LENNOX

Split-system heat pump units, HP8 series.

50 Hz

CI/Sfb	
Ref.	33.1.13–18
Date	March 1977
Replaces	January 1977

Nominal cooling capacity 6 to 15 kW at 24°C ambient temperature

Nominal heating capacity 6 to 15 kW at 7°C ambient temperature

Compact low silhouette

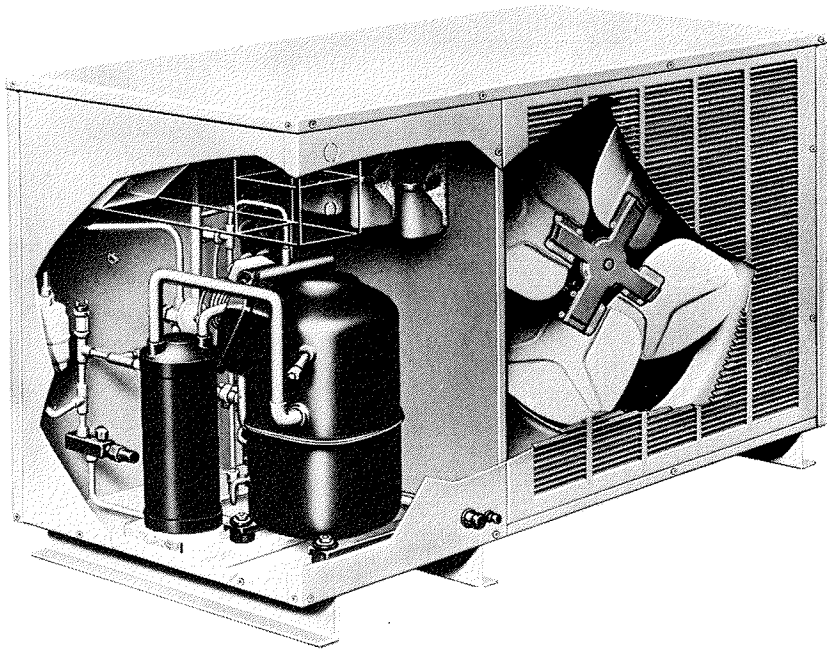
Roof or ground level installation

Power supply choice

Low installation cost

Complete service access

Factory assembled



The Lennox HP8 is a 'split-system' heat pump unit which can be used with Lennox indoor units to provide a versatile, efficient, and economical heating/cooling system. The outdoor HP8 units are equally suited for installation on a concrete slab at ground level or on a roof.

Quiet operation, ease of installation, and maximum performance have been stressed in the design of these units.

There is a galvanized steel cabinet which has a long-lasting baked-on enamel finish, protecting it from all types of weather conditions.

An extra large outdoor coil provides sub-cooling of refrigerant, maximum heat transfer, and low air resistance. Large air volumes are moved through the outdoor coil quietly and with low power consumption by a direct drive fan. And the outdoor coil is protected by a strong steel grille type guard. A separate compartment isolates the compressor and the controls.

Units are despatched completely factory assembled, piped and wired, with all controls mounted. An installer has only to set the outdoor unit in position, connect the refrigerant lines, make the electrical connections, and charge the system to complete the installation.

Features

Weather resistant cabinet
The heavy gauge galvanised steel panels have a five-station zinc phosphate metal preparation for the finish coat of baked-on outdoor enamel.

Separate compressor and controls compartment isolates them from the weather and sound transmission. Complete service access may be accomplished by removing the top panel or end panels. The top panel is lined with thick acoustical glass fibre insulation. And the legs under the unit and the holes in the base section under the coil permit condensate and defrost drainage. A strong steel outdoor coil guard is supplied as standard equipment.

Large outdoor coil
Extra refrigerant tubes for additional sub-cooling are incorporated in the air inlet side of the coil. They are subject to the coolest entering air temperature, resulting in

maximum heat transfer. The coil is constructed of ripple-edged aluminium fins machine fitted to copper tubes for maximum strength and contact area. Each joint is silver-soldered resulting in leak-proof joints and pressure leak tested at 30 to 40 bar.

