MARSTAIR

REFRIGERATION AND SPECIALIST AIR CONDITIONING



CD3 (929 SERIES) R513A PACKAGED DX CLOSE CONTROL UNITS. FOR USE IN SPLIT SYSTEMS

This manual details technical, installation and operating information for the R513A CD3 range (929 series) DX indoor units for use in conjunction with 550 series CKC condensing units

INDEX

GENERAL	General description and part numbers	3
	- DX upflow package units	3
	- DX configured units	4
	- Condensing units	4
	DX configurable accessories	5
	Dimensions and weights	6
SELECTION	Unit combinations	7
	Performance data DX	7
	Airflows	8
	Sound levels - CD3 units, outdoor/ducted units	8
INSTALLATION	Airflow options	9
	Indoor unit	10
	CKC 80 200	13
	DCU 30 - 80	14
APPLICATION	Pipe sizing and application	16
	Refrigeration installation	17
	Evacuating, factory charge	17
	Adding refrigerant	17
	Electrical data	18
	Fuses	19
	Condensate drain	20
	Fan speed controller	20
WIRING DIAGRAMS	CD3	23
	CKC	26
	DCU	27
	Interconnecting wiring diagrams	28
ACCESSORIES	Condensate pump	29
	Humidifier	31
	Auto change over	33
OPERATION and COMMISSIONING	pCONet Parameters	34
	Microprocessor control	36
COMPONENT IDENTIFICATION	Exploded views of units with component identification	44
COMMISIONING CHECK LIST		48

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 Marsatair range of CKC outdoor condensing units using R513A 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.

PACKAGE UNITS INCLUDE

* EC high efficiency fan
* Class 'O' thermal and acoustic insulation
* Washable filters
* Discharge plenum and grille
* Single or Twin circuit coils
* Electric heating (2 stage)
* Thermal Expansion Valves
* Humidifier with modulating control
* 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
* Floor stand plinth
* Dehumidification

KITS AVAILABLE FOR FIELD FITTING TO PAKAGE UNITS

* Condensate pump
* pCONET BMS BACnet control
* USB to RS485 connector

PERFORMANCE DATA

CKC+ 45 – 240 CAPACITIES – 1 & 3 Phase

Model	Air on °C	Evaporating Temperature										
		-15	-12.5	-10	-7.5	-5	-2.5	0	2.5	5	7.5	10
		TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL
CKC45 R134A / R513A ZR18	30	1.14	1.31	1.50	1.70	1.93	2.20	2.44	2.72	3.02	3.34	3.67
	34	1.08	1.24	1.42	1.62	1.83	2.07	2.32	2.59	2.88	3.18	3.51
	38	1.01	1.17	1.34	1.53	1.73	1.96	2.20	2.46	2.74	3.03	3.34
	41		1.12	1.28	1.46	1.66	1.88	2.11	2.36	2.63	2.91	3.22
	45			1.19	1.37	1.56	1.77	1.99	2.23	2.49	2.76	3.05
	50				1.25	1.43	1.62	1.84	2.06	2.30	2.56	2.84
	55					1.29	1.47	1.67	1.89	2.11	2.36	2.62
CKC50 R134A / R513AZR24	30	1.53	1.75	2.00	2.28	2.58	2.94	3.27	3.65	4.04	4.47	4.92
	34	1.44	1.66	1.90	2.17	2.45	2.77	3.10	3.47	3.85	4.27	4.70
	38	1.36	1.57	1.80	2.05	2.32	2.62	2.95	3.29	3.67	4.06	4.48
	41		1.50	1.71	1.96	2.23	2.52	2.83	3.16	3.53	3.90	4.31
	45			1.60	1.83	2.09	2.37	2.67	2.99	3.34	3.70	4.09
	50				1.67	1.92	2.18	2.46	2.76	3.09	3.43	3.80
	55					1.73	1.97	2.24	2.53	2.83	3.16	3.51
CKC60 R134A / R513A ZR28	30	1.78	2.04	2.33	2.65	3.00	3.42	3.80	4.24	4.70	5.20	5.72
	34	1.68	1.93	2.21	2.52	2.85	3.22	3.61	4.04	4.48	4.96	5.46
	38	1.58	1.82	2.09	2.38	2.70	3.05	3.43	3.83	4.27	4.72	5.21
	41		1.74	1.99	2.28	2.59	2.93	3.29	3.68	4.10	4.54	5.01
	45			1.86	2.13	2.43	2.75	3.10	3.48	3.88	4.30	4.75
	50				1.94	2.23	2.53	2.86	3.21	3.59	3.99	4.42
	55					2.01	2.29	2.60	2.94	3.29	3.67	4.08
CKC80 R134A / R513A ZR34	30	2.22	2.52	2.85	3.21	3.60	4.02	4.48	4.97	5.51	6.08	6.70
	34	2.09	2.38	2.70	3.04	3.42	3.83	4.24	4.74	5.26	5.81	6.40
	38	1.96	2.24	2.55	2.88	3.24	3.63	4.05	4.51	5.00	5.53	6.10
	41		2.14	2.43	2.75	3.10	3.48	3.88	4.33	4.81	5.32	5.88
	45			2.27	2.58	2.91	3.24	3.66	4.08	4.54	5.03	5.57
	50				2.36	2.67	3.01	3.37	3.77	4.20	4.67	5.17
	55					2.42	2.74	3.08	3.45	3.85	4.29	4.76
CKC90 R134A / R513A ZR40	30	2.46	2.83	2.24	3.67	4.14	4.65	5.19	5.77	6.39	7.04	7.73
	34	2.30	2.66	3.04	3.47	3.92	4.41	4.94	5.50	6.10	6.74	7.42
	38	2.15	2.48	2.86	3.26	3.70	4.18	3.70	5.23	5.82	6.44	7.10
	41		2.36	2.72	3.11	2.53	4.00	4.49	5.03	5.60	6.21	6.85
	45			2.53	2.90	3.31	3.75	4.23	4.74	5.29	5.88	6.51
	50				2.63	3.02	3.43	3.88	4.37	4.90	5.46	6.06
	55					2.71	3.09	3.52	3.97	4.47	5.00	5.57
CKC100 R134A / R513A ZR48	30	3.09	3.53	4.01	4.52	5.07	5.67	6.31	7.00	7.76	8.57	9.44
	34	2.88	3.31	3.78	4.27	4.81	5.38	6.00	6.67	7.39	8.17	9.01
	38	2.65	3.08	3.53	4.01	4.53	5.08	5.68	6.32	7.01	7.76	8.56
	41		2.89	3.34	3.81	4.31	4.85	5.43	6.05	6.72	7.44	8.22
	45			3.07	3.53	4.01	4.53	5.09	2.56	6.33	7.02	7.76
	50				3.16	3.62	4.12	4.65	5.21	5.82	6.47	7.17
	55					3.22	3.69	4.19	4.72	5.29	5.91	6.57

R134A/R513A

Model	Air on °C	Evaporating Temperature										
		-15	-12.5	-10	-7.5	-5	-2.5	0	2.5	5	7.5	10
		TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL
CKC130 R134A / R513A ZR57	30	3.43	3.92	4.45	5.02	5.63	6.29	7.00	7.77	8.61	9.51	10.48
	34	3.20	3.67	4.20	4.74	5.34	5.97	6.66	7.40	8.20	9.07	10.00
	38	2.94	3.42	3.92	4.45	5.03	5.64	6.30	7.02	7.78	8.61	9.50
	41		3.21	3.71	4.23	4.78	5.38	6.03	6.72	7.46	8.26	9.12
	45			3.41	3.92	4.45	5.03	5.65	2.84	7.03	7.79	8.61
	50				3.51	4.02	4.57	5.16	5.78	6.46	7.18	7.96
	55					3.57	4.10	4.65	5.24	5.87	6.56	7.29
CKC150 R134A / R513A ZR72	30	4.02	4.59	5.22	5.88	6.60	7.38	8.21	9.11	10.10	11.15	12.28
	34	5.02	4.31	4.92	5.56	6.26	7.00	7.81	8.68	9.61	10.63	11.72
	38	6.02	4.01	4.59	5.22	5.89	6.61	7.39	8.22	9.12	10.10	11.14
	41		3.76	4.35	4.96	5.61	6.31	7.06	7.87	8.74	9.68	10.69
	45			3.99	4.59	5.22	5.89	6.62	3.33	8.24	9.13	10.10
	50				4.11	4.71	5.36	6.05	6.78	7.57	8.42	9.33
	55					4.19	4.80	5.45	6.14	6.88	7.69	8.55
CKC165 R134A / R513A ZR72	30	4.80	5.44	6.14	6.91	7.75	8.66	9.65	10.70	11.85	13.10	14.40
	34	4.52	5.13	5.80	6.53	7.34	8.21	9.16	10.20	11.30	12.50	13.75
	38	4.25	4.82	5.45	6.15	6.92	7.75	9.66	9.65	10.70	11.85	13.10
	41		4.59	5.19	5.86	6.60	7.41	8.29	9.24	10.25	11.40	12.55
	45			4.85	5.48	6.17	6.94	7.77	8.68	9.66	10.70	11.85
	50				5.00	5.64	6.34	7.12	7.97	8.89	9.89	10.95
	55					5.10	5.75	6.46	7.24	8.10	9.03	10.05
CKC180 R134A / R513A ZR81	30	5.51	6.21	6.98	7.82	8.73	9.71	10.80	11.95	13.15	14.50	15.95
	34	5.22	5.90	6.64	7.44	8.31	9.26	10.30	11.40	12.60	13.85	15.25
	38	4.92	5.57	6.28	7.05	7.89	8.80	9.78	10.85	12.00	13.20	14.55
	41		5.33	6.01	6.76	7.57	8.45	9.40	10.40	11.55	12.75	14.00
	45			5.64	6.36	7.13	7.97	8.87	9.85	10.90	12.05	13.30
	50				5.84	6.57	7.35	8.21	9.13	10.10	11.20	12.35
	55					5.99	6.72	7.52	8.38	9.31	10.30	11.40
CKC200 R134A / R513A ZR90	30	6.07	6.89	7.80	8.80	9.90	11.06	12.24	13.92	15.75	17.18	18.48
	34	5.69	6.48	7.35	8.30	9.35	10.48	11.67	13.13	14.85	16.22	17.76
	38	5.46	6.21	7.04	7.94	8.93	10.03	11.10	12.48	14.01	15.33	16.88
	41		5.93	6.71	7.58	8.53	9.56	10.67	11.85	13.27	14.65	16.28
	45			6.34	7.16	8.04	9.01	10.01	11.17	12.36	13.71	15.48
	50				6.57	7.40	8.30	9.29	10.28	11.29	12.61	14.39
	55					6.74	7.58	8.50	9.37	10.26	11.48	13.30
CKC220 R134A / R513A ZR108	30	7.59	8.56	9.62	10.78	12.03	13.38	14.88	16.47	18.12	19.98	21.98
	34	7.19	8.13	9.15	10.25	11.45	12.76	14.19	15.71	17.36	19.09	21.01
	38	6.78	7.68	8.65	9.71	10.87	12.13	13.48	14.95	16.54	18.19	20.05
	41		7.34	8.28	9.32	10.43	11.64	12.95	14.33	15.92	17.57	19.29
	45			7.77	8.76	9.83	10.98	12.22	13.57	15.02	16.60	18.33
	50				8.05	9.05	10.13	11.31	12.58	13.92	15.43	17.02
	55					8.25	9.26	10.36	11.55	12.83	14.19	15.71
CKC240 R134A / R513A ZR125	30			10.47	11.73	13.10	14.57	16.20	17.93	19.73	21.75	23.93
	34	7.83	8.85	9.96	11.16	12.47	13.89	15.45	17.10	18.90	20.78	22.88
	38	7.36	8.36	9.42	10.58	11.84	13.20	14.67	16.28	18.00	19.80	21.83
	41		8.00	9.02	10.14	11.36	12.68	14.10	15.60	17.33	19.13	21.00
	45			8.46	9.54	10.70	11.96	13.31	14.78	16.35	18.08	19.95
	50				8.76	9.86	11.03	12.32	13.70	15.15	16.80	18.53
	55					8.99	10.08	11.28	12.57	13.97	15.45	17.10

