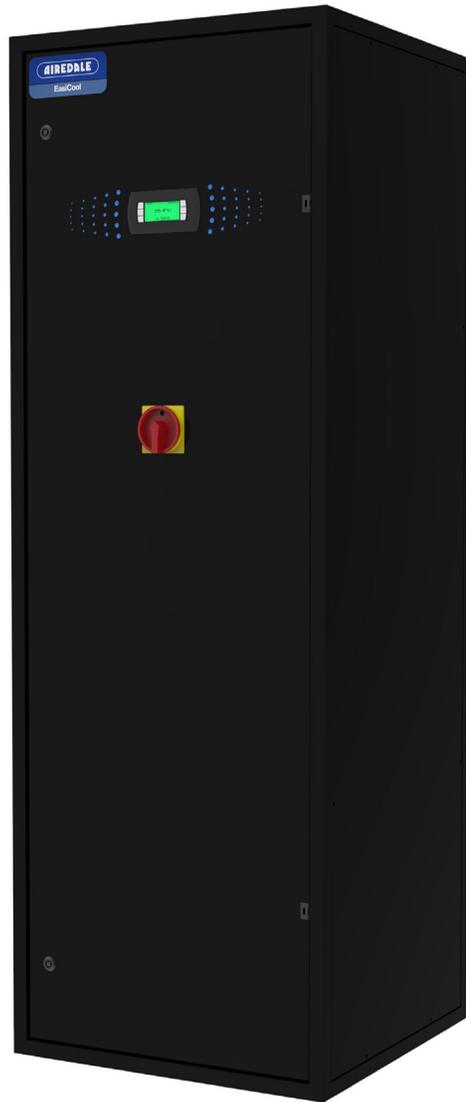


EasiCool™ EZRE



Operation and Maintenance Manual



ISO 14001
EM552086



ISO 9001
FM00542

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.

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

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

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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).

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 know. 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.

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, crank case heater permanent supplies 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.

The refrigerant used in this range of products is classified under the COSHH regulations as an irritant, with set Workplace Exposure Levels (WEL) for consideration if this plant is installed in confined or poorly ventilated areas.

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

Protective Personal Equipment

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

Refrigerant Warning

The Airedale EasiCool EZRE Precision Air Conditioning units use R410A refrigerant which requires careful attention to proper storage and handling procedures.

Use only manifold gauge sets designed for use with refrigerants. Use only refrigerant recovery units and cylinders designed for the pressure category of the refrigerants.

Refrigerants must only be charged in the liquid state to ensure correct blend makeup.

The refrigerant must be stored in a clean, dry area away from sunlight.

The refrigerant must never be stored above 50°C.

Global Warming Potential

R410A = 1900

EN378-1 :2008 (100 year life)

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.

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 ⁽¹⁾ is used within the system to ensure adequate protection. Please ensure that the concentration is capable of protection at least 3°C lower than ambient.

Water / glycol solution is 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 ⁽¹⁾ (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.

⁽¹⁾ 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)	2004/108/EC
Low Voltage Directive (LVD)	2006/95/EC
Machinery Directive (MD)	89/392/EEC version 2006/42/EC
Pressure Equipment Directive (PED)	97/23/EC

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

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Introduction

The EasiCool EZRE range of direct expansion and chilled water precision air conditioning units have been specifically designed for today's modern working environment.

The present day demands for efficient operation of computer rooms, telecommunication centres, operating theatres, laboratories and clean rooms, which utilise stand-alone or multiple in room air handling units, require a high degree of control flexibility.

The Airedale design philosophy has taken this fully into account offering an adaptable control system, utilising an microprocessor controller taking full advantage of the latest state of the art technology.

The control system comprises 2 main parts, the controller and the display keypad.

The controller offers powerful analogue and digital control to meet a wide range of monitoring and control features. The display keypad is used for viewing the unit operating status and making adjustments to control parameters by allowing the operator access to a series of display pages.

Visual alarm acknowledgement and the facility to adjust and display control settings are available at the display keypad for local operator information and control.

The microprocessor controller is supplied pre-programmed whilst allowing the control parameters to be individually set to suit the customer's requirements.

Pre Start Checks

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.

Crankcase Heater

The compressor crankcase heaters must be energised for a period of 8 hours before the unit can be started.

This is to ensure that liquid refrigerant has not condensed in the compressor during its off period.

Compressors cannot pump liquid and damage will occur if it does.

Check that the crankcase heater is operating correctly.

Shut Off Valves

All shut off valves must be opened prior to starting unit.

Electrical Power Supply

The power supply to the unit must be correct to design. The three phase power must be of correct phase orientation.

IMPORTANT

Check phase rotation of electrical supply prior to running the compressor as the compressor is direction sensitive.

Visual Inspection

Check that the unit is of satisfactory condition and that it's not damaged.

CAUTION

A damaged component could indicate a reason why the unit is not operating. Refrigerant leaks etc.

Electrical Overloads

Check that circuit breakers are all turned on. If not investigate why they have tripped. This could be the reason why the unit is turned off.

Unit Operation

The unit must not be started unless the pre start checks have been carried out. As standard the units are supplied with a microprocessor controller connected to a back-lit LCD keypad display.

