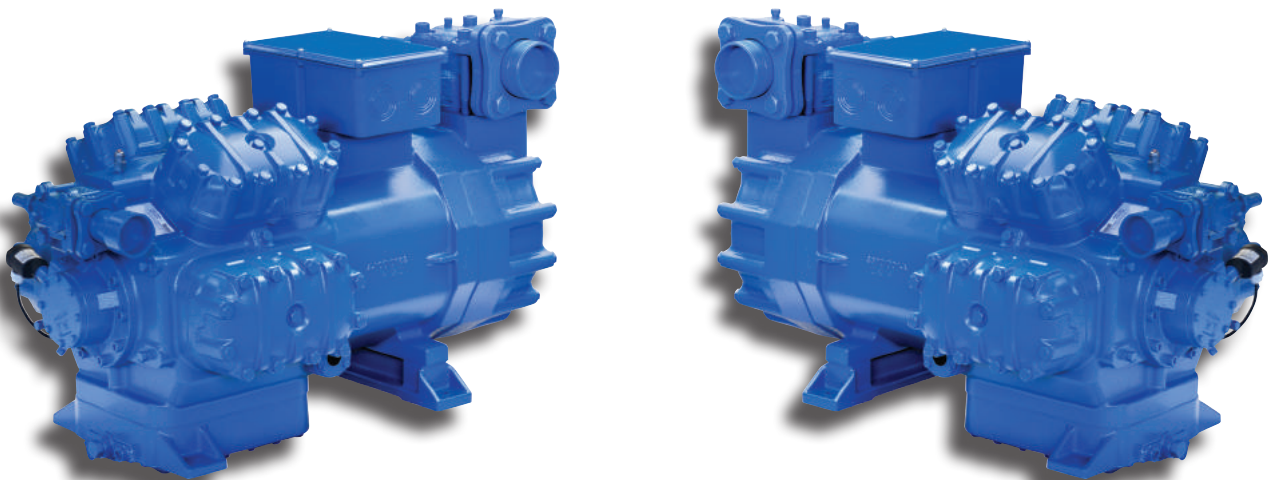


Frascold[®]

Semi-hermetic reciprocating compressors



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General information

Fracold produces a wide range of semi-hermetic reciprocating single- and two-stage compressors with displacement ranging from 4 to 240 m³/h at 50Hz and electrical ratings from 0.50 to 80 HP.

Suitable for conventional HFC-based refrigerants, new low-GWP refrigerants, HFO, natural refrigerants.

The compressors are suitable for use in a wide range of retail and industrial cooling applications, process chillers and AC, heat pumps; in single, multi-compressor systems and cascade systems. A long list of accessories multiplies their application versatility.

All models can work with inverter.

The range stands out for its high efficiency and ensuing operating cost savings. The design also assures sturdiness, low noise and compact overall dimensions.

The protection system integrated in the compressors is the most advanced on the market.

In addition to standard models, the compressor range also includes the ECOinside models optimised for use with R134a and R1234ze, AXH, AXY and AXE models with ATEX configuration, VS models with integrated inverter, SK3 and TK models for applications with CO₂ in subcritical and transcritical cycle, two-stage models, twin configuration models.

The performance of most models is ASERCOM-certified.



ASERCOM performance certification



Fracold is a member of ASERCOM, the Association which ensures the accuracy and reliability of compressor performance and that has set out the procedure for measuring the performance of compressors and their certification process. The certification of compressors certifies and guarantees that the performance published corresponds to that actually measured with reference to European standard EN12900.

The compressors with certified performance are marked with the Certified Product logo.

Further details on www.asercom.org.

Data on compressor capacity

This catalogue indicates the data for compressors with R134a, R407A, R407F, R404A, R507A, R448A, R449A, R407C, R22, R1234ze. Data relating to other refrigerants are available on request.

The capacities are indicated in accordance with European EN12900 standard and at 50Hz operation. To calculate capacity in other conditions and at 60 Hz use the Frascold Selection Software.

Operating limits

Compressor operation is possible within the application diagram; pay attention to the indications for the various areas of the diagram. The limits refer to the operation of the compressor at full load and with a power supply frequency of 50 Hz.

They also differ in terms of application in the 3 different motor sizes.

The diagrams published in this catalogue are to be considered as a general diagram for the full range of compressors.

Check the diagram of every single compressor model on the Frascold Selection Software program.

Motor version

Compressors can be fitted with three different electric motors:

- Size 1: for medium-high temperature applications
- Size 2: for low temperature applications
- Size 3: optimised for applications with R134a and R1234ze in medium temperatures

Safety

Frascold compressors are constructed according to International safety standards. They may only be used if installed within systems complying with the operating instructions and conforming to the regulations in force.

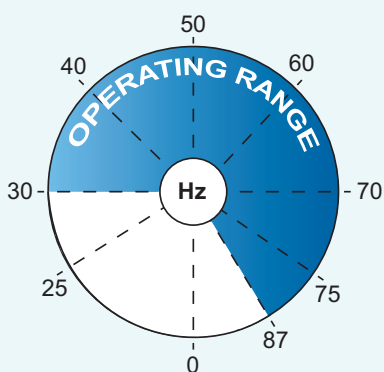
For the relevant standards please refer to the Manufacturer's Declaration, available on the www.frascold.it website in the documentation section. They will be put into service by experienced staff, suitably documented in relation to the manufacturer's declarations and able to understand and apply the instructions contained in the installation manual supplied with the compressor or available on the www.frascold.it website.

Application with variable frequency drive

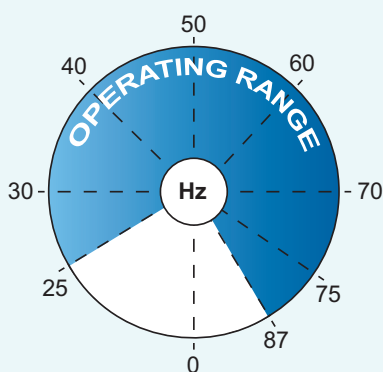
All compressors are constructed for use with inverter technology and are suitable for operation with variable frequency drive in a wide range of applications.

- 2 cylinder models: cooling capacity control from 60% to 174% (30Hz - 87Hz)
- 4 cylinder models with centrifugal lubrication: cooling capacity control from 50% to 174% (25Hz - 87Hz)
- 4 cylinder models with forced lubrication: cooling capacity control from 60% to 140% (30Hz - 70Hz)
- 6 and 8 cylinder models: cooling capacity control from 60% to 140% (30Hz - 70Hz)

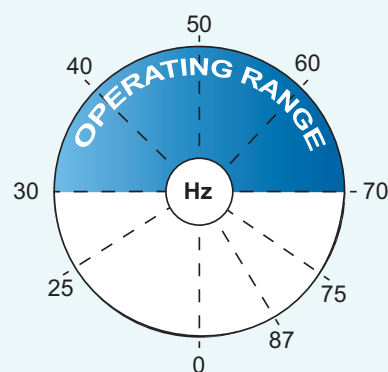
A-B-D Series



Q-S Series



V-Z-W Series



For 400V motors, in certain application conditions there might be a narrowing of the frequency range. Always check on the Frascold Selection Software. For capacity data at the various frequencies see the Frascold Selection Software.

Protection of compressors series A - B - D

All models are supplied with protection consisting of a chain of PTC thermistors inserted in the electric motor stator and connected to the INT69 electronic control module inside the electrical box.

The INT69 device is triggered and stops the compressor in the event of thermal overload due to electric motor or mechanical issues.

Protection of compressors series Q - S - V - Z - W with Diagnose technology

Frascold equips semi-hermetic reciprocating compressors with Diagnose technology, which enables a significant step forward in the compressor protection system and adds new diagnostic and communication functions.

Increased protection

Frascold compressors are even more reliable. Diagnose technology monitors the system conditions and stops the compressor in the event of incorrect functional parameters.

Lower costs

Quick identification of the cause of the malfunction. The information stored in Diagnose devices allow technicians to accurately and quickly diagnose the past and present state of the cooling system, ensuring fast and cost-effective servicing, with short system downtime.

More information

The communication systems supported by Diagnose technology allow you to monitor and download system operating data in real time; technicians can then intervene improving the efficiency and reliability of the system, diagnosing any required maintenance in advance.

Safety device to control discharge temperature

The discharge temperature, in certain extreme conditions (such as high condensing temperatures, low evaporator pressures or extremely high compression ratios), may reach values that can damage the compressor.

All V - Z and W series models are supplied complete with a safety device which, in combination with the electronic control module, stops the compressor in the event that the discharge temperature exceed the set safety limit.

Electronic safety device to control lubrication

Frascold compressors in the V - Z and W series are supplied complete with an electronic pressure switch to control lubrication. It efficiently monitors the differential pressure in the lubrication system and stops the compressor in the event of any detected measurement that does not comply with the set safety values. The device is attached directly to the compressor's oil pump and does not require additional fittings.

Unloaded start

In Frascold compressors, the compressor can be started unloaded through the US device integrated in the head (available on request). The device equalises the suction and discharge pressure, thus reducing the starting torque on the compressor reducing absorption peaks from the electrical mains. Note: a check valve, not supplied by Frascold, must be installed after the discharge valve.

Capacity control with RSH system

The thermal load of many applications can change considerably and a refrigerating system should be able to adapt to the mutated conditions. The maximum number of start stop cycles and the minimum running time of the compressor impose some limitations, therefore the simple start-stop regulation may not be the most efficient method to follow precisely the system load fluctuations. These limitations determine the minimum and maximum pressure reached in the evaporator. The higher is the pressure difference, the higher is the amount of energy wasted.

The exclusive RSH capacity control system developed by Frascold allows the system designer to reduce substantially the total energy consumption of the system. The new RSH system solves completely the problems of the traditional capacity control system based on a permanent or pulsing choke of the suction of the cylinder head, avoiding the overheat of the valve plates and the accumulation of oil in the cylinder head, therefore it can be used for long periods of time in a wide range of operating conditions without damaging the compressor. The RSH system reduces by 50% the capacity of each cylinder head where is installed, therefore the possible capacity control steps are:

2 cylinder compressors	4 cylinder compressors
50% - 100%	1 x RSH: 75% - 100% 2 x RSH: 50% - 75% - 100%
6 cylinder compressors	8 cylinder compressors
1 x RSH: 83% - 100% 2 x RSH: 66% - 83% - 100% 3 x RSH: 50% - 66% - 83% - 100%	1 x RSH: 87,5% - 100% 2 x RSH: 75% - 87,5% - 100% 3 x RSH: 62,5% - 75% - 87,5% - 100% 4 x RSH: 50% - 62,5% - 75% - 87,5% - 100%

Compared to a traditional CC capacity control system, the new RSH system offers the possibility to regulate the capacity with more steps and without time limitation, therefore it is able to follow the fluctuations of the system load more effectively and improve the total system efficiency substantially.

Features and advantages

- Enhanced system efficiency and reliability
- Greater reduction of compressor on-off cycles
- Enhanced suction pressure stability
- Greater number of regulating steps
- No time operation limit
- No increase in vibration and noise compared to full load operation
- No overheating on discharge
- No oil carry-over

Standard capacity control

Through the CC device, available on request, on Frascold 4, 6 and 8-cylinder compressors, capacity may be adjusted by choking the heads in order to adapt the cooling capacity of the system to the actual thermal demand. This reduces the start-up frequency and the stress on the compressor mechanics and electric motor.

Possible control stages:

- 4-cylinder models: 50% - 100% (2 steps)
- 6-cylinder models: 33% - 66% - 100% (2 or 3 steps)
- 8-cylinder models: 50% - 66% - 100% (2 or 3 steps)

Lubricating oil

All compressors are supplied filled with oil with specific features for refrigerants.

Oil viscosity assures, perfect lubrication within the application limits of the compressors.

Accessories

Frascold has selected and developed a comprehensive range of accessories for its compressors, suitable to assure efficiency and reliability in all intended operating conditions.

General information

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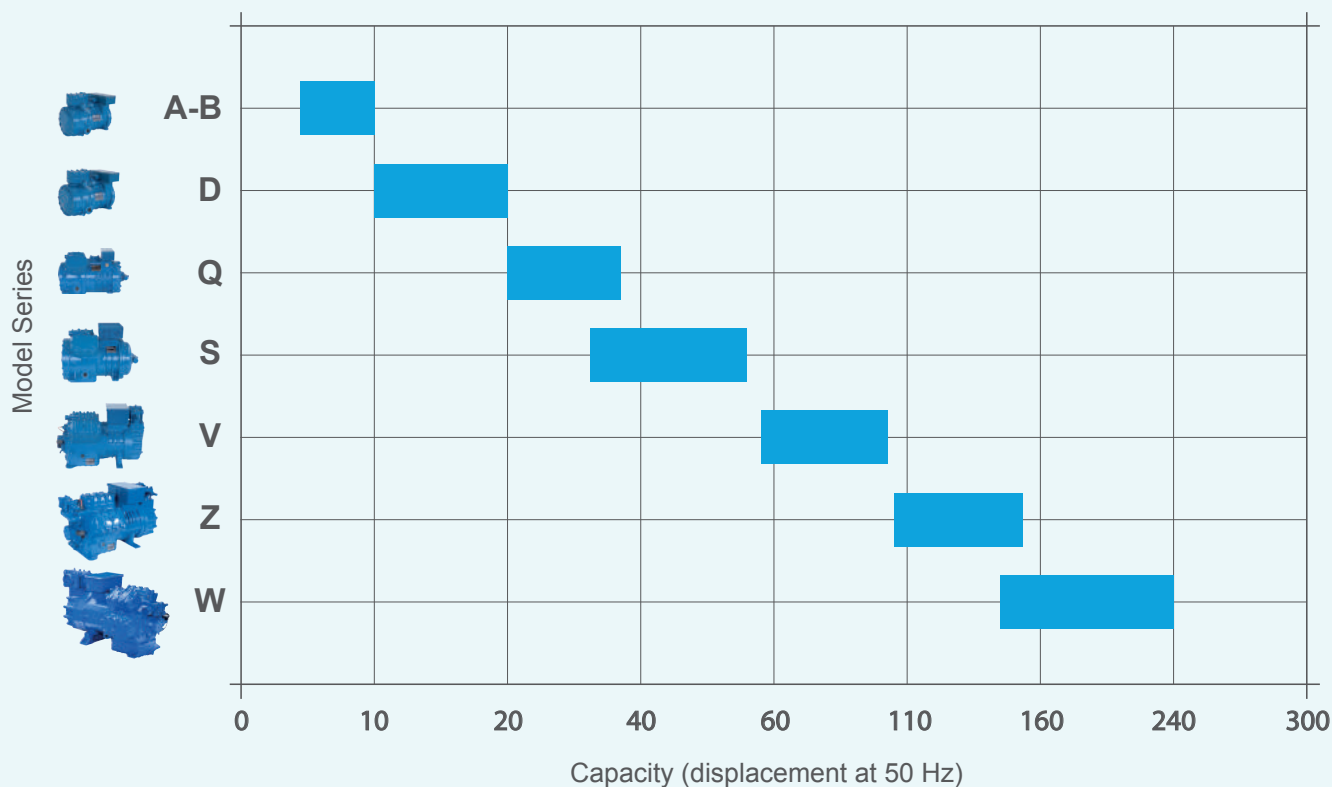
Range of models

The range of Frascold semi-hermetic reciprocating compressors includes models with 2, 4, 6 and 8 cylinders for refrigeration in low and medium temperature, process cooling, air conditioning and heat pump applications.

To select the right model, use this catalogue, the Frascold FSS3 selection software and the many publications available on the www.frascold.it website.

Current range:

7 series, 85 models with 38 capacity stages, from 3.95 to 239.00 m³/h (50 Hz)



Compressors for special applications



Inverter Compressors

By varying the power supply frequency, Frascold inverter compressors ensure the modulation of the cooling capacity in order to optimise operation at low loads, while maximising efficiency.



Two-stage Compressors

The Frascold range includes 4 and 6-cylinder two-stage compressors with a modern and innovative design, offering unique control and protection features

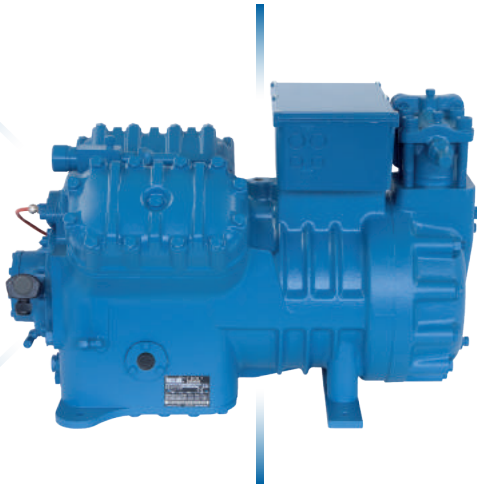


ATEX Compressors

To meet the ATEX standards required in applications in explosive atmospheres, Frascold offers a wide range of models certified in accordance with directive 94/9/EC. All ATEX compressors made by Frascold are also approved for use with hydrocarbons (R290 and R1270).

Semi-hermetic reciprocating compressors

Special features



Suitable for standard HFC and HFO refrigerants and new low GWP blends. Models for applications with hydrocarbons available.

- Perfect mechanical balancing with low level of vibrations, pulsation and noise.
- Innovative protection, diagnostics and preventive maintenance system, with Diagnose technology
- Compact design requiring less space for installation.
- High efficiency level.
- ASERCOM certified performance.
- Q - V - Z - W available in TWIN version.
- High reliability even in critical operating conditions.
- Three motor sizes optimise the various applications
- Advanced lubrication system management.
- Capacity modulation through the exclusive RSH system. The standard CC heads or a variable frequency drive.
- Wide operating range to ensure the use of a single model for low and medium temperature applications

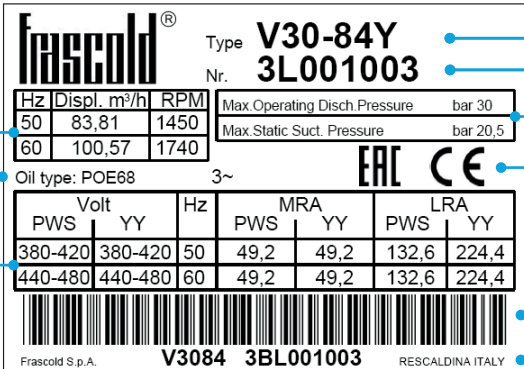
Model names

V 30 - 84 Y

Model series	A - B - D - Q - S - V - Z - W	Oil type	POE (others on request)
Electric motor	from 0,5 to 80 HP	Displacement	from 3,95 to 239,00 m ³ /h at 50Hz

Compressor nameplate

All the important information to identify the compressor is displayed on the nameplate. The date of production is contained in the serial number. The indication of the type of refrigerant is the installer's responsibility.



Compressor model: V30-84Y
Serial number: 3L001003

Maximum operating pressures:
Max. Operating Disch. Pressure: bar 30
Max. Static Suct. Pressure: bar 20,5

Safety markings: EAC, CE

Displacement (m ³ /h)		Oil type	
50	83,81	60	100,57
RPM: 1450		3~	

Electrical data		Safety markings	
Volt	Hz	MRA	LRA
PWS	YY	PWS	YY
380-420	380-420	50	49,2
440-480	440-480	60	49,2
			132,6
			224,4

Bar code: [Barcode]
Production facility: RESCALDINA ITALY

Identification number: V3084 3BL001003

Semi-hermetic reciprocating compressors

Technical specifications

Compressor	Cylinders Nr.	Displacement m ³ /h 50Hz	Oil Charge dm ³	Net Weight kg	Electrical data										Pipe connections ^⑩			
					Motor		Max operating current A ^⑨			Max power consumption kW	Locked rotor current A ^⑨			Suction		Discharge		
					Version	Connections	230V		400V		230V	400V		inch	mm	inch	mm	
							DOL	DOL	PWS			⑨	DOL					DOL
①	②	③	④	⑤	⑥													
A05-4Y	2	3,95	1	36	1	⑦	4,9	2,8		1,6	18,6	10,7		5/8	15,8	1/2	12,7	
A05-5Y	2		1	36	2	⑦	4,7	2,7		1,5	18,6	10,7		5/8	15,8	1/2	12,7	
A07-5Y	2	4,93	1	36	1	⑦	4,7	2,7		1,5	18,6	10,7		5/8	15,8	1/2	12,7	
A07-6Y	2		1	36	2	⑦	4,9	2,8		1,6	18,6	10,7		5/8	15,8	1/2	12,7	
A1-6Y	2	5,47	1	36	1	⑦	6,2	3,6		2,0	23,6	13,6		5/8	15,8	1/2	12,7	
A1-7Y	2		1	36	2	⑦	6,4	3,7		2,1	23,6	13,6		5/8	15,8	1/2	12,7	
A1.5-7Y	2	6,91	1	36	1	⑦	7,9	4,5		2,3	35,8	20,6		5/8	15,8	1/2	12,7	
A1.5-8Y	2	7,65	1	36	1	⑦	8,4	4,8		2,3	35,8	20,6		5/8	15,8	1/2	12,7	
B1.5-9.1Y	2	8,96	1	38	2	⑦	10,2	5,9		3,3	46,6	26,8		5/8	15,8	1/2	12,7	
B1.5-10.1Y	2		1	38	2	⑦	9,5	5,5		3,1	46,6	26,8		5/8	15,8	1/2	12,7	
B2-10.1Y	2	9,88	1	40	1	⑦	11,7	6,7		3,6	62,5	35,9		5/8	15,8	1/2	12,7	
D2-11.1Y	2	11,26	1,1	45	1	⑦	12,4	7,1		4,1	62,5	35,9		7/8	22,2	5/8	15,8	
D2-13.1Y	2		1,1	45	2	⑦	12,4	7,1		4,1	62,5	35,9		7/8	22,2	5/8	15,8	
D3-13.1Y	2	13,15	1,1	49	1	⑦	15,3	8,8		4,8	79,9	43,7		1 1/8	28,6	5/8	15,8	
D2-15.1Y	2		1,1	45	2	⑦	14,6	8,4		4,7	62,5	35,9		7/8	22,2	5/8	15,8	
D3-15.1Y	2	15,36	1,1	49	1	⑦	17,5	10,1		5,7	75,9	43,7		1 1/8	28,6	5/8	15,8	
D3-16.1Y	2		1,1	49	2	⑦	17,2	9,9		5,4	75,9	43,7		1 1/8	28,6	5/8	15,8	
D4-16.1Y	2	16,40	1,2	51	1	⑦	20,1	11,6		6,2	90,3	52,0		1 1/8	28,6	3/4	19,0	
D3-18.1Y	2		1,1	49	2	⑦	17,3	10,0		5,5	75,9	43,7		1 1/8	28,6	5/8	15,8	
D4-18.1Y	2	17,93	1,2	51	1	⑦	21,7	12,5		6,7	90,3	52,0		1 1/8	28,6	3/4	19,0	
D3-19.1Y	2		1,1	49	2	⑦	17,0	9,8		5,4	75,9	43,7		1 1/8	28,6	5/8	15,8	
D4-19.1Y	2	19,12	1,2	51	1	⑦	20,5	11,8		6,4	90,3	52,0		1 1/8	28,6	3/4	19,0	
Q4-20.1E	4		1,6	74	3	⑦	10,6	6,1		3,1	97,8	56,3		1 1/8	28,6	3/4	19,0	
Q4-20.1Y	4	19,77	1,6	74	2	⑦	17,5	10,1		5,7	92,6	53,2		1 1/8	28,6	3/4	19,0	
Q4-21.1Y	4		1,6	79	2	⑦	17,3	10,0		5,7	92,6	53,2		1 1/8	28,6	3/4	19,0	
Q5-21.1Y	4	21,18	1,6	79	1	⑦	20,1	11,6		6,6	109,7	63,1		1 1/8	28,6	3/4	19,0	
Q4-24.1E	4		1,6	79	3	⑦	12,5	7,2		4,0	97,8	56,3		1 1/8	28,6	3/4	19,0	
Q4-24.1Y	4	23,91	1,6	79	2	⑦	20,3	11,7		6,8	92,6	53,2		1 1/8	28,6	3/4	19,0	
Q5-24.1Y	4		1,6	79	1	⑦	23,9	13,8		7,9	109,7	63,1		1 1/8	28,6	7/8	22,2	
Q4-25.1Y	4		1,6	77	2	⑦	19,1	11,0		7,0	92,6	53,2		1 1/8	28,6	3/4	19,0	
Q5-25.1Y	4	24,69	1,6	79	2	⑦	22,1	12,7		8,5	109,7	63,1		1 1/8	28,6	7/8	22,2	
Q7-25.1Y	4		1,6	79	1	⑦	26,8	15,4		8,4	151,8	87,3		1 1/8	28,6	7/8	22,2	
Q5-28.1E	4		1,6	79	3	⑦	13,7	7,9		4,7	95,1	54,7		1 1/8	35,0	7/8	22,2	
Q5-28.1Y	4	28,02	1,6	79	2	⑦	24,3	14,0		8,2	109,7	63,1		1 1/8	35,0	7/8	22,2	
Q7-28.1Y	4		1,6	79	1	⑦	30,7	17,6		9,5	151,8	87,3		1 1/8	35,0	1 1/8	28,6	
Q5-33.1E	4		1,6	79	3	⑦	16,2	9,3		5,6	95,1	54,7		1 1/8	35,0	1 1/8	28,6	
Q5-33.1Y	4	32,66	1,6	79	2	⑦	25,0	14,4		8,3	109,7	63,1		1 1/8	35,0	1 1/8	28,6	
Q7-33.1Y	4		1,6	79	1	⑦	34,7	20,0		11,2	151,8	87,3		1 1/8	35,0	1 1/8	28,6	
Q5-36.1E	4		1,6	79	3	⑦	20,5	11,8		6,9	109,7	63,1		1 1/8	35,0	1 1/8	28,6	
Q7-36.1Y	4	35,86	1,6	79	1	⑦	33,6	19,4		10,8	151,8	87,3		1 1/8	35,0	1 1/8	28,6	

① Conversion factor for 60Hz = 1,2.

② Lubricant charge.

③ Including valves, oil charge and rubber dampers.

④ Motor size.

⑤ Connection alternatives.

⑥ Tolerance ±10% based on mean value of voltage range. Other voltages upon request.

⑦ 220-240V Δ / 380-420V Λ / 3 / 50Hz

265-290V Δ / 440-480V Λ / 3 / 60Hz

⑧ 380V-420V Λ/Λ/Λ / 3 / 50Hz

440V-480V Λ/Λ/Λ / 3 / 60Hz

⑨ Referred to 50Hz operation. At 60 Hz the max operating current remains unchanged while the max power consumption should be multiplied by 1,2. The maximum operating current /max. power consumption must be considered for the selection of cables, fuses and contactors (AC3 category).

⑩ Valves with solder connections.

