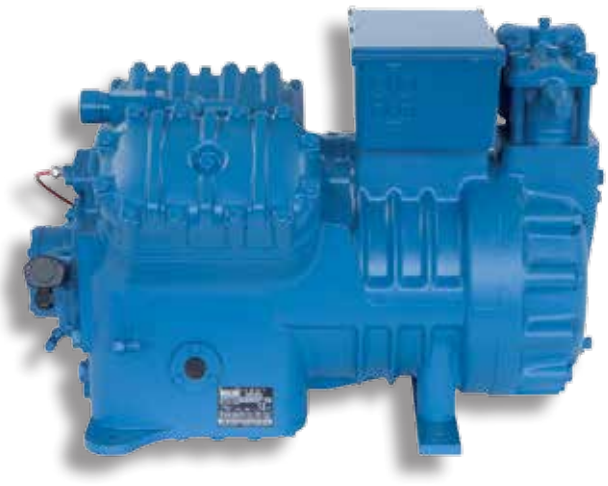
Reciprocating semi-hermetic compressors

refrigeration, process cooling, air conditioning, heating pumps



Since 1936

Quality Product
Quality Service

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 m3/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 CO2 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

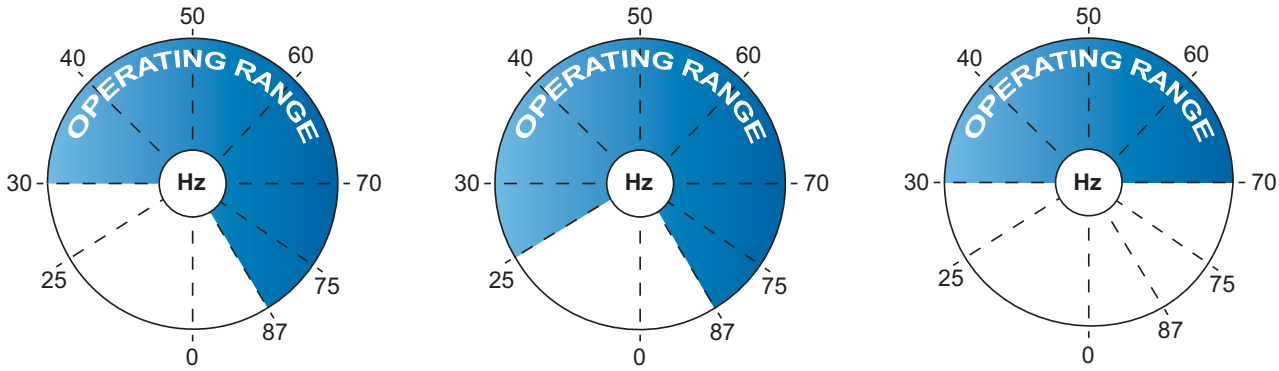
To allow the compressor to adapt ideally to the various applications, electric motors have been provided in three different versions:

- 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 devices 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

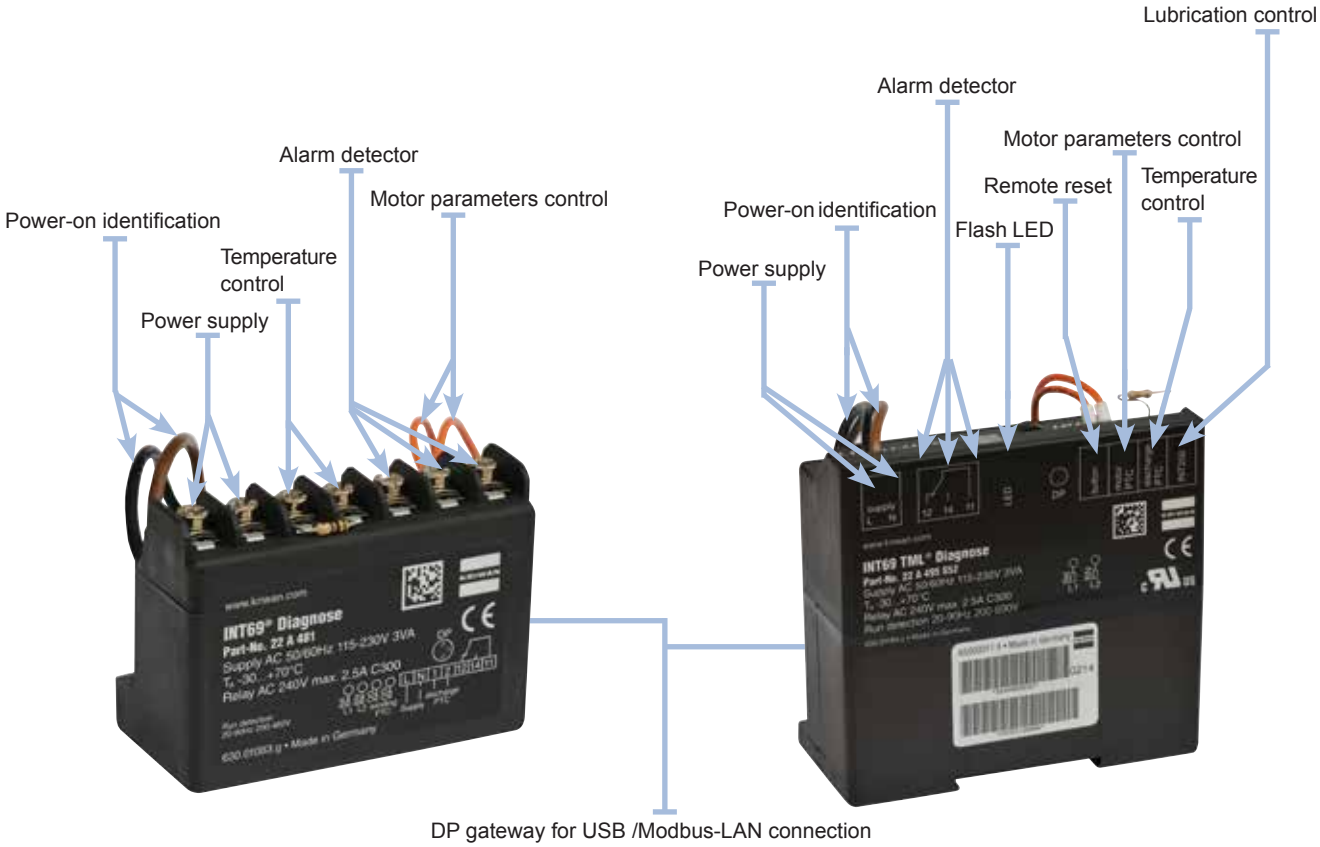
The data and the information contained in the present catalogue have been decided based on our skills, and they do not exempt the user from his duty to control the adequacy of the products with regards to the specific application. Frascold reserves itself the right to modify the content of the present 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 **INT69TML Diagnose**