DX UPFLOW & DOWNFLOW CONFIGURED UNITS

CD3 units can be specially configured with the following options

* Downflow
* LPHW heater coil
* Condensate pump
* Fresh air spigot and fan
* Alternative filter options
* BacNet interface
* Ducted inlet and discharge
* LPHW heater valves
* Various alarms
* Double deflection grilles
* Remote electrical panel

CKC CONDENSING UNITS (FOR USE WITH R513A 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.

STANDARD FEATURES CKC

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

* Suction & liquid service valves
* Auto HP&LP switches
* Contractor
* Fan speed control
* 3 minute timer
* Overload (3ph Only)

OPTIONS CKC

* Manual HP switch with alarm
* Isolator

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	45	50	60	80	90	100	130	150	165	180	200	220	240
HEIGHT	720	720	720	720	820	820	1080	1080	1080	1275	1275	1275	1275
WIDTH	1000	1000	1000	1000	1000	1000	1000	1000	1000	1100	1100	1100	1100
DEPTH	300	300	300	300	350	350	425	425	425	425	425	425	425
1 Ph kg	61	64	65	66	76	81	-	103	-	-	-	-	-
3 Ph kg	-	64	65	66	76	81	101	103	103	118	173	140	141

PACKED

MODEL	45	50	60	80	90	100	130	150	165	180	200	220	240
HEIGHT	720	720	720	720	820	820	1080	1080	1080	1280	1280	1280	1280
WIDTH	1090	1090	1090	1090	1090	1090	1090	1090	1090	1215	1215	1215	1215
DEPTH	340	340	340	340	390	390	465	465	465	465	465	465	465
1 Ph kg	63	66	67	68	78	85	-	107	-	-	-	-	-
3 Ph kg	-	66	67	68	78	85	105	107	107	123	178	145	146

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 100	2 x 50	1 x 150	2 x 80	1 x 200	2 x 100	1 x 200	2 x 135
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 150	2 x 80	1 x 165	2 x 90	1 x 220	2 x 150	1 x 240	2 x 165
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 (m^3/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	45	50	60	80	90	100	130	165	180	200	220	240
Airflow m^3/s	0.78	0.78	0.78	0.78	1.14	1.14	1.74	1.74	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.

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.

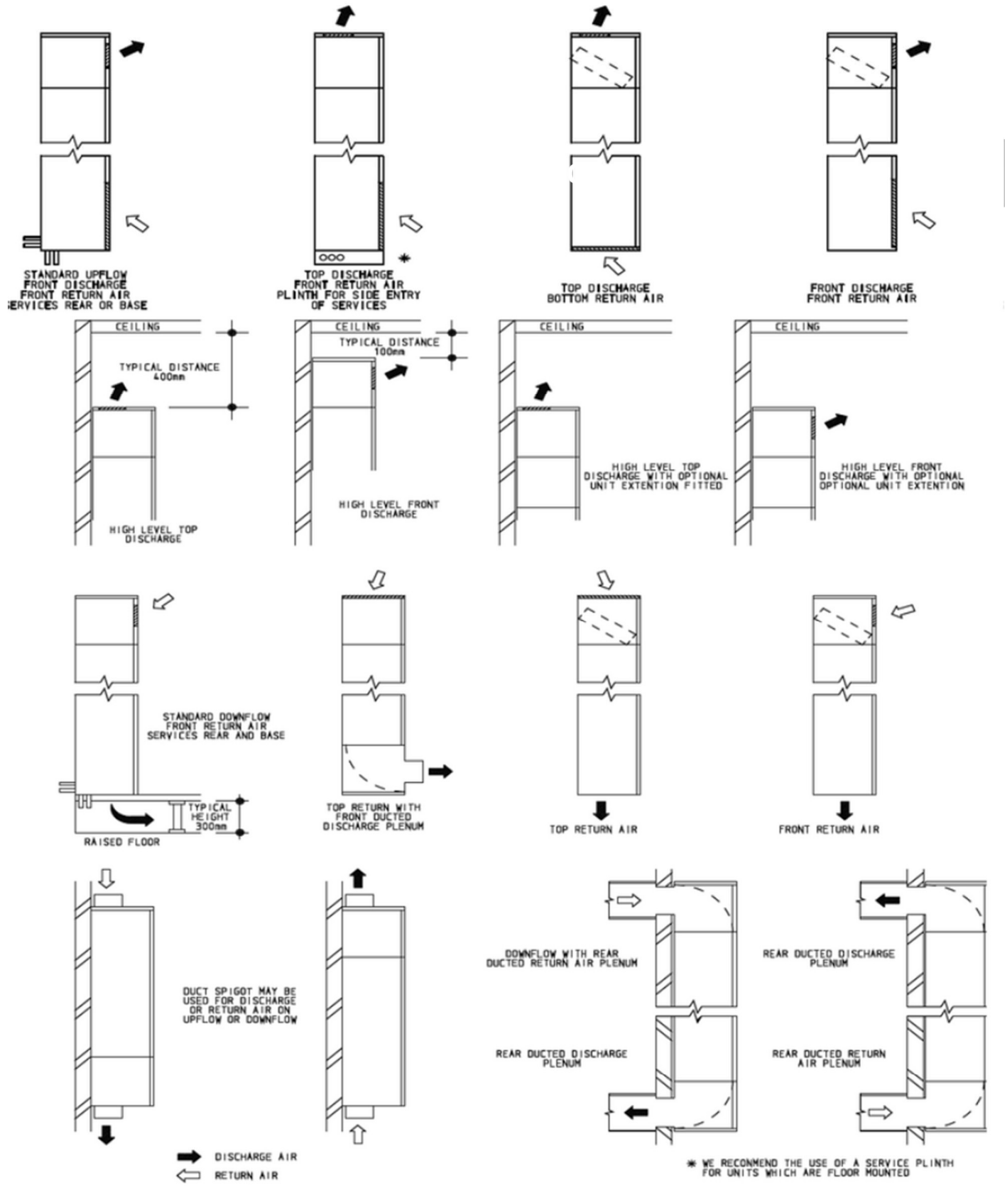
SOUND POWER AND SOUND PRESSURE LEVELS – 550 SERIES

CKC UNITS (Maximum fan speed)

CKC	SOUND POWER LEVELS							SOUND PRESSURE LEVELS	
	Frequency Hz						dBA	dBA	NC
	125	250	500	1k	2k	4k			
45	73.6	68.2	67.1	65.5	61.1	54.3	69.7	49.2	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
220	73.0	71.8	71.5	70.1	66.1	58.3	75.7	61.8	55
240	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 $2 \times 10^{-5} N/m^2$, 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).

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.

