

GEA Bock Open Type Compressors F

The full range of open type compressors and units

In touch with our customers

GEA Refrigeration Technologies: Your partner for low temperatures

GEA Refrigeration Technologies, part of the internationally active GEA Group, is a synonym for industrial refrigeration technology. Since the end of the 19th century, it has been our business to cool processes and products, and to control the temperature of goods in transport.

You will find our solutions in the food and beverage sector; in the petrochemical, chemical, and pharmaceutical industries; on fishing ships; in natural gas liquefaction; in infrastructure facilities; and in ice factories. We are also at the top with know-how when it comes to refrigeration at leisure facilities. After all, we have been excited about refrigeration for decades now. As a result, our staff enthusiastically goes about its development and production projects – to include preventive and remedial maintenance of your refrigeration systems.

This enthusiasm is highly apparent in the daily work of all companies in our Segment. Whether it's complete systems or individual valves: we have the experience in every section of our company to optimally design, manufacture, and install refrigeration systems. And to take full advantage of this experience, we not only carry out development in our own company: we also manufacture, assemble, and test the core components. A chain is, after all, only as strong as its weakest link: and this also applies equally well to refrigeration technology, cooling processes, and cooling chains.

This makes it all the more important that you have a partner – in GEA Refrigeration Technologies – that has learned to master refrigeration from A to Z. And all of this since 1896, when Willem Grasso founded his refrigeration division. From this history of GEA Refrigeration Technologies, you will profit in the form of technical expertise and top sector know-how.

But we all live in the present and think about the future. We ponder a future in which more and more processes need energy around the world, and fewer natural resources are available. As a result, we have taken it as our goal to create solutions that are not only long-life and cost-effective, but also energy-saving and environment-protecting. We feel obligated to sustainability in many respects. Our objective is to produce longlife and material-saving products over the long run – as well as products that use environmentally benign refrigerants. And we aim to produce efficiently. But our responsibility does not end at the factory gate. As a result, we take great pains to ensure that our systems are energy-efficient and that they protect the climate. With GEA Refrigeration Technologies, you can also count on optimal economy: saving energy indeed means reducing money spent for energy. At the same time, you protect the environment. Thanks to our refrigeration technology, your processes will run more economically and more ecologically. To maintain our standard of living and to assure quality of life for future generations as well.

Our claim of combining economy with saving natural resources is reflected in all components of our company, such as the following: compressors, chillers, heat pumps, ice machines, fittings and valves, control systems, and many, many more. You can find proof of the above throughout the world. Our international corporate network – and above all our reference projects – are spread all over the globe.



- Characteristics I 1**
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- F compressors for NH₃ I 3**
- Compressor units for directive drive I 4**

Disclaimer

This brochure has been produced for you with the greatest of care. Nevertheless it is not possible to rule out mistakes completely. In such cases we cannot assume any liability. The contents correspond to the status on going to print. Illustrations may include optional equipment. Deviations cannot be ruled out because of the ongoing development process of our products.

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GEA Bock - More than a compressor

Over 80 years ago, when the refrigeration and air-conditioning industry was still in its infancy, our company's founder, Wilhelm Bock, had a vision: He wanted to build first-class and reliable refrigeration machines. In the following decades Bock developed into one of the world's leading manufacturers of refrigeration and air-conditioning compressors.

As part of the GEA Group AG, GEA Bock offers the right compressor for refrigeration and air conditioning in all commercial, industrial, rail, bus and transport sectors.

The F model series provides modern open type compressors for separate drive systems (using V belts or direct couplings) in 7 model sizes and 10 capacity stages from 10,5 to 282 m³/h. Load transfer through a V pair.

GEA Bock F compressors are compact, robust and due to their open type construction they are easy to handle in almost all application fields of refrigeration technology.

As an alternative to the established F compressor series, a specially modified compressor series F NH₃ is available for use with the refrigerant R 717. The F NH₃ series is especially suitable for small to medium capacities.

No matter what your application is – we offer you the ideal compressor for your individual demand.

Be inspired. By our new products, our established product series and the entire passion that goes into each of our products.



Semi-hermetic compressors HG (HA)

The GEA Bock HG (Hermetic Gas-cooled) range of semi-hermetic compressors offers traditional suction gas-cooled compressor state of the art technology. These compressors of the highest quality standard excel in their running comfort, easy maintenance, efficiency and reliability. Suitable as standard for conventional or chlorine-free HFC refrigerants. The HA (Hermetic Air-cooled) range, specially engineered by GEA Bock, is available for deep-freezing applications, in particular for use with the refrigerants R22 and R404A.

- Single-stage
- CO₂ compressors subcritical
- CO₂ compressors transcritical
- R134a compressors
- R407C compressors
- ATEX compressors
- HC compressors
- Aluminium compressors
- 2-pole compressors
- Two-stage compressors
- Duplex compressors
- Compressor units with receiver
- Condenser units air-cooled



Vehicle compressors FK

GEA Bock vehicle compressors of the FK range are the result of many years of experience in the domain of mobile cooling systems.

The unsurpassed light, compact, robust design and wide r.p.m. range are only some of the outstanding features of this unique product range of two, four and six cylinder compressors.

A wide variety of designs can be tailored to suit individual requirements.

The so-called K version is a special innovation with a unique valve plate system for maximum requirements in bus and coach air-conditioning systems.



- Compressors for bus and train air-conditioning
- Compressors for transport refrigeration and other applications

Open type compressors F

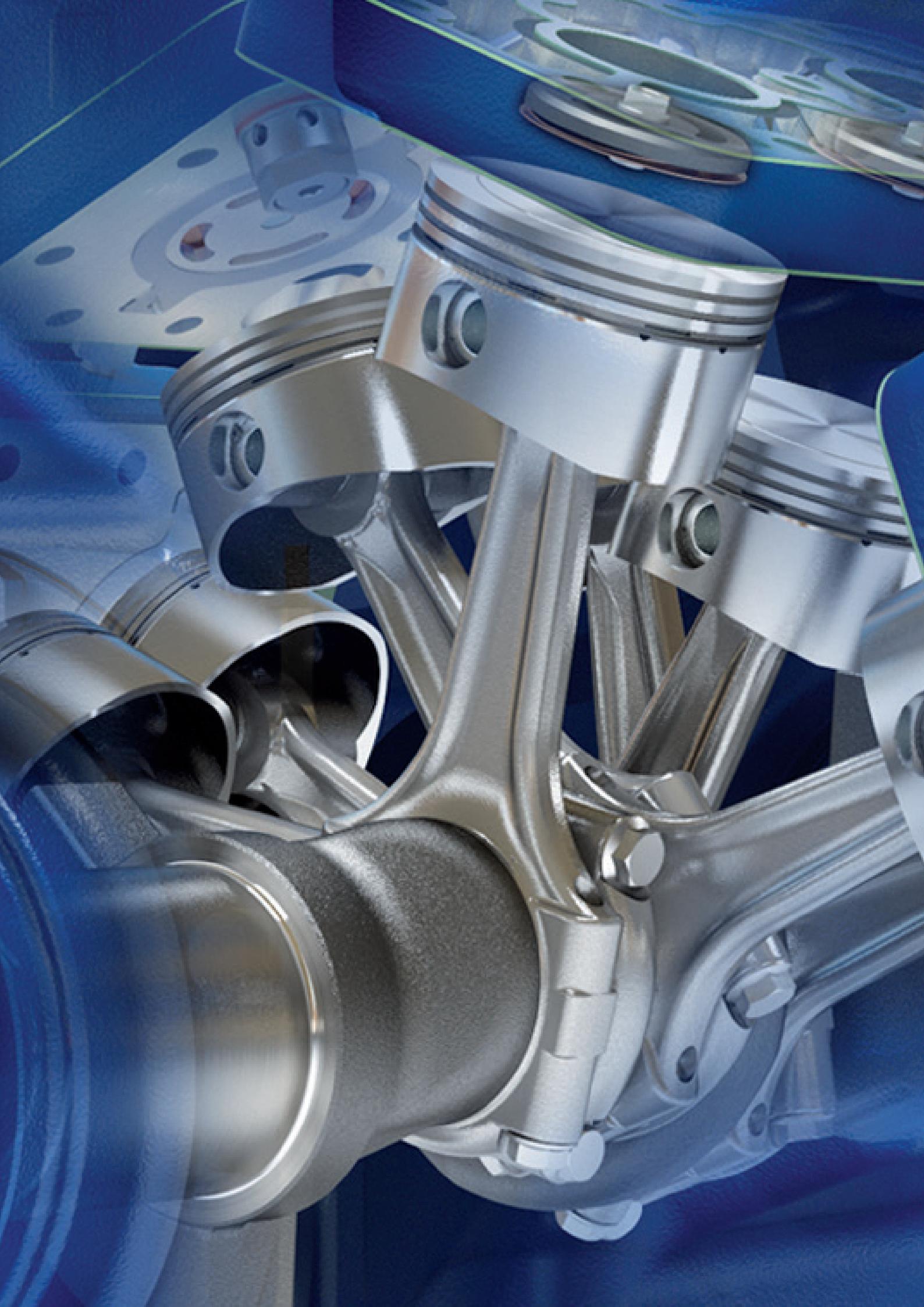
The F model series provides modern open type compressors for separate drive systems (using V belts or direct couplings). Load transfer through a V pair.

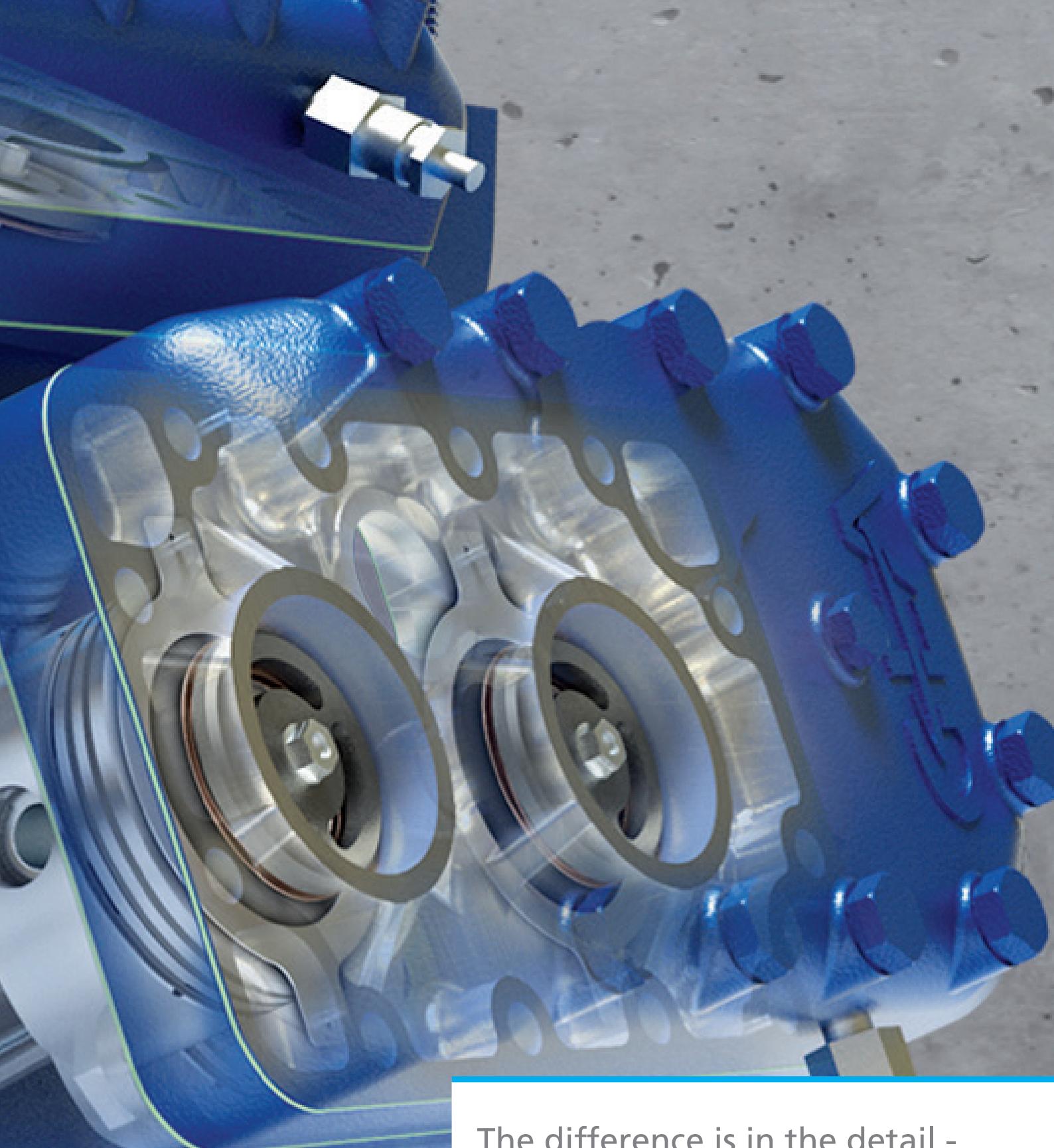
Virtually all drive capacity requirements can be met.

Very compact compressor design, robust and easy to handle. Oil pump lubrication as standard.



- F compressors
- F NH₃ compressors
- Compressor units for direct drive
- NH₃ compressor units for direct drive





The difference is in the detail -
Characteristics
GEA Bock open type compressors F

Special features

8

Open type 2-, 4-, 6- and 8-cylinder compressors

- Compact construction
- Robust and easy to handle
- Suitable for v-belt or coupling drive
- Large number of applications with a wide r.p.m. range
- Naturally with oil pump lubrication

Quiet with low vibrations

- Large-dimensioned crankshaft area
- Dynamic mass balance
- High volume pressure area to dampen pulsations

Universal

- e.g. R134a, R404A, R507, R407C, R22
- One compressor design for all conventional refrigerants, for air-conditioning applications, normal or deep-freezing. Maximum permissible operating pressure: 28 bar
- Compressor designs for NH₃
- Compressor designs for CO₂ on request

Reliable and safe oil supply



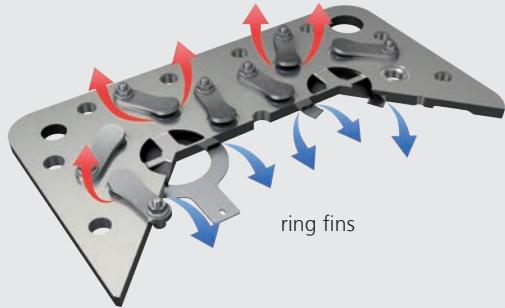
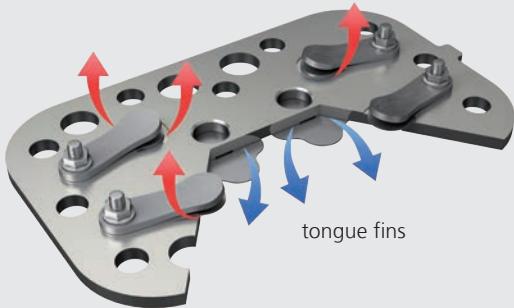
- Classic lubricating oil circuit with oil pump independent of rotating direction
- High-volume oil sump
- F14, F16 option of expanding the oil volume by 2.5 litres by raising the base plate (accessories)
- F14, F16, F18 with connection facility for oil pressure monitoring via Δp oil differential pressure sensor
- F14, F16 and F18 with practical oil service valve for clean oil changes without intervening in the refrigeration cycle (accessories).
- Maximum slant of 30° short-term possible in both axes (e.g. marine applications)

Low-wearing long-lived mechanism



- Solid construction and design
- Classic crankshaft construction with hardened surface
- Classic crankshaft construction with carbonated plasma-nitrite surface (F18)
- Low-friction, wear-resistant plain bearings
- Aluminium pistons with two-ring assembly, F14, F16, F18 three-ring assembly, compression ring chromehardened
- Aluminium con-rod in divided, screwed design, F14, F16, F18 with high-strength small end bearings

Valve plate construction for safe operation



- Universally proven valve design with intake and discharge finger reed valves clamped on one side (F14, F16 intake side formed as ring fins)
- Valves made out of high-quality, impact-resistant spring steel

mexxFlow valve system - F18



- Valve plate with highly efficient double ring fins
- Fins made out of high-quality, impact-resistant spring steel
- Flow optimized system of valve plate and cylinder head

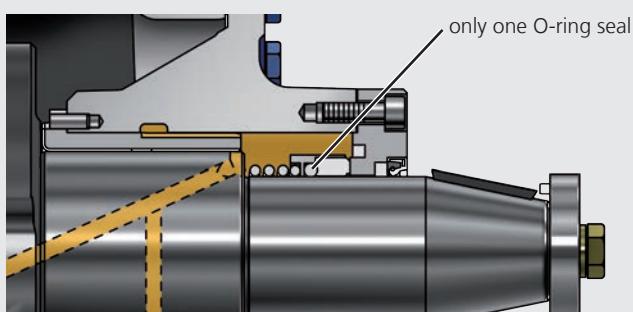
mexxFlow

mexxFlow by GEA – the new benchmark for efficiency

With mexxFlow GEA Bock presents in the F18 compressor its new generation of highly efficient and reliable valve systems for higher refrigerating capacity at a lower power consumption!

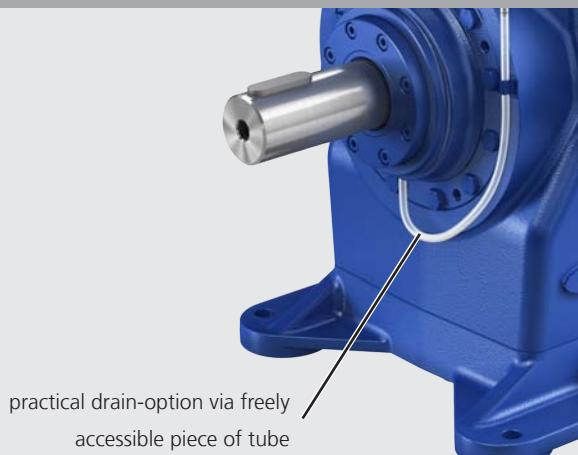
Further information is available on www.mexxFlow.com

Simply constructed floating ring seals

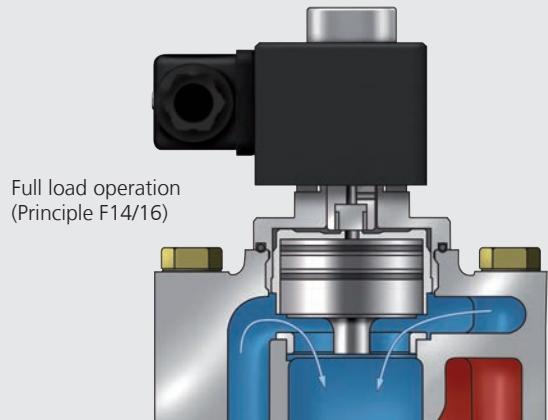
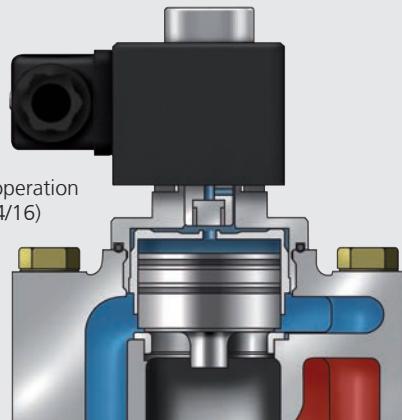


Example: assembly shaft seal F16

- Tried and tested construction for decades
- Only one o-ring seal, counter ring designed as the screw-on cover
- With oil washing for cooling and lubricating the whole unit
- Easy to change the shaft seal for maintenance purposes
- F14, F16 and F18 design with piece of tube for controlled oil drain option

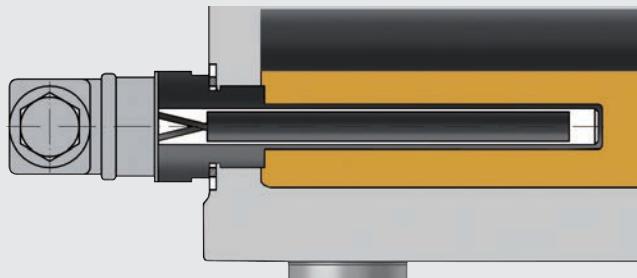


Economic performance regulation (accessories)

Full load operation
(Principle F14/16)Partial load operation
(Principle F14/16)

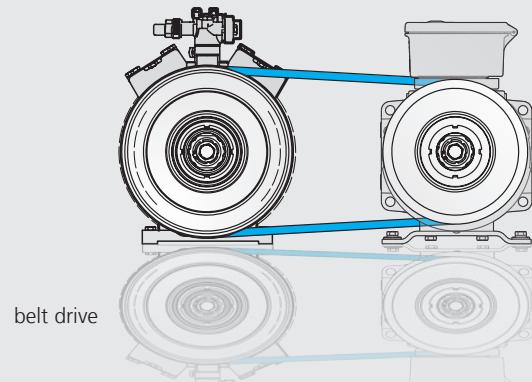
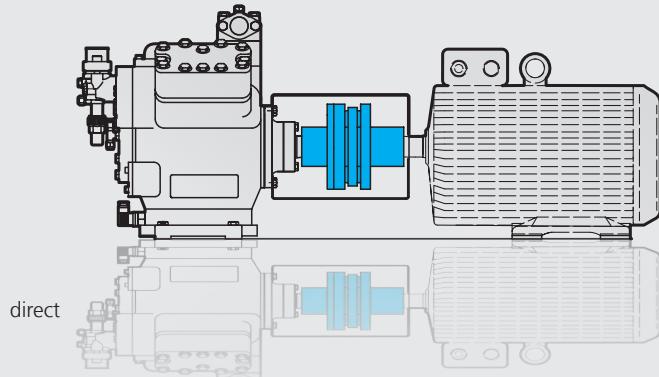
- Blocking of the intake of a cylinder bank with an electromagnetic pilot valve
- Possible regulating steps:
 - 4-cylinder compressor: 50 %
 - 6-cylinder compressor: 33 % / 66 %
 - 8-cylinder compressor: 25 % / 50 % / 75 %
- Continuously variable speed control (up to 60 Hz) via external frequency converter possible

Oil sump heater (accessories)



- Design with immersion sleeve
- Changes possible without intervening in the refrigeration cycle

Various drive options



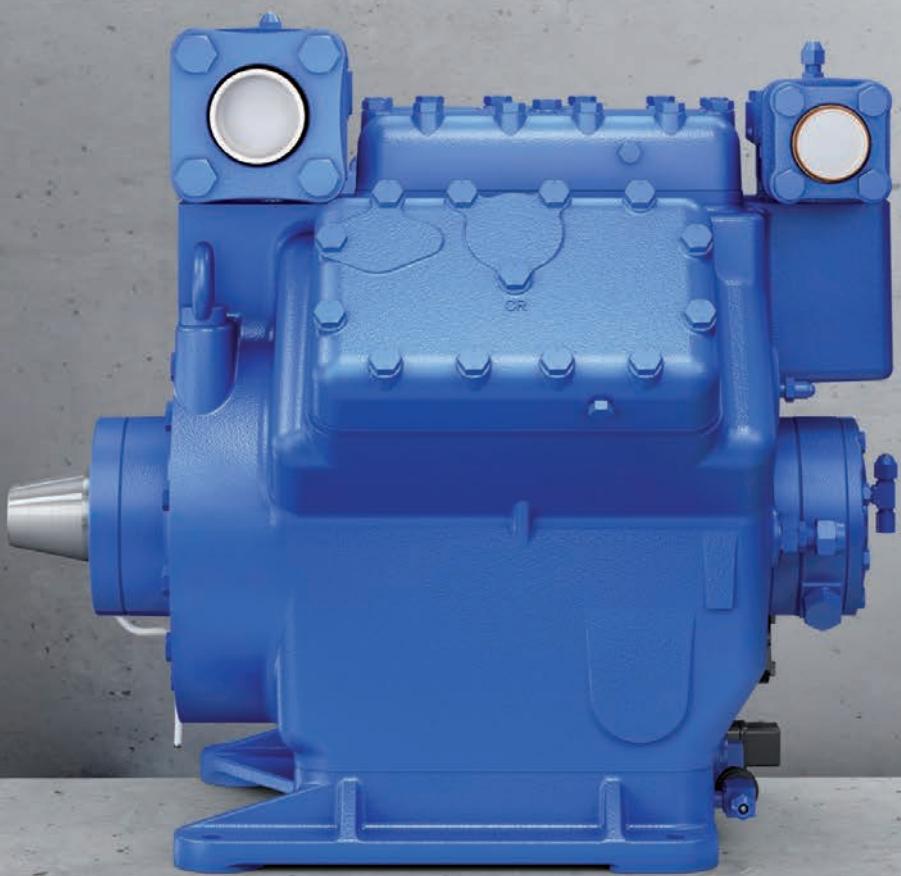
- Conical (F18 = cylindrical) shaft end for safe force transmission and exact installation of the drive elements
- Drive via v-belt or coupling, with all the conventional drive sources (electric motors, combustible motors, hydraulic motors, etc.)
- Coupling bell for quick and easy installation

