USE MANUAL

ZMS

DEALER

for Maintenance
date of commissioning:

.....

position / system reference:

.....

service:

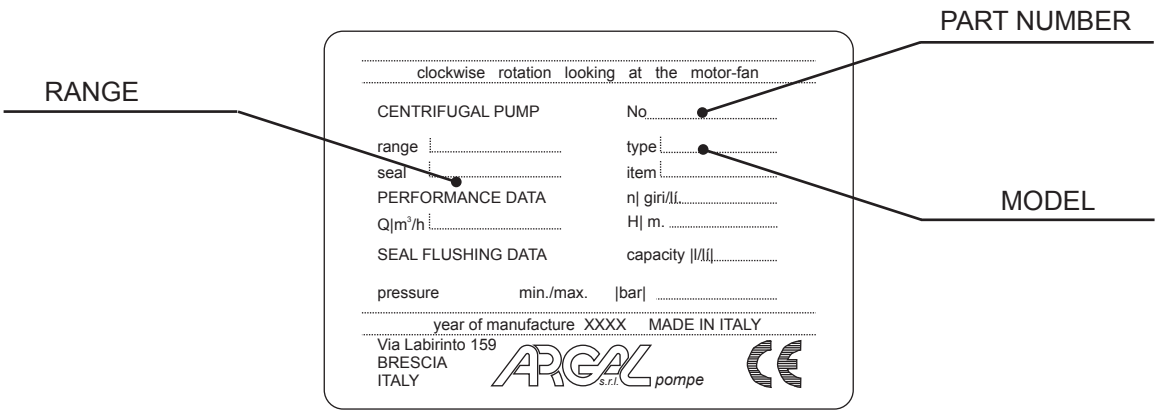
.....

INDEX:

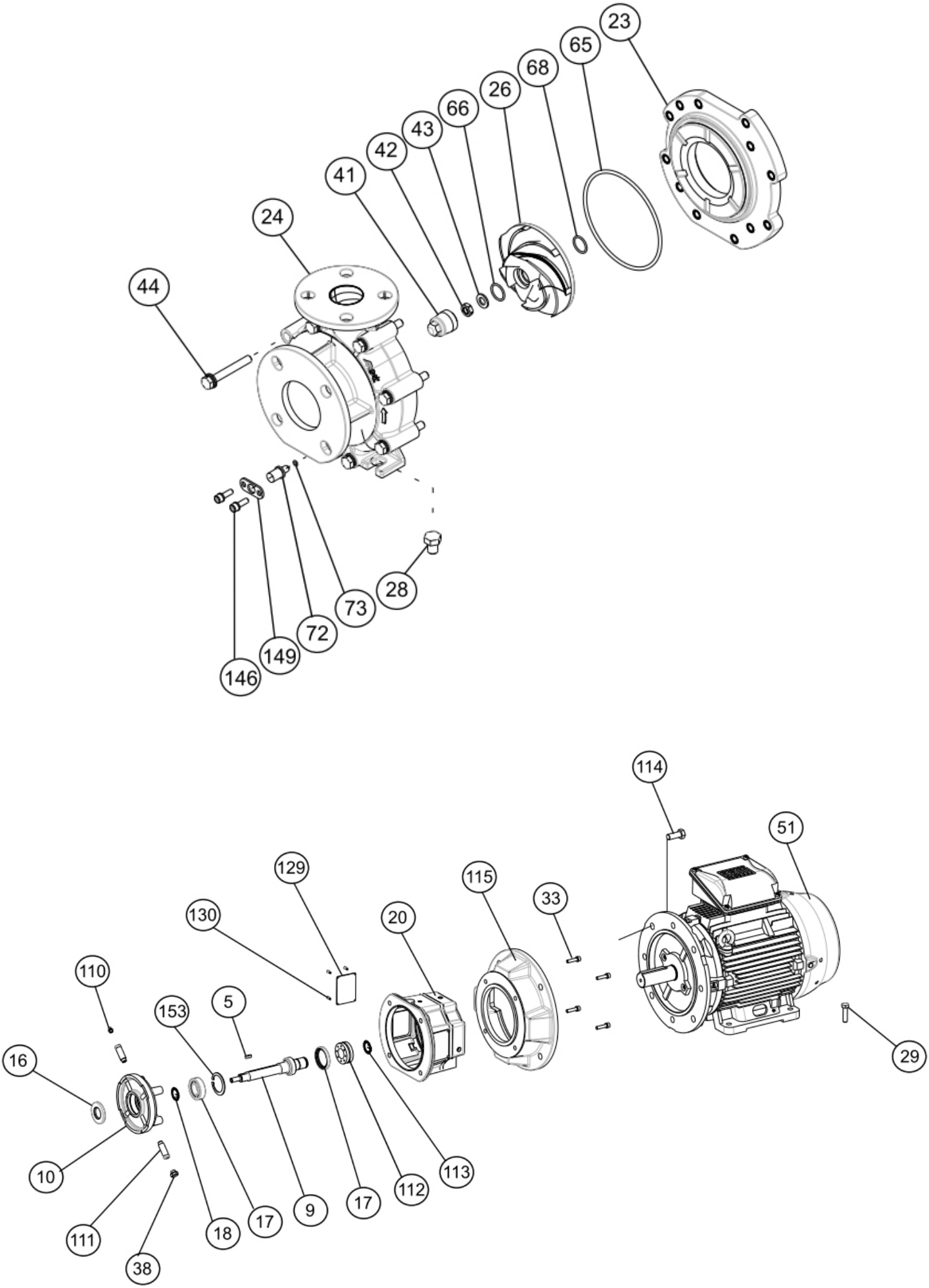
IDENTIFICATION CODE

Size	PUMP DATA							MOTOR DATA		
	Model	Version	O-Ring Material	Ø Impeller	Mechanical Seal		Base	rpm	Standard	Power
G1	□ 1.5x1x6	□ **V1G** Epoxy Vinyl Ester Resin	□ **V** FPM	_____**mm**	□ **TR5**	**Single External**	□ **133**	□ **1450**	□ **E** IEC	_____ **Kw**
	□ 1.5x1x8	□ **V1A** Epoxy Vinyl Ester Resin Mixture	□ **E** EPDM		□ **TR8**		□ **233**	□ **2900**	□ **U** NEMA	
	□ 3x1.5x6	□ **V1C** Epoxy Vinyl Ester Resin Mixture	□ **F** FEP		□ **BF8**	**Single Internal**	□ **244**	□ **1750**		
	□ 3x2x6	□ **V1F** Epoxy Vinyl Ester Resin Mixture	□ **K** FFKM		□ **MTR5**	**External Double**		□ **3500**		
	□ 3x1.5x8				□ **MTR8**	**Flushed with External Flush (API PLAN 54)**				
G2	□ 3x2x8									
	□ 3x2x10				□ **MC8-1**	**External Double Cartridge Flushed with External Flush (API PLAN 54)**				
	□ 4x3x8				□ **CS8-F**	**Single Internal Cartridge prepared for External Quench (API PLAN 03)**				
	□ 4x3x10				□ **CS8-1**	**Single Internal Cartridge with Flushing inlet on Pump (API PLAN 03)**				
	□ 6x4x10									
	□ 6x4x13									

Each pump is supplied with the serial and model abbreviation and the serial number on the rating plate, which is riveted onto the support side. Check these data upon receiving the goods. Any discrepancy between the order and the delivery must be communicated immediately.
In order to be able to trace data and information, the abbreviation, model and serial number of the pump must be quoted in all correspondence.

