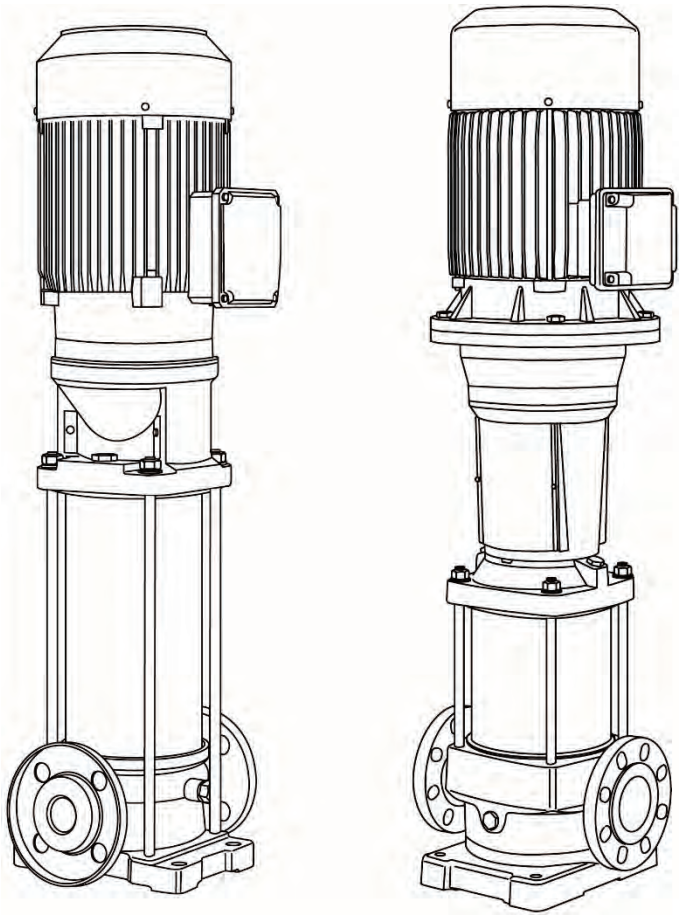
INSTRUCTIONS FOR INSTALLATION AND MAINTENANCE (GB)



NKV

DAB WATER•TECHNOLOGY

CONTENTS

1. APPLICATIONS

Multistage centrifugal pumps indicated for booster sets for water systems of small, medium and large utilieties. They may be used in various fields of applications such as:

- for fire-fighting and washing systems,
- for supplying drinking water and feeding autoclaves,
- for feeding boilers and circulating hot water,
- for conditioning and chilling systems,
- for circulating and industrial processing plants.

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.
Small quantities of sand, up to 50 ppm, are accepted.

3. TECHNICAL DATA

3.1 Electrical data

Supply voltage:	1x 230 50Hz
(+/- 10%)	3x 230-400V – 50Hz
	3x 400V Δ – 50Hz
	3x 220-240/380-415V – 50Hz
	3x 380-415V Δ – 50Hz
	3x 380-480V Δ – 60Hz
	3x 220-277V Δ / 380-480V-60Hz
Absorbed power:	see electric data plate
Degree of protection:	IP55
Insulation class:	F

3.2 Operating conditions

Delivery:	from 20 to 1967 l/min
Head up:	pag. 108
Liquid temperature:	-30°C ÷ 120°C (EPDM);
	-15°C ÷ 120°C (VITON/FKM)
Max. environment temperature:	50°C
Storage temperature:	-20°C ÷ 60°C
Maximum working pressure:	25 bar (2500 kPa)
Maximum working pressure NKV 32-45:	32 bar (3200 kPa)
Relative humidity in air:	Max. 95%
Motor construction:	Cei 2-3 / Cei 61-69
	(EN 60335-2-41)
Weight:	see plate on package

4. MANAGEMENT

Observe the current accident prevention standards. Risk of crushing. The pump may be heavy. Use suitable lifting methods and always wear personal protection equipment.
Before handling the product, check its weight to identify suitable lifting equipment.

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 Handling

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.

The pump motors supplied with eyebolt should not be used to handle the whole assembled electric pump (fig.1C, page 1).
For handling pumps with motor of up to 4kW, use the belts wound around the motor as shown in fig. 1A, page 1.
For pumps with motor power greater or equal to 5.5kW, use the belts attached to the two flanges, located in the coupling area between the pump and the motor as shown in fig.1B, page 1.

There is a risk that the pump may overturn during handling; make sure that the pump remains in a stable position during handling.

5. WARNINGS

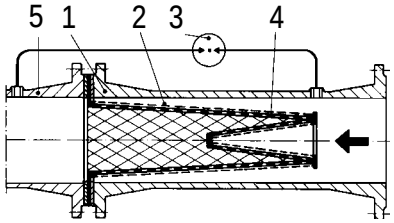
5.1 Checking motor shaft rotation

Before installing the pump you must check that the rotating parts turn freely.
For this purpose, remove the fan cover from its seat in the motor end cover. Insert a screwdriver in the notch on the motor shaft from the ventilation side. Fig. 2, page 1.

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.
To avoid welding waste or other impurities getting into the pump, the use of TRUNCATED CONICAL filters made of corrosion resistant materials (DIN 4181) is recommended.
FIG. 3



1- Filter body
2- Narrow mesh filter
3- Differential pressure gauge
4- Perforated sheet
5- Pump intake aperture

6. PROTECTIONS

6.1 Moving parts

Before starting the pump all the moving parts have to be properly protected with dedicated components (fan, cover, etc.).

During pump operation, keep well away from the moving parts (shaft, fan, etc.).
If getting closed to the running pump is necessary, be properly dressed as from laws rules, in order to avoid injuries.

6.2 Noise level

See table A, pag. 105.
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

DANGER OF BURNING !!
As well as being at high temperature and high pressure, the fluid in the system may also be in the form of steam!
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.

7.1 Pump installation

- The electropump must be fitted in a well ventilated place and with an environment temperature not exceeding 50°C.
- If installed outdoors, protect the pump from the weather and direct sunlight.
- It is always good practice to place the pump as close as possible to the liquid to be pumped.

- The installation baseplate, provided by the customer, if they are metallic they have to be painted rust and corrosion. They have to be flat and stiff enough to resist to short circuit forces and avoid resonance due to vibrations.
- Concrete basements have to be well solid and dry before installing the pumps.
- A firm anchoring of the feet of the pump assembly on the base helps absorb any vibrations created by pump operation.
- The pump can be installed horizontally with the aid of the appropriate supports or vertically with the motor at the top.
- Ensure that the metal pipes do not transmit excess force to the pump apertures, so as to avoid causing deformations or breakages.
- Use pipes with a suitable thread to avoid damage to the inserts.
- The internal diameter of the pipes must never be smaller than that of the electric pump inlets.
- If the head at intake is negative, it is indispensable to fit a foot valve with suitable characteristics at intake.
- 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.
- Any passage from a pipe with a small diameter to one with a larger diameter must be gradual. 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.
- To prevent the formation of air pockets, the intake pipe must slope slightly upwards towards the pump. Fig. 4, page 1.
- 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. Do not run the pump with closed valve on the plant.

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 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.
- If more than one pump is installed, each pump must have its own intake pipe. The only exception is the reserve pump (if envisaged).

7.2 Minimum inlet pressure (Z1) (negative suction head pump)

To have good performances of the pump avoiding cavitation phenomenon it is necessary to calculate the suction lift Z1. Fig. 5, page 2
To determine the suction level Z1, the following formula must be applied:

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

where:

Z1 = difference in level in metres between the intake mouth of the pump and the free surface of the liquid to be pumped.
Pb = barometric pressure in mcw of the place of installation.(chart 1, pag. 107)
NPSH = net load at intake of the place of work.
Hr = load loss in metres on the whole intake duct.
pV = vapour tension in metres of the liquid in relation to the temperature expressed in °C. (chart 2, pag. 107)
Hs = safety margin = minimum 0.5 metres head

If the calculated “Z1” is positive, the pump can operate at a suction lift of maximum “Z1” metres head.
If the calculated “Z1” is negative, than the pump has to be fitted with a positive lift of at least “Z1” mt.

Ex. : installation at sea level and fluid at 20°C

required N.P.S.H:	3,25 m
pb :	10,33 mcw (chart 1, pag. 107)
Hr:	2,04 m
t:	20°C
pV:	0.22 m (chart 2, pag. 107)
Z1	10,33 – 3,25 – 2,04 – 0,22 –0,5 = 4,32 approx.

This means that the pump can operate at a suction lift of maximum 4,32 metres head.

7.3 Minimum suction pressure (positive suction head pump)

It is important to maintain the sum of the inflow pressure and that developed by the pump, the latter with feeder closed, always lower than the maximum pressure rating (PN) permitted by the pump.
P1max + P2max ≤ PN (fig.6A, page 2)
P1max + P2max + P3max ≤ PNHP (fig.6B, page 2)

7.4 Minimum nominal capacity

The function of the pump at a lower level than the minimum permitted nominal capacity may cause excessive and detrimental overheating of the pump. For liquid temperatures higher than 40°C, the minimum capacity should be increased in relation to the temperature of the liquid (see fig. 6A, page 2).

The pump must never operate with the delivery valve closed.

