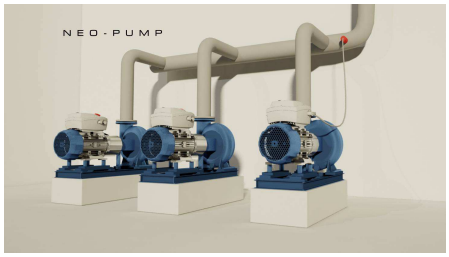
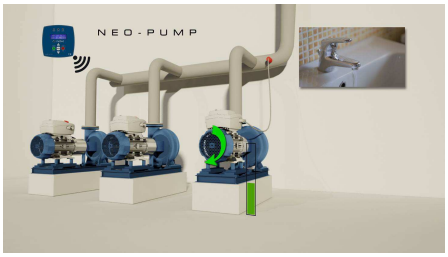
motive®

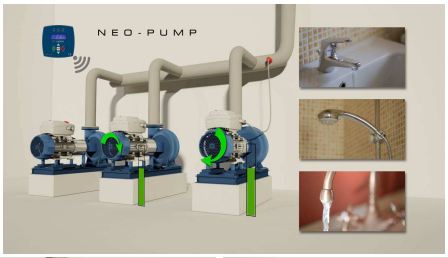
NEO-PUMP

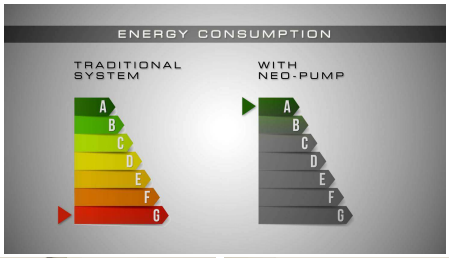
Technical manual

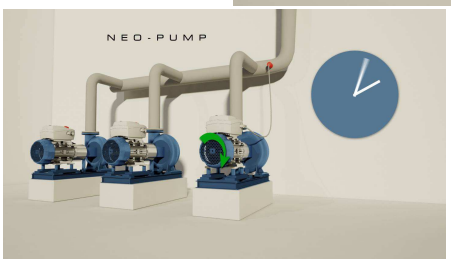
Introduction

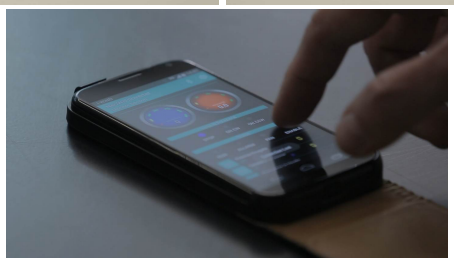
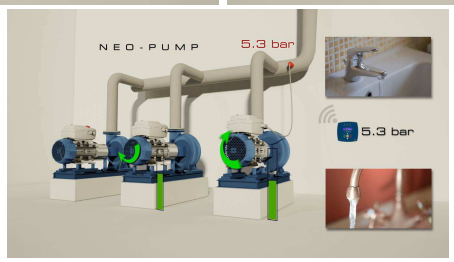










https://www.youtube.com/watch?v=Utafxke3O-4

CONTENTS

1. WORKING CONDITONS

Fig.2

Physical quantity	Symbol	UOM	NEO-PUMP-3	NEO-PUMP-11	NEO-PUMP-22
Inverter protection degree*			IP65		
Inverter supply voltage	V_{1n}	V	3x 200-460		
Inverter supply frequency	f_{1n}	Hz	50-60		
Maximum output voltage of the inverter	V_2	V	= V1n-5%		
Inverter output frequency	f_2	Hz	110% f_{1n} [$f_2$55Hz if f_{1n}50Hz]		
Rated input current to the inverter	I_{1n}	A	7.5	23	47
Rated output current from the inverter (to the motor)	I_{2n}	A	7.0	22	45
Maximum continuous current output from the inverter	I_2	A	I_{2n} + 5%		
Maximum Starting torque / Rated torque ratio	Cs/Cn	Nm	150%	200% (7,5kW) 160% (11kW)	150%
Maximum Starting current (kept for 3 seconds)	I_{2max}	A	150% I_2	200% I_2 (7,5kW) 160% I_2 (11kW) Max 35A	150% I_2
Storage temperature	T_{stor}	°C	-20 ÷ +60		
Environmental operating temperature	T_{amb}	°C	-20 ÷ +40 (-20 only with inverter powered and pre-heating function active)		
Maximum relative humidity		% (40°C)	50		
Maximum WiFi keypad-inverter communication distance out in the open		mt	20		
Power losses (% motor speed ; % load torque)	(50 ; 25)	%	4.1 (IE2)	2.5 (IE2)	2.0 (IE2)
	(50 ; 50)	%	4.6 (IE2)	2.9 (IE2)	2.4 (IE2)
	(50 ; 100)	%	5.6 (IE2)	4.2 (IE2)	3.8 (IE2)
	(90 ; 50)	%	4.9 (IE2)	3.2 (IE2)	2.8 (IE2)
	(90 ; 100)	%	6.7 (IE2)	5.4 (IE2)	5.0 (IE2)
Stand-by losses		W	4	6	10

Tab. 1: operating conditions

Further characteristics	NEO-PUMP-3	NEO-PUMP-11	NEO-PUMP-22
Motor control	V/F	vectorial	vectorial
Synchronous motors control	NO	optional	optional
Programmer with built-in clock and battery (to make it possible to plan starts and stops);	NO	YES	YES
EMC for INDUSTRIAL ENVIRONMENT (ref. EN 50081-2, para 5)	YES	YES Class A – Cat C2	YES Class A – Cat C2
EMC for DOMESTIC, COMMERCIAL AND LIGHT INDUSTRIAL ENVIRONMENT (ref. EN 50081-1, para 5)	YES (since V2.01) Class A – Cat C1	optional	optional
3PH Power Switch	optional cod.INTEM3X32A	optional cod.INTEM3X32A	optional cod.INTEM3X63A
 Communication Protocol (from July 2014)	MODBUS RS485	MODBUS RS485	MODBUS RS485
Internal braking resistances	YES	YES	YES

For different environmental conditions contact our Support Service

*The IP65 degree refers to both the inverter case and to the removable keypad, whether it is placed in the inverter case or whether inverter and keypad are distant from each other. This is possible thanks to:

- adoption of an induction powered system (Ill.1) instead of "male-female" connectors,
- shapes of the cases of the 2 items
- special sealing gaskets on the keypad (Ill. 3) and on the inverter case (Ill. 4)

Fig.3

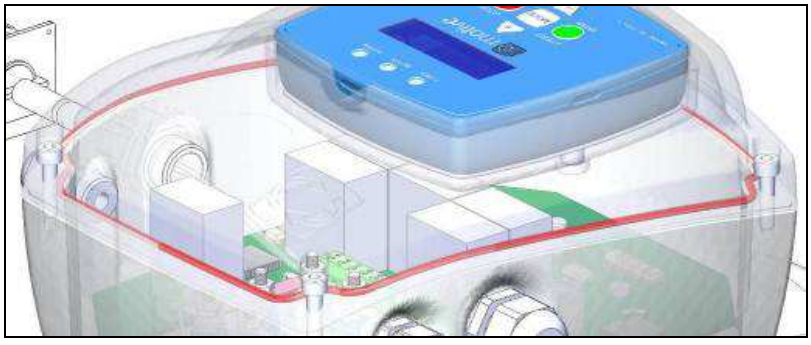


Fig.4

NEO-PUMP EMC = Secure operation

Have you ever had a sporadic and inexplicable malfunction of electrical/ electronic devices? For example, an automatic gate, a computer, a PLC, a circuit breaker ... If you didn't find the fault, it was probably due to the electromagnetic compatibility of the device (not sufficiently immune to electrical/electromagnetic interference received from the power line or radiated in the air) or to that of other equipment that showed no malfunction but was disturbing your device. Electromagnetic compatibility is a requirement prescribed by law and by the need to guarantee the operation of all electrical/electronic equipment, on the basis of which it must in practice:

- limit below precise thresholds emissions of electrical and electromagnetic interference which can affect the operation of other devices, whether the interference is radiated through the air or conducted in the power line or in the earth return circuits;
- be immune to a series of conducted and radiated interference that may be present in the environment in which it is intended to operate.

It is important therefore not only to protect the operation of the inverter (variable speed drive), but also to protect all the other devices from it. Electromagnetic compatibility is therefore the result of coexistence without reciprocal interference of devices in the same environment.

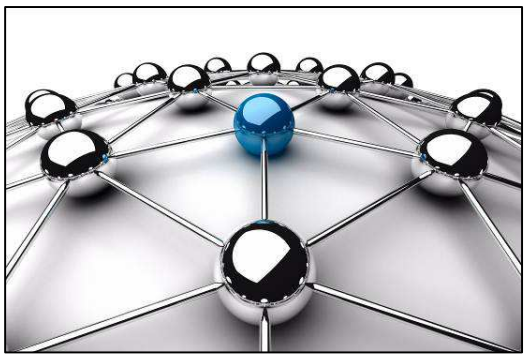
In an industrial environment, the immunity level must be higher compared to the others, but on the other hand, in a residential, commercial or light industrial environment, it is necessary to limit potential interference emissions more than in the industrial environment. So the regulations define these two environments:

DOMESTIC, COMMERCIAL AND LIGHT INDUSTRIAL ENVIRONMENT **(ref. EN 50081-1, para 5)**	**INDUSTRIAL ENVIRONMENT** **(ref. EN 50081-2, para 5)**
This concerns residential, commercial and light industrial locations, both internal and external. Locations with a power supply from 50 to 1000V provided direct from the public network are considered residential, commercial or light industrial locations.	Industrial environments are characterized by the existence of one or more of the following conditions: • presence of industrial, scientific or medical equipment • inductive and capacitive loads are frequently switched • currents and associated magnetic fields are high
	

The part of the first definition that we have underlined contradicts a recurrent belief: in fact, not every location that is often considered an "industrial environment" is only that for the EMC regulations. Indeed, the vast majority of companies also fall within the definition of light industry and their facilities and equipment must therefore satisfy the legal requirements of both environments.
Nevertheless, most of the three-phase inverters circulating on the market are declared in conformity with the regulations which relate only to the industrial environment and, at times, they place limitations even on this.

Having said this, and wanting to talk about the EMC advantages of NEO-PUMP, we cite the two main ones:

1. **maximum distance between inverter and motor**
   In a normal motor/inverter installation it is necessary to minimize the parasitic capacitance of the system and for this (but not with NEO-PUMP), the cables connecting motor and inverter should be short and of shielded type, or unshielded but inserted in a duct or metal tube connected to earth. This also because the cables connecting motor and inverter also radiate radio waves. It is not uncommon for inverter manufacturers, in their declaration of conformity, to specify for the sake of correctness the maximum length of the cable connecting motor and inverter and this statement may be considered valid. With an inverter motor this problem does not exist, because motor and inverter are a single unit. If, however, we were unable to control the inverter motor in its position (under a conveyor belt, in the narrow space in which a hydraulic control unit was installed, on an industrial fan attached to a ceiling, etc.), with a normal inverter motor we would still have to have a control device connected via cable to the inverter. This problem does not exist with NEO-PUMP, whose detachable keypad is connected to the inverter via authorized and tested radio frequencies.
2. **the installation of additional anti-interference filters**
   To make a compatible inverter, the manufacturer will have to allow for additional costs, such as the insertion of components, shielding and filters. To offer a price apparently more attractive, a frequent trick is to not incorporate in the inverter everything you need and to resolve the problem by requiring you in the instruction manual to buy anti-interference filters separately and install them. A careless buyer may then fool themselves that they have saved, only to find out later, on reading the manual, that if he/she wants to comply with applicable laws and avoid problems operating the inverter or other devices in the same environment, he/she will have to incur additional costs for materials and installation.
   Another recurrent story is installing inverters suitable only for industrial environments, even if the company has power supplied directly from the mains, putting at risk the operation of other devices. This leaves the problem to the end user to understand why an automatic gate, a computer, a PLC, a protective circuit breaker or other electronic devices in the same environment will begin to have problems of malfunction which will not be confirmed and resolved by the suppliers of the inverter.



NEO-PUMP was designed as a plug-and-play inverter motor, to avoid the costs of additional materials and labour to the buyer. It had to take into account, viewing the situation seriously, the fact of having been designed for its intended environment, without the need for additional material and installation costs.
Very unusually, therefore, in the NEO-PUMP-3 project, Motive has been careful to make it compatible not only with the industrial environment, with high immunity, but also to keep its emissions below the most restrictive thresholds prescribed for the home, commercial and light industrial environment, without the need to install additional external filters.
NEO-PUMP-11, however, because of its greater power, is the standard suitable for installation in industrial environments but requires the installation of an optional external anti-interference filter to make it suitable for the domestic, commercial and light industrial environment too.

