LogiCool™ OnRak IT Cooling

Technical, Installation, Operational and Maintenance Manual
About Airedale Products & Customer Services

Warranty, Commissioning & Maintenance
As standard, Airedale guarantees all non consumable parts only for a period of 18 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.

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: enquiries@airedale.com or telephone:

UK Sales Enquiries + 44 (0) 113 238 7789 enquiries@airedale.com
International Enquiries + 44 (0) 113 239 1000 enquiries@airedale.com
Spares Hot Line + 44 (0) 113 238 7878 spares@airedale.com
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Training Enquiries + 44 (0) 113 239 1000 marketing@airedale.com

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

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Warranty

Warranty

All AIAC products or parts (non consumable) supplied for installation within the UK mainland and commissioned by an AIAC 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 AIAC for installation within the UK or for Export that are properly commissioned in accordance with AIAC standards and specification, not commissioned by an AIAC 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 AIAC standards or specification invalidate all warranty.

Warranty is only valid in the event that:

- is properly protected & serviced as per the AIAC 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.
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.

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

Installation, service and maintenance of Airedale equipment should only be carried out by technically trained competent personnel.

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.

Personal Protective Equipment

Airedale recommends that Personal Protective Equipment is used whilst installing, maintaining and commissioning equipment.

Electrical Bonding

It is important that the components attached to the server rack are electrically bonded to earth correctly.

It is recommended that a mechanical earth strap is used at the following locations:

- Doors
- Mating Flange
- LogiCool OnRak
- LogiCool OnRak Chilled Water Coil
- Dual Power Supplies
CONTENTS

About Airedale Products & Customer Services ................................................................. 2
Warranty .......................................................................................................................... 3
Health and Safety ........................................................................................................... 4
Personal Protective Equipment ...................................................................................... 4
Electrical Bonding .......................................................................................................... 4
Specifier’s Guide Indoor Unit ............................................................................................ 6
Nomenclature .................................................................................................................. 6
Introduction .................................................................................................................... 6
Standard Features .......................................................................................................... 7
Optional Features .......................................................................................................... 9
Technical Data ................................................................................................................ 11
Design Parameters....................................................................................................... 12
Cooling Performance LOR 6042U-C028-0 (N+1 configuration, Fans at 75%) .. 13
Cooling Performance LOR 6042U-C033-0 (N Configuration, Fans at 100%) .. 14
Cooling Performance LOR 8042U-C032-0 (N+1 configuration, Fans at 75%) .. 15
Cooling Performance LOR 8042U-C038-0 (N Configuration, Fans at 100%) .. 16
Ethylene Glycol Correction Factors ........................................................................... 17
Mechanical Data ............................................................................................................ 18
Electrical Data ............................................................................................................... 18
Waterside Pressure Drop .............................................................................................. 18
Dimensional Data .......................................................................................................... 19
Component Masses ...................................................................................................... 19
Sound Measurement Method ....................................................................................... 20
Noise Data ..................................................................................................................... 20
Pipework Schematics ..................................................................................................... 21
Installation ..................................................................................................................... 23
Installer Responsibilities ............................................................................................... 23
Positioning ....................................................................................................................... 23
Fitting Hinges ................................................................................................................ 24
Data Rack Feet ............................................................................................................... 24
Rack Support Wheel ...................................................................................................... 25
Wheel Adjustment ......................................................................................................... 25
Door Latch Mechanism .................................................................................................. 26
Floor Cut Outs ............................................................................................................... 26
Water Connections ........................................................................................................ 28
Flexible Water Connection ......................................................................................... 29
Pipework Sweep ............................................................................................................ 29
Compression Fittings .................................................................................................... 30
Chilled Water Valve (3 Way) ....................................................................................... 31
Chilled Water Valve (2 Way) ....................................................................................... 32
Solenoid Valve ............................................................................................................... 33
Customer Terminal Box ............................................................................................... 34
Dual Power Supply ....................................................................................................... 34
Rack Mounted Temperature/Humidity Sensor ............................................................ 37
Rack Pressure Management ......................................................................................... 38
Rack Sealing .................................................................................................................. 39
Interconnecting Wiring ................................................................................................. 40
Controls ......................................................................................................................... 42
Addressing the Display Keypad ..................................................................................... 42
Extra Functions Buttons ............................................................................................... 44
Navigation ...................................................................................................................... 44
Enabling the Unit ........................................................................................................... 45
Dew Point Control ........................................................................................................ 46
Modulated Cooling ....................................................................................................... 46
Temperature Sensor Locations ..................................................................................... 47
Modes of Operation ..................................................................................................... 48
Temperature Neutral Mode ......................................................................................... 48
Load Neutral Mode ....................................................................................................... 48
Rack Pressure Management ....................................................................................... 50
Commissioning Procedure ......................................................................................... 51
General ......................................................................................................................... 51
Maintenance .................................................................................................................. 53
Operational Maintenance checks ............................................................................... 54
Owners Responsibility ................................................................................................. 54
Maintenance Schedule ............................................................................................... 54
Troubleshooting .......................................................................................................... 55
Specifier’s Guide Indoor Unit

Nomenclature

Example: LOR 60 42U - C 033 - 0

- LOR: LogiCool OnRak
- 60: Case width in centimetres
- 42U: Unit height in U
- C: Chilled water cooling
- 028: Nominal cooling capacity in kW
- 033: Separator
- 0: 230V / 1Ph / 50Hz / 60Hz

Introduction

The OnRak is a compact rear door heat exchanger designed to manage discharge temperatures from a server rack into the aisle space.

In dealing with the heat load closer to the source, the OnRak is highly efficient in floor space and power usage. Elevated air temperature combined with increased water temperature allows the OnRak to take advantage of free cooling applications.

Part of the LogiCool range of IT cooling solutions, the OnRak offers an expandable cooling system that can be supplied with an industry standard data rack (42 - 48U) or a mating frame to fit a customer-specific rack.

The OnRak is available in both 600mm and 800mm widths.

The slim configuration of the OnRak ensures minimal impact into the aisle.

The OnRak air volumes are based on an N (All four fans operating 100%) and N+1 (fans operating at a reduced speed to 75%). This configuration greatly increases the energy efficiency ratio (EER) of the equipment.

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 in the version 2006/42/EC
Pressure Equipment Directive (PED) 2014/68/EU

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

Maximum and Minimum Operation Temperature (TS) and Pressure (PS)
Allowable Temperature range (TS), = Min -5°C* to Max 40°C **
Maximum Allowable Pressure (PS), = High Side 10 Barg

*Based on the waterside temperature in the unit off state.
**Based on the waterside temperature in the unit off state.
Standard Features

The OnRak unit comes with a series of standard features.