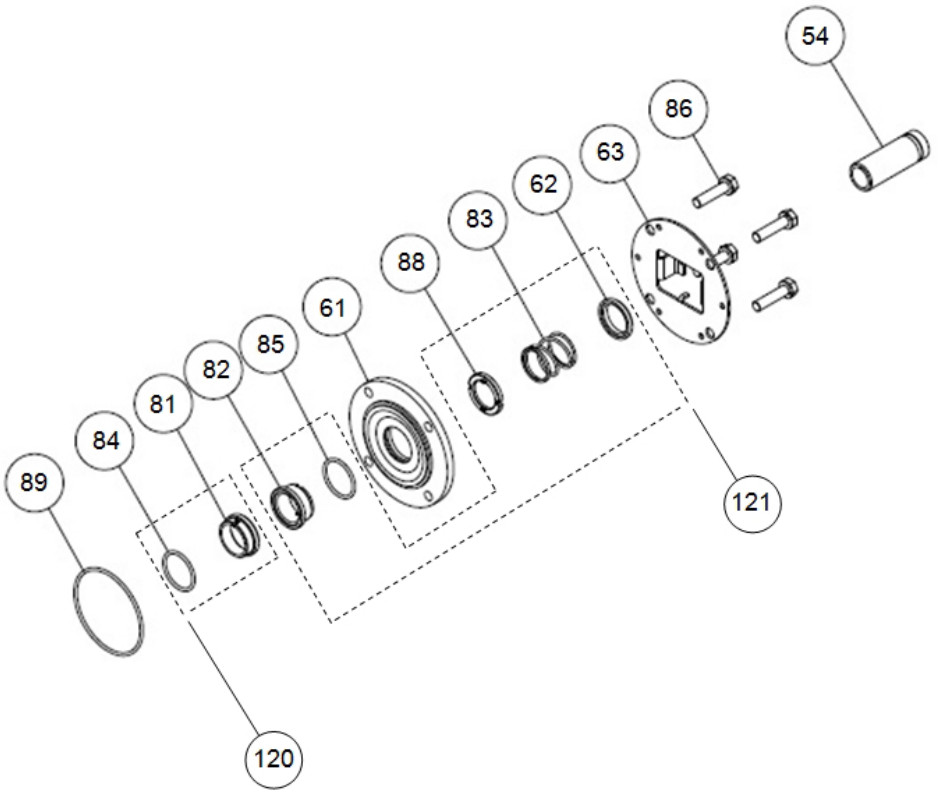


EXPLODED VIEW - Size G1



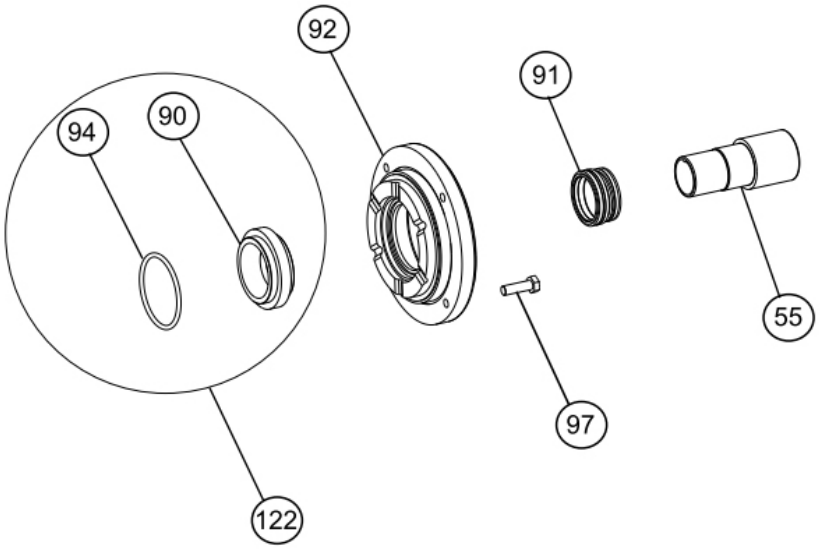
LEGEND - EXPLODED VIEW - Size G1

Pos.	Rif.	Part name	Q.ty	Disassembling steps sequence (A1,...,A10,B1,...,B10,C1....)										Spare parts stock		
				1	2	3	4	5	6	7	8	9	10	start up	2 years	5 years
5	940.1	Feather Key (impeller)	1									C				
9	210	Shaft	1								C					
10	807.1	Bearing Housing	1													
11	320.2	Bearing (inboard)	1							B					1	1
16	421.1	Elastic Seal Ring (inboard)	1							B					1	1
17	421.2	Elastic Seal Ring (outboard)	1							B					1	1
18	932.1	Snap Ring	1							B						
20	807.1	Bracket	1						B							
23	134	Cover	1					A								
24	102	Volute Casing	1		A											
26	230	Impeller	1				A								1	1
28	910.1	FASTENERS Volute Casing / Baseplate	2		A											
29	910.2	FASTENERS Motor / Baseplate	4		B											
33	910.9	FASTENERS Motor Flange / Bracket	4						B							
38	638.2	Grease Drain Plug	1													
41	260	Ogive	1			A									1	1
42	920	Nut (Impeller)	1			A										
43	925	Washer	1			A										
44	910.5	FASTENERS Volute Casing / Cover			A											
51	800	Motor	1													
65	412.1	O-ring Volute Casing / Cover	1		A									1	1	1
66	412.2	O-ring Impeller (inboard)	1			A								1	1	1
68	412.3	O-ring Impeller (outboard)	1				A							1	1	1
72	638.3	Drain Plug	1	A												1
73	412.4	O-ring Drain Plug	1	A											1	1
110	636	Grease Fill Plug	1													
111	630	Grease Pipe	2					B								
112	887	Self Centering Locking Device	1								C					1
113	932.1	Snap Ring	1								C					
114	910	FASTENERS Motor / Motor Flange	4						B							
115	807	Motor Flange	1													
129	135	Protection Shield	2													
130	910.20	FASTENERS Protection Shield / Bracket	8													
146		FASTENERS Drain Plug	2	A												
149		Drain Plug Flange	1	A												
153	932.1	Snap Ring	1						B							



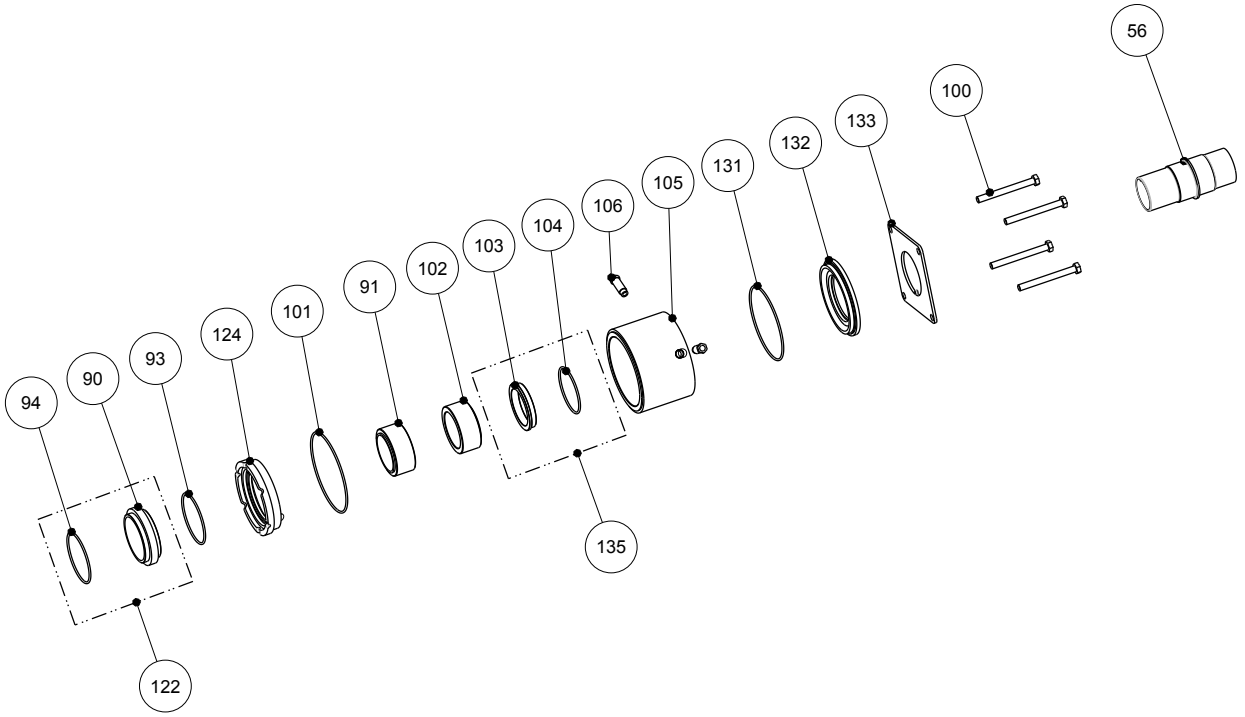
LEGEND INTERNAL MECHANICAL SEAL BF..

Pos.	Rif.	Part name	Q.ty	Disassembling steps sequence (A1,...,A10,B1,...,B10,C1....)										Spare parts stock		
				1	2	3	4	5	6	7	8	9	10	start up	2 years	5 years
54	524.1	Shaft sleeve (BF)	1											1	1	1
61	135.1	Diaphragm	1							C						1
62	488	Lock Ring	1				C									
63	198	Locking Counter-Plate	1		C											
81	472.1	Rotating Seal	1													
82	475.1	Fixed Seal	1					C								
83	477	Spring	1				C									
84	412.5	O-ring Rotating Seal	1													
85	412.6	O-ring Fixed Seal	1						C							
86	910.	FASTENERS Counter-Plate / Diaphragm	1	C												
88	487	Stationary Seal Locking Ring	1					C								
89	412.	O-ring Diaphragm / Cover	1								C			1	1	1
120		ROTATING SEAL COMPLETE												1	1	1
121		FIXED SEAL COMPLETE												1	1	1



LEGEND EXTERNAL MECHANICAL SEAL TYPE TR..

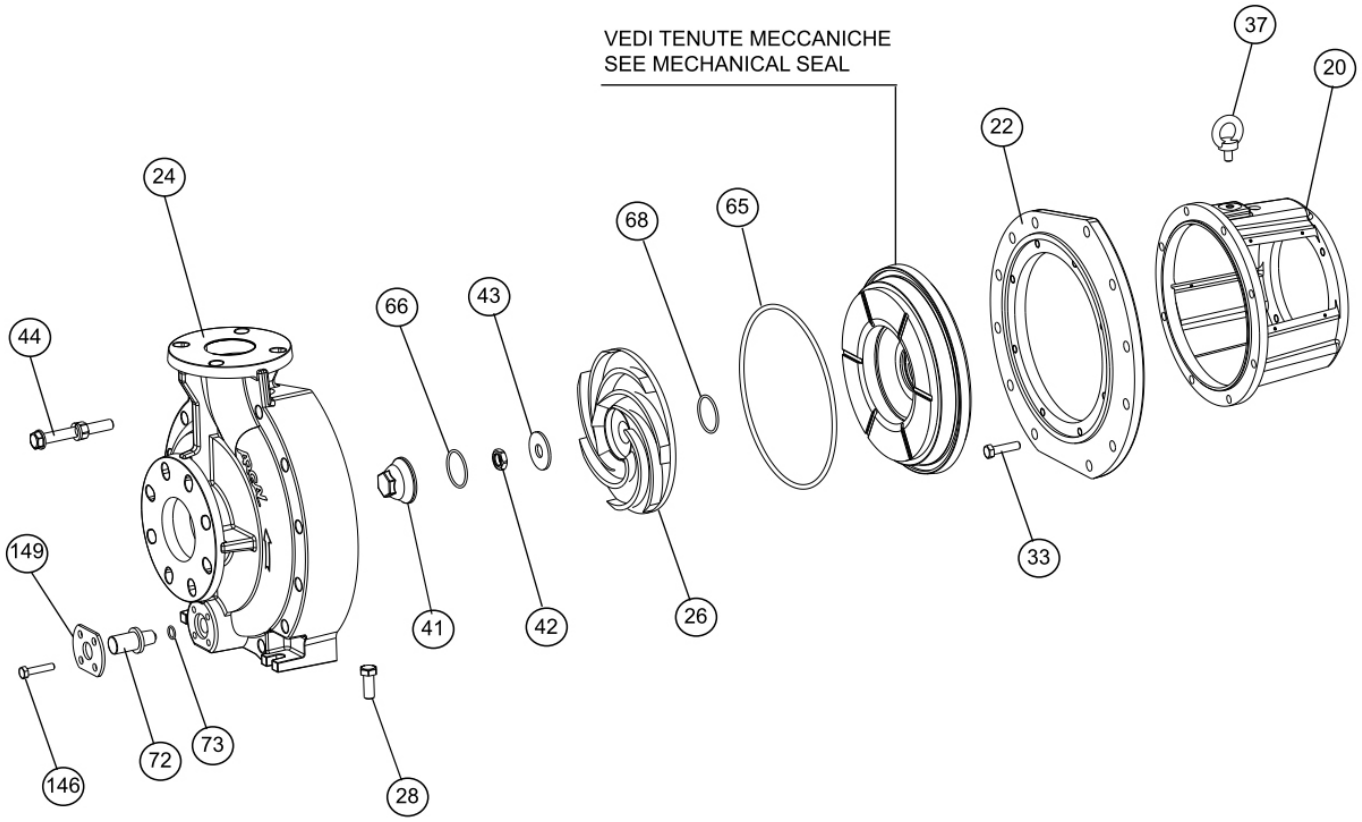
Pos.	Rif.	Part name	Q.ty	Disassembling steps sequence (A1,...,A10,B1,...,B10,C1....)										Spare parts stock		
				1	2	3	4	5	6	7	8	9	10	start up	2 anni	5 anni
55	524.2	Shaft sleeve (TR)	1											1	1	1
90	475.2	Fixed Seal	1			C										
91	472.2	Rotating Seal	1	C										1	1	1
92	135.2	Diaphragm (TR)	1		C											1
94	412.8	O-ring Fixed Seal	1				C									
97	910.	FASTENERS Diaphragm	1	C												
122		FIXED SEAL COMPLETE												1	1	1



