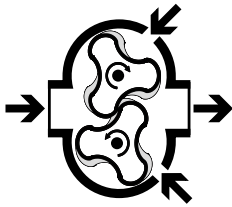
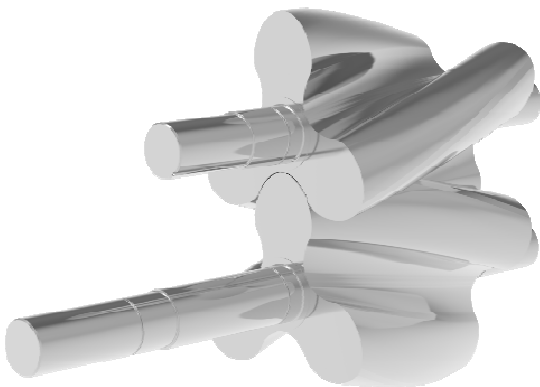
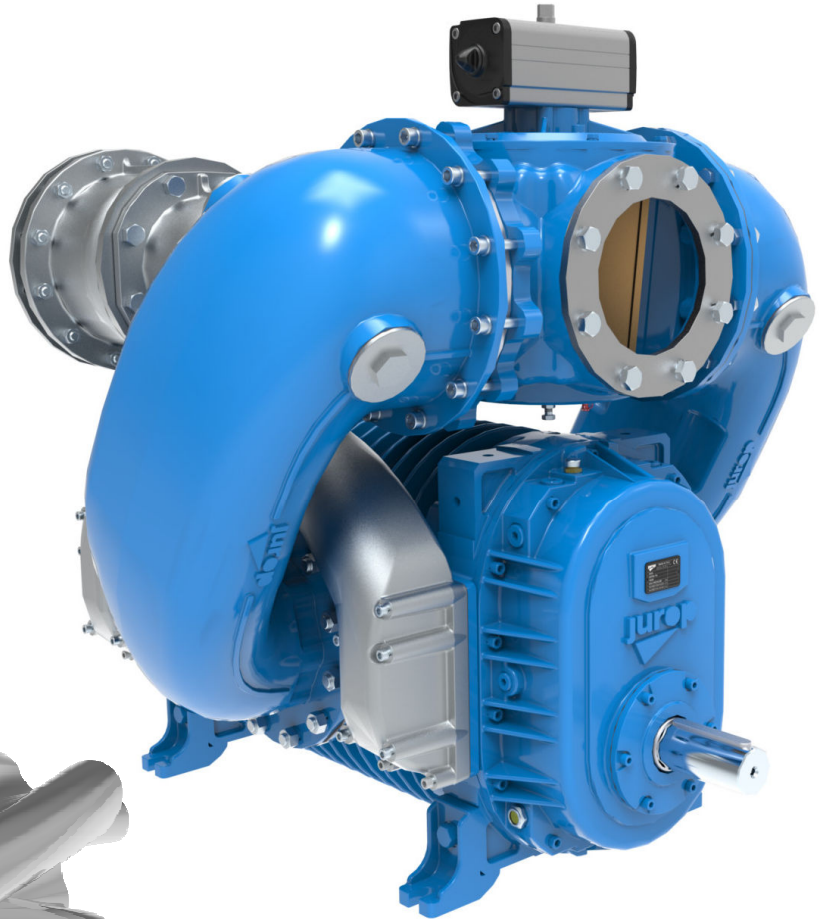


EN

HELIX



ORIGINAL INSTRUCTIONS



INSTALLATION, USE AND
MAINTENANCE MANUAL



COMPANY WITH
QUALITY SYSTEM
CERTIFIED BY DNV GL
= ISO 9001 =

Rev. 08
20-01-2020

2020 – **Juop** – Azzano Decimo (PN)

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1. General information

1.1. Introduction

- This booklet contains the necessary instructions for a correct installation, running, use and maintenance of the compressor, as well as some practical suggestions for a safe operating.
- The knowledge of the following pages will grant a long and trouble-free operation of the compressor.
- Following the instructions below contributes to limiting pump repair expenses by extending its duration, as well as preventing hazardous situations, thereby increasing its reliability.
- If the pump is driven by an hydraulic motor please refer to manufacturer's specific manual.
- It is recommended to:
 - Understand and apply carefully the instructions before running the pump.
 - Keep the booklet at hand and have it known to all operators.
- Below is a brief description of the symbols used in this manual.



If these safety rules are not respected, operators can be injured and the compressor or oilers damaged remarkably.



If these safety rules are not respected, the compressor or system can be damaged.



Suggestions for an environment friendly use of the compressor.



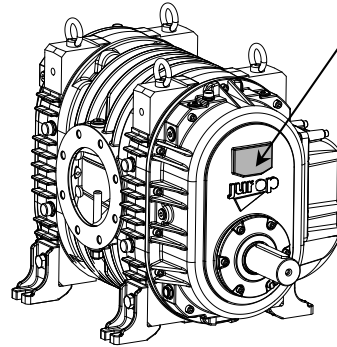
Useful information for an easy usage and maintenance of the compressor.

• The graphic representations and photographs contained in this manual are there to illustrate the product in the parts that make it up and in specific operating phases. Though the model shown in the manual may differ from the one purchased, the operating principle at the base of the illustrated operating phase is the same.

• Each HELIX shows a manufacturer plate that specifies:

1. HELIX Model
2. Serial Number
3. Year of manufacture
4. Max Pressure
5. Maximum speed at maximum vacuum rate
6. Maximum speed at vacuum ratee equal of 80%
7. Maximum required power

MADE IN ITALY <small>Jurop S.p.A. - Via Crosera, 50 - 33082 Azzano Decimo - PN (ITALY)</small>		
MOD.		
SERIAL No.		
YEAR		
MAX PRESSURE	(bar)	
MAX SPEED AT MAX VACUUM	(r.p.m.)	
MAX SPEED AT 80% VACUUM	(r.p.m.)	



Pic. 1.1

1.2. Spare part request

• Use only **genuine spare parts** for maintenance and repairs. To order spare parts, provide the following details:

EXAMPLE:

- | | |
|---|--------------|
| a) The model of the compressor (see compressor tag) | HELIX 750 |
| b) The serial number of the compressor (see compressor tag) | J000001 |
| c) A description of the parts (see parts list) | SPACER |
| d) The quantity (see parts list) | 1 |
| e) The code number of the part (see parts list) | 16240 393 00 |

1.3. Warranty terms and conditions

• Compliance with the installation, use and maintenance instructions provided by this manual **is crucial for the recognition of warranty** against defective parts.

2. Technical data

- HELIX vacuum pumps are tri-lobe worm screw profile blowers specifically designed for vacuum plants that must convey gas free from polluting substances, oil or water: this is made possible due to the lack of sliding parts, and therefore oil lubrication within the compression chambers.
- HELIX blowers do not need any auxiliary cooling system, as they are provided with a built in air injection cooling system.
- The specific and accurate lobes profiles grant high volumetric efficiency and high flow rates combined with minimized dimensions and vacuum rates that can reach 93%.
- Operating without oil (no oil emission into the atmosphere) and without wear-proof operation, reduced maintenance.
- Silencers are designed to be installed in correspondence with the discharge and injection line (depending on the choice of model) of lobe vacuum pumps (without lubrication). All silencers are equipped with coupling flanges.

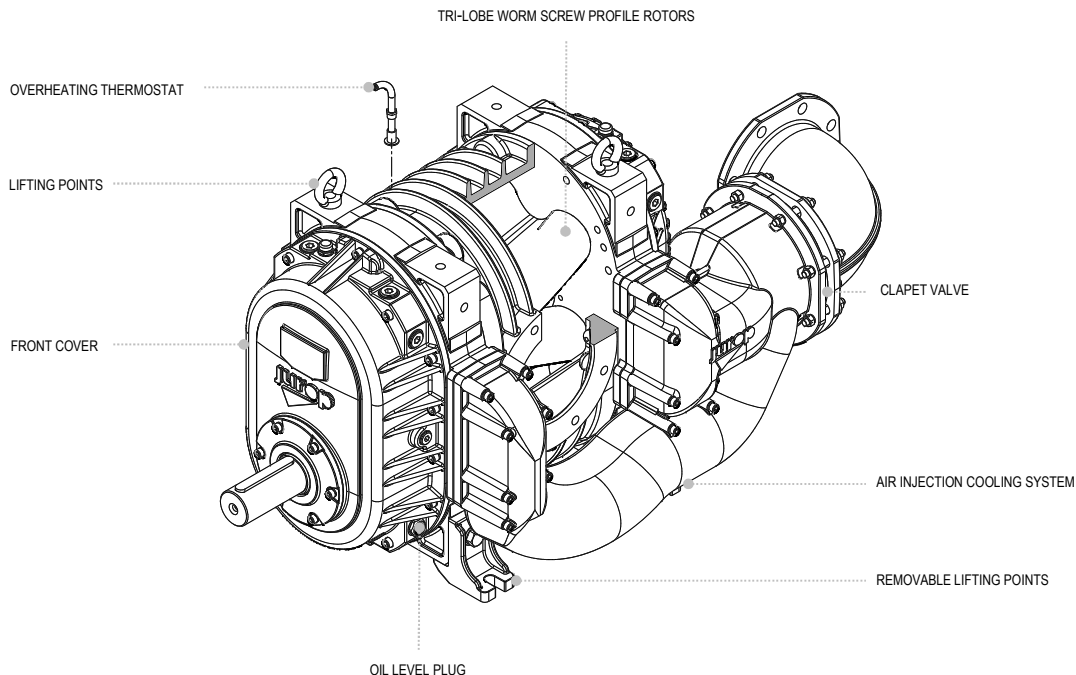
STANDARD EQUIPMENT

- **Volumetric pump** with synchronised phase helical gears.
- **Tri-lobe worm screw profile rotors**, dynamically balanced rotors to reduce vibrations.
- Splash lubricated bearings and gears in the front and rear boxes. Internal combined seals: Y-seals and labyrinth seals with PTFE/cast iron rings with discharge into the atmosphere. Seals and gaskets for high temperatures.
- Side **air injection cooling system** with clapet valve. This valve opens only in the vacuum functioning mode.
- **Overheating thermostat** on the exhaust port.
- Removable lifting points.
- **Inductive sensor**.

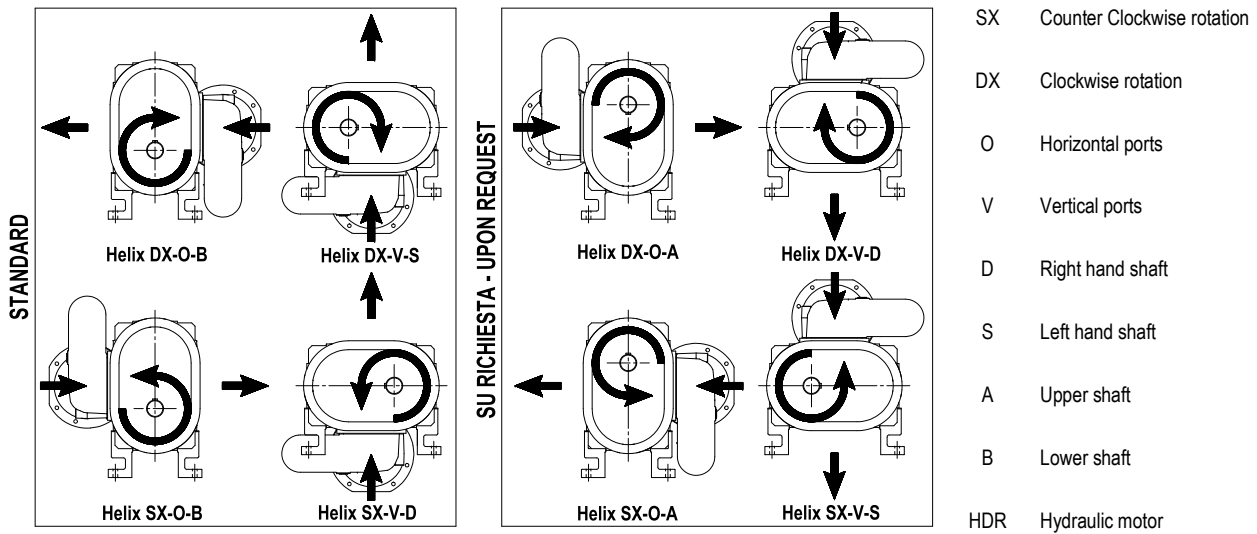
AVAILABLE ON REQUEST

- **Hydraulic motor**.
- **Pulley** for the belt drive.
- **Injection muffler** (compulsory accessory) and vacuum pump exhaust.
- Air flow change-over valve (**4-way valve**).
- **Flushing-Kit**.
- HELIX 1200 only: **Injection manifold with vertical port**.

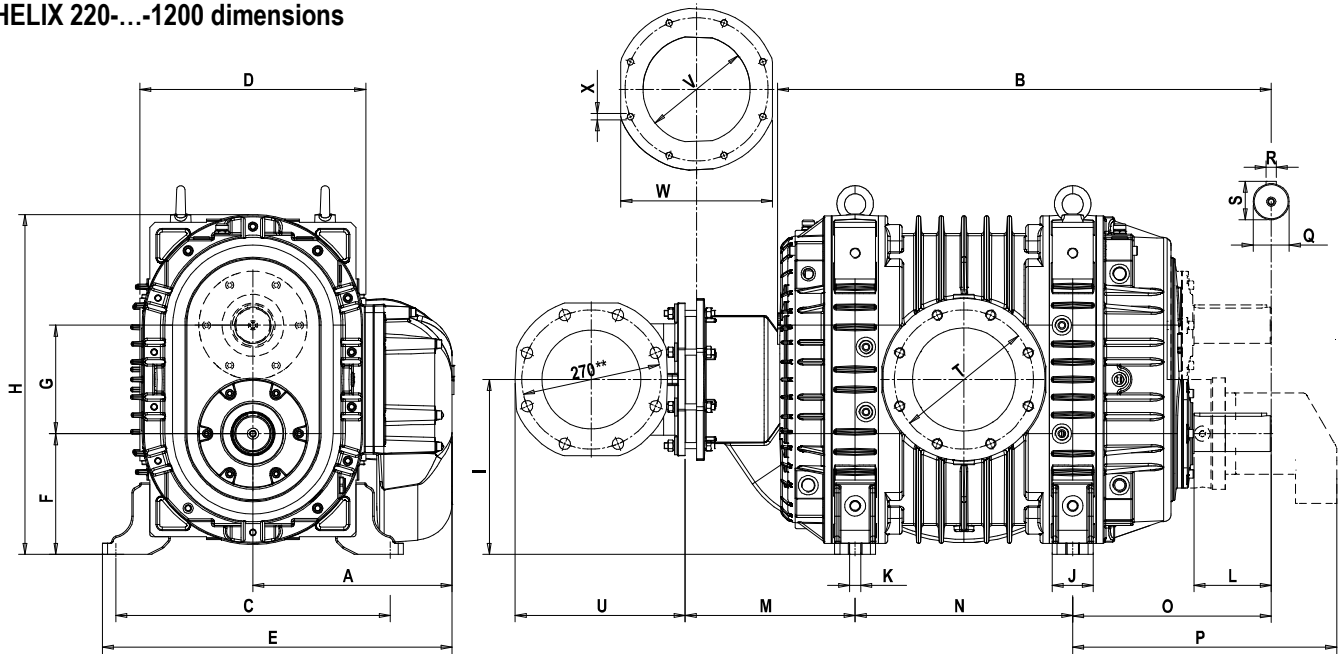
ITALIAN PATENT GRANTED
US PATENT PENDING
PATENT APPLICATION
in Europe, Russia and China



Weight	HELIX 220	HELIX 300	HELIX 450	HELIX 750	HELIX 1200	HELIX 1500	HELIX 2000
Direct transmission	152 kg	192 kg	240 kg	647 kg	765 kg	850 kg	1200 kg

2.1. Dimensions and arrangements HELIX


Note: HELIX 220 M (with gearbox 3:1) is available only in the following arrangements HELIX DX-O-B and HELIX SX-O-B.

HELIX 220-...-1200 dimensions


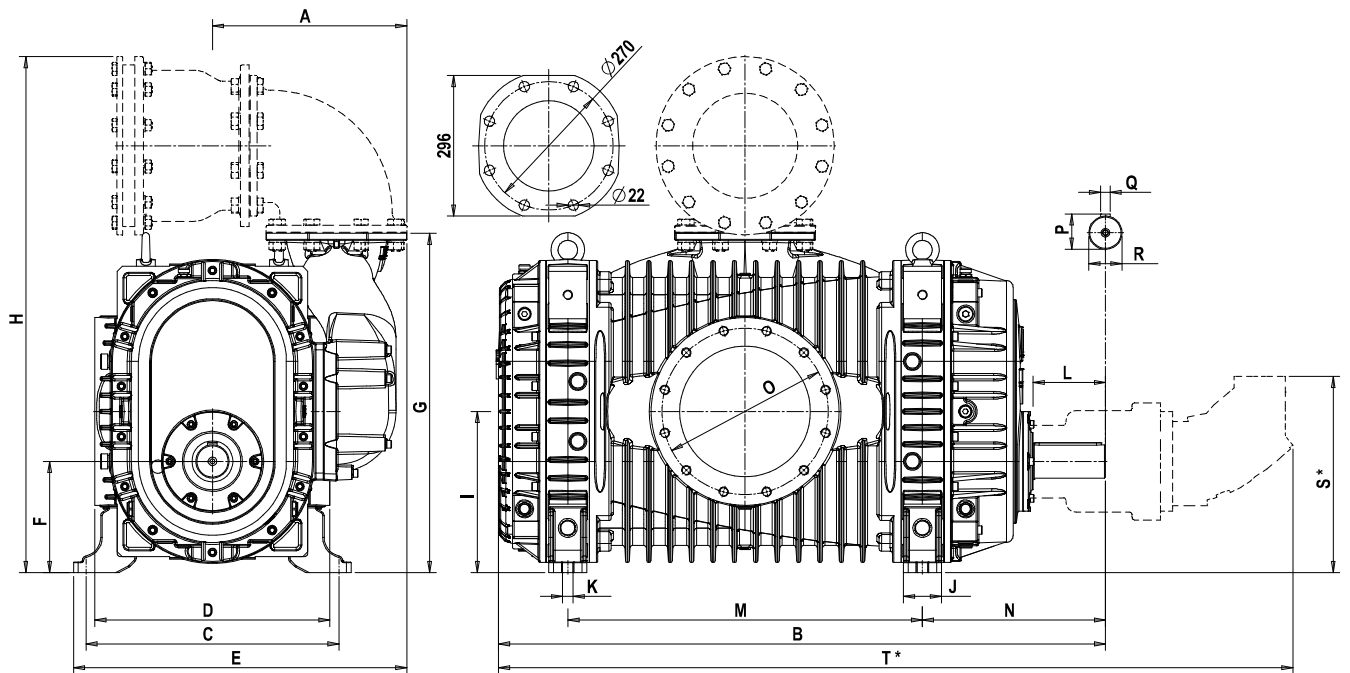
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
HELIX 220	275.5	617	176	276	413.5	155	104	373	207	62	M14	68.5	268	329
HELIX 300	312	700	200	312	468	167	135	436	234	62	M14	86	220	350
HELIX 450	312	829	237	392	508	203	135	472	270	60	M14	106	220	460
HELIX 750	386	958	532	438	678	234	210	659	339	80	22	150	330	422
HELIX 1200	386	1160	532	462	678	234	210	659	339	80	22	150	330	630

	O	P*	Q	R	S	T	U	V	W	X	
HELIX 220	154	421	38 h7	-0.000 -0.025	10	41	170	-	Ø136	215	Ø8.5
HELIX 300	241	379	50 g6	-0.009 -0.025	14	53.5	180	-	Ø160	224	Ø10.5
HELIX 450	261	395	50 g6	-0.009 -0.025	14	53.5	240	-	Ø160	224	Ø10.5
HELIX 750	385	512	70 g6	-0.010 -0.029	20	74.5	270	330	Ø208	294	Ø12.5
HELIX 1200	385	512	70 g6	-0.010 -0.029	20	74.5	295	330	Ø208	294	Ø12.5

* Hydraulic motor

** Only Helix 750-1200

HELIX 1500 – 2000 Dimensions

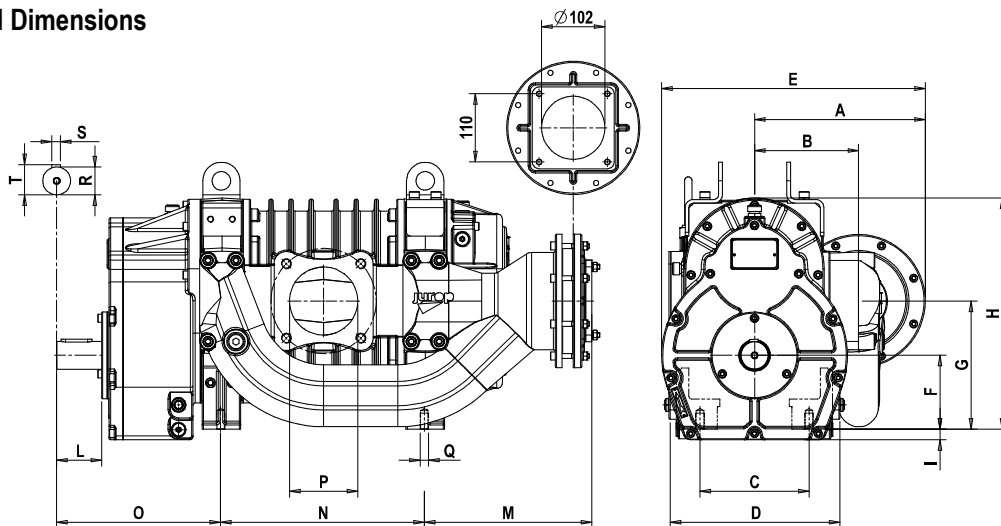


	A	B	C	D	E	F	G	H	I	J	K
HELIX 1500	409	1277	532	494	701	234	714	1085,5	339	80	22
HELIX 2000	465	1362	620	575	800	268	832	1204	400	103	26

	L	M	N	O	P	Q	R	S*	T*
HELIX 1500	152	746	385	350	DN250 PN10 UNI EN 1092-1	74,5	Ø70	413	1671
HELIX 2000	174	760	456	400	DN300 PN10 UNI EN 1092-1	95	Ø90	-	-

* Trasmissione idraulica

HELIX 220 M Dimensions



	A	B	C	D	E	F	G	H	I	L	M
HELIX 220 MOLT.	275.5	168	176	276	425.5	119	207	373	17	72.5	269

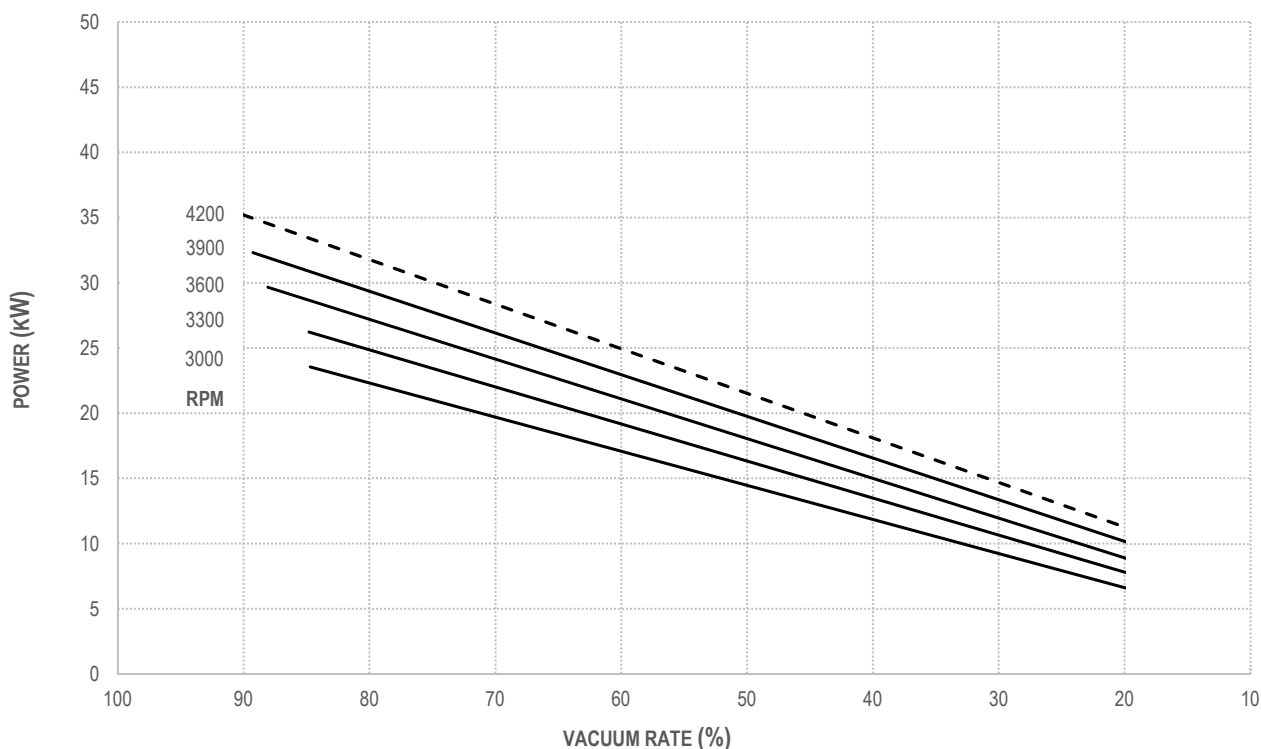
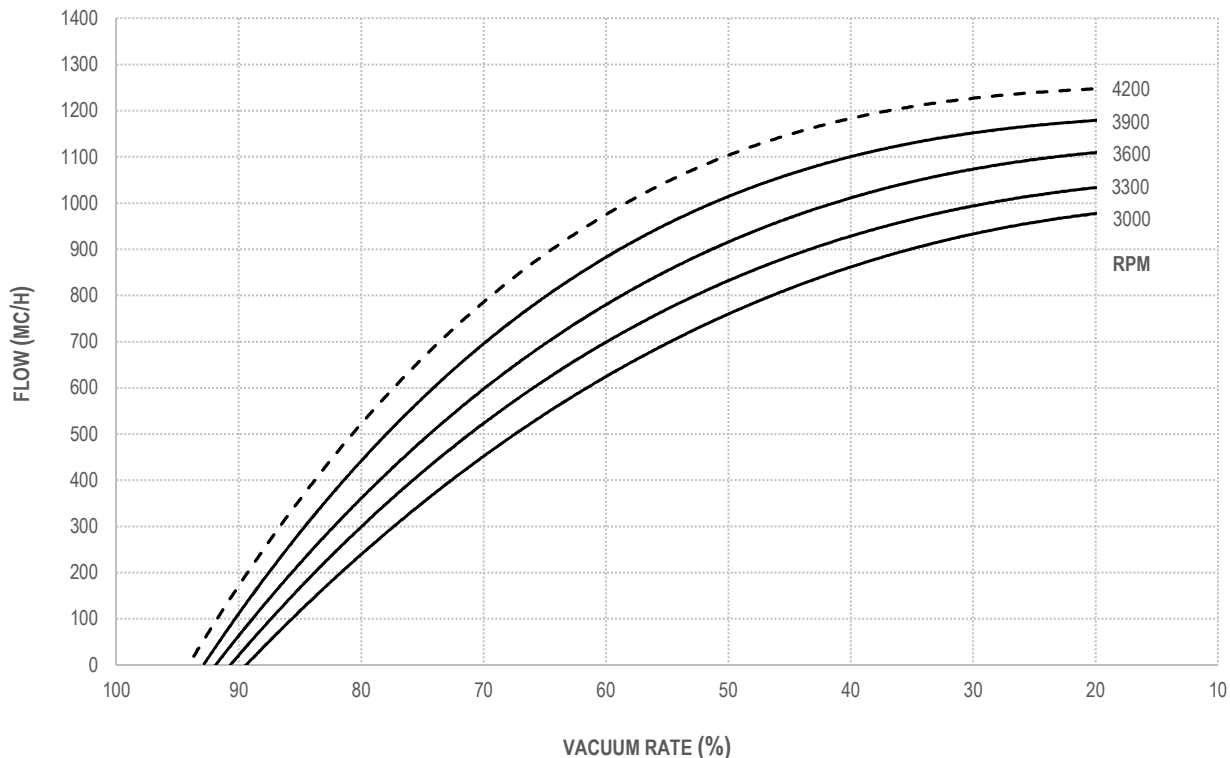
	N	O	P	Q	R	S	T	U	Weight
HELIX 220 MOLT.	329	265	110	M14	45 g6 -0.009 -0.025	14	48.5	110	DN100 PN6 UNI EN 1092-1 188 Kg

2.2. Performances – operation in vacuum mode

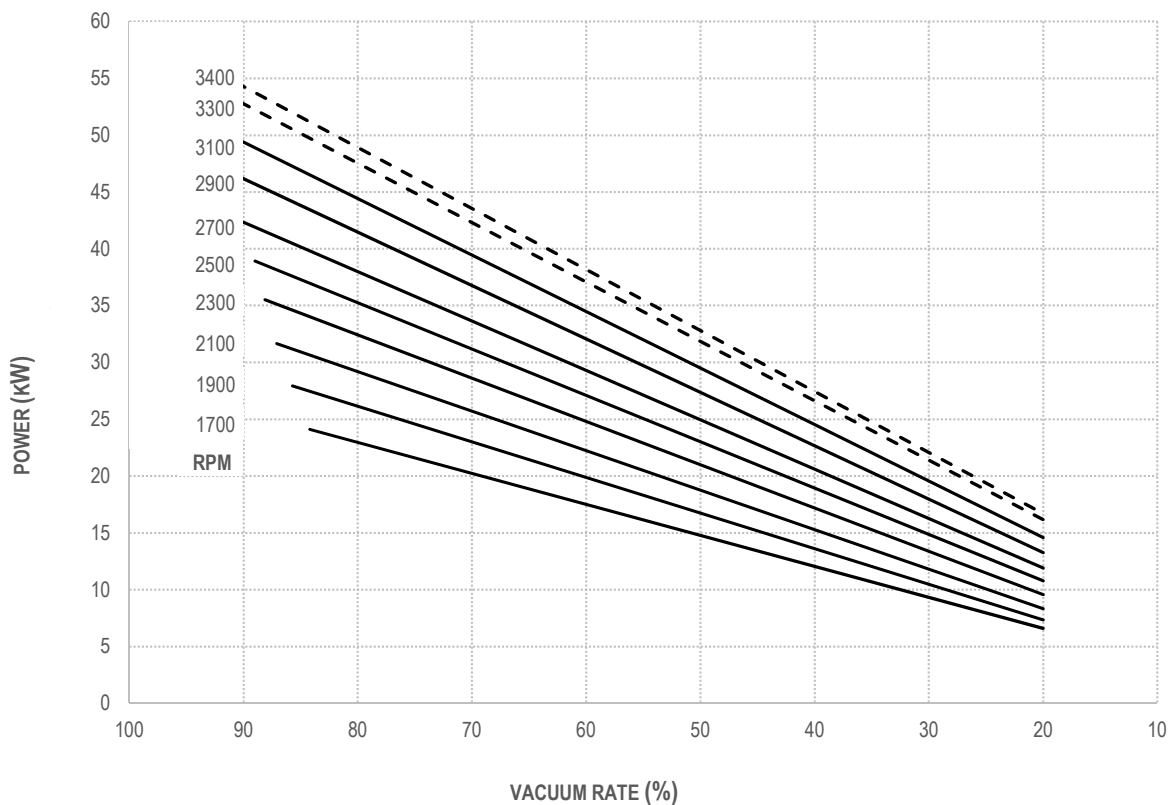
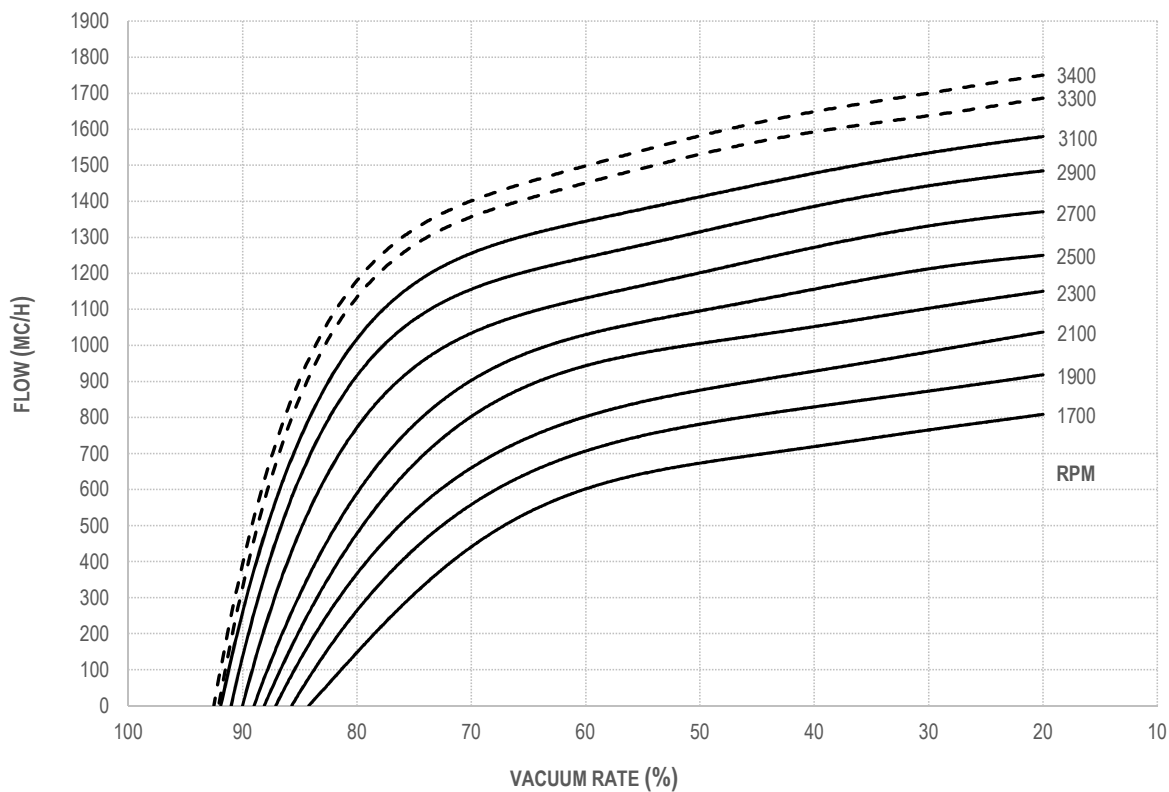
REFERENCE CONDITIONS