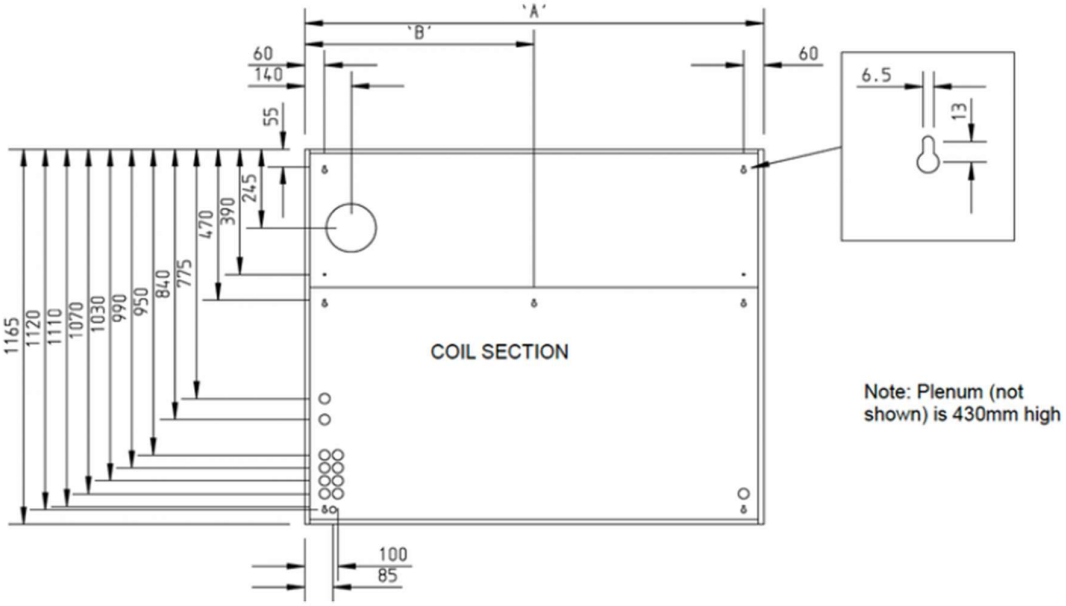
3 Mark off the mounting holes as shown and drill holes to suit M6 Rawlbolt shields or equivalent fasteners.

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

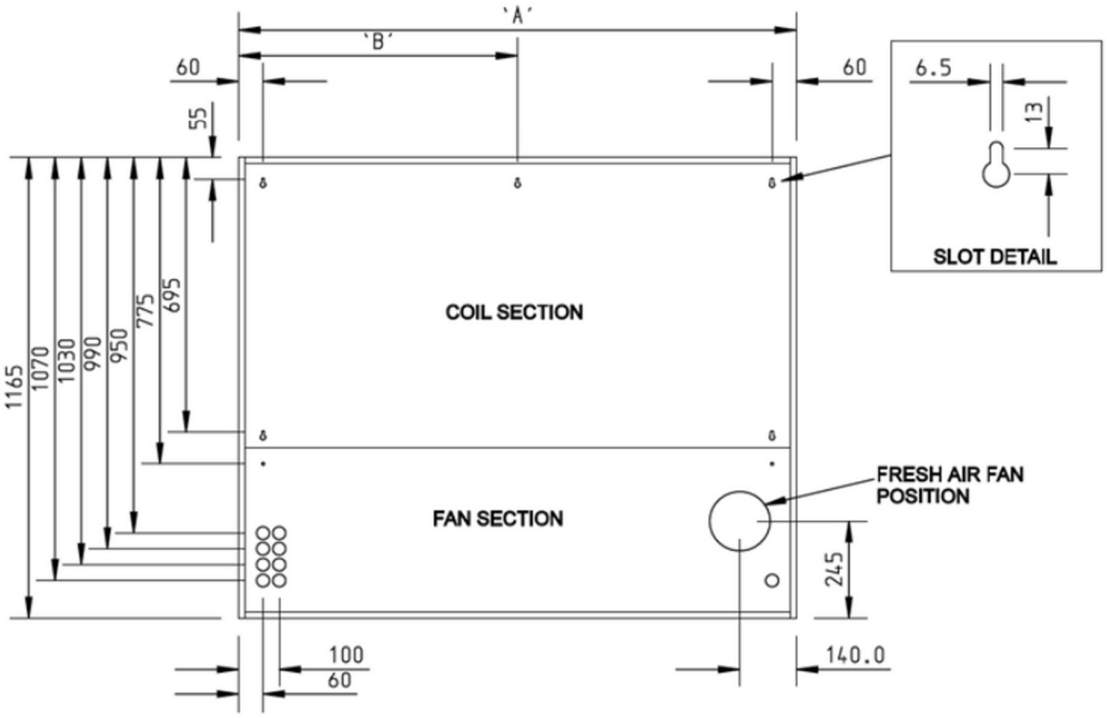
6 Check that the unit is square and level. Failure to do so will result in misalignment of the cabinet access panels and possible operational problems.

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.

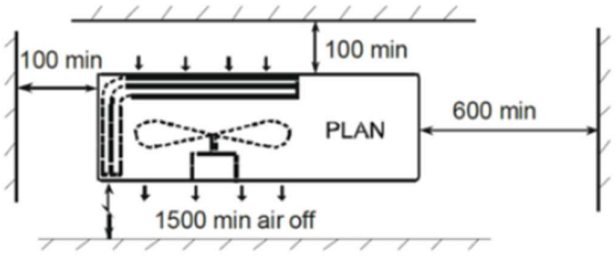
Note: It is easier to fit any kits prior to mounting the unit.

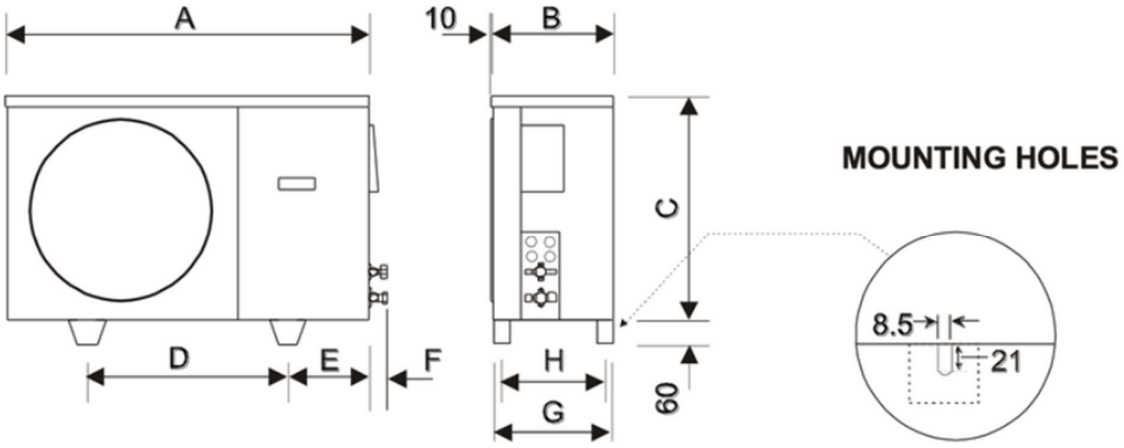
The units are designed to stand on a flat surface.

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

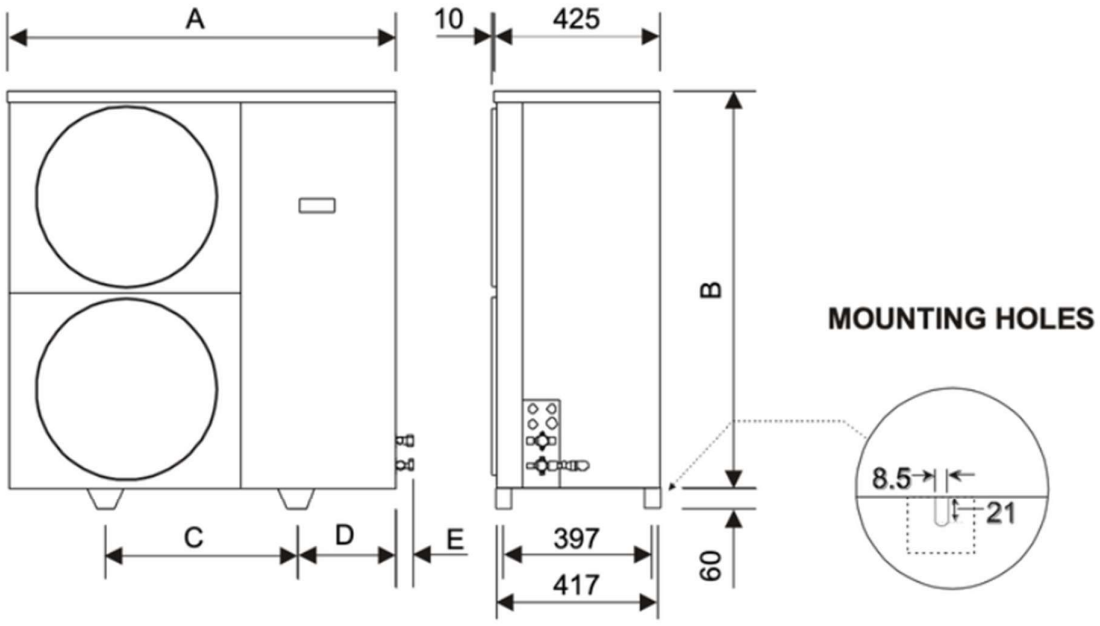
CKC 45-100 (DIMENSIONS IN MM)





MODEL	A	B	C	D	E	F	G	H	Weight (kg)	
									1 Ph	3 Ph
CKC+ 45	1000	300	660	495	250	60	345	325	61	-
CKC+ 50	1000	300	660	495	250	60	345	325	64	64
CKC+ 60	1000	300	660	495	250	60	345	325	65	65
CKC+ 80	1000	300	660	495	250	60	345	325	66	66
CKC+ 90	1000	350	760	495	250	70	345	325	76	76
CKC+ 100	1000	350	760	495	250	70	345	325	81	81

CKC 130-240 (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
CKC + 220	1100	1215	675	211	95	190
CKC + 240	1100	1215	675	211	95	191

CKC 130-240 (DIMENSIONS IN MM)
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.

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		
	½	⅝	¾	⅞	1⅛	1⅜	1⅝	⅜	½	⅝
45	8	25	45					45		
50		13	34	45				45		
60		10	25	45				45		
80		7	18	42	45			35	45	
90		5	14	34	45			29	45	
100			10	24	45			20	45	
130			8	19	45			16	45	
150			6	14	45			12	45	
165				10	36	45		9	42	45
180				8	28	45			32	45
200				6	22	45			26	45
220					15	41	45		18	45
240					6	25	45		12	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.

2 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.

3 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.