The microprocessor controller can be linked together locally to provide run/standby operation. Windows based supervisor software is also available for local or remote networking. This modular approach provides great flexibility while at the same time reducing installation and maintenance costs.



Operation



1. ALARM

When more than one alarm is active the ALARM button will illuminate red.
Pressing the ALARM button once will indicate information regarding any active alarms.
Pressing the ALARM button twice will reset any active alarms.



2. PRG

Pressing the PRG button will select the main navigation menu.



3. ESC

Pressing the ESC button will return the user to the main display screen showing unit status.



4. UP

Pressing the UP button can either:
1.Scroll through the various display screens, providing the cursor is in the top left position.
2.Increase the value of a set point adjustment



5. ENTER

Pressing the ENTER button will confirm any set point adjustments and move the cursor to the next available set point.



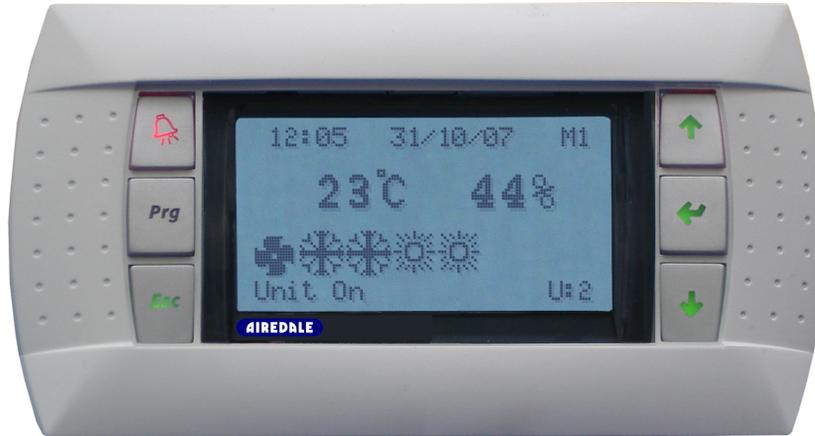
6. DOWN

Pressing the DOWN button can either:
1.Scroll through the various display screens, providing the cursor is in the top left position.
2.Decrease the value of a set point adjustment.

Display / Keypad

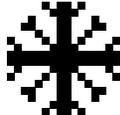
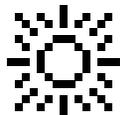
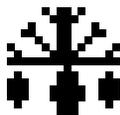
The display keypad features a simple array of keys to navigate through the in built menus. With an 8 x 22 character (132 x 64 pixel) screen size, back lit in white for improved contrast, the larger screen provides for user friendly viewing and easy status recognition by displaying a combination of text and icons.

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



Operation

Standard Icons

-  Fan operating
-  Cooling - up to 2 stages
-  Heating - up to 3 stages
-  De-Humidification
-  Humidification - Variable

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

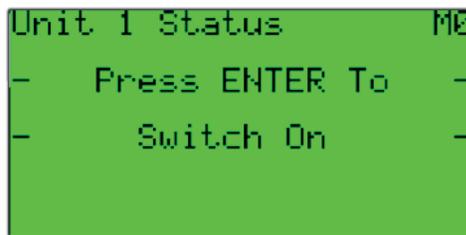
There are eight sub menu's available from the main navigation menu, these are listed below:

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

Enabling the Unit

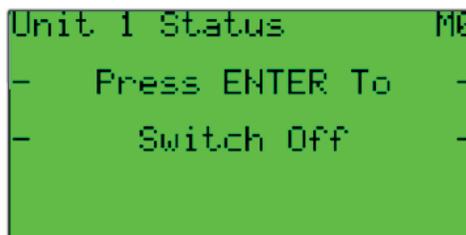
To turn the unit on press the  key to enter the program menu.

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:



CAUTION

The unit will be going through its start-up sequence.

Pressing  will turn the unit off.

Once the screen has changed to the above press the  key which will return back to the main screen.

Changing the Setpoint

To change the setpoint of the unit from the main screen press the  button.

Use the  and  to scroll to the setpoint option as shown below and press : 



The following screen will be shown:

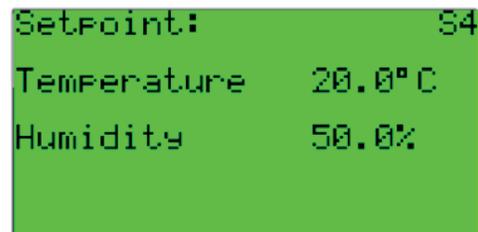
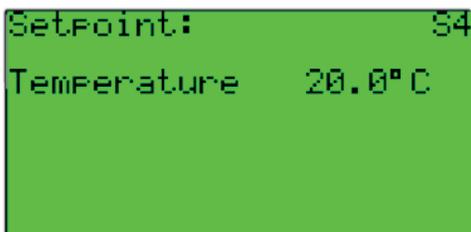


Using the  or  button, scroll to the password screen.



Enter the password 4648 using the  and  keys and press  after each number is entered. (The numbers start at 5555. So down one to 4, up one to 6 etc).

When the final number is entered the screen will jump to the set point adjustment screen:



To adjust the setpoint press the  key to highlight the set point, using the  and  keys enter the required setpoint and press the  until the cursor returns to the top of the screen.