Semi-hermetic reciprocating compressors

Technical specifications

Compressor	Cylinders Nr.	Displacement m ³ /h 50Hz	Oil Charge dm ³	Net Weight kg	Electrical data										Pipe connections ^⑩			
					Motor		Max operating current A ^⑨			Max power consumption kW	Locked rotor current A ^⑨			Suction		Discharge		
					Version	Connections	230V		400V		230V	400V		inch	mm	inch	mm	
							DOL	DOL	PWS	⑨		DOL	DOL					PWS
①	②	③	④	⑤	⑥													
S5-33Y	4		2,9	115	2				15,9	7,8		57,8	35,5	1 ³ / ₈	35,0	1 ¹ / ₈	28,6	
S7-33Y	4	32,80	2,9	117	1	⑧			20,4	11,1		75,0	47,0	1 ³ / ₈	35,0	1 ¹ / ₈	28,6	
S8-42E	4		2,9	117	3				12,8	7,3		90,3	52,7	1 ³ / ₈	35,0	1 ¹ / ₈	28,6	
S8-42Y	4	41,32	2,9	117	2	⑧			20,3	11,8		90,3	52,7	1 ³ / ₈	35,0	1 ¹ / ₈	28,6	
S12-42Y	4		2,9	120	1				22,4	12,9		102,3	59,1	1 ³ / ₈	35,0	1 ¹ / ₈	28,6	
S10-52E	4		2,9	120	3				14,7	8,4		102,7	59,5	1 ³ / ₈	35,0	1 ¹ / ₈	28,6	
S10-52Y	4	51,50	2,9	120	2	⑧			24,5	14,9		102,3	59,1	1 ³ / ₈	35,0	1 ¹ / ₈	28,6	
S15-52Y	4		2,9	126	1				32,4	17,8		117,1	74,8	1 ⁵ / ₈	42,0	1 ¹ / ₈	28,6	
S12-56E	4		2,9	130	3				16,1	9,0		102,7	59,5	1 ⁵ / ₈	42,0	1 ¹ / ₈	28,6	
S15-56Y	4	56,00	2,9	130	2	⑧			30,7	16,5		117,1	74,8	1 ⁵ / ₈	42,0	1 ¹ / ₈	28,6	
S20-56Y	4		2,9	132	1				38,4	19,6		136,2	87,5	1 ⁵ / ₈	42,0	1 ¹ / ₈	28,6	
V15-59E	4		4,0	170	3				17,5	10,2		102,7	59,5	1 ⁵ / ₈	42,0	1 ¹ / ₈	28,6	
V15-59Y	4	58,48	4,0	170	2	⑧			31,1	17,8		117,1	74,8	1 ⁵ / ₈	42,0	1 ¹ / ₈	28,6	
V20-59Y	4		4,0	174	1				35,3	19,6		180,5	106,6	1 ⁵ / ₈	42,0	1 ¹ / ₈	28,6	
V15-71E	4		4,0	174	3				20,2	12,0		102,7	59,5	1 ⁵ / ₈	42,0	1 ¹ / ₈	28,6	
V15-71Y	4	70,77	4,0	174	2	⑧			32,2	19,6		117,1	74,8	1 ⁵ / ₈	42,0	1 ¹ / ₈	28,6	
V25-71Y	4		4,0	184	1				43,5	23,6		202,7	118,3	2 ¹ / ₈	54,0	1 ³ / ₈	35,0	
V20-84E	4		4,0	180	3				27,2	14,2		173,0	103,0	1 ⁵ / ₈	42,0	1 ¹ / ₈	28,6	
V20-84Y	4	83,81	4,0	180	2	⑧			46,2	24,2		180,5	106,6	2 ¹ / ₈	54,0	1 ³ / ₈	35,0	
V30-84Y	4		4,0	187	1				49,2	28,4		224,4	132,6	2 ¹ / ₈	54,0	1 ³ / ₈	35,0	
V25-93Y	4		4,0	200	2				52,3	25,8		202,7	118,3	2 ¹ / ₈	54,0	1 ³ / ₈	35,0	
V32-93Y	4	93,05	4,0	192	1	⑧			53,1	30,9		239,2	144,5	2 ¹ / ₈	54,0	1 ³ / ₈	35,0	
V25-103E	4		4,0	204	3				29,9	16,9		210,3	122,7	2 ¹ / ₈	54,0	1 ³ / ₈	35,0	
V25-103Y	4	102,90	4,0	204	2	⑧			52,3	28,8		202,7	118,3	2 ¹ / ₈	54,0	1 ³ / ₈	35,0	
V35-103Y	4		4,0	207	1				61,0	38,5		239,2	144,5	2 ¹ / ₈	54,0	1 ³ / ₈	35,0	
Z25-106E	6		3,7	220	3				30,2	17,1		210,3	122,7	2 ¹ / ₈	54,0	1 ³ / ₈	35,0	
Z25-106Y	6	106,16	3,7	220	2	⑧			53,6	31,9		202,7	118,3	2 ¹ / ₈	54,0	1 ³ / ₈	35,0	
Z35-106Y	6		3,7	223	1				60,2	35,1		239,2	144,5	2 ¹ / ₈	54,0	1 ³ / ₈	35,0	
Z30-126E	6		7,2	229	3				33,8	19,7		212,5	122,7	2 ¹ / ₈	54,0	1 ³ / ₈	35,0	
Z30-126Y	6	125,72	7,2	229	2	⑧			55,7	35,0		224,4	132,6	2 ¹ / ₈	54,0	1 ³ / ₈	35,0	
Z40-126Y	6		7,2	240	1				71,9	40,7		273,0	159,2	2 ⁵ / ₈	67,0	1 ⁵ / ₈	42,0	
Z40-154E	6		7,2	240	3				41,1	23,8		239,2	144,5	2 ⁵ / ₈	67,0	1 ⁵ / ₈	42,0	
Z40-154Y	6	154,38	7,2	240	2	⑧			77,9	37,9		273,0	159,2	2 ⁵ / ₈	67,0	1 ⁵ / ₈	42,0	
Z50-154Y	6		7,2	244	1				90,4	52,1		321,4	188,8	2 ⁵ / ₈	67,0	1 ⁵ / ₈	42,0	
W40-142Y	8	141,50	7,7	295	2	⑧			89,3	42,3		298,0	215,0	2 ⁵ / ₈	67,0	1 ⁵ / ₈	42,0	
W40-168Y	8		7,7	299	2				71,4	37,3		298,0	215,0	2 ⁵ / ₈	67,0	1 ⁵ / ₈	42,0	
W50-168Y	8	167,60	7,7	305	1	⑧			94,8	55,2		367,0	258,0	3 ¹ / ₈	79,4	1 ⁵ / ₈	42,0	
W50-187Y	8		7,7	311	2				89,1	50,2		367,0	258,0	3 ¹ / ₈	79,4	1 ⁵ / ₈	42,0	
W60-187Y	8	186,10	7,7	315	1	⑧			103,5	59,9		455,0	326,0	3 ¹ / ₈	79,4	1 ⁵ / ₈	42,0	
W60-206Y	8		7,7	320	2				98,8	56,7		455,0	326,0	3 ¹ / ₈	79,4	2 ¹ / ₈	54,0	
W70-206Y	8	205,80	7,7	328	1	⑧			116,8	66,8		548,0	390,0	3 ¹ / ₈	79,4	2 ¹ / ₈	54,0	
W70-228Y	8		7,7	328	2				109,5	61,9		548,0	390,0	3 ¹ / ₈	79,4	2 ¹ / ₈	54,0	
W75-228Y	8	227,77	7,7	328	1	⑧			128,4	74,2		584,0	417,0	3 ¹ / ₈	79,4	2 ¹ / ₈	54,0	
W75-240Y	8		7,7	328	2				115,3	65,4		584,0	417,0	3 ¹ / ₈	79,4	2 ¹ / ₈	54,0	
W80-240Y	8	239,02	7,7	328	1	⑧			135,7	78,9		584,0	417,0	3 ¹ / ₈	79,4	2 ¹ / ₈	54,0	

Semi-hermetic reciprocating compressors

Kriwan INT69 ®Diagnose multifunctional device

Kriwan Diagnose devices are a step ahead in the protection of compressors.

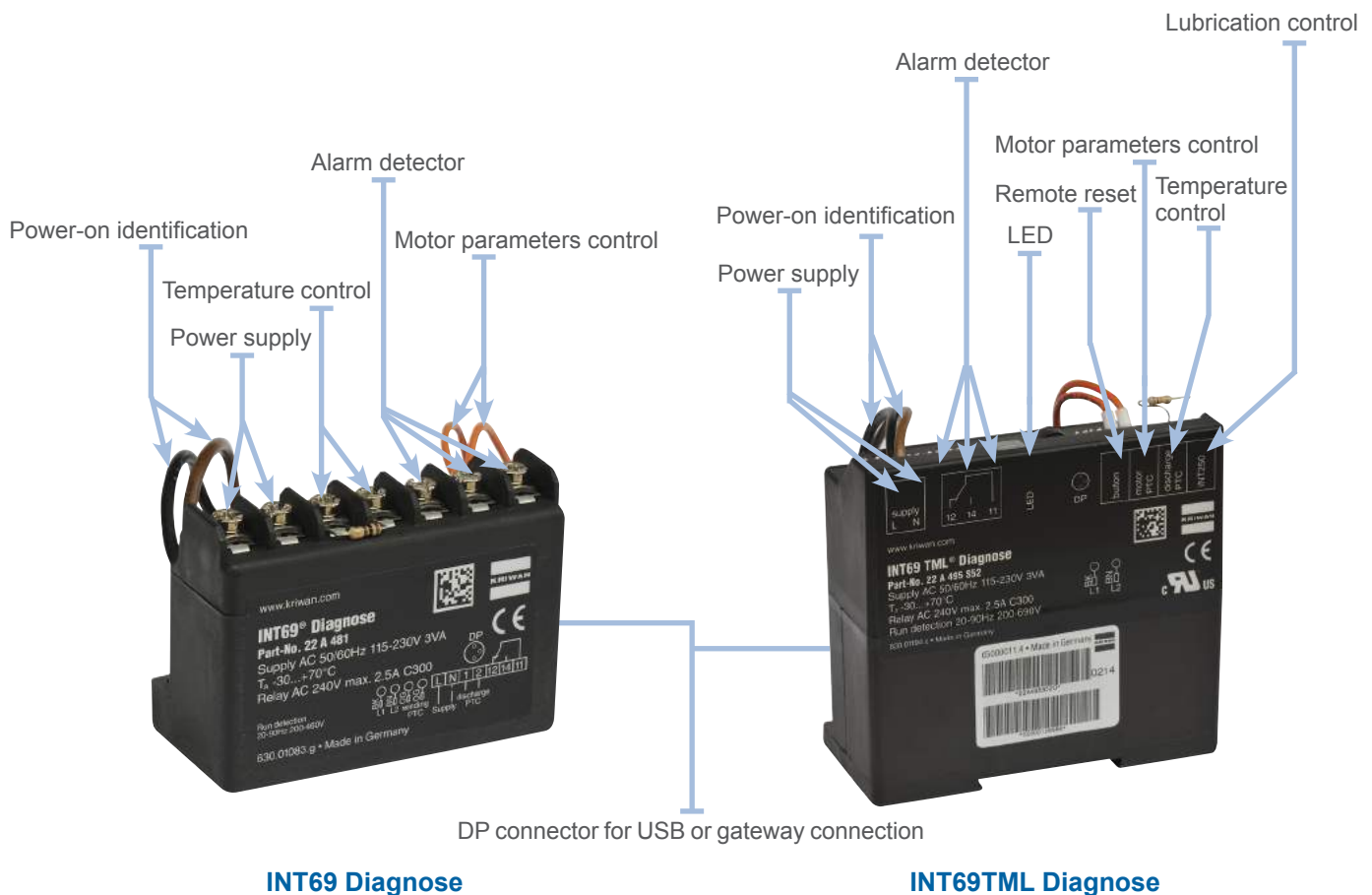
The Diagnose technology is not only limited to protecting the compressor, but also offers diagnosis and system optimisation features; providing detailed information to technicians in order to promptly diagnose system problems; it even makes it possible to prevent malfunctioning before it occurs thanks to data analysis.

The additional protection features help extending the compressor's service life.

Through this technology applied to compressors, users will benefit from enhanced reliability of the cooling system and from the reduction in running and maintenance costs. Frascold was the first compressor manufacturer to adopt this innovative technology and today it is standard on all models in the Q - S - V - Z - W series.

Advantages

- Guaranteed optimal operation throughout the compressor's entire life cycle
- Simple and straightforward operation
- Fast diagnosis and precise instructions for solving the problems causing errors and failures
- Specifically designed to satisfy the user's needs
- Intelligent monitoring of compressor operation
- Extends the operative life of cooling systems
- Improves compressor protection
- Reduces running and maintenance costs
- Automatic storage of operational data and errors in a memory
- Technical card with retrieval of stored data
- Display of compressor status through flash LED code (for TML version)
- Data download through USB connection
- Remote communication through DP-Modbus gateway to PLC (Modbus protocol RS485) or Modbus-LAN Gateway to the web (HTTP protocol)
- Applicable to previously installed compressors



INT69® Diagnose and INT69TML® Diagnose are intellectual property and trademarks ® of KRIWAN Industrie-Elektronik GmbH.

Semi-hermetic reciprocating compressors

Standard equipment and optional accessories

Frascold supplies its compressors equipped with standard components as shown here below. Optional accessories are available on request for other needs.

Description	Series						
	A - B	D	Q	S	V	Z	W
Semi-hermetic compressor with integrated electric motor, direct on line start and PTC sensor / AMS sensor 220-240V Δ / 380-420V λ / 3 / 50 Hz 265-290V Δ / 440-480V λ / 3 / 60 Hz	S PTC	S PTC	S AMS				
Semi-hermetic compressor with integrated electric motor, part winding start and AMS sensor / PTC sensor 380-420V λ / 3 / 50 Hz 440-480V λ / 3 / 60 Hz				S AMS	S AMS	S AMS	S PTC
Electric terminal box Protection class	S IP56	S IP56	S IP56	S IP56	S IP65	S IP65	S IP65
Control and protection device	S	S					
Multifunctional control, protection and diagnostics device	▲	▲	S	S	S	S	S
Discharge temperature sensor			▲	▲	S	S	S
Differential oil pressure switch					S	S	S
Reversible oil pump					S	S	S
Oil sight glass	S [x1]	S [x1]	S [x2]	S [x2]	S [x2]	S [x2]	S [x2]
POE oil charge	S	S	S	S	S	S	S
Viscosity (cSt)	32	32	32	32	68	68	68
Liquid injection connection			S	S	S	S	S
Suction shut-off valve	S	S	S	S	S	S	S
Discharge shut-off valve	S	S	S	S	S	S	S
Nitrogen protective charge	S	S	S	S	S	S	S
Rubber dampers kit	S	S	S	S	S	S	S
Oil heater	▲	▲	▲	▲	▲	▲	▲
US unloader start head		▲	▲	▲	▲	▲	▲
RSH capacity control head		▲	▲	▲	▲	▲	▲
CC capacity control head			▲	▲	▲	▲	▲
Head cooling fan	▲	▲	▲	▲	▲	▲	▲
Water cooled head	▲	▲	▲	▲	▲	▲	▲
Electronic liquid injection kit			▲	▲	▲	▲	▲
Oil level switch	▲	▲	▲	▲	▲	▲	▲
Oil level regulator	▲	▲	▲	▲	▲	▲	▲
Flange and shut-off valve for oil equalization	▲	▲	▲	▲	▲	▲	▲
DP Modbus gateway			▲	▲	▲	▲	▲
INT-gateway cable			▲	▲	▲	▲	▲
Modbus-LAN gateway			▲	▲	▲	▲	▲
USB adapter cable			▲	▲	▲	▲	▲

S Included in the standard extent of delivery

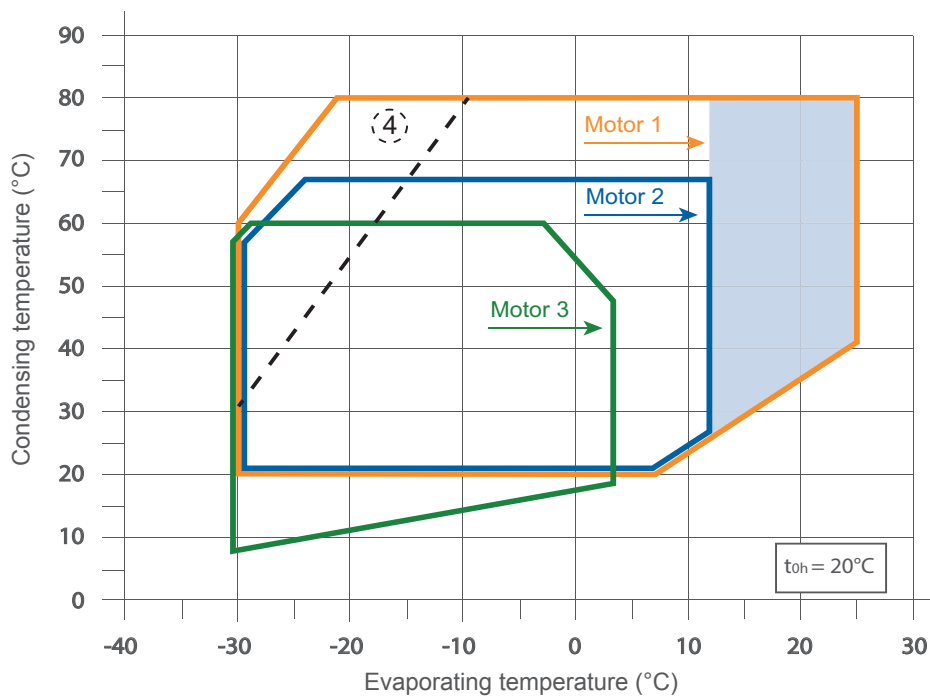
▲ Option available at an additional charge

Operating limits

The compressors can operate within the range of the application diagrams; pay attention to the different areas. For the operating limits of each compressor refer to the Frascold Selection Software program (see page 74).

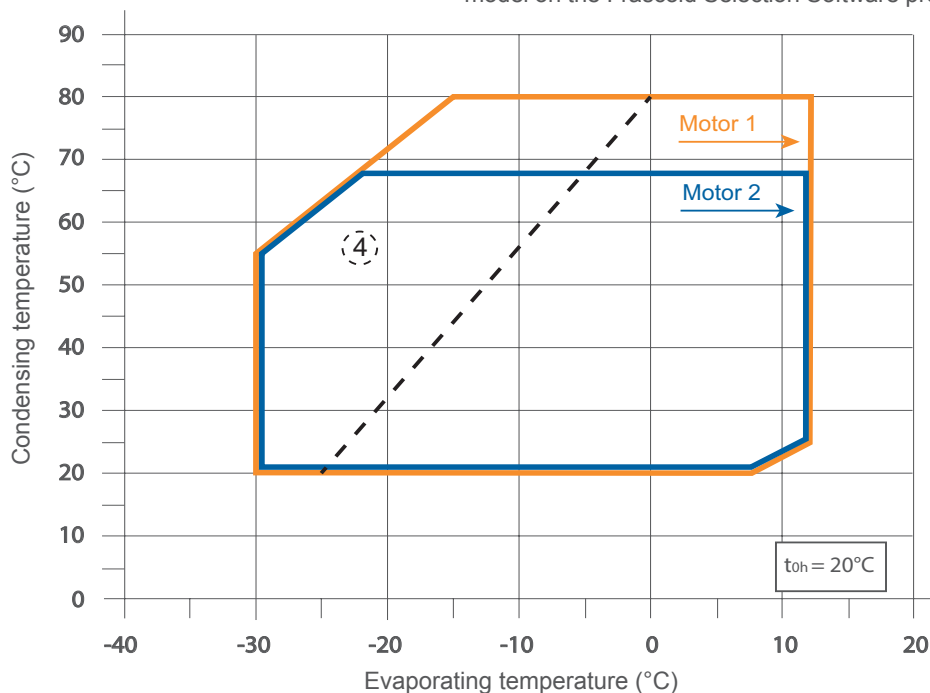
R134a

Standard application diagram
 Motor size 1 - 2 - 3
 Check the diagram of every single compressor model on the Frascold Selection Software program





R450A - R513A

Standard application diagram
 Motor size 1 - 2 - 3
 Check the diagram of every single compressor model on the Frascold Selection Software program



Compressor at 100% capacity

- t_{0h} Suction gas temperature = 20°C
-  For operation in this area contact Frascold
-  Additional cooling or superheat reduction, check on the Frascold Selection Software program

Operating limits

The compressors can operate within the range of the application diagrams; pay attention to the different areas. For the operating limits of each compressor refer to the Frascold Selection Software program (see page 74).

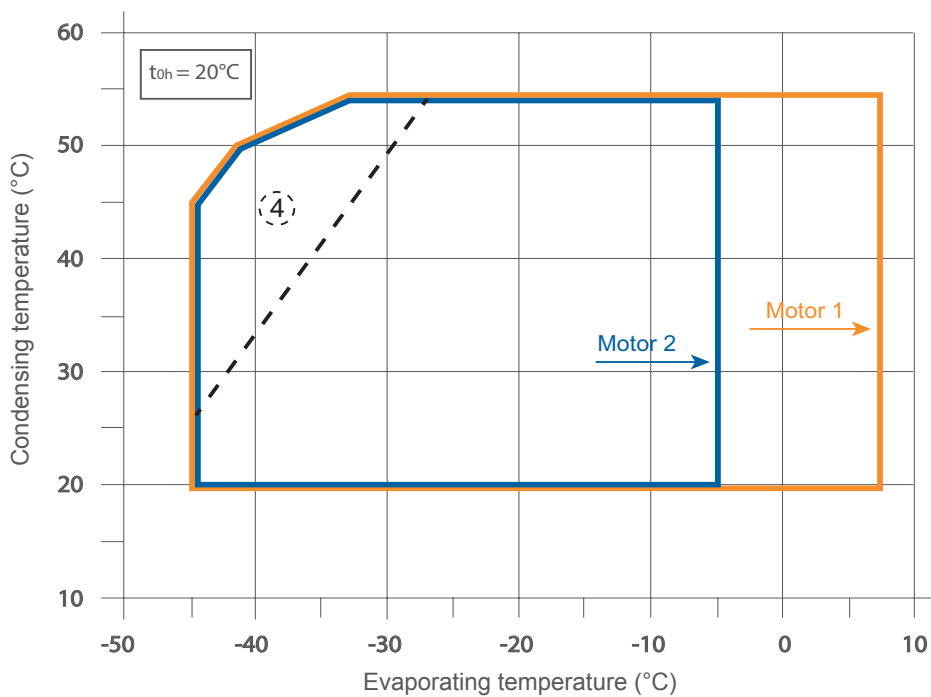
R404A - R507A

Standard application diagram

Motor size 1 - 2

Check the diagram of every single compressor

model on the Frascold Selection Software program



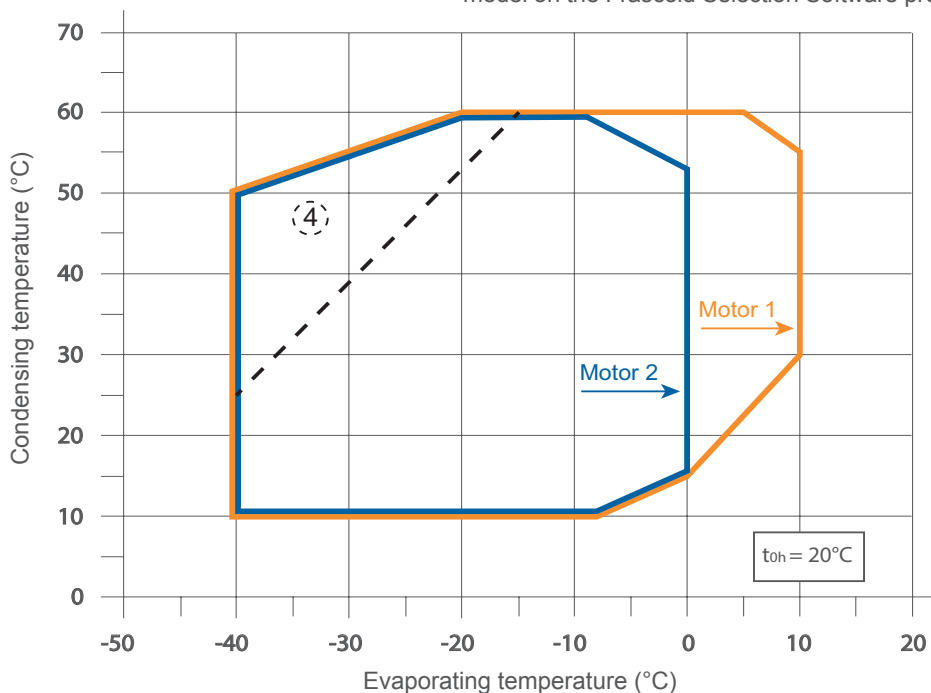
R448A - R449A

Standard application diagram

Motor size 1 - 2

Check the diagram of every single compressor

model on the Frascold Selection Software program



Compressor at 100% capacity

t_{oh}
4

Suction gas temperature = 20°C

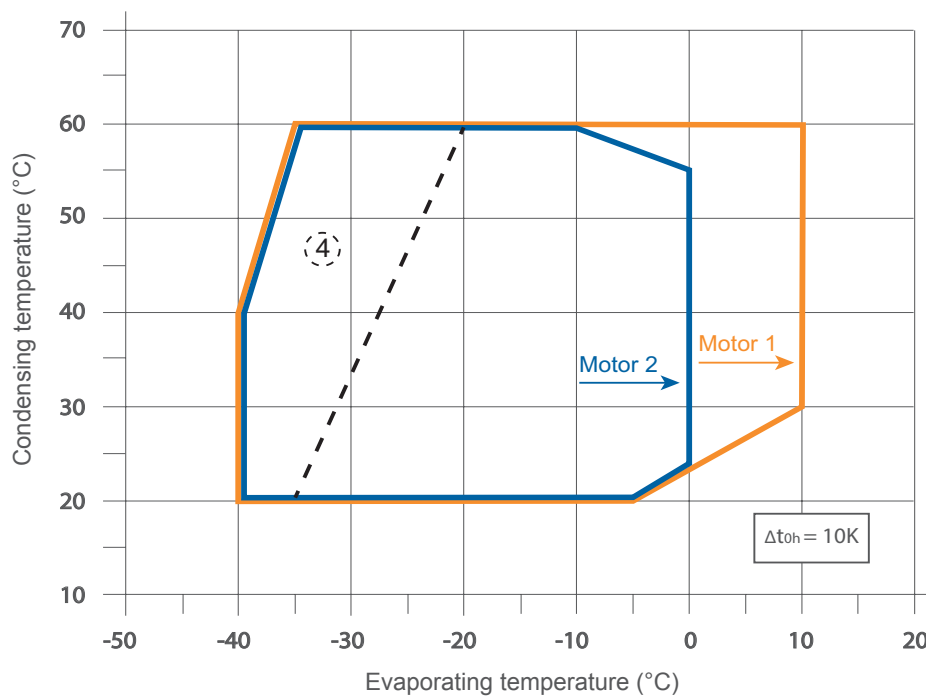
Additional cooling or superheat reduction, check on the Frascold Selection Software program

Operating limits

The compressors can operate within the range of the application diagrams; pay attention to the different areas. For the operating limits of each compressor refer to the Frascold Selection Software program (see page 74).

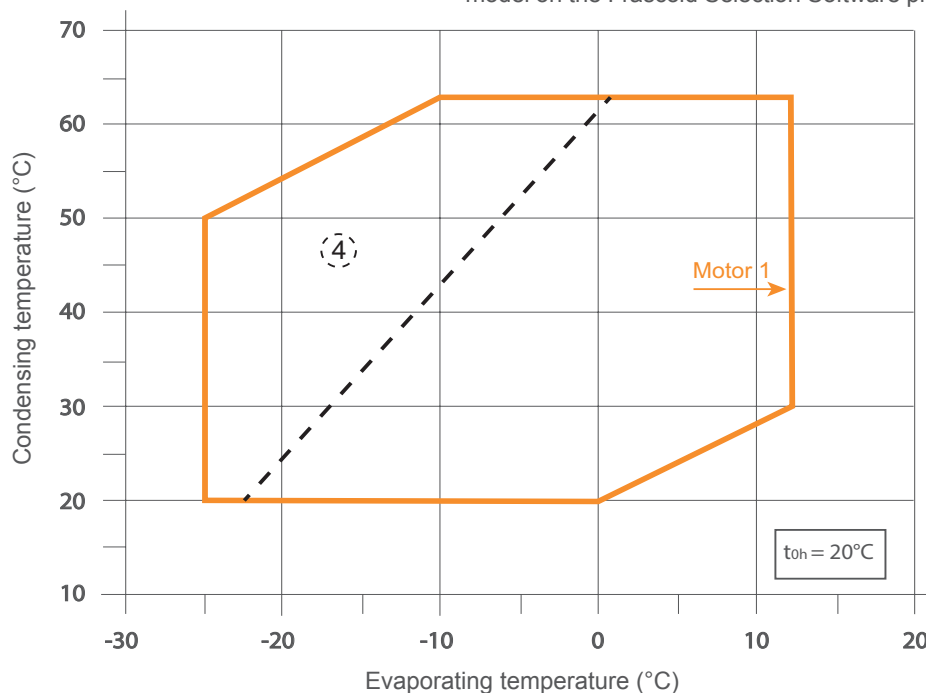
R407F - R407A

Standard application diagram
 Motor size 1 - 2
 Check the diagram of every single compressor model on the Frascold Selection Software program



R407C

Standard application diagram
 Motor size 1
 Check the diagram of every single compressor model on the Frascold Selection Software program



Compressor at 100% capacity

t_{oh} Suction gas temperature = $20^\circ C$

Δt_{oh} Superheat = 10K

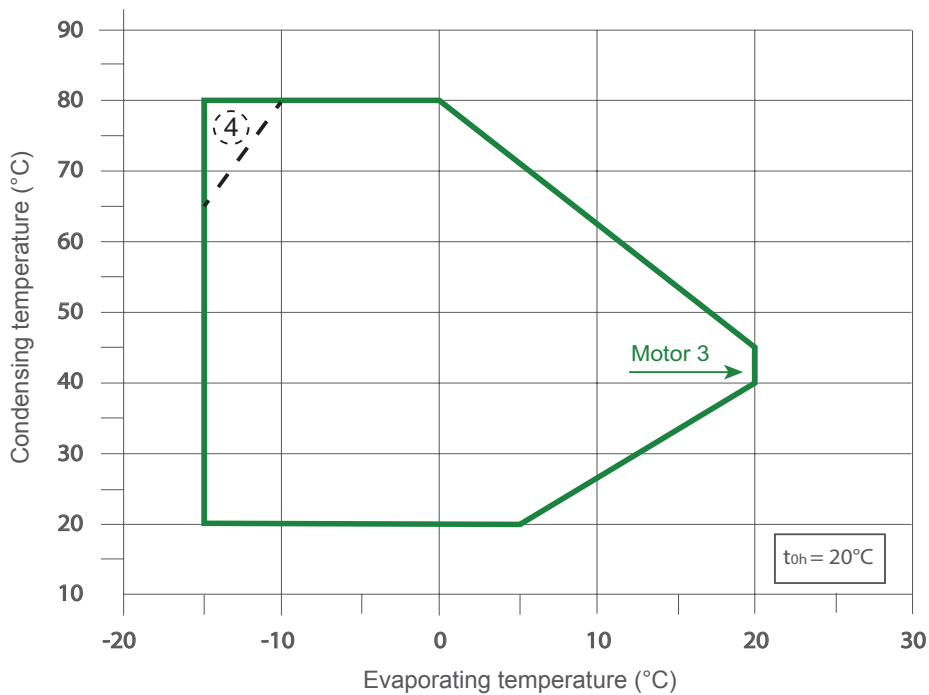
(4) Additional cooling or superheat reduction, check on the Frascold Selection Software program

Operating limits

The compressors can operate within the range of the application diagrams; pay attention to the different areas. For the operating limits of each compressor refer to the Frascold Selection Software program (see page 74).

