

NERA

Installation, use and maintenance manual

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1. Introduction

1.1. Purpose of the manual

The purpose of this manual is to provide users with detailed information on the installation, operation, and maintenance of the product, with special regard to safety regulations.



WARNING

Read the manual carefully before installing and using the product.



WARNING

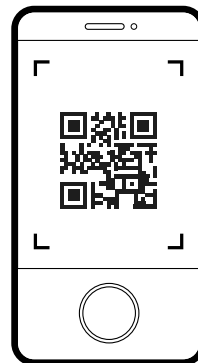
Failure to follow the instructions may result in damage to the product, the system in which it is installed and, in the worst cases, damage to property or persons with even fatal consequences.



NOTE

Store the manual in a protected and easily accessible place next to the installation location for possible consultation. A digital copy of this manual can be downloaded from the manufacturer's website or via the QR code shown on the product itself.

The complete installation, use and maintenance manual of the product, constantly updated in its contents, can be downloaded by scanning the QR code shown in the product with the smartphone camera and following the relative link.



1.2. Product overview

NERA Range of 4" submersible pumps equipped with:

- Permanent magnet motor with rotor in water bath and encapsulated and resin-coated stator.
- Electronics (inverter) integrated on-board the motor.
- Multistage centrifugal type or volumetric (helical) hydraulic part with built-in check-valve.

All parts are made entirely of stainless steel.

The pumps NERA are suitable for direct current (DC) power supply with ample operating voltage margins. This allows use with photovoltaic panels and batteries.

To connect the pump NERA the photovoltaic system, STOP MODULE is available as an accessory, equipped with:

- MC4 connectors for quick and easy panel connection.
- Button for starting and stopping the pump.
- Connections for floater and pressure switch.
- Protection against overvoltage

In the application with photovoltaic panels, the MPPT (Maximum Power Point Tracking: tracking of the maximum power point) function allows maximizing the electrical power obtained from the panel or the quantity of water pumped for different irradiation and temperature conditions. When irradiation increases, the pump increases its running speed and the water flow increases as a consequence. When irradiation decreases (at the passage of clouds or at different times of the day), the pump reduces the frequency and consequently the flow rate, but continues to supply water until irradiation falls below the minimum necessary to guarantee operation.

1.3. Nastec NSC solar calculator

To correctly size the solar pumping system, the Nastec NSC solar calculator is available free of charge on the site solar.nastec.eu.

Performance required

Daily Delivery: m³/day

Dynamic Head: m

PV panel specs

Panel Model:

Wp	330	W
Vmp	38.35	VDC
Voc	46.9	VDC
Imp	8.63	A
NOCT	45	°C
TC	-0.37	%/K

Tilt Angle: degrees

Set optimal value:

Orientation:

Pipe specs

Length: m

Internal Diameter: mm

Roughness Coefficient:

Info:

Check Valves:

Valves:

Cable specs

Motor Cable Length: m

Estimated friction losses

2.83 m (3.59 %)
Recalculate

WARNING: whenever possible increase pipe diameter in order to contain friction losses.

Constant head curves

Flow Rate [m³/h]

P1 Power [W]

Legend: System curve, Working point, H 5.00 m, H 10.00 m, H 20.00 m, H 40.00 m, H 60.00 m, H 70.00 m, H 80.00 m, H 100.00 m

Monthly delivery

m³/day

Month	Delivery (m ³ /day)
Jan	11.65
Feb	15.85
Mar	18.37
Apr	17.89
May	17.99
Jun	17.64
Jul	18.26
Aug	17.05
Sep	16.09
Oct	12.02
Nov	10.11
Dec	8.68

Solar pump

Manufacturer	Nastec
Part n.°	3013000110
Description	4HS 02/02H MP
Pump P2 Power	825 W
Min motor speed for flow (H = 60 m)	2788 RPM
Pump cable size	2.5 mm ²

Solar panels

Manufacturer	Nastec
Part n.°	2009110500
Description	PV panel 330 Wp, poly
Wp	330 W
Vmp	38.35 V
Voc	46.9 V
Imp	8.63 A
Strings	1
Panels per string	4
Total panels	4
Total PV Power	1320 W

Typical working point

P1 Power	848 W
Flow	2.89 m ³ /h

Daily performance

Month	m ³ /day	m ³ /Wday
Jan	11.65	0.0088
Feb	15.85	0.0120
Mar	18.37	0.0139
Apr	17.89	0.0136
May	17.99	0.0136
Jun	17.64	0.0134
Jul	18.26	0.0138
Aug	17.05	0.0133
Sep	16.09	0.0122
Oct	12.02	0.0091
Nov	10.11	0.0077
Dec	8.68	0.0066

2. Safety

2.1. Symbols



TIP
This symbol indicates a TIP or recommendation.



NOTE
This symbol indicates a NOTE or an indication or concept to be emphasised.



CAUTION
This symbol indicates CAUTION, thus an indication which failure to respect can lead to minor or moderate damage.



WARNING
This symbol indicates a WARNING, thus an indication which, in the event of non-compliance, may lead to serious, even fatal damage to persons or things.



DANGER
This symbol indicates an ELECTRICAL HAZARD, which if not avoided will result in death or electrocution.

2.2. Qualified personnel



WARNING

The installation, use and maintenance of the product are strictly for qualified personnel who have undergone appropriate training. Any use by unqualified personnel must be carried out under the approval, responsibility, and close monitoring of the latter.



WARNING

Failure to follow the instructions may result in damage to the product, the system in which it is installed and, in the worst cases, damage to property or persons with even fatal consequences.



WARNING

Failure to comply with the instructions may lead to loss of warranty.



WARNING

Keep out of the reach of children.

2.3. Safety warnings



WARNING

During installation and use of the product, comply with the general safety regulations, working in a clean, dry environment, free of hazardous substances and using the appropriate accident prevention tools (gloves, helmet, goggles, shoes, and whatever else is necessary).



WARNING

The product is suitable for installation in industrial environments. In case of installation in a residential environment, it is recommended to adopt all the safety precautions required by local regulations.



WARNING

The unsuitable use of the product, non-original spare parts or tampering with the hardware and/or firmware of the product may lead to serious damage to property or persons in addition to the loss of warranty. The manufacturer waives all liability due to the improper use of its products.



WARNING

Before commissioning the product, ensure that the installation is safe and in accordance with local regulations.



