

SEMI-HERMETIC CO₂

SK3-Subcritical & TK-Transcritical Compressors

50Hz



frascold[®]
BLUE IS BETTER

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ABOUT THE COMPANY

Frascold manufactures over 70,000 screw and reciprocating compressors a year. Our 53,000 m² factory outside of Milan (Italy) houses our advanced engineering, manufacturing and testing facilities. More than 200 employees work in the Headquarters and in the Subsidiaries based in the United States, China and India, with distribution partners and service centers in 86 countries.

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The infographic is a 3D-style illustration on a light grey background. It features four numbered callouts: 1. A large industrial factory building with two chimneys, surrounded by trees. 2. A group of 200 small human figures. 3. A large number of small truck icons. 4. A world map with several flagpoles and flags. Below the map is a laptop computer and a pen.

53.000 sqm factory outside Milan (Italy) hosting our advanced engineering manufacturing and testing facilities. ①

② **More than 200 employees** working in Italy, China, India and United States.

③ **Over 70.000 screw and reciprocating compressors** manufactured every year.

④ **Distribution partners and service centers** in **86** countries.

More than 80 years ago Frascold born as a small family owned Company developing solutions in refrigeration and conditioning industry. Today we invest more and more in people, products, technologies and services aiming to become the best partner for our Customers and the touchstone for the market.

GIUSEPPE GALLI - Frascold Executive Managing Director

SEGMENTS



COMFORT



COMMERCIAL & TRANSPORT REFRIGERATION



INDUSTRIAL REFRIGERATION



PROCESS COOLING

SOLUTIONS

Cooling capacity range @50Hz



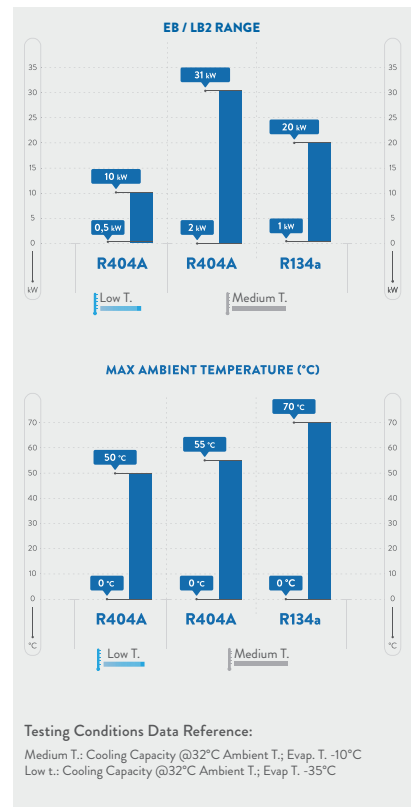
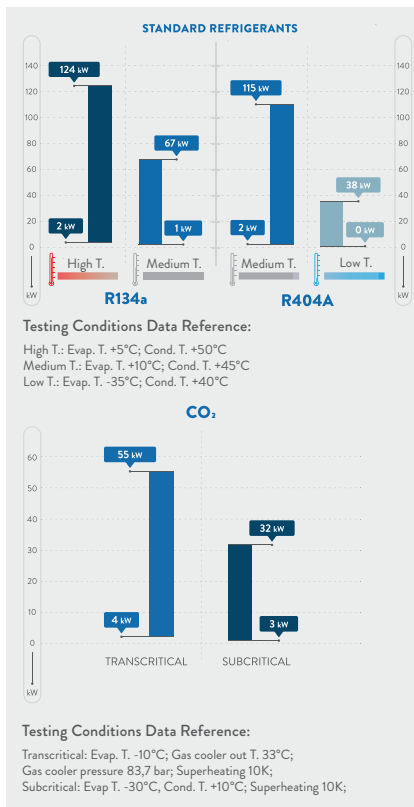
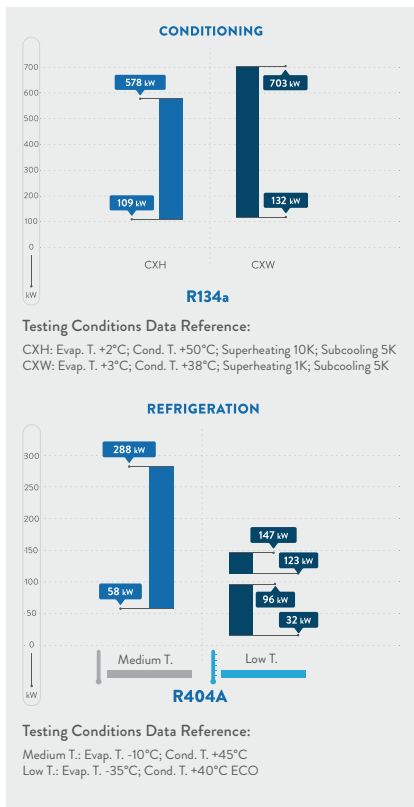
SCREW COMPRESSORS



RECIPROCATING COMPRESSORS



CONDENSING UNITS





FRASCOLD SOLUTIONS FOR CO₂ APPLICATIONS

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In certain segment of the refrigeration, air conditioning and heating market, the growing demand for solutions with natural refrigerants makes CO₂ one of the most interesting solutions. In addition to interesting energy efficiency values, CO₂ also has several advantages over other natural refrigerants: it is not flammable, it is chemically inert and heavier than air.

The solutions offered by Frascold for CO₂ applications include semi-hermetic reciprocating compressors for use in both subcritical and transcritical conditions, in single-stage, cascade and booster systems. Frascold ensures wide operating limits, excellent performances and high safety. These compressors are designed to withstand high standstill pressures (PSS) allowing the immediate restart of the system in case of operation interruption.

The range of Frascold SK3 compressors for subcritical applications consists of 3 main series with 11 models and capacity from 1.7 to 19.8 m³/h at 50Hz.

Their particular construction allows working with condensing temperatures up to 20°C and evaporating temperatures down to -50°C.

The maximum standstill pressure (PSS) is 80 bar(a).

The range of Frascold TK compressors for transcritical applications consists of 3 main series with 28 models and capacity from 1,9 to 25,3 m³/h at 50Hz.

Their particular construction allows working with high operating pressures (140 bar(a) in the discharge side) and maximum standstill pressure (PSS) of 80 bar(a) (100bar(a) for series D).

Main systems applications: single-stage, cascade, booster and integrated systems.

FEATURES & BENEFITS



High safety

CO₂ is not flammable and chemically inert.



Wide operating limits

Wide range of applications to allow operations in transcritical and subcritical process.



Excellent performances



Strong construction

Compressor body in high tensile strength spheroidal cast iron.
Robust and efficient valve plates with optimised flow for CO₂.
Bore/Stroke ratio, crankshaft and main bearings designed for high pressures.



High flexibility

Main system application: single-stage, cascade, booster and integrated systems.

CONFORMITY DECLARATION

Frascold CO₂ compressors are intended for installation in refrigeration systems.

The machine or partly completed machines shall comply with local safety regulation and standards of the place of installation (within the EU according to the EU Directives 2006/42/EC Machinery Directive, 2014/68/UE Pressure Equipment, 2006/95/EC Low Voltage Directive). They may be put into operation only if the compressor has been installed in accordance with these assembly instructions.

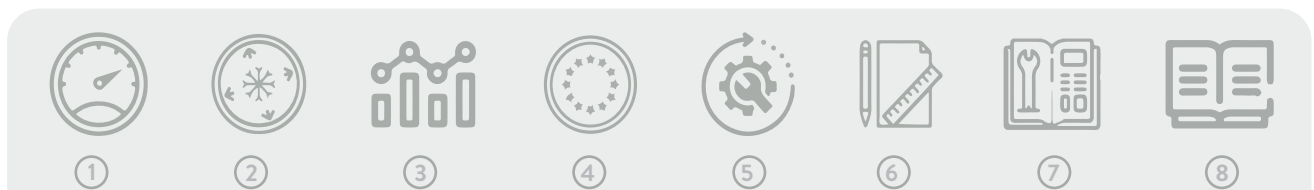
Commissioning is only possible if the entire system into which it is integrated has been inspected and approved in accordance to the provisions of legal regulations.

The Manufacturer Declaration, describes the standards to be applied.
The Manufacturer Declaration of incorporation, according to the 2006/42/EC, is available at: www.frascold.it, documentation, manufacturer's declaration.

PERFORMANCE DATA FSS3 SOFTWARE

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Please refer to our FSS3 to check performances of all our compressors.



①	②	③	④	⑤	⑥	⑦	⑧
① Operating limits				⑤ Technical information			
② Cooling capacity				⑥ Drawings			
③ All operating data with any kind of refrigerant				⑦ Manuals			
④ European standard EN12900 at 50Hz				⑧ Catalogues and certifications			

Transcritical CO₂ cycle tool

Define and select the compressors for subcritical and transcritical application and verify their performance according to the considered refrigeration cycle. In particular it's possible to:

- Easily design CO₂ transcritical systems
- Optimize system configuration for greater efficiency
- Choose the optimal gas cooler and intermediate pressure
- Find the best compressors combination
- Evaluate feasibility of variable frequency drive
- Test different operating conditions
- Seasonal calculations

Seasonal Calculations

The new tool “Seasonal calculations”, developed in steady-state conditions, allows to calculate the hourly performance of the system across a year. It evaluates COPs, compressor energy consumptions and thermal powers, in addition to mass flow rates, pressures and operating temperatures. It is possible to choose between different system configurations, define load profiles (refrigeration loads and, if required, any thermal and/or conditioning loads) and select the temperature profile of many cities in the world.

CONTROL PROTECTION DEVICE

The compressors are equipped with the INT69® Diagnose control module by Kriwan, this is a further development of the compressors protection capability.

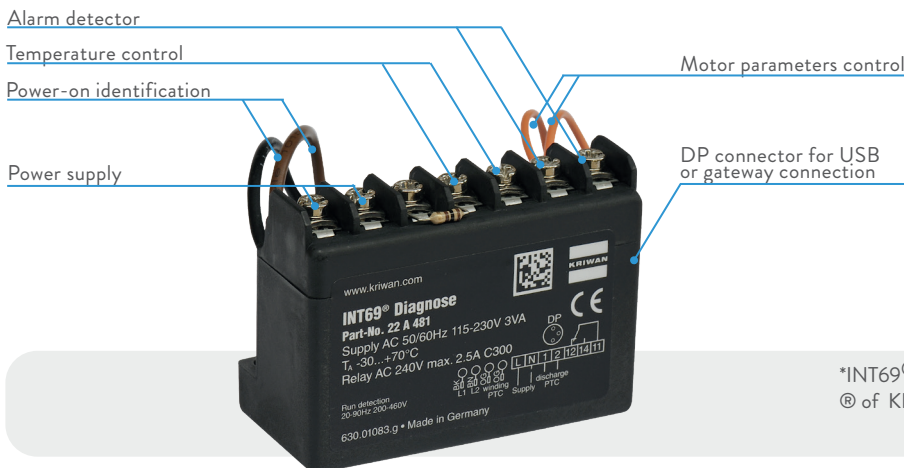
The Diagnose technology is not limited to the protection of the compressor, it also provides specific functions of diagnostics aimed to:

- preventing operating faults that may occur in the system through the historical data analysis,
- planning maintenance actions,
- adjusting parameters for system optimization.

