

# Frascold<sup>®</sup>

## Reciprocating semi-hermetic compressors

refrigeration, process cooling, air conditioning, heating pumps





## Since 1936 a path of development, constant improvement and a focus on cutting edge technologies

Throughout this time, Frascold has been producing 'Made in Italy' compressors for the cooling and air conditioning industry, marketing them worldwide 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 our technology, application experience and global presence, we offer products, solutions and services that allow our customers to reap benefits in terms of performance, energy efficiency and operating comfort.

Frascold, today, is a landmark industrial operation, working across the world with expertise, resources and the best, highly qualified personnel. Frascold has all the tools to be sensitive to and promptly address the needs of the market.

### Frascold products

- Reciprocating compressors
- Screw compressors
- Condensing units

Our products are known worldwide for their high quality and are used in both retail and industrial applications.

### Applications

Our products are used in many sectors: in cooling, air conditioning, heat pumps, and affect the day-to-day life of vast numbers of people.

- Retail cooling systems in general
- Industrial cooling
- Transit refrigeration and ship cooling systems
- Passenger transport comfort cooling
- Environmental simulation chambers
- Air conditioning systems
- Liquid chillers
- Heat pumps

## General information

Frascold produces a wide range of semi-hermetic reciprocating single- and two-stage compressors with displacement range from 4 to 240 m<sup>3</sup>/h at 50Hz and electrical ratings from 0.50 to 80 HP. Suitable for conventional HFC-based, new low-GWP, HFO and natural refrigerants. The compressors are suitable for use in a wide range of retail and industrial cooling applications, process chillers, air conditioning and heat pumps; in single, multi-compressor systems and cascade systems. A wide range of accessories broadens 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 systems integrated in the compressors are among the most advanced on the market.

In addition to standard models, the range of compressors also includes ECOinside models optimised for use with R134a and R1234ze, ATEX construction AXH, AXY and AXE models, VS models with integrated inverter, SK2 and TK models for CO<sub>2</sub> applications in sub-critical and trans-critical cycle, two-stage models, Tandem construction models.

The performance of most models are ASERCOM-certified, while the entire range of compressors is UL-certified. Other certifications are available on request.

### Data on compressor capacity

This brochure indicates the data for compressors with R134a, R407A, R407F, R404A, R507A. Data for other refrigerants are available on request.

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

### Motor version

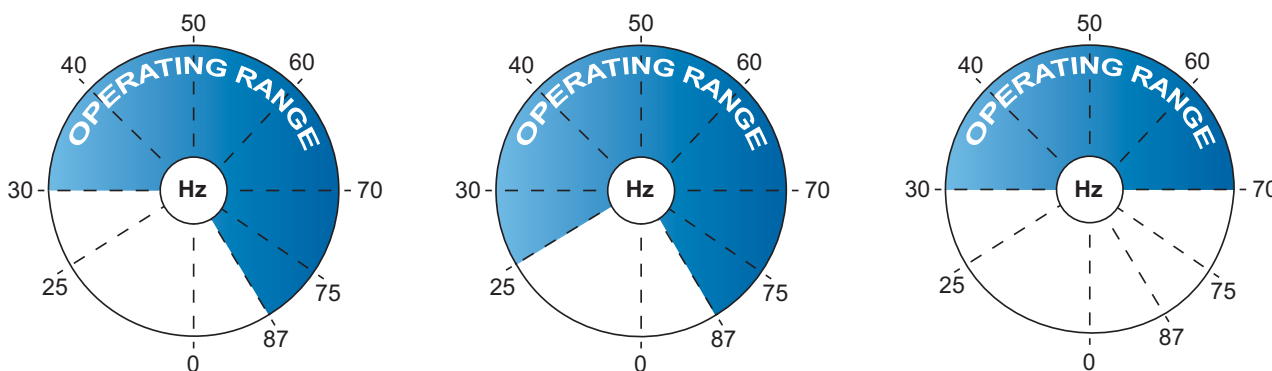
To allow the compressor to adapt ideally to the various applications, electric motors have been provided in three different versions:

- size 1: for medium-high temperature applications
- size 2: for low temperature applications
- size 3: optimised for applications with R134a and R12334ze in medium temperatures

### Application with variable frequency drive

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

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



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 the new Diagnose technology

Frascold integrates the Diagnose technology on semi-hermetic reciprocating compressors, which provides a significant advance in the compressors protection system and adds new diagnostics and communication features.

### Increased protection

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

### Lower costs

Quick identification of the cause of the malfunction.

The information stored inside the Diagnose devices allow technicians to accurately and rapidly diagnose the cooling system's past and present state, leading to prompt servicing times, improved cost-effectiveness, with short system downtime.

### More information

The communication systems supported by the Diagnose technology allow system operating data to be monitored and downloaded in real time: hence technicians are able to intervene improving the system's efficiency and reliability, diagnosing the required maintenance in advance.

## Safety device to control delivery temperature

In certain extreme conditions (such as coolant leaks or high compression ratios) the internal delivery temperature may reach figures that might 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 temperature should 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 of proven reliability to control lubrication. It efficiently monitors pressure swings in the lubrication system and stops the compressor in the event of any detected measurements that do not comply with the set safety values. The device is attached directly on the compressor's oil pump and does not require supplementary fittings.

## Standard capacity control

Through the CC device, available on request, on Frascold 4, 6 and 8-cylinder compressors, capacity may be adjusted by throttling the heads in order to adapt the cooling capacity of the system to the actual thermal demands of fixtures. This leads to avoiding high start-up frequency and reducing strain 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)

## Unloaded start

In Frascold compressors, unloaded compressor start is possible through the US device integrated in the head (available on request on 4, 6 and 8-cylinder models). The device equalises the inlet and outlet pressure, thus preventing excessive strain on the power mains at the same time as reducing the starting torque on the compressor. Note: to perform unloaded start, a check valve downstream of the compressor discharge valve is required (not supplied by Frascold).

## Capacity control with RSH system

The cooling load of many applications may be extremely variable at different times and cooling systems must adapt to this variability. However, there is a limit in the number of admissible hour cycles for the compressor and a minimum operation time to be complied with. It is obvious that complying with these limits and adapting to the required cooling load result in an operating compromise that is not always the most efficient one.

In general, the compressor's functional limits described above set the maximum and minimum evaporation pressure values, and the higher the difference between these two values, the higher the wasted energy.

The exclusive RSH system developed by Frascold to control compressors capacity allows the cooling system design to be optimised in order to reduce energy consumption. Compared to a conventional capacity control system, the RSH system allows the load to be split over a higher number of steps and with no operation time limit, thus offering fine adjustment to the system's cooling load.

### Features and advantages

- Enhanced system efficiency and reliability
- Greater reduction of compressor on-off cycles
- Enhanced intake pressure stability
- More control steps
- No time operation limit
- No increase in vibration and noise compared to full load operation
- No overheating on discharge
- No oil carryover
- Available for all 2, 4, 6 and 8 cylinder compressor models

## Lubricating oil

All compressors are supplied filled with oil with specific features for cooling fluids and having low carryover. Oil viscosity is suitable to assure perfect lubrication within the application limits of the compressors and is appropriate to their mechanics.

## 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.

## Information plate

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

## Safety

Frascold compressors are constructed according to European and American (UL) 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 refer to the Manufacturer's Declaration, available on request.

They may only be commissioned by skilled personnel adequately informed on the manufacturer's declarations.

## FSS.2 Product Selection Software

The FSS.2 selection software, quick and easy to use, allows users to obtain the capacity in the various operating points and to access all the information on Frascold compressors.

If you have any questions on how the software works please contact customer service via e-mail or telephone. You can also send your comments and suggestions to improve the FSS.2 program. Your feedback is always welcome.

Download the 'setup.exe' file on your computer, run it and follow the installation instructions. A program shortcut will be created on your desktop for easier start up.

## General information

Frascold reserves itself the ownership of the contents of the present catalogue; no reproduction is allowed without Frascold explicit consent. The data and the information contained in the present catalogue have been decided based on our skills, and they do not exempt the user from his duty to control the adequacy of the products with regards to the specific application. Frascold reserves itself the right to modify the content of the present catalogue, in view of normal innovations and updates deemed appropriate.

## Kriwan Diagnose multifunctional device

### INT69 ®Diagnose and INT69TML ®Diagnose

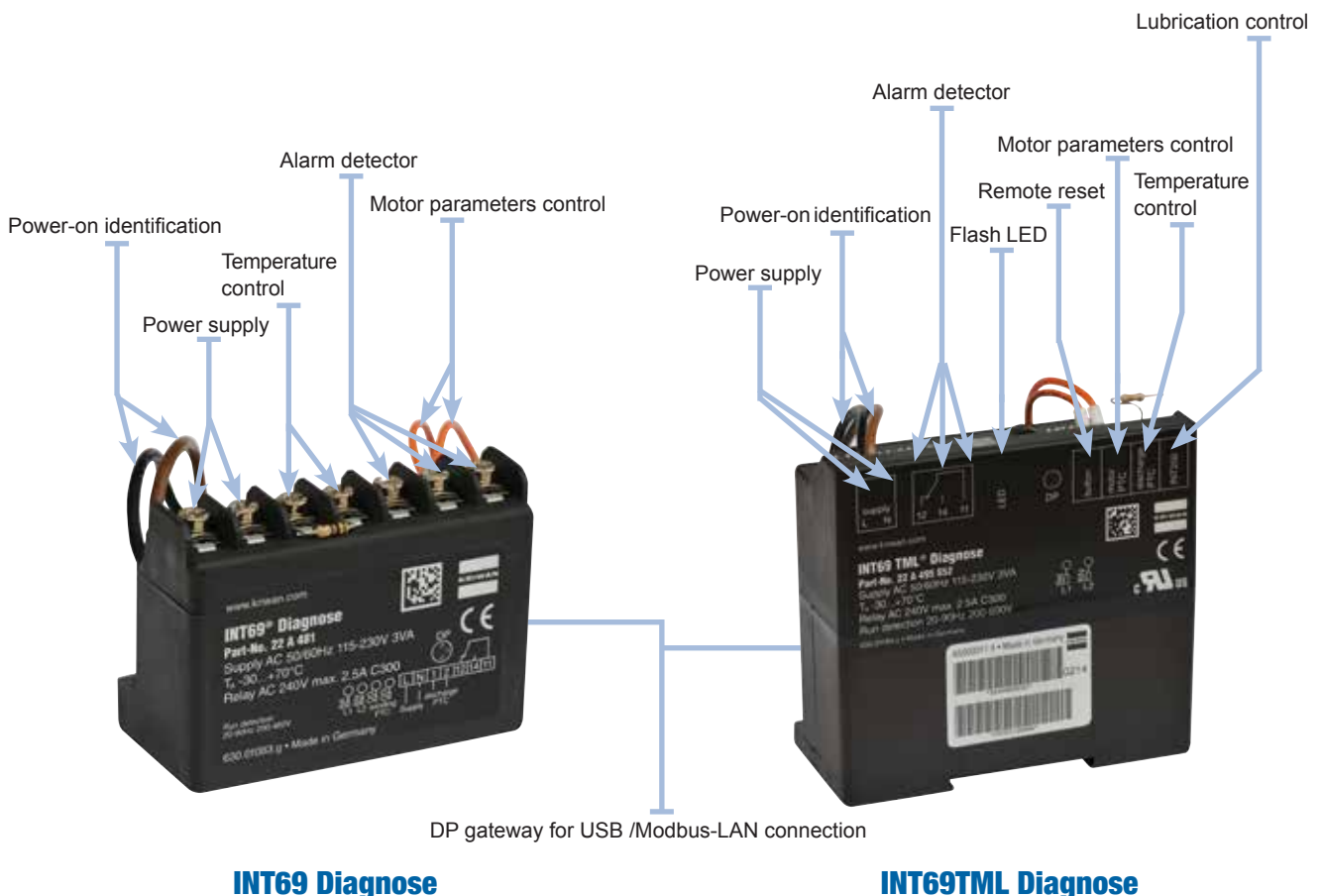
Kriwan Diagnose devices are a further development of compressors' protection units.

