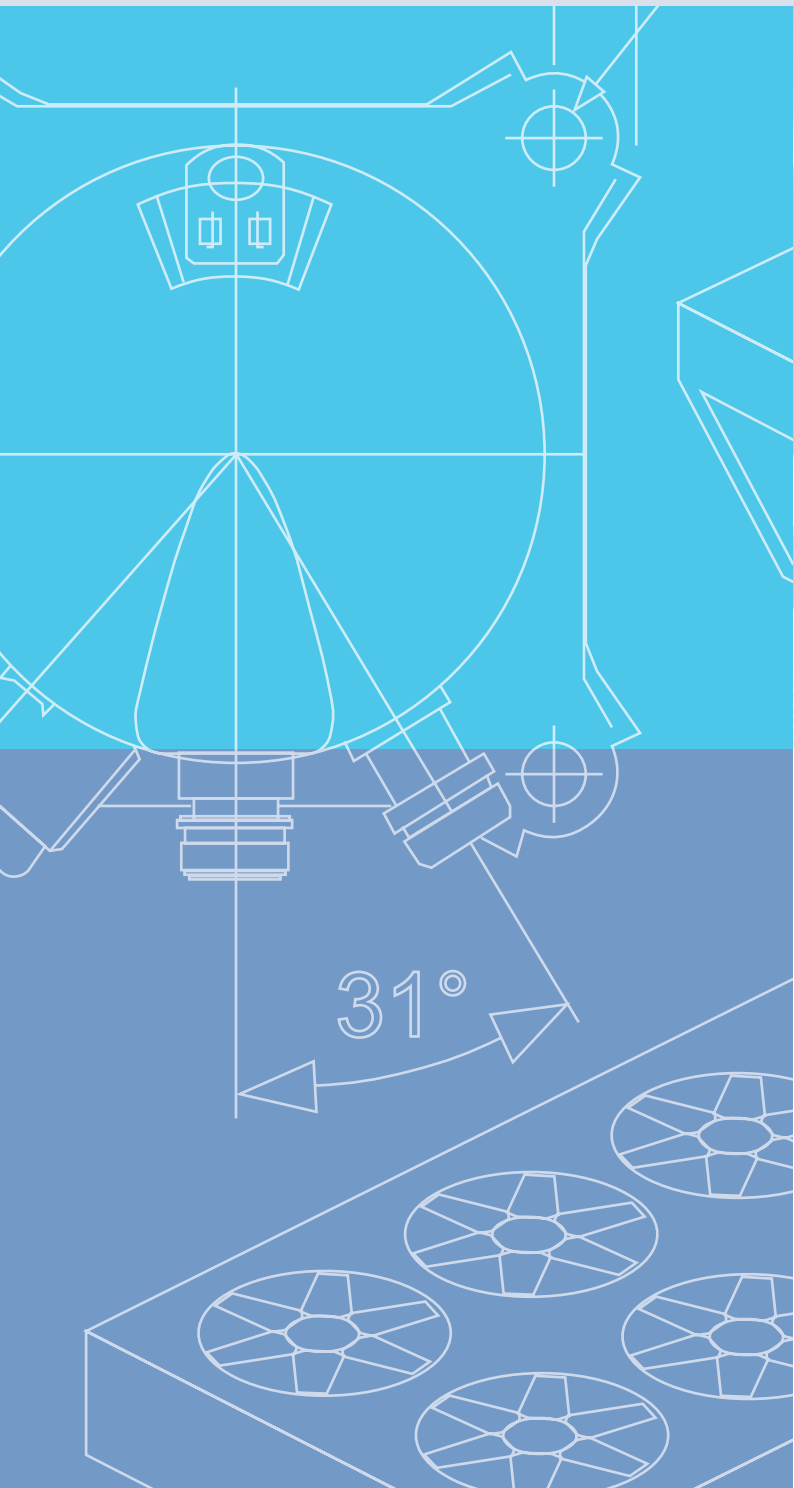




Replacement Guidelines for Scroll Compressors

ZR90K3*, ZR11M3*... ZR19M3* with ZR94KCE... ZR190KCE
ZP180KCE with ZP182KCE



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1 Introduction

The purpose of this Replacement Guideline is to help customers in replacing the existing A/C compressor range (ZR90K* to ZR19M*, ZP180K*) with the new A/C **SUMMIT** compressor range (ZR94K* to ZR190K* and ZP90K* to ZP182K*, from 7.5 to 15 HP). The previous generation will be phased out by the end of 2010.

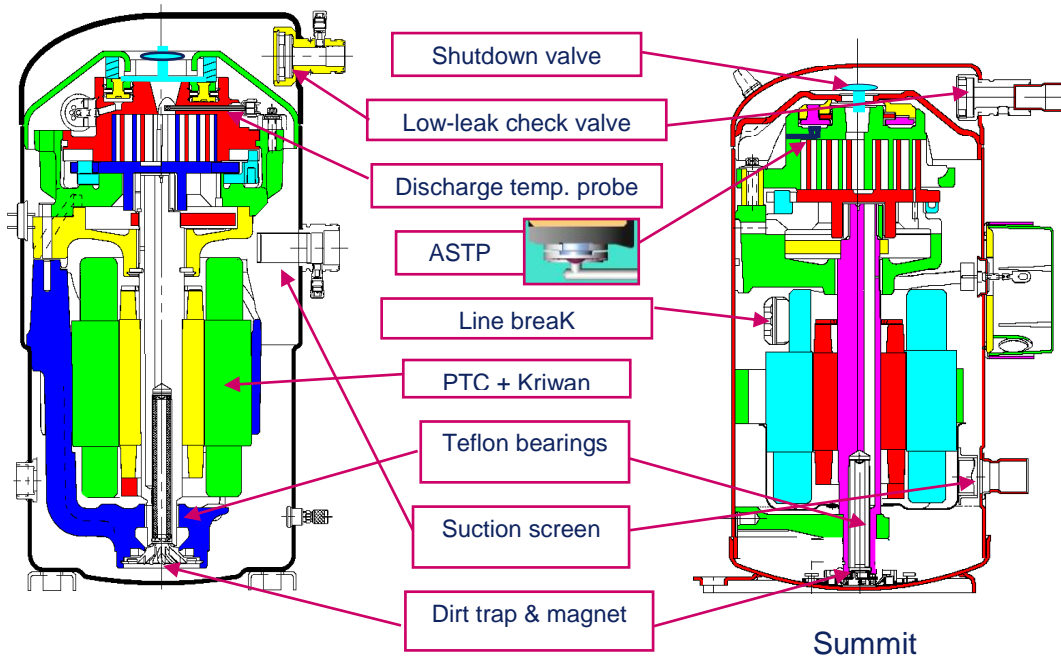
This new range of compressors features a significant size, weight, and sound reduction in all models. These compressors are designed for use with R410A (ZP) and R407C, R22, R134a (ZR) refrigerants. They are built in a uniform platform design, which simplifies engineering and system manufacturing for OEMs.



Previous generation



Summit



2 Nomenclature

2.1 Previous generation

Z R 90K 3 E - TWD - 522

Bill of material number (522, 551, 561, 568, 591)
Motor version
Oil type: E = POE oil None = mineral oil
Model variation
Nominal capacity [BTU/h] @ 60 Hz and ARI conditions Capacity multiplier; K - x 1000, M - x 10000
Application range temperature: R = high/medium; P = 410A
Compressor family: Z = Scroll

2.2 Summit – New generation

Z R 94K 3 E - TFD - 425

Bill of material number (425, 550)
Motor version
Oil type: E = POE oil None = mineral oil
Model variation
Nominal capacity [BTU/h] @ 60 Hz and ARI conditions Capacity multiplier; K - x 1000
Application range temperature: R = high/medium; P = 410A
Compressor family: Z = Scroll

3 Ident numbers

	Previous generation				SUMMIT			
		TWD-551	TWD-522	kW*		TFD-425	TFD-550	kW*
R407C	ZR90K3E	8508586	8514256	18.7	ZR94KCE	8600200	8608000	20.5
	ZR11M3E	8508326	8506013	22.7	ZR108KCE	8600244	8608011	23.0
	ZR12M3E	8506886	8514314	26.3	ZR125KCE	8600222	8608022	26.9
					ZR144KCE	8600288	8608033	30.8
	ZR16M3E	8508246	8527438	32.0	ZR160KCE	8604100	8608044	33.4
	ZR19M3E	8512192	8512216	39.5	ZR190KCE	8604122	8608055	39.2

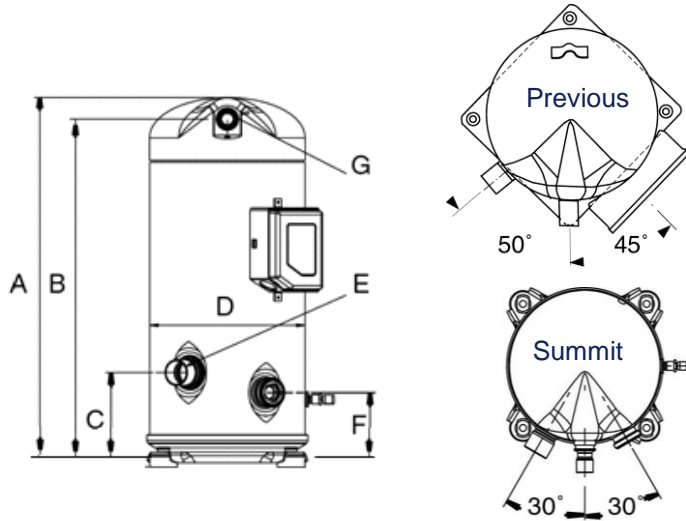
*R407C Dew (En 12900)

	TWD-551 TWD-522 kW**			TFD-425 kW**		
R410A				ZP90KCE	8600211 19.2	
				ZP103KCE	8600255 22.4	
				ZP120KCE	8600233 26.0	
				ZP137KCE	8600299 29.3	
				ZP154KCE	8604144 33.1	
	ZP180KCE	8542219	8543041	39.0	ZP182KCE	8604155 39.1

**R410A (EN 12900)

4 Technical comparisons

4.1 Performance & dimensions – Cross-reference tables



4.1.1 R407C refrigerant

	ZR90	ZR94	ZR11	ZR108	ZR12	ZR125	ZR144	ZR16	ZR160	ZR19	ZR190
HP	7.5	7.5	9	9	10	10	12	13	13	15	15
kW (En 12900)	18.7	20.5	22.7	23	26.3	26.9	29.3	32	33.4	39.5	39.2
COP	3.14	3.26	3.17	3.34	3.22	3.31	3.11	3.14	3.23	3.2	3.2
Sound Lwa	77	74	78	74	78	74	75	78	78	80	80
A	524	476	524	533	524	533	533	532	552	578	551
B	484	444	484	501	484	501	501	492	520	533	519
C	305	94	305	122	305	122	122	305	141	305	140
Shell Diameter D	283	232	283	232	283	232	232	283	234	283	234
Suction Diameter E	1"3/8	1"1/8	1"3/8	1"3/8	1"3/8	1"3/8	1"3/8	1"3/8	1"3/8	1"5/8	1"3/8
Discharge Diameter G	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	1"1/8	7/8"
Sight Glass Ext Diam	1"3/4	1"1/4	1"3/4	1"1/4	1"3/4	1"1/4	1"1/4	1"3/4	1"1/4	1"3/4	1"1/4
Weight kg	94	57	96	59	100	61	61	103	64	119	66
Foot Mounting	220X220	190X190	220X220	190X190	220X220	190X190	190X190	220X220	190X190	220X220	190X190

