



TECHNICAL MANUAL
for HL/HLR WALL MOUNTED
SPLIT SYSTEMS
(with CEILING MOUNTED OPTION)

This manual provides technical and installation information for **HL/HLR WALL MOUNTED** split systems comprising:

INDOOR UNIT 526 series **HL**
 527 series **HLR**

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TEV LIMITED - HL/HLR SPLIT SYSTEMS

The HL/HLR range of split systems comprises the 526 series HL indoor unit with in-built electromechanical controls, the 527 series HLR indoor unit with hard wired remote control.

By choosing appropriate combinations, the installer can provide:

or **AIR CONDITIONERS** with a cooling range of 7.9 - 13.8 kW,
HEAT PUMP systems with a cooling range of 7.9 - 12.8 kW, and a heating range of 9.1 - 13.2 kW with an outdoor temperature of 7°C

PART NUMBERS

526/527 Series HL/HLR INDOOR UNITS

HL Models	380	460	540
Part Number	52600010	52600009	52600007
HLR Models	380	460	540
Part Number	52700020	52700021	52700022

UNPACKED DIMENSIONS AND WEIGHTS

HL/HLR INDOOR UNITS

Model	HL/HLR		
	380	460	540
HEIGHT mm	786	786	786
WIDTH mm	1170	1320	1520
DEPTH mm	288	288	288
WEIGHT kg	58	62	69

PACKED DIMENSIONS AND WEIGHTS

HL/HLR INDOOR UNITS

Model	HL/HLR		
	380	460	540
HEIGHT mm	850	850	850
WIDTH mm	1210	1360	1560
DEPTH mm	305	305	305
WEIGHT kg	63	74	82

FEATURES/ACCESSORIES

INDOOR UNITS

	HL	HLR
Manual air deflection	*	*
De-ice thermostat	*	*
3 fan speeds	STD	STD
Remote hard wired control	*	STD
Programmable timer	*	*
Condensate pump	*	*
Ceiling mounting kit	*	*
Floor mounting kit	*	*
LPHW coil	*	*
Long life washable filter	STD	STD
Fresh air inlet facility	STD	STD
Air deflectors	*	*

TECHNICAL INFORMATION - R407C

	MODEL	AIR ON EC	HUMIDITY % RH	EVAPORATING TEMPERATURE EC											
				-2.5		0		2.5		5		7.5		10	
				TOTAL	SENS	TOTAL	SENS	TOTAL	SENS	TOTAL	SENS	TOTAL	SENS	TOTAL	SENS
LOW FAN SPEED	HLR 460	10	70	5.14	3.71	3.91	3.00	2.66	2.32	1.62	1.62	0.82	0.82	-	-
		12.7	70	6.62	4.39	5.40	3.70	4.15	3.04	2.82	2.37	1.70	1.70	0.89	0.89
		15	70	7.98	4.94	6.76	4.28	5.51	3.63	4.18	2.98	2.74	2.31	1.63	1.63
		18	60	8.97	5.81	7.77	5.16	6.52	4.52	5.18	3.88	3.75	3.23	2.59	2.59
		21	50	9.80	6.68	8.57	6.04	7.34	5.43	6.02	4.80	4.58	4.16	3.54	3.54
	HLR 540	10	70	6.10	4.40	4.65	3.55	3.17	2.74	1.92	1.92	0.97	0.97	-	-
		12.7	70	7.85	5.20	6.41	4.38	4.93	3.60	3.34	2.80	2.00	2.00	1.05	1.05
		15	70	9.46	5.86	8.00	5.05	6.54	4.30	4.95	3.52	3.26	2.74	1.93	1.93
		18	60	10.64	6.88	9.20	6.09	7.73	5.35	6.15	4.59	4.46	3.82	3.06	3.06
		21	50	11.62	7.92	10.17	7.14	8.68	6.39	7.14	5.68	5.44	4.92	4.18	4.18
MEDIUM FAN SPEED	HLR 460	10	70	5.97	4.36	4.54	3.56	3.10	2.78	1.96	1.96	0.98	0.98	-	-
		12.7	70	7.71	5.14	6.27	4.37	4.82	3.61	3.27	2.84	2.04	2.04	1.07	1.07
		15	70	9.30	5.78	7.86	5.02	6.40	4.29	4.84	3.54	3.18	2.78	1.97	1.97
		18	60	10.47	6.83	9.04	6.07	7.58	5.37	6.02	4.64	4.35	3.90	3.14	3.14
		21	50	11.44	7.90	10.00	7.17	8.54	6.49	6.98	5.77	5.32	5.03	4.29	4.29
	HLR 540	10	70	7.10	5.17	5.40	4.22	3.67	3.28	2.31	2.31	1.17	1.17	-	-
		12.7	70	9.15	6.10	7.44	5.16	5.72	4.27	3.88	3.36	2.42	2.42	1.26	1.26
		15	70	11.03	6.86	9.32	5.95	7.60	5.08	5.74	4.19	3.78	3.30	2.33	2.33
		18	60	12.43	8.09	10.72	7.20	8.97	6.33	7.14	5.49	5.17	4.61	3.70	3.70
		21	50	13.57	9.36	11.86	8.49	10.12	7.63	8.30	6.82	6.32	5.95	5.06	5.06
HIGH FAN SPEED	HLR 460	10	70	6.74	5.00	5.14	4.10	3.49	3.23	2.28	2.28	1.15	1.15	-	-
		12.7	70	8.73	5.88	7.09	5.02	5.44	4.18	3.69	3.32	2.39	2.39	1.26	1.26
		15	70	10.53	6.60	8.89	5.75	7.22	4.94	5.46	4.11	3.58	3.27	2.31	2.31
		18	60	11.87	7.82	10.23	7.00	8.56	6.22	6.79	5.41	4.90	4.58	3.68	3.68
		21	50	12.97	9.11	11.33	8.30	9.65	7.51	7.89	6.75	6.12	6.12	5.04	5.04
	HLR 540	10	70	8.07	5.96	6.13	4.90	4.17	3.85	2.72	2.72	1.38	1.38	-	-
		12.7	70	10.41	7.01	8.47	5.96	6.50	4.97	4.40	3.94	2.85	2.85	1.49	1.49
		15	70	12.56	7.86	10.61	6.85	8.62	5.87	6.52	4.90	4.27	3.89	2.75	2.75
		18	60	14.16	9.32	12.20	8.34	10.21	7.37	8.10	6.44	5.86	5.45	4.38	4.38
		21	50	15.48	10.85	13.52	9.88	11.52	8.94	9.38	7.98	7.28	7.28	5.99	5.99

TECHNICAL INFORMATION – R134A

	MODEL	AIR ON EC	HUMIDITY % RH	EVAPORATING TEMPERATURE EC											
				-2.5		0		2.5		5		7.5		10	
				TOTAL	SENS	TOTAL	SENS	TOTAL	SENS	TOTAL	SENS	TOTAL	SENS	TOTAL	SENS
LOW FAN SPEED	HLR 460	10	70	5.18	3.74	3.94	3.02	2.69	2.33	1.63	1.63	0.82	0.82	-	-
		12.7	70	6.69	4.42	5.45	3.73	4.18	3.05	2.83	2.37	1.70	1.70	0.89	0.89
		15	70	8.06	4.99	6.82	4.31	5.54	3.65	4.19	2.98	2.74	2.31	1.63	1.63
		18	60	9.06	5.86	7.83	5.19	6.56	4.54	5.21	3.89	3.76	3.23	2.59	2.59
		21	50	9.90	6.75	8.66	6.10	7.39	5.46	6.04	4.81	4.59	4.16	3.54	3.54
	HLR 540	10	70	6.15	4.43	4.68	3.58	3.18	2.75	1.93	1.93	0.97	0.97	-	-
		12.7	70	7.93	5.25	6.46	4.42	4.96	3.62	3.36	2.81	2.00	2.00	1.05	1.05
		15	70	9.55	5.92	8.08	5.10	6.58	4.32	4.97	3.53	3.26	2.74	1.93	1.93
		18	60	10.75	6.95	9.29	6.15	7.78	5.38	6.18	4.60	4.46	3.82	3.06	3.06
		21	50	11.74	8.00	10.27	7.22	8.77	6.46	7.16	5.69	5.45	4.92	4.18	4.18
MEDIUM FAN SPEED	HLR 460	10	70	6.04	4.40	4.59	3.58	3.12	2.78	1.96	1.96	0.99	0.99	-	-
		12.7	70	7.78	5.19	6.34	4.40	4.86	3.62	3.29	2.85	2.05	2.05	1.07	1.07
		15	70	9.39	5.84	7.94	5.06	6.45	4.31	4.86	3.55	3.18	2.78	1.97	1.97
		18	60	10.58	6.90	9.13	6.14	7.64	5.40	6.05	4.66	4.36	3.90	3.14	3.14
		21	50	11.55	7.98	10.10	7.24	8.62	6.51	7.02	5.78	5.33	5.04	4.28	4.28
	HLR 540	10	70	7.17	5.22	5.45	4.24	3.70	3.30	2.32	2.32	1.17	1.17	-	-
		12.7	70	9.24	6.16	7.52	5.21	5.77	4.30	3.90	3.37	2.42	2.42	1.26	1.26
		15	70	11.14	6.93	9.42	6.01	7.66	5.11	5.78	4.21	3.78	3.30	2.33	2.33
		18	60	12.55	8.17	10.83	7.27	9.06	6.39	7.18	5.50	5.18	4.61	3.70	3.70
		21	50	13.70	9.46	11.98	8.58	10.22	7.71	8.34	6.84	6.33	5.96	5.06	5.06
HIGH FAN SPEED	HLR 460	10	70	6.83	5.06	5.19	4.14	3.52	3.25	2.29	2.29	1.16	1.16	-	-
		12.7	70	8.82	5.94	7.18	5.06	5.49	4.20	3.70	3.33	2.39	2.39	1.26	1.26
		15	70	10.64	6.66	8.98	5.81	7.30	4.98	5.50	4.13	3.59	3.27	2.31	2.31
		18	60	11.99	7.90	10.34	7.07	8.64	6.26	6.83	5.42	4.92	4.58	3.68	3.68
		21	50	13.10	9.20	11.45	8.38	9.75	7.58	7.94	6.78	6.13	6.13	5.03	5.03
	HLR 540	10	70	8.15	6.02	6.19	4.93	4.20	3.87	2.73	2.73	1.38	1.38	-	-
		12.7	70	10.52	7.08	8.56	6.02	6.55	5.00	4.42	3.96	2.85	2.85	1.49	1.49
		15	70	12.69	7.94	10.72	6.92	8.70	5.93	6.55	4.91	4.28	3.89	2.75	2.75
		18	60	14.30	9.42	12.33	8.42	10.31	7.45	8.15	6.46	5.87	5.46	4.38	4.38
		21	50	15.63	10.96	13.66	9.98	11.63	9.03	9.47	8.06	7.29	7.29	5.98	5.98

