates electronically commutated DC motor control using semi-conductor modules responding to a signal from the Airedale indoor unit. EC motors are DC motors with integrated AC to DC conversion; this gives the flexibility of connecting to AC mains with the efficiency and simple speed control of a DC motor. The EC fan offers significant power reduction in comparison with equivalent AC fan at both full and modulated fan speeds. The inbuilt EC fan control module allows for fan speed modulation from 15-100%, the modulating range of a standard AC fan is typically 40-100% of full fan speed.

Head pressure control is maintained by a modulating fan speed controller fitted to the outdoor unit. The controller is rated to IP54 for outdoor use and will operate accurately in ambient temperatures down to a minimum of -20°C.

⚠**IMPORTANT**	All fans are supplied pre-programmed to a head pressure setpoint of 26 barg and proportional band setpoint of 6 barg. For alternative settings, please specify at order.

Corrosion Resistant Coated Coils

For aggressive atmospheres a corrosion resistant coating can be applied to the aluminium fins.

Head Pressure Control

(On / Off) Head pressure control is maintained via a factory fitted on/off pressure switch rated to IP54 for outdoor use as standard. Good control with ambients down to 0°C, below this temperature variable speed controllers are recommended. The head pressure is factory set to 26 barg (377 psig).

Shut Off Valves

Where unit isolation for easier maintenance is required, shut off valves can be supplied loose for on site fitment.

Coil Guards

Protective mesh guards can be fitted to each of the outer coils to protect against damage.

BMS Interface Card

It is possible to integrate the unit control system into a BMS. Communication protocols must be specified at the time of order. Serial protocols options include Modbus RTU and BACnet MSTP. Ethernet IP protocols include BACnet/IP and Modbus TCP. Configuration for all protocols should occur as part of the installation.

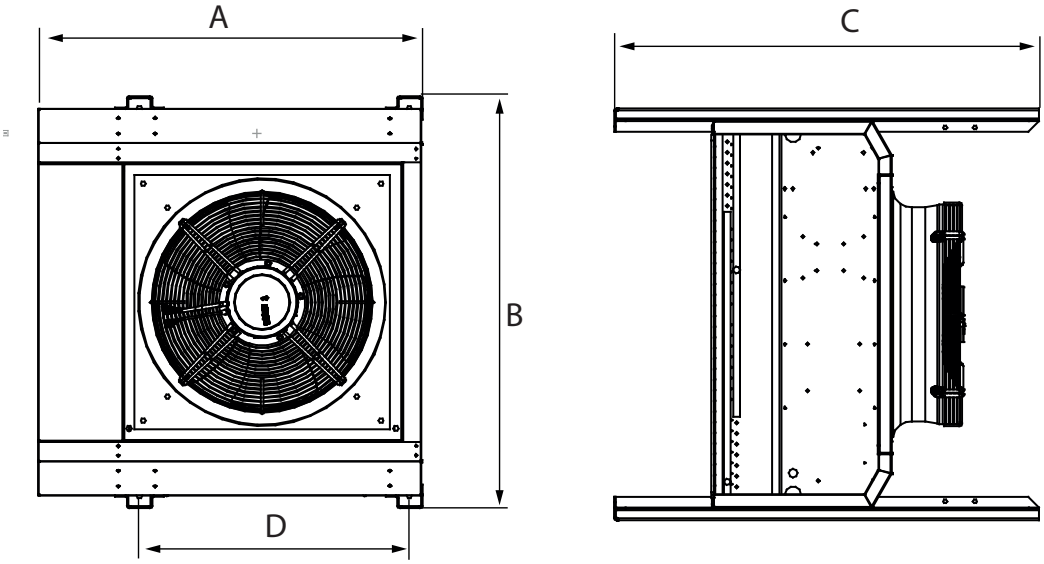
Installation Data

Dimensions

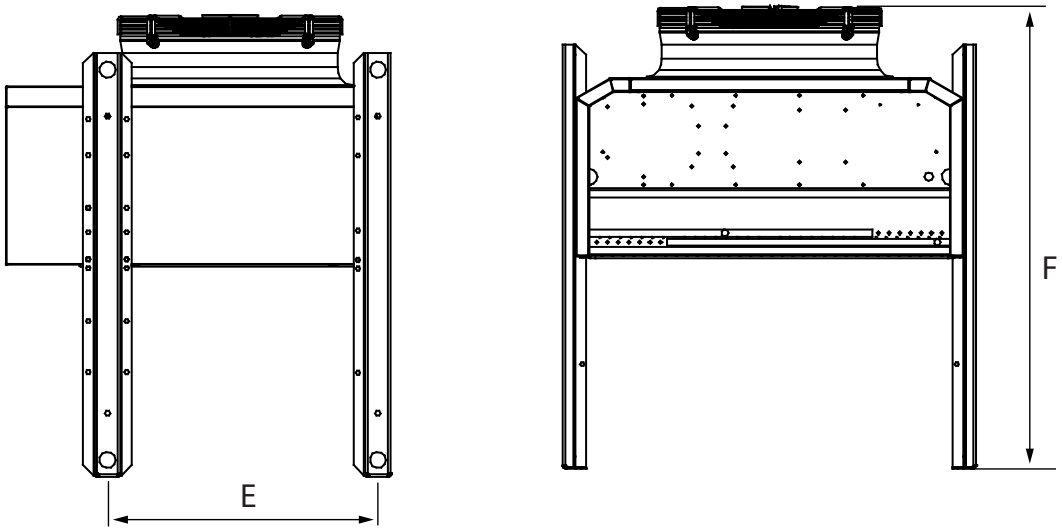
⚠IMPORTANT	Unit diagrams can be supplied on request. The legs attached to the top of the horizontal unit are for lifting and stacking and may be removed and stored safely if not required. Only 2 units may be stacked together.

Standard Condenser 1 Fan

Horizontal



Vertical



UNIT	FAN TYPE	A mm	B mm	C mm	D mm	E mm	F mm
CR12	AC	902	972	1000	635	635	1165
CR16	AC	902	972	1000	635	635	1165
CR22	AC	1095	1167	1000	820	820	1126
CR26	EC	1095	1167	1000	820	820	1217
CR30	AC	1095	1167	1000	820	820	1126
CR35	EC	1095	1167	1000	820	820	1217

⚠CAUTION	A vertical air discharge unit is recommended for installation in windy locations or wherever a horizontal airflow would be obstructed.

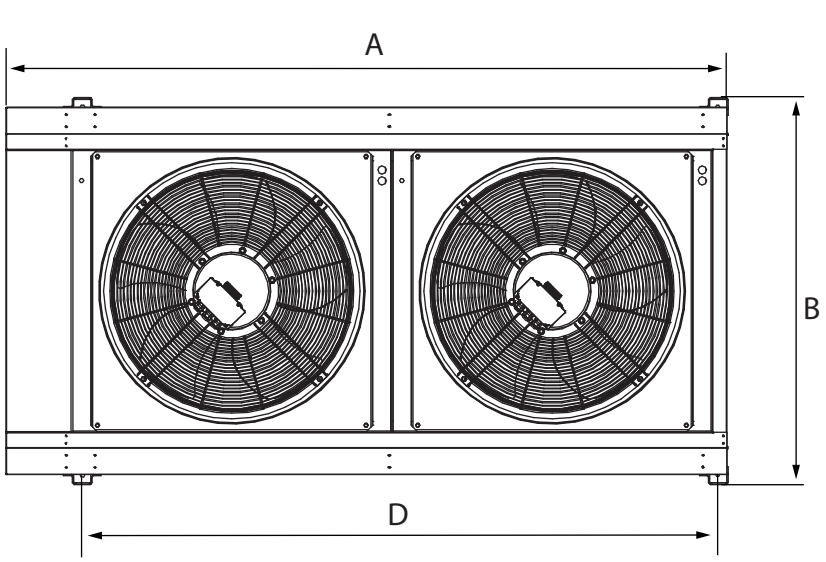
Installation Data

Dimensions

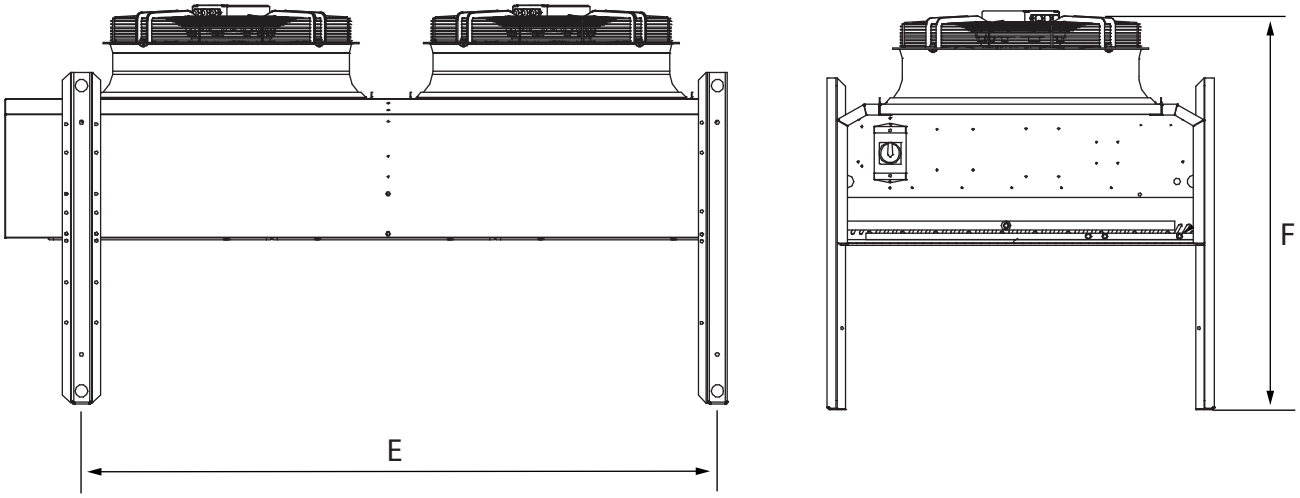
⚠IMPORTANT	Unit diagrams can be supplied on request. The legs attached to the top of the horizontal unit are for lifting and stacking and may be removed and stored safely if not required. Only 2 units may be stacked together.

