

# ARGAL

**USE MANUAL**

## **KGK G3**



DEALER

for Maintenance

date of commissioning:

.....

position / system reference:

.....

service:

.....

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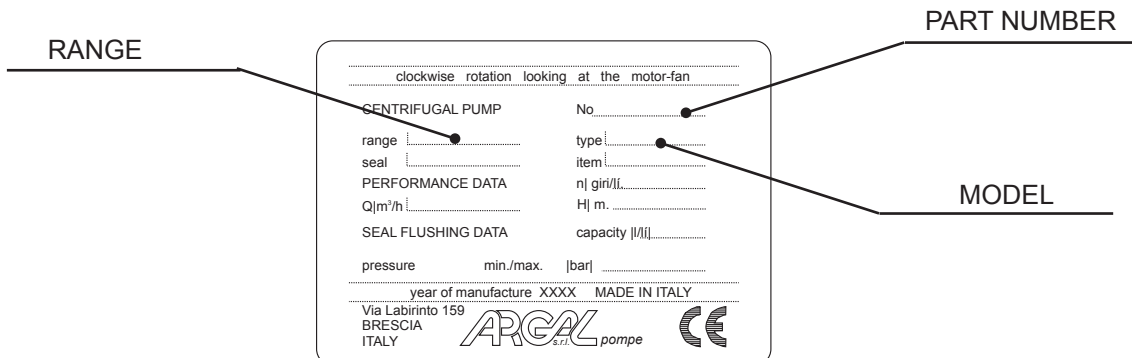
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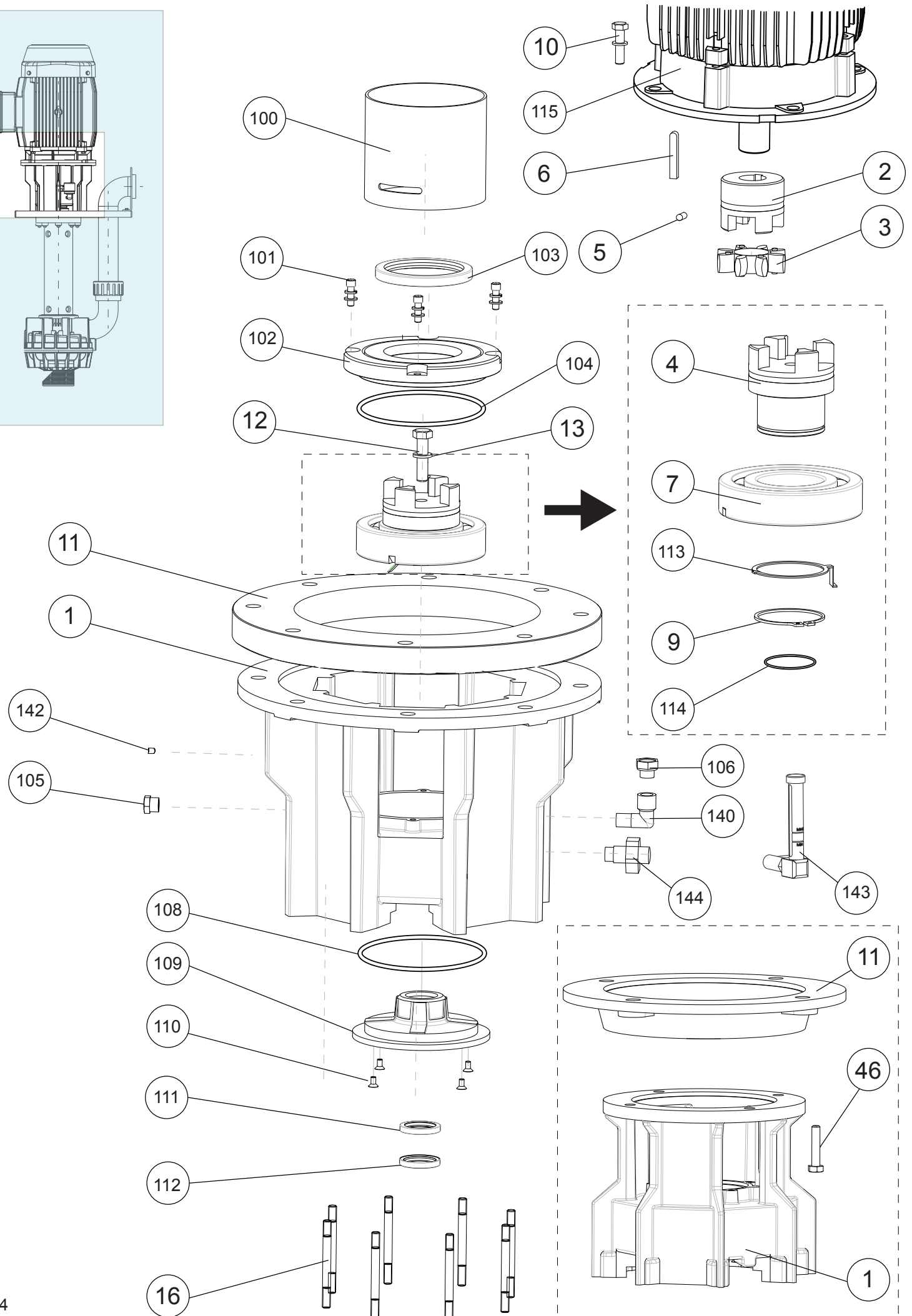
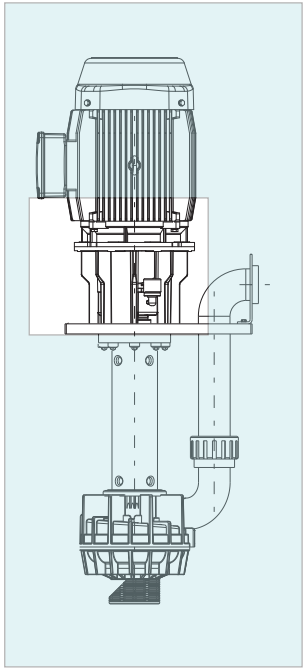
PUMP DATA						MOTOR DATA					
model		version	O-ring material	internal structures	vapour seal	rpm	voltage	phase	power kW	optional	
50 Hz	<input type="checkbox"/> C40/180	<input type="checkbox"/> D50/160	<input type="checkbox"/> <b>WR</b> GFR-PP (Pump Casing/Impeller)	<input type="checkbox"/> <b>V</b> FPM	<input type="checkbox"/> <b>N</b> PTFE/Al <sub>2</sub> O <sub>3</sub>	<input type="checkbox"/> <b>VR</b> V-ring	<input type="checkbox"/> <b>1450</b>	<input type="checkbox"/> <b>0</b> without motor	<input type="checkbox"/> <b>3</b>	<input type="checkbox"/> 0.25	<input type="checkbox"/> filter
	<input type="checkbox"/> C40/200	<input type="checkbox"/> D50/200	<input type="checkbox"/> <b>FC</b> CFF-PVDF (Pump Casing/Impeller)	<input type="checkbox"/> <b>E</b> EPDM	<input type="checkbox"/> <b>X</b> SiC/SiC	<input type="checkbox"/> <b>VL</b> deflettore	<input type="checkbox"/> <b>2900</b>	<input type="checkbox"/> <b>N</b> standard	<input type="checkbox"/> <b>1</b>	<input type="checkbox"/> 0.37	<input type="checkbox"/> extension
	<input type="checkbox"/> C50/160	<input type="checkbox"/> D65/160	<input type="checkbox"/> <b>WF</b> GFR-PP (Pump Casing) CFF-PVDF (Impeller)			<input type="checkbox"/> <b>VM</b> mechanical	<input type="checkbox"/> <b>1750</b>	<input type="checkbox"/> <b>S</b> special version		<input type="checkbox"/> 0.55	<input type="checkbox"/> _____
	<input type="checkbox"/> C50/200	<input type="checkbox"/> D65/200	<input type="checkbox"/> <b>WRG</b> GFR-PP (Pump Casing/Impeller) PP-FRP (Submerged Column)				<input type="checkbox"/> <b>3500</b>	<input type="checkbox"/> <b>E</b> EEx		<input type="checkbox"/> 0.75	<input type="checkbox"/> _____
	<input type="checkbox"/> C65/160	<input type="checkbox"/> D80/160	<input type="checkbox"/> <b>FCG</b> CFF-PVDF (Pump Casing/Impeller) PVDF-FRP (Submerged Column)							<input type="checkbox"/> 1.1	<input type="checkbox"/> _____
	<input type="checkbox"/> C65/200	<input type="checkbox"/> D80/200	<input type="checkbox"/> <b>WFG</b> GFR-PP (Pump Casing) CFF-PVDF (Impeller)							<input type="checkbox"/> 1.5	<input type="checkbox"/> _____
	<input type="checkbox"/> C80/160	<input type="checkbox"/> D100/160								<input type="checkbox"/> 2.2	
	<input type="checkbox"/> C80/200	<input type="checkbox"/> D100/200								<input type="checkbox"/> 3	
	<input type="checkbox"/> C100/160									<input type="checkbox"/> 4	
	<input type="checkbox"/> C100/200									<input type="checkbox"/> 5.5	
60 Hz	<input type="checkbox"/> C40/110	<input type="checkbox"/> D50/170								<input type="checkbox"/> 7.5	
	<input type="checkbox"/> C40/210	<input type="checkbox"/> D50/210								<input type="checkbox"/> 11	
	<input type="checkbox"/> C50/170	<input type="checkbox"/> D65/170								<input type="checkbox"/> 15	
	<input type="checkbox"/> C50/190	<input type="checkbox"/> D65/210								<input type="checkbox"/> 18.5	
	<input type="checkbox"/> C50/210	<input type="checkbox"/> D80/170								<input type="checkbox"/> 22	
	<input type="checkbox"/> C65/170	<input type="checkbox"/> D80/210								<input type="checkbox"/> 30	
	<input type="checkbox"/> C65/190	<input type="checkbox"/> D100/170								<input type="checkbox"/> 37	
	<input type="checkbox"/> C65/210	<input type="checkbox"/> D100/190								<input type="checkbox"/> 45	
	<input type="checkbox"/> C80/150										
	<input type="checkbox"/> C80/170										
	<input type="checkbox"/> C80/210										
	<input type="checkbox"/> C100/170										
	<input type="checkbox"/> C100/210										