Previous Summit

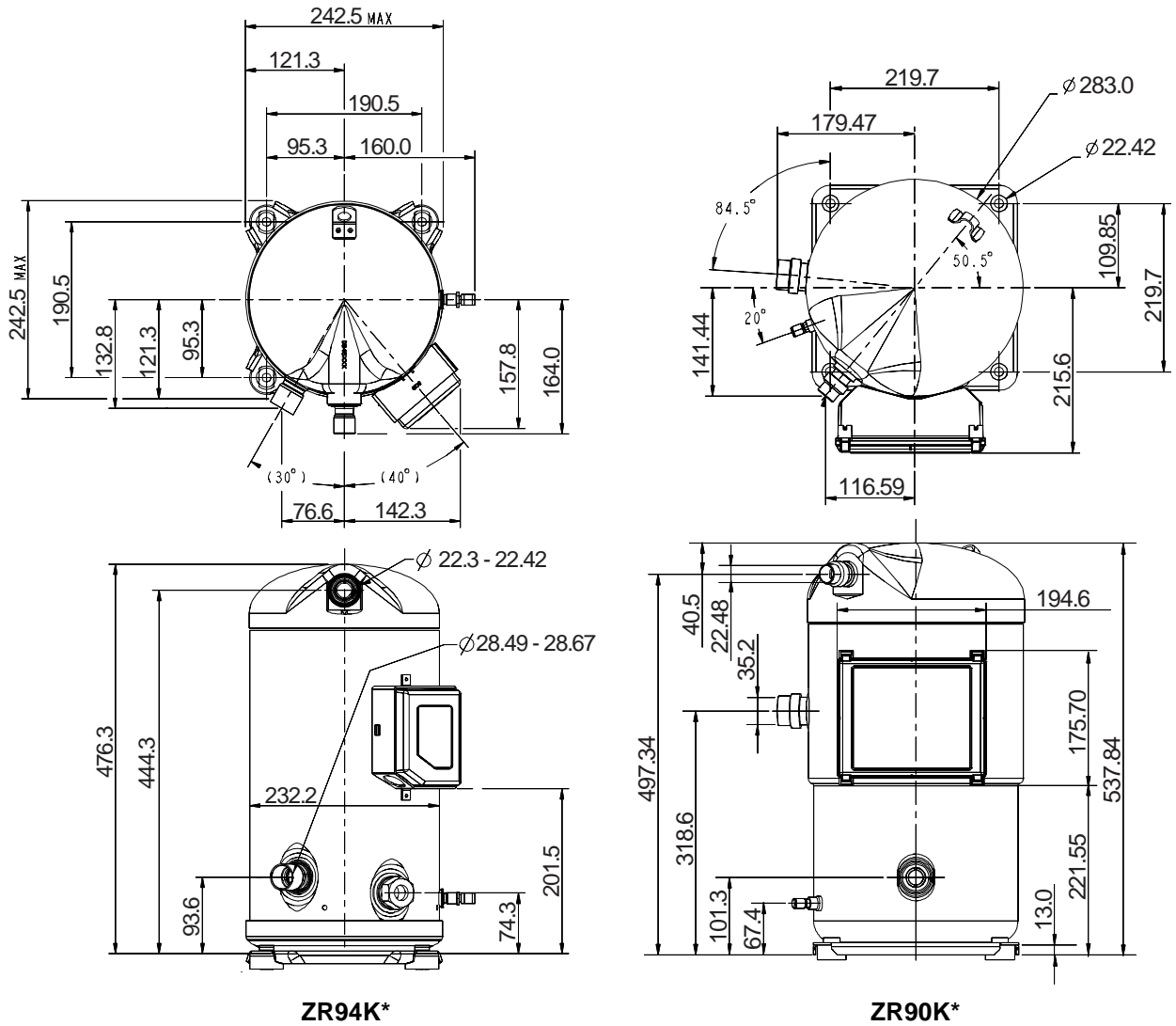
4.1.2 R410A refrigerant

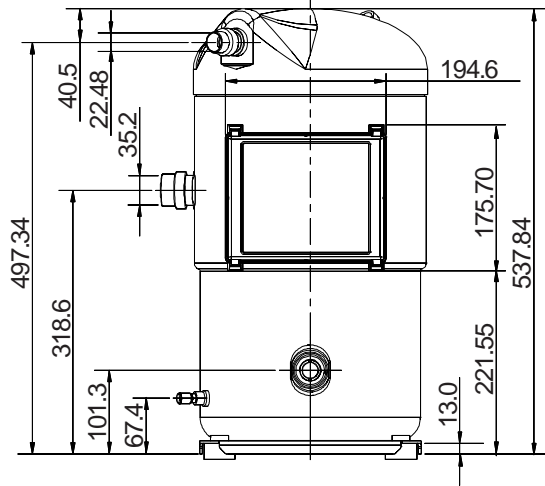
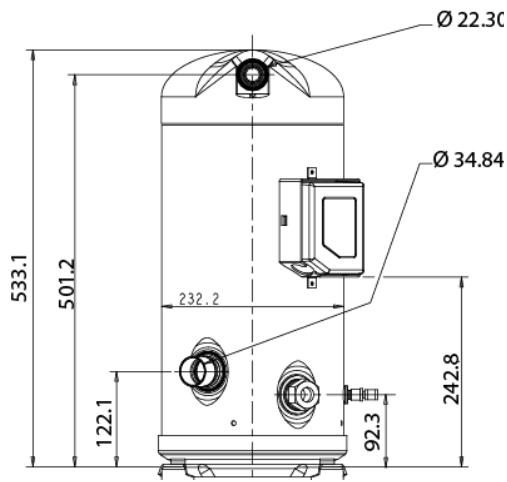
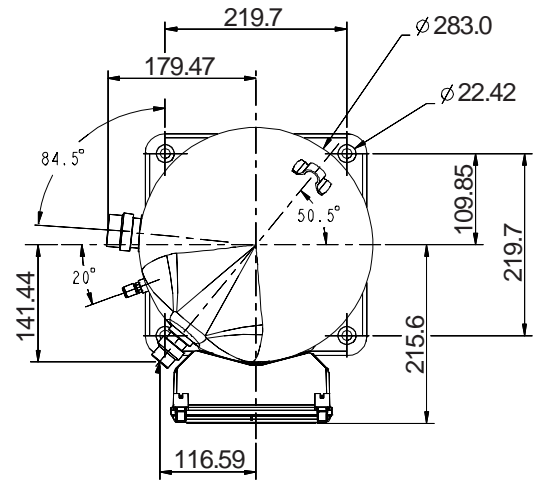
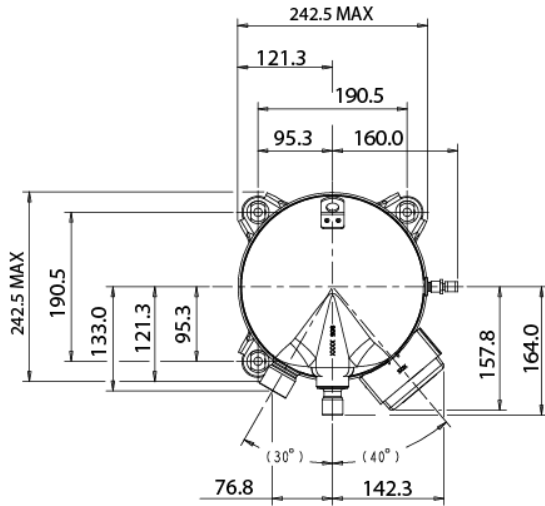
	ZP90	ZP103	ZP120	ZP137	ZP154	ZP180	ZP182
HP	7.5	9	10	12	13	15	15
kW (En 12900)	19.2	22.4	26	29.3	33.1	38.9	39.1
COP	3.05	3.17	3.15	3.11	3.2	3.2	3.2
Sound Lwa	72	74	74	75	76	80	77
A	495	552	552	552	570	578	551
B	463	520	520	520	538	533	519
C	94	141	141	141	159	305	92
Shell Diameter D	232	232	232	232	232	283	232
Suction Diameter E	1"1/8	1"3/8	1"3/8	1"3/8	1"3/8	1"5/8	1"3/8
Discharge Diameter G	7/8"	7/8"	7/8"	7/8"	7/8"	1"1/8 UNF	7/8"
Sight Glass Ext Diam	1"1/4 UNF	1"1/4 UNF	1"1/4 UNF	1"1/4 UNF	1"1/4 UNF	1"3/4 UNF	1"1/4 UNF
Weight kg	56	59	61	61	64	119	66
Foot Mounting	190 X 190	191 X 190	192 X 190	193 X 190	194 X 190	220 X 220	196 X 190

Previous Summit

5 Drawings

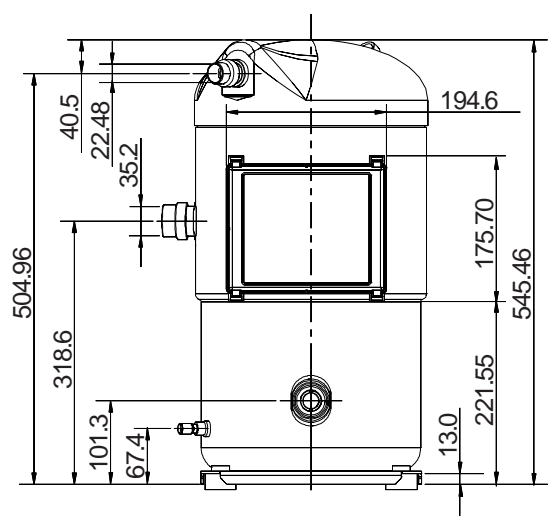
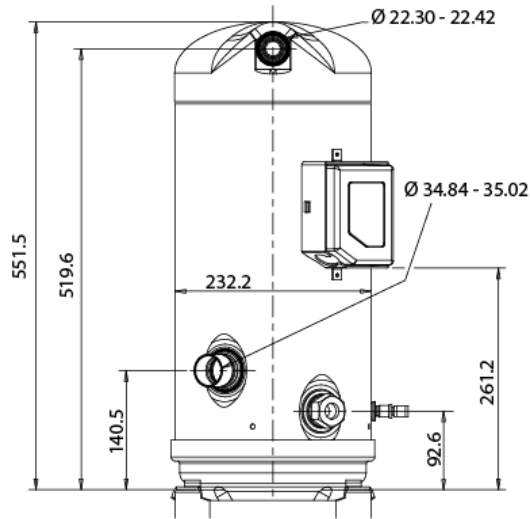
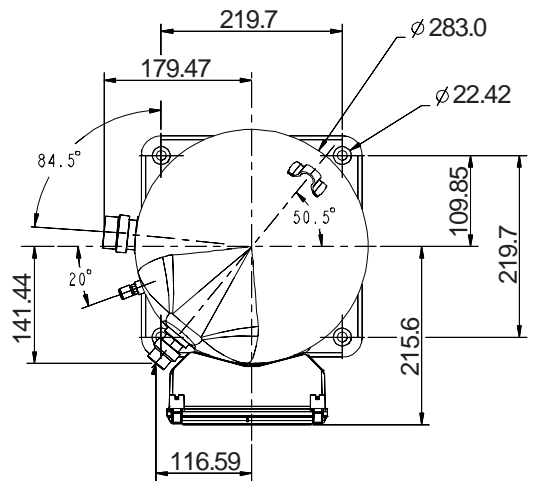
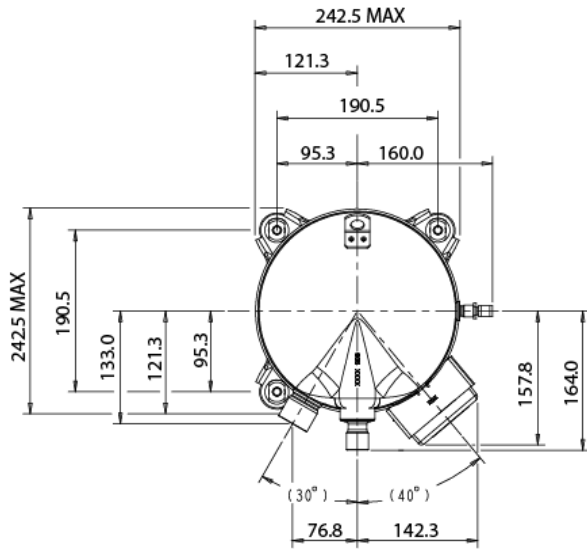
The following drawings show the position of the suction and discharge plugs as well as the sight glass, the Schrader valve and the terminal box.





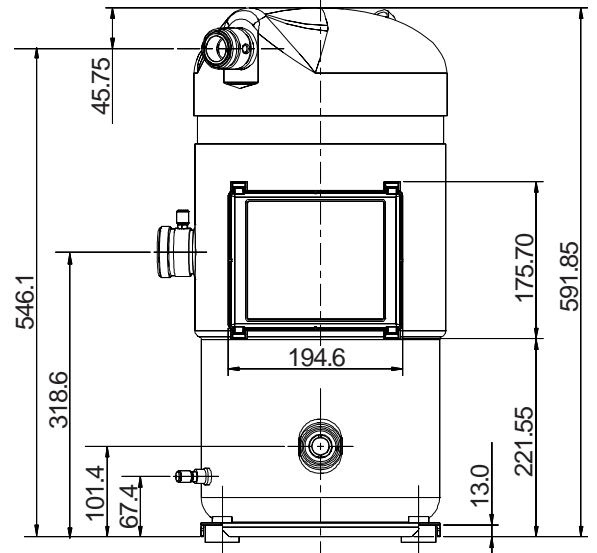
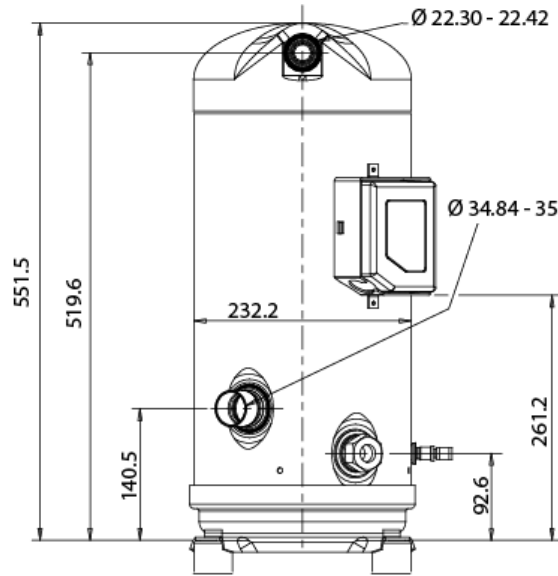
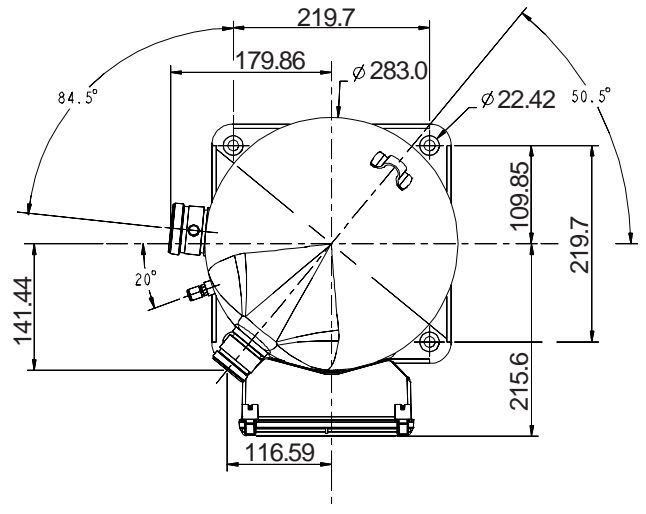
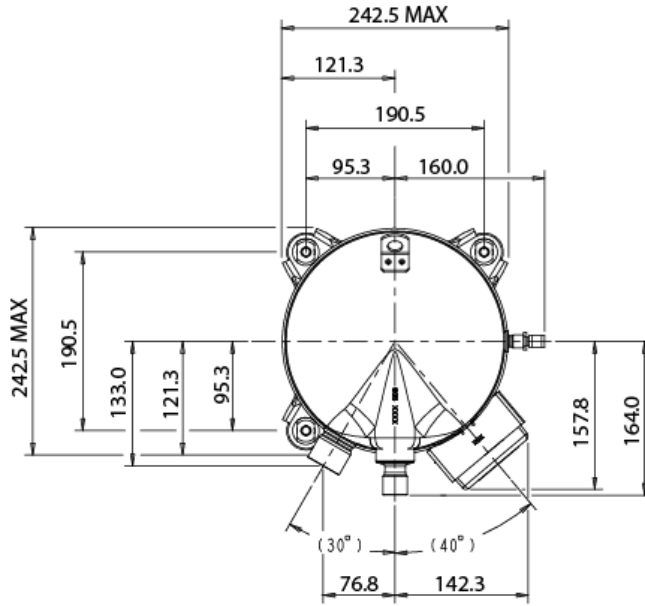
ZR108K*, ZR125K*, ZR144K*

