GEA Bock EX-HG Compressors for explosion-risk environments

Semi-hermetic compressors
for zone 1 + 2

engineering for
a better world

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Semi-hermetic compressors for explosion-risk environments

Use in zone 1 + 2

Electrical as well as mechanical devices operated in explosive atmospheres must fulfill what are known as ATEX (ATmospheres EXplosibles) or IECEx conditions. The system builder must use correspondingly labeled, conforming components for this type of use. GEA is the first European manufacturer to offer compressors conforming to the ATEX-/IECEx requirements.

Information on the compressors

The semi-hermetic GEA Bock compressors of the HG model series are used as the basic compressor for use inside explosion-risk environments. Detailed descriptions and information on the standard compressors can be found in the brochure "Semi-hermetic GEA Bock compressors" and online at vap.gea.com.

GEA Bock maintains a quality management system in accordance with EN 80079-34 conforming to the ATEX and IECEx requirements.

Our solutions are customer-oriented and user-friendly, because they are reliable, energy-efficient, durable and tailored to their specific needs.

Electronic motor protection INT69 EX2 supplied separately for installation in the switchboard (outside the EX zone)

Safety barrier supplied separately for installation in the switchboard (outside the EX zone)

DIFFERENCES TO THE STANDARD COMPRESSOR

1 Monitoring of all cylinder covers with special thermal protection thermostat (zone 1: in scope of supply)

2 Special coatings:
- ESD coating (explosion sub-group IIC)
- Polyurethane-free offshore paint (explosion sub-group IIB)

3 Classification of the compressor in temperature class T3

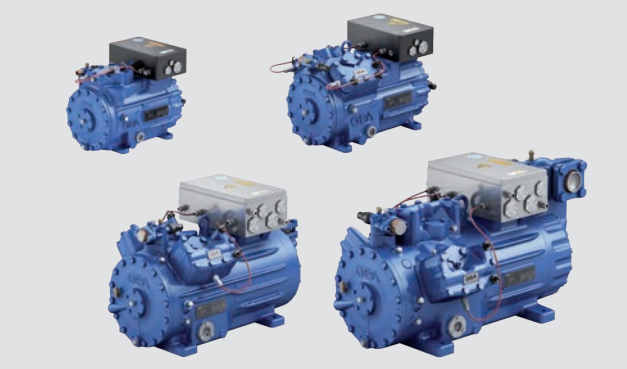
4 Special explosion-proof design of the electric components

5 Connection potential compensation

6 Special explosion-proof terminal box

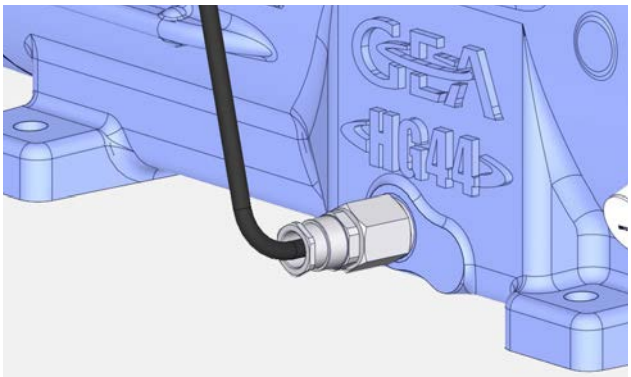
7 Special explosion-proof accessories available

Ambient temperature and power supply



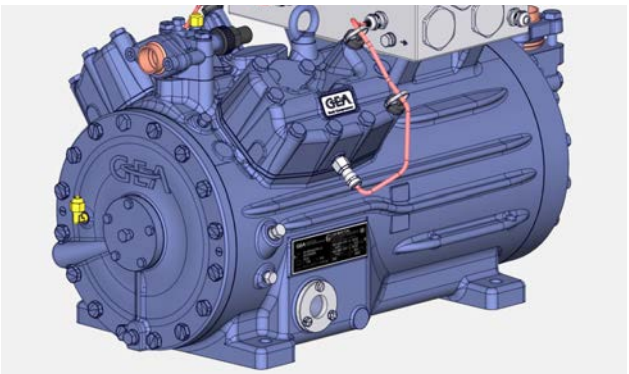
- Permissible ambient temperature -20°C to 60°C.
  When a capacity regulator is used, the ambient temperature range can be partially limited
- All models are approved for power supplies of 400–690 V

Oil sump heater



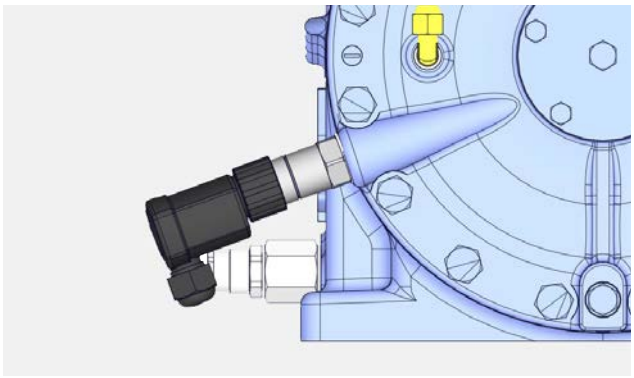
- Optional for all models
- Ex d heating element, self-regulating (EX-HG22-56, EX-HG7, EX-HG88)
- Ex d/e heating element, power-limited (EX-HG12/HG6)
- Oil sump heater generally required with HC compressor designs

Offshore coating



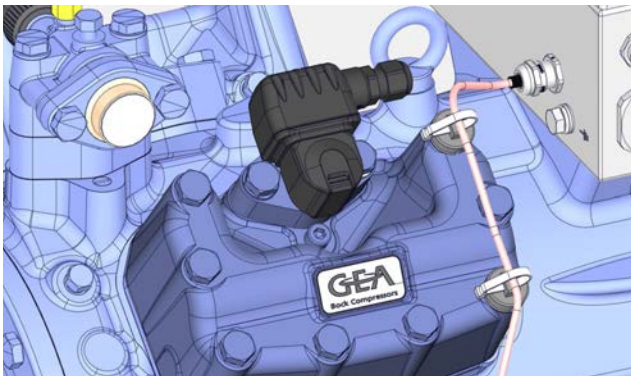
- Optional for all models
- Corrosion-resistant, multi-layered offshore coating, polyurethane-free (explosion sub-group IIB)

Oil differential pressure sensor (INT250 EX by Kriwan)



- Optional for EX-HG44, EX-HG56, EX-HG6, EX-HG7 and EX-HG88

Capacity regulator



- Optional for all 4-, 6- and 8-cylinder models

General Information on EX

Explosion protection

According to the dictionary, an explosion is “a sudden expression of force that is based on the expansion efforts of gases and vapors.” In explosions, temperature and pressure go up suddenly and mostly simultaneously. Values of above 2000 °C and above 10 bar can be reached thereby. The workers' compensation board of the chemical industry estimates that, on average, three small to medium explosions occur in Germany alone.

The danger of explosion exists in almost all process-technology systems: in the chemical and petrochemical industry, in mining, in oil and gas production. In many branches, combustible gases, vapors and mists are created in production processes, machining, transportation and storage (e.g. paint shops, refineries, chemical companies, research operations, hydrogen production).

For a potentially explosive atmosphere to exist, oxygen and combustible materials must normally be present in a corresponding mix ratio. To cause an explosion, all that is needed is a corresponding ignition source. We immediately think of open flames, hot surfaces, and visible electrical or mechanical sparks.

But even the discharges of static electricity (e.g. even with very low ignition energies from the workers' clothing), electrical compensating currents, ultrasound, electromagnetic radiation, shock waves, and adiabatic compression can trigger explosions. The origins of the rules for prevention of explosion hazards go back to mining. With the expansion of electricity, electrical explosion protection then developed more and more. Today, explosion protection in Europe is regulated by a European guideline (ATEX) and in most of the rest of the world by IECEx.

General protection principles for EX areas

1. The safest systems are those in which the possibility of forming explosive atmospheres is excluded in advance. Primary explosion protection means, for example, the use of non-combustible replacement materials. But prevention of corresponding mixtures through additional ventilation or changes in concentration are also possibilities.

2. Unfortunately, the primary explosion protection is often not possible in practice. Therefore, avoidance of potentially explosive atmospheres is necessary in such cases as secondary explosion protection. This occurs through the use of corresponding devices, components and materials. But corresponding instructions and procedures must be observed for work in such areas as well.

3. As the last measure, all that remains is to limit the effects of an explosion to a harmless level. This can be done, for example, through appropriate encapsulating or through the choice of where to set it up.

General measures for potentially explosive areas

- The operator must create an explosion protection document
- Employers must instruct employees sufficiently and appropriately regarding explosion protection
- Before starting work, a written work release by the operator is required for dangerous activities
- Potentially explosive areas must be marked with warning signs at their access points
- Sources of ignition (smoking, open fire, soldering, ...) must be prohibited
- Unauthorized persons must be prohibited by clear and permanently recognizable signs
- Tools must meet the requirements for EX protection
- The tests and inspections specified in the explosion protection document and operating instructions must be performed and logged as specified
- Systems with defects cannot be operated

Zone classification

An evaluation of explosion risks by the operator is also included in preparing a so-called explosion protection document. A zone classification must be performed accordingly.

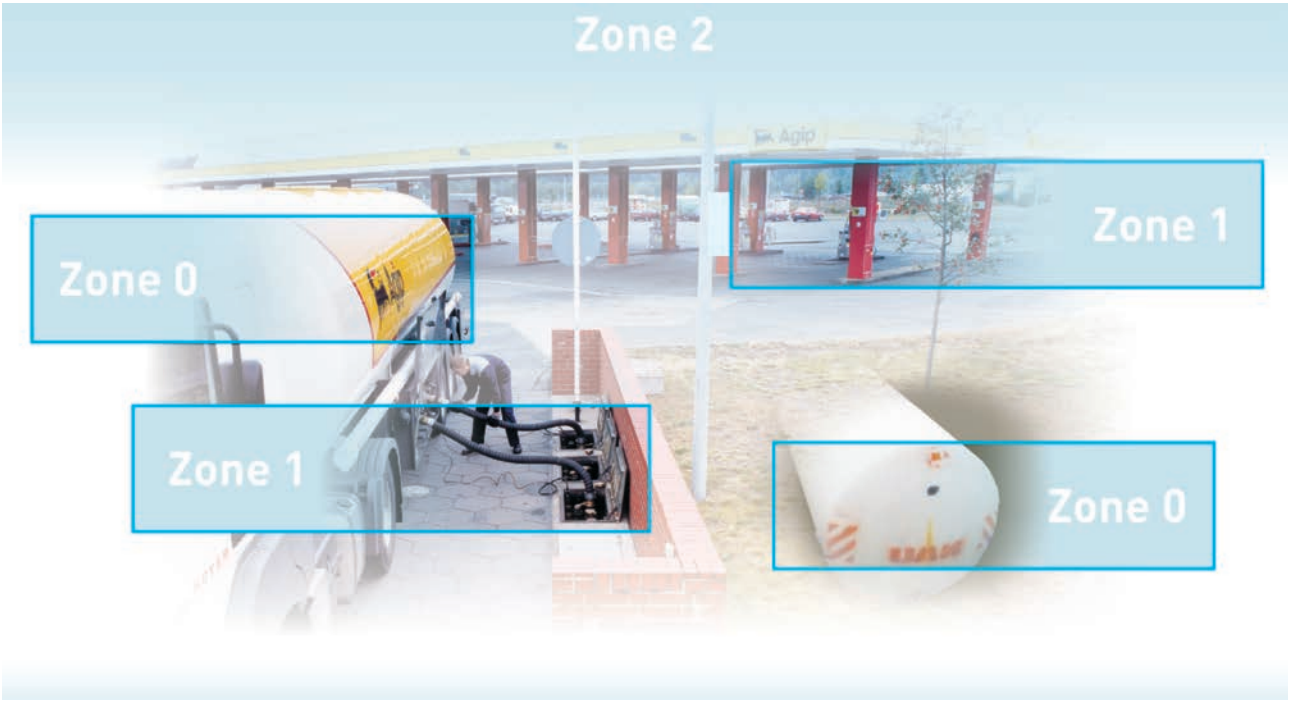
Potentially explosive areas are divided into zones and labeled accordingly, depending on the frequency and duration of the occurrence of explosive atmospheres:

Zone 0:
Explosive atmospheres are present constantly or frequently over long periods of time.

Zone 1:
Explosive atmospheres are occasionally present in normal operation.

Zone 2:
Explosive atmospheres are not present or only briefly present in normal operation.

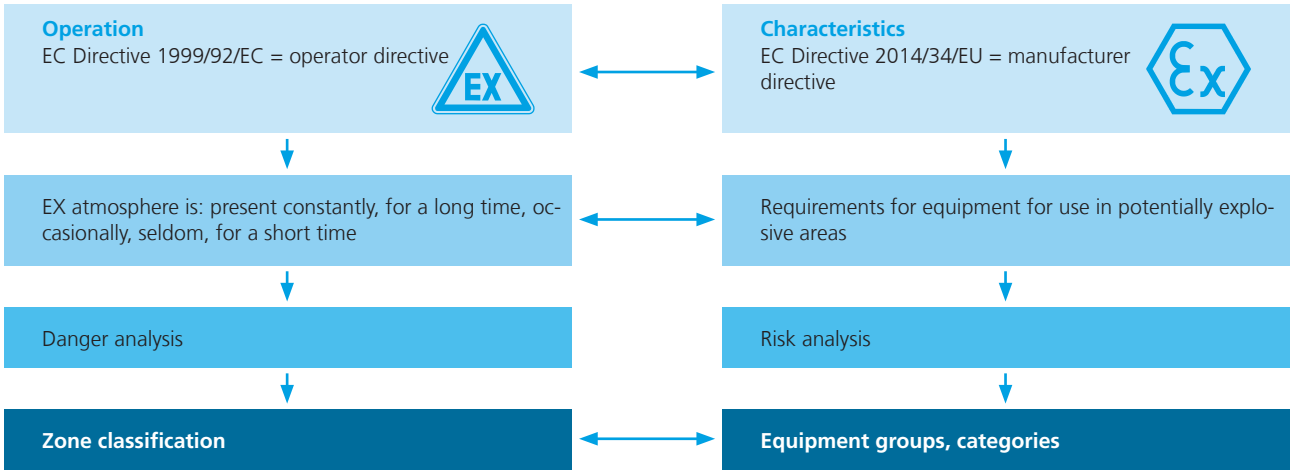
Example of zone classification for gases, vapors and mists



What is ATEX?

To create uniform minimum standards Europe-wide, the so-called ATEX Directive (ATEX is derived from the French ATmosphères EXplosibles) was created. Despite a seven-year transition period, many were surprised when it became mandatory on July 1, 2003. ATEX now includes dust explosion protection, which was previously neglected in many national regulations, as well as mechanical explosion protection. And so today, even non-electric equipment (mechanical components) must be tested or at least evaluated.

ATEX general conditions in EU explosion protection



The ATEX Guidelines

1. EC Directive 1999/92/EC (ATEX 137)

This contains the "minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres". There, requirements are established especially for workplaces, such as:

- The creation of explosion-protection documents with a comprehensive risk evaluation
- Zone classification (zone 0, 1, 2, 20, 21, 22) and labeling
- Safety measures
- Requirements for workers
- Rules for work approval and authorization of work
- Equipment selection

This directive is therefore oriented primarily on the operators. This ATEX directive took effect on January 28, 2000. Existing workplaces must meet the new requirements not later than the end of the transition period on June 30, 2006.

