SAER®
ELETTROPOMPE

# POMPE AD ASPIRAZIONE ASSIALE SERIE NCA
# END SUCTION CENTRIUGAL PUMP NCA

| | |
|---|---|
| I | Questo manuale é da considerarsi parte integrante della fornitura del prodotto; qualora risultasse rovinato o illeggibile in qualsiasi parte occorre richiederne immediatamente una copia. Ogni operatore addetto all'uso del prodotto, o responsabile della manutenzione, deve conoscerne la collocazione e deve avere la possibilità di consultarlo in ogni momento. |
| GB | This manual is to be considered an integral part of the supply of the product; in the event it is ruined or any part is illegible, you should immediately request a copy. Every operator assigned to use the product or responsible for its maintenance must know its location and must be able to consult it at any time. |

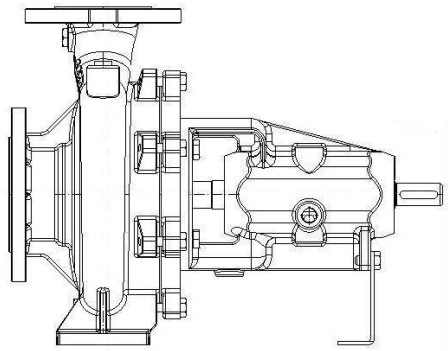


Fig.1 Pompa ad asse nudo / Bare shaft pump

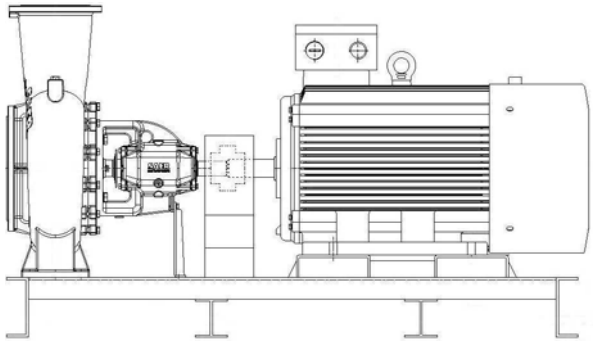


Fig.2 Gruppo completo / Complete set

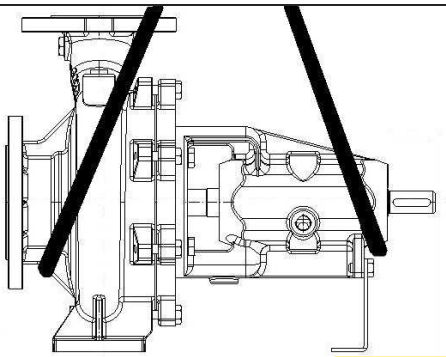


Fig.3 Sollevamento pompa ad asse nudo /Lifting the pump

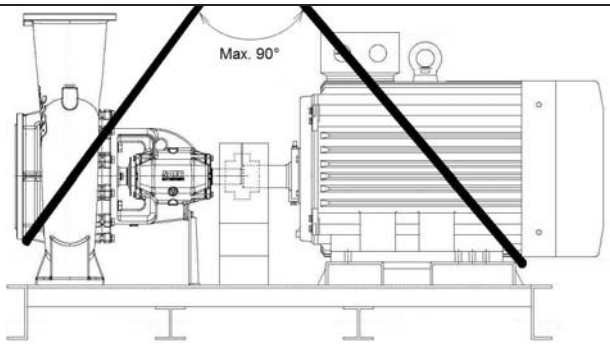
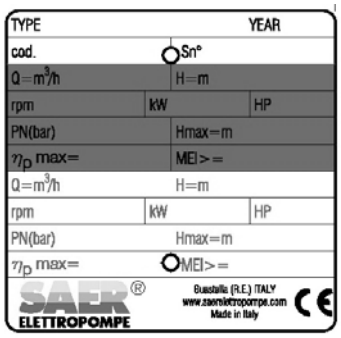
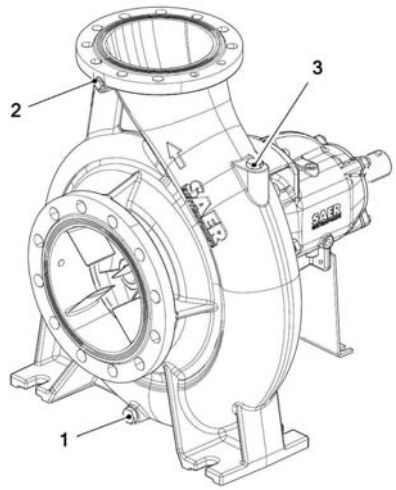


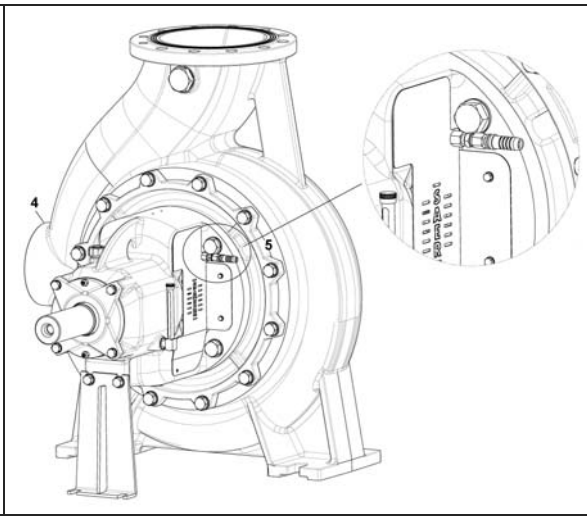

Fig.4 Sollevamento gruppo completo / Lifting the group




| | |
|---|---|
| TYPE | *Tipo / Pump model* |
| YEAR | *Anno di costruzione / Year of manufacturing* |
| Cod. | *Codice articolo / Article number* |
| Sn. | *Numero di matricola / Serial number* |
| Q | *Campo di portata / Flow range* |
| H | *Campo di prevalenza/ Head range* |
| rpm | *Velocità di rotazione /Speed* |
| Kw | *Potenza richiesta / Power required (max or duty point)* |
| HP | |
| Hmax | *Close delivery head / Prevalenza a mandata chiusa /* |
| Pn | *Max working pressure of the pump / Massima pressione di lavoro della pompa* |
| MEI | *Indice MEI / MEI Index* |
| $\eta_{Pmax}$ | *Efficienza idraulica / Pump's hidraulic eff.* |

