ISTRUZIONI PER L'INSTALLAZIONE E LA MANUTENZIONE (IT)
INSTRUCTIONS DE MISE EN SERVICE ET D'ENTRETIEN (FR)
INSTRUCTIONS FOR INSTALLATION AND MAINTENANCE (GB)
INSTALLATIONSANWEISUNG UND WARTUNG (DE)
INSTRUCTIES VOOR INGEBRUIKNAME EN ONDERHOUD (NL)
INSTRUCCIONES PARA LA INSTALACIÓN Y EL MANTENIMIENTO(ES)
INSTALLATIONS - OCH UNDERHÅLLSANVISNING(SE)
KULLANIM VE BAKIM TALİMATLARI(TR)
ИНСТРУКЦИИ ПО МОНТАЖУ И ТЕХНИЧЕСКОМУ БСЛУЖИВАНИЮ(RU)
APTARNAVIMO IR MONTAŽO INSTRUKCIJA(LT)
INSTRUCTIUNI DE INSTALARE SI INTRETINERE(RO)
INSTRUÇÕES PARA A INSTALAÇÃO E A MANUTENÇÃO(PT)
安装和维护说明
INSTALLÁCIÓS ÉS KARBANTARTÁSI KÉZIKÖNYV(HU)
ИНСТРУКЦИЯ ЗА МОНТАЖ И ПОДРЪЖКА(BG)
ІНСТРУКЦІЇ З МОНТАЖУ ТА ТЕХНІЧНОГО ОБСЛУГОВУВАННЯ (UA)

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

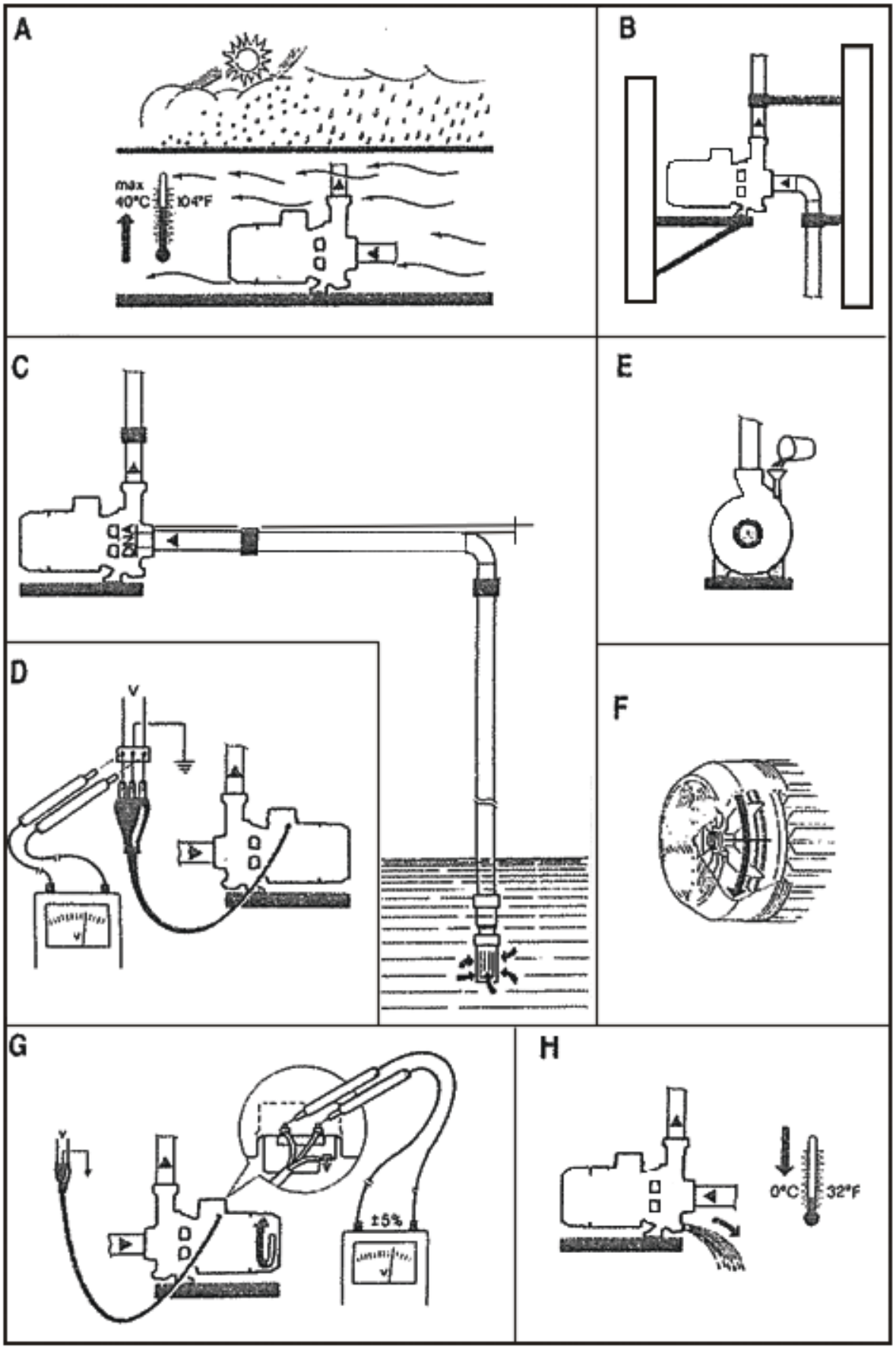
K 11/500 - K 18/500 - K 28/500
K 40/400 - K 50/400

