COMMERCIAL CONDENSING UNITS
TECHNICAL MANUAL

V3

V3 FUSION DIGITAL TWIN SCROLL
Commercial Condensing Units
Variable Capacity

Medium Temperature Applications

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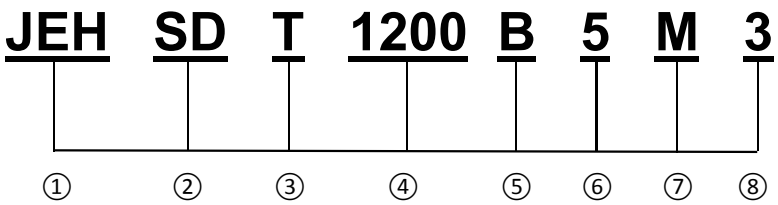
CE

J&E Hall International

Contents

Nomenclature



①	J & E Hall International	⑤	Unit Generation
②	SD: Digital Scroll	⑥	Unit Series
③	T: Twin Compressor	⑦	M: Medium Temperature
④	Approximate HP (1200 = 12.0hp; 1600 = 16.0hp)	⑧	Power Supply: 3: 400V / 3Ph / 50Hz

Standard Product Configuration

Digital Twin Scroll

- Copeland hermetic scroll compressors - ZBD & ZB (Digital & Fixed)
- Variable compressor capacity control
- 18 litre horizontal liquid receiver with PRV
- Fitted liquid line drier & sight glass
- External service valves
- Ball valves on compressors
- Check valve in discharge line
- Oil separator/reservoir with return line isolation valve
- OM 3 oil management system
- High & Low pressure transducers
- Manual low pressure switch (adjustable)
- High pressure switches on compressors (Fixed cartridge type)
- Gomex flexible pressure hoses
- IP rated control panel
- Mains isolator
- Phase protection module
- Compressor manual motor starters with short circuit and overload protection
- Compressor contactors
- Advanced programmable controller
- LCD display
- Step Down Transformer 240V to 24V
- Fuse protection on controller, fan speed controller and backup system
- Mechanical by-pass circuit
- AC modulation fan speed control to both fans
- External indicator lights
- Alarm relay (volt free)
- Crankcase heaters on compressors
- Acoustic insulation to compressor compartment
- Operates with refrigerants R404A, R407A, R407F, R448A & R449A
- BACnet and Modbus Protocol feature (Additional Serial Card required)

Specifications

Unit Data

Unit Model	Compressor			Oil Sep. Charge	Oil Type	Electrical Data					Coil Volume	Liquid Receiver	Airflow	Connections		Unit Dry Weight	SPL @ 10m [d]
						Compressor			Fan Motors								
	Type	Swept Volume	Oil Charge			NC [a]	MCC [b]	LRC [c]	No.	FLC				Liquid	Suction		
		(m³/h)	(Litres)	(Litres)		(A)	(A)	(A)		(A)	(Litres)	(Litres)	(m³/h)	(inch)	(inch)	(kgs)	dB(A)
JEHSDT-1200-B5-M-3	ZB45KQE-TFD	17.10	1.89	1.5	A	9.2	13.5	74.0	2	1.8	9.4	18.0	7500	3/4	1 3/8	315	42
	ZBD45KQE-TFD	17.10	1.89			7.5	14.2	74.0									
JEHSDT-1600-B6-M-3	ZB57KCE-TFD	21.40	1.89	1.5		9.7	21.3	102.0	2	1.8	19.0	18.0	8200	3/4	1 3/8	380	44
	ZBD57KCE-TFD	21.40	1.89			9.7	21.3	102.0									

Oil Type A = Polyolester Oil - (Copeland Ultra 22 CC, Copeland Ultra 32 CC, Copeland Ultra 32-3MAF, Mobil EAL Arctic 22CC, Uniqema Emkarate RL32CF)

[a] NC = Nominal Current @ condition -10°Cte / +32°Cta MT with R448A refrigerant

[b] MCC = Maximum Continuous Current

[c] LRC = Locked Rotor Current

[d] Sound Pressure Level measured in an anechoic room (-10/+32°C) MT conditions. Alternative conditions may produce different results

Unit Dimensions

Model	Overall Dimensions (mm)				Mounting Dimensions (mm)	
	W	D	H		W	D
JEHSDT-1200-B5-M-3	1387	851	1697		940	808
JEHSDT-1600-B6-M-3	1735	854	1727		Refer to drawing (page 38)	808

Performance Data:

The performance data shown on pages 5 to 10 have the following criteria:

- TE: Evaporating Temperature
- TA: Ambient Temperature
- HP: Approximate Compressor Horsepower
- CC: Cooling Capacity (Watts)
- PC: Power Consumed (Watts)
- COP: Coefficient of Performance
- Data presented in accordance with BS EN13215:2016

Specifications

Performance Data Medium Temperature (R404A): 10K SH / 0K SC

MODEL	HP	Ta / Te	(Watts)	-30	-25	-20	-15	-10	-5	0	5	10
JEHSDT-1200-B5-M-3	12	27	CC			15480	18440	21800	25600	29900	35000	41000
		27	PC			7100	7760	8440	9120	9780	10420	11020
		27	COP			2.18	2.38	2.58	2.81	3.06	3.36	3.72
		32	CC			14000	16640	19620	23000	26900	31500	37000
		32	PC			7900	8620	9340	10040	10740	11380	11980
		32	COP			1.77	1.93	2.10	2.29	2.50	2.77	3.09
		35	CC			13050	15500	18260	21390	25050	29700	34500
		35	PC			8460	9210	9960	10690	11410	11950	12670
		35	COP			1.54	1.68	1.83	2.00	2.20	2.49	2.72
		38	CC			12100	14360	16900	19780	23200	27900	32000
		38	PC			9020	9800	10580	11340	12080	12520	13360
		38	COP			1.34	1.47	1.60	1.74	1.92	2.23	2.40
		43	CC			10420	12340	14480	16920			
		43	PC			10080	10920	11760	12580			
		43	COP			1.03	1.13	1.23	1.34			
JEHSDT-1600-B6-M-3	16	27	CC			18200	21800	25600	29900	34700	40200	45800
		27	PC			9960	10760	11660	12540	13380	14120	14960
		27	COP			1.83	2.03	2.20	2.38	2.59	2.85	3.06
		32	CC			17020	20600	24200	27800	32000	36800	42000
		32	PC			10620	11380	12260	13340	14280	15160	16000
		32	COP			1.60	1.81	1.97	2.08	2.24	2.43	2.63
		35	CC			16570	19790	23100	26500	30350	34700	
		35	PC			10880	11770	12750	13840	14860	15820	
		35	COP			1.52	1.69	1.82	1.92	2.05	2.19	
		38	CC			16120	18980	22000	25200	28700		
		38	PC			11140	12160	13240	14340	15440		
		38	COP			1.45	1.56	1.66	1.76	1.86		
		43	CC			15080	17580	20200	22900			
		43	PC			11760	12900	14060	15260			
		43	COP			1.28	1.36	1.44	1.50			

Specifications

Performance Data Medium Temperature (R407A): 10K SH / 0K SC

MODEL	HP	Ta \ Te	(Watts)	-30	-25	-20	-15	-10	-5	0	5	10
JEHSDT-1200-B5-M-3	12	27	CC				15780	19240	23200	27800	33000	
		27	PC				7860	8360	8860	9280	9660	
		27	COP				2.01	2.30	2.62	3.00	3.42	
		32	CC				14300	17480	21200	25400	30200	
		32	PC				9060	9560	10060	10520	10900	
		32	COP				1.58	1.83	2.11	2.41	2.77	
		35	CC					16390	19860	23800		
		35	PC					10440	10900	11360		
		35	COP					1.57	1.82	2.10		
		38	CC					15300				
		38	PC					11320				
		38	COP					1.35				
		43	CC									
		43	PC									
		43	COP									
JEHSDT-1600-B6-M-3	16	27	CC				20600	25000	30100	35800	42200	
		27	PC				11420	12180	12960	13700	14400	
		27	COP				1.80	2.05	2.32	2.61	2.93	
		32	CC				19480	23800	28300	33600		
		32	PC				12320	13020	14020	14880		
		32	COP				1.58	1.83	2.02	2.26		
		35	CC					22850	27250			
		35	PC					13740	14730			
		35	COP					1.67	1.86			
		38	CC					21900	26200			
		38	PC					14460	15440			
		38	COP					1.51	1.70			
		43	CC									
		43	PC									
		43	COP									

Specifications

Performance Data Medium Temperature (R407F): 10K SH / 0K SC

MODEL	HP	Ta \ Te	(Watts)	-30	-25	-20	-15	-10	-5	0	5	10
JEHSDT-1200-B5-M-3	12	27	CC				17520	21200	25400	30000	35100	
		27	PC				7800	8560	9320	10040	10700	
		27	COP				2.25	2.48	2.73	2.99	3.28	
		32	CC				15760	19440	23500	27900	32800	
		32	PC				8640	9460	10260	11060	11780	
		32	COP				1.82	2.05	2.29	2.52	2.78	
		35	CC				14380	18010	22100	26600	31500	
		35	PC				9220	10070	10910	11720	12380	
		35	COP				1.56	1.79	2.03	2.27	2.54	
		38	CC					16580	20700			
		38	PC					10680	11560			
		38	COP					1.55	1.79			
		43	CC									
		43	PC									
		43	COP									
JEHSDT-1600-B6-M-3	16	27	CC				20850	25450	30650	36450	43000	
		27	PC				10970	11880	12750	13570	14300	
		27	COP				1.90	2.14	2.40	2.69	3.01	
		32	CC				19650	24250	28950	34300	40300	
		32	PC				11660	12560	13660	14610	15490	
		32	COP				1.69	1.93	2.12	2.35	2.60	
		35	CC				18910	23225	27825	32950		
		35	PC				11700	13115	14235	14850		
		35	COP				1.62	1.78	1.96	2.22		
		38	CC					22200	26700			
		38	PC					13670	14810			
		38	COP					1.62	1.80			
		43	CC									
		43	PC									
		43	COP									

Specifications

Performance Data Medium Temperature (R448A/R449A): 10K SH / 0K SC

MODEL	HP	Ta \ Te	(Watts)	-30	-25	-20	-15	-10	-5	0	5	10
JEHSDT-1200-B5-M-3	12	27	CC				16820	20400	24400	29000	34300	40600
		27	PC				7700	8420	9140	9840	10520	11160
		27	COP				2.18	2.42	2.67	2.95	3.26	3.64
		32	CC				15480	18800	22600	26900	31900	37800
		32	PC				8560	9360	10140	10880	11560	12220
		32	COP				1.81	2.01	2.23	2.47	2.76	3.09
		35	CC				14620	17810	21400	25550	30350	36000
		35	PC				9170	10020	10840	11610	12320	12960
		35	COP				1.59	1.78	1.97	2.20	2.46	2.78
		38	CC				13760	16820	20200	24200	28800	
		38	PC				9780	10680	11540	12340	13080	
		38	COP				1.41	1.57	1.75	1.96	2.20	
		43	CC									
		43	PC									
		43	COP									
JEHSDT-1600-B6-M-3	16	27	CC				20500	24700	29500	35050	41500	48500
		27	PC				9780	10750	11830	12980	14180	15590
		27	COP				2.10	2.30	2.49	2.70	2.93	3.11
		32	CC				19570	23700	28050	33200	39250	46100
		32	PC				10310	11260	12490	13740	15070	16490
		32	COP				1.90	2.10	2.25	2.42	2.60	2.80
		35	CC				18990	22900	27150	32075	37800	
		35	PC				10675	11695	12930	14245	15630	
		35	COP				1.78	1.96	2.10	2.26	2.42	
		38	CC				18410	22100	26250	30950		
		38	PC				11040	12130	13370	14750		
		38	COP				1.67	1.82	1.96	2.10		
		43	CC				17390	20800				
		43	PC				11700	12850				
		43	COP				1.49	1.62				

Specifications

Performance Data Medium Temperature (R404A): 20°C RGT / 0K SC

MODEL	HP	Ta \ Te	(Watts)	-30	-25	-20	-15	-10	-5	0	5	10
JEHSDT-1200-B5-M-3	12	27	CC			16720	19720	23000	26700	30900	35500	41000
		27	PC			7100	7760	8440	9120	9780	10420	11020
		27	COP			2.35	2.54	2.73	2.93	3.16	3.41	3.72
		32	CC			15380	18100	21100	24300	28000	32200	37000
		32	PC			7900	8620	9340	10040	10740	11380	11980
		32	COP			1.95	2.10	2.26	2.42	2.61	2.83	3.09
		35	CC			14530	17050	19810	22800	26200	30400	34500
		35	PC			8460	9210	9960	10690	11410	11950	12670
		35	COP			1.72	1.85	1.99	2.13	2.30	2.54	2.72
		38	CC			13680	16000	18520	21300	24400	28600	32000
		38	PC			9020	9800	10580	11340	12080	12520	13360
		38	COP			1.52	1.63	1.75	1.88	2.02	2.28	2.40
		43	CC				14160	16280	18560			
		43	PC				10920	11760	12580			
		43	COP				1.30	1.38	1.48			
JEHSDT-1600-B6-M-3	16	27	CC			19980	23600	27400	31500	36100	41000	45800
		27	PC			9960	10760	11660	12540	13380	14120	14960
		27	COP			2.01	2.19	2.35	2.51	2.70	2.90	3.06
		32	CC			18900	22500	26100	29600	33500	37700	42000
		32	PC			10620	11380	12260	13340	14280	15160	16000
		32	COP			1.78	1.98	2.13	2.22	2.35	2.49	2.63
		35	CC			18500	21750	25100	28350	31900	35600	
		35	PC			10880	11770	12750	13840	14860	15820	
		35	COP			1.70	1.85	1.97	2.05	2.15	2.25	
		38	CC			18100	21000	24100	27100	30300		
		38	PC			11140	12160	13240	14340	15440		
		38	COP			1.62	1.73	1.82	1.89	1.96		
		43	CC			17160	19760	22400	24900			
		43	PC			11760	12900	14060	15260			
		43	COP			1.46	1.53	1.59	1.63			

Specifications

Performance Data Medium Temperature (R407F): 20°C RGT / 0K SC

MODEL	HP	Ta \ Te	(Watts)	-30	-25	-20	-15	-10	-5	0	5	10
JEHSDT-1200-B5-M-3	12	27	CC				17820	21500	25700	30200	35300	
		27	PC				7800	8560	9320	10040	10700	
		27	COP				2.28	2.51	2.76	3.01	3.30	
		32	CC					19860	23900	28300	33000	
		32	PC					9460	10260	11060	11780	
		32	COP					2.10	2.33	2.56	2.80	
		35	CC						22600	26900	31700	
		35	PC						10900	11720	12380	
		35	COP						2.07	2.30	2.56	
		38	CC									
		38	PC									
		38	COP									
		43	CC									
		43	PC									
		43	COP									