WARNING

Comply with the provisions to meet EMC requirements.



WARNING

Use cables of the appropriate type and cross-section according to the electrical characteristics of the load, the ambient temperature and local regulations.



WARNING

Any insulation tests may only be performed in accordance with the manufacturer's instructions. Failure to do so may result in damage to the unit.



CAUTION

Take care during installation and electrical connection that no foreign bodies enter into the device.



DANGER

During the entire period in which the device is powered, regardless of whether it is operated or remains in stand-by (digital shutdown), high voltage is present inside the device and at the input and output terminals.

**DANGER**

The device, previously in stand-by condition, may suddenly start up following the reset of an alarm or changed system conditions. This may result in serious mechanical and electrical danger to the operator who, upon seeing the device stopped, may have intervened on it, on the load or on the system in which it is installed.

**DANGER**

Disconnect the device from the power supply, check that the load is completely stopped and wait at least 5 minutes before intervening on it or on the load applied to it.

**DANGER**

If the motor is of the permanent magnet type, the device may be energized by the passive rotation of the motor. In this case, both the power supply and the load should be disconnected before working on the device itself.

**DANGER**

Ensure that the device is fully closed and all fixing screws are properly tightened before supplying power. Do not remove the protective parts for any reason while the device is powered on.

**DANGER**

It is recommended to install the appropriate protection devices upstream of the device, such as a circuit breakers, fuses and a residual current device (RCD).

**DANGER**

Make sure that the device and the loads connected to it are properly grounded with the appropriate connection terminals before commissioning.

Ensure that the grounding system is compliant and refer to local regulations for grounding devices.

Each load must be fitted with its own earthing cable, the length of which must be as short as possible. Do not make interconnected grounding connections.

Leakage currents may exceed 3.5 mA. It is recommended to use the reinforced ground connection if necessary.

**WARNING**

Do not start the pump for any reason unless it is fully immersed in water.

Failure to do so may cause serious damage to the pump and the warranty will be void.

**DANGER**

Pay attention as the photovoltaic panels exposed to sunlight supply a DC voltage to any connected devices.

**DANGER**

The open circuit voltage of the photovoltaic panels remains high even in low irradiation conditions.

Verify that the power supply is completely and surely cut off before intervening on the loads of the photovoltaic system.

Failure to observe these instructions can cause serious damage to people and things, including death.

2.4. Acoustic emission

The device has an acoustic emission:

< 70 dB.

2.5. Certifications

The product has the following certifications:

- CE

3. Maintenance

3.1. Maintenance


WARNING

Before carrying out any work on the device, carefully read the chapter [Safety \[5\]](#) in the manual.


WARNING

Failure to follow the instructions may result in damage to the product, the system in which it is installed and, in the worst cases, damage to property or persons with even fatal consequences.


WARNING

Failure to comply with the instructions may lead to loss of warranty.

The device requires the following maintenance:

Intervention	Interval
Check the flow rate and pressure of the pumped liquid	Every 6 months or following an alarm
Check that the device cools down correctly	Every 6 months, or following a temperature alarm
Check the suction filter	Every 12 months
Check for any leaks	Every 12 months
Check for alarms	Every 12 months
Check the correct tightening of the power terminals	Every 12 months
Verify the maintenance of the protection rating (ingress of dust or water) by checking the tightening of the screws in the mechanical closing parts, the gaskets, and the cable glands.	Every 12 months


TIP

For more information contact the dealer or technical support at service@nastec.eu or by opening a support ticket on the portal service.nastec.eu

3.2. Warranty

Nastec guarantees that the products accompanied by this warranty are free from material or workmanship defects. The Company has the right to inspect any product returned under warranty, and confirm that the product contains a material or workmanship defect. The Company has the exclusive right to decide whether to repair or replace defective equipment, parts or components. To qualify for the warranty coverage, the buyer must return the product to the place of purchase. Subject to the terms and conditions listed below, the Company agrees to repair or replace any part of this product that has material or workmanship defects. The Company will evaluate products under warranty for 24 months from the date of installation (only in case of product registration) but no longer than 36 months from the date of invoice. IN NO EVENT shall the Company be liable for any other costs incurred by the customer in removing and/or fastening any product, part or component thereof. The Company reserves the right to change or improve its products or any part thereof, without being obliged to provide such a change or improvement for products previously sold. THIS WARRANTY DOES NOT APPLY to products damaged by natural events, including lightning, normal wear and tear, normal maintenance services, or any other condition beyond the control of the Company. THIS WARRANTY WILL BE VOIDED if any of the following conditions occurs:

- The product is used for purposes other than those for which it was designed and manufactured.
- The product has not been installed in accordance with applicable codes and rulings.
- The product has not been installed by qualified personnel.
- The item has been damaged due to negligence, abuse, misapplication, tampering, alteration, improper installation, operation, maintenance and storage.

If the customer wishes to make a warranty claim, it is necessary:

- Fill in the warranty claim on the service.nastec.eu portal
- Wait for the result from the Nastec technical support service. The outcome may envisage the following:
 - Absence of warranty based on the information received. A quotation for repair or spare parts may be made upon request.

- Warranty advanced based on information received. Nastec will decide if the product is to be replaced under warranty. However, Nastec reserves the right to inspect the product.
- Need to receive the product by the manufacturer in order to establish the potential warranty. Following the analysis of the returned product, Nastec will establish the unquestionable existence or absence of the warranty conditions by providing a detailed report on the damage found and its origins. If the warranty is applicable, Nastec will repair the device. Nastec is willing to refurbish the product upon offer. In the absence of a warranty, Nastec will make an offer to repair and/or refurbish the device. After 60 days from the offer, if no response is received from the buyer, Nastec will scrap the product upon notice. Nastec does not cover any warranties provided by the buyer to third parties, without its prior authorization.

3.3. Product registration

By registering the product on the portal service.nastec.eu, it is possible to activate the manufacturer's warranty valid for 24 months from the registration date up to a maximum of 36 months from the date of manufacture, according to the warranty conditions. Registration must be completed within one month from the date of installation of the product.

The warranty is offered through the distribution chain. It is therefore necessary to specify the official distributor or importer from which the product was purchased. Alternatively, the distributor can register the product in the customer's name.

3.4. Spare parts

The manufacturer provides spare parts for the device. Contact your dealer for more information.

**WARNING**

It is recommended to use only original spare parts.

