marstair

TECHNICAL MANUAL

FOR CD3 (929 SERIES) CHILLED WATER CLOSE CONTROL UNITS

This manual covers installation and technical aspects of TEV Ltd. CD3 range (929 series) of close control units.

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92908133-09

INTRODUCTION

The standard air handler units in the CD3 Chilled Water range are available as Configured units in upflow and downflow versions. All units are electronically controlled.

Options can provide the close control of temperature and humidity demanded by computer rooms, laboratories, banks, offices etc..

CD3-RANGE - GENERAL DESCRIPTION

CW UPFLOW/DOWNFLOW CONFIGURABLE* -- electronic (microprocessor) controls

- **CUSTOMER CONFIGURABLE**

MODEL	8	10	15	20
UPFLOW	92917001	92917002	92917003	92917004
DOWNFLOW	92917005	92917006	92917007	92917008

CHILLED WATER ELECTRONIC CONFIGURABLE UNIT FEATURES:

* 4 capacity sizes in 3 cabinets
* Class 'O' thermal and acoustic insulation
* Washable filters
* Discharge plenum (Upflow only)
* Display giving access to set points and alarms
* Upflow and downflow systems available
* Electronic (microprocessor) controls
* Electronically controlled fan speeds
* Switches: Off/standby, unit run
* Alarms: humidity/temperature out of limits

Each unit is controlled using a programmable microprocessor controller, providing the versatility of control needed to meet the demand of the market place; from

CD3 CONFIGURABLE ACCESSORIES

DESCRIPTION	MODEL	Field Fit Kit Part Number	Factory Fitted Option Part Number
CONTROLS			
Electronic Humidity Only Control (and bottle change indication)	ALL		92900405
Hum and Dehum Control (and bottle change indication)	ALL		92900418
Dehum Control (No Humidifier)	ALL		92900416
pCONET BMS BACnet Control	ALL	92919134	92919133
USB to RS485 Connector	ALL	92919136	
ALARMS			
1 High water level	ALL		92900412
2 Water spillage	ALL		92900411
3 Fan failure	ALL		92900408
Dirty filter indication	ALL		92900409
Dirty filter indication - volt free relay	ALL		92900621
Hum bottle change indication - volt free relay	ALL		92900622
CHILLED WATER VALVES			
2 way motorised	008, 010, 015	92911028	92900428
	20	92911029	92900429
3 way motorised	008, 010, 015	92911030	92900430
	20	92911031	92900431
Modulating 3 port valve	008, 010, 015	92911092	92900492
	20	92911093	92900493
ELECTRIC HEATERS - SINGLE STAGE For 2 stage heaters add kits together , e.g.: 8kW + 6kW = 14kW Max. heater loads: 008 = 8kW, 010 = 10kW, 015 = 16kW, 020 = 20kW	2 kW		92900451
	4 kW		92900452
	6 kW		92900453
	8 kW		92900454
	10kW		92900455
HEATER RAIL (must be used with electric heaters on all units)	008U		92919021
	010U, 015U		92919022
	020U		92919023
	008D		92900464
	010D, 015D		92900465
	020D		92900466

DESCRIPTION		MODEL	Field Fit Kit Part Number	Factory Fitted Option Part Number
LPHW COIL	7.52kW	008 U/D		92900423
	10.50kW	010 U/D		92900424
	14.94kW	015 U/D		92900424
	18.40kW	020 U/D		92900425
LPHW VALVE	2 WAY	ALL		92900426
(motorised)	3 WAY	ALL		92900427
HUMIDIFIER (For hum and dehum controls see next page)	0-4kg/h	008U		92900444
		010U, 015U		92900445
		020U		92900446
		008D		92900447
		010D, 015D		92900448
		020D		92900449
CONDENSATE PUMP (alarm interface fitted)		ALL		92900402
FRESH AIR SPIGOT	100mm dia	ALL		92900462
FRESH AIR SPIGOT	160mm dia	ALL		92900463
FRESH AIR FAN AND FILTER	93m³/h	ALL		92900403
FRESH AIR FAN AND FILTER	186m³/h	ALL		92900404
TOP DUCTED DISCHARGE SPIGOT (when used as return air spigot on downflow units a plenum is required for access to disposable filters).		8		92900459
		010, 015		92900460
		20		92900461
SOUND ATTENUATION SECTION		008 U		92900475
		010U, 015U		92900476
		020U		92900477
FLOOR STAND PLINTH 75mm high (Recommended for use with all floor standing units and for side entry of services)		008U		92900432
		010U, 015U		92900433
		020U		92900434
		008D		92900435
		010D, 015D		92900436
		020D		92900437
DOWNFLOW PLINTH	Front discharge	008D		92900481
300mm high	Front discharge	010D, 015D		92900482
	Front discharge	020D		92900483
	Rear discharge	008D		92900484
	Rear discharge	010D, 015D		92900485
	Rear discharge	020D		92900486
DOUBLE DEFLECTION GRILLE (Upflow only)		008U		92900494
		010U, 015U		92900495
		020U		92900496
DISPOSABLE FILTER (Replaces washable filter)	50mm	008U		92900438
		010U, 015U		92900439
		020U		92900440
		008D		92900441
		010D, 015D		92900442
		020D		92900443
HIGH EFFICIENCY FILTERS 100mm (Includes additional plenum section)		008U/D		92900478
		010U/D, 015U/D		92900479
		020U/D		92900480
ISOLATOR	63A	008U/D		92900456
		010U/D, 015U/D		92900457
		020U/D		92900458

U = UPFLOW D = DOWNFLOW

CD3 UNITS DIMENSIONS AND WEIGHTS (no plenums fitted)

	UNPACKED				PACKED			
	CD3				CD3			
Model	**8**	**10**	**15**	**20**	**8**	**10**	**15**	**20**
HEIGHT mm	1165	1165	1165	1165	1300	1300	1300	1300
WIDTH mm	1230	1380	1380	1580	1250	1400	1400	1600
DEPTH mm	430	430	430	430	455	455	455	455
WEIGHT kg	124	142	151	160	141	160	169	184

PRODUCT SELECTION

CHILLED WATER PERFORMANCE DATA

MODEL	**008**	**010**	**015**	**020**
AIRFLOW (max) m^3/s	**0.78**	**1.04**	**1.23**	**1.51**

NOMINAL COOLING CAPACITIES CHILLED WATER 5°C - 10.5°C

22°C 50% RH	**TOTAL**	**8.75**	**12.40**	**16.81**	**22.06**
	SENS	**8.33**	**11.34**	**14.84**	**18.87**
24°C 50% RH	**TOTAL**	**12.19**	**16.48**	**22.11**	**28.25**
	SENS	**9.77**	**13.03**	**17.05**	**21.43**
26°C 50% RH	**TOTAL**	**15.57**	**20.57**	**27.45**	**34.62**
	SENS	**11.07**	**14.60**	**19.09**	**23.85**

NOMINAL COOLING CAPACITIES CHILLED WATER 6°C - 11°C

22°C 50% RH	**TOTAL**	**8.19**	**11.49**	**15.59**	**20.37**
	SENS	**8.09**	**10.95**	**14.31**	**18.12**
24°C 50% RH	**TOTAL**	**11.56**	**15.51**	**20.82**	**26.48**
	SENS	**9.50**	**12.62**	**16.49**	**20.66**
26°C 50% RH	**TOTAL**	**14.88**	**19.54**	**26.07**	**32.84**
	SENS	**10.78**	**14.16**	**18.50**	**23.08**

NOMINAL COOLING CAPACITIES CHILLED WATER 7°C - 12.5°C

22°C 50% RH	**TOTAL**	**6.80**	**9.50**	**12.49**	**16.17**
	SENS	**6.80**	**9.50**	**12.49**	**16.17**
24°C 50% RH	**TOTAL**	**9.01**	**12.62**	**17.13**	**22.36**
	SENS	**8.45**	**11.42**	**14.94**	**18.90**
26°C 50% RH	**TOTAL**	**12.54**	**16.83**	**22.60**	**28.75**
	SENS	**9.83**	**13.05**	**17.06**	**21.36**

NOMINAL COOLING CAPACITIES CHILLED WATER 9°C – 14.5°C

22°C 50% RH	**TOTAL**	**5.07**	**7.48**	**9.86**	**13.03**
	SENS	**5.07**	**7.48**	**9.86**	**13.03**
24°C 50% RH	**TOTAL**	**6.95**	**9.61**	**12.64**	**16.28**
	SENS	**6.95**	**9.61**	**12.64**	**16.28**
26°C 50% RH	**TOTAL**	**9.24**	**12.81**	**17.42**	**22.63**
	SENS	**8.55**	**11.48**	**15.00**	**18.91**

AIRFLOWS (m^3/s)

CD3							
008		010		015		020	
Min	Max	Min	Max	Min	Max	Min	Max
0.42	0.78	0.67	1.04	0.72	1.23	0.92	1.51

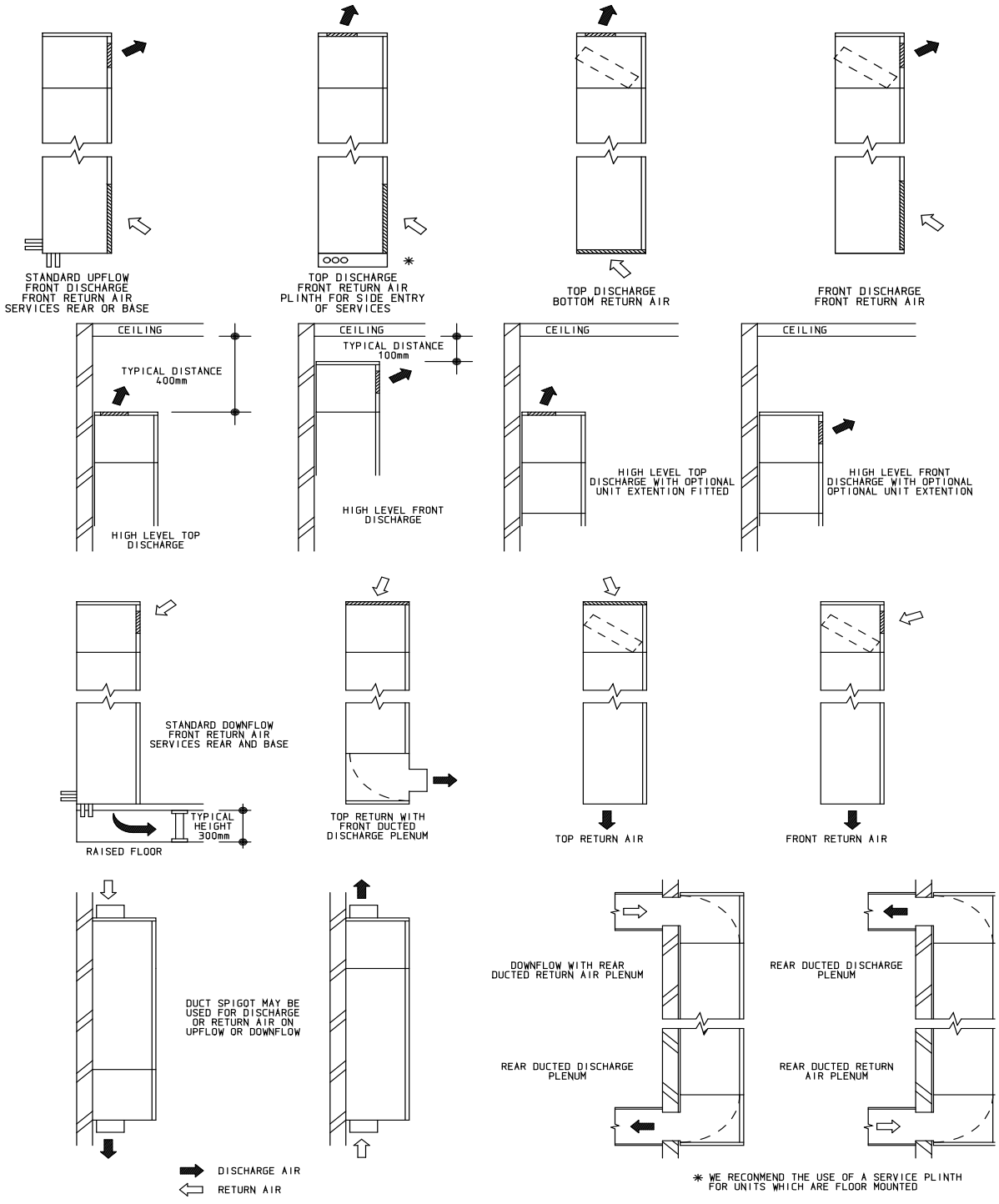
Maximum external resistance = 150 Pa at Maximum air volume

SOUND PRESSURE LEVELS -- CD3 UNITS

UPFLOW	FAN SPEED		8	10	15	20
Top Discharge and Front Return	High	NC	59	60	58	61
		dBA	66.5	67	65	68
Front Discharge with Plenum and Front Return	High	NC	49	49	48	50
		dBA	58.5	58.5	57	58
Front Discharge and Front Return	High	NC	60	58	58	60
		dBA	67	65	65	65

DOWNFLOW	FAN SPEED					
Standard	High	NC	44	45	45	48
		dBA	53	54	54	56

CD3 AIRFLOW OPTIONS



CD3 SERIES CLOSE CONTROL UNIT INSTALLATION

An envelope containing important user information is supplied with the indoor unit. Please pass this to the end user.