under plate length

mm \_\_\_\_\_

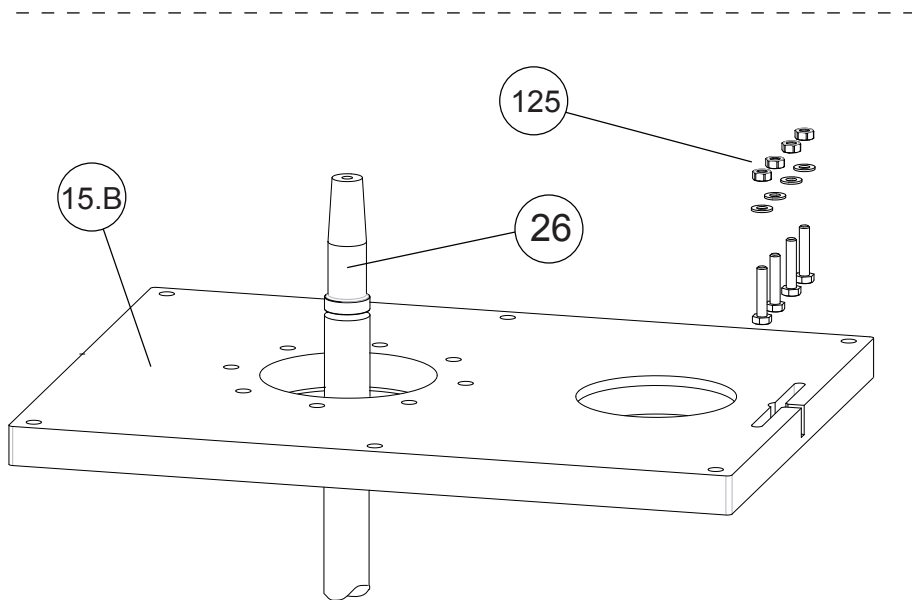
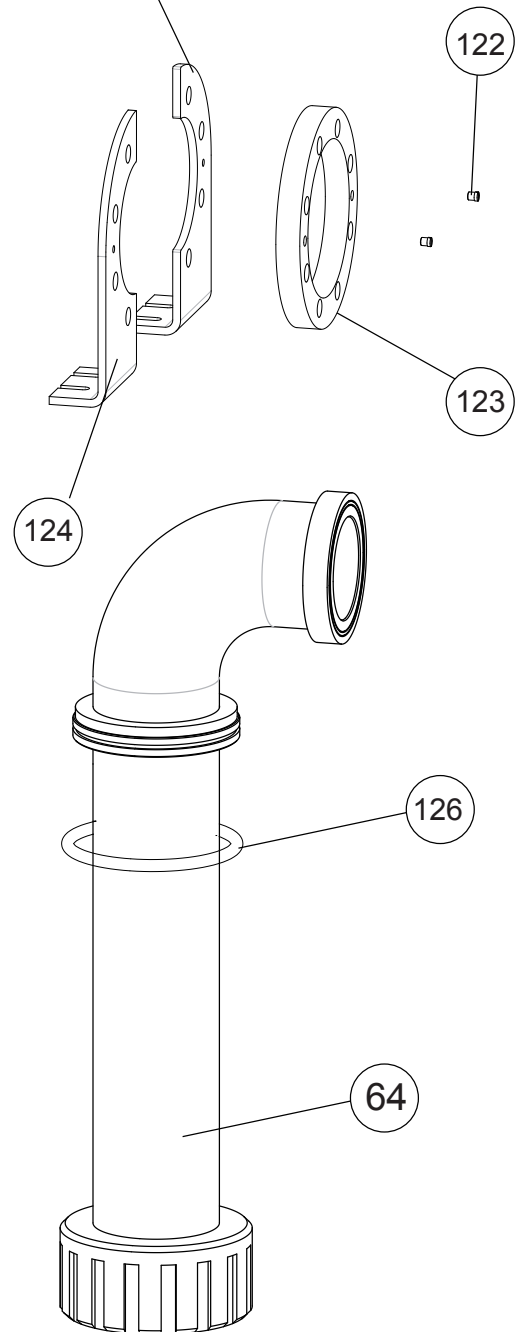
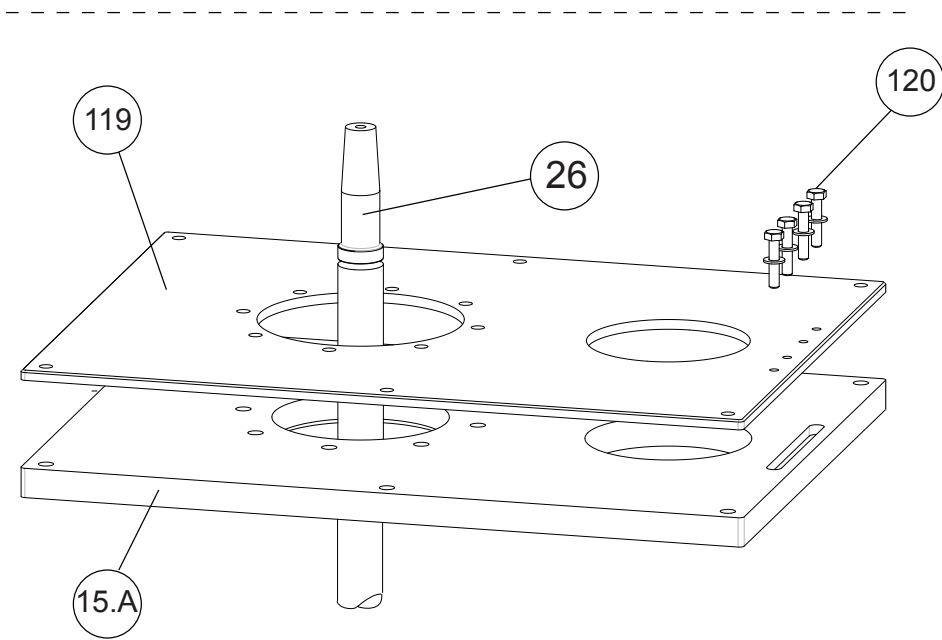
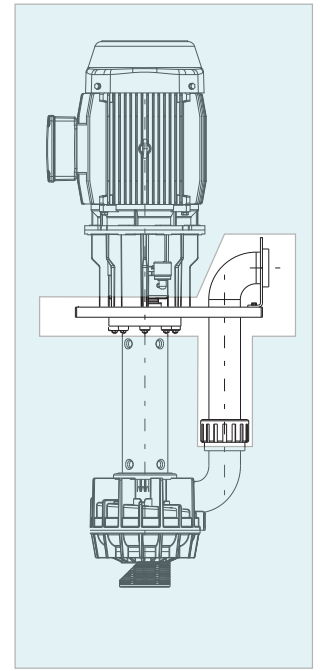
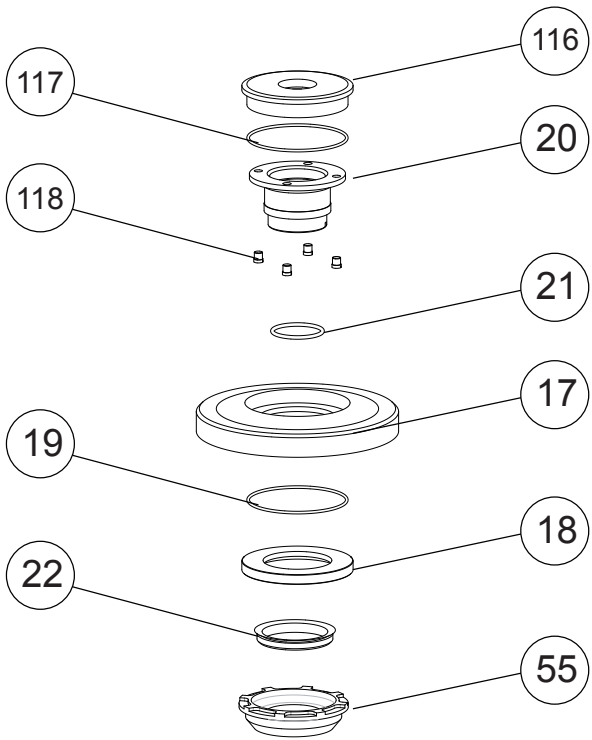
Each pump is supplied with the serial and model abbreviation and the serial number on the rating plate, which is riveted onto the support side. Check these data upon receiving the goods. Any discrepancy between the order and the delivery must be communicated immediately. In order to be able to trace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





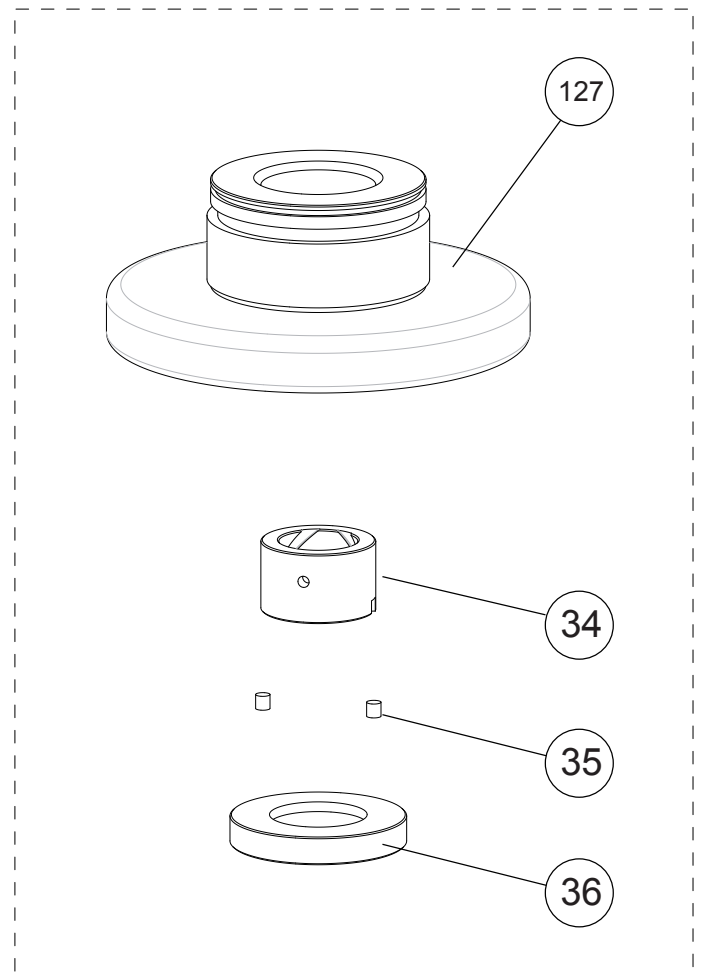
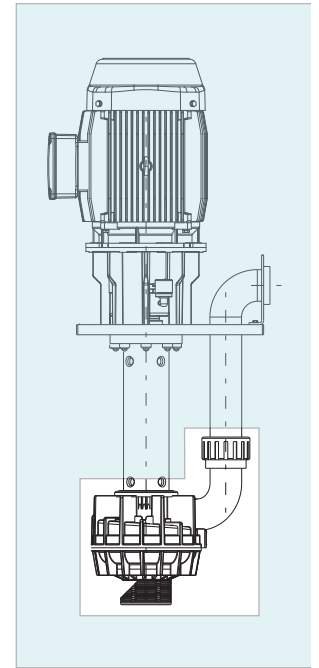
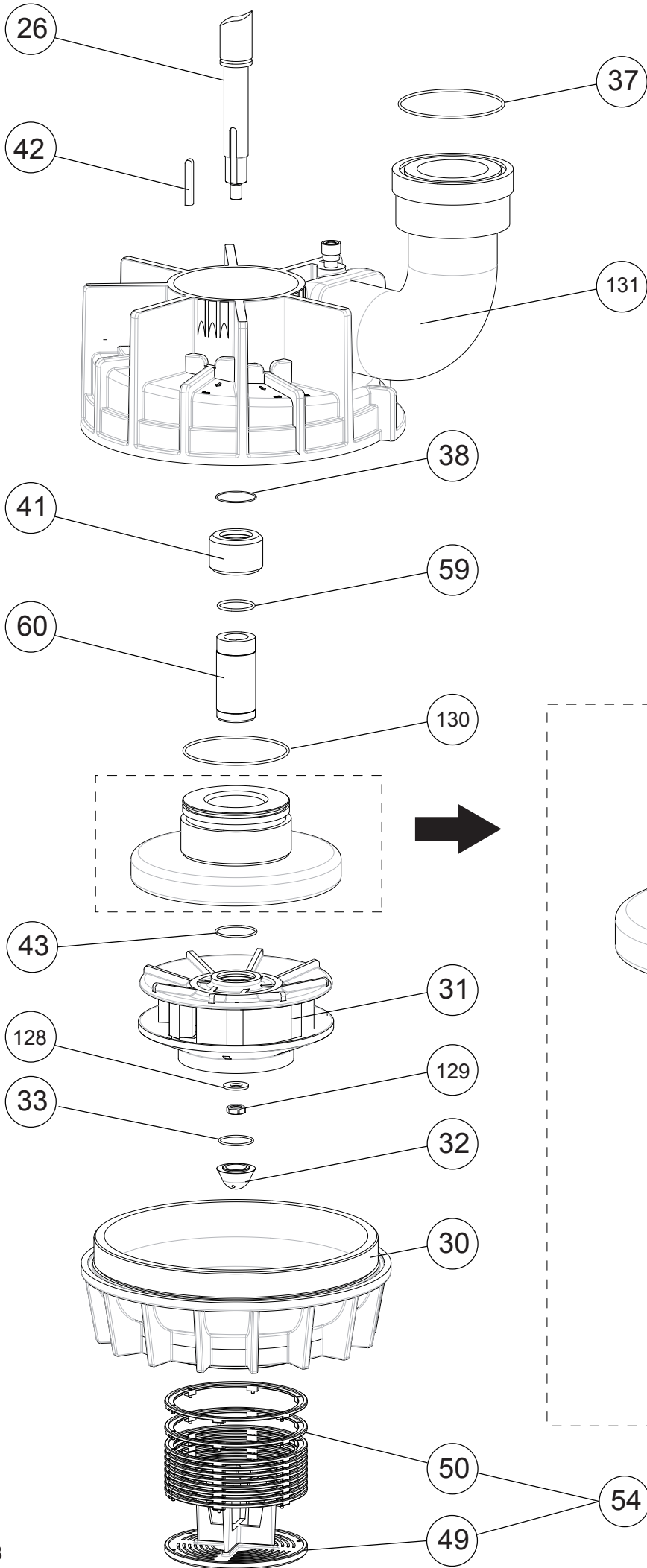
notes	pos.	ref.	Part name	Q.ty	Disassembling steps sequence										Spare stock for working years		
					1	2	3	4	5	6	7	8	9	10	start up	2 year	
	1	330	Bearing Support	1													
	2	841	Flexible coupling (motor side)	1				•									
	3	848	Spider	1		•										•	
	4	842	Flexible coupling (pump side)	1								•					
	5	904	Grub screw (UNI 5925 M5x8)	1			•										
	6	940.1	Key (motor)	1				•									
	7	321	Rolling Bearing	1										•			
	9	932.1	Seeger ring	1						•							
	10	910.1	Fixing Set: motor lock flange / motor	1	•												
( <sup>1</sup> )	11	807	Motor lock flange	1			•										
	12	914	Locking screw (ISO 4762 - M12 x 40)	1													
	13	552	Spring washer (UNI 1751 - A 8)	1													
	16	902	Joint pin (UNI 5914 M10x90)	8	•												
( <sup>1</sup> )	46	910.2	Fixing Set: motor flange/support	1		•											
	100	875	Coupling guard	1		•											
	101	910.3	Fixing Set: bearing cover/ support	1			•										
	102	360	Bearing cover	1				•									
	103	421.1	Elastic seal ring	1					•								•
	104	412.1	O-ring	1					•								•
	105	643	Oil Level Indicator	1	•												
	106	637	Inlet Oil-Plug	1	•												
	107	638	Drain Oil-Plug	1	•												
	108	412.2	O-ring (3550)	1					•								•
	109	360	Bearing cover	1				•									
	110	910.4	Fixing Set: bearing cover/ support	1			•										
	111	421.2	Elastic seal ring	1		•											•
	112	421.3	Elastic seal ring	1	•												•
	113	123	Lubricating ring	1							•						
	114	412.3	O-ring	1													
	115	800	Electric motor	1		•											
	140	763	Oil-charge fitting	1		•											
	141	731	Oil-discharge fitting	1	•												
	142		grub screw	1													
	143	643	Oil level	1	•												
	144	726	Union	1	•												

