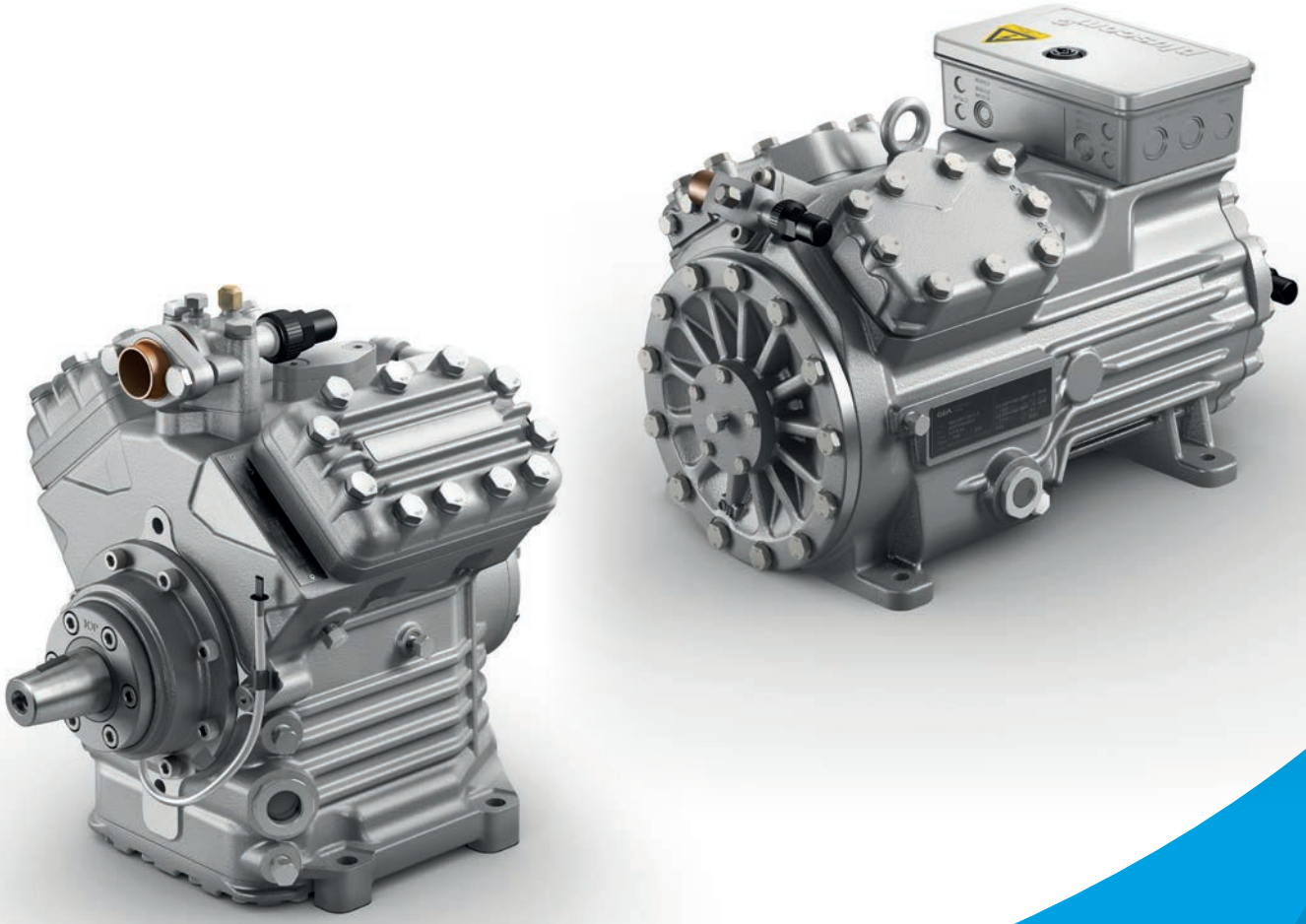


GEA Bock FK and HG compressors for mobile applications

For bus- and railway air-conditioning

engineering for
a better world

gea.com

Special features

Semi-hermetic 2- und 4-cylinder compressors

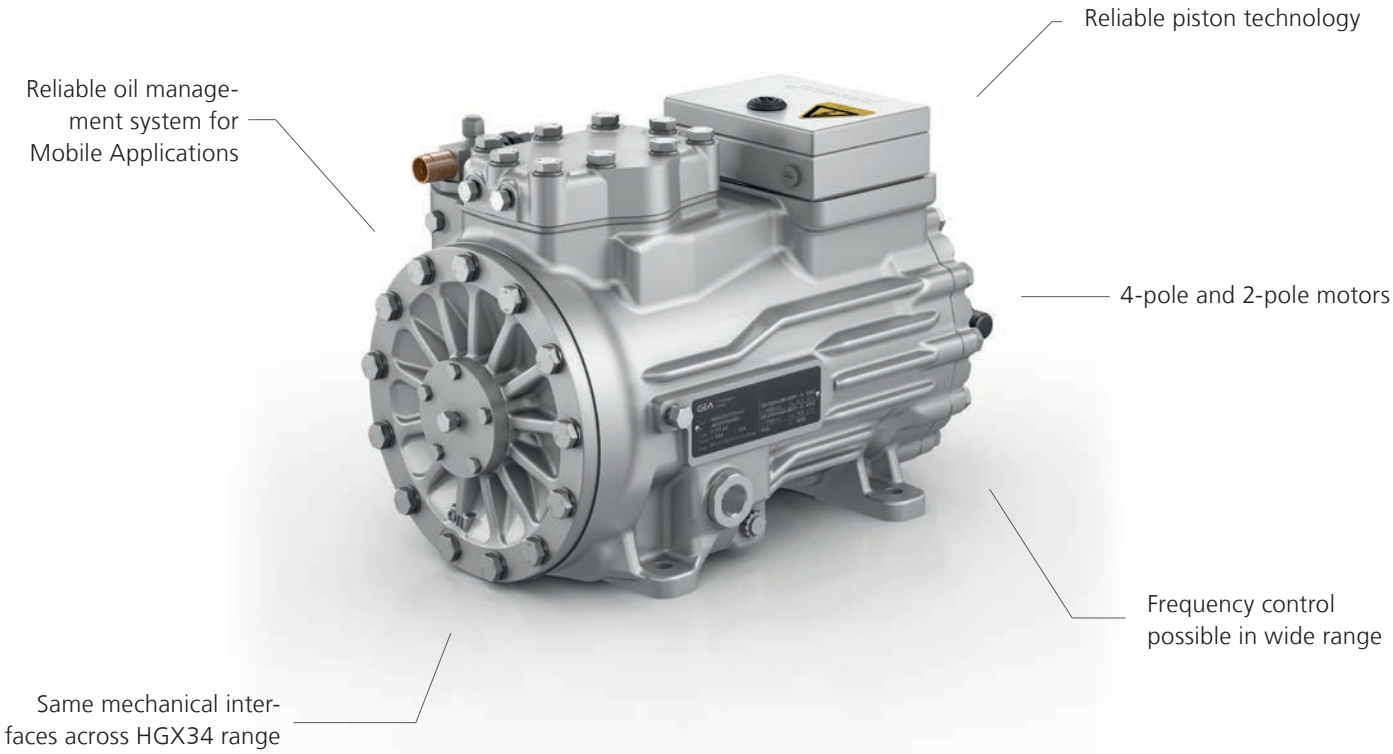
The HG compressors are specially designed for mobile applications. They have a low weight, particularly in the aluminium version, and this is of crucial importance for many applications. The 2-pole version also allows a significant increase in capacity with the same installation space.

Universal

- Housing in aluminium and cast iron
- One compressor design for all standard refrigerants.
  For air-conditioning applications, normal refrigeration and deep-freezing
  e. g. R134a, R404A, R507, R407C, R22, R513A
- Maximum allowed operating pressure: 28 bar
- On request maximum allowed operating pressure: 35 bar

High refrigeration capacity combined with minimum power requirement

- Optimized gas flow
- Efficient service valves
- Minimum clearance volume
