

# LogiCool InRak™ 300mm Chilled Water



## Technical Manual



FM00542

EMS52086

## Customer Services

### Warranty, Commissioning & Maintenance

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

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

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

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

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

### SafeCool™

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.

### 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.

#### 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.

### 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](mailto:enquiries@airedale.com) or telephone:

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For information, visit us at our web site: [www.airedale.com](http://www.airedale.com)

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## 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.

### 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
- LogiCool InRak
- LogiCool InRak Chilled Water Coil
- Dual Power Supplies

### 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.

## Environmental Considerations

### Freeze Protection

Airedale recommends the following actions to help protect the unit during low temperature operation. This also includes the units subject to low ambient temperatures. The LogiCool InRak must have a minimum of 20% glycol as standard.

#### Units with supply water temperatures below +5°C

Glycol is recommended when a supply water temperature of +5°C or below is required or when static water can be exposed to freezing temperatures.

#### Units subject to ambient temperatures lower than 0°C

Glycol of an appropriate concentration <sup>(1)</sup> must be used within the system to ensure adequate freeze protection.

Please ensure that the concentration is capable of protection to at least 3°C lower than ambient.

Water/glycol solution should be constantly circulated through all waterside pipework and coils to avoid static water from freezing.

Ensure that pumps are started and running even during shut down periods, when the ambient is within 3°C of the solution freeze point <sup>(1)</sup> (i.e. if the solution freezes at 0°C, the pump must be operating at 3°C ambient).

Additional trace heating is provided for interconnecting pipework.

<sup>(1)</sup> Refer to your glycol supplier for details.

### 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
Low Voltage Directive (LVD)	2014/35/EU
Machinery Directive (MD)	89/392/EEC 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)

#### Waterside

Allowable Temperature Range (TS) = Min -5°C\* to Max 40°C\*\*

Maximum Allowable Pressure (PS) = 10 Barg

\*Based on the waterside temperature in the unit off state.

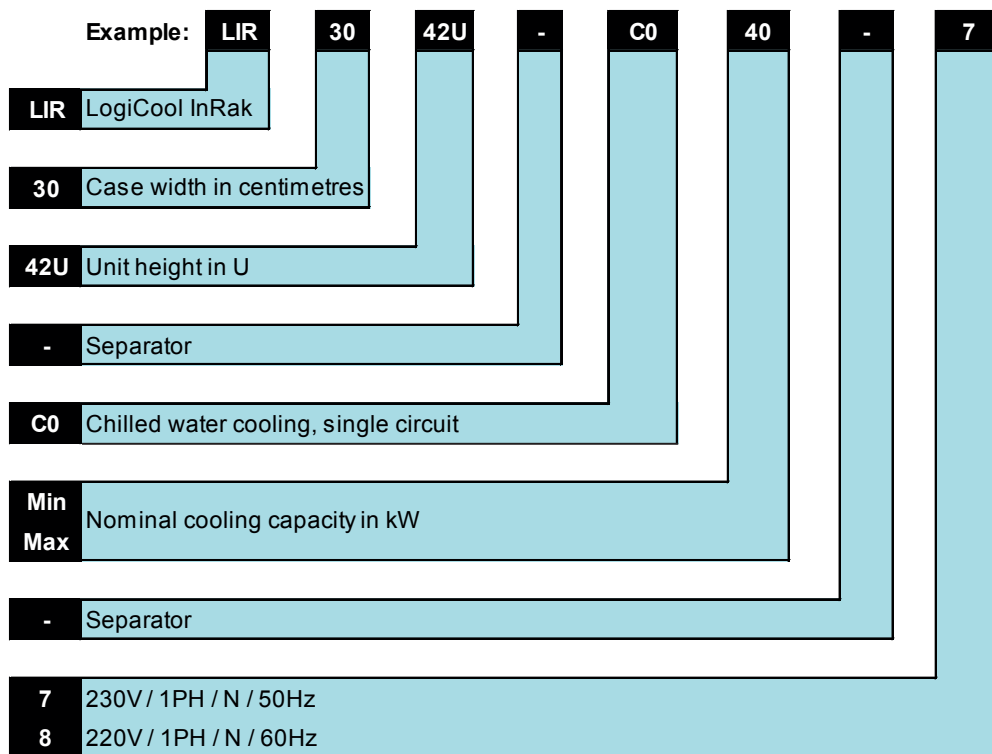
\*\*Based on the waterside temperature in the unit off state.

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## Specifiers Guide

### Nomenclature



### Introduction

The LogiCool InRak is an efficient in-row IT cooling solution for data centre applications. The InRak delivers complete confidence, with redundancy features such as dual power supplies. It is extremely efficient, offering the latest fan technology coupled with sophisticated controls logic designed to optimise operation.

The InRak delivers even greater efficiency when combined with Airedale's latest free cooling chillers.

Providing industry-leading cooling for its footprint, the InRak offers the ultimate in scalable solutions for the modern data centre. The InRak is designed to fit in between industry standard server racks and offer "plug and play" connectivity.

### 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 colours shall be Black Grey (RAL 7021) or Light Grey (RAL 7035).

### Standard Features

- Chilled water cooling
- Variable capacity
- 300mm wide case size
- Multi-cabinet cooling solution
- 50Hz/60Hz power supply
- Dew point control
- Top or bottom service connections
- Aisle differential pressure control

## Unit Overview

### Standard Control Features

- Microprocessor Control
- Graphical Display
- Unit Status LED
- Dew Point Control

### Optional Control Features

- Filter Change Monitoring
- Aisle Pressure Management
- Constant Air Volume Control
- Water Detection
- Fire / Smoke Detection

### Standard Front Door Features

- Discharge Grille
- Removable Access Panel
- Secure Door Lock



### Standard Construction Features

- Levelling Feet
- Castors
- Anti-Recirculation Brush Seal
- Side Access Panels

**Unit Overview****Standard Rear Door Features**

- Secure Door Lock
- Return Air Grille

**Optional Rear Door Features**

- ISO-C-80 Return Door Air Filters

**Standard Electrical Components**

- Electrical Switch Gear
- Controller UPS Backup

**Optional Electrical Components**

- Condensate Pump
- Energy Manager
- Phase Rotation Monitoring
- IEC 60309 Plug and Socket

**Standard Chilled Water Features**

- Efficient Chilled Water Coil
- Bleed / Drain Valves
- Modulating Control Valve

**Optional Chilled Water Features**

- 3 Way Chilled Water Valve
- 2 Way Chilled Water Valve
- 2 Way PICV Valve
- Bypass Regulating Valve



General



Introduction

		System Configuration
General	Features	CW
	Hydrophilic Fin Chilled Water Coil	●
	Top Service Connections*	○
	Bottom Service Connections*	○
	Axial Fan Door	●
	2 Way Chilled Water Regulating Valve	●
	3 Way Chilled Water Regulating Valve	○
	2 Way PICV Valve	○
	Condensate Pump**	○
	Brazed Pipework Connection	●
	Threaded Pipework Connection	○
	Flexible Hose Connection 1.5m or 3m	○
	Flexible Hose Termination Male/Female	○

- Standard Features      ○ Optional Features      — Feature Not Available
- \* At least one is selected at time of order
- \*\* required for top entry systems

Compact Cooling Coil

3/8" plain tube cooling coil with and hydrophilic fins.

300mm Case Size

300mm case width shall offer high cooling capacity for space-critical applications.

Top and Bottom Service Connections

The unit shall offer top and bottom service connections for maximum accessibility.

Axial Fan Door

The fan doors shall have a hex-punch pattern and attach to the frame with hinges.

### 2 Way Chilled Water Regulating Valve

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).



### 3 Way Chilled Water Regulating Valve

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).



### 2 Way PICV Valve

2-way pressure independent control valves, internally mounted 0-10V DC PICV valves shall be used to compensate for pressure variations, performing a continual balancing function to maintain system performance at varying loads.



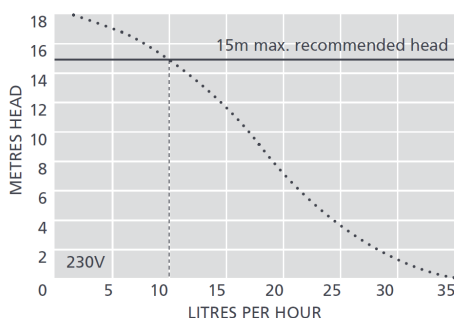
### Bypass Regulating Valve

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).

### Condensate Pumps

The InRak condensate pump shall be a cold water type (cooling only). The pump shall be able to pump water 10l/hr @15m maximum head.



### Pipework Termination

Pipework shall be terminated in either:

- Brazed Pipework
- Threaded Pipework Connection (BSP)
- Flexible Hose Connection

### Flexible Hose Connection

A Flexible Hose connection shall be fitted to the unit. Length of 1.5 and 3m shall be available. Hose ends can be either Male or Female.

Airflow



DC Axial Fan

		System Configuration
Airflow	Features	CW
	48V DC Axial Fans	●
	ISO 16890 Filtration	○
	Constant Air Volume	○
	Constant Aisle Pressure Control	●
	Fan Capacity Control	○

● Standard Features    ○ Optional Features    — Feature Not Available

48V DC Axial Fans

The fan’s small size shall allow for up to eight fans to be fitted, which shall deliver high airflow to reach target capacities.

ISO16890:2016 Filtration

Optional pleated disposable filters shall be available in a rigid metal frame conforming to ISO16890:2016 (ISO-C-80)

Constant Air Volume

Constant air volume control allows the user to specify through the user menu the exact air volume requirements as a set point.  
The controller with the aid of differential pressure sensors monitors the air volume and compensates accordingly to achieve the set point. This ensures a smooth response to changing system pressures.  
The controller uses a PID control loop function to modulate the 0-10 VDC signal to the fans

Constant Aisle Pressure Control

Constant aisle pressure control is a method of maintaining a pressure differential between the hot and cold aisles by modulating the fan speed of the InRak unit.