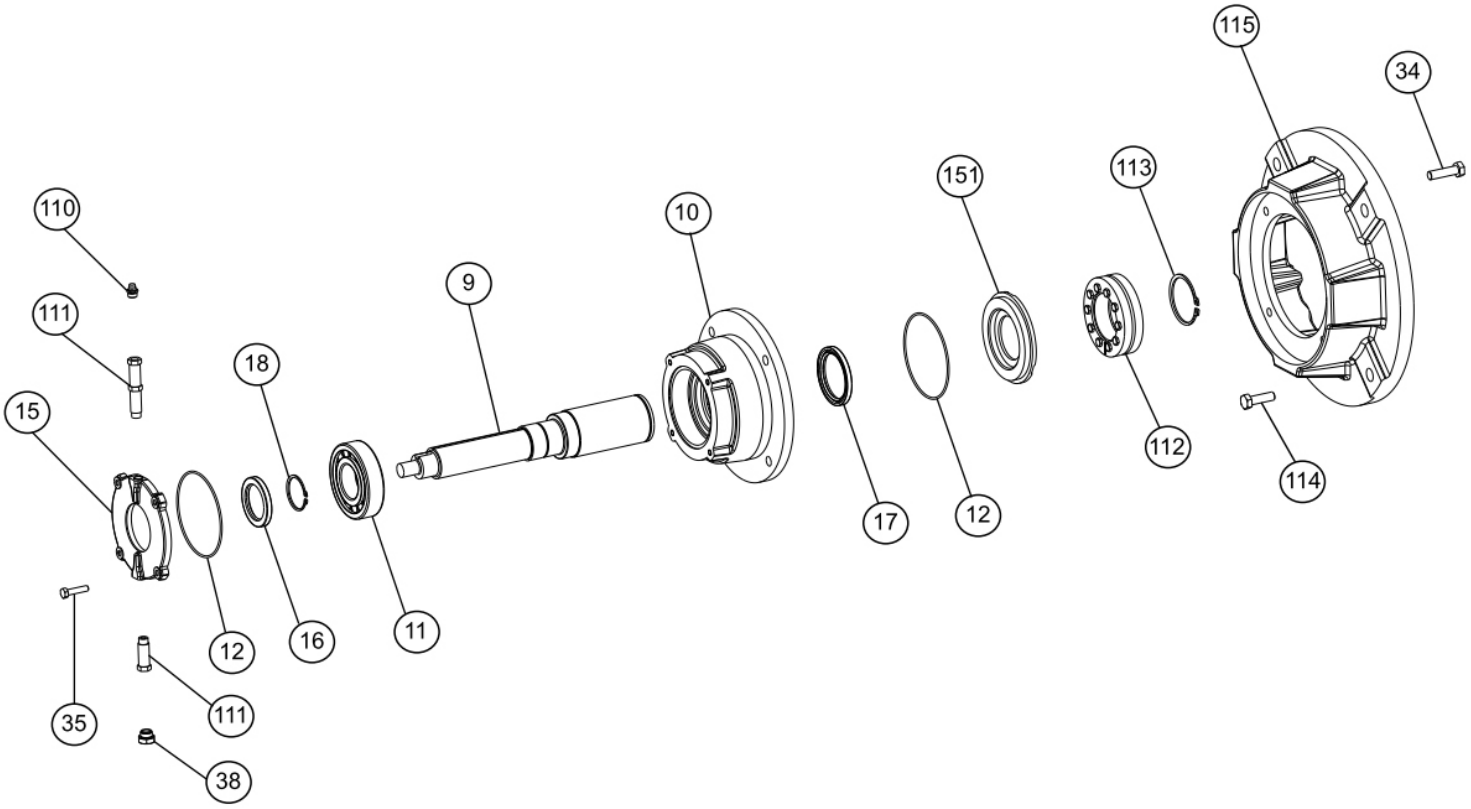
LEGEND EXTERNAL DOUBLE MECHANICAL SEAL MTR..

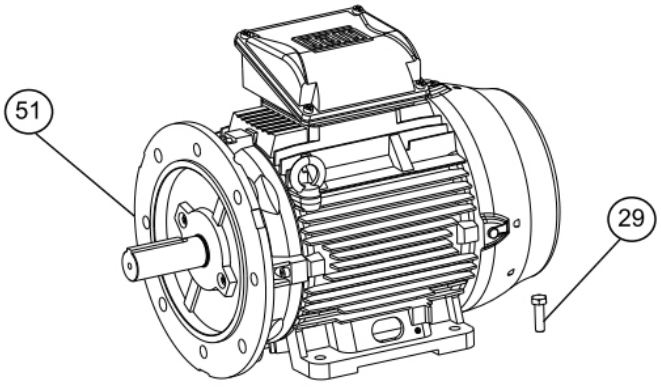
Pos.	Rif.	Part name	Q.ty	Disassembling steps sequence (A1,...,A10,B1,...,B10,C1....)										Spare parts stock		
				1	2	3	4	5	6	7	8	9	10	start up	2 years	5 years
56	524.3	Shaft Sleeve (MTR)	1					C						1	1	1
90	475.2	Fixed Seal (Inboard)	1									C				
91	472.2	Rotating Seal (Inboard)	1						C					1	1	1
93	412.7	O-Ring Fixed Seal / Diaphragm	1									C		1	1	1
94	412.8	O-Ring Fixed Seal	1									C				
100	910.	FASTENERS Flushing Chamber	4		C											
101	412.	O-Ring Flushing Chamber	1							C				1	1	1
102	472.3	Rotating Seal (Outboard)	1						C					1	1	1
103	475.3	Fixed seal (Outboard)	1					C								
104	412.	O-Ring Fixed Seal	1					C								
105	471	Flushing Chamber	1						C							
106	718	Flushing Piping	2	C												
122		FIXED SEAL COMPLETE (Inboard)												1	1	1
124	605.3	Diaphragm (MTR)	1								C					1
131		O-Ring Flushing Chamber / Flange	1					C						1	1	1
132		Flange Flushing Chamber	1				C									
133		Counter Plate Flushing Chamber	1			C										
135		FIXED SEAL COMPLETE (Outboard)												1	1	1

