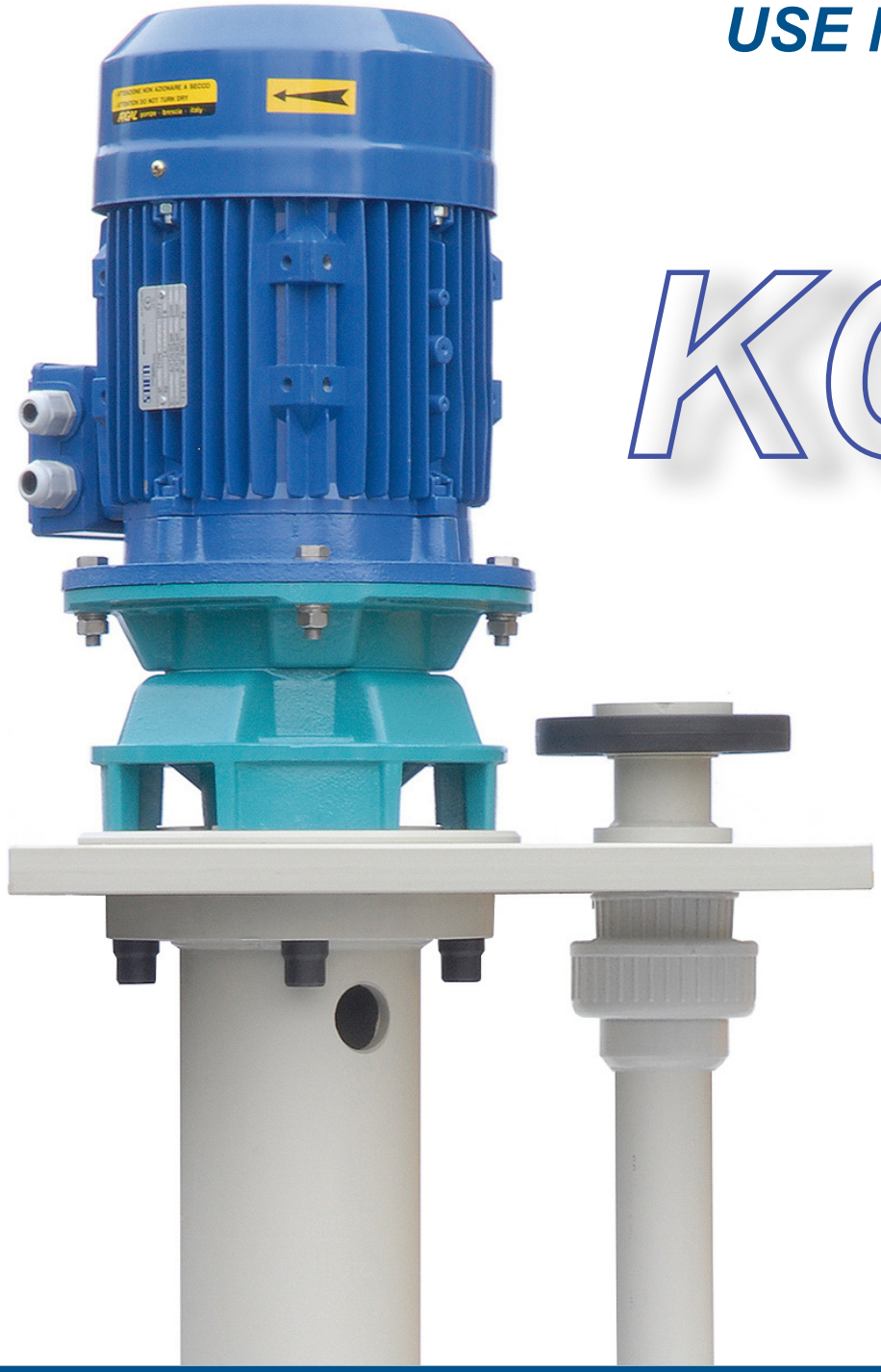
ARGAL

USE MANUAL

KGK



CE

DEALER

for Maintenance
date of commissioning:
.....
position / system reference:
.....
service:
.....

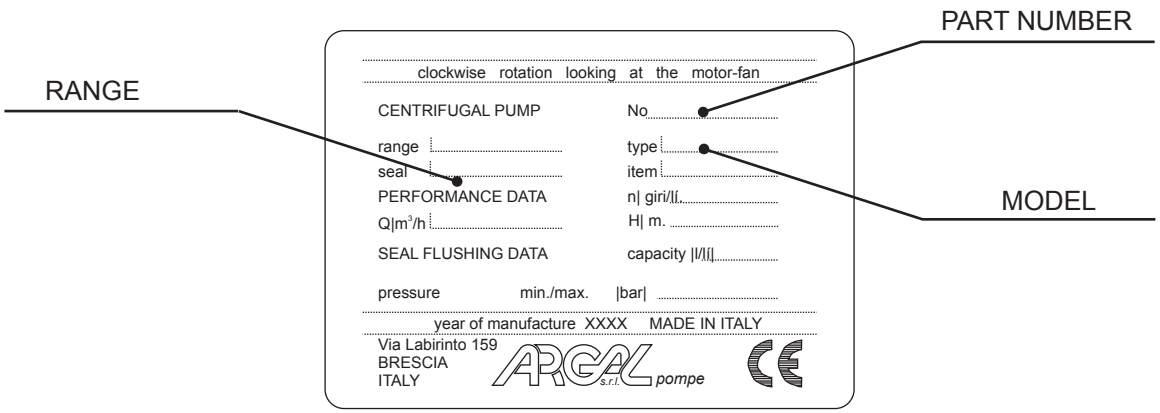
INDEX

IDENTIFICATION CODE

	PUMP DATA						MOTOR DATA				
	model		version	O-ring material	internal structure	vapour seal	rpm	Voltage	phase	power kW	optional
	50 Hz	60 Hz	□ **WR** GFR-PP	□ **V** FPM	□ **N** PTFE/Al_2O_3	□ **VR** V-ring	□ **1450**	□ **0** senza motore	□ **3**	□ 0.25	□ filter
	□ C25/100	□ C25/90	□ **FC** PVDF	□ **E** EPDM	□ **X** SiC/SiC	□ **VL** deflettore	□ **2900**	□ **N** standard	□ **1**	□ 0.37	□ extension
G1	□ C25/120	□ C25/110	□ **WF** PP+PVDF		□ **NX** PTFE/SiC	□ **VF** fluido	□ **1750**	□ **S** ver. speciale		□ 0.55	□ external flushing
	□ C32/120	□ C32/110	□ **QR** PVC+PVDF			□ **VM** mech. seal	□ **3500**	□ **E** EEx		□ 0.75	□ _____
	□ C32/140	□ C32/130	□ **GF** E-CTFE+PVDF							□ 1.1	□ _____
	□ C32/160	□ C32/170	□ **WRG** GFR-PP+FRP		under plate length					□ 1.5	□ _____
	□ A40/100	□ A40/90	□ **FCG** PVDF+FRP		mm_____					□ 2.2	
	□ A40/120	□ A40/110	□ **WFG** PP+PVDF+FRP							□ 3	
	□ C40/140	□ A40/130	□ **QRG** PVC+PVDF+FRP							□ 4	
	□ C40/160	□ C40/150								□ 5.5	
G2	□ A50/100	□ C40/170								□ 7.5	
	□ A50/120	□ A50/90								□ 11	
	□ A50/140	□ A50/110								□ 15	
	□ C65/100	□ A50/130								□ 18.5	
	□ C65/120	□ A50/150									
		□ C65/90									
		□ C65/110									