- Powerful, economic drive motors



SEMI-HERMETIC COMPRESSORS WITH 2-POLE DRIVE MOTOR

Based on our compressors of the Pluscom series with its outstanding advantages and features, GEA offers already for some time a compressor version with 2-pole drive. This compressor version enables double the rotation speed to be achieved with the same mains power frequency, and this gives a refrigerating capacity that is up to 70 % higher than that of a 4-pole motor.

This increase in the maximum possible compressor capacity can be realized through the use of a special valve plate system. The socalled GEA Bock K valve plate, which was developed by GEA Bock especially for mobile applications, is already used thousands of times in the area of bus air-conditioning and sets the international standard for quality and reliability.

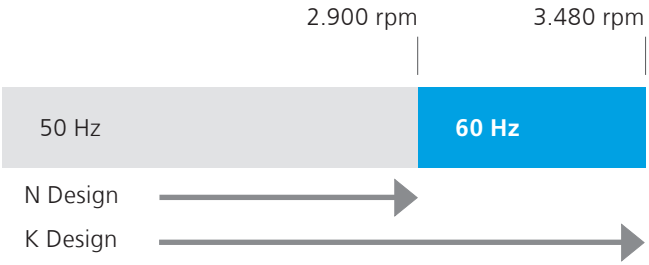
Shall the compressor without a frequency converter operate at a power supply frequency of 50 Hz, the adaptation of the mains frequency is necessary. e.g.