**WARNING**

Failure to follow the instructions may result in damage to the product, the system in which it is installed and, in the worst cases, damage to property or persons with even fatal consequences.

**WARNING**

Failure to comply with the instructions may lead to loss of warranty.

3.5. Disassembly and repair

If it is necessary to disassemble and repair the device, it is recommended that the safety instructions be strictly observed.

**WARNING**

The installation, use and maintenance of the product are strictly for qualified personnel who have undergone appropriate training. Any use by unqualified personnel must be carried out under the approval, responsibility, and close monitoring of the latter.

**WARNING**

Failure to follow the instructions may result in damage to the product, the system in which it is installed and, in the worst cases, damage to property or persons with even fatal consequences.

**WARNING**

Failure to comply with the instructions may lead to loss of warranty.

**TIP**

For more information contact the dealer or technical support at service@nastec.eu or by opening a support ticket on the portal service.nastec.eu

3.6. Disposal



Devices marked with this symbol cannot be disposed of in household waste but must be disposed of at appropriate waste drop-off centres. It is recommended to contact the Waste Electrical and Electronic Equipment drop-off centres (WEEE) in the area. If not disposed of properly, the product may have potential harmful effects on the environment and on human health due to certain substances present within. Illegal or incorrect disposal of the product is subject to severe administrative and/or criminal penalties.

4. Transport and storage

4.1. Transport

Avoid subjecting the product to severe shocks or extreme weather conditions during transport. The packaging must remain dry and at a temperature between -20°C (-4°F) and $+70^{\circ}\text{C}$ ($+158^{\circ}\text{F}$). Do not stack packages without first checking feasibility with the manufacturer.



TIP

It is advisable to always indicate FRAGILE on the packaging

4.2. Inspection on delivery

Upon receipt of the product, check:

- the integrity of the packaging
- the integrity of the content
- the presence of all components

In case of problems, notify the forwarder immediately.



WARNING

The manufacturer declines all responsibility for damage to the product due to transport

4.3. Handling

The product must be handled by hand or using suitable lifting equipment in relation to its weight and the regulations in force.

If necessary, use dedicated handling equipment (cranes, ropes, trolleys), using the lifting points provided in the product.

During handling it is recommended to:

- Handle with care
- keep away from suspended loads
- always wear accident prevention equipment
- be careful not to damage electrical cables

Do not handle the product using electrical cables as lifting gear.



WARNING

Failure to follow the instructions may result in damage to the product, the system in which it is installed and, in the worst cases, damage to property or persons with even fatal consequences.

4.4. Storage

The product must be stored in its packaging in a dry place, without sudden changes in humidity and temperature and protected from mechanical (weights, vibrations), thermal and chemical agents.

The temperature of the storage environment must be between -20°C (-4°F) and 70°C (+158°F) with a maximum relative humidity of 85% (non-condensing).

If the product remains in stock for more than 24 months from the manufacturing date shown on the packaging, it is necessary to check the mechanical integrity of its parts and supply power to it at least once every 12 months.

If the product is put back into storage after it has been used, it is advisable to contact the manufacturer for further information on storage.

In particular, store the pump in a place with a minimum temperature that is not below 4 °C (40 °F).



TIP

For more information contact the dealer or technical support at service@nastec.eu or by opening a support ticket on the portal service.nastec.eu

5. Technical features

5.1. Name

NERA XX/YY (H)

- **NERA** : Product name
- **XX**: Nominal flow rate in m³/ h
- **YY**: Number of stages
- **H** : If present, it identifies the type of volumetric helical rotor pump. If it is not present, it means that the pump is of the centrifugal type.

5.2. Technical Data

Electrical specifications by model:

Model	Vin [VDC]	Vnom **	I in [A]	P1 [kW]	Max RPM
NERA 01/02H	26 - 190	80 V	Max 10 A	0,8	3600
NERA 02/01H	26 - 190	80 V	Max 10 A	0,8	3600
NERA 06/04	26 - 190	80 V	Max 10 A	0,8	3600

**Minimum voltage for nominal performances.

General electrical specifications:

EMC compliance	EN61800-3 C2
Winding insulation class	Class F
Characteristics of the power cable	2 meters of flat cable with removable connector according to ACS - WRAS - KTM standards



WARNING

The built-in motor electronics is not equipped with a pre-charging circuit of the capacitors contained inside. It is therefore recommended to check that, by supplying voltage to the device, the input current does not exceed the allowed limit.

Environmental specifications:

Characteristics of the pumped liquid	Clean, non-corrosive, non-explosive, free of solid particles and fibers, with a maximum sand content of 50 g / m ³
Maximum temperature of the pumped liquid	35 °C (92 °F)
Minimum cooling flow rate on the motor surface	0,2 m/s (0,66 ft/s)
recommended ph	6,5 - 8,5
Maximum chlorine concentration	700 ppm (10 °C); 300 ppm (20 °C); 200 ppm (30 °C)

Mechanical specifications:

Protection rating	IP68
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Maximum immersion depth	150 m (492 ft)
Motor filling fluid	70% water + 30% glycol
Materials	AISI 304 stainless steel

5.3. Performance



NOTE

The performance graphs show the performance of the pumps in terms of flow rate (Q), head (H) and absorbed electrical power (P1). The graphs show average values with a tolerance of 15% and are related to a water temperature of 20 °C (68 °F) and a density of 1 kg / m³.

The photovoltaic power (Pp) that must be installed to obtain the desired performance must be at least equal to the electrical power (P1) absorbed by the pump at the working point. To take into account the losses due to the temperature of the photovoltaic modules and other factors, increase the photovoltaic power by 20% compared to the absorbed electrical power.

