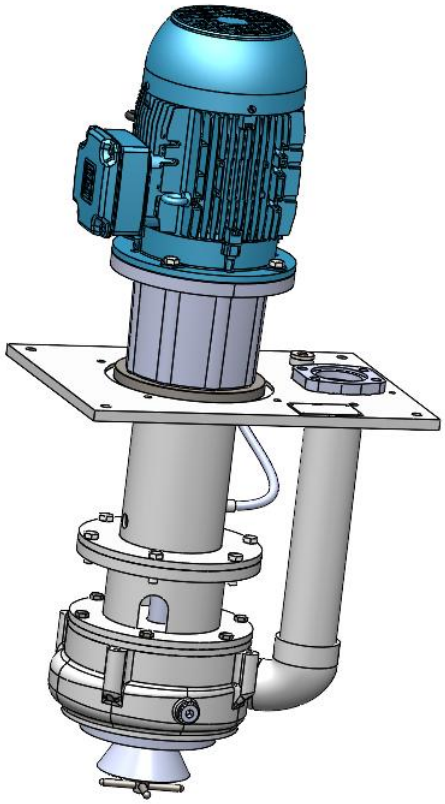
ESP GROUPE

EVA SEIM POMPES GROUPE

ASSEMBLY AND MAINTENANCE INSTRUCTIONS

EVA VORTEX Pump

Type SBA with single bearing box Evolving pump

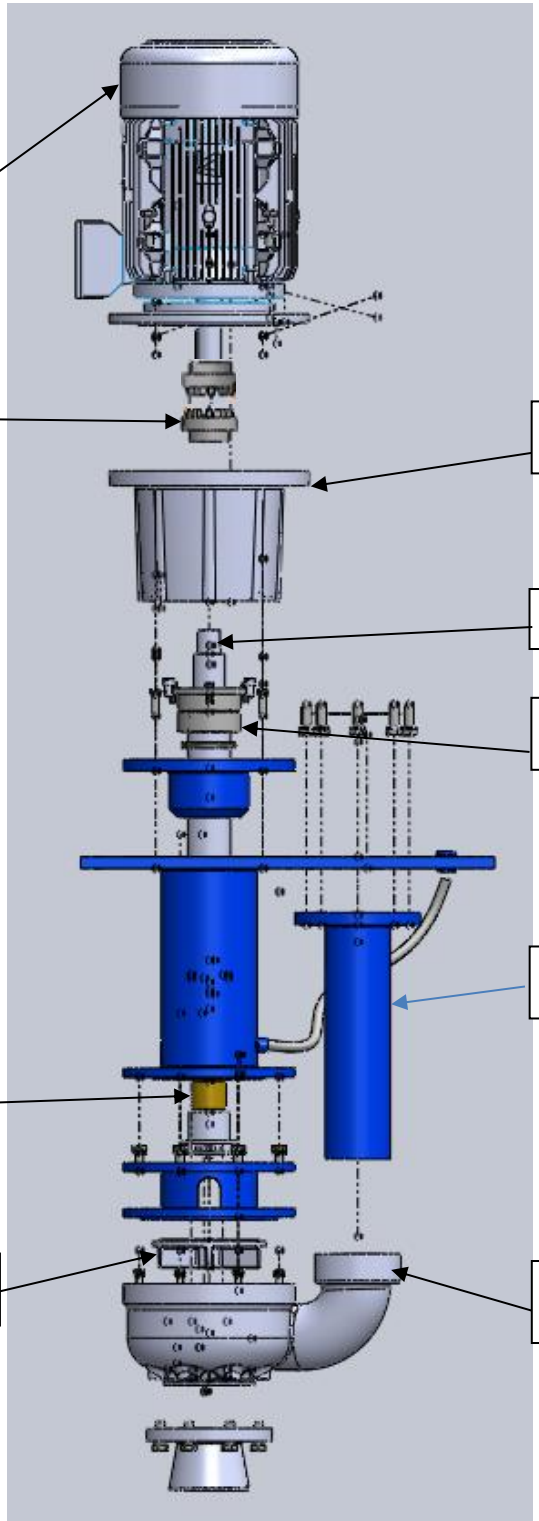


CONTENTS

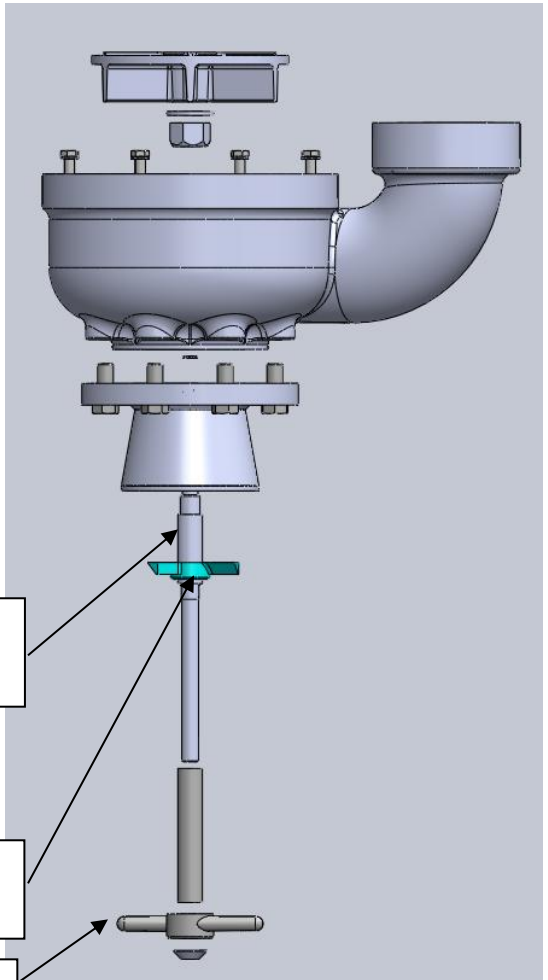
1. PRODUCT DESCRIPTION – PRINCIPLE OF OPERATION

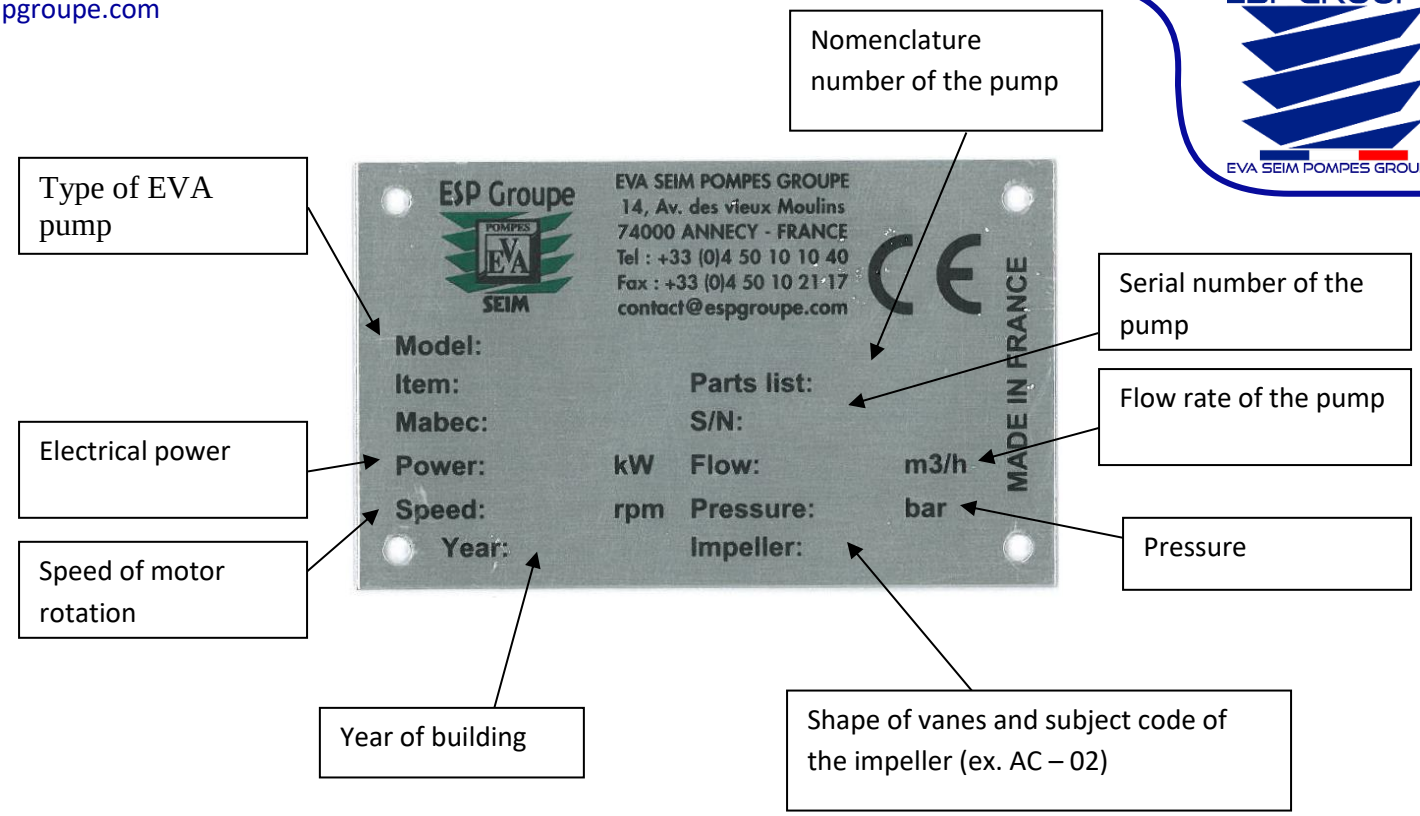
- Vertical pump with submerged housing
- Dry operation without risk of deterioration.
- Installation inside a pumpback system

1.1 Pump construction detail



Cutter + agitator version (Optional)

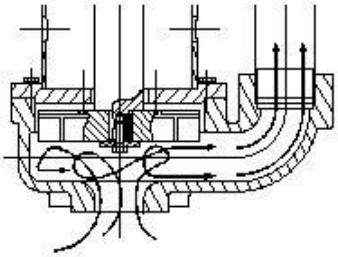




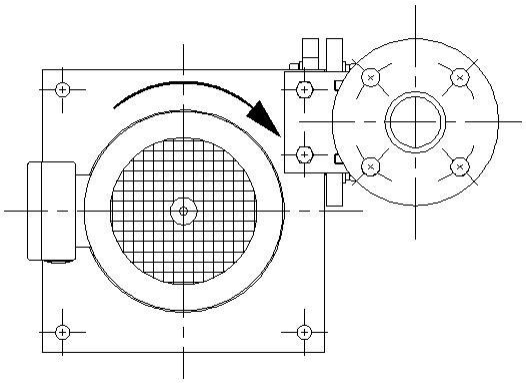
The rating plate specifications must be given for all requests for after-sales-service and/or replacement parts.

