KD SCROLL INSTALLATION
AND
OPERATING INSTRUCTIONS.

Thermofrost Cryo
REFRIGERATION & AIR CONDITIONING

Thermofrost Cryo Plc
Ernest Avenue
West Norwood
London
SE27 0DA

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!

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 a 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 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℃, 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℃, at these ambient conditions the unit should be limited to a maximum evaporating temperature of 0℃ 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 ¼ of a sight glass and maximum level should be ¾ 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.
509 Yongmiri
Kwangtanmyon
Paju
Kyunggido 413-855
Republic of Korea

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

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

Model	Capacity in Watts / Condensing temp °C						
Evap Temp °C	10	5	0	-5	-10	-15	-20
1PAL015M1	4893/47.1	4200/45.2	3550/43.4	3000/42.3	2495/41.0	2015/40.6	1650/38.8
1PAL020M1	6800/45.9	5800/43.9	4950/42.4	4150/41.5	3450/40.2	2815/39.2	2260/38.3
1PAL020M3	6800/45.9	5800/43.9	4950/42.4	4150/41.5	3450/40.2	2815/39.2	2260/38.3
1PAL025M1	7900/48.3	6800/46.8	5850/44.8	4950/43.6	4150/42.0	3450/40.8	2820/39.7
1PAL025M3	7900/48.3	6800/46.8	5850/44.8	4950/43.6	4150/42.0	3450/40.8	2820/39.7
1PAL030M1	9600/47.6	8250/46.1	7100/44.2	6000/43.0	5000/41.5	4150/40.3	3400/39.2
1PAL030M3	9600/47.6	8250/46.1	7100/44.2	6000/43.0	5000/41.5	4150/40.3	3400/39.2
1PAL036M1	11300/47.5	9750/45.7	8350/43.9	7000/42.7	5900/41.3	4900/40.0	4000/39.0
1PAL036M3	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
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	Capacity in Watts / Condensing temp °C						
Evap 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 model (L3) are three-phase

