



DAS HERZ DER FRISCHE

EVOLUTION SERIES

AIR COOLED CONDENSING UNIT

OUTDOOR AIR COOLED CONDENSING UNIT

ORIGINAL MANUFACTURED EQUIPMENT
CONCISE BROCHURE VERSION

Evolution
Series 1 - 6



Evolution Air Cooled Condensing Unit Series

Content	Page
Explanation of Type Designation	2
Product Specifications	3
Standard Features and Standard Optional Accessories	3
Carel FCP Stand-alone Condenser Fan Speed Controller	3
Standard Features – Economy Unit	
BITZER ECOLINE Compressor	4
The Special Highlights of the BITZER ECOLINE Compressor	4
Optional Features – Economy Unit	
The CRII System	4
Control Principle	4
The CRII Capacity Controller	4
Standard Features – Premium Unit	
BITZER ECOLINE VARISPEED Compressor	5
Highlights and Technical Features	5
The Premium Unit Controller	5
System Performance – SEER Rating	5
Application limits – Economy Unit	6
Application limits – Premium Unit	7
Technical Data	
Compressor Data	8
Single Phase Compressor Data	9
VARISPEED Inverter Compressor Data	9
Condenser Data	10
Condensing Unit Data	10
Sound Data	10
Dimensional Data	11



Explanation of Type Designation

4EES-6.F1Y-EVO3

Compressor number of cylinders and displacement code

4EES-6.F1Y-EVO3

ECOLINE line compressor

4EES-6.F1Y-EVO3

Centrifugal lubrication or not

4EES-6.F1Y-EVO3

Code for Motor size

4EES-6.F1Y-EVO3

Code for Frequency Inverter (Premium - ECOLINE VARISPEED models only)

4EES-6.F1Y-EVO3

Code for Ester Oil

4EES-6.F1Y-EVO3

Condenser model

Product Specifications

The EVOLUTION Outdoor Air Cooled Condensing Unit Series is the latest addition to BITZER Australia's Air Cooled Condensing Unit Range. The EVOLUTION incorporates the latest compressor developments including BITZER ECOLINE compressors, CRII capacity control and the BITZER ECOLINE VARISPEED compressors in combination with outstanding Australian made Buffalo Trident heat exchange and world class fan technology to produce an extremely efficient unit.

The unit is available in two options; Premium and Economy. The Economy Unit is a cost effective basic air cooled condensing unit with several options available. The Premium unit includes the BITZER ECOLINE VARISPEED Compressor for seamless capacity control and stable operation as well as unit controller to make the installation and operation easy.



Standard Features

- BITZER ECOLINE compressor
- Gold epoxy fin & copper tube condenser
- Internal float oil separator
- Liquid receiver
- Liquid line filter drier and sight glass
- Liquid line ball valve
- Single Phase AC condenser fans c/w Fan speed controller
- Vertical Airflow design (Horizontal Airflow Optional)
- Pre wired electrical panel and componentry
- Galvanised steel base
- High quality powder coated panel set
- Mechanical dual pressure control

Standard Optional Accessories

- Suction Accumulator
- Oil return sight glass
- OLCK – BITZER oil safety switch
- Electronic Oil Level control and reservoir oil separator
- Electronic Oil Level watch
- Liquid line solenoid
- MP15 Phase protection
- CRII capacity control solenoid and controller
- Head Fan
- Mechanical unloader control

CAREL FCP Stand-alone Condenser Fan speed controller

FCP is the new CAREL proposal for the stand-alone speed control of single-phase fans, on condensing units.

The device can be configured manually by adjusting the trimmers for the set point, differential and motor speed, or alternatively managed directly by setting parameters via the programming key or RS485 serial line.

Main features and advantages:

- Optimised pressure management, improving the efficiency of the refrigeration installation, with a consequent reduction in energy consumption;
- Minimum and maximum speed management, cut-off, speed up.