1 The standard unit is supplied configured for the correct airflow as ordered by the customer.

2 The central panel, with control panel inset, **MUST** be removed first using the two keys provided.

UNIT ACCESS AND CABINET STRIP DOWN

1 If a door interlock isolator is fitted, ensure that the switch is turned to the **OFF** position.

2 Using the keys provided, unlock the electrics access panel. Remove the panel by easing outwards and down.

3 The side panels can be removed by releasing the two swell latches located through the side bulkheads within the electrics compartment and carefully pulling outwards until they are clear of the upper and lower grabber catches.

4 Access to the fan section, (and coil section in the downflow mode), can be gained by releasing the appropriate swell latches located through the cut outs to the front of the side bulkheads and removing the panel.

5 The return air grille can be removed by turning the 4 retaining screws anticlockwise until a click is heard and pulling the grille outwards.

MOUNTING

1 It is recommended that **ALL** field fit kits be installed prior to mounting the unit and brazing the pipe work.

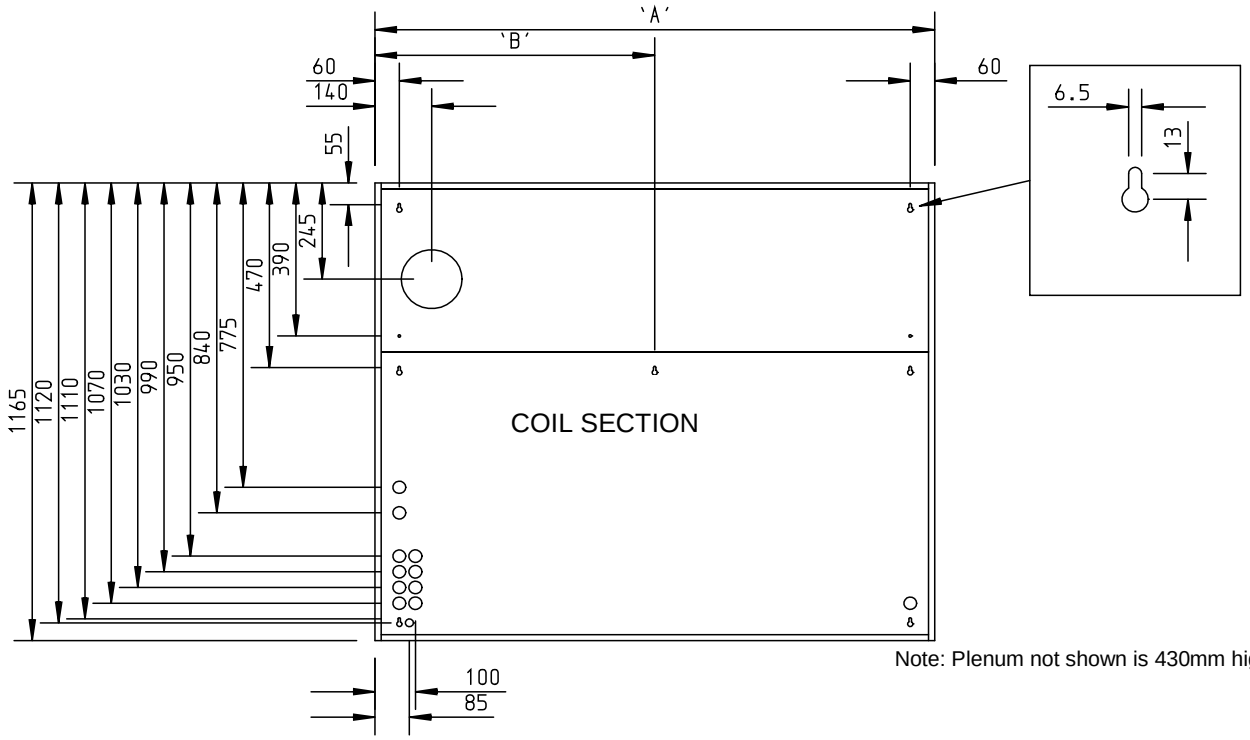
2 Ensure that the wall or floor will accept the operating weight of the unit ;the weights shown below include the plenum.

Model	**8**	**10**	**15**	**20**
Weight (kg)	144	165	165	187

NOTE:-When wall mounting, the unit should be lifted into position using the pallet provided.

3 Mark off the mounting holes as shown and drill holes to suit M6 Rawlbolt shields or equivalent fasteners.

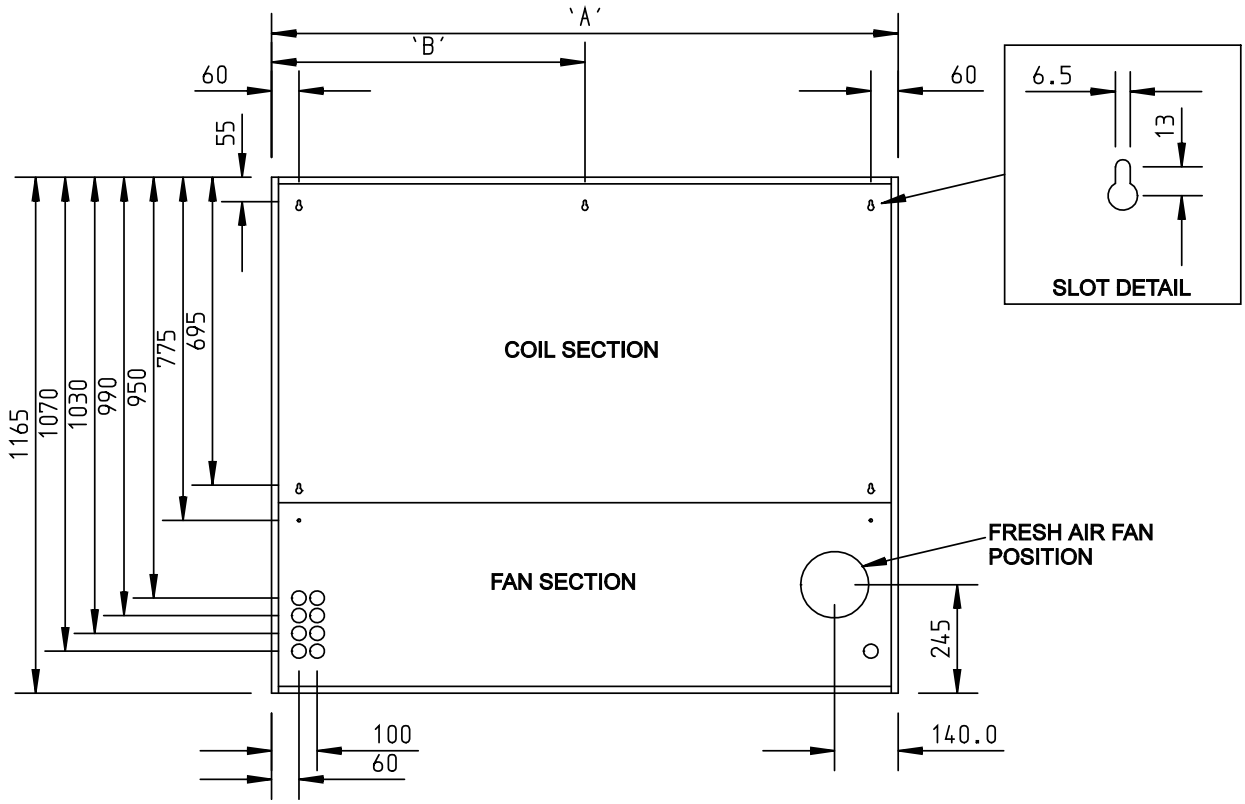
UPFLOW SERVICE AND FIXING HOLE CENTRES (excluding discharge plenum)

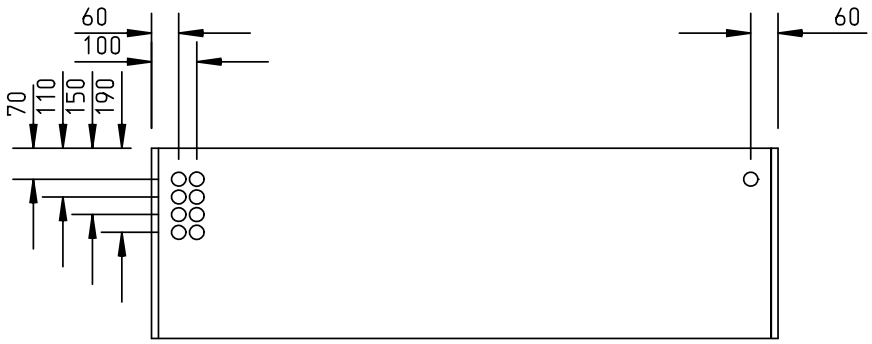


Note: Plenum not shown is 430mm high

UNIT SIZE	DIMENSION 'A'	DIMENSION 'B'
008	1230	-
010 / 015	1380	690
020	1580	790

DOWNFLOW SERVICE AND FIXING HOLE CENTRES





UNIT	DIMENSION 'A'	DIMENSION 'B'
008	1230	--
010/015	1380	690
020	1580	790

4 If a fresh air facility is required, apertures must be prepared as shown above/opposite. This must be suitably lined and screened on the internal wall to prevent brick dust entering the unit.