Performance Data Medium Temperature (R448A/R449A): 20°C RGT / 0K SC

MODEL	HP	Ta \ Te	(Watts)	-30	-25	-20	-15	-10	-5	0	5	10
JEHSDT-1200-B5-M-3	12	27	CC				17340	20900	24900	29400	34600	40600
		27	PC				7700	8420	9140	9840	10520	11160
		27	COP				2.25	2.48	2.72	2.99	3.29	3.64
		32	CC				16120	19440	23200	27400	32200	37800
		32	PC				8560	9360	10140	10880	11560	12220
		32	COP				1.88	2.08	2.29	2.52	2.79	3.09
		35	CC				15340	18510	22100	26100	30700	
		35	PC				9140	10020	10840	11610	12320	
		35	COP				1.68	1.85	2.04	2.25	2.49	
		38	CC					17580	21000	24800	29200	
		38	PC					10680	11540	12340	13080	
		38	COP					1.65	1.82	2.01	2.23	
		43	CC									
		43	PC									
		43	COP									
JEHSDT-1600-B6-M-3	16	27	CC				21250	25400	30200	35650	41900	48500
		27	PC				9780	10750	11830	12980	14180	15590
		27	COP				2.17	2.36	2.55	2.75	2.95	3.11
		32	CC				20400	24550	28800	33900	39650	46100
		32	PC				10310	11260	12490	13740	15070	16490
		32	COP				1.98	2.18	2.31	2.47	2.63	2.80
		35	CC				19860	23800	27975	32825	38300	
		35	PC				10675	11695	12930	14245	15630	
		35	COP				1.86	2.04	2.17	2.31	2.45	
		38	CC				19320	23050	27150	31750		
		38	PC				11040	12130	13370	14750		
		38	COP				1.75	1.90	2.03	2.15		
		43	CC					21900				
		43	PC					12850				
		43	COP					1.70				

Specifications

Product Information based on the requirements of Commission Regulation EU 2015/1095

Model : JEHSDT-1200-B5-M-3

Refrigerant fluid:		**R404A**	**R407A**	**R407F**	**R448A**	**R449A**	
Item	**Symbol**	**Value**					**Unit**
Evaporating temperature*	*t*	-10					°C
Annual electricity consumption	*Q*	41034	39743	42887	42697	42697	kWh/a
Seasonal Energy Performance Ratio	*SEPR*	2.94	2.70	2.79	2.71	2.71	
Parameters at full load and ambient temperature 32°C (Point A)							
Rated cooling capacity	P_A	19.62	17.48	19.44	18.80	18.80	kW
Rated power input	D_A	9.34	9.56	9.46	9.36	9.36	kW
Rated COP	COP_A	2.10	1.83	2.05	2.01	2.01	
Parameters at part load and ambient temperature 25°C (Point B)							
Declared cooling capacity	P_B	21.500	19.000	21.000	20.200	20.200	kW
Declared power input	D_B	8.560	8.520	8.680	8.540	8.540	kW
Declared COP	COP_B	2.51	2.23	2.42	2.37	2.37	
Parameters at part load and ambient temperature 15°C (Point C)							
Declared cooling capacity	P_C	24.100	21.100	22.900	22.000	22.000	kW
Declared power input	D_C	7.540	7.220	7.620	7.520	7.520	kW
Declared COP	COP_C	3.20	2.92	3.01	2.93	2.93	
Parameters at part load and ambient temperature 5°C (Point D)							
Declared cooling capacity	P_D	26.300	22.700	24.400	23.600	23.600	kW
Declared power input	D_D	6.800	6.260	6.780	6.800	6.800	kW
Declared COP	COP_D	3.87	3.63	3.60	3.47	3.47	
Parameters at full load and ambient temperature 43°C							
Cooling capacity	P_3	14.48	*N/A*	*N/A*	*N/A*	*N/A*	kW
Power input	D_3	11.76	*N/A*	*N/A*	*N/A*	*N/A*	kW
Declared COP	COP_3	1.23	*N/A*	*N/A*	*N/A*	*N/A*	
Other items							
Capacity control		Variable					
Coefficient of degradation for fixed and staged capacity units*	*Cd*	0.25					
Contact details		Daikin Refrigeration Malaysia Sdn. Bhd. Lot 10, Jalan Perusahaan 8, Kawasan Perusahaan Pekan Banting, 42700 Banting, Selangor Darul Ehsan.					

Note: Published data based on condition - superheat 10K.

Specifications

Product Information based on the requirements of Commission Regulation EU 2015/1095

Model : JEHSDT-1200-B5-M-3

Refrigerant fluid:		**R404A**	**R407F**	**R448A**	**R449A**	
Item	**Symbol**	**Value**				**Unit**
Evaporating temperature*	*t*	-10				°C
Annual electricity consumption	*Q*	42003	43363	43274	43274	kWh/a
Seasonal Energy Performance Ratio	*SEPR*	3.09	2.82	2.76	2.76	
Parameters at full load and ambient temperature 32°C (Point A)						
Rated cooling capacity	P_A	21.10	19.86	19.44	19.44	kW
Rated power input	D_A	9.34	9.46	9.36	9.36	kW
Rated COP	COP_A	2.26	2.10	2.08	2.08	
Parameters at part load and ambient temperature 25°C (Point B)						
Declared cooling capacity	P_B	22.800	21.300	20.700	20.700	kW
Declared power input	D_B	8.560	8.680	8.540	8.540	kW
Declared COP	COP_B	2.66	2.45	2.42	2.42	
Parameters at part load and ambient temperature 15°C (Point C)						
Declared cooling capacity	P_C	25.200	23.100	22.400	22.400	kW
Declared power input	D_C	7.540	7.620	7.520	7.520	kW
Declared COP	COP_C	3.34	3.03	2.98	2.98	
Parameters at part load and ambient temperature 5°C (Point D)						
Declared cooling capacity	P_D	27.300	24.500	23.900	23.900	kW
Declared power input	D_D	6.800	6.780	6.800	6.800	kW
Declared COP	COP_D	4.01	3.61	3.51	3.51	
Parameters at full load and ambient temperature 43°C						
Cooling capacity	P_3	16.28	*N/A*	*N/A*	*N/A*	kW
Power input	D_3	11.76	*N/A*	*N/A*	*N/A*	kW
Declared COP	COP_3	1.38	*N/A*	*N/A*	*N/A*	
Other items						
Capacity control		Variable				
Coefficient of degradation for fixed and staged capacity units*	*Cd*	0.25				
Contact details		Daikin Refrigeration Malaysia Sdn. Bhd. Lot 10, Jalan Perusahaan 8, Kawasan Perusahaan Pekan Banting, 42700 Banting, Selangor Darul Ehsan.				

Note: Published data based on condition - Return Gas Temperature 20° C

Specifications

Product Information based on the requirements of Commission Regulation EU 2015/1095

Model : JEHSDT-1600-B6-M-3

Refrigerant fluid:		**R404A**	**R407A**	**R407F**	**R448A**	**R449A**	
Item	**Symbol**	**Value**					**Unit**
Evaporating temperature*	*t*	-10					°C
Annual electricity consumption	*Q*	54325	54942	55280	53583	53583	kWh/a
Seasonal Energy Performance Ratio	*SEPR*	2.74	2.66	2.70	2.72	2.72	
Parameters at full load and ambient temperature 32°C (Point A)							
Rated cooling capacity	P_A	24.20	23.80	24.25	23.70	23.70	kW
Rated power input	D_A	12.26	13.02	12.56	11.26	11.26	kW
Rated COP	COP_A	1.97	1.83	1.93	2.10	2.10	
Parameters at part load and ambient temperature 25°C (Point B)							
Declared cooling capacity	P_B	26.800	26.100	26.550	25.550	25.550	kW
Declared power input	D_B	11.140	11.460	11.280	10.320	10.320	kW
Declared COP	COP_B	2.41	2.28	2.35	2.48	2.48	
Parameters at part load and ambient temperature 15°C (Point C)							
Declared cooling capacity	P_C	30.600	29.400	29.600	28.350	28.350	kW
Declared power input	D_C	9.620	9.480	9.480	9.110	9.110	kW
Declared COP	COP_C	3.18	3.10	3.12	3.11	3.11	
Parameters at part load and ambient temperature 5°C (Point D)							
Declared cooling capacity	P_D	31.300	29.900	30.050	28.850	28.850	kW
Declared power input	D_D	9.400	9.200	9.210	8.950	8.950	kW
Declared COP	COP_D	3.33	3.25	3.26	3.22	3.22	
Parameters at full load and ambient temperature 43°C							
Cooling capacity	P_3	20.20	*N/A*	*N/A*	20.80	*20.80*	kW
Power input	D_3	14.06	*N/A*	*N/A*	12.85	*12.85*	kW
Declared COP	COP_3	1.44	*N/A*	*N/A*	1.62	*1.62*	
Other items							
Capacity control		Variable					
Coefficient of degradation for fixed and staged capacity units*	*Cd*	0.25					
Contact details		Daikin Refrigeration Malaysia Sdn. Bhd. Lot 10, Jalan Perusahaan 8, Kawasan Perusahaan Pekan Banting, 42700 Banting, Selangor Darul Ehsan.					

Note: Published data based on condition - superheat 10K.

Specifications

Product Information based on the requirements of Commission Regulation EU 2015/1095

Model : JEHSDT-1600-B6-M-3

Refrigerant fluid:		**R404A**	**R448A**	**R449A**	
Item	**Symbol**	**Value**			**Unit**
Evaporating temperature*	*t*	-10			°C
Annual electricity consumption	*Q*	55576	54361	54361	kWh/a
Seasonal Energy Performance Ratio	*SEPR*	2.89	2.78	2.78	
Parameters at full load and ambient temperature 32°C (Point A)					
Rated cooling capacity	P_A	26.10	24.55	24.55	kW
Rated power input	D_A	12.26	11.26	11.26	kW
Rated COP	COP_A	2.13	2.18	2.18	
Parameters at part load and ambient temperature 25°C (Point B)					
Declared cooling capacity	P_B	28.600	26.250	26.250	kW
Declared power input	D_B	11.140	10.320	10.320	kW
Declared COP	COP_B	2.57	2.54	2.54	
Parameters at part load and ambient temperature 15°C (Point C)					
Declared cooling capacity	P_C	32.100	28.850	28.850	kW
Declared power input	D_C	9.620	9.110	9.110	kW
Declared COP	COP_C	3.34	3.17	3.17	
Parameters at part load and ambient temperature 5°C (Point D)					
Declared cooling capacity	P_D	32.600	29.250	29.250	kW
Declared power input	D_D	9.400	8.950	8.950	kW
Declared COP	COP_D	3.47	3.27	3.27	
Parameters at full load and ambient temperature 43°C					
Cooling capacity	P_3	22.40	*21.90*	*21.90*	kW
Power input	D_3	14.06	*12.85*	*12.85*	kW
Declared COP	COP_3	1.59	*1.70*	*1.70*	
Other items					
Capacity control		Variable			
Coefficient of degradation for fixed and staged capacity units*	*Cd*	0.25			
Contact details		Daikin Refrigeration Malaysia Sdn. Bhd. Lot 10, Jalan Perusahaan 8, Kawasan Perusahaan Pekan Banting, 42700 Banting, Selangor Darul Ehsan.			

Note: Published data based on condition - Return Gas Temperature 20° C

Health and Safety

Important Note:

Only qualified personnel, who are familiar with refrigeration systems and components including all controls, should perform the installation and start-up of the system. To avoid potential injury, use care when working around coil surfaces or sharp edges of metal cabinets. All piping and electrical wiring should be installed in accordance with all applicable codes, ordinances and local by-laws.

General Information

Before Installation

- Ensure the units received are the correct models for the intended application.
- Ensure the refrigerant, voltage and MWP are all suitable for the proposed application.
- Check there is no damage to the units. Any damage should be advised to the supplier immediately.
- Check that the proposed equipment locations are suitable and provide adequate support for the weight of the units.

Offloading and Lifting

- Whenever a condensing unit is lifted, it should be from the base and, where possible, all packing and protection is kept in position.
- If lifting equipment is required, ensure that it is suitable, certificated, and that the operatives are qualified to use it.
- When using a fork-lift or pallet truck to lift the unit, the two support points should be sufficiently apart to give stability when lifting and suitably placed to distribute the load on the forks.
- If slings are used, care should be taken to ensure that the slings do not crush the casework or coil.
- When lifting by crane, use spreader bars to prevent compressing the top of the equipment.
- Do not drop the unit. Should this inadvertently happen, it should be immediately unpacked and inspected for damage.
- Use the appropriate spreader bars/lifting sling with the holes and lugs provided.

During Installation and subsequent maintenance

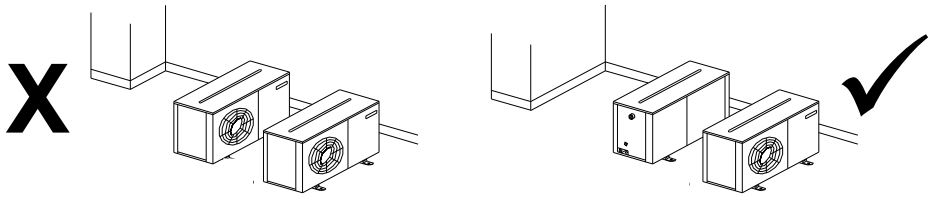
- Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations, and experienced with this type of equipment.
- Safe working methods are identified and operatives have suitable Personal Protective Equipment (PPE).
- Ensure the working area has adequate ventilation during brazing procedures.
- The units contain moving machinery and electrical power hazards, which may cause severe injury or death. Disconnect and shut off power before installation or service of the equipment.
- Refrigerant release into the atmosphere is illegal. Proper evacuation, recovery, handling and leak testing procedures must be observed at all times.
- Units must be earthed and no maintenance work should be attempted prior to disconnecting the electrical supply.
- The electrical covers and fan guards must remain fitted at all times.
- Use of the units outside of the design conditions and the application for which the units were intended may be unsafe and be detrimental to the units, regardless of short or long term operation.
- The units are not designed to withstand loads or stresses from other equipment or personnel. Such extraneous loads or stress may cause failure/leak/injury.
- In some circumstances, a suction accumulator (not supplied) may be required. It offers protection against refrigerant flood back during operation and also against off-cycle migration by adding internal free volume to the low side of the system.
- Tests must be conducted to ensure the amount of off-cycle migration to the compressor does not exceed the compressor's charge limit.
- Wherever possible the system should be installed to utilize a pump down configuration.
- After installation, the system should be allowed to run for 3 – 4 hours. The oil level should then be checked and topped up as necessary. It should then be rechecked after 24 hours once the system has stabilized. The oil level should be visible at least ½ - ¾ way up the compressor oil sight glass. For details of the oil requirements, please refer to page 41 in the service and maintenance section.

Installation

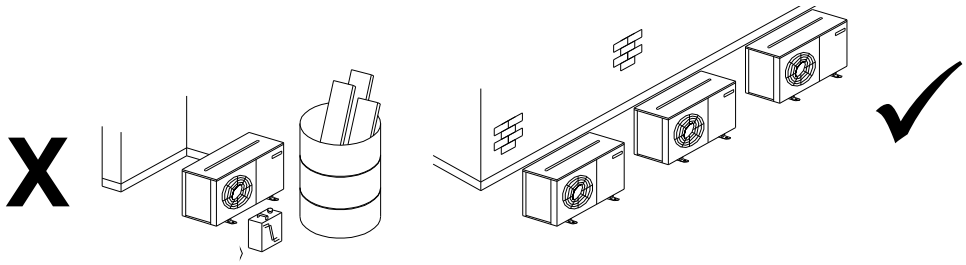
Unit Location

- In order to achieve maximum cooling capacity, the installation location for the condensing unit should be carefully selected.

