ISTRUZIONI PER L'INSTALLAZIONE E LA MANUTENZIONE
INSTRUCTIONS DE MISE EN SERVICE ET D'ENTRETIEN
INSTRUCTIONS FOR INSTALLATION AND MAINTENANCE
INSTALLATIONSANWEISUNG UND WARTUNG
INSTRUCTIES VOOR INGEBRUIKNAME EN ONDERHOUD
INSTRUCCIONES PARA LA INSTALACION Y EL MANTENIMIENTO
INSTALLATIONS - OCH UNDERHÅLLSANVISNING
KULLANIM VE BAKIM TALİMATLARI
ИНСТРУКЦИИ ПО МОНТАЖУ И ТЕХНИЧЕСКОМУ ОБСЛУЖИВАНИЮ
MONTAVIMO IR PRIEŽIŪROS INSTRUKCIJA
INSTRUCTIUNI PENTRU INSTALARE SI INTRETINERE
安装维护说明

CE

МП09

DAB
PUMP PERFORMANCE

K 36/200 - K 40/200 - K 55/200

K 11/500 - K 18/500 - K 28/500
K 40/400 - K 50/400

K 30/800 - K 40/800 - K 50/800
K 20/1200 - K 25/1200 - K 35/1200

K 55/100 - K 66/100 - K 90/100
K 70/300 - K 80/300 - K 70/400 - K 80/400

DICHIARAZIONE DI CONFORMITÀ

La Ditta DAB PUMPS s.p.a. - Via M. Polo,14 - Mestrino (PD) - ITALY - sotto la propria esclusiva responsabilità dichiara che i prodotti summenzionati sono conformi a:

- Direttiva del Consiglio n° 98/37/CE concernente il riavvicinamento delle legislazioni degli Stati membri CEE relative alle macchine e successive modifiche.
- Direttiva della Compatibilità elettromagnetica 89/336 e successive modifiche.
- Direttiva Bassa Tensione 73/23 e successive modifiche.

DÈCLARATION DE CONFORMITÈ

L'entreprise DAB PUMPS s.p.a. - Via M. Polo,14 - Mestrino (PD) - ITALIE - déclare sous sa responsabilité exclusive que les produits susmentionnés sont conformes à:

- la Directive du Conseil n° 98/37/CE concernant l'harmonisation des législations des Etats membres de la CEE relatives aux machines et ses modifications successives.
- la Directive de la compatibilité électromagnétique 89/336 et ses modifications successives.
- la Directive basse tension 73/23 et ses modifications successives.

DECLARATION OF CONFORMITY

The Company DAB PUMPS s.p.a. - Via M. Polo,14 - Mestrino (PD) - ITALY - declares under its own responsibility that the above-mentioned products comply with:

- Council Directive no. 98/37/CE concerning the reconciliation of the legislations of EEC Member Countries with relation to machines and subsequent modifications.
- Directive on electromagnetic compatibility no. 89/336 and subsequent modifications.
- Directive on low voltage no. 73/23 and subsequent modifications.

KONFORMITÄTSERKLÄRUNG

Die Firma DAB PUMPS s.p.a. - Via M. Polo,14 - Mestrino (PD) - ITALY - erklärt unter ihrer eigenen, ausschließlichen Verantwortung, daß die genannten Produkte den folgenden Verordnungen entsprechen:

- Ratsverordnung Nr. 98/37/CE über die Angleichung der Gesetzgebung der CEE-Staaten über Maschinen und folgende Abänderungen.
- Verordnung über die elektromagnetische Kompatibilität 89/336 und folgende Abänderungen.
- Verordnung über Schwachstrom 73/23 und folgende Abänderungen.

CONFORMITEITSVERKLARING

De firma DAB PUMPS s.p.a. - Via M. Polo, 14 Mestrino (PD) - Italië, verklaart hierbij onder haar verantwoording dat hierbovengenoemde produkten conform zijn aan:

- de Richtlijn van de Raad nr. 98/37/CE betreffende harmonisatie van de wetgeving in de EEG-lidstaten t.a.v. machines en daaropvolgende wijzigingen.
- De richtlijnen van de elektromagnetische overeenstemming 89/336 en latere veranderingen.
- De richtlijnen voor lage druk 73/23 en latere veranderingen.

DECLARACION DE CONFORMIDAD

La Empresa DAB PUMPS s.p.a. - Via M. Polo,14 - Mestrino (PD) - ITALY - bajo su propia y exclusiva responsabilidad declara que los productos anteriormente mencionados respetan:

- Las Directrices del Consejo n° 98/37/CE referentes a la homogeneización de las legislaciones de los Estados miembros de la CEE relativas a las máquinas y sucesivas modificaciones.
- Directriz de la Compatibilidad electromagnética 89/336 y sucesivas modificaciones.
- Directriz Baja Tensión 73/23 y sucesivas modificaciones.

FÖRSÄKRAN OM ÖVERENSSTÄMMELSE

Bolaget DAB PUMPS s.p.a. - Via M. Polo,14 - Mestrino (PD) - ITALIEN - intygar på eget ansvar att ovannämnda produkter är i enlighet med:

- Rådets direktiv nr. 98/37/CE och efterföljande ändringar som innehåller en jämkning av EU-ländernas lagstiftning beträffande maskiner.
- EMC-direktivet nr. 89/336 och efterföljande ändringar.
- Lågspänningsdirektiv nr. 73/23 och efterföljande ändringar.

UYGUNLUK BEYANI

Via M. Polo, 14 – Mestrino (PD) –İTALYA'da bulunan DAB PUMPS S.p.A., kendi sorumluluğunu üstüne alarak yukarıda belirtilen ürünlerin:

- AET üyelerinin makinelerle ilgili normlar ile ilişkin tamamlamalarının uyumlaştırılmasına ait, 98/37/CE sayılı Avrupa Konseyi Yönetmeliğine.
- 89/336 sayılı AET Elektromanyetik Uyum Yönetmeliği ile ilişkin tamamlamalarına.
- 73/23 sayılı AET Alçak Gerilim Yönetmeliği ile ilişkin tamamlamalarına uygun olduklarını beyan eder.