Fig.5 Targa identificativa della pompa / Pump nameplate

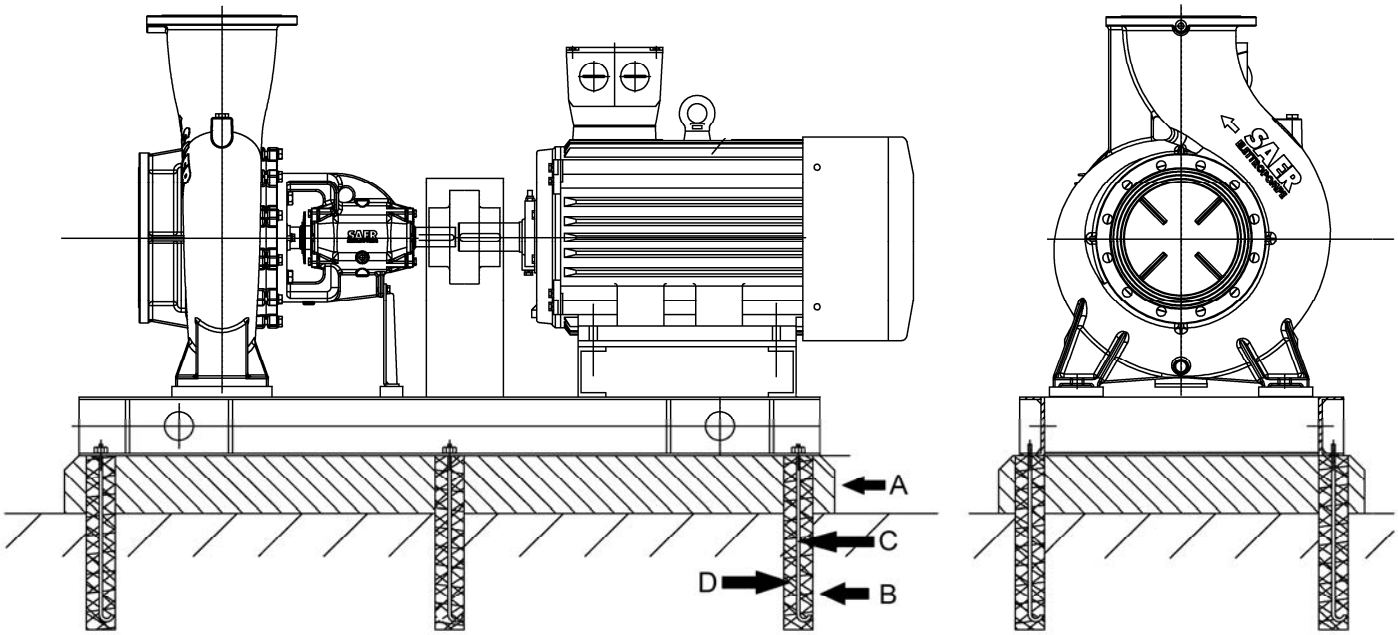



1. Tappo di scarico per svuotamento / Pump's draining cap
2. Connessione per manometro in mandata (opzionale) / Connection for delivery pressure gauge (optional)
3. Tappo per riempimento / Filling cap
4. Finestra per ispezione (opzionale) / Inspection opening (optional)
5. Linea flussaggio tenuta / Seal flushing line

Fig.6 : Connessioni ausiliarie / Pump's auxiliary connections

Fig. 7 Fissaggio del gruppo al suolo / Ground fixing of the group

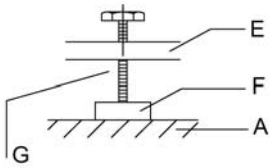



A: Base in cemento / Concrete base
B: Fori per tirafondi / Holes for anchor bolt
C: Tirafondi / Anchor bolt
D: Malta colabile per ancoraggio / Anchoring grout

Fig. 8 Regolazione del livello

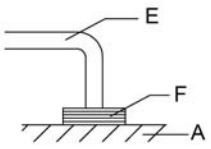
Basamento con viti di regolazione /Base plate with levelling screws

A: Base in cemento / Concrete base
E: basamento / base
F: Spessori / Shims
G: Vite di regolazione / Levelling screw




Basamento senza viti di regolazione

A: Base in cemento / Concrete base
E: basamento / base
F: Spessori / Shims




**TAB.I**

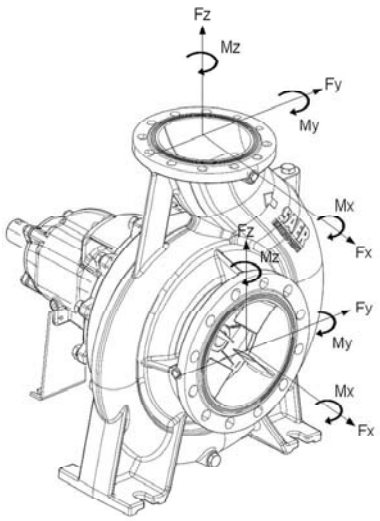
**Livelli di rumorosità** In condizioni di funzionamento normale (esente da cavitazione). Valori indicativi e soggetti a tolleranza e al motore accoppiato.
**Noise level u**nder normal operating conditions (without cavitation). Indicative values, subject to tolerance and dependent from the motor coupled.

| Rated power of motor kW | Noise Pressure level ($L_{pA}$) – 1m dBA | | | | Noise power level ($L_{WA}$) – 1m dBA | | | |
|---|---|---|---|---|---|---|---|---|
| | 1450 1/min | 1750 1/min | 2900 1/min | 3600 1/min | 1450 1/min | 1750 1/min | 2900 1/min | 3600 1/min |
| ≤1.1 | 62 | 64 | 69 | 72 | 71 | 73 | 78 | 81 |
| 1.5÷2.2 | 64 | 66 | 72 | 76 | 73 | 75 | 81 | 85 |
| 3 | 64 | 67 | 73 | 76 | 73 | 76 | 82 | 85 |
| 4 | 64 | 67 | 73 | 76 | 73 | 76 | 82 | 85 |
| 5.5÷7.5 | 69 | 72 | 77 | 80 | 78 | 81 | 86 | 89 |
| 11÷18.5 | 70 | 73 | 78 | 81 | 79 | 82 | 87 | 90 |
| 22 | 70 | 73 | 78 | 81 | 79 | 82 | 87 | 90 |
| 30÷ 37 | 76 | 79 | 81 | 84 | 85 | 88 | 90 | 93 |
| 45 ÷ 55 | 76 | 80 | 81 | 85 | 85 | 89 | 90 | 94 |
| 75 ÷ 90 | 77 | 81 | 84 | 88 | 87 | 91 | 94 | 98 |
| 110÷132 | 80 | 84 | 85 | 89 | 90 | 94 | 95 | 99 |
| 160÷200 | 84 | 86 | 87 | 91 | 94 | 96 | 97 | 101 |
| 250÷315 | 91 | 92 | 93 | 96 | 101 | 102 | 103 | 106 |

**TAB.II** Tabella/figura sforzi ammessi sulle flange per macchine in metallurgia standard. Permisseble forces and moments at pump nozzles – standard cast iron flanges.