5 Mount the unit and secure the fixings.

6 Check that the unit is square and level, (failure to do so will result in misalignment of the cabinet panels).

PIPE CONNECTIONS

CD 3	CW inlet & outlet (mm)	LPHW inlet & outlet (mm)	Condensate connection (mm)
008	22	15	15
010	22	15	15
015	28	15	15
020	28	15	15

ELECTRICAL CONNECTIONS

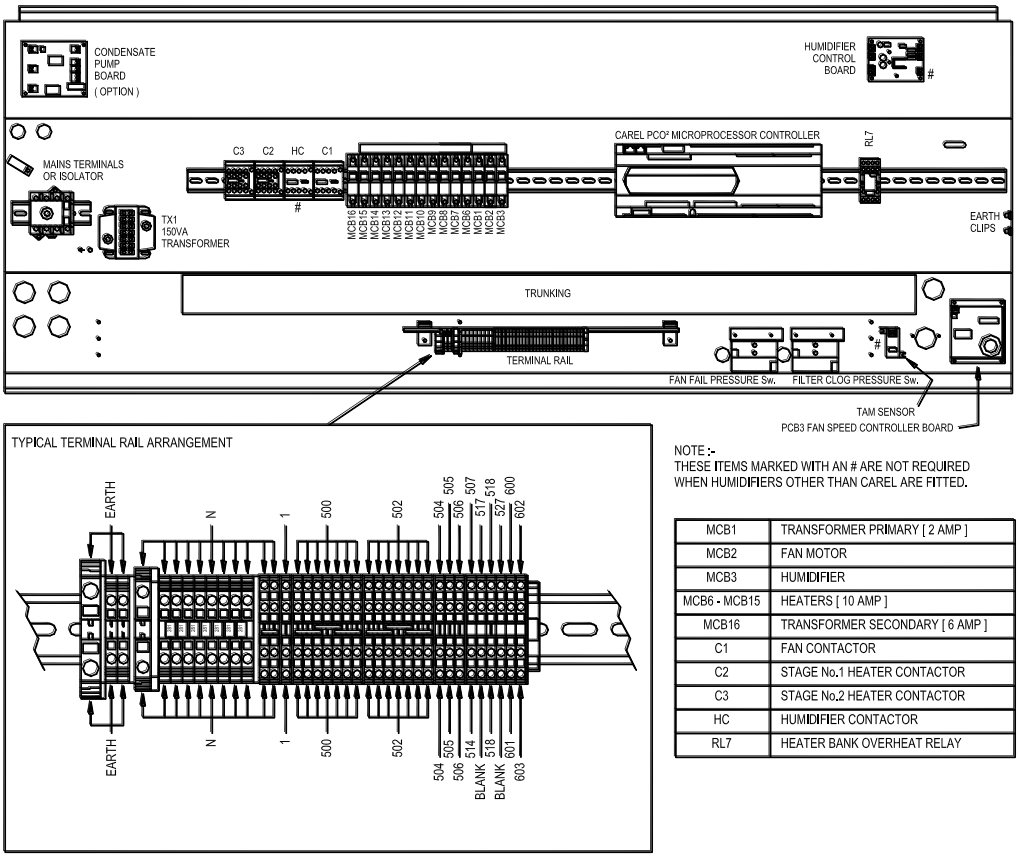
The installation wiring should be carried out in accordance with I.E.E. regulations and/or local codes.

A mains isolator should be used and the system suitably fused, (see page 24).
Supply cables and connecting cables are provided by the installer.

INDOOR UNIT WIRING

Connections for internal wiring are made within the electrics enclosure accessed by removing the centre front cover. When removing the cover disconnect the connecting cable from the display panel before moving the cover away from the unit.

Mains cables should be connected via a fused switch and routed through knockouts in the bottom left hand corner of the unit, then through an access hole in the bottom left hand side of the electrics compartment to the mains terminal block.



NOTE :-
THESE ITEMS MARKED WITH AN # ARE NOT REQUIRED WHEN HUMIDIFIERS OTHER THAN CAREL ARE FITTED.

MCB1	TRANSFORMER PRIMARY [2 AMP]
MCB2	FAN MOTOR
MCB3	HUMIDIFIER
MCB6 - MCB15	HEATERS [10 AMP]
MCB16	TRANSFORMER SECONDARY [6 AMP]
C1	FAN CONTACTOR
C2	STAGE No.1 HEATER CONTACTOR
C3	STAGE No.2 HEATER CONTACTOR
HC	HUMIDIFIER CONTACTOR
RL7	HEATER BANK OVERHEAT RELAY

The earth wire is connected to an earth stud at the right hand side of the mains terminal block. All mains and interconnecting cable must be sized to suit the electrical rating of the unit and the length of cable run.

Make sure that all connections are secure and all wires are clear of any rotating parts.

ELECTRICAL DATA

	1 Ph 230V 50Hz	3 Ph 400V 50Hz		
CD3	Full Load Amps	Full Load Amps		
	Cooling Only	Cooling Only	Cool & Heat	Cool/Heat/Hum/Dehum
	Amps	A/PH	A/PH	A/PH
008	5.4	5.4	16.7	32.7
010	7.4	7.4	17.7	32.7
015	9	9	26.0	41.0
020	9.4	9.4	33.3	49.3

The 3 ph unit loads are based on maximum heating capacities, in 2 stages, which are:-
CD3 08 = 8kW (2x4) CD3 10 = 10kW (6+4) CD3 15 = 16kW (2x8) CD3 20 = 20kW (2x10)

CURRENT RATINGS

CD3 HEATING (1 PHASE)

TOTAL HEATING LOAD	CURRENT RATING (Amps)	UNIT SIZE							
		8		10		15		20	
		1 STAGE	2 STAGE	1 STAGE	2 STAGE	1 STAGE	2 STAGE	1 STAGE	2 STAGE
2kW	8.3	O		O		O		O	
4kW	16.7	O	O (2+2)	O	O (2+2)	O	O (2+2)	O	O (2+2)
6kW	25	O	O (4+2)	O	O (4+2)	O	O (4+2)	O	O (4+2)
8kW	33.3	O	O (4+4)	O	O (4+4)	O	O (4+4)	O	O (4+4)

CD3 HEATING (3 PHASE)

1 STAGE								2 STAGE							
TOTAL HEATING LOAD	CURRENT RATING AMPS/PHASE			UNIT SIZE				TOTAL HEATING LOAD	CURRENT RATING AMPS/PHASE			UNIT SIZE			
	L1	L2	L3	8	10	15	20		L1	L2	L3	8	10	15	20
2kW	-	-	8.3	O	O	O	O	-	-	-	-	-	-	-	-
4kW	-	8.3	8.3	O	O	O	O	**4kW (2+2)**	8.3	-	8.3	O	O	O	O
6kW	8.3	8.3	8.3	O	O	O	O	**6kW (4+2)**	8.3	8.3	8.3	O	O	O	O
8kW	8.3	8.3	16.7	O	O	O	O	**8kW (4+4)**	8.3	8.3	16.7	O	O	O	O
10kW	16.7	8.3	16.7	-	O	O	O	**10kW (6+4)**	16.7	8.3	16.7	-	O	O	O
O = HEATING OPTIONS **Note: If non-standard 2 stage heating arrangements have been fitted to order, check the wiring diagram provided with the unit before calculating current ratings.**								**12kW (6+6)**	16.7	16.7	16.7	-	-	O	O
								14kW (8+6)	16.7	16.7	25.0	-	-	O	O
								16kW (8+8)	25.0	16.7	25.0	-	-	O	O
								18kW (10+8)	25.0	25.0	25.0	-	-	-	O
								20kW (10+10)	25.0	25.0	33.3	-	-	-	O

CD3 FANS

	UNIT SIZE			
	8	10	15	20
RUNNING CURRENT	4.4A	6.4A	8.0A	8.4A
NUMBER OF FANS	1	2	2	2
POWER RATING	550W	370W	330W	550W
CONTROL CIRCUIT	2A			
HUMIDIFIER	16A			

FUSES

The system and its supply/interconnecting wiring must be protected by fuses, preferably H.R.C. motor rated types to EN60269 or miniature circuit breakers to EN60898 or local codes having similar time lag characteristics that allow starting of the compressor yet still afford close over-current protection under running conditions. The ratings below are for H.R.C. motor rated or semi-enclosed wire fuses.

Air Handler	CW 08	CW 10	CW 15	CW 20
1 Phase	10	16	16	16
3 Phase	10	16	16	16

Fuse ratings are for cool only units. For other variants use the electrical tables to calculate fuse sizes.

CONDENSATE DRAIN

The condensate drain connection is at the left hand end of the condensate drain tray.

A 15mm O.D. copper drain stub is provided in the drain sump for connection with non-kink plastic tubing secured with a suitable clip.

Should it be necessary for the drain tube to go through the back or base of the unit, use the knockouts provided.

The drain line must have a constant fall to open drain using a 'U' trap if required. Check that the water will run freely and that there are no leaks.

IMPORTANT: If a humidifier is fitted the drain tube must be capable of carrying water at 60°C.