Absolute reference pressure: 1013 mbar abs Ambient reference temperature: 20°C Broken line speed: MAX vacuum rate 80%
 Counter pressure at the exhaust port: 1013 mbar abs. Tolerances on the air flow and power: ±5%
 HELIX 220 M performances are identical to HELIX 220 performances. The rotation speed of the HELIX 220 M is 1/3 of the rotation speed showed on the graphs

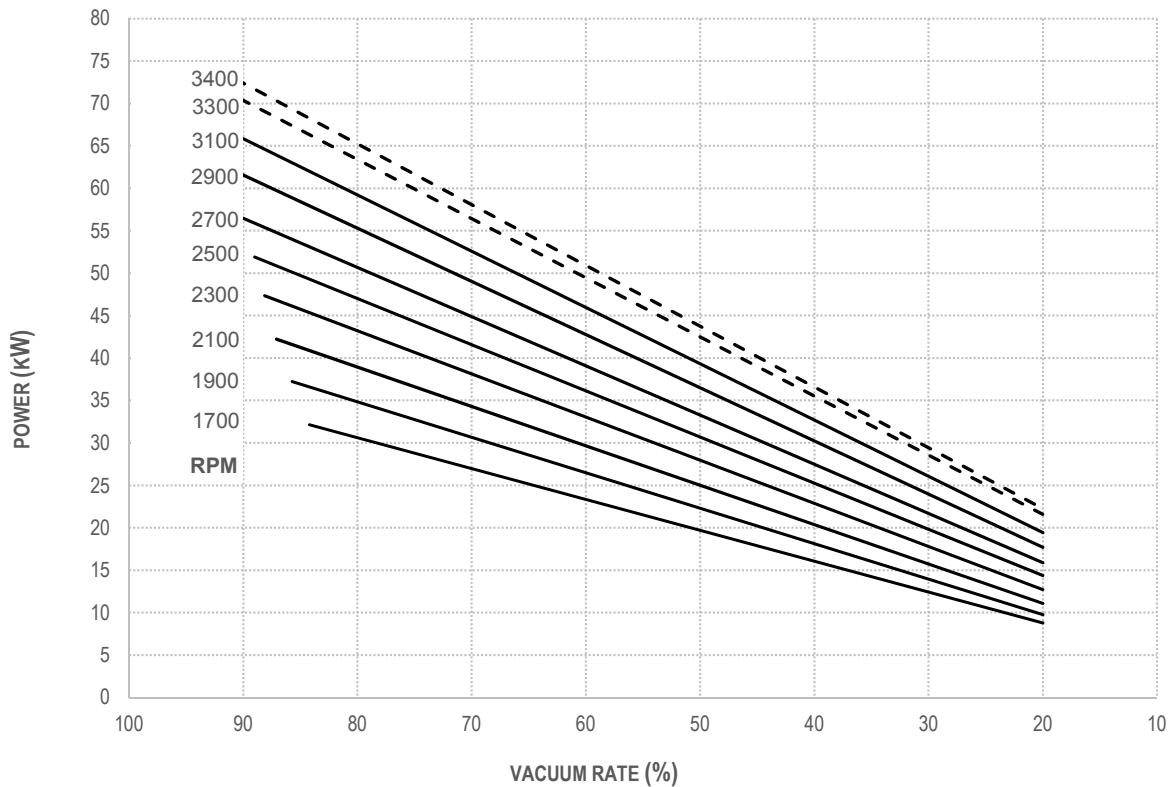
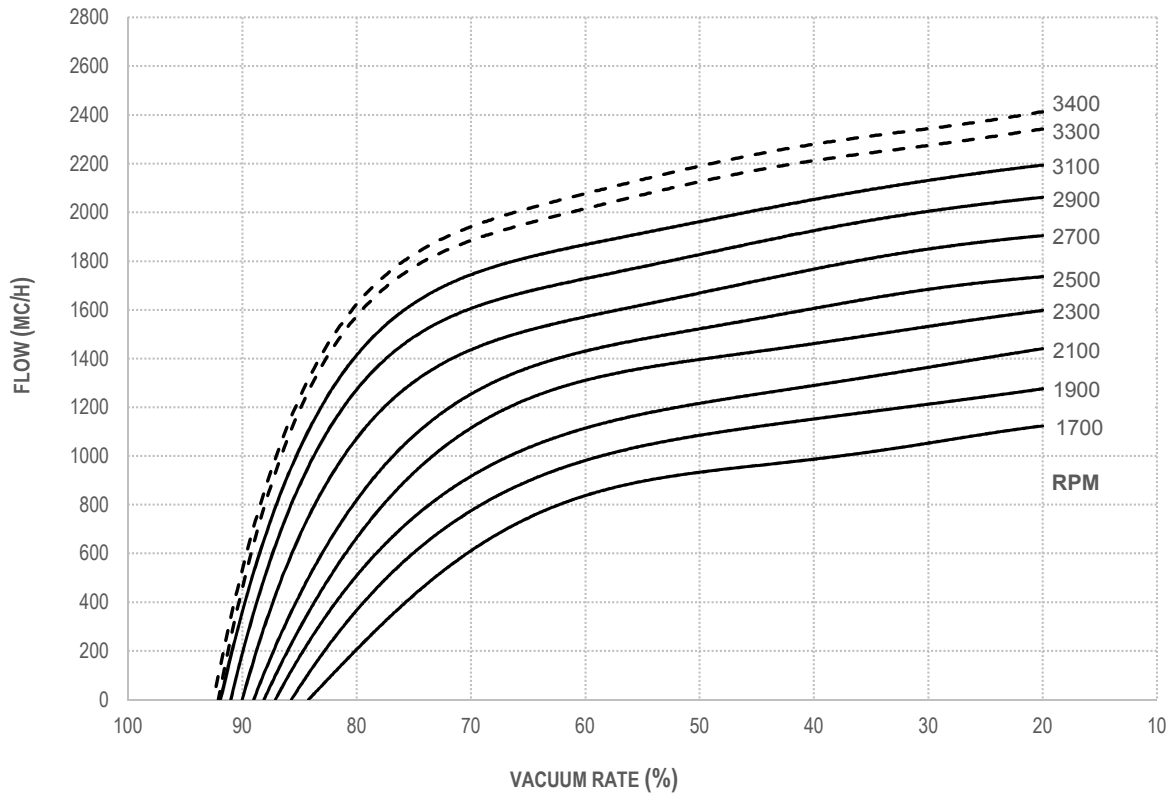
HELIX 220



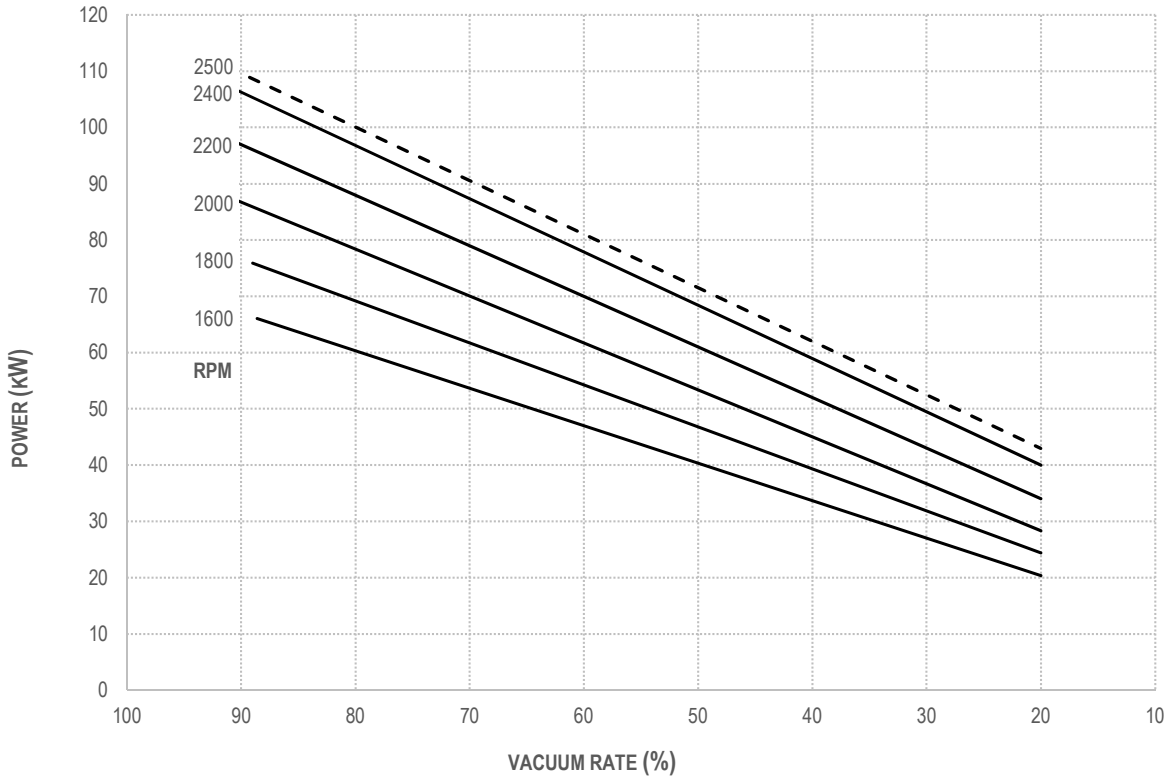
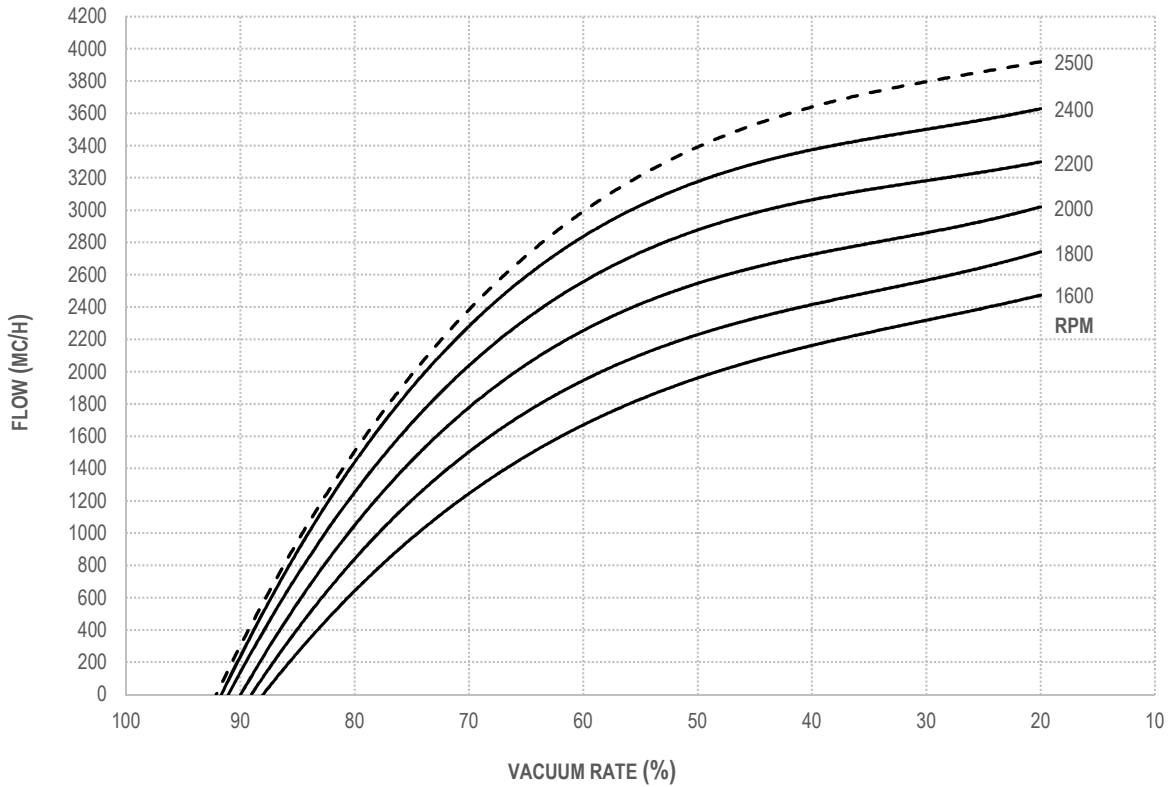
HELIX 300



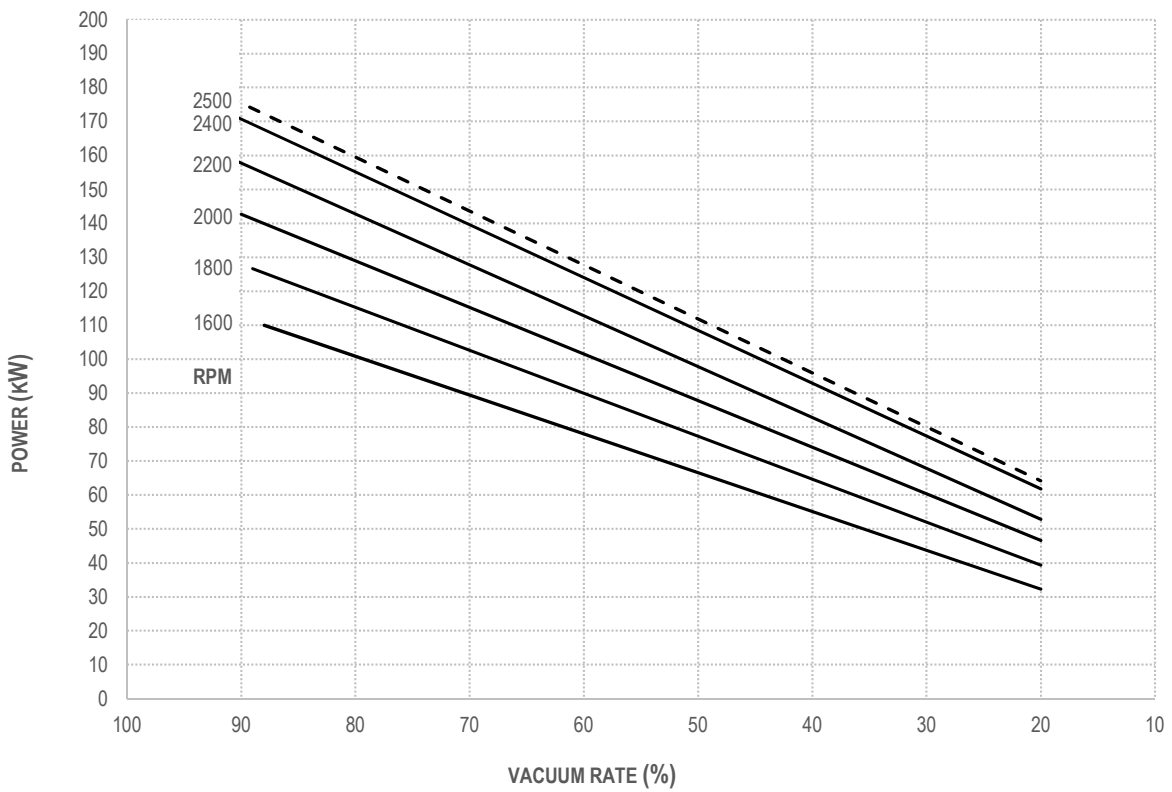
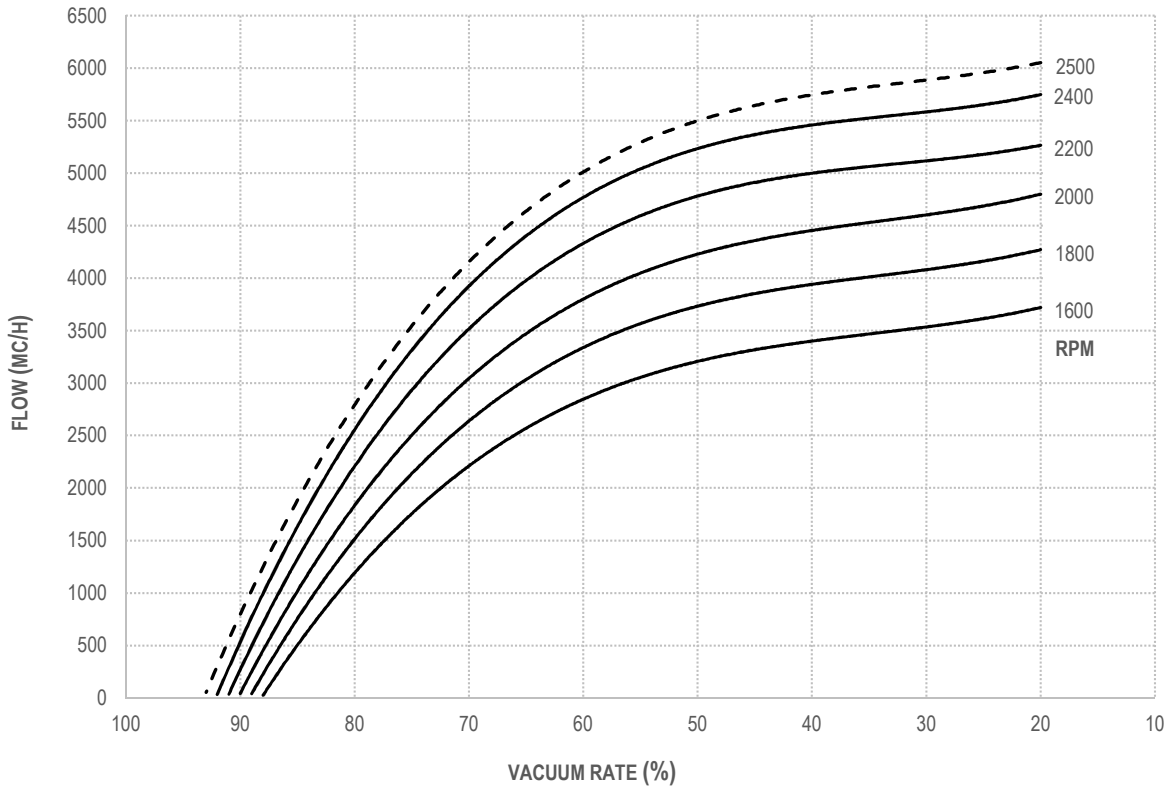
HELIX 450



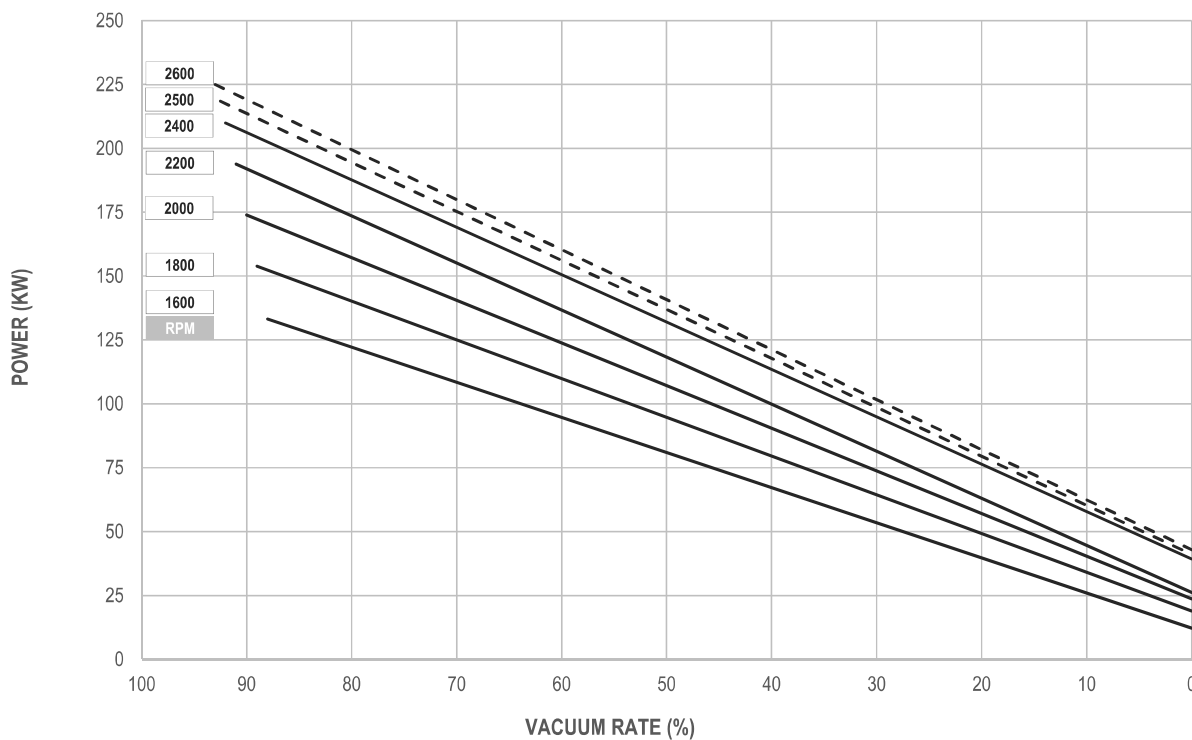
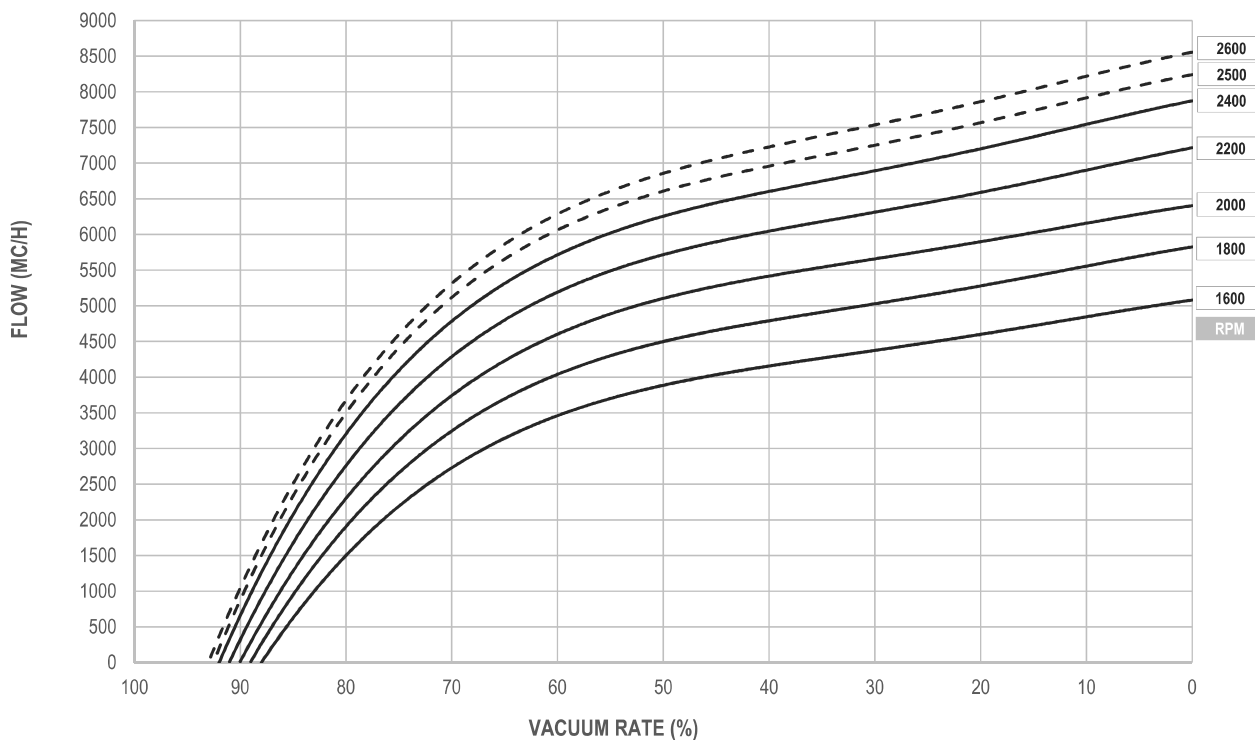
HELIX 750



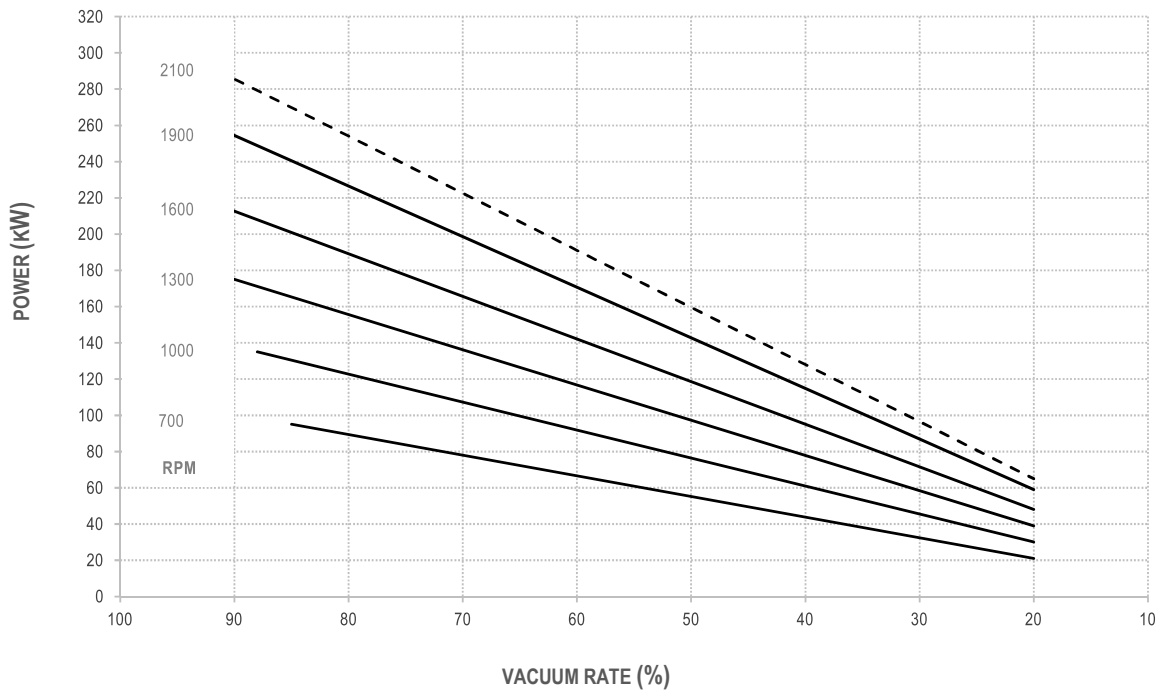
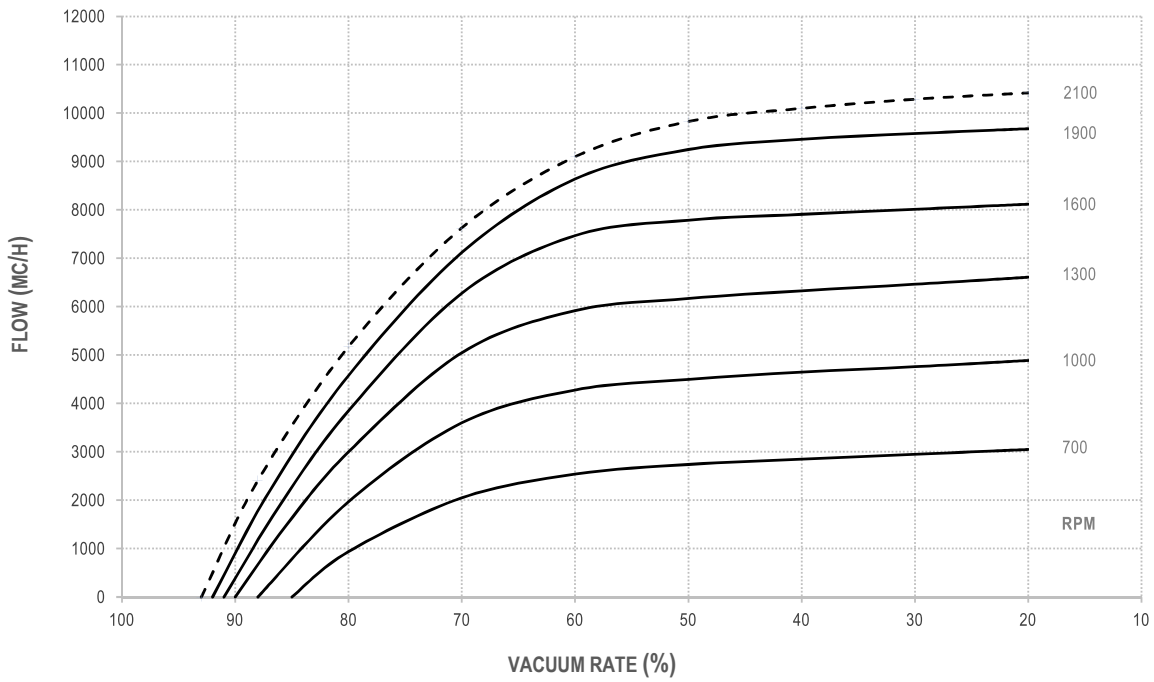
HELIX 1200



HELIX 1500



HELIX 2000



2.3. Performances– operation in pressure mode

REFERENCE CONDITIONS

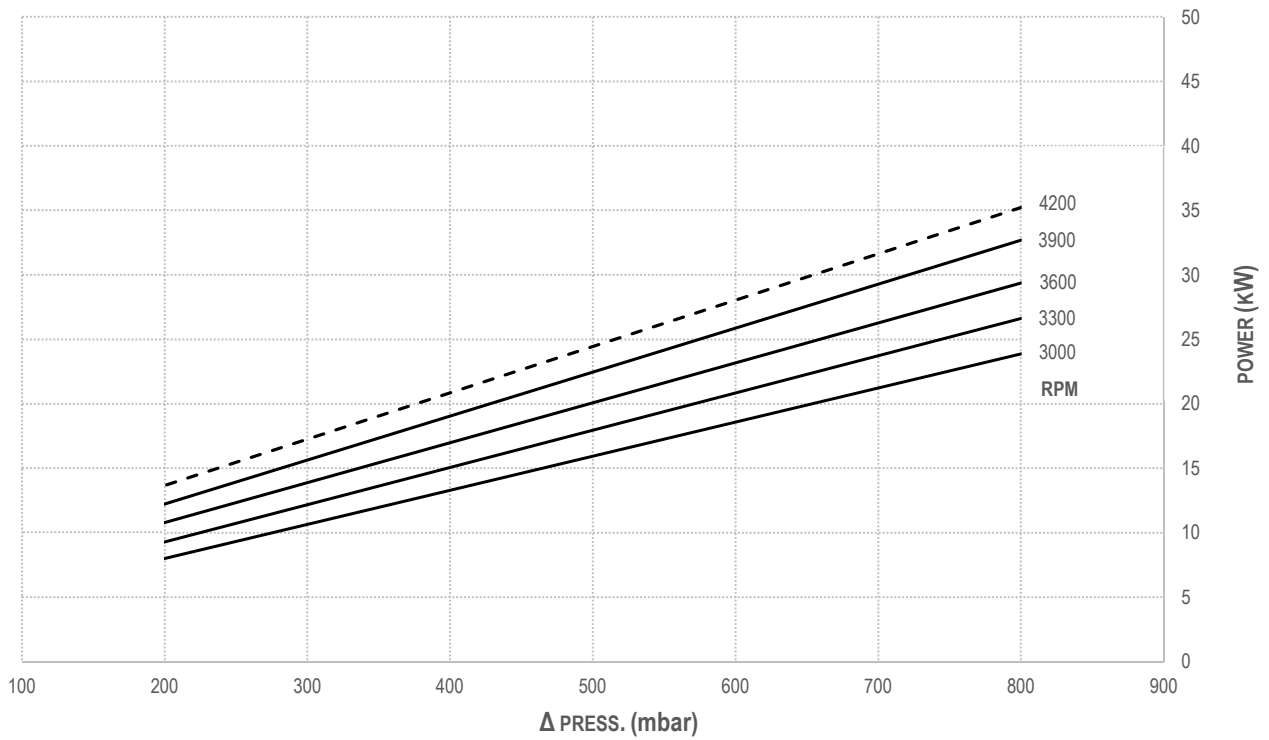
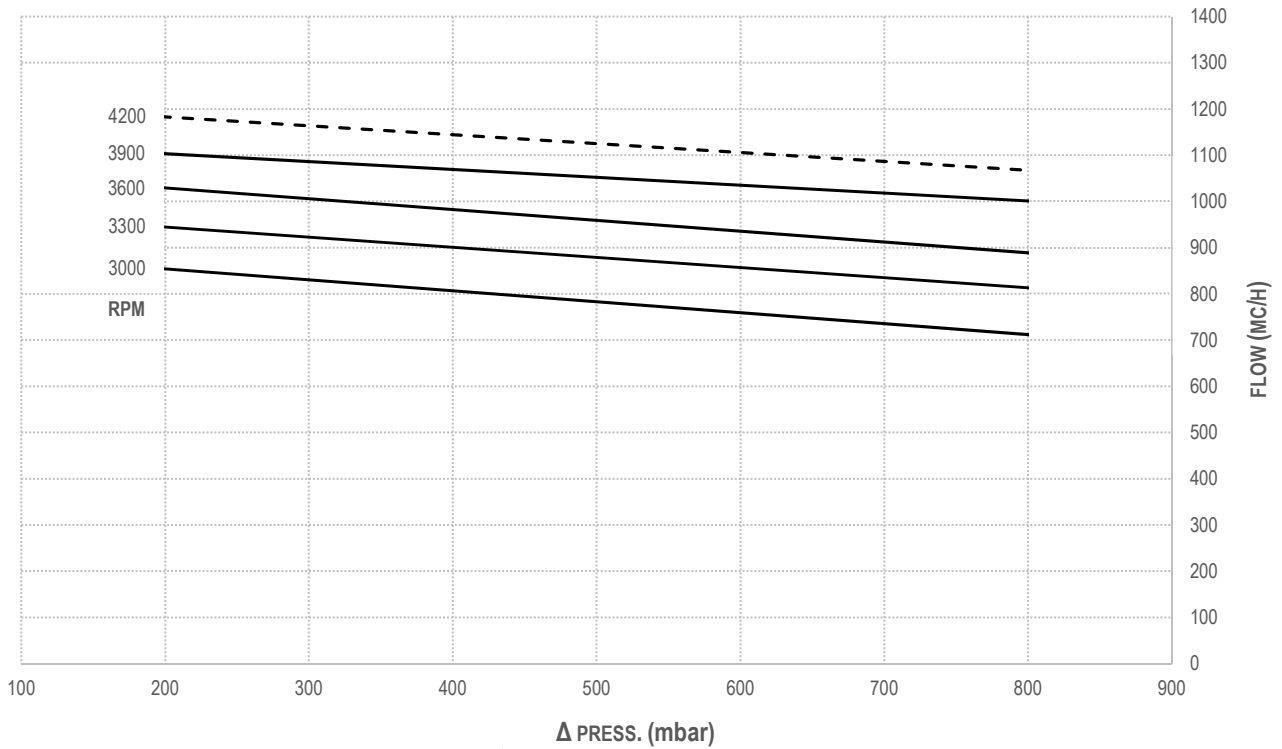
Absolute reference pressure: 1013 mbar abs
Suction temperature: 1013 mbar abs.