1
2
3
4

Acceptance by classification societies (accessories)

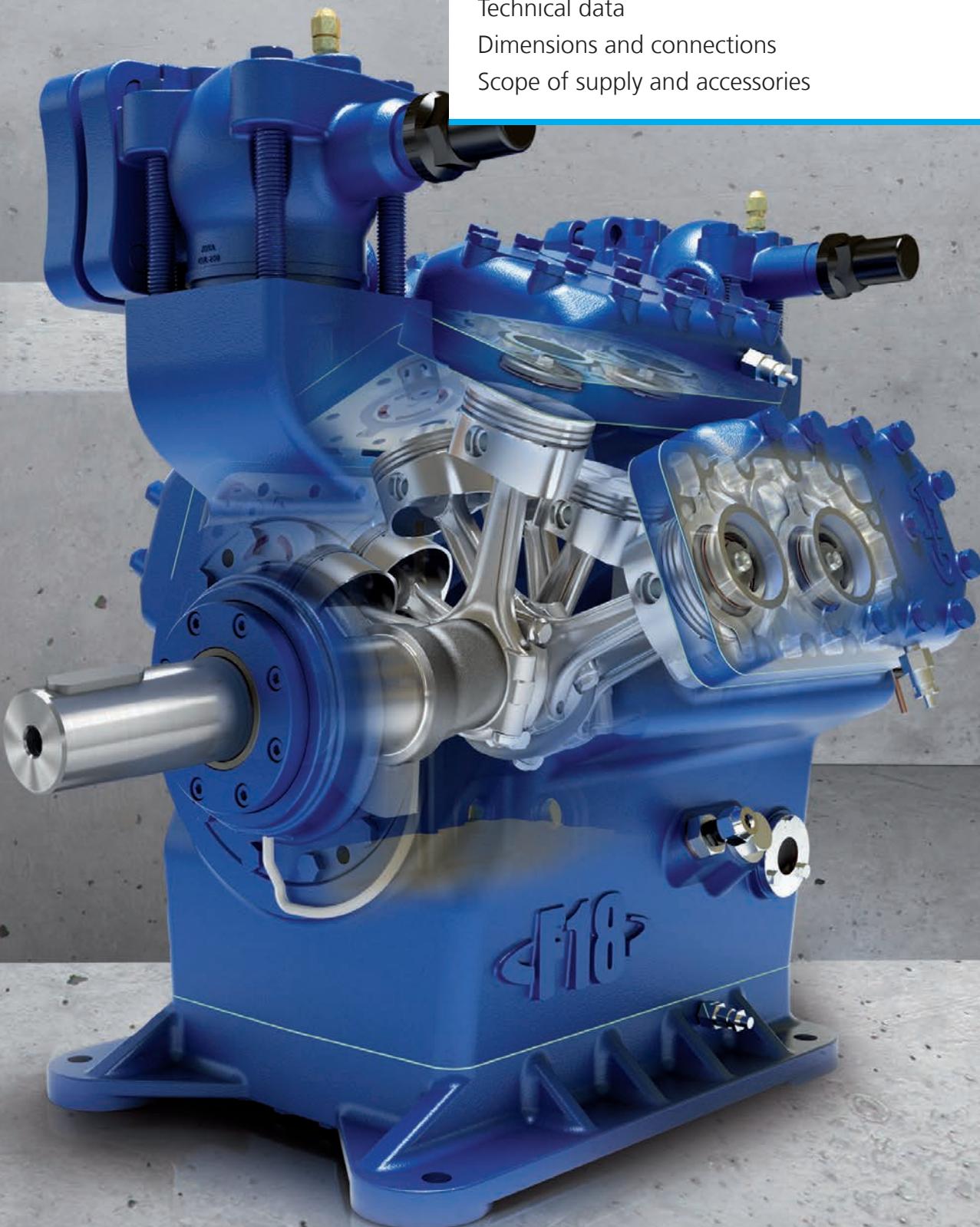


Further classification
societies on request.



F Compressors

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Scope of supply and accessories	34



The F model series provides modern open type compressors for separate drive systems using V belts or direct couplings. Load transfer through a V pair. Virtually all drive capacity requirements can be met.

The compressor design is very compact, robust and due to its open type construction it can be used reliably and without problems in almost all areas of refrigeration technology.

All our F compressors are equipped with oil pump lubrication.

Type key

F | X | 14 | / | 1166

Swept volume 2)

Size

Ester oil filling 1)

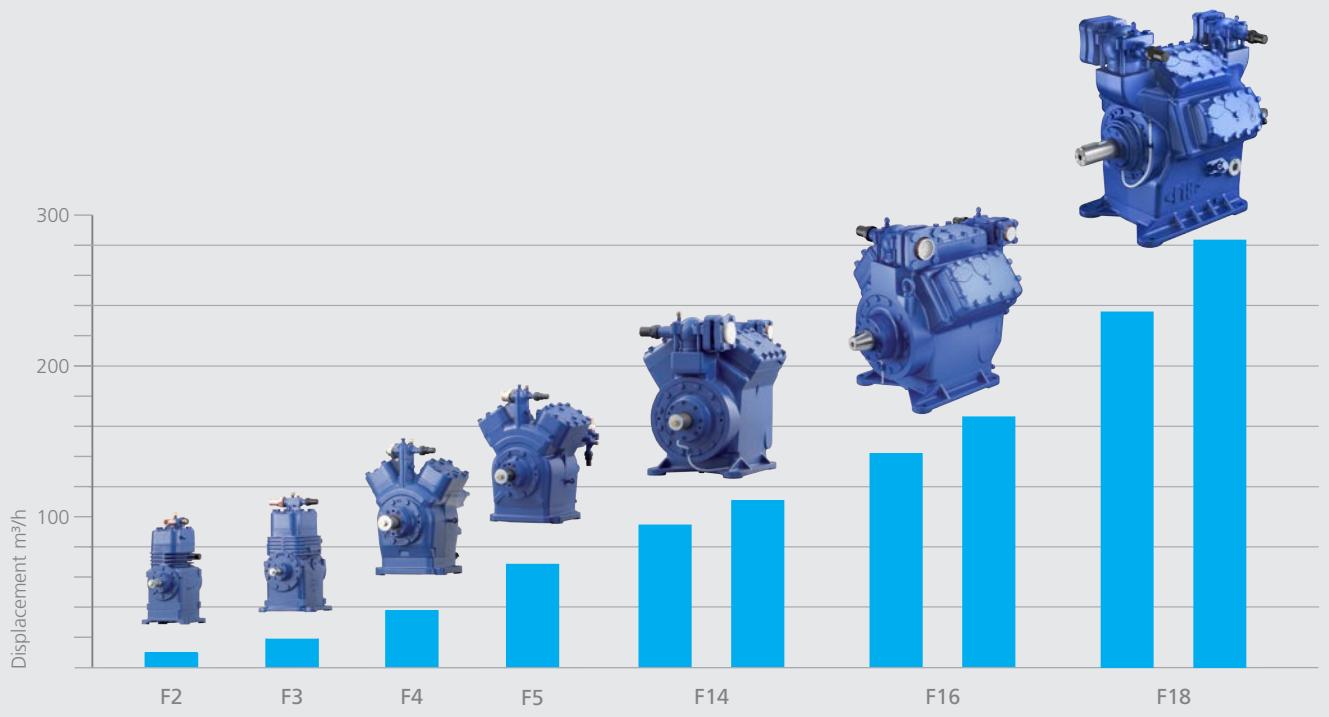
Series

1) X - Ester oil filling (HFC refrigerant, e.g. R134a, R407C)

2) Indication only at F14, F16, F18

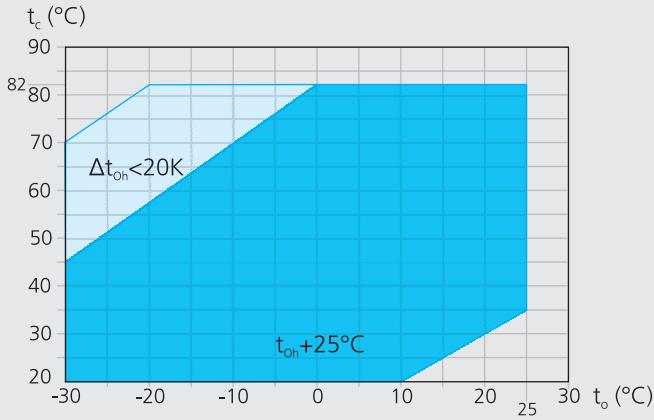
The current program

...7 model sizes with 10 capacity stages from 10.5 to 281 m³/h (1.450 rpm)



R134a Operating limits

FX2, FX3, FX4, FX5, FX14, FX16, FX18



Unlimited application range

Supplementary cooling or reduced suction gas temperature

 t_o Evaporating temperature (°C) t_c Condensing temperature (°C) t_{oh} Suction gas temperature (°C) Δt_{oh} Suction gas overheating (K)Maximum permissible operating pressure (LP/HP)¹⁾: 19/28 bar¹⁾ LP = low pressure HP = high pressure

1

2

3

4

R134a Notes

Operating limits

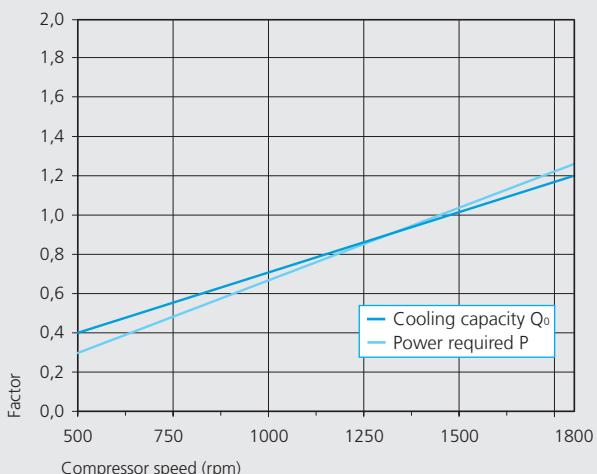
Compressor operation is possible within the examples in the diagram showing the limitations of use. The meaning of the surfaces marked in colour are to be observed. Limiting areas should not be selected for layout or continuous operating points.

Performance data

Performance specifications for the R134a are based on 25 °C suction gas temperatures without liquid subcooling. (Exception: FX18 = 20 °C suction gas temperature). Compressor speed 1450 rpm.

The values can be stated to judge the overall performance at other speed with the help of the calculation factors below.

For additional technical data for other operating points see GEA Bock software.



R134a		Performance data											1.450 rpm		
Type	Cond. temp. °C	Cooling capacity \dot{Q}_o [W]											Power consumption P [kW]		
		Evaporating temperature °C													
FX2	30	Q P	10018 0,92	9158 0,97	8354 1,01	6903 1,05	5648 1,04	4570 1,01	3653 0,95	2878 0,87	2228 0,78	1684 0,69	1229 0,60		
	40	Q P	8960 1,33	8176 1,34	7444 1,34	6126 1,32	4990 1,26	4017 1,18	3190 1,08	2490 0,97	1901 0,86	1404 0,76	981 0,66		
	50	Q P	7870 1,68	7163 1,66	6504 1,63	5323 1,55	4308 1,45	3442 1,33	2707 1,20	2085 1,07	1559 0,94	1111 0,83	723 0,74		
	60	Q P	6757 1,99	6128 1,94	5544 1,88	4500 1,75	3609 1,61	2852 1,45	2212 1,30	1671 1,15	1211 1,01	815 0,90	464 0,81		
	70	Q P	5629 2,24	5079 2,17	4570 2,08	3667 1,91	2902 1,73	2257 1,55	1715 1,37	1256 1,21	865 1,08	522 0,97	211 0,89		
	30	Q P	19421 1,79	17754 1,89	16195 1,96	13383 2,03	10949 2,02	8861 1,95	7083 1,84	5580 1,68	4319 1,51	3265 1,33	2383 1,16		
FX3	40	Q P	17370 2,57	15850 2,60	14431 2,60	11877 2,56	9674 2,45	7787 2,29	6183 2,10	4827 1,89	3685 1,68	2721 1,47	1902 1,29		
	50	Q P	15258 3,26	13887 3,22	12610 3,17	10319 3,01	8351 2,81	6672 2,58	5247 2,33	4042 2,07	3023 1,83	2154 1,61	1402 1,43		
	60	Q P	13100 3,86	11881 3,76	10748 3,65	8725 3,40	6997 3,12	5530 2,82	4289 2,52	3240 2,23	2348 1,97	1580 1,75	900 1,58		
	70	Q P	10912 4,35	9847 4,20	8861 4,04	7110 3,71	5627 3,36	4376 3,00	3324 2,67	2436 2,35	1677 2,09	1013 1,87	410 1,73		
FX4	30	Q P	38841 3,58	35508 3,77	32390 3,91	26765 4,05	21899 4,04	17722 3,91	14165 3,67	11160 3,37	8638 3,02	6530 2,66	4767 2,32		
	40	Q P	34740 5,15	31700 5,20	28861 5,20	23753 5,11	19347 4,89	15575 4,58	12367 4,20	9655 3,78	7369 3,35	5442 2,94	3804 2,58		
	50	Q P	30516 6,52	27774 6,45	25219 6,34	20638 6,03	16702 5,63	13344 5,16	10494 4,66	8084 4,15	6045 3,66	4308 3,22	2805 2,86		
	60	Q P	26201 7,71	23762 7,52	21496 7,30	17450 6,80	13994 6,23	11060 5,64	8578 5,04	6479 4,46	4696 3,94	3159 3,49	1800 3,16		
FX5	70	Q P	21825 8,70	19693 8,40	17721 8,08	14220 7,41	11254 6,71	8753 6,01	6648 5,33	4871 4,71	3353 4,17	2026 3,74	819 3,46		
	30	Q P	70611 6,51	64551 6,86	58883 7,11	48658 7,37	39811 7,35	32217 7,10	25751 6,67	20288 6,12	15703 5,49	11871 4,84	8666 4,21		
	40	Q P	63155 9,36	57629 9,45	52468 9,46	43182 9,29	35173 8,89	28315 8,32	22483 7,63	17552 6,87	13397 6,09	9894 5,35	6916 4,69		
	50	Q P	55477 11,86	50492 11,72	45848 11,52	37518 10,96	30364 10,23	24259 9,38	19078 8,47	14697 7,54	10990 6,65	7832 5,86	5099 5,20		
FX14/1166	60	Q P	47632 14,02	43198 13,67	39078 13,27	31723 12,36	25440 11,33	20106 10,25	15594 9,16	11779 8,11	8537 7,15	5743 6,35	3271 5,74		
	70	Q P	39677 15,81	35802 15,27	32216 14,70	25852 13,48	20459 12,20	15912 10,92	12086 9,69	8856 8,56	6096 7,58	3683 6,81	1490 6,29		
	30	Q P	97150 8,96	88813 9,43	81014 9,78	66946 10,14	54774 10,11	44326 9,77	35430 9,18	27914 8,42	21605 7,55	16333 6,65	11923 5,80		
	40	Q P	86892 12,87	79288 13,00	72188 13,02	59412 12,78	48392 12,24	38956 11,45	30932 10,50	24148 9,45	18432 8,38	13612 7,36	9515 6,45		
FX14/1366	50	Q P	76328 16,32	69469 16,13	63079 15,85	51620 15,08	41776 14,07	33376 12,90	26248 11,65	20220 10,37	15120 9,15	10776 8,06	7015 7,16		
	60	Q P	65534 19,29	59433 18,80	53766 18,26	43646 17,00	35002 15,59	27662 14,10	21454 12,60	16206 11,16	11746 9,84	7902 8,73	4501 7,90		
	70	Q P	54590 21,75	49258 21,01	4325 20,22	35568 18,54	28148 16,79	21892 15,03	16628 13,33	12184 11,78	8387 10,43	5067 9,37	2050 8,65		
	30	Q P	114013 10,52	104228 11,07	95076 11,48	78566 11,90	64282 11,87	52020 11,47	41580 10,77	32759 9,88	25356 8,86	19168 7,81	13993 6,80		
FX14/1366	40	Q P	101973 15,11	93049 15,25	84717 15,28	69724 15,00	56792 14,36	45718 13,44	36302 12,32	28340 11,09	21632 9,84	15975 8,63	11167 7,57		
	50	Q P	89575 19,15	81526 18,93	74027 18,60	60579 16,51	49027 15,14	39169 13,67	30804 12,17	23730 10,74	17745 10,46	12646 9,46	8233 8,40		
	60	Q P	76908 22,63	69749 22,07	63098 21,43	51221 19,95	41077 18,30	32463 16,55	25178 14,79	19019 13,09	13785 11,55	9273 10,25	5282 9,27		
	70	Q P	64065 25,52	57808 24,65	52019 23,73	41743 21,76	33034 19,70	25692 17,63	19514 15,65	14298 13,82	9843 12,24	5946 10,99	2405 10,15		

Based on 25 °C suction gas temperature
without liquid subcooling

Supplementary cooling or
reduced suction gas temp.

R134a		Performance data											1.450 rpm	
Type	Cond. temp. °C	Cooling capacity \dot{Q}_o [W]										Power consumption P [kW]		
		Evaporating temperature °C												
		15	12,5	10	5	0	-5	-10	-15	-20	-25			
FX16/1751	30 Q	145822	133308	121602	100486	82215	66533	53180	41898	32429	24515	17897		
	30 P	13,45	14,16	14,68	15,22	15,18	14,67	13,78	12,63	11,33	9,99	8,70		
	40 Q	130423	119010	108353	89177	72636	58473	46429	36247	27667	20431	14282		
	40 P	19,32	19,51	19,54	19,18	18,37	17,19	15,76	14,19	12,58	11,04	9,68		
	50 Q	114566	104272	94681	77480	62705	50097	39399	30351	22696	16175	10530		
	50 P	24,50	24,21	23,79	22,63	21,12	19,37	17,48	15,57	13,74	12,09	10,74		
FX16/2051	60 Q	98365	89208	80702	65512	52538	41521	32203	24326	17631	11861	6756		
	60 P	28,95	28,23	27,40	25,52	23,41	21,17	18,91	16,74	14,78	13,11	11,86		
	70 Q	81937	73935	66531	53388	42250	32860	24959	18288	12589	7605	3076		
	70 P	32,65	31,53	30,35	27,83	25,19	22,55	20,01	17,68	15,66	14,06	12,99		
	30 Q	170924	156256	142534	117783	96368	77986	62334	49110	38011	28735	20977		
	30 P	15,77	16,60	17,21	17,84	17,80	17,19	16,15	14,81	13,29	11,71	10,20		
FX16/2051	40 Q	152875	139497	127005	104528	85140	68539	54422	42486	32429	23948	16740		
	40 P	22,65	22,87	22,90	22,49	21,53	20,15	18,47	16,63	14,75	12,94	11,35		
	50 Q	134288	122222	110980	90818	73499	58721	46181	35575	26602	18959	12342		
	50 P	28,71	28,37	27,89	26,52	24,75	22,70	20,49	18,25	16,10	14,17	12,59		
	60 Q	115298	104565	94594	76789	61582	48668	37746	28513	20666	13902	7919		
	60 P	33,93	33,08	32,12	29,91	27,43	24,81	22,17	19,63	17,32	15,37	13,90		
FX16/2051	70 Q	96042	86662	77983	62578	49523	38517	29255	21436	14757	8914	3606		
	70 P	38,27	36,96	35,57	32,62	29,53	26,44	23,46	20,72	18,35	16,48	15,22		

Based on 25 °C suction gas temperature
without liquid subcooling

Supplementary cooling or
reduced suction gas temp.

R134a		Performance data											1.450 rpm	
Type	Cond. temp. °C	Cooling capacity \dot{Q}_o [W]										Power consumption P [kW]		
		Evaporating temperature °C												
		15	12,5	10	5	0	-5	-10	-15	-20	-25			
FX18/2735	30 Q	242000	222000	203000	169000	139000	112000	89500	70500	54500	41300	30600		
	30 P	19,90	20,90	21,70	22,50	22,50	21,80	20,60	18,90	16,90	14,70	12,60		
	40 Q	218000	200000	182000	151000	123000	99100	78700	61300	46700	34400	24300		
	40 P	29,20	29,50	29,60	29,10	27,90	26,10	23,80	21,30	18,60	15,90	13,30		
	50 Q	193000	176000	161000	132000	107000	85700	67400	51800	38600	27400	18000		
	50 P	37,50	37,10	36,40	34,70	32,30	29,60	26,50	23,20	19,90	16,80	13,80		
FX18/3235	60 Q	167000	152000	138000	113000	90800	72000	55900	42200	30500	20500	12000		
	60 P	44,70	43,60	42,40	39,40	36,10	32,40	28,60	24,70	20,90	17,30	14,20		
	70 Q	140000	127000	115000	93000	74300	58200	44400	32700	22600	14000	6290		
	70 P	50,90	49,20	47,40	43,40	39,10	34,70	30,20	25,70	21,60	17,70	14,40		
	30 Q	290000	265000	243000	201000	165000	134000	107000	84200	65100	49300	36500		
	30 P	23,70	25,00	25,90	26,90	26,90	26,10	24,60	22,60	20,20	17,60	15,00		
FX18/3235	40 Q	261000	238000	218000	180000	147000	119000	94000	73200	55700	41100	29000		
	40 P	34,90	35,30	35,30	34,70	33,30	31,10	28,50	25,50	22,30	19,00	15,90		
	50 Q	230000	210000	192000	158000	128000	103000	80500	61900	46100	32800	21500		
	50 P	44,80	44,30	43,50	41,40	38,60	35,30	31,60	27,80	23,80	20,00	16,50		
	60 Q	199000	182000	165000	135000	109000	86000	66800	50400	36400	24500	14300		
	60 P	53,40	52,10	50,60	47,10	43,10	38,70	34,10	29,50	25,00	20,70	16,90		
FX18/3235	70 Q	168000	152000	138000	112000	88700	69500	53000	39000	27000	16700	7520		
	70 P	60,80	58,80	56,60	51,90	46,80	41,40	36,00	30,80	25,80	21,20	17,20		

Based on 20 °C suction gas temperature
without liquid subcooling

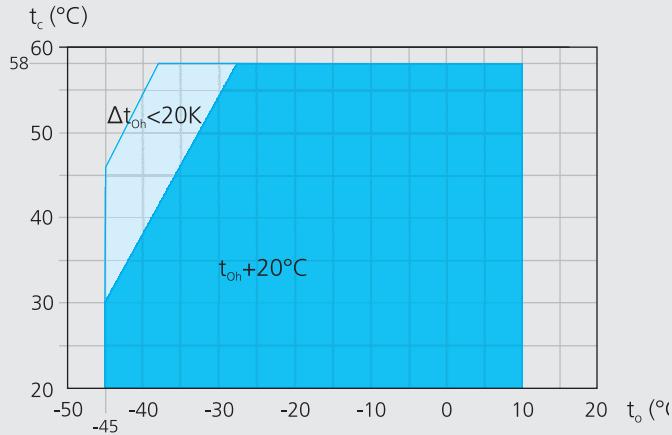
Supplementary cooling or
reduced suction gas temp.

The performance data for the FX18 is preliminary data!

1
2
3
4

R404A/R507 Operating limits

FX2, FX3, FX4, FX5, FX14, FX16, FX18



Unlimited application range

Supplementary cooling or reduced suction gas temperature

 t_o Evaporating temperature (°C) t_c Condensing temperature (°C) t_{oh} Suction gas temperature (°C) Δt_{oh} Suction gas overheating (K)Maximum permissible operating pressure (LP/HP)¹⁾: 19/28 bar¹⁾ LP = low pressure HP = high pressure

R404A/R507 Notes

Operating limits

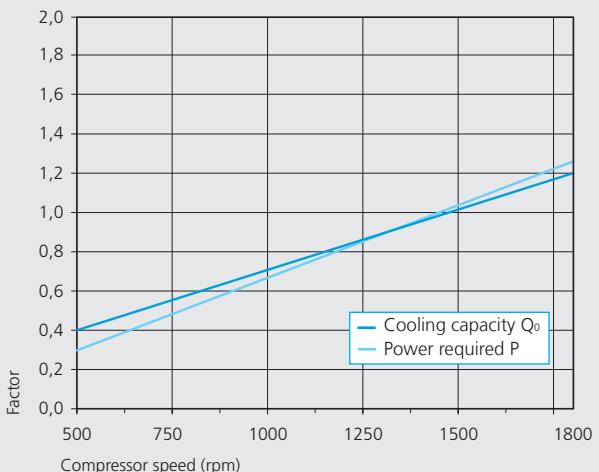
Compressor operation is possible within the examples in the diagram showing the limitations of use. The meaning of the surfaces marked in colour are to be observed. Limiting areas should not be selected for layout or continuous operating points.

Performance data

Performance specifications for R404A/R507 are based on 20°C suction gas temperatures without liquid subcooling. Compressor speed 1450 rpm.

The values can be stated to judge the overall performance at other speed with the help of the calculation factors below.

For additional technical data for other operating points see GEA Bock software.