- Install the condensing unit in such a way so that hot air ejected by the condensing unit cannot be drawn in again (short circuit of hot discharge air). Allow sufficient space for maintenance around the unit.



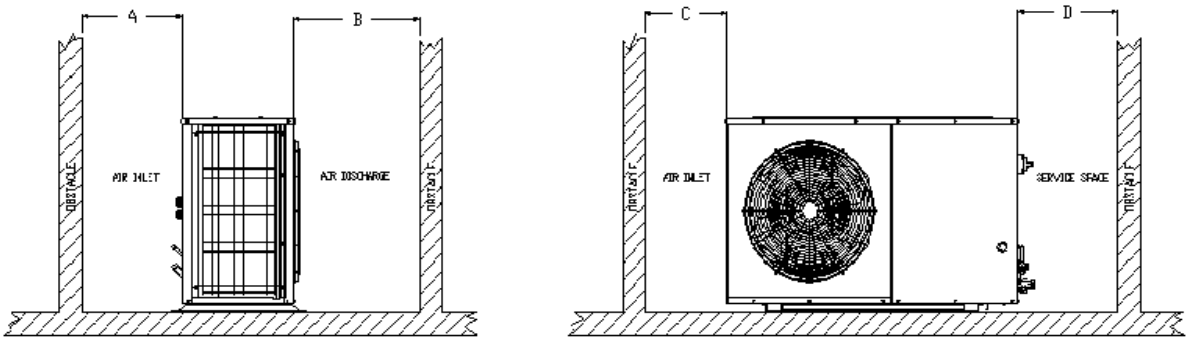
- Ensure that there is no obstruction to air flow into or out of the unit. Remove obstacles which block air intake or discharge.



- The location must be well ventilated, so the unit can draw in and distribute plenty of air thus lowering the condensing temperature.
- To optimize the unit running conditions, the condenser coil must be cleaned at regular intervals.
- The unit must be level in all directions.

Installation Clearances

- The installation location should allow sufficient space for air flow and maintenance around the unit.



ALL MODELS	A	B	C	D
Minimum Distance	300 mm	1000 mm	300 mm	500 mm

Installation

Field Piping

Important Note:

Pipe sizing should only be determined by qualified personnel. All local codes of practice must be observed in the installation of refrigerant piping.

To ensure satisfactory operation and performance, the following points should be noted for field piping arrangements:

- Pipework routes must be as simple and as short as possible.
- Avoid low points on pipework where oil can accumulate.
- Suction gas velocity must be sufficient to ensure good oil return.
- Use only clean, dehydrated refrigeration grade copper tube with long radius bends.
- Avoid flare type connections and take great care when brazing. Use only silver alloy rods.
- Run braze without over filling to ensure there is no leakage into the tube.
- To prevent oxidation, blow oxygen free nitrogen through pipework when brazing.
- Install insulation on all suction lines and on all pipes penetrating walls or passing through hot areas.
- Adequately support all pipe work at a maximum of 2 metre intervals.
- Where the condensing unit is situated below the indoor unit (coldroom evaporator/display case), the height difference between the two units should be no more than 6 metres.
- In vertical pipework, the use of U-trap and double suction risers is often required. These suction risers must always be fitted with a U-trap at the bottom and a P-trap at the top and never be higher than 4m unless a second U-trap system is fitted.
- Additional oil may be required if piping length exceeds 20m or multiple oil traps are fitted. Check the oil level closely during commissioning and add oil as necessary. Add oil in small amounts. Do not overfill the compressors!
- When installing a single condensing unit with multiple evaporators connected which operate independently, care should be taken to ensure that the evaporating pressure/temperature does not fall outside the compressor operating limit at minimum load. If there is potential for this scenario, consider multiple evaporators fed by a single solenoid valve or separate condensing units.
- Suction pipework should slope gently back towards the unit to assist oil return to the compressor. A fall of approximately 2cm per metre of pipework is acceptable.
- Liquid lines should be sized to ensure a full supply of liquid refrigerant to the expansion device. Careful attention should be paid to sizing of liquid lines on large risers (maximum 6m).
- Maximum recommended pipe length is 50 metres.

Correct line sizing will minimize the pressure drop and maintain sufficient gas velocity for proper oil return.

Important Note:

One of the main factors affecting equipment reliability and compressor service life is refrigeration circuit contamination. During installation, circuit contamination can be caused by:

- Brazing & Welding Oxides
- Filings & Particles from de-burring pipework
- Brazing Flux
- Moisture & Air

Installation

Pressure Testing

The condensing units are pressure tested in the factory prior to dispatch. All units come with a holding charge of oxygen free nitrogen (OFN).

Once the pipework installation is complete, it should be pressure tested prior to evacuation to test for leaks.
A pressure leak test should be carried out using OFN. **NEVER USE OXYGEN FOR PRESSURE TESTING SYSTEMS**. A calibrated nitrogen pressure regulator must always be used. Before starting any pressure testing, ensure the area surrounding the system is safe, inform relevant personnel and fit warning signs indicating high pressure testing. Also, use correct PPE as required.

Always pressurize the system slowly, preferably in stages up to the maximum required pressure. Maximum test pressures applicable to the unit are as follows:

Test pressure	
High side	**Low side**
28 barG (405 psiG)	**19 barG (275 psiG)**

Listen for any possible leaks and check all joints with bubble spray. If any leaks are discovered, release pressure slowly from system until empty, repair leak and then restart pressure testing procedure. Never attempt to repair a leak on a pressurized system.
A strength test should also be incorporated (to installed pipework only) according to local regulations.
Once testing has been completed satisfactorily, release the pressure from the system gradually and safely to external atmosphere.

Evacuation & Charging

Important Note:

Moisture prevents proper functioning of the compressor and the refrigeration system. Ensure that a good quality vacuum pump is used to pull a vacuum below 250 microns (0.25 torr).

Once pressure testing has been completed, the system can now be evacuated to remove air and any moisture from the piping. This can be done as follows:

- Ensure any nitrogen charge is safely released from the system.
- Connect a gauge manifold to the connections on the service valves on the condensing unit.
- Connect a vacuum pump and vacuum gauge to the system.
- Ensure all gauge manifold and service valves are open as required.
- Evacuate the system until vacuum is below 250 microns (0.25 torr).

Note: A triple evacuation procedure is recommended for all new systems or where moisture is suspected

Once the system is isolated and the vacuum pump is switched off, any rise in pressure indicates that either there may be a leak in the system or moisture is still present. In this case, recheck the system for leaks, repair as necessary, and then restart the evacuation procedure. Once completed satisfactorily, the vacuum pump and vacuum gauge can be removed.

At this point, the refrigerant charge can be added to the system as required. Refrigerants must be charged in the liquid phase. **Charging of liquid into the suction side of the system should ONLY be done with a metering device.** Use calibrated weighing scales to record the amount of refrigerant added to the system.

Installation

Electrical

Important Note:

The mains electrical supply to the condensing unit must be via a suitable motor rated circuit breaker or fuse. A mains isolator is fitted to all condensing units therefore an additional isolator is not required unless site conditions or regulations dictate differently.

J & E Hall Fusion Digital Scroll condensing units require a 400 volt / 3 phase / 50Hz supply which must include a Neutral and an Earth. These systems are not suitable for any other supply voltages (other than a deviation of +/- 10% of the above values) and are not suitable for 60Hz supplies.

The three phase supply must be connected to ensure that the compressor motors rotate in the correct direction. The phase protection module will only allow the compressors to operate when phases are connected correctly. Please see note on page 27.

Mains cable type and sizing must be selected for the particular application and the electrical installation should conform to the current local standards.

- Cables to the condensing unit should wherever possible be routed through the cable glands supplied on the rear of the units.
- Connect the mains supply to the units as per the wiring diagram on page 39.

To gain access to the electrical box, turn the mains isolator switch on the front of the unit to the OFF position and open the top hinged door. The electrical box is located behind the hinged door. Remove the screws in the electrical box cover to access components.

Important Note:

There must be no more than 10 compressor starts per hour. A higher number reduces the service life of the compressor. There is no minimum off time for scroll compressors, as they start unloaded. However, consideration should be given to ensuring an adequate minimum run time to ensure proper oil return.

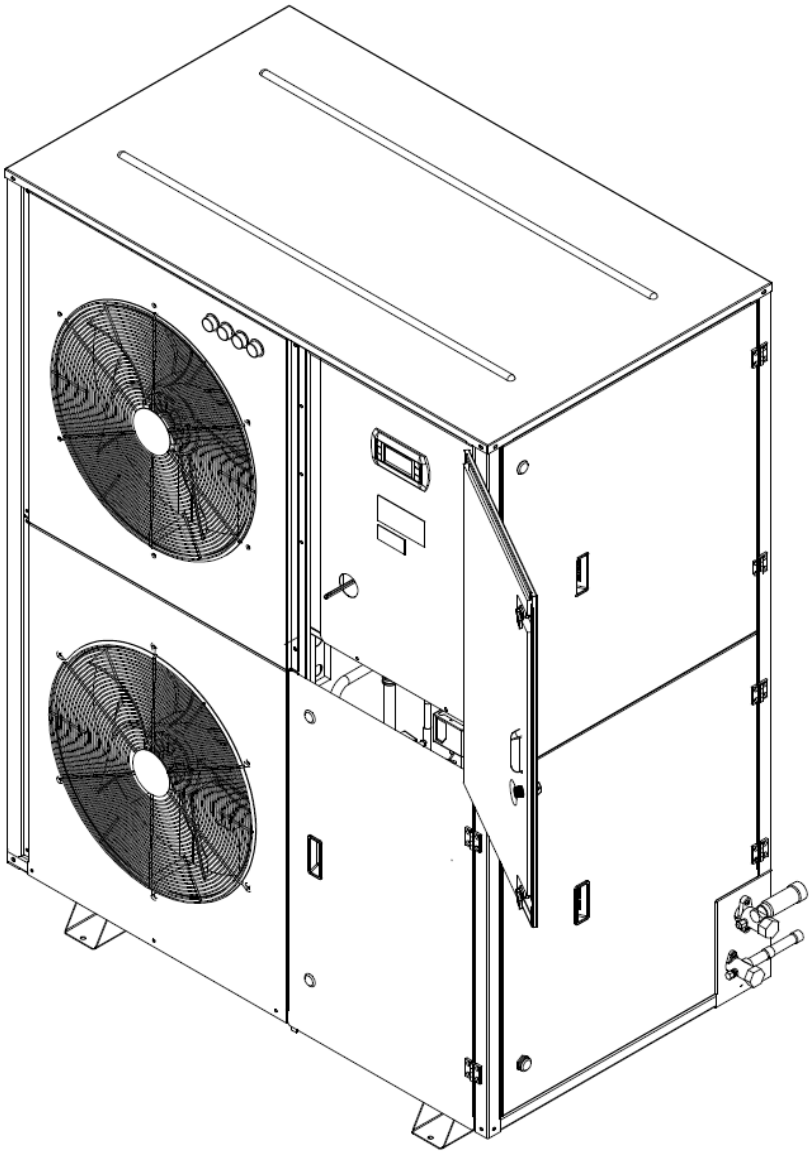
Commissioning

Access to Controller and LCD Display

Important Note:

Warning! Only Authorized personnel are allowed to access the controller and LCD display.

The controller and LCD display are accessed by opening the top hinged door.



Commissioning

Pre Startup Checks

Before starting the condensing unit, the following checks should be carried out as a minimum:

- Check electrical supply is correct and all connections are sound.
- All moving parts are free and guards fitted.
- Compressor oil levels satisfactory.
- The mechanical bypass switch in the control panel is in the **OFF** (0) position.
- LCD Display cable is connected to the controller to enable settings.
- Check setting of LP back up control (factory set).
- Overloads set correctly.
- All valves in correct operating position.
- Initial refrigerant charge.
- Crankcase heaters energized for a minimum of 12 hours before compressor start-up.
- Gauge manifold connected to both low and high sides of system.

Please wait for 1 minute for controller loading after switching on the main isolator.

Before running the unit, the controller settings on page 24 should be checked/altered as required:

Running the Unit

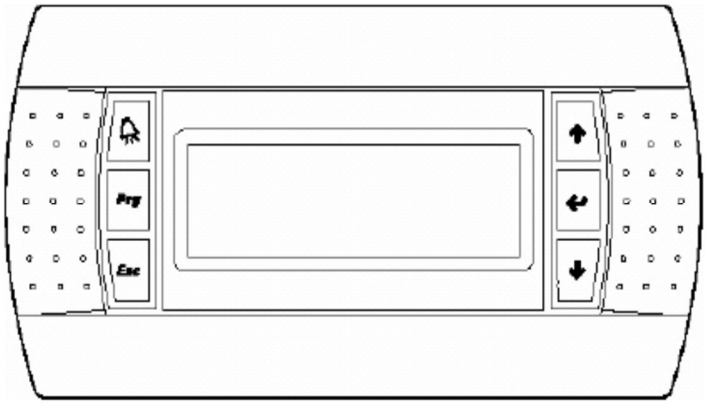
- Check green 'ON' LED on phase protection module is lit. If any fault indications are shown on the phase module (see page 47), switch power off to unit and check/modify incoming supply according to fault shown.
- Switch unit on at controller (see page 26).
- Run the unit and check compressor and condenser fan operation.
- Check system pressures and temperatures, gas charge and running currents of motors to ensure correct operation.
- Check transducer/sensor readings are accurate (calibrated equipment required).
- Check compressor superheats.
- Final adjustment of controller settings.
- Check compressor oil levels (ensure there are no OM3 alarm conditions) and adjust as necessary.
- Carry out final leak test and ensure all panels/covers are fitted and screws tightened.
- Log all information along with the system model and serial numbers for future reference.
- Complete refrigerant labelling to comply with F-Gas regulations.
- Ensure that the customer / responsible person are provided with basic operating instructions and where electrical isolators are situated in case of emergency.

Commissioning

The User Terminal Interface – LCD Display

The user terminal can be used to perform all the operations allowed by the program, display the operating conditions of the unit at all times, and set the parameters.

It can be disconnected from the main board, and in fact is not required for operation.



Button Functions

ALARM	Displays the alarms
UP	If the cursor is in the home position (top left corner), scrolls up the screens in the same group; if the cursor is in a setting field, increases the value.
DOWN	If the cursor is in the home position (top left corner), scrolls down the screens in the same group; if the cursor is in a setting field, decreases the value.
ENTER	Used to move the cursor from the home position (top left corner) to the setting fields, in the setting fields confirms the set value and moves to the next parameter.
PRG	Accesses the menu for selecting the group of parameters to be displayed/modified (access to the parameters is confirmed by pressing the [Enter] button).
ESC	Used to move back to previous screen. Continuous pressing of the ESC button will eventually return to the HOME screen.