Ambient temperature: 20°C
Tolerances on the air flow and power: ±5%

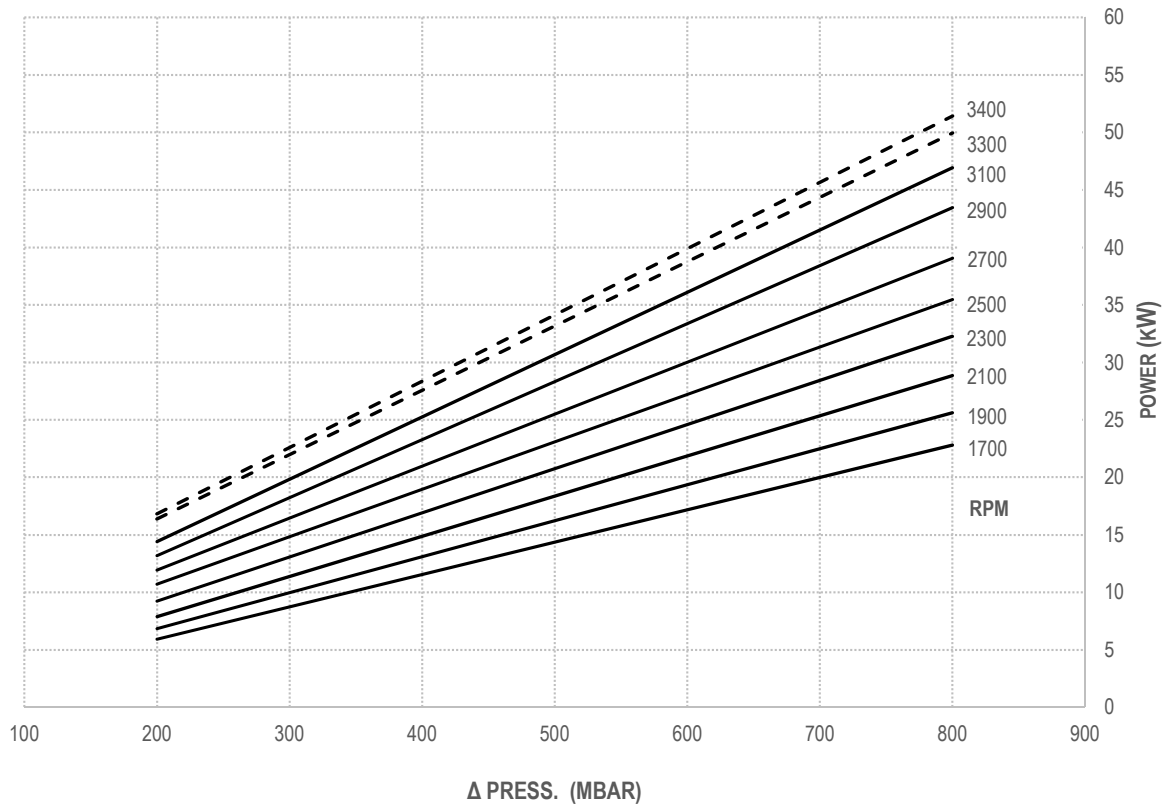
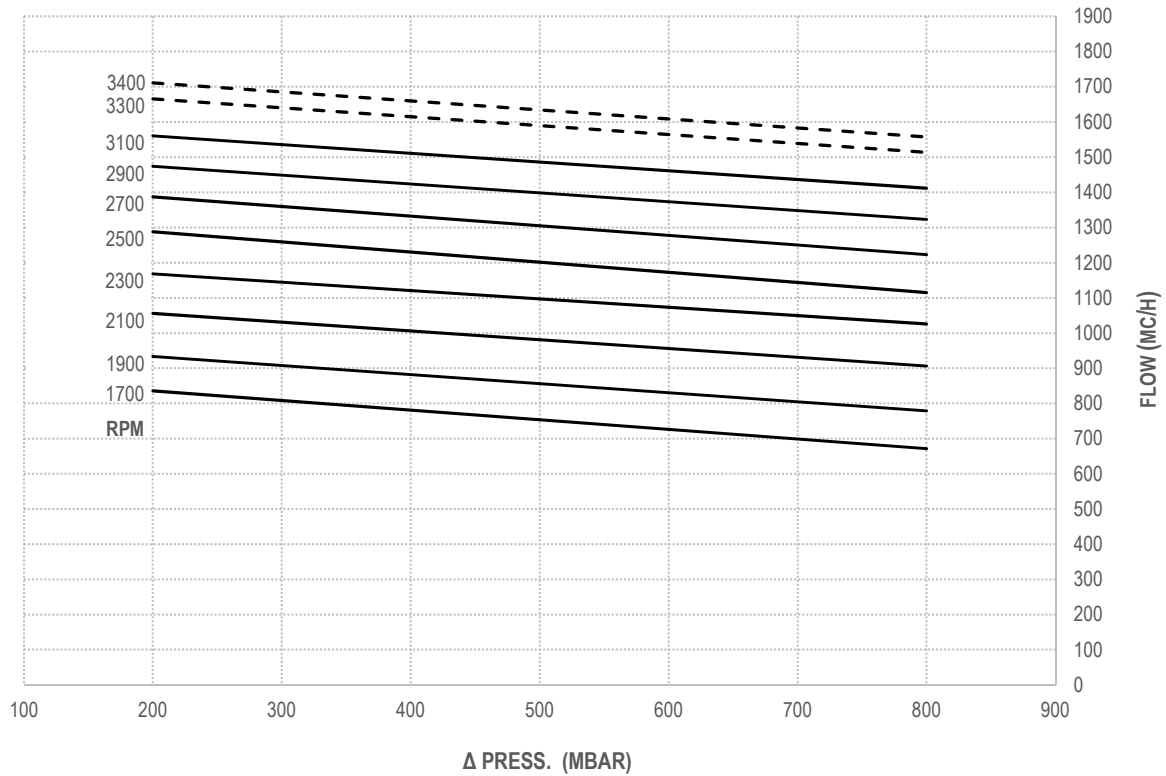
The operations with exhaust pressure higher than 800 – 1000 mbar rel are allowed only in intermittent duty

HELIX 220 M performances are identical to HELIX 220 performances. The rotation speed of the HELIX 220 M is 1/3 of the rotation speed showed on the graphs

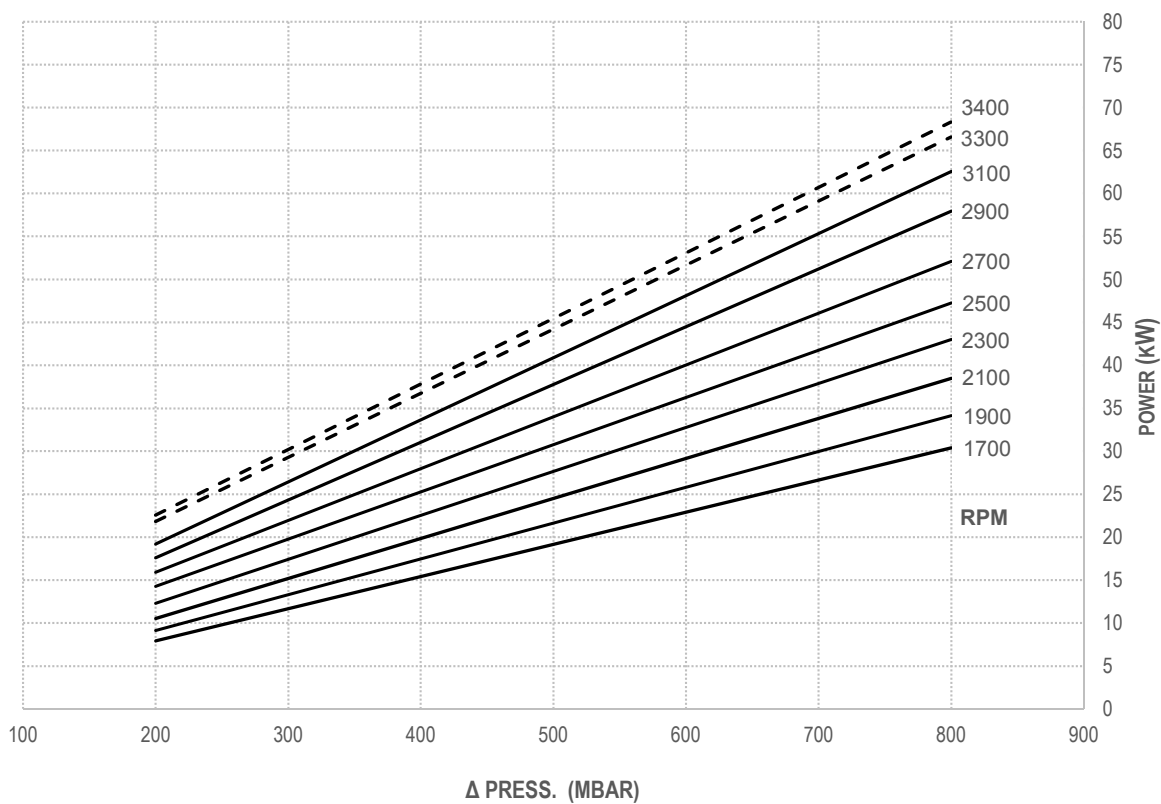
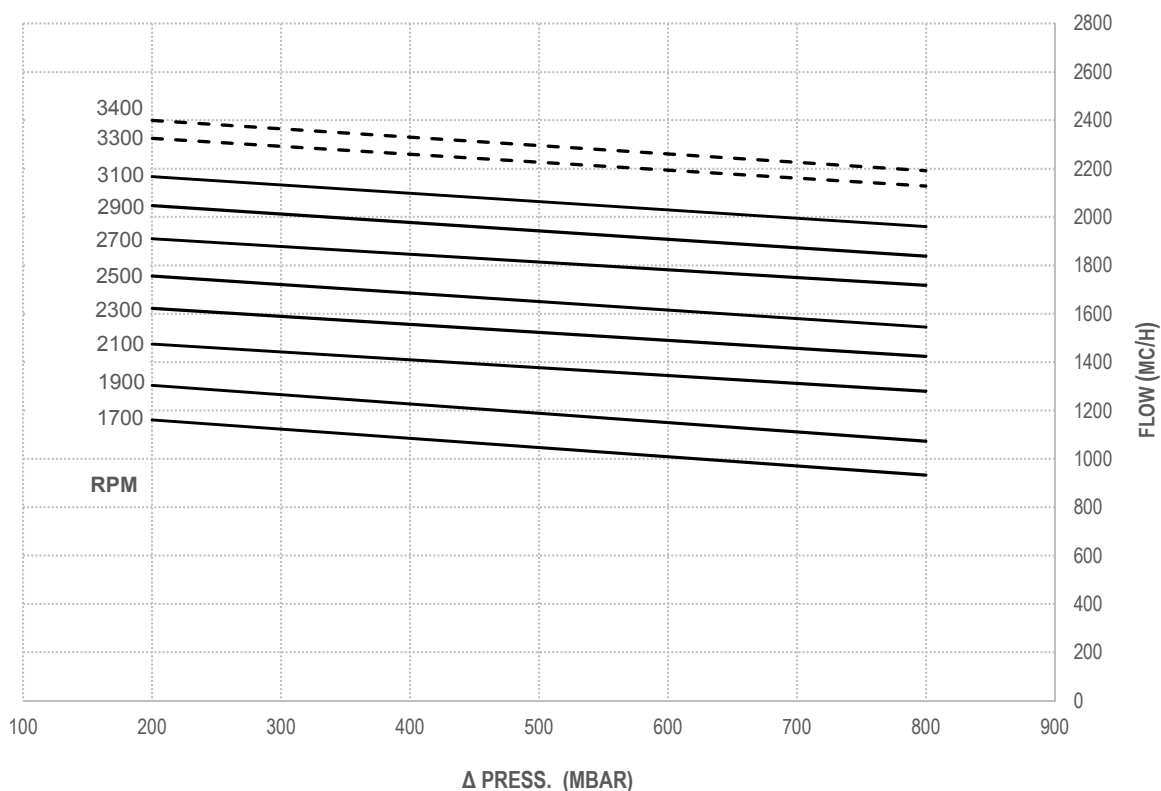
HELIX 220



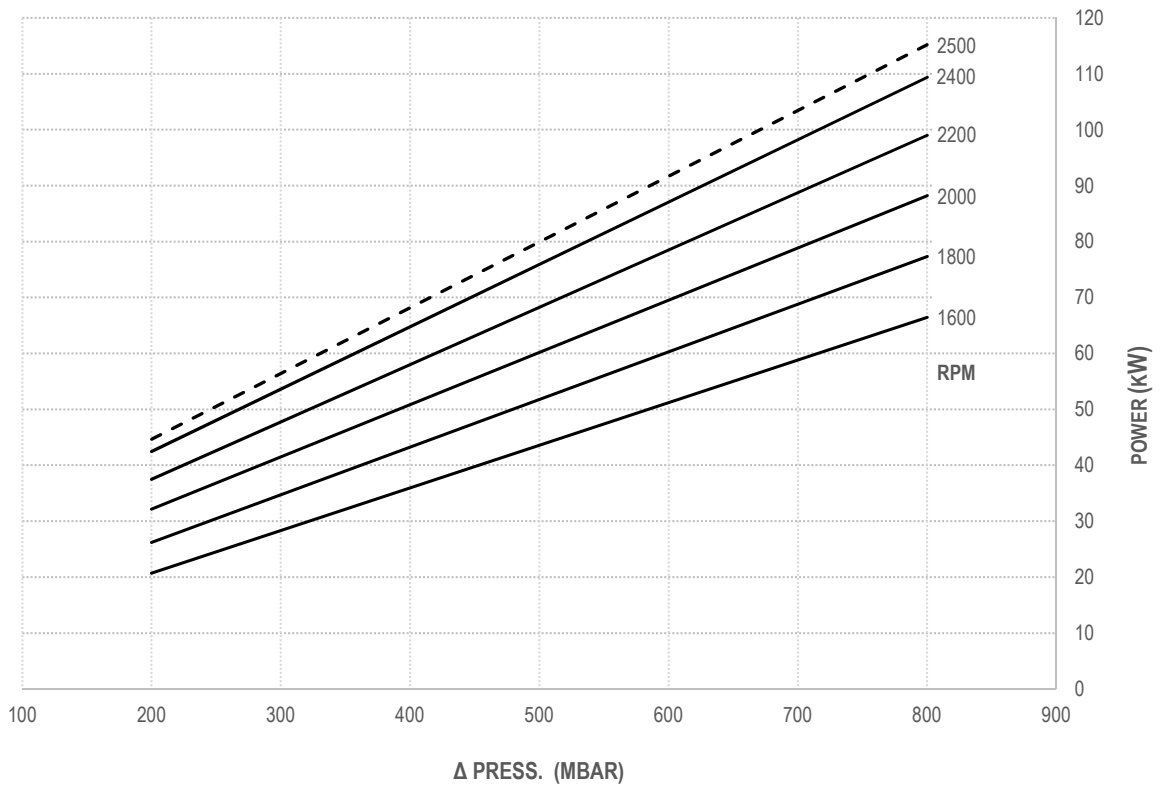
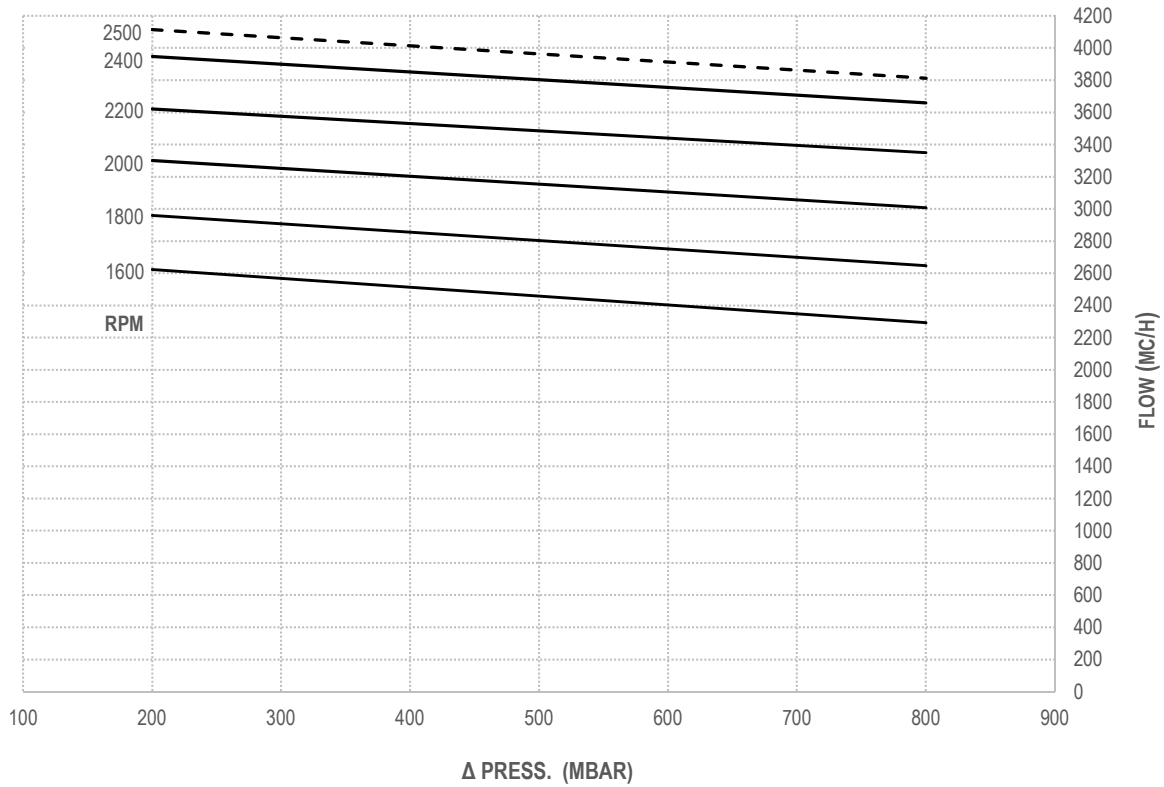
HELIX 300



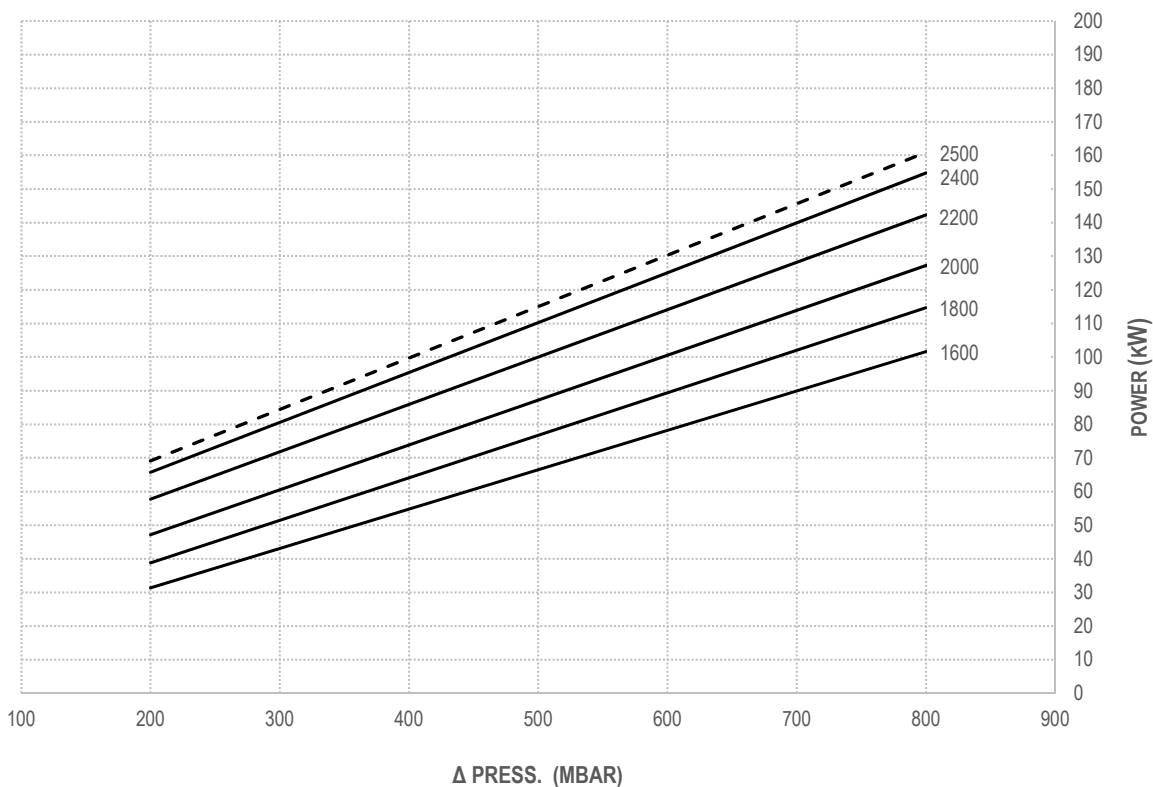
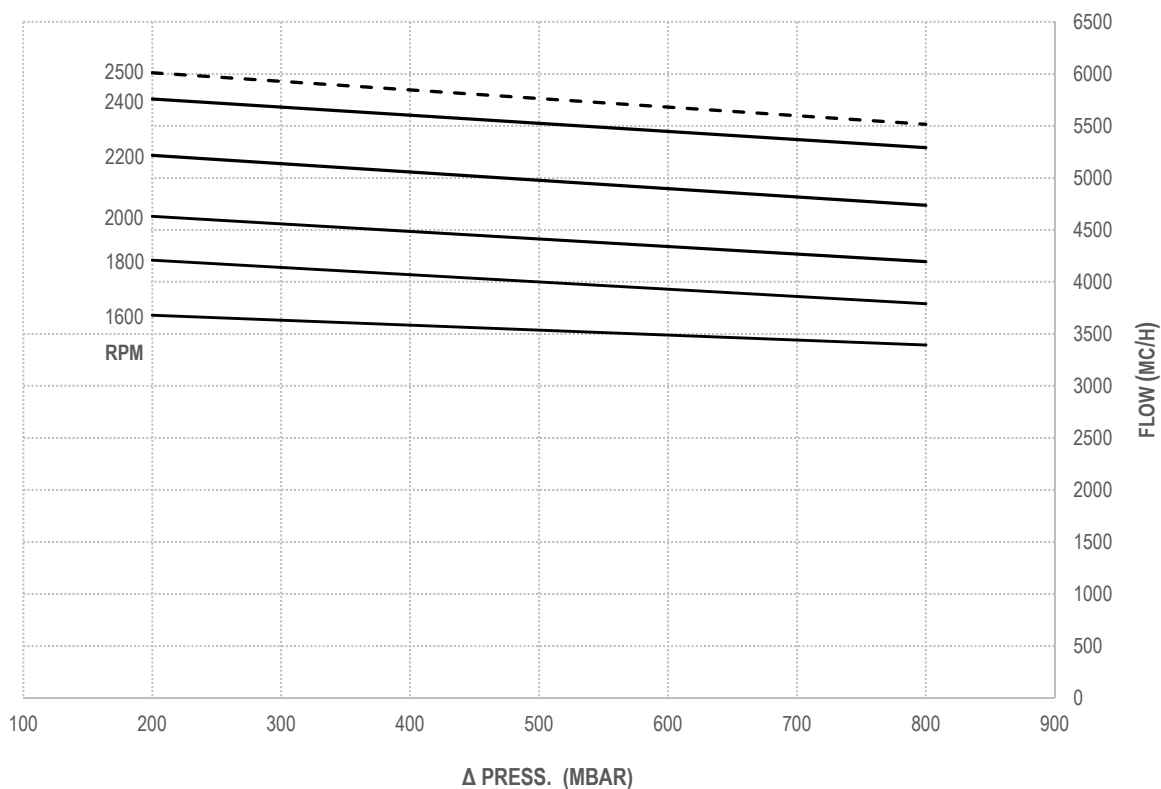
HELIX 450



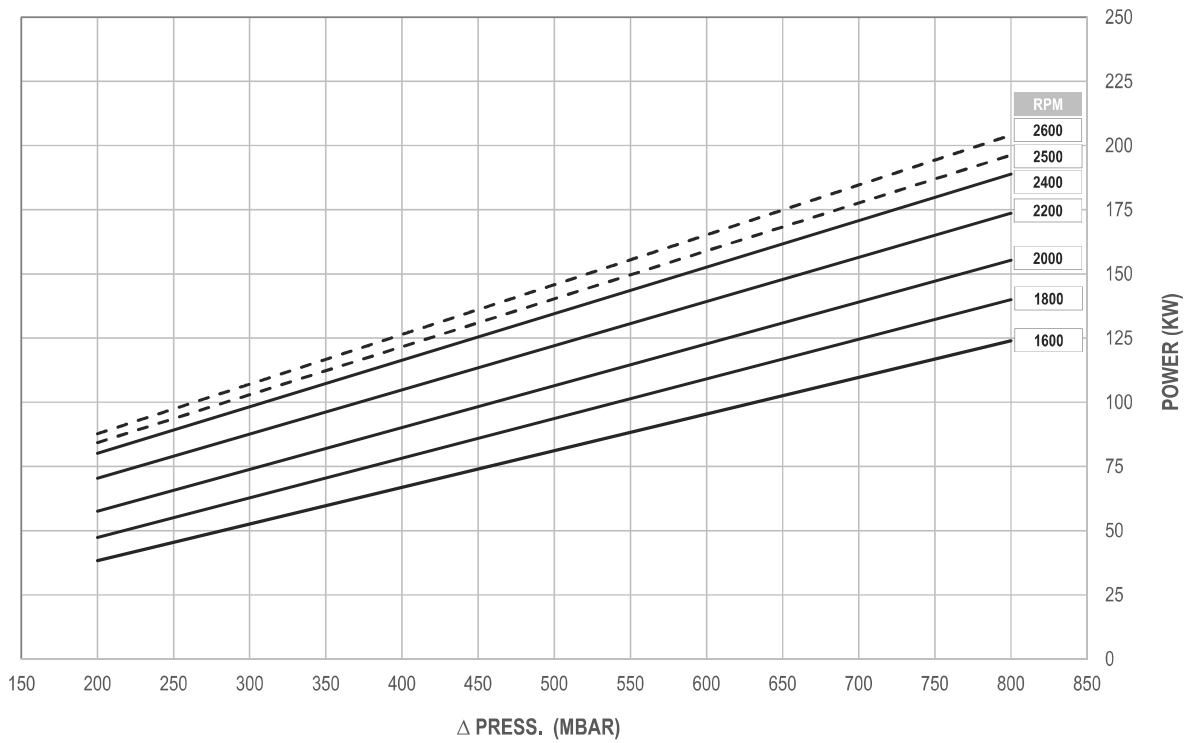
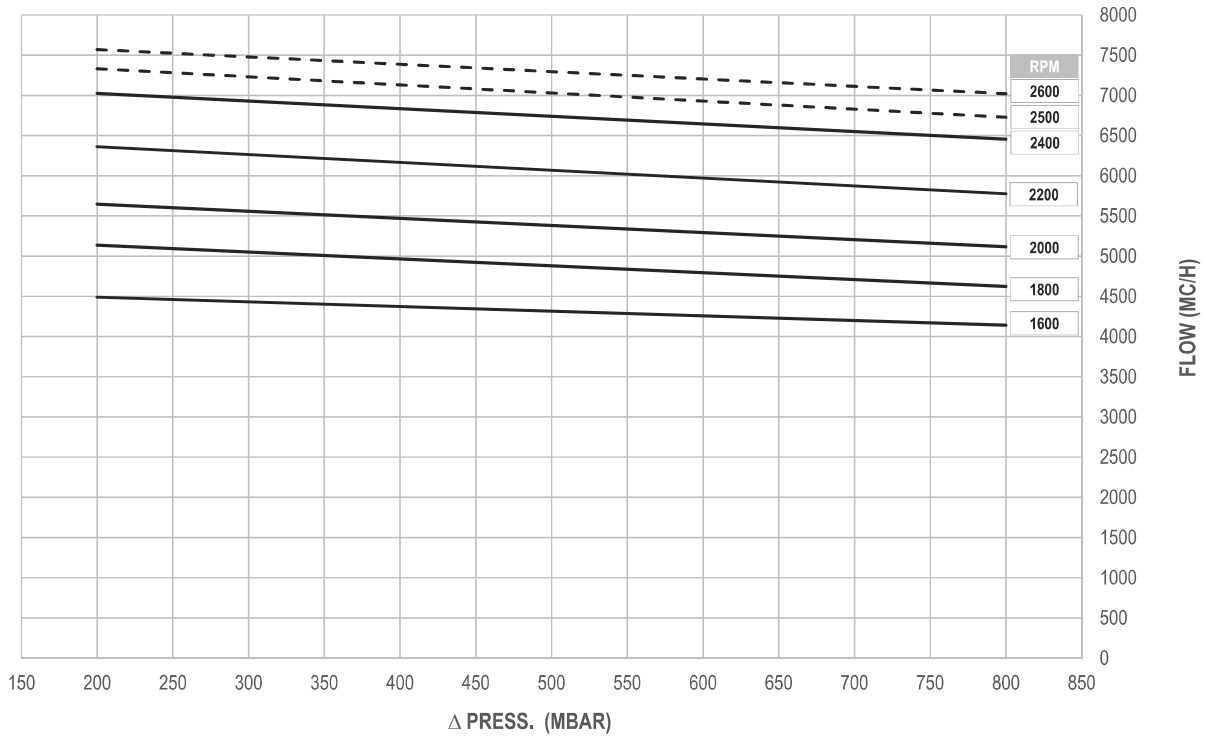
HELIX 750