(<sup>1</sup>) if required by the motor



notes	pos.	ref.	Part name	Q.ty	Disassembling steps sequence										Spare stock for working years		
					1	2	3	4	5	6	7	8	9	10	start up	2 year	
	15.A	890.1	Base plate (armoured)	1													
	15.B	890.2	Base plate (standard)	1													
	17	476	Counterface housing (V-ring)	1			•										
	18	414	Counterface (V-ring)	1				•									•
	19	412.4	O-ring	1					•								•
	20	713.1	Ending Coating (motor side)	1							•						
	21	412.5	O-ring	1								•					•
	22	415	V-ring	1		•											•
	26	210	Coated shaft	1													
	55	231	Vapour deflector	1	•												
	64	700	Discharge pipe	1			•										
	116	713.2	Ending Coating (motor side)	1							•						
	117	412.6	O-ring	1													
	118	910.5	Fixing Set: ending coating	1						•							
	119	890.2	Base plate (armour)	1													
	120	910.6	Fixing Set: semi-bracket / armoured base plate	1	•												
	121	722.1	Semi-bracket (DX)	1		•											
(²)	122	910.7	Fixing Set: flat flange / semi-bracket	1													
(²)	123	722.3	FF flange	1													
	124	722.2	Semi-bracket (SX)	1		•											
	125	910.8	Fixing Set: semi-bracket / standard base plate	1	•												
(²)	126	412.7	O-ring	1				•									

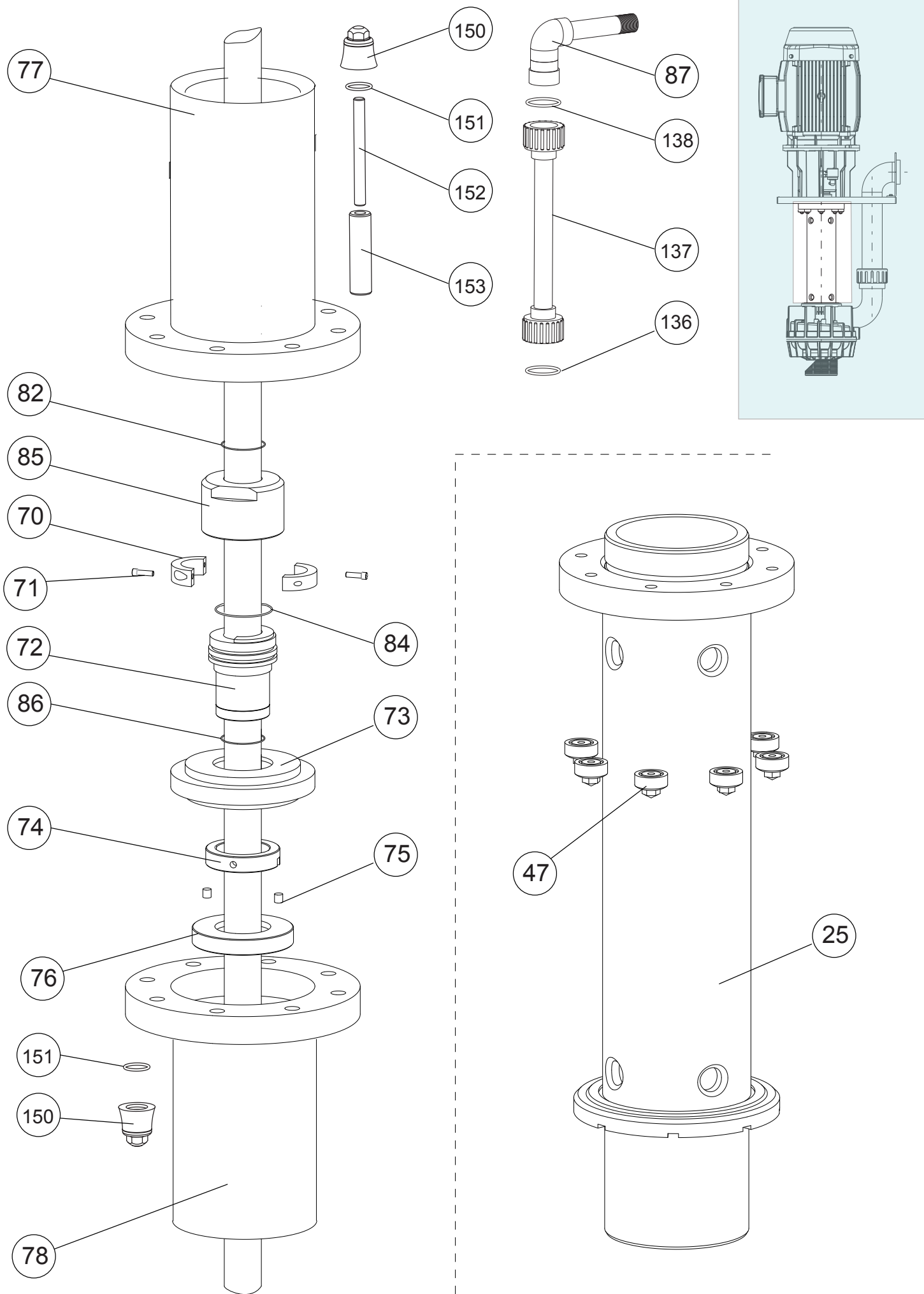
(²) if required





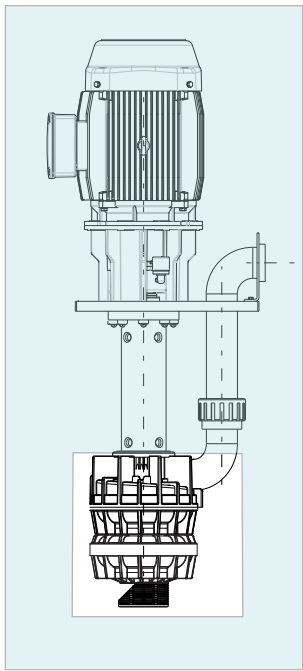
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					1	2	3	4	5	6	7	8	9	10	start up	2 year	
	30	102	Pump casing	1		•											
	31	230.1	Impeller	1					•								•
	32	260	Ogive	1			•										•
	33	412.8	O-ring	1								•					•
	34	545.1	Guide bushing	1							•					•	•
	35	560.1	Safety pin	2													•
	36	922.1	Lock threaded ring (guide bushing)	1							•						
	37	412.9	O-ring	1													
	38	412.10	O-ring	1												•	•
	41	713.3	Ending coating (pump side)	1									•				•
	42	940.2	Key	1													
	43	412.11	O-ring	1							•						•
	49	153	Filter clamping unit	1													
	50	745.1	Filtering module														
	54	745.2	Filter (complete unit)	1	•												
	59	412.13	O-ring	1									•				•
	60	523.1	Rotating bushing	1												•	•
	127	161	Casing Plate	1							•						
	128	934	Washer	1													
	129	920	Locking nut	1													
( <sup>9</sup> )	130	412.14	O-ring (only with flush pipe)	1													•
	131	103	Volute casing	1													

(<sup>9</sup>) only for version with external flushing



notes	pos.	ref.	Part name	Q.ty	Disassembling steps sequence										Spare stock for working years		
					1	2	3	4	5	6	7	8	9	10	start up	2 year	
	25	711.1	Column	1		•											
	47	910.9	Cap-Nut	1	•												
	70	488	Locking ring	1								•					
	71	914.2	Screw (Locking ring)	1							•						
	72	529.2	Rotating bushing (Intermediate)	1				•							•		•
	73	491	Guiding unit	1		•											
	74	545.2	Guide bushing (Intermediate)	1				•							•		•
	75	560.2	Safety pin	1					•								
	76	922.2	Lock threaded ring (Lower)	1			•										
	77	711.3	Upper column	1		•											
	78	711.4	Lower column	1		•											
	82	412.15	O-ring	1													•
	84	412.16	O-ring	1					•								•
	85	412.17	Lock threaded ring (Upper)	1			•										•
	86	412.18	O-ring	2													•
	87	718	Flush-fitting	1		•											
	136	412.19	O-ring	1		•											•
	137	418	Flush-pipe	1	•												
	138	412.20	O-ring	1			•										•
(1)	150	260.2	Cap-nut	16	•												
(1)	151	412.30	O-ring	16		•											
(1)	152	905	Screw	8		•											
(1)	153	714	coating screw	8		•											

(1) quantity for one intermediate guide



42

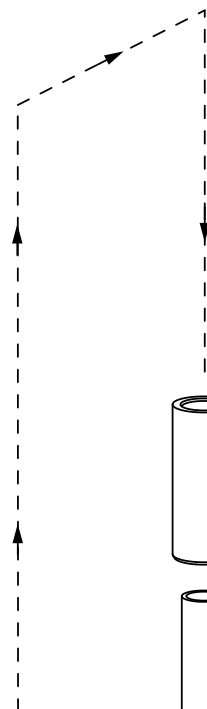
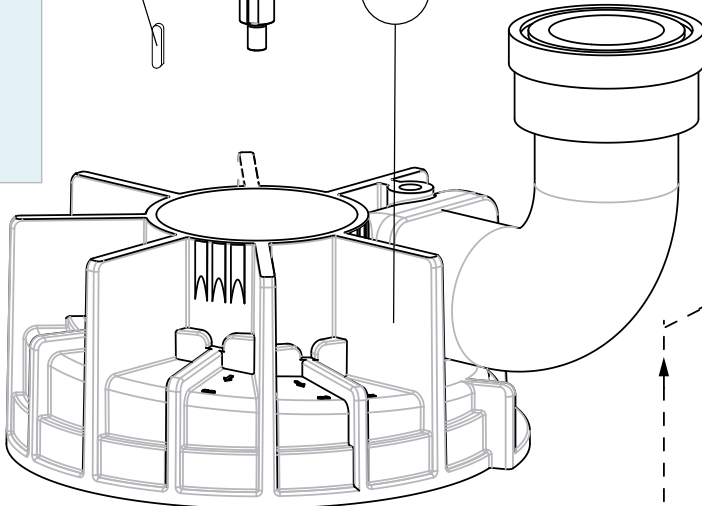
44