For a correct sizing of the system, use the solar calculator available free of charge by connecting to the site solar.nastec.eu

Figure 1. NERA 01/02H

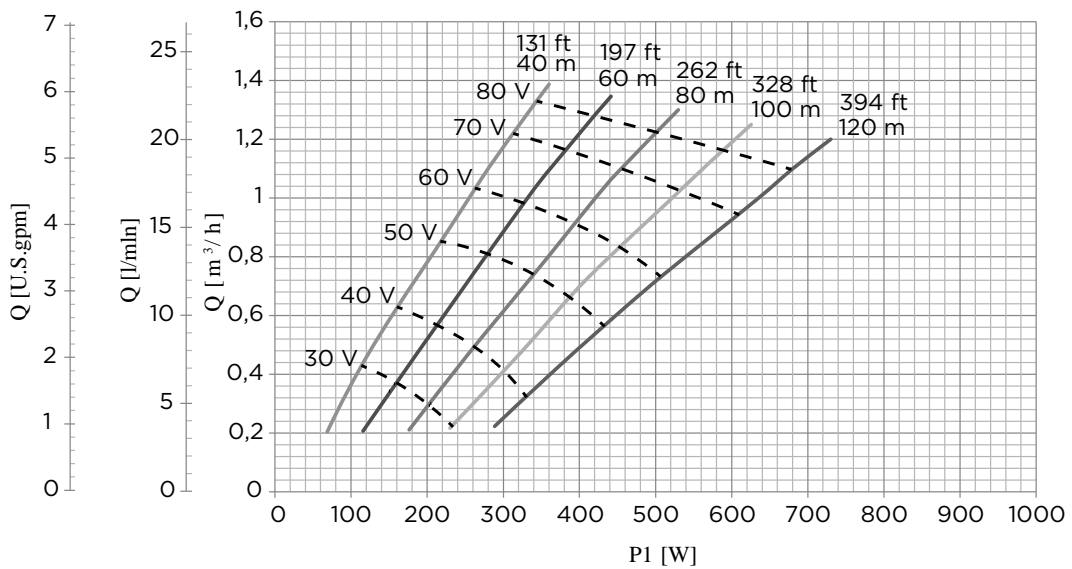


Figure 2. NERA 02/01H

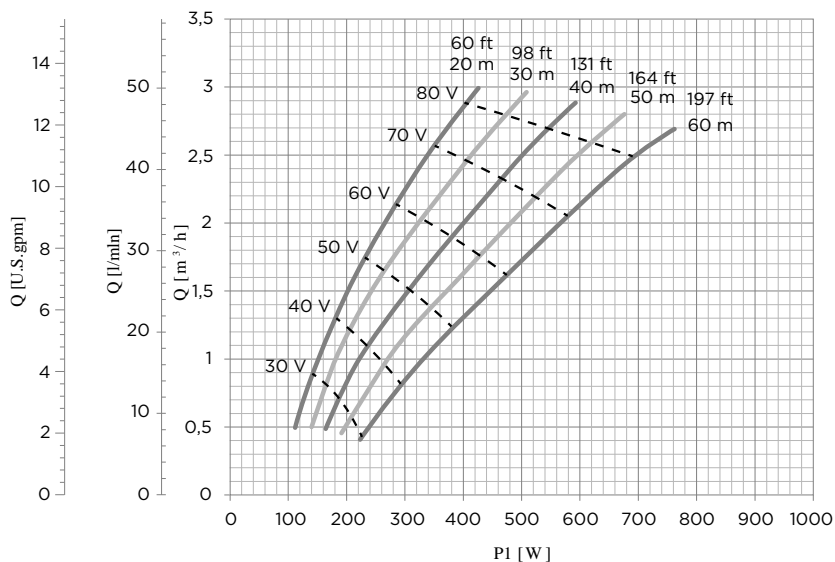
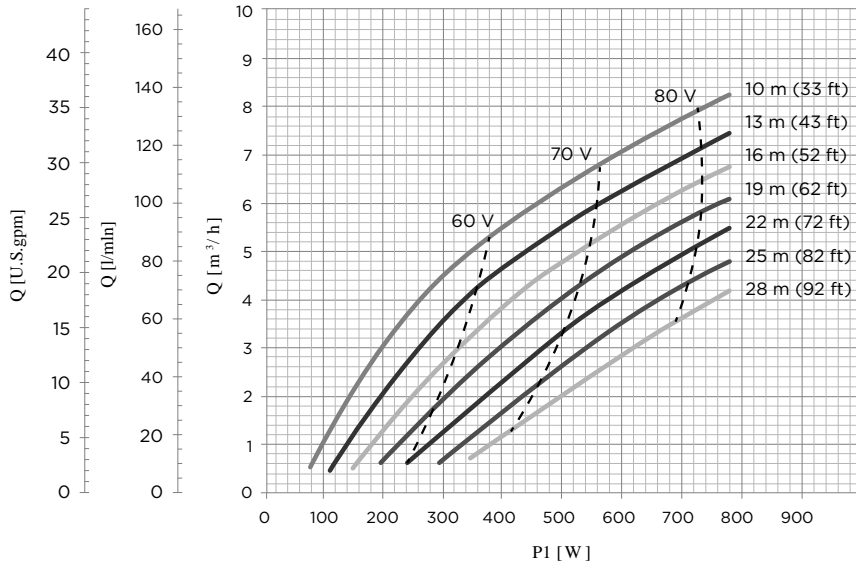
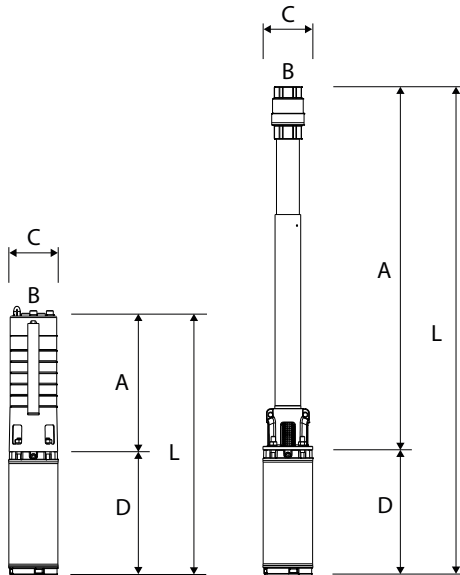


Figure 3. NERA 06/04



5.4. Dimensions and weight



Model	A [mm]	B [mm]	C [mm] *	D [mm]	L [mm]	Weight [kg]
NERA 01/02H	660	1 1/4" RP	93	280	940	12,8
NERA 02/01H	600	1 1/4" RP	93	280	880	11,9
NERA 06/04	251	1 1/2" RP	98	280	531	10,9

* Maximum diametrical dimensions including cable and cable cover

6. Mechanical installation



WARNING

Read the safety chapter carefully before continuing.

6.1. Installation environment



WARNING

The environmental specifications stated in the technical data of the product must be strictly complied with.

6.2. Mechanical assembly of pump and motor

Pump and motor are usually supplied already assembled. However, it may be necessary to assemble or disassemble the two parts for maintenance purposes.



