

Bock HG Compressors - R410A

Semi-hermetic Compressors for the Refrigerant R410A



GEA Bock - More than a compressor

Over 75 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.

Today, GEA Bock offers as part of GEA Refrigeration Technologies the right compressor for all fields of commercial-, industrial-, rail-, bus- and transport refrigeration.

In this brochure we present you our semi-hermetic compressors for the refrigerant R410A.

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



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. Deviations cannot be ruled out because of the ongoing development process for our products.

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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
- ° R410A 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

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.

- ° Single-stage compressors
- ° NH₃ compressors
- ° Compressor units for direct drive
- ° NH₃ Compressor units for direct drive



° R410A compressor

The refrigerant R410A

Our solutions are customer-oriented and user-friendly, because they are low-priced, energy-efficient, long-lasting and tailored to your individual needs.

Based on our current semi-hermetic product range, with its outstanding advantages and features, as well as our longstanding activities and field applications for the transport sector, there is now a perfectly matched compressor series available for use with R410A for selected projects.

It is particularly suited for air-conditioning applications, heat pumps and industrial refrigeration systems.

Condensing pressures of up to 43 bar possible (= approx. 65°C condensing temperature).

Special features

As Bock compressors are of extremely high quality and robust, the coordination with R410A is limited primarily to the motor design together with the individual mechanism adjustments as well as small modifications in the valve and seal areas.

This permits the greatest possible level of operational safety through the extensive use of tried-and-trusted standard parts. In addition, there are the best possible conditions for economic spare part storage.

The refrigerant R410A

Besides R407C, R410A is also considered a long-term replacement refrigerant for R22. In addition, it is an alternative to R134a. It is almost azeotropic and behaves like a single component refrigerant – the temperature glide is very small.

However, compared to R22, R410A has a considerable higher pressure level. At 25 bar, it has a condensing temperature of 42°C, whereas R22 has a condensing temperature of 62°C. Therefore, the volumetric refrigeration capacity may be up to 50% higher than that of R22.

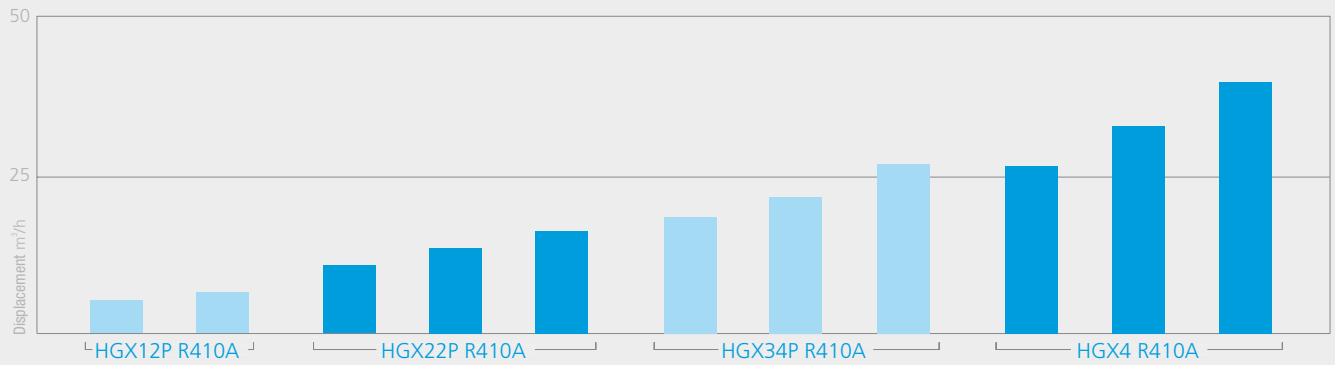
Suitable refrigeration oils are ester oils, such as Fuchs Reniso SE55.

- R410A (50% R32 and 50% R125)
- ODP = 0; GWP = 1725
- Non-toxic, non-combustible
- Low temperature glide
- High pressure level
- High volumetric refrigeration capacity



The current program

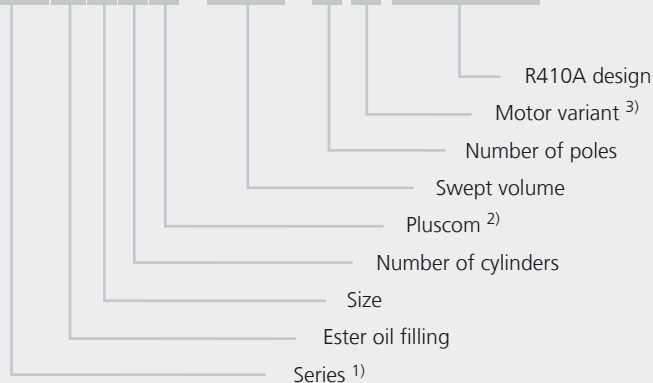
...4 model sizes with 11 capacity stages from 5,4 to 40,5 m³/h (50 Hz)