Efficient outdoor coil fan
Large air volumes are moved uniformly through the entire outdoor coil by a direct drive fan. This results in a high refrigerant cooling and heating capacity. The straight-through flow of outdoor coil air results in both minimum restriction and operating cost. A louvred panel is removed for complete service access to the fan and motor. The air enters through the louvred panel and is discharged through the coil.

Compressor and controls compartment
A separate compressor and controls compartment isolates the compressor and controls from the weather and sound transmission. The end or top panels can be removed for service access.

Accessible control box
This is conveniently located for easy service access and pre-wired at the factory. The wiring inlets are provided in the cabinet for power and supply entry. (See dimensioned drawing for location.)

Dependable and quiet compressor
The sturdy and reliable compressor is hermetically sealed, suction cooled, overload protected and equipped with internal pressure relief valve. It is internally protected from excessive current and temperature. A crankcase heater is supplied as standard equipment and provides protection from slugging. All moving parts are spring mounted within the sealed can. In addition, the compressor is installed on resilient rubber mounts within the unit, for quiet and vibration-free operation.

Reversing valve
This permits quick change-over from heating to cooling and vice versa. It is factory installed and piped.

Expansion valve
All models are expansion valve types and are designed specifically for use in heat pump units. They have field adjustable superheat features and are factory installed and piped.

Suction line accumulator
Large amounts of liquid refrigerant are trapped and prevented from flooding directly into the compressor and causing damage on start-ups by the suction line accumulator. It is factory installed and piped.

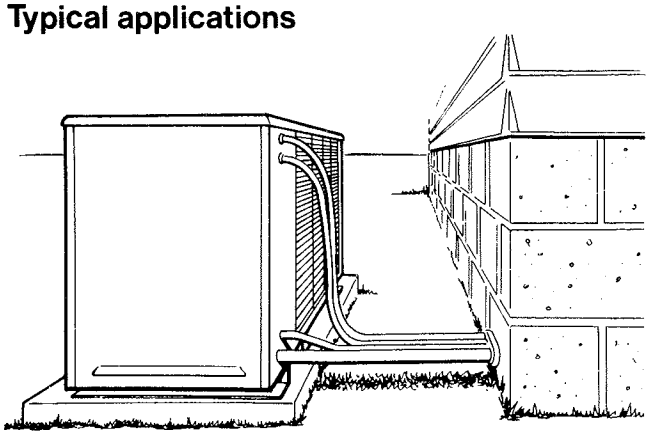
High and low pressure switches
These protect the system against abnormal operating conditions. The low pressure reset is automatic and the high pressure is manual. It is factory installed and wired.

Low temperature compressor monitor
This terminates the compressor operation when the outdoor temperature drops below the temperature setting. The control has an adjustable 'off' setting of minus 17°C to minus 6°C with a 8°C differential. It is factory installed and wired.

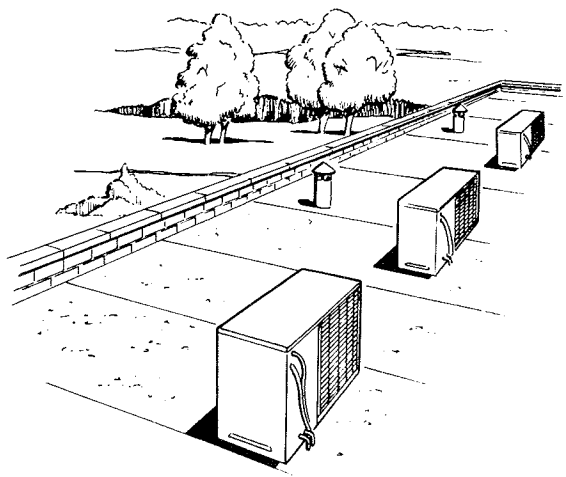
Defrost control
The solid state defrost control is factory set and calibrated. It initiates and controls the defrost cycle of the unit by simultaneously sensing the temperature of the coil and the ambient air by means of thermistors. When the coil temperature is reduced due to frost on the coil, the control initiates a defrost cycle. If the weather conditions do not produce frost on the coil, the unit operation will not be interrupted by an unnecessary defrost cycle.