26

37

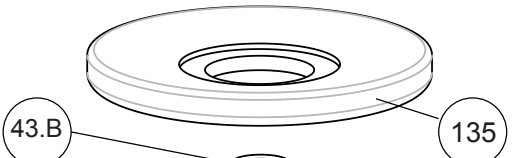
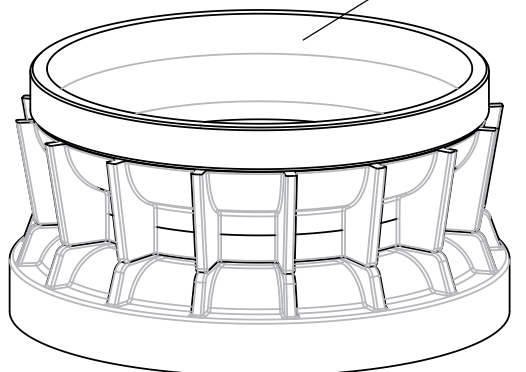
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132

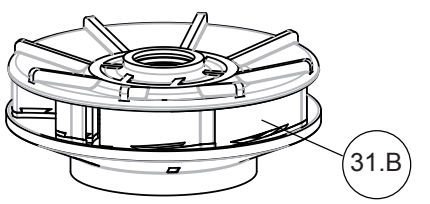
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134

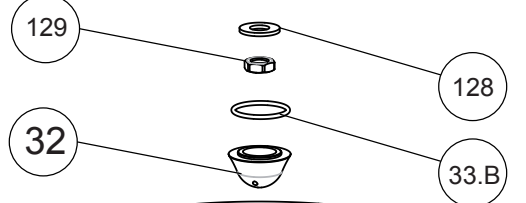


43.B

135



31.B

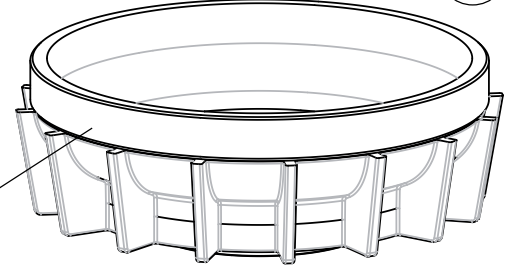


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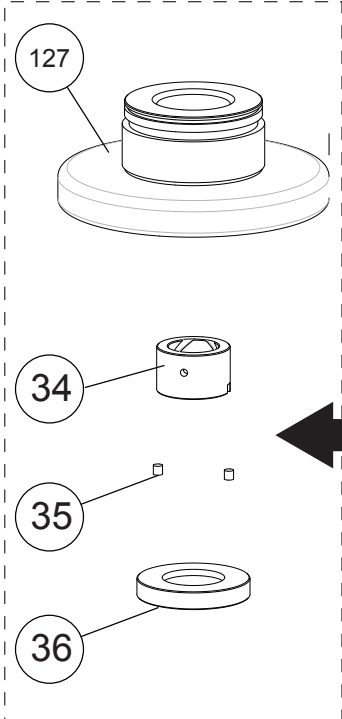
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32

33.B



30

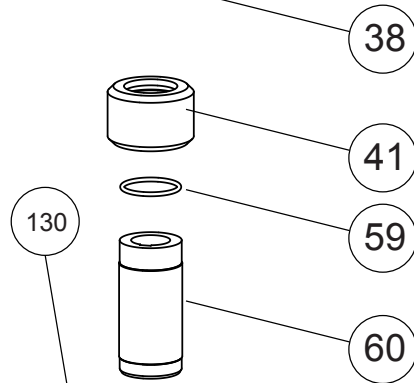


127

34

35

36



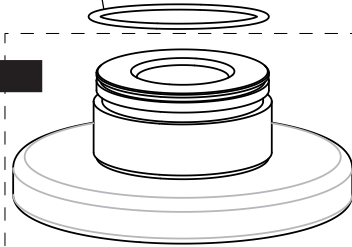
38

41

59

60

130



31.A

43.A

33.A

notes	pos.	ref.	Part name	Q.ty	Disassembling steps sequence										Spare stock for working years	
					1	2	3	4	5	6	7	8	9	10	start up	2 year
	30	102	Pump casing	1	•											
	31.A	230.2	Impeller (second stage)	1							•					•
	31.B	230.2	Impeller (first stage - only D. Models)	1				•								•
	32	260	Ogive	1		•										•
	33.A	412.21	O-ring	1								•				•
	33.B	412.22	O-ring (only D. Models)	1			•									•
	34	545.1	Guide bushing	1								•			•	•
	35	560.1	Safety pin	2												
	36	922.1	Lock threaded ring (guide bushing)	1								•				
	38	412.23	O-ring	1									•			•
	41	713.4	Ending coating (pump side)	1								•				•
	42	940.2	Key	1												
	43.A	412.24	O-ring	1								•				•
	43.B	412.25	O-ring (only D. Models)	1					•							•
	44	940.3	Key	1												
	59	412.27	O-ring	1									•			•
	60	523.1	Rotating bushing	1								•			•	•
	127	161	Casing Plate	1								•				
	128	934	Washer	1				•								
	129	920	Locking nut	1				•								
( <sup>o</sup> )	130	412.28	O-ring (only with flush pipe)	1									•			•
	131	103	Volute casing	1									•			
	132	737	Spacer Coating	1									•			
	133	525	Spacer	1									•			
	134	605	Conveyor	1						•						
	135	161	Conveyor Plate	1						•						

(<sup>o</sup>) only for version with external flushing

## GENERAL NOTES

“KGK” 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 environmental 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 thermoplastic materials; other parts in high chemical-resistant materials.

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

“KGK” pumps are centrifugal, vertical, with driven self-supporting pump shaft, single-stage with the volute casing directly dipping in the liquid to be pumped, coupled to a non-synchronous electric motor via a flexible coupling, with hydraulic connections to the axial inlet facing the bottom of the pump and radial outlet connected to a vertical piping system. The vertical piping ends with hydraulic connections to the system turned upwards on the base plate. This plate has to be mounted on a very rigid structure (see INSTALLATION INSTRUCTIONS).

“KGK” pumps are not self-priming and as a consequence they must start with the volute casing immersed in the liquid. After starting operation the liquid level can drop (see APPLICATION LIMITS).

“KGK” pumps cannot run dry. The shaft guide bushings must be constantly kept wet with the liquid being pumped.

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

The fume seal, located at the base plate level, develops a back pressure (can vary according to the pump size) of approximately 60 mbar for standard execution (V-ring seal), and approximately 240 mbar for fluid barrier seal execution.

To grant the correct running of the fluid barrier seal is required to feed with air the circuit of the seal with the following specifications: 3 bar air pressure; 50 l/min air capacity.

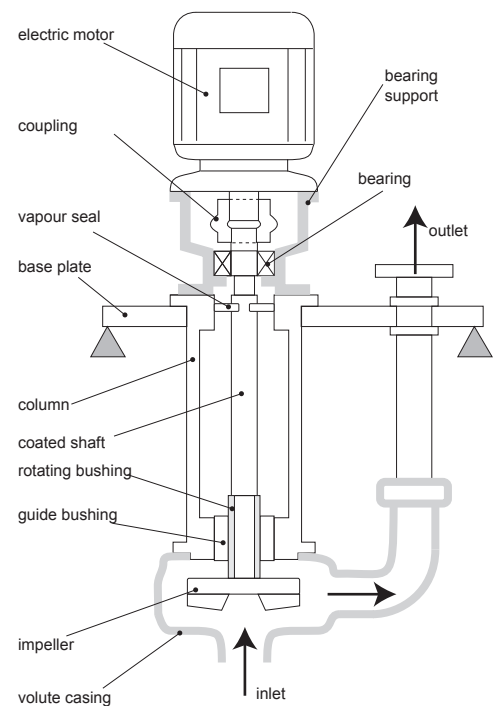
The submerged part (liner) must not be subject to lateral hydrodynamic thrusts by the liquid mass being moved.

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

When calculating the head, consider the actual level of the liquid in the suction tank and not the outlet connection.

## STRUCTURE

The impeller is rotated by the pump shaft coupled to the motor shaft by means of a flexible coupling. Inside the support (placed outside the tank, on the base plate), the pump shaft is driven and at the same time supported by two rolling bearings packed with grease; near the impeller (for under-plate length over 2000 mm also at 2/3 length) the pump shaft is driven by a sliding friction bearing supporting all the radial mechanical loads caused by hydrodynamic stress, while the axial loads are borne by the support bearings. In order to ensure pump lifetime, it is essential that the sliding friction bearing is kept wet with the liquid being pumped. The pump is provided with a base plate to be fitted in the system and to be equipped with adequate supports to mount the pump on. The delivery tube is fastened to the plate by two metal half clamps that prevent mechanical tension, deriving from the system, from affecting the pump body. It is absolutely necessary to reduce to a minimum any load on the connections. To do that, back the piping up with proper brackets in such a way to allow thermal expansions (e.g.: expansion coupling, proper configuration). The pump shaft (coated), where it crosses the base plate, is provided with fume seal ring (single or fluid barrier) to protect the motor bearing and to reduce fume dispersion in the environment in case of hot liquids.



## APPLICATION LIMITS

**TEMPERATURE** The ambient temperature range is related to the choice of materials (specified on the identification plate):

execution		under plate length (mm)									
		500	750	1000	1250	1500	1750	2000	2500	3000	3500
version	material	ambient temperature range (°C)									
WR	gfr-PP	0 ÷ +40						+5 ÷ +40		n.a.	n.a.
WF	PP+PVDF	0 ÷ +40						+5 ÷ +40		n.a.	n.a.
FC	PVDF	-10 ÷ +40			0 ÷ +40			+5 ÷ +40		n.a.	n.a.
QR	PVC-PVDF	+5 ÷ +30								n.a.	n.a.
WRG	PP+frp	0 ÷ +40						+5 ÷ +40			
WFG	PP+PVDF+frp	0 ÷ +40						+5 ÷ +40			
FCG	PVDF+frp	-10 ÷ +40			0 ÷ +40			+5 ÷ +40			
QRG	PVC+frp	+5 ÷ +30									

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

execution		under plate length (mm)									
		500	750	1000	1250	1500	1750	2000	2500	3000	3500
version	material	maximum temperature (°C)									
WR	gfr-PP	70	65	55	50	45	40	35	30	n.a.	n.a.
WF	PP+PVDF	70	65	55	50	45	40	35	30	n.a.	n.a.
FC	PVDF	90	85	75	65	60	55	45	40	n.a.	n.a.
QR	PVC-PVDF	40						35	30	n.a.	n.a.
WRG	PP+frp	70									
WFG	PP+PVDF+frp	75									
FCG	PVDF+frp	80									
QRG	PVC+frp	40									

## IMMERSION DEPTH

Immersion depth can be increased by adding a suction extension in order to prevent mud sediment in the tank (nevertheless ensure minimum distance from the bottom "S"). Should the extension-length be higher than 1,5 m, arrange for a bracket to keep lateral movements of the extension within 2-5 mm. without blocking it and allowing at the same time thermal dilatation. The maximum length of the extension is 2,2 m; the nominal bore must be the same as the one of the pump inlet.