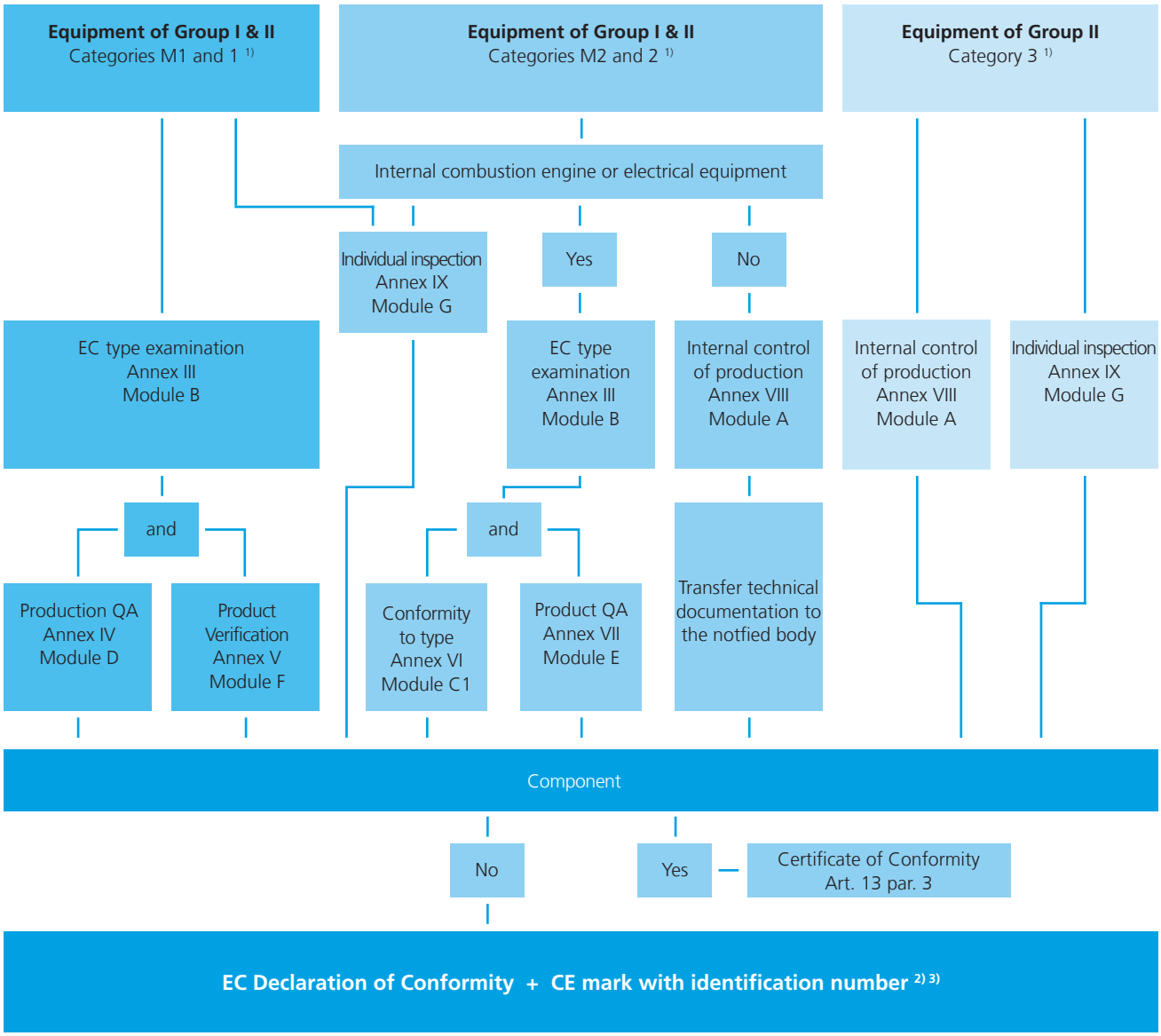
2. EC Directive 2014/34/EU

This directive establishes the requirements for the products used in potentially explosive areas. These are:

- Equipment and protected systems for intended use in potentially explosive areas
- Safety, control and regulation devices that contribute to safe operation of the equipment and protective systems
- All electrical, mechanical, hydraulic and pneumatic equipment with its own source of ignition

This directive is oriented primarily on the manufacturers. It has replaced the EC Directive 94/9/EC since April 20, 2016. The 94/9/EC directive has been mandatory since July 1, 2003, and does not differ significantly from the now valid directive 2014/34/EU. The certificates issued under the 94/9/EC directive remain valid without restriction.

ATEX conformity evaluation procedure for devices, including their fixtures and components



1) And their components, when separately certified.
2) Identification of the notified body that certified the QA system or checked the products.
3) CE mark without identification number for Annex VIII (Module A).

Source: BARTEC "Basic concepts for explosion protection"

What is IECEx?

The physical and chemical principles for occurrence of explosions, like the technical and organizational processes and measures that can be used to avoid explosion hazards, are valid worldwide, despite slight differences.

It therefore makes sense to subject the approval conditions for electrical devices to a worldwide set of rules and so promote global free trade in goods through certificates that are country- or region-neutral. As part of this, the IEC has set up a procedure whose target is precisely this uniformity: The IEC-Ex system. The International Electrotechnical Commission (IEC) is responsible for worldwide standards in the electrotechnical area. IEC publications that discuss explosion protection of electrical devices and systems are worked out by the Technical Committee TC31 and are equivalent to recommendations. The requirements for gas-explosion-endangered areas and for areas with combustible dust are treated in the IEC 60079 series of standards.

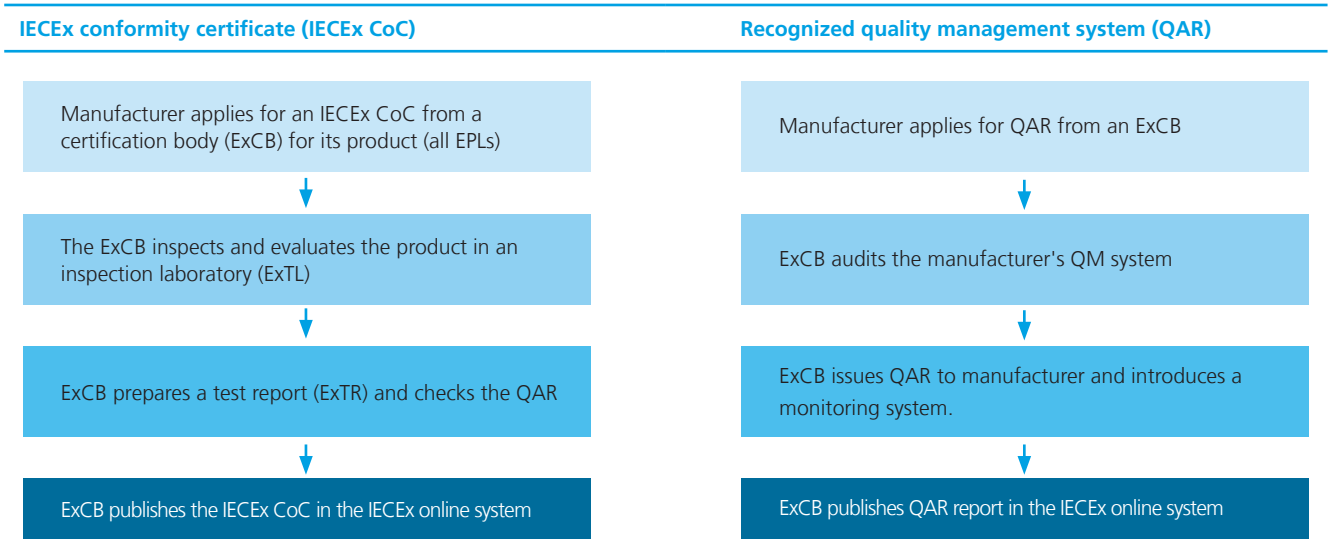
Worldwide, there are numerous recognized IECEx certification offices (ExCB = certification body) and correspondingly many recognized IECEx test laboratories (ExTLs) that are accredited according to high, uniform standards and are monitored regularly.

For IECEx, a certificate is awarded only when the type inspections on test samples have passed and the presence of an effective quality management system has been proved by audit. But there are currently still regional and national approval processes everywhere in the world that have to be considered, such as the ATEX directive in the European Union area or national certifications in the USA (UL, FM).

But these national regulations can deviate from these standards. For this reason, the extent to which the IEC standards can be used in the individual countries must be investigated.

IECEx conformity

The IECEx system establishes the process for evaluation and certification of electrical devices for use in Ex areas. All devices of a certification body must be checked, regardless of the level of device protection. The result is summarized in a technical report. At the same time, the manufacturer must have its quality management system checked and audited by a certification body. In combination with the manufacturer's audit for quality monitoring (QAR), IEC issues a certificate of conformity (CoC) through an authorized certification body.



ExCB (Ex Certification Body)
subject to audit; issues QAR and CoC

ExTL (Ex Testing Laboratory)
subject to audit; checks compliance with the IEC standards

ExTR (IECEx Test Report)
Prepared by ExTL on the basis of uniform forms, approved by ExCB

QAR (IECEx Quality Assessment Report)
Issued by ExCB following the audit of the manufacturer's QMS

CoC (IECEx Certificate of Conformity)
Design corresponds to IEC standards (ExTR); Production takes place with recognized QMS (QAR)

Comparison of ATEX and IECEx systems

Certification	**ATEX** Legally required in the EU		**IECEx** Voluntary in the EU Varied acceptance worldwide
Testing and conformity of **electrical devices**	**Device category 1 and 2** • Recognized QA sQS-System • EC type examination certification • EU Declaration of Conformity • CE mark	**Device category 3** • Internal production control • EU Declaration of Conformity • CE mark	**Equipment protection level (EPL a, b, c)** • Quality Assessment Report (QAR) • Test Report (ExTR) • Certificate of Conformity (CoC)
Testing and conformity of **non-electrical devices**	**Device category 1** • Recognized QA system • EC type examination • EU Declaration of Conformity • CE mark	**Device category 2[1)] and 3** • Internal production control • EU Declaration of Conformity • CE mark [1)] Submission of the technical documentation to a notified body	**Equipment protection level (EPL a, b, c)** • Quality Assessment Report (QAR) • Test Report (ExTR) • Certificate of Conformity (CoC)
Certificates	Manufacturer (often online)		IECEx online database
Repair facilities	No EU-certified workshops (regulated on a national level)		Certified Service Facilities
Service personnel	No EU-certified persons (regulated on a national level)		Certified Competent Persons
Zone classification	No EU-certified bodies (regulated on a national level)		Certified Service Facilities (in progress)

Source: BARTEC "Basic concepts for explosion protection"

What does this mean for refrigerating systems?

Equipment in explosive atmospheres must fulfill the EX conditions.

Referred to, all electrical and mechanical devices must be considered in accordance with the EX directives.

Devices are defined as: machines, tools, stationary or movable fixtures, control and equipment parts as well as warning and prevention systems that, individually or combined, are intended for generation, transfer, storage, measurement, regulation and conversion of energy and/or for processing of materials, that have their own potential ignition sources and so can cause an explosion.

Thus almost all components (compressors evaporators and condensers – but also valves, manometers, sensors,...) of a refrigerating plant must be looked at and evaluated.

The operator will undertake a corresponding zone classification. This must be recorded in the explosion protection document.

For explosion protection reasons all material characteristics have to be declared. The results of this are the requirements for the components to be used (group, category, gas group, temperature class).

Accordingly, the system builder must use correspondingly labeled components equipped with the required documentation (e.g. manufacturer or conformity declaration).

The declarations of the component manufacturer only refer to the product itself.

It is thereby assumed that the applicable installation standards and mounting and operating instructions are followed during installation and operation.

As most manufacturers offer serial products for diverse application ranges, only the product itself can be evaluated.

The system builder must evaluate the interactions with other devices and components of the system and with the surroundings, especially regarding potential ignition sources.

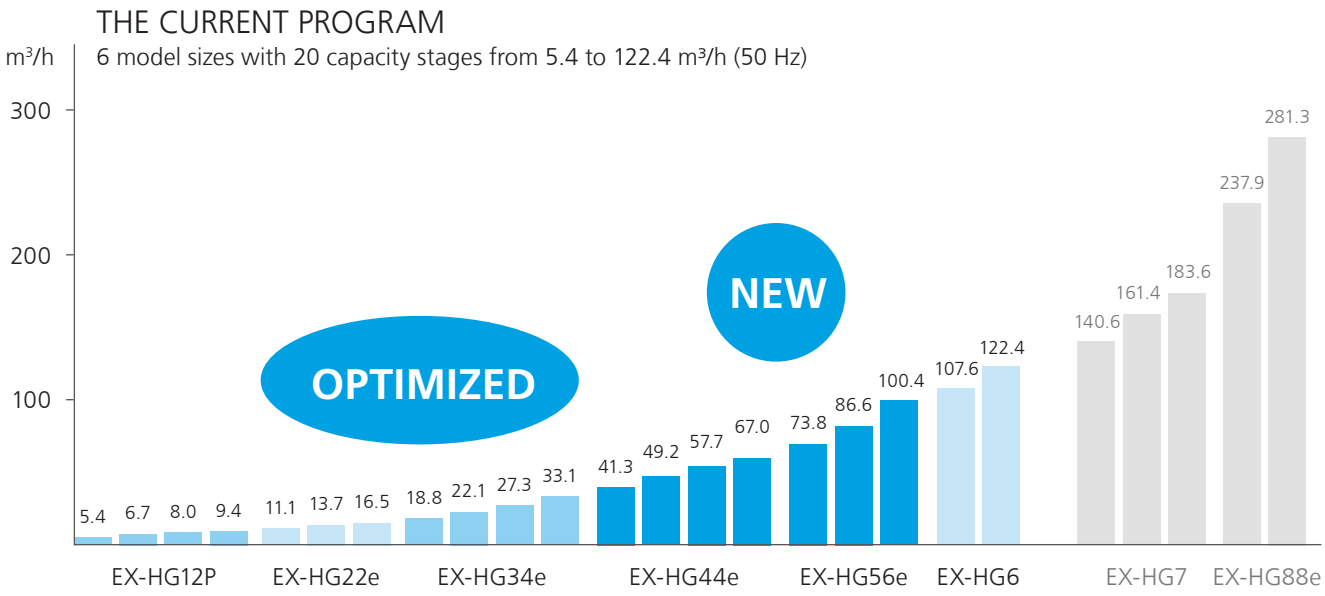
If the result is positive, the system builder must make a corresponding declaration for the equipment group or system.

The operator will report the systems to the supervising office and request an acceptance inspection, if necessary.

Combustible refrigerant

If no special protective measures are taken for refrigeration or air conditioning systems with refrigerant in safety group A2, or especially with refrigerant in safety group A3, it must be expected that an explosive atmosphere can occur at least temporary, e.g. due to leaks, filling, repair or maintenance work. Accordingly, a zone classification must be made for the set-up location of such systems in accordance with EC Directive 1999/92/EC, and the refrigerant compressors must also meet the requirements of the EC Directive 2014/34/EU.

GEA Bock HG compressors for zone 1



Type code – EX compressor

EX – HG X 3 4 e / 215 – 4 S HC

- EX design
- Series [1]
- Oil charge [2]
- Size
- Number of cylinders
- e-series [3]
- Swept volume
- Number of poles
- Motor version [4]
- Hydrocarbons

[1] HG = Compressor Hermetic Gas-cooled (suction gas-cooled)

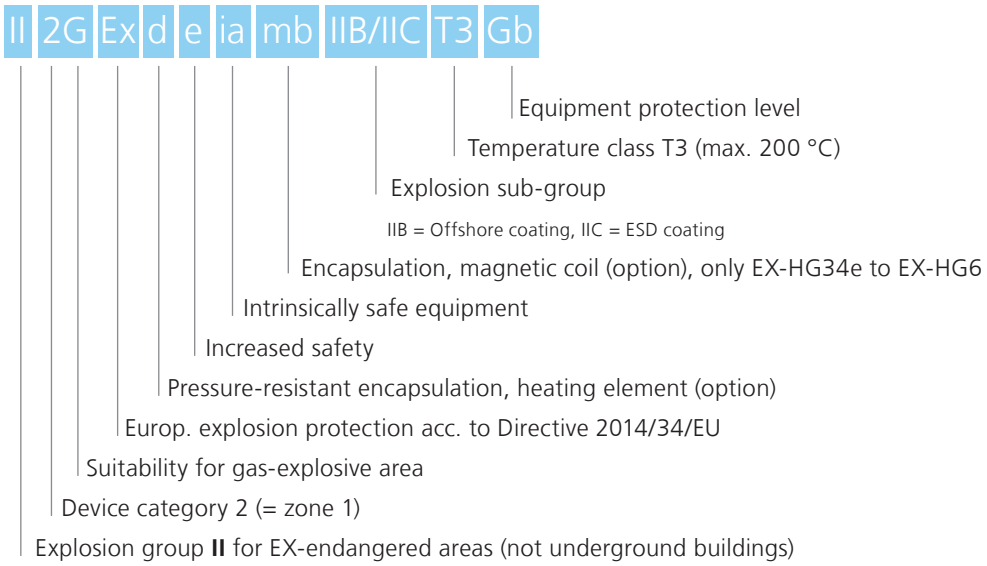
[2] X = Ester oil filling (HFC refrigerants e.g. R134a, R404A, R507, R407C)

[3] e = Additional specification for e-series compressor

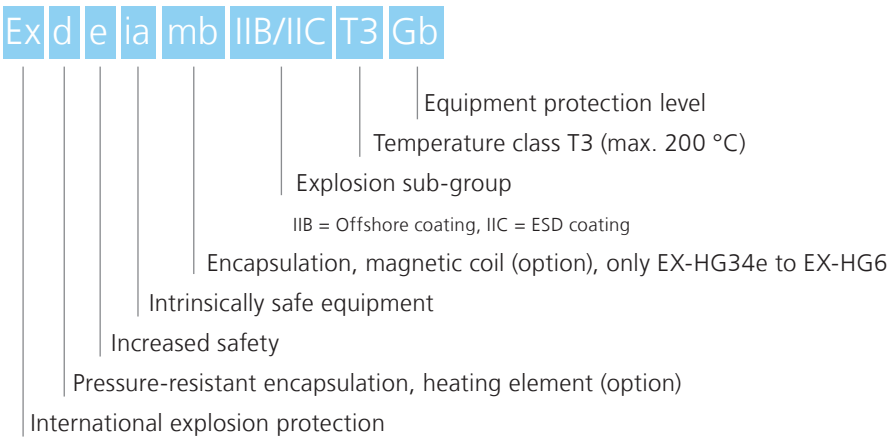
P = Additional specification for Pluscom compressor

[4] S = More powerful motor, e.g. air conditioning applications

ATEX identification



IECEx identification



The new 4- and 6-cylinder compressors: GEA Bock EX-HG44e and HG56e

With the **GEA Bock EX-HG44e and EX-HG56e series**, GEA brings to market new, more efficient semi-hermetic compressors and replaces the EX-HG4, EX-HG5 series and, in part, EX-HG6. Compared to their predecessors, the new 4- and 6-cylinder compressors offer higher efficiency and smoother operation. A modern valve plate system, the latest generation of electric motors and an improved gas flow in the compressor increase the overall level of efficiency. The proven oil pump lubrication is used in all compressors, and this enables a greater range of speed control to be achieved in the operation of the frequency converter. The emergency running properties have also been optimized - which is particularly important for operation with natural refrigerants. As usual, ease of servicing was one of the main priorities in the development of the new series.