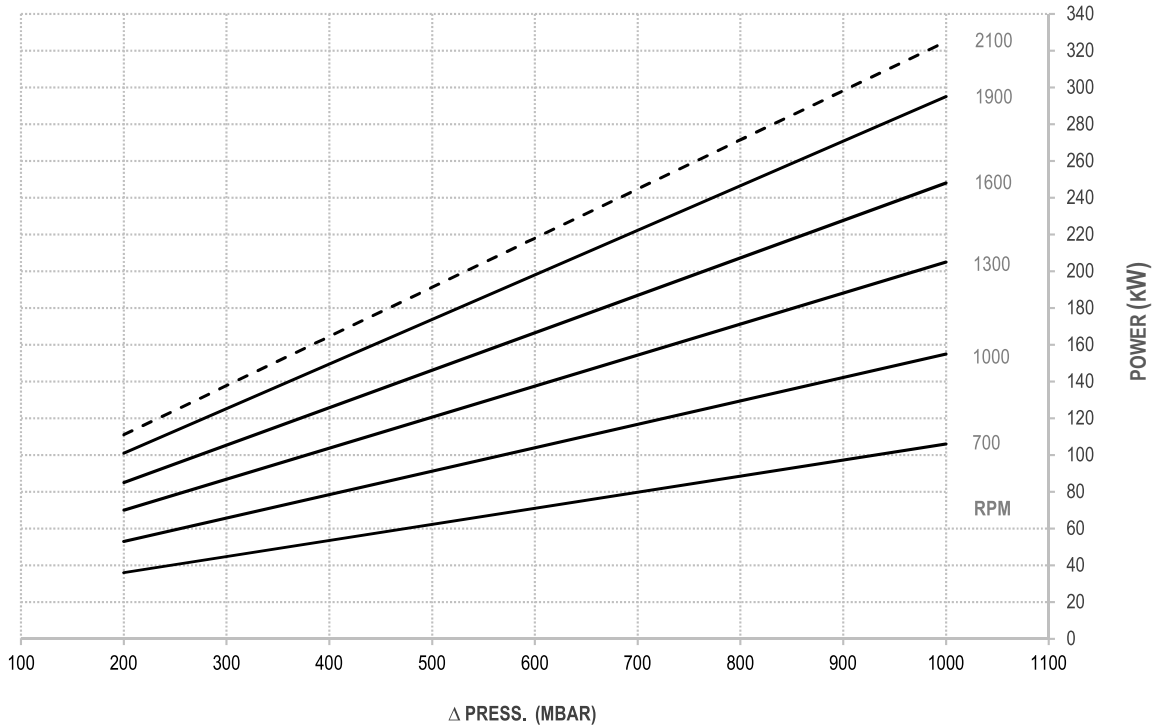
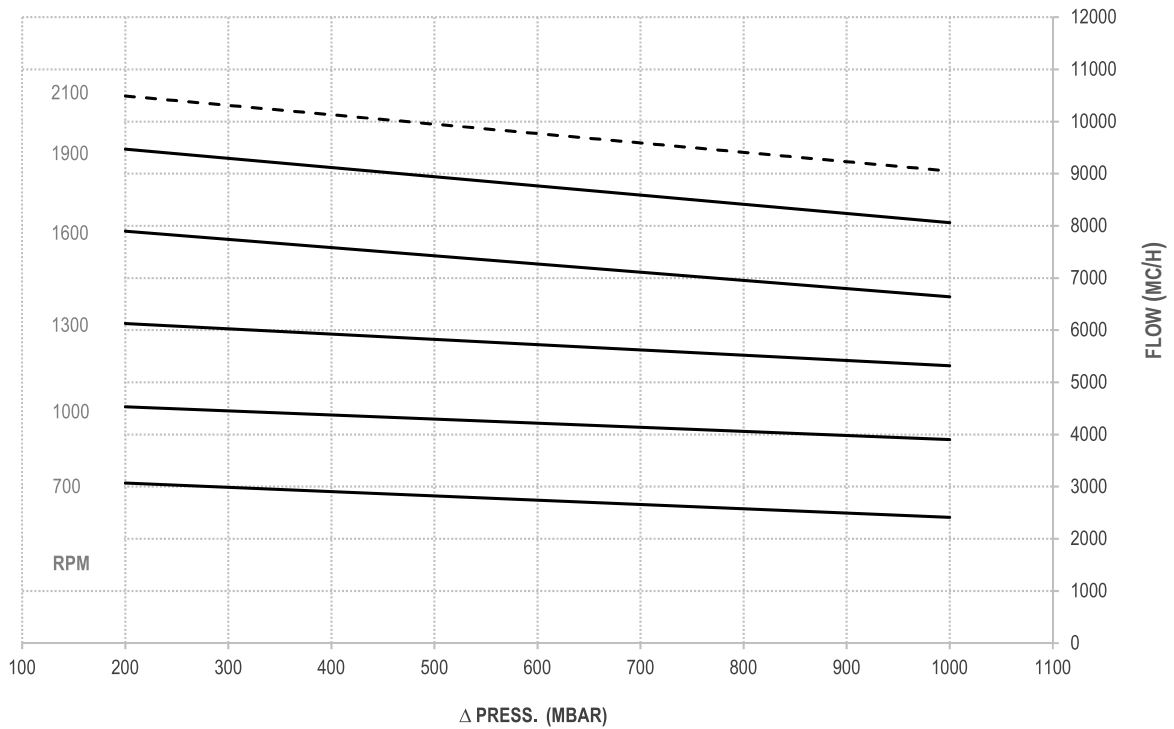
HELIX 1200



HELIX 1500



HELIX 2000



2.4. Sound level

Potoise power **L_w (A)** of the pump only and relative noise pressure **L_p (A)** in free field, at 7m from the pump.

Measures according to: UNI EN ISO 9614-2

Measure tolerance: ±2%

HELIX 220				
Rotation Speed	Vacuum/Pressure	L _w (A)		L _p (A)
		Noise power of the only pump. (without drive trasmission suction group, mufflers).		Noise pressure of the only pump at 7m in free field. (without drive trasmission suction group, mufflers).
[rpm]		[dB(A)]		[dB(A)]
3300	vac 50%	90		62
	vac 80%	91		63
	Δ press 600 mbar	96		68
3600	vac 50%	91		63
	vac 80%	92		64
	Δ press 600 mbar	97		69
3900	vac 50%	93		65
	vac 80%	94		66
	Δ press 600 mbar	98		70
4200	vac 50%	94		66
	vac 80%	95		67
	Δ press 600 mbar	101		73

HELIX 220 M				
Rotation Speed	Vacuum/Pressure	L _w (A)		L _p (A)
		Noise power of the only pump. (without drive trasmission suction group, mufflers).		Noise pressure of the only pump at 7m in free field. (without drive trasmission suction group, mufflers).
[rpm]		[dB(A)]		[dB(A)]
1100	vac 50%	91		63
	vac 80%	92		64
	Δ press 600 mbar	96		68
1200	vac 50%	92		64
	vac 80%	93		65
	Δ press 600 mbar	97		69
1300	vac 50%	94		66
	vac 80%	95		67
	Δ press 600 mbar	99		71
1400	vac 50%	95		67
	vac 80%	96		68
	Δ press 600 mbar	102		74

HELIX 300 - 450

Rotation Speed [rpm]	Vacuum/Pressure	Lw (A)		Lp (A)	
		Noise power of the only pump. (without drive transmission suction group, mufflers). [dB(A)]		Noise pressure of the only pump at 7m in free field. (without drive transmission suction group, mufflers). [dB(A)]	
		HELIX 300	HELIX 450	HELIX 300	HELIX 450
2300	vac 50%	91	92	63	64
	vac 80%	93	94	65	66
	Δ press 600 mbar	113	114	85	86
2500	vac 50%	93	94	65	66
	vac 80%	94	95	66	67
	Δ press 600 mbar	116	117	88	89
2700	vac 50%	93	94	65	66
	vac 80%	94	95	66	67
	Δ press 600 mbar	118	119	90	91
2900	vac 50%	95	96	67	68
	vac 80%	96	97	68	69
	Δ press 600 mbar	121	122	93	94
3100	vac 50%	96	97	68	69
	vac 80%	97	98	69	70
	Δ press 600 mbar	123	124	95	96
3300	vac 50%	97	98	69	70
	vac 80%	98	99	70	71
	Δ press 600 mbar	126	127	98	99

HELIX 750 - 1200

Rotation Speed [rpm]	Vacuum/Pressure	Lw (A)			Lp (A)		
		Noise power of the only pump. (without drive transmission suction group, mufflers). [dB(A)]			Noise pressure of the only pump at 7m in free field. (without drive transmission suction group, mufflers). [dB(A)]		
		HELIX 750	HELIX 1200	HELIX 1500	HELIX 750	HELIX 1200	HELIX 1500
1200	vac 50%	97	98	99	69	71	72
	vac 80%	98	99	100	70	72	73
	Δ press 600 mbar	103	104	105	75	77	78
1600	vac 50%	99	100	101	71	73	74
	vac 80%	100	101	102	72	74	75
	Δ press 600 mbar	104	105	106	76	78	79
2000	vac 50%	102	103	103	74	76	77
	vac 80%	104	105	106	76	78	79
	Δ press 600 mbar	107	108	109	79	81	82
2400	vac 50%	105	106	107	77	79	80
	vac 80%	107	108	109	79	81	82
	Δ press 600 mbar	110	111	112	83	85	86

HELIX 2000				
Rotation Speed	Vacuum/Pressure	Lw (A)		Lp (A)
		Noise power of the only pump. (without drive transmission suction group, mufflers).		Noise pressure of the only pump at 7m in free field. (without drive transmission suction group, mufflers).
[rpm]		[dB(A)]		[dB(A)]
		HELIX 2000		HELIX 2000
2100	vac 50%	109		82
	vac 80%	111		84
	Δ press 600 mbar	113		86
1900	vac 50%	107		80
	vac 80%	109		82
	Δ press 600 mbar	111		84
1600	vac 50%	105		78
	vac 80%	107		80
	Δ press 600 mbar	109		82
1300	vac 50%	102		75
	vac 80%	104		77
	Δ press 600 mbar	107		80
1000	vac 50%	100		73
	vac 80%	101		74
	Δ press 600 mbar	105		78
700	vac 50%	98		71
	vac 80%	99		72
	Δ press 600 mbar	104		77

2.5. Usage limitations

Model	rpm		P ₂ (bar rel.) max		P ₂ .P ₁ (bar)	T ₂ (°C)	T ₂ - T ₁ (°C)
	Min	Max	Max continuous	Max intermittent	Max continuous	Max	Max
HELIX 220	2500	4200	0,8	1	1	160	130
HELIX 220 MOLT.	833	1400	0,8	1	1	160	130
HELIX 300-450	1700	3300	1.0	1.1	1	160	130
HELIX 750-1200	1000	2400	1.0	1.1	1	160	130
HELIX 1500	1000	2600	1.0	1.1	1	160	130
HELIX 2000	800	2100	1.0	1.1	1	160	130

 P₁: inlet relative pressure

 T₁: inlet air temperature

 P₂: max continuous: pressure limit for continuous duty

 P₂: outlet relative pressure

 T₂: outlet air temperature

 P₂ max intermittent: pressure limit for intermittent duty

Vacuum operation: MAX counter pressure discharge + 0.1 bar

Under pressure operation: MAX vacuum value suction - 0.1 bar

2.6. Lubrication

 Recommended lubricant: synthetic gear oil: **TENNEX FACTOR SYNT ISO 150**.

In case this oil is not available, it is possible to refill the level with a gear oil composed of polyalphaolefine PAO:

Viscosity	ENI	ESSO	SHELL	TOTAL	MOBIL	BP	Q8
ISO VG 150	BLASIA SX 100	MOBIL SHC 629	MORLINA S4 B 150	CARTER SH 150	SHC 629	ENERSYN HTX 150	EL GRECO 150

Recommended grease (range temperature: from -20°C to +40°C):


Viscosity	ENI	ESSO	SHELL	TOTAL	MOBIL	BP	Q8	TENNEX
NLGI 2	GR MU EP 2	GP GREASE NLGI 2	ALVANIA GREASE EP 2	MULTIS EP 2	MOBILUX EP 2	GREASE LTX EP 2	REMBRANDT EP 2	UNIVERSAL GREASE EP 2

3. Safety and accident prevention

 **Attention: carefully apply these prescriptions.**

3.1. General recommendations

- When transporting the pump, use proper slinging. Store the compressor in stable places.
- Installation and maintenance must be carried out with the unit totally disengaged from its drive system and must be performed by qualified personnel.
- Use adequate clothing (avoid ties, loose sleeves, necklaces and so on) and suitable protection equipment (gloves, protection glasses, boots...).
- Before each maintenance operation, stop the pump and restore the atmospheric pressure.
- Make sure that all the parts of the unit are idle and cool, before performing any maintenance operation.
- To prevent errors and hazardous situations, establish what each operator is responsible for in the different maintenance operations.
- Do not start the machine if the protection devices provided for transmissions are removed. Replace damaged parts.
- Final manufacturer must make the transmission inaccessible by means of a fixed guard or interlocked movable guard.
- Operators working nearby must avoid prolonged exposure to the noise emitted by the aspirator, if not equipped with the proper ear-protection devices. IPDs recommended: ear protectors.
- When the pump is running, some parts may reach very high temperatures (above 70°C). Use all necessary precautions to avoid contact.
- Avoid accidental suction of solids: solids may be projected at high speed through the exhaust manifold and cause injuries.
- Pressure relief valve: point the air flux away from the operators.
- Do not use the aspirator over its designed limits: the machine may be damaged and the operator may be injured.


 **Do not exceed the power supply parameters indicated in the technical tables (see paragraph 2.3 - 2.6).**

• Based on the final use of the decompressor, the insertion in the housing machine and the typology of the same, the designer of the housing machine must apply safety signals (pictograms) to warn the operator on the risk still present. These pictograms essentially refer to three categories:


- Signals prescribing the use of Individual Protection Devices (IPDs) such as, in this case, the use of gloves and ear protectors.
- Signals indicating to pay particular attention to the dangers related to the machine's components, such as: risk of dragging in the transmission equipment and contact with hot surfaces.
- Signals indicating specific parts of the machine for an easier identification, such as: greasing points, oil tanks, etc.

3.2. Intended use

- HELIX are specifically designed for vacuum plants that must convey gas free from polluting substances, oil or water: this is made possible due to the lack of sliding parts, and therefore oil lubrication within the compression chambers.
- Liquids or solids infiltrations can seriously damage the machine.
- Do not sack toxic substances and inflammable or explosive gasses, since the internal components of the pump may reach high temperatures.

 **Do not sack toxic substances and inflammable or explosive gasses, since the internal components of the compressor may reach high temperatures.**

- Liquids or solids infiltrations can seriously damage the pump.

 **Attention: liquids or solids infiltrations can seriously damage the pump.**

- Do not run the pump over its designed operating limits (see paragraph 2.6): it may break and transmission can be damaged.

3.3. Conveyed fluid

- HELIX pumps are suitable for conveying filtered air. Before conveying other kind of gases, verify compatibility with compressor's characteristics.
- Please contact JUROP's Technical dept. if necessary.

4. Installation

4.1. Compulsory accessories

- The correct installation of HELIX pumps requires the following accessories:
 - Suction silencer for the injection system.
 - Exhaust silencer.

- Overheating alarm to connect to the thermostat on the exhaust port.
- Undersigned suction filter on the vacuum line to avoid suction of foreign bodies or liquids.
- Adequate overpressure safety valves.
- Inductive sensor.

Model	Air filter	Spark Arrestor ATEX
HELIX 220	1445002900	14450MNZB0
HELIX 300-450	1445003200	14450GU6B0
HELIX 750-1200	1450 068 00	14450 HYJ B0
HELIX 2000	1450 068 00 (x2)	14450 HYJ B0 (x2)

4.2. Checking upon receipt

• When the goods are delivered, make sure that all parts listed on the delivery note are in perfect condition and have suffered no damage during shipping.

• Remove the parts of the packaging that can be dangerous if sucked by the pump.

• Make sure the pump has its identification plate affixed on the front cover. Pump without such identification are to be considered anonymous and potentially dangerous: in such an event, they must not be used, otherwise the manufacturer will be deemed free from any liability whatsoever.

4.3. Storing in the warehouse

• If the compressor will not be installed inside a short time after delivery:

- Remove the guards from the ports and spray a film of protective oil over the inner surfaces of the body, rotors and sides. Then attach again the guards;
- Store in a closed and dry place. Renew the preserving oil periodically.

• To temporarily store a used pump, follow the instructions below:


- Thoroughly clean the pump.
- Equip the pump with suitable anti-corrosion protection.

4.4. Handling and installation

• Before each movement, verify that the lifting equipment has a suitable capacity (check the weight of the decompressor, possibly showed in this manual, in the paragraphs).

• Do not lift the packaging or the machine when moving more than 50 cm from the ground. Proceed with the final lifting only near the installation point.

• Harness the machine with suitable straps / chains near the main body, paying attention to the position of the mass centre of gravity to ensure the load stability.



Warning: do not stand under the machine when it is lifted during the installation.

4.5. Mounting

• When the pump is installed it must be accessible for maintenance and fitted, with vibration adsorbing pads, to a bearing frame or level base (Max. admitted angle 3° in all the directions).

• The size of the frame must be suitable to support the pump weight and avoid bending. It is recommended to install the pump on vibration adsorbing pads to reduce the noise and vibrations produced during its operation.

• Leave enough space around the pump to allow the free circulation of air for cooling; avoid exposure to dirt and debris.

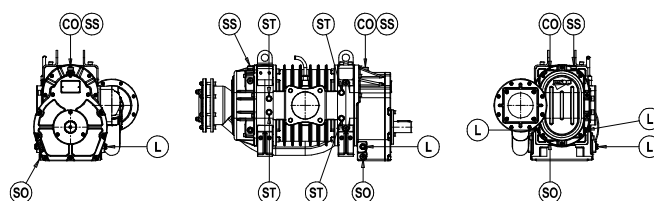
• Leave enough room to access the oil drainage, filling and checking ports (see Fig. 4.1).

• The oil level control and drainage plugs are mounted correctly during the final inspection in the factory. Do not change their position.

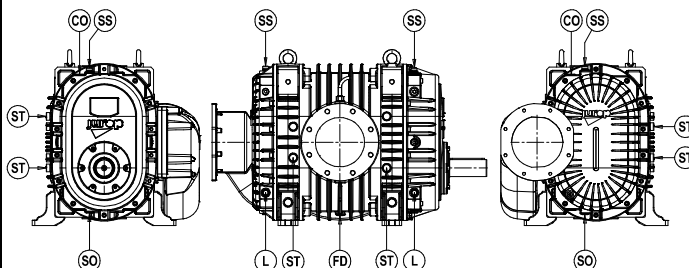
Legend

L	oil level (front and rear gearboxes)
SO	oil drainage (front and rear gearboxes)
SS	gearbox vent (front and rear gearboxes)
ST	seals vent (front and rear gearboxes)
CO	filler cap (front and rear gearboxes)
FD	Drainage Hole

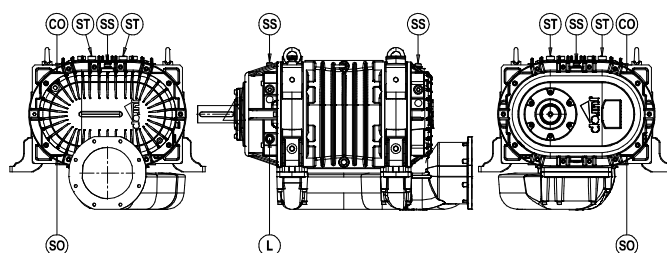
HELIX 220 – With Gearbox



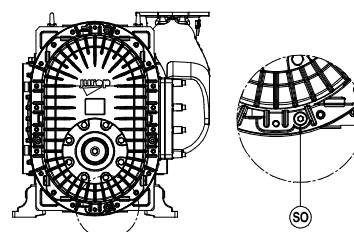
HELIX – Horizontal Ports



HELIX – Vertical Ports



HELIX 2000 - oil drainage (front and rear cover)



Pic. 4.1

• Oil levels, filler caps and oil drainages are individual for the front and rear gearboxes.

Oil levels, filler caps and oil drainages are individual for the front and rear gearboxes.

• The vacuum pump's rotation direction determines the room taken up by the injection system and flow direction (see the paragraph 2.1). Any changes made to rotation direction or to the assembly position must be agreed with our Technical Assistance.

Any changes made to rotation direction or to the assembly position must be agreed with our Technical Assistance.

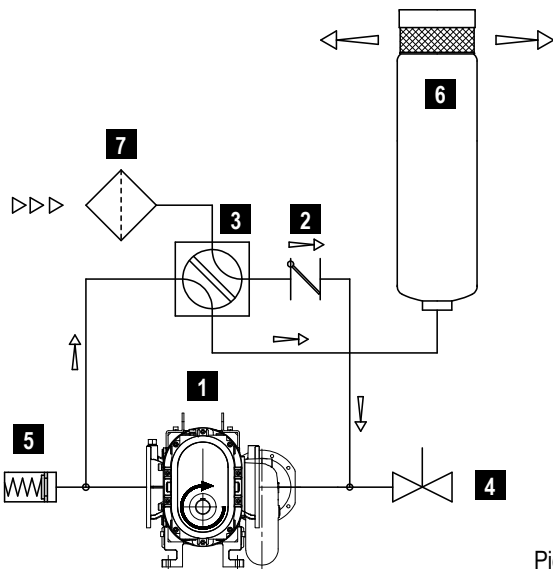
- Keep suction filter clean: obstructions may lead to noticeably reduced performance.
- Keep injection filter clean: obstructions may reduce the air injection cooling performance and cause overheating of the pump.
 - Do not embed nor cover the pump.
 - The base must not lead heat towards the machine while it is running.
- In the event that the decompressor is electrically isolated, connect it to the ground or make it equipotential with the housing machine. Check that the paint does not prevent its passage.

4.6. Vacuum – pressure line

• See figures 4.2 e 4.3.

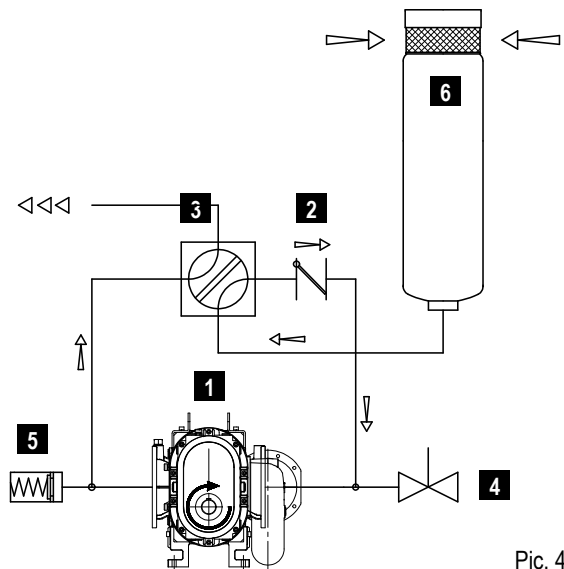
- The diameter of the vacuum and pressure line pipes must be suitable for the pump's flow rate (approximate average air speed is 15-30 m/s); in any case, it should not be smaller than the ports diameter.
- The weight or dimensions of the pipes must in no way stress the vacuum pump body. Use high temperature resistant rubber sleeves.
- Remove the port guards when mounting. The pipes and components of the whole line must be clean.
- Avoid constrictions and tight curves where they are not essential.
- The exhaust pipes can reach high temperatures. Protect those adequately from the operator reach.
- A clapet valve on suction pipe avoids rotation in the opposite direction when the vacuum pump stops.
- Over-pressure safety relief valve on the vacuum line: install it close to the vacuum pump. Valve relief flow rate must limits the HELIX from exceeding a pressure of 1800 mbar or, in any case, the maximum allowed by the system (see par. 2.5). Do not interpose shutoff valves on the line between the pump and the safety relief valve.
- If necessary apply:
 - A second shutoff valve or suction filter. Liquids and materials must never reach the pump;
 - A venting valve on the suction line, controlled by the thermostat: when the vacuum pump is overheating, this valve will open a direct connection with the atmosphere and consequently the pump will suck fresh air, from the outside, for a better cooling (a 2" valve size can be enough for a good cooling without losing too much vacuum rate). Install a silencer filter;
 - A 4-way change-over valve to obtain alternatively vacuum or pressure in the system (this is not required if the pump is used only for vacuum or only for pressure).

Vacuum/Pressure Line – Vacuum operation



Pic. 4.2

Vacuum/Pressure Line – Pressure operation



Pic. 4.3

Vacuum / Pressure line components


1	Vacuum Pump	5	Over-pressure safety relief valve
2	Clapet valve	6	Silencer
3	4-way change-over valve (optional)	7	Suction filter
4	Overheating safety venting valve (optional)		

- Turning of 90 deg. (from the vacuum position) the 4-way valve changeover, the pump can suck air from the exhaust silencer to pressurize the tank. In this case it is recommended to control the pump speed in order to avoid dangerous overpressure in the line.

- In case of overheating working under pressure condition, opening of the safety venting valve mounted on suction line will not cool down the pump. The only possible solution is to stop the pump drive and wait for a proper cooling.

- The clapet valve, on the suction line, avoids opposite rotation of the vacuum pump when it is stopped under vacuum conditions:

- Before servicing the vacuum pump or its drive system. The pressure difference between inlet/outlet ports can start the machine turning automatically;
- Before starting the machine again: otherwise it would require a higher starting torque.



Attention: when pump is stopped under load, vent the system before any maintenance operation.

4.7. Air injection cooling system

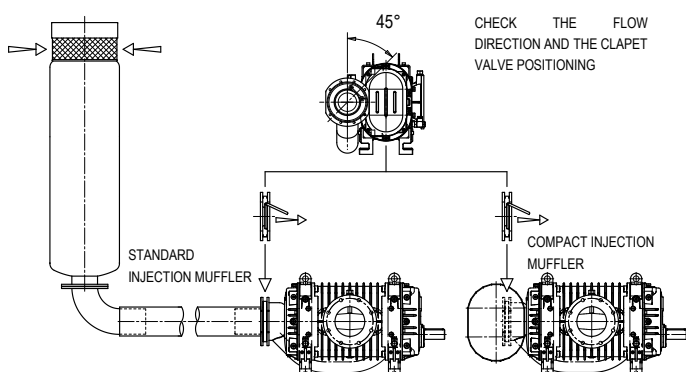
- Operating only in the vacuum mode.
- Use only the specific air injection muffler for the HELIX, standard or compact.
- The minimum pipeline inner diameter (Di) of the injection system must be:

Model	Inner diameter
HELIX 220	98 mm
HELIX 300	110 mm
HELIX 450	127 mm
HELIX 750	160 mm
HELIX 1200	190 mm
HELIX 1500	208 mm
HELIX 2000	210 mm

- The silencer should be mounted as close as possible to the vacuum pump (max. 1-1.5 m) and in a position protected against debris and water:


- Avoid tight curves;
- Avoid pumping nearby heat sources;
- Check the flow direction and the clapet valve positioning.

- Check weekly the cleanliness of the muffler suction port. Remove all the filth that obstruct the air flow.



Pic. 4.4

- An inefficient AIR injection could cause the vacuum pump overheating during the vacuum operation.



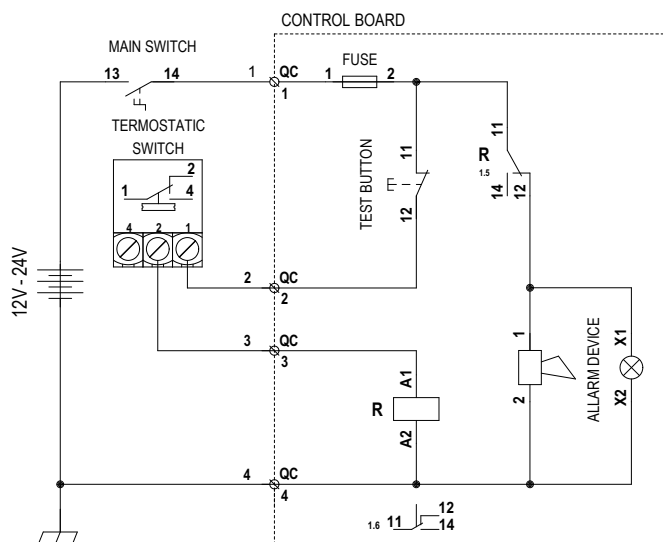
Attention: an inefficient AIR injection could cause the vacuum pump overheating during the vacuum operation.

- Max injection line vacuum value: - 0.1 bar. Measurement taken near the pump injection vent.

4.8. Overheating alarm

- The vacuum pump is supplied with a thermostatic switch on the exhaust port. When reaching the maximum allowed temperature, the switch must send an electric signal to the alarm system or open a valve on the suction line, to let the fresh air coming in and cool the pump.

- Electric characteristics of the SPDT connector:
 - DC power supply: max 220V, 12W dc-13 (control coils data).
 - AC power supply:
 - max 440V, 10A ca-1 (resistive load);
 - max 440V, 6A ca-3 (start-stop for asynchronous motors);
 - max 440V, 4A ca-15 (power supply with control coils power supply with control coils > 72VA).



Pic. 4.5

- Protection: IP67 (IEC 529 e DIN 40050).
- Room temperature: from -40 to +70°C.
- Core hitch: Pg 13.5 for cables from 5 to 14 mm.

- Use the NC (normally closed) contact of the switch to control the coils of a power relay. In this way (see above diagram) the alarm advises also in case of accidental wires damage (safety protection of the circuit).

- Sensor installation:

1. The sensor of the thermostat is supplied by us already fitted inside its housing. In case of disassembling, follow the instruction (above drawing) to reassemble.
2. Unwind the protected capillary of the sensor avoiding tight curves or buckling. Fix the unit to a stable support before proceeding (to avoid vibrations or accidental impacts).

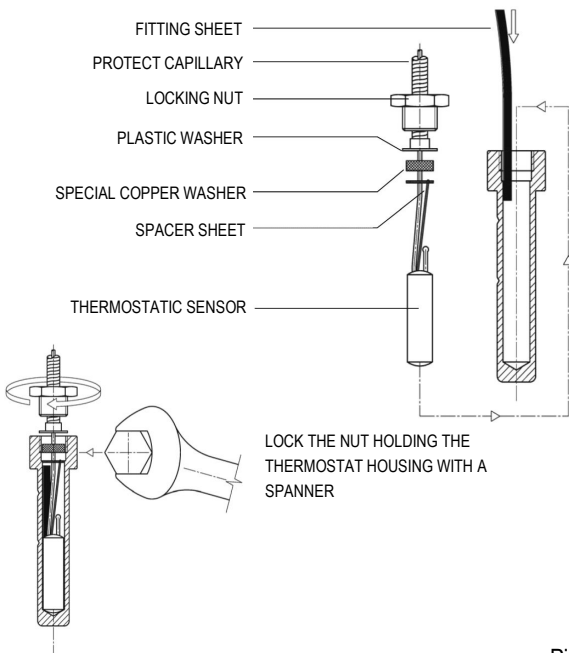
3. The thermostat operation can be influenced by the ambient temperature. The setting made by the manufacturer is correct to work in ambient temperatures between 0°C and 40°C. If the thermostat is frequently used over said temperature range, it could be necessary a new setting. Please contact the after sale technical service.

• Check the following points to grant a correct operation of the thermostat:

1. The spacer sheet keeps the sensor fitted on the lowest part of its housing.
2. The fitting sheet must fill the clearance between the sensor and its seat in the housing; this is important to grant an easy and correct heat transmission.

• Overheating can seize the vacuum pump, causing a damage also in the drive line. Stop the pump for cooling or drive it at free ports conditions (with the suction valves fully opened) to let it cool down properly. The pump can be again operated only when the alarm is turned off after cooling.

Attention: overheating can seize the vacuum pump, causing a damage also in the drive line.



Pic. 4.6

4.9. Oil level alarm (optional)

• The vacuum pump can be supplied with two optical oil level switches, one in the front gearbox and one in the rear gearbox. When reaching the minimum oil level necessary for the gears lubrication in one of the gearboxes, the switch must send an electric signal to the alarm system.