1.2 Principle of operation

Aspiration of liquid by VORTEX vane impeller



Clockwise rotation when seen from the motor side.



2. INSTRUCTIONS FOR ASSEMBLY AND INSTALLATION

2.1 Storage

It is preferable to store the pump covered, in its original packaging.

2.2 Handling

For handling and installation on the frame, pass a strap over the width of the plate between four rings on base plate.

2.3 Installation

- Before installation, make sure that:
- The base plate of the trough is completely level.

- The trough has been cleaned before placement in water.

2.4 Connecting the line

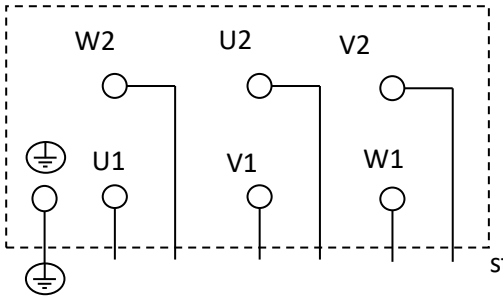
- The diameter of the discharge line should not be less than the nominal diameter of the pump. (Especially if pumping large shavings).

- The discharge line should be perfectly maintained independently of the pump.
- The pump should never withstand the constraints of misalignment or the weight of the discharge line. These cause premature wear and tear of the pump's mechanical components.
- The suction diameter should not be reduced.

2.5 Electrical connection

- The stuffing boxes provided to balance tractive effort or torsional stress should be used in compliance with regulations. After loosening the screws or nuts, insert the power leads between the lower part and the presser of the terminal posts.
- The stripped ends of the wires should fill the entire length of the terminals however; they should not jut out. Make sure the leads are well in place and then retighten the screws or nuts.
- Connect the guard wire with the neutral terminal found inside the terminal box or in the case of a separate earth, connect the latter to the earth terminal.

• **Connection diagrams for three-phase motors with cage rotors**



Delta connection

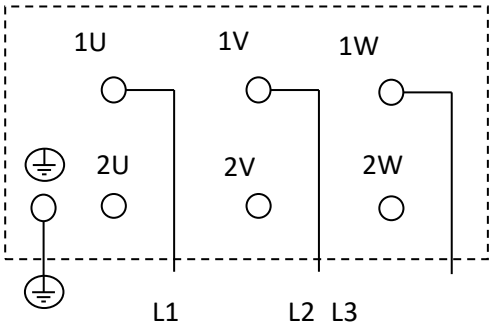
star-delta connection

With switch

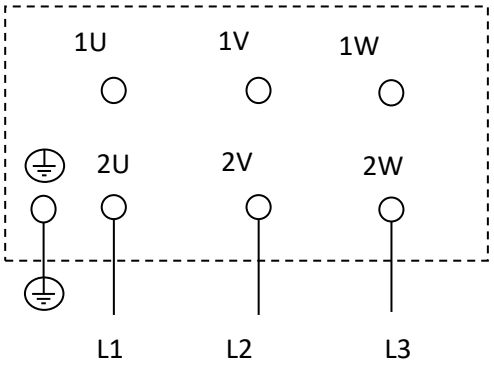
• **Connection diagrams for three-phase motors with switchable poles**

2 speed motor with separate inter windings:

In the type designation, the fewer the number of poles = the high speed is mentioned first (ex. AM 280. 4/8)



Low speed



High speed

The individual connection diagrams are found in the lid of the terminal box or delivered with the motor.