The HG44e has been successful in the market since April 2014 and offers decisive advantages compared to the previous series. These advantages have now been transferred to compressors for explosion-risk environments.
With the EX-HG44e series, four sizes cover the range of maximum displacement from 41.3 m³/h to 67.0 m³/h. The GEA Bock EX-HG44e series now offers four sizes, instead of the three offered by its predecessors. The largest version, the EX-HG44e/770-4 compressor, offers 67 m³/h, almost 20 % more displacement than the largest EX-HG4 model, and replaces the smallest size of the previous EX-HG5 series with 62.9 m³/h – and so this series has the largest power density in the industry.

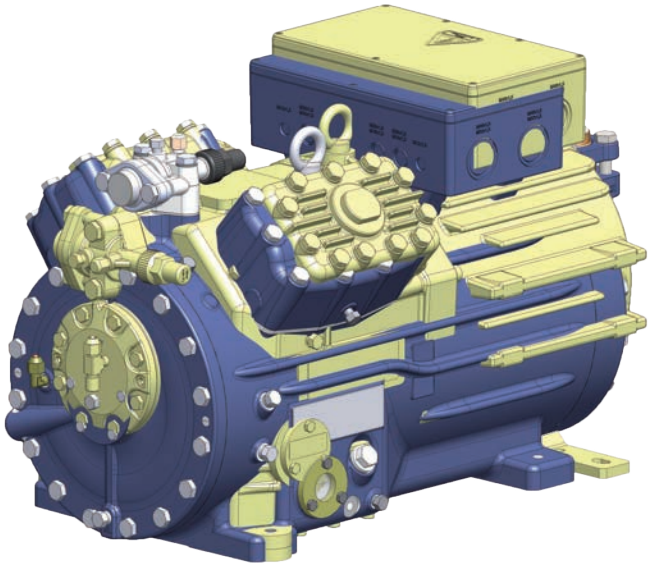
The GEA Bock EX-HG56e series is a new development based on the HG44e series that have already proved successful in practice. The EX-HG56e series, with three sizes, covers the range from 73.8 m³/h to 100.4 m³/h displacement (at 50 Hz).

Replacement for predecessor models

HG44e		**vs.**	**HG4/HG5**	
Models:	Displacement at 50 Hz:		Predecessor models:	Displacement at 50 Hz:
HG44e/475-4 (S)	41.3 m³/h		HG4/465-4 (S)	40.5 m³/h
HG44e/565-4 (S)	49.2 m³/h		HG4/555-4 (S)	48.2 m³/h
HG44e/665-4 (S)	57.7 m³/h		HG4/650-4 (S)	56.6 m³/h
HG44e/770-4 (S)	67.0 m³/h		HG5/725-4 (S)	62.9 m³/h

HG56e		**vs.**	**HG5/HG6**	
Models:	Displacement at 50 Hz:		Predecessor models:	Displacement at 50 Hz:
HG56e/850-4 (S)	73.8 m³/h		HG5/830-4 (S)	72.2 m³/h
HG56e/995-4 (S)	86.6 m³/h		HG5/945-4 (S)	82.2 m³/h
HG56e/1155-4 (S)	100.4 m³/h		HG6/1080-4 (S)	93.7 m³/h
			HG6/1240-4 (S)	107.6 m³/h

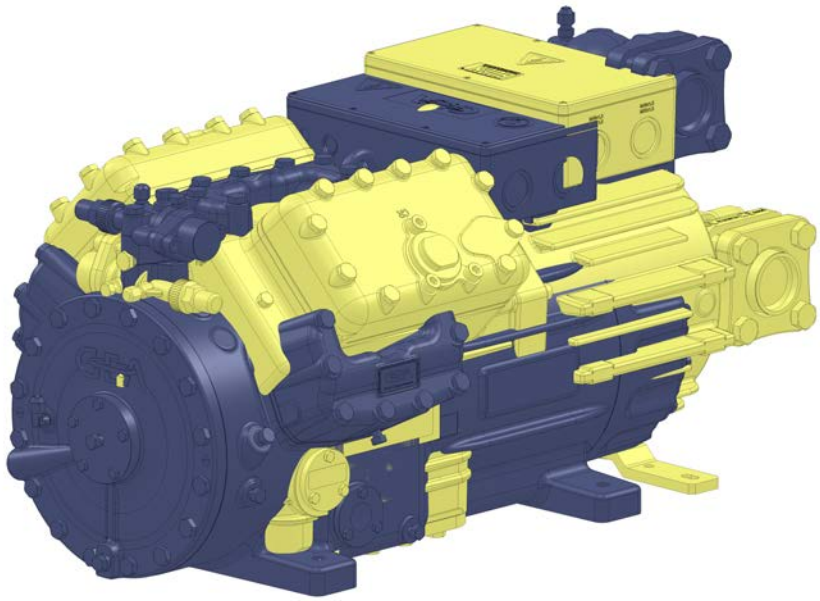
Comparison of the dimensions of the HG44e vs. HG4



Blue: GEA Bock HG44e
Yellow: GEA Bock HG4

Length (mm)	Width (mm)	Height (mm)
-30	-10	-20

Comparison of the dimensions of the HG56e vs. HG5



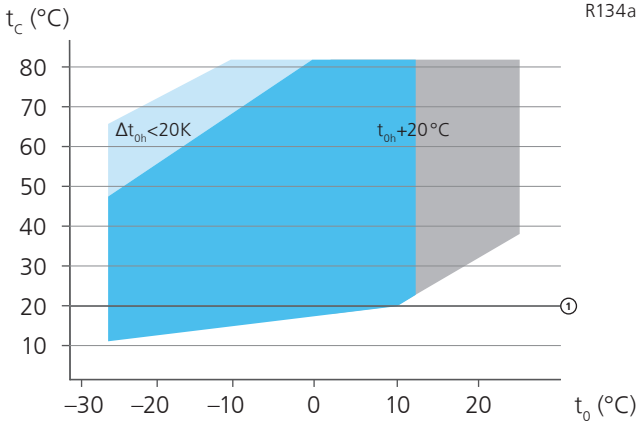
Blue: GEA Bock HG56e
Yellow: GEA Bock HG5

Length (mm)	Width (mm)	Height (mm)
-90	+5	+25

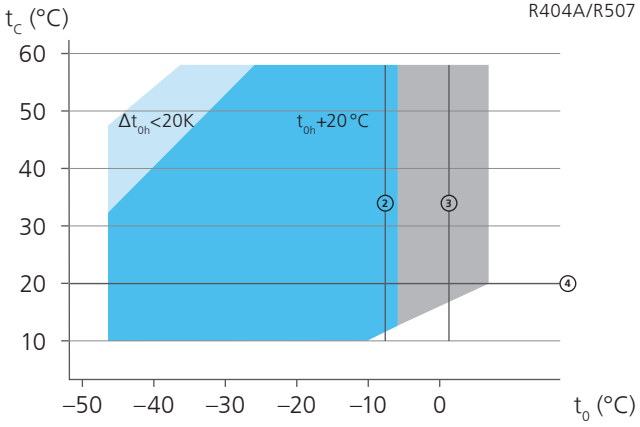
OPERATING LIMITS

Operating limits: synthetic refrigerants

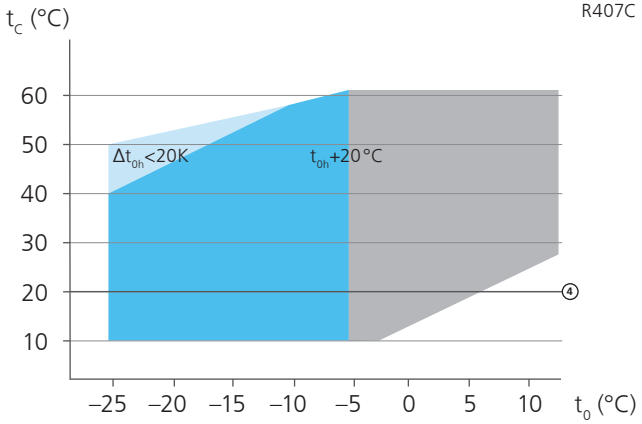
R134a



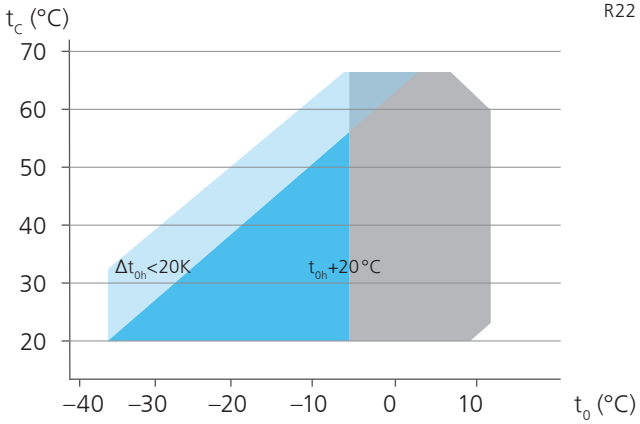
R404A/R507



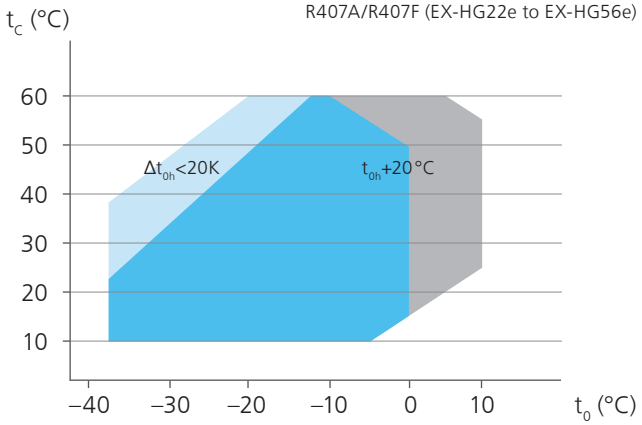
R407C



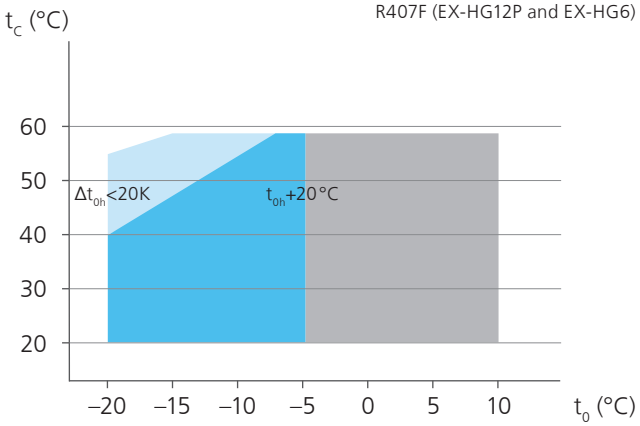
R22



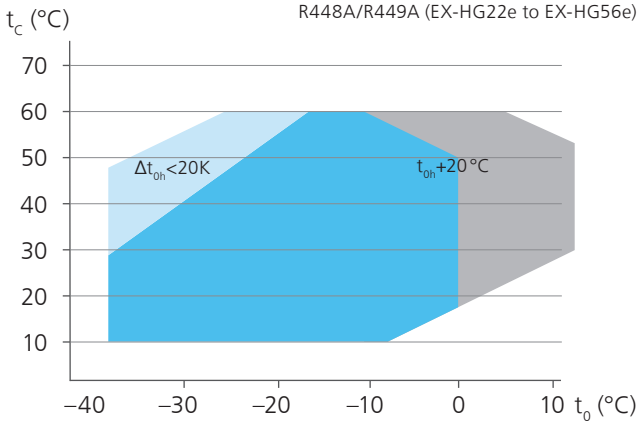
R407A/R407F (EX-HG22e to EX-HG56e)



R407F (EX-HG12P and EX-HG6)



R448A/R449A (EX-HG22e to EX-HG56e)



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

- Unlimited application range
- Reduced suction gas temperature
- Motor version -S- (more powerful motor)

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

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

① EX-HG12P and EX-HG6
Minimum condensing temperature t_O = 20 °C

② EX-HGX6/1410-4
Maximum evaporation temperature t_O = -7 °C

③ EX-HGX6/1410-4S
Maximum evaporation temperature t_O = 2 °C

④ EX-HG12P to EX-HG34e and EX-HG6
Minimum condensing temperature t_O = 20 °C

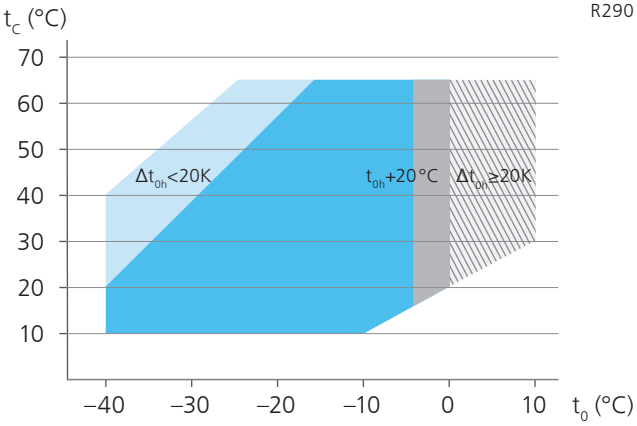
OPERATING LIMITS

Notes

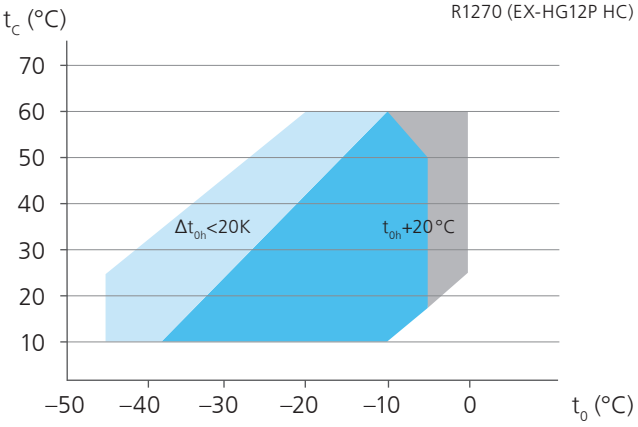
Operating limits
Compressor operation is possible within the limits shown on the application diagrams. Please note the coloured areas. Compressor application limits should not be chosen for design purposes or continuous operation.