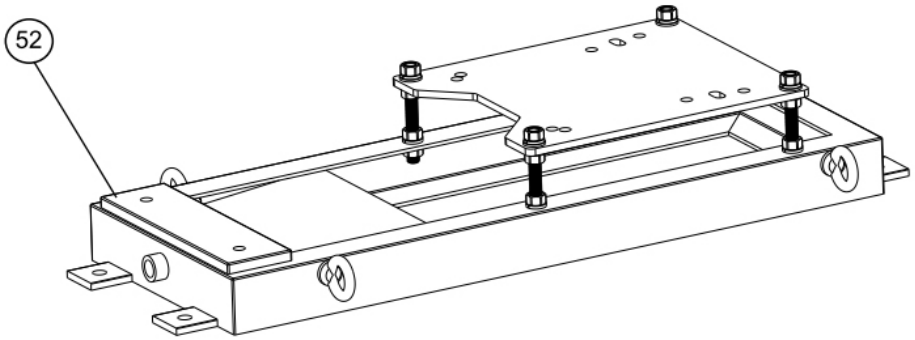
EXPLODED VIEW - Size G2



EXPLODED VIEW - Size G2



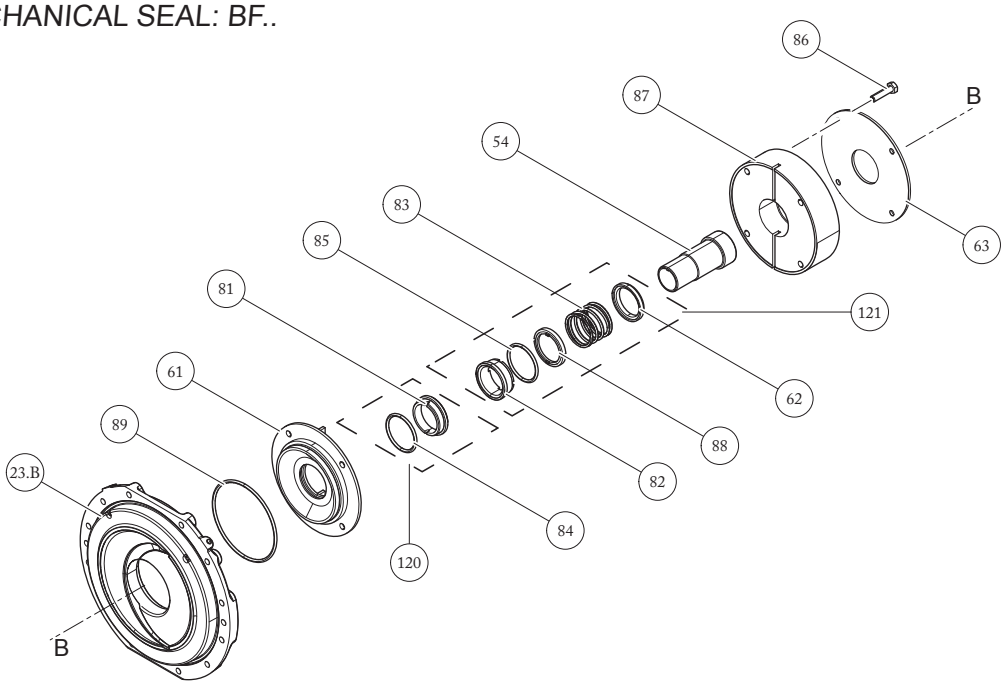




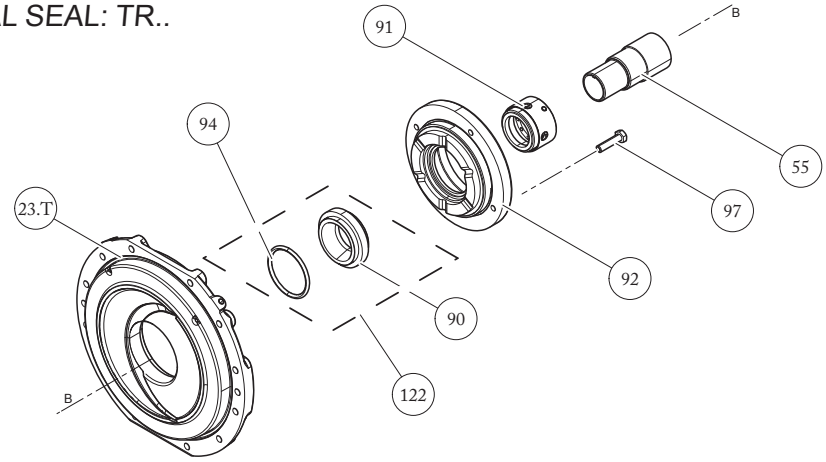
LEGEND EXPLODED VIEW - Size G2

Pos.	Rif.	Part name	Q.ty	Disassembling steps sequence (A1,...,A10,B1,...,B10,C1....)										Spare parts stock		
				1	2	3	4	5	6	7	8	9	10	start up	2 years	5 years
5	940.1	Feather Key (impeller)	1									C				
9	210	Shaft	1								C					
10	360.1	Bearing Housing	1													
11	320.2	Bearing (inboard)	1							B					1	1
12	412.15	O-Ring	2					B								
15	360.2	Bearing Cover (inboard)	1				B									
16	421.1	Elastic Seal Ring (inboard)	1							B					1	1
17	421.2	Elastic Seal Ring (outboard)	1							B					1	1
18	932.1	Snap Ring	1							B						
20	331	Bracket	1						B							
22	155	Rear Flange	1							A						
23	134	Cover	1					A								
24	102	Volute Casing	1		A											
26	230	Impeller	1				A								1	1
28	910.1	FASTENERS Volute Casing / Baseplate	2	A												
29	910.2	FASTENERS Motor / Baseplate	4	B												
33	910.9	FASTENERS Rear Flange / Bracket	8						B							
34	910.10	FASTENERS Motor Flange / Bearing Housing	4			B										
35	910.7	FASTENERS Bearing Cover / Bearing Housing				B										
37	918	Eyebolt	1													
38	638.2	Grease Drain Plug	1													1
41	260	Ogive	1			A									1	1
42	920	Nut (Impeller)	1			A										
43	925	Washer	1			A										
44	910.5	FASTENERS Volute Casing / Cover			A											
51	800	Motor	1													
52	891	Baseplate	1													
65	412.1	O-ring Volute Casing / Cover	1		A									1	1	1
66	412.2	O-ring Impeller (inboard)	1			A								1	1	1
68	412.3	O-ring Impeller (outboard)	1				A							1	1	1
72	638.3	Drain Plug	1	A												1
73	412.4	O-ring Drain Plug	1		A										1	1
110	636	Grease Fill Plug	1	A												1
111	630	Grease Pipe	2													1
112	887	Self Centering Locking Device	1	C												1
113	932.1	Snap Ring	1		C											
115	807	Motor Flange	1	B												
146		FASTENERS Drain Plug	4													
149		Drain Plug Flange	1													
151		Bearing Cover	1		B											

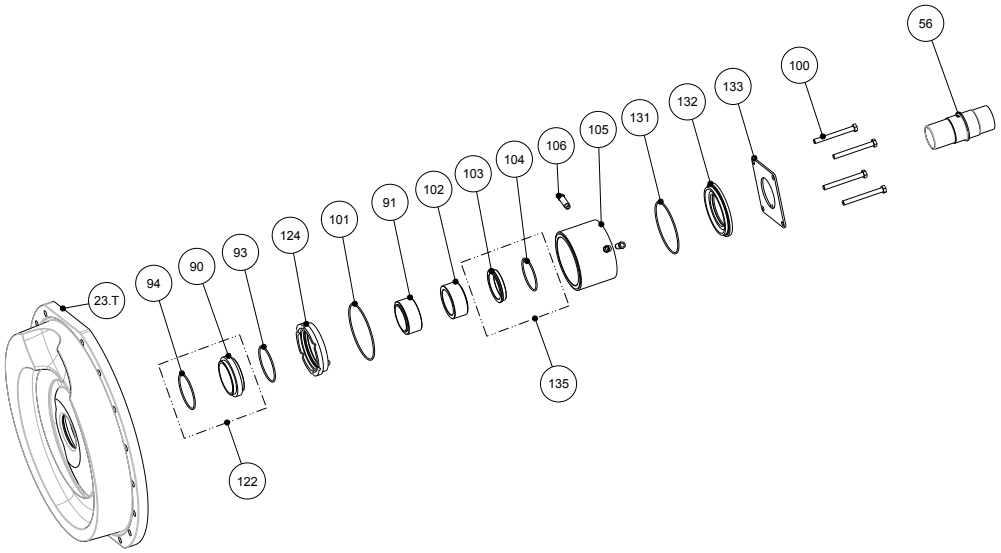
INTERNAL MECHANICAL SEAL: BF..



EXTERNAL MECHANICAL SEAL: TR..



DOUBLE MECHANICAL SEAL: MTR..



LEGEND INTERNAL MECHANICAL SEAL TYPE BF..

Pos.	Rif.	Part name	Q.ty	Disassembling steps sequence (A1,...,A10,B1,...,B10,C1....)										Spare parts stock		
				1	2	3	4	5	6	7	8	9	10	start up	2 anni	5 anni
23.B	134.1	Cover	1													
54	524.1	Shaft Sleeve (BF)	1											1	1	1
61	135.1	Diaphragm	1							C						1
62	488,0	Lock Ring	1				C									
63	360	Locking Counter-Plate	1		C											1
81	472.1	Rotating Seal	1													
82	475.1	Fixed Seal	1					C								
83	477	Spring	1				C									
84	412.6	O-ring Rotating Seal	1													
85	412.7	O-ring Fixed Seal	1						C							
86	910.16	FASTENERS Counter-Plate / Spring Spacer	4	C												
87	478	Spring Spacer	1			C										
88	476	Stationary Seal Locking Ring	1					C								
89	412.8	O-ring Diaphragm / Cover	1								C			1	1	1
120		ROTATING SEAL COMPLETE												1	1	1
121		FIXED SEAL COMPLETE												1	1	1

LEGEND EXTERNAL MECHANICAL SEAL TYPE TR..

Pos.	Rif.	Part name	Q.ty	Disassembling steps sequence (A1,...,A10,B1,...,B10,C1....)										Spare parts stock		
				1	2	3	4	5	6	7	8	9	10	start up	2 anni	5 anni
23.T	134.2	Cover	1													
55	524.2	Shaft Sleeve (TR)	1											1	1	1
90	475.2	Fixed Seal	1			C										
91	472.2	Rotating Seal	1	C										1	1	1
92	135.2	Diaphragm (TR)	1		C											1
94	412.8	O-ring Fixed Seal	1				C									
97	910.17	FASTENERS Diaphragm	4	C												
122		FIXED SEAL COMPLETE												1	1	1

LEGEND DOUBLE MECHANICAL SEAL MTR..

Pos.	Rif.	Part name	Q.ty	Disassembling steps sequence (A1,...,A10,B1,...,B10,C1....)										Spare parts stock		
				1	2	3	4	5	6	7	8	9	10	start up	2 anni	5 anni
23.T	134.2	Cover	1													
56	524.3	Shaft Sleeve (MTR)	1					C						1	1	1
90	475.2	Fixed seal (pump side)	1									C				
91	472.2	Rotating seal (pump side)	1						C					1	1	1
93	412.7	O-ring fixed seal / diaphragm	1									C				
94	412.8	O-ring fixed seal	1									C				
100	910.19	FASTENERS flushing chamber	4		C											
101	412.9	O-ring flushing chamber	1							C				1	1	1
102	472.3	Rotating seal (motor side)	1						C					1	1	1
103	475.3	Fixed seal (motor side)	1					C								
104	412.10	O-ring fixed seal	1					C								
105	471	Flushing chamber	1						C							1
106	910.18	Flushing piping	2	C												1
122		FIXED SEAL COMPLETE (pump side)												1	1	1
124	605.3	Diaphragm (MTR)	1								C					1
131		O-ring flushing chamber / flange	1					C								
132		Flange flushing chamber	1				C									
133		Counter plate flushing chamber	1			C										
135		FIXED SEAL COMPLETE (motor side)												1	1	1

GENERAL NOTES

ZMS pumps are designed and built for the transfer of liquid chemical products having a specific weight, viscosity, temperature and stability of state appropriate for use with centrifugal pumps in a fixed installation, from a tank at a lower level to a tank or a pipe to a higher level. The characteristics of the liquid (pressure, temperature, chemical reactivity, specific weight, viscosity, vapour tension) and the enviromental conditions must be compatible with the characteristics of the pump and are defined upon ordering. Impeller and static casings, in contact with the liquid, are constructed from thermosetting resins; other parts in high chemical-resistant materials.

The pump's performance (capacity, head, rpm) is defined upon ordering and specified on the identification plate.

The ZMS series pumps are dimensionally constructed in accordance with **ANSI/ASME B73.1** (only for the hydraulic parts).

ZMS pumps are not self priming.

ZMS pumps cannot run dry.

The type of the solid particles contained in the pumped liquid depend on the mechanical seal; the presence of fibrous, adhesive or abrasive bodies is not allowed.

Clockwise rotation seen from the motor side.

Make sure that the chemical and physical characteristics of the liquid have been carefully evaluated for pump suitability.

The specific weight which can be pumped at a temperature of 25°C (both of the liquid and the ambient) depends upon the diameter of the impeller (shown on the identification plate) and the installed motor power (shown on the motor plate) and has to be defined upon ordering.

The level of kinematic viscosity must not exceed **40 cSt** so as not to significantly modify the pump's performance. Higher values up to a maximum of 250 cSt are possible provided that the pump is equipped with suitable impeller and motor to be defined upon ordering.

The maximum continuous **working temperature referred to water** depends on the choice of materials (specified on the identification plate):

80 °C	execution V1G
80 °C	execution V1A
80 °C	execution V1C
80 °C	execution V1F

variations may occur, depending on operating pressure and mechanical seal installed.

