

KD SCROLL INSTALLATION AND OPERATING INSTRUCTIONS.



Thermofrost Cryo Plc
Ernest Avenue
West Norwood
London
SE27 0DA

HYDRON

INSTRUCTIONS

DAIRY CASE PUMP



HY/DP30-S

Specification

Voltage:	230V 50Hz +/- 10%
Pumping Head:	30 metres
Max Flow Rate:	110ltr/hr
Noise Level:	45-60 dbA
Ambient Temperature:	0-50°C
Tank Capacity	5ltr
Inlet (ID):	48mm Top, 38mm Side
Outlet (ID):	15mm
Power Consumption	37W

General Information

These instructions contain important information regarding safety. They should be read carefully and retained for future reference. The company will not accept any responsibility for any injury, damage or loss which may arise due to incorrect installation, operation or maintenance due to non-adherence to these instructions.

Flow Rates

HORIZONTAL RUN	PERFORMANCE					
	1m	10m	15m	20m	25m	30m
HY/DP30-S						
1m	110ltr/hr	60ltr/hr	50ltr/hr	45ltr/hr	40ltr/hr	25ltr/hr

Version 1.02/2022

A division of



HYDRON PUMPS

Unit 3, Drake Business Park
Drake House Crescent, Sheffield, S20 7HT

T: 01246 432325

E: sales@hydronpumps.co.uk
www.hydronpumps.co.uk

Safety Instructions

1. Ensure the power is disconnected before installing this pump.
2. The pump is for use with AC condensate only.
3. This pump is not for use in swimming pools or marine areas.
4. If the cord is damaged, please replace with a specific cord from the manufacturer or service agent.
5. DO NOT let the pump run dry.
6. Always mount the pump on a level surface.
7. The pump is ideal for most working environments. It is not recommended for environments where it is particularly oily or dusty.
8. For indoor use only.

WE WILL NOT BE LIABLE FOR ANY INJURIES OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THIS PUMP.



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Commissioning and Maintenance

Ensure on commissioning that the filter/reservoir is free from all debris as this can cause the pump to fail.

We would advise that the filter, pump and reservoir be inspected every 3-4 months for signs of contamination.

If there are signs of contamination remove all debris from the filter then pump through 15 litres of hot soapy water.

Testing

Fill the tank with clean water until the pump switches on. If the pump fails to operate check the power supply.

The pump should operate till the water level reaches the nozzle height. If the pump is not horizontal, it may effect the pump as it may not pump long enough to remove the water.

Diary Pump Fault Finding Chart

REPORTED PROBLEM	POSSIBLE CAUSE	SOLUTION
Pump Fails to start with condensate level high and spilling over edge of reservoir	Debris stopping float mechanism from rising	Remove Debris
	Filter is blocked preventing water entering float chamber	Remove Debris
	Mains Supply is not connected	Connect Mains Supply
Pump Starts but fails to evacuate water	Debris has entered the float chamber and blocked the pump inlet	Remove Debris
	Discharge hose has a restriction preventing water from being pumped away	Remove restriction on discharge hose
Pump Starts but is noisy/ Pump Cycles regularly	The float switch has debris keeping the float ballast in the switch on position	Remove Debris
	The end of the discharge hose is lower to the ground than the pump and the condensate in the discharge can syphon back into the reservoir	Use a Tun Dish to gravity fall the condensate at a higher level than the pump.
Overload/Alarm Contacts Operate intermittently	There could be a restriction on the pumps inlet or outlet that is reducing the flow rate	Remove restriction or debris

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Installation

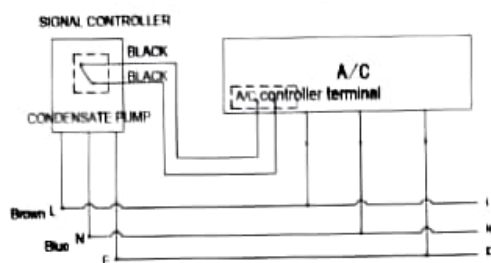
- 1) Mount the pump level underneath the dairy cabinet.
Connect the inlet to the dairy pump on top of the lid. Make sure that the connection pipe has no kinks or sharp corners and the condensate enters before the filter.
- 2) Connect the mains using the IEC lead supplied. Plug in the 3 pin plug into the pump and wire the other end as follows:-



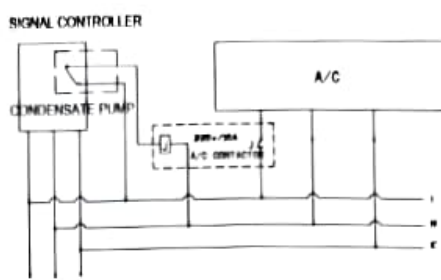
L-LIVE Brown
N-NEUTRAL Blue
EARTH Yellow/Green

- 3) Connect the discharge tube to the pump taking care not to have any sharp corners or kinks.