4 Connect pipe work between units noting the following:-

a) Use only refrigeration quality copper tube/pipe, supported every 2 metres.
b) Use tube cutters to avoid forming swarf.
c) If brazing, use copper phosphorus alloy with 5% silver, and purge the system with dry nitrogen to avoid oxidation and build up of scale.
d) Do not leave pipe ends, valves, driers etc. open to the atmosphere longer than necessary.
e) Fully insulate the suction line, or suction and liquid if run together.

5. 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.

6. If a sight glass is fitted to assist charging, positipn this in the liquid line as near to the air handler as practicable, and downstream of the liquid line filter/drier.

EVACUATING AND CHARGING

1. Evacuate the system and interconnecting pipework as page 8 ensuring the service valves are fully open. 2. Allow the evacuated system to draw in the majority of the refrigerant charge.

3. The final charge should be adjusted with the system running.
4. All units are fitted with head pressure control. The link wire across the orange terminals allows the fan to operate at full speed. **THIS SHOULD BE REMOVED AFTER CHARGING**

5. A random start delay of up to 1 minute occurs when mains is first applied. A 3 minute delay occurs between successive compressor operations on all systems.

6. Refrigerant and polyolester oil should be introduced through the Schrader valve the service port on the suction service valve on the outdoor unit. **Ensure the refrigerant is the correct type, as shown on the rating plate**. R513A must always be added in the liquid state.

7. Run the system for a few minutes to allow it to stabilize. Where possible, charge to a sweat line on the evaporator. Typical suction pressures on short lines at UK conditions, with high speed evaporator fan, high speed condenser fan, should be; low temperature system approx 2.5 bar.

8. **Systems should not be overcharged, to avoid liquid return to the compressor.**

9. Head Pressure control

a. with the system switched off, connect a high pressure guage to the liquid line service valve. b. Switch on the system, and run for a few minutes to stabilise.
c. The head pressure should be approximately:

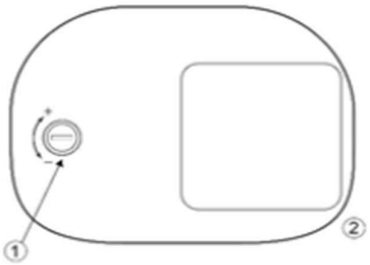
Units come pre-charged with Nitrogen,

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.

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 and/or high subcooling

SAGINOMIYA (XGE-4C)



1. Range adjusting screw
2. Top view

R513A: 140 – 145 psig (9.7 – 10 barg) at 32°C ambient temperature, 250 – 260 psig (17.2 – 17.9 barg) at 55°C ambient temperature to achieve this adjust the screw clockwise to increase pressure or anticlockwise to decrease. Each ½ turn will alter the pressure by approx. 5 psig (0.5 barg)

Pressure changes per 1 turn of adjusting screw:

Pressure change: 10 … 25bar:
Clockwise ~ +1.5 bar, counterclockwise ~ -1.5 bar

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. 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.

CKC ELECTRICAL DATA

CKC+		45	50	60	80	90	100	130	150	165	180	200	220	240
1 Ph (230V 50Hz) compressor load only (at nominal cooling capacity)														
Power (nominal)	kW	0.92	1.30	1.40	1.61	2.00	2.40	-	-	-	-	-	-	-
Starting current LRA	A	35	58	61	76	110	114	-	-	-	-	-	-	-
Nominal current FLA	A	10.0	8.9	9.8	11.5	16.9	20.5	-	-	-	-	-	-	-
3 Ph (400V 50Hz) compressor load only (at nominal cooling capacity)														
Power (nominal)	kW	-	1.30	1.40	1.61	2.00	2.40	2.70	2.70	3.20	3.50	4.00	4.50	5.2
Starting current LRA	A	-	26	32	40	48	51	62	68	71	71	98	111	118
Nominal current FLA	A	-	4.2	4.2	4.9	7.1	7.2	7.7	8.7	9.5	11.9	16.9	16.8	19.9

CD3 ELECTRICAL DATA

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
								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

O = HEATING OPTIONS

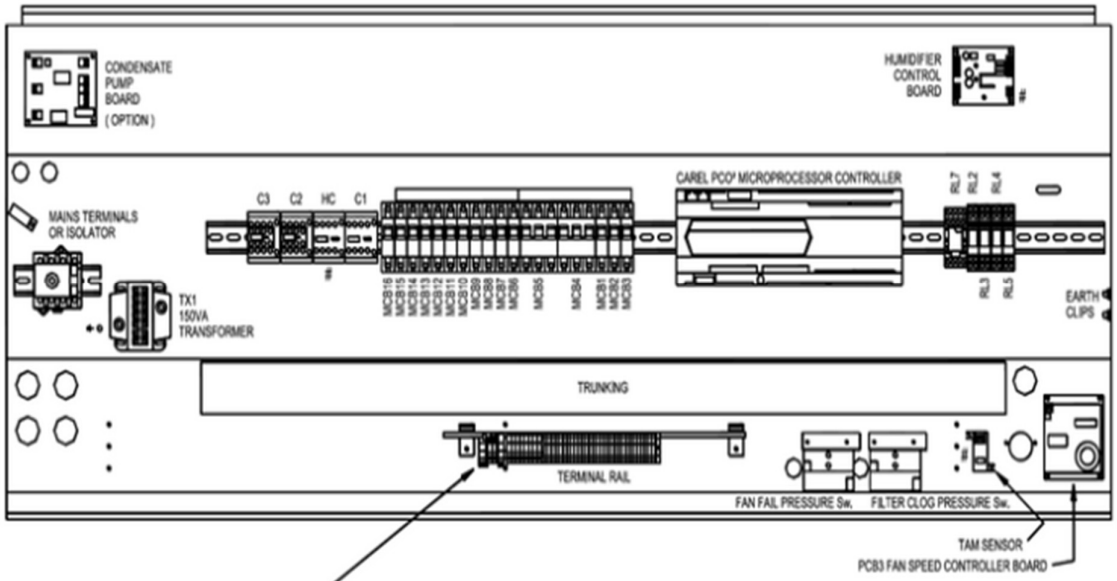
Note: If non-standard 2 stage heating arrangements have been fitted to order, check the wiring diagram provided with the unit before calculating current ratings.

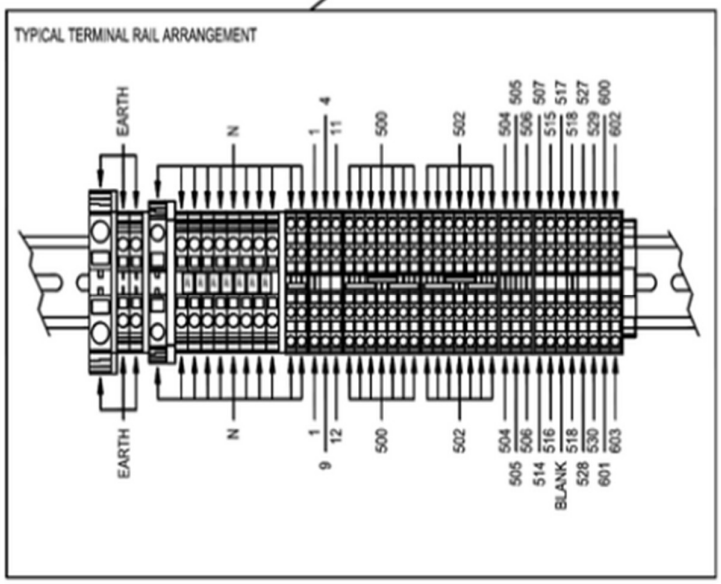
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CD3 FANS

	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			

TYPICAL CONTROL PANEL AND TERMINAL LAYOUT





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

RECOMMENDED FUSE SIZES

System fuse sizes should be calculated based on full system current.

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.

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.

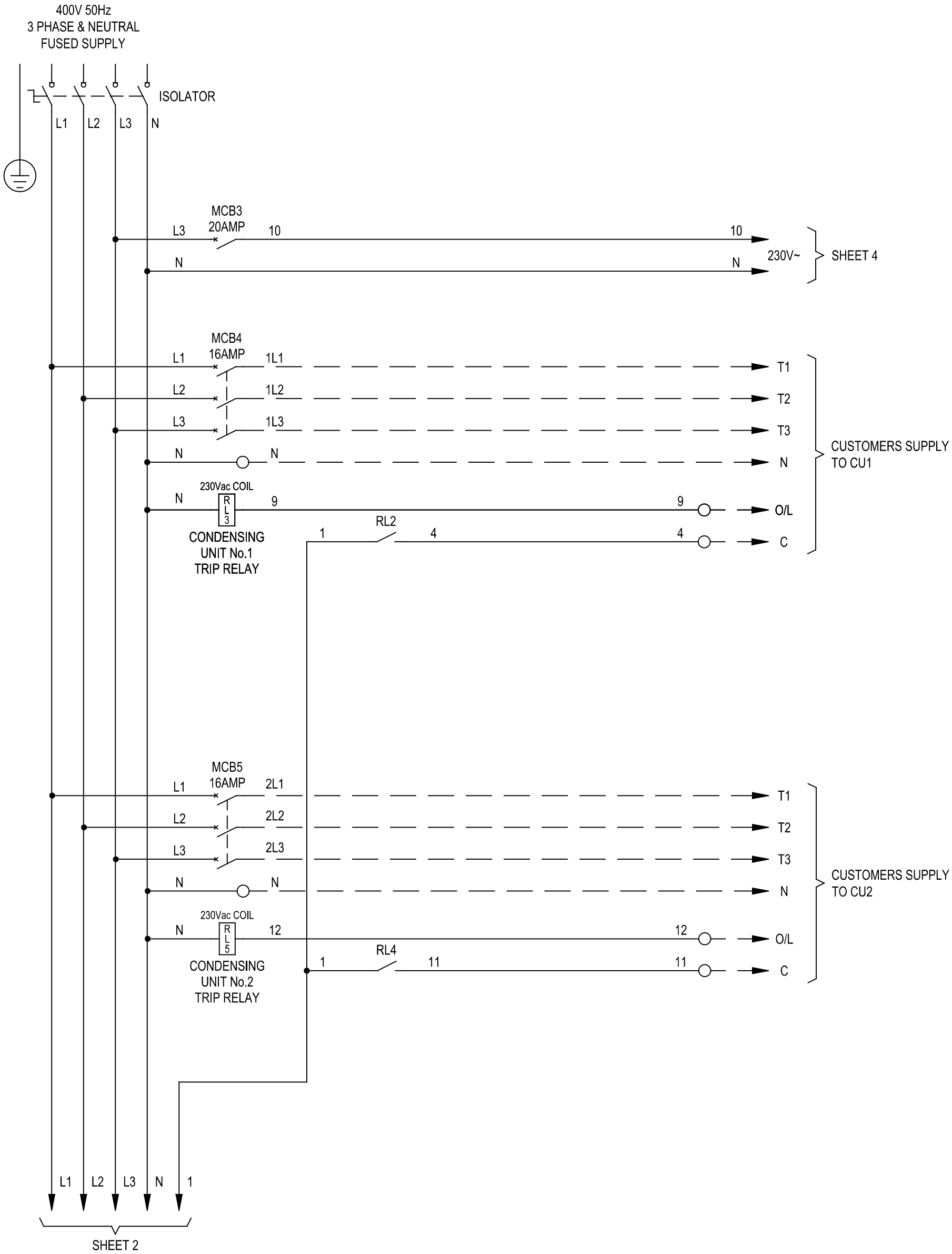
A 15mm O.D. copper drain pipe is provided in the drain sump for connection with non-kink plastic tubing secured with a suitable clip.