| MANDATA - OUTLET | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DN | Forza N | | | | Momento Nm | | | |
| | Fy | Fz | Fx | ∑F | My | Mz | Mx | ∑M |
| 32 | 300 | 370 | 320 | 580 | 270 | 300 | 390 | 560 |
| 40 | 350 | 440 | 390 | 690 | 320 | 370 | 460 | 670 |
| 50 | 480 | 580 | 530 | 910 | 350 | 410 | 490 | 720 |
| 65 | 600 | 740 | 650 | 1160 | 390 | 420 | 530 | 770 |
| 80 | 720 | 880 | 790 | 1390 | 410 | 460 | 560 | 830 |
| 100 | 950 | 1180 | 1050 | 1840 | 440 | 510 | 620 | 910 |
| 125 | 1120 | 1390 | 1250 | 2170 | 530 | 670 | 740 | 1070 |
| 150 | 1420 | 1750 | 1580 | 2750 | 620 | 720 | 880 | 1280 |
| 200 | 1890 | 2350 | 2100 | 3660 | 810 | 930 | 1140 | 1680 |
| 250 | 2370 | 2930 | 2610 | 4570 | 1110 | 1280 | 1560 | 2300 |
| 300 | 2820 | 3500 | 3140 | 5480 | 1510 | 1740 | 2120 | 3120 |

| ASPIRAZIONE - SUCTION | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DN | Forza N | | | | Momento Nm | | | |
| | Fy | Fz | Fx | ∑F | My | Mz | Mx | ∑M |
| 40 | 390 | 350 | 440 | 690 | 320 | 370 | 460 | 670 |
| 50 | 530 | 480 | 580 | 910 | 350 | 410 | 490 | 720 |
| 65 | 650 | 600 | 740 | 1160 | 390 | 420 | 530 | 770 |
| 80 | 790 | 720 | 880 | 1390 | 410 | 460 | 560 | 830 |
| 100 | 1050 | 950 | 1180 | 1840 | 440 | 510 | 620 | 910 |
| 125 | 1250 | 1120 | 1390 | 2170 | 530 | 670 | 740 | 1070 |
| 150 | 1580 | 1420 | 1750 | 2750 | 620 | 720 | 880 | 1280 |
| 200 | 2100 | 1890 | 2350 | 3660 | 810 | 930 | 1140 | 1680 |
| 250 | 2610 | 2370 | 2930 | 4570 | 1110 | 1280 | 1560 | 2300 |
| 300 | 3140 | 2820 | 3500 | 5480 | 1510 | 1740 | 2120 | 3120 |
| 350 | 3660 | 3290 | 4080 | 6390 | 1930 | 2230 | 2720 | 3990 |




**TAB.III Diametri tubazioni in funzione dei diametri delle bocche / Recomended diameters for suction pipe**

| DN [mm] | DN [mm] |
|---|---|
| Aspirazione pompa / Pump suction / | Tubo aspirazione / Suction pipe |
| 50 | 80 |
| 65 | 100 |
| 80 | 150 |
| 100 | 200 |
| 125 | 250 |
| 150 | 300 |
| 200 | 350 |
| 250 | 400 |
| 300 | 500 |
| 350 | 600 |

**TAB. IV - Intervalli di sostituzione dei cuscinetti prelubrifcati a vita (ingrassaggio permanente) - principio $L_{10}$**
***Terms of replacements for pre-lubricated bearings for life (permanent greasing) - principle $L_{10}$***

| Velocità di rotazione max. | Temperatura ambiente max. | Intervallo di sostituzione | |
|---|---|---|---|
| *Max rotatational speed* | *Max ambient temperature* | *Terms of replacement* | |
| 1/min (rpm) | °C | O | V |
| 1500 | 40 | 40.000 h | 20.000 h |
| 1800 | 40 | 32.000 h | 16.000 h |
| 3000 | 40 | 20.000 h | 10.000 h |
| 3600 | 40 | 16.000 h | 8.000 h |

O: funzionamento in orizzontale / *Horizontal mounting* - V: funzionamento in verticale / *Vertical mounting*

**INDICE**



**INDEX**

## 1. GENERAL INFORMATION

Before performing any operation on the machine, it is indispensable that you be completely familiar with the entire use and maintenance manual. The manufacturer declines all responsibility for improper use of the product, for damage caused following operations not contemplated in this manual or unreasonable interventions. Instructions and limitations contained in this manual are in reference to standard models. For all other versions and all other situation non contemplated in the manual you should contact the technical service.
Terminology:

- Pump: bare-shaft pump, without motor, couplings and/or additional accessories (fig. 1)
- Group: set consists of pump, motor, coupling and base-plate assembled (fig. 2)

## 2. SAFETY INFORMATION

Cautionary warning to be followed to guarantee the safety of the operator and those persons present in the work area.

Failure to comply with instructions may result in electric shock.

**WARNING**

Failure to comply with instructions may result in damage to the motor pump or to the system.

| | |
|---|---|
|  | Each transport, installation, connection, setting at work, control and eventual maintenance or stop operation shall be executed by trained and qualified staff. Furthermore, possible local regulations or directions not mentioned in this manual must be taken into consideration as well. For trained and qualified staff make reference to the definition stated in the IEC 60364.<br>The appliance is not to be used by children or persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.<br>Install the electric pump so as to avoid accidental contacts with people, animals or property.<br>It is forbidden to use the pump / electric pump in case of damages or anomalous operations.<br>Tampering with the product is prohibited.<br>The user is responsible for dangers or accidents in relation to other persons and their property: it must be taken all the necessary precautions to avoid risks or consequent damages to the inadequate or inefficient operation of the product.<br>Use the pump / electric pump only for the purposes described in Paragraph 4. Any other use can be a cause of accidents.<br>Verify the conformity of the product to the local prescriptions in force. |

| | |
|---|---|
|  | Before executing any operation, the feeder cables shall be disconnected.<br>Never touch the electric pump while it is working. |

| | |
|---|---|
|  | The pumps are capable of operating properly with no problems only if the installation is correct and the required maintenance is guaranteed. Carefully follow the instructions of this manual. Use the pump/group only when in perfect condition and correctly assembled. Must also be applied to the relevant National and Local Regulations in force regarding safety, during transport, installation, electric connection, installation, operation and eventual maintenance or demounting. |

## 3. TRANSPORT, HANDLING AND INTERMEDIATE STORAGE

**RECEIVING THE PRODUCT**

When receiving the product it is necessary to verify that:

- during the transportation it have not restored damages: in case of damages, even if exterior, write a note of reserve on the documents of transportation and inform the conveyor.
- the supply correspond to the order: in case of deficiencies, write a note of reserve on the documents of transportation and inform the conveyor.