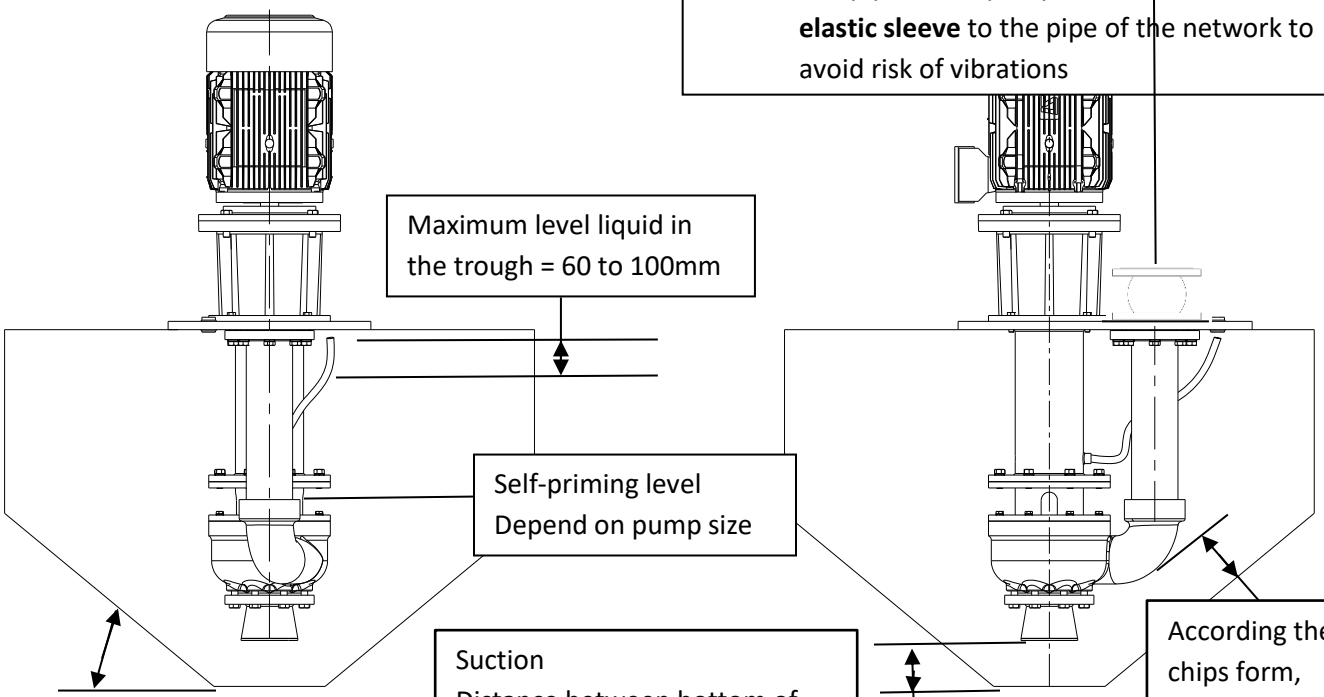
3. Recommendations and adjustments to observe for position of the pump EVA inside the tank

- working conditions

Discharge line:

Pay Attention:

- Checking if there is nothing blocking the line because of risk of overflow
- The pipe of the pump has to be connected with **elastic sleeve** to the pipe of the network to avoid risk of vibrations



Maximum level liquid in the trough = 60 to 100mm

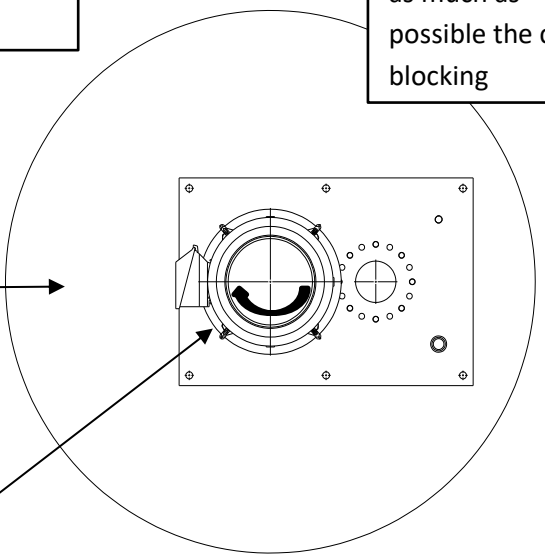
Self-priming level
Depend on pump size

Suction
Distance between bottom of the tank and end of suction must be equal to 1 x to 1.5 maxi X Ø suction

According the chips form, respect a passage in order to reduce as much as possible the chips blocking

To avoid risk of decantation, angle recommendation doesn't must be inferior to 40°

Liquid entrance
If possible, opposite to the pump delivery pipe



Motor
Speed limited up to 1750 rpm
Pay attention to the direction indicated with arrow

4. Technical characteristics

From size 40 up size 200
Q: 10 m3/h up 360 m3/h
Pressure: up 20CW
Speed: mini 750 rpm up 1750 rpm

4.2 Main characteristics

- Open impeller with Vortex effect
- Protection against running dry during - starting working (limited at 15 min maxi)
- Used for aluminium chips – steel chips with very low alloy and very thin- cast iron GG25 very thin
- Load aluminium chips: up 15 g/l
- Load steel and cast iron: up 5 g/l
- Length of aluminium chips up 120 mm (following size of casing)
- Fluid: Emulsion or oil up 32 Cst
- Air: up 10 % with special impeller patented EVA (For % > on request)
- Outline: Din or ANSI Size: DN 50 and 65 2" – 2"1/2 up to DN200 PN16 according pump size
- Casing: cast Iron GGG50
- Impeller: cast Iron GGG50 or carbon steel (on request)
- Cutter and agitator (in option) Special design patented by EVA - Hard material with hard treatment

5. MAINTENANCE, SERVICING AND SAFETY

Before any intervention, make sure that the pump has been shut down:

- Electrical power cut.

- Hydraulic network disconnected.

Use personal protective equipment and the correct tools.

5.1 Preventive maintenance and checks.

- **Cleaning**:

Clean the motor regularly with compressed air in order to avoid any obstruction of the cooling flanges.

Never use liquid products.

- **Regular checks (at least monthly):**

• Inspect the fan motor cowling supports.
• Inspect the condition of the various electrical and hydraulic connections.

• Inspect abnormal noises, vibrations and any phenomena that could signal the deterioration of a pump component, the motor or a failure of the discharge line support structure.

• Inspect the greasing if applicable.

- **Checking and replacing the impeller:**

Checking and/or replacing the impeller requires dismantling the moto pump assembly. See chapter 5.3, page 10 for the dismantling procedure.

• Half-yearly inspection for non-abrasive liquids.

• Quarterly inspection for abrasive liquids.

• Immediate inspection if the specifications of the pump diminish.