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

CE

DAB
WATER•TECHNOLOGY


A
max
40°C
104°F
B
C
E
D
V
F
G
V
±5%
H
0°C
32°F

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

KE 36/200 - KE 40/200 - KE 55/200

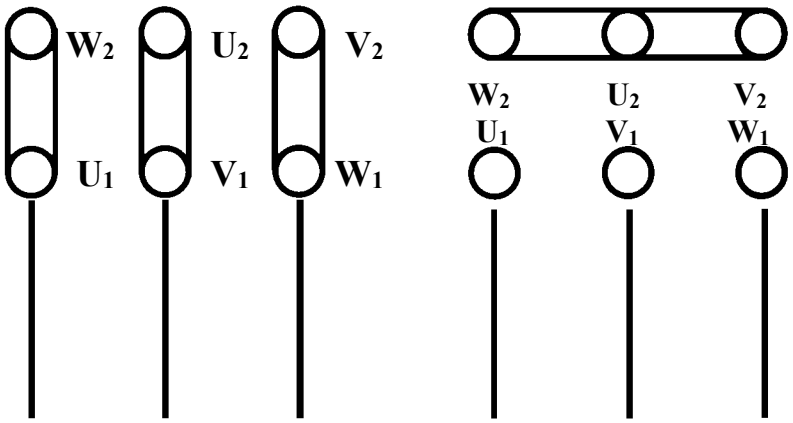
KE 40/400 - KE 50/400

KE 30/800 - KE 40/800 - KE 50/800
KE 25/1200 - KE 35/1200

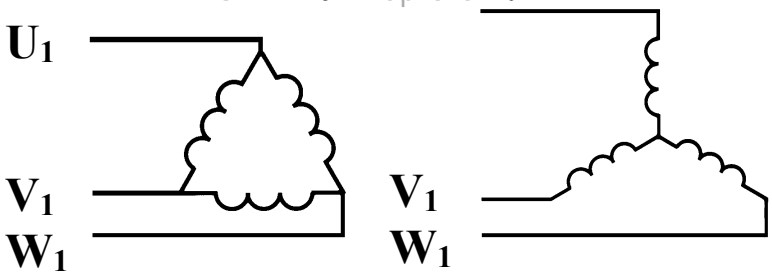
KE 55/100 - KE 66/100 - KE 90/100
KE 70/300 - KE 80/300 - KE 70/400 - KE 80/400

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 /** Ligação TRIFÁSICA para motores **/ Motorok háromfázisú bekötése /** Свързване НА ТРИФАЗЕН мотор **/ ТРИФАЗНЕ з'єднання двигунів

3 ~ 230/400 V
3 ~ 220-277/380-480 V



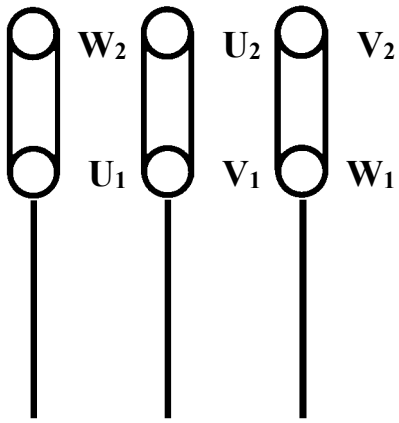
230V Linea – Ligne – Line - Tápvonal **400V**
220-277 V Lijn – Linie – Línea **380-480 V**
Ledning – Hat – Линия – Linija
Linie – Linha – Tápvonal - Лінія



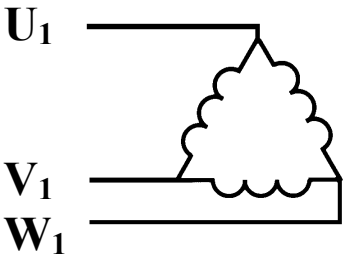
Collegamento a TRIANGOLO
Branchement TRIANGLE
DELTA starting
Driehoekaansluiting
DREIECK-Schaltung
Conexión de TRIÁNGULO
DELTA-anslutning
Üçgen bağlantı
Соединение на ТРЕУГОЛНИК
Trikampis jungimas
Conexiune TRIUNGHI
Ligação em TRIÂNGULO
Delta kötésű indítás
Триъгълник
З'єднання ТРИКУТНИКОМ

Collegamento a STELLA
Branchement ETOILE
STAR starting
Steraansluiting
STERN-Schaltung
Conexión de ESTRELLA
Y-anslutning
Yıldız bağlantı
Соединение на ЗВЕЗДУ
Jungimas žvaigžde
Conexiune STEA
Ligação em ESTRELA
Csillag kötésű indítás
Звезда
З'єднання ЗІРКОЮ

3 ~ 400 Δ V
3 ~ 380-480 Δ V



Linea – Ligne – Line
Lijn – Linie – Línea
Ledning – Hat – Линия – Linija
Linie – Linha – Tápvonal - Лінія



Collegamento a TRIANGOLO
Branchement TRIANGLE
DELTA starting
Driehoekaansluiting
DREIECK-Schaltung
Conexión de TRIÁNGULO
DELTA-anslutning
Üçgen bağlantı
Соединение на ТРЕУГОЛНИК
Trikampis jungimas
Conexiune TRIUNGHI
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Delta kötésű indítás
Триъгълник
З'єднання ТРИКУТНИКОМ

CONTENTS

1. GENERAL

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

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

2. 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.

3. 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:** 3x230V 50Hz / 3x400V 50Hz / 3x220-277 V 60Hz / 3x380-480V Hz up to 4 KW inclusive
  3x400V 50Hz 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 - KE 36/200 - KE 40/200 - KE 55/200
  - 10 Bar (1000KPa): K 40/400 - K 50/400 - K 30/800 - K 40/800 -K 50/800 KE 40/400 - KE 50/400 - KE 30/800 - KE 40/800 - KE 50/800 K 20/1200 - K 25/1200 - K 35/1200 - KE 25/1200 - KE 35/1200 K 55/100 - K 66/100 - KE 55/100 - KE 66/100
  - 12 Bar (1200KPa): K 90/100 - K 70/300 - K 80/300 - K 70/400 - K 80/400 KE 90/100 - KE70/300 - KE 80/300 - KE 70/400 - KE 80/400
- **Motor construction:** in conformity with standards CEI 2-3 pamphlet 1110
- **Weight:** see plate on package
- **Dimensions:** see table on page 98

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; KE 36/200 T;	12	8
K 40/200 T; K 18/500 T; K 55/100 T; KE 40/200 T; KE 55/100 T;	15	8
K 55/200 T; K 28/500 T; K 66/100 T; K 90/100 T; KE 55/200 T; KE 66/100T; KE 90/100 T;	20	12
K 40/400 T; KE 40/400 T;	25	12
K 70/300 T; KE 70/300 T;	25	16
K 50/400 T; K 30/800 T; K 40/800 T; K 20/1200 T; KE 50/400 T; KE 30/800 T; KE 40/800 T; K 25/1200 T; K 70/400 T; K 80/300 T; KE 25/1200 T; KE 70/400 T; KE 80/300 T	40	20
K 50/800 T; K 35/1200 T; K 80/400 T; KE 50/800 T; KE 35/1200 T; KE 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 - KE 36/200 T - KE 40/200 T - KE 55/200 T - KE 55/100 T - KE 66/100 T - KE 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 70/300 T - K 80/300 T - K 70/400 T - K 80/400 T - KE 40/400 T - KE 50/400 T - KE 30/800 T - KE 40/800 T - KE 50/800 T - KE 25/1200 T - KE 35/1200 T - KE 70/300 T - KE 80/300 T - KE 70/400 T - KE 80/400 T

The leads of the supply cables must have a rated section no smaller than that illustrated in the following table:

Rated current of the appliance A			Rated section mm²
		≤ 0,2	Flat twin tinsel cord [a]
> 0,2	and	≤ 3	0,5 [a]
> 3	and	≤ 6	0,75
> 6	and	≤ 10	1,0 (0,75) [b]
> 10	and	≤ 16	1,5 (1,0) [b]
> 16	and	≤ 25	2,5
> 25	and	≤ 32	4
> 32	and	≤ 40	6
> 40	and	≤ 63	10

a. These cables may be used only if their length does not exceed 2 m between the point in which the cable or its sheath enters the appliance and its entry in the plug.

b. The cables with the sections indicated in brackets may be used for **mobile appliances** if their length does not exceed 2 m.