7.5 Electrical connections

Scrupulously follow the wiring diagrams inside the terminal board box and those on table C, page 106.

- Ensure that the mains voltage is the same as that shown on the motor data plate.
- The pumps must always be connected to an external switch.

- Three-phase motors must be protected with an automatic switch (e.g. circuit breaker) calibrated at the values shown on the data plate of the electropump.
- 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.(see table B, page 106).

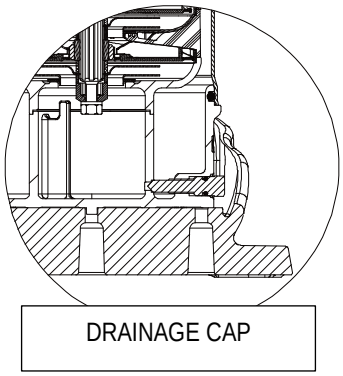
In electropumps the terminal board may face in four different positions: slacken and remove the four retaining screws between the motor flange and the support. Turn the motor into the desired position and replace the screws.

7.6 Starting

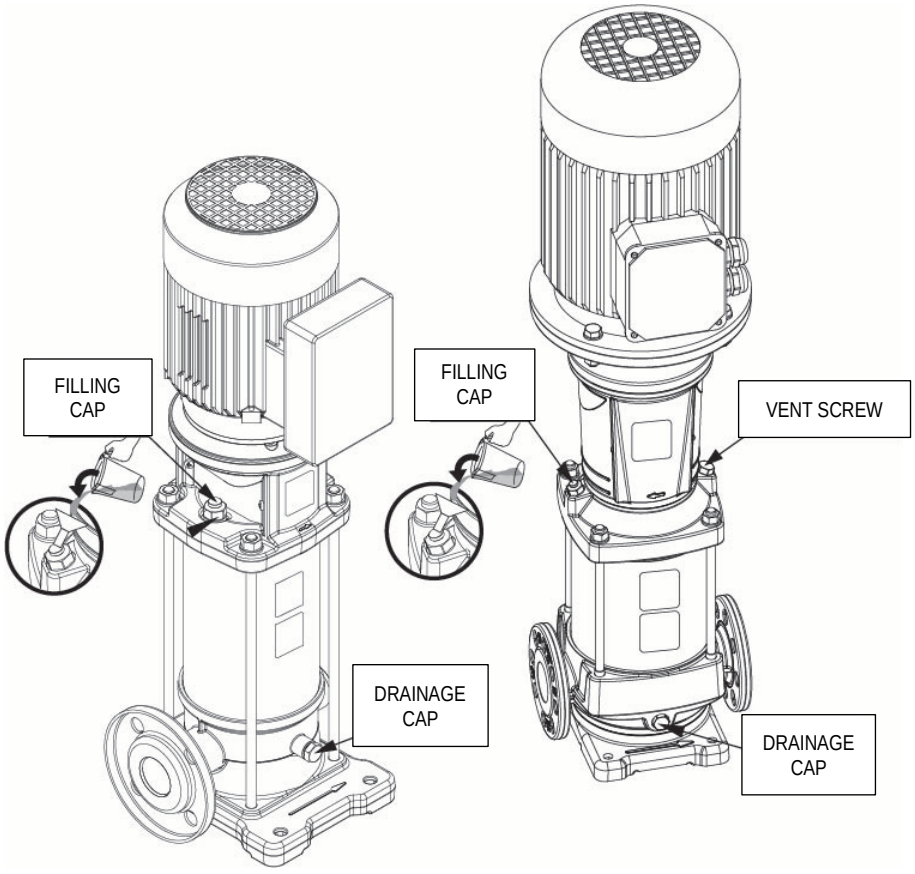
In accordance with accident-prevention regulations, the pump must be run only if the coupling (where provided) is suitably protected. So the pump must be started only after having checked that the coupling protections are correctly fitted.
To obtain priming, proceed as follows: NKV (Fig.7):

- Before filling the pump through the filling hole you must first partially unscrew the drainage pin/cap (when filling just unscrew it by 3 or 4 turns) without forcing it.
- After having removed the cap, fill the pump slowly through the filling hole so as to discharge any air pockets present inside.
- Before starting the pump, close the filling cap and screw the drainage pin/cap all the way, without forcing it.
- Vent by means of the screw on the part opposite the filling cap, as indicated in Fig. 7
- Fully open the gate valve on intake and keep the one on delivery almost closed.
- Switch on and check that the direction of rotation is correct, as indicated in Fig. 2, page 1. If not, invert any two phase leads, after having disconnected the pump from the power 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%.
- With the unit at regular running speed, check that the current absorbed by the motor does not exceed the value on the data plate.

FIG. 7



Before filling the pump you must partially unscrew the drainage pin/cap!!



NKV 1-3-6-10 NKV 15-20-32-45-65-95

7.7 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 ramain 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.

7.8 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 hours
NKV 10	10 ÷ 15
NKV 15 - NKV 20 NKV 32 - NKV 45 NKV 65 - NKV 95	5 ÷ 10

- 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.

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

- It is recommended to empty the pump when it is not running for a long time at normal temperature.
- The drain plug shall be opened until the pump will be utilized again.
- When restarting after long periods of inactivity it is necessary to repeat the operations described above in the paragraphs WARNINGS and STARTING UP.

8. MAINTENANCE

- In normal operating conditions the electropump does not require any kind of maintenance.
- It is recommended to check time by time current absorption, pressure head at closed valve and maximum flow.
- The electropump can only be dismantled by specialised, skilled personnel in possession of the qualifications required by the specific regulations.
- In any case all repair and maintenance jobs must be carried out only after having disconnected the pump from the power mains.

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.

8.1 Modifications and spare parts

Any modification not authorised beforehand relieves the manufacturer of all responsibility. All the spare parts must be authentic and all the accessories must be authorised by the manufacturer.

Carry out maintenance based on the type of bearing indicated on the technical data plate.

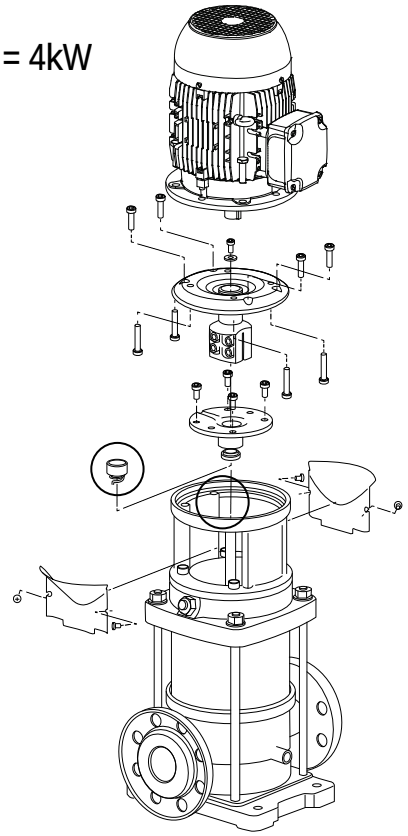
9. TROUBLESHOOTING

Fault	Check (possible cause)	Remedy
The motor does not start and makes no noise.	– Check the protection fuses.	If they are burnt-out, change them.
	– Check the electric connections.	Correct any errors.
	– Check that the motor is live.	
	– Motor protector cut-off the motor, for the single-phased motors, due to over heating of tag windings.	Wait for automatic reset of the motor protector once the temperature has fallen below the maximum limit.
The motor does not start but makes noise.	– Check that supply voltage correspond with voltage on the pump label.	
	– Check the electrical connections.	Correct any errors.
	– Check that all the phases are present.	Restore the missing phase.
	– Check for obstructions in the pump or motor.	Remove any obstructions.
The motor turns with difficulty.	– Verify that supply voltage is at an acceptable valve.	
	– Check whether any moving parts are scraping against fixed parts.	Eliminate the cause of the scraping.
	– Check the state of the bearings.	Change any worn bearings.
The (external) motor protection trips immediately after starting.	– Check that all the phases are present.	Restore the missing phase.
	– Look for possible open or dirty contacts in the protection.	Change or clean the component concerned.