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 any plant 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 has been the first compressor manufacturer to adopt this innovative technology and today it is standard supplied on all models in the Q - S - V - Z - W series.

#### Advantages

- Guaranteed optimal operation throughout the compressor's entire life cycle
- Convenient and with straightforward operation
- Instantaneous diagnosis and precise problem-solving in case of error or fault
- Specifically adapted to the user's needs
- Intelligent monitoring of compressor operation
- It extends the operative life of cooling systems
- Improves compressor protection
- Reduces running and maintenance costs
- Automatic storage of operative data and errors in a memory
- Data sheet with retrieval of stored data
- Display of compressor status through flash LED code
- Data download through USB connection
- Remote communication through Modbus-Gateway and LAN-Gateway protocol
- Also applicable to already installed compressors



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

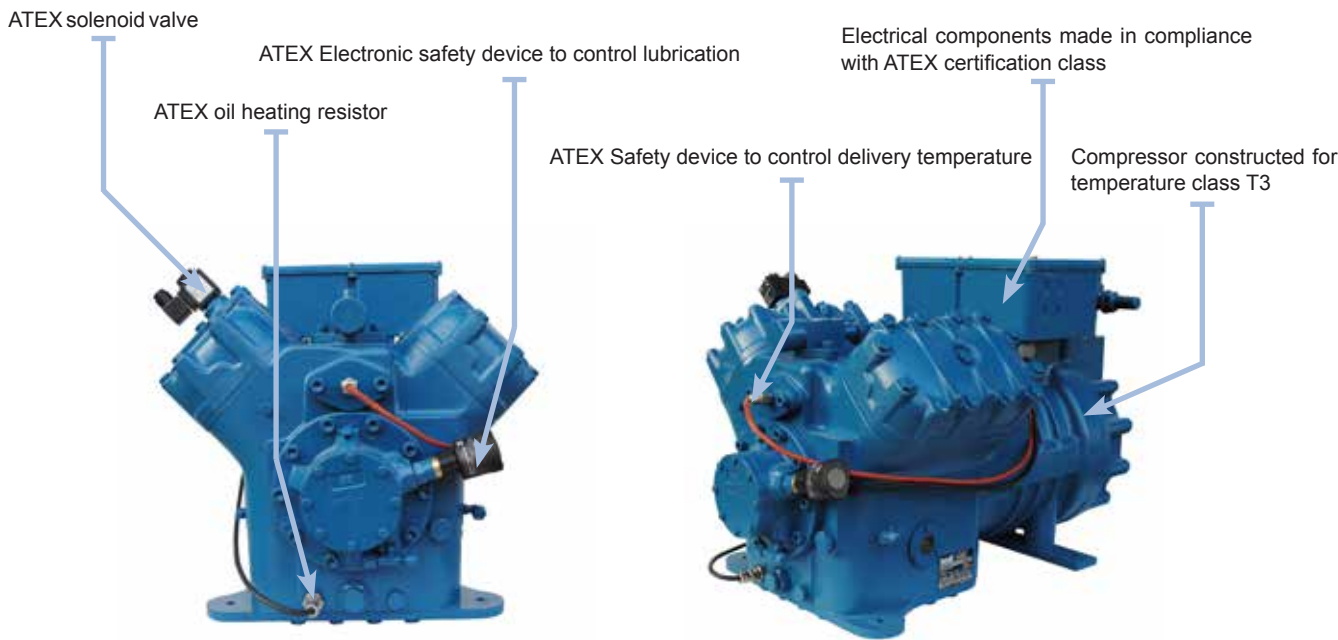
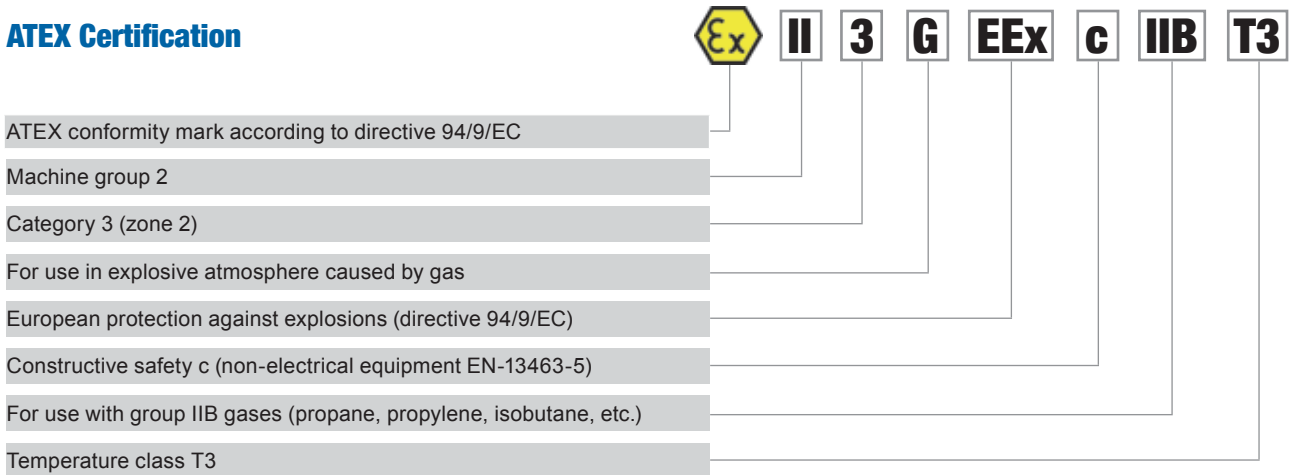
## ATEX compressors

Within the European Union, mechanical and electrical equipment used in explosive atmosphere must comply with ATEX requirements. Frascold has been 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. Contact Frascold for use with other conventional 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