ATEX compressors

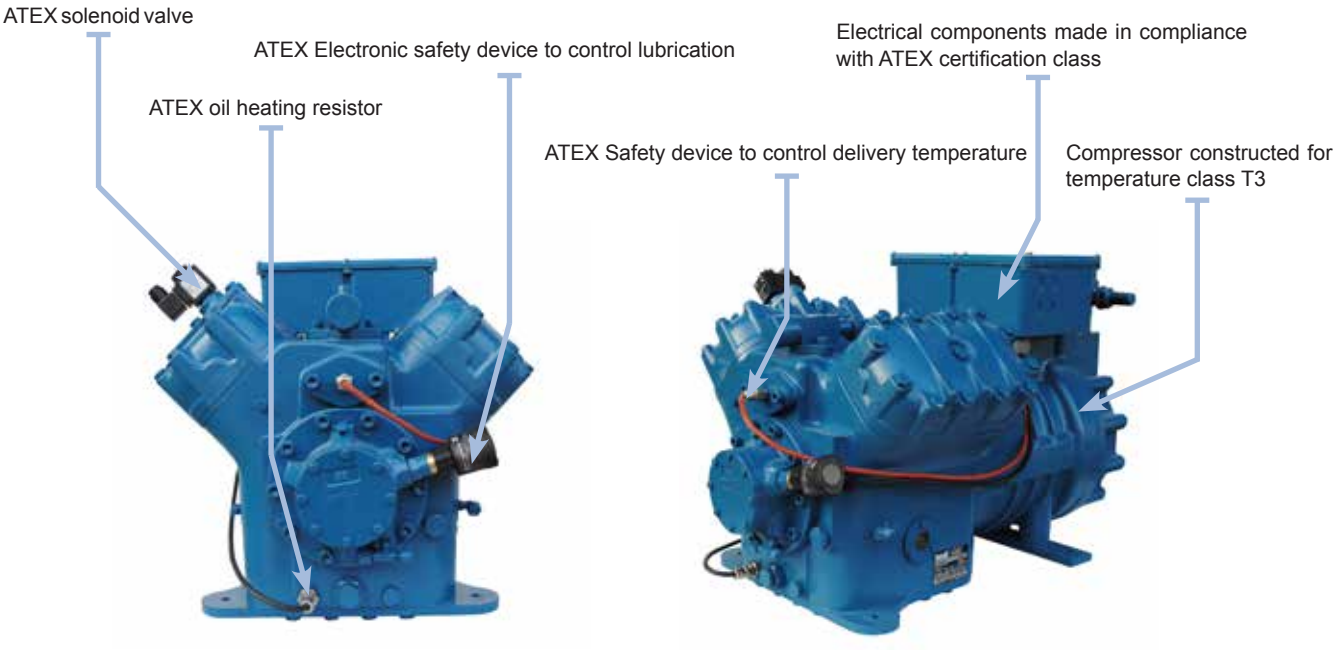
Within the European Union, mechanical and electrical equipment used in explosive atmosphere must comply with ATEX requirements. Frascold has been among the first compressor manufacturers to offer a comprehensive range of ATEX-certified compressors.
All ATEX compressors produced by Frascold are approved 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

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



Compressor protection device (INT69 - INT69 Diagnose - INT69TML Diagnose) supplied not included in the compressor for remote installation (outside the EX area).