ЗАЯВЛЕНИЕ О СООТВЕТСТВИИ

Фирма DAB PUMPS s.p.a. – Via Marco Polo, 14 Mestrino (PD) ИТАЛИЯ- под собственную исключительную ответственность заявляет, что вышеуказанные агрегаты соответствуют:

- Директиве Совета n° 98/37/CE касательно сближения законодательств Государств членов ЕЭС в области агрегатов и последющим поправкам.
- Директиве об Электромагнитной совместимости 89/336 и последующим поправкам.
- Директиве о низком напряжении 73/23 и последующим поправкам.

ATITIKTIES DEKLARACIJA

DAB PUMPS s.p.a. – Via M. Polo, 14 – Mestrino (PD) – Italija – garantuoja, kad šiame leidinyje išvardyti gaminiai atitinka:

- Tarybos direktyvą Nr. 98/37/CE, bei jos pataisas, suderintas su ES valstybių įstatymais, susijusiais su mechanizmais.
- Elektromagnetinio suderinamumo direktyvą Nr. 89/336, bei jos pataisas.
- Įrenginių, skirtų naudoti tam tikros įtampos ribose, direktyvą Nr. 73/23, bei jos pataisas.

DECLARATIE DE CONFORMITATE

Firma DAB PUMPS s.p.a. – Via M. Polo, 14 – Mestrino (PD) – Italia – declara pe propria raspundere ca produsele mentionate mai sus in conformitate cu:

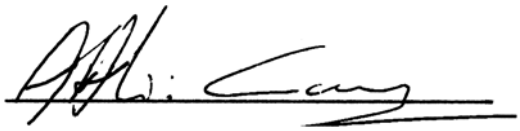
- Directiva Consiliului nr. 98/37/CE privind armonizarea legislatiilor Statelor membre CEE referitoare la masini cu modificarile sale ulterioare.
- Directiva referitoare la compatibilitatea electromagnetica 89/336 si modificarile ulterioare.
- Directiva referitoare la Joasa Tensiune 73/23 si modificarile ulterioare.

确认声明

DAB PUMPS s.p.a公司，位于意大利Via M. Polo,14 - Mestrino (PD)，声明其责任下的以上产品符合如下标准：

- 符合欧洲经济共同体成员国法规的修正中有关机械产品部分及随后所做的修改，98/37/CE号议会指令文件。
- 符合电磁兼容89/336号指令及其修正文件。
- 符合低电压73/23号指令及其修正文件

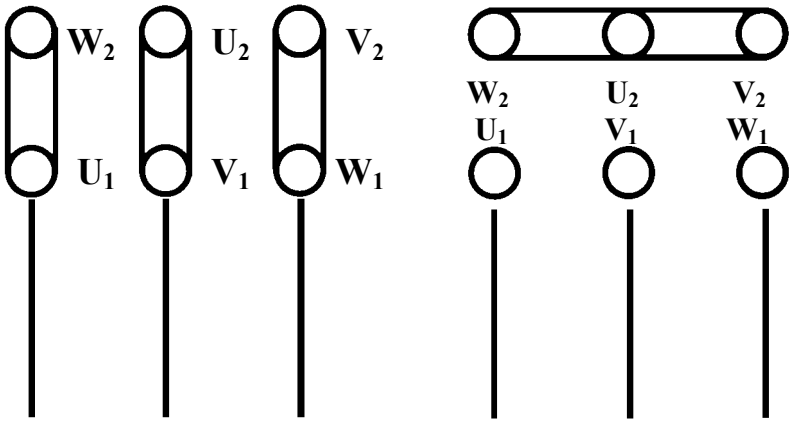
Mestrino (PD), 07 Gennaio 1998



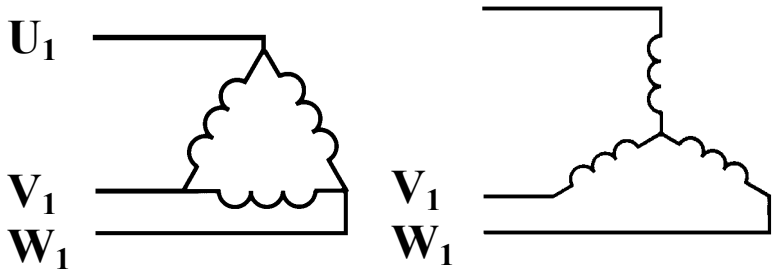
Attilio Conca
Legale Rappresentante
Legal Representative

Collegamento TRIFASE per motori
Branchement TRIPHASE pour moteurs
THREE-PHASE motor connection
Aansluiting TRIPLEFASE voor motoren
DREIPHASIGER Anschluß für Motoren
Conexión TRIFASICA para motores
TREFAS elanslutning för motorer
Motorlar için ÜÇ FAZLI bağlantı
ТРЕХФАЗНОЕ соединение двигателей
TRIFAZIO variklio pajungimas
Conexiune TRIFAZICA pentru motoare

3 ~ 230/400 V



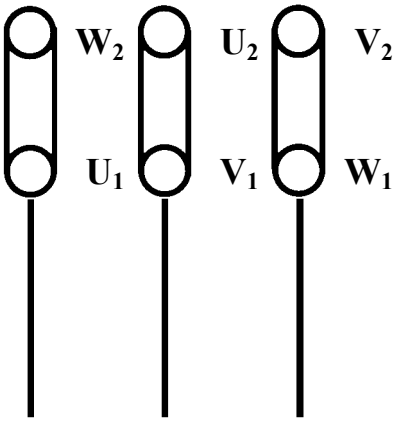
230V **Linea** – Ligne – Line **400V**
Lijn – Linie – Línea
Ledning – Hat – Линия – Linija
Linie



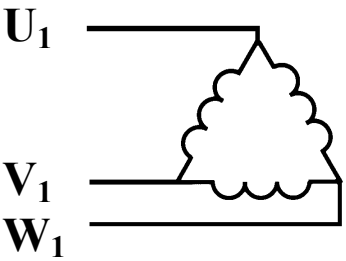
Collegamento a TRIANGOLO
Branchement TRIANGLE
DELTA starting
Driehoekaansluiting
DREIECK-Schaltung
Conexión de TRIÁNGULO
DELTA-anslutning
Üçgen bağlantı
Соединение на ТРЕУГОЛНИК
Trikampis jungimas
Conexiune TRIUNGHI