## Technical data

COMPRESSOR MODEL	Cylinders	Displacement m <sup>3</sup> /h 50Hz	Nominal power (HP)	Motor version	Max operating current 400V / 50 Hz (A)	Locked rotor current 400V / 50 Hz (A)	Oil charge (liters)	Pipe connections (valves with solder conn.)				Weight (kg)	Sound pressure at 1m (dBA)	
								Suction line		Discharge line			(1)	(2)
								mm	inch	mm	inch			
A05-4Y	2	3,95	0,50	1	2,8	10,7	1	15,8	5/8	12,7	1/2	36	55,0	55,0
A05-5Y	2	4,93	0,50	2	2,7	10,7	1	15,8	5/8	12,7	1/2	36	55,0	55,0
A07-5Y			0,75	1	2,7	10,7	1	15,8	5/8	12,7	1/2	36	55,8	54,3
A07-6Y	2	5,47	0,75	2	2,8	10,7	1	15,8	5/8	12,7	1/2	36	55,9	54,6
A1-6Y			1	1	3,6	13,6	1	15,8	5/8	12,7	1/2	36	56,4	54,5
A1-7Y	2	6,91	1	2	3,7	13,6	1	15,8	5/8	12,7	1/2	36	56,4	54,5
A1.5-7Y			1,5	1	4,5	20,6	1	15,8	5/8	12,7	1/2	36	55,1	55,4
A1.5-8Y	2	7,65	1,5	2	4,8	20,6	1	15,8	5/8	12,7	1/2	36	57,4	57,6
B1.5-9.1Y	2	8,96	1,5	1	5,9	26,8	1	12,7	1/2	12,7	1/2	38	57,7	57,5
B1.5-10.1Y	2	9,88	1,5	2	5,5	26,8	1	15,8	5/8	12,7	1/2	38	57,7	57,6
B2-10.1Y			2	1	6,7	35,9	1	15,8	5/8	12,7	1/2	40	57,9	58,0
D2-11.1Y	2	11,26	2	1	7,1	35,9	1,1	22,2	7/8	15,8	5/8	45	58,0	59,8
D2-13.1Y	2	13,15	2	2	7,1	35,9	1,1	22,2	7/8	15,8	5/8	45	58,2	59,8
D3-13.1Y			3	1	8,8	43,7	1,1	28,6	1 1/8	15,8	5/8	49	58,7	60,0
D2-15.1Y	2	15,36	3	2	8,4	35,9	1,1	22,2	7/8	15,8	5/8	45	59,0	60,4
D3-15.1Y			3	1	10,1	43,7	1,1	28,6	1 1/8	15,8	5/8	49	59,0	60,5
D3-16.1Y	2	16,40	3	2	9,9	43,7	1,1	28,6	1 1/8	15,8	5/8	49	59,1	62,0
D4-16.1Y			4	1	11,6	52,0	1,2	28,6	1 1/8	19,0	3/4	51	59,3	62,5
D3-18.1Y	2	17,93	3	2	10,0	43,7	1,1	28,6	1 1/8	15,8	5/8	49	60,1	62,3
D4-18.1Y			4	1	12,5	52,0	1,2	28,6	1 1/8	19,0	3/4	51	60,5	63,0
D3-19.1Y	2	19,12	3	2	9,8	43,7	1,1	28,6	1 1/8	15,8	5/8	49	60,5	63,0
D4-19.1Y			4	1	11,8	52,0	1,2	28,6	1 1/8	19,0	3/4	51	62,0	64,0
Q4-20.1E (ECOinside)	4	19,77	4	3	6,1	56,3	1,6	28,6	1 1/8	19,0	3/4	74	59,0	-
Q4-20.1Y			4	2	10,1	53,2	1,6	28,6	1 1/8	19,0	3/4	74	59,0	62,0
Q4-21.1Y	4	21,18	4	2	10,0	53,2	1,6	28,6	1 1/8	19,0	3/4	79	59,4	62,3
Q5-21.1Y			5	1	11,6	63,1	1,6	28,6	1 1/8	19,0	3/4	79	59,4	62,4
Q4-24.1E (ECOinside)	4	23,91	4	3	7,2	56,3	1,6	28,6	1 1/8	19,0	3/4	79	61,8	-
Q4-24.1Y			4	2	11,7	53,2	1,6	28,6	1 1/8	19,0	3/4	79	62,0	64,0
Q5-24.1Y			5	1	13,8	63,1	1,6	28,6	1 1/8	22,2	7/8	79	62,0	64,0
Q4-25.1Y	4	24,69	4	2	11,0	54,2	1,6	28,6	1 1/8	19,0	3/4	79	62,3	64,1
Q5-25.1Y			5	2	12,7	63,1	1,6	28,6	1 1/8	22,2	7/8	79	62,5	64,3
Q7-25.1Y			7,5	1	15,4	87,3	1,6	28,6	1 1/8	22,2	7/8	79	62,7	-
Q5-28.1E (ECOinside)	4	28,02	5	3	7,9	54,7	1,6	35	1 1/8	22,2	7/8	79	63,0	-
Q5-28.1Y			5	2	14,0	63,1	1,6	35	1 1/8	22,2	7/8	79	64,0	64,7
Q7-28.1Y			7,5	1	17,6	87,3	1,6	35	1 1/8	28,6	1 1/8	79	64,0	-
Q5-33.1E (ECOinside)	4	32,66	5	3	9,3	54,7	1,6	35	1 1/8	28,6	1 1/8	79	61,5	-
Q5-33.1Y			5	2	14,4	63,1	1,6	35	1 1/8	28,6	1 1/8	79	64,2	64,4
Q7-33.1Y			7,5	1	20,0	87,3	1,6	35	1 1/8	28,6	1 1/8	79	64,3	-
Q5-36.1E (ECOinside)	4	35,86	5	3	11,8	63,1	1,6	35	1 1/8	28,6	1 1/8	79	64,3	-
Q7-36.1Y			7,5	2	19,4	87,3	1,6	35	1 1/8	28,6	1 1/8	79	63,2	-
S5-33Y	4	32,80	5	2	15,9	35,5	2,9	35	1 1/8	28,6	1 1/8	115	65,6	65,8
S7-33Y			7,5	1	20,4	47,0	2,9	35	1 1/8	28,6	1 1/8	117	65,8	-
S8-42E (ECOinside)	4	41,32	8	3	12,8	52,7	2,9	35	1 1/8	28,6	1 1/8	117	64,2	-
S8-42Y			8	2	20,3	52,7	2,9	35	1 1/8	28,6	1 1/8	117	66,0	66,3
S12-42Y			12	1	22,4	59,1	2,9	35	1 1/8	28,6	1 1/8	120	66,2	-
S10-52E (ECOinside)	4	51,50	10	3	14,7	59,5	2,9	35	1 1/8	28,6	1 1/8	120	64,5	-
S10-52Y			10	2	24,5	59,1	2,9	35	1 1/8	28,6	1 1/8	120	66,3	66,8
S15-52Y			15	1	32,4	74,8	2,9	42	1 1/8	28,6	1 1/8	126	66,5	-
S12-56E (ECOinside)	4	56,00	15	3	16,1	59,5	2,9	42	1 1/8	28,6	1 1/8	130	65,0	-
S15-56Y			15	2	30,7	74,8	2,9	42	1 1/8	28,6	1 1/8	130	66,9	67,2
S20-56Y			20	1	38,4	87,5	2,9	42	1 1/8	28,6	1 1/8	132	67,6	-

1) Average sound pressure level in application NT (-10°C / 45°C)

2) Average sound pressure level in application LT (-35°C / 40°C)



## Technical data

COMPRESSOR MODEL	Cylinders	Displacement m <sup>3</sup> /h 50Hz	Nominal power (HP)	Motor version	Max operating current 400V / 50 Hz (A)	Locked rotor current 400V / 50 Hz (A)	Oil charge (litri)	Pipe connections (valves with solder conn.)				Weight (kg)	Sound pressure at 1m (dBA)	
								Suction line		Discharge line			(1)	(2)
								mm	inch	mm	inch			
V15-59E (ECOinside)	4	58,48	15	3	17,5	59,5	4	42	1%	28,6	1%	170	65,0	-
V15-59Y			15	2	31,1	74,8	4	42	1%	28,6	1%	170	67,0	67,5
V20-59Y			20	1	35,3	106,6	4	42	1%	28,6	1%	174	67,2	-
V15-71E (ECOinside)	4	70,77	15	3	20,2	59,5	4	42	1%	28,6	1%	174	67,5	-
V15-71Y			15	2	32,2	74,8	4	42	1%	28,6	1%	174	67,9	68,1
V25-71Y			20	1	43,5	118,3	4	54	2%	35	1%	184	68,0	-
V20-84E (ECOinside)	4	83,81	20	3	27,2	89,9	4	42	1%	28,6	1%	180	69,6	-
V20-84Y			20	2	46,2	106,6	4	54	2%	35	1%	180	71,0	71,5
V30-84Y			30	1	49,2	132,6	4	54	2%	35	1%	187	71,3	-
V25-93Y	4	93,05	25	2	52,3	118,3	4	54	2%	35	1%	200	71,3	71,6
V32-93Y			32	1	53,1	144,5	4	54	2%	35	1%	192	71,5	-
V25-103E (ECOinside)	4	102,90	25	3	29,9	122,7	4	54	2%	35	1%	204	70,5	-
V25-103Y			25	2	52,3	118,3	4	54	2%	35	1%	204	71,3	71,6
V35-103Y			35	1	61,0	144,5	4	54	2%	35	1%	207	71,5	-
Z25-106E (ECOinside)	6	106,16	25	3	30,2	122,7	3,7	54	2%	35	1%	220	71,5	-
Z25-106Y			25	2	53,6	118,3	3,7	54	2%	35	1%	220	72,0	72,0
Z35-106Y			35	1	60,2	144,5	3,7	54	2%	35	1%	223	71,5	-
Z30-126E (ECOinside)	6	125,72	30	3	33,8	122,7	7,2	54	2%	35	1%	229	72,0	-
Z30-126Y			30	2	55,7	132,6	7,2	54	2%	35	1%	229	73,0	73,5
Z40-126Y			40	1	71,9	159,2	7,2	67	2%	42	1%	240	73,2	-
Z40-154E (ECOinside)	6	154,38	40	3	41,1	144,5	7,2	67	2%	42	1%	240	73,0	-
Z40-154Y			40	2	77,9	159,2	7,2	67	2%	42	1%	240	73,6	73,8
Z50-154Y			50	1	94,4	188,8	7,2	67	2%	42	1%	244	73,7	-
W40-142Y	8	141,50	40	1	89,3	215	7,7	67	2%	42	1%	295	76,5	77,2
W40-168Y			40	2	71,4	215	7,7	67	2%	42	1%	299	76,6	77,4
W50-168Y			50	1	94,8	258	7,7	79,4	3%	42	1%	305	76,7	-
W50-187Y	8	186,10	50	2	89,1	258	7,7	79,4	3%	42	1%	311	77,5	78,0
W60-187Y			60	1	103,5	326	7,7	79,4	3%	42	1%	315	78,0	-
W60-206Y	8	205,80	60	2	98,8	326	7,7	79,4	3%	54	2%	320	79,4	80,2
W70-206Y			70	1	116,8	390	7,7	79,4	3%	54	2%	328	79,4	-
W70-228Y	8	227,77	70	2	109,5	390	7,7	79,4	3%	54	2%	328	81,0	-
W75-228Y			75	1	128,4	417	7,7	79,4	3%	54	2%	328	81,0	-
W75-240Y	8	238,02	75	2	115,3	417	7,7	79,4	3%	54	2%	328	81,0	-
W80-240Y			80	1	135,7	417	7,7	79,4	3%	54	2%	328	81,0	-

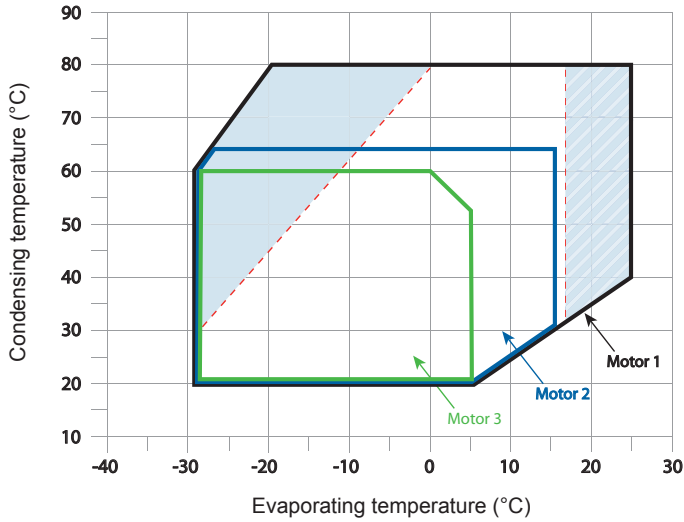
1) Average sound pressure level in application MT (-10°C / 45°C)

2) Average sound pressure level in application LT (-35°C / 40°C)

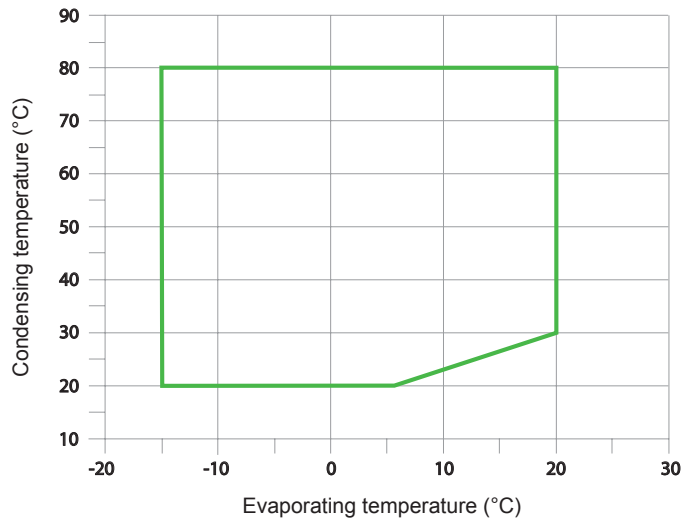
## Operating limits

Compressor operation is possible within the limits shown on the application diagrams. Please note the different zones. Restrictions on the limits of operation can occur when the compressor is controlled by inverter. For the operating limits of each compressor consult Frascold Selection Software.

