



### Compressor Selection: Semi-hermetic Reciprocating Compressors

#### Input Values

Compressor model Mode	(2FC-2.2Y) Refrigeration and Air conditioning	Suction gas temperature Operating mode	20,00 °C Auto
Refrigerant Reference temperature Liq. subc. (in condenser)	R404A Dew point temp. 0 K	Power supply Capacity Control Useful superheat	400V-3-50Hz 100% 100%

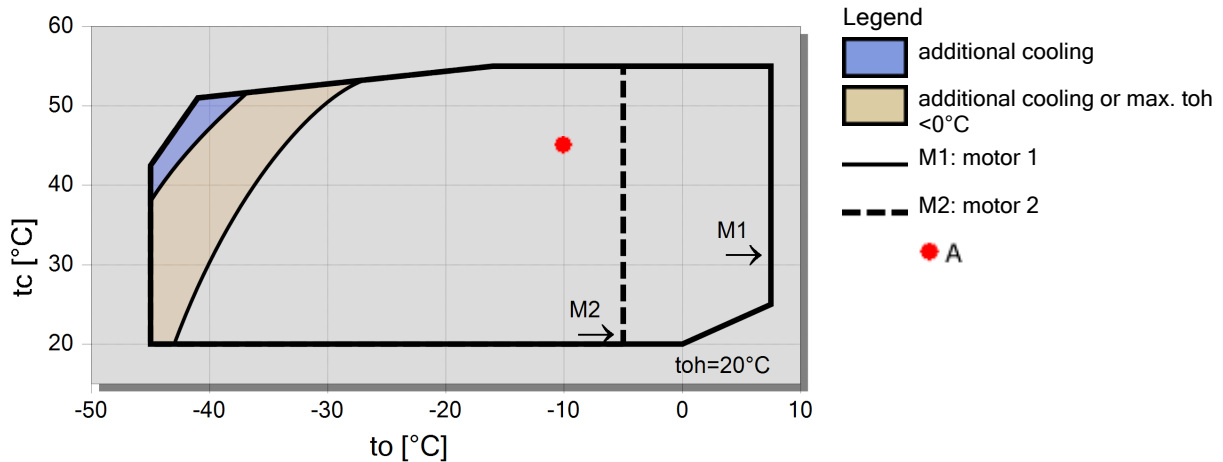
#### Result

Q [W] Qu* [W] P [kW] I [A] Qc [W]	Cooling capacity Evaporator capacity Power input Current Condenser Capacity	COP [ - ] m [kg/h] Op. th [°C]	COP/EER Mass flow Operating mode Discharge gas temp. w/o cooling
-----------------------------------------------	-----------------------------------------------------------------------------------------	-----------------------------------------	---------------------------------------------------------------------------

tc	to	-5°C	-10°C	-15°C	-20°C	-25°C	-30°C	-35°C	-40°C
30°C	Q [W]	7135	5890	4812	3881	3081	2397	1816	1326
	Qu* [W]	7135	5890	4812	3881	3081	2397	1816	1326
	P [kW]	1,98	1,91	1,80	1,67	1,51	1,35	1,17	0,98
	I [A]	3,77	3,68	3,56	3,41	3,24	3,06	2,89	2,72
	Qc [W]	9116	7796	6611	5548	4595	3743	2983	2309
	COP [ - ]	3,60	3,09	2,67	2,33	2,03	1,78	1,56	1,35
	m [kg/h]	179,2	146,5	118,7	95,1	75,0	58,1	43,8	31,9
	Op.	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
	th [°C]	72,1	79,8	88,1	96,9	106,5	117,0	128,9	0
	40°C	Q [W]	5951	4895	3978	3185	2502	1918	1422
Qu* [W]		5951	4895	3978	3185	2502	1918	1422	1002
P [kW]		2,27	2,13	1,97	1,79	1,60	1,39	1,18	0,97
I [A]		4,11	3,95	3,76	3,55	3,33	3,11	2,90	2,71
Qc [W]		8218	7027	5950	4977	4099	3310	2603	1974
COP [ - ]		2,63	2,30	2,02	1,78	1,57	1,38	1,20	1,03
m [kg/h]		168,5	137,0	110,3	87,6	68,4	52,1	38,5	27,0
Op.		Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
th [°C]		84,2	92,1	100,6	109,8	119,9	131,3	0	0
50°C		Q [W]	4811	3938	3178	2520	1953	1467	1054
	Qu* [W]	4811	3938	3178	2520	1953	1467	1054	706
	P [kW]	2,55	2,36	2,15	1,92	1,68	1,44	1,20	0,97
	I [A]	4,48	4,23	3,97	3,70	3,43	3,16	2,92	2,71
	Qc [W]	7363	6297	5325	4440	3636	2909	2256	1672
	COP [ - ]	1,89	1,67	1,48	1,31	1,16	1,02	0,88	0,73
	m [kg/h]	157,8	127,5	101,8	80,0	61,5	45,9	32,8	21,9
	Op.	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
	th [°C]	97,5	105,8	114,8	124,7	136,0	0	0	0