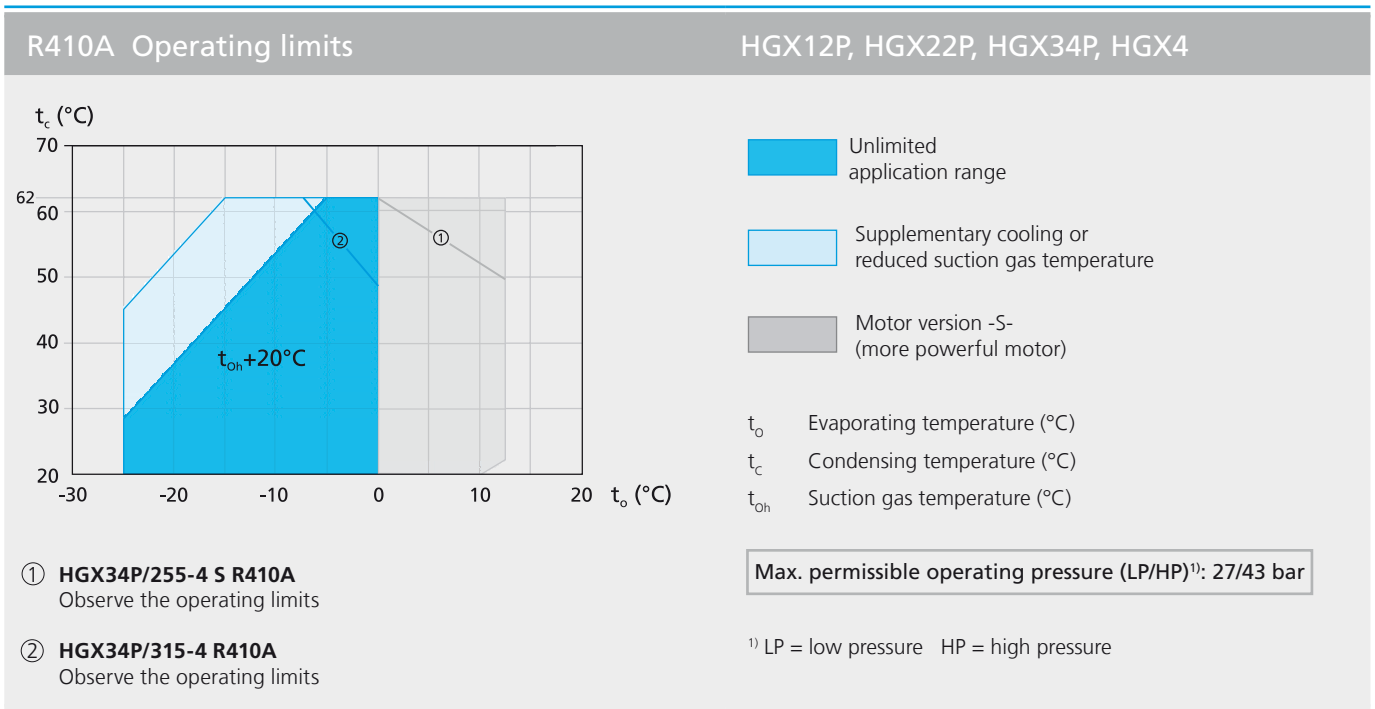
Available models	Displacement 50 Hz (1.450 rpm)
HGX12P/60-4 R410A HGX12P/60-4 S R410A	5,40 m ³ /h
HGX12P/75-4 R410A HGX12P/75-4 S R410A	6,70 m ³ /h
HGX22P/125-4 R410A HGX22P/125-4 S R410A	11,10 m ³ /h
HGX22P/160-4 S R410A	13,70 m ³ /h
HGX22P/190-4 R410A HGX22P/190-4 S R410A	16,50 m ³ /h
HGX34P/215-4 R410A HGX34P/215-4 S R410A	18,80 m ³ /h
HGX34P/255-4 S R410A	22,10 m ³ /h
HGX34P/315-4 S R410A	27,30 m ³ /h
HGX4/310-4 R410A HGX4/310-4 S R410A	27,10 m ³ /h
HGX4/385-4 S R410A	33,50 m ³ /h
HGX4/465-4 R410A HGX4/465-4 S R410A	40,50 m ³ /h

Type key - compressor for R410A

HGX34P / 215 - 4 S R410A



- ¹⁾ HG = Compressor Hermetic Gas-cooled (suction gas-cooled)
- ²⁾ = Additional declaration for Pluscom compressors
- ³⁾ S = More powerful motor e.g. air-conditioning applications



R410A notes

Operating limits

Compressor operation is possible within the limits shown on the application diagrams. Please note the coloured areas. Compressor application limits should not be chosen for design purposes or continuous operation.