TECHNICAL INFORMATION - R404A

	MODEL	AIR ON EC	HUMIDITY % RH	EVAPORATING TEMPERATURE EC											
				-2.5		0		2.5		5		7.5		10	
				TOTAL	SENS	TOTAL	SENS	TOTAL	SENS	TOTAL	SENS	TOTAL	SENS	TOTAL	SENS
LOW FAN SPEED	HLR 460	10	70	5.06	3.66	3.86	2.97	2.62	2.30	1.62	1.62	0.82	0.82	-	-
		12.7	70	6.53	4.34	5.32	3.66	4.09	3.01	2.78	2.34	1.68	1.68	0.88	0.88
		15	70	7.86	4.89	6.66	4.22	5.43	3.59	4.11	2.94	2.70	2.30	1.62	1.62
		18	60	8.86	5.74	7.66	5.10	6.42	4.47	5.10	3.84	3.70	3.20	2.58	2.58
		21	50	9.66	6.63	8.47	6.00	7.24	5.38	5.93	4.76	4.52	4.13	3.52	3.52
	HLR 540	10	70	6.01	4.34	4.58	3.52	3.12	2.72	1.91	1.91	0.96	0.96	-	-
		12.7	70	7.74	5.14	6.32	4.34	4.86	3.56	3.30	2.78	1.99	1.99	1.04	1.04
		15	70	9.33	5.79	7.90	5.02	6.44	4.26	4.88	3.49	3.21	2.71	1.91	1.91
		18	60	10.50	6.82	9.08	6.05	7.62	5.30	6.06	4.55	4.39	3.79	3.05	3.05
		21	50	11.46	7.86	10.05	7.10	8.59	6.37	7.03	5.63	5.36	4.88	4.16	4.16
MEDIUM FAN SPEED	HLR 460	10	70	5.86	4.30	4.46	3.51	3.04	2.74	1.94	1.94	0.98	0.98	-	-
		12.7	70	7.57	5.07	6.17	4.30	4.74	3.56	3.21	2.81	2.02	2.02	1.06	1.06
		15	70	9.12	5.70	7.72	4.96	6.29	4.23	4.75	3.50	3.12	2.76	1.95	1.95
		18	60	10.28	6.74	8.88	6.02	7.45	5.30	5.91	4.59	4.27	3.86	3.11	3.11
		21	50	11.23	7.82	9.83	7.10	8.40	6.42	6.86	5.71	5.18	5.18	4.26	4.26
	HLR 540	10	70	6.97	5.10	5.30	4.16	3.61	3.25	2.30	2.30	1.16	1.16	-	-
		12.7	70	8.98	6.02	7.32	5.10	5.62	4.22	3.82	3.33	2.39	2.39	1.26	1.26
		15	70	10.83	6.76	9.17	5.88	7.46	5.02	5.65	4.14	3.70	3.26	2.31	2.31
		18	60	12.21	7.98	10.54	7.13	8.84	6.29	7.02	5.43	5.08	4.57	3.68	3.68
		21	50	13.33	9.26	11.67	8.42	9.98	7.59	8.15	6.75	6.12	6.12	5.02	5.02
HIGH FAN SPEED	HLR 460	10	70	6.61	4.93	5.03	4.06	3.42	3.20	2.26	2.26	1.14	1.14	-	-
		12.7	70	8.53	5.78	6.95	4.94	5.33	4.12	3.61	3.28	2.37	2.37	1.24	1.24
		15	70	10.29	6.48	8.70	5.67	7.08	4.87	5.35	4.06	3.50	3.23	2.29	2.29
		18	60	11.60	7.70	10.02	6.91	8.39	6.14	6.66	5.34	4.81	4.54	3.65	3.65
		21	50	12.68	8.99	11.10	8.22	9.47	7.46	7.74	6.68	6.06	6.06	4.98	4.98
	HLR 540	10	70	7.89	5.87	6.00	4.82	4.08	3.81	2.69	2.69	1.36	1.36	-	-
		12.7	70	10.18	6.89	8.30	5.89	6.36	4.90	4.31	3.90	2.82	2.82	1.48	1.48
		15	70	12.28	7.73	10.39	6.76	8.45	5.81	6.38	4.83	4.18	3.85	2.73	2.73
		18	60	13.85	9.10	11.95	8.24	10.02	7.31	7.94	6.36	5.74	5.40	4.34	4.34
		21	50	15.13	10.71	13.25	9.78	11.30	8.88	9.23	7.95	7.21	7.21	5.94	5.94

TECHNICAL INFORMATION - R410A

	MODEL	AIR ON EC	HUMIDITY % RH	EVAPORATING TEMPERATURE EC											
				-2.5		0		2.5		5		7.5		10	
				TOTAL	SENS	TOTAL	SENS	TOTAL	SENS	TOTAL	SENS	TOTAL	SENS	TOTAL	SENS
LOW FAN SPEED	HLR 460	10	70	5.61	3.95	4.28	3.21	2.92	2.46	1.70	1.70	0.86	0.81	-	-
		12.7	70	7.22	4.74	5.90	3.98	4.54	3.24	3.10	2.50	1.77	1.77	0.92	0.92
		15	70	8.70	5.37	7.38	4.62	6.02	3.90	4.58	3.17	3.02	2.43	1.70	1.70
		18	60	9.79	6.27	8.47	5.54	7.13	4.83	5.68	4.11	4.12	3.39	2.70	2.70
		21	50	10.68	7.19	9.37	6.47	8.02	5.77	6.58	5.06	5.03	4.35	3.68	3.68
	HLR 540	10	70	6.65	4.68	5.07	3.80	3.46	2.90	2.01	2.01	1.01	1.01	-	-
		12.7	70	8.56	5.62	6.99	4.71	5.38	3.83	3.66	2.95	2.08	2.08	1.09	1.09
		15	70	10.30	6.35	8.74	5.46	7.14	4.61	5.42	3.74	3.57	2.88	2.00	2.00
		18	60	11.59	7.43	10.03	6.55	8.44	5.71	6.72	4.86	4.88	4.01	3.18	3.18
		21	50	12.64	8.51	11.09	7.66	9.50	6.82	7.79	5.98	5.96	5.14	4.34	4.34
MEDIUM FAN SPEED	HLR 460	10	70	6.66	4.77	5.07	3.86	3.46	2.97	2.07	2.07	1.04	1.04	-	-
		12.7	70	8.58	5.64	7.00	4.76	5.39	3.90	3.66	3.03	2.15	2.15	1.13	1.13
		15	70	10.34	6.37	8.76	5.50	7.15	4.66	5.42	3.82	3.57	2.96	2.07	2.07
		18	60	11.63	7.47	10.06	6.62	8.46	5.80	6.74	4.97	4.88	4.13	3.30	3.30
		21	50	12.70	8.60	11.14	7.77	9.54	6.96	7.82	6.14	5.97	5.31	4.50	4.50
	HLR 540	10	70	7.88	5.64	6.02	4.56	4.10	3.51	2.45	2.45	1.23	1.23	-	-
		12.7	70	10.16	6.68	8.30	5.63	6.38	4.61	4.34	3.58	2.54	2.54	1.33	1.33
		15	70	12.24	7.54	10.38	6.51	8.47	5.52	6.42	4.51	4.23	3.50	2.45	2.45
		18	60	13.78	8.84	11.93	7.84	10.02	6.86	7.98	5.87	5.78	4.88	3.90	3.90
		21	50	15.04	10.18	13.19	9.19	11.30	8.23	9.26	7.26	7.06	6.27	5.32	5.32
HIGH FAN SPEED	HLR 460	10	70	7.66	5.53	5.84	4.50	3.98	3.49	2.45	2.45	1.23	1.23	-	-
		12.7	70	9.88	6.53	8.06	5.53	6.20	4.56	4.21	3.57	2.55	2.55	1.34	1.34
		15	70	11.91	7.34	10.10	6.38	8.23	5.43	6.24	4.47	4.10	3.50	2.46	2.46
		18	60	13.42	8.65	11.61	7.70	9.74	6.78	7.75	5.84	5.62	4.89	3.92	3.92
		21	50	14.66	10.00	12.85	9.07	10.99	8.17	9.00	7.25	6.86	6.31	5.36	5.36
	HLR 540	10	70	9.13	6.58	6.96	5.35	4.74	4.15	2.91	2.91	1.47	1.47	-	-
		12.7	70	11.78	7.78	9.61	6.58	7.39	5.42	5.02	4.25	3.04	3.04	1.59	1.59
		15	70	14.19	8.75	12.02	7.59	9.81	6.46	7.43	5.32	4.89	4.16	2.93	2.93
		18	60	15.99	10.30	13.83	9.18	11.62	8.07	9.24	6.95	6.70	5.81	4.66	4.66
		21	50	17.46	11.90	15.31	10.80	13.10	9.71	10.72	8.62	8.18	7.50	6.37	6.37

AIRFLOWS HL/HLR UNITS

HL/HLR	Minimum		Medium		Maximum	
	CFM	m³/s	CFM	m³/s	CFM	m³/s
380	805	0.38	1000	0.47	1145	0.54
460	850	0.40	1100	0.52	1400	0.66
540	1000	0.47	1290	0.61	1650	0.78

SOUND PRESSURE LEVELS HL/HLR UNITS

MODEL	Sound Pressure Levels		
	Speed	dBA	NC
380	Min	50	42
	Med	53	47
	Max	57	51
460	Min	47	41
	Med	53	47
	Max	59	53
540	Min	48	42
	Med	53	48
	Max	59	53

Sound Pressure Levels are dB relative to $2 \times 10^{-5} \text{N/m}^2$ and are calculated from the results under anechoic conditions and are quoted as an average of all points on a hemisphere of a radius of 3m away from the centre of the unit.

ELECTRICAL DATA

Electrical Loads (At 230 Volts 50 Hz 1Ph or 400 Volts 50 Hz 3PhN)

HL/HLR

	380	460	540
FAN MOTOR	1.3	1.4	1.6

Recommended Fuse Sizes (R407C systems) When matched with Marstair Outdoor units

The system and its supply/interconnecting wiring must be protected by fuses, preferably High Rupture Current (HRC) motor rated types (to EN 60269) or miniature circuit breakers (to EN 60898) or local codes having similar time lag characteristics, that allow starting of the compressor yet still afford close overcurrent protection under running conditions. The ratings below are for HRC motor rated fuses.

Air Conditioners

HL/HLR + MCU(+)	380 + 90	380 + 100	460 + 100	460 + 130	540 + 130	540 + 165
1 Phase cool only	32	--	--	--	--	--
3 Phase cool only	16	16	16	16	16	20

Heat Pumps

HL/HLR + MHPUE	380 + 90	460 + 100	540 + 130
1 Phase cool only	32	--	--
3 Phase cool only	16	16	20

HL/HLR Installation

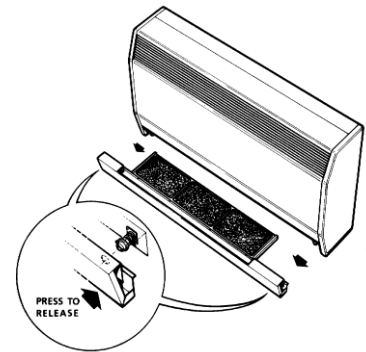
An envelope containing important user information is supplied with the indoor unit. Please pass this to the end user.

Indoor Unit Cabinet Removal

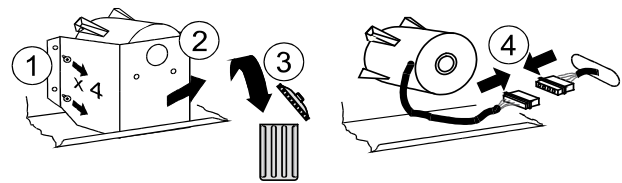
1. Press the filter tray at both sides to spring it and the filter out (Fig.1).
2. Remove the two outer self tap screws then release the quarter turn fasteners.
3. Pivot the cabinet forward from the bottom and lift upwards to clear the chassis top flange and remove, this will reveal the polystyrene fan scrolls which should **NOT** be removed.

	Weight (kg)
HL/HLR 380	61
HL/HLR 460	62
HL/HLR 540	69

Fig. 1.



4. The unit is shipped with a bracket to protect the motor during transit. Remove and discard the bracket, and fit the motor wiring plug and socket as shown.



Mounting

1. It is generally easier to fit kits prior to mounting the unit and brazing the pipework.
2. Ensure that the wall or ceiling will accept the operating weight of the unit.
3. Mark off the mounting holes as Fig.2 and drill holes to suit M6 rawlbolt shields or equivalent fasteners. Allow 130mm minimum from ceiling to holes for cabinet removal on wall mounted units. Allow 150mm at the base plate (wall or ceiling mounted) to maintain design airflows.
4. If a fresh air facility is required, apertures must be prepared as shown in Fig.2. This must be suitably lined and screened on the internal wall to prevent brick dust from entering the unit, (apertures are 35mm high), filters are fitted as standard.
5. Mount the unit and secure the fixings. On ceiling mounted units two extra holes are provided for screws to prevent movement on the keyhole slots.
6. Check the unit is square and level. Use the extra self tap screws to additionally secure ceiling mounted cabinets.

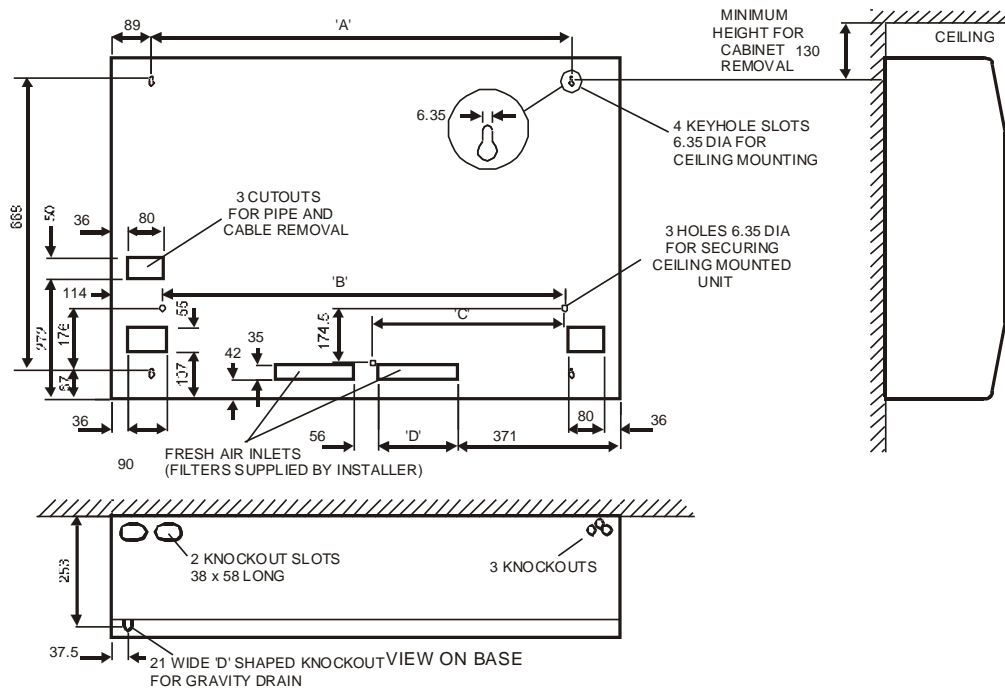


Fig. 2

Model	'A'	'B'	'C'	'D'	No. of air inlets	No. of spaces
HL/HLR 380	961	921	461	250	2	1
HL/HLR 460	1111	1071	536	300	2	1
HL/HLR 540	1311	1271	626	240	3	2

RESTRICTORS

Marstair outdoor units (cool only & heat pumps) are supplied with expansion assemblies and cooling restrictors fitted.

MCU+	90	100	130	150	165
Expansion Assembly Fitted	1/2"				
Restrictor Cooling	0.063	0.068	0.071	0.080	0.082

Heat pump heating

All heat pump units have an additional expansion assembly supplied loose inside the unit. This is to be fitted to some indoor units for heating. Fit the assembly within 10m of the indoor unit in the expansion line.

Note: the refrigerant flow is from indoor and outdoor, opposite to cooling assembly. Placing it directly at the indoor coil may cause increased noise during the heating cycle. No separate check valve is needed. The expansion assembly and line must be fully insulated.

Note: The indoor units listed below are fitted with heating capillary's.
HL380, HL460, HL540

The additional heating expansion assembly (supplied loose in the heat pump unit) is not required.
Retain as a spare.

MHPUE(L)	90	100	130
Expansion Assembly Fitted	1/2"		
Restrictor Cooling	0.065	0.068	0.076
Expansion Assembly Loose	1/2"		
Restrictor Heating	0.058	0.083	0.092

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						

Fitting losses, in equivalent straight lengths of pipe (metres).

1. Use the shortest possible route, avoiding sharp bends.
2. Fully insulate **both** the suction and expansion lines, including the expansion device, since both lines may sweat.

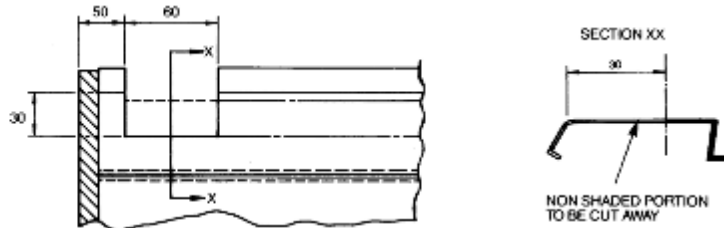
Refrigeration Installation

- The refrigerant connections are terminated on the left hand side of the indoor coil and the lower front of the right end panel on outdoor units; (indoor units are brazed connections, outdoor units are flare fittings).
Units are supplied with the following pipes: (HL are the same as HLR models; MCU+ are the same as MCU models).

	HLR 380	HLR 460	HLR 540	MCU 90	MCU 100	MCU 130	MCU 165	MHPUE 90	MHPUE 100	MHPUE 130
Expansion	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
Suction	5/8"	5/8"	5/8"	5/8"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"

- Using a tube cutter, remove sealed ends of suction and expansion pipes on the indoor unit. This will release a small holding charge of dry nitrogen.
- Pipe exit will normally be via knockouts in the base or cutouts in the back panel.
Alternatives are:
For top left hand exit, turn your pipework through 180° and exit via the gap provided in the back panel. The cabinet will need to be locally notched as Fig. 3 - do not completely cut away as this will weaken the structure.

Fig. 3
Cabinet Cut Away Details for
Top Discharge Pipework



BOTTOM RIGHT HAND EXIT can be achieved by running pipework underneath the scroll attached to the back panel. Remove the lower grille (4 screws) for access, fit suitable lengths of insulation to the pipework and braze in. It is recommended that the liquid and suction lines be kept to 2" and 5/8" respectively until exit, when the full pipe size can be run. Exit is preferably made via notches to be cut to suit in the right hand side panel.

- It is recommended that the drip tray is removed during brazing to prevent it being melted. Remove the top two screws on the front scroll, and remove drip tray and the support bracket together.
- Connect pipework between units ensuring:
 - Only refrigeration quality copper is used.
 - The ends are capped on tubes and parts when not working on them to prevent moisture or dirt entering the system.
 - If pipes are brazed, use a copper phosphorous alloy containing 5% silver, ensuring that dry nitrogen is passed through the components involved to prevent oxidation.
 - The suction and expansion lines are fully insulated, including inside the cabinet of the indoor unit up to the drip deflector. Bend pipework back to ensure it is over the drip tray; if in doubt, use non-drip tape.
 - The system is leak tested and evacuated before final charging.
- If a sight glass is fitted to aid charging it must be positioned before the expansion device on the outdoor unit.

Condensate Drain

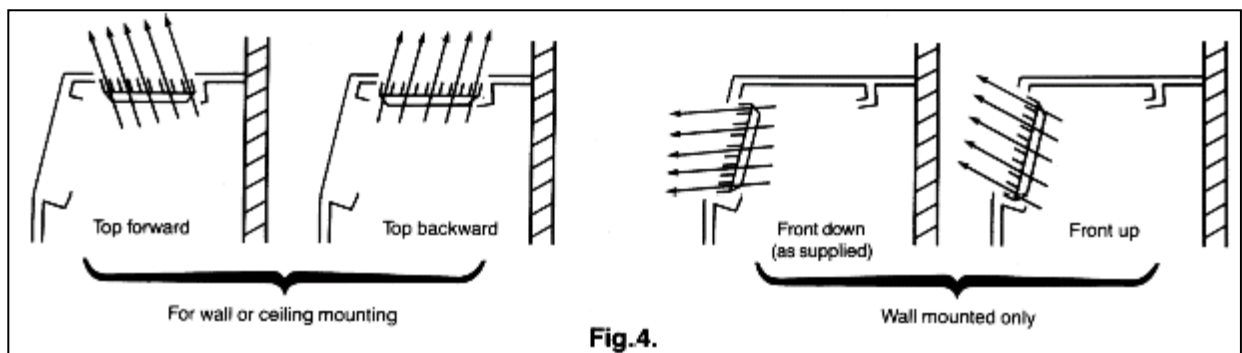
The condensate drain connection is at the left hand end of the drain tray. A 2" O.D. plastic drain pipe is provided in the drain tray sump for connection with non-kink plastic tubing secured with a suitable clip. Should it be necessary for the drain pipe to go through the bottom of the unit a knockout is provided at the left hand end of the 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.

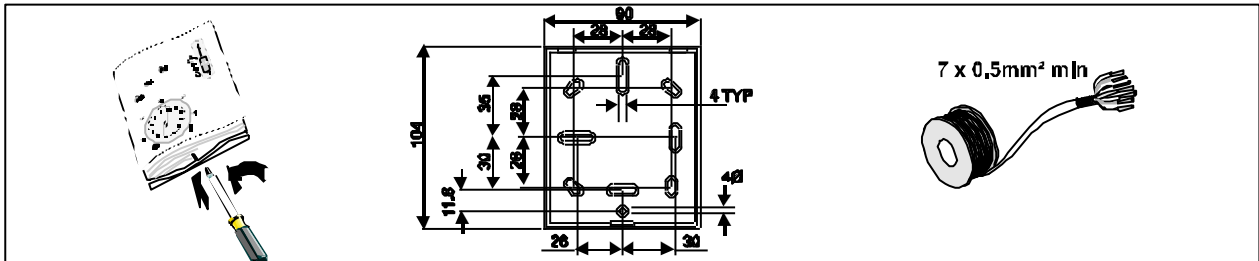
Details of ceiling mounted drain and fitting of optional condensate pump are provided on pages 25 to 27.

Discharge Grille position

The discharge grille is supplied for front down discharge. The alternatives are achieved by:


- Remove and retain grille and blanking panel screws (12 in total).
- Slacken but do not remove all other fixing screws.
- Remove blanking panel.
- Remove grille.
- Slide blanking panel into new position and fix.
- Clip panel location bracket under return edge of blanking panel and screw down into return edge of front panel.

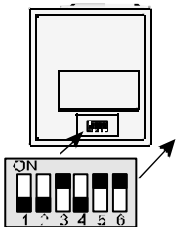




17°C=30°C

27°C=27°C

	ON	Fan control is temperature dependent in all operating modes	Changeover between normal operation and energy saving mode	Changeover activated when contact of switch is closed (NO)	Frost protection disabled	1K in heating mode, 0.5K in cooling mode	2K
	OFF	Fan control in normal operation is temperature independent	Changeover between normal operation and standby	Changeover activated when contact of switch is opened (NC)	Frost protection enabled	4K in heating mode, 2K in cooling mode	5K
	FUNCTION	Fan control	Operating mode changeover via external switch	Action of switch for externally-operated mode changeover	Standby	Switching differential	Dead zone in normal operation



MARCHE	La commande du ventilateur est dépend de la température dans tout les régimes	Commutation entre régime normal et régime d'économie	Commutation activée lorsque le contact est fermé (NO= normalement ouvert)	Contrôle antigel désactivé	1K en régime chauffage, 0.5K en régime refroidissement	2K
ARRET	En régime normal, la commande du ventilateur est indépendante de la température	Commutation entre régime normal et état de veille	Commutation activée lorsque le contact est ouvert (NC= normalement fermé)	Contrôle antigel active	4K en régime chauffage, 2K en régime refroidissement	5K
SIGNIFICATION	Commande du ventilateur	Commutation du régime via un contact externe	Série d'action du contact pour la commutation externe du régime	Etat de veille	Différentiel	Zone neutre en régime normal

ON	Die Ventilatorsteuerung ist in allen Betriebsarten temperaturabhängig	Umschaltung zwischen Normaltrieb und Energiepartrieb	Umschaltung aktiviert wenn Kontakt geschlossen (NO=normal offen)	Frostschutzfunktion gesperrt	1K im Heibetrieb, 0,5K im Khlbetrieb	2K
OFF	Die Ventilatorsteuerung ist im Normaltrieb temperaturunabhngig	Umschaltung zwischen Normaltrieb und Betriebsbereitschaft	Umschaltung aktiviert wenn Kontakt offen (NO=normal geschlossen)	Frostschutzfunktion freigegeben	4K im Heibetrieb, 2K im Khlbetrieb	5K
BEDEUTUNG	Ventilatorsteuerung	Betriebsarten-Umschaltung ber einen externen Kontakt	Wirkung des Kontaktes fr die externe Betriebsarten-Umschaltung	Betriebsbereitschaft	Schallferenz	Totzone im Normalbetrieb

1	2	3	4	5	6
---	---	---	---	---	---

ELECTRICAL CONNECTIONS

Supply, control and connecting cables are fitted by the installer.

Installer wiring should be carried out in accordance with local and national codes.

Cables must be size compatible with the recommended fuse for a given system. (See page 7 for fuse ratings).

A double pole isolator switch should be positioned adjacent to the indoor unit.

The equipment must be earthed.

Systems should have the supply taken to the outdoor unit; a single phase supply (L1), is run back to the indoor unit.

Power should be connected to the outdoor unit for 4 hours to allow the lubricating oil to be heated prior to compressor start up.

INDOOR UNIT WIRING

The connections for internal wiring for indoor units are made at the right hand side of the unit. Mains supply should be routed to the terminal blocks in the unit through the slots behind the fan motor if brought from below.

Cable grips are provided above the terminal block to give a secure installation.

Note that the electrics assembly can be quickly removed if required by removing 2 screws from the evaporator flange and springing the electrics mounting plate free of locating slots in the rear panel. These screws and washers form the earth connection to the air handler and must be securely re-fitted.

Make sure all connections are secure and all wires are clear of rotating parts. Interconnect as shown on pages 21 to 23.

CONVERSION OF HLR INDOOR UNIT FOR AIR CONDITIONER USE

The HLR indoor unit is supplied wired for use as a heat pump.

For air conditioner mode, remove the pink link between relay 1 terminal 14 and relay 2 terminal 22.

OUTDOOR UNIT WIRING

Cable entry for the outdoor unit electrics is through the cabinet to a terminal block.

MCU+, MHPUE and DCUE units are supplied wired via a head pressure controller to give maximum control. Ensure that all connections are secure and that both units are earthed.

MCU unit fan motors have a high speed (black) wire and a low speed (red) wire; the speed not being used is wired into a dummy terminal. They are supplied wired for low fan speed, which is suitable for temperate climates. If continuous running is expected at ambient temperatures of 35°C or higher, change to high speed by interchanging the black and red wires, i.e. black to fused terminal, red to terminal 4 (single fan units) or terminals 4 and 8 (double fan units).

SCROLL COMPRESSOR ROTATION

On 3 Phase units it is possible for the scroll compressor to run backwards. This becomes obvious on start up; the compressor will not develop a normal running pressure differential and the top will not become warm. It may be excessively noisy. If this happens, switch off the mains power and exchange any two of the phases supplying the unit. This will correct the rotation of the compressor.

DATA PLATES

Because of the ability to match indoor and outdoor units, the data plates only give information on either an indoor or outdoor unit. To obtain the system details, input power and currents from indoor and outdoor units should be added.

FIRE LINK

In order to automatically switch off the fan in the event of a fire, it is necessary to fit an external switch (240V, 3A, closed to run, volt free contact) to:-

HLR units: in the installer wire between terminal block terminal 2 and the Marstair remote control thermostat terminal 2(96000320) or L (97200211)

HL units: in the internal (black) wire between the fuse and rotary switch terminal 'd'. This external switch should be operated by the building's fire alarm or BMS system.

EVACUATING

Connect a vacuum pump to the service ports on the outdoor unit valves and evacuate the interconnecting pipework and indoor unit to 1000 microns (1 Torr) or better and allow to be held for a minimum of 15 minutes.

After evacuating the indoor unit and interconnecting pipework, open the outdoor unit valves using a 5mm Allen key. The high and low side pressures should equalise within a minute.

Run the system for a few minutes to allow it to stabilize.

If a manual HP cutout is fitted, ensure that the reset button is depressed (in the compressor compartment, outdoor unit).

MHPUE units: if no extra refrigerant is to be added **REMOVE** link **JP6** (in the electrics box, outdoor unit, identified by a white label), otherwise the unit will always run at full speed.

ADDING REFRIGERANT

Each outdoor unit is charged with refrigerant, as below:-

		MCU(+) 90	MCU(+) 100	MCU(+) 130	MCU(+) 165	MHPUE 90	MHPUE 100	MHPUE 130
FACTORY CHARGE (g) (sufficient for up to 7.5m runs at UK conditions)	R407C	2060	2520	4170	4540	2260	3380	4470
New 17 Series Condensing Units	R407C	1422	1882	3075	3445			

1. Ensure the refrigerant being added is the same refrigerant that the system was originally charged with.
2. Refrigerant should be introduced with the system in the **AIR CONDITIONING MODE** (including heat pumps).
3. Refrigerant should be charged through the Schrader valve on the indoor unit, or the service port on the suction service valve on the outdoor unit.
4. Indoor and outdoor units should be run at maximum fan speed during charging:

Set the indoor unit to operate in cooling mode at maximum speed.

MHPUE are supplied with link JP6 fitted on the outdoor unit pcba; this is only for charging, overriding alarms and running the MHPUE fan at maximum speed during the charging process.
(Do not forget to remove it once charging is complete: see 10)

MCU+ outdoor units are fitted with head pressure control; before charging, isolate the unit and transfer the blue wire on the head pressure control from terminal 4 to terminal 1.
(Do not forget to transfer it back once charging is complete: see 10)

5. All systems with pipe runs longer than 7.5m (UK or NEMA) require added refrigerant.
As a guide, add:- 1/2" Expansion line add 30 g/m; 5/8" Expansion line add 48 g/m.
6. Further refrigerant needs to be added if the system is to be run at NEMA conditions (27°C/19°C indoor, 35°C ambient) :-

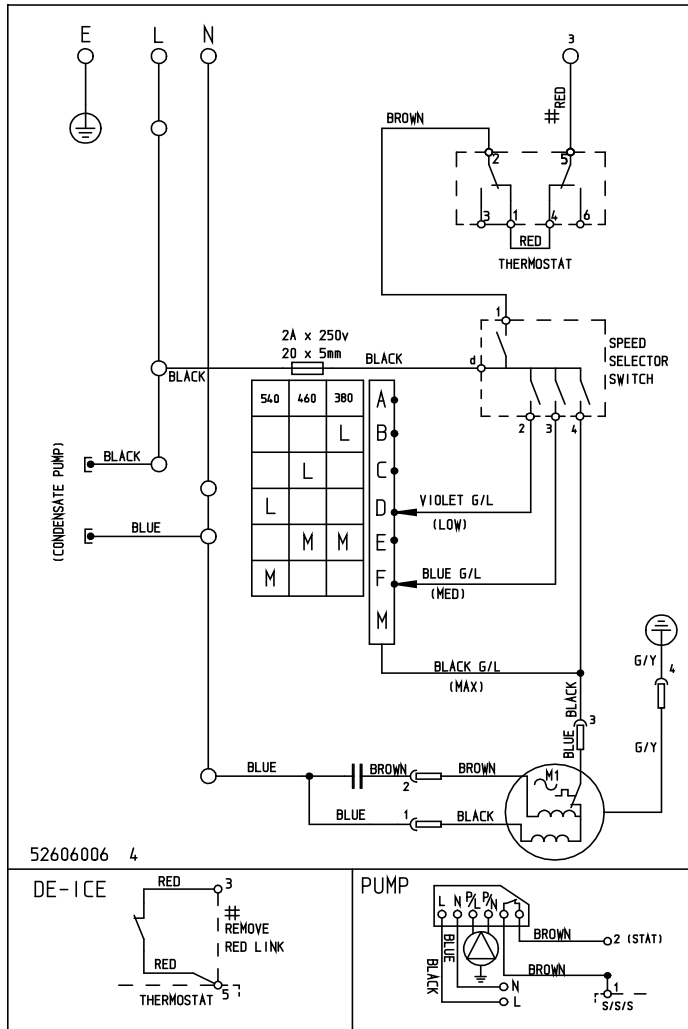
		MCU(+) 90	MCU(+) 100	MCU(+) 130	MCU(+) 165	MHPUE 90	MHPUE 100	MHPUE 130
Extra refrigerant required for NEMA conditions (g)	R407C	115	145	250	200	180	250	200

7. Run the system for a few minutes to allow it to stabilize.
8. If a sight glass is fitted, it should be just clear of bubbles (flooded).
9. Indications of incorrect charge are:-
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.
10. **MHPUE** units: once refrigerant has been added, **REMOVE** link **JP6** (in the electrics box, outdoor unit, identified by a white label), otherwise the unit will always run at full speed.

MCU(+) units: once refrigerant has been added, transfer the blue wire on the head pressure control back from terminal 1 to terminal 4.

11. **MHPUE** units: 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 incorporating MHPUE units, or MCU(+) units fitted with a 3 minute timer kit.

HL WIRING DIAGRAM

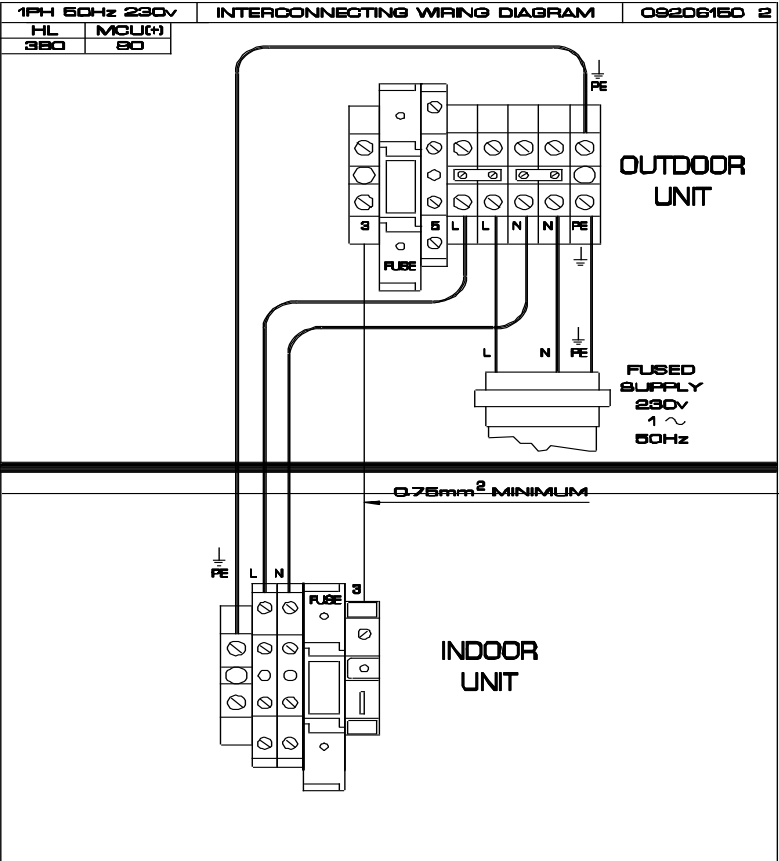


HLR WIRING DIAGRAM

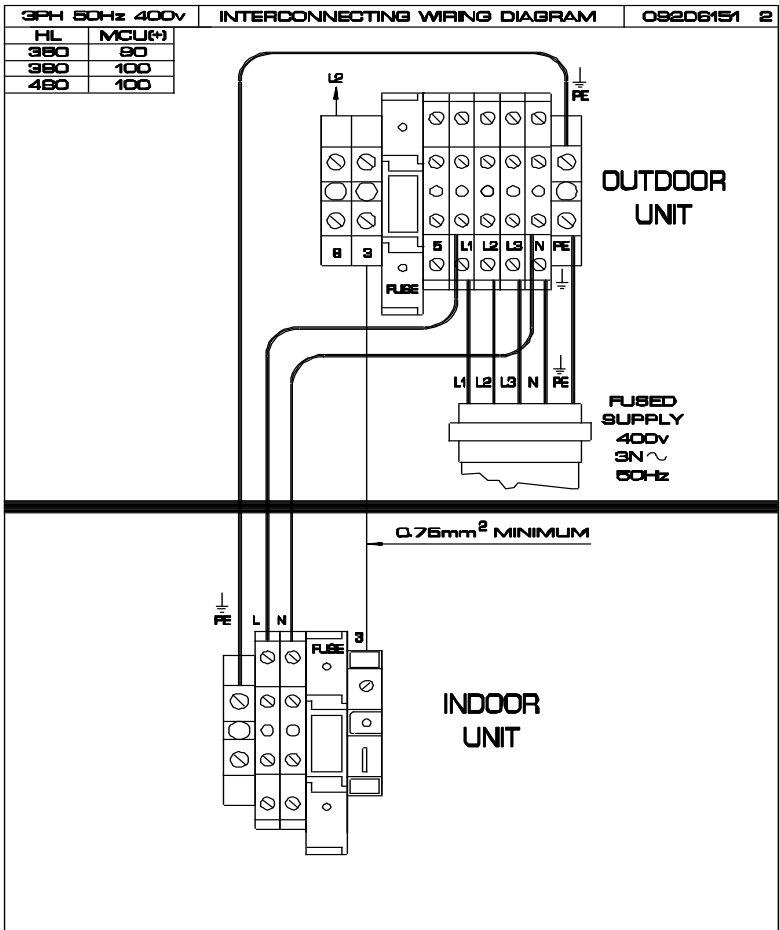


HL INTERCONNECTING WIRING DIAGRAMS

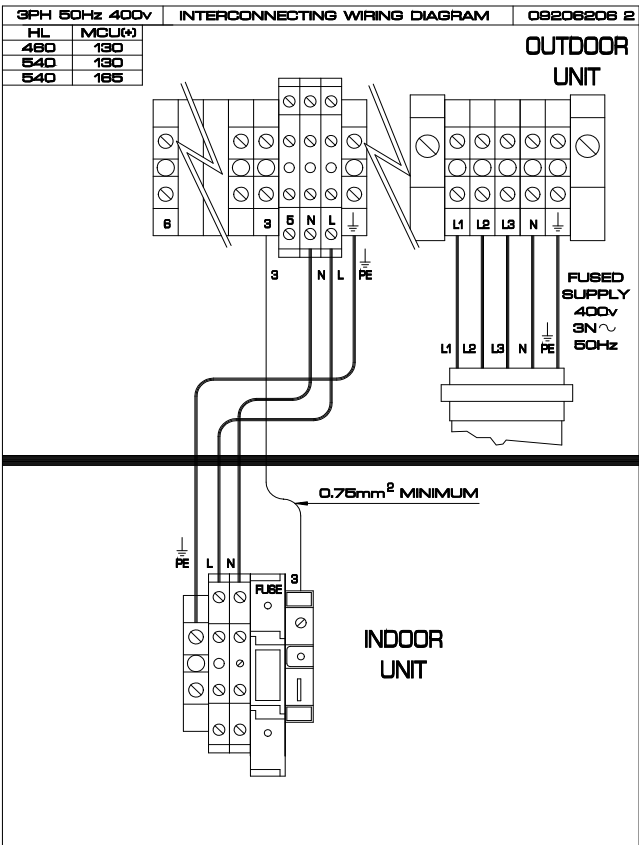
HL 380 + 1 Phase MCU(+)
90



HL 380 to 460 + 3 Phase MCU(+)
90 to 100



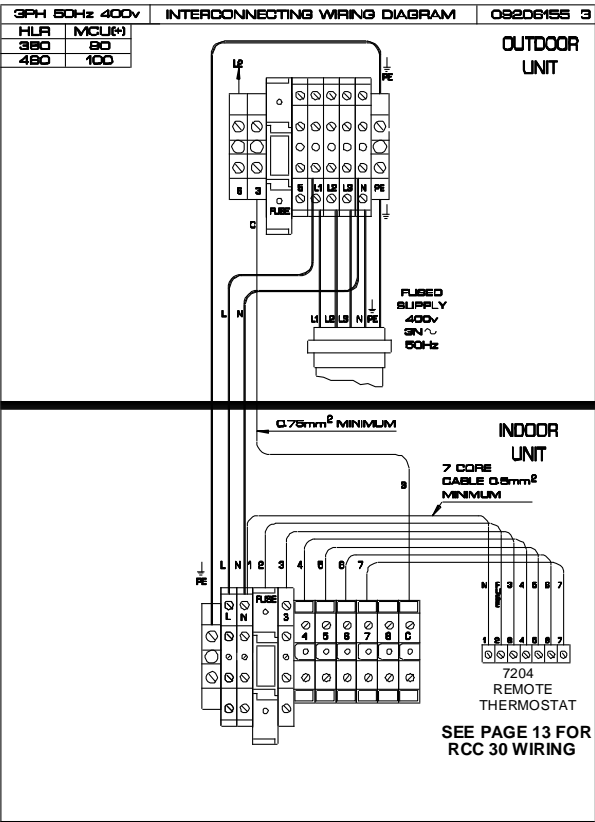
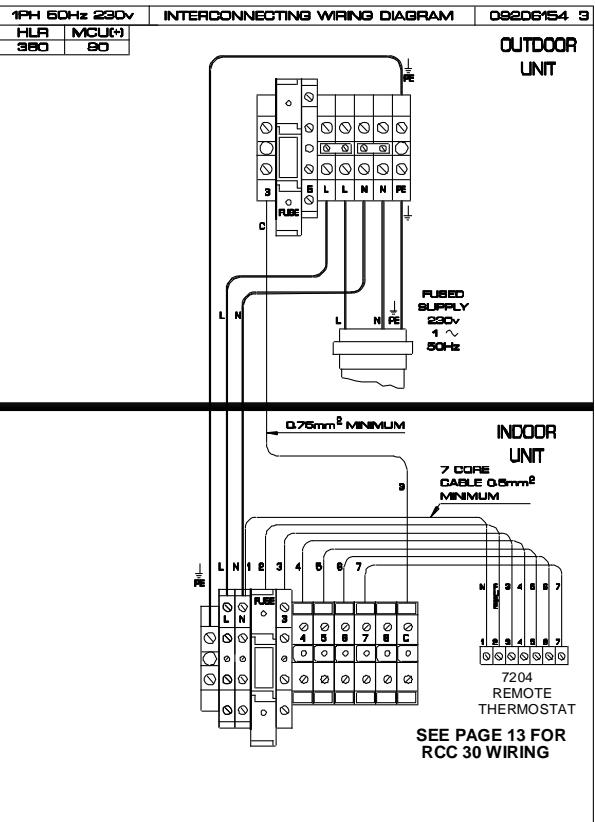
HL 460 to 540 + 3 Phase MCU(+)
130 to 165



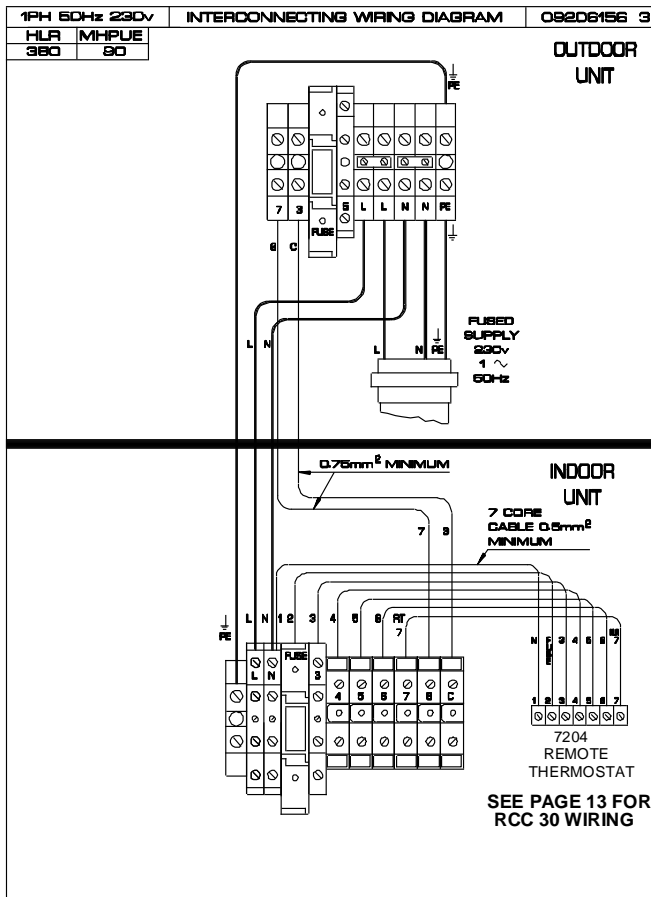
HLR INTERCONNECTING WIRING DIAGRAMS

HLR 380 + 1 Phase MCU(+)
90

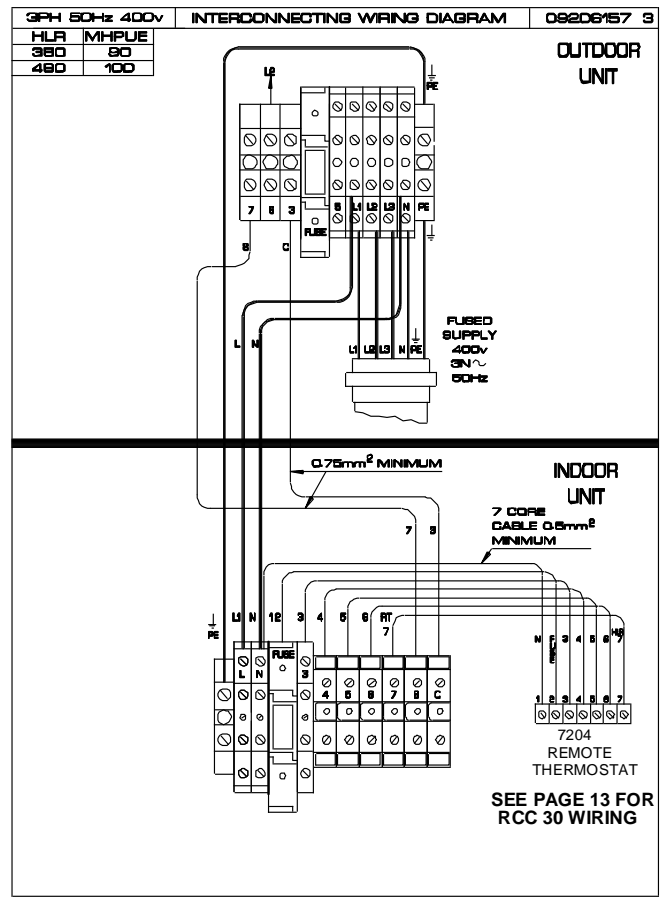
HLR 380 to 460 + 3 Phase MCU(+)
90 to 100



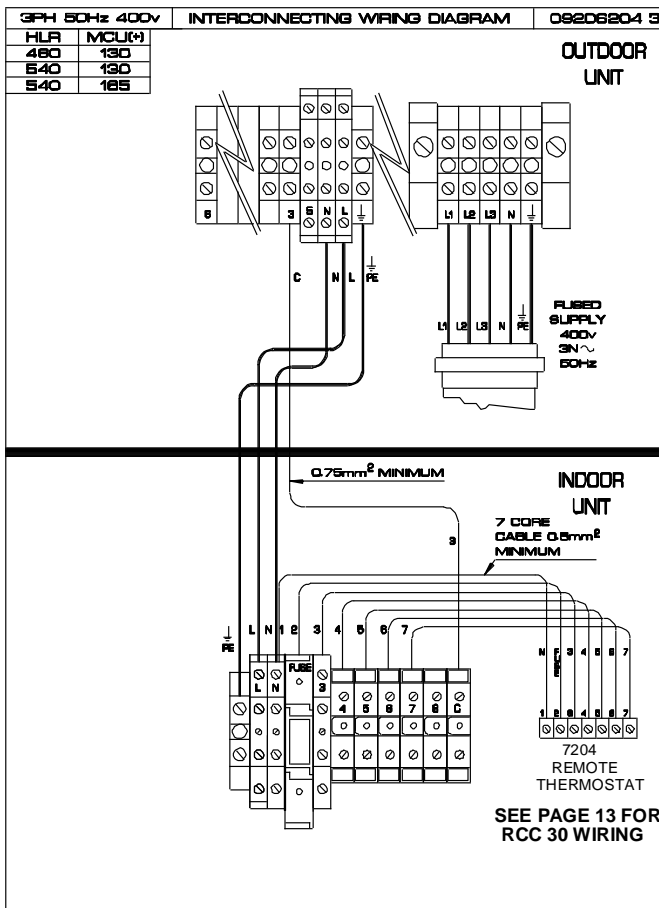
HLR 380 + 1 Phase MHPUE 90



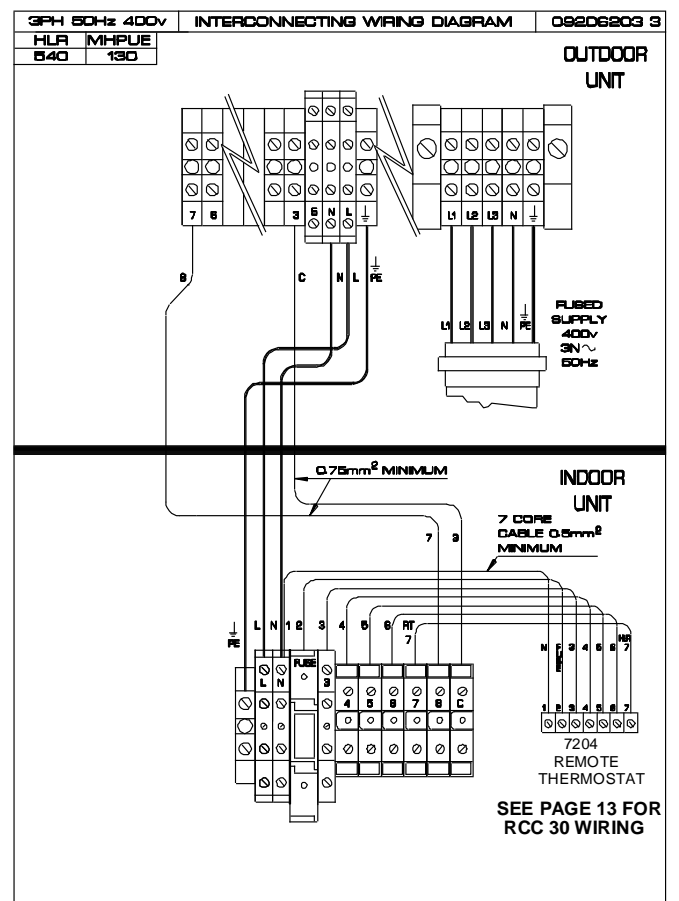
HLR 380 to 460 + 3 Phase MHPUE 90 to 100



HLR 460 to 540 + 3 Phase MCU(+) 130 to 165



HLR 540 + 3 Phase MHPUE 130



HL OPERATING INSTRUCTIONS (using Speed Selector Switch and Thermostat)

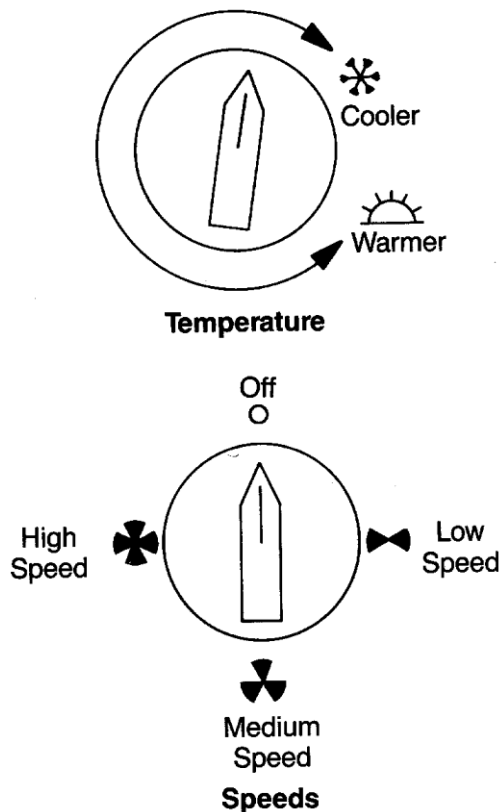
The switches to operate the fan speed and thermostat control are located on the right hand side.

The upper knob selects temperature, which is automatically controlled by an internal thermostat that senses return room air.

Lower room temperatures can be maintained by turning the knob clockwise, further towards the snow flake. (Minimum is approximately 19°C room temperature).

Similarly, higher room temperatures can be maintained by turning the knob anticlockwise, further towards the sun.

The lower knob selects the fan speed required, or the Off position.

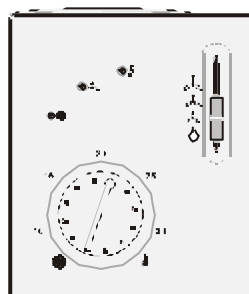


Knob Position		Effect
Upper	Lower	
Any	Off	Unit Switched Off
As Set	Minimum fan speed icon	Minimum fan speed with auto control for normal room temperature and lowest sound level
As Set	Medium fan speed icon	Medium fan speed with auto control
As Set	Maximum fan speed icon	Maximum fan speed giving rapid change of room temperature

HLR OPERATING INSTRUCTIONS FOR 97200211 (RCC30)

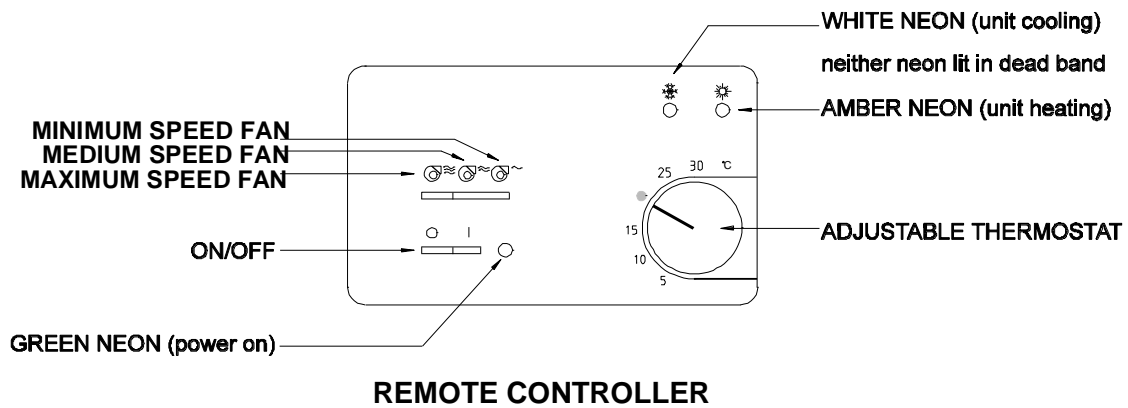
Neon lit in heating
 Neon lit when fan runs
 Neon lit in cooling

17-30°C



MAX
 MED
 MIN
 Off (standby)

HLR OPERATING INSTRUCTIONS FOR 96000320 (7204)






Controls to operate the fan speeds and thermostat are on the front face of the controller.

ON/OFF AND FAN SPEEDS

The switches on the left hand side control the ON/OFF and fan speed operations.

The lower left hand switch is the ON/OFF control. The green neon is lit when the switch is 'ON'.

The upper left hand switch operates the fan speeds.

The fan speed switch gives minimum fan speed at position , medium fan speed at position  and maximum fan speed at position .

TEMPERATURE CONTROL

The right hand knob selects temperature, which is automatically controlled by the thermostat in the remote control housing; the range is factory set from 17°C to 30°C.

By turning anti-clockwise, lower room temperatures are maintained; by turning clockwise, higher temperatures.

The white neon is lit when the unit is in cooling mode.

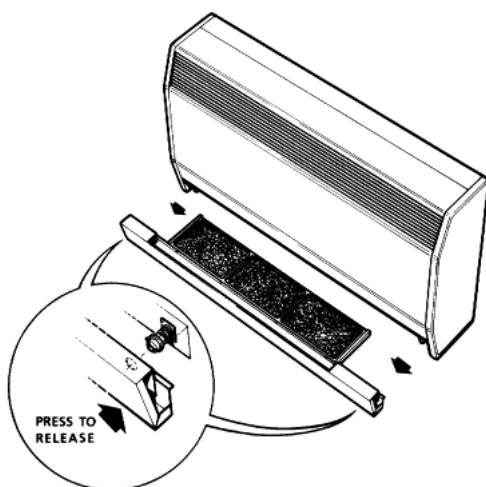
The amber neon is lit when the unit is in heating mode (if the system includes a heat pump outdoor unit).

Neither neon is lit when the thermostat is between cooling and heating.

User Maintenance

Isolate at the mains before commencing any maintenance work.

In order to maintain maximum efficiency it is important that the filter behind the return grille is cleaned regularly; this will normally be every two to three weeks.



SWITCH OFF THE UNIT AND ALLOW THE FAN TO STOP

Remove the filter from the housing.

Wash the filter (in tepid water) and dry before use.

Alternatively tap the filter gently to remove dust or vacuum clean.

THE UNIT SHOULD ALWAYS BE USED WITH A FILTER. FAILURE TO DO SO WILL CAUSE A DECLINE IN UNIT PERFORMANCE AND MAY RESULT IN MALFUNCTION.

We recommend that in order to prolong the life and maintain performance of your 'Marstair' units you arrange a regular service contract with your TEV Ltd. installer/dealer.

CEILING MOUNTING KITS - 52600230 to 233

This kit converts HL (526) and HLR (527) indoor units for ceiling mounting.

ITEM	QTY	DESCRIPTION
1	1	Ceiling Mounting Drip Tray
2	1	Left Hand Sealing Plate
3	1	Right Hand Sealing Plate
4	2	Latch for Filter Carrier

ITEM	QTY	DESCRIPTION
5	1	No. 10 x 1/2" Screw
6	1	Sensor Bracket

Ceiling mounted units can only have top discharge on the air off grille.



- 1 Remove the filter tray, release the fasteners and lift off the cabinet.
- 2 Remove and keep the 4 off No. 10 x 3/8" screws securing the insulation plate to the sealing plates and the 6 off No. 10 x 3/8" screws securing the sealing plates to the coil. Transfer the six grommets from the old sealing plates to the new sealing plates.
- 3 With the black faces of the new sealing plates innermost, secure them to the coil using 6 off No. 10 x 3/8" screws.

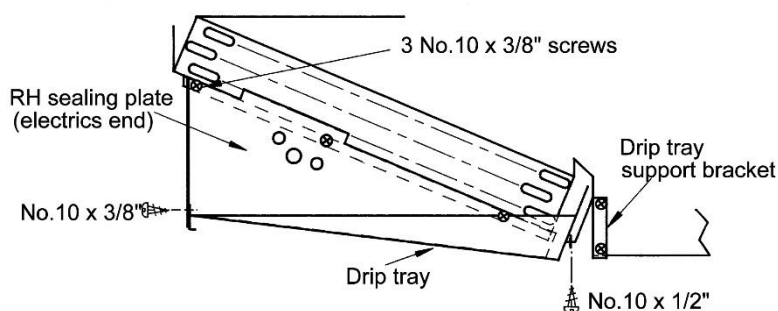


Fig. 1.

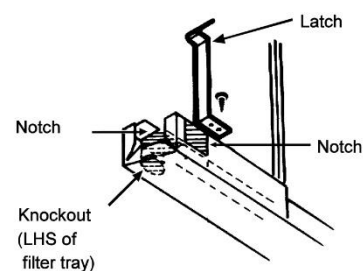


Fig. 2.

- 4 Remove the three No. 10 x 3/4" screws from the ends of the drip tray support bracket and extract the plastic drip tray.
- 5 Secure the indoor unit in position and braze all pipework
- 6 Fit the drip tray so that the rear flange is held in position by the drip tray support bracket and refit the three No. 10 x 3/4" drip tray support bracket screws, (Fig. 1).
- 7 Use two of the retained No. 10 x 3/8" screws to secure the drip tray to the lugs at the front of the sealing plates. Use the No. 10 x 1/2" screw provided in the kit to secure the centre of the rear flange to the centre of the drip tray support bracket, (Fig. 1).
- 8 If a gravity drain is to be used, pull off the plastic cap from the drain spout, ensure that the drain pipe is kept as low as possible within the unit and has a constant fall to an open drain. A knockout is provided in the filter tray for cabinet exit.
- 9 Using four No. 6 x 3/8" screws, secure the two filter carrier retention latches to the rear of the filter carrier, (Fig. 2).
- 10 Leak test the drip tray and ensure the effectiveness of the gravity drain, (if fitted), before refitting the cabinet; use the quarter turn fasteners and self tapping screws for additional security. Press the latches towards the filter to fit/release the filter tray

CONDENSATE PUMP KIT 52600240

This kit is for use on all HL/HLR units for the removal of condensate where gravity drain is not practicable or desirable.

The pump is capable of overcoming a resistance equivalent to 5 metres lift.

The sensor is arranged so that residual condensate in the sump is kept to a minimum.

The kit includes an overflow protection circuit which will prevent further cooling and condensate production if a high condensate level occurs.

ITEM	QTY	DESCRIPTION
1	PUMP ASSEMBLY CONSISTING OF:	
	1	Pump
	2	Grommet
	2	Hose
	1	Green/Yellow Cable
	1	Bracket
	1	Connector
	2	Cable Tie

ITEM	QTY	DESCRIPTION
2	CONTROL BOARD ASSEMBLY CONSISTING OF:	
	1	Control Board
	4	Mounting Foot
	1	Plastic Cover
3	4	Cable Tie
4	2	No. 6 Screw
5	1	Sensor Block (with filter)

It is preferable to fit this kit prior to installing the unit; the following instructions refer to bench fitting.

ISOLATE THE SYSTEM ELECTRICALLY PRIOR TO INSTALLATION OF THIS KIT

WALL MOUNTED UNITS

- 1 Remove the filter tray, release the fasteners and remove the cabinet, (Fig. 1).
- 2 Locate and secure the pcb assembly in the left hand hanger bracket, (Fig. 2).
- 3 Remove the rubber boots from the black and blue cables running across the front of the unit and connect to the pcb, black to L, blue to N.
- 4 Cut the loop of the red cable (brown on HL units) running across the front of the unit, bare back by 5mm and connect to terminal TB1 on the pcb.
- 5 Using 2 x No. 6 screws, supplied loose, secure the pump/bracket assembly to the left hand hanger bracket at the angle shown in Fig. 2. **Use one of the screws to connect the earth (green/yellow) cable ring terminal between the pump bracket and the hanger bracket.**
- 6 Ease off the edge clips and remove the sensor bracket from the drip tray. The sensor/filter assembly is supplied fitted to a transition bracket.
 - a If the unit has been supplied with a **sensor bracket with screws fitted**, align the holes in the transition bracket with those in the sensor bracket and connect together with the No. 6 screws (Fig. 3a).
 - b If the unit has been supplied with a **sensor bracket with notches (no screws) fitted**, unhook the sensor/filter from the transition bracket and discard the transition bracket. Hook the sensor/filter to the unit sensor bracket (Fig. 3b).
- 7 Refit the sensor bracket.
- 7 Push the bottom hose from the pump onto one of the sensor spouts.
- 8 Connect the red cables from the pump onto the pcb terminals P/L and P/N. Secure the plastic pcb cover to the red cables.
- 9 The pump top hose is supplied fitted with a connector suitable for joining to 8mm bore plastic hose to give condensate outlet. If 1/4" diameter copper is to be used, the connector should be discarded and the hose pushed directly onto the copper for at least 20mm, and be secured with a cable tie.

NOTE: If the condensate outlet pipe bore is less than 8mm and the outlet is below the level of the sump, syphoning may occur which will lead to noise on pumping. To ensure quiet running fit an air break no further than 200mm below the level of the drain tray by pumping into a larger diameter pipe than that from the pump.

- 10 See opposite for application and testing.

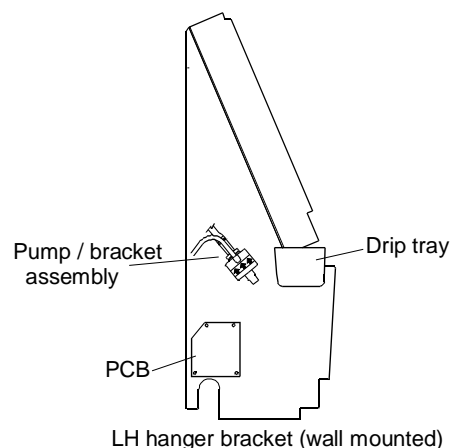
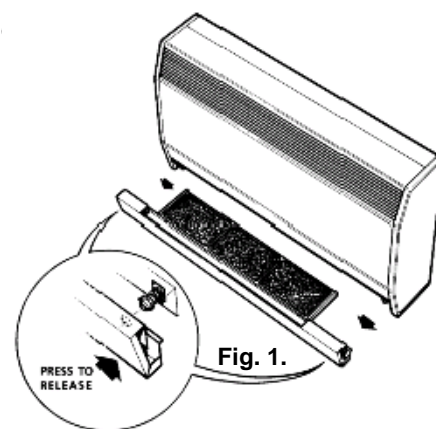


Fig. 2.

Fig. 3a.

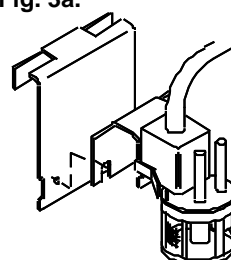
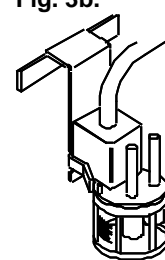


Fig. 3b.



CEILING MOUNTED UNITS

- 1 Remove the filter tray, release the fasteners and remove the cabinet, (Fig. 1).
- 2 Locate and secure the pcb assembly in the left hand hanger bracket, (Fig. 4).
- 3 Remove the rubber boots from the black and blue cables running across the front of the unit and connect to the pcb, black to L, blue to N.
- 4 Cut the loop of the red cable (brown on HL units) running across the front of the unit, bare back by 5mm and connect to terminal TB1 on the pcb.
- 5 Using 2 x No. 6 screws, supplied loose, secure the pump/bracket assembly to the left hand hanger bracket at the angle shown in Fig. 4. **Use one of the screws to connect the earth (green/yellow) cable ring terminal between the pump bracket and the hanger bracket.**
- 6 Remove the sensor bracket from the ceiling mounted drip tray. The sensor block is supplied fitted to a transition bracket. Hook this bracket onto the two screws in the sensor bracket and fasten the screws. Refit the sensor block to the drip tray.
- 7 Push the bottom hose from the pump onto the sensor spout.
- 8 Connect the red cables from the pump onto the pcb terminals P/L and P/N. Secure the plastic pcb cover to the red cables.
- 9 The pump top hose is supplied fitted with a connector suitable for joining to 8mm bore plastic hose to give condensate outlet. If 1/4" diameter copper is to be used, the connector should be discarded and the hose pushed directly onto the copper for at least 20mm, and be secured with a cable tie.

NOTE: If the condensate outlet pipe bore is less than 8mm and the outlet is below the level of the sump, syphoning may occur which will lead to noise on pumping. To ensure quiet running fit an air break no further than 200mm below the level of the drain tray by pumping into a larger diameter pipe than that from the pump.

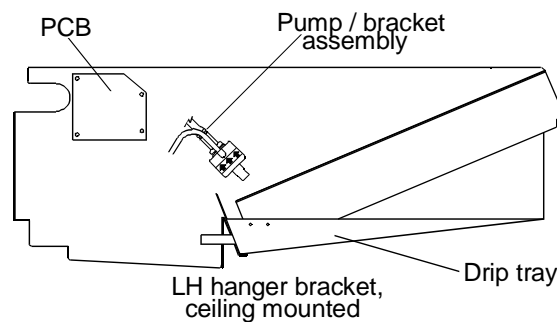


Fig. 4.

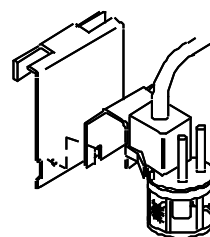


Fig. 5.

TESTING THE PUMP AND CONTROL

- a Connect a suitably fused supply to the unit (refer to the unit installation instructions). Allow approximately one minute for the controls and sensor to stabilize.
- b Slowly add water to the condensate tray sump until the pump runs. Initially the pump will be noisy until the air in the hose has been expelled. It is possible that, on this first cycle, the pump will run dry for a short period (indicated by noise).
- c Add more water to the sump and the pump will cycle in the normal manner.
- d With the system in cooling mode, continue adding water to the sump until it reaches the higher of the sensor probes. The cooling cycle will shut down, and the pump continue to run, until the water has dropped below the level of this probe.

NOTE: Whenever the electrical supply to a unit fitted with a condensate pump and controls is interrupted, a delay of up to 1 minute will occur before the compressor or the pump will start when the supply is reinstated.

TROUBLE SHOOTING

Unit will not cool

Pump does not run

Cooling is interrupted

Excessive pump noise

No mains supply to the control board.
 Fuse on control board blown (315 mA x 20mm)
 Sensor disconnected from control board
 Restriction in pump flow allowing level to rise and trip overflow circuit
 Check for blockage or kink in hoses.
 Condensate at high level -- tripping overflow circuit
 Filter blocked -- remove and clean
 Air leak in hoses and/or joints
 Pumping without water in sump -- control board fault
 Loose connection between sensor and control board
 Loose fuse, intermittent mains supply to control board.
 Debris in pump or bottom hose
 Water syphoning due to lack of air break

Application Notes

- 1 The pump will work against a 5m head. Flow rate is highest with minimum head.
- 2 Long lengths of drain pipe should not be exposed to the outdoor ambient, otherwise freezing of condensate may occur during winter operation.
- 3 It is not advisable to have the outlet of the drain well below the position of the pump, otherwise the syphon effect may open the pump valves.
- 4 For normal applications, i.e., where the drain is level or above the pump or within 3 feet below it, no extra check valves are needed; the pump has its own internal check valves.
- 5 Ensure that no hose is kinked, as this could seriously affect the pump performance.

LOW PRESSURE HOT WATER COIL KIT

This kit provides LPHW heating for HL (526) and HLR (527) indoor units.

A control valve is not provided in this kit.

Since the coil is upstream of the evaporator, a de-ice thermostat is not necessary on the LPHW coil. It is, however, highly recommended to fit a de-ice thermostat to the evaporator to protect the LPHW coil.

UNIT SIZE	KIT PART NUMBER
HL/HLR 380	52600227
HL/HLR 460	52600226
HL/HLR 540	52600224

Item	Qty	Description
1	1	LPHW coil assembly
2	7	Grommet strip

Fitting the LPHW coil is best done prior to installing the unit.

- 1 Remove the unit cabinet and lay the unit on its backpanel.
- 2 Remove the three No. 10 electrics tray retaining screws and spring the tray free.
- 3 Remove the four No. 10 evaporator coil retaining screws and lift the coil away complete with sealing plates and the insulation plate.
- 4 Remove and discard the blanking plate from the left hand hanger bracket.
- 5 Remove the tape covering the slots in the right hand hanger bracket and fit the grommet strips in place, (Fig. 1).
- 6 Position the end of the LPHW coil into these slots and secure the left hand end plate to the left hand hanger bracket, (Fig. 2).

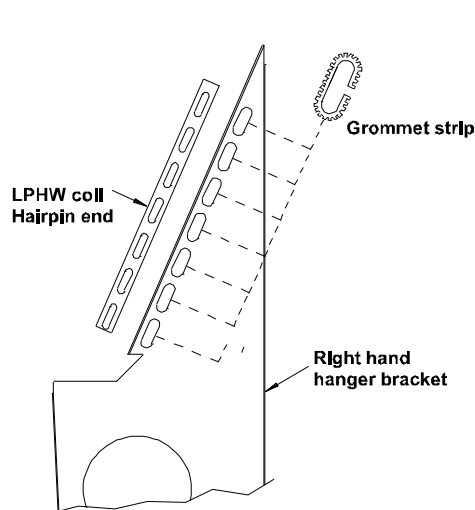


Fig. 1.

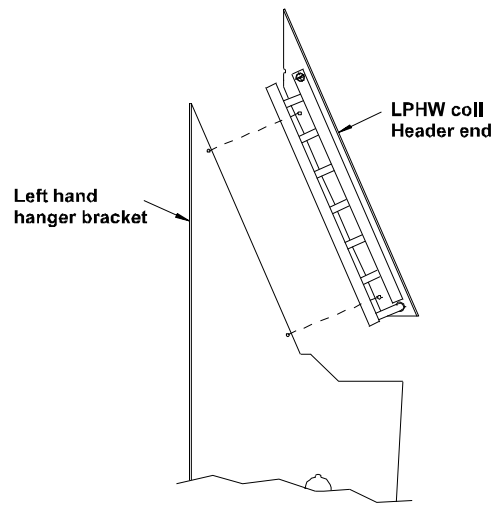


Fig. 2.

- 7 Replace the evaporator assembly and electrics plate.
- 8 If a valve is to be fitted, connect to the indoor unit as shown in either Fig. 3, (HL) or Fig. 4, (HLR).

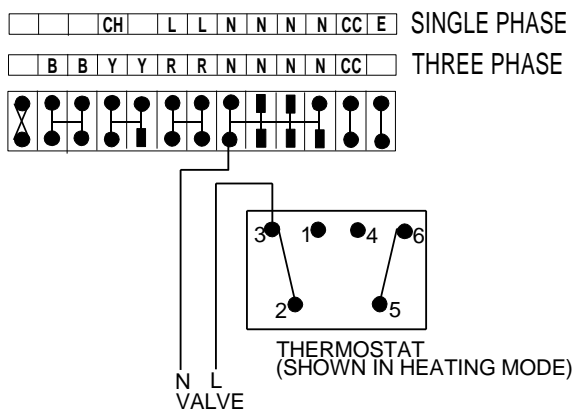


Fig. 3 526 Models

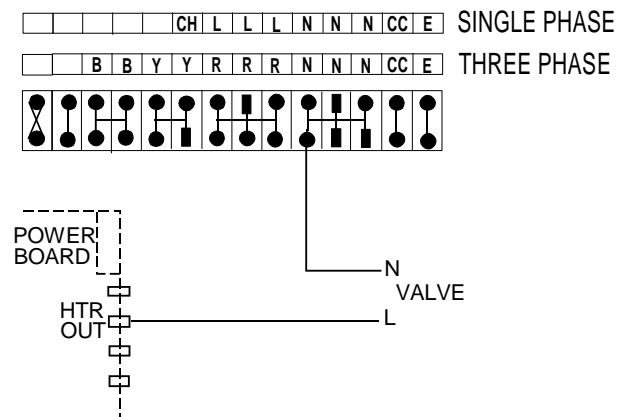


Fig. 4 527 Models.

EVAPORATOR DE-ICE THERMOSTAT KIT 52600242

This kit stops the compressor running during cooling mode if the indoor coil starts to ice up, (due to lack of charge, blocked filter or over condensing).

This kit **MUST** be fitted to all HL/HLR units with LPHW coils fitted, to provide protection against the hot water system freezing.

ITEM	QTY	DESCRIPTION
1	1	De-ice Thermostat
2	1	Mounting Bracket
3	1	Red Cable

ITEM	QTY	DESCRIPTION
4	2	Nº10 x 3/8 Screw
5	2	Cable Tie
6	2	Cable Clamp

ISOLATE THE UNIT ELECTRICALLY PRIOR TO INSTALLATION OF THE KIT.

- 1 Remove the filter tray (Fig. 1), release the cabinet retaining screws and remove the cabinet.
- 2 Screw the thermostat to the left hand hanger bracket using the 2 x Nº10 x 3/8 Screws.
- 3 Insert the thermostat phial into the hole in the left hand end of the fin block to a depth of at least 150mm; neatly coil the excess capillary without kinking it.
- 4 Route the cables along the ledge beneath the drip tray using the self adhesive cable clamps to secure them; pass the cables through the flexi-grommetted hole into the electrics tray.
- 5 The cables are supplied to suit HL/HLR 540 models. On all other models, gather the excess cable and secure neatly with a cable tie.
- 6 **For HL units:** Refer to Fig. 3. Remove and discard the red cable between the heat/cool thermostat terminal 5 and the terminal block. Cut the termination off the end of one of the de-ice thermostat cables and bare back by approximately 10mm to allow it to fit terminal 3. Connect the other cable to the heat/cool thermostat terminal 5.
- 7 **For HLR units:** Refer to Fig. 4. Remove and discard the black cable as indicated. Connect the de-ice thermostat cables across the vacated terminals.

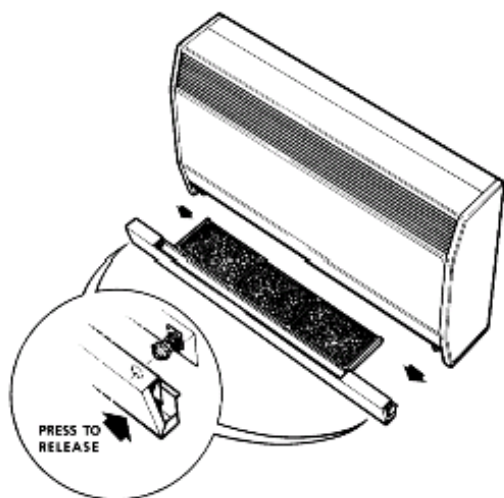


Fig. 1.



Fig. 2.

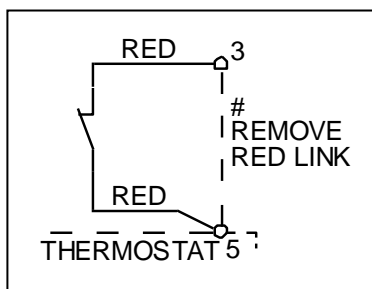


Fig. 3.

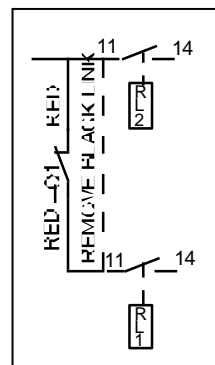


Fig. 4.

FAULT FINDING

	CONDITION	POSSIBLE CAUSE	ACTION
A	Indoor fan motor will not run	No electric supply at socket or switched fuse box	Check fuse rating and replace if necessary. Check for loose electrical connections
		Unit wiring fault	Check wiring and connections
		Fan motor capacitor defective	Replace if faulty
		Fan motor defective	Replace if faulty
		Internal fuse blown	Clear fault and replace fuse
B	Inadequate cooling or heating	Dirty evaporator fins/filter	Clean if blocked
		Evaporator motor not running	As in section A
		Refrigerant shortage or excess	Check for leaks. Repair, evacuate and recharge or check for high head pressure and recover refrigerant if necessary
		Faulty thermostat or incorrectly set	Replace if faulty
		Dirty condenser	Clean if necessary
		Faulty compressor	Replace
		LP cutout circuit open (if fitted)	Check as refrigerant shortage or excess
C	Compressor and outdoor fan motor will not run	LP cutout circuit open (if fitted)	Check as above
		No electric supply at socket or switch fuse box	Check fuse rating and replace if necessary. Check for loose electrical connection.
		Unit wiring fault	Check wiring and connections
		Capacitor, thermostat, relay or overload defective	Replace if faulty
		Compressor failure	Replace if faulty
		Controls not set properly	Check and rectify
		Off cycle delay operating	If applicable, wait 3 minutes
		High condensate level detected	See G
D	System runs for long periods and will not cycle	Unit underrated for conditioned area	Check heat load against capacity
		Thermostat not operating correctly	Check wiring, position of phial and operation
		Refrigerant shortage	Check for leaks. Recover, repair, evacuate and recharge
	Indoor coil dry or partly sweating	Dirty condenser	Clean fins if necessary
E	Indoor coil frosting	Refrigerant shortage	Check for leaks. Recover, repair, evacuate and recharge
		Dirty evaporator fins/filter	Clean if blocked
		Running in cool ambient without a head pressure controller	Fit head pressure controller
	If room temperature is also low	Thermostat set too low or cooling permanently	Reset or replace
F	Noisy unit	Fan fouling cowl (outdoor unit)	Realign fan
		Worn motor bearing	Replace motor
		Casing or piping vibration	Check cause and rectify
		Loose parts or mounting	Find and tighten
		Bent fan blade	Replace fan
G	Water leaking from unit Units with condensate pump	Blocked drain	Clear obstruction
		No supply to pump or loose connection	Secure the supply
		Fouled sensor	Clean sensor
		Pumping slowly	Check drain pipes; if clear, replace pump
		Pump windings shorted	Replace pump
H	Pump always runs	Faulty sensor or pcb	Replace sensor or pcb
I	No heating (Heat pump systems only)	Controls not set for heating	Reset
		Unit wiring fault	Check wiring and connections
		Dirty evaporator fins/filter	Clean
		Faulty thermostat	Check for signal; replace if faulty
		Reversing valve jammed	A light tap may free it; preferably replace
J	Overload tripped on three phase units	High voltage supply	Max rated voltage 254v -- check supply
		Compressor failure	Replace
		Fuses blown	Replace fuses and investigate reason for fuses blowing