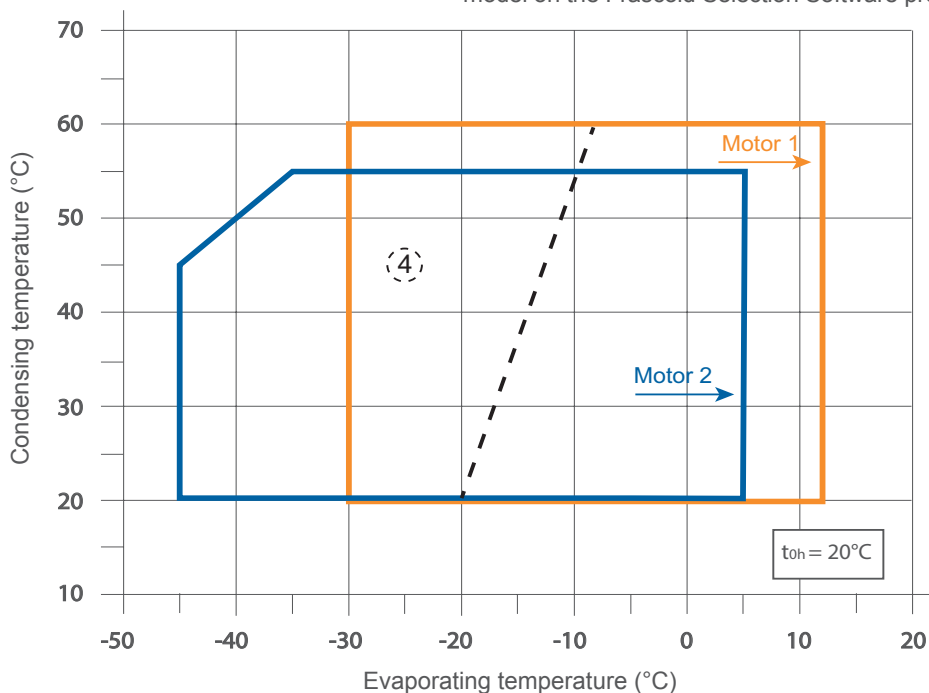
R1234ze

Standard application diagram
 Motor size 3
 Check the diagram of every single compressor model on the Frascold Selection Software program



R22

Standard application diagram
 Motor size 1 - 2
 Check the diagram of every single compressor model on the Frascold Selection Software program




Compressor at 100% capacity

t_{0h}

Suction gas temperature = 20 ° C
 Additional cooling or superheat reduction, check on the Frascold Selection Software program

Semi-hermetic reciprocating compressors

Performance R134a [50 Hz]

Compressor	Motor version	Cond. Temp. [°C]	Qo [W] = Cooling capacity Pe [kW] = Power consumption ①	Evaporating temperature [°C]										
				12,5	10	7,5	5	0	-5	-10	-15	-20	-25	-30
S10-52E <i>ECOinside</i>	3	20	Qo					35106	28055	21995	16899	12696	9288	6525
			Pe					4,82	4,74	4,55	4,24	3,83	3,37	2,87
		30	Qo					30841	24563	19205	14610	10849	7791	5316
			Pe					5,98	5,67	5,25	4,74	4,16	3,55	2,90
		40	Qo					26660	21119	16434	12373	8946	6207	4073
Pe						6,94	6,42	5,79	5,09	4,34	3,57	2,79		
50	Qo					22345	17612	13541	10119	7170	4745	2825		
	Pe					7,70	6,94	6,12	5,25	4,34	3,43	2,52		
S15-52Y	1	50	Qo	36604	33327	30276	27439	22363	18008	14283	11099	8363	5984	3873
			Pe	8,65	8,49	8,30	8,08	7,57	6,97	6,30	5,59	4,84	4,09	3,34
		60	Qo	31463	28593	25926	23450	19024	15224	11960	9140	6675	4472	2442
			Pe	10,10	9,80	9,48	9,14	8,39	7,57	6,70	5,81	4,90	4,00	3,13
		70	Qo	26268	23811	21533	19422	15656	12421	9626	7182	4996	2979	
			Pe	11,42	10,99	10,53	10,06	9,07	8,03	6,96	5,88	4,81	3,76	
S12-56E <i>ECOinside</i>	3	20	Qo					37765	30053	23510	18020	13511	9874	6936
			Pe					5,19	5,10	4,87	4,52	4,06	3,53	2,95
		30	Qo					33093	26290	20529	15594	11572	8318	5694
			Pe					6,42	6,09	5,64	5,07	4,42	3,72	2,99
		40	Qo					28524	22586	17574	13224	9563	6655	4410
			Pe					7,46	6,90	6,21	5,43	4,58	3,74	2,90
50	Qo					23888	18820	14483	10847	7711	5144	3127		
	Pe					8,27	7,48	6,58	5,62	4,64	3,61	2,63		
S15-56Y	2	30	Qo	51659	47184	43006	39111	32123	26126	21025	16723	13125	10136	7661
			Pe	8,59	8,54	8,43	8,28	7,87	7,32	6,68	5,97	5,24	4,52	3,83
		40	Qo	46068	42045	38290	34792	28517	23125	18520	14608	11292	8476	6066
			Pe	10,67	10,41	10,11	9,77	9,02	8,19	7,31	6,41	5,54	4,72	3,99
		50	Qo	40436	36865	33536	30436	24878	20095	15992	12473	9442	6804	4464
			Pe	12,45	11,99	11,50	11,00	9,94	8,86	7,77	6,71	5,73	4,84	4,10
S20-56Y	1	50	Qo	40994	37342	33938	30772	25102	20233	16065	12500	9440	6786	4439
			Pe	10,68	10,40	10,08	9,74	8,98	8,14	7,27	6,39	5,52	4,69	3,94
		60	Qo	35304	32103	29126	26359	21409	17154	13495	10334	7572	5110	2851
			Pe	12,15	11,71	11,25	10,77	9,76	8,72	7,66	6,63	5,64	4,73	3,93
		70	Qo	29536	26793	24247	21886	17667	14038	10900	8153	5701	3444	
			Pe	13,43	12,85	12,25	11,65	10,41	9,16	7,94	6,77	5,69	4,71	
V15-59Y	2	30	Qo	54947	50179	45727	41575	34128	27736	22297	17710	13873	10684	8041
			Pe	8,57	8,50	8,39	8,23	7,79	7,23	6,57	5,85	5,11	4,36	3,65
		40	Qo	48975	44687	40684	36955	30265	24516	19605	15431	11893	8889	6316
			Pe	10,59	10,31	10,00	9,65	8,89	8,04	7,14	6,23	5,34	4,50	3,75
		50	Qo	42957	39149	35599	32294	26366	21263	16885	13129	9894	7078	4580
			Pe	12,28	11,81	11,32	10,81	9,73	8,63	7,53	6,46	5,46	4,55	3,78
V15-59E <i>ECOinside</i>	3	20	Qo					41098	32894	25941	20178	15386	11420	8192
			Pe					5,63	5,54	5,32	4,99	4,58	4,09	3,57
		30	Qo					37157	29455	22935	17543	13160	9546	6576
			Pe					7,06	6,65	6,14	5,56	4,91	4,24	3,55
		40	Qo					32648	25533	19691	14860	10922	7688	5029
			Pe					8,28	7,57	6,79	5,97	5,12	4,27	3,44
50	Qo					27971	21678	16498	12244	8796	5978	3658		
	Pe					9,34	8,34	7,31	6,26	5,22	4,21	3,26		
V20-59Y	1	50	Qo	43798	39839	36150	32717	26565	21278	16752	12880	9556	6675	4132
			Pe	10,67	10,32	9,95	9,55	8,70	7,81	6,89	5,97	5,08	4,25	3,51
		60	Qo	37564	34090	30857	27852	22473	17847	13868	10431	7431	4761	2316
			Pe	11,97	11,48	10,97	10,44	9,36	8,27	7,18	6,14	5,16	4,27	3,50
		70	Qo	31268	28285	25514	22943	18348	14394	10975	7985	5320	2872	
			Pe	13,07	12,44	11,81	11,16	9,88	8,61	7,38	6,23	5,18	4,25	
V15-71Y 	2	30	Qo	64862	59249	54008	49123	40362	32844	26447	21051	16533	12773	9648
			Pe	9,96	9,90	9,78	9,60	9,10	8,45	7,68	6,85	5,99	5,16	4,39
		40	Qo	57731	52698	48002	43627	35782	29041	23283	18386	14228	10690	7648
			Pe	12,46	12,14	11,78	11,38	10,48	9,47	8,41	7,35	6,31	5,35	4,52
		50	Qo	50581	46127	41975	38109	31179	25213	20091	15692	11894	8575	5614
			Pe	14,57	14,03	13,45	12,84	11,56	10,25	8,94	7,67	6,49	5,45	4,59
V15-71E <i>ECOinside</i>	3	20	Qo					47145	38124	30278	23627	18042	13399	9605
			Pe					6,50	6,43	6,19	5,81	5,32	4,75	4,12
		30	Qo					42762	33989	26562	20347	15285	11083	7651
			Pe					8,19	7,73	7,14	6,45	5,70	4,90	4,10
		40	Qo					37665	29532	22821	17284	12743	9022	6016
			Pe					9,62	8,81	7,91	6,96	5,98	5,00	4,05
50	Qo					32593	25374	19429	14543	10575	7355	4747		
	Pe					10,89	9,76	8,59	7,41	6,25	5,13	4,08		

① Suction gas temperature 20°C without liquid sub-cooling.

The performance refers to European standard EN12900 and with operation at 50Hz; conversion factor at 60Hz = 1.2.





To calculate the performance in different operating points refer to the Frascold Selection Software.

All published data is subject to change.

■ This field requires additional cooling or limitation of the suction temperature.

Semi-hermetic reciprocating compressors

Performance R134a [50 Hz]

Compressor	Motor version	Cond. Temp. [°C]	Qo [W] = Cooling capacity Pe [kW] = Power consumption ①	Evaporating temperature [°C]										
				12,5	10	7,5	5	0	-5	-10	-15	-20	-25	-30
Z25-106E <i>ECOinside</i>	3	20	Qo					70873	57495	46141	36549	28458	21606	15732
			Pe					10,10	9,84	9,48	9,00	8,37	7,57	6,56
		30	Qo					64336	51850	41308	32447	25005	18722	13334
			Pe					12,56	11,73	10,88	9,97	8,98	7,88	6,65
		40	Qo					56301	44912	35385	27458	20869	15357	10660
			Pe					14,56	13,25	11,98	10,72	9,45	8,14	6,76
50	Qo					47400	37311	29003	22213	16680	12143	8339		
Pe						16,19	14,47	12,87	11,34	9,87	8,43	6,99		
Z35-106Y	1	50	Qo	75477	68770	62518	56700	46272	37306	29621	23039	17379	12460	8103
			Pe	18,43	17,83	17,18	16,50	15,02	13,45	11,84	10,24	8,70	7,27	6,01
		60	Qo	64877	59015	53559	48485	39399	31575	24835	18997	13882	9310	5101
			Pe	20,93	20,06	19,15	18,22	16,31	14,37	12,46	10,62	8,92	7,39	6,09
		70	Qo	54178	49167	44513	40193	32462	25796	20013	14934	10379	6168	
			Pe	23,10	21,97	20,82	19,67	17,36	15,09	12,92	10,88	9,05	7,45	
Z30-126Y 	2	30	Qo	115255	105213	95794	86975	71054	57277	45473	35469	27093	20172	14535
			Pe	17,31	17,16	16,94	16,65	15,87	14,87	13,69	12,38	10,99	9,57	8,14
		40	Qo	101354	92322	83866	75964	61739	49475	38999	30139	22723	16579	11535
			Pe	21,12	20,64	20,09	19,48	18,12	16,60	14,95	13,24	11,50	9,78	8,12
		50	Qo	87864	79835	72335	65345	52803	42039	32878	25150	18682	13302	8837
			Pe	24,40	23,59	22,74	21,85	19,95	17,95	15,89	13,81	11,76	9,79	7,95
Z30-126E <i>ECOinside</i>	3	20	Qo					85431	68684	54601	42863	33151	25146	18531
			Pe					12,35	11,96	11,34	10,55	9,62	8,60	7,54
		30	Qo					74905	59956	47438	37031	28417	21277	15293
			Pe					15,00	14,06	12,94	11,70	10,38	9,03	7,69
		40	Qo					64690	51506	40520	31411	23862	17554	12168
			Pe					17,17	15,72	14,15	12,51	10,86	9,22	7,66
50	Qo					54932	43481	33993	26150	19633	14123	9301		
Pe						18,89	16,98	15,02	13,04	11,10	9,23	7,50		
Z40-126Y	1	50	Qo	89585	81551	74065	67100	54624	43901	34710	26830	20041	14122	8852
			Pe	22,81	22,10	21,34	20,51	18,71	16,77	14,74	12,69	10,67	8,75	6,99
		60	Qo	76694	69683	63160	57097	46242	36897	28841	21854	15714	10201	5094
			Pe	25,88	24,84	23,74	22,61	20,25	17,82	15,39	13,00	10,72	8,61	6,74
		70	Qo	63760	57776	52219	47062	37835	29875	22962	16874	11391	6291	
			Pe	28,50	27,12	25,72	24,30	21,42	18,55	15,74	13,06	10,56	8,30	
W40-142Y 	2	50	Qo	101545	92241	83527	75384	60730	48116	37379	28357	20887	14806	9953
			Pe	27,82	27,19	26,49	25,72	24,00	22,09	20,07	18,00	15,94	13,96	12,12
		60	Qo	86613	78420	70768	63638	50862	39929	30677	22943	16564	11377	7221
			Pe	31,14	30,15	29,09	27,98	25,65	23,21	20,73	18,27	15,90	13,68	11,69
		70	Qo	71910	64838	58260	52153	41277	32046	24300	17874	12608	8337	
			Pe	33,89	32,55	31,16	29,75	26,85	23,92	21,03	18,24	15,61	13,21	
Z40-154Y 	2	30	Qo	139527	127216	115688	104916	85532	68845	54634	42682	32769	24675	18182
			Pe	19,31	19,22	19,02	18,74	17,93	16,83	15,53	14,06	12,51	10,92	9,37
		40	Qo	122877	111831	101510	91885	74617	59807	47236	36686	27937	20770	14966
			Pe	24,39	23,84	23,21	22,50	20,91	19,13	17,22	15,23	13,24	11,31	9,48
		50	Qo	106046	96283	87184	78722	63602	50702	39804	30688	23136	16928	11846
			Pe	28,70	27,72	26,68	25,59	23,28	20,88	18,42	15,98	13,62	11,39	9,37
Z40-154E <i>ECOinside</i>	3	20	Qo					98035	79207	63217	49787	38638	29492	22070
			Pe					14,30	14,00	13,35	12,43	11,34	10,15	8,96
		30	Qo					87766	70603	56077	43908	33819	25530	18762
			Pe					17,71	16,70	15,41	13,94	12,36	10,78	9,26
		40	Qo					76968	61546	48559	37728	28774	21418	15382
			Pe					20,56	18,91	17,06	15,10	13,12	11,21	9,44
50	Qo					65835	52231	40860	31442	23700	17354	12125		
Pe						22,80	20,58	18,24	15,86	13,54	11,37	9,42		
Z50-154Y 	1	50	Qo	108377	98551	89353	80759	65299	51988	40647	31095	23151	16634	11364
			Pe	28,51	27,59	26,60	25,55	23,31	20,94	18,48	16,02	13,60	11,30	9,18
		60	Qo	91619	83068	75089	67658	54351	42966	33322	25239	18537	13034	
			Pe	32,01	30,71	29,36	27,97	25,10	22,18	19,26	16,41	13,69	11,16	
		70	Qo	74981	67734	61000	54758	43657	34251	26359	19799			
			Pe	34,78	33,13	31,45	29,75	26,33	22,93	19,61	16,44			

① Suction gas temperature 20°C without liquid sub-cooling.

The performance refers to European standard EN12900 and with operation at 50Hz; conversion factor at 60Hz = 1.2.













To calculate the performance in different operating points refer to the Frascold Selection Software.

All published data is subject to change.

■ This field requires additional cooling or limitation of the suction temperature.

Semi-hermetic reciprocating compressors

Performance R404A - R507A [50 Hz]

Compressor	Motor version	Cond. Temp. [°C]	Qo [W] = Cooling capacity Pe [kW] = Power consumption ①	Evaporating temperature [°C]											
				5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	
D2-13.1Y 	2	30	Qo			10326	8506	6919	5548	4378	3391	2571	1901	1366	
			Pe			2,87	2,74	2,57	2,38	2,16	1,93	1,70	1,46	1,24	
		40	Qo			8762	7192	5831	4661	3668	2833	2141	1574	1118	
			Pe			3,28	3,08	2,85	2,60	2,33	2,06	1,80	1,54	1,30	
		50	Qo			7255	5933	4795	3824	3005	2320	1753	1288		
			Pe			3,74	3,47	3,17	2,87	2,55	2,24	1,95	1,66		
D3-13.1Y 	1	30	Qo	15124	12636	10454	8552	6906	5491	4282	3255				
			Pe	2,88	2,86	2,79	2,68	2,52	2,33	2,12	1,90				
		40	Qo	12705	10598	8756	7152	5764	4564	3530	2636				
			Pe	3,51	3,38	3,21	3,00	2,76	2,51	2,25	1,98				
		50	Qo	10390	8660	7152	5843	4706	3718	2854	2088				
			Pe	4,11	3,88	3,61	3,33	3,02	2,72	2,42	2,12				
D2-15.1Y 	2	30	Qo			11535	9512	7747	6221	4915	3811	2889	2130	1517	
			Pe			3,38	3,22	3,02	2,79	2,54	2,27	1,99	1,70	1,41	
		40	Qo			9672	7961	6475	5196	4103	3179	2405	1761	1229	
			Pe			3,86	3,62	3,36	3,07	2,76	2,43	2,10	1,77	1,44	
		50	Qo			7945	6533	5313	4266	3373	2615	1974	1431		
			Pe			4,32	4,01	3,68	3,33	2,96	2,59	2,21	1,83		
D3-15.1Y 	1	30	Qo	17155	14417	12010	9911	8096	6543	5227	4124				
			Pe	3,44	3,52	3,49	3,37	3,18	2,95	2,68	2,40				
		40	Qo	14526	12191	10147	8369	6834	5519	4400	3454				
			Pe	4,34	4,24	4,06	3,81	3,52	3,20	2,86	2,54				
		50	Qo	11831	9911	8240	6795	5551	4486	3576	2798				
			Pe	5,10	4,85	4,54	4,18	3,80	3,41	3,03	2,68				
D3-16.1Y 	2	30	Qo			12721	10514	8577	6893	5441	4200	3152	2275	1551	
			Pe			3,70	3,48	3,24	2,97	2,68	2,37	2,05	1,73	1,40	
		40	Qo			10777	8867	7197	5748	4500	3433	2527	1763	1120	
			Pe			4,33	4,01	3,65	3,28	2,90	2,51	2,12	1,74	1,36	
		50	Qo			8876	7260	5854	4638	3592	2697	1932	1277		
			Pe			4,93	4,49	4,03	3,56	3,09	2,62	2,16	1,72		
D4-16.1Y 	1	30	Qo	18799	15745	13058	10713	8679	6931	5441	4180				
			Pe	3,83	3,79	3,68	3,52	3,30	3,04	2,76	2,45				
		40	Qo	16131	13488	11169	9147	7394	5882	4584	3471				
			Pe	4,66	4,49	4,26	3,99	3,67	3,33	2,97	2,60				
		50	Qo	13396	11181	9246	7563	6106	4846	3756	2808				
			Pe	5,42	5,12	4,78	4,40	3,99	3,57	3,13	2,70				
D3-18.1Y 	2	30	Qo			13895	11541	9481	7693	6155	4847	3747	2832	2083	
			Pe			4,15	3,97	3,73	3,45	3,13	2,80	2,47	2,14	1,83	
		40	Qo			11790	9764	8000	6475	5168	4057	3121	2339	1689	
			Pe			4,86	4,52	4,15	3,75	3,34	2,94	2,54	2,17	1,85	
		50	Qo			9739	8040	6569	5305	4226	3311	2538	1887		
			Pe			5,50	5,02	4,53	4,03	3,53	3,06	2,62	2,22		
D4-18.1Y 	1	30	Qo	19831	16745	14012	11608	9508	7689	6125	4791				
			Pe	4,32	4,21	4,04	3,83	3,59	3,32	3,04	2,77				
		40	Qo	16916	14272	11937	9889	8102	6553	5216	4068				
			Pe	5,16	4,93	4,66	4,35	4,01	3,67	3,32	2,99				
		50	Qo	13909	11731	9820	8153	6705	5452	4368	3431				
			Pe	5,98	5,64	5,26	4,85	4,44	4,02	3,61	3,23				
D3-19.1Y 	2	30	Qo					10017	8173	6587	5237	4099	3150	2368	
			Pe					4,05	3,76	3,42	3,07	2,71	2,36	2,03	
		40	Qo					8508	6938	5590	4443	3472	2656	1972	
			Pe					4,56	4,14	3,70	3,27	2,85	2,45	2,09	
		50	Qo					6987	5695	4590	3651	2854	2176		
			Pe					4,98	4,45	3,93	3,43	2,95	2,52		
D4-19.1Y 	1	30	Qo			14880	12243	9975	8041	6409	5044	3912	2981	2215	
			Pe			4,29	4,11	3,88	3,62	3,33	3,04	2,75	2,48	2,24	
		40	Qo			12578	10347	8435	6806	5429	4268	3290	2462	1750	
			Pe			4,95	4,66	4,34	3,98	3,61	3,24	2,88	2,54	2,23	
		50	Qo			10357	8519	6948	5611	4474	3503	2666	1927		
			Pe			5,68	5,28	4,84	4,38	3,91	3,44	2,99	2,57		
Q4-20.1Y 	2	30	Qo			14773	12190	9934	7981	6308	4893	3712	2743	1963	
			Pe			3,94	3,71	3,44	3,16	2,85	2,54	2,22	1,92	1,63	
		40	Qo			12745	10452	8458	6741	5277	4044	3019	2179	1500	
			Pe			4,61	4,25	3,86	3,46	3,06	2,67	2,29	1,93	1,60	
		50	Qo			10651	8661	6943	5474	4232	3195	2337	1638		
			Pe			5,19	4,70	4,20	3,70	3,21	2,74	2,30	1,89		
Q4-21.1Y 	2	30	Qo			16354	13354	10755	8528	6640	5061	3759	2704	1864	
			Pe			4,10	3,91	3,66	3,36	3,03	2,67	2,32	1,97	1,66	
		40	Qo			13856	11228	8965	7038	5414	4062	2952	2051	1329	
			Pe			4,84	4,47	4,07	3,64	3,20	2,76	2,35	1,96	1,63	
		50	Qo			11230	8996	7092	5485	4146	3043	2145	1420		
			Pe			5,34	4,83	4,30	3,76	3,24	2,74	2,29	1,89		

① Suction gas temperature 20°C without liquid sub-cooling.

The performance refers to European standard EN12900 and with operation at 50Hz; conversion factor at 60Hz = 1.2.

To calculate the performance in different operating points refer to the Frascold Selection Software.

All published data is subject to change.

■ This field requires additional cooling or limitation of the suction temperature.

Semi-hermetic reciprocating compressors

Performance R448A [50 Hz]