2. MOTORS THAT CAN BE CONNECTED

Tab. RP: Power range of motors that can be connected (at 400Vac*)

Motor kW	0,13	0,18	0,25	0,37	0,55	0,75	1,1	1,5	1,9	2,2	3	4	5,5	7,5	9,2	11	15	18,5	22
NEO-PUMP-3											SV								
NEO-PUMP-11															SV	SV+F			
NEO-PUMP-22																			

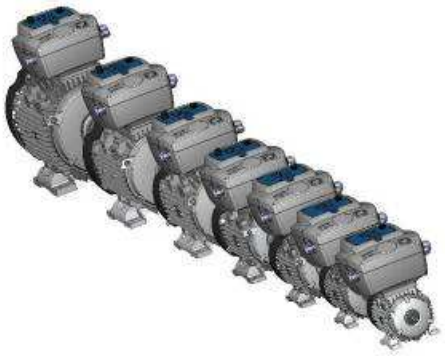
SV= applicable power only with forced ventilation

F= needed also 2 internal fans

The power that can be applied is dependent not only on the electronic characteristics of NEO-WiFi, but also on the dissipative capacity of its case. It is therefore not allowable to use the electronic board in cases that are different from the original one by removing the electronic board and mounting it in another case. This transferral would also compromise its electrical insulation and safety of the device with resulting inapplicability of the warranty

Tab. RD: Size range of IEC motors that can be connected

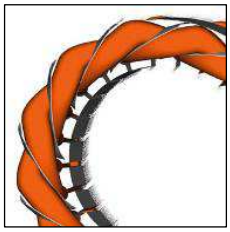
Motor IEC Type	63	71	80	90S	90L	100	112	132S	132M	160	180	200
NEO-PUMP-3	X	X	X	X			* X	*X	*X			
NEO-PUMP-11				X	X	X				X		
NEO-PUMP-22												X



*. after removing the plastic knockout as shown in chap.4
X. required mechanical adapter, chapter 4

Why connect motors size 112 and 132 to a NEO-WiFi-3kW or motors size 160 to a NEO-WiFi-11kW? Because motors with more than 4 poles can be of a greater size (for example, 112M-6 2.2kW, 132S-6 3kW, 132S-8 2.2 kW and 132M-8 3kW).

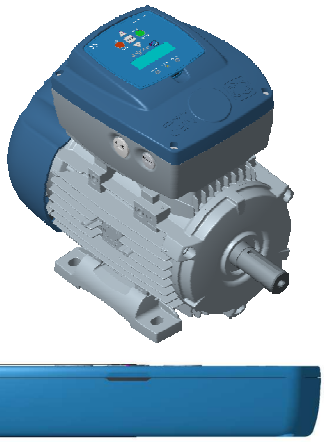
It is important that the motor is suitable to be powered by Variable Speed Drive VSD. A fundamental requirement is that it has reinforced insulation between the phase windings. Others, are the limited current absorption and low temperature rise, since the current is the limit of an inverter and the motor temperature will heat the inverter. The Delphi series of motive motors, as a standard feature, can be powered by an inverter and are designed to fit with motive VSD.

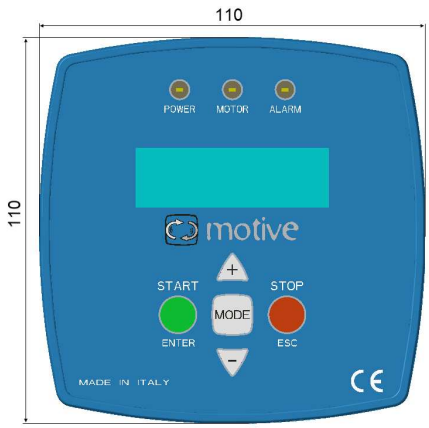


3. MECHANICAL ASSEMBLY

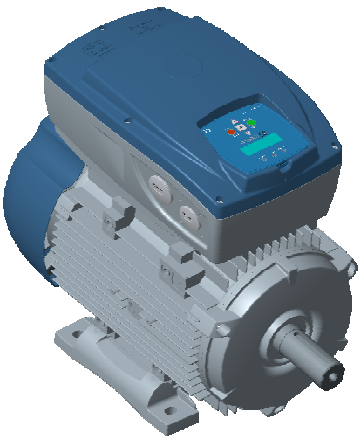
3a. Dimensions

NEO-PUMP-3 and Keypad



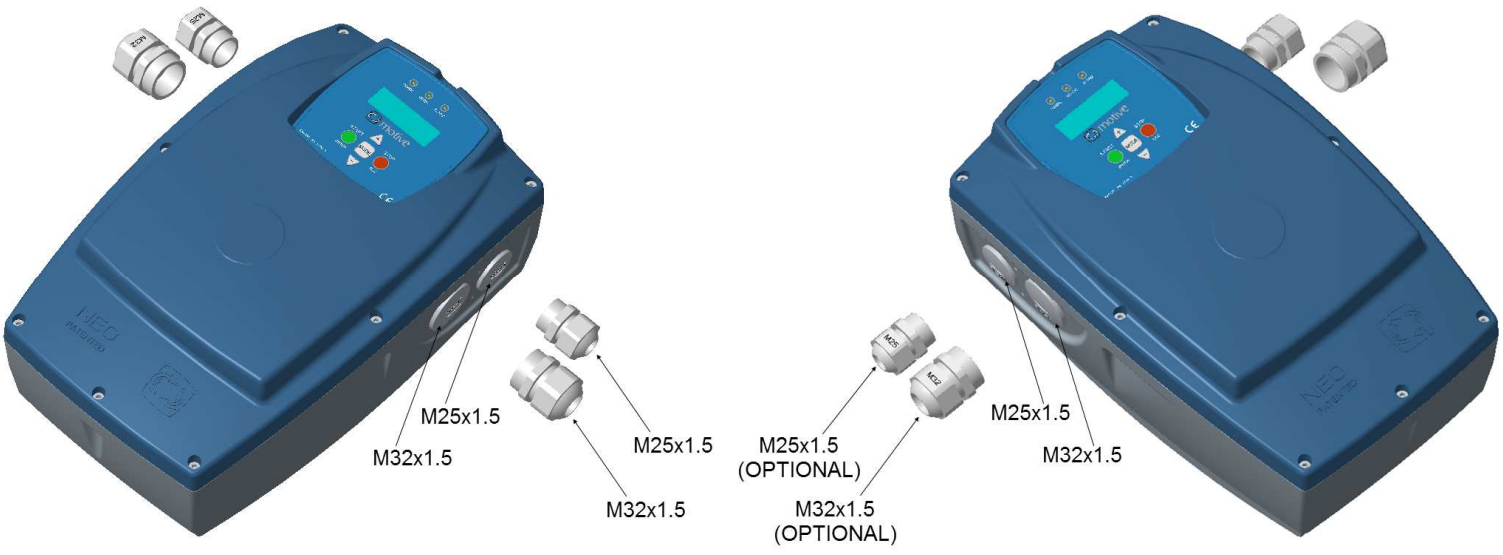


NEO-PUMP-11

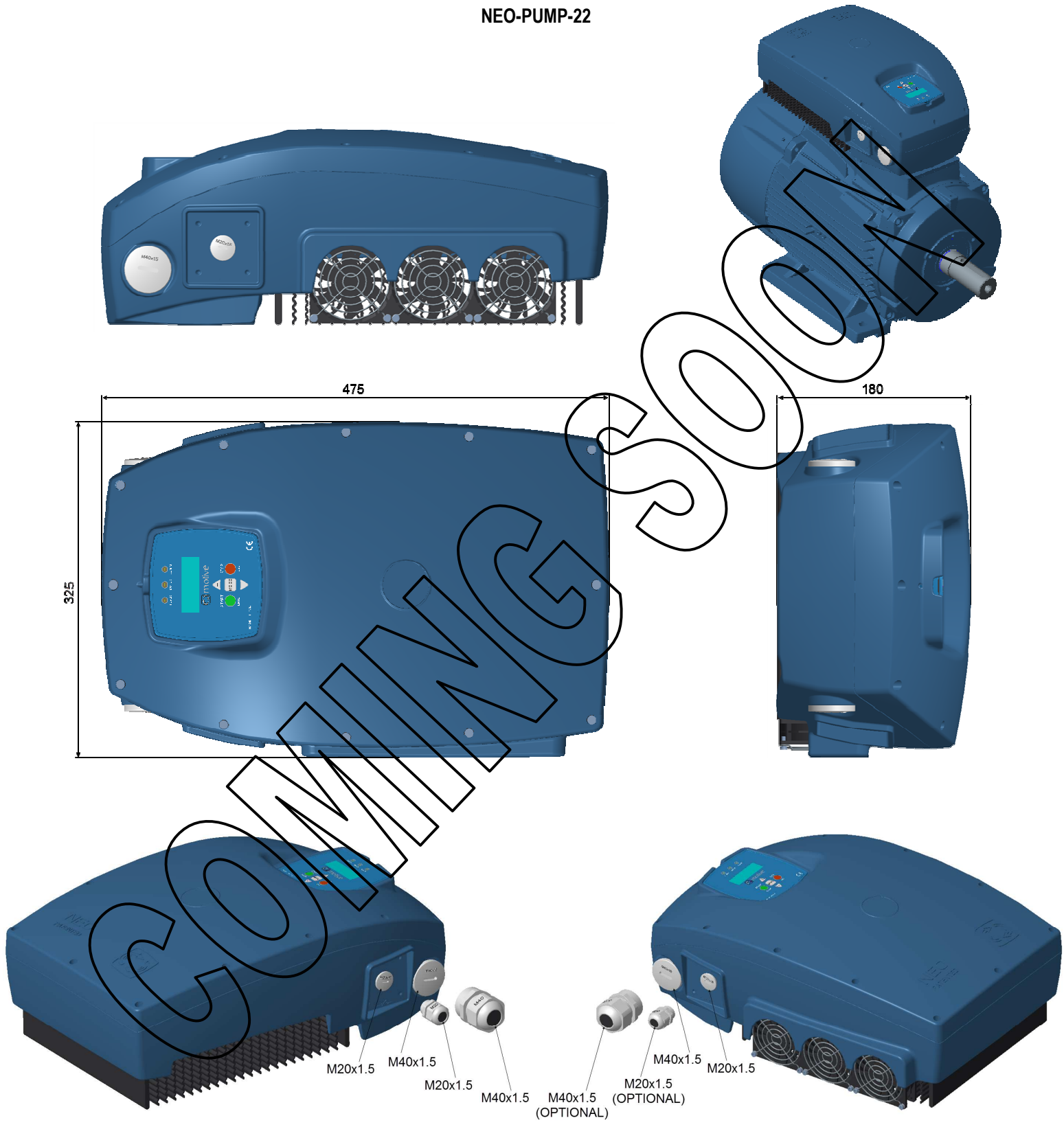



362
226


158

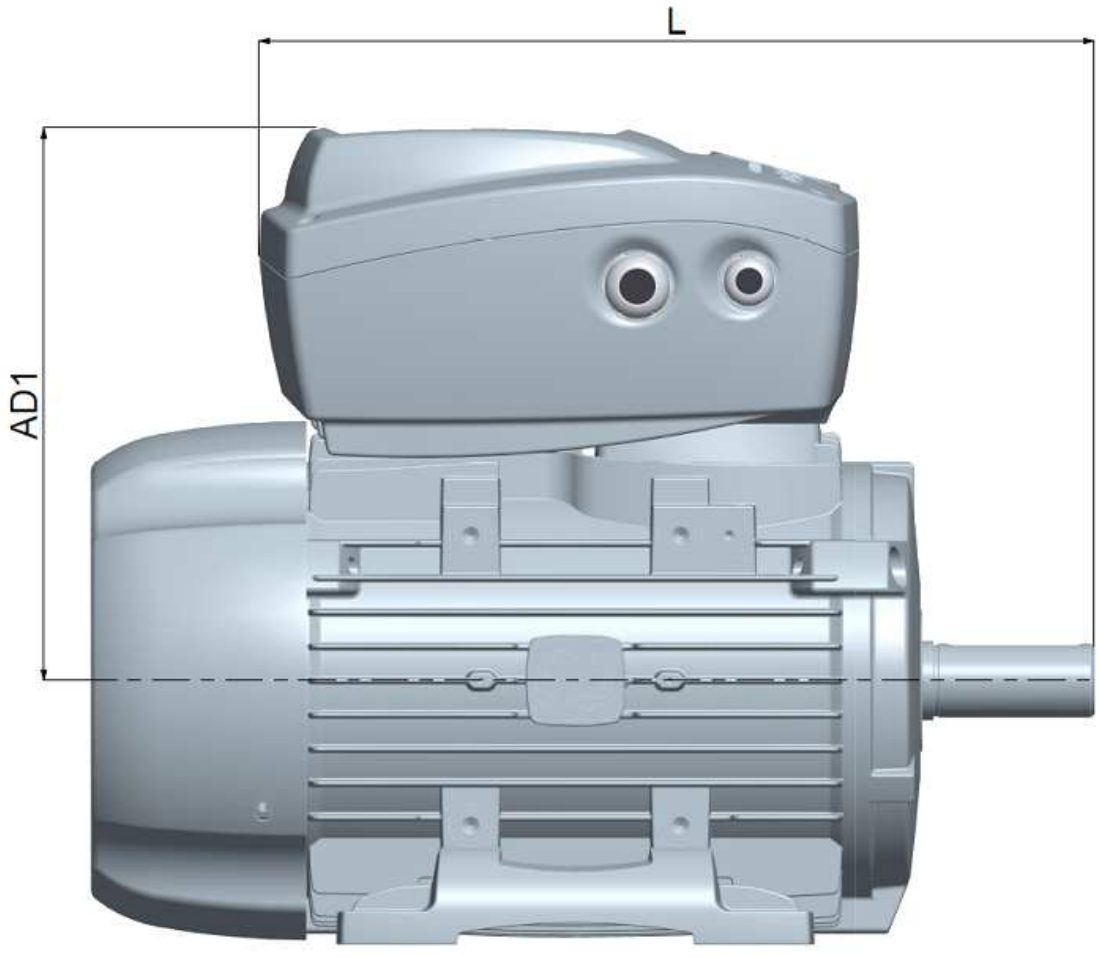

M25x1.5
M32x1.5
M25x1.5
M32x1.5
M25x1.5
(OPTIONAL)
M32x1.5
(OPTIONAL)
M25x1.5
M32x1.5