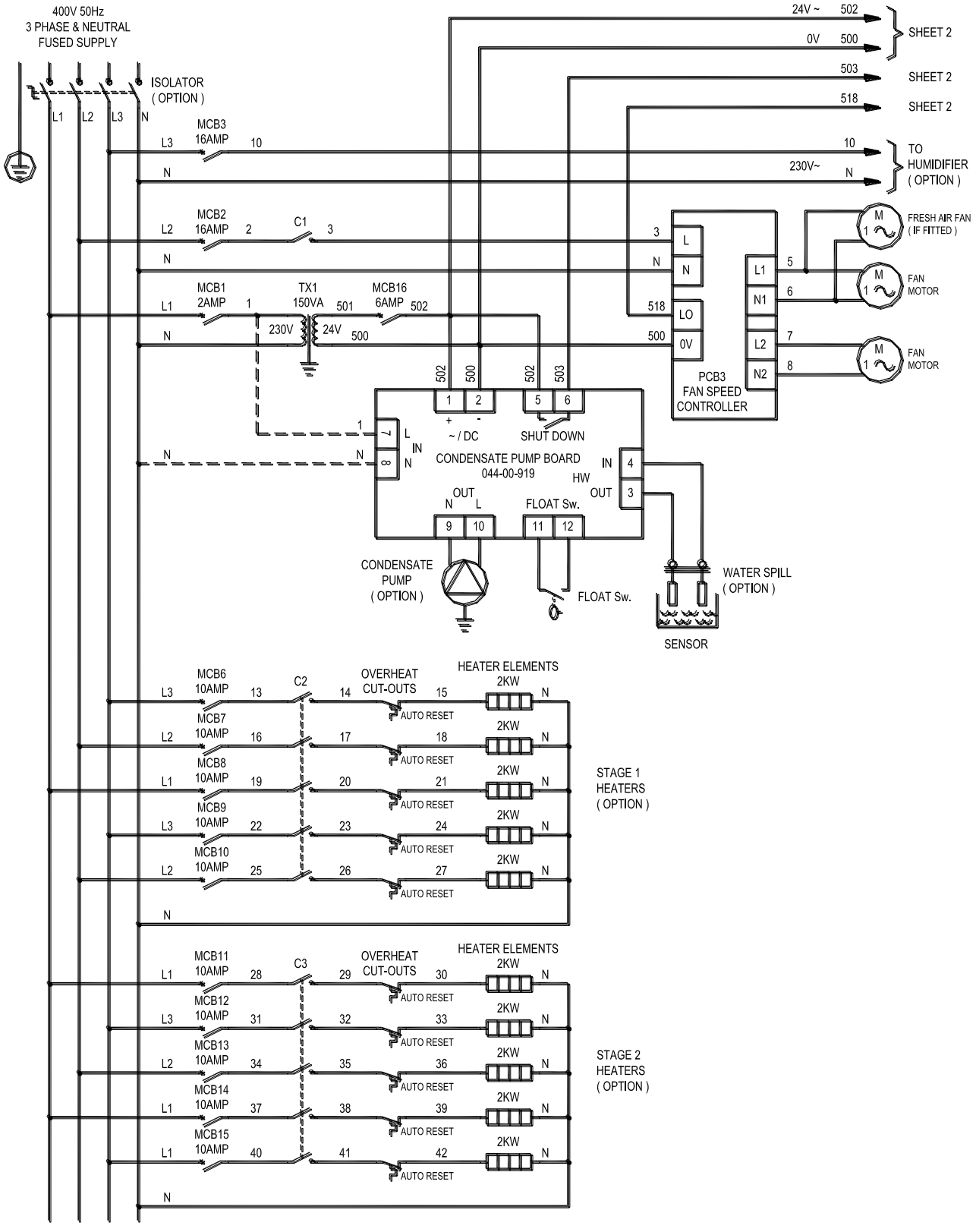
WHEN INSTALLATION HAS BEEN COMPLETED - CHECK:-

1 All pipe work and joints for leakage.

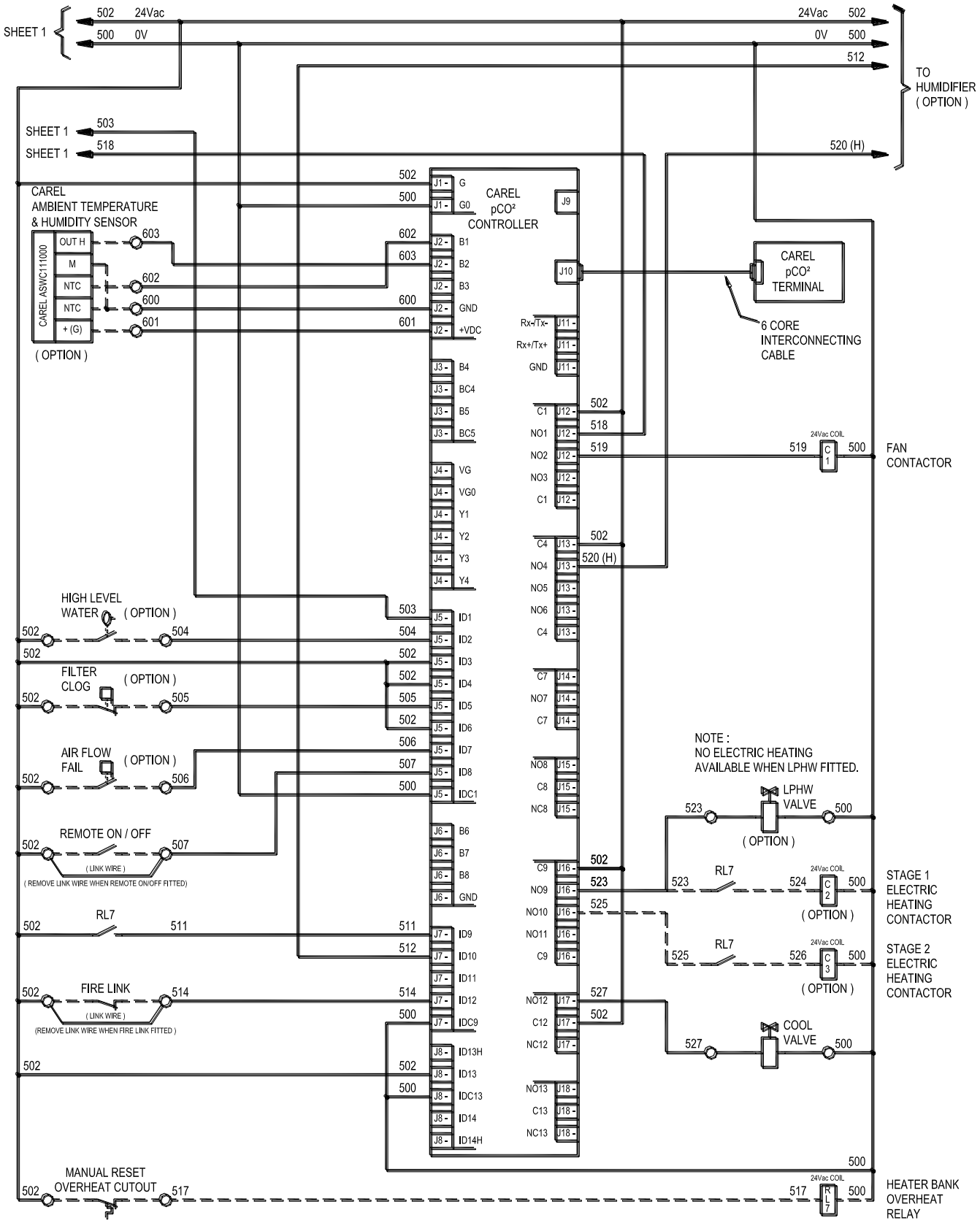
2 All pipe work and fittings for insulation.

3 All bolts are secure and that fan rotates freely.

POWER WIRING DIAGRAM



CONTROL WIRING DIAGRAM



For HUMIDIFIER wiring diagram see page 13.

FAN SPEED CONTROLLER

One control is used on eachCD3 unit, and has a switch for selecting high or boost speed (see diagram below). These can only be selected if the Pico Controller is set at low.

SETTING

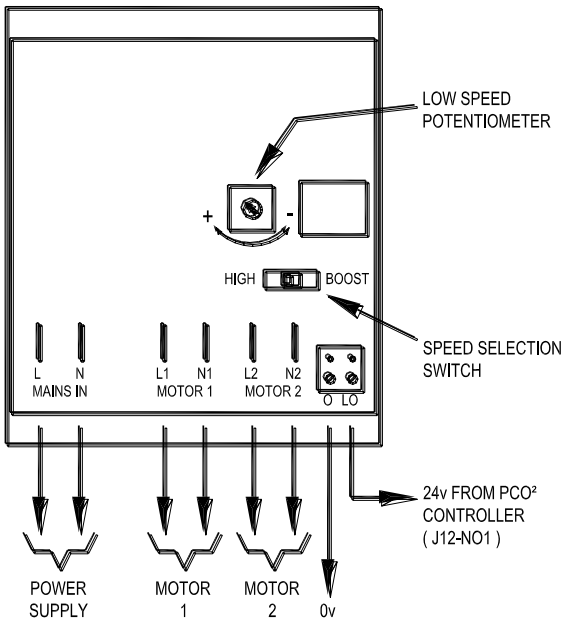
The **boost** speed should be selected for:-

- **ALL DOWNFLOW** units
- Upflow units requiring ductwork on the supply or return air
- When high efficiency filters are fitted.

The **High** speed should be selected for standard **'Free Blow' Upflow** units.

Units are despatched with the low speed set on 50%. The speed can be increased by turning the low speed potentiometer clockwise. The fan speed is adjustable between 50% and 100% of the selected top speed.

Pico Controller * Setting	High/Boost Switch	Potentiometer
Unit Fan Speed High	No Adjustment Possible	No Adjustment Possible
Unit Fan Speed Low	Select High or Boost	Adjust for De-Hum Low SP 50% to 100%
* See Page 4 of 92908131 Operator Instructions if the Pico Controller is set at high. Low speed will automatically be selected during de-hum		

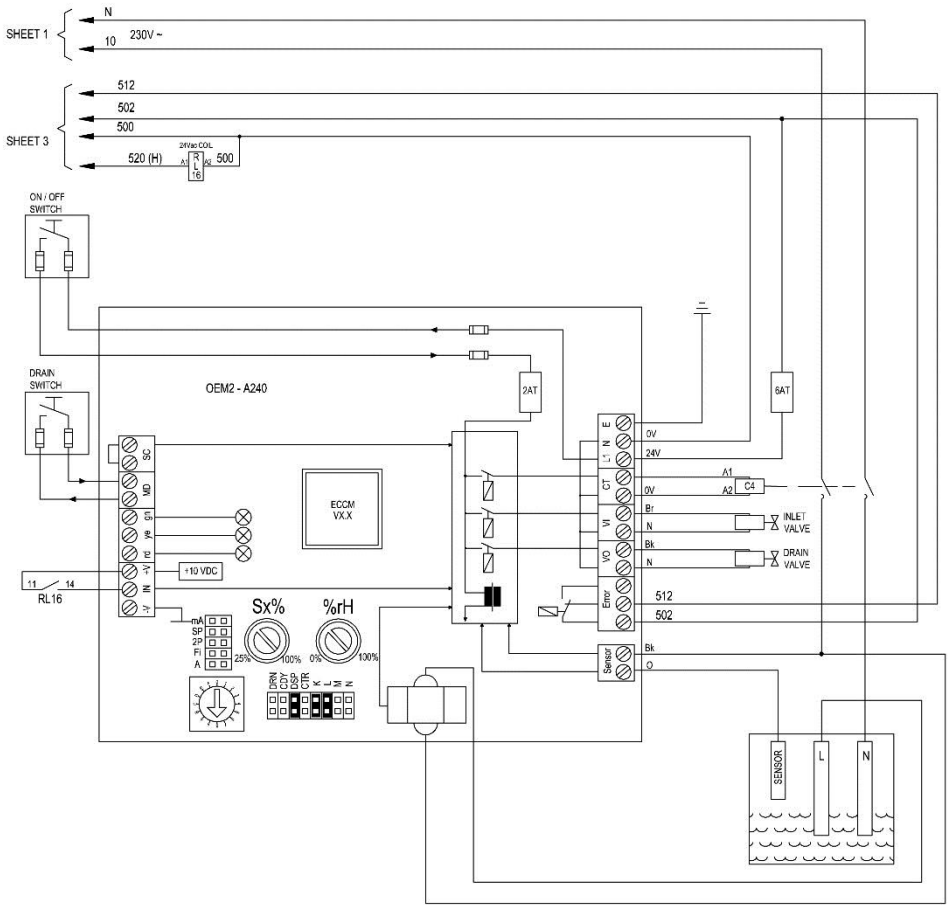


CONDENSATE PUMP (OPTIONAL)

An optional condensate pump is available, providing a 5m lift where gravity drain is not an option. The full assembly comprises a condensate pump(suitable for hot and cold water removal) a control board, a float switch to activate the pump and a high level alarm. The high level alarm disables cooling until the condensate in the tray has fallen to a safe level.

WATER SPILL SENSOR (OPTION)
Can be connected to the condensate pump board providing an alarm in the event of condensate spillage.

CD3 SYSTEM HUMIDIFIER (OPTIONAL)



DESCRIPTION

The humidifier is an electrode steam boiler, electronically controlled. The steam bottle requires changing periodically. The humidifier is fitted with a bottle change indication and the frequency of change is dependent upon the condition of the water feeding the humidifier.

INSTALLATION

Water supply

The humidifier operates with a range of water qualities; pre-treated water is preferable to extend the bottle life (it is not suitable for use with fully de-mineralised water). The humidifier system incorporates an air break in the water feed to meet local regulations. Connect directly to water supplies operating at pressures between 0.1 and 1 MPa (14 to 145 psig). For supplies at higher pressures fit a pressure regulator set at 0.4 to 0.6 MPa (60 to 90 psig).

Plumbing connections

The inlet connection is a 15mm pipe. A stop valve and strainer should be fitted ahead of the control solenoid valve, which is fitted to the inlet of the humidifier.

Waste water is drained into the unit condensate tray. The drain tube should be suitable for use with water at 60°C.

Drainpipes should be correctly sized with a minimum slope of 5% (1 in 20) and an air break at the entry.

HUMIDIFIER WIRING DIAGRAM

Setting the capacity limitation “Sx%”

Use the potentiometer “Sx%” to set the capacity limitation in % of the minimum capacity (setting range: 25…100%, factory setting: 100%).

Setting the humidity setpoint value “%rH”

Use the potentiometer “%rH” to set the humidity setpoint value for the internal controller in % relative humidity (setting range: 0…100%, factory setting: 100%).

General Settings

With the jumpers on the jumper blocs “JP1” and “JP2” you can set different unit parameters.