ZR11M*, ZR12M*



ZR160K*

ZR16M*

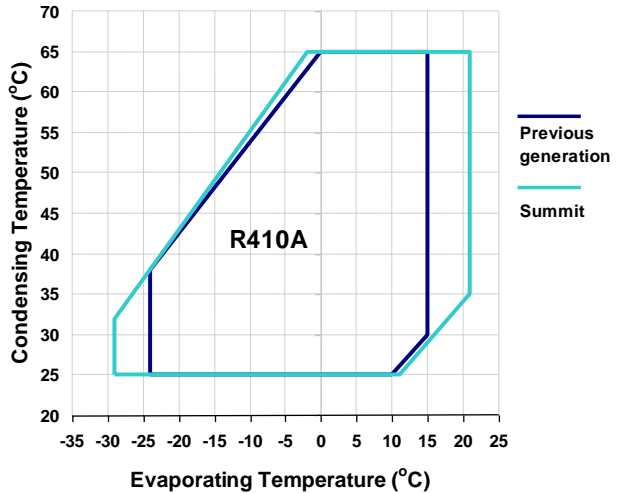
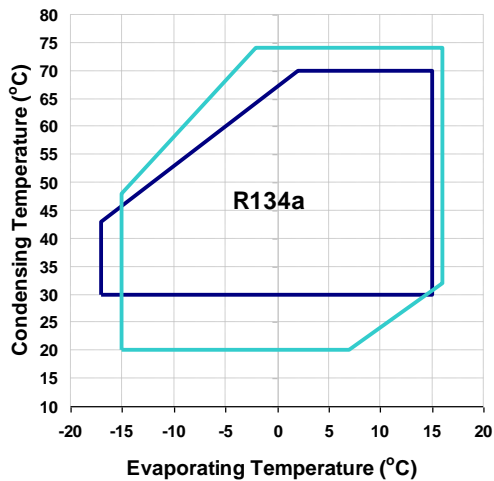
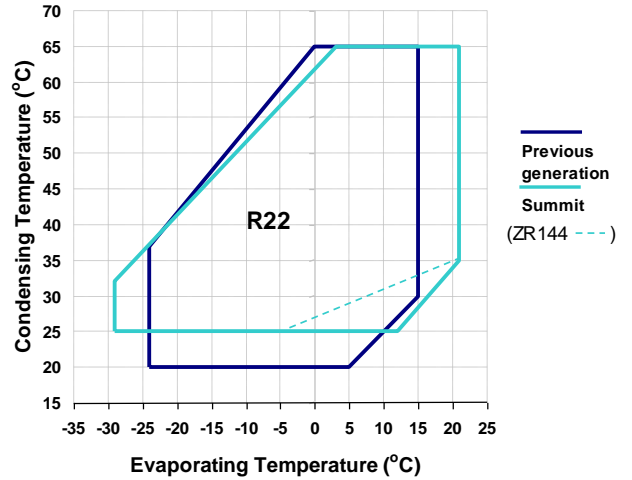
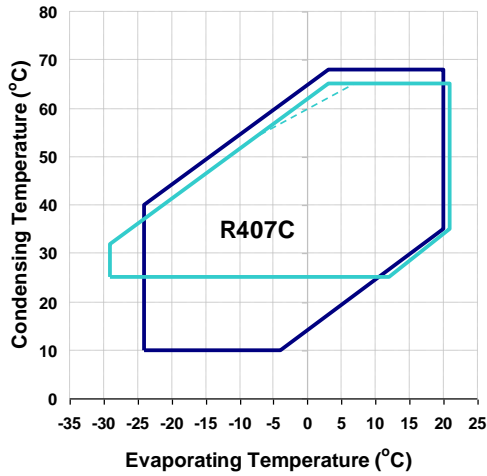


ZR190K* & ZP182K*

ZR19M* & ZP180K*

6 Operating envelopes

Operating envelopes for all qualified refrigerants R407C, R22, R134a & R410A are shown in the diagrams below:



7 Motor version

7.1 Motor insulation

The motor insulation material for scroll compressor models is shown in the table below:

Compressor	Class
ZR94K* to ZR190K*	B
ZP90K* to ZP182K*	
ZR90K* to ZR19M* and ZP180K*	H

7.2 Motor designation

Scroll refrigerant compressors are available in various motor versions depending upon the size of the load. The motor versions differ in operating voltage, type of switching, number of phases, frequency and type of motor protection. A code for the motor is included in the model designation to ensure correct designation because of the many variations available during order handling and service. An example for the compressor model designation is given below:

T F D
T W D

Motor Type	Motor Protection Device	Motor Voltages			
		V	Ph	Hz	
T Three-phase motor	F Inherent Internal klixon line break motor protection	C	200	3	50
			208/230	3	60
	W For three-phase motors, electronic motor protection with thermistors & release module KRIWAN in the terminal box	D	380/420	3	50
			460	3	60
		E	500	3	50
			575	3	60
		R	200/240	3	50
		5	200/220	3	50
		200/230	3	60	
		7	380	3	60

		3~ / 50Hz						
		TFD	TF5	TWC	TWD	TWE	TWR	TW5
		380/420	200/220	200/220	380/420	500	200/240	200/220
SUMMIT	ZR94							
	ZR108							
	ZR125							
	ZR144							
	ZR160							
	ZR190							
Previous gen.	ZR90							
	ZR11							
	ZR12							
	ZR16							
	ZR19							
SUMMIT	ZP90							
	ZP103							
	ZP120							
	ZP137							
	ZP154							
	ZP182							
Previous gen.	ZP180							

		3~ / 60 Hz								
		TFD	TFE	TF5	TF7	TWC	TWD	TWE	TW5	TW7
		460	575	200/230	380	208/230	460	575	200/230	380
SUMMIT	ZR94									
	ZR108									
	ZR125									
	ZR144									
	ZR160									
	ZR190									
Previous gen.	ZR90									
	ZR11									
	ZR12									
	ZR16									
	ZR19									
SUMMIT	ZP90									
	ZP103									
	ZP120									
	ZP137									
	ZP154									
	ZP182									
Previous gen.	ZP180									

8 Motor protection

8.1 Motor code

The centre letter of the motor code in the nomenclature of a Copeland Scroll™ compressor indicates which kind of motor protection device is used. Compressors ZR94K* to ZR144K* and ZP90K* to ZP137K* are code **TF***. Compressors ZR160K*, ZR190K*, ZP154K* and ZP182K* are code **TF*** and **TW***.

The centre letter "F" (eg, TFD) stands for inherent motor protector (Klixon) which is embedded in the stator head and internally interrupts the power supply of the windings at high current or high motor winding temperature. After the temperature has dropped down to the reset value the compressor motor restarts automatically. This protection device is always installed internally and is not accessible.

The centre letter "W" in the motor code (eg, TWD) stands for the use of an electronic motor protection device, which can offer various functions. In general it monitors the winding resistances during compressor operation. The electronic motor protector is always installed outside the shell of the compressor (inside the terminal box) and is exchangeable.

8.2 Electronic motor protection device INT69SC – Models ZR90K* to ZR19M*

This system utilises the temperature dependent resistance of thermistors (also called PTC-resistances) to read the winding temperature. A chain of four thermistors connected in series is embedded in the motor windings so that the temperature of the thermistors can follow the winding temperature with little inertia. An electronic module is required to process the resistance values and trip a control relay depending on the thermistor resistance.

9 Discharge temperature protection

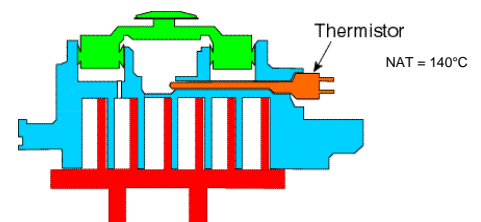
ZR94K* to ZR190K* and ZP90K* to ZP182K* Scroll compressors have an Advanced Scroll Temperature Protection (ASTP). Advanced Scroll Temperature Protection is a temperature sensitive thermo-disc that acts to protect the compressor from discharge gas overheating. Once the discharge gas reaches a critical temperature, the ASTP feature will cause the scrolls to separate and stop pumping although the motor continues to run. After running for some time without pumping gas, the motor protector will open.



NOTE: Depending upon the heat build-up in the compressor, it may take up to two hours for the ASTP and motor protector to reset!

A label has been added above the terminal box to identify compressors with Advanced Scroll Temperature Protection.

For compressors ZR90K* to ZR19M* and ZP180K*, a thermistor is located in the discharge port of the fixed scroll. Excessive discharge temperature will cause the electronic protector module to trip. The discharge gas thermistor is wired in series with the motor thermistor chain.

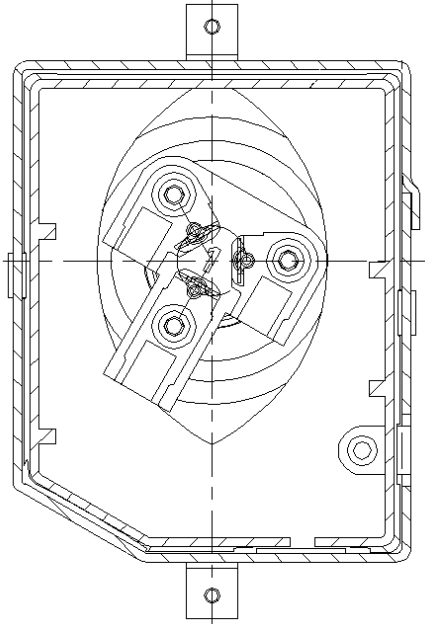


10 Terminal box

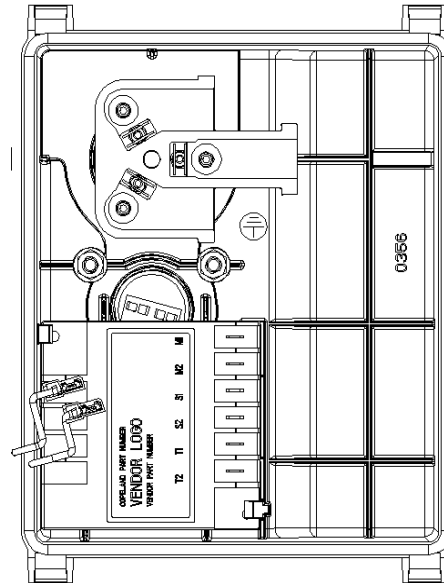
10.1 Protections

The terminal box is IP21 for all models without electronic motor protection (eg, TF*) and IP54 for all models with electronic motor protection (eg, TW*).

Because the electrical characteristics are very close in previous generation and Summit, motor protections (fuses, contactors) will be the same for both.



Summit TF*

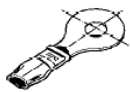


Summit TW*

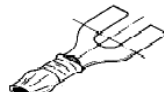
10.2 Cable connectors

The following table lists the recommended types of cable connectors to be used for the various electrical terminals of the compressors and the motor protection module. “B” and “C” must be selected for diameters of 5 mm.

Cable sizes must be selected according to DIN ISO 0100, IEC 364 or national regulations.