With the suction extension installed, the level can drop under the centrifugal impeller (pump casing) during operation (not during startup) for the amount shown by the following values applying to water at 25°C.

Nominal Suction Diameter of the Pump (mm)	40 - 50 - 65	80	100 - 125
maximum suction lift (negative) allowed:			
without foot strainer :	2 m	1.8 m	1 m
with foot strainer :	1 m	0.8 m	0

At 40°C reduce of 0,75 m; at 60°C the impeller must always be under positive suction head (minimum value 0,2 m).

As to the liquids having high vapour pressure (i.e.: much more evaporation in comparison to water at the same temperature, presence of detergent), positive suction head is advisable.

The maximum level allowed is 110 mm under the lower surface of the base plate; vent holes on the columns must be visible.

## SOLID PARTICLES

The liquid being pumped may contain a maximum 10% of solid non-abrasive particles not greater than 1 mm in size. The presence of fibrous, adhesive or abrasive bodies is not allowed. The maximum allowed size for bodies occasionally present is 3 mm. As to the FC execution, the maximum allowed concentration of metallic particles is 0,5% provided that their size is lower than max. 0,5 mm. Arrange for proper filtering or sedimentation stages to comply with above mentioned limits.

**SPECIFIC WEIGHT** 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 identification plate) and has to be defined upon ordering.

**KINEMATIC VISCOSITY** The level of kinematic viscosity must not exceed 20 cSt so as not to significantly modify the pump's performance. Higher values up to a maximum of 80 cSt are possible provided that the pump is equipped with suitable impeller and motor to be defined upon ordering.

**VAPOUR PRESSURE** The vapour pressure value of the liquid to be pumped must exceed (by at least 1,5 m 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 filter-drops and the inlet NPSHr drops shown on the specific tables).

**MINIMUM CAPACITY** 5% of the maximum capacity

**EXTERNAL FLUSH VAPOUR SEAL VM** 100 l/h - 1,5 bar

**EXTERNAL FLUSH BUSHING** min capacity 300 l/h  
pressure = 1,1 x pressure at duty point (max 8 bar)

The liquid used for the external lubrication must be clean and compatible with the pumped liquid

## MOTOR

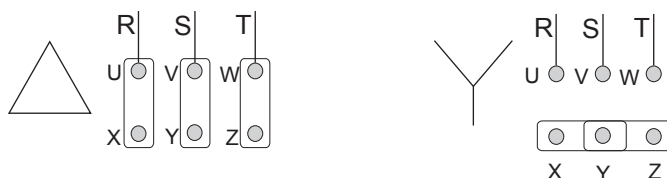
### ELECTRICAL CONNECTIONS

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 INSTRUCTIONS

- 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

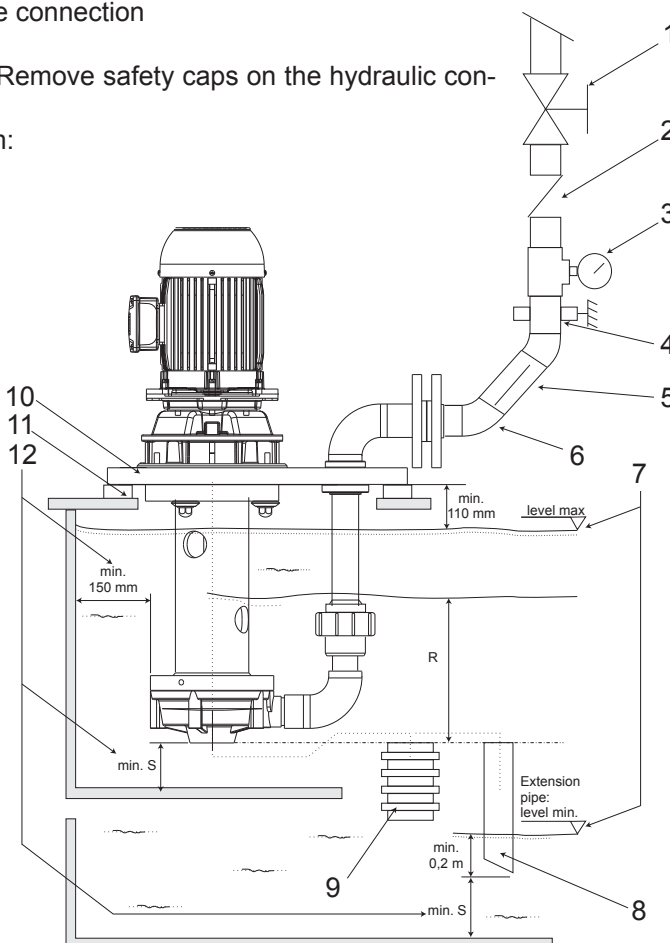
### STORAGE INSTRUCTIONS

- When is necessari to store the pump before 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 integrity and to store a new package
- The place where the pump is stored must be closed with an ambient temperature not lower than  $-5^{\circ}\text{C}$  and not higher than  $40^{\circ}\text{C}$ , 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

- arrange for a particularly rigid carrying structure: maximum deflection lower than 0.2 mm referred to the pump weight on the installation site
- paint the carrying structure with epoxydic enamel or similar to prevent corrosion
- arrange for adequate passage and install protection guards for people safety; act in compliance with the relevant safety rules
- for B5 frame motors: fit additional protection guards in case of outdoor installation: make sure that the motor impeller is duly ventilated and rain-water is quickly drained
- the tanks under the pump must be covered in case of hot liquids or liquids emitting corrosive fume (dangerous for the metallic part of the pump outside the tank). Seal the plate base by means of thin, not soft seals, well compressed by the locking screws
- do not use anti-vibration mounts to fix the pump
- anti-vibration joints are recommended on the outlet pipe connection
- 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. YES: flow control valve on the discharge side
2. YES: non-return valve (particularly with long vertical or horizontal pipe runs; mandatory with pumps in parallel)
3. YES: connection point for pressure gauge or safety pressure switch
4. YES: firmly fix all piping by suitable brackets, close to the pump; YES: expansion joint (indispensable with long piping or hot liquids)
5. Maximum fluid speed on the discharge side: 3 m/sec
6. YES: divert discharge (by means of  $45^{\circ}$  bend) in order to avoid hindrance over the plate (free space is required to lift the pump). NO: bends (or other fittings) close to the pump (both at inlet and outlet)
7. Min. suction head 0,3 m during startup; for suction head during pumping see "APPLICATION LIMITS"
8. Vertical extension on the suction side allowed (see APPLICATION LIMITS). NO: complex piping system on the suction side
9. YES: foot strainer (3-5 mm mesh screen) if solid bodies (open tanks) or rough impurities are present
10. Arrange for drainage of liquids from the base plate
11. Use all of the fixing holes provided to in-



stall the pump; the fixing points must be kept at the same level

11. Ensure lowest distance from the bottom "S" and the wall (or from other working pumps)

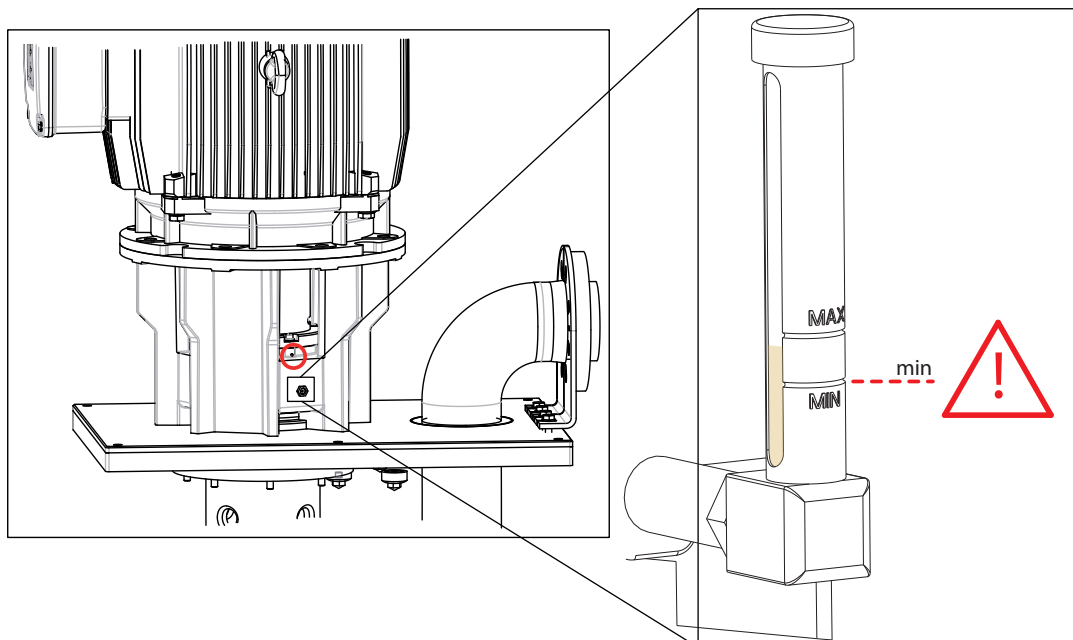
- manually verify that all rotating parts are free to turn without abnormal friction by turning the motor cooling fan
  - make sure that the power supply is compatible with the data shown on the pump motor identification plate
  - connect the motor to the power supply via a magnetic/thermal control switch
  - 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, pressure-sensitive)
  - 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 NOTES
  - other environmental conditions in accordance with the IP protection of the motor
  - leave enough free space around the pump for a person to move
  - leave enough free space over the pump for lifting operation
  - arrange for a rigid wall to separate the inlet ports in case of pumps installed close to each other
  - pump axis must not be positioned in the center of small tanks
  - highlight the presence of aggressive liquids with coloured tags following the local safety regulations
  - do not install the pump (made in thermoplastic 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 pre-arranged
  - 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
- the pump is supplied without oil (bearing support empty), follow the next instruction to fill the bearing support
- use lubricating oil (not hydraulic), SAE grading equal to 30 (indicative), viscosity index > 100.

**TANK FILLING AT FIRST START-UP** (pump with oil windows pos 143)

Remove the filler plug (pos. 106) and fill the tank with oil

Engine tolerance:	tank capacity in c.c. (+/- 10%)
≤ 22 kW	800
≥ 30 kW	1300

Once the correct level has been reached (check the level indicator pos.143), reposition the breather grub screw and the filler plug (pos. 106). Top up if necessary (carry out this operation when pump is stopped)  
Replace completely after approximately every 1500 hours of operation.



**TANK FILLING AT FIRST START-UP** (pump with constant level oiler pos xxx)

- Remove the filler plug (pos. 106) and fill the tank with oil

Engine tolerance:	tank capacity in c.c. (+/- 10%)
≤ 22 kW	800
≥ 30 kW	1300

- during this step take the constant level oiler opened
- fill oil; this phase is finished when oil begin to fill in the level oiler elbow.
- fill oil into the constant level oil
- close the constant level oiler
- refill oil when when the constant level oiler is empty

Replace completely after approximately every 1500 hours of operation

**STARTUP**

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, in presence of extension pipe with negative suction lift)  
 totally flood the suction pipe (if present) and the pump  
 start the pump with the discharge valve partially closed  
 slowly regulate the flow by opening or closing the discharge valve (never the suction valve). Make sure that the power absorbed by the motor does not exceed the rated one indicated on the motor identification plate  
 do not operate the pump at the limit values of its performance curve: maximum head (discharge valve excessively closed) or maximum capacity (total absence of drops and geodetic head on the discharge side)  
 set the operating point to that for which the pump was requested  
 ensure that there are no abnormal vibrations or noise due to inadequate mounting or cavitation  
 avoid short and/or frequent starts by properly setting the control devices

Motor power ( kW )	0,75÷1,5	2,2÷4	5,5÷7,5	11÷15	18,5÷30	37÷110
max. start/hour	: 36	28	20	15	10	6

ensure that the temperature, pressure and liquid characteristics are as those specified at the time of order.

**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)

## 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) cleaning 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

## DISASSEMBLING

### SINGLE-STAGE

The nuts and bolts are right-threaded; the non-revolving coaxial parts screwed onto the shaft are left-threaded; the revolving screwed in parts are right-threaded.