Restrictions to the operating limits may occur when using the Bock EFC (Electronic Frequency Control). More explanations see sample calculation in brochure "Bock Semi-hermetic Compressors Electronic Controls".

Performance data


The performance data for R410A are based on 20K suction gas superheat without liquid subcooling, at **50 Hz power supply frequency**.

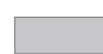
These are **preliminary values** as no uniform reference data are available. Besides which the influence of the oil part on refrigeration performance is largely unknown. **Variations cannot be excluded.**

Conversion factor for 60 Hz = 1.2

R410A		Performance data										50 Hz	
Type	Cond. temp. °C		Cooling capacity \dot{Q}_o [W]						Power consumption P_e [kW]				
			Evaporating temperature °C										
			12,5	10	7,5	5	0	-5	-10	-15	-20	-25	
HGX4/310-4 R410A HGX4/310-4 S R410A	30	Q	53590	49284	45239	41446	34575	28591	23417	18973	15182	11965	
		P	7,34	7,61	7,79	7,89	7,89	7,67	7,27	6,77	6,22	5,68	
	40	Q	46337	42573	39042	35735	29753	24547	20039	16152	12805	9921	
		P	9,86	9,85	9,77	9,64	9,21	8,63	7,96	7,25	6,57	5,97	
	50	Q	39028	35813	32804	29990	24912	20498	16672	13354	10466		
		P	12,00	11,75	11,45	11,11	10,33	9,47	8,59	7,75	7,01		
HGX4/385-4 S R410A	30	Q	65359	60132	55224	50622	42290	35041	28780	23411	18839	14969	
		P	9,73	9,98	10,12	10,17	10,04	9,65	9,08	8,40	7,70	7,04	
	40	Q	56324	51790	47539	43560	36368	30118	24716	20064	16069	12634	
		P	13,14	13,04	12,86	12,62	11,96	11,13	10,22	9,30	8,44	7,71	
	50	Q	47370	43531	39940	36585	30536	25289	20748	16817	13402		
		P	15,98	15,58	15,13	14,63	13,54	12,38	11,22	10,15	9,22		
HGX4/465-4 R410A HGX4/465-4 S R410A	30	Q	80909	74450	68382	62689	52367	43360	35547	28804	23010	18041	
		P	12,02	12,43	12,69	12,82	12,74	12,29	11,56	10,65	9,66	8,68	
	40	Q	70775	65079	59733	54719	45632	37694	30783	24777	19553	14989	
		P	15,69	15,69	15,57	15,36	14,67	13,72	12,61	11,43	10,28	9,27	
	50	Q	60393	55475	50864	46546	38722	31883	25905	20664	16040		
		P	18,85	18,51	18,08	17,59	16,42	15,11	13,75	12,44	11,27		

Relating to 20 °C suction gas temperature without liquid subcooling

 Supplementary cooling or reduced suction gas temperature

 Motor version -S- (more powerful motor)

R410A Type	Number of cylinders	Displacement 50 / 60 Hz (1450 / 1740 rpm) m³/h	Electrical data				Weight kg	Connections ⑤		Oil charge Ltr.
			Vol- tage ①	Max. working current ②	Max. power consumption ②	Starting current (rotor locked) ②		Discharge line DV	Suction line SV	
				A Δ / Y	kW	A Δ / Y		mm inch	mm inch	
HGX12P/60-4 R410A HGX12P/60-4 S R410A	2	5,40 / 6,40	③	8,8 / 5,1 9,5 / 5,5	3,1 3,2	40 / 23 43 / 25	48 50	12 1/2	16 5/8	0,8
HGX12P/75-4 R410A HGX12P/75-4 S R410A	2	6,70 / 8,10	③	9,9 / 5,7 11,1 / 6,4	3,3 3,7	43 / 25 45 / 26	49	12 1/2	16 5/8	0,8
HGX22P/125-4 R410A HGX22P/125-4 S R410A	2	11,10 / 13,30	③	15,6 / 9,0 19,2 / 11,1	5,3 6,6	67 / 40 121 / 70	76 78	16 5/8	22 7/8	1,0
HGX22P/160-4 S R410A	2	13,70 / 16,40	③	23,7 / 13,7	8,1	121 / 70	82	16 5/8	22 7/8	1,0
HGX22P/190-4 R410A HGX22P/190-4 S R410A	2	16,50 / 19,80	③	24,6 / 14,2 29,3 / 16,9	8,4 9,7	121 / 70 134 / 77	81 84	16 5/8	22 7/8	1,0
HGX34P/215-4 R410A HGX34P/215-4 S R410A	4	18,80 / 22,60	③	25,9 / 15,0 29,3 / 16,9	8,9 9,7	111 / 64 132 / 76	95 98	16 5/8	22 7/8	1,3
HGX34P/255-4 S R410A	4	22,10 / 26,60	③	29,9 / 17,3	9,9	132 / 76	97	16 5/8	28 1 1/8	1,3
HGX34P/315-4 R410A	4	27,30 / 32,80	③	30,5 / 17,6	10,1	132 / 76	97	22 7/8	28 1 1/8	1,3
				* PW 1+2		*PW1 / PW 1+2				
HGX4/310-4 R410A HGX4/310-4 S R410A	4	27,10 / 32,50	④	20,8 30,6	12,3 17,9	57 / 75 82 / 107	149 152	22 7/8	28 1 1/8	2,7
HGX4/385-4 S R410A	4	33,50 / 40,20	④	31,6	18,5	82 / 107	151	22 7/8	28 1 1/8	2,7
HGX4/465-4 R410A HGX4/465-4 S R410A	4	40,50 / 48,60	④	31,9 38,2	18,7 22,2	82 / 107 107 / 140	151 154	28 1 1/8	35 1 3/8	2,7