4. MANAGEMENT

4.1 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.

4.2 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.

4.3 Dimensions and weights

The adhesive label on the package indicates the total weight of the electropump. The dimensions are given on page 98.

5. WARNINGS

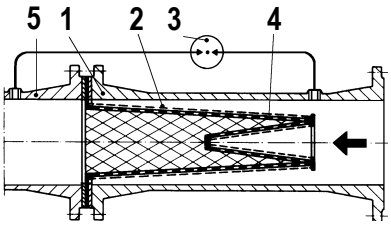
5.1 Checking motor shaft rotation

Before installing the pump, it is advisable to check that the rotor shaft turns freely. To do this remove the fan cover releasing it from the groove in the motor end cover, unscrewing the screws and the nuts if provided. Working the fan by hand, turn the rotor shaft a few times. If this is not possible, dismantle the pump body, slackening the screws 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.

5.2 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. PROTECTIONS

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**.**

6.2 Noise level

The noise levels of pumps with standard supply motors are indicated in table 1 on page 97**.**
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.

6.3 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

The pumps may contain small quantities of residual water from testing.
We advise flushing them briefly with clean water before their final installation.

- 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.
- 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**
- 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.
- 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.
- **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.
- 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.
  - 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.
- 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 100-102. 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 99)**
NPSH = net load at intake of the place of work **(page 100-102)**
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 99)**

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 99)**
Hr:	2,04 m
t:	20°C
pV:	0.22 m **(fig. 7, page 99)**
Z1	**10,33 – 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 99)**
Hr:	2,04 m
t:	50°C
pV:	1,147 m **(fig. 7, page 99)**
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 99)**
Hr:	2,04 m
t:	90°C
pV:	7,035 m **(fig. 7, page 99)**
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

Scrupulously follow the wiring diagrams inside the terminal board box and those on page 1 of this manual.
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 2 on page 97.
In particular the earth terminal must be connected to the yellow/green lead of the power cable. The earth lead used must be longer than the phase leads so that it does not disconnect first when subject to traction.

- Before opening the terminal board and working on the pump, ensure that the **power has been switched off.**
- 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)**
- The pumps must always be connected to an external switch**.**
- Three-phase motors must be protected with special remote-control motor-protectors calibrated for the current shown on the plate or with fuses of the size indicated in chapter 4.

9. STARTING UP

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 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.**

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

- Once the hydraulic circuit has been completely filled with liquid, gradually open the delivery gate valve until its maximum opening.
- With the pump running, check the supply voltage at the motor terminals, which must not differ from the rated value by +/- 5% **(Fig. G)**.
- 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

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

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

11.1 DANGER OF FROST: Fig. H

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

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 (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.

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.
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. 1:

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: /** Ruído aéreo produzido pelas bombas equipadas com motor de série: **/** 标准电机水泵产生的空气噪音 **/** Szériagyártású motorokkal ellátott szivattyúk zajszintje: **/ Ниво на шум на помпите със стандартен мотор:**

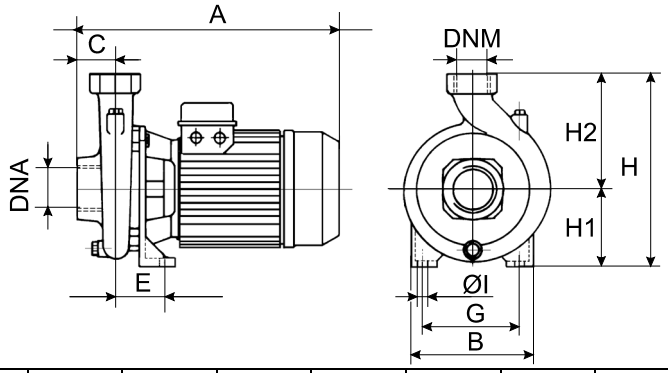
Grandezza motore Grandeur moteur **Motor size** Motorgröße **Motorgrootte** Tamaño del motor **Motorns storlek** Motor **Величина двигателя** Variklio dydis **Marime motor** Tamanho do motor 电机尺寸 Motor méret **Мотор**	**n° poli** n.de pôles **no. poles** Polzahl **aantal polen** n° polos **antal poler** Kutup sayısı **Число полюсов** Polių skaičius **Nr. Poli** n° de pólos 极数 Póluszszám **n° полюси**	**Potenza** Puissance **Power** Leistung **Vermogen** Potencia **Effekt** Güç **Мощность** Galingumas **Putere** Potência 功率 Teljesítmény **Мощност**		**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** Pressão acústica Lpa 噪音压力 **Lpa** Hangnyomás Lpa **Ниво на шум 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** Potência acústica Lwa 噪音量 **Lwa** Zajteljesítmény Lwa **Сила на звука 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. 2:

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: /** Tempos de comutação estrela-triângulo: **/** 星～三角开关换向时间。**/** Csillag/delta átkapcsolási idő: **/ Време за превключване звезда-триъгълник:**

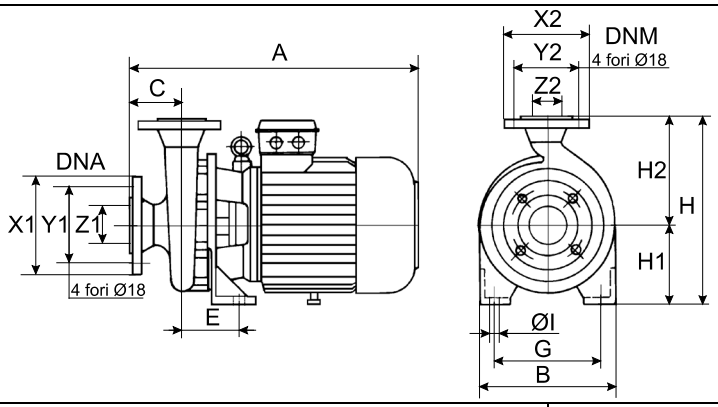
Potenza / Puissance / Power / Leistung / Vermogen / Potencia / Effekt / Güç / Мощность/ Galingumas / Putere / Potência / 功率 **/ Teljesítmény / Мощност**		**Tempi di commutazione / Temps de commutation /Switch-over times / Umschaltzeiten / Overgangstijden / Tiempos de conmutación / Omkopplingstid / Geçiş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