Jumper Positions		
POS	With Jumper	Without Jumper
Fi	Connection to a mains supply with ground fault circuit interrupter	Connection to a mains supply without ground fault circuit interrupter *
DRN	Increased drain operation factor	Regular drain operation factor *
CDY	Low water conductivity (<125 µS/cm)	Normal water conductivity (≤125 µS/cm) *
DSP	Exchangeable steam cylinder *	Cleanable steam cylinder
K	Fault No.4 “steam cylinder maintenance due”: the unit triggers a warning only *	Fault No.4 “steam cylinder maintenance due”: 72 hours after the warning an error is triggered and the unit is switched off
L	Fault No.3 “Fill time”: a warning is triggered after 20 minutes filling time exceeded. After 220 minutes filling time exceedance an error is triggered and the unit is switched off *	Fault No.3 “Fill time”: the unit directly triggers an error after 20 minutes filling time exceedance. However, the unit is switched off after 220 minutes filling time exceedance.
Z, M, N	No function (spare)	

* Factory settings

COMMISSIONING

Pre-start check
Ensure the drain line is connected and that water flows away freely. Do this by filling and draining the bottle using the manual drain switch.

HUMIDIFIER START UP

On initial start up the feed valve will open to fill the bottle and the drain valve will remain closed.

The initial current draw will be below the normal operating level as the bottle is filled with fresh water. This will increase as the humidifier continues to operate until reaching its full value (this may take several operations depending upon the condition of the water and the length of time it is operating). The bottle will continue to fill and drain automatically on demand.

During the start up period, whenever the current is less than 70% of the set operating level, the 'bottle change' indication will be active. This is normal and the indication will go off once the current has risen above 70% of the set output. The 'bottle change' indication will not appear again until the bottle requires changing.

NOTE: The start up process described above occurs only when a new bottle has been fitted.

Adding a teaspoon of table salt into a new bottle can reduce the length of the start up period.

NORMAL OPERATION

After the start up period, the unit will operate automatically, at a constant output until the bottle requires changing. The frequency of the drain and fill sequence will depend upon the quality of the water.

There will be a short delay from the unit receiving a humidifier on signal and the steam being generated as the water is brought up to temperature.

HUMIDIFIER MAINTENANCE

Prior to carrying out maintenance on the humidifier, the cylinder should be drained by operating the manual switch. The system should also be isolated from the electrical supply.

STEAM BOTTLE REPLACEMENT

Access to the bottle and solenoid valves is from the front and left hand side of the unit.

1. Before switching off the power to the humidifier, isolate the water supply and drain the bottle using the manual drain switch.
2. Remove the discharge hose from the top of the bottle.
3. Remove the electrical connectors pulling upwards.
4. Lift the bottle support bracket clear of the outlet spigot.
5. Remove and replace the bottle.
6. Replace the hose and electrical connectors.
7. When replacing the bottle clean the feed/drain manifold and check the "O" ring seal, replacing if necessary. Check and clean the strainer protecting the outlet solenoid valve
8. Reconnect the water supply and switch on the electrical supply.

After replacing the bottle check that the operating current is correct (see start up).

pCONET BMS CONTROL KIT 92919134

ENSURE THE ELECTRICAL SUPPLY IS DISCONNECTED

1. If a door interlock isolator is fitted, ensure that the switch is turned to the **OFF** position.
2. Using the keys provided, unlock the electrics access panel. Remove the panel by easing outwards and down, before fully removing the panel, release the cable from the keypad.
3. Remove the “Serial card” cover from the pCO3, insert pCO net into the plug in connector and make sure it is fully inserted.
4. Insert the required Jumper (see Carel pCO net instruction supplied for more information)
5. Fit the cover supplied with pCO net

SETTINGS

The pCO3 has been configured for the BACnet MS/TP network as from January 2016

Comm. Speed 19200 bps (RS485)

NOTE: For CD3 systems supplied before January 2016 contact Marstair for further assistance.

CONFIGURATION

Procedure for configuring the pCOnet parameters for correct communication over an MS/TP network

- Connect pCOnet via RS485 to a computer: during configuration, the CAREL RS485 converter (CVSTDMOR0) for USB ports can be used, Marstair part number 92919136. USB converters should not be used in the installation due to the large volume of data transmitted across a complex BACnet network.
- Install the CAREL ”BACset” configuration tool, available free of charge at ksa.carel.com. You need to create a free of charge account to access the software download sections. Navigate through the following menu’s:-
  Software and support
  pCONet
  BacSet.

DATABASE OF THE SUPERVISOR

The variables reported below will be transmitted between pCO and supervisor only if all the following conditions will be met:

- the serial card is inserted into the proper connector that is found on the interface
- the supervisory function is enabled in the M_MANUF_CONF1.window protected by manufacturer’s password
- the address of the unit is properly selected with reference to the supervisory network in the M_PARAM_USER12 window protected by user password.
- the equipments have been correctly connected to the network (supervisor and pCO)

Digital Variables

Address	Description	Type	Communication type
1	Compressor 1 general alarm digital input	Digital	Reading
2	Compressor 2 general alarm digital input	Digital	Reading
8	ON/OFF remote	Digital	Reading
11	fire / smoke alarm digital input	Digital	Reading
12	Dehumidification	Digital	Reading
13	ON /OFF unit	Digital	Reading
18	3p cold valve opening contact (CW) / Cooling 1 DX	Digital	Reading
19	3p cold valve closing contact (CW) / Cooling 2 DX	Digital	Reading
20	3p warm valve opening contact (CW) / Electric Heating	Digital	Reading
21	3p warm valve closing contact (CW)	Digital	Reading
22	General alarm	Digital	Reading
23	Compressor 1 general alarm	Digital	Reading
24	Compressor 2 general alarm	Digital	Reading
31	Fire / smoke alarm	Digital	Reading
32	Air filter alarm / Filter Clog	Digital	Reading
33	Ambient high temperature alarm	Digital	Reading
34	Ambient temperature alarm	Digital	Reading
35	Ambient high humidity alarm	Digital	Reading
36	Ambient low humidity alarm	Digital	Reading
55	Humidity probe enabling	Digital	Writing / Reading
58	Inlet water probe enabling	Digital	Writing / Reading
61	Cold modulating valve 0/10V enabling	Digital	Writing / Reading
63	Enabling of simultaneous operation of compressors with	Digital	Writing / Reading
64	Warm 0/10V modulating valve enabling	Digital	Writing / Reading
66	Compressor rotation enabling	Digital	Writing / Reading
67	Compressor 1dehumidification enabling	Digital	Reading
68	Compressor 2 dehumidification enabling	Digital	Reading
73	ON/OFF from supervisor enabling	Digital	Writing / Reading
74	3p cold valve enabling	Digital	Reading
75	3p warm valve enabling	Digital	Reading

Whole Variables

Address	Description	Type	Communication type
01	Delay common alarm relay	Whole	Writing / Reading
10	Cold 0/10V valve ramp start	Whole	Writing / Reading
11	Cold 0/10V valve ramp end	Whole	Writing / Reading
12	Warm 0/10V valve ramp start	Whole	Writing / Reading
13	Warm 0/10V valve ramp end	Whole	Writing / Reading
16	Compressor 1 step without energy saving	Whole	Writing / Reading
17	Compressor 1 hysteresis without energy saving	Whole	Writing / Reading
18	Compressor 2 step without energy saving	Whole	Writing / Reading
19	Compressor 2 hysteresis without energy saving	Whole	Writing / Reading
26	Time interval between same compressor switching on	Whole	Writing / Reading
28	Low pressure delay alarm	Whole	Writing / Reading
29	Stop minimum time compressors	Whole	Writing / Reading
30	Time interval between different compressor switching on	Whole	Writing / Reading
33	High / low temperature / humidity alarm delay	Whole	Writing / Reading
34	Start-up delay between heaters	Whole	Writing / Reading
48	Integration time P+1 ONLY	Whole	Writing / Reading
54	Cold 3p valve ramp start	Whole	Writing / Reading
55	Cold 3p valve ramp end	Whole	Writing / Reading
56	Warm 3p valve start ramp	Whole	Writing / Reading
57	Warm 3p valve end ramp	Whole	Writing / Reading
58	3p valve complete opening time	Whole	Writing / Reading
59	Fan switching on delay	Whole	Writing / Reading
61	Cold valve ramp limit	Whole	Reading
62	Warm valve ramp limit	Whole	Reading

Analog Variables

Address	Description	Type	Communication type
1	Ambient temperature	Analog	Reading
2	Ambient humidity	Analog	Reading
5	Supply air temperature	Analog	Reading
6	Dead zone in temperature	Analog	Writing / Reading
7	Ambient humidity band	Analog	Writing / Reading
8	Ambient humidity set	Analog	Writing / Reading
9	Low temperature alarm offset	Analog	Writing / Reading
10	High temperature alarm offset	Analog	Writing / Reading
11	Low humidity alarm offset	Analog	Writing / Reading
12	High humidity alarm offset	Analog	Writing / Reading
13	Ambient temperature set	Analog	Writing / Reading
18	Water low temperature limit	Analog	Writing / Reading
19	Water high temperature limit	Analog	Writing / Reading
23	Cooling valve position	Analog	Reading
24	Heating valve position	Analog	Reading

GENERAL MAINTENANCE

12 MONTHLY (or more frequently if conditions dictate)

1. Clean the feed water strainer and drain solenoid valve. Check hoses for wear and flush out the drain tube.
2. Check all electrical connections are tight.
3. Check and clean the drain tray to prevent a build up of deposit

UNIT OPERATING INSTRUCTIONS

DESCRIPTION OF CONTROLS

All CD3 units are fitted with a microprocessor controller and a display and keypad mounted on the front of the unit, providing the functionality necessary for all applications. Each unit is delivered tested, fully programmed and ready to run.

The microprocessor controller provides the capability to have either stand alone, grouped or master/slave unit configurations for both chilled water and direct expansion systems. In addition a number of alarm outputs are available as standard.

USER INTERFACE

The user can access the controls via the panel mounted display and keypad to carry out various checks or make alterations to the operating parameters, depending upon the access authority held by the individual. Access for the end user, maintenance engineer and commissioning engineer is available on 3 levels:

1. **FIRST USER LEVEL**, *not protected by password,* which allows the user to view monitored items, e.g. running hours, display active and stored alarms and select temperature and humidity set points.
2. **SECOND USER LEVEL**, *protected by a password,* that allows an authorised user to select various control parameters including; set point limits, differentials and dead zones.
3. **ENGINEERING LEVEL**, *protected by a password,* allowing the commissioning/service/maintenance engineers access to the time functions and hours run counters. This level also provides facilities for calibrating the attached sensors and overriding timers during commissioning.

A fourth **MANUFACTURES LEVEL**, *protected by password,* is included for configuring and programming the controller. This level is only available to TEV and any changes to the operating software for individual applications, must be carried out by an TEV engineer.