The ambient temperature interval is related to the choice of materials (specified on the identification plate).

The maximum pressure the pump may be subjected to is **1.5 times** the head value developed with the outlet closed.

The vapour pressure value of the liquid to be pumped must exceed (by at least 1m w.c) to the difference between the absolute total head (suction side pressure added to the positive suction head, or subtracted by the suction lift) and the pressure drops in the suction side piping (including the inlet NPSHr drops shown on the specific tables).

In case of **double mechanical seal**, the flushing liquid must be **clean** and must not lead to violent chemical reactions on contact with the liquid being pumped. On the below table are reported the vaules of the capacity of flushing liquid and the rispective pressure.

Capacity [L/min]	Pressure [bar]
1-3	> 0.5 delivery pressure (measured)

The pump shaft is supported by rolling bearings packed with grease (to be periodically recharged).

The pump does not include any non return valve nor any liquid flow control or motor stop device.

OPERATING PRINCIPLE

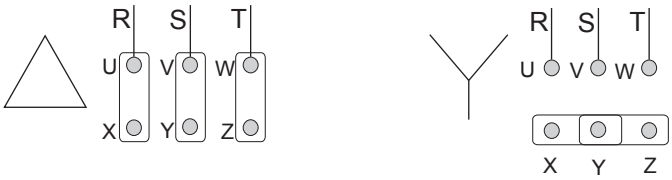
HYDRAULICALLY alike to all centrifugal pumps, it is equipped with a blade-type impeller rotating within a fixed housing. It has a radial outlet (facing the upper part of the pump, with an internal deflector) and, by creating a depression in the center, it allows the liquid to flow from the central suction side. Then, flowing through the impeller's blades the fluid acquires energy and is conveyed towards the outlet.

MECHANICALLY, static stress caused by the pipes is absorbed by the flanges on the body pump; the impeller is driven directly by the shaft; all the dinamic mechanical loads are borne by the bearing (oblique) of the support. The axiality of the pump-motor assembly is guaranteed by the self-centering coupling system jointing the pump shaft and the motor shaft.

THE MECHANICAL SEAL, placed at the point where the shaft enters the pump body to drive the impeller, is made up of two main section: a fixed section inserted in the pump body and a rotating section integral with the shaft. The tight contact between these two parts guarantees a seal against leakage whether the pump is rotating or not. The rubbing action that occurs between these two parts when the pump is operating generates heat by friction; this heat is absorbed by the liquid being pumped in the case of single mechanical seal and by the cooling liquid (generally water) in the case of double seal. The presence of the thin layer of liquid between the sealing surfaces, as well as its cooling action, is indispensable for the life of the seal. To prevent damage by liquid vapour, the inner component near the mechanical seal are made in stainless steel.

MOTOR

ELECTRICAL CONNECTIONS
The electrical connection to the motor terminal determines the direction of rotation of the motor and can be verified by looking at the cooling fan at the rear of the motor (for the Argal pump this has to rotate clockwise looking at the front end).
With single phase motors the direction of rotation may be reversed by changing the position of the connection plates.
With three-phase motors the direction of rotation may be changed by swapping any two of the three conductors independently of the type of connection to the windings:
Star/Delta starting is used when the motor power is above 7.5 kW (10 HP) only in case of frequent starts and short running times, but always when the motor power is above 15 kW (20 HP). All this is also to safeguard the structure of the pump.



PROTECTION LEVEL
The initials IP are followed by two numbers :
The first number indicates the level of protection against penetration of solid objects, The second number indicates the protection against the penetration of liquids.
According to the IP protection indicated on the identification plate of the motor and to the environmental conditions, arrange for opportune extra protections allowing in any case correct ventilation and rapid drainage of rainwater.

DIRECTIONS FOR USE

TRANSPORT

- cover the hydraulic connections
- when lifting the unit do not exert force on the plastic fittings
- lay the pump on its base or fixing plate during transport
- if the road is particularly rough, protect the pump by means of adequate shock absorbing supports
- bumps and shocks may damage important working parts vital for safety and functionality of the machine

STORAGE INSTRUCTIONS

- When is necessari to store the pump bifore installation don't remove it from the original packaged. The packaged pump must be stored lifted from ground level, the ambient must be close, clean and dry.
- If at the receipt of the pump package seems damaged is necessary to free the pump in order to check its integry and to store a new package
- The place where the pump is stored must be closed with an ambient temperature not lower than –5°C and not higher than 40°C, the air humidity rate not higher than 80%, the package pump mustn't received shock, vibrations and loads rising above.
- If the storing period is higher than 6 months, before installation check the condition of the grease in the support, eventually provide to restore it.

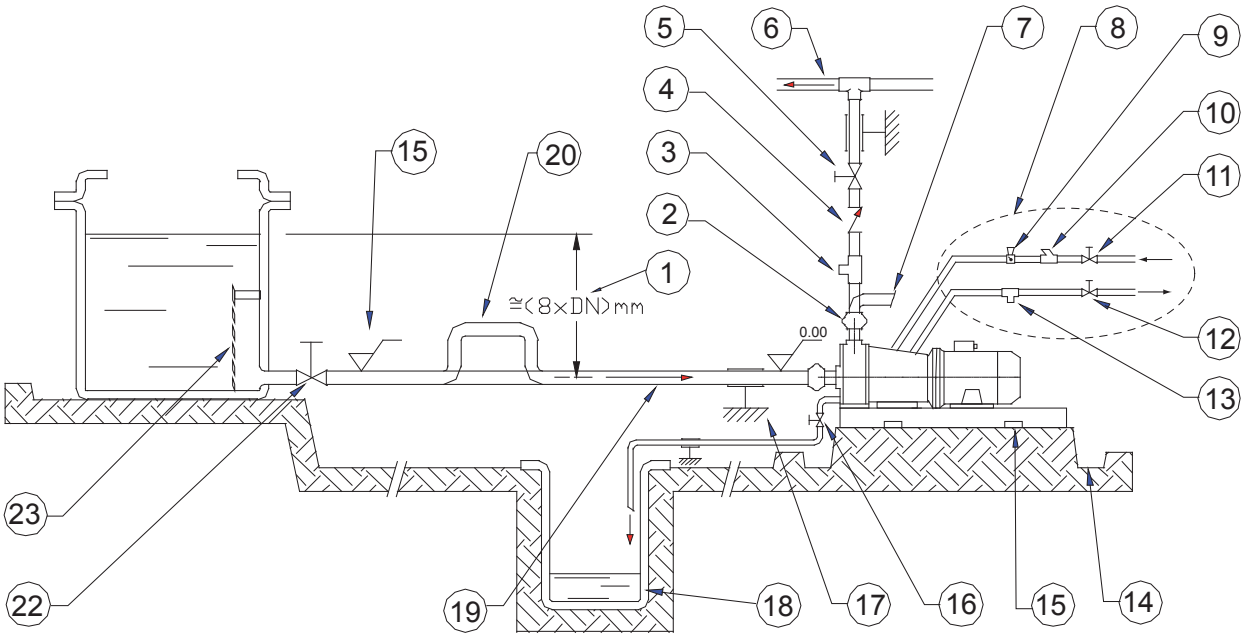
INSTALLATION INSTRUCTIONS

- clean the plant before connecting the pump
- make sure that no foreign bodies are left in the pump. Remove safety caps on the hydraulic connections.

follow the instructions indicated in the following diagram:
1) Suction head adapts to delivery rate in order to prevent winage
2) YES: expansion joint (indispensable with long piping or hot liquids) and/or vibration damping system at inlet and outlet; anchor system near the pump
03) YES: connection point for pressure gauge or safety pressure switch
04) YES: non-return valve (particularly with long vertical or horizontal pipe runs; mandatory with pumps in parallel)
05) YES: flow control valve on the discharge side
06) Maximum fluid speed on the discharge side: 3.5 m/sec
07) NO: bends (or other fittings) close to the pump (both at inlet and outlet)
08) Auxiliary piping for double mechanical seal (only for M type seals):
    09) pressure reducer
    10) inlet filter
    11) inlet shut-off valve
    12) delivery hand control valve
    13) pressure gauge for checking seal chamber pressure
14) YES: drain channel around the base plate
15) The pump must be installed using all of the fixing holes provided; the fixing points must be kept at the same level
16) YES: pipe drain (perfectly airtight); drain valve must be closed when the system is working
17) YES: firmly fix all piping by suitable brackets, close to the pump
18) YES: drain collecting sump (leak proof)
19) Maximum fluid speed on suction side: 2.5 m/sec
20) NO: air pockets. The circuit must be linear and short
21) Incline the piping towards the pump
22) YES: shut off gate valve (one is also fitted near the pump in case of long piping)
23) YES: filtering sector (5÷10 mm mesh screen)

- anchor the pump to an adequate base plate having a mass at least 5 times that of the pump
- do not use anti-vibration mounts to fix the pump
- anti-vibration joints are recommended on the pipe connections
- manually verify that all rotating parts are free to turn without abnormal friction by turning the motor cooling fan
- make sure that the power supply is compatible with the data shown on the pump motor identification plate
- connect the motor to the power supply via a magnetic/thermal control switch
- ensure that star-delta starting is implemented for motors whose power is more than 15kW

- install emergency stop devices to switch off the pump in case of low liquid level (floating, magnetic, electronic, pressuresensitive)
- ambient temperature as a function of the physical-chemical characteristics of the liquid to be pumped and in any case not greater or lower than the interval indicated in the GENERAL HINTS
- other environmental conditions in accordance with the IP protection of the motor
- install a drainage pit to collect any liquid overflow from the base drainage channel due to normal maintenance work
- leave enough free space around the pump for a person to move
- leave free space above the pump for lifting operations
- highlight the presence of aggressive liquids with coloured tags following the local safety regulations
- do not install the pump (made in thermosetting material) in close proximity to heating apparatus
- do not install the pump in areas subject to solid or liquid matter falling
- do not install the pump in an explosive atmosphere unless the motor and its coupling have been adequately prearranged
- do not install the pump in close proximity to workplaces or crowded areas
- install extra protection guards for the pump or persons as the need arises
- install a spare equivalent pump in parallel



PRESSURE SWITCH TO PREVENT DRY RUNNING

The principal cause of pump malfunctions is dry-running (being it caused by improper use or cavitation). It is therefore advisable to install a simple device that will stop the pump motor when the pressure falls below a preset level. This is justified by the fact that such a condition is normally caused to an inadequate flooding of the impeller due to various causes: absence of liquid, suction valves closed at start-up, cavitation, clogged channels, dirty filters, etc.....
The pressure switch (pressure gauge with electrical contacts) must be fitted on the discharge side of the pump. This device needs furthermore:

1)) A fluid separator to transmit pressure to the instrument via a secondary fluid separated from the main one by a chemically resistant diaphragm.

