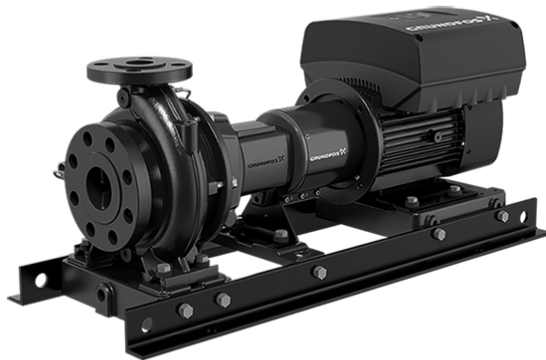
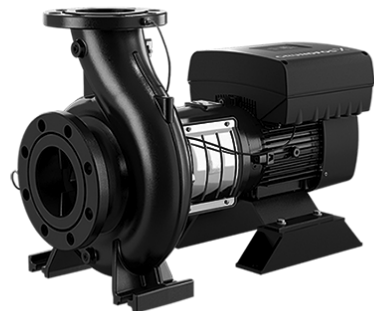


NBE, NKE, NBSE; NBE, NKE, NBSE Series 2000; VLSE

Safety instructions and other important information



**NBE, NKE, NBSE; NBE, NKE,
NBSE Series 2000; VLSE**
Installation and operating instructions
(all available languages)
<http://net.grundfos.com/qr/i/93103355>

NBE, NKE, NBSE; NBE, NKE, NBSE Series 2000; VLSE

English (US)

Safety instructions 4

Appendix A 8

English (US) Safety instructions

Intended use of the product

Only use the product according to the specifications stated in the installation and operating instructions.

Radio module

CAUTION

Radiation

Minor or moderate personal injury



- Locate the product at a minimum distance of 8 inches (20 cm) from any body parts. Human tissue may be heated by RF energy.

Battery

WARNING

Intoxication or risk of chemical burn

Death or serious personal injury



- The battery can cause severe or fatal injuries in 2 hours or less if it is swallowed or placed inside any part of the body. In such an event, seek medical attention immediately.

- The replacement or servicing of batteries must be carried out by a qualified person.
- The battery contained within this product, whether new or used, is hazardous and is to be kept away from children.



Transporting the product

WARNING

Falling objects

Death or serious personal injury



- Secure the product during transport to prevent it from tilting or falling down.
- When moving the pallets by forklift, only transport one pallet at a time to prevent the load from falling down.
- When storing the product, do not stack more than two pallets on top of each other.

WARNING

Back injury

Death or serious personal injury



- Use lifting equipment and follow local regulations when lifting the product.

CAUTION

Crushing of feet

Minor or moderate personal injury



- Wear safety shoes when moving the product.

CAUTION

Cutting and crushing of hands

Minor or moderate personal injury



- Wear protective gloves when handling pallets.

Mechanical installation

WARNING

Rotating parts

Death or serious personal injury



- Stay clear of the product after switching on power, as the shaft can rotate immediately.
- Make sure to install a protective cover before powering on the product.

WARNING

Flying object

Death or serious personal injury



- If no pump or coupling is attached to the motor, always remove the parallel key from the motor shaft before starting the motor.

WARNING

Crushing of feet

Death or serious personal injury



- Secure the product to a solid foundation by bolts through the holes in the flange or the foot.

WARNING

Tilting object

Death or serious personal injury



- Keep your distance when lifting the motor, as the motor may tilt slightly to the sides.

CAUTION

Sharp element

Minor or moderate personal injury



- When opening the packaging or mounting the product on a pump, wear protective gloves to avoid cutting your hands on sharp edges.

Handling the product

WARNING

Fire hazard

Death or serious personal injury



- Make sure that the air inlets are kept clean and free of residuals.

WARNING

Cutting of hands

Death or serious personal injury



- Do not start up and run the motor if there is no pump connected to it or if the fan cover is not installed.