Compressor	Motor version	Cond. Temp. [°C]	Qo [W] = Cooling capacity Pe [kW] = Power consumption ①	Evaporating temperature [°C]																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
				5	0	-5	-10	-15	-20	-25	-30	-35	-40																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
				A05-4Y	1	30	Qo	4126	3377	2730	2179	1712	1322	999	734	517	340	Pe	0,71	0,7	0,69	0,66	0,64	0,6	0,55	0,5	0,45	0,38	40	Qo	3456	2821	2277	1815	1426	1100	829	603	414	252	Pe	0,86	0,84	0,8	0,76	0,71	0,66	0,59	0,52	0,45	0,37	50	Qo	2829	2303	1856	1478	1160	894	669	477	309	156	Pe	1,01	0,96	0,91	0,84	0,78	0,7	0,62	0,53	0,44	0,34	A05-5Y	2	30	Qo		4359	3479	2745	2141	1649	1254	938	685	478	Pe		0,9	0,89	0,86	0,81	0,74	0,67	0,6	0,54	0,49	40	Qo		3668	2907	2280	1770	1361	1036	778	570	396	Pe		1,09	1,04	0,98	0,89	0,81	0,72	0,64	0,57	0,53	50	Qo		3060	2406	1874	1447	1108	841	629	455	302	Pe		1,25	1,16	1,07	0,96	0,85	0,75	0,67	0,6	0,56	A07-5Y	1	30	Qo	5450	4404	3515	2769	2150	1646	1242	924	678	491	Pe	0,85	0,86	0,86	0,83	0,8	0,75	0,69	0,62	0,56	0,49	40	Qo	4588	3694	2940	2312	1795	1376	1040	774	563	394	Pe	1,09	1,07	1,03	0,98	0,92	0,84	0,76	0,68	0,59	0,51	50	Qo	3772	3024	2398	1881	1459	1118	844	622	440	282	Pe	1,32	1,26	1,18	1,09	0,99	0,88	0,77	0,66	0,55	0,45	A07-6Y	2	30	Qo		4667	3743	2976	2346	1833	1416	1076	792	545	Pe		0,98	0,94	0,9	0,85	0,79	0,73	0,66	0,59	0,53	40	Qo		3993	3187	2524	1984	1548	1195	906	660	436	Pe		1,18	1,12	1,05	0,97	0,89	0,8	0,71	0,62	0,53	50	Qo		3421	2713	2136	1669	1291	984	726	498	280	Pe		1,35	1,26	1,17	1,06	0,96	0,85	0,74	0,63	0,52	A1-6Y	1	30	Qo	5975	4901	3968	3166	2485	1915	1446	1069	772	546	Pe	0,97	0,99	0,98	0,95	0,89	0,82	0,74	0,67	0,6	0,55	40	Qo	5078	4151	3351	2667	2089	1607	1212	893	639	442	Pe	1,22	1,19	1,14	1,07	0,99	0,89	0,8	0,71	0,64	0,59	50	Qo	4172	3394	2728	2163	1690	1298	978	718	510	343	Pe	1,43	1,37	1,28	1,18	1,06	0,95	0,85	0,75	0,68	0,64	A1-7Y	2	30	Qo		6175	4997	4012	3195	2522	1971	1517	1136	807	Pe		1,42	1,36	1,29	1,2	1,11	1,01	0,91	0,81	0,71	40	Qo		5302	4272	3418	2716	2141	1671	1282	951	653	Pe		1,67	1,58	1,47	1,35	1,22	1,09	0,96	0,84	0,72	50	Qo		4529	3627	2884	2276	1780	1372	1028	725	439	Pe		1,88	1,75	1,6	1,45	1,29	1,13	0,97	0,82	0,68	A1.5-7Y	1	30	Qo	7797	6370	5143	4098	3221	2495	1903	1430	1058	772	Pe	1,32	1,31	1,27	1,2	1,12	1,02	0,93	0,84	0,75	0,69	40	Qo	6719	5469	4401	3501	2752	2137	1641	1247	938	699	Pe	1,6	1,54	1,45	1,35	1,23	1,12	1,01	0,91	0,82	0,77	50	Qo	5677	4597	3685	2923	2296	1787	1381	1060	809	612	Pe	1,84	1,73	1,6	1,47	1,33	1,19	1,07	0,97	0,89	0,84	A1.5-8Y	1	30	Qo		6624	5376	4323	3444	2717	2123	1640	1248	927	Pe		1,5	1,46	1,39	1,3	1,2	1,08	0,97	0,86	0,77	40	Qo		5765	4657	3729	2960	2331	1819	1405	1067	786	Pe		1,77	1,68	1,57	1,44	1,31	1,17	1,04	0,93	0,83	50	Qo		4906	3941	3141	2487	1957	1531	1189	909	671	Pe		2	1,87	1,72	1,56	1,4	1,25	1,11	0,99	0,89	B1.5-9.1Y	2	30	Qo	9451	7731	6256	5005	3959	3097	2400	1847	1419	1095	Pe	1,86	1,82	1,75	1,64	1,52	1,39	1,26	1,15	1,05	0,99	40	Qo	8287	6751	5444	4345	3435	2693	2100	1635	1278	1009	Pe	2,29	2,18	2,04	1,88	1,72	1,55	1,41	1,28	1,18	1,13	50	Qo	7020	5684	4560	3628	2869	2262	1787	1425	1155	957	Pe	2,66	2,47	2,27	2,07	1,87	1,68	1,52	1,39	1,3	1,26	B1.5-10.1Y	2	30	Qo		8294	6756	5457	4369	3463	2714	2091	1569	1118	Pe		1,96	1,93	1,86	1,75	1,61	1,45	1,29	1,14	1,01	40	Qo		7200	5848	4716	3776	3001	2364	1835	1387	993	Pe		2,34	2,24	2,11	1,95	1,76	1,58	1,4	1,25	1,12	50	Qo		6254	5067	4081	3271	2606	2060	1605	1212	855	Pe		2,66	2,51	2,32	2,12	1,91	1,7	1,52	1,37	1,26	B2-10.1Y	1	30	Qo	10340	8511	6929	5576	4432	3478	2694	2061	1559	1169	Pe	2,06	2,07	2,02	1,92	1,79	1,65	1,5	1,36	1,24	1,15	40	Qo	8981	7376	5998	4828	3846	3032	2368	1834	1409	1076	Pe	2,51	2,43	2,3	2,15	1,98	1,81	1,64	1,49	1,37	1,3	50	Qo	7629	6256	5089	4108	3295	2629	2091	1662	1322	1052	Pe	2,9	2,75	2,56	2,36	2,15	1,96	1,78	1,63	1,53	1,49	D2-11.1Y	1	30	Qo	12357	10147	8246	6627	5264	4130	3200	2447	1844	1366	Pe	2,21	2,22	2,16	2,06	1,93	1,77	1,61	1,45	1,32	1,21	40	Qo	10710	8780	7129	5730	4559	3587	2790	2140	1610	1176	Pe	2,73	2,64	2,51	2,34	2,16	1,96	1,77	1,6	1,47	1,38	50	Qo	8990	7348	5956	4788	3816	3016	2359	1821	1375	994	Pe	3,17	3,01	2,8	2,58	2,35	2,12
A05-5Y	2	30	Qo		4359	3479	2745	2141	1649	1254	938	685	478	Pe		0,9	0,89	0,86	0,81	0,74	0,67	0,6	0,54	0,49	40	Qo		3668	2907	2280	1770	1361	1036	778	570	396	Pe		1,09	1,04	0,98	0,89	0,81	0,72	0,64	0,57	0,53	50	Qo		3060	2406	1874	1447	1108	841	629	455	302	Pe		1,25	1,16	1,07	0,96	0,85	0,75	0,67	0,6	0,56	A07-5Y	1	30	Qo	5450	4404	3515	2769	2150	1646	1242	924	678	491	Pe	0,85	0,86	0,86	0,83	0,8	0,75	0,69	0,62	0,56	0,49	40	Qo	4588	3694	2940	2312	1795	1376	1040	774	563	394	Pe	1,09	1,07	1,03	0,98	0,92	0,84	0,76	0,68	0,59	0,51	50	Qo	3772	3024	2398	1881	1459	1118	844	622	440	282	Pe	1,32	1,26	1,18	1,09	0,99	0,88	0,77	0,66	0,55	0,45	A07-6Y	2	30	Qo		4667	3743	2976	2346	1833	1416	1076	792	545	Pe		0,98	0,94	0,9	0,85	0,79	0,73	0,66	0,59	0,53	40	Qo		3993	3187	2524	1984	1548	1195	906	660	436	Pe		1,18	1,12	1,05	0,97	0,89	0,8	0,71	0,62	0,53	50	Qo		3421	2713	2136	1669	1291	984	726	498	280	Pe		1,35	1,26	1,17	1,06	0,96	0,85	0,74	0,63	0,52	A1-6Y	1	30	Qo	5975	4901	3968	3166	2485	1915	1446	1069	772	546	Pe	0,97	0,99	0,98	0,95	0,89	0,82	0,74	0,67	0,6	0,55	40	Qo	5078	4151	3351	2667	2089	1607	1212	893	639	442	Pe	1,22	1,19	1,14	1,07	0,99	0,89	0,8	0,71	0,64	0,59	50	Qo	4172	3394	2728	2163	1690	1298	978	718	510	343	Pe	1,43	1,37	1,28	1,18	1,06	0,95	0,85	0,75	0,68	0,64	A1-7Y	2	30	Qo		6175	4997	4012	3195	2522	1971	1517	1136	807	Pe		1,42	1,36	1,29	1,2	1,11	1,01	0,91	0,81	0,71	40	Qo		5302	4272	3418	2716	2141	1671	1282	951	653	Pe		1,67	1,58	1,47	1,35	1,22	1,09	0,96	0,84	0,72	50	Qo		4529	3627	2884	2276	1780	1372	1028	725	439	Pe		1,88	1,75	1,6	1,45	1,29	1,13	0,97	0,82	0,68	A1.5-7Y	1	30	Qo	7797	6370	5143	4098	3221	2495	1903	1430	1058	772	Pe	1,32	1,31	1,27	1,2	1,12	1,02	0,93	0,84	0,75	0,69	40	Qo	6719	5469	4401	3501	2752	2137	1641	1247	938	699	Pe	1,6	1,54	1,45	1,35	1,23	1,12	1,01	0,91	0,82	0,77	50	Qo	5677	4597	3685	2923	2296	1787	1381	1060	809	612	Pe	1,84	1,73	1,6	1,47	1,33	1,19	1,07	0,97	0,89	0,84	A1.5-8Y	1	30	Qo		6624	5376	4323	3444	2717	2123	1640	1248	927	Pe		1,5	1,46	1,39	1,3	1,2	1,08	0,97	0,86	0,77	40	Qo		5765	4657	3729	2960	2331	1819	1405	1067	786	Pe		1,77	1,68	1,57	1,44	1,31	1,17	1,04	0,93	0,83	50	Qo		4906	3941	3141	2487	1957	1531	1189	909	671	Pe		2	1,87	1,72	1,56	1,4	1,25	1,11	0,99	0,89	B1.5-9.1Y	2	30	Qo	9451	7731	6256	5005	3959	3097	2400	1847	1419	1095	Pe	1,86	1,82	1,75	1,64	1,52	1,39	1,26	1,15	1,05	0,99	40	Qo	8287	6751	5444	4345	3435	2693	2100	1635	1278	1009	Pe	2,29	2,18	2,04	1,88	1,72	1,55	1,41	1,28	1,18	1,13	50	Qo	7020	5684	4560	3628	2869	2262	1787	1425	1155	957	Pe	2,66	2,47	2,27	2,07	1,87	1,68	1,52	1,39	1,3	1,26	B1.5-10.1Y	2	30	Qo		8294	6756	5457	4369	3463	2714	2091	1569	1118	Pe		1,96	1,93	1,86	1,75	1,61	1,45	1,29	1,14	1,01	40	Qo		7200	5848	4716	3776	3001	2364	1835	1387	993	Pe		2,34	2,24	2,11	1,95	1,76	1,58	1,4	1,25	1,12	50	Qo		6254	5067	4081	3271	2606	2060	1605	1212	855	Pe		2,66	2,51	2,32	2,12	1,91	1,7	1,52	1,37	1,26	B2-10.1Y	1	30	Qo	10340	8511	6929	5576	4432	3478	2694	2061	1559	1169	Pe	2,06	2,07	2,02	1,92	1,79	1,65	1,5	1,36	1,24	1,15	40	Qo	8981	7376	5998	4828	3846	3032	2368	1834	1409	1076	Pe	2,51	2,43	2,3	2,15	1,98	1,81	1,64	1,49	1,37	1,3	50	Qo	7629	6256	5089	4108	3295	2629	2091	1662	1322	1052	Pe	2,9	2,75	2,56	2,36	2,15	1,96	1,78	1,63	1,53	1,49	D2-11.1Y	1	30	Qo	12357	10147	8246	6627	5264	4130	3200	2447	1844	1366	Pe	2,21	2,22	2,16	2,06	1,93	1,77	1,61	1,45	1,32	1,21	40	Qo	10710	8780	7129	5730	4559	3587	2790	2140	1610	1176	Pe	2,73	2,64	2,51	2,34	2,16	1,96	1,77	1,6	1,47	1,38	50	Qo	8990	7348	5956	4788	3816	3016	2359	1821	1375	994	Pe	3,17	3,01	2,8	2,58	2,35	2,12	1,91	1,74	1,61	1,55																																																																							
A07-5Y	1	30	Qo	5450	4404	3515	2769	2150	1646	1242	924	678	491	Pe	0,85	0,86	0,86	0,83	0,8	0,75	0,69	0,62	0,56	0,49	40	Qo	4588	3694	2940	2312	1795	1376	1040	774	563	394	Pe	1,09	1,07	1,03	0,98	0,92	0,84	0,76	0,68	0,59	0,51	50	Qo	3772	3024	2398	1881	1459	1118	844	622	440	282	Pe	1,32	1,26	1,18	1,09	0,99	0,88	0,77	0,66	0,55	0,45	A07-6Y	2	30	Qo		4667	3743	2976	2346	1833	1416	1076	792	545	Pe		0,98	0,94	0,9	0,85	0,79	0,73	0,66	0,59	0,53	40	Qo		3993	3187	2524	1984	1548	1195	906	660	436	Pe		1,18	1,12	1,05	0,97	0,89	0,8	0,71	0,62	0,53	50	Qo		3421	2713	2136	1669	1291	984	726	498	280	Pe		1,35	1,26	1,17	1,06	0,96	0,85	0,74	0,63	0,52	A1-6Y	1	30	Qo	5975	4901	3968	3166	2485	1915	1446	1069	772	546	Pe	0,97	0,99	0,98	0,95	0,89	0,82	0,74	0,67	0,6	0,55	40	Qo	5078	4151	3351	2667	2089	1607	1212	893	639	442	Pe	1,22	1,19	1,14	1,07	0,99	0,89	0,8	0,71	0,64	0,59	50	Qo	4172	3394	2728	2163	1690	1298	978	718	510	343	Pe	1,43	1,37	1,28	1,18	1,06	0,95	0,85	0,75	0,68	0,64	A1-7Y	2	30	Qo		6175	4997	4012	3195	2522	1971	1517	1136	807	Pe		1,42	1,36	1,29	1,2	1,11	1,01	0,91	0,81	0,71	40	Qo		5302	4272	3418	2716	2141	1671	1282	951	653	Pe		1,67	1,58	1,47	1,35	1,22	1,09	0,96	0,84	0,72	50	Qo		4529	3627	2884	2276	1780	1372	1028	725	439	Pe		1,88	1,75	1,6	1,45	1,29	1,13	0,97	0,82	0,68	A1.5-7Y	1	30	Qo	7797	6370	5143	4098	3221	2495	1903	1430	1058	772	Pe	1,32	1,31	1,27	1,2	1,12	1,02	0,93	0,84	0,75	0,69	40	Qo	6719	5469	4401	3501	2752	2137	1641	1247	938	699	Pe	1,6	1,54	1,45	1,35	1,23	1,12	1,01	0,91	0,82	0,77	50	Qo	5677	4597	3685	2923	2296	1787	1381	1060	809	612	Pe	1,84	1,73	1,6	1,47	1,33	1,19	1,07	0,97	0,89	0,84	A1.5-8Y	1	30	Qo		6624	5376	4323	3444	2717	2123	1640	1248	927	Pe		1,5	1,46	1,39	1,3	1,2	1,08	0,97	0,86	0,77	40	Qo		5765	4657	3729	2960	2331	1819	1405	1067	786	Pe		1,77	1,68	1,57	1,44	1,31	1,17	1,04	0,93	0,83	50	Qo		4906	3941	3141	2487	1957	1531	1189	909	671	Pe		2	1,87	1,72	1,56	1,4	1,25	1,11	0,99	0,89	B1.5-9.1Y	2	30	Qo	9451	7731	6256	5005	3959	3097	2400	1847	1419	1095	Pe	1,86	1,82	1,75	1,64	1,52	1,39	1,26	1,15	1,05	0,99	40	Qo	8287	6751	5444	4345	3435	2693	2100	1635	1278	1009	Pe	2,29	2,18	2,04	1,88	1,72	1,55	1,41	1,28	1,18	1,13	50	Qo	7020	5684	4560	3628	2869	2262	1787	1425	1155	957	Pe	2,66	2,47	2,27	2,07	1,87	1,68	1,52	1,39	1,3	1,26	B1.5-10.1Y	2	30	Qo		8294	6756	5457	4369	3463	2714	2091	1569	1118	Pe		1,96	1,93	1,86	1,75	1,61	1,45	1,29	1,14	1,01	40	Qo		7200	5848	4716	3776	3001	2364	1835	1387	993	Pe		2,34	2,24	2,11	1,95	1,76	1,58	1,4	1,25	1,12	50	Qo		6254	5067	4081	3271	2606	2060	1605	1212	855	Pe		2,66	2,51	2,32	2,12	1,91	1,7	1,52	1,37	1,26	B2-10.1Y	1	30	Qo	10340	8511	6929	5576	4432	3478	2694	2061	1559	1169	Pe	2,06	2,07	2,02	1,92	1,79	1,65	1,5	1,36	1,24	1,15	40	Qo	8981	7376	5998	4828	3846	3032	2368	1834	1409	1076	Pe	2,51	2,43	2,3	2,15	1,98	1,81	1,64	1,49	1,37	1,3	50	Qo	7629	6256	5089	4108	3295	2629	2091	1662	1322	1052	Pe	2,9	2,75	2,56	2,36	2,15	1,96	1,78	1,63	1,53	1,49	D2-11.1Y	1	30	Qo	12357	10147	8246	6627	5264	4130	3200	2447	1844	1366	Pe	2,21	2,22	2,16	2,06	1,93	1,77	1,61	1,45	1,32	1,21	40	Qo	10710	8780	7129	5730	4559	3587	2790	2140	1610	1176	Pe	2,73	2,64	2,51	2,34	2,16	1,96	1,77	1,6	1,47	1,38	50	Qo	8990	7348	5956	4788	3816	3016	2359	1821	1375	994	Pe	3,17	3,01	2,8	2,58	2,35	2,12	1,91	1,74	1,61	1,55																																																																																																																																														
A07-6Y	2	30	Qo		4667	3743	2976	2346	1833	1416	1076	792	545	Pe		0,98	0,94	0,9	0,85	0,79	0,73	0,66	0,59	0,53	40	Qo		3993	3187	2524	1984	1548	1195	906	660	436	Pe		1,18	1,12	1,05	0,97	0,89	0,8	0,71	0,62	0,53	50	Qo		3421	2713	2136	1669	1291	984	726	498	280	Pe		1,35	1,26	1,17	1,06	0,96	0,85	0,74	0,63	0,52	A1-6Y	1	30	Qo	5975	4901	3968	3166	2485	1915	1446	1069	772	546	Pe	0,97	0,99	0,98	0,95	0,89	0,82	0,74	0,67	0,6	0,55	40	Qo	5078	4151	3351	2667	2089	1607	1212	893	639	442	Pe	1,22	1,19	1,14	1,07	0,99	0,89	0,8	0,71	0,64	0,59	50	Qo	4172	3394	2728	2163	1690	1298	978	718	510	343	Pe	1,43	1,37	1,28	1,18	1,06	0,95	0,85	0,75	0,68	0,64	A1-7Y	2	30	Qo		6175	4997	4012	3195	2522	1971	1517	1136	807	Pe		1,42	1,36	1,29	1,2	1,11	1,01	0,91	0,81	0,71	40	Qo		5302	4272	3418	2716	2141	1671	1282	951	653	Pe		1,67	1,58	1,47	1,35	1,22	1,09	0,96	0,84	0,72	50	Qo		4529	3627	2884	2276	1780	1372	1028	725	439	Pe		1,88	1,75	1,6	1,45	1,29	1,13	0,97	0,82	0,68	A1.5-7Y	1	30	Qo	7797	6370	5143	4098	3221	2495	1903	1430	1058	772	Pe	1,32	1,31	1,27	1,2	1,12	1,02	0,93	0,84	0,75	0,69	40	Qo	6719	5469	4401	3501	2752	2137	1641	1247	938	699	Pe	1,6	1,54	1,45	1,35	1,23	1,12	1,01	0,91	0,82	0,77	50	Qo	5677	4597	3685	2923	2296	1787	1381	1060	809	612	Pe	1,84	1,73	1,6	1,47	1,33	1,19	1,07	0,97	0,89	0,84	A1.5-8Y	1	30	Qo		6624	5376	4323	3444	2717	2123	1640	1248	927	Pe		1,5	1,46	1,39	1,3	1,2	1,08	0,97	0,86	0,77	40	Qo		5765	4657	3729	2960	2331	1819	1405	1067	786	Pe		1,77	1,68	1,57	1,44	1,31	1,17	1,04	0,93	0,83	50	Qo		4906	3941	3141	2487	1957	1531	1189	909	671	Pe		2	1,87	1,72	1,56	1,4	1,25	1,11	0,99	0,89	B1.5-9.1Y	2	30	Qo	9451	7731	6256	5005	3959	3097	2400	1847	1419	1095	Pe	1,86	1,82	1,75	1,64	1,52	1,39	1,26	1,15	1,05	0,99	40	Qo	8287	6751	5444	4345	3435	2693	2100	1635	1278	1009	Pe	2,29	2,18	2,04	1,88	1,72	1,55	1,41	1,28	1,18	1,13	50	Qo	7020	5684	4560	3628	2869	2262	1787	1425	1155	957	Pe	2,66	2,47	2,27	2,07	1,87	1,68	1,52	1,39	1,3	1,26	B1.5-10.1Y	2	30	Qo		8294	6756	5457	4369	3463	2714	2091	1569	1118	Pe		1,96	1,93	1,86	1,75	1,61	1,45	1,29	1,14	1,01	40	Qo		7200	5848	4716	3776	3001	2364	1835	1387	993	Pe		2,34	2,24	2,11	1,95	1,76	1,58	1,4	1,25	1,12	50	Qo		6254	5067	4081	3271	2606	2060	1605	1212	855	Pe		2,66	2,51	2,32	2,12	1,91	1,7	1,52	1,37	1,26	B2-10.1Y	1	30	Qo	10340	8511	6929	5576	4432	3478	2694	2061	1559	1169	Pe	2,06	2,07	2,02	1,92	1,79	1,65	1,5	1,36	1,24	1,15	40	Qo	8981	7376	5998	4828	3846	3032	2368	1834	1409	1076	Pe	2,51	2,43	2,3	2,15	1,98	1,81	1,64	1,49	1,37	1,3	50	Qo	7629	6256	5089	4108	3295	2629	2091	1662	1322	1052	Pe	2,9	2,75	2,56	2,36	2,15	1,96	1,78	1,63	1,53	1,49	D2-11.1Y	1	30	Qo	12357	10147	8246	6627	5264	4130	3200	2447	1844	1366	Pe	2,21	2,22	2,16	2,06	1,93	1,77	1,61	1,45	1,32	1,21	40	Qo	10710	8780	7129	5730	4559	3587	2790	2140	1610	1176	Pe	2,73	2,64	2,51	2,34	2,16	1,96	1,77	1,6	1,47	1,38	50	Qo	8990	7348	5956	4788	3816	3016	2359	1821	1375	994	Pe	3,17	3,01	2,8	2,58	2,35	2,12	1,91	1,74	1,61	1,55																																																																																																																																																																																																																					
A1-6Y	1	30	Qo	5975	4901	3968	3166	2485	1915	1446	1069	772	546	Pe	0,97	0,99	0,98	0,95	0,89	0,82	0,74	0,67	0,6	0,55	40	Qo	5078	4151	3351	2667	2089	1607	1212	893	639	442	Pe	1,22	1,19	1,14	1,07	0,99	0,89	0,8	0,71	0,64	0,59	50	Qo	4172	3394	2728	2163	1690	1298	978	718	510	343	Pe	1,43	1,37	1,28	1,18	1,06	0,95	0,85	0,75	0,68	0,64	A1-7Y	2	30	Qo		6175	4997	4012	3195	2522	1971	1517	1136	807	Pe		1,42	1,36	1,29	1,2	1,11	1,01	0,91	0,81	0,71	40	Qo		5302	4272	3418	2716	2141	1671	1282	951	653	Pe		1,67	1,58	1,47	1,35	1,22	1,09	0,96	0,84	0,72	50	Qo		4529	3627	2884	2276	1780	1372	1028	725	439	Pe		1,88	1,75	1,6	1,45	1,29	1,13	0,97	0,82	0,68	A1.5-7Y	1	30	Qo	7797	6370	5143	4098	3221	2495	1903	1430	1058	772	Pe	1,32	1,31	1,27	1,2	1,12	1,02	0,93	0,84	0,75	0,69	40	Qo	6719	5469	4401	3501	2752	2137	1641	1247	938	699	Pe	1,6	1,54	1,45	1,35	1,23	1,12	1,01	0,91	0,82	0,77	50	Qo	5677	4597	3685	2923	2296	1787	1381	1060	809	612	Pe	1,84	1,73	1,6	1,47	1,33	1,19	1,07	0,97	0,89	0,84	A1.5-8Y	1	30	Qo		6624	5376	4323	3444	2717	2123	1640	1248	927	Pe		1,5	1,46	1,39	1,3	1,2	1,08	0,97	0,86	0,77	40	Qo		5765	4657	3729	2960	2331	1819	1405	1067	786	Pe		1,77	1,68	1,57	1,44	1,31	1,17	1,04	0,93	0,83	50	Qo		4906	3941	3141	2487	1957	1531	1189	909	671	Pe		2	1,87	1,72	1,56	1,4	1,25	1,11	0,99	0,89	B1.5-9.1Y	2	30	Qo	9451	7731	6256	5005	3959	3097	2400	1847	1419	1095	Pe	1,86	1,82	1,75	1,64	1,52	1,39	1,26	1,15	1,05	0,99	40	Qo	8287	6751	5444	4345	3435	2693	2100	1635	1278	1009	Pe	2,29	2,18	2,04	1,88	1,72	1,55	1,41	1,28	1,18	1,13	50	Qo	7020	5684	4560	3628	2869	2262	1787	1425	1155	957	Pe	2,66	2,47	2,27	2,07	1,87	1,68	1,52	1,39	1,3	1,26	B1.5-10.1Y	2	30	Qo		8294	6756	5457	4369	3463	2714	2091	1569	1118	Pe		1,96	1,93	1,86	1,75	1,61	1,45	1,29	1,14	1,01	40	Qo		7200	5848	4716	3776	3001	2364	1835	1387	993	Pe		2,34	2,24	2,11	1,95	1,76	1,58	1,4	1,25	1,12	50	Qo		6254	5067	4081	3271	2606	2060	1605	1212	855	Pe		2,66	2,51	2,32	2,12	1,91	1,7	1,52	1,37	1,26	B2-10.1Y	1	30	Qo	10340	8511	6929	5576	4432	3478	2694	2061	1559	1169	Pe	2,06	2,07	2,02	1,92	1,79	1,65	1,5	1,36	1,24	1,15	40	Qo	8981	7376	5998	4828	3846	3032	2368	1834	1409	1076	Pe	2,51	2,43	2,3	2,15	1,98	1,81	1,64	1,49	1,37	1,3	50	Qo	7629	6256	5089	4108	3295	2629	2091	1662	1322	1052	Pe	2,9	2,75	2,56	2,36	2,15	1,96	1,78	1,63	1,53	1,49	D2-11.1Y	1	30	Qo	12357	10147	8246	6627	5264	4130	3200	2447	1844	1366	Pe	2,21	2,22	2,16	2,06	1,93	1,77	1,61	1,45	1,32	1,21	40	Qo	10710	8780	7129	5730	4559	3587	2790	2140	1610	1176	Pe	2,73	2,64	2,51	2,34	2,16	1,96	1,77	1,6	1,47	1,38	50	Qo	8990	7348	5956	4788	3816	3016	2359	1821	1375	994	Pe	3,17	3,01	2,8	2,58	2,35	2,12	1,91	1,74	1,61	1,55																																																																																																																																																																																																																																																																																												
A1-7Y	2	30	Qo		6175	4997	4012	3195	2522	1971	1517	1136	807	Pe		1,42	1,36	1,29	1,2	1,11	1,01	0,91	0,81	0,71	40	Qo		5302	4272	3418	2716	2141	1671	1282	951	653	Pe		1,67	1,58	1,47	1,35	1,22	1,09	0,96	0,84	0,72	50	Qo		4529	3627	2884	2276	1780	1372	1028	725	439	Pe		1,88	1,75	1,6	1,45	1,29	1,13	0,97	0,82	0,68	A1.5-7Y	1	30	Qo	7797	6370	5143	4098	3221	2495	1903	1430	1058	772	Pe	1,32	1,31	1,27	1,2	1,12	1,02	0,93	0,84	0,75	0,69	40	Qo	6719	5469	4401	3501	2752	2137	1641	1247	938	699	Pe	1,6	1,54	1,45	1,35	1,23	1,12	1,01	0,91	0,82	0,77	50	Qo	5677	4597	3685	2923	2296	1787	1381	1060	809	612	Pe	1,84	1,73	1,6	1,47	1,33	1,19	1,07	0,97	0,89	0,84	A1.5-8Y	1	30	Qo		6624	5376	4323	3444	2717	2123	1640	1248	927	Pe		1,5	1,46	1,39	1,3	1,2	1,08	0,97	0,86	0,77	40	Qo		5765	4657	3729	2960	2331	1819	1405	1067	786	Pe		1,77	1,68	1,57	1,44	1,31	1,17	1,04	0,93	0,83	50	Qo		4906	3941	3141	2487	1957	1531	1189	909	671	Pe		2	1,87	1,72	1,56	1,4	1,25	1,11	0,99	0,89	B1.5-9.1Y	2	30	Qo	9451	7731	6256	5005	3959	3097	2400	1847	1419	1095	Pe	1,86	1,82	1,75	1,64	1,52	1,39	1,26	1,15	1,05	0,99	40	Qo	8287	6751	5444	4345	3435	2693	2100	1635	1278	1009	Pe	2,29	2,18	2,04	1,88	1,72	1,55	1,41	1,28	1,18	1,13	50	Qo	7020	5684	4560	3628	2869	2262	1787	1425	1155	957	Pe	2,66	2,47	2,27	2,07	1,87	1,68	1,52	1,39	1,3	1,26	B1.5-10.1Y	2	30	Qo		8294	6756	5457	4369	3463	2714	2091	1569	1118	Pe		1,96	1,93	1,86	1,75	1,61	1,45	1,29	1,14	1,01	40	Qo		7200	5848	4716	3776	3001	2364	1835	1387	993	Pe		2,34	2,24	2,11	1,95	1,76	1,58	1,4	1,25	1,12	50	Qo		6254	5067	4081	3271	2606	2060	1605	1212	855	Pe		2,66	2,51	2,32	2,12	1,91	1,7	1,52	1,37	1,26	B2-10.1Y	1	30	Qo	10340	8511	6929	5576	4432	3478	2694	2061	1559	1169	Pe	2,06	2,07	2,02	1,92	1,79	1,65	1,5	1,36	1,24	1,15	40	Qo	8981	7376	5998	4828	3846	3032	2368	1834	1409	1076	Pe	2,51	2,43	2,3	2,15	1,98	1,81	1,64	1,49	1,37	1,3	50	Qo	7629	6256	5089	4108	3295	2629	2091	1662	1322	1052	Pe	2,9	2,75	2,56	2,36	2,15	1,96	1,78	1,63	1,53	1,49	D2-11.1Y	1	30	Qo	12357	10147	8246	6627	5264	4130	3200	2447	1844	1366	Pe	2,21	2,22	2,16	2,06	1,93	1,77	1,61	1,45	1,32	1,21	40	Qo	10710	8780	7129	5730	4559	3587	2790	2140	1610	1176	Pe	2,73	2,64	2,51	2,34	2,16	1,96	1,77	1,6	1,47	1,38	50	Qo	8990	7348	5956	4788	3816	3016	2359	1821	1375	994	Pe	3,17	3,01	2,8	2,58	2,35	2,12	1,91	1,74	1,61	1,55																																																																																																																																																																																																																																																																																																																																																																			
A1.5-7Y	1	30	Qo	7797	6370	5143	4098	3221	2495	1903	1430	1058	772	Pe	1,32	1,31	1,27	1,2	1,12	1,02	0,93	0,84	0,75	0,69	40	Qo	6719	5469	4401	3501	2752	2137	1641	1247	938	699	Pe	1,6	1,54	1,45	1,35	1,23	1,12	1,01	0,91	0,82	0,77	50	Qo	5677	4597	3685	2923	2296	1787	1381	1060	809	612	Pe	1,84	1,73	1,6	1,47	1,33	1,19	1,07	0,97	0,89	0,84	A1.5-8Y	1	30	Qo		6624	5376	4323	3444	2717	2123	1640	1248	927	Pe		1,5	1,46	1,39	1,3	1,2	1,08	0,97	0,86	0,77	40	Qo		5765	4657	3729	2960	2331	1819	1405	1067	786	Pe		1,77	1,68	1,57	1,44	1,31	1,17	1,04	0,93	0,83	50	Qo		4906	3941	3141	2487	1957	1531	1189	909	671	Pe		2	1,87	1,72	1,56	1,4	1,25	1,11	0,99	0,89	B1.5-9.1Y	2	30	Qo	9451	7731	6256	5005	3959	3097	2400	1847	1419	1095	Pe	1,86	1,82	1,75	1,64	1,52	1,39	1,26	1,15	1,05	0,99	40	Qo	8287	6751	5444	4345	3435	2693	2100	1635	1278	1009	Pe	2,29	2,18	2,04	1,88	1,72	1,55	1,41	1,28	1,18	1,13	50	Qo	7020	5684	4560	3628	2869	2262	1787	1425	1155	957	Pe	2,66	2,47	2,27	2,07	1,87	1,68	1,52	1,39	1,3	1,26	B1.5-10.1Y	2	30	Qo		8294	6756	5457	4369	3463	2714	2091	1569	1118	Pe		1,96	1,93	1,86	1,75	1,61	1,45	1,29	1,14	1,01	40	Qo		7200	5848	4716	3776	3001	2364	1835	1387	993	Pe		2,34	2,24	2,11	1,95	1,76	1,58	1,4	1,25	1,12	50	Qo		6254	5067	4081	3271	2606	2060	1605	1212	855	Pe		2,66	2,51	2,32	2,12	1,91	1,7	1,52	1,37	1,26	B2-10.1Y	1	30	Qo	10340	8511	6929	5576	4432	3478	2694	2061	1559	1169	Pe	2,06	2,07	2,02	1,92	1,79	1,65	1,5	1,36	1,24	1,15	40	Qo	8981	7376	5998	4828	3846	3032	2368	1834	1409	1076	Pe	2,51	2,43	2,3	2,15	1,98	1,81	1,64	1,49	1,37	1,3	50	Qo	7629	6256	5089	4108	3295	2629	2091	1662	1322	1052	Pe	2,9	2,75	2,56	2,36	2,15	1,96	1,78	1,63	1,53	1,49	D2-11.1Y	1	30	Qo	12357	10147	8246	6627	5264	4130	3200	2447	1844	1366	Pe	2,21	2,22	2,16	2,06	1,93	1,77	1,61	1,45	1,32	1,21	40	Qo	10710	8780	7129	5730	4559	3587	2790	2140	1610	1176	Pe	2,73	2,64	2,51	2,34	2,16	1,96	1,77	1,6	1,47	1,38	50	Qo	8990	7348	5956	4788	3816	3016	2359	1821	1375	994	Pe	3,17	3,01	2,8	2,58	2,35	2,12	1,91	1,74	1,61	1,55																																																																																																																																																																																																																																																																																																																																																																																																																																										
A1.5-8Y	1	30	Qo		6624	5376	4323	3444	2717	2123	1640	1248	927	Pe		1,5	1,46	1,39	1,3	1,2	1,08	0,97	0,86	0,77	40	Qo		5765	4657	3729	2960	2331	1819	1405	1067	786	Pe		1,77	1,68	1,57	1,44	1,31	1,17	1,04	0,93	0,83	50	Qo		4906	3941	3141	2487	1957	1531	1189	909	671	Pe		2	1,87	1,72	1,56	1,4	1,25	1,11	0,99	0,89	B1.5-9.1Y	2	30	Qo	9451	7731	6256	5005	3959	3097	2400	1847	1419	1095	Pe	1,86	1,82	1,75	1,64	1,52	1,39	1,26	1,15	1,05	0,99	40	Qo	8287	6751	5444	4345	3435	2693	2100	1635	1278	1009	Pe	2,29	2,18	2,04	1,88	1,72	1,55	1,41	1,28	1,18	1,13	50	Qo	7020	5684	4560	3628	2869	2262	1787	1425	1155	957	Pe	2,66	2,47	2,27	2,07	1,87	1,68	1,52	1,39	1,3	1,26	B1.5-10.1Y	2	30	Qo		8294	6756	5457	4369	3463	2714	2091	1569	1118	Pe		1,96	1,93	1,86	1,75	1,61	1,45	1,29	1,14	1,01	40	Qo		7200	5848	4716	3776	3001	2364	1835	1387	993	Pe		2,34	2,24	2,11	1,95	1,76	1,58	1,4	1,25	1,12	50	Qo		6254	5067	4081	3271	2606	2060	1605	1212	855	Pe		2,66	2,51	2,32	2,12	1,91	1,7	1,52	1,37	1,26	B2-10.1Y	1	30	Qo	10340	8511	6929	5576	4432	3478	2694	2061	1559	1169	Pe	2,06	2,07	2,02	1,92	1,79	1,65	1,5	1,36	1,24	1,15	40	Qo	8981	7376	5998	4828	3846	3032	2368	1834	1409	1076	Pe	2,51	2,43	2,3	2,15	1,98	1,81	1,64	1,49	1,37	1,3	50	Qo	7629	6256	5089	4108	3295	2629	2091	1662	1322	1052	Pe	2,9	2,75	2,56	2,36	2,15	1,96	1,78	1,63	1,53	1,49	D2-11.1Y	1	30	Qo	12357	10147	8246	6627	5264	4130	3200	2447	1844	1366	Pe	2,21	2,22	2,16	2,06	1,93	1,77	1,61	1,45	1,32	1,21	40	Qo	10710	8780	7129	5730	4559	3587	2790	2140	1610	1176	Pe	2,73	2,64	2,51	2,34	2,16	1,96	1,77	1,6	1,47	1,38	50	Qo	8990	7348	5956	4788	3816	3016	2359	1821	1375	994	Pe	3,17	3,01	2,8	2,58	2,35	2,12	1,91	1,74	1,61	1,55																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
B1.5-9.1Y	2	30	Qo	9451	7731	6256	5005	3959	3097	2400	1847	1419	1095	Pe	1,86	1,82	1,75	1,64	1,52	1,39	1,26	1,15	1,05	0,99	40	Qo	8287	6751	5444	4345	3435	2693	2100	1635	1278	1009	Pe	2,29	2,18	2,04	1,88	1,72	1,55	1,41	1,28	1,18	1,13	50	Qo	7020	5684	4560	3628	2869	2262	1787	1425	1155	957	Pe	2,66	2,47	2,27	2,07	1,87	1,68	1,52	1,39	1,3	1,26	B1.5-10.1Y	2	30	Qo		8294	6756	5457	4369	3463	2714	2091	1569	1118	Pe		1,96	1,93	1,86	1,75	1,61	1,45	1,29	1,14	1,01	40	Qo		7200	5848	4716	3776	3001	2364	1835	1387	993	Pe		2,34	2,24	2,11	1,95	1,76	1,58	1,4	1,25	1,12	50	Qo		6254	5067	4081	3271	2606	2060	1605	1212	855	Pe		2,66	2,51	2,32	2,12	1,91	1,7	1,52	1,37	1,26	B2-10.1Y	1	30	Qo	10340	8511	6929	5576	4432	3478	2694	2061	1559	1169	Pe	2,06	2,07	2,02	1,92	1,79	1,65	1,5	1,36	1,24	1,15	40	Qo	8981	7376	5998	4828	3846	3032	2368	1834	1409	1076	Pe	2,51	2,43	2,3	2,15	1,98	1,81	1,64	1,49	1,37	1,3	50	Qo	7629	6256	5089	4108	3295	2629	2091	1662	1322	1052	Pe	2,9	2,75	2,56	2,36	2,15	1,96	1,78	1,63	1,53	1,49	D2-11.1Y	1	30	Qo	12357	10147	8246	6627	5264	4130	3200	2447	1844	1366	Pe	2,21	2,22	2,16	2,06	1,93	1,77	1,61	1,45	1,32	1,21	40	Qo	10710	8780	7129	5730	4559	3587	2790	2140	1610	1176	Pe	2,73	2,64	2,51	2,34	2,16	1,96	1,77	1,6	1,47	1,38	50	Qo	8990	7348	5956	4788	3816	3016	2359	1821	1375	994	Pe	3,17	3,01	2,8	2,58	2,35	2,12	1,91	1,74	1,61	1,55																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
B1.5-10.1Y	2	30	Qo		8294	6756	5457	4369	3463	2714	2091	1569	1118	Pe		1,96	1,93	1,86	1,75	1,61	1,45	1,29	1,14	1,01	40	Qo		7200	5848	4716	3776	3001	2364	1835	1387	993	Pe		2,34	2,24	2,11	1,95	1,76	1,58	1,4	1,25	1,12	50	Qo		6254	5067	4081	3271	2606	2060	1605	1212	855	Pe		2,66	2,51	2,32	2,12	1,91	1,7	1,52	1,37	1,26	B2-10.1Y	1	30	Qo	10340	8511	6929	5576	4432	3478	2694	2061	1559	1169	Pe	2,06	2,07	2,02	1,92	1,79	1,65	1,5	1,36	1,24	1,15	40	Qo	8981	7376	5998	4828	3846	3032	2368	1834	1409	1076	Pe	2,51	2,43	2,3	2,15	1,98	1,81	1,64	1,49	1,37	1,3	50	Qo	7629	6256	5089	4108	3295	2629	2091	1662	1322	1052	Pe	2,9	2,75	2,56	2,36	2,15	1,96	1,78	1,63	1,53	1,49	D2-11.1Y	1	30	Qo	12357	10147	8246	6627	5264	4130	3200	2447	1844	1366	Pe	2,21	2,22	2,16	2,06	1,93	1,77	1,61	1,45	1,32	1,21	40	Qo	10710	8780	7129	5730	4559	3587	2790	2140	1610	1176	Pe	2,73	2,64	2,51	2,34	2,16	1,96	1,77	1,6	1,47	1,38	50	Qo	8990	7348	5956	4788	3816	3016	2359	1821	1375	994	Pe	3,17	3,01	2,8	2,58	2,35	2,12	1,91	1,74	1,61	1,55																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
B2-10.1Y	1	30	Qo	10340	8511	6929	5576	4432	3478	2694	2061	1559	1169	Pe	2,06	2,07	2,02	1,92	1,79	1,65	1,5	1,36	1,24	1,15	40	Qo	8981	7376	5998	4828	3846	3032	2368	1834	1409	1076	Pe	2,51	2,43	2,3	2,15	1,98	1,81	1,64	1,49	1,37	1,3	50	Qo	7629	6256	5089	4108	3295	2629	2091	1662	1322	1052	Pe	2,9	2,75	2,56	2,36	2,15	1,96	1,78	1,63	1,53	1,49	D2-11.1Y	1	30	Qo	12357	10147	8246	6627	5264	4130	3200	2447	1844	1366	Pe	2,21	2,22	2,16	2,06	1,93	1,77	1,61	1,45	1,32	1,21	40	Qo	10710	8780	7129	5730	4559	3587	2790	2140	1610	1176	Pe	2,73	2,64	2,51	2,34	2,16	1,96	1,77	1,6	1,47	1,38	50	Qo	8990	7348	5956	4788	3816	3016	2359	1821	1375	994	Pe	3,17	3,01	2,8	2,58	2,35	2,12	1,91	1,74	1,61	1,55																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
D2-11.1Y	1	30	Qo	12357	10147	8246	6627	5264	4130	3200	2447	1844	1366	Pe	2,21	2,22	2,16	2,06	1,93	1,77	1,61	1,45	1,32	1,21	40	Qo	10710	8780	7129	5730	4559	3587	2790	2140	1610	1176	Pe	2,73	2,64	2,51	2,34	2,16	1,96	1,77	1,6	1,47	1,38	50	Qo	8990	7348	5956	4788	3816	3016	2359	1821	1375	994	Pe	3,17	3,01	2,8	2,58	2,35	2,12	1,91	1,74	1,61	1,55																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													