Drawing 1



Drawing 2



If there is no controller terminal please refer to Drawing 2

Fail-safe Connection

1 - Common 2 - Normally Open 3 - Normally Closed

Run On Time

40 Seconds

Fail-safe Time

10 minutes

Overload Time

20 Minutes

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Model 2PAL00A13		Refrigerant				Unit
Item	Symbol	R404A	R407F	R449A	R134a	
		Value				
Evaporating Temperature	t	-10				°C
Annual Electrical Consumption	Q	11,867	10,607	10,713	6,984	kWh/a
Seasonal energy performance ratio	SEPR	3.71	3.92	3.78	3.61	
Parameters at full load and ambient temperature 32°C (Point A)						
Declared Cooling capacity	P _a	6.86	6.76	6.80	6.78	Kw
Declared power input	D _a	1.25	1.12	1.01	1.19	Kw
Rated COP	COP A	2.11	2.17	2.26	2.29	
Parameters at full load and ambient temperature 25°C (Point B)						
Declared Cooling capacity	P _a	1.62	1.61	1.11	4.99	Kw
Declared power input	D _a	2.17	2.04	2.47	1.55	Kw
Rated COP	COP B	2.75	2.81	2.89	2.85	
Parameters at full load and ambient temperature 15°C (Point C)						
Declared Cooling capacity	P _a	8.66	8.80	7.87	4.80	Kw
Declared power input	D _a	2.20	2.00	1.96	1.26	Kw
Rated COP	COP C	3.94	4.15	4.02	3.81	
Parameters at full load and ambient temperature 5°C (Point D)						
Declared Cooling capacity	P _a	9.66	8.89	8.59	5.18	Kw
Declared power input	D _a	1.74	1.51	1.59	1.07	Kw
Rated COP	COP D	5.55	5.89	5.40	5.08	
Other Items						
Capacity Control	Fixed					
Degradation coefficient for fixed and staged capacity unit	Cdc	0.25				
Parameters at full low and ambient temperature 43°C (where applicable)						
Cooling capacity	P _s					
Power input	D _s					
Declared COP	COP _s					

Model 2PAL00A13		Refrigerant				Unit
Item	Symbol	Value				
		R404A	R407F	R449A	R134a	
Evaporating Temperature	t	-10				°C
Annual Electrical Consumption	QEPH	14 925	14 112	14 127	8 881	kWh/a
Seasonal energy performance ratio	SEPR	3.65	3.82	3.70	3.27	
Parameters at full load and ambient temperature 32°C (Point A)						
Declared Cooling capacity	P _a	8.95	8.75	8.93	7.48	Kw
Declared power input	D _a	2.19	1.13	1.87	1.10	Kw
Rated COP	COP A	2.09	2.07	2.23	2.37	
Parameters at full load and ambient temperature 25°C (Point B)						
Declared Cooling capacity	P _a	5.92	5.95	5.47	1.88	Kw
Declared power input	D _a	1.85	1.52	1.26	1.01	Kw
Rated COP	COP B	2.72	2.69	2.88	2.91	
Parameters at full load and ambient temperature 15°C (Point C)						
Declared Cooling capacity	P _a	11.15	10.50	10.55	6.55	Kw
Declared power input	D _a	2.93	2.14	2.64	1.65	Kw
Rated COP	COP C	3.83	3.84	4.00	3.97	
Parameters at full load and ambient temperature 5°C (Point D)						
Declared Cooling capacity	P _a	12.15	11.40	11.35	7.05	Kw
Declared power input	D _a	2.13	2.08	2.19	1.81	Kw
Rated COP	COP D	5.67	5.54	5.19	3.90	
Other Items						
Capacity Control	Fixed					
Degradation coefficient for fixed and staged capacity unit	Cdc	0.25				
Parameters at full low and ambient temperature 43°C (where applicable)						
Cooling capacity	P _s					
Power input	D _s					
Declared COP	COP _s					

Model 2PAL07SM3		Refrigerant				Unit
Item	Symbol	R404A	R407F	R449A	R134a	
		Value				
Evaporating Temperature	t	-10				kWh/a
Annual Electrical Consumption	Q	15,895	19,379	18,833	12,008	
Seasonal energy performance ratio	SEPR	3.63	3.60	3.74	3.82	
Parameters at full load and ambient temperature 32°C (Point A)						
Declared Cooling capacity	P _A	11.75	11.35	11.45	7.47	Kw
Declared power input	D _A	5.66	5.57	5.15	3.06	Kw
Rated COP	COP A	2.08	2.04	2.23	2.44	
Parameters at full load and ambient temperature 25°C (Point B)						
Declared Cooling capacity	P _A	13.20	12.60	12.55	7.98	Kw
Declared power input	D _A	4.83	4.71	4.37	2.66	Kw
Rated COP	COP B	2.73	2.68	2.87	3.00	
Parameters at full load and ambient temperature 15°C (Point C)						
Declared Cooling capacity	P _A	15.10	13.90	14.00	8.65	Kw
Declared power input	D _A	3.87	3.63	3.48	2.16	Kw
Rated COP	COP C	3.90	3.83	4.03	4.01	
Parameters at full load and ambient temperature 5°C (Point D)						
Declared Cooling capacity	P _A	16.75	14.75	15.15	9.26	Kw
Declared power input	D _A	3.13	2.80	2.87	1.73	Kw
Rated COP	COP D	5.35	5.28	5.29	5.37	
Other items						
Capacity Control	Fixed					
Degradation coefficient for fixed and staged capacity unit	Cdc	0.25				
Parameters at full low and ambient temperature 43°C (where applicable)						
Cooling capacity	P _L					
Power input	D _L					
Declared COP	COP _L					