Ring tongue (B)

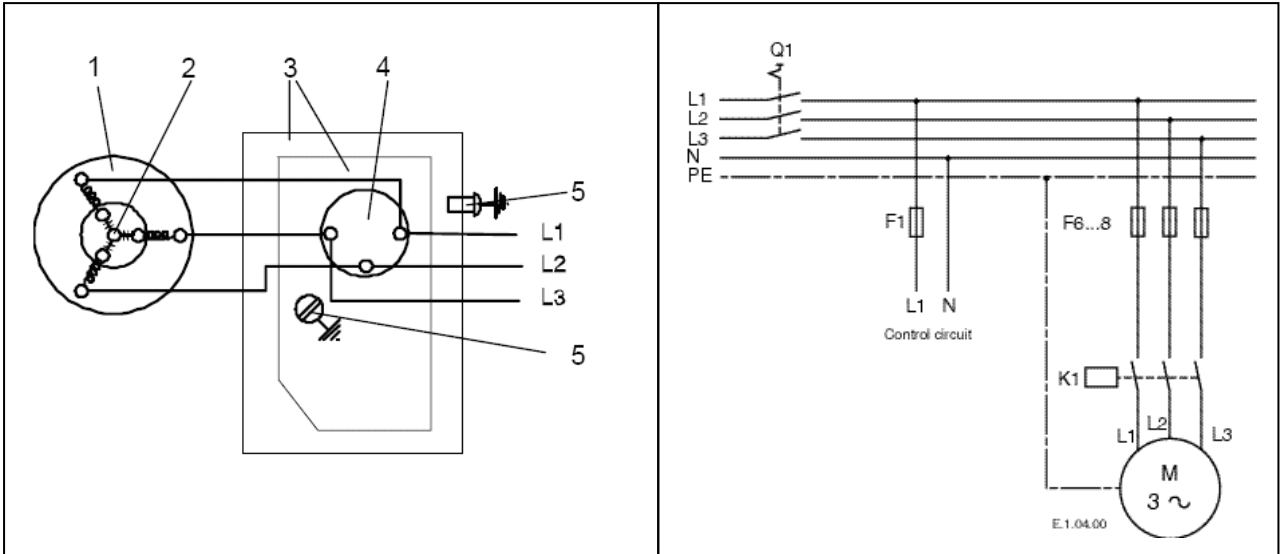


Spade (C)

	Model	TF*	TW*
SUMMIT	ZR94K* to ZR190K*	B/C	B/C
	ZR90K* to ZR19M*		B/C
Previous generation	ZP90K* to ZP182K*	B/C	
	ZP180K*		B/C

NOTE: To earth these compressors use a Ring tongue (B) connection.

Fusite connections and recommended wiring diagrams are shown below. Both generations of compressors are wired in the same way.

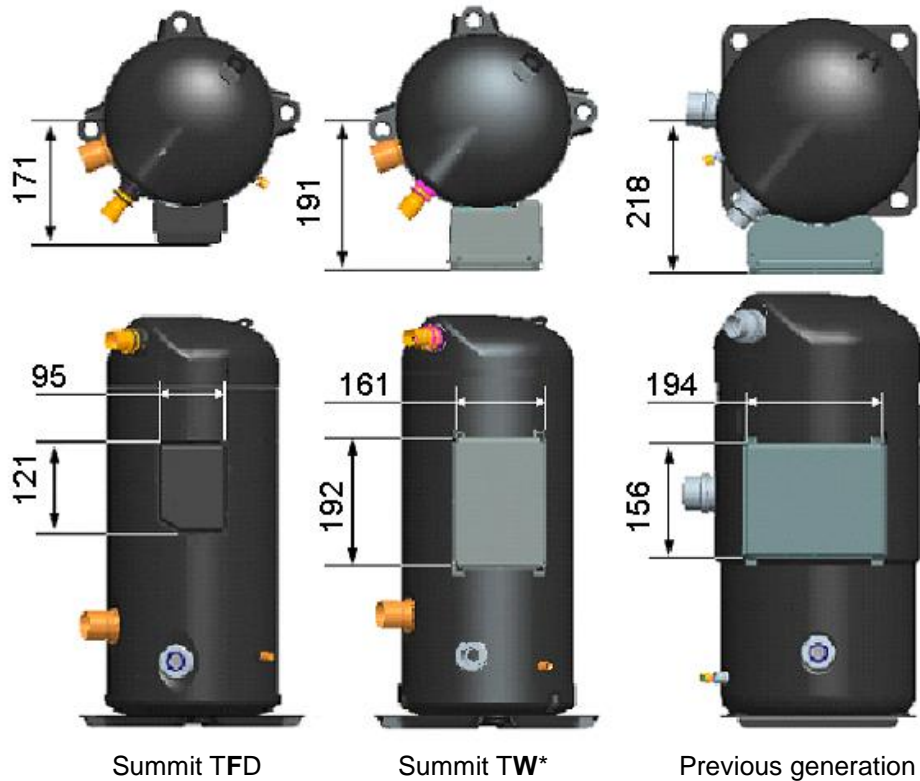


Legend

- 1.....Motor
- 2.....Internal inherent motor protection
- 3.....Terminal box
- 4.....Lead connection
- 5.....Earth connection

- L1, L2, L3 .. Line
- N..... Neutral
- PE..... Protective earth
- F1, F6, F8.. Fuses
- K1 Contactor
- Q1..... Main switch

10.3 Terminal box dimensions



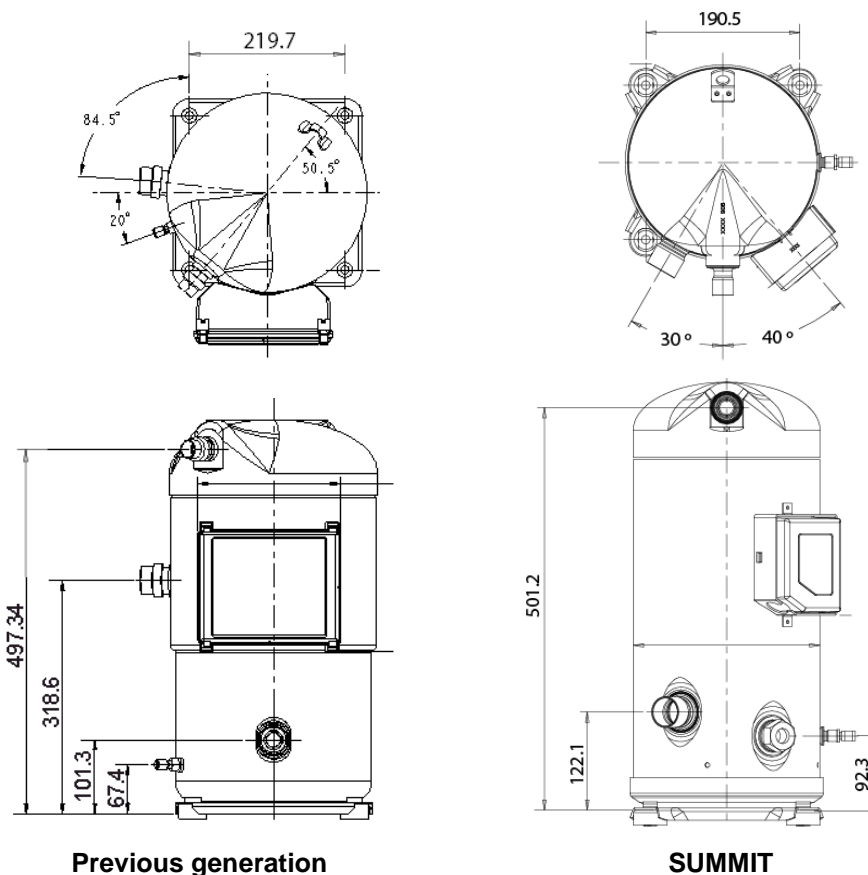
11 Tandemization

The following table shows the Tandem Summit-Summit configurations approved by Emerson Climate Technologies:

ZP Tandem SUMMIT Compressors	HP	ZR Tandem SUMMIT Compressors
		ZRT188K*E = 2 x ZR94K*E
ZPT180K*E = 2 x ZP90K*E	16	
ZPT206K*E = 2 x ZP103K*E	18	ZRT216K*E = 2 x ZR108K*E
ZPU223K*E = ZP103K*E+ZP120K*E	19	
ZPT240K*E = 2 x ZP120K*E	20	ZRT250K*E = 2 x ZR125K*E
ZPU240K*E = ZP103K*E + ZP137K*E	21	
ZPU257K*E = ZP120K*E + ZP137K*E	22	
ZPU272K*E = ZP90K*E + ZP182K*E	23	ZRT285K*E = ZR160K*E + ZR125K*E
ZPT274K*E = 2 x ZP137K*E	24	
ZPU274K*E = ZP120K*E + ZP154K*E	23	
ZPU285K*E = ZP103K*E + ZP182K*E	24	ZRT288K*E = 2 x ZR144K*E
ZPU302K*E = ZP182K*E + ZP120K*E	25	ZRU315K*E = ZR190K*E + ZR125K*E
ZPT308K*E = 2 x ZP154K*E	26	ZRT320K*E = 2 x ZR160K*E
ZPU319K*E = ZP137K*E + ZP182K*E	27	ZRU334K*E = ZR190K*E + ZR144K*E
ZPU336K*E = ZP182K*E + ZP154K*E	28	ZRU350K*E = ZR190K*E + ZR160K*E
ZPT364K*E = 2 x ZP182K*E	30	ZRT380K*E = 2 x ZR190K*E

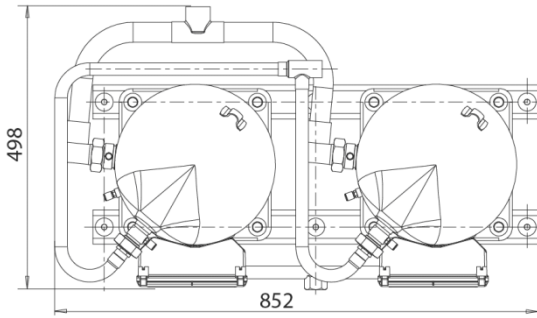
11.1 Replacement of a compressor in an existing Tandem

A compressor in an existing Tandem with previous generation compressors **cannot be** replaced with a new Summit compressor because the positions of the suction, discharge and sight glass ports are different. The distances between holes on the mounting feet are different too. Therefore a previous generation compressor will be needed for replacement on a Tandem.

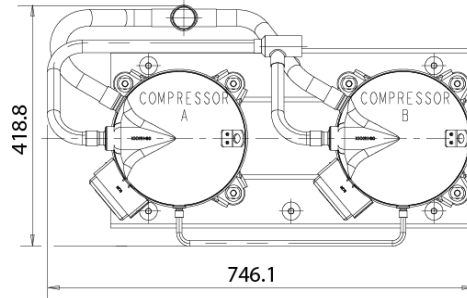


11.2 Replacement of a Tandem

A new Summit Tandem can replace a previous generation Tandem.



Previous generation



SUMMIT

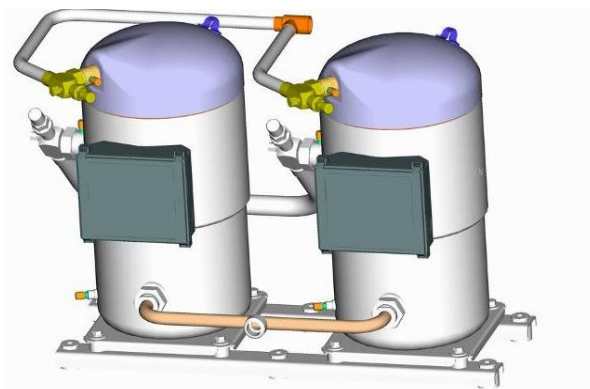
Summit Tandems are approximately 100 mm shorter in length and 80 mm shorter in width than previous generation Tandems. For replacement see table below:

ZR previous generation	HP	ZR SUMMIT
ZRT180K3* = ZR90K3* + ZR90K3*	15	ZRT188K*E = 2 x ZR94K*E
ZRT220K3* = ZR11M3* + ZR11M3*	18	ZRT216K*E = 2 x ZR108K*E
ZRT240K3* = ZR12M3* + ZR12M3*	20	ZRT250K*E = 2 x ZR125K*E
ZRT280K3* = ZR12M3* + ZR16M3*	23	ZRT285K*E = ZR160K*E + ZR125K*E
ZRU310K3* = ZR19M3* + ZR12M3*	25	ZRU315K*E = ZR190K*E + ZR125K*E
ZRT320K3* = ZR16M3* + ZR16M3*	26	ZRT320K*E = 2 x ZR160K*E
ZRU350K3* = ZR16M3* + ZR19M3*	28	ZRU350K*E = ZR190K*E + ZR160K*E
ZRT380K3* = ZR19M3* + ZR19M3*	30	ZRT380K*E = 2 x ZR190K*E

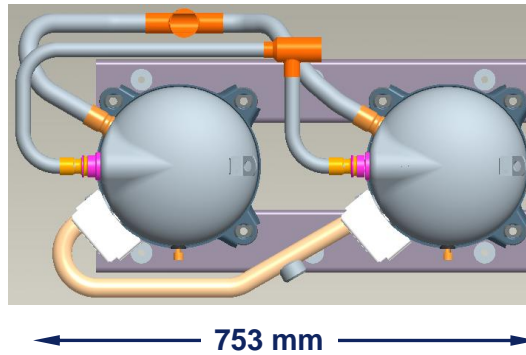
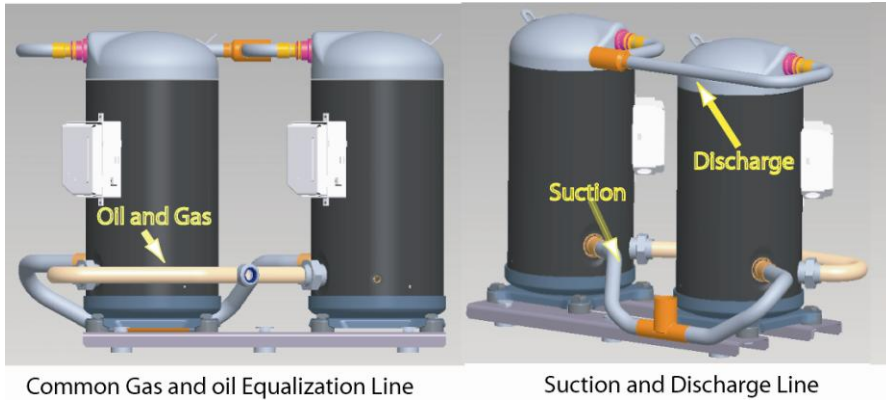
11.3 Oil and gas equalization – Two-Phase Tube Line (TPTL) design

Connection for both oil and gas equalization is made via the sight glass of each compressor even when the compressors are of different tonnage (ZRU/ZPU). The so-called Two-Phase Tube Line (TPTL) for oil and gas equalization balances the pressure between the shells thereby maintaining the same oil level in each compressor.