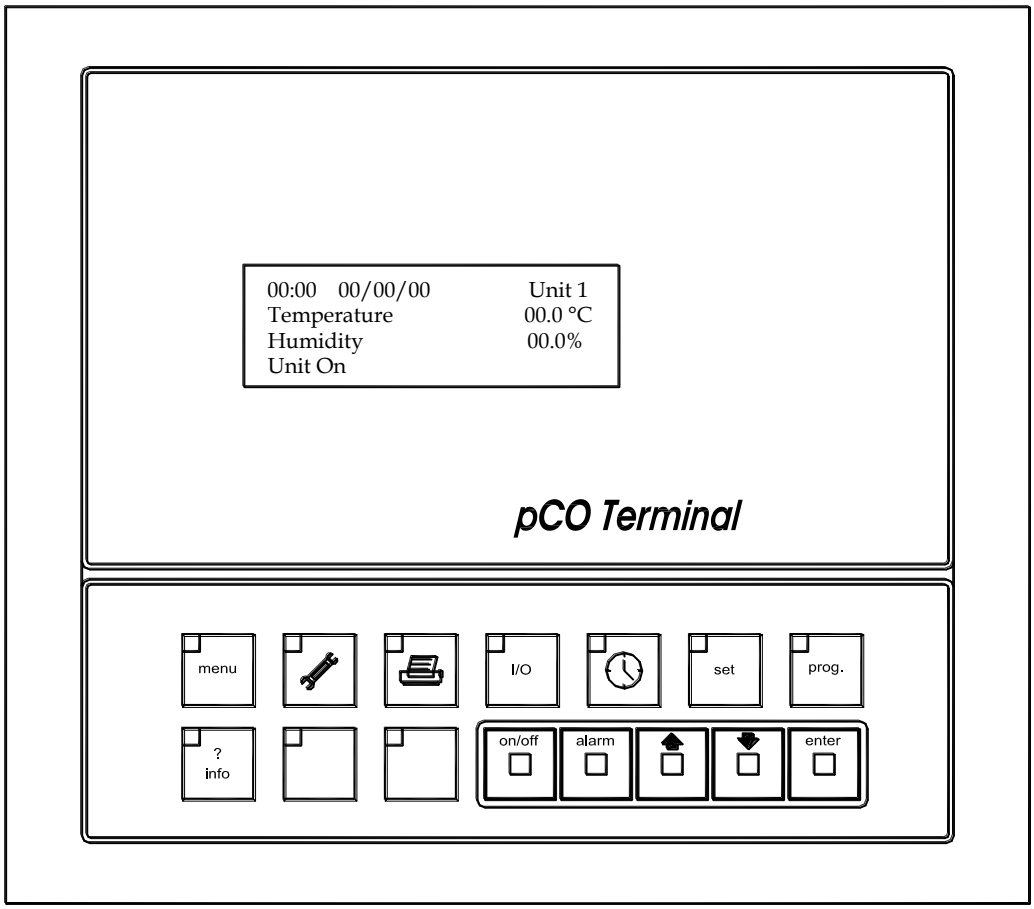
PASSWORDS

A document in a sealed envelope is enclosed separately in the unit information envelope. This document contains the passwords for the second user level and the third engineering level. This document should be held by the installer and passed to the relevant person once the unit has been installed and commissioned. Passwords may be altered by the user/engineer; if this happens ensure that a record of the new passwords is kept in a safe location. Should the passwords be lost, contact TEV Ltd Technical Services Department for assistance.

DISPLAY AND KEYPAD

A combined display and 15 button keypad is mounted on the front panel of the unit, connected to the microprocessor controller by a 1m cable. The display is fixed to the front panel of the unit and if the panel is removed, the cable should be disconnected before moving the panel away from the unit.

The following pages define the function keys and displays on the display and keypad and describe the procedures for entering and changing accessible parameters during commissioning and normal operation.



Display and keypad

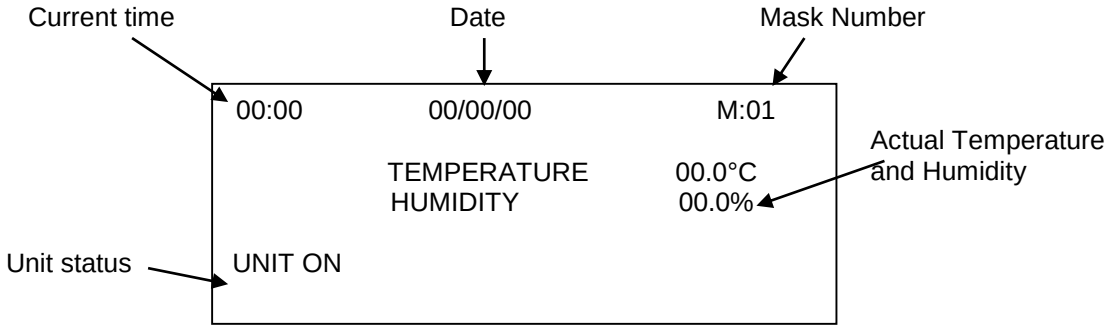
KEYPAD FUNCTIONS

KEY	FUNCTION	KEY	FUNCTION
menu	1. Displays measured values. 2. Returns operator to the main mask window.	prog.	Setting of operating parameters and safety thresholds.
	Displays working hours and allows counter re-set.	? info	Displays the version of the application programme loaded into the controller.
	Not used.	on/off	Unit ON/OFF button. The green LED is lit when the unit is ON.
I/O	Displays current status of inputs and outputs.	alarm	1. Displays alarm status. 2. Mute and reset alarms. Red LED lit when alarm is present.
	Allows the time clock functions to be displayed and programmed.	enter	Confirms data entry. Yellow LED is lit when there is power to the unit.
set	For setting and adjusting set-points.		1. Toggle between display screens. 2. Raise or lower set values.

Each function button has a green LED in the top left hand corner that is lit when the particular function button is operated. This does not apply to the ON/OFF, ALARM and ENTER buttons that have LEDs as defined above.

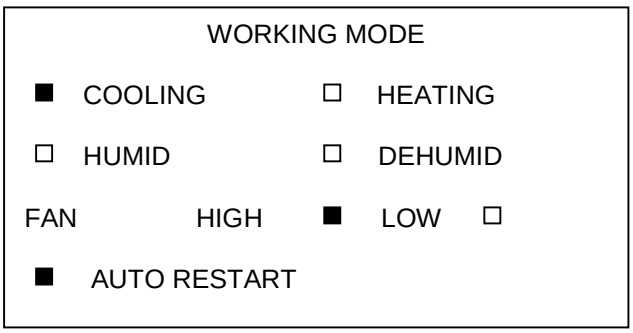
OPERATING SEQUENCE

When the unit is first powered up the display will show; SELF TEST - PLEASE WAIT. Once the self test has been completed the MAIN MASK will be displayed. This is the default screen.



The default screen will always be displayed during normal operation.
To view the current operating mode of the unit:

Press  **or**  **to toggle between the MAIN MASK and the WORKING MODE MASK.**



SECOND USER LEVEL ACCESS (Password required)

