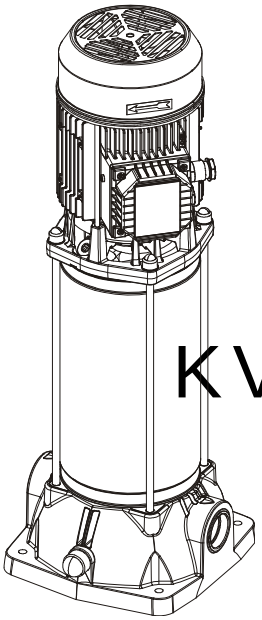
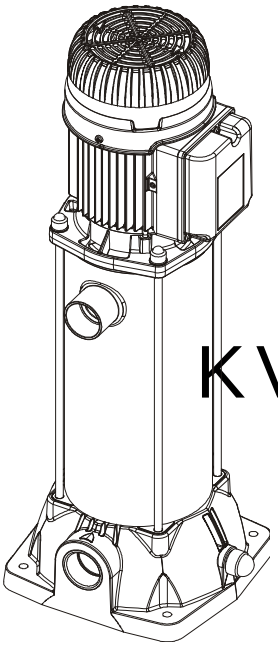
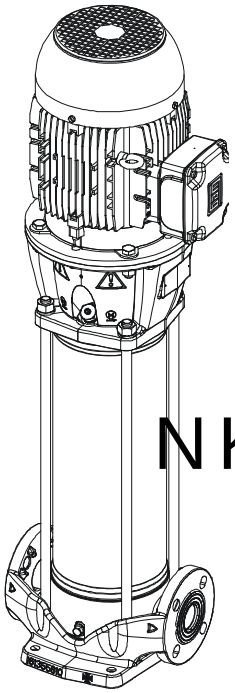
INSTRUCTIONS FOR INSTALLATION AND MAINTENANCE



KVC



KVCX



NKV

DAB
WATER•TECHNOLOGY

KVC – 50/60Hz

KVC 15/30 – KVC 15/306
KVC 25/30 – KVC 25/306
KVC 35/30 – KVC 35/306
KVC 45/30 – KVC 45/306
KVC 50/30 – KVC 50/306
KVC 60/30 – KVC 60/306
KVC 70/30 – KVC 70/306

KVC 20/50 – KVC 20/506
KVC 30/50 – KVC 30/506
KVC 40/50 – KVC 40/506
KVC 55/50 – KVC 55/506
KVC 65/50 – KVC 65/506
KVC 75/50 – KVC 75/506

KVC 15/80 – KVC 15/806
KVC 20/80 – KVC 20/806
KVC 30/80 – KVC 30/806
KVC 40/80 – KVC 40/806
KVC 45/80 – KVC 45/806
KVC 55/80 – KVC 55/806
KVC 65/80 – KVC 65/806

KVC 25/120 – KVC 25/1206
KVC 35/120 – KVC 35/1206
KVC 45/120 – KVC 45/1206
KVC 60/120 – KVC 60/1206
KVC 70/120 – KVC 70/1206
KVC 85/120 – KVC 85/1206

KVCX – 50/60Hz

KVCX 15/30 – KVCX 15/306
KVCX 25/30 – KVCX 25/306
KVCX 35/30 – KVCX 35/306
KVCX 45/30 – KVCX 45/306
KVCX 50/30 – KVCX 50/306
KVCX 60/30 – KVCX 60/306
KVCX 70/30 – KVCX 70/306

KVCX 20/50 – KVCX 20/506
KVCX 30/50 – KVCX 30/506
KVCX 40/50 – KVCX 40/506
KVCX 55/50 – KVCX 55/506
KVCX 65/50 – KVCX 65/506
KVCX 75/50 – KVCX 75/506

KVCX 15/80 – KVCX 15/806
KVCX 20/80 – KVCX 20/806
KVCX 30/80 – KVCX 30/806
KVCX 40/80 – KVCX 40/806
KVCX 45/80 – KVCX 45/806
KVCX 55/80 – KVCX 55/806
KVCX 65/80 – KVCX 65/806

KVCX 25/120 – KVCX 25/1206
KVCX 35/120 – KVCX 35/1206
KVCX 45/120 – KVCX 45/1206
KVCX 60/120 – KVCX 60/1206
KVCX 70/120 – KVCX 70/1206
KVCX 85/120 – KVCX 85/1206

NKV 10-15-20 – 50/60Hz

NKV 10/2 – NKV 10/26
NKV 10/3 – NKV 10/36
NKV 10/4 – NKV 10/46
NKV 10/5 – NKV 10/56
NKV 10/6 – NKV 10/66
NKV 10/7 – NKV 10/76
NKV 10/8 – NKV 10/86
NKV 10/9 – NKV 10/96
NKV 10/10 – NKV 10/106
NKV 10/12 – NKV 10/126
NKV 10/14 – NKV 10/146
NKV 10/16 – NKV 10/176
NKV 10/18
NKV 10/20
NKV 10/22

NKV 15/2 – NKV 15/26
NKV 15/3 – NKV 15/36
NKV 15/4 – NKV 15/46
NKV 15/5 – NKV 15/56
NKV 15/6 – NKV 15/66
NKV 15/7 – NKV 15/76
NKV 15/8 – NKV 15/86
NKV 15/9 – NKV 15/96
NKV 15/10 – NKV 15/106
NKV 15/12 – NKV 15/126
NKV 15/14
NKV 15/16
NKV 15/17

NKV 20/2 – NKV 20/26
NKV 20/3 – NKV 20/36
NKV 20/4 – NKV 20/46
NKV 20/5 – NKV 20/56
NKV 20/6 – NKV 20/66
NKV 20/7 – NKV 20/76
NKV 20/8 – NKV 20/86
NKV 20/9
NKV 20/10 – NKV 20/106
NKV 20/12
NKV 20/14
NKV 20/16
NKV 20/17