2) Remote-control switch to energize the motor (controlled by a pushbutton or auxiliary relay) having the normally closed contact of the pressure switch in series with the latch circuit of said remote-control switch.

In order to obviate any pulsations of the pressure switch, it is necessary to set its setpoint to a pressure value equal to 65% of the working pressure. It is obvious that this device cannot be used to control working pressure.
On start-up the pressure switch contact must be by-passed for a sufficient time to allow pressure to build up in the system. In case of automatic start-up it is necessary to short circuit the latch with a timer for the pressure build-up time.
The system is not suitable for full capacity applications in which case it is advisable to install some control devices for the motor power absorbtion.
All of the above must be adapted to the local safety rules and in particular when the classification of the environment requires explosion-proof equipment.

START-UP

- verify that the instructions outlined in the INSTALLATION have been followed
- verify the correct direction of rotation (clockwise from the motor side) supplying the motor with short impulses
- ensure that the NPSH available is greater than that required by the pump (in particular for hot liquids, liquids with high vapour pressure, very long suction pipes or negative suction lift)
- close the discharge valve; completely cover the suction pipe and the pump.
- close the outlet valve. Start up the motor two or three times with short supplies of current in order to expel the air from the pump and the lubrication circuit between the guide shaft and bush.
- start the pump with the suction valve completely open and the outlet valve semi-closed.
- slowly adjust the flow by adjusting the outlet valve (never adjust the suction valve) and making sure that the motor absorption is does not exceed the nominal power rating shown on the plate
- do not operate at the extremes of the operating curve: maximum head (discharge valve shut too tight) or maximum flow (total absence of loss and lift in discharge circuit).
- set the operating point for which the pump has been requested
- check that there are no unusual vibrations or noises due to inadequate fixing or cavitation
- avoid excessively short and/or frequent start-ups by adjusting the consent appliances

Motor power	kW	0,75÷5,5	7,5÷30	37÷110	132÷200	250÷315
Max. no. starts/hour	2-4 poles	20-40	10-20	6-12	2-4	1-2

- check that temperature, pressure and characteristics of liquid match order specifications
- The pump's shipped with grease inside (filled). **READY TO START!**

USE

- switch automatic control on
- do not activate valves whilst the pump is in operation
- risks of dangerous water hammer effects in case of sudden or improper valve actuation (only trained personnel should operate valves)
- completely empty and wash the pump before using a different liquid
- isolate or empty the pump if the crystallization temperature of the liquid is the same or lower than the ambient temperature
- stop the pump if the liquid temperature exceeds the maximum allowed temperature indicated in the general notes; if the increase is of approximately 20%, check internal parts
- close the valves in case of leaks
- wash with water only if compatible from the chemical point of view. As alternative use an appropriate solvent that will not generate dangerous exothermal reactions
- contact the liquid supplier for information on the appropriate fire precautions
- empty the pump in case of long periods of inactivity (in particular with liquids which would easily crystallize)

SHUTDOWN

- disconnect the motor
- before starting maintenance, turn off the suction and discharge valves

MAINTENANCE

- all these maintenance operations must be performed under the supervision of qualified personnel
- make periodic inspections (2 to 30 days depending on the type of liquid and the operating conditions) clening filtering sections
- make periodic inspections (1 to 6 months depending on the type of liquid and the operating conditions) on the rotating parts of the pump (pump rotor); clean or replace or lubricate as necessary (see RECOMMENDATIONS)
- make periodic inspections (3 to 5 months depending on the type of liquid and the operating conditions) on the functionality of the motor control system; efficiency must be guaranteed
- excessive current consumption could be an indication of impeller problems
- unusual vibrations could be due to unbalanced impeller (due to damage or presence of foreign material obstructing its blades)
- reduced pump performance could be due to an obstruction of the impeller or damages to the motor
- motor damages could be due to abnormal friction within the pump
- damaged parts must be replaced with new original parts
- the replacement of damaged parts must be carried out in a clean dry area

INSPECTION

Check:
- the pump shaft for cracks and excessive wear
- excessive wear of seal rings
- counterthrust bushing for cracks or excessive wear
- the impeller, volute and intermediate disk for abrasion and corrosion
- that the pressure balancig holes on the impeller blades are not blocked
- for lumps and clusters created by the pumped liquid (especially at the bottom of the rear chamber)
- for infiltration of liquid outside the seal in the support for adequate grease on the rolling bearing.

Replace broken, cracked or deformed parts.
Reopen all the blocked pipes and eliminate any chemical agglomeration.
Clean all surfaces before reassembly; in particular seal rings (risk of leakage or premature wear) and O-ring seats (risk of leakage).
The lubrication of the bearings is made with grease: **SKF LGMT 2/5 - LITHIUM SOAP/MINERAL OIL**.
Add grease approximately **every 100 hours of working** and **replace all grease every 2000 hours of working.**
The grease feed rate is 6.25 g/day.
The support temperature (max) is 70°C.

Argal's factory vibration test complies to **ISO 10816-7** regulation, category I and applies to new pumps, preferred vibration band Zone A. Pumps comply if vibration are up to or less than **2.5 mm/s**. This limit does not apply for measures made on site for vibrations are influenced by peculiar plant conditions (namely cavitation, vortexes, hydraulic load losses localized in close proximity of the pump).

For on site vibration test we suggest compliance to **ISO 10816-7** regulation, category I applied to long life pumps, admissible vibration band Zone B which prescribes admissible vibration limit of **4,0 mm/s**.

SAFETY RISKS

WARNING! CHEMICAL HAZARD. The pumps are designed to pump different types of liquid and chemical. Follow the specific instructions to decontaminate during inspection or maintenance. §

WARNING! Safety risks for personnel mainly arise from improper use or accidental damages.
These risks may be of an electrical nature as far as the non-synchronous motor is concerned and may cause injury to hands if working on an open pump. Risks may also arise due to the nature of the liquids pumped. It is therefore of utmost importance to closely follow all the instructions contained in this manual so as to eliminate the causes that may lead to pump failure and the consequent leakage of liquid dangerous for both personnel and the environment.
Risks may also arise from improper maintenance or dismantling practices.
In any case five general rules are important:
A - all services must be carried out by specialised personnel or supervised by qualified personnel depending on the type of maintenance required
B - install protection guards against eventual liquid sprays (when the pump is not installed in remote areas) due to an accidental pipe rupture. Arrange for safety basins to collect possible leakage
C - when working on the pump always wear acid-proof protective clothing
D - arrange for proper conditions for suction and discharge valve closing during disassembly
E - make sure that the motor is completely disconnected during disassembly.

Proper design and building of the plants, with well positioned and well marked piping fitted with shut-off valves, adequate passages and work areas for maintenance and inspections are extremely important (since the pressure developed by the pump could give some kind of damage to the plant in case this one should be faulty made or wear and tear-damaged).

It must be stressed that the major cause of pump failures leading to a consequent need to intervene is due to the pump running dry in manually operated plants. This is generally due to:
- the suction valve being open at start-up or
- the suction tank being emptied without stopping

INSTALLATION AND START-UP PERSONNEL

Interventions allowed only to specialised personnel who may eventually delegate to others some operations depending on specific evaluations (technical capability required: specialisation in industrial plumbing or electric systems as needed).

MAINTENANCE AND OPERATIONAL PERSONNEL

Interventions allowed to general operators (after training on the correct use of the plant):
- pump starting and stopping
- opening and closing of valves with the pump at rest
- emptying and washing of the pump body via special valves and piping
- cleaning of filtering elements

Interventions allowed to qualified personnel (technical capacities required: general knowledge of the mechanical, electrical and chemical features of the plant being fed by the pump and of the pump itself):
- verification of environmental conditions
- verification of the condition of the liquid being pumped
- inspections of the control/stop devices of the pump
- inspections of the rotating parts of the pump
- trouble shooting

PERSONNEL RESPONSIBLE FOR REPAIRS

Interventions allowed to general operators under the supervision of qualified personnel:
- stopping of the pump
- closing of the valve
- emptying of pump body
- disconnection of piping from fittings
- removal of anchoring bolts
- washing with water or suitable solvent as needed
- transport (after removal of electrical connections by qualified personnel)

Interventions by qualified personnel (technical capacities required: general knowledge of machining operations, awareness of possible damage to parts due to abrasion or shocks during handling, know-how of required bolt and screw tightening required on different materials such as plastics and metals, use of precision measuring instruments):
- opening and closing of the pump body
- removal and replacement of rotating parts

WASTE DISPOSAL

Materials: separate plastic from metal parts. Dispose of by authorized companies.

RECOMMENDATIONS

DISASSEMBLING

- all these maintenance operations must be performed under supervision of qualified personnel
- cut off the power supply from the motor and disconnect the electrical wiring; pull the wires out from the terminal box and isolate their extremities accordingly
- close discharge valves
- use gloves, safety glasses and acid-proof overalls when disconnecting and washing the pump
- disconnect the piping and leave enough time for the residual liquid to exit the pump body and atmospheric air to fill the empty volume
- wash the pump before carrying out any maintenance work
- do not scatter the liquid in the environment
- lift the pump vertically avoiding to exert traction on the liner
- before attempting to dismantle the pump ensure that its motor is disconnected and that it may not be started accidentallly
- now open the pump following the sequence indicated in the respective table of the LEGEND and following the suggestions outlined in the RECOMMENDATIONS section

IMPROPER USE

The pump must not be used for purposes other than the transfer of liquids.
The pump cannot be used to generate isostatic or counter pressures.
The pump cannot be used to mix liquids generating an exothermal reaction
The pump must be installed vertically on a firm structure.
The pump must be installed on a suitable hydraulic plant with outlet connection to proper discharge pipe.
The plant must be able to shut off the liquid flow independently from the pump.
Handling of aggressive liquids requires specific technical knowledge

OPERATING FAULTS AND POSSIBLE CAUSES

The pump does not deliver:
1. rotates in wrong direction
2. suction pipe is excessively long and tortuous
3. insufficient geodetic pump head or excessive suction geodetic lift
4. air infiltration into the suction pipe or branches
5. pump or suction pipe not completely covered by liquid
6. impeller channels blocked by impurities
7. check valve on discharge pipe jammed
8. geodetic system height is greater than maximum potential pump head
9. impeller jammed by considerable layer of crystals or by melting of materials for dry rotation.
10. bottom valve blocked by mud or other debris
11. bottom valve insufficiently immersed
12. bottom valve faulty, thereby causing suction valve to empty when pump stops

