General Description

UNIT IDENTIFICATION

AIR COOLED CONDENSING UNIT & OUTDOOR HEAT PUMP RANGE
CUS..... Condensing Unit Cooling Only
CUHS .... Outdoor Heat Pump
5-12 ..... Model Size
e.g. ..... Model CUS 6

INTRODUCTION

This range of air cooled condensing units and heat pumps covers the 14-35kW requirement, in axial fan only.

The range is custom designed for use with Airedale's comprehensive range of close control units and Comfort Modular units. They can also be used in conjunction with other cooling applications, eg air handling units. All units are leak tested and carry a holding charge of inert gas.

CONSTRUCTION

The units are constructed of corrosion resistant pre-coated sheet steel.

Standard unit colour is Light Grey (RAL 7035).

CONDENSER

Large surface area condenser coil(s) manufactured from refrigeration quality copper tubes, with mechanically bonded aluminium fins.

FAN

610mm diameter axial flow fan assembly(s) with low noise paddle type blades. The external rotor motor design allows the use of a low power output single phase speed controllable motor. The motor has inbuilt thermal overload protection, and the assembly is supplied complete with a finger guard for protection.

COMPRESSOR

All units utilise hermetic scroll compressors. The CUS7.5/10 and 12 models are fitted with a crankcase heater to guard against floodback and oil foaming on start up. Other features include internal motor protection.

REFRIGERATION

Cooling Only

Each unit is fitted with a liquid and suction line shut off valve for ease of maintenance and installation. Factory set HP/LP pressure switches are fitted, with manual reset high pressure cut-out and automatic reset low pressure cut-out.

A large capacity filter drier is supplied loose for on site installation.

REFRIGERATION

Heat Pump

Each unit is fitted with a thermostatic expansion valve and a check valve assembly to prevent short circuiting of refrigerant, together with a large capacity suction accumulator and a reversing valve. A factory set defrost switch facilitates defrosting of the outside coil when in heat pump mode. All heat pump compressors are fitted with crankcase (oil sump) heaters.

Factory set HP/LP pressure switches are fitted, with manual reset high pressure cut-out and automatic reset low pressure cut-out.

A bi-directional filter drier is supplied loose for on site installation.

ELECTRICAL

Weatherproof control panels are accessed via a lockable panel and contain the necessary contactors, sub-circuit protection and terminals .

All wiring is colour coded and numbered for identification. All units are wired in accordance with current local and European standards.

HEAD PRESSURE CONTROL

Head pressure is maintained by a factory fitted, pressure actuated head pressure controller which varies the speed of the fan to provide optimum head pressure control under varying ambient conditions.

MAINS ISOLATOR

A weatherproof mains isolator is fitted to ensure mains isolation of the electrical panel.

OPTIONS

Epoxy Coated Coils

In atmospheres where high corrosion is anticipated epoxy coated aluminium finned coils can be supplied.

Hot Gas Bypass (Cooling Only Units)

To achieve capacity control during low load conditions, a factory fitted hot gas bypass valve is fitted. This will modulate down to 40% of full capacity. A stub is provided for site connection of the hot gas line to the local expansion device.

Compressor Anti-Cycle Timer

To prevent short cycling and subsequent additional wear on the compressor, this option can be factory fitted to limit compressor starts to six per hour. Not required on Airedale equipment featuring start delay timers inbuilt into the Air Handling unit.

Defrost Drain Tray (Heat Pump Only)

An insulated and trace heated drain tray can be provided to collect condensate when units are used in the reverse cycle/defrost mode.