A -100 to +100Pa differential pressure sensor is used to monitor the pressure difference between the aisles (the same sensor can be easily changed to -50/+50Pa using a jumper connection depending on individual requirements). This signal is sent back to the InRak unit microprocessor to modulate the fan speed to maintain a target differential pressure set point of -10Pa (adjustable). The fan speed modulates to maintain the target differential.

In the event of the differential pressure sensor failing, (open circuit), the unit will revert to the fixed fan speed (as commissioned). The fixed fan speed can be adjusted in the Manufacturer > Parameters > fans menu.

As the pressure difference decreases the fan speed will increase until the pressure difference reaches the set point again. If the pressure difference was to increase the fans would lower their speed and decrease the pressure difference back to the set point.



**Fan Capacity Control**

Capacity control will allow the unit to modulate air volume based on demand for unit cooling. The controller will modulate the chilled water valve alone to try and increase unit cooling performance whilst maintaining the fans at their minimum speed. However, if the cooling performance is not increased sufficiently then the fan speed will increase to further satisfy demand.

By default, the valve/fan changeover point is set at 50% cooling demand. The fans will therefore stay at minimum speed until the cooling demand reaches 50% and then start to ramp up to satisfy the cooling demand. As the unit cooling demand increases the fan speed is modulated to match the required cooling performance. This feature enhances system energy efficiencies, by having only the required fan input power for particular loadings.

Electrical



UltraCap Controller

System Configuration		
Electrical	Features	CW
	UltraCap Controller Backup	●
	Mains isolator	●
	MCBs	●
	Dual Power Supply	○
	Retractable Control Panel	●
	Internal IEC Power connection	●

● Standard Features      ○ Optional Features      — Feature Not Available

Standard Electrical features include

- Mains Isolator
- MCBs
- Withdrawable Main Control Panel

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

UltraCap Controller Backup

The Ultracap module is an external backup device for the controller. The module guarantees temporary power to the controller in the event of power failures and allows for enough time to keep the controller running with time to change power supplies. The module is made using Ultracap storage capacitors (EDLC = Electric Double Layer Capacitor), which are recharged independently by the module.

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

### Dual Power Supply

The InRak range shall be designed with dual power supply capability, so that in the event of a power failure the supply can be switched from utility to an alternative power supply (such as second utility or generator).

A dual power supply changeover switch shall be provided to enable continuous power to the InRak in order to reduce unit downtime and therefore loss of cooling to a minimum.

For the dual power supply feature to operate effectively the two incoming power supplies must have the same voltage and frequency.

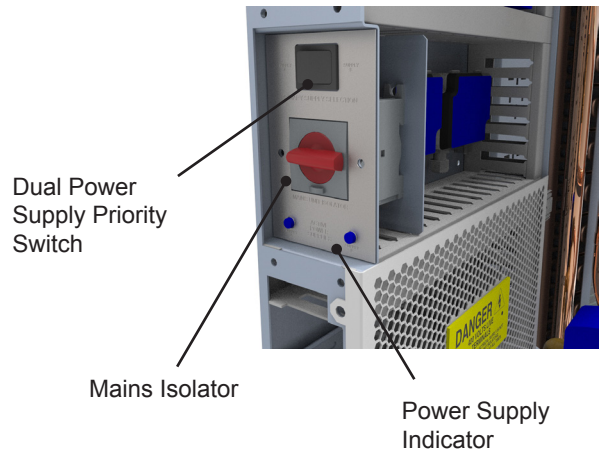
During changeover of power there is an interval of .180ms with no power. The dual power supply option as standard is offered with a supply priority select switch. This is used to determine which of the two power supplies will be used to supply power to the machine, in the case of an electrical system with a healthy set of both primary and secondary incoming power supplies.

### Retractable Control Panel

To improve the service access to the InRak, a retractable control panel has been incorporated into the design to allow service and maintenance engineers easier access to the panel and the components around it.

### Internal IEC Power connection

An internal IEC Power connector shall be fitted. The connector shall be to specification C13 and C14. The power connector shall incorporate a retaining clip to safeguard against accidental disconnection.



Retractable Control Panel



Controls



pGD1 Display

		System Configuration
Controls	Features	CW
	Unit Controller	●
	PGD1 Display	●
	Supply Air Temperature Control	●
	Return Air Temperature Control	○
	Additional Control Temperature Sensors	○
	Tri Colour LED for Easy Fault Detection	●
	Fire Detection	○
	Flood Detection	○
	Smoke Detection	○
	Constant Air Volume	○
	Constant Aisle Pressure Management	●
	Software Managed Filter Change	○
	BMS/SNMP Compatibility	●

● Standard Features      ○ Optional Features      — Feature Not Available

Unit Controller

The units shall be supplied with a European ROHS Directive 2002/95/EC compatible microprocessor controller connected to an 8 x 22 character back-lit LCD keypad display. LEDs shall not be acceptable.

The microprocessor controller offers powerful analogue and digital control to meet a wide range of monitoring and control features including a real time clock and Industry standard communication port and network connections.

All the boards feature a 16 bit microprocessor, and consequently the calculation power and operation processing speed have been significantly increased.

Also featured are a visual alarm and the facility to adjust and display control settings by local operator for information and control.

Display/Keypad

The display keypad features a simple array of keys to navigate through the in built menus.

With an 8 x 22 character (132 x 64 pixel) screen size, back lit in white for improved contrast, the larger screen shall provide for user friendly viewing and easy status recognition by displaying a combination of text and icons.

The default screen shall show the unit status and room condition (°C/RH %) without the need for interrogation an easy to navigate menu structure for further interrogation and adjustment shall be provided.

**Supply Air Temperature Control**

Modulation of unit capacity to ensure that user defined supply air set points shall be maintained and/or a high/low return air temperature alarm. During peak demand, the standby units shall temperature assist.

**Return Air Temperature Control**

An optional temperature sensor shall be available to be mounted in the return air side of the unit to sense the return dry bulb condition.

**Password Protection**

The control system integrity shall be maintained by restricting access with a password PIN number.

**Expansion Board**

An expansion board can be added as an option to add up to 4 additional supply or return air temperature sensors to the unit. These can be placed on server racks adjacent to the unit to give better regulation over the controlled temperature and help prevent hot-spots occurring on a server rack or within the room.

**IMPORTANT ▲**

To change the PIN , please contact Airedale at time of order with the preferred 4 digit number.

**Tri Colour LED for Easy Fault Detection**

LED indication for alarm status shall be incorporated in the front face of the InRak unit which signals Healthy, Non Critical and Critical Alarm respectively (Green, Yellow and Red.)

**Remote On/Off**

Terminals for interlocking shall be provided to enable or disable the unit remotely.

**Fan Hours Run Log & Reset**

Hours run log or visual service indicator shall be provided to monitor the running time of the fans and allow reset after maintenance.

**Fan Speed Control**

Fan speed control shall be easily set via the display keypad and can be incrementally increased or decreased to meet on site airflow and external static pressure requirements.

**Filter Change Alarm**

Filter change shall be managed by the software, and shall be based on fan(s) hours run with an alarm being generated when the pre-set run time limit has been exceeded. The set-point value shall be adjusted to suit each application and is factory set to 4000 hours.

**Fire Shut Down**

Terminals for interlocking shall be provided to shut down the unit in the event of fire.

**Fire Detector**

Shall be installed in the return air stream to shut down the unit in the event of an unusually high return air temperature.

**Flood Detection**

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 base of the unit. Monitored by a sensing relay, the water detection tape will provide an alarm when in contact with several drops of conductive liquid. High humidity should normally not cause an alarm unless it results in condensation dripping on the tape surface or condensation present on the surface to which the tape is applied.

**Smoke Detector**

Activates the alarm upon sensing the presence of smoke.



**Constant Aisle Pressure Management**

The InRak shall be fitted with Aisle pressure management, which allows the differential pressure across the IT equipment to be monitored and controlled to achieve:

- Positive air pressure in the cold aisle.
- Negative air pressure in the hot aisle at the server outlet, to prevent backwash of hot air (behind InRak coil guard).
- Controlled differential pressure across the IT hardware so that air is not 'forced' through the IT equipment.

**Programming Smart Key**

A smart key shall be supplied (optional) 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.

**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 types of LonWorks® serial cards shall be FTT-10A 78 kbs (TP/FT-10) on the LonWorks® network.