NEO-PUMP-22



Dimensions NEO-PUMP + motore

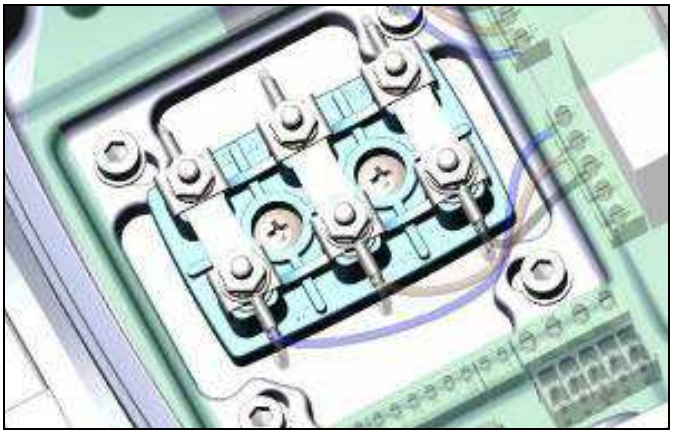
	NEO-PUMP-3		NEO-PUMP-11		NEO-PUMP-22	
Motore IEC	AD1	L	AD1	L	AD1	L
63	188	264				
71	195	278				
80	211	288				
90S	215	=	242	431		
90L	196	=	242	431		
100L	210	=	251	438		
112	233	=	261	447		
132S	252	=	274	475		
132M	252	=	274	=		
160M			342	=	335	640
160L					335	=
180M					350	=
180L					350	=



3b. Motor mounting

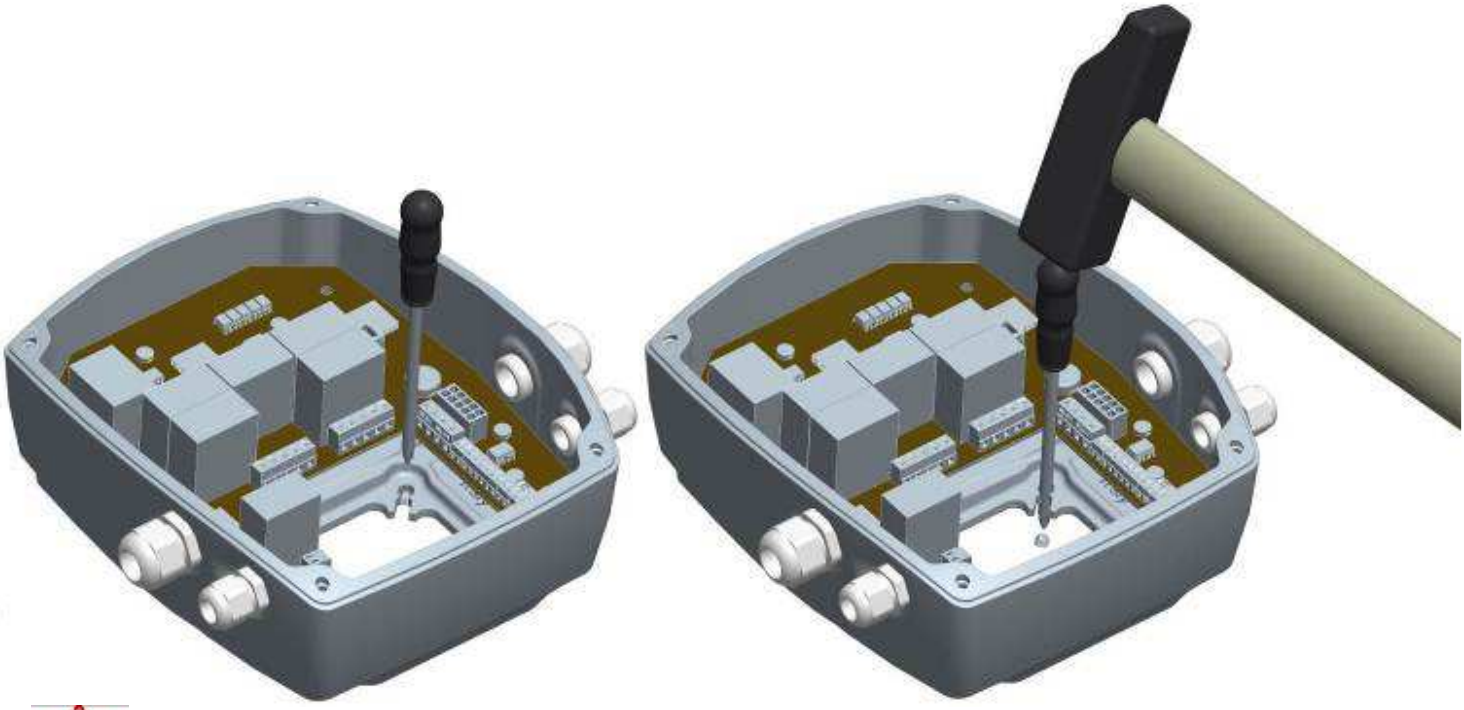
The mechanical fastening with slots (Ill. 5) allows the NEO-PUMP case to be fixed onto a wide range of Delphi series motive motors from size 71 to size 160 (Table. RD)

Ill.5



The plastic knockouts allow the NEO-PUMP-3 to broaden its field of use to engines with greater sizes (Table RD), as shown in the following image.

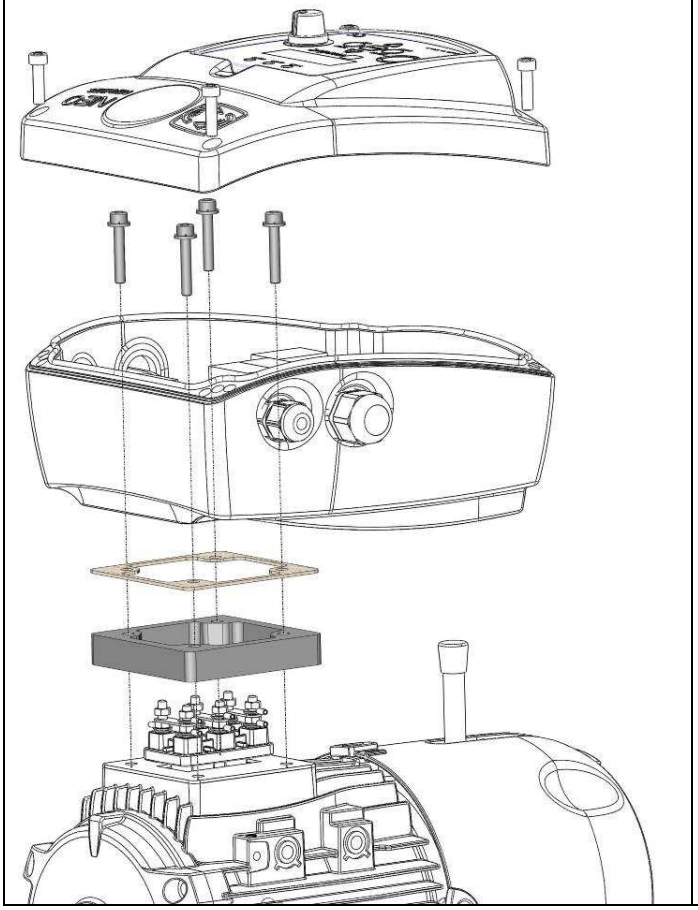
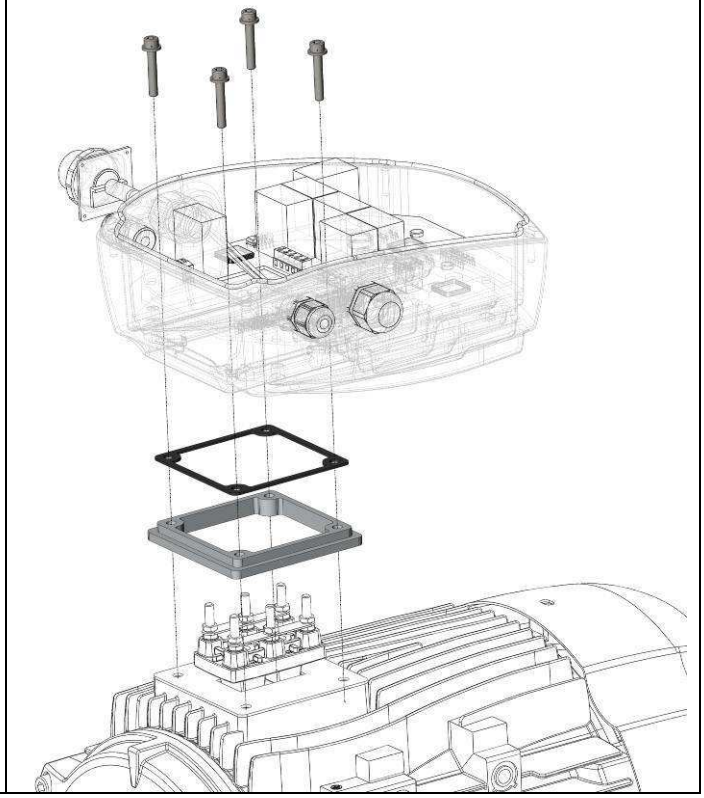
Aluminum knockout removal procedure