Capacity Data

COOLING DUTY - COOLING ONLY UNITS

	Evaporating Temperature °C	Ambient 25°C Output kW	25°C Input kW	30°C Output kW	30°C Input kW	35°C Output kW	35°C Input kW	40°C Output kW	40°C Input kW	45°C Output kW	45°C Input kW
CUS5	-5	10.83	2.65	10.21	3.07	9.61	3.49	9.06	3.91	8.40	4.33
	0	12.99	2.88	12.28	3.28	11.57	3.67	10.89	4.07	10.21	4.50
	5	15.26	3.13	14.48	3.51	13.73	3.89	12.95	4.27	12.17	4.72
	10	17.64	3.43	16.82	3.80	16.00	4.17	15.16	4.54	14.35	4.99
CUS6	-5	14.31	4.00	13.60	4.54	12.88	5.07	12.16	5.61	11.21	6.21
	0	17.09	4.30	16.16	4.81	15.23	5.32	14.28	5.84	13.31	6.46
	5	19.86	4.60	18.87	5.11	17.90	5.62	16.84	6.18	15.57	6.75
	10	22.86	4.93	21.81	5.43	20.77	5.94	19.57	6.51	18.43	7.07
CUS7.5	-5	16.67	4.81	15.79	5.47	14.86	6.12	13.96	6.77	12.98	7.49
	0	19.85	5.08	18.83	5.71	17.84	6.36	16.84	7.00	15.64	7.76
	5	23.39	5.39	20.21	6.00	21.04	6.60	19.81	7.26	18.57	7.99
	10	27.19	5.67	25.89	6.24	24.58	6.82	23.14	7.54	21.78	8.19
CUS10	-5	22.15	5.27	20.88	6.21	19.66	7.14	18.41	8.07	17.17	9.01
	0	26.12	5.56	24.90	6.47	23.61	7.38	22.38	8.29	21.12	9.22
	5	33.92	5.94	30.66	6.73	27.41	7.52	24.14	8.30	21.79	9.17
	10	35.89	6.14	34.60	7.00	33.32	7.87	31.98	8.73	30.52	9.69
CUS12	-5	28.25	7.81	26.80	8.83	25.35	9.86	23.94	10.89	22.38	11.97
	0	33.54	8.35	31.95	9.32	30.30	10.30	28.69	11.27	26.87	12.35
	5	39.30	8.85	37.52	9.82	35.73	10.79	33.91	11.78	31.86	12.89
	10	45.68	9.53	43.74	10.14	41.78	10.74	39.62	11.98	37.23	13.37

COOLING DUTY – REVERSE CYCLE MODE

	Evaporating Temperature °C	Ambient 25°C Output kW	25°C Input kW	30°C Output kW	30°C Input kW	35°C Output kW	35°C Input kW	40°C Output kW	40°C Input kW	45°C Output kW	45°C Input kW
CUHS5	-5	10.40	2.54	9.80	2.95	9.23	3.35	8.70	3.75	8.06	4.16
	0	12.47	2.76	11.79	3.15	11.11	3.52	10.45	3.91	9.80	4.32
	5	14.65	3.00	13.90	3.37	13.18	3.73	12.43	4.10	11.68	4.53
	10	16.93	3.29	16.15	3.65	15.36	4.00	14.55	4.36	13.78	4.79
CUHS6	-5	13.74	3.84	13.06	4.36	12.36	4.87	11.67	5.39	10.76	5.96
	0	16.41	4.13	15.51	4.62	14.62	5.11	13.71	5.61	12.78	6.20
	5	19.07	4.42	18.12	4.91	17.18	5.40	16.17	5.93	14.95	6.48
	10	21.95	4.73	20.94	5.21	19.94	5.70	18.79	6.25	17.69	6.79
CUHS7.5	-5	16.00	4.62	15.16	5.25	14.27	5.88	13.40	6.50	12.46	7.19
	0	19.06	4.88	18.08	5.48	17.13	6.11	16.17	6.72	15.01	7.45
	5	22.45	5.17	19.40	5.76	20.20	6.34	19.02	6.97	17.83	7.67
	10	26.10	5.44	24.85	5.99	23.60	6.55	22.21	7.24	20.91	7.86
CUHS10	-5	21.29	5.06	20.06	5.97	18.89	6.86	17.69	7.76	16.50	8.66
	0	25.10	5.34	23.93	6.22	22.69	7.09	21.51	7.97	20.30	8.86
	5	32.60	5.71	29.46	6.47	26.34	7.23	23.20	7.98	20.94	8.81
	10	34.49	5.90	33.25	6.73	32.02	7.56	30.73	8.39	29.33	9.31
CUHS12	-5	27.15	7.51	25.75	8.49	24.36	9.48	23.01	10.47	21.51	11.50
	0	32.23	8.02	30.70	8.96	29.12	9.90	27.57	10.83	25.82	11.87
	5	37.77	8.50	36.06	9.44	34.34	10.37	32.59	11.32	30.62	12.39
	10	43.90	9.16	42.03	9.74	40.15	10.32	38.07	11.51	35.78	12.85