CAUTION

Back injury

Minor or moderate personal injury



- Use lifting equipment and follow local regulations when lifting the product.

CAUTION

Crushing of feet

Minor or moderate personal injury



- Wear safety shoes.
- When lifting the motor, attach lifting equipment to the eye bolts fitted to the motor.
- **Model K:** When lifting the terminal box, attach lifting equipment to the eye bolts or lifting brackets fitted to the terminal box.

CAUTION

Cold surface

Minor or moderate personal injury



- Make sure that no one can accidentally come into contact with cold surfaces. Wear protective gloves.

**CAUTION****Hot surface**

Minor or moderate personal injury

- Do not touch the product while it is running.

Installing the product in areas with high humidity**WARNING****Fire hazard**

Death or serious personal injury



- In high humidity environments where condensation can occur, connect the product permanently to the power supply and activate the standstill heating function.

Changing the position of the operating panel**WARNING****Electric shock**

Death or serious personal injury



- Switch off the power supply to the product including the power supply for the signal relays. Wait at least 5 minutes before you make any connections in the terminal box.

Electrical connection**WARNING****Electric shock**

Death or serious personal injury



- Switch off the power supply to the product including the power supply for the signal relays. Wait at least 5 minutes before you make any connections in the terminal box. Make sure that the power supply cannot be switched on accidentally.
- Check that the supply voltage and frequency correspond to the values stated on the nameplate.

CAUTION**Sharp element**

Minor or moderate personal injury



- When installing the wiring in the terminal box, wear protective gloves to avoid cutting your hands on sharp edges.

Protection against electric shock, indirect contact**WARNING****Electric shock**

Death or serious personal injury



- Connect the product to protective earth and provide protection against indirect contact in accordance with local regulations.

Cable cross-section**WARNING****Electric shock**

Death or serious personal injury



- Switch off the power supply to the product including the power supply for the signal relays. Wait at least 5 minutes before you make any connections in the terminal box.
- Follow the wiring diagrams and local regulations.
- Use branch-circuit protection fuses.
- Comply with local regulations as to cable cross-sections.
- Use the recommended fuse size.
- Connect the cables to terminals by applying the recommended tightening torque.

WARNING**Fire hazard**

Death or serious personal injury



- Comply with local regulations as to cable cross-sections.
- Use the recommended fuse size.
- Connect the cables to terminals by applying the recommended tightening torque.

Residual-current circuit breakers**WARNING****Electric shock**

Death or serious personal injury



- This product can cause a DC current in the protective-earth conductor. If a residual current-operated protective (RCD) or monitoring (RCM) device is used for protection in case of direct or indirect contact, only an RCD or RCM of Type B is allowed on the supply side of this product.

Functional module, FM300**DANGER****Electric shock**

Death or serious personal injury



- Make sure that the wires to be connected to the connection groups below are separated from each other by reinforced insulation in their entire lengths.

Functional module, FM310 and FM311 from 15 kW 2-pole and 11 kW 4-pole**WARNING****Electric shock**

Death or serious personal injury



- Make sure that the wires to be connected to the connection relays below are separated from each other by reinforced insulation in their entire lengths.

Installing a communication interface module**WARNING****Electric shock**

Death or serious personal injury



- Switch off the power supply to the product including the power supply for the signal relays. Wait at least 5 minutes before you make any connections in the terminal box. Make sure that the power supply cannot be switched on accidentally.

User interfaces

**WARNING****Hot surface**

Death or serious personal injury

- Touch only the buttons on the operating panel. The product may be very hot.

**WARNING****Electric shock**

Death or serious personal injury

- If the operating panel is cracked or perforated, replace it immediately. Contact the nearest Grundfos sales company.

Grundfos GO

**CAUTION****Radiation**

Minor or moderate personal injury

- Locate the product at a minimum distance of 8 inches (20 cm) from any body parts. Human tissue may be heated by RF energy.

