

TECHNICAL MANUAL



**CD3 (929 SERIES) PACKAGED DX CLOSE CONTROL UNITS.
FOR USE IN SPLIT SYSTEMS**

This manual details technical, installation and operating information for the CD3 range (929 series) DX indoor units for use in conjunction with 550 series CKC condensing units or 542 series DCU ducted condensing units. Remove the expansion device from the outdoor condensing unit if the CD3 unit has capillaries or expansion valves fitted.

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GENERAL

INTRODUCTION

The CD3 range of direct expansion units is designed to provide the close control of temperature and humidity demanded by computer rooms, laboratories, banks, offices etc.. All units are fitted with programmable microprocessor controls.

CD3 indoor units are available in upflow or downflow configurations, matching with the Marsair range of CKC and DCU outdoor/ducted condensing units using R407C refrigerant. There is a range of 4 capacities in 3 cabinet sizes for both upflow and downflow units. Packaged units are available in upflow versions only.

CD3-RANGE - GENERAL DESCRIPTION

DX UPFLOW PACKAGE UNITS

Twin circuit, packaged upflow units are normally supplied ex-stock. A field fit kit is available for converting from twin circuit to single circuit if required.

MODEL CD3	008	010	015	020
Twin Circuit upflow	92918001	92918002	92918003	92918004

PACKAGE UNITS INCLUDE:

- | | |
|--|---|
| <ul style="list-style-type: none"> * Electronically controlled fan speeds * Class 'O' thermal and acoustic insulation * Washable filters * Discharge plenum and grille * Twin circuit coils * Electric heating (2 stage) * Humidifier with modulating control | <ul style="list-style-type: none"> * Four pole mains isolator * Microprocessor controls * Display giving access to set points and alarms * Alarms: humidity/temperature out of limits * Switches: Off/standby, unit run * De-ice thermostat * Dehumidification |
|--|---|

KITS AVAILABLE FOR FIELD FITTING TO PACKAGE UNITS:

Condensate pump, including high water level indication. (hot or cold, 5m lift)	ALL	92919077	Floor stand plinth 75mm high	008	92911032
Fresh air spigot 100mm dia.	ALL	92911062	Double deflection grille	010, 015	92911033
Fresh air spigot 160mm dia.	ALL	92911063		020	92911034
Fresh air fan and filter 93m ³ /h	ALL	92911003		008	92911094
Fresh air fan and filter 186m ³ /h	ALL	92911004	Disposable filter (replaces washable filter)	010, 015	92911095
Top ducted discharge spigot	008	92911059		020	92911096
	010, 015	92911060		008	92911038
	020	92911061	010, 015	92911039	
Master/slave, run/standby, duty assist and unit sequencing are available using a pLAN network	ALL	92900820	Sound attenuation section	020	92911040
				008	92911075
				010, 015	92911076
Changeover on alarm	ALL	92900821	3 phase to 1phase conversion kit	020	92911077
Changeover on set time and/or alarm	ALL	92900821		008/2 + 50	92911125
Two circuit to single circuit pipe work conversion kit	008	92911102		008/2 + 30	92911126
	010	92911103		010/2 + 50	92911127
	015	92911104		010/2 + 60	92911128
	020	92911105		015/2 + 80	92911129
			BACnet Controls		
			pCONET BMS BACnet Control	ALL	92919134
			USB to RS485 Connector	ALL	92919136

DX UPFLOW & DOWNFLOW CONFIGURED UNITS

MODEL	COOLING CIRCUITS	CD3 008	CD3 010	CD3 015	CD3 020
UPFLOW	1	92918006	92918008	92918010	92918012
	2	92918007	92918009	92918011	92918013
DOWNFLOW	1	92918014	92918016	92918018	92918020
	2	92918015	92918017	92918019	92918021

CONFIGURABLE UNIT FEATURES

- * Electronically controlled fan speeds
- * Class 'O' thermal and acoustic insulation
- * Washable filters
- * Discharge plenum and grille
- * Single and twin circuit coils
- * Microprocessor controls
- * Display giving access to set points and alarms
- * Alarms: humidity/temperature out of limits
- * Switches: Off/standby, unit run
- * Upflow and downflow units available

CKC CONDENSING UNITS (For use with R407C refrigerant)

CKC 30 1ph	CKC 30 3ph	CKC 40 1ph	CKC 40 3ph	CKC 50 1ph	CKC 50 3ph	CKC 60 1ph	CKC 60 3ph	
55017730	55017774	55017741	55017775	55023722	55017776	55017740	55017777	
CKC 80 1ph	CKC 80 3ph	CKC 90 1ph	CKC 90 3ph	CKC 100 3ph	CKC 130 3ph	CKC 165 3ph	CKC 180 3ph	CKC 200 3ph
55017723	55017724	55017771	55023778	55017779	55017780	55017782	55017783	55017784

CKC 30 and 40 units are fitted with reciprocating compressors. All other CKC units are fitted with scroll compressors.

DCU DUCTED CONDENSING UNITS (for use with R407C)

DCU 30 1ph	DCU 30 3ph	DCU 50 1ph	DCU 50 3ph	DCU 60 1ph	DCU 60 3ph	DCU 80 1ph	DCU 80 3ph
54224029	54224035	54224031	54224037	54224032	54224038	54224033	54224039

All DCU units are fitted with reciprocating compressors.

STANDARD FEATURES AND OPTIONS, CKC, DCU

CKC = standard condensing unit + head pressure control + HP and LP switch and timers

DCU = electronic controlled ducted condensing unit + head pressure control + HP and LP switches and timers

CONDENSING UNIT MODEL	CKC	DCU
Suction and liquid service valves	Standard	Standard
Expansion device (fixed orifice type)	Not available	Standard
Pre-charged with refrigerant (R407C)	Not available	Standard
Ducted air inlet and/or discharge	Not available	Standard
Ceiling suspendible	Not available	Standard
Capacitor start relay (1 phase) (CKC 30 - 40, All DCU)	Option	Option
PTC resistor (1 phase)	Option	Option
Fan speed/head pressure control	Standard	Standard
LP cut-out - Auto	Standard	Standard
HP cut-out - Auto	Standard	Standard
HP cut-out - Manual	Option	Not available
Isolator	Option	Option
3 minute start delay timer and low ambient start	Standard	Standard
Wall mounting brackets	Option	Option
Contactora	Standard	Standard
Overload (standard on 3ph)	Not available	Option

DIMENSIONS AND WEIGHTS

CD3 INDOOR UNITS

UPFLOW UNITS (With plenum fitted)								
	UNPACKED				PACKED			
Model	008	010	015	020	008	010	015	020
HEIGHT mm	1595	1595	1595	1595	1755	1755	1755	1755
WIDTH mm	1230	1380	1380	1580	1250	1400	1400	1600
DEPTH mm	430	430	430	430	455	455	455	455
WEIGHT kg	142	162	171	182	163	185	194	211

DOWNFLOW UNITS								
	UNPACKED				PACKED			
Model	008	010	015	020	008	010	015	020
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

CKC CONDENSING UNITS

UNPACKED											
Model	CKC 30	CKC 40	CKC 50	CKC 60	CKC 80	CKC 90	CKC 100	CKC 130	CKC 165	CKC 180	CKC 200
HEIGHT mm	620	620	720	720	720	820	820	1080	1080	1275	1275
WIDTH mm	904	904	1004	1004	1004	1004	1004	1004	1004	1104	1104
DEPTH mm	304	304	304	304	304	354	354	429	429	429	429
1 Ph kg	48	53	64	65	66	76	-	-	-	-	-
3 Ph kg	48	53	62	63	64	73	81	101	103	118	173
PACKED											
Model	CKC 30	CKC 40	CKC 50	CKC 60	CKC 80	CKC 90	CKC 100	CKC 130	CKC 165	CKC 180	CKC 200
HEIGHT mm	620	620	720	720	720	820	820	1080	1080	1280	1280
WIDTH mm	980	980	1080	1080	1080	1090	1090	1090	1090	1215	1215
DEPTH mm	340	340	340	340	340	390	390	465	465	465	465
1 Ph kg	50	55	66	67	68	78	-	-	-	-	-
3 Ph kg	50	55	64	65	66	75	83	105	107	123	178

DCU DUCTED CONDENSING UNITS

	UNPACKED				PACKED			
Model	DCU 30	DCU 50	DCU 60	DCU 80	DCU 30	DCU 50	DCU 60	DCU 80
HEIGHT mm	560	625	625	625	580	650	650	650
WIDTH mm	1075	1245	1245	1245	1090	1270	1270	1270
DEPTH mm	565	565	565	565	610	610	610	610
WEIGHT kg	66	70	81	81	76	86	86	90

SELECTION

PRODUCT SELECTION

Systems can be selected to provide either comfort cooling or cooling with higher sensible heat ratios

CD3 COMBINATIONS AND DX PERFORMANCE DATA (nominal cooling capacities in kW)

CD3 MODEL	008	010	015	020					
AIRFLOW (maximum) ³ /s	0.78	1.04	1.23	1.51					
HIGH SENSIBLE COOLING SYSTEMS									
	CKC/DCU	1 x 80	2 x 30	1 x 100	2 x 50	1 x 165	2 x 80	1 x 180	2 x 90
Return air	EXTERNAL AMBIENT 30°C								
22°C 50%RH	Total	7.20	7.36	10.63	11.08	13.56	13.86	16.76	18.05
	Sensible	7.20	7.36	10.58	10.77	13.44	13.57	16.56	17.11
24°C 50%RH	Total	7.46	7.74	11.23	11.62	14.23	14.44	17.60	19.05
	Sensible	7.46	7.74	10.86	11.01	13.76	13.84	16.96	17.54
26°C 50%RH	Total	7.75	8.09	11.89	12.13	14.87	14.98	18.40	20.04
	Sensible	7.75	8.09	11.13	11.22	14.03	14.07	17.29	17.91
Return air	EXTERNAL AMBIENT 35°C								
22°C 50%RH	Total	6.86	7.17	10.11	10.56	12.97	13.19	16.03	17.20
	Sensible	6.86	7.17	10.11	10.55	12.97	13.19	16.03	16.75
24°C 50%RH	Total	7.11	7.39	10.60	11.15	13.62	13.72	16.78	18.05
	Sensible	7.11	7.39	10.60	10.83	13.52	13.56	16.63	17.14
26°C 50%RH	Total	---	---	11.22	11.64	14.22	14.22	17.79	19.00
	Sensible	---	---	10.88	11.04	13.79	13.79	17.07	17.52
Return air	EXTERNAL AMBIENT 40°C								
22°C 50%RH	Total	6.57	6.63	9.43	10.15	12.28	12.62	15.22	15.83
	Sensible	---	6.57	6.63	9.43	10.15	12.28	12.62	15.22
24°C 50%RH	Total	6.79	6.98	9.93	10.60	12.85	13.08	16.00	16.78
	Sensible	6.79	6.98	9.93	10.60	12.85	13.08	16.00	16.63
26°C 50%RH	Total	---	---	10.42	11.05	13.43	13.49	16.79	17.54
	Sensible	---	---	10.42	10.82	13.43	13.49	16.70	16.98
Return air	EXTERNAL AMBIENT 45°C								
22°C 50%RH	Total	---	6.21	8.79	9.75	11.52	---	14.33	14.88
	Sensible	---	6.21	8.79	9.75	11.52	---	14.33	14.88
24°C 50%RH	Total	---	6.46	9.24	10.20	12.09	---	15.11	15.59
	Sensible	---	6.46	9.24	10.20	12.09	---	15.11	15.59
26°C 50%RH	Total	---	---	9.73	10.65	12.73	---	15.83	16.31
	Sensible	---	---	9.73	10.65	12.73	---	15.83	16.31
STANDARD COOLING SYSTEMS									
	CKC/DCU	1 x 100	2 x 50	1 x 130	2 x 60	1 x 180	2 x 100	1 x 200	2 x 130
Return air	EXTERNAL AMBIENT 30°C								
22°C 50%RH	Total	9.84	10.26	11.67	11.81	15.98	18.78	18.88	21.90
	Sensible	8.80	8.98	11.02	11.08	14.48	15.72	17.49	18.80
24°C 50%RH	Total	10.40	10.79	12.30	12.53	16.84	19.98	19.91	23.13
	Sensible	9.01	9.17	11.29	11.38	14.82	16.13	17.89	19.22
26°C 50%RH	Total	10.96	11.32	12.92	13.08	17.69	21.20	21.04	24.36
	Sensible	9.20	9.34	11.52	11.58	15.11	16.49	18.30	19.59
Return air	EXTERNAL AMBIENT 35°C								
22°C 50%RH	Total	9.31	9.84	11.08	11.30	15.17	17.91	17.95	20.91
	Sensible	8.57	8.80	10.77	10.86	14.13	15.33	17.07	18.36
24°C 50%RH	Total	9.90	10.35	11.77	11.85	16.10	19.01	19.05	22.11
	Sensible	8.81	9.00	11.08	11.11	14.51	15.72	17.54	18.80
26°C 50%RH	Total	10.45	10.88	12.37	12.45	16.92	20.12	19.92	23.41
	Sensible	9.00	9.17	11.31	11.34	14.81	16.06	17.87	19.22
Return air	EXTERNAL AMBIENT 40°C								
22°C 50%RH	Total	8.67	9.44	10.46	10.78	14.33	16.76	16.65	19.77
	Sensible	8.29	8.63	10.46	10.64	13.77	14.82	16.52	17.86
24°C 50%RH	Total	9.19	9.94	11.07	11.31	15.13	17.65	17.71	20.93
	Sensible	8.52	8.83	10.80	10.89	14.12	15.15	17.00	18.31
26°C 50%RH	Total	9.76	10.45	11.64	11.89	16.02	18.81	18.76	22.10
	Sensible	8.74	9.00	11.04	11.13	14.46	15.54	17.43	18.71
Return air	EXTERNAL AMBIENT 45°C								
22°C 50%RH	Total	8.02	9.06	9.84	---	13.47	15.35	15.63	18.47
	Sensible	8.02	8.46	9.84	---	13.40	14.21	15.63	17.29
24°C 50%RH	Total	8.57	9.55	10.38	---	14.23	16.56	16.47	19.70
	Sensible	8.27	8.67	10.38	---	13.76	14.70	16.47	17.80
26°C 50%RH	Total	9.08	10.04	10.88	---	15.08	17.50	17.54	20.82
	Sensible	8.48	8.85	10.75	---	14.11	15.03	16.98	18.21

AIRFLOWS (m³/s)

CD3

Model	008		010		015		020	
Fan speed	Min	Max	Min	Max	Min	Max	Min	Max
Airflow	0.42	0.78	0.67	1.04	0.72	1.23	0.92	1.51

Note: Maximum external resistance at the maximum speed = 150Pa

CKC (Maximum fan speed)

Model	30	50	60	80	90	100	130	165	180	200
Airflow m³/s	0.81	0.78	0.78	0.78	1.14	1.14	1.74	1.74	1.74	1.74

Note: All CKC units are fitted with fan speed control that will allow the fan to stop during normal operation.

DCU

Model	30		50		60		80	
Fan speed	Min	Max	Min	Max	Min	Max	Min	Max
Airflow m³/s	0.32	0.42	0.42	0.53	0.42	0.53	0.34	0.48

Note: All DCU units are fitted with fan speed control, modulating the airflow according to system conditions.

SOUND PRESSURE LEVELS – CD3 UNITS

	UNIT	008		010		015		020	
UPFLOW	Fan speed	Min	Max	Min	Max	Min	Max	Min	Max
Top discharge and front return air	NC	43	59	46	60	47	58	48	61
	dBA	52	66.5	55	67	56	65	57	68
Front discharge with standard plenum and front return air	NC	43	60	44	58	47	58	48	60
	dBA	52	67	52.5	65	56	65	58.5	67
Front discharge with additional attenuator and front return air	NC	38	49	41	49	41	48	43	50
	dBA	47	58.5	50	58.5	50	57	52	58
DOWNFLOW									
Top return and bottom discharge air (supplied as)	NC	31	44	37	45	37	45	39	48
	dBA	41	53	46	54	46	54	48	56

Note: CD3 Sound Pressure Levels were calculated from measurements taken at 3m from the front of the unit in an office installation and should be used for guidance only.