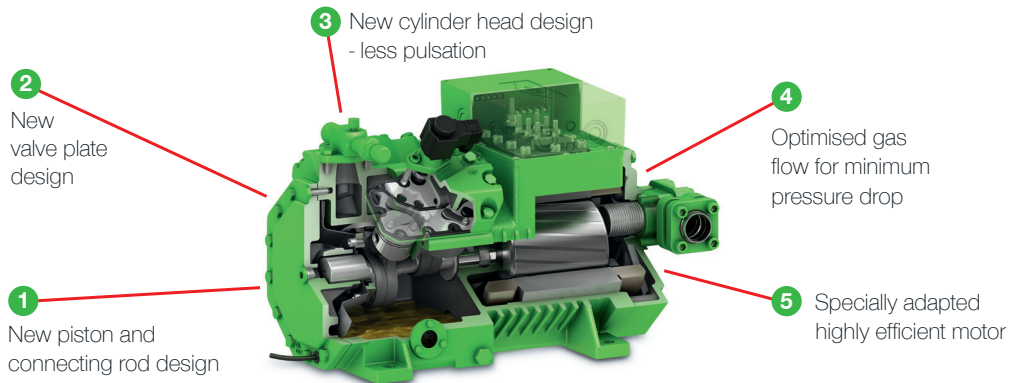
ECONOMY UNIT

Standard Features – Economy Unit

BITZER ECOLINE Compressor

BITZER has always paid special attention to the efficiency of compressors and a few years ago introduced the BITZER ECOLINE series, which has been optimised especially for R134a. More models have now been added to the BITZER ECOLINE series and it has been further developed for the universal use with different refrigerants at an extended application range. This includes, R134a, R404A R407A, R407C, R407F, R507A and R22. This continues to incorporate the extra high efficiency and moderate pressure levels (reduced leakage rates) common to the series. This gives the BITZER ECOLINE compressors, which can also be used at very low condensing temperatures, a beneficial seasonal energy efficiency ratio beyond comparison.

The Special Highlights of the BITZER ECOLINE Compressors

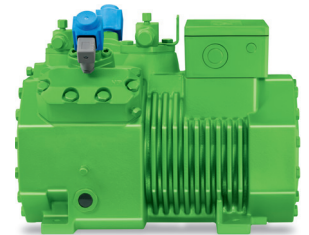


Optional Features - Economy Unit

The CRII System

Capacity control is often required to match the output of a refrigeration, air-conditioning or heat pump system to the actual requirement. It prevents high switching frequency of the compressor and, thus, ensures more efficient operation of the system.

The CRII system is designed for the special requirements of intelligent system controls. This enables higher cycling frequency of capacity control.



The Economy Unit Controller

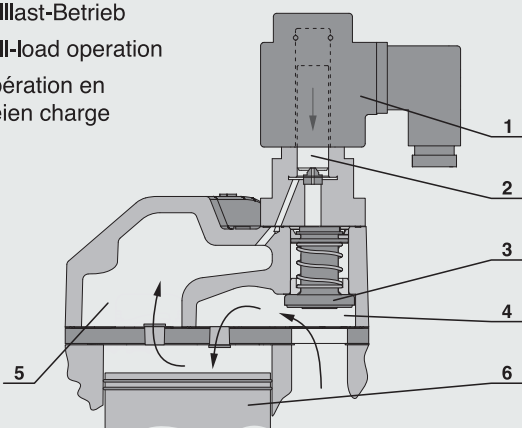
As an optional feature BITZER utilises the Carel pR300 controller to operate and control the functionality of the BITZER CRII capacity control system. The controller will start / stop, load / unload the compressor based upon the suction pressure set point. The capacity steps can be activated / deactivated rapidly (5 s).

Control Principle

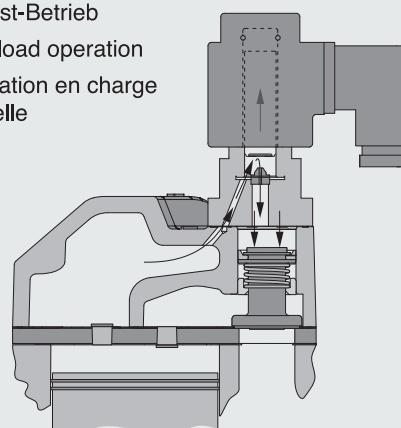
See KT-100-3 and KT-101-2 brochure, www.bitzer.com.au for further information.