<table>
<thead>
<tr>
<th>Standard Features</th>
<th>LOR 6042U-C0-32.0</th>
<th>LOR 6042U-C0-33.0</th>
<th>LOR 8042U-C0-32.0</th>
<th>LOR 8042U-C0-38.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC axial fans</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
</tr>
<tr>
<td>EC fan node</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
</tr>
<tr>
<td>0-10V 2 or 3 way chilled water valve</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
</tr>
<tr>
<td>Advanced Airetronix controls</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
</tr>
<tr>
<td>Water temperature sensor</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
</tr>
<tr>
<td>Tri coloured LED (Alarm status) for easy fault detection</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
</tr>
<tr>
<td>Rack mounted temperature / humidity sensor</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
</tr>
<tr>
<td>Leak detection</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
</tr>
<tr>
<td>Bleed and drain valves</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
</tr>
</tbody>
</table>

*Features available

**Construction**

The cabinet shall be manufactured with galvanised sheet steel to provide a smooth aesthetically pleasing finish. The galvanised sheet steel panels shall be coated with an epoxy baked powder paint to provide a durable finish.

Standard unit colour shall be Black Grey to RAL 7021.

**Fan & Motor Assembly**

300mm diameter axial fans with EC motors mounted in bell mouth housing shall be provided to ensure optimum efficiency.

The fan section shall be designed as a hot swap assembly which can be changed quickly minimising downtime during replacement or maintenance.

**Compact Cooling Coil**

3/8” plain tube cooling coil with 1.8mm fin pitch and hydrophilic fins

**0-10 Volts DC Chilled Water 3 Way Valve**

A 0-10 VDC chilled water 3 way regulating valve shall be provided. This shall be used to govern the chilled water going to the coil when there is a demand for cooling. (supplied loose)

**or**

**0-10 Volts DC Chilled Water 2 Way Valve**

A 0-10 VDC chilled water 2 way regulating valve shall be provided. This shall be used to govern the chilled water going to the coil when there is a demand for cooling. (supplied loose)

**Bleed and Drain Valves**

Valves shall be factory fitted to easily bleed the system of any air and drain water for maintenance.

**Airetronix Controls**

Advanced Airetronix controls strategy with integrated system control, free cooling mode, dew point management, and fan and alarm management shall be provided.

**Water Temperature Sensor**

A water temperature sensor shall be fitted to the water inlet pipework.

**Tri colour LED for Easy Fault Detection**

LED indication for alarm status shall be incorporated in the front face of the OnRak unit (signals Healthy, Non Critical and Critical Alarm respectively) Green, Yellow and Red.
<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rack Mounted Temperature/ Humidity Sensor</td>
<td>Rack mounted temperature and Humidity sensor shall be supplied as standard. This shall be supplied loose for onsite fitment in a customer rack.</td>
</tr>
<tr>
<td>Leak Detection</td>
<td>Leak detection for the water system, able to report alarm status to the BMS system shall be provided. The unit shall then be shut down before any damage occurs. The leak detection tape shall be fitted within the drip tray of the coil.</td>
</tr>
<tr>
<td>Bypass Regulating Valve</td>
<td>A bypass regulating valve shall be fitted in the bypass leg of the system to enable constant flow when there is no cooling demand. This simulates the coil pressure drop ensuring that the water flow rate does not change irrespective of amount of flow through the chilled water coil. This enables flow through each cooling module without the need for a Cooling Distribution unit (CDU).</td>
</tr>
<tr>
<td>EC Fan Nodes</td>
<td>The fan nodes enable independent control. The fan can be interrogated by the controller giving information such as temperature, fan speed, currents and power consumption. If during a controller failure the fans resume operation at the last setpoint. This ensures downtime is reduced.</td>
</tr>
</tbody>
</table>
Optional Features

The OnRak unit comes with a series of optional features.

<table>
<thead>
<tr>
<th>Optional Features</th>
<th>LOR 9042U-C02-0</th>
<th>LOR 9042U-C03-0</th>
<th>LOR 9042U-C02-0</th>
<th>LOR 9042U-C03-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Various display options</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Modbus / Carel BMS connection</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Lon BMS connection</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>pCOWeb</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>BacNet protocol</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Programming smart key</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Threaded pipe connections</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Quick coupling water connections</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Flexible hoses of alternative lengths</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Isolating solenoid valves</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Dual power supply</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Uninterrupted Power Supply</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Static Transfer Switch</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Room mounted temperature / humidity sensor</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Rack Pressure Management</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

**Features available**

1. White backlit 8 x 22 character, semi-graphical LCD Display. Integrated for local monitoring, adjustment of parameters and commissioning.
   or
2. Semi-graphical LCD Display with Audible alarm.
   or
3. Remote Handheld Display (unit fitted with RJ11 Connection port)
   or
4. No Display (RJ11 Connection port only)

**Display Options**

**Modbus / Carel BMS Connection**

The Airedale controllers shall be able to communicate directly using the Modbus® protocol.

The Modbus® card shall be a small PCB (60mm x 30mm), which can be plugged into the controller to provide it with the following protocol support:

- Modbus® - JBus slave
- RTU mode (Remote Terminal Unit) with 8 bit encoding and error handling using 16 bit CRC
- Communication standard connection options of RS485 (multipoint) or RS232 (point-point)
- Maximum Baud Rate of 19200

The data communication shall be asynchronous serial, 8 data bits, 2 stop bits and no parity (in total 11 bits/datum).

The data/parameters from the controller shall be represented within Modbus® registers, each register containing information pertaining to temperatures, pressures, setpoint, status, etc and is available to the site integration company in a spreadsheet format.
| Lon BMS Connection | The Airedale controllers, using special serial cards, shall be integrated into LonWorks® networks. The RS485 and the FTT10 standards shall be supported by the LonWorks® serial cards. The two types of LonWorks® serial cards shall differ by the type of interface on the LonWorks® network side:-  
|                   | FTT-10A 78 kbs (TP/FTT-10)  
|                   | RS485 39 kbs (TP/485-39)  
| pCOWeb            | pCOWeb is a new generation of Airedale supervisory plug-in cards which make communicating with an Airedale unit simply a matter of logging onto the office Intranet or via the web. Based on Ethernet TCP/IP secure technology, pCOWeb shall require no proprietary cabling. It shall have little or no set-up on site and can be pre-programmed with an IP address prior to dispatch from airedale.  
| BacNet Protocol   | The BACnet protocol option shall be supplied either with a pCOWeb (Ethernet) or pCONet (RS485) interface card.  
| Programming Smart Key | A smart key shall be supplied to offer software back-up of the control strategy. The key shall feature simple plug in operation and allow transfer of software programs from the key to the microprocessor and vice versa. The use of a service laptop shall not be necessary.  
| Water Pipework Connections | Various water side connections shall be available. 1” BSP (British Standard Pipe) and 1”self seal fittings, with 1” BSP connections.  
| Flexible Connections | Silicone flexible connections shall be supplied with the unit. They shall be supplied either 1.5m or 3m long. Longer lengths can be provided. Please contact Airedale.  
| Isolating Solenoid Valves | Isolating solenoid valves shall be fitted to the inlet and outlet connections. This shall control the water flow to and from the cooling module in the event of fault or power failure. The valves have a low pressure drop and are fast acting. The valves shall be Normally Closed (NC) operation and are supplied loose.  
| Rack Pressure Management | The OnRak shall be fitted with rack pressure management, which allows the differential pressure across the IT equipment to be monitored and controlled to achieve:  
|                   | • Positive air pressure at the server inlet.  
|                   | • Negative air pressure in the rear of the cabinet at the server outlet, to prevent backwash of hot air (behind OnRak coil guard).  
|                   | • Controlled differential pressure across the IT hardware so that air is not ‘forced’ through the IT equipment.  
| Room Mounted Temperature and Humidity Sensor | A room mounted temperature and humidity sensor shall be supplied loose for onsite fitment.  