**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.

**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

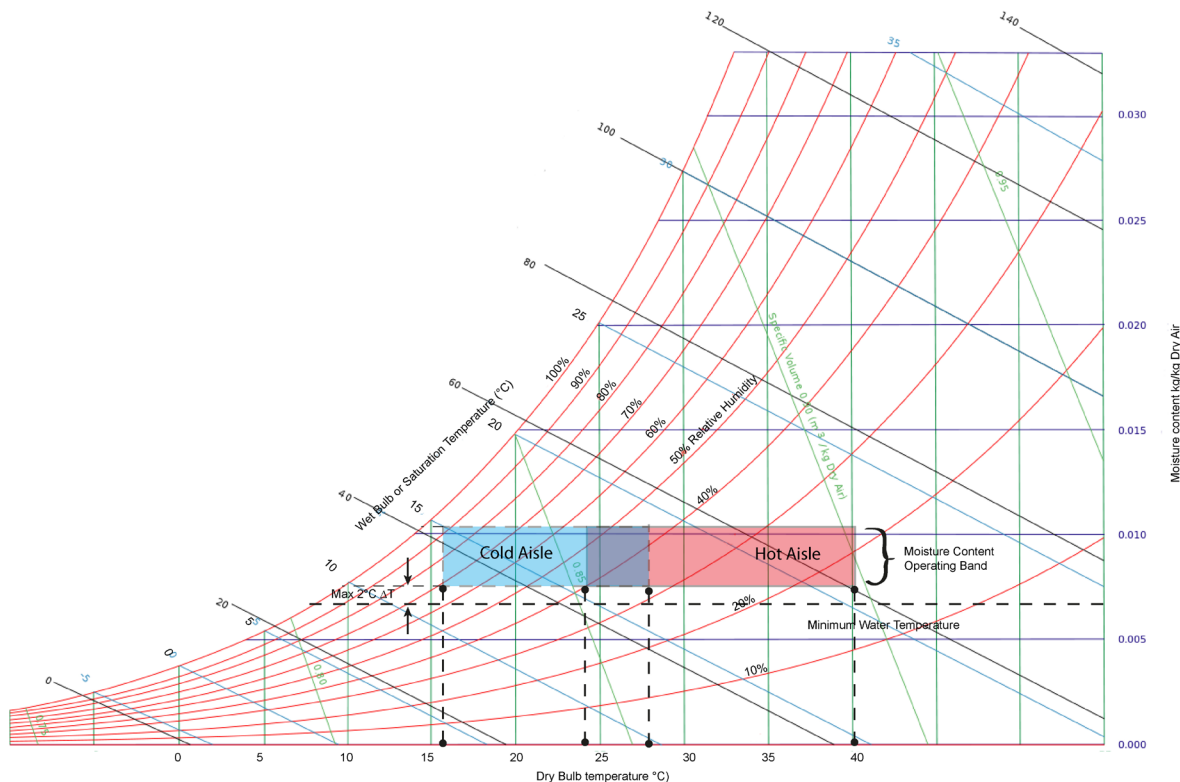
The data communication shall be asynchronous serial, 8 data bits, 2 stop bits and no parity (in total 11 bits/datum).

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

Technical Data - Chilled Water  
Operating Limits

Cooling		Min	Max
Room Temperature	°C	16	28
Room %RH at 24°C	%	40	55
Return Air Temperature	°C	25	40
Entering Water Temperature	°C	8	16
Leaving Water Temperature	°C	13	24

Technical



**CAUTION** ⚠

Low humidity in a data centre may cause static electricity build up.

**Technical Data - Chilled Water****Performance Data****Full Load**

Air On DB / RH			Water Temperatures (°C)				
			10/15	11/16	12/18	13/20	14/22
LIR3042U-C025	25°C / 42%	Gross Total Cooling (kW)	12.14	11.05	8.99	7.26	5.57
		Power Input (kW)	0.30	0.30	0.30	0.30	0.30
		EER	40.47	36.83	29.97	24.20	18.57
	30°C / 32%	Gross Total Cooling (kW)	17.52	16.42	14.46	12.62	10.85
		Power Input (kW)	0.30	0.30	0.30	0.30	0.30
		EER	58.39	54.72	48.21	42.08	36.16
	35°C / 24%	Gross Total Cooling (kW)	22.10	21.06	19.23	17.60	16.22
		Power Input (kW)	0.30	0.30	0.30	0.30	0.30
		EER	73.67	70.20	64.10	58.67	54.07
	40°C / 18%	Gross Total Cooling (kW)	26.85	25.81	23.99	22.46	21.33
		Power Input (kW)	0.30	0.30	0.30	0.30	0.30
		EER	89.50	86.03	79.97	74.87	71.10
LIR3042U-C040	25°C / 42%	Gross Total Cooling (kW)	19.24	17.40	13.48	10.16	6.97
		Power Input (kW)	1.55	1.55	1.55	1.55	1.55
		EER	12.41	11.23	8.70	6.55	4.50
	30°C / 32%	Gross Total Cooling (kW)	28.37	26.59	23.05	19.56	15.98
		Power Input (kW)	1.55	1.55	1.55	1.55	1.55
		EER	18.30	17.15	14.87	12.62	10.31
	35°C / 24%	Gross Total Cooling (kW)	36.44	34.68	31.27	28.21	25.55
		Power Input (kW)	1.55	1.55	1.55	1.55	1.55
		EER	23.51	22.37	20.17	18.20	16.48
	40°C / 18%	Gross Total Cooling (kW)	44.70	42.93	39.51	36.60	34.37
		Power Input (kW)	1.55	1.55	1.55	1.55	1.55
		EER	28.84	27.70	25.49	23.61	22.17

Technical

All the performance data is based on a SHR of 1.0.

Maximum duty data is based on achievable duty at maximum air volume.

Performance data is based upon a unit with no filtration.

## Technical Data - Chilled Water

## Mechanical Data

Technical

			LIR3042U-C025	LIR3042U-C040
<b>Capacity</b>				
Nom Cooling (Gross)	(1)	kW	22.1	36.4
Nom Fan Power Input	(1)	kW	0.30	1.55
Nom EER	(1)		73.67	23.51
<b>Dimensions - W x D x H</b>			300 x 1120 x 1995	300 x 1120 x 1995
<b>Weight - Machine / operating</b>			223 / 236	223 / 236
<b>Construction</b>			Panels: Galvanised Sheet Steel, Epoxy Baked Powder Paint	
Material			Frame: Sheet Steel, Epoxy Baked Powder Paint	
Colour			Optional: RAL7021 (Black Grey) or RAL7035 (Light Grey)	
<b>Cooling Coil</b>			Copper Tube/Turbulated Hydrophilic Coated Aluminium Fins	
Cooling			Fully Modulating	
Water volume	l		13.3	13.3
Nominal Water flow rate	l/s		1.05	1.74
Nominal Pressure drop	kPa		14	37.7
<b>Fan</b>			DC Axial Fan	
Motor Type			DC	DC
Quantity x Motor Size	W		8 x 200	8 x 200
Maximum Speed	rpm		3290	6232
Maximum Airflow	m³/s		1.10	2.20
<b>Connections</b>				
Water Inlet / Outlet -	mm		28	35
Condensate Drain Hose	mm		22	22
<b>OPTIONAL EXTRAS</b>				
<b>Filtration</b>			Disposable to ISO16890:2016 (ISO-C-80)	
Quantity			3	3
Depth	mm		45	45
<b>Condensate Pump</b>				
Head	m		15.0	15.0
Flow	l/min		0.16	0.16
Drain			Vinyl Tube 1/4" Connection	
<b>Threaded Connections</b>				
Water Inlet/Outlet	in		1	1 1/4
Thread Type			BSP Male	
<b>Flexible Hose</b>				
Water Inlet/Outlet	in		1	1 1/4
Thread Type			BSP Male / BSP Female	
Hose Length	m		1.5 / 3	

(1) Nominal data based on 35°C/24% Air On condition, 10/15°C Water temperatures and without optional filtration.

**Technical Data - Chilled Water****Electrical Data**

		LIR3042U-C025	LIR3042U-C040
<b>Unit Data Cooling only</b>			
Nominal Run Amps	A	7.5	7.5
Maximum Start Amps	A	7.5	7.5
Recommended Mains Fuse Size	A	16	16
Max Mains Incoming Cable Size	mm <sup>2</sup>	16	16
Mains Supply 50Hz	V	230 / 1PH / + N / 50Hz	
Mains Supply 60Hz	V	220 / 1PH / + N / 60Hz	
Control Circuit	VAC	24VAC	24VAC
<b>Fan - Motor - Per Fan</b>			
Motor Type		48V DC	48V DC
Quantity		8	8
Motor Size	W	200	200
Full Load Amps	A	4.2	4.2

Sound Data

Measurement of Sound Data

All sound data quoted has been measured in the third-octave band, limited values using a Real Time Analyser calibrated sound pressure in accordance with BS 3744:2010.

Sound Power Levels calculated from measured sound pressure according to BS 3744:2010.

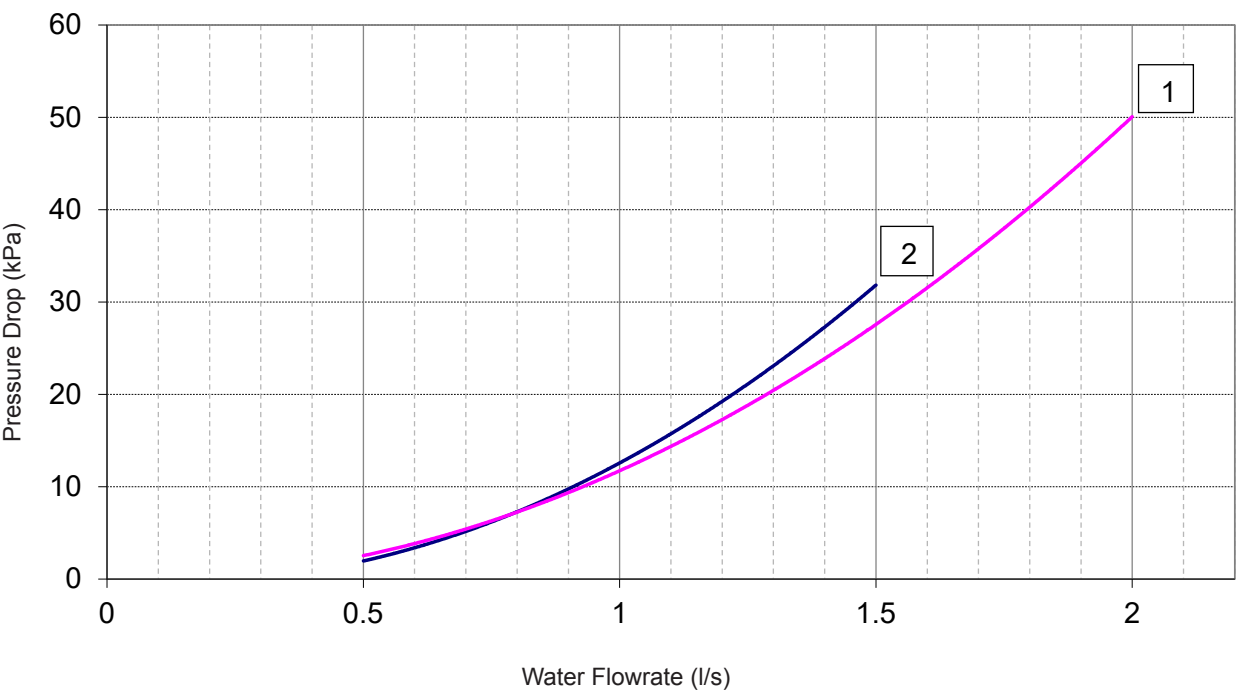
dB(A) is the overall sound level, measured on the A scale.