- 1 Solenoid coil
- 2 Armature (spring-loaded)
- 3 Control piston
- 4 Suction gas chamber
- 5 Discharge gas chamber
- 6 Piston

Volllast-Betrieb
Full-load operation
Opération en
plein charge



Teillast-Betrieb
Part-load operation
Opération en charge
partielle



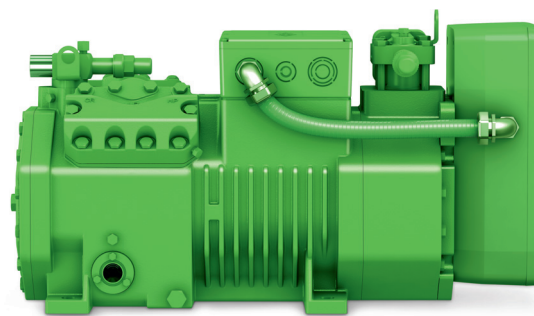
PREMIUM UNIT

Standard Features – Premium Unit

The Premium Unit differentiates itself from the Economy Unit by incorporation of BITZER VARISPEED Compressor technology and electronic unit controller. The stepless capacity control minimises suction pressure fluctuations and cycling frequencies and therefore saves energy costs.

BITZER ECOLINE VARISPEED Compressor

The BITZER ECOLINE compressors with their innovative design are extended by the new series featuring integrated frequency inverter (FI) which allows stepless capacity control.



Highlights and technical features

- Maintenance-free, suction gas-cooled
- The frequency inverter is solidly flanged on the compressor's motor cover
- The suction gas cooling for the power elements of the FI ensures an optimum temperature of the electrical components and therefore no fan or regular maintenance work is needed.
- Through operation with frequency inverter the compressor cooling capacity can be increased by approx. 70 % (25 -87Hz).
- Optimum capacity adaptation due to integrated FI - capacity control range of more than 3:1
- Very cost-effective due to high system efficiency: slight suction pressure fluctuations and optimised compressor running time
- Maintenance-free, suction gas-cooled
- Low starting current during compressor start

The Premium Unit Controller

The premium unit will be fitted standard with a unit safety control module. This controller will perform and provide the following actions:

- Provide energy and cost savings through intelligent capacity control incl.
 - Compressor frequency inverter by Suction pressure
- Start / Stop the compressor
- Compressor Protection
- Easy installation
- Refrigerant configurable

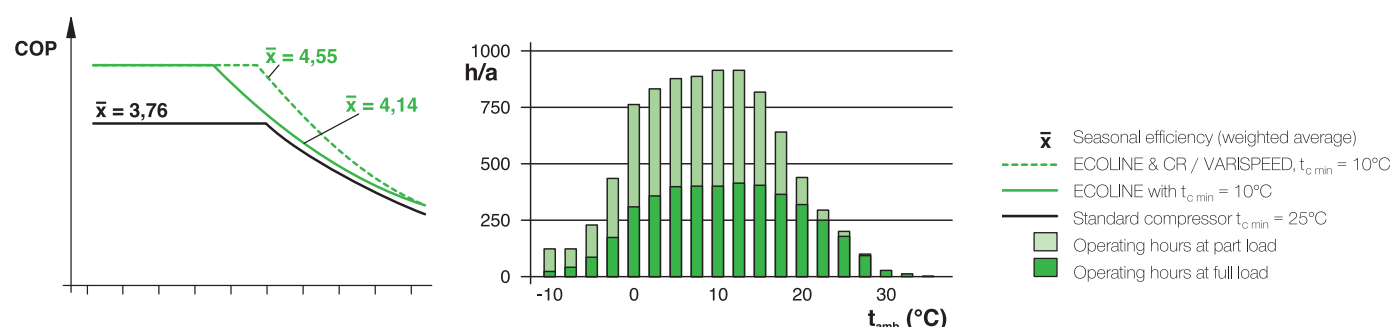
The standard Carel FCP condenser fan speed control will still be used in the premium model.

System Performance – SEER Rating

The SEER rating of a unit is the cooling output during a typical cooling-season divided by the total electric energy input during the same period. The higher the unit's SEER rating the more energy efficient it is.

The SEER is related to the coefficient of performance (COP) with the primary difference being that the COP of a cooling device is unit-less, because the numerator and denominator are expressed in the same units.