Model 2PAL090M3		Refrigerant				Unit
Item	Symbol	Value				
		R404A	R407F	R449A	R134a	
Evaporating Temperature	t	-10				°C
Annual Electrical Consumption	Q	25,632	26,047	23,809	15,240	kWh/a
Seasonal energy performance ratio	SEPR	3.77	3.73	3.94	3.84	
Parameters at full load and ambient temperature 32°C (Point A)						
Declared Cooling capacity	P _a	15.70	15.80	14.95	9.51	Kw
Declared power input	D _a	6.89	6.74	6.54	3.95	Kw
Rated COP	COP A	2.28	2.34	2.29	2.41	
Parameters at full load and ambient temperature 25°C (Point B)						
Declared Cooling capacity	P _a	17.50	17.60	16.45	10.25	Kw
Declared power input	D _a	5.97	5.80	5.56	3.42	Kw
Rated COP	COP B	2.93	3.03	2.96	3.00	
Parameters at full load and ambient temperature 15°C (Point C)						
Declared Cooling capacity	P _a	20.00	19.55	18.25	11.25	Kw
Declared power input	D _a	4.94	4.84	4.37	2.77	Kw
Rated COP	COP C	4.05	4.04	4.18	4.06	
Parameters at full load and ambient temperature 5°C (Point D)						
Declared Cooling capacity	P _a	22.30	20.80	19.80	12.20	Kw
Declared power input	D _a	4.13	4.08	3.43	2.26	Kw
Rated COP	COP D	5.40	5.10	5.77	5.40	
Other Items						
Capacity Control	Fixed					
Degradation coefficient for fixed and staged capacity unit	Cdc	0.25				
Parameters at full low and ambient temperature 43°C (where applicable)						
Cooling capacity	P _s					
Power input	D _s					
Declared COP	COP _s					

Model 2PAL100M3		R404A	R407F	R449A	R134a	Unit
Refrigerant	Symbol	Value				°C
Item						
Evaporating Temperature	t	-10				
Annual Electrical Consumption	Q	31,391	30,917	26,922	17,595	kWh/a
Seasonal energy performance ratio	SEPR	3.58	3.63	4.03	3.81	
Parameters at full load and ambient temperature 32°C (Point A)						
Declared Cooling capacity	P _A	18.30	18.25	17.65	10.90	Kw
Declared power input	D _A	8.35	7.91	7.47	4.60	Kw
Rated COP	COP A	2.19	2.31	2.36	2.37	
Parameters at full load and ambient temperature 25°C (Point B)						
Declared Cooling capacity	P _A	20.40	20.30	19.25	11.75	Kw
Declared power input	D _A	7.24	6.82	6.35	3.98	Kw
Rated COP	COP B	2.82	2.98	3.03	2.95	
Parameters at full load and ambient temperature 15°C (Point C)						
Declared Cooling capacity	P _A	23.31	22.40	21.30	12.95	Kw
Declared power input	D _A	5.97	5.71	5.00	3.21	Kw
Rated COP	COP C	3.87	3.92	4.26	4.03	
Parameters at full load and ambient temperature 5°C (Point D)						
Declared Cooling capacity	P _A	25.60	23.70	23.10	14.05	Kw
Declared power input	D _A	4.97	4.81	3.93	2.60	Kw
Rated COP	COP D	5.15	4.93	5.88	5.40	
Other items						
Capacity Control	Fixed					
Degradation coefficient for fixed and staged capacity unit	Cdc	0.25				
Parameters at full low and ambient temperature 43°C (where applicable)						
Cooling capacity	P _s					
Power input	D _s					
Declared COP	COP _s					

Model 2PALD30L3		R404A		R407F		R449A		R134a		Unit	
Refrigerant		Symbol		Value							
Item		t		-35						°C	
Evaporating Temperature		Q		7,804		7,163		8,201		KWh/a	
Annual Electrical Consumption		SEPR		1.74		1.84		1.65			
Seasonal energy performance ratio											
Parameters at full load and ambient temperature 32°C (Point A)		Pa		2.03		1.77		1.82		Kw	
Declared Cooling capacity		Da		1.79		1.58		1.73		Kw	
Declared power input		COP A		1.13		1.12		1.05			
Rated COP											
Parameters at full load and ambient temperature 25°C (Point B)		Pa		2.19		1.93		1.93		Kw	
Declared Cooling capacity		Da		1.58		1.36		1.47		Kw	
Declared power input		COP B		1.39		1.42		1.31			
Rated COP											
Parameters at full load and ambient temperature 15°C (Point C)		Pa		2.41		2.12		2.09		Kw	
Declared Cooling capacity		Da		1.35		1.11		1.22		Kw	
Declared power input		COP C		1.79		1.91		1.71			
Rated COP											
Parameters at full load and ambient temperature 5°C (Point D)		Pa		2.63		2.25		2.24		Kw	
Declared Cooling capacity		Da		1.18		0.94		1.07		Kw	
Declared power input		COP D		2.23		2.39		2.09			
Rated COP											
Other Items		Fixed									
Capacity Control		Cdc									
Degradation coefficient for fixed and staged capacity unit				0.25							
Parameters at full low and ambient temperature 43°C (where applicable)		Ps									
Cooling capacity		Ds									
Power input		COPs									
Declared COP											