### 3.2 HANDLING

| | |
|---|---|
|  | Use suitable means for lifting and transporting the pump / electricpump: it may be damaged if it is knocked or if it falls, even if there is no apparent external damage, and it may also damage things or persons.<br>Use ropes, straps or chains suitable for the purpose: for the weights of the complete set or of the individual components (pump, motor, coupling, base ...), refer to the drawings and technical documentation submitted. If necessary, contact the technical support service. |

| | |
|---|---|
|  | Make sure that the lifting means adopted have a capacity adequate to the load to be lifting and that they are in good condition.<br>Do not pause or pass under the load during lifting or transport.<br>Use suitable auxiliary means of support during the operations of coupling, installation, maintenance etc. |

| | |
|---|---|
|  | Use, during any operations, the necessary individual devices of protection (ex: gloves, glasses etc.)<br>Adjust the length of the cables or belts so that the load is maintained horizontal.<br>Always comply with general and local regualtions in force.<br>The pump is supplied packed in protective packaging which must be removed just before installation. Appropriate measures must be taken to prevent contamination of materials and articles themselves, in order not to deteriorate the water quality post then in contact with them. |

**Handling of the bare shaft pump**
To lift the pump, harness it as shown in the picture FIG.3, by passing the ropes around the bearing supports.

| | |
|---|---|
|  | Do not attach lifting devices to the shaft end of the pump. The angle of pull must not be greater than 90° |

**Handling of the complete set**
Set with total load up to 1500 kg: Sling the group as in Fig. 4 or, if present, use the holes or lifting pins made in the basement.
Set with total load higher than 1500 kg: it is not recomended to lift the complete set assembled. Lift the single components (pump, motor, coupling, base). In case it is necessary to enliven the entire group, proceed like in figure 4.

| | |
|---|---|
|  | Do not attach lifting devices to the shaft end of the pump or to the eybolts of the motor. The angle of pull must not be greater than 90° |

## STORING

| | |
|---|---|
| **WARNING** | Storage conditions: store the pump / set in a covered and dry place, lacking dust, freeze and vibrations.<br>Storage temperature= min 0°C - max 50°C<br>Metallic exposed surfaces (shaft ends, flanges) must be protected in a suitable way to prevent corrosion.<br>f you plan to store the pump or the complete set, for a long period of time (more than one month), it is necessary to perform the following operations monthly:<br>• verify that the preservation status of the pump / complete set and paying more attention to the non-painted surfaces;<br>• check with the appropriate tools, the free rotation of the shaft;<br>• check the condition of lubricating bearings.<br>• Once a month, rotate shaft by hand, in order to keep the bearings protected by the lubricant.<br>• For versions with oil lubricated bearings: fill the oil chamber to the brim. During the put on use, drain the oil and fill the chamber up to the appropriate level.<br>For any problem replace or recondition the damages parts prior the use. |

## 4. TECHNICAL SPECIFICATIONS AND USE

**DESCRIZIONE DEL PRODOTTO**
NCA: End-suction centrifugal pump with axial suction;
NCAZ : complete set with pump and motor coupled together by mean of an elastic coupling, on a base plate.
The pump / electric pump's identification and technical data are listed on the name plate which certify the conformity to CE norms (FIG.5). In case of pump and motor assembled, a name plate will state for the hydraulic part and another one for the motor; in case of pumps sold without motor, there will be the name plate with the hydraulic data only.

| | |
|---|---|
| **WARNING** | In case of a bare shaft pump, the useful output power provided by the motor must be above the power absorbed by the pump. |

| | |
|---|---|
|  | Do not use the pump for rotating speeds higher than those indicated on the data plate. |

**General Specifications**

- ✓ End-suction centrifugal pump ( ESOB axial suction ) , single stage.
- ✓ " back pull out " system: the hydraulic part is removable without the need to remove the pump from the piping .
- ✓ Horizontal or vertical installation on request ( with suction down)
- ✓ Pump body divided radially and integrated with feet .
- ✓ Impeller:
  - o NCA- C version with closed impeller ;
  - o NCA- O version with open impeller ;
  - o NCA- V version with vortex impeller ;
- ✓ Ball bearings , permanent grease lubrication (standard ) or in oil bath ( optional )
- ✓ Shaft seal : stuffing box (standard ) , mechanical seal according to EN12756 ( optional )

For the characteristics of the motor , refer to the motor manual .

## USE – STANDARD VERSIONS

Free passage: according to the type of impeller and the pump type . Refer to the technical documentation (data sheet of the pump ) .
Maximum content of solids : according to the type of impeller and the pump type . Refer to the technical documentation (data sheet of the pump ) .
For the special versions, refer to the specific technical literature (technical data, drawings, etc. ...).
Limitation for use
Passing of solids: max 2 mm.
Max working time with closed delivery: 2 min.
Temperature of the pumped liquid: min -15°C max 120°C.
Max starts / h equally distributed: Refer to the motor instruction manual
Maximum working pressure: refer to pump name plate
Max ambient temperature: 40°C (higher temperature on request).

| | |
|---|---|
|  | Never use the pump for operating pressures higher than those indicated on the data plate. |

**Pumping of liquids with different characteristics from the water**
Performance refers to liquids with the same characteristics of the water (density , viscosity and temperature) . For liquids with different physical characteristics , performance must be recalculated .

| | |
|---|---|
| **WARNING** | For liquids with a density greater than that of water , the power absorbed increases proportionally with the density . Check that the motor is coupled with adequate power . |

| | |
|---|---|
| **WARNING** | For abrasive substances , verify that the maximum content of solids does not exceed that specified in the data sheet of the pump . |

## NOT FORESEEN AND IMPROPER USES

| | |
|---|---|
|  | Don't use the pump/electric pump for applications not covered from EN 809 standard.<br>Never use the electric pump in explosive atmospheres, hazardous area or to pump inflammable or dangerous liquids.<br>Don't use the pump in case of abnormal pressure (ex: water hammer)<br>Avoid dry operation of the pump.<br>It is forbidden to use the pump / electric pump in case of damages or anomalous operations.<br>Always use the pump with a delivery (flow and head) included in the working diagram.<br>Pumps already used to pump toxic or harmful liquids or other liquids other than potable water may not be used for pumping water intended for human consumption. |

| | |
|---|---|
|  | Please refer to the motor instruction manual for others limitation of use and safety warnings |

**PREVENTION OF FORESEEABLE MISUSE**

| | |
|---|---|
| **WARNING** | Always use the pump with a delivery (flow and head) included in the working diagram. Do reference to the name plate and the technical documentation.<br>Do not operate the pump under the minimum head.<br>Do not use the pump beyond the limits specified. |

## 5. INSTALLATION

| | |
|---|---|
|  | Never use the electric pump in explosive atmospheres, hazardous area or to pump inflammable or dangerous liquids.<br>For the classification of the risky places, refer to local regulations . |

| | |
|---|---|
|  | Use suitable means for lifting and transporting the pump / electricpump. |

| | |
|---|---|
|  | Before executing any operation, turn off the power and prevent it from being reconnected. |

### PRELIMINARY VERIFICATIONS

| | |
|---|---|
| **WARNING** | Verify that the data shown on the plate, and in particular, power, frequency, voltage, absorbed current, are compatible with the characteristics of the electric line or current generator available. In particular, the voltage of the line voltage can have a variance of ± 5% from the nominal voltage value on the plate.<br>Verify that the protection and insulation grade indicated on the plate are compatible with the environmental conditions.<br>Verify that the chemical/physical characteristics of the liquid to be moved correspond to those specified on the order.<br>Verify that the pump has not been exposed to the weather inclemency.<br>Verify the environmental conditions: SAER pumps can be installed in enclosed or, at any rate, protected areas, with maximum ambient temperature of + 40 °C (higher temperature on request) in a non-explosive atmosphere.<br>Contact the customer care in case of ambient temperature +40°C or altitude over 1000m above sea level.<br>The connection to the water supply must be done in the respect of the local and national standards of the place where the pump is installed.<br>Verify that the pump's flow rate and head correspond to the required characteristics.<br>Before connecting the pipes to the relative openings, make sure that the rotating part of the pump turns freely and is not hindered.<br>In case of problems please contact our technical assistance servicing. |

| | |
|---|---|
|  | The connection to the power grid must be done in the respect of the local and national standards of the electric system of the place where the pump is installed. |