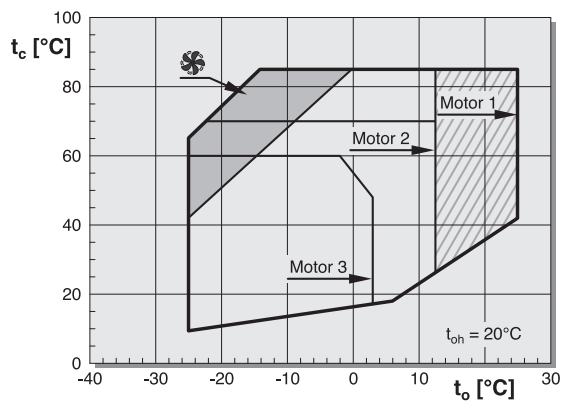
It is for these reasons that we can assess our condensing units in locations for accuracy and performance benefits of using the CR11 capacity control system or the Premium BITZER ECOLINE VARISPEED compressor and controller combination.



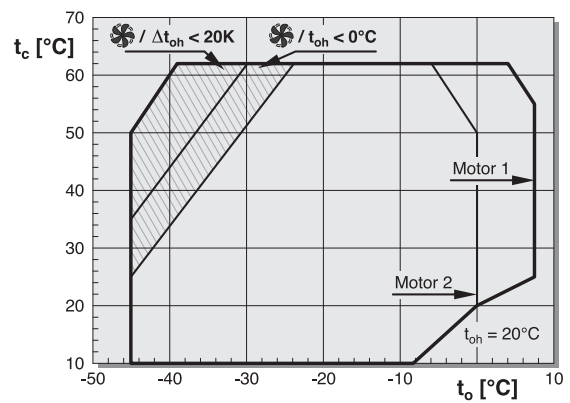
Application limits - Economy Unit

Relating to 20°C suction gas temperature

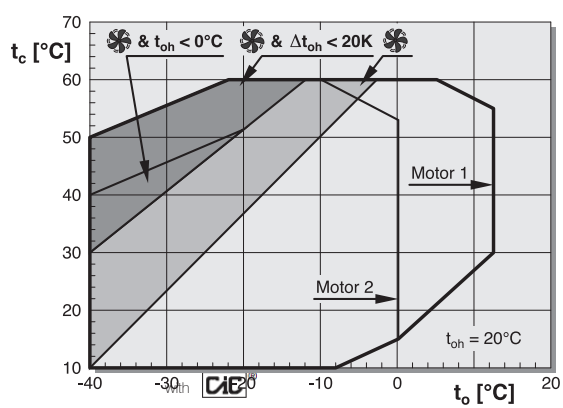
R134a ① 2KES-05Y .. 6FE-50Y



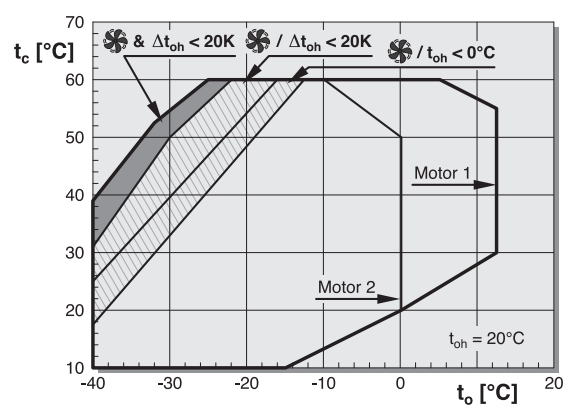
R404A ■ R507A 2KES-05Y .. 6FE-50Y



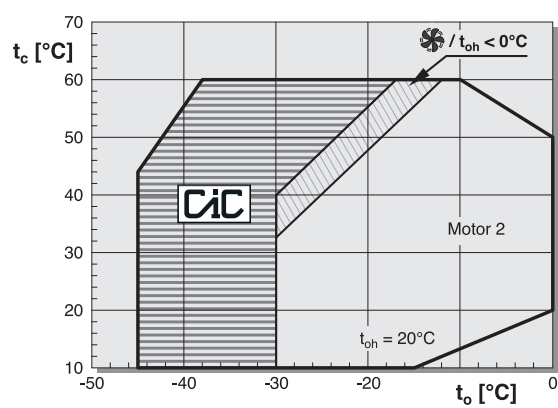
R407F ③ 2KES-05Y .. 4CES-9F



R407F ③ 4VES-7F .. 6FE-50Y



R407F ③ 4VES-7Y .. 6FE-40Y

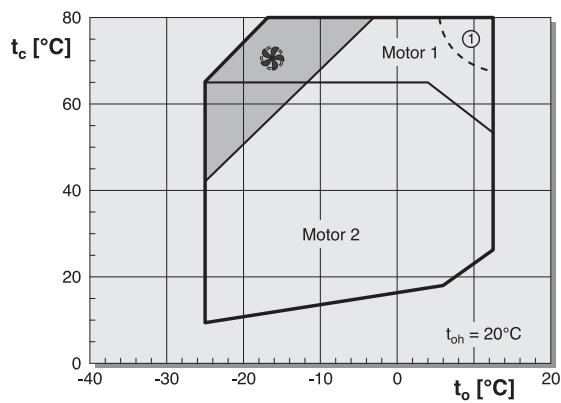


- Additional cooling or limitation see diagram
- Additional cooling
- Additional cooling + limitation see diagram
- Limitation see diagram
- Suction gas superheat > 10 K
- Additional fan +