Start kit
This provides assistance for the compressor to start under loaded conditions or in the event of low voltage on the 261 and 411 models. It is factory installed and wired.

Typical applications



1) Unit at ground level



2) Multiple units on roof

Refrigerant lines and service valves
The vapour and liquid lines extend outside the cabinet for easy connection. The refrigerant line and wiring connections are all conveniently made at one central location on the unit. A factory installed high capacity drier is provided as standard equipment. Also provided and factory installed are a check valve, a Schrader fitting in the suction and discharge lines, and a shut off valve with gauge ports on the vapour and liquid lines.

Thermostat provided
A combination heating/cooling thermostat is provided as standard equipment. Separate bulbs control the cooling cycle, heating, and auxiliary heating operations. The reversing valve operation is controlled by a manual 'heat-cool-off' system switch. It is an attractive wall mounted model. An optional emergency heat thermostat sub-base is available and must be ordered as an extra. This sub-base permits auxiliary electric heat only to operate in case of compressor malfunction. Order No P-8-11226. A relay is required when the sub-base is used with an outdoor thermostat. Order No P-8-3251.

Control system
To ensure that the HP8 unit and relevant fan/coil equipment is properly controlled there is a range of control system panels available. Order No BE-6686 if indoor fan/coil unit is fitted with ½hp motor. BE-6687 for ¾hp motor or BE-6688 for 1hp motor

Outdoor thermostat kit (optional)
This maintains the heating load on the heat pump as long as possible before allowing the optional auxiliary heat to switch on to line power. The kit contains one outdoor thermostat and mounting bracket with provisions for mounting two thermostats. Order No LB-44376BA. If the application requires two thermostats, an additional thermostat can be added. Order No P-R-231 (P-8-10715)

Time-off control (optional)
Compressor short-cycling is prevented by the time-off control, which also allows time for the suction and discharge pressure to equalise, allowing the compressor to start in an unloaded condition. An automatic reset control will shut the compressor off and hold it off for five minutes. Order No P-8-10238

Specifications

Model no.		HP8-261V HP8-263V	HP8-411V HP8-413V	HP8-513V	HP8-653V
Outdoor coil	Net face area Tube diameter and no. of rows Fin spacing per inch	0.30m² ½in – 3 13	0.52m² ½in – 3 10	0.59m² ½in – 3 13	0.74m² ½in – 3 13
Outdoor coil	Diameter and no. of blades Motor power Air volume (factory setting) RPM (factory setting) Watts input	457 mm – 4 124 W 760 litre/s 970 230	558 mm – 4 187 W 1 180 litre/s 685 370	609 mm – 4 187 W 1 330 litre/s 675 410	660 mm – 5 373 W 1 830 litres/s 730 485
Refrigerant – 22		Holding charge of 0.9 kg			
Liquid line connection Vapour line connection		⅜in flare ⅝in flare	½in flare ¾in flare	½in sweat 1⅛ in sweat	½in sweat 1⅛ in sweat
Approximate net weight		100 kg	147 kg	195 kg	213 kg
Electrical characteristics		See electrical data			

Selector chart

Lennox outdoor unit model number	Cooling capacity[1]	Heating capacity[2]	Total kW input[3]		Lennox indoor unit used		
	kW	kW	Cocling	Heating	Upflow	Downflow	Horizontal
HP8-261V HP8-263V	6.59	6.24	2.8	3.0	CBH8-26FF C4-26FF	– CR4-26FF	CBH8-26FF CH2-26FF
HP8-411V HP8-413V	9.26	9.23	3.7	3.8	C4-41FF CB3E-41FF	CR4-41FF CB3E-41FF	– CB3E-41FF
HP8-513V	12.16	12.30	4.6	4.9	C4-51FF CB3E-41FF C4-65FF CB3E-65	CR4-51FF CB3E-41FF CR4-65FF CB3E-65	– CB3E-41FF – CB3-65
HP8-653V	15.38	15.38	5.8	5.9	C4-65FF CB3E-65	CR4-65FF CB3E-65	– CB3E-65

[1] Cooling ratings 211 litre/sec indoor coil air volume per 3.51 kW cooling capacity, 24°C outdoor air temperature and 23°C db/16°C wb entering indoor coil air.