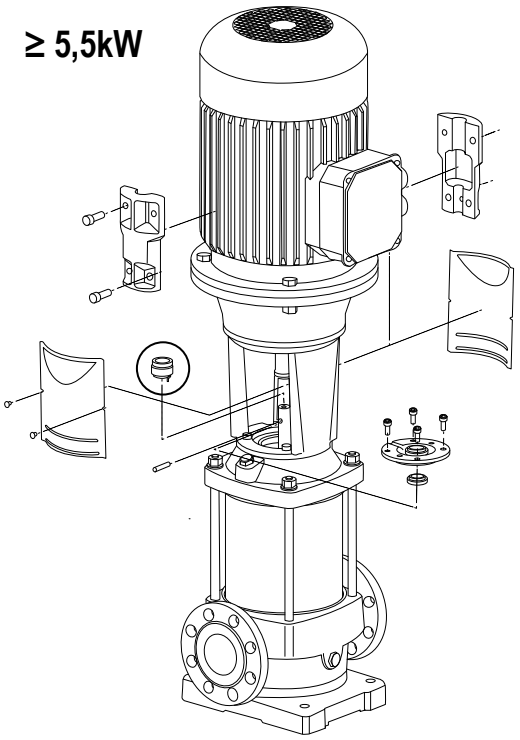
	– Look for possible faulty insulation of the motor, checking the phase resistance and insulation to earth.	Change the motor casing with the stator or reset any cables discharging to earth.
The motor protection trips too frequently.	– Ensure that the environment temperature is not too high.	Provide suitable ventilation in the environment where the pump is installed.
	– Check the calibration of the protection.	Calibrate at a current value suitable for the motor absorption at full load.
	– Check the state of the bearings.	Change any worn bearings.
	– Check the motor rotation speed.	
The pump does not deliver.	– Check priming.	
	– On three-phase motors, check that the direction of rotation is correct.	Invert the connection of two supply wires.
	– Difference in suction level too high.	
	– The diameter of the intake pipe is insufficient or the horizontal stretch is too long.	Replace the intake pipe with one with a larger diameter.
	– Foot valve or intake pipe blocked.	Clean the foot valve and the intake pipe.
The pump does not prime.	– The intake pipe or the foot valve is taking in air.	Check the suction pipe, repeat the priming operations.
	– Check the slope of the suction pipe.	Correct the inclination of the intake pipe.
The pump supplies insufficient flow.	– Foot valve or impeller blocked.	Remove clog. Replace the impeller if weared down.
	– The diameter of the intake pipe is insufficient.	Replace the pipe with one with a larger diameter.
	– Check that the direction of rotation is correct.	Invert the connection of two supply wires.
The pump flow rate is not constant.	– Intake pressure too low.	
	– Intake pipe or pump partly blocked by impurities.	Remove clog.
The pump turns in the opposite direction when switching off.	– Leakage in the intake pipe.	
	– Foot valve or check valve faulty or blocked in partly open position.	Repair or replace the faulty valve.
The pump vibrates and operates noisily.	– Check that the pump and/or the pipes are firmly anchored.	
	– There is cavitation in the pump.	Reduce the intake height or check for load losses.
	– The pump is running above its plate characteristics.	Reduce the flow rate.
	– The pump is not turning freely.	Check the state of wear of the bearings.

NKV Mechanical Seal Maintenance

= 4kW



≥ 5,5kW



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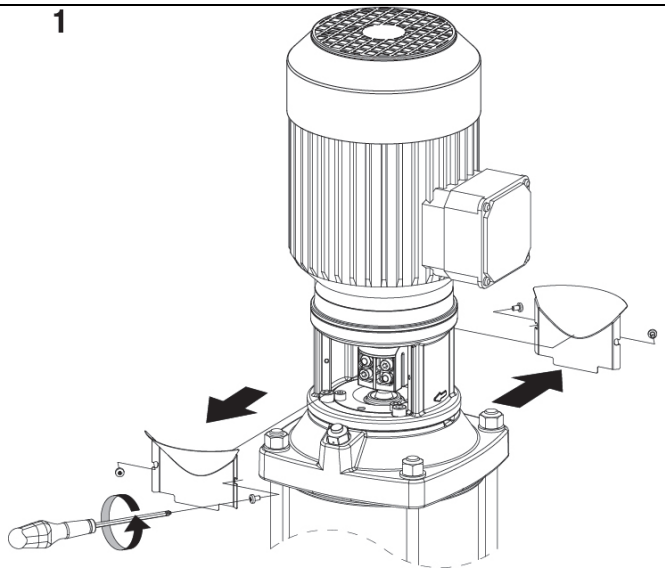

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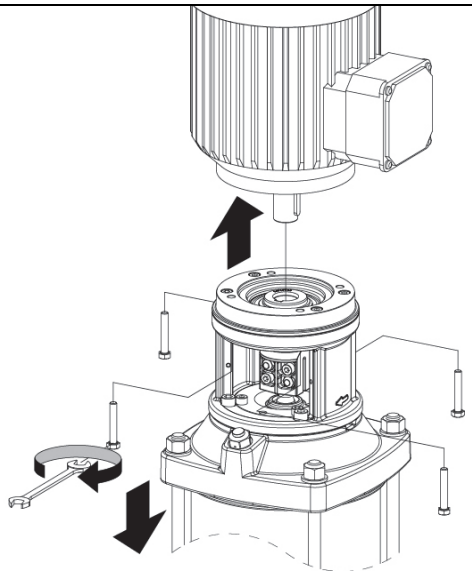

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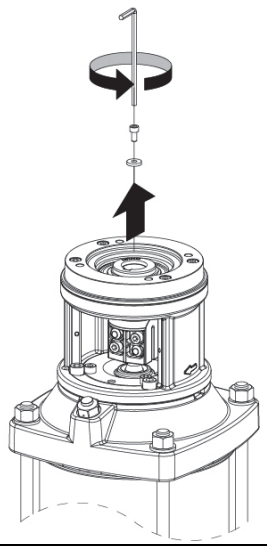

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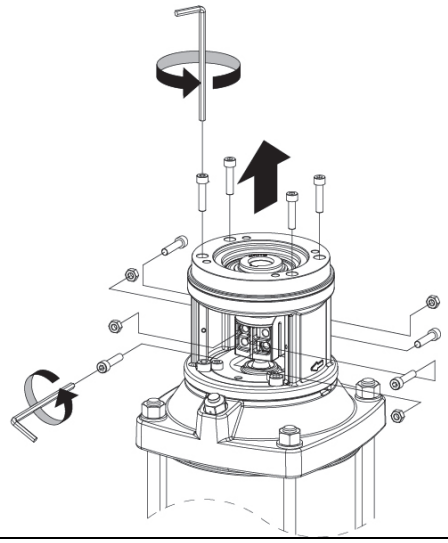

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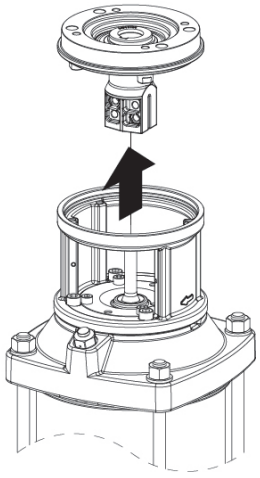

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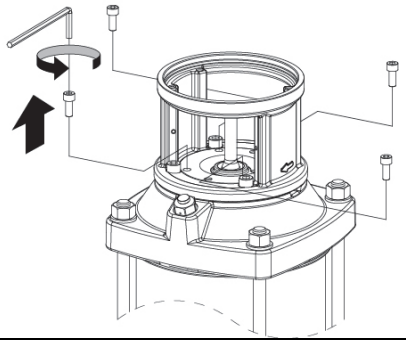

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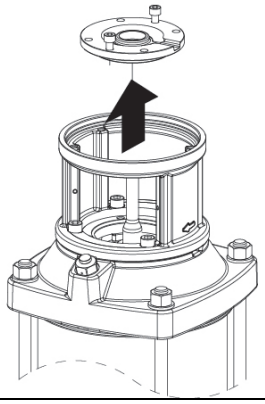

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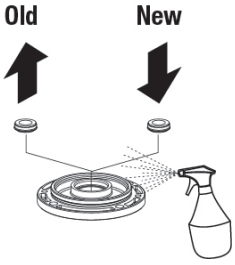

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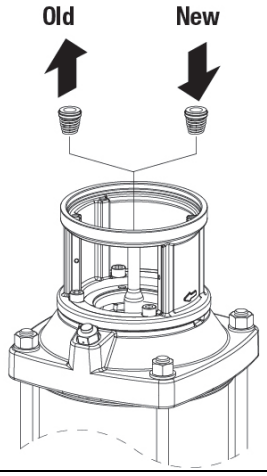

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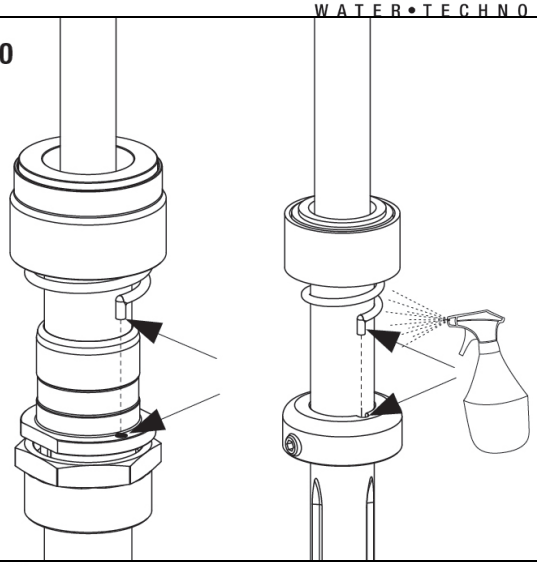

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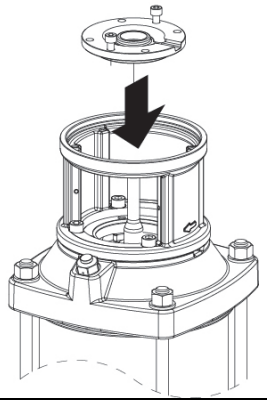