- The oil gauge alarm must work only when the blower is turned off.
- Electric characteristics of the K11 oil level switch:

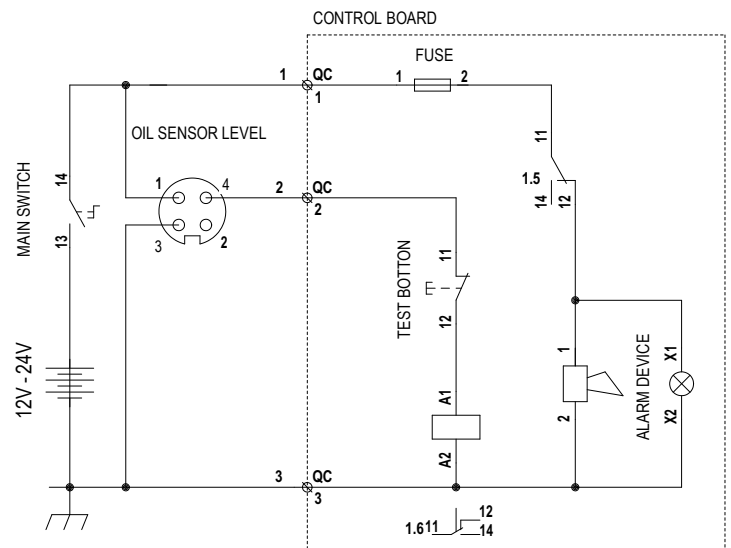
- a. DC power supply: 10-28 V;
- b. AC power supply: 24 V;
- c. Protection: IP65 (IEC 529 and DIN 40050);
- d. Room temperature: from -40 to +125°C.

• Use the NC (normally closed) contact of the switch to control the coils of a power relay. In this way (see above diagram) the alarm advises also in case of accidental wires damage (safety protection of the circuit).

• Working with an oil level lower than the minimum recommended leads to a rapid wear of internal seals, bearings and gears causing the seize of the vacuum pump.

Attention: working with an oil level lower than the minimum recommended leads to a rapid wear of internal seals, bearings and gears causing the seize of the vacuum pump.

• Stop the vacuum pump and refill both the gearboxes with the recommended oil (see par. 2.7).



Pic. 4.7

4.10. Drive system

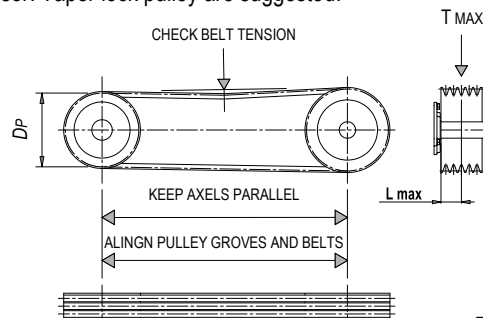
• For the machines of this series, the allowed power transmissions are:

- Direct transmission;
- Oil hydraulic transmission (HDR)

A) Belt drive

• Install a suitable pulley on the smooth shaft as close as possible to the pump in order to avoid excessive bending stress on the drive shaft.

• Install a suitable pulley on the smooth shaft as close as possible to the compressor. Taper lock pulley are suggested.



Pic. 4.8

- Do not use driven or driving pulleys with a pitch diameter inferior to values reported in the box below. Small pulleys require a high belt tension which may cause premature wear to the bearing or transmission damages.
 - Let the air circulate freely to cool down the pump.

- A limited speed ratio will extend the belts life and reduce stress on the shafts. When possible prefer:
 - Pulleys with a pitch diameter bigger than the one indicated;
 - Engines or power take-offs with a speed similar to the one of the vacuum pump.

Model	Max Speed (rpm)	T. max (N)	L. max (mm)	Pd Min. Transmission (mm)	N° grooves	Belt Type
HELIX 220	4200	3000	50	160	4 x SPA	XPA
HELIX 220 M	1400	3800	35	250	4 x SPB	XPB
HELIX 300	3300	3500	45	180	4 x SPB	XPB
HELIX 450	< 2800	5000	55	160	5 x SPB	XPB
	> 2800 (MAX 3000)	5000	55	180	5 x SPB	XPB
HELIX 750	2500	6500	75	250	4 x SPC	XPC
HELIX 1200-1500	2500	11500	87	250	5 x SPC	XPC
HELIX 2000	2100	16000	110	300	8 x SPC	XPC

Pd Min: minimum pitch diameter of small pulley.

B) Hydraulic Drive

- The HELIX HDR vacuum pump is completed with a fixed displacement high pressure motor suitable for open or closed type oil circuits.

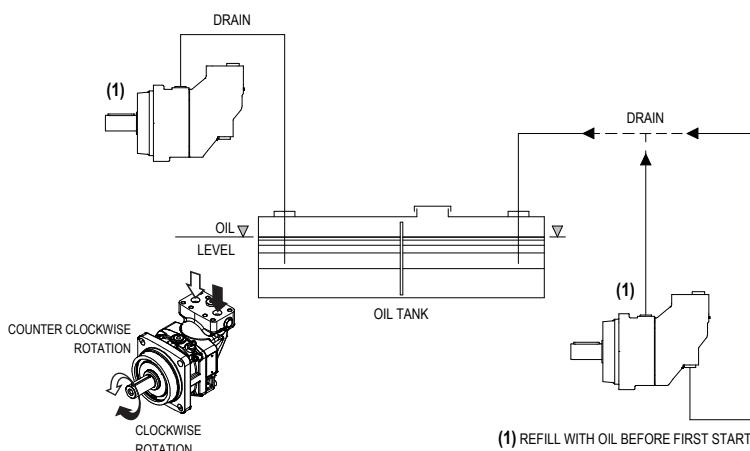
Model	Displacement	Working press.	Max drainage pressure	Fluid	Filtering class	Optimal viscosity	Max viscosity	T° oil Max
HELIX 300	40 cc/rev	420 bar	1 bar	HLP	20/18/13 (ISO 4406)	15-30 cSt	1000 cSt	80 °C
HELIX 450	60 cc/rev	420 bar	1.5 bar	HLP	20/18/13 (ISO 4406)	15-30 cSt	1000 cSt	90 °C
HELIX 750	90 cc/rev	350 bar	1 bar	HLP	20/18/13 (ISO 4406)	15-30 cSt	1000 cSt	80 °C
HELIX 1200	125 cc/rev	420 bar	2 bar	HLP	20/18/13 (ISO 4406)	15-30 cSt	1000 cSt	90 °C
HELIX 1500	163 cc/rev	420 bar	2 bar	HLP	20/18/13 (ISO 4406)	15-30 cSt	1000 cSt	90 °C

(*) : Value reported to the main circuit

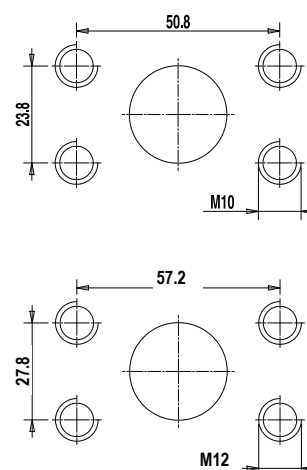
- **Oil flow and pressure:** to be defined according to the vacuum pump speed rotation.
- **Fluid:** mineral oil for hydraulic systems HLP (DIN51524) and HL/HM (ISO6743-4).
- **Filtering:** class 21/19/16 (HELIX220) and class 20/18/13, according ISO 4406.
- **Check the oil line connections** that must logically following the rotation direction of the vacuum pump (see Fig. 4.7).

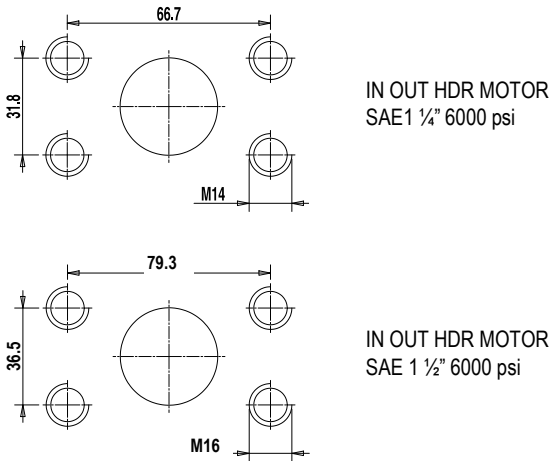
- **Drainage:** connect this line to the oil tank to make sure the motor never operates without oil. Discharge into the tank under free surface or bend the pipe into a U-shape.

Model	Drain threaded	In/Out Flange
HELIX 220 HDR	G 3/8	SAE 3/4" 6000psi
HELIX 300 HDR	M18x1.5	SAE 3/4" 6000psi
HELIX 450 HDR	M22x1.5	SAE 3/4" 6000psi
HELIX 750 HDR	M22x1.5	SAE 1" 6000psi
HELIX 1200 HDR	M22x1.5	SAE 1 1/4" 6000psi
HELIX 2000 HDR	BSP 3/4	SAE 1 1/2" 6000psi



Pic. 4.9





Pic. 4.10

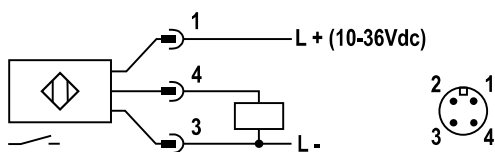
- **Starting-up:** be sure that the system is well cleaned and pour oil into the tank and into the motor housing (necessary to lubricate the internal bearings).
- Vent the circuit and adjust the overpressure safety valve to the lowest possible value.
- Check the oil tank level.
- Increase pressure and rotation speed until operating values are reached.
- It is recommended to avoid rotation in the opposite direction when the vacuum pump stops; this because it could damage the hydraulic motor whether the circuits are open or closed (see also the "Vacuum – Pressure Line" paragraph). The hydraulic circuit must be protected against overpressures.

Attention: avoid rotation in the opposite direction when vacuum pump stops; this because it could damage the hydraulic motor.

- Check the rotation speed, using the inductive sensor mounted on the hyd. motor bracket. Connect it to an electronic rev counter, suitable for 2 kHz max inductive sensors, and set the teeth number at z.
- The inductive sensor must be powered at 12-24V DC from the rev counter.

Model	Z (teeth n. of the inductive sensor gear)
HELIX 220-300-450-750 HDR	4
HELIX 1200-1500 HDR	2
HELIX 2000 HDR	4

- In the picture the wiring of tachometer sensor.



Pic. 4.11

- The machine/system manufacturer is responsible for dimensioning the lines.

The machine/system manufacturer is responsible for dimensioning the lines.

5. Start up

5.1. Starting-up

- Check the oil level, in the front and rear gearboxes.
- Check that all protection devices are correctly installed.
- Check that there are no obstacles in the vacuum/pressure line.
- Check rotation direction: open all system valves and start running slowly.
 - Rotation in the wrong direction is allowed at slow speed: possible damage to the line and/or pump.



Attention: rotation in the wrong direction is allowed at slow speed: possible damage to the line and/or pump.

- Close the valves and increase pressure or vacuum rate.
- Check speed under load and operation: absence of anomalous noise or vibrations.

5.2. Operating suggestions

• The manufacturer declines all responsibility for damages caused if the installation, operating and maintenance instructions are disregarded.

• When the overheating alarm advises (optional) the operator that the maximum operating temperature has been reached:

1. Stop the pump and wait until it has cooled down.
2. If possible drive it with all the valves opened for the time necessary to a proper pump cooling, run the pump at a vacuum rate lower than 30% - if working in vacuum mode - or at an exhaust pressure lower than 200 mbar rel. - if working in pressure mode - for the time necessary to restore the alarm. To this purpose, provide an adequate opening which is in communication with the atmosphere on the suction/discharge line and is operated by a valve regulated by the alarm system itself.
3. Work can be started again only when the temperature has returned to normal values.
4. If the alarm triggers often during normal use, it is necessary to check the conditions of use (temperature, pressures, speed) and the conditions of the system.

• When ambient temperatures are very low (like in the winter for instance), exhaust temperatures are lower than usual and the overheating alarm does not advise even if you are working at high speed and with high vacuum levels. We recommend not to exceed a temperature difference of 130°C between incoming and outgoing air, to avoid anomalous deformation of the components and block/seize the vacuum pump. Avoid continuous duty under such conditions even if the overheating alarm does not trigger.

• After operation in dusty environments, after accidental sucking of liquids inside the pump or before a long inoperativity period it is recommended to wash the pump inside according to the following procedure.

1. Before washing the pump, be sure that it has cooled down. To obtain this in a short time, it is possible to run the pump for a few minutes at zero vacuum conditions, or stop it at all.



Attention: Do not carry out this operation on very hot pumps (for example after a working day) until they have cooled down.

2. Use 1-2 liters of water mixed with a non-flammable detergent. We suggest some product like Henkel Bonderite C-NE 5225: 5% concentration in water. This detergent grants a good protection against rust and oxidation.
3. Use one of the openings placed in the vacuum line (closest on the pump) to suck some water mixed with detergent.
4. Start the pump at low speed (about 1000 rpm for HELIX 220-300-450; 500 rpm for HELIX 220M-750-1200-1500; 400 rpm for HELIX2000) leaving opened all the suction valves in the tank, in order to keep low the vacuum rate (max vac. 10-20%). Let the detergent mix entering the pump very slowly.
5. The detergent mix stays suspended in the pump inside, before being expelled through the exhaust silencer.
6. After keeping the pump speed for a while to make the product reaching the internal parts, it is necessary to dry the pump preventing oxidation. When the detergent mix is finished, continue running the pump at the lowest possible vacuum rate for a few minutes, then close venting and suction valves up to 50-60% maximum, for a couple of minutes. With this operation the pump will dry from the heated air and protected from the chemical attack of the detergent.
7. Washing the pump with this detergent guarantees a protection after some days of inoperativity. If the pump is not used for more than two weeks, after having washed and dried the inner parts as described above, it is recommended to suck slowly 200 cc anti-rust and water-repellent protective oil (or, if not available, a very fluid gear oil).



Attention: do not carry out also this operation on very hot pumps (for example after a working day) until they have cooled down.



Dispose of used oil in accordance with the current regulations.

- Do not convey the exceeding flow outlet towards the suction port.
 - Control the air flow by adjusting the rotation speed: do not use the safety relief valve to discharge the exceeding flow.
 - Do not squeeze the hoses/pipes.
 - When stopping the pump, avoid rotation in the opposite direction.
- In fact, the difference in pressure between delivery and suction ports can make the rotors turning. Use non-return valves on the line.
- If the decompressor operates in vacuum or under pressure with a capacity environment (such as a cistern) and is not equipped with the "suction unit" accessory, it is advisable to intercept the working line of the machine when it is stopped, to prevent contrary rotations until the rebalancing of the pressures. The interception can take place through a controlled valve or an automatic unidirectional valve (swing valve).
 - Avoid starting the pump under load: motor and drive system can be excessively stressed.

6. Maintenance

6.1. Ordinary maintenance

- Any interventions must be performed when the machine is cold, stopped and switched off.
- Installation and maintenance must be operated only by qualified personnel wearing the proper clothes and the necessary tools as well as protection devices.
- Use suitable protection equipment (gloves, protection glasses, boots...).
- In the following table summarizes the main controls to be performed and the frequency of intervention.

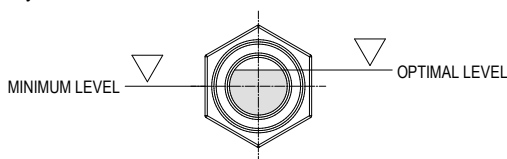
Operating conditions	Maintenance Area	Checking	8H	50H	500H	1000H
IN FUNZIONE	Vacuum line	Verifica efficienza valvole sicurezza (valvola non ritorno)				
		Working pressure				
	Transmission / Pump	Rotating speed				
		Noise (also HDR motor)				
		Temperature				
MACCHINA FERMA	Vacuum line	Clean filter and vacuum line shutoff				
		4-way changeover valve (optional): check and lubricate				
	Pump	Oil level				
		Change oil in front gearbox (*)				
		Change oil in rear gearbox (*)				
		Pump's inner washing (**)				
	Overall	Chack transmission pulley				

(*) The first oil change must be done inside 500 hours operation. Following changes every 5000 hours or 12 months. In order to choose the most suitable oil, see paragraph 2.6.

(**) After operation in dusty environments, after accidental sucking of liquids inside the pump or before a long inoperativity period it is recommended to wash the pump inside according to the procedure described at paragraph.

Checking oil level rear and front gearbox

- Check the oil level in both gearboxes (front/rear) when the pump is still and cold. Oil sight, refill and drainage are showed in Fig. 4.1.
- The oil level must not drop below minimum: internal components may rapidly wear.



• The wearing of the internal lip seals will cause the level of oil in the boxes to drop. We strongly recommend that you often check the oil level - every day or at the latest every week - because frequent oil refilling indicates wearing of seals.

• Use synthetic gear oils: **“olio sintetico per ingranaggi TENNEX FACTOR SYNT ISO”**.

• In case this oil is not available, it is possible to refill the level with a gear oil composed of polyalphaolefine (PAO), see par. 2.6.

• It is recommended to refill the oil level always with the same type: avoid mixing of various oil types.

• Check and change also the washer mounted with the discharge plug.



Dispose of used oil in accordance with the current regulations.

- Do not run the compressor with insufficient lubrication: that may cause seals and internal transmission members to wear quickly and/or the compressor to stop with possible breakdown of the drive system.
- Follow installer's instructions for the checking and servicing of vacuum –pressure line components (filters, safety valves, seals, etc.) drive members (belts, hydraulic drive system, etc.) controlling and adjusting devices (revolution counters, sensors, etc).



Follow installer's instructions for the checking and servicing of vacuum –pressure line components, drive members, controlling and adjusting devices.

Model	Arrangement	Front Gearbox (shaft side)	Rear Gearbox
HELIX 220	DX-O-B, SX-O-B, DX-O-A, SX-O-A	0,25 l	0,5 l
	DX-V-S, SX-V-D (lower injection)	0,6 l	0,9 l
	DX-V-D, SX-V-S (upper injection)	0,6 l	0,9 l
HELIX 220 M	-	1,1 l	0,55 l
HELIX 300-450	DX-O-B, SX-O-B, DX-O-A, SX-O-A	0,65 l	0,5 l
	DX-V-S, SX-V-D (lower injection)	1,2 l	0,9 l
	DX-V-D, SX-V-S (upper injection)	1,2 l	0,9 l
HELIX 750-1200-1500	DX-O-B, SX-O-B, DX-O-A, SX-O-A	1,8 l	1,4 l
	DX-V-S, SX-V-D (lower injection)	5 l	3,75 l
	DX-V-D, SX-V-S (upper injection)	5 l	3,75 l
HELIX 2000	DX-O-B, SX-O-B, DX-O-A, SX-O-A	3,8 l	1,75 l

Flushing-Kit (optional)

- Use appropriate protective equipment (recommended IPDs: gloves and goggles).

- The flush kit is a specific tool for the maintenance of JUROP vacuum pumps. The regular use of the kit helps reducing the repair costs of the pump and increase its life span.

- It's recommended to use the flush kit every week, possibly at the end of the working week or at any time the need arises. Use instructions:

- Before doing this operation wait for the pump to cool down. Connect, if not already done, the flush kit near the blower suction manifold. The tank position must be possibly higher than the connection of the same with the pump.
 - Start the pump at medium speed, under conditions of use close to the free vent.
 - Open the ball valve in order to let the flushing fluid out. We suggest some product like Henkel BONDERITE C-NE 5225: 5% concentration in water.
 - Flush about 0,2 litre before turning the ball valve off.
 - Keep the blower running for one minute from the closing of the valve, letting the fluid drain out the pump.
 - Turn the blower off.
 - Drain the flushing liquid (FD plug, fig. 4.1) and dispose of it according to local regulations.
- To order spare parts see spare parts list at the end of this manual.

6.2. Extraordinary maintenance

- Except for the cases described below, extraordinary maintenance on a HELIX must be carried out by specialized personnel only; otherwise the guarantee will be invalidated.

- All extraordinary maintenance interventions must be carried out when the machine is cold, stopped and switched off. Implement the safety instructions reported in the "Safety and accident prevention" Chapter, before performing any maintenance operation.



Follow the safety prescriptions as described in Cap. "Safety and accident prevention".

Replacing the front sealing ring (HELIX 220)

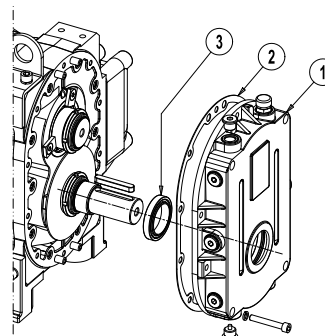
- Replace it immediately in case lubricant leaks or every 5 years.



Attention: Replace it immediately in case lubricant leaks or every 5 years.

- See Pic. 6.1.
- Remove the transmission.
- Unscrew the drainage plug (SO) of the front cover and empty it.
- Remove the front cover.
- Replace the Y-seal (3). Spread the Y-seal lip with high temperature grease 220°C NLGI2.
- Change the gasket (2) and fit the flange back on its seat. Do not damage the seal lip or turn it over when remounting.
- The housing seat of the tongue has sharp edges: pay attention.
- Refill with oil (recommended synthetic gear oil) the front box. Check the oil level sight (L). See paragraph 4.5.

	Gasket code (2)	Y-seal code (3)
HELIX 220	1680709600	4022200154



Pic. 6.1

Replacing the front sealing ring (HELIX 220 M, HELIX 300-...-2000)

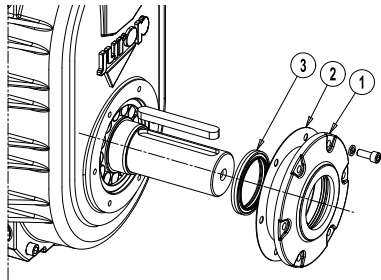
- Replace it immediately in case lubricant leaks or every 5 years.



Attention: Replace it immediately in case lubricant leaks or every 5 years.

- See Fig. 6.1.
- Remove the transmission.
- Clean the front flange (1) and remove.
- Replace the sealing ring (3). Spread the Y-seal lip with high temperature grease 220°C NLGI2.

- Change the gasket (2) and fit the flange back on its seat. Do not damage the sealing lip or turn it over when remounting.
- The housing seat of the tongue has sharp edges: pay attention.



Pic. 6.2

Model	Gasket code (2)	Y-seal code (3)
HELIX 220 M	1680708700	4022200412
HELIX 300-450	1680708400	4022200425
HELIX 750-1200-1500	1680710500	4022200152
HELIX 750-1200 HDR	1680701400	4022200152
HELIX 2000	16807029E0	4022200156

Common maintenance for all HELIX

Cleaning the rotors and body

- Is necessary to eliminate hard formations.
- Remove the pipes from the suction and exhaust ports.
- Clean the inside surface of the body and rotors with solvents and scrape without scratching.
- Drain the solvent used through the FD cap (Fig. 4.1). Dispose of in compliance with the standards in force.

Checking the clapet valve on the injection

- Check it periodically to avoid the accidental suction of solid particles inside the vacuum pump (See par. 4.6).
- Once a year: change the O rings.
- Once every 3 years: change the clapet and related screws and washers.

Replacing the rock wool of the compact air injection muffler

- It is possible to replace the internal rock wool of the compact injection muffler if its noise level increase. The spare part code of the rock wool is 40222 136 00 and the quantity is reported on the side table.

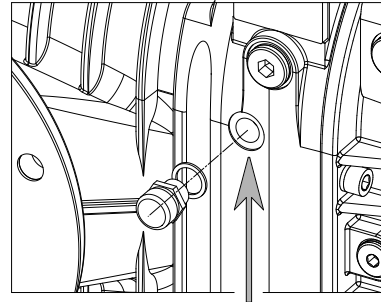
Model	Rock wool (kg)
HELIX 220-220M-300-450	2,5
HELIX 750	8,5

- Remove the muffler cover.
- Extract the exhausted rock wool.
- Clean the internal surfaces of the muffler with a solvent.
- Insert the new rock wool.
- Check the cleanness of the internal air injection duct before closing the muffler with his cover.
- Close the muffler with his cover.

Cleaning the seals venting plugs

- Remove the seals venting plugs (Label ST in paragraph 4.5) and clean them with a solvent.
- Do not use compressed air and/or solvents in the seals venting ducts in the pump benches. Internal seals can be damaged.

Attention: do not use compressed air and/or solvents in the seals venting ducts in the pump benches. Internal seals can be damaged.



Pic. 6.2

Every 10.000 working hours: general overhauling

- In case of particularly hard formations, general overhaul of the pump is recommended: rotors wash-up, seals check, replacement of bearing and sealing ring, and lubricant replacement. The servicing operations which require the pump to be completely disassembled must be performed at a Service Centre authorised by Jurop.

The servicing operations which require the pump to be completely disassembled must be performed at a Service Centre authorised by Jurop.

7. Malfunctions: troubleshooting

PROBLEMS

Reduced performances

Cause	Solution
• Speed not correct	• Check and restore
• Pipes and/or filters clogged or leaking	• Check conditions and restore
• Pipes are undersized	• Check the maximum compressor performance
• Safety valves not adjusted	• Check and adjust correctly

Overheating

Cause	Solution
• Ambient and/or suction or injected air temperature is too high.	• Reduce pressure or vacuum rate
• Inefficient air injection	• Check that the suction port of the air injection muffler is clean, check condition of the injection line and clapet valve.
• Pipes are undersized	• Check, close to the pump ports, the effective suction and delivery pressure. Do not exceed operating limits.

Oil leakage

Cause	Solution
• Front sealing ring is worn	• Replace it
• Level indicators broken	• Replace it
• Oil leakage from internal seals	• Check the pump inclination (max. 3°). Service to check the internal seals. • If this is not enough to solve the problem, contact the after sale.

Abnormal vibrations or noise (stop the vacuum pump)

Cause	Solution
• The rotors are getting in contact	• Temperature is over the max working limits ($T_2 > 160^\circ\text{C}$ and/or $T_2 - T_1 > 130^\circ\text{C}$: see par. 2.6). Stop the pump and leave it cooling. Start again only after the alarm has reset.
• Rotors with hard formations on the surface	• Inner wash of the pump. • Remove the in/out pipes and clean rotors and housing.
• Suction of liquids or foreign bodies	• If they have caused incrustations, the pipes must be removed and the rotors must be cleaned.
• Not uniform power transmission	• Check the operating conditions. Do not install propellers too much angled.

8. Scrapping

• Recycling materials allow reducing the environmental impact and respecting the environment.



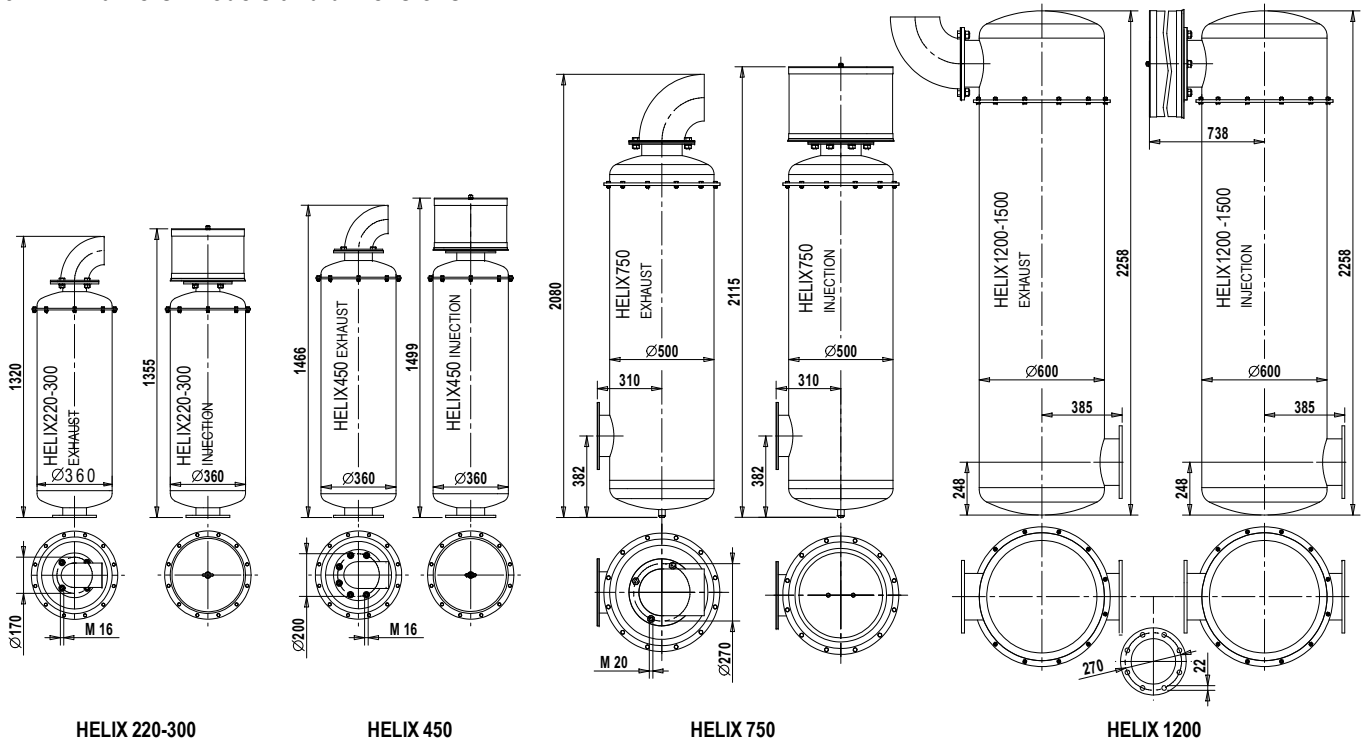
Do not dispose of in the environment. Dispose of in compliance with the standards in force.

• Before scrapping the machine, the following materials need to be separated and suitably disposed of:

Material	Cast Iron	Steel	Alluminum	Bronze	Rubber	Gasket	Oil
HELIX 220	79 %	13 %	6.8 %	0.0 %	0.1 %	0.1 %	0.6 %
HELIX 300	74 %	17 %	7.8 %	0.3 %	0.1 %	0.1 %	1.1 %
HELIX 450	70 %	22 %	7.1 %	0.2 %	0.1 %	0.1 %	0.9 %
HELIX 750	78 %	14 %	6.9 %	0.2 %	0.0 %	0.0 %	0.5 %
HELIX 1200	74 %	19 %	6.1 %	0.2 %	0.0 %	0.0 %	0.4 %
HELIX 1500	74 %	19 %	6.2 %	0.2 %	0.0 %	0.0 %	0.4 %
HELIX 2000	80 %	13 %	6.0 %	0.2 %	0.0 %	0.0 %	0.5 %

9. Accessories

9.1 Mufflers: models and dimensions



MODELLO	HELIX 220-300		HELIX 450		HELIX 750		HELIX 1200 - 1500	
TYPE	EXHAUST	INJECTION	EXHAUST	INJECTION	EXHAUST	INJECTION	EXHAUST	INJECTION
FLANGE (UNI EN 1092-1)	DN100 PN6	DN100 PN6	DN125 PN6	DN125 PN6	DN175 PN10	DN175 PN10	DN175 PN10	DN175 PN10
CODE (IRON)	1414014600	1414014700	1414014200	1414014300	1414013800	1414013900	1414014000	1414014100
CODE (INOX)	1414014800	1414014900	1414014400	1414014500	-	-	-	-
WEIGHT	46 kg	57 kg	52 kg	64 kg	108 kg	135 kg	193 kg	220 kg

9.2 Suction groups: models and dimensions

Characteristics

• Pre-assembled group installed to the vacuum pump and complete with:

- Aluminium and cast iron manifolds
- 4ways valve
- Clapet (non returne) valve
- Suction filter

• This suction group can be installed on all the HELIX with horizontal ports (read paragraph 2.1).

• The compact injection silencer replace the standard injection silencer. It is installed on the HELIX side and it is made of galvanized S235JR.

Operating limits

• The suction group is developed to make the installation easier on stationary or mobile vacuum-pressure plants, conveying air. If other gases have to be conveyed, check first the compatibility with the vacuum pump.



Attention: If other gases have to be conveyed, check first the compatibility with the vacuum pump.

- The flow losses caused by the components on the vacuum line can reduce the nominal air flow of the pump.
- The presence of a 4-way valve can be cause of the working temperature increase on the pump, especially during a continuous duty.

Installation

- Compulsory accessories:
 - Exhaust silencer.
 - Injection silencer: use only the specific silencer of the HELIX.
 - Overheating alarm to be connected to the thermostat on the exhaust port (which is always included on the standard pump execution).
 - Secondary shutoff on the vacuum line to grant a good protection of the pump against the accidental suction of liquids and solid bodies.
 - Suitable safety overpressure valves.

- Check on the first part of this manual for all the indications about the technical data, safety, installation, use and maintenance of the HELIX.

- Provide for the necessary space to reach the manual 4-way valve to operate it. In the case of pneumatic valve, refer to the note "Pneumatic actuator adjustment".

Suction group maintenance

- **4-way valve cock adjusting.** When the valve cock is hard to move, we recommend to adjust its clearance with the housing. This can be done through the screw placed under the valve itself.