The additional protection capabilities help extending the service life of the compressor. Through this technology applied to the compressors, users benefit from the increased reliability of the refrigeration system and the reduced operating and maintenance cost.

Advantages :

- Guarantee of optimal operation throughout the life cycle of the compressor
- Practical and with simple operation
- Immediate diagnosis and accurate problem-solving in case of error or failure
- Intelligent monitoring of the compressor operation
- Extends the service life of the refrigeration systems
- Improves the compressor protection
- Reduces operating and maintenance costs
- Automatically saves operational data and errors in a memory
- Technical sheet with retrieval of stored data
- Data download through DP port connection
- Remote communication through Modbus-Gateway and LAN-Gateway protocol
- Also applicable to already installed compressors

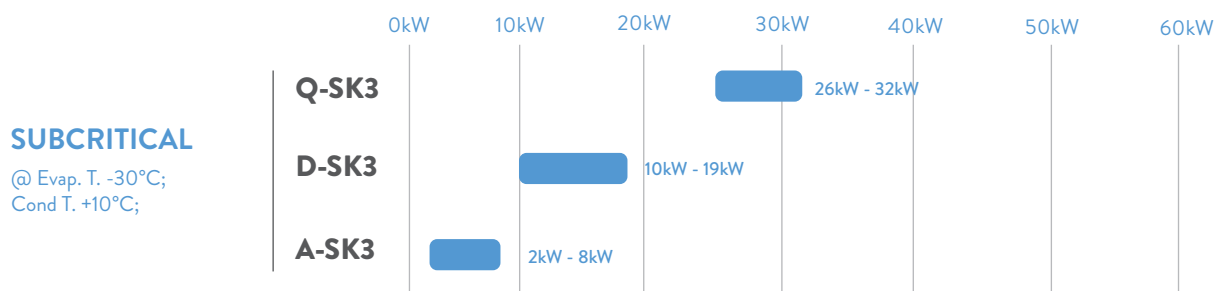


*INT69® Diagnose is intellectual property and trademarks © of KRIWAN Industrie-Elektronik GmbH.

COOLING CAPACITY

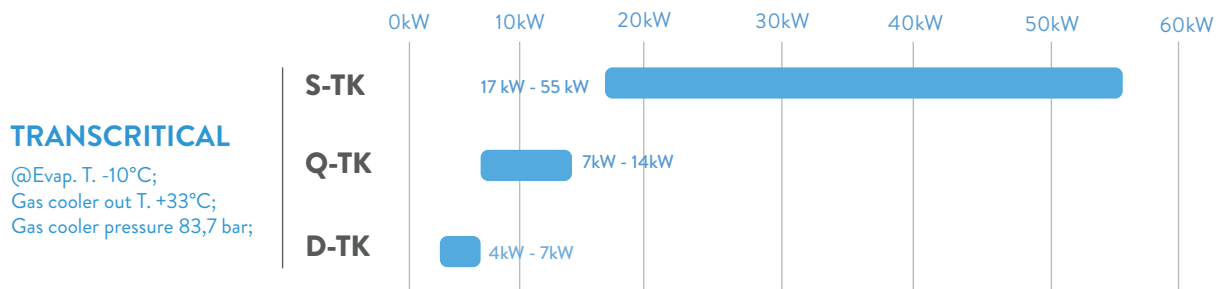
Range @50Hz

3 Series for 11 models with displacements from 1,7 to 19,8 m³/h (50 Hz).



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3 Series for 28 models with displacements from 1,9 to 25,3 m³/h (50 Hz).



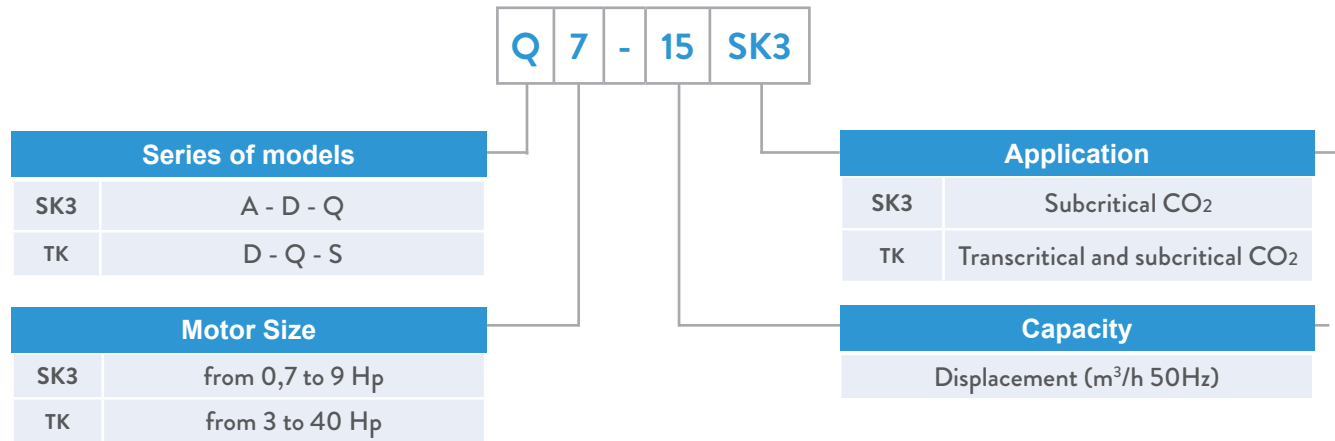
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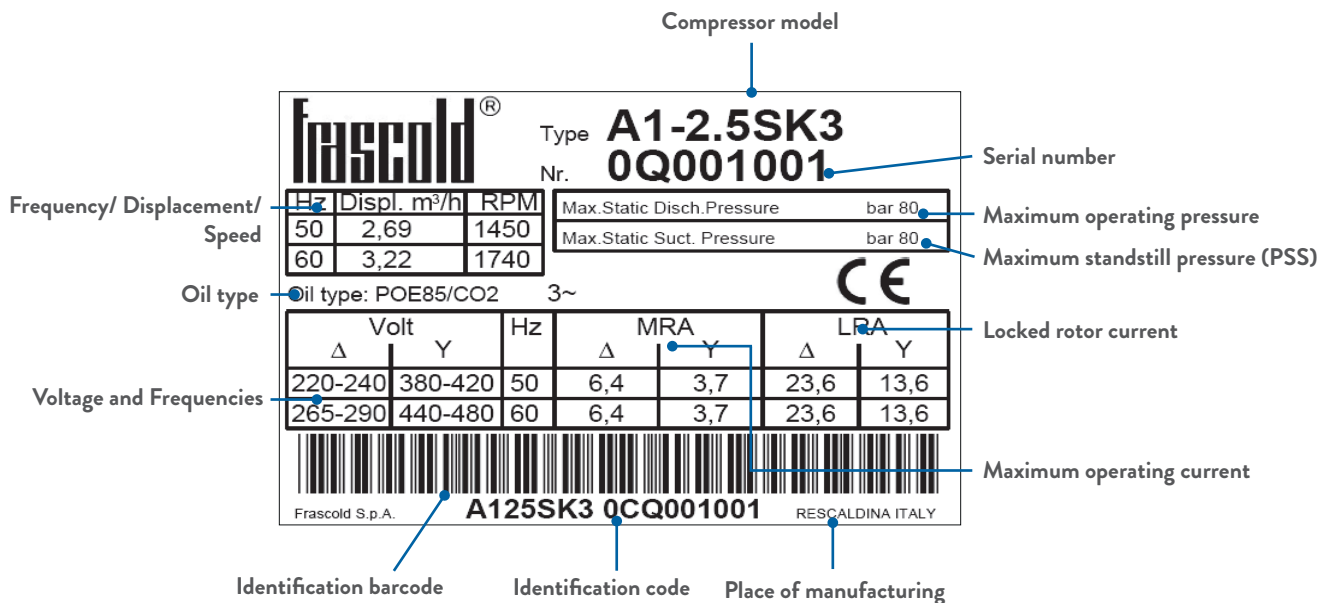
https://www.frascold.it/en/download/software/fss_3_frascold_selection_software

MODEL DESIGNATION



INFORMATION PLATE

All the important information to identify the compressor is displayed on the nameplate. The date of production is contained in the serial number. The user is responsible for indicating the refrigerant type.



PRODUCT RANGE SK3 SUBCRITICAL

SK3 SUBCRITICAL MODELS RANGE

2 Cylinders **5** Models
1,7 - 4,9 m³/h 0,7 - 2,5 HP

A-SK3 SERIES

12

D-SK3 SERIES

2 Cylinders **4** Models
16,5 - 11,3 m³/h 3 - 5 HP

4 Cylinders **2** Models
15 - 19,8 m³/h 7 - 9 HP

Q-SK3 SERIES

PRODUCT RANGE TK TRANSCRITICAL

TK TRANSCRITICAL MODELS RANGE

2 Cylinders **7** Models
1,9 - 3,5 m³/h 3 - 5 HP

D-TK SERIES

Q-TK SERIES

4 Cylinders **7** Models
3,8 - 7 m³/h 5 - 9 HP

4 Cylinders **14** Models
7,9 - 25,3 m³/h 8 - 40 HP

S-TK SERIES



SK3 SUBCRITICAL CO₂ COMPRESSORS

The range of Frascold SK3 series compressors for subcritical CO₂ applications has been designed considering the most recent developments of refrigeration technology for industrial and supermarkets applications. The SK3 models are ideal for use in booster systems but also in cascade systems where LT compressors are required. The SK3 models can operate in a wide range of condensing and evaporating temperatures. The high standstill pressure (PSS) allows to withstand higher ambient temperature as the system is in stand-by or is off for maintenance.

FEATURES & BENEFITS



Wide Operating Limits

Wide range of application to allow operations in subcritical process.
Electric motor sized to work with condensing temperatures up to 20° C.