Notes:
1 Output kW refers to the compressor duty.
2 Input kW refers to the compressor input power only

Capacity Data

HEATING DUTY - REVERSE CYCLE MODE

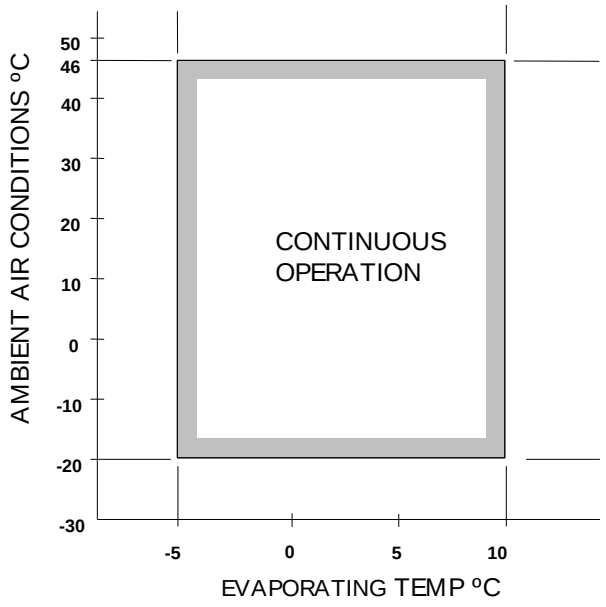
Outdoor Unit Evaporator Air On Temperature °C/ RH %		Indoor Unit Condensing Temperature					
		30°C Output kW	35°C Output kW	40°C Output kW	45°C Output kW	50°C Output kW	55°C Output kW
CUHS5	5 / 85	14.24	14.07	14.01	13.93	13.84	13.75
	7 / 85	15.30	15.07	14.98	14.88	14.71	14.58
	10 / 80	16.40	16.30	16.09	15.90	15.70	15.55
CUHS 6	5 / 85	18.65	18.60	18.64	18.61	18.57	18.49
	7 / 85	19.78	19.71	19.69	19.58	19.49	19.31
	10 / 80	21.40	21.17	21.14	20.93	20.65	20.41
CUHS 7.5	5 / 85	22.16	22.01	21.94	21.89	21.75	21.69
	7 / 85	23.45	23.24	23.20	23.02	22.95	22.90
	10 / 80	25.38	25.24	25.15	24.93	24.74	24.58
CUHS 10	5 / 85	25.66	25.40	25.15	24.90	24.65	24.40
	7 / 85	27.19	26.92	26.65	26.38	26.12	25.86
	10 / 80	29.37	29.08	28.79	28.50	28.21	27.93
CUHS 12	5 / 85	29.16	28.87	28.58	28.29	28.01	27.73
	7 / 85	30.90	30.59	30.29	29.98	29.68	29.39
	10 / 80	33.38	33.05	32.72	32.39	32.06	31.74

Notes:

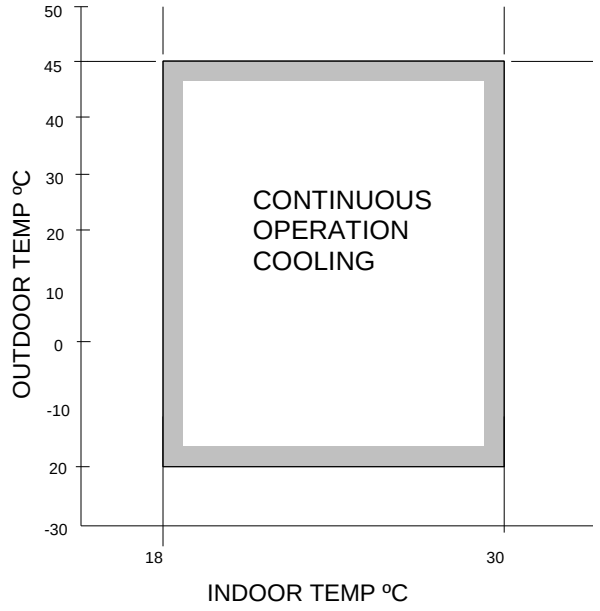
1 Output kW refers to the compressor duty.
2 Indoor ambient at 20°C