Collegamento a STELLA
Branchement ETOILE
STAR starting
Steraansluiting
STERN-Schaltung
Conexión de ESTRELLA
Y-anslutning
Yıldız bağlantı
Соединение на ЗВЕЗДУ
Jungimas žvaigžde
Conexiune STEA

3 ~ 400 Δ V



Linea – Ligne – Line
Lijn – Linie – Línea
Ledning – Hat – Линия – Linija
Linie



Collegamento a TRIANGOLO
Branchement TRIANGLE
DELTA starting
Driehoekaansluiting
DREIECK-Schaltung
Conexión de TRIÁNGULO
DELTA-anslutning
Üçgen bağlantı
Соединение на ТРЕУГОЛНИК
Trikampis jungimas
Conexiune TRIUNGHI

1. GENERAL

Read this documentation carefully before installation. It contains fundamental instructions to be followed during installation, operation and maintenance.

Installation and functioning must comply with the safety regulations in force in the country in which the product is installed. The entire operation must be carried out in a workmanlike manner, exclusively by skilled personnel (paragraph 6.1), in possession of the technical qualifications indicated by the standards in force. Failure to comply with the safety regulations not only causes risk to personal safety and damage to the equipment, but invalidates every right to assistance under guarantee.

The pump may be installed in either horizontal or vertical position, as long as the motor is always above the pump.

2. APPLICATIONS

Single-impeller and twin-impeller centrifugal pumps designed for use where particularly high flow rates are required. Suitable for a wide range of applications such as for feeding water in water supply systems in the civil, agricultural and industrial sector, for raising pressure and constructing booster sets, loading and decanting general clean liquids from cisterns, mixing, sprinkling and irrigation, circulating water in heating and air-conditioning systems.

3. PUMPED FLUIDS

The machine has been designed and built for pumping water, free from explosive substances and solid particles or fibres, with a density of 1000 kg/m³ and a kinematic viscosity of 1 mm²/s, and chemically non-aggressive liquids.

4. TECHNICAL DATA AND RANGE OF USE

- **Liquid temperature range:** from -10°C to +50°C for K 36/200 - K 40/200
  from -15°C to +110°C for the rest of the range
- **Supply voltage:** 3 x 230-400 V 50/60 Hz up to 4 KW inclusive
  3 x 400 V Δ 50/60 Hz over 4 KW
- **Degree of motor protection:** see electric data plate
- **Degree of terminal board protection:** IP55
- **Thermal class:** F
- **Absorbed power** see electric data plate
- **Maximum environment temperature:** +40°C
- **Storage temperature:** -10°C to +40°C
- **Relative humidity of the air:** max. 95%
- **Maximum working pressure:** 8 Bar (800 KPa): K 36/200 - K 40/200 - K 55/200
  K 11/500 - K 18/500 - K 28/500
  10 Bar (1000KPa): K 40/400 - K 50/400
  K 30/800 - K 40/800 - K 50/800
  K 20/1200 - K 25/1200 - K 35/1200
  K 55/100 - K 66/100
  12 Bar (1200KPa): K 90/100 - K 70/300 - K 80/300 - K 70/400
  K 80/400
- **Motor construction:** in conformity with standards CEI 2-3 pamphlet 1110
- **Weight:** see plate on package
- **Dimensions:** see table on page 102-103
- **Class AM line fuses: indicative values (Amps)**

Model	Line fuses	
	3 x 230V 50/60Hz	3 x 400V 50/60Hz
K 36/200 T; K11/500 T;	12	8
K 40/200 T; K 18/500 T; K 55/100 T;	15	8
K 55/200 T; K 28/500 T; K 66/100 T; K 90/100 T;	20	12
K 40/400 T; K 70/300 T;	25	16
K 50/400 T; K 30/800 T; K 40/800 T; K 20/1200 T; K 25/1200 T; K 70/400 T; K 80/300 T;	40	20
K 50/800 T; K 35/1200 T; K 80/400 T;	40	25

– **Cable clamp:**	PG 13,5	K 36/200 T - K 40/200 T - K 55/200 T - K 11/500 T - K 18/500 T - K 28/500 T K 55/100 T – K 66/100 T - K 90/100 T
	PG 21	K 40/400 T - K 50/400 T - K 30/800 T - K 40/800 T - K 50/800 T - K 20/1200 T - K 25/1200 T - K 35/1200 T - K 70/300 T - K 80/300 T - K 70/400 T - K 80/400 T

5. MANAGEMENT

5.1 Storage

All the pumps must be stored indoors, in a dry, vibration-free and dust-free environment, possibly with constant air humidity.
They are supplied in their original packaging and must remain there until the time of installation. If this is not possible, the intake and delivery aperture must be accurately closed.

5.2 Transport

Avoid subjecting the products to needless jolts or collisions.
To lift and transport the unit, use lifting equipment and the pallet supplied standard (if applicable).
Use suitable hemp or synthetic ropes only if the part can be easily slung, connecting them if possible to the eyebolts provided.
In the case of coupled pumps, the eyebolts provided for lifting one part must not be used to lift the pump-motor assembly.

5.3 Dimensions and weights

The adhesive label on the package indicates the total weight of the electropump. The dimensions are given on page 102-103.

6. WARNINGS

6.1 Skilled technical personnel

It is advisable that installation be carried out by skilled personnel in possession of the technical qualifications required by the specific legislation in force.

The term **skilled personnel** means persons whose training, experience and instruction, as well as their knowledge of the respective standards and requirements for accident prevention and working conditions, have been approved by the person in charge of plant safety, authorizing them to perform all the necessary activities, during which they are able to recognize and avoid all dangers. (Definition for technical personnel IEC 364).

6.2 Safety

Use is allowed only if the electric system is in possession of safety precautions in accordance with the regulations in force in the country where the product is installed (for Italy, CEI 64/2).