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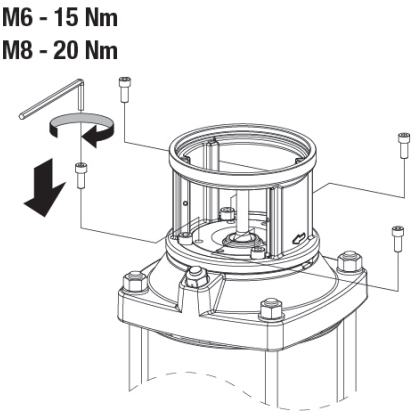

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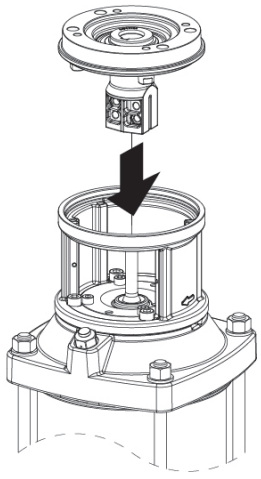

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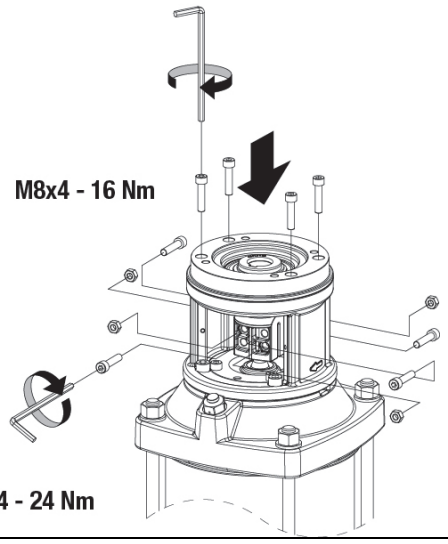

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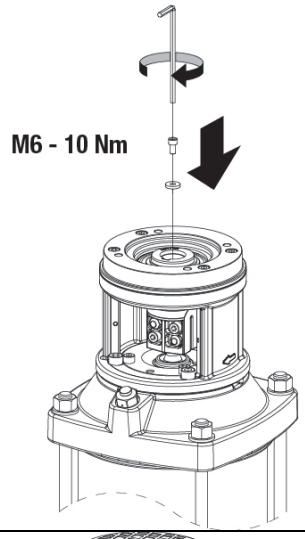

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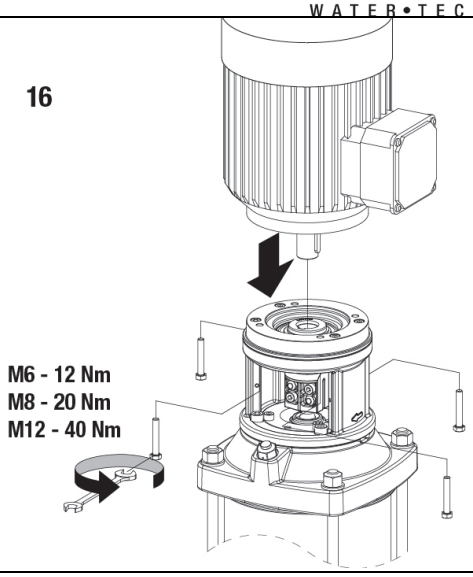

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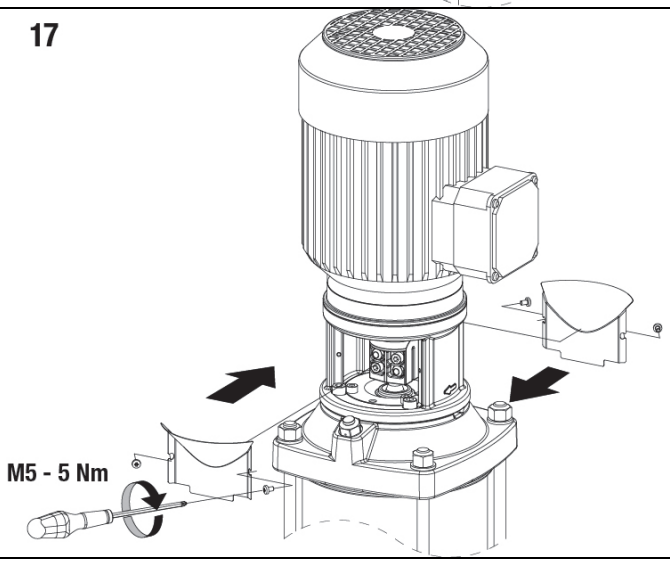

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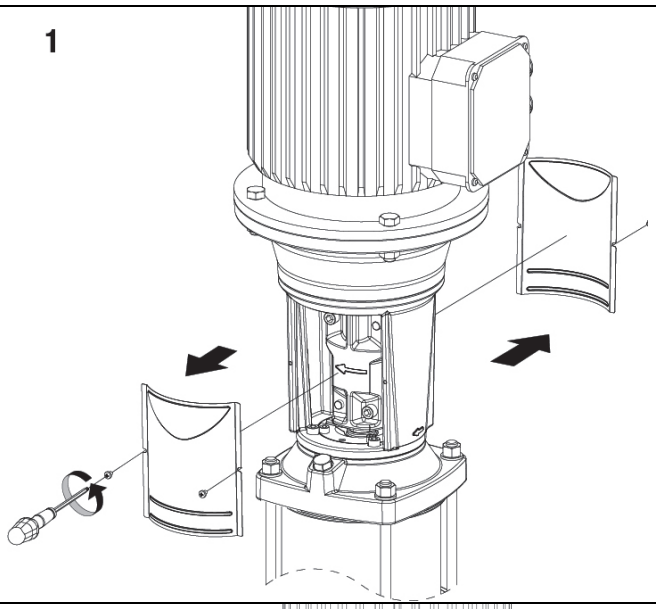

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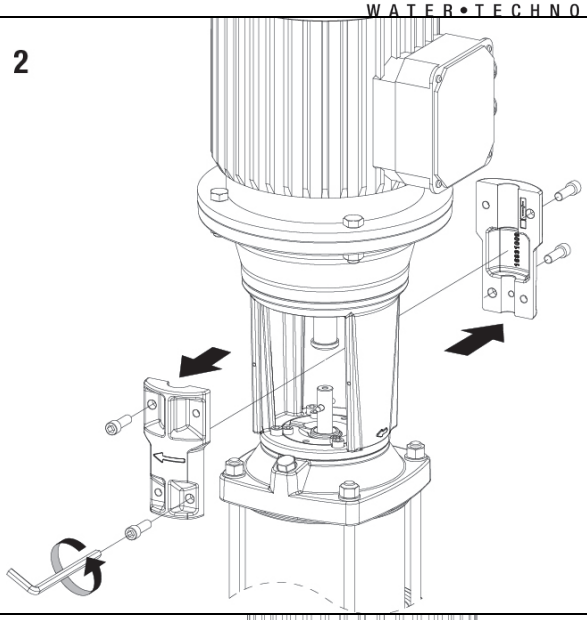

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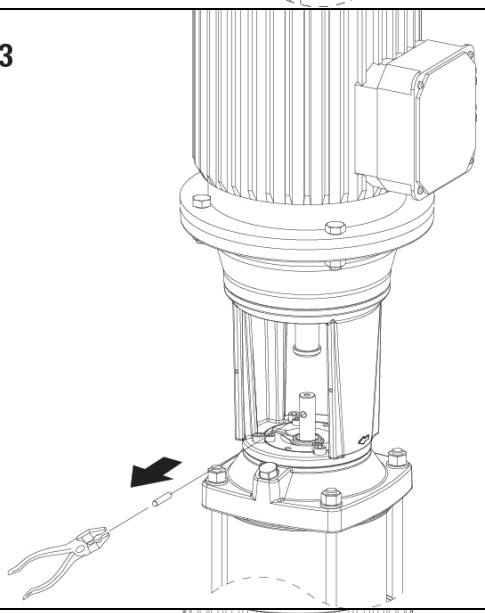

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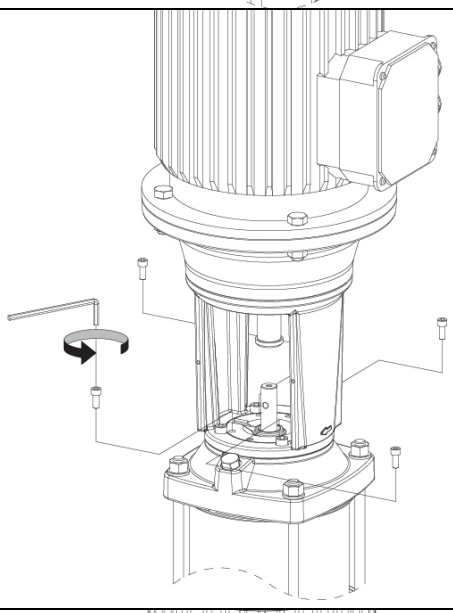

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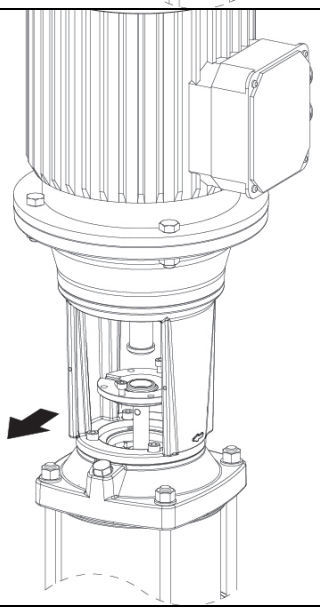