High Efficiency



Strong Construction

Compressor body in high tensile strength spheroidal cast iron.
Robust and efficient valve plates with optimised flow for CO₂.
Bore/Stroke ratio, crankshaft and main bearings designed for high pressures.

80 bar(a) standstill pressure



Very Quiet Operation



Excellent Reliability

Electronic protection device with advanced functions (INT69 Diagnose).

STANDARD EQUIPMENT AND OPTIONAL ACCESSORIES

SK3-SUBCRITICAL CO₂ COMPRESSORS

Motor power supply

A & D-SK3	2-Cylinder semi-hermetic compressor with integrated DOL starting electric motor with thermal protection sensors 220-240V Δ / 380-420V Y / 3 / 50Hz 265-290V Δ / 440-480V Y / 3 / 60Hz
Q-SK3	4-Cylinder semi-hermetic compressor with integrated DOL starting electric motor with thermal protection sensors 220-240V Δ / 380-420V Y / 3 / 50Hz 265-290V Δ / 440-480V Y / 3 / 60Hz

Description	A-SK3		D-SK3		Q-SK3	
	Std.	Opt.	Std.	Opt.	Std.	Opt.
Electronic control module for protection and diagnosis (INT69 Diagnose)	•		•		•	
16 Discharge temperature sensor						•
Relief valve for maximum standstill pressure (PSS)	•		•		•	
Suction and discharge valves	•		•		•	
Oil charge POE 85cSt	•		•		•	
Oil charge PAG 68cSt		•		•		•
Oil level sight glass (two for series Q)	•		•		•	
Crankcase oil heater (recommended due to the high solubility of the CO ₂ with the oil)		•		•		•
RSH capacity control head (not available for model A07-1.6SK3)		•		•		•
Rubber vibration dampers	•		•		•	

CAPACITY CONTROL

RSH control heads

Frascold's patented **Reduced Suction Head (RSH)** unloading technology represents a revolution in capacity control in reciprocating compressors. By allowing 50% gas flow to the unloaded cylinder head, our patented **RSH** system avoids problems encountered in traditional unloading.

RSH equipped systems can run unloaded indefinitely with no additional vibration or compressor damage. This allows the system to more accurately match fluctuating cooling demand. Thus saving a significant amount of energy over traditional unloading. Reducing the number of start-stop cycles dramatically decreases wear and tear on the compressor and motor.

Standard unloading blocks gas flow to one or more cylinder heads to temporarily reduce cooling capacity. This method is not nearly as energy-efficient and can cause mechanical issues. Blocking gas flow causes the compressor to run in a partial vacuum, causing vibration, heat and stress.

Patented Technology

RSH unloading is available exclusively from Frascold and can be fitted to any Frascold reciprocating compressor (2, 4, 6 and 8 cylinders). The reduced vibration and noise while running unloaded is noticeable when compared to compressors not equipped with this technology.

RSH Unloading Steps

With more unloading steps and the ability to run unloaded indefinitely, **RSH** equipped systems provide greater application flexibility and energy costs can be significantly reduced. Fewer start-stop cycles means increased service life, less down time and lower maintenance costs.

RSH Heads	A & D -SK3	Q-SK3
1	50 / 100%	75 / 100%
2		50 / 75 / 100%



TK TRANSCRITICAL CO₂ COMPRESSORS

The range of Frascold TK series compressors for transcritical CO₂ applications has been designed taking into account the most recent changes in refrigeration and heating technologies.

TK series compressors are designed for CO₂ transcritical application, such as heat pumps and medium temperature refrigeration systems but also booster and cascade systems in combinations with SK3 series compressors for CO₂ subcritical application.

FEATURES AND BENEFITS



Wide Operating Limits

Wide range of application to allow the operation in transcritical and subcritical process.



High Efficiency



Strong Construction

Compressor body in high tensile strength spheroidal cast iron. Robust and efficient valve plates with optimised flow for CO₂. Bore/Stroke ratio, crankshaft and main bearings designed for high pressures.

Maximum operating pressure 140bar(a)



Very Quiet Operation



Excellent Reliability

Electronic protection device with advanced functions, (INT69 Diagnose).



Special Piston Design

Optimized cylinder heads to increase mass-flow and decrease discharge gas temperature. Advanced lubrication system with dynamic disc.

Very Low Oil Carryover

STANDARD EQUIPMENT AND OPTIONAL ACCESSORIES

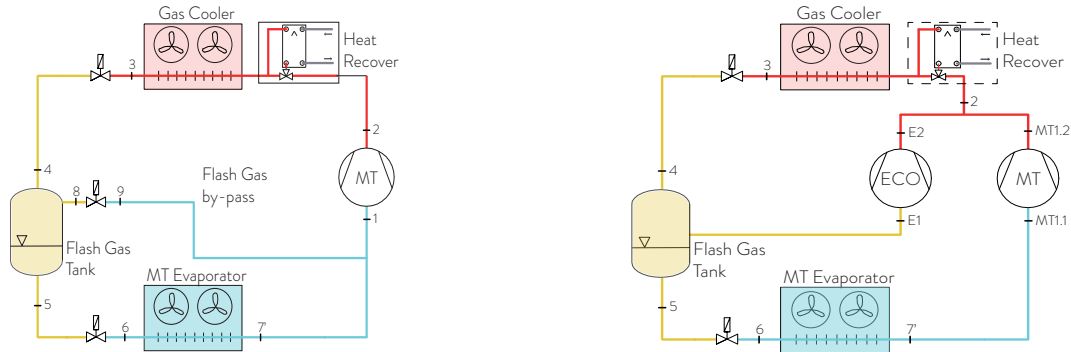
TK-TRANSCRITICAL CO₂ COMPRESSORS

Motor power supply

D-TK	2-Cylinder semi-hermetic compressor with integrated DOL starting electric motor with thermal protection sensors 220-240V Δ / 380-420V Y / 3 / 50Hz 265-290V Δ / 440-480V Y / 3 / 60Hz
Q-TK	4-Cylinder semi-hermetic compressor with integrated DOL starting electric motor with thermal protection sensors 220-240V Δ / 380-420V Y / 3 / 50Hz 265-290V Δ / 440-480V Y / 3 / 60Hz
S-TK	4-Cylinder semi-hermetic compressor with integrated PWS starting electric motor with thermal protection sensors 380V-420V Y / YY / 3 / 50Hz 440V-480V Y / YY / 3 / 60Hz

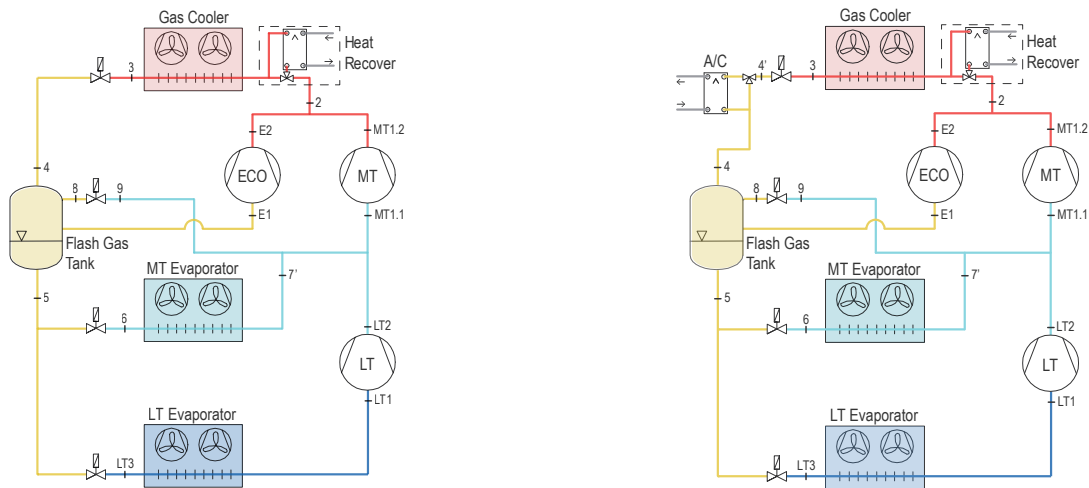
Description	D-TK		Q-TK		S-TK	
	Std.	Opt.	Std.	Opt.	Std.	Opt.
Electronic control module for protection and diagnosis (INT69 Diagnose)	•		•		•	
Discharge temperature sensor	•		•		•	
Relief valve for maximum standstill pressure (PSS)	•		•		•	
Suction and discharge valves	•		•		•	
Discharge valve with thread connection (ogive DIN3861) for steel pipes		•		•		•
POE 85 cSt oil charge	•		•		•	
PAG 68 cSt oil charge		•		•		•
Oil level sight glass (two for series Q and S)	•		•		•	
Crankcase oil heater (recommended due to the high solubility of the CO ₂ in the oil)		•		•		•
Rubber vibration dampers	•		•		•	

TRANSCRITICAL CO₂ SYSTEMS



Single-stage transcritical system

In the single-stage transcritical system, the refrigerant leaving the gas cooler is expanded and collected into an intermediate pressure receiver (flash gas tank) that has the function of separating the two-phases fluid at its inlet. The vapor is expanded to the medium temperature through a by-pass valve (which is used to regulate the pressure of the receiver itself), while the liquid is expanded and sent to the medium temperature (MT) evaporator. MT compressors are able to operate in transcritical conditions, bringing the superheated vapor at their inlet from the MT evaporator pressure to the gas cooler pressure. The flash gas by-pass line allows to increase the efficiency of the system improving its management and stability. To further increase the efficiency of the system with high ambient temperatures, it's possible to use transcritical auxiliary compressors (ECO) that have the function of regulating the pressure of the intermediate pressure receiver by taking the flash vapor and bringing it to the gas cooler pressure, with a lower overall compressors power consumption. Transcritical operating conditions allow to exploit the high discharge temperatures to recover heat with higher temperature differences than any other fluids.



Booster and integrated system

The booster system is characterized by two evaporating temperature levels and two different stages of compressions. The LT (low temperature) stage includes compressors for subcritical application (called “booster”). The discharge piping of the LT compressors is connected to the suction manifold of MT (medium temperature) compressors (for transcritical application). The booster system includes different construction arrangements. The most common in refrigeration systems consists in an intermediate pressure receiver (flash gas tank) that has the function of separating the two-phase fluid at its inlet. The vapor is expanded to the medium temperature through a by-pass valve, while the liquid is expanded and sent to the medium (MT) and low temperature (LT) evaporators. It's possible to increase the efficiency of the system with high ambient temperatures by using transcritical auxiliary compressors (ECO). Transcritical systems can be combined with a heat recovery and air conditioning system (A/C), creating integrated systems.