[2] Heating ratings 211 litre/sec indoor coil air volume, 7°C outdoor air temperature and 21°C db entering indoor coil air.

[3] Wattage for indoor units using standard drives is included in total unit watts.

Ordering information

Outdoor unit	Indoor unit		Heap pump kit for field installation to indoor coil	Additional items available for site installation
	Fan section	Coil section		
	CBH8-26FF			P-8-11226 emergency heat sub-base P-8-3251 outdoor thermostat/emergency heat sub-base relay LB-44376BA outdoor thermostat kit PR-231 (P-8-10715) additional outdoor thermostat P-8-10238 timed off control BE-6686 control panel for ½ hp motor BE-6687 control panel for ¾ hp motor BE-6688 control panel for 1 hp motor
HP8-261FF HP8-263FF	G30/O11 G30R/O8R B3E-41	C4-26FF CR2-26FF CH2-26FF	LB-43058BB	
HP8-411FF HP8-413FF	G30/O11 G30R/O8R B3E-41 B3E-41	C4-41FF CR4-41FF C3-41FF CH3-41FF	LB-43058BC	
HP8-513	G30/011 G30R/O8R	C4-51FF CR4-51FF	LB-44421BA	
	B3E-41 B3E-41	C3-41FF CH3-41FF	LB-43058BC	
HP8-653	G30/O11 G30R/O8R B3E-65 B3E-65	C4-51FF CR4-65FF C3-65FF CH3-65FF	LB-44421BB	

Heating data

Outdoor air temperature	HP8-261/263 with CBH8-26 at 350 litres/s coil air volume		HP8-411/413 with CB3E-41 and CB3H-41 at 520 litres/s coil air volume		HP8-513 with CB3E-65 at 705 litres/s coil air volume		HP8-653 with CB3E-65 at 850 litres/s coil air volume	
°C	Total heat output kW	Comp. motor kW input	Total heat output kW	Comp. motor kW input	Total heat output kW	Comp. motor kW input	Total heat output kW	Comp. motor kW input
18	7.67	2.5	13.04	3.8	16.06	5.0	19.49	6.4
13	7.06	2.4	11.16	3.4	14.12	4.6	17.46	5.8
7	6.24	2.3	9.23	2.8	12.30	4.2	15.38	5.1
4	5.39	2.5	7.70	2.7	11.67	4.0	12.83	4.8
– 4	4.33	2.1	5.97	2.3	7.73	3.4	9.49	3.8
–15	2.84	1.9	3.98	1.9	4.83	2.7	5.89	2.6
–18	2.60	1.9	3.54	1.9	4.10	2.6	4.92	2.3

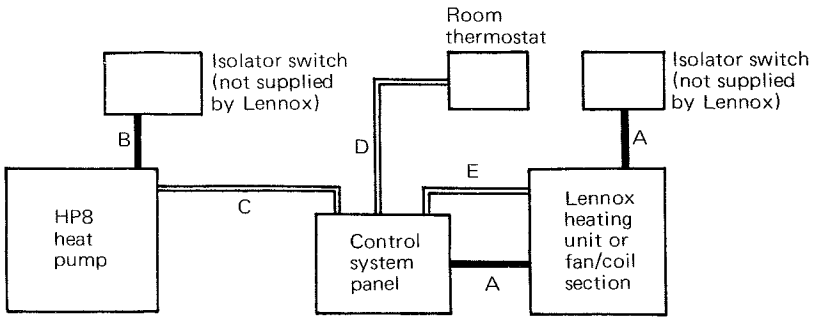
Electrical data

Model no. HP8 series		261-1T	*263-1M	411-1T	*413-1N	413-1M	*513-1N	513-1M	*653-1N	653-1M
Line voltage Hertz and phase		220/240 50/1	380/420 50/3	220/240 50/1	220/240 50/3	380/420 50/3	220/240 50/3	380/420 50/3	220/240 50/3	380/420 50/3
Compressor	Full load amps Locked rotor amps	12.1 58	4.5 27	19.4 87	12.5 72	6.2 35	15 104	9 50	20 132	11.5 62
Outdoor fan motor	Full load amps Locked rotor amps	1.4 2.9	1.4 2.9	2.3 4.6	2.3 4.6	2.3 4.6	2.3 4.6	[illegible] 4.6	3.4 18	3.4 18
Maximum unit amps HRC fuse size (amps)		14 30	6 15	22 35	15 30	9 20	17 50	11 20	24 50	15 30

* Before specifying these models in the U.K. please consult your Lennox representative on availability.
Extremes of operating are plus and minus 10% of line voltage.