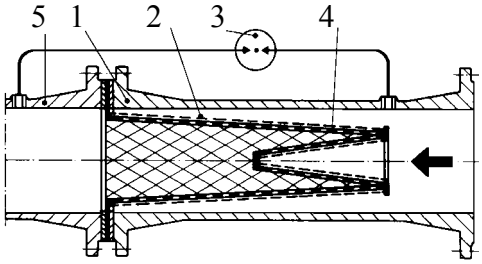
6.3 Checking motor shaft rotation

Before installing the pump, it is advisable to check that the rotor shaft turns freely. To do this remove the fan cover (13) releasing it from the groove in the motor end cover (11), unscrewing the screws (136) and the nuts (133) if provided. Working the fan by hand, turn the rotor shaft a few times. If this is not possible, dismantle the pump body (1), slackening the screws (45) to check for any foreign bodies inside it. To reassemble, proceed in inverse order.

Do not force the fan with pliers or other tools to try to free the pump as this could cause deformation or breakage of the pump.

6.4 New systems

Before running new systems the valves, pipes, tanks and couplings must be cleaned accurately. Often welding waste, flakes of oxide or other impurities fall off after only a certain period of time. To prevent them from getting into the pump they must be caught by suitable filters. The free surface of the filter must have a section at least 3 times larger than the section of the pipe on which the filter is fitted, so as not to create excessive load losses. We recommend the use of TRUNCATED CONICAL filters made of corrosion-resistant materials (SEE DIN 4181).



(Filter for intake pipe)
1) Filter body
2) Narrow mesh filter
3) Differential pressure gauge
4) Perforated sheet
5) Pump intake aperture

6.5 Responsibility

The Manufacturer does not vouch for correct operation of the pumps if they are tampered with or modified, run outside the recommended work range or in contrast with the other instructions given in this manual.

The Manufacturer declines all responsibility for possible errors in this instructions manual, if due to misprints or errors in copying. The company reserves the right to make any modifications to products that it may consider necessary or useful, without affecting the essential characteristics.

6.6 Protections

6.6.1 Moving parts

In accordance with accident-prevention regulations, all moving parts (fans, couplings, etc.) must be accurately protected with special devices (fan covers, coupling covers) before operating the pump.

During pump operation, keep well away from the moving parts (shaft, fan, etc.) unless it is absolutely necessary, and only then wearing suitable clothing as required by law, to avoid being caught.

6.6.2 **Noise level**

The noise levels of pumps with standard supply motors are indicated in table 6.6.2 on page 93.
Remember that, in cases where the LpA noise levels exceed 85 dB(A), suitable HEARING PROTECTION must be used in the place of installation, as required by the regulations in force.

6.6.3 **Hot and cold parts**

As well as being at high temperature and high pressure, the fluid in the system may also be in the form of steam!
DANGER OF BURNING.
It may be dangerous even to touch the pump or parts of the system.

If the hot or cold parts are a source of danger, they must be accurately protected to avoid contact with them.

7. INSTALLATION

7.1 The electropump must be fitted in a well ventilated place, protected from unfavourable weather conditions and with an environment temperature not exceeding 40°C. **Fig. A.**
Electropumps with degree of protection IP55 may be installed in dusty and damp environments. If installed in the open, generally it is not necessary to take any particular steps to protect them against unfavourable weather conditions.

7.2 The buyer is fully responsible for preparing the foundation. Metal foundations must be painted to avoid corrosion; they must be level an sufficiently rigid to withstand any stress due to short circuits. Their dimensions must be calculated to avoid the occurrence of vibrations due to resonance.
With concrete foundations, care must be taken to ensure that the concrete has set firmly and is completely dry before placing the unit on it.
A firm anchoring of the feet of the pump/motor assembly on the base helps absorb any vibrations created by pump operation. **Fig. B.**

7.3 Ensure that the metal pipes do not transmit excess force to the pump apertures, so as to avoid causing deformations or breakages. **Fig. B.** Any expansion due to the heat of the pipes must be compensated with suitable precautions to avoid weighing down on the pump. The flanges of the pipes must be parallel to those of the pump.

7.4 To reduce noise to a minimum it is advisable to fit vibration-damping couplings on the intake and delivery pipes and between the motor feet and the foundation.

7.5 **It is always good practice to place the pump as close as possible to the liquid to be pumped.**
The internal diameter of the pipes must never be smaller than that of the apertures of the pump. If the head at intake is negative, it is indispensable to fit a foot valve with suitable characteristics at intake. **Fig. C.** For suction depths of over four metres or with long horizontal stretches it is advisable to use an intake pipe with a diameter larger than that of the intake aperture of the pump.
Irregular passages between the diameters of the pipes and tight curves considerably increase load losses. Any passage from a pipe with a small diameter to one with a larger diameter must be gradual. Usually the length of the passage cone must be 5 to 7 times the difference in diameter.
Check accurately to ensure that the joins in the intake pipe do not allow air infiltrations.
Ensure that the gaskets between flanges and counterflanges are well centred so as not to create resistances to the flow in the pipes. To prevent the formation of air pockets, the intake pipe must slope slightly upwards towards the pump. **Fig. C.**
If more than one pump is installed, each pump must have its own intake pipe. The only exception is the reserve pump (if envisaged) which, as it starts up only in the case of breakdown of the main pump, ensures the operation of only one pump for each intake pipe.

7.6 Interception valves must be fitted upstream and downstream from the pump so as to avoid having to drain the system when carrying out pump maintenance.

7.7 

The pump must not be operated with the interception valves closed, as in these conditions there would be an increase in the temperature of the liquid and the formation of vapour bubbles inside the pump, leading to mechanical damage. If there is any possibility of the pump operating with the interception valves closed, provide a by-pass circuit or a drain leading to a liquid recovery tank.

7.8 To guarantee good operation and maximum performance of the electropump, it is necessary to know the level of the N.P.S.H. (Net Positive Suction Head) of the pump concerned, so as to determine the suction level Z1. The curves for the N.P.S.H. of the various pumps are given on page 97-100. This calculation is important because it ensures that the pump can operate correctly without cavitation phenomena which occur when, at the impeller intake, the absolute pressure falls to values that allow the formation of vapour bubbles in the fluid, so that the pump works irregularly with a fall in head. The pump must not cavitate because, as well as producing considerable noise similar to metallic hammering, it would cause irreparable damage to the impeller.