Note: It is recommended to delay the shutdown of the pump in case of prolonged operation without liquid (time = 3-5 minutes corresponding to the average time of recovery of overall volume and machine drippings

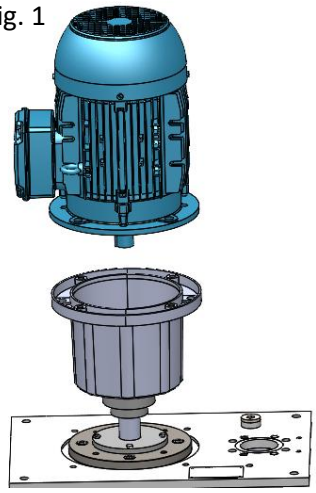
5.2 Incidents and main causes

CORRECTIVE MAINTENANCE AND TROUBLE-SHOOTING

The motor functions, but not the pump:	- The half plates of the coupling are incorrectly joined.
The pump functions but does not discharge:	- The impeller is no longer on its shaft. - Impeller is broken - Presence of air inside liquid (Check) - A plug is obstructing the discharge system. - Outlet pressure is too low facing to the real outlet pressure required.
The motor heated or cuts out:	- Something is blocking the turbine. - The outlet pressure is lower than that announced during the selection (Check). - The motor is turning in reverse. - The motor's rotation speed is not good. - Presence of air inside liquid (Check).
The pump vibrates abnormally:	- The diameter of outlet piping is too small (Check) - The coupling is badly blocked. - The discharge line is constraining the pump. - The base plate is not attached to a level support. - The outlet pressure is lower than that announced. - The impeller is damaged (loss of balancing). - Cutter, agitator or secondary shaft is damaged →to be check and change if necessary
The pump makes a strange noise:	- The fan motor is rubbing against the cowling. - A bearing has deteriorated. - The impeller is rubbing in the pump casing. - The cut is rubbing against the cutting flange. - Lower bushing is wearing to be check and remove if necessary
The pump is not performing as rated:	- The outlet pressure is higher than initially expected. - The viscosity of the product is different from that announced. - The discharge pipe is clogged (partially or totally). - The motor rotation speed is not good. - The diameter or shape of the impeller does not comply.
Lifting tank overflow (	- Impeller is broken - Discharge pipe is clogged - Outlet pressure is too low or too high facing to the outlet pressure required - Presence of air inside liquid (Check)
The pump is not cutting chips:	- The knife must be change.

5.3 Dismantling the various pump elements (pump out of lifting tank)

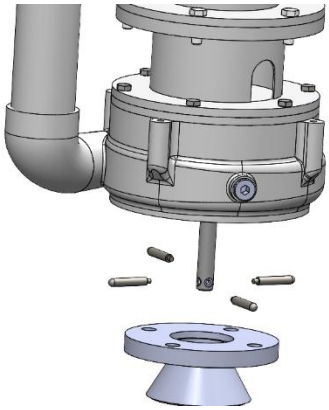
Fig. 1



1- **Removing the pump from its trough:**

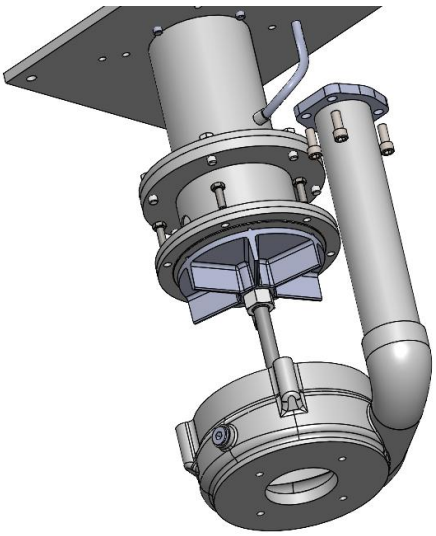
1. Unscrew the 4 screws from motor (fig 1)
2. Unscrew the 4 screws from bell housing (fig 1)
3. Remove the moto pump assembly and put it on an appropriate support (fig 2)

Fig. 2



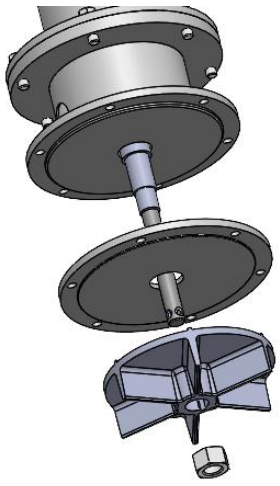
2- **Remove the tulip(optional)**

1. Unscrew the 4 branches from the shaft (fig 2)
2. Unscrew the 4 screws from the cone (fig 2)
3. Disconnect the discharge line



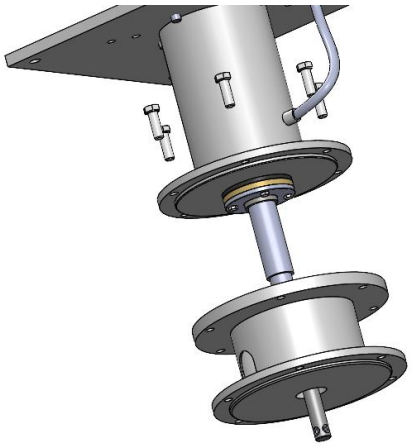
3- **Remove the casing + piping**

1. Remove the blocking screw of the flange piping
2. Remove the blocking screw of the casing
3. Remove the set of casing + piping