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

ECODESIGN DATA

Model 1PAL020M3			
Refrigerant			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-10	°C
Parameters at full load and ambient temperature 32°C			
Rated cooling capacity	P_A	3.64	Kw
Rated power input	D_A	1.72	Kw
Rated COP	COP_A	2.12	
Parameters at full load and ambient temperature 25°C			
Rated cooling capacity	P_A	4.12	Kw
Rated power input	D_A	1.45	Kw
Rated COP	COP_2	2.84	
Parameters at full load and ambient temperature 43°C			
(where applicable)			
Rated cooling capacity	P_A		Kw
Rated power input	D_A		Kw
Rated COP	COP_3		
Other items			
Capacity Control	Fixed		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 1PAL020M1			
Refrigerant			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-10	°C
Parameters at full load and ambient temperature 32°C			
Rated cooling capacity	P_A	3.64	Kw
Rated power input	D_A	1.72	Kw
Rated COP	COP_A	2.12	
Parameters at full load and ambient temperature 25°C			
Rated cooling capacity	P_A	4.12	Kw
Rated power input	D_A	1.45	Kw
Rated COP	COP_2	2.84	
Parameters at full load and ambient temperature 43°C			
(where applicable)			
Rated cooling capacity	P_A		Kw
Rated power input	D_A		Kw
Rated COP	COP_3		
Other items			
Capacity Control	Fixed		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 1PAL020M3			
Refrigerant			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-10	°C
Parameters at full load and ambient temperature 32°C			
Rated cooling capacity	P_A	3.64	Kw
Rated power input	D_A	1.72	Kw
Rated COP	COP_A	2.12	
Parameters at full load and ambient temperature 25°C			
Rated cooling capacity	P_A	4.12	Kw
Rated power input	D_A	1.45	Kw
Rated COP	COP_2	2.84	
Parameters at full load and ambient temperature 43°C			
(where applicable)			
Rated cooling capacity	P_A		Kw
Rated power input	D_A		Kw
Rated COP	COP_3		
Other items			
Capacity Control	Fixed		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 1PAL025M1			
Refrigerant			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-10	°C
Parameters at full load and ambient temperature 32°C			
Rated cooling capacity	P_A	4.11	Kw
Rated power input	D_A	2.06	Kw
Rated COP	COP_A	2.00	
Parameters at full load and ambient temperature 25°C			
Rated cooling capacity	P_A	4.58	Kw
Rated power input	D_A	1.77	Kw
Rated COP	COP_2	2.59	
Parameters at full load and ambient temperature 43°C			
(where applicable)			
Rated cooling capacity	P_A		Kw
Rated power input	D_A		Kw
Rated COP	COP_3		
Other items			
Capacity Control	Fixed		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 1PAL025M3			
Refrigerant			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-10	°C
Parameters at full load and ambient temperature 32°C			
Rated cooling capacity	P_A	4.11	Kw
Rated power input	D_A	2.06	Kw
Rated COP	COP_A	2.00	
Parameters at full load and ambient temperature 25°C			
Rated cooling capacity	P_A	4.58	Kw
Rated power input	D_A	1.77	Kw
Rated COP	COP_2	2.59	
Parameters at full load and ambient temperature 43°C			
(where applicable)			
Rated cooling capacity	P_A		Kw
Rated power input	D_A		Kw
Rated COP	COP_3		
Other items			
Capacity Control	Fixed		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 1PAL030M1			
Refrigerant R404A			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-10	°C
Annual Electrical Consumption	Q	8,765	KWh/a
Seasonal energy performance ratio	SEPR	3.74	
Parameters at full load and ambient temperature 32°C			
(Point A)			
Declared Cooling capacity	P_A	5.33	Kw
Declared power input	D_A	2.46	Kw
Rated COP	COP A	2.17	
Parameters at full load and ambient temperature 25°C			
(Point B)			
Declared Cooling capacity	P_A	5.94	Kw
Declared power input	D_A	2.10	Kw
Rated COP	COP B	2.83	
Parameters at full load and ambient temperature 15°C			
(Point C)			
Declared Cooling capacity	P_A	6.75	Kw
Declared power input	D_A	1.69	Kw
Rated COP	COP C	3.99	
Parameters at full load and ambient temperature 5°C			
(Point D)			
Declared Cooling capacity	P_A	7.46	Kw
Declared power input	D_A	1.36	Kw
Rated COP	COP D	5.49	
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_3		
Power input	D_3		
Declared COP	COP_3		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 1PAL030M3			
Refrigerant R404A			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-10	°C
Annual Electrical Consumption	Q	8,765	KWh/a
Seasonal energy performance ratio	SEPR	3.74	
Parameters at full load and ambient temperature 32°C			
(Point A)			
Declared Cooling capacity	P_A	5.33	Kw
Declared power input	D_A	2.46	Kw
Rated COP	COP A	2.17	
Parameters at full load and ambient temperature 25°C			