TECHNICAL DATA AND OPERATING LIMITS

Semi-hermetic CO₂ Series

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SK3-Subcritical CO₂ compressors @50Hz

Motor power supply⁴

DOL connection

220-240V Δ / 380-420V Δ / 3 / 50Hz

265-290V Δ / 440-480V Δ / 3 / 60Hz

Models	Cylinders	Displacement ¹	Oil Charge ²	Electrical Data				Pipe Connection ⁶				Net Weight ³
				Max operating Current [A] ⁵		Locked Motor Current [A] ⁵		Suction		Discharge		
			[l]	230 V	400V	230 V	400V	[Inch]	[mm]	[Inch]	[mm]	
A07-1.6SK3	2	1,69	1	4,4	2,5	18,6	11,8	5/8	16	1/2	12,7	40
A1.2-5SK3	2	2,69	1	6,4	3,7	23,6	13,6	5/8	16	1/2	12,7	41
A1.5-3SK3	2	3,35	1	8,6	5,1	46,6	26,8	5/8	16	1/2	12,7	44
A2-4SK3	2	3,95	1,2	9,5	5,5	40,2	23,2	5/8	16	1/2	12,7	44
A2.5-5SK3	2	4,93	1,2	12,5	7,2	56,9	34,3	5/8	16	1/2	12,7	47
D3-6SK3	2	6,51	1,2	16,6	9,6	75,9	43,7	7/8	22,2	5/8	16	51
D4-8SK3	2	7,96	1,2	20,3	11,7	90,3	52	7/8	22,2	5/8	16	56
D4.5-9SK3	2	9,13	1,2	25,4	14,6	107	61,6	7/8	22,2	5/8	16	56
D5-11SK3	2	11,27	1,2	28,9	16,7	107	61,6	7/8	22,2	5/8	16	58
Q7-15SK3	4	14,95	1,6	36,9	21,3	152	87,3	1 1/8	28,6	3/4	19	79
Q9-20SK3	4	19,77	1,6	43,3	25	171	98,8	1 1/8	28,6	3/4	19	81

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- 1 Conversion factor for 60Hz = 1,2
- 2 Oil charged: POE 85cSt specific for CO₂
The use of crankcase heater is recommend due to the high solubility of the CO₂ in the oil.
- 3 Net weight including: valves, oil charge, rubber vibration dampers.
- 4 Motor voltage tolerance ± 10% referred to the mean value of the voltage range.
Other voltages available on request.
- 5 The indicated data refers to operation 50 Hz.
For 60Hz and other power supply voltages refer to FSS.3 selection software.
For sizing of contactors, cables and fuses, consider the maximum operating current .
- 6 Soldering valve connections.

Find the most updated information in our Product Selection Software FSS3 at the link :
https://www.frascold.it/en/download/software/fss_3_frascold_selection_software

TK-Transcritical CO₂ compressors @50Hz

Motor power supply⁵

DOL connection

220-240V Δ / 380-420V Λ / 3 / 50Hz

265-290V Δ / 440-480V Λ / 3 / 60Hz

Models	Motor Version 1	Cylinders	Displacement 2	Oil Charge 3	Electrical Data				Pipe Connection 7				Net Weight 4
					Max operating Current [A] 6		Locked Motor Current [A] 6		Suction		Discharge		
					230V	400V	230V	400V	[Inch]	[mm]	[Inch]	[mm]	
D3-1.9TK	1	2	1,89	1,5	11,0	6,3	69	39,7	7/8	22,2	3/4	19	80
D3-2.2TK	2	2	2,19	1,5	10,3	5,9	69	39,7	7/8	22,2	3/4	19	80
D3.5-2.2TK	1	2	2,19	1,5	12,7	7,3	80,5	46,3	7/8	22,2	3/4	19	81
D3.5-3TK	2	2	3	1,5	13,9	8	80,5	46,3	7/8	22,2	3/4	19	81
D4-3TK	1	2	3	1,5	17,2	9,9	93,4	53,9	7/8	22,2	3/4	19	82
D4-3.5TK	2	2	3,48	1,5	16,7	9,6	93,4	53,9	7/8	22,2	3/4	19	82
D5-3.5TK	1	2	3,48	1,5	20,0	11,5	109	63,1	7/8	22,2	3/4	19	83
Q5-4TK	2	4	3,78	1,8	18,2	10,5	109	63,1	7/8	22,2	3/4	19	90
Q6-4TK	1	4	3,78	1,8	24,4	14,1	94,7	54,7	7/8	22,2	3/4	19	94
Q6-4.5TK	2	4	4,38	1,8	24,5	14,1	94,7	54,7	7/8	22,2	3/4	19	94
Q7-4.5TK	1	4	4,38	1,8	28,6	16,5	151	87,3	7/8	22,2	3/4	19	94
Q7-6TK	2	4	6	1,8	28,0	16,2	151	87,3	7/8	22,2	3/4	19	94
Q9-6TK	1	4	6	1,8	40,9	23,6	168	96,8	7/8	22,2	3/4	19	96
Q9-7TK	2	4	6,95	1,8	38,6	22,2	168	96,8	7/8	22,2	3/4	19	96

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- 1 Motor size (see operating limits page 27)
- 2 Conversion factor for 60Hz = 1,2
- 3 Oil charged: POE 85cSt specific for CO₂
The use of crankcase heater is recommend due to the high solubility of the CO₂ in the oil.
- 4 Net weight including: valves, oil charge, rubber vibration dampers.
- 5 Motor voltage tolerance ± 10% referred to the mean value of the voltage range.
Other voltages available on request.
The indicated data refers to operation 50 Hz.
- 6 For 60Hz and other power supply voltages refer to FSS.3 selection software.
- 7 For sizing of contactors, cables and fuses, consider the maximum operating current .
Soldering valve connections.

TK-Transcritical CO₂ compressors @50Hz

Motor power supply₅

DOL connection
380-420V Δ/Δ/Δ / 3 / 50Hz
440-480V Δ/Δ/Δ / 3 / 60Hz

Models	Motor Version 1	Cylinders	Displacement 2	Oil Charge 3	Electrical Data				Pipe Connection 7				Net Weight 4
					Max operating Current [A] 6	Locked Motor Current [A] 6		Suction		Discharge			
						400V		[Inch]	[mm]	[Inch]	[mm]		
						400V	PWS	DOL	[Inch]	[mm]	[Inch]	[mm]	
S8-8TK	2	4	7,89	3,3	19,6	53,1	90,3	1½	28,6	¾	19	181	
S10-8TK	1	4	7,89	3,3	26,6	60	102	1½	28,6	¾	19	183	
S10-10TK	2	4	9,64	3,3	23,5	60	102	1½	28,6	¾	19	181	
S15-10TK	1	4	9,64	3,3	30,4	69,1	119	1½	28,6	¾	19	183	
S15-12TK	2	4	11,84	3,3	31,0	69,1	119	1½	28,6	¾	19	183	
S20-12TK	1	4	11,84	3,3	40,9	102	171	1½	28,6	¾	19	187	
S20-14TK	2	4	14,46	3,3	40,6	102	171	1½	28,6	¾	19	187	
S25-14TK	1	4	14,46	3,3	49,7	112	189	1½	28,6	¾	19	187	
S20-18TK	2	4	17,84	3,3	51,8	102	171	1½	28,6	¾	19	187	
S30-18TK	1	4	17,84	3,3	60,4	132	224	1½	28,6	¾	19	204	
S25-21TK	2	4	20,50	3,3	61,0	112	189	1½	28,6	¾	19	187	
S35-21TK	1	4	20,50	3,3	69,5	145	239	1½	28,6	¾	19	215	
S30-26TK	2	4	25,28	3,3	70,4	132	224	1½	28,6	¾	19	201	
S40-26TK	1	4	25,28	3,3	81,6	159	273	1½	28,6	¾	19	220	

26

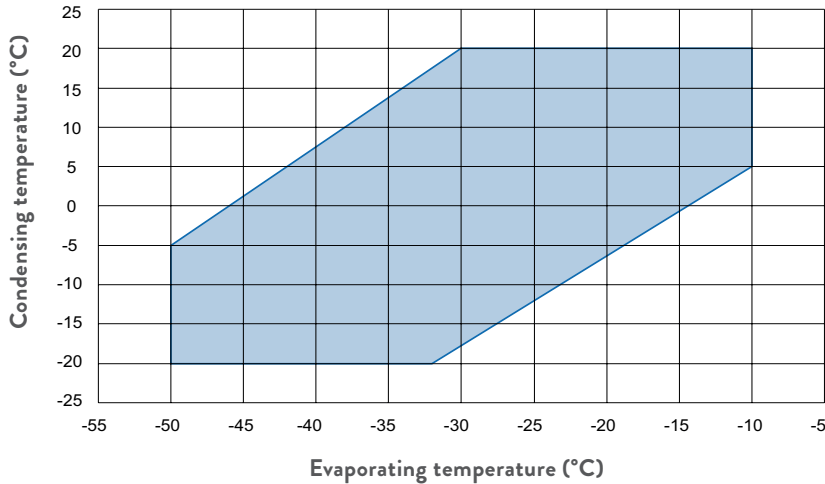
- 1 Motor size (see operating limits page 27)
- 2 Conversion factor for 60Hz = 1,2
- 3 Oil charged: POE 85cSt specific for CO₂
The use of crankcase heater is recommend due to the high solubility of the CO₂ in the oil.
- 4 Net weight including: valves, oil charge, rubber vibration dampers.
- 5 Motor voltage tolerance ± 10% referred to the mean value of the voltage range.
Other voltages available on request.
- 6 The indicated data refers to operation 50 Hz.
For 60Hz and other power supply voltages refer to FSS.3 selection software.
For sizing of contactors, cables and fuses, consider the maximum operating current .
- 7 Soldering valve connections.

