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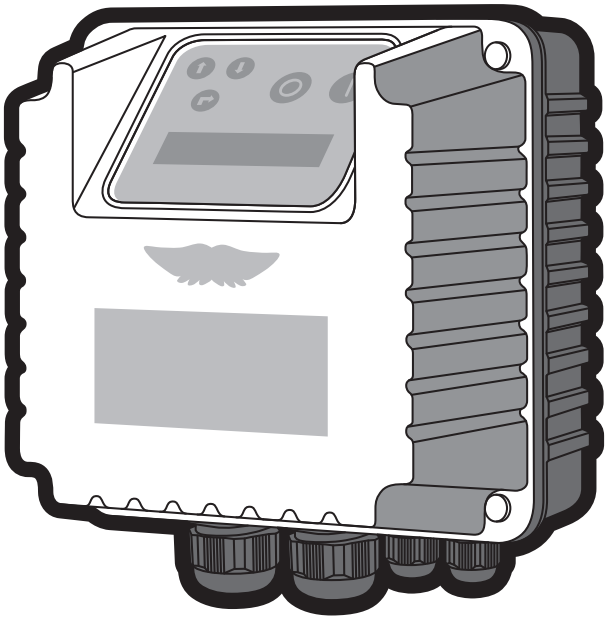

PILOT

Installation, use and maintenance manual

V 3.0
24/04/2022

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Table of Contents

1. Introduction

1.1. Purpose of the manual

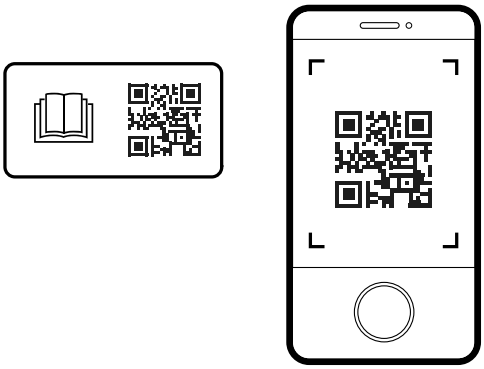
The purpose of this manual is to provide users with detailed information on the installation, operation, and maintenance of the product, with special regard to safety regulations.

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

PILOT It is an electronic device that protects and controls single-phase and three-phase pumps by signaling:

- **Overcurrent, phase failure, excessive number of restarts.** The back-lit LCD display allows viewing the absorbed current value and setting the maximum threshold beyond which the device intervenes by stopping the pump. It is also possible to program the maximum number of restarts that the pump can perform and beyond which the device stops running.
- **Dry run**. PILOT provides an indication of the power factor (PF or cosø) and allows programming a minimum threshold relating to the dry run condition below which the pump is to be stopped. The device makes up to 5 automatic restart attempts with user-definable times. PILOTrecords the number of pump starts and total hours of operation. The error log allows checking the alarms that have occurred, thus facilitating support operations. The aluminum structure guarantees PILOT extreme solidity and easy cooling. The IP55 (NEMA 4) protection rating makes installation possible even in humid and dusty environments. PILOT, in combination with an inverter equipped with cascade control of D.O.L. pumps. , manages the starting and stopping of the D.O.L. pumps while guaranteeing their protection.

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
Electronic boards and components may be damaged by electrostatic discharge. We therefore, recommend to don't touch the components.

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
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.

CAUTION
During operation, some surfaces may reach high temperatures that may cause burns upon contact with skin. Be very careful when touching the device!
Avoid contact with flammable products.

WARNING
Do not perform insulation tests on the load or power cable without first disconnecting them from the device.

2.4. Acoustic emission

The device has an acoustic emission:
< 65 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 [4]* 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 correct cooling of the unit.	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°C (+158°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.

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. Technical Data

Electrical specifications by model:

Model	V +/- 10% [VAC]	Max I [A]	Typical motor P2 [kW] 50 Hz	Typical motor P2 [kW] 60 Hz + S.F.
PILOT 112 1x230V	1 x 230	12	1,5	1,1
PILOT 118 1x230V	1 x 230	18	2,2	1,5
PILOT 312 3x230V	3 x 230	12	2,2	2,2
PILOT 325 3x230V	3 x 230	25	4	3,7
PILOT 330 3x230V	3 x 230	30	5,5	5,5
PILOT 312 3x400V	3 x 400	12	4	-
PILOT 325 3x400V	3 x 400	25	9,2	-
PILOT 330 3x400V	3 x 400	30	11	-
PILOT 312 3x460V	3 x 460	12	-	3,7
PILOT 325 3x460V	3 x 460	25	-	7,5
PILOT 330 3x460V	3 x 460	30	-	11

General electrical specifications:

Power supply frequency	50 - 60 Hz (+/- 2%)
Voltage unbalance between the power supply phases	+/- 2%
EMC compliance	EN61800-3 C2