FIG.1



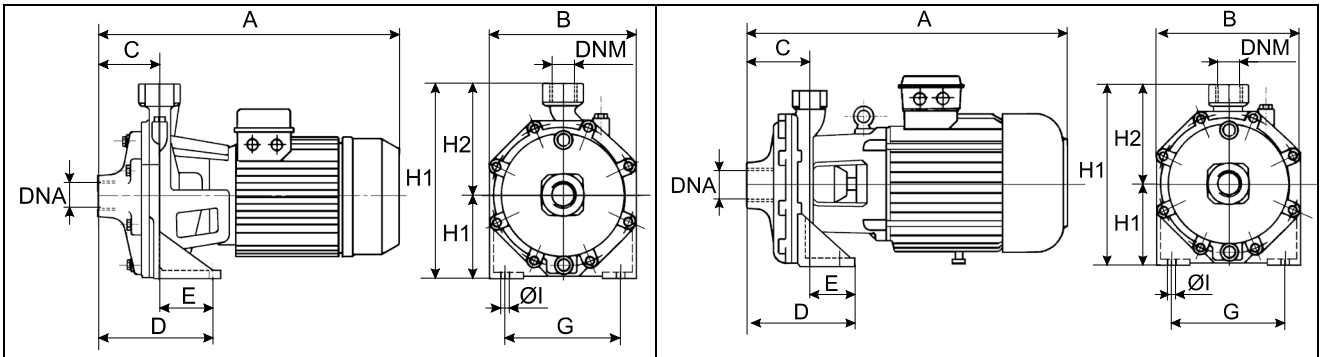
Tipo/Type	A	B	C	E	G	I	H	H1	H2	DNA	DNM
K 36/200	425	250	55	86	175	14	320	135	185	2" G	1¼" G
K 40/200	425	250	55	86	175	14	320	135	185	2" G	1¼" G
K 55/200	425	250	55	86	175	14	320	135	185	2" G	1¼" G
K 11/500	440	240	62	100	155	14	312	132	180	2½" G	2" G
K 18/500	440	240	62	100	155	14	312	132	180	2½" G	2" 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. 6:ph

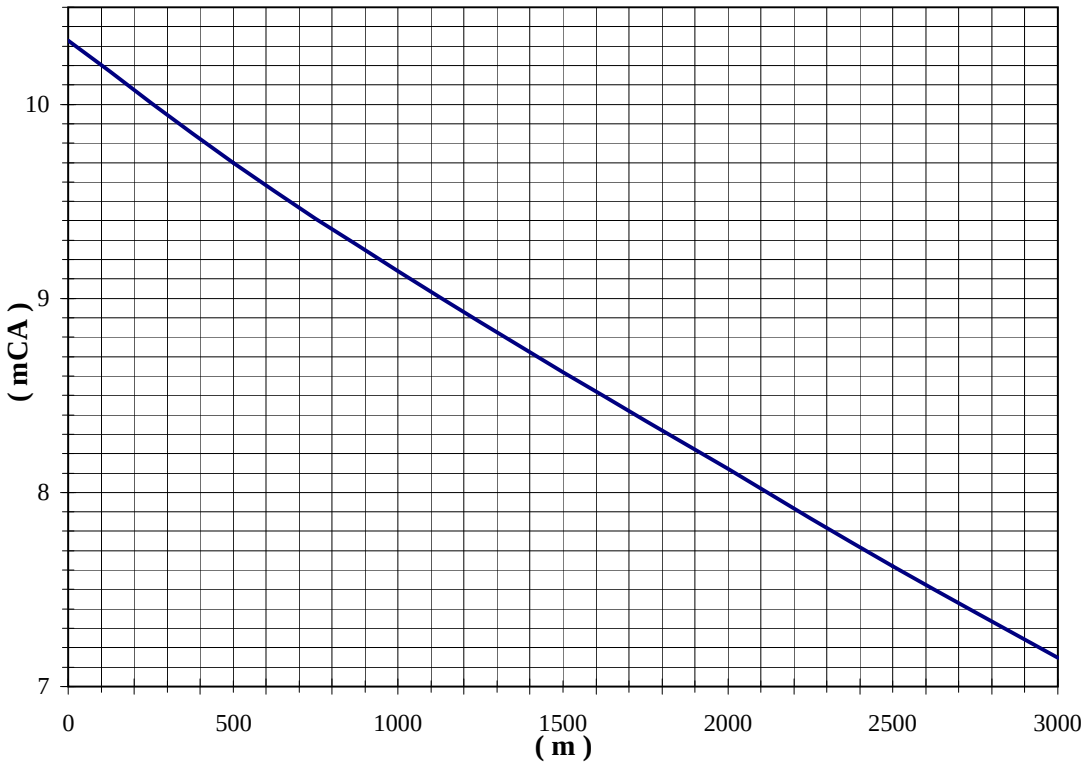
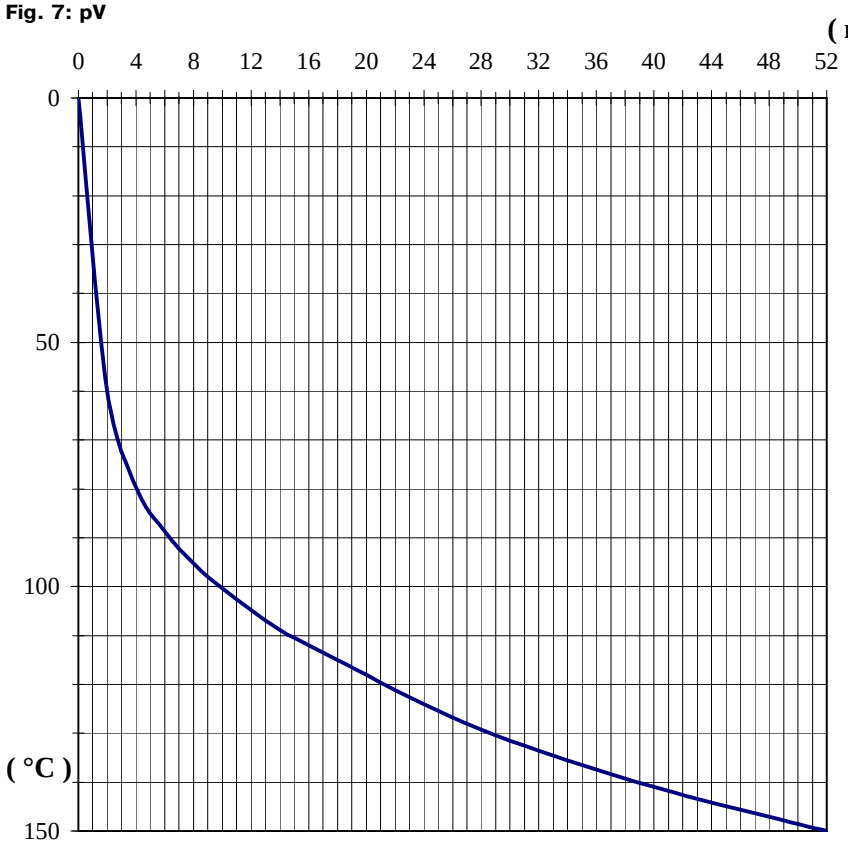