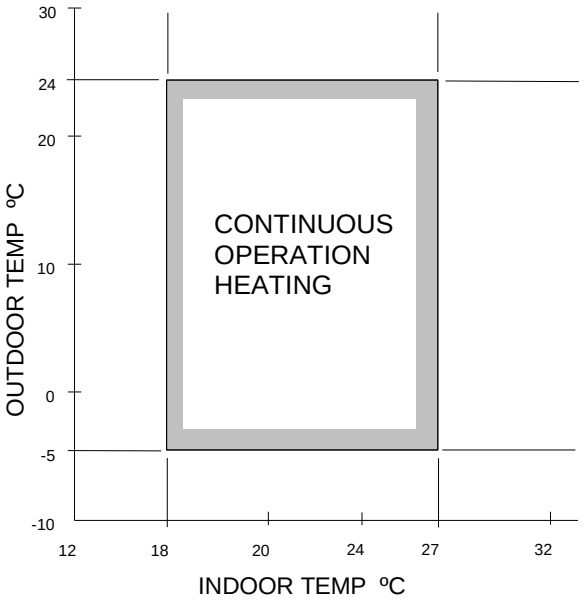
Operating Data

OPERATING LIMITS - COOLING ONLY

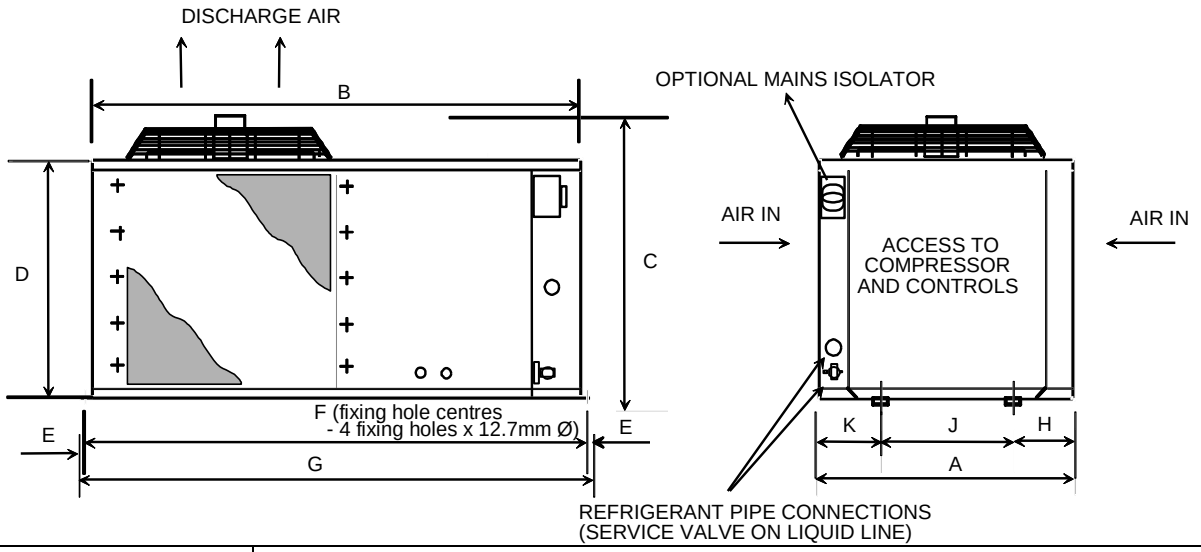


OPERATING LIMITS - HEAT PUMP



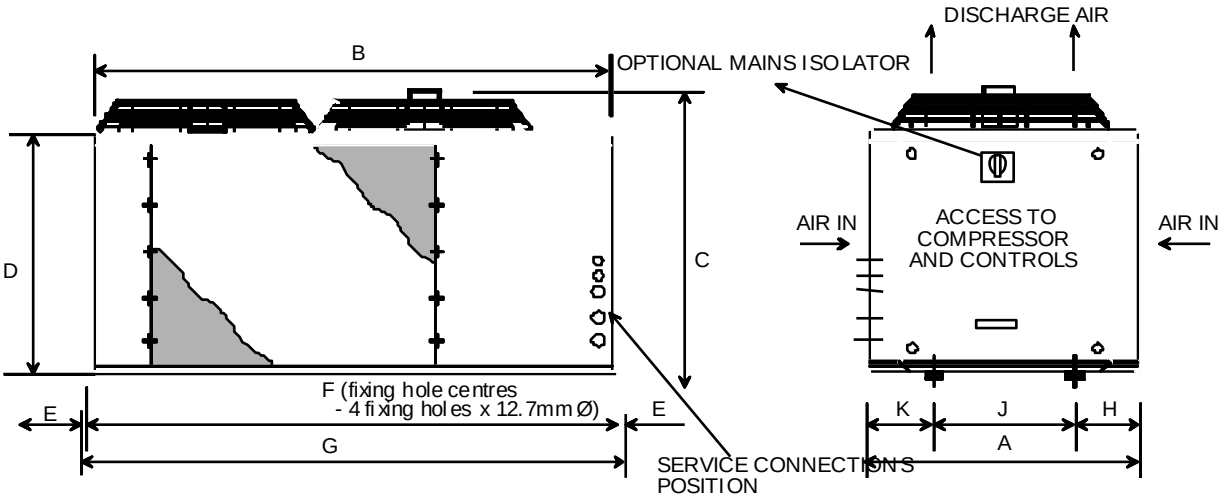


Dimensions: CUS/CUHS 5 - 7.5



CUS/CUHS		A	B	C	D	E	F	G	H	J	K
5	mm	865	1148	699	550	16	1181	1213	195	457	213
6	mm	865	1148	699	550	16	1181	1213	195	457	213
7.5	mm	996	1376	699	550	16	1409	1441	193	610	193

Dimensions: CUS/CUHS 10 - 12



CUS/CUHS		A	B	C	D	E	F	G	H	J	K
10	mm	866	1705	953	810	16	1738	1770	204	457	204
12	mm	866	1705	953	810	16	1738	1770	204	457	204

Notes:

1 Incoming Services: Connections to left hand side of unit compressor compartment.
2 Airflow and Maintenance Clearance: Please allow 500mm around the unit for airflow and maintenance purpose.

Technical Data

CUS/CUHS		5	6	7.5	10	12
Nominal Capacity(1)	kW	13.7	17.9	21.0	27.4	35.7
Nominal Input (1)	kW	5.1	6.4	6.6	10.0	11.5
Capacity Steps	%	0-100	0-100	0-100	0-100	0-100
Construction						
Material		Pre Coated Sheet Steel				
Colour		Light Grey (RAL 7035)				
Condenser						
Type		Air Cooled				
Quantity		2	2	3	2	2