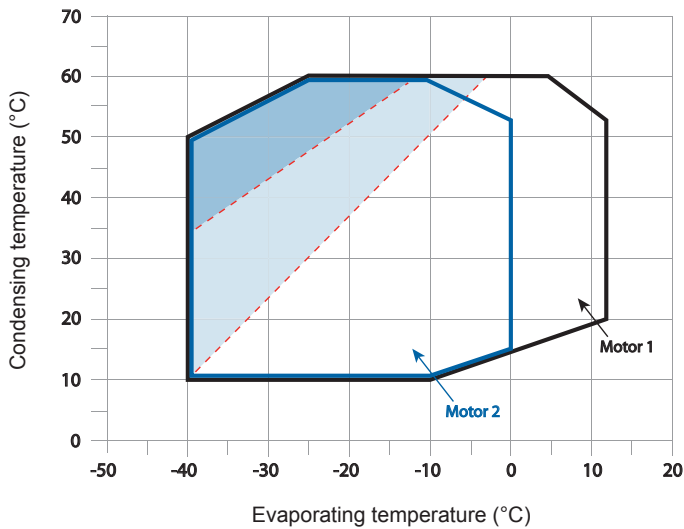
**R134a - Motor 1-2-3**



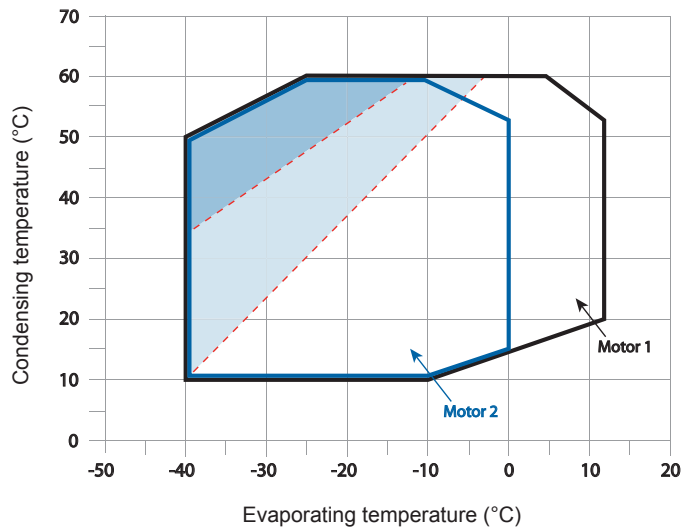
**R1234ze - Motor 3**



**R407A - Motor 1-2**



**R407F - Motor 1-2**



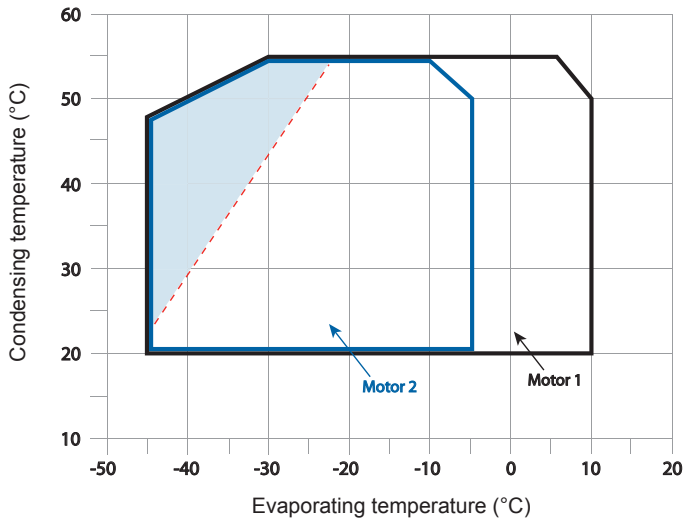
- $t_{oh}$  Suction gas temperature (°C)
- $\Delta t_{oh}$  Suction superheating (K)
- Additional cooling or reduced suction gas temperature (<20K)
- Additional cooling or suction gas temperature max 0°C
- Suction gas superheating (>10K)

Suction side maximum pressure 20,5 bar  
 Discharge side maximum pressure 30 bar

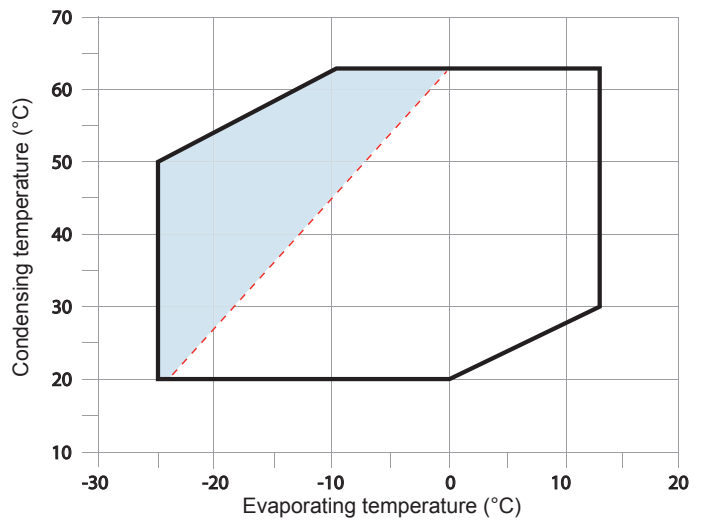
## Operating limits

Compressor operation is possible within the limits shown on the application diagrams. Please note the different zones. Restrictions on the limits of operation can occur when the compressor is controlled by inverter. For the operating limits of each compressor consult Frascold Selection Software.

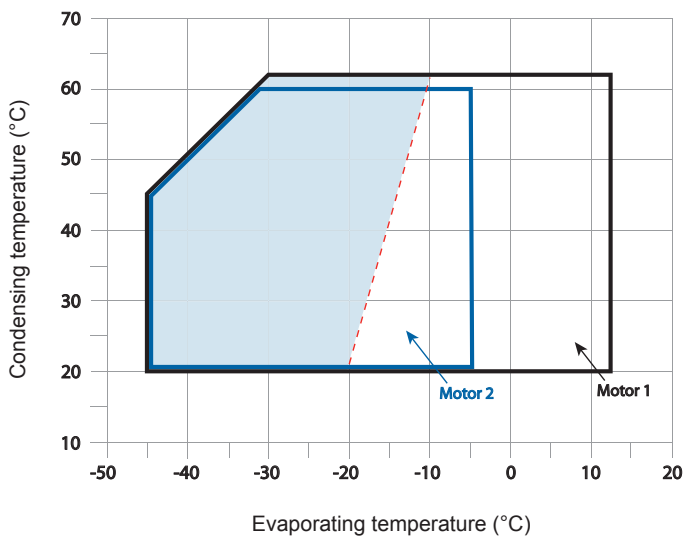
### R404A / R507A - Motor 1-2



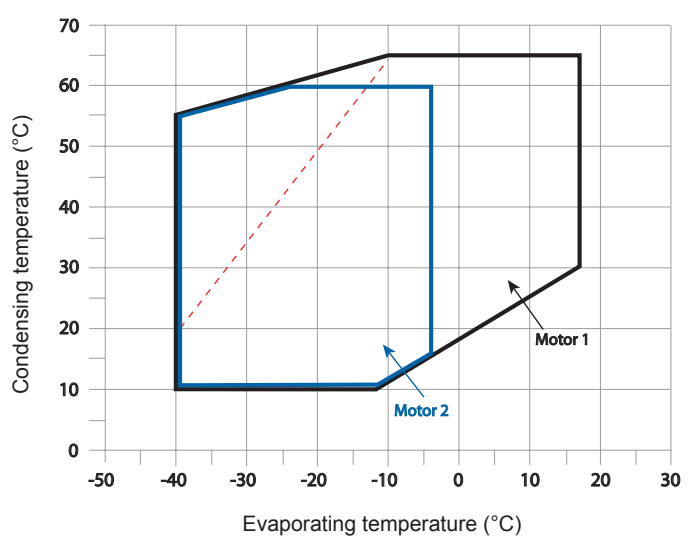
### R407C - Motor 1



### R22 - Motor 1-2



### R290 - Motor 1-2



- $t_{oh}$  Suction gas temperature (°C)
- $\Delta t_{oh}$  Suction superheating (K)
- Additional cooling or reduced suction gas temperature (<20K)
- Additional cooling or suction gas temperature max 0°C
- Suction gas superheating (>10K)

Suction side maximum pressure 20,5 bar

Discharge side maximum pressure 30 bar

## Semi-hermetic Frascold compressors series A – B – D with INT69 protection device

22 two cylinder model range with a displacement at 50Hz from 3,95 to 19,12 m<sup>3</sup>/h and a nominal electric power from ½ to 4HP for a wide scope of application in single and multi-compressor systems with HFC and HCFC traditional refrigerants, low GWP new refrigerants, HFO and HC (AXH version).

All models can be driven by a VFD and excel for their high efficiency and resulting savings on running cost, for their robust construction, low noise and compact size. These models are supplied with the electronic protection device INT69.