Servicing the product

**WARNING****Rotating parts**

Death or serious personal injury

- All service and maintenance related work on the product must be carried out by qualified service persons.
- Stay clear of the product after switching on power, as the shaft can rotate immediately.
- Make sure to install a protective cover before powering on the product.

**WARNING****Electric shock**

Death or serious personal injury

- Switch off the power supply to the product including the power supply for the signal relays. Wait at least 5 minutes before you make any connections in the terminal box. Make sure that the power supply cannot be switched on accidentally.
- Tighten the cable glands to the recommended torques.
- For measuring mains voltage, use the measuring points accessible through the holes on the cover for mains cables.
- Follow the instructions in the service instructions for the motor. If parts are damaged, order new service kits.
- Connect the product to protective earth and provide protection against indirect contact in accordance with local regulations.

**WARNING****Magnetic field**

Death or serious personal injury

- Do not handle the motor or rotor if you have a pacemaker.

**WARNING****Crushing of hands**

Death or serious personal injury

- Follow the instructions in the service instructions for the motor.
- Wear protective gloves when servicing the product.
- Be careful when handling magnetised parts to avoid personal injury.

**WARNING****Falling objects**

Death or serious personal injury

- Follow the lifting instructions for the product.
- Use lifting equipment rated for the weight of the product.

**WARNING****Back injury**

Death or serious personal injury

- Use lifting equipment and follow local regulations when lifting the product.

**WARNING****Crushing of feet**

Death or serious personal injury

- Wear safety shoes.
- When lifting the motor, attach lifting equipment to the eye bolts fitted to the motor.
- **Model K:** When lifting the terminal box, attach lifting equipment to the eye bolts or lifting brackets fitted to the terminal box.

**WARNING****Hot surface**

Death or serious personal injury

- Do not touch the product while it is running. Allow surfaces to cool before servicing.

**WARNING****Cutting of hands**

Death or serious personal injury

- Do not start up and run the motor if there is no pump connected to it.

**CAUTION****Sharp element**

Minor or moderate personal injury

- When servicing the product, wear protective gloves to avoid cutting your hands on sharp edges.

**CAUTION****Cold surface**

Minor or moderate personal injury

- Make sure that no one can accidentally come into contact with cold surfaces. Wear protective gloves.

Cleaning the product

WARNING

Electric shock

Death or serious personal injury



- Switch off the power supply to the product including the power supply for the signal relays. Make sure that the power supply cannot be switched on accidentally.
- Check that the terminal box cover is intact before spraying water or chemicals on the product.
- Cleaning must be done with non-aggressive materials to avoid damage to surfaces and labels.
- Make sure that the air inlets are kept clean and free of residuals.

Taking the product out of operation

WARNING

Electric shock

Death or serious personal injury



- Switch off the power supply and make sure that it cannot be accidentally switched on.
- The power supply must be switched off for at least five minutes before you start working on the product.

WARNING

Back injury

Death or serious personal injury



- Use lifting equipment and follow local regulations when lifting the product.

Technical data, three-phase motors

WARNING

Electric shock

Death or serious personal injury



- Use the recommended fuse size.

Leakage current (AC)

WARNING

Electric shock

Death or serious personal injury



- If the leakage current is greater than 3.5 mA, use a PE cable with a minimum cross-section of at least 8 AWG (10 mm²), or use 2 separate PE cables with the same cross section as the power cable.

Disposing of the product

DANGER

Magnetic field

Death or serious personal injury



- Do not dismantle, assemble or maintain the motor if you have a pacemaker or any other implanted electronic device.
- Keep the working environment clean, make sure no magnetized dust exist.

Appendix A

A.1. Installation in the USA and Canada



To maintain the cURus approval, the additional information in this section must be followed.