Standard Condenser 2 Fans

Horizontal



Vertical



UNIT	FAN TYPE	A mm	B mm	C mm	D mm	E mm	F mm
CR50	AC	2177	1167	1000	1916	1916	1126
CR60	EC	2177	1167	1000	1916	1916	1217
CR65	AC	2177	1167	1000	1916	1916	1126
CR75	EC	2177	1167	1000	1916	1916	1217

⚠CAUTION	A vertical air discharge unit is recommended for installation in windy locations or wherever a horizontal airflow would be obstructed.

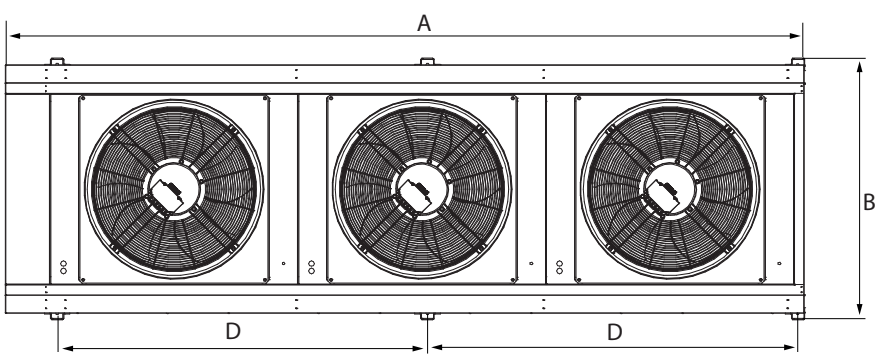
Installation Data

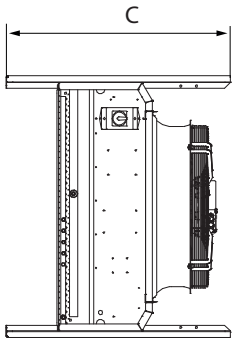
Dimensions

⚠IMPORTANT	Unit diagrams can be supplied on request. The legs attached to the top of the horizontal unit are for lifting and stacking and may be removed and stored safely if not required. Only 2 units may be stacked together.

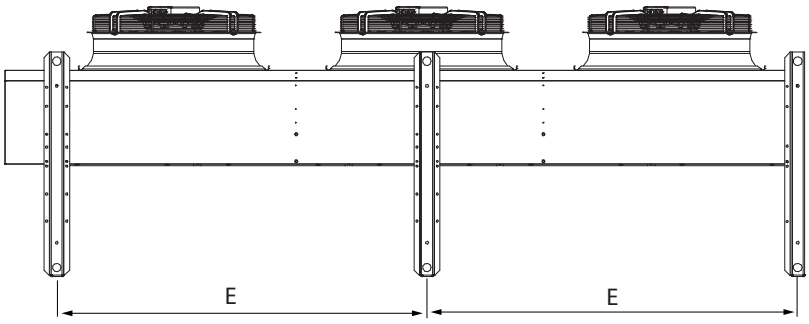
Standard Condenser 3 Fans

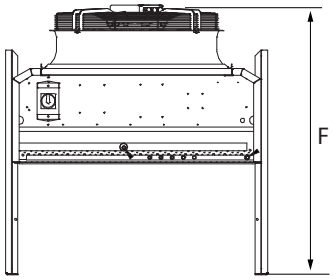
Horizontal





Vertical





UNIT	FAN TYPE	A mm	B mm	C mm	D mm	E mm	F mm
CR80	AC	3560	1167	1000	1650	1650	1126
CR95	EC	3560	1167	1000	1650	1650	1217
CR105	AC	3560	1167	1000	1650	1650	1126
CR130	EC	3560	1167	1000	1650	1650	1217

⚠CAUTION	A vertical air discharge unit is recommended for installation in windy locations or wherever a horizontal airflow would be obstructed.

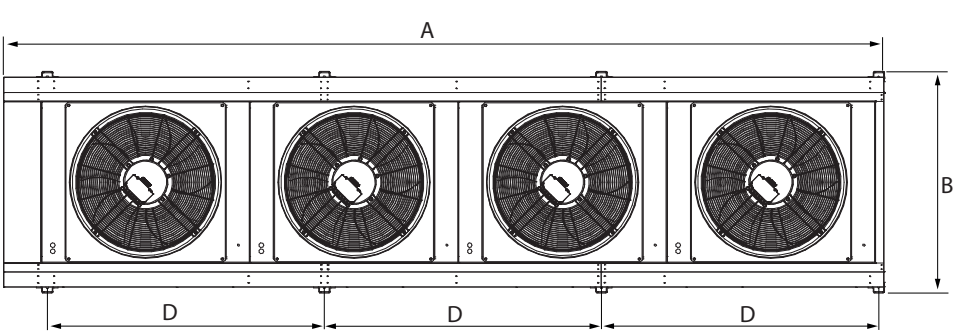
Installation Data

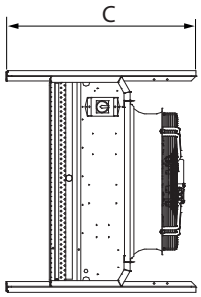
Dimensions

⚠IMPORTANT	Unit diagrams can be supplied on request. The legs attached to the top of the horizontal unit are for lifting and stacking and may be removed and stored safely if not required. Only 2 units may be stacked together.