-- No calculation possible (see message in single point selection)  
 \*According to EN12900 (20°C suction gas temp., 0K liquid subcooling)

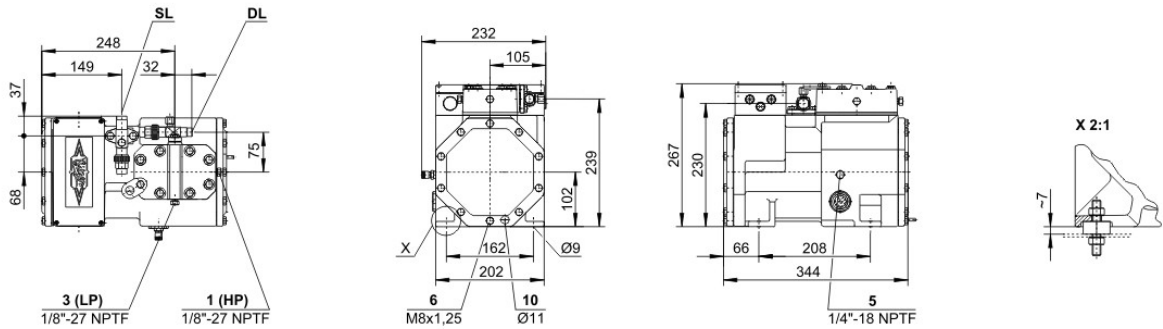
#### Application Limits 100% Octagon





## Technical Data: (2FC-2.2Y)

### Dimensions and Connections



### Technical Data

#### Technical Data

Displacement (1450 RPM 50Hz)	9,54 m <sup>3</sup> /h
Displacement (1750 RPM 60Hz)	11,51 m <sup>3</sup> /h
No. of cylinder x bore x stroke	2 x 46 mm x 33 mm
Weight	45 kg
Max. pressure (LP/HP)	19 / 28 bar
Connection suction line	16 mm - 5/8"
Connection discharge line	12 mm - 1/2"
Oil type R134a/R407C/R404A/R507A/R407A/R407F	tc<55°C: BSE32 / tc>55°C: BSE55 (Option)
Oil type R22 (R12/R502)	B5.2 (Standard)
Oil type R290/R1270	SHC226E (Standard)

#### Motor data

Motor voltage (more on request)	380-420V Y-3-50Hz
Max operating current	4.9 A
Starting current (Rotor locked)	22.5 A
Max. Power input	2,8 kW

#### Extent of delivery (Standard)

Motor protection	SE-B1
Enclosure class	IP65
Vibration dampers	Standard
Oil charge	1,00 dm <sup>3</sup>

#### Available Options

Additional fan	Option
Crankcase heater	0..60 W PTC (Option)

#### Sound measurement

Sound power level (-10°C / 45°C)	65,5 dB(A) @ 50Hz
Sound power level (-35°C / 40°C)	65,5 dB(A) @ 50Hz
Sound pressure level @ 1m (-10°C / 45°C)	57,5 dB(A) @ 50Hz
Sound pressure level @ 1m (-35°C / 40°C)	57,5 dB(A) @ 50Hz