Find the most updated information in our Product Selection Software FSS3 at the link :
https://www.frascold.it/en/download/software/fss_3_frascold_selection_software

R744 CO₂ Operating Limits

SK3 Series

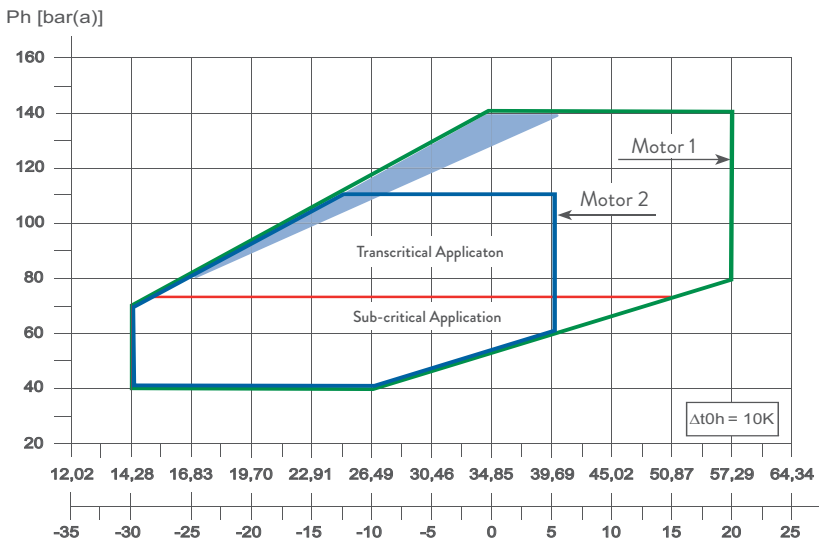
Standard application diagram for Subcritical process



- Restrictions to operating limits may occur when the compressor is regulated by inverter.
- Compressor at 100% of the capacity
- Δt_{0h} Considered suction superheating = 10K

TK Series

Standard application diagram for Transcritical process



- Restrictions to operating limits may occur when the compressor is regulated by inverter.
 - Compressor at 100% of the capacity
 - Ph [bar(a)] Delivery pressure (absolute)
 - P0 [bar(a)] Suction pressure (absolute)
 - T0 [°C] Evaporating temperature
 - Δt_{0h} Considered suction superheating = 10K
- Area where additional cooling or discharge temperature reduction is needed.

• Motor version:
The electric motor is supplied into two different versions optimized for the application:

- Motor 1 for heat pump applications
- Motor 2 for refrigeration applications

• Maximum allowed Stand Still Pressure (PSS) on Low / High pressure side:

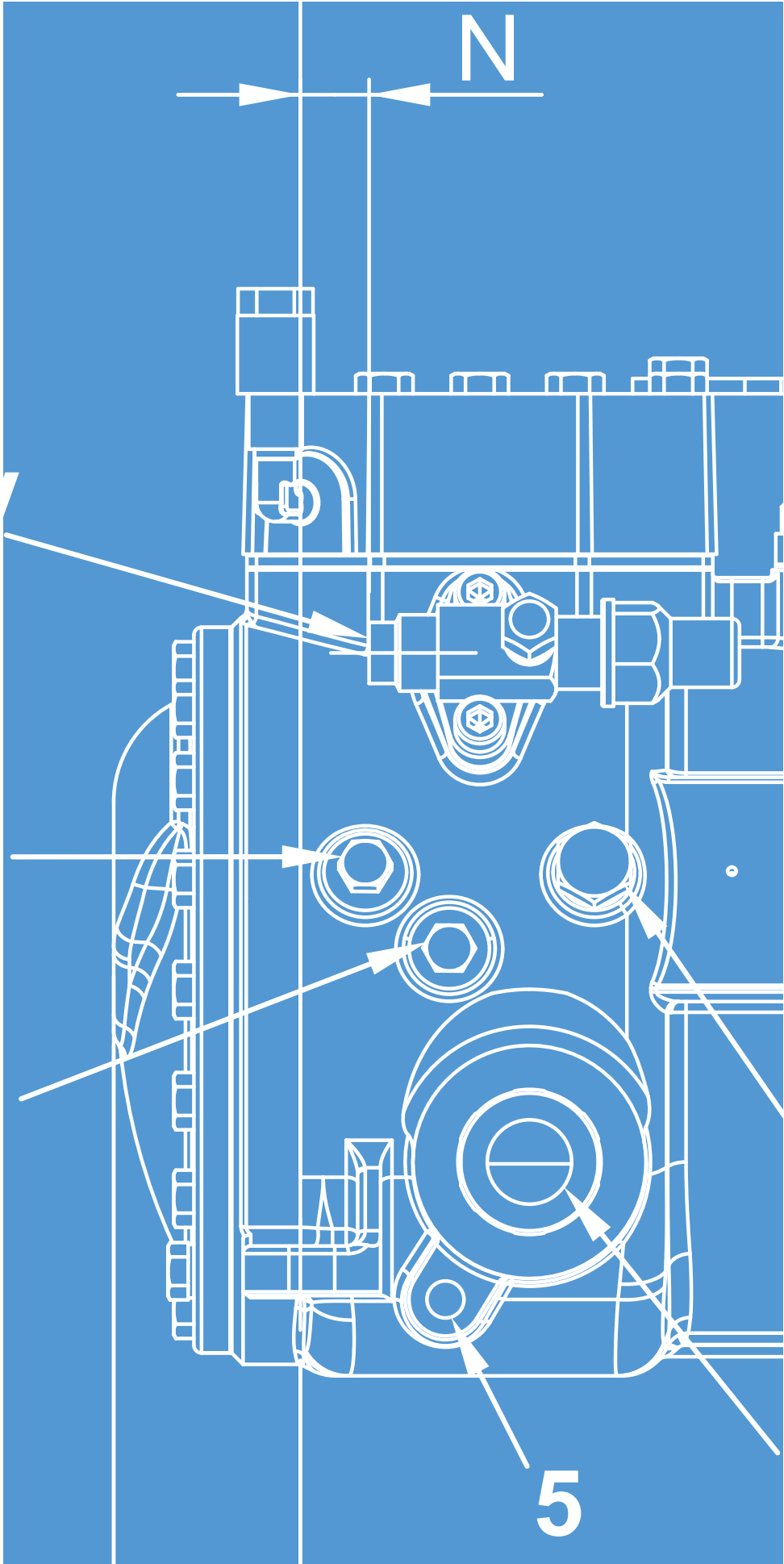
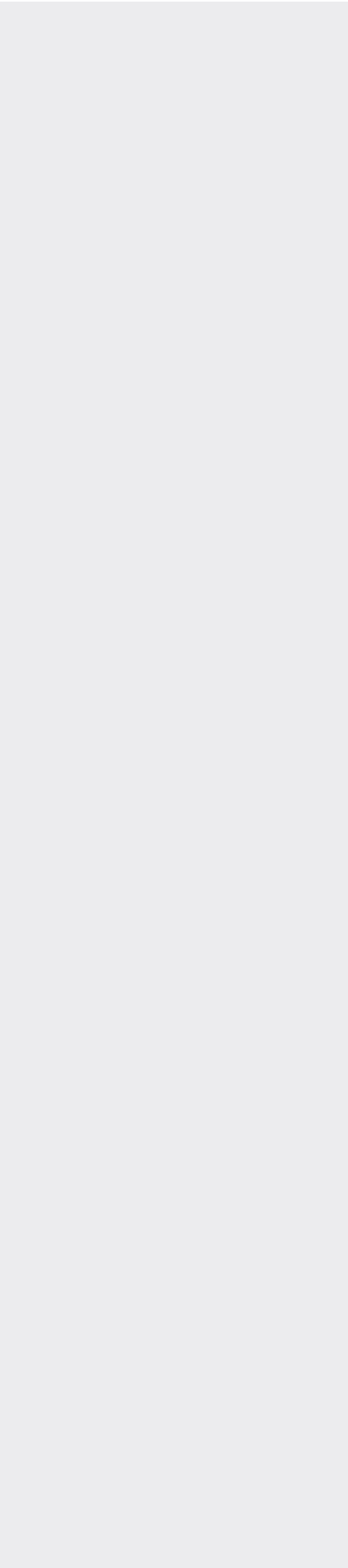
Series	Max standstill pressure	Max Operating pressure
D-TK	100 bar(a)	140 bar(a)
Q-TK	80 bar(a)	140 bar(a)
S-TK		

The operation of the compressors is allowed within the operating envelope shown below. Use the FSS.3 Frascold Selection Software to verify the exact operating limits of each individual compressor.

TECHNICAL DRAWINGS AND DIMENSIONS

28

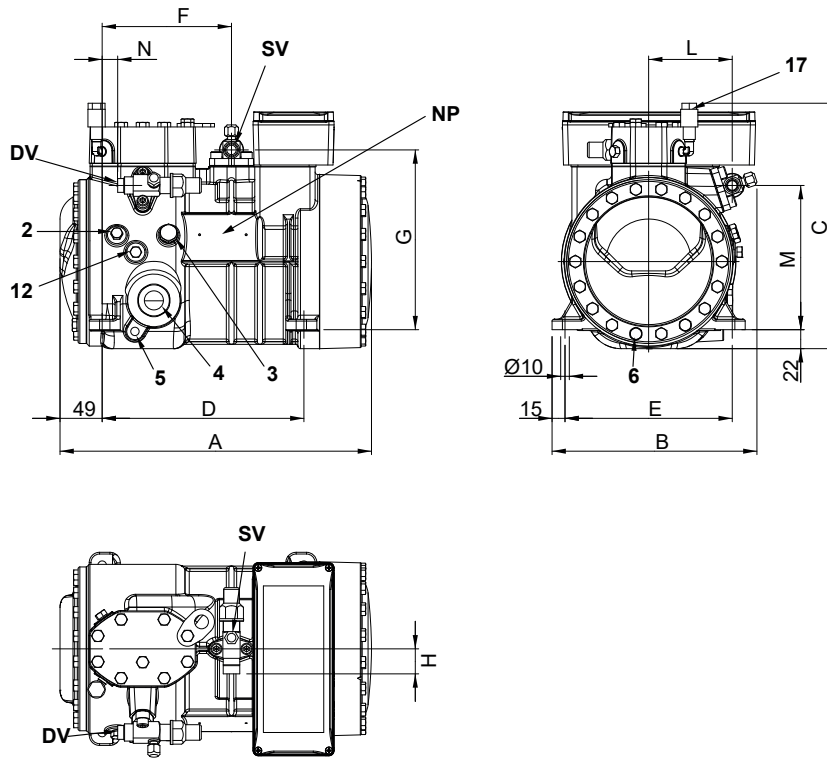
Semi-hermetic CO₂ Series



Dimensional drawing

Subcritical CO2 R744

	Compressor					Valves position						Valves				Net Weight [Kg]
	Length	Width	Height	Base mounting		Suction			Discharge			Suction		Discharge		
	A	B	C	D	E	F	G	H	L	M	N	Ø		Ø		
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[inch]	[mm]	[inch]	
A07-1.6SK3	361	238	281	234	194	150	209	29	97	167	18	16	5/8	12,7	1/2	40
A1-2.5SK3	361	238	281	234	194	150	209	29	97	167	18	16	5/8	12,7	1/2	41
A1.5-3SK3	361	238	281	234	194	150	209	29	97	167	18	16	5/8	12,7	1/2	44
A2-4SK3	361	238	285	234	194	150	209	29	97	167	18	16	5/8	12,7	1/2	44
A2.5-5SK3	361	238	285	234	194	150	209	29	97	167	18	16	5/8	12,7	1/2	47