Unit Operating Parameters

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

	X/WX Unit		CW Unit	
Analogue Inputs	B1	Return air humidity	B1	Return air humidity
	B2	Condensing Pressure	B2	Supply Air Temperature
	B3	Coil Temperature	B3	Coil Temperature
	B4	Not Used	B4	Not used
	B5	Return Air Temperature	B5	Return air temperature
	B6	Not Used	B6	Not used
Digital Inputs	ID1	Remote on/off	ID1	Remote on/off
	ID2	Airflow differential pressure switch	ID2	Airflow differential pressure switch
	ID3	Critical Alarm	ID3	Critical Alarm
	ID4	Overheat cut-out	ID4	Overheat cut-out
	ID5	Not Used	ID5	Not used
	ID6	Low pressure safety switch	ID6	Not used
	ID7	Compressor 1 status alarm	ID7	Not used
	ID8	Compressor 2 status alarm	ID8	Not used
Analogue Outputs	Y1	Main Fan Speed Controller Option 2 / EC Fans	Y1	Main Fan Speed Controller Option 2 / EC Fans
	Y2	Thyristor Heating	Y2	Thyristor Heating
	Y3	Main Fan Speed Controller Option 1	Y3	Main Fan Speed Controller Option 1
	Y4	Condenser Fan Speed Controller	Y4	Chilled Water Valve
Digital Outputs	NO1	Compressor 1	NO1	Open CW Valve
	NO2	Compressor 2	NO2	Close CW Valve
	NO3	Not Used	NO3	Not Used
	NO4	HGRH / Heat Stage 1 / LPHW Valve Open	NO4	Heat Stage 1 / Open LPHW Valve
	NO5	Heat Stage 2 / LPHW Valve Close	NO5	Heat Stage 2 / Close LPHW Valve
	NO6	Heat Stage 3	NO6	Heat Stage 3
	NO7	Not Used	NO7	Not Used
	NO8	Common Alarm	NO8	Common Alarm

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 compressors, 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.

Operational Maintenance checks

Owners Responsibility

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 follow 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.

Maintenance

General Inspections

	Task	Frequency		
		3 Mths	12 Mths	60 Mths
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
- Gloves

Procedures

General Wear

Visually inspect the equipment checking for signs of mechanical damage such as scratches etc. Treat with touch up paint available from Airedale.



Ensure adequate ventilation is available when using solvents and paint.

Excess Vibration

Check fans and rotating equipment for excess vibration. Be careful near rotating equipment.

Maintenance

Electrical Inspection

	Task	Frequency		
		3 Mths	12 Mths	60 Mths
Electrical Inspection	Check main power supply voltages		•	
	Check electrical terminals are tight.		•	
	Check for signs of hot spots / 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 busbar
- Dedicated power supply
- Voltage at permanent supply
- Control voltage at transformer (min 22.5V, max 25V)

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

EC Fan Interrogation

The EC fans can be interrogated by connecting a hardware interface kit to the fan and PC. The kit comprises of a USB to RS232 9-pin "D-type" adapter. This should be installed on the PC with the software supplied with the kit. The "COM" port of the USB to RS232 adapter should be assigned to a free COM port between COM 1 and COM 4 via the system device manager.

Connect the RS232 to RS485 interface converter to the USB port of your PC via the USB to RS232 serial interface lead and connect the RS485 output to the fan.

Tx += RS A Tx - = RS B

Maintenance

Refrigeration

	Task	Frequency		
		3 Mths	12 Mths	60 Mths
Refrigeration	Compare the following and compare results with commissioning records.			
	Suction, Liquid and Discharge pressures.	•		
	Refrigeration system temperatures, Suction, Liquid and Discharge. Record superheat and sub cooling readings.	•		
	Check each circuit sight glass for dryness and bubbles for indication of leaks.	•		
	Head pressure control is maintained.	•		
	Record details on F-Gas record.	•		
	Check compressor oil level.	•		



Service Tools / Test Equipment

- Refrigerant Manifold gauges
- Spanners
- Voltmeter

Safety Equipment

- Safety Glasses / Goggles
- Gloves
- Overalls

Procedures

HP / LP Safety Pressure Switch Settings

Check operating of HP / LP cut-out,

Settings

LP cut-out – (Manual reset)

Has a 2 minute delay on start-up (similar to a Low ambient kit) plus 60 second run delay.

Low pressure cut-out 1.5 +/- 0.2 Barg

HP switch (manual reset): High pressure switch 40.25 bar +/- 1 Barg

Compressor Oil Level (Full load)

Check the compressor oil level at full load. (record oil level)

Maintenance

Waterside

	Task	Frequency		
		3 Mths	12 Mths	60 Mths
Waterside	Check pressure drop of water strainer. If excessive clean the strainer.		•	
	Visually inspect pipe and pipework insulation. Pipework clamps are secure.		•	
	Inspect for water leakage.	•		
	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 cooling coil.

Water Strainer

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

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

Water Flow Rate

Check that the design water flow rate is available to the unit. If not available do not turn unit on.

Waterside Pressure Drop

Measure the waterside pressure drop of the unit ensuring control valves are operating satisfactory.