- 400 V / 50 Hz
- 460 V / 60 Hz

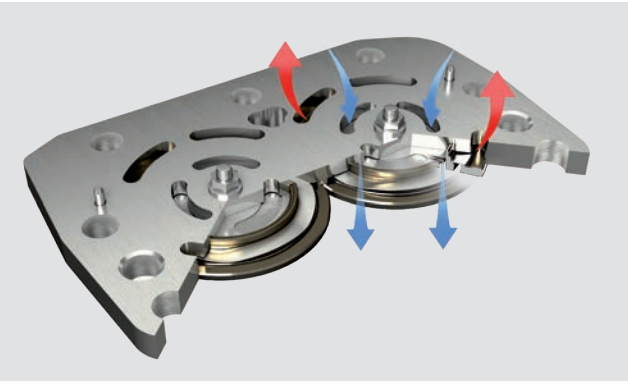
Advantages

- High performance with 2-pole drive motor (up to 3.480 rpm)
- With oil pump lubrication as standard
- Optional: GEA Bock K valve plate
- Available in aluminium lightweight design (ca. 40 % weight savings)
- Also available with terminal box with reduced height

Available models	Displacement 50 Hz (2.900 rpm)	Displacement 60 Hz (3.480 rpm)
HGX34P/255-2 HGX34P/255-2 A	44,3 m³/h	–
HGX34P/315-2 HGX34P/315-2 A HGX34P/315-2 S HGX34P/315-2 S A	54,7 m³/h	–
HGX34P/315-2 A K HGX34P/315-2 S A K	54,7 m³/h	65,6 m³/h
HGX34P/380-2 HGX34P/380-2 A	66,1 m³/h	–
HGX34P/380-2 A K	66,1 m³/h	79,4 m³/h

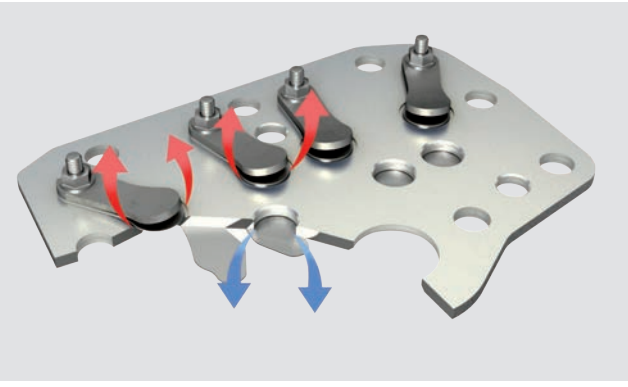


K Design for 50 Hz und 60 Hz



- The GEA Bock K-valve plate with ringfins for higher loads

N Design for 50 Hz



- Valve design, tried and trusted all over the world, with one-sided fixed finger reed valves, suction and pressure side
- Valve made out of high quality, impact resistant spring steel

SILENT BLOCKS FOR GEA BOCK HG34 ALUMINIUM COMPRESSORS

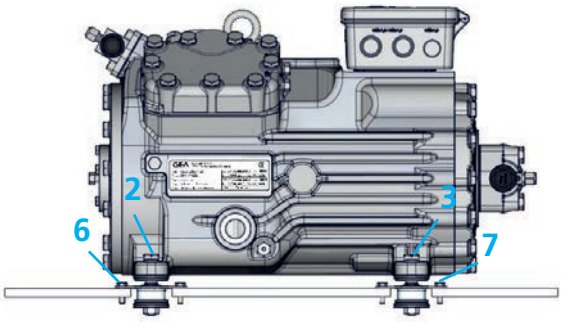
After numerous and extensive tests, GEA Bock was able to develop silent blocks that are especially adjusted to the specific demands of mobile applications (bus and rail air-conditioning). Those silent blocks can be used with all Bock aluminium compressors of the HG34 series at ambient temperatures from -30°C to +70°C.

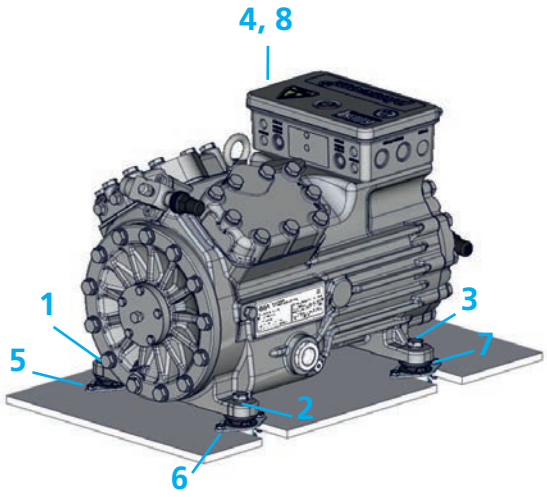
Many test runs were needed to adjust the silent blocks exactly to the GEA Bock HG34 Aluminium compressors. This was done by the installation of acceleration sensors in front and behind the resepective silent blocks. At control points 1 to 4 they were used to measure vibrations of the compressor at the compressor foot. Control points 5 to 8 measured vibrations at the base plate. The result showed a vibration reduction of up to 78 %.

With the new silent blocks, GEA offers an ideal solution to reduce the vibrations caused by the compressor.

Due to their unique design, the running comfort increases and therefore the vibrations at the vehicle decrease. This way a quieter, safer operation can be ensured.