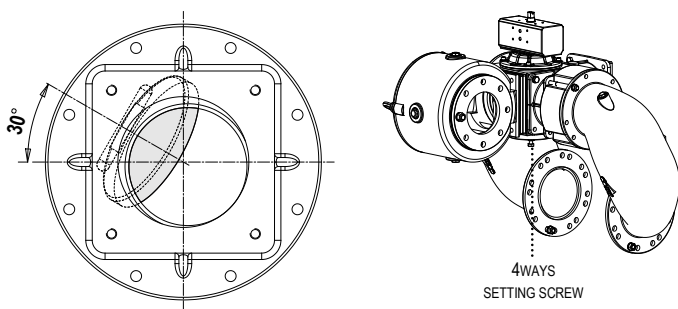
- **Suction filter cleaning.** remove the filter cover to access to the filtering cartridge. Clean it and, if necessary, clean also the filter housing. Refer to the dedicated technical sheet.

- **Clapet (non return) valve.** Periodic checks to avoid the accidental suction of solid bodies:

- Every year: replace the OR.
- Every 3 years: replace the clapet and related screw/bolts.

- When reassembling, rotate the clapet as indicated in the figure above: the valve must allow air flow sucked into the pump and not coming out from the pump.

- Angle the clapet pivoting axle of 30 deg from the horizontal.



Pneumatic actuator: adjustment

A specific design of the vacuum-pressure diverter available on request enables the application of a pneumatic or hydraulic angular actuator (90°)

Pneumatic actuator		
Fluid	Filtered, dried compressed air	
Filtration	ISO 8573-1 classe 4 (15 micron)	
Temperature	°C	-20 ÷ +80
Rated pressure	bar	5.6
Maximum pressure	bar	8.4
Supply holes	G 1/4	

Pneumatic actuator installation

- Adjust movement speed by applying two unidirectional flow control valves. Full rotation should not take less than 1 second.

- Fluid filtration: ensure a level equal to or greater than the recommended value.

- In the event of a (hydraulic or pneumatic) supply failure, the suction unit inverter will remain in the same position it was when the failure occurred.

Maintenance

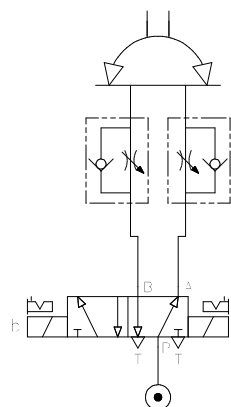
- The diverter is adjusted before shipment and does not usually require further adjustments.

- Diverter lubrication:

- Use NLGI 2 Lithium grease. Quantity: 80-100 grams for 1000 working cycles.
- A bleeder hole covered by a filter is preventing the hole to overfill. Clean the filter whenever clogged.

- For non-dried air, use temperature 0 ÷ +80°C.

- The following figure shows a possible schematic view of a pneumatic connection.

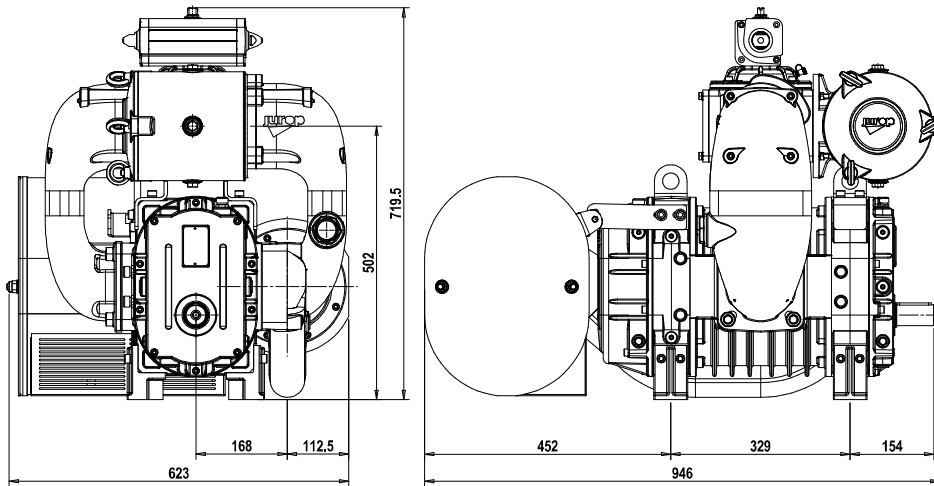


- In case of interruption of the pneumatic or hydraulic supply, the inverter of the suction unit remains in the same position it was when the failure occurred.

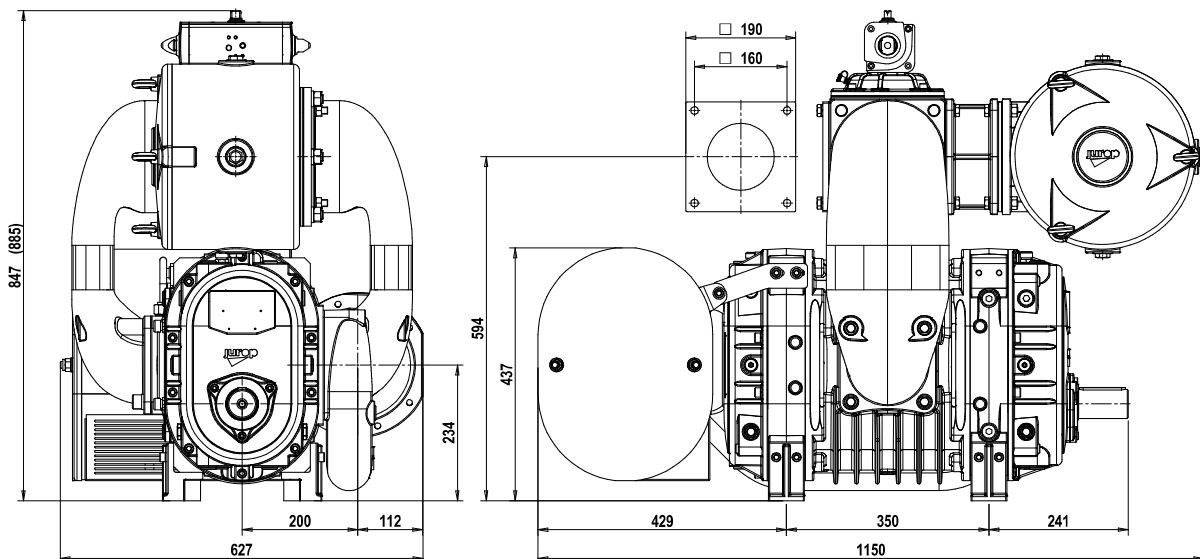
Models	Code	Description	Weight
HELIX 220	1847000300	Compact injection silencer	29,5 kg
	18521075E0	Suction group (pneumatic 4way valve + suction filter)	39 kg
	18521076E0	Suction group (manual 4way valve + suction filter)	37 kg
HELIX 300	1847000400	Compact injection silencer	29,5 kg
	18521001E0	Suction group (pneumatic 4way valve + suction filter)	71 kg
	18521006E0	Suction group (manual 4way valve + suction filter)	42 kg
HELIX 450	1847000400	Compact injection silencer	29,5 kg
	18521082E0	Suction group (pneumatic 4way valve + suction filter)	108 kg
	1852108400	Suction group (manual 4way valve + suction filter)	-
HELIX 750	1414012700	Compact injection silencer	82 kg
	18521018E0	Suction group (pneumatic 4way valve)	109 kg
	18521021E0	Suction group (pneumatic 4way valve + suction filter)	140 kg
	1852109100	Manifolds group	106.5 kg
HELIX 1200	18521085E0	Suction group (pneumatic 4way valve)	245 kg
HELIX 1500	18521087E0	Suction group (pneumatic 4way valve)	240 kg

Note: Dimensions in brackets refer to HELIX models with the old pneumatic actuator.

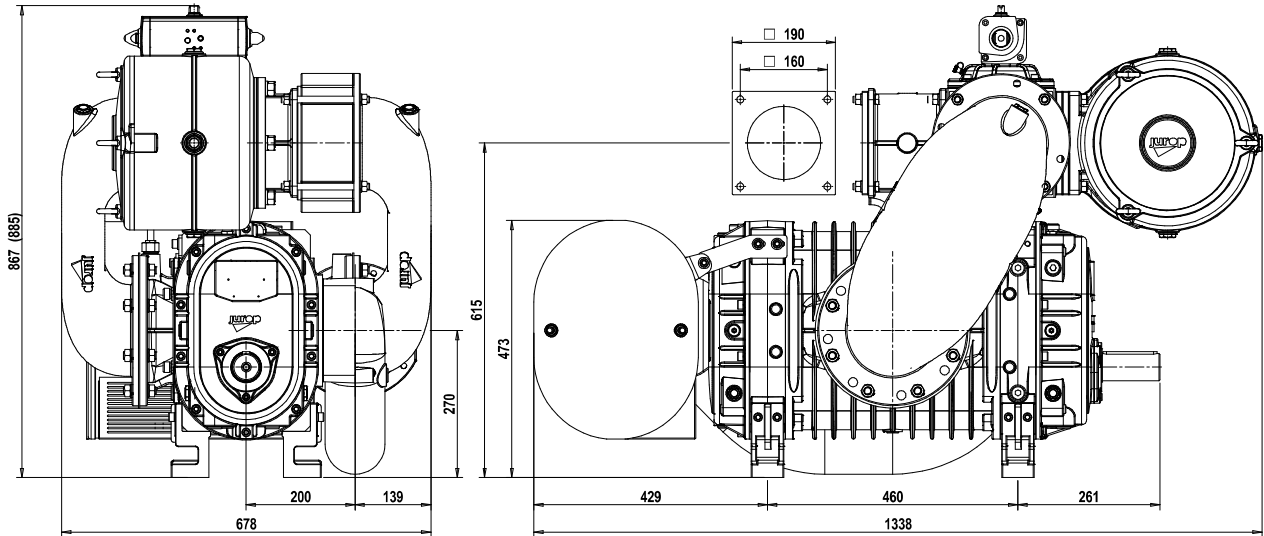
HELIX 220 Suction Unit



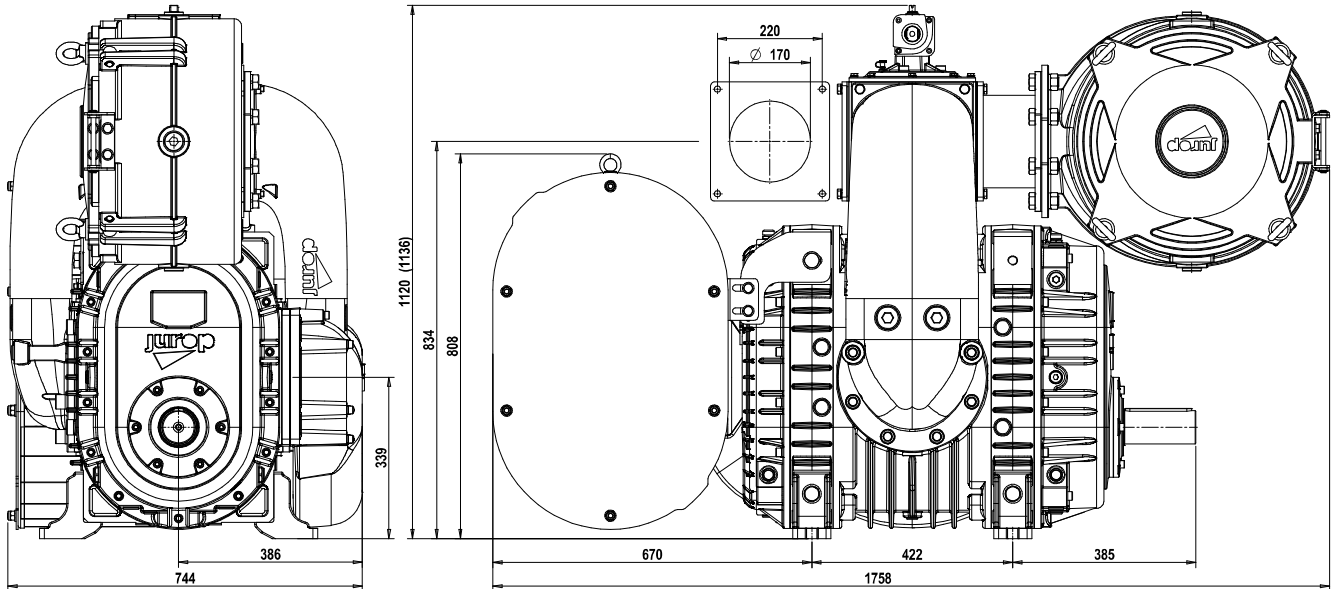
HELIX 300 Suction Unit



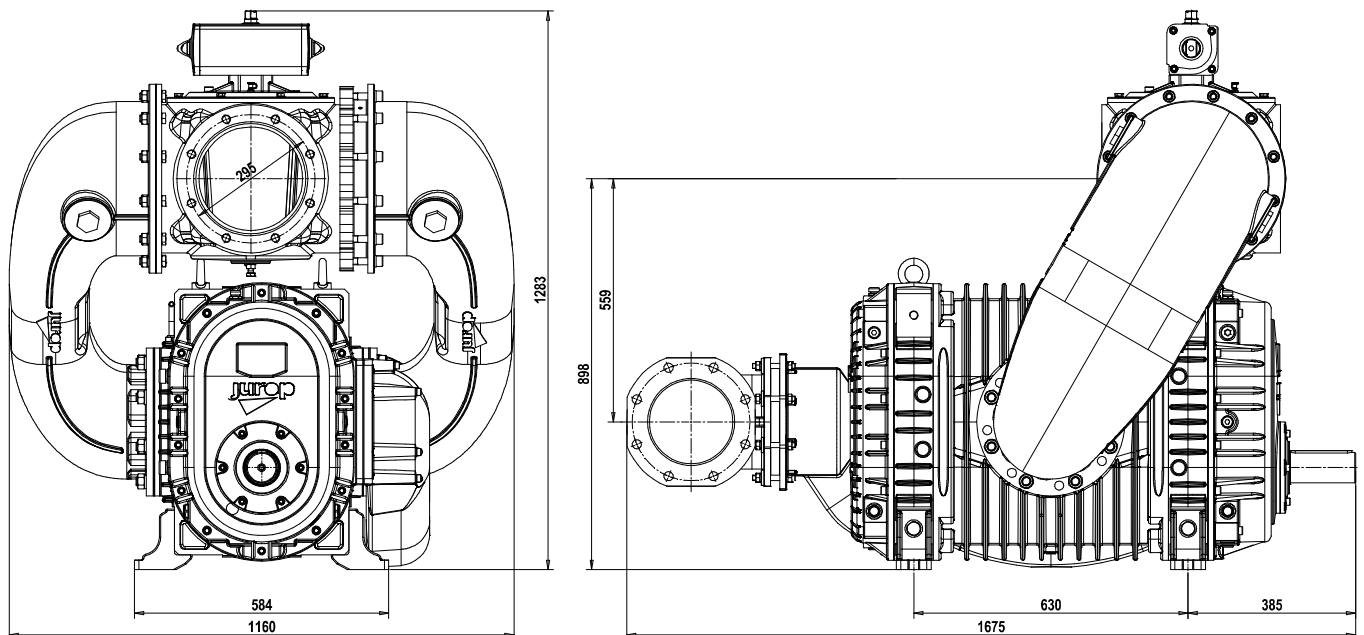
HELIX 450 Suction Unit



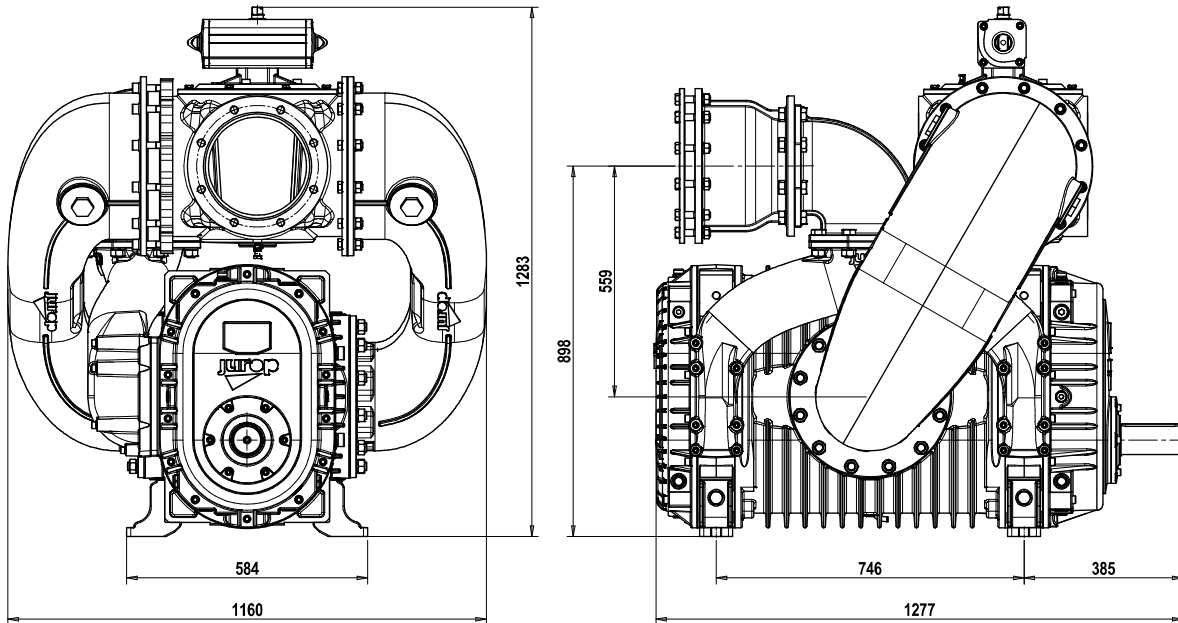
HELIX 750 Suction Unit



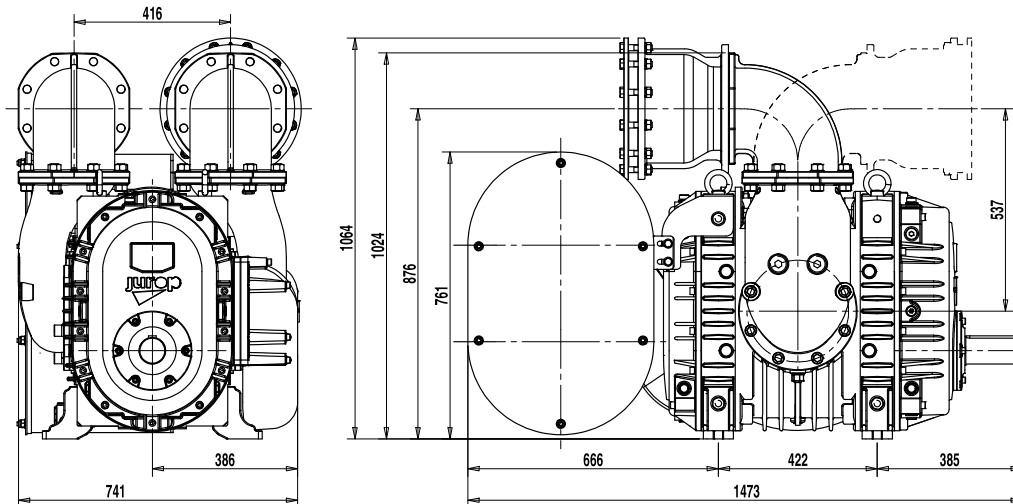
HELIX 1200 Suction Unit



HELIX 1500 Suction Unit



9.3. HELIX750 Manifolds group



Code	Description	Weight
1414012700	Compact injection silencer	82 kg
1852109100	Manifolds group	106.5 kg

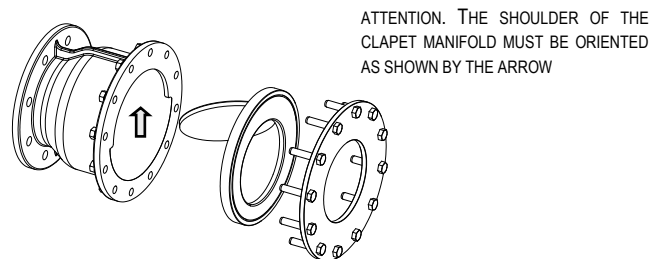
Charateristics

- The manifolds group is directly mounted on the pump ports and it is developed to reduce the plant dimensions. It is composed of:
 - 2 aluminum manifolds and 2 cast iron manifolds
 - Clapet (non return) valve with relative aluminum manifold.
 - The manifolds group do not include the 4 ways valve and the suction filter.

Attention: The manifolds group do not include the 4 ways valve and the suction filter.

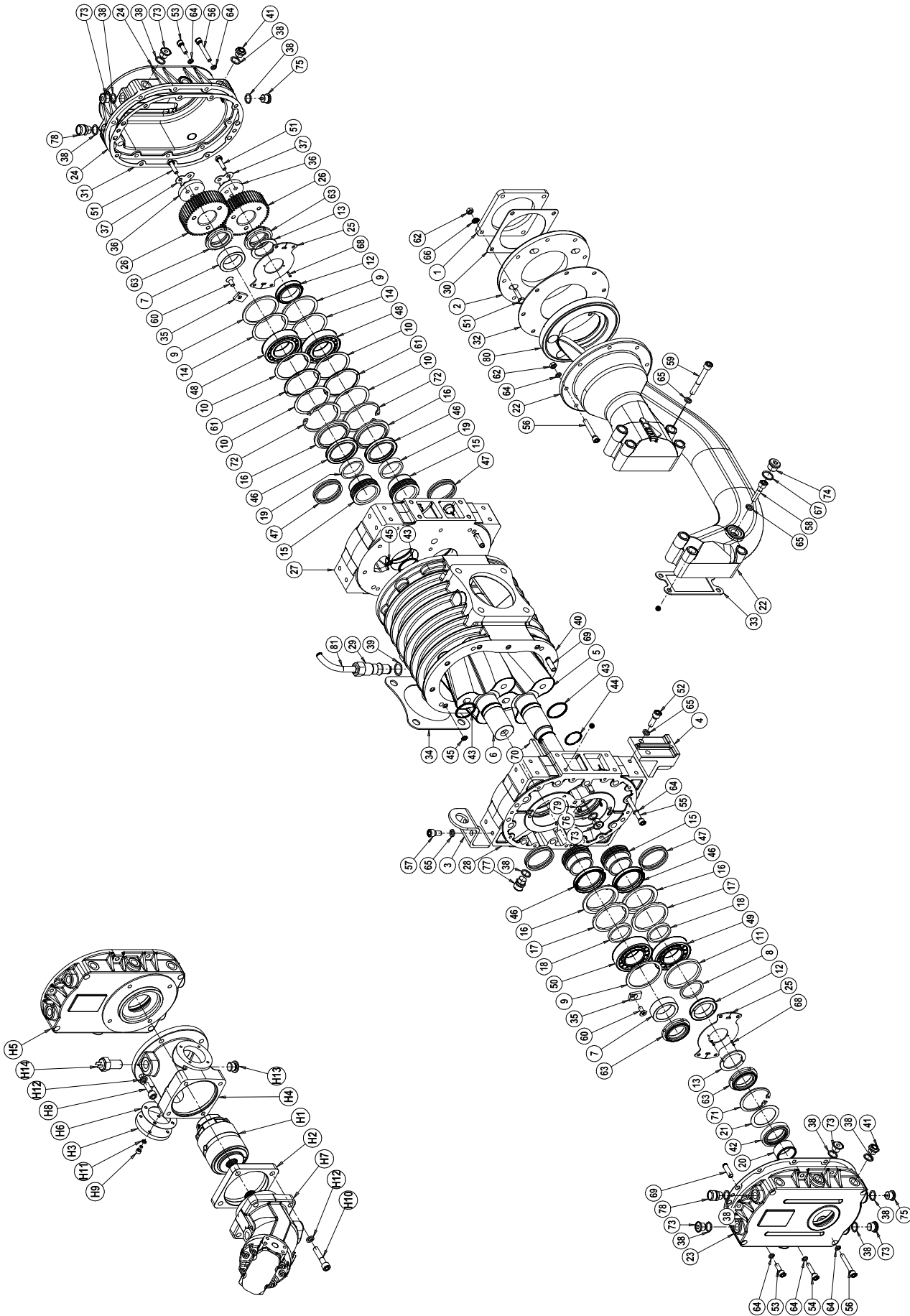
- It is possible to install the manifold group in all the HELIX750 excepts for the arrangements SX-O-B e DX-O-A (read par. 2.1).

- The compact injection silencer replace the standard injection silencer. It is installed on the HELIX side and it is made of galvanized S235JR.
- The suction filter (1445006300) is made of galvanized S235JR and is provided with an internal stainless steel cartridge. Avoid to place the out-port (HELIX side) of the filter facing the ground when positioning the filter. This could be dangerous during the filter cleaning because some solid parts could enter in the pump suction port.



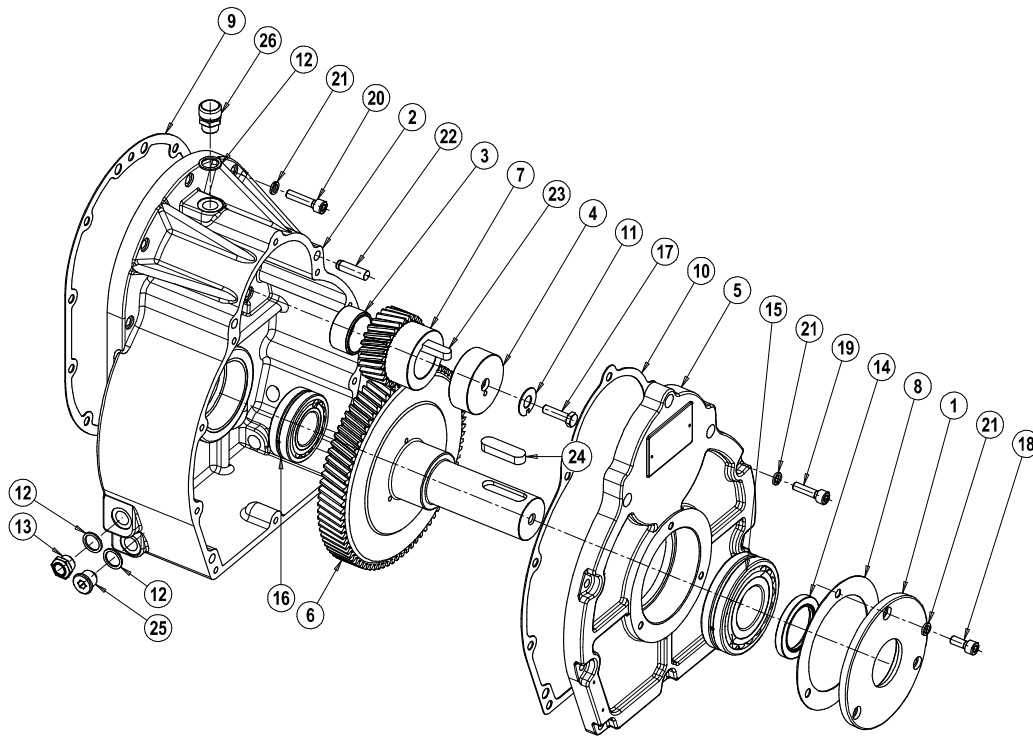
ATTENTION. THE SHOULDER OF THE CLAPET MANIFOLD MUST BE ORIENTED AS SHOWN BY THE ARROW

HELIX 220



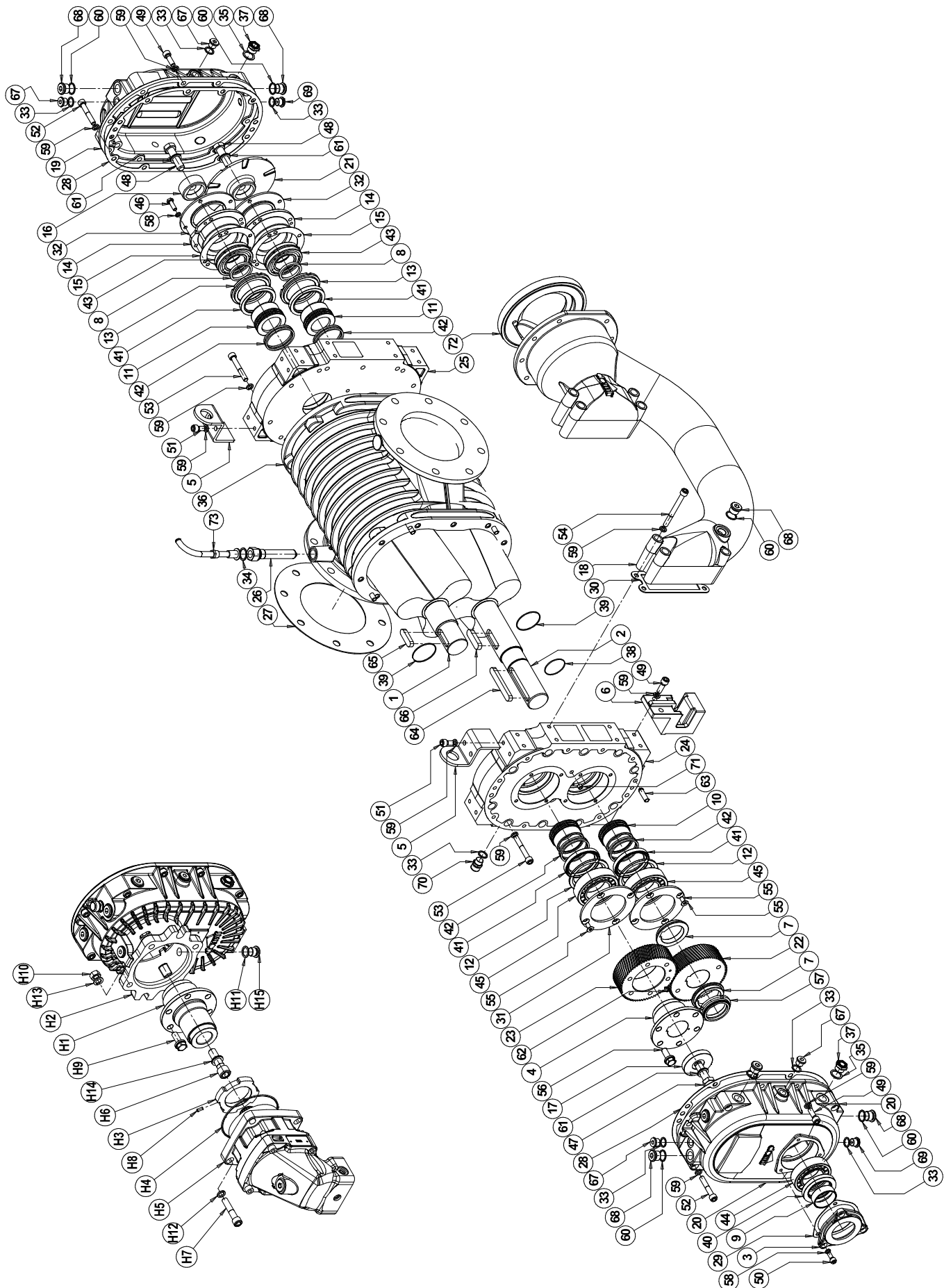
HELIX 220

Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
1	16100BDSB0	FLANGE	1	59	4026121817	SCREW TCEI 8.8 M10X80 ZINC.	7
2	1610513800	FLANGE	1	60	4026155706	SCREW TSPEI 10.9 M8X18 ZINC.	12
3	1613034900	SUPPORT	2	61	4026300018	FEDER RING	8
4	1613501300	SUPPORT	4	62	4026308005	BOLT M8	12
5	16215061E0	DRIVING LOBE	1	63	402630RB05	RING NUT M45X1.5 SELF LOCKING	4
6	16215062E0	DRIVED LOBE	1	64	4026350505	WASHER GROWER M8 SQUARE	49
7	1624035500	SPACER 60X45X18	2	65	4026350506	WASHER GROWER M10 SQUARE	20
8	1624035600	SPACER 54X45X4	1	66	4026350706	WASHER GROWER M8 FLAT	4
9	1624035700	SPACER 85X73X3	3	67	4026359003	WASHER 21.5X26X1.5 AL.	1
10	1624036000	SPACER	4	68	4026401101	PIN 3X12	4
11	1624036100	SPACER 87X76X7	1	69	4026401806	PIN 10X36	12
12	1624036200	SPACER	2	70	4026500911	TAB 10X8X63	1
13	1624036300	SPACER	2	71	4026510538	SEEGER I 68	1
14	1624036900	ADJUSTING SPACER	2	72	4026510545	SEEGER I 85	2
15	1624040300	SEAL BUSHING	4	73	4026701602	PLUG 3/8	14
16	1624040700	SPACER	4	74	4026701603	PLUG 1/2	1
17	1624040800	FRONT SPACER 1	2	75	4026701620	MAGNETIC PLUG 3/8	2
18	1624040900	FRONT SPACER 2	2	76	4026702702	WASHER 3/8"	2
19	1624041000	REAR SPACER 1	2	77	4026910006	VENTIL PLUG 3/8	4
20	162404TQB0	BUSHING	1	78	4026910102	VENTIL PLUG 3/8 WITH VALVE	2
21	162404TUB0	SPACER	1	79	4026910601	PLUG 1/8'	4
22	1627104700	INJECTION MANIFOLD	1	80	4027400413	CLAPET VALVE DN125 PN6	1
23	1640102100	FRONT COVER	1	81	4028249B00	THERMOSTAT	1
24	1640102200	REAR COVER	1				
25	1647001200	OIL DISC	2		1892007600	GASKET KIT HELIX 220	
26	1651002RA0	TIMING GEAR	2				
27	1662500800	BENCH	1			HELIX 220 HDR	
28	16625009E0	BENCH	1	H1	14701004E0	JOINT	1
29	16630A1XB0	THERMOSTAT HOUSING	1	H2	16100226E0	HDR FLANGE	1
30	1680609100	GASKET	1	H3	1610051700	FLANGE	2
31	1680709600	GASKET	2	H4	1612504500	HDR MOTOR MOUNTING FLANGE	1
32	1680710300	GASKET	1	H5	1640501500	FRONT COVER HDR	1
33	1680711600	INJECTION MANIFOLD GASKET	2	H6	1680709700	GASKET	2
34	1680712000	GASKET (DN100 PN6)	2	H7	402416DC02	HYDRAULIC MOTOR	1
35	1681008400	BEARING PLATE	12		402416DC50	FLUSHING VALVE (OPTIONAL)	1
36	1681008500	WASHER	2	H8	4026120506	SCREW TCEI 8.8 M10X30 ZINC.	4
37	1681008600	WASHER	2	H9	4026121303	SCREW TCEI 8.8 M6X12 ZINC.	8
38	1685100200	WASHER 17X22X1,5	24	H10	4026121813	SCREW TCEI 8.8 M10X50 ZINC.	4
39	16851ABUB0	WASHER 28X22,5X1,5	1	H11	4026350503	WASHER GROWER 6 ZINC.	8
40	1687508900	HOUSING	1	H12	4026350506	WASHER GROWER 10 ZINC.	8
41	4022104501	PLUG 3/8	4	H13	4026701670	PLUG M18X1.5	1
42	4022200154	Y-SEAL 45X65X10	1	H14	4028321601	INDUCTIVE SENSOR	1
43	4022200313	O-RING 2162	4				
44	4022200316	O-RING 2137	2				
45	4022200317	O-RING 108	20				
46	4022202806	SEAL 72X55X8	4				
47	4022203601	SEAL 65X58X3,8	8				
48	4023115046	BEARING NUP 209 ECJ/C3	2				
49	4023115051	BEARING NJ 209 ECJ/C3	1				
50	4023115053	BEARING NJ 2209 ECJ/C3	1				
51	4026102808	SCREW TE 8.8 M8X30 ZINC.	10				
52	4026120506	SCREW TCEI 8.8 M10X30 ZINC.	8				
53	4026121407	SCREW TCEI 8.8 M8X25 ZINC.	10				
54	4026121408	SCREW TCEI 8.8 M8X35 ZINC.	2				
55	4026121416	SCREW TCEI 8.8 M8X70 ZINC.	21				
56	4026121418	SCREW TCEI 8.8 M8X55 ZINC.	16				
57	4026121807	SCREW TCEI 8.8 M10X20 ZINC.	4				
58	4026121812	SCREW TCEI 8.8 M10X45 ZINC.	1				