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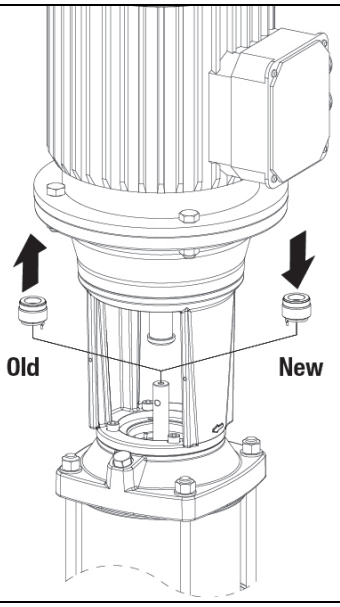
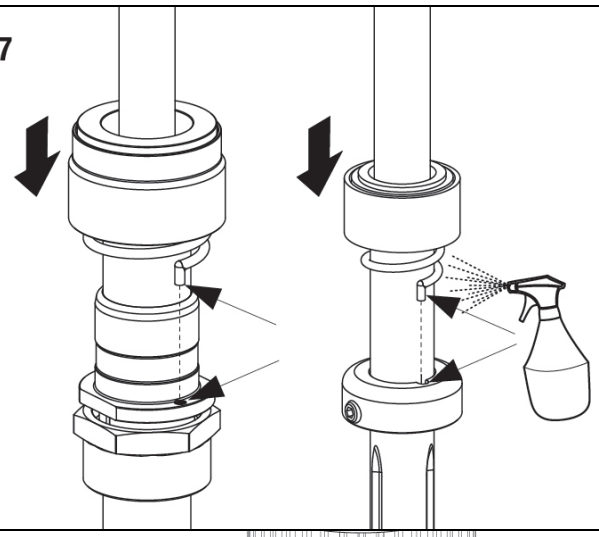
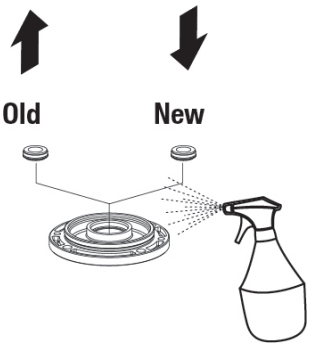


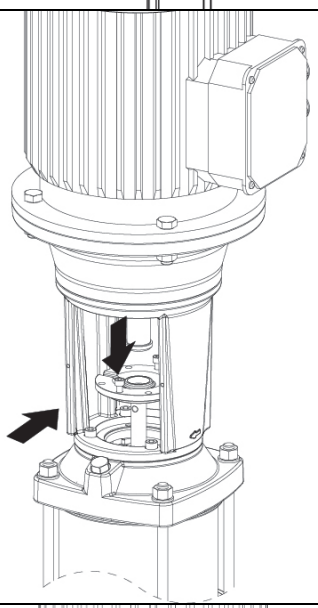
7



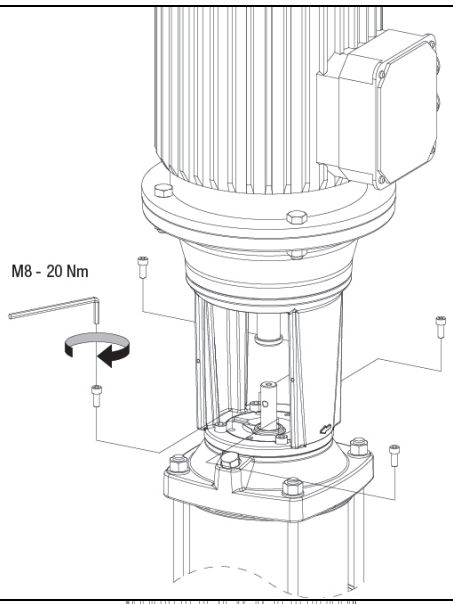
8



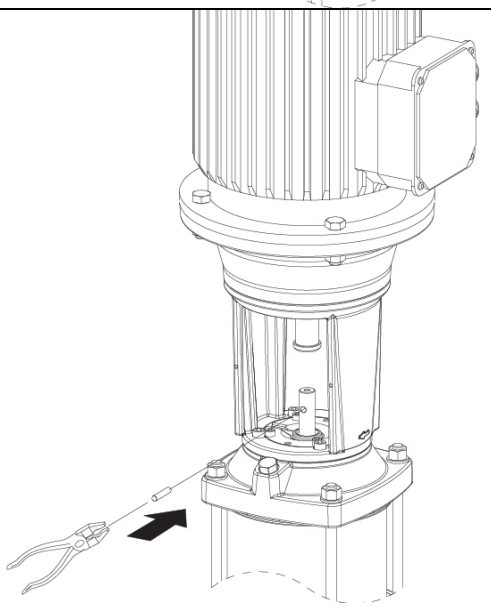
9



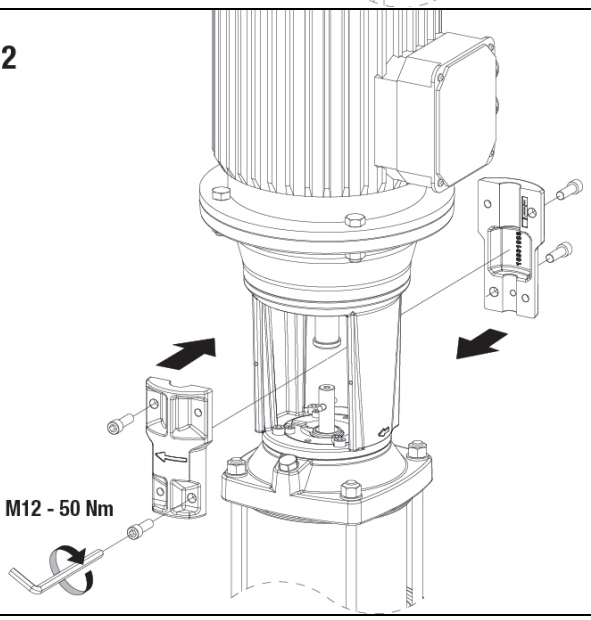
10

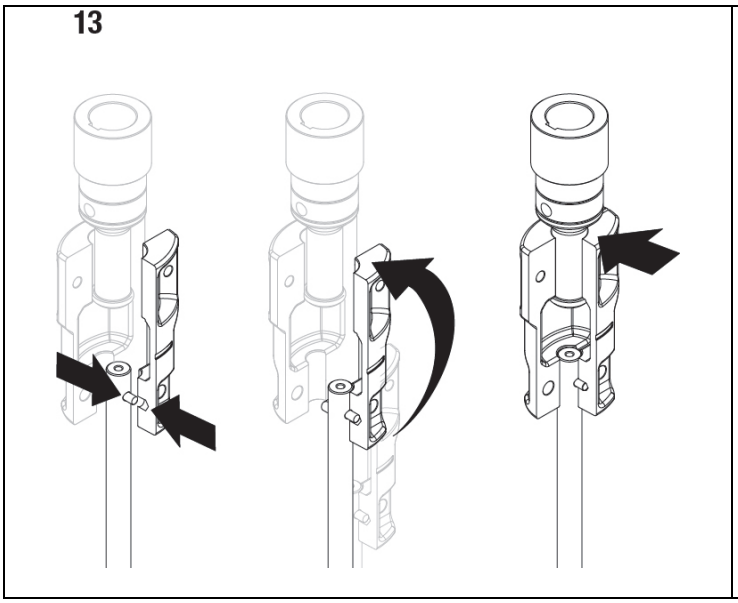


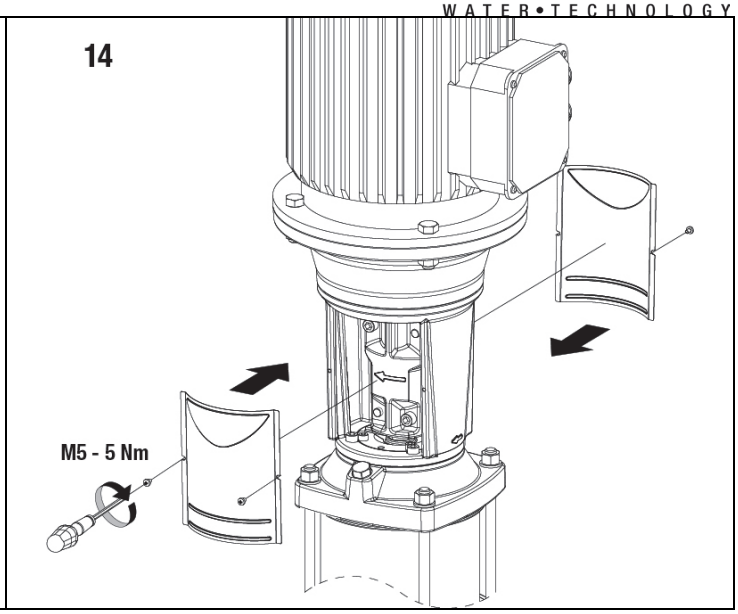
11



12







Rumore aereo prodotto dalle pompe dotate con motore di serie / Bruit aérien produit par les pompes équipées d'un moteur de série / Airborne noise produced by the pumps with standard motor / Geräuschemission der Pumpe mit serienmäßigem Motor / Luchtgeluid geproduceerd door pompen met standaard motoren / Ruido aéreo producido por las bombas provistas de motor de serie / Luftburet buller från pumpar med standardmotor / **Εναέριος θόρυβος από τις αντλίες με στάνταρτ κινητήρα / Standart üretim motorlar ile donatılmış pompaların çıkardığı gürültü** / Hluk **vyprodukovaný čerpadlami vybavenými sé**riovým motorom / **Воздушный шум, производимый насосами с серийным двигателем** / Zgomot aerian produs de pompele dotate cu motor de serie / **Hałas wytwarzany przez pompę wyposażoną w silnik seryjny** / ضجيج هوائي ناتج عن المضخات المزودة بمحرك اعتيادي / **Széria jellegű motorral szerelt szivattyúk zajszintje** / **Ниво на шум на помпи със стандартен мотор** / **Шум, що створюється насосами зі стандартними двигунами**