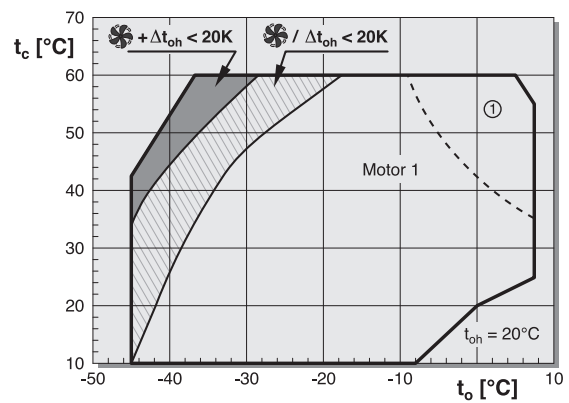
Application limits - Premium Unit

Relating to 20°C suction gas temperature

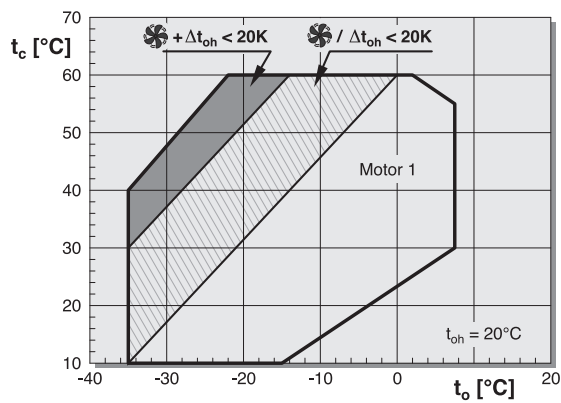
R134a ② ③



R404A ■ R507A 2DES-3.F1Y .. 4NES-20.F4Y



R407F



① Effective application limits of the individual compressors are determined by max. power consumption of frequency inverter.
See performance data (KP-102-4 p. 7-14) and BITZER software www.bitzer.com.au.

② For R134a and $t_c > 70^\circ\text{C}$ the oil BSE55 has to be used (instead of BSE32).

③ Max. suction gas temperature 20°C
Applications > 12.5°C evaporating temperature upon request.

t_o Evaporating temperature (°C)

t_{ch} Suction gas temperature (°C)

Δt_{ch} Suction gas superheat (K)

t_c Condensing temperature (°C)

- Additional cooling
- Additional cooling or max. 20K suction superheat
- Additional cooling and max. 20K suction superheat

Application limits for R407C upon request.