NKV 32-45 – 50/60Hz

NKV 32/2-2 – NKV 32/26-2
NKV 32/2 – NKV 32/26
NKV 32/3-2 – NKV 32/36-2
NKV 32/3 – NKV 32/36
NKV 32/4-2 – NKV 32/46-2
NKV 32/4 – NKV 32/46
NKV 32/5-2 – NKV 32/56-2
NKV 32/5 – NKV 32/56
NKV 32/6-2 – NKV 32/66-2
NKV 32/6 – NKV 32/66
NKV 32/7-2 – NKV 32/76-2
NKV 32/7 – NKV 32/76
NKV 32/8-2 – NKV 32/86-2
NKV 32/8 – NKV 32/86
NKV 32/9-2
NKV 32/9
NKV 32/10-2
NKV 32/10
NKV 32/11-2
NKV 32/11
NKV 32/12-2
NKV 32/12
NKV 32/13-2
NKV 32/13

NKV 45/2-2 – NKV 45/26-2
NKV 45/2 – NKV 45/26
NKV 45/3-2 – NKV 45/36-2
NKV 45/3 – NKV 45/36
NKV 45/4-2 – NKV 45/46-2
NKV 45/4 – NKV 45/46
NKV 45/5-2 – NKV 45/56-2
NKV 45/5 – NKV 45/56
NKV 45/6-2 – NKV 45/66-2
NKV 45/6 – NKV 45/66
NKV 45/7-2 – NKV 45/76-2
NKV 45/7 – NKV 45/76
NKV 45/8-2
NKV 45/8
NKV 45/9-2
NKV 45/9
NKV 45/10-2
NKV 45/10
NKV 45/11-2
NKV 45/11
NKV 45/12-2
NKV 45/12
NKV 45/13-2

NKV 65-95 – 50/60Hz

NKV 65/2-2 – NKV 65/26-2
– NKV 65/26-1
NKV 65/2 – NKV 65/26
NKV 65/3-2 – NKV 65/36-2
NKV 65/3 – NKV 65/36
NKV 65/4-2 – NKV 65/46-2
NKV 65/4 – NKV 65/46
NKV 65/5-2 – NKV 65/56-2
NKV 65/5
– NKV 65/56-1
NKV 65/6-2
NKV 65/6
NKV 65/7-2
NKV 65/7
NKV 65/8-2
NKV 65/8

NKV 95/2-2 – NKV 95/26-2
– NKV 95/26-1
NKV 95/2 – NKV 95/26
NKV 95/3-2 – NKV 95/36-2
– NKV 95/36-1
NKV 95/3 – NKV 95/36
NKV 95/4-2 – NKV 95/46-2
NKV 95/4
NKV 95/5-2
NKV 95/5
NKV 95/6-2
NKV 95/6

KVCE

KVCE 35/30
KVCE 45/30
KVCE 50/30
KVCE 60/30
KVCE 70/30

KVCE 30/50
KVCE 40/50
KVCE 55/50
KVCE 65/50
KVCE 75/50

KVCE 30/80
KVCE 40/80
KVCE 45/80
KVCE 55/80
KVCE 65/80

KVCE 35/120
KVCE 45/120
KVCE 60/120
KVCE 70/120
KVCE 85/120

NKVE 10-15-20

NKVE 10/2
NKVE 10/3
NKVE 10/4
NKVE 10/5
NKVE 10/6
NKVE 10/7
NKVE 10/8
NKVE 10/9
NKVE 10/10
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NKVE 10/22

NKVE 15/2
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NKVE 20/2
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NKVE 20/10
NKVE 20/12
NKVE 20/14

NKVE 32-45-65-95

NKVE 32/2
NKVE 32/3-2
NKVE 32/3
NKVE 32/4
NKVE 32/5-2
NKVE 32/5
NKVE 32/6
NKVE 32/7-2

NKVE 45/2-2
NKVE 45/2
NKVE 45/3
NKVE 45/4

NKVE 65/2-2
NKVE 65/2
NKVE 65/3-2

NKVE 95/2-2
NKVE 95/2

1. GENERAL

Read this documentation carefully before installation.

Installation, electrical connection and commissioning must be carried out by skilled personnel in compliance with the general and local safety regulations in force in the country of installation of the product. Failure to comply with these instructions not only causes risk to personal safety and damage to the equipment, but invalidates every right to assistance under guarantee.

The appliance is not intendend for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsable for their safety. Children should be supervised to ensure that they do not play with the appliance.

2. 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.

3. PUMPED FLUIDS

The machine has been designed and built for pumping water, free from explosive substances and solid particles or fibres, with a density of 1000 kg/m³ and a kinematic viscosity of 1 mm²/s, and chemically non-aggressive liquids.
Small quantities of sand, up to 50 ppm, are accepted.

4. TECHNICAL DATA *KVC – KVCX*

4.1 Electrical data

- Supply voltage:	1x 220-240V – 50Hz 3x 230-400V – 50Hz 1x 115V – 60Hz 1x 220-230V – 60Hz 3x 220-230/380-400V – 60Hz
- Absorbed power:	see electric data plate
- Degree of protection:	IP55
- Insulation class:	F

4.2 Operating conditions

- Delivery:	50 ÷ 200 l/min.
- Head up:	pag. 126
- Liquid temperature:	0 ÷ 35°C domestic use (EN 60335-2-41)
- Liquid temperature:	0 ÷ 40°C for other uses
- Environment temperature:	0 ÷ 40°C
- Storage temperature:	-10 ÷ 40°C
- Maximum working pressure:	12 bar (1200 kPa)
- Relative humidity in air:	Max. 95%
- Motor construction:	Cei 2-3 / Cei 61-69 (EN 60335-2-41)
- Weight:	see plate on package
- Limit of operation with closed mouth:	60 min. max.