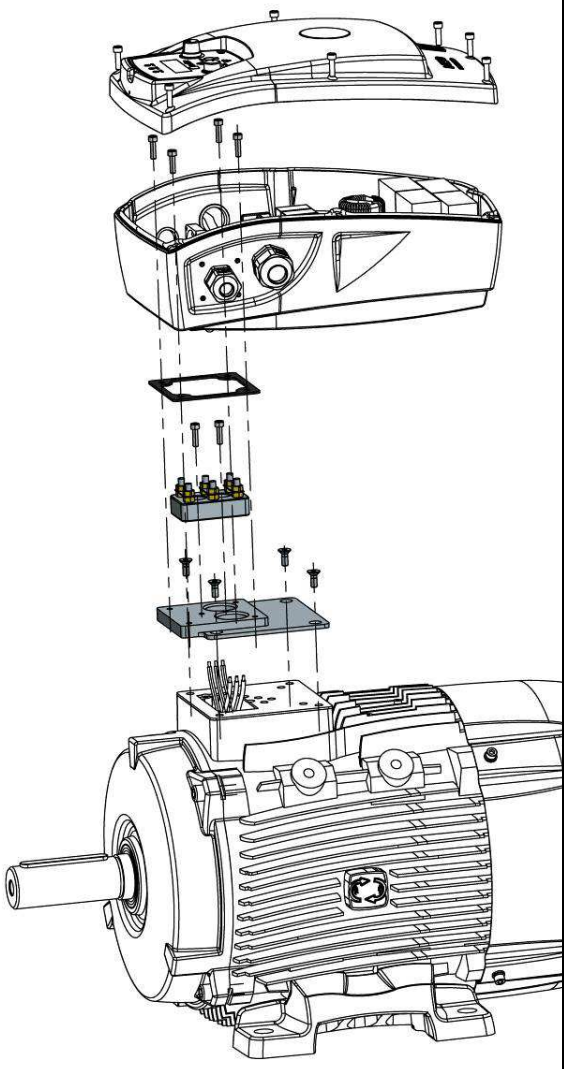
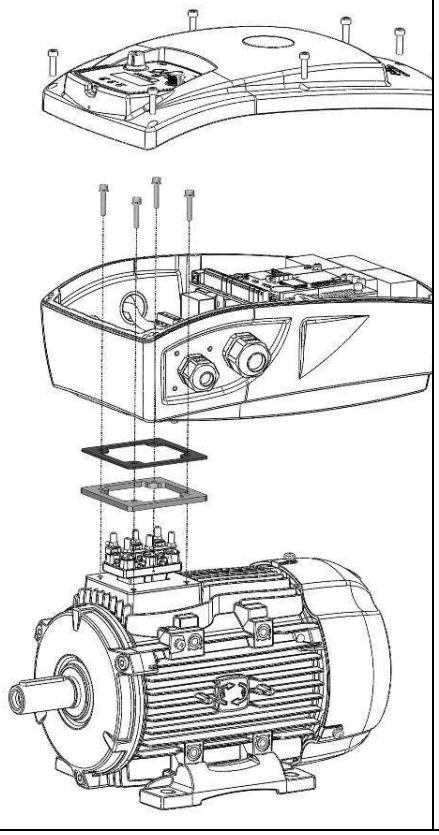
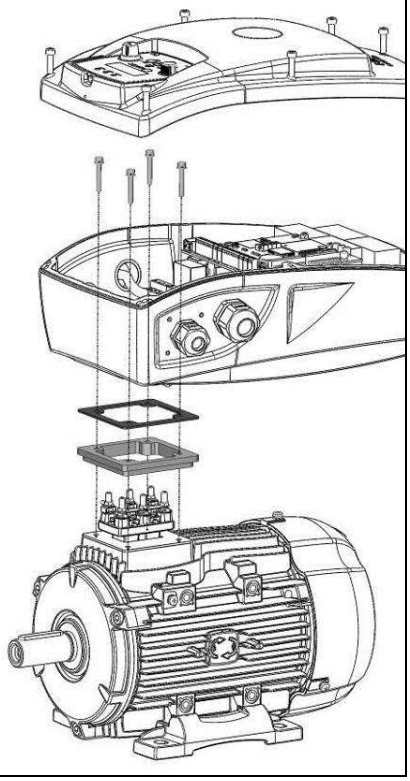


Be careful not to disperse metal or wire ends inside the housing of the inverter, that can create dangerous short-circuits.

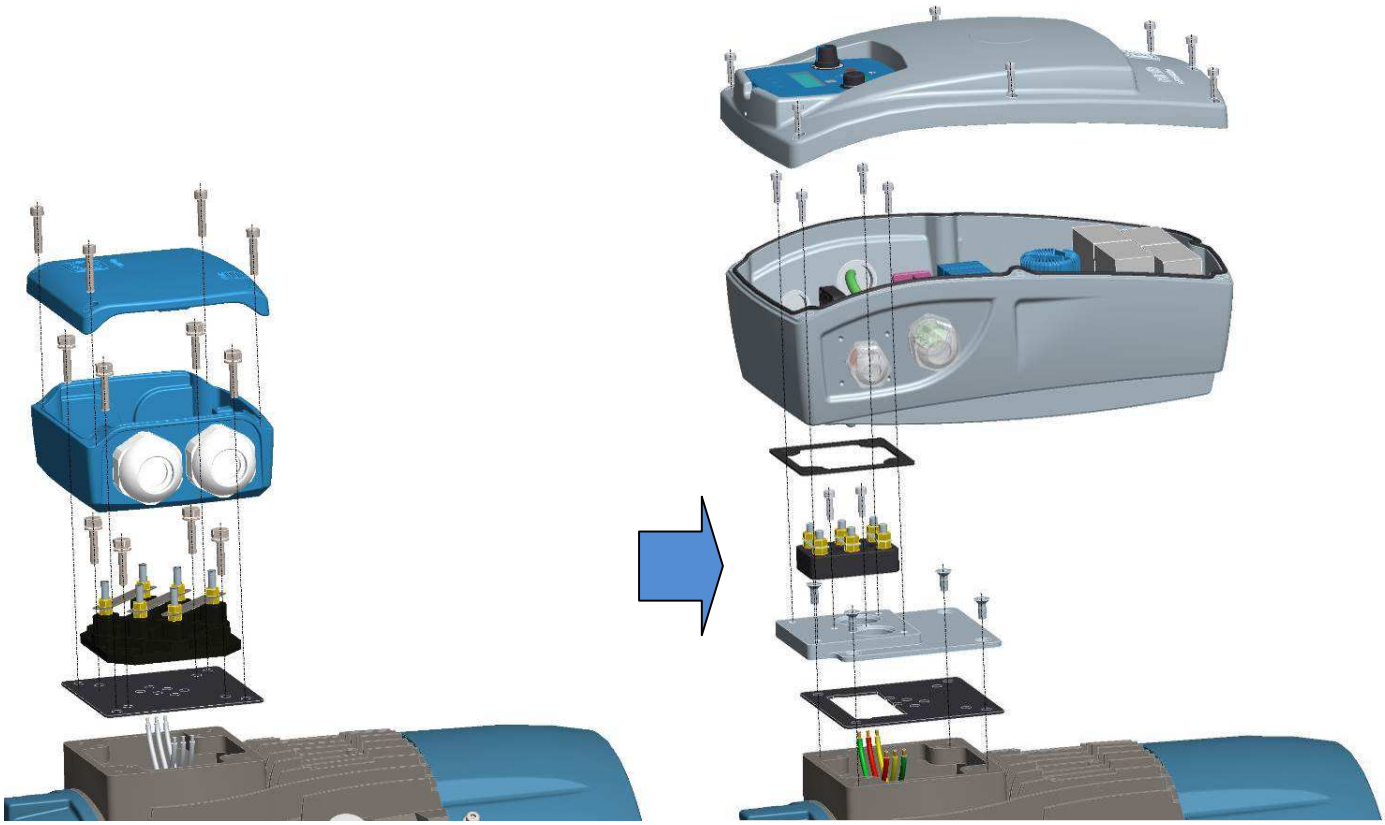
For the connection between NEO-PUMP-3 and the motors marked with X in the “Tab. RD”, specific mechanical adapters are needed. See the following images.

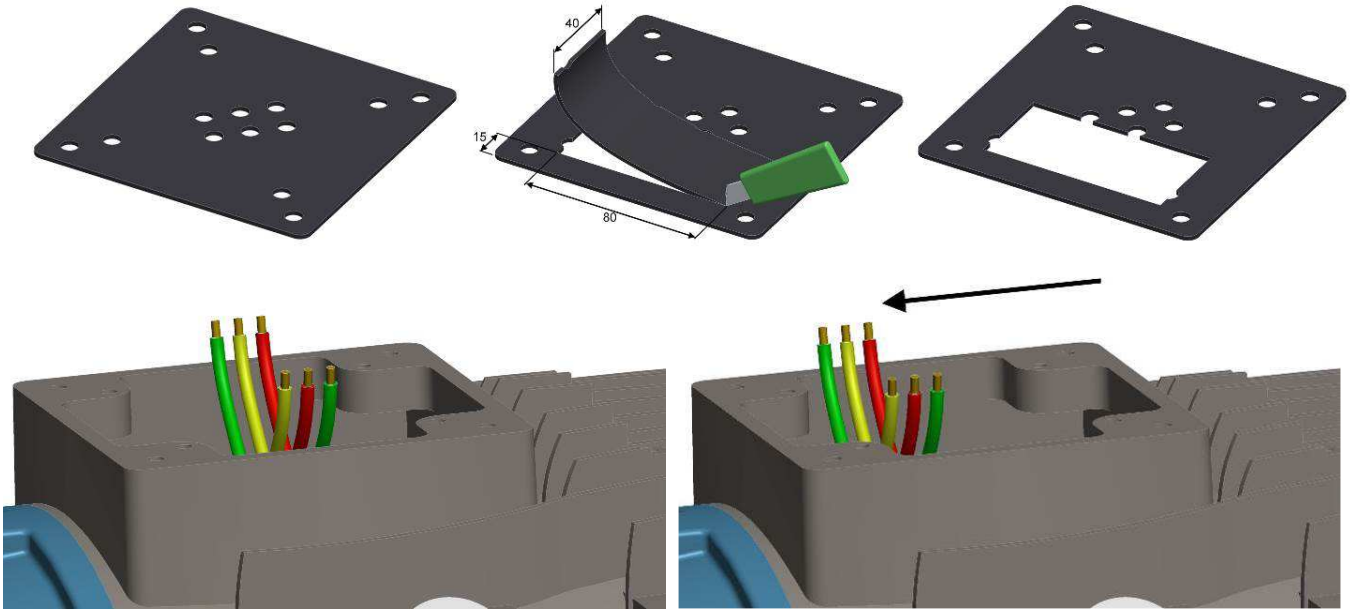
NEO-PUMP-3

71-80-90S:	112-132:
	

160M*	100L	90S/90L
		

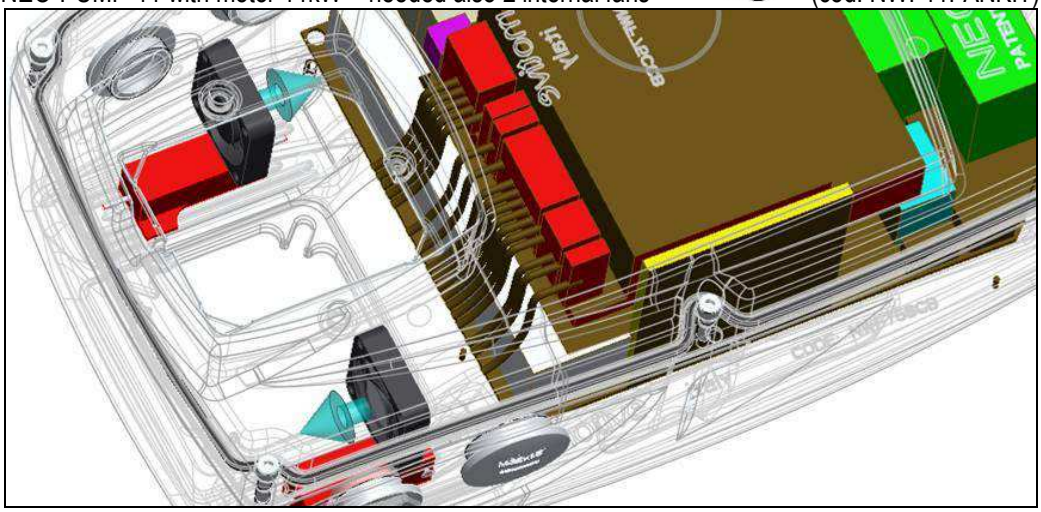
*NEO-PUMP-11 + motor IEC 160M

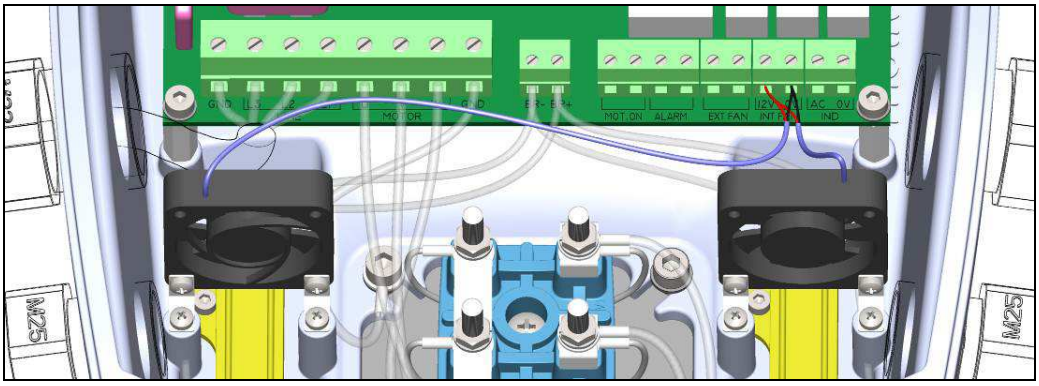


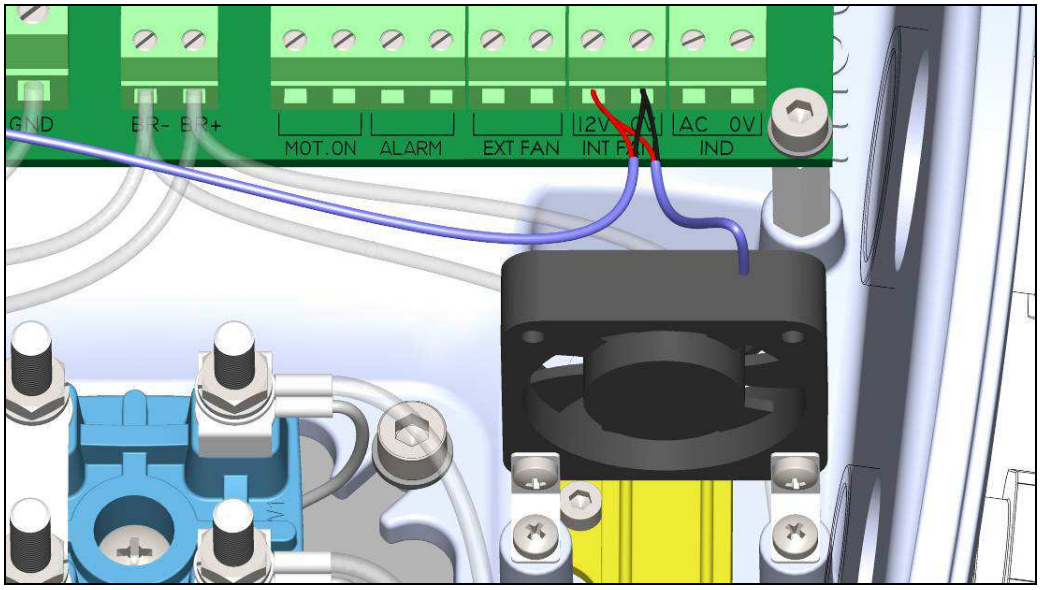


Do not lift or transport the motor connected to the inverter by gripping the inverter box.