Face Area	m²	0.69	0.69	1.03	1.37	1.37
Nominal Airflow	m³/s	2.00	2.00	2.25	4.45	4.45
Coil Volume (2)	l	8.0	8.0	12.0	15.7	15.7
Discharge		Vertical				
Fan						
Type		Axial				
Quantity		1	1	1	2	2
Diameter	mm	610	610	610	610	610
Maximum Speed	rpm	930	930	930	930	930
Compressor						
Type		Hermetic Scroll				
Quantity		1	1	1	1	1
Oil Charge Volume	L	1.55	1.65	3.25	3.80	4.00
Refrigeration						
Number of Circuits		1	1	1	1	1
Refrigerant Type		R407C				
Refrigeration Control (CUH only)		Thermostatic Expansion Valve				
Unit Refrigerant Charge	kg	2.4	2.4	3.63	4.76	4.76
Dimensions						
Height	mm	699	699	699	953	953
Width	mm	1148	1148	1376	1705	1705
Depth	mm	865	865	996	866	866
Weights CUS Units						
Machine Weight (nom)	kg	138	141	203.5	242	247
Operating Weight (nom)	kg	141	144	208.5	261	266
Weights CUHS Units						
Machine Weight (nom)	kg	164	167	216.5	267	272
Operating Weight (nom)	kg	168	171	222.5	272	277
Connections						
Liquid Line	in	Flare 1/2	Flare 5/8	Flare 5/8	Sweat 7/8	Sweat 7/8
Suction Line	in	Sweat 7/8	Sweat 7/8	Sweat 1 1/8	Sweat 1 1/8	Sweat 1 3/8
Hot Gas Stub	in	5/8	5/8	5/8	7/8	7/8