### 5.2 PLACE OF INSTALLATION

| | |
|---|---|
| **WARNING** | Prepare a concrete base for the complete set, and raise it, up to the required height (minimum 30 mm).<br>Make sure that the pump's support surface is solid and even (so that it rests on all the feet) and that the load capacity of the surface is adequate for the weight shown on the plate.<br>Verify that the surrounding area is sufficient for ventilation and allows movement in the case of maintenance.<br>Select suitables point and area of fixing: verify the prevention of possible vibrations to the surrounding structures.<br>Check that the strength of the concrete foundations is appropriate and complies with current relevant regulations.<br>It is recommended for the foundation base, a weight about five times major then the weight of the complete set.<br>The pump/electric pump must be installed as close as possible to the suction point of the liquid.<br>The available NPSH value in the lifting plant must be always bigger than the pump's NPSH , both in installation under head and over head in order to avoid cavitation.<br>As far as hot liquids are concerned, NPSH must be re-calculated, in order to obtain the required head in any case. |

| | |
|---|---|
| ⚠ | If you pump toxic or harmful liquids or at high temperatures, it is important to taken all necessary precautions to avoid any loss and/or leakage that could cause damage to persons, animals, property or to he environment. |

## 5.3 BASEMENT FIXING TO THE GROUND (fig.7)

i. Insert the anchor bolts into the appropriate basement holes and into the basic foundation.
ii. To position the complete set, at the required height, insert the shims, under the basement, and closed to the anchor bolts, in an intermediate positions. If the basement is provided with threaded holes, use a screw instead of the shim for the leveling.
iii. Perform a first alignment between pump and motor.
iv. Fix the anchor bolts with the proper product (pourable mortar for anchors)
v. When bolts are anchored, proceed to a first tightening of the screw nuts bolts.
vi. Recheck the alignments between complete set and pipes and between pump and motor, then, if necessary, make the correction needs.
vii. Use the anchor mortar to "drown" the base. This, together with the basic foundation, will build a very rigid base for the pump. Moreover, if necessary, before to drip the mortar, build a mortar containment basin around the basement.

### CONNECTING THE PIPES

| | |
|---|---|
| **WARNING** | The pump maximum working pressure can't be bigger than the PN pump nominal pressure.<br>Pipes must be suitable for the pump maximum working pressure. |

| | |
|---|---|
| **WARNING** | The intake and delivery pipes must not transmit forces to the pumps/ electric pump due to their own weight and/or heat expansion, at the risk of possible liquid leaks or breaking the pump. For this reason, the pipes must be supported by anchorages and, if necessary, expansion joints must be inserted in the appropriate positions.<br>Refer to TAB.II for permissible forces and moments at pump nozzles.<br>Pumps don't have to transmit vibrations to the pipes, therefore insert anti-vibration couplings both in suction and delivery. |

| | |
|---|---|
| **WARNING** | Install non return valve on the discharge side. Install gate valve both in suction and discharge side. |

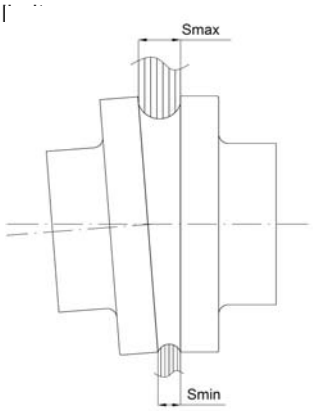
The intake pipe must always be perfectly air tight and not positioned horizontally, but must always rise towards the pump. On the other hand, in the case of operation under water head, the intake pipe must always slope down towards the pump. For this reason, any fitting cones 1 must be eccentric and oriented to avoid the formation of bubbles during priming or operation.
It is a good idea to protect the pump by inserting a filter on the intake pipe; especially during the initial period of operation, the pipes release slags capable of damaging the pump seals. The filter must have a mesh less than 2 mm and a free passage area of at least 3 times the section area of the pipe so as to avoid excessive losses of head.
To adjust the flow rate, it is a good idea to install a shutter on the delivery pipe.
The diameter of the pipe must be such that the speed of the liquid never exceeds 1,5 - 2 m/s at intake and 3 – 3,5 m/s at the delivery. In any case, the diameter of the pipe must not be less than the diameter of the pump openings. The suction piping must be absolutely hermetic and for the catalogue data it must have the diameters of TAB.III (pipes of smaller diameters reduce the delivery values).
After having performed the controls listed, connect the pipelines to the pump.

### ALIGNEMENT

| | |
|---|---|
| **WARNING** | Although the group has already been fully aligned before shipment, it is necessary to check and recalibrate the alignment after having installed the complete set. |

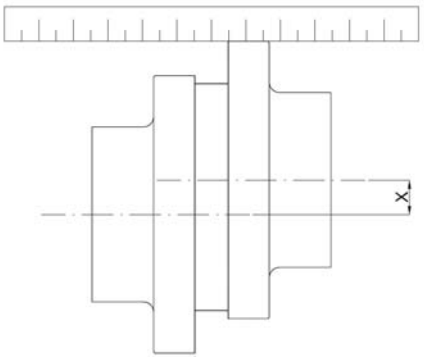
i. Remove the coupling guard.
ii. Check the angular alignment through a feeler gauge: the angular displacement has to be measured as the difference of the gap between the two half coupling and seeds must be within the following l

| 1/min | 750 | 1000 | 1500 | 1800 | 3000 | 3600 |
|---|---|---|---|---|---|---|
| Smax – Smin (mm) | 0,25 | 0,2 | 0,2 | 0,15 | 0,15 | 0,1 |



iii. Check the radial displacement of the two semi-couplings by using a bracket or a comparator. The radial displacement must be included within the following limits:

| 1/min | 750 | 1000 | 1500 | 1800 | 3000 | 3600 |
|---|---|---|---|---|---|---|
| Xmax | 0,25 | 0,2 | 0,2 | 0,15 | 0,15 | 0,1 |




iv. If necessary, correct the angle alignment by moving the motor (through the use of the shims or, through the adjustment screws placed in the feet of the motor, if equipped).
v. When the alignment is completed, replace the coupling guard.

| | |
|---|---|
| **WARNING** | Do not use the pump without the properly coupling guard, installed in the appropriate way.<br>The coupling guard and coupling must not touch each other. |