NEO-PUMP-11 with motor 11kW = needed also 2 internal fans  (cod. NWF11FANKIT)







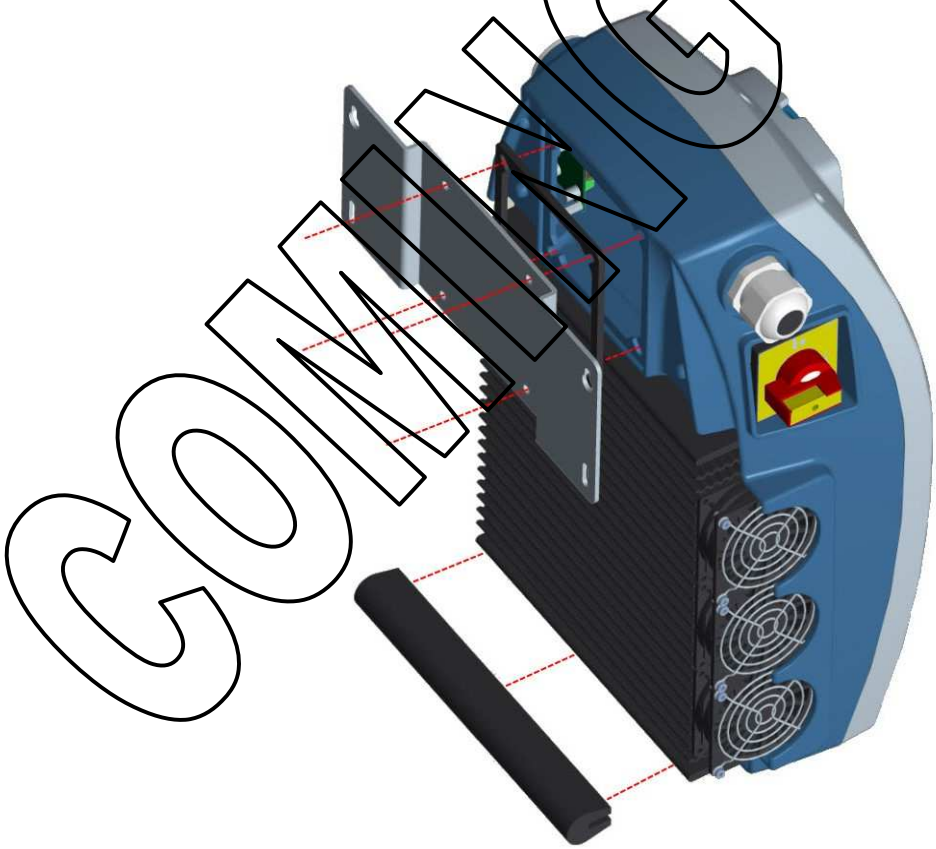
3c. Wall mounting NEO-WALL (optional)

If a wall mounting is needed, for example when submersible pump is used, you can use NEO-“WALL” (mounting instructions and electrical connections provided with every kit).

NEO-WALL3

NEO-WALL11

NEO-WALL22



3d. Keypad

A keypad is compulsory for each NEO-PUMP. The keypad is supplied in this version:

Standard version
IP67

Thanks to 4 magnets incorporated into the keypad case (Ill. 6), the keypad safely rests in its housing, in any assembly position.

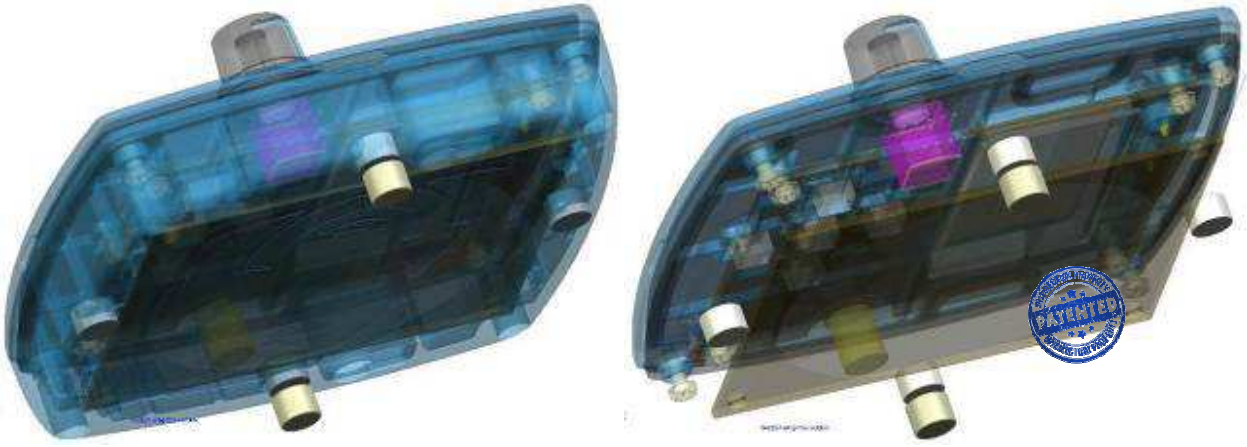


Fig.6

This also offers the advantage of allowing the keypad to be rotated into 4 positions, depending on the preferred point of view

If the keypad is removed from the NEO-PUMP case, it can be fixed to the wall in 2 ways.

- If the wall is made of metal, by using the magnetism of 4 magnets in the keypad (Ill. 7).

Fig.7

- Alternatively, it can be fixed onto 2 inserts by using the designated slots on the back of the case (Ill. 8)

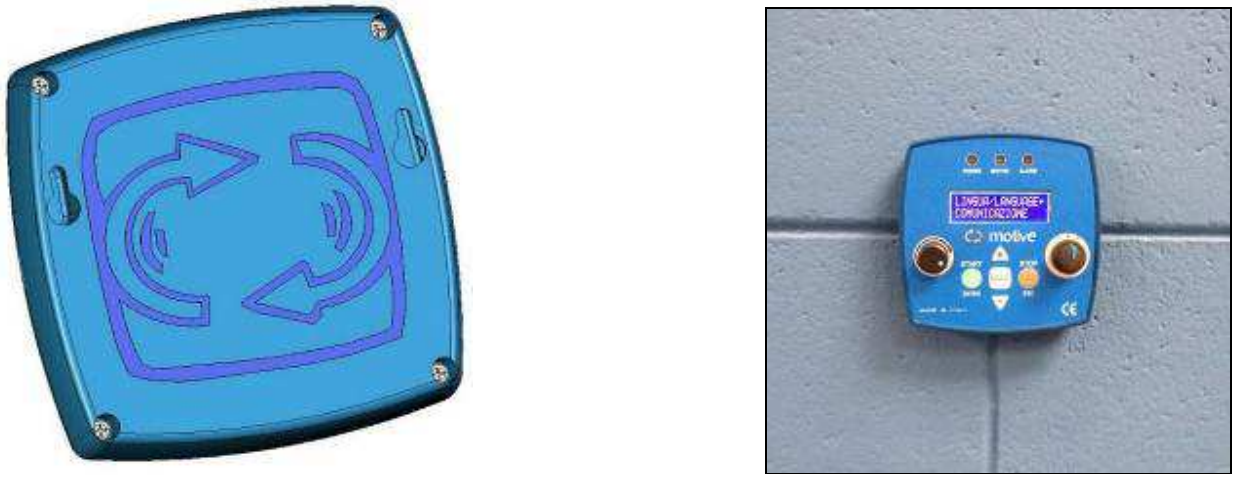


Fig.8

Each keypad comes equipped with two rechargeable 250BVH batteries (Diameter = 25mm, height 6.4mm, 1.2 Vdc, 250 mAh)

3e. Keypad batteries

Before you start to use the keypad for the first time, recharge the batteries, leaving the keypad resting inside its seat in NEO-WiFi (with stopped motor) or inside BLOCK, while BLOCK or NEO-WiFi are powered, for 10 hours

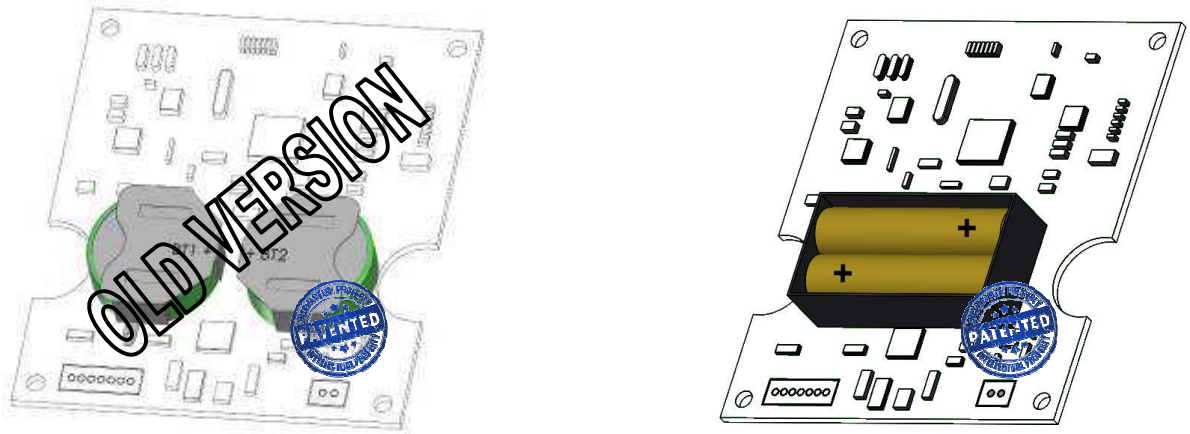
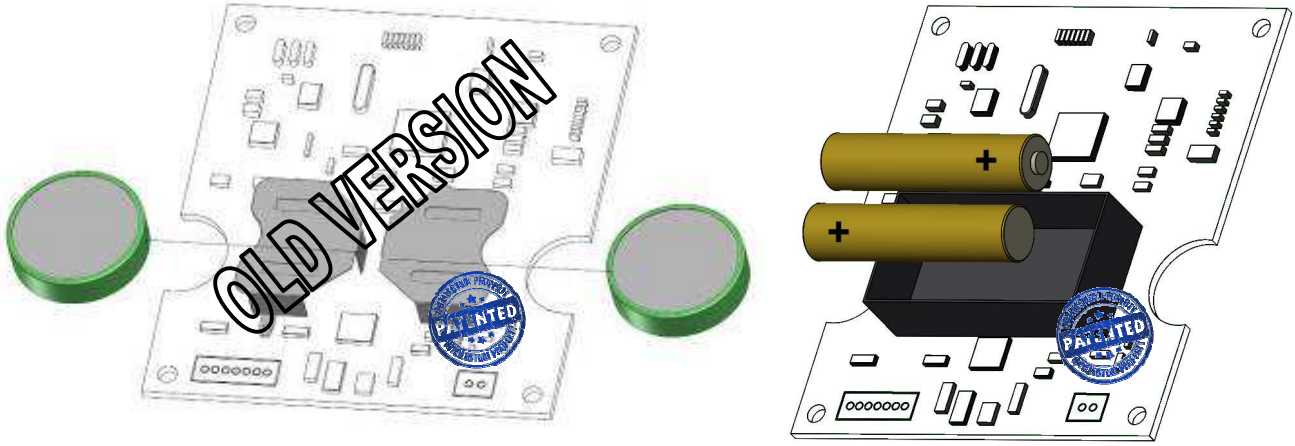


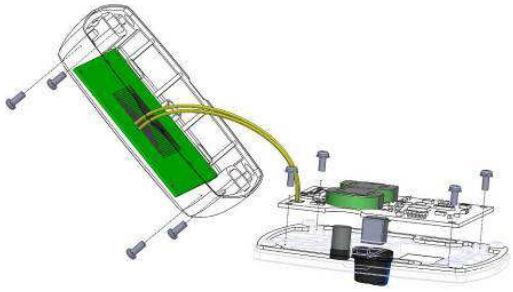
Illustration 14 - Diagram rear NEO-WiFi logic control board

- the rechargeable batteries, if they are regularly charged, can last for several years; if not charged for long periods of time, it may however become necessary to replace the batteries.
- Battery charging time: with display turned on about 1 hour (NB: it is unlikely that the client will uninterruptedly use the buttons for this period of time) – in stand-by mode it will last indefinitely because there is no power use, until the MODE button is pressed that will reactivate the keypad and its screen;
- Full-charge time with keypad in the inverter case or on BLOCK feeder: about 1 hour;

To remove the batteries, open the control panel and move them externally from their slots. Check that there is no oxide on the contacts.