### Main technical characteristics

- Electronic protection device INT69
- IP56 electrical terminal box
- Suction and compression service valves
- POE32 lubricant charge
- Oil level sight glass or connection for automatic mechanical or electrical level devices/regulators
- Rubber vibration absorbers
- Nitrogen protective gas charge
- Packing ensuring proper handling and adequate protection

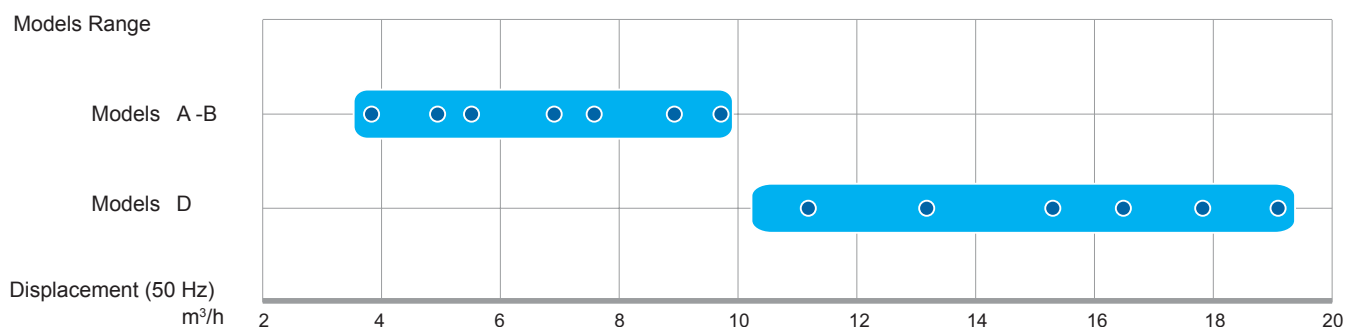
### Optional accessories

- Wide range of motors for all power supplies
- INT69@ Diagnose for monitoring, protection, diagnostics and communication
- Crankcase heater
- Additional cooling fan
- RSH capacity control head (only for D series)
- Electronic oil level regulator
- Flange + valve kit for oil equalization
- Modbus gateway plus cable
- LAN gateway

### ATEX version

All A – B – D series models are available with ATEX marking, designed and built according to the safety requirements of directive 94/9/ EC ATEX. These models are suitable for application in areas where explosive mixtures might occasionally form and are available in two different versions.

- **AXH** for application with hydrocarbons [R290, R1270, R600a, etc.]. charged with PAG lubricant.
- **AXY** for application with HFC, HCFC, HFO. charged with POE lubricant.





Frascold compressor series A - B  
with INT69 Diagnose device



Frascold compressor series D  
with INT69 Diagnose device

COMPRESSOR MODEL	Cylinders	Displacement m <sup>3</sup> /h 50Hz	Nominal power (HP)	Motor version	Cooling capacity 50 Hz (data based on EN12900)							
					R404A / R507A		R407F		R407A		R134a	
					MT (1) kW	LT (2) kW	MT (1) kW	LT (2) kW	MT (1) kW	LT (2) kW	HT (3) kW	MT (1) kW
A05-4Y	2	3,95	0,5	1	1,72	0,43	1,86	0,43	1,73	0,38	2,01	1,03
A05-5Y	2	4,93	0,5	2	2,17	0,59	2,33	0,54	2,18	0,47	2,50	1,29
A07-5Y			0,75	1	2,18	0,58	2,31	0,53	2,16	0,48	2,47	1,26
A07-6Y	2	5,47	0,75	2	2,43	0,68	2,71	0,67	2,53	0,61	2,64	1,36
A1-6Y			1	1	2,52	0,67	2,79	0,73	2,60	0,68	2,63	1,36
A1-7Y			1	2	3,29	0,98	3,50	0,90	3,28	0,84	3,53	1,92
A1.5-7Y	2	6,91	1,5	1	3,36	0,98	3,47	0,92	3,24	0,86	3,51	1,91
A1.5-8Y	2	7,65	1,5	2	3,58	1,12	3,93	1,03	3,69	0,97	3,95	2,18
B1.5-9.1Y	2	8,96	1,5	1	4,17	1,34	4,49	1,25	4,26	1,16	4,70	2,61
B1.5-10.1Y	2	9,88	1,5	2	4,58	1,43	5,07	1,40	4,76	1,27	5,30	2,97
B2-10.1Y			2	1	4,66	1,48	5,07	1,41	4,70	1,29	5,15	2,85
D2-11.1Y	2	11,26	2	1	5,49	1,69	5,47	1,42	5,15	1,28	5,88	3,20
D2-13.1Y	2	13,15	2	2	6,56	2,14	6,55	1,71	6,13	1,53	6,94	3,86
D3-13.1Y			3	1	6,49	-	6,49	1,70	6,05	1,57	6,88	3,70
D2-15.1Y	2	15,36	3	2	7,23	2,40	7,66	2,01	7,17	1,80	8,01	4,45
D3-15.1Y			3	1	7,59	-	7,59	1,97	7,09	1,81	7,98	4,38
D3-16.1Y			3	2	8,06	2,53	8,27	2,27	7,77	2,04	8,34	4,59
D4-16.1Y	2	16,40	4	1	8,36	-	8,19	2,28	7,66	2,09	8,56	4,82
D3-18.1Y	2	17,93	3	2	8,90	3,12	9,01	2,49	8,46	2,24	9,48	5,40
D4-18.1Y			4	1	9,02	-	8,94	2,46	8,36	2,26	9,99	5,50
D3-19.1Y	2	19,12	3	2	-	3,47	9,52	2,65	8,94	2,38	10,74	5,98
D4-19.1Y			4	1	9,42	3,29	9,47	2,61	8,85	2,39	10,17	5,81

(1) MT = Evaporation temperature -10°C, Condensing temperature 45°C, suction gas temperature 20°C, without liquid subcooling

(2) LT = Evaporation temperature -35°C, Condensing temperature 40°C, suction gas temperature 20°C, without liquid subcooling

(3) HT = Evaporation temperature 5°C, Condensing temperature 50°C, suction gas temperature 20°C, without liquid subcooling

Cooling capacity: for individual conditions or other refrigerant see Frascold Selection Software available at [www.frascold.it](http://www.frascold.it)

## Frascold semi-hermetic compressors series Q and S with INT69 ®Diagnose protection device

29 four cylinder models range with a displacement at 50Hz from 19,77 to 56,00 m<sup>3</sup>/h and nominal electric power from 4 to 20 HP, for a wide scope of application in single and multi-compressor systems with HFC and HCFC traditional refrigerants, low GWP new refrigerants, HFO and HC (AXH version).

All models can be driven by a VFD and excel for their high efficiency and resulting savings on running cost, for their robust construction, low noise and compact size. These models are supplied with the electronic protection device INT69 Diagnose with advanced protection and diagnosis functions for a higher system reliability. An extensive range of options increases the flexibility of its application.

### Main technical characteristics

- 4 cylinder compressors with:  
230-400/3/50 (265-480/3/60) DOL electric motor (Q series)  
400/3/50 (480/3/60) PWS electric motor (S series)
- PTC sensors connected to the protection system to detect excessively high motor temperatures
- Electronic protection device INT69 Diagnose for monitoring, protection, diagnostics and communication
- IP56 electrical terminal box
- Suction and compression service valves
- POE32 lubricant charge
- 2 x oil level sight glass or connection for automatic mechanical or electrical level devices/regulators
- Rubber vibration absorbers
- Nitrogen protective gas charge
- Packing ensuring proper handling and adequate protection

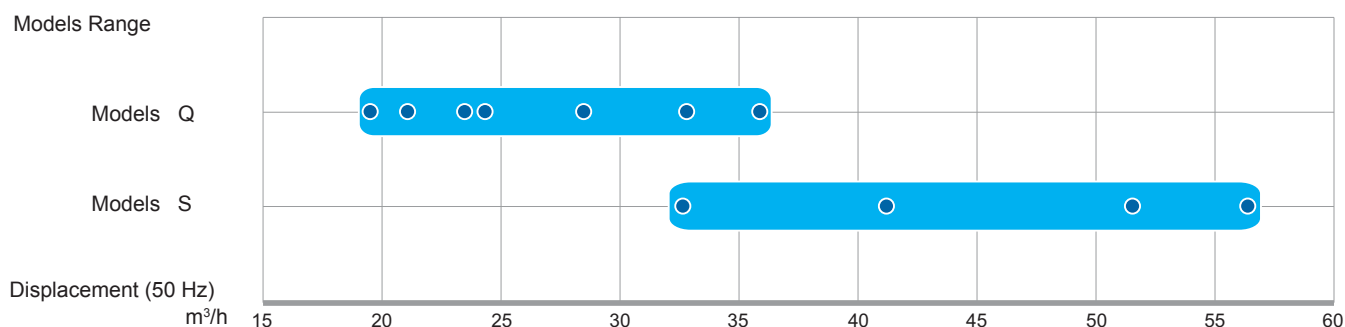
### Optional accessories

- Wide range of motors for all power supplies
- Crankcase heater
- Discharge temperature sensor
- Additional cooling fan
- FLI liquid injection kit
- US head for unloaded start
- CC head for capacity control
- RSH capacity control head
- Electronic oil level regulator
- Opto-electronic oil level switch
- Flange + valve kit for oil equalization
- Modbus gateway plus cable
- LAN gateway

### ATEX version

All Q and S series models are available with ATEX marking, designed and built according to the safety requirements of directive 94/9/EC ATEX. These models are suitable for application in areas where explosive mixtures might occasionally form and are available in three different versions.

- **AXH** for application with hydrocarbons [R290, R1270, R600a, etc.].  
charged with PAG lubricant.
- **AXY** for application with HFC, HCFC.  
charged with POE lubricant.
- **AXE** ECOinside version optimized for application with R134a and HFO refrigerants [R1234ze, R1234yf].  
charged with POE lubricant.