Fig. 7: pV

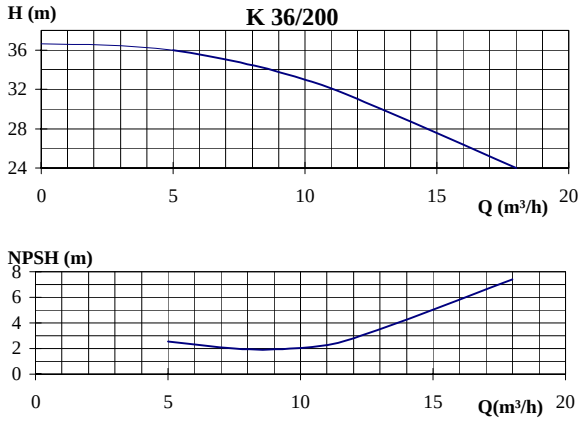


°C	m
10	0,121
20	0,22
30	0,387
40	0,675
50	1,147
60	1,888
70	3,014
80	4,67
90	7,035
100	10,33
110	14,83
120	20,85
130	28,744
140	38,97
150	52

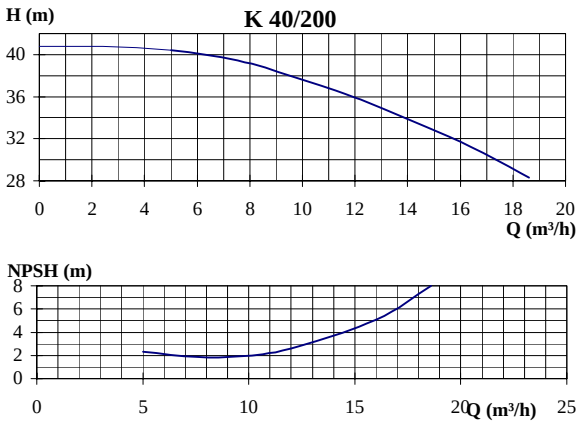
$$\frac{Pb}{Y4°} - \frac{(Pb\text{-}Pv)}{Yt}$$