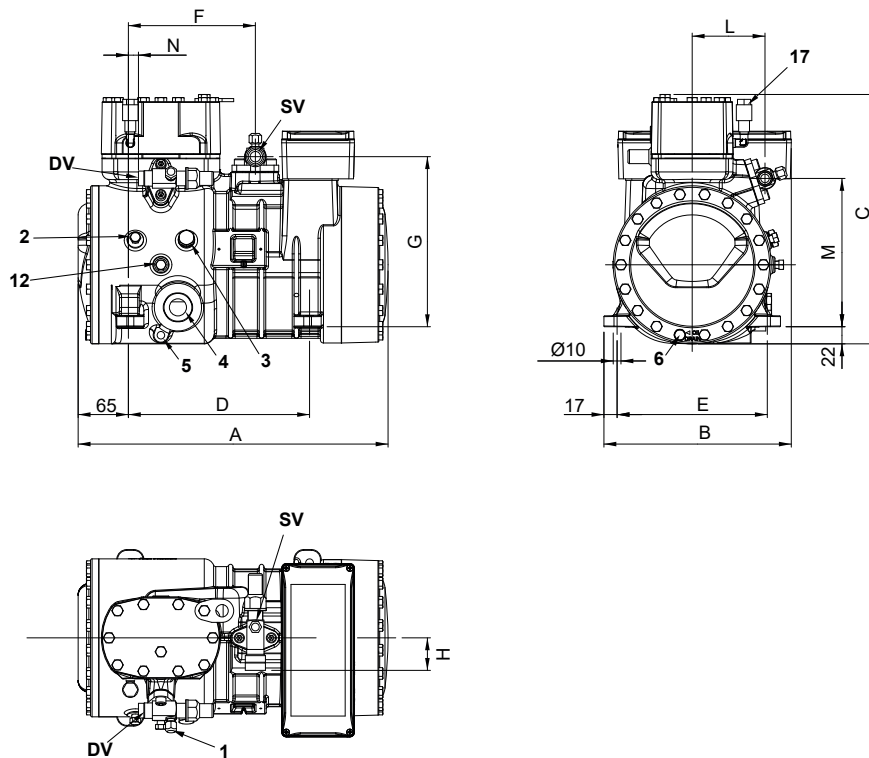


30

1	High pressure connection	1/8" NPT
2	Low pressure connection	1/8" NPT
3	Oil charge plug	1/4" Gas
4	Oil level sight glass	1 1/8" UNEF
5	Crankcase heater seat	
6	Oil drain plug	M8x18
12	Oil return plug	1/8" NPT
17	Relief valve	
DV	Discharge valve	
SV	Suction valve	
NP	Nameplate	

Dimensional drawing

	Compressor					Valves position						Valves				Net Weight [Kg]
	Length	Width	Height	Base mounting		Suction			Discharge			Suction		Discharge		
	A	B	C	D	E	F	G	H	L	M	N	Ø		Ø		
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[inch]	[mm]	[inch]	
D3-6SK3	400	242	322	234	194	164	220	42	94	192	13	22,2	7/8	16	5/8	51
D4-8SK3	400	242	322	234	194	164	220	42	94	192	13	22,2	7/8	16	5/8	56
D4-5.9SK3																
D5-11SK3	400	242	322	234	194	164	220	42	94	192	13	22,2	7/8	16	5/8	58

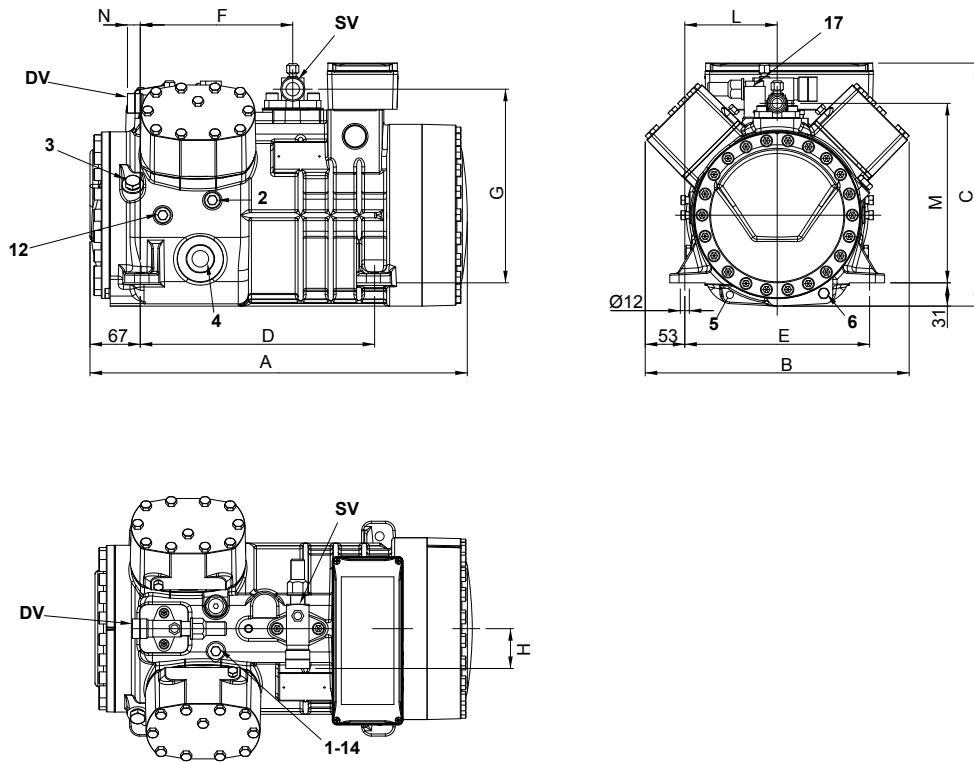


31

1	High pressure connection	1/8" NPT
2	Low pressure connection	1/8" NPT
3	Oil charge plug	1/4" Gas
4	Oil level sight glass	1 1/8" UNEF
5	Crankcase heater seat	
6	Oil drain plug	M8x18
12	Oil return plug	1/8" NPT
17	Relief valve	
DV	Discharge valve	
SV	Suction valve	
NP	Nameplate	

Dimensional drawing

	Compressor					Valves position						Valves				Net Weight [Kg]
	Length	Width	Height	Base mounting		Suction			Discharge			Suction		Discharge		
	A	B	C	D	E	F	G	H	L	M	N	Ø		Ø		
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[inch]	[mm]	[inch]	
Q7-15SK3	502	351	324	312	246	203	258	53	123	239	17	28,6	1 1/8	19	3/4	79
Q9-20SK3	502	351	324	312	246	203	258	53	123	239	17	28,6	1 1/8	19	3/4	81



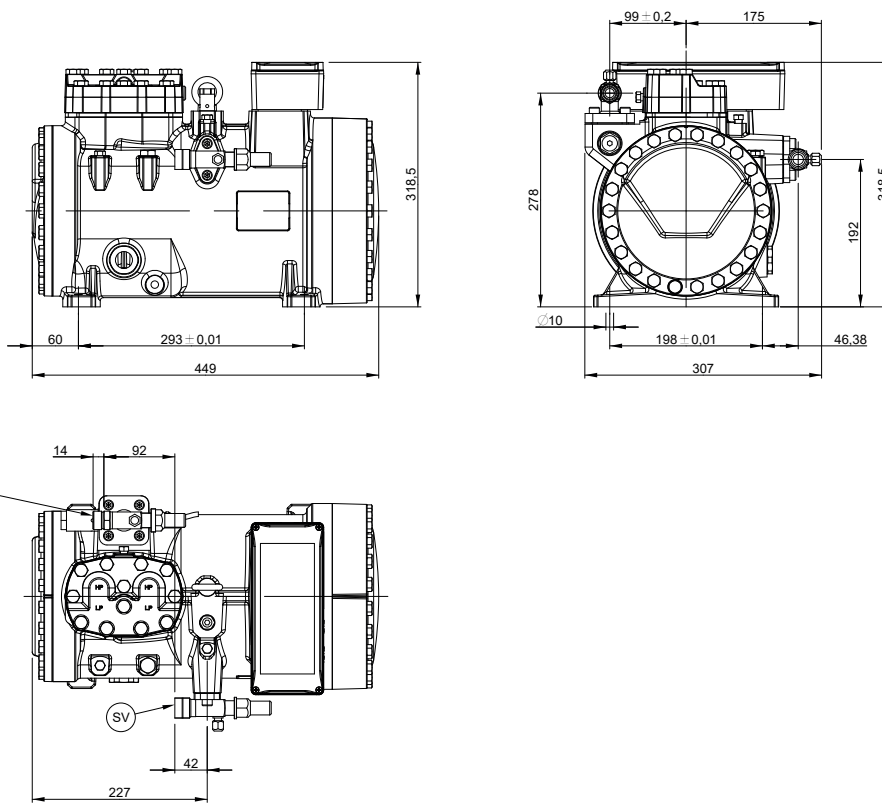
32

1	High pressure connection	1/8" NPT
2	Low pressure connection	1/8" NPT
3	Oil charge plug	1/4" Gas
4	Oil level sight glass	1 1/8" UNEF
5	Crankcase heater seat	
6	Oil drain plug	M8x22
12	Oil return plug	1/8" NPT
14	Max discharge temperature sensor connection	1/8" NPT
17	Relief valve	
DV	Discharge valve	
SV	Suction valve	
NP	Nameplate	