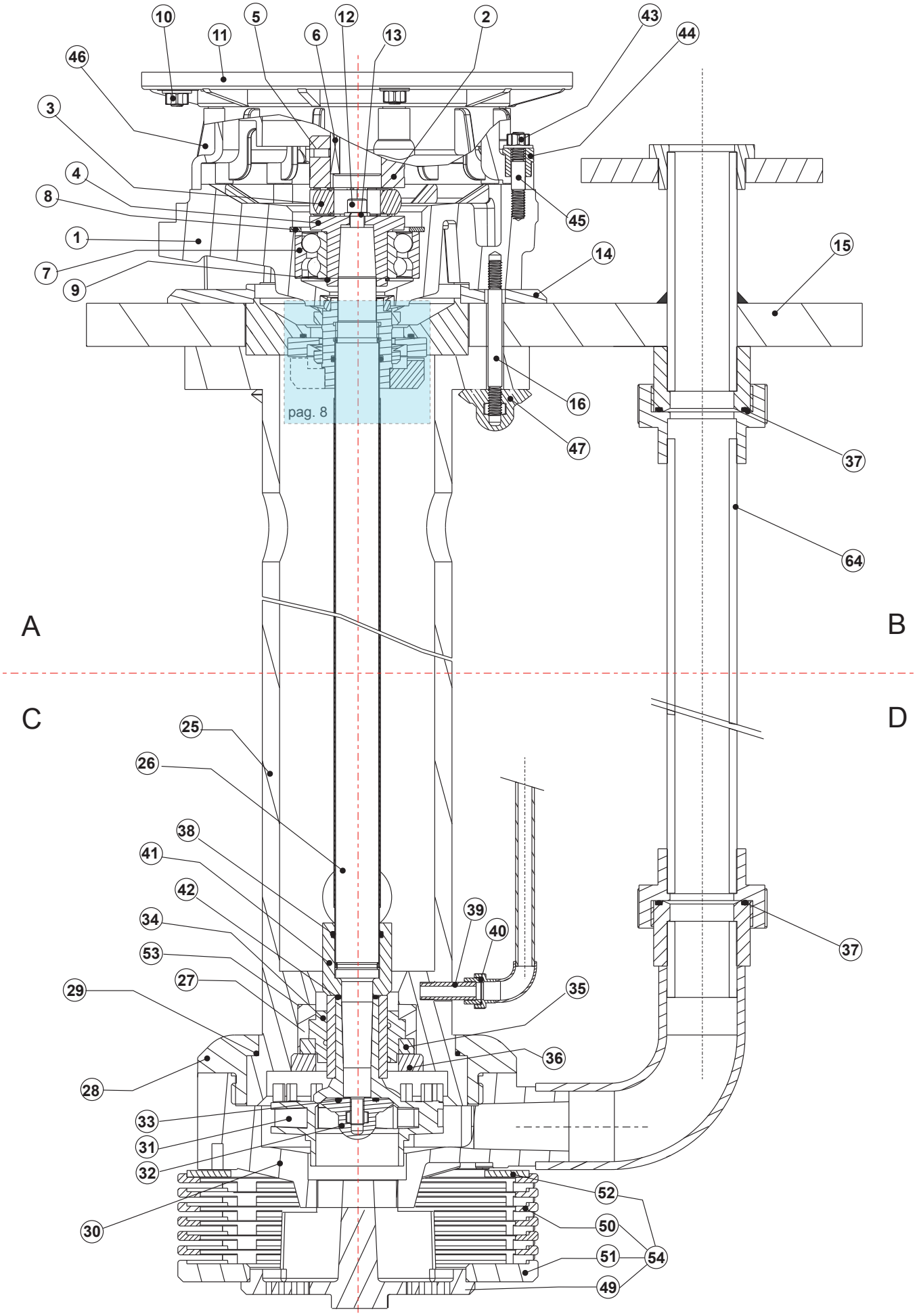
Each pump is supplied with the serial and model abbreviation and the serial number on the rating plate, which is riveted onto the support side. Check these data upon receiving the goods. Any discrepancy between the order and the delivery must be communicated immediately.

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.