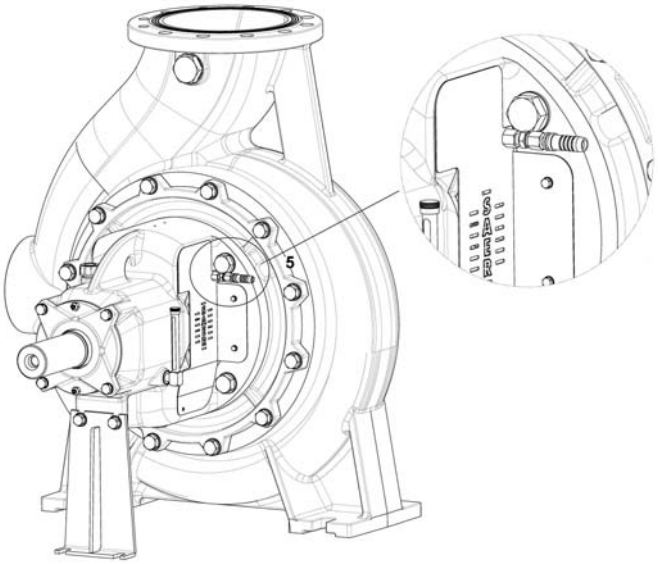
## AUXILIARY CONNECTIONS

| | |
|---|---|
| **WARNING** | Verify the presence and proper installation of the necessary auxiliary connections. |

**Pumps with line seal flushing**

Connect the line flushing of the mechanical seal

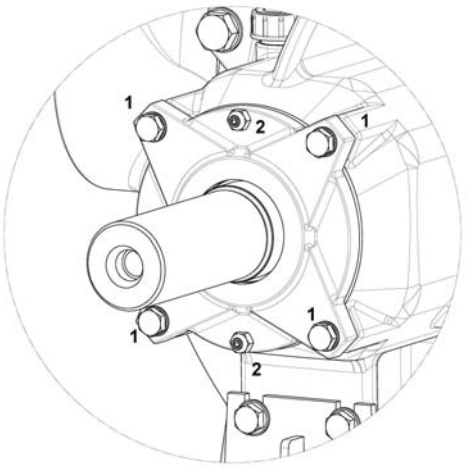
| | |
|---|---|
| **WARNING** | The pressure of the seal flushing liquid must be greater than the operating pressure of the pump. For flushing use clean water at ambient temperature. |



## ADJUSTING THE DISTANCE BETWEEN ROTOR AND WEAR DISC

NCA series pumps are equipped with a system for adjusting the distance between impeller and wear disc.
This system allows to maintain unchanged the performance of the pump over time, even in the event of pumping of abrasive substances .
The distance can be set as shown:

1. Stop the pump and make sure that it can not be restarted accidentally
2. Loosen the screws in figure 1 ;
3. Turn the grain 2 clockwise to increase the distance between the impeller and the disc ;
4. Adjust ,
5. Tighten the screws 1 ;
6. Start the pump and check the performance ;
7. Repeat steps 1 to 6 until obtaining the desired performance




## ELECTRICAL CONNECTIONS

| | |
|---|---|
| ⚡ | The connection to the power grid must be done in the respect of the local and national standards of the electric system of the place where the pump is installed. |

### CHECKS ON THE ELECTRICAL SYSTEM

| | |
|---|---|
| ⚡ | Verify that the electrical system corresponds to the CEI EN 60204-1 standard and to the local and national standards of the electric system of the place where the pump is installed.<br>Verify:<br>- the existence of an earth connection,<br>- the presence of an omni-polar switch disconnector that can disconnect all the feeding cables to insulate the motor in case of malfunction or small maintenance operations (the disconnection device from the supply mains must be over-voltage III category)<br>- the presence of an emergency stop button.<br>- The presence of a residual current device (RCD) with rated residual operating current not exceeding 0,03 A.<br>- for three-phase pumps and for pumps without integrated protection device: the presence of a thermal protection device adjusted on a maximum absorbed current not higher than 5% the current stated in the label and with an operating time lower than 30 seconds.<br>The feeding cable must have adequate section in order to avoid a voltage drop greater than 3 % of the nominal voltage and to operate within the rated temperature.<br>For further limitations, please refer to the motor instruction manual. |

### ELECTRICAL CONNECTION

| | |
|---|---|
| ⚡ | Furthermore, respect the connection diagrams supplied with the motor and with the control panel.<br>Perform the earth connection before all the other connections.<br>Verify the correct operation of the electric equipment (control panel etc…) |

| | |
|---|---|
| **WARNING** | Set properly the values of the electrical devices (protections, electronic devices etc…) |

| | |
|---|---|
| **WARNING** | Avoid dry operation of the pump, even for few instants. |

# 6. SETTING AT WORK, OPERATION AND STOP

### FILLING AND PRIMING THE PUMP

**Priming over head (liquid level on the suction side lower than the pump).**

i. Close the gate valve on the delivery side
ii. Unscrew the venting cap (Fig.6)
iii. Fill the pump and the suction side
iv. Make sure that all the air is leaked out from the pump.
v. Once the filling is finished, close completely the caps.

**Priming under head (liquid level on the suction side higher than the pump)**

i. Close the gate valve on the delivery side
ii. Unscrew the venting caps (FIG.6)
iii. Open the gate valve on the suction side
iv. Waiting for the exit of the water from the venting caps.
v. Once that the water exits without air presence, close the caps

| | |
|---|---|
| **WARNING** | The priming operation must be repeated in case of long periods of inactivity and whenever necessary. |

| | |
|---|---|
| **WARNING** | Check the right setting for auxiliary connection:<br>• Venting and drain holes must be closed<br>• In case there are some flushing lines for the seals, they must be open. |

## 6.2 CHECKING OF THE ROTATION WAY

| | |
|---|---|
| **WARNING** | Remove any lifting device before starting the pump. |

Verify that the rotation direction of the electric pump corresponds to that indicated by the arrow on the pump body. Rapidly apply and remove voltage and observe the rotation direction of the motor cooling fan through the holes of fan guard. In the event that the pump is rotating in reverse, reverse two phases on the terminal board.

| | |
|---|---|
| **WARNING** | The checking of the rotation way must be repeat every time the motor is connected. |

| | |
|---|---|
| **WARNING** | In order to avoid serious damages to the components we recommend:<br>• do not leave the pump run without liquid;<br>• do not run the pump for a long period with the delivery valve closed;<br>• do not run the pump in cavitation. |

Do the starting as shown in the paragraph Starting

## 6.3 STARTING

| | |
|---|---|
|  | Before starting the group be sure that all the prescriptions and the controls described in the previous paragraphs are respected. |

After having done the electrical connection and the priming:

i. Fully open the gate valve in suction.
ii. Keeping the gauge valve closed on the delivery side, feed current, waiting for the pump to reach full operating speed.
iii. Slowly open the valve on the delivery until you achieve the desired flow rate.

## 6.4 CHECKS WHILE RUNNING

After a sufficient period of time to reach normal operating conditions, verify that:

- There are no liquid leaks (for soft packing seal, do reference to the specific section of this manual)
- There are no vibrations or anomalous noises.