SOUND POWER AND SOUND PRESSURE LEVELS – 550 SERIES CKC UNITS (Maximum fan speed)

CKC	SOUND POWER LEVELS							SOUND PRESSURE LEVELS		
	Frequency Hz							dBA	dBA	NC
	125	250	500	1k	2k	4k				
30	77.4	67.5	68.5	64.8	60.2	53.8	69.8	50.0	44	
50	73.6	68.2	67.1	65.5	61.1	54.3	69.7	49.2	44	
60	72.9	67.7	67.8	66.4	61.9	54.1	70.3	49.8	45	
80	70.9	68.6	68.1	65.3	59.5	53.8	69.7	49.2	43	
90	81.8	71.8	69.2	68.6	63.1	57.4	72.8	52.3	47	
100	79.4	73.7	71.5	68.5	63.8	58.1	73.4	52.9	47	
130	73	70.3	70.0	68.8	65.0	56.7	72.6	52.1	47	
165	73.1	70.3	70.1	68.9	65.5	57.5	73.1	57.2	51	
180	72.5	71.9	71.7	68.9	66.0	58.2	75.5	59.2	53	
200	73.0	71.8	71.5	70.1	66.1	58.3	75.7	61.8	55	

Sound Power Levels were obtained in full accordance with the direct method of ISO 3741: 1988. Quantities are shown in dB with a standard reference of 1 pW.

Sound Pressure Levels are dB relative to $2 \times 10^{-5} \text{N/m}^2$, calculated from the results under anechoic conditions and quoted as an average of all points on a sphere of a radius of 3m away from the centre of the unit (in cooling mode); (add 3dBA or 3NC for units at an intersection of a wall, add 1dBA or 1NC for high level wall mounted units).

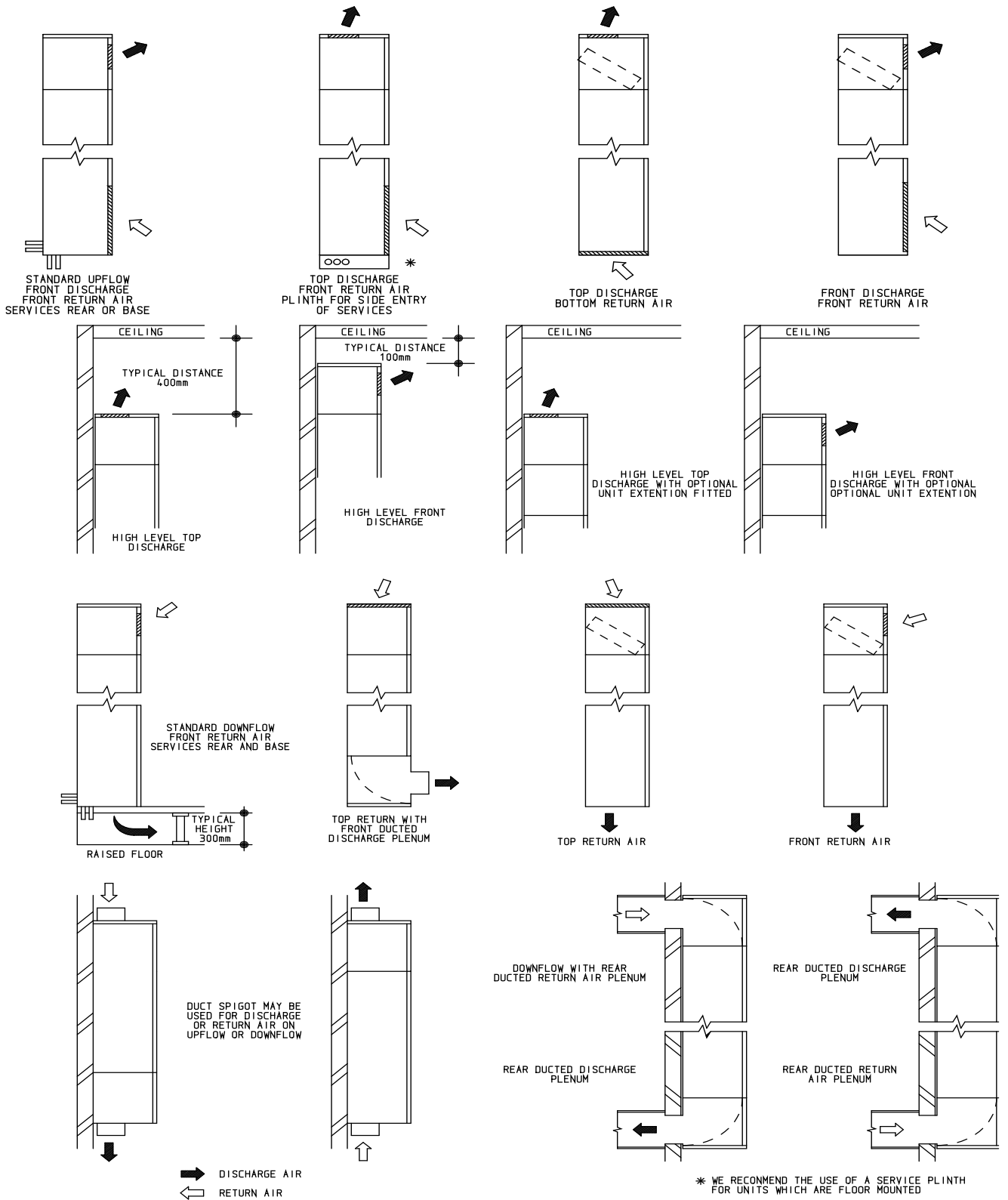
DUCTED CONDENSING UNITS

Measurement point	Unit	Fan speed	dBA	NC
3m from unit in void	DCU 30	Max	52	46
		Min	35	28
	DCU 50, 60, 80	Max	54	48
		Min	44	31
Office area	DCU 30	Max	37	26
		Min	30	15
	DCU 50, 60, 80	Max	42	28
		Min	32	17
3m from discharge grille	DCU 30	Max	52	46
		Min	34	27
	DCU 50, 60, 80	Max	52	44
		Min	40	28

Sound Pressure Levels are dB relative to $2 \times 10^{-5} \text{N/m}^2$. All readings taken from a typical application of a unit suspended in a ceiling void complete with 5m of insulated ducting, conditioning an office directly below.

INSTALLATION

CD3 AIRFLOW OPTIONS



CD3 SERIES CLOSE CONTROL UNIT INSTALLATION

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

1. The Packaged units are supplied for Upflow operation with front return air and top discharge.

Configured units are supplied for Upflow or Downflow operation. Standard upflow units are supplied with front return air and top discharge; Downflow units with top return air and front discharge.

Units may be ordered with other airflow configurations or altered on site. Other configurations include:

Upflow: (wall mounted) with bottom return air.
with front or top discharge, wall or floor mounted.

Downflow: with top return air and under floor discharge.

See page 9 for all available configurations.

Note:- The required airflow arrangement must be configured prior to installation.

2. The chassis is made up of removable panels. 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 is removed by turning the 4 retaining screws anticlockwise, until a click is heard, and pulling the grille outwards.

MOUNTING

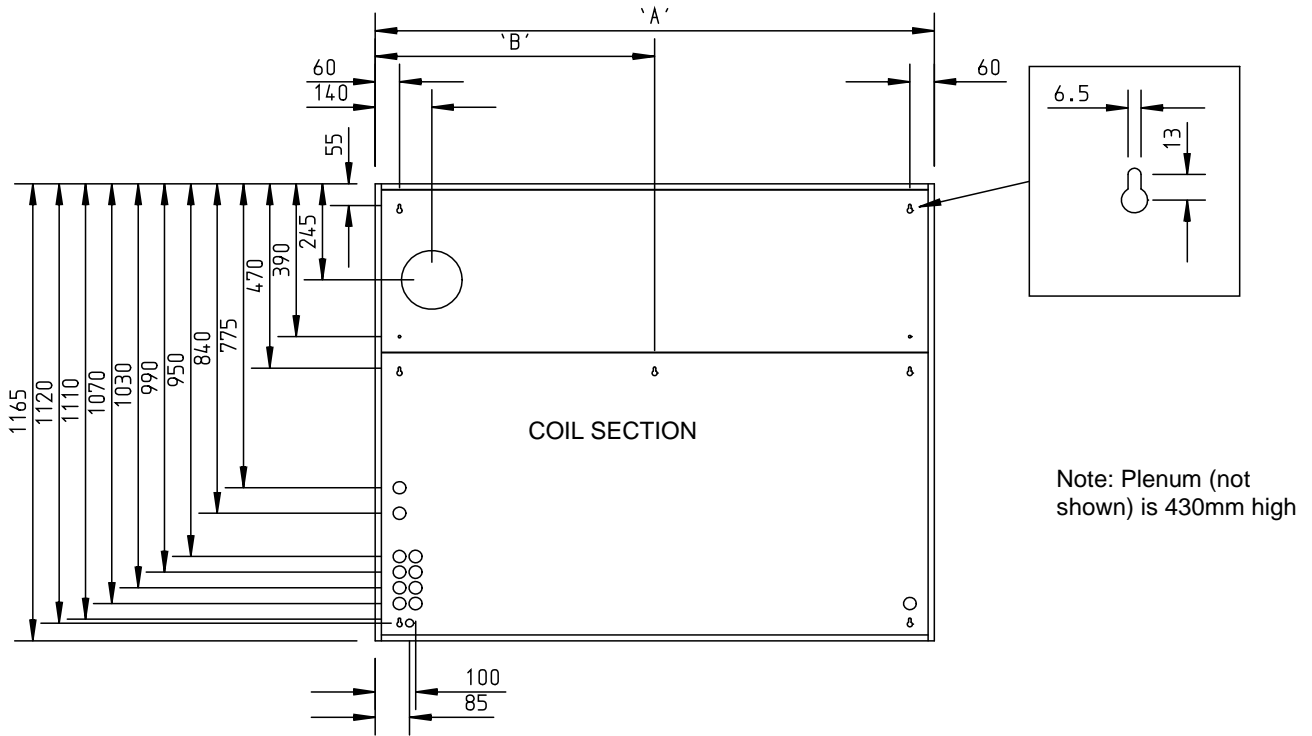
- 1 It is recommended that **ALL** field fit kits are installed prior to mounting the unit and brazing the pipe work.
- 2 Ensure that the wall or floor will accept the operating weight of the unit; weights shown below include the plenum.

MODEL		WEIGHT (kg)
Upflow units with plenum fitted	CD3	142
	CD3	162
	CD3	171
	CD3	182
Downflow units	CD3	124
	CD3	142
	CD3	151
	CD3	160

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

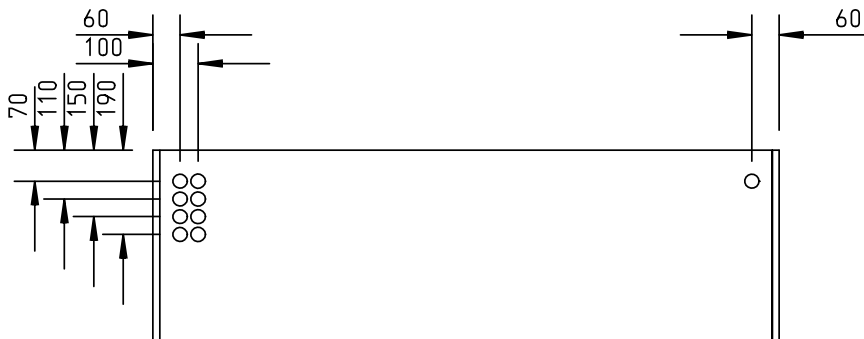
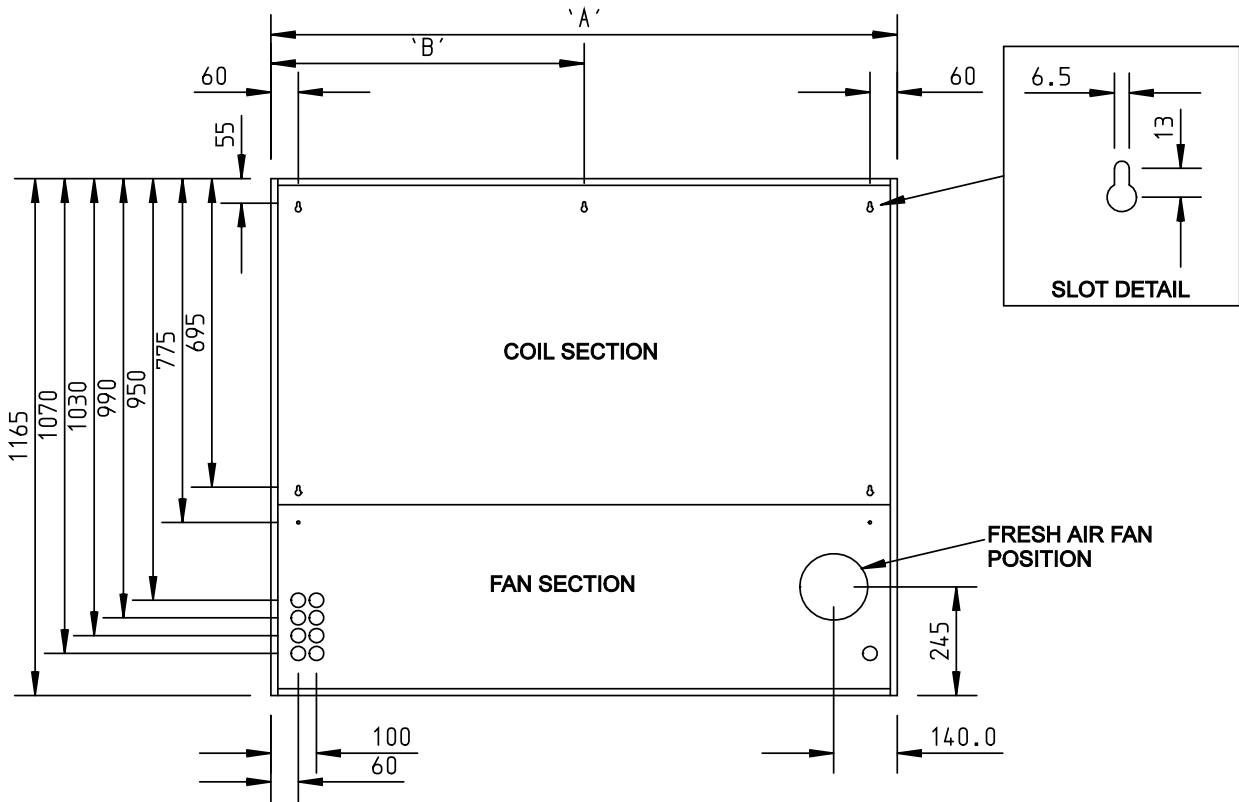
- 3 Mark off the mounting holes as shown and drill holes to suit M6 Rawlbolt shields or equivalent fasteners.
- 4 If a fresh air facility is required, the appropriate apertures must be prepared to match up with the positions of the unit fresh air inlets as shown in the diagrams following. Any opening in the external wall must be suitably lined and screened to prevent brick dust entering the unit during installation and operation.
- 5 Mount the unit as required and secure all fixing bolts
- 6 Check that the unit is square and level. Failure to do so will result in misalignment of the cabinet access panels and possible operational problems.

UPFLOW SERVICE AND FIXING HOLE CENTRES (excluding discharge plenum)



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

INSTALLATION of 550 Series CKC CONDENSING UNITS

CKC units include fan speed control, high & low pressure switches with low ambient and compressor delay start timers.

Note: It is easier to fit any kits prior to mounting the unit.

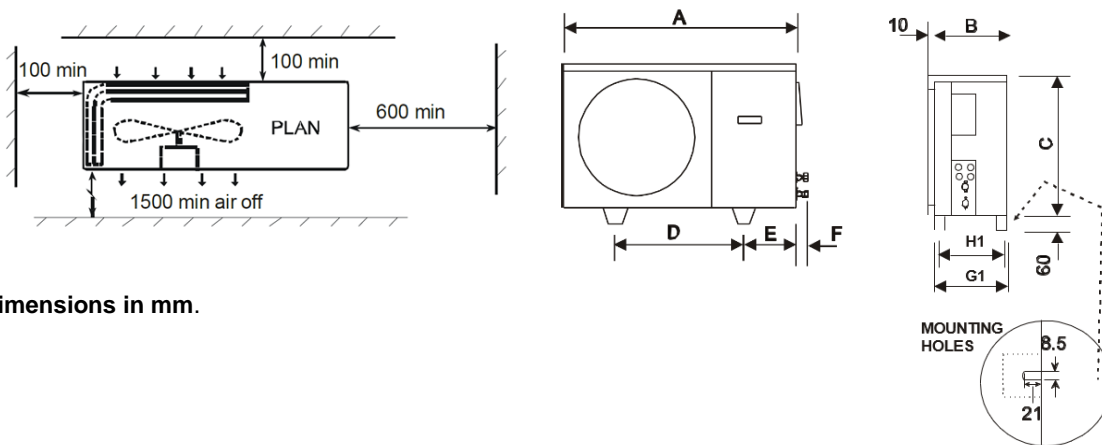
The units are designed to stand on a flat surface. If they are to be wall mounted the following kits are available. (TEV Ltd cannot accept liability for installers own mounting arrangements).