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 6 0 ° C.

WIRING DIAGRAMS



DRAWING No.

NOTES.

MODIFICATIONS

REV	MOD No.	DATE	APPR'D	DESCRIPTION OF CHANGE

CAD DRAWING
NO MANUAL REVISIONS

IF IN DOUBT ASK

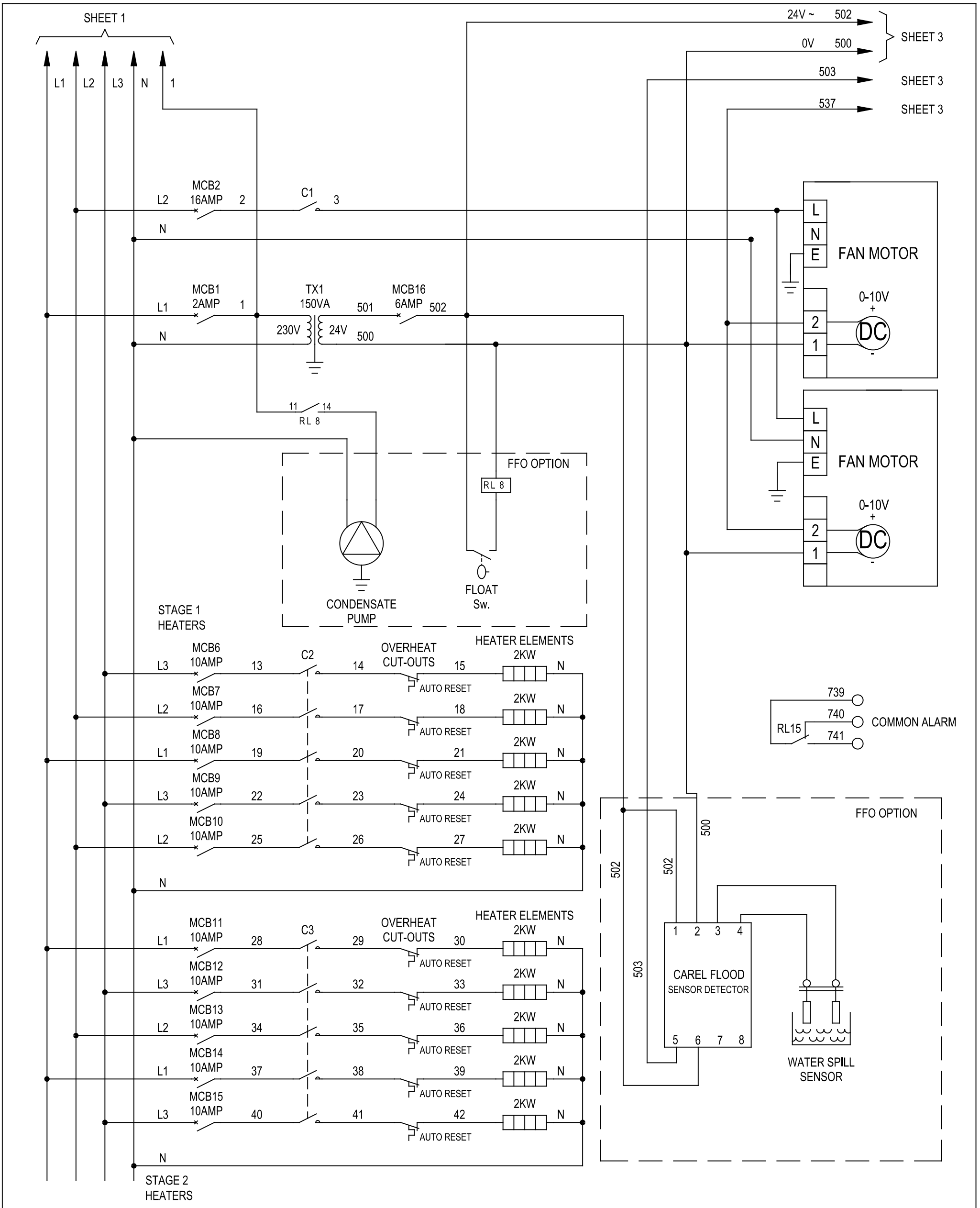
SCALE	1 : 1
DRAWN	DATE
DC	25/09/25
CHECKED	DATE
APPR'D	DATE

Marstair Ltd
Armytage Road
Brighouse, West Yorkshire.
HD6 1QF. England.
Tel. 44 01484 405600
Fax. 44 01484 405620

TITLE

CD3 015/2U
Mains wiring diagram

DRAWING No.	REV	SHEET
316395D11	01	1 OF 4



DRAWING No.

NOTES.

MODIFICATIONS				
REV	MOD No.	DATE	APPR'D	DESCRIPTION OF CHANGE

CAD DRAWING
NO MANUAL REVISIONS

IF IN DOUBT ASK

SCALE	1 : 1
DRAWN	DATE
DC	25/09/25
CHECKED	DATE
APPR'D	DATE

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HD6 1QF. England.
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Fax. 44 01484 405620

TITLE

CD3 015/2U
Mains to control wiring diagram

DRAWING No.	REV	SHEET
316396D11	01	2 OF 4

SHEET 2 502 24Vac
500 0V

24Vac 502
0V 500
512
536
SHEET 4

SHEET 2 503
SHEET 2 537
502

CAREL
AMBIENT TEMPERATURE
& HUMIDITY SENSOR

CAREL ASWC111000: OUT H, M, NTC, NTC, + (G)
G 602
Y 603
BL 600
R 601

CAREL pCO5+ CONTROLLER
J1 - G: 502
J1 - G0: 500
J2 - U1: 602
J2 - U2
J2 - U3
J2 - GND: 603
J2 - +VDC: 601
J3 - U4
J3 - GND
J3 - U5: 600
J3 - GND
J4 - VG: 502
J4 - VG0: 500
J4 - Y1: 537
J4 - Y2: 536
J4 - Y3
J4 - Y4
J5 - ID1: 502
J5 - ID2: 504
J5 - ID3: 511
J5 - ID4
J5 - ID5: 505
J5 - ID6
J5 - ID7: 506
J5 - ID8: 507
J5 - IDC1: 500
J6 - U6
J6 - U7
J6 - U8
J6 - GND
J7 - ID9
J7 - ID10: 512
J7 - ID11
J7 - ID12: 514
J7 - IDC9: 500
J8 - ID13H
J8 - ID13: 515
J8 - IDC13: 500
J8 - ID14: 516
J8 - ID14H

J10 → 6 CORE INTERCONNECTING CABLE → CAREL PGD1 TERMINAL

Rx-/Tx- J11 -
Rx+/Tx+ J11 -
GND J11 -

C1 J12 - 502
NO1 J12 -
NO2 J12 - 519 → 519 C1 500 FAN CONTACTOR
NO3 J12 -
C1 J12 -

C4 J13 - 502
NO4 J13 - 523 → RL7 → 523 524 C2 500 STAGE 1 HEATER CONTACTOR
NO5 J13 - 525 → RL7 → 525 526 C3 500 STAGE 2 HEATER CONTACTOR
NO6 J13 -
C4 J13 -

C7 J14 -
NO7 J14 -
C7 J14 -

NO8 J15 -
C8 J15 -
NC8 J15 -

C9 J16 - 502
NO9 J16 - 533 → 533 RL15 500 COMMON ALARM RELAY (FFO OPTION)
NO10 J16 -
NO11 J16 -
C9 J16 -

NO12 J17 - 527 → 527 DE-ICE STAT 1 → 528 RL2 500 CONDENSING UNIT No.1 CONTROL RELAY
C12 J17 - 502
NC12 J17 -

NO13 J18 - 529 → 529 DE-ICE STAT 1 → 530 RL4 500 CONDENSING UNIT No.2 CONTROL RELAY
C13 J18 - 502
NC13 J18 -

500

517 RL7 500 HEATER BANK OVERHEAT RELAY

FFO OPTION
HIGH LEVEL WATER RL7: 502 — 504

FILTER CLOG: 502 — 505

AIR FLOW FAIL: 502 — 506

REMOTE ON / OFF: 502 — 507
(LINK WIRE)
(REMOVE LINK WIRE WHEN REMOTE ON/OFF FITTED)

FIRE LINK: 502 — 514
(LINK WIRE)
(REMOVE LINK WIRE WHEN FIRE LINK FITTED)

RL3: 502 — 515
RL5: 502 — 516

MANUAL RESET OVERHEAT CUTOUT: 502 — 517

DRAWING No.