In the presence of selector and potentiometer the 4 M3 screws that are at the top of the display board must be unscrewed. Extract it so that the batteries can be removed and replaced; at the end of this operation the board will need to be screwed back on to the cover of the keypad.
Do not damage the screws' seats by excessive clamping.



3f. BLOCK – induction power support for table or wall mounting

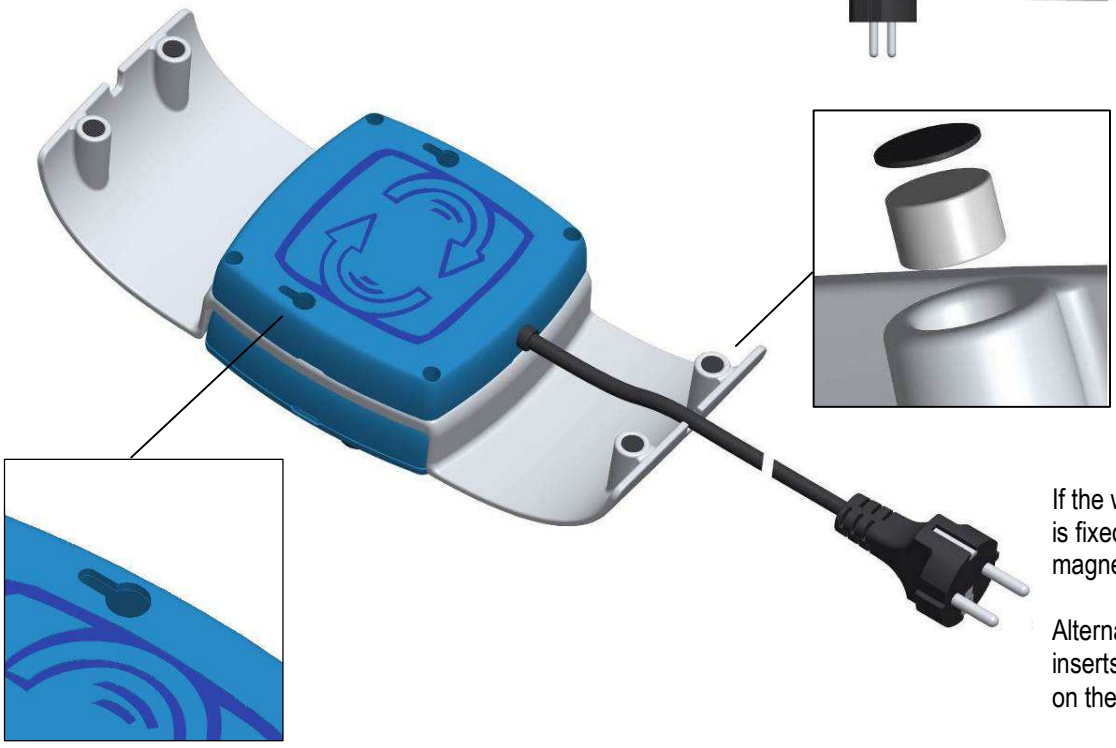
200-260Vac 1PH 50/60Hz IP65

The keypad is attracted and hold in BLOCK seat by magnets

The keypad can be positioned in any position.

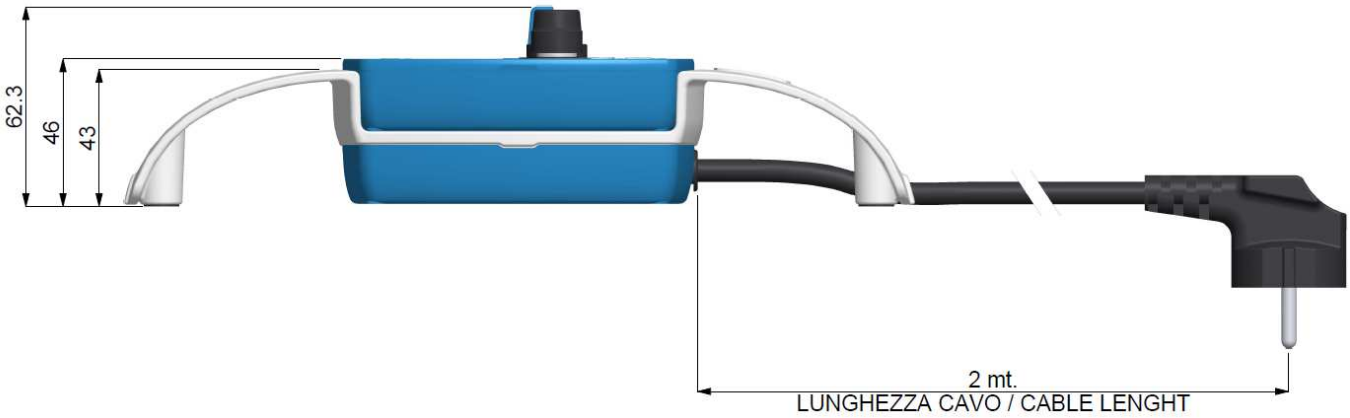
The keypad is powered by induction.

BLOCK is IP65



If the wall is made of metal, BLOCK is fixed by the magnetism of its 4 magnets

Alternatively, it can be fixed onto 2 inserts by using the designated slots on the back of BLOCK


62.3
46
43
2 mt.
LUNGHEZZA CAVO / CABLE LENGHT


247
110
motive
STOP
ESC
MODE
START
ENTER
ALARM
MOTOR
POWER
MADE IN ITALY

4. ELECTRICAL ASSEMBLY

4a. Warnings

The installation must be carried out exclusively by qualified and expert personnel.

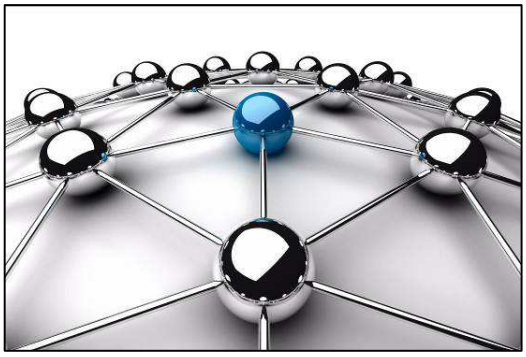
Any handling of the open Inverter box must be done at least 1 minute after the interruption of power, with an appropriate disconnect switch or by manually removing the power cable. To be certain that the internal capacitors are discharged, and that therefore maintenance can be performed, the internal LED located on the lower part (green diode) of the power board, must be completely turned off. Always unplug NEO-WiFi from the power outlet before handling any electrical or mechanical parts of the system.

Read this manual and the engine manual (download from www.motive.it) before installation.
In the event that the product has evident signs of damage, do not proceed with the installation and contact the Service Centre.
Strictly observe the safety and accident prevention regulations.

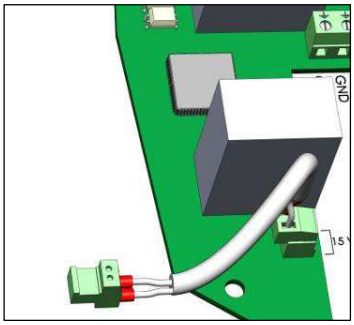
The mains voltage must match the one required by the inverter (Chap. 2).

Disconnect the power supply of the Inverter by acting on the upstream switch before opening its enclosure;

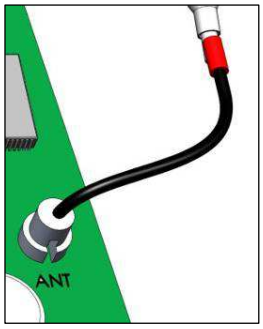
EMC Directive requires that the both the NEO-WiFi power cables are of the coaxial (or armoured) type with the single conductors having a section greater than or equal to 1.5 mm. The shielding of the conductors must be grounded at both ends.
To avoid ground loops that can cause radiated disturbance (antenna effect), the motor driven by NEO-WiFi must be grounded individually, always with a low-impedance connection.
The paths of the main and motor-inverter power cords should be separated as much as possible. Do not create loops. If they should intersect, make sure it is at 90 degrees to produce the least coupling. Failure to comply with these conditions may completely or in part nullify the effect of the anti-disturbance filter.
In some cases, to completely eliminate some disturbances (radiated or conducted) that other very sensitive plant equipment may be subject to, another three-phase EMC mains filter must be used, (Minimum rated current 8 amps) connected upstream, as input to the inverter.



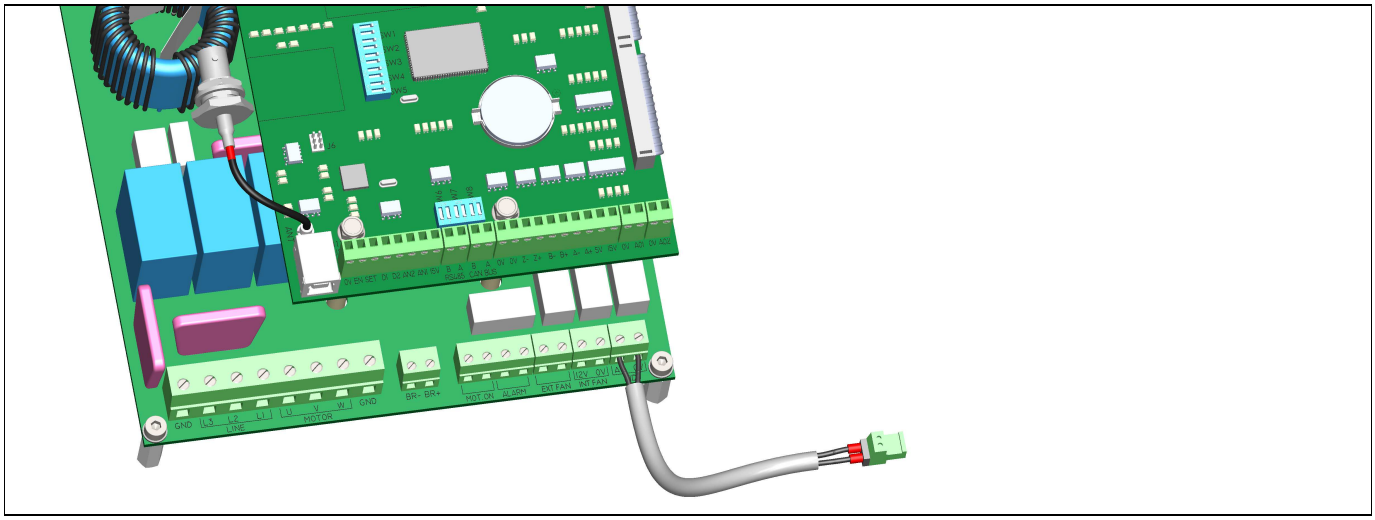
4b. Electrical connection of NEO-PUMP



- Open the inverter box by unscrewing the 4 screws of the lid;
- Disconnect the connectors of the coaxial cable of the antenna (ANT) and the inductive power supply (15Vac) – (Ill. 13) – to completely separate the lid from the bottom of the inverter box, to facilitate the mounting on the motor;
- Connect the terminals of the motor terminal box to NEO-PUMP connectors as shown in the Ill. 9, 10, 11, or 12.



NEO-PUMP-11 / NEO-PUMP-22



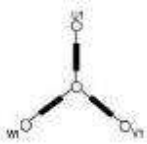
COAXIAL CABLE CONNECTOR ON THE POWER BOARD: When connecting the coaxial cable to the power board, do not use metal tools that may damage the surrounding SMD electrical components that are extremely delicate.

NEO-PUMP must be installed on a three-phase asynchronous motor.