Model	CKC 30 - 80	CKC 90 - 200
Mounting Bracket Kit	55021100	55021101

Whether floor or wall mounted, it is essential that the mounting surface is capable of supporting the unit weight. Leave space around the unit for air circulation and access for installation and maintenance.

MOUNTING:

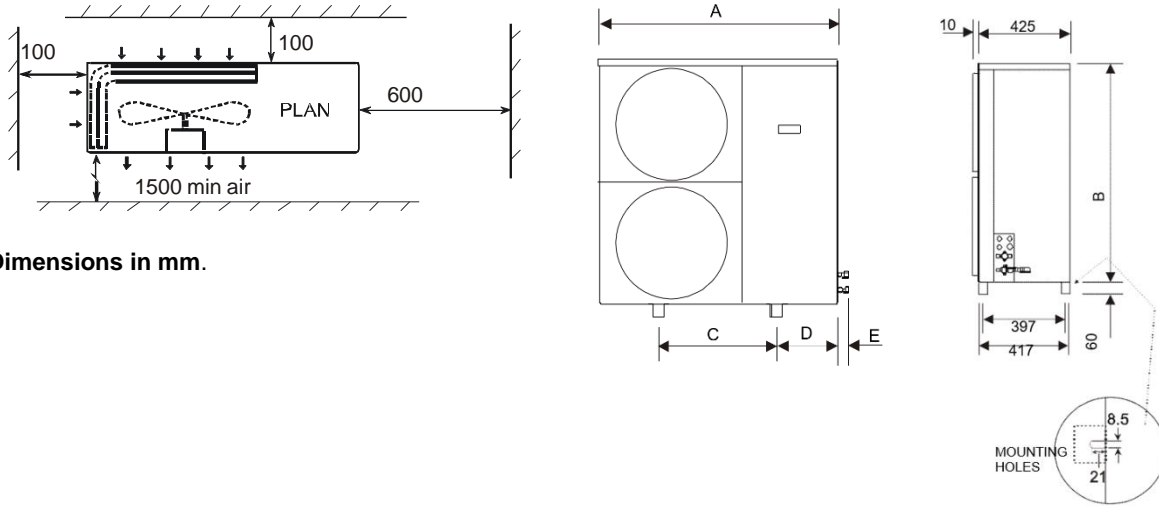
CKC 15 – 100



Dimensions in mm.

MODEL	A	B	C	D	E	F	G1	H1	Weight (kg)	
									1 Ph	3 Ph
CKC 15	900	300	560	525	185	60	295	275	45	--
CKC 20	900	300	560	525	185	60	295	275	46	--
CKC 30	900	300	560	525	185	60	295	275	48	48
CKC 40	900	300	560	525	185	60	295	275	53	53
CKC 50	1000	350	660	570	213	60	345	325	64	62
CKC 60	1000	350	660	570	213	60	345	325	65	63
CKC 80	1000	350	660	570	213	60	345	325	66	64
CKC 90	1000	350	760	495	250	70	345	325	76	73
CKC 100	1000	350	760	495	250	70	345	325	--	81

CKC 130 - 200



Dimensions in mm.

MODEL	A	B	C	D	E	Weight (kg)
CKC 130	1000	1020	495	251	100	101
CKC 150	1000	1020	495	251	100	103
CKC 165	1000	1020	495	251	100	103
CKC 180	1100	1215	675	211	95	118
CKC 200	1100	1215	675	211	95	173

INSTALLING 542 SERIES DUCTED CONDENSING UNITS

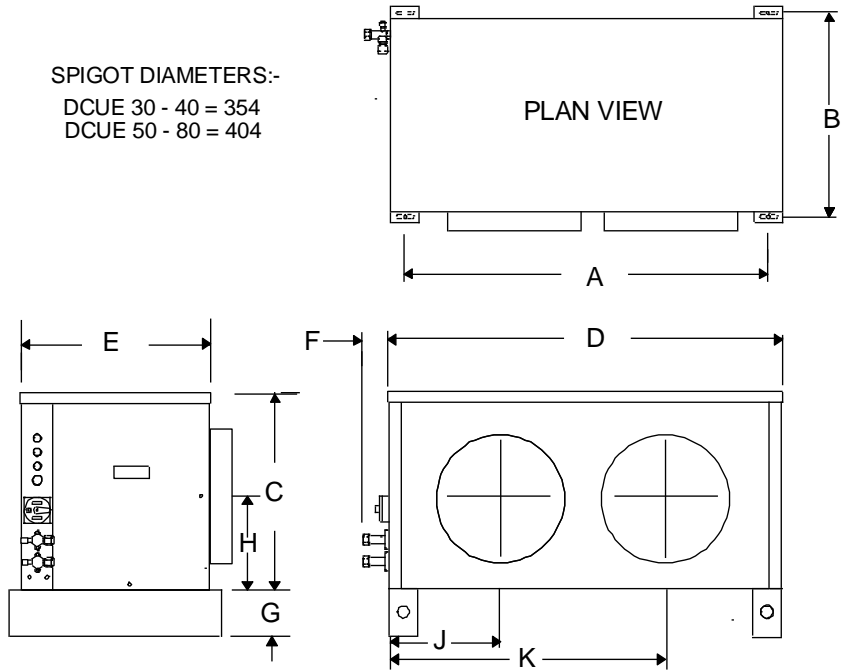
MOUNTING

Units are supplied with a polystyrene packing piece supporting the blower assembly, this **MUST** be removed prior to commissioning.

Ducted Units are designed to be hung on a wall (kit available), suspended from a ceiling (installer supplied fittings), or to stand on a flat surface. Whichever method is used it is essential that the mounting surface is capable of supporting the units weight.

DIMENSIONS

SPIGOT DIAMETERS:-
 DCUE 30 - 40 = 354
 DCUE 50 - 80 = 404

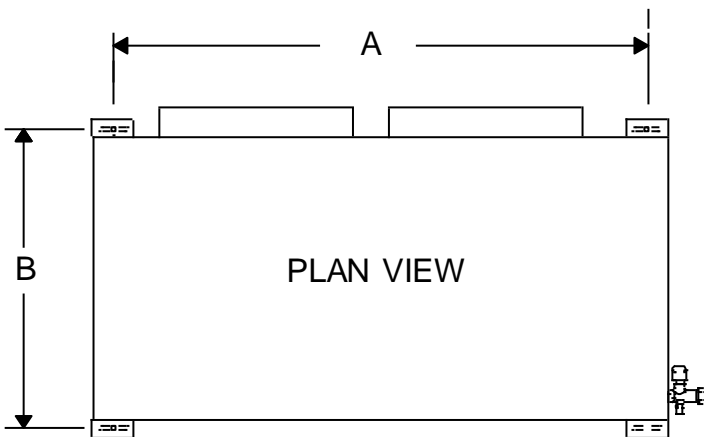


Dimensions in mm

Model	A	B	C	D	E	F	G	H	J	K	Spigot dia.	Weight (kg)
DCU 30	930	510	495	1004	490	65	65	210	317	717	354	70
DCU 50	1100	510	560	1174	490	65	65	240	392	865	404	81
DCU 60	1100	510	560	1174	490	65	65	240	392	865	404	81
DCU 80	1100	510	560	1174	490	65	65	240	392	865	404	84

FLOOR MOUNTING

Using the appropriate side of the packing carton as a template, (centres marked A), mark out and drill 4 holes to suit maximum M8 bolts (also see opposite). Secure the unit to the floor. Discard the stabilizing brackets.



Dimensions in mm

DCU	A	B
30	930	510
50-80	1100	510

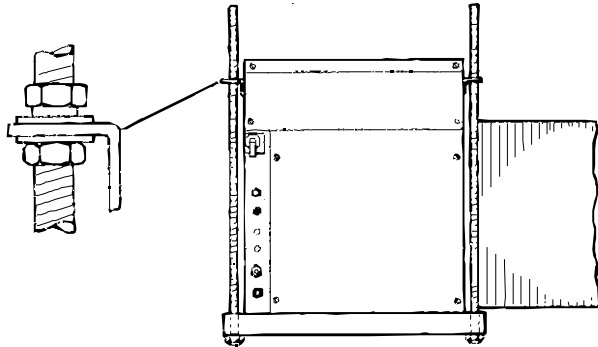
SUSPENSION MOUNTING

The installer must supply 4 x M8 threaded rods with 16 nuts and washers to suit.

IMPORTANT: The stabilizing brackets provided **MUST** be used when suspending a unit.
Fit the stabilizing brackets to the top corners of the back panel and front face using the No. 10 screws provided, (2 per bracket).
If these brackets are omitted the unit will be subject to unacceptable movement on compressor start.

Where long drops of M8 rod are used, it is advisable to incorporate flexible pipes in the suction and expansion lines to absorb any movement of the unit.

Using the template printed on the side of the packing carton, (centres marked A), mark out the ceiling and drill 4 holes to suit M8 screwed rod. Raise the unit to the required height and pass the screwed rods through the mounting holes in the units feet and stabilizing brackets. Secure the unit with a nut and washer on either side of each stabilizing bracket and two nuts and washers underneath each foot mounting hole, (as shown).



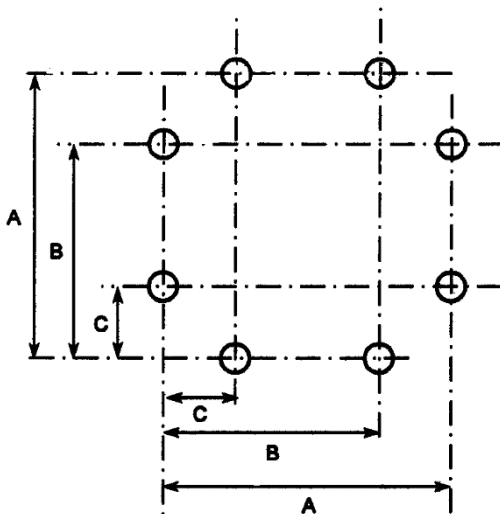
WALL MOUNTING

Brackets to enable ducted units to be wall mounted are available as an optional kit (53200407).

DUCTWORK

Each unit is supplied with air inlet and discharge spigots, models 30 to 40 - 354mm (14") dia., models 50 to 80 - 404mm (16") dia. These may be used for connecting installers ducting or used with the optional Duct, Plenum and Grille kits. Please refer to the kit instruction for installation methods. The front face of the units are also fitted with M6 rivnuts to accept installer supplied square ducting, see dimensions below. Maximum flange width is 25mm and fixing holes should be central within them.

NOTE: It is essential that ducting is adequately insulated to prevent sweating. An insulation thickness of at least 45mm is recommended.



Dimensions mm.	Model	
	30	50-80
A	400	450
B	300	350
C	100	100

APPLICATION

APPLICATION

- 1 To maximise performance, pipe runs should be kept as short as possible, avoiding sharp bends. Individual pipe runs to a maximum of 45m are allowed for air conditioners, providing pipe work is sized and installed correctly. Performance ratings are based on 6m pipe runs but there will be no significant loss of capacity on extended pipe runs for correctly sized pipes.
 - a) Pipe sizes are based on:-
 - Minimum of 3.8 m/s (750fpm) suction gas velocity for horizontal or down flow.
 - Minimum of 7.6 m/s (1500 fpm) suction gas velocity for up flow.
 - Maximum of 15.2 m/s (3000 fpm) suction gas.
 - b) Where vertical risers exceed 3m, oil traps must be formed in the pipe. This will help ensure that oil returns to the compressor. Typically fit an oil trap every 3m with a trap at the bottom of the riser.
- 2 Add 25 grams of refrigerant oil for every 350 grams of charge added to systems with pipe runs exceeding 25m, up to a maximum of 300 grams; preferably by slowly pumping into the suction side with the unit running, after charging the system.
R407C : Use polyolester oil - L'Unite 181-023, ICI Emkarate RL32S,RL32CF,Mobil Artic EAL22 or EAL22CC
- 3 For systems with capillary control at the indoor unit; the table shows the suggested pipe sizes (in inches).

UNIT SIZE	MAXIMUM LENGTH OF EQUIVALENT SUCTION LINE PIPE SIZES (m)							LIQUID LINE		
	3/8	1/2	5/8	3/4	7/8	1 1/8	1 3/8	3/8	1/2	5/8
20	7.5	20						20		
30		15	45					45		
40		10	36	45				7.5	45	
50		7.5	18	45				7.5	45	
60			14	36	45			7.5	45	
80			11	30	45				45	
90			10	25	45				20	45
100			7.5	22	45				15	45
130				15	30	45			12	45
150				12	27	45			8	45
165				8	18	45			7.5	45
180				7.5	16	45			7.5	45
200					15	45			7.5	45

- 4 In calculating equivalent lengths of pipe runs, the effect of bends and fittings must be taken into account. Information relating to the equivalent lengths of line fittings and bends etc. is generally available to the design engineer. The table below covers the fittings most likely to be encountered in this type of installation. The equivalent lengths of all the fittings in a particular pipe run must be added together and the total added to the actual length of pipe in the run, in order to calculate its total equivalent length.

FITTING LOSSES, in equivalent straight lengths of pipe (metres).

Fitting	Pipe Size (outside diameter in inches)					
	3/8	1/2	5/8	3/4	7/8	1-1/8
45° Bend	0.12	0.15	0.18	0.21	0.24	0.3
90° Bend R/d = 1	0.37	0.43	0.49	0.55	0.61	0.79
90° Bend R/d = 2	0.24	0.27	0.30	0.37	0.43	0.52
180° Bend C/d = 1	0.73	0.91	1.10	1.28	1.46	1.83
180° Bend C/d = 2	0.46	0.55	0.64	0.76	0.85	1.07
90° Elbow	0.67	0.85	1.04	1.25	1.46	1.89
R = Radius of bend d = Diameter of tube C = Centres of bend						

- 5 Use the shortest possible route, avoiding sharp bends.
- 6 Fully insulate the suction line, (or suction and liquid line if run together).

REFRIGERATION INSTALLATION

- 1 Units are supplied with the following pipe connections (in inches):-

Model	008S	008T	010S	010T	015S	015T	020S	020T
Liquid	3/8	3/8	3/8	3/8	1/2	3/8	1/2	3/8
Suction	3/4	1/2	3/4	1/2	7/8	5/8	7/8	5/8

S = Single Circuit T = Twin Circuit

NOTE: On twin circuit units, the lower half of the coil is the first circuit.

- Using a tube cutter, remove sealed ends of suction and liquid pipes. This will release a small holding charge of dry nitrogen. Discard the expansion device on the condensing unit.
- Pipe exit positions are shown on pages 3 and 4. It is recommended that the liquid and suction lines be kept at the supplied size until exit, when the full pipe size can be run.
- Connect pipe work between units noting the following:-
 - Use only refrigeration quality copper tube/pipe, supported every 2 metres.
 - Use tube cutters to avoid forming swarf.
 - If brazing, use copper phosphorus alloy with 5% silver, and purge the system with dry nitrogen to avoid oxidation and build up of scale.
 - Do not leave pipe ends, valves, driers etc. open to the atmosphere longer than necessary.
 - Fully insulate the suction line, or suction and liquid if run together.
- A strainer is fitted in the liquid line just prior to the capillary on the air handler. It is recommended that a liquid line filter drier is fitted.
- If a sight glass is fitted to assist charging, position this in the liquid line as near to the air handler as practicable, and downstream of the liquid line filter/drier.

EVACUATING AND CHARGING

When the compressor is first started in the field, the bearing surfaces are susceptible to damage if not properly lubricated. Care should be taken when the bearings are being run in to ensure that:-

- The compressor is not started the first time with excessive refrigerant charge.
- The system is not overcharged, which could result in liquid return to the compressor.

Evacuate the air handler and interconnecting pipe work by connecting a vacuum pump to the Schrader connections on both suction and discharge service valves on the condensing unit (**DO NOT OPEN THE VALVES**) and evacuate to 1000 microns (1 Torr) or better and hold for a minimum of 15 minutes.