To determine the suction level Z1, the following formula must be applied:

Z1 = pb - rqd. N.P.S.H. - Hr - correct pV

where:

Z1 = difference in level in metres between the axis of the pump and the free surface of the liquid to be pumped
pb = barometric pressure in mcw of the place of installation **(fig. 6, page 104)**
NPSH = net load at intake of the place of work **(page 105-108)**
Hr = load loss in metres on the whole intake duct (pipe - curves - foot valves)
pV = vapour tension in metres of the liquid in relation to the temperature expressed in °C **(see fig. 7, page 104)**.

Example 1: installation at sea level and fluid at t = 20°C

required N.P.S.H.:	3,25 m
pb :	10.33 mcw **(fig. 6, page 104)**
Hr:	2,04 m
t:	20°C
pV:	0.22 m **(fig. 7, page 104)**
Z1	**10.35 - 3.25 - 2.04 - 0.22 = 4.82 approx.**

Example 2: installation at a height of 1500 m and fluid at t = 50°C

required N.P.S.H.:	3,25 m
pb :	8,6 mcw **(fig. 6, page 104)**
Hr:	2,04 m
t:	50°C
pV:	1,147 m **(fig. 7, page 104)**
Z1	**8.6 - 3.25 - 2.04 - 1.147 = 2.16 approx.**

Example 3: installation at sea level and fluid at t = 90°C

required N.P.S.H.:	3,25 m
pb :	10.33 mcw **(fig. 6, page 104)**
Hr:	2,04 m
t:	90°C
pV:	7.035 m **(fig. 7, page 104)**
Z1	**10.33 - 3.25 - 2.04 - 7.035 = -1.99 approx.**

In the last case, in order to operate correctly the pump must be fed with a positive head of 1.99 - 2 m, that is the free surface of the water must be 2 m higher than the axis of the pump.

N.B.: it is always good practice to leave a safety margin (0.5 m in the case of cold water) to allow for errors or unexpected variations in the estimated data. This margin becomes especially important with liquids at a temperature close to boiling point, because slight temperature variations cause considerable differences in the working conditions. For example in the third case, if instead of 90°C the water temperature reaches 95°C at any time, the head required by the pump would no longer be 1.99 but 3.51 metres.

8. ELECTRICAL CONNECTION

Caution! always follow the safety regulations.

Scrupulously follow the wiring diagrams inside the terminal board box and those on page 1 of this manual.

8.1 **The electrical connections must be made exclusively by skilled personnel (see point 6.1) as required by the safety regulations in force.**
The requirements of the electric energy supply company must be scrupulously complied with.
In the case of three-phase motors with star-delta start, ensure that the switch-over time from star to delta is as short as possible and that it falls within table 8.1 on page 101.

8.2 Before opening the terminal board and working on the pump, ensure that the **power has been switched off**

8.3 Check the mains voltage before making any connection. If it is the same as the voltage on the data plate, proceed to connect the wires to the terminal board, **giving priority to the earth lead. (Fig. D).**

8.4 **ENSURE THAT THE EARTH SYSTEM IS EFFICIENT AND THAT THERE IS THE POSSIBILITY OF MAKING A GOOD CONNECTION.**

8.5 The pumps must always be connected to an external switch.

8.6 Three-phase motors must be protected with special remote-control motor-protectors calibrated for the current shown on the plate.

9. STARTING UP

9.1

Do not start the pump unless it has been completely filled with fluid.

Before starting up, check that the pump is properly primed; fill it completely with clean water by means of the hole provided after having removed the filler cap (25) on the discharge body. This ensures that the mechanical seal is well lubricated and that the pump immediately starts to work regularly. **(Fig. E).** The filler cap must then be put back in place. **Dry operation causes irreparable damage to the mechanical seal and the stuffing box seal.**

9.2 Fully open the gate valve on intake and keep the one on delivery almost closed.

9.3 Switch on the power and check that the motor is turning in the right direction, that is clockwise when viewed from the fan side, **Fig. F** (indicated also by the arrow on the fan cover). Otherwise invert any two phase leads, after having disconnected the pump from the mains.

9.4 Once the hydraulic circuit has been completely filled with liquid, gradually open the delivery gate valve until its maximum opening.

9.5 With the pump running, check the supply voltage at the motor terminals, which must not differ from the rated value by +/- 5% **(Fig. G)**.

9.6 With the unit at regular running speed, check that the current absorbed by the motor does not exceed the value on the data plate.

10. STOPPING

10.1 Close the interception device on the delivery pipe. If there is a check device on the delivery pipe, the interception valve on the delivery side may remain open as long as there is back.
For a long period of inactivity, close the interception device on the intake pipe and, if supplied, all the auxiliary control connections.

11. PRECAUTIONS

11.1 The electropump should not be started an excessive number of times in one hour. The maximum admissible value is as follows:

TYPE OF PUMP	MAXIMUM NUMBER OF STARTS PER HOUR
THREE-PHASE MOTORS UP TO 5.5 HP	30
THREE-PHASE MOTORS FROM 7.5 TO 60 HP	5 - 10

11.2 **DANGER OF FROST:** When the pump remains inactive for a long time at temperatures of less than 0°C, the pump body must be completely emptied through the drain cap (26) **Fig. H**, to prevent possible cracking of the hydraulic components. This operation is advisable even in the event of prolonged inactivity at normal temperature.

Check that the leakage of liquid does not damage persons or things, especially in plants that use hot water.

Do not close the drainage cap until the pump is to be used again.
When restarting after long periods of inactivity it is necessary to repeat the operations described above in the paragraphs **"WARNINGS"** and **"STARTING UP"**.