Empty the oil from the tank

- 1) The pump body (pos. 30) is screwed to the spiral body (pos.31) (via left thread)
- 2) The impeller(pos.31), once the pump body is open, must be disconnected, blocking the shaft on the opposite side (remove the motor fan if necessary); proceed by unscrewing the head (pos.32) and the locknut (pos.129), the impeller is then axially unthreaded.
- 3) To access the drive bush: unscrew the locknut (pos. 36) (fastened via left thread); unthread the bush (pos. 34) and the baffle (pos. 27) axially.
- 4) To remove the spiral body (pos.31) unscrew the closing lantern (pos.127) and the filler nut on the delivery tube
- 5) To remove the delivery tube (pos.64) unthread the 4 screws (pos. 120), remove the 2 delivery half clamps (pos.121 and pos.124)) and then unthread the delivery tube moving downwards
- 6) To remove the column bearing, vertically position the pump, resting it against the motor flange, and remove the 8 head nut covers (pos.47); axially unthread the column (pos.25).
- 7) Unthread the revolving bush (pos.60)
- 8) Once the column, revolving bush and delivery tube have been removed, the v-ring vapour seal (pos.22), counterface (pos.18), the bearing plate and the bearing protection disc can be taken off (pos.17)
- 9) The pump shaft is fastened to the flexible coupling by a locking screw. Loosen the screw, bang it on the head with a rubber mallet (in order to release the shaft); remove the screw and unthread the shaft.  
ATTENTION: Do not force the thermoplastic covering of the shaft in any way.
- 10) Remove the lock cap (pos.102) to disassemble the coupling-bearing unit.

### MULTI-STAGE

- 1) The pump body (pos. 30) is screwed to the spiral body (pos.31) (via left thread)
  - 2) Once the pump body is open, the impeller (pos. 31) must be disconnected, blocking the shaft on the opposite side (remove the motor fan if necessary); proceed by unscrewing the head (pos.32) and the locknut (pos.129); the impeller is then axially unthreaded.
  - 3) Unscrew the conveyor closing lantern (pos.135)
  - 4) Unscrew the conveyor (pos.134)
  - 5) Unthread the second impeller
- Resume the single-stage sequence from point 3

Replace the parts: broken, cracked, deformed

Clean all the surfaces before reassembling; especially the O-ring housings (risk of fluid leakage towards the shaft), the rings of the vapour seal (risk of premature wear), the thread housings, the parts of the slide bearing.

## SAFETY RISKS

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 (should the plant be faulty constructed or present wear-and-tear defects, the pressure developed by the pump could lead to failure).

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 accidentally
- 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

**NOTE:** the pumps will be handled for investigation, inspection or repair only in **VERTICAL POSITION** to avoid any crack of the pump.

## LUBRICATION SCHEDULE

The pump is supplied without oil (bearing housing is empty).

Before starting pump fill with lubricating oil as per ISO 6743:

- Kinematics viscosity ref. to 50 °C (125°F): 2,8÷3,3 °E (≈ 20 cSt);
- Operating conditions: temperature increment 40°C - max. temperature 100 °C - max. rpm 4000.

Business names:

**ESSO Teresso 68;**

**SHELL Tellus T68;**

**MOBIL DTE 68;**

**BP Energol HLC 68;**

**AGIP Blasias 68**

## MALFUNCTIONS AND POSSIBLE CAUSES

The pump does not deliver:

- 01- The motor side semi-coupling was not assembled following maintenance operations.
- 02- wrong sense of rotation
- 03- suction piping is too long or has too many bends
- 04- pump not completely flooded
- 05- impeller blades obstructed by impurities
- 06- non-return valve on the discharge pipe blocked
- 07- the geodetic head of the plant is greater than the maximum head developed by the pump
- 08- impeller blocked by a considerable layer of crystals or by melting due to dry running

The pump has reduced capacity or insufficient pressure:

see 02, 03, 04, 05

- 09- the head required by the plant is greater than that expected
- 10- insufficient geodetic suction head on the pump (make sure that the level of liquid is above the pump body - see part R)
- 11- damaged or worn impeller
- 12- worn bushings (guide and rotating) of the sliding bearing
- 13- viscosity of liquid greater than that expected
- 14- excessive quantities of air or gases in the liquid
- 15- excessive quantities of slurries in the liquid
- 16- bends, non-return valve or other parts close to the outlet
- 17- Liquid liable to turn to the gaseous status (particularly if hot or containing surface activ agents):

The pump starts up regularly and then disconnects:

- 18- Make sure the min. suction head is reached at the inlet port
- 19- Reduce or remove the suction extension

The pump is overloaded:

see 13, 15

- 20- capacity is higher delivery than expected
- 21- the specific weight of the liquid is greater than expected
- 22- impurities inside the pump generate abnormal friction
- 23- the power supply voltage is not the one on the motor identification plate

The pump vibrates and is noisy

see 12, 22

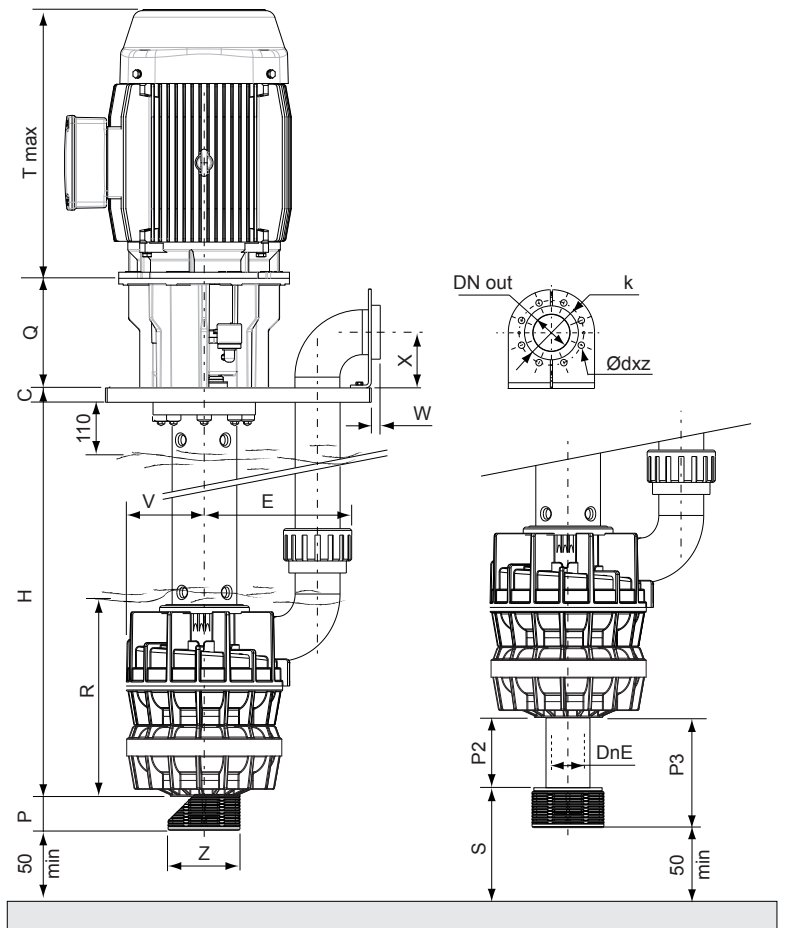
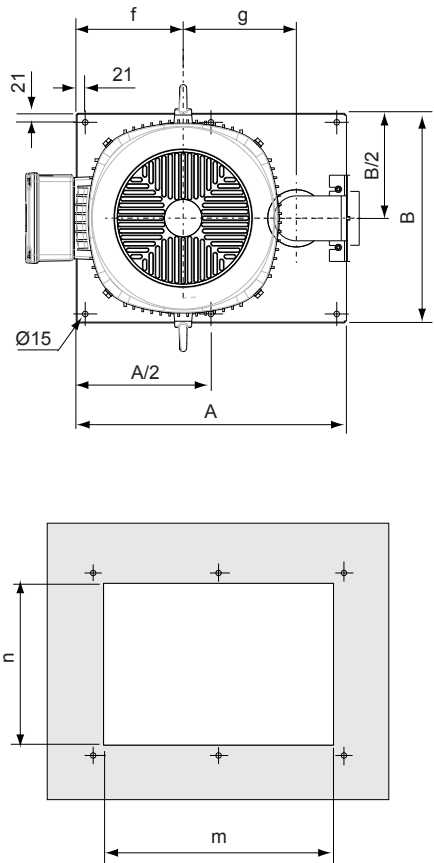
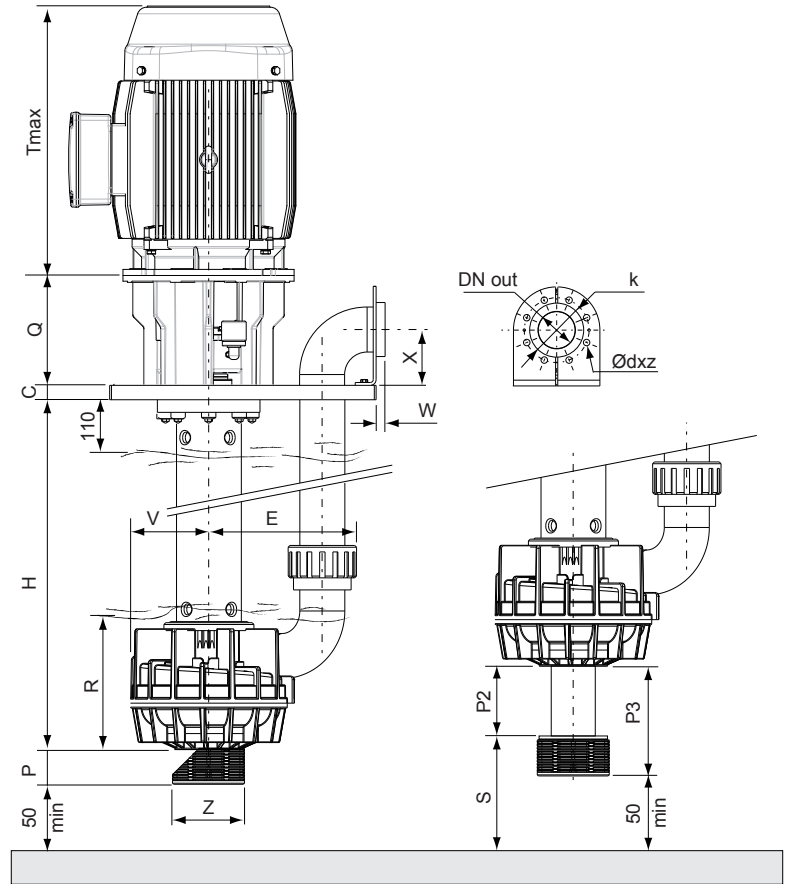
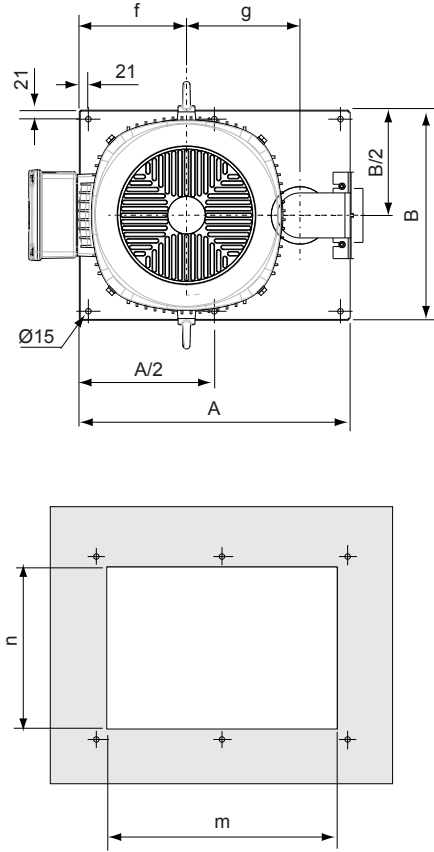
- 24- the pump is working at free capacity (zero head)
- 25- the pump or piping are not firmly fixed
- 26- the supporting structure must be made more rigid
- 27- damaged or dry central support bearings
- 28- "motor + coupling" unit not assembled correctly following maintenance operations