HELIX 220 MULTIPLIER


Pos	Code	Description	Q.ty	Pos	Code	Description	Q.ty
1	1610512300	FLANGE	1	14	4022200412	Y-SEAL 45X65X8	1
2	161058B2B0	FRONT FLANGE	1	15	4023105008	BEARING 21309 E/C3	1
3	162404TQB0	BUSHING	1	16	4023105009	BEARING 22207 E/C3	1
4	1624082EB0	SPACER	1	17	4026102808	SCREW TE 8.8 M8X30 ZINC.	1
5	164058B8B0	FRONT COVER	1	18	4026121405	SCREW TCEI 8.8 M8X20 ZINC.	3
6	165107ZZB0	DRIVING GEAR	1	19	4026121406	SCREW TCEI 8.8 M8X30 ZINC.	10
7	16510802B0	DRIVED GEAR	1	20	4026121408	SCREW TCEI 8.8 M8X35 ZINC.	10
8	1680708700	FRONT FLANGE GASKET	1	21	4026350505	WASHER GROWER 8 ZINC.	23
9	1680709600	GASKET	1	22	4026401806	PIN 10X36	8
10	1680795CB0	GASKET	1	23	4026500911	TAB 10X8X63	1
11	1685002400	SAFETY WASHER	1	24	4026501603	TAB 14X9X63	1
12	1685100200	WASHER 17X22X1.5	5	25	4026701620	MAGNETIC PLUG 3/8	2
13	4022104501	OIL LEVEL PLUG 3/8"	2	26	4026910102	VENTIL PLUG 3/8	1

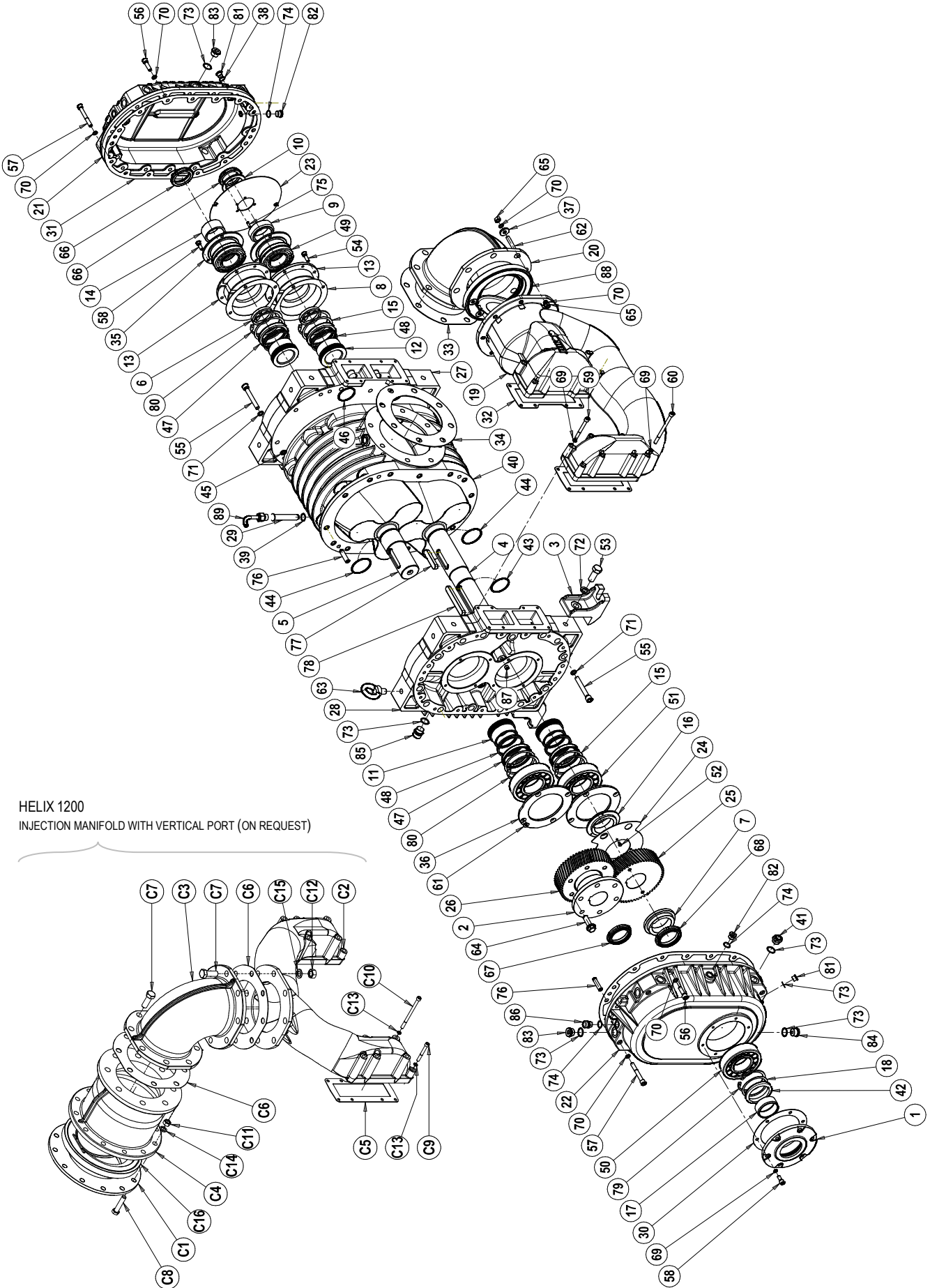
HELIX 300-450



HELIX 300-450

Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
1	16215043E0	DRIVED LOBE HELIX300	1	53	4026121816	SCREW TCEI M 10 X 70 ZINC.	20
	15215011E0	DRIVED LOBE HELIX450 SX	1	54	4026121819	SCREW TCEI M 10 X 100 ZINC.	7
2	16215044E0	DRIVING LOBE HELIX300	1	55	4026155706	SCREW TSPEI M 8 X 18 ZINC.	8
	15215012E0	DRIVING LOBE HELIX450 DX	1	56	40261D2C10	SCREW TE M12X30	6
3	1610512200	SHAFT FLANGE	1	57	402630RB07	RING NUT M55X2	1
4	1611000900	ADJUSTING HUB	1	58	4026350505	WASHER GROWER 8	11
5	1613034900	LIFTING SUPPORT	2	59	4026350506	WASHER GROWER 10	60
6	1613501300	SUPPORT (HELIX 300)	4	60	4026359003	WASHER 21,5X26X1,5	11
	1613501200	SUPPORT (HELIX 450)	4	61	4026385C25	WASHER AUTOBLOQ M16 ZINC.	3
7	1624027600	SPACER	2	62	4026401101	PIN 3X12	1
8	1624027800	SPACER	2	63	4026401806	PIN 10X36	8
9	1624030200	BUSHING 50X55X18	1	64	4026501607	TAB 14X9X80 (HELIX 300)	1
10	1624040100	FRONT SEAL BUSHING	2		4026501609	TAB 14X9X100 (HELIX 450)	1
11	1624040200	REAR SEAL BUSHING	2	65	4026502003	TAB 14X9X50	1
12	1624040400	SPACER	2	66	4026502106	TAB 16X10X56	1
13	1624040500	SPACER	2	67	4026701602	PLUG 3/8 FE ZINC.	8
14	1624041200	BEARING BUSHING	2	68	4026701603	PLUG 1/2 FE ZINC.	11
15	1624041300	SPACER	2	69	4026701620	PLUG G3/8 ESG.INC.	2
16	16260020E0	BICCHIERE POST HELIX450	1	70	4026910006	VENTIL PLUG 3/8	4
17	16260021E0	BICCHIERE ANT HELIX450	1	71	4026910601	PLUG 1/8"	4
18	16271001E0	INJECTION MANIFOLD HELIX300	1	72	4027400414	CLAPET DN150 PN6 ZINC.	1
	1627104600	INJECTION MANIFOLD HELIX450	1	73	4028249B00	THERMOSTAT	1
19	1640102000	REAR COVER	1				
20	1640500800	FRONT COVER	1		1892009500	GASKET KIT HELIX300	1
21	16471001E0	OIL DISC	1		1892007700	GASKET KIT HELIX450	1
22	1651008800	TIMING GEAR	1				
23	1651008900	TIMING GEAR	1				
24	1662500700	BENCH	1	H1	16110010E0	HELIX450 HDR JOINT	1
25	16625010E0	BENCH HELIX300-450	1	H2	16401129E0	HELIX450 HDR FRONT COVER	1
26	166308WRB0	THERMOSTAT HOUSING HELIX300	1	H3	16510027E0	HELIX300-450 GEAR	1
	16630ZUPA0	THERMOSTAT HOUSING HELIX450	1	H4	4022200383	OR 4487	1
27	1680613800	GASKET	2	H5	4024107540	HELIX300 HDR MOTOR	1
28	1680708200	GASKET	2		4024107541	HELIX450 HDR MOTOR	1
29	1680708400	GASKET	1	H6	4026121214	SCREW TCEI M16X55 ZINC.	1
30	1680711500	GASKET	2	H7	4026121715	SCREW TCEI M12X60 ZINC.	4
31	1681009100	FRONT BEARING FLANGE	2	H8	4026136205	SCREW M6X12	2
32	1681009200	REAR BEARING FLANGE	2	H9	40261D2C10	SCREW TE FLANG M12X30	6
33	1685100200	WASHER 17X22X1,5	14	H10	4026308007	NUT M12 ESAG. ZINC.	4
34	16851ABUB0	WASHER 28X22,5X1,5	1	H11	4026312B06	WASHER IN RAME DA 18	1
35	16851DBVB0	WASHER 21,5X28X1,5	4	H12	4026350508	WASHER GROWER 12 ZINC.	4
36	16875002E0	HOUSING HELIX300	1	H13	4026350709	WASHER GROWER 12 ZINC.	4
	1687509000	HOUSING HELIX450	1	H14	4026385C25	WASHER M16 ZINC.	3
37	4022104502	OIL SIGHT PLUG 1/2"	4	H15	4026701670	PLUG M C/TESTA M18X1,5	1
38	4022200322	OR 2175 IN VITON	3	H16	4028321601	INDUCTIVE SENSOR	1
39	4022200374	OR 2212 VITON	2				
40	4022200425	SEAL 80X55X10 VITON	1				
41	4022202805	SEAL BABSL 85X65X10 VIT	4				
42	4022203600	SEAL PTFE/CAR	8				
43	4023105010	BEARING 22209	2				
44	4023110060	BEARING NU 2210 ECJ/C3	1				
45	4023110065	BEARING NU 2211 ECJ/C3	2				
46	4026102807	SCREW TE M 8 X 25 ZINC.	8				
47	4026103212	SCREW TE M 16 X 50 ZINC.	1				
48	4026103214	SCREW TE M 16 X 60 ZINC.	2				
49	4026120506	SCREW TCEI M 10 X 30 ZINC.	20				
50	4026121405	SCREW TCEI M 8 X 20 ZINC.	3				
51	4026121807	SCREW TCEI M10 X 20 ZINC.	4				
52	4026121815	SCREW TCEI M 10 X 60 ZINC.	9				

HELIX 750-1200



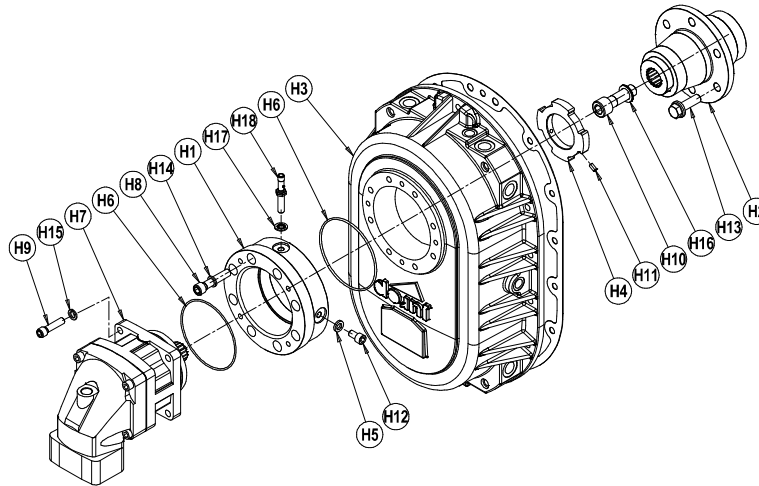
HELIX 1200
INJECTION MANIFOLD WITH VERTICAL PORT (ON REQUEST)

HELIX 750-1200

Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
1	1610513700	SHAFT FLANGE	1	54	4026120506	SCREW M10X30	8
2	161104EAB0	ADJUSTING HUB	1	55	4026120719	SCREW M14X100	28
3	1613501700	SUPPORT	4	56	4026121711	SCREW M12X40	20
4	16215035E0	DRIVING LOBE HELIX750 DX	1	57	4026121720	SCREW M12X90	9
	15215009E0	DRIVING LOBE HELIX1200 DX	1	58	4026121808	SCREW M10X25	12
5	16215036E0	DRIVED LOBE HELIX750 SX	1	59	4026121818	SCREW M10X90	4
	15215010E0	DRIVED LOBE HELIX1200 SX	1	60	4026121823	SCREW M10X140	11
6	1624038800	SPACER	2	61	4026155807	SCREW M10X20	8
7	1624038900	SPACER	1	62	4026171211	SCREW M12X80	8
8	1624039000	ADJUST. SPACER THICKNESS 0.5	CK	63	4026190103	EYE BOLT M20	2
9	1624039300	SPACER	1	64	40261D3C10	SCREW M16X50	6
10	1624039400	SPACER	1	65	4026308007	NUT M12	16
11	1624041500	FRONT SEAL BUSHING	2	66	402630RB09	RING NUT M65X2	2
12	1624041600	REAR SEAL BUSHING	2	67	402630RB10	RING NUT M70X2	1
13	1624041700	BEARING BUSHING	2	68	402630RB11	RING NUT M75X2	1
14	1624041800	SPACER	1	69	4026350506	WASHER GROWER M10 QUADRA	21
15	1624041900	SPACER	4	70	4026350508	WASHER GROWER M12 QUADRA	44
16	1624042000	SPACER	1	71	4026350509	WASHER GROWER M14 QUADRA	28
17	162404TSB0	BUSHING	1	72	4026350713	WASHER GROWER M20 PIATTA	4
18	162404TWB0	SPACER	1	73	4026359000	WASHER 32X26X1.5	18
19	1627104800	INJECTION MANIFOLD (HELIX750)	1	74	4026359003	WASHER 21.5X26X1.5	7
	1627105500	INJECTION MANIFOLD (HELIX1200)	1	75	4026401208	PIN 6X24	1
20	1627104900	90° MANIFOLD DN175	1	76	4026402011	PIN 14X55 M8	12
21	1640102600	REAR COVER	1	77	4026501404	TAB 20X12X90	2
22	1640501400	FRONT COVER	1	78	4026501408	TAB 20X12X140	1
23	1647001600	REAR OIL DISC	1	79	4026510552	SEEGER I102	1
24	1647002000	FRONT OIL DISC	1	80	4026510558	SEEGER I120	4
25	165104E6B0	TIMING GEAR	1	81	4026701602	PLUG 3/8	3
26	165104E7B0	ADJUSTABLE TIMING GEAR	1	82	4026701603	PLUG 1/2	5
27	16625003E0	BENCH	1	83	4026701604	PLUG 3/4	9
28	1662500900	BENCH	1	84	4026701622	MAGNETIC PLUG 3/4	2
29	1663063800	THERMOSTAT HOUSING	1	85	4026910008	VENTIL PLUG 3/4	4
30	1680710500	GASKET	1	86	4026910104	VENTIL PLUG 1/2	2
31	1680710600	GASKET	2	87	4026910602	PLUG	4
32	1680711700	GASKET	2	88	4027400415	CLAPET VALVE DN200 PN6	1
33	1680711800	GASKET	1	89	4028249B00	THERMOSTAT	1
34	1680711900	GASKET DN175 (HELIX750)	2				
	16807D1WB0	GASKET DN200 (HELIX1200)	2		1892007400	GASKET KIT HELIX750	1
35	1681008900	BEARING FLANGE	2		1892007500	GASKET KIT HELIX1200	1
36	1681009300	BEARING FLANGE	2				
37	1685002700	WASHER 35X13X6	8				
38	1685100200	WASHER 17X22X1.5	1				
39	16851ABUB0	WASHER 28X22.5X1.5	2				
40	1687509200	HOUSING HELIX 750	1	C1	16100210E0	FLANGE DN250 PN6	1
	1687509900	HOUSING HELIX 1200	1	C2	16271022E0	TOP INJECTION MANIFOLD	1
41	4022104504	OIL SIGHT GLASS 3/4	4	C3	1627104900	90° MANIFOLD DN175	1
42	4022200152	SEAL RING	1	C4	1627105000	COLLECTOR DN250	1
43	4022200305	OR 3256	1	C5	1680711700	GASKET (INJECTION MANIFOLD)	2
44	4022200327	OR 3275	2	C6	1680711800	GASKET DN175 PN10	2
45	4022200328	OR 119	28	C7	4026101814	SCREW TE M20X55 ZINC.	16
46	4022200329	OR 3237	2	C8	4026103217	SCREW TE M16X75 ZINC.	12
47	4022202807	Y-SEAL	4	C9	4026121817	SCREW TCEI M10X80 ZINC.	1
48	4022203603	PTFE RING	8	C10	4026121824	SCREW TCEI M10X150 ZINC.	1
49	4023105014	BEARING 22213 E C3	2	C11	4026308009	NUT M16 ESAG. ZINC.	12
50	4023110096	BEARING NU314 ECJ C3	1	C12	4026308011	NUT M20 ESAG. ZINC.	16
51	4023110097	BEARING NU315 ECJ C3	2	C13	4026350506	WASHER GROWER 10 ZINC.	2
52	4026101301	SCREW M6X10	3	C14	4026350711	WASHER GROWER 16 ZINC.	12
53	4026101813	SCREW M20X50	4	C15	4026350713	WASHER GROWER 20 ZINC.	16
				C16	4027400416	CLAPET VALVE DN250 PN6	1

HELIX 750-1200-1500 HDR

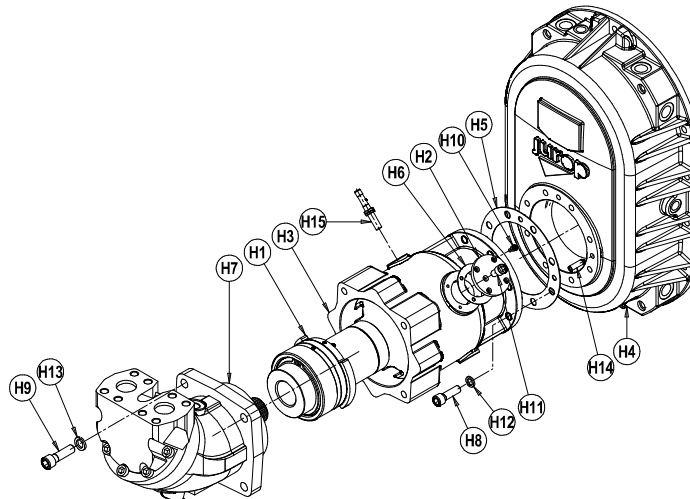
HELIX 750 HDR



Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
H1	16110014E0	HDR MOTOR MOUNTING FLANGE	1	H9	4026121713	SCREW TCEI M12X50 ZINC.	4
	1611001700	HDR MOTOR MOUNTING FLANGE (*)	1	H10	4026121922	SCREW TCEI M22X70 ZINC.	1
H2	16110015E0	HDR JOINT	1	H11	4026135407	GRUB SCREW M8X14	2
	1611001600	HDR JOINT(*)	1	H12	4026186C00	SCREW TCEI M12X1X20	2
H3	1640501700	HDR FRONT COVER	1	H13	40261D3C10	SCREW TE FLANG M16X50	6
H4	1651011800	HDR GEAR	1	H14	4026350509	WASHER GROWER 14 ZINC.	8
H5	16851BLGC0	WASHER 13X22X4	1	H15	4026350709	WASHER GROWER 12 ZINC.	4
H6	4022200346	OR 4562 VITON	2	H16	4026385C33	SELF-LOCKING WASHER M22	1
H7	4024107513	HDR MOTOR	1	H17	4026702956	WASHER GSWMF 12	1
H8	4026120716	SCREW TCEI M14X70 GALV.	8	H18	40283PUB27	INDUCTIVE SENSOR	1

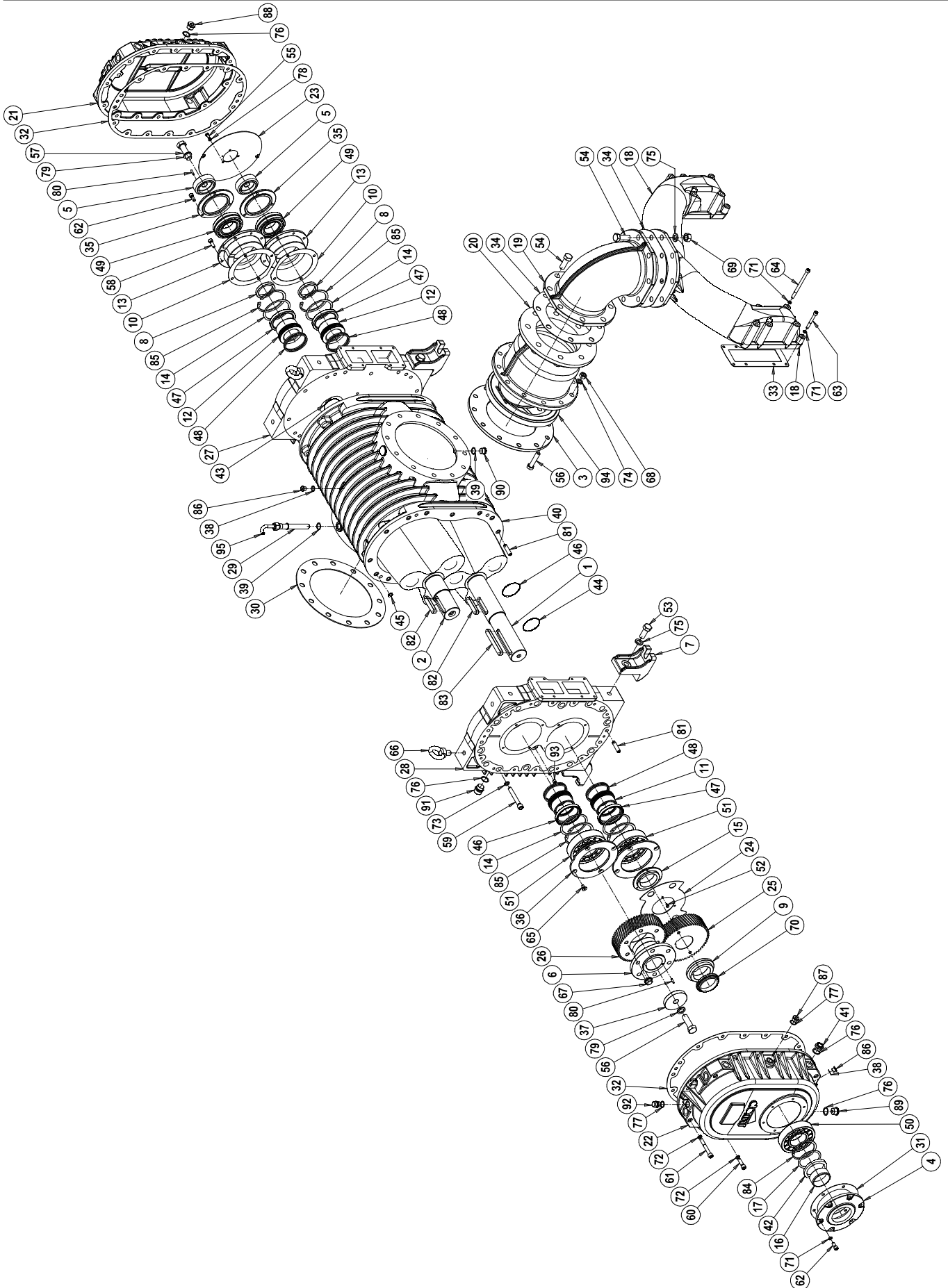
(*) Compatible with smooth-shaft hydraulic motor (part 4024107505): no longer supplied.

HELIX 1200-1500 HDR



Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
H1	1470106300	HDR JOINT (HELIX 1200)	1	H8	4026120712	SCREW TCEI M14X45 ZINC.	8
	14701015E0	HDR JOINT (HELIX 1500)	1	H9	4026121215	SCREW TCEI M16X60 ZINC. (HELIX 1200)	4
H2	1610051900	FLANGE FOR 2° REV. COUNTER	1		4026121214	SCREW TCEI M16X55 ZINC. (HELIX 1500)	4
H3	1612504600	HDR MOTOR MOUNTING FLANGE (H.1200)	1	H10	4026121303	SCREW TCEI M6X12 ZINC.	8
	16125014E0	HDR MOTOR MOUNTING FLANGE (H.1500)	1	H11	4026186C00	SCREW TCEI M12X1X20 ZINC.	2
H4	1640501700	FRONT COVER HDR	1	H12	4026350509	WASHER GROWER 14 ZINC.	8
H5	1680701400	GASKET	1	H13	4026350611	WASHER GROWER 16 (HELIX 1200)	4
H6	1680709700	GASKET	2		4026350711	WASHER GROWER 16 (HELIX 1500)	4
H7	4024107765	HYDRAULIC MOTOR (HELIX 1200)	1	H14	4026401806	PIN 10X36	4
	4024107785	HYDRAULIC MOTOR (HELIX 1500)	1	H15	40283PUB27	INDUCTIVE SENSOR	1

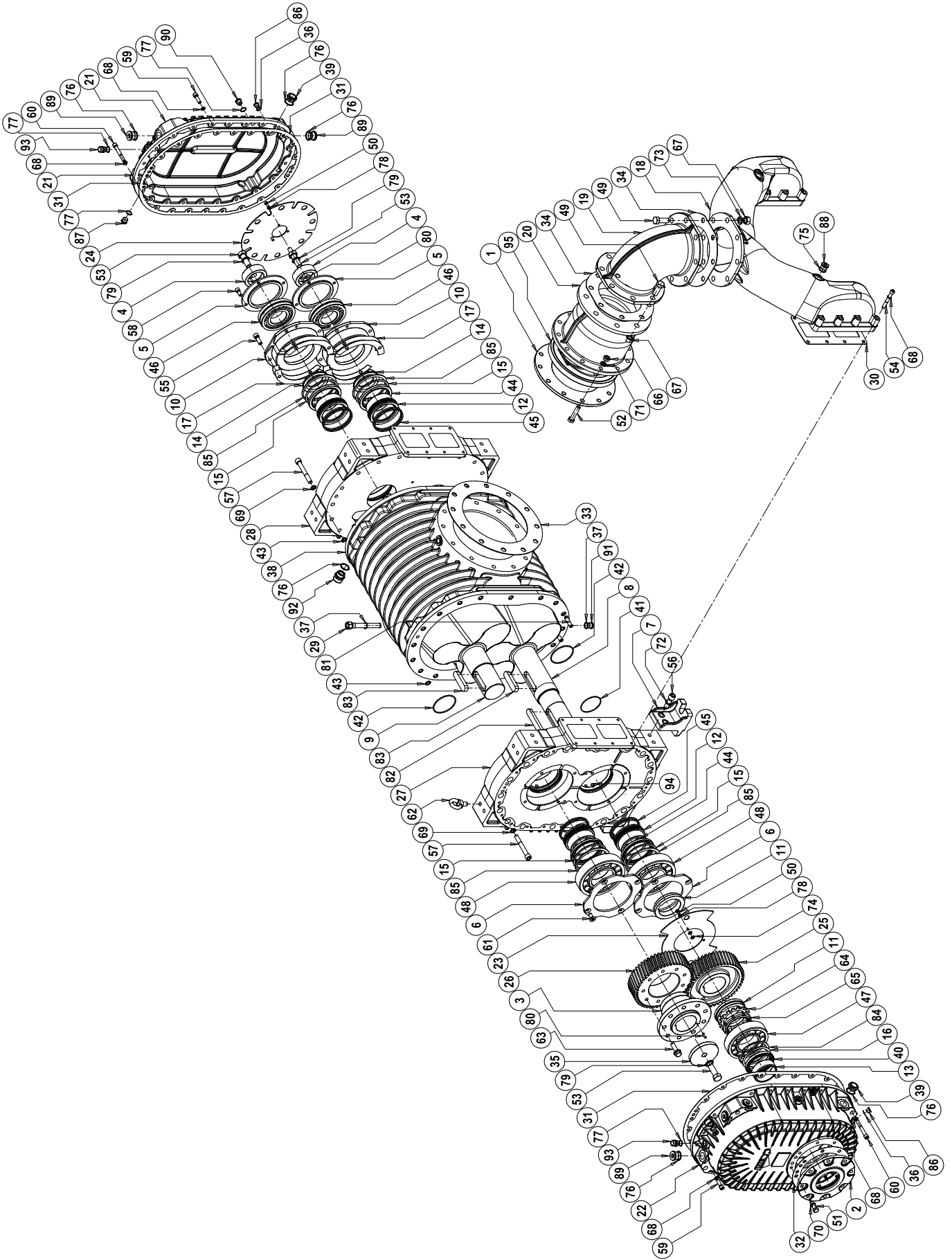
HELIX 1500



HELIX 1500

Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
1	15215023E0	DRIVING LOBE (RIGHT)	1	59	4026120719	SCREW TCEI M14X100 ZINC.	28
2	15215024E0	DRIVED LOBE (LEFT)	1	60	4026121711	SCREW TCEI M12X40 ZINC.	20
3	16100210E0	FLANGE DN250 PN6	1	61	4026121720	SCREW TCEI M12X90 ZINC.	8
4	1610513700	FLANGE FRONT COVER	1	62	4026121808	SCREW TCEI M10X25 ZINC.	12
5	16110011E0	REAR ADJUSTING HUB	2	63	4026121817	SCREW TCEI M10X80 ZINC.	4
6	16110012E0	ADJUSTING HUB	1	64	4026121824	SCREW TCEI M10X150 ZINC.	10
7	1613501700	SUPPORT	4	65	4026155807	SCREW TSPEI M10X20 ZINC.	8
8	1624038800	SPACER	2	66	4026190103	EYE BOLT M20	2
9	1624038900	FRONT SPACER	1	67	40261D3C10	SCREW M16X50	6
10	1624039000	SPACER	2	68	4026308009	NUT M16 ESAG.ZINC.	12
11	1624041500	FRONT SEAL BUSHING	2	69	4026308011	NUT M20 ESAG.ZINC.	16
12	1624041600	REAR SEAL BUSHING	2	70	402630RB11	RING NUT M75X2	1
13	1624041700	BEARING BUSHING	2	71	4026350506	WASHER GROWER 10 ZINC.	20
14	1624041900	SPACER	4	72	4026350508	WASHER GROWER 12 ZINC.	28
15	1624042000	SPACER	1	73	4026350509	WASHER GROWER 14 ZINC.	28
16	162404TSB0	BUSHING	1	74	4026350711	WASHER GROWER 16 ZINC.	12
17	162404TWB0	SPACER	1	75	4026350713	WASHER GROWER 20 ZINC.	20
18	16271020E0	INJECTION MANIFOLD	1	76	4026359000	WASHER 26X32X1.5	18
19	1627104900	MANIFOLD DN175	1	77	4026359003	WASHER 21.5X26X1.5	7
20	1627105000	CLAPET MANIFOLD	1	78	4026385C12	WASHER M8	3
21	1640102600	REAR COVER	1	79	4026385C33	WASHER M22	3
22	1640501400	FRONT COVER	1	80	4026401208	PIN 6X24	3
23	1647001600	OIL DISC	1	81	4026402011	PIN 14X55	12
24	1647002000	FRONT OIL DISC	1	82	4026501404	TAB 20X12X90	2
25	165104E6B0	TIMING GEAR	1	83	4026501408	TAB 20X12X140	1
26	165104E7B0	ADJUSTABLE TIMING GEAR	1	84	4026510552	SEEGER I 102	1
27	16625003E0	REAR BENCH	1	85	4026510558	SEEGER I 120	4
28	1662500900	FRONT BENCH	1	86	4026701602	PLUG 3/8	4
29	1663063800	THERMOSTAT HOUSING	1	87	4026701603	PLUG 1/2	5
30	16807038E0	GASKET DN250 PN10	2	88	4026701604	PLUG 3/4	9
31	1680710500	GASKET	1	89	4026701622	MAGNETIC PLUG G3/4	2
32	1680710600	COVER GASKET	2	90	4026904510	PLUG M22X1,5	2
33	1680711700	INJECTION MANIFOLD GASKET	2	91	4026910008	VENTIL PLUG 3/4	4
34	1680711800	GASKET DN175 PN10	2	92	4026910104	VENTIL PLUG 1/2"	2
35	1681008900	BEARING FLANGE	2	93	4026910602	PLUG G1/4	2
36	1681009300	BEARING FLANGE	2	94	4027400416	CLAPET VALVE DN250 PN6 ZINC.	4
37	16850054E0	WASHER	1	95	4028249B00	THERMOSTAT	1
38	1685100200	WASHER 17X22X1,5	4				
39	16851ABUB0	WASHER 28X22,5X1,5	3	18920131E0	GASKET KIT HELIX 1500		
40	16875039E0	HOUSING HELIX1500	1				
41	4022104504	OIL SIGHT GLASS 3/4"	4				
42	4022200152	DOMSEL SEAL 80X100X10	1				
43	4022200305	O-RING 3256	2				
44	4022200327	O-RING 3275	1				
45	4022200328	O-RING 119	28				
46	4022200368	O-RING 3287	2				
47	4022202807	Y-SEAL BABSL 110X90X12	4				
48	4022203603	Y-SEAL PTFE/CAR 100X91X4	8				
49	4023105014	BEARING 22213 E/C3	2				
50	4023110096	BEARING NU 314 ECJ/C3	1				
51	4023110097	BEARINGNU315 ECJ/C3	2				
52	4026101301	SCREW TE M6X10 ZINC.	3				
53	4026101813	SCREW TE M20X50 ZINC.	4				
54	4026101814	SCREW TE M20X55 ZINC.	16				
55	4026102804	SCREW TE M8X16 ZINC.	3				
56	4026103217	SCREW TE M16X75 ZINC.	12				
57	4026103316	SCREW TE M22X70 ZINC.	3				
58	4026120506	SCREW TCEI M10X30 ZINC.	8				