If the equipment is placed adjacent to a reflective wall, values may vary to those stated in our Performance Data section, typically you can add 3dB(A) for each side added.

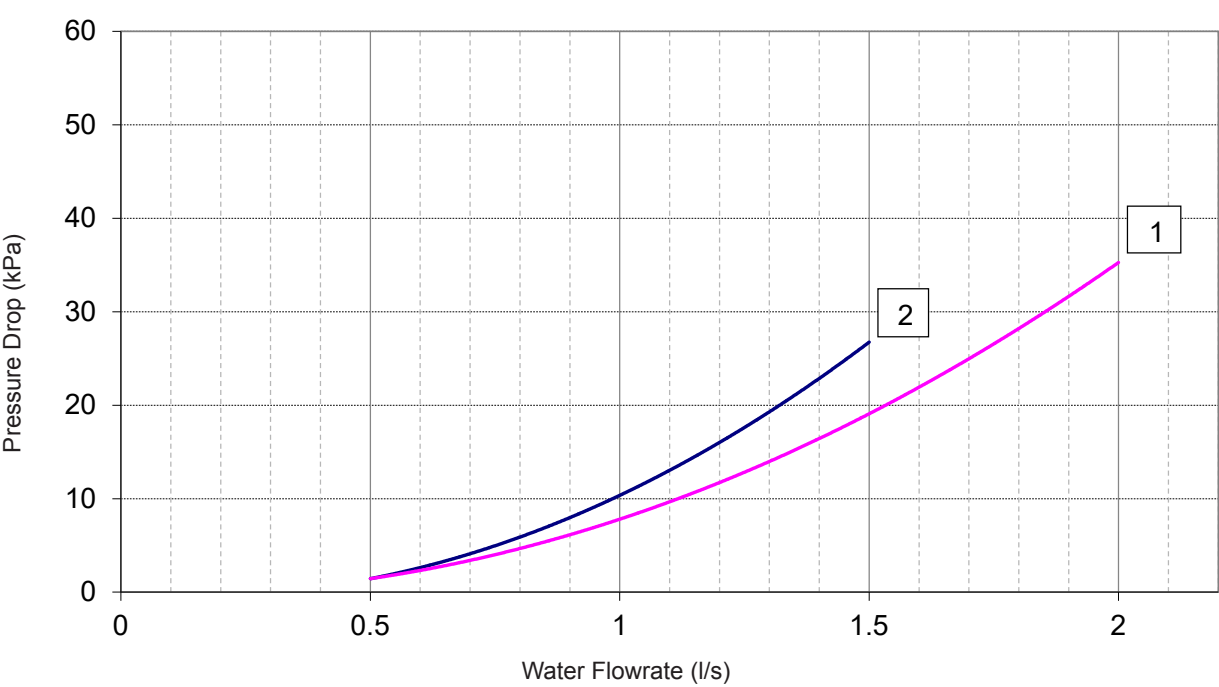
				Frequency (Hz) dB							
	Fan Load %	Sound Measurement	Overall dB(A)	63	125	250	500	1000	2000	4000	8000
LIR3042U-C025	100	Overall L <sub>w</sub>	100	81	82	81	100	92	91	90	87
		Sound Pressure @ 1m	92	73	74	73	92	84	83	82	79
	50	Overall L <sub>w</sub>	90	75	78	94	86	86	81	79	74
		Sound Pressure @ 1m	82	67	70	86	78	78	73	71	66
LIR3042U-C040	100	Overall L <sub>w</sub>	100	81	82	81	100	92	91	90	87
		Sound Pressure @ 1m	92	73	74	73	92	84	83	82	79
	50	Overall L <sub>w</sub>	90	75	78	94	86	86	81	79	74
		Sound Pressure @ 1m	82	67	70	86	78	78	73	71	66

100% fan load refers to fans operating at 100% of Max fan speed.  
50% fan load refers to fans operating at 50% of Max fan speed.