Environmental specifications:

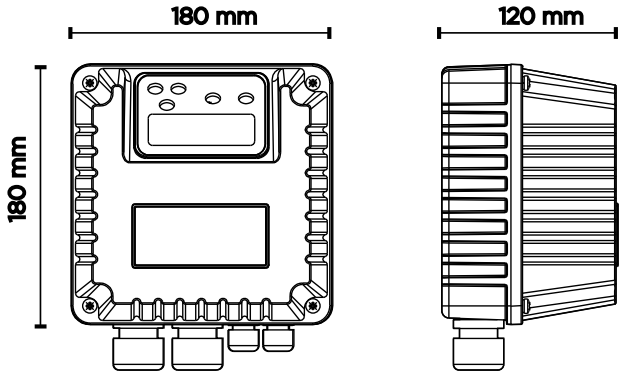
Maximum workplace temperature at nominal load	40°C (104 °F)
Power derating beyond maximum temperature	-2.5% every °C (-1.4% every °F)
Maximum altitude at nominal load	1000 m (3280 ft)
Power derating beyond maximum altitude	- 1% every 100 m (328 ft)

Mechanical specifications:

Protection rating	IP55 (NEMA 4)

WARNING
Protect the device from direct exposure to weather and sunlight.

5.2. Dimensions and weight



Model	Maximum weight [kg]
PILOT 112 1x230V	2
PILOT 118 1x230V	2
PILOT 312 3x230V	2,2
PILOT 325 3x230V	2,4
PILOT 330 3x230V	2,4
PILOT 312 3x400V	2,2
PILOT 325 3x400V	2,4
PILOT 330 3x400V	2,4
PILOT 312 3x460V	2,2
PILOT 325 3x460V	2,4
PILOT 330 3x460V	2,4

5.3. Cables entry

Cable gland	Tightening torque [Nm]	Cable diameter [mm]	Quantity
PG9	3	5-8	2
PG21	8	13-18	2

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.

WARNING
Do not install the device in environments at a risk of explosion, flooding, or in the presence of flammable fluids or solids. Ensure sufficient ventilation in the room.
Refer to local regulations when selecting the appropriate installation location.

WARNING
The degree of protection of the device is only ensured if, at the end of the installation, the cover screws and the cable glands have been properly tightened. Close the holes of unused cable glands with the appropriate plugs.
Protect the device from direct exposure to weather and sunlight.
Do not leave the device installed without cover or with the cable glands open, even if not connected to the power supply. The infiltration of dust, water or humidity may irreparably damage the device.

6.2. Cooling

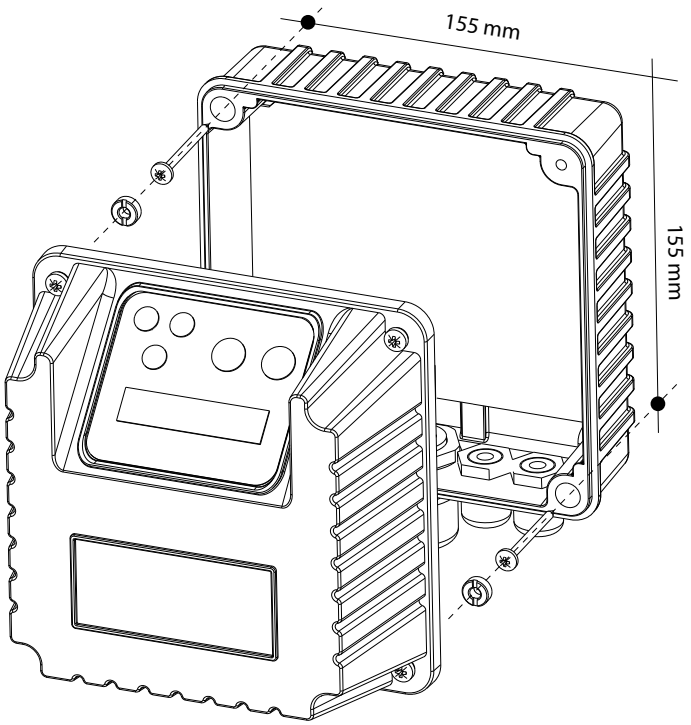
The device is cooled by natural ventilation of the air through its surfaces.
It is therefore necessary to ensure sufficient space around the device during installation.

- 150 mm for current intensity up to 18 A
- 200 mm for current intensity up to 30 A

	During operation, the surfaces of the device can become hot enough to cause burns. Do not touch them.

In the case of installation inside electric cabinet, it is necessary to guarantee the appropriate air flow for the heat dissipation of all the components. The heat released by the device may be calculated from its conversion efficiency.