Environmental enclosure ratings

According to UL 778/C22.2 No 108-14, pumps intended for outdoor use must be marked enclosure type 3 and the product must be tested at a surface temperature down to -31 °F (-35 °C). The MLE Model J enclosure is approved for NEMA type 3 or 4 and is rated at a surface temperature down to 32 °F (0 °C), thus it is only for indoor use in UL 778/C22.2 No 108-14 pump applications.

The MGE, MLE Model K enclosure is approved for NEMA type 12 and is suitable for indoor use only.

For more information about ambient temperature during operation, see the sections on operating conditions and ambient temperature.

EMC statements for USA

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



MLE motors of the C2 emission category fulfill the limits of Class A.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

A.2. Radio communication

For the USA and Canada

CAUTION Radiation



Minor or moderate personal injury

- This equipment complies with FCC and ISED radiation exposure limits set forth for an uncontrolled environment. This equipment must be installed and operated with a minimum distance of 8 inches (20 cm) between the radiator and your body.



This device complies with Part 15 of the FCC rules and RSS210 of the IC rules.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



MLE motors of the C1 emission category fulfill the limits of Class B.



MLE motors of the C3 emission category can only be used in industrial plants and public utilities in accordance with FCC § 15.103(b) and ICES 003 § 1.5.1(c). In other locations, MLE motors of the C1 or C2 emission category must be used.

Canadian Interference-Causing Equipment Standard

MLE Model J complies with the Canadian ICES-003 Class B specifications. This Class B device meets all the requirements of the Canadian interference-causing equipment regulations.

L'appareil MLE Model J, est conforme à la norme NMB-003 du Canada pour le matériel de classe B. Cet appareil de classe B respecte toutes les exigences du règlement canadien s'appliquant au matériel brouilleur.

MLE Model K complies with the Canadian ICES-003 Class A specifications. This Class A device meets all the requirements of the Canadian interference-causing equipment regulations.

L'appareil MLE Model K, est conforme à la norme NMB-003 du Canada pour le matériel de classe A. Cet appareil de classe A respecte toutes les exigences du règlement canadien s'appliquant au matériel brouilleur.

Hot surface

The product might reach a surface temperature of 149 °F (65 °C), therefore pay attention when operating the product.

The following marking is found on the product:



Changes or modifications made to this equipment not expressly approved by Grundfos may void the FCC authorization to operate this equipment.

Operation is subject to the following two conditions:

- This device may not cause interference.
- This device must accept any interference, including interference that may cause undesired operation of the device.

Pour les États-Unis et le Canada

CAUTION

Radiation

Blessures corporelles mineures à modérées



- Cet équipement est conforme aux limites d'exposition aux rayonnements définies par la FCC et l'ISDE pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimale de 20 cm (0,66 pi) entre le radiateur et votre corps.



Cet appareil est conforme à la section 15 de la réglementation FCC et à RSS210 de la réglementation IC.



Les changements ou modifications apportés à cet équipement qui ne sont pas expressément approuvés par Grundfos peuvent annuler l'autorisation de la FCC à utiliser cet équipement.

Son fonctionnement est soumis aux deux conditions suivantes:

- Ce dispositif ne doit pas provoquer de brouillage préjudiciable.
- Il doit accepter tout brouillage reçu, y compris le brouillage pouvant entraîner un mauvais fonctionnement.

A.3. Identification numbers

For the USA

Grundfos Holding A/S

Contains FCC ID: OG3-RADIOM01-2G4

Contains FCC ID: OG3-RA2G4MSR.

For Canada

Grundfos Holding A/S

Model: RADIOMODULE 2G4

Contains IC: 10447A-RA2G4M01

Contains IC: 10447A-RA2G4MSR.

Pour le Canada

Numéros d'identification:

Grundfos Holding A/S

Modèle: RADIOMODULE 2G4

Contient IC: 10447A-RA2G4M01

Contient IC: 10447A-RA2G4MSR.

A.4. Electrical connection

Installation altitude

For corner earthed grid systems: The maximum altitude is 6560 ft (2000 m) above sea level.

For all other grid systems: The maximum altitude is 11480 ft (3500 m) above sea level.