REFRIGERANT CHARGE

CKC units fitted with 5mm finned tube coils									
Single circuit systems	CD3	Outdoor unit	CKC charge (g)		Twin circuit systems	CD3	Outdoor units	CKC charge (g)	
				R407C					R407C
S 08 S	8	CKC 90		1422	S 08 T	8	2 x CKC 50		1167*
S 10 S	10	CKC 130		3075	S 10 T	10	2 x CKC 60		1477*
S 15 S	15	CKC 180		3389	S 15 T	15	2 x CKC 100		1882*
S 20 S	20	CKC 200		4229	S 20 T	20	2 x CKC 130		3075*
HS 08 S	8	CKC 80		1357	HS 08 T	8	2 x CKC 30		761*
HS 10 S	10	CKC 100		1882	HS 10 T	10	2 x CKC 40		807*
HS 15 S	15	CKC 165		3445	HS 15 T	15	2 x CKC 80		1357*
HS 20 S	20	CKC 180		3389	HS 20 T	20	2 x CKC 90		1422*

CKC units fitted with microchannel coils									
Single circuit systems	CD3	Outdoor unit	CKC charge (g)		Twin circuit systems	CD3	Outdoor units	CKC charge (g)	
				R407C					R407C
S 08 S	8	CKC 90		1222	S 08 T	8	2 x CKC 50		967*
S 10 S	10	CKC 130		2700	S 10 T	10	2 x CKC 60		1277*
S 15 S	15	CKC 180		2949	S 15 T	15	2 x CKC 100		1682*
S 20 S	20	CKC 200		3789	S 20 T	20	2 x CKC 130		2700*
HS 08 S	8	CKC 80		1157	HS 08 T	8	2 x CKC 30		631*
HS 10 S	10	CKC 100		1682	HS 10 T	10	2 x CKC 40		547*
HS 15 S	15	CKC 165		3070	HS 15 T	15	2 x CKC 80		1157*
HS 20 S	20	CKC 180		2949	HS 20 T	20	2 x CKC 90		1222*

* = per circuit

CKC units come precharged with Nitrogen, base charge level shows refrigerant required for a 3m pipe run

The base charge will generally be sufficient for 3m pipe runs at room 22°C 50% RH, ambient 27°C 50% RH.
Typical charge to be added for longer liquid lines:-
3/8" OD add 50 g/m; 1/2" OD add 80 g/m; 5/8" OD add 110 g/m.

The preferred method of adding refrigerant is:-

1. Start the unit (on highest fan setting) and allow the compressor to run for a few seconds.
2. Additional charge should be introduced through the Schrader valve on the suction side of the compressor.
3. The correct unit charge may be determined by examining the condition of the evaporator coil during the charging process (with the system running in cooling). Refrigerant enters the coil at the bottom left hand side and leaves at the top left hand side. A properly charged unit should show signs of 'sweating' all the way up the coil. 'Sweating' should be reduced at the coil outlet as it enters the suction line, which should be completely dry a few inches before it enters the compressor.
4. If a sight glass is fitted, position this in the liquid line as near to the air handler as possible. Charge should be added to the unit, (with the system running), until the sight glass is just clear of bubbles (flooded).

Undercharged Unit - the top few tubes of the evaporator are dry and there are, (possibly), slight signs of frosting at the inlet to the evaporator coil.

Overcharged Unit - the suction line 'sweats' all the way back to the compressor.

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 7). Supply cables and inter-connecting cables are to be provided by the installer.

INDOOR UNIT WIRING

Connections for internal wiring are made within the electrics enclosure accessed by removing the centre front 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.

System Interconnecting Wiring

On single or three phase systems, connect the incoming mains supply to the indoor unit and then link to the condensing unit via a three pole circuit breaker.

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.

Data Plates

Because indoor and outdoor units can be mix-matched, the data plates only give information relevant to the indoor unit with maximum possible running currents. To determine the full system details please refer to the Technical Manual for more specific information.

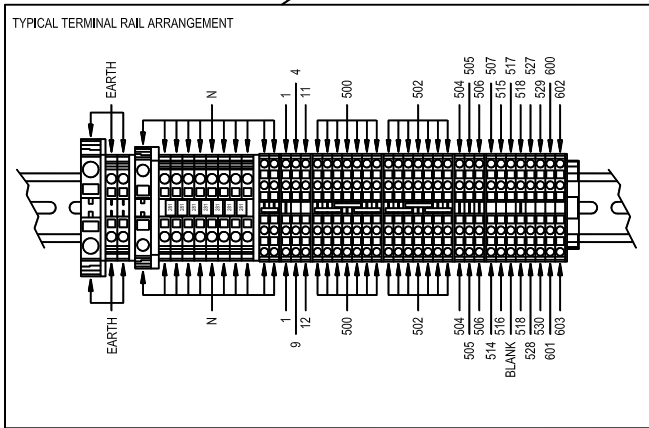
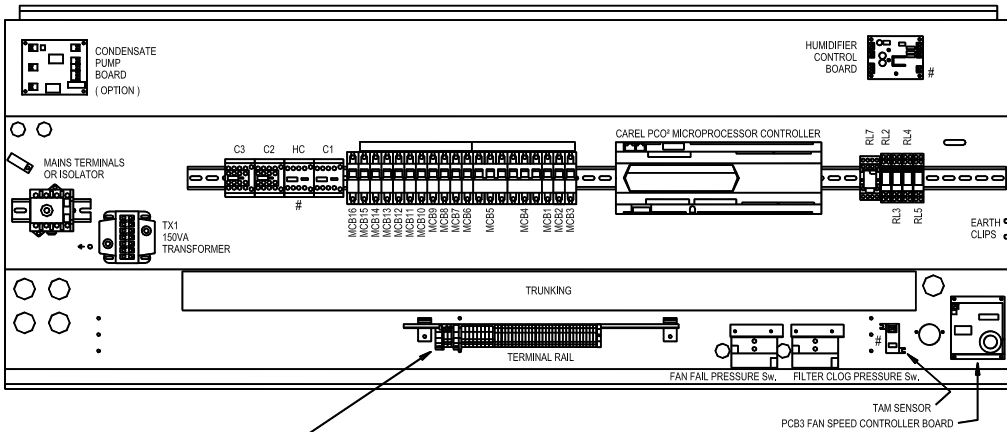
ELECTRICAL DATA

System	Model Combination	Single Phase Supply 230 Volts - 50 Hz					Three Phase Supply 400 Volts - 50 Hz				
		Full Load Amps				System max. starting current	Full Load Amps				System max. starting current
		Cool Only	Cool & Heat	Cool/Heat/Hum/Dehum	If DCU fitted		Cool Only	Cool & Heat	Cool/Heat/Hum/Dehum	If DCU fitted	
Amps	Amps	Amps	Amps	Amps	A/PH*	A/PH*	A/PH*	A/PH	A/PH		
S 08 S	CD008 + CKC 100	-	-	-	-	-	12.5	16.7	32.7	-	69.0
S 10 S	CD010 + CKC 130	-	-	-	-	-	15.75	16.7	32.7	-	89.3
S 15 S	CD015 + CKC 180	-	-	-	-	-	22.1	33.0	47.1	-	139.6
S 20 S	CD020 + CKC 200	-	-	-	-	-	23.91	33.4	49.3	-	138.0
HS 08 S	CD008 + CKC 80 / DCU 80	19.9	**38.7	-	+1.0	82.5	10.3	16.7	32.7	+2.0	57.8
HS 10 S	CD010 + CKC 100	-	-	-	-	-	14.5	23.1	32.7	-	75.4
HS 15 S	CD015 + CKC 165	-	-	-	-	-	19.4	33.0	44.6	-	109.2
HS 20 S	CD020 + CKC 180	-	-	-	-	-	22.5	33.4	49.3	-	140.0
S 08 T	CD008 +2x CKC 50 / DCU 50	26.8	**38.7	-	+1.0	75.2	13.7	16.7	32.7	+4.0	43.8
S 10 T	CD010 +2x CKC 60 / DCU 60	35.5	**40.7	-	+1.0	83.0	16.3	23.1	32.7	+5.0	56.2
S 15 T	CD015 +2x CKC 100	-	-	-	-	-	25.1	33.0	41.0	-	85.3
S 20 T	CD020 +2x CKC 130	-	-	-	-	-	27.1	33.4	49.3	-	99.6
HS 08 T	CD008 +2x CKC 30 / DCU 30	21.9	**38.7	-	+4.0	51.0	11.8	16.7	32.7	+4.0	36.1
HS 10 T	CD010 +2x CKC 50 / DCU 50	28.8	**40.7	-	+1.0	77.2	15.9	23.1	32.7	+4.0	50.2
HS 15 T	CD015 +2x CKC 80 / DCU 80	38.5	**42.3	-	+1.0	100.9	19.7	33.0	41.0	+4.0	74.1
HS 20 T	CD020 +2x CKC 90	44.7	**44.7	-	-	129.4	22.5	33.4	49.3	-	81.7

* Max. Phase

**Single phase models are available for twin circuit dx systems where electric heating requirement is 8kW or less. The electric heating loads shown are based on maximum amounts of heating which are:-

CD 008 = 8kW (4+4) CD 010 = 10kW (4+6) CD 015 = 16kW (8+8) CD 020 = 20kW (10+10)



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
MCB4	CONDENSING UNIT No.1 [3 POLE]
MCB5	CONDENSING UNIT No.2 [3 POLE]
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
RL2	CONDENSING UNIT No.1 CONTROL RELAY
RL3	CONDENSING UNIT No.1 TRIP RELAY
RL4	CONDENSING UNIT No.2 CONTROL RELAY
RL5	CONDENSING UNIT No.2 TRIP RELAY
RL7	HEATER BANK OVERHEAT RELAY

Typical control panel and terminal layout

RECOMMENDED FUSE SIZES

The system and its supply/interconnecting wiring must be protected by fuses, preferably H.R.C. motor rated types to BS60269 or miniature circuit breakers to BS60898 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.

Standard Cooling

System	S 08 S	S 10 S	S 15 S	S 20 S	S 08 T	S 10 T	S 15 T	S 20 T
1 Phase Cool Only	-	-	-	-	40	40	-	-
1 Phase Cool and Heat	-	-	-	-	50	50	-	-
3 Phase Cool Only	20	25	35	40	16	20	32	35
3 Phase Cool and Heat	20	32	40	40	20	32	40	40
3 Phase Cool/Heat/Hum/Dehum	40	40	63	63	40	40	50	63

High Sensible Cooling

System	HS 08 S	HS 10 S	HS 15 S	HS 20 S	HS 08 T	HS 10 T	HS 15 T	HS 20 T
1 Phase Cool Only	32	-	-	-	32	40	50	63
1 Phase Cool and Heat	50	-	-	-	50	50	50	63
3 Phase Cool Only	16	20	32	40	16	20	25	32
3 Phase Cool and Heat	20	32	40	40	20	32	40	40
3 Phase Cool/Heat/Hum/Dehum	40	40	63	63	40	40	50	63

CONDENSATE DRAIN

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

A 15mm O.D. copper drain pipe 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 pipe to go through the back or base of the unit, a knockout is provided in the back panel or base plate.

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 pipe must be capable of carrying water at 60°C.

FAN SPEED CONTROLLER

One control is used on each CD3 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.

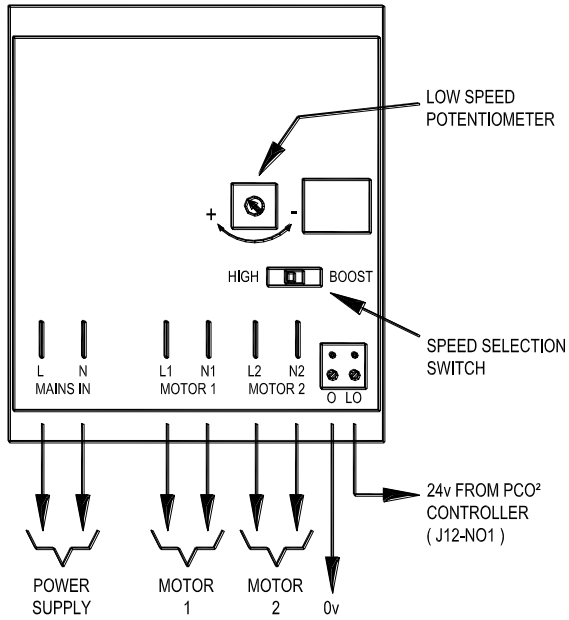
SETTING

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 fan speed may be adjusted between 50% and 100% of the selected top speed by turning the low speed potentiometer clockwise.



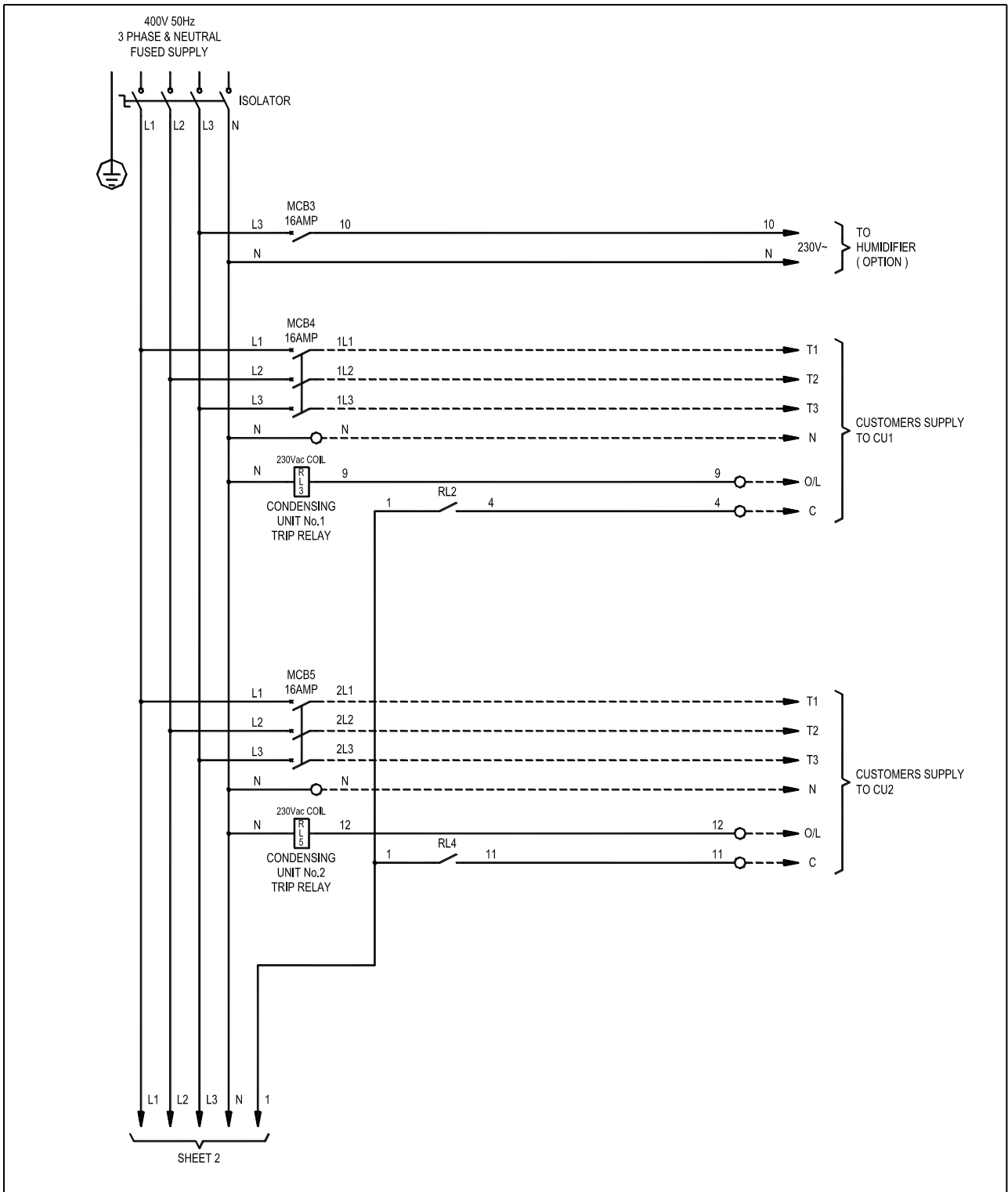
Pico Controller * Setting	High/Boost Switch	Potentiometer
Unit Fan Speed High	No Adjustment Possible	No Adjustment Possible
Unit Fan Speed Low	Select High or Boost	Adjust for De-Hum Low SP 50% to 100%
* See Page 4 of 92908131 Operator Instructions if the Pico Controller is set at high. Low speed will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