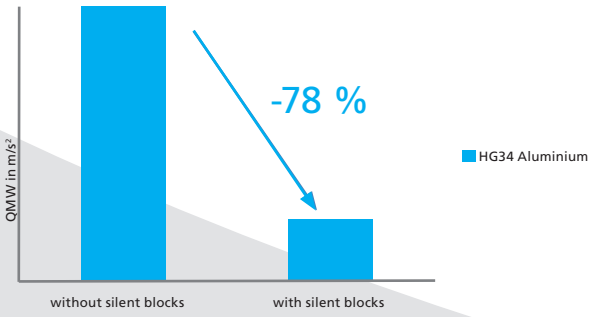
Especially in partial load operation at low rotation speeds, vibration at the compressor and therefore the vehicle increasingly occur. The vibrations are ideally dampened by the silent blocks. In addition, the reduced transmission of vibrations results in a higher passenger comfort in the vehicle.





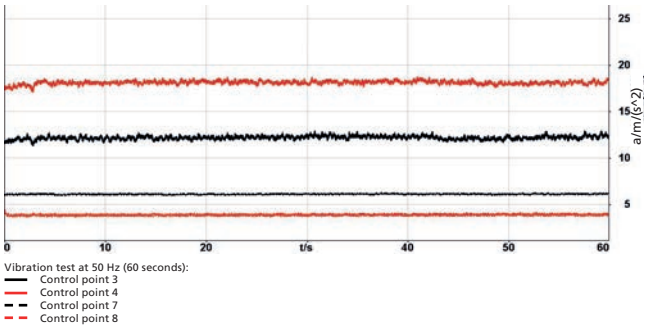
Test results with and without silent blocks

Average vibration at 50Hz operation



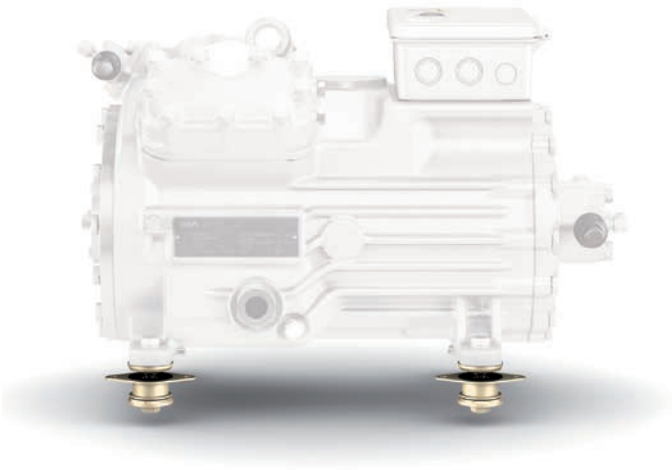
RMS: root mean square (average increase in velocity of a vibration)

Vibration with and without silent blocks



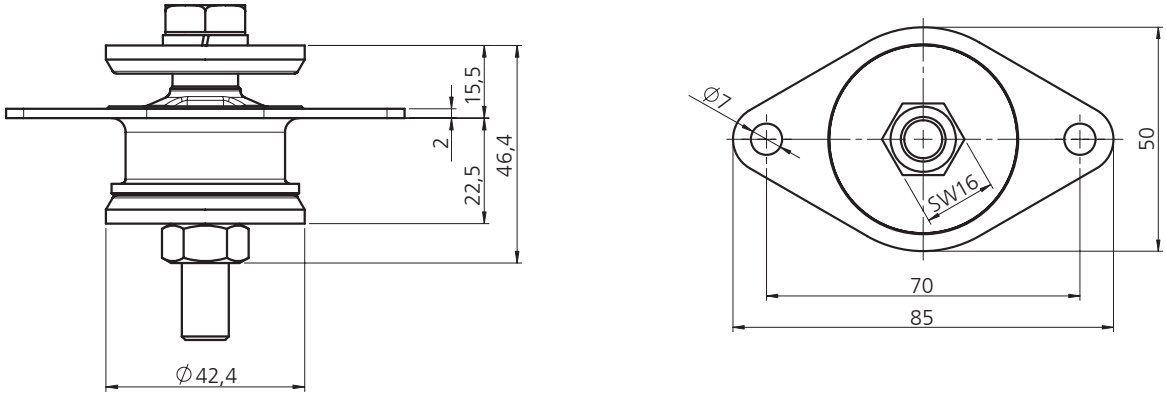
Advantages

- Special design for the use with GEA Bock HG34 aluminium compressors
- Suitable for rail and bus applications
- Vibrations and annoying noises are minimized up to 78 %
- Running comfort of compressor is increased
- Increased passenger comfort
- Easy installation
- Suitable for ambient temperatures from -30°C to +70°C
- Safe compressor operation, also in case of damage (if the rubber element is breaking/torn off, the compressor stays in its safe holder)



The GEA silent blocks are developed and tested as a universal solution. The use of these silent blocks in series systems requires a pre-testing in an identical model system.