① Suction gas temperature 20°C without liquid sub-cooling.

The performance refers to European standard EN12900 and with operation at 50Hz; conversion factor at 60Hz = 1.2.

To calculate the performance in different operating points refer to the Frascold Selection Software.

All published data is subject to change.

■ This field requires additional cooling or limitation of the suction temperature.

Semi-hermetic reciprocating compressors

Performance R448A [50 Hz]

Compressor	Motor version	Cond. Temp. [°C]	Qo [W] = Cooling capacity Pe [kW] = Power consumption ①	Evaporating temperature [°C]									
				5	0	-5	-10	-15	-20	-25	-30	-35	-40
W40-168Y	2	30	Qo		152579	124241	100117	79770	62765	48666	37036	27440	19442
			Pe		31,59	29,97	28,09	26,01	23,76	21,42	19,03	16,64	14,31
		40	Qo		133149	108118	86941	69182	54405	42175	32056	23611	16405
			Pe		37,26	34,87	32,25	29,47	26,58	23,63	20,67	17,76	14,95
		50	Qo			93258	74735	59270	46429	35776	26874	19287	12580
			Pe			38,85	35,5	32,01	28,46	24,89	21,36	17,91	14,61
W50-168Y	1	30	Qo	189814	156020	126930	102144	81262	63884	49612	38043	28778	21419
			Pe	29,94	29,7	28,88	27,58	25,88	23,87	21,64	19,28	16,89	14,55
		40	Qo	166230	136494	111018	89402	71246	56150	43716	33541	25226	18372
			Pe	38,96	36,96	34,65	32,13	29,48	26,79	24,17	21,68	19,44	17,51
		50	Qo	140369	115056	93558	75476	60410	47960	37726	29309	22308	16323
			Pe	46,19	42,52	38,81	35,16	31,66	28,4	25,46	22,94	20,94	19,53
W50-187Y	2	30	Qo		170541	137962	110579	87783	68963	53511	40816	30268	21258
			Pe		35,03	33,06	30,83	28,39	25,81	23,18	20,55	18	15,6
		40	Qo		147900	119189	95263	75513	59328	46101	35221	26077	18061
			Pe		40,84	38,05	35,05	31,89	28,66	25,42	22,25	19,21	16,38
		50	Qo		127776	102448	81496	64308	50277	38791	29242	21020	13514
			Pe		45,66	42,04	38,25	34,36	30,46	26,6	22,87	19,32	16,04
W60-187Y	1	30	Qo	208709	170957	138601	111178	88225	69276	53871	41542	31828	24265
			Pe	34,78	34,02	32,69	30,89	28,73	26,3	23,7	21,02	18,37	15,84
		40	Qo	181631	148641	120515	96790	77001	60685	47379	36618	27938	20876
			Pe	44,33	41,6	38,61	35,46	32,25	29,08	26,05	23,26	20,8	18,77
		50	Qo	152807	124852	101229	81474	65123	51711	40777	31855	24482	18195
			Pe	51,92	47,31	42,75	38,34	34,18	30,37	27,01	24,19	22,01	20,57
W60-206Y	2	30	Qo		188083	152973	123306	98465	77830	60782	46703	34973	24975
			Pe		38,75	36,98	34,75	32,17	29,37	26,44	23,53	20,74	18,19
		40	Qo		164499	133259	107099	85399	67541	52906	40875	30829	22150
			Pe		45,73	42,85	39,63	36,19	32,63	29,08	25,66	22,48	19,67
		50	Qo		142854	115145	92151	73253	57832	45271	34948	26247	18548
			Pe		51,31	47,43	43,33	39,12	34,92	30,86	27,04	23,59	20,62
W70-206Y	1	30	Qo	227171	186963	152351	122851	97978	77246	60170	46266	35047	26029
			Pe	37,54	36,85	35,54	33,71	31,46	28,86	26,01	23	19,93	16,87
		40	Qo	199123	163598	133156	107309	85574	67465	52497	40185	30043	21587
			Pe	47,64	44,94	41,94	38,72	35,36	31,97	28,63	25,43	22,47	19,83
		50	Qo	169799	139192	113151	91191	72827	57573	44946	34458	25626	17965
			Pe	55,91	51,28	46,63	42,07	37,69	33,56	29,79	26,47	23,67	21,51
W70-228Y	2	30	Qo		188083	152973	123306	98465	77830	60782	46703	34973	24975
			Pe		38,75	36,98	34,75	32,17	29,37	26,44	23,53	20,74	18,19
		40	Qo		164499	133259	107099	85399	67541	52906	40875	30829	22150
			Pe		45,73	42,85	39,63	36,19	32,63	29,08	25,66	22,48	19,67
		50	Qo		142854	115145	92151	73253	57832	45271	34948	26247	18548
			Pe		51,31	47,43	43,33	39,12	34,92	30,86	27,04	23,59	20,62
W75-228Y	1	30	Qo	246232	202283	164464	132236	105059	82393	63700	48439	36072	26059
			Pe	43,1	41,83	39,97	37,61	34,82	31,68	28,27	24,67	20,97	17,23
		40	Qo	214848	176285	143249	115201	91601	71909	55588	42096	30895	21445
			Pe	53,89	50,45	46,76	42,88	38,91	34,91	30,98	27,18	23,61	20,33
		50	Qo	181347	148520	120617	97100	77427	61060	47461	36088	26402	17865
			Pe	62,4	56,89	51,45	46,17	41,11	36,35	31,99	28,09	24,75	22,03
W75-240Y	2	30	Qo		215742	174824	140436	111845	88313	69107	53491	40727	30083
			Pe		43,77	42,05	39,61	36,67	33,42	30,05	26,76	23,76	21,24
		40	Qo		189025	152442	122004	96976	76622	60208	46996	36253	27242
			Pe		52,23	49,01	45,27	41,23	37,07	33	29,21	25,91	23,28
		50	Qo		165271	132564	105615	83691	66055	51972	40706	31523	23686
			Pe		59,04	54,48	49,61	44,63	39,73	35,12	31	27,56	25
W80-240Y	1	30	Qo	255174	209818	170795	137561	109571	86281	67147	51623	39166	29230
			Pe	45,14	43,79	41,82	39,34	36,43	33,2	29,74	26,14	22,5	18,91
		40	Qo	223665	183462	149032	119830	95312	74933	58150	44417	33190	23924
			Pe	56,67	52,98	49,03	44,92	40,73	36,56	32,51	28,68	25,15	22,03
		50	Qo	190339	155576	126026	101144	80385	63206	49061	37406	27696	19388
			Pe	66	60,03	54,15	48,45	43,03	37,98	33,39	29,37	26,01	23,4

① Suction gas temperature 20°C without liquid sub-cooling.

The performance refers to European standard EN12900 and with operation at 50Hz; conversion factor at 60Hz = 1.2.

To calculate the performance in different operating points refer to the Frascold Selection Software.

All published data is subject to change.

■ This field requires additional cooling or limitation of the suction temperature.

Semi-hermetic reciprocating compressors

Performance R449A [50 Hz]

Compressor	Motor version	Cond. Temp. [°C]	Qo [W] = Cooling capacity Pe [kW] = Power consumption ①	Evaporating temperature [°C]									
				5	0	-5	-10	-15	-20	-25	-30	-35	-40
W40-168Y	2	30	Qo		163497	130492	103123	80728	62646	48214	36768	27649	20191
			Pe		37,43	32,73	28,92	25,84	23,3	21,11	19,11	17,11	14,93
		40	Qo		141552	112170	88045	68517	52921	40598	30882	23113	16629
			Pe		40,87	36,02	32	28,6	25,66	23	20,43	17,78	14,86
		50	Qo			96494	75387	58497	45161	34718	26505	19860	14120
			Pe			40,23	35,67	31,66	28,02	24,57	21,13	17,52	13,56
W50-168Y	1	30	Qo	191137	157475	128325	103346	82194	64529	50009	38292	29035	21898
			Pe	30,24	30,32	29,56	28,14	26,24	24,04	21,7	19,42	17,36	15,71
		40	Qo	166922	137671	112404	90779	72453	57084	44333	33854	25309	18353
			Pe	37,87	36,74	34,92	32,57	29,89	27,04	24,2	21,55	19,27	17,53
		50	Qo	141077	116413	95203	77107	61781	48884	38075	29011	21351	14752
			Pe	44,36	42,07	39,23	36,01	32,59	29,15	25,85	22,89	20,44	18,67
W50-187Y	2	30	Qo		181499	144781	114298	89346	69224	53229	40655	30803	22967
			Pe		41,12	36,08	31,87	28,36	25,42	22,9	20,68	18,62	16,58
		40	Qo		153600	122011	96021	74928	58028	44620	33999	25463	18308
			Pe		43,7	38,83	34,65	31,01	27,78	24,82	22,01	19,2	16,26
		50	Qo		129494	102656	80782	63170	49116	37918	28872	21275	14425
			Pe		47,55	42,53	38,05	33,95	30,11	26,4	22,66	18,78	14,62
W60-187Y	1	30	Qo	210160	172542	140116	112480	89233	69974	54300	41812	32106	24783
			Pe	35,09	34,68	33,43	31,51	29,13	26,49	23,77	21,17	18,88	17,11
		40	Qo	182382	149917	122018	98283	78312	61702	48053	36963	28031	20855
			Pe	43,07	41,32	38,89	35,95	32,71	29,36	26,1	23,12	20,62	18,79
		50	Qo	153577	126328	103019	83249	66617	52721	41160	31532	23437	16472
			Pe	49,85	46,8	43,22	39,3	35,23	31,22	27,45	24,13	21,44	19,58
W60-206Y	2	30	Qo		200035	160465	127432	100227	78143	60473	46507	35540	26862
			Pe		45,39	40,27	35,89	32,16	28,95	26,16	23,69	21,43	19,26
		40	Qo		170783	136404	107966	84761	66080	51218	39464	30112	22454
			Pe		48,83	43,7	39,2	35,23	31,68	28,44	25,41	22,47	19,53
		50	Qo		144775	115393	91355	71955	56484	44234	34498	26567	19735
			Pe		53,39	48	43,14	38,7	34,57	30,63	26,8	22,95	18,98
W70-206Y	1	30	Qo	228753	188709	154028	124296	99098	78020	60647	46563	35354	26606
			Pe	37,9	37,59	36,35	34,39	31,9	29,06	26,09	23,17	20,49	18,26
		40	Qo	199951	165015	134825	108967	87027	68588	53238	40561	30142	21566
			Pe	46,29	44,66	42,26	39,26	35,87	32,28	28,69	25,29	22,28	19,85
		50	Qo	170667	140843	115149	93170	74491	58698	45375	34109	24484	16085
			Pe	53,68	50,74	47,16	43,12	38,83	34,49	30,28	26,4	23,05	20,42
W70-228Y	2	30	Qo		215141	172869	137575	108511	84930	66084	51224	39604	30476
			Pe		49,51	43,86	39,05	34,96	31,47	28,45	25,79	23,36	21,04
		40	Qo		184684	147749	117185	92242	72174	56233	43670	33738	25691
			Pe		52,94	47,4	42,55	38,28	34,47	30,98	27,71	24,52	21,29
		50	Qo		158079	126246	100173	79115	62323	49050	38547	30068	22864
			Pe		57,97	52,23	47,03	42,27	37,81	33,54	29,33	25,07	20,62
W75-228Y	1	30	Qo	247958	204181	166282	133800	106270	83229	64212	48757	36399	26675
			Pe	43,46	42,63	40,86	38,36	35,31	31,91	28,36	24,85	21,58	18,74
		40	Qo	215747	177806	145034	116968	93144	73098	56367	42487	30994	21425
			Pe	52,33	50,1	47,09	43,48	39,47	35,27	31,06	27,04	23,41	20,36
		50	Qo	182252	150260	122728	99190	79185	62247	47915	35722	25207	15905
			Pe	59,9	56,29	52,04	47,34	42,39	37,39	32,54	28,02	24,04	20,78
W75-240Y	2	30	Qo		228894	183165	145098	113883	88712	68776	53264	41368	32280
			Pe		51,15	45,71	40,9	36,67	32,97	29,74	26,95	24,54	22,45
		40	Qo		195899	155950	123024	96310	75001	58287	45358	35407	27623
			Pe		55,67	49,95	44,8	40,17	36,02	32,29	28,93	25,89	23,12
		50	Qo		167262	132821	104763	82279	64560	50797	40180	31900	25150
			Pe		61,39	55,16	49,44	44,19	39,35	34,88	30,72	26,83	23,15
W80-240Y	1	30	Qo	256948	211774	172673	139178	110825	87147	67678	51953	39505	29869
			Pe	45,52	44,63	42,75	40,12	36,94	33,44	29,83	26,32	23,14	20,5
		40	Qo	224597	185047	150896	121680	96931	76184	58974	44834	33298	23900
			Pe	55,03	52,62	49,38	45,54	41,32	36,93	32,59	28,52	24,94	22,05
		50	Qo	191306	157416	128252	103350	82242	64462	49546	37027	26439	17317
			Pe	63,36	59,39	54,75	49,68	44,38	39,07	33,97	29,3	25,27	22,1

① Suction gas temperature 20°C without liquid sub-cooling.

The performance refers to European standard EN12900 and with operation at 50Hz; conversion factor at 60Hz = 1.2.

To calculate the performance in different operating points refer to the Frascold Selection Software.

All published data is subject to change.

■ This field requires additional cooling or limitation of the suction temperature.

Semi-hermetic reciprocating compressors

Performance R407F [50 Hz]

Compressor	Motor version	Cond. Temp. [°C]	Qo [W] = Cooling capacity Pe [kW] = Power consumption ①	Evaporating temperature [°C]								
				0	-5	-10	-15	-20	-25	-30	-35	-40
V15-71Y	2	30	Qo	69338	56168	45040	35722	27981	21585	16301	11895	8137
			Pe	13,793	13,018	12,11	11,099	10,018	8,897	7,766	6,658	5,603
		40	Qo	60834	48960	38989	30690	23828	18173	13490	9547	6113
			Pe	16,303	15,057	13,725	12,336	10,923	9,516	8,146	6,844	5,642
		50	Qo	52345	41824	33067	25843	19918	15060	11036	7613	
			Pe	18,517	16,843	15,129	13,405	11,703	10,053	8,487	7,035	
V20-84Y	2	30	Qo	83519	67748	54460	43355	34133	26495	20143	14777	10097
			Pe	16,824	15,837	14,739	13,548	12,285	10,968	9,617	8,253	6,894
		40	Qo	73505	59290	47385	37489	29306	22534	16875	12029	7698
			Pe	20,074	18,499	16,871	15,208	13,53	11,856	10,206	8,6	7,057
		50	Qo	63514	50908	40439	31808	24716	18863	13951	9680	
			Pe	23,036	20,916	18,799	16,706	14,655	12,666	10,759	8,952	
V25-93Y	2	30	Qo	90015	72682	58129	46008	35972	27673	20763	14894	9718
			Pe	17,716	16,721	15,522	14,17	12,72	11,226	9,74	8,316	7,008
		40	Qo	78669	63058	50038	39263	30385	23056	16927	11651	6881
			Pe	20,774	19,213	17,494	15,669	13,793	11,919	10,1	8,39	6,842
		50	Qo	67426	53582	42143	32759	25084	18770	13469	8834	
			Pe	23,371	21,293	19,103	16,854	14,601	12,396	10,293	8,346	
V25-103Y	2	30	Qo	100541	81686	65778	52456	41358	32123	24389	17795	11979
			Pe	19,973	18,908	17,639	16,216	14,689	13,107	11,52	9,978	8,529
		40	Qo	89017	71846	57454	45478	35557	27329	20434	14508	9192
			Pe	23,81	22,068	20,185	18,211	16,195	14,186	12,235	10,391	8,702
		50	Qo	-	61948	49149	38597	29931	22789	16810	11632	
			Pe	-	24,858	22,414	19,94	17,487	15,104	12,84	10,745	
Z25-106Y	2	30	Qo	103691	84092	67567	53740	42233	32670	24675	17870	11879
			Pe	20,72	19,493	18,141	16,678	15,119	13,479	11,774	10,017	8,224
		40	Qo	91507	73683	58754	46343	36075	27572	20458	14356	8890
			Pe	24,683	22,727	20,714	18,658	16,575	14,48	12,386	10,311	8,267
		50	Qo	79204	63231	49976	39061	30110	22746	16592	11271	
			Pe	28,167	25,533	22,91	20,313	17,757	15,256	12,827	10,483	
Z30-126Y	2	30	Qo	120978	99206	80465	64454	50873	39422	29799	21705	14840
			Pe	24,679	23,546	22,016	20,196	18,189	16,1	14,034	12,096	10,391
		40	Qo	106169	86634	69888	55629	43556	33370	24770	17454	11124
			Pe	29,394	27,423	25,13	22,619	19,996	17,364	14,829	12,496	10,468
		50	Qo	-	73957	59274	46834	36338	27485	19975	13507	
			Pe	-	30,754	27,771	24,644	21,477	18,376	15,445	12,789	
Z40-154Y	2	30	Qo	149627	122889	99856	80159	63430	49300	37400	27362	18818
			Pe	30,32	29,026	27,252	25,125	22,767	20,307	17,868	15,576	13,557
		40	Qo	131640	107564	86917	69329	54432	41857	31236	22199	14379
			Pe	35,892	33,645	31,001	28,087	25,027	21,947	18,973	16,23	13,843
		50	Qo	113255	91974	73845	58498	45565	34677	25466	17563	
			Pe	40,713	37,612	34,198	30,597	26,934	23,335	19,925	16,83	

① Suction gas temperature 20°C without liquid sub-cooling.

The performance refers to European standard EN12900 and with operation at 50Hz; conversion factor at 60Hz = 1.2.

To calculate the performance in different operating points refer to the Frascold Selection Software.

All published data is subject to change.

■ This field requires additional cooling or limitation of the suction temperature.