Technical Data

Compressor Data									
Compressor Model	Motor Version	Motor Connection Volt	Max Operating Current Amps	Maximum Power Consumption kW	Capacity Control	Oil Charge dm ³	Compressor Weight kg	Crankcase Heater 240/1/50	EVO Suction Line Size Inlet inch
2KES-05Y	1	380...420V Y/3/50Hz	2.8	1.5	N/A	1	43	0 .. 60W Self Regulating PTC Heater	5/8
2JES-07Y	1		3.7	1.9		1	43		5/8
2HES-1Y	2		3.8	2.0		1	44		5/8
2HES-2Y	1		4.5	2.4		1	45		5/8
2GES-2Y	1		5.0	2.7		1	45		5/8
2FES-2Y	2		5.3	2.9		1	45		5/8
2FES-3Y	1		6.1	3.4		1	47		5/8
2EES-2Y	2		6.0	3.3		1.5	68	0 .. 120W Self Regulating PTC Heater	7/8
2EES-3Y	1		7.5	3.8		1.5	71		7/8
2DES-2Y	2		7.5	4.0		1.5	68		7/8
2DES-3Y	1		8.6	4.6		1.5	71		7/8
2CES-3Y	2		9.1	5.0		1.5	70		7/8
2CES-4Y	1		10.0	5.6		1.5	70		7/8
4FES-3Y	2		9.5	5.3		2	82		7/8
4FES-5Y	1		10.8	5.8		2	86		7/8
4EES-4Y	2		12.2	6.9		2	84		1 1/8
4EES-6Y	1		13.6	7.6		2	86		1 1/8
4DES-5Y	2		14.5	8.1		2	86		1 1/8
4DES-7Y	1		16.5	8.9		2	89		1 1/8
4CES-6Y	2		17.7	9.7		2	91		1 1/8
4CES-9Y	1		20.2	11.3		2	91		1 1/8
4VES-6Y	3	PW 380.420V YY/3/50Hz	10.0	6.0	Optional 50% Further control with CRIL unloader available. See KT-100-3 and KT-101-2 for further information.	2.6	129	0 .. 140W Self Regulating PTC Heater	1 1/8
4VES-7Y	2		16.6	11.0		2.6	129		1 1/8
4VES-10Y	1		19.9	12.0		2.6	139		1 1/8
4TES-8Y	3		12.1	7.0		2.6	134		1 3/8
4TES-9Y	2		19.9	13.0		2.6	134		1 3/8
4TES-12Y	1		25.1	14.0		2.6	141		1 3/8
4PES-10Y	3		13.6	8.0		2.6	139		1 3/8
4PES-12Y	2		22.7	14.0		2.6	139		1 3/8
4PES-15Y	1		28.2	16.0		2.6	147		1 5/8
4NES-12Y	3		15.9	9.0		2.6	141		1 3/8
4NES-14Y	2		26.6	17.0		2.6	141		1 3/8
4NES-20Y	1		33.2	19.0		2.6	150		1 5/8
4JE-13Y	3		19.8	11.0		4	179	0 .. 140W Heater	1 5/8
4JE-15Y	2		30.8	19.0		4	190		1 5/8
4JE-22Y	1		37.2	21.0		4	190		1 5/8
4HE-15Y	3		22.5	13.0		4	183		1 5/8
4HE-18Y	2		36.7	22.0		4	190		1 5/8
4HE-25Y	1		44.0	25.0		4	194		2 1/8
4GE-20Y	3		25.9	16.0		4.5	192		2 1/8
4GE-23Y	2		43.9	27.0		4.5	192		2 1/8
4GE-30Y	1		51.2	28.0		4.5	206		2 1/8

Note for total unit power consumption, add compressor and condensing unit values together.

Technical Data - Continued

Single Phase Compressor Data									
Compressor Model	Motor Version	Motor Connection Volt	Max Operating Current Amps	Maximum Power Consumption kW	Capacity Control	Oil Charge dm ³	Compressor Weight kg	Crankcase Heater 240/1/50	EVO Suction Line Size Inlet inch
2JES-07Y (20E)	2	220,240 Δ/1/50	10.0	*	N/A	1	47	0 .. 60W Self Regulating PTC Heater	5/8
2HES-2Y (20E)	1		13.5	2.8		1	47		5/8
2GES-2Y (20E)	1		15.0	3.15		1	47		5/8
2FES-2Y (20E)	2		15.0	3.15		1	47		5/8

* Information available on request

Check with your local BITZER office for full application limits of single phase compressors.