The pump shows signs of premature wear of internal parts:

see 15, 22

- 29- liquid is excessively abrasive
- 30- frequent recurrence of cavitation (see 02, 13, 16)
- 31- high tendency of the liquid to crystallize or polymerize in stand-by
- 32- pump execution with materials not suitable for the liquid being pumped
- 33- operation at much reduced capacity

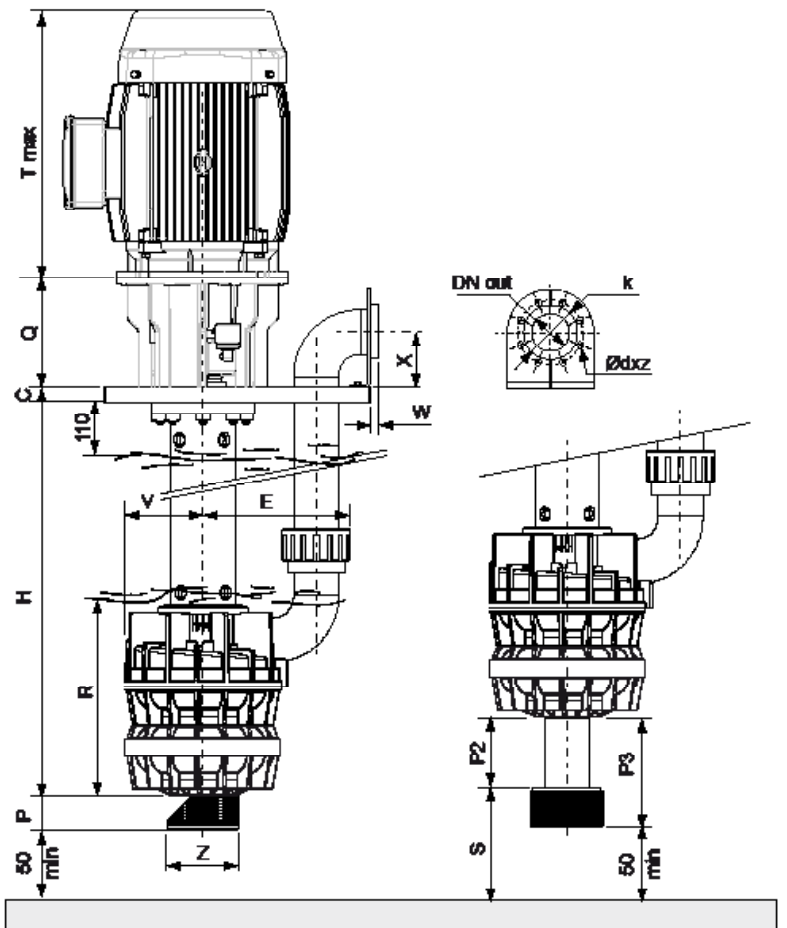
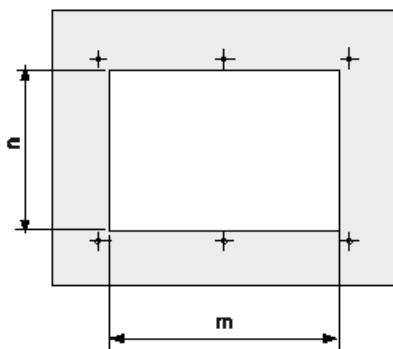
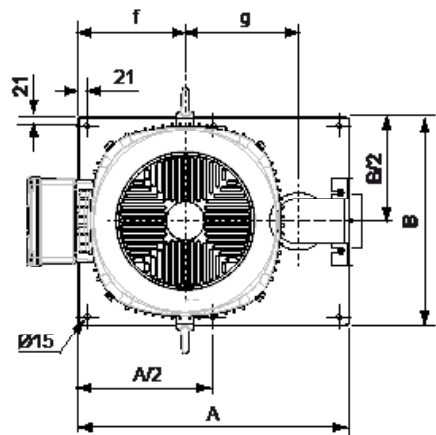
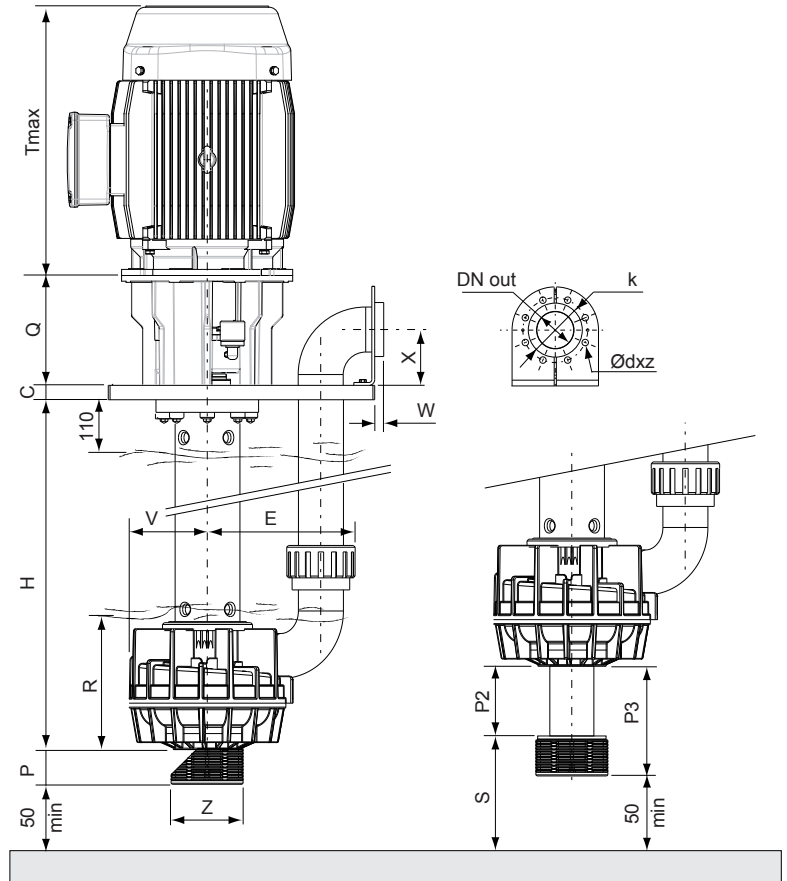
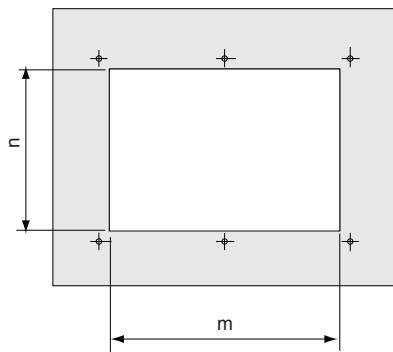
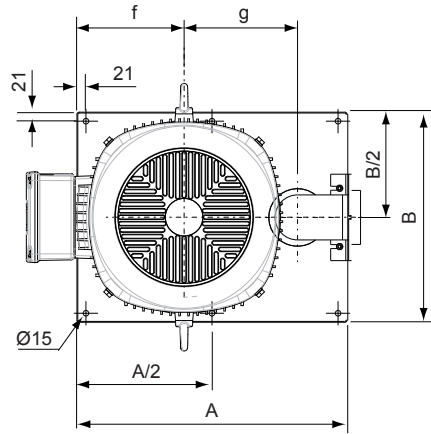
# TECHNICAL DATA 50Hz