6.3. Wall installation



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 16 mm^2. (6 AWG)
- 16 mm2 (6 AWG) for mains power cable cross-section between 16 mm^2 (6 AWG) and 35 mm^2 (1 AWG).
- cross-section equal to half the cross-section of the power supply cable when the latter is greater than 35 mm^2 (1 AWG).

7.2. Connecting cables

WARNING
The connecting cables must comply with local regulations, feature the appropriate cross-section, and meet the requirements for voltage, current, and temperature.

7.2.1. Power cables

Model	Maximum cross-section of the input cable with ground	Maximum cross-section of the output cable with ground	Cable tightening torque [Nm]	Ground cable tightening torque
PILOT 112 1x230V	3 x 6 mm^2	3x 6 mm^2	1	1
PILOT 118 1x230V	3 x 6 mm^2	3 x 6 mm^2	1	1
PILOT 312 3x230V	4 x 6 mm^2	4 x 6 mm^2	1	1
PILOT 325 3x230V	4 x 6 mm^2	4 x 6 mm^2	1	1
PILOT 330 3x230V	4 x 6 mm^2	4 x 6 mm^2	1	1
PILOT 312 3x400V	4 x 6 mm^2	4 x 6 mm^2	1	1
PILOT 325 3x400V	4 x 6 mm^2	4 x 6 mm^2	1	1
PILOT 330 3x400V	4 x 6 mm^2	4 x 6 mm^2	1	1
PILOT 312 3x460V	4 x 6 mm^2	4 x 6 mm^2	1	1
PILOT 325 3x460V	4 x 6 mm^2	4 x 6 mm^2	1	1
PILOT 330 3x460V	4 x 6 mm^2	4 x 6 mm^2	1	1

WARNING
Always use cables with appropriate cable lugs, which may be supplied with the product.

7.2.2. Control cables

Model	Maximum cross-section of the control cables	Tightening torque [Nm]
Control terminals of all models	1 mm^2	0,5

WARNING
Use shielded cable for control cables.

WARNING
Always use cables with appropriate cable lugs, which may be supplied with the product.

7.3. 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.
Instead, it is necessary to install overcurrent and short-circuit protection devices, such as fuses and circuit breakers, upstream of the device. These trigger in the event of failure of a component inside the device.

Supply voltage	Model	Recommended fuse gC	Recommended circuit breaker ABB MCB S200
1 x 230 VAC	PILOT 112 1x230V	16	S201-C16
1 x 230 VAC	PILOT 118 1x230V	25	S201-C25
3 x 230 VAC	PILOT 312 3x230V	16	S203-C16
3 x 230 VAC	PILOT 325 3x230V	32	S203-C32
3 x 230 VAC	PILOT 330 3x230V	32	S203-C32
3 x 400 VAC	PILOT 312 3x400V	16	S203-C16
3 x 400 VAC	PILOT 325 3x400V	32	S203-C32
3 x 400 VAC	PILOT 330 3x400V	32	S203-C32
3 x 460 VAC	PILOT 312 3x460V	16	S203-C16
3 x 460 VAC	PILOT 325 3x460V	32	S203-C32
3 x 460 VAC	PILOT 330 3x460V	32	S203-C32

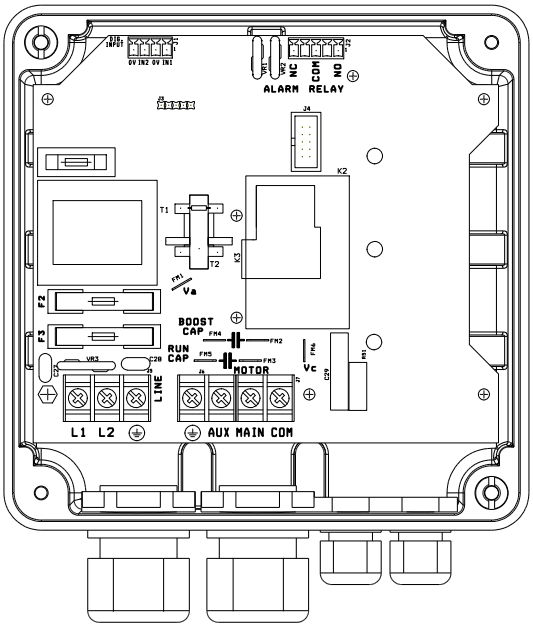
Residual Current Devices (RCD)

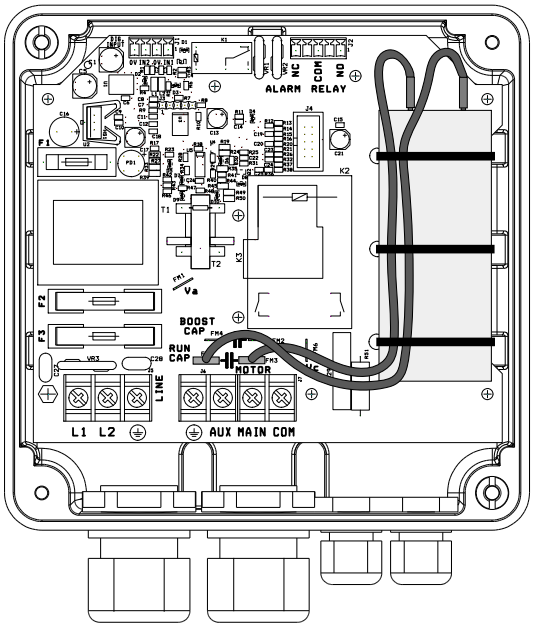
Use type AC or A RCD devices.