TAB. A

Power motor P2 (kW)	dB +/- 3							
	50Hz				**60Hz**			
	2 pole - **2900 rpm**		4 pole - **1450 rpm**		2 pole - **3600 rpm**		4 pole - **1800** rpm	
	Size motor IEC	LpA*	**Size motor** IEC	LpA*				
0.37	71	<70	71	<70	-	-	71	<70
0.55	71	<70	71	<70	71	<70	80	<70
0.75	80	<70	80	<70	80	<70	80	<70
1.1	80	<70	90	<70	80	<70	90	<70
1.5	90	<70	90	<70	90	<70	90	<70
2.2	90	<70	100	<70	90	70	100	<70
3	100	<70	100	<70	100	70	100	<70
4	112	<70	112	<70	112	72	112	<70
5.5	132	<70	132	<70	132	73	132	<70
7.5	132	72	132	<70	132	74	132	<70
11	160	74	-	-	160	78	160	<70
15	160	75	-	-	160	78	160	<70
18.5	160	75	-	-	160	80	-	-
22	180	75	-	-	180	80	-	-
30	200	75	-	-	200	79	-	-
37	200	75	-	-	200	78	-	-
45	225	78	-	-	225	80	-	-

Tempi commutazione stella-triangolo / Temps de commutation étoile/triangle / Star-delta switch-over times / **Umschaltzeiten Stern**-Dreieck / Ster-**driehoek schakeltijden** / Tiempos de conmutación estrella-triángulo / Omkopplingst**ider stjär**na/triangel / **Χρόνοι μεταγωγής αστέρα-τριγώνου** / **Yıldız-üçgen komütasyon süreleri** / **Časy komutácie hviezda-trojuholník** / **Время переключения со звезды на треугольник** / Timpi de comutare stea-triunghi / **Czas komutacji gwiazda-trójkąt** / أزمان التحويل نجمة – مثلث / Csillag-delta **átkapcsolási idő** / **Време за превключване звезда-триъгълник** / **Час перемикання з зірки на трикутник**

TAB. B

Motor (kW)	(Hp)	⅄//Δ
≤ 30	≤ 40	< 3”
> 30	> 40	< 5”

Collegamento TRIFASE per motori / Connexion TRIPHASÉE pour moteurs / THREE-PHASE motor connection / DREIPHASEN-Anschluss für Motoren / DRIEFASE aansluiting voor motoren / Conexión trifásica para motores / TREFASANSLUTNING för motorer / **ΤΡΙΦΑΣΙΚΗ σύνδεση κινητήρων** / **Motorlar için TRİFAZ bağlantı** / **TROJFÁZOVÉ zapojenie mo**torov / **ТРЕХФАЗНОЕ соединение двигателей** / Racordare TRIFA**ZATĂ pentru motoare** / P**ołączenie TRÓJFAZOWE dla silników** / ربط ثلاثي الطور للمحركات / **Motorok háromfázisú bekötése** / **Свързване на 3-фазен мотор** / **ТРИФАЗНЕ з'єднання двигунів**

TAB. C

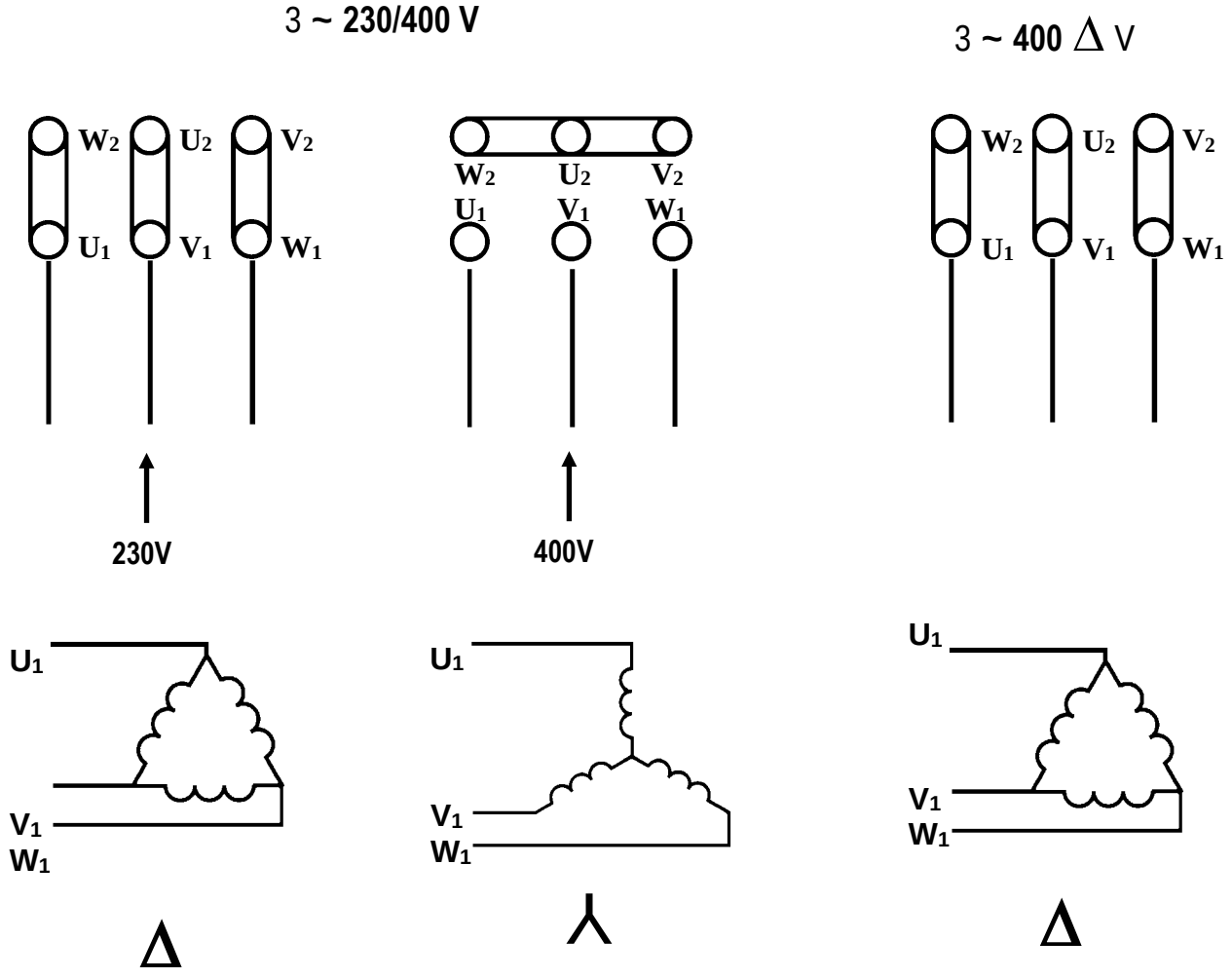


Grafico 1 : Pressione Barometrica (pb) / Graphique 1 : Pression Barométrique (pb) / Chart 1 : Barometric Pressure (pb) / Grafik 1 : Barometrischer Druck (pb) / Grafiek 1 : Barometerdruk (pb) / Gráfico 1 : Presión Barométrica (pb) / Diagram 1: Barometertryck (pb) / **Διάγραμμα** 1 : **Βαρομετρική πίεση** (pb) / **Grafik 1 : Barometrik basınç (pb)** / Graf 1 : Barometrický tlak (pb) / **График** 1 : **Барометрическое давление** (pb) / Graficul **1 : Presiune Barometrică (pb)** / **Rysunek 1 : Ciśnienie barometryczne (pb)** / (Pb) رسم بيان ١: ضغط بارومتري / 1.grafikon : Barometrikus nyomás (pb) / **диаграма** 1 : **Барометрично налягане** (pb) / **Графік** 1 : **Барометричний тиск** (pb)