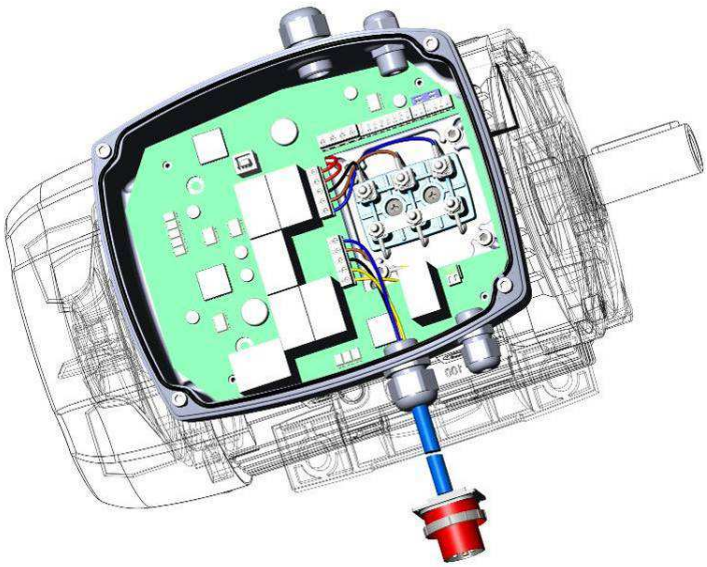
GROUNDING CONNECTIONS, important for the electrical safety of people and to suppress electromagnetic interference conducted in the mains:

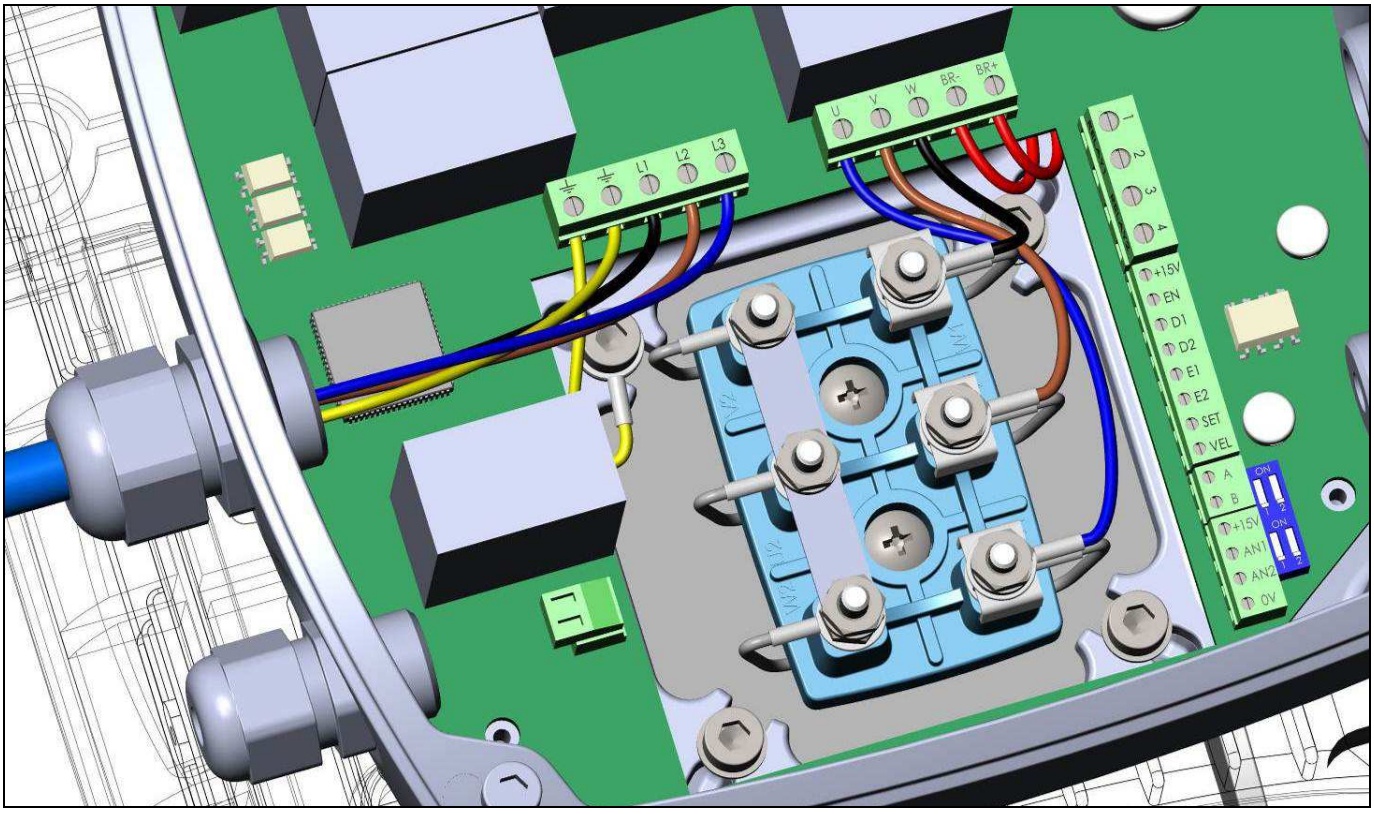
- Small yellow/green cable with M5 eyelet on one side and pre-insulated point on the other, to be connected between the motor frame and GND input on the power board.
- Yellow/green ground wire of the mains supply cable 400 V to connect to the other GND input of the terminal box on the power board.

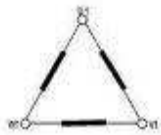
4c. Diagrams

NEO-PUMP-3. The phases of the motor must be in a star connection  if the motor has 230VΔ/400VY on plate (III.9).

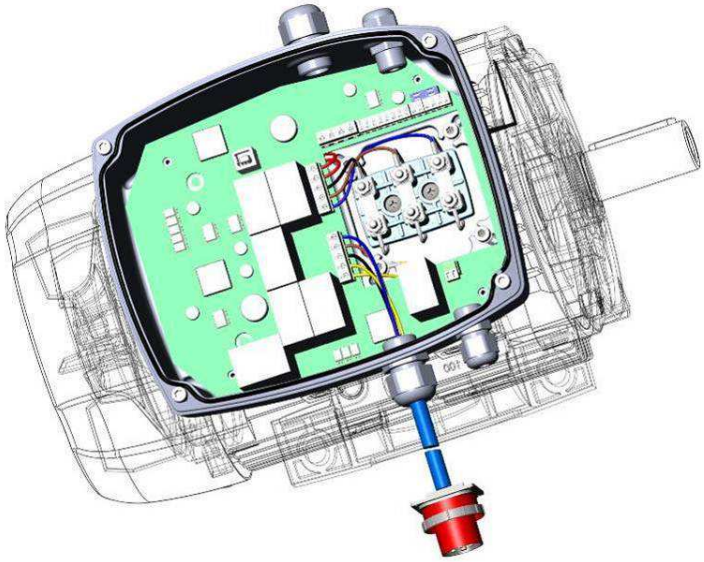
III. 9

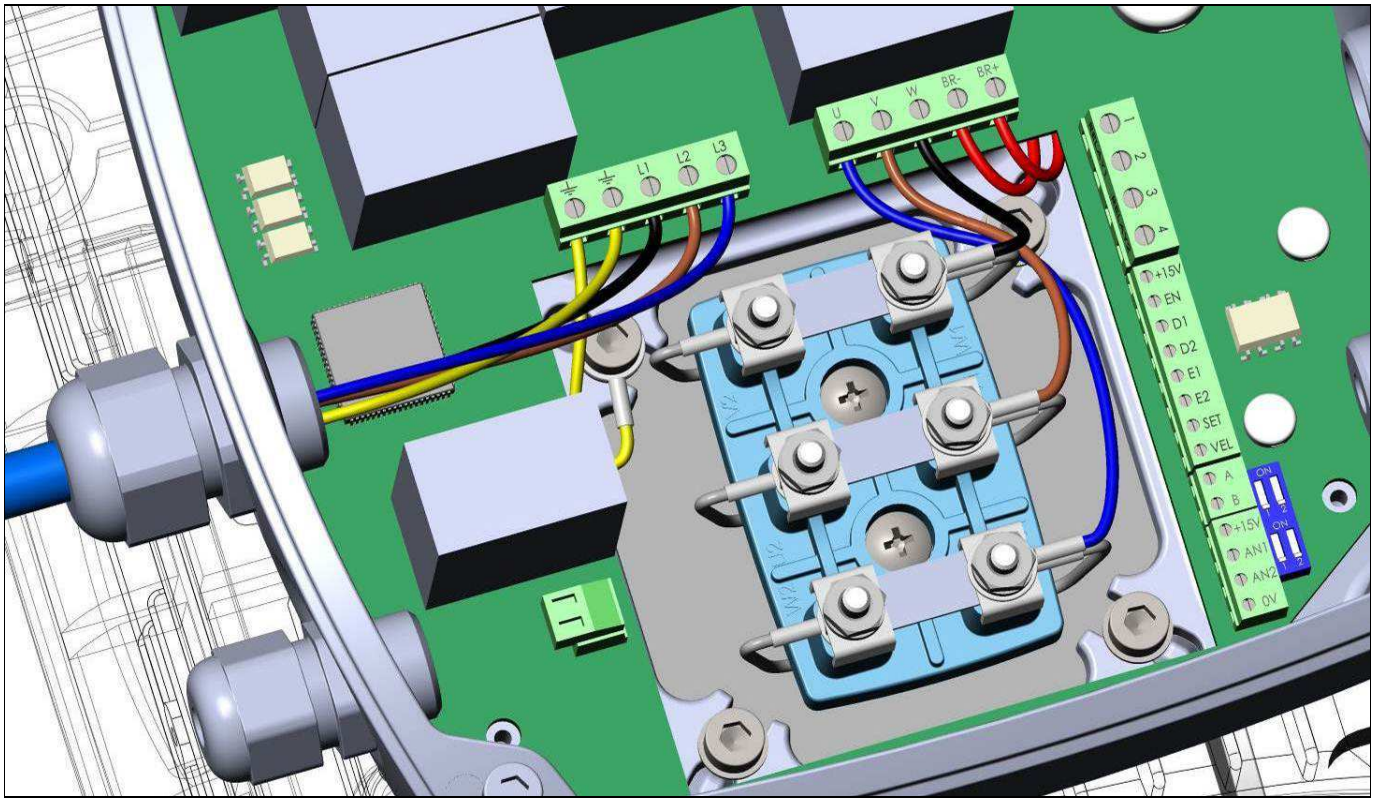


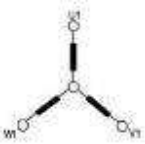


NEO-PUMP-3. The phases of the motor must be in a triangle connection  if the motor has 400VΔ/690VY or 230Δ/400Y on the plate with 87Hz technique (chap. 5d) (Ill.10).