SECTION VIEW

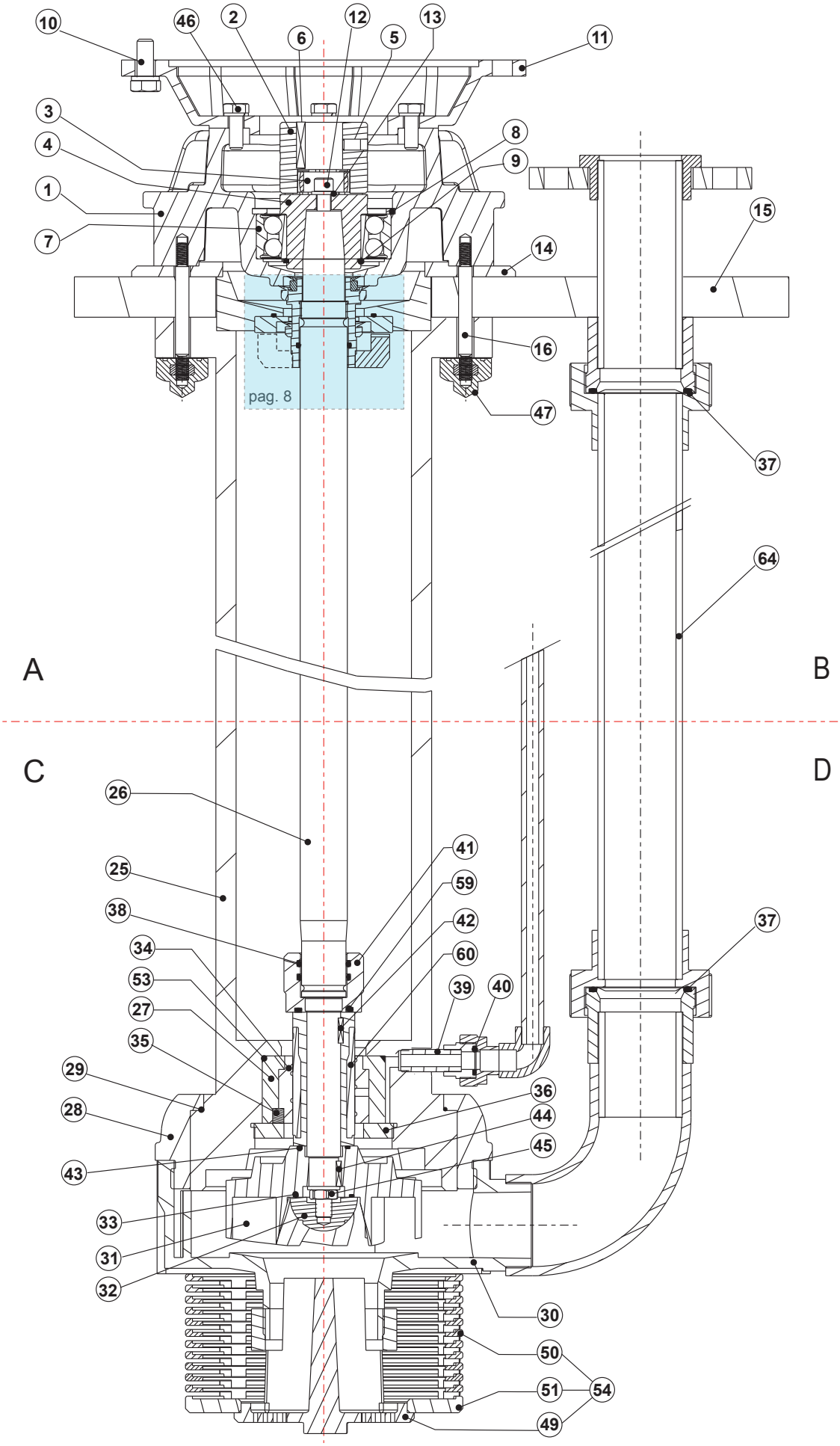
KGK G1:



LEGEND G1:

	pos.	ref	Part name	Q.ty	Disassembling steps sequence										Spare stock for working years	
					1	2	3	4	5	6	7	8	9	10	2	5
A	1	330	Support	1												
B	2	841	Flexible coupling (motor side)	1			•									
A	3	848	Spider	1			•									
A	4	842	Flexible coupling (pump side)	1										•		
A	5	904	Grub screw (UNI 5925 M5x8)	1			•									
A	6	940	Key (motor)	1												
A	7	321	Bearing (3207 A2RS1)	1										•		1
A	8	932.1	Seeger (UNI 7437 – 75)	1									•			1
A	9	932.2	Seeger (UNI 7435 – 35)	1												1
A	10	910.1	Connection motor lock flange / motor	1												
A	11	807	Motor lock flange	1		•										
A	12	914.1	Locking screw (ISO 4762 – M8x25)	1							•					
B	13	552	Spring washer (UNI 1751 – A 8)	1							•					
B	14	161	Support protection ring	1							•					
B	15	890	Base plate	1							•					
B	16	902.1	Joint pin (UNI 5914 M8x75)	3												
C	25	711.1	Column	1						•						
C	26	210	Coated shaft	1								•				
C	27	135	Guide bushing cartridge	1						•					1	2
C	28	164	Lock threaded ring (pump casing)	1												
C	29	412.3	O-ring (3425)	1											1	2
C	30	102	Volute casing	1	•											1
C	31	230	Impeller	1			•								1	2
C	32	260.1	Ogive	1		•									1	2
C	33	412.4	O-ring (3081)	1		•									1	2
C	34	545.1	Guide bushing	1					•						1	2
D	35	560.1	Safety pin	4					•						2	4
D	36	922.1	Lock threaded ring (guide bushing)	1				•							1	2
B/D	37	412.5	O-ring	1	•										1	2
C	38	412.6	O-ring (3100)	1											1	2
D	39	718.1	Flush-fitting	1	•											
D	40	412.7	O-ring	1	•											
C	41	713.4	Ending coating (lower)	1											1	2
C	42	412.8	O-ring (121)	1											1	2
B	43	910.2	Connection support/strainer	1	•											
B	44	587	Spacer	3	•											
B	45	902.2	Joint pin (UNI 5914 M8x35)	3												
A	46	161	Strainer	1		•										
B	47	260.2	Flange bolt	3					•							
D	49	153	Filter – suction connection	1	•											
D	50	745	Filter module				•									
D	51	142.1	Filtering plate	1		•										
D	52	142.2	Clamping ring (only 25/100)	1				•								
C	53	412.17	O-ring (3262)	1							•				1	2
D	54	745.2	Filter (complete)	1	•											
B	64	700	Disharge pipe	1	•											