Technical Data - Chilled Water  
Unit Pressure Drop

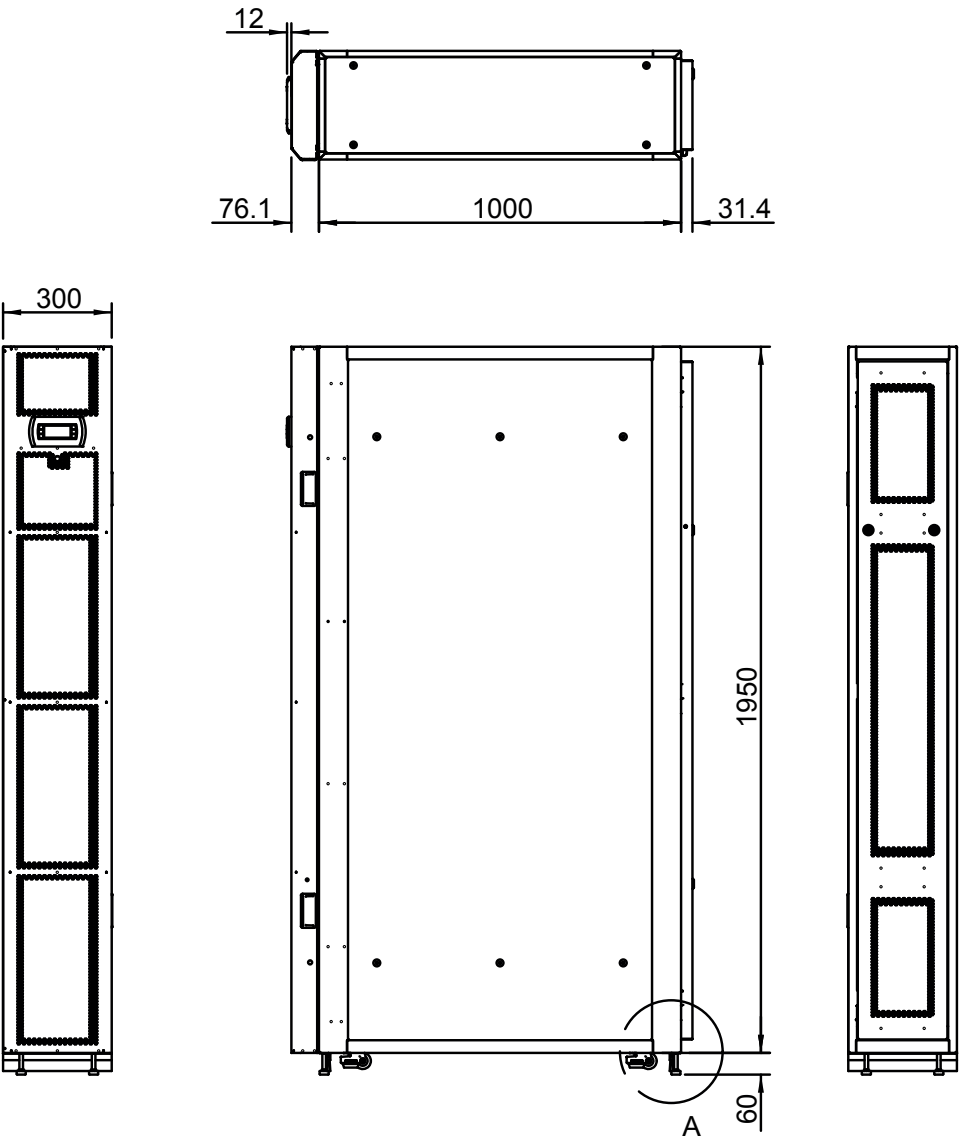


Coil Pressure Drop Curves

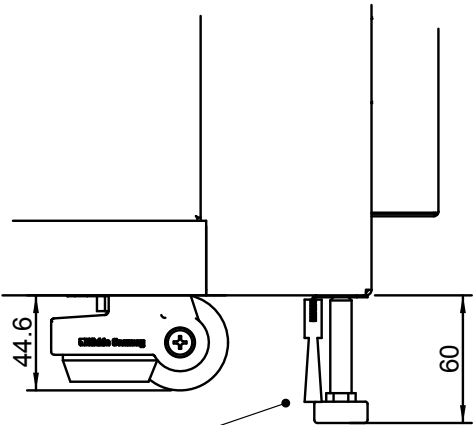


- 1 - LIR3042U-C040
- 2 - LIR3042U-C025

Installation  
Dimensions



Adjustable Foot  
Foot Diameter - 25mm  
Stud Length - 45mm  
Thread Size - M10

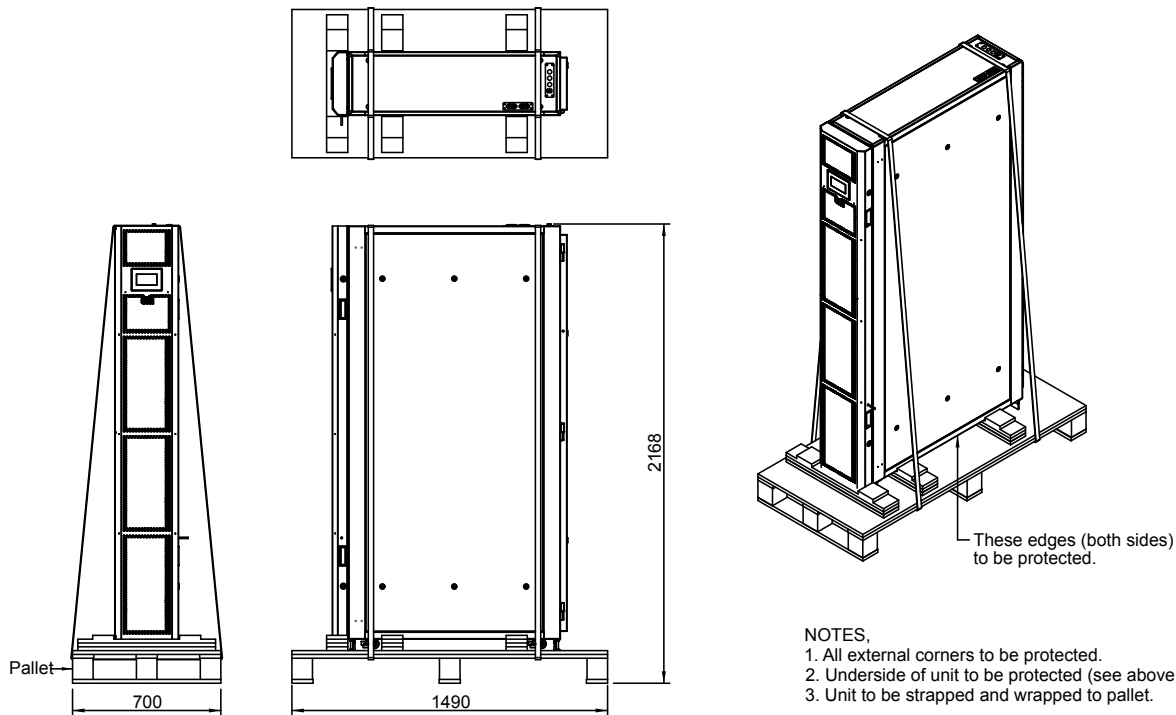


DETAIL A



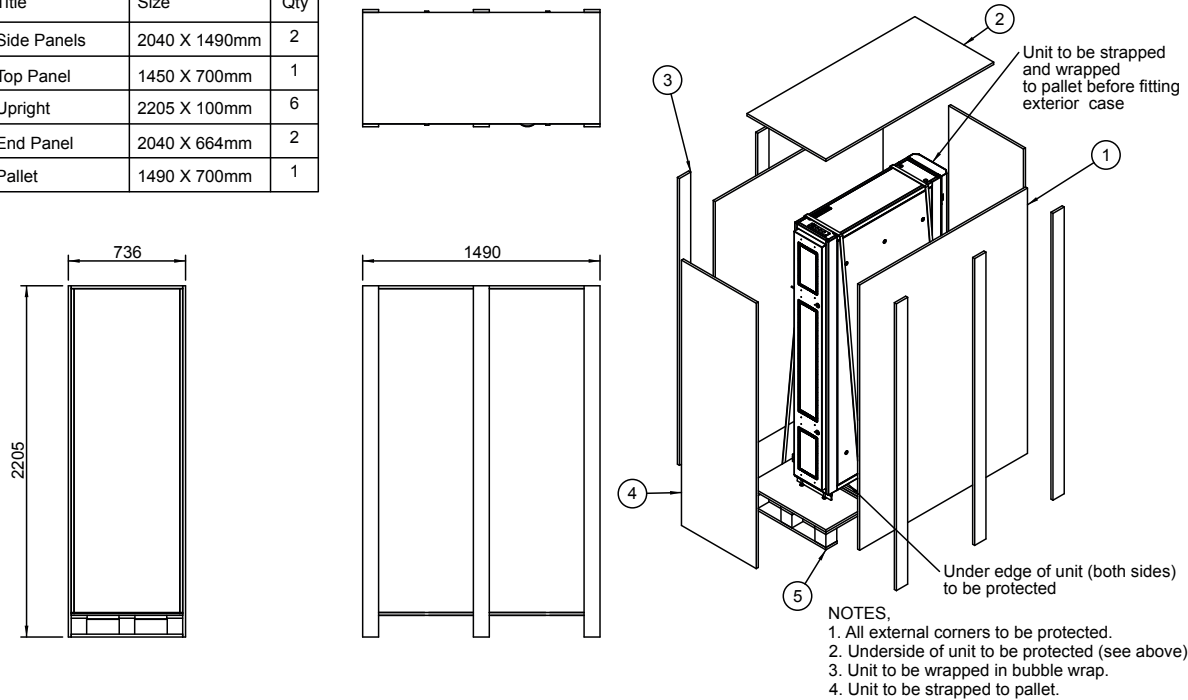
Installation

Packaging  
Standard Packaging



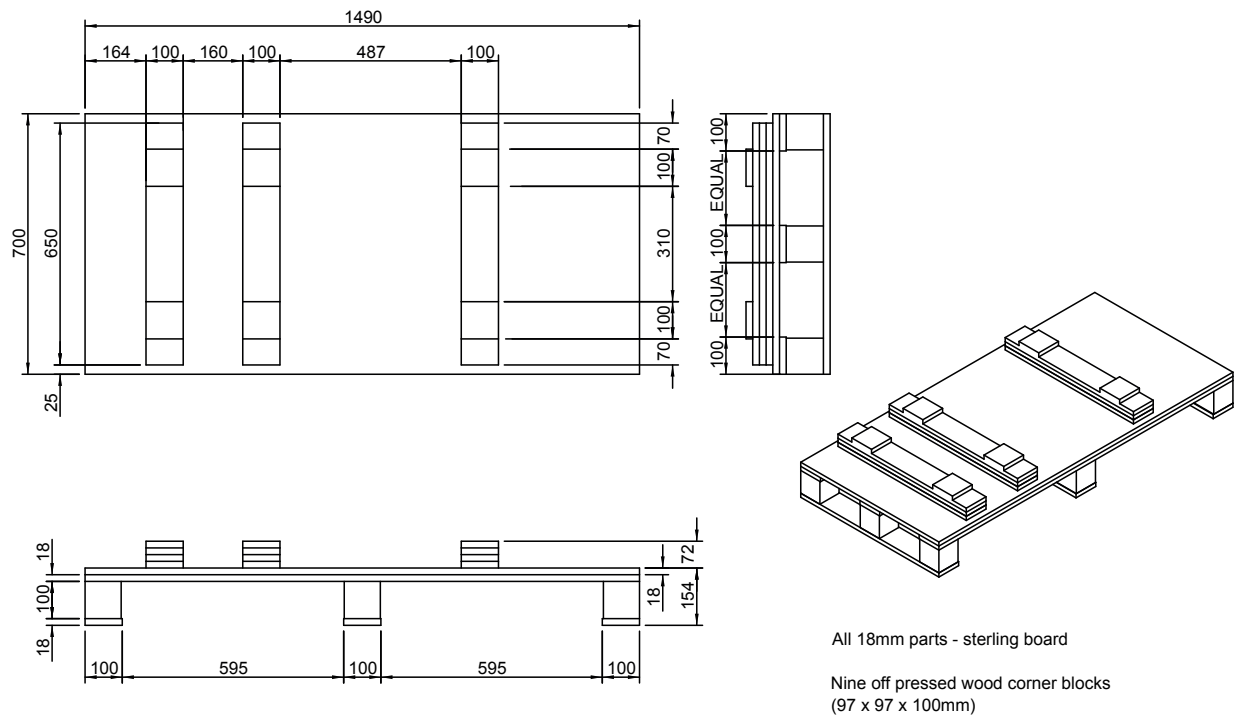
Export Packaging

Item	Title	Size	Qty
1	Side Panels	2040 X 1490mm	2
2	Top Panel	1450 X 700mm	1
3	Upright	2205 X 100mm	6
4	End Panel	2040 X 664mm	2
5	Pallet	1490 X 700mm	1