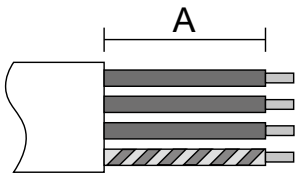
7.4. Electrical connections

7.4.1. Power connections

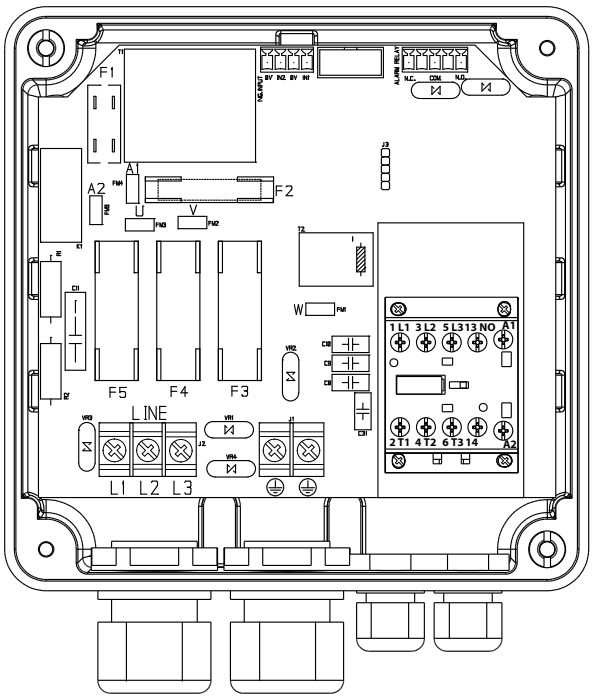
PILOT 112 1x230V , PILOT 118 1x230V

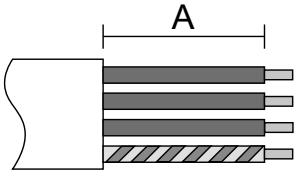




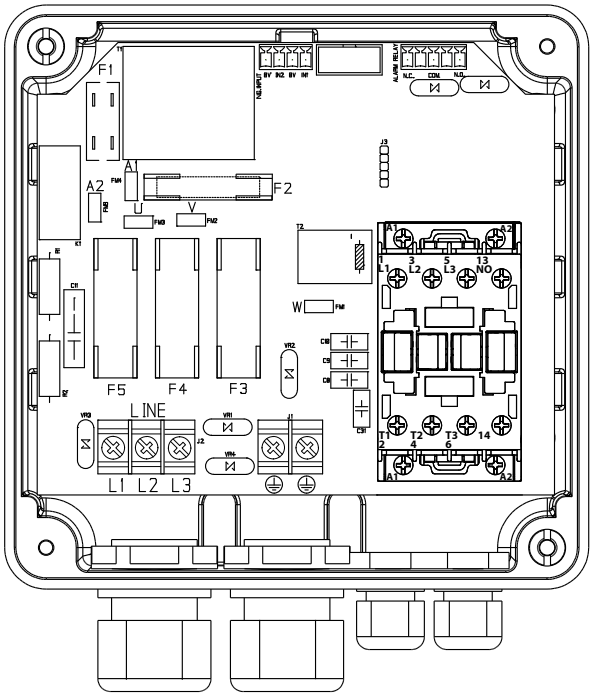
		A [mm]	Pre-insulated cable lug	Stripping diagram
Power Supply **LINE**	**L1**	50	Fork for M4 screw	
	L2	50	Fork for M4 screw	
	P.E. ⏚	50	Fork for M4 screw	
Motor **MOTOR**	**AUX**	50	Fork for M4 screw	
	MAIN	50	Fork for M4 screw	
	COM	50	Fork for M4 screw	
	P.E. ⏚	50	Fork for M4 screw	
Running capacitor **RUN CAP**	**FM3**	-	6.3 x 0.8 mm female Faston	-
	FM5	-	6.3 x 0.8 mm female Faston	
Starting capacitor **BOOST CAP**	**FM2**	-	6.3 x 0.8 mm female Faston	
	FM4	-	6.3 x 0.8 mm female Faston	