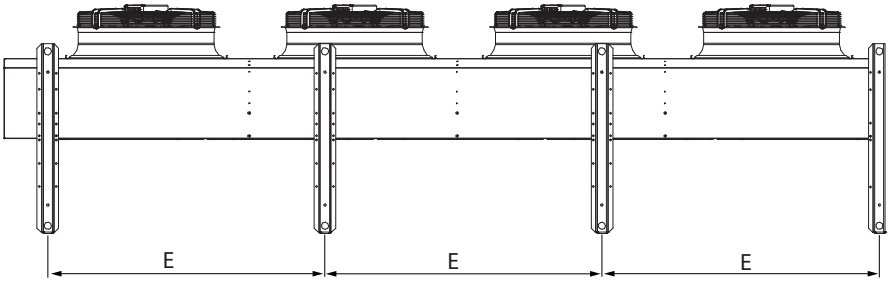
Standard Condenser 4 Fans

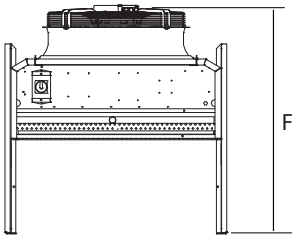
Horizontal





Vertical



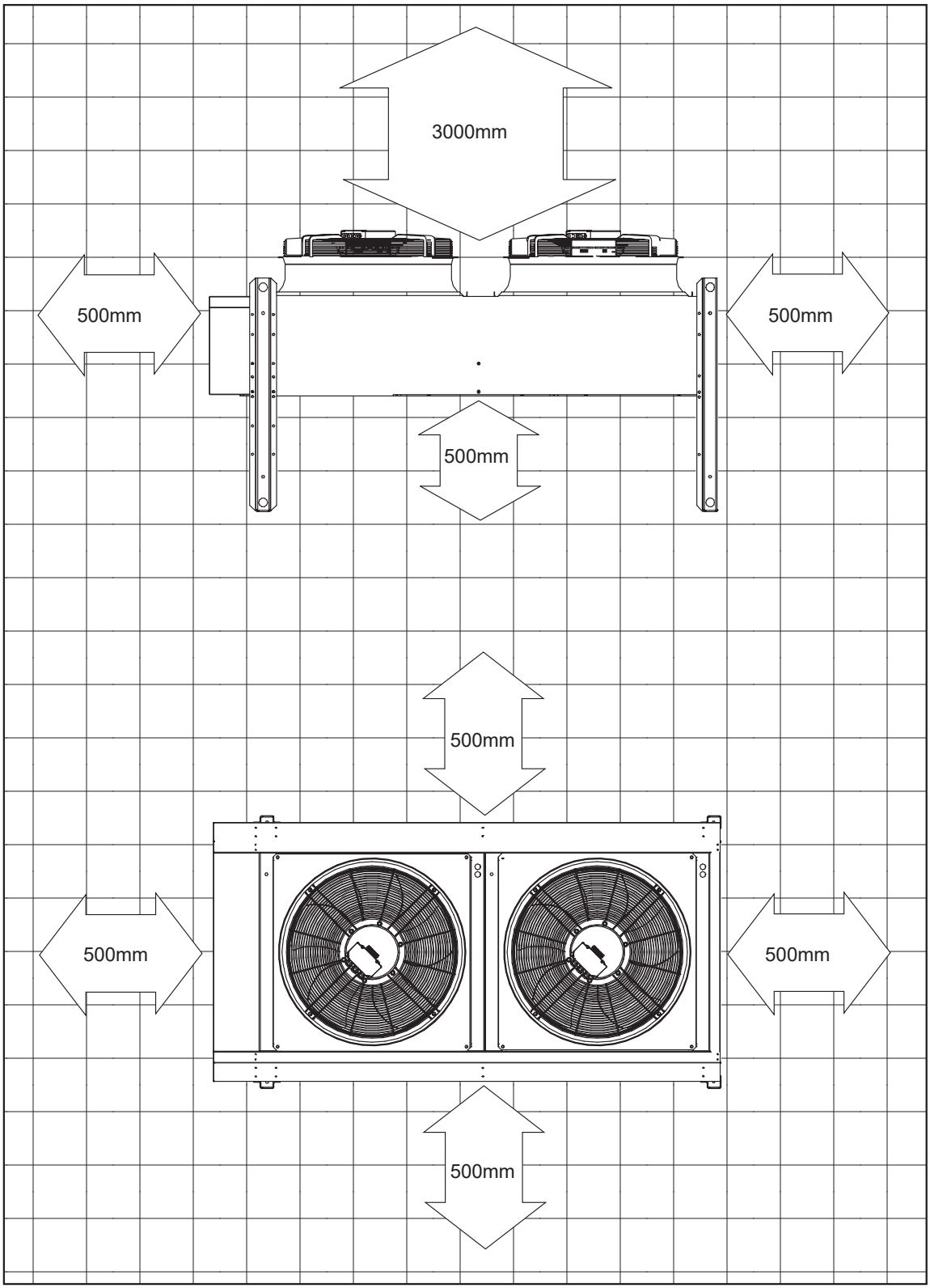


UNIT	FAN TYPE	A mm	B mm	C mm	D mm	E mm	F mm
CR140	AC	4644	1167	1000	1460	1460	1126
CR165	EC	4644	1167	1000	1460	1460	1217

⚠CAUTION	A vertical air discharge unit is recommended for installation in windy locations or wherever a horizontal airflow would be obstructed.

Installation Data

Minimum Clearances



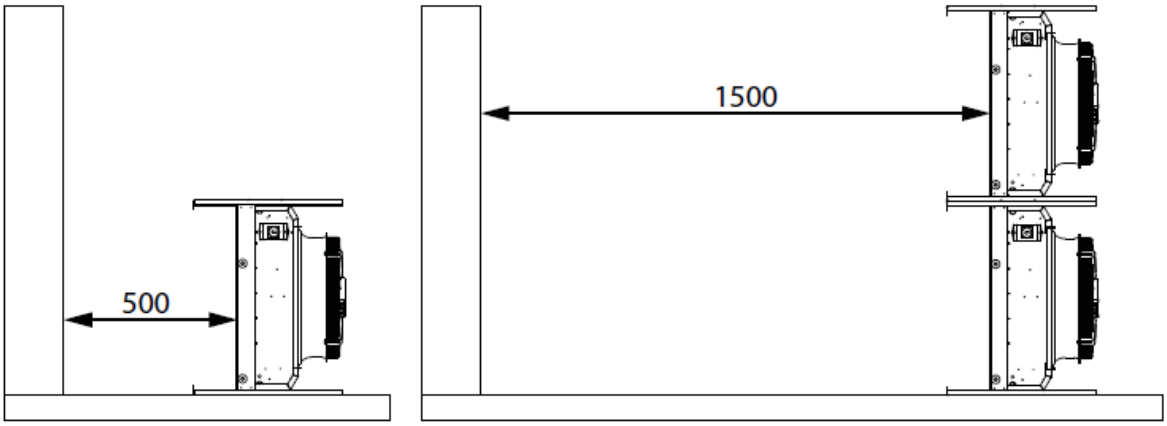
⚠CAUTION	A vertical air discharge unit is recommended for installation in windy locations or wherever a horizontal airflow would be obstructed.

Installation Data

Stacking Units

Positioning condensers stacked on top of each other can cause the bottom unit to be starved of air. It is therefore required that additional clearance is allowed.

Single unit clearance is 500mm, stacked units clearance is 1500mm.



Unit Lifting - Condenser

General

- Employ lifting specialists
- Local codes and regulations relating to the lifting of this type of equipment should be observed
- Each chain/sling must be capable of lifting the whole unit
- Lift the unit slowly and evenly

IMPORTANT

Only use lifting points provided. Do not lift from the pipework connections as this may damage the unit.

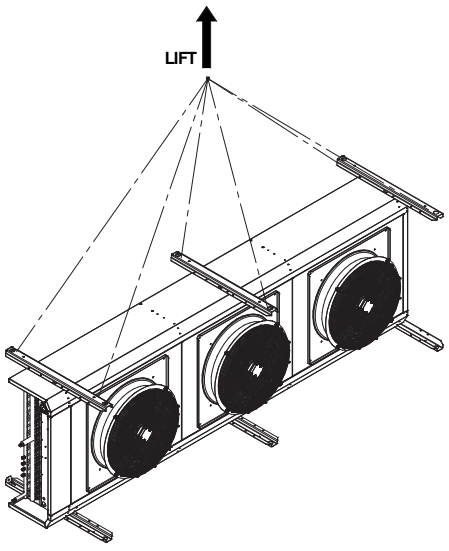
- Do not use 1 chain between 2 lifting points to avoid load shift.
- Ensure that chains/slings DO NOT crush the casework, coil or fan assemblies.
- If the unit is dropped it should immediately be checked for damage and reported to Airedale.
- Airedale will accept no responsibility for mishandling during the positioning of the equipment.

⚠CAUTION	Check the unit is as ordered, discrepancies or transit damage should be reported to Airedale immediately. Care should be taken to ensure the unit does not sustain damage before it is lifted into final position.

Horizontal Air Discharge

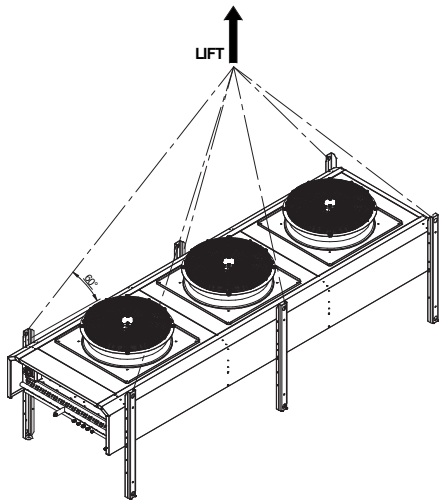
Use lifting eyes attached to individual slings/chains (supplied by others) and attach 2 to every top leg using the holes provided as illustrated. Maximum of 8 slings/chains.

Vertical Air Discharge



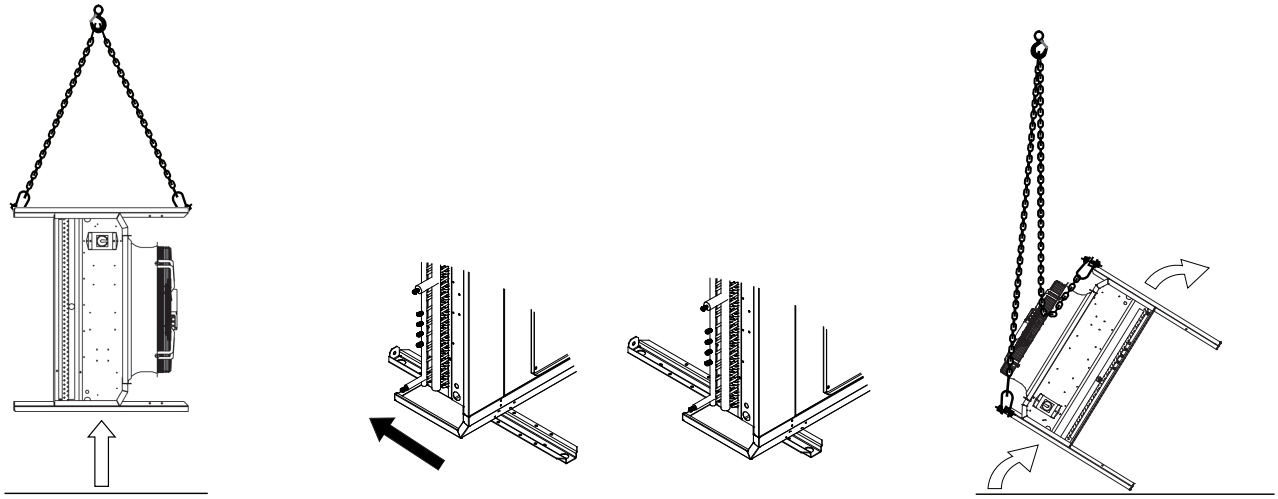
Installation Data

Use lifting eyes attached to individual slings/chains (supplied by others) and attach 1 to the top of every leg using the holes provided as illustrated. Maximum of 8 slings/chains.