WARNING

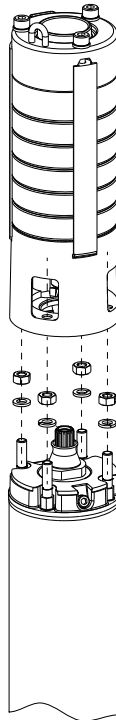
It is recommended to carefully read and strictly follow the instructions given in order to guarantee correct operation and reliability of the pump over time.



WARNING

Failure to comply with the instructions may lead to loss of warranty.

6.2.1. Assembling the centrifugal pump on the motor



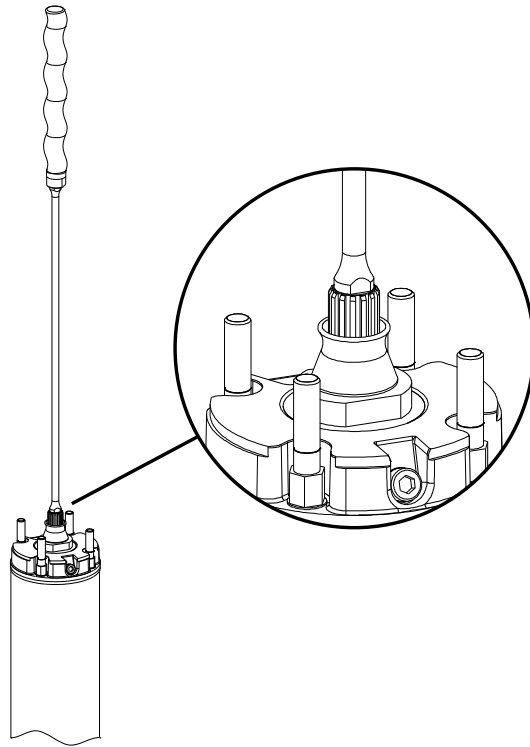
1. Remove the cable cover from the pump.
2. Position the pump on the motor by slightly rotating the pump shaft so that the tothing of the motor shaft meets the tothing of the coupling, running the motor cable inside the pump cable cover. Be careful not to damage the cable.
3. Screw the four nuts with the relative split washers ("grower" type) into the motor support studs. Tightening torque 14 Nm.
4. Run the motor cable inside the pump cable cover carefully, so as not to damage the cable.
5. Fasten the cable cover to the pump.

6.2.2. Disassembling the centrifugal pump from the motor

Follow the assembly operations in the reverse order

6.2.3. Assembling the helical rotor pump on the motor

1. Screw the flexible shaft onto the crankshaft head, covering the thread with sealant to prevent it from unscrewing. Tightening torque XX.X Nm



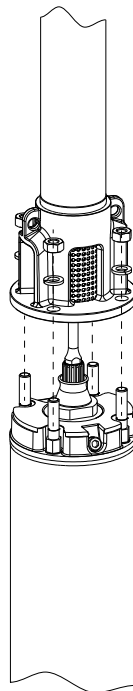
2. Gently insert the pump on the helical rotor, first wetting the surface with plenty of water to facilitate insertion.



WARNING

Excessive effort in inserting the pump can irreparably bend the flexible shaft compromising the use of the pump itself.

3. Screw the four nuts with the relative split washers ("grower" type) into the motor support studs. Tightening torque 14 Nm.



6.2.4. Disassembling the helical rotor pump from the motor

Follow the assembly operations in the reverse order

6.3. Power connector

The motor is supplied already equipped with a power connector. However, it may be necessary to remove and reconnect the power connector during maintenance.



WARNING

It is recommended to carefully read and strictly follow the instructions given in order to guarantee correct operation and reliability of the product over time.



DANGER

Disconnect the device from the power supply, check that the load is completely stopped and wait at least 5 minutes before intervening on it or on the load applied to it.



WARNING

Failure to comply with the instructions may lead to loss of warranty.

6.3.1. Installation of the power connector

1. Blow the connector seat and connector with compressed air to completely remove any foreign bodies and liquids deposited on the surfaces.
2. Insert the rubber connector into its seat and tighten the fixing screws progressively (alternating tightening) with a tightening torque of 3.5 Nm.



DANGER

At the end of the operation, check that the connector flange rests completely on the seat and that a small amount of rubber is extruded from the connector seat. This testifies the correct seal of the connector against the penetration of water.

6.3.2. Removing the power connector

1. Blow the connector and nearby surfaces with compressed air to completely remove any foreign bodies and liquids deposited on the surfaces.
2. Progressively loosen the fixing screws (alternating).
3. Remove the connector by lifting it from its seat and applying a slight waving motion.

6.4. Cooling

The motor cools mainly through the pumped liquid that laps the surface of the motor itself. In order to ensure correct cooling, it is necessary that:

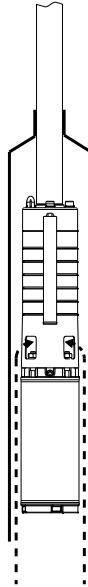
- the temperature of the pumped liquid is lower than the maximum temperature indicated on the motor data plate
- the minimum speed of the flow around the motor is always higher than the minimum speed indicated in the motor data plate at the working capacity.

The motor must always be installed well above the well filter in order to allow cooling.

If the diameter of the well is excessive compared to the diameter of the pump, it is necessary to install a cooling jacket in order to guarantee the minimum cooling speed.

In particular, the cooling jacket must be installed if the pump is located in an open space (reservoir, river, pond) or if the diameter of the well is greater than 4" and the flow rate is less than 8 m³ / h (35 USgpm).

The cooling jacket is also recommended to avoid the formation of sediment on the motor surface, which may reduce the heat exchange properties.



WARNING

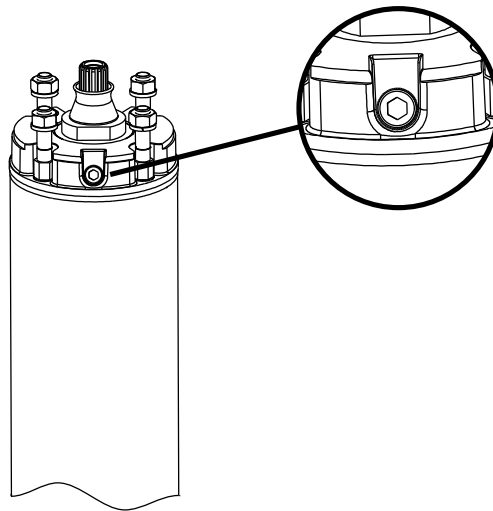
When radiance falls below the minimum necessary to ensure the presence of flow, the engine is no longer sufficiently cooled. The integrated electronics on-board the motor can protect the motor against excessive and sporadic overheating. However, prolonged operation without flow (no cooling) may cause premature deterioration of the mechanical and electronic parts of the pump and motor as well as damage to the pumping system.