Model 1PAL05L3						
Refrigerant		R404A	R407F	R449A	R134a	
Evaporating Temperature	Symbol	Value				Unit
Annual Electrical Consumption	I	35				°C
Seasonal energy performance ratio	Q	10.80%	8.85%	10.26%		W/h·h
Parameters at full load and ambient temperature 32°C (Point A)						
Declared Cooling capacity	P _A	2.53	2.70	2.21		Kw
Declared power input	D _A	2.20	1.95	2.15		Kw
Rated COP	COP A	1.15	1.33	1.06		
Parameters at full load and ambient temperature 25°C (Point B)						
Declared Cooling capacity	P _B	2.54	2.81	2.42		Kw
Declared power input	D _B	1.96	1.69	1.84		Kw
Rated COP	COP B	1.40	1.61	1.32		
Parameters at full load and ambient temperature 15°C (Point C)						
Declared Cooling capacity	P _C	3.00	2.64	2.80		Kw
Declared power input	D _C	1.69	1.38	1.53		Kw
Rated COP	COP C	1.78	1.91	1.70		
Parameters at full load and ambient temperature 5°C (Point D)						
Declared Cooling capacity	P _D	1.25	2.80	2.77		Kw
Declared power input	D _D	1.47	1.15	1.33		Kw
Rated COP	COP D	2.21	2.43	2.08		
Other Items						
Capacity Control	Fixed					
Degradation coefficient for fixed and staged capacity unit	Cdc	0.25				
Parameters at full low and ambient temperature 43°C (where applicable)						
Cooling capacity	P _L					
Power input	D _L					
Declared COP	COP _L					

Model 1 (PAL05L3) Refrigerant		R404A				R407F	R449A	R134a	
Item	Symbol	Value							Unit
Evaporating Temperature	t	-35							°C
Annual Electrical Consumption	Q	17 073							kWh/a
Seasonal energy performance ratio	SEPR	1.97							
Parameters at full load and ambient temperature 32°C (Point A)									
Declared Cooling capacity	P _A	2.88							kW
Declared power input	D _A	2.53							kW
Rated COP	COP A	1.24							
Parameters at full load and ambient temperature 25°C (Point B)									
Declared Cooling capacity	P _B	3.14							kW
Declared power input	D _B	2.05							kW
Rated COP	COP B	1.53							
Parameters at full load and ambient temperature 15°C (Point C)									
Declared Cooling capacity	P _C	3.50							kW
Declared power input	D _C	1.74							kW
Rated COP	COP C	2.01							
Parameters at full load and ambient temperature 5°C (Point D)									
Declared Cooling capacity	P _D	1.87							kW
Declared power input	D _D	1.49							kW
Rated COP	COP D	2.60							
Other items									
Capacity Control	Fixed								
Degradation coefficient for fixed and staged capacity unit	Cdc	0.25							
Parameters at full low and ambient temperature 43°C (where applicable)									
Cooling capacity	P _L								
Power input	D _L								
Declared COP	COP _L								

Model 2PAL05L3 Refrigerant		R404A				R407F	R449A	R134a	Unit
Item	Symbol	Value							°C
Evaporating Temperature	t	-35							
Annual Electrical Consumption	Q	14,711	12,015	13,835				KWh/a	
Seasonal energy performance ratio	SEPR	1.79	1.86	1.72					
Parameters at full load and ambient temperature 32°C (Point A)									
Declared Cooling capacity	P _A	3.54	3.00	3.19				Kw	
Declared power input	D _A	3.11	2.84	3.01				Kw	
Rated COP	COP A	1.14	1.06	1.06					
Parameters at full load and ambient temperature 25°C (Point B)									
Declared Cooling capacity	P _B	3.87	3.24	3.43				Kw	
Declared power input	D _B	2.76	2.42	2.57				Kw	
Rated COP	COP B	1.40	1.34	1.34					
Parameters at full load and ambient temperature 15°C (Point C)									
Declared Cooling capacity	P _C	4.32	3.57	3.75				Kw	
Declared power input	D _C	2.34	1.91	2.12				Kw	
Rated COP	COP C	1.85	1.87	1.77					
Parameters at full load and ambient temperature 5°C (Point D)									
Declared Cooling capacity	P _D	4.73	3.88	4.03				Kw	
Declared power input	D _D	2.01	1.53	1.82				Kw	
Rated COP	COP D	2.35	2.58	2.22					
Other Items									
Capacity Control	Fixed								
Degradation coefficient for fixed and staged capacity unit	Cdc	0.25							
Parameters at full low and ambient temperature 43°C (where applicable)									
Cooling capacity	P _L								
Power input	D _L								
Declared COP	COP _L								