R404A/R507			Performance data										1.450 rpm			
Type	Cond. temp.	°C	Cooling capacity \dot{Q}_o [W]								Power consumption P [kW]					
			Evaporating temperature °C													
FX2	30	Q	13423	11418	9621	8020	6606	5366	4290	3366	2584	1933	1402	979		
		P	2,21	2,19	2,13	2,05	1,94	1,80	1,65	1,48	1,31	1,12	0,94	0,75		
	40	Q	11561	9785	8201	6797	5562	4485	3555	2761	2092	1537	1085	724		
FX3	40	P	2,65	2,56	2,44	2,30	2,13	1,95	1,76	1,55	1,34	1,12	0,91	0,70		
		Q	9652	8113	6749	5548	4500	3593	2816	2159	1609	1157	791			
	50	P	3,03	2,88	2,71	2,51	2,30	2,07	1,83	1,59	1,34	1,10	0,86			
FX4	30	Q	28402	24165	20377	17011	14041	11442	9187	7251	5608	4231	3096	2175		
		P	3,92	3,97	3,94	3,83	3,66	3,44	3,17	2,88	2,56	2,23	1,90	1,57		
	40	Q	24498	20763	17437	14495	11911	9657	7710	6042	4628	3442	2458	1650		
FX5	50	P	5,90	5,62	5,28	4,89	4,47	4,02	3,56	3,08	2,61	2,15	1,72			
		Q	53909	45836	38585	32117	26393	21373	17019	13292	10151	7559	5476	3862		
	40	Q	8,34	8,30	8,09	7,73	7,25	6,68	6,04	5,36	4,66	3,96	3,29	2,69		
FX14/1166	40	P	10,09	9,75	9,27	8,67	7,98	7,21	6,41	5,59	4,78	4,00	3,27	2,63		
		Q	46772	39538	33069	27326	22270	17862	14063	10834	8135	5928	4173	2832		
	50	P	11,44	10,83	10,10	9,28	8,40	7,47	6,53	5,59	4,69	3,85	3,09			
FX14/1366	30	Q	95654	81844	69253	57854	47620	38522	30533	23624	17768	12938	9105	6242		
		P	12,98	13,48	13,55	13,24	12,62	11,75	10,69	9,49	8,22	6,94	5,70	4,57		
	40	Q	83330	70784	59401	49154	40014	31955	24949	18967	13981	9965	6890	4728		
FX16/1751	50	P	16,87	16,64	16,05	15,16	14,03	12,72	11,28	9,79	8,29	6,85	5,53	4,39		
		Q	70427	59251	49183	40194	32258	25345	19428	14480	10472	7377	5168			
	30	P	20,21	19,31	18,12	16,70	15,11	13,41	11,67	9,93	8,26	6,73	5,38			
FX16/1751	30	Q	131605	112604	95281	79598	65518	53000	42008	32503	24447	17801	12527	8587		
		P	17,86	18,55	18,64	18,22	17,37	16,17	14,71	13,06	11,32	9,55	7,85	6,29		
	40	Q	114650	97388	81727	67628	55054	43966	34326	26096	19237	13711	9480	6506		
FX16/1366	50	P	23,21	22,89	22,08	20,86	19,30	17,49	15,52	13,47	11,41	9,43	7,61	6,04		
		Q	96896	81521	67668	55301	44382	34871	26730	19922	14408	10150	7110			
	30	P	27,80	26,56	24,92	22,97	20,79	18,45	16,05	13,66	11,37	9,25	7,40			
FX16/2051	30	Q	154448	132149	111819	93414	76889	62199	49299	38144	28690	20890	14701	10078		
		P	20,96	21,77	21,87	21,38	20,38	18,98	17,26	15,33	13,28	11,21	9,21	7,38		
	40	Q	134550	114291	95912	79366	64609	51597	40284	30625	22575	16091	11125	7635		
FX16/2051	50	P	27,24	26,87	25,91	24,48	22,65	20,53	18,22	15,80	13,39	11,06	8,93	7,09		
		Q	113715	95670	79413	64900	52085	40923	31370	23380	16909	11912	8344			
	30	P	32,63	31,17	29,25	26,96	24,40	21,66	18,84	16,03	13,34	10,86	8,68			
FX18/2735	30	Q	197537	169017	143016	119476	98341	79552	63053	48786	36694	26719	18803	12890		
		P	26,81	27,84	27,98	27,34	26,07	24,27	22,08	19,61	16,98	14,33	11,78	9,44		
	40	Q	172088	146178	122670	101508	82635	65992	51523	39169	28874	20580	14229	9765		
FX18/3235	50	P	34,84	34,36	33,14	31,30	28,97	26,26	23,30	20,21	17,12	14,15	11,42	9,06		
		Q	145440	122361	101569	83006	66616	52340	40122	29903	21627	15236	10672			
	30	P	41,73	39,87	37,41	34,48	31,20	27,70	24,09	20,50	17,06	13,89	11,11			
FX18/2735	40	Q	231541	198112	167635	140043	115270	93247	73908	57185	43011	31318	22040	15108		
		P	31,42	32,63	32,79	32,05	30,56	28,45	25,88	22,98	19,91	16,80	13,81	11,07		
	50	Q	201712	171341	143787	118983	96860	77352	60392	45912	33845	24123	16679	11446		
FX18/3235	50	P	40,83	40,28	38,85	36,69	33,96	30,78	27,31	23,69	20,07	16,59	13,39	10,62		
		Q	170476	143424	119053	97295	78083	61350	47028	35051	25350	17858	12509			
	30	P	48,92	46,73	43,85	40,42	36,57	32,47	28,24	24,03	20,00	16,28	13,02			
FX18/2735	30	Q	337000	285000	239000	199000	163000	133000	107000	83800	65100	49700	37200	27200		
		P	44,70	45,30	44,70	43,10	40,70	37,70	34,30	30,60	26,80	23,20	20,00	17,20		
	40	Q	292000	246000	206000	170000	139000	113000	89800	70600	54500	41300	30400	21500		
FX18/3235	50	P	57,10	55,50	53,10	49,80	46,00	41,80	37,40	33,00	28,80	25,00	21,70	19,10		
		Q	246000	206000	172000	141000	115000	92200	73300	57300	44000	33000	24000			
	30	P	67,40	64,00	59,90	55,30	50,30	45,20	40,10	35,30	30,80	27,00	24,00			
FX18/3235	40	Q	402000	340000	286000	237000	195000	159000	127000	101000	77800	59400	44400	32500		
		P	53,40	54,10	53,40	51,50	48,70	45,10	40,90	36,50	32,10	27,80	23,90	20,60		
	50	Q	349000	294000	246000	203000	166000	135000	108000	84300	65100	49300	36300	25700		
	30	P	68,20	66,40	63,40	59,50	55,00	50,00	44,70	39,50	34,40	29,80	25,90	22,90		
	40	Q	294000	246000	205000	169000	137000	111000	87500	68500	52600	39400	28600			
	50	P	80,50	76,50	71,60	66,00	60,10	54,00	47,90	42,10	36,90	32,30	28,70			

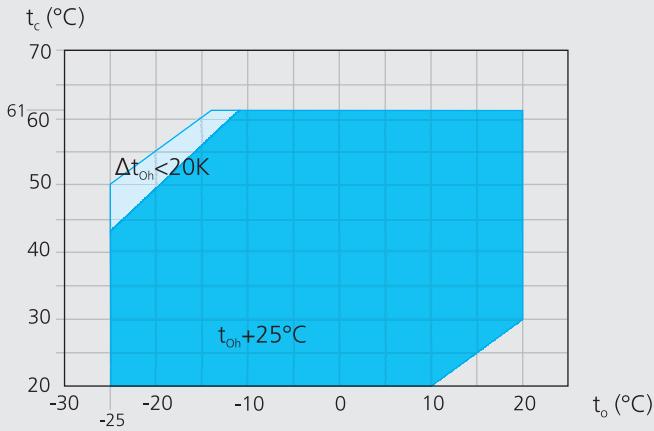
Based on 20 °C suction gas temperature
without liquid subcooling

 Supplementary cooling or
reduced suction gas temp.

The performance data for the FX18 is preliminary data!

R407C Operating limits

FX2, FX3, FX4, FX5, FX14, FX16, FX18



Unlimited application range

Supplementary cooling or reduced suction gas temperature

t_o Evaporating temperature (°C)

t_c Condensing temperature (°C)

t_{oh} Suction gas temperature (°C)

Δt_{oh} Suction gas overheating (K)

Maximum permissible operating pressure (LP/HP)¹⁾: 19/28 bar

¹⁾ LP = low pressure HP = high pressure

R407C Notes

Operating limits

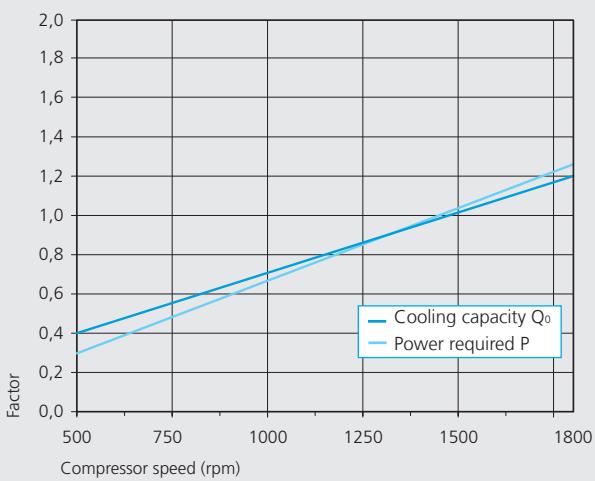
Compressor operation is possible within the examples in the diagram showing the limitations of use. The meaning of the surfaces marked in colour are to be observed. Limiting areas should not be selected for layout or continuous operating points.

Performance data

Performance specifications for R407C are based on 25°C suction gas temperatures without liquid subcooling. (Exception: FX18 = 20 °C suction gas temperature). Compressor speed 1450 rpm.

The values can be stated to judge the overall performance at other speed with the help of the calculation factors below.

For additional technical data for other operating points see GEA Bock software.



R407C		Performance data										1.450 rpm	
Type	Cond. temp.	Cooling capacity \dot{Q}_o [W]										Power consumption P [kW]	
		Evaporating temperature °C											
	°C	15	12,5	10	5	0	-5	-10	-15	-20	-25		
FX2	30	Q P	14121 1,39	12935 1,47	11824 1,54	9817 1,60	8075 1,61	6576 1,56	5296 1,47	4209 1,36	3292 1,23	2522 1,10	
	40	Q P	12635 2,06	11555 2,09	10545 2,09	8724 2,06	7149 1,97	5796 1,85	4640 1,71	3657 1,55	2824 1,38	2117 1,24	
	50	Q P	11089 2,69	10118 2,85	9213 2,97	7586 3,10	6184 3,11	4984 3,01	3960 2,85	3089 2,63	2346 2,38	1709 2,13	
FX3	30	Q P	27301 2,69	25007 2,85	22860 2,97	18980 3,10	15614 3,11	12716 3,01	10240 2,85	8138 2,63	6366 2,38	4875 2,13	
	40	Q P	24426 3,99	22338 4,03	20386 4,05	16867 3,98	13823 3,82	11206 3,58	8971 3,30	7071 2,99	5460 2,68	4092 2,39	
	50	Q P	21437 5,12	19561 5,06	17812 4,97	14667 4,74	11957 4,43	9636 4,07	7656 3,70	5971 3,32	4536 2,97	3304 2,67	
FX4	30	Q P	54466 5,37	49891 5,69	45607 5,92	37866 6,18	31151 6,20	25369 6,01	20429 5,68	16236 5,24	12699 4,75	9726 4,24	
	40	Q P	48732 7,96	44566 8,05	40672 8,07	33651 7,94	27577 7,61	22356 7,15	17897 6,58	14107 5,96	10893 5,34	8163 4,76	
	50	Q P	42767 10,21	39025 10,09	35535 9,92	29262 9,45	23855 8,83	19224 8,13	15274 7,38	11913 6,63	9050 5,93	6591 5,32	
FX5	30	Q P	99116 9,77	90790 10,35	82994 10,78	68907 11,25	56687 11,27	46165 10,94	37174 10,33	29545 9,53	23110 8,64	17699 7,73	
	40	Q P	88680 14,48	81100 14,64	74013 14,68	61236 14,44	50182 13,85	40682 13,00	32568 11,97	25671 10,85	19823 9,72	14856 8,67	
	50	Q P	77827 18,57	71017 18,36	64665 18,05	53248 17,19	43410 16,08	34982 14,79	27794 13,42	21679 12,06	16469 10,78	11995 9,68	
FX14/1166	30	Q P	136367 13,45	124912 14,24	114186 14,83	94805 15,47	77993 15,51	63517 15,05	51147 14,21	40650 13,12	31796 11,88	24352 10,63	
	40	Q P	122008 19,92	111579 20,14	101830 20,20	84252 19,87	69043 19,06	55973 17,89	44809 16,47	35320 14,93	27274 13,37	20439 11,93	
	50	Q P	107077 25,55	97708 25,26	88968 24,84	73262 23,65	59727 22,12	48130 20,35	38241 18,47	29828 16,59	22659 14,84	16503 13,32	
FX14/1366	30	Q P	160037 15,78	146594 16,71	134006 17,40	111261 18,16	91531 18,20	74543 17,66	60025 16,68	47706 15,39	37314 13,95	28578 12,47	
	40	Q P	143185 23,38	130946 23,64	119504 23,70	98876 23,32	81028 22,37	65689 20,99	52587 19,33	41450 17,52	32007 15,69	23987 14,00	
	50	Q P	125661 29,99	114666 29,64	104410 29,15	85978 27,76	70093 25,96	56484 23,88	44878 21,68	35005 19,47	26592 17,41	19367 15,63	
FX16/1751	30	Q P	204684 20,19	187491 21,37	171392 22,25	142302 23,22	117067 23,28	95339 22,58	76771 21,33	61015 19,69	47725 17,84	36551 15,95	
	40	Q P	183133 29,91	167479 30,23	152845 30,32	126461 29,82	103634 28,61	84015 26,85	67258 24,72	53015 22,40	40937 20,07	30679 17,90	
	50	Q P	160720 38,35	146658 37,92	133540 37,28	109966 35,50	89649 33,20	72243 30,55	57399 27,72	44771 24,90	34010 22,27	24770 19,99	
FX16/2051	30	Q P	239918 23,66	219766 25,05	200895 26,08	166798 27,22	137219 27,28	111751 26,47	89987 25,00	71519 23,08	55940 20,91	42843 18,70	
	40	Q P	214657 35,05	196309 35,44	179156 35,53	148231 34,96	121474 33,53	98478 31,47	78836 28,98	62141 26,26	47985 23,53	35960 20,99	
	50	Q P	188386 44,95	171903 44,44	156528 43,70	128895 41,62	105081 38,92	84679 35,81	67280 32,50	52478 32,50	39865 29,19	29034 26,10	23,43

Based on 25 °C suction gas temperature
without liquid subcooling

Supplementary cooling or
reduced suction gas temp.

R407C		Performance data										1.450 rpm	
Type	Cond. temp.	Cooling capacity \dot{Q}_o [W]										Power consumption P [kW]	
		Evaporating temperature °C											
	°C	15	12,5	10	5	0	-5	-10	-15	-20	-25		
FX18/2735	30	Q P	369000 34,00	338000 35,70	309000 36,90	256000 37,90	210000 37,50	170000 35,80	137000 33,20	108000 30,10	84400 26,70	64800 23,50	
	40	Q P	330000 48,80	301000 49,00	274000 48,80	226000 47,40	185000 44,80	150000 41,40	120000 37,40	93800 33,30	72700 29,20	55100 25,70	
	50	Q P	289000 60,80	263000 59,80	239000 58,40	197000 54,90	160000 50,60	129000 45,80	102000 40,90	79800 36,10	61300 31,80	45900 28,30	
FX18/3235	30	Q P	441000 40,70	403000 42,70	368000 44,10	305000 45,30	250000 44,80	203000 42,70	163000 39,70	129000 36,00	101000 32,00	77400 28,10	
	40	Q P	394000 58,30	360000 58,50	328000 58,30	270000 56,60	221000 53,50	179000 49,40	143000 44,70	113000 39,70	86800 34,90	65800 30,70	
	50	Q P	345000 72,70	314000 71,40	286000 69,80	235000 65,60	191000 60,50	154000 54,80	122000 48,80	95300 43,10	73200 38,00	54800 33,80	

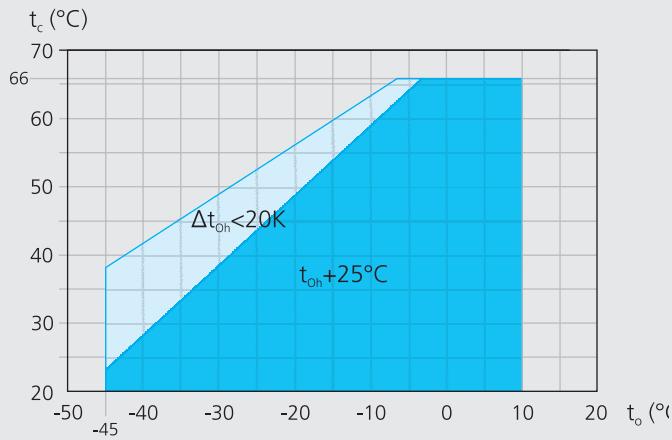
Bezogen auf 20 °C Sauggastemperatur
ohne Flüssigkeitsunterkühlung

Supplementary cooling or
reduced suction gas temp.

The performance data for the FX18 is preliminary data!

R22 Operating limits

F2, F3, F4, F5, F14, F16, F18



- Unlimited application range
- Supplementary cooling or reduced suction gas temperature

t_o Evaporating temperature ($^\circ\text{C}$)
 t_c Condensing temperature ($^\circ\text{C}$)
 t_{oh} Suction gas temperature ($^\circ\text{C}$)
 Δt_{oh} Suction gas overheating (K)

Maximum permissible operating pressure (LP/HP)¹⁾: 19/28 bar

¹⁾ LP = low pressure HP = high pressure

R22 Notes

Operating limits

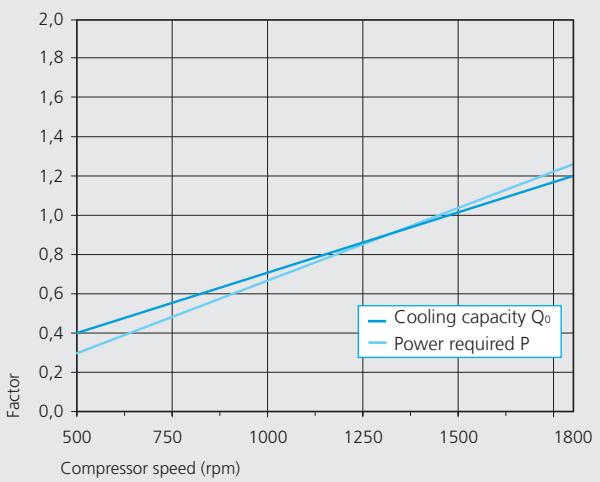
Compressor operation is possible within the examples in the diagram showing the limitations of use. The meaning of the surfaces marked in colour are to be observed. Limiting areas should not be selected for layout or continuous operating points.

Performance data

Performance specifications for R22 are based on 25°C suction gas temperatures without liquid subcooling. (Exception: F18 = 20 °C suction gas temperature). Compressor speed 1450 rpm.

The values can be stated to judge the overall performance at other speed with the help of the calculation factors below.

For additional technical data for other operating points see GEA Bock software.



R22		Performance data										1.450 rpm		
Type	Cond. temp.	Cooling capacity \dot{Q}_o [W]						Power consumption P [kW]						
		°C		10	5	0	-5	-10	-15	-20	-25	-30	-35	-40
F2	30	Q P	12420 1,48	10492 1,59	8792 1,63	7303 1,63	6007 1,59	4889 1,51	3932 1,42	3118 1,31	2431 1,20	1854 1,09	1370 1,00	
	40	Q P	11359 2,04	9565 2,07	7987 2,04	6610 1,98	5415 1,88	4386 1,76	3507 1,63	2760 1,49	2129 1,36	1597 1,24	1147 1,15	
	50	Q P	10263 2,57	8608 2,52	7157 2,43	5895 2,30	4805 2,15	3871 1,99	3074 1,83	2398 1,67				
F3	30	Q P	24080 2,87	20342 3,08	17046 3,16	14158 3,08	11646 2,93	9479 2,75	7622 2,54	6044 2,33	4712 2,12	3593 1,94	2656 1,94	
	40	Q P	22022 3,96	18543 4,01	15485 3,96	12814 3,83	10497 3,64	8503 3,41	6798 3,16	5350 2,89	4127 2,64	3095 2,41	2223 2,23	
	50	Q P	19897 4,99	16687 4,89	13875 4,71	11429 4,46	9316 4,18	7503 3,86	5959 3,54	4649 3,23				
F4	30	Q P	48161 5,75	40685 6,15	34091 6,33	28316 6,32	23293 6,15	18957 5,87	15244 5,50	12088 5,08	9424 4,65	7187 4,24	5312 3,88	
	40	Q P	44044 7,92	37087 8,01	30970 7,92	25627 7,66	20994 7,29	17005 6,82	13596 6,31	10700 5,78	8253 5,28	6191 4,82	4446 4,46	
	50	Q P	39795 9,98	33374 9,77	27750 9,41	22858 8,93	18632 8,35	15006 7,73	11917 7,08	9299 6,46				
F5	30	Q P	87555 10,45	73963 11,18	61977 11,51	51477 11,49	42345 11,19	34463 10,67	27712 10,00	21975 9,24	17132 8,46	13065 7,71	9656 7,06	
	40	Q P	80069 14,40	67422 14,57	56302 14,39	46589 13,93	38166 13,25	30915 12,41	24716 11,48	19452 10,52	15004 9,59	11254 8,76	8084 8,10	
	50	Q P	72345 18,14	60673 17,77	50449 17,11	41554 16,23	33871 15,18	27281 14,05	21665 12,88	16905 11,74				
F14/1166	30	Q P	120460 14,38	101761 15,39	85270 15,83	70824 15,80	58260 15,39	47416 14,68	38128 13,76	30234 12,71	23571 11,63	17976 10,61	13286 9,72	
	40	Q P	110163 19,82	92762 20,05	77462 19,80	64100 19,16	52511 18,22	42534 17,07	34006 15,79	26763 14,47	20644 13,20	15484 12,06	11121 11,14	
	50	Q P	99536 24,96	83477 24,45	69410 23,54	57173 22,32	46602 20,89	37535 19,33	29808 17,72	23259 16,15				
F14/1366	30	Q P	141369 16,88	119424 18,06	100070 18,58	83117 18,55	68372 18,06	55646 17,23	44746 16,15	35482 14,92	27662 13,65	21096 12,45	15592 11,40	
	40	Q P	129284 23,26	108863 23,53	90907 23,24	75225 22,49	61625 21,39	49917 20,03	39908 18,53	31409 16,98	24227 15,49	18172 14,15	13052 13,08	
	50	Q P	116813 29,29	97966 28,69	81458 27,62	67096 26,20	54690 24,52	44049 22,68	34982 20,79	27295 18,96				
F16/1751	30	Q P	180811 21,58	152743 23,09	127990 23,76	106306 23,72	87448 23,10	71171 22,03	57230 20,65	45381 19,08	35380 17,46	26982 15,92	19942 14,59	
	40	Q P	165353 29,74	139235 30,09	116270 29,72	96212 28,76	78818 27,35	63843 25,62	51042 23,70	40171 21,72	30986 19,81	23241 18,10	16693 16,73	
	50	Q P	149402 37,46	125297 36,69	104183 35,33	85815 33,51	69948 31,36	56338 29,01	44741 26,60	34911 24,25				
F16/2051	30	Q P	211935 25,30	179036 27,07	150022 27,85	124606 27,80	102501 27,08	83422 25,83	67081 24,21	53193 22,37	41470 20,47	31626 18,66	23375 17,10	
	40	Q P	193817 34,86	163203 35,27	136285 34,83	112775 33,71	92386 32,06	74833 30,03	59829 27,78	47086 25,45	36320 23,22	27242 21,21	19567 19,61	
	50	Q P	175120 43,91	146867 43,01	122118 41,41	100588 39,28	81990 36,76	66037 34,00	52443 31,17	40921 28,42				

Based on 25 °C suction gas temperature
without liquid subcooling

Supplementary cooling or
reduced suction gas temp.

R22		Performance data										1.450 rpm		
Type	Cond. temp.	Cooling capacity \dot{Q}_o [W]						Power consumption P [kW]						
		°C		10	5	0	-5	-10	-15	-20	-25	-30	-35	-40
F18/2735	30	Q P	304000 33,90	256000 35,90	215000 36,60	178000 36,20	146000 34,90	119000 32,80	94900 30,20	74800 27,10	57900 23,80	43700 20,50	31600 17,40	
	40	Q P	278000 46,90	234000 46,80	195000 45,60	161000 43,50	132000 40,70	106000 37,40	84300 33,60	65900 29,70	50200 25,80	36900 22,10	25500 18,70	
	50	Q P	250000 58,30	210000 56,30	174000 53,40	143000 49,80	117000 45,70	93200 41,30	73600 36,70	56800 32,10				
F18/3235	30	Q P	363000 40,50	306000 42,90	256000 43,80	213000 43,30	175000 41,70	142000 39,20	114000 36,00	89400 32,40	69200 28,50	52200 24,50	37800 20,70	
	40	Q P	331000 56,00	279000 55,90	233000 54,50	192000 52,00	157000 48,70	127000 44,60	101000 40,20	78700 35,50	60000 30,90	44100 26,40	30500 22,40	
	50	Q P	299000 69,60	251000 67,20	208000 63,80	171000 59,50	139000 54,60	112000 49,30	87900 43,80	67800 38,40				

Based on 20 °C suction gas temperature
without liquid subcooling

Supplementary cooling or
reduced suction gas temp.