Operating limits: hydrocarbons

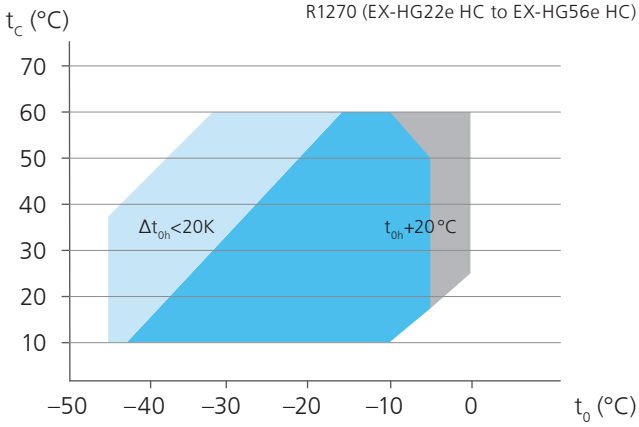
R290



R1270 (EX-HG12P HC)



R1270 (EX-HG22e HC to EX-HG56e HC)



Design for other ranges on request

The use of other hydrocarbons is permitted only following prior written approval from GEA Bock

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

- Required minimum superheating Δt_{Oh} = 20 K
- Motor version -S- (more powerful motor)
  Required minimum superheat Δt_{Oh} = 20 K
- Required minimum superheat Δt_{Oh} = 20 K, the suction gas temperature must be adapted accordingly
- Reduced suction gas temperature (Δt_{Oh} < 20 K)

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

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

Notes

Operating limits
Compressor operation is possible within the limits shown on the application diagrams. Please note the coloured areas.For the dark blue and gray application area a minimum superheating ΔtOh = 20 K must be applied. If necessary there must be planned an internal heat exchanger IHX. Compressor application limits should not be chosen for design purposes or continuous operation.

TECHNICAL DATA

EX-HG, EX-HG... HC

Model	Number of cylinders	Displacement 50/60 Hz (1450/1740 rpm)	Electrical data				Weight	Connections ⑤		Oil charge
			Voltage ①	Max. working current ②	Max. power consumption ②	Starting current (Rotor blocked)		Discharge line DV	Suction line SV	
		m^3/h		A	kW	A	kg	mm | inch	mm | inch	Ltr.
				Y		Y				
EX-HG12P/60-4 S (HC)	2	5.40 / 6.40	③	3.9	2.2	23	48	12 | 1/2	16 | 5/8	0.8
EX-HG12P/75-4 (HC)	2	6.70 / 8.10	③	4.1	2.3	23	48	12 | 1/2	16 | 5/8	0.8
EX-HG12P/75-4 S (HC)	2	6.70 / 8.10	③	4.6	2.6	25	49	12 | 1/2	16 | 5/8	0.8
EX-HG12P/90-4 (HC)	2	8.00 / 9.60	③	4.9	2.8	25	49	12 | 1/2	16 | 5/8	0.8
EX-HG12P/90-4 S (HC)	2	8.00 / 9.60	③	5.3	3.0	26	49	12 | 1/2	16 | 5/8	0.8
EX-HG12P/110-4 (HC)	2	9.40 / 11.30	③	5.3	3.1	25	48	12 | 1/2	16 | 5/8	0.8
EX-HG12P/110-4 S (HC)	2	9.40 / 11.30	③	6.1	3.6	26	48	12 | 1/2	16 | 5/8	0.8
EX-HG22e/125-4 (HC)	2	11.10 / 13.30	③	5.4	3.0	40	73	16 | 5/8	22 | 7/8	0.9
EX-HG22e/125-4 S (HC)	2	11.10 / 13.30	③	6.2	3.6	40	74	16 | 5/8	22 | 7/8	0.9
EX-HG22e/160-4 (HC)	2	13.70 / 16.40	③	6.5	3.8	40	74	16 | 5/8	22 | 7/8	0.9
EX-HG22e/160-4 S (HC)	2	13.70 / 16.40	③	7.6	4.5	50	75	16 | 5/8	22 | 7/8	0.9
EX-HG22e/190-4 (HC)	2	16.50 / 19.80	③	8.0	4.8	40	74	16 | 5/8	22 | 7/8	0.9
EX-HG22e/190-4 S (HC)	2	16.50 / 19.80	③	9.4	5.6	50	75	16 | 5/8	22 | 7/8	0.9
EX-HG34e/215-4 (HC)	4	18.80 / 22.60	③	8.1	4.8	50	94	22 | 7/8	28 | 11/8	1.1
EX-HG34e/215-4 S (HC)	4	18.80 / 22.60	③	10.5	6.0	76	96	22 | 7/8	28 | 11/8	1.1
EX-HG34e/255-4 (HC)	4	22.10 / 26.60	③	9.8	6.0	50	94	22 | 7/8	28 | 11/8	1.1
EX-HG34e/255-4 S (HC)	4	22.10 / 26.60	③	12.2	7.2	76	96	22 | 7/8	28 | 11/8	1.1
EX-HG34e/315-4 (HC)	4	27.30 / 32.80	③	12.2	7.4	64	93	22 | 7/8	28 | 11/8	1.1
EX-HG34e/315-4 S (HC)	4	27.30 / 32.80	③	14.7	8.9	76	96	22 | 7/8	28 | 11/8	1.1
EX-HG34e/380-4 (HC)	4	33.10 / 39.70	③	15.1	9.3	64	91	22 | 7/8	28 | 11/8	1.1
EX-HG34e/380-4 S (HC)	4	33.10 / 39.70	③	18.0	11.1	76	94	22 | 7/8	28 | 11/8	1.1

Further information can be found online at **vap.gea.com**

TECHNICAL DATA

EX-HG, EX-HG... HC

Model	Number of cylinders	Displacement 50/60 Hz (1450/1740 rpm)	Electrical data: Voltage ①	Electrical data: Max. working current ②	Electrical data: Max. power consumption ②	Electrical data: Starting current (Rotor blocked)	Weight	Connections ⑤: Discharge line DV	Connections ⑤: Suction line SV	Oil charge
		m³/h		A	kW	A	kg	mm | inch	mm | inch	Ltr.
				*PW 1+2		*PW1/PW 1+2				
EX-HG44e/475-4 (HC)	4	41.30 / 49.60	④	19	11.0	83 / 109	164	28 | 1 1/8	35 | 1 3/8	2.3
EX-HG44e/475-4 S (HC)	4	41.30 / 49.60	④	23	13.1	115 / 150	169	28 | 1 1/8	35 | 1 3/8	2.3
EX-HG44e/565-4 (HC)	4	49.20 / 59.00	④	22	13.2	83 / 109	165	28 | 1 1/8	35 | 1 3/8	2.3
EX-HG44e/565-4 S (HC)	4	49.20 / 59.00	④	26	15.6	133 / 171	170	28 | 1 1/8	42 | 1 5/8	2.3
EX-HG44e/665-4 (HC)	4	57.70 / 69.20	④	26	15.4	115 / 150	171	28 | 1 1/8	42 | 1 5/8	2.3
EX-HG44e/665-4 S (HC)	4	57.70 / 69.20	④	30	18.3	133 / 171	168	28 | 1 1/8	42 | 1 5/8	2.3
EX-HG44e/770-4 (HC)	4	67.00 / 80.40	④	30	17.8	133 / 171	168	28 | 1 1/8	42 | 1 5/8	2.3
EX-HG44e/770-4 S (HC)	4	67.00 / 80.40	④	35	21.4	133 / 171	168	28 | 1 1/8	42 | 1 5/8	2.3
EX-HG56e/850-4 (HC)	6	73.80 / 88.60	④	38	22.6	101 / 174	194	35 | 1 3/8	54 | 2 1/8	2.7
EX-HG56e/850-4 S (HC)	6	73.80 / 88.60	④	43	25.3	125 / 209	211	35 | 1 3/8	54 | 2 1/8	2.7
EX-HG56e/995-4 (HC)	6	86.60 / 103.90	④	44	26.0	125 / 209	208	35 | 1 3/8	54 | 2 1/8	2.7
EX-HG56e/995-4 S (HC)	6	86.60 / 103.90	④	50	29.9	149 / 246	211	35 | 1 3/8	54 | 2 1/8	2.7
EX-HG56e/1155-4 (HC)	6	100.40 / 120.50	④	51	30.4	149 / 246	212	35 | 1 3/8	54 | 2 1/8	2.7
EX-HG56e/1155-4 S (HC)	6	100.40 / 120.50	④	61	34.5	196 / 335	221	35 | 1 3/8	54 | 2 1/8	2.7
EX-HG6/1240-4	4	107.60 / 129.10	④	57	32.5	156 / 193	225	35 | 1 3/8	54 | 2 1/8	3.6
EX-HG6/1240-4 S	4	107.60 / 129.10	④	75	41.8	204 / 250	228	35 | 1 3/8	54 | 2 1/8	3.6
EX-HG6/1410-4	4	122.40 / 146.90	④	65	38.3	156 / 193	223	35 | 1 3/8	54 | 2 1/8	3.6
EX-HG6/1410-4 S	4	122.40 / 146.90	④	76	42.3	204 / 250	226	35 | 1 3/8	54 | 2 1/8	3.6

* PW = part winding, motors for partial winding start 1 = 1st partial winding 2 = 2nd partial winding

Explanations

① Tolerance (± 10 %) relative to the mean value of the voltage range. Other voltages and types of current 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. working current / max. power consumption for designing fuses, supply lines and safety devices.
Fuse: consumption category AC3

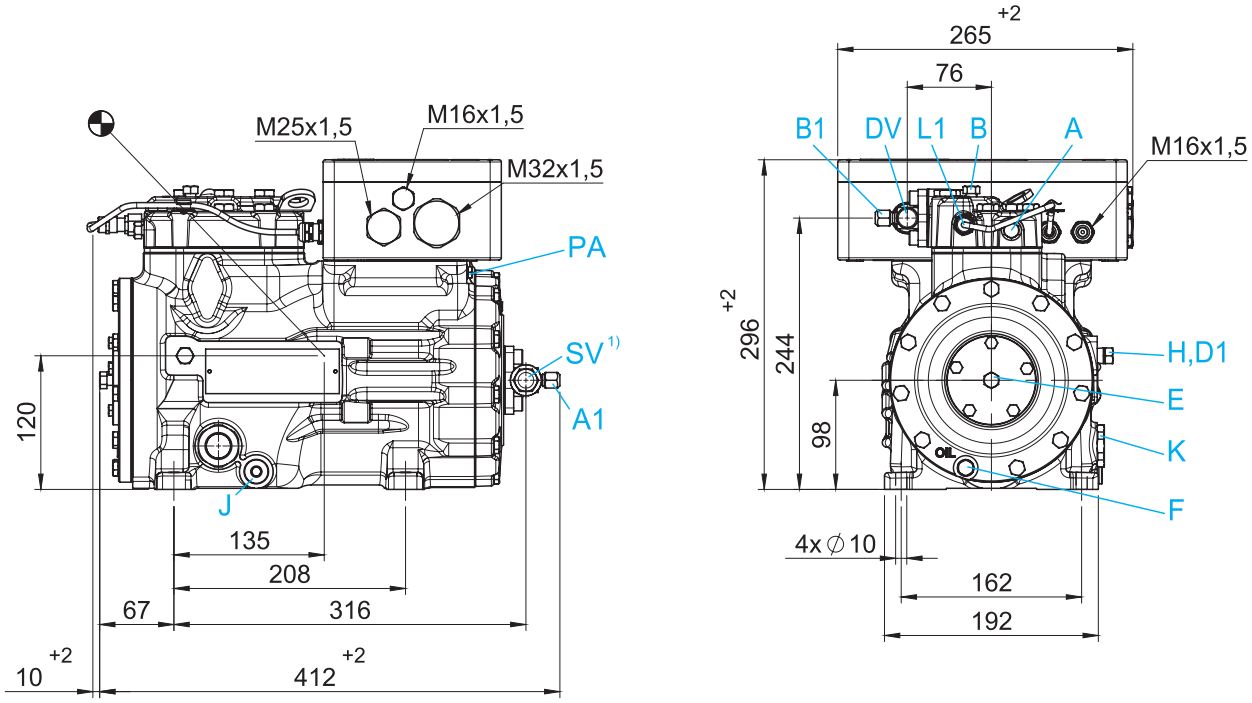
③ 380-420 V Y - 3 - 50 Hz
440-480 V Y - 3 - 60 Hz

④ 380-420 V Y/YY - 3 - 50 Hz PW
440-480 V Y/YY - 3 - 60 Hz PW
PW = part winding, motors for partial winding start (no start-up relief required)
Winding ratio:
EX-HG44e, EX-HG56e = 50% / 50%
EX-HG6 = 66% / 33%

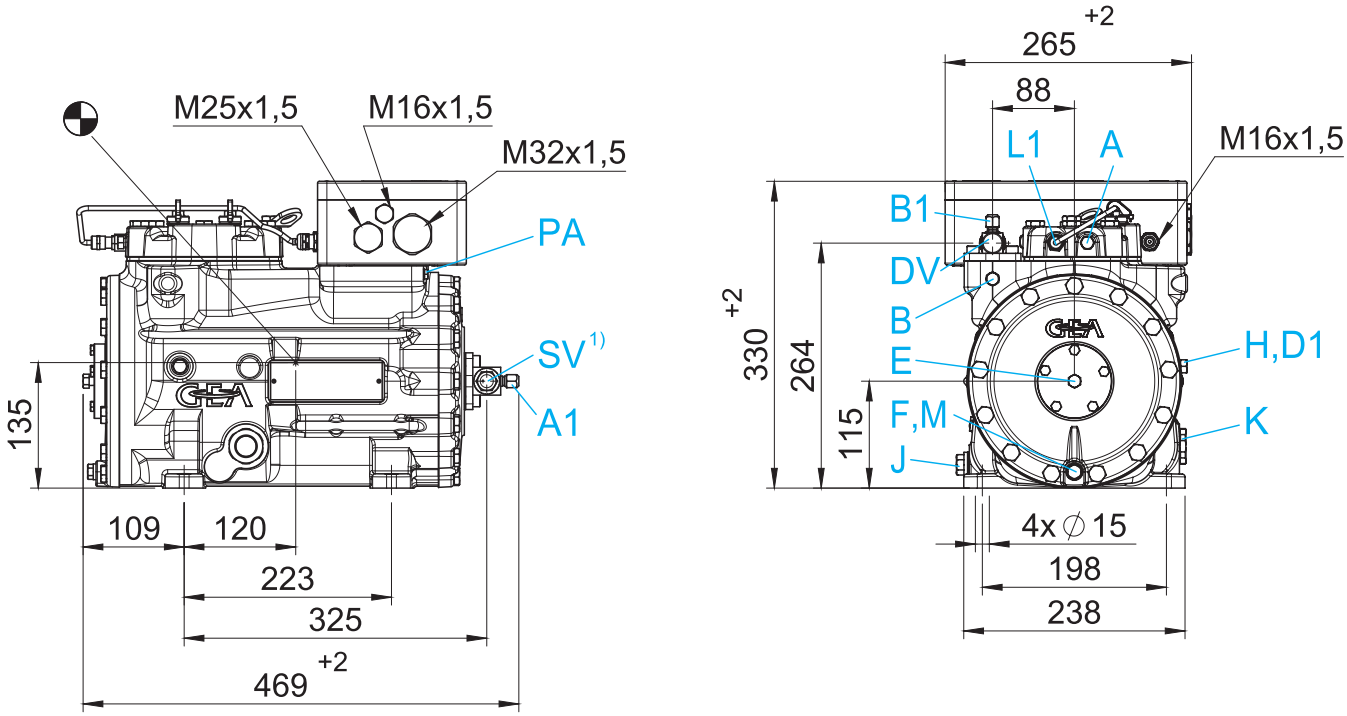
⑤ For solder connections

DIMENSIONS AND CONNECTIONS

EX-HG12P **EX-HG12P/60-4 S** **EX-HG12P/75-4** **EX-HG12P/90-4** **EX-HG12P/110-4**
EX-HG12P... HC **EX-HG12P/75-4 S** **EX-HG12P/90-4 S** **EX-HG12P/110-4 S**



EX-HG22e **EX-HG22e/125-4** **EX-HG22e/160-4** **EX-HG22e/190-4**
EX-HG22e... HC **EX-HG22e/125-4 S** **EX-HG22e/160-4 S** **EX-HG22e/190-4 S**