Important Note:

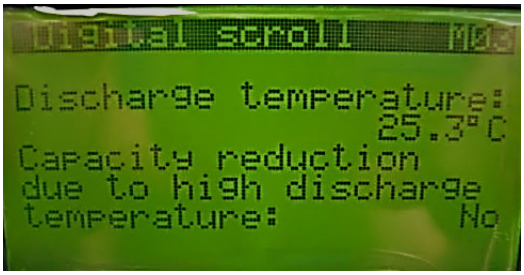
All controller parameters are preset in the factory and are **not accessible so cannot be altered.** The only settings which can be changed are the compressor setpoint (suction pressure), the refrigerant type, condenser fan control type and the time/date. The fan setpoint is also preset but can be adjusted if required.

Commissioning

Controller Home Screen

Following controller power-up and initialisation process (approximately 1 minute), the controller home screen will appear as follows:

The low pressure and high pressure conditions of the unit are displayed. If **OFF by Key** is indicated in the lower box, then the unit is switched OFF on the controller. To switch the unit ON, follow instructions on page 26. Further information on the system conditions can be displayed by pressing the DOWN arrow:



The symbols against Compressor and Valve change depending on their status (whether compressor is running or not and whether the capacity valve is open or closed. The percentage value will also change depending on the amount of capacity being provided at the current time.

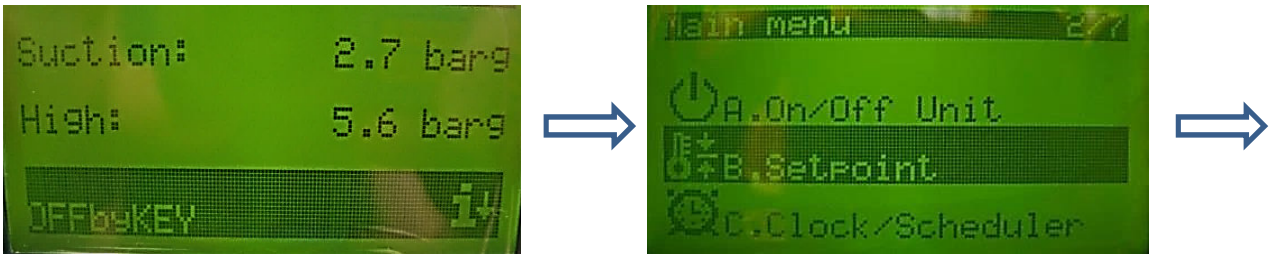
To return to the Home Screen – press ESCAPE button repeatedly until it is reached.

To enter the Programming menu press PRG button.

Commissioning

Changing Set Point & Refrigerant Selection

1. With controller Home screen displayed, Press PRG button to go Main Menu screen and select “B. Setpoint” using DOWN button. Press ENTER button. Screen B01 is displayed.



2. Using ENTER button, move the cursor from the ‘home’ position to the Compressor Setpoint and adjust value as required by using UP or DOWN buttons.
3. Press the ENTER button again to move the cursor to the Fan Setpoint and adjust the value as required. Please note that the setpoint value of 16.0 bar is recommended for R404A/R407A/R407F/R448A/R449A operation.
4. Press ENTER button once more to return the cursor to the ‘home’ position.
5. From screen B01, use the DOWN button to move to the next screen – B02.

6. At screen B02, the Refrigerant Type can be selected. The default refrigerant is set as R404A.
7. To change the refrigerant, press ENTER to move the cursor from the ‘home’ position to the refrigerant type.
8. Use UP or DOWN buttons to scroll to different refrigerants.
9. With required refrigerant selected, press ENTER button to return cursor to ‘home’ position.
10. Press ESC button repeatedly to return to Home screen.
11. The unit is now ready to run once the controller is set to ON.

IMPORTANT NOTE:

The only refrigerants which should be selected are R404A, R407A, R407F, R448A & R449A.

Commissioning

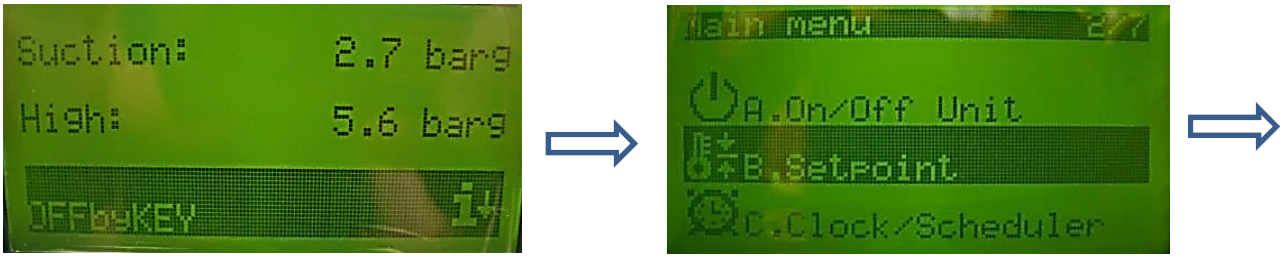
Changing Condenser Fan Control Type

The unit comes factory set with condenser fan control operating around a setpoint (16.0 bar) by modulating the speed of the two condenser fans via the fan speed control board. **This method should always be used when thermostatic type expansion valves (TEV/TXV) are used on the evaporator coils.**

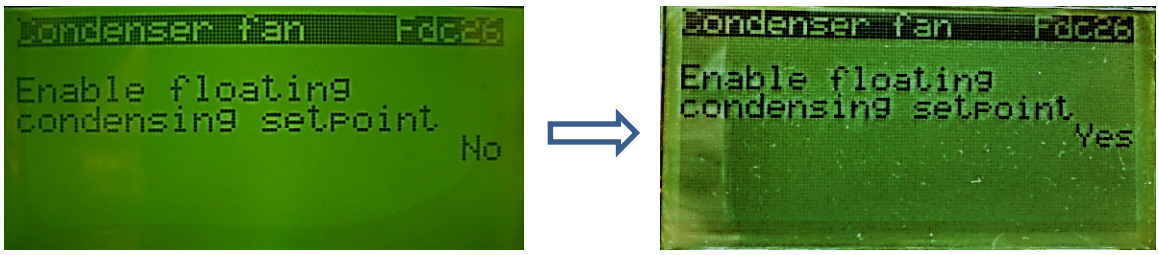
If electronic type expansion valves (EEV) are used, it is possible to select condenser fan control with floating head pressure to achieve improved system efficiencies. **This method should not be selected if using thermostatic type expansion valves.**

To select floating head pressure fan control:

1. With controller Home screen displayed, Press PRG button to go Main Menu screen and select “B. Setpoint” using DOWN button. Press ENTER button. Screen B01 is displayed.



2. Using the DOWN button, go to the following screen:

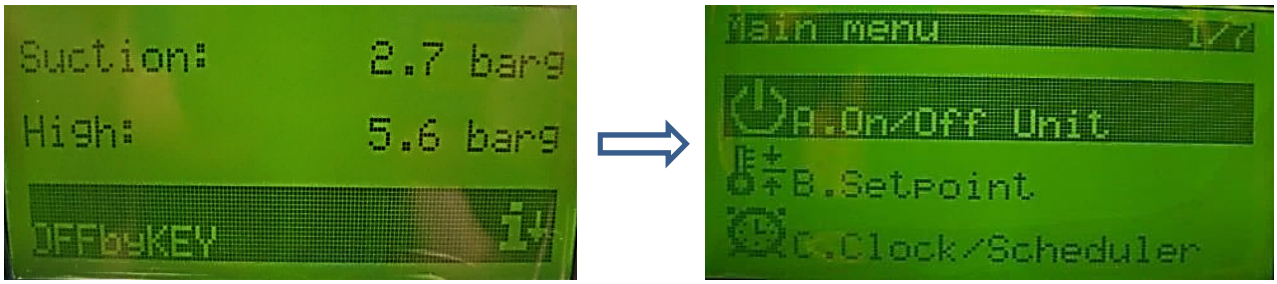


3. Using ENTER button, move cursor from ‘home’ position to ‘No’. Use UP or DOWN button to change setting from ‘No’ to ‘Yes’. Press ENTER button to return cursor to ‘home’ position.
4. Press ESC button repeatedly to return to Home screen.

Commissioning

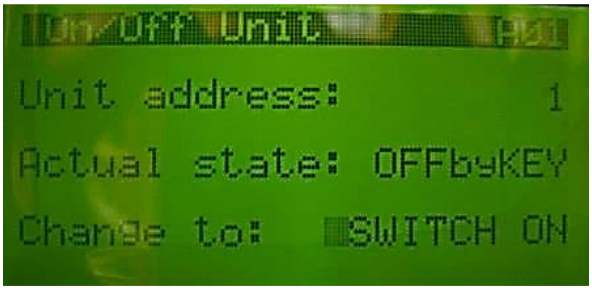
Switch Unit On/Off (By Controller)

1. With controller Home screen displayed, Press PRG button to go Main Menu screen and select “A. On/Off Unit”



2. Press ENTER button. Screen A01 is displayed.

3. Press ENTER button to move cursor from home position to SWITCH OFF value. Switch Unit ON by using UP/DOWN arrows. Press ENTER button to confirm.



4. Press ESC button repeatedly to return to Home Screen. This should now show ON by KEY at the bottom of the screen.

5. The unit will start up following a short delay (assuming all conditions for compressor start-up are met).

Commissioning

Compressor Operation

The compressor(s) operate in accordance to the suction pressure setpoint which is programmed into the controller. There is a differential pressure setting both above and below the setpoint. This allows stable operation of the compressors without constantly switching on & off due to small variations in suction pressure. This range is known as the Neutral Zone. When the compressor(s) are operating within this zone, there will be no change to capacity status (i.e. no compressor switched on/off or additional loading/unloading of variable capacity compressor).
Once the suction pressure goes outside the Neutral Zone, then the controller reacts by increasing or decreasing capacity, depending on whether the pressure is above or below the Neutral Zone. The rate at which the capacity increases or decreases depends upon the setting of the Minimum and Maximum timers within the controller. This means that the further away the suction pressure moves away from the Neutral Zone (either above or below), the quicker the controller will adjust the compressor capacity.

On Digital twin compressor units, the compressor with the capacity control is always the first to start and the last to stop.

Both fixed and Digital Scroll compressor motors are designed to run only in one direction. The correct rotation of the motor depends on the connection of the three incoming phases to the unit. Correct rotation can be determined by a drop in suction pressure and a rise in discharge pressure when the compressor is energized. Running the compressor for a short period of time in reverse direction will have no negative impact but prolonged running in reverse direction may cause premature failure. ***To reverse the rotation of a three phase fixed and digital scroll compressor, shut off the incoming power supply to the unit, swap connection of any two of the three incoming phases at the unit isolator, reapply power to the unit and following compressor restart, recheck operating pressures.***

If the unit model is fitted with a Phase Protection Module, this will not allow the compressors to run unless the incoming phases are connected correctly (phase sequence). See page 47.

Digital compressor:

At initial start-up, the digital compressor will run at 50% capacity for three minutes followed by 1 minute at 100% capacity. Following this, the compressor will modulate the capacity according to the system requirement in relation to the suction pressure set-point.

Vacuum operation:

Do not operate scroll compressors in a vacuum condition, as this will cause the scrolls to overheat very quickly causing premature failure.

System charge:

Ensure an adequate liquid charge has been introduced to the high side of the system before starting to ensure a minimum operating pressure on the suction side of 0.5 bar is maintained, otherwise overheating of the scrolls and subsequent damage may occur.

Commissioning

Compressor rotalock connections

The rotalock connections as used on some compressor models are sealed with Loctite 554 thread sealant. The connections should be leak tested at commissioning and during service/maintenance visits. For further information including recommended torque tightening values, please refer to Service & Maintenance section on pages 41 - 42.

Safety Pressure Switches (Mechanical)

The Saginomiya low pressure switch fitted to the JEH Digital Scroll condensing unit has adjustable cut-out and differential. High pressure protection is provided for each compressor by a cartridge type high pressure switch (HP1 and HP2) which have fixed settings.

High Pressure Safety

The high pressure safety switch is required to stop the compressor should the discharge pressure exceed the values shown in the following table. The differential pressure is fixed at 6 bar (87 psi). Once tripped, it will create an alarm condition which requires manual reset at the controller.

Refrigerant	R404A/R407A/R407F/R448A/R449A
Cut Out / Cut In (bar g)	28 / 22
Cut Out / Cut In (psi g)	410 / 323

Low Pressure Safety

The adjustable low pressure safety switch provides compressor protection from low suction pressure/evaporating temperature in Normal (controller) operation. In mechanical bypass mode, it provides compressor control. It also protects the compressor against deep vacuum operation, a potential cause of failure due to internal arcing and overheating. The low pressure switch is factory set as below. For Normal (controller) operation, please do not adjust this setting.

For operation in bypass mode, the low pressure control should be set to control the compressor (fixed speed only for twin compressor) at the required SST according to the application/refrigerant. **If adjusted for operation in bypass mode, the low pressure control must be reset to factory setting as below before returning to Normal (controller) operation.**

Refrigerant	R404A/R407A/R407F/R448A/R449A
Application	M*
Cut Out / Cut In (bar g)	1.0 / 3.0
Cut Out / Cut In (psi g)	15 / 44

AC Fan Speed Modulation Controller

Fan speed control is factory preset with a ±3.0barG differential setting. With this setting, the fan operation is as follows:

Refrigerant	R404A/R407A/R407F/R448A/R449A
Fan Setpoint (bar g)	16
Fan start run (bar g)	13
Fan Full Speed (bar g)	19

Both condenser fans are speed controlled. The fans start at 45% of full fan speed and modulate up to 100%.

Commissioning

AC Fan Speed Modulation Controller (cont')

Recommended settings to gain higher energy efficiency as published in the Ecodesign data sheets are as follows:

Refrigerant		**R404A/ R407A/ R407F/ R448A/R449A**
Condenser fan	**(Fdc28)**	**Cut off enable: No**
Fan setpoint limit	**(Fdc16)**	**Minimum: 8.0barg Maximum: 28.0barg**
Setpoint	**(B01)**	**Fan setpoint: 13.5 barg**
Regulation	**(Fdc11)**	**Differential: 5.5 barg Dead band: 0.0barg**

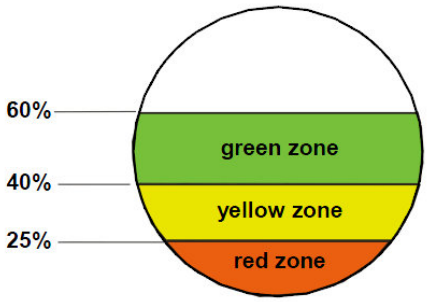
Go to Fdc16, to change fan setpoint limit, minimum to 8.0barg, then go to Fdc11, Fdc28 & B01 to change as table above.

Commissioning

Oil Management system: OM3

The OM3 oil level control manages the oil level within the compressor. It also protects the compressor against low oil level operation which can cause premature failure and additionally provides an alarm feature. The OM3 operations are as follow:

Sight-Glass Level Control Zones



LED	Status / Function
● Green	Oil Level in green zone (60 - 40%)
● Green ● Yellow	Oil Level in green zone (60 - 40%) & Injection
● Yellow	Oil Level in yellow zone (40 - 25%) & Injection
● Red ● Yellow	Oil Level in red zone (25 - 0%) & Injection

Note: Compressor will trip off when there is red light alarm from OM3.