Pb e Pv in mCA

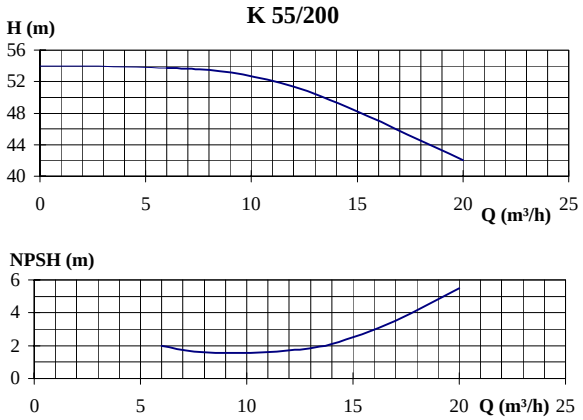
K 36/200



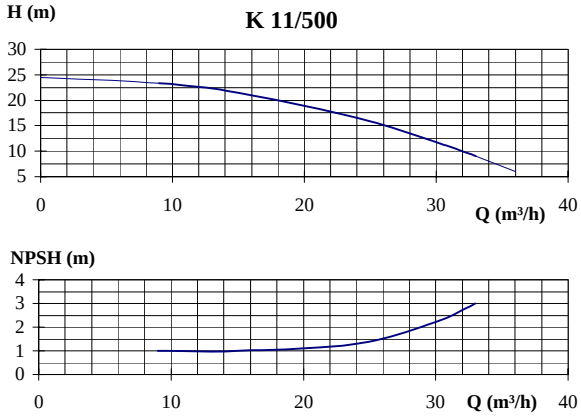
K 40/200



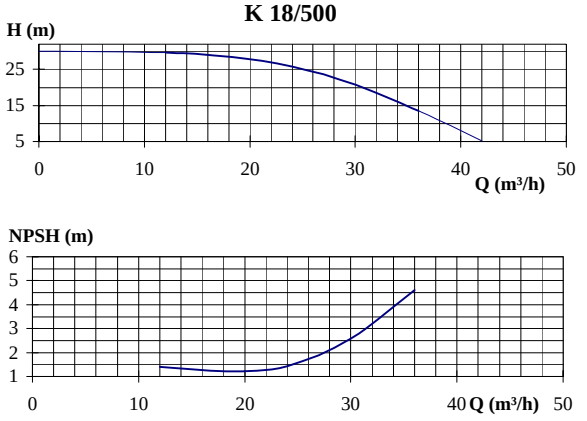
K 55/200



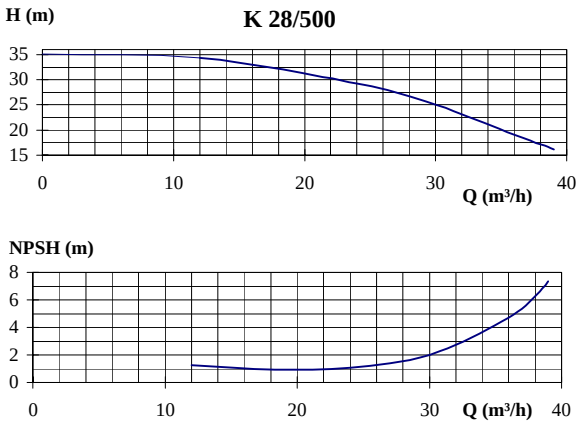
K 11/500



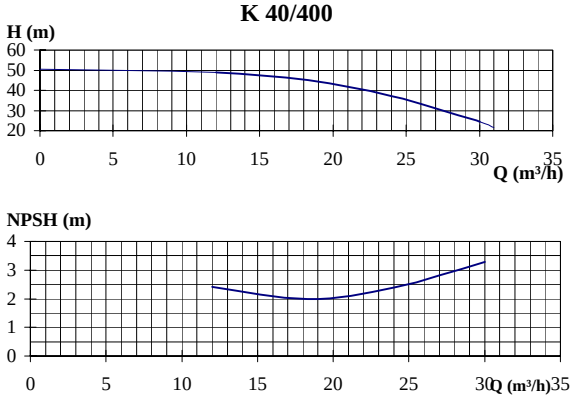
K 18/500



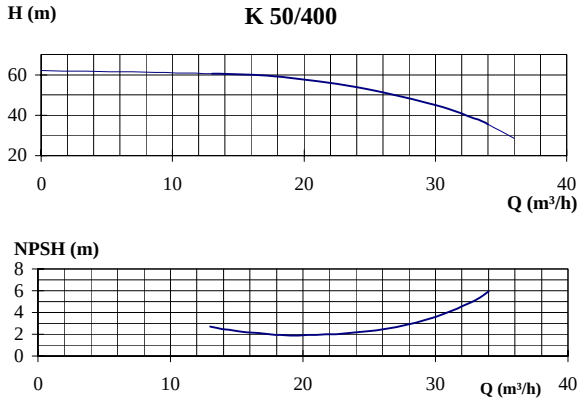
K 28/500

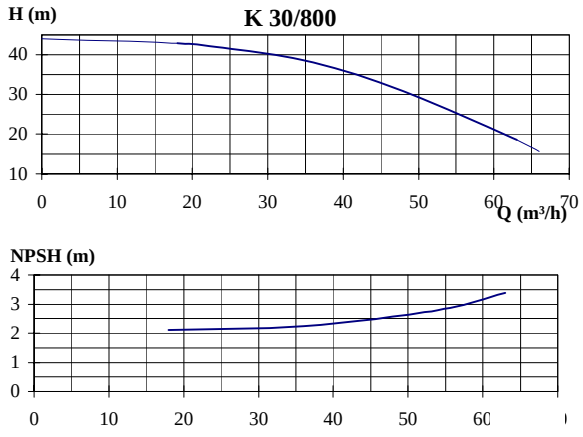


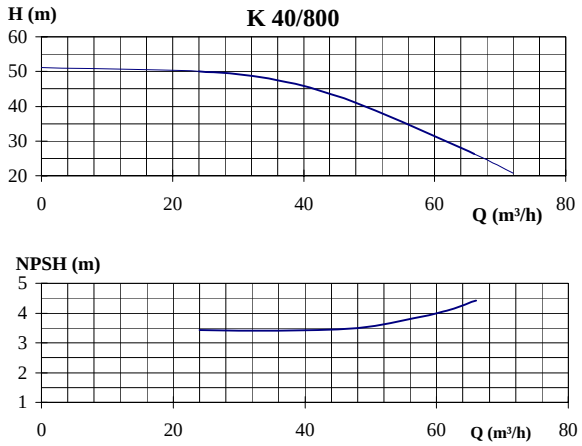
K 40/400

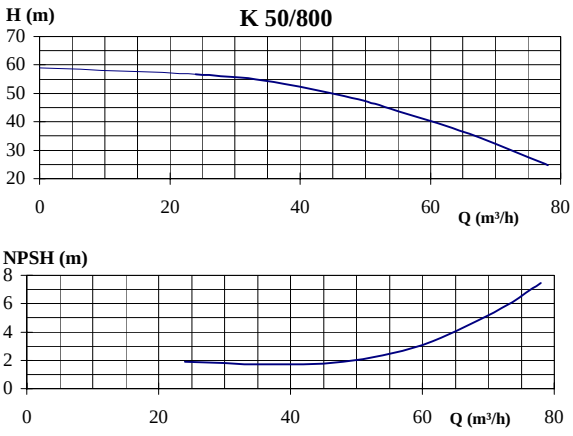


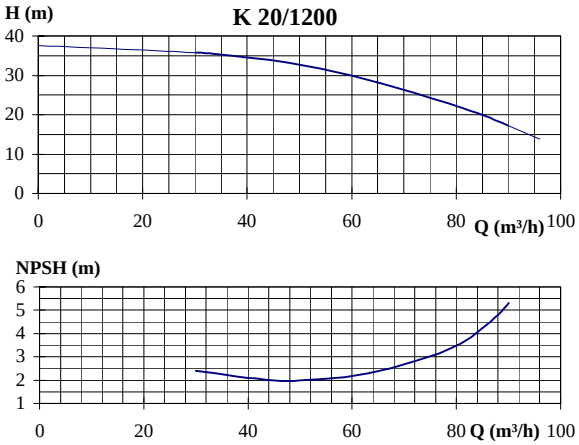
K 50/400

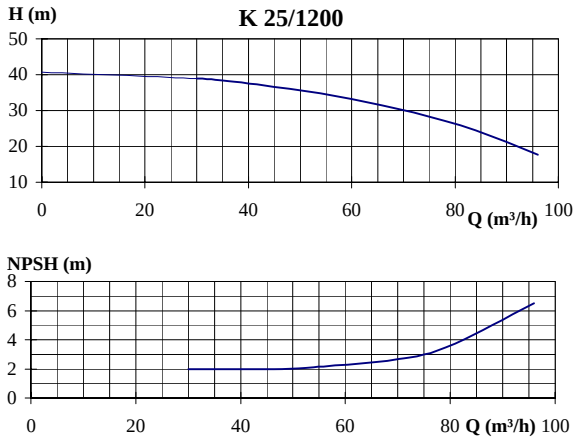


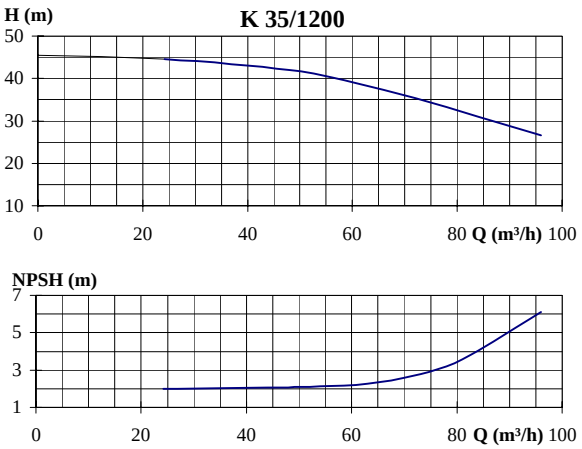

K 30/800
H (m)
40
30
20
10
0 10 20 30 40 50 60 70
Q (m³/h)
NPSH (m)
4
3
2
1
0
0 10 20 30 40 50 60


K 40/800
H (m)
60
50
40
30
20
0 20 40 60 80
Q (m³/h)
NPSH (m)
5
4
3
2
1
0 20 40 60 80
Q (m³/h)

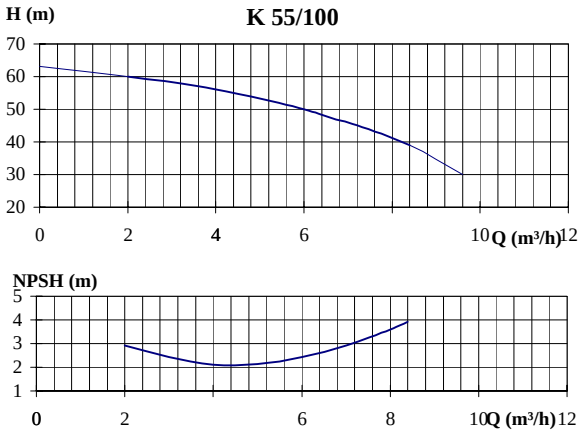

K 50/800
H (m)
70
60
50
40
30
20
0 20 40 60 80
Q (m³/h)
NPSH (m)
8
6
4
2
0
0 20 40 60 80
Q (m³/h)