SET BUTTON MENU

Pre

ACTUAL SET POINT

TEMPERATURE 21.0°C
HUMIDITY 50%

To change parameters

To change screen

USER PASSWORD

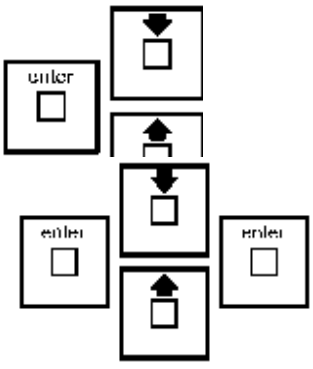
0000

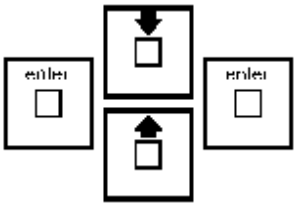
SET POINT

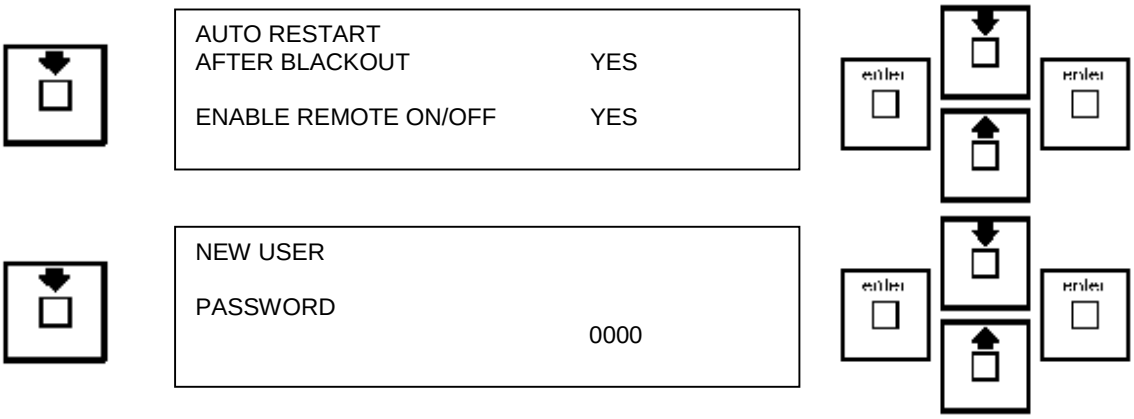
TEMPERATURE 21.0°C
HUMIDITY 50%

UNIT FAN SPEED

HIGH



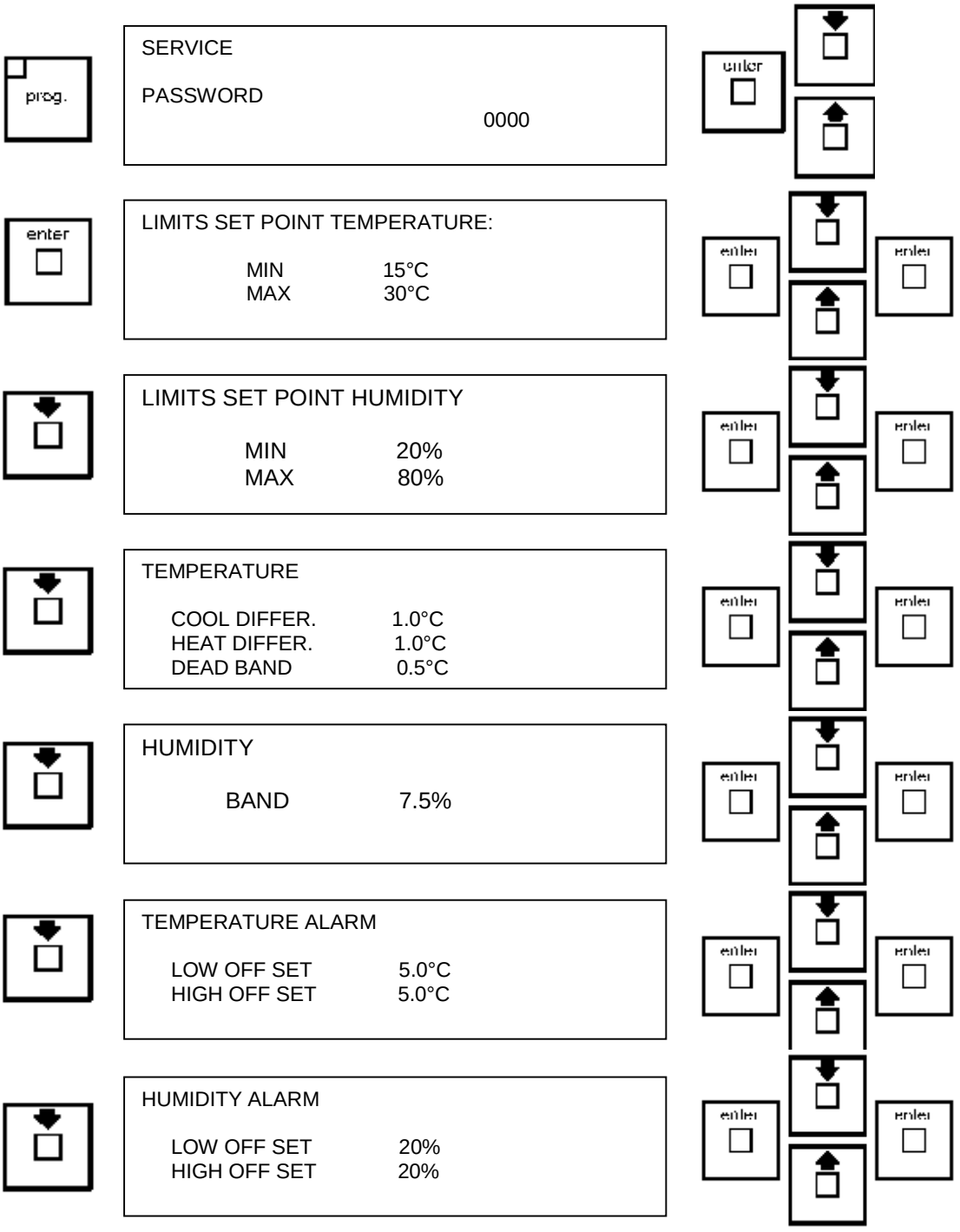


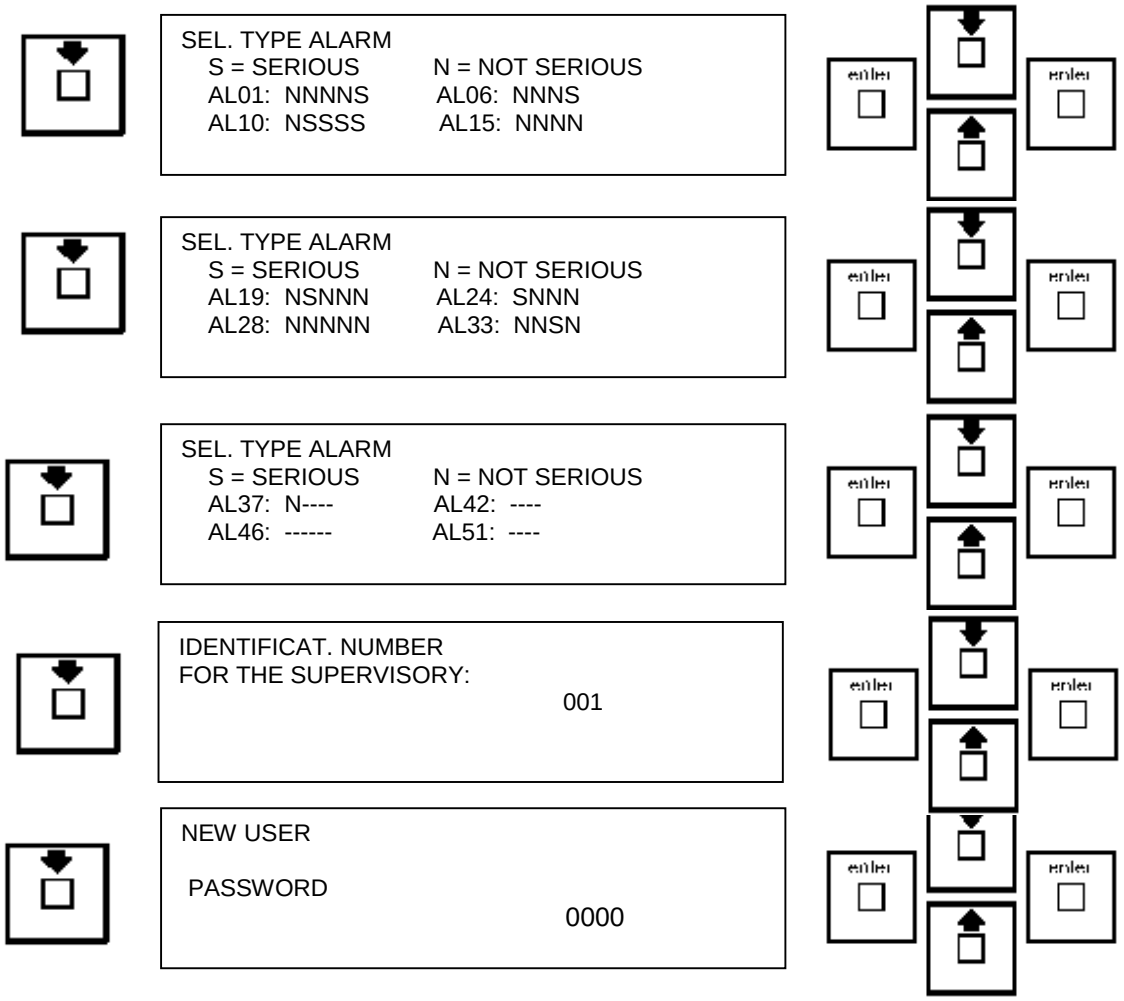


ENGINEERING LEVEL ACCESS (Password required)

PROGRAMME BUTTON MENU

Press





The values shown in the above screen masks are the default settings when the unit leaves the factory.

ALARM DESCRIPTIONS

ALARM	DESCRIPTION	ALARM	DESCRIPTION
AL01	Compressor 1 General alarm	AL20	Return Air Temperature Probe Fault
AL02	Compressor 2 General alarm	AL21	Not used
AL03	Low Pressure Circuit 1	AL22	Not used
AL04	Low Pressure Circuit 2	AL23	Not used
AL05	Fan Fail (Serious alarm) Unit OFF	AL24	Return Air Humidity Probe Fault
AL06	Fan Overload (Serious alarm) Unit OFF	AL25	Not used
AL07	Heater 1 & 2 Over temperature	AL26	Not used
AL08	Not used	AL27	Not used
AL09	Smoke/Fire (Serious alarm) Unit OFF	AL28	Alarm E06 – Humidifier High Current
AL10	Filter Clog	AL29	Alarm E09 – Humidifier Low Water
AL11	High Return Air temperature	AL30	Alarm E10 – Humidifier Low Current
AL12	Low Return Air temperature	AL31	Clock alarm
AL13	High Return Air humidity	AL32	High Pressure Circuit 1
AL14	Low Return Air humidity	AL33	High Pressure Circuit 2
AL15	Not used	AL34	Not used
AL16	Not used	AL35	Water Spill (Serious alarm) Unit OFF
AL17	Hours Run Compressor 1	AL36	Condensate High Level Cooling OFF
AL18	Hours Run Compressor 2	AL37	Humidifier Bottle Change
AL19	Hours run Fan		

CLOCK BUTTON MENU

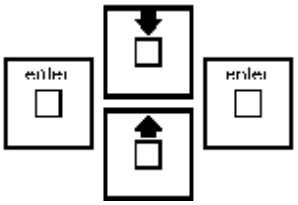
Press

REGULATION CLOCK
HOUR 00:00
DATE 00/00/00
DAY MONDAY

SERVICE

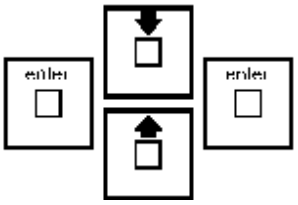
PASSWORD
0000

ENABLE AUTOMATIC
TEMPERATURE SET POINT
VARIATION
NO



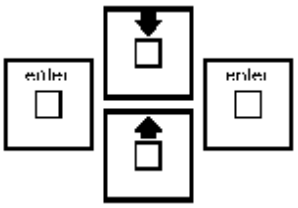
TEMPERATURE

TIME ZONE N.1
START HOUR 00:00
SET POINT 00.0°C



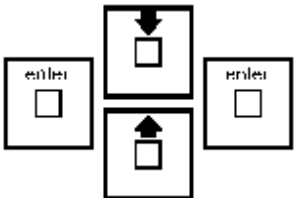
TEMPERATURE

TIME ZONE N.2
START HOUR 00:00
SET POINT 00.0°C



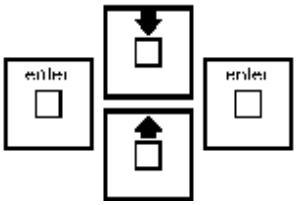
TEMPERATURE

TIME ZONE N.3
START HOUR 00:00
SET POINT 00.0°C

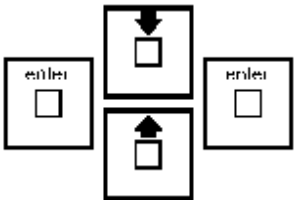


TEMPERATURE

TIME ZONE N.4
START HOUR 00:00
SET POINT 00.0°C

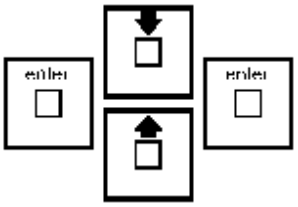


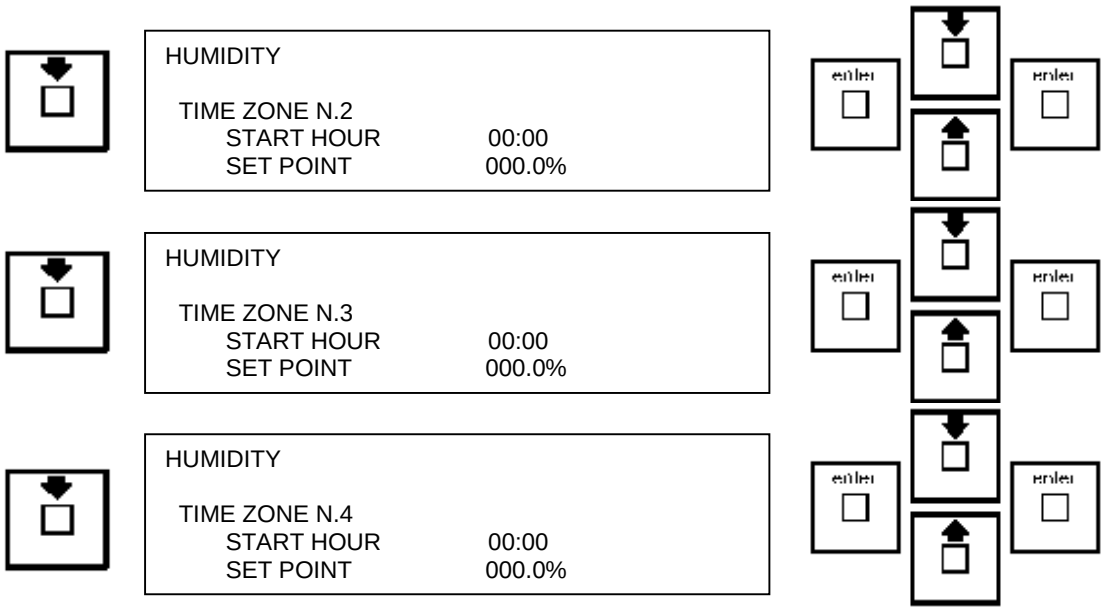
ENABLE AUTOMATIC
HUMIDITY SET POINT
VARIATION



HUMIDITY

TIME ZONE N.1
START HOUR 00:00
SET POINT 000.0%

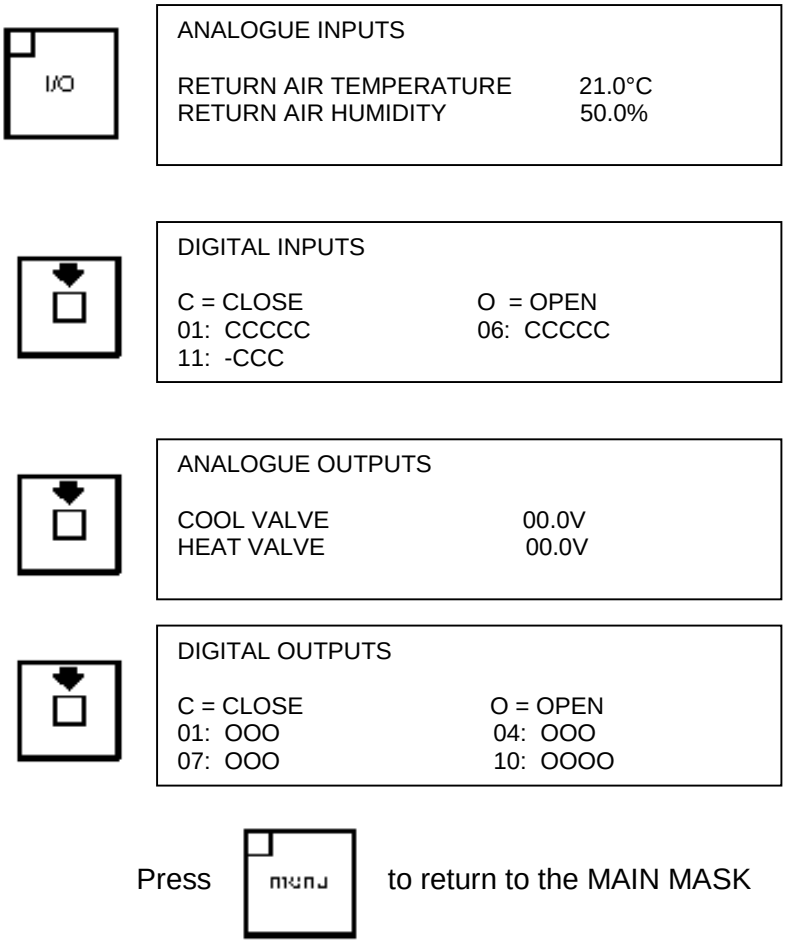




Press menu to return to the MAIN MASK

INPUT /OUTPUT BUTTON MENU

Press I/O



Only available when modulating valves are fitted

Press menu to return to the MAIN MASK

MAINTENANCE BUTTON MENU

Press

WORK HOURS

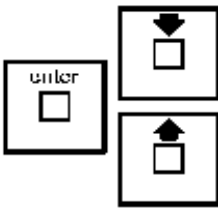
FAN 000000
COMPRESSOR 1 000000
COMPRESSOR 2 000000