# TECHNICAL DATA 60Hz

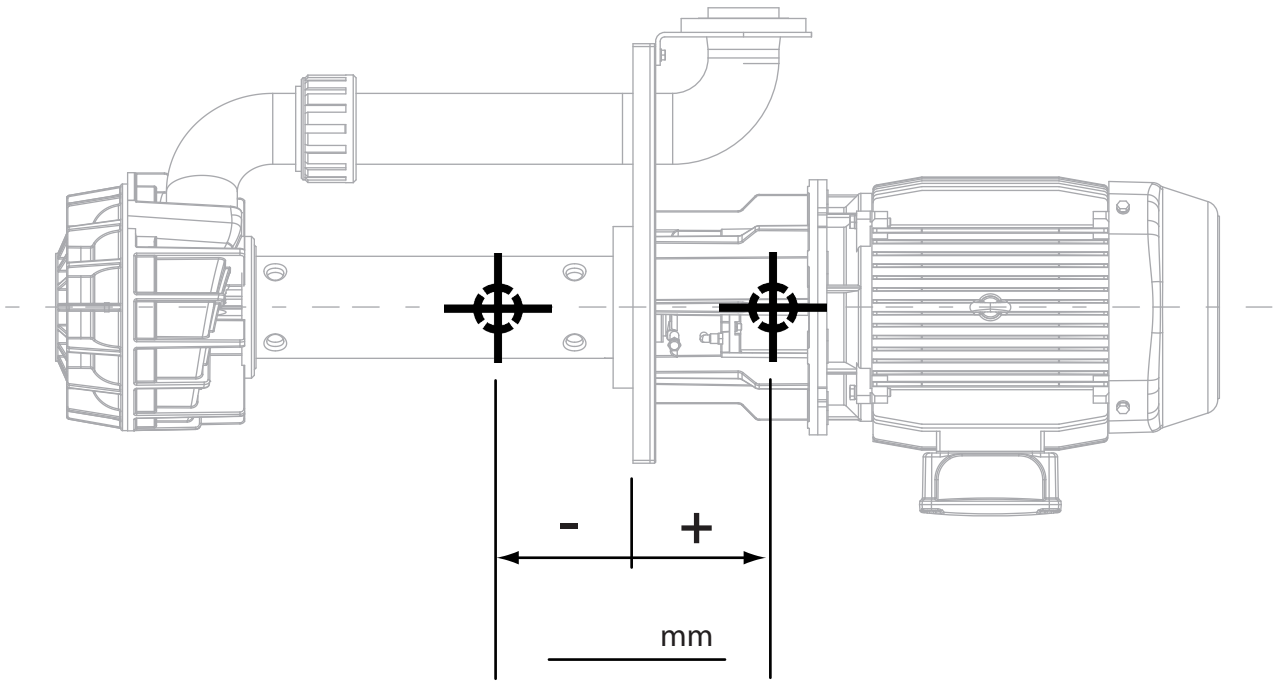


n° poles		2	2			2	4	4	2			2	4	4	2	4	4		4	4		4	4		4	4			
model		C 40/210	C 50/170			C 50/190	C 50/210	D 50/210	C 65/170			C 65/190	C 65/210	D 65/210	C 80/150	C 80/170	D 80/170		C 80/210	D 80/210		C 100/170	D 100/170		C 100/210	D 100/190			
inlet (GAS thread)	DN	100	100			100	100	100	100			100	100	100	125	125	125		125	125		125	125		125	125			
	Thread	4"	4"			4"	4"	4"	4"			4"	4"	4"	5"	5"	5"		5"	5"		5"	5"		5"	5"			
outlet (flanged DIN)	DN	40	50			50	50	50	65			65	65	65	80	80	80		80	80		100	100		100	100			
	k	110	125			125	125	125	145			145	145	145	160	160	160		160	160		180	180		180	180			
	d x z	18x4	18x4			18x4	18x4	18x4	18x4			18x4	18x4	18x4	18x8	18x8	18x8		18x8	18x8		18x8	18x8		18x8	18x8			
	W	20	20			20	20	20	20			20	20	20	45	45	45		45	45		45	45		45	45			
	X	100	100			100	100	100	100			100	100	100	155	155	155		155	155		155	155		155	155			
	max. load on port-section F(x;y;z)	Kg	10	12			12	12	12	15			15	15	15	20	20	20		20	20		25	25		25	25		
pump	V	195	195			195	195	195	195			195	195	195	220	220	220		220	220		220	220		220	220			
	E	300	310			310	310	310	325			325	325	325	415	415	415		415	415		415	415		415	415			
	R min	230	230			230	230	460	230			230	230	460	250	250	500		250	500		250	500		250	500			
	S min	90	100			100	100	100	130			130	130	130	150	150	150		150	150		150	150		150	150			
	H max	4000	4000			4000	4000	4000	4000			4000	4000	4000	4000	4000	4000		4000	4000		4000	4000		4000	4000			
filter	P	55	55			55	55	55	55			55	55	55	100	100	100		100	100		100	100		100	100			
	P2 max	1800	1800			1800	1800	1800	1000			1000	1000	1000	1000	1000	1000		1000	1000		1000	1000		1000	1000			
	P3 max	800	800			800	800	800	n.a.			n.a.	n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.		n.a.	n.a.		n.a.	n.a.			
	DnE	65	80			80	80	80	100			100	100	100	125	125	125		125	125		125	125		125	125			
	Z	200	200			200	200	200	200			200	200	200	200	200	200		200	200		200	200		200	200			
base-plate	A	630	630			630	630	630	630			630	630	630	740	740	740		740	740		740	740		740	740			
	B	490	490			490	490	490	490			490	490	490	550	550	550		550	550		550	550		550	550			
	C	40	40			40	40	40	40			40	40	40	40	40	40		40	40		40	40		40	40			
	f	250	250			250	250	250	250			250	250	250	275	275	275		275	275		275	275		275	275			
	g	251	251			251	251	251	251			251	251	251	315	315	315		315	315		315	315		315	315			
	m	530	530			530	530	530	530			530	530	530	640	640	640		640	640		640	640		640	640			
	n	390	390			390	390	390	390			390	390	390	450	450	450		450	450		450	450		450	450			
	max. tangential reaction at each fixing hole at starting	Kg	20	20			20	14	20	20			20	17	40	17	12	23		23	34		17	34		28	34		
pump weight	Kg (rif. ad H=500 mono-stage - H1000 multi-stage - without support and shaft)																												
	WR	21	22			24	24	39	23			25	25	40	29	29	45		29	45		31	47		31	47			
	WF	22	23			25	25	40	24			26	26	41	30	30	46		30	46		32	48		32	48			
	FC	32	33			36	36	59	35			37	37	60	43	43	67		44	68		47	72		47	72			
	WRG	23	24			26	26	41	25			27	27	42	31	31	47		31	47		33	49		33	49			
	WFG	24	25			27	27	42	26			28	28	43	32	32	48		32	48		34	50		34	50			
	FCG	34	35			38	38	61	37			39	39	62	45	45	69		46	70		49	74		49	74			
Max. head (60Hz)	m	99	70			81	27	55	62			82	31	60	51	20	39		31	60		22	43		27	46			
Max. Capacity (60Hz)	m³/h	70	110			110	70	70	120			160	100	110	220	180	120		200	200		220	220		300	300			
sound p.l.	dB	75	71			75	66	67	75			77	65	67	77	66	68		67	69		65	67		67	69			
Temperature on the support: max 70°C																													
motors	power	kW																											
	weight <sup>1)</sup>	Kg																											
	support weight <sup>2)</sup>	Kg																											
	Q																												
	T																												
	power	kW																											
	weight <sup>1)</sup>	Kg																											
	support weight <sup>2)</sup>	Kg																											
	Q																												
	T																												
	power	kW																											
	weight <sup>1)</sup>	Kg																											
	support weight <sup>2)</sup>	Kg																											
	Q																												
	T																												

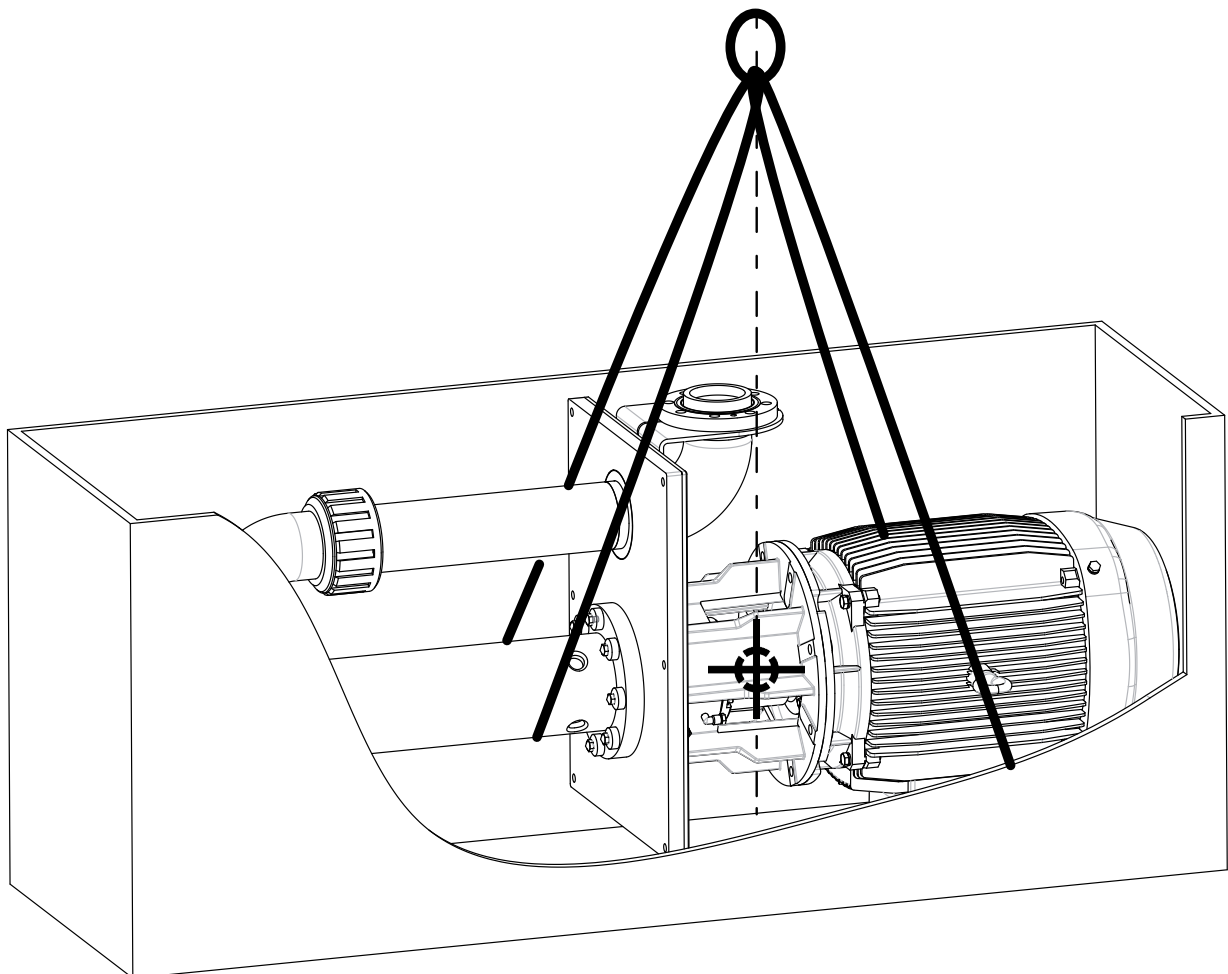
dimension in mm

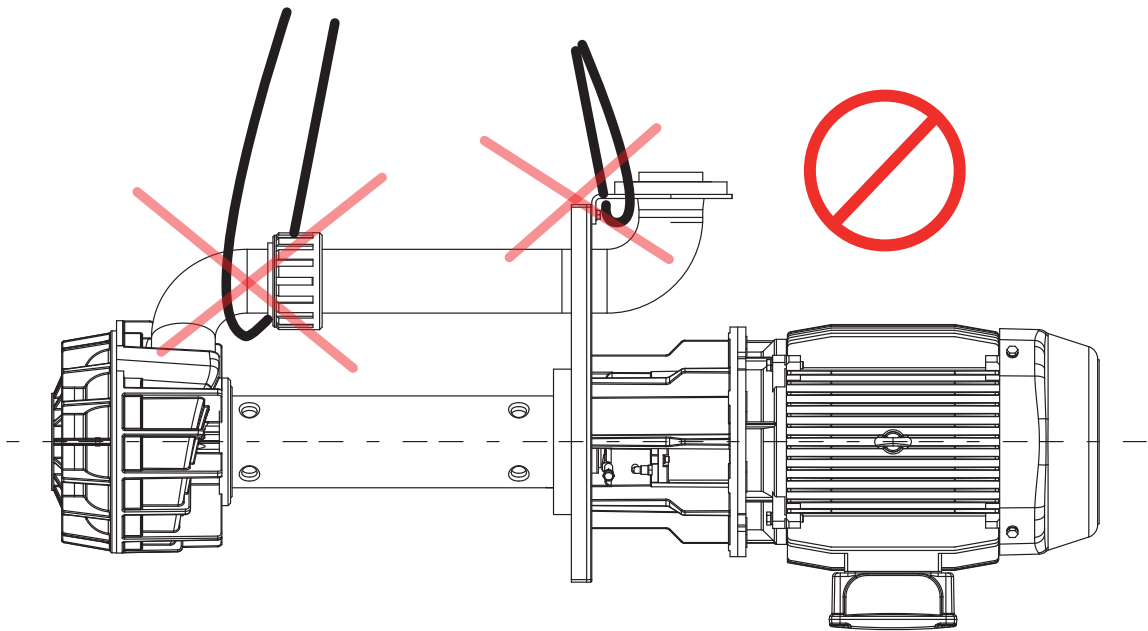
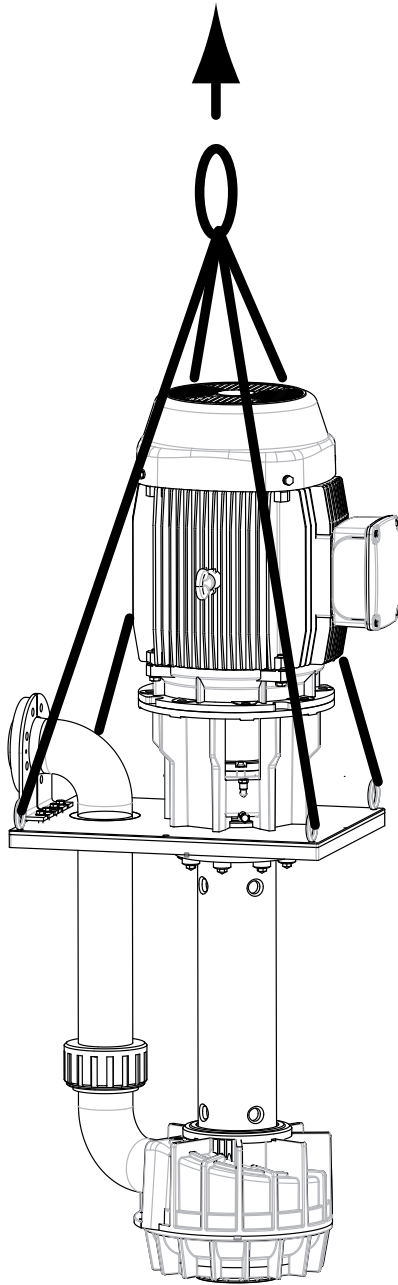
<sup>1)</sup>can change for motors of different brands  
<sup>2)</sup>with shaft

# CENTRE OF GRAVITY POSITION



# LIFTING





## **GENERAL CONDITIONS OF SALE**

### **1. 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.

### **2. LONG TERM STORAGE – HORIZONTAL AND VERTICAL 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.

### **3. LONG TERM STORAGE PACKAGE**

Due to their unique corrosion resistant design, **ARGAL Centrifugal Pumps** require very little special preparation for long term storage (more than **four** months). Those customers who find it necessary to store centrifugal 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.**

### **4. 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.

**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. The warranty period is shortened to **six** months if the machines work continuously twenty-four hours a day.

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 Code, 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 Italian 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.

BS, 13.11.2017  
**ARGAL S.r.l.**

Rev. 02 - 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:	<a href="http://www.argal.it">www.argal.it</a>
E-mail:	<a href="mailto:sales@argal.it">sales@argal.it</a> <a href="mailto:customercare@argal.it">customercare@argal.it</a>

REV. 9 - 11/17

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

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