Operation

The Level control is divided into 3 Zones. The green LED indicates that oil level is within the normal limit green zone (40-60% sight glass height) and only the green LED is on.

On reaching the "Fill level" OM3/OM4 TraxOil is starting after 10 sec delay to fill oil into the crankcase of the compressor and the yellow LED is switched on. The time delay of 10 sec. is necessary for some applications / compressor types to avoid overfilling of the compressor. During the start of a compressor the oil level can vary much and quickly and although there is enough oil in the compressor the fill level is reached and would lead to immediate oil injection. If this happens frequently the result could be overfilling.

Should the oil level reaching the yellow zone although oil is injected, the green LED will go off and the yellow is now indicating oil level in the yellow zone (25-40% sight glass height). The yellow zone could be understood as a warning zone. Reason that oil level reaches the yellow zone could be that the oil separator is not working properly or the compressor is throwing more oil into the circuit than the OM3/OM4 can feed into the crankcase of the compressor. For compensation Alco recommends to have the OM3/OM4 TraxOil permanently under power supply also during stand-by and shut-off mode of the compressor.

Should the system fail to reach oil level within green or yellow zone, the float will stay in the red zone (<25% sight glass height). OM3/OM4 TraxOil will interpret this as a fault in the oil supply system. After a time delay of 20 sec the alarm relay will switch to "ALARM" and the red LED will illuminate. In this condition OM3/OM4-TraxOil is still feeding oil into the crankcase of the compressor and subsequently the yellow LED is on. Depending on the external wiring of the cable OM3-N__ the compressor may be shut down automatically. See Table 1 for complete functional explanation and LED configuration.

Commissioning

External Status Lights

There are four external unit status lights on the front of the unit. They give a clear visual display of the current operating condition of the unit. The lights are as follows (from left to right):

BLUE: Unit in manual bypass mode

GREEN: Mains power onto unit

YELLOW: Compressor run

RED: Alarm condition

Manual Bypass Operation

In the event of failure of the main electronic controller, the unit can be run **temporarily** in mechanical bypass mode to give 50% unit capacity. By changing the position of the manual bypass switch in the electrical panel from '0' to '1', the **fixed speed** compressor only will run – controlled by the adjustable LP switch (see page 28).

In bypass mode, an A28 fault code is created (Compressor 2 HP switch). This is normal.

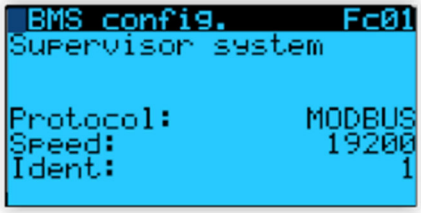
Note: Please ensure bypass switch at "0" position while running in electronic controller mode!

BACnet and Modbus Protocol

To enable this BACnet and Modbus Protocol feature, an additional serial card is required to be plugged into the board

Protocol	Part-code	Description, (Design Special)
BACnet MS/TP	PC010B0BA0	pCOnet BACnet MS/TP RS485 Serial Card
Modbus RTU	PC0S004850	Modbus, Optocoupled RS485 Serial Card

The protocol can be for BACnet protocol or Modbus RTU protocol on screen Fc01

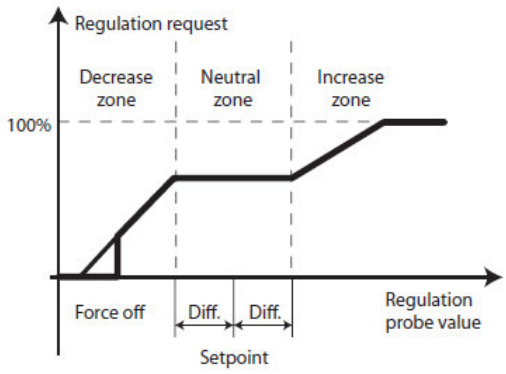


Please contact J & E Hall for the BMS point list for Modbus and BACnet protocol.

Control Logic

Parameters for neutral zone compressor control

1. Preset differentials for neutral zone, activation zone and deactivation zone.



Neutral zone

The operating principle is schematized in the above figure:

Inside the neutral zone the capacity request sent by the controller is constant (except when there is a modulation device and modulation is enabled inside the neutral zone) and the value satisfies the pressure control request in those specific operating conditions. Therefore within this zone no device is stopped or started.
In the decrease zone, the request also decreases at a rate that depends on the deviation from the set point, and vice-versa in the increase zone the request increases proportionally to the deviation.

Control Logic

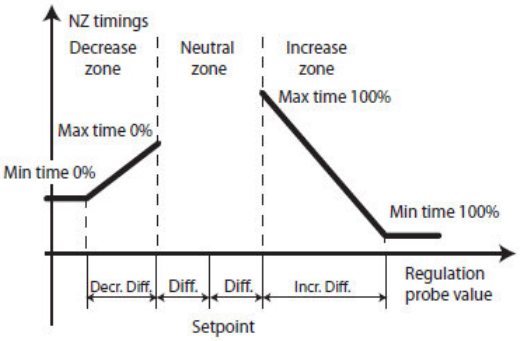
Parameters for neutral zone compressor control

As well as the decrease and increase differentials, 4 time parameters are preset, two for each zone, which represent the maximum and minimum time to reach the request, equal to 0% or 100%, for the decrease and increase respectively.

Example: the decrease/increase times (minimum and maximum) represent the time needed to change from maximum to minimum capacity and vice-versa, and not the time between the deactivation/activation of the individual device. For example, in the case of 4 devices with the same capacity, an increase time of 180 s means that one device is activated every 45 s.
In the situation shown in the figure, the request sent by the controller decreases/increases slowly as soon as the controlled value is outside of the Neutral zone, while it decreases/increases quickly the further the controlled value moves away from the Neutral zone; in this way the response of the system is faster when further from steady conditions.

Note: When using fixed times, the maximum and minimum must be set to the same value. In this case, the request sent by the controller decreases/increases constantly inside the deactivation/ activation differential.

1. Preset loading and unloading time



2. Preset time interval for loading and unloading compressor

Note: None of the above settings can be altered

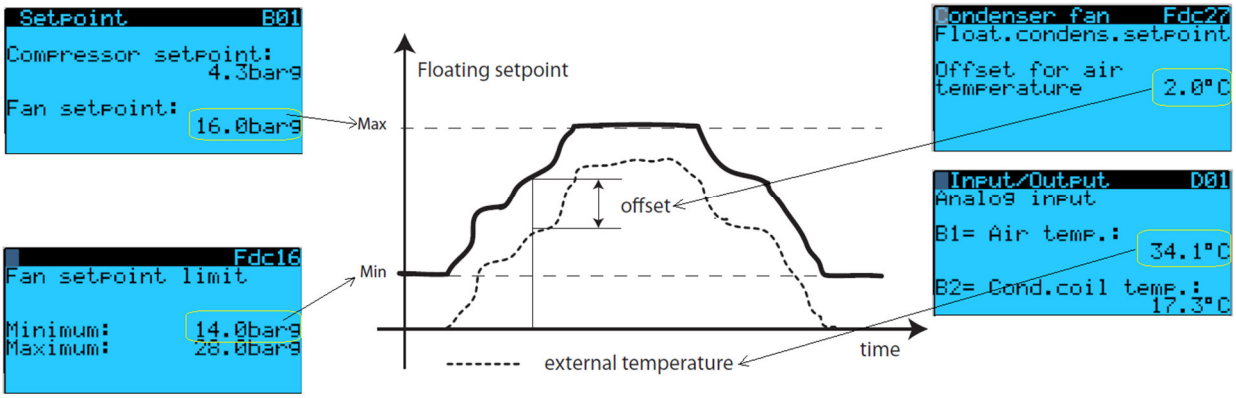
Control Logic

Floating Head Pressure Control

This function adjusts the condensing pressure set point according to the external air temperature.

Below is the algorithm to adjust set point based on external air temperature.

1. Calculate a temperature value by adding external air temperature and offset
2. Convert the temperature value into pressure (this depends on the refrigerant type) which will be the pressure set point
3. Pressure setpoint is limited between the minimum and maximum allowable setpoint



For example,

Refrigerant type = R404A,

Offset = 2.0C (Screen Fdc27)

Minimum allowable set point = 9.0 barG (Screen Fdc16)

Maximum allowable set point = 16.0 barG (Screen B01)

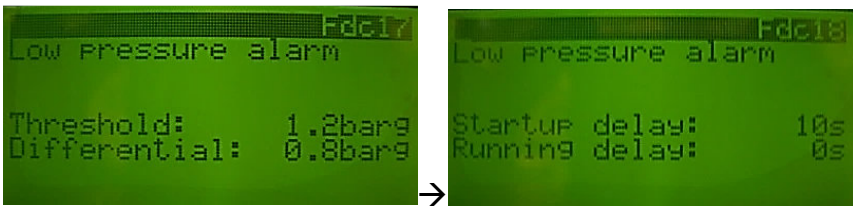
1. If external air temperature = 20°C, external air temp. + offset = 20°C + 2°C = 22°C.
2. Convert 22°C into pressure, pressure = 10.4 barG
3. Therefore, the pressure set point will be 10.4 barG because it is between 9.0 and 16.0 barG

Note: This function should only be used when electronic expansion valves are used on the system evaporators.

Alarm Information

Alarm Settings

1. Low pressure alarm (by transducer)



2. High pressure alarm (by transducer)

3. High condensing coil temperature alarm

4. High discharge alarm for fixed scroll compressor

Alarm Information

Alarm Codes

Type of Alarm

The alarms below are in ascending order of priority. When there is any alarm, the alarm code will be displayed on the main screen and the alarm LED will be on or blinking.

Code	Description	Reset type
A01	Clock board error	Auto
A08	Suction temperature probe fault	Auto
A09	Outdoor temperature probe fault	Auto
A10	Condensing coil temperature probe fault	Auto
A11	Discharge temperature probe 1 fault	Auto
A12	Discharge temperature probe 2 fault	Auto
A13	Discharge pressure transducer fault	Auto
A14	Suction pressure transducer fault	Auto
A15	Outside of operating envelope (Digital scroll)	Auto
A16	Condensing coil high temperature	Auto
A17	Compressor 1 high discharge temperature alarm	Auto
A18	Compressor 2 high discharge temperature alarm	Auto
A19	Compressor 1 overload trip (Digital)	Auto
A20	Compressor 2 overload trip (Fixed)	Auto
A22	Compressor 1 OM3 oil management	Auto
A23	Compressor 2 OM3 oil management	Auto
A24	Low pressure alarm by transducer	Auto
A25	High pressure alarm by transducer	Auto: less than 3 times in 30 minutes Manual: 3 times or more in 30 minutes
A26	Low pressure alarm by pressure switch	Auto
A27	Compressor 1 high pressure alarm by pressure switch	Manual
A28	Compressor 2 high pressure alarm by pressure switch	Manual

Alarm LED

Off	No alarm
On	Only auto reset alarm
Blinking	Manual reset alarm

Auto: An alarm condition is created but when cleared the unit will restart automatically.

Manual: An alarm condition is created but requires resetting manually before the unit can restart.

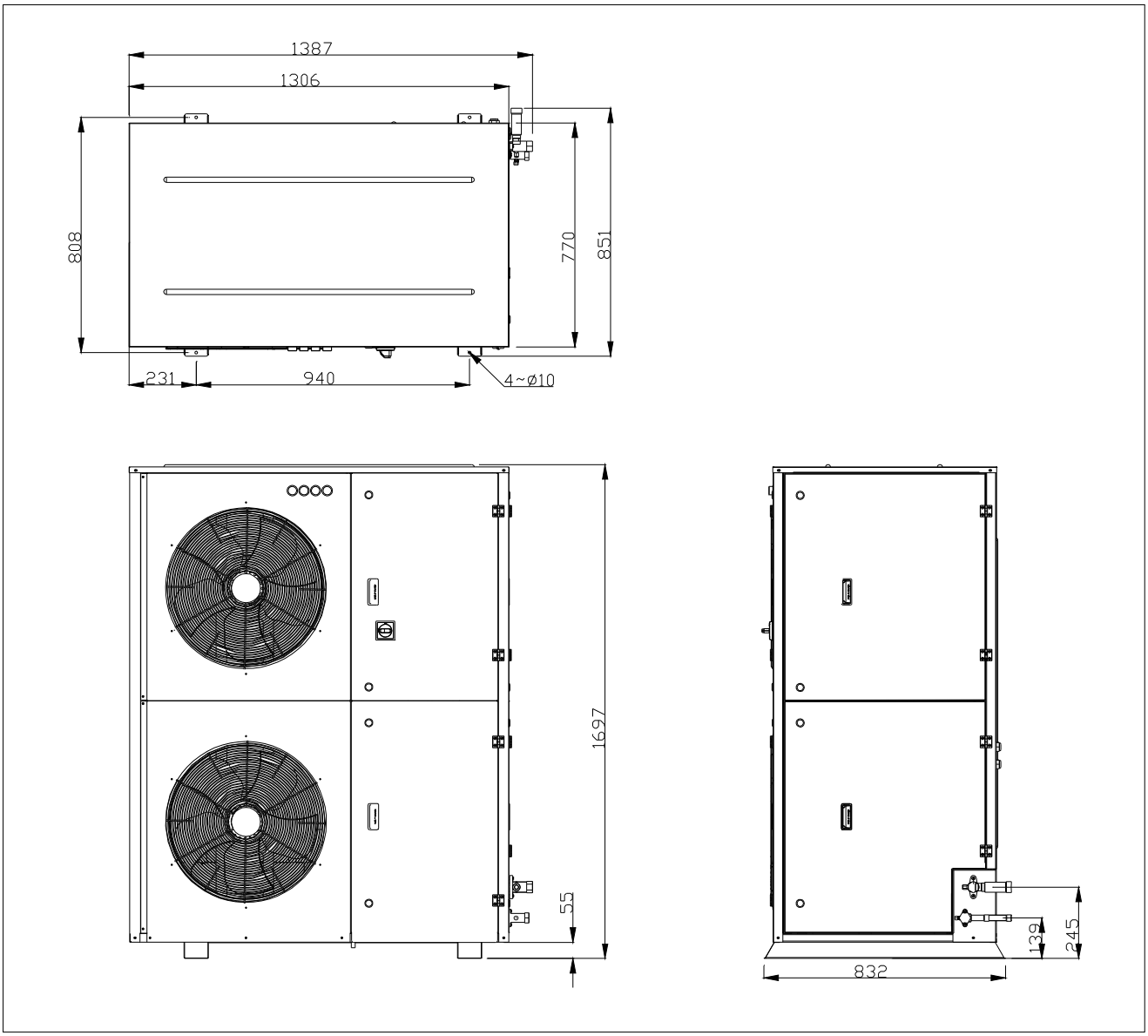
To Reset Alarm Condition:

- Press **ALARM** button for more than 5 seconds.
- Power controller **OFF** then back **ON**.