5. TECHNICAL DATA *NKV*

5.1 Electrical data

- Supply voltage:	3x 230-400V – 50Hz 3x 400V 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

5.2 Operating conditions

- Delivery:	160 ÷ 1166 l/min.
- Head up:	pag. 126
- Liquid temperature:	-15°C ÷ 120°C
- Max. environment temperature:	40°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

6. 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.

6.1 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.

6.2 Handling KVC-KVCX / NKV 10-15-20

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.

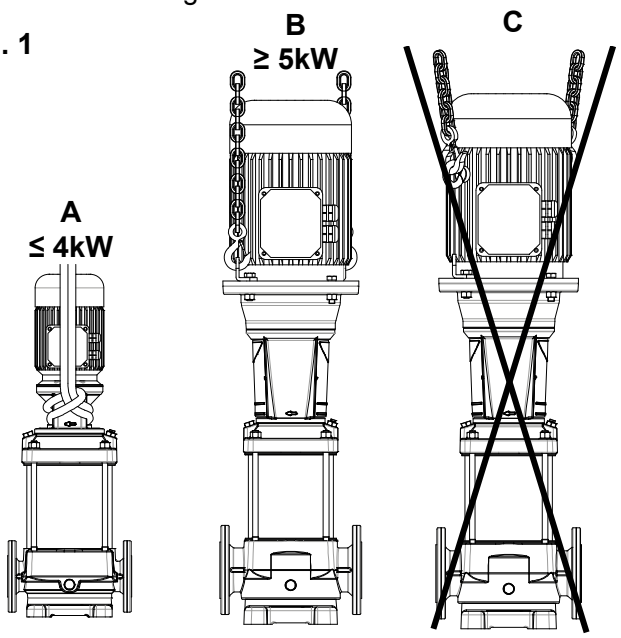
6.3 Handling NKV 32-45-65-95

The pump motors supplied with eyebolt should not be used to handle the whole assembled electric pump (fig.1C).

For handling pumps with motor of up to 4kW, use the belts wound around the motor as shown in fig. 1A.

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.

Fig. 1



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

7. WARNINGS

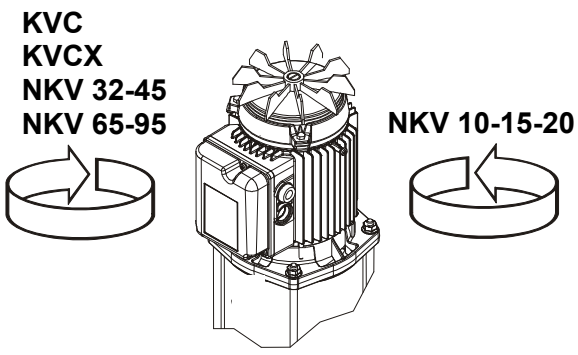
7.1 Safety

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

7.2 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

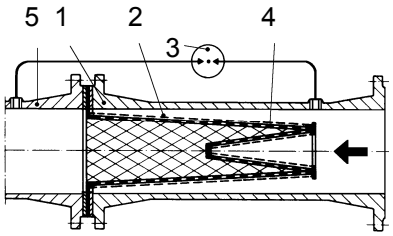


Do not force the fan with pliers or other tools to try to free the pump as this could cause deformation or breakage of the pump.

7.3 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

8. PROTECTIONS

8.1 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.

8.2 Noise level

See table A, pag. 122.
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.

8.3 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.

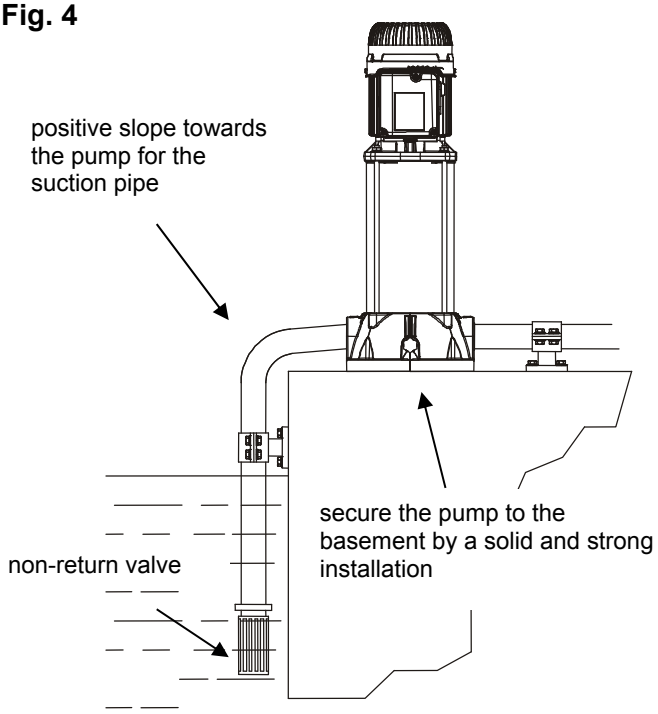
9. INSTALLATION

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

9.1 Pump installation

- The electropump must be fitted in a well ventilated place and with an environment temperature not exceeding 40°C.
- Electropumps with degree of protection IP55 may be installed in dusty and damp environments, without any specific protection.
- 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 resonnance 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 may be installed in either horizontal or vertical position, **as long as the motor is always above the pump.**
- 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 apertures of the pump
- 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