## Selection: Semi-hermetic Reciprocating Compressors

### Input Values

Compressor model Mode	(4CC-9.2) Refrigeration and Air conditioning	Suction gas temperature Operating mode	20,00 °C Auto
Refrigerant Reference temperature Liq. subc. (in condenser)	R22 Dew point temp. 0 K	Power supply Capacity control Useful superheat	400V-3-50Hz 100% 100%

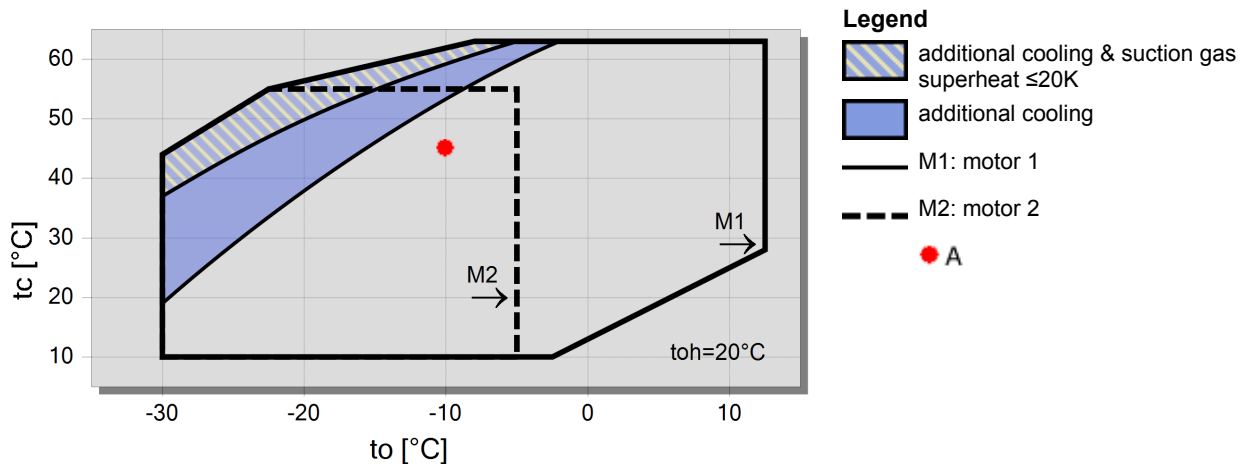
### Result

Q [W]	Cooling capacity	COP [ - ]	COP/EER
Qu* [W]	Evaporator capacity	m [kg/h]	Mass flow
P [kW]	Power input	Op.	Operating mode
I [A]	Current	th [°C]	Discharge gas temp. w/o cooling
Qc [W]	Condenser capacity		

tc	to	-5°C	-10°C	-15°C	-20°C	-25°C	-30°C	-35°C	-40°C
30°C	Q [W]	22947	18746	15117	11996	9327	7059	--	--
	Qu* [W]	22947	18746	15117	11996	9327	7059	--	--
	P [kW]	5,78	5,53	5,18	4,77	4,34	3,93		
	I [A]	10,54	10,20	9,75	9,24	8,74	8,27		
	Qc [W]	28732	24271	20293	16768	13672	10988		
	COP [ - ]	3,97	3,39	2,92	2,51	2,15	1,80		
	m [kg/h]	447	363	291	230	178,3	134,5		
	Op.	Standard	Standard	Standard	Standard	Standard	Standard		
	th [°C]	94,0	105,5	117,9	132,0	0	0		
40°C	Q [W]	20263	16417	13093	10233	7787	5708	--	--
	Qu* [W]	20263	16417	13093	10233	7787	5708	--	--
	P [kW]	6,64	6,21	5,72	5,20	4,66	4,13		
	I [A]	11,70	11,11	10,45	9,78	9,11	8,49		
	Qc [W]	26900	22622	18812	15432	12449	9834		
	COP [ - ]	3,05	2,65	2,29	1,97	1,67	1,38		
	m [kg/h]	425	342	271	211	159,9	116,8		
	Op.	Standard	Standard	Standard	Standard	Standard	Standard		
	th [°C]	109,6	121,8	135,6	0	0	0		
50°C	Q [W]	17490	14005	10984	8380	6145	--	--	--
	Qu* [W]	17490	14005	10984	8380	6145	--	--	--
	P [kW]	7,50	6,92	6,30	5,66	4,99			
	I [A]	12,94	12,10	11,24	10,37	9,51			
	Qc [W]	24995	20923	17285	14035	11131			
	COP [ - ]	2,33	2,02	1,74	1,48	1,23			
	m [kg/h]	398	316	247	187,2	136,7			
	Op.	Standard	Standard	Standard	Standard	Standard			
	th [°C]	127,5	0	0	0	0			