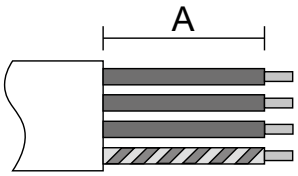
PILOT 312 3x230V , PILOT 312 3x400V , PILOT 312 3x460V



		A [mm]	Pre-insulated cable lug	Stripping diagram
Power Supply **LINE**	**L1**	50	Fork for M4 screw	
	L2	50	Fork for M4 screw	
	L3	50	Fork for M4 screw	
	P.E. ⏚	50	Fork for M4 screw	
Motor **MOTOR**	**T1**	60	Fork for M4 screw	
	T2	60	Fork for M4 screw	
	T3	60	Fork for M4 screw	
	P.E. ⏚	60	Fork for M4 screw	

PILOT 325 3x230V , PILOT 325 3x400V , PILOT 325 3x460V , PILOT 330 3x230V , PILOT 330 3x400V , PILOT 330 3x460V



		A [mm]	Pre-insulated cable lug	Stripping diagram
Power Supply **LINE**	**L1**	50	Fork for M4 screw	
	L2	50	Fork for M4 screw	
	L3	50	Fork for M4 screw	
	P.E. ⏚	50	Fork for M4 screw	
Motor **MOTOR**	**T1**	70	Fork for M4 screw	
	T2	70	Fork for M4 screw	
	T3	70	Fork for M4 screw	
	P.E. ⏚	70	Fork for M4 screw	

7.4.2. Control connections

Type		Description	Functionality	Comments
Signal GND	0V	Insulated	Signal GND for analog and digital inputs	-
Digital inputs	IN1	Active low	Motor start and stop	Programmable as Normally Open or Normally Closed.
	IN2	Active low	Motor start and stop	Programmable as Normally Open or Normally Closed.
Relay outputs	NO2	Normally Open	ALARM relay NO2, COM2: closed contact without alarm. NC2, COM2: closed contact with alarm or without power supply.	Potential-free contacts Max 250 VAC, 2 A Max 30 VDC, 2 A
	COM 2	Common		
	NC2	Normally Closed		

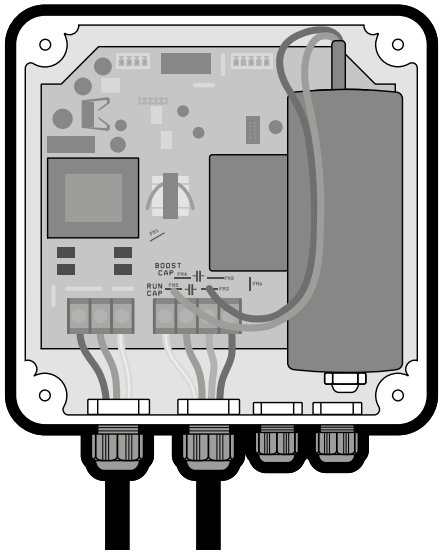
7.4.3. Circuit board installation AVIATOR

The circuit board AVIATOR allows increasing the starting torque of single-phase motors in a simple and economical way. AVIATORIt can be ordered as an accessory for PILOT 118 1x230V, is equipped with specific contacts with which it is mechanically and electrically coupled to the power board of the PILOT. The starting capacitor, present in the board AVIATOR, is inserted in parallel with the run capacitor only in the starting phase of the motor. Subsequently, when the motor has started, AVIATOR it disconnects the starting capacitor.

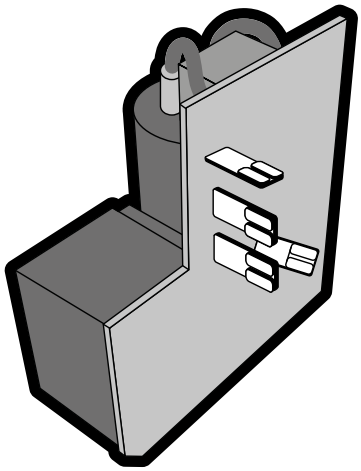
Model	Motor power [kW]	Starting capacitor [µF]
AVIATOR 1	0,37 - 0,55	53 - 6 4
AVIATOR 2	0,75 - 1,1	108 - 130
AVIATOR 3	1,5 - 2,2	1 8 9 - 2 27

Procedure for installing the board AVIATOR:

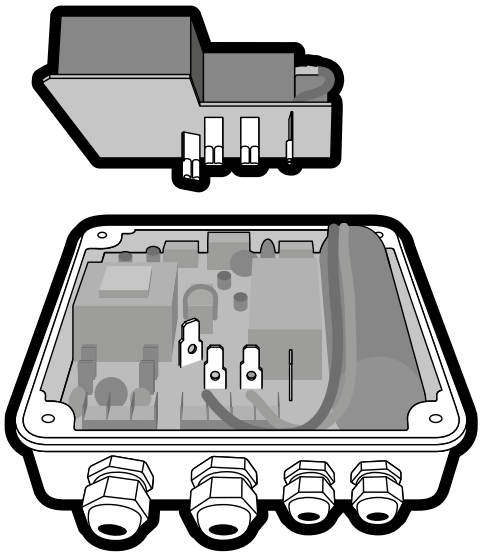
1. Make the power connections relative to the power supply, the motor and the run capacitor (if present).