WHEN INSTALLATION HAS BEEN COMPLETED - CHECK:-

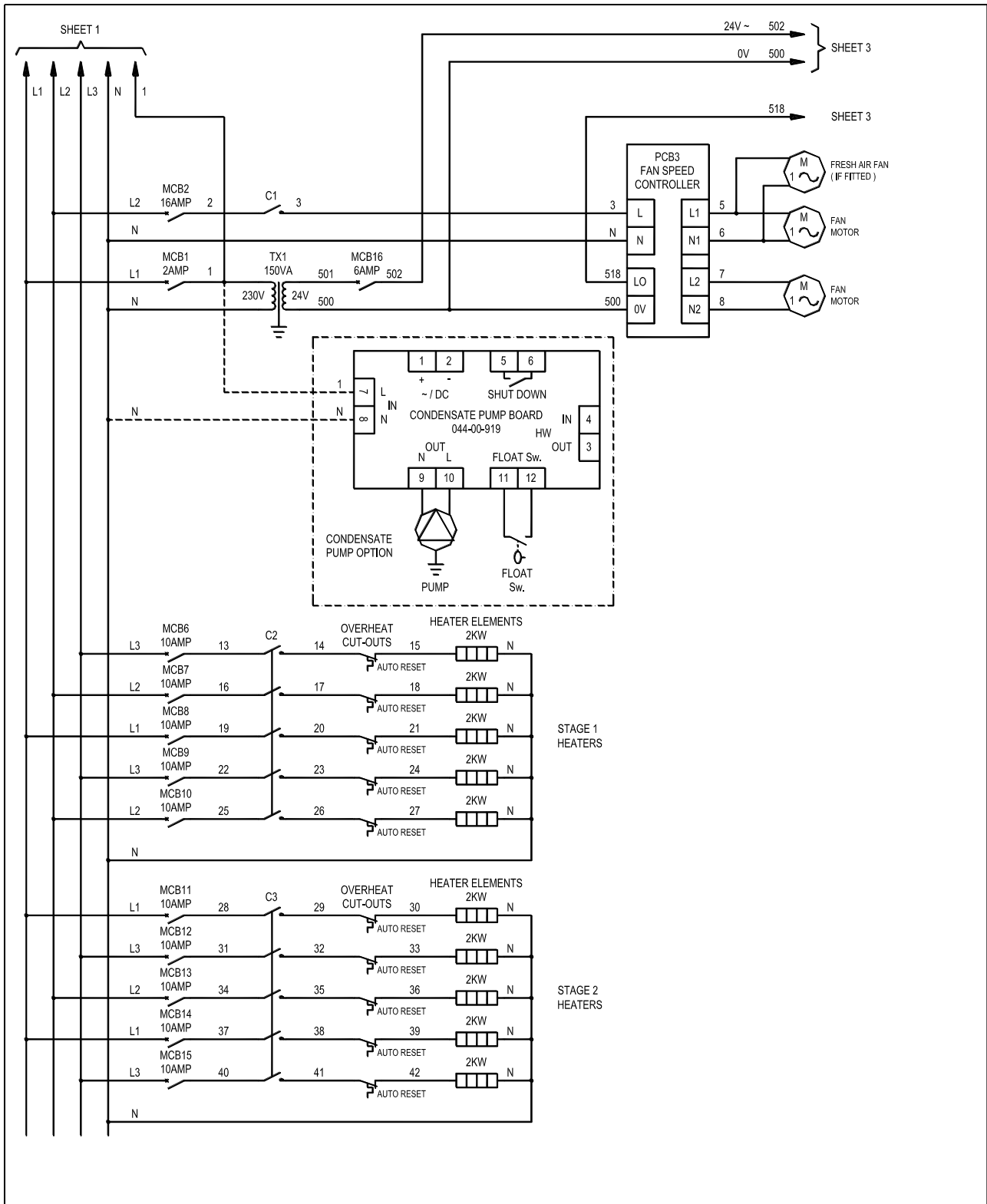
1. All pipe work and joints for leakage.
2. All pipe work and fittings for insulation.
3. All bolts are secure and that fan rotates freely.

WIRING DIAGRAMS

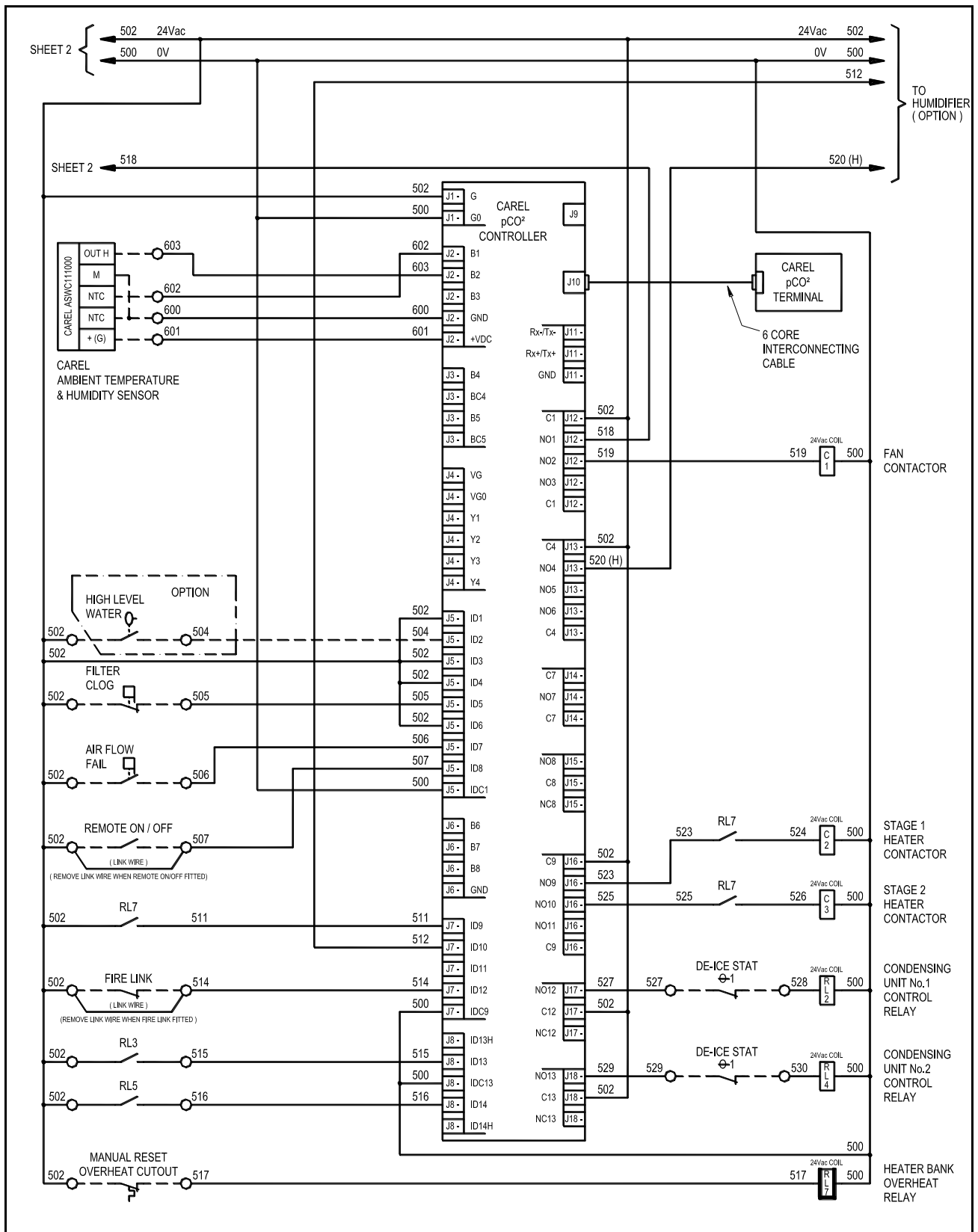
POWER WIRING DIAGRAM – Sheet 1



POWER WIRING DIAGRAM – Sheet 2

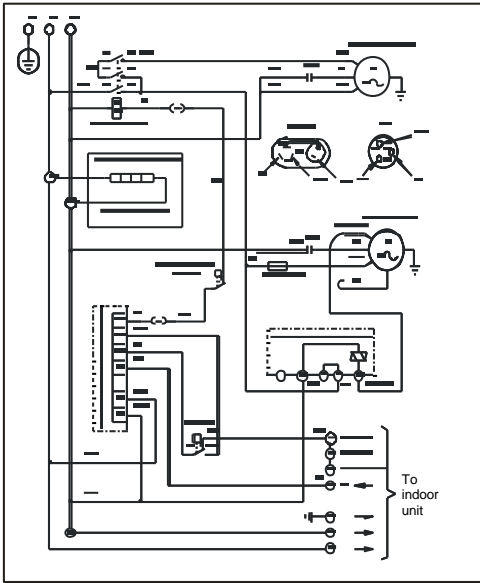


CONTROL WIRING DIAGRAM

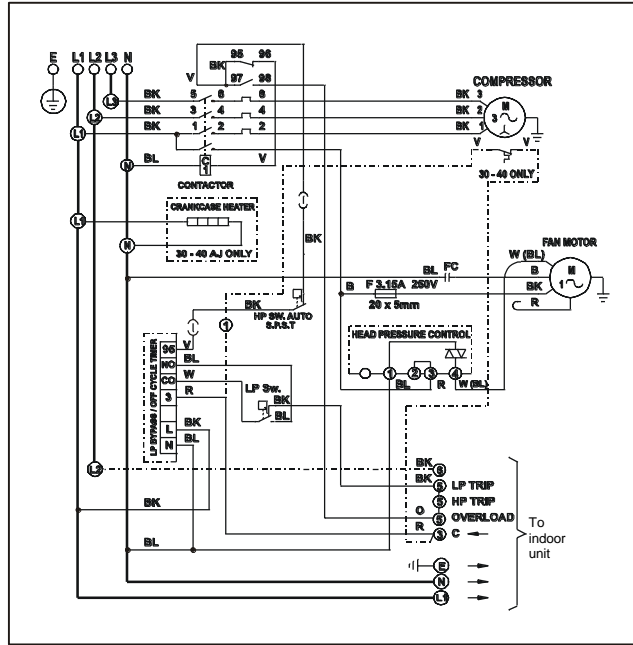


For HUMIDIFIER wiring diagram see page 27.