NOTES.

CAD DRAWING
NO MANUAL REVISIONS

IF IN DOUBT ASK

MODIFICATIONS

REV	MOD No.	DATE	APPR'D	DESCRIPTION OF CHANGE

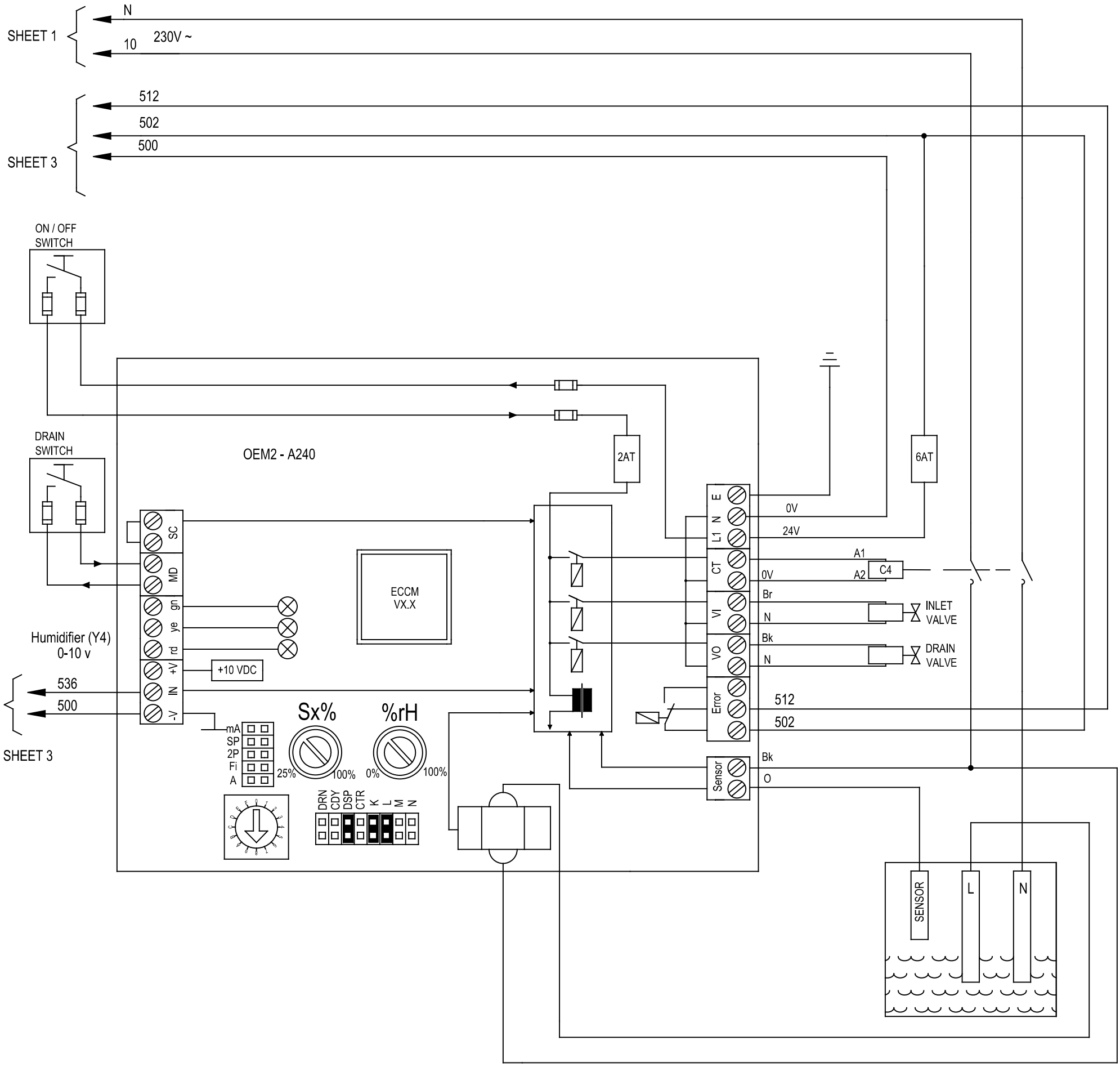
SCALE	1 : 1
DRAWN	DATE
DC	25/09/25
CHECKED	DATE
APPR'D	DATE

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Fax. 44 01484 405620

TITLE

CD3 015/2 U
Control wiring diagram

DRAWING No.	REV	SHEET
316396D11	01	3 OF 4



See humidifier operating instruction inclosed with unit for further data and error codes

DRAWING No.

NOTES.

CAD DRAWING
NO MANUAL REVISIONS

IF IN DOUBT ASK

MODIFICATIONS				
REV	MOD No.	DATE	APPR'D	DESCRIPTION OF CHANGE

SCALE	1 : 1
DRAWN	DATE
DC	25/09/25
CHECKED	DATE
APPR'D	DATE

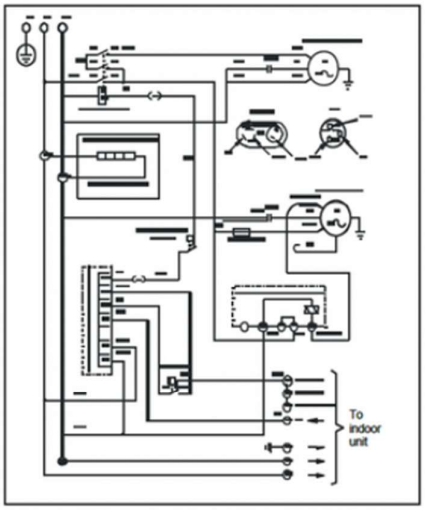
Marstair Ltd
Armytage Road
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HD6 1QF. England.
Tel. 44 01484 405600
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TITLE