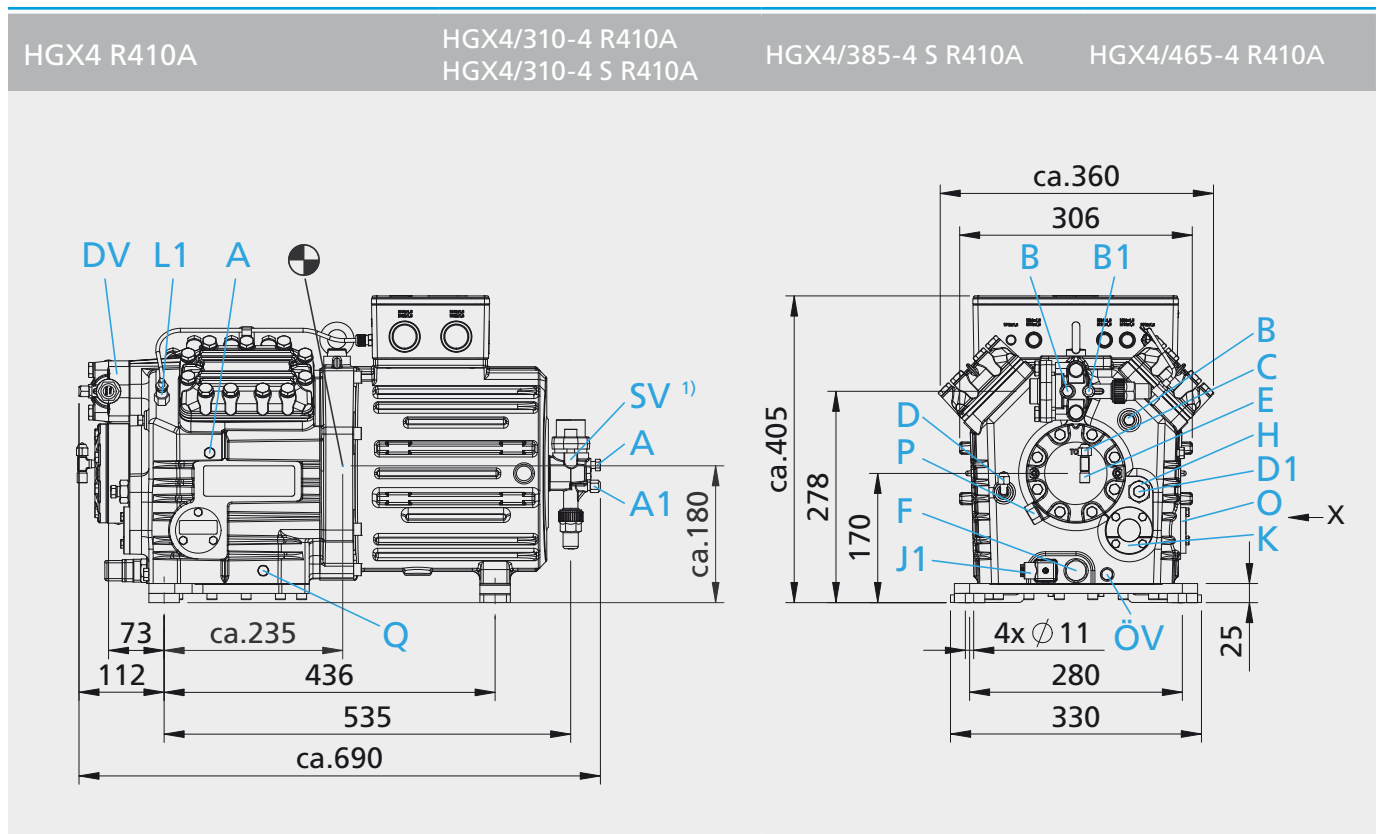
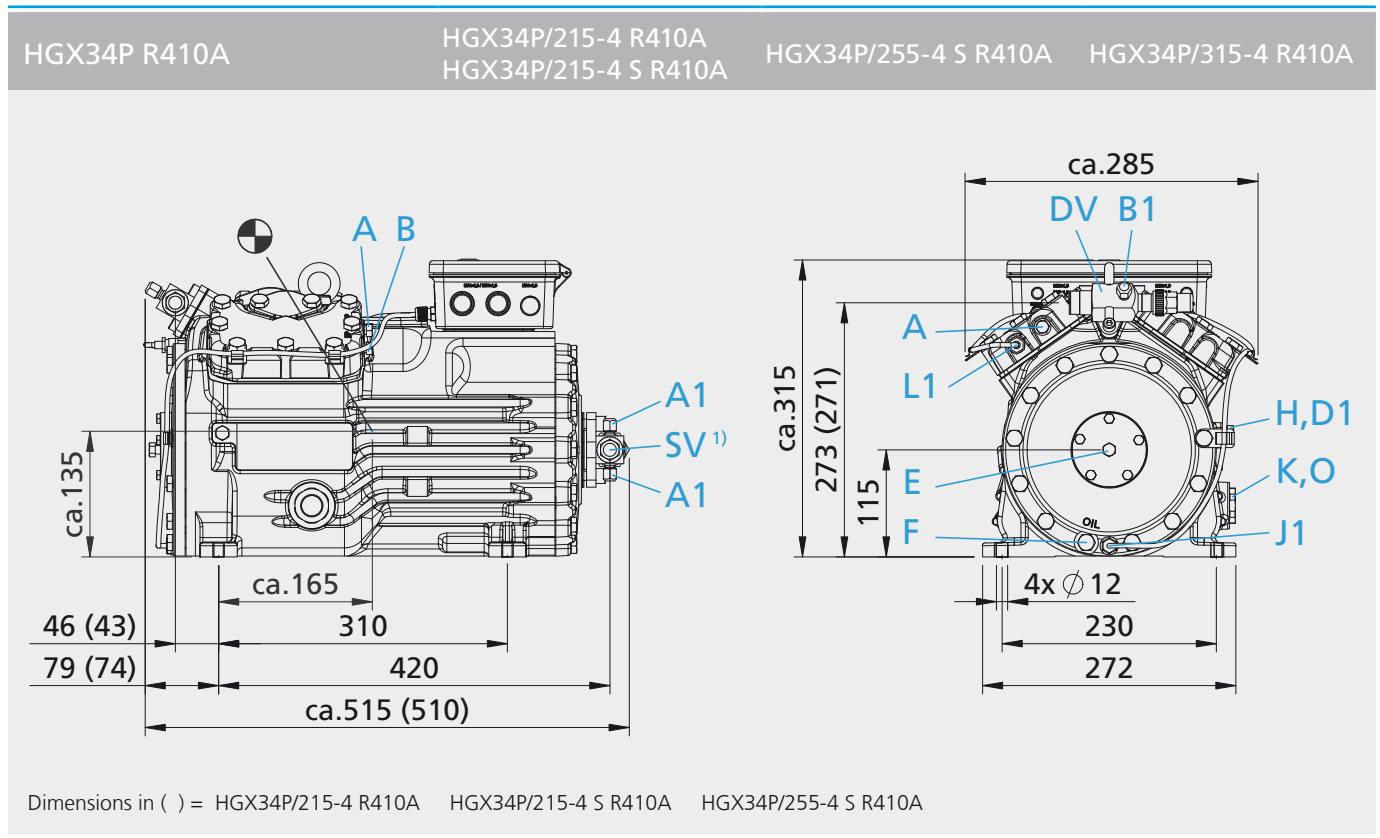
* PW = Part Winding, motors for part winding start 1 = 1. part winding 2 = 2. part winding