Re-Orientation To Vertical Discharge

1 Remove the fixings securing the unit to the pallet.
2 In line with horizontal discharge lifting instructions, lift the unit sufficiently to gain access to the lower leg fixings.
3 Reposition and secure the lower 2 legs to the corner of the unit using the fixings and hole positions provided to both faces. Note, model sizes CR80 & CR105 have an additional mid support leg, this should also be adjusted and secured.
4 Lower and rest the unit down to floor and reposition and secure the upper legs as described in Step 3.
5 In line with vertical discharge lifting instructions lift the unit slowly into vertical orientation.



⚠CAUTION	It is strictly prohibited to use the connections, which are delicate parts of the Coil, as anchoring points when lifting or handling the unit. This would cause serious damage to the Coil and serious risks for the safety of persons and goods.

Installation Data

Positioning

- Unit must be positioned on an even base to ensure correct operation
- Observe airflow and maintenance clearances
- Where multiple units are installed, due care should be taken to avoid the discharge air from each unit adversely affecting other units in the vicinity
- When mounting the units adjacent to a wall or other vertical surface the condenser should be positioned with the coil side facing the wall
- Check all services are present and accessible

Mounting

Fix the condenser down using the appropriate bolt holes in unit fixing legs.

Siting Recommendations

Horizontal air discharge

- Avoid where possible siting the unit where wind and air re-circulation may interfere with the fan operation
- A vertical air discharge unit is recommended for installation in windy locations or wherever a horizontal airflow would be obstructed

Pipework Connections

⚠CAUTION	Take care that the service connections are correctly made and in particular do not invert the inlet and outlet connections.

Connections			CR12	CR16	CR22	CR30
Liquid Line - Sweat		in	5/8	5/8	5/8	3/4
Discharge Line - Sweat		in	5/8	5/8	5/8	3/4

Connections			CR50	CR65	CR80	CR105
Liquid Line - Sweat		in	3/4	3/4	7/8	7/8
Discharge Line - Sweat		in	1 1/8	1 1/8	1 3/8	1 3/8

Connections			CR130	CR140	CR165
Liquid Line - Sweat		in	7/8	7/8	7/8
Discharge Line - Sweat		in	1 3/8	1 3/8	1 3/8

Holding Charge

The units are shipped with a holding charge of inert gas to guard against contamination or moisture during shipping and storage.

⚠CAUTION	The charge should be checked to indicate if leaks are present prior to evacuation. If the charge appears to be either partially or totally lost then the unit should be carefully checked for signs of physical damage.

General

Run the refrigeration lines taking care to ensure the following:

- Use straight line routes where ever possible
- Refrigerant lines should be insulated in areas of high / low temperature or when exposed to direct sunlight
- When insulating refrigerant lines, cut approximately 30 - 50cm longer than the distance between the units to ensure the insulation goes right upto the unit, leave connections uncovered for leak testing

Installation Data

Pipework Installation - Good Practices

CAUTION

The following information is based on a complete matched Airedale system using R410A.

- Remove burrs to the ends of the copper tube, holding the tube downward to avoid allowing dirt to contaminate the tube
- Avoid any contact between the discharge line and the liquid line

Oil Traps

For long vertical rises in discharge lines, it is essential that oil traps are located every 4m to ensure proper oil movement / entrapment. In addition there should be an oil trap at the exit of the air handling unit before a vertical riser is applied (refer to example below).

Pipe Supports

⚠CAUTION	Weight of pipework must not be supported by the unit. Three planes of movement must be allowed between the coil and the first pipe clamp If this is not possible, a vibration eliminator must be fitted.

The following table identifies the maximum distance between pipe supports on vertical and horizontal pipe runs. All pipework should be clamped prior to insulation being applied.

Pipe O/D (inches)	Support distance (m)
3/8 - 7/8”	1.0
1 1/8 - 2 1/8”	2.0

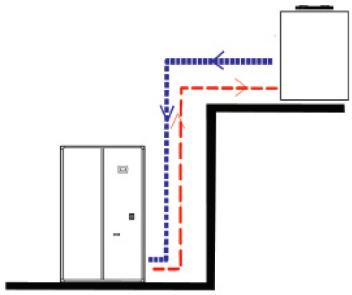
Pipe Lengths

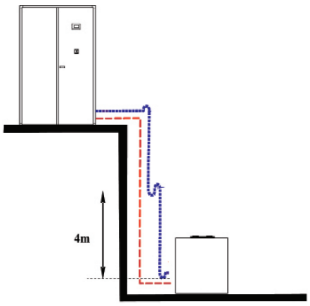
Discharge Line:

Maximum pressure loss for discharge pipework 42 kPa.
Minimum velocity for discharge risers 5 m/s, to ensure good oil return.

Liquid Line:

Maximum pressure loss for liquid line pipework 21 kPa.
Minimum velocity for liquid line 1.5 m/s, to ensure good oil return.





IMPORTANT

It is the responsibility of the installing contractor/site engineer to check the pipe size/refrigerant charge is correct for each system installation and application.
Split systems may require additional oil which should be added to the low pressure side of each compressor.

Design should be in accordance with accepted refrigeration practice to ensure good oil return to the compressor(s) under all normal operating conditions.

REMEMBER excessive pressure loss in interconnecting pipework will impair system performance; this should be factored in during the design of the system and where necessary oil traps employed.

Installation Data

Pressure Testing

In accordance with PED 97/23/EC, a strength test should be carried out in order to ensure that all interconnecting joints, pipework and components are sufficiently strong to cater for maximum permissible operating pressures. Once installation is completed, the high pressure side of the system should be strength tested with dry nitrogen.
NOTE: To comply with the PED directive, the unit is factory pressure tested and recorded on the Test Certificate provided.

Split Systems:

Ensure additional in line system components will withstand the intended SYSTEM PED recommendation test pressure. If not, we recommend isolation where possible, eg in line HP/LP switches, pressure transducer(s) and compressor(s).

⚠**CAUTION**	Pressure testing can be dangerous if not properly conducted; personnel undertaking pressure testing MUST be technically competent and suitably qualified.

- Record the pressure over a minimum of 60 minutes to detect major leaks (a 24 hour period should preferably be allowed), on the Commissioning Sheet provided
- If a reduction in pressure is detected, trace the leak and repair before conducting a further pressure test and charging

Evacuation

Evacuation for systems operating on R410A refrigerant should be carried out as follows (for other refrigerants refer to Airedale for advice):

- All system valves (i.e. liquid line solenoids, EEVs, shut off valves etc) need to be open to allow evacuation.
- Use a high vacuum pump and connect to the high and low pressure sides of the system via a gauge manifold fitted with compound gauges, a high vacuum gauge should be fitted to the system at the furthest point from the vacuum pump
- The system should be evacuated to 0.5 Torr and if achieved no further evacuation steps are required
- Triple evacuation should be used to ensure that all contaminants are removed if initially 0.5 Torr could not be achieved
- Operate the vacuum pump until a pressure of 1.5 Torr (200 Pa) absolute pressure is reached, then stop the vacuum pump to break the vacuum using oxygen free Nitrogen until the pressure rises above zero
- The above operation should be repeated a second time
- The system should then be evacuated a third time but this time to 0.5 Torr absolute pressure

Installation Data

Electrical Data

IMPORTANT

The following information is for general guidance; refer to the certified drawings provided for installation.