-- No calculation possible (see message in single point selection)  
 \*According to EN12900 (20°C suction gas temp., 0K liquid subcooling)

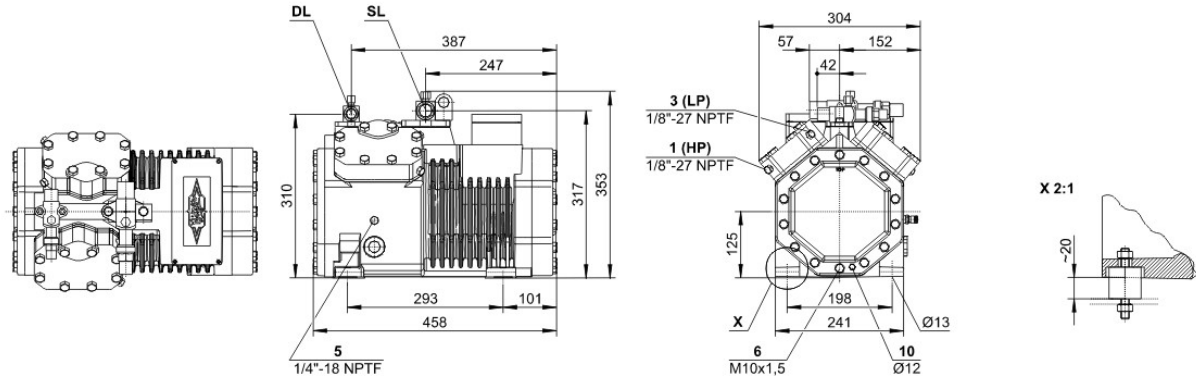
### Application Limits 100% Octagon 4CC-9.2





## Technical Data: (4CC-9.2)

### Dimensions and Connections



### Technical Data

#### Technical Data

Displacement (1450 RPM 50Hz)	32,48 m <sup>3</sup> /h
Displacement (1750 RPM 60Hz)	39,20 m <sup>3</sup> /h
No. of cylinder x bore x stroke	4 x 55 mm x 39,3 mm
Weight	90,5 kg
Max. pressure (LP/HP)	19 / 28 bar
Connection suction line	28 mm - 1 1/8"
Connection discharge line	22 mm - 7/8"
Oil type R134a/R407C/R404A/R507A/R407A/R407F	tc<55°C: BSE32   tc>55°C: BSE55 (Option)
Oil type R22 (R12/R502)	B5.2 (Standard)
Oil type R290/R1270	SHC226E (Standard)

#### Motor data

Motor voltage (more on request)	380-420V Y-3-50Hz
Max operating current	20.0 A
Starting current (Rotor locked)	82.4 A
Max. Power input	11,8 kW

#### Extent of delivery (Standard)

Motor protection	SE-B1
Enclosure class	IP65
Vibration dampers	Standard
Oil charge	2,00 dm <sup>3</sup>

#### Available Options

Discharge gas temperature sensor	Option
Start unloading	Option
Capacity control	100-50% (Option)
Additional fan	Option
Crankcase heater	0..120 W PTC (Option)
Oil level monitoring	OLC-K1 (Option, not for R290/R1270)

#### Sound measurement

Sound power level (+5°C / 50°C)	73,5 dB(A) @ 50Hz
Sound power level (-10°C / 45°C)	72,5 dB(A) @ 50Hz
Sound power level (-35°C / 40°C)	(76,0) dB(A) @ 50Hz
Sound pressure level @ 1m (+5°C / 50°C)	65,5 dB(A) @ 50Hz
Sound pressure level @ 1m (-10°C / 45°C)	64,5 dB(A) @ 50Hz
Sound pressure level @ 1m (-35°C / 40°C)	(68,0) dB(A) @ 50Hz



## Semi-hermetic Reciprocating Compressors

**Motor 1** = e.g. 4TES-12 with 12 "HP", primary for air-conditioning (e.g. R22,R407C) and air-conditioning with R134a at high ambient temperatures.