## Dual Power Supply

Dual power supply for redundancy and backup in the event of mains supply failure shall be provided. The dual power supply switch ensures that the OnRak always has an incoming power supply.

For the dual power supplies to operate effectively, the incoming power supplies must have the same voltage and frequency and be within 120° Phase Angle.

### Rack Mounted

The dual power supply changes from primary to the secondary within a period of 5ms (1/4 of a cycle)

<table>
<thead>
<tr>
<th>Supply A</th>
<th>Primary Supply Selection Switch</th>
<th>Supply B</th>
</tr>
</thead>
</table>

## Under floor Dual Power Supply

Selection can be made to determine primary power supply.

The dual power supplies use C14 / C13 socket combinations for ease of use.

<table>
<thead>
<tr>
<th>Supply A</th>
<th>Supply B</th>
</tr>
</thead>
</table>

## Uninterrupted Power Supply

Uninterrupted power supply shall be supplied to enable power backup in the event of AC power loss. The UPS system ensures the OnRak can still maintain its cooling function. The UPS is available in 1U and 2U profiles.

## Static Transfer Switch

An ATS can be supplied allowing monitoring of primary power loss. With this loss detected a second power supply can be selected, and therefore resume power. Available in 2U profile.
Technical 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.

⚠️ A fused and isolated electrical supply of the appropriate rating should be installed. As standard the equipment is designed for 230V ±10%, 1 Phase, 50Hz to all relevant IEE regulations, British standards and IEC requirements.

**Design Parameters**

The OnRak is designed for operation at air on dry bulb temperatures and water approach temperatures as standard:

* Minimum water temperature is always 2°C above the dew point temperature of the air
(1) At the design chilled water temperature project a line until it intersects with the Server Discharge Temperature (SDT), read off the cooling performance, (e.g. 14°C projected up to 35°C SDT Line, reading across to 17.3 kW.) All capacities based on water.

(2) Take the capacity, project a line to intersect the server discharge temperature (SDT) again and you can then read off the air off temperature. (E.g. 17.3 kW projected up to 35°C SDT line, read across to air off temperature; 24.5°C). All capacities based on water.
(1) At the design chilled water temperature project a line until it intersects with the Server discharge temperature (SDT), read off the capacity. All capacities based on water.

(2) Take the capacity, project a line to intersect the server discharge temperature (SDT) again and you can then read off the air off temperature. All capacities based on water.
(1) At the design chilled water temperature project a line until it intersects with the Server discharge temperature (SDT), read off the capacity. All capacities based on water.

(2) Take the capacity, project a line to intersect the server discharge temperature (SDT) again and you can then read off the air off temperature. All capacities based on water.
Cooling Performance LOR 8042U-C038-0 (N Configuration, Fans at 100%)

(1) At the design chilled water temperature project a line until it intersects with the Server discharge temperature (SDT), read off the capacity. All capacities based on water.

(2) Take the capacity, project a line to intersect the server discharge temperature (SDT) again and you can then read off the air off temperature. All capacities based on water.
Ethylene Glycol Correction Factors

Calculation of Design Volumetric Flow Rate (l/s)
The maximum design volumetric flow rate can be calculated using the following equation:

\[
\dot{V} = \frac{Q}{\rho \times Cp \times \Delta T}
\]

Where:
- \( Q \) = Cooling Capacity (kW).
- \( \Delta T \) = Temperature Difference between Water/Glycol Entering/Leaving (°C).
- \( \rho \) = Density of Glycol/Water mixture at design condition. Refer to table below.
- \( Cp \) = Specific heat capacity at design condition. Refer to table below.

Calculation of Indoor Unit Pressure Drop (\( \Delta P_s \))
The maximum indoor unit pressure drop can be calculated using the following equation:

\[
\Delta P_s = \Delta P_w \times P_x
\]

Using the volumetric flow rate calculated above, the pressure drop (\( \Delta P_w \)) can be taken from the relevant pressure drop graph.

Where:
- \( \Delta P_s \) = Maximum Water/Glycol Pressure Drop for the indoor unit (kPa).
- \( \Delta P_w \) = Equivalent Water Pressure Drop for indoor unit (kPa).
- \( P_x \) = % Glycol Pressure Drop Correction Factor @ 10°C Water Temperature. Refer to table below.

The resultant pressure drop (\( \Delta P_s \)) is the maximum pressure drop based on the indoor unit running at the prescribed conditions.

This will typically occur when the water/glycol temperature is approximately 10°C.

The indoor unit pressure drop will change at other operating conditions.

### Specific Heat Capacity (Cp)

<table>
<thead>
<tr>
<th>Water/Glycol Temperature °C</th>
<th>Ethylene Glycol (Volume) / Freezing Point °C</th>
<th>0% / 0°C</th>
<th>10% / -4°C</th>
<th>20% / -9°C</th>
<th>30% / -15°C</th>
<th>40% / -23°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Cp</td>
<td>4.193</td>
<td>4.064</td>
<td>3.918</td>
<td>3.773</td>
<td>3.606</td>
</tr>
</tbody>
</table>

### Density (\( \rho \))

<table>
<thead>
<tr>
<th>Water/Glycol Temperature °C</th>
<th>Ethylene Glycol (Volume) / Freezing Point °C</th>
<th>0% / 0°C</th>
<th>10% / -4°C</th>
<th>20% / -9°C</th>
<th>30% / -15°C</th>
<th>40% / -23°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>( \rho )</td>
<td>( \rho )</td>
<td>( \rho )</td>
<td>( \rho )</td>
<td>( \rho )</td>
<td>( \rho )</td>
</tr>
</tbody>
</table>

### Pressure Drop Correction Factor (\( P_x \))

<table>
<thead>
<tr>
<th>Water/Glycol Temperature °C</th>
<th>Ethylene Glycol (Volume)</th>
<th>0%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>( P_x )</td>
<td>( P_x )</td>
<td>( P_x )</td>
<td>( P_x )</td>
<td>( P_x )</td>
<td>( P_x )</td>
</tr>
</tbody>
</table>