Semi-hermetic reciprocating compressors

Performance R407A [50 Hz]

Compressor	Motor version	Cond. Temp. [°C]	Qo [W] = Cooling capacity Pe [kW] = Power consumption ①	Evaporating temperature [°C]								
				0	-5	-10	-15	-20	-25	-30	-35	-40
A05-5Y	2	30	Qo	4294	3506	2820	2228	1721	1292	934	639	399
			Pe	0,954	0,911	0,851	0,778	0,695	0,607	0,516	0,426	0,34
		40	Qo	3706	3005	2396	1872	1425	1048	732	471	256
			Pe	1,109	1,032	0,941	0,84	0,731	0,62	0,508	0,4	0,3
		50	Qo	3113	2499	1969	1515	1130	805	534	308	
			Pe	1,222	1,114	0,995	0,867	0,736	0,604	0,474	0,351	
A07-6Y	2	30	Qo	4845	3980	3221	2563	1997	1517	1116	786	521
			Pe	1,064	1,02	0,959	0,884	0,798	0,706	0,61	0,515	0,424
		40	Qo	4206	3436	2763	2181	1682	1260	906	615	379
			Pe	1,25	1,17	1,075	0,969	0,856	0,739	0,621	0,506	0,398
		50	Qo	3560	2887	2302	1798	1367	1003	699	447	
			Pe	1,398	1,284	1,158	1,024	0,885	0,745	0,608	0,476	
A1-7Y	2	30	Qo	6169	5088	4134	3300	2581	1970	1460	1046	721
			Pe	1,343	1,288	1,211	1,117	1,01	0,894	0,774	0,655	0,54
		40	Qo	5386	4417	3566	2825	2187	1648	1201	838	554
			Pe	1,592	1,491	1,372	1,239	1,096	0,949	0,801	0,657	0,521
		50	Qo	4603	3748	2999	2351	1797	1330	944	634	
			Pe	1,796	1,653	1,494	1,326	1,151	0,975	0,802	0,637	
A1.5-8Y	1	30	Qo	6904	5693	4627	3699	2900	2221	1655	1191	824
			Pe	1,479	1,42	1,339	1,239	1,125	1,002	0,875	0,747	0,623
		40	Qo	6025	4948	4003	3182	2476	1877	1377	968	640
			Pe	1,759	1,649	1,52	1,377	1,225	1,068	0,911	0,758	0,614
		50	Qo	5137	4196	3373	2661	2051	1535	1104	750	
			Pe	1,996	1,836	1,663	1,48	1,292	1,104	0,921	0,746	
B1.5-9.1Y	2	30	Qo	8070	6613	5358	4285	3376	2610	1968	1429	976
			Pe	1,727	1,661	1,564	1,443	1,304	1,155	1,001	0,85	0,709
		40	Qo	7045	5742	4626	3677	2877	2204	1640	1165	759
			Pe	2,073	1,939	1,78	1,605	1,419	1,229	1,042	0,865	0,704
		50	Qo	6029	4880	3904	3079	2387	1808	1322	910	
			Pe	2,369	2,17	1,955	1,729	1,5	1,274	1,058	0,859	
B1.5-10.1Y	2	30	Qo	8857	7320	5962	4772	3745	2871	2142	1551	1089
			Pe	1,932	1,845	1,73	1,592	1,438	1,275	1,108	0,943	0,787
		40	Qo	7752	6375	5162	4104	3194	2422	1782	1265	863
			Pe	2,329	2,168	1,986	1,787	1,58	1,369	1,161	0,963	0,78
		50	Qo	6647	5431	4365	3439	2647	1980	1429	988	
			Pe	2,673	2,441	2,194	1,939	1,681	1,426	1,181	0,953	
D2-11.1Y	1	30	Qo	9971	8137	6558	5211	4069	3111	2310	1642	1084
			Pe	2,105	2,008	1,875	1,714	1,533	1,34	1,142	0,949	0,767
		40	Qo	8682	7029	5615	4416	3407	2564	1863	1279	787
			Pe	2,5	2,32	2,112	1,883	1,642	1,396	1,154	0,924	0,713
		50	Qo	7405	5933	4685	3635	2759	2032	1431	930	
			Pe	2,82	2,562	2,283	1,992	1,696	1,403	1,121	0,859	
D2-13.1Y	2	30	Qo	11667	9606	7788	6202	4834	3674	2710	1930	1322
			Pe	2,518	2,406	2,251	2,063	1,851	1,623	1,389	1,158	0,939
		40	Qo	10146	8303	6684	5276	4068	3048	2205	1527	1001
			Pe	2,993	2,789	2,55	2,285	2,004	1,715	1,427	1,151	0,894
		50	Qo	8631	7007	5587	4359	3312	2435	1714	1139	
			Pe	3,374	3,085	2,768	2,433	2,089	1,746	1,412	1,096	
D2-15.1Y	2	30	Qo	13505	11158	9077	7251	5669	4320	3193	2277	1562
			Pe	2,962	2,828	2,643	2,419	2,165	1,894	1,617	1,345	1,089
		40	Qo	11785	9673	7807	6177	4772	3581	2593	1797	1182
			Pe	3,509	3,273	2,994	2,683	2,351	2,009	1,67	1,343	1,04
		50	Qo	10072	8196	6547	5115	3888	2857	2009	1335	
			Pe	3,931	3,604	3,24	2,853	2,452	2,05	1,657	1,285	
D3-16.1Y	2	30	Qo	14568	12024	9776	7812	6118	4680	3484	2517	1765
			Pe	3,126	2,996	2,812	2,587	2,332	2,059	1,779	1,504	1,245
		40	Qo	12715	10438	8435	6691	5194	3929	2883	2041	1392
			Pe	3,73	3,488	3,202	2,885	2,547	2,201	1,858	1,53	1,227
		50	Qo	10866	8859	7102	5582	4283	3194	2299	1586	
			Pe	4,227	3,882	3,503	3,102	2,691	2,281	1,883	1,51	
D3-18.1Y	2	30	Qo	15699	13005	10612	8509	6685	5128	3826	2769	1944
			Pe	3,428	3,282	3,077	2,825	2,541	2,238	1,928	1,626	1,344
		40	Qo	13752	11325	9177	7299	5677	4301	3158	2239	1531
			Pe	4,074	3,814	3,503	3,156	2,784	2,403	2,025	1,662	1,33
		50	Qo	11812	9654	7754	6102	4685	3492	2512	1733	
			Pe	4,586	4,224	3,82	3,389	2,943	2,496	2,06	1,65	
D3-19.1Y	2	30	Qo	16542	13718	11207	8997	7077	5436	4063	2947	2075
			Pe	3,656	3,496	3,273	3	2,693	2,367	2,035	1,713	1,415
		40	Qo	14503	11954	9695	7717	6008	4555	3349	2378	1631
			Pe	4,328	4,054	3,724	3,354	2,958	2,549	2,144	1,757	1,402
		50	Qo	12480	10207	8204	6459	4961	3699	2661	1837	
			Pe	4,842	4,469	4,05	3,598	3,127	2,653	2,19	1,753	

① Suction gas temperature 20°C without liquid sub-cooling.

The performance refers to European standard EN12900 and with operation at 50Hz; conversion factor at 60Hz = 1.2.

To calculate the performance in different operating points refer to the Frascold Selection Software.

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■ This field requires additional cooling or limitation of the suction temperature.

Semi-hermetic reciprocating compressors

Performance R407A [50 Hz]

Compressor	Motor version	Cond. Temp. [°C]	Qo [W] = Cooling capacity Pe [kW] = Power consumption ①	Evaporating temperature [°C]									
				0	-5	-10	-15	-20	-25	-30	-35	-40	
Q4-20.1Y	2	30	Qo	17446	14306	11544	9143	7084	5348	3917	2772	1894	
			Pe	3,692	3,528	3,296	3,01	2,687	2,343	1,992	1,65	1,334	
		40	Qo	15094	12298	9849	7730	5921	4403	3159	2169	1416	
	Q4-21.1Y	2	30	Qo	18624	15310	12388	9841	7650	5795	4257	3019	2060
				Pe	3,977	3,796	3,543	3,235	2,888	2,517	2,137	1,765	1,417
			40	Qo	16141	13181	10583	8328	6397	4772	3434	2363	1542
Q4-24.1Y		2	30	Qo	21421	17515	14160	11301	8885	6856	5161	3744	2552
				Pe	4,577	4,376	4,083	3,721	3,313	2,882	2,452	2,044	1,682
			40	Qo	18540	15047	12068	9548	7432	5667	4198	2970	1929
	Q5-25.1Y	2	30	Qo	21809	17797	14352	11418	8943	6871	5148	3719	2531
				Pe	4,559	4,368	4,095	3,758	3,376	2,967	2,547	2,135	1,75
			40	Qo	19025	15408	12324	9716	7532	5716	4214	2972	1935
Q5-28.1Y		2	30	Qo	24794	20400	16536	13172	10281	7833	5800	4152	2862
				Pe	5,198	5,005	4,707	4,327	3,888	3,412	2,922	2,442	1,994
			40	Qo	21554	17616	14170	11185	8634	6488	4718	3294	2189
	Q5-33.1Y	2	30	Qo	29141	24048	19552	15626	12242	9371	6987	5062	3568
				Pe	6,01	5,832	5,511	5,078	4,569	4,015	3,451	2,91	2,425
			40	Qo	25420	20870	16868	13388	10401	7881	5798	4126	2836
S5-33Y		2	30	Qo	29339	23652	18862	14861	11539	8788	6499	4562	2868
				Pe	5,902	5,553	5,141	4,678	4,176	3,649	3,109	2,569	2,042
			40	Qo	25518	20356	16046	12479	9546	7139	5147	3463	1977
	Q7-36.1Y	1	30	Qo	32129	26241	21204	16930	13331	10317	7800	5691	3901
				Pe	6,613	6,365	6,001	5,543	5,016	4,444	3,849	3,257	2,69
			40	Qo	28048	22782	18305	14527	11361	8717	6507	4642	3033
S8-42Y		2	30	Qo	37619	30482	24448	19387	15168	11660	8733	6255	4096
				Pe	7,604	7,193	6,694	6,124	5,501	4,843	4,168	3,494	2,84
			40	Qo	32970	26467	21015	16484	12743	9660	7106	4949	3058
	S10-52Y	2	30	Qo	46247	37312	29767	23449	18195	13843	10229	7190	4564
				Pe	9,189	8,666	8,033	7,311	6,524	5,697	4,851	4,011	3,199
			40	Qo	40139	32070	25310	19698	15069	11262	8113	5460	3139
S15-56Y		2	30	Qo	51060	41271	33030	26146	20428	15686	11727	8363	5400
				Pe	10,219	9,665	8,989	8,215	7,369	6,476	5,559	4,645	3,758
			40	Qo	44641	35742	28314	22166	17106	12944	9490	6551	3938
	V15-59Y	2	30	Qo	52718	42689	34224	27122	21181	16199	11974	8305	4989
				Pe	10,718	10,045	9,288	8,463	7,588	6,68	5,755	4,831	3,925
			40	Qo	46111	36959	29305	22947	17682	13310	9627	6433	3526

① Suction gas temperature 20°C without liquid sub-cooling.

The performance refers to European standard EN12900 and with operation at 50Hz; conversion factor at 60Hz = 1.2.

To calculate the performance in different operating points refer to the Frascold Selection Software.

All published data is subject to change.

■ This field requires additional cooling or limitation of the suction temperature.

Semi-hermetic reciprocating compressors

Performance R407A [50 Hz]

Compressor	Motor version	Cond. Temp. [°C]	Qo [W] = Cooling capacity Pe [kW] = Power consumption ①	Evaporating temperature [°C]								
				0	-5	-10	-15	-20	-25	-30	-35	-40
V15-71Y	2	30	Qo	64324	52213	41983	33391	26196	20156	15028	10571	6542
			Pe	13,223	12,408	11,488	10,485	9,424	8,327	7,218	6,119	5,055
		40	Qo	56463	45409	36154	28456	22073	16764	12286	8398	4857
			Pe	15,499	14,26	12,95	11,593	10,212	8,829	7,47	6,156	4,91
		50	Qo	48770	38789	30527	23740	18188	13627	9817	6515	
			Pe	17,489	15,852	14,178	12,492	10,816	9,175	7,59	6,086	
V20-84Y	2	30	Qo	77523	63117	50940	40706	32127	24918	18791	13459	8636
			Pe	16,257	15,284	14,181	12,98	11,714	10,413	9,111	7,837	6,625
		40	Qo	68364	55206	44183	35005	27387	21042	15682	11021	6772
			Pe	19,266	17,762	16,176	14,54	12,885	11,243	9,646	8,127	6,715
		50	Qo	59402	47514	37663	29562	22923	17461	12889	8918	
			Pe	22,008	20,004	17,966	15,925	13,912	11,96	10,1	8,365	
V25-93Y	2	30	Qo	83775	67876	54440	43153	33699	25766	19039	13203	7944
			Pe	17,011	15,946	14,741	13,425	12,026	10,572	9,093	7,615	6,169
		40	Qo	73250	58755	46614	36513	28139	21176	15311	10229	5616
			Pe	19,794	18,189	16,485	14,71	12,895	11,066	9,252	7,482	5,785
		50	Qo	62943	49875	39053	30163	22891	16922	11943	7639	
			Pe	22,149	20,035	17,865	15,666	13,466	11,295	9,18	7,151	
V25-103Y	2	30	Qo	92862	75511	60841	48508	38170	29482	22103	15689	9898
			Pe	19,18	18,057	16,762	15,336	13,823	12,265	10,706	9,188	7,754
		40	Qo	81678	65844	52573	41522	32349	24709	18261	12661	7565
			Pe	22,61	20,875	19,017	17,08	15,106	13,139	11,22	9,394	7,702
		50	Qo	70731	56437	44590	34846	26861	20294	14800	10037	
			Pe	25,671	23,352	20,961	18,541	16,135	13,787	11,538	9,432	
Z25-106Y	2	30	Qo	96462	78330	63001	50116	39318	30249	22551	15866	9836
			Pe	19,887	18,608	17,229	15,762	14,215	12,598	10,92	9,191	7,421
		40	Qo	84652	68112	54251	42711	33135	25165	18443	12610	7310
			Pe	23,427	21,487	19,504	17,488	15,447	13,391	11,33	9,273	7,23
		50	Qo	73090	58166	45799	35630	27302	20456	14735	9780	
			Pe	26,553	23,98	21,419	18,88	16,372	13,905	11,488	9,131	
Z30-126Y	2	30	Qo	112190	92124	74797	59922	47211	36376	27130	19185	12253
			Pe	23,665	22,452	20,889	19,07	17,087	15,032	12,999	11,081	9,369
		40	Qo	97936	79858	64348	51119	39881	30349	22234	15248	9105
			Pe	27,86	25,894	23,636	21,18	18,616	16,039	13,542	11,215	9,154
		50	Qo	83938	67859	54177	42603	32851	24632	17659	11644	
			Pe	31,52	28,845	25,937	22,886	19,787	16,731	13,812	11,122	
Z40-154Y	2	30	Qo	138311	113672	92396	74128	58516	45205	33842	24072	15542
			Pe	29,136	27,744	25,926	23,793	21,455	19,024	16,612	14,329	12,288
		40	Qo	120932	98731	79682	63431	49625	37909	27930	19334	11767
			Pe	34,134	31,883	29,269	26,404	23,397	20,362	17,408	14,647	12,191
		50	Qo	103867	84116	67307	53084	41096	30987	22404	14993	
			Pe	38,509	35,459	32,109	28,571	24,956	21,374	17,938	14,759	

① Suction gas temperature 20°C without liquid sub-cooling.

The performance refers to European standard EN12900 and with operation at 50Hz; conversion factor at 60Hz = 1.2.

To calculate the performance in different operating points refer to the Frascold Selection Software.

All published data is subject to change.

■ This field requires additional cooling or limitation of the suction temperature.

Semi-hermetic reciprocating compressors

Performance R22 [50 Hz]

Compressor	Motor version	Cond. Temp. [°C]	Qo [W] = Cooling capacity Pe [kW] = Power consumption ①	Evaporating temperature [°C]											
				10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	
				W40-168Y	2	30	Qo				119638	98195	80111	64948	52271
Pe							29,28	28,03	26,19	23,96	21,49	18,98	16,60	14,53	
40	Qo						107856	88369	71977	58244	46733	37009	28635	21174	
	Pe						35,11	32,62	29,70	26,55	23,33	20,23	17,43	15,09	
50	Qo									63715	51371	40987	32126	24352	
	Pe									32,79	28,87	25,05	21,50	18,42	
W50-168Y	1	30	Qo	211998	177122	147068	121365	99540	81122	65640					
			Pe	29,01	30,59	31,01	30,44	29,09	27,12	24,74					
		40	Qo	189187	158004	131189	108270	88775	72234	58174					
			Pe	39,55	39,38	38,19	36,18	33,53	30,42	27,06					
		50	Qo			114985	94873	77733	63090	50476					
			Pe			44,64	41,43	37,75	33,76	29,67					
W50-187Y	2	30	Qo			162942	134308	109918	89324	72078	57731	45836	35944	27607	
			Pe			33,64	33,21	31,91	29,93	27,49	24,80	22,06	19,48	17,28	
		40	Qo			144994	119015	96993	78479	63027	50187	39511	30553	22863	
			Pe			41,78	39,63	36,81	33,54	30,01	26,45	23,04	20,02	17,57	
		50	Qo				103841	84204	67789	54148	42832	33395	25387		
			Pe				45,71	41,47	36,99	32,47	28,12	24,14	20,75		
W60-187Y	1	30	Qo	237251	198393	164558	135325	110276	88992	71054					
			Pe	30,02	31,96	32,41	31,64	29,90	27,45	24,53					
		40	Qo	211763	176745	146285	119965	97366	78070	61657					
			Pe	41,12	41,24	40,03	37,73	34,60	30,89	26,87					
		50	Qo	185568	154436	127400	104041	83940	66679	51838					
			Pe	51,00	49,59	46,98	43,43	39,19	34,52	29,67					
W60-206Y	2	30	Qo			185162	153035	125104	101062	80600	63410	49183	37609	28381	
			Pe			36,49	36,21	34,64	32,10	28,88	25,29	21,63	18,21	15,33	
		40	Qo			165114	135974	110708	89007	70562	55066	42209	31683	23178	
			Pe			45,60	43,64	40,58	36,72	32,35	27,80	23,36	19,33	16,02	
		50	Qo			144853	118774	96246	76959	60606	46877	35465	26060		
			Pe			54,06	50,57	46,15	41,11	35,75	30,37	25,29	20,80		
W70-206Y	1	30	Qo	261472	220332	183937	151971	124119	100065	79494					
			Pe	31,12	34,10	35,35	35,13	33,73	31,40	28,43					
		40	Qo	233794	196925	164234	135404	110121	88069	68932					
			Pe	43,26	44,44	43,96	42,08	39,09	35,24	30,81					
		50	Qo	205356	172817	143887	118251	95595	75602	57958					
			Pe	55,40	54,79	52,60	49,07	44,50	39,14	33,26					
W70-228Y	2	30	Qo			204997	169221	138114	111338	88558	69438	53641	40832	30674	
			Pe			40,34	40,02	38,26	35,41	31,82	27,82	23,75	19,97	16,80	
		40	Qo			182730	150153	121916	97681	77113	59876	45633	34049	24787	
			Pe			50,20	47,97	44,51	40,18	35,31	30,24	25,32	20,88	17,26	
		50	Qo			160632	131293	105964	84309	65992	50676	38027			
			Pe			59,70	55,68	50,63	44,92	38,88	32,84	27,16			
W75-228Y	1	30	Qo	289394	243846	203581	168239	137461	110889						
			Pe	34,53	37,84	39,25	39,06	37,56	35,04						
		40	Qo	258694	217975	181888	150076	122178	97836						
			Pe	47,95	49,21	48,66	46,60	43,32	39,10						
		50	Qo	226728	190907	159069	130856	105908	83866						
			Pe	61,52	60,71	58,19	54,24	49,15	43,24						
W75-240Y	2	30	Qo			213234	176683	144817	117316	93860	74131	57807	57807	34100	
			Pe			42,00	41,61	39,90	37,16	33,69	29,79	25,74	25,74	25,74	18,44
		40	Qo			191247	157845	128814	103834	82585	64748	50002	50002	50002	28507
			Pe			52,67	50,44	47,07	42,85	38,08	33,06	28,08	28,08	28,08	19,46
		50	Qo			169102	138922	112798	90410	71439	55566	42470			
			Pe			62,93	58,93	53,97	48,35	42,36	36,29	30,46			
W80-240Y	1	30	Qo	303321	255556	213354	176334	144113	116310						
			Pe	36,30	39,81	41,29	41,07	39,44	36,72						
		40	Qo	270934	228233	190416	157102	127908	102453						
			Pe	50,32	51,75	51,23	49,08	45,61	41,12						
		50	Qo	237571	199954	166543	136955	110809	87722						
			Pe	64,08	63,48	61,01	56,98	51,71	45,51						

① Suction gas temperature 20°C without liquid sub-cooling.

The performance refers to European standard EN12900 and with operation at 50Hz; conversion factor at 60Hz = 1.2.

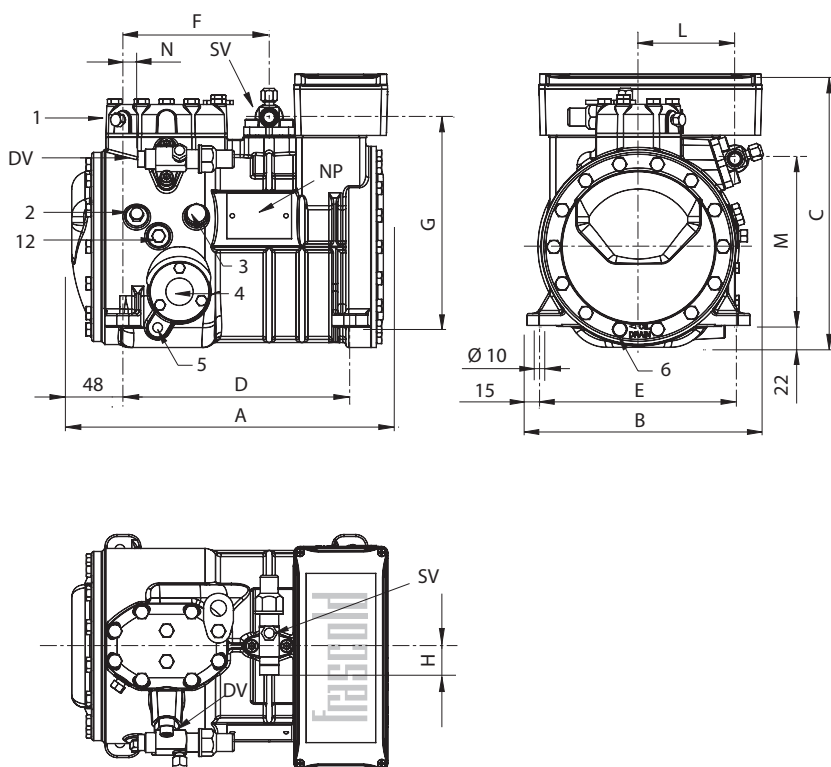
To calculate the performance in different operating points refer to the Frascold Selection Software.

All published data is subject to change.

 This field requires additional cooling or limitation of the suction temperature.

Dimensional drawing

Series **A**



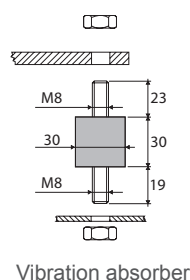
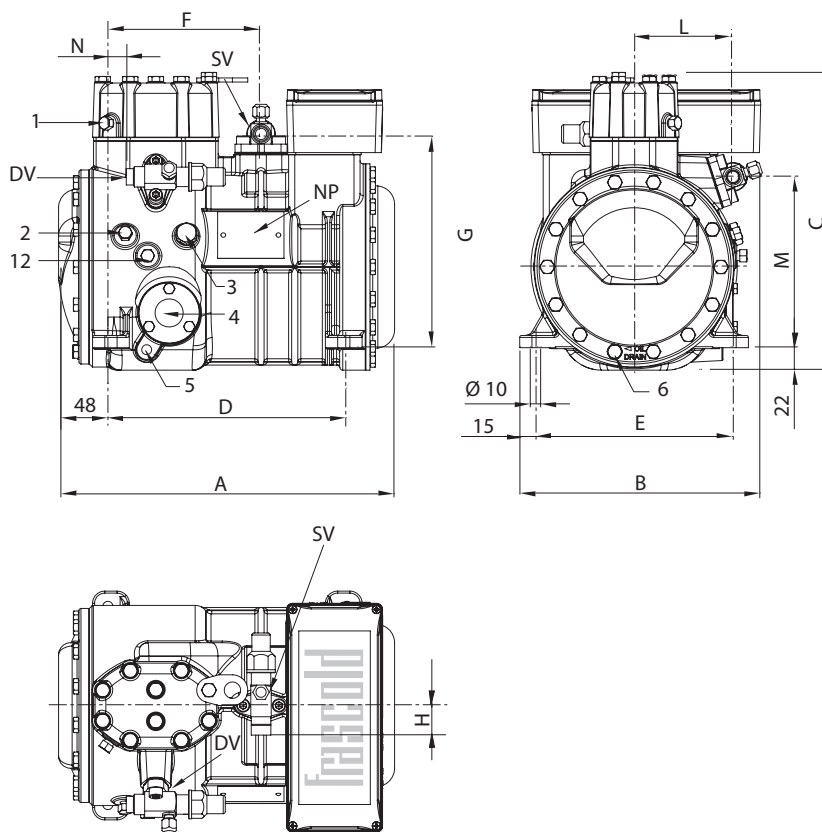
Vibration absorber

1	High pressure plug	1/8" NPT
2	Low pressure plug	1/8" NPT
3	Oil charge plug	1/4" GAS
4	Oil level sight glass	
5	Crankcase heater seat	
6	Oil drain plug	M8 x 22 ISO4017
12	Oil return plug	1/8" NPT
DV	Discharge valve	
SV	Suction valve	
NP	Nameplate	

Compressor	Valves				Valves position						Compressor				
	Suction		Discharge		Suction			Discharge			Length	Width	Height	Base mounting	
	Ø	Ø	Ø	Ø	F	G	H	L	M	N	A	B	C	D	E
A05-4Y	5/8	15,8	1/2	12,7	150	209	29	97	167	18	317	237	275	234	194
A05-5Y	5/8	15,8	1/2	12,7	150	209	29	97	167	18	317	237	275	234	194
A07-5Y	5/8	15,8	1/2	12,7	150	209	29	97	167	18	317	237	275	234	194
A07-6Y	5/8	15,8	1/2	12,7	150	209	29	97	167	18	317	237	275	234	194
A1-6Y	5/8	15,8	1/2	12,7	150	209	29	97	167	18	317	237	275	234	194
A1-7Y	5/8	15,8	1/2	12,7	150	209	29	97	167	18	317	237	275	234	194
A1.5-7Y	5/8	15,8	1/2	12,7	150	209	29	97	167	18	317	237	275	234	194
A1.5-8Y	5/8	15,8	1/2	12,7	150	209	29	97	167	18	317	237	275	234	194

Dimensional drawing

Series **B**



Vibration absorber

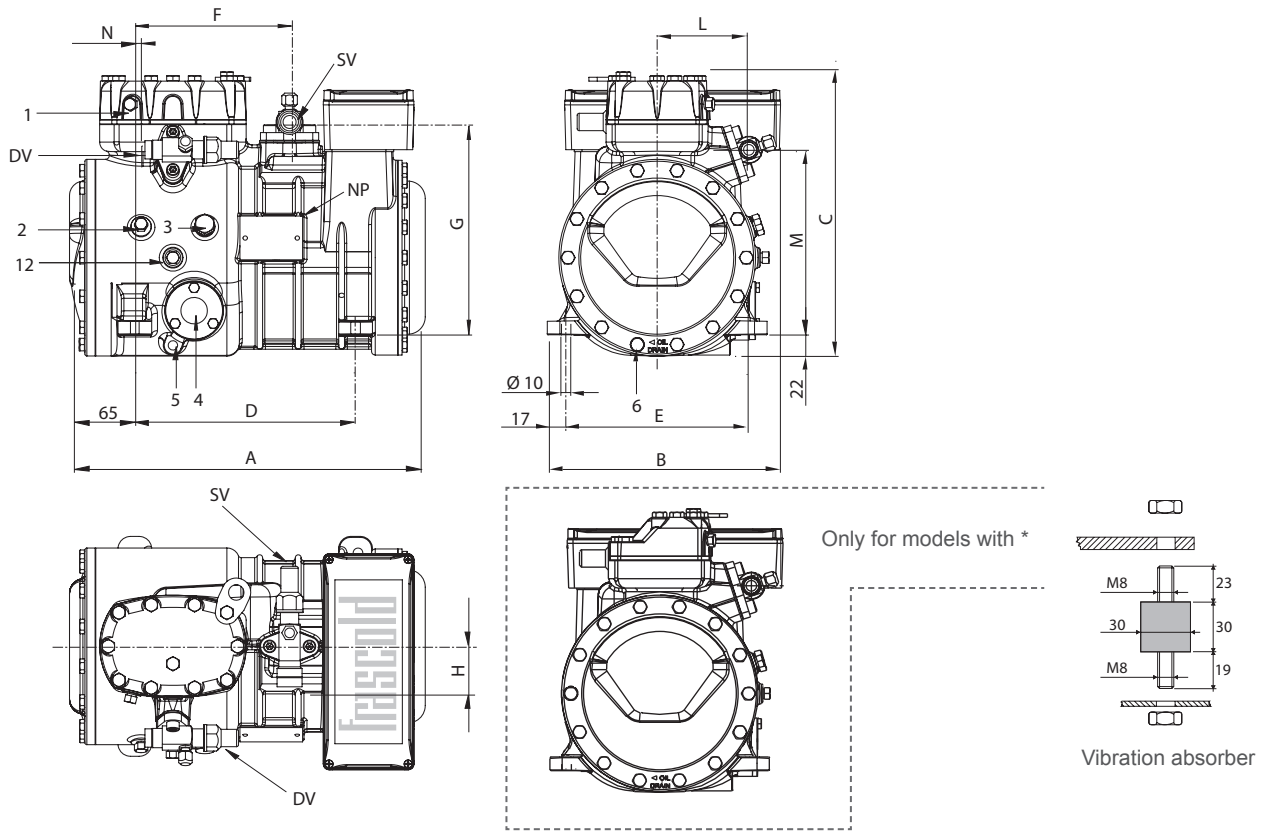
1	High pressure plug	1/8" NPT
2	Low pressure plug	1/8" NPT
3	Oil charge plug	1/4" GAS
4	Oil level sight glass	
5	Crankcase heater seat	
6	Oil drain plug	M8 x 22 ISO4017
12	Oil return plug	1/8" NPT
DV	Discharge valve	
SV	Suction valve	
NP	Nameplate	