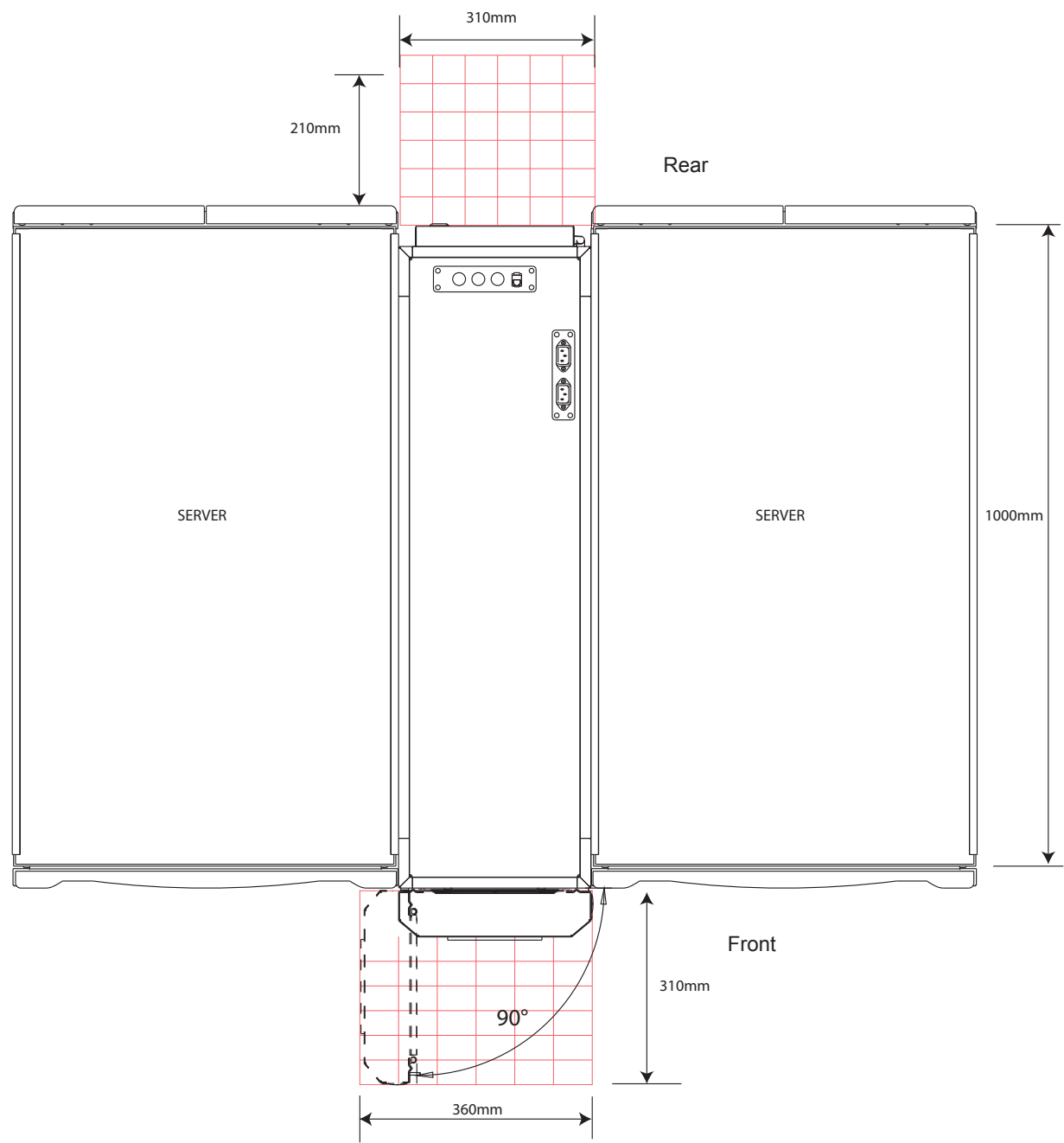


Installation

Pallet



Installation  
Clearance

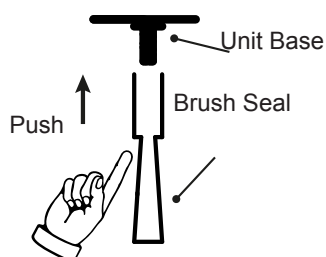
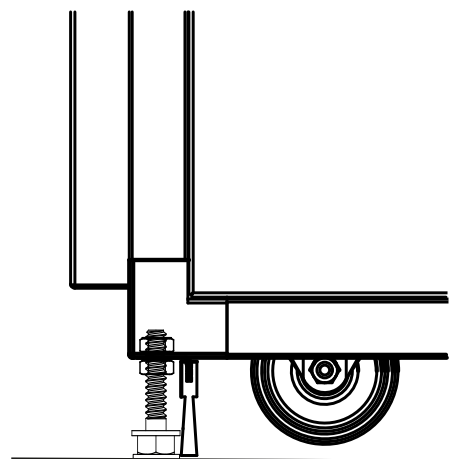
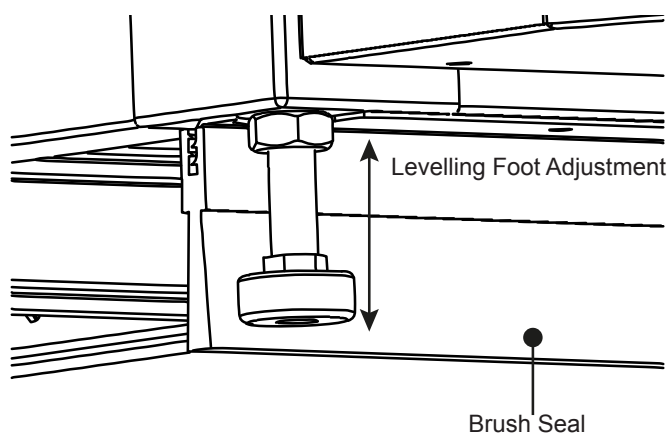


<b>IMPORTANT</b> ⚠	The InRak requires space at the front and rear of the unit for maintenance purposes. This is highlighted above. The fan door can be removed for ease of fan maintenance.
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## Installation

### Levelling

The unit once positioned shall be levelled. This ensures that the unit has an air tight seal between the InRak and any adjacent server racks. Unit need to be level to ensure that any condensate collected is disposed of correctly.

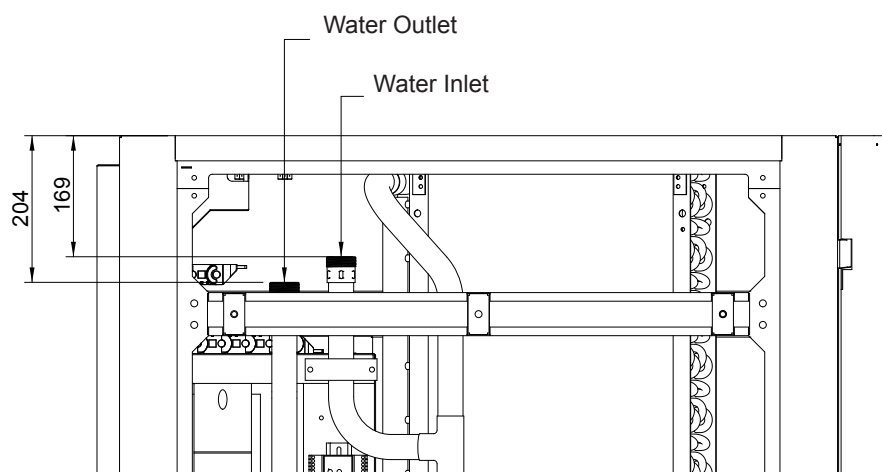


Note: The brush seal compresses when the feet are adjusted creating a tight seal to the floor. The seal is supplied loose for easy fitment.