External wiring

A – Three wire power
B – Three wire power for 261/411 models
Five wire power for 263/413/513/653 models
C – Nine wire low voltage
D – Five wire low voltage
E – Six wire low voltage



Additional external wiring is necessary if the HP8 is to be used with a fuelmaster system. (See detailed wiring diagram).

All fuses, isolators and wiring must conform to national regulations and local requirements. Detailed diagrams available on request.

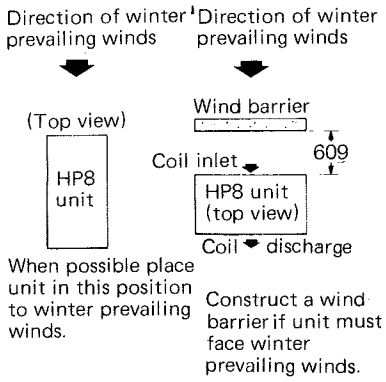
Cooling performance

Indoor unit model no.	Outdoor unit model no.	Indoor coil db temperature 23°C		Outdoor air temperature entering condenser unit					
				24°C			29°C		
		Entering air wb	Air volume litre/sec	Total cooling capacity kW	S/T ratio	Comp. motor watts input	Total cooling capacity kW	S/T ratio	Comp. motor watts input
HP8-261 HP8-263	CBH8-26	14°C	306	5.94	0.93	2110	5.62	0.95	2200
			353	6.09	0.97	2140	5.83	0.99	2230
			400	6.21	1.00	2160	5.94	1.00	2260
		16°C	306	6.33	0.75	2180	6.00	0.76	2270
			353	6.47	0.78	2200	6.12	0.80	2300
			400	6.59	0.81	2220	6.24	0.83	2320
		18°C	306	6.77	0.59	2240	6.41	0.60	2340
			353	6.91	0.61	2260	6.56	0.62	2370
			400	7.03	0.62	2280	6.65	0.64	2380
HP8-411 HP8-413	CB3-41	14°C	470	8.29	0.92	2990	7.94	0.94	3100
			517	8.44	0.95	3020	8.08	0.97	3130
			564	8.61	0.97	3040	8.23	0.99	3160
		16°C	470	8.96	0.74	3100	8.55	0.75	3220
			517	9.11	0.76	3120	8.70	0.77	3240
			564	9.26	0.78	3140	8.82	0.79	3260
		18°C	470	9.70	0.58	3200	9.29	0.59	3330
			517	9.84	0.59	3230	9.40	0.60	3360
			564	9.99	0.60	3240	9.52	0.61	3380
HP8-513	CB3-65	14°C	611	10.84	0.92	3710	10.34	0.94	4000
			705	11.13	0.96	3770	10.63	0.98	4060
			800	11.45	0.99	3810	10.87	1.00	4120
		16°C	611	11.66	0.74	3870	11.10	0.76	4180
			705	11.92	0.77	3930	11.37	0.79	4240
			800	12.16	0.80	3980	11.54	0.81	4290
		18°C	611	12.54	0.58	4060	11.95	0.59	4380
			705	12.80	0.60	4130	12.19	0.61	4440
			800	13.04	0.61	4170	12.39	0.62	4480
HP8-653	CB3-65	14°C	752	13.92	0.91	4830	13.07	0.93	5070
			846	14.21	0.94	4890	13.36	0.97	5140
			940	14.47	0.97	4950	13.51	1.00	5190
		16°C	752	14.88	0.74	5040	13.98	0.75	5310
			846	15.15	0.76	5100	14.21	0.78	5370
			940	15.38	0.78	5150	14.39	0.80	5420
		18°C	752	15.91	0.58	5270	14.91	0.59	5550
			846	16.17	0.59	5330	15.15	0.60	5610
			940	16.41	0.60	5370	15.35	0.62	5650