Dimensions silent blocks

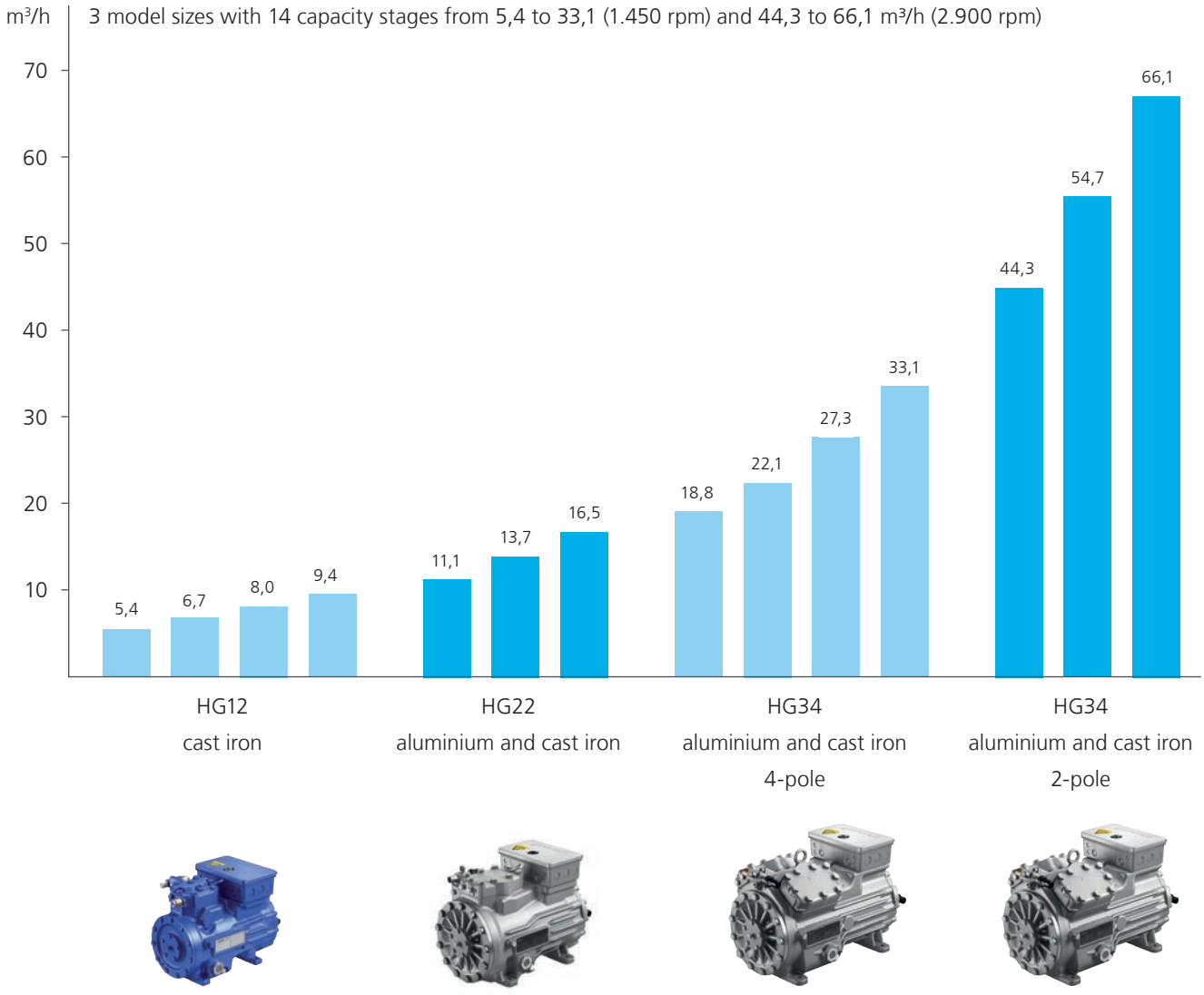


Dimensions in mm

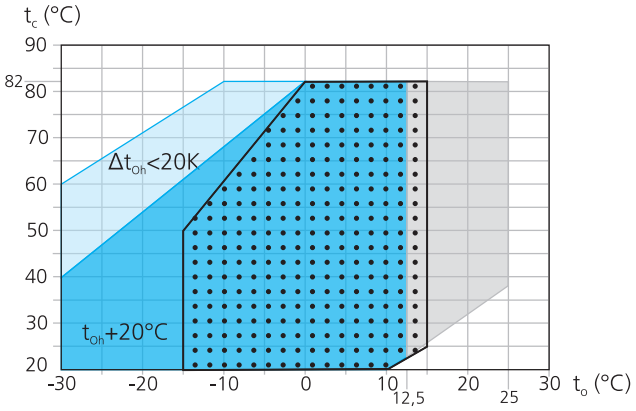
At a glance

THE CURRENT PROGRAM

3 model sizes with 14 capacity stages from 5,4 to 33,1 (1.450 rpm) and 44,3 to 66,1 m³/h (2.900 rpm)



R134a Operating limits



[1] LP = low pressure, HP = high pressure

HGX12P / HGX22e / HGX34e / HGX34P 2-pole

t_O Evaporating temperature (°C)
t_C Condensing temperature (°C)
Δt_{Oh} Suction gas superheat (K)
t_{Oh} Suction gas temperature (°C)

Permissible rotation speeds

Max. permissible operating pressure (LP/HP) [1]: 19/28 bar

4-pole

- Unlimited application range
- Supplementary cooling or reduced suction gas temperature
- Motor variant -S- (more powerful motor)

2-pole

- Unlimited application range

R134a 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 a capacity regulator.
- Restrictions to the operating limits may occur when using a frequency converter.