**Motor 2** = e.g. 4TES-9 with 8 "HP", universal Motor for medium and low temperature application (e.g. R404A, R507A, R407A, R407F) and air-conditioning with R134a

**Motor 3** = e.g. 4TES-8, for medium temperature applications and R134a

For more information concerning the application range use the "Limits" button.

### Operation modes 4VES-7 to 6FE-44 and 44JE-30 to 66FE-88 with R407F/R407A/R22

CIC = liquid injection with low temperature application, suction gas cooled motor.

### ASERCOM certified performance data

The Association of European Refrigeration Component Manufacturers has implemented a procedure of certifying performance data. The high standard of these certifications is assured by:

- \* plausibility tests of the data performed by experts.
- \* regular measurements at independent institutes.

These high efforts result in the fact that only a limited number of compressors can be submitted. Due to this not all BITZER compressors are certified until now. Performance data of compressors which fulfil the strict requirements may carry the label "ASERCOM certified". In this software you will find the label at the respective compressors on the right side below the field "result" or in the print out of the performance data. All certified compressors and further information are listed on the homepage of ASERCOM.

### Condensing capacity

The condensing capacity can be calculated with or without heat rejection. This option can be set in the menu Program  Options. The heat rejection is constantly 5 % of the power consumption. The condensing capacity is to be found in the line Condensing cap. (with HR) resp. Condensing capacity.

### Data for sound emission

Data based on 50 HZ application (IP-units 60 Hz) and R404A if not declared.

Sound pressure level: values based on free field area conditions with hemispherical sound emission in 1 meter distance.

### General remarks regarding sound data

Listed sound data were measured under testing conditions in our laboratory. For this purpose the free-standing test sample is mounted on a solid foundation plate and the pipework is connected vibration-free to the largest extent possible. Suction and discharge lines are fixed in a flexible configuration, such that a transmission of vibrations to the environment can be largely excluded. In real installations considerable differences might be observed, compared to the measurements in the laboratory. The airborne sound emitted by the compressor can be reflected from surfaces of the system and this may increase the airborne sound level measured close to the compressor. Vibrations caused by the compressor are also transferred to the system by the compressor feet and piping depending on the damping ratio of the fixings. Thus, the vibrations can induce other components to such an extent that these components contribute to an increase in airborne sound emission. If required, the transfer of vibrations to the system can be minimized by suitable fixing and damping elements.

### Legend of connection positions according to "Dimensions":

- 1 High pressure connection (HP)
- 2 Connection for discharge gas temperature sensor (HP) (for 4VE(S)-6Y .. 4NE(S)-20(Y) connection for CIC sensor as alternative)
- 3 Low pressure connection (LP)
- 4 CIC system: injection nozzle (LP)
- 4b Connection for CIC sensor
- 4c Connection for CIC sensor (MP / operation with liquid subcooler)
- 5 Oil fill plug
- 6 Oil drain
- 7 Oil filter (magnetic screw)
- 8 Oil return (oil separator)
- 8\* Oil return with NH3 and insoluble oil
- 9 Connection for oil and gas equalization (parallel operation)
- 9a Connection for gas equalization (parallel operation)
- 9b Connection for oil equalization (parallel operation)
- 10 Oil heater connection
- 11 Oil pressure connection +
- 12 Oil pressure connection –
- 13 Cooling water connection
- 14 Intermediate pressure connection (MP)
- 15 Liquid injection (operation without liquid subcooler and with thermostatic expansion valve)
- 16 Connection for oil monitoring (opto-electrical oil monitoring "OLC-K1" or differential oil pressure switch "Delta-PII")



- 17 Refrigerant inlet at liquid subcooler
  - 18 Refrigerant outlet at liquid subcooler
  - 19 Clamp space
  - 20 Terminal plate
  - 21 Maintenance connection for oil valve
  - 22 Pressure relief valve to the atmosphere (discharge side)
  - 23 Pressure relief valve to the atmosphere (suction side)
  - 24 IQ MODULE
  - SL Suction gas line
  - DL Discharge gas line
- Dimensions can show tolerances according to EN ISO 13920-B.