Frascold compressor series Q  
with INT69 Diagnose device



Frascold compressor series S  
with INT69 Diagnose device

COMPRESSOR MODEL	Cylinders	Displacement m <sup>3</sup> /h 50Hz	Nominal power (HP)	Motor version	Cooling capacity 50 Hz (data based on EN12900)							
					R404A / R507A		R407F		R407A		R134a	
					MT (1) kW	LT (2) kW	MT (1) kW	LT (2) kW	MT (1) kW	LT (2) kW	HT (3) kW	MT (1) kW
Q4-20.1E (ECOinside)	4	19,77	4	3	-	-	-	-	-	-	-	6,18
Q4-20.1Y			4	2	9,56	3,02	9,52	2,43	9,01	2,17	10,98	6,04
Q4-21.1Y	4	21,18	4	2	10,12	2,95	10,31	2,65	9,68	2,36	10,77	5,64
Q5-21.1Y			5	1	10,13	-	10,22	2,64	9,55	2,43	10,86	5,62
Q4-24.1E (ECOinside)	4	23,91	4	3	-	-	-	-	-	-	-	7,01
Q4-24.1Y			4	2	11,31	3,50	11,84	3,24	11,05	2,97	12,17	6,57
Q5-24.1Y			5	1	11,55	-	11,78	3,10	11,00	2,85	12,33	6,50
Q4-25.1Y	4	24,69	4	2	11,68	3,45	12,17	3,29	11,36	3,02	12,16	6,44
Q5-25.1Y			5	2	12,00	3,71	12,14	3,24	11,33	2,97	13,52	7,69
Q7-25.1Y			7,5	1	11,86	3,68	12,28	3,25	11,41	2,98	13,83	7,80
Q5-28.1E (ECOinside)	4	28,02	5	3	-	-	-	-	-	-	-	8,04
Q5-28.1Y			5	2	13,74	4,43	13,86	3,65	12,99	3,29	14,41	7,89
Q7-28.1Y			7,5	1	14,06	-	13,79	3,68	12,90	3,38	14,43	7,78
Q5-33.1E (ECOinside)	4	32,66	5	3	-	-	-	-	-	-	-	9,62
Q5-33.1Y			5	2	16,03	5,51	16,51	4,58	15,53	4,13	16,51	9,36
Q7-33.1Y			7,5	1	16,23	-	16,34	4,53	15,35	4,17	17,04	9,38
Q5-36.1E (ECOinside)	4	35,86	5	3	-	-	-	-	-	-	-	11,19
Q7-36.1Y			7,5	2	18,41	6,03	17,94	5,04	16,86	4,64	19,89	11,27
S5-33Y	4	32,80	5	2	16,80	5,88	15,65	3,72	14,66	3,46	17,89	10,21
S7-33Y			7,5	1	16,56	5,20	15,59	3,66	14,71	3,40	17,81	10,03
S8-42E (ECOinside)	4	41,32	8	3	-	-	-	-	-	-	-	13,61
S8-42Y			8	2	21,16	6,86	20,19	5,08	19,31	4,95	24,06	13,08
S12-42Y			12	1	19,75	-	20,07	5,04	19,24	4,85	21,79	11,89
S10-52E (ECOinside)	4	51,50	10	3	-	-	-	-	-	-	-	14,95
S10-52Y			10	2	25,84	9,15	24,31	5,66	23,11	5,46	27,54	15,64
S15-52Y			15	1	26,53	8,46	24,36	5,60	23,13	5,40	27,44	15,44
S12-56E (ECOinside)	4	56,00	15	3	-	-	-	-	-	-	-	16,08
S15-56Y			15	2	28,94	9,91	27,62	6,83	25,99	6,55	30,44	17,26
S20-56Y			20	1	29,24	9,41	27,37	6,70	25,91	6,37	30,77	17,34

(1) MT = Evaporation temperature -10°C, Condensing temperature 45°C, suction gas temperature 20°C, without liquid subcooling

(2) LT = Evaporation temperature -35°C, Condensing temperature 40°C, suction gas temperature 20°C, without liquid subcooling

(3) HT = Evaporation temperature 5°C, Condensing temperature 50°C, suction gas temperature 20°C, without liquid subcooling

Cooling capacity: for individual conditions or other refrigerant see Frascold Selection Software available at [www.frascold.it](http://www.frascold.it)

## Frascold semi-hermetic compressors series V and Z with INT69TML ®Diagnose protection device

23 four and six cylinder models range with a displacement at 50Hz from 58,48 to 154,38 m<sup>3</sup>/h and nominal electric power from 15 to 50 HP, for a wide scope of application in single and multi-compressor systems with HFC and HCFC traditional refrigerants, low GWP new refrigerants, HFO and HC (AXH version).

All models can be driven by a VFD and excel for their high efficiency and resulting savings on running cost, for their robust construction, low noise and compact size. These models are supplied with the electronic protection device INT69TML Diagnose with advanced protection and diagnosis functions for a higher system reliability. An extensive range of options increases the flexibility of its application.

### Main technical characteristics

- 4 and 6 cylinder compressors with a 400/3/50 (480/3/60) PWS electric motor
- PTC sensors connected to the protection system to detect excessively high motor temperatures
- Electronic protection device INT69TML Diagnose for monitoring, protection, diagnostics and communication
- Discharge temperature sensor
- IP56 electrical terminal box
- Suction and compression service valves
- Forced lubrication oil pump
- Differential oil pressure switch
- POE68 lubricant charge
- 2 x oil level sight glass or connection for automatic mechanical or electrical level devices/regulators
- Rubber vibration absorbers
- Nitrogen protective gas charge
- Packing ensuring proper handling and adequate protection

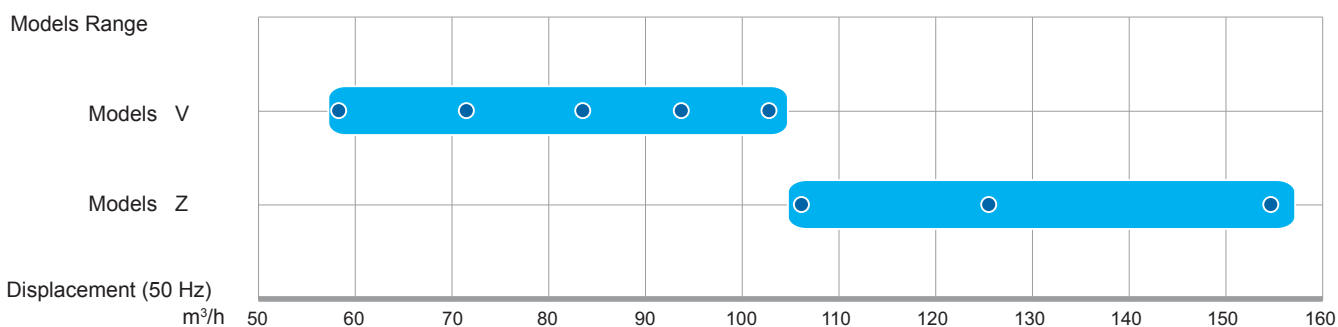
### Optional accessories

- Wide range of motors for all power supplies
- Crankcase heater
- Additional cooling fan
- FLI liquid injection kit
- US head for unloaded start
- CC head for capacity control
- Electronic oil level regulator
- Opto-electronic oil level switch
- Flange + valve kit for oil equalization
- Modbus gateway plus cable
- LAN gateway

### ATEX version

All V and Z series models are available with ATEX marking, designed and built according to the safety requirements of directive 94/9/EC ATEX. These models are suitable for application in areas where explosive mixtures might occasionally form and are available in three different versions.

- **AXH** for application with hydrocarbons [R290, R1270, R600a, etc.]. charged with PAG lubricant.
- **AXY** for application with HFC, HCFC. charged with POE lubricant.
- **AXE** ECOinside version optimized for application with R134a and HFO refrigerants [R1234ze, R1234yf]. charged with POE lubricant.







Frascold compressor series V  
with INT69TML Diagnose device



Frascold compressor series Z  
with INT69TML Diagnose device

COMPRESSOR MODEL	Cylinders	Displacement m <sup>3</sup> /h 50Hz	Nominal power (HP)	Motor version	Cooling capacity 50 Hz (data based on EN12900)							
					R404A / R507A		R407F		R407A		R134a	
					MT (1) kW	LT (2) kW	MT (1) kW	LT (2) kW	MT (1) kW	LT (2) kW	HT (3) kW	MT (1) kW
V15-59E (ECOinside)	4	58,48	15	3	-	-	-	-	-	-	-	18,14
V15-59Y			15	2	29,76	10,33	28,98	7,32	26,90	6,43	32,29	18,25
V20-59Y			20	1	28,93	8,51	28,62	6,70	26,27	5,81	32,72	18,19
V15-71E (ECOinside)	4	70,77	15	3	-	-	-	-	-	-	-	21,22
V15-71Y			15	2	35,31	12,26	35,99	9,55	33,30	8,40	38,11	21,69
V25-71Y			20	1	34,78	10,51	36,00	8,75	31,88	7,00	37,47	20,35
V20-84E (ECOinside)	4	83,81	20	3	-	-	-	-	-	-	-	25,27
V20-84Y			20	2	40,69	13,50	43,88	12,03	40,88	11,02	42,85	23,39
V30-84Y			30	1	42,17	13,16	42,96	10,92	39,34	9,54	42,68	23,61
V25-93Y	4	93,05	25	2	44,66	13,68	46,05	11,65	42,78	10,23	49,57	27,80
V32-93Y			32	1	45,11	12,46	45,53	10,69	41,83	9,31	48,42	25,29
V25-103E (ECOinside)	4	102,90	25	3	-	-	-	-	-	-	-	31,06
V25-103Y			25	2	51,60	16,05	53,28	14,51	48,53	12,66	50,40	28,01
V35-103Y			35	1	50,43	15,96	51,93	13,18	47,24	11,44	53,93	30,46
Z25-106E (ECOinside)	6	106,16	25	3	-	-	-	-	-	-	-	32,21
Z25-106Y			25	2	53,91	16,53	54,34	14,36	49,97	12,61	52,88	29,21
Z35-106Y			35	1	53,29	17,15	53,30	13,23	48,98	11,60	56,70	32,00
Z30-126E (ECOinside)	6	125,72	30	3	-	-	-	-	-	-	-	37,20
Z30-126Y			30	2	61,70	19,49	64,56	17,45	59,20	15,25	65,34	35,89
Z40-126Y			40	1	62,14	19,20	64,15	16,29	58,81	14,21	67,10	37,63
Z40-154E (ECOinside)	6	154,38	40	3	-	-	-	-	-	-	-	44,72
Z40-154Y			40	2	77,73	27,44	80,36	22,20	73,42	19,33	78,72	43,52
Z50-154Y			50	1	76,07	23,00	79,07	20,21	72,15	17,49	80,76	44,39

(1) MT = Evaporation temperature -10°C, Condensing temperature 45°C, suction gas temperature 20°C, without liquid subcooling

(2) LT = Evaporation temperature -35°C, Condensing temperature 40°C, suction gas temperature 20°C, without liquid subcooling

(3) HT = Evaporation temperature 5°C, Condensing temperature 50°C, suction gas temperature 20°C, without liquid subcooling

Cooling capacity: for individual conditions or other refrigerant see Frascold Selection Software available at [www.frascold.it](http://www.frascold.it)

## Frascold semi-hermetic compressors series W with INT69TML ®Diagnose protection device

11 eight cylinder models range with a displacement at 50Hz from 141,50 to 238,02 m<sup>3</sup>/h and nominal electric power from 40 to 80 HP, for a wide scope of application in single and multi-compressor systems with HFC and HCFC traditional refrigerants, low GWP new refrigerants, HFO and HC (AXH version).