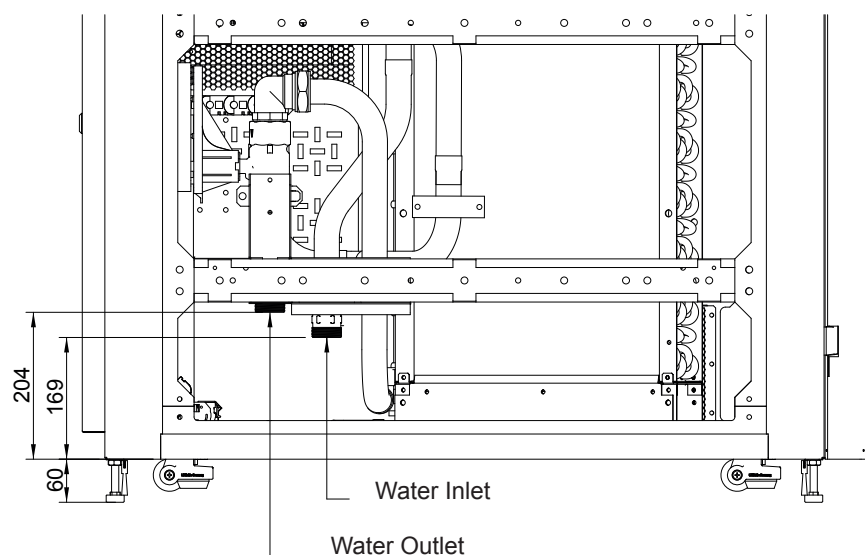
## Installation

### Incoming Services

#### Top Entry - Chilled Water



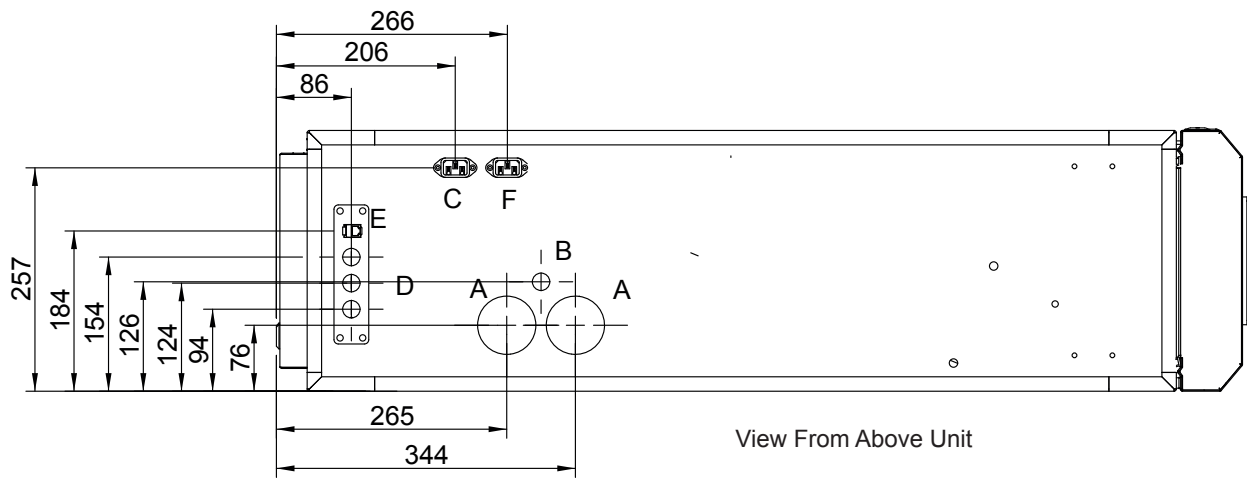
#### Bottom Entry - Chilled Water



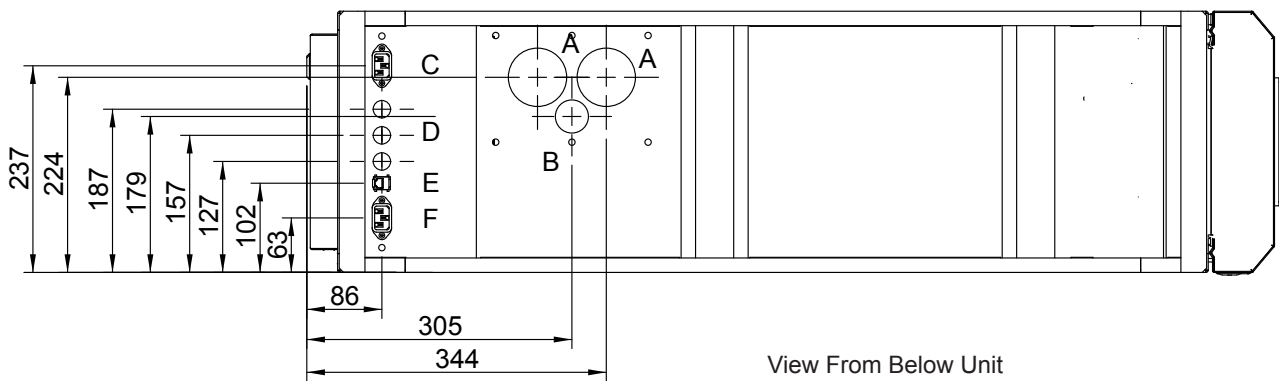
Installation

Incoming Services

Top Entry - Chilled Water



Bottom Entry - Chilled Water

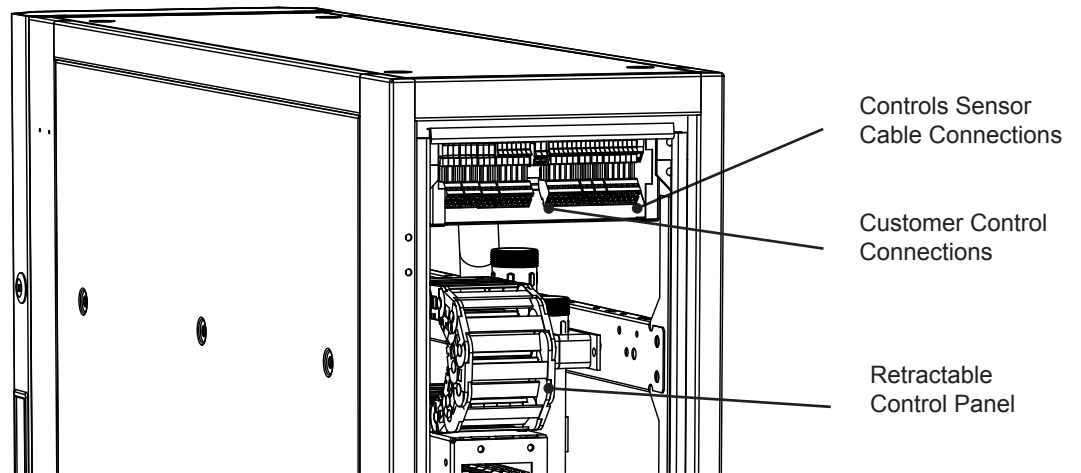


Incoming Services			
Item	Description	Size	Qty
A	Water Inlet/outlet	Ø 67mm	2
B	Condensate Drain	Ø 38mm	1
C	Primary Mains Supply (A)	-	1
D	Controls	Ø 20mm	3
E	BMS (Ethernet)	-	1
F	Secondary Supply (B)	-	1

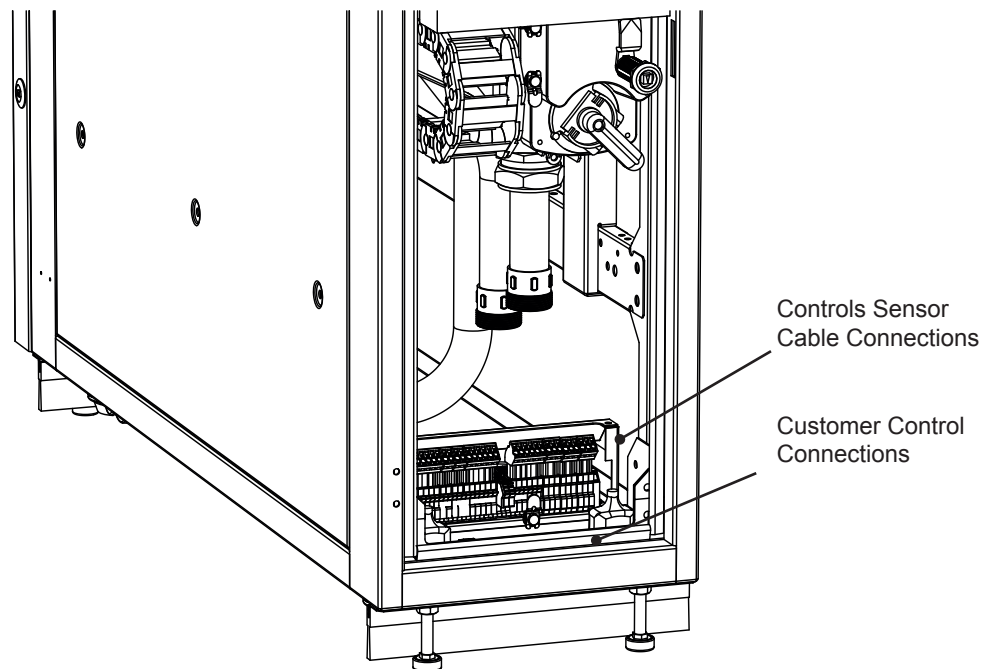
## Installation

### Incoming Services

#### Top Entry - Chilled Water



#### Bottom Entry - Chilled Water



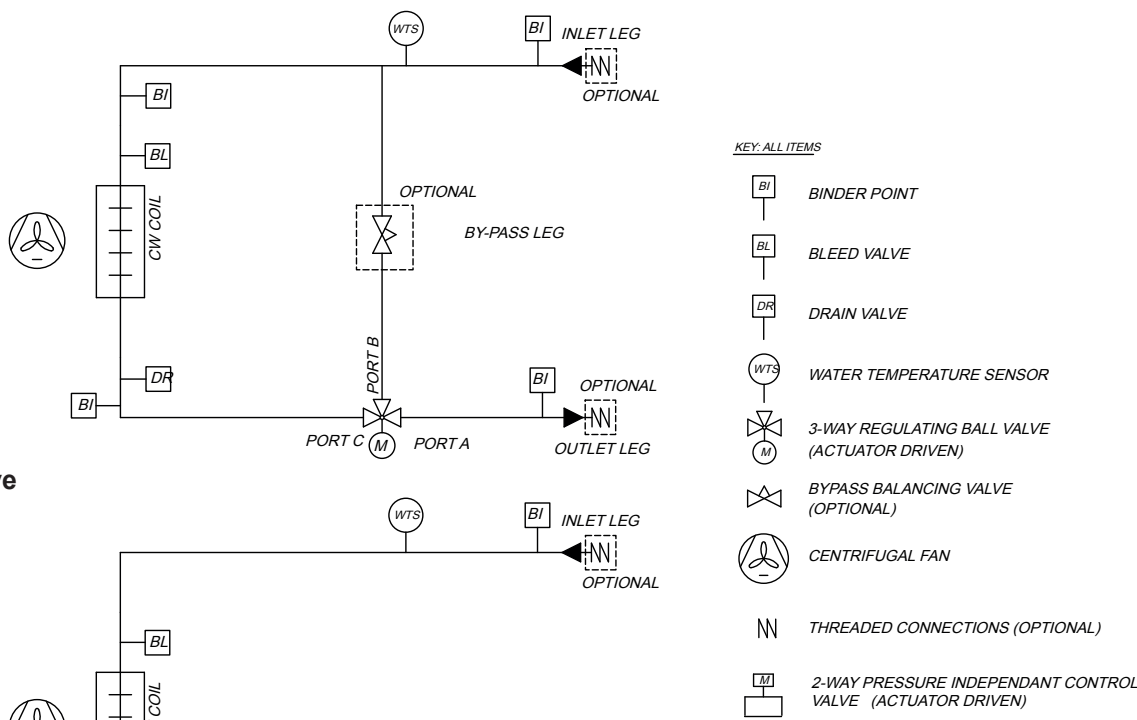
### Electrical Services Incoming Cabling

The electrical services enter the unit through either the base or the roof of the unit.