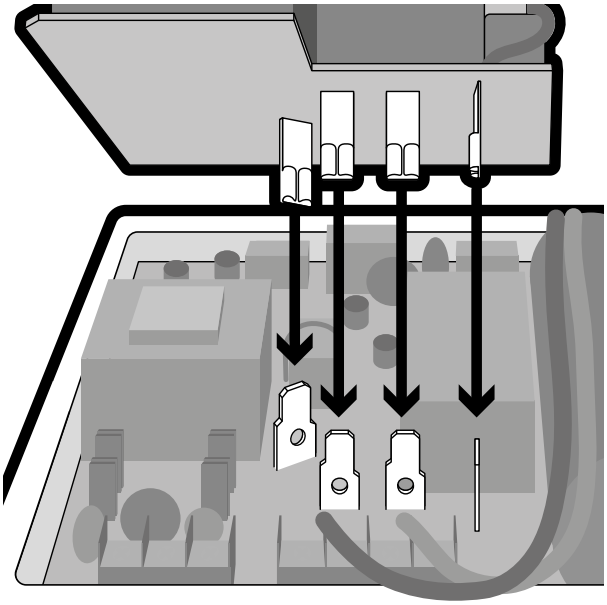
2. Take the board AVIATOR.



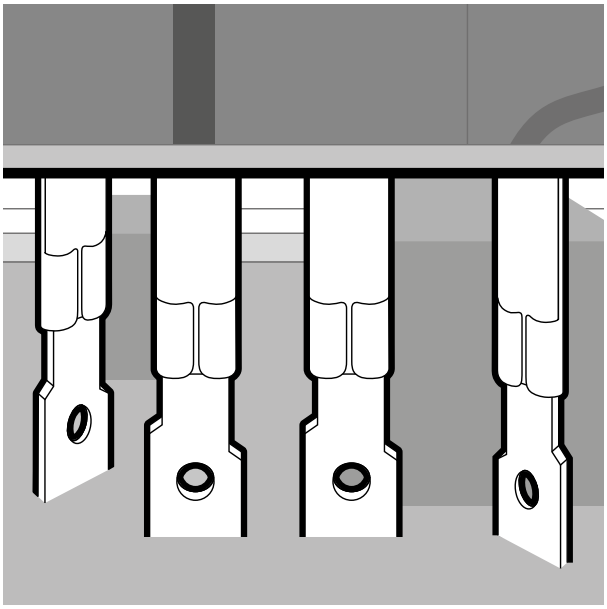
3. Place board AVIATOR above board PILOT.



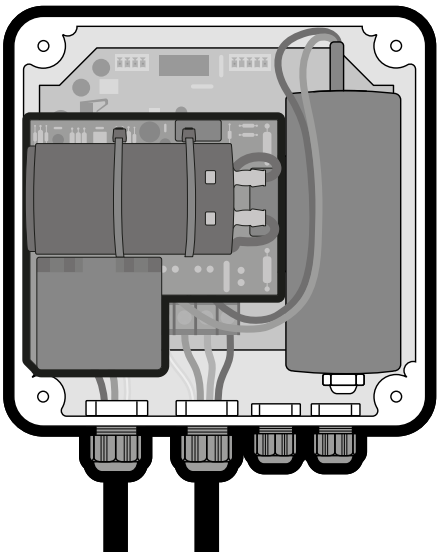
4. Insert the female faston terminals of board AVIATOR in the male faston terminals of board PILOT paying attention to the correct insertion of all 4 terminals.



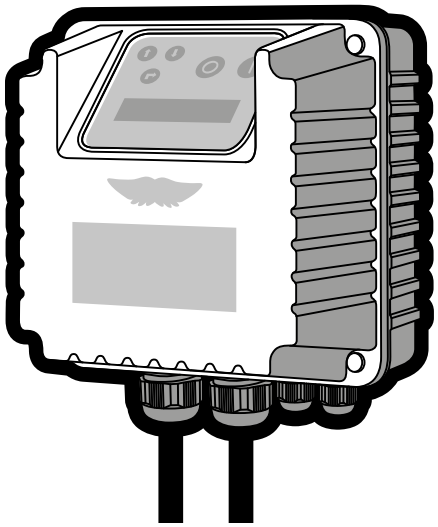
5. Gently press the board AVIATOR downwards making sure the faston contacts are correctly coupling.