The performance data for the F18 is preliminary data!

F Type	Number of cylinders	Displacement (1.450/1.740 rpm)	Weight ②	Connections ①		Oil charge	Speed range
				Discharge line DV	Suction line SV		
		m³/h	kg	mm inch	mm inch	Ltr.	rpm
F2	2	10,5 / 12,6	18	16 1 5/8	16 1 5/8	0,8	960 - 1800
F3	2	20,3 / 24,3	28	22 1 7/8	28 1 1 1/8	1,5	960 - 1800
F4	4	40,5 / 48,6	51	28 1 1 1/8	35 1 1 3/8	2,6	500 - 1800
F5	4	73,7 / 88,4	85	35 1 1 3/8	2 x 35 1 2 x 1 3/8	3,8	500 - 1800
F14/1166	4	101,4 / 121,7	149	42 1 1 5/8	54 1 2 1/8	3,8	700 - 1800
F14/1366	4	119,0 / 142,8	149	42 1 1 5/8	54 1 2 1/8	3,8	700 - 1800
F16/1751	6	152,2 / 182,6	175	42 1 1 5/8	54 1 2 1/8	5,0	700 - 1800
F16/2051	6	178,4 / 214,1	175	42 1 1 5/8	54 1 2 1/8	5,0	700 - 1800
F18/2735	8	238,0 / 285,5	292	54 1 2 1/8	76 1 3 1/8	10,0	500 - 1800
F18/3235	8	281,3 / 337,6	286	54 1 2 1/8	76 1 3 1/8	10,0	500 - 1800

① for soldering connections

② version with accessories

Oil sump heater: 230 V – 1 – 50/60 Hz

F2: 40 W (accessories)

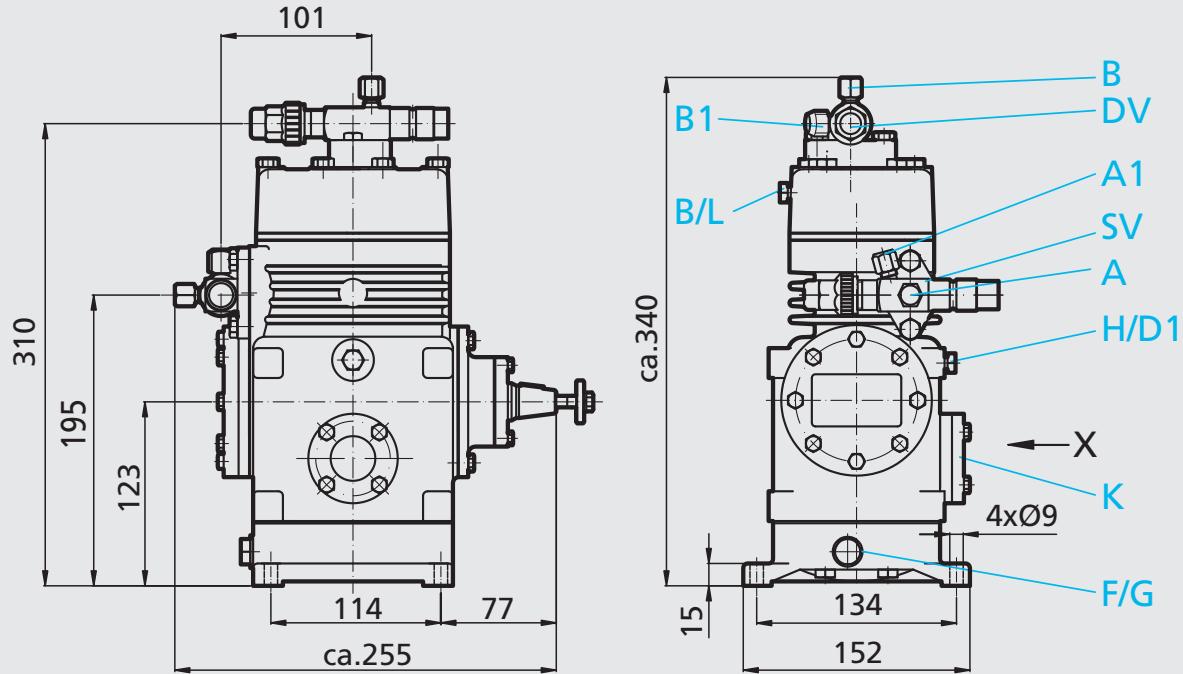
F3: 60 W (accessories)

F4, F5: 80 W (accessories)

F14, F16: 140 W (accessories)

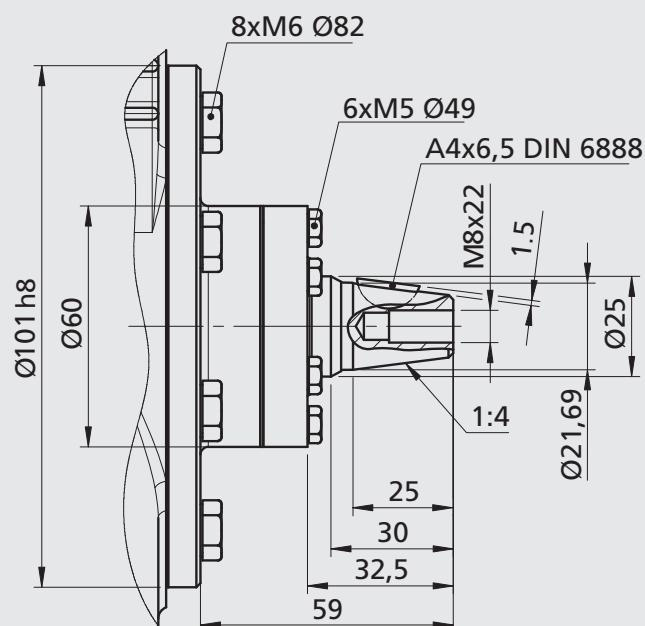
F18: 200 W (accessories)

F2



1
2
3
4

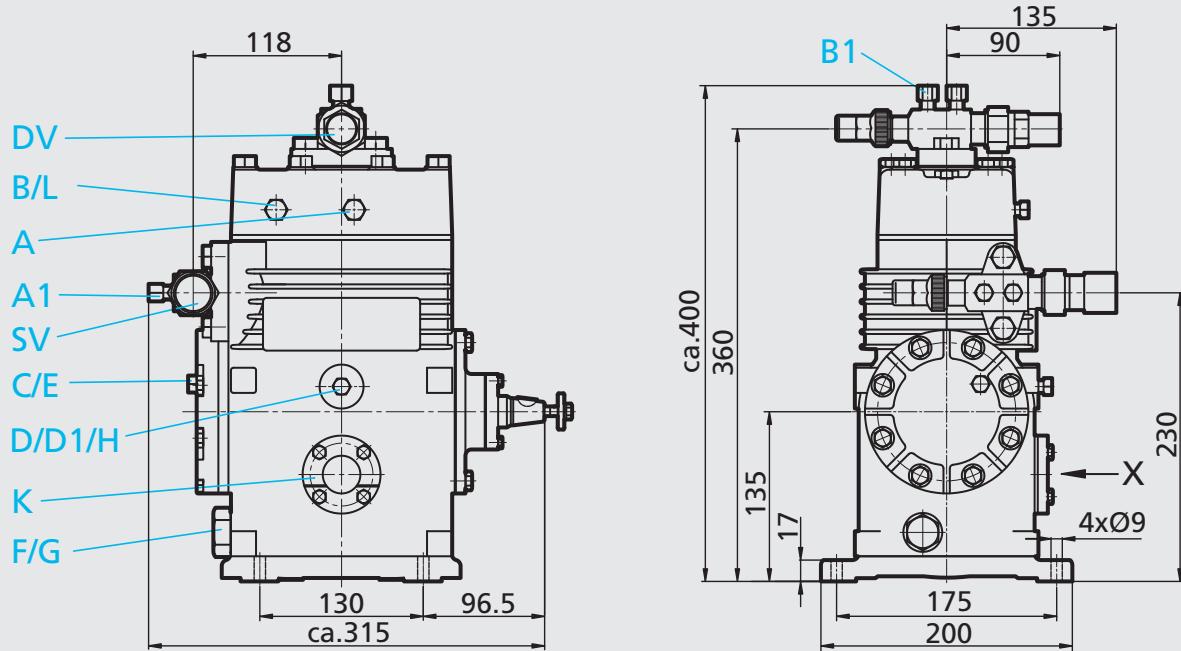
Shaft end



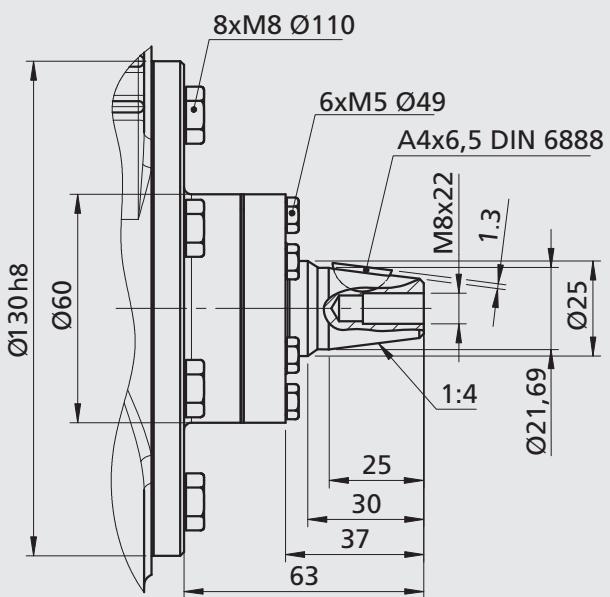
Dimensions in mm

- Connections see page 33
- Dimensions for view X see page 32

F3



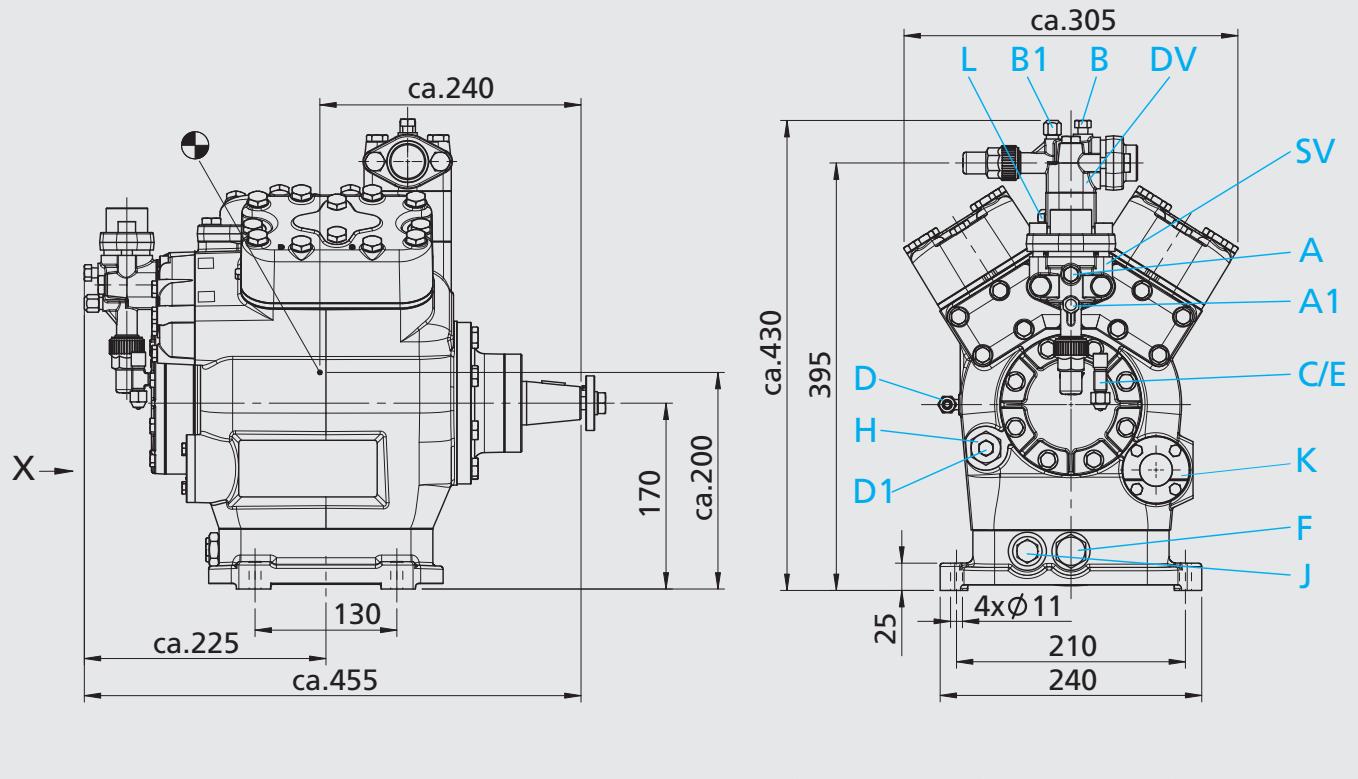
Shaft end



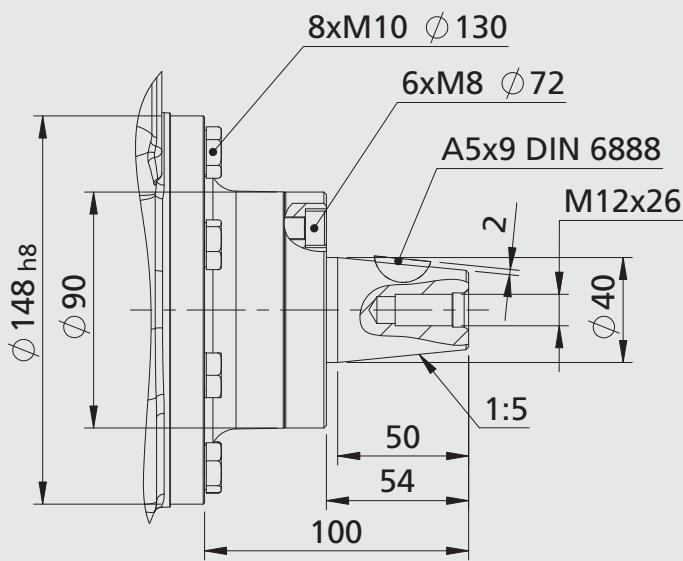
Dimensions in mm

- Connections see page 33
- Dimensions for view X see page 32

F4

1
2
3
4

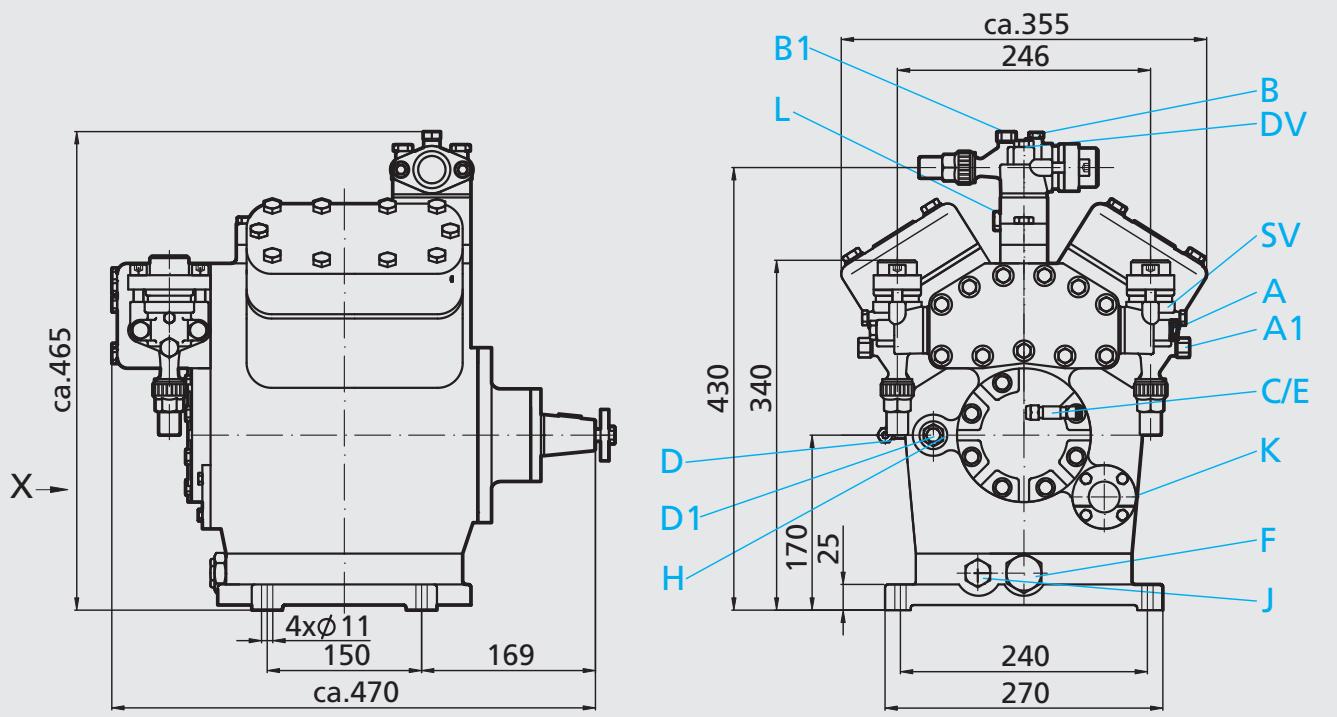
Shaft end



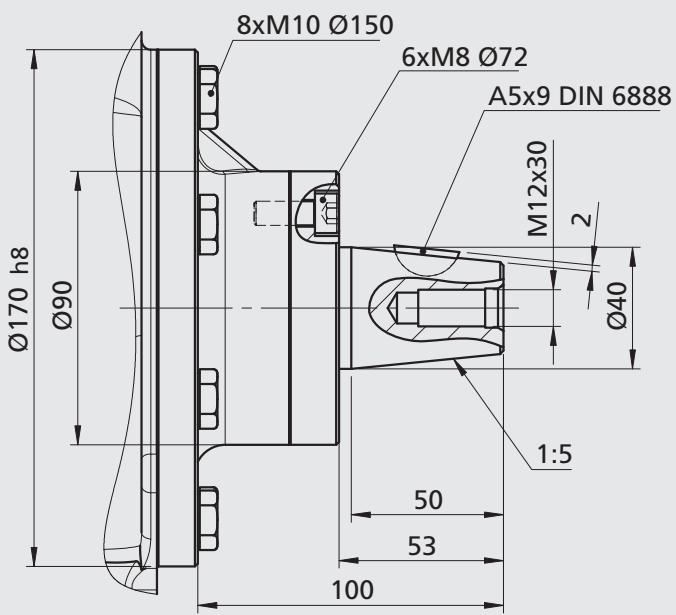
Dimensions in mm
Centre of gravity

- Connections see page 33
- Dimensions for view X see page 32

F5



Shaft end



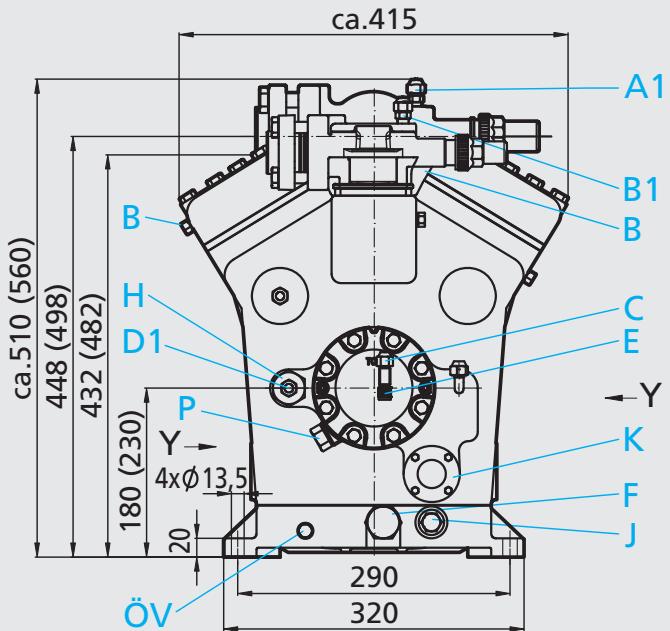
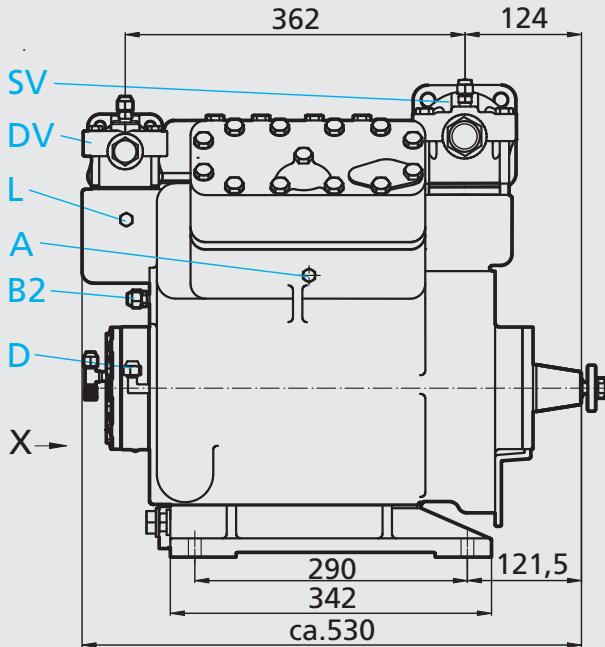
Dimensions in mm