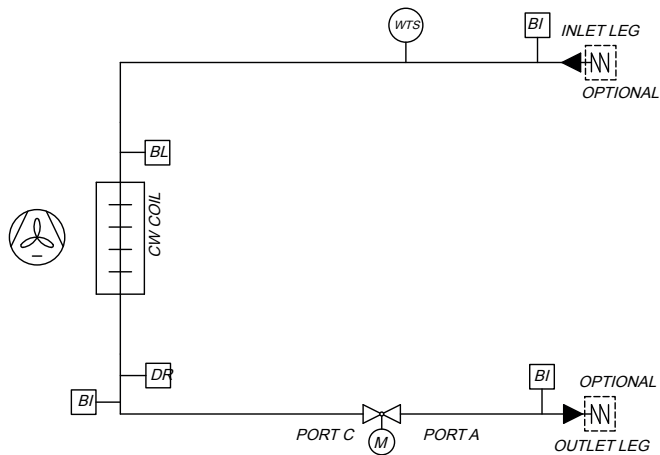
Installation

Pipework Schematics

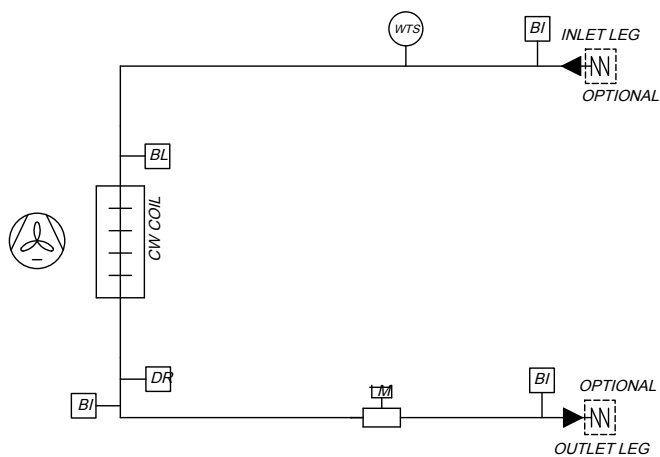
3 Port Valve



2 Port Valve



PICV Valve





## Interconnecting Wiring

## Mains Power Connections

Indoor Unit	L1	←	Mains Incoming Supply - Primary 230V / 1PH / + N / 50Hz
	N1	←	
	PE	←	
	L2	←	Mains Incoming Supply - Secondary 230V / 1PH / + N / 50Hz (Dual Power Supply Option Only)
	N2	←	
	PE	←	

## Controls Connections

Standard	502	→	Remote On/Off
	522	←	
Option	860	→	Rack Temperature Sensor 1
	861	←	
Option	862	→	Rack Temperature Sensor 2
	500	←	
Option	864	→	Rack Temperature Sensor 3
	500	←	
Option	885	→	Rack Temperature Sensor 4
	886	←	
Option	887	→	Rack Temperature Sensor 5
	886	←	
Option	888	→	Rack Temperature Sensor 6
	889	←	
Option	890	→	Rack Temperature Sensor 7
	889	←	
Standard	560	→	Non-Critical Alarm - N/O Non-Critical Alarm - Common Non-Critical Alarm - N/C
	561	←	
	562	→	
Standard	563	→	Critical Alarm - N/O Critical Alarm - Common Critical Alarm - N/C
	564	←	
	565	→	
Standard	RX/TX-	←	Network In (pLAN)
	RX/TX+	←	
	GND	←	
Standard	RX/TX-	→	Network Out (pLAN)
	RX/TX+	→	
	GND	→	
Option	BMS Interface (Ethernet)	←	BMS Interface (Ethernet)
Option	891	←	BMS Interface (3-wire)
	892	←	
	893	←	

## Commissioning

**CAUTION** ⚠

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

**General**

To be read in conjunction with the commissioning sheets provided.

**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.

**Applying Mains Voltage**

Apply mains electrical supply to the unit.

Check the mains incoming voltage (230 Volts) carry this procedure out with all MCB's turned off.

Turn on the MCB that supplies the transformer. Measure both the primary and secondary tapping. (230 Volts and 24 Volts respectively)

Turn on the remaining MCB.

**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.

**2 Way PICV Valve**

Check that the PICV Valve operates correctly. The valve will auto configure itself determining the operating range. After this process the actuator moves into the required position to ensure the flow rate is as per unit setpoint.

**Resetting Alarms**

Reset any alarms to ensure correct alarm monitoring.

**Dual Power Supply**

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

**Dew Point Control**

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 InRak water temperatures can be offset to produce this alarm through the maintenance parameter of the controller.

Maintenance

Operational Maintenance checks

Owner’s Responsibilities

To ensure that the unit can be maintained correctly ensure the following requirements are met.  
Maintain a safe working environment around the unit, free from obstructions and debris.  
The unit shall observe the following maintenance regime as a minimum.

CAUTION ⚠	The equipment contains live electrical and moving parts, ISOLATE prior to maintenance or repair work. Ensure Lock off procedures are carried out accordingly.
CAUTION ⚠	Inputs or outputs not required will not be connected, nor will they appear on the display keypad.

Service Indicator

The maintenance of key components such as fans and air filters can be monitored via a service indicator which visually demonstrates the status relative to the component service intervals.

Inputs and outputs can be located by the labels to the microprocessor controller.

Maintenance

General Inspections

	Task	Frequency		
		3 Months	12 Months	60 Months
General Inspections	Check for visible mechanical damage to unit	●		
	Visually inspect the unit for general wear and tear, treat metalwork	●		
	Rust should be inhibited, primed and touched up with matching paint	●		
	Check for excess vibration from other rotating equipment	●		



- Service Tools/Test Equipment**

  - Touch up paint
  - Stiff Brush
- Safety Equipment**

  - Safety Glasses / Goggles

Maintenance  
Controls

	Task	Frequency		
		3 Months	12 Months	60 Months
Controls	Change controller battery. The controller will keep the strategy for a short period of time with no battery		●	



- Service Tools/Test Equipment**
  - Small Terminal Screwdriver
- Safety equipment**
  - Electrostatic Wristband

**Procedures**  
The following controller settings are to be recorded on the maintenance sheet.

**Maintenance****Electrical Inspection**

	Task	Frequency		
		3 Months	12 Months	60 Months
Electrical Inspections	Check main power supply voltages		•	
	Check electrical terminals are tight		•	
	Check for signs of hotspots/discolouration on power cables		•	
	Check amperages are as per design	•		

**Service Tools/Test Equipment**

- Voltmeter
- Screwdrivers / Allen Keys
- Ammeter

**Safety Equipment**

- Safety Glasses / Goggles

**Procedures****Electrical Connections**

Ensure all electrical connections are tight and correctly terminated.

**Electrical Earthing**

Check that the unit is correctly earthed.

**Voltage**

Measure the voltage at the following points and record on the maintenance sheet:

- Voltage at mains supply
- Control voltage at transformer 24V (min 22.5V, max 25V)

The voltage measurements should be carried out with the unit MCB's turned off.

**Maintenance****Waterside**

	Task	Frequency		
		3 Months	12 Months	60 Months
Waterside	Check pressure drop of water strainer. If excessive clean the strainer		•	
	Visually inspect pipe and pipework insulation. Check pipework clamps are secure		•	
	Inspect for water leakage	•		
	Check pressure drop of coil. If excessive clean	•		
	Check condition of Water/Glycol solution to ensure that the system is protected against corrosion, scale and microbiological fouling, ensuring maximum heat transfer efficiency	•		

**Service Tools/Test Equipment**

- Spanners
- Manometer
- Thermometer
- Refractometer

**Safety Equipment**

- Safety Glasses / Goggles
- Gloves
- Overalls

**Procedures****Binder Points**

Binder points should be fitted to both the flow and return pipe work adjacent to the unit.

**Water Strainer**

A water strainer must be fitted to the inlet side of the heat exchanger.

Failure to do so may result in severe damage and will void the AIREDALE warranty.

**Waterside Pressure Drop**

Measure the waterside pressure drop of the unit ensuring that the pump (if fitted) is operating.

**Glycol Strength**

Check and record the glycol type and strength. Low levels of glycol can cause freeze up problems when operating at low temperatures or during the unit off state during cold ambient conditions.

Glycol concentration is measured by use of a Refractometer.

Maintenance

System

	Task	Frequency		
		3 Months	12 Months	60 Months
System	Check the following against the commissioning records:			
	Record operating conditions	•		
	Water on/off temperatures	•		
	Water pressure drop	•		

Unit Operation Checks

Record the following operating conditions of the unit at stable conditions.

- Waterside Pressure drop (kPa)
  - Water flowrate (l/s)
- Water return temperature (°C)
  - Water supply temperature (°C)



**Troubleshooting**

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

Alarms

Alarm Menu Display

Alarm Description

Air Flow Fail

Number of Trips:1

Alarm Code

Number Of Trips

Alarm Log

The alarm page offers a log of the last 100 alarm messages in a scrolling log, pressing the alarm button will enter the alarm page. Consequently the most recent alarm has the lowest log number (001) and will be displayed upon entering the alarm page. As another alarm occurs, the alarm number increases until 100 alarms have occurred. From this point on, alarm 001 moves to 002 and any new alarm will reside in position 001. As new alarms are generated and cleared, the highest number logs (100) in the scroll will be lost.

Viewing the Alarm Log

By using the arrow keys, the last 100 alarms generated can be reviewed in chronological order. The display provides the alarm type information and the time and date of each alarm occurrence.

Alarm Detection

When the controller detects an alarm an output is generated to the relevant alarm relay which in turn illuminates the button. To see which alarm has accrued press the  button and the most recent alarm will be displayed. If the alarm light is on, the alarm page can be interrogated to identify which alarm is active.

Alarm Description

Displays Alarm Active or clear

Alarm Label Time

Alarm Log

Air Flow Al

Alarm Clear


11:22

20/04/15

The most current alarm is H001

Date of Alarm

Resetting the Alarm

The auto reset alarms will automatically reset once the conditions are within the set parameters. To clear a manual alarm press the  button twice and the red LED will disappear.

## 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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