(Point B)			
Declared Cooling capacity	P_A	5.94	Kw
Declared power input	D_A	2.10	Kw
Rated COP	COP B	2.83	
Parameters at full load and ambient temperature 15°C			
(Point C)			
Declared Cooling capacity	P_A	6.75	Kw
Declared power input	D_A	1.69	Kw
Rated COP	COP C	3.99	
Parameters at full load and ambient temperature 5°C			
(Point D)			
Declared Cooling capacity	P_A	7.46	Kw
Declared power input	D_A	1.36	Kw
Rated COP	COP D	5.49	
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_3		
Power input	D_3		
Declared COP	COP_3		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 1PAL036M3			
Refrigerant R404A			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-10	°C
Annual Electrical Consumption	Q	11,739	KWh/a
Seasonal energy performance ratio	SEPR	3.02	
Parameters at full load and ambient temperature 32°C			
(Point A)			
Declared Cooling capacity	P_A	5.76	Kw
Declared power input	D_A	3.17	Kw
Rated COP	COP A	1.82	
Parameters at full load and ambient temperature 25°C			
(Point B)			
Declared Cooling capacity	P_A	6.42	Kw
Declared power input	D_A	2.76	Kw
Rated COP	COP B	2.33	
Parameters at full load and ambient temperature 15°C			
(Point C)			
Declared Cooling capacity	P_A	7.32	Kw
Declared power input	D_A	2.27	Kw
Rated COP	COP C	3.22	
Parameters at full load and ambient temperature 5°C			
(Point D)			
Declared Cooling capacity	P_A	8.18	Kw
Declared power input	D_A	1.89	Kw
Rated COP	COP D	4.40	
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_3		
Power input	D_3		
Declared COP	COP_3		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 1PAL036M1			
Refrigerant R404A			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-10	°C
Annual Electrical Consumption	Q	11,739	KWh/a
Seasonal energy performance ratio	SEPR	3.02	
Parameters at full load and ambient temperature 32°C			
(Point A)			
Declared Cooling capacity	P_A	5.76	Kw
Declared power input	D_A	3.17	Kw
Rated COP	COP A	1.82	
Parameters at full load and ambient temperature 25°C			
(Point B)			
Declared Cooling capacity	P_A	6.42	Kw
Declared power input	D_A	2.76	Kw
Rated COP	COP B	2.33	
Parameters at full load and ambient temperature 15°C			
(Point C)			
Declared Cooling capacity	P_A	7.32	Kw
Declared power input	D_A	2.27	Kw
Rated COP	COP C	3.22	
Parameters at full load and ambient temperature 5°C			
(Point D)			
Declared Cooling capacity	P_A	8.18	Kw
Declared power input	D_A	1.89	Kw
Rated COP	COP D	4.40	
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_3		
Power input	D_3		
Declared COP	COP_3		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 1PAL040M3			
Refrigerant R404A			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-10	°C
Annual Electrical Consumption	Q	11,367	KWh/a
Seasonal energy performance ratio	SEPR	3.71	
Parameters at full load and ambient temperature 32°C			
(Point A)			
Declared Cooling capacity	P_A	6.86	Kw
Declared power input	D_A	3.25	Kw
Rated COP	COP A	2.11	
Parameters at full load and ambient temperature 25°C			
(Point B)			
Declared Cooling capacity	P_A	7.62	Kw
Declared power input	D_A	2.77	Kw
Rated COP	COP B	2.75	
Parameters at full load and ambient temperature 15°C			
(Point C)			
Declared Cooling capacity	P_A	8.66	Kw
Declared power input	D_A	2.20	Kw
Rated COP	COP C	3.94	
Parameters at full load and ambient temperature 5°C			
(Point D)			
Declared Cooling capacity	P_A	9.66	Kw
Declared power input	D_A	1.74	Kw
Rated COP	COP D	5.55	
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_3		
Power input	D_3		
Declared COP	COP_3		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 2PAL050M3			
Refrigerant R404A			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-10	°C
Annual Electrical Consumption	Q	14,923	KWh/a
Seasonal energy performance ratio	SEPR	3.65	
Parameters at full load and ambient temperature 32°C			
(Point A)			
Declared Cooling capacity	P_A	8.85	Kw
Declared power input	D_A	4.24	Kw
Rated COP	COP A	2.09	
Parameters at full load and ambient temperature 25°C			
(Point B)			
Declared Cooling capacity	P_A	9.92	Kw
Declared power input	D_A	3.65	Kw
Rated COP	COP B	2.72	
Parameters at full load and ambient temperature 15°C			
(Point C)			
Declared Cooling capacity	P_A	11.35	Kw
Declared power input	D_A	2.93	Kw
Rated COP	COP C	3.87	
Parameters at full load and ambient temperature 5°C			
(Point D)			
Declared Cooling capacity	P_A	12.75	Kw
Declared power input	D_A	2.33	Kw
Rated COP	COP D	5.47	
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_3		
Power input	D_3		
Declared COP	COP_3		
Contact Details	hofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 2PAL075M3			