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

Controls

Controls	Task	Frequency		
		3 Mths	12 Mths	60 Mths
	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:

- Return air setpoint (°C)
- Return air humidity setpoint (%RH)
- Superheat setpoints (°C)
- Head pressure setpoint (Bar)
- Compressor hours run
- Unit hours run

Maintenance

System

	Task	Frequency		
		3 Mths	12 Mths	60 Mths
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:

- Suction pressure (Bar)
- Liquid pressure (Bar)
- Discharge pressure (Bar)
- Suction temperature (°C)
- Liquid temperature (°C)
- Discharge temperature (°C)
- Superheat (°C)
- Sub cooling (°C)
- Water return temperature (°C) (CW Units)
- Water supply temperature (°C) (CW units)
- Return air temperature (°C)
- Return air humidity (%RH)

Liquid line sight glass

Record the status of the liquid line sight glass

- Clear / Flashing
- Wet / Dry

The sight glass is used to indicate:

- The condition of the refrigerant in the system
- Lack of refrigerant
- Moisture content of the refrigerant

The colour of the sight glass depends on the moisture content of the refrigerant. The recommended moisture levels of a system should be below 75ppm.

An indication of green / dry are to be considered as perfect conditions meaning full protection by the filter drier against effects from moisture.

If the green colour starts to fade, the colour change from green to yellow has begun and the indicator should therefore be watched carefully. If the colour changes to yellow it is a clear signal that the capacity of the filter drier is exceeded and should be replaced as soon as possible.

F-Gas Leak Detection Checks

Perform an F-Gas refrigerant leak detection on the unit and ensure no refrigerant leaks are visible.

Maintenance

Troubleshooting

General Faults

	POSSIBLE CAUSE	REMEDY / ACTION
Compressor not operating.	No power to compressor.	Check isolator, fuses, MCBs, contactor and control circuit wiring.
	Seized compressor, possibly due to lack of oil, broken valve.	Replace compressor - investigate oil trapping and general installation.
	Defective compressor motor.	Check winding resistances - replace compressor. If burnt out follow burn out procedure using suction line burn-out drier.
	Compressor phase loss.	Check 3 phase supply to compressor.
	Klixon out and does not reset.	Sometimes it takes up to 4 hours to reset. Replace compressor if necessary.
	Low pressure switch operated (large or complete loss of refrigerant charge).	Repair leak and recharge system - if completely out evacuate before charging.
Noisy compressor.	Condenser fan motor thermal trip open circuit.	Investigate and correct.
	Lack of oil.	Repair leaks if any, add oil if required but not too much - remember too much is as bad as too little. Investigate pipe system and trapping. Best method to pump down to see if oil can be encouraged back. If no oil still, drain compressor and measure in correct quantity.
	Expansion valve stuck in open position (abnormally cold suction line).	Ensure bulb is tight on suction and superheat is correct (normally 5 to 6°C). Replace power assembly or valve as necessary.
Head pressure too high.	Damaged or worn compressor bearing (excessive knocking).	Replace compressor.
	Condenser coil clogged or dirty. Air or other non-condensable gas in system.	Clean condenser coil. Evacuate system and re-charge with new refrigerant. Always install new drier before evacuating.
	Overcharge of refrigerant.	Reclaim excess refrigerant from system (liquid only).
Head pressure too low.	Head pressure controller faulty.	Check fan speed controller - if faulty - replace.
	Fan not operating or operating inefficiently. Fan operating too fast in low ambient conditions.	Check motor - if faulty - replace. Check fan speed controller adjustment - if faulty - replace.
Compressor short cycles or LP cut-out operated.	Dirty filters.	Replace.
	Dirty or icing evaporator (reduced airflow).	Defrost and/or clean. Check gas charge and expansion valve.
	Lack of refrigerant (bubbles in sight glass only as indication).	Check for leaks - repair and recharge system.
	Clogged filter drier (pressure / temperature drop across it).	Replace.
	Condenser fan running at full speed in winter (full airflow).	Check fan speed controller setting - if faulty - replace.
	Start up problems in very low ambients.	Check for low suction pressures on start-up and fit a low ambient start kit if required, or check operation of system if already fitted.

Troubleshooting

FAULT	POSSIBLE CAUSE	REMEDY / ACTION
Suction pressure too low.	Low evaporator airflow.	Depending on model: Check fan motor speed set point or Check fan motors, belts and drives
	Flash gas (bubbles in sight glass) at expansion valve.	Investigate for refrigerant leaks, repair and re-charge system.
	Clogged filter drier (pressure / temperature drop across it). Obstruction in expansion valve.	Replace. Inspect, clean or replace.
Condenser fan not operating - power on.	Motor / fan assembly jammed.	Isolate unit and check free rotation of motor / fan assembly. If faulty - replace.
	Fault at motor terminal box supply terminals.	Isolate and check electrical connections are secure.
	Motor internal overheat protector tripped.	Carry out continuity check at terminals "TK" in motor terminal box. If tripped and motor hot - check bearings. If tripped and motor cold - replace motor.
	Power supply failure.	Check power supply at circuit breaker.
	Wiring to motor.	Check voltage at motor terminals.
	Faulty motor windings / capacitor.	Motor humming would indicate fault in motor or capacitor.
	Minimum speed set too low.	Adjust head pressure controller to suit.
Condenser fan runs too fast. Condenser fans runs only slowly.	Faulty pressure sensor.	Check electrical connections are secure at controller and pressure sensor. Replace controller and sensor (as they are matched sets). Link wires "line" and "load" to bypass controller. If motor runs full speed - replace unit.
	Faulty Controller.	
	High ambient condition or excessive re-circulation of air around condenser coil. Minimum set speed setting incorrect. Incorrect pressure setting.	Check installation against design. Adjust as necessary. Adjust sensor screw as necessary.
Condenser fan runs too fast. Condenser fans runs only slowly.	Faulty Fan Speed Controller.	Replace controller and sensor (as they are matched sets).
	Faulty pressure sensor.	Replace controller and sensor (as they are matched sets).
	Motor wired incorrectly.	Check against wiring diagram - correct as required.
	Motor / capacitor faulty.	Replace.