6.5. Filling the motor liquid

The motor is filled in the factory with a mixture of water and glycol according to the percentages indicated in the technical specifications. This reduces the likelihood of freezing during transport and storage.

It is therefore generally not necessary to fill the motor with liquid before putting the pump into service.

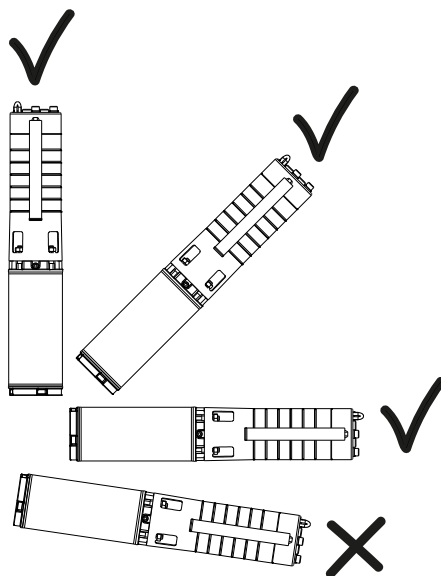
However, if liquid is added following a pre-installation check, it is recommended to carefully observe the following instructions:



1. Locate the infill hole screw.
2. Place the motor at 45° keeping the filling hole screw upwards.
3. Remove the screw from the infill hole, taking care to keep the relative O-Ring in a safe place.
4. Use a syringe to add drinking water until the hole is completely filled.
5. Tighten the screw with the relative O-Ring applying a torque of 4 Nm and checking that the O-Ring is correctly compressed without being extruded from its seat.

6.6. Position of the pump

The pump can be installed both vertically and horizontally, but the delivery must never be below the horizontal plane. Furthermore, in order to avoid counter thrust, a counter pressure of at least 10% of the maximum pump pressure must always be guaranteed.



6.7. Diameter of the well

Before lowering the pump into the well, use a caliper to check that the internal diameter of the well is greater than the maximum diameter of the pump including the cable cover.

In some cases the well may present slight narrowing or curvatures due to the movements of the ground. The pump must be lowered into the well slowly and very carefully. If lowering the pump into the well proves to be difficult, do not to force it and do not continue any further in order to avoid damaging the power cable and blocking the pump in the well.



WARNING

If the diameter of the well is greater than 4" and the nominal flow rate of the pump is less than 8 m³ / h (35 USgpm), the cooling jacket should be installed.

6.8. Positioning the pump in the well



WARNING

Read the safety chapter carefully before continuing.



DANGER

Before lowering the pump into the well check that it is completely disconnected from the electrical power supply.

To facilitate operations and reduce the transmission of vibrations (noise) to the device on the surface, use plastic pipes by making use of special compression fittings between the pump outlet and the pipe.



WARNING

Check that the pipes can support the weight of the pipes and the maximum pressure of the pump during its operation.



WARNING

Lower the pump into the well through the delivery pipe using suitable lifting systems.

Do not lower the pump into the well using the power cable, the integrity of which must be safeguarded in all operations. In this regard, it is advisable to previously fix the cable and the safety rope on the pipeline by means of adequate cable clamps suitably spaced.

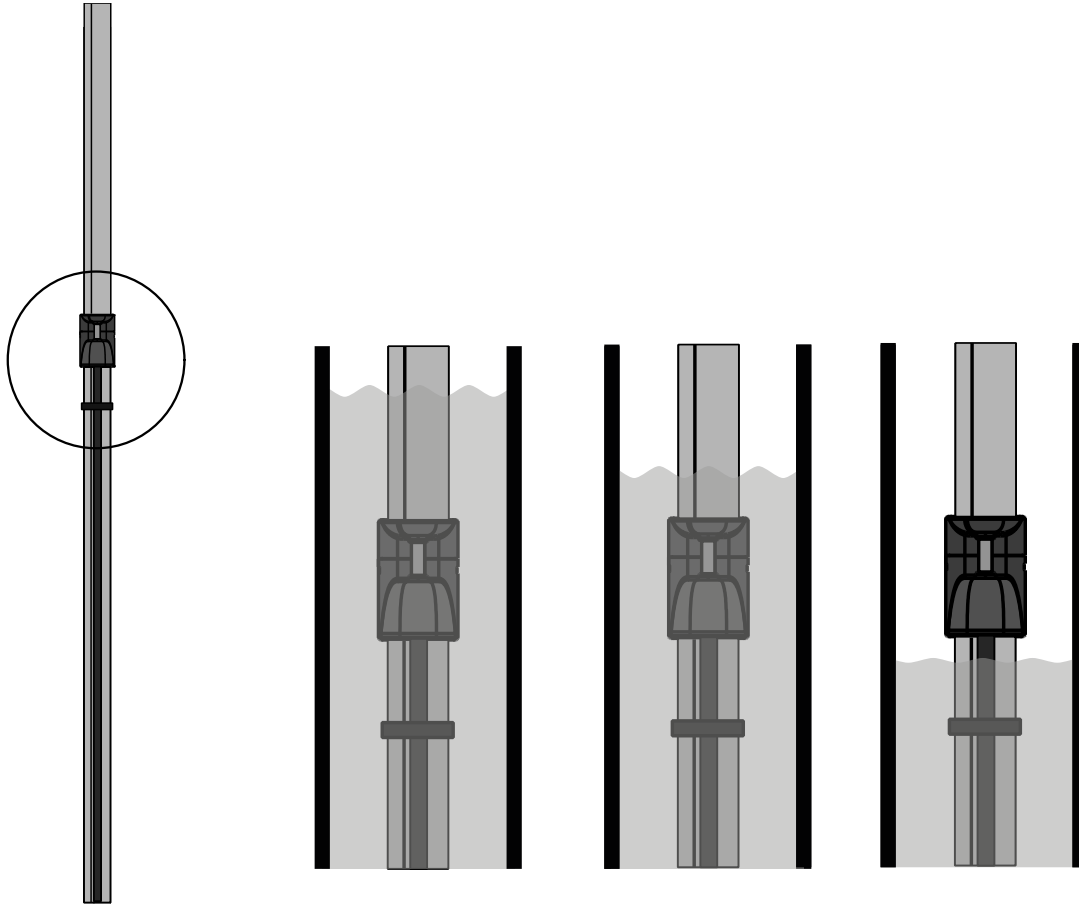
**CAUTION**

Secure the pump in the well by means of the special steel safety rope connected to the eyelet in the pump delivery.