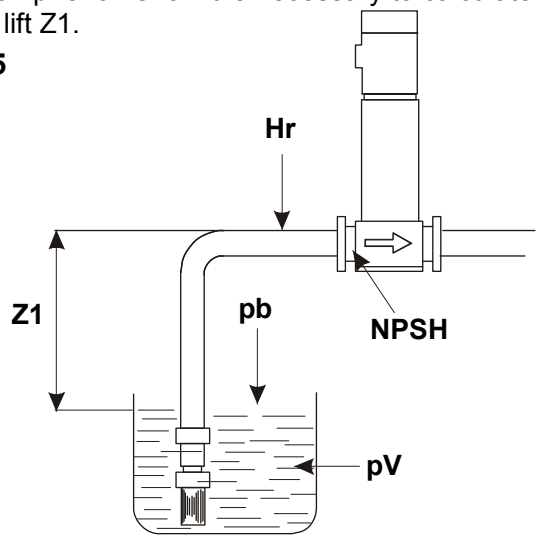


- Interception valves must be fitted upstream and downstream from the pump so as to avoid having to drain the system when carrying out pump maintenance. **Do not run the pump with closed valve on the plant.**
- If there is any possibility of the pump operating with the interception valves closed, provide 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).

9.2 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



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. 124)
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. 125)
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. 124)
Hr :	2,04 m.
t :	20°C
pV :	0,22 m. (chart 2, pag. 125)
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.

9.3 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.

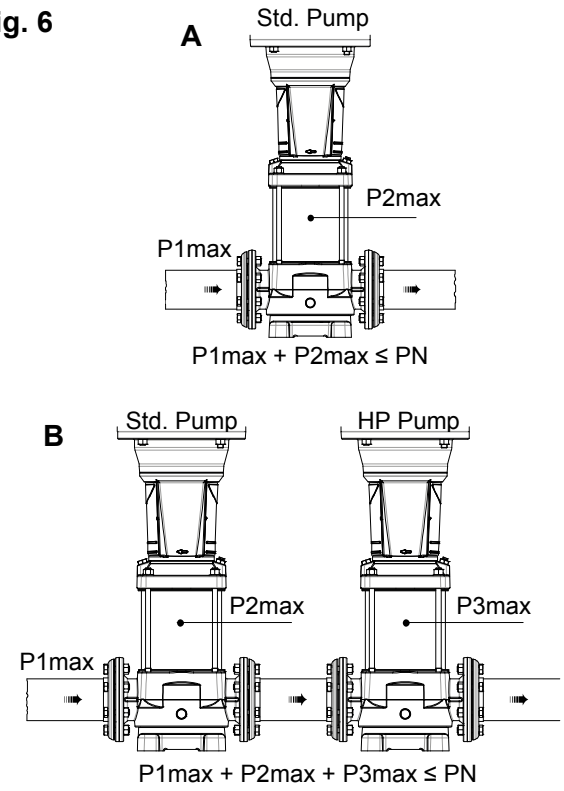
P1max + P2max ≤ PN (fig.6A)
P1max + P2max + P3max ≤ PNHP (fig.6B)

9.4 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)

The pump must never operate with the delivery valve closed.

Fig. 6



9.5 Electrical connections

ATTENTION!!
ALWAYS OBSERVE THE SAFETY REGULATIONS!!

Electrical installation must be carried out by an authorised, skilled electrician who assumes all responsability.

THE SYSTEM MUST BE CORRECTLY AND SAFELY EARTHED!!

Scrupulously follow the wiring diagrams inside the terminal board box and those on table C, pag. 123.

- 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,pag.122).

In *NKV* elecropumps 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.

9.6 Starting

Before starting the pump and the suction pipe have to be properly primed pump and pipe have to be fully filled with clean water.

Starting *NKV*

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:

KVC – KVCX (Fig.7) :

- After having removed the cap, fill the pump slowly through the filling hole so as to discharge any air pockets present inside.

NKV (Fig.8) :

- 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. 8.
- 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. 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 KVC - KVCX

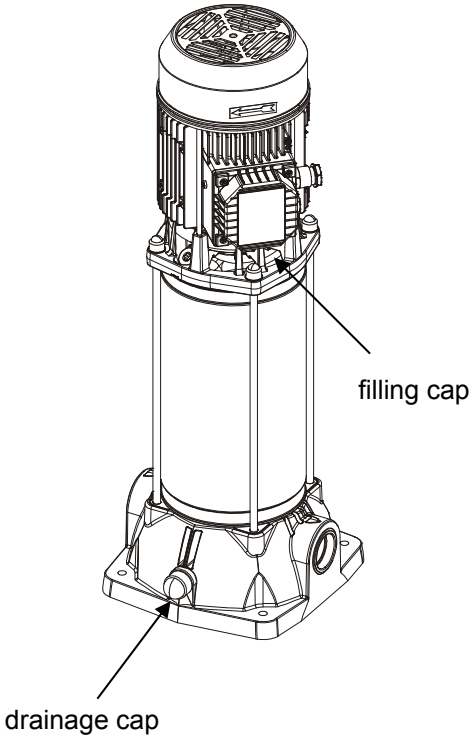
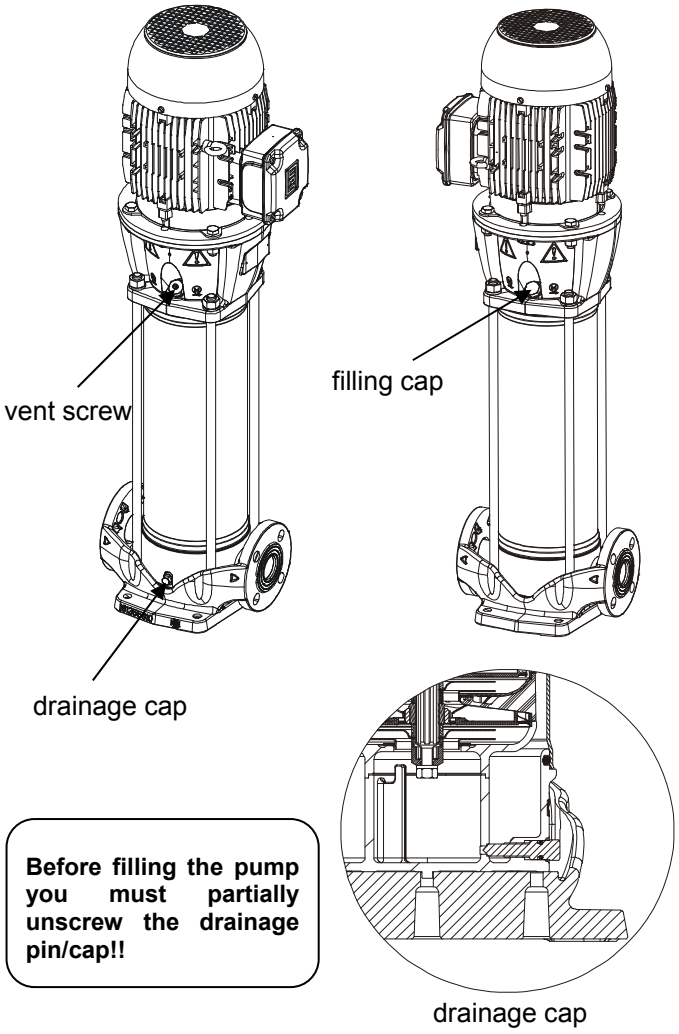