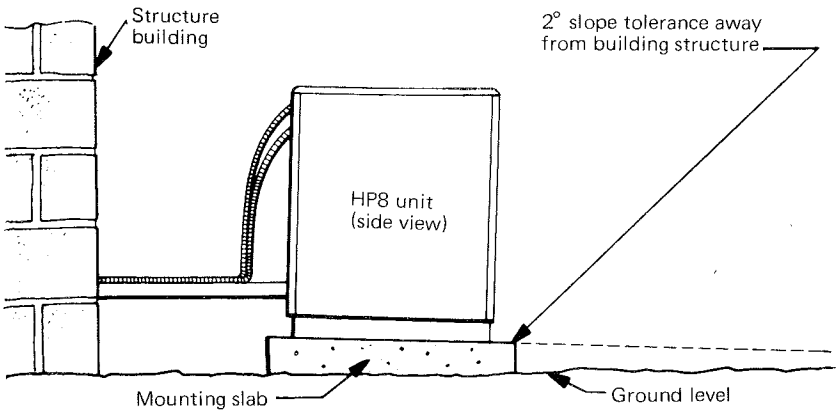
Indoor unit model no.	Outdoor unit model no.	Outdoor air temperature entering condenser unit								
		35°C			41°C			46°C		
		Total cooling capacity kW	S/T ratio	Comp. motor watts input	Total cooling capacity kW	S/T ratio	Comp. motor watts input	Total cooling capacity kW	S/T ratio	Comp. motor watts input
HP8-261 HP8-263	CBH8-26	5.33	0.98	2310	4.98	1.00	2440	4.71	1.00	2610
		5.48	1.00	2350	5.18	1.00	2500	4.89	1.00	2670
		5.65	1.00	2380	5.33	1.00	2530	5.04	1.00	2710
		5.65	0.78	2390	5.30	0.81	2540	4.95	0.83	2690
		5.77	0.82	2410	5.42	0.85	2550	5.07	0.88	2726
		5.86	0.86	2430	5.50	0.88	2570	5.12	0.92	2740
		6.06	0.61	2470	5.68	0.62	2620	5.33	0.64	2790
		6.18	0.63	2490	5.80	0.64	2640	5.42	0.66	2820
		6.27	0.65	2510	5.89	0.67	2660	5.48	0.69	2840
HP8-411 HP8-413	CB3-41	7.56	0.96	3230	7.18	0.99	3370	6.77	1.00	3550
		7.70	0.99	3260	7.32	1.00	3410	6.94	1.00	3610
		7.82	1.00	3290	7.47	1.00	3460	7.09	1.00	3660
		8.14	0.77	3360	7.70	0.79	3520	7.23	0.81	3700
		8.29	0.79	3380	7.82	0.81	3540	7.32	0.84	3730
		8.38	0.81	3400	7.91	0.83	3570	7.41	0.86	3760
		8.82	0.60	3490	8.32	0.61	3680	7.79	0.62	3898
		8.90	0.61	3520	8.41	0.62	3710	7.88	0.64	3930
		9.02	0.62	3550	8.52	0.63	3740	7.97	0.65	3960
HP8-513	CB3-65	9.81	0.96	4260	9.29	0.99	4510	8.73	1.00	4730
		10.05	1.00	4330	9.58	1.00	4610	9.05	1.00	4850
		10.37	1.00	4420	9.87	1.00	4690	9.32	1.00	4940
		10.55	0.77	4460	9.93	0.79	4720	9.29	0.82	4930
		10.75	0.80	4520	10.14	0.83	4780	9.46	0.85	5000
		10.93	0.84	4570	10.28	0.86	4830	9.61	0.89	5050
		11.34	0.60	4670	10.66	0.61	4950	9.99	0.63	5180
		11.54	0.62	4740	10.87	0.63	5010	10.16	0.65	5240
		11.75	0.64	4780	11.01	0.65	5050	10.31	0.67	5290
HP8-653	CB3-65	12.28	0.96	5320	11.51	0.99	5570	10.75	1.00	5830
		12.63	0.99	5380	11.75	1.00	5670	11.04	1.00	5950
		12.80	1.00	5470	12.04	1.00	5760	11.28	1.00	6060
		13.07	0.77	5570	12.19	0.80	5830	11.37	0.82	6080
		13.30	0.80	5630	12.36	0.83	5890	11.57	0.85	6150
		13.45	0.83	5690	12.54	0.85	5950	11.75	0.88	6200
		14.00	0.60	5830	13.15	0.61	6110	12.39	0.63	6390
		14.21	0.62	5890	13.39	0.63	6180	12.60	0.64	6450
		14.44	0.63	5940	13.56	0.65	6220	13.04	0.66	6740