Explanations:

- ① Tolerance (± 10%) relates to the mean value of the voltage range. Other voltages and current types on request.
- ② - The specifications for max. power consumption apply for 50 Hz operation. For 60 Hz operation, the specifications have to be multiplied by the factor 1.2.
The max. working current remains unchanged.
- Take account of the max. operating current / max. power consumption when designing contactors, leads and fuses.
Switches: service category AC3
- ③ 220-240 V Δ / 380-420 V Y - 3 - 50 Hz
265-290 V Δ / 440-480 V Y - 3 - 60 Hz
- ④ 380-420 V Y/YY - 3 - 50 Hz PW
440-480 V Y/YY - 3 - 60 Hz PW
PW = Part Winding, motors for part winding start
(no start unloaders required)
- Winding ratio: 66% / 33%
- Designs for Y/Δ on request
- ⑤ For soldering connections

Oil sump heater 110-240 V - 1 - 50/60 Hz
HGX12P, HGX22P, HGX34P: 50-120 W
PTC heater, self-regulating, installation in housing bore

Oil sump heater 230 V - 1 - 50/60 Hz
HGX4: 80 W
Permanently set version, installation in immersion sleeve



¹⁾ SV 90° rotatable
 Centre of gravity

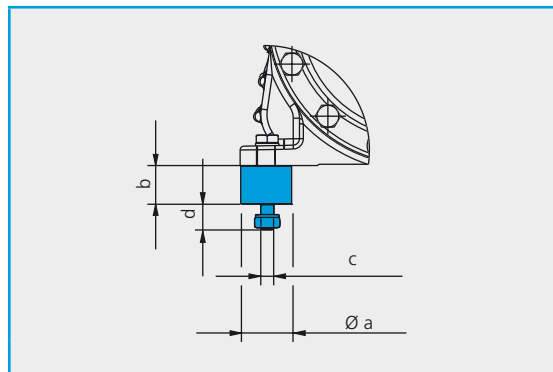
Dimensions in mm

Connections		HGX12P R410A	HGX22P R410A	HGX34P R410A	HGX4 R410A
SV	Suction line	please refer to Technical data page 9			
DV	Discharge line				
A	Connection suction side, not lockable	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
B	Connection discharge side, not lockable	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
C	Connection oil pressure safety switch OIL	-	-	-	7/16" UNF
D	Connection oil pressure safety switch LP	-	-	-	7/16" UNF
D1	Connection oil return from oil separator	1/4" NPTF	1/4" NPTF	1/4" NPTF	1/4" NPTF
E	Connection oil pressure gauge	1/8" NPTF	1/8" NPTF	1/8" NPTF	1/8" NPTF
F	Oil drain	M 8	M 10	M 10	M 22 x 1,5
H	Oil charge plug	1/4" NPTF	1/4" NPTF	1/4" NPTF	M 22 x 1,5
J1	Oil sump heater	Ø 15 mm	Ø 15 mm	Ø 15 mm	M 22 x 1,5
K	Sight glass	1 1/8" - 18 UNEF	1 1/8" - 18 UNEF	1 1/8" - 18 UNEF	4 hole M 6
L1	Thermal protection thermostat	1/8" NPTF	1/8" NPTF	1/8" NPTF	1/8" NPTF
O	Connection oil level regulator	1 1/8" - 18 UNEF	1 1/8" - 18 UNEF	1 1/8" - 18 UNEF	①
ÖV	Connection oil service valve	-	-	-	1/4" NPTF
P	Connection oil differential pressure sensor	-	-	-	M 20 x 1,5
Q	Connection oil temperature sensor	-	-	-	1/8" NPTF

① Dimensions for view X see page 13

Dimensions for anti-vibration pad

Type	Ø a mm	b mm	c mm	d mm
HGX12P R410A	30	30	M8	20
HGX22P R410A	40	30	M10	20
HGX34P R410A	40	30	M10	20
HGX4 R410A	40	30	M10	10