Model 2PAL05L3 Refrigerant		R404A		R407F		R449A		R134a			
Item	Symbol	Value								Unit	
Evaporating Temperature	t	35								°C	
Annual Electrical Consumption	Q	17,049		15,474		16,134				KWh/a	
Seasonal energy performance ratio	SEPR	1.81		1.73		1.73					
Parameters at full load and ambient temperature 32°C (Point A)											
Declared Cooling capacity	P _A	4.14		3.60		3.74				Kw	
Declared power input	D _A	3.69		3.54		3.62				Kw	
Rated COP	COP A	1.12		1.02		1.03					
Parameters at full load and ambient temperature 25°C (Point B)											
Declared Cooling capacity	P _B	4.57		3.87		4.06				Kw	
Declared power input	D _B	3.17		3.04		2.98				Kw	
Rated COP	COP B	1.44		1.27		1.36					
Parameters at full load and ambient temperature 15°C (Point C)											
Declared Cooling capacity	P _C	5.12		4.23		4.44				Kw	
Declared power input	D _C	2.70		2.44		2.44				Kw	
Rated COP	COP C	1.90		1.74		1.82					
Parameters at full load and ambient temperature 5°C (Point D)											
Declared Cooling capacity	P _D	5.60		4.58		4.77				Kw	
Declared power input	D _D	2.40		1.94		2.18				Kw	
Rated COP	COP D	2.33		2.37		2.19					
Other Items											
Capacity Control	Fixed										
Degradation coefficient for fixed and staged capacity unit	Cdc					0.25					
Parameters at full low and ambient temperature 43°C (where applicable)											
Cooling capacity	P _L										
Power input	D _L										
Declared COP	COP _L										

Model 2PAL075L3(ZF25KQE-TFD)		R404A		R407F		R449A		R134a			
Refrigerant	Symbol	Value						Unit			
Evaporating Temperature	t	-35						°C			
Annual Electrical Consumption	Q	19,549		19,309		17,910		KWh/a			
Seasonal energy performance ratio	SEPR	1.99		1.71		1.94					
Parameters at full load and ambient temperature 32°C (Point A)											
Declared Cooling capacity	P _A	5.23		4.44		4.65		Kw			
Declared power input	D _A	3.94		3.93		4.56		Kw			
Rated COP	COP A	1.33		1.13		1.02					
Parameters at full load and ambient temperature 25°C (Point B)											
Declared Cooling capacity	P _B	5.72		4.78		5.71		Kw			
Declared power input	D _B	3.59		3.42		3.60		Kw			
Rated COP	COP B	1.60		1.40		1.59					
Parameters at full load and ambient temperature 15°C (Point C)											
Declared Cooling capacity	P _C	6.40		5.29		6.39		Kw			
Declared power input	D _C	3.14		2.93		3.14		Kw			
Rated COP	COP C	2.04		1.81		2.04					
Parameters at full load and ambient temperature 5°C (Point D)											
Declared Cooling capacity	P _D	7.03		5.95		7.03		Kw			
Declared power input	D _D	2.71		2.78		2.72		Kw			
Rated COP	COP D	2.60		2.14		2.59					
Other Items											
Capacity Control	Fixed										
Degradation coefficient for fixed and staged capacity unit	Cdc	0.25									
Parameters at full low and ambient temperature 43°C (where applicable)											
Cooling capacity	P _L										
Power input	D _L										
Declared COP	COP _L										

Model 2 PAL100L3(ZF34KQE-TFD) Refrigerant		Value				Unit
Item	Symbol	R404A	R407F	R449A	R134a	°C
Evaporating Temperature	t	35				kWh/a
Annual Electrical Consumption	Q	25,642	25,438	23,926		
Seasonal energy performance ratio	SEPR	2.04	1.80	1.96		
Parameters at full load and ambient temperature 32°C (Point A)						
Declared Cooling capacity	P _A	7.03	6.15	6.28		kW
Declared power input	D _A	5.20	5.05	5.03		kW
Rated COP	COP A	1.35	1.22	1.25		
Parameters at full load and ambient temperature 25°C (Point B)						
Declared Cooling capacity	P _B	7.56	6.64	6.75		kW
Declared power input	D _B	4.68	4.43	4.36		kW
Rated COP	COP B	1.64	1.50	1.55		
Parameters at full load and ambient temperature 15°C (Point C)						
Declared Cooling capacity	P _C	8.49	7.39	7.40		kW
Declared power input	D _C	4.05	3.86	3.65		kW
Rated COP	COP C	2.10	1.91	2.03		
Parameters at full load and ambient temperature 5°C (Point D)						
Declared Cooling capacity	P _D	9.30	8.32	7.95		kW
Declared power input	D _D	3.52	3.73	3.19		kW
Rated COP	COP D	2.64	2.23	2.49		
Other Items						
Capacity Control	Fixed					
Degradation coefficient for fixed and staged capacity unit	Cdc	0.25				
Parameters at full low and ambient temperature 43°C (where applicable)						
Cooling capacity	P _L					
Power input	D _L					
Declared COP	COP _L					