- Connections see page 33
- Dimensions for view X see page 32

F14

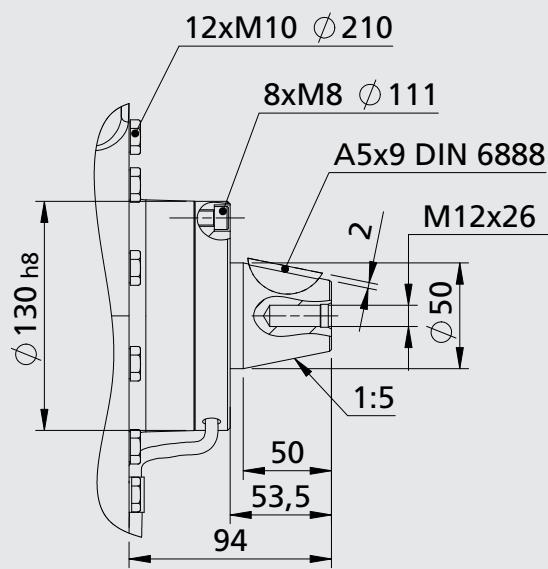
F14/1166

F14/1366



() = Dimensions at elevated base plate

Shaft end



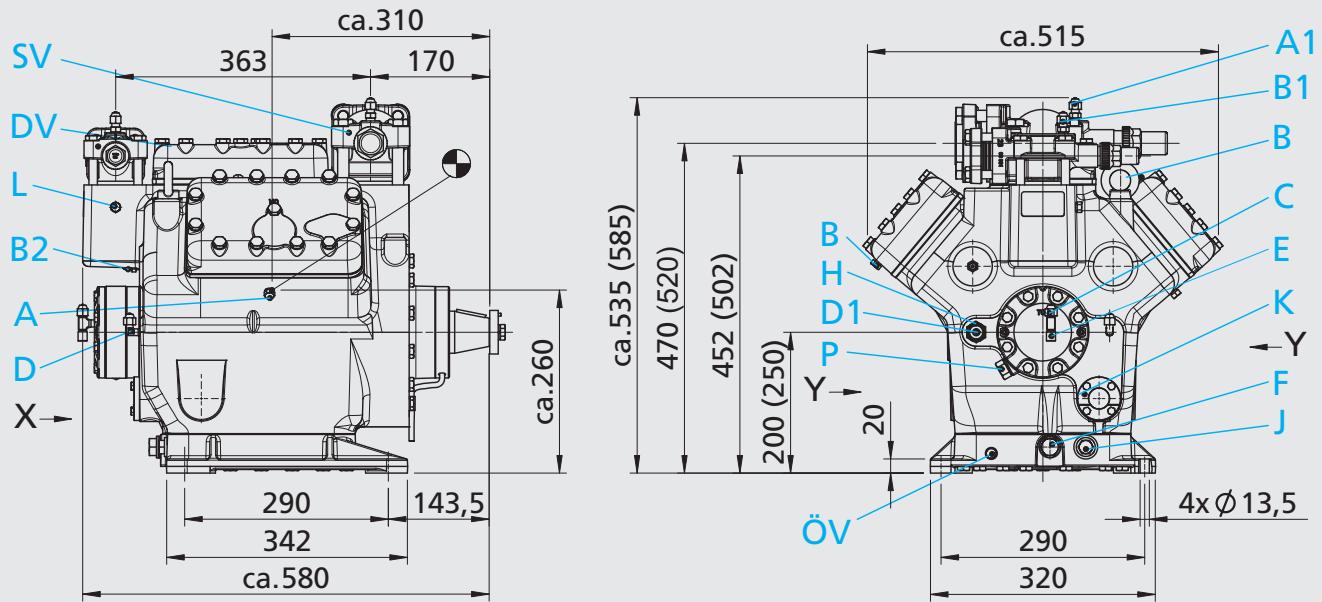
Dimensions in mm

- Connections see page 33
- Dimensions for view X see page 32

F16

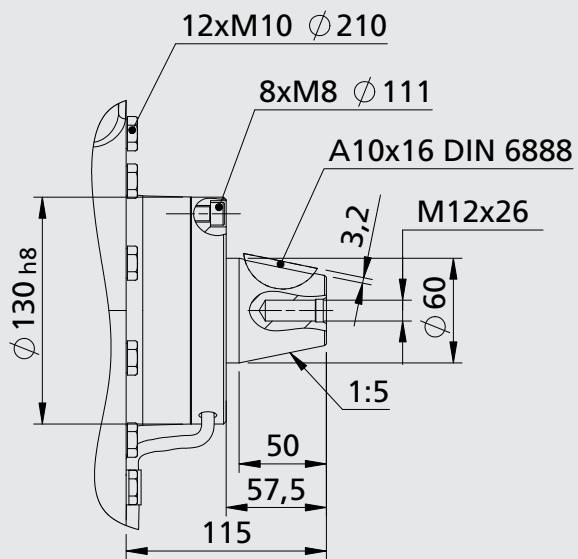
F16/1751

F16/2051



() = Dimensions at elevated base plate

Shaft end



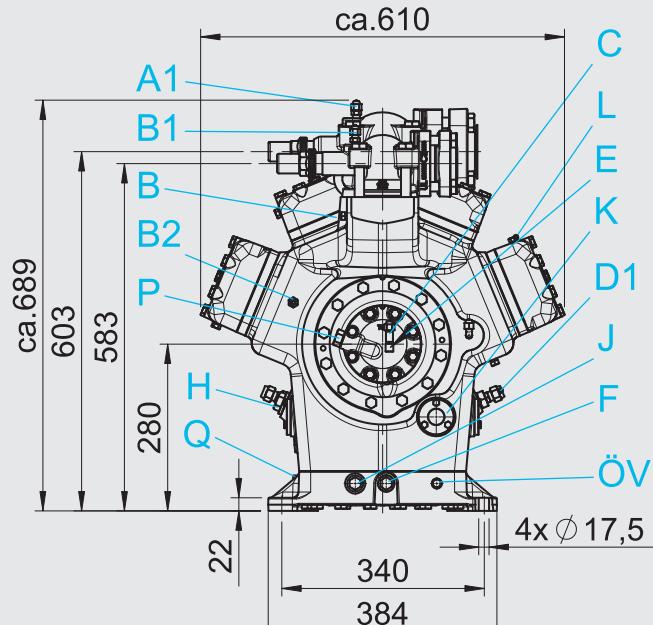
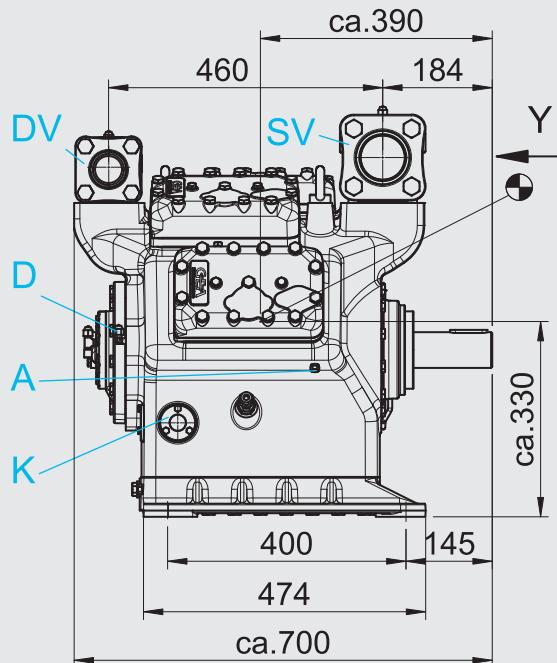
Dimensions in mm
● Centre of gravity

- Connections see page 33
- Dimensions for view X see page 32

F18

F18/2735

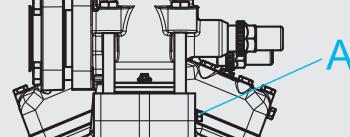
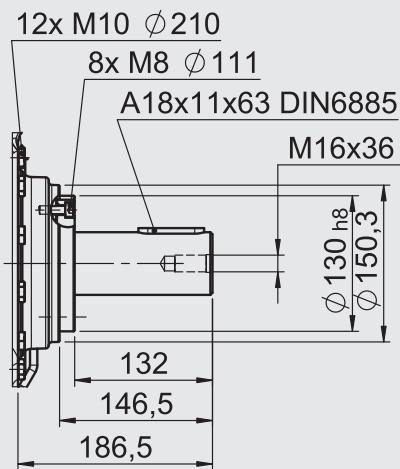
F18/3235



1
2
3
4

Shaft end

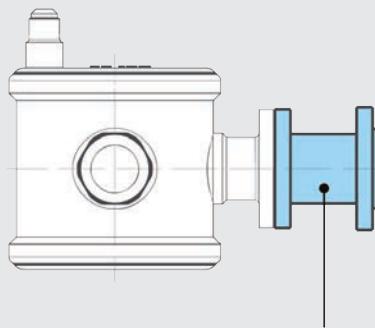
View Y



Dimensions in mm
Centre of gravity

- Connections see page 33
- Dimensions for view X see page 32

Connection facilities

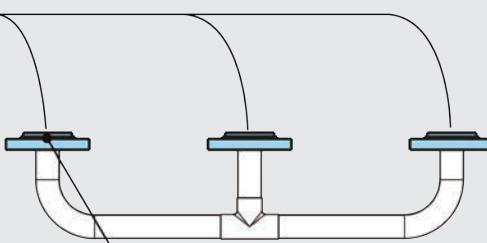
A Operation with oil level regulator

Art.Nr. 80462

GEA Bock adapter for oil level regulator,
fits the makes ESK, AC+R, CARLY.
Three-hole fastener on the side of the oil level regulator.
Four-hole fastener on the side of the compressor.
Available for F2 - F16.

B

Operation with common oil-gas balance pipe



Example: 3 compressors in parallel

Art.Nr. 80463

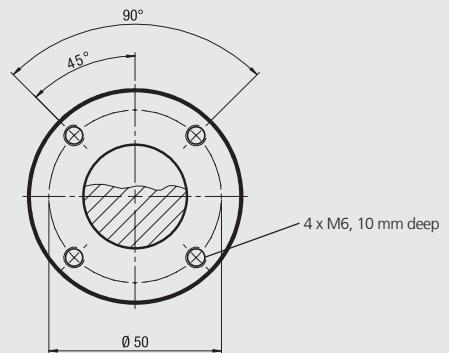
GEA Bock adapter for oil-gas regulator,
single design, four-hole steel connector for
Pipe Ø 35 mm, fits all sightglass positions.
1 item per compressor required.
Available for F2 - F16.

View X,Y

- Oil sight glass
- Connection facility for parallel operation

Position view X:

F2, F3, F4, F5, F14, F16
Four-hole oil sight glass

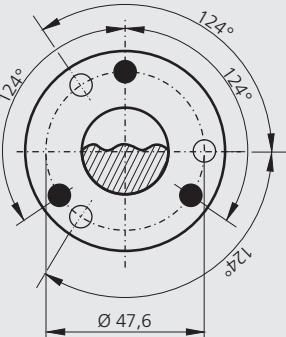


Position view X:

F18

Possibility to connect to oil level regulator

- Three-hole connection for oil level regulator make ESK, AC+R, CARLY (3x M6, 10 deep)
- Three-hole connection for oil level regulator make TRAXOIL (3x M6, 10 deep)



Position view Y:

F14, F16

Second oil sight glass can be attached as accessories
(available as original equipment only)

Connections	F2	F3	F4	F5	F14	F16	F18		
SV Suction line DV Discharge line				please refer to technical data page 24					
A Connection suction side, not lockable	7/16 " UNF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF		
A1 Connection suction side, lockable	7/16 " UNF	7/16 " UNF	7/16 " UNF	7/16 " UNF	7/16 " UNF	7/16 " UNF	7/16 " UNF		
B Connection discharge side, not lockable	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF		
B1 Connection discharge side, lockable	7/16 " UNF	7/16 " UNF	7/16 " UNF	7/16 " UNF	7/16 " UNF	7/16 " UNF	7/16 " UNF		
B2 Connection discharge side, not lockable	-	-	-	-	7/16 " UNF	7/16 " UNF	7/16 " UNF		
C Connection oil pressure safety switch OIL	-	1/8 " NPTF	7/16 " UNF	7/16 " UNF	7/16 " UNF	7/16 " UNF	7/16 " UNF		
D Connection oil pressure safety switch LP	-	1/8 " NPTF	7/16 " UNF	7/16 " UNF	7/16 " UNF	7/16 " UNF	7/16 " UNF		
D1 Connection oil return from oil separator	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	5/8 " UNF	5/8 " UNF	5/8 " UNF		
E Connection oil pressure gauge	-	1/8 " NPTF	7/16 " UNF	7/16 " UNF	7/16 " UNF	7/16 " UNF	7/16 " UNF		
F Oil drain plug	R 3/8 "	M 22 x 1,5	M 22 x 1,5	M 22 x 1,5	M 26 x 1,5	M 26 x 1,5	M 22 x 1,5		
G Oil sump heater plug	R 3/8 "	M 22 x 1,5	-	-	-	-	-		
H Oil charge plug	1/8 " NPTF	1/8 " NPTF	M 22 x 1,5	M 22 x 1,5	M 22 x 1,5	M 22 x 1,5	M 22 x 1,5		
J Connection oil sump heater	-	-	M 22 x 1,5	M 22 x 1,5	M 22 x 1,5	M 22 x 1,5	M 22 x 1,5		
K Sight glass	4 hole M 6	4 hole M 6 ¹⁾	4 hole M 6 ¹⁾	3 hole M 6					
L Connection thermal protection thermostat	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF		
ÖV Connection oil service valve	-	-	-	-	1/4 " NPTF	1/4 " NPTF	1/4 " NPTF		
P Connection oil pressure differential sensor	-	-	-	-	M 20 x 1,5	M 20 x 1,5	M 20 x 1,5		
Q Connection oil temperature sensor	-	-	-	-	-	-	1/8 " NPTF		

¹⁾ Second sight glass can be attached,
Positioning view Y (accessories, available only as original equipment)

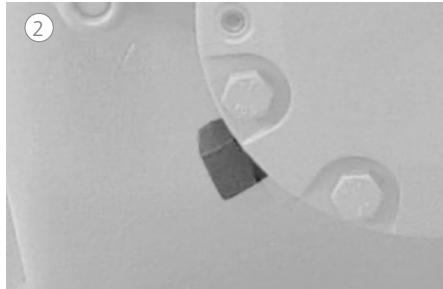
Scope of supply	F2	F3	F4	F5	F14	F16	F18
Open type compressor with suction and discharge shut-off valves	●	●	●	●	●	●	●
Two cylinder, cylinder arrangement in row	●	●					
Four cylinder, cylinder arrangement in V			●	●	●		
Six cylinder, cylinder arrangement in W						●	
Eight cylinder, cylinder arrangement in VV							●
Seat front bearing flange	●	●	●	●	●	●	●
① Shaft seal with piece of tube for controlled oil collection					●	●	●
Oil pump	●	●	●	●	●	●	●
② Oil pump cover with screw-in option for oil pressure differential sensor (Δp -switch by Kriwan)					●	●	●
Connection possibility for oil level regulators make ESK, AC+R or CARLY	● 1)	● 1)	● 1)	● 1)	● 1)	● 1)	●
Connection possibility for oil level regulators make Traxoil							● 1)
Oil charge: F: FUCHS Reniso SP46 FX: FUCHS Reniso Triton SE55	●	●	●	●	●	●	●
Sight glass	●	●	●	●	●	●	
Three sight glasses							●
Decompression valve			●	●	●	●	●
Inert gas charge	●	●	●	●	●	●	●

1) Only possible with additional adapter

Shaft seal with piece of tube



Screw-in option for oil differential pressure switch



1

2

3

4

Accessories	F2	F3	F4	F5	F14	F16	F18
① Oil sump heater 220-240 V - 1 - 50/60 Hz	●	●	●	●	●	●	● 1)
② Compressor flywheel	● 2)	● 2)	● 2)	● 2)	● 2)	● 2)	● 2)
③ Shaft coupling for direct drive	● 2) 3)	● 2) 3)	● 2) 3)	● 2) 3)	● 2) 3)	● 2) 3)	● 2) 3)
Coupling bell for motor adjustment, for B5/B35 IEC motors, flange diameter Ø 450 and Ø 550 (on request)							● 2)
④ Capacity regulator 230 V - 1 - 50/60 Hz, IP65 1 capacity regulator = 50 % residual capacity			●	●	●		
Capacity regulator 230 V - 1 - 50/60 Hz, IP65 1-2 capacity regulator = 66/33 % residual capacity						●	
Capacity regulator 230 V - 1 - 50/60 Hz, IP65 1-3 capacity regulator = 75/50/25 % residual capacity							● 5)
⑤ Start unloader 230 V - 1 - 50/60 Hz, IP65, without check valve, including thermal protection thermostat (bimetal sensor)		●	●	●	●	●	
Thermal protection thermostat (bimetal-sensor)	●	●	●	●	●	●	
⑥ Thermal protection thermostat (PTC)							● 2)
⑦ Oil pressure safety switch MP 54 230 V - 1 - 50/60 Hz, IP20 Oil pressure differential sensor (Δp -switch by Kriwan) 220-240 V - 1 - 50/60 Hz	● 2)	● 2)	● 2)	● 2)	● 2)	● 2)	● 2)
⑧ Oil service valve Oil temperature sensor (NTC)					● 1)	● 1)	● 1)
Electronic motor protection unit Bock MP10 for installation in switch cabinet							●
⑨ Bock Compressor Management BCM2000 including oil pressure control (Δp -switch by Kriwan) ⑦, oil temperature control (NTC), thermal protection thermostat (PTC) per cylinder cover ⑥							●
⑩ Two additional sight glasses (both-sided), positioning view Y					● 4)	● 4)	
⑪ Elevated base plate (oil volume plus 2,5 litres)					●	●	
⑫ Additional fan 230 V Δ / 400 V Y - 3 - 50 Hz, 120 W, 230-265 V Δ / 400-460 V Y - 3 - 60 Hz, 190 W, IP54, Voltage range ± 10%							● 1)
⑬ Water-cooled cylinder covers Sea water resistant water-cooling cylinder covers	●	●	●	●	●	●	

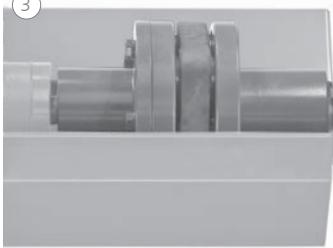
1) Installed

2) Enclosure

3) Please state motor Ø and feather key groove dimensions when ordering shafts

4) Available as original equipment only

5) Capacity regulator premounted, control unit enclosed

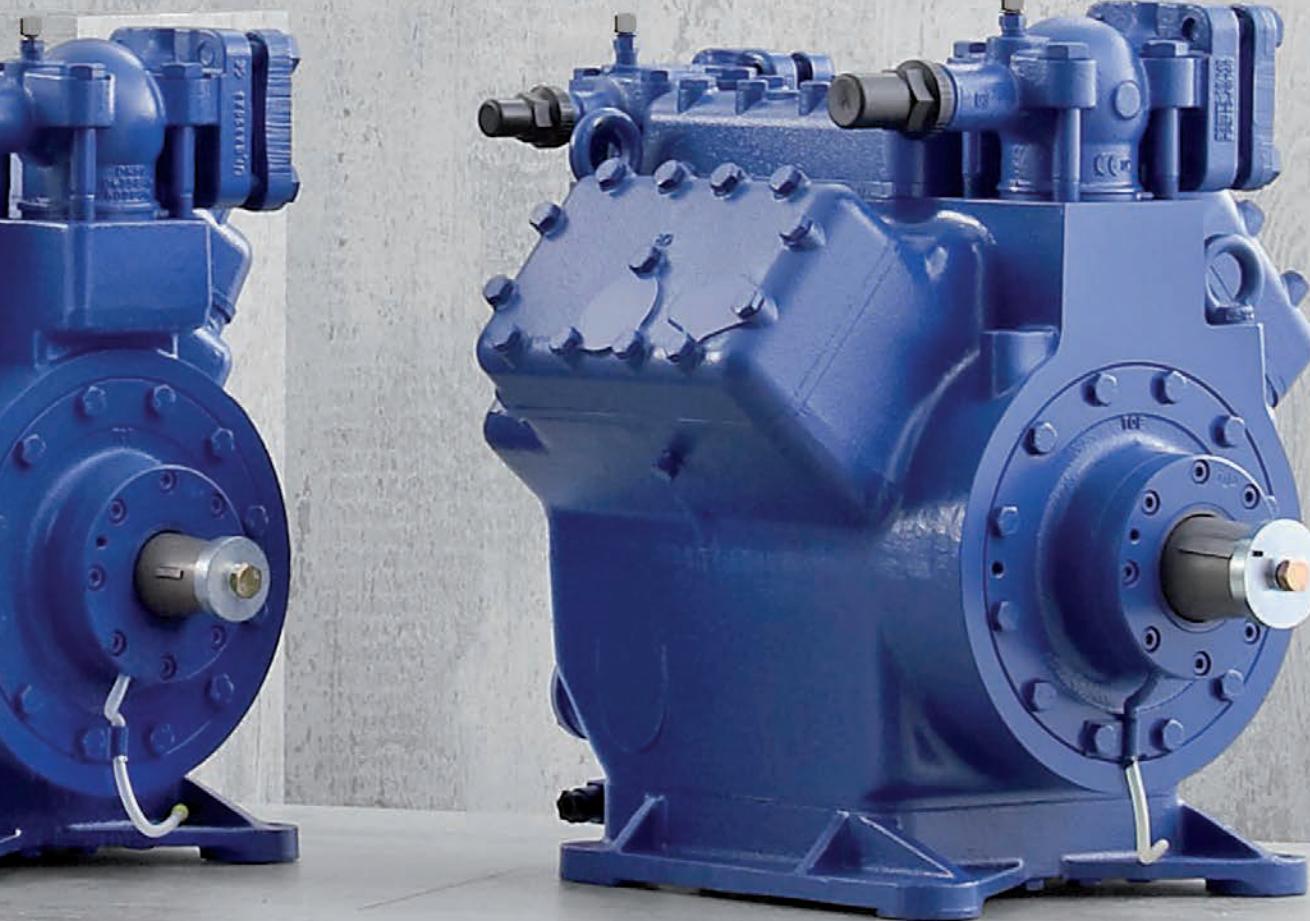
Oil sump heater	Compressor flywheel	Capacity regulator/Start unloader	
			
F2: 40 Watt F14: 140 Watt F3: 60 Watt F16: 140 Watt F4+5: 80 Watt F18: 200 Watt	F2: Ø 165,2 x SPA F3: Ø 210,2 x SPA F4: Ø 210,3 x SPA F5: Ø 230,4 x SPA F14: Ø 322 x SPB F16: Ø 322 x SPB F18: Ø 406,9 x SPB		
Shaft coupling	Thermal protection thermostat	Oil pressure safety switch	
			
F2: WK 42.44 F3: WK 42.44 F4: WK 70.40 F5: WK 70.40 F14: WK 190.50 F16: WK 190.60			
Oil service valve	BCM2000	Sight glass	Elevated base plate
			
Additional fan	Water-cooled cylinder covers		
			

1
2
3
4



F Compressors for NH₃

At a glance	40
Operating limits and performance data	41
Technical data	44
Dimensions and connections	45
Scope of supply and accessories	52



Based on the F compressor series, a specially modified selection of compressors is available for use with the refrigerant R 717.

The special features:

2, 4 and 6 cylinder models with displacements of 10 to 180 m³/h (1450 rpm)

Deviations from the basis compressor F:

- Pistons with three-ring assembly
- Connecting rod with additional oil supply oil to the small end
- Valve plate with optimized pressure unit
- Shut-off valve with steel connector for welded joints
- All connections are designed as compression joints for steel pipes
- F14 NH₃, F16 NH₃ with increased oil volume by elevated base plate
- Special oil filling for NH₃ (Fuchs Reniso KC 68). If R723 or other oils are used, please consult our application engineering department.
- You will find further information on the F basis compressors in the chapter entitled „F series single-stage compressors“ from page 8 onwards.

Type key

F | 14 / 1166 | NH₃

Refrigerant

Swept volume ¹⁾

Size

Series

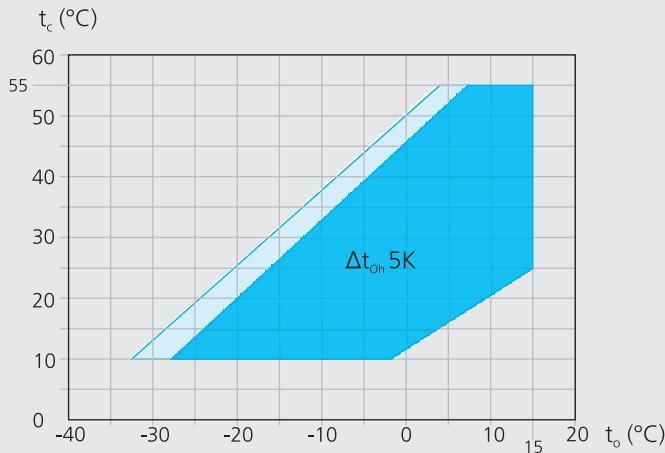
¹⁾ Indication only at F14, F16

The current program

...6 model sizes with 8 capacity stages from 10,5 to 178,4 m³/h (1.450 rpm)

Models available	Displacement (1.450 rpm) [m ³ /h]
F2 NH ₃	10,5
F3 NH ₃	20,3
F4 NH ₃	40,5
F5 NH ₃	73,7
F14 NH ₃	101,5 / 118,9
F16 NH ₃	152,2 / 178,4
F18 NH ₃	in planning stage



NH₃ Operating limits**F2 NH₃, F3 NH₃, F4 NH₃, F5 NH₃, F14 NH₃, F16 NH₃**

Unlimited application range

Supplementary cooling necessary (e.g. water-cooled cylinder covers)

t_o Evaporating temperature (°C)

t_c Condensing temperature (°C)

Δt_{oh} Suction gas overheating (K)

Maximum permissible operating pressure (LP/HP)^{1):} 19/25 bar

¹⁾ LP = low pressure HP = high pressure

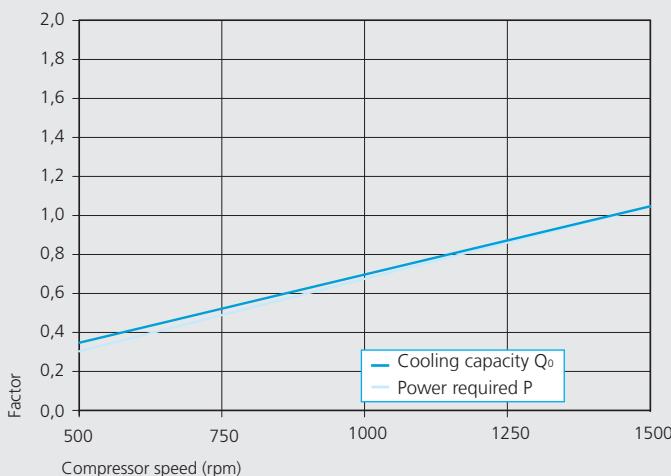
NH₃ Notes**Operating limits**

Compressor operation is possible within the examples in the diagram showing the limitations of use. The meaning of the surfaces marked in colour are to be observed. Limiting areas should not be selected for layout or continuous operating points.

Performance data

Performance specifications for the NH₃ are based on 5 K suction gas overheating without liquid subcooling. Compressor speed 1450 rpm. The values can be stated to judge the overall performance at other speed with the help of the calculation factors below.

For additional technical data for other operating points see GEA Bock software.

**Operation with NH₃ and R723**

NH₃ is a refrigerant traditionally used in industry and largescale refrigeration systems, as NH₃ has considerably more vapouration heat and thus a larger volumetric refrigerating capacity than most F gases. That is why operating NH₃ at small capacities (< 30 KW, e.g. in the commercial sector) can be problematic.