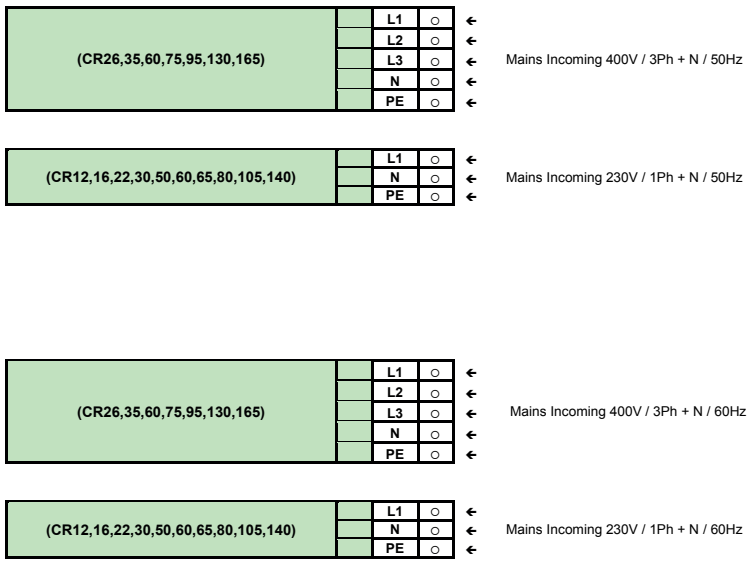
⚠CAUTION	ALL work MUST be carried out by technically trained competent personnel. The equipment contains live electrical and moving parts, ISOLATE prior to maintenance or repair work.

GENERAL

- Once the refrigeration pipework is complete the electrical supply can be connected by routing the cables through the appropriate casing hole and connecting the cables as per the wiring diagram supplied with each unit
- A fused and isolated electrical supply of the appropriate rating should be installed
- As standard the equipment is designed for 230V, 1 Phase, 50Hz or 400V, 3 Phase, 4 wire 50 / 60 Hz to all relevant IEE regulations, British standards and IEC requirements
- All mains and interconnecting wiring should be carried out to National and Local codes
- Wires should be capable of carrying the maximum load current under non-fault conditions at the stipulated voltage
- Avoid large voltage drops on cable runs, particularly low voltage wiring

⚠CAUTION	Each unit requires an independently fused and isolated power supply.

Interconnecting Wiring



Technical Data

Performance Data

Mean Condensing Temperature °C		Ambient					
		25°C	30°C	35°C	40°C	45°C	48°C
		Output kW	Output kW	Output kW	Output kW	Output kW	Output kW
CR12	35	8.8	3.3	-	-	-	-
	40	13.8	8.8	3.4	-	-	-
	45	19	14	8.9	3.6	-	-
	50	24.4	19.2	14.1	9.1	3.8	-
	55	29.8	24.7	19.5	14.4	9.3	4.1
CR16	35	11.9	5	-	-	-	-
	40	18.2	12	5.2	-	-	-
	45	24.7	18.4	12.1	5.4	-	-
	50	31.3	25	18.6	12.3	5.6	-
	55	38.2	31.8	25.4	19	12.6	6.5
CR22	35	15.4	6.2	-	-	-	-
	40	24	15.5	6.4	-	-	-
	45	32.8	24.2	15.7	6.7	-	-
	50	41.7	33.1	24.6	16	7	-
	55	51	42.3	33.7	25.1	16.4	7.7
CR30	35	19.8	8.1	-	-	-	-
	40	30.6	20	8.4	-	-	-
	45	41.7	30.9	20.2	8.7	-	-
	50	53.1	42.1	31.3	20.5	9.2	-
	55	64.8	53.8	42.8	31.9	21	9.8
CR50	35	33.7	13.7	-	-	-	-
	40	52.6	34	14.2	-	-	-
	45	71.7	53.1	34.4	14.8	-	-
	50	91.3	72.5	53.8	35.1	15.5	-
	55	111.5	92.6	73.7	54.8	35.9	16.9

(1) Output kW refers to the condenser heat rejection.

Operating Limit

Standard Variable Speed Head Pressure Control	
Minimum Ambient Air DB °C	-20°C
Maximum Ambient Air DB °C	+48

Optional On/Off Head Pressure Control	
Minimum Ambient Air DB °C	-0°C
Maximum Ambient Air DB °C	+48

(1) For conditions outside those quoted, please contact Airedale.
(2) Low ambient kits are available for applications with temperatures below those quoted, please contact Airedale.

Technical Data

Performance Data

Mean Condensing Temperature °C		Ambient					
		25°C	30°C	35°C	40°C	45°C	48°C
		Output kW	Output kW	Output kW	Output kW	Output kW	Output kW
CR65	35	44.9	18.6	-	-	-	-
	40	69.1	45.2	19.3	-	-	-
	45	93.8	69.7	45.6	20	-	-
	50	119.2	94.8	70.6	46.4	21	-
	55	145.5	120.9	96.4	72	47.5	22.6
CR80	35	55.3	23	-	-	-	-
	40	85.8	55.8	23.8	-	-	-
	45	116.7	86.6	56.5	24.7	-	-
	50	148.4	118.1	87.8	57.5	25.8	-
	55	180.9	150.4	120	89.5	58.9	28.3
CR105	35	72.1	30	-	-	-	-
	40	110.8	72.6	31	-	-	-
	45	150.4	111.7	73.3	32.2	-	-
	50	191.1	152.1	113.2	74.5	33.8	-
	55	233.3	193.8	154.6	115.5	76.3	36.4
CR130	35	95.3	40.5	-	-	-	-
	40	146.3	95.9	41.7	-	-	-
	45	198.3	147.6	97	43.2	-	-
	50	251.6	200.6	149.7	98.6	45.1	-
	55	306.6	255.2	203.9	152.6	101	50.6
CR140	35	95.8	40.2	-	-	-	-
	40	147.2	96.3	41.5	-	-	-
	45	199.6	148.3	97.2	43	-	-
	50	253.5	201.6	150.1	98.7	44.9	-
	55	309	256.8	204.8	152.9	101	48.3
CR165	35	124.8	53.5	-	-	-	-
	40	191.6	125.6	55	-	-	-
	45	259.6	193.2	126.9	56.9	-	-
	50	329	262.3	195.7	128.9	59.2	-
	55	400.6	333.4	266.4	199.3	131.8	66.6

(1) Output kW refers to the condenser heat rejection.

Operating Limit

Standard Variable Speed Head Pressure Control	
Minimum Ambient Air DB °C	-20°C
Maximum Ambient Air DB °C	+48

Optional On/Off Head Pressure Control	
Minimum Ambient Air DB °C	-0°C
Maximum Ambient Air DB °C	+48

(1) For conditions outside those quoted, please contact Airedale.
(2) Low ambient kits are available for applications with temperatures below those quoted, please contact Airedale.

Technical Data
Mechanical Data

			CR12	CR16	CR22	CR26	CR30	CR35
Total Heat of Rejection	(1)	kW	14.1	18.6	24.6	29.9	31.3	39.7
Dimensions - Horizontal	(2)							
H x W x L		mm	972 x 1000 x 902	972 x 1000 x 902	1167 x 1000 x 1095	1167 x 1000 x 1095	1167 x 1000 x 1095	1167 x 1000 x 1095
Dimensions - Vertical	(2)							
H x W x L		mm	1061 x 972 x 902	1061 x 972 x 902	1126 x 1167 x 1095	1204 x 1167 x 1095	1126 x 1167 x 1095	1204 x 1167 x 1095
Weight								
Machine		kg	69	78	96	106	110	119
Condenser								
Total Face Area		m²	0.59	0.59	0.92	0.92	0.92	0.92
Nominal Airflow		m³/s	1.3	1.1	2.3	3.3	1.9	2.6
Discharge			**-H** Horizontal or **-V** Vertical (***Please Specify at Order***)					
Fan & Motor			Axial - AC			Axial - EC	Axial - AC	Axial - EC
Quantity			1	1	1	1	1	1
Diameter		mm	500	500	630	710	630	710
Maximum Speed		rpm	910	910	860	1030	860	1030
Refrigeration			Single Circuit					
Refrigerant Type			R410A					
Holding Charge			Inert Gas					
Coil Volume		l	3.0	6.1	4.7	4.7	9.4	9.4
Refrigerant Charge	(3)	kg	1.2	2.4	1.9	1.9	3.7	3.7

Option

EC Fan			Designed to 75 Pa ESP					
Dimensions - Horizontal								
H x W x L		mm	972 x 1000 x 902	972 x 1000 x 902	1167 x 1000 x 1095	-	1167 x 1000 x 1095	-
Dimensions - Vertical								
H x W x L		mm	1090 x 972 x 902	1090 x 972 x 902	1217 x 1167 x 1095	-	1217 x 1167 x 1095	-
Weight								
Machine		kg	73	81	88	-	101	-

(1) Nominal data based on 35°C ambient and a 50°C mean condensing temperature and using standard fan.

(2) Overall dimensions for clearance; refer to ***Dimensional & Installation Data***, for detail.

(3) For guidance only.