Conductors

See the sections on electrical installation and cable requirements.

Conductor temperature ratings

Model J: Use minimum 140 °F (60 °C) copper conductors.

Model K: Use 167 °F (75 °C) copper conductors only. The wire sizes for the supply mains must be sized for a wire size which is suitable for at least 125% of the rated input current of the motor drive units.

Recommended ring terminals



Ensure that the used ring terminals are UL certified.

The supply terminals are suitable for field wiring when used with stranded wires and specific listed crimp terminals manufactured by Tyco Electronics (E13288).

Cable cross-section		Part number/ Designation number	Manufacturer
[mm ²]	[AWG]		
16	6	130552	Tyco Electronics
10	8	160013	Tyco Electronics
6	10	130191	Tyco Electronics

Ethernet cable connection

The connection of Ethernet cables must be done by connecting the Ethernet cable screen to an earth clamp on the terminal box, to be in compliance with FCC and ISED requirements.

The recommended Ethernet cable types for earth clamp applications are SF/UTP, S/FTP or SF/FTP, where the cable screen consists of both a braided and a foil screen.

Torques

See the section on torques.

Line reactors

The maximum line reactor size in front of the drive must not exceed the following values:

Model J

P2		Maximum line reactor size [mH]
[kW]	[HP]	3500-4000 rpm 4000-5900 rpm
2.2	3	1.5
4	5	0.7
5.5	7.5	0.3
7.5	10	0.6
11	15	0.3

Model K

P2		Maximum line reactor size [mH]	
[kW]	[HP]	3400-4000 rpm	3500-4000 rpm
7.5	15	0.2	-
11	20	0.2	-
15	20	-	0.2
18.5	25	-	0.2
22	30	-	0.2



Line reactors are often required for six-pulse variable speed drives. Please observe that the MGE, MLE utilize a small DC capacitor concept for lower harmonics and exceeding the maximum inductance may cause resonance between reactor and the MGE, MLE that will reduce the lifetime of the product.

Short-circuit current

Model J: If a short circuit occurs, the motor can be used on a mains supply delivering not more than 5000 RMS symmetrical amperes, 600 V maximum.

Model K: Suitable for use on a circuit capable of delivering not more than 5000 rms symmetrical amperes, when protected by RK1, J or T Class fuses, rated 80 A, 600 V.

Fuses

Model J: Fuses used for motor protection must be rated for minimum 500 V. Motors up to and including 10 hp (7.5 kW) require class K5 UL-listed fuses. Any UL-listed fuse can be used for motors of 15 hp (11 kW).

Model K: Fuses used for motor protection must be rated for minimum 600 V.



For fuse sizes, see the section on recommended size of fuses.

3 × 440-480 V, MLE Model K

Motor size [hp]	Recommended [A]	Maximum [A]	Fuse type
20	50	80	RK1, Class J or T UL listed fuse
25	60	80	RK1, Class J or T UL listed fuse
30	70	80	RK1, Class J or T UL listed fuse

3 x 200-240 V, MLE Model K

Motor size [hp]	Recommended [A]	Maximum [A]	Fuse type
10	70	80	RK1, Class J or T UL listed fuse
15	80	80	RK1, Class J or T UL listed fuse

Branch-circuit protection for MLE Model J

When the pump is protected by a circuit breaker, the circuit breaker must be rated for a minimum voltage of 500 V. The circuit breaker must be of the inverse-time type.

Branch circuit short-circuit protection**For the USA**

Integral solid state short-circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes, or the equivalent.

For Canada

INTEGRAL SOLID STATE SHORT-CIRCUIT PROTECTION DOES NOT PROVIDE BRANCH CIRCUIT PROTECTION. BRANCH CIRCUIT PROTECTION MUST BE PROVIDED IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART I.

Overload protection

Degree of overload protection provided internally by the drive, in percent of full-load current: 102 %.

U.S.A.

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