NH₃ has a high adiabatic index and thus significantly higher pressure gas temperatures. On one hand, this greatly limits the application range with regard to lower temperatures; on the other hand, this requires thermally highly stable refrigeration oils. Nonsoluble mineral oils with a viscosity of 68 are used as standard - Fuchs Reniso KC 68. Flooded operation is customary.

In case of dry expansion, please note that the necessary overheating in the evaporator results in higher hot gas temperatures. This is why only low compression ratios are possible and accordingly multi-stage refrigeration systems are necessary.

Compared to mineral oil, PAO (poly-alpha-olefin) oil has better thermal and chemical characteristics and higher lubricating properties. For applications with PAO oil a suitable shaft seal is used in the compressor. The PAO oil "Fuchs Reniso Synth 68" is approved for these systems. The compressors can also be operated with R723 (60 % NH₃ + 40 % dimethyl ether). It is recommended to use the oil „Fuchs Reniso Synth 68". The use of the mentioned PAO oils and the use of R723 have to be explicitly when ordering a compressor.

NH ₃		Performance data									1.450 rpm	
Type	Cond. temp. °C	Cooling capacity \dot{Q}_o [W]									Power consumption P [kW]	
		Evaporating temperature °C										
F2 NH ₃	10	Q P				9670 1,30	7740 1,26	6080 1,19	4690 1,11	3520 1,02	2570 0,94	
	20	Q P			13700 1,44	11200 1,47	8920 1,45	7020 1,41	5400 1,33	4050 1,24	2940 1,14	
	30	Q P	18700 1,67	15500 1,77	12600 1,81	10200 1,80	7970 1,75	6140 1,66	4610 1,54			
	40	Q P	17300 2,28	14200 2,32	11400 2,29	9020 2,21	7000 2,08					
	50	Q P	15900 2,99	12900 2,92	10300 2,79	8070 2,61						
F3 NH ₃	10	Q P				18700 2,51	15000 2,43	11800 2,31	9050 2,15	6800 1,98	4970 1,81	
	20	Q P			26500 2,80	21600 2,84	17300 2,82	13600 2,72	10500 2,58	7820 2,40	5680 2,20	
	30	Q P	36100 3,24	29800 3,43	24400 3,50	19600 3,48	15400 3,38	11900 3,21	8910 2,98			
	40	Q P	33400 4,42	27300 4,48	22100 4,43	17500 4,28	13600 4,03					
	50	Q P	30600 5,78	24900 5,65	19900 5,40	15600 5,04						
F4 NH ₃	10	Q P				37300 5,02	29900 4,86	23500 4,61	18100 4,30	13600 3,96	9910 3,61	
	20	Q P			52700 5,58	4300 5,68	34400 5,62	27100 5,44	20900 5,16	15600 4,80	11400 4,40	
	30	Q P	71900 6,47	59500 6,84	48600 6,99	39000 6,96	30800 6,75	23700 6,41	17800 5,95			
	40	Q P	66500 8,83	54500 8,95	43900 8,85	34800 8,54	27000 8,05					
	50	Q P	61100 11,50	49600 11,20	69700 10,70	31200 10,00						
F5 NH ₃	10	Q P				67900 9,13	54300 8,84	42700 8,39	32900 7,83	24700 7,21	18100 6,57	
	20	Q P			95900 10,10	78200 10,30	62600 10,20	49300 9,90	37900 9,39	28400 8,74	20700 8,01	
	30	Q P	131000 11,70	109000 12,40	88400 12,70	71000 12,60	55900 12,20	43100 11,60	32400 10,80			
	40	Q P	12100 16,00	99100 16,30	79900 16,10	63300 15,50	49200 14,60					
	50	Q P	112000 21,00	90200 20,50	72100 19,60	56700 18,30						

Based on 5 K suction gas overheating
without liquid subcooling

 Supplementary cooling
necessary

NH ₃		Performance data										1.450 rpm	
Type	Cond. temp. °C	Cooling capacity \dot{Q}_o [W]										Power consumption P [kW]	
Evaporating temperature °C													
		15	10	5	0	-5	-10	-15	-20	-25	-30		
F14/1166 NH ₃	10	Q P				93500	74800	58800	45300	34000	24900		
	20	Q P			133000	108000	86300	67900	52200	39100	28400	9,93	9,05
	30	Q P	181000	149000	12200	97700	77000	59400	44600				
	40	Q P	167000	137000	111000	87200	67700						
	50	Q P	153000	125000	99300	78000							
			28,90	28,20	27,00	25,20							
F14/1366 NH ₃	10	Q P				110000	87600	68900	53100	39900	29100		
	20	Q P			155000	127000	101000	79500	61100	45800	33300	11,60	10,60
	30	Q P	211000	175000	143000	115000	90200	69500	52200	17,40			
	40	Q P	196000	160000	129000	103000	79300						
	50	Q P	180000	146000	117000	91400							
			33,90	33,10	31,60	29,50							
F16/1751 NH ₃	10	Q P				141000	113000	88200	67900	51000	37300		
	20	Q P			199000	162000	130000	102000	78300	58600	42600	14,80	13,50
	60	Q P	270000	224000	183000	147000	116000	89000	66800				
	40	Q P	250000	205000	165000	131000	102000						
	50	Q P	230000	187000	149000	117000							
			43,40	42,40	40,50	37,80							
F16/2051 NH ₃	10	Q P				165000	132000	104000	79600	59800	43700		
	20	Q P			233000	190000	152000	120000	91700	68700	49900	17,40	15,90
	30	Q P	317000	262000	214000	172000	136000	105000	78300				
	40	Q P	293000	240000	194000	154000	119000						
	50	Q P	269000	219000	175000	138000							
			50,80	49,70	47,50	44,30							

Based on 5 K suction gas overheating
without liquid subcooling

Supplementary cooling necessary

1
2
3
4

Type F NH ₃	Number of cylinders	Displacement (1.450 rpm)	Weight	Connections ①		Oil charge	Speed range
				Discharge line DV	Suction line SV		
		m ³ /h	kg	mm	mm	Ltr.	rpm
F2 NH ₃	2	10,5	18	18	18	0,8	960 - 1450
F3 NH ₃	2	20,3	28	25	30	1,5	960 - 1450
F4 NH ₃	4	40,5	51	30	38	2,6	700 - 1450
F5 NH ₃	4	73,7	85	38	2 x 38	3,8	700 - 1450
F14/1166 NH ₃	4	101,5	157	49	60	6,3	700 - 1450
F14/1366 NH ₃	4	118,9	158	49	60	6,3	700 - 1450
F16/1751 NH ₃	6	152,2	183	49	60	7,5	700 - 1450
F16/2051 NH ₃	6	178,4	183	49	60	7,5	700 - 1450

① for welded connections

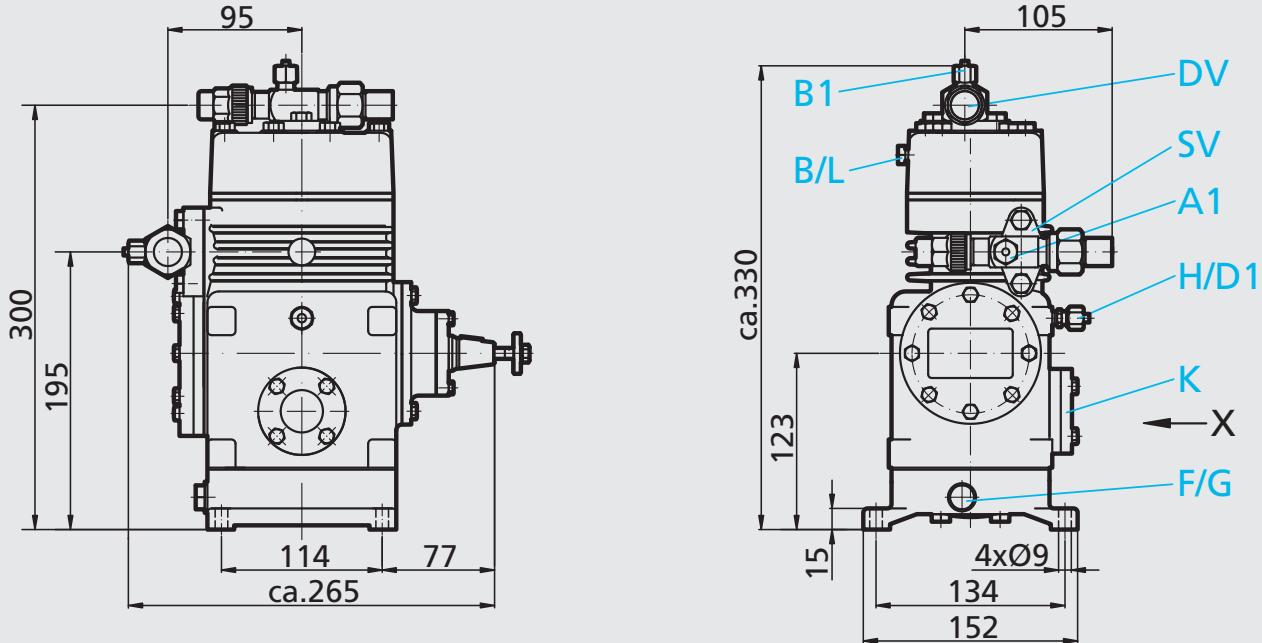
Oil sump heater: 230 V – 1 – 50/60 Hz

F2 NH₃: 40 W (accessories)

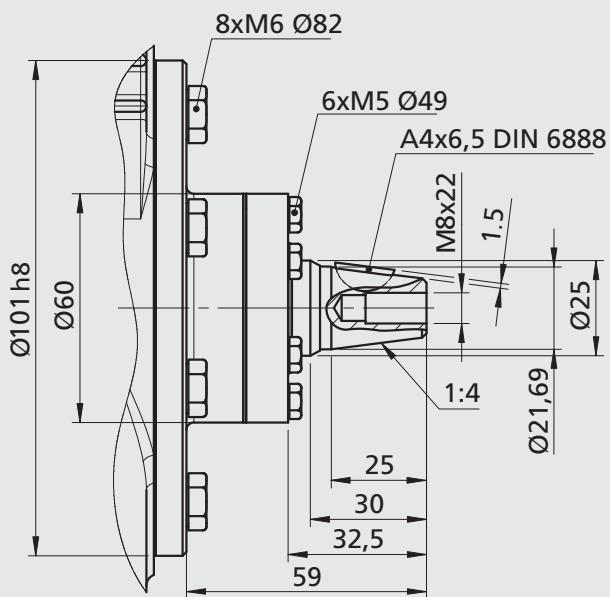
F3 NH₃: 60 W (accessories)

F4 NH₃; F5 NH₃: 80 W (accessories)

F14 NH₃; F16 NH₃: 140 W (accessories)