Application and dimensions

Roof top application

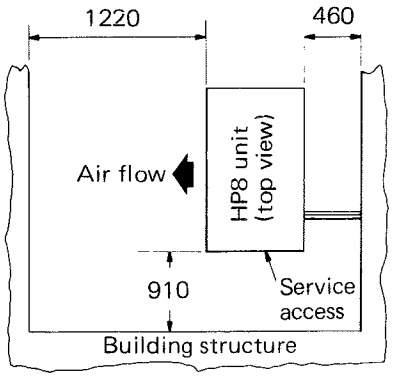


Slab mounting at ground level

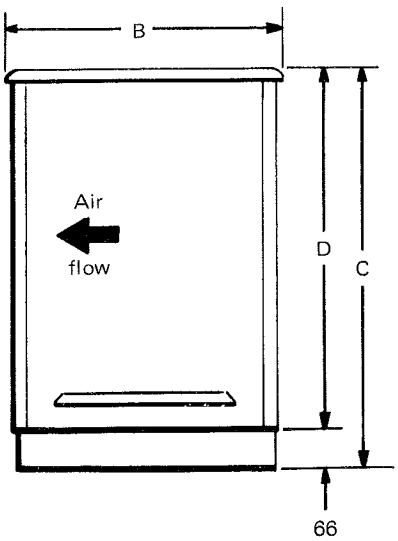


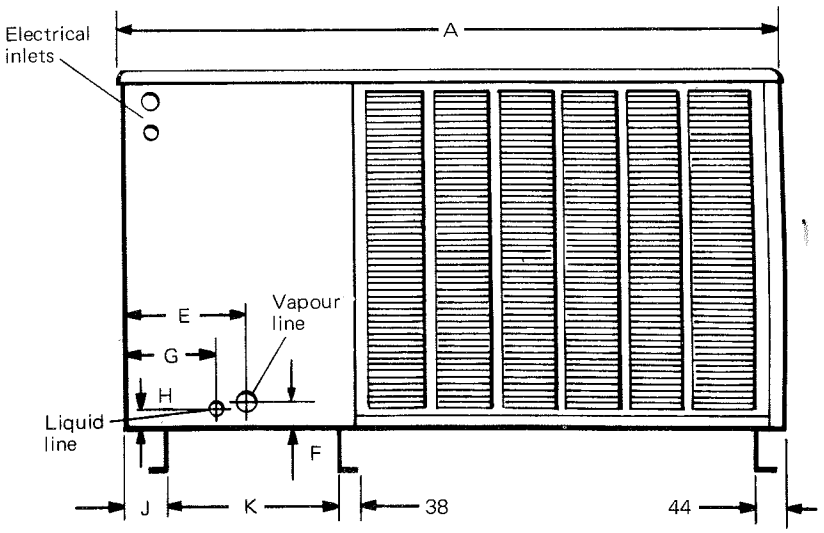
Note: Position slab so that condensate or defrost water does not flow onto pathways etc.

Clearances



Model no.	HP8-261 HP8-263	HP8-411 HP8-413	HP8-513	HP8-653
	mm	mm	mm	mm
A	933	1222	1372	1499
B	437	543	687	687
C	651	714	778	841
D	584	638	711	775
E	203	184	381	381
F	38	41	51	51
G	159	114	432	432
H	35	108	35	35
J	76	64	64	64
K	254	248	343	343
L	44	44	64	64





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Since the Company pursues a policy of continuous product development it reserves the right to make changes without prior notice.

5M/3/77 PBR