\( P_x \) = 0.983, 1.0125, 1.027, 1.045, 1.067

(1) All data based upon ASHRAE fundamentals 2001.
Mechanical Data

<table>
<thead>
<tr>
<th>Dimensions - H x W x D</th>
<th>mm</th>
<th>LOR6042U-C028-0</th>
<th>LOR6042U-C033-0</th>
<th>LOR8042U-C032-0</th>
<th>LOR8042U-C038-0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2030 x 600 x 203</td>
<td>2030 x 600 x 203</td>
<td>2032 x 800 x 213</td>
<td>2032 x 800 x 213</td>
<td></td>
</tr>
<tr>
<td>Weight - Machine – Operating</td>
<td>kg</td>
<td>65</td>
<td>75</td>
<td>96</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>Sheet steel, epoxy baked powder paint</td>
<td>RAL 7021 (Black Grey)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material/ Colour</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal Air flow</td>
<td>m³/s</td>
<td>1.4</td>
<td>1.8</td>
<td>1.4</td>
<td>1.8</td>
</tr>
<tr>
<td>Fan redundancy</td>
<td>N+1</td>
<td>N</td>
<td>N+1</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Fan gains</td>
<td>kW</td>
<td>28.1</td>
<td>33.4</td>
<td>32.0</td>
<td>38.5</td>
</tr>
<tr>
<td>EER</td>
<td>W</td>
<td>200</td>
<td>320</td>
<td>200</td>
<td>320</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross Total cooling Capacity</td>
<td>kW</td>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>200</td>
<td>320</td>
<td>200</td>
<td>320</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| (1) Based upon a server discharge temperature of 45°C. Water on 13°C. Water off 19°C. 100% water
All performance data is supplied in accordance with BS EN 14511-1:2013|

Electrical Data

<table>
<thead>
<tr>
<th>Nominal Run Amps</th>
<th>LOR6042U-C028-0</th>
<th>LOR6042U-C033-0</th>
<th>LOR8042U-C032-0</th>
<th>LOR8042U-C038-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>1.35</td>
<td>1.52</td>
<td>1.35</td>
<td>1.52</td>
</tr>
<tr>
<td>Maximum Run Amps</td>
<td>(1)</td>
<td>1.62</td>
<td>1.62</td>
<td>1.62</td>
</tr>
<tr>
<td>Recommended Mains Fuse Size</td>
<td>A</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Mains Supply</td>
<td>V</td>
<td>230</td>
<td>230</td>
<td>230</td>
</tr>
<tr>
<td>Control Circuit</td>
<td>VAC</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Motor Type</td>
<td></td>
<td>EC Axial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantity x Motor Size</td>
<td>W</td>
<td>4 x 80</td>
<td>4 x 80</td>
<td>4 x 80</td>
</tr>
<tr>
<td>Power input</td>
<td>W</td>
<td>200</td>
<td>320</td>
<td>200</td>
</tr>
<tr>
<td>(1) Measured on a basic unit including 3 way valves.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Earth Leakage current from the OnRak may exceed 3mA

Waterside Pressure Drop

![Graph: Water flow rate vs. Pressure drop]

Coil, Hose and Valve Pressure Drop Only
Dimensional Data

<table>
<thead>
<tr>
<th>Component Masses</th>
<th>LOR 600</th>
<th>LOR 800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door</td>
<td>65 kg</td>
<td></td>
</tr>
<tr>
<td>Mating frame</td>
<td>28 kg</td>
<td></td>
</tr>
<tr>
<td>Fans</td>
<td>5 kg</td>
<td>5 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOR 600</td>
<td>mm</td>
<td>600</td>
<td>210</td>
<td>2030</td>
<td>90</td>
</tr>
<tr>
<td>LOR 800</td>
<td>mm</td>
<td>800</td>
<td>213</td>
<td>2032</td>
<td>103</td>
</tr>
</tbody>
</table>
Sound Measurement Method

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: 2009.

All sound power levels quoted are calculated from measured sound intensity according to BS EN ISO9614 Part 1: 2009.

Semi Hemispherical

Sound pressure levels are calculated from sound power using the semi-hemispherical method where the noise source is in junction with 1 boundary i.e. the floor.

Free Field

For comparison, the semi hemispherical figures can typically be reduced by 3dB to provide free field conditions.

Specialist acoustic advice is recommended for noise critical applications.

Noise Data

LOR 6042U-C028-0

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Overall</th>
<th>63</th>
<th>125</th>
<th>250</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
<th>4000</th>
<th>8000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound Pressure @ 1m dB(A)</td>
<td>62</td>
<td>35</td>
<td>43</td>
<td>48</td>
<td>58</td>
<td>57</td>
<td>55</td>
<td>51</td>
<td>39</td>
</tr>
</tbody>
</table>

LOR 6042U-C033-0

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Overall</th>
<th>63</th>
<th>125</th>
<th>250</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
<th>4000</th>
<th>8000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound Pressure @ 1m dB(A)</td>
<td>67</td>
<td>42</td>
<td>46</td>
<td>53</td>
<td>61</td>
<td>62</td>
<td>60</td>
<td>56</td>
<td>47</td>
</tr>
</tbody>
</table>

LOR 8042U-C032-0

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Overall</th>
<th>63</th>
<th>125</th>
<th>250</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
<th>4000</th>
<th>8000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound Pressure @ 1m dB(A)</td>
<td>62</td>
<td>35</td>
<td>43</td>
<td>48</td>
<td>58</td>
<td>57</td>
<td>55</td>
<td>51</td>
<td>39</td>
</tr>
</tbody>
</table>

LOR 8042U-C038-0

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Overall</th>
<th>63</th>
<th>125</th>
<th>250</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
<th>4000</th>
<th>8000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound Pressure @ 1m dB(A)</td>
<td>67</td>
<td>42</td>
<td>46</td>
<td>53</td>
<td>61</td>
<td>62</td>
<td>60</td>
<td>56</td>
<td>47</td>
</tr>
</tbody>
</table>
Pipework Schematics

Scheme 1
- 3 way chilled water valve
- Bypass balancing valve
- Normally closed solenoid valves
- Threaded pipe connections

Scheme 2
- 3 way chilled water valve
- Bypass balancing valve
- Normally closed solenoid valves
- Quick connector

- 0-10V regulating valve
- Temperature sensor
- Bleed valve
- Drain valve
- Threaded connections
- Quick connector
Pipework Schematics

Scheme 3
- 2 way chilled water valve
- Normally closed solenoid valves
- Threaded connections

Scheme 4
- 2 way chilled water valve
- Normally closed solenoid valves
- Quick connector
Installation

**IMPORTANT**

If the unit is dropped, it should immediately be checked for damage and reported to Airedale.

**Installer Responsibilities**

It is the responsibility of the installer to complete the following processes prior to commissioning of the unit.

**Positioning**

The mating frame is attached to the customer's rack. An air tight seal must be placed between the mating frame and the data enclosure.