Drawings

Dimensional drawing:

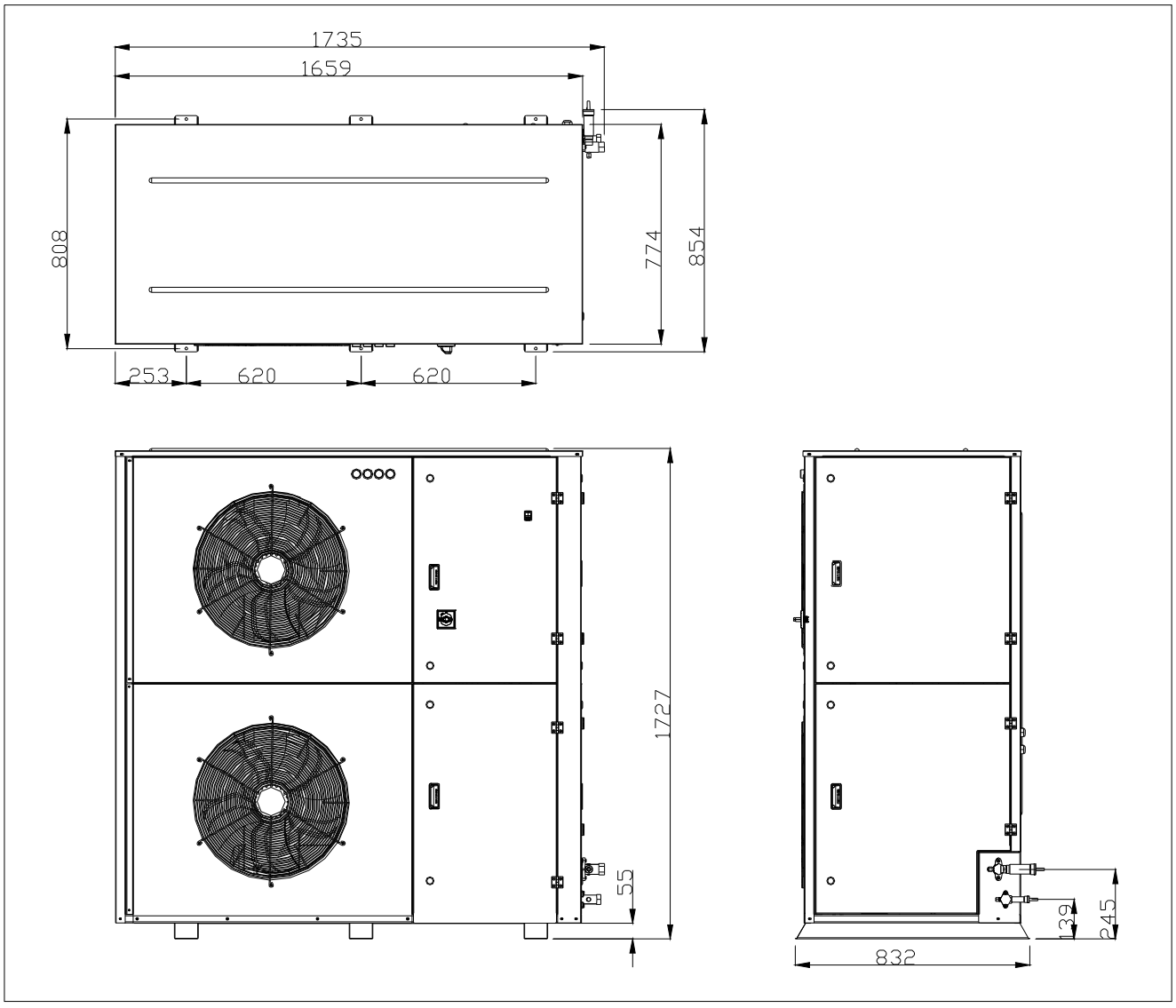
JEHSDT-1200-B5-M-3



Drawings

Dimensional drawing:

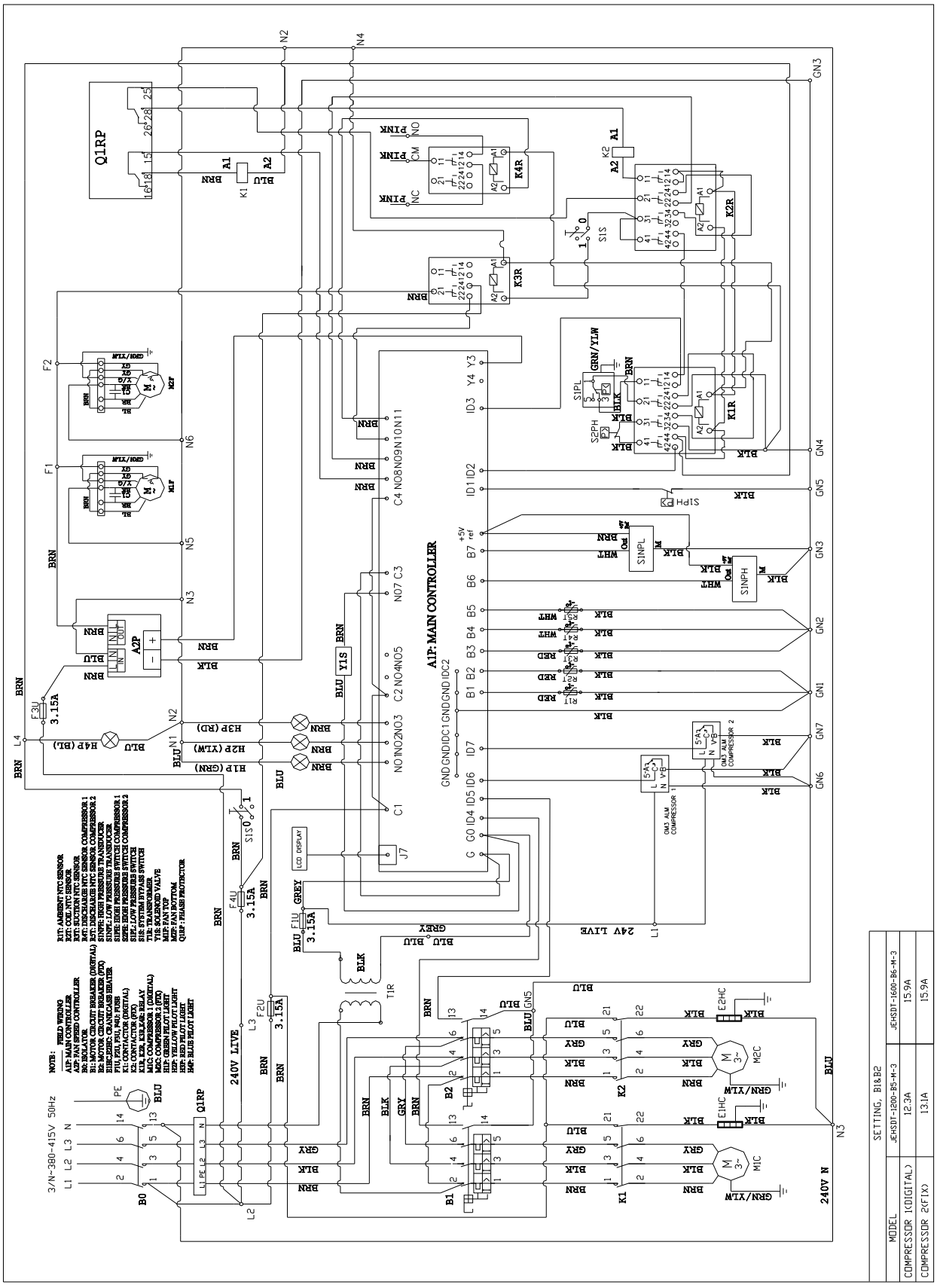
JEHSDT-1600-B6-M-3



Drawings

Electrical Wiring Diagram:

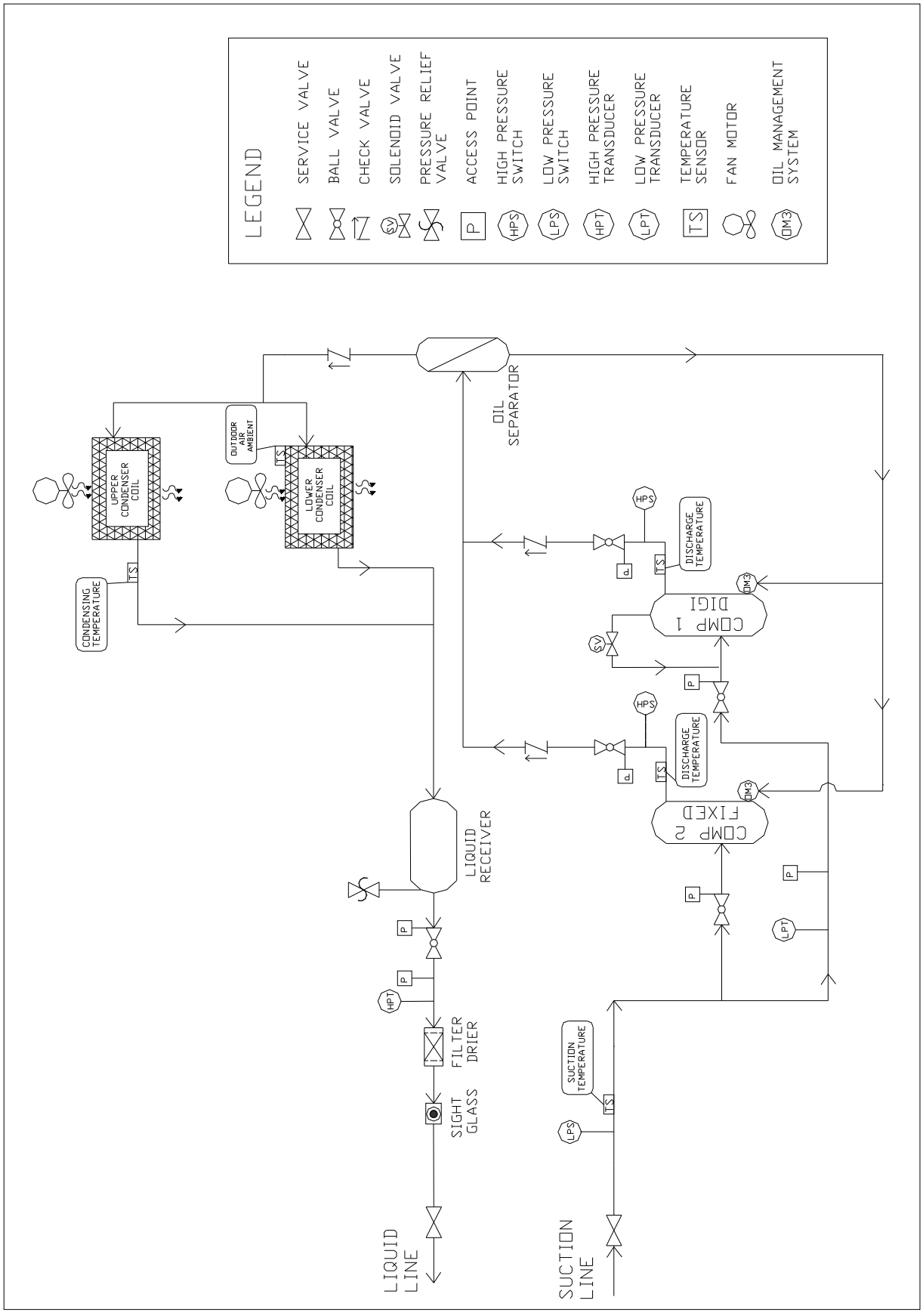
JEHSDT-1200-B5-M-3 & JEHSDT-1600-B6-M-3



Drawings

P&I Diagram

JEHSDT-1200-B5-M-3 & JEHSDT-1600-B6-M-3



Servicsse & Maintenance

Important Note:

Warning! – Disconnect the mains electrical supply before servicing or opening the unit.

The condensing units are designed to give long life operation with minimum maintenance. However, they should be routinely checked and the following service schedule is recommended under normal circumstances:

The removal of the top, side and front panels ensures that all parts are accessible.

1. Compressor – Inspect at regular intervals

- Check for refrigerant leaks on all joints and fittings.
- Check mountings for tightness and wear.
- Check operation of crankcase heater.
- Check electrical connections.
- Ensure that no abnormal noise or vibration is detected during test run.
- Check the compressor oil levels and top up if required. The oil level should be visible at least ½ way up the oil sight glass.

Compressor Model	ZBD45KQE-TFD / ZBD57KCE-TFD	ZB45KQE-TFD / ZB57KCE-TFD
Applicable Refrigerant	R404A / R407A / R407F / R448A / R449A	
Recommended Oils	Polyolester - Emkarate RL 32 3-MAF	
	Polyolester - Mobil EAL Arctic 22 CC	

2. Condenser Fan Motor & Blade – Clean and inspect at regular intervals

- Check for abnormal noise, vibration and fan imbalance.
- Ensure that the fan motor is clean and spins freely.
- Check that the condenser fan blade is clean and free from restriction and damage/imbalance.
- **Note:** The Fan Motor is pre-lubricated and factory sealed so no maintenance is necessary.

3. Condenser Coil – Clean and inspect at regular intervals.

- Check and remove the dirt and debris between the fins using a soft brush, low pressure compressed air/inert gas or a low pressure sprayer utilizing clean water. A suitable chemical coil cleaner may be used as required. Accumulations of dirt on the condenser face can be removed with a soft bristle hand brush. When using liquids, ensure electrical items are isolated and correctly protected.
- Do not use high pressure jet washers.
- Check and remove any obstacles which may hinder the airflow through the condenser coil.

Service & Maintenance

4. Controls

- Check settings and operation of controller and transducers/sensors.
- Check settings and operation of pressure switches.
- Check overload setting.
- Check fan speed control setting and operation.

5. Power Supply – Inspect at regular intervals.

- Check the running current and voltage for the condensing unit.
- Check the electrical wiring and tighten the wires onto the terminal blocks if necessary.

6. Refrigerant Charge

- Check the refrigerant charge by ensuring that the system is operating correctly, the pressures are as expected and that the liquid line sight glass shows a full bore of liquid refrigerant.
- Carry out a full leak test.

7. Compressor replacement (rotalock connections)

- The rotalock connections as used on some compressor models are factory sealed with Loctite 554 thread sealant. If the rotalock connections need to be disassembled (e.g. compressor change), then they should be thoroughly cleaned and Loctite 554 reapplied before reassembly. In case of difficulty undoing the connections due to the sealant, apply heat to rotalock using a heat gun for several minutes and then loosen using hand tools whilst hot. Replacement of the 'O' ring seal may be required. Please refer table below for recommended torque tightening values.

Unit Model	Series	Compressor	Rotalock (Suction) Thread: Tightening Torque (Nm)	Rotalock (Discharge) Thread: Toghtening Torque (Nm)
JEHSDT-1200-B5-M-3	5	ZB45KQE-TFD	Not Applicable (Brazed Connection)	
		ZBD45KQE-TFD		
JEHSDT-1600-B6-M-3	6	ZB57KCE-TFD	1-1/4"-12UNF (110-135 Nm)	
		ZBD57KCE-TFD		

8. Unit decommissioning and disposal

- At the end of the unit's useful life, a suitably qualified engineer should decommission it. The refrigerant and compressor oil are classed as hazardous waste and as such must be reclaimed and disposed of in the correct manner, including completion of waste transfer paperwork. The unit components must be disposed of or recycled as appropriate in the correct manner.