Compressor	Valves				Valves position						Compressor				
	Suction		Discharge		Suction			Discharge			Length	Width	Height	Base mounting	
	Ø	Ø	Ø	Ø	F	G	H	L	M	N	A	B	C	D	E
B1.5-9.1Y	5/8	15,8	1/2	12,7	150	209	29	97	167	18	329	237	292	234	194
B1.5-10.1Y	5/8	15,8	1/2	12,7	150	209	29	97	167	18	329	237	292	234	194
B2-10.1Y	3/4	19,0	5/8	15,8	150	209	31	97	167	18	334	237	292	234	194

Semi-hermetic reciprocating compressors

Dimensional drawing

Series **D**

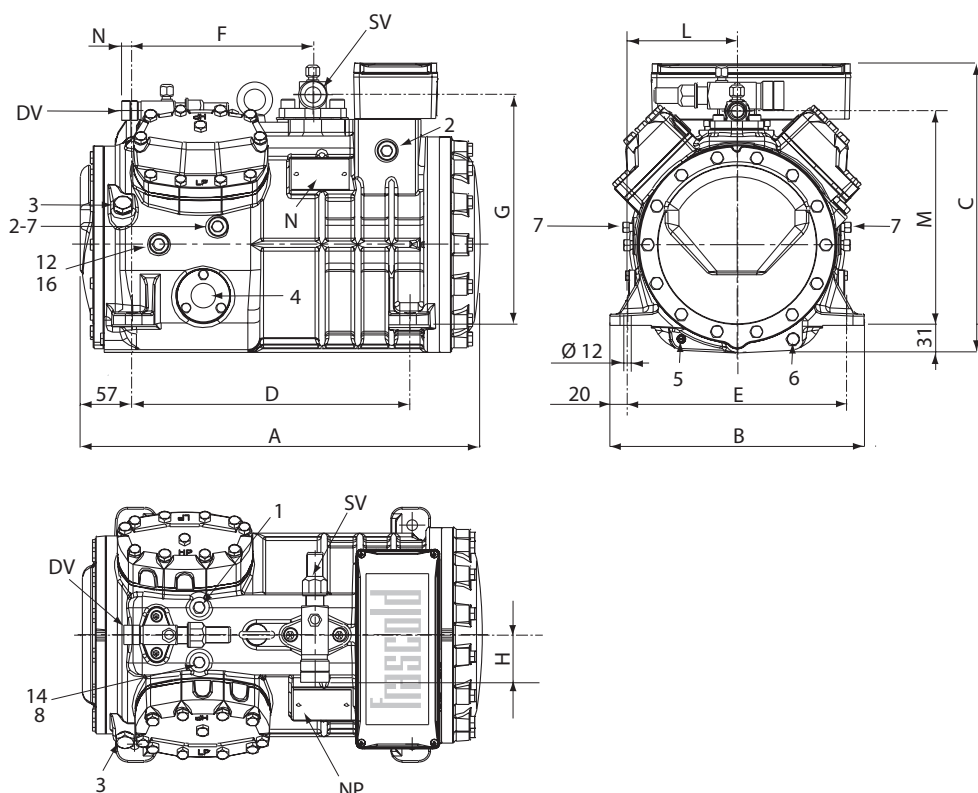


1	High pressure plug	1/8" NPT
2	Low pressure plug	1/8" NPT
3	Oil charge plug	1/4" GAS
4	Oil level sight glass	
5	Crankcase heater seat	
6	Oil drain plug	M8 x 22 ISO4017
12	Oil return plug	1/8" NPT
DV	Discharge valve	
SV	Suction valve	
NP	Nameplate	

Compressor	Valves				Valves position						Compressor				
	Suction		Discharge		Suction			Discharge			Length	Width	Height	Base mounting	
	Ø	Ø	Ø	Ø	F	G	H	L	M	N	A	B	C	D	E
D2-11.1Y*	7/8	22,2	5/8	15,8	165	221	42	94	192	13	369	242	294	234	194
D2-13.1Y*	7/8	22,2	5/8	15,8	165	221	42	94	192	13	369	242	294	234	194
D3-13.1Y	1 1/8	28,6	5/8	15,8	165	225	53	94	192	13	374	242	317	234	194
D2-15.1Y*	7/8	22,2	5/8	15,8	165	221	42	94	192	13	369	242	294	234	194
D3-15.1Y	1 1/8	28,6	5/8	15,8	165	225	53	94	192	13	374	242	317	234	194
D3-16.1Y	1 1/8	28,6	5/8	15,8	165	225	53	94	192	13	374	242	317	234	194
D4-16.1Y	1 1/8	28,6	3/4	19,0	165	225	53	94	192	5	401	242	317	234	194
D3-18.1Y	1 1/8	28,6	5/8	15,8	165	225	53	94	192	13	374	242	317	234	194
D4-18.1Y	1 1/8	28,6	3/4	19,0	165	225	53	94	192	5	401	242	317	234	194
D3-19.1Y	1 1/8	28,6	5/8	15,8	165	225	53	94	192	13	374	242	317	234	194
D4-19.1Y	1 1/8	28,6	3/4	19,0	165	225	53	94	192	5	401	242	317	234	194

Dimensional drawing

Series **Q**



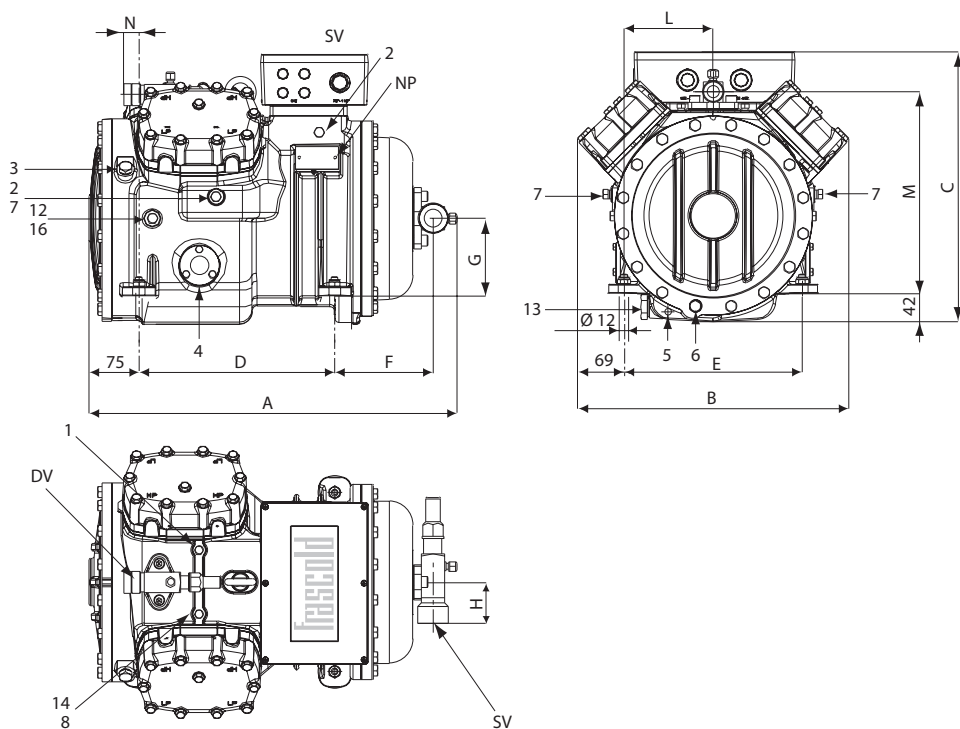
Vibration absorber

1	High pressure plug	1/8" NPT
2	Low pressure plug	1/8" NPT
3	Oil charge plug	1/4" GAS
4	Oil level sight glass	
5	Crankcase heater seat	
6	Oil drain plug	M8 x 22 ISO4017
7	Liquid injection valve plug	1/8" NPT
8	Liquid injection sensor plug	1/8" NPT
12	Oil return plug	1/8" NPT
14	Max. discharge temperature sensor	1/8" NPT
16	Crankcase pressure plug	1/8" NPT
DV	Discharge valve	
SV	Suction valve	
NP	Nameplate	

Compressor	Valves				Valves position						Compressor				
	Suction		Discharge		Suction			Discharge			Length	Width	Height	Base mounting	
	Ø	Ø	Ø	Ø	F	G	H	L	M	N	A	B	C	D	E
	mm	"	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
Q4-20.1E	1 1/8	28,6	3/4	19,0	203	258	53	123	239	12	449	286	325	312	246
Q4-20.1Y	1 1/8	28,6	3/4	19,0	203	258	53	123	239	12	449	286	325	312	246
Q4-21.1Y	1 1/8	28,6	3/4	19,0	203	258	53	123	239	12	449	286	325	312	246
Q5-21.1Y	1 1/8	28,6	3/4	19,0	203	258	53	123	239	12	449	286	325	312	246
Q4-24.1E	1 1/8	28,6	3/4	19,0	203	258	53	123	239	12	449	286	325	312	246
Q4-24.1Y	1 1/8	28,6	3/4	19,0	203	258	53	123	239	12	449	286	325	312	246
Q5-24.1Y	1 1/8	28,6	7/8	22,2	203	258	53	123	239	17	449	286	325	312	246
Q4-25.1Y	1 1/8	28,6	3/4	19,0	203	258	53	123	239	17	449	286	325	312	246
Q5-25.1Y	1 1/8	28,6	7/8	22,2	203	258	53	123	239	17	449	286	325	312	246
Q7-25.1Y	1 1/8	28,6	7/8	22,2	203	258	53	123	239	17	449	286	325	312	246
Q5-28.1E	1 3/8	35,0	7/8	22,2	203	261	58	123	239	17	449	286	328	312	246
Q7-28.1Y	1 3/8	35,0	7/8	22,2	203	261	58	123	239	17	449	286	325	312	246
Q5-28.1Y	1 3/8	35,0	1 1/8	28,6	203	261	58	123	239	28	449	286	328	312	246
Q5-33.1E	1 3/8	35,0	1 1/8	28,6	203	261	58	123	239	28	449	286	328	312	246
Q5-33.1Y	1 3/8	35,0	1 1/8	28,6	203	261	58	123	239	28	449	286	328	312	246
Q7-33.1Y	1 3/8	35,0	1 1/8	28,6	203	261	58	123	239	28	449	286	328	312	246
Q5-36.1Y	1 3/8	35,0	1 1/8	28,6	203	261	58	123	239	28	449	286	328	312	246
Q7-36.1Y	1 3/8	35,0	1 1/8	28,6	203	261	58	123	239	28	449	286	328	312	246

Dimensional drawing

Series **S**



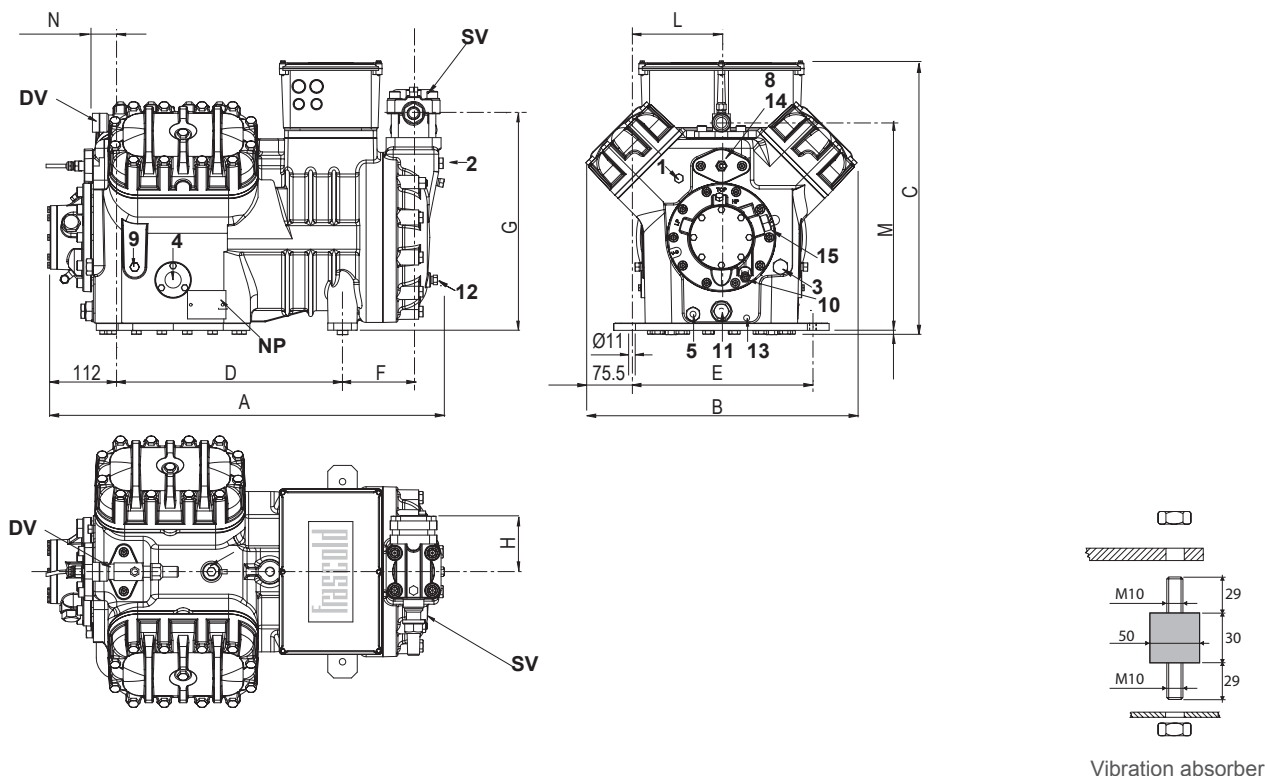
Vibration absorber

1	High pressure plug	1/8" NPT
2	Low pressure plug	1/8" NPT
3	Oil charge plug	1/4" GAS
4	Oil level sight glass	
5	Crankcase heater seat	
6	Oil drain plug	M10 x 30 ISO4017
7	Liquid injection valve plug	1/4" NPT
8	Liquid injection sensor plug	1/8" NPT
12	Oil return plug	1/4" NPT
13	Magnetic plug	1/2" GAS
14	Max. discharge temperature sensor	1/8" NPT
16	Crankcase pressure plug	1/4" NPT
DV	Discharge valve	
SV	Suction valve	
NP	Nameplate	

Compressor	Valves				Valves position						Compressor				
	Suction		Discharge		Suction			Discharge			Length	Width	Height	Base mounting	
	∅	∅	∅	∅	F	G	H	L	M	N	A	B	C	D	E
S5-33Y	1 3/8	35,0	1 1/8	28,6	147	115	58	133	298	23	550	405	405	292	266
S7-33Y	1 3/8	35,0	1 1/8	28,6	147	115	58	133	298	23	550	405	405	292	266
S8-42E	1 3/8	35,0	1 1/8	28,6	147	115	58	133	298	23	550	405	405	292	266
S8-42Y	1 3/8	35,0	1 1/8	28,6	147	115	58	133	298	23	550	405	405	292	266
S12-42Y	1 3/8	35,0	1 1/8	28,6	147	115	58	133	298	23	550	405	405	292	266
S10-52E	1 3/8	35,0	1 1/8	28,6	147	115	58	133	298	23	550	405	405	292	266
S10-52Y	1 3/8	35,0	1 1/8	28,6	147	115	58	133	298	23	550	405	405	292	266
S15-52Y	1 5/8	42,0	1 1/8	28,6	147	115	61	133	298	23	550	405	405	292	266
S12-56E	1 3/8	35,0	1 1/8	28,6	147	115	58	133	298	23	550	405	405	292	266
S15-56Y	1 5/8	42,0	1 1/8	28,6	147	115	61	133	298	23	550	405	405	292	266
S20-56Y	1 5/8	42,0	1 1/8	28,6	147	115	61	133	298	23	550	405	405	292	266

Dimensional drawing

Series **V**

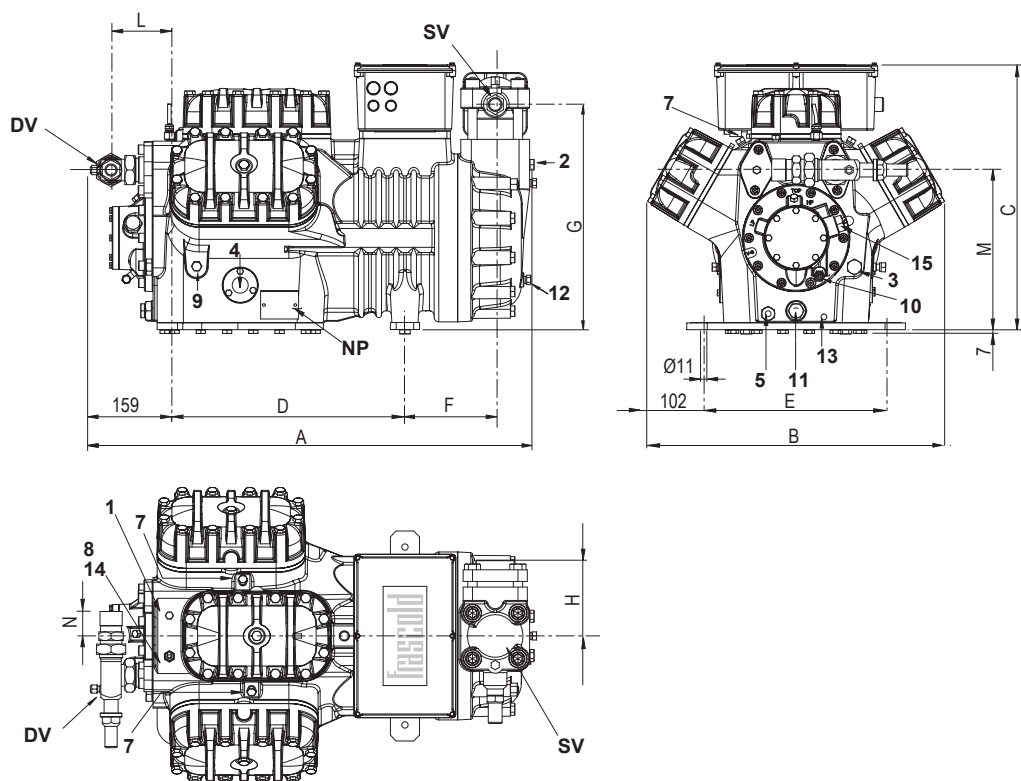


1	High pressure plug	1/8" NPT
2	Low pressure plug	1/4" NPT
3	Oil charge plug	3/8" GAS
4	Oil level sight glass	
5	Crankcase heater seat	
7	Liquid injection valve plug	1/8" NPT
8	Liquid injection sensor plug	1/8" NPT
9	Oil pressure switch connection (l.p.)	1/4" NPT
10	Oil pressure switch connection (h.p.)	1/4" SAE
11	Oil filter	
12	Oil return plug	1/8" NPT
13	Oil drain plug	3/8" GAS
14	Max. discharge temperature sensor	
15	Electronic oil pressure switch connection	3/4" UNF
DV	Discharge valve	
SV	Suction valve	
NP	Nameplate	

Compressor	Valves				Valves position						Compressor				
	Suction		Discharge		Suction			Discharge			Length	Width	Height	Base mounting	
	Ø	Ø	Ø	Ø	F	G	H	L	M	N	A	B	C	D	E
V15-59E	1 5/8	42,0	1 1/8	28,6	120	367	95	152	352	43	672	460	463	381	305
V15-59Y	1 5/8	42,0	1 1/8	28,6	120	367	95	152	352	43	672	460	463	381	305
V20-59Y	1 5/8	42,0	1 1/8	28,6	120	367	95	152	352	43	672	460	463	381	305
V15-71E	1 5/8	42,0	1 1/8	28,6	120	367	95	152	352	43	672	460	463	381	305
V15-71Y	1 5/8	42,0	1 1/8	28,6	120	367	95	152	352	43	672	460	463	381	305
V25-71Y	2 1/8	54,0	1 3/8	35,0	133	389	130	152	352	48	703	460	463	381	305
V20-84E	2 1/8	54,0	1 1/8	28,6	133	389	130	152	352	48	703	460	463	381	305
V20-84Y	1 5/8	42,0	1 1/8	28,6	120	367	95	152	352	43	672	460	463	381	305
V30-84Y	2 1/8	54,0	1 3/8	35,0	133	389	130	152	352	48	703	460	463	381	305
V25-93Y	2 1/8	54,0	1 3/8	35,0	133	389	130	152	352	48	703	460	463	381	305
V32-93Y	2 1/8	54,0	1 3/8	35,0	158	389	130	152	352	48	743	460	463	381	305
V25-103Y	2 1/8	54,0	1 3/8	35,0	133	389	130	152	352	48	703	460	463	381	305
V35-103Y	2 1/8	54,0	1 3/8	35,0	158	389	130	152	352	48	743	460	463	381	305
V25-103E	2 1/8	54,0	1 3/8	35,0	133	389	130	152	352	48	703	460	463	381	305

Dimensional drawing

Series **Z**



Vibration absorber

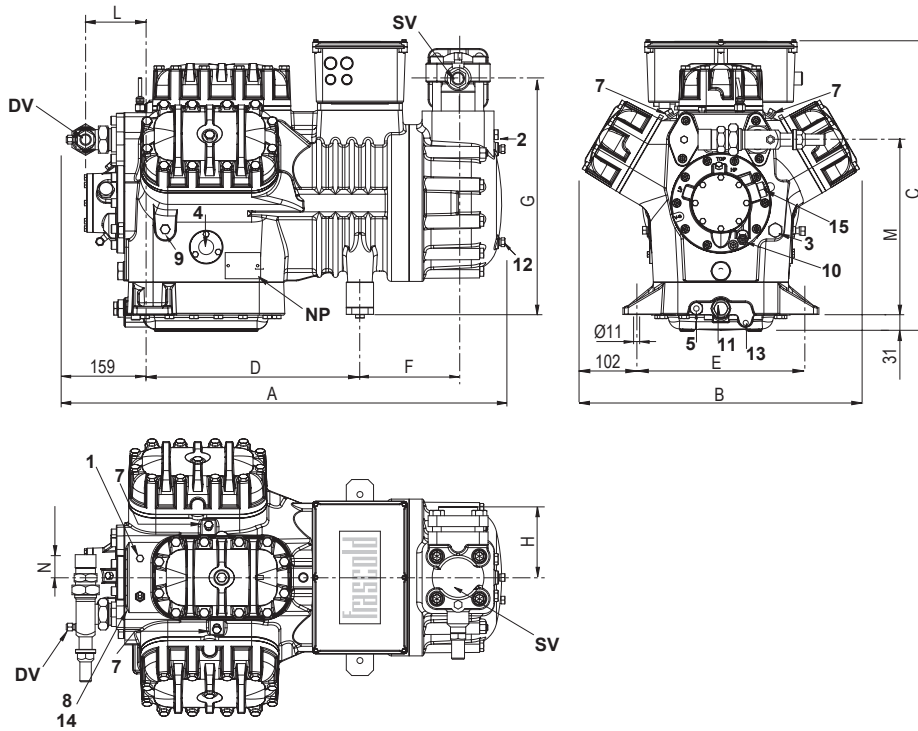
1	High pressure plug	1/8" NPT
2	Low pressure plug	1/4" NPT
3	Oil charge plug	3/8" GAS
4	Oil level sight glass	
5	Crankcase heater seat	
7	Liquid injection valve plug	1/8" NPT
8	Liquid injection sensor plug	
9	Oil pressure switch connection (l.p.)	1/4" SAE
10	Oil pressure switch connection (h.p.)	1/4" SAE
11	Oil filter	3/8" GAS
12	Oil return plug	1/4" NPT
13	Oil drain plug	3/8" GAS
14	Max. discharge temperature sensor	
15	Electronic oil pressure switch connection	
DV	Discharge valve	
SV	Suction valve	
NP	Nameplate	

Compressor	Valves				Valves position						Compressor				
	Suction		Discharge		Suction			Discharge			Length	Width	Height	Base mounting	
	Ø	Ø	Ø	Ø	F	G	H	L	M	N	A	B	C	D	E
Z25-106E	2 1/8	54,0	1 3/8	35,0	155	386	130	123	274	42	765	509	457	381	305
Z25-106Y	2 1/8	54,0	1 3/8	35,0	155	386	130	123	274	42	765	509	457	381	305
Z35-106Y	2 1/8	54,0	1 3/8	35,0	180	386	130	123	274	42	806	509	457	381	305

Semi-hermetic reciprocating compressors

Dimensional drawing

Series **Z**



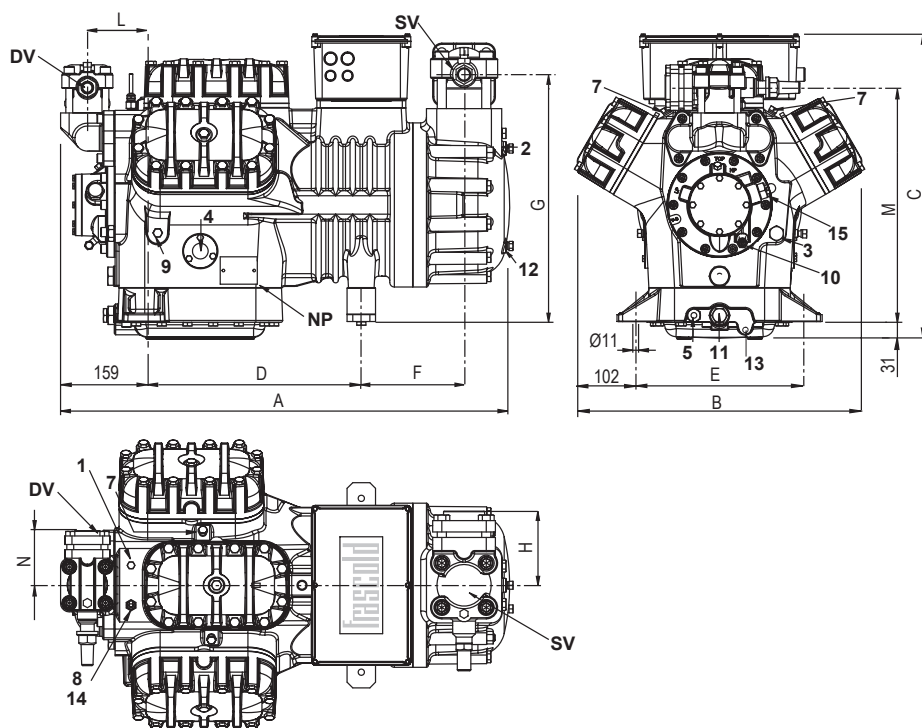
Vibration absorber

1	High pressure plug	1/8" NPT
2	Low pressure plug	1/4" NPT
3	Oil charge plug	3/8" GAS
4	Oil level sight glass	
5	Crankcase heater seat	
7	Liquid injection valve plug	1/8" NPT
8	Liquid injection sensor plug	
9	Oil pressure switch connection (l.p.)	1/4" SAE
10	Oil pressure switch connection (h.p.)	1/4" SAE
11	Oil filter	3/8" GAS
12	Oil return plug	1/4" NPT
13	Oil drain plug	3/8" GAS
14	Max. discharge temperature sensor	
15	Electronic oil pressure switch connection	
DV	Discharge valve	
SV	Suction valve	
NP	Nameplate	

Compressor	Valves				Valves position						Compressor				
	Suction		Discharge		Suction			Discharge			Length	Width	Height	Base mounting	
	Ø	Ø	Ø	Ø	F	G	H	L	M	N	A	B	C	D	E
	"	mm	"	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
Z30-126E	2 1/8	54,0	1 3/8	35,0	155	433	130	123	321	42	765	509	536	381	305
Z30-126Y	2 1/8	54,0	1 3/8	35,0	155	433	130	123	321	42	765	509	536	381	305
Z40-126Y	2 5/8	67,0	1 5/8	42,0	180	433	130	123	321	42	806	509	536	381	305