### Selection: Semi-hermetic Reciprocating Compressors

#### Input Values

Compressor model Mode	4PES-15 Refrigeration and Air conditioning	Suction gas temperature Operating mode	20,00 °C Auto
Refrigerant	R22	Power supply	400V-3-50Hz
Reference temperature	Dew point temp.	Capacity control	100%
Liq. subc. (in condenser)	0 K	Useful superheat	100%

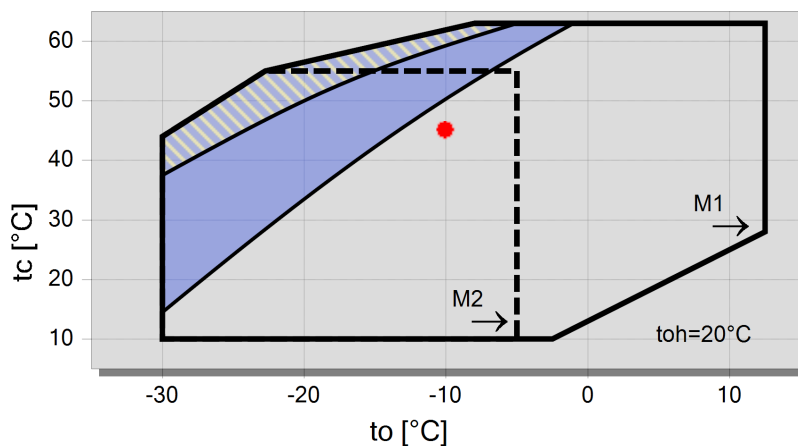
#### Result

Q [W]	Cooling capacity	COP [ - ]	COP/EER
Qu* [W]	Evaporator capacity	m [kg/h]	Mass flow
P [kW]	Power input	Op.	Operating mode
I [A]	Current	th [°C]	Discharge gas temp. w/o cooling
Qc [W]	Condenser capacity		

tc	to	-5°C	-10°C	-15°C	-20°C	-25°C	-30°C	-35°C	-40°C
30°C	Q [W]	35543	28962	23275	18384	14200	10643	--	--
	Qu* [W]	35543	28962	23275	18384	14200	10643		
	P [kW]	8,23	7,79	7,24	6,60	5,89	5,13		
	I [A]	15,98	15,45	14,79	14,05	13,27	12,51		
	Qc [W]	43768	36756	30520	24986	20090	15778		
	COP [ - ]	4,32	3,72	3,21	2,78	2,41	2,07		
	m [kg/h]	693	561	449	353	271	203		
	Op.	Standard	Standard	Standard	Standard	Standard	Standard		
	th [°C]	89,2	99,6	110,8	123,1	137,1	0		
	40°C	Q [W]	31476	25450	20247	15779	11965	8732	--
Qu* [W]		31476	25450	20247	15779	11965	8732		
P [kW]		9,49	8,79	8,00	7,14	6,22	5,28		
I [A]		17,63	16,71	15,70	14,66	13,63	12,66		
Qc [W]		40962	34243	28250	22917	18188	14015		
COP [ - ]		3,32	2,89	2,53	2,21	1,92	1,65		
m [kg/h]		660	530	419	325	246	178,7		
Op.		Standard	Standard	Standard	Standard	Standard	Standard		
th [°C]		104,3	115,1	127,0	0	0	0		
50°C		Q [W]	27404	21941	17233	13199	9767	--	--
	Qu* [W]	27404	21941	17233	13199	9767			
	P [kW]	10,57	9,62	8,60	7,51	6,40			
	I [A]	19,12	17,81	16,45	15,11	13,83			
	Qc [W]	37973	31564	25829	20714	16171			
	COP [ - ]	2,59	2,28	2,00	1,76	1,53			
	m [kg/h]	624	496	387	295	217			
	Op.	Standard	Standard	Standard	Standard	Standard			
	th [°C]	119,5	131,1	0	0	0			