Dimensional drawing

Transcritical C02 R744

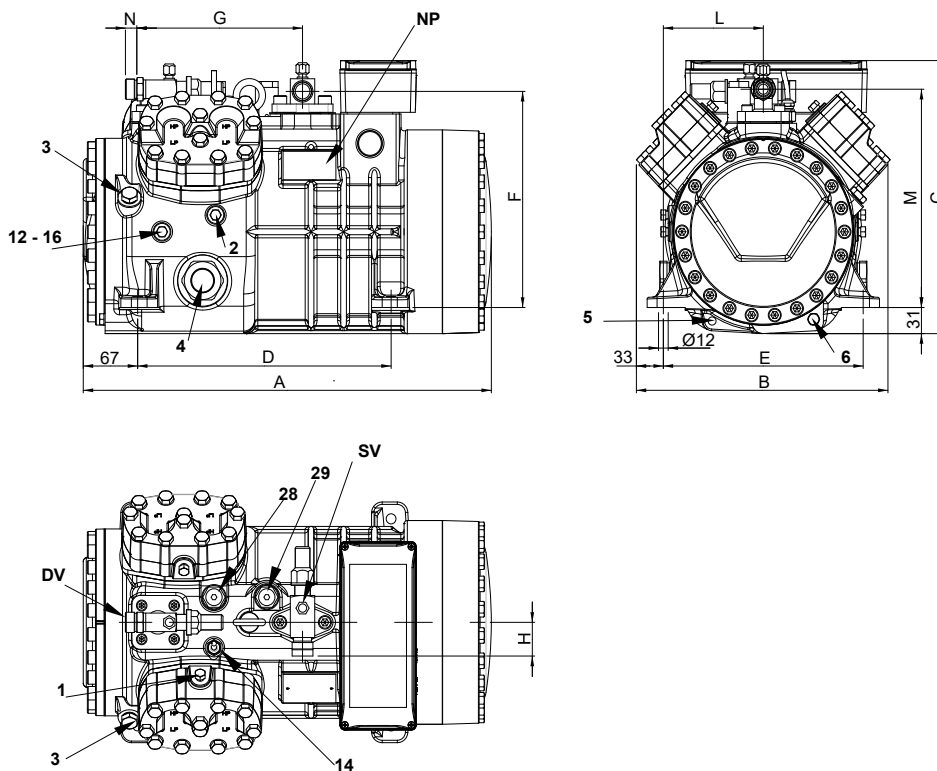
	Compressor					Valves position						Valves						Net Weight [Kg]	
	Length	Width	Height	Base mounting		Suction			Discharge			Suction		Discharge					
	A	B	C	D	E	F	G	H	L	M	N	Øint		Øint		Øint (OGV)			
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
D3-1.9TK	449	307	319	293	198	192	92	42	99	278	14	22,2	7/8	19	3/4	16	5/8	80	
D3-2.2TK	449	307	319	293	198	192	92	42	99	278	14	22,2	7/8	19	3/4	16	5/8	80	
D3.5-2.2TK	449	307	319	293	198	192	92	42	99	278	14	22,2	7/8	19	3/4	16	5/8	81	
D3.5-3TK	449	307	319	293	198	192	92	42	99	278	14	22,2	7/8	19	3/4	16	5/8	81	
D4-3TK	449	307	319	293	198	192	92	42	99	278	14	22,2	7/8	19	3/4	16	5/8	82	
D4-3.5TK	449	307	319	293	198	192	92	42	99	278	14	22,2	7/8	19	3/4	16	5/8	82	
D5-3.5TK	449	307	319	293	198	192	92	42	99	278	14	22,2	7/8	19	3/4	16	5/8	83	



1	High pressure connection	1/8" NPT
2	Low pressure connection	1/8" NPT
3	Oil charge plug	1/4" Gas
4	Oil level sight glass	1 1/8" UNEF
5	Crankcase heater seat	
6	Oil drain plug	M8
12	Oil return plug	1/8" NPT
14	Max discharge temperature sensor connection	1/8" NPT
28	High pressure side relief valve	
29	Low pressure side relief valve	
DV	Discharge valve (available optional thread connection for steel pipes)	
SV	Suction valve	
NP	Nameplate	

Dimensional drawing

	Compressor					Valves position						Valves						Net Weight [Kg]
	Length	Width	Height	Base mounting		Suction			Discharge			Suction		Discharge				
	A	B	C	D	E	F	G	H	L	M	N	Øint	Øint	Øint (OGV)				
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	
Q5-4TK	502	310	324	312	246	257	204	40	123	259	14	22,2	7/8	19	3/4	16	5/8	90
Q6-4TK	502	310	324	312	246	257	204	40	123	259	14	22,2	7/8	19	3/4	16	5/8	94
Q6-4.5TK																		
Q7-4.5TK																		
Q7-6TK																		
Q9-6TK	502	310	324	312	246	257	204	40	123	259	14	22,2	7/8	19	3/4	16	5/8	96
Q9-7TK																		

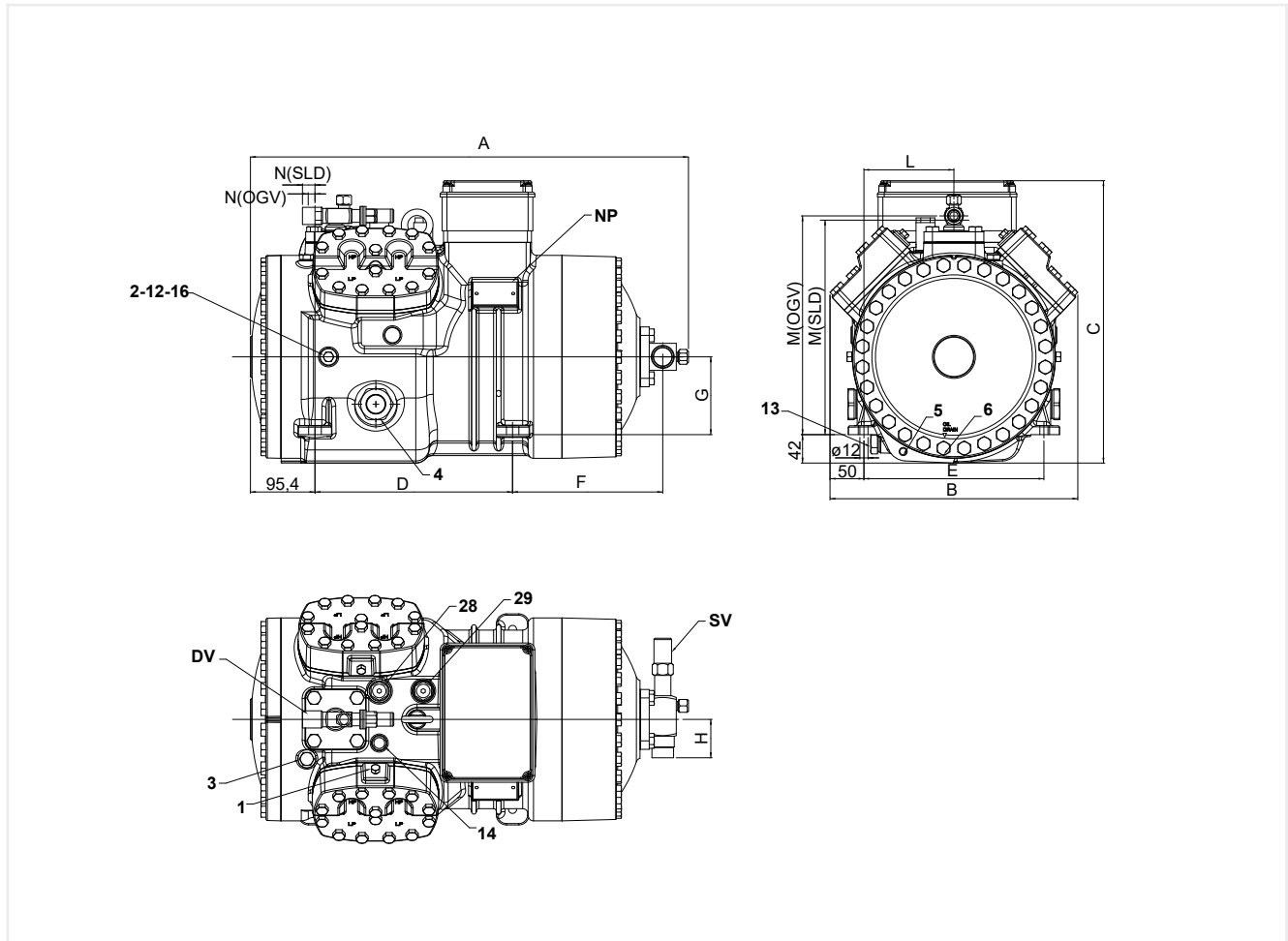


34

1	High pressure connection	1/8" NPT
2	Low pressure connection	1/8" NPT
3	Oil charge plug	1/4" Gas
4	Oil level sight glass	1 1/8" UNEF
5	Crankcase heater seat	
6	Oil drain plug	M8
12	Oil return plug	1/8" NPT
14	Max discharge temperature sensor connection	1/8" NPT
28	High pressure side relief valve	
29	Low pressure side relief valve	
16	Crankcase pressure plug	1/8" NPT
DV	Discharge valve (available optional thread connection for steel pipes)	
SV	Suction valve	
NP	Nameplate	

Dimensional drawing

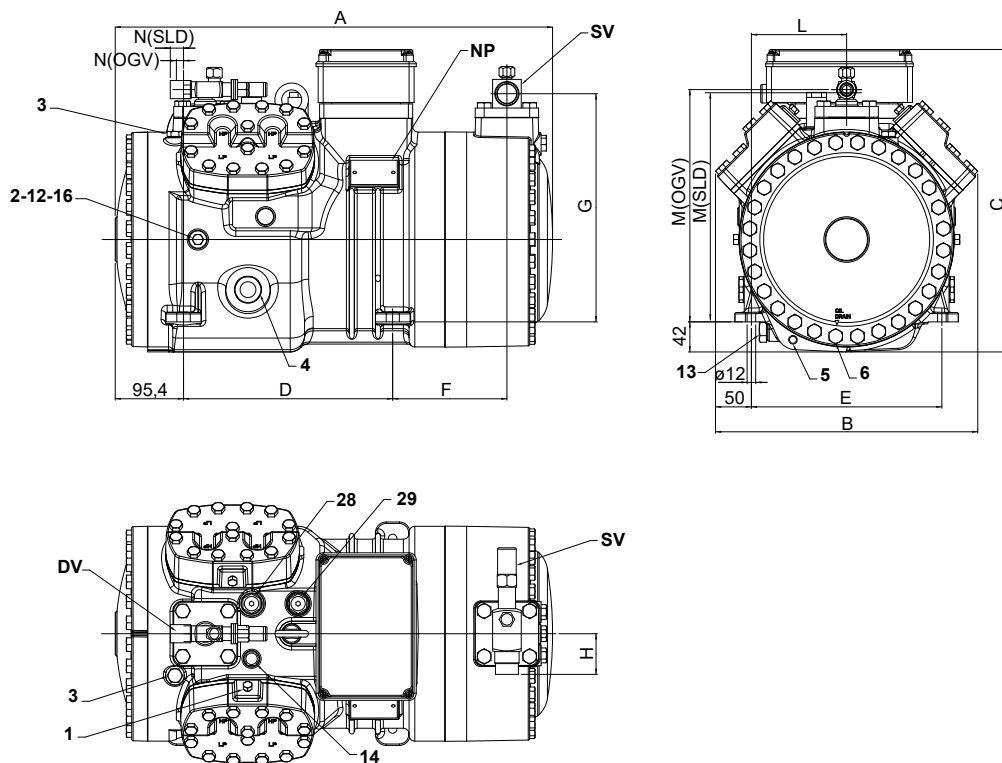
	Compressor					Valves position								Valves						Net Weight	
	Length	Width	Height	Base mounting		Suction			Discharge					Suction		Discharge					
	A	B	C	D	E	F	G	H	L	M		N			Øint		Øint		Øint (OGV)		
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	(OGV)	(SLD)	(OGV)	(SLD)	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]		[Kg]
S8-8TK	648	366	423	292	266	221	115	55	133	324	316	10	34,5	28,6	1 1/8	19	3/4	16	5/8	181	
S10-8TK	648	366	423	292	266	221	115	55	133	324	316	10	34,5	28,6	1 1/8	19	3/4	16	5/8	183	
S10-10TK	648	366	423	292	266	221	115	55	133	324	316	10	34,5	28,6	1 1/8	19	3/4	16	5/8	181	
S15-10TK	648	366	423	292	266	221	115	55	133	324	316	10	34,5	28,6	1 1/8	19	3/4	16	5/8	183	
S15-12TK																					