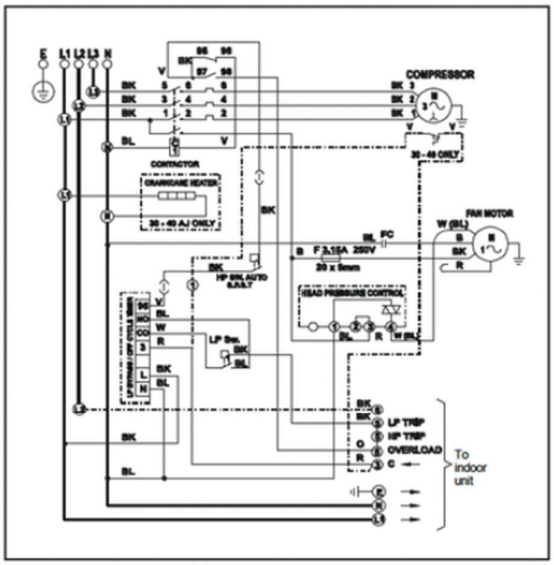
CD3 015/2 U
Humidifier wiring diagram

DRAWING No.	REV	SHEET
316396D11	01	4 OF 4

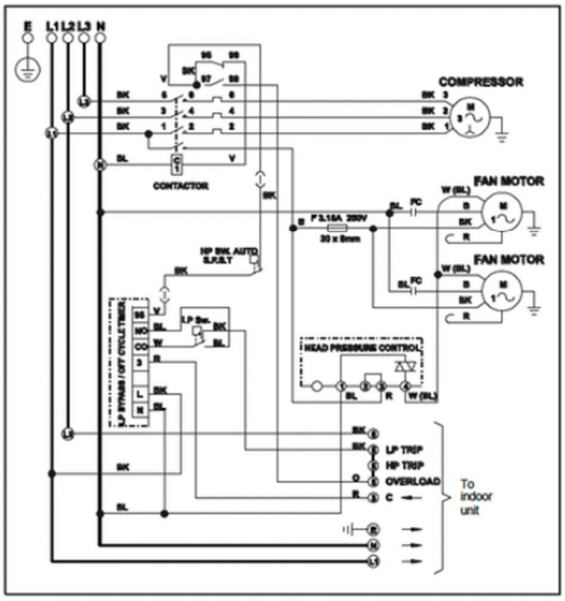
CKC WIRING DIAGRAMS



1 PHASE CKC 45 to 100



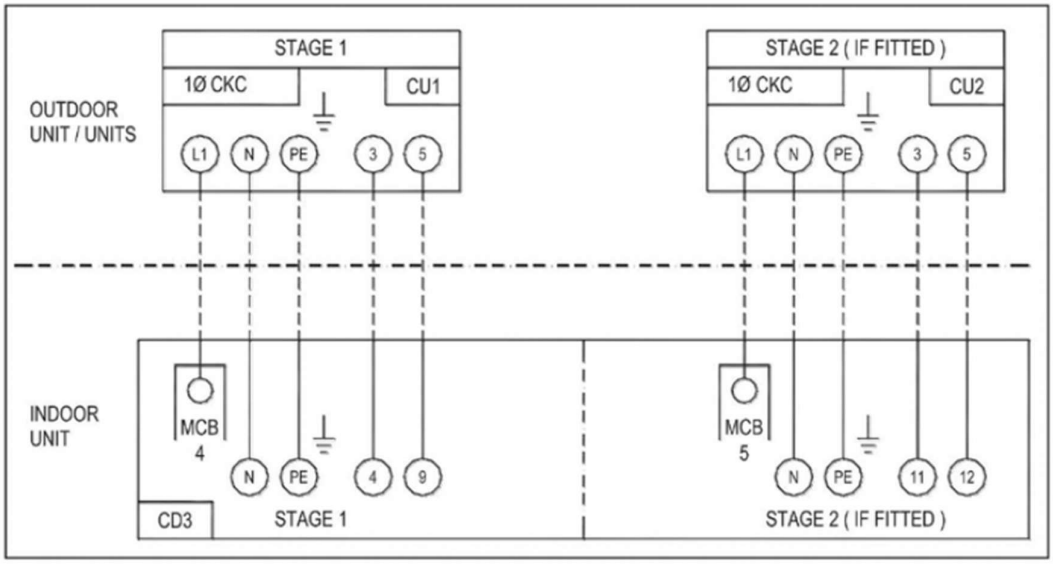
3 PHASE CKC 50 to100



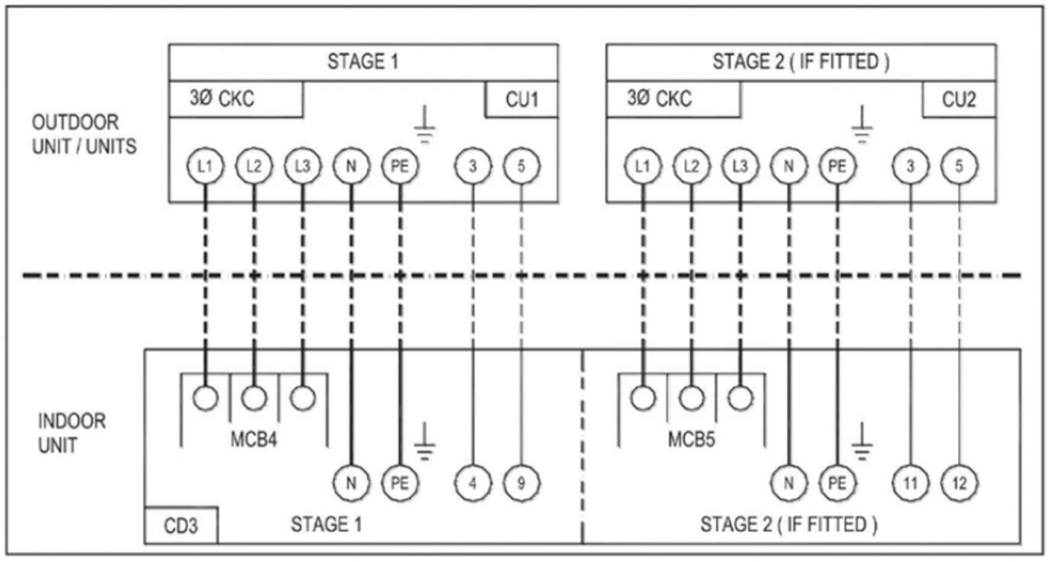
3 PHASE CKC 130 to 240

INTERCONNECTING WIRING DIAGRAMS

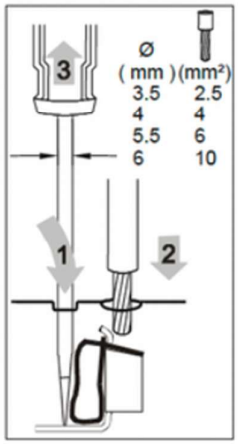
1 phase units



3 phase units



WAGO terminals



ACCESSORIES

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

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.

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).

Commissioning Check List

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

Check and record	Value	Time HeldFor
Leak(tightness) testpressure	(bar)	(min)
Strength (pressure)testpressure	(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	
Additional POE oil added	
Pipe run length	(Kg)
Suction pipe size	(g)
Liquid / Expansion pipe size	(m)
	(")
	(")

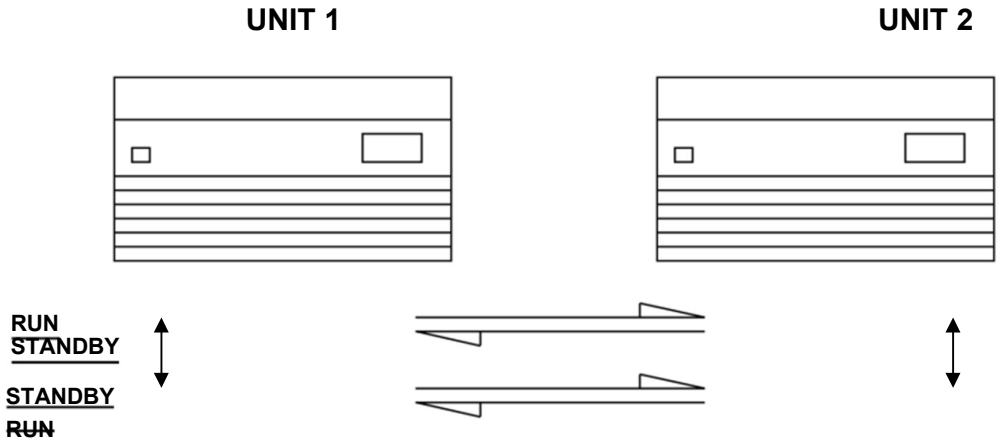
GENERAL MAINTENANCE

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.

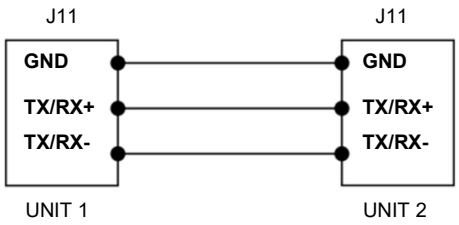
1. **Run time:** If programmed, units will switch between run and standby on a timer basis to ensure even running of fans and compressors. This is factory set at 168hrs and is factory adjustable by TEV Ltd.
2. **Unit assist:** The standby unit will switch on in the event the room load exceeds the running 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 5of 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..**

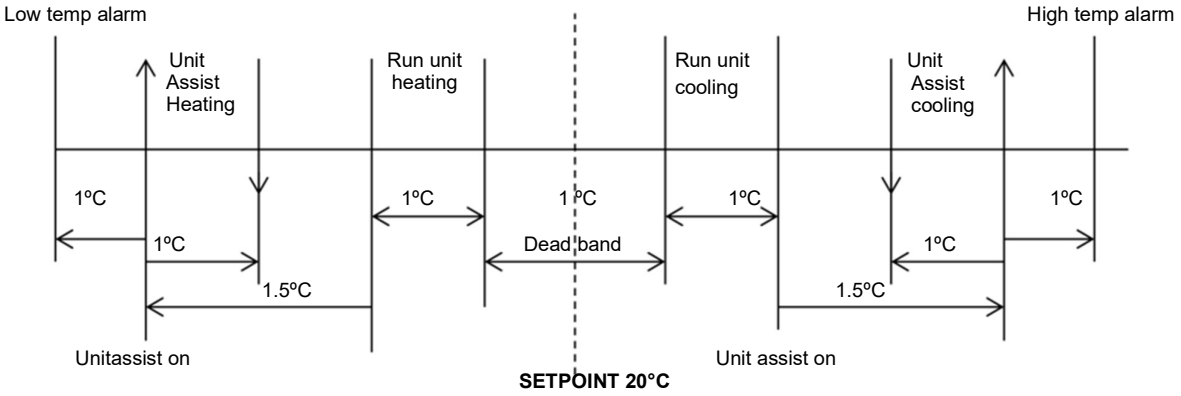
Connections



CAUTION: Donotcrossthe 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
Inthis modethestand-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.

USERINTERFACE

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 fourthMANUFACTURES LEVEL, protected by password, is for configuring and programming the controller. This level is onlyavailable to TEV and any changes to the operating software, which may be required for an individual application, mustbecarried out by an TEV engineer.

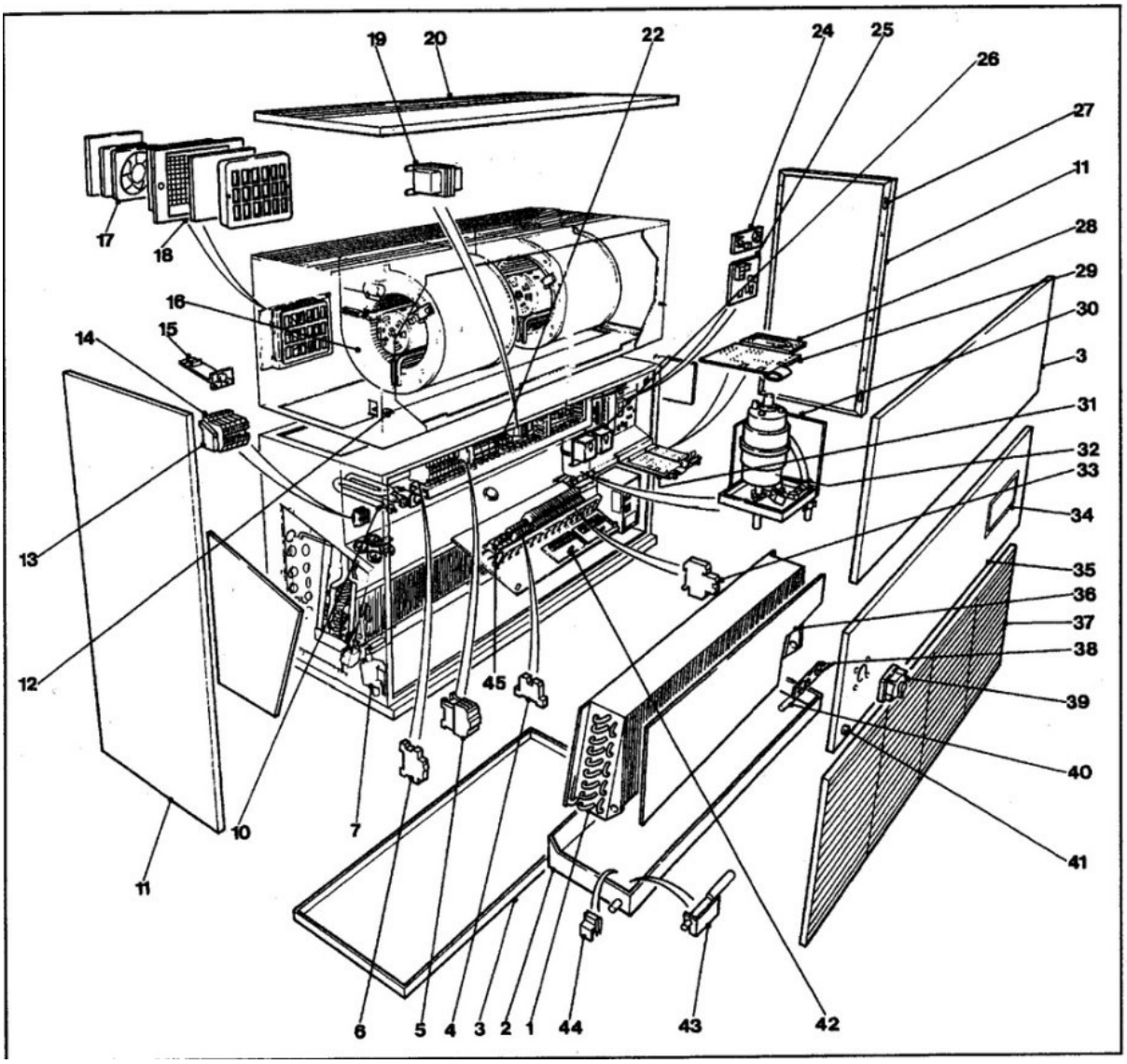
PASSWORDS

Adocument 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.