Fig. 8 NKV



9.7 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.

9.8 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
KVC - KVCX	30
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**.

10. 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.

10.1 Modifications and spare parts

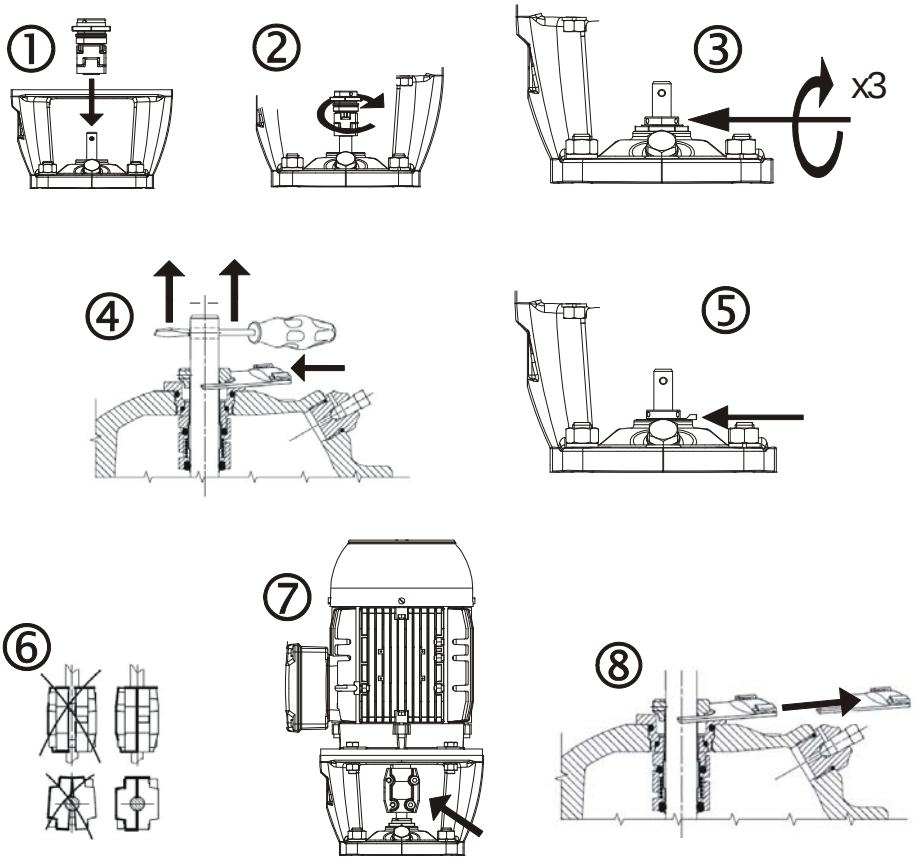
Any modification not authorised beforehand relieves the manufacturer of all responsibility. All the spare parts must be authentic and all the accessories must be authorised by the manufacturer

11. TROUBLESHOOTING

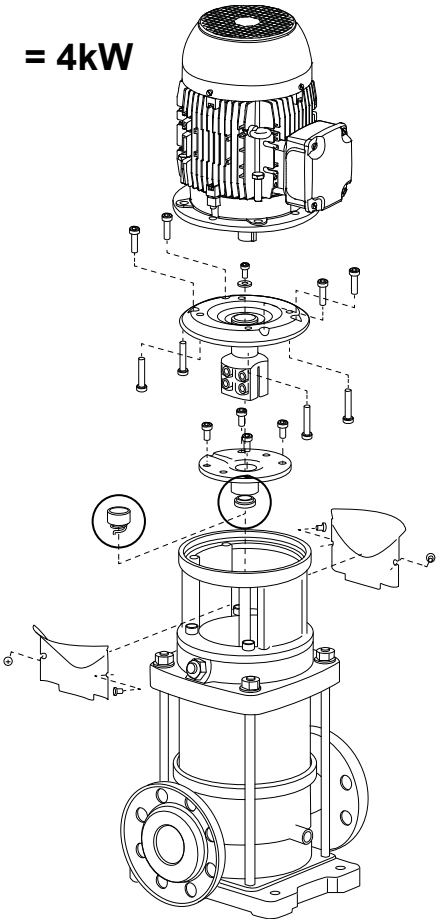
Fault	Check (possible cause)	Remedy
The motor does not start and makes no noise.	– Check the protection fuses.	If they are burnt-out, change them.
	– Check the electric connections.	Correct any errors.
	– Check that the motor is live.	
	– Motor protector cut-off the motor, for the single-phased motors, 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.	