The OnRak is then lifted onto the hinges and as it's closed will produce an air tight seal.

**CAUTION**

Airedale will accept no responsibility for mishandling during the positioning of the equipment. The data rack must be mounted level.

**IMPORTANT**

Ensure that the OnRak, the mating frame and data rack are earth bonded together.
Fitting Hinges

The OnRak needs to be lifted vertically to ensure that the assembly fits onto the hinges.
Care must be taken whilst locating the lift-off hinges together prior to lowering into place.

Data Rack Feet

The data rack feet must be used prior to the unit being mounted to the rack. This takes the weight off the castors.
The Data rack feet must be secured to the floor to avoid unnecessary movement during operation.
**Rack Support Wheel**

A support wheel is provided for fitment under the Onrak door. This is to be at the same level as the door rack feet. The wheel is to be fitted ensuring that it has free movement.

**Wheel Adjustment**

The castor can be adjusted by the following procedure:

- Slacken locking nut
- Rotate castor to desired height Min 70mm, Max 87mm
- Tighten Locking Nut
Door Latch Mechanism

CAUTION

Ensure that the door latch mechanism does not snag on the sheet metal. Distortion of the door can occur if the latch is forced.
Floor Cut Outs

The floor tile shall be cut-out to allow pipework, cables etc. to pass from the unit to under floor. The cut-out must be fitted with a brush seal grommet (supplied by other) to ensure an airtight seal between above and below floor levels. The cut out size allows for the electrical termination box to pass through both the mating frame and tile prior to the flexible hose being fitted.

Floor Tile Cut Out Dimension (Minimum)

Mating Frame Cut Out

IMPORTANT

Ensure that the mating frame and floor is sealed for correct unit operation.
**Water Connections**

Two flexible, silicone hoses connect the coil to the chilled water supply. The flexibility of the hoses allows the OnRak door to be easily opened for accessing hardware within the server cabinet, without the need to disconnect services or disrupt cooling.

The silicon hose is attached directly to both the coil inlet and outlet (male BSP). Termination at the other end of the hose is either a male tapered BSP thread or female BSP thread.
Flexible Water Connection

Pipework Sweep

The stainless steel braided must be installed so that the hose has unobtrusive movement in either fully opened or closed positions.

Recommended Dimensions

\[
\begin{align*}
X &= \text{Floor Void Depth} \\
Y &= 500\text{mm} \\
Z &= 110\text{mm}
\end{align*}
\]

Minimum recommended hose length \( X + 1\text{m} \)
(Hoses available as standard in 1.5m and 3m lengths)
Compression Fittings
The recommended method of using compression fitting is as follows:-

1. Apply small amount of oil to top of olive.

2. Nip nut slightly to secure olive onto pipe.

3. Undo and remove pipe from fitting.
   Apply small amount of pipe sealant to leading edge of olive that will be inserted into fitting.

4. Insert into fitting (remove any excess sealant with a cloth).

5. Mark two alignment marks on fitting.
   If it leaks you can tighten a further 90 degree only.
   If it a leak still occurs replace olive.

6. Tighten with spanner, maximum 270 degree.

**IMPORTANT**

The above method is for advice only.

**CAUTION**

Over tightening can cause the compression fittings to fail.

If you are applying heat around any compression fitting it is recommended that the pipe is kept cool with a wet rag. This ensures that the pipe does not become soft. If the pipe gets soft the olive cannot compress onto the pipe.

Airedale will not be held responsible for any water leaks by compression fitting misuse.
Chilled Water Valve (3 Way)

The chilled water valve has an indication of flow on the stem. The actuator is securely attached to the top of the valve so that when there is a demand for cooling the valve opens allowing water to flow through the coil. No demand, the water goes through the bypass (0 VDC no demand, 10 VDC 100% demand).

Valve Actuator Orientation

CAUTION

The chilled water valve electrical connection must be a maximum of 3m away from the customer terminal box. This is to ensure EMC Compatibility.
Chilled Water Valve (2 Way)

The chilled water valve has an indication of flow on the stem.

The actuator is securely attached to the top of the valve so that when there is a demand for cooling the valve opens allowing water to flow through the coil. No demand, the water is shut off allowing no water to enter the coil (0 VDC no demand, 10 VDC 100% demand).

Valve connection sizes 1”BSP.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G*</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>19</td>
<td>33</td>
<td>141</td>
<td>87</td>
<td>9</td>
<td>43</td>
</tr>
</tbody>
</table>

* for 3 way valves only

CAUTION

The chilled water valve electrical connection must be a maximum of 3m away from the customer terminal box. This is to ensure EMC Compatibility.
**Solenoid Valve**

The solenoid valve can be installed in any position, vertical with coil upwards preferred.

**Mass 1kG**

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>f</th>
<th>g</th>
<th>l</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>105</td>
<td>85</td>
<td>106</td>
<td>71</td>
<td>46</td>
<td>28</td>
<td>42</td>
</tr>
</tbody>
</table>

**CAUTION**

The solenoid valve electrical connection must be a maximum of 3m away from the customer terminal box. This is to ensure EMC Compatibility.

**Coil Water Connections**

Coil connections are brazed at Airedale. Full pressure testing to 20Barg is carried out prior to unit despatch.

**Water Temperature Sensor**

The water temperature sensor is attached to the inlet water pipework with a copper strap. It is factory fitted although if you are replacing the sensor ensure that it is fixed securely.
Customer Terminal Box

The customer terminal box is attached to the coil guard during shipment. Carefully remove this and feed the box through the hole in the mating frame and floor tile cut-out. This must be done after the door is fitted to the mating frame.

Dual Power Supply

The dual power supply can be either fitted into a rack or fitted in the floor void under the server rack. The following procedures apply.

CAUTION

The dual power supplies must be electrically earth bonded. (Earth stud fitted to back of power supply)

Rack Mounted

Selection can be made to determine primary power supply by using the centre selection switch.
- Attach the earth strap to the rear of the power supply unit.
- Locate the Dual power supply between the cable support guides of the server rack.
- Secure the unit with screws supplied by your rack manufacturer.
- Attach the incoming fused power supplies.
- Fit power supply retaining clips.
- Attach the outgoing power supply to the customer terminal box.

**LED Indicators**

<table>
<thead>
<tr>
<th>LED</th>
<th>Status Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green A</td>
<td>Supply Live A</td>
</tr>
<tr>
<td>Green B</td>
<td>Supply Live B</td>
</tr>
<tr>
<td>Blue A</td>
<td>Primary supply selected A</td>
</tr>
<tr>
<td>Blue B</td>
<td>Primary supply selected B</td>
</tr>
</tbody>
</table>

**IMPORTANT**

Do not route the outgoing cable through the area occupied by the pipework. The recommended location is through the PDU trunking to the customer terminals.
The under floor Dual Power supply is located under the floor void. The supply is to be mounted securely. Provision is made for fixing to the floor or associated supports.