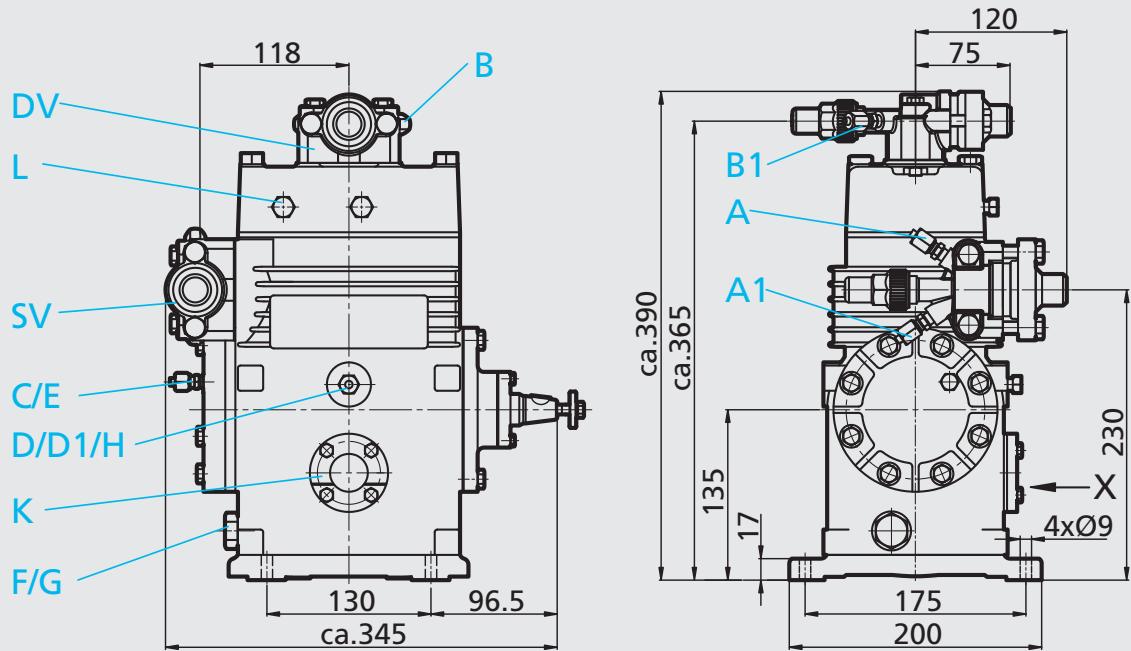
F2 NH₃1
2
3
4

Shaft end

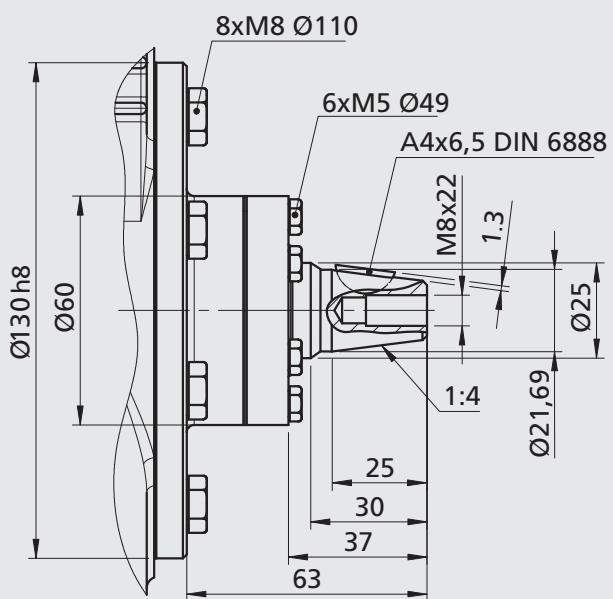


Dimensions in mm

- Connections see page 51
- Dimensions for view X see page 51

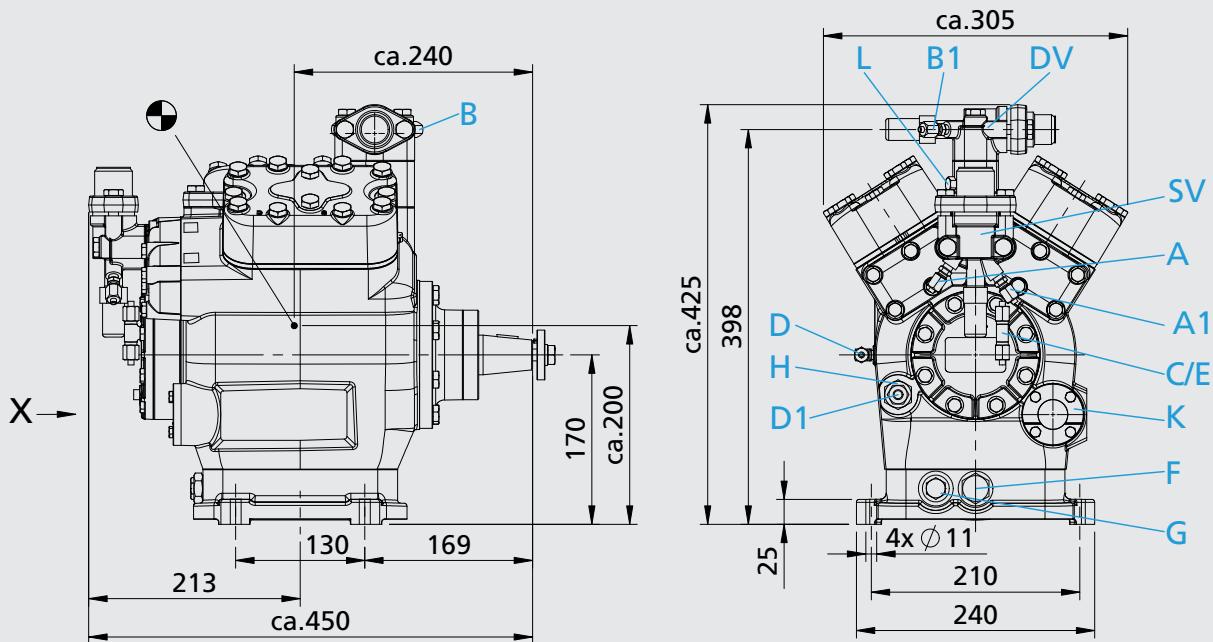
F3 NH₃

Shaft end

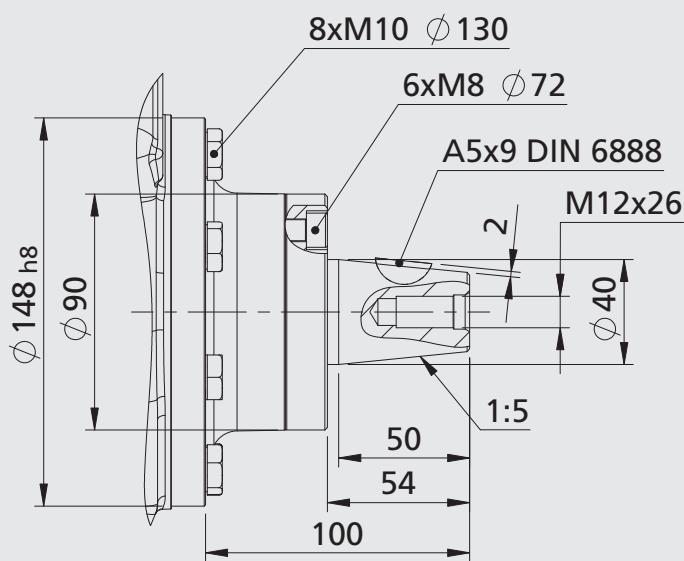


Dimensions in mm

- Connections see page 51
- Dimensions for view X see page 51

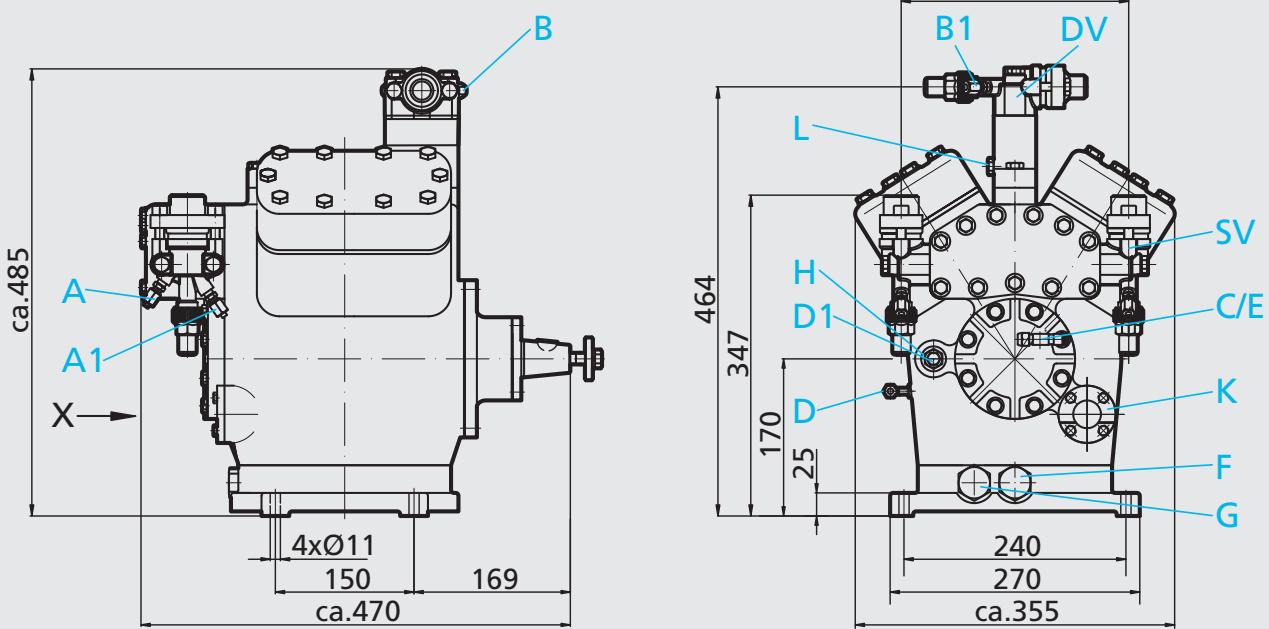
F4 NH₃1
2
3
4

Shaft end

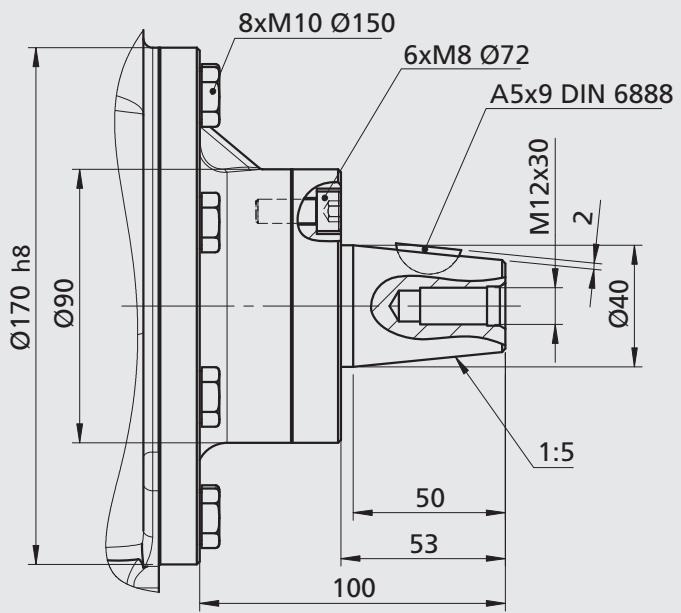


Dimensions in mm
 ● Centre of gravity

- Connections see page 51
 - Dimensions for view X see page 51

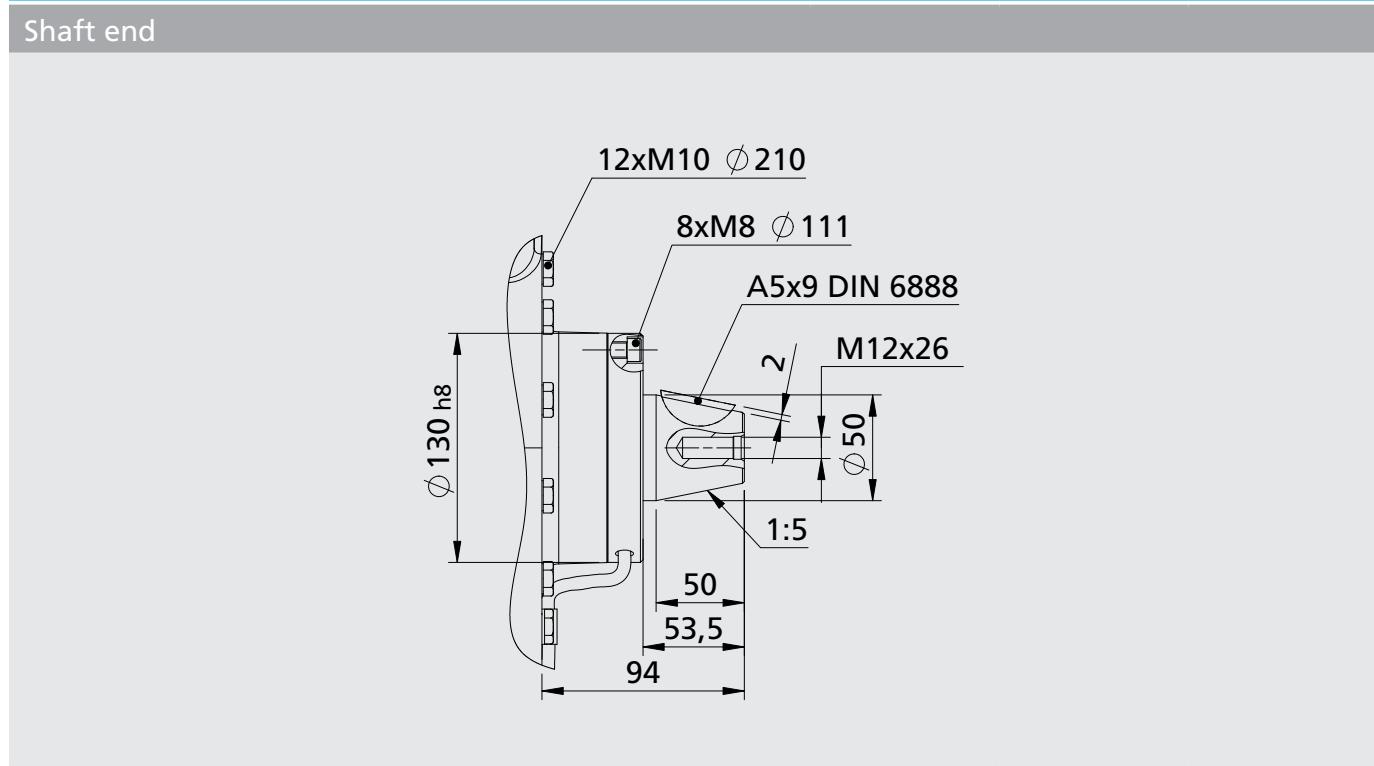
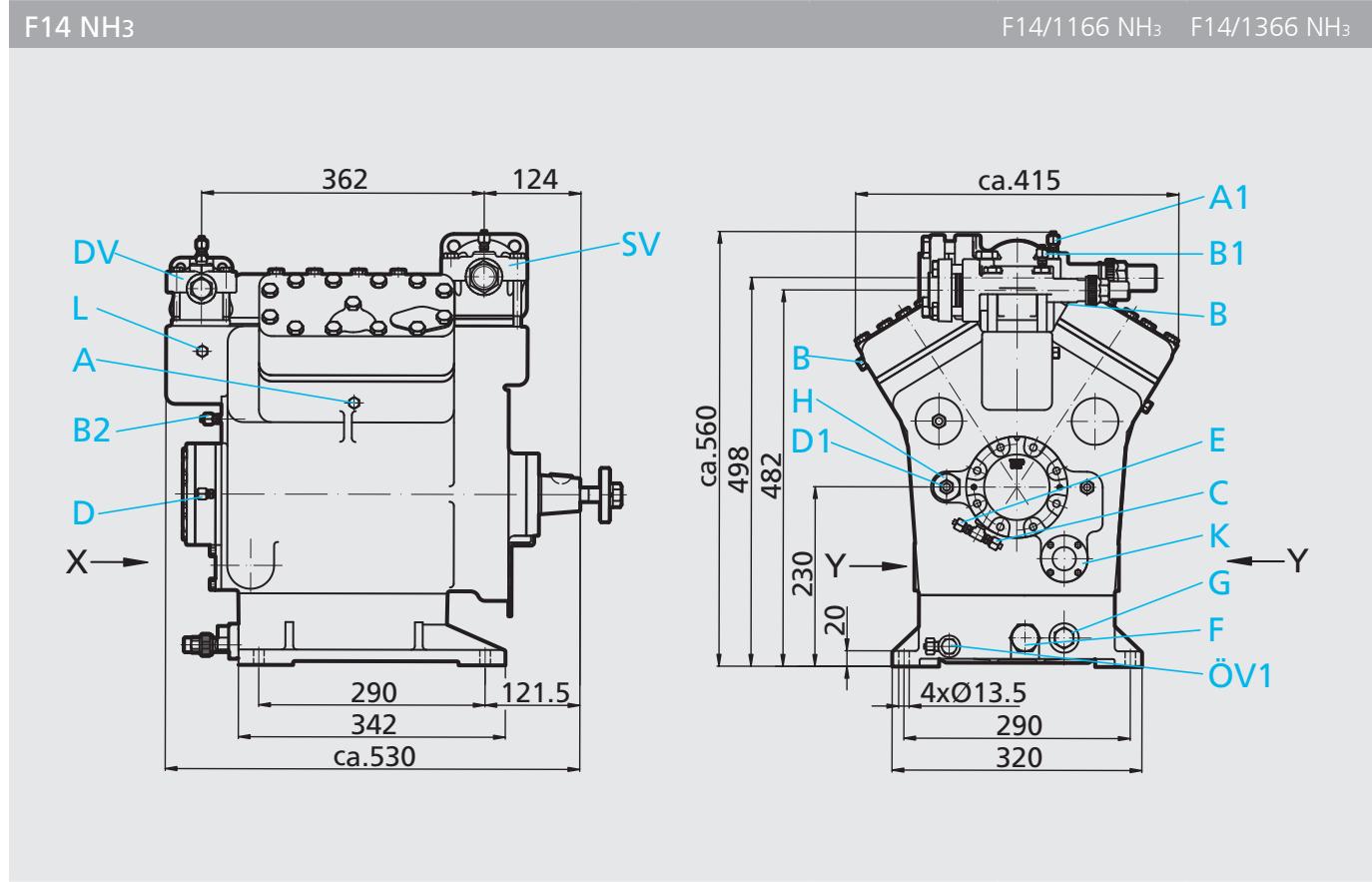
F5 NH₃

Shaft end



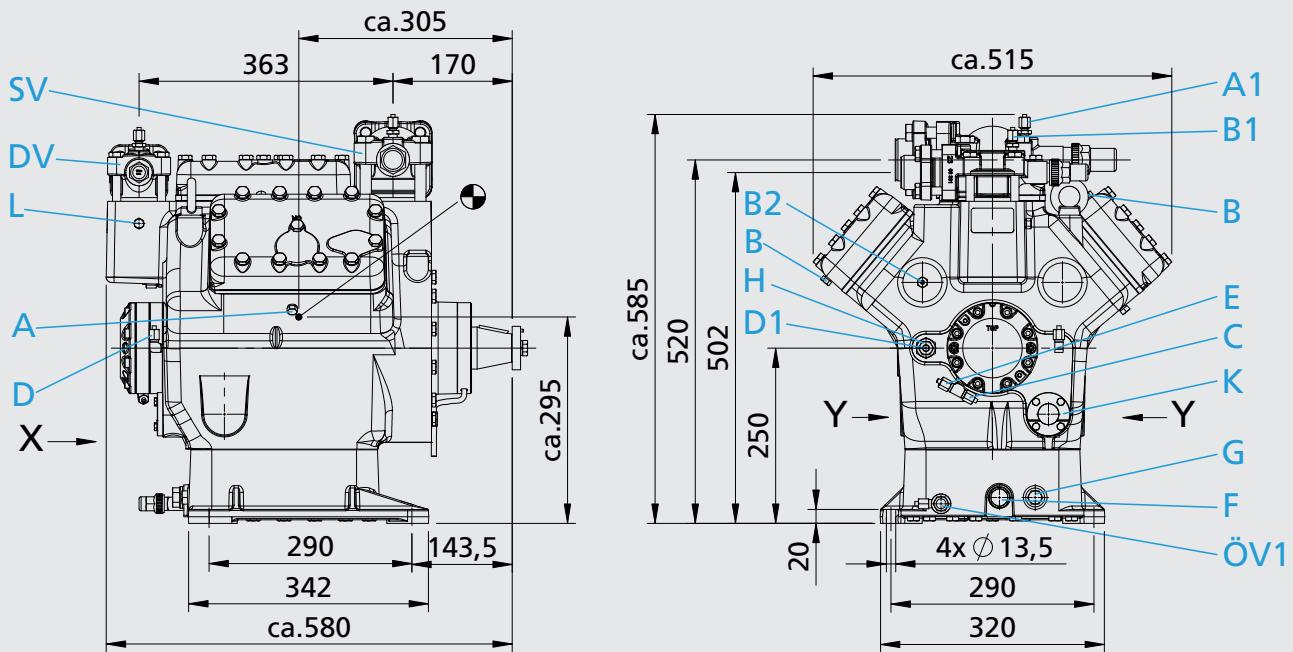
Dimensions in mm

- Connections see page 51
- Dimensions for view X see page 51

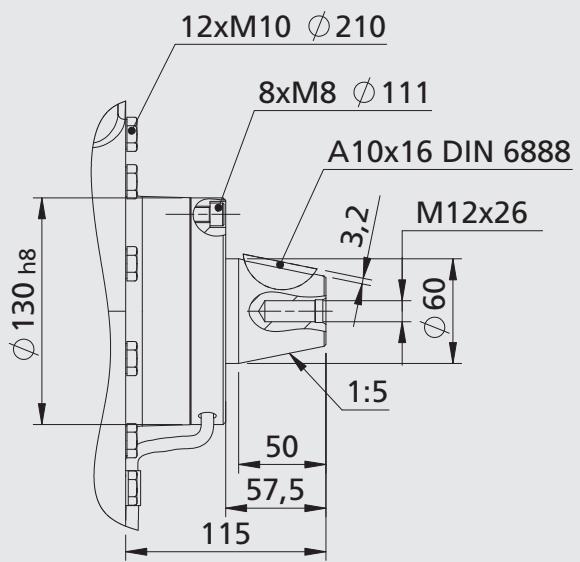


Dimensions in mm

- Connections see page 51
- Dimensions for view X see page 51

F16 NH₃F16/1751 NH₃ F16/2051 NH₃

Shaft end



Dimensions in mm

Centre of gravity

- Connections see page 51
- Dimensions for view X see page 51

Connections	F2 NH ₃	F3 NH ₃	F4 NH ₃	F5 NH ₃	F14 NH ₃	F16 NH ₃
SV Suction line	please refer to technical data page 44					
DV Discharge line						
A Connection suction side, not lockable	-	Ø 6 mm 1)	Ø 6 mm 1)	Ø 6 mm 1)	1/8 " NPTF 1)	1/8 " NPTF 1)
A1 Connection suction side, lockable	Ø 6 mm 1)	Ø 6 mm 1)	Ø 6 mm 1)	Ø 6 mm 1)	Ø 6 mm 1)	Ø 6 mm 1)
B Connection discharge side, not lockable	1/8 " NPTF	Ø 6 mm 1)	Ø 6 mm 1)	Ø 6 mm 1)	1/8 " NPTF	1/8 " NPTF
B1 Connection discharge side, lockable	Ø 6 mm 1)	Ø 6 mm 1)	Ø 6 mm 1)	Ø 6 mm 1)	Ø 6 mm 1)	Ø 6 mm 1)
B2 Connection discharge side, not lockable	-	-	-	-	Ø 6 mm 1)	Ø 6 mm 1)
C Connection oil pressure safety switch OIL	-	Ø 6 mm 1)	Ø 6 mm 1)			
D Connection oil pressure safety switch LP	-	Ø 10 mm 1)	Ø 6 mm 1)	Ø 6 mm 1)	Ø 6 mm 1)	Ø 6 mm 1)
D1 Connection oil return from oil separator	Ø 10 mm 1)	Ø 10 mm 1)	Ø 10 mm 1)	Ø 10 mm 1)	Ø 10 mm 1)	Ø 10 mm 1)
E Connection oil pressure gauge	-	Ø 6 mm 1)	Ø 6 mm 1)			
F Oil drain plug	R 3/8 "	M 22 x 1,5	M 22 x 1,5	M 22 x 1,5	M 26 x 1,5	M 26 x 1,5
G Oil sump heater plug	R 3/8 "	M 22 x 1,5	M 22 x 1,5			
H Oil charge plug	Ø 10 mm 1)	Ø 10 mm 1)	M 22 x 1,5	M 22 x 1,5	M 22 x 1,5	M 22 x 1,5
K Sight glass	4 hole M 6	4 hole M 6	4 hole M 6	4 hole M 6	4 hole M 6 ²⁾	4 hole M 6 ²⁾
L Connection thermal protection thermostat	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF	1/8 " NPTF
ÖV1 Oil service valve (accessories)	-	-	-	-	Ø 6 mm 1)	Ø 6 mm 1)

1) Compression joint for steel pipes

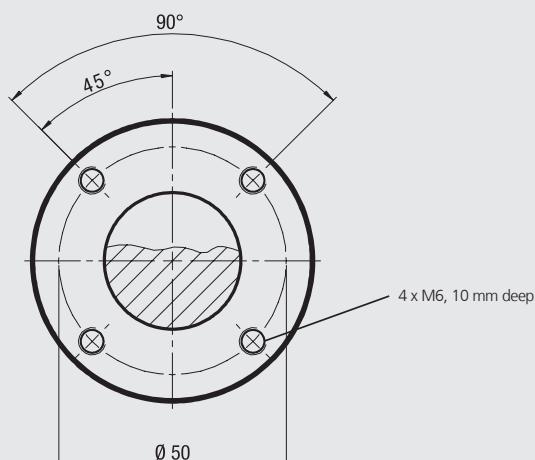
2) Second sight glass can be attached, Positioning view Y (accessories, only as original equipment)

View X,Y

- Oil sight glass
- Connection facility for parallel operation

Position view X:
 F2 NH₃, F3 NH₃, F4 NH₃, F5 NH₃, F14 NH₃, F16 NH₃
 4 hole sight glass

Position view Y:
 F14 NH₃, F16 NH₃
 Second oil sight glass can be attached as accessories
 (available as original equipment only)



Scope of supply	F2 NH ₃	F3 NH ₃	F4 NH ₃	F5 NH ₃	F14 NH ₃	F16 NH ₃
Open type compressor for NH ₃ with suction and discharge shut-off valve	●	●	●	●	●	●
Two cylinder, cylinder arrangement in row	●	●				
Four cylinder, cylinder arrangement in V			●	●	●	
Six cylinder, cylinder arrangement in W						●
Seat front bearing flange	●	●	●	●	●	●
① Shaft seal with piece of tube for controlled oil collection					●	●
Oil pump	●	●	●	●	●	●
Oil charge: FUCHS Reniso KC 68	● 1)	● 1)	● 1)	● 1)	● 1)	● 1)
Sight glass	●	●	●	●	●	●
Decompression valve			●	●	●	●
② Elevated base plate (oil volume plus 2,5 litres)					●	●
Inert gas charge	●	●	●	●	●	●

1) If R723 or other oils are used, please consult our application engineering department



Accessories	F2 NH ₃	F3 NH ₃	F4 NH ₃	F5 NH ₃	F14 NH ₃	F16 NH ₃
① Oil sump heater 220-240 V - 1 - 50/60 Hz	●	●	●	●	●	●
② Compressor flywheel	● 1)	● 1)	● 1)	● 1)	● 1)	● 1)
③ Shaft coupling for direct drive	● 1) 2)	● 1) 2)	● 1) 2)	● 1) 2)	● 1) 2)	● 1) 2)
④ Capacity regulator 230 V - 1 - 50/60 Hz, IP65 1 capacity regulator = 50 % residual capacity Capacity regulator 230 V - 1 - 50/60 Hz, IP65 1-2 capacity regulator = 66/33 % residual capacity			●	●	●	●
⑤ Start unloader 230 V - 1 - 50/60 Hz, IP65, without check valve, including thermal protection thermostat (bimetal sensor)			●	●	●	●
⑥ Thermal protection thermostat (bimetal sensor)	●	●	●	●	●	●
⑦ Oil pressure safety switch MP 55A for NH ₃ 230 V - 1 - 50/60 Hz, IP20 Oil service valve		● 1)	● 1)	● 1)	● 1)	● 1)
⑧ Two additional sight glasses (both-sided), positioning view Y					● 3)	● 3)
⑨ Water-cooled cylinder covers Sea water resistant water-cooled cylinder covers		●	●	●	●	●

1) Enclosure

2) Please state motor Ø and feather key groove dimensions when ordering shafts

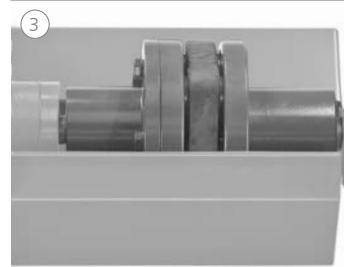
3) Available as original equipment only

Oil sump heater

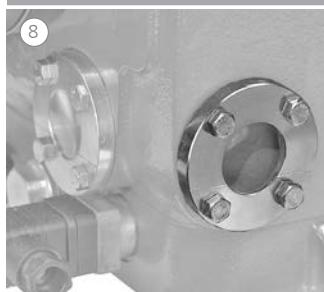
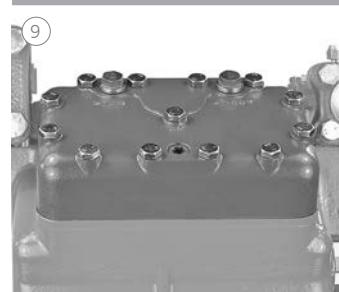
F2 NH₃: 40 Watt
F3 NH₃: 60 Watt
F4 NH₃: 80 Watt
F5 NH₃: 80 Watt
F14 NH₃: 140 Watt
F16 NH₃: 140 Watt

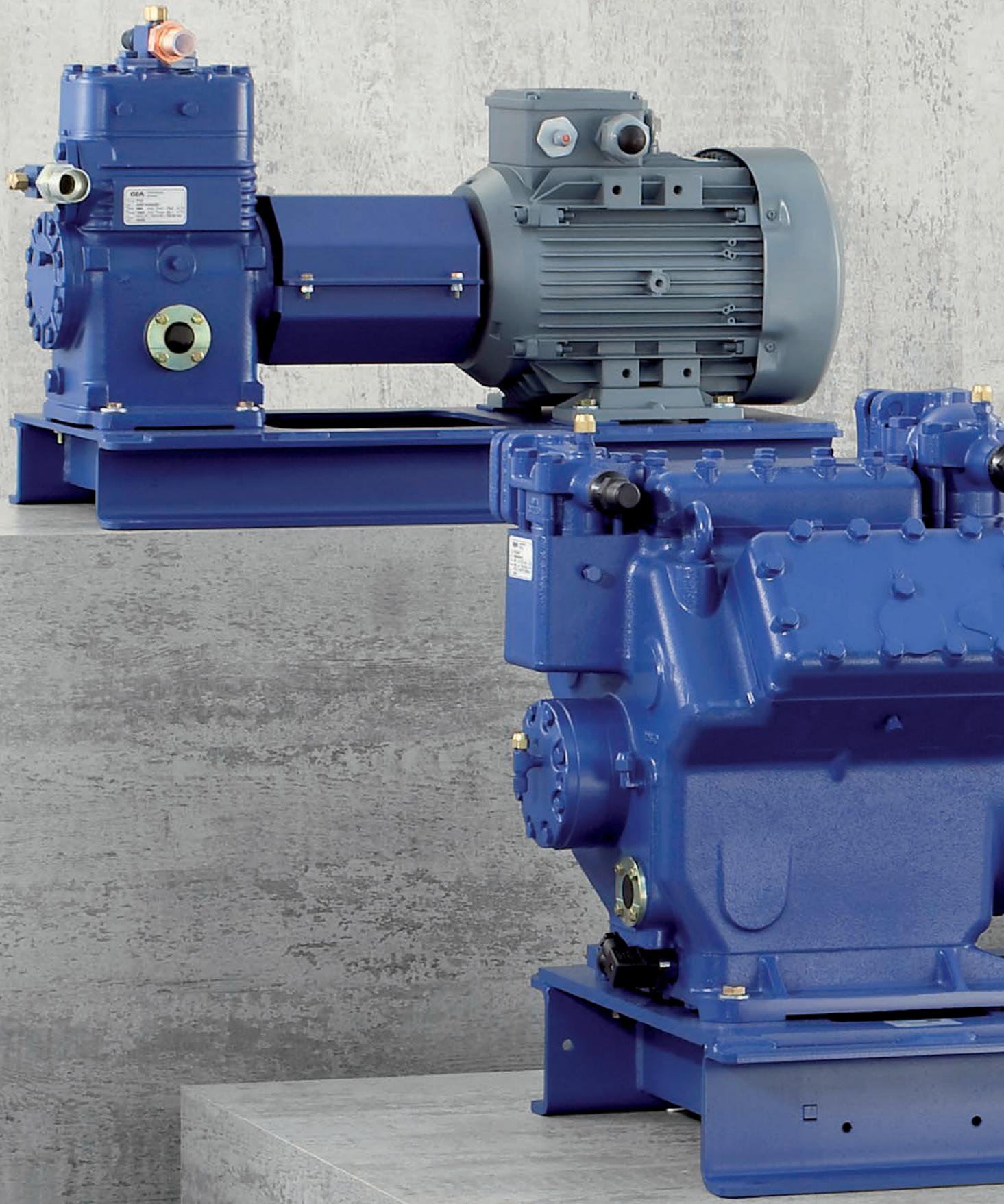
Compressor flywheel

F2 NH₃: Ø 165,2 x SPA
F3 NH₃: Ø 210,2 x SPA
F4 NH₃: Ø 210,3 x SPA
F5 NH₃: Ø 230,4 x SPA
F14 NH₃: Ø 322 x SPB
F16 NH₃: Ø 322 x SPB

Shaft coupling

F2 NH₃: WK 42.44
F3 NH₃: WK 42.44
F4 NH₃: WK 70.40
F5 NH₃: WK 70.40
F14 NH₃: WK 190.50
F16 NH₃: WK 190.60

Capacity regulator**Start unloader****Thermal protection thermostat****Oil pressure safety switch****Sight glass****Water-cooled cylinder covers**



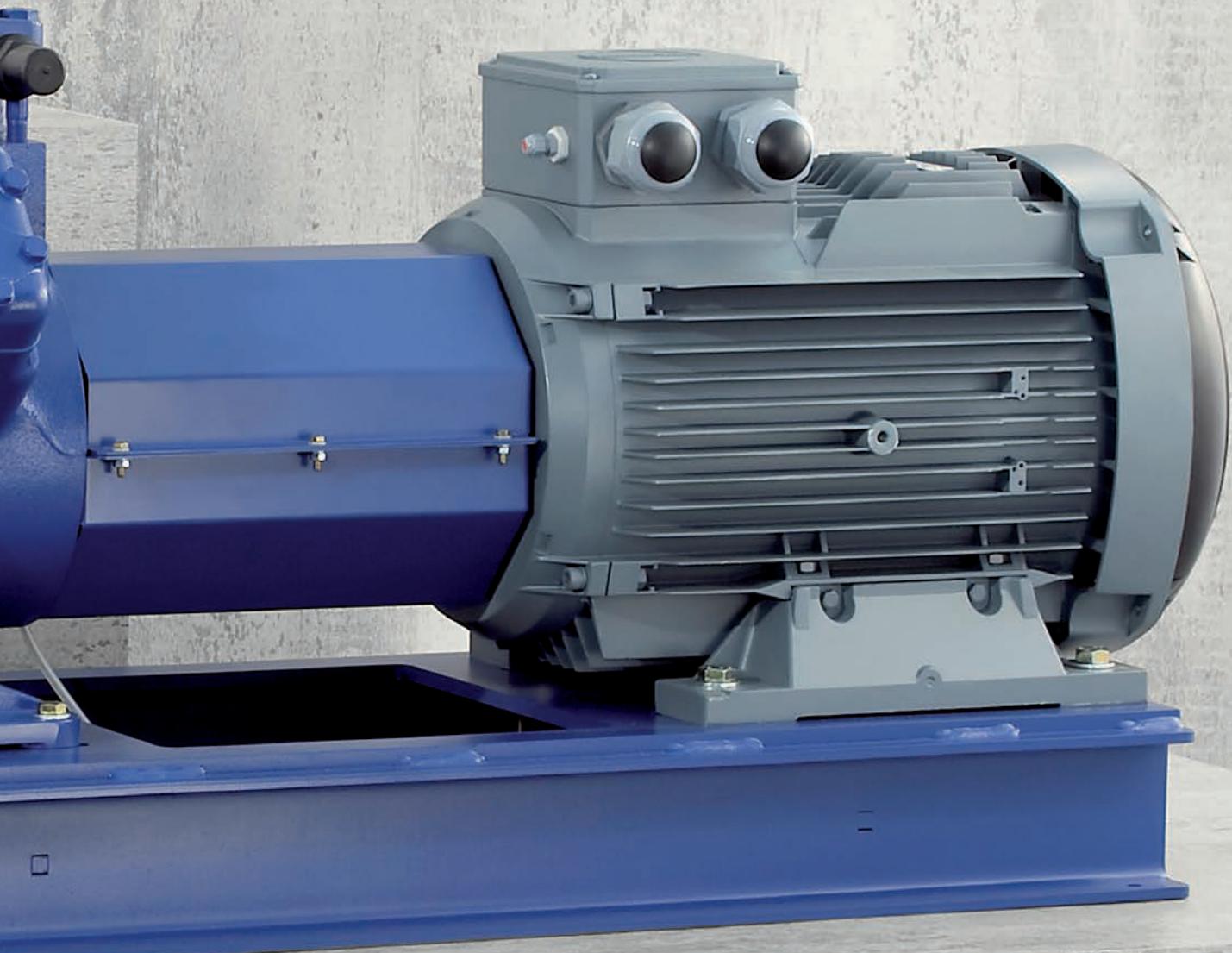
Compressor units for directive drive

At a glance

56

Dimensions and connections

59



FDK compressor units

Based on the F compressor series with its many designs and application options, a selection of compressor units with compact construction is available for use with direct drive.
 Compressor with flexible shaft coupling for direct drive mounted on a profile base frame. The power transmission from motor to compressor occurs via an elastic flexible shaft coupling. The automatic self-aligning of motor and compressor is achieved using coupling bell. ICE standard motors of type IM B5 are used as drive motors (option).

The special features:

Designed for optimum running comfort

- simple and robust construction
- use of standard motors
- optimum power transmission via direct coupling

Service-friendly

- Flexible shaft coupling can be separated in its installed state, which enables maintenance work to be carried out on the compressor and motor, without having to dismantle them from the base frame.