Technical Data
Mechanical Data

			CR50	CR60	CR65	CR75	CR80
Total Heat of Rejection	(1)	kW	53.8	67.2	70.6	89.0	87.8
Dimensions - Horizontal	(2)						
H x W x L		mm	1167 x 1000 x 2177	1167 x 1000 x 2177	1167 x 1000 x 2177	1167 x 1000 x 2177	1167 x 1000 x 3560
Dimensions - Vertical	(2)						
H x W x L		mm	1126 x 1167 x 2177	1205 x 1167 x 2177	1126 x 1167 x 2177	1205 x 1167 x 2177	1126 x 1167 x 3560
Weight							
Machine		kg	167	187	198	217	257
Condenser							
Total Face Area		m²	2.15	2.15	2.15	2.15	3.69
Nominal Airflow		m³/s	4.8	7.0	4.2	5.7	7.5
Discharge			**-H** Horizontal or **-V** Vertical (***Please Specify at Order***)				
Fan & Motor			Axial - AC	Axial - EC	Axial - AC	Axial - EC	Axial - AC
Quantity			2	2	2	2	3
Diameter		mm	630	710	630	710	630
Maximum Speed		rpm	860	1030	860	1030	860
Refrigeration			Single Circuit				
Refrigerant Type			R410A				
Holding Charge			Inert Gas				
Coil Volume		l	10.7	10.7	21.5	21.5	18.3
Refrigerant Charge	(3)	kg	4.2	4.2	8.5	8.5	7.2

Option

EC Fan			Designed to 75 Pa ESP		Designed to 75 Pa ESP		Designed to 75 Pa ESP
Dimensions - Horizontal							
H x W x L		mm	1167 x 1000 x 2177	-	1167 x 1000 x 2177	-	1167 x 1000 x 3560
Dimensions - Vertical							
H x W x L		mm	1217 x 1167 x 2177	-	1217 x 1167 x 2177	-	1217 x 1167 x 3560
Weight							
Machine		kg	150	-	180	-	231

(1) Nominal data based on 35°C ambient and a 50°C mean condensing temperature and using standard fan.

(2) Overall dimensions for clearance; refer to ***Dimensional & Installation Data***, for detail.

(3) For guidance only.

Technical Data
Mechanical Data

			CR95	CR105	CR130	CR140	CR165
Total Heat of Rejection CR	(1)	kW	109.9	113.2	149.7	150.1	195.7
Dimensions - Horizontal	(2)						
H x W x L		mm	1167 x 1000 x 3560	1167 x 1000 x 3560	1167 x 1000 x 3560	1167 x 1000 x 4644	1167 x 1000 x 4644
Dimensions - Vertical	(2)						
H x W x L		mm	1205 x 1167 x 3560	1126 x 1167 x 3560	1205 x 1167 x 3560	1126 x 1167 x 4644	1205 x 1167 x 4644
Weight							
Machine		kg	286	309	338	408	447
Condenser							
Total Face Area		m²	3.69	3.69	3.69	4.9	4.9
Nominal Airflow		m³/s	10.8	6.6	9.3	8.7	12.4
Discharge			**-H Horizontal or -V Vertical (Please Specify at Order)**				
Fan & Motor			Axial - EC	Axial - AC	Axial - EC	Axial - AC	Axial - EC
Quantity			3	3	3	4	4
Diameter		mm	710	630	710	630	710
Maximum Speed		rpm	1030	860	1030	860	1030
Refrigeration - CR			Single Circuit				
Refrigerant Type			R410A				
Holding Charge			Inert Gas				
Coil Volume		l	18.3	36.7	36.7	48.3	48.3
Refrigerant Charge	(3)	kg	7.2	14.5	14.5	19.1	19.1

Option

EC Fan				Designed to 75 Pa ESP		Designed to 75 Pa ESP	
Dimensions – Horizontal							
H x W x L		mm	-	1167 x 1000 x 3560	-	1167 x 1000 x 4644	-
Dimensions – Vertical							
H x W x L		mm	-	1217 x 1167 x 3560	-	1217 x 1167 x 4644	-
Weight							
Machine		kg	-	283	-	373	-

(1) Nominal data based on 35°C ambient and a 50°C mean condensing temperature and using standard fan.

(2) Overall dimensions for clearance; refer to ***Dimensional & Installation Data***, for detail.

(3) For guidance only.

Technical Data
Electrical Data

		CR12	CR16	CR22	CR30
Mains Supply	(1)	**230V / 1Ph + N / 50Hz**			
Unit Data					
Nominal Run Amps	A	1.1	1.1	2.9	2.9
Maximum Start Amps	A	2.8	2.8	5.6	5.6
Recommended Mains Fuse	A	6	6	6	6
Max Mains Cable Incoming	mm²	6	6	6	6
Fan - Per Fan					
Quantity		1	1	1	1
Motor Size	kW	0.22	0.22	0.63	0.63
Full Load Amps	A	0.97	0.97	2.9	2.9
Locked Rotor Amps	A	1.7	1.7	5.6	5.6
EC Condenser Fan - Per Fan					
Quantity		1	1	1	1
Motor Size	kW	0.7	0.7	0.77	0.77
Full Load Amps	A	3.1	3.1	3.3	3.3

Mains Supply	(1)	**230V / 1Ph + N / 60Hz**			
Nominal Run Amps	A	1.1	1.1	2.9	2.9
Maximum Start Amps	A	2.8	2.8	5.6	5.6
Recommended Mains Fuse	A	6	6	6	6
Max Mains Cable Incoming	mm²	6	6	6	6
Fan - Per Fan					
Quantity		1	1	1	1
Motor Size	kW	0.24	0.24	0.63	0.63
Full Load Amps	A	1.1	1.1	2.9	2.9
Locked Rotor Amps	A	2.8	2.8	5.6	5.6
EC Condenser Fan - Per Fan					
Quantity		1	1	1	1
Motor Size	kW	0.7	0.7	0.77	0.77
Full Load Amps	A	3.1	3.1	3.3	3.3

Mains Supply	(1)	**220V / 2Ph / 60Hz**			
Nominal Run Amps	A	1.72	1.72	3.02	3.02
Maximum Start Amps	A	6.02	6.02	7.7	7.7
Recommended Mains Fuse	A	6	6	6	6
Max Mains Cable Incoming	mm²	6	6	6	6
Fan - Per Fan					
Quantity		1	1	1	1
Motor Size	kW	0.39	0.39	0.64	0.64
Full Load Amps	A	1.72	1.72	3.02	3.02
Locked Rotor Amps	A	6.02	6.02	7.7	7.7
EC Condenser Fan - Per Fan					
Quantity		1	1	1	1
Motor Size	kW	0.75	0.75	0.73	0.73
Full Load Amps	A	3.4	3.4	3.3	3.3

(1) Nominal data based on 35°C ambient and a 50°C mean condensing temperature and using standard fan.

Technical Data

Electrical Data

		CR50	CR65	CR80	CR105
Mains Supply	(1)	**230V / 1Ph + N / 50Hz**			
Unit Data					
Nominal Run Amps	A	5.8	5.8	8.7	8.7
Maximum Start Amps	A	11.2	11.2	16.8	16.8
Recommended Mains Fuse	A	10	10	16	16
Max Mains Cable Incoming	mm²	6	6	6	6
Fan - Per Fan					
Quantity		2	2	3	3
Motor Size	kW	0.63	0.63	0.63	0.63
Full Load Amps	A	2.9	2.9	2.9	2.9
Locked Rotor Amps	A	5.6	5.6	5.6	5.6
EC Condenser Fan - Per Fan					
Quantity		2	2	3	3
Motor Size	kW	0.77	0.77	0.77	0.77
Full Load Amps	A	3.3	3.3	3.3	3.3

Mains Supply	(1)	**230V / 1Ph + N / 60Hz**			
Nominal Run Amps	A	5.8	5.8	8.7	8.7
Maximum Start Amps	A	11.2	11.2	16.8	16.8
Recommended Mains Fuse	A	10	10	16	16
Max Mains Cable Incoming	mm²	6	6	6	6
Fan - Per Fan					
Quantity		2	2	3	3
Motor Size	kW	0.63	0.63	0.63	0.63
Full Load Amps	A	2.9	2.9	2.9	2.9
Locked Rotor Amps	A	5.6	5.6	5.6	5.6
EC Condenser Fan - Per Fan					
Quantity		2	2	3	3
Motor Size	kW	0.77	0.77	0.77	0.77
Full Load Amps	A	3.3	3.3	3.3	3.3

Mains Supply	(1)	**220V / 2Ph / 60Hz**			
Nominal Run Amps	A	6.04	6.04	9.06	9.06
Maximum Start Amps	A	15.4	15.4	23.1	23.1
Recommended Mains Fuse	A	10	10	16	16
Max Mains Cable Incoming	mm²	6	6	6	6
Fan - Per Fan					
Quantity		2	2	3	3
Motor Size	kW	0.64	0.64	0.64	0.64
Full Load Amps	A	3.02	3.02	3.02	3.02
Locked Rotor Amps	A	7.7	7.7	7.7	7.7
EC Condenser Fan - Per Fan					
Quantity		2	2	3	3
Motor Size	kW	0.73	0.73	0.73	0.73
Full Load Amps	A	3.3	3.3	3.3	3.3

(1) Nominal data based on 35°C ambient and a 50°C mean condensing temperature and using standard fan.