Dimensions in mm

[1] Position SV see table on page 25

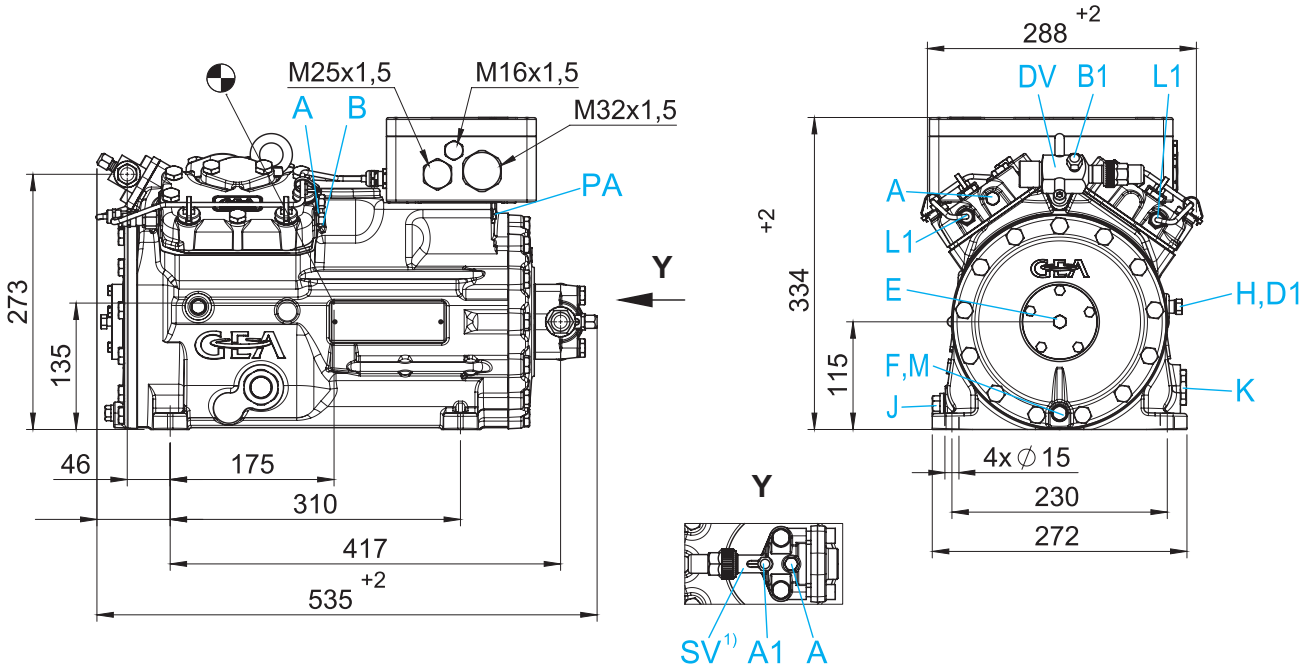
Center of gravity

For connections see page 26

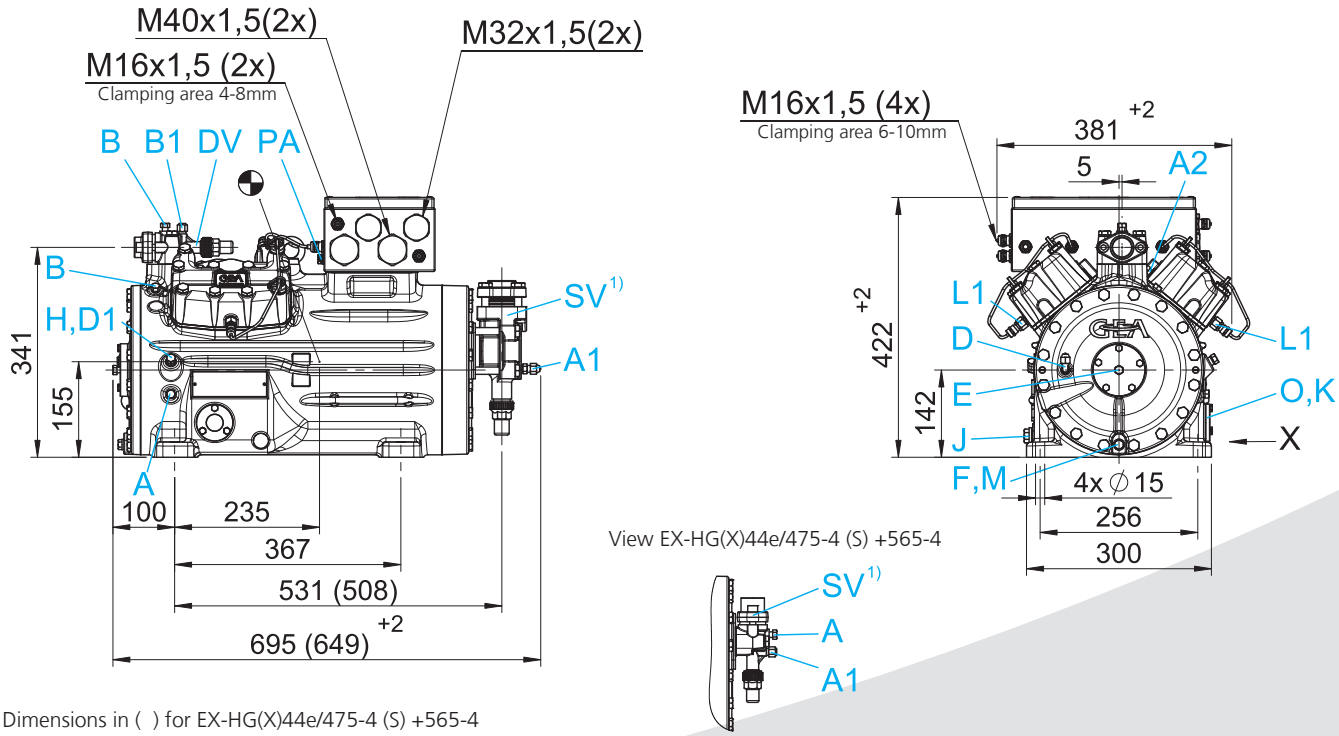
Dimensions for anti-vibration pad, see page 25

DIMENSIONS AND CONNECTIONS

EX-HG34e EX-HG34e... HC	EX-HG34e/215-4 EX-HG34e/215-4 S	EX-HG34e/255-4 EX-HG34e/255-4 S	EX-HG34e/315-4 EX-HG34e/315-4 S	EX-HG34e/380-4 EX-HG34e/380-4 S



EX-HG44e EX-HG44e... HC	EX-HG44e/475-4 EX-HG44e/475-4 S	EX-HG44e/565-4 EX-HG44e/565-4 S	EX-HG44e/665-4 EX-HG44e/665-4 S	EX-HG44e/770-4 EX-HG44e/770-4 S



Dimensions in ( ) for EX-HG(X)44e/475-4 (S) +565-4

Dimensions in mm

1) Position SV see table on page 25

Center of gravity

For connections see page 26
Dimensions for anti-vibration pad, see page 25
Dimensions for view X, see page 25

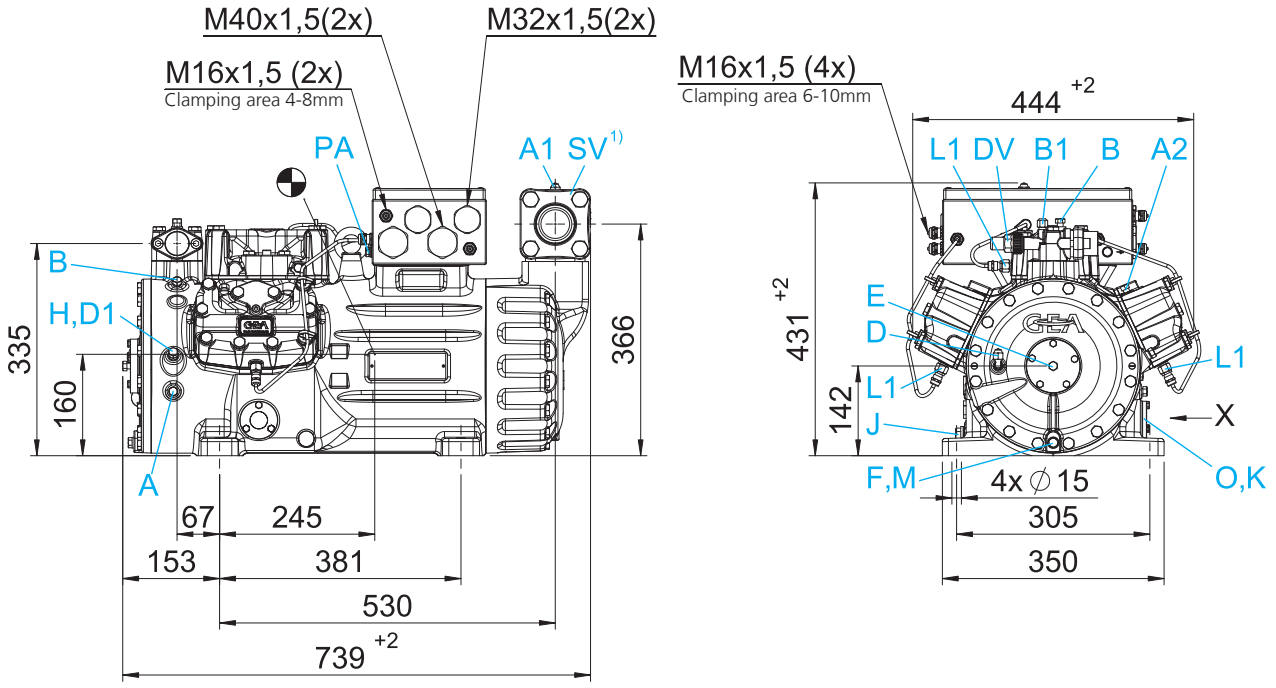
DIMENSIONS AND CONNECTIONS

EX-HG56e
EX-HG56e...HC

EX-HG56e/850-4
EX-HG56e/850-4 S

EX-HG56e/995-4
EX-HG56e/995-4 S

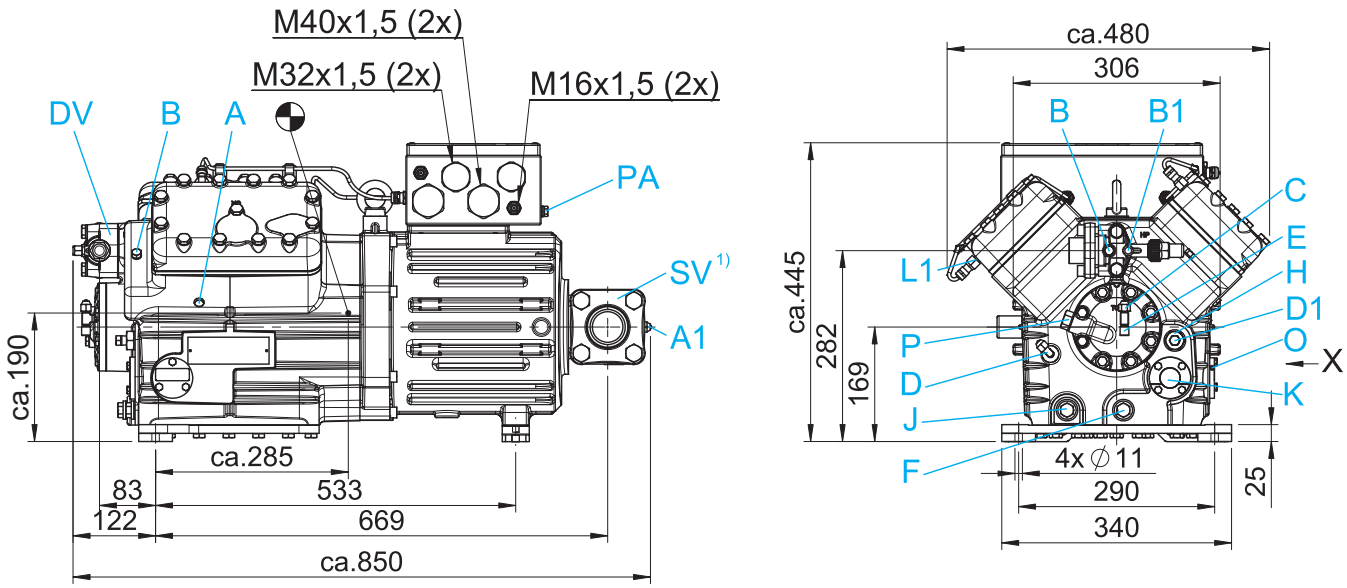
EX-HG56e/1155-4
EX-HG56e/1155-4 S



EX-HG6

EX-HG6/1240-4
EX-HG6/1240-4 S

EX-HG6/1410-4
EX-HG6/1410-4 S



Dimensions in mm
[1] Position SV see table on page 25
Center of gravity

For connections see page 26
Dimensions for anti-vibration pad, see page 25
Dimensions for view X, see page 25

DIMENSIONS AND CONNECTIONS

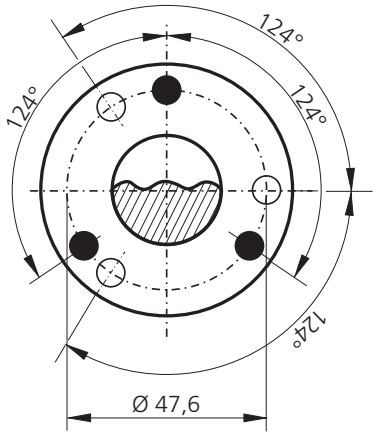
View X

Possibility to connect to oil level regulator

EX-HG44e, EX-HG56e, EX-HG6

● Three-hole connection for oil level regulator
Products ESK, AC+R, CARLY (3x M6, 10 deep) 1)

○ Three-hole connection for oil level regulator
Product TRAXOIL (3x M6, 10 deep) 1)

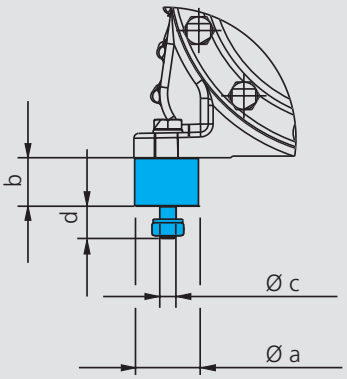


Dimensions in mm

[1] Operation of these components only with suitable ignition protection.

Dimensions for anti-vibration pad

Type	Ø a mm	b mm	Ø c mm	d mm
EX-HG12P (HC)	30	30	M8	20
EX-HG22e (HC)	40	30	M10	20
EX-HG34e (HC)	40	30	M10	20
EX-HG44e (HC)	50	30	M12	25
EX-HG56e	50	30	M12	25
EX-HG6	50	30	M10	25



Variable suction line valve position

1 Shut-off valve can be rotated 90°
2 The suction cover can be rotated by 90°
1+2 Flexible connection positioning of the suction line

	Suction line valve position	Suction cover position
EX-HG12P, EX-HG22e, EX-HG34e, EX-HG44e	90°	–
EX-HG56e	180°	90°
EX-HG6	90°	–

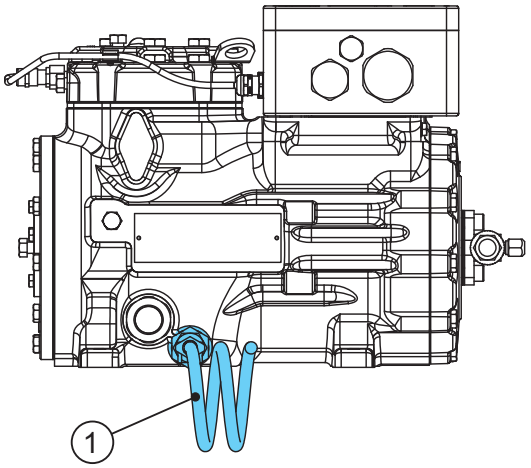
DIMENSIONS AND CONNECTIONS

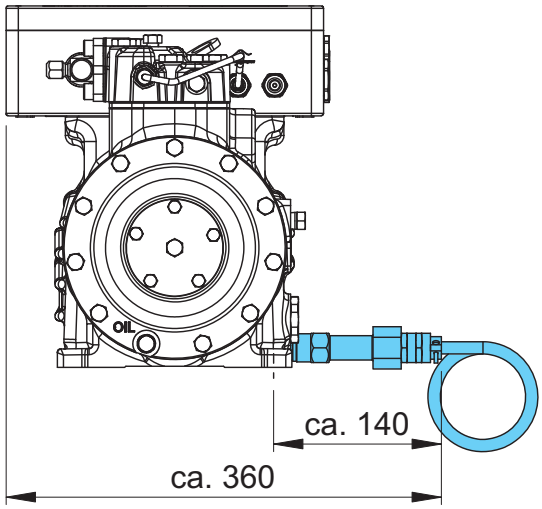
Connections		EX-HG12P (HC)	EX-HG22e (HC)	EX-HG34e (HC)	EX-HG44e (HC)	EX-HG56e	EX-HG6
SV	Suction line	See technical data pages 20 and 21					
DV	Discharge line						
A	Connection suction side, not lockable	1/8" NPTF	1/8" NPTF	1/8" NPTF	1/8" NPTF	1/8" NPTF	1/8" NPTF
A1	Connection suction side, lockable	7/16" UNF	7/16" UNF	7/16" UNF	7/16" UNF	7/16" UNF	7/16" UNF
B	Connection discharge side, not lockable	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
C	Connection oil pressure safety switch HP [1]	1/8" NPTF	1/8" NPTF	1/8" NPTF	1/8" NPTF	1/8" NPTF	7/16" UNF
D	Connection oil pressure safety switch LP [1]	–	–	–	7/16" UNF	7/16" UNF	7/16" UNF
D1	Connection oil return from oil separator	1/4" NPTF	1/4" NPTF	1/4" NPTF	1/4" NPTF	1/4" NPTF	1/4" NPTF
F	Oil drain	M 8	M 12 × 1.5	M 12 × 1.5	M 12 × 1.5	M 12 × 1.5	M 22 × 1.5
H	Oil charge plug	1/4" NPTF	1/4" NPTF	1/4" NPTF	1/4" NPTF	1/4" NPTF	M 22 × 1.5
J	Connection oil sump heater [1]	M 16 × 1.5	M 22 × 1.5	M 22 × 1.5	M 22 × 1.5	M 22 × 1.5	M 22 × 1.5
K	Sight glass	1 1/8" – 18 UNEF	1 1/8" – 18 UNEF	1 1/8" – 18 UNEF	3 x M 6	3 x M 6	4 x M 6
L1	Thermal protection thermostat	1/8" NPTF	1/8" NPTF	1/8" NPTF	1/8" NPTF	1/8" NPTF	1/8" NPTF
M	Oil filter	–	M 12 × 1.5	M 12 × 1.5	M 12 × 1.5	M 12 × 1.5	–
O	Connection oil level regulator [1]	1 1/8" – 18 UNEF	1 1/8" – 18 UNEF	1 1/8" – 18 UNEF	3 x M 6	3 x M 6	3 x M 6
P	Connection oil differential pressure sensor [1]	–	–	–	–	–	M 20 × 1.5
PA	Connection potential compensation	M 6	M 6	M 6	M 8	M 8	M 8