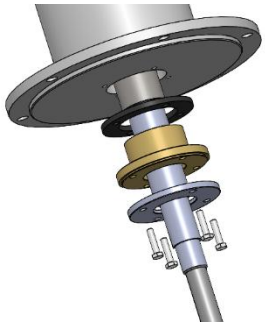
4- **Remove the impeller**:

1. Unscrew the nut under impeller
2. Remove the impeller and the wearing plate (optional)



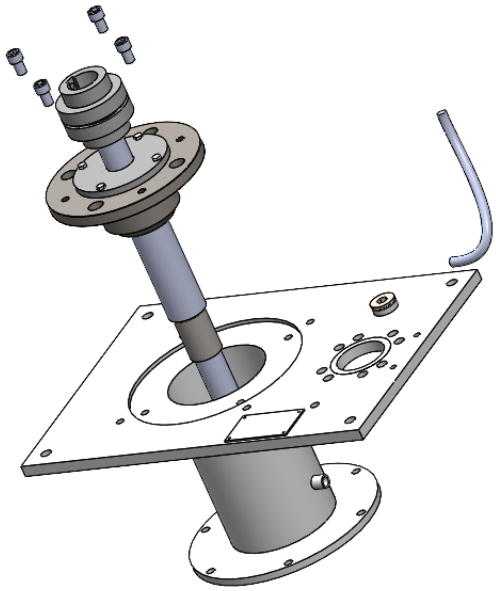
5- **Remove the spacer**

1. Unscrew the screws of the spacer and remove the spacer



6- **Remove the bushing**

1. Unscrew the screws of the bushing
2. Remove the cover, the bushing and the gasket

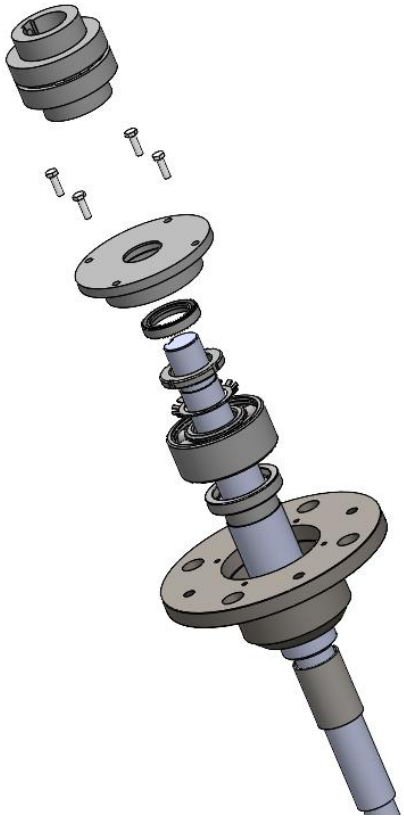


7- **Remove the column**

1. unscrew the 4 fixing screws
2. Remove the flexible piping
3. Remove the column

8- **Remove the shaft**

1. Remove the coupling
2. Unscrew the 4 screws of the cover
3. Remove lipseal
4. Unscrews the nut and remove the washer
5. Extract the bearing
6. Remove the bearing box



- **Reassembly:**

Carry out the various operations in reverse order.

5.4 parts list

Item 09 → Column with connection for coolant liquid

Item 01 → Pump casing

Item 02 → Impeller

Item 15→ bell housing

Item 14 → Motor

Item 48 → Spacer

Item 08 → Shaft

Item 12 → Coupling (polynorm)