Technical Data
Electrical Data

		CR130	CR140	CR165
Mains Supply	(1)	**400V / 3Ph / 50Hz**	**230V / 1Ph + N / 50Hz**	**400V / 3Ph / 50Hz**
Unit Data				
Nominal Run Amps	A	4.94	10.48	6.6
Maximum Start Amps	A	18.3	36.7	24.4
Recommended Mains Fuse	A	10	16	10
Max Mains Cable Incoming	mm²	6	6	6
Fan - Per Fan				
Quantity		3	4	4
Motor Size	kW	0.88	0.6	0.88
Full Load Amps	A	1.65	2.62	1.65
Locked Rotor Amps	A	6.1	9.17	6.1
EC Condenser Fan - Per Fan				
Quantity		3	4	4
Motor Size	kW	1.68	0.73	1.68
Full Load Amps	A	2.6	3.3	2.6

(1) Nominal data based on 35°C ambient and a 50°C mean condensing temperature and using standard fan.

Sound Data

IMPORTANT

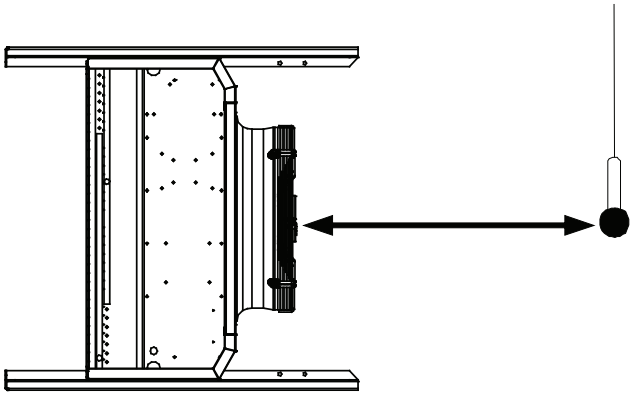
The sound data quoted is based on the unit having the STANDARD FAN running at FULL SPEED under normal operating conditions. For sound data of optional fan selections, please contact Airedale.

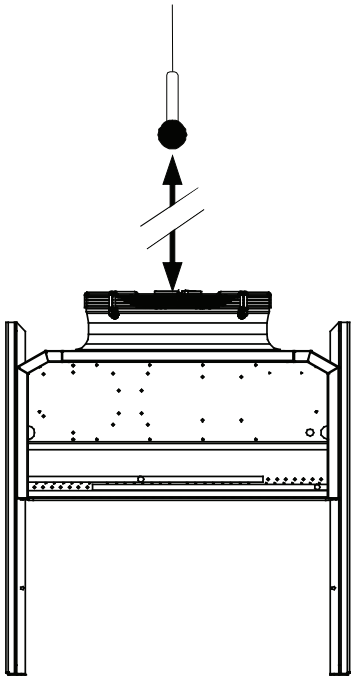
Measurement of Sound Data

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 BS EN ISO9614 Part 1 : 1995.
All Sound Power Levels quoted are calculated from measured sound intensity according BS EN ISO9614 Part 1 : 1995.

Semi Hemispherical

Sound Pressure Levels are calculated from sound power using the semi-hemispherical method where the noise source is in junction with 2 boundaries i.e. the floor and 1 wall.





Sound Data

Noise Data - Horizontal

	Sound Measurement		Overall dB(A)	Frequency (Hz) dB 63	125	250	500	1000	2000	4000	8000
CR12	Power		74	72	83	76	68	68	65	60	50
	Pressure	@10m	46	44	55	48	40	40	37	32	22
CR16	Power		74	72	83	76	68	68	65	60	50
	Pressure	@10m	46	44	55	48	40	40	37	32	22
CR22	Power		78	82	87	74	74	73	70	63	62
	Pressure	@10m	50	54	59	46	46	45	42	35	34
CR26	Power		82	83	80	82	79	78	74	67	59
	Pressure	@10m	54	55	52	54	51	50	46	39	31
CR30	Power		78	82	87	74	74	73	70	63	62
	Pressure	@10m	50	54	59	46	46	45	42	35	34
CR35	Power		82	83	80	82	79	78	74	67	59
	Pressure	@10m	54	55	52	54	51	50	46	39	31
CR50	Power		81	85	90	77	77	76	73	66	65
	Pressure	@10m	53	57	62	49	49	48	45	38	37
CR60	Power		85	86	83	85	82	81	77	70	62
	Pressure	@10m	57	58	55	57	54	53	49	42	34
CR65	Power		81	85	90	77	77	76	73	66	65
	Pressure	@10m	53	57	62	49	49	48	45	38	37
CR75	Power		85	86	83	85	82	81	77	70	62
	Pressure	@10m	57	58	55	57	54	53	49	42	34
CR80	Power		83	80	90	80	77	79	75	68	67
	Pressure	@10m	55	52	62	52	49	51	47	40	39
CR95	Power		87	88	85	87	84	83	79	72	64
	Pressure	@10m	59	60	57	59	56	55	51	44	36
CR105	Power		82	80	90	80	77	79	75	68	67
	Pressure	@10m	55	52	62	52	49	51	47	40	39
CR130	Power		87	88	85	87	84	83	79	72	64
	Pressure	@10m	59	60	57	59	56	55	51	44	36
CR140	Power		84	81	90	81	78	81	77	70	69
	Pressure	@10m	56	53	62	53	50	53	49	42	41
CR165	Power		88	89	86	88	85	84	80	73	65
	Pressure	@10m	60	61	58	60	57	56	52	45	37

Sound Data

Noise Data - Vertical

	Sound		Overall	Frequency (Hz) dB							
	Measurement		dB(A)	63	125	250	500	1000	2000	4000	8000
CR12	Power		75	69	86	75	68	69	65	61	51
	Pressure	@ 10m	47	41	58	47	40	41	37	33	23
CR16	Power		75	69	86	75	68	69	65	61	51
	Pressure	@ 10m	47	41	58	47	40	41	37	33	23
CR22	Power		79	80	90	73	74	74	70	64	63
	Pressure	@ 10m	51	52	62	45	46	46	42	36	35
CR26	Power		83	80	83	82	79	79	73	68	60
	Pressure	@ 10m	55	52	55	54	51	51	45	40	32
CR30	Power		79	80	90	73	74	74	70	64	63
	Pressure	@ 10m	51	52	62	45	46	46	42	36	35
CR35	Power		83	80	83	82	79	79	73	68	60
	Pressure	@ 10m	55	52	55	54	51	51	45	40	32
CR50	Power		82	83	93	76	77	77	73	67	66
	Pressure	@ 10m	54	55	65	48	49	49	45	39	38
CR60	Power		86	83	86	85	82	82	76	71	63
	Pressure	@ 10m	58	55	58	57	54	54	48	43	35
CR65	Power		82	83	93	76	77	77	73	67	66
	Pressure	@ 10m	54	55	65	48	49	49	45	39	38
CR75	Power		86	83	86	85	82	82	76	71	63
	Pressure	@ 10m	58	55	58	57	54	54	48	43	35
CR80	Power		84	78	93	79	78	80	75	69	68
	Pressure	@ 10m	56	50	65	51	50	52	47	41	40
CR95	Power		88	85	88	87	84	84	78	73	65
	Pressure	@ 10m	60	57	60	59	56	56	50	45	37
CR105	Power		84	78	93	79	78	80	75	69	68
	Pressure	@ 10m	56	50	65	51	50	52	47	41	40
CR130	Power		88	85	88	87	84	84	78	73	65
	Pressure	@ 10m	60	57	60	59	56	56	50	45	37
CR140	Power		85	78	94	81	78	81	77	71	70
	Pressure	@ 10m	57	50	66	53	50	53	49	43	42
CR165	Power		89	86	89	88	85	85	79	74	66
	Pressure	@ 10m	61	58	61	60	57	57	51	46	38

Commissioning Procedure

GENERAL

To be read in conjunction with the commissioning sheets provided.

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

Pre Commissioning Checklist

⚠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.

The following commissioning information is based on a complete matched Airedale system using R410A.

Start-Up

Switch on the power supply to the condenser and switch the isolator to the on position.

The fan motor starts automatically when the refrigerant condensing pressure reaches the pre-set value of the pressure regulator (factory set). Therefore to check operation of the condenser the indoor unit to which it is linked must be running. Refer to Control Device Adjustment.

General

1 The unit condition is satisfactory.
2 All pipework is complete and insulated where necessary.
3 All fans are able to rotate freely.

Electrical

1 All electrical connections (both mains and control) are properly terminated.
2 The power supply is of the correct voltage and frequency.
3 External fuses/circuit breakers are of the correct rating.
4 The units are properly earthed in accordance with current regulations.
5 All pipework is earth bonded as required.