The Two-Phase Tube Line (TPTL) allows for oil and gas equalization between compressors. TPTL is not a requirement for even Tandem combinations, but is a requirement for all uneven Tandems. An even Tandem is defined as any Tandem assembly where the compressors are of equal capacity. An uneven Tandem includes compressors of different capacities.



Previous generation



New generation SUMMIT

11.4 Adaptor for TPTL

Even or uneven Tandems:

- 1"1/4 Rotalock sight glass
- Tube 1"1/8 for TPTL
- Adapter kit 1"1/4 ⇒ 1"1/8
- # 8602955 (with seal)

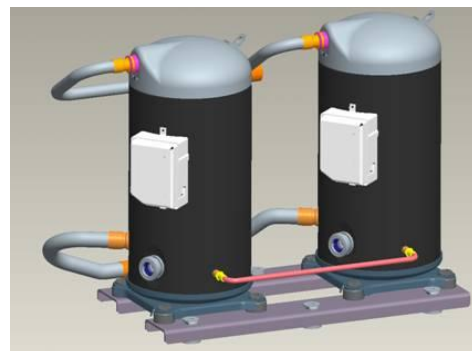


11.5 Oil equalization only

For even Tandems an oil equalization line is an adequate and much more cost-effective option.

Even Tandem only:

- 3/8" Oil tube throughout Schrader stub (Schrader removed)



12 BOM description

Model	BOM	Suction / Discharge		Oil sight glass	Protection			Equalization lines			
		Connections			Klixon	Relay		INT69SCE 24V	Gas		Oil
		Braze	Rot			120-240 V	24V AC		Rot	Braze	
Previous generation	ZR90K to ZR19M	522	X		X			X			
		551		X	X			X			
		561		X	X				X		
		568	X		X				X		
		591		X	X					X	
		570		X	X		X			X	X
		572	X		X		X			X	X
		540		X	X				X		X
	542	X		X				X		X	
	Summit	ZR and ZP	522	X		X			X		
551				X	X			X			
561				X	X				X		
568			X		X				X		
425	X		X	X							
550	X		X	X							

13 Adapters and fittings

Because new Summit compressors have only brazed connections and many systems with previous generation compressors have Rotalock connections, the customer will need adaptors if he wants to keep Rotalock valve connections. For adapters and fittings please refer to tables hereunder:



Kit to transform braze into Rotalock

Model		Suction		Discharge			Suction + Discharge	
		Diam comp	Ident	Diam Rotalock	Diam comp	Ident	Diam Rotalock	
ZR94	ZP90	1 1/8"	8515168	1 3/4"	7/8"	8026935	1 1/4"	8400648
ZR108	ZP103	1 3/8"	8515146					8515157
ZR125	ZP120							
ZR144	ZP137							
ZR160	ZP154							
ZR190	ZP182							



Rotalock valve kit

Model		Suction		Discharge			Suction + Discharge	
		Diam comp	Ident	Diam Rotalock	Diam comp	Ident	Diam Rotalock	
ZR94	ZP90	1 1/8"	8547952	1 3/4"	7/8"	8547918	1 1/4"	8401378
ZR108	ZP103	1 3/8"	8547929					8547021
ZR125	ZP120							
ZR144	ZP137							
ZR160	ZP154							
ZR190	ZP182							

NOTE: There is no Summit Rotalock version available.

14 Mounting parts

14.1 Mounting parts for single operation

Mounting parts originally delivered with the compressors:

Compressors	Ident number	Characteristics
ZR94KCE to ZR190KCE BOM 550	8607621 527-0210-00	Rubber 55-65 Durometer

Optional mounting parts: The following compressors are originally delivered with hard mounting parts. Rubber grommets are available on request. The mounting part kit N° 8607621 is compliant with the sound shell base plate.

Compressors	Ident number	Characteristics
ZR94KCE to ZR144KCE BOM 425 ZP90KCE to ZP182KCE BOM 425	8607621 527-0210-00 Variation = 8608260	Rubber 55-65 Durometer Height 33 mm
ZR94KCE to ZR144KCE BOM 425 ZP90KCE to ZP137KCE BOM 425	8000822 527-0116-00 Variation = 8600357	Rubber 35-64 Durometer Height 19mm
ZR94KCE to ZR190KCE ZP90KCE to ZP182KCE	<i>Special 8030450</i> 527-0157-00 <i>Variation = 8600368</i>	Rubber 60-70 Durometer Height 19mm

14.2 Mounting parts for compressors in Tandem/Trio operation

Standard delivery for Summit compressors is BOM 425.

Mounting parts between compressor and rails **are part of the standard delivery with the following compressors:**

Compressors	Ident number	Characteristics
ZR94KCE to ZR190KCE BOM 425 ZP90KCE to ZP182KCE BOM 425	8602933 527-0206-01	Hard zinc

Mounting parts between rails and ground **must be ordered separately.**

Compressors	Tandem	Trio	Characteristics
ZR94KCE to ZR190KCE ZP90KCE to ZP180KCE	8537451 527-0177-00	2 x 8537451 527-0177-00	Rubber 65-75 Durometer

14.3 Crankcase heater (optional)

Previous generation		Summit	
70W, 120V	8563349	90W, 120V	8561014
70W, 240V	8563350	90W, 240V	8561025
70W, 480V	8563361	90W, 480V	8561036

15 Standard components and accessories – Summit

15.1 Standard components

- Discharge temperature protection: Advanced Scroll Temperature Protection
- Inherent internal line break motor protection on **TF***
- Electronic motor protection on **TW***
- Rubber grommet mounting parts on 550
- Hard rubber grommets mounting parts on 425



15.2 Accessories

- Adapter kit to convert a brazing into a Rotalock connection (suction and discharge)
- Rotalock valves (kit) (1 suction valve + gasket, 1 discharge valve + gasket)
- Crankcase heater - 90 W External
- Sound shell assembly with base
- Mounting parts kit: compressor > rail: steel
- Mounting parts kit: rail > ground: rubber

16 Data sheets

16.1 Performance data sheet with R407C

Conditions: Suction superheat: 10K; Liquid subcooling: 0K; Power supply: 380/420V – 3~ – 50 Hz

R407C - ZR94KCE-TFD

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	7.61	9.65	12	14.75	17.95	21.8	26.2	28.2	31.4			
	30	6.93	9.07	11.45	14.2	17.4	21.1	25.3	27.2	30.3	33.1	36.1	
	35	6.03	8.29	10.75	13.5	16.65	20.2	24.4	26.2	29.2	31.8	34.7	41
	40		7.3	9.84	12.6	15.75	19.25	23.3	25	27.9	30.4	33.1	39.2
	45			8.73	11.55	14.65	18.1	22	23.7	26.5	28.9	31.5	37.3
	50				10.25	13.35	16.8	20.6	22.3	24.9	27.2	29.7	35.2
	55					11.9	15.25	19	20.6	23.2	25.4	27.8	33.1
	60						13.55	17.2	18.75	21.2	23.4	25.7	30.8
	65							15.2	16.75	19.2	21.2	23.5	28.3

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	3.4	3.46	3.5	3.53	3.55	3.55	3.56	3.56	3.56			
	30	3.81	3.87	3.92	3.95	3.97	3.98	3.98	3.97	3.97	3.97	3.96	
	35	4.28	4.34	4.39	4.42	4.44	4.44	4.44	4.43	4.43	4.42	4.41	4.39
	40		4.89	4.94	4.97	4.98	4.98	4.96	4.96	4.94	4.93	4.91	4.88
	45			5.57	5.59	5.6	5.59	5.57	5.55	5.53	5.51	5.49	5.45
	50				6.32	6.32	6.3	6.26	6.24	6.21	6.19	6.16	6.09
	55					7.15	7.12	7.07	7.04	7	6.97	6.93	6.85
	60						8.06	8	7.97	7.92	7.87	7.83	7.72
	65							9.07	9.04	8.97	8.92	8.86	8.73

R407C - ZR108KCE-TFD

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	8.48	10.75	13.5	16.75	20.6	25	30.2	32.5	36.2			
	30	7.93	10.15	12.8	15.95	19.6	23.9	29	31.2	34.8	38	41.4	
	35	7.34	9.5	12.05	15.05	18.6	22.8	27.6	29.7	33.2	36.3	39.5	46.8
	40		8.82	11.25	14.15	17.55	21.5	26.2	28.2	31.5	34.4	37.6	44.6
	45			10.45	13.2	16.45	20.2	24.6	26.6	29.7	32.5	35.6	42.2
	50				12.2	15.25	18.85	23	24.9	27.9	30.6	33.4	39.8
	55					14.05	17.4	21.4	23.1	25.9	28.5	31.2	37.3
	60						15.95	19.65	21.3	23.9	26.3	28.9	34.6
	65							17.85	19.35	21.8	24.1	26.5	31.9

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	3.74	3.8	3.84	3.89	3.96	4.06	4.23	4.31	4.46			
	30	4.19	4.26	4.3	4.34	4.38	4.45	4.56	4.62	4.74	4.85	4.99	
	35	4.67	4.77	4.82	4.85	4.88	4.92	5	5.04	5.11	5.2	5.3	5.56
	40		5.32	5.39	5.43	5.46	5.48	5.52	5.55	5.6	5.65	5.72	5.92
	45			6.02	6.08	6.11	6.12	6.14	6.16	6.19	6.22	6.27	6.4
	50				6.79	6.84	6.85	6.86	6.87	6.88	6.9	6.93	7.01
	55					7.64	7.67	7.68	7.68	7.68	7.69	7.7	7.75
	60						8.58	8.59	8.6	8.59	8.59	8.6	8.62
	65							9.61	9.61	9.61	9.61	9.61	9.61



R407C - ZR125KCE-TFD

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	9.91	12.55	15.7	19.4	23.8	28.9	34.8	37.4	41.5			
	30	9.21	11.85	14.95	18.6	22.8	27.8	33.5	36	40.1	43.7	47.6	
	35	8.41	11.05	14.05	17.6	21.7	26.6	32.1	34.6	38.5	42	45.8	54.1
	40		10.1	13.1	16.55	20.5	25.2	30.5	32.9	36.7	40.1	43.7	51.7
	45			12	15.35	19.2	23.7	28.8	31.1	34.8	38	41.5	49.2
	50				14	17.75	22	27	29.1	32.6	35.8	39.1	46.5
	55					16.15	20.2	25	27	30.4	33.4	36.6	43.7
	60						18.35	22.8	24.8	28	30.8	33.9	40.6
	65							20.5	22.4	25.4	28.1	31	37.3

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	4.38	4.44	4.49	4.53	4.6	4.69	4.83	4.9	5.03			
	30	4.9	4.97	5.02	5.05	5.1	5.16	5.26	5.32	5.41	5.51	5.63	
	35	5.46	5.55	5.61	5.65	5.68	5.72	5.79	5.83	5.9	5.97	6.06	6.29
	40		6.2	6.28	6.32	6.35	6.38	6.43	6.45	6.5	6.55	6.62	6.79
	45			7.03	7.09	7.12	7.15	7.18	7.19	7.23	7.26	7.31	7.43
	50				7.96	8	8.03	8.05	8.06	8.08	8.11	8.14	8.23
	55					9.01	9.04	9.07	9.07	9.08	9.1	9.12	9.18
	60						10.2	10.2	10.25	10.3	10.3	10.3	10.3
	65							11.55	11.55	11.6	11.6	11.6	11.6

R407C - ZR144KCE-TFD

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	10.6	13.85	17.55	21.8	26.8	32.5	39.2	42.2	46.9			
	30	9.61	12.95	16.75	21	25.9	31.6	38.1	41	45.6	49.7	54.2	
	35	8.44	11.9	15.7	19.95	24.8	30.3	36.7	39.5	44	48	52.3	61.7
	40		10.6	14.45	18.7	23.4	28.9	35	37.7	42	45.9	50.1	59.2
	45			13	17.2	21.9	27.1	33.1	35.7	39.9	43.6	47.6	56.3
	50				15.55	20.1	25.2	30.9	33.4	37.4	41	44.8	53.2
	55					18.1	23	28.5	30.9	34.7	38.2	41.8	49.8
	60							25.9	28.2	31.8	35.1	38.5	46.1
	65								25.3	28.7	31.8	35	42.1