K 20/1200
H (m)
40
30
20
10
0
0 20 40 60 80 100
Q (m³/h)
NPSH (m)
6
5
4
3
2
1
0 20 40 60 80 100
Q (m³/h)

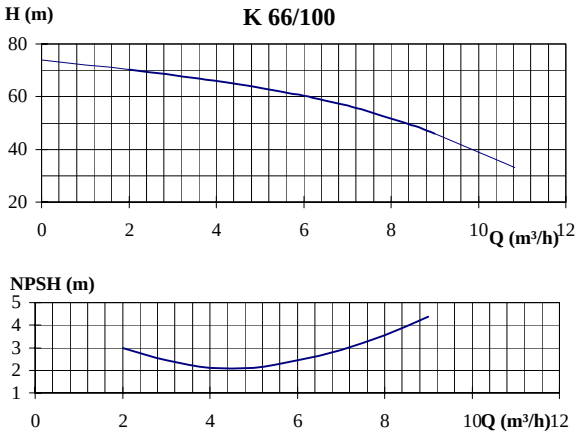

K 25/1200
H (m)
50
40
30
20
10
0 20 40 60 80 100
Q (m³/h)
NPSH (m)
8
6
4
2
0
0 20 40 60 80 100
Q (m³/h)


K 35/1200
H (m)
50
40
30
20
10
0 20 40 60 80 100
Q (m³/h)
NPSH (m)
7
5
3
1
0 20 40 60 80 100
Q (m³/h)

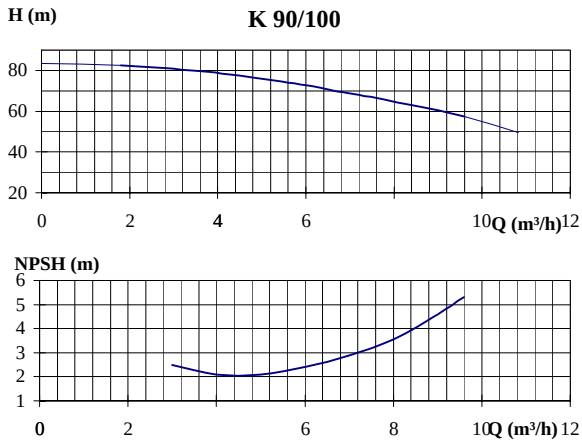
K 55/100



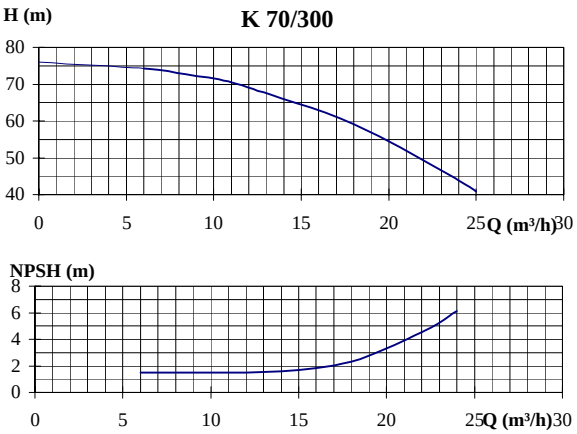
K 66/100



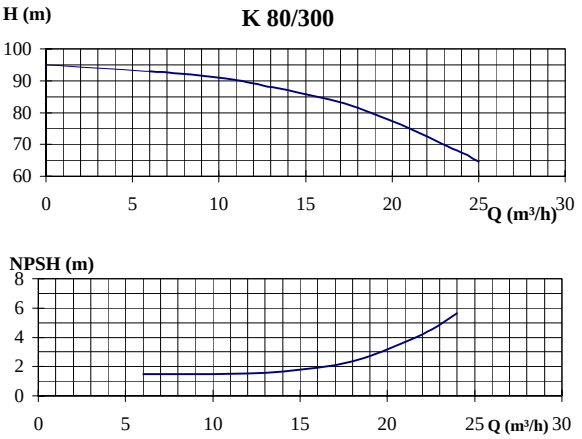
K 90/100



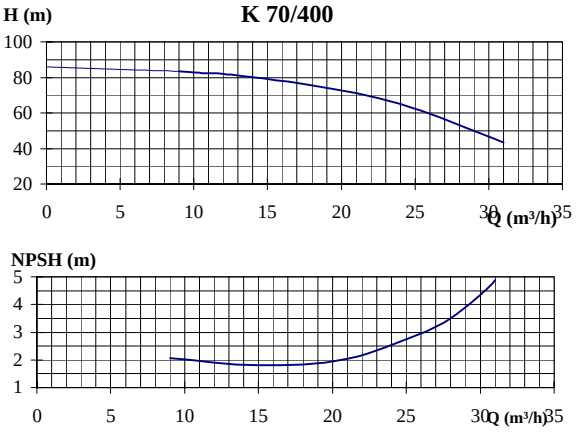
K 70/300



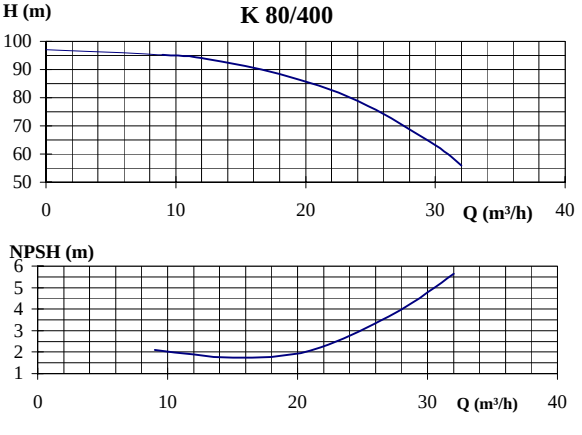
K 80/300



K 70/400

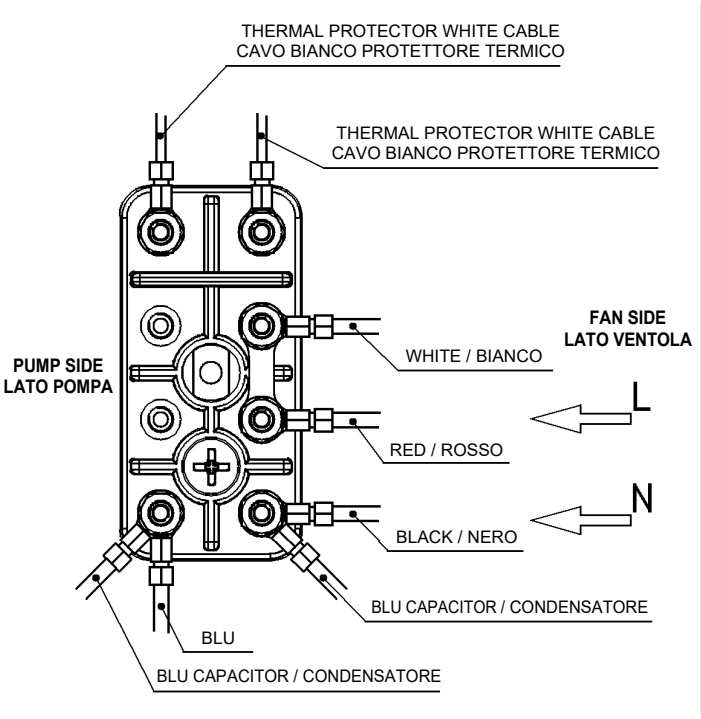


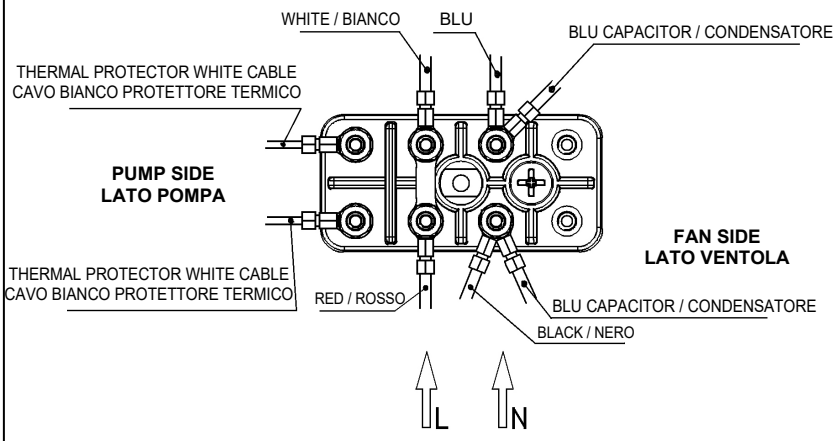
K 80/400

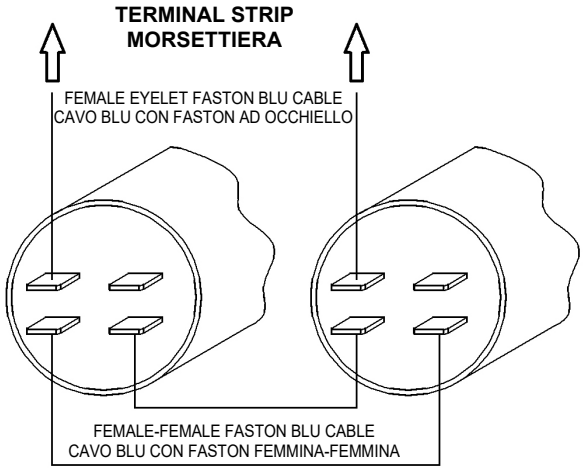


SCHEMA CONNESSIONE MORSETTIERA / TERMINAL STRIP WIRING

MEC 100 M 50HZz



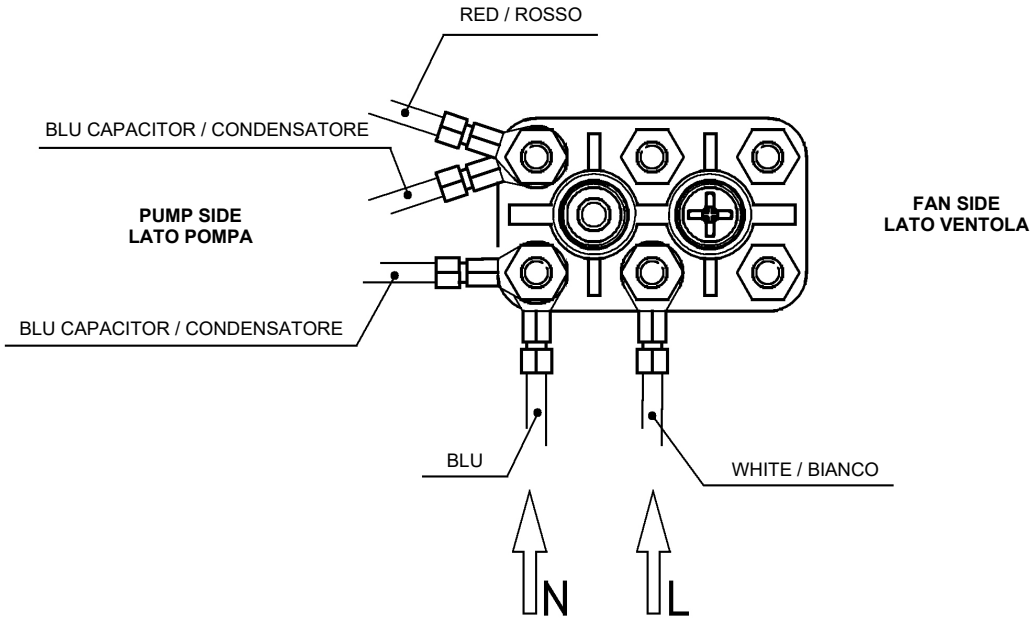




DOUBLE CAPACITOR VERSION
VERSIONE A DOPPIO CONDENSATORE

SCHEMA CONNESSIONE MORSETTIERA / TERMINAL STRIP WIRING

MEC 100 M 60HZz



Modello* / *Modèle* / *Model ***Modell* / *Model*** ***Modelo* / *Modell* / *Model*** **Модель /** نموذج / ***Modell* / *Модел***	**Prevalenza / Hauteur d'élévation / Head up** **Förderhöhe / Overwicht / Prevalencia** **Maximal pumphöjd / Manometrik yükseklik** **Напор /** التفوق / **Emelési magasság / Напор**	
	Hmax (m) 2 poles ***50 Hz***	***Hmax (m) 2 poles*** ***60 Hz***
K 36/200	36.6	36.3
K 40/200	41.3	42.3
K 55/200	54	54
K 11/500	24.5	25.5
K 18/500	29.6	32
K 28/500	35	38.5
K 40/400	50.5	50.5
K 50/400	62	63.5
K 30/800	44	44.5
K 40/800	51.5	51
K 50/800	58	58
K 20/1200	37.5	37.4
K 25/1200	40.7	41.6
K 35/1200	45	46.9
K 55/100	62	62
K 66/100	73	74
K 90/100	83	81.5
K 70/300	76	79
K 80/300	95	97
K 70/400	86	89
K 80/400	97	104
KE 36/200	36.6	36.3
KE 40/200	41.3	42.3
KE 55/200	54	54
KE 40/400	50.5	50.5
KE 50/400	62	63.5
KE 30/800	44	44.5
KE 40/800	51.5	51
KE 50/800	58	58
KE 25/1200	40.7	41.6
KE 35/1200	45	46.9
KE 55/100	62	62
KE 66/100	73	74
KE 90/100	83	81.5
KE 70/300	76	79
KE 80/300	95	97
KE 70/400	86	89
KE 80/400	97	104