HELIX 2000

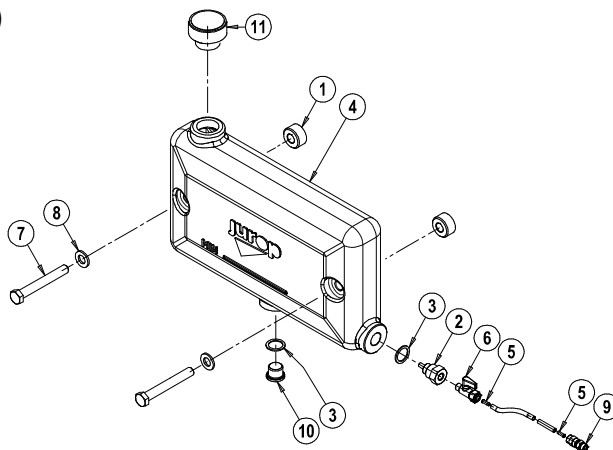


HELIX 2000

Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
1	16100210E0	FLANGE DN250 PN6	1	59	4026121711	SCREW TCEI M12X40 ZINC.	36
2	16101004E0	FRONT FLANGE	1	60	4026121720	SCREW TCEI M12X90 ZINC.	8
3	16110004E0	ADJUSTING HUB	1	61	4026155109	SCREW TSPEI M14X30 ZINC.	8
4	16110005E0	HUB	2	62	4026190110	EYEBOLT M18	4
5	16120470F0	BEARING FLANGE	2	63	40261D3C10	SCREW TE M16X50	9
6	16120471F0	BEARING FLANGE	2	64	4026306320	WASHER MB20 PER GHIERE M100X2	1
7	1619500200	SUPPORT	4	65	4026306520	RING NUT M100X2 AUTOBLOQ.	1
8	16215039E0	DRIVING LOBE	1	66	4026308009	NUT M 16 ESAG.ZINC.	12
9	16215040E0	DRIVED LOBE	1	67	4026308011	NUT M 20 ESAG.ZINC.	16
10	16240082E0	REAR BEARING BUSHING	2	68	4026350508	WASHER GROWER 12 ZINC.	60
11	16240083E0	SPACER	2	69	4026350510	WASHER GROWER 16 ZINC.	37
12	16240091E0	BUSHING	4	70	4026350710	WASHER GROWER 14 ZINC.	8
13	16240094E0	BUSHING	1	71	4026350711	WASHER GROWER 16 ZINC.	12
14	16240095E0	SPACER	2	72	4026350712	WASHER GROWER 18 ZINC.	8
15	16240096E0	SPACER	4	73	4026350713	WASHER GROWER 20 ZINC.	16
16	16240097E0	SPACER DOMSEL	1	74	4026357005	WASHER M 8 ZINC.	6
17	16240098E0	SPACER	8	75	4026359000	WASHER 32X26X1,5	2
18	16271016E0	INJECTION MANIFOLD	1	76	4026359001	WASHER 40X33,5X1,5	16
19	1627104900	90° MANIFOLD DN175	1	77	4026359003	WASHER 21,5X26X1,5	12
20	1627105000	CLAPET MANIFOLD DN250	1	78	4026385C12	WASHER M8	8
21	16401107E0	REAR COVER	1	79	4026385C33	WASHER M22	3
22	16401108E0	FRONT COVER	1	80	4026401208	PIN. 6X24	3
23	16470041E0	FRONT OIL DISC	1	81	4026402011	PIN 14X55	12
24	16470042E0	REAR OIL DISC	1	82	4026501725	TAB 25X14X160	1
25	16510019E0	TIMING GEAR	1	83	4026501735	TAB 28X16X110	2
26	16510022E0	TIMING GEAR	1	84	4026510561	SEEGER I 135	1
27	16625004E0	BENCH	1	85	4026510565	SEEGER I 155	4
28	16625005E0	BENCH	1	86	4026701602	PLUG 3/8"	4
29	1663063800	THERMOSTAT HOUSING	1	87	4026701603	PLUG 1/2"	8
30	16807027E0	GASKET	2	88	4026701604	PLUG 3/4"	2
31	16807028E0	GASKET	2	89	4026701605	PLUG 1"	8
32	16807029E0	GASKET	1	90	4026701621	PLUG G 1/2"	2
33	16807031E0	GASKET	2	91	4026904510	PLUG M22X1,5	1
34	1680711800	GASKET	2	92	4026910009	VENTIL PLUG 1"	4
35	16850041E0	WASHER	1	93	4026910104	VENTIL PLUG 1/2"	2
36	1685100200	WASHER 17X22X1,5	4	94	4026910602	PLUG G 1/4"	4
37	16851ABUB0	WASHER 28X22,5X1,5	2	95	4027400416	CLAPET DN250 PN6	1
38	16875027E0	HOUSING HELIX2000	1		4028249B00	THERMOSTAT	
39	4022104505	OIL SIGHT PLUG 1"	4				
40	4022200156	SEAL DOMSEL 105X130X12	1	18920129E0		GASKET KIT HELIX 2000	
41	4022200369	SEAL OR 3350	1				
42	4022200376	OR 4387	4				
43	4022200379	OR 3068	36				
44	4022202809	SEAL 150X120X10	4				
45	4022203606	SEAL 135X126X5	8				
46	4023105023	BEARING 21315 E/C3	2				
47	4023110072	BEARING NU 318 ECJ/C3	1				
48	4023110073	BEARING NU 320 ECJ/C3	2				
49	4026101814	SCREW TE M20X55 ZINC.	16				
50	4026102806	SCREW TE M8X20 ZINC.	8				
51	4026103111	SCREW TE M14X45 ZINC.	8				
52	4026103217	SCREW TE M16X75 ZINC.	12				
53	4026103315	SCREW TE M22X65 ZINC.	3				
54	4026120618	SCREW TCEI M12X90 ZINC.	16				
55	4026120711	SCREW TCEI M14X40 ZINC.	8				
56	4026121114	SCREW TCEI M18X55 ZINC.	8				
57	4026121221	SCREW TCEI M16X120 ZINC.	36				
58	4026121708	SCREW TCEI M12X25 ZINC.	8				

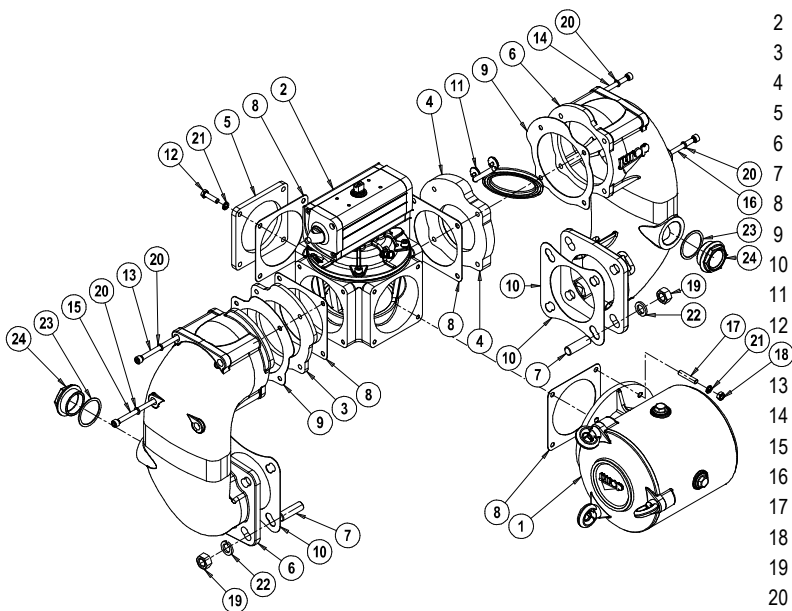
HELIX - ACCESSORIES

Flushing kit (cod. 18920 031 E0)



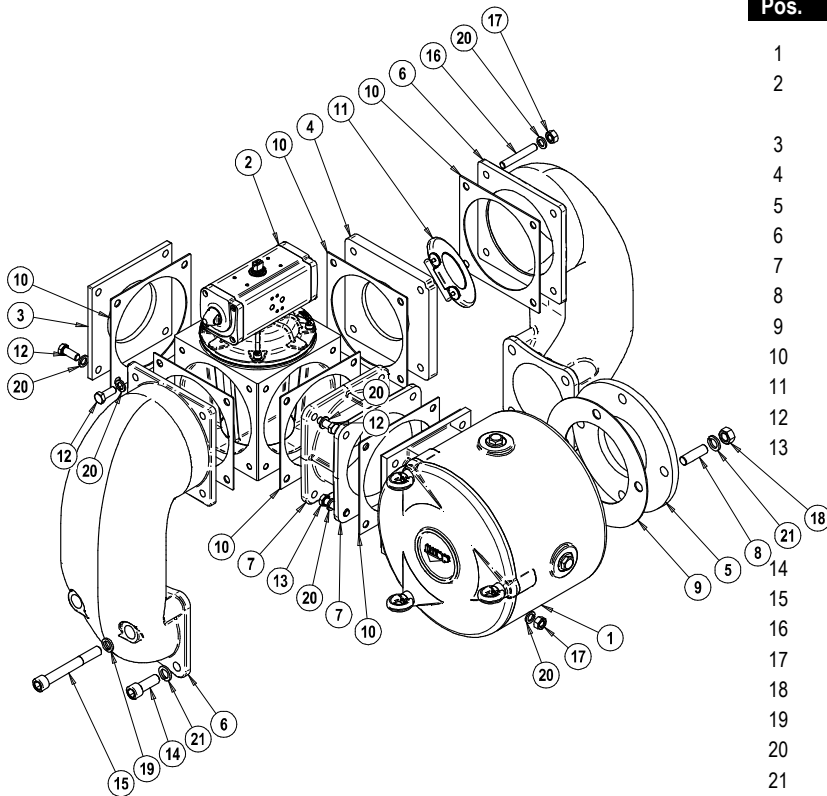
Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
1	1624042800	SPACER	2	7	4026103013	SCREW TE M12X90 GALV.	2
2	1673001000	FILTER LINK	1	8	4026357007	WASHER M12 GALV.	2
3	1685100300	WASHER DI 20	2	9	4026702004	CONNECTION DIR 6X1/8	1
4	1687600000	SIDE OIL TANK	1	10	4026904503	PLUG M20X1,5	1
5	4023125000	BUSHING	2	11	4026910103	PLASTIC VENT 1"	1
6	4024405400	VALVE G1/8	1	4021102005	PIPE RILSAN		

HELIX 220 Suction Unit



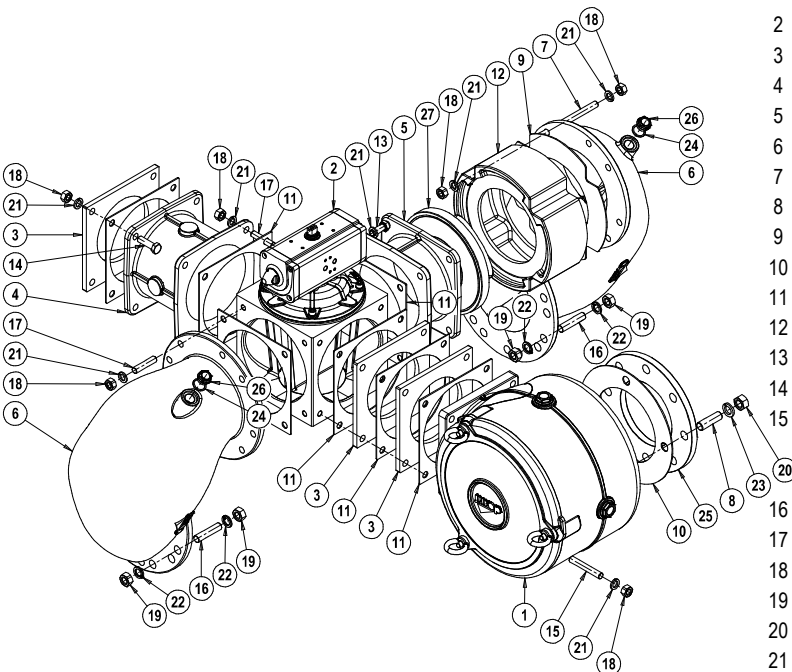
Pos.	Code	Description	Q.ty
1	1445002900	AIR FILTER (SMALL)	1
	14450MNZB0	FILTER DFR/C 140	1
2	1488102900	4-WAYS VALVE 4" PNEUMATIC	1
3	16100378E0	FLANGE SUCTION GROUP	1
4	16100379E0	FLANGE SUCTION GROUP	1
5	16100BDSB0	4-WAYS VALVE 4" FLANGE	1
6	16271023E0	SUCTION-EXHAUST MANIFOLD	2
7	1672001700	STUD SCREW M16X52	8
8	16806041E0	4-WAYS VALVE 4" GASKET	4
9	16807046E0	GASKET	2
10	16807048E0	GASKET	2
11	18930004E0	CLAPET DN125 INOX	1
12	4026102808	SCREW TE 8.8 M8X30 ZINC.	4
13	4026121420	SCREW TCEI 8.8 M8X120 ZINC.	2
14	4026121421	SCREW TCEI 8.8 M8X130 ZINC.	2
15	4026121423	SCREW TCEI 8.8 M8X180 ZINC.	2
16	4026121424	SCREW TCEI 8.8 M8X190 ZINC.	2
17	4026171603	STUD SCREW 8.8 M8X30 ZINC.	4
18	4026308005	NUT M8 ZINC.	4
19	4026308009	NUT M16 ZINC.	8
20	4026350505	WASHER GROWER 8 ZINC.	8
21	4026350706	WASHER GROWER 8 ZINC.	8
22	4026350711	WASHER GROWER 16 ZINC.	8
23	4026702708	WASHER 1"1/2	2
24	4026904005	PLUG 1"1/2 ZINC.	2

HELIX 300 Suction Unit

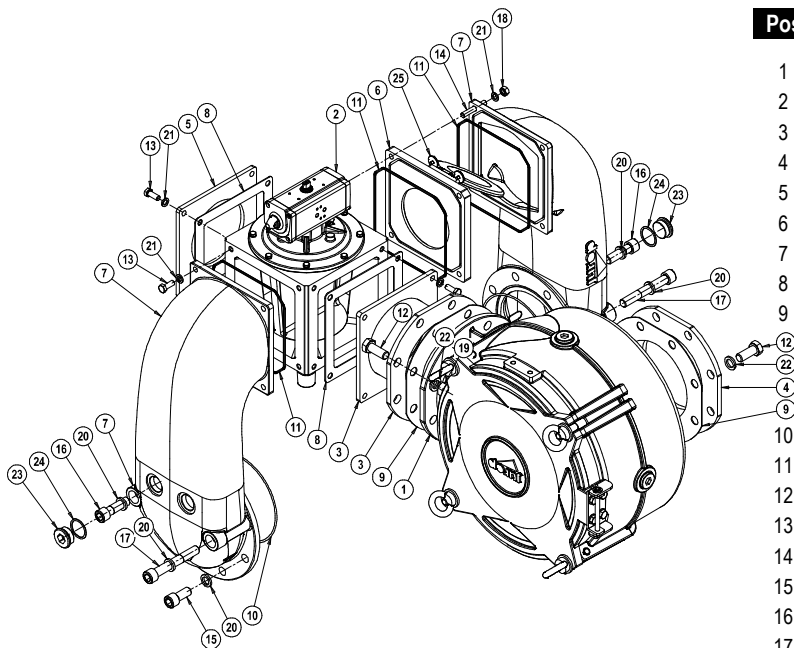


Pos.	Code	Description	Q.ty
1	1445003200	AIR FILTER	1
2	1488102200	4-WAYS VALVE 6" PNEUMATIC	1
	1488102100	4-WAYS VALVE 6" MANUAL	1
3	1612001300	FLANGE	1
4	16120107E0	PIASTA CLAPET DN150 PN10	1
5	1612011100	PLATE FOR CLAPET VALVE DN150 PN10	1
6	16271002E0	FILTER PR 200-250	2
7	1627102100	SUCTION EXHAUST MANIFOLD	1
8	1672001700	STUD SCREW M 16X52	4
9	1680609500	GASKET	1
10	1680609600	GASKET	6
11	18930005E0	CLAPET VALVE DN150 PN10	1
12	4026103002	SCREW M12X30	12
13	4026103006	SCREW M12X50	4
14	4026121212	SCREW TCEI M16 X 45	4
15	4026121222	SCREW TCEI M 16 X 130	4
16	4026171207	STUD SCREW M 12 X 60	4
17	4026308007	NUT M 12	8
18	4026308009	NUT M 16	4
19	4026350510	WASHER GROWER 16	4
20	4026350709	WASHER GROWER 12	24
21	4026350711	WASHER GROWER 16	8

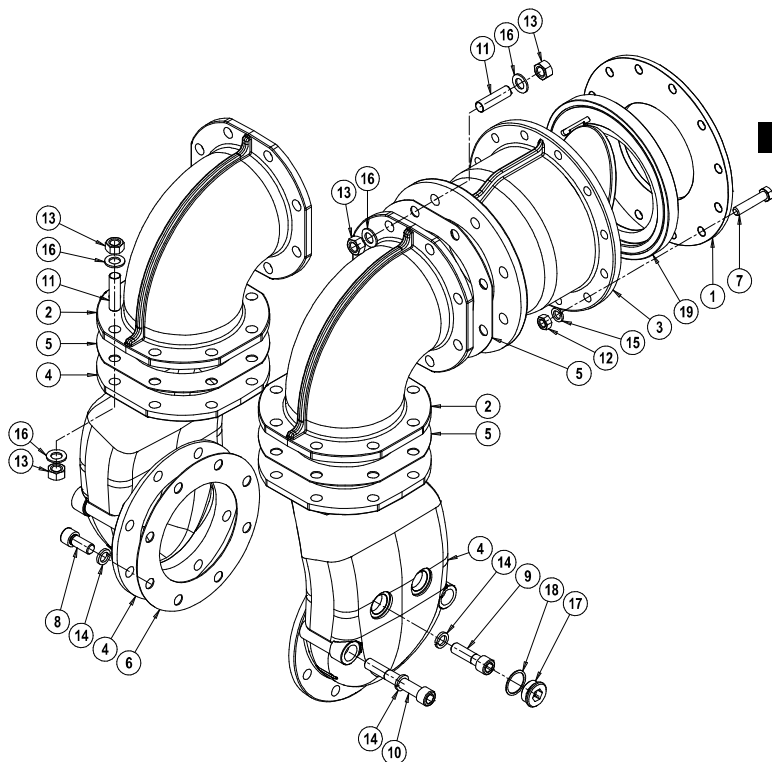
HELIX 450 Suction Unit



Pos.	Code	Description	Q.ty
1	1445003200	AIR FILTER-ACQUA D220	1
	14450GU6B0	DRF/C 220 FILTER	1
2	1488102200	4-WAYS VALVE 6" PNEUMATIC	1
3	1612011500	FLANGE 4 VIE 6"	3
4	1627101700	MANIFOLD L141	1
5	1627102100	MANIFOLD L87.5	1
6	1627507200	SUCTION-EXHAUST MANIFOLD	2
7	1671001300	ROD CONNECTION	4
8	1672001700	STUD SCREW M16X52	4
9	1680609400	GASKET	1
10	1680609500	AIR FILTER GASKET	1
11	1680609600	4-WAYS VALVE 6" GASKET	7
12	16871YAVA0	CLAPET VALVE	1
13	4026103002	SCREW TE 8.8 M12X30 ZINC.	4
14	4026103004	SCREW TE 8.8 M12X40 ZINC.	4
15	4026171207	STUD SCREW 8.8 M12X60 ZINC.	4
16	4026171304	C 8.8 M14X40	15
17	4026171704	SCREW M12X35	8
18	4026308007	NUT M12	24
19	4026308008	NUT M14	30
20	4026308009	NUT M16	4
21	4026350709	WASHER GROWER M12 PIATTA	28
22	4026350710	WASHER GROWER M14 PIATTA	30
23	4026350711	WASHER GROWER M16 PIATTA	4
24	4026359003	WASHER 21.5X26X1.5	2
25	4026713008	FLANGE	1
26	4026904001	PLUG 1/2	2
27	4027400414	CLAPET DN150 PN6	1

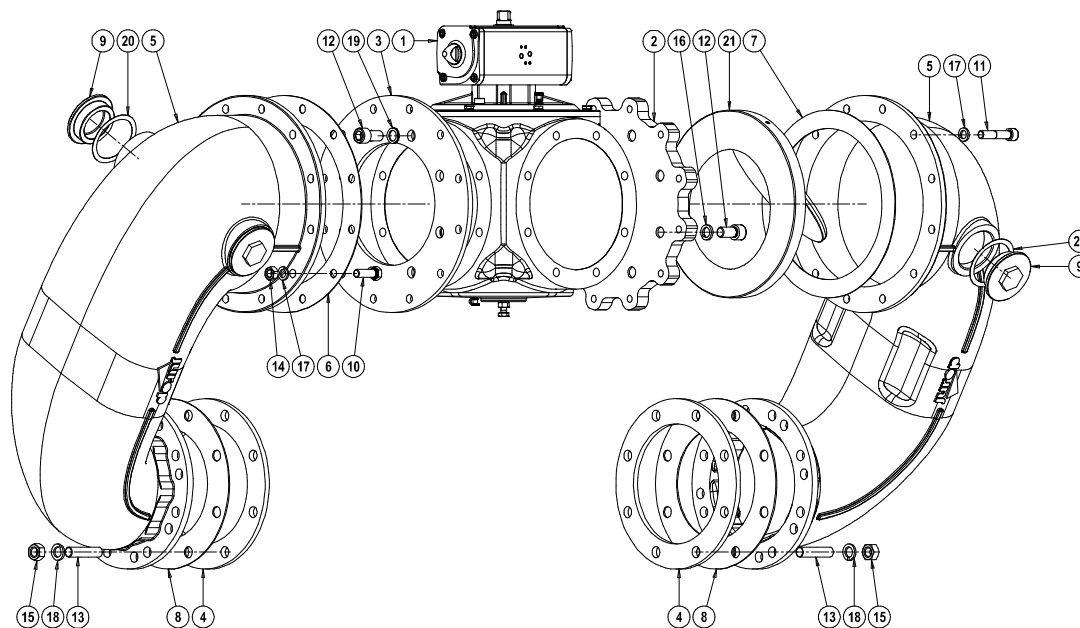
HELIX 750 Suction Unit


Pos.	Code	Description	Q.ty
1	1445006800	AIR FILTER D400	1
2	14881BWPB0	4-WAY VALVES 8" PNEUMATIC	1
3	15260033E0	AIR FILTER MANIFOLD	1
4	16100083E0	FLANGE DN175	1
5	16100M4BB0	FLANGE 8"	1
6	16120660E0	CLAPET PLATE DN200 PN10	1
7	16271013E0	SUCTION-EXHAUST MANIFOLD	2
8	1680605300	4-WAY VALVES 8" GASKET	2
9	1680711800	GASKET DN175 PN10	2
10	4022200309	O-RING 4875 VITON	2
11	4022200375	O-RING 41050 VITON	3
12	4026103002	SCREW TE M12X30 ZINC.	12
13	4026103209	SCREW TE M16X35 ZINC.	8
14	4026103212	SCREW TE M16X50 ZINC.	8
15	4026171206	STUD SCREW M12X55 ZINC.	4
16	40261FPB13	SCREW TCEI M20X45 ZINC.	8
17	40261FPB17	SCREW TCEI M20X70 ZINC.	4
18	40261FPB24	SCREW TCEI M20X140 ZINC.	4
19	4026308007	NUT M 12 ESAG.ZINC.	4
20	4026308009	NUT M 16 ESAG.ZINC.	8
21	4026350512	WASHER GROWER 20 ZINC.	16
22	4026350709	WASHER GROWER 12 ZINC.	16
23	4026350711	WASHER GROWER 16 ZINC.	16
24	4026701606	PLUG 1"1/4 FE ZINC.	4
25	4026702707	WASHER 1"1/4	4
26	4027400488	CLAPET DN200 PN10 INOX	1

HELIX 750 Suction Unit (manifolds group)


Pos.	Code	Description	Q.ty
1	16100KKDB0	FLANGE DN250 PN6	1
2	1627104900	MANIFOLD (90°) DN175	2
3	1627105000	CLAPET MANIFOLD DN250	1
4	1627508000	SUCTION-EXHAUST MANIFOLD	2
5	1680711800	GASKET DN175 PN10	3
6	1680711900	GASKET DN175 PN10	2
7	4026103217	SCREW TE 8.8 M16X75 ZINC.	12
8	40261FPB13	SCREW TCEI 8.8 M20X45 ZINC.	8
9	40261FPB17	SCREW TCEI 8.8 M20X70 ZINC.	4
10	40261FPB24	SCREW TCEI 8.8 M20X140 ZINC.	4
11	40261MYB00	STUD SCREW M20X43	24
12	4026308009	NUT M16 ZINC.	12
13	4026308011	NUT M20 ZINC.	48
14	4026350512	WASHER GROWER M20 ZINC.	16
15	4026350711	WASHER GROWER M16 ZINC.	12
16	4026356111	WASHER M20	48
17	4026701606	PLUG 1"1/4	4
18	4026702707	WASHER 1"1/4	4
19	4027400416	CLAPET DN250 PN6	1

HELIX 1200-1500 Suction Unit



HELIX 1200 Suction Unit

Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
1	14881005E0	4-WAY VALVE DN200 PN10 PNEUMATIC	1	11	4026121217	SCREW TCEI 8.8 M16X80 ZINC.	12
2	16100445E0	FLANGE SUCTION UNIT HELIX1200-1500	1	12	4026121611	SCREW TCEI 8.8 M20X40 ZINC.	16
3	16100446E0	FLANGE SUCTION UNIT HELIX1200-1500	1	13	4026171813	STUD SCREW M20X57 ZINC.	16
4	16100447E0	FLANGE SUCTION UNIT (HELIX1200)	2	14	4026308009	NUT M16 ESAGONALE ZINC.	12
5	16271026E0	SUCTION UNIT MANIFOLD HELIX1200	2	15	4026308011	NUTM20 ESAGONALE ZINC.	16
	16271027E0	SUCTION UNIT MANIFOLD HELIX1500	2	16	4026350512	WASHER GROWER 20 ZINC.	8
6	16807051E0	SUCTION UNIT GASKET HELIX1200-1500	1	17	4026350711	WASHER GROWER 16 ZINC.	24
7	16807052E0	SUCTION UNIT GASKET HELIX1200-1500	1	18	4026350713	WASHER GROWER 20 ZINC.	16
8	16807D1WB0	GASKET DN200 PN10 (HELIX1200)	2	19	4026385C31	WASHER SELF-LOCKING M20 ZINC.	8
9	16840176E0	PLUG 3"	4	20	4026702712	WASHER 3"	4
10	4026103212	SCREW TE 8.8 M16X50 ZINC.	12	21	4027400417	CLAPET DN300 PN6	1

HELIX 1500 Suction Unit

Pos.	Code	Description	Q.ty	Pos.	Code	Description	Q.ty
1	14881005E0	4-WAY VALVE DN200 PN10 PNEUMATIC	1	11	4026121217	SCREW TCEI 8.8 M16X80 ZINC.	12
2	16100445E0	FLANGE SUCTION UNIT HELIX1200-1500	1	12	4026121611	SCREW TCEI 8.8 M20X40 ZINC.	16
3	16100446E0	FLANGE SUCTION UNIT HELIX1200-1500	1	13	40261MYB00	STUD SCREW M20X43 ZINC.	24
4	-	-	-	14	4026308009	NUT M16 ESAGONALE ZINC.	12
5	16271026E0	SUCTION UNIT MANIFOLD HELIX1200	2	15	4026308011	NUTM20 ESAGONALE ZINC.	24
	16271027E0	SUCTION UNIT MANIFOLD HELIX1500	2	16	4026350512	WASHER GROWER 20 ZINC.	8
6	16807051E0	SUCTION UNIT GASKET HELIX1200-1500	1	17	4026350711	WASHER GROWER 16 ZINC.	24
7	16807052E0	SUCTION UNIT GASKET HELIX1200-1500	1	18	4026350713	WASHER GROWER 20 ZINC.	24
8	-	-	-	19	4026385C31	WASHER SELF-LOCKING M20 ZINC.	8
9	16840176E0	PLUG 3"	4	20	4026702712	WASHER 3"	4
10	4026103212	SCREW TE 8.8 M16X50 ZINC.	12	21	4027400417	CLAPET DN300 PN6	1

Model	Issue date	Revision No.	Revision date	Filled out by	Viewed by
HELIX	30-06-2016	08	20-01-2020	U.T.	A.T.

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Juop SpA reserves the right to modify the products described in this manual without prior notice.