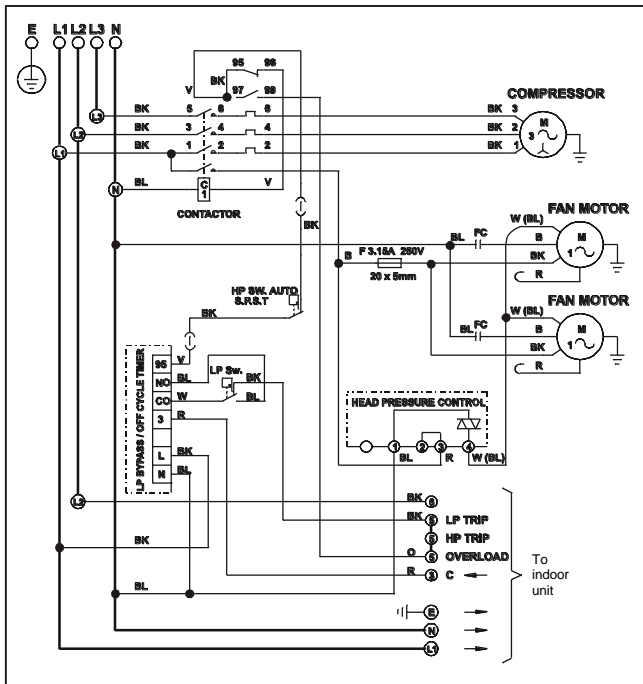
CKC WIRING DIAGRAMS



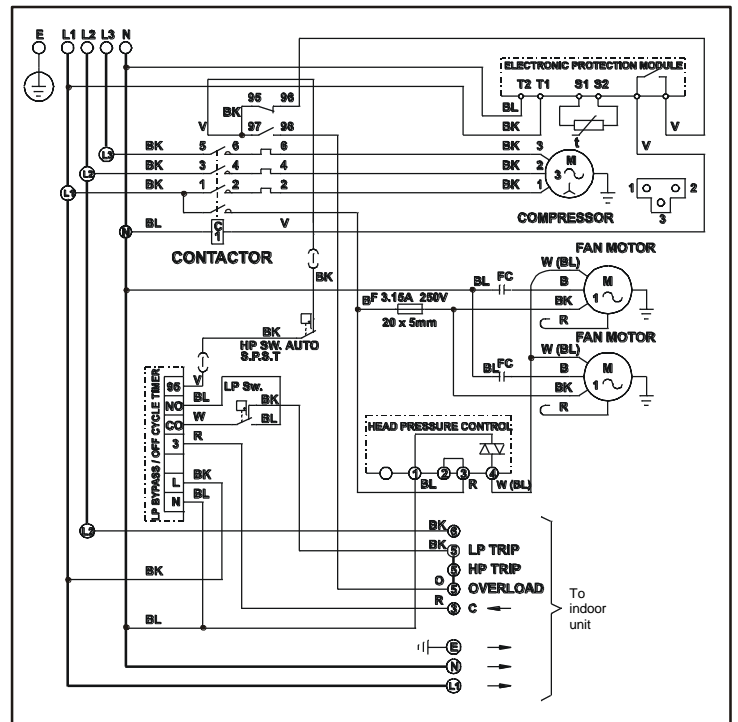
1 PHASE CKC 30 to 90



3 PHASE CKC 30 to 100

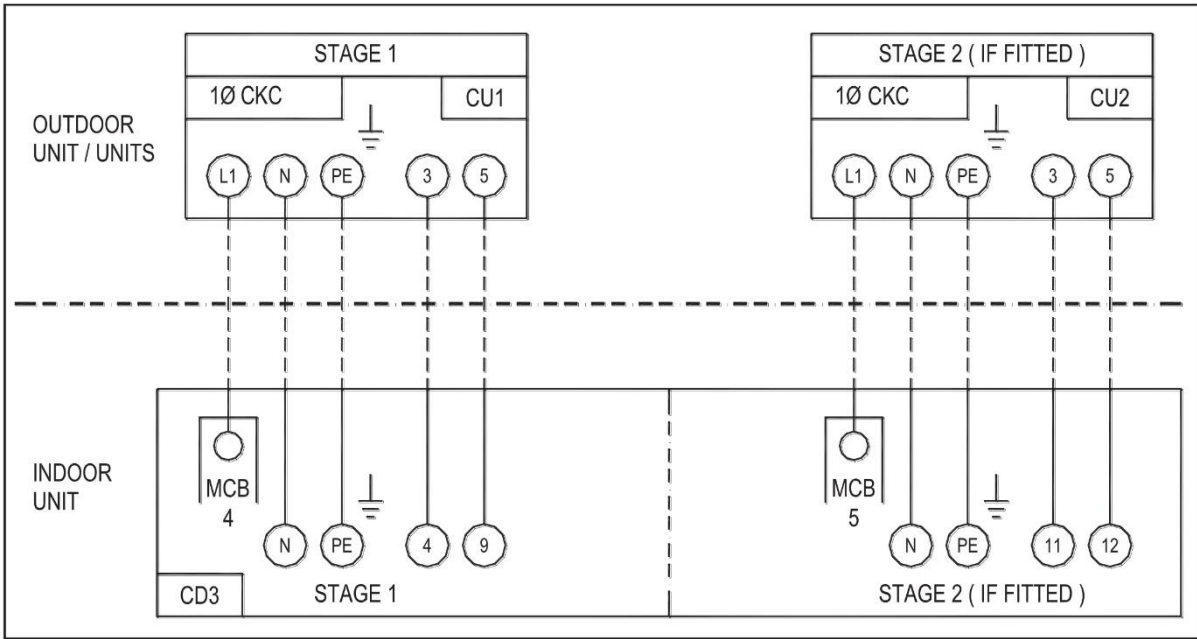


3 PHASE CKC 130 to 180

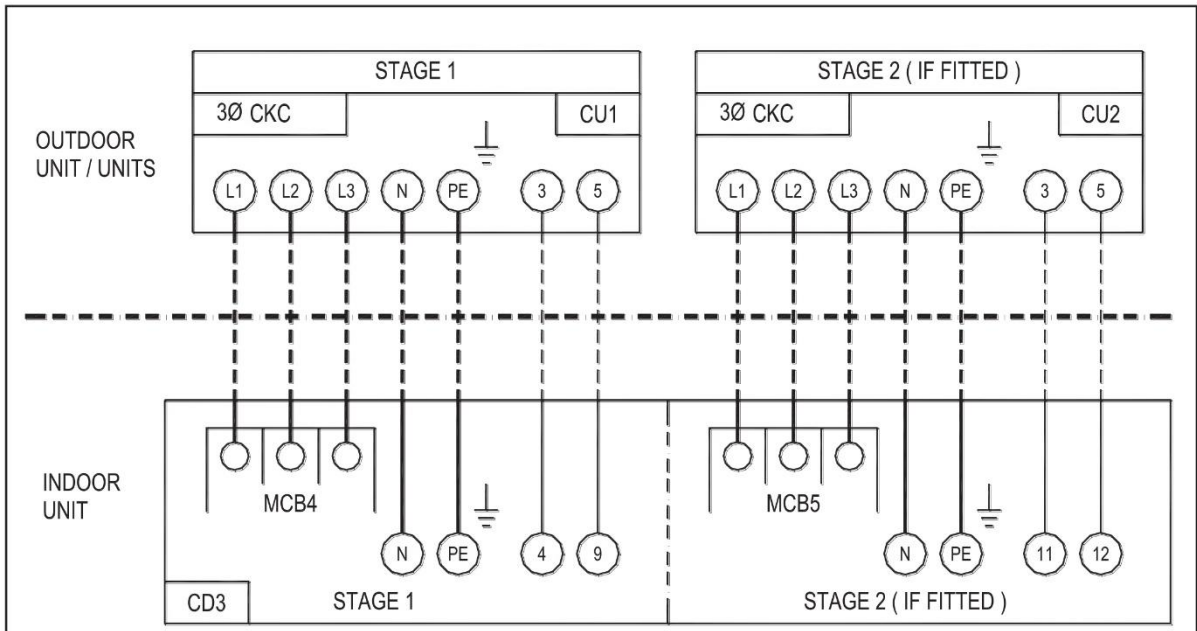


3 PHASE CKC 200

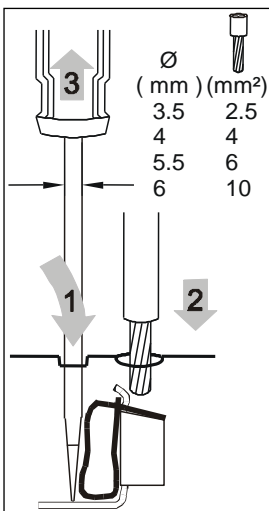
1 phase units



3 phase units



WAGO terminals



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 second float switch to provide a high water 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 will require replacing periodically. The humidifier is fitted with bottle change indication and the frequency of change is dependent upon the condition of the water feeding the humidifier.

INSTALLATION

Water supply

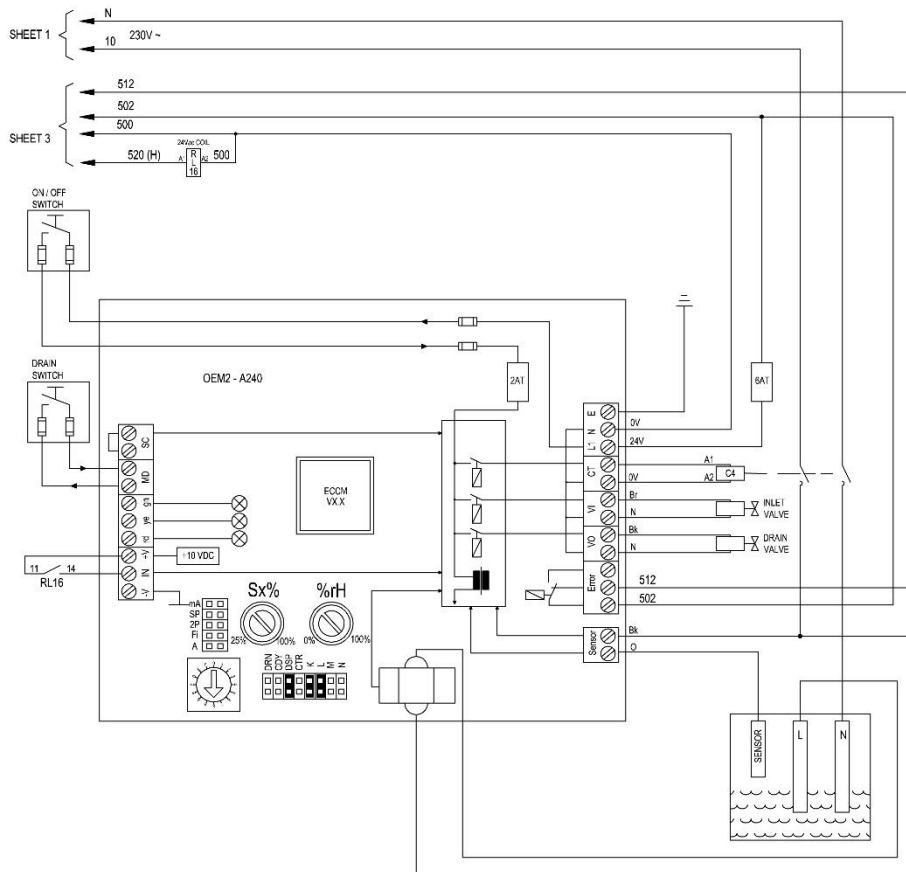
The humidifier operates with a range of water qualities; pre-treated water is preferable, extending the bottle life (fully de-mineralised water is not suitable). The humidifier system incorporates an air break in the water feed to meet local regulations. Connect directly to a water supply operating at 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 that is fitted to the inlet of the humidifier.

Waste water is drained into the unit condensate tray. The drainpipe should be suitable for use with water at 60°C . Drain pipes 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 it's 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 the new bottle before connecting up may reduce the start-up time after a bottle change.

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).

OPERATION AND COMMISSIONING

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

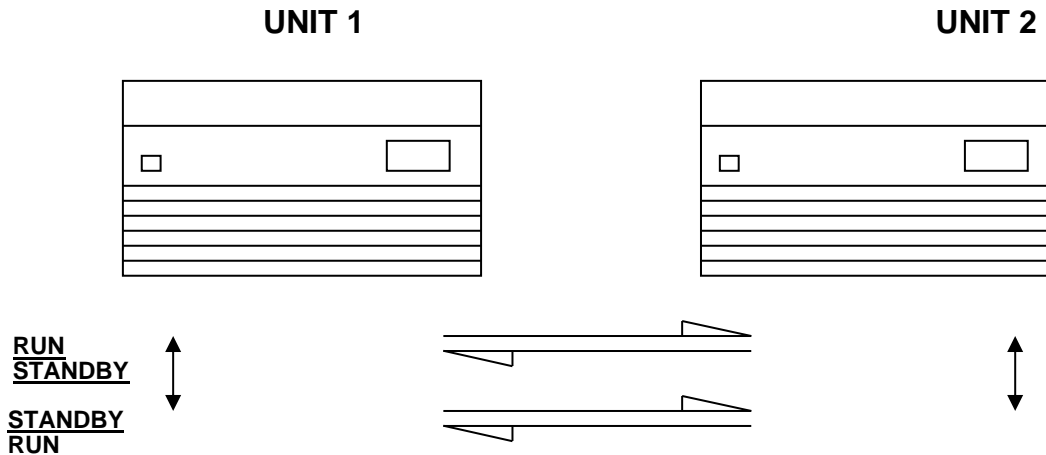
GENERAL MAINTENANCE

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 pipe.
2. Check all electrical connections are tight.
3. Check and clean the drain tray to prevent a build up of deposits.

CD3 AUTO CHANGEOVER

It is possible to connect two CD3 units to allow them to operate in Run/Standby operation, changing over on alarm or on a timer to equalise component wear. One unit will be configured as the run unit, the second as the standby unit.



UNIT 1 starts as the run unit with UNIT 2 in standby mode. One of the following will cause the units to change modes.

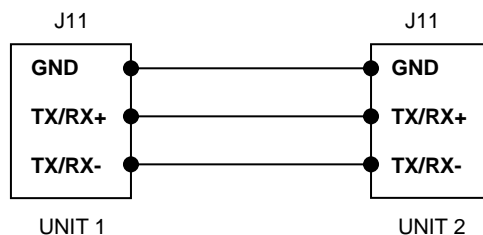
1. **Run time:** If programmed, units will switch between run and standby on a timer basis to ensure even running of fans and compressors. This is factory set at 168hrs and is factory adjustable by TEV Ltd.
2. **Unit assist:** The standby unit will switch on in the event the room load exceeds the running unit capacity.
3. **Alarm:** If the run unit is disabled by alarm or power loss (including switching off) the standby unit will take over.
4. **Network:** If communication is broken.

Critical alarms are set in the Engineering Level mask (see operating Instructions page 5 of 9) note that only AL01 and ALO2 are used with Marstair condensing units. AL03, AL04, AL32 and AL33 are not available.

WIRING

WARNING !! Units can start automatically, isolate both units before beginning work..

Connections

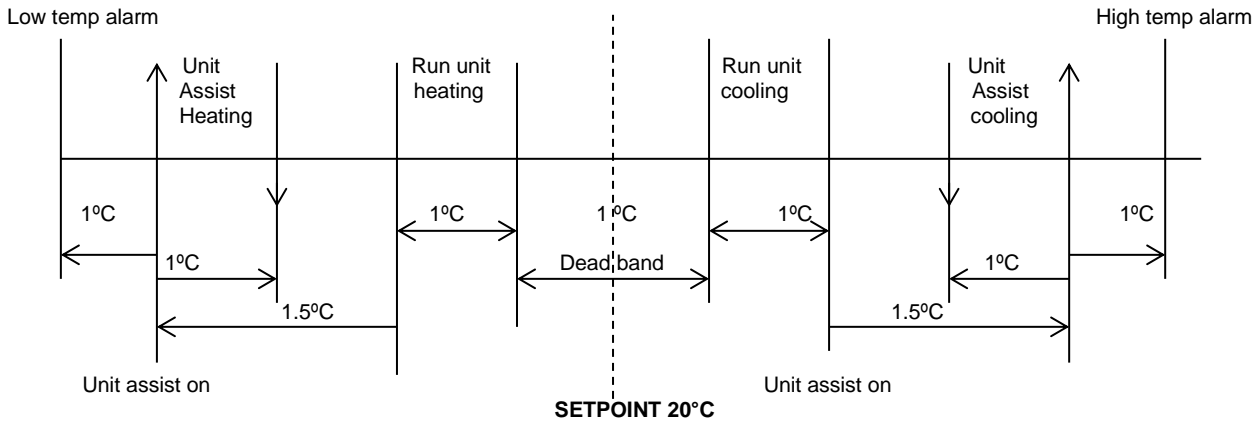


CAUTION:
Do not cross the polarity of the connections.

Units are connected in parallel using a twisted pair shielded cable (min AWG20/22, 0.75/0.5mm²) via J11 on the controllers. Communication is via an RS485 connection. Using correct shielded cable, units may be up to 200m apart.

UNIT ASSIST

In this mode the stand-by unit is enabled if the room temperature drifts out of limits, subject to a 3 Minute delay. This allows the run unit to control the temperature, and not respond to fast transients.



This is a typical example: values will change for the run unit between one and two stage cooling, one and two stage heating, L.P.H.W. and any combination depending upon conditions.

OPERATING INSTRUCTIONS

DESCRIPTION OF CONTROLS

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

USER INTERFACE

The user interface is divided into 3 parts:

1. **FIRST USER LEVEL**, not protected by password, which allows the user to view monitored items, e.g. running hours, display active /stored alarms and temperature /humidity set points.
2. **SECOND USER LEVEL**, protected by a password, which 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 the facility for calibrating the attached sensors and manually operating the fans, the cooling mode, the heating mode and the humidification and de-humidification sequences during commissioning.

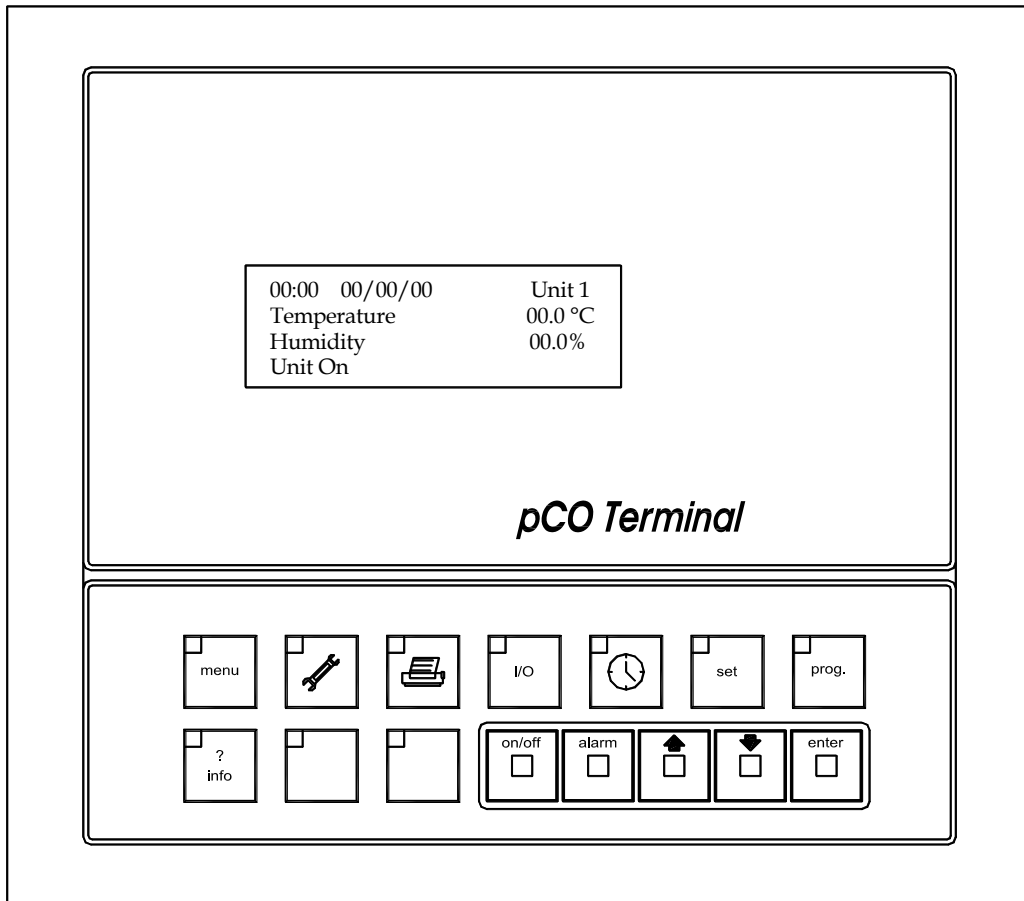
A fourth **MANUFACTURES LEVEL**, protected by password, is for configuring and programming the controller. This level is only available to TEV and any changes to the operating software, which may be required for an individual application, must be carried out by an TEV engineer.

PASSWORDS

A document is enclosed separately in the unit containing the passwords for the second level user and engineering levels. This 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 or Engineer, if changes are made ensure that a record of the new passwords is kept in a safe location. Should passwords be lost, contact TEV Ltd. for assistance.

DISPLAY AND KEYPAD

The display/keypad is mounted on the front of the unit, connected by a 1.5m cable. It 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.



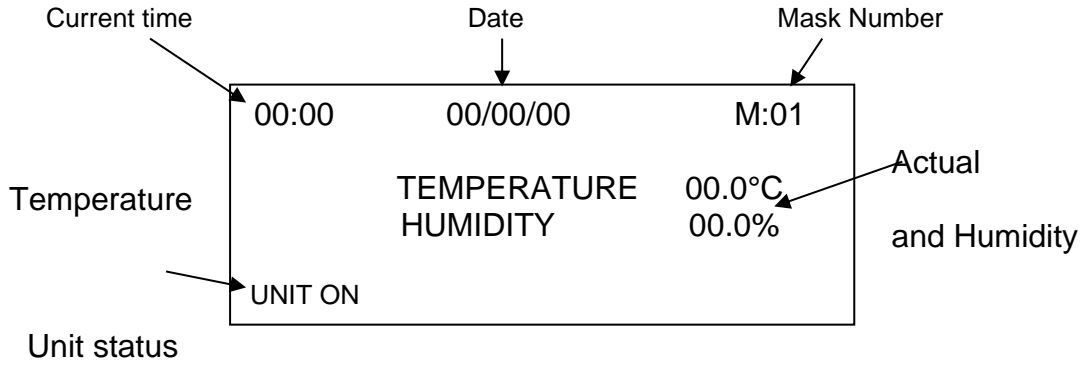
KEYPAD FUNCTIONS

KEY	FUNCTION	KEY	FUNCTION
	<ol style="list-style-type: none"> 1. Displays measured values. 2. Returns operator to the main mask window. 		Setting of operating parameters and safety thresholds.
	Displays working hours and allows counter re-set.		Displays the version of the application programme loaded into the controller.
	Not used.		Unit ON/OFF button. The green LED is lit when the unit is ON.
	Displays current status of inputs and outputs.		<ol style="list-style-type: none"> 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.		Confirms data entry. Yellow LED is lit when there is power to the unit.
	For setting and adjusting set-points.		<ol style="list-style-type: none"> 1. Toggle between display screens. 2. Raise or lower set values.