Model 1PAI015M1					
Refrigerant	Symbol	R404A	R407F	R449A	R134a
Item	Symbol	Value			
Evaporating Temperature	t	-10			
Parameters at full load and ambient temperature 32°C					
Rated cooling capacity	P _k	2.66	2.68	2.49	1.69
Rated power input	D _k	1.32	1.21	1.11	0.79
Rated COP	COP _k	2.02	2.22	2.21	2.14
Parameters at full load and ambient temperature 25°C					
Rated cooling capacity	P _k	2.97	2.91	2.69	1.81
Rated power input	D _k	1.17	1.07	0.10	0.71
Rated COP	COP _k	2.54	2.72	2.70	2.56
Parameters at full load and ambient temperature 43°C (where applicable)					
Rated cooling capacity	P _k				
Rated power input	D _k				
Rated COP	COP _k				
Other items					
Capacity Control		Fixed			

Model 1PAI020M1/3					
Refrigerant	Symbol	R404A	R407F	R449A	R134a
Item	Symbol	Value			
Evaporating Temperature	t	-10			
Parameters at full load and ambient temperature 32°C					
Rated cooling capacity	P _k	3.75	3.17	3.46	2.26
Rated power input	D _k	1.58	1.71	1.54	0.10
Rated COP	COP _k	2.37	1.97	2.25	2.26
Parameters at full load and ambient temperature 25°C					
Rated cooling capacity	P _k	4.16	3.76	3.83	2.42
Rated power input	D _k	1.36	1.41	1.29	0.87
Rated COP	COP _k	3.06	2.67	2.97	2.79
Parameters at full load and ambient temperature 43°C (where applicable)					
Rated cooling capacity	P _k				
Rated power input	D _k				
Rated COP	COP _k				
Other items					
Capacity Control		Fixed			

Model 1PAI025M1/3					
Refrigerant	Symbol	R404A	R407F	R449A	R134a
Item	Symbol	Value			
Evaporating Temperature	t	-10			
Parameters at full load and ambient temperature 32°C					
Rated cooling capacity	P _k	4.26	4.03	3.96	2.58
Rated power input	D _k	2.00	2.07	1.85	1.14
Rated COP	COP _k	2.16	1.95	2.14	2.27
Parameters at full load and ambient temperature 25°C					
Rated cooling capacity	P _k	4.74	4.47	4.29	2.77
Rated power input	D _k	1.71	1.74	1.59	1.00
Rated COP	COP _k	2.77	2.57	2.70	2.78
Parameters at full load and ambient temperature 43°C (where applicable)					
Rated cooling capacity	P _k				
Rated power input	D _k				
Rated COP	COP _k				
Other items					
Capacity Control		Fixed			

Model 1PAI030M1/M3					
Refrigerant	Symbol	R404A	R407F	R449A	R134a
Item	Symbol	Value			
Evaporating Temperature	t	-10			
Annual Electrical Consumption	Q	8.707	8.786	8.402	5.423
Seasonal energy performance ratio	SEPR	3.76	3.45	3.75	3.70
Parameters at full load and ambient temperature 32°C (Point A)					
Declared Cooling capacity	P _k	5.33	4.93	5.12	3.26
Declared power input	D _k	2.45	2.45	2.23	1.37
Rated COP	COP _k	2.18	2.01	2.30	2.38
Parameters at full load and ambient temperature 25°C (Point B)					
Declared Cooling capacity	P _k	5.94	5.45	5.55	3.50
Declared power input	D _k	2.09	2.04	1.89	1.20
Rated COP	COP _k	2.84	2.67	2.94	2.92
Parameters at full load and ambient temperature 15°C (Point C)					
Declared Cooling capacity	P _k	6.75	5.97	6.12	3.82
Declared power input	D _k	1.68	1.59	1.52	0.98
Rated COP	COP _k	4.02	3.75	4.03	3.90
Parameters at full load and ambient temperature 5°C (Point D)					
Declared Cooling capacity	P _k	7.46	6.18	6.61	4.13
Declared power input	D _k	1.35	1.29	1.27	0.80
Rated COP	COP _k	5.53	4.79	5.20	5.16
Other items					
Capacity Control	Fixed				
Degradation coefficient for fixed and staged capacity unit	Cdc	0.25			
Parameters at full load and ambient temperature 43°C (where applicable)					
Cooling capacity	P _k				
Power input	D _k				
Declared COP	COP _k				