12. MAINTENANCE AND CLEANING

The electropump can only be dismantled by competent skilled personnel, in possession of the qualifications required by the legislation in force. In any case, all repair and maintenance jobs must be carried out only after having disconnected the pump from the power mains. Ensure that it cannot be switched on accidentally.
If possible, keep to a maintenance schedule: expensive repairs or machine down times can be avoided with a minimum expense. During maintenance schedule discharge the condensate, if necessary present into the motor, through the hole, removing the exhaust port plug no 64 (electropumps with IP55 Degree of motor protection only)

If the liquid has to be drained out maintenance, ensure that the liquid coming out cannot harm persons or things, especially in using hot water.
The legal requirements on the disposal of any harmful fluids must also be complied with.

12.1 Periodic checks

In normal operation, the pump does not require any kind of maintenance. However, from time to time it is advisable to check current absorption, the manometric head with the aperture closed and the maximum flow rate, which will enable you to have advance warning of any faults or wear.

13. MODIFICATIONS AND SPARE PARTS

Any modification not authorized beforehand relieves the manufacturer of all responsibility. All the spare parts used in repairs must be original ones and the accessories must be approved by the manufacturer so as to be able to guarantee maximum safety of the machines and systems in which they may be fitted.

14. TROUBLESHOOTING

FAULT	CHECK (possible cause)	REMEDY
1. The motor does not start and makes no noise.	A. Check the protection fuses. B. Check the electric connections. C. Check that the motor is live.	A. If they are burnt-out, change them. If the fault is repeated immediately this means that the motor is short circuiting.
2. The motor does not start but makes noise.	A. Ensure that the mains voltage corresponds to the voltage on the data plate. B. Check that the connections have been made correctly. C. Check that all the phases are present on the terminal board. D. The shaft is blocked. Look for possible obstructions in the pump or motor.	 B. Correct any errors. C. If not, restore the missing phase. D. Remove any obstructions.
3. The motor turns with difficulty.	A. Check the supply voltage which may be insufficient. B. Check whether any moving parts are scraping against fixed parts. C. Check the state of the bearings.	 B. Eliminate the cause of the scraping. C. Change any worn bearings.
4. The (external) motor protection trips immediately after starting.	A. Check that all the phases are present on the terminal board. B. Look for possible open or dirty contacts in the protection. C. Look for possible faulty insulation of the motor, checking the phase resistance and insulation to earth.	A. If not, restore the missing phase. B. Change or clean the component concerned. C. Change the motor casing with the stator or reset any cables discharging to earth.
5. The motor protection trips too frequently.	A. Ensure that the environment temperature is not too high. B. Check the calibration of the protection. C. Check the state of the bearings. D. Check the motor rotation speed.	A. Provide suitable ventilation in the environment where the pump is installed. B. Calibrate at a current value suitable for the motor absorption at full load. C. Change any worn bearings.

continued on next page

continued from previous page

FAULT	CHECK (possible cause)	REMEDY
6. The pump does not deliver.	A. The pump has not been correctly primed. B. On three-phase motors, check that the direction of rotation is correct. C. Difference in suction level too high. D. The diameter of the intake pipe is insufficient or the length is too long. E. Foot valve blocked.	A. Fill the pump and the intake pipe with water. Prime the pump. B. Invert the connection of two supply wires. C. See point 5 of the instructions for installation. D. Replace the intake pipe with one with a larger diameter. E. Clean the foot valve.
7. The pump does not prime.	A. The intake pipe or the foot valve is taking in air. B. The downward slope of the intake pipe favours the formation of air pockets.	A. Eliminate the phenomenon, checking the intake pipe accurately, and prime again. B. Correct the inclination of the intake pipe.
8. The pump supplies insufficient flow.	A. Blocked foot valve. B. The impeller is worn or blocked. C. The diameter of the intake pipe is insufficient. D. Check that the direction of rotation is correct.	A. Clean the foot valve. B. Change the impeller or remove the obstruction. C. Replace the pipe with one with a larger diameter. D. Invert the connection of two supply wires.
9. The pump flow rate is not constant.	A. Intake pressure too low. B. Intake pipe or pump partly blocked by impurities.	B. Clean the intake pipe and the pump.
10. The pump turns in the opposite direction when switching off.	A. Leakage in the intake pipe. B. Foot valve or check valve faulty or blocked in partly open position.	A. Eliminate the fault. B. Repair or replace the faulty valve.
11. The pump vibrates and operates noisily.	A. Check that the pump and/or the pipes are firmly anchored. B. There is cavitation in the pump (see point 8, paragraph on INSTALLATION). C. The pump is running above its plate characteristics.	A. Fasten any loose parts. B. Reduce the intake height or check for load losses. C. Reduce the flow rate.

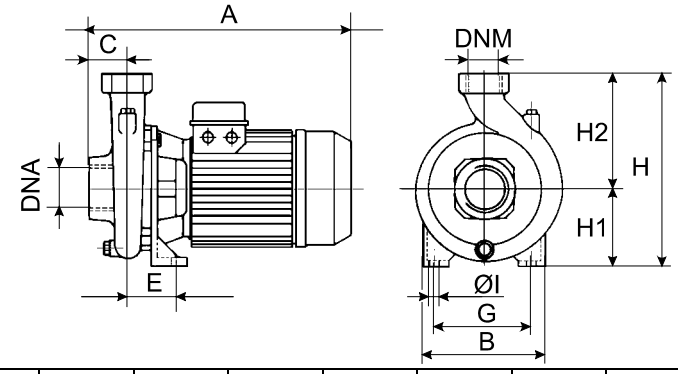
TAB. 6.6.2: **Rumore aereo prodotto dalle pompe dotate con motore di serie:**
Bruit aérien produit par les pompes équipées de moteur de série:
Airborne noise produced by the pumps with standard motor:
Lärmpegel der Pumpen mit serienmäßigem Motor:
Luchtlawaai geproduceerd door standaardmotoren:
Ruido aéreo producido por las bombas dotadas de motor en serie:
Luftburen bullernivå för pumpar med standardmotorer:
Seri motor ile donatılan pompaların gürültü seviyesi:
Шумовой уровень, производимый насосами, оснащенными серийными двигателями:
Siurblių su standartiniais varikliais sukeliamas triukšmo lygis:
Zgomot aerian produs de pompale dotate cu motor de serie:
标准电机水泵产生的空气噪音