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	4.87	4.96	5.04	5.1	5.18	5.26	5.38	5.44	5.53			
	30	5.44	5.55	5.63	5.69	5.75	5.82	5.91	5.95	6.03	6.1	6.19	
	35	6.08	6.21	6.3	6.36	6.42	6.47	6.53	6.56	6.62	6.67	6.74	6.91
	40		6.95	7.05	7.13	7.18	7.22	7.26	7.29	7.32	7.36	7.41	7.53
	45			7.92	8	8.05	8.09	8.12	8.13	8.16	8.18	8.21	8.29
	50				9	9.06	9.1	9.12	9.13	9.14	9.15	9.16	9.21
	55					10.2	10.25	10.25	10.3	10.3	10.3	10.3	10.3
	60							11.6	11.6	11.6	11.6	11.6	11.6
	65								13.1	13.1	13.1	13.1	13.1

R407C - ZR160KCE-TFD

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	11.2	14.85	19.2	24.3	30.4	37.5	45.7	49.3	55.2			
	30	10.05	13.6	17.8	22.8	28.7	35.5	43.5	47	52.7	57.8	63.2	
	35	8.86	12.3	16.4	21.2	26.9	33.5	41.2	44.6	50.1	55	60.3	71.9
	40		10.95	14.85	19.5	24.9	31.3	38.7	42	47.3	52	57.1	68.3
	45			13.3	17.7	22.9	29	36.1	39.3	44.4	48.9	53.8	64.6
	50				15.9	20.8	26.7	33.4	36.5	41.3	45.7	50.3	60.7
	55					18.7	24.2	30.6	33.5	38.1	42.3	46.7	56.6
	60						21.7	27.7	30.4	34.8	38.8	43	52.4
	65							24.7	27.3	31.4	35.1	39.1	48

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	5.54	5.61	5.68	5.76	5.84	5.94	6.07	6.13	6.23			
	30	6.22	6.3	6.37	6.45	6.53	6.62	6.73	6.78	6.87	6.95	7.04	
	35	6.98	7.07	7.15	7.22	7.29	7.37	7.46	7.5	7.58	7.65	7.72	7.91
	40		7.95	8.03	8.09	8.15	8.21	8.29	8.32	8.38	8.43	8.49	8.64
	45			9.04	9.09	9.14	9.18	9.23	9.26	9.29	9.33	9.38	9.48
	50				10.25	10.3	10.3	10.3	10.35	10.4	10.4	10.4	10.5
	55					11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6
	60						13.1	13.05	13.05	13	13	13	13
	65							14.7	14.7	14.7	14.6	14.6	14.5

R407C - ZR190KCE-TFD

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	13.65	17.7	22.4	27.9	34.4	41.8	50.5	54.3	60.5			
	30	12.55	16.6	21.3	26.8	33.1	40.4	48.9	52.6	58.6	63.9	69.7	
	35	11.2	15.35	20	25.4	31.6	38.7	46.9	50.6	56.4	61.6	67.1	79.3
	40		13.85	18.45	23.8	29.8	36.7	44.7	48.2	53.8	58.8	64.2	76
	45			16.75	21.9	27.8	34.5	42.1	45.5	50.9	55.8	60.9	72.3
	50				19.8	25.5	31.9	39.3	42.6	47.7	52.4	57.3	68.2
	55					23	29.2	36.2	39.3	44.3	48.7	53.4	63.8
	60						26.2	32.9	35.8	40.5	44.7	49.2	59.1
	65							29.3	32.1	36.5	40.5	44.7	54

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	6.77	6.86	6.93	7.02	7.16	7.37	7.68	7.84	8.13			
	30	7.57	7.67	7.74	7.8	7.89	8.03	8.26	8.38	8.6	8.82	9.08	
	35	8.44	8.57	8.65	8.7	8.76	8.85	9	9.09	9.25	9.42	9.62	10.2
	40		9.57	9.67	9.73	9.77	9.83	9.92	9.98	10.1	10.2	10.4	10.8
	45			10.8	10.9	10.95	10.95	11.05	11.05	11.2	11.2	11.4	11.7
	50				12.2	12.25	12.3	12.3	12.35	12.4	12.5	12.5	12.8
	55					13.75	13.75	13.8	13.8	13.9	13.9	13.9	14.1
	60						15.45	15.5	15.5	15.5	15.5	15.6	15.7
	65							17.35	17.35	17.4	17.4	17.4	17.5

16.2 Performance data sheet with R410A

Conditions: Suction superheat: 10K; Liquid subcooling: 0K; Power supply: 380/420V – 3~ – 50 Hz

R410A - ZP90KCE-TFD

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	8.27	10.21	12.55	15.31	18.52	22.21	26.42	28.26	31.2			
	30	7.74	9.61	11.85	14.48	17.54	21.06	25.07	26.82	29.6	32.1	34.7	
	35	7.22	9.01	11.15	13.66	16.57	19.92	23.74	25.4	28.1	30.4	32.9	38.3
	40		8.37	10.41	12.8	15.57	18.75	22.37	23.95	26.5	28.7	31.1	36.2
	45			9.61	11.88	14.51	17.52	20.95	22.44	24.8	26.9	29.2	34
	50				10.85	13.33	16.18	19.41	20.82	23.1	25.1	27.2	31.8
	55					12.02	14.69	17.73	19.05	21.2	23	25	29.3
	60						13.01	15.84	17.07	19	20.8	22.6	26.6
	65							13.65	14.78	16.6	18.2	19.9	23.6

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	3.71	3.69	3.66	3.65	3.64	3.64	3.66	3.68	3.71			
	30	4.08	4.06	4.05	4.05	4.06	4.09	4.13	4.16	4.2	4.25	4.3	
	35	4.52	4.5	4.49	4.49	4.5	4.53	4.59	4.62	4.67	4.73	4.79	4.94
	40		5.02	5	4.99	4.99	5.02	5.07	5.1	5.15	5.21	5.27	5.43
	45			5.62	5.59	5.57	5.58	5.61	5.64	5.69	5.73	5.79	5.94
	50				6.32	6.27	6.25	6.25	6.27	6.3	6.34	6.38	6.51
	55					7.12	7.06	7.02	7.02	7.03	7.05	7.08	7.18
	60						8.05	7.96	7.94	7.92	7.91	7.92	7.97
	65							9.1	9.05	8.99	8.95	8.93	8.92

R410A - ZP103KCE-TFD

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	9.18	11.52	14.27	17.49	21.22	25.53	30.47	32.64	36.1			
	30	8.49	10.82	13.51	16.6	20.17	24.25	28.91	30.95	34.2	37.1	40.2	
	35	7.67	10.01	12.65	15.65	19.07	22.95	27.35	29.27	32.3	35.1	37.9	44.2
	40		9.06	11.68	14.61	17.89	21.6	25.76	27.58	30.5	33	35.7	41.6
	45			10.56	13.44	16.62	20.16	24.12	25.83	28.5	31	33.5	39
	50				12.12	15.21	18.61	22.38	24	26.6	28.8	31.2	36.4
	55					13.64	16.92	20.5	22.03	24.4	26.6	28.8	33.6
	60						15.02	18.43	19.88	22.2	24.1	26.2	30.7
	65							16.07	17.43	19.6	21.4	23.3	27.5

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	3.98	4.03	4.04	4.02	4.01	4	4.04	4.06	4.12			
	30	4.47	4.52	4.53	4.52	4.51	4.51	4.56	4.59	4.66	4.73	4.83	
	35	5.04	5.08	5.07	5.06	5.04	5.04	5.09	5.12	5.19	5.27	5.38	5.66
	40		5.73	5.7	5.67	5.63	5.63	5.66	5.69	5.76	5.84	5.94	6.22
	45			6.45	6.38	6.32	6.29	6.31	6.33	6.39	6.46	6.56	6.83
	50				7.23	7.13	7.07	7.05	7.07	7.11	7.17	7.25	7.5
	55					8.09	7.98	7.93	7.92	7.94	7.98	8.05	8.27
	60						9.07	8.96	8.94	8.93	8.94	8.99	9.16
	65							10.18	10.13	10.1	10.1	10.1	10.2

R410A - ZP120KCE-TFD

Capacity kW	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
		25	11.02	13.93	17.22	20.92	25.08	29.75	34.95	37.19	40.7		
30	10	12.86	16.09	19.74	23.84	28.44	33.57	35.78	39.3	42.4	45.6		
35	8.98	11.76	14.91	18.46	22.46	26.95	31.97	34.14	37.6	40.6	43.8	50.6	
40		10.65	13.67	17.09	20.96	25.3	30.18	32.28	35.6	38.6	41.7	48.4	
45			12.39	15.64	19.33	23.5	28.19	30.21	33.4	36.3	39.3	45.8	
50				14.13	17.6	21.55	26.01	27.94	31	33.7	36.6	42.8	
55					15.77	19.45	23.64	25.46	28.4	30.9	33.7	39.6	
60						17.19	21.06	22.75	25.5	27.9	30.4	36	
65							18.19	19.73	22.2	24.4	26.7	31.8	

Power Input kW	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
		25	4.56	4.58	4.57	4.57	4.58	4.62	4.71	4.77	4.87		
30	5.17	5.19	5.19	5.18	5.17	5.19	5.25	5.29	5.37	5.46	5.56		
35	5.85	5.88	5.87	5.85	5.83	5.83	5.86	5.89	5.94	6.01	6.09	6.32	
40		6.64	6.63	6.61	6.57	6.55	6.55	6.56	6.6	6.64	6.7	6.88	
45			7.5	7.47	7.42	7.37	7.35	7.35	7.36	7.38	7.42	7.55	
50				8.45	8.39	8.32	8.27	8.25	8.24	8.25	8.27	8.35	
55					9.5	9.41	9.33	9.31	9.27	9.26	9.25	9.29	
60						10.67	10.56	10.52	10.5	10.4	10.4	10.4	
65							11.96	11.91	11.8	11.8	11.7	11.7	

R410A - ZP137KCE-TFD

Capacity kW	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
		25	12.36	15.51	19.08	23.19	27.99	33.61	40.19	43.12	47.9		
30	11.3	14.46	17.96	21.92	26.48	31.78	37.95	40.69	45.1	49.1	53.4		
35	10.07	13.29	16.76	20.6	24.96	29.97	35.77	38.34	42.5	46.2	50.3	59.2	
40		11.94	15.41	19.18	23.37	28.13	33.59	36	39.9	43.4	47.2	55.5	
45			13.88	17.59	21.66	26.2	31.36	33.63	37.3	40.5	44.1	51.9	
50				15.79	19.76	24.12	29.01	31.14	34.6	37.6	40.9	48.2	
55					17.62	21.82	26.47	28.48	31.7	34.6	37.6	44.4	
60						19.22	23.64	25.54	28.5	31.2	34.1	40.3	
65							20.4	22.17	25	27.5	30.1	35.8	

Power Input kW	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
		25	5.16	5.19	5.21	5.23	5.26	5.31	5.38	5.43	5.5		
30	5.81	5.84	5.86	5.86	5.88	5.9	5.95	5.98	6.04	6.1	6.18		
35	6.52	6.55	6.57	6.57	6.57	6.58	6.61	6.63	6.67	6.72	6.77	6.93	
40		7.34	7.36	7.36	7.35	7.35	7.36	7.38	7.4	7.44	7.48	7.6	
45			8.23	8.24	8.23	8.22	8.22	8.23	8.25	8.27	8.3	8.4	
50				9.22	9.22	9.21	9.21	9.21	9.22	9.23	9.25	9.33	
55					10.33	10.32	10.32	10.32	10.3	10.3	10.4	10.4	
60						11.58	11.57	11.57	11.6	11.6	11.6	11.6	
65							12.98	12.98	13	13	13	13	



R410A - ZP154KCE-TFD

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	14.07	17.65	21.67	26.27	31.6							
	30	12.95	16.55	20.51	24.98	30.1	36	42.85	45.88				
	35	11.74	15.36	19.27	23.6	28.51	34.13	40.61	43.47	48.1	52.3	56.7	66.6
	40		14.07	17.92	22.12	26.82	32.15	38.26	40.96	45.3	49.2	53.4	62.7
	45			16.43	20.5	24.99	30.04	35.78	38.31	42.4	46	49.9	58.6
	50				18.72	22.99	27.75	33.13	35.48	39.3	42.7	46.3	54.4
	55					20.79	25.25	30.25	32.44	35.9	39.1	42.4	49.9
	60					18.33	22.48	27.09	29.1	32.3	35.2	38.2	45
	65						19.33	23.52	25.33	28.2	30.8	33.6	39.7