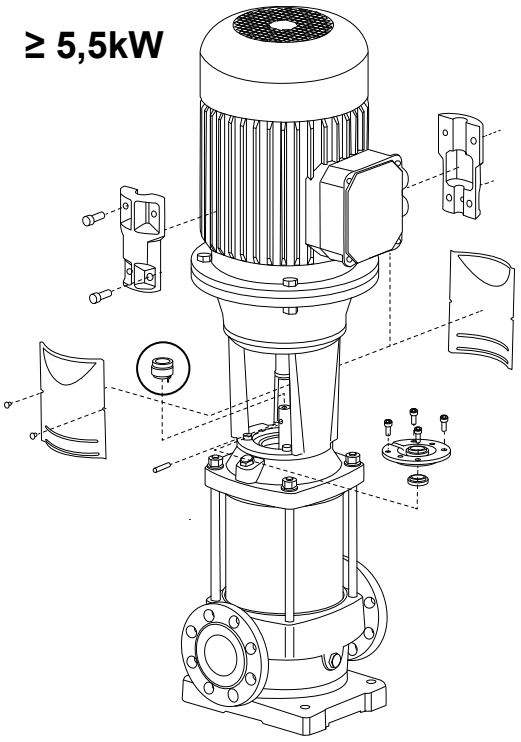
Fault	Check (possible cause)	Remedy
The pump does not deliver.	– Check priming.	
	– On three-phase motors, check that the direction of rotation is correct.	Invert the connection of two supply wires.
	– Difference in suction level too high.	
	– The diameter of the intake pipe is insufficient or the horizontal 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 10-15-20 Mechanical Seal Maintenance



NKV 32-45-65-95 Mechanical Seal Maintenance





Airborne noise produced by the pumps with standard motor

TAB. A

KVC - KVCX

Motor	Lpa [dB(A)]	Lwa [dB(A)]
MEC 71	72,2	75,2
MEC 80	74,3	77,3

NKV

Motor	Power kW	Lpa [dB(A)]
MEC 80S	0,75	62
MEC 80M	1,1	62
MEC 90S	1,5	67
MEC 90L	2,2	67
MEC 100L	3	66
MEC 112M	4	69
MEC 132S	5,5	71
MEC 132S	7,5	71
MEC 160M	11	73
MEC 160M	15	73
MEC 160L	18,5	73
MEC 180M	22	75
MEC 200 L	30	76
MEC 200 L	37	76
MEC 225 M	45	76

Star-delta switch-over times

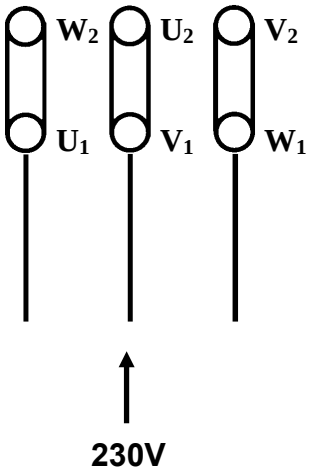
TAB. B

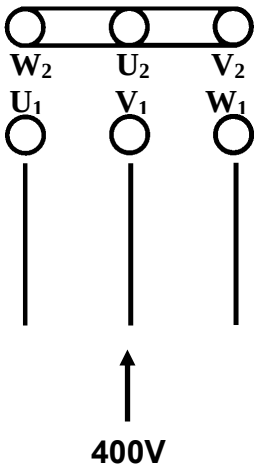
Motor (kW)	Motor (Hp)	⅄//Δ
≤ 30	≤ 40	< 3”
> 30	> 40	< 5”

THREE-PHASE motor connection

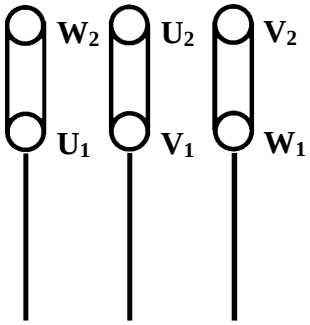
TAB. C

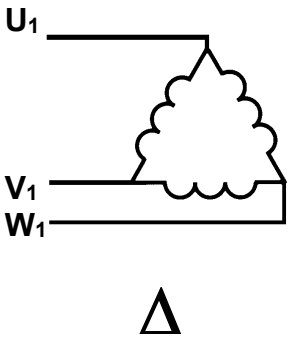
3 ~ **230/400 V**

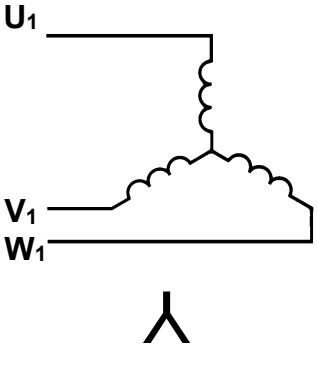




3 ~ **400 Δ V**







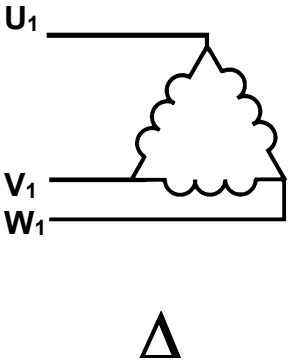


Chart 1 : Barometric Pressure (pb)