[1] Operation of this component is permissible only with the appropriate type of protection
[2] Dimensions for view X, see page 25

DIMENSIONS AND CONNECTIONS

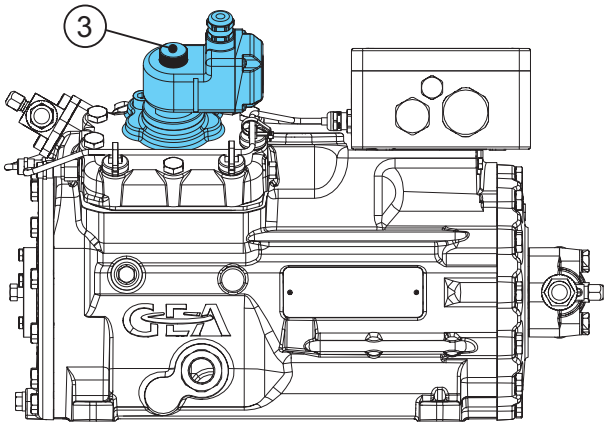
Dimensions with accessories: **EX-HG12P**

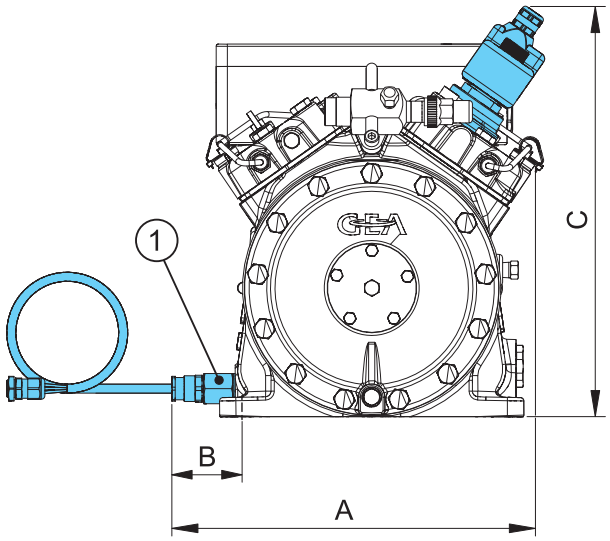




① Oil sump heater

Dimensions with accessories: **EX-HG22e** **EX-HG34e**





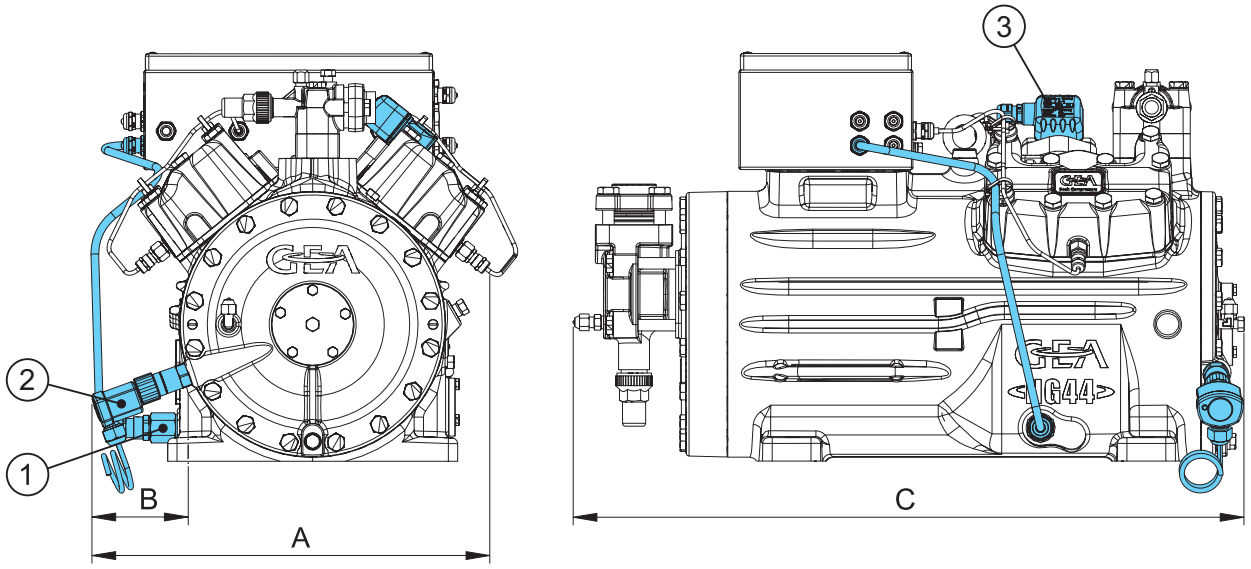
① Oil sump heater ③ Capacity regulator

Dimensions

Type	A mm	B mm	C mm
EX-HG22e	Ca. 289	Ca. 71	–
EX-HG34e	Ca. 325	Ca. 64	Ca. 367

DIMENSIONS AND CONNECTIONS

Dimensions with accessories: **EX-HG44e** **EX-HG56e**

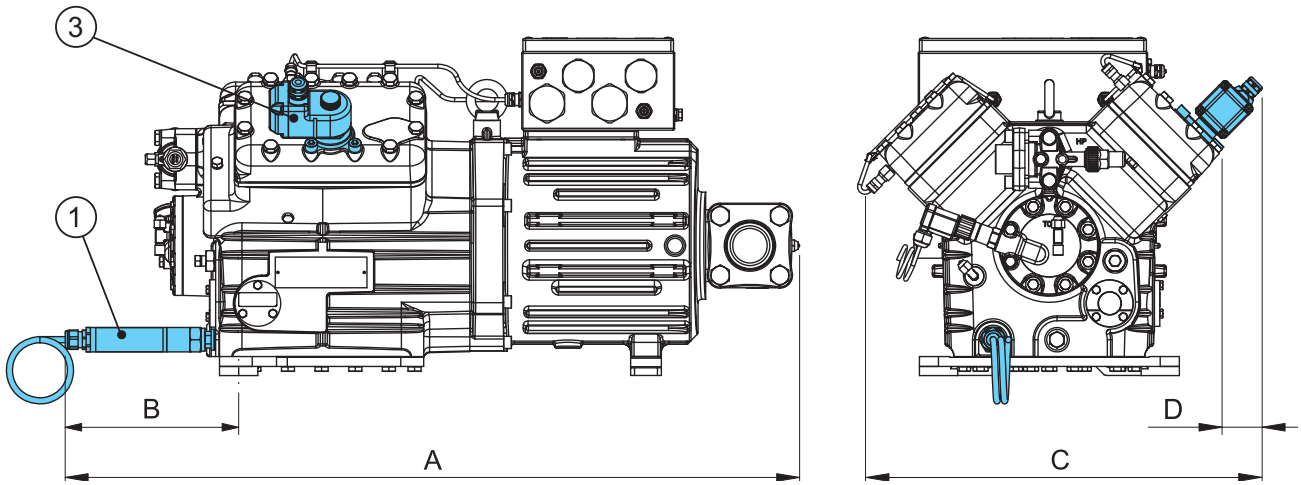


① Oil sump heater ② Oil differential pressure sensor ③ Capacity regulator

Dimensions

Type	A mm	B mm	C mm
EX-HG44e	Ca. 420	Ca. 105	Ca. 695
EX-HG56e	Ca. 448	Ca. 105	Ca. 740

Dimensions with accessories: **EX-HG6**



① Oil sump heater ③ Capacity regulator

Dimensions

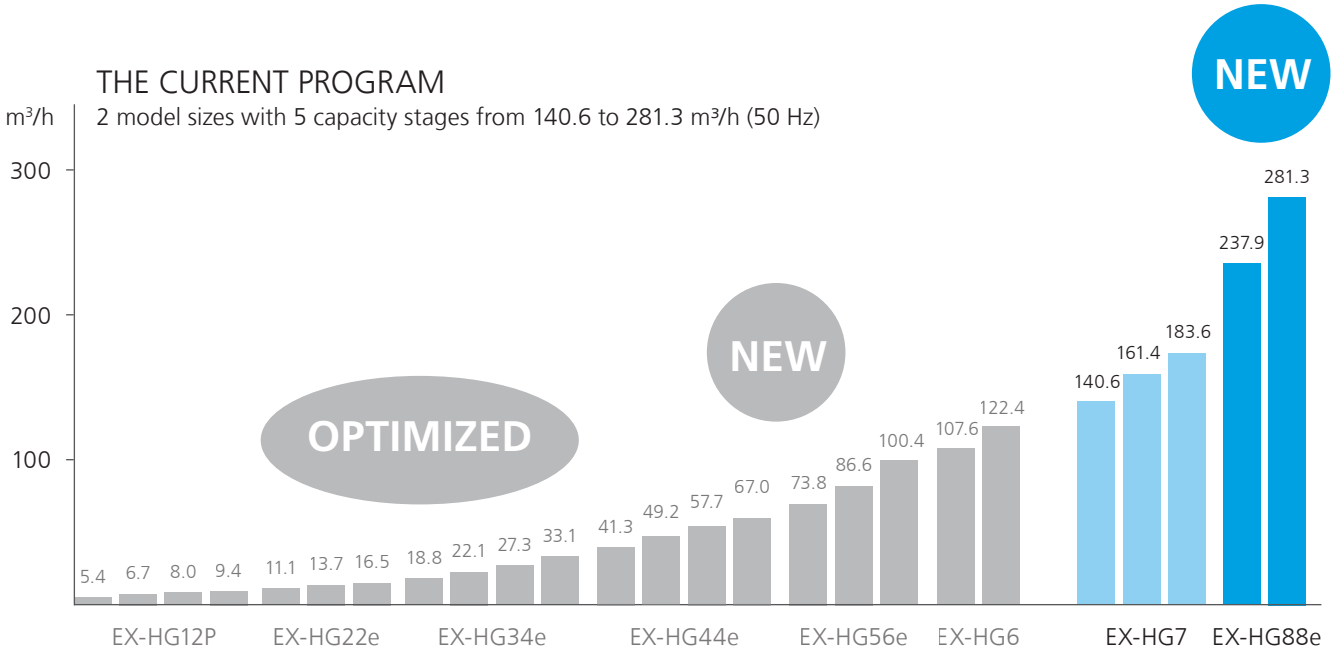
Type	A mm	B mm	C mm	D mm
EX-HG6	Ca. 965	Ca. 315	Ca. 520	Ca. 55

	Scope of supply and accessories	EX-HG12P (HC)	EX-HG22e (HC)	EX-HG34e (HC)	EX-HG44e (HC)	EX-HG56e (HC)	EX-HG6
	Semi-hermetic two-cylinder reciprocating compressor with drive motor for direct start 380-420 V Y - 3 - 50 Hz 440-480 V Y - 3 - 60 Hz Single-section compressor housing with integrated electric motor	●	●				
	Semi-hermetic four-cylinder reciprocating compressor with drive motor for direct start 380-420 V Y - 3 - 50 Hz 440-480 V Y - 3 - 60 Hz Single-section compressor housing with integrated electric motor			●			
	Semi-hermetic four-cylinder reciprocating compressor with drive motor for partial winding start 380-420 V Y/YY - 3 - 50 Hz 440-480 V Y/YY - 3 - 60 Hz Single-section compressor housing with integrated electric motor				●		
	Semi-hermetic six-cylinder reciprocating compressor with drive motor for partial winding start 380-420 V Y/YY - 3 - 50 Hz 440-480 V Y/YY - 3 - 60 Hz Single-section compressor housing with integrated electric motor					●	
	Semi-hermetic four-cylinder reciprocating compressor with drive motor for partial winding start 380-420 V Y/YY - 3 - 50 Hz 440-480 V Y/YY - 3 - 60 Hz Motor unit flange-mounted to the compressor case						●
	Special voltage and/or special frequency (on request)	○	○	○	○	○	○
	Winding protection with PTC sensors and electronic trigger device INT69 EX2 for control cabinet installation	● [1]	● [1]	● [1]	● [1]	● [1]	
	Winding protection with PTC sensors and electronic trigger device MP10 for switch cabinet installation						● [1]
	Thermal protection thermostat (PTC Sensor)	●	●	●	●	●	●
	Two-channel safety barrier as energy limiter in the intrinsically safe circuit for avoidance of ignition through sparks or thermal effects. For control cabinet installation.	● [1]	● [1]	● [1]	● [1]	● [1]	● [1]
	Oil pump	●	●	●	●	●	●
	Oil charge: HG: FUCHS Reniso SP 46 HGX: FUCHS Reniso Triton SE 55 HG...HC: FUCHS Reniso SYNTH 68	●	●	●	●	●	●
	Inert gas charge	●	●	●	●	●	●
	Four anti-vibration pads enclosed	●	●	●	●	●	●
	Pressure relief valve	–	–	–	●	●	●
	Suction and pressure shutoff valve	●	●	●	●	●	●
	Sight glass	●	●	●	●	●	●
(1)	Oil sump heater 230 V - 1 - 50/60 Hz, 80 W, explosion-proof, conforming to the ATEX/IECEx requirement	○ [1] [2]	–	–	–	–	–
	Oil sump heater 230 V - 1 - 50/60 Hz, 120 W, explosion-proof, conforming to the ATEX/IECEx requirement	–	○ [1] [2]	○ [1] [2]	–	–	–
	Oil sump heater 230 V - 1 - 50/60 Hz, 180 W, explosion-proof, conforming to the ATEX/IECEx requirement	–	–	–	○ [1] [2]	○ [1]	–
	Oil sump heater 230 V - 1 - 50/60 Hz, 140 W, explosion-proof, conforming to the ATEX/IECEx requirement	–	–	–	–	–	○ [1]
	Oil pump cover with screw-in option for oil differential pressure sensor INT250 EX	–	–	–	○ [5]	○ [5]	● [5]
	Possibility to connect to oil level regulator of makes ESK, AC+R, CARLY	● [3] [5]	● [3] [5]	● [3] [5]	● [5]	● [5]	● [5]
	Possibility to connect to oil level regulator Product TRAXOIL	● [3] [5]	● [3] [5]	● [3] [5]	● [3] [5]	● [3] [5]	● [3] [5]
(2)	Oil differential pressure (INT250 EX, product Kriwan), including switching amplifier	–	–	–	○ [1]	○ [1]	○ [1]
(3)	Capacity regulator 230 V - 1 - 40-60 Hz, 1 capacity regulator = 50% residual output, explosion-proof, conforming to the ATEX/IECEx requirement	–	–	○ [4]	○ [4]	–	○ [4]
	Capacity regulator 230 V - 1 - 40-60 Hz, 1-2 capacity regulator = 66/33% residual output, explosion-proof, conforming to the ATEX/IECEx requirement	–	–	–	–	○ [4]	–
	Offshore coating (multi-layer)	○	○	○	○	○	○