Technical data

COMPRESSOR MODEL	Cylinders	Displacement m³/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				
								mm	inch	mm	inch		(1)	(2)
V15-59E (ECOinside)	4	58,48	15	3	17,5	59,5	4	42	1⅝	28,6	1⅛	170	65,0	-
V15-59Y			15	2	31,1	74,8	4	42	1⅝	28,6	1⅛	170	67,0	67,5
V20-59Y			20	1	35,3	106,6	4	42	1⅝	28,6	1⅛	174	67,2	-
V15-71E (ECOinside)	4	70,77	15	3	20,2	59,5	4	42	1⅝	28,6	1⅛	174	67,5	-
V15-71Y			15	2	32,2	74,8	4	42	1⅝	28,6	1⅛	174	67,9	68,1
V25-71Y			20	1	43,5	118,3	4	54	2⅛	35	1⅜	184	68,0	-
V20-84E (ECOinside)	4	83,81	20	3	27,2	89,9	4	42	1⅝	28,6	1⅛	180	69,6	-
V20-84Y			20	2	46,2	106,6	4	54	2⅛	35	1⅜	180	71,0	71,5
V30-84Y			30	1	49,2	132,6	4	54	2⅛	35	1⅜	187	71,3	-
V25-93Y	4	93,05	25	2	52,3	118,3	4	54	2⅛	35	1⅜	200	71,3	71,6
V32-93Y			32	1	53,1	144,5	4	54	2⅛	35	1⅜	192	71,5	-
V25-103E (ECOinside)	4	102,90	25	3	29,9	122,7	4	54	2⅛	35	1⅜	204	70,5	-
V25-103Y			25	2	52,3	118,3	4	54	2⅛	35	1⅜	204	71,3	71,6
V35-103Y			35	1	61,0	144,5	4	54	2⅛	35	1⅜	207	71,5	-
Z25-106E (ECOinside)	6	106,16	25	3	30,2	122,7	3,7	54	2⅛	35	1⅜	220	71,5	-
Z25-106Y			25	2	53,6	118,3	3,7	54	2⅛	35	1⅜	220	72,0	72,0
Z35-106Y			35	1	60,2	144,5	3,7	54	2⅛	35	1⅜	223	71,5	-
Z30-126E (ECOinside)	6	125,72	30	3	33,8	122,7	7,2	54	2⅛	35	1⅜	229	72,0	-
Z30-126Y			30	2	55,7	132,6	7,2	54	2⅛	35	1⅜	229	73,0	73,5
Z40-126Y			40	1	71,9	159,2	7,2	67	2⅝	42	1⅝	240	73,2	-
Z40-154E (ECOinside)	6	154,38	40	3	41,1	144,5	7,2	67	2⅝	42	1⅝	240	73,0	-
Z40-154Y			40	2	77,9	159,2	7,2	67	2⅝	42	1⅝	240	73,6	73,8
Z50-154Y			50	1	94,4	188,8	7,2	67	2⅝	42	1⅝	244	73,7	-
W40-142Y		141,50	40	1	89,3	215	7,7	67	2⅝	42	1⅝	295	76,5	77,2
W40-168Y	8	167,60	40	2	71,4	215	7,7	67	2⅝	42	1⅝	299	76,6	77,4
W50-168Y			50	1	94,8	258	7,7	79,4	3⅛	42	1⅝	305	76,7	-
W50-187Y	8	186,10	50	2	89,1	258	7,7	79,4	3⅛	42	1⅝	311	77,5	78,0
W60-187Y			60	1	103,5	326	7,7	79,4	3⅛	42	1⅝	315	78,0	-
W60-206Y	8	205,80	60	2	98,8	326	7,7	79,4	3⅛	54	2⅛	320	79,4	80,2
W70-206Y			70	1	116,8	390	7,7	79,4	3⅛	54	2⅛	328	79,4	-
W70-228Y	8	227,77	70	2	109,5	390	7,7	79,4	3⅛	54	2⅛	328	81,0	-
W75-228Y			75	1	128,4	417	7,7	79,4	3⅛	54	2⅛	328	81,0	-
W75-240Y	8	238,02	75	2	115,3	417	7,7	79,4	3⅛	54	2⅛	328	81,0	-
W80-240Y			80	1	135,7	417	7,7	79,4	3⅛	54	2⅛	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)

Frascold compressor series V with INT69TMLDiagnose device

Frascold compressor series Z with INT69TML Diagnose device

COMPRESSOR MODEL	Cylinders	Displacement m3/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 conditiones or other refrigerant see Frascold Selection Software available at www.frascold.it