KGK G2: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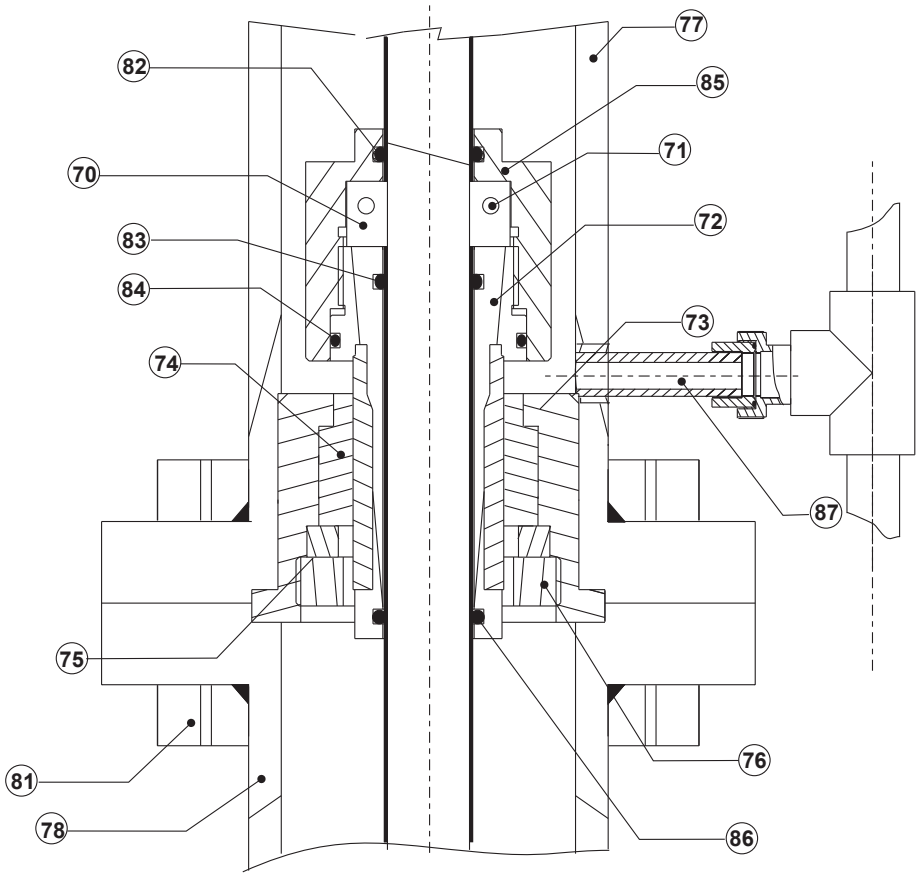
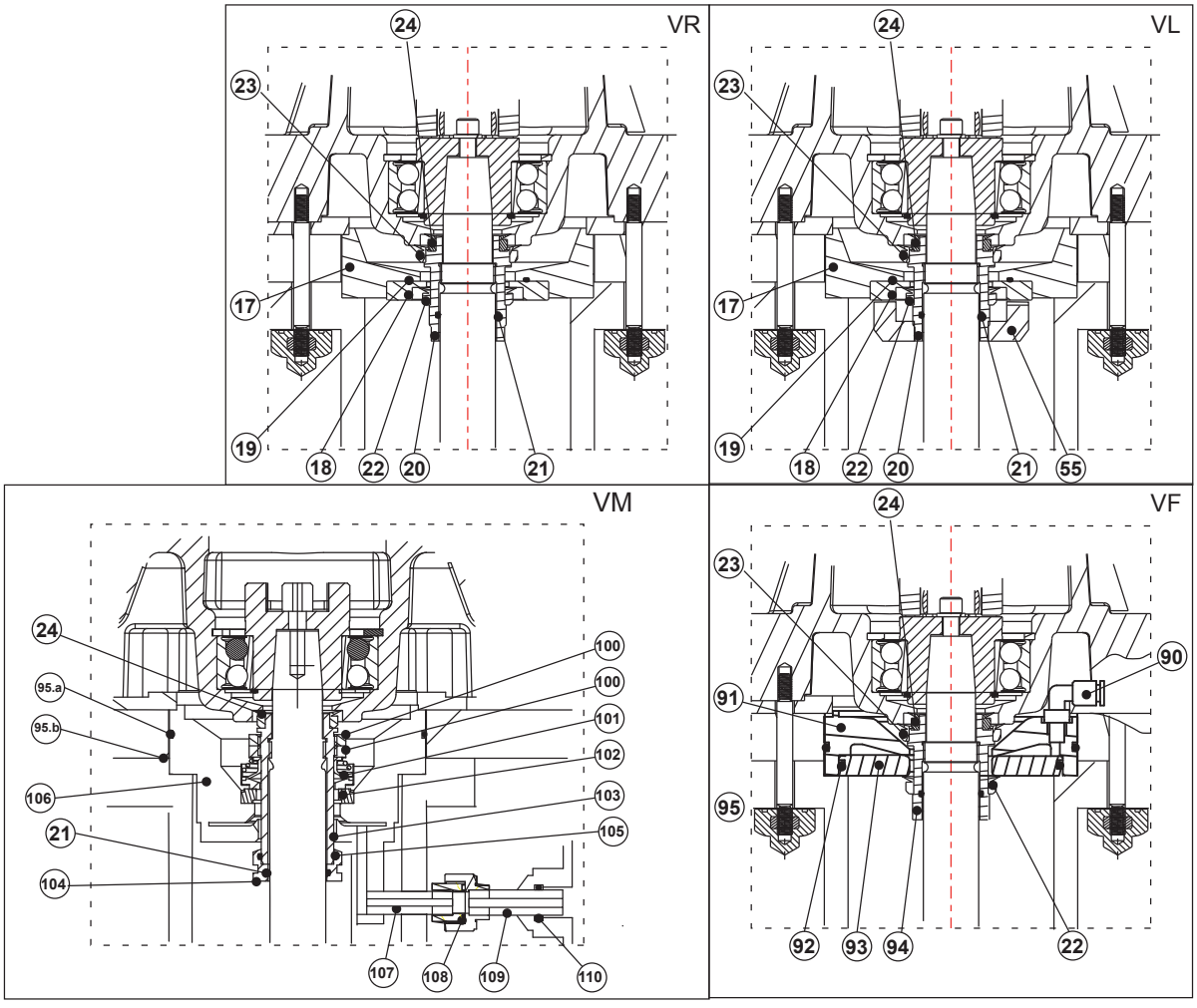
LEGEND G2:

	pos.	ref	Part name	Q.ty	Disassembling steps sequence										Spare stock for working years	
					1	2	3	4	5	6	7	8	9	10	2	5
A	1	330	Support	1												
A	2	841	Flexible coupling (motor side)	1			●									
A	3	848	Spider	1				●								
A	4	842	Flexible coupling (pump side)	1										●		
B	5	904	Grub screw (UNI 5925 M8x12)	1		●										
A	6	940.1	Key (motor)	1				●								
A	7	321	Bearing (3211 A2RS1)	1										●		1
B	8	932.1	Seeger (UNI 7437 – 100)	1									●			1
B	9	932.2	Seeger (UNI 7435 – 55)	1										●		1
A	10	910.1	Connection motor lock flange / motor	1	●											
B	11	807	Motor lock flange	1			●									
B	12	914.1	Locking screw (ISO 4762 – M10x30)	1							●					
B	13	552	Spring washer (UNI 1751 – A 10)	1								●				
B	14	161	Support protection ring	1							●					
B	15	890	Base plate	1							●					
B	16	902	Joint pin (UNI 5914 M10x90)	4												
C	25	711.1	Column	1							●					
C	26	210	Coated shaft	1								●				
C	27	161.1	Guide bushing cartridge	1						●					1	2
C	28	164	Lock threaded ring (pump casing)	1												
C	29	412.3	O-ring (3475)	1											1	2
D	30	102	Volute casing	1	●											1
C	31	230	Impeller	1				●							1	2
C	32	260	Ogive	1		●									1	2
C	33	412.4	O-ring (3156)	1		●									1	2
C	34	545.1	Guide bushing	1						●					1	2
C	35	560.1	Safety pin	2						●					2	4
D	36	922.1	Lock threaded ring (guide bushing)	1					●						1	2
B/D	37	412.5	O-ring	1											1	2
C	38	412.14	O-ring (4131)	2									●		1	2
D	39	718.1	Flush-fitting	1	●											
D	40	412.15	O-ring	1	●											
D	41	713.4	Ending coating (lower)	1								●			1	2
D	42	940.2	Key (UNI 6604-A 6x6x20)	1								●				
C	43	412.16	O-ring (3131)	1				●							1	2
D	44	940.3	Key (UNI 6604-A 6x6x20)	1				●								
D	45	910.5	Connection impeller / coated shaft	1			●									
A	46	910.6	Connection motor lock flange / support	1		●										
B	47	910.7	Connection column / baseplate	1						●						
D	49	153	Filter – suction connection	1	●											
D	50	745.1	Filter module				●									
D	51	142	Filtering plate	1		●										
C	53	412.17	O-ring (3350)	1							●					
D	54	745.2	Filter (complete)	1	●											
D	59	412.19	O-ring (3131)	1								●			1	2
D	60	523	Rotating bushing	1							●				1	2
D	64	700	Disharge pipe	1	●											