Grandezza motore **Grandeur moteur** **Motor size** **Motorgröße** **Motorgrootte** **Tamaño del motor** **Motorns storlek** **Motor** **Величина двигателя** **Variklio dydis** **Marime motor** 电机尺寸	**n° poli** **n.de pôles** **no. poles** **Polzahl** **aantal polen** **n° polos** **antal poler** **Kutup sayısı** **Число полюсов** **Polių skaičius** **Nr. poli** 极数	**Potenza** **Puissance** **Power** **Leistung** **Vermogen** **Potencia** **Effekt** **Güç** **Мощность** **Galingumas** **Putere** 功率		**Pressione sonora Lpa** **Pression sonore Lpa** **Sound pressure Lpa** **Schalldruck Lpa** **Geluidsdruk Lpa** **Presión sonora Lpa** **Ljudtryck Lpa** **Ses basıncı (Lpa)** **Акустическое давление Lpa** **Garso slėgimas Lpa** **Presiune fonica Lpa** 噪音压力 Lpa	**Potenza sonora Lwa** **Puissance sonore Lwa** **Sound power Lwa** **Schalleistung Lwa** **Geluidsvermogen Lwa** **Potencia sonora Lwa** **Ljudeffekt Lwa** **Ses gücü (Lwa)** **Акустическая мощность Lwa** **Garso galingumas** **Putere fonica Lwa** 噪音量Lwa
		KW	**Hp**	**[dB(A)]**	**[dB(A)]**
MEC 100	2	3 - 5,5	4 - 7,5	70	- -
MEC 132	2	5,5 - 7,5	7,5 - 10	81	- -
MEC 132	2	9,2 - 11	12,5 - 15	82	- -
MEC 160	2	15 - 22	20 - 30	88	96
MEC 200	2	30 - 45	40 - 60	86	94
MEC 160	4	9,2 - 15	12,5 - 20	74	- -
MEC 180	4	18 - 22	25 - 30	77	- -
MEC 200	4	30 - 37	40 - 50	81	- -

TAB. 8.1: **Tempi commutazione stella-triangolo:**
Temps de commutation étoile-triangle:
Star-delta switch-over times:
Umschaltzeiten Stern-Dreieck:
Overgangstijden ster-driehoek:
Tiempos de conmutación estrella-triángulo:
Omkopplingstid stjärna – triangel:
Yıldızdan üçgene geçiş süreleri:
Время переключения со звезды на треугольник:
Persijungimo iš žvaigždės į trikampį laikas:
Timpi comutare stea-triunghi:
星 ～ 三角开关换向时间。

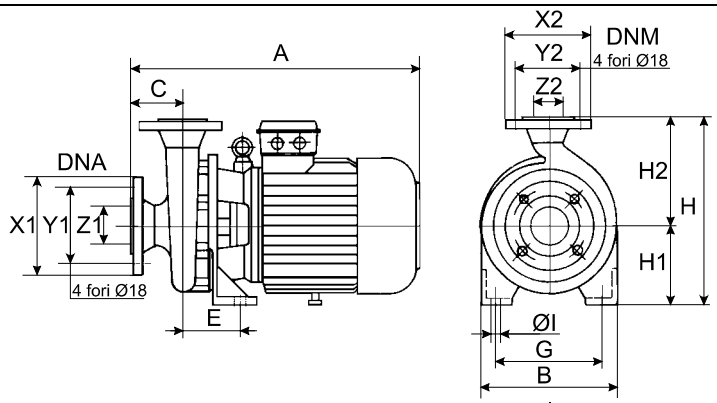
Potenza / Puissance **Power / Leistung** **Vermogen / Potencia** **Effekt / Güç** **Мощность / Galingumas** **Putere** / 功率		**Tempi di commutazione / Temps de commutation** **Switch-over times / Umschaltzeiten** **Overgangstijden / Tiempos de conmutación** **Omkopplingstid / Geçiş süreleri** **Время переключения / Persijungimo laikas** **Timpi de comutare** / 换向时间
KW	**Hp**	
≤ 30	**≤ 40**	**< 3 sec.**
> 30	**> 40**	**< 5 sec.**

FIG.1



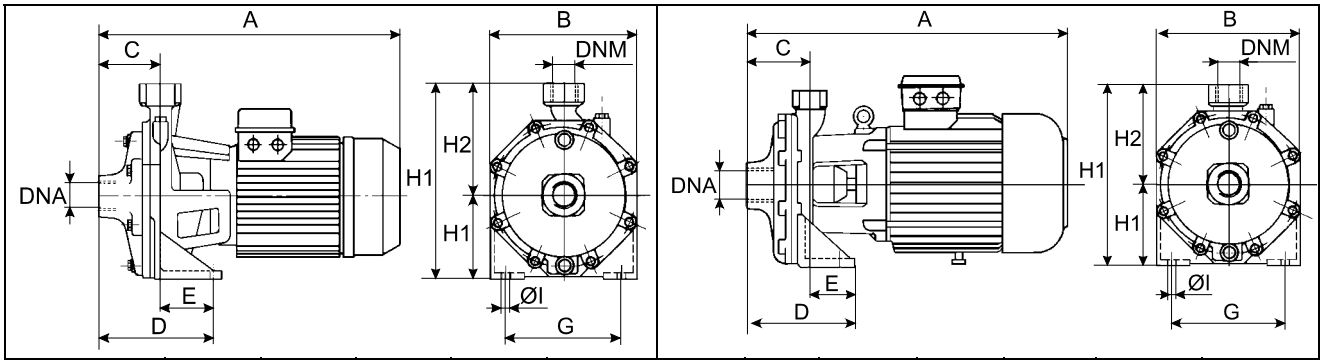
Tipo/Type	A	B	C	E	G	I	H	H1	H2	DNA	DNM
K 36/200	425	250	55	86	175	14	320	135	185	2” G	1¼” G
K 40/200	425	250	55	86	175	14	320	135	185	2” G	1¼” G
K 55/200	425	250	55	86	175	14	320	135	185	2” G	1¼” G
K 11/500	440	240	62	100	155	14	312	132	180	2½” G	2” G
K 18/500	440	240	62	100	155	14	312	132	180	2½” G	2” G
K 28/500	440	240	62	100	155	14	312	132	180	2½” G	2” G