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	5.74	5.79	5.86	5.95	6.08							
	30	6.45	6.48	6.54	6.62	6.73	6.86	7.01	7.08				
	35	7.22	7.26	7.31	7.38	7.46	7.57	7.7	7.76	7.86	7.95	8.04	8.24
	40		8.12	8.16	8.22	8.3	8.39	8.51	8.55	8.64	8.71	8.79	8.96
	45			9.12	9.18	9.25	9.33	9.43	9.47	9.54	9.6	9.66	9.8
	50				10.25	10.32	10.39	10.48	10.51	10.6	10.6	10.7	10.8
	55					11.52	11.59	11.67	11.7	11.8	11.8	11.8	11.9
	60					12.87	12.94	13.01	13.04	13.1	13.1	13.2	13.3
	65						14.45	14.52	14.55	14.6	14.6	14.7	14.7

R410A - ZP182KCE-TFD

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	16.44	20.68	25.41	30.83	37.12	44.49	53.12	56.97	63.2			
	30	15.18	19.41	24.04	29.26	35.26	42.23	50.37	53.99	59.9	65.2	70.9	
	35	13.84	18.08	22.63	27.67	33.39	39.99	47.64	51.04	56.6	61.5	66.9	78.9
	40		16.64	21.12	26	31.46	37.69	44.88	48.07	53.2	57.9	62.9	74.1
	45			19.46	24.18	29.39	35.28	42.03	45.01	49.8	54.2	58.9	69.3
	50				22.16	27.14	32.69	39	41.78	46.3	50.3	54.7	64.4
	55					24.62	29.85	35.73	38.31	42.5	46.2	50.2	59.2
	60					21.77	26.66	32.11	34.48	38.3	41.7	45.4	53.6
	65						22.97	27.96	30.12	33.6	36.7	40	47.4

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	6.84	6.93	7.03	7.13	7.23	7.32	7.39	7.41	7.43			
	30	7.6	7.69	7.8	7.91	8.02	8.13	8.23	8.27	8.31	8.34	8.37	
	35	8.46	8.54	8.64	8.75	8.87	8.99	9.1	9.15	9.21	9.25	9.29	9.35
	40		9.51	9.59	9.69	9.8	9.92	10.04	10.09	10.2	10.2	10.3	10.4
	45			10.68	10.76	10.85	10.96	11.08	11.12	11.2	11.3	11.3	11.4
	50				11.99	12.06	12.15	12.25	12.29	12.4	12.4	12.5	12.6
	55					13.46	13.51	13.58	13.62	13.7	13.7	13.8	13.9
	60					15.08	15.09	15.12	15.14	15.2	15.2	15.2	15.3
	65						16.92	16.9	16.9	16.9	16.9	16.9	17

16.3 Performance data sheet with R134a

Conditions: Suction superheat: 10K; Liquid subcooling: 0K; Power supply: 380/420V – 3~ – 50 Hz

R134a - ZR94KCE-TFD

Capacity kW	Cond. Temp. °C	Evaporating temperature °C								
		-15	-10	-5	0	5	7	10	12.5	15
21	7.88	9.88	12.25	14.95	18.1	19.45				
25	7.54	9.48	11.75	14.45	17.5	18.85	21			
30	7.12	8.99	11.2	13.75	16.75	18.05	20.1	22		
35	6.7	8.49	10.6	13.1	15.95	17.2	19.2	21	22.9	
40	6.28	7.99	10	12.4	15.15	16.35	18.3	20	21.9	
45	5.87	7.48	9.4	11.65	14.3	15.45	17.3	19	20.8	
50		6.97	8.78	10.95	13.45	14.55	16.3	17.9	19.65	
55		6.45	8.15	10.2	12.55	13.6	15.3	16.8	18.45	
60			7.51	9.4	11.65	12.65	14.25	15.7	17.25	
65			6.86	8.62	10.7	11.65	13.15	14.5	16	
70				7.81	9.75	10.6	12.05	13.3	14.7	
74.1				7.14	8.94	9.76	11.1	12.3	13.6	

Power Input kW	Cond. Temp. °C	Evaporating temperature °C								
		-15	-10	-5	0	5	7	10	12.5	15
21	2.18	2.21	2.27	2.36	2.45	2.48				
25	2.4	2.42	2.48	2.55	2.63	2.65	2.68			
30	2.69	2.71	2.76	2.82	2.88	2.9	2.91	2.91		
35	3.01	3.03	3.07	3.13	3.18	3.19	3.19	3.18	3.15	
40	3.36	3.37	3.42	3.47	3.51	3.52	3.52	3.5	3.46	
45	3.72	3.75	3.8	3.85	3.89	3.89	3.88	3.86	3.82	
50		4.15	4.21	4.27	4.3	4.31	4.29	4.27	4.22	
55		4.59	4.66	4.72	4.76	4.76	4.75	4.72	4.67	
60			5.13	5.21	5.25	5.26	5.25	5.22	5.17	
65			5.64	5.73	5.79	5.79	5.79	5.76	5.71	
70				6.28	6.36	6.37	6.37	6.35	6.3	
74.1				6.77	6.85	6.87	6.88	6.86	6.82	

R134a - ZR108KCE-TFD

Capacity kW	Cond. Temp. °C	Evaporating temperature °C								
		-15	-10	-5	0	5	7	10	12.5	15
21	8.97	11.25	13.9	17.05	20.6	22.2				
25	8.61	10.8	13.4	16.5	20	21.5	24			
30	8.15	10.25	12.8	15.75	19.15	20.6	23	25.1		
35	7.68	9.7	12.15	14.95	18.25	19.7	22	24	26.2	
40	7.21	9.13	11.45	14.2	17.35	18.7	20.9	22.9	25	
45	6.73	8.55	10.75	13.35	16.35	17.7	19.8	21.7	23.7	
50		7.96	10.05	12.5	15.4	16.65	18.7	20.5	22.4	
55		7.37	9.31	11.65	14.35	15.55	17.5	19.25	21.1	
60			8.57	10.75	13.3	14.45	16.3	17.9	19.7	
65			7.83	9.84	12.25	13.3	15.05	16.6	18.25	
70				8.93	11.15	12.15	13.75	15.2	16.75	
74.1				8.17	10.25	11.15	12.7	14.05	15.55	

Power Input kW	Cond. Temp. °C	Evaporating temperature °C								
		-15	-10	-5	0	5	7	10	12.5	15
21	2.44	2.46	2.54	2.63	2.74	2.78				
25	2.68	2.7	2.76	2.84	2.93	2.96	2.99			
30	3	3.02	3.08	3.15	3.21	3.23	3.25	3.26		
35	3.36	3.38	3.43	3.49	3.54	3.55	3.56	3.55	3.53	
40	3.74	3.77	3.82	3.88	3.92	3.93	3.92	3.91	3.87	
45	4.15	4.19	4.25	4.3	4.34	4.34	4.34	4.31	4.27	
50		4.64	4.71	4.77	4.81	4.81	4.8	4.77	4.72	
55		5.12	5.21	5.28	5.32	5.32	5.31	5.28	5.22	
60			5.74	5.83	5.87	5.88	5.87	5.83	5.78	
65			6.3	6.41	6.47	6.48	6.47	6.44	6.39	
70				7.03	7.11	7.13	7.12	7.1	7.05	
74.1				7.56	7.66	7.69	7.69	7.67	7.63	



R134a - ZR125KCE-TFD

	Cond. Temp. °C	Evaporating temperature °C								
		-15	-10	-5	0	5	7	10	12.5	15
Capacity kW	21	10.3	12.9	16	19.6	23.7	25.5			
	25	9.86	12.4	15.45	18.95	22.9	24.7	27.5		
	30	9.33	11.8	14.7	18.1	22	23.7	26.4	28.8	
	35	8.79	11.1	13.9	17.2	20.9	22.6	25.2	27.5	30
	40	8.25	10.45	13.1	16.25	19.85	21.5	24	26.2	28.6
	45	7.72	9.79	12.3	15.3	18.75	20.3	22.7	24.9	27.2
	50		9.12	11.5	14.3	17.6	19.05	21.4	23.5	25.7
	55		8.45	10.65	13.3	16.4	17.8	20	22	24.1
	60			9.81	12.3	15.2	16.5	18.65	20.5	22.5
	65			8.97	11.25	14	15.2	17.2	19	20.9
	70				10.2	12.75	13.9	15.75	17.4	19.2
74.1				9.36	11.7	12.75	14.5	16.1	17.8	

	Cond. Temp. °C	Evaporating temperature °C								
		-15	-10	-5	0	5	7	10	12.5	15
Power Input kW	21	2.85	2.89	2.98	3.09	3.2	3.24			
	25	3.13	3.16	3.24	3.34	3.43	3.46	3.49		
	30	3.52	3.54	3.61	3.7	3.77	3.79	3.8	3.79	
	35	3.94	3.96	4.02	4.1	4.15	4.16	4.16	4.14	4.1
	40	4.39	4.42	4.48	4.54	4.59	4.6	4.59	4.56	4.51
	45	4.87	4.9	4.97	5.04	5.08	5.08	5.06	5.03	4.97
	50		5.43	5.5	5.57	5.62	5.62	5.6	5.56	5.5
	55		5.99	6.08	6.16	6.2	6.21	6.19	6.15	6.08
	60			6.69	6.79	6.84	6.85	6.83	6.8	6.73
	65			7.35	7.46	7.54	7.55	7.54	7.5	7.44
	70				8.18	8.28	8.29	8.29	8.27	8.21
74.1				8.81	8.92	8.95	8.96	8.93	8.88	

R134a - ZR144KCE-TFD

	Cond. Temp. °C	Evaporating temperature °C								
		-15	-10	-5	0	5	7	10	12.5	15
Capacity kW	21	13.3	16.15	19.45	23.2	27.3	29			
	25	13	15.8	19.05	22.7	26.8	28.4	31		
	30	12.5	15.15	18.35	22	25.9	27.6	30.2	32.3	
	35	11.85	14.4	17.5	21	24.9	26.5	29.1	31.2	33.4
	40	11.05	13.55	16.5	19.95	23.7	25.3	27.8	29.9	30.5
	45	10.2	12.55	15.4	18.7	22.4	23.9	26.4	28.4	32
	50		11.5	14.2	17.4	20.9	22.5	24.8	26.8	28.8
	55		10.4	13	16	19.4	20.9	23.1	25.1	27
	60			11.7	14.55	17.8	19.2	21.4	23.2	25.1
	65			10.4	13.1	16.15	17.5	19.55	21.3	23.2
	70				11.65	14.5	15.75	17.7	19.4	21.2
74.1				10.45	13.15	14.35	16.2	17.8	19.5	

	Cond. Temp. °C	Evaporating temperature °C								
		-15	-10	-5	0	5	7	10	12.5	15
Power Input kW	21	3.12	3.17	3.28	3.51	3.93	4.17			
	25	3.36	3.41	3.48	3.64	3.96	4.15	4.51		
	30	3.75	3.81	3.86	3.96	4.17	4.31	4.57	4.86	
	35	4.21	4.31	4.36	4.41	4.54	4.63	4.81	5.02	5.29
	40	4.73	4.88	4.94	4.97	5.03	5.08	5.2	5.34	5.54
	45	5.26	5.5	5.59	5.62	5.63	5.65	5.71	5.8	5.92
	50		6.13	6.28	6.32	6.31	6.31	6.33	6.36	6.43
	55		6.74	6.97	7.05	7.04	7.02	7.01	7.01	7.02
	60			7.65	7.78	7.79	7.77	7.73	7.7	7.68
	65			8.29	8.5	8.54	8.52	8.48	8.43	8.38
	70				9.16	9.25	9.25	9.21	9.16	9.09
74.1				9.64	9.8	9.81	9.79	9.73	9.66	

R134a - ZR160KCE-TFD

	Cond. Temp. °C	Evaporating temperature °C								
		-15	-10	-5	0	5	7	10	12.5	15
Capacity kW	21	14.45	17.55	21.1	25.2	29.9	32			
	25	13.9	17	20.5	24.5	29	31	34.2		
	30	13.1	16.2	19.65	23.5	27.9	29.8	32.9	35.6	
	35	12.15	15.3	18.75	22.5	26.7	28.6	31.5	34.1	36.9
	40	11	14.25	17.7	21.4	25.5	27.3	30.1	32.6	35.3
	45	9.59	12.95	16.45	20.2	24.2	26	28.7	31.1	33.6
	50		11.45	15.05	18.8	22.8	24.5	27.1	29.4	31.9
	55		9.65	13.35	17.15	21.2	22.8	25.4	27.7	30.1
	60			11.4	15.3	19.3	21	23.5	25.8	28.1
	65			9.15	13.15	17.2	18.9	21.4	23.6	25.9
	70				10.7	14.85	16.5	19.05	21.2	23.5
74.1				8.45	12.65	14.35	16.9	19.1	21.3	

	Cond. Temp. °C	Evaporating temperature °C								
		-15	-10	-5	0	5	7	10	12.5	15
Power Input kW	21	3.63	3.66	3.63	3.5	3.25	3.1			
	25	3.95	4.02	4.05	4	3.85	3.76	3.57		
	30	4.35	4.45	4.52	4.56	4.51	4.46	4.35	4.22	
	35	4.81	4.89	4.99	5.07	5.1	5.09	5.04	4.98	4.88
	40	5.35	5.4	5.49	5.59	5.67	5.68	5.68	5.66	5.61
	45	6.03	6.02	6.07	6.16	6.25	6.28	6.31	6.32	6.31
	50		6.78	6.77	6.82	6.9	6.93	6.97	7	7.02
	55		7.74	7.64	7.62	7.66	7.68	7.72	7.75	7.77
	60			8.71	8.6	8.56	8.57	8.58	8.6	8.62
	65			10.05	9.8	9.67	9.64	9.61	9.6	9.6
	70				11.25	11	10.95	10.85	10.8	10.75
74.1				12.7	12.3	12.2	12.05	11.95	11.9	