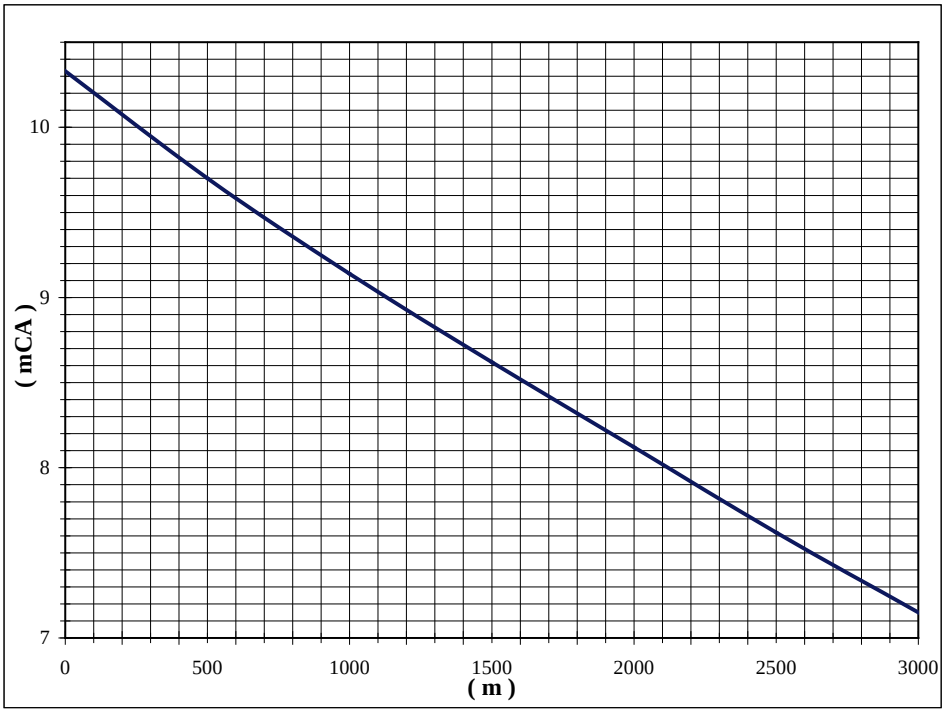
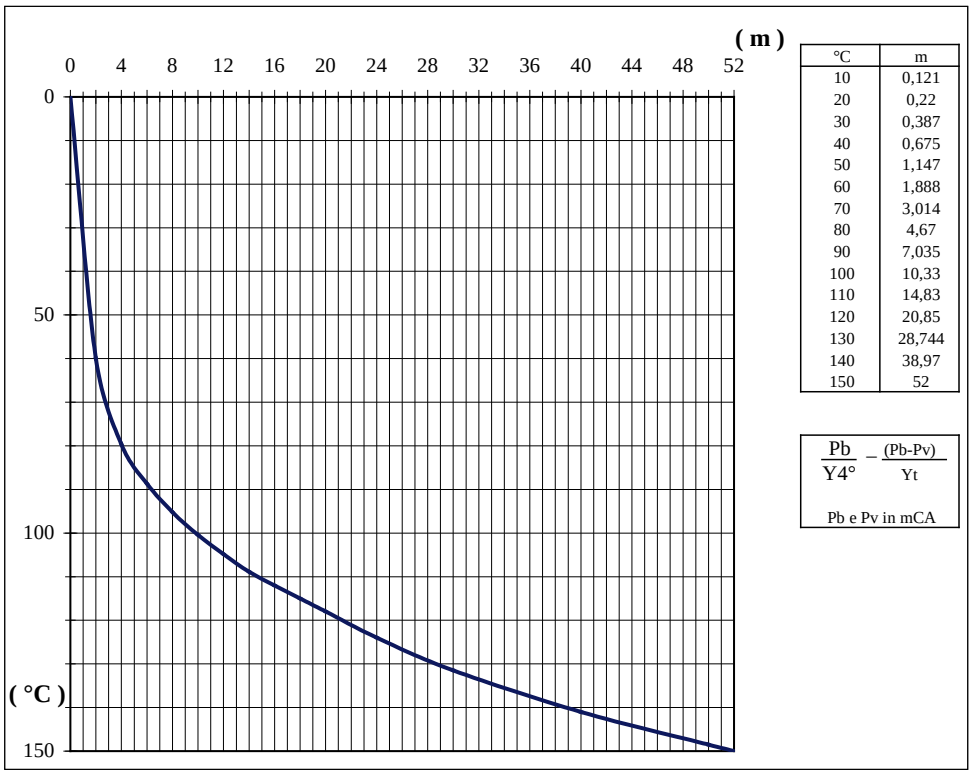


Grafico 2: Tensione di vapore (pV) / Graphique 2 : Pression de vapeur (pV) / Chart 2 : Vapour Tension (pV) / Grafik 2 : Dampfspannung (pV) / Grafiek 2 : Dampspanning (pV) / Gráfico 2 : Tensión de vapor (pV) / Diagram 2: Ångspänning (pV) / **Διάγραμμα** 2 : **Τάση ατμών** (pV) / Grafik 2 : Buhar gerilimi (pV) / **Graf 2 : Tenzia pary (pV)** / **График** 2 : **Напряжение пара** (pV) / Graficul 2 : Tensiune de abur (pV) / Rysunek **2 : Prężność pary (pV)** / (Pv) رسم بيان ٢: جهد البخار / **2.grafikon : Gőzfeszültség (pV)** / **диаграма** 2 : **Усилие от парите** (pV) / **Графік** 2 : **Напруга пара** (pV)



Modello / Modèle / Model Modell / Model Modelo / Modell / Model **Модель /** Model **/** نموذج / Modell / **Модел** / **Модель**	Prev**alenza /** Hauteur d'élévation **/** Head up **/** Förderhöhe **/** Overwicht **/** Prevalencia **/ Maximal pumphöjd /** Manometrik yükseklik **/ Напор / Prężność pary (pV) /** التفوق / Emelési magasság **/ Напор /** **Натиск**	
	Hmax (m.) 2 poles 50 Hz	*Hmax (m.) 2 poles 60 Hz*
NKV 1/2 - NKVE 1/2	14,5	19,5
NKV 1/3 - NKVE 1/3	21,5	29
NKV 1/4 - NKVE 1/4	28	38,5
NKV 1/5 - NKVE 1/5	35	49
NKV 1/6 - NKVE 1/6	41,5	58
NKV 1/7 - NKVE 1/7	48	70,5
NKV 1/8 - NKVE 1/8	55	80
NKV 1/9 - NKVE 1/9	61,5	91
NKV 1/10 - NKVE 1/10	68	101
NKV 1/11 - NKVE 1/11	74,5	110,5
NKV 1/12 - NKVE 1/12	83	120
NKV 1/13 - NKVE 1/13	89,5	132
NKV 1/14 - NKVE 1/14	96	141,5
NKV 1/15 - NKVE 1/15	102,5	151,5
NKV 1/17 - NKVE 1/17	118	173
NKV 1/19 - NKVE 1/19	131	193
NKV 1/22 - NKVE 1/22	150,5	222,5
NKV 1/23 - NKVE 1/23	160,5	-
NKV 1/25 - NKVE 1/25	174	256
NKV 1/27 - NKVE 1/27	187	-
NKV 1/30 - NKVE 1/30	206,5	-
NKV 1/32 - NKVE 1/32	224,5	-
NKV 1/34 - NKVE 1/34	238	-
NKV 1/37 - NKVE 1/37	258	-
NKV 3/2 - NKVE 3/2	15	21
NKV 3/3 - NKVE 3/3	22,5	32
NKV 3/4 - NKVE 3/4	30	42
NKV 3/5 - NKVE 3/5	37,5	54
NKV 3/6 - NKVE 3/6	44,5	65,5
NKV 3/7 - NKVE 3/7	52,5	76
NKV 3/8 - NKVE 3/8	59,5	87,5
NKV 3/9 - NKVE 3/9	67	98,5
NKV 3/10 - NKVE 3/10	75	109
NKV 3/11 - NKVE 3/11	82,5	121
NKV 3/12 - NKVE 3/12	89,5	131,5
NKV 3/13 - NKVE 3/13	96,5	142,5
NKV 3/14 - NKVE 3/14	105,5	153
NKV 3/15 - NKVE 3/15	112,5	165,5
NKV 3/16 - NKVE 3/16	120	176,5
NKV 3/17 - NKVE 3/17	127	187,5
NKV 3/18 - NKVE 3/18	136,5	198
NKV 3/19 - NKVE 3/19	144	209
NKV 3/21 - NKVE 3/21	158,5	232