All models can be driven by a VFD and excel for their high efficiency and resulting savings on running cost, for their robust construction, low noise and compact size. These models are supplied with the electronic protection device INT69TML Diagnose with advanced protection and diagnosis functions for a higher system reliability. An extensive range of options increases the flexibility of its application.

### Main technical characteristics

- 8 cylinder compressors with a 400/3/50 (480/3/60) PWS electric motor
- PTC sensors connected to the protection system to detect excessively high motor temperatures
- Electronic protection device INT69TML Diagnose for monitoring, protection, diagnostics and communication
- Discharge temperature sensor
- IP56 electrical terminal box
- Suction and compression service valves
- Forced lubrication oil pump
- Differential oil pressure switch
- POE68 lubricant charge
- 2 x oil level sight glass or connection for automatic mechanical or electrical level devices/regulators
- Rubber vibration absorbers
- Nitrogen protective gas charge
- Packing ensuring proper handling and adequate protection

### Optional accessories

- Wide range of motors for all power supplies
- Crankcase heater
- Additional cooling fan
- FLI liquid injection kit
- US head for unloaded start
- CC head for capacity control
- Electronic oil level regulator
- Opto-electronic oil level switch
- Flange + valve kit for oil equalization
- Modbus gateway plus cable
- Lan gateway

### ATEX version

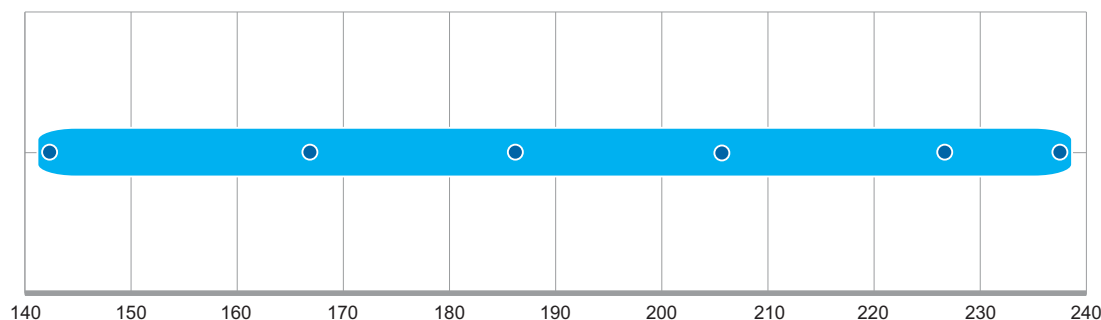
All W series models are available with ATEX marking, designed and built according to the safety requirements of directive 94/9/EC ATEX. These models are suitable for application in areas where explosive mixtures might occasionally form and are available in two different versions.

- **AXH** for application with hydrocarbons (R290, R1270, R600a, etc.) and charged with PAG lubricant.  
carica olio lubrificante PAG.
- **AXY** for application with HFC, HCFC and charged with POE lubricant.  
carica olio lubrificante POE.

Models Range

Models W

Displacement (50 Hz)





Frascold compressor series W  
with INT69TML Diagnose device



Frascold compressor series W  
with INT69TML Diagnose device

COMPRESSOR MODEL	Cylinders	Displacement m <sup>3</sup> /h 50Hz	Nominal power (HP)	Motor version	Cooling capacity 50 Hz (data based on EN12900)							
					R404A / R507A		R407F		R407A		R134a	
					MT (1) kW	LT (2) kW	MT (1) kW	LT (2) kW	MT (1) kW	LT (2) kW	HT (3) kW	MT (1) kW
W40-142Y	8	141,50	40	1	78,31	23,69	71,90	18,49	65,61	16,01	75,38	40,83
W40-168Y			40	2	84,40	24,33	86,60	24,07	79,12	20,96	90,87	51,31
W50-168Y	8	167,60	50	1	86,16	-	85,18	21,89	77,73	18,95	88,09	49,26
W50-187Y			50	2	92,22	26,86	95,93	26,81	87,65	23,34	97,56	52,53
W60-187Y	8	186,10	60	1	93,11	-	94,22	24,34	85,97	21,07	97,02	52,00
W60-206Y			60	2	104,00	31,79	105,33	29,60	96,23	25,77	110,95	61,12
W70-206Y	8	205,80	70	1	103,56	31,46	103,38	26,85	94,33	23,25	109,74	59,69
W70-228Y			70	2	113,31	35,64	115,10	32,56	105,16	28,34	120,57	65,42
W75-228Y	8	227,77	75	1	110,87	-	112,88	29,49	102,99	25,54	117,94	63,41
W75-240Y			75	2	118,68	37,39	120,23	34,20	109,83	29,77	126,35	70,12
W80-240Y	8	238,02	80	1	115,31	-	118,05	30,93	107,70	26,80	124,00	67,10

(1) MT = Evaporation temperature -10°C, Condensing temperature 45°C, suction gas temperature 20°C, without liquid subcooling

(2) LT = Evaporation temperature -35°C, Condensing temperature 40°C, suction gas temperature 20°C, without liquid subcooling

(3) HT = Evaporation temperature 5°C, Condensing temperature 50°C, suction gas temperature 20°C, without liquid subcooling

Cooling capacity: for individual conditions or other refrigerant see Frascold Selection Software available at [www.frascold.it](http://www.frascold.it)

## **Frascold VS series semi-hermetic compressors with integrated inverter device**

The semi-hermetic compressors in the VS series have a built-in inverter in order to obtain a compact and reliable system for use in all those applications that require high energy efficiency and a high degree of adaptability of the cooling capacity. The compressors are able to work in a wide range of temperatures with R134a, R404A, R507A, R407A, R407F, R22 refrigerants. Ask Frascold about other refrigerants. The range consists of 9 different 2 and 4-cylinder, displaced volume models from 4.20 m<sup>3</sup>/h (30Hz) to 57.30 m<sup>3</sup>/h (87Hz) and electrical power from 1.5 to 7.5 HP.

### **Main advantages of VS compressors**

- Better COP in comparison with constant speed systems.
- Better flexibility of use.
- Enhanced system thermal stability.
- Reduced stop starts of the compressor - Lower noise level.

### **Description of the VS system**

Compressor operation is optimised by the inverter which, in combination with the soft-start feature, reduces mechanical stress and lengthens its service life. Furthermore, through this system, the cooling capacity turn down ratio may vary within a range of about 3:1.

The compressor-inverter combination warrants better system efficiency owing the lower intake pressure swings and lower number of compressor start-ups. A further and significant advantage is obtained from the reduction of the power input in operation at reduced loads and from compressor operation optimisation.

### **Main features of VS compressors**

- Universal application with all refrigerants in a wide range of temperatures.
- Start-up without current spikes.
- Inverter ready for immediate connection and already fully programmed with the parameters required by the compressor.
- Built-in RFI filter in accordance with the EMC directive on harmonic disturbances in networks.
- Straightforward commissioning with connection to the 400V/3/50Hz mains.
- IP65 Inverter and resistant to vibration in compliance with GL certification (Germanischer Lloyd). UL and cUL Certificate.
- Operative in a wide range of frequencies 30-87Hz for 2-cylinder models, 25-87Hz for 4-cylinder models.
- Operative parameters easily modifiable and adaptable to the system's operative conditions.
- Operation monitoring and storing error or fault information.
- Accurate temperature control (inverter and electric motor).
- Option of excluding the system's resonance frequencies.
- Availability of a variety of types of construction for total versatility.

### **VS compressors standard equipment**

- Intake and compression valves with braze-on coupling.
- All models are supplied with protection consisting of a chain of PTC thermistors inserted in the electric motor stator.
- Electrical terminal box with high degree of protection.
- POE lubricant oil filling.
- Rubber supports.
- Inverter Kit with power supply 3Ph+PE AC / 400V (320V-550V)-50Hz (45-65Hz).
- Input/Output standard module.
- Software.

### **Optional accessories**

- Crankcase heater.
- Opto-electronic oil level switch.
- Programming keypad + cable (from inverter to keypad).
- Serial\_USB interface.