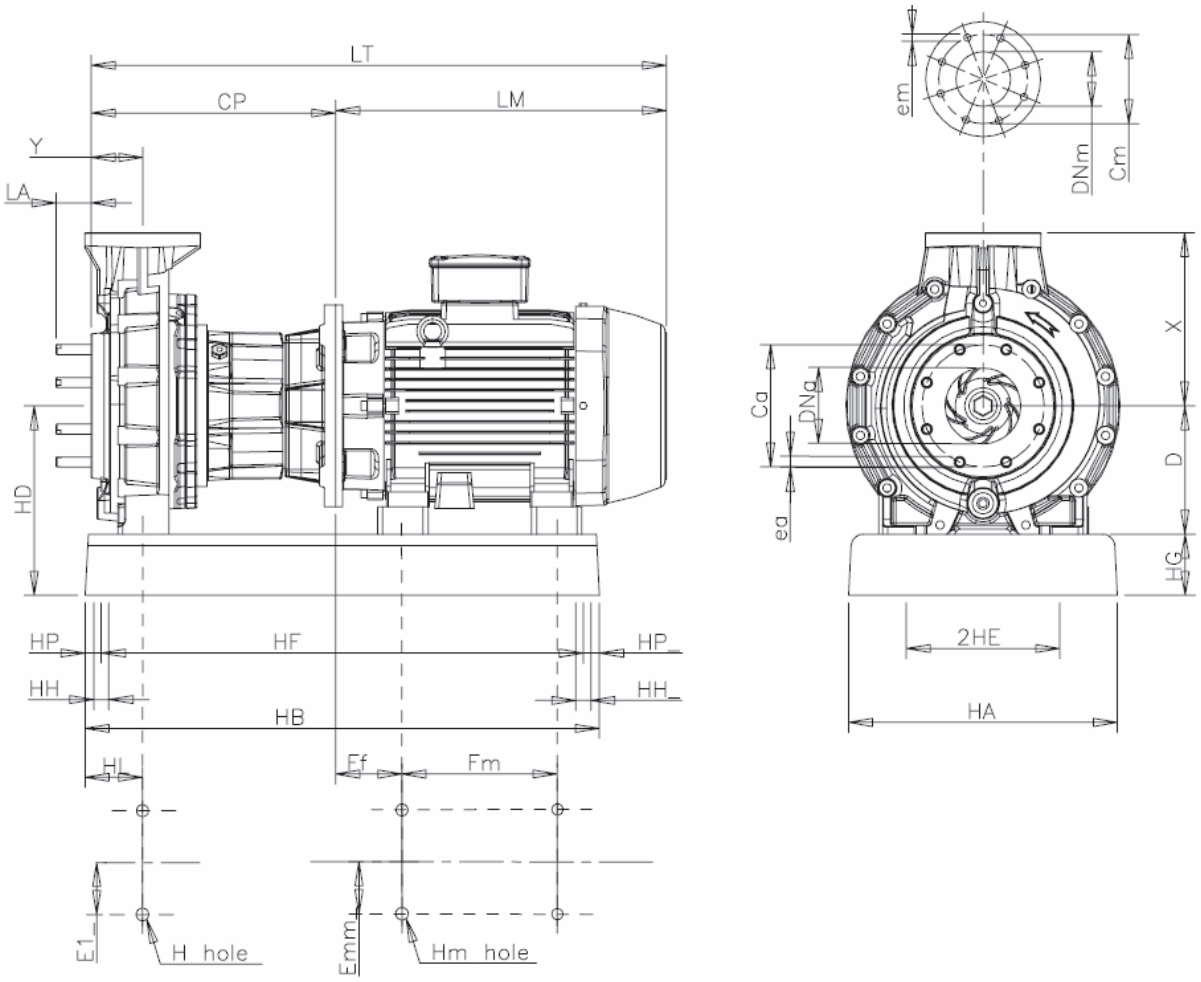
Pump discharge rate or pressure insufficient: see 01, 02, 03, 04, 05, 06, 10, 11, 12
13. system's resisting head is greater than expected
14. suction pipe, closing valve and other items have an insufficient nominal diameter
15. small geometric pump suction head
16. damaged or worn impeller
17. liquid viscosity greater than expected
18. excessive quantities of air or gas in liquid
19. elbow joints, check valves or other items on the outlet port
20. liquid (especially if hot) with tendency to change into gaseous state

Pump absorbs too much power: see 17
21. pump operates at greater capacity than expected
22. specific weight of liquid is greater than expected
23. impurities inside pump create abnormal wear
24. electric motor supply voltage is not rated voltage

Pump vibrates and is noisy: see 23
25. operates at full capacity (no head)
26. pump or pipes inadequately fixed
27. eccentric impeller operation because of worn bushes
28.support bearing without grease

Pump's internal parts wear out too quickly : see 23
29. liquid excessively abrasive
30. recurring cavitation problems (see. 02, 14, 18, 16)
31. high tendency of liquid to crystallise or polymerise when pump is not operating.
32. pump made of materials that are unsuitable for pumped liquid
33. operation with capacity too reduced

TECHNICAL DATA



TAB. 1	PUMP

MODEL	CP	Y	D	X	E1	H	LA	Weight (kg)
1.5 x 1 x 6	445	102	133	165	184	76	n.a.	28
1.5 x 1 x 8	445	102	133	165	184	76	n.a.	29
3 x 1.5 x 6	445	102	133	165	184	76	n.a.	28
3 x 2 x 6	445	102	133	165	184	76	n.a.	26
3 x 1.5 x 8	445	102	133	165	184	76	n.a.	29
3 x 2 x 8	483	102	210	242	124	16	n.a.	95
3 x 2 x 10	483	102	210	242	124	16	n.a.	95
4 x 3 x 8	483	102	210	280	124	16	n.a.	100
4 x 3 x10	483	102	210	280	124	16	n.a.	100
6 x 4 x 10	483	102	254	343	124	16	n.a.	120
6 x 4 x 13	483	102	254	343	124	16	60	120

Dimension in mm

TAB. 2	CONNECTIONS - ANSI/ASME B16.5 class 150

MODEL	INLET					OUTLET				
	DNa	Ca	ea	no.	type	DNm	Cm	em	no.	type
1.5 x 1 x 6	40	38	16	4	hole	25	79	16	4	hole
1.5 x 1 x 8	40	38	16	4	hole	25	79	16	4	hole
3 x 1.5 x 6	80	152	19	4	hole	40	98	16	4	hole
3 x 1.5 x 8	80	152	19	4	hole	40	98	16	4	hole
3 x 2 x 6	80	152	19	4	hole	50	121	19	4	hole
3 x 2 x 8	80	152	19	4	hole	50	121	19	4	hole
3 x 2 x 10	80	152	19	4	hole	50	121	19	4	hole
4 x 3 x 8	100	191	19	8	hole	80	152	19	4	hole
4 x 3 x 10	100	191	19	8	hole	80	152	19	4	hole
6 x 4 x 10	150	241	22	8	hole	100	191	19	8	hole
6 x 4 x 13	150	241	22	8	hole	100	191	19	8	hole

Dimension in mm

TAB. 3 — BASEPLATE

No.	HA	HB	HE	HF	HG	HH	HL	HP	Weight (kg)
133	381	734	114	670	95	19	114	32	25
233	381	838	114	774	95	19	114	32	35
244	381	1143	114	1080	95	19	114	32	40

Dimension in mm

TAB. 4 — MOTOR IP 55

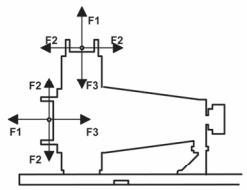
kW	1,5		2,2		3		4		5,5		7,5			11			15			18,5			22			30			37		
Poles	2	4	2	4	2	4	2	4	2	4	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6
Frame	I90S	I90L	I90L	I100L	I100L		I112M		I132S		I132S	I132M	I160M	I160M		I160L	I160M	I160L	I180L	I160L	I180M	I200LA	I180M	I180L	I200L	I200L		I225M	I200L	I225S	I250M
LM (1)	260	285	285		326		335		356		356	395	500	500		545	500	545	610	545	570	650	570	610	650	650		850	650	825	925
Weight kg(1)	12	15	16	22	23	27	27	31	39	41	43	50	103	101	109	121	111	130	173	126	165	221	180	242	236	226	240	301	245	278	370

Dimensioni n mm / (1) It can change in function of brand

TAB. 5 — SUPPORT: bearing and seal

Size	Model	Bearing	Seal Ring Pump Side	Seal Ring Motor Side
G1	1.5 x 1 x 6			
	1.5 x 1 x 8			
	3 x 1.5 x 6			
	3 x 1.5 x 8			
	3 x 2 x 6			
G2	3 x 2 x 8	NUP310ECJ	50x72x8	63x85x10
	3 x 2 x 10			
	4 x 3 x 8			
	4 x 3 x 10			
	6 x 4 x 10			
	6 x 4 x 13			

TAB. 6 — CONNECTION LOADS



F1 (kg):	250
F2 (kg):	250
F3 (kg):	250
Torque (kg*m):	28,5

TAB. 7 — PUMP PERFORMANCE

MODEL	2 poles						4 poles						6 poles					
	Capacity max (m3/h)		Head Max (m)		Noise (dB)		Capacity max (m3/h)		Head Max (m)		Noise (dB)		Capacity max (m3/h)		Head Max (m)		Noise (dB)	
Frequency	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
1.5 x 1 x 6	32	32	36	52	76	77	16	16	9	12	73	74						
1.5 x 1 x 8	32	32	69	102	76	77	20	24	17.5	25	73	74						
3 x 1.5 x 6	80	100	23	34	76	77	60	60	6	9	73	74						
3 x 1.5 x 8	120	120	50	73	76	77	60	80	12	18	73	74						
3 x 2 x 6	70	70	23	33	77	78	40	50	6	9	74	75						
3 x 2 x 8	120	120	50	73	77	79	60	80	13	18	74	75						
3 x 2 x 10	140	140	90	130	78	79	80	80	22	33	74	76						
4 x 3 x 8	160	200	52	76	78	80	100	100	13	19	75	76						
4 x 3 x10	200	240	93	135	78	80	100	120	23	34	75	76						
6 x 4 x 10	400	400	84	122	78	80	300	300	21	31	75	77						
6 x 4 x 13							300	400	37	53	75	76	200	250	17	23	74	75