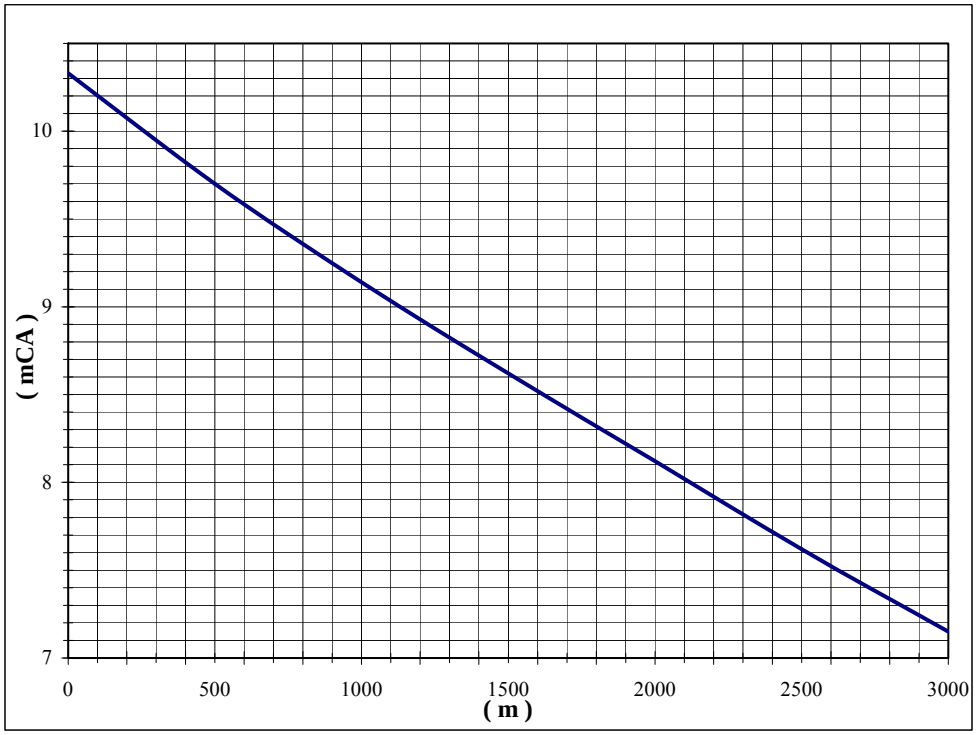
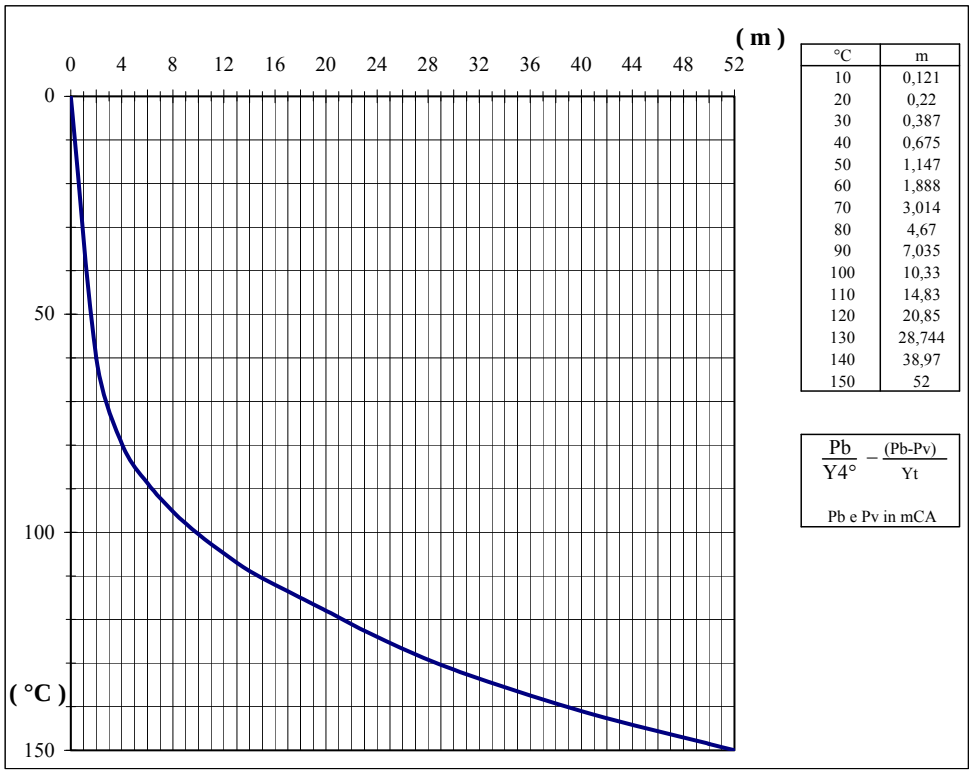


Chart 2 : Vapour Tension (pV)