Frascold compressor series VS  
with built-in variable speed drive



Frascold compressor series VS  
with built-in variable speed drive

COMPRESSOR MODEL	Cylinders	Displacement m <sup>3</sup> /h 50Hz	Nominal power (HP)	Oil charge (liters)	Max operating current 400V / 50 Hz (A)	Locked rotor current 400V / 50 Hz (A)	Max power consumption (kW)	Pipe connections (valves with solder conn.)				Weight (kg)
								Suction line		Discharge line		
								mm	inch	mm	inch	
A1.5-7Y-VS	2	6,91	1,5	1,2	4,5	20,6	2,4	15,8	¾	12,7	½	36
B2-10.1Y-VS	2	9,88	2	1,2	6,7	35,9	3,6	19,0	¾	15,8	¾	38
D2-11.1Y-VS	2	11,25	2	1,2	7,1	35,9	4,0	22,2	7/8	15,8	¾	40
D3-13.1Y-VS	2	13,15	3	1,2	8,8	43,7	4,7	28,6	1 1/8	15,8	¾	49
D4-16.1Y-VS	2	16,40	4	1,2	11,6	52,0	6,2	28,6	1 1/8	19,0	¾	51
Q5-21.1Y-VS	4	21,18	5	1,8	11,6	63,1	6,6	28,6	1 1/8	19,0	¾	79
Q5-24.1Y-VS	4	23,91	5	1,8	13,8	63,1	7,9	28,6	1 1/8	22,2	7/8	79
Q7-28.1Y-VS	4	28,02	7,5	1,8	17,6	87,3	9,6	35,0	1 1/8	28,6	1 1/8	79
Q7-33.1Y-VS	4	32,66	7,5	1,8	20,0	87,3	11,2	35,0	1 1/8	28,6	1 1/8	79

COMPRESSOR MODEL	INVERTER: 3PH+PE AC / 400V (320V-550V) / 50 Hz (45Hz-65Hz)				
	Power inverter (kW)	Output current supplied by inverter @400V chopper 4kZ (A)	Frequency range admissible (Hz)	Max operating current 400V / 50 Hz (A)	Recommended fuses (A)
A1.5-7Y-VS	2,2	7,3	30 ~ 87	4,5	10,0
B2-10.1Y-VS	2,2	7,3	30 ~ 87	6,7	10,0
D2-11.1Y-VS	4,0	11,6	30 ~ 87	7,1	16,0
D3-13.1Y-VS	4,0	11,6	30 ~ 87	8,8	16,0
D4-16.1Y-VS	4,0	11,6	30 ~ 87	11,6	16,0
Q5-21.1Y-VS	7,5	20,0	30 ~ 87	10,7	25,0
Q5-24.1Y-VS	7,5	20,0	30 ~ 87	13,8	25,0
Q7-28.1Y-VS	7,5	20,0	30 ~ 87	17,6	25,0
Q7-33.1Y-VS	7,5	20,0	30 ~ 87	20,0	25,0

## Frascold two-stage semi-hermetic compressors with built-in liquid sub-cooling unit

Based on the S and V series four-cylinder and Z series six-cylinder compressors, two-stage compressors are available, for refrigerating and blast freezing applications.

### Main construction features

- Available in 7 different models with 2:1 ratio and displaced volume from 25 to 103 m<sup>3</sup>/h at 50Hz
- Suitable for operation with R407F - R407A - R404A - R507A - R 22 refrigerants (R410A consult with Frascold)
- Built-in inter-stage connection within the compressor for enhanced reliability
- Innovative electrical motor protection and cooling with liquid injection for extremely low cooling of the electrical connections
- 2nd stage liquid sub-cooling system configured depending on application.  
Consisting of: insulated heat exchanger, thermostatic valve, solenoid valve, liquid sight glass, filter dryer, all installed on the compressor and fully connected
- Valve plates optimised for the flow rate of each stage
- Piston heads recessed to match suction reeds and give reduced clearance.
- Pumped lubrication system complete with DeltaP-II electronic pressure switch
- Electrical motors with high-efficiency part-winding start and AMS PTC's
- Improved balancing of mechanical masses for quiet and vibration-free operation
- Sub-cooling system consisting of: isolated heat exchanger, thermostatic valve, solenoid valve, liquid sight glass, filter dryer, all installed on the compressor and fully connected.
- Electrical motor protection and cooling consisting of: electronic injection control module, solenoid valve for suction liquid injection
- Sistema di protezione e raffreddamento del motore elettrico composto da: modulo elettronico di controllo dell'iniezione, valvola solenoide per l'iniezione del liquido in aspirazione.

### Cooling optimization and motor protection system

Frascold introduces on two-stage compressors an advanced liquid injection system fitted to the suction which makes it possible to stabilise motor temperature over the whole range of the compressors application, leading to increased efficiency. The system is controlled by an electronic device entirely developed by Frascold.



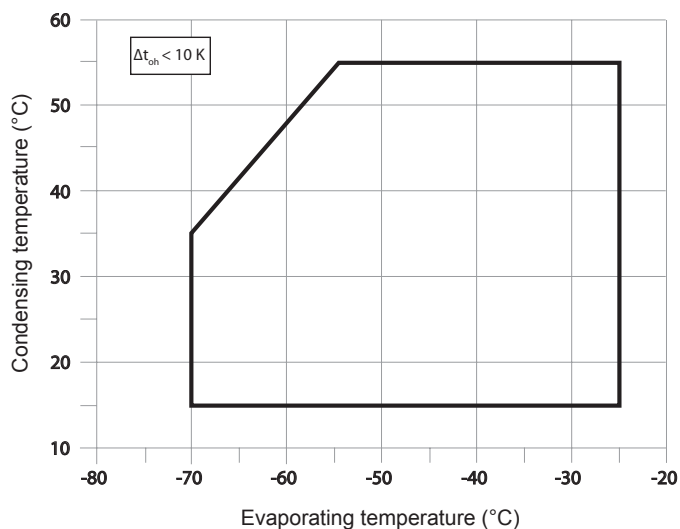
### Operating principle

The electronic device controls motor temperature through the signal from the AMS PTC's. When motor temperature exceeds the level set for correct operation, the device commands the opening of the dedicated solenoid valve; when motor temperature falls back within safety parameters, it commands the closing of the solenoid valve. In the event motor temperature should continue increasing despite the injection of liquid, the device opens the alarm contact and the compressor is stopped. The compressor is also stopped in the event of exceeding maximum admissible discharge temperature.

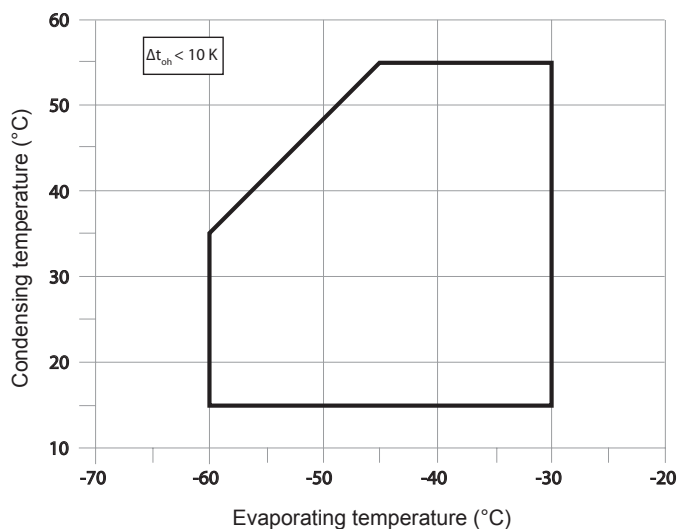
The electronic device may perfectly be interfaced with the Kriwan INT69TML Diagnose module (available as option in the event one should wish to add the diagnostic functions as well as the protection function).

### Application Limitations

R404A - R507A

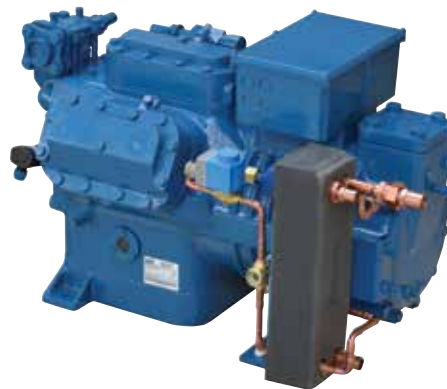


R22





Frascold double-stage compressor  
with integrated units of liquid sub-cooling



Frascold double-stage compressor  
with integrated units of liquid sub-cooling

COMPRESSOR MODEL	Cylinders	Displacement m <sup>3</sup> /h 50Hz		Nominal power (HP)	Max operating current 400V / 50 Hz (A)	Locked rotor current 400V / 50 Hz (A)	Pipe connections (valves with solder conn.)				Weight (kg)
							Suction line		Discharge line		
		LP	HP				mm	inch	mm	inch	
S5-26.15Y	4	25,22	16,4	5	14,0	35,5	35	1 $\frac{1}{8}$	22,2	$\frac{7}{8}$	120
S7-27.19Y	4	26,87	19,13	8	18,0	47,0	35	1 $\frac{1}{8}$	22,2	$\frac{7}{8}$	122
V10-42.29Y	4	41,91	29,42	10	23,0	53,9	35	1 $\frac{1}{8}$	28,6	1 $\frac{1}{8}$	173
Z15-60.30Y	6	58,84	29,42	15	31,0	74,8	42	1 $\frac{1}{8}$	35	1 $\frac{1}{8}$	220
Z20-72.36Y	6	70,77	35,39	20	37,0	96,7	42	1 $\frac{1}{8}$	35	1 $\frac{1}{8}$	225
Z25-84.42Y	6	83,81	41,91	25	45,0	104,0	42	1 $\frac{1}{8}$	35	1 $\frac{1}{8}$	230
Z30-102.51Y	6	102,92	51,46	30	53,0	111,0	54	2 $\frac{1}{8}$	35	1 $\frac{1}{8}$	239

COMPRESSOR MODEL	Cylinders	Displacement m <sup>3</sup> /h 50Hz		Oil charge (liters)	Cooling capacity 50 Hz (data based on EN12900)			
					R404A / R507A		R22	
		LP	HP		LT (1) kW	LT (2) kW	LT (1) kW	LT (2) kW
S5-26.15Y	4	25,22	16,4	3,30	4070	1430	3340	-
S7-27.19Y	4	26,87	19,13	3,30	4640	1640	3620	-
V10-42.29Y	4	41,91	29,42	4,50	6960	2600	5650	-
Z15-60.30Y	6	58,84	29,42	7,50	9120	3410	7500	-
Z20-72.36Y	6	70,77	35,39	7,50	11050	4160	9090	-
Z25-84.42Y	6	83,81	41,91	7,50	13080	4920	10770	-
Z30-102.51Y	6	102,92	51,46	7,50	16070	6040	13220	-

(1) = Evaporation temperature -50°C, Condensing temperature 40°C, suction gas temperature 20°C.

(2) = Evaporation temperature -70°C, Condensing temperature 35°C, suction gas temperature 20°C.

Cooling capacity: for individual conditions or other refrigerant see Frascold Selection Software available at [www.frascold.it](http://www.frascold.it)

# FASCOLD®

A company with more than 75 years of experience manufacturing compressors for refrigeration and air conditioning industries. The wide experience gained over the years provides cutting-edge products and solutions, in line with the latest demands of the market. Our product range has available a wide range of options to meet the specific application and market needs worldwide, always paying attention to the energy efficiency and in full respect of the environment. All quality and construction directives indicated by the relevant authorities are strictly followed.