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EC DECLARATION OF CONFORMITY

(According to Council Directive 2006/42/EC Annex II.a)

The Manufacturer: **ARGAL SRL**

Production head and legal office: **Via Labirinto, 159 - 25125 Brescia – Italy**

- ARGAL produces and sells under its own registered trademark:

- The responsible person for the technical file is: **Mr. Omar Gabrieli - Via Cucca, 147 - 25127 Brescia - Italy.**

- ARGAL declares that its own products being part of the above mentioned categories are comply with the requirements of the *Machinery Directive 2006/42/EC* of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC. Reference to HARMONIZED STANDARDS:

EN ISO 12100:2010
EN 1032:2003 + A1:2008
EN 1127-1:2011
EN 953:1997 + A1:2009
EN 1299:1997 + A1:2008
EN ISO 4871:2009
EN ISO 11688-1:2009
EN 12162:2001 + A1:2009
EN 61310- 1:2008
EN 61310-2:2008
EN ISO 20361:2009 + AC:2010
EN ISO 4414:2010
EN ISO 4413:2010

- ARGAL declares that own products could include Electric Motors in accordance to: *Directive 2014/30/EU* of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility and *Directive 2014/35/EU* of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits. Reference to HARMONIZED STANDARDS:

EN 60204-1:2006+A1:2009+AC:2010
EN 55014-1:2006+A1:2009+A2:2011
EN 55014-2:1997+AC1997+A1:2001+A2:2008
EN 60034-1:2010+AC:2010
EN 60947-1:2007+A1:2011
EN 60730-2-9:2010
EN 60947-8:2003+A1:2006+A2:2012
EN 61000-3-2:2006+A1:2009+A2:2009
EN 61000-3-2:2014
EN 61000-3-12:2011

BS, 12.04.2017

Omar Gabrieli
C.E.O.

Rev. 9 - 17/04

GENERAL CONDITIONS OF SALE

1. ACCEPTING ORDER

The order is deemed to be accepted: a) through our Order Confirmation b) by returning a copy of the Customer's Order signed by us to indicate our acceptance. Any departure from these conditions and any verbal agreement will be deemed to be valid only if they are accepted by us in writing. The purchaser forgoes the right to raise objections based on any type of verbal agreement. Our offers and quotations are not binding and may be modified. Measurements, weights, drawings and reproductions are not essential parts of the order unless this is specifically stated in writing.

2. SUPPLIES AND DELIVERY TIMES

Only the supply and delivery dates set out in our order confirmation are binding. The delivery time that we indicate shall be calculated from the moment in which all the details required for meeting the order have been settled. Unavoidable interruptions to work or other cases of force majeure, including decisions by public authorities, procurement difficulties, lack of raw materials, labour disputes, etc., shall, if prompt notification thereof is given, entitle us to put back delivery dates without this giving entitlement to claim any sort of compensation. Without our explicit consent, orders that have been confirmed in writing may not be cancelled either wholly or in part even if deliveries are late. Any order accepted by our agents or representatives is not binding until it has been formally approved by us. Our agents and representatives are not entitled to collect any sort of payment until they are authorised so do in writing by ourselves. Any other payments are made at the purchaser's risk. If the goods have still not been collected seven days after the agreed delivery date the invoice for the goods will be issued and payment will fall due subject to the agreed conditions.

3. CARRIAGE OF GOODS

If the method of carriage of goods is not specified in the order documents or agreement, we shall dispatch the goods in the manner that we deem to be most appropriate. We also reserve the right to dispatch goods from places other than our premises. For carriage-paid goods the purchaser must take out insurance to cover carriage and the relative amount will be charged in the invoice.

4. COMPLAINTS

Complaints of any type must be made upon receiving the goods and within **one week** of discovering the defect. Complaints about incomplete orders or deterioration during transit must be made to us **immediately** and all the proofs of the irregularity must be collected in order to substantiate any claims against the carrier.

5. LONG TERM STORAGE – HORIZONTAL PUMPS

The following storage procedure is recommended for pumps that will remain idle for extended periods prior to start-up (for accessory equipment such as motors and controls, refer to the appropriate equipment manufacturer for their recommended procedures).

1. Drain pump.
2. Cover suction and discharge flanges with flange protectors and plug all the auxiliary connections to exclude dust or dirt from pump internals.
3. Coat interior and exterior of all metallic items - in contact with the external atmosphere (unpainted) - with a rust preventative.
4. Remove breather and oiler and plug tapped holes in pump power frame.
5. Cover and wrap pump with barrier film sacks (suitable for a long-term preservation of materials that need a constant environment to maintain their properties). Protect with wooden box if storage area could result in damage to pump. Indoor storage is highly recommended.
6. Rotate shaft several times at 4-6 month intervals.

6. LONG TERM STORAGE PACKAGE

Due to their unique corrosion resistant design, **ARGAL Horizontal Pumps** require very little special preparation for long term storage (more than **four** months). Those customers who find it necessary to store horizontal pumps (such as series Saturn pumps) for long periods of time may purchase a special Long Term Storage Package at: a nominal price. This package includes items 1, 2, 3, 4, and 5 as stated above using our standard wooden box. Cut away area on box will be noted for shaft rotation.

THIS LONG TERM STORAGE PACKAGE HAS A COST PER PUMP.

7. WARRANTY

Specifications, dimensions and any other information contained in our catalogues is to the best of our knowledge accurate. However, the above information is merely illustrative and is subject to modification without warning. In all cases we reserve the right to - at any moment - make any changes to our products that we deem to be appropriate and such changes shall not entitle the purchaser to make any claims against us. All drawings remain our exclusive property and may not be passed on to third parties or be reproduced without our written approval.

APPROVAL TESTING: the purchaser is entitled to request that the pumps be tested on our premises. Such testing must be requested in good time before the pumps are due to be dispatched and shall be conducted using the instruments in our possession. The cost of the test shall be agreed with our Sales Department in writing. The purchaser will be given **ten** days' advance notice of the test date. The test will be conducted on this date even if the purchaser (or his official delegate) is absent and they will be informed of the results - If the results are satisfactory, the pump shall be deemed to have been approved.

DURATION OF WARRANTY: Argal manufactures its products from first-class materials, uses qualified personnel and tests the different production stages. Within **twelve** months from the time of installation and no more than **eighteen** months from delivery Argal undertakes to examine any defective parts and to promptly replace any faulty parts free of charge if it is responsible for the fault. Such faults must not be due to wear, inexpert use or carelessness on the purchaser's part, fortuitous events or force majeure.
Even machines that are under warranty must be sent to Argal carriage paid. Once the machines have been repaired they will be returned to the purchaser carriage forward. The replaced parts remain the property of Argal and must be returned to Argal.

The warranty is voided: **1a)** if the machines have not been properly maintained; **1b)** if they have not been used in accordance with the technical standards set out in the manuals supplied with the delivery; **1c)** if the machines are dismantled without our prior authorisation; **1d)** if the machines are 'mistreated'; **1e)** if the machines are used to circulate liquids in applications that are different from those which have been specifically approved beforehand by ARGAL. We shall not be liable for the downtime arising from repairs to or the replacement of any machines of ours that are under warranty.

Argal shall not be responsible for any direct, accidental or indirect damage, injury or loss (including, but not limited to accidental or indirect damage arising from loss of profit or sales, or for any personal injury or damage arising or any other accidental or indirect loss) or for damage and injury caused by use of the machine or inability to use the machine. Before using the machine the user must check the suitability of the machine for its intended purpose and shall use the machine entirely at his own risk and responsibility.

The user notes that the pumps supplied to him by us oblige him, in accordance with Article 2050 of the Italian Civil Cod, to comply with all the legislative and regulatory standards governing dangerous activities such as using, storing and conveying aggressive and polluting chemical products.

The user also undertakes to comply with the prescriptions that apply to the system (such as guards, washers, seals etc.) in which the pumps will be used and to comply with the installation instructions, checks and maintenance prescribed for pumps and installations. The user must also allow us, if necessary, to check the operating efficiency of the systems and to subsequently check that the pump has been correctly installed.

If the user fails to comply with the prescriptions laid down by us or prevents us from carrying out the above inspection, he voids all contractual warranty rights and warranty rights under the terms of Articles 1667 and 1668 of the Civil Code.

NOTE: The purchase of the ***ARGAL Long Term Storage Package*** does not extend the standard pump warranty in any manner, i.e., **twelve** months from start-up not to exceed **eighteen** months from factory shipment. If an extension of our standard warranty is to be considered, the Long Term Storage Package must be furnished and the customer must agree to allow a ARGAL representative to inspect the equipment prior to installation and start-up. The customer shall bear the cost of this visit plus traveling expenses for the representative. As we have no control over the actual storage conditions, any repairs or repair parts required to put the equipment back in an "as new condition" shall be billed to the customer. If an extension of our standard warranty is required and if the customer is agreeable to the above conditions, contact ARGAL Division management, who has the sole authority to extend our standard warranty.

8. TERMS OF PAYMENT AND RETENTION OF TITLE

Only the terms of payment set out in the approved documents are valid. We retain title to the goods sold until the goods have been paid for in full. We have the right to cease or suspend deliveries if the purchaser should fall into arrears with his payments by however small an amount or if the state of his assets and/or financial situation should deteriorate after the agreement has been signed. If the purchaser should fall into arrears with his payments, even for other supplies of goods, and even if he falls into arrears by refusing to pay for goods that he deems to be faulty, we shall be entitled to demand full payment of the outstanding amount owing to us or to make good our retention of title by requiring the immediate return of the goods. Interest will be charged on late payments at two percentage points above the current bank rate, without there being any need to declare the purchaser to be in arrears.

9. DISPUTES

Any disputes arising over the interpretation or performance of the agreement shall be subject to the exclusive jurisdiction of the Court of Brescia, whatever method of payment is chosen.

BS, 11.04.2017

ARGAL S.r.l.

Rev. 01 - 2017

MANUFACTURER DATA

Production head and legal office:

Via Labirinto, 159 I - 25125 BRESCIA
Tel: 030 3507011 Fax: 030 3507077

Export manager: Tel: 030 3507035
Customer service: Tel: 030 3507023
Web: www.argal.it
E-mail: sales@argal.it
customercare@argal.it

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The INSTRUCTION MANUAL must be delivered to the pump-user , who takes diligent note of it, fills in data for Maintenance Department (page 1), keeps the file for subsequent reference.Possible modifications do not imply updating of the existing manuals