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

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

Pb e Pv in mCA

Model	Head up	
	Hmax (m.) 2 poles 50 Hz	***Hmax (m.) 2 poles 60 Hz***
KVC 15/30 – 15/306	22.4	23
KVC 25/30 – 25/306	33.9	35
KVC 35/30 – 35/306	45.6	46
KVC 45/30 – 45/306	56.6	58
KVC 50/30 – 50/306	69.8	71
KVC 60/30 – 60/306	82	85
KVC 70/30 – 70/306	95	- -
KVC 20/50 – 20/506	27.4	25
KVC 30/50 – 30/506	41.1	37
KVC 40/50 – 40/506	54.9	50
KVC 55/50 – 55/506	68.6	65
KVC 65/50 – 65/506	82.3	78
KVC 75/50 – 75/506	96	91
KVC 15/80 – 15/806	22.8	23
KVC 20/80 – 20/806	34.6	34
KVC 30/80 – 30/806	46.6	47
KVC 40/80 – 40/806	58.8	59
KVC 45/80 – 45/806	71.3	70
KVC 55/80 – 55/806	84	82
KVC 65/80 – 65/806	97	94
KVC 25/120 – 25/1206	30.4	29
KVC 35/120 – 35/1206	46.2	45
KVC 45/120 – 45/1206	62.4	61
KVC 60/120 – 60/1206	78	76
KVC 70/120 – 70/1206	95	92
KVC 85/120 – 85/1206	112.7	- -
KVCX 15/30 – 15/306	22.4	23
KVCX 25/30 – 25/306	33.9	35
KVCX 35/30 – 35/306	45.6	46
KVCX 45/30 – 45/306	56.6	58
KVCX 50/30 – 50/306	69.8	71
KVCX 60/30 – 60/306	82	85
KVCX 70/30 – 70/306	95	- -
KVCX 20/50 – 20/506	27.4	25
KVCX 30/50 – 30/506	41.1	37
KVCX 40/50 – 40/506	54.9	50
KVCX 55/50 – 55/506	68.6	65
KVCX 65/50 – 65/506	82.3	78
KVCX 75/50 – 75/506	96	91
KVCX 15/80 – 15/806	22.8	23
KVCX 20/80 – 20/806	34.6	34
KVCX 30/80 – 30/806	46.6	47
KVCX 40/80 – 40/806	58.8	59

Model	Head up	
	Hmax (m.) 2 poles 50 Hz	***Hmax (m.) 2 poles 60 Hz***
KVCX 45/80 – 45/806	71.3	70
KVCX 55/80 – 55/806	84	82
KVCX 65/80 – 65/806	97	94
KVCX 25/120 – 25/1206	30.4	29
KVCX 35/120 – 35/1206	46.2	45
KVCX 45/120 – 45/1206	62.4	61
KVCX 60/120 – 60/1206	78	76
KVCX 70/120 – 70/1206	95	92
KVCX 85/120 – 85/1206	112.7	- -
NKV 10/2	20	29
NKV 10/3	31	44
NKV 10/4	41	59
NKV 10/5	51	73
NKV 10/6	61	87
NKV 10/7	72	106
NKV 10/8	82	119
NKV 10/9	92	132
NKV 10/10	102	148
NKV 10/12	123	176
NKV 10/14	143	209
NKV 10/16	164	242
NKV 10/17	- -	253
NKV 10/18	184	- -
NKV 10/20	205	- -
NKV 10/22	225	- -
NKV 15/2	26	38
NKV 15/3	40	56
NKV 15/4	53	75
NKV 15/5	66	97
NKV 15/6	79	113
NKV 15/7	92	133
NKV 15/8	106	154
NKV 15/9	119	172
NKV 15/10	132	195
NKV 15/12	158	231
NKV 15/14	185	- -
NKV 15/16	211	- -
NKV 15/17	225	- -
NKV 20/2	28.6	39
NKV 20/3	42.9	59
NKV 20/4	57.2	80
NKV 20/5	71.5	101

Model	Head up	
	Hmax (m.) 2 poles 50 Hz	***Hmax (m.) 2 poles 60 Hz***
NKV 20/6	85.8	120
NKV 20/7	100.1	141
NKV 20/8	114.4	162
NKV 20/9	128.8	- -
NKV 20/10	143.1	202
NKV 20/12	171.7	- -
NKV 20/14	200.3	- -
NKV 20/16	228.9	- -
NKV 20/17	243.2	- -
NKV 32/2-2	36	
NKV 32/2	48,5	
NKV 32/3-2	60	
NKV 32/3	73	
NKV 32/4-2	84,5	
NKV 32/4	98	
NKV 32/5-2	109,5	
NKV 32/5	122,5	
NKV 32/6-2	134	
NKV 32/6	146,5	
NKV 32/7-2	158	
NKV 32/7	171	
NKV 32/8-2	182,5	
NKV 32/8	194,5	
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	38,5	
NKV 45/2	48,5	
NKV 45/3-2	63	
NKV 45/3	73,5	
NKV 45/4-2	87,5	
NKV 45/4	97,5	
NKV 45/5-2	112	
NKV 45/5	122	
NKV 45/6-2	137,5	
NKV 45/6	147,5	

Model	Head up	
	Hmax (m.) 2 poles 50 Hz	***Hmax (m.) 2 poles 60 Hz***
NKV 45/7-2	162,5	
NKV 45/7	172,5	
NKV 45/8-2	187	
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 32/26-2		52
NKV 32/26		71
NKV 32/36-2		88
NKV 32/36		106
NKV 32/46-2		123
NKV 32/46		141
NKV 32/56-2		158
NKV 32/56		176
NKV 32/66-2		193
NKV 32/66		213
NKV 32/76-2		230,5
NKV 32/76		248,5
NKV 32/86-2		265,5
NKV 32/86		284
NKV 45/26-2		56
NKV 45/26		70,5
NKV 45/36-2		91,5
NKV 45/36		106
NKV 45/46-2		126
NKV 45/46		142,5
NKV 45/56-2		163
NKV 45/56		178
NKV 45/66-2		198,5
NKV 45/66		213
NKV 45/76-2		234
NKV 45/76		249
NKV 65/2-2	39	57

Model	Head	
	Hmax (m.) 2 poles 50 Hz	***Hmax (m.) 2 poles 60 Hz***
NKV 65/2-1		69
NKV 65/2	56,5	81,5
NKV 65/3-2	67,5	97
NKV 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 65/5-1		192,5
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	44,5	64,5
NKV 95/2-1		77
NKV 95/2	62	90,5
NKV 95/3-2	75,5	110,5
NKV 95/3-1		123
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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