6.9. The level sensor

The detection of the lack of water is carried out by the electronics integrated on the motor by measuring the impedance variation between the level electrode and the earthed pump body.

When the electronics detect a lack of water, it stops the motor and automatically starts it again after a few minutes.

**WARNING**

Keep the metal plate clean and not in direct contact with the delivery pipe in order to keep it in good working order.

**TIP**

To force operation in the absence of water, connect the level electrode to the pump body or to the ground cable.

6.10. Installation depth

The pump must be installed at a depth which:

- ensures that the motor is well above the well filter (at least 3 meters)
- ensures that the dynamic water level at maximum flow rate in the driest season is abundantly above the pump inlet (at least 1.5 meters).

**WARNING**

For more details refer to the technical data of the pump.

7. Electrical installation



WARNING

Read the safety chapter carefully before continuing.

7.1. Grounding



DANGER

Make sure that the device and the loads connected to it are properly grounded with the appropriate connection terminals before commissioning.

Ensure that the grounding system is compliant and refer to local regulations for grounding devices.

Each load must be fitted with its own earthing cable, the length of which must be as short as possible. Do not make interconnected grounding connections.

Leakage currents may exceed 3.5 mA. It is recommended to use the reinforced ground connection if necessary.

Use the following minimum cross-sections for ground cables:

- cross-section equal to the mains power cable cross-section up to 16 mm². (6 AWG)
- 16 mm² (6 AWG) for mains power cable cross-section between 16 mm² (6 AWG) and 35 mm² (1 AWG).
- cross-section equal to half the cross-section of the power supply cable when the latter is greater than 35 mm² (1 AWG).

7.2. Protection devices



DANGER

It is recommended to install the appropriate protection devices upstream of the device, such as a circuit breakers, fuses and a residual current device (RCD).

Fuses and switches.

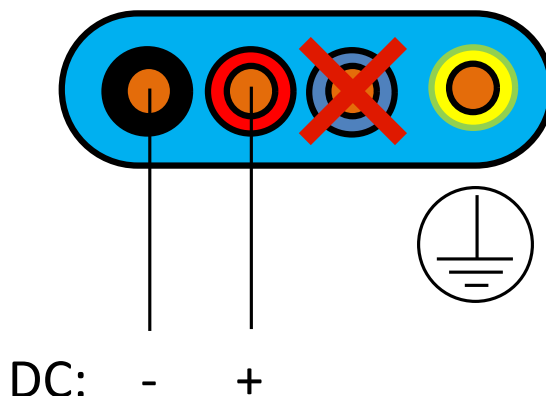
The control device can protect the motor from overloads by digitally controlling the absorbed current against the set rated current.

Install on the DC supply:

- DC disconnect of suitable voltage and current
- DC fuses of suitable voltage and current on both the positive and negative poles. Generally, DC fuses are chosen for a current that is approximately double the short-circuit current of a string of panels and are installed only if the photovoltaic system consists of three or more strings.
- surge arresters of suitable voltage and current

7.3. Power cable

The power cable consists of:



- A black (negative) cable and a red (positive) cable for connecting the power supply.
- Yellow/green protective ground connection.

The motor is supplied with 2 m of flat cable which must be suitably spliced with the round cable of suitable length and cross-section.

**WARNING**

It is recommended to perform the joint using the resin joint kit supplied as an accessory by the manufacturer. Only in this way can the manufacturer guarantee the waterproofness of the electrical connections over time.

**WARNING**

The material and other specifications of the round cable to be used depend on the type of installation and local regulations. If the application is for pumping drinking water, it is recommended to use cables of suitable material available on request.

**WARNING**

Failure to comply with the instructions may lead to loss of warranty.

**WARNING**

Failure to follow the instructions may result in damage to the product, the system in which it is installed and, in the worst cases, damage to property or persons with even fatal consequences.

The cross-section of the power cable to be used can be calculated using the following formula:

$$S = \frac{2 \cdot \rho \cdot L \cdot P1 \cdot 100}{V^2 \cdot \Delta P} \quad (1)$$

Where:

- S: cable cross-section [mm²]
- ρ: specific resistance = 0.018 [Ω mm²/m]
- L: cable length [m]
- P1: electric power of the pump [W]
- V: voltage at maximum power [V]
- ΔP: tolerated power loss [%]. It is recommended not to exceed 3%.

**WARNING**

The length between the photovoltaic panels and the power supply of the pump should not exceed 500 m. For longer lengths contact the supplier.

**DANGER**

It is recommended to use only approved photovoltaic cables with resistance to UV rays and atmospheric agents.

Use the appropriate connectors to connect the photovoltaic cables.

Always respect the polarities.

7.4. Electrical connections

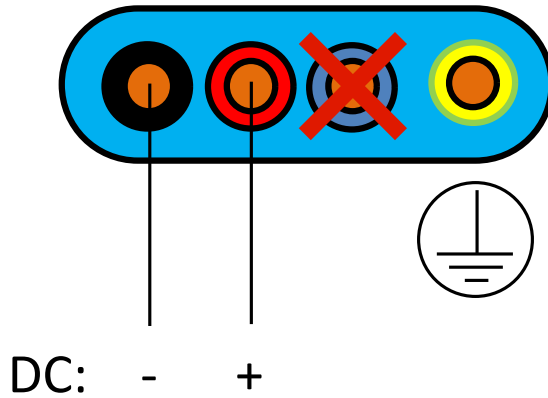
7.4.1. Connections

**DANGER**

Disconnect the device from the power supply, check that the load is completely stopped and wait at least 5 minutes before intervening on it or on the load applied to it.

**WARNING**

Read the safety chapter carefully before continuing.