INTERMEDIATE GUIDE



VAPOUR SEAL



LEGEND

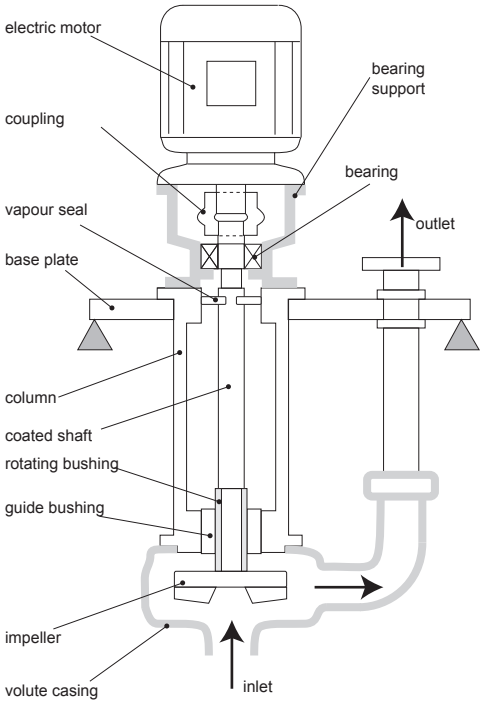
pos.	ref	Part name	Q.ty	Disassembling steps sequence										Spare stock for working years	
				1	2	3	4	5	6	7	8	9	10	2	5
70	488	Locking ring	1										●		
71	914.2	Locking ring screws	2									●			
72	529.2	Rotatine bushing	1								●			1	2
73	491	Guiding unit	1			●									1
74	545.2	Guide bushing	1					●						1	2
75	560.2	Safety pin	2				●							2	4
76	922.2	Lock threaded ring	1			●								1	2
77	711.3	Upper column	1						●						
78	711.4	Lower column	1		●										
81	910.4	Connection upper column / lower column	1	●											
82	412.9	O-ring	1											1	2
84	412.11	O-ring	1											1	2
85	713.3	Threaded ending	1												1
86	412.12	O-ring	1							●				1	2
87	718.2	Flush-fitting	1	●											
		vapour seal													
17	476.1	Counterface housing (V-ring)	1							●					
18	414.1	Counterface (V-ring)	1								●				1
19	412.1	O-ring (G1-3237 / G2-3287)	1									●			1
20	713.1	Ending coating (upper)	1									●			1
21	412.2	O-ring (G1→3100 / G2→3143)	1									●			1
22	415.1	V-ring (G1→V-40S / G2→V-45S)	1							●					1
23	415.2	V-ring (G1→V-40S / G2→V-55S)	1									●			1
24	415.3	V-ring (G1→V-30S/ G2→V-40S)	1									●			1
55	231	Vapour deflector	1										●		
90	762	Push in fitting	1												
91	476.2	Upper part	1												
92	412.13	O-ring	1											1	2
93	414.2	Lower part	1												
94	713.2	Ending coating (upper)	1												
95.a	412.18	O-ring	1											1	2
95.b	412.20	O-ring (version with pvdf plate)	1											1	2
100	922.3	Lock ring	2										●		
101	472	Mechanical seal (rotating ring)	1									●			
102	475	Mechanical seal (static ring)	1								●				
103	713.3	Ending coating (upper)	1									●			
104	713.4	Ending coating (lower)	1							●					
105	412.19	O-ring	1											1	2
106	479.2	Mechanical seal housing	1							●					
107	718.3	Flush-fitting mechanical seal (pump side)	1	●											
108	412.21	O-ring	1		●										
109	718.4	Flush-fitting mechanical seal (discharge pipe side)	1	●											
110	412.22	O-ring	1		●										

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 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 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 grante 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 one rolling bearing packed with grease; near the impeller (for underplate 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 axials loads are borne by the support bearing. 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 adeguate supports to mount the pump on.The discharge pipe, where it crosses the base plate, is provided with threaded collar (pipe clamp ring) and a lock nut which, by fastening it to the plate, prevents the volute casing from being affected by mechanical stress from the system. It is abosolutely 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 or with a fluid barrier vapour seal 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	4000
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
GF	ECTFE+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	4000
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
GF	ECTFE+PVDF	90		85	75	65	60	55	45	40	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 braket 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) ans 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 thr filter-drops and the inlet NPSHr drops shown on the specific tables).
MINIMUM CAPACITY	5% of the maximum capacity
EXTERNAL FLUSH	100 l/h - Operating pressure on the delivery +10% (Clear liquid)