- There are no oscillations of the flow rate.
- Ambient temperature does not exceed 40 °C
- The temperature of the pump body does not exceed 90 °C.
- The motor's current absorption does not exceed that shown on the plate.

In the presence of even only one of these conditions, stop the pump and find the cause.

| | |
|---|---|
| **WARNING** | In the event that the surface of the pump is hotter than 50 °C, we recommend protecting it against accidental contact, such as using grates or shielding, in such a way that however does not affect correct ventilation. |

| | |
|---|---|
| **WARNING** | The pump maximum working pressure can't be bigger than the PN pump nominal pressure. |

### 6.5 CHECKING OF THE SEAL

**MECHANICAL SEAL**

The mechanical seal does not require regulations and/or maintenance. It's possible a loss of liquid during the first instants of operation due to the arrangement of the seal. If the loss should not stop, stop the group and research the cause.

**SOFT PACKING**

i. Regulate the tightening of the soft packing after about 30 minutes of working.
ii. After the tightening of the soft packing, wait some minutes: the loss of liquid have to be equal to a light dripping (between the 20 and the 100 drops per minute).
iii. If necessary, modify the tightening of the soft packing.
iv. After some hours of operation, verify again the dripping.

| | |
|---|---|
| **WARNING** | The lack of dripping from the packing seal could result in heavy damage of the seal: don't tight too much the soft packing.<br>Ensure the dripping also in minimum pressure condition. |

For pumps with line seal flush : make sure the line is connected and that the pressure of the flushing liquid is sufficient.

### 6.6 STOP THE PUMP/ELECTROPUMP

i. If the non-return valve is not present, close the gate valve on the delivery pipe.
ii. If there is no foot valve present, close the gate valve on the suction pipe.
iii. Stop the electrical feeling

| | |
|---|---|
| **WARNING** | If the pump / electric pump remains inactive at low temperatures or, at any rate, for a period exceeding three months, it is a good idea to empty the pump through the specific cap. |

### 6.7 STORAGE

Pump installed, not in operation but ready to be started up: operate the pump for at least 10 minutes once a month.
Pump removed from the system and put into storage: clean the pump and protect its surfaces from corrosion by applying appropriate products.

## 7. MAINTENANCE

| | |
|---|---|
|  | Before executing any operation, turn off the power and prevent it from being reconnected. |

| | |
|---|---|
|  | In the event it is necessary to perform any type of maintenance, the following precautions must be observed:<br>i. disconnect the pump motor from the electrical system;<br>ii. wait until the temperature of the liquid is such not to create a danger of burns;<br>iii. if the liquid handled by the pump is harmful for one's health, it is indispensable to observe the following warnings:<br>a. the operator must wear suitable individual protection devices (mask, goggles, gloves, etc.);<br>b. the liquid must be carefully collected and disposed of with respect for current law;<br>iv. the pump must be washed inside and out, disposing of the residues as said above. |

| | |
|---|---|
|  | The surfaces of pump and motor can reach high temperatures. Wait to cool before handling and use appropriate personal protection. |

| | |
|---|---|
| **WARNING** | Schedule a regular cycle of maintenance based on the type of employment and conditions of use. |

## 7.1 OPERATIONS NEEDED EVERY 1000 WORKING HOURS AND NOT LESS THAN ONCE A YEAR

Check:

- the state and the temperature of the bearings;
- the level of vibrations at the bearing housings;
- the condition of the lubricant for bearings lubricated with oil or outside greaser;
- seals conditions:
  - mechanical seals must not have any leaks;
  - for soft packing seals, dripping must be on the initial values
- the gaskets conditions: there must be no leakages;
- alignment of the complete set;
- performances of the pump (flow / head);
- motor data (current consumption, value and imbalance of voltages, isolation, vibrations, etc. ...): refer to motor instruction;
- the condition of all electrical connections (terminal, grounding, control panel, etc. ...);

Record data and keep them for future reference.

| | |
|---|---|
| **WARNING** | Perform measurements with appropriate instruments. |

## 7.3 OPERATIONS NEEDED EVERY 30000 WORKING HOURS

Check:

- The conditions of the shaft protections: wear rings and bushings;
- The conditions of the shaft;
- The conditions of the impeller.

## 7.4 LUBRICATING THE BEARINGS

Check the bearing type in the specific technical documentation

### Pumps with the bearings permanently lubricated with grease (version supplied a standard)

The bearings are of the permanently lubricated type (with grease) and they do not request any maintenance. The intervals of the indicative changing are indicated in the table VII
(foreseen duration according to $L_{10}$).

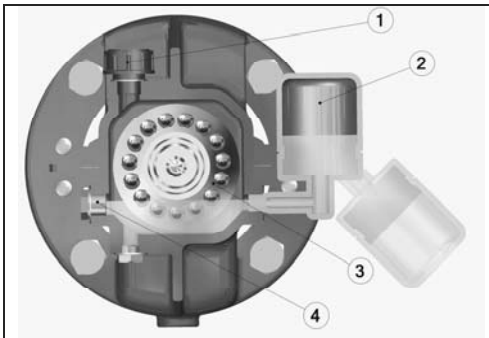
### Pumps with oil bath bearing (version supplied upon request)

| | |
|---|---|
| **WARNING** | Pumps with bearings in oil bath are shipped without oil inside. Before starting, the pump must be plugged with the lubricatingoil in the bearing support. |

| | |
|---|---|
| **WARNING** | Use a costant level oiler (supplied on request). Replenish and top up the oil, through the oiler. |

| | |
|---|---|
| **WARNING** | It is oil supplier's responsibility to indicate an oil with suitable characteristics. |

| | |
|---|---|
| **WARNING** | Do not mix different types of oil.<br>Do not introduce contaminating substances inside the bearing, the support and in the oil. |




**Oil filling procedure**
Pour the oil from the cap (1)- Chek that the level arrive to the middle of the control window (red dot - 4) – This is the necessary quantity of oil for pump operation.
Open the oiler (2) and pour the oil in the overtuned bulb.
Once the bulb (4) is returned to its position, the quantity of oil must be such that, its level in the oiler is about at the center line of the bearing (3).
This is the level in the oiler only and constitutes the oil reservoir which progressively over time is consumed.

Characteristics of the oil to be used for the normal working conditions (Tamb.= -10°C – 40°C, Tmax bearings = 110°C) - the following indications are of general character

- Basic oil: mineral (suggested) or synthetic
- Viscosity Index– VI min: 95
- ISO Viscosity Grade ISO VG: 46
- Working temperature: -10°C / + 170°C
- Flash point > 200°C

Some types of the oil that are possible to be used

- AGIP ARUM HT

The relubrication breaks has to be based on the type of use. Approximately every 1000 - 1500 working hours and not less than once a year.

### 7.5 PUMP DISASSEMBLY

Refer to specific literature, and require it to the manufacturer (section, instructions etc ...)
Execute the pump stop as indicated above.