Item 06 → Sleeve bearing

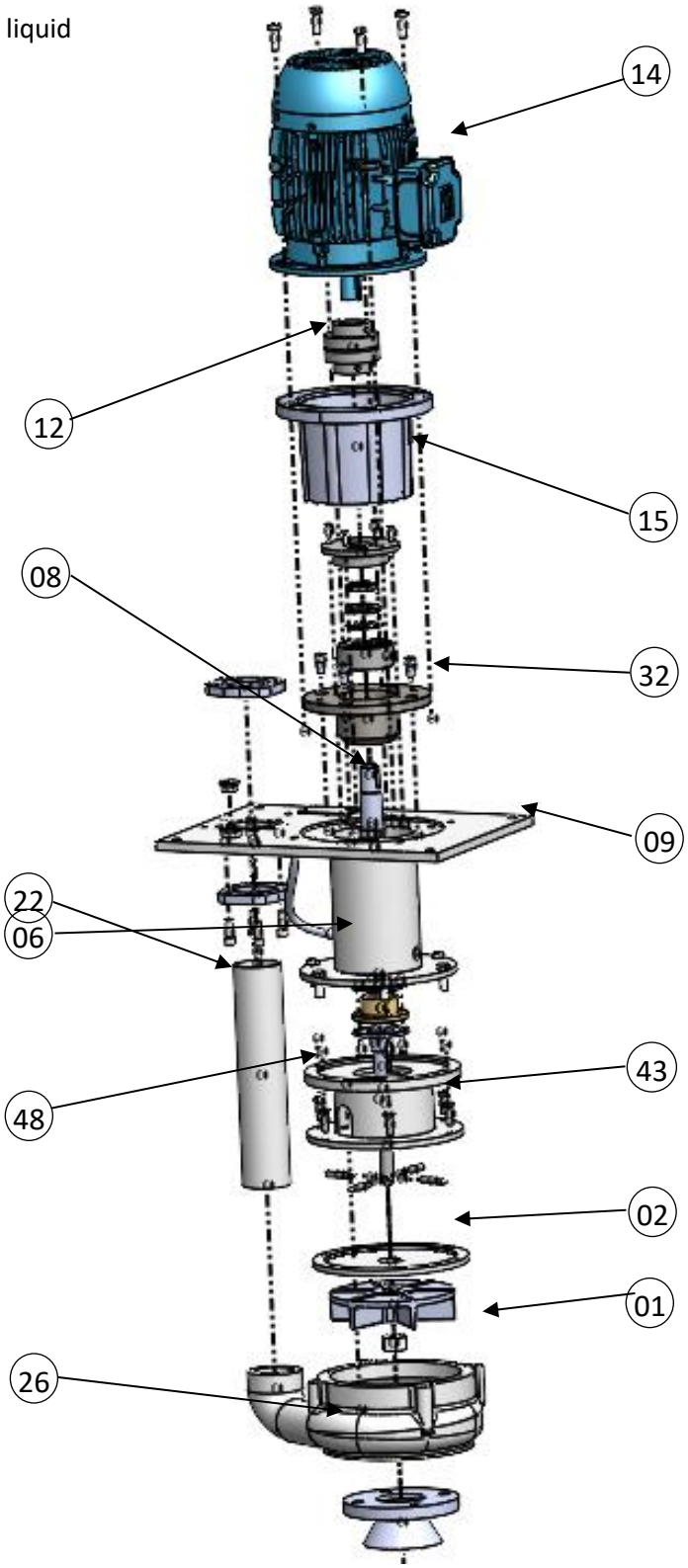
Item 32 → Bearing Support

Item 22 → Discharge pipe

Item 26 → Suction piping

Item 47 → Knife (option – not show)

Item 43 → Agitator (option)



6. CONDITIONS OF GUARANTEES

The pumps are guaranteed for parts and labour if recognized as defective by our after-sales-service (materials returned to our workshops).

Excluded from the guarantee:
- Abnormal running.
- Operation other than that provided for when ordered.
- Lack of checks and maintenance.
- Wearing parts.

Wearing parts: - Impeller / knife / casing / bushing / ball bearing / seal

7. APPENDICES

7.1 Assembly sheet for the Poly-norm

- **PRECAUTIONS FOR USE**

1) before start-up for the coupling, please inspect the tightening of the setscrews in the hubs, the alignment and the distance dimensions and adjust, if necessary, and also inspect all screw connection for the tightening torques specified, dependent on the type of coupling

- **Assembly**:
The coupling is generally supplied in individual parts. Before assembly the coupling has to be inspected for completeness.

Components of POLY-NORM®, type AR

Component	Quantity	Description	Material	Balancing condition
1	2	Hub	EN-GJL-250	According to customer specification
2	1	Elastomer ring/DZ individual elastomers	NBR (Perbunan) from size 200 T-PUR	
9	2	Setscrews DIN EN ISO 4029	Steel	

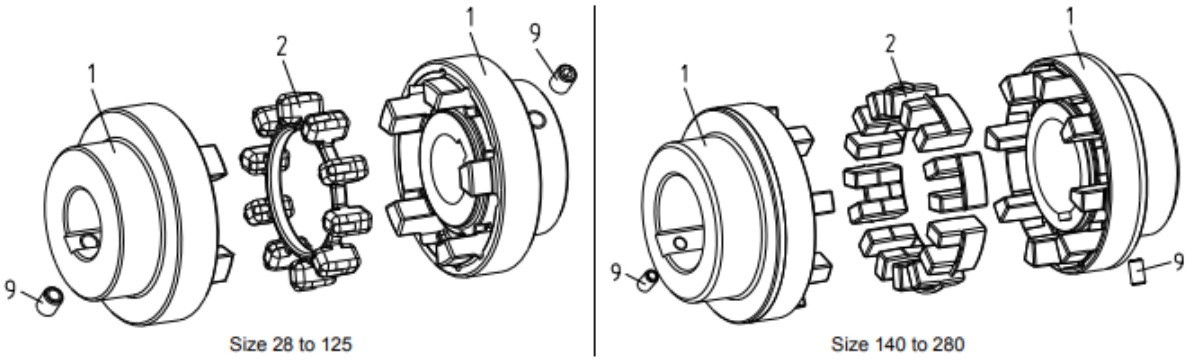


Illustration 9: POLY-NORM®, type AR

Assembly of type AR

- Mount the hubs on the shaft of driving and driven side (see illustration 17).
- Insert the elastomer ring or DZ individual elastomers, respectively, into the cam section of the drive- or driven-sided hub (see illustration 18.1 and 18.2).

Insert the DZ individual elastomers with the web into the cam section of the hub first (see illustration 18.2).