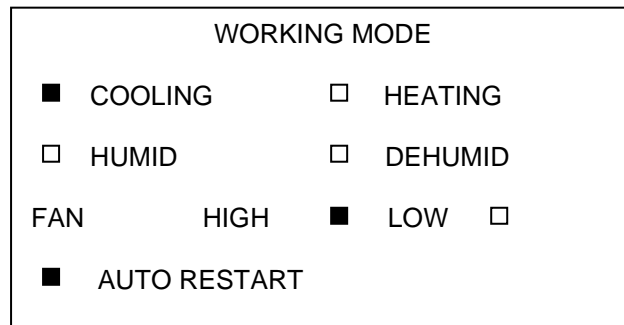
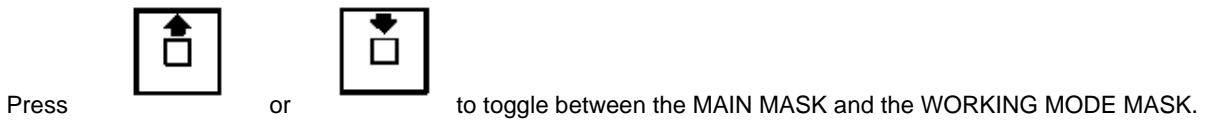
Each function button has a green LED in the top left hand corner that is lit when the particular function button is operated. This does not apply to the ON/OFF, ALARM and ENTER buttons that have LEDs as defined above.

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.

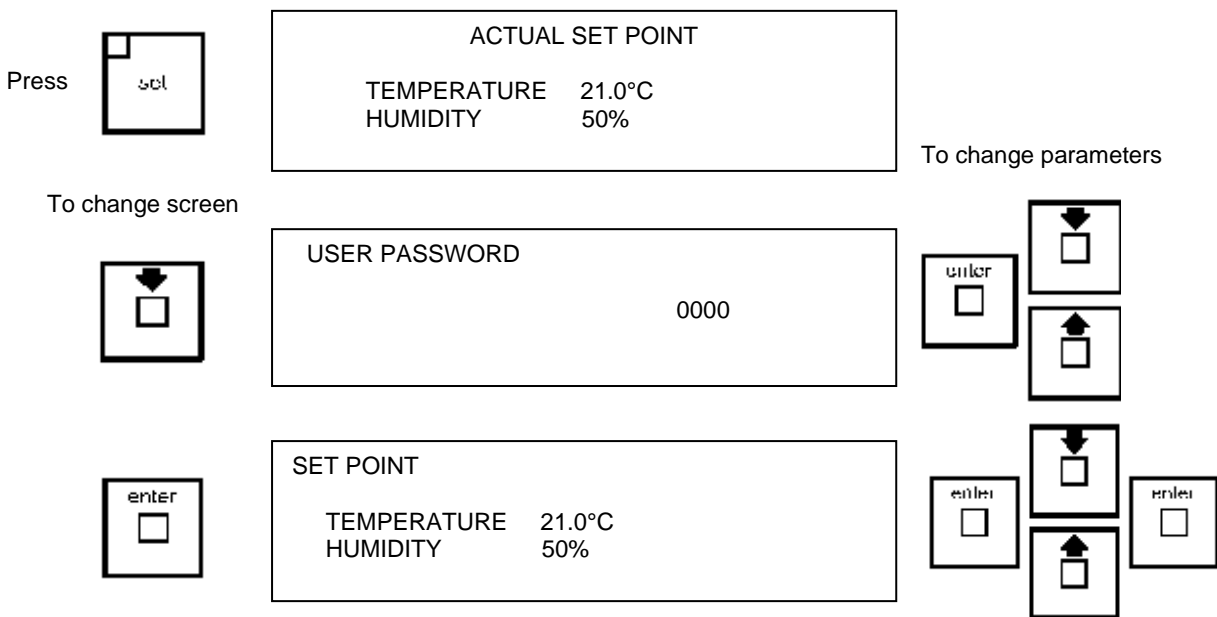


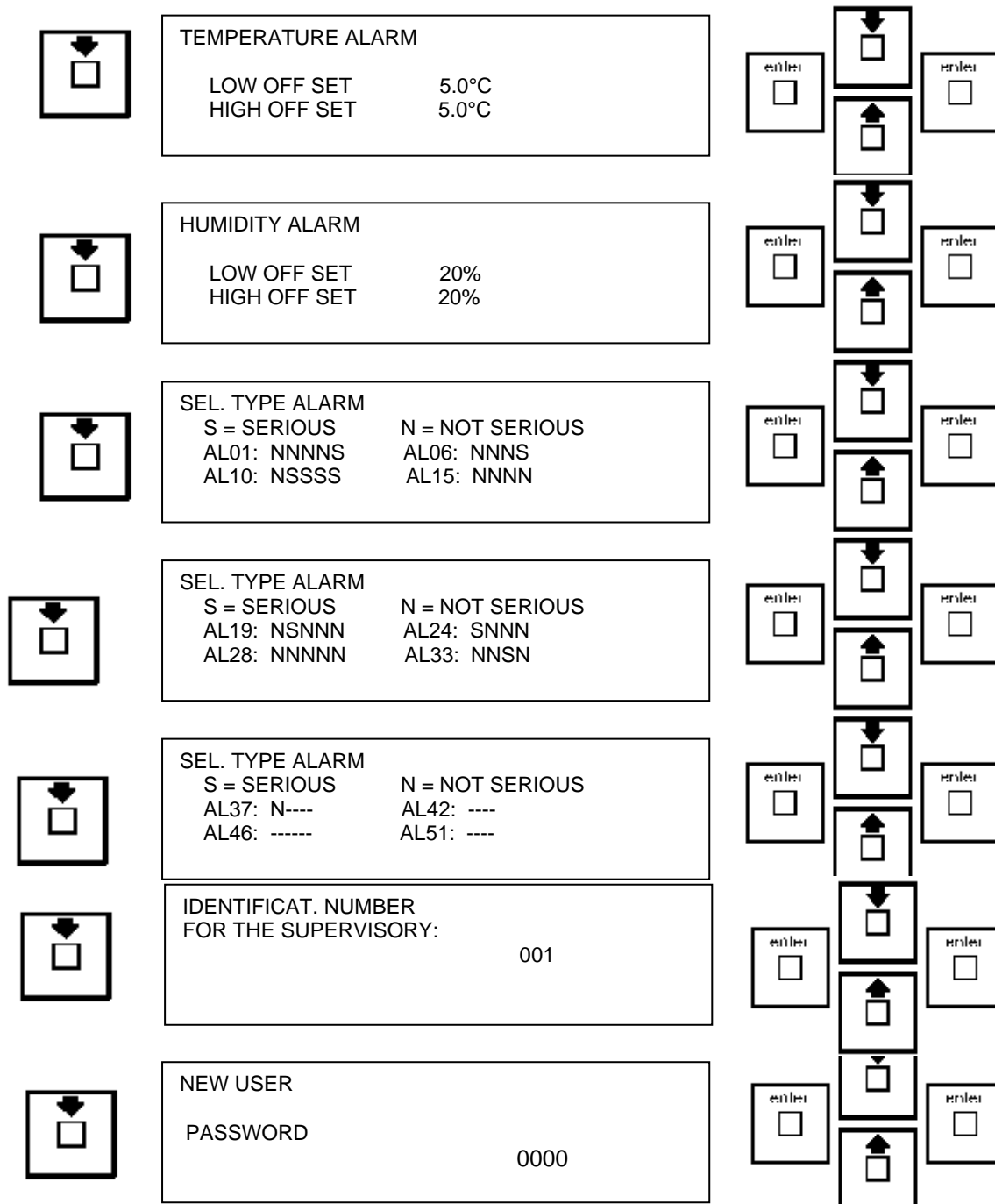
The default screen will always be displayed during normal operation. To view the current operating mode of the unit:



SECOND USER LEVEL ACCESS (Password required)

SET BUTTON MENU

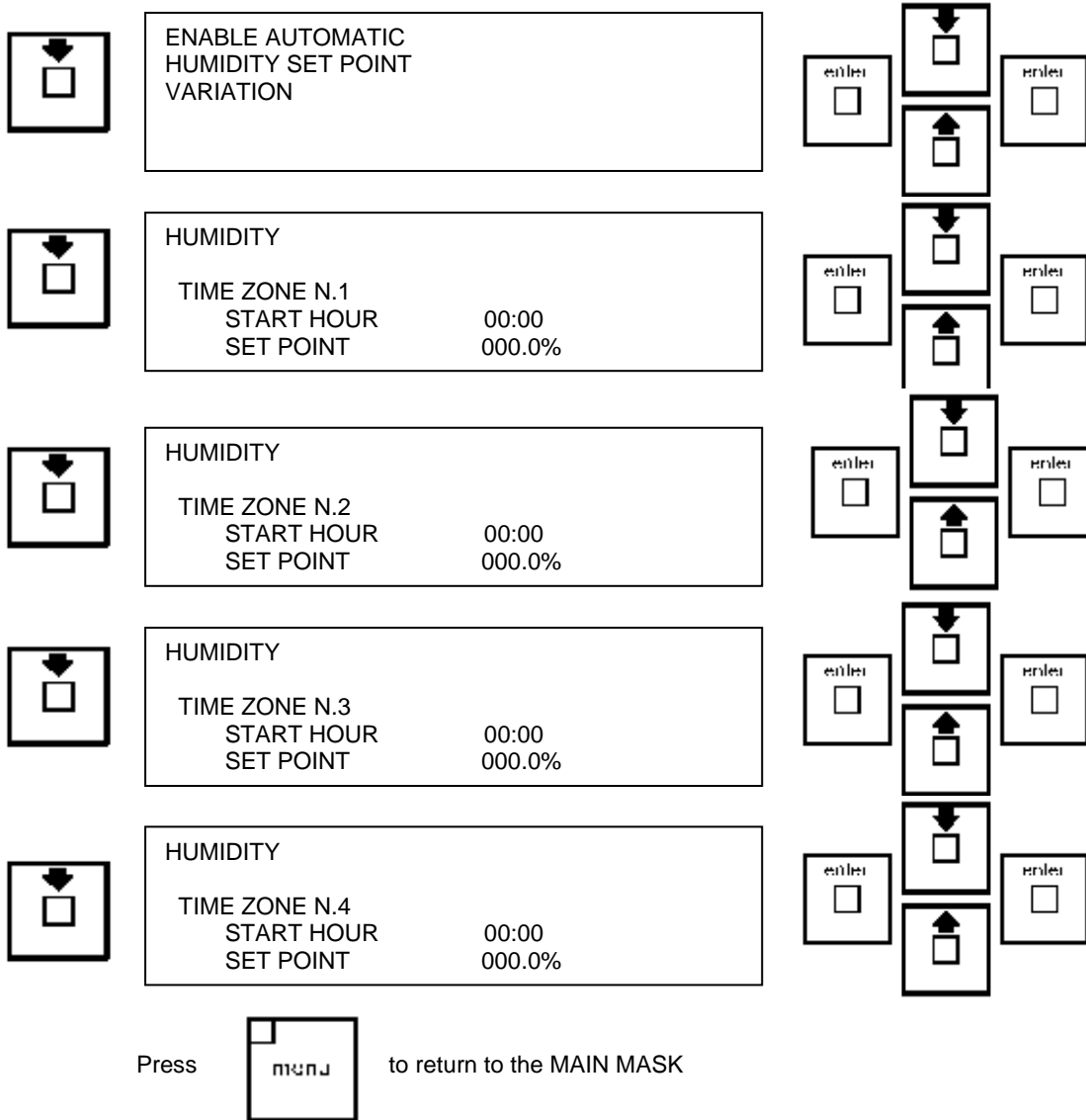




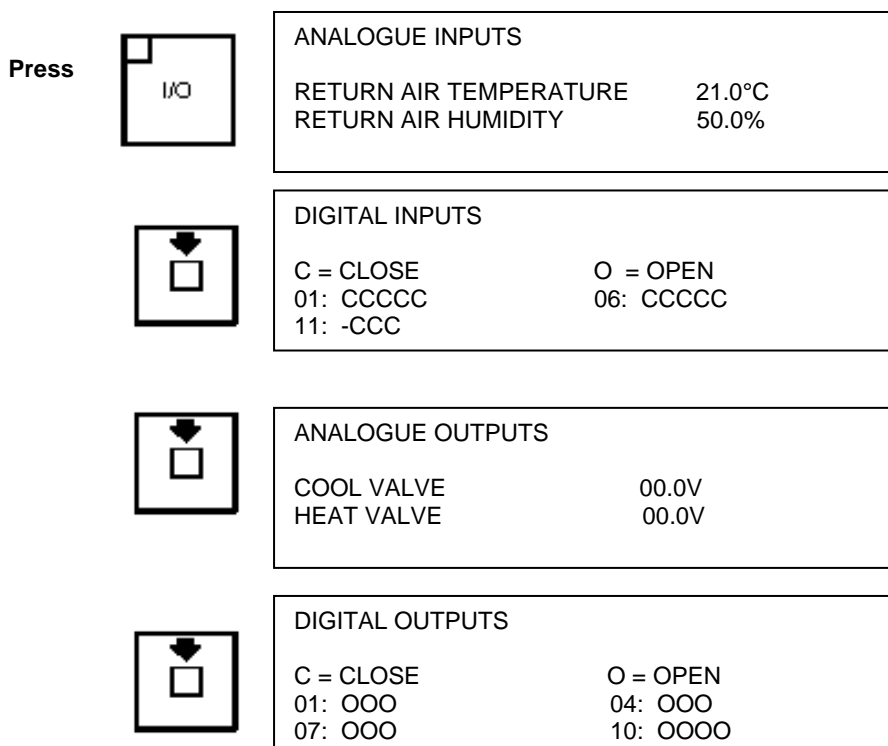
The values shown in the above screen masks are the default settings when the unit leaves the factory.