● Scope of supply (standard)
○ Accessories
– Not available

[1] Enclosed
[2] Oil sump heater required with HC compressor designs
[3] Only possible with additional adapter
[4] Mounted
[5] Operation of these components only with suitable ignition protection

GEA Bock HG compressors for zone 2



Type code – EX compressor

EX – HG X 7 / 2110 – 4 S 3G HC

- EX design
- Series [1]
- Oil charge [2]
- Size
- Swept volume
- Number of poles
- Motor version
- Device category 3 [4]
- Hydrocarbons

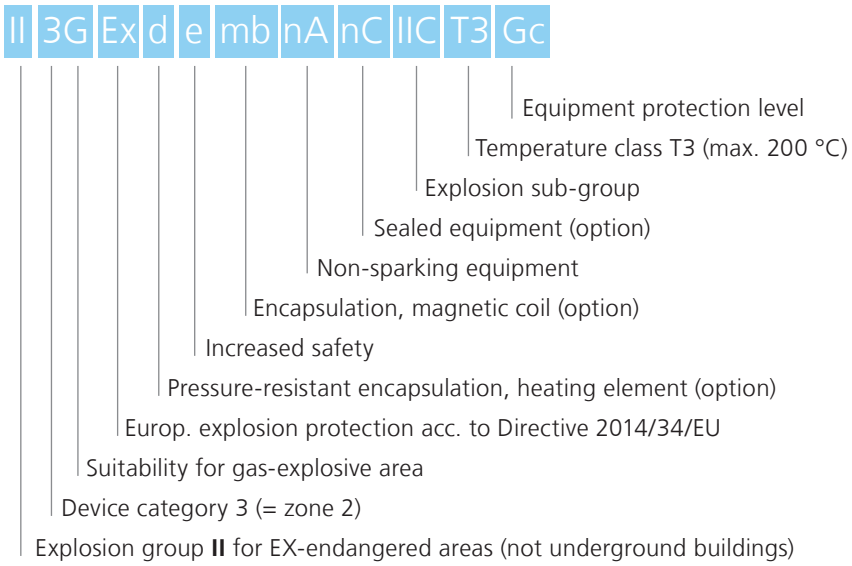
[1] HG = Compressor Hermetic Gas-cooled

[2] X = Ester oil charge (HFC refrigerant e.g. R134a, R404A, R507, R407C)

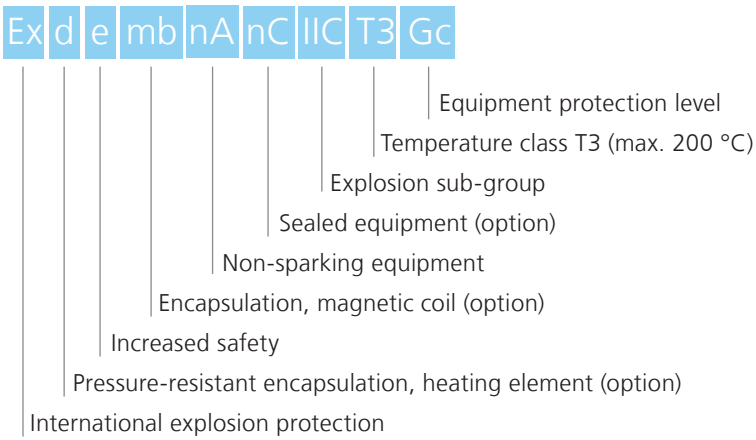
[3] S = Stronger motor, e.g. air conditioning applications

[4] For potentially explosive atmospheres caused by gases, vapors or mists

ATEX identification



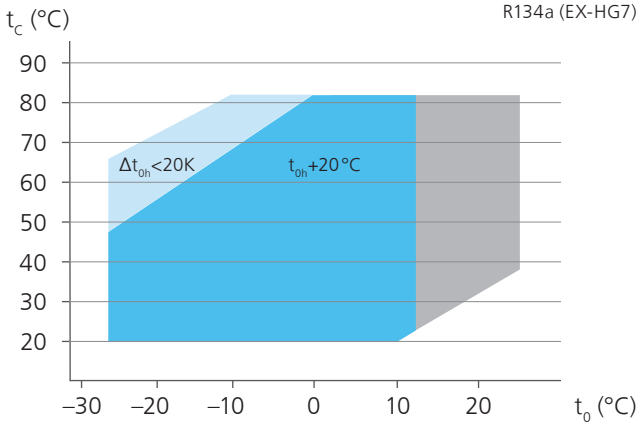
IECEx identification



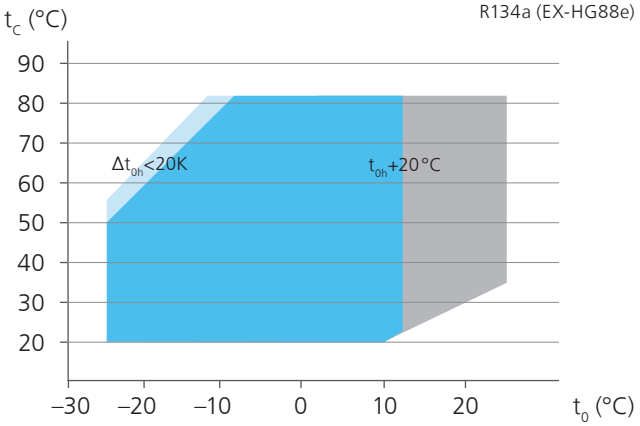
OPERATING LIMITS

Operating limits: synthetic refrigerants

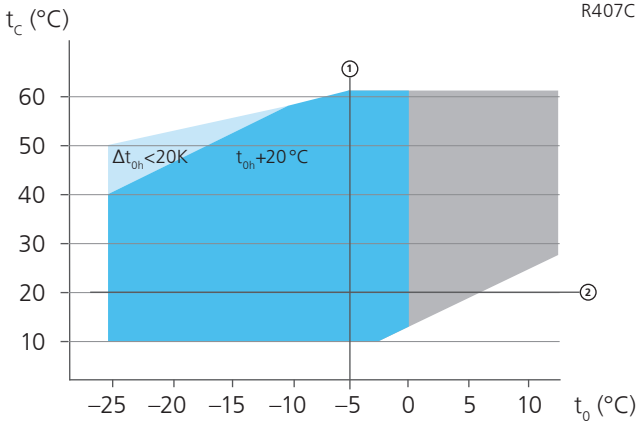
R134a (EX-HG7)



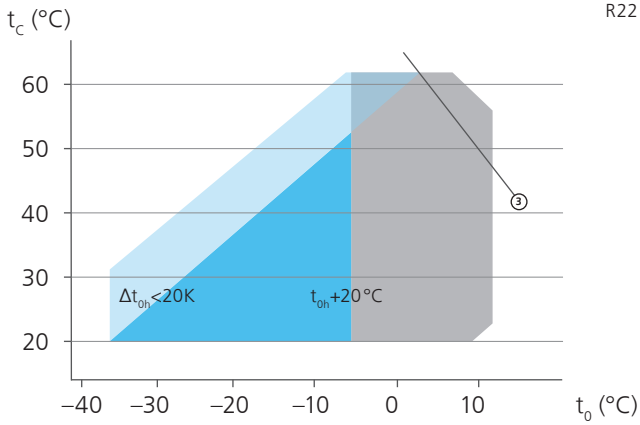
R134a (EX-HG88e)



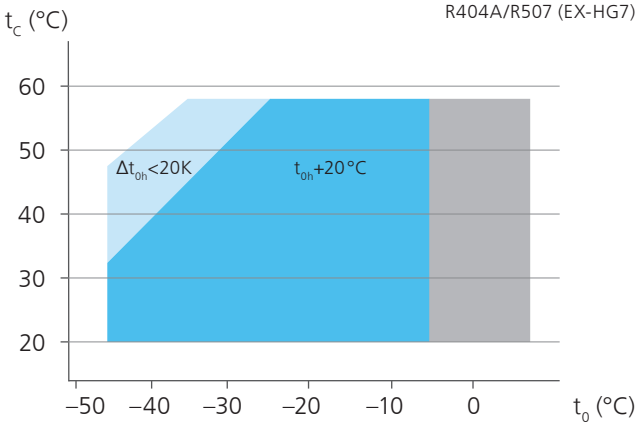
R407C



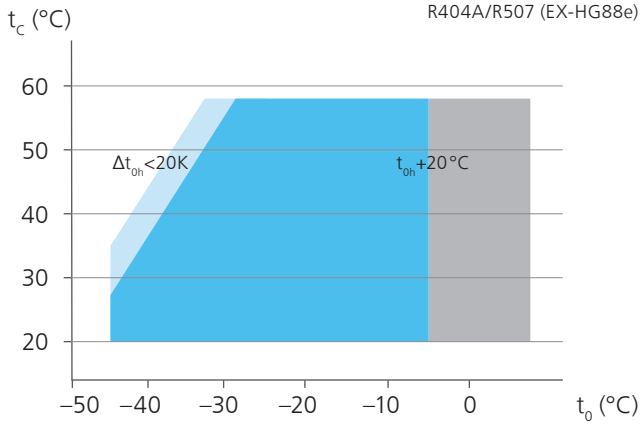
R22



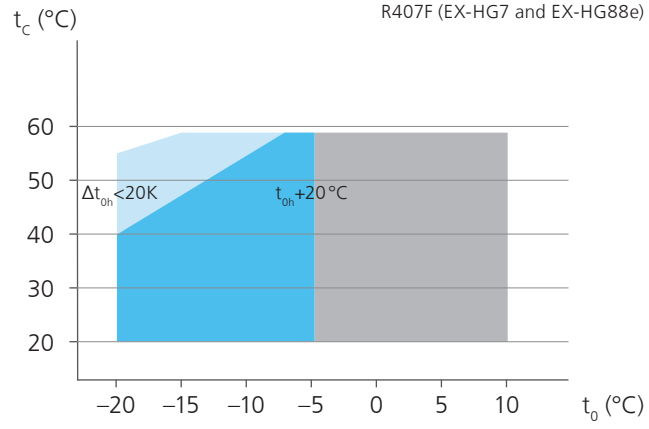
R404A/R507 (EX-HG7)



R404A/R507 (EX-HG88e)



R407F (EX-HG7 and EX-HG88e)



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

- Unlimited application range
- Reduced suction gas temperature
- Motor version -S- (more powerful motor)

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

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

① EX-HG7
Maximum evaporation temperature t_O = 5 °C

② EX-HG88e
Minimum condensing temperature t_O = 20 °C

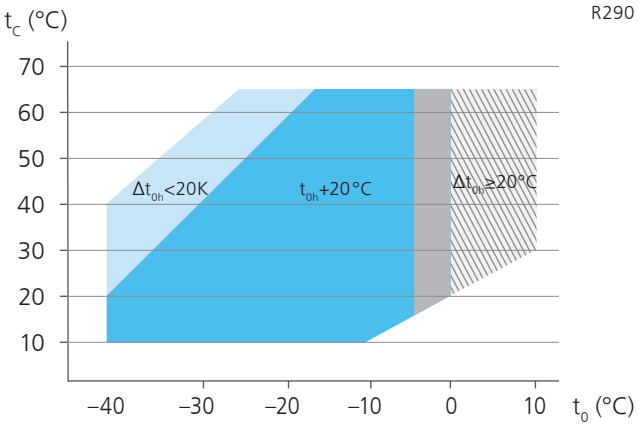
③ EX-HG7... -4 S

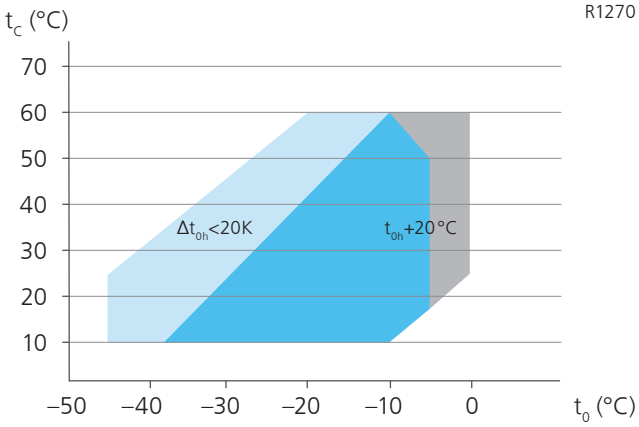
OPERATING LIMITS

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.

Operating limits: hydrocarbons





Design for other ranges on request

The use of other hydrocarbons is permitted only following prior written approval from GEA Bock

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

- Required minimum superheating Δt_{Oh} = 20 K
- Motor version -S- (stronger motor)
  Required minimum superheating Δt_{Oh} = 20 K
- Required minimum superheating Δt_{Oh} = 20 K, the suction gas temperature must be adapted accordingly
- Reduced suction gas temperature (Δt_{Oh} < 20 K)

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

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

Notes

Operating limits
The compressor can be operated within the operating limits shown in the diagram. The meaning of the color-shaded areas should be observed. A minimum superheating of Δt_{oh} = 20 K must be maintained for the dark-blue and gray application range. An internal IHX heat exchanger must be provided for this, if necessary. Thresholds should not be selected as the design point or the continuous operating point.

TECHNICAL DATA

EX-HG, EX-HG... HC

Model	Number of cylinders	Displacement 50/60 Hz (1450/1740 rpm)	Electrical data: Voltage ①	Electrical data: Max. working current ②	Electrical data: Max. power consumption ②	Electrical data: Starting current (Rotor blocked)	Weight	Connections ⑤: Discharge line DV	Connections ⑤: Suction line SV	Oil charge
		m³/h		A	kW	A	kg	mm | inch	mm | inch	Ltr.
				*PW 1+2		*PW1/PW 1+2				
EX-HG7/1620-4 3G (HC)	6	140.60 / 168.80	④	73	39.5	232 / 357	278	42 I 1 5/8	54 I 2 1/8	4.5
EX-HG7/1620-4 S 3G (HC)	6	140.60 / 168.80	④	87	47.4	232 / 357	299	42 I 1 5/8	54 I 2 1/8	4.5
EX-HG7/1860-4 3G (HC)	6	161.40 / 193.70	④	84	45.8	232 / 357	296	42 I 1 5/8	54 I 2 1/8	4.5
EX-HG7/1860-4 3G S (HC)	6	161.40 / 193.70	④	102	56.7	268 / 412	292	42 I 1 5/8	54 I 2 1/8	4.5
EX-HG7/2110-4 3G (HC)	6	183.60 / 220.30	④	96	53.1	268 / 412	289	42 I 1 5/8	64 I 2 5/8	4.5
EX-HG7/2110-4 3G S (HC)	6	183.60 / 220.30	④	121	65.6	326 / 501	297	42 I 1 5/8	64 I 2 5/8	4.5
EX-HG88e/2735-4 3G	8	237.90 / 285.50	④	114	63.7	475 / 551	448	54 I 2 1/8	76 I 3 1/8	9.0
EX-HG88e/2735-4 S 3G	8	237.90 / 285.50	④	135	77.5	520 / 605	468	54 I 2 1/8	76 I 3 1/8	9.0
EX-HG88e/3235-4 3G	8	281.30 / 337.60	④	131	74.6	475 / 551	442	54 I 2 1/8	76 I 3 1/8	9.0
EX-HG88e/3235-4 S 3G	8	281.30 / 337.60	④	160	91.0	520 / 605	462	54 I 2 1/8	76 I 3 1/8	9.0

* PW = part winding, motors for partial winding start 1 = 1st partial winding 2 = 2nd partial winding

Explanations

① Tolerance (± 10 %) relative to the mean value of the voltage range. Other voltages and types of current 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. working current / max. power consumption for designing fuses, supply lines and safety devices.
Fuse: consumption category AC3

③ 380-420 V Y - 3 - 50 Hz
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 partial winding start
(No start unloader required)
Winding ratio:
EX-HG7, EX-HG88e = 50% / 50%

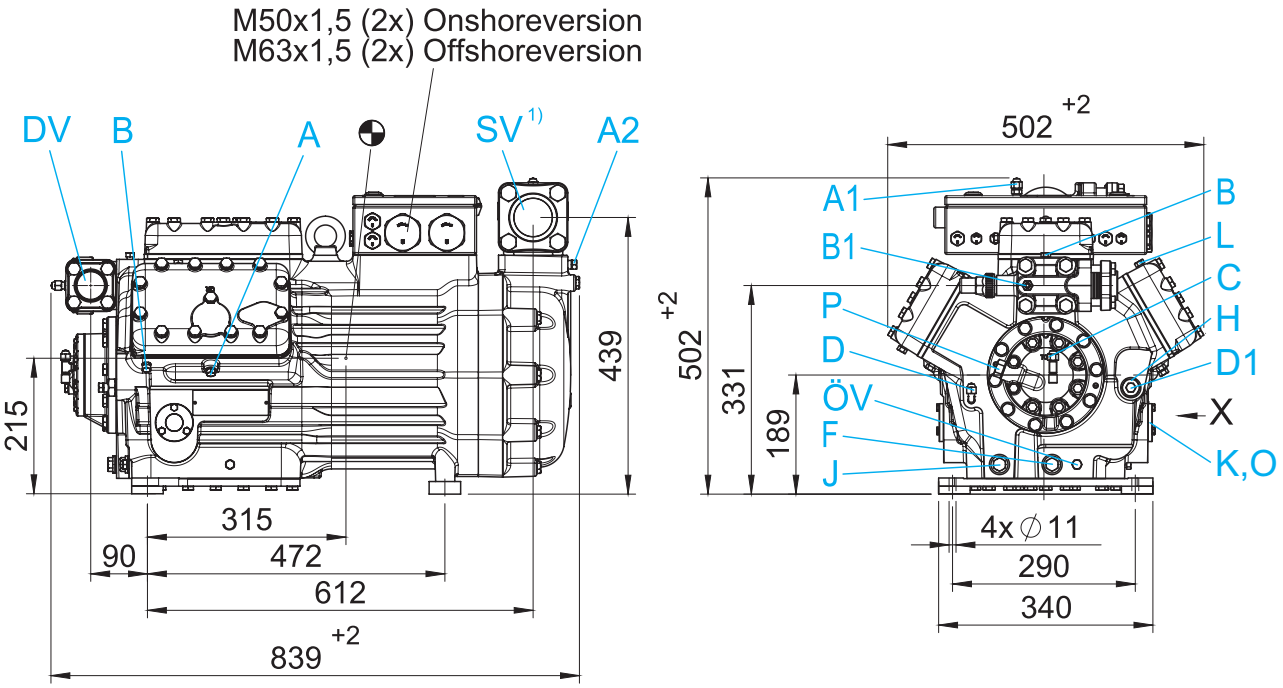
⑤ For solder connections

Further information can be found online at **vap.gea.com**

DIMENSIONS AND CONNECTIONS

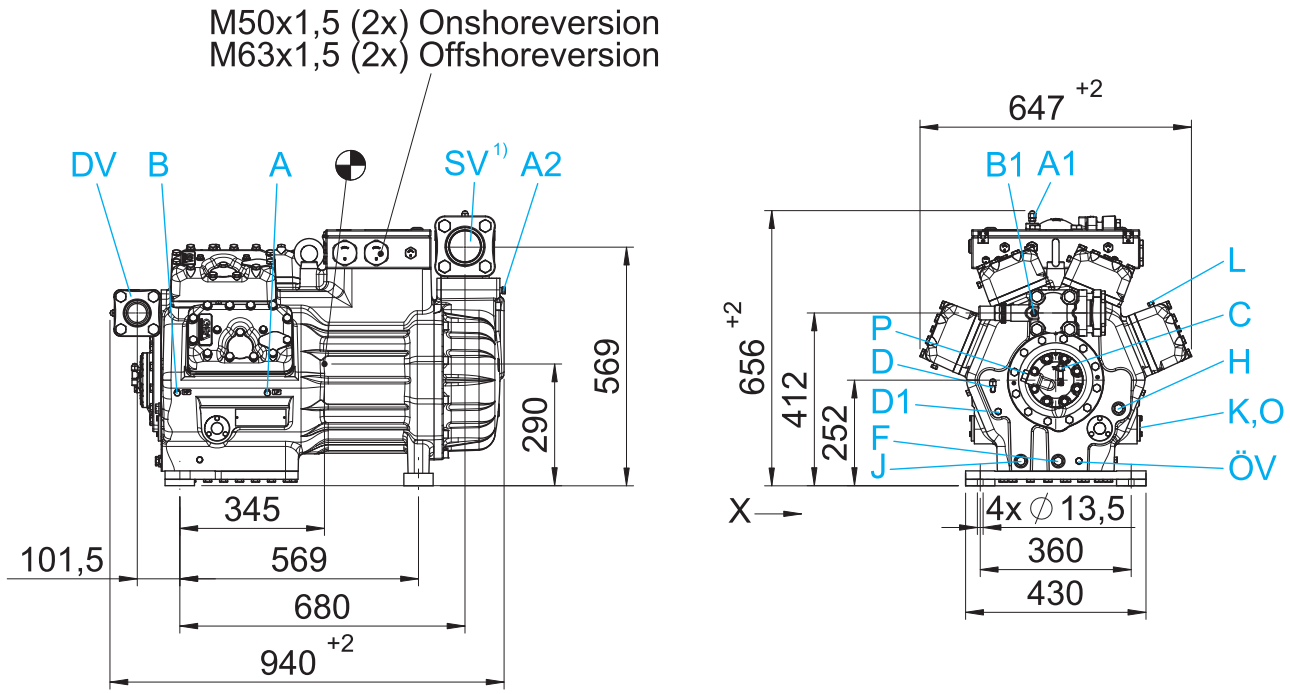
EX-HG7
EX-HG7... HC

EX-HG7/1620-4 3G **EX-HG7/1620-4 S 3G**
EX-HG7/1860-4 3G **EX-HG7/1860-4 S 3G**
EX-HG7/2110-4 3G **EX-HG7/2110-4 S 3G**



EX-HG88e

EX-HG88e/2735-4 3G **EX-HG88e/3235-4 3G**
EX-HG88e/2735-4 S 3G **EX-HG88e/3235-4 S 3G**



Dimensions in mm
[1] Position SV see table on page 36
Center of gravity

For connections see page 37
Dimensions for anti-vibration pad, see page 36
Dimensions for view X, see page 36

DIMENSIONS AND CONNECTIONS

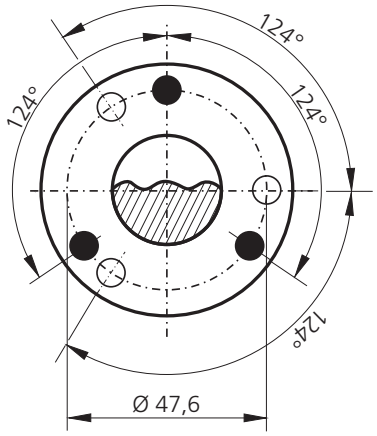
View X

Possibility to connect to oil level regulator

EX-HG7, EX-HG88e

● Three-hole connection for oil level regulator
Products ESK, AC+R, CARLY (3x M6, 10 deep) 1)

○ Three-hole connection for oil level regulator
Product TRAXOIL (3x M6, 10 deep) 1)

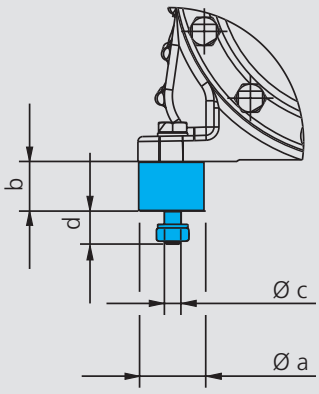


Dimensions in mm

[1] Operation of these components only with suitable ignition protection.

Dimensions for anti-vibration pad

Type	Ø a mm	b mm	Ø c mm	d mm
EX-HG7 (HC)	50	30	M10	25
EX-HG88e	70	45	M12	37



Variable suction line valve position

1 Shut-off valve can be rotated 90°
2 The suction cover can be rotated by 90°
1+2 Flexible connection positioning of the suction line

	Suction line valve position	Suction cover position
EX-HG7	180°	–
EX-HG88e	180°	90°

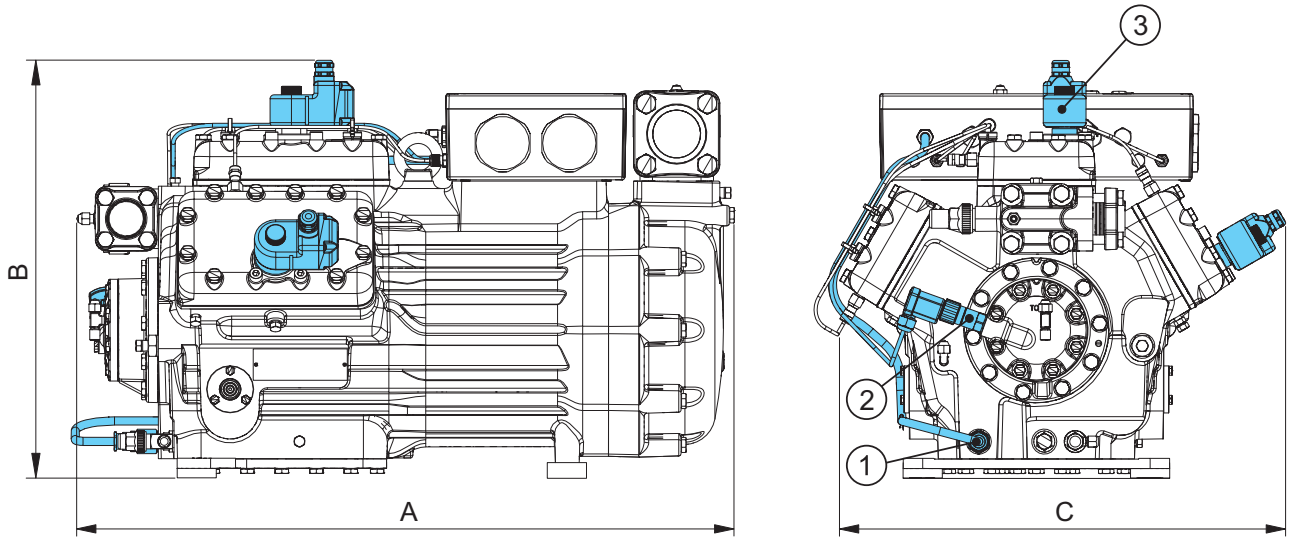
DIMENSIONS AND CONNECTIONS

Connections		EX-HG7 (HC)	EX-HG88e
SV	Suction line	See technical data page 34	
DV	Discharge line		
A	Connection suction side, not lockable	1/8" NPTF	1/8" NPTF
A1	Connection suction side, lockable	7/16" UNF	7/16" UNF
A2	Connection suction side, not lockable	1/4" NPTF	1/4" NPTF
B	Connection discharge side, not lockable	1/8" NPTF	1/8" NPTF
B1	Connection discharge side, lockable	7/16" UNF	7/16" UNF
C	Oil pressure gauge connection [1]	7/16" UNF	7/16" UNF
D	Connection oil pressure safety switch LP [1]	7/16" UNF	7/16" UNF
D1	Connection oil return from oil separator	1/4" NPTF	1/4" NPTF
F	Oil drain	M 22 × 1.5	M 22 × 1.5
H	Oil charge plug	M 22 × 1.5	M 22 × 1.5
J	Connection oil sump heater [1]	M 22 × 1.5	M 22 × 1.5
K	Sight glass	3 hole M6	3 hole M6
L	Connection Thermal protection thermostat	1/8" NPTF	1/8" NPTF
O	Connection oil level regulator [1]	3 x M 6	3 x M 6
OV	Oil service valve connection	1/4" NPTF	1/4" NPTF
P	Connection oil differential pressure sensor [1]	M 20 × 1.5	M 20 × 1.5

[1] Operation of these components only with suitable ignition protection
[2] Dimensions for view X, see page 36

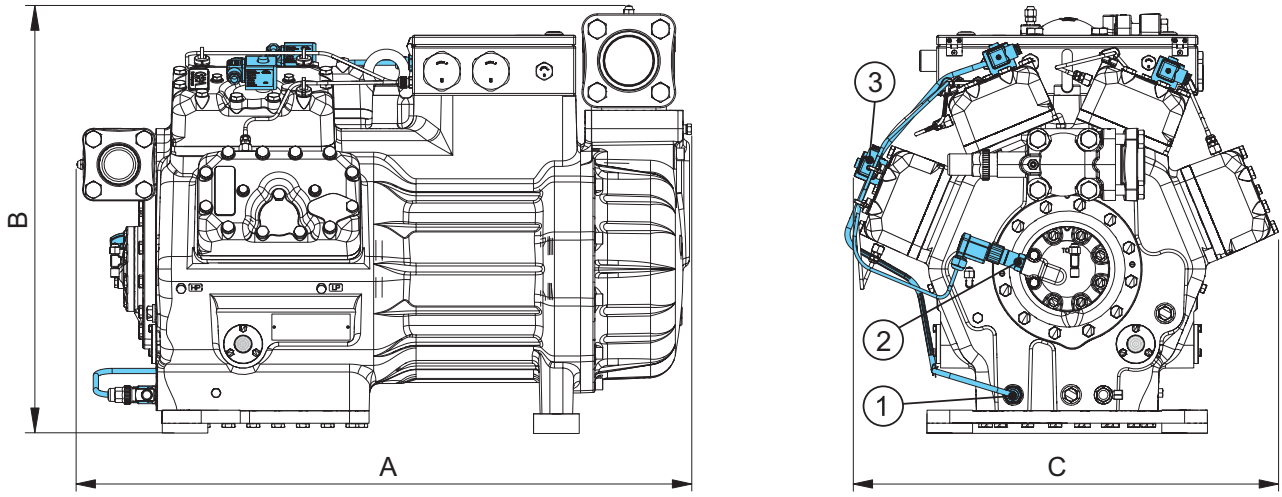
DIMENSIONS AND CONNECTIONS

Dimensions with accessories: **EX-HG7**



① Oil sump heater ② Oil differential pressure sensor ③ Capacity regulator

Dimensions with accessories: **EX-HG88e**



① Oil sump heater ② Oil differential pressure sensor ③ Capacity regulator

Dimensions

Type	A mm	B mm	C mm
EX-HG7	Ca. 840	Ca. 535	Ca. 570
EX-HG88e	Ca. 940	Ca. 656	Ca. 652

SCOPE OF SUPPLY AND ACCESSORIES

	Scope of supply and accessories	EX-HG7 (HC)	EX-HG88e
	Semi-hermetic six-cylinder reciprocating compressor with drive motor for partial winding start 380-420 V Y/YY - 3 - 50 Hz 440-480 V Y/YY - 3 - 60 Hz Single-section compressor housing with integrated electric motor	●	
	Semi-hermetic eight-cylinder reciprocating compressor with drive motor for partial winding start 380-420 V Y/YY - 3 - 50 Hz 440-480 V Y/YY - 3 - 60 Hz Single-section compressor housing with integrated electric motor		●
	Special voltage and/or special frequency (on request)	○	○
	Winding protection with PTC sensors and electronic trigger device MP10 for switch cabinet installation	●	
	Winding protection with PTC sensors and electronic trigger device INT69 EX2 for control cabinet installation		●
	Thermal protection thermostat (PTC Sensor)	○ [4]	○ [4]
	Oil pump	●	●
	Oil charge: HG: FUCHS Reniso SP 46 HGX: FUCHS Reniso Triton SE 55 HG...HC: FUCHS Reniso SYNTH 68	●	●
	Service charge	●	●
	Four anti-vibration pads enclosed	●	●
	Pressure relief valve	●	●
	Suction and pressure shutoff valve	●	●
	Sight glass	● Two sight glasses	● Three sight glasses
(1)	Oil sump heater 230 V - 1 - 50/60 Hz, 240 W, explosion-proof, conforming to the ATEX/IECEx requirement	○ [2] [4]	○ [2] [4]
	Oil pump cover with screw-in option for oil differential pressure sensor	● [4]	● [4]
	Possibility to connect to oil level regulator of makes ESK, AC+R, CARLY	● [5]	● [5]
	Possibility to connect to oil level regulator Product TRAXOIL	● [3] [5]	● [3] [5]
(2)	Oil differential pressure (INT 250 EX, product Kriwan), explosion-proof, conforming to the ATEX/IECEx requirement	○ [1]	○ [1]
(3)	Capacity regulator 230 V - 1 - 40-60 Hz 1-2 capacity regulator = 66/33% residual output, explosion-proof, conforming to the ATEX/IECEx requirement	○ [4]	–
	Capacity regulator 230 V - 1 - 40-60 Hz 1-3 capacity regulator = 75/50/25% residual output, explosion-proof, conforming to the ATEX/IECEx requirement	–	○ [4]
	Offshore coating (multi-layer)	○	○

● Scope of supply (standard)
○ Accessories
– Not available

[1] Enclosed
[2] Oil sump heater required with HC compressor designs
[3] Only possible with additional adapter
[4] Mounted
[5] Operation of these components only with suitable ignition protection

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