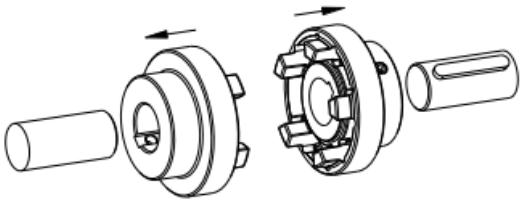


Illustration 17: Assembly of hub

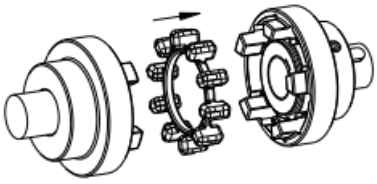


Illustration 18.1: Assembly of elastomer ring

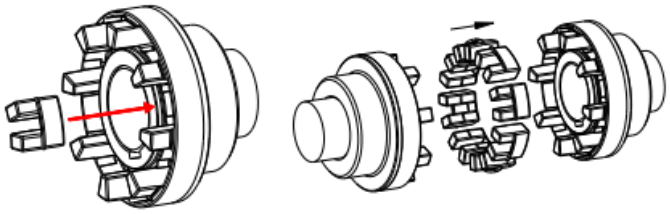


Illustration 18.2: Assembly of DZ individual elastomers

- Shift the power packs in axial direction until the distance dimension s is achieved (see illustration 19).
- If the power packs are already firmly assembled, shifting the hubs axially on the shafts allows for adjusting the dimension s (see illustration 19).
- Fasten the hubs by tightening the setscrews DIN EN ISO 4029 with a cup point (tightening torques see table 2).

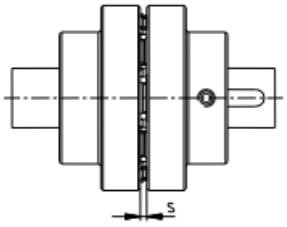


Illustration 19: Assembly of coupling

Table 1: Dimensions and torques – type AR

POLY-NORM® AR Cast iron (EN-GJL-250)													
Size	Elastomer ring [1] (part 2) Torque [Nm]		Dimensions [mm]										Weight [4] [kg]
			Finish bore [2]	General							Thread for setscrews [3]		
	T_{KN}	$T_{Kmax.}$	$d_{max.}$	L_{AR}	l_1	s	D_H	D	d_H	N	G	t	
28	40	80	30	59	28	3	69	46	36.5	12.0	M5	7	0.77
32	60	120	35	68	32	4	78	53	41.5	14.0	M8	7	1.14
38	90	180	40	80	38	4	87	62	50.0	19.5	M8	10	1.59
42	150	300	45	88	42	4	96	69	55.5	20.0	M8	10	2.17
48	220	440	50	101	48	5	106	78	64	24.0	M8	15	3.03
55	300	600	60	115	55	5	118	90	73	29.0	M8	14	4.27
60	410	820	65	125	60	5	129	97	81	33.0	M8	15	5.32
65	550	1100	70	135	65	5	140	105	86	36.0	M10	20	6.86
75	850	1700	80	155	75	5	158	123	100	42.5	M10	20	10.25
85	1350	2700	90	175	85	5	182	139	116	48.5	M10	25	15.05
90	2000	4000	95	185	90	5	200	148	128	49.0	M12	25	19.50
100	2900	5800	110	206	100	6	224	165	143	55.0	M12	25	26.98
110	3900	7800	50-120	226	110	6	250	185	158	60.0	M16	30	38.12
125	5500	11000	55-140	256	125	6	280	210	178	70.0	M16	35	54.21
140	7200	14400	65-155	286	140	6	315	235	216	76.5	M20	35	77.28
160	10000	20000	75-175	326	160	6	350	265	246	94.5	M20	45	106.24
180	13400	26800	75-200	366	180	6	400	300	290	111.5	M20	50	155.20
200	19000	38000	200	408	200	8	450	335	-	126	M24	50	218.50
220	30000	60000	220	448	220	8	500	370	-	140	M24	50	296.10
240	43000	86000	240	488	240	8	550	405	-	154	M24	50	390.00
260	55000	110000	260	530	260	10	650	440	-	158	M24	60	575.00
280	67000	134000	280	570	280	10	700	475	-	172	M24	60	716.00

1) Material Perbunan (NBR) 78 Shore A with size 28 to 180; material T-PUR 84 Shore A with size 200 to 280; with size 140 to 280 use of DZ individual elastomers
2) Bores H7 with keyway to DIN 6885 sheet 1 [JS9] and thread for setscrew on the keyway
3) Tightening torques of setscrews see table 2
4) Weights apply for max. bore diameters with feather keyway according to DIN 6885 sheet 1

- **Dismantling**:

1) Before removing the pump shaft, remove all oxidation that could have formed on the motor shaft.
2) Remove the Poly-norm of the pump shaft.

7.2 Certificate of EC conformity

DECLARATION OF CONFORMITY WITH THE
DIRECTIVE « MACHINES »
(Directive 2006/42/CE) and to the regulations for its transposition

MATERIAL SUBJECT TO AUTO CERTIFICATION

The manufacturer:

14, Avenue des vieux moulins
Z.I de Vovray
74000 ANNECY
Tel. (+33) 04.50.10.10.40

Declares that the machine designated below:

MONOBLOC VERTICAL PUMP WITH VORTEX EFFECT

Model EVA VM SBA

- Conforms with the provisions of the directive « MACHINES » (Directive 2006/42/CE) and to the national laws that transpose it,
- Conforms with the following provisions of the European Harmonized Standards:
  CEN / TC 197 / SC1 N 36 E (pr EN 809)
  Transposed in French by law N° 91 1414 (decrees N° 92-765, 92-766 and 92-767 of 29.07.1992).

Signed at ANNECY, The 03.01.2019

Name of the signer: S.CHENAL

Signature: