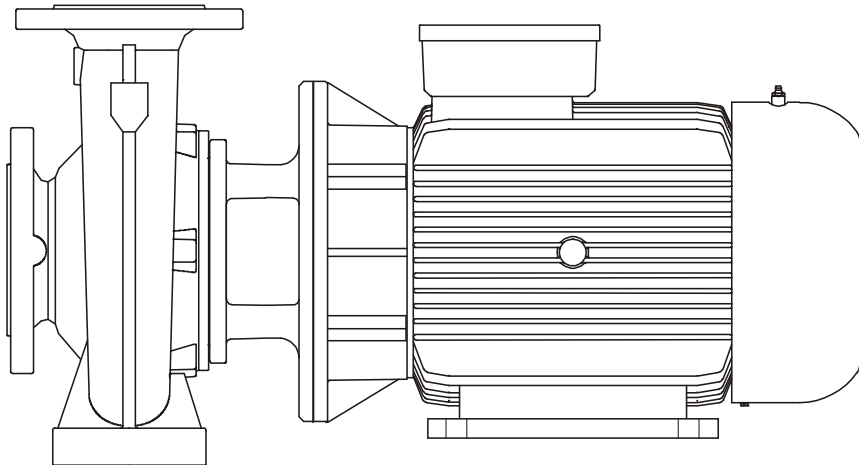
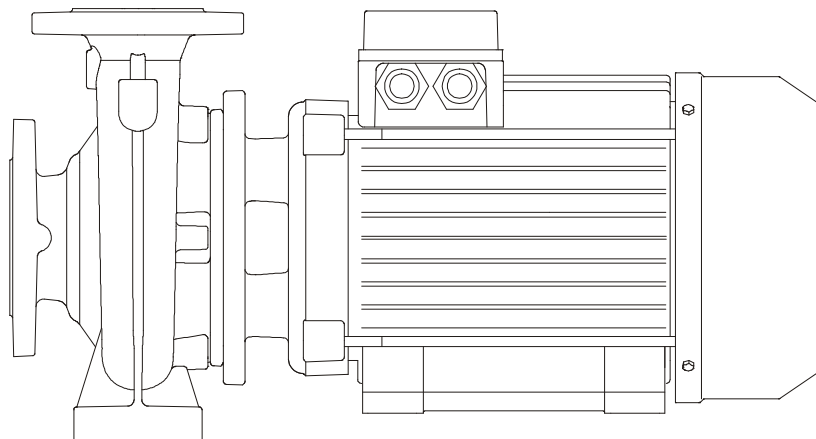


ISTRUZIONI PER L'INSTALLAZIONE E LA MANUTENZIONE
INSTRUCTIONS DE MISE EN SERVICE ET D'ENTRETIEN
INSTRUCTIONS FOR INSTALLATION AND MAINTENANCE
ANLEITUNGEN FÜR INSTALLATION UND WARTUNG
INSTRUCTIES VOOR INGEBRUIKNAME EN ONDERHOUD
INSTRUCCIONES PARA LA INSTALACION Y EL MANTENIMIENTO
INSTALLATIONS - OCH UNDERHÅLLSANVISNING
РУКОВОДСТВО ПО МОНТАЖУ И ТЕХНИЧЕСКОМУ ОБСЛУЖИВАНИЮ
MONTAVIMO IR PRIEŽIŪROS INSTRUKCIJA
INSTRUCTIUNI PENTRU INSTALARE SI INTRETINERE
INSTRUÇÕES PARA A INSTALAÇÃO E A MANUTENÇÃO
INSTALLÁCIÓS ÉS KARBANTARTÁSI KÉZIKÖNYV
ИНСТРУКЦИЯ ЗА МОНТАЖ И ЕКСПЛОАТАЦИЯ
إرشادات للتركيب والعناية.
ІНСТРУКЦІЇ З МОНТАЖУ ТА ТЕХНІЧНОГО ОБСЛУГОВУВАННЯ

NKM-G / NKP-G / NKX-G



NKM / NKP



STANDARD PUMPS

NKM 32-125.1	NKM 32-125	NKM 32-160.1	NKM 32-160	NKM 32-200.1	NKM 32-200
NKM 40-125	NKM 40-160	NKM 40-200	NKM 40-250	NKM 50-125	NKM 50-160
NKM 50-200	NKM 50-250				
NKM-G 32-125.1	NKM-G 32-125	NKM-G 32-160.1	NKM-G 32-160		NKM-G 32-200.1
NKM-G 32-200	NKM-G 40-125	NKM-G 40-160	NKM-G 40-200		NKM-G 40-250
NKM-G 50-125	NKM-G 50-160	NKM-G 50-200	NKM-G 50-250		NKM-G 65-125
NKM-G 65-160	NKMG- 65-200	NKM-G 65-250	NKM-G 65-315		NKM-G 80-160
NKM-G 80-200	NKM-G 80-250	NKM-G 80-315	NKM-G 100-200		NKM-G 100-250
NKM-G 100-315	NKM-G 125-250	NKM-G 150-200			
NKM-GE 32-125.1	NKM-GE 32-125	NKM-GE 32-160.1	NKM-GE 32-160		NKM-GE 32-200.1
NKM-GE 32-200	NKM-GE 40-125	NKM-GE 40-160	NKM-GE 40-200		NKM-GE 40-250
NKM-GE 50-125	NKM-GE 50-160	NKM-GE 50-200	NKM-GE 50-250		NKM-GE 65-125
NKM-GE 65-160	NKM-GE 65-200	NKM-GE 65-250	NKM-GE 65-315		NKM-GE 80-160
NKM-GE 80-200	NKM-GE 80-250	NKM-GE 80-315	NKM-GE 100-200		NKM-GE 100-250
NKM-GE 125-250	NKM-GE 150-200				

NKP 32-125.1	NKP 32-125	NKP 32-160.1	NKP 32-160	NKP 32-200.1	NKP 32-200
NKP 40-125	NKP 40-160	NKP 40-200	NKP 40-250	NKP 50-125	NKP 50-160
NKP 50-200	NKP 50-250				
NKP-G 32-125.1	NKP-G 32-125	NKP-G 32-160.1	NKP-G 32-160		NKP-G 32-200.1
NKP-G 32-200	NKP-G 40-125	NKP-G 40-160	NKP-G 40-200		NKP-G 40-250
NKP-G 50-125	NKP-G 50-160	NKP-G 50-200	NKP-G 50-250		NKP-G 65-125
NKP-G 65-160	NKP-G 65-200	NKP-G 80-160	NKP-G 80-200		
NKP-GE 32-125.1	NKP-GE 32-125	NKP-GE 32-160.1	NKP-GE 32-160		NKP-GE 32-200.1
NKP-GE 32-200	NKP-GE 40-125	NKP-GE 40-160	NKP-GE 40-200		NKP-GE 40-250
NKP-GE 50-125	NKP-GE 50-160	NKP-GE 50-200	NKP-GE 65-125		NKP-GE 65-160
NKP-GE 80-160					

OVERSIZE PUMPS

NKX-G 250-330 NKX-G 250-330A

NKM-G 40-330	NKM-G 80-400	NKM-G 125-400	NKM-G 150-400	NKM-G 200-330
NKM-G 50-330	NKM-G 100-400	NKM-G 150-250	NKM-G 200-200	NKM-G 200-400
NKM-G 65-400	NKM-G 125-330	NKM-G 150-330	NKM-G 200-250	NKM-G 250-330A
				NKM-G 250-330

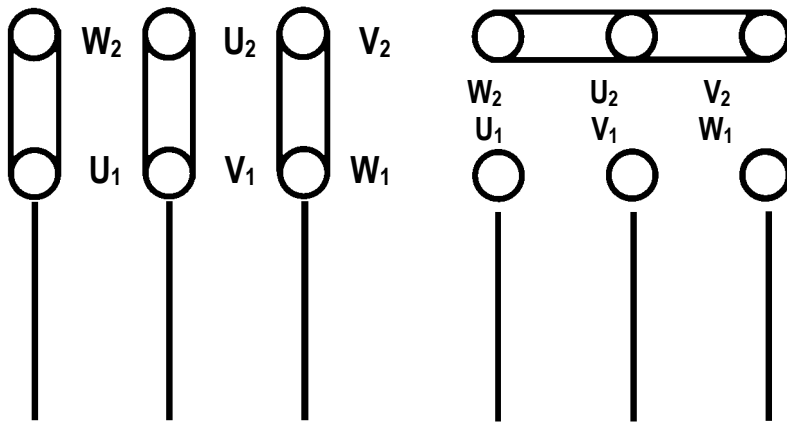
NKP-G 32-250A	NKP-G 65-250	NKP-G 80-330	NKP-G 100-330	NKP-G 125-250
NKP-G 32-250	NKP-G 65-330	NKP-G 100-200	NKP-G 125-160	
NKP-G 40-330	NKP-G 80-250	NKP-G 100-250	NKP-G 125-200	

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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 / ТРЕХФАЗНОЕ соединение двигателей
 TRIFAZIO variklio pajungimas / Conexiune TRIFAZICA pentru motor
 Ligação TRIFÁSICA para motores / Háromfázisú bekötés szivattyúmotorokhoz
 СВЪРЗАВАНЕ НА 3-ФАЗНИ МОТОРИ / إيصال ثلاثي الطور للمحركات

ТРИФАЗНЕ з'єднання двигунів

3 ~ 230/400 V



230V

Linea - Ligne

400V

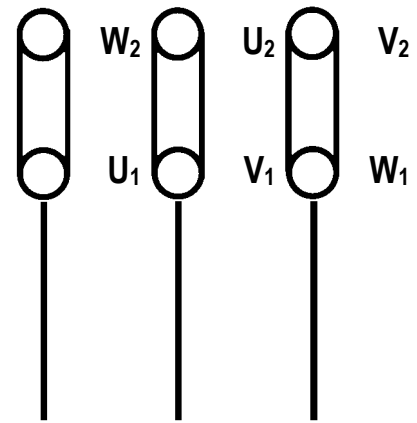
Line - Lijn

Linie - Línea - Ledning

Линия - Лінія 230В 400 В - Linija - Linie

Linha - Tápvonal - خط V₂₃₀

3 ~ 400 Δ V



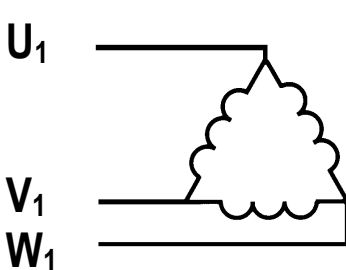
Linea - Ligne

Line - Lijn

Linie - Línea - Ledning

Линия - Лінія - Linija - Linie

Linha - Tápvonal - خط



Collegamento a TRIANGOLO

Branchement TRIANGLE

DELTA starting

Driehoekaansluiting

DREIECK-Schaltung

Conexión de TRIÁNGULO

DELTA-anslutning

Соединение на ТРЕУГОЛНИК

Trikampis jungimas

Conexiune TRIUNGHI

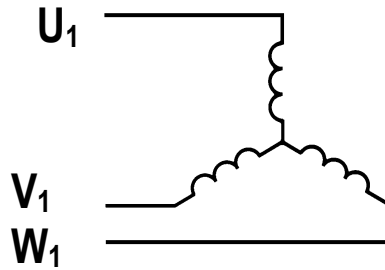
Ligação em TRIÂNGULO

DELTA bekötés

СЪЕДИНЕНИЕ ТРИЪГЪЛНИК

الإيصال بمثلث

З'єднання ТРИКУТНИКОМ



Collegamento a STELLA

Branchement ETOILE

STAR starting

Steraansluiting

STERN-Schaltung

Conexión de ESTRELLA

Y-anslutning

Соединение на ЗВЕЗДУ

Jungimas žvaigždė

Conexiune STEA

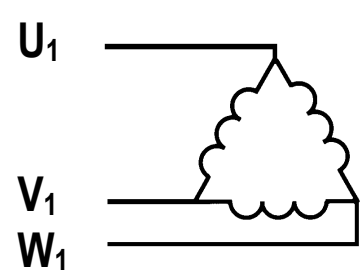
Ligação em ESTRELA

CSILLAG bekötés

СЪЕДИНЕНИЕ ЗВЕЗДА

الإيصال بنجمة

З'єднання Зіркою



Collegamento a TRIANGOLO

Branchement TRIANGLE

DELTA starting

Driehoekaansluiting

DREIECK-Schaltung

Conexión de TRIÁNGULO

DELTA-anslutning

Соединение на ТРЕУГОЛНИК

Trikampis jungimas

Conexiune TRIUNGHI

Ligação em TRIÂNGULO

DELTA bekötés

СЪЕДИНЕНИЕ ЗВЕЗДА

الإيصال بمثلث

З'єднання ТРИКУТНИКОМ

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1. GENERAL



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

1.1. Pump description:

Example:	NKM - G 50 - 250 / 263 A W / BAQE / 4 / 4
Type range:	
TWO-POLE MOTOR = P	
FOUR-POLE MOTOR = M	
With standardised motor and coupling	
Nominal diameter of discharge port	
Nominal impeller diameter	
Actual impeller diameter	
Cod for materials:	
A = Cast iron	
B = Cast iron with bronze impeller	
Wear rings (only when there is)	
Code for shaft seal:	
Motor power in kW	
Poles:	
4 = 4 poles	
2 = 2 poles	

2. APPLICATIONS

Single-stage stub shaft type centrifugal motor-driven pumps with a spiral body, dimensions in accordance with DIN 24255 - EN 733 and flanged DIN 2533 (DIN 2532 per DN 200). Designed and built with advanced characteristics, they are outstanding for their particular performances which ensure maximum yield while guaranteeing absolute reliability and sturdy construction. They cover a wide range of applications, such as water supply, circulation of hot and cold water in heating, air-conditioning and refrigerating systems, transfer of liquids in agriculture, market gardening and industry. Also suitable for use in fire-fighting sets.

3. PUMPED FLUIDS



The machine has been designed and built for pumping clean, pure and aggressive fluids, on condition that in the latter case the compatibility of the pump construction materials is checked and that the motor used has sufficient power for the specific gravity and the viscosity of the fluid.

4. TECHNICAL DATA AND RANGE OF USE

Pump

- **Liquid temperature range:** from -10°C to +140°C standard pumps
from -25°C to +140°C oversize pumps
- **Rotation speed:** 970-1450-2900 1/min
- **Flow rate:** from 1 m³/h to 1100 m³/h depending on the model
- **Head up – Hmax (m):** pag. 110
- **Maximum environment temperature:** +40°C
- **Storage temperature:** -10°C +40°C
- **Relative humidity of the air:** max 95%
- **Maximum working pressure (including any pressure at intake):** 16 Bar - 1600 kPa (for DN 200- DN 250 max 10 Bar-1000 kPa)
- **Weight:** See plate on package

Motor

- **Supply voltage:** see electrical data plate
- **Degree of motor protection :** IP55
- **Thermal class :** F
- **Absorbed power :** see electric data plate
- **Motor construction :** in conformity with Standards CEI 2 - 3
- **Class AM line fuses:** see table 4.1. page 104



If a fuse trips which protects a three-phase motor, it is recommended to change the other two fuses as well, not only the one that is burnt-out.

5. MANAGEMENT

5.1. Storage

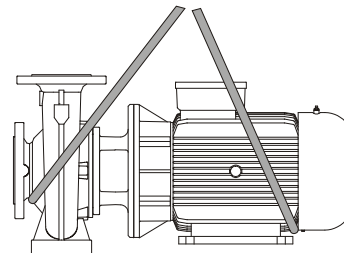
All the pumps/electropumps must be stored indoors, in a dry, vibration-free and dust-free environment, possibly with constant air humidity. They are supplied in their original packaging and must remain there until the time of installation, with the intake and delivery mouths closed with the special adhesive disc supplied. In the case of long storage, or if the pump is stored after a certain period of operation, only the parts made of low-percentage alloy materials, such as cast iron GG-25, GGG-40 which have been wet with the pumped fluid, should be kept in the special preserving mediums available on the market.

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, as indicated in fig.5.2. If an eyebolt is provided on the motor, it must not be used for lifting the whole assembly.



(fig. 5.2.)

5.3. Dimensions and weights

The adhesive label on the package indicates the total weight of the electropump.

6. WARNINGS

6.1. Checking pump/motor shaft rotation

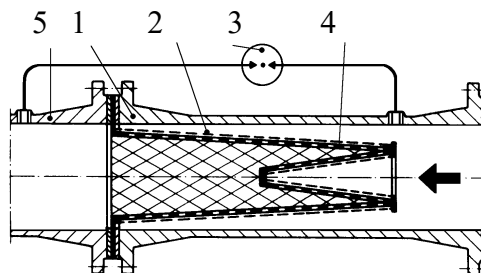
Before installing the electropump, it is good practice to check that the pump shaft and/or the motor are moving freely. For this purpose, if the pumps are supplied without a motor, check them by turning the pump coupling by hand. If the electropump is supplied as a complete unit, check by turning the coupling by hand after having removed the coupling cover. When you have finished checking, put the coupling cover back in its original position.



Do not force the shaft or the fan of the motor (if supplied) with pliers or other tools to try to free the pump, but look for the cause of the blockage.

6.2. 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

6.3. Protections

6.3.1. 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.

6.3.2. Noise level

The noise levels of pumps with standard supply motors are indicated in table 6.6.2 on page 101. 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.

6.3.3. 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.

6.3.4. Any leaks of dangerous or harmful liquids (for example, from the shaft seal) must be conveyed and disposed of in accordance with the regulations in force so as not to cause a risk or damage to persons and to the environment.

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, with an environment temperature not exceeding 40°C. As they have degree of protection IP55, the electropumps 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. If the unit is installed in a location where there is a risk of explosion, the local regulations on "Ex" protection must be respected, using only suitable motors.

7.1. Foundation

The buyer is fully responsible for preparing the foundation which must be made in conformity with the dimensions. Metal foundations must be painted to avoid corrosion; they must be level and sufficiently rigid to withstand any stress. 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. The surface that it sits on must be perfectly flat and horizontal. After the pump has been positioned on the foundation, check with a spirit level to ensure that it is sitting perfectly level. If not, suitable shims must be inserted.

7.2. Connecting the pipes

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

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

It is always good practice to place the pump as close as possible to the liquid to be pumped. It is advisable to use a suction pipe with a diameter larger than that of the intake aperture of the electropump. If the head at intake is negative, it is indispensable to fit a foot valve with suitable characteristics at intake. 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 joints 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.

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 (following the requirements of local legislation concerning toxic fluids).

7.3. Calculating the NPSH

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 may be found in the technical catalogue.

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:

$$Z1 = pb - rqd. N.P.S.H. - Hr - \text{correct } pV$$

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 on page 108)
NPSH	=	net load at intake of the place of work (see characteristic curves in the catalogue)
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 on page 108)

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

Required N.P.S.H. :	3.25 m
Pb :	10.33 mcw
Hr:	2.04 m
t:	20°C
PV:	0.22 m
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
Hr:	2.04 m
t:	50°C
pV:	1.147 m
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
Hr:	2.04 m
t:	90°C
pV:	7.035 m
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.

7.4. Connecting auxiliary systems and measuring instruments.

The realization and connection of any auxiliary systems (washing liquid, seal cooling fluid, dripping liquid) must be considered when designing the system. These connections are necessary for better and longer lasting pump operation.

In order to ensure continuous monitoring of the pump functions, it is recommended to install a vacuum pressure gauge on the intake side and a pressure gauge on the delivery side. To check the motor load the installation of an ammeter is advised.

8. ELECTRICAL CONNECTION

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

- 8.1. 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 105.
- 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**.
- 8.4. The pumps must always be connected to an external switch.
- 8.5. The motors must be protected with special remote-control motor-protectors calibrated for the current shown on the plate.

9. STARTING UP**9.1. Before starting the pump, check that:**

- the pump has been properly primed, filling the pump body completely. This ensures that the pump immediately starts to work regularly and that the seal (mechanical seal or stuffing box seal) is well lubricated. **Dry operation causes irreparable damage to the mechanical seal and the stuffing box seal.**
- the auxiliary circuits have been correctly connected;
- all the moving parts have been protected with suitable safety systems;
- the electrical connection has been made as indicated previously;

10. STARTING/STOPPING**10.1. STARTING**

- 10.1.1. Fully open the gate valve on intake and keep the one on delivery almost closed.
- 10.1.2. Switch on the power and check that the motor is turning in the right direction, that is clockwise when viewed from the fan side. This check must also be performed after having fed the pump, activating the main switch with a fast start-stop sequence. If the motor is turning in the wrong direction, invert any two phase leads, after having disconnected the pump from the mains.
- 10.1.3. Once the hydraulic circuit has been completely filled with liquid, gradually open the delivery gate valve until its maximum allowed opening. The motor's energy consumption must be checked and compared with the value shown on the data plate, **especially in cases where the pump has intentionally been given a reduced power motor (check the design characteristics)**.
- 10.1.4. With the pump running, check the supply voltage at the motor terminals, which must not differ from the rated value by +/- 5%

10.2. 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 pressure downstream from the pipe.

If hot water is to be pumped, arrange that the pump can be stopped only after having excluded the source of heat and let sufficient time elapse to allow the liquid temperature to drop to acceptable values, so as not to create excessive temperature increases inside the pump body.

For a long period of inactivity, close the interception device on the intake pipe and, if supplied, all the auxiliary control connections. To guarantee maximum system functionality it will be necessary to arrange for brief running periods (5 - 10 min) at intervals of 1 to 3 months.

If the pump is removed from the system and stored, proceed as indicated in par.5.1

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 AND INCLUDING 4 kW	100
THREE-PHASE MOTORS OVER 4 kW	20

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, to prevent possible cracking of the hydraulic components.



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".

11.3. To avoid needless motor overloads, accurately check that the density of the pumped liquid corresponds to that used in the design phase: **remember that the power absorbed by the pump increases in proportion to the density of the liquid carried.**

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 the liquid has to be drained to carry out maintenance, ensure that the liquid coming out cannot harm persons or things, especially in systems using hot water. The legal requirements on the disposal of any harmful fluids must also be complied with. After a long period of operation there may be difficulties in removing the parts in contact with water: to do this, use a special solvent available on the market and, where possible, use a suitable extractor. Do not force the parts with unsuitable tools.

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. If possible, arrange for programmed maintenance so that problem-free operation may be ensured with minimum expense and reduced machine down times, thus avoiding long and costly repairs.

12.2. Shaft seal**12.2.1. Mechanical seal**

Normally no checking is required. Just ensure that there are no leaks of any kind. If leaks are present, change the seal as described in par.12.3.1

12.3. Greasing the bearings

Carry out maintenance based on the type of bearing indicated on the technical data plate. See tables on page 105 (12.3.1)

12.4. Changing the seal**12.4.1. Preparing disassembly**

1. Switch off the electric power supply and ensure that it cannot be switched on accidentally.
2. Close the interception devices on intake and delivery.
3. If hot liquids have been pumped, wait until the pump body returns to room temperature.
4. Empty the pump body by means of the drainage caps, taking particular care if harmful fluids have been pumped (observe the legal requirements in force).
5. Dismantle any auxiliary connections provided.

12.4.2. Changing the mechanical seal

Slacken the nuts from the stud bolts in order to slip the pump body off the motor block. Preventing shaft rotation by immobilising the shaft itself or the impeller, slacken the nut; remove the flat washer and the spring washer. Slip off the impeller, if necessary levering with two screwdrivers on the lantern cover. Then remove the tab. Retain the spacer or spacers; extract the mechanical seal. To facilitate extraction, lever with two screwdrivers on the seal spring, taking care not to spoil the seat of the seal. NB: extraction may be facilitated by lubricating the shaft with alcohol.

Before assembly, ensure that the seat of the seal has not been scored; if it has, eliminate the scores with abrasive cloth. If that is not sufficient, replace the coupling.

Reassemble proceeding in inverse order and ensuring particularly that:

- the fittings of the individual parts must be free from residue and spread with suitable lubricants;
- all the O-Rings must be perfectly whole. If not, replace them.

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 persons and operators, and 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 the obstruction.
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. D. The pump is functioning above the work point for which it was intended. E. The protection tripping values are wrong. F. The viscosity or density of the pumped fluid are different from those used in the design phase.	A. If not, restore the missing phase. B. Change or clean the component concerned. C. Look for possible faulty insulation of the motor, checking the phase resistance and insulation to earth. D. Set the work point to suit the pump characteristics. E. Check the set values on the motor protector: alter them or change the component if necessary. F. Reduce the flow rate with a shutter on the delivery side or install a larger motor.
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. Check that the direction of rotation of the three-phase motors 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 8 of the instructions on "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. Invert the connection of two supply wires.	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. Presence of air in the pump or in the intake manifold. D. Pump-motor alignment incorrectly performed.	A. Fasten any loose parts. B. Reduce the intake height or check for load losses. Open the intake valve. C. Bleed the intake pipes and the pump. D. Repeat the procedure described in paragraph 7.2.

TAB. 4.1.: Fusibili di linea classe AM : valori indicativi (Ampere)
 Fusibles de ligne classe AM : valeurs indicatives (Ampères)
 Class AM line fuses : indicative values (Ampere)
 Leitungssicherungen Klasse AM : hinweisende Werte (Ampere)
 Netzekeringen klasse AM : indicatieve waarden (Ampere)
 Fusíveis de linha classe AM : valores indicativos (Amperios)
 Säkringar i klass AM: vägläddande värden (Ampere)

Плавкие предохранители линии класса AM: приблизительные значения (Ампер)
 AM klasės linijiniai saugikliai: žymimosios reikšmės
 Fuzibili de linie clase AM : valori orientative (Amperi)
 Fusíveis de linha classe AM: valores indicativos (Ampere)
 AM osztályú tápvonalai biztosítékok: informatív értékek (Amper)
 Клас AM предпазителі - (Ампер)
 Лінійні запобіжники класу AM: приблизні значення (в амперах)

مصابر أساسية فئة AM: قيم دلالية (أمبير)

Grandezza motore Grandeur moteur Motor size Motorgroße Motorgrootte Tamaño motor Motorns storlek Величина двигателя Variklis Marime motor Tamanho do motor Motore nagysága Тип на мотора كبر المحرك Величина двигуна	Potenza Puissance Power Leistung Vermogen Potencia Efeito Мощность Galingumas Putere Potência Teljesít-mény Мощност القوة Потужність (KW)	4 POLI / 4 PÔLES 4 POLES / 4 POLIG 4 POLEN / 4 POLOS 4-POLIG / 4 ПОЛЮСА 4 polių / 4 POLI 4 Pólos / 4 PÓLUS 4 ПОЛЮСА ٤ أقطاب 4 ПОЛЮСИ	
		3 x 230V 50/60Hz	3 x 400V 50/60Hz
MEC 71	0.25	4	2
MEC 71	0.37	4	2
MEC 80	0.55	4	4
MEC 80	0.75	4	4
MEC 90S	1.1	6	4
MEC 90L	1.5	8	4
MEC 100L	2.2	10	6
MEC 100L	3	12	8
MEC 112M	4	20	10
MEC 132S	5.5	--	12
MEC 132M	7.5	--	20
MEC 160M	11	--	25
MEC 160L	15	--	32
MEC 180M	18.5	--	40
MEC 180L	22	--	50
MEC 200L	30	--	80

Grandezza motore Grandeur moteur Motor size Motorgroße Motorgrootte Tamaño motor Motorns storlek Величина двигателя Variklis Marime motor Tamanho do motor Motore nagysága Тип на мотора كبر المحرك Величина двигуна	Potenza Puissance Power Leistung Vermogen Potencia Efeito Мощность Galingumas Putere Potência Teljesít-mény Мощност القوة Потужність (KW)	2 POLI / 2 PÔLES 2 POLES / 2 POLIG 2 POLEN / 2 POLOS 2-POLIG 2 polių / 2 POLI 2 Pólos / 2 PÓLUS 2 ПОЛЮСА ٢ أقطاب 2 ПОЛЮСИ	
		3 x 230V 50/60Hz	3 x 400V 50/60Hz
MEC 100L	3	12	--
MEC 112M	4	20	--
MEC 132S	5.5	--	12
MEC 132S	7.5	--	20
MEC 160M	11	--	25
MEC 160M	15	--	32
MEC 160L	18.5	--	40
MEC 180M	22	--	50
MEC 200L	30	--	80

TAB. 6.6.2: Rumore aereo prodotto dalle pompe dotate con motore di serie:
 Airborne noise produced by the pumps with standard motor:
 Luchtlawaai geproduceerd door standaardmotoren:
 Luftburen bullernivå för pumpar med standardmotorer:
 Siurblio su standartiniu varikliu keliamas triukšmas:
 Ruído aéreo produzido pelas bombas equipadas com motor de série:

Bruit aérien produit par les pompes équipées de moteur de série :
 Lärmpegel der Pumpen mit serienmäßigem Motor
 Ruido aéreo producido por las bombas dotadas de motor en serie:
 Шумовой уровень, производимый насосами, оснащенными серийными двигателями:
 Zgomot aerian produs de pompele dotate cu motor de serie:
 Széria jellegű motorral szerelt szivattyú zajszintje:
 ШУМ
 Рівень шуму, що видається насосами, оснащеними серійними двигунами:

شجة هوائية ناتجة عن المضخات المزودة بمحركاتي:

Versione 50Hz/Version 50Hz/50Hz version/Version 50Hz/Uitvoering 50Hz/Versión 50Hz/Version 50Hz/Версия 50 Гц/ 50 Hz versija/Versão 50Hz
 Verzió: 50Hz/Версия 50 Hz/Hz ٥٠ : نموذج / Версия 50 Hz

Grandezza motore / Grandeur moteur Motor size / Motorgroße Motorgrootte / Tamaño del motor Motorns storlek / Величина двигателя Variklis / Marime motor Tamanho do motor / A motor nagysága Тип на мотора / كبر المحرك / Величина двигуна	4 POLI / 4 PÔLES 4 POLES / 4 POLIG 4 POLEN / 4 POLOS 4-POLIG / 4 ПОЛЮСА 4 polių / 4 POLI 4 Pólos / 4 PÓLUS 4 ПОЛЮСА ٤ أقطاب 4 ПОЛЮСИ	
	Lwa [dB(A)]	Lpa [dB(A)]
MEC 71	51	42
MEC 80	54	45
MEC 90	60	51
MEC 100	63	54
MEC 112	65	56
MEC 132	68	58
MEC 160	70	60
MEC 180	71	61
MEC 200	72	62

Grandezza motore / Grandeur moteur Motor size / Motorgroße Motorgrootte / Tamaño del motor Motorns storlek / Величина двигателя Variklis / Marime motor Tamanho do motor / A motor nagysága Тип на мотора / كبر المحرك / Величина двигуна	2 POLI / 2 PÔLES 2 POLES / 2 POLIG 2 POLEN / 2 POLOS 2-POLIG / 2 ПОЛЮСА 2 polių / 2 POLI 2 Pólos / 2 PÓLUS 2 ПОЛЮСА ٢ أقطاب 2 ПОЛЮСИ	
	Lwa [dB(A)]	Lpa [dB(A)]
MEC 100	76	67
MEC 112	79	70
MEC 132	77	67
MEC 160	79	69
MEC 180	80	70
MEC 200	82	72

Versione 60Hz: aumentare i valori sia in pressione che in potenza sonora di 4 dB (A) circa.

Version 60Hz: augmenter les valeurs aussi bien pression qu'en puissance sonore de 4 dB (A) environ.

60Hz version: increase the values of both sound pressure and power by about 4 dB (A).

Version 60Hz: die Werte für Schalldruck und -leistung um zirka 4 dB(A) erhöhen.

Uitvoering 60Hz: verhoog de waarden voor geluidsdruk en -vermogen met ongeveer 4 dB (A).

Versión 60Hz: aumentar los valores tanto de presión como de potencia sonora 4 dB (A) aprox.

Version 60Hz: öka värdena för ljudtryck och ljudeffekt med cirka 4 dB (A).

Версия 60 Гц: увеличить значения как давления, так и акустической мощности примерно на 4 Дб (А).

Paididinkite galingumo ir garso slėgio reikšmes apytiksliai 4 dB(A)

Versiuone 60Hz: cresteti valorile atat pentru presiune cat si pentru puterea fonica de 4 dB (A) aproximativ.

Versão 60Hz: aumentar os valores quer na pressão quer na potência acústica de 4 dB (A) aprox.

Verzió: 60Hz: kb. 4dB(A) értékkel növelendő a hangnyomás illetve a zajszint.

Версия 60 Hz: увеличива, както значението на налягането, така и на акустичната мощност с 4 Дб (А).

نموذج ٦٠ Hz : زيادة القيم سواء للضغط أو في القوة الصوتية ب ٤ dB (A) تقريباً.

Версия 60 Гц: збільшити значення як тиску, так і акустичної потужності приблизно на 4 Дб (А).

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
Время переключения со звезды на треугольник
Perjungimo nuo “žvaigždės” į “trikampį” laikas
Timpri comutare stea – triunghi
Tempos de comutação estrela-triângulo:
Csillag-delta átkapcsolási idő:
Време за превключване от звезда на триъгълник
زمن التخيير مثلث-نجمة

Час перемикання з зірки на трикутник

Potenza / Puissance Power / Leistung Vermogen / Potencia Effekt / Мощность Galingumas / Putere Potência / Teljesítmény мощност / القوة Потужність		Tempi di commutazione / Temps de commutation Switch-over times / Umschaltzeiten Overgangstijden / Tiempos de conmutación Omkopplingstid / Время переключения Perjungimo laikas / Timpri de comutare Tempos de comutação / Átkapcsolási idő Време на превключване / المتقايبس (ملم) Час перемикання
KW	Hp	
≤ 30	≤ 40	< 3 sec.
> 30	> 40	< 5 sec.

TAB. 12.3.1: TIPO CUSCINETTI - POMPE/TYPE DE ROULEMENTS – POMPES/BEARING TYPE – PUMPS/ART DER LAGER – PUMPE/TYPE LAGERS – POMPEN
TIPO DE COJINETES – BOMBAS/TYP AV LAGER – PUMPAR/ТИП ПОДШИПНИКОВ – НАСОСЫ/GUOLIŲ TIPAS – SIURBLIAI/TIP RULMENŢI – POMPE
TIPO ROLAMENTOS – BOMBAS/CSAPÁGY TÍPUS – POMRÁK/ТИП ЛАГЕРИ – ПОМПИ/نوع حشيات منع الاحتكاك – المصحات
ТИП ПІДШИПНИКІВ - НАСОСИ

CLASSIFICAZIONE DEI CUSCINETTI (COSTRUZIONE STANDARD)/CLASSIFICATION DES ROULEMENTS (CONSTRUCTION STANDARD)

BEARINGS CLASSIFICATION (STANDARD CONSTRUCTION)/EINSTUFUNG DER LAGER (STANDARD AUFBAU)

CLASSIFICATIE VAN DE LAGERS (STANDAARD CONSTRUCTIE)/CLASIFICACIÓN DE LOS COJINETES (CONSTRUCCIÓN ESTÁNDAR)

KLASSIFICERING AV LAGER (STANDARDUTFÖRANDE)/КЛАССИФИКАЦИЯ ПОДШИПНИКОВ (СТАНДАРТНАЯ КОНСТРУКЦИЯ)

GUOLIŲ KLASIFIKAVIMAS (STANDARTINĖ KONSTRUKCIJA)/CLASIFICARE RULMENŢI (CONSTRUCTIE STANDARD)

CLASSIFICAÇÃO DOS ROLAMENTOS (CONSTRUÇÃO STANDARD)/A CSAPÁGYAK OSZTÁLYOZÁSA (STANDARD FELÉPÍTÉS)

КЛАСИФИКАЦИЯ НА лагерите (СТАНДАРТНО ПРОИЗВОДСТВО)/التصنيف حشيات منع الاحتكاك (البنية القياسية) تصنيف حشيات منع الاحتكاك

КЛАСИФИКАЦИЯ ПІДШИПНИКІВ (СТАНДАРТНА КОНСТРУКЦИЯ)

Secondo costruzione standard i cuscinetti hanno una lubrificazione permanente (Cuscinetti a sfera secondo la normativa ISO15 –DIN 625)

Selon la construction standard, les roulements ont une lubrification permanente (Roulements à billes selon ISO15 - DIN 625)

According to standard construction the bearings are permanently lubricated (Ball bearings according to ISO15 -DIN 625)

Gemäß des Standardaufbaus haben die Lager eine permanente Schmierung (Kugellager nach Norm ISO15 –DIN 625)

Volgens de standaardconstructie hebben de lagers een permanente smering (kogellagers volgens de norm ISO15 –DIN 625)

Según la construcción estándar, los cojinetes tienen una lubricación permanente (Cojinetes de esfera según la normativa ISO15 –DIN 625)

Enligt standardutförandet har lagren en permanent smörjning (kullager enligt standard ISO15 –DIN 625)

Согласно стандартной конструкции, подшипники имеют перманентную смазку (Шарикоподшипники согласно нормам ISO15 –DIN 625)

Standartinės konstrukcijos guoliai yra sutepti visam laikui (Rutuliniai guoliai pagal standartą ISO15 –DIN 625)

Conform construcției standard rulmenții au o lubrifiere permanentă (Rulmenți cu bile în conformitate cu legislația ISO15 –DIN 625)

Segundo a construção standard os rolamentos têm uma lubrificação permanente (Rolamentos de esfera de acordo com a norma ISO15 –DIN 625)

A standard felépítés szerint a csapágyak kenőszirozása örökös (az ISO15 –DIN 625 irányelv értelmében, a csapágyakra és a gömbökre nézve)

Съгласно стандартното производство, лагерите имат постоянно смазване (сферичните лагери в съответствие с ISO15 - DIN 625)

ISO15 - DIN 625 وفقاً للبنية القياسية يكون لحشيات منع الاحتكاك تشحيم دائم محامل منع احتكاك كروية وفقاً لمعيار

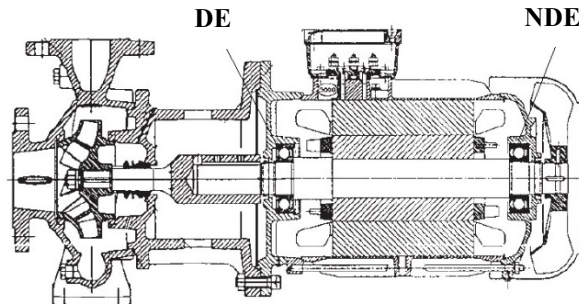
Згідно зі стандартною конструкцією, підшипники мають перманентне мастило (Шарикопідшипники згідно з нормою ISO15 –DIN 625)

Altezza d'asse/Hauteur d'axe Axis height/Achsenhöhe Ashoogte/Altura de eje Höjd på axeln Высота оси/Šies aukštis Inălțime axă/Altura eixo Tengelymagasság Височина на оста/Висота осі ارتفاع المحور	N° di Poli/N. de Pôles No. of Poles Pole-Anzahl/Aantal polen N° de Polos/Antal poler Кол-во полюсов/Polij sk. Nr. de Poli/N.° de Pólos Pólusok száma N° на полюсите/Кількість полюсів/عدد الاقطاب	Motori	
		Moteurs/Motors/Motoren/Motores Motorer/Двигатели/Varikliai/Motoare/Motores Motorok/Двигатели/Двигуни /محركات IE2	Moteurs/Motors/Motoren/Motores Motorer/Двигатели/Varikliai/Motoare/Motores Motorok/Двигатели/Двигуни/محركات IE3
MEC 56	2-4	DE-NDE	DE-NDE
		Dimensioni/Dimensions/Dimensions Abmessungen/Afmetingen Dimensiones/Mätt/Размеры Matmenys/Dimensiuni/Dimensões Méterek/Размери/Розміри/الأبعاد	Dimensioni/Dimensions/Dimensions Abmessungen/Afmetingen Dimensiones/Mätt/Размеры Matmenys/Dimensiuni/Dimensões Méterek/Размери/Розміри/الأبعاد
		6201-2Z	6201-2Z
		12x32x10	12x32x10

MEC 63	2-4	6202-ZZ	15x35x11	6202-ZZ	15x35x11
MEC 71	2-8	6203-ZZ	17x40x12	6203-ZZ	17x40x12
MEC 80	2-8	6204-ZZ	17x40x12	6204-ZZ	20x47x14
MEC 90	2-8	6205-ZZ	25x52x15	6205-ZZ	25x52x15
MEC 100	2-8	6206-ZZ	30x62x16	6206-ZZ	30x62x16
MEC 112	2-8	6306-ZZ	30x72x19	6306-ZZ	30x72x19
MEC 132	2-8	6208-ZZ	40x80x18	6208-ZZ	40x80x18
MEC 160	2-8	6309-ZZ	45x100x25	6309-ZZ	45x100x25
MEC 180	2-8	6311 C3	55x120x29	6311 C3	55x120x29
MEC 200	2-8	6312 C3	60x130x31	6312 C3	60x130x31
MEC 225	2-8	6313 C3	65x140x33	6313 C3	65x140x33
MEC 250	2-8	6314 C3	70x150x35	6314 C3	70x150x35
MEC 280	2-8	6316 C3	80x170x39	6316 C3	80x170x39
MEC 315	2	6317 C3	85x180x41	6317 C3	85x180x41
MEC 315	4-8	NU319 - 6319 C3	95x200x45	NU319 - 6319 C3	95x200x45

**LUBRIFICAZIONE/LUBRIFICATION/LUBRICATION/SCHMIERUNG/SMERING/LUBRICACIÓN/SMÖRJNING/CMA3KA/TEPIMAS/LUBRIFIÈRE/LUBRIFICAÇÃO/KENŐZSÍRÓZÁS
СМАЗКА/МАСТИЛО/التشحييم**

Lubrificazione permanente fino al 160. Dal 180, ingrassatori M10x1 DIN 3404/Lubrification permanente jusqu'à 160. À partir de 180, graisseurs M10x1 DIN 3404
Permanent lubrication up to 160. After 180, grease nipples M10x1 DIN 3404/Permanente Schmierung bis 160. Ab 180 Fettbüchsen M10x1 DIN 3404
Permanente smering tot 160. Vanaf 180, smeerpipels M10x1 DIN 3404/Lubricación permanente hasta 160. A partir de 180, engrasadores M10x1 DIN 3404
Permanentsmörjning upp till 160. Från 180, smörjnipplar M10x1 DIN 3404/Перманентная смазка до 160. От 180 - масленки M10x1 DIN 3404
Sutepta visam laikui iki 160. Nuo 180, tepimo įtaisai M10 x 1 DIN 3404/Lubrifiere permanentă până la 160. De la 180, lubricatori M10x1 DIN 3404
Lubrificação permanente até 160. De 180, lubrificadores M10x1 DIN 3404/160-ig örökös kenőzsírózás. 180 felett M10x1 DIN 3404 kenőzsírok
Постоянно смазване до 160. От 180, гресюри M10x1 DIN3404 /Перманентне мастило до 160. Від 180 - маслянки M10x1 DIN 3404
مادة تشحييم دائمة إلى 160. من 180، مَشحيم M10x1 DIN 3404



**MONTAGGIO CUSCINETTI/ASSEMBLAGE ROUEMENTS/BEARING ASSEMBLY/MONTAGE LAGER/MONTAGE LAGERS/MONTAJE COJINETES
MONTERING AV LAGER/МОНТАЖ ПОДШИПНИКОВ/GUOLIŲ MONTAVIMAS/ASAMBLARE RULMENȚI/MONTAGEM ROLAMENTOS/CSAPÁGYAK BESZERELÉSE
МОНТАЖ НА ЛАГЕРИТЕ/МОНТАЖ ПІДШИПНИКІВ/الاحتكاك/تركيب حشيات منع الاحتكاك**

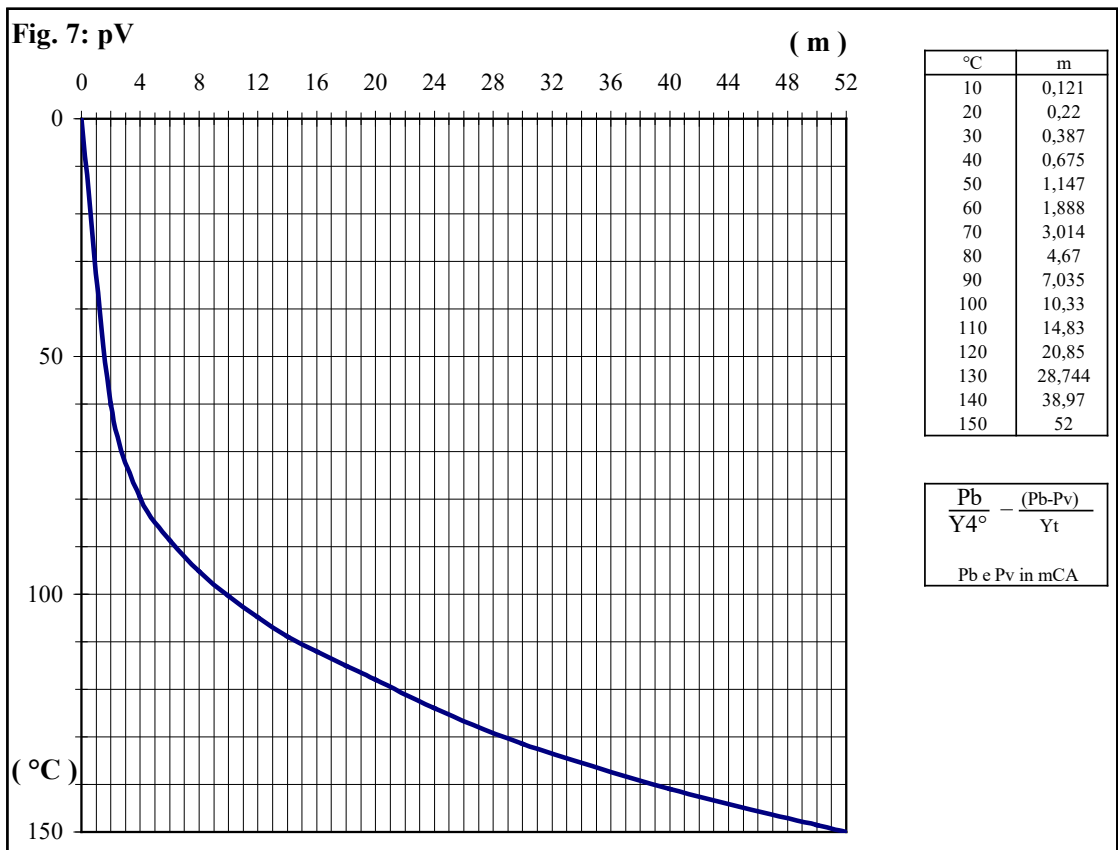
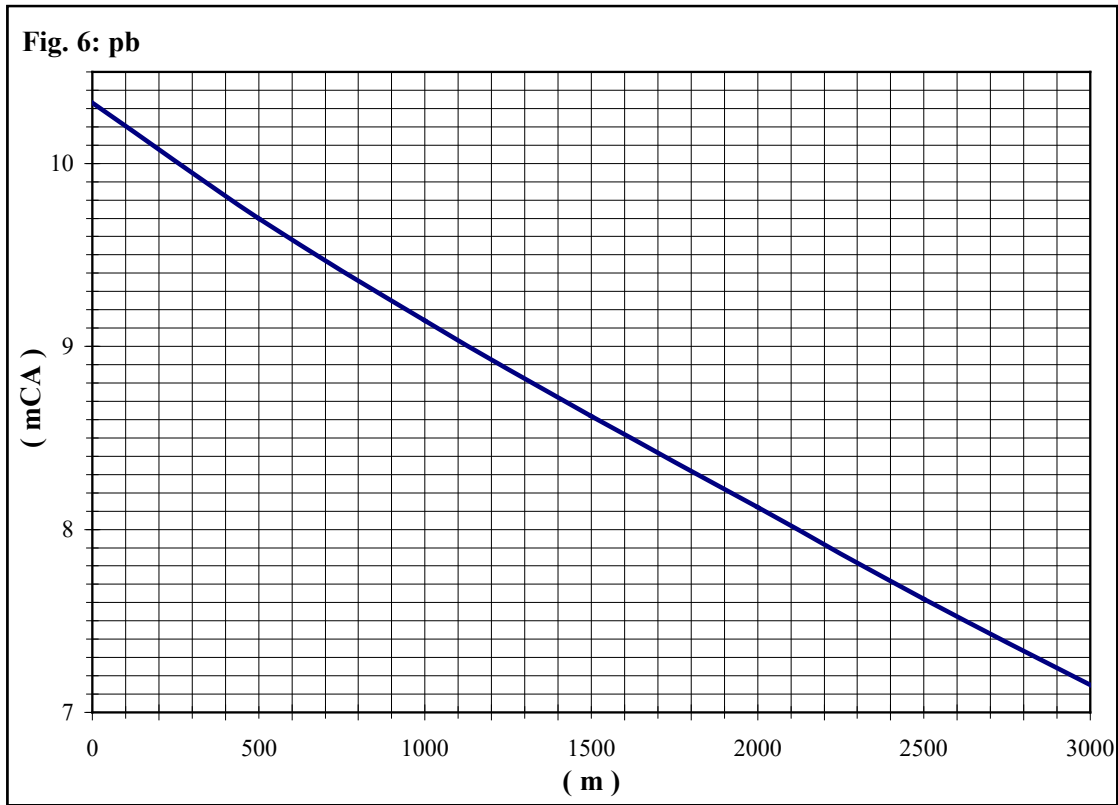
Altezza d'asse/Hauteur d'axe Axis height/Achsenhöhe/Ashoogte Altura de eje/Höjd på axeln Высота оси/Ašies aukštis Înălțime axă/Altura eixo Tengelymagasság/ Височина на оста/ Висота осі/ارتفاع المحور	Cuscinetti/Roulements Bearings/Lager/Lagers Cojinetes/Lager Подшипники/Guoliai Rulmenți/Rolamentos Csapágyak/Лагери/ Підшипники حشيات منع الاحتكاك DE	Cuscinetti/Roulements Bearings/Lager/Lagers Cojinetes/Lager Подшипники/Guoliai Rulmenți/Rolamentos Csapágyak/Лагери/ Підшипники حشيات منع الاحتكاك NDE	Molla di precarico/Ressort de précharge Preloading spring/Vorspannfeder Voorbelastingsveer/Muelle de precarga Förbelastningsfjäder/Временная пружина Prispaudimo spyruoklė/Arc de preîncărcare Mola de pré-carga/Előöltési rugó Предварителен натяг на пружината/ Тимчасова пружина نابض حمل أولي
MEC 56-MEC 160 Motori Standard MEC 56-160 Moteurs Standard MEC 56-160 Standard Motors MEC 56-160 Standardmotoren MEC 56-160 Standaard motoren MEC 56-160 Motores estándar MEC 56-160 Standardmotorer MEC 56-160 Стандартные двигатели MEC 56-160 standartiniai varikliai MEC 56-160 Motoare Standard MEC 56-160 Motores Standard MEC 56-160 Standard Motorok MEC 56-160 Стандартни Двигатели MEC 56-160 محركات قياسية MEC 56-160 Стандарти двигуни	Cuscinetti non bloccanti Roulements non bloquants Non-blocking bearings Nicht sperrende Lager Niet-blokkerende lagere Cojinetes no bloqueantes Lager utan låsning Неблокирующие подшипники Neblokuojantys guoliai Rulmenți neblocanți Rolamentos não de bloqueio Szabad csapágyak Не блокиращи лагери حشيات منع احتكاك غير حاجبة Неблокуючі підшипники	Cuscinetti non bloccanti Roulements non bloquants Non-blocking bearings Nicht sperrende Lager Niet-blokkerende lagere Cojinetes no bloqueantes Lager utan låsning Неблокирующие подшипники Neblokuojantys guoliai Rulmenți neblocanți Rolamentos não de bloqueio Szabad csapágyak Не блокиращи лагери حشيات منع احتكاك غير حاجبة Неблокуючі підшипники	Lato opposto comando Côté opposé à la commande Side opposite control Entgegen gesetzte Steuerseite Zijde tegenover bediening Lado contrario al mando Motsatt sida av reglaget Противоположная сторона управления Priešais valdymo pusę Parte opusă comenzi Lado oposto comando Írányító egységgel ellenkező oldal Противоположная на управлението страна الجانب المقابل لوحدۃ التحكم Протилежна сторона керування
MEC 180-MEC 315 Motori Standard MEC 180-MEC 315 Moteurs Standard MEC 180-MEC 315 Standard Motors MEC 180-MEC 315 Standardmotoren MEC 180-MEC 315 Standaard motoren MEC 180-MEC 315 Motores estándar MEC 180-MEC 315 Standardmotorer MEC 180-MEC 315 Стандартные двигатели MEC 180-MEC 315 standartiniai varikliai MEC 180-MEC 315 Motoare Standard	Cuscinetti bloccanti Roulements de blocage Blocking bearings Sperrende Lager Blokkerende lagere Cojinetes bloqueantes Lager med låsning Блокирующие подшипники Blokkuojantys guoliai Rulmenți blocanți	Cuscinetti non bloccanti Roulements non bloquants Non-blocking bearings Nicht sperrende Lager Niet-blokkerende lagere Cojinetes no bloqueantes Lager utan låsning Неблокирующие подшипники Neblokuojantys guoliai Rulmenți neblocanți	Lato opposto comando Côté opposé à la commande Side opposite control Entgegen gesetzte Steuerseite Zijde tegenover bediening Lado contrario al mando Motsatt sida av reglaget Противоположная сторона управления Priešais valdymo pusę Parte opusă comenzi

MEC 180-MEC 315 Motores Standad MEC 180-MEC 315 Standard Motorok MEC 180-MEC 315 Стандартни Двигатели MEC 180-MEC 315 محركات قياسية MEC 180-MEC 315 Стандартні двигуни	Rolamentos de bloqueio Blokolt csapágyak Заключащи лагери حشيات منع احتكاك حاجية Блокуючі підшипники	Rolamentos não de bloqueio Szabad csapágyak Не блокиращи лагери Неблокуючі підшипники حشيات منع احتكاك غير حاجية	Lado oposto comando Írányító egységgel ellenkező oldal Противоположната на управлението страна الجانِب المقابل لوحدة التحكم Протилежна сторона керування
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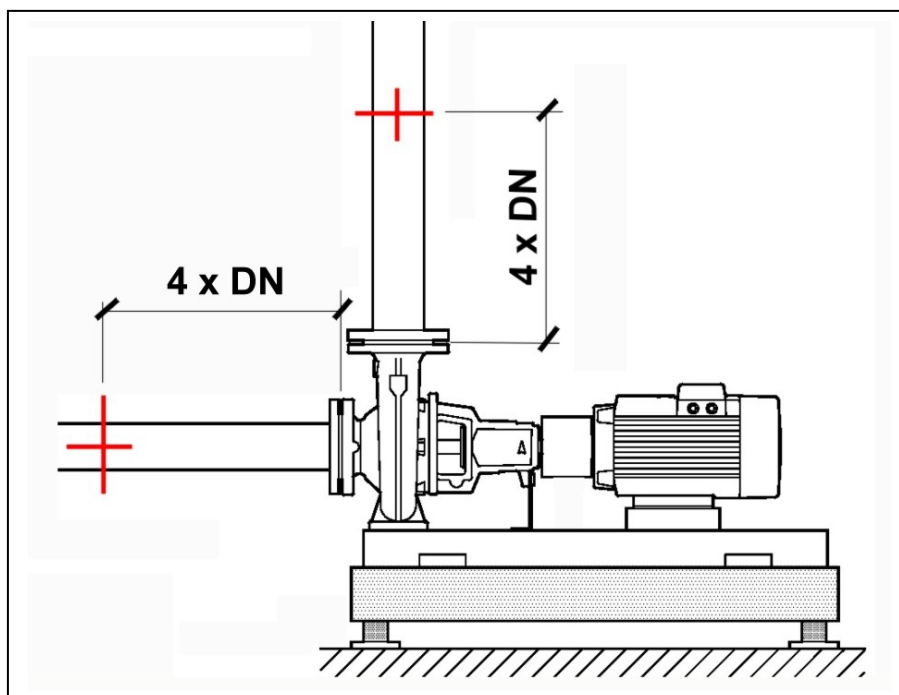
**INTERVALLI DI REINGRASSAGGIO/INTERVALLES DE REGRAISSAGE/RE-GREASING INTERVALS/INTERVALLE ERNEUTES FETTEN/NASMEERINTERVALLEN
INTERVALOS DE ENGRASADO/SMÖRJINTERVALL/ПЕРИОДИЧНОСТЬ СМАЗКИ/PAKARTOTINIO TERIMO INTERVALAI/INTERVALE DE RELUBRIFIERE
INTERVALOS ATÉ À LUBRIFICAÇÃO SEGUINTE/ÚJRA ZSÍROZÁSI SZÜNET/ВРЕМЕНИ ИНТЕРВАЛИ ЗА ПОВТОРНО ГРЕСИРАНЕ/ПЕРИОДИЧНІСТЬ ЗМАЩЕННЯ
فترات إعادة التشحيم**

Intervalli di reingrassaggi per temperature fino a 70° C (ore di funzionamento)/Intervalles de regraisage pour des températures allant jusqu'à 70° C (heures de fonctionnement)
Re-greasing intervals for temperatures up to 70°C (operating hours)/Intervalle erneutes Fetten bei Temperaturen bis 70° C (Betriebsstunden)
Nasmeerintervallen voor temperaturen tot 70° C (bedrijfsuren)/Intervalos de engrasado para temperaturas de hasta 70° C (horas de funcionamiento)
Smörjintervall för temperaturer upp till 70 °C (driftstimmor)/Периодичность смазки при температуре до 70° C (часы работы)
Pakartotinio terimo intervalai, kai temperatūra iki 70 °C (veikimo valandos)/Intervale de relubrifiere pentru temperaturi până la 70° C (ore de funcționare)
Intervalos até às lubrificações seguintes para temperaturas até 70° C (horas de funcionamento)/Újra zsírozási szünet a 70° fokot meghaladó hőmérsékleten (munkavégzési órák)
Времени Интервали за повторно гресирање за температури до 70° C (работни часове)/(فترات إعادة تشحيم في درجة حرارة إلى 70 درجة مئوية (ساعات التشغيل))
Періодичність змащення при температурі до 70° C (години роботи)

Altezza d'asse/Hauteur d'axe Axis height/Achsenhöhe Ashoogte/Altura de eje Höjd på axeln/Высота оси Åsies aukštis/Ināļtīme axā Altura eixo/Tengelymagasság Височина на оста ارتفاع المحور Висота осі	3000 RPM		1500 RPM		1000 RPM		Quantità gr. Quantité gr. Quantity gr. Menge in g. Hoeveelheid gr. Cantidad g. Fettmängd Количество г. Kiekis g. Cantitate gr. Quantidade gr. Gramm mennysiség Количество гр الكمية بالجرامات Кількість г
	Orizzontale/Horizontal Horizontal/Horizontal Horizontaal/Horizontal Horizontell Горизонтальное Horizontalus/Orizental Horizontal/Vizszintes Horizontalно أفقي Горизонтальне	Verticale/Vertical Vertical/ Vertikal Verticaal/Vertical Vertikalt Вертикальное Vertikalus Vertical/Vertical Függőleges Вертикално رأسي Вертикальне	Orizzontale/Horizontal Horizontal/Horizontal Horizontaal/Horizontal Horizontell Горизонтальное Horizontalus/Orizental Horizontal/Vizszintes Horizontalно أفقي Горизонтальне	Verticale/Vertical Vertical/ Vertikal Verticaal/Vertical Vertikalt Вертикальное Vertikalus Vertical/Vertical Függőleges Вертикално رأسي Вертикальне	Orizzontale/Horizontal Horizontal/Horizontal Horizontaal/Horizontal Horizontell Горизонтальное Horizontalus/Orizental Horizontal/Vizszintes Horizontalно أفقي Горизонтальне	Verticale/Vertical Vertical/ Vertikal Verticaal/Vertical Vertikalt Вертикальное Vertikalus Vertical/Vertical Függőleges Вертикално رأسي Вертикальне	
180	4000	2000	9000	4500	1300	7500	15
200	3500	1750	8000	4000	1200	6000	20
225	3000	1500	7500	3750	1100	5500	23
250	2000	1000	7000	3500	1000	5000	26
280	1500	750	6500	3250	900	4500	40
315	1000	500	4000	2000	800	4000	55



**PRESA DI PRESSIONE / PRISE DE PRESSION / PRESSURE INTAKE / DRUCKMESSUNG
 DRUKMEETPUNT / MEDIDA DE LA PRESIÓN / TRYCKUTTAG / ТОЧКИ ИЗМЕРЕНИЯ ДАВЛЕНИЯ
 PASIURBIMO VAMZDIS / PRIZA DE PRESIUNE / TOMADA DE PRESSÃO
 NYOMÁS BEMENET / ТОЧКИ ЗА ИЗМЕРВАНЕ НА НАЛЯГАНЕ / قياس الضغط / ТОЧКИ ВИМІРУ ТИСКУ**



- La distanza delle prese di pressione secondo la normativa UNI-EN ISO 9906 8.2.1.1 è pari a 2 x DN. DAB consiglia di mantenere 4 x DN allo scopo di ottenere una rilevazione della pressione più precisa.
- D'après la norme UNI-EN ISO 9906 8.2.1.1 les prises de pression doivent se trouver à une distance égale à deux fois le diamètre nominal. DAB conseille de maintenir une distance égale à quatre fois le diamètre nominal pour obtenir une mesure de la pression plus précise.
- The distance of pressure intake, following the standard UNI-EN ISO 9906 8.2.1.1, it is placed at 2 x DN. Suggested is to keep 4 x DN in order to obtain a better pressure survey.
- Der Abstand der Druckmesspunkte soll gemäß UNI-EN ISO 9906 8.2.1.1 gleich 2 x DN sein. Um eine präzisere Messung des Drucks zu erhalten empfiehlt DAB jedoch einen Abstand von 4 x DN.
- De afstand van de drukmeetpunten is volgens de norm UNI-EN ISO 9906 8.2.1.1 gelijk aan a 2 x DN (Nominale diameter). DAB adviseert om 4 x DN aan te houden omdat daardoor de drukmeting nauwkeuriger wordt.
- La distancia de las medidas de la presión según la normativa UNI-EN ISO 9906 8.2.1.1 es igual a 2 x DN. DAB aconseja mantener 4 x DN con la finalidad de obtener una medida de la presión más precisa.
- Avståndet mellan tryckuttagen ska enligt standard UNI-EN ISO 9906 8.2.1.1 vara på 2 x DN. DAB rekommenderar dock ett avstånd på 4 x DN för en noggrannare tryckmätning.
- В соответствии с нормативом UNI-EN ISO 9906 8.2.1.1 расстояние между точками измерения давления должно быть 2 УД. Фирма DAB рекомендует оставить расстояние, равное 4-ем УД, для более точного измерения давления.
- Pasiurbimo vamzdžio ilgis pagal standartą UNI-EN ISO 9906 8.2.1.1 turi būti nemažesnis nei DN x 2, visgi DAB rekomenduoja priimti šį ilgį DN x 4.
- Distanța prizelor de presiune conform normativei UNI-EN ISO 9906 8.2.1.1 este egala cu 2 x DN. DAB recomandă menținerea 4 x DN în scopul de a obține o determinare a presiunii mai precise.
- A distância das tomadas de pressão segundo a norma UNI-EN ISO 9906 8.2.1.1 é igual a 2 x DN. A DAB aconselha a manter 4 x DN a fim de obter um levantamento mais preciso da pressão.
- Az UNI-EN ISO 9906 8.2.1.1 szerint a nyomásbemenet távolsága 2 x DN. A DAB javasolja, hogy 4 x DN távolság legyen tartva a pontosabb nyomásvétel érdekében.
- В съответствие с норматив UNI-EN ISO 9906 8.2.1.1 разстоянието между точките за измерване на налягането трябва да бъде DN x 2. За по-точно измерване фирма DAB препоръчва DN x 4.

◀ البعد الزمني لقياسات الضغط بموجب القانون. UNI-EN ISO 9906 8.2.1.1.

يجب أن يكون 2x قطر تعييني (DN). شركة DAB تنصح بالحفظ على بعد

زمني يساوي 2x قطر تعييني (DN) لهدف الحصول على قياس أكثر دقة للضغط.

- Відповідно до нормативу UNI-EN ISO 9906 8.2.1.1 відстань між точками вимірювання тиску повинна бути 2 УД. Фірма DAB рекомендує залишити відстань, рівну 4 УД, для більш точного вимірювання тиску.

STANDARD PUMPS

Modello / Modèle / Model Modell / Model Modelo / Modell / Model Модель / Modell / МОДЕЛ نموذج / Модель	Prevalenza / Hauteur d'élévation / Head up Förderhöhe / Overwicht / Prevalencia Maximal pumphöjd / Manometrik yükseklik Hanop / Emelési magasság / НАПОР التفتو / Hanip			
	<i>Hmax (m) 2 poles</i> 50 Hz	<i>Hmax (m) 2 poles</i> 60 Hz	<i>Hmax (m) 4 poles</i> 50 Hz	<i>Hmax(m) 4 poles</i> 60 Hz
NKM 32-125.1			6.2	6.4
NKM 32-125			7	6.6
NKM 32-160.1			8.9	9.2
NKM 32-160			9.4	11.5
NKM 32-200.1			12.7	19.8
NKM 32-200			16	23
NKM 40-125			6.6	6.5
NKM 40-160			9.2	8.8
NKM 40-200			15.6	13.9
NKM 40-250			23.3	34.8
NKM 50-125			6.5	6.8
NKM 50-160			10.8	10.4
NKM 50-200			16.8	19
NKM 50-250			23.8	33
NKM-G 32-125.1			6.2	6.4
NKM-G 32-125			7	6.6
NKM-G 32-160.1			8.9	9.2
NKM-G 32-160			9.4	11.5
NKM-G 32-200.1			12.7	19.8
NKM-G 32-200			16	23
NKM-G 40-125			6.6	6.5
NKM-G 40-160			9.2	8.8
NKM-G 40-200			15.6	13.9
NKM-G 40-250			23.3	34.8
NKM-G 50-125			6.5	6.8
NKM-G 50-160			10.8	10.4
NKM-G 50-200			16.8	19
NKM-G 50-250			23.8	33
NKM-G 65-125			6.5	6.4
NKM-G 65-160			10.5	11.4
NKM-G 65-200			17	16.9
NKM-G 65-250			24.1	22.8
NKM-G 65-315			34.2	53.8
NKM-G 80-160			10.2	10.5
NKM-G 80-200			16.5	15.7
NKM-G 80-250			25.5	25.8
NKM-G 80-315			41	55
NKM-G 100-200			15.6	15.7
NKM-G 100-250			25.5	26
NKM-G 100-315			36	53
NKM-G 125-250			24.6	32

STANDARD PUMPS

Modello / Modèle / Model Modell / Model Modelo / Modell / Model Модель / Modell / МОДЕЛ نموذج / Model	Prevalenza / Hauteur d'élévation / Head up Förderhöhe / Overwicht / Prevalencia Maximal pumphöjd / Manometrik yükseklik Напор / Emelési magasság / НАПОР النفو / Hanip			
	<i>Hmax (m) 2 poles</i> 50 Hz	<i>Hmax (m) 2 poles</i> 60 Hz	<i>Hmax (m) 4 poles</i> 50 Hz	<i>Hmax (m) 4 poles</i> 60 Hz
NKM-G 150-200			13.2	
NKM-GE 32-125.1			6.2	6.4
NKM-GE 32-125			7	6.6
NKM-GE 32-160.1			8.9	9.2
NKM-GE 32-160			9.4	11.5
NKM-GE 32-200.1			12.7	19.8
NKM-GE 32-200			16	23
NKM-GE 40-125			6.6	6.5
NKM-GE 40-160			9.2	8.8
NKM-GE 40-200			15.6	13.9
NKM-GE 40-250			23.3	34.8
NKM-GE 50-125			6.5	6.8
NKM-GE 50-160			10.8	10.4
NKM-GE 50-200			16.8	19
NKM-GE 50-250			23.8	33
NKM-GE 65-125			6.5	6.4
NKM-GE 65-160			10.5	11.4
NKM-GE 65-200			17	16.9
NKM-GE 65-250			24.1	22.8
NKM-GE 65-315			27	53.8
NKM-GE 80-160			10.2	10.5
NKM-GE 80-200			16.5	15.7
NKM-GE 80-250			20.5	25.8
NKM-GE 80-315			41	55
NKM-GE 100-200			15.6	15.7
NKM-GE 100-250			25.5	26
NKM-GE 125-250			24.6	32
NKM-GE 150-200			13.2	
NKP 32-125.1	27	26.2		
NKP 32-125	28.6	28.2		
NKP 32-160.1	35.3	35		
NKP 32-160	43.5	42		
NKP 32-200.1	56.6	77		
NKP 32-200	58.5	92		
NKP 40-125	26.4	27.2		
NKP 40-160	41	39.9		
NKP 40-200	57	54		
NKP 40-250	96	108		
NKP 50-125	28	29.8		
NKP 50-160	39.5	42		
NKP 50-200	67.5	71		
NKP 50-250	92.5	106		
NKP-G 32-125.1	27	26.2		
NKP-G 32-125	28.6	28.2		
NKP-G 32-160.1	35.3	35		

STANDARD PUMPS

Modello / Modèle / Model Modell / Model Modelo / Modell / Model Модель / Modell / МОДЕЛ نموذج / Модель	Prevalenza / Hauteur d'élévation / Head up Förderhöhe / Overwicht / Prevalencia Maximal pumphöjd / Manometrik yükseklik Hanop / Emelési magasság / НАПОР التفتو / Hanip			
	<i>Hmax (m) 2 poles</i> 50 Hz	<i>Hmax (m) 2 poles</i> 60 Hz	<i>Hmax (m) 4 poles</i> 50 Hz	<i>Hmax (m) 4 poles</i> 60 Hz
NKP-G 32-160	43.5	42		
NKP-G 32-200.1	56.6	77		
NKP-G 32-200	58.5	92		
NKP-G 40-125	26.4	27.2		
NKP-G 40-160	41	39.9		
NKP-G 40-200	57	54		
NKP-G 40-250	96	108		
NKP-G 50-125	28	29.8		
NKP-G 50-160	39.5	42		
NKP-G 50-200	67.5	71		
NKP-G 50-250	92.5	106		
NKP-G 65-125	23.5	25.7		
NKP-G 65-160	40	43		
NKP-G 65-200	68.5	75		
NKP-G 80-160	38.5	37		
NKP-G 80-200	48	64		
NKP-GE 32-125.1	27	26.2		
NKP-GE 32-125	28.6	28.2		
NKP-GE 32-160.1	35.3	35		
NKP-GE 32-160	43.5	42		
NKP-GE 32-200.1	56.6	77		
NKP-GE 32-200	58.5	92		
NKP-GE 40-125	26.4	27.2		
NKP-GE 40-160	41	39.9		
NKP-GE 40-200	57	54		
NKP-GE 40-250	96	108		
NKP-GE 50-125	28	29.8		
NKP-GE 50-160	32	42		
NKP-GE 50-200	67.5	71		
NKP-GE 65-125	23.5	25.7		
NKP-GE 65-160	40	43		
NKP-GE 80-160	38.5	37		

OVERSIZE PUMPS

Modello / Modèle / Model Modell / Model Modelo / Modell / Model Модель / Modell / МОДЕЛ نموذج / Модель	Prevalenza / Hauteur d'élévation / Head up Förderhöhe / Overwicht / Prevalencia Maximal pumphöjd / Manometrik yükseklik Hanop / Emelési magasság / НАПОР التفتو / Hanip					
	<i>Hmax (m)</i> 2 poles 50 Hz	<i>Hmax (m)</i> 2 poles 60 Hz	<i>Hmax (m)</i> 4 poles 50 Hz	<i>Hmax(m)</i> 4 poles 60 Hz	<i>Hmax (m)</i> 6 poles 50 Hz	<i>Hmax (m)</i> 6 poles 60 Hz
NKM-G 40-330			39			
NKM-G 50-330			38			
NKM-G 65-400			55			
NKM-G 80-400			61			
NKM-G 100-400			59			
NKM-G 125-330			38			
NKM-G 125-400			61			
NKM-G 150-330			37			
NKM-G 150-400			59			
NKM-G 200-200			12			
NKM-G 200-250			20			
NKM-G 200-330			36			
NKM-G 200-400			57			
NKM-G 250-330A			30			
NKM-G 250-330			35			
NKP-G 32-250A	81					
NKP-G 32-250	100					
NKP-G 40-330	158					
NKP-G 65-250	100					
NKP-G 65-330	150					
NKP-G 80-250	94					
NKP-G 80-330	148					
NKP-G 100-200	61					
NKP-G 100-250	94					
NKP-G 100-330	148					
NKP-G 125-160	36					
NKP-G 125-200	58					
NKP-G 125-250	96					
NKX-G 250-330A					12	
NKX-G 250-330					15	