Before executing any operation, turn off the power and prevent it from being reconnected. Assure that the pump cannot be started accidentally.

Follow all safety rules, listed in the previous paragraphs and those, pertaining the country where it operates.

La e della pompa, è estraibile senza dovere rimuovere il corpo pompa dalle tubazioni dell'impianto.

Before proceeding with the disassembly:

- Disconnect the motor from the electricity network;
- Close all valves;
- Drain liquid from the pump using the appropriate plugs

Dismantling procedure: refer to specifc documentation.

## 8. DECOMISSIONING AND DISPOSAL

At the end of the operating life of the pump/electropump or any of its parts, it must be disposed of in observance of current regulations.In case you need to return the material to the supplier :

- completely empty the pump from the liquid and wash it carefully
- if necessary, provide for a complete decontamination of the product,
- remove any liquids or grease residues (lubricants etc …)
- protect the pump from corrosion and pack it carefully
- indicate to the supplier any security measure applied
-

It is the responsibility of who returns the materials to take all measures necessary to ensure the safety of the product and that the return is in accordance with the regulations of applicable law.

# 9. TROUBLESHOOTING

| FAILURES OR MALFUNCTIONS | ID | | PROBABLE REASONS | | REMEDY ACTIONS |
|---|---|---|---|---|---|
| ! **No flow** | A.1 | ⇨ | Wrong direction of rotation | ✓ | Verify the rotation direction of the motor. If correct, verify the right assembly of the impeller with the pump body. |
| | A.2 | ⇨ | Pump not filled with the fluid | ✓ | Fill the pump and the suction pipe, with the fluid. |
| | A.3 | ⇨ | Air presence in the pump or in the suction pipeline | ✓ | Verify the possible losses of the pipeline. Breathe the pump in order to get out the air. |
| | A.4 | ⇨ | Suction pipeline not enought immersed. | ✓ | Increase the immersion of the suction, that is sublevelled |
| | A.5 | ⇨ | Suction head too raised | ✓ | Low the level of the pump |
| | A.6 | ⇨ | Impeller or suction line clogged. | ✓ | Check any eventual obstuction of the sucton filters and of the impeller. Remove the obstruction. |
| | A.7 | ⇨ | Isufficience of the motor rotation speed. | ✓ | Check the motor rotation speed. For motors powered by inverter, check the feed frequency. |
| | A.8 | ⇨ | Head of the pumping plant too hight. | ✓ | Check the outlet valves holes. Make a calculation of the pumping plant and compare it whit the one of the pump. Use a pump with higher head. |
| ! **Insufficient flow rate** | | ⇨ | Reasons already listed on previous points | | Consider points: from A.1 to A.7 |
| | B.1 | ⇨ | Cavitation functioning. NPSHa insufficient. | ✓ | Icrease the pumping plant NPSHa, reducing the suction losses, or approaching the pump to the fluid that has to be aspirated. |
| | B.2 | ⇨ | Losses from the seals. | ✓ | Replace the seals |
| | B.3 | ⇨ | Demaged impellers. | ✓ | Replace the impeller. |
| | B.4 | ⇨ | Demaged wear rings. | ✓ | Replace the wear rings. |
| | B.5 | ⇨ | Foot valve too slim | ✓ | Replace the foot valve . |
| ! **Outlet pressure too low** | | ⇨ | Reasons already listed on previous points | | Consider points: A.1, A.3 ÷ A.7,B.2 ÷ B.4 |
| | C.1 | ⇨ | Outlet line ostructions | ✓ | Remove the ostructions |
| | C.2 | ⇨ | Pressure gauge wrong positioning | ✓ | Position the outlet pressure gauge on the outlet and the inlet pressure gauge on the inlet |
| | C.3 | ⇨ | Excessive wear of the wear disc | ✓ | Reduce the distance between the impelelr and the disc ( |
| ! **HIGH ABSORPTION** | | ⇨ | Reasons already listed on previous points. | ✓ | Consider points: A.1, B.1 ÷ B.3 |
| | D.1 | ⇨ | Usury or mechanical seizure | | Check and, where necessary, replace seals, bearings and wear rings. |
| | D.2 | ⇨ | Functioning out of performance curves. The head is lower than the minimum head allowed | ✓ | Act on the outlet regulation valve to increase the head and low the flow rate. |
| | D.3 | ⇨ | Excessive tightening of the soft packing. | ✓ | Relax the tightening of the soft packing. |
| | D.4 | ⇨ | Excessive speed of the motor speed rotation. | ✓ | Check the corrispondence between motor speed and pump. When the motor is powered by inverter, low the frequency |
| | D.5 | ⇨ | Fluid density / viscosity higher then of the contractual ones | ✓ | Low the flow rate. Call the technical assistance |
| | D.6 | ⇨ | Misalignment between pump and motor | ✓ | Check and realign pomp and motor. |
| | D.7 | ⇨ | Motor problems | ✓ | Refer to motor informations. |
| ! **VIBRATIONS OR HIGH NOISE** | | ⇨ | Reason already listed on previous points. | ✓ | Consider points: a3-a6, b1,b3-b4,d1,d2,d3, d5,d6, d7 |
| | E.1 | ⇨ | Pump, motor o basament not properly setted | ✓ | Check the tightening of all anchor bolts |
| | E.2 | ⇨ | Pipeline misaligned or imposed on the pump | ✓ | Support the pipes checking their alignment with the pump. |
| | E.3 | ⇨ | Damaged bearings | ✓ | Replace the bearings |

# 10. SPARE PARTS

Use only original spare parts. To order spare parts, refer to the catalogues or contact the SAER Technical assistance specifying the kind of the motor, the serial number and the year of manufacture (all these data are to be found in the identification plate). This product is free from the manufacturing defects.

## DICHIARAZIONE DI CONFORMITA'

La Ditta SAER Elettropompe S.p.A. con sede in via Circonvallazione, 22 - 42016 Guastalla (RE) - Italy, dichiara che le pompe / elettropompe a girante singola per il sollevamento di acque pulite serie
**NCA.... / NCAZ ….**
sono conformi alle prescrizioni della **Direttiva macchine (2006/42/EC)**
**Direttiva Compatibilità Elettromagnetica (2004/108/EC)**

## DECLARATION OF CONFORMITY

SAER Elettropompe S.p.A. with headquarters at Via Circonvallazione, 22 - 42016 Guastalla (RE) - Italy, hereby declares that the pumps / electricpumps with single impeller, for clean water raising, series
**NCA.... / NCAZ ….**
are in conformity with the relevant provisions of the **Machinery Directive (2006/42/EC)**
**Electromagnetic compatibility – directive (2004/108/EC)**

Legale rappresentante - Legal representative • Representante legal • Représentant légal • Representante legal • Legaler Vertreter • Законный представитель: Favella Franco

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Guastalla (RE) – Italy - 01/01/2015

SAER can alter without notifications the data mentioned in this manual.
Keep the manual for future reference
For more information visit www.saerelettropompe.com or contact SAER

Organization with
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