For further information see sample calculation page 39.

For operation with frequency converter:

HGX12P	… -4	30 – 70 Hz
HGX22e	… -4	30 – 70 Hz
HGX34e	… -4	25 – 70 Hz
HGX34P	… -2	15 – 50 Hz
HGX34P	… -2 K	15 – 60 Hz

Performance data

The performance data for R134a are based on EN 12900 at 50Hz upply frequency. This signifies 20 °C suction gas temperature without liquid subcooling. This results in significant differences compared to specifications with liquid undercooling and/or suction gas temperatures.

4-pole compressor:
Conversion factor for 60 Hz = 1,2
Performance data for other operating points, see GEA software.

Pluscom / e-series:
The proven Pluscom series relates primarily to 2-pole compressors in the mobile range.
The e-series compressors set a new benchmark as regards motor efficiency, gas flow and the efficiency of the valve system. This enables the compressor to provide a higher refrigerating capacity with reduced drive power. In addition to this, the limits of use have been expanded to a liquefaction temperature of 15 °C and an evaporation temperature of -15 °C.

ASERCOM certified performance data
For compressors with this label, the performance data are certified according to the strict requirements of ASERCOM. Information about the Association and the constantly updated overview of certified GEA compressors can be found at www.asercom.org

CERTIFIED PRODUCT ASERCOM

TYPSCHLÜSSEL

HG X 3 4 P / 215 – 2 S A K

- Series [1]
- Ester oil filling [2]
- Size
- Number of cylinders
- e-series / Pluscom [3]
- Swept volume
- Number of poles [4]
- Motor variant [5]
- Aluminium version
- Version [6]

[1] HG = Hermetic Gas-cooled (suction gas-cooled)
[2] X = Ester oil filling (HFC refrigerant e. g. R134a, R407C)
[3] = Additional indication for e-series and Pluscom compressors
[4] 2 = 2-poles (2.900 rpm – 50 Hz)
4 = 4-poles (1.450 rpm – 50 Hz)
[5] S = More powerful motor e.g. air-conditioning systems
[6] K = K valve plate

PERFORMANCE DATA

R134a			Performance data							50 Hz 2-pole
Type	Cond. temp. °C		Cooling capacity $\dot{Q}_0$ [W]							Power consumption P_e [kW]
			Evaporation temperature °C							
			15	12,5	10	5	0	-5	-10	-15
HGX34P/255-2 HGX34P/255-2 A	30	Q	39699	32887	29809	26941	21802	17406	13692	10598
		P	8,45	7,93	7,64	7,35	6,72	6,06	5,39	4,73
	40	Q	35067	28934	26166	23588	18969	15013	11659	8846
		P	9,53	8,81	8,43	8,05	7,25	6,45	5,65	4,86
	50	Q	30304	24875	22429	20153	16077	12585	9615	7106
		P	10,40	9,49	9,03	8,56	7,62	6,68	5,76	4,87
	60	Q	25473	20771	18659	16696	13188	10184	7622	
		P	11,05	9,97	9,42	8,88	7,80	6,74	5,72	
	70	Q	20632	16682	14916	13279	10362	7869		
		P	11,46	10,22	9,61	9,00	7,79	6,63		
HGX34P/315-2 HGX34P/315-2 A HGX34P/315-2 A K	30	Q	49386	40993	37189	33638	27263	21812	17227	13450
		P	8,65	8,62	8,51	8,34	7,86	7,24	6,52	5,75
	40	Q	43240	35838	32488	29362	23754	18957	14914	11567
		P	10,52	10,14	9,87	9,55	8,79	7,92	6,99	6,04
	50	Q	37096	30698	27807	25113	20284	16154	12665	9760
		P	12,03	11,34	10,92	10,47	9,47	8,39	7,28	6,19
	60	Q	30994	25612	23187	20930	16893	13441	10519	
		P	13,20	12,23	11,69	11,12	9,91	8,66	7,41	
	70	Q	24974	20620	18667	16854	13620	10860		
		P	14,04	12,83	12,18	11,51	10,14	8,75		
HGX34P/380-2 HGX34P/380-2 A HGX34P/380-2 A K	30	Q	54230	45243	41160	37338	30436	24457	19322	14952
		P	13,28	12,00	11,41	10,86	9,81	8,83	7,88	6,92
	40	Q	48142	40109	36453	33023	26803	21371	16647	12551
		P	14,18	12,89	12,28	11,68	10,54	9,42	8,28	7,09
	50	Q	41930	34842	31607	28565	23018	18124	13801	9971
		P	15,17	13,79	13,12	12,46	11,15	9,81	8,42	6,93
	60	Q	35602	29450	26632	23973	19091	14724	10794	
		P	16,15	14,61	13,85	13,08	11,53	9,91	8,19	
	70	Q	29169	23944	21538	19257	15030	11182		
		P	16,99	15,23	14,34	13,44	11,57	9,60		

Relating to 20 °C suction gas temperature without liquid subcooling

Further information can be found on the internet at vap.gea.com/mobileapplication

Semi-hermetic Compressors HG – technical data

HG 2-pole HG 2-pole Alu	Number of cylinders	Displace-ment	Electrical data				Weight	Connections [4]		Oil charge
		50 / 60 Hz (2.900 rpm)	Voltage [1]	Max. working current [2]	Max. power consump-tion [2]	Starting current (rotor locked)		Discharge line DV	Suction line SV	
		m^3/h		A	kW	A	kg	mm | inch	mm | inch	Ltr.
Typ				Δ / Y		Δ / Y				
HGX34P/255-2	4	44,3	[3]	25,8	16,0	117	95,0	22 I 7/8	35 I 1 3/8	1,3
HGX34P/255-2 A	4	44,3	[3]	25,8	16,0	117	58,0	22 I 7/8	35 I 1 3/8	1,3
HGX34P/315-2	4	54,7	[3]	24,3	14,7	117	95,0	22 I 7/8	35 I 1 3/8	1,3
HGX34P/315-2 A	4	54,7	[3]	24,3	14,7	117	58,0	22 I 7/8	35 I 1 3/8	1,3
HGX34P/315-2 S	4	54,7	[3]	32,2	19,0	172	103,0	22 I 7/8	35 I 1 3/8	1,3
HGX34P/315-2 S A	4	54,7	[3]	32,2	19,0	172	68,0	22 I 7/8	35 I 1 3/8	1,3
HGX34P/380-2	4	66,1	[3]	38,0	23,5	172	102,0	22 I 7/8	35 I 1 3/8	1,3
HGX34P/380-2 A	4	66,1	[3]	38,0	23,5	172	67,0	22 I 7/8	35 I 1 3/8	1,3

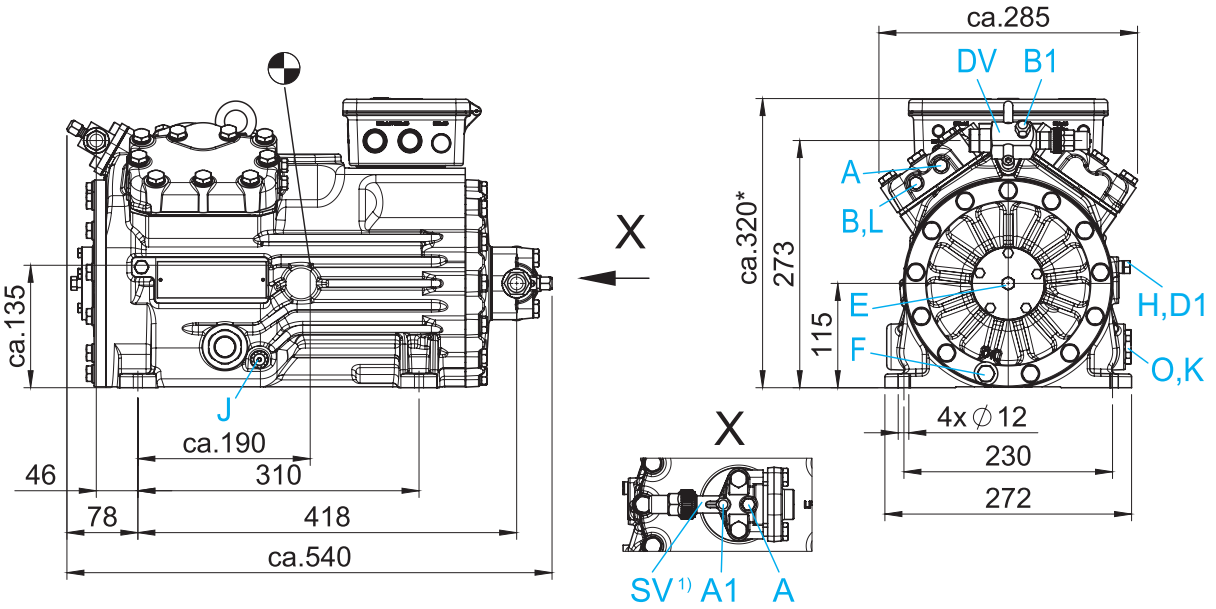
HG 2-pole Alu K	Number of cylinders	Displace-ment	Electrical data				Weight	Connections [4]		Oil charge
		50 / 60 Hz (2.900/3.480 rpm)	Voltage [1]	Max. working current [2]	Max. power consump-tion [2]	Starting current (rotor locked)		Discharge line DV	Suction line SV	
		m^3/h		A	kW	A	kg	mm | inch	mm | inch	Ltr.
Typ				Δ / Y		Δ / Y				
HGX34P/315-2 A K	4	54,7 / 65,6	[4]	24,3	14,7	117	58,0	22 I 7/8	35 I 1 3/8	1,3
HGX34P/315-2 S A K	4	54,7 / 65,6	[4]	32,2	19,0	172	68,0	22 I 7/8	35 I 1 3/8	1,3
HGX34P/380-2 A K	4	66,1 / 79,4	[4]	38,0	23,5	172	67,0	22 I 7/8	35 I 1 3/8	1,3