- Attach relevant earth bonding to the power supply.
- Attach the incoming fused power supplies. (The Primary supply for this supply is always “A”.)

- Fit power supply retaining clips.
- Attach the outgoing power supply to the customer terminal box.

The dual power supplies use C14 / C13 socket combinations for ease of use.

CAUTION
The OnRak must have relevant over current protection (MCB’s) upstream of the unit.
Uninterrupted Power Supply

The UPS shall fit within the server cabinet and shall be the same dimension as 1U/2U rack. Various capacities are available. Installation of the UPS is rack mounted. Full information of the installation is supplied with the UPS.

The UPS can be personalised to the application (response times etc) through a computer. This connection can be either RS232 or USB.

Rack Mounted Temperature/Humidity Sensor

The temperature/humidity sensor is to be fitted on the front door of the rack so that the room condition can be correctly recognised by the OnRak. This then relates within the strategy of the microprocessor for dew point control. It should be positioned at the highest temperature point entering the rack.

Temperature sensor mounted at the cold air inlet of a server rack.

The sensor is fitted with the supplied bracket.
The rack pressure management comes in two parts for onsite fitment.

**Part one (Factory Fitted)**
A static pressure ring (Negative pressure) is fitted behind the coil guard. An airflow tube comes out from the controller and is then routed around the drip tray.

**Part two (Site Fitted)**
A pressure tapping is then fixed to the inlet of the servers (+VE Positive Pressure) by the bracket supplied loose.

The tubing leaves the OnRak door and must make its way diagonally towards the hinged side of the front of the rack (so that both doors can be opened without obstruction.)

Blue – ve (Negative pressure)
Red + ve (Positive pressure)

Care must be taken when routing the tubing around the server cabinet (Any kinks in the tubing will give faulty readings).

The server cabinet differential pressure is then controlled by the OnRak ensuring air is not forced over the IT equipment.
Rack Sealing

The rack must be sealed so that air does not bypass the servers. The racks must not have any ventilation holes such as a perforated roof. Any space within the server racks that are redundant must be sealed with blanking panel (usually supplied in 1U and 2U).

The heat leaving the servers must be sensed by the OnRak to ensure correct operation.

![Image of cabinet with and without sealing](image)

**Figure 1 Wrong Cabinet not sealed**

**Figure 2 Right Cabinet sealed**

**CAUTION**

Any air bypass will reduce the efficiency of the unit and may cause overheating of the server racks due to the OnRak not detecting the cooling demand.
### Interconnecting Wiring

<table>
<thead>
<tr>
<th>OnRak</th>
<th>L1</th>
<th>N1</th>
<th>PE</th>
<th>Mains incoming supply 230V/1PH/50Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>509</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>Flow solenoid valve</td>
</tr>
<tr>
<td>509</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>Return solenoid valve</td>
</tr>
<tr>
<td>500</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>Common</td>
</tr>
<tr>
<td>502</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>24VAC</td>
</tr>
<tr>
<td>560</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>Critical Alarm Volt Free Common Alarm</td>
</tr>
<tr>
<td>561</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>Critical Alarm Volt Free Alarm N/O</td>
</tr>
<tr>
<td>562</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>Non Critical Alarm Volt Free Alarm N/C</td>
</tr>
<tr>
<td>564</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>Non Critical Alarm Volt Free Alarm N/O</td>
</tr>
<tr>
<td>563</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>Non Critical Alarm Volt Free Alarm N/O</td>
</tr>
</tbody>
</table>

**Critical Alarm Volt Free Common Alarm**

**Non Critical Alarm Volt Free Alarm N/O**

**Network Connections (Inward connection)**

- RX+/Tx+ use Awg20/22 twisted pair (with overall shield) cable, Belden ref. 8762 (Airedale ref: 6110316), or equivalent, for dLAN network

**Network Connections (Outward connection)**

- RX+/Tx+ use Awg20/22 twisted pair (with overall shield) cable, Belden ref. 8762 (Airedale ref: 6110316), or equivalent, for dLAN network

**Screened cable terminated at controller.**

**Air on temperature**

**Air on humidity**

**24VAC**

**Common**

**Volt Free Alarm N/O**

**Volt Free Alarm N/C**

**Volt Free Common Alarm**

**Volt Free Alarm N/O**

**dLAN Network Connections (Inward connection)**

**dLAN Network Connections (Outward connection)**
Automatic Fan Disconnect

This type of connector removes the requirement for manual disconnection of the fan wiring, as removing the fan automatically and fully disconnects power from the fan.

Plug (Fan side)

Socket (Unit side)
Controls

Addressing the Display Keypad

The address of the display keypad can be configured only after having connected the power supply, using the RJ11 connection cable.

To access configuration mode, press the + + buttons together and hold them for at least 5 seconds; the screen shown below will be displayed, with the cursor flashing in the top left corner:

![Display address setting][nn]

To change the address of the display keypad (display address setting), press the button once: the cursor will move to the address field (nn).

Use the or buttons to select the desired value, and confirm by pressing again. If the value selected is not the same as the one saved previously, the screen shown below will be displayed, and the new value will be saved to the permanent memory. If the field nn is set to 0, the terminal will communicate with the pCO board using “point-to-point” protocol (not pLAN) and the field “I/O Board address: xx” will not be displayed, as it has no meaning.

![Display address changed]
### IT Cooling LogiCool™ OnRak

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ALARM</td>
<td>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.</td>
</tr>
<tr>
<td>2. PRG</td>
<td>Pressing the PRG button will select the main navigation menu.</td>
</tr>
<tr>
<td>3. ESC</td>
<td>Pressing the ESC button will return the user to the main display screen showing unit status.</td>
</tr>
<tr>
<td>4. UP</td>
<td>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 set point adjustment.</td>
</tr>
<tr>
<td>5. ENTER</td>
<td>Pressing the ENTER button will confirm any set point adjustments and move the cursor to the next available set point.</td>
</tr>
<tr>
<td>6. DOWN</td>
<td>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 set point adjustment.</td>
</tr>
</tbody>
</table>
Extra Functions Buttons

<table>
<thead>
<tr>
<th>Button Combination</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>UP + DOWN + ENTER</td>
<td>Allow users to change display address.</td>
</tr>
<tr>
<td>ALARM + ENTER</td>
<td>Allows access to controller system information.</td>
</tr>
<tr>
<td>ALARM + UP</td>
<td>Allows access to change controller address (only when display address is zero).</td>
</tr>
<tr>
<td>ESC + ENTER</td>
<td>Allows the user to switch between the preinstalled languages.</td>
</tr>
<tr>
<td>PRG + ENTER</td>
<td>Temporary displays the address of the controller.</td>
</tr>
<tr>
<td>ENTER + UP</td>
<td>Change unit on remote display keypad.</td>
</tr>
</tbody>
</table>

Navigation

Initially, use the button to access the main navigation menu, the cursor will appear in the top right hand corner with the first menu UNIT ON/OFF selected.