VARISPEED Inverter Compressor Data									
Compressor Model	Motor Version	FI Connection Volt	Max Operating Current for 380/3/50Hz Amp.	Input frequency Inverter Maximum Power Consumption kW	Frequency range	Oil Charge dm ³	Compressor Weight kg	Crankcase Heater 240/1/50	EVO Suction Line Size Inlet inch
2DES-3.F1Y	1	380,480V/3/50Hz	15	9	30 .. 87 Hz	1.5	88	0 .. 120W Self Regulating PTC Heater	7/8
4FES-5.F1Y	1		20	11	25 .. 87 Hz	2.0	105		1 1/8
4EES-6.F1Y	1		22	12		2.0	105		1 1/8
4DES-7.F3Y	1		28	17		2.0	106		1 3/8
4CES-6.F1Y	2		22	12		2.0	106	0 .. 140W Self Regulating PTC Heater	1 3/8
4CES-9.F3Y	1		34	21		2.0	106		1 3/8
4TES-9.F3Y	2		26	16		2.6	158		1 5/8
4TES-12.F4Y	1		42	26		2.6	165		1 5/8
4NES-14.F3Y	2		34	22		2.6	165		1 5/8
4NES-20.F4Y	1		55	36		2.6	174		1 5/8

Note for total unit power consumption, add compressor and condensing unit values together.



Technical Data - Continued

Condenser Data					
Model	Number of Fans	Fan Voltage	Fan Total Amps	Fan Total KW	Condenser Airflow L/S
EVO1	1 x 300mm	240 / 1 / 50	0.32	0.07	447.2
EVO2	2 x 300mm		0.64	0.14	816.8
EVO3	1 x 500mm		3.20	0.72	1,977.0
EVO4	2 x 500mm		6.40	1.44	3,388.0
EVO5	2 x 630mm		6.60	1.40	5,228.0
EVO6	2 x 630mm		6.60	1.40	4,834.0

Note for total unit power consumption, add compressor and condensing unit values together.

Condensing Unit Data						
Model	Unit Weight KG	Receiver Pump Down KG			EVO Liquid Line Size Outlet inch	
		R134a	R404A	R507A		
EVO1	170	7.73	6.65	6.64	1/2	
EVO2	190	7.73	6.65	6.64	1/2	
EVO3	210	10.28	8.83	8.83	5/8	
EVO4	280	10.28	8.83	8.83	7/8	
EVO5	350	13.80	11.73	11.73	1 1/8	
EVO6	365	13.80	11.73	11.73	1 1/8	

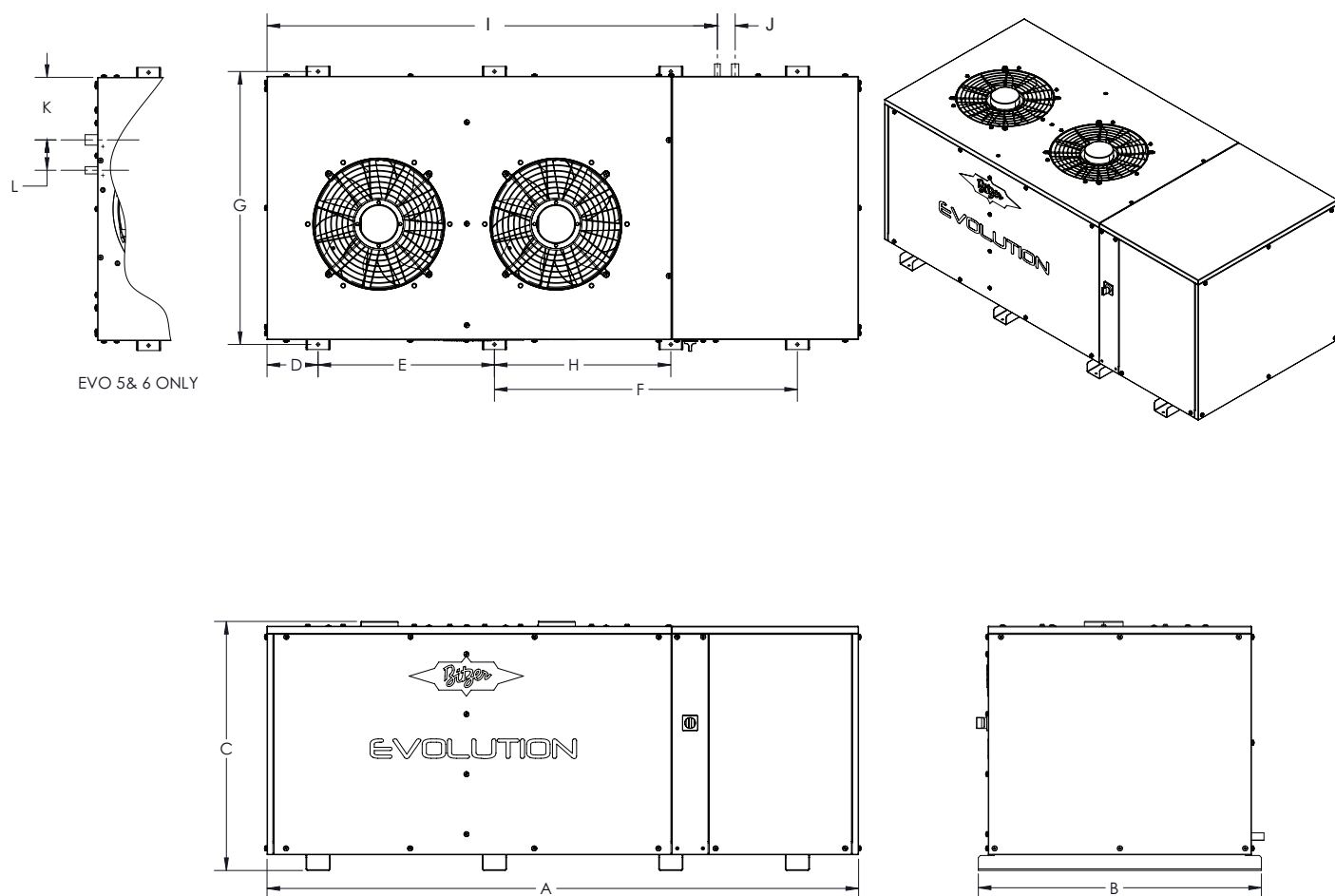
Note for total unit weight, add compressor and condensing unit values together.