[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 50Hz operation. For 60Hz 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] 380-420 V Y - 3 - 50 Hz
[4] 380-420 V Y - 3 - 50 Hz, 440–480 V Y - 3 - 60 Hz
[5] For soldering connections

Further information can be found on the internet at vap.gea.com/mobileapplication

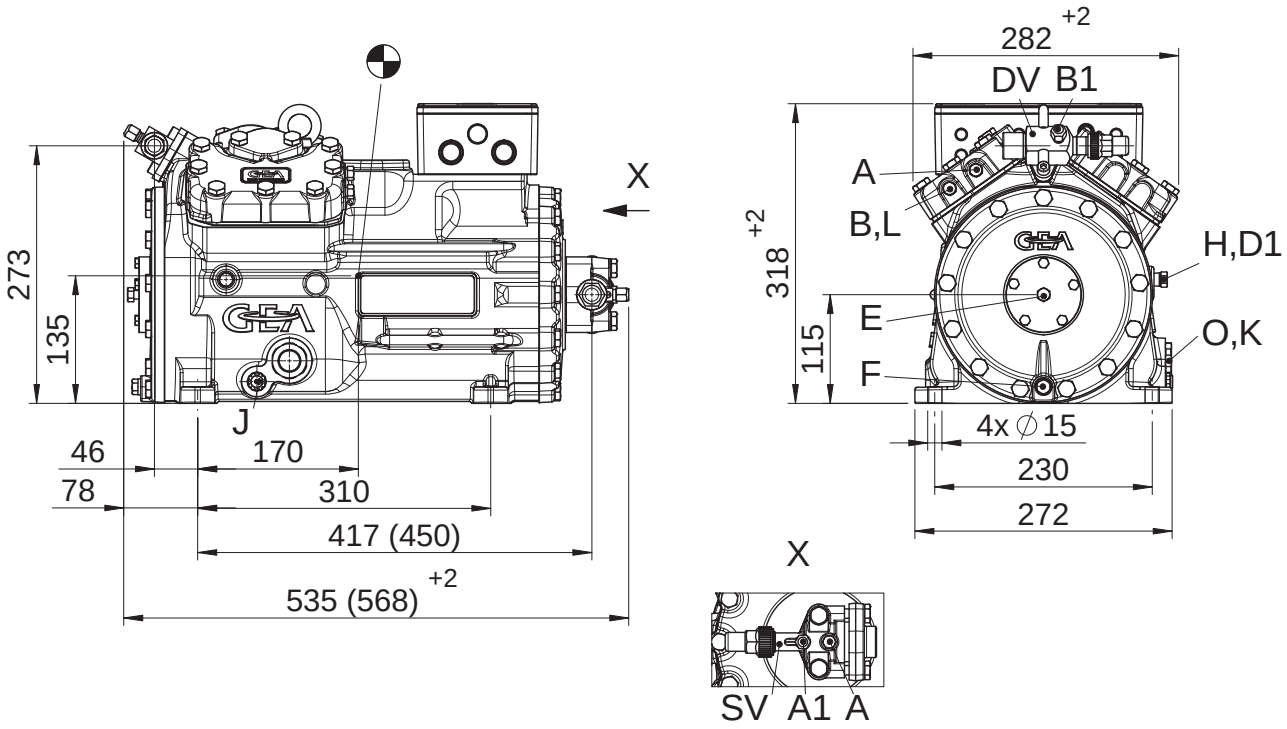
DIMENSIONS AND CONNECTIONS

HG34e Aluminium 4-pole	HGX34e/215-4 A HGX34e/215-4 S A	HGX34e/255-4 A HGX34e/255-4 S A	HGX34e/315-4 A HGX34e/315-4 S A	HGX34e/380-4 A HGX34e/380-4 S A



* With the accessory "Terminal box with reduced height" about ca. 300 mm
(Motor protection INT69 as an extra for control cabinet installation)

HGX34P 2-pole	HGX34P/255-2	HGX34P/315-2 HGX34P/315-2 S	HGX34P/380-2



Dimensions in ( ) = HGX34P/315-2 S
HGX34P/380-2

* With the accessory "Terminal box with reduced height" about ca. 300 mm
(Motor protection INT69 as an extra for control cabinet installation)

1) SV 90° rotatable ◓ Centre of gravity
Dimensions in mm

Connections see page 54