SFD compressor units

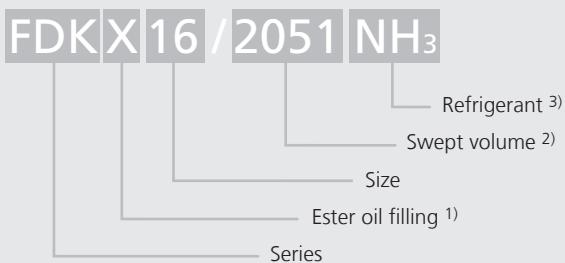
Compressor with flexible shaft coupling for direct drive mounted on a profile base frame. Power transmission from motor to compressor occurs via an elastic flexible shaft coupling. The automatic self-aligning of motor and compressor is achieved using coupling bell. ICE standard motors of type IM B5 are used as drive motors (option).

The special features:

Designed for optimum running comfort

- simple and robust construction
- use of standard motors
- optimum power transmission via direct coupling
- optimum alignment of motor and compressor via coupling bell

Type key



¹⁾ X - Ester oil filling (HFC refrigerant e.g. R134a, R407C)

²⁾ Indication only at FDK14, FDK16 and FDK18

³⁾ Indication only at NH₃ version

Type key



¹⁾ X - Ester oil filling (HFC refrigerant e.g. R134a, R407C)



The current program

...6 model sizes with 9 capacity stages from 20,3 to 281,3 m³/h (50 Hz)

Models available	Displacement (1.450 rpm) [m ³ /h]
FDK 3	
FDK 3 NH ₃	20,3
FDK 4	
FDK 4 NH ₃	40,5
FDK 5	
FDK 5 NH ₃	73,7
FDK 14	
FDK 14 NH ₃	101,5 / 118,9
FDK 16	
FDK 16 NH ₃	152,2 / 178,4
FDK 18	238,0 / 281,3

Models available	Displacement (1.450 rpm) [m ³ /h]
SFD 18	238,0 / 281,3

1
2
3
4

Operating limits

You will find the operating limits diagrams for the various refrigerants in the chapter entitled „F compressors” from page 15 onwards as well as in „F compressors for NH₃ series” from page 41 onwards.

Performance data

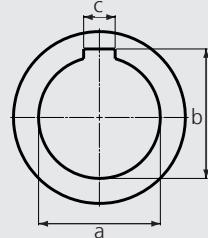
You will find the performance data for the various refrigerants in the chapter entitled „F compressors” from page 16 onwards as well as in „F compressors for NH₃ series” from page 42 onwards.

Technical data

You will find the technical data for the various compressors in the chapter entitled „F compressors” from page 24 onwards as well as in „F compressors for NH₃ series” from page 44 onwards.

Scope of supply FDK

- Open type F or F-NH₃ compressors for direct drive
- Mounted on a profile base frame
- With shaft coupling and coupling protection
- Hub on the motor side of the shaft coupling manufactured according to customer specifications.
Required dimensions, see fig. (otherwise only one pilot hole)
- Without drive motor
- 4 rubber sheets as an extra item



You will find further information on the scope of supply for the individual basic compressors in the chapter entitled „F compressors“ from page 34 onwards as well as in „F compressors for NH₃ series“ from page 52 onwards.

Scope of supply SFD

- Open type F compressors for direct drive
- Mounted on a profile base frame
- With shaft coupling and coupling bell
- Without drive motor
- 4 rubber sheets as an extra item

You will find further information on the scope of supply for the individual basic compressors in the chapter entitled „F compressors“ from page 34 onwards.

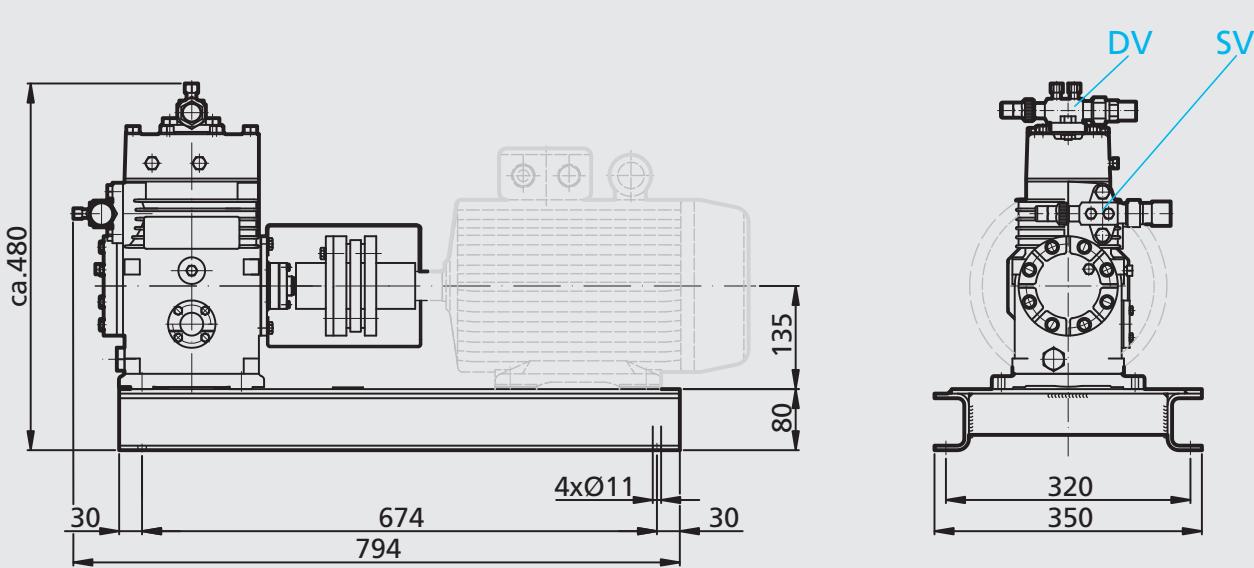
Accessories

- Drive motors 4 to 90 KW, mounted and aligned, IP55
FDK3 to FDK18: design IMB3
SFD18: design IMB5
- Instrument panel can be equipped with ¹⁾:
HP-, LP switch and pressure gauge, oil pressure gauge, oil differential pressure switch

You will find the accessories for the various compressors in the chapter entitled „F compressors“ from page 36 onwards as well as in „F compressors for NH₃ series“ from page 53 onwards.

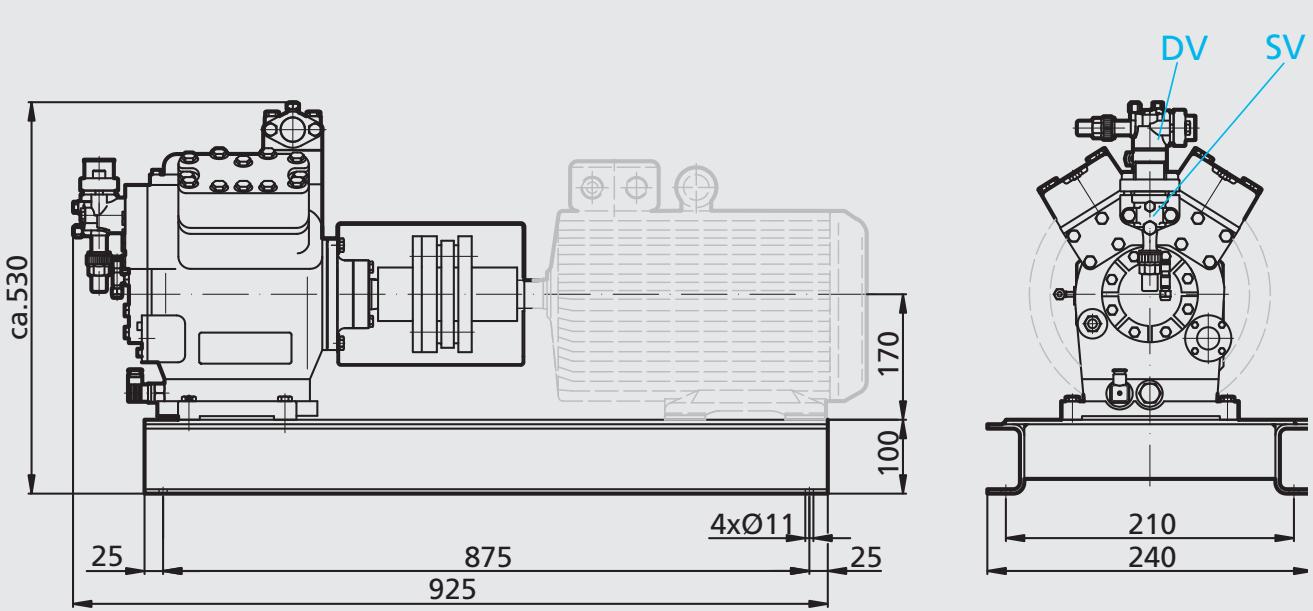
¹⁾ not available for NH₃ version

FDK3



1
2
3
4

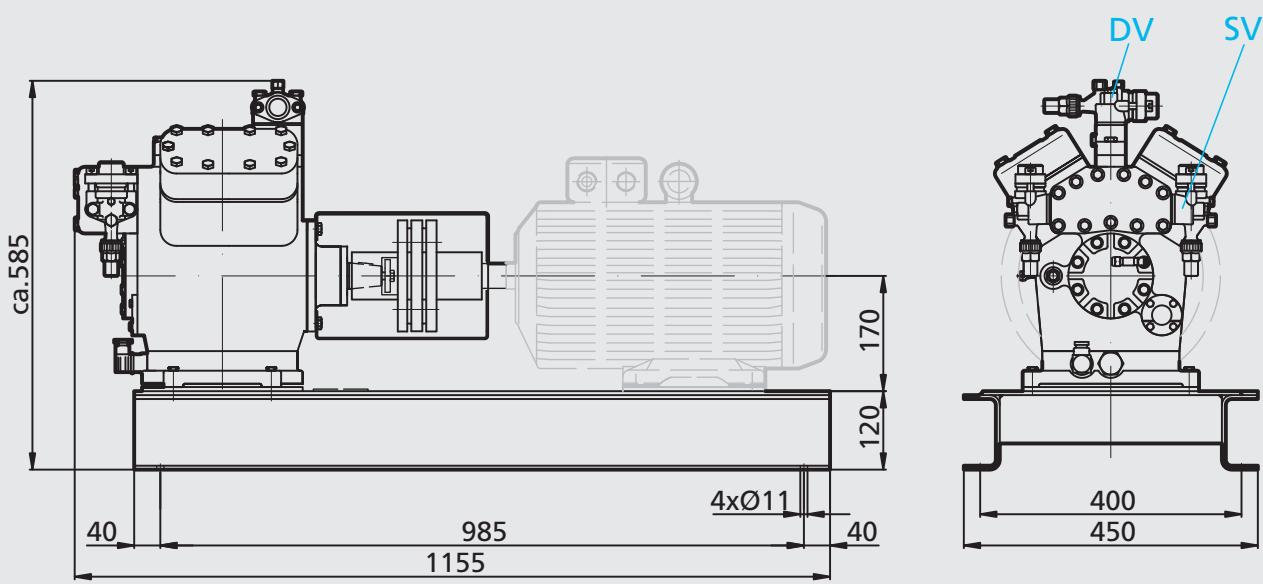
FDK4



Dimensions in mm
Motor accessories

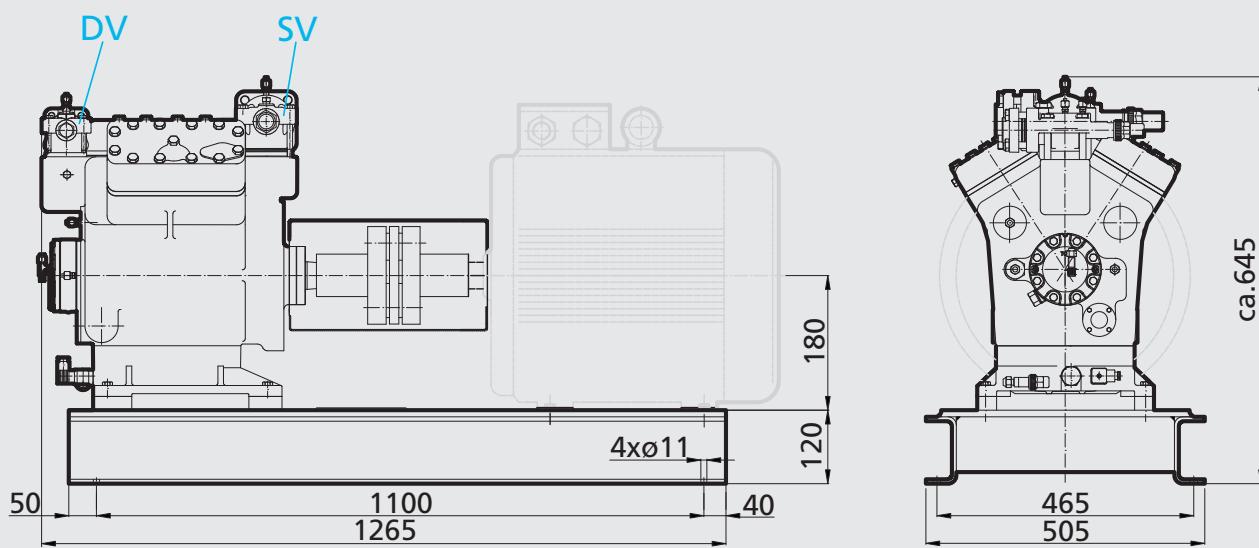
further dimensions and connections see page 26, 27

FDK5



FDK14

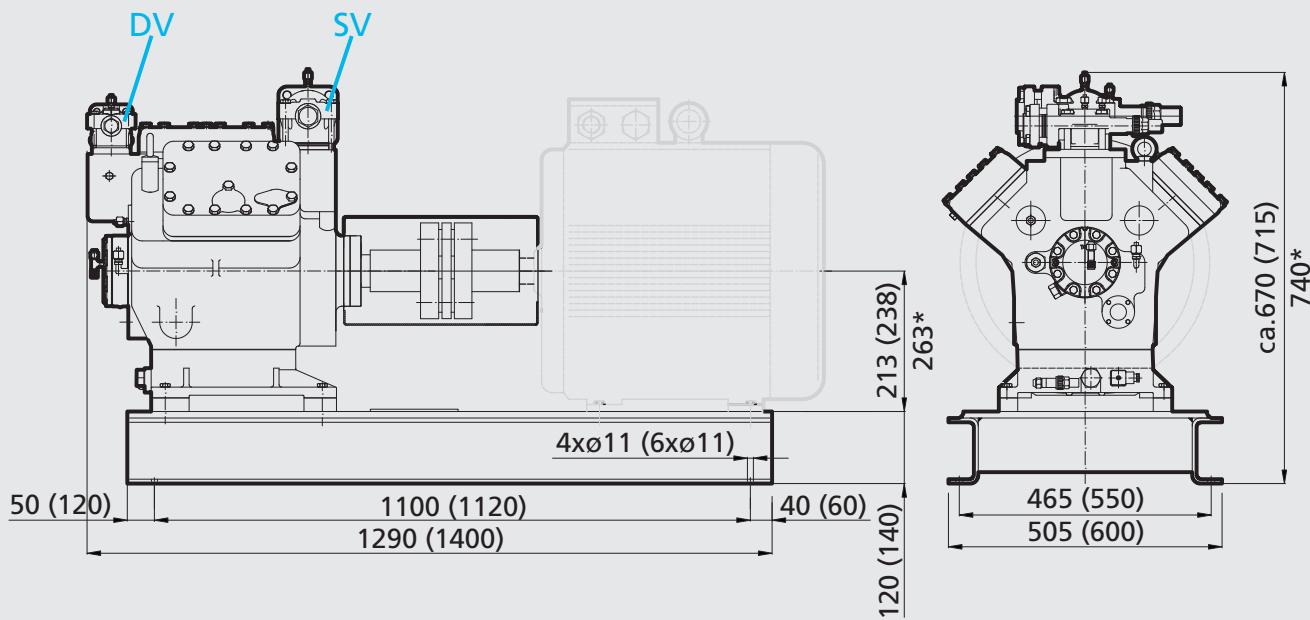
FDK14/1166 FDK14/1366



FDK16

FDK16/1751

FDK16/2051



Dimensions in () = For motor rated power (kW) 37, 45, 55

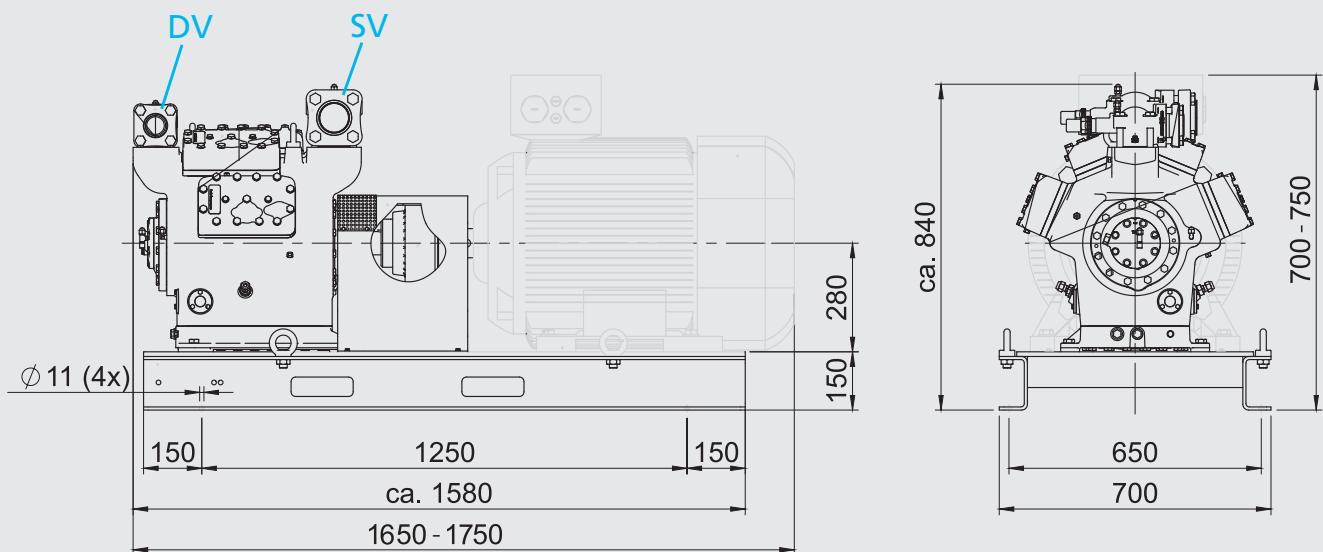
* = For motor rated power (kW) 55

1
2
3
4

FDK18

FDK18/2735

FDK18/3235



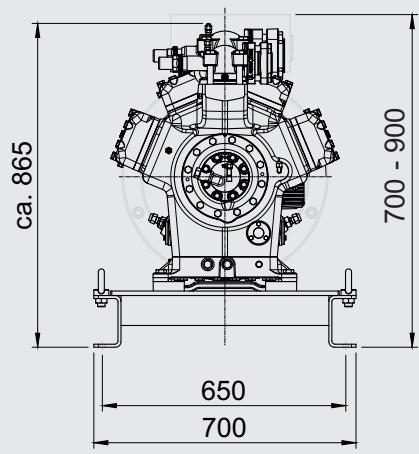
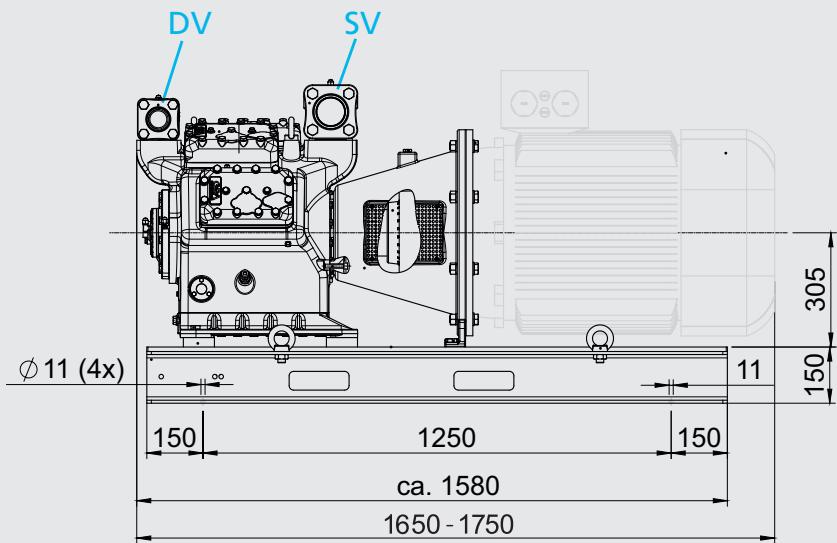
Dimensions in mm
Motor accessories

further dimensions and connections see page 30, 31

SFD18

SFD18/2735

SFD18/3235



Dimensions in mm
Motor accessories

further dimensions and connections see page 31

GEA Bock open type compressors

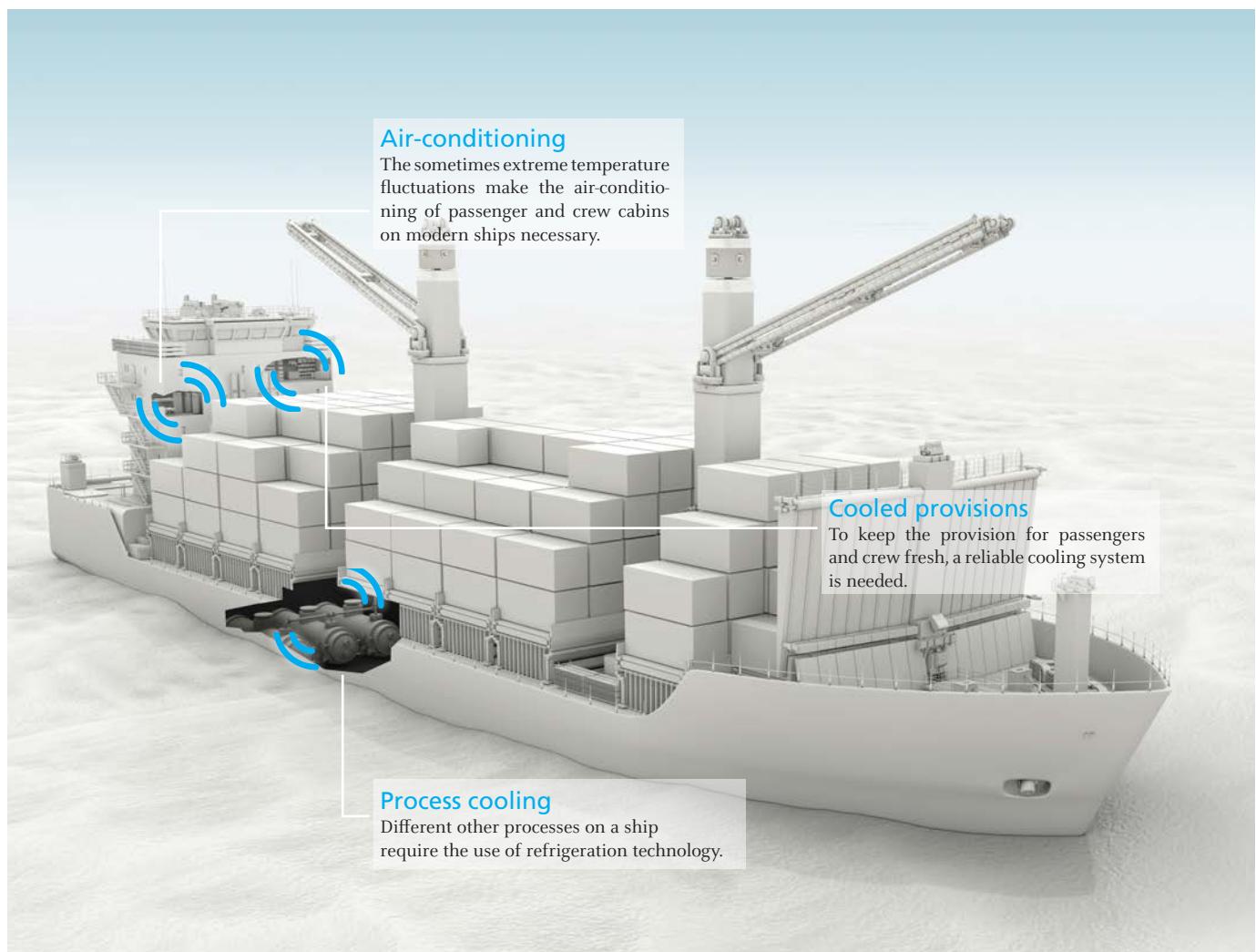
Compressor solutions for the entire ship

GEA Bock compressors fulfill the high maritime demands already for many years. They help to provide a comfortable climate in cabins, keep provisions cooled and are additionally used in many other applications.

GEA Bock compressors also work reliably on container ships, passenger ships or fishing boats.

With a broad product range of open type and semi-hermetic compressors, the GEA Bock program has the right compressor for nearly all refrigeration and maritime applications.

Together with the program of industrial Grasso piston and screw compressors, GEA offers the broadest compressor program for maritime applications.





We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA Group is a global engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881, the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 index.

GEA Refrigeration Technologies

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