Receiver pump down capacity calculated @ 80% of full capacity and +25°C ambient temperature.

Sound Data		
Model	Total Max Sound Pressure level @ 3m dB(A)	
	Economy Unit	Premium Unit
EVO1	53.7	N/A
EVO2	57.0	N/A
EVO3	59.7	60.0
EVO4	63.2	63.9
EVO5	67.4	68.7
EVO6	66.2	67.8

Sound pressure levels dB(A) are an approximate total max system noise, with compressor and fan noise added at 3m equal distance from each source.

Dimensional Data



Dimensions												
Model	A	B	C	D	E	F	G	H	I	J	K	L
EVOLUTION 1	1460	755	837	215	600	388	715	N/A	925	100		
EVOLUTION 2	1840	755	837	201	691	691	715	N/A	1306	100		
EVOLUTION 3	1840	905	980	201	691	691	865	N/A	1303	106		
EVOLUTION 4	2330	1115	980	201	695	1193	1075	695	1774	70		
EVOLUTION 5	2330	1115	1186	201	695	1193	1075	695			246	120
EVOLUTION 6	2330	1115	1186	201	695	1193	1075	695			246	120

Note: Minimum distances apply when installing next to existing structures. Unit is not designed to be mounted inside a well. For detailed information, refer to the installation information contained in the Evolution Series Operating Manual.

BITZER Australia Pty Limited

134 Dunheved Circuit,
St Marys, NSW 2760
Australia
tel +61 1300 BITZER
fax +61 (2) 9673 4698
info@bitzer.com.au

Victoria

tel +61 (3) 8326 8200
fax +61 (3) 9310 2520

Queensland

tel +61 (7) 3725 1360
fax +61 (7) 3274 3621

South Australia

tel +61 (8) 8345 6110
fax +61 (8) 8268 4555

Western Australia

tel +61 (8) 6350 6297
fax +61 (8) 9359 2077

BITZER New Zealand

BITZER Australia Pty Ltd

Unit 5, 5-7 Henry Rose Place
Albany, Auckland 0632
Auckland
New Zealand
tel +64 9 415 2030

www.bitzer.com.au



In the interest of continuous improvement BITZER reserves the right to change the specifications or design of any of its products without notice. The BITZER Symbol, Name BITZER and model numbers are registered trade marks. All products manufactured are pending design and specification registration and must not be copied or duplicated in any way.

Note: The ISO standard only applies to the BITZER NSW and VIC branches