Troubleshooting

Suction Throttle Valve (STV) (Optional Extra)

FAULT	POSSIBLE CAUSE	REMEDY / ACTION
Suction pressure too low.	Suction throttle valve fully shut.	Check valve opens fully at 100% cooling demand. Inspect, clean or replace.
High discharge temperature.	Suction throttle valve in operation.	Check suction throttle valve operation. Inspect, clean or replace. Open suction throttle valve to reduce discharge temperature.
	Large or complete loss of refrigerant charge.	Investigate for refrigerant leaks, repair and re-charge system.
High compressor superheat.	Suction throttle valve shut.	Check suction throttle valve operation. Inspect, clean or replace.
	Large or complete loss of refrigerant charge.	Investigate for refrigerant leaks, repair and re-charge system.
Cooling output insufficient.	Suction throttle valve in operation.	Check supply air setpoint and unit cooling demand.

Hot Gas Re-Heat (HGRH) (Optional Extra)

FAULT	POSSIBLE CAUSE	REMEDY / ACTION
Cooling output insufficient.	Hot gas re-heat coil in operation.	Check cooling demand and ensure hot gas re-heat valve is closed. Check hot gas re-heat valve operation. Inspect, clean or replace.
Re-heat output insufficient.	Faulty hot gas re-heat valve.	Check hot gas re-heat valve operation. Inspect, clean or replace.

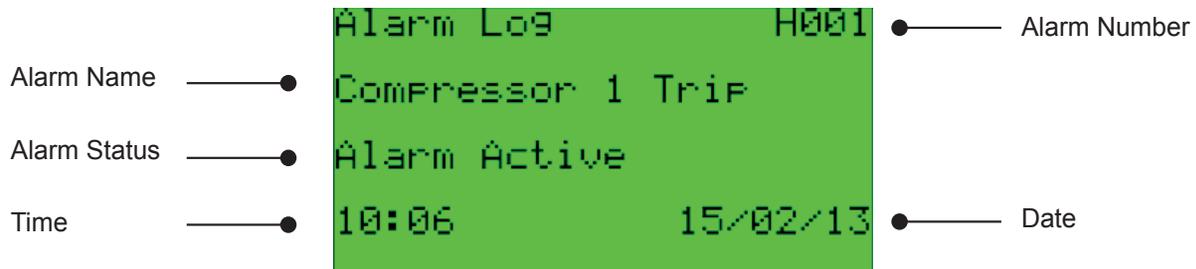
Humidifier (Optional Extra)

FAULT	POSSIBLE CAUSE	REMEDY / ACTION
Main fuses / MCB trips when initially switched on.	Cylinder damage (shorted electrode(s).	Test with Megger - Replace cylinder.
Humidifier 'called for' but not filling.	Water not available at cylinder.	Check all mains cold water valves. Check any strainers fitted. Check inlet solenoid valve (yellow) strainer - clean as necessary. Inlet water solenoid not operating - check for feed. Replace solenoid / control board as necessary. Mains water pressure over 8 Bar - fit pressure reducing device.
	Too high steam delivery back pressures.	Check steam delivery pipe is not blocked with debris.
	Cylinder inlet filter clogged. Limescale inside the supply tank.	Clean the filter. Clean the supply tank.
The humidifier loads with water but does not produce steam.	Drain solenoid valve faulty.	Check 24 Vac anomalous presence on the drain solenoid valve and/or replacement of drain solenoid valve.
	Supply or overflow hydraulic circuit leaking.	Check the entire hydraulic circuit.
The humidifier wets the underlying floor.	Steam delivery pipe not properly fastened to the cylinder.	Check fastening of the clamp on the steam delivery pipe.
Cylinder operating - Low Current / Low output.	Humidifier in start-up phase.	Wait for impurity concentration to build up through natural drain cycle. This will allow an increase in passed current.
	Cylinder nearing end of useful life.	Strip and clean or replace.

Troubleshooting

Alarms

Alarm Menu Display



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.

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.

Alarm Codes

Alarm 1: Airflow Failure

This alarm indicates that the airflow switch has not detected any airflow for 60 seconds when the main fan has been switched on. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 2: Critical Alarm

This alarm indicates that a critical alarm has occurred and the unit has shutdown. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 3: Overheat Cut-out

This alarm indicates that the auto overheat cut-out(s) has tripped and has switched off all stages of electric heating. This alarm is auto reset within the controller.

Alarm 4: Low Pressure

This alarm indicates that the low pressure safety switch has tripped and the controller has switched off DX cooling. This alarm is manual reset and can be cleared by referring to resetting the Alarm..