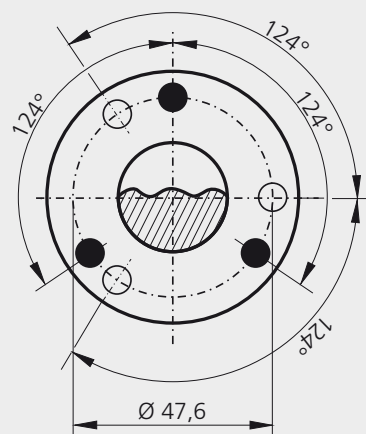


View X

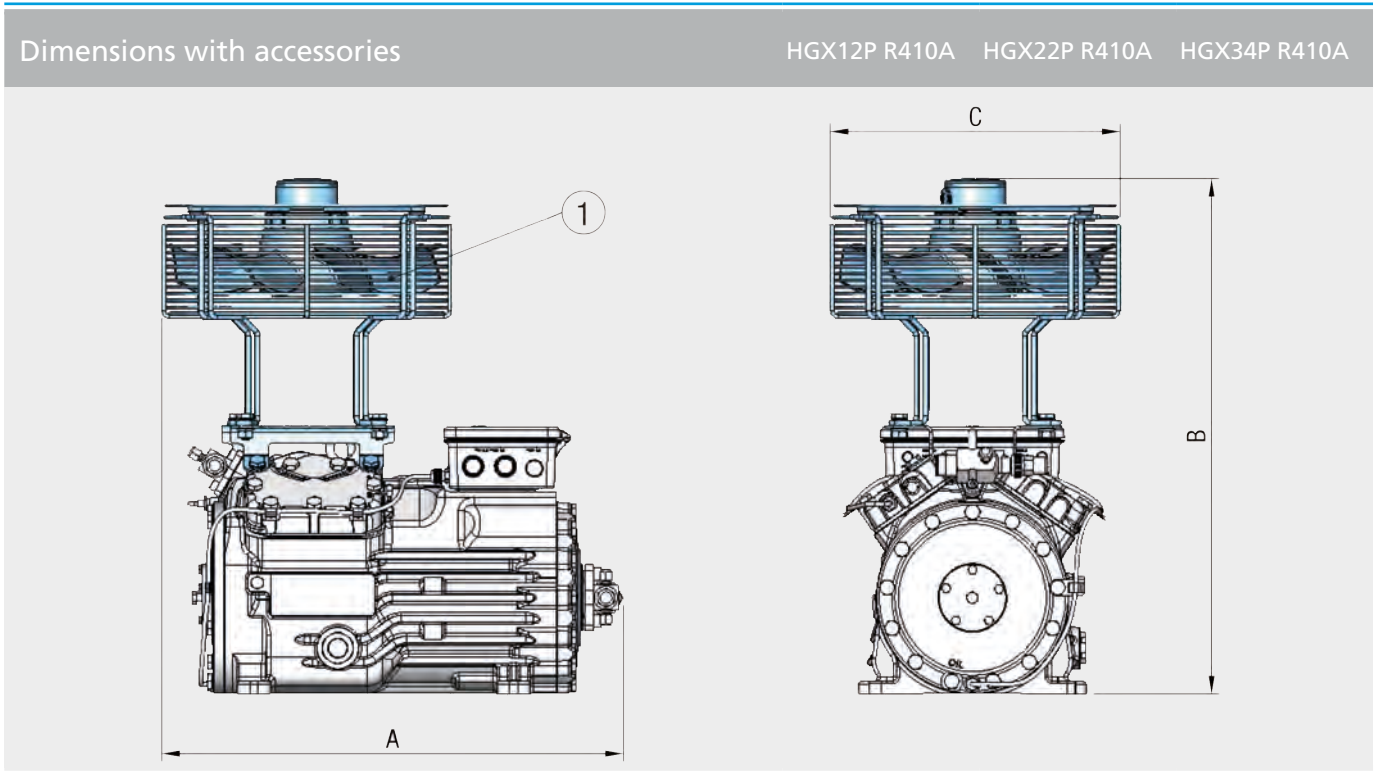
Possibility to connect to oil level regulator

HGX4... R410A

- 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 (3 x M6 x 10 deep)



Dimensions in mm



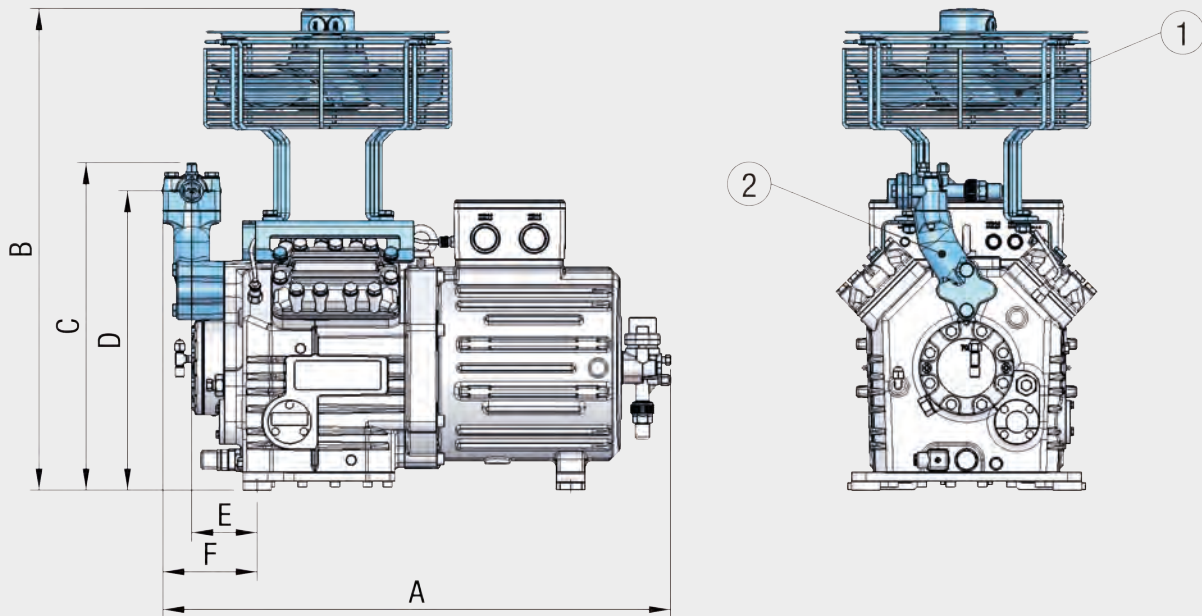
① Additional fan

Type	A mm	B mm	C mm
HGX12P R410A	ca. 460	ca. 500	ca. 315
HGX22P R410A	ca. 550 (515)	ca. 595	ca. 350
HGX34P R410A	ca. 550	ca. 620	ca. 350

Dimensions in () = only for HGX22P/125-4 R410A

Dimensions with accessories

HGX4 R410A



- ① Additional fan ② Intermediate adapter for discharge line valve

Type	A mm	B mm	C mm	D mm	E mm	F mm
HGX4 R410A	ca. 705	ca. 680	ca. 455	416	91	131

Scope of supply	HGX12P R410A	HGX22P R410A	HGX34P R410A	HGX4P R410A
Semi-hermetic two cylinder reciprocating compressor with drive motor for direct start 220-240 V Δ / 380-420 V Y - 3 - 50 Hz 265-290 V Δ / 440-480 V Y - 3 - 60 Hz Single-section compressor housing with hermetically integrated electric motor	●	●		
Semi-hermetic four cylinder reciprocating compressor with drive motor for direct start 220-240 V Δ / 380-420 V Y - 3 - 50 Hz 265-290 V Δ / 440-480 V Y - 3 - 60 Hz Single-section compressor housing with hermetically integrated electric motor			●	
Semi-hermetic four cylinder reciprocating compressor with drive motor for part winding start 380-420 V Y/YY - 3 - 50 Hz 440-480 V Y/YY - 3 - 60 Hz Motor unit flanged onto the compressor housing				●
Winding protection with PTC resistor sensors and electronic triggering unit Bock MP10	●	●	●	●
Thermal protection thermostat (PTC sensor)	●	●	●	●
Oil pump cover with screwed connection for differential oil pressure sensor (Δp-switch Kriwan make)				●
Connection possibility of oil level controllers ESK, AC+R, CARLY	● ¹⁾	● ¹⁾	● ¹⁾	●
Connection possibility of oil level controllers Traxoil	● ¹⁾	● ¹⁾	● ¹⁾	● ¹⁾
Oil sump heater 110-240 V - 1 - 50/60 Hz, 50-120 W PTC heater, self regulating	●	●	●	
Oil sump heater 230 V - 1 - 50/60 Hz, 80 W				●
Oil charge: Fuchs Reniso SE55	●	●	●	●
Sight glass	●	●	●	●
Decompression valve				●
Suction and discharge line valve	●	●	●	●
Inert gas charge	●	●	●	●
4 anti-vibration pads enclosed	●	●	●	●

¹⁾ Only possible with additional adapter.

Accessories	HGX12P R410A	HGX22P R410A	HGX34P R410A	HGX4 R410A
① Bock ESS (Electronic Soft Start) IP20 (connection clamps IP00) for installation in switch cabinet		●	●	●
② Continuously variable speed control by means of a Bock EFC (Electronic Frequency Control), compactly built onto compressor and Connected ready-to-operate HGX12P: IP65 HGX22P/HGX34P: IP54	●	●	●	
③ Continuously variable speed control by means of a Bock EFCe (Electronic Frequency Control for individual installation) IP54 Compressor oil Bock SE55 as refill unit in 1 or 5 liter packaging	●	●	●	●
④ Oil differential pressure sensor (Δp -switch Kriwan make) 220-240 V - 1 - 50/60 Hz				●
⑤ Oil service valve				●
⑥ Bock Compressor Management BCM2000 including oil pressure control, oil temperature control (NTC), thermal protection thermostat (PTC) per cylinder cover (only possible ex-works)				●
⑦ Water-cooled cylinder covers Sea water resistant water-cooled cylinder covers				● ●
⑧ Additional fan 220-240 V - 1 - 50/60 Hz, 72/68 W, IP44 enclosed	●			
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 enclosed		● ¹⁾	● ¹⁾	● ¹⁾
⑨ Intermediate adapter for discharge line valve				●

¹⁾ Voltage range \pm 10%

ESS Electronic Soft Start

①



EFC Electronic Frequency Control

②



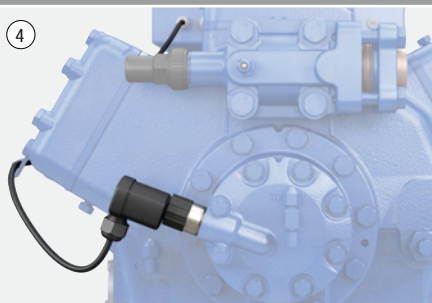
EFCE Electronic Frequency Control external

③



Oil differential pressure sensor

④



Oil service valve

⑤



BCM2000 Bock Compressor Management

⑥



Water-cooled cylinder covers

⑦



Additional fan

⑧



Intermediate adapter for discharge line valve

⑨