MOTOR

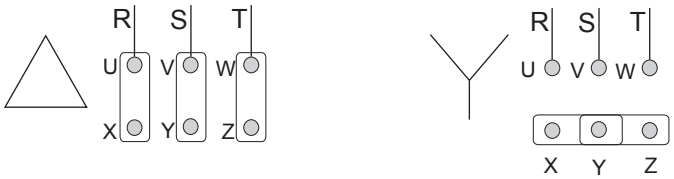
ELECTRICAL CONNECTIONS

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

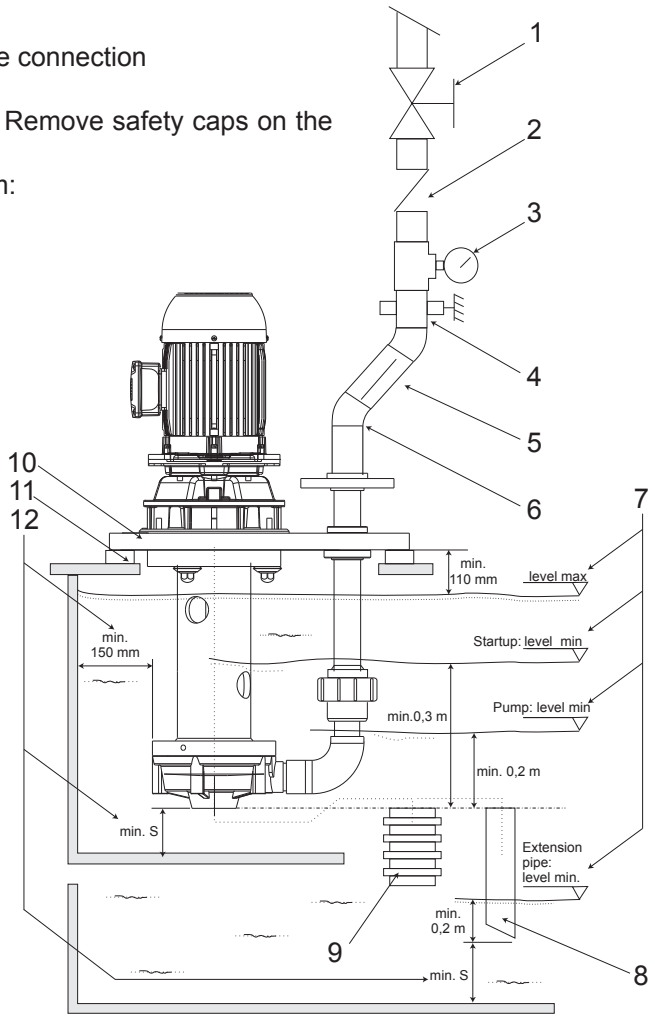
- cover the hydraulic connections
- when lifting the unit do not exert force on the plastic fittings
- lay the pump on its base or fixing plate during transport
- if the road is particularly rough, protect the pump by means of adequate shock absorbing supports
- bumps and shocks may damage important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

STORAGE INSTRUCTIONS

- When is necessari to store the pump 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, bifore 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° 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 present10)
10. Arrange for drainage of liquids from the base plate

11. Use all of the fixing holes provided to install the pump; the fixing points must be kept at the same level
12. 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 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

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) 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

DISASSEMBLY

- All bolts come with right-handed thread. Non-rotating parts coaxial to the shaft have a left-handed. Rotating parts have right-handed thread.
- The pump casing is screwed to the column (through left-handed thread): loose the pipe union before unscrewing (clockwise from the impeller side)
- Once the volute casing is open, the impeller must be detached by blocking off the opposite side of the shaft (removing the motor fan if necessary); now proceed unscrewing the ogive and the lock nut. The impeller is axially taken off.
- To remove the column , place the pump in vertical position on the motor flange, take off the four cap nuts an subsequently the four lock nuts (on the pumps models 25/100 – 25/120 – 25/125 they are three); pull off the column axially
- To access to the guide bushing unscrew the lock threaded ring (left handed thread) ; take off the two safety pins (preventing rotation of the bushing), thn pull off the bushins axially.
- To take off the rotating bushing , remove at first the driving feather key
- Once removed the column and the rotatine bushing, it is possibile to take off the V-ring of the vapour seal , the base plate and the protection disk of the support (fig. 9 g)
- The shaft of the pump is fixed to the elastic coupling by mean of a lock screw, loose the screw, then hit the head of the screw with a plastic mallet in order to unblock the shaft; remove the screw
- Do not submit the thermoplastic coating of the shaft to any stress.
- Remove the lock seeger to dismantle the coupling-bearing group

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 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

MALFUNCTIONS AND POSSIBLE CAUSES

THE PUMP DOES NOT DELIVER:
01- the semi joint to motor side has not been assembled furhter to maintenence 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 (please check that liquid level is above of the casing - see R dimension)
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):

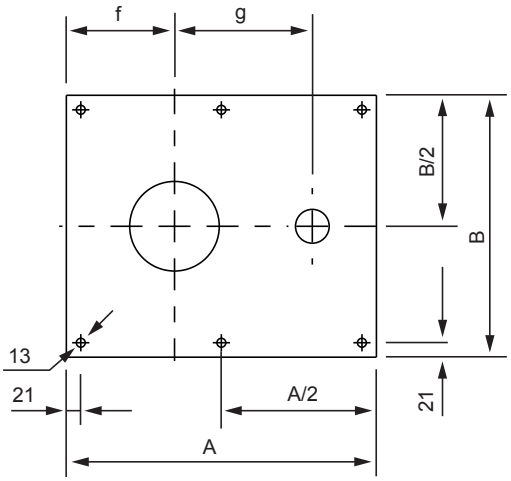
THE PUMP STARTS UP REGULARLY AND THEN DISCONNECTS:
18- Make sure the min. suction head is reached at the inlet port
19- Reduce or remove the suction extension

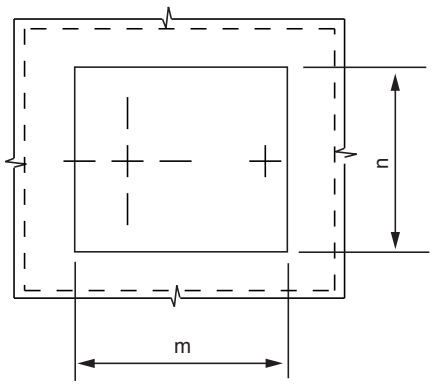
THE PUMP IS OVERLOADED:
see 13, 15
20- capacity is higher delivery than expected
21- the specific weight of the liquid is greater than expected
22- impurities inside the pump generate abnormal friction
23- the power supply voltage is not the one on the motor identification plate

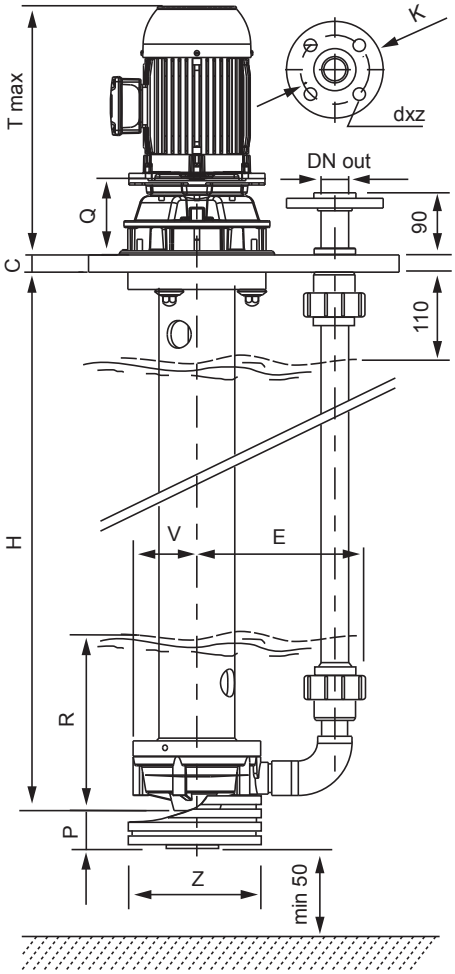
THE PUMP VIBRATES AND IS NOISY
see 12, 22
24- the pump is working at free capacity (zero head)
25- the pump or piping are not firmly fixed
26- the supporting structure must be made more rigid
27- the bearing hosted in the support is about to fail
28- the re assemply of motor and flexible joint further to maintenance operation is not proper