Refrigeration

1 Check for the presence of a refrigerant charge in the condenser.
2 The system has been evacuated correctly.

Commissioning Checklist

System Readings

Condensing temperature (as read on the discharge gauge) should be in the region of 40 to 41°C with an external ambient temperature of 30°C (condensing is normally 10°C. above ambient) at full fan speed.

Running Checks

Once the system has been charged, the following running checks should be carried out:

Check the operation of the fan speed controller by observing an increase in fan speed if the outdoor coil is temporarily partially blocked.

Commissioning Checklist

Operating Limits

Standard Variable Speed Head Pressure Control	
Minimum Ambient Air DB °C	-20°C
Maximum Ambient Air DB °C	+48

Optional On / Off Head Pressure Control	
Minimum Ambient Air DB °C	-0°C
Maximum Ambient Air DB °C	+48

(1) For conditions outside those quoted, please contact Airedale.
(2) Low ambient kits are available for applications with ambient temperatures below those quoted, please contact Airedale.

Control Device Adjustment

Standard AC Type Fans

When the condenser is matched to an Airedale indoor unit, head pressure control is provided by the indoor unit.

Unmatched condensers are supplied with a head pressure control device which can be either:
1 Variable speed control (standard)
2 On/Off pressure switch (optional)

The control device is factory pre-set.
To check the setting connect a pressure gauge with scale reading up to at least 45bar to the pressure tapping located in the outlet manifold of the condenser and watch the operation of the fan as the pressure changes. If the settings require adjustment, follow the instructions set out below and check new settings as explained above.

⚠CAUTION	Before carrying out any work, ensure that the isolator is switched off.

Variable Speed Control

The fan speed is controlled via alteration of the supply voltage which corresponds to a particular condensing pressure. The output voltage from the controller varies between a maximum of 95% and a minimum of 40% of the mains voltage (ie 220 Volts down to approximately 90 Volts on a 230 Volt supply) as the condensing pressure varies within a band of 5 Bar.

The control system is suitable for temperatures down to -20°C.

The pressure set point corresponding to the maximum output voltage can be adjusted by means of a potentiometer internal to the case of the controller.

Factory setting: Set = 26 barg (58%) - Standard Thermostatic Expansion Valve
= 22 barg (49%) - Optional Electronic Expansion Valve
Differential = 5 barg (11%)

To adjust the set points, find the required setting below and adjust the relevant potentiometer:

		SET POINT Potentiometer position (%)								
	%	20	30	40	50	60	70	80	90	100
Range 0 - 45 barg	barg	9	13.5	18	22.5	27	31.5	36	40.5	45

		DIFF Potentiometer position (%)			
	%	5	10	15	20
Range 0 - 45 barg	barg	2.3	4.5	6.8	9.0

Commissioning Checklist

Control Device Adjustment

On - Off Pressure Switch

The control device comprises a pressure switch with on/off contact which cycles operation of the fan as a function of the pressure; the contact:

- Closes and feeds the fan motor when the pressure rises and reaches the set point (29 barg)
- Opens when the pressure falls to a level equal to the set point value, minus the differential pressure pre-set (23 barg)

This type of control system is suitable where ambient temperatures seldom fall below 0˚C.
In cold climates it could cause excessive hunting of the system.
The values of Set and Differential are adjusted by means of the adjusting screws which are accessed by removing the external casing of the pressure switch.

Factory setting:	Set	= 26 barg
	Differential	= 6 barg

Optional EC Fans

When the condenser is matched to an Airedale indoor unit, head pressure control is provided by the indoor unit.

The fan speed of unmatched condensers is controlled by the onboard EC fan electronics connected to a pressure transducer on the outlet manifold.

CAUTION

All fans are supplied pre-programmed to a head pressure setpoint of 26 barg and proportional band setpoint of 5 barg unless otherwise specified at order.

Commissioning Data

Refrigerant Charging

It is important that the system is charged with the correct amount of refrigerant. Remember, a seriously over or undercharged system may lead to major component failure.
The final refrigerant charge level should be set by the design evaporating and condensing pressures, together with a full or nearly full sight glass.

The suction and discharge pressures should be constantly monitored whilst charging is in progress.

To calculate the system refrigeration charge, please refer to the indoor unit data.

			CR12	CR16	CR22	CR30
Refrigeration			Single Circuit			
Refrigerant Type			R410A			
Coil Volume		l	3.0	6.0	4.7	9.3
Refrigerant Charge	(1)	kg	1.4	2.7	2.2	4.3

			CR50	CR65	CR80	CR105
Refrigeration			Single Circuit			
Refrigerant Type			R410A			
Coil Volume		l	10.7	21.4	18.3	36.6
Refrigerant Charge	(1)	kg	4.9	9.8	8.4	16.7

			CR130	CR140	CR165
Refrigeration			Single Circuit		
Refrigerant Type			R410A		
Coil Volume		l	36.6	48.3	48.3
Refrigerant Charge	(1)	kg	16.7	19.1	19.1

(1) For guidance only.

⚠NOTE	Calculations provide an approximate refrigerant charge. An additional 15% of the total calculated charge should be made available during the commissioning of the units to allow for optimisation of the system refrigerant charge. This is required to accommodate for a range of possible variations in the volume of the system.

Troubleshooting

FAULT	POSSIBLE CAUSE	REMEDY / ACTION
Unit will not start	No power	Check power supply to the controller
	Wired incorrectly	Check wire connections in accordance with wiring diagram on control box lid
	Loose wires	Check all wires, connections, terminals etc
Head pressure too high	Condenser coil clogged or dirty	Clean condenser
	Overcharge of refrigerant, normally troublesome in warm weather	Reclaim excess refrigerant from system
	Air or other non-condensable gas in system	Evacuate system and re-charge with new refrigerant
	Head pressure controller faulty	Refer to Indoor unit
	Fan not operating or operating inefficiently	Refer to Indoor unit
Head pressure too low	Fan operating too fast in low ambient conditions	Refer to Indoor unit
Condenser fan not operating - power on	Power supply failure	Check power supply at circuit breaker
	Wiring to motor	Check voltage at motor terminals
	Motor / fan assembly jammed	Isolate unit and check free rotation of motor/fan assembly, if faulty - replace
	Motor internal overheat protector tripped	Carry out continuity check at terminals “TK” in motor terminal box, if tripped and motor hot - check bearings, if tripped and motor cold - replace motor
	Faulty motor windings/capacitor	Motor humming would indicate fault in motor or capacitor, check windings for continuity and if OK replace capacitor
	Minimum speed set too low	Refer to Indoor unit
	Faulty pressure sensor	Check electrical connections are secure at controller and pressure sensor, replace controller and sensor (as they are matched sets)
	Faulty fan speed controller	Refer to Indoor unit
Condenser fan runs too fast	High ambient condition or excessive re-circulation of air around condenser coil	Check installation against design
	Minimum set speed setting incorrect	Adjust as necessary
	Incorrect pressure sensor setting	Adjust sensor screw as necessary
	Faulty fan speed controller	Refer to Indoor unit
	Faulty pressure sensor	Refer to Indoor unit
Condenser fans runs only slowly	Incorrect pressure setting	Adjust sensor screw as necessary
	Faulty fan speed controller	Refer to Indoor unit
	Faulty pressure sensor	Refer to Indoor unit
	Motor/capacitor faulty	Replace

Maintenance

⚠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.

⚠IMPORTANT	Ensure relevant F-Gas Regulation checks are carried out at the appropriate period.

GENERAL MAINTENANCE

The maintenance schedule indicates the time period between maintenance operations.

3 MONTHS

At every service visit the following checks should be carried out:

Fan & Motor Assembly

1 Examine the fan and motor assemblies for lateral and end play in the bearings.
2 Ensure that no water is entering the motor via the electrical gland plate.
3 Check fan blades for damage and corrosion.

Refrigeration Circuits

1 Visually examine pipework and components for damage, wear and tear and oil patches, the latter being indicative of a system leak.
2 Ensure the fan head pressure controller is controlling the head pressure at the required setting as indicated on the commissioning sheets provided.

The gauges can then be removed from the system. Do not forget to replace the security caps on the Schrader valves.

Condenser Coil

Clean the condenser coil with a stiff bristled hand brush. If dirt has accumulated over a long period or the coil is greasy or sticky, then it may be necessary to use a water hose or chemical pressure hose. Take care not to damage the fins and comb out if they have become damaged in any way. For epoxy coated coils use a suitable cleaning fluid and soft bristle brush.

⚠CAUTION	Do not use steam for cleaning condenser coils otherwise damage or danger may result from excessive internal pressures.

Electrical

1 Check all electrical connections for signs of overheating or arcing.
2 Check all cables for signs of chafing or physical damage.

Cabinet

1 Clean the cabinets using a mild detergent.
2 Treat any paint damage or rust as necessary.

12 MONTHS

As per 3 months plus the following:

1 Check all electrical connections for security.
2 Check all refrigeration connections with a leak detector.

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 & 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 acceptable 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 warranted 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 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 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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