R134a - ZR190KCE-TFD

	Cond. Temp. °C	Evaporating temperature °C								
		-15	-10	-5	0	5	7	10	12.5	15
Capacity kW	21	17.35	21.1	25.5	30.4	36	38.5			
	25	16.55	20.3	24.6	29.4	34.9	37.3	41.1		
	30	15.5	19.25	23.4	28.1	33.5	35.8	39.5	42.9	
	35	14.45	18.15	22.2	26.8	32	34.3	37.9	41.1	44.6
	40	13.25	16.95	21	25.5	30.5	32.7	36.2	39.4	42.7
	45	11.9	15.6	19.6	24	28.9	31.1	34.5	37.5	40.7
	50		14.05	18.05	22.4	27.2	29.3	32.6	35.5	38.6
	55		12.35	16.25	20.5	25.3	27.3	30.5	33.3	36.4
	60			14.25	18.45	23.1	25.1	28.2	31	33.9
	65			12	16.15	20.7	22.6	25.6	28.3	31.1
	70				13.5	17.9	19.8	22.8	25.4	28.1
74.1				11.1	15.45	17.3	20.2	22.7	25.4	

	Cond. Temp. °C	Evaporating temperature °C								
		-15	-10	-5	0	5	7	10	12.5	15
Power Input kW	21	4.35	4.46	4.57	4.68	4.79	4.84			
	25	4.73	4.84	4.94	5.05	5.16	5.2	5.26		
	30	5.26	5.36	5.45	5.55	5.65	5.69	5.76	5.81	
	35	5.85	5.94	6.03	6.12	6.21	6.25	6.3	6.35	6.4
	40	6.53	6.6	6.68	6.76	6.84	6.87	6.93	6.97	7.01
	45	7.29	7.35	7.41	7.48	7.55	7.58	7.63	7.67	7.7
	50		8.2	8.25	8.31	8.36	8.39	8.42	8.46	8.49
	55		9.17	9.2	9.24	9.28	9.3	9.33	9.35	9.38
	60			10.25	10.3	10.3	10.35	10.35	10.35	10.4
	65			11.5	11.5	11.5	11.5	11.5	11.5	11.5
	70				12.8	12.8	12.8	12.8	12.8	12.8
74.1				14.05	14	14	13.95	13.95	13.95	

16.4 Performance data sheet with R22

Conditions: Suction superheat: 10K; Liquid subcooling: 0K; Power supply: 380/420V – 3~ – 50 Hz

R22 - ZR94KC-TFD

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	7.42	9.77	12.4	15.35	18.7	22.5	26.8	28.7	31.7			
	30	6.75	9.08	11.65	14.55	17.85	21.5	25.7	27.5	30.5	33	35.8	
	35	6.05	8.37	10.95	13.8	17	20.6	24.6	26.4	29.2	31.8	34.4	40.2
	40		7.62	10.15	12.95	16.1	19.6	23.5	25.3	28	30.4	33	38.7
	45			9.3	12.05	15.1	18.55	22.4	24	26.7	29.1	31.6	37
	50				11.05	14.05	17.35	21.1	22.7	25.3	27.6	30	35.3
	55					12.85	16.1	19.7	21.3	23.8	26	28.3	33.4
	60						14.65	18.2	19.7	22.1	24.2	26.5	31.4
	65							16.45	17.95	20.3	22.3	24.5	29.2

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	3.4	3.44	3.46	3.48	3.51	3.57	3.66	3.72	3.81			
	30	3.81	3.86	3.88	3.9	3.92	3.97	4.05	4.1	4.18	4.28	4.38	
	35	4.28	4.32	4.35	4.36	4.38	4.41	4.48	4.52	4.59	4.67	4.77	5.03
	40		4.85	4.87	4.88	4.88	4.91	4.96	4.99	5.05	5.12	5.21	5.44
	45			5.46	5.46	5.46	5.47	5.5	5.52	5.57	5.63	5.7	5.9
	50				6.13	6.11	6.1	6.12	6.13	6.17	6.21	6.27	6.44
	55					6.86	6.83	6.82	6.83	6.85	6.88	6.93	7.07
	60						7.66	7.63	7.63	7.63	7.65	7.68	7.79
	65							8.55	8.54	8.53	8.53	8.54	8.62

R22 - ZR108KC-TFD

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	9.06	11.45	14.2	17.4	21.1	25.3	30.1	32.1	35.4			
	30	8.59	10.9	13.55	16.65	20.2	24.3	28.9	30.9	34.1	36.9	39.9	
	35	8.08	10.3	12.9	15.9	19.35	23.3	27.7	29.7	32.7	35.5	38.4	44.6
	40		9.72	12.25	15.15	18.45	22.2	26.5	28.4	31.3	34	36.8	42.8
	45			11.5	14.3	17.5	21.1	25.2	27	29.9	32.4	35.1	40.9
	50				13.4	16.45	19.95	23.9	25.6	28.4	30.8	33.4	39
	55					15.35	18.7	22.5	24.2	26.8	29.1	31.6	36.9
	60						17.35	21	22.6	25.1	27.3	29.7	34.8
	65							19.35	20.9	23.3	25.4	27.7	32.6

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	3.62	3.7	3.77	3.82	3.88	3.96	4.07	4.13	4.23			
	30	4.07	4.16	4.24	4.3	4.36	4.43	4.54	4.6	4.7	4.8	4.91	
	35	4.56	4.66	4.74	4.8	4.86	4.93	5.03	5.08	5.17	5.26	5.37	5.64
	40		5.22	5.3	5.36	5.41	5.47	5.56	5.6	5.68	5.76	5.86	6.1
	45			5.94	5.99	6.03	6.08	6.14	6.18	6.25	6.32	6.4	6.62
	50				6.72	6.74	6.77	6.82	6.84	6.9	6.95	7.02	7.21
	55					7.58	7.58	7.6	7.62	7.65	7.69	7.74	7.89
	60						8.53	8.52	8.52	8.53	8.55	8.58	8.69
	65							9.59	9.58	9.56	9.57	9.58	9.64

R22 - ZR125KC-TFD

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	10.8	13.55	16.9	20.8	25.2	30.2	35.7	38	41.7			
	30	10.25	12.85	16	19.7	24	28.8	34.1	36.4	40	43.1	46.3	
	35	9.75	12.2	15.2	18.7	22.8	27.4	32.6	34.8	38.3	41.3	44.5	51.2
	40		11.55	14.4	17.8	21.7	26.2	31.1	33.3	36.6	39.6	42.7	49.2
	45			13.6	16.85	20.6	24.9	29.7	31.7	35	37.8	40.8	47.2
	50				15.8	19.4	23.5	28.1	30.1	33.3	36	38.9	45.1
	55					18.1	22	26.5	28.4	31.4	34.1	36.9	42.9
	60						20.4	24.7	26.5	29.5	32	34.7	40.5
	65							22.7	24.4	27.2	29.7	32.3	37.9

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	4.17	4.29	4.38	4.45	4.52	4.61	4.73	4.8	4.91			
	30	4.7	4.83	4.93	5.01	5.08	5.17	5.28	5.34	5.44	5.53	5.65	
	35	5.29	5.43	5.54	5.62	5.69	5.77	5.87	5.92	6.01	6.1	6.2	6.46
	40		6.11	6.22	6.31	6.37	6.44	6.53	6.57	6.65	6.73	6.82	7.05
	45			6.99	7.08	7.14	7.2	7.27	7.31	7.37	7.44	7.52	7.72
	50				7.96	8.02	8.07	8.12	8.15	8.2	8.25	8.31	8.48
	55					9.02	9.05	9.09	9.11	9.15	9.19	9.23	9.37
	60						10.2	10.2	10.2	10.3	10.3	10.3	10.4
	65							11.5	11.5	11.5	11.5	11.5	11.6

R22 - ZR144KC-TFD

	Cond. Temp. °C	Evaporating temperature											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	12.45	15.6	19.4	23.8	28.8							
	30	11.85	14.85	18.5	22.8	27.6	33	38.9	41.4				
	35	11.2	14	17.5	21.6	26.3	31.6	37.4	39.9	43.7	47	50.4	57.6
	40		13.2	16.45	20.4	25	30.1	35.8	38.2	42	45.2	48.6	55.7
	45			15.4	19.15	23.5	28.5	34	36.3	40	43.2	46.5	53.5
	50				17.8	21.9	26.7	32	34.3	37.9	41	44.3	51.1
	55					20.3	24.8	29.9	32.1	35.6	38.7	41.8	48.5
	60						22.8	27.7	29.8	33.2	36.1	39.1	45.6
	65							25.3	27.3	30.5	33.3	36.3	42.5

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	4.73	4.89	4.98	5.06	5.15							
	30	5.31	5.49	5.61	5.68	5.76	5.89	6.09	6.2				
	35	5.94	6.16	6.29	6.38	6.45	6.54	6.7	6.79	6.96	7.14	7.36	7.95
	40		6.89	7.05	7.14	7.21	7.28	7.41	7.48	7.62	7.77	7.95	8.45
	45			7.89	8	8.07	8.12	8.22	8.27	8.38	8.5	8.65	9.07
	50				8.96	9.03	9.08	9.14	9.18	9.26	9.36	9.48	9.82
	55					10.1	10.15	10.2	10.2	10.3	10.4	10.5	10.7
	60						11.35	11.4	11.4	11.5	11.5	11.6	11.8
	65							12.7	12.75	12.8	12.8	12.8	13



R22 - ZR160KC-TFD

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	13	16.9	21.1	25.8	31	37	43.9	46.9	51.7			
	30	11.45	15.55	19.9	24.6	29.8	35.6	42.2	45.1	49.7	53.9	58.3	
	35	9.53	13.95	18.45	23.3	28.4	34.1	40.5	43.3	47.7	51.6	55.8	65.1
	40		11.95	16.75	21.7	26.9	32.5	38.7	41.4	45.7	49.4	53.4	62.2
	45			14.6	19.75	25	30.7	36.8	39.4	43.5	47.2	51	59.3
	50				17.45	22.9	28.6	34.7	37.2	41.2	44.7	48.4	56.4
	55					20.4	26.2	32.2	34.8	38.7	42.1	45.7	53.4
	60						23.4	29.5	32	35.9	39.3	42.7	50.2
	65							26.3	28.9	32.7	36.1	39.5	46.7

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	5.65	5.74	5.85	5.96	6	5.94	5.71	5.57	5.29			
	30	6.31	6.34	6.46	6.59	6.71	6.76	6.69	6.62	6.46	6.27	6.02	
	35	7.11	7.07	7.13	7.26	7.4	7.52	7.56	7.55	7.48	7.38	7.23	6.76
	40		7.96	7.94	8.01	8.15	8.29	8.4	8.43	8.43	8.4	8.33	8.04
	45			8.94	8.93	9.01	9.14	9.27	9.32	9.36	9.38	9.36	9.22
	50				10.05	10.05	10.1	10.25	10.3	10.4	10.4	10.4	10.4
	55					11.35	11.3	11.35	11.4	11.5	11.5	11.6	11.6
	60						12.75	12.7	12.7	12.8	12.8	12.8	12.8
	65							14.35	14.3	14.3	14.3	14.3	14.3

R22 - ZR190KC-TFD

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Capacity kW	25	15.1	19.8	24.9	30.6	37	44.2	52.4	56	61.8			
	30	13.5	18.3	23.4	29	35.3	42.4	50.4	53.8	59.4	64.4	69.8	
	35	11.8	16.65	21.8	27.4	33.6	40.5	48.3	51.6	57.1	61.9	67.1	78.4
	40		14.85	20	25.6	31.7	38.5	46.1	49.4	54.6	59.3	64.3	75.3
	45			18.05	23.6	29.6	36.3	43.7	46.9	52	56.6	61.4	72
	50				21.3	27.3	33.9	41.1	44.2	49.2	53.6	58.3	68.6
	55					24.7	31.2	38.2	41.3	46.1	50.4	55	64.9
	60						28.1	35	38	42.7	46.9	51.3	60.9
	65							31.4	34.3	38.9	43	47.2	56.5

	Cond. Temp. °C	Evaporating temperature °C											
		-25	-20	-15	-10	-5	0	5	7	10	12.5	15	20
Power Input kW	25	6.72	6.86	7.01	7.16	7.31	7.47	7.63	7.69	7.79			
	30	7.52	7.65	7.79	7.92	8.07	8.22	8.37	8.43	8.52	8.59	8.67	
	35	8.43	8.55	8.66	8.79	8.92	9.05	9.19	9.25	9.33	9.4	9.47	9.62
	40		9.56	9.66	9.77	9.88	10	10.1	10.15	10.3	10.3	10.4	10.5
	45			10.8	10.9	10.95	11.05	11.2	11.2	11.3	11.4	11.4	11.5
	50				12.15	12.2	12.3	12.4	12.4	12.5	12.5	12.6	12.7
	55					13.6	13.65	13.75	13.75	13.8	13.9	13.9	14
	60						15.25	15.25	15.3	15.3	15.4	15.4	15.4
	65							17	17	17	17.1	17.1	17.1

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