THE PUMP SHOWS SIGNS OF PREMATURE WEAR OF INTERNAL PARTS:
see 15, 22
27- liquid is excessively abrasive
28- frequent recurrence of cavitation (see 03, 14, 17)
29- high tendency of the liquid to crystallize or polymerize in stand-by
30- pump execution with materials not suitable for the liquid being pumped
31- operation at much reduced capacity

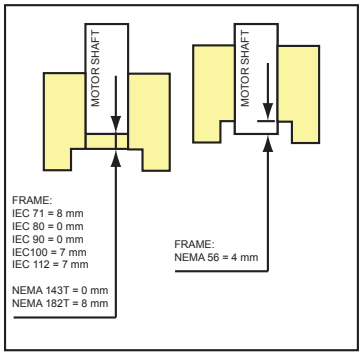
TECHNICAL DATA

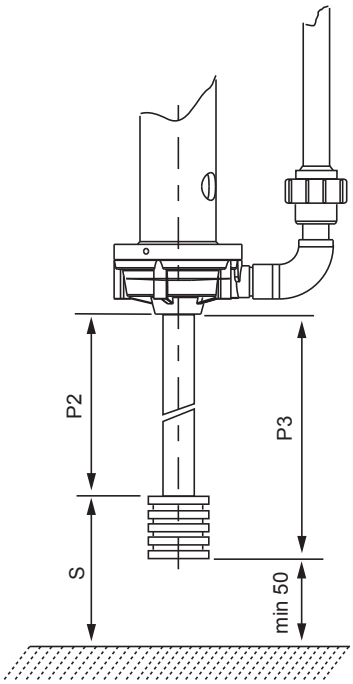






coupling position





size		G1						G2																			
n° poles		2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	2
model		c25/100	c25/100	c25/120	c25/120	c32/120	c32/120	c32/140	c32/140	c32/160	c32/160	a40/100	a40/100	a40/120	a40/120	c40/140	c40/140	c40/160	c40/160	a50/100	a50/100	a50/120	a50/120	a50/140	a50/140	c65/100	c65/120
inlet (GAS thread)																											
	DN	40	40	50	50	50	50	50	50	50	50	65	65	65	65	65	65	65	65	80	80	80	80	80	80	100	100
	thread	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	3	3	3	3	3	3	4	4
outlet (flanged DIN)																											
	DN	25	25	25	25	32	32	32	32	32	32	40	40	40	40	40	40	40	40	50	50	50	50	50	50	65	65
	K	85	85	85	85	100	100	100	100	100	100	110	110	110	110	110	110	110	110	125	125	125	125	125	125	145	145
	d	14	14	14	14	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	z	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
max. load on port-section F(x;y;z)																											
	Kg	7	7	7	7	7	7	10	10	10	10	10	10	10	10	10	10	10	10	12	12	12	12	12	12	12	12
pump	V	93	93	111	111	111	111	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125
	E	240	240	240	240	240	240	275	275	275	275	280	280	280	280	280	280	280	280	290	290	290	290	290	290	305	305
	R min	130	130	130	130	130	130	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	300	300
	S min	50	50	50	50	60	60	60	60	60	60	80	80	80	80	80	80	80	80	100	100	100	100	100	100	130	130
	H max	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
filter	P	40	40	40	40	45	45	50	50	50	50	50	50	50	50	50	50	50	50	65	65	65	65	65	65	90	90
	P2 max	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	1800	1800	1800	1800	1800	1800	1000	1000
	P3 max	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	800	800	800	800	800	800	/	/
	Z	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
base-plate	A	450	450	450	450	450	450	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
	B	380	380	380	380	380	380	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	C	25	25	25	25	25	25	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
	f	157	157	157	157	157	157	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185
	g	200	200	200	200	200	200	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235
	m	345	345	345	345	345	345	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420
	n	260	260	260	260	260	260	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280
max. tangential reaction at each fixing hole at starting																											
	Kg	3	3	3	3	3	3	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
pump weight		Kg (rif. ad H=1000; +30% per H=2000; + 60% per H=3000																									
	WR	24	24	24	24	24	24	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	54	54
	WF	24	24	24	24	24	24	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	54	54
	FC	26	26	26	26	26	26	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	57	57
	QR	26	26	27	27	27	27	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	62	62
	WRG	25	25	25	25	25	25	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	57	57
	WFG	25	25	25	25	25	25	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	57	57
	FCG	26	26	27	27	27	27	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	60	60
	QRG																										
max. head (50Hz)																											
	m	13		22		27.5		31		36		22		24.5		32.5		41		24		26.5		32		20	28
max capacity (50Hz)																											
	m³/h	18		26		30		26		27		40		48		30		35		65		70		80		100	140
sound p.l.																											
	dB	63	61	63	61	64	62	70	68	70	68	70	68	70	68	70	68	72	70	72	70	72	70	72	70	72	72
Temperature on the support: max 70°C																											
motors																											
	kW	0.75	0.25	1.5	0.37	2.2	0.55	3	0.75	4	1.1	3	0.55	4	0.75	4	0.75	5.5	1.1	5.5	1.1	5.5	1.5	7.5	1.5	7.5	7.5
weight [2]	Kg	8	5.4	13	6.3	16	7.6	22	9.2	31	12.5	22	7.6	31	9.2	31	9.2	53	12.5	53	12.5	53	15	61	15	61	61
	kW	1.1	0.37	2.2	0.55	3	0.75	4	1.1	5.5	1.5	4	0.75	5.5	1.1	5.5	1.1	7.5	1.5	7.5	1.5	7.5	2.2	11	2.2	11	11
weight [2]	Kg	10	6.3	16	7.6	22	9.2	31	12.5	53	15	31	9.2	53	12.5	53	12.5	61	15	61	15	61	21	74	21	74	74
	kW	1.5		3	0.75	4	1.1	5.5	1.5	7.5	2.2	5.5	1.1	7.5	1.5	7.5	1.5	11	2.2	11	2.2	11	3	15	3	15	15
weight [2]	Kg	13		22	9.2	31	12.5	53	15	61	21	53	12.5	61	15	61	15	74	21	74	21	74	25	85	25	85	85
	kW	2.2		4									1.5		2.2							15			4		
weight [2]	Kg	16		31									15		21							85			33		
[2]	Q max	119		134		134		161	141	161	141	161	141	161	141	161	141	191	141	191	141	191	161	191	161	191	191
[2]	T max	410		470		470		550	475	550	475	550	475	550	475	550	475	700	475	700	475	700	550	700	560	700	700