Alarm 5: Condensing Unit Trip

This alarm indicates that the condensing unit has tripped. During this alarm the controller will switch off DX cooling. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 6: Compressor 1 Trip

This alarm indicates that compressor 1 contactor did not close within 5 seconds of the compressor 1 output switching on. This alarm can be triggered by either one or more of the following conditions; high pressure safety switch, discharge gas thermostat or thermal cut-out protection. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 7: Compressor 2 Trip

This alarm indicates that compressor 1 contactor did not close within 5 seconds of the compressor 1 output switching on. This alarm can be triggered by either one or more of the following conditions; high pressure safety switch, discharge gas thermostat or thermal cut-out protection. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 8: Filter Change

This alarm is generated after the main fan has operated for 1500 hours and indicates the air filters should be cleaned or replaced. This alarm is manual reset and be cleared after filter maintenance by referring to resetting the Alarm.

Alarm 9: Return Humidity Fault

This alarm indicates that the return air humidity sensor is not operating correctly. During this alarm the controller disables all humidification and dehumidification outputs. When the sensor is operating normally the alarm will auto reset and the controller will enable humidification and dehumidification.

Alarm 10: Condensing Pressure Fault

This alarm indicates that condensing pressure sensor is not operating correctly. During this alarm the controller will operate the condenser fan at full speed. When the sensor is operating normally the alarm will auto reset and the controller will resume normal head pressure control.

Alarm 11: Return Temperature Fault

This alarm indicates that the return air temperature sensor is not operating correctly. During this alarm the controller disables all heating and cooling outputs. When the sensor is operating normally the alarm will auto reset and the controller will enable heating and cooling.

Alarm 12: Coil Temperature Fault

This alarm indicates that the coil temperature sensor is not operating correctly. When the sensor is operating normally the alarm will auto reset.

Alarm 13: High Return Temperature

This alarm indicates that the return air temperature has exceeded the return air temperature high limit. To prevent nuisance alarms on initial fan start-up, the alarm is delayed for 2 minutes. When the return air temperature is below the high limit the alarm is auto reset within the controller.

Alarm 14: Low Return Temperature

This alarm indicates that the return air temperature has exceeded the return air temperature low limit. To prevent nuisance alarms on initial fan start-up, the alarm is delayed for 2 minutes. When the return air temperature is above the low limit the alarm is auto reset within the controller.

Alarm 15: High Return Humidity

This alarm indicates that the return air humidity has exceeded the return air humidity high limit. To prevent nuisance alarms on initial fan start-up, the alarm is delayed for 2 minutes. When the return air humidity is below the high limit the alarm is auto reset within the controller.

Alarm 16: Low Return Humidity

This alarm indicates that the return air humidity has exceeded the return air humidity low limit. To prevent nuisance alarms on initial fan start-up, the alarm is delayed for 2 minutes. When the return air humidity is above the low limit the alarm is auto reset within the controller.

Alarm 17: Hours Limit Compressor 1

This alarm indicates that the running hours of compressor 1 have exceeded the hours run threshold. This alarm is for maintenance use only and the compressor will continue to operate. Before attempting to reset this alarm, the running hours of compressor need to adjusted below the hours run threshold. Then this manual reset alarm can be cleared by referring to resetting the Alarm.

Alarm 18 Hours Limit Compressor 2

This alarm indicates that the running hours of compressor 2 have exceeded the hours run threshold. This alarm is for maintenance use only and the compressor will continue to operate. Before attempting to reset this alarm, the running hours of compressor need to adjusted below the hours run threshold. Then this manual reset alarm can be cleared by referring to resetting the Alarm.

Alarm 19: Hours Limit Main Fan

This alarm indicates that the running hours of the main fan have exceeded the hours run threshold. This alarm is for maintenance use only and the main fan will continue to operate. Before attempting to reset this alarm, the running hours of main fan need to adjusted below the hours run threshold. Then this manual reset alarm can be cleared by referring to resetting the Alarm.

Alarm 20: Hours Limit Humidifier

This alarm indicates that the running hours of the humidifier have exceeded the hours run threshold. This alarm is for maintenance use only and the humidifier will continue to operate. Before attempting to reset this alarm, the running hours of humidifier need to reset. Then this manual reset alarm can be cleared by referring to resetting the Alarm.

Alarm 21: Clock Faulty

This alarm indicates that the controller's real time clock is not operating correctly. During this alarm any time zones set-up would be ignored. When the clock is operating normally the alarm will auto reset and the controller will resume any time zones previously set-up.

Alarm 22: LAN Disconnected

This alarm indicates that there is a network communications fault between one or more units. If the unit is configured as standby, the unit will automatically start-up and continue to operate until the network communications fault has been rectified. This alarm is auto reset.

Alarm 23: High Pressure

This alarm indicates that the condenser pressure has exceeded the condenser high limit and DX cooling has switched off. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 24: Frost Protection

This alarm indicates that the controller has disabled DX cooling to prevent frost damaging the heating coil. This alarm is auto reset.