1	High pressure connection	1/8" NPT
2	Low pressure connection	1/8" NPT
3	Oil charge plug	1/4" Gas
4	Oil level sight glass	1 1/8" UNEF
5	Crankcase heater seat	
6	Oil drain plug	M12
12	Oil return plug	1/4" NPT
13	Magnetic plug	1/2" Gas
14	Max discharge temperature sensor connection	1/8" NPT
16	Crankcase pressure plug	1/4" NPT
28	High pressure side relief valve	
29	Low pressure side relief valve	
DV	Discharge valve (available optional thread connection for steel pipes)	
SV	Suction valve	
NP	Nameplate	

Dimensional drawing

	Compressor					Valves position								Valves					Net Weight [Kg]	
	Length	Width	Height	Base mounting		Suction			Discharge					Suction		Discharge				
	A	B	C	D	E	F	G	H	L	M		N		Øint		Øint		Øint (OGV)		
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	(OGV)	(SLD)	(OGV)	(SLD)	[mm]	[inch]	[mm]	[inch]	[mm]		[inch]
S20-12TK																				
S20-14TK	648	366	423	292	266	221	115	55	133	324	316	10	34,5	28,6	1 1/8	19	3/4	16	5/8	187
S25-14TK																				
S20-18TK																				

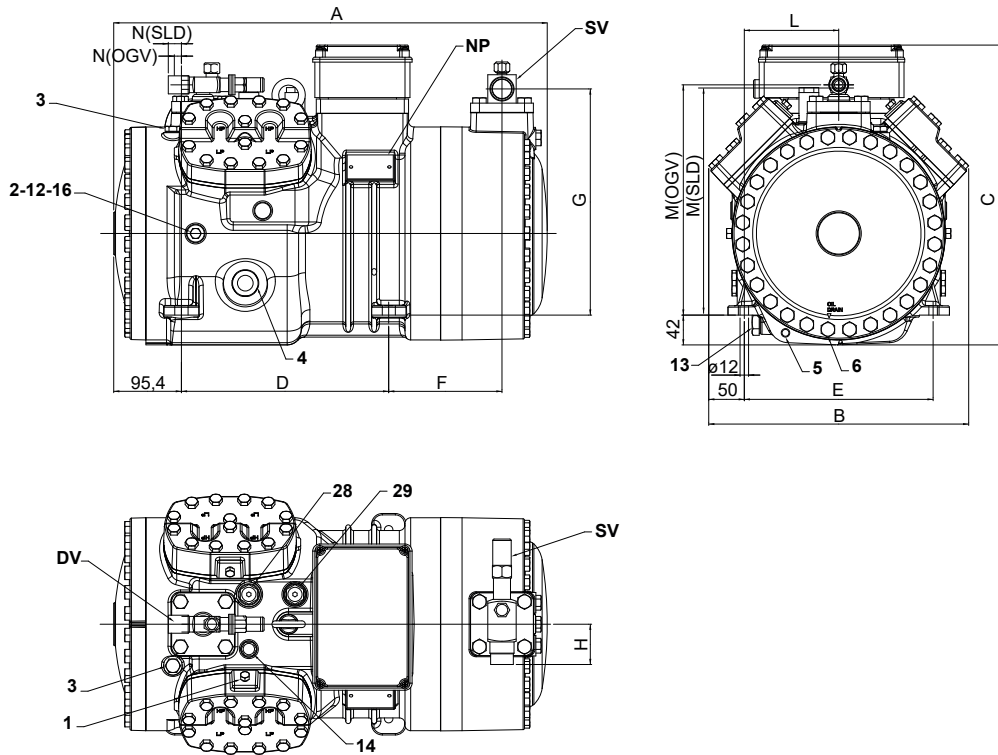


36

1	High pressure connection	1/8" NPT
2	Low pressure connection	1/8" NPT
3	Oil charge plug	1/4" Gas
4	Oil level sight glass	1 1/8" UNEF
5	Crankcase heater seat	
6	Oil drain plug	M8
12	Oil return plug	1/4" NPT
13	Magnetic plug	1/2" Gas
14	Max discharge temperature sensor connection	1/8" NPT
16	Crankcase pressure plug	1/4" NPT
28	High pressure side relief valve	
29	Low pressure side relief valve	
DV	Discharge valve (available optional thread connection for steel pipes)	
SV	Suction valve	
NP	Nameplate	

Dimensional drawing

	Compressor					Valves position								Valves					Net Weight [Kg]	
	Length	Width	Height	Base mounting		Suction			Discharge					Suction		Discharge				
									L	M		N				Ø _{int}	Ø _{int}			Ø _{int} (OGV)
	(OGV)	(SLD)	(OGV)	(SLD)	(mm)	(inch)	(mm)	(inch)		(mm)	(inch)									
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]		
S30-18TK	611	366	423	292	266	160	319	55	133	324	316	10	34,5	28,6	1 1/8	19	3/4	16	5/8	204
S25-21TK	611	366	423	292	266	160	319	55	133	324	316	10	34,5	28,6	1 1/8	19	3/4	16	5/8	187
S35-21TK	611	366	423	292	266	160	319	55	133	324	316	10	34,5	28,6	1 1/8	19	3/4	16	5/8	215
S30-26TK	611	366	423	292	266	160	319	55	133	324	316	10	34,5	28,6	1 1/8	19	3/4	16	5/8	201
S40-26TK	611	366	423	292	266	160	319	55	133	324	316	10	34,5	28,6	1 1/8	19	3/4	16	5/8	220



1	High pressure connection	1/8" NPT
2	Low pressure connection	1/4" NPT
3	Oil charge plug	1/4" Gas
4	Oil level sight glass	1 1/8" UNEF
5	Crankcase heater seat	
6	Oil drain plug	M12
12	Oil return plug	1/4" NPT
13	Magnetic plug	1/2" Gas
14	Max discharge temperature sensor connection	1/8" NPT
16	Crankcase pressure plug	1/4" NPT
28	High pressure side relief valve	
29	Low pressure side relief valve	
DV	Discharge valve (available optional thread connection for steel pipes)	
SV	Suction valve	
NP	Nameplate	



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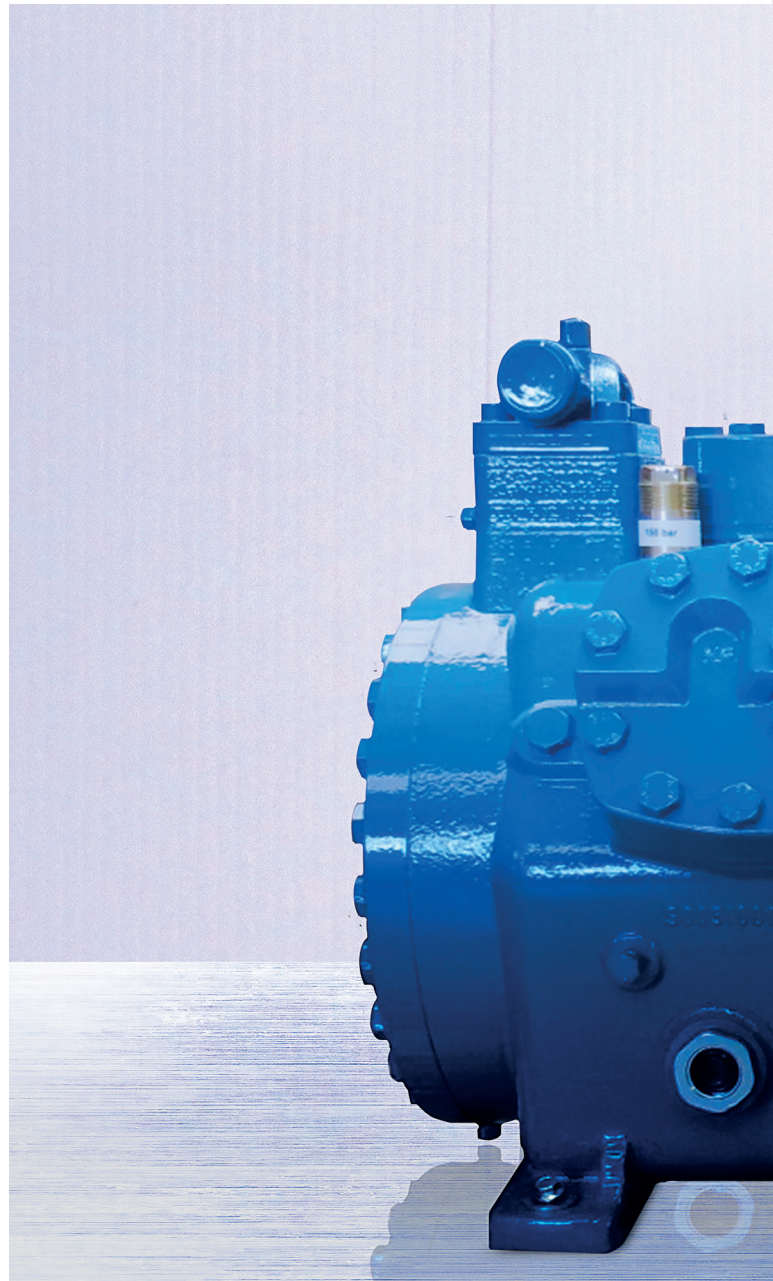
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