FIG. 2



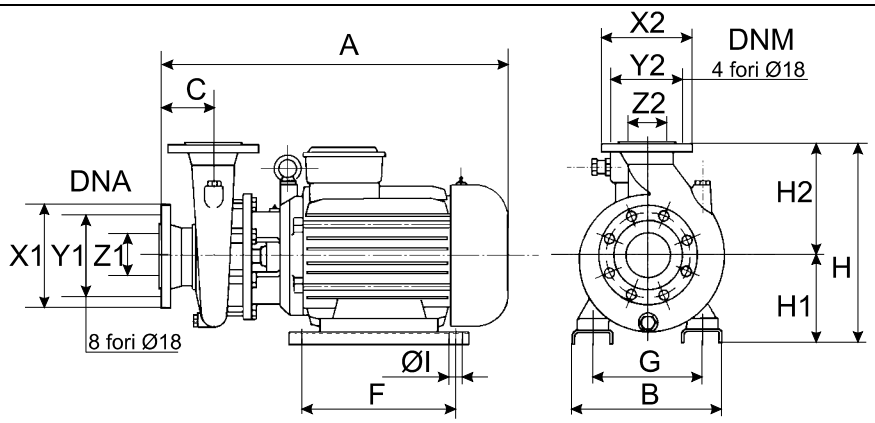
										DNA			DNM		
Tipo/Type	**A**	**B**	**C**	**E**	**G**	**I**	**H**	**H1**	**H2**	**X1**	**Y1**	**Z1**	**X2**	**Y2**	**Z2**
K 40/400	560	273	100	110	212	14	360	160	200	185	145	65	165	125	50
K 50/400	560	273	100	110	212	14	360	160	200	185	145	65	165	125	50
K 30/800	600	273	100	110	212	14	385	160	225	200	160	80	185	145	65
K 40/800	600	273	100	110	212	14	385	160	225	200	160	80	185	145	65
K 50/800	600	273	100	110	212	14	385	160	225	200	160	80	185	145	65
K 20/1200	600	273	100	110	212	14	385	160	225	200	160	80	185	145	65
K 25/1200	600	273	100	110	212	14	385	160	225	200	160	80	185	145	65
K 35/1200	600	273	100	110	212	14	385	160	225	200	160	80	185	145	65

FIG.3



Tipo/Type	A	B	C	D	E	G	I	H	H1	H2	DNA	DNM
K 55/100	450	256	88	160	72	200	14	312,5	140	172,5	1½”G	1” G
K 66/100	450	256	88	160	72	200	14	312,5	140	172,5	1½”G	1” G
K 90/100	450	256	88	160	72	200	14	312,5	140	172,5	1½”G	1” G
K 70/300	595	270	122	182	60	210	14	340	160	180	2” G	1¼” G
K 80/300	595	270	122	182	60	210	14	340	160	180	2” G	1¼” G
K 70/400	635	270	122	182	60	210	14	340	160	180	2” G	1¼” G
K 80/400	635	270	122	182	60	210	14	340	160	180	2” G	1¼” G

FIG.4



										DNA			DNM		
Tipo/Type	**A**	**B**	**C**	**F**	**G**	**I**	**H**	**H1**	**H2**	**X1**	**Y1**	**Z1**	**X2**	**Y2**	**Z2**
K 60/800	713	337	100	364	245	14	440	190	250	200	160	80	185	145	65
K 70/800	757	337	100	364	245	14	440	190	250	200	160	80	185	145	65
K 80/800	757	337	100	364	245	14	440	190	250	200	160	80	185	145	65
K 30/1600	738	337	125	364	245	14	440	190	250	220	180	100	200	160	80
K 40/1600	782	337	125	364	245	14	440	190	250	220	180	100	200	160	80
K 50/1600	782	337	125	364	245	14	440	190	250	220	180	100	200	160	80
K 15/3000	746	337	125	364	245	14	440	190	250	250	210	125	220	180	100
K 20/3000	790	337	125	364	245	14	440	190	250	250	210	125	220	180	100
K 30/3000	790	337	125	364	245	14	440	190	250	250	210	125	220	180	100

15. DISEGNI ESPLOSI - VUES ÉCLANTÉES - PART DRAWINGS EXPLOSIONSZEICHNUNGEN EXPLOSIETEKENINGEN - DIBUJOS DESPIEZADOS SPRÄNGSKISS - YAYGIN GÖRÜNÜŞLER - РАЗВЕРНУТЫЕ ЧЕРТЕЖИ-DALIŲ BRĖŽINIAI DESENE EXPLODATE - 部件图

K 36/200 - K 40/200 - K 55/200

K 11/500 - K 18/500 - K 28/500

K 40/400 - K 50/400

K 30/800 - K 40/800 - K 50/800
K 20/1200 - K 25/1200 - K 35/1200

K 55/100 - K 66/100 - K 90/100

K 70/300 - K 80/300
K 70/400 - K 80/400

Modello / Modèle / Model ***Modell / Model*** ***Modelo / Modell / Model*** **Модель /** نموذج	**Prevalenza / Hauteur d'élévation / Head up** **Förderhöhe / Overwicht / Prevalencia** **Maximal pumphöjd / Manometrik yükseklik** **Напор /** التفوق	
	Hmax (m) 2 poles ***50 Hz***	***Hmax (m) 2 poles*** ***60 Hz***
K 36/200	36.5	36.4
K 40/200	41	42.3
K 55/200	54	54
K 11/500	24	25.6
K 18/500	31	32
K 28/500	36	37.5
K 40/400	51	50.5
K 50/400	62	63.5
K 30/800	44	44
K 40/800	51	51
K 50/800	58	58.26
K 20/1200	37	37.4
K 25/1200	41	41.6
K 35/1200	45	46.9
K 55/100	62	62
K 66/100	73	74
K 90/100	86	81.5
K 70/300	73	79
K 80/300	95	97
K 70/400	86	89
K 80/400	96	106

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