Alarm 25: High Conductivity Alarm

This alarm indicates that the mains water supply conductivity has exceeded the high conductivity limit and the humidifier has been disabled. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 26: High Conductivity Warning

This alarm indicates that the mains water supply conductivity has exceeded the warning conductivity limit, the humidifier is still allowed to operate. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 27: High Current Humidifier

This alarm indicates that the humidifier has a high operating current. During this alarm the humidifier will be switched off. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 28: Low Current Humidifier

This alarm indicates that the humidifier has a low operating current, suggestion the cylinder needs replacing or cleaning. During this alarm the humidifier will be switched off. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 29: Lack Water Humidifier

This alarm indicates that the humidifier has not measured any current during the fill cycle and hence determined that no water has entered the humidifier. During this alarm the humidifier will be switched off. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 30: Low Production Humidifier

This alarm indicates that the humidifier has not reached its required steam production. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 31: Drain Alarm Humidifier

This alarm indicates that the humidifier cannot drain the water from the cylinder. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 32: Humidifier Full

This alarm indicates that the water level within the cylinder has reached the high level electrodes. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 33: Pre-exhaustion Humidifier

This alarm indicates that the cylinder needs to be replaced. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 34: Foam In The Humidifier

This alarm indicates that foam or bubbles have been detected within the cylinder. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 35: Exhaustion Humidifier

This alarm indicates that the cylinder has ceased working and needs to be replaced. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 36: Probes Error Driver

This alarm can be triggered by either a suction pressure transducer fault or a suction line temperature sensor fault. During the alarm the electronic expansion valve is closed and compressor 1 is switched off. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 37: EEPROM Error Driver

This alarm indicates that there has been an error between the data stored in the EEPROM memory and the data stored in the controller. During the alarm the electronic expansion valve is closed and compressor 1 is switched off. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 38: Stepper Motor Error Driver

This alarm indicates that there has been an electrical fault with the electronic expansion valves stepper motor. During the alarm compressor 1 is switched off. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 39: Battery Error Driver

This alarm indicates that the battery is not recharging correctly or storing electrical charge. This alarm is manual reset and can be cleared by referring to resetting the Alarm..

Alarm 40: MOP Alarm Driver

This alarm indicates that the evaporating temperature has exceeded the MOP limit. During the alarm the electronic expansion valve driver modulates the valve closed to reduce the operating pressure, still maintaining the super heat. This alarm is auto reset.

Alarm 41: LOP Alarm Driver

This alarm indicates that the evaporating temperature has exceed the LOP limit. During the alarm the electronic expansion valve driver modulates the valve open to increase the operating pressure, still maintaining the super heat. This alarm is auto reset.

Alarm 42: Low Super Heat Alarm Driver

This alarm indicates that the super heat has exceeded the low super heat limit. During the alarm compressor 1 is switched off. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 43: High Suction Temperature Alarm Driver

This alarm indicates that the suction temperature sensor has exceeded the high suction temperature limit. This alarm is manual reset and can be cleared by referring to resetting the Alarm.

Alarm 44: Valve Not Closed Driver

This alarm indicates that the electronic expansion valve was not closed when the power was restored. During this alarm compressor 1 is switched until the alarm is reset. This alarm is manual reset and can be cleared by referring to Resetting the Alarm.

Alarm 45: Supply Air Temperature Sensor Fault

This alarm indicates that the supply air temperature sensor is not operating correctly. During this alarm the controller will disable supply air limiting, if enabled. When the sensor is operating normally the alarm will auto will resume reset and the controller supply air limiting, if enabled.

Alarm 45: High Supply Air Temperature Alarm

This alarm indicates that the supply air temperature has exceeded the supply air temperature high limit. To prevent nuisance alarms on initial fan start-up, the alarm is delayed for 2 minutes. When the supply air temperature is below the high limit the alarm is auto reset within the controller.

Alarm 46: Low Supply Air Temperature Alarm

This alarm indicates that the supply air temperature has exceeded the supply air temperature low limit. To prevent nuisance alarms on initial fan start-up, the alarm is delayed for 2 minutes. When the supply air temperature is above the low limit the alarm is auto reset within the controller.

Alarm 48: Discharge Temperature 1 Sensor Fault

This alarm indicates that the Discharge temperature sensor is not operating correctly. During this alarm the controller will disable compressors, if enabled. When the sensor is operating normally the alarm will auto resume reset.

Alarm 49: Discharge Temperature 2 Sensor Fault

This alarm indicates that the Discharge temperature sensor is not operating correctly. During this alarm the controller will disable compressors, if enabled. When the sensor is operating normally the alarm will auto resume reset.

Alarm 50: Fire / Smoke Alarm

This alarm indicates that a Fire/Smoke alarm has occurred and the unit has shutdown. This alarm is manual reset.

Alarm 51: Water Flood Alarm

This alarm indicates that the water has been detected by the unit and the unit has shutdown. This alarm is manual reset.

Alarm 52: Phase Failure

When the phase failure is detected, the unit will shut down and the alarm will be indicated on the display and circuit 1 and 2 alarm relays. The alarm will auto reset when alarm condition is cleared. The unit will restart after the delay on period has elapsed

Alarm 53: Warning Cylinder 1 Maintenance

This alarm indicates that the cylinder operating hours have exceeded. The warning can be reset by the operation hour's counter.

Alarm 54: Alarm Cylinder 1 Maintenance

This alarm indicates that the cylinder maximum operating life has been exceeded and the bottle needs replacing.