Use the and buttons to move to the desired menu. The selected menu will be shown in BLOCK CAPITALS.

Press to enter the selected menu.

Navigation Sub Menus

There are eight sub menus available from the main navigation menu, these are listed below:

<table>
<thead>
<tr>
<th>Menu</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Unit On/Off</td>
<td>Allows the user to switch on or switch off the unit.</td>
</tr>
<tr>
<td>2. Maintenance</td>
<td>Allows the user to view maintenance related parameters, such as hours run, sensor calibration and manual overrides.</td>
</tr>
<tr>
<td>3. Alarm Log</td>
<td>Allows the user to view the alarm log.</td>
</tr>
<tr>
<td>4. Input/Output</td>
<td>Allows the user to view the status of the controller inputs and outputs.</td>
</tr>
<tr>
<td>5. Clock</td>
<td>Allows the user to view the current time, date and day of the week. On/Off and temperature time zones can also be set.</td>
</tr>
<tr>
<td>6. Set point</td>
<td>Allows the user to adjust the return air temperature set point.</td>
</tr>
<tr>
<td>7. User</td>
<td>Allows the user to adjust user related parameters, such as high and low alarm limits and temperature bands.</td>
</tr>
<tr>
<td>8. Manufacturer</td>
<td>Allows the user to enter the manufacturer menu and adjust various manufacturer related parameters, such as unit configuration and timing settings.</td>
</tr>
</tbody>
</table>
Enabling the Unit

To turn the unit on press the key to enter the program menu. Using the and keys select the Unit On/Off option and press:

When is pressed the above screen will be shown. To turn the unit on simply press the key again and the screen will change:

Once the screen has changed to the above, press the key which will return back to the main screen.
LogiCool™ OnRak

IT Cooling

Dew Point Control

The pCO controller within the OnRak unit can calculate the dew point within a room by monitoring the temperature and humidity of that room and then performing a calculation to provide a dew point value. The pCO controller uses a signal received from the temperature/humidity sensor which is wired into the controller.

The calculated value of dew point is then used to ensure that the supply water temperature to the OnRak is never less than two degrees below the dew point.

This ensures that no condensate or moisture build up can occur from the supply water being below the room’s dew point.

To view the dew point information simply scroll down from the main page until the following screen is displayed:

Modulated Cooling

The OnRak can modulate its cooling performance to suit the heat being produced by the servers within the cabinet. It does this by modulating both the fan speed and the three way modulating valve to maintain the appropriate level of cooling.

The fans are designed to control the server discharge temperature to a user defined set point, defaulted to 40°C, whilst the three-way modulating valve is designed to match the air temperature off the fans with the air on temperature if the unit is configured to be temperature neutral, or to maintain the room temperature if the unit is configured to work as load neutral.
Temperature Sensor Locations

- **Water Temp. Sensor**: Ensures the water inlet temperature is above the dew point.
- **3-way regulating valve**: Controls air off temperature.
- **Server Air Off / Coil On Sensors**: No. 1, No. 2, No. 3, No. 4. Monitor temperature and heat generated from the server and regulate fans to maintain a constant temperature.
- **Room Temp. & Humidity Sensor**: Used to calculate the dew point of the air in the room.
Modes of Operation
Temperature Neutral Mode

When operating in temperature neutral mode, the unit ensures the “Air Off” temperature is matched to the valve temperature setpoint irrespective of the surrounding room temperature. This mode of temperature control only considers the individual server unit load and not the impact of other equipment in the room on the surrounding environment.
Load Neutral Mode

When operating in load neutral mode, the unit ensures the "Air On"/room temperature is modulated to maintain the valve temperature setpoint. In this condition the air temperature leaving the OnRak is less than the air temperature entering the server cabinet.

This mode of temperature control considers the impact of case heat radiation as well as the effect of other equipment on the surrounding environment. Using the OnRak in load neutral mode reduces the cooling capacity as the OnRak tries to maintain a room setpoint and operates in a similar manner to a CRAC unit.
Rack Pressure Management

The fans will operate to maintain the “air off” temperature as long as the pressure remains within the normal operating range. However, if the pressure within the server space changes beyond the high or low differential set-points, the fans prioritise pressure control to bring the server pressure back within limits, at which point normal temperature control resumes.

The diagram shows the normal operating area between the dotted lines (B) of the low and high set-point differentials. The red zones (A and C) indicate areas where the fans prioritise pressure control to bring it back within limits.
## Commissioning Procedure

### General
To be read in conjunction with the commissioning sheets provided.

### CAUTION
Please ensure all documents have been completed correctly and returned to Airedale technical support to validate warranty.

### CAUTION
All work MUST be carried out by Technically Trained and competent personnel.
The equipment contains live electrical and moving parts, Isolate prior to maintenance or repair work.

### General
Visually inspect the unit for any mechanical damage that could have occurred during installation.

<table>
<thead>
<tr>
<th>Applying Mains Voltage</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Applying Mains Voltage</strong></td>
<td><strong>Apply mains electrical supply to the unit.</strong></td>
</tr>
<tr>
<td></td>
<td>Check the mains incoming voltage (230 Volts) carry this procedure out with all MCBs turned off.</td>
</tr>
<tr>
<td></td>
<td>Turn on the MCB that supplies the transformer. Measure both the primary and secondary tapping. (230 Volts and 24 Volts respectively)</td>
</tr>
<tr>
<td></td>
<td>Turn on the remaining MCB.</td>
</tr>
</tbody>
</table>

### Turning Unit On
Use the display to turn the unit on.

Using the display to enter maintenance mode. Within the parameters sub menu increase/ decrease the fan output voltage. Check the current and fan speed with the unit running at full output. Record on commissioning sheet.

### 3 Way Chilled Water Valve
Check that the chilled water valve operates correctly and delivers water to the coil when the microprocessor is calling for cooling.
Check that the valve goes into bypass with no demand or when in alarm.

### 2 Way Chilled Water Valve
Check that the chilled water valve operates correctly and delivers water to the coil when the microprocessor is calling for cooling.
Check that the valve shuts off water with no demand or when in alarm.

### Solenoid Valve
Ensure that the solenoids de-energise on alarm (making them close).

### Resetting Alarms
Reset any alarms to ensure correct alarm monitoring.

### Door Open Alarm
Ensure that the door open alarm is activated when the door is opened, following delay.

### Leak Detection Alarm
Check that the leak detection alarm operates. Apply a small controlled leak to verify that the alarm operates.

### Dual power Supply
Check that the two power supplies are live. Ensure that the Dual power supply LED illuminate with correct power source.

### Uninterrupted Power Supply
The UPS requires charging for a period of 8 hours before the internal battery can supply the rated backup time. The UPS charges the battery as soon as it is connected to the AC power supply.