		Color	Comments
DC Power Supply	-	Black	 WARNING Respect the polarity of the connections.
	+	Red	
	P.E. ⊕	Yellow/ Green	

**WARNING**

Failure to comply with the instructions may lead to loss of warranty.

**WARNING**

Failure to follow the instructions may result in damage to the product, the system in which it is installed and, in the worst cases, damage to property or persons with even fatal consequences.

8. Commissioning

8.1. Preliminary checks

Before supplying power to the device, carry out the following electrical and mechanical checks:

- Verify proper grounding of the device, of the load, and of the entire system.
- Check the correct connection of the power and signal cables, paying particular attention to any polarity.
- Check that the connection terminals of the power and signal cables are correctly tightened.
- Check the implementation of electromagnetic compatibility (EMC) regulations and the correct connection of cable shields.
- Check that the protective devices are present and correctly installed.
- Check that the mechanical installation is correct, sturdy and complies with environmental and cooling requirements.
- Check that the pump and the level electrode are completely submerged in water and that the delivery valve is open.
- Check that the device is completely closed and that live parts are not accessible.
- Carry out a reduced voltage insulation test:
 - Connect the two power cables together and check that the insulation with respect to the ground is greater than 100 MOhm with an applied voltage of 500 V.

**NOTE**

The pump may contain traces of water used for the final tests of the product. Before commissioning, rinse with fresh water. Under no circumstance should solvents or other chemical products be used to clean any part of the product.

8.2. Powering



DANGER

Before supplying power to the device, make sure you have read, understood and implemented all the safety, mechanical, and electrical installation instructions.

At the end, it shall be possible to:

- power up the device.
- wait for the water to come out of the delivery pipe.

9. Alarms & warnings

If after having been installed and connected to the power supply, the pump does not pump water, check the electrical connections, the following alarm conditions and implement the possible solutions.



WARNING

Immediate remedies must be implemented in case of alarms to safeguard the integrity of the device itself and of the system in which it is installed.

Alarm	Description	Automatic restart time	Possible solutions
A01 OVER-CURRENT MOT.	The motor is overloaded.	30 s Max 5 attempts in 10 min.	Make sure that the motor is free to rotate and check for any mechanical issues.
A03 OVER TEMP. INV.	The temperature reached by the device is higher than the maximum allowed value.	7 min	Check that the ambient temperature is within the allowed limits. Check that the device is cooled as indicated in the dedicated chapter.
A05 UNDER VOLTAGE	<ul style="list-style-type: none"> • Supply voltage below the minimum allowed value. • Insufficient input power to power the device. 	4 min	<ul style="list-style-type: none"> • Check the value of the power supply voltage both under no load and load conditions. • Verify that the source has enough power to power the load.
A06 OVER VOLTAGE	The power supply voltage or the voltage inside the device exceeds the maximum allowed value.	10 s	<ul style="list-style-type: none"> • Check the value of the power supply voltage both under no load and load conditions. • Check for regeneration from the load. • In the case of a permanent magnet motor, check that the load is not subjected to passive movement.
A08 LOCKED ROTOR	The rotor is blocked or the motor is overloaded.	6 min	Make sure that the motor is free to rotate and check for any mechanical issues.
A09 OVER-LOAD INV.	The current absorbed by the load exceeds the rated current of the device.	30 s Max 5 attempts in 15 minutes.	Make sure that the motor is free to rotate and check for any mechanical issues.
A10 IGBT TRIP ALARM	The current absorbed by the load exceeds the rated current of the device.	30 s Max 3 attempts in 60 minutes	Make sure that the motor is free to rotate and check for any mechanical issues.
A19 OUT OF STEP	Loss of motor control	3 min	Make sure that the motor is free to rotate and check for any mechanical issues.
W26 NO WATER	The impedance value read by the level sensor integrated in the power cable is permanently below the minimum threshold. This indicates a lack of water and causes the pump to stop.	5 min	Check that there is water at the level sensor. Check that the level sensor is clean, free of encrustations and in contact with the same water in which the pump is immersed.

10. EC Declaration of Conformity

The manufacturer hereby:

Nastec srl

Via della Tecnica, 8, 36048, Barbarano Mossano, Vicenza, Italy

declares under its own responsibility that the product:

NERA

complies with the following directives:

- 2011/65 / EU - RoHS Directive
- 2015/863/EU - RoHS 2 Directive
- 2014/35 / EU - Low Voltage Directive (LVD)
- 2014/30 / EU - EMC Directive
- 2006/42 / EC - Machinery Directive (MD)

and that the following harmonized standards and technical specifications have been applied:

- EN 61000-6-4:2019
- EN 61000-3-2:2019 + A1:2021
- EN 61000-3-3:2013+A1+A2:2021
- EN 61000-6-2:2019
- EN 61800-3:2018
- EN 60335-1:2012+A11+A13+A14+A2+A15:2021
- EN 60335-2-41:2021+A11:2021
- EN 809+A1:2009
- EN 60034-1:2011+EC1:2015
- EN 60204-1:2006+A1:2009
- EN 63000:2018

Barbarano Mossano

27/01/2020

Ing. Marco Nassuato

Managing Director



11. UK Declaration of Conformity

The manufacturer hereby:

Nastec srl

Via della Tecnica, 8, 36048, Barbarano Mossano, Vicenza, Italy

declares, under its own responsibility, that the product:

NERA

complies with the following directives:

- UK SI 2012 No. 3032. Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (RoHS2)
- UK SI 2016 No. 1101. The Electrical Equipment (Safety) Regulations 2016
- UK SI 2016 No. 1091. Electromagnetic Compatibility Regulations 2016
- UK SI 2008 No. 1597. The Supply of Machinery (Safety) Regulations 2008

and that the following harmonised standards and technical specifications have been applied:

- BS EN 61000-6-4:2019
- BS EN 61000-3-2:2019 + A1:2021
- BS EN 61000-3-3:2013+A1+ A2:2021
- BS EN 61000-6-2:2019
- BS EN 61800-3:2018
- BS EN 60335-1:2012+A11+A13+A1+A14+A2+A15:2021
- BS EN 60335-2-41:2021+A11:2021
- BS EN 809+A1:2009
- BS EN 60034-1:2011+EC1:2015
- BS EN 60204-1:2006+A1:2009
- BS EN 63000:2018

Barbarano Mossano

02/03/2022

Ing. Marco Nassuato

Managing Director