-- No calculation possible (see message in single point selection)  
 \*According to EN12900 (20°C suction gas temp., 0K liquid subcooling)

#### Application Limits 100% 4PES-15



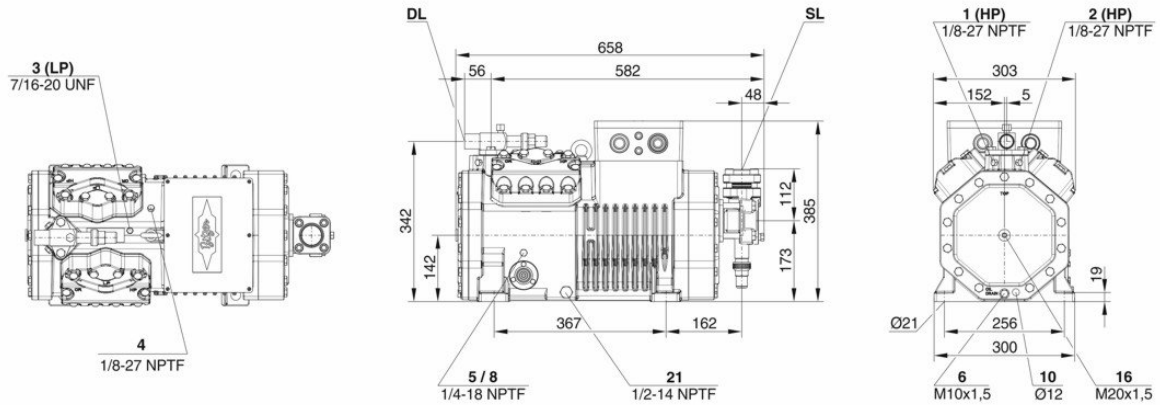
#### Legend

- additional cooling & suction gas superheat ≤ 20K
- additional cooling
- M1: motor 1
- M2: motor 2
- A



## Technical Data: 4PES-15

### Dimensions and Connections



### Technical Data

#### Technical Data

Displacement (1450 RPM 50Hz)	48,50 m3/h
Displacement (1750 RPM 60Hz)	58,53 m3/h
No. of cylinder x bore x stroke	4 x 65 mm x 42 mm
Weight	142 kg
Max. pressure (LP/HP)	19 / 32 bar
Connection suction line	42 mm - 1 5/8"
Connection discharge line	28 mm - 1 1/8"
Oil type R134a/R407C/R404A/R507A/R407A/R407F	BSE32(Standard)   R134a tc>70°C: BSE55 (Option)
Oil type R22 (R12/R502)	B5.2(Option)
Oil type R1234yf/R1234ze	BSE32 (Standard)   R1234ze tc>70°C & to>0°C: BSE55 (Option)   R1234ze to>15°C: BSE85K (Option)

#### Motor data

Motor version	1
Motor voltage (more on request)	380-420V PW-3-50Hz
Max operating current	28.2 A
Winding ratio	50/50
Starting current (Rotor locked)	81.0 A Y / 132.0 A YY
Max. Power input	16,0 kW

#### Extent of delivery (Standard)

Motor protection	SE-B1, CM-RC-01(Option)
Enclosure class	IP66
Vibration dampers	Standard
Oil charge	2,60 dm <sup>3</sup>

#### Available Options

Connection suction line	Option
Discharge shut-off valve	Option
Discharge gas temperature sensor	Option
Start unloading	Option
Capacity control	100-50% (Option)
Capacity Control - infinite	100-10% (Option)
Additional fan	Option
Oil service valve	Option
Crankcase heater	0..140 W PTC (Option)
Oil level monitoring	OLC-K1 (Option)

#### Sound measurement

Sound power level (+5°C / 50°C)	75,0 dB(A) @50Hz
Sound power level (-10°C / 45°C)	76,3 dB(A) @50Hz
Sound power level (-35°C / 40°C)	79,9 dB(A) @50Hz
Sound pressure level @ 1m (+5°C / 50°C)	67 dB(A) @50Hz
Sound pressure level @ 1m (-10°C / 45°C)	68,3 dB(A) @50Hz
Sound pressure level @ 1m (-35°C / 40°C)	71,9 dB(A) @50Hz
Sound power level (+5°C / 50°C) R134a	73 dB(A) @50Hz
Sound power level (-10°C / 45°C) R134a	74,3 dB(A) @50Hz
Sound pressure level @ 1m (+5°C / 50°C) R134a	65 dB(A) @50Hz
Sound pressure level @ 1m (-10°C / 45°C) R134a	66,3 dB(A) @50Hz