6. Check the correct and safe positioning of board AVIATOR on board PILOT.



7. Close the cover.



8. Commissioning

8.1. Preliminary checks

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

- Check that the device complies with the motor control according to its data plate.
- Verify proper grounding of the device, of the load, and of the entire system.
- Check the correct connection of the power supply cable and the motor cable, paying particular attention to any connection reversal.
- 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 seals are intact and correctly positioned in their seats.

- Check that the cable glands and screws are properly tightened.
- Check that the device is completely closed and that live parts are not accessible.

8.2. Powering

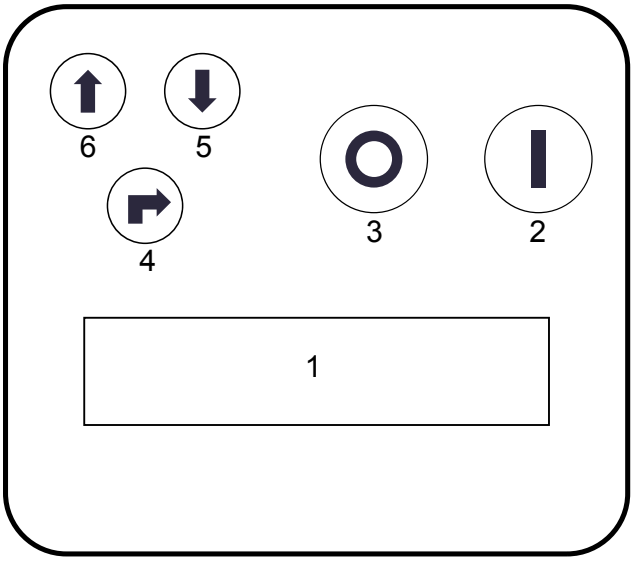
DANGER
Before supplying power to the device, make sure you have read, understood and implemented all the safety, mechanical, and electrical installation instructions.

At the end, it shall be possible to:

- power up the device.
- verify the correct switching on and the absence of alarm messages.
- perform programming.
- start the motor.

9. Use and programming

9.1. Keyboard and display



1. DISPLAY
2. START: motor start
3. STOP: motor stop / alarm reset / exit the menu
4. ENTER: access the menu / edit parameters / confirm parameters
5. +: parameter scrolling / parameter editing
6. -: parameter scrolling / parameter editing

9.2. Initial display

When the device is switched on, the firmware versions are communicated to the user.

Next, the initial view opens.

The first line in the display shows the status of the device:

- START: motor started
- STOP: motor stopped

9.2.1. Operating parameters

Parameter	Description
I = XX.X A	I is the measured current value.

Parameter	Description
P.F = X.XX	The P.F. parameter represents the measured power factor (cosØ).
STATUS: NORMAL	In the absence of alarms, the STATUS is NORMAL. Otherwise, the alarm message flashes. Press th ENTER key to access the Diagnostics menu. To return to the initial display, simply press the ENTER key.
MENU' ENT to access	Press the ENTER key to access the menu display.

9.2.2. Diagnostics

Parameter	Description
Motor starts XXXXX h : XX m	Number of restarts performed by the motor
Motor hours XXXXX h : XX m	Motor life hours
ALL. XXXXXXXXXXXXX XXXXXXX h : XX m	Alarm log in relation to motor hours

9.3. Menu

To access the Menu section, press the ENTER key on the MENU' / ENT to accessscreen. To exit the Menu section, press the STOP button several times until you go back to the Home screen.

NOTE
Stop the motor before entering the Menu section.

The menu is password-protected (default 001).
The access password can be changed from the menu.

NOTE
When an incorrect password is entered to access the menu, the parameters can only be displayed but not edited.
In case of loss of the password, contact the technical support service to obtain the universal password.

9.4. Parameters

Parameter	Default	Description
Amp. max		Maximum current absorbed by the motor beyond which the device intervenes by stopping the pump. It corresponds to the rated motor current increased by 10%.
Dry run PF		Minimum power factor (or cosØ) below which the device intervenes by stopping the pump. The dry running condition is characterized by a low power factor value. Contact the pump manufacturer for more information.
Restarts delay	10	Time base that establishes the delay of attempts to restart the pump following a no-water alarm. With each attempt, the delay time is doubled. The maximum number of attempts is 5.
Max restarts	5	Maximum number of restarts per minute beyond which the device intervenes by stopping the pump.
Digital input1	N.O.	If N.O.(Normally Open) is selected, the device will continue to operate the motor if digital input 1 is open. Conversely, it will stop the motor if digital input 1 is closed. If N.C. (Normally Closed) is selected, the device will continue to operate the motor if digital input 1 is closed. Conversely, it will stop the motor if digital input 1 is open.
Digital input2	N.O.	If N.O.(Normally Open) is selected, the device will continue to operate the motor if digital input 2 is open. Conversely, it will stop the motor if digital input 2 is closed. If N.C. (Normally Closed) is selected, the device will continue to operate the motor if digital input 2 is closed. Conversely, it will stop the motor if digital input 2 is open.
Change PASSWORD		By pressing the ENTER key it is possible to change the password (default 001).