dimension in mm

[2]can change for motors of different brands

size		G1						G2																					
n° poles		2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4
modello		c25/90	c25/90	c25/110	c25/110	c32/110	c32/110	c32/130	c32/130	c32/170	c32/170	a40/90	a40/90	a40/110	a40/110	a40/130	a40/130	c40/150	c40/150	c40/170	c40/170	a50/90	a50/90	a50/110	a50/110	a50/130	a50/130	a50/150	a50/150
inlet (GAS thread)																													
	DN	40	40	50	50	50	50	50	50	50	50	65	65	65	65	65	65	65	65	65	65	80	80	80	80	80	80	80	80
	Filetto	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	3	3	3	3	3	3	3	3
outlet (flanged DIN)																													
	DN	25	25	25	25	32	32	32	32	32	32	40	40	40	40	40	40	40	40	40	40	50	50	50	50	50	50	50	50
	K	85	85	85	85	100	100	100	100	100	100	110	110	110	110	110	110	110	110	110	110	125	125	125	125	125	125	125	125
	d	14	14	14	14	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	z	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
max. tangential reaction at each fixing hole at starting																													
	Kg	7	7	7	7	7	7	10	10	10	10	10	10	10	10	10	10	10	10	10	10	12	12	12	12	12	12	12	12
pump	V	93	93	111	111	111	111	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125
	E	240	240	240	240	240	240	275	275	275	275	280	280	280	280	280	280	280	280	280	280	290	290	290	290	290	290	290	290
	R min	130	130	130	130	130	130	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
	S min	50	50	50	50	60	60	60	60	60	60	80	80	80	80	80	80	80	80	80	80	100	100	100	100	100	100	100	100
	H max	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
filtro	P	40	40	40	40	45	45	50	50	50	50	50	50	50	50	50	50	50	50	50	50	65	65	65	65	65	65	65	65
	P2 max	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	1800	1800	1800	1800	1800	1800	1800	1800
	P3 max	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	800	800	800	800	800	800	800	800
	Z	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
plate	A	450	450	450	450	450	450	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
	B	380	380	380	380	380	380	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	C	25	25	25	25	25	25	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
	f	157	157	157	157	157	157	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185
	g	200	200	200	200	200	200	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235	235
	m	345	345	345	345	345	345	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420
	n	260	260	260	260	260	260	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280
max. tangential reaction at each fixing hole at starting																													
	Kg	3	3	3	3	3	3	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
pump weight		Kg (rif. ad H=1000; +30% per H=2000; + 60% per H=3000																											
	WR	24	24	24	24	24	24	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
	WF	24	24	24	24	24	24	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
	FC	26	26	26	26	26	26	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55
	QR	26	26	27	27	27	27	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	WRG	25	25	25	25	25	25	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54
	WFG	25	25	25	25	25	25	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54
	FCG	26	26	27	27	27	27	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
	QRG																												
max. head (60Hz)																													
	m	18.5		23.5		29		38.5		51		23.5		29		34		44		57.5		34		37		41.5		45	
max capacity (60Hz)																													
	m³/h	21		23.5		31.5		23		23		44.5		49		59		30		30		79.5		84.5		90		100	
sound p.l.																													
	dB	64	62	64	62	65	62	70	68	70	68	70	68	70	68	70	68	72	70	72	70	72	70	72	70	72	70	72	70
Temperature on the support: max 70°C																													
motor																													
	kW	1.1	0.25	2.2	0.55	2.2	0.55	4	1.1	5.5	1.5	3	0.75	4	1.1	5.5	1.1	5.5	1.1	7.5	1.5	7.5	1.5	11	2.2	11	2.2	11	3
weight [2]	Kg	10	5.4	16	7.6	16	7.6	31	12.5	53	15	22	9.2	31	12.5	53	12.5	53	12.5	61	15	61	15	74	21	74	21	74	25
	kW	1.5	0.37	3	0.75	3	0.75	5.5	1.5	7.5	2.2	4	1.1	5.5	1.5	7.5	1.5	7.5	1.5	11	2.2	11	2.2	15	3	15	3	15	4
weight [2]	Kg	13	6.3	22	9.2	22	9.2	53	15	61	21	31	12.5	53	15	61	15	61	15	74	21	74	21	85	25	85	25	85	33
	kW	2.2	0.55	4	1.1	4	1.1	7.5	2.2	11	3	5.5	1.5	7.5	2.2	11	2.2	11	2.2	15	3	15	3		4		4		5.5
weight [2]	Kg	16	7.6	31	12.5	31	12.5	61	21	74	25	53	15	61	21	74	21	74	21	85	25	85	25		33		33		53
	kW	3										7.5	2.2	11		15	3						4				5.5		
weight [2]	Kg	22										61	21	74		85	25						33				53		
[2]	Q max	119		134		134		161	141	161	141	161	141	161	141	161	141	161	141	191	141	191	141	191	141	191	161	191	161
[2] [3]	T max	410		470		470		550	475	550	475	550	475	550	475	550	475	550	475	700	475	700	475	700	475	700	550	700	560

dimension in mm

[2]can change for motors of different brands

n° poli		2	2							
modello		c65/190	c65/110							
inlet (GAS thread)										
	DN	100	100							
	Filetto	4	4							
outlet (flanged DIN)										
	DN	65	65							
	K	145	145							
	d	18	18							
	z	4	4							
max. tangential reaction at each fixing hole at starting										
	Kg	12	12							
pump	V	125	125							
	E	305	305							
	R min	300	300							
	S min	130	130							
	H max	4000	4000							
filtre	P	90	90							
	P2 max	1000	1000							
	P3 max	/	/							
	Z	200	200							
plate	A	530	530							
	B	400	400							
	C	30	30							
	f	185	185							
	g	235	235							
	m	420	420							
	n	280	280							
max. tangential reaction at each fixing hole at starting										
	Kg	8	8							
pump weight										
	WR	54	54							
	WF	54	54							
	FC	57	57							
	QR	62	62							
	WRG	57	57							
	WFG	57	57							
	FCG	60	60							
	QRG									
max. head (60Hz)										
	m	30	40							
max capacity (60Hz)										
	m^3/h	100	140							
sound p.l.										
	dB	72	72							
Temperature on the support: max 70°C										
motor										
	kW	7.5	11							
weight [2]	Kg	61	74							
	kW	11	15							
weight [2]	Kg	74	85							
	kW	15								
weight [2]	Kg	85								
	kW									
weight [2]	Kg									
[2]	Q max	191	191							
[2] [3]	T max	700	700							

cotes en mm

IT - 25125 BRESCIA - Via Labirinto, 159
Tel. +39 030 3507011 - Fax +39 030 3507077
Export dpt. Tel. +39 030 3507033
Web: www.argal.it - E-mail: export@argal.it

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

Omar Gabrieli
C.E.O.

GENERAL CONDITIONS OF SALE

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.

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.

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.

COMPLAINTS
Complaints of any type must be made upon receiving the goods and within on 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.

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. 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 una 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 or 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.

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.

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.

ARGAL SRL

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

REV. 14 - 03/17

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