Dimensional drawing

Series **Z**



Vibration absorber

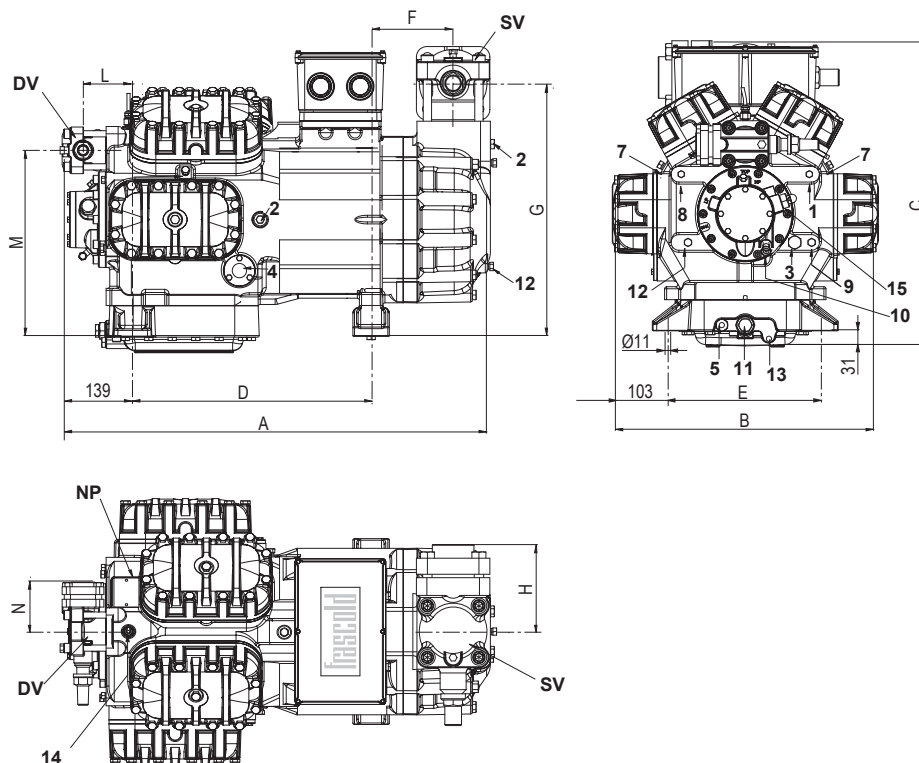
1	High pressure plug	1/8" NPT
2	Low pressure plug	1/4" NPT
3	Oil charge plug	3/8" GAS
4	Oil level sight glass	
5	Crankcase heater seat	
7	Liquid injection valve plug	1/8" NPT
8	Liquid injection sensor plug	
9	Oil pressure switch connection (l.p.)	1/4" SAE
10	Oil pressure switch connection (h.p.)	1/4" SAE
11	Oil filter	3/8" GAS
12	Oil return plug	1/4" NPT
13	Oil drain plug	3/8" GAS
14	Max. discharge temperature sensor	
15	Electronic oil pressure switch connection	
DV	Discharge valve	
SV	Suction valve	
NP	Nameplate	

Compressor	Valves				Valves position						Compressor				
	Suction		Discharge		Suction			Discharge			Length	Width	Height	Base mounting	
	∅	∅	∅	∅	F	G	H	L	M	N	A	B	C	D	E
	"	mm	"	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
Z40-154E	2 5/8	67,0	1 5/8	42,0	180	433	130	100	411	95	794	509	536	381	305
Z40-154Y	2 5/8	67,0	1 5/8	42,0	180	433	130	100	411	95	794	509	536	381	305
Z50-154Y	2 5/8	67,0	1 5/8	42,0	180	433	130	100	411	95	794	509	536	381	305

Semi-hermetic reciprocating compressors

Dimensional drawing

Series **W**



Vibration absorber

1	High pressure plug	1/8" NPT
2	Low pressure plug	1/4" NPT
3	Oil charge plug	3/8" GAS
4	Oil level sight glass	
5	Crankcase heater seat	
7	Liquid injection valve plug	1/8" NPT
8	Liquid injection sensor plug	
9	Oil pressure switch connection (l.p.)	1/4" SAE
10	Oil pressure switch connection (h.p.)	1/4" SAE
11	Oil filter	3/8" GAS
12	Oil return plug	1/4" NPT
13	Oil drain plug	3/8" GAS
14	Max. discharge temperature sensor	
15	Electronic oil pressure switch connection	
DV	Discharge valve	
SV	Suction valve	
NP	Nameplate	

Compressor	Valves				Valves position						Compressor				
	Suction		Discharge		Suction			Discharge			Length	Width	Height	Base mounting	
	Ø	Ø	Ø	Ø	F	G	H	L	M	N	A	B	C	D	E
W40-142Y	2 5/8	67,0	1 5/8	42,0	158	486	160	95	358	95	838	511	588	458	305
W40-168Y	2 5/8	67,0	1 5/8	42,0	158	486	160	95	358	95	838	511	588	458	305
W50-168Y	3 1/8	79,4	1 5/8	42,0	158	486	160	95	358	95	838	511	588	458	305
W50-187Y	3 1/8	79,4	1 5/8	42,0	158	486	160	95	358	95	838	511	588	458	305
W60-187Y	3 1/8	79,4	1 5/8	42,0	158	486	160	95	358	95	838	511	588	458	305
W60-206Y	3 1/8	79,4	2 1/8	54,0	158	486	160	95	358	95	838	511	588	458	305
W70-206Y	3 1/8	79,4	2 1/8	54,0	190	486	160	95	358	162	864	511	588	458	305
W70-228Y	3 1/8	79,4	2 1/8	54,0	190	486	160	95	358	162	864	519	588	458	305
W75-228Y	3 1/8	79,4	2 1/8	54,0	190	486	160	95	358	162	864	519	588	458	305
W75-240Y	3 1/8	79,4	2 1/8	54,0	190	486	160	95	358	162	864	519	588	458	305
W80-240Y	3 1/8	79,4	2 1/8	54,0	190	486	160	95	358	162	864	519	588	458	305

ATEX Compressors

Within the European Union, mechanical and electrical equipment used in explosive atmospheres must comply with ATEX requirements. Frascold was among the first compressor manufacturers to offer a comprehensive range of ATEX-certified compressors. All ATEX compressors produced by Frascold are approved also for use with hydrocarbons R290 and R1270. Please contact Frascold when interested to run the compressor with other hydrocarbons.

Construction concepts

ATEX compressors are designed in accordance with safety requirements set forth for use in hazardous areas due to presence of flammable gases in Category 3 and Zone 2, according to the ATEX directive 94/9/EC and use mechanical and electrical components complying with this directive (with the exception of the electronic protection device INT69, INT69 Diagnose, INT69TML Diagnose).

ATEX Certification



- Temperature class T3
- For use with group IIB gases (propane, propylene, isobutane, etc.)
- Protection method c (non-electrical equipment EN-13463-5)
- European protection against explosions (directive 94/9/EC)
- For use in explosive atmosphere caused by gas
- Category 3 (zone 2)
- Machine group 2
- ATEX marking according to 94/9/CE directive

ATEX solenoid coil

ATEX oil heater



ATEX Electronic differential pressure switch

ATEX Safety device to control discharge temperature



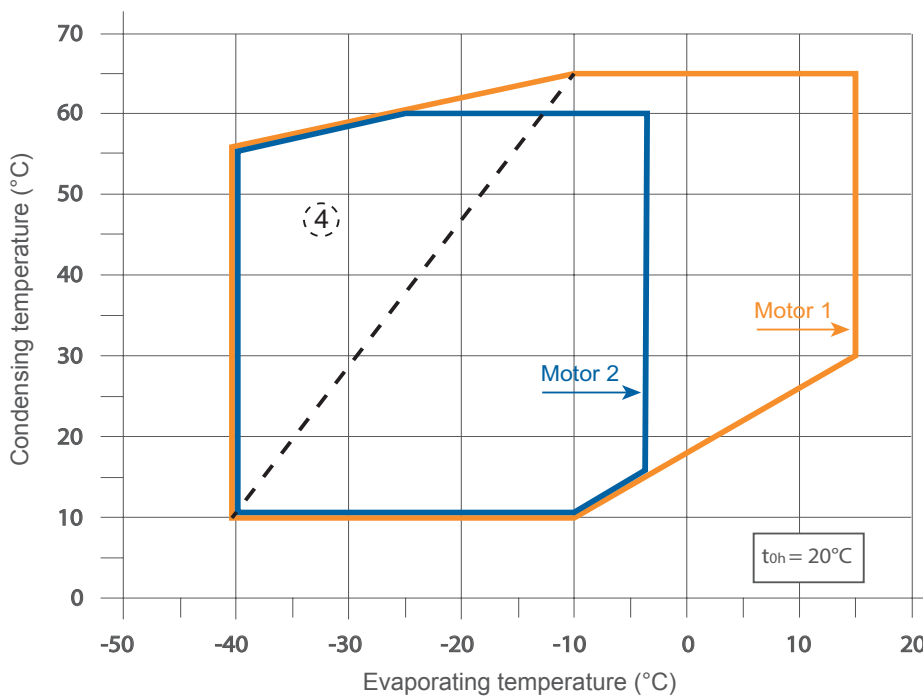
Compressor protection device (INT69 - INT69 Diagnose - INT69TML Diagnose) supplied separately unassembled for remote installation (outside the EX area).

Operating limits

The compressors can operate within the range of the application diagrams; pay attention to the different areas. For the operating limits of each compressor refer to the Frascold Selection Software program (see page 74).

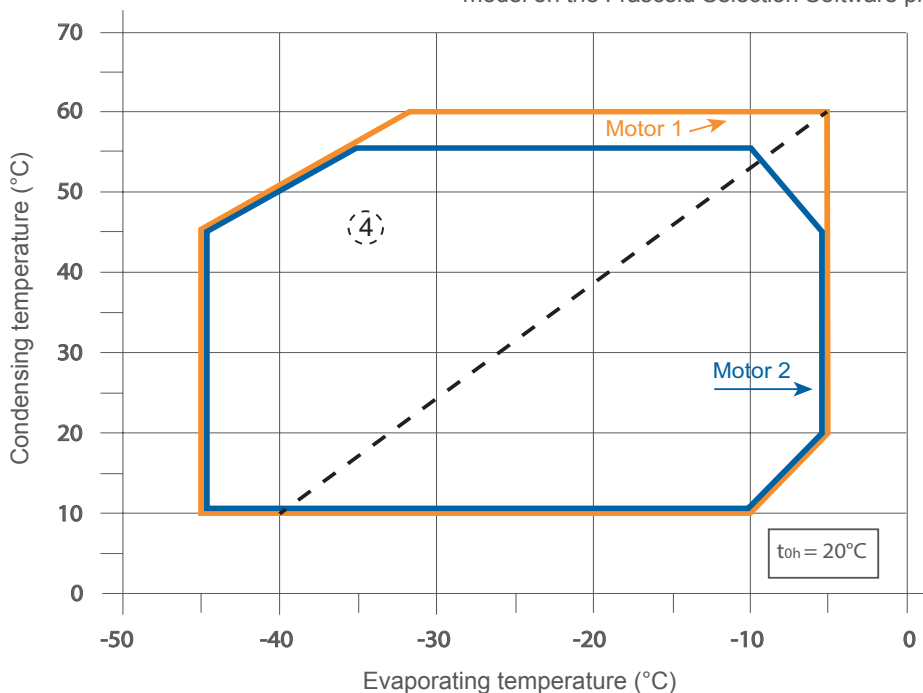
R290

Standard application diagram
 Motor size 1 - 2
 Check the diagram of every single compressor model on the Frascold Selection Software program



R1270

Standard application diagram
 Motor size 1 - 2
 Check the diagram of every single compressor model on the Frascold Selection Software program



Compressor at 100% capacity

t_{0h}

Suction gas temperature = 20°C
 Additional cooling or superheat reduction, check on the Frascold Selection Software program

Semi-hermetic reciprocating TWIN compressors

Compressors in TWIN configuration

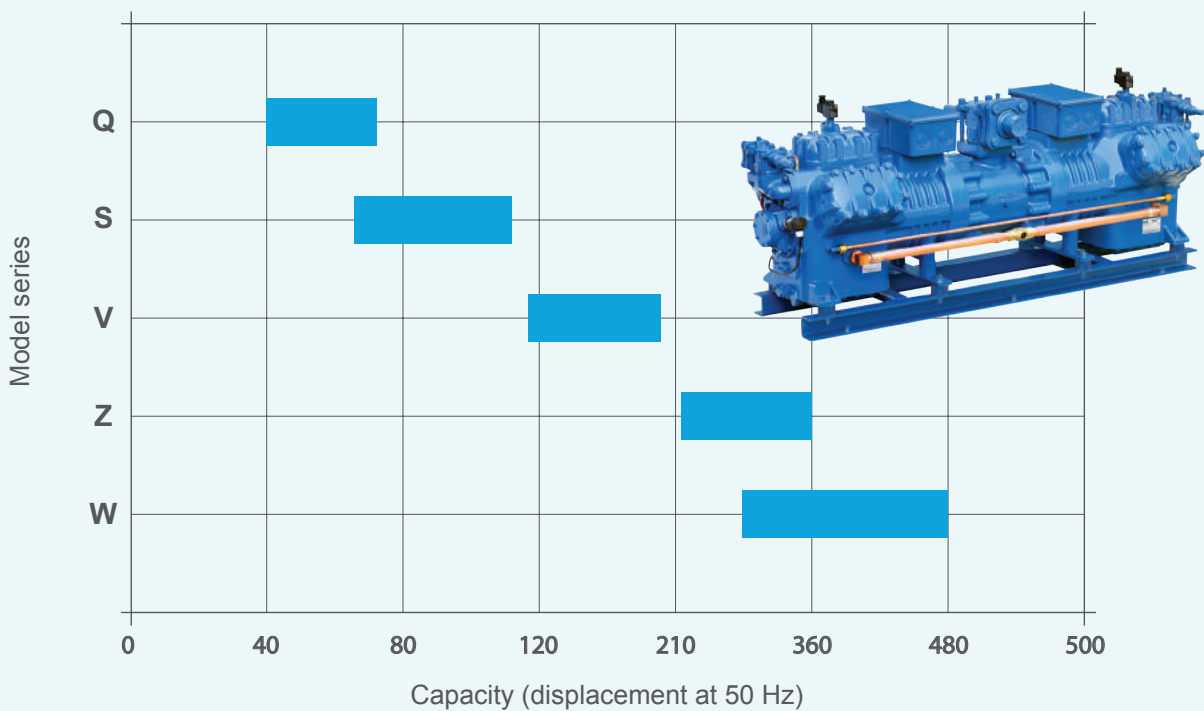
All compressor models Q, S, V, Z and W are also available in TWIN version; two compressors with the same volume displaced are coupled together through a common intake flange. The TWIN configuration is the easiest way to connect 2 compressors in parallel. Starting or stopping one of the compressors ensures easy capacity adjustment and higher efficiency.

In addition all models can also be equipped with the RSH system for adjusting the capacity, or with the standard CC heads. Especially for applications with large load fluctuations, operation at full or partial load thus becomes more efficient.

Range of models

Current range:

5 series, 64 models with 26 capacity stages, from 39.50 to 478.00 m³/h (50 Hz)



Technical specifications

Compressor	Cylinders Nr.	Displacement m ³ /h 50Hz	Oil Charge dm ³	Net Weight kg	Electrical data									Pipe connections ⑩			
					Motor		Max operating current A [x2] ⑨ ⑪			Max power consumption kW [x2]	Locked rotor current A [x2] ⑨ ⑪			Suction [x1]		Discharge [x2]	
					Version	Connections	230V		400V		230V		400V		inch	mm	inch
							④	⑤ ⑥	DOL	DOL	PWS	⑨	⑪	DOL	DOL	PWS	
TWIN Q4-20.1E	4+4		3,2	151	3		10,6	6,1		3,1	97,8	56,3		1 ⁵ / ₈	28,6	¾	19,0
TWIN Q4-20.1Y	4+4	39,54	3,2	151	2	⑦	17,5	10,1		5,7	92,6	53,2		1 ⁵ / ₈	28,6	¾	19,0
TWIN Q4-21.1Y	4+4		3,2	161	2	⑦	17,3	10,0		5,7	92,6	53,2		1 ⁵ / ₈	28,6	¾	19,0
TWIN Q5-21.1Y	4+4	42,36	3,2	161	1	⑦	20,1	11,6		6,6	109,7	63,1		1 ⁵ / ₈	28,6	¾	19,0
TWIN Q4-24.1E	4+4		3,2	161	3		12,5	7,2		4,0	97,8	56,3		1 ⁵ / ₈	28,6	¾	19,0
TWIN Q4-24.1Y	4+4	47,82	3,2	161	2	⑦	20,3	11,7		6,8	92,6	53,2		1 ⁵ / ₈	28,6	¾	19,0
TWIN Q5-24.1Y	4+4		3,2	161	1		23,9	13,8		7,9	109,7	63,1		1 ⁵ / ₈	28,6	¾	19,0
TWIN Q4-25.1Y	4+4		3,2	161	2		19,1	11,0		7,0	92,6	53,2		1 ⁵ / ₈	28,6	¾	19,0
TWIN Q5-25.1Y	4+4	49,38	3,2	161	2	⑦	22,1	12,7		8,5	109,7	63,1		1 ⁵ / ₈	28,6	¾	19,0
TWIN Q7-25.1Y	4+4		3,2	161	1		26,8	15,4		8,4	151,8	87,3		1 ⁵ / ₈	28,6	¾	19,0

Semi-hermetic reciprocating two-stage compressors

Special features

The new Frascold two-stage compressor has been completely redesigned and re-engineered by eliminating the external manifolds of the interstage circuitry and including an additional liquid injection system. These new features provide the following benefits:

Injection of liquid in the second stage intake conduit: the amount of liquid injected is exactly what is required, therefore achieving the highest efficiency level.

The compressed gas and injected liquid mixing process is instantaneous and the liquid is not overheated as it does not go through the motor.

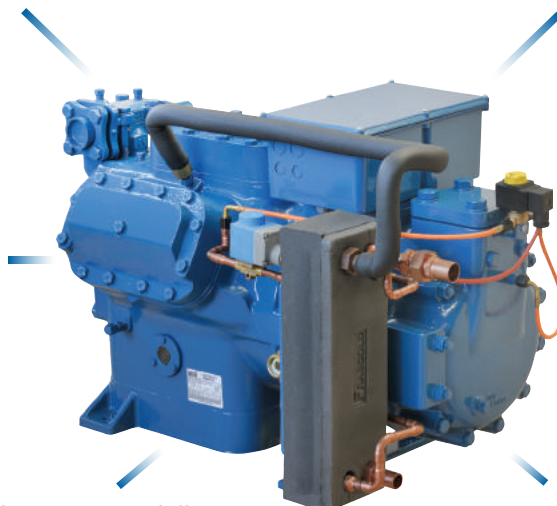
Sub-cooler kit: each model can be equipped with a sub-cooler (already installed and connected to the compressor or supplied already assembled but not mounted and connected).

Compact: thanks to the elimination of external conduits, the compressor features reduced dimensions. In addition to the absence of welding and pipes eliminates possible refrigerant leaks and heat dissipation, which cause system inefficiency.

Liquid injection on the motor side: thanks to the exclusive Motor Cooling System, the exact amount of fluid required to cool the motor is injected. This exclusive system, only available on Frascold compressors, prevents the formation of ice on the compressor body eliminating ice formation in the electrical box and flooded start.

Reliable and sturdy: The new specially designed components make the compressor resistant to all operating conditions within its working range.

Silent: the optimisation of the centre of gravity and the homogeneous distribution of weights ensure low vibrations and low noise.



Technical specifications

Compressor	Cylinders Nr.		Displacement m ³ /h 50Hz ②		Oil Charge dm ³	Net Weight kg	Electrical data						Pipe connections ⑦					
							Motor	Max operating current A ⑥			Max power consumption kW ⑥	Locked rotor current A ⑥		Suction		Discharge		
	⑤	230V		400V	⑥	230V		400V	inch	mm		inch	mm					
		DOL	DOL				PWS				DOL			DOL	PWS			
S5-26.16Y	2	2	25,2	16,4	3,3	120	⑧			14,0	8,3		57,8	35,5	5/8	15,8	1/2	12,7
S7-27.19Y	2	2	26,9	19,1	3,3	122	⑧			18,0	9,5		75,0	47,0	5/8	15,8	1/2	12,7
2V10-42.29Y	2	2	41,9	29,4	4,5	173	⑧			23,0	13,0		87,6	53,9	5/8	15,8	1/2	12,7
2Z15-60.30Y	4	2	58,8	29,4	7,5	220	⑧			31,0	17,0		117	74,8	5/8	15,8	1/2	12,7
2Z20-72.36Y	4	2	70,8	35,4	7,5	225	⑧			37,0	20,9		181	107	5/8	15,8	1/2	12,7
2Z25-84.42Y	4	2	83,8	41,9	7,5	230	⑧			45,0	25,8		208	118	7/8	22,2	5/8	15,8
2Z30-102.51Y	4	2	102,9	51,5	7,5	239	⑧			53,0	30,9		224	133	1 ¹ / ₈	35,0	1 ¹ / ₈	28,6

② Conversion factor for 60Hz = 1,2.

③ POE 32 cSt oil charge. Carter heater is strongly recommended.

④ Including valves, oil charge and rubber dampers.

⑤ Tolerance ±10% based on mean value of voltage range. Other voltages upon request.

⑥ Referred to 50Hz operation. At 60 Hz the max operating current remains unchanged while the max power consumption should be multiplied by 1,2. The maximum operating current /max. power consumption must be considered for the selection of cables, fuses and contactors (AC3 category).

⑦ Valves with solder connections.

⑧ 380V-420V $\Delta/\Delta/\Delta$ / 3 / 50Hz

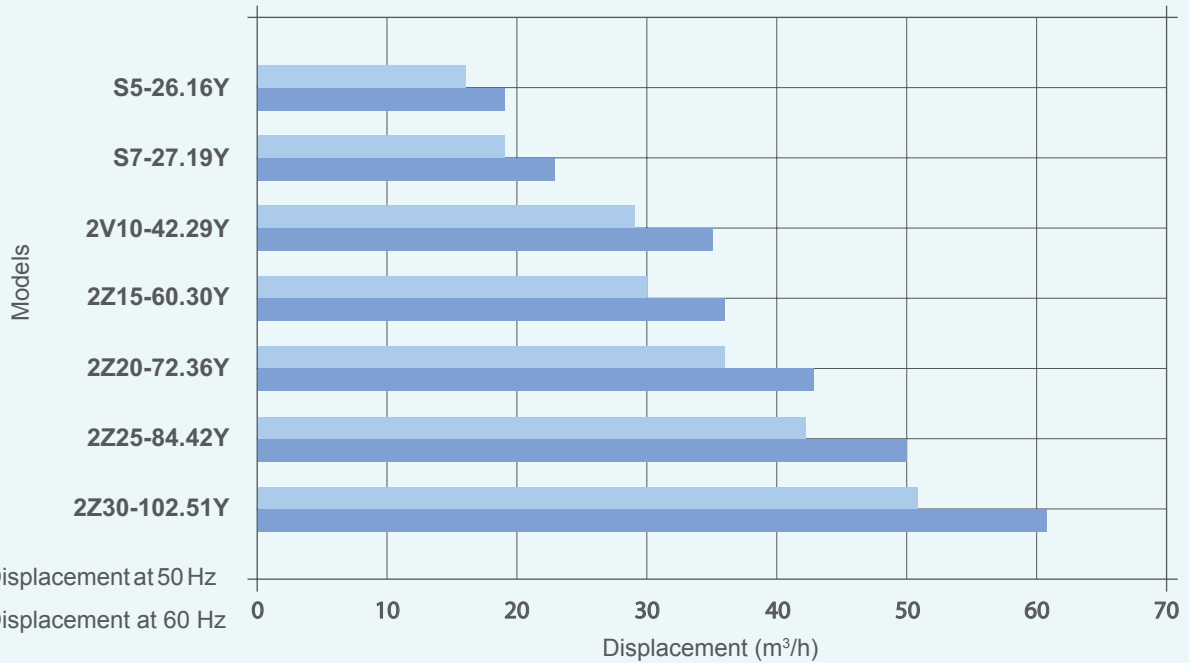
440V-480V $\Delta/\Delta/\Delta$ / 3 / 60Hz

Semi-hermetic reciprocating two-stage compressors

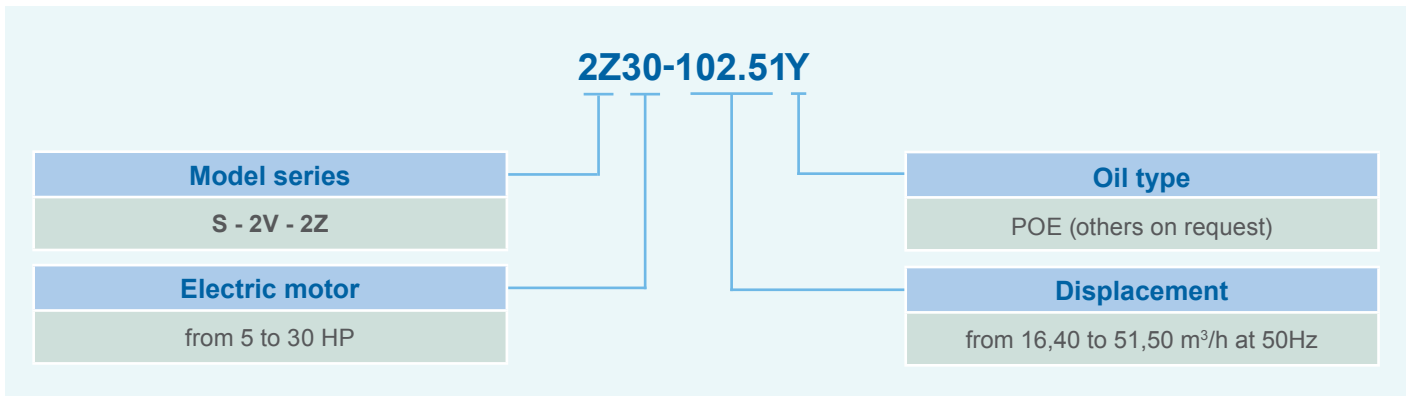
Range of models

Current range:

3 series, 7 models with 7 capacity stages, from 16 to 51 m³/h (50 Hz)



Model names



Compressor nameplate

All the important information to identify the compressor is displayed on the nameplate. The date of production is contained in the serial number. The indication of the type of coolant is the installer's responsibility.

frascold® Type **2Z30-102.51Y** Compressor model
 Nr. **3P001001** Serial number

Hz	Displ. m ³ /h	RPM	Max. Operating Disch. Pressure bar 30	
50	51/103	1450		
60	62/124	1740	Max. Static Suct. Pressure bar 20,5	

Oil type: POE32 3~ Safety markings: EAC CE

Volt		Hz	MRA		LRA	
PWS	YY		PWS	YY	PWS	YY
380-420	380-420	50	53	53	132,6	224,4
440-480	440-480	60	53	53	132,6	224,4

Bar code: [Barcode] Production facility: RESCALDINA ITALY

Identification number: **2Z30 3AP001001**

Frascold Selection Software FSS3

Frascold has released the FSS3 program, the new software dedicated to the processes in the refrigeration, air conditioning and heat pumps industry.

The software was developed by the Frascold technical research and development team, based on many years of experience in the production of compressors and their application in systems, from the simplest to the most complex.

Using the FSS3 software, it is possible to perform calculations based either on the requirements set by the user or on standard operating conditions (EN12900), for the selection of compressors and condensing units. FSS3 fully replaces the previous FSS2 software, with the addition of new important functions and applications. The software comes with a new graphical interface and is easy to use, accurate in calculations and flexible in the various functions.



Main features of FSS3

Easy to use and accurate in calculations, it provides users with all the elements necessary for the selection of compressors and condensing units, according to the project capacities and conditions:

- Provides performance reports for all products
- Lets you export reports to several useful formats for printing and archiving
- Displays the operating limits of all compressors and condensing units with all approved refrigerants
- Essential for contractors and designers in the development and design of complex systems
- Can be configured according to user needs
- Provides full support for the recalculation of performance coefficients in conditions other than standard EN12900
- Features the technical specifications of the selected products (dimensional drawings, mechanical and electrical data, etc.)
- Designed to receive notification whenever a software update is available

The program is available on our website in the Software section. Download the executable file to your computer, run it and follow the installation instructions. A program shortcut will be created on your desktop for easier start up.

Since
1936

Quality Product
Quality Service

From 1936 to date, a long process involving the development, constant improvement and attention to the latest technology

Throughout this time, Frascold has been producing made in Italy compressors for the cooling and air conditioning industry, for a wide range of applications.

It has built its reputation and established its international market position thanks to its ability to constantly improve its product, whilst cultivating customer relationships in order to stay firmly at the forefront of its sector.

With its technology, application experience and global presence, it offers products, solutions and services that allow customers to reap benefits in terms of performance, energy efficiency and operating comfort.

Today, Frascold is an industrial company that operates worldwide with experience, resources, great professional skills and tools to be nearby and to respond quickly to market needs.

Frascold products

Renowned worldwide for their high quality and used in commercial and industrial applications.

- Reciprocating compressors
- Screw compressors
- Condensing units

Applications

The products are used in many refrigeration sectors, relating to air conditioning, process chiller and heat pump; and they influence the daily lives of many people.

- Retail cooling systems
- Industrial refrigeration
- Transport refrigeration and marine cooling systems
- Environmental simulation chambers
- Air conditioning systems
- Liquid chillers
- Heat pumps



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