9. Warranty

- The warranty as provided by J & E Hall on its products is subject to correct application, sitting and installation procedures together with subsequent recorded maintenance/servicing carried out in accordance with our recommendations. Failure to do so could result in the withdrawal of our warranty.
  Please go to our website for our detailed warranty terms and conditions: www.jehall.co.uk

F-Gas Information

From 1/1/2015, F-Gas Regulation EU 517/2014 came into force replacing the old Regulation EC 842/2006. This affects system labelling, information supplied within documentation and also the way in which thresholds for frequency of leak testing refrigeration systems are calculated. Please be aware of the following:

- The models of equipment covered in this Technical Manual rely on fluorinated greenhouse gases for their functioning.
- All unit models come from the factory pressurized with OFN (Oxygen Free Nitrogen) only.
- The GWP (Global Warming Potential) values of refrigerants which are specified for use along with the three new thresholds for leak testing requirements based on TCO_2Eq (Tonnes CO_2 Equivalent) are as follows:

		Refrigerant Charge - kg		
		5T	50T	500T
Refrigerant	GWP	CO_2Eq	CO_2Eq	CO_2Eq
R404A	3922	1.3	12.7	127
R407A	2107	2.4	23.7	237
R407F	1825	2.7	27.4	274
R448A	1387	3.6	36.0	360
R449A	1397	3.6	35.8	358

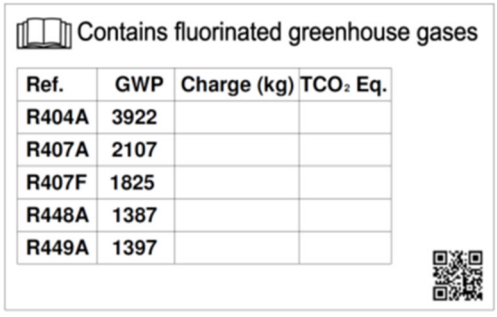
- Changes to leak testing requirements are as follows:

OLD LEGISLATION	NEW LEGISLATION	LEAK CHECKING FREQUENCY
3-30 kgs	5-50 TCO_2Eq	Every 12 months but can be increased to 24 months if fitted with a fixed leak detection system.
30-300 kgs	50-500 TCO_2Eq	Every 6 months but can be increased to 12 months if fitted with a fixed leak detection system.
300+ kgs	500+ TCO_2Eq	Every 6 months - however automatic leak detection system is mandatory which requires servicing every 12 months

To calculate TCO_2Eq value: $\frac{\text{Refrigerant charge (kgs) x Refrigerant GWP}}{1000}$

Please note: From 1st January 2017, the new legislation applies to systems which previously were exempt from leak testing under the 'below 3kg' charge limit.

A refrigerant charge label is supplied with each unit (inside the electrical box) manufactured from January 2015. The total refrigerant charge for the system and the TCO_2Eq value must be entered on the label with indelible ink and must be adhered in the proximity of the product charging port. The label supplied will represent the refrigerants approved for use with that particular unit. An example of the unit label is as follows:


Contains fluorinated greenhouse gases

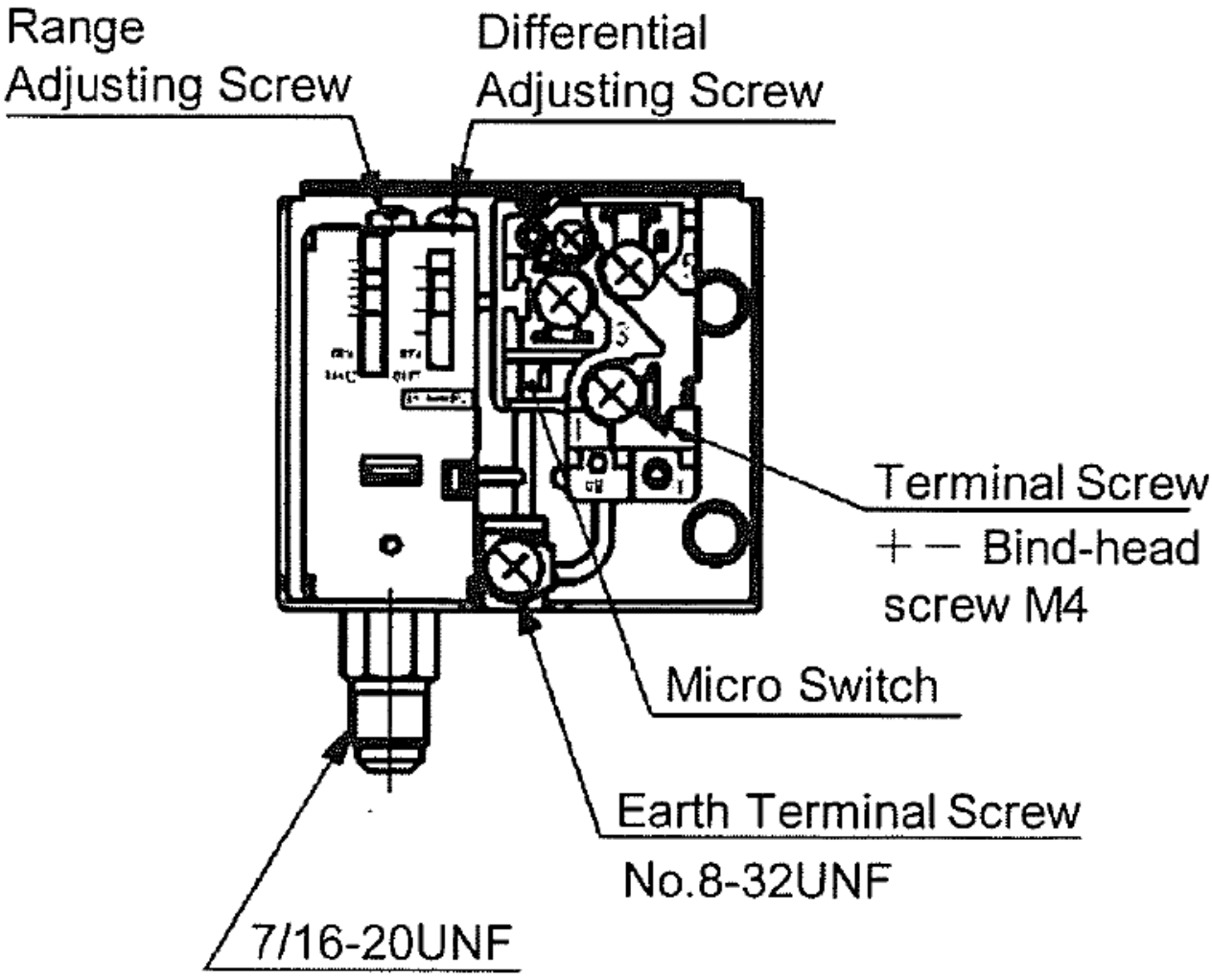
Ref.	GWP	Charge (kg)	TCO_2 Eq.
R404A	3922		
R407A	2107		
R407F	1825		
R448A	1387		
R449A	1397		

Technical Information

Low Pressure Switch

Safety pressure switch settings:

The pressure switch fitted to the condensing unit with auto reset for low pressure is factory preset to 1.0 bar cut-out. **Do not set pressure control below this setting.**

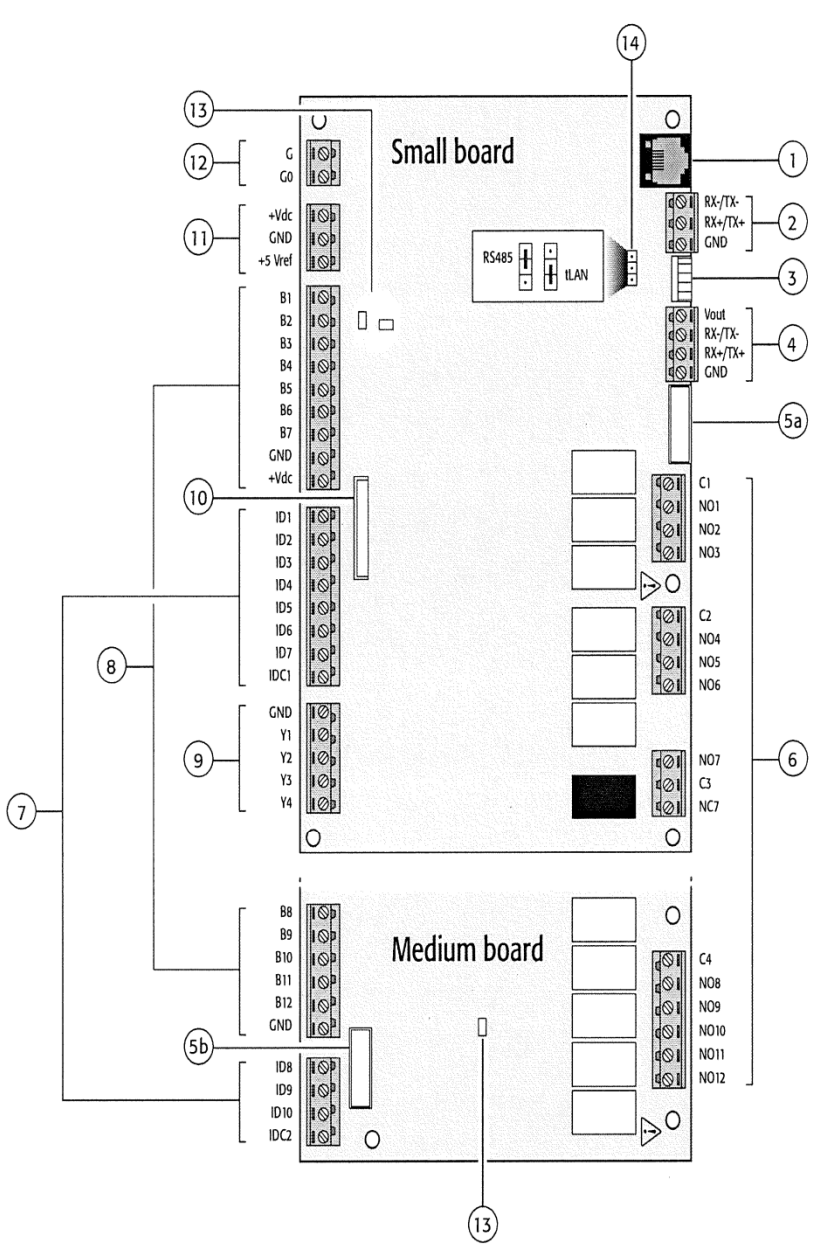


Setting procedure for Low Pressure switch:

Turning the range adjusting screw counterclockwise increases the setting pressure. Turning the range adjusting screw clockwise decreases the setting pressure.
Turning the differential adjusting screw clockwise increases the differential. Turning the differential adjusting screw anti-clockwise decreases the differential setting.
By turning these two adjusting screws, the desired setting pressure and differential are obtained.
Lock the spindles with the locking plate after setting.

Technical Information

Medium Version Controller



Key:

1 Terminal connector/ application download (note1)
2 µPC bus
3 PLD terminal connector (note2)
4 RS485/tLAN connection (note2)
5a Valve 1 control output
5b Valve 2 control output
6 Relay digital output
7 Digital Input
8 Probe analogue input
9 Analogue output
10 Serial card
11 Power supply for external probe
12 Power supply:
230 Vac for UPCA version
24 Vac for UPCB version
13 LED
14 tLAN/RS485 jumper

Please Note: The battery in the controller should be changed every three years.

Medium Version Controller

Do not dispose of the product as municipal waste; it must be disposed of through specialist waste disposal centres.

- The product contains a battery that must be removed and separated from the rest of the product according to the instructions provided, before disposing of the product.
- Improper use or incorrect disposal of the product may negative effects on human health and on the environment.
- The public or private waste collection systems defined by local legislation must be used for disposal.
- In the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.

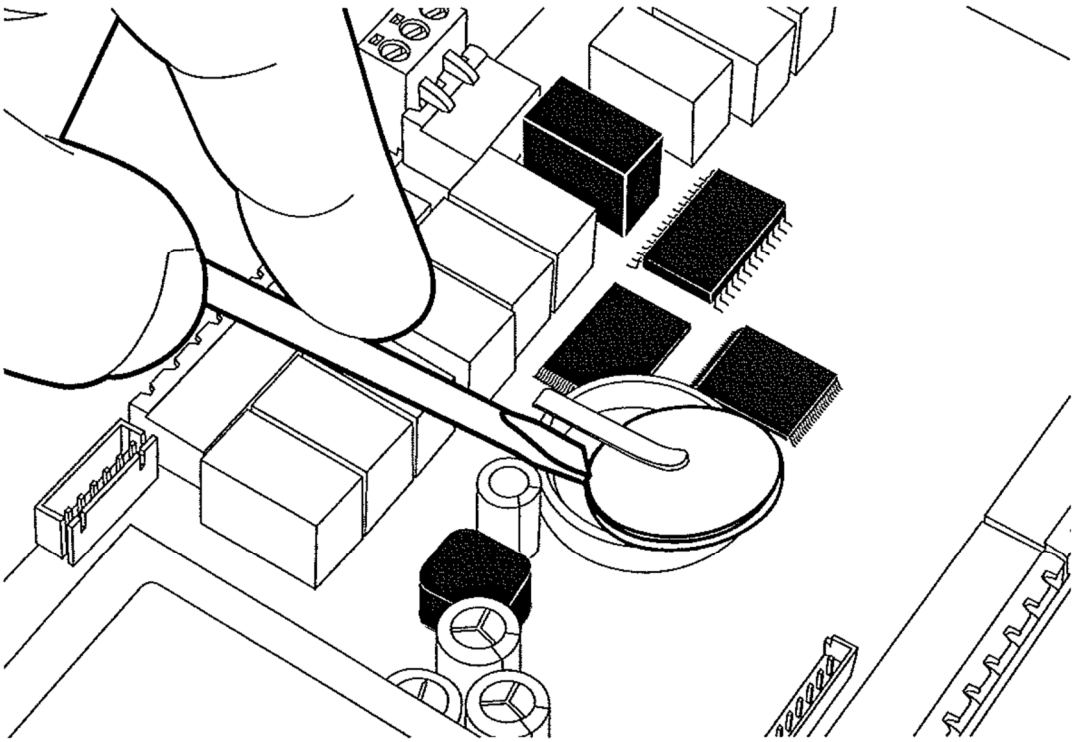


Fig. 4.c

IMPORTANT WARNINGS

The CAREL product is a state-of-the-art device, whose operation is specified in the technical documentation supplied with the product or can be downloaded, even prior to purchase, from the website www.carel.com.

The customer (manufacturer, developer or installer of the final equipment) accepts all liability and risk relating to the configuration of the product in order to reach the expected results in relation to the specific final installation and/or equipment. The failure to complete such phase, which is required/indicated in the user manual, may cause the final product to malfunction; CAREL accepts no liability in such cases. The customer must use the product only in the manner described in the documentation relating to the product. The liability of CAREL in relation to its products is specified in the CAREL general contract conditions, available on the website www.carel.com and/or by specific agreements with customers.