Model 1PAI036M1/M3					
Refrigerant	Symbol	R404A	R407F	R449A	R134a
Item	Symbol	Value			
Evaporating Temperature	t	-10			
Annual Electrical Consumption	Q	9.993	9.979	9.634	6.054
Seasonal energy performance ratio	SEPR	3.80	3.53	3.80	3.83
Parameters at full load and ambient temperature 32°C (Point A)					
Declared Cooling capacity	P _k	6.18	5.73	5.96	3.77
Declared power input	D _k	2.84	2.82	2.58	1.54
Rated COP	COP _k	2.18	2.03	2.31	2.45
Parameters at full load and ambient temperature 25°C (Point B)					
Declared Cooling capacity	P _k	6.89	6.32	6.46	4.05
Declared power input	D _k	2.43	2.36	2.19	1.34
Rated COP	COP _k	2.84	2.68	2.95	3.02
Parameters at full load and ambient temperature 15°C (Point C)					
Declared Cooling capacity	P _k	7.86	6.95	7.15	4.43
Declared power input	D _k	1.94	1.83	1.76	1.10
Rated COP	COP _k	4.05	3.80	4.06	4.03
Parameters at full load and ambient temperature 5°C (Point D)					
Declared Cooling capacity	P _k	8.78	7.39	7.78	4.78
Declared power input	D _k	1.55	1.47	1.45	0.89
Rated COP	COP _k	5.66	5.03	5.37	5.37
Other items					
Capacity Control	Fixed				
Degradation coefficient for fixed and staged capacity unit	Cdc	0.25			
Parameters at full load and ambient temperature 43°C (where applicable)					
Cooling capacity	P _k				
Power input	D _k				
Declared COP	COP _k				

Capacities R404A, -20°C to +10°C evaporating

Model Evap Temp °C	Capacity in Watts/Condensing temp °C						
	10	5	0	-5	-10	-15	-20
1PAL015M1	4893/47.1	4200/45.2	3550/43.4	3000/42.3	2494/41.0	2015/40.6	1650/38.8
1PAL020M1/3	6800/45.9	5800/43.9	4950/42.4	4150/41.5	3450/40.2	2815/39.2	2260/38.3
1PAL025M1/3	7900/48.3	6800/46.8	5850/44.8	4950/43.6	4150/42.0	3450/40.8	2820/39.7
1PAL030M1/3	9600/47.6	8250/46.1	7100/44.2	6000/43.0	5000/41.5	4150/40.3	3400/39.5
1PAL036M1/3	11300/47.5	9750/45.7	8350/43.9	7000/42.7	5900/41.3	4900/40.0	4000/39.0
1PAL040M3	12640/49.6	10850/47.8	9350/45.7	7960/43.9	6660/42.7	5550/41.3	4560/40.0
2PAL050M3	15900/49.5	13650/47.8	11800/45.7	10050/43.9	8400/42.7	7000/41.3	5750/40.1
PAUP050M3	15900/49.5	13650/47.8	11800/45.7	10050/43.9	8400/42.7	7000/41.3	5750/40.1
2PAL075M3	20900/50.8	17950/49.0	15300/47.5	13100/45.5	11100/43.7	9210/42.5	7580/41.1
2PAL090M3	27100/51.4	23700/48.9	20300/47.4	17400/45.4	14750/43.6	12250/43.4	10100/41.0
2PAL100M3	31400/51.5	27400/49.3	23800/47.1	20100/45.7	17000/43.8	14050/42.5	11500/41.0

M1 models are single-phase, M3 models are three-phase

Capacities R404A, -40°C to -10°C evaporating

Model Evap Temp °C	Capacity in Watts/Condensing temp °C						
	-10	-15	-20	-25	-30	-35	-40
1PAL030L3	4850/41.1	4050/39.8	3350/38.8	2740/37.9	2220/37.1	1770/36.4	1380/35.9
1PAL035L3	5800/43.2	4850/41.6	4050/40.3	3350/39.2	2735/38.3	2200/37.5	1730/36.8
1PAL040L3	6850/42.8	5750/41.2	4800/39.9	3900/38.8	3150/37.9	2500/37.1	1940/36.3
2PAL050L3	8450/42.6	7100/41.1	5900/39.7	4850/38.6	3900/37.7	3100/36.9	2375/36.1
PAUP050L3	8450/42.6	7100/41.1	5900/39.7	4850/38.6	3900/37.7	3100/36.9	2375/36.1
2PAL060L3	9750/44.0	8150/42.7	6800/41.2	5650/39.9	4600/38.8	3700/37.9	2900/37.1
PAUP060L3	9750/44.0	8150/42.7	6800/41.2	5650/39.9	4600/38.8	3700/37.9	2900/37.1
2PAL075L3	11850/44.9	10000/43.5	8400/42.0	6950/40.6	5650/39.4	4550/38.4	3500/37.5

All models L3 are three-phase.

Duties are quoted at 10K suction superheat with liquid subcooled to condenser limits in an ambient of 32°C.

Compressor is fitted with an internal relief valve set to operate at a pressure differential of 28bar (+/- 3 bar). To prevent repeated lifting of this valve, ensure that the LP switch is set to avoid reaching the pressure differential limit of 28bar. The low temperature units fitted with ZF compressors should have a LP cut out setting of approximately 0.3bar (R404A/R407F).

The HP switch is not factory pre-set and will require adjustment to suit conditions on site, suggested maximum cut out for use with R404A/R407F is approximately 28 bar and 16bar for R134a.

NOTE: The 2PAL090M3 and 2PAL100M3 units are fitted with PRVs set at 24.8barg, so the HP switch should be set accordingly on these units to prevent this valve from lifting.