Modello / Modèle / Model Modell / Model Modelo / Modell / Model **Модель /** Model **/** نموذج / Modell / **Модел** / **Модель**	**Prevalenza /** Hauteur d'élévation / Head up / Förderhöhe / Overwicht / Prevalencia / **Maximal pumphöjd /** Manometrik yükseklik / **Hanop / Prężność pary (pV) /** التفوق / Emelési magasság **/ Напор / Натиск**	
	Hmax (m.) 2 poles 50 Hz	*Hmax (m.) 2 poles 60 Hz*
NKV 3/23 - NKVE 3/23	173	254
NKV 3/25 - NKVE 3/25	187,5	-
NKV 3/27 - NKVE 3/27	205,5	-
NKV 3/29 - NKVE 3/29	220	-
NKV 3/31 - NKVE 3/31	235	-
NKV 3/33 - NKVE 3/33	249,5	-
NKV 6/2 - NKVE 6/2	15	21,5
NKV 6/3 - NKVE 6/3	22,5	32,5
NKV 6/4 - NKVE 6/4	29,5	43,5
NKV 6/5 - NKVE 6/5	37,5	54
NKV 6/6 - NKVE 6/6	44,5	65,5
NKV 6/7 - NKVE 6/7	52,5	76
NKV 6/8 - NKVE 6/8	59,5	87,5
NKV 6/9 - NKVE 6/9	67	98
NKV 6/10 - NKVE 6/10	75	109
NKV 6/11 - NKVE 6/11	82,5	121
NKV 6/12 - NKVE 6/12	89,5	132
NKV 6/13 - NKVE 6/13	97	142,5
NKV 6/14 - NKVE 6/14	105,5	154
NKV 6/15 - NKVE 6/15	113	165,5
NKV 6/16 - NKVE 6/16	120,5	176,5
NKV 6/17 - NKVE 6/17	127,5	187,5
NKV 6/18 - NKVE 6/18	135	198,5
NKV 6/19 - NKVE 6/19	142	210,5
NKV 6/20 - NKVE 6/20	152	221,5
NKV 6/21 - NKVE 6/21	159	232
NKV 6/23 - NKVE 6/23	174	254
NKV 6/25 - NKVE 6/25	189	-
NKV 6/28 - NKVE 6/28	214	-
NKV 6/30 - NKVE 6/30	229	-
NKV 6/33 - NKVE 6/33	251,5	-
NKV 6/36 - NKVE 6/36	275	-
NKV 10/2 - NKVE 10/2	20	28,5
NKV 10/3 - NKVE 10/3	30	43,5
NKV 10/4 - NKVE 10/4	40	57,5
NKV 10/5 - NKVE 10/5	49,5	72,5
NKV 10/6 - NKVE 10/6	60,5	87,5
NKV 10/7 - NKVE 10/7	70	102
NKV 10/8 - NKVE 10/8	81	117
NKV 10/9 - NKVE 10/9	91	131,5
NKV 10/10 - NKVE 10/10	102,5	146,5

Modello / Modèle / Model Modell / Model Modelo / Modell / Model **Модель /** Model /نموذج / Modell / **Модел / Модель**	**Prevalenza /** Hauteur d'élévation / Head up / Förderhöhe / Overwicht / Prevalencia **Maximal pumphöjd /** Manometrik yükseklik / **Напор / Prężność pary (pV) /** التفوق / Emelési magasság / **Напор / Натиск**	
	Hmax (m.) 2 poles *50 Hz*	*Hmax (m.) 2 poles* *60 Hz*
NKV 10/11 - NKVE 10/11	112,5	161
NKV 10/12 - NKVE 10/12	122,5	175
NKV 10/13 - NKVE 10/13	132	189,5
NKV 10/15 - NKVE 10/15	153	220
NKV 10/17 - NKVE 10/17	172,5	249
NKV 10/19 - NKVE 10/19	194,5	-
NKV 10/21 - NKVE 10/21	214,5	-
NKV 10/23 - NKVE 10/23	234	-
NKV 10/24 - NKVE 10/24	248,5	-
NKV 15/1 - NKVE 15/1	14,5	21
NKV 15/2 - NKVE 15/2	29	42
NKV 15/3 - NKVE 15/3	43,5	63,5
NKV 15/4 - NKVE 15/4	58	84,5
NKV 15/5 - NKVE 15/5	72,5	106
NKV 15/6 - NKVE 15/6	87,5	128
NKV 15/7 - NKVE 15/7	102	149
NKV 15/8 - NKVE 15/8	117	170
NKV 15/9 - NKVE 15/9	131,5	191,5
NKV 15/10 - NKVE 15/10	147,5	212,5
NKV 15/11 - NKVE 15/11	162	233,5
NKV 15/12 - NKVE 15/12	176,5	255
NKV 15/13 - NKVE 15/13	191	-
NKV 15/14 - NKVE 15/14	205,5	-
NKV 15/15 - NKVE 15/15	221	-
NKV 15/16 - NKVE 15/16	235,5	-
NKV 15/17 - NKVE 15/17	249,5	-
NKV 20/1 - NKVE 20/1	15,5	22,5
NKV 20/2 - NKVE 20/2	31	45,5
NKV 20/3 - NKVE 20/3	46,5	68
NKV 20/4 - NKVE 20/4	62,5	91
NKV 20/5 - NKVE 20/5	78	114,5
NKV 20/6 - NKVE 20/6	94,5	137,5
NKV 20/7 - NKVE 20/7	110	160
NKV 20/8 - NKVE 20/8	126,5	182,5
NKV 20/9 - NKVE 20/9	142,5	206
NKV 20/10 - NKVE 20/10	158	228,5
NKV 20/11 - NKVE 20/11	174	-
NKV 20/12 - NKVE 20/12	189,5	-
NKV 20/13 - NKVE 20/13	205	-
NKV 20/14 - NKVE 20/14	220,5	-
NKV 20/15	237	-

Modello / Modèle / Model Modell / Model Modelo / Modell / Model **Модель /** Model **/** نموذج / Modell / **Модел** / **Модель**	**Prevalenza /** Hauteur d'élévation / Head up / Förderhöhe / Overwicht / Prevalencia **Maximal pumphöjd /** Manometrik yükseklik / **Напор / Prężność pary (pV) /** التفوق / Emelési magasság **/ Напор /** **Натиск**	
	Hmax (m.) 2 poles 50 Hz	*Hmax (m.) 2 poles 60 Hz*
NKV 20/16	252,5	-
NKV 20/17	268	-
NKV 20/16	252,5	-
NKV 20/17	268	-
NKV 32/2-2 - NKVE 32/2-2	36	52
NKV 32/2 - NKVE 32/2	48,5	71
NKV 32/3-2 - NKVE 32/3-2	60	88
NKV 32/3 - NKVE 32/3	73	106
NKV 32/4-2 - NKVE 32/4-2	84,5	123
NKV 32/4 - NKVE 32/4	98	141
NKV 32/5-2 - NKVE 32/5-2	109,5	158
NKV 32/5 - NKVE 32/5	122,5	176
NKV 32/6-2 - NKVE 32/6-2	134	193
NKV 32/6 - NKVE 32/6	146,5	213
NKV 32/7-2 - NKVE 32/7-2	158	230,5
NKV 32/7	171	248,5
NKV 32/8-2	182,5	265,5
NKV 32/8	194,5	284
NKV 32/9-2	208,5	-
NKV 32/9	221	-
NKV 32/10-2	233	-
NKV 32/10	246,5	-
NKV 32/11-2	258	-
NKV 32/11	271	-
NKV 32/12-2	282,5	-
NKV 32/12	295	-
NKV 32/13-2	307	-
NKV 32/13	319,5	-
NKV 45/2-2 - NKVE 45/2-2	38,5	56
NKV 45/2 - NKVE 45/2	48,5	70,5
NKV 45/3-2 - NKVE 45/3-2	63	91,5
NKV 45/3 - NKVE 45/3	73,5	106
NKV 45/4-2 - NKVE 45/4-2	87,5	126
NKV 45/4 - NKVE 45/4	97,5	142,5
NKV 45/5-2	112	163
NKV 45/5	122	178
NKV 45/6-2	137,5	198,5
NKV 45/6	147,5	213
NKV 45/7-2	162,5	234
NKV 45/7	172,5	249
NKV 45/8-2	187	-

Modello / Modèle / Model Modell / Model Modelo / Modell / Model **Модель /** Model **/**نموذج / Modell / **Модел** / **Модель**	**Prevalenza /** Hauteur d'élévation / Head up / Förderhöhe / Overwicht / Prevalencia Max**imal pumphöjd /** Manometrik yükseklik / **Напор / Prężność pary (pV) /** التفوق/ Emelési magasság / **Напор** / **Натиск**	
	Hmax (m.) 2 poles 50 Hz	*Hmax (m.) 2 poles 60 Hz*
NKV 45/8	197	-
NKV 45/9-2	211,5	-
NKV 45/9	221,5	-
NKV 45/10-2	235,5	-
NKV 45/10	246	-
NKV 45/11-2	261	-
NKV 45/11	271	-
NKV 45/12-2	285,5	-
NKV 45/12	295,5	-
NKV 45/13-2	309,5	-
NKV 65/2-2 - NKVE 65/2-2	39	57
NKV 65/2 - NKVE 65/2	56,5	81,5
NKV 65/3-2 - NKVE 65/3-2	67,5	97
NKV 65/3 - NKVE 65/3	84,5	123
NKV 65/4-2	95,5	139,5
NKV 65/4	113,5	164,5
NKV 65/5-2	125	180,5
NKV 65/5	142	-
NKV 65/6-2	153	-
NKV 65/6	170	-
NKV 65/7-2	181,5	-
NKV 65/7	199	-
NKV 65/8-2	210	-
NKV 65/8	227	-
NKV 95/2-2 - NKVE 95/2-2	44,5	64,5
NKV 95/2 - NKVE 95/2	62	90,5
NKV 95/3-2	75,5	110,5
NKV 95/3	93,5	136
NKV 95/4-2	108	155,5
NKV 95/4	125,5	-
NKV 95/5-2	139	-
NKV 95/5	156	-
NKV 95/6-2	170,5	-
NKV 95/6	188	-

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