Technical Information

Phase Protection Module – MG73BF

Main Features:

- Monitors own supply
- Phase loss (failure) & Neutral loss detection
- Phase reverse detection
- Phase asymmetry (10%) – Phase to Phase
- Adjustable Over & Under voltage trip level
- Adjustable Operate Time & Release Time Delay
- SPDT, DPDT Relay output (5A Resistive)
- DIN rail & base mounting
- LED indication for all failure conditions

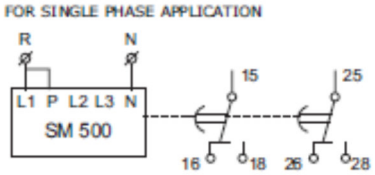
Model Function Description:

- Rated Voltage 240VAC Un (Ph ~ N)
- Output relay will energize after operate time if following conditions are within limit:

  1. All phases are present and phase voltages are within the over & under voltage trip levels Set on the device.
  2. If Phase Sequence is OK.
  3. If Phase to Phase asymmetry is less than 10%.

- Relay will trip after release time if any of the Phases exceeds over voltage & under voltage trip levels.
- Relay will trip in <100ms if any phase fail, line interruption or phase reverse occurs.

LED Indications	Green	Power ON	
	OV	Over Voltage	
	UV	Under Voltage	
	BLINK	N.A.	Phase Asymmetry
	ON	N.A.	Phase Reverse
	All LEDs OFF	Phase Fail	



Three Phase Mode:

Connect three phases at L1, L2, L3 and Neutral at N terminal. Keep P terminal open.

Technical Information

Pressure Relief Valve – 31bar setting

The function of a Pressure Relief Valve is to protect against over-pressure. For safety reasons, excessive over-pressure in any part of the refrigeration system must be avoided

Applications

A typical application for a Henry Technologies pressure relief valve (PRV) is to protect a liquid receiver from being over-pressurised. In the event of a fire, any liquid refrigerant inside the receiver will evaporate resulting in an increase in pressure. The PRV will safely control this increase in pressure by venting the vapour from the receiver. Another application is to protect equipment from compressor over-pressure.

Henry Technologies pressure relief valves are designed to discharge vapour and should not be used to vent liquid refrigerant. The valves are "back-pressure dependent" and are therefore required to discharge to atmosphere.

The brass and stainless steel series valves are suitable for use with HCFC and HFC refrigerant gases. The stainless steel series valves are also suitable for ammonia.

Once a PRV has discharged, replacement is recommended, as the set pressure can no longer be guaranteed. Refer to Installation Section for further information.

In line with the Institute of Refrigeration Guidelines (UK), Henry Technologies recommend that a PRV should be replaced at least every 5 years. These intervals may have to be reduced if other regulations apply.

It is recommended to have a relief valve pressure setting at least 25% higher than the maximum system operating pressure. The PRV set pressure should not be higher than the design pressure (MWP) of the vessel.

How it works

A conventional PRV is designed to open at a predetermined pressure - the set pressure. A spring exerts a sealing force on a valve seat via a piston seal assembly. At a pressure equal to the set pressure, the piston will start to lift resulting in a small amount of flow through the valve. From this point, the pressure force acting on the piston increases significantly and overcomes the spring force. This imbalance of forces causes the valve to "pop" fully open. By design, the difference in pressure from the valve set point to the fully open condition is no more than 10%. System pressure is controlled/reduced by venting the refrigerant vapour through the valve. The valve then re-closes at a pressure where the spring force overcomes the piston force. Under normal system operating conditions, the pressure at the valve inlet is below the set pressure. Only under abnormal operating conditions should the PRV be open.

Main features

- Proven safe design
- Category IV PED compliant
- Precision machined parts for reliability
- High flow capacity
- Compact
- Non-stick teflon valve seal
- Blow-out proof seal design
- Seal material with high chemical resistance
- Tamper proof
- Test Certificates available on request
- Non-standard pressure settings available on request

Technical Specification

All Henry Technologies PRV's are designed and manufactured to the intent of ASME VIII Division 1.

For 526, 5230 and 5231 series models:-

Set pressure range = 14 to 31 barg
Allowable operating temperature = -40°C to +107°C

For 5232 and 524 series models:-

Set pressure range = 10.3 to 31 barg
Allowable operating temperature = -40°C to +107°C

For 53 series models:-

Set pressure range = 10.3 to 31 barg
Allowable operating temperature = -29°C to +135°C

Materials of Construction

For all 52 series valves, the main body and outlet connection are made from brass. Valve internals such as the piston and adjusting gland are either made from brass, plated steel or stainless steel.

For the 53 series valves, the main body is made from stainless steel. The outlet connection and valve internals are made from either plated steel or stainless steel.

For all valves, the seal is made from premium quality teflon (PTFE). All springs are made from high strength plated alloy steel.

Technical Information

Oil Separator / Reservoir

Function

Refrigerant gas leaving the compressor through the discharge line contains refrigeration oil in a vaporous mist. As the mixture enters the oil separator, the velocity is reduced to allow oil separation to begin. The refrigerant gas and oil mixture renters the oil separator and passes through an inlet screen, causing the fine particles to combine. Larger oil particles are formed and drop to the bottom of the oil separator.

The refrigerant gas then passes through an outlet screen to remove residual oil particles. The oil gathers in the reservoir at the bottom and return to the compressor. Oil returns quickly to the compressor, because of the higher pressure in the oil separator than in the compressor crankcase. The refrigerant gas leaves through the outlet of the oil separator and goes to the condenser.

Type	Maximum Working Pressure, PS	Marking	Connection ODF	Conformity Assessment Category	Volume Litres	Initial Oil Charge Litres
RSPW-OC-04/22	31 bar	CE	7/8‘‘	Cat. I	4.2	1.5

Certification

DOC/002-15(5)

CE

Declaration of Conformity

Konformitätsbescheinigung
Déclaration de Conformité
Conformiteitsverklaring
Declaracion de Conformidad
Dichiarazione di Conformità
Overensstemmelseserklæring
Declaração de Conformidade
Δήλωση Συμμόρφωσης
Deklaracja zgodności

DAIKIN REFRIGERATION MALAYSIA SDN. BHD.

LOT 10, JALAN PERUSAHAAN 8, KAWASAN PERUSAHAAN PEKAN BANTING, 42700 BANTING, SELANGOR DARUL EHSAN, MALAYSIA.

declare under our sole responsibility that the products
bescheinigen auf unsere eigene Verantwortung, daß die Produkten
déclarons sous notre seule responsabilité que les produits
verklaren onder onze uitsluitende verantwoordelijkheid de producten
declaramos sobre nuestra sola responsabilidad que los productos
dichiariamo sotto nostra sola responsabilità che i prodotti
erklærer som eneansvarlige, at produktet
declaramos sob a nossa responsabilidade exclusiva que os produtos
δηλώνει υπό την αποκλειστική της ευθύνη ότι τα προϊόντα
oświadcza z pełną odpowiedzialnością, że produkty

COMMERCIAL REFRIGERATION CONDENSING UNIT
Unided que condensa comercial de la refrigeración
Unité de condensation commerciale de réfrigération
Commerciële condenserende koel-unit
Kommerzielle kondensierende Maeinheit der Abkühlung
Unità condensate commerciale di refrigerazione
kølekondenseringsenheden til kommercielt brug
Unidade de condensação de refrigeração
Εμπορικη Μοναδα Συμπυκνωσης Ψυξης
AGREGAT SKRAPLAJĄCY - CHŁODNICTWO KOMERCYJNE

Model Designations:	See Appendix 1 overleaf
Baumuster-Bezeichnungen:	*Sehen sie anhang l umseitig*
Désignations Modéles:	*Voir l'annexe l au verso*
Aanduidingen Model:	*Zie ommezijde voor bijlage 1*
Disgnaciones Modelo:	*Vea el apendice l a la vuelta*
ndicazionu de Modello:	*Veda overleaf l'appendice l*
modelbetegnelse:	*se appendiks 1 på bagsiden*
Designações do modelo:	*Ver Apêndice l verso*
Ονομασίες μοντέλου:	*Βλ. Παράρτημα 1 στο πίσω μέρος της σελίδας*
Oznaczenia modelu:	*Patrz na odwrocie Załącznik 1*

which this declaration relates is in conformity with the requirements of the following directives
auf diese Bescheinigung sich beziehen, sind den Vorschriften der Normen entsprechend
auxquels se réfèrent cette déclaration, sont conformes aux prescriptions des directives
waarop deze verklaring betrekking heeft, in overeenstemming is/zijn met de eisen van de volgende richtlijnen
a los cuales se refieren está declaracion, son conformes a las prescripciones de las directivas
alla quale si riferisce questa dichiarazione, sono conormi alle prescrizioni delle directtive
som denne erklæring vedrører, er i overensstemmelse med kravene fremsat i følgende direktiver
que esta declaração está conforme os requerimentos das seguintes directrizes
τα οποία αφορά αυτή η δήλωση συμμορφώνονται με τις απαιτήσεις των παρακάτω οδηγιών
których dotyczy ta deklaracja są zgodne z wymaganiami następujących Dyrektyw

Machinery Directive *	**2006/42/EC**
IEC/ EN 60335-1	Safety of Household and Similar Electrical Appliances: Part I
IEC/ EN 60335-2-89	Safety of Household and Similar Electrical Appliances: Part II
Eco-design Directive	**2009/125/EC**
Commission regulation (EU) 2015/1095	Ecodesign requirements for condensing units

* J&E Hall International is authorised to compile the Technical Construction File.
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* J&E Hall International est autorisé à compiler le Dossier de Construction Technique.
* J&E Hall International is gevolmachtigd het Technisch Constructiedossier op te stellen.
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J & E Hall Limited, Hansard Gate, West Meadows, Derby, DE21 6JN, United Kingdom.

General Manager

Teh Yeow Chong
Issue Date: 15 March 2019

Certification

DOC/002-15(5)

CE

Declaration of Conformity
Konformitätsbescheinigung
Déclaration de Conformité
Conformiteitsverklaring
Declaracion de Conformidad
Dichiarazione di Conformità
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Δήλωση Συμμόρφωσης
Deklaracja zgodności

DAIKIN REFRIGERATION MALAYSIA SDN. BHD.
LOT 10, JALAN PERUSAHAAN 8, KAWASAN PERUSAHAAN PEKAN BANTING,
42700 BANTING, SELANGOR DARUL EHSAN, MALAYSIA.

Model Designations:
Baumuster-Bezeichnungen:
Designation Modeles:
Aanduidingen Model:
Disignaciones Modelo:
Indicazionu de Modello:
modelbetegnelse:
Designações do modelo:
Ονομασίες μοντέλου:
Oznaczenia modelu:

JEHR-0050-B1-M-1	JEHR-0150-B2-M-3	JEHS-0350-B3-M-1
JEHR-0067-B1-M-1	JEHR-0225-B2-M-1	JEHS-0350-B3-M-3
JEHR-0100-B1-M-1	JEHR-0225-B2-M-3	JEHS-0400-B3-M-1
JEHR-0113-B1-M-1	JEHR-0300-B2-M-1	JEHS-0400-B3-M-3
JEHR-0040-B1-M-1	JEHR-0300-B2-M-3	JEHS-0500-B3-M-3
JEHR-0051-B1-M-1	JEHS-0200-B2-M-1	JEHS-0600-B3-M-3
JEHR-0063-B1-M-1	JEHS-0200-B2-M-3	JEHS-0680-B3-M-3
JEHR-0077-B1-M-1	JEHS-0250-B2-M-1	JEHS-0800-B4-M-3
JEHR-0095-B1-M-1	JEHS-0250-B2-M-3	JEHS-1000-B4-M-3
JEHR-0140-B2-M-1	JEHS-0300-B2-M-1	
JEHR-0140-B2-M-3	JEHS-0300-B2-M-3	
JEHR-0150-B2-M-1		

JEHR-0115-B1-L-1	JEHR-0135-B1-L-1	JEHR-0175-B2-L-1
JEHR-0175-B2-L-3	JEHR-0225-B2-L-1	JEHR-0225-B2-L-3
JEHS-0200-B2-L-3	JEHS-0300-B2-L-3	JEHS-0400-B3-L-3
JEHS-0500-B3-L-3	JEHS-0600-B3-L-3	JEHS-0750-B4-L-3
JEHS-0950-B4-L-3 EVI	JEHS-1150-B4-L-3 EVI	

JEHSD-0400-B3-M-3	JEHSD-0600-B3-M-3	JEHSD-0800-B4-M-3
JEHSDT-1200-B5-M-3	JEHSDT-1600-B6-M-3	

J&E Hall International

Certification

DOC/004-15(6)

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Tel: +603-31872911 Fax: +603-31878597

EU Declaration of Conformity 2014/68/EU

We declare under our sole responsibility that the following products:

Refrigeration Condensing Unit

Model Designations:

JEHS-0350-B3-M-1	JEHS-0600-B3-M-3	JEHS-0500-B3-L-3	JEHSD-0400-B3-M-3
JEHS-0350-B3-M-3	JEHS-0680-B3-M-3	JEHS-0600-B3-L-3	JEHSD-0600-B3-M-3
JEHS-0400-B3-M-1	JEHS-0800-B4-M-3	JEHS-0750-B4-L-3	JEHSD-0800-B4-M-3
JEHS-0400-B3-M-3	JEHS-1000-B4-M-3	JEHS-0950-B4-L-3 EVI	JEHSDT-1200-B5-M-3
JEHS-0500-B3-M-3	JEHS-0400-B3-L-3	JEHS-1150-B4-L-3 EVI	JEHSDT-1600-B6-M-3

Which are assemblies that containing refrigerating fluids classified in Group 2 and comply the requirements of **PRESSURE EQUIPMENT DIRECTIVE 2014/68/EU**. The details of pressure equipment as listed below.

Pressure equipment	Part description	Category	Conformity assessment
Safety device	High pressure switch	IV	Module B & D
Vessel	Compressor	I or II	- or Module A2 or Module D1
Vessel	Liquid receiver	II	Module A2 or Module D1 or Module B & D
Vessel	Oil separator	I or II	Module A or Module D1 or Module B & D
Vessel	Check valve	SEP	-
Vessel	Filter drier	SEP	-
Piping	System Piping	SEP	-
Piping	Sight glass	SEP	-
Piping	Coil	SEP	-
Piping	Service valve	SEP	-

Category: II
Evaluation module: A2
Notified body number: 2561
Notified body name & address: Hartford Steam Boiler UK Limited
Unit 7, Brewery Yard, Deva City Office Park, Trinity Way, Salford, M3 7BB, United Kingdom.
Technical standards and specification:
are in conformity with the **Machinery Directive 2006/42/EC** and **Eco-design Directive 2009/125/EC**.

MD IEC/ EN 60335-1 & IEC/ EN 60335-2-89
Eco Commission regulation (EU) 2015/1095

The products are provided with a CE 2561 marking of conformity.

J&E Hall International

J & E Hall Limited, Hansard Gate, West Meadows, Derby, DE21 6JN, United Kingdom

DAIKIN REFRIGERATION MALAYSIA SDN. BHD.

Teh Yeow Chong
General Manager
Issued Date: 14 March 2019

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