10. Alarms

When an alarm occurs, the device starts emitting an acoustic signal (if available) and an intermittent warning appears on the STATUS screen indicating the corresponding alarm. By pressing the STOP key (only and exclusively in correspondence with the STATUS screen) it is possible to attempt to reset the machine. If the cause of the alarm has not been resolved, the device displays the alarm again and emits an acoustic signal.

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	Possible solutions
AL. AMP. MAX	The current absorbed by the motor exceeds the value set in the parameter Amp. max.	• Verify that the value set for the parameter Amp. max exceeds by 10% the rated current of the motor according to the data on the plate. **WARNING** Check with the motor manufacturer the tolerability to withstand a current greater than its rated current. • Check that all the motor phases are correctly connected and that the connection is suitably configured in Star or Delta. • Check that the pump is turning in the correct direction. • Make sure the motor is not running on two phases. • Make sure that the motor is free to rotate and check for any mechanical issues.
PHASE FAILURE	Null current in the COMMON phase of the single-phase motor or on the T1 phase of the three-phase motor.	• Check that the load is correctly connected. • Check the load and the connection.
WATER MISSING	The warning DRY RUN PF appeared 5 consecutive times following the automatic reset attempts.	**WARNING** When the warning DRY RUN PF appears, the device will automatically restart the load after a time equal to the value set in the parameter Restarts delay multiplied by the number of attempts made. At the end of the fifth attempt, the device will definitively stop the load producing the alarm WATER MISSING. The alarm must be reset manually.
KEYBOARD FAULT	One of the keys of the keyboard was held down for more than 30 seconds.	Check that the keys are mechanically free.
MAX RESTARTS	The maximum number of motor restarts per hour has been exceeded.	Check the possible causes (pressure switch, floater, pre-charge pressure of the autoclave, etc ..)

11. Warnings

Warning	Description	Possible solutions
DIGITAL INPUT1	Digital input 1 has been activated.	• Check the configuration and connections to digital input 1.
DIGITAL INPUT2	Digital input 2 has been activated.	• Check the configuration and connections to digital input 2.
DRY RUN PF	The power factor (Dry run PF cosphi) of the motor read by the device is permanently below the value set in the parameter.	• Check that the pump is properly primed. • Check that the pump is turning in the correct direction. • Check that the parameter Dry run PF is set correctly.

NOTE

The correct value for parameter Dry run PF depends on:

- The type of motor (construction and winding data). Generally, three-phase surface motors have a higher rated cosphi than submersible motors having the same power rating.
- The type of pump (hydraulic performance and power consumption curve).
- The power supply characteristics (voltage and frequency).

In general, the parameter Dry run PF may be set to 60% of the nominal cosphi shown on the pump's data plate.

Parameter Dry run PF must also be determined empirically at the end of the installation. In the presence of centrifugal pumps with three-phase asynchronous motor, a simple method consists in starting the pump at the rated frequency and, paying attention to the sustainability of the system, completely closing the delivery and then reading the measured cosphi value on the display (or on the App). Parameter Dry run PF must therefore be set to 10% less than the cosphi value read under closed flow condition.

CAUTION

The electronic water shortage protection based on parameter Dry run PF works correctly only with centrifugal pumps equipped with three-phase asynchronous motors.

In the presence of permanent magnet motors it is not possible to base the water shortage protection on the cosphi reading; it must be based on the absorbed power, instead.

In the presence of other types of pumps and motors, it is advisable to contact the technical support service.

WARNING

If parameter Dry run PF is set too low, the electronic water shortage protection may no longer be effective.

Typically, it is recommended not to go below the value of 0.5 with centrifugal surface pumps and 0.4 with centrifugal submersible pumps equipped with asynchronous three-phase motor.

Setting parameter Dry run PF to 0 completely excludes the water shortage protection.

12. 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:

PILOT

complies with the following directives:

- 2011/65 / EU - RoHS 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 61000-6-3:2007 + A1:2011
- EN 61000-6-1:2007 + A1:2011
- EN 62233:2008
- EN 62311:2008
- EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017

Barbarano Mossano
14/11/2018
Ing. Marco Nassuato
Managing Director

13. 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:

PILOT

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 61000-6-3:2007 + A1:2011
- BS EN 61000-6-1:2007 + A1:2011
- BS EN 62233:2008
- BS EN 62311:2008
- BS EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017

Barbarano Mossano
02/03/2022
Ing. Marco Nassuato
Managing Director