(1) Nominal cooling capacity based on 5°C evaporating temperature and a 35°C ambient.
(2) Figures for guidance.

Electrical Data

CUS/CUHS		5	6	7.5	10	12
Unit Data						
Nominal Run Amps (1)	A	11.4	13.5	15.2	21.1	26.6
Maximum Start Amps	A	68.3	100.8	103.8	131.6	146.6
Control Circuit CUS	VAC	230	230	230	230	230
Control Circuit CUHS	VAC	24	24	24	24	24
Mains Supply	V			400/3/50		
Rec. Mains Fuse	A	20	25	32	40	40
Max Incoming Mains	mm²	10	10	10	10	10
Compressor						
Motor Rating	kW	4.5	5.9	6.9	8.9	11.6
Nominal Run Amps (1)	A	8.9	11.0	12.7	16.1	21.6
Locked Rotor Amps	A	62.5	95.0	98.0	120.0	135.0
Crankcase Heater Rating	W	65 (2)	65 (2)	50	50	50
Type of Start				Direct on Line		
Condenser Fan						
Motor Rating	kW	0.55	0.55	0.55	0.55	0.55
Full Load Amps	A	2.50	2.50	2.50	2.50	2.50
Locked Rotor Amps	A	5.80	5.80	5.80	5.80	5.80

(1) Nominal data based on 5°C evaporating temperature and a 35°C ambient.
(2) Heat pumps only.

Noise Data

Sound Pressure Measurement		Frequency (Hz)								
		dBa	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
CUS/CUHS 5 – 6	@ 1 m	71	72	73	71	70	68	60	53	46
	@ 10 m	51	52	53	51	50	48	40	33	26
CUS/CUHS 7.5	@ 1 m	73	73	71	74	71	69	64	57	50
	@ 10 m	53	53	51	54	51	49	44	37	30
CUS/CUHS 10-12	@ 1 m	73	80	77	73	72	69	63	56	47
	@ 10 m	53	60	57	53	52	49	43	36	27

Note: Above noise levels are with the condenser fan running at full speed. Under normal operating conditions (ambients up to 35°C) noise levels will be reduced by 3 - 4 dB.

Field Connections

CUS 5-12	L1		
	L2		
	L3	➔	Mains Incoming 400/3/50
	N		
	E		
	576	➔	576/577 Cooling Signal from AHU (24vac)
	577		
	589	➔	589/502 Volt Free Contacts For Trip Indication
	502		

CUHS 5-12	L1		
	L2		
	L3	➔	Mains Incoming 400/3/50
	N		
	E		
	504	➔	Cooling Signal from AHU
	502	➔	24vac
	523	➔	Defrost Signal to AHU
	517	➔	AHU Fan Running
	515	➔	Heating Signal from AHU
	500	➔	0 vac
	589	➔	589/590 Volt Free Contact for Trip Indication
	590	➔	

Part No: 902-023 TM E 04/98

ISSUE	DATE
~~A~~	~~01/04/98~~
~~B~~	~~30/11/98~~
~~C~~	~~15/04/99~~
D	19/09/00
E	14/08/09
V1.4.0	02_2013