HISTORY ALARM 000

AL00 00:00 00/00/00
SET T: 00.0 T: 00.0
SET H : 000.0 H: 000.0

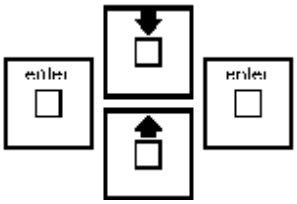
SERVICE

PASSWORD
0000



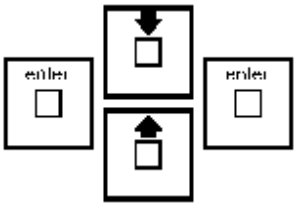
FAN

H. THRESHOLD 100 x 1000
RESET No 000000



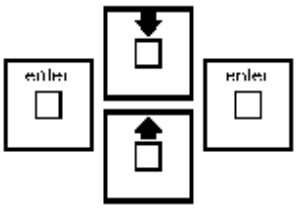
COMPRESSOR 1

H. THRESHOLD 100 x 1000
RESET No 000000



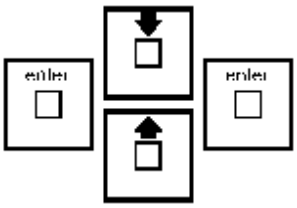
COMPRESSOR 2

H. THRESHOLD 100 x 1000
RESET No 000000



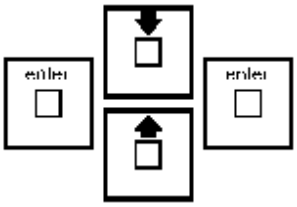
PROBES SETTING

RETURN AIR HUMIDITY 00.0%



PROBES SETTING

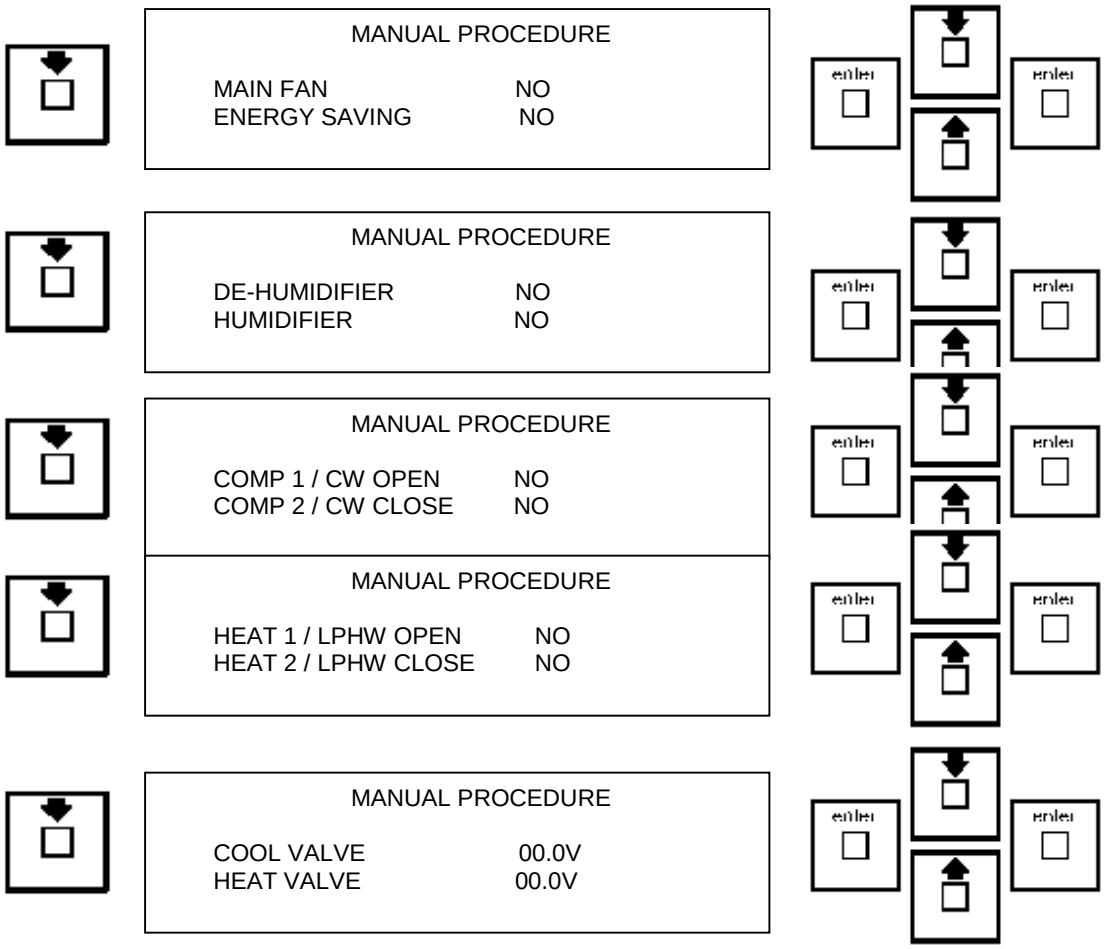
RETURN AIR TEMPERATURE 00.0°C



MANUAL PROCEDURE

WILL ONLY WORK
IN CONJUNCTION
WITH THE MAIN FAN

The manual operating procedure may only be activated when the unit is in standby mode.
In this mode the ON/OFF button is in the OFF position.

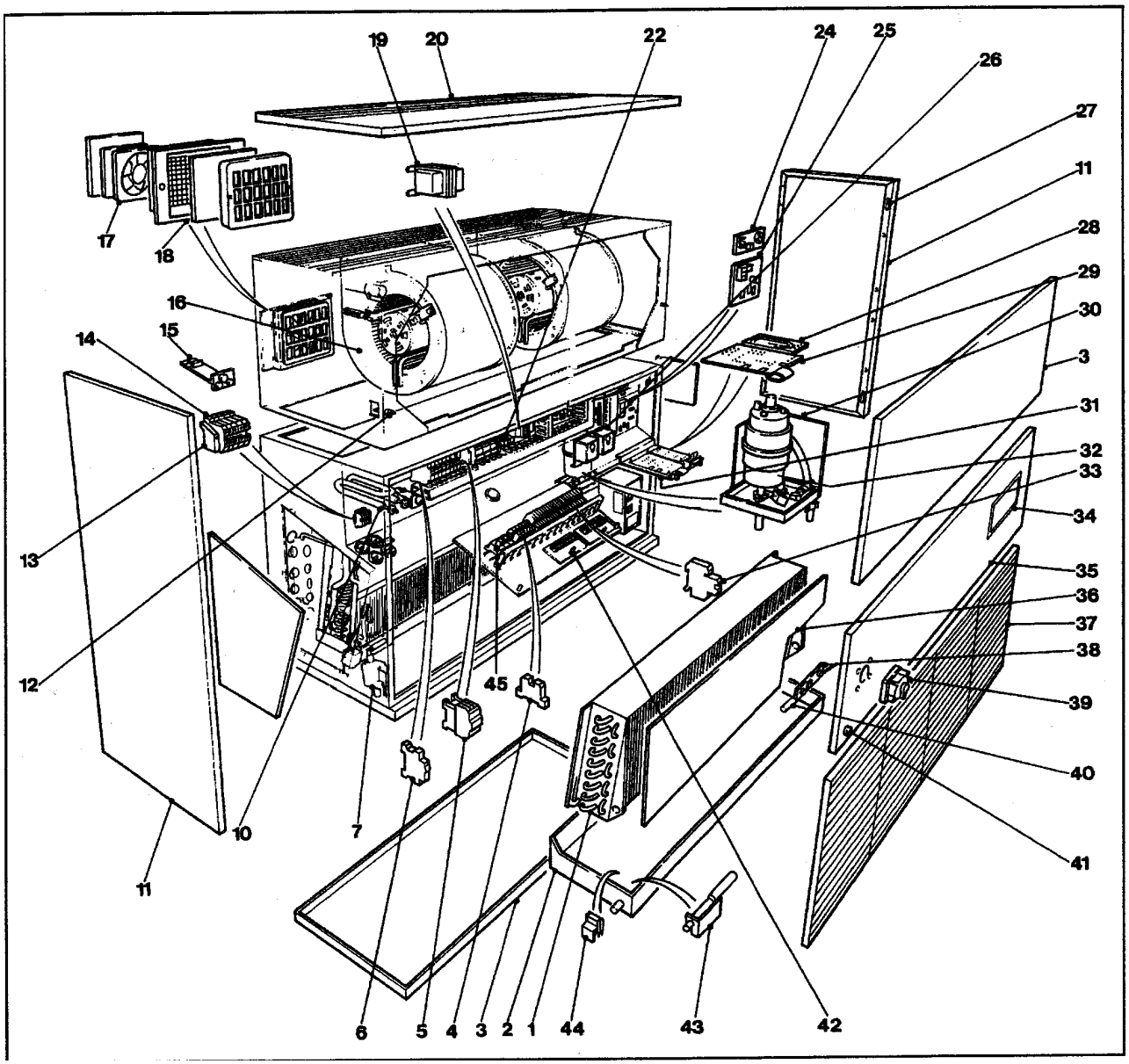


Press menu to return to the MAIN MASK

NOTE:

Alarms and conditions referring to compressors, low pressure and high pressure are not relevant to Chilled Water units unless an alternative Chilled Water option is displayed.

CD 3 EXPLODED DIAGRAM *(DISCHARGE SPIGOT NOT SHOWN)*



Note: The position of some of the controls shown in this diagram may vary from those in the unit delivered.

1	Coil
2	Drain tray
3	Access panel
4	Terminal
5	Contactor
6	Circuit breaker
7	Condensate pump
10	Heater element (2kW)
11	Side panel assembly
12	Swell latch
13	End stop
14	Terminal
15	Heater cut out
16	Blower assembly
17	Fresh air fan

18	Filter
19	Transformer
20	Discharge grille
22	Relay
24	Fan speed control
25	Humidity control pcb
26	Pressure switch
27	Grabber
28	Alarm indicator
29	Touch control
30	Humidifier assembly
31	Membrane key pad
32	Humidifier bottle
33	Terminal
34	Panel surround

35	Electrics access
36	Washable filter
37	Return air grille
38	Humidity sensor
39	Isolator
40	Temperature sensor
41	Vice latch
42	Volt free pcb
43	Float switch
44	High water level assembly
45	Relay