Following its initial charge the UPS can be changed over to operate on battery power. During battery operation an audible alarm beep will sound every 10 seconds. Low battery warning the alarms beeps every 3 seconds. Automatic shutdown is imminent.

Upon return of AC input power the UPS will restart automatically (unless the restart function has been disabled via UPS personalisation).

### Static Transfer Switch
The static transfer switch is to be commissioned as per the manufacturer’s instructions.
## Commissioning Procedure

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fan Removal Alarm</strong></td>
<td>Check alarm state when a fan goes offline.</td>
</tr>
<tr>
<td><strong>Differential Pressure</strong></td>
<td>The differential pressure switch should cause the OnRak fans to increase/decrease when the server fans are active. One of the fans can be removed to allow the differential pressure to be recognised if the server load is low. If the server discharge temperature is high the differential pressure feature becomes second priority, ensuring that the cooling demand is satisfied.</td>
</tr>
<tr>
<td><strong>Dew Point Control</strong></td>
<td>The dew point control feature will isolate the chilled water supply to the unit if the water temperature falls lower than the dew point temperature of the air. The OnRak water temperatures can be offset to produce this alarm through the maintenance parameter of the controller.</td>
</tr>
<tr>
<td><strong>Rack Support Wheel</strong></td>
<td>Ensure that the rack support wheel turns freely and supports the OnRak door when full of water.</td>
</tr>
</tbody>
</table>
Maintenance

Changing EC Fans

The fans are designed as plug and play “hot swap” enabling the fans to be changed without the need to disconnect the power from the entire unit. Removing the 4 security fixings enable the fan to be removed.

The unit has automatic disconnect sockets to the fan motors. The remaining fans will increase speed to compensate for the fan being serviced (only in N+1 configuration).

CAUTION

The unit will remain live up to the fan disconnect socket.

Ensure that the fan has stopped rotating before placing hand near blades.

2 or 3 Way Chilled Water Regulating Valve

The 2 or 3 way chilled water regulating valve actuator must be inspected to ensure a secure fixing to the valve body. The actuator is located onto the valve body by four pegs that are secured by a torque screw through the adjustment handle.

Coil Guard Cleaning

The coil guard must be cleaned periodically. Carefully remove any debris. Be careful not to damage the temperature sensors.

CAUTION

When cleaning the coil guard, extreme care must be taken to ensure that the coil does not become damaged.
Operational Maintenance checks

Owners Responsibility

To ensure that the unit can be maintained correctly the following requirements are required.

- Maintain a safe working environment around the unit, free from obstructions and debris.
- The unit shall follow the following maintenance regime as a minimum.

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

Ensure Lock off procedures is carried out accordingly.

Maintenance Schedule

<table>
<thead>
<tr>
<th>Item</th>
<th>Task</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit Inspection</td>
<td></td>
<td>6 Mths</td>
</tr>
<tr>
<td>General Inspections</td>
<td>Check for visible mechanical damage to unit.</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Check for cleanliness</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Visually inspect the unit for general wear and tear, treat metalwork.</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td><strong>Rust should be inhibited, primed and touched up with matching paint.</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Check for excess vibration from other rotating equipment.</td>
<td>●</td>
</tr>
<tr>
<td>Coil Guard Cleaning</td>
<td>Ensure that the coil guard is free from debris.</td>
<td>●</td>
</tr>
<tr>
<td>Electrical Inspection</td>
<td>Check main power supply voltages</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Check electrical terminals are tight</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Check that the control panel and fan assembly cables are securely fastened together.</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Check amperages are as per design</td>
<td>●</td>
</tr>
<tr>
<td>Controls alarm log</td>
<td>Check alarm log for any spurious events.</td>
<td>●</td>
</tr>
<tr>
<td>Dual Power Supply</td>
<td>Check operation of dual power supply.</td>
<td>●</td>
</tr>
<tr>
<td>Static Transfer Switch</td>
<td>Check operation of static transfer switch. Refer to manufacturer information.</td>
<td>●</td>
</tr>
<tr>
<td>Uninterrupted Power Supply</td>
<td>Check operation of UPS. Ensure battery within UPS is holding charge.</td>
<td>●</td>
</tr>
</tbody>
</table>

Service tools/Test Equipment

- Voltmeter
- Screwdrivers/ Allen keys

Safety Equipment

- Safety Glasses/Goggles
## Troubleshooting

<table>
<thead>
<tr>
<th>FAULT</th>
<th>POSSIBLE CAUSE</th>
<th>REMEDY/ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit will not start</strong></td>
<td>No power</td>
<td>Check power supply to the controller.</td>
</tr>
<tr>
<td></td>
<td>Wired incorrectly</td>
<td>Check wire connections in accordance with wiring diagram on control panel.</td>
</tr>
<tr>
<td></td>
<td>Loose wires</td>
<td>Check all wires, connections, terminals etc.</td>
</tr>
<tr>
<td><strong>Fan not operating - power on</strong></td>
<td>Power supply failure</td>
<td>Check power supply at circuit breaker.</td>
</tr>
<tr>
<td></td>
<td>Wiring to motor</td>
<td>Check voltage at motor terminals.</td>
</tr>
<tr>
<td></td>
<td>Motor / fan assembly jammed</td>
<td>Isolate unit and check free rotation of motor/fan assembly, if faulty – replace.</td>
</tr>
<tr>
<td></td>
<td>Power disconnected to fans.</td>
<td>Carefully check status of power disconnect socket.</td>
</tr>
<tr>
<td><strong>Status indication LED faulty</strong></td>
<td>Wired incorrectly</td>
<td>Check that the wiring to the LED has the correct polarity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check that the terminations are correct.</td>
</tr>
<tr>
<td><strong>Display faulty</strong></td>
<td>Does not illuminate</td>
<td>Faulty cable - Replace cable.</td>
</tr>
<tr>
<td></td>
<td>Wrong display address</td>
<td>Faulty display – Replace display.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change address of display (see controls section)</td>
</tr>
<tr>
<td><strong>No Cooling</strong></td>
<td>Low water flow through coil</td>
<td>Ensure any chilled water valves are open and not in bypass.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensure that any solenoid valves are open when there is a demand for cooling.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water temperature sensor faulty. The sensor has failed causing the valves on the unit to close.</td>
</tr>
<tr>
<td><strong>UPS</strong></td>
<td>The UPS system does not operate correctly</td>
<td>Please refer to the UPS documentation / fault codes. Various solutions are available from changing battery modules to module restart.</td>
</tr>
<tr>
<td><strong>Water Leak Detection</strong></td>
<td>Damaged flexible hose</td>
<td>Ensure that the flexible hose is not rubbing on the coil or sheet metal in the vicinity of the door.</td>
</tr>
<tr>
<td></td>
<td>Condensation has formed on coil</td>
<td>Check operating conditions ensuring that the unit operates with its dew point control feature.</td>
</tr>
</tbody>
</table>