Refrigerant R404A			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-10	°C
Annual Electrical Consumption	Q	19,895	KWh/a
Seasonal energy performance ratio	SEPR	3.63	
Parameters at full load and ambient temperature 32°C			
(Point A)			
Declared Cooling capacity	P_A	11.75	Kw
Declared power input	D_A	5.66	Kw
Rated COP	COP A	2.08	
Parameters at full load and ambient temperature 25°C			
(Point B)			
Declared Cooling capacity	P_A	13.20	Kw
Declared power input	D_A	4.83	Kw
Rated COP	COP B	2.73	
Parameters at full load and ambient temperature 15°C			
(Point C)			
Declared Cooling capacity	P_A	15.10	Kw
Declared power input	D_A	3.87	Kw
Rated COP	COP C	3.90	
Parameters at full load and ambient temperature 5°C			
(Point D)			
Declared Cooling capacity	P_A	16.75	Kw
Declared power input	D_A	3.13	Kw
Rated COP	COP D	5.35	
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_3		
Power input	D_3		
Declared COP	COP_3		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 2PAL090M3			
Refrigerant		R404A	
Item	Symbol	Value	Unit
Evaporating Temperature	t	-10.00	°C
Annual Electrical Consumption	Q	31,391	KWh/a
Seasonal energy performance ratio	SEPR	3.58	
Parameters at full load and ambient temperature 32°C			
(Point A)			
Declared Cooling capacity	P_A	18.30	Kw
Declared power input	D_A	8.35	Kw
Rated COP	COP A	2.19	
Parameters at full load and ambient temperature 25°C			
(Point B)			
Declared Cooling capacity	P_A	20.40	Kw
Declared power input	D_A	7.24	Kw
Rated COP	COP B	2.82	
Parameters at full load and ambient temperature 15°C			
(Point C)			
Declared Cooling capacity	P_A	23.10	Kw
Declared power input	D_A	5.97	Kw
Rated COP	COP C	3.87	
Parameters at full load and ambient temperature 5°C			
(Point D)			
Declared Cooling capacity	P_A	25.60	Kw
Declared power input	D_A	4.97	Kw
Rated COP	COP D	5.15	
Other items			
Capacity Control	Fixed		
Degradation coefficient for fixed and			
staged capacity unit	Cdc		
Parameters at full low and ambient temperature 43°C			
(where applicable)			
Cooling capacity	P_3		
Power input	D_3		
Declared COP	COP_3		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 2PAL100M3			
Refrigerant R404A			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-10	°C
Annual Electrical Consumption	Q	31,391	KWh/a
Seasonal energy performance ratio	SEPR	3.58	
Parameters at full load and ambient temperature 32°C			
(Point A)			
Declared Cooling capacity	P_A	18.30	Kw
Declared power input	D_A	8.35	Kw
Rated COP	COP A	2.19	
Parameters at full load and ambient temperature 25°C			
(Point B)			
Declared Cooling capacity	P_A	20.40	Kw
Declared power input	D_A	7.24	Kw
Rated COP	COP B	2.82	
Parameters at full load and ambient temperature 15°C			
(Point C)			
Declared Cooling capacity	P_A	2.31	Kw
Declared power input	D_A	5.97	Kw
Rated COP	COP C	3.87	
Parameters at full load and ambient temperature 5°C			
(Point D)			
Declared Cooling capacity	P_A	25.60	Kw
Declared power input	D_A	4.97	Kw
Rated COP	COP D	5.15	
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_3		
Power input	D_3		
Declared COP	COP_3		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 1PAL030L3			
Refrigerant R404A			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-35	°C
Annual Electrical Consumption	Q	8,786	KWh/a
Seasonal energy performance ratio	SEPR	1.72	
Parameters at full load and ambient temperature 32°C			
(Point A)			
Declared Cooling capacity	P_A	2.03	Kw
Declared power input	D_A	1.80	Kw
Rated COP	COP A	1.13	
Parameters at full load and ambient temperature 25°C			
(Point B)			
Declared Cooling capacity	P_A	2.19	Kw
Declared power input	D_A	1.59	Kw
Rated COP	COP B	1.38	
Parameters at full load and ambient temperature 15°C			
(Point C)			
Declared Cooling capacity	P_A	2.41	Kw
Declared power input	D_A	1.36	Kw
Rated COP	COP C	1.77	
Parameters at full load and ambient temperature 5°C			
(Point D)			
Declared Cooling capacity	P_A	2.63	Kw
Declared power input	D_A	1.19	Kw
Rated COP	COP D	2.21	
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_3		
Power input	D_3		
Declared COP	COP_3		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 1PAL035L3			
Refrigerant R404A			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-35	°C
Annual Electrical Consumption	Q	10,973	KWh/a
Seasonal energy performance ratio	SEPR	1.72	
Parameters at full load and ambient temperature 32°C			
(Point A)			
Declared Cooling capacity	P_A	2.53	Kw
Declared power input	D_A	2.21	Kw
Rated COP	COP A	1.14	
Parameters at full load and ambient temperature 25°C			
(Point B)			
Declared Cooling capacity	P_A	2.74	Kw
Declared power input	D_A	1.97	Kw
Rated COP	COP B	1.39	