COMPONENT IDENTIFICATION



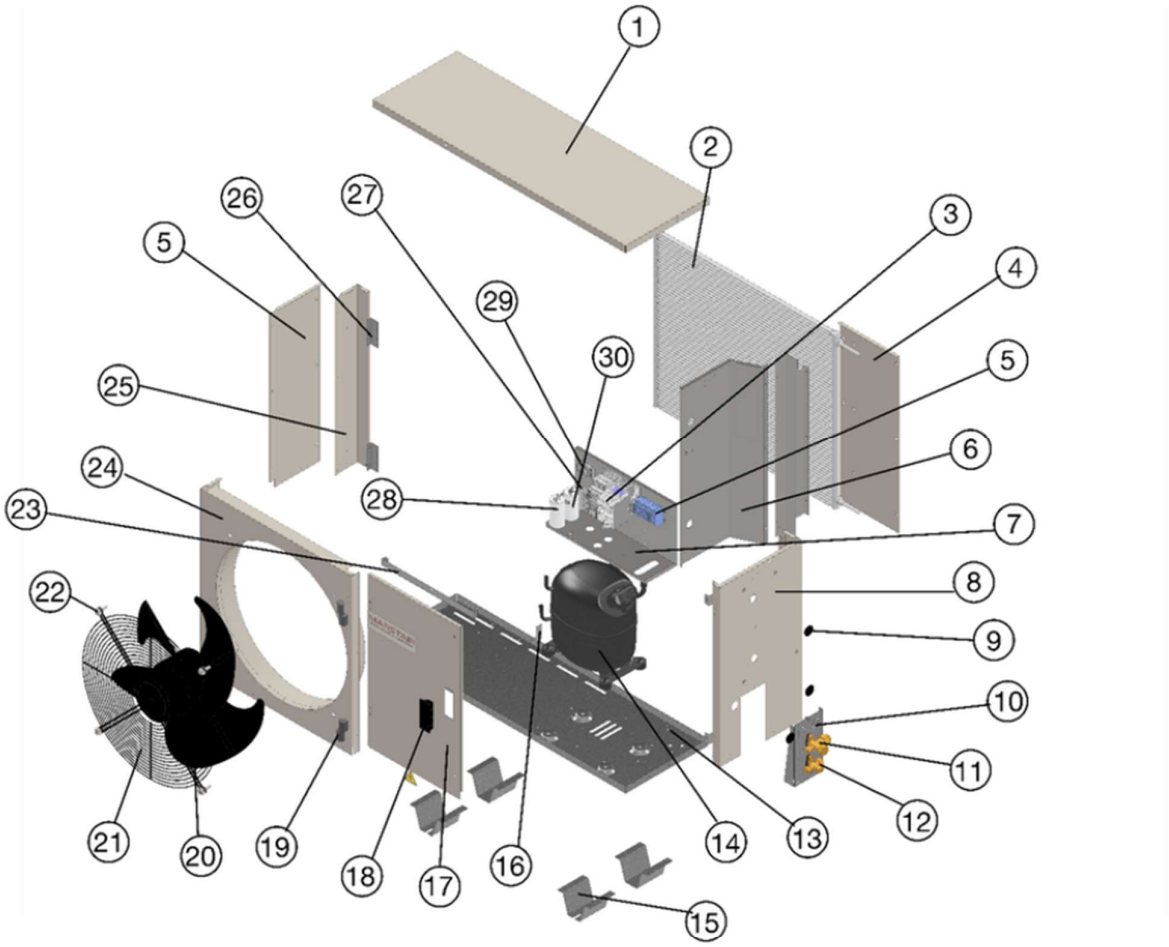
Note: The position of some of the controls shown in this diagram may vary from those in the unit delivered.

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

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

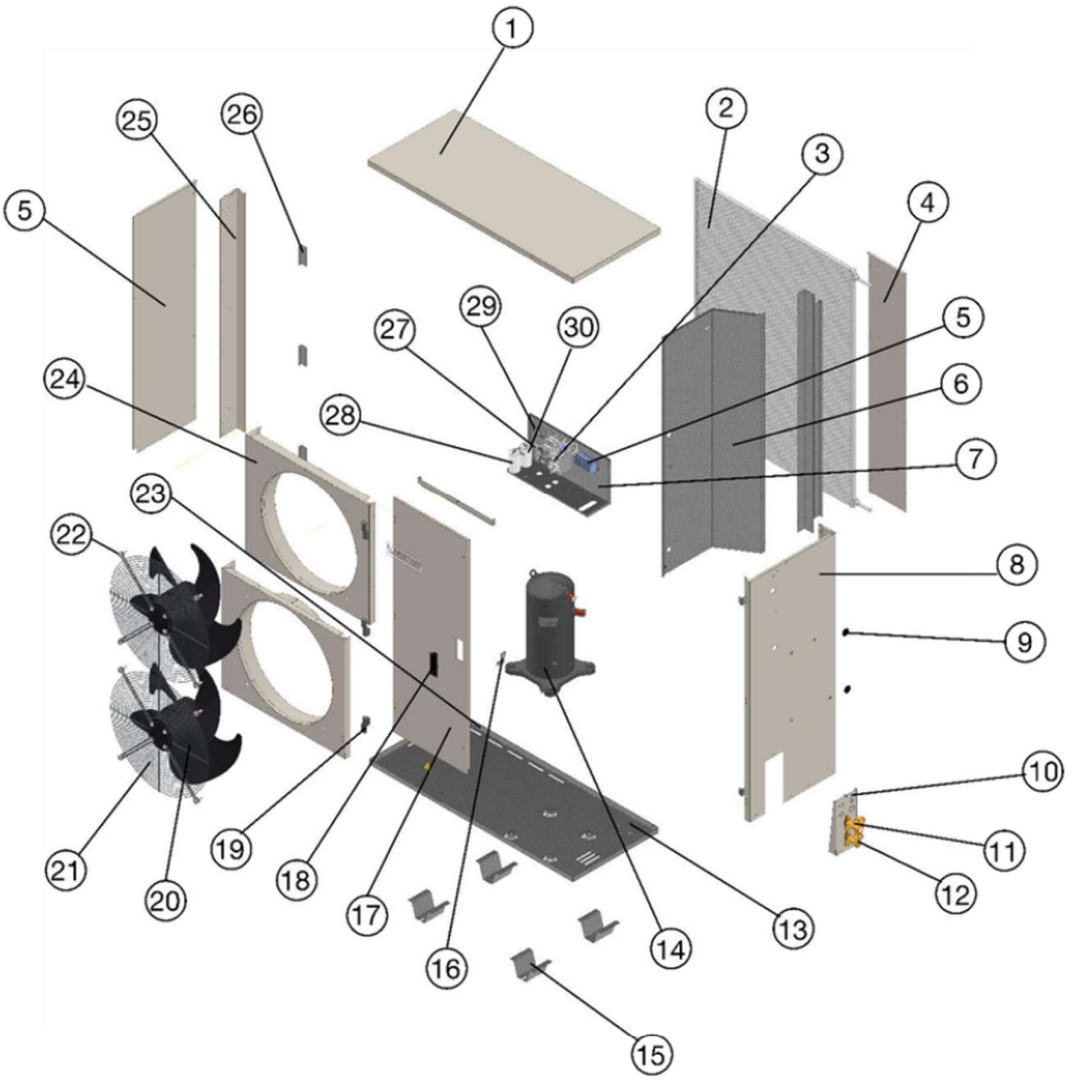
CKC 30 – 100



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.

END OF LIFE REQUIREMENTS

Refrigerant must be recovered by a certificated technician before the plant is dismantled. Modern refrigerant recovery machines should be able to remove well over 95% of the refrigerant in an old system.

All recovered HFC refrigerants can either be:

a) Sent for destruction by incineration at a licenced waste facility

b) Sent to a specialist plant that can re-process the old refrigerant into a gas with properties identical to virgin refrigerant, to create “reclaimed refrigerant”

c) Given a basic cleaning process, to create “recycled refrigerant”

Given the HFC supply shortage that will be created by the phase down process, it is worth trying to send the old refrigerant for reclamation as it may have a good residual value. If the old refrigerant is too contaminated it cannot be reclaimed and must be sent for destruction. It is important not to mix different gases in the same recovery cylinder – as this would render them unsuitable for reclamation.

Reclaimed refrigerant can be used in any refrigeration equipment. Recycled refrigerant must always be used with care as it may be contaminated or of unknown composition. The use of recycled refrigerant with a GWP above 2,500 is restricted to either (a) the organisation owning the plant from which the gas was recovered or (b) the organisation that carried out the recovery.