## Semi-hermetic Reciprocating Compressors

**Motor 1** = e.g. 4TES-12 with 12 "HP", primary for air-conditioning (e.g. R22,R407C) and air-conditioning with R134a at high ambient temperatures.

**Motor 2** = e.g. 4TES-9 with 8 "HP", universal Motor for medium and low temperature application (e.g. R404A, R507A, R407A, R407F) and air-conditioning with R134a

**Motor 3** = e.g. 4TES-8, for medium temperature applications and R134a

For more information concerning the application range use the "Limits" button.

### Operation modes 4VES-7 to 6FE-44 and 44JE-30 to 66FE-88 with R407F/R407A/R22

CIC = liquid injection with low temperature application, suction gas cooled motor.

### ASERCOM certified performance data

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### Condensing capacity

The condensing capacity can be calculated with or without heat rejection. This option can be set in the menu Program  Options. The heat rejection is constantly 5 % of the power consumption. The condensing capacity is to be found in the line Condensing cap. (with HR) resp. Condensing capacity.

### Data for sound emission

Data based on 50 HZ application (IP-units 60 Hz) and R404A if not declared.

Sound pressure level: values based on free field area conditions with hemispherical sound emission in 1 meter distance.

### General remarks regarding sound data

Listed sound data were measured under testing conditions in our laboratory. For this purpose the free-standing test sample is mounted on a solid foundation plate and the pipework is connected vibration-free to the largest extent possible. Suction and discharge lines are fixed in a flexible configuration, such that a transmission of vibrations to the environment can be largely excluded. In real installations considerable differences might be observed, compared to the measurements in the laboratory. The airborne sound emitted by the compressor can be reflected from surfaces of the system and this may increase the airborne sound level measured close to the compressor. Vibrations caused by the compressor are also transferred to the system by the compressor feet and piping depending on the damping ratio of the fixings. Thus, the vibrations can induce other components to such an extent that these components contribute to an increase in airborne sound emission. If required, the transfer of vibrations to the system can be minimized by suitable fixing and damping elements.

### Legend of connection positions according to "Dimensions":

- 1 High pressure connection (HP)
- 2 Connection for discharge gas temperature sensor (HP) (for 4VE(S)-6Y .. 4NE(S)-20(Y) connection for CIC sensor as alternative)
- 3 Low pressure connection (LP)
- 4 CIC system: injection nozzle (LP)
- 4b Connection for CIC sensor
- 4c Connection for CIC sensor (MP / operation with liquid subcooler)
- 5 Oil fill plug
- 6 Oil drain
- 7 Oil filter (magnetic screw)
- 8 Oil return (oil separator)
- 8\* Oil return with NH3 and insoluble oil
- 9 Connection for oil and gas equalization (parallel operation)
- 9a Connection for gas equalization (parallel operation)
- 9b Connection for oil equalization (parallel operation)
- 10 Oil heater connection
- 11 Oil pressure connection +
- 12 Oil pressure connection –
- 13 Cooling water connection
- 14 Intermediate pressure connection (MP)
- 15 Liquid injection (operation without liquid subcooler and with thermostatic expansion valve)
- 16 Connection for oil monitoring (opto-electrical oil monitoring "OLC-K1" or differential oil pressure switch "Delta-PII")



- 17 Refrigerant inlet at liquid subcooler
  - 18 Refrigerant outlet at liquid subcooler
  - 19 Clamp space
  - 20 Terminal plate
  - 21 Maintenance connection for oil valve
  - 22 Pressure relief valve to the atmosphere (discharge side)
  - 23 Pressure relief valve to the atmosphere (suction side)
  - 24 IQ MODULE
  - SL Suction gas line
  - DL Discharge gas line
- Dimensions can show tolerances according to EN ISO 13920-B.