The RGE/XGE fan speed controller should be set to maintain the optimum condensing temperature as shown in the tables at the end of this brochure (ambient 32°C, R404A refrigerant)

Check condenser fan(s) are free to rotate, and check all service valves are fully open.

Check all electrical wiring is sound and that the power supply is correct for the condensing unit being installed.

Units are rated at a maximum ambient to condenser of 38°C, at these ambient conditions the unit should be limited to a maximum evaporating temperature of 0°C to prevent excessive head pressures.

START UP.

Once the unit is running a check should be made to ensure condenser fan(s) are running correctly, drawing air through the condenser, there are no unusual noises coming from the unit, no leaks are apparent and that all readings are within expected ranges (i.e suction pressure, discharge pressure, suction superheat, current drawn etc).

Compressors should be limited to 12 starts per hour, this can be achieved by use of a delay timer or by programming a delay time into an electronic controller which gives the unit its start signal.

3Ph units:

On start up if the compressor is running noisy and not pumping, switch off immediately. The compressor is running in the wrong direction. Change over two of the three-phase supply and restart.

SERVICE AND MAINTENANCE.

WARNING: Disconnect the main electrical supply before servicing or opening the unit.

At regular intervals the unit should be checked to ensure that there are no refrigerant or oil leaks, there is no abnormal or unusual vibration or noise from the unit.

Check compressor oil level is correct, minimum oil level is $\frac{1}{4}$ of a sight glass and maximum level should be $\frac{3}{4}$ of a sight glass.

Clean and inspect the condenser coil. Remove any obstacles that may hinder airflow.

Check all fan motors for excessive noise or vibration and check all fans run smoothly.

Check running current and voltage to the unit. Check all electrical wiring and tighten as necessary.

Safety Notice: Do not operate any device which is not stated on the user's manual for safety.

Units manufactured by: Kyung Dong Industrial Co Ltd.

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Kyunggido 413-855

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The following tables give the design condensing temperature for each unit based on a 32°C ambient and the required evaporating temperature.

Installation, commissioning and maintenance.

The following has been issued to aid installation of the KD Scroll range of low noise units. It is important that the following is read and understood before installation is undertaken.

In compiling the contents of this manual it is assumed that qualified and competent refrigeration and electrical engineers will carry out all installation work.

IMPORTANT NOTES:

Check that:-

- 1) The electrical supply available is suitable for the KD Scroll unit being installed.
- 2) The equipment is sited correctly to ensure adequate airflow around it and that discharge air is not drawn back into the unit. (Min 300 mm from condenser face to wall is recommended).
- 3) Allow sufficient space around the unit for maintenance purposes.
- 4) If the unit is to be installed on a roof, check that the structure of the roof is able to stand the weight of the unit.
- 5) Ensure the location of the unit is clear of debris such as leaves, paper etc.
- 6) For best noise reduction mount unit onto anti-vibration mounts.

INSTALLATION.

The KD Scroll is fitted with all necessary components to minimise installation time on site. The units are fitted with compressor contactor, overload, electrical isolator, crankcase heater, start and run capacitors, dual HP/LP switch, pressure operated fan speed controller, liquid line drier/sight glass and liquid receiver. The condenser coil is coated with a blue weatherproof coating suitable for installation in aggressive atmospheres.

The low temperature models using the ZF Copeland scroll have a liquid injection system operated by a discharge temperature control (DTC). This is set at 89.4°C +/- 2.4°C.

Installation is straightforward and should be carried out in accordance with recognised standards of refrigeration practice and in accordance with current IEE regulations and to comply with any relevant local codes of practice.

To use the units on a pump down system a link wire should be fitted between terminals 1 & 2 of the terminal rail. If you wish to use the unit on direct control, a thermostat with volt free contacts can be wired across these terminals.

Full wiring diagrams are included on the removable side panel of the units

The units are supplied with an inert gas holding charge; the unit should be fully evacuated and then charged with R404A/R407F/R134a to a clear sight glass. Where the silver label states the refrigerant type and weight (Kg), this weight is the liquid receiver volume not the total system charge. The total system charge will depend on pipe line sizing and total pipe run. The system should be charged to the expected running pressures for the refrigerant type and to a clear sight glass! The fan speed controller should be linked out of the system during the charging of refrigerant to ensure a correct head pressure is recorded during charging.

Units should be sited in free air with a minimum clearance of 300mm from the condenser face to any obstruction, and 1000mm free air discharge from the condenser fan.

Piping:

Pipework routes should be as short and simple as possible, avoiding low points where oil can accumulate. Pipelines should be sized to ensure the suction gas velocity is sufficient to ensure good oil return.

All copper tube should be dehydrated refrigeration grade only. Nitrogen should be passed through the pipework when brazing to avoid oxidation.

Suction line should be fully insulated and all pipework should be supported at a maximum of 2m intervals.

In vertical risers, the suction riser should be fitted with a U trap at the bottom and a P trap at the top for a rise of 3m or over.

PRE-START UP

For all installations it will be necessary to set the LP switch to ensure effective control if using a pump down cycle, we suggest a setting of 1.5bar (R404A/R407F) or 0.6bar (R134a), but this will be dependent on site conditions. The ZB