Alarm 55: Warning Compressor 1 High Discharge Temperature

This alarm is a warning that indicates the discharge temperature sensor is close to the high discharge temperature limit. This alarm is manual reset and can be cleared by referring to resetting the Alarm

Alarm 56: Compressor 1 High Discharge Temperature

This alarm indicates that the discharge temperature sensor has exceeded the high discharge temperature limit. This alarm is manual reset and can be cleared by referring to resetting the Alarm

Alarm 57: Warning Compressor 1 Low Discharge Temperature

This alarm is a warning that indicates the discharge temperature sensor is close to the low discharge temperature limit. This alarm is manual reset and can be cleared by referring to resetting the Alarm

Alarm 58: Compressor 1 Low Discharge Temperature

This alarm indicates that the discharge temperature sensor has exceeded the low discharge temperature limit. This alarm is manual reset and can be cleared by referring to resetting the Alarm

Alarm 59: Warning Compressor 2 High Discharge Temperature

This alarm is a warning that indicates the discharge temperature sensor is close to the high discharge temperature limit. This alarm is manual reset and can be cleared by referring to resetting the Alarm

Alarm 60 Compressor 2 High Discharge Temperature

This alarm indicates that the discharge temperature sensor has exceeded the high discharge temperature limit. This alarm is manual reset and can be cleared by referring to resetting the Alarm

Alarm 61: Warning Compressor 2 Low Discharge Temperature

This alarm is a warning that indicates the discharge temperature sensor is close to the low discharge temperature limit. This alarm is manual reset and can be cleared by referring to resetting the Alarm

Alarm 62: Compressor 2 Low Discharge Temperature

This alarm indicates that the discharge temperature sensor has exceeded the low discharge temperature limit. This alarm is manual reset and can be cleared by referring to resetting the Alarm

Alarm 63: Driver 1 LAN Disconnected

This alarm indicates that the system cannot detect a connection to EEV driver 1.

Alarm 64: Bottle Change Alarm

This alarm indicates that the cylinder needs to be changed when a vapac humidifier is selected.

Alarm 65: Unit Switched Off By Display

This alarm indicates that the unit is turned off by the display, the unit can be turned on in the programming section of the controller.

Alarm 66: Maintenance Required (Mn)

The Mn alarm occurs when the life timer within the CPY board is greater than 1.5 times the user's maintenance life time.

This is defaulted to 4500 hours of operation. The cylinder may need cleaning or replacing at this stage.

Alarm 67: High Supply Water Conductivity (EC)

This alarm implies the water entering the humidifier cylinder has high conductivity. If the water continues to have high conductivity the humidifier will stop production.

Alarm 68: Configuration Parameters Corrupt (E1)

This alarm is associated with the parameters within the CPY when they become corrupted. This will stop the humidifier from working correctly.

Alarm 69: Internal Error (E0)

This alarm is similar to the alarm 68, it is associated with the internal memory within the device. This will cause humidification to stop.

Alarm 70: High Current (EH)

This alarm will be active when the CPY detects a high electrode current, a current higher than the maximum limits. The humidifier will cut power from the electrodes and drain the cylinder.

Alarm 71: Low Steam Production (EP)

The CPY estimates the steam production rate using the current drawn by its electrodes. If this steam production rate is lower than what it expects this alarm will be activated.

Alarm 72: High Water Level with no Humidification Demand (EU)

This alarm occurs when the humidifier is effectively switched off however there is a high water level within the cylinder. Usual the result of a faulty fill valve.

Alarm 73: External Control Signal Fault (E3)

This alarm is active when there is no external control signal connected to the CPY Board. This signal can be a 0-10V connection or a serial connection depending on the circuit setup.

Alarm 74: Lack of Supply Water (EF)

This alarm occurs when the CPY Board tries to add water but the level doesn't increase within the cylinder. This level is estimated by the TAM circuit as the current will increase as the water content increases.

Alarm 75: Drain Fault (Ed)

This signals there is a fault with the drain, either the pump has become blocked or is not working correctly.

Alarm 76: Maintenance Time Expired (CY)

This alarm signals that the maintenance time has expired and the cylinder may need cleaning or replacing. The maintenance period is defaulted to 3000 operating hours.

Alarm 77: Foam in Humidifier Cylinder (EA)

This alarm is active when the CPY Board constantly has its high water level sensor active. This means that there is foam in the cylinder which keeps triggering a high water level alarm. If the water added to the cylinder is too soft it can cause the cylinder to foam.

Alarm 78: Humidifier Cylinder Requires Clean (CP)

Lime scale can build up on the electrodes as water is boiled and minerals are left behind. This can limit the amount of steam being produced, this alarm will be active when the CPY realises this.

Alarm 79: Replace Humidifier Cylinder (CL)

This alarm is active 3 hours prior to the bottle being completely depleted. The Cylinder is full of flakes and cannot operate to the required standard anymore, it needs replacing.

Alarm 80: CPY Device Offline

When there is no active connection over the serial bus the CPY will pCO will display this alarm.

Alarm 81: Serial Disconnected (Su)

When there is no demand sent over the serial connection this alarm is displayed.



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OM_7610207_Easicool_EZRE_SCROLL_V1.0.0_02_2013