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

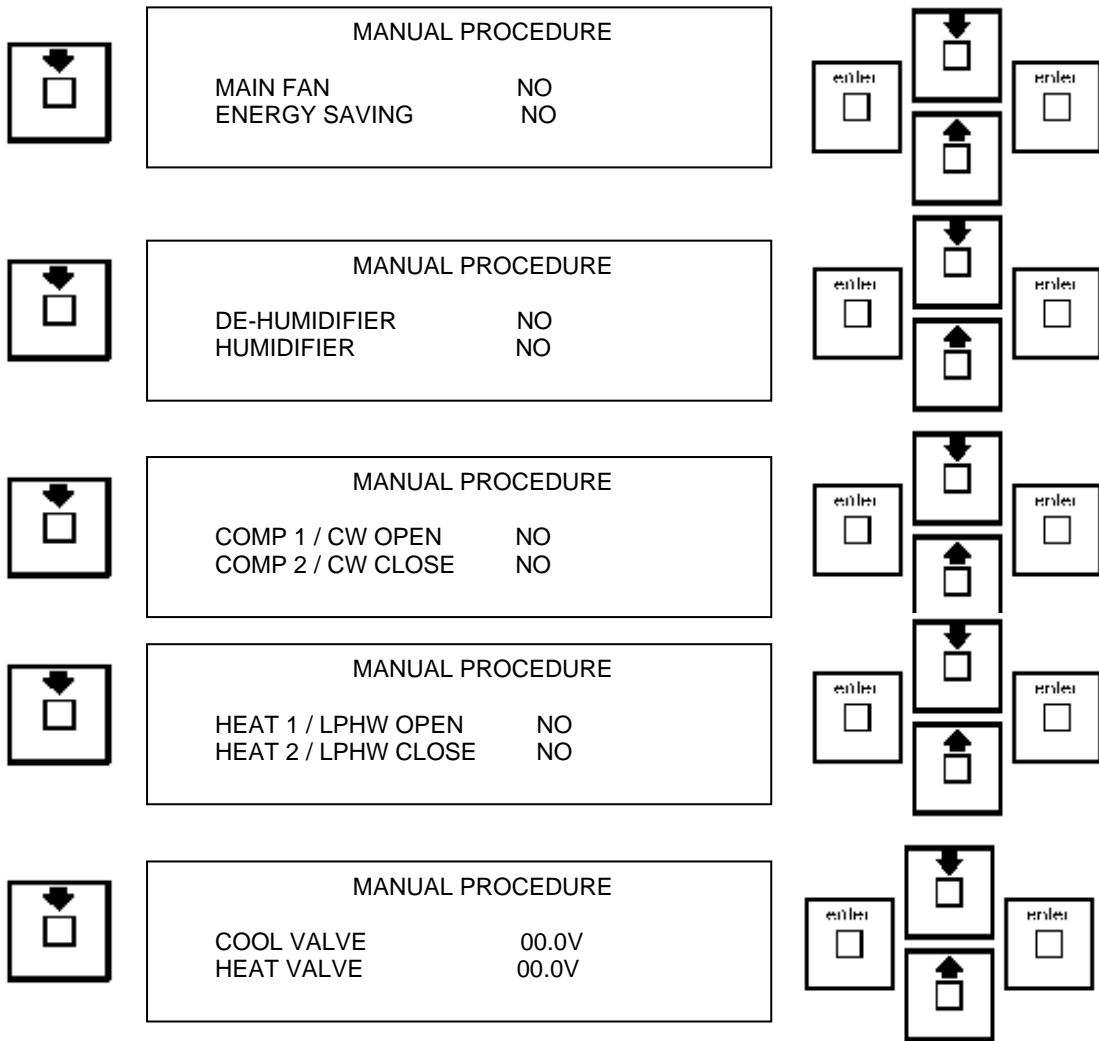


INPUT /OUTPUT BUTTON MENU



Only available when modulating valves are fitted

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

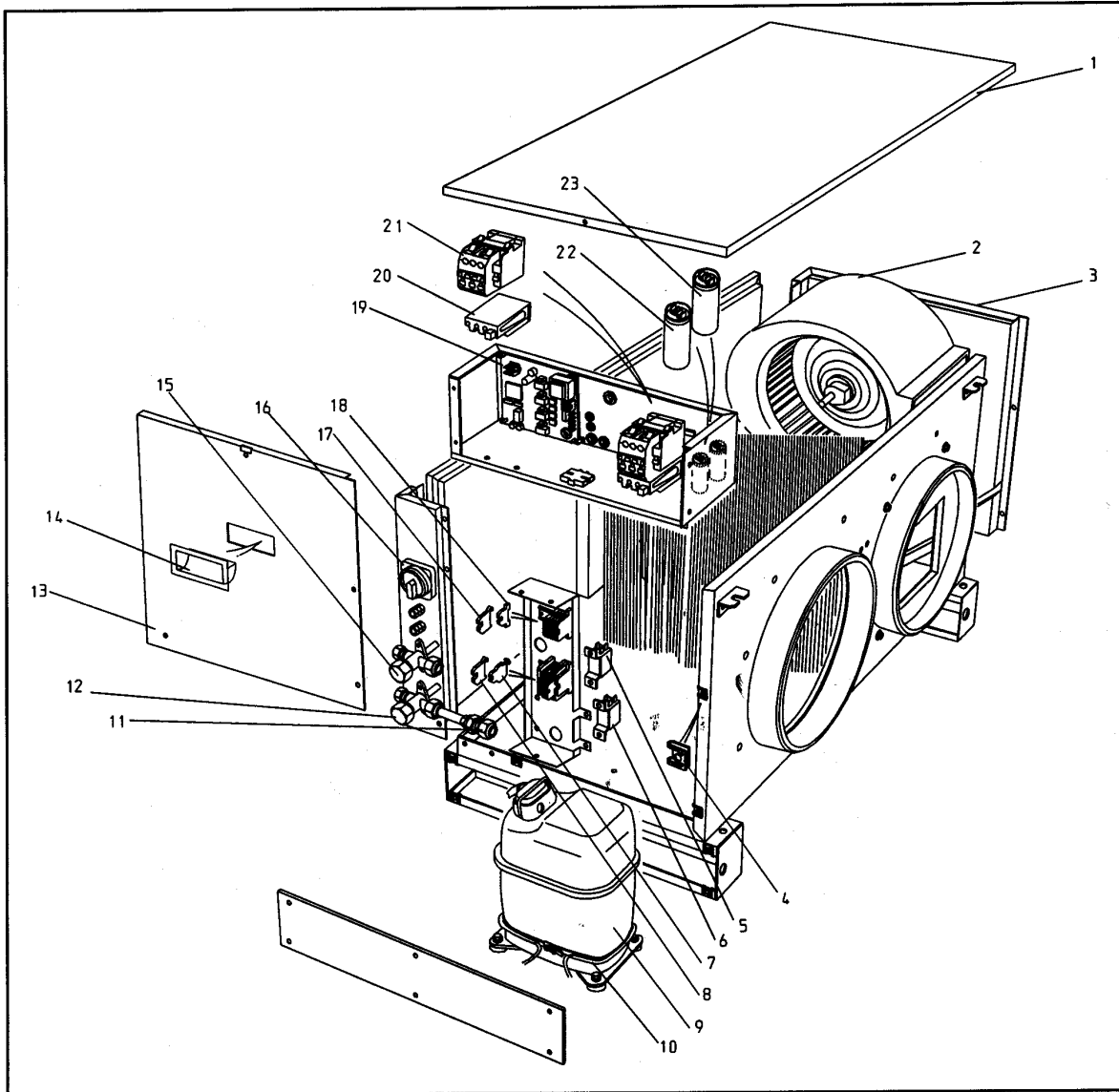


Press to return to the MAIN MASK

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.

DCU

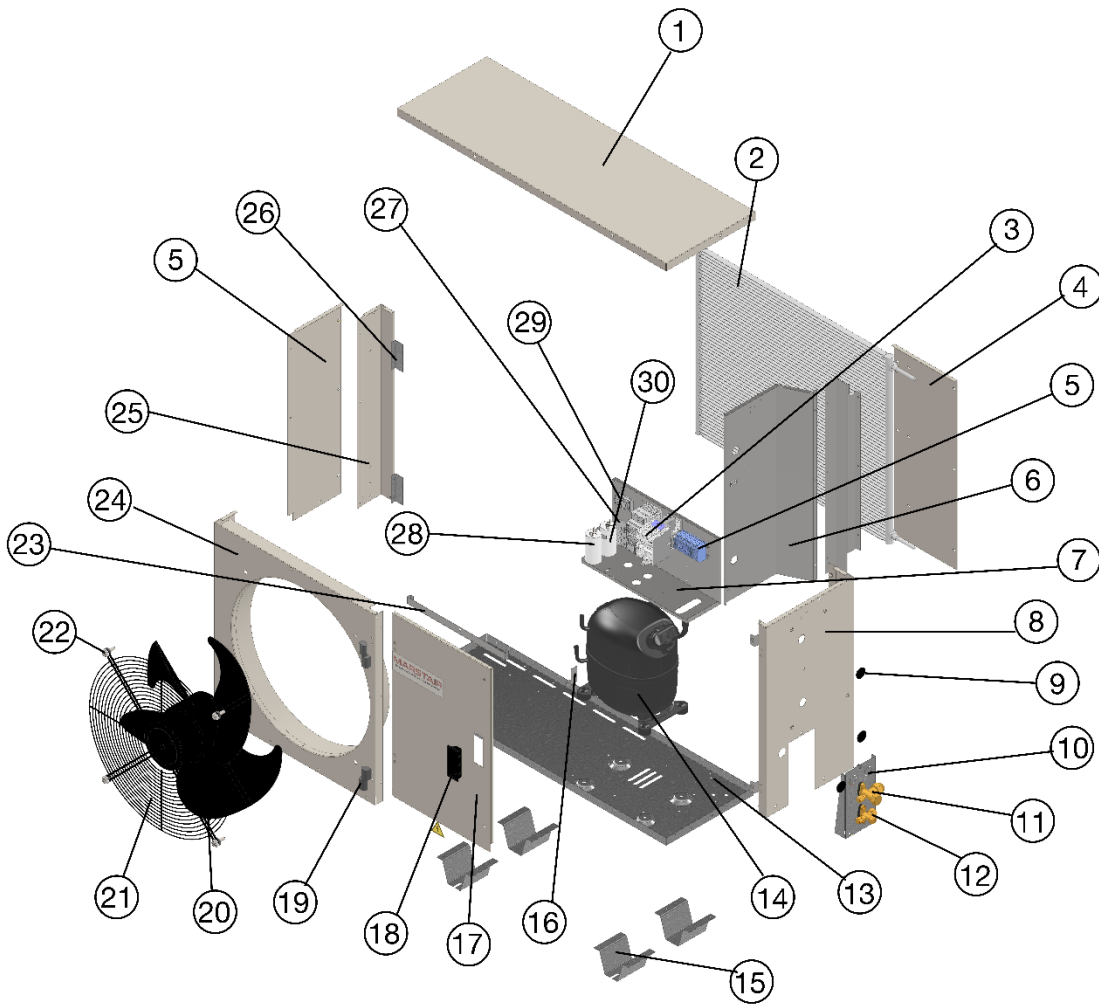


COMPONENT IDENTIFICATION

ITEM No.	DESCRIPTION
1	Lid
2	Fan assembly
3	Right hand access panel
4	Spire clip
5	LP switch auto
6	HP switch auto
7	4 way terminal
8	Fused terminal
9	Compressor
10	Crankcase heater
11	Expansion assembly (including restrictor)
12	Liquid service valve

ITEM No.	DESCRIPTION
13	Electrics access panel
14	Handle
15	Suction service valve
16	Isolator
17	End clamp
18	Terminal
19	Power board PCBA
20	Overload (3 phase)
21	Contactor
22	Fan capacitor
23	Compressor capacitor (1 phase only)

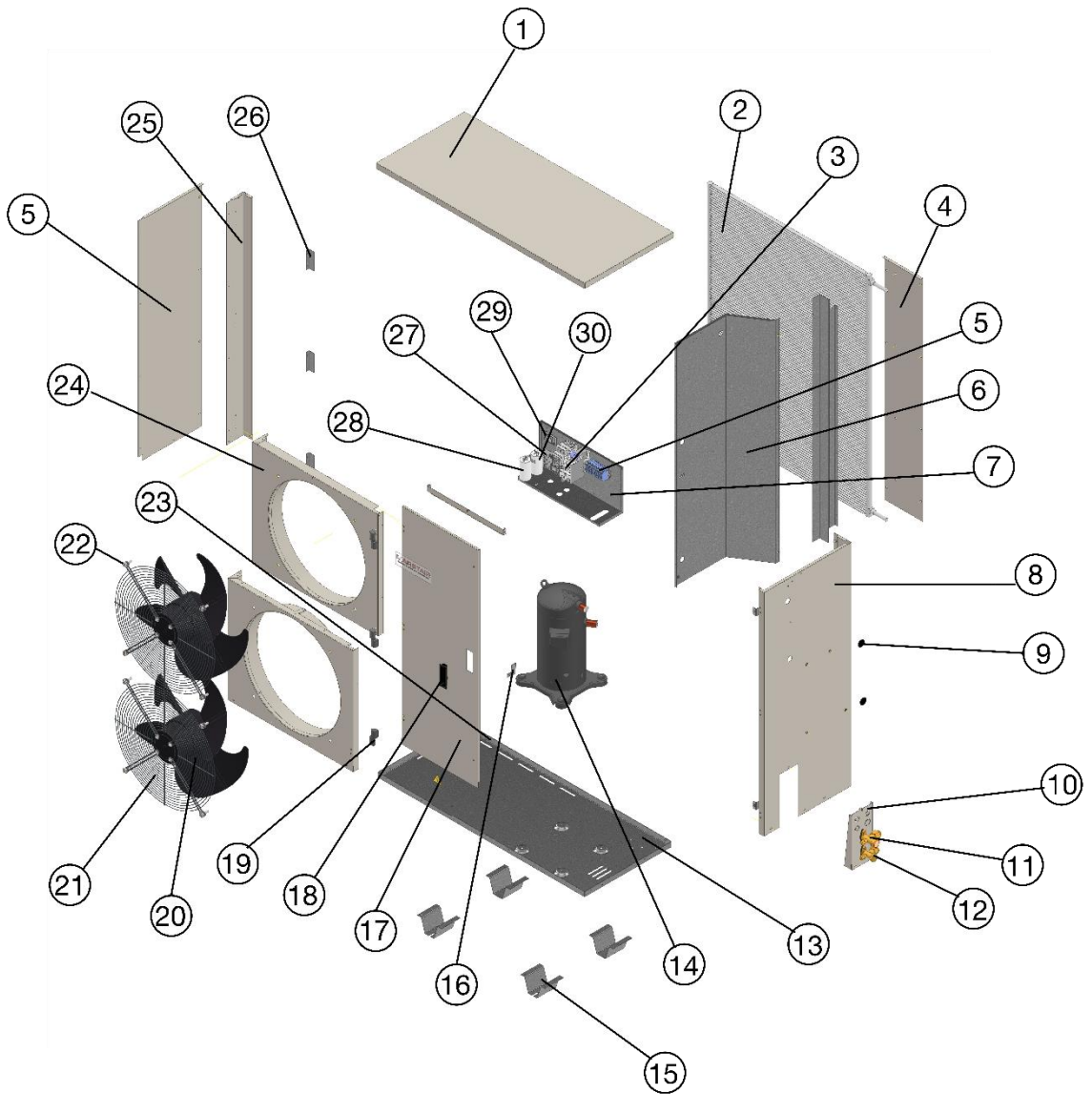
CKC 30 – 100



1	LID	12	SERVICE VALVE (LIQUID)	22	DAMPING WASHER
2	MICROCHANNEL COIL	13	BASE	23	DOOR BRACKET
3	CONTACTOR & OVERLOAD	14	COMPRESSOR	24	FASCIA PANEL
4	REAR ACCESS PANEL	15	MOUNTING FOOT	25	CORNER PANEL
5	TERMINALS	16	DOOR STOPPER	26	COIL BRACKET
6	BULKHEAD PANEL	17	HINGED DOOR	27	FAN SPEED CONTROLLER
7	ELECTRICS BOX	18	HANDLE	28	FAN CAPACITOR
8	SIDE PANEL	19	HINGE	29	TIMER
9	BLANKING PLUGS	20	FAN / MOTOR ASSEMBLY	30	COMPRESSOR CAPACITOR
10	VALVE PANEL	21	FAN GUARD		
11	SERVICE VALVE (SUCTION)				

Note: The fan, motor and fan guard are supplied as a single assembly.

CKC 130 to 200



1	LID	12	SERVICE VALVE (LIQUID)	22	DAMPING WASHER
2	MICROCHANNEL COIL	13	BASE	23	DOOR BRACKET
3	CONTACTOR & OVERLOAD	14	COMPRESSOR	24	FASCIA PANEL
4	REAR ACCESS PANEL	15	MOUNTING FOOT	25	CORNER PANEL
5	TERMINALS	16	DOOR STOPPER	26	COIL BRACKET
6	BULKHEAD PANEL	17	HINGED DOOR	27	FAN SPEED CONTROLLER
7	ELECTRICS BOX	18	HANDLE	28	FAN CAPACITOR
8	SIDE PANEL	19	HINGE	29	TIMER
9	BLANKING PLUGS	20	FAN / MOTOR ASSEMBLY	30	COMPRESSOR CAPACITOR
10	VALVE PANEL	21	FAN GUARD		
11	SERVICE VALVE (SUCTION)				

Note: The fan, motor and fan guard are supplied as a single assembly.

Commissioning Check List

The following information will be required to validate your 5yr parts warranty

Check and record	Value	Time Held For
Leak (tightness) test pressure	(bar)	(min)
Strength (pressure) test pressure	(bar)	(min)
Evacuation level	(microns)	(min)

	Value
Low pressure (gauge)	(barg)
Suction line temperature	(°C)
Evaporator superheat	(K)
Evaporator air ON / OFF	(°C)
	(°C)
High pressure (gauge)	(barg)
Liquid line temperature	(°C)
Condenser sub cooling	(K)
Condenser air ON / OFF	(°C) (°C)
Compressor current	(A)
Head pressure control set	(Y/N)
Refrigerant type	
Charged weight	(Kg)
Additional POE oil added	(g)
Pipe run length	(m)
Suction pipe size	(")
Liquid / Expansion pipe size	(")