Parameters at full load and ambient temperature 15°C			
(Point C)			
Declared Cooling capacity	P_A	3.00	Kw
Declared power input	D_A	1.70	Kw
Rated COP	COP C	1.76	
Parameters at full load and ambient temperature 5°C			
(Point D)			
Declared Cooling capacity	P_A	3.25	Kw
Declared power input	D_A	1.48	Kw
Rated COP	COP D	2.20	
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_3		
Power input	D_3		
Declared COP	COP_3		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 1PAL040L3			
Refrigerant R404A			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-35	°C
Annual Electrical Consumption	Q	10,994	KWh/a
Seasonal energy performance ratio	SEPR	1.95	
Parameters at full load and ambient temperature 32°C			
(Point A)			
Declared Cooling capacity	P_A	2.88	Kw
Declared power input	D_A	2.34	Kw
Rated COP	COP A	1.23	
Parameters at full load and ambient temperature 25°C			
(Point B)			
Declared Cooling capacity	P_A	3.14	Kw
Declared power input	D_A	2.06	Kw
Rated COP	COP B	1.52	
Parameters at full load and ambient temperature 15°C			
(Point C)			
Declared Cooling capacity	P_A	3.50	Kw
Declared power input	D_A	1.75	Kw
Rated COP	COP C	2.00	
Parameters at full load and ambient temperature 5°C			
(Point D)			
Declared Cooling capacity	P_A	3.87	Kw
Declared power input	D_A	1.50	Kw
Rated COP	COP D	2.58	
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_3		
Power input	D_3		
Declared COP	COP_3		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 2PAL050L3			
Refrigerant R404A			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-35	°C
Annual Electrical Consumption	Q	14,711	KWh/a
Seasonal energy performance ratio	SEPR	1.79	
Parameters at full load and ambient temperature 32°C			
(Point A)			
Declared Cooling capacity	P_A	3.54	Kw
Declared power input	D_A	3.11	Kw
Rated COP	COP A	1.14	
Parameters at full load and ambient temperature 25°C			
(Point B)			
Declared Cooling capacity	P_A	3.87	Kw
Declared power input	D_A	2.76	Kw
Rated COP	COP B	1.40	
Parameters at full load and ambient temperature 15°C			
(Point C)			
Declared Cooling capacity	P_A	4.32	Kw
Declared power input	D_A	2.34	Kw
Rated COP	COP C	1.85	
Parameters at full load and ambient temperature 5°C			
(Point D)			
Declared Cooling capacity	P_A	4.73	Kw
Declared power input	D_A	2.01	Kw
Rated COP	COP D	2.35	
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_3		
Power input	D_3		
Declared COP	COP_3		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 2PAL060L3			
Refrigerant R404A			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-35	°C
Annual Electrical Consumption	Q	17,049	KWh/a
Seasonal energy performance ratio	SEPR	1.81	
Parameters at full load and ambient temperature 32°C			
(Point A)			
Declared Cooling capacity	P_A	4.14	Kw
Declared power input	D_A	3.69	Kw
Rated COP	COP A	1.12	
Parameters at full load and ambient temperature 25°C			
(Point B)			
Declared Cooling capacity	P_A	4.57	Kw
Declared power input	D_A	3.17	Kw
Rated COP	COP B	1.44	
Parameters at full load and ambient temperature 15°C			
(Point C)			
Declared Cooling capacity	P_A	5.12	Kw
Declared power input	D_A	2.70	Kw
Rated COP	COP C	1.90	
Parameters at full load and ambient temperature 5°C			
(Point D)			
Declared Cooling capacity	P_A	5.60	Kw
Declared power input	D_A	2.40	Kw
Rated COP	COP D	2.33	
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_3		
Power input	D_3		
Declared COP	COP_3		
Contact Details	Thermofrost Cryo Ltd		
	Ernest Avenue		
	West Norwood		
	London SE27 0DA		

Model 2PAL075L3			
Refrigerant R404A			
Item	Symbol	Value	Unit
Evaporating Temperature	t	-35	°C
Annual Electrical Consumption	Q	22,883	KWh/a
Seasonal energy performance ratio	SEPR	1.70	
Parameters at full load and ambient temperature 32°C			
(Point A)			
Declared Cooling capacity	P_A	5.23	Kw
Declared power input	D_A	4.67	Kw
Rated COP	COP A	1.12	
Parameters at full load and ambient temperature 25°C			
(Point B)			
Declared Cooling capacity	P_A	5.68	Kw
Declared power input	D_A	4.20	Kw
Rated COP	COP B	1.35	
Parameters at full load and ambient temperature 15°C			
(Point C)			
Declared Cooling capacity	P_A	6.23	Kw
Declared power input	D_A	3.58	Kw
Rated COP	COP C	1.74	
Parameters at full load and ambient temperature 5°C			
(Point D)			
Declared Cooling capacity	P_A	6.75	Kw
Declared power input	D_A	3.06	Kw
Rated COP	COP D	2.21	
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_3		
Power input	D_3		
Declared COP	COP_3		
Contact Details	Thermofrost Cryo Ltd		
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	West Norwood		
	London SE27 0DA		

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