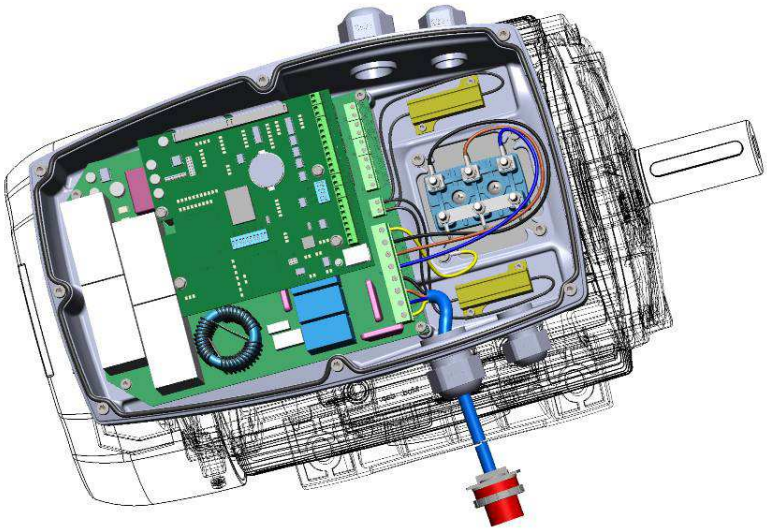
Ill.10

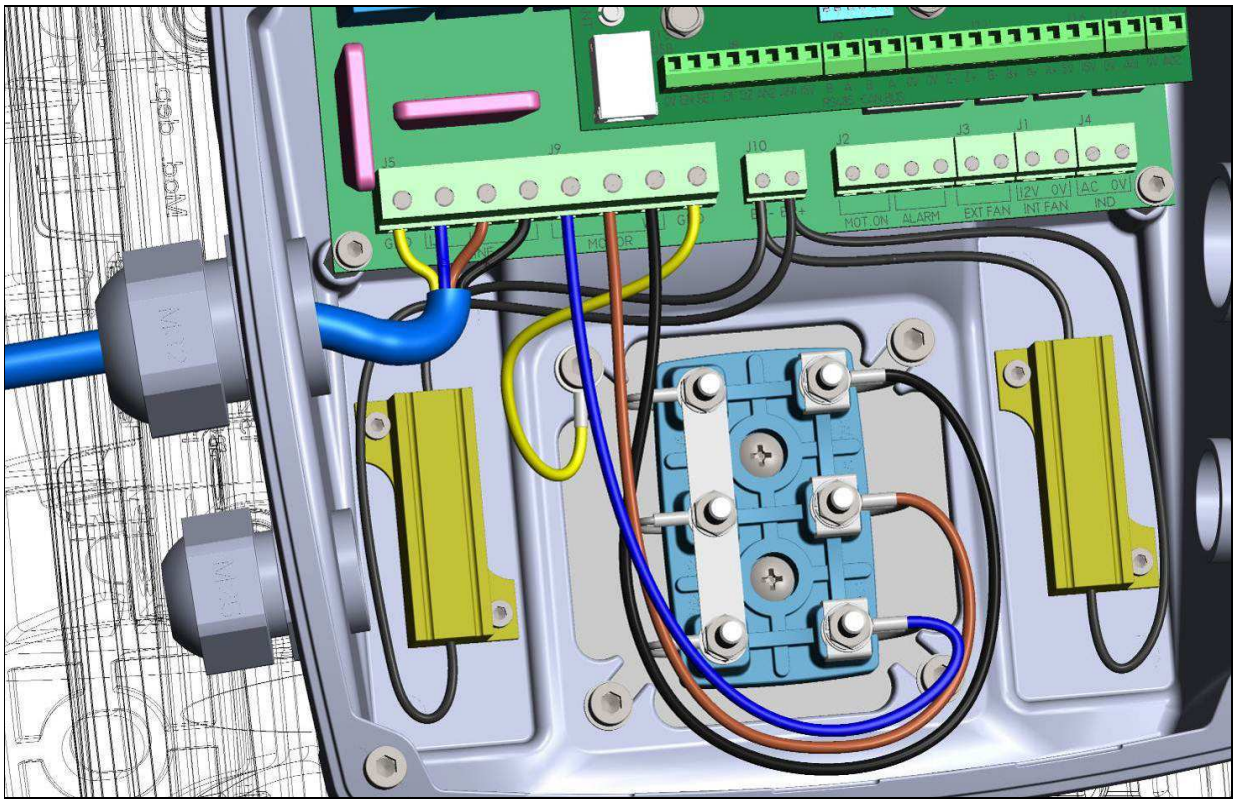


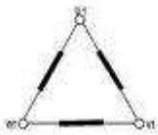


NEO-PUMP-11/ NEO-PUMP-22. The phases of the motor must be in a star connection  if the motor has 230VΔ/400VY on the plate (Ill. 9 (11)).

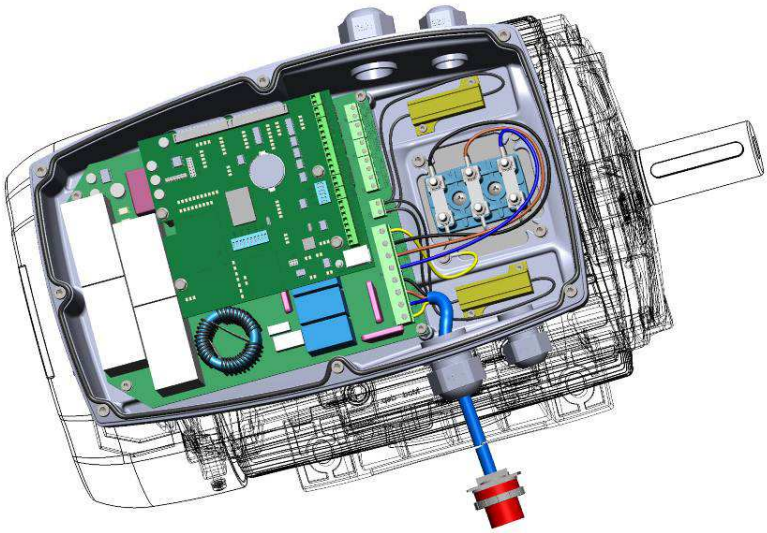
Ill. 9 (11)

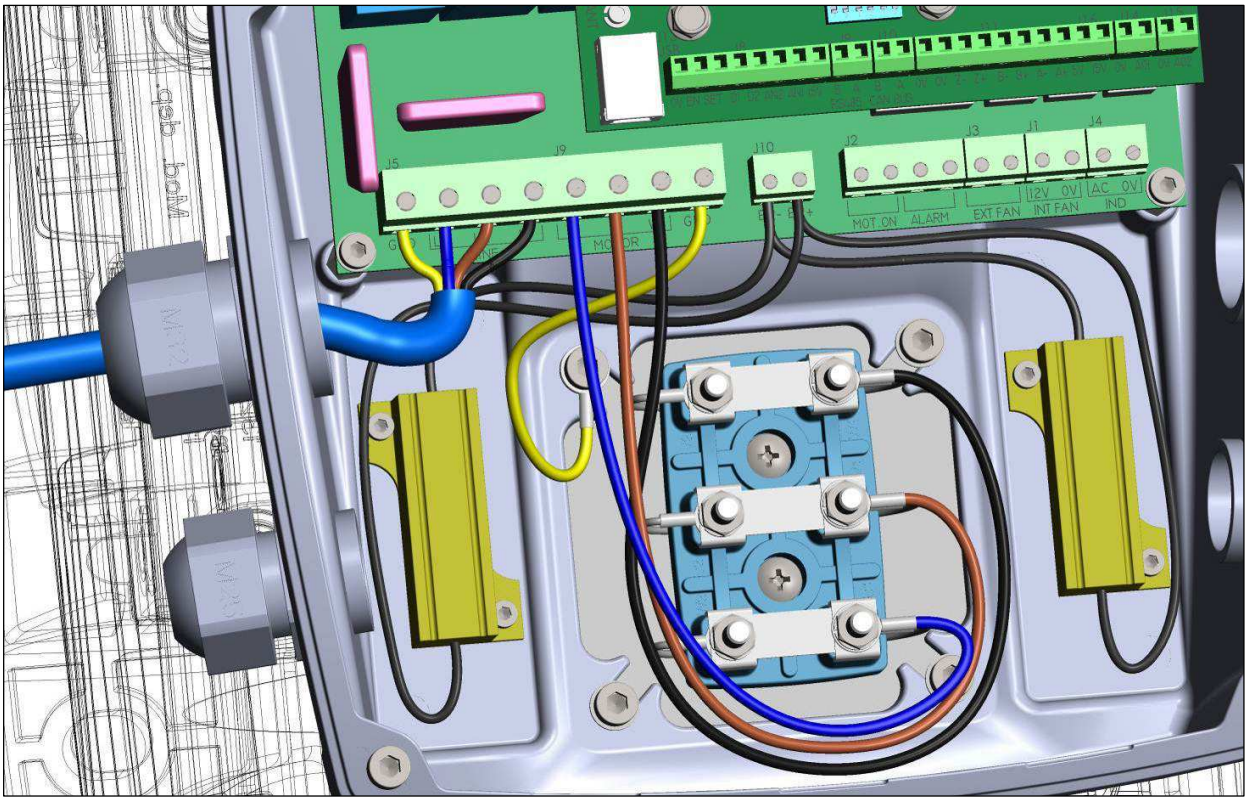




NEO-PUMP-11/ NEO-PUMP-22. The phases of the motor must be in a triangle connection  if the motor has 400VΔ/690VY or 230Δ/400Y on the plate with 87Hz technique (chap. 5d) (III.10 (11)).

(III.10 (11))





4d. Connection of the external devices

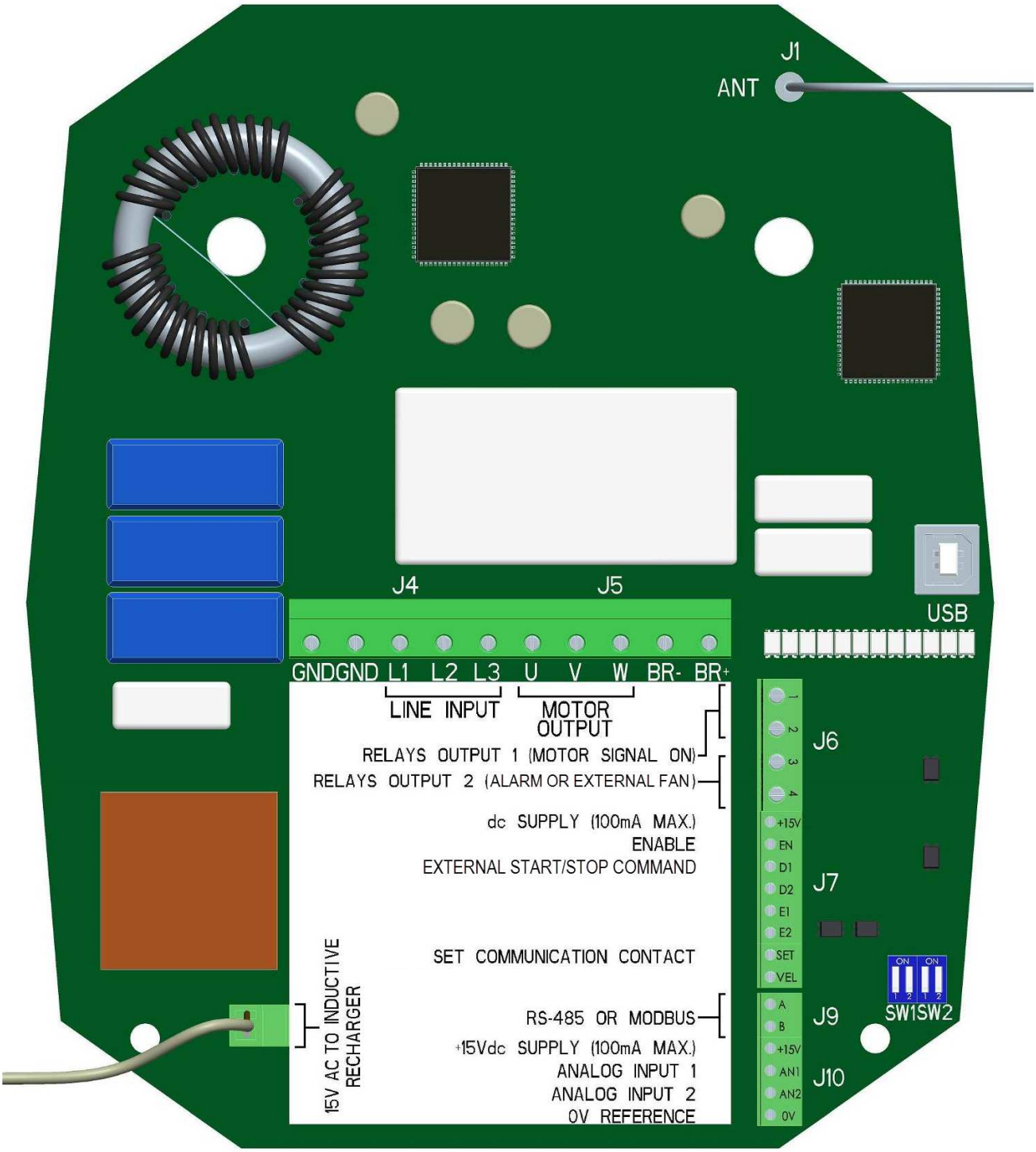


Illustration 13 (3) - Power Module - NEO-PUMP-3

NEO-PUMP-3

Pin	Terminal	Function
1	J6	MOTOR ON - normally open contact that closes when the motor starts It is possible to connect to external devices 5 Ampere max, 250Vac max
2		
3		FAN - normally open contact that can be set as: - enabling for external ventilation, the contact closes when the IGBT bridge temperature exceeds 50°C and it opens again when the temperature drops below 45°C (*Advanced Functions* > *Control type* > *Relais RL1* > *Fan*). - inverter alarm signaling (*Advanced Functions* > *Control type* > *Relais RL1* > *Alarm*).
4		
+15V	J7	15Vdc output (max 100mA)
EN		enables/disables the inverter operation (NOTE: do not connect it to 24Vdc)
D1		digital input for external motor start / stop command
D2		not activated
E1		not activated
E2		not activated
SET		communication channel selection (closing this contact with 15V)
VEL		not activated
A	J9	RS485 Modbus (for Master-Slave group connection)
B		
+15V	J10	15Vdc output (max 100mA)
AN1		analog input 1 (external signal for speed 0-10Vdc / 4-20mA)
AN2		analog input 2 (external potentiometer)
0V		0Vdc

GND	J4	ground
GND		ground
L1		phase 1 for inverter power supply from net
L2		phase 2 for inverter power supply from net
L3		phase 3 for inverter power supply from net
U	J5	U phase motor connection
V		V phase motor connection
W		W phase motor connection
BR-		internal braking resistances connection (opt. External)
BR+		

USB		PC connection for diagnostic

SW1		Via the 2 dips in ON position there's a 4-20mA configuration, in OFF position there's a 0-10V configuration (SW1 for AN1 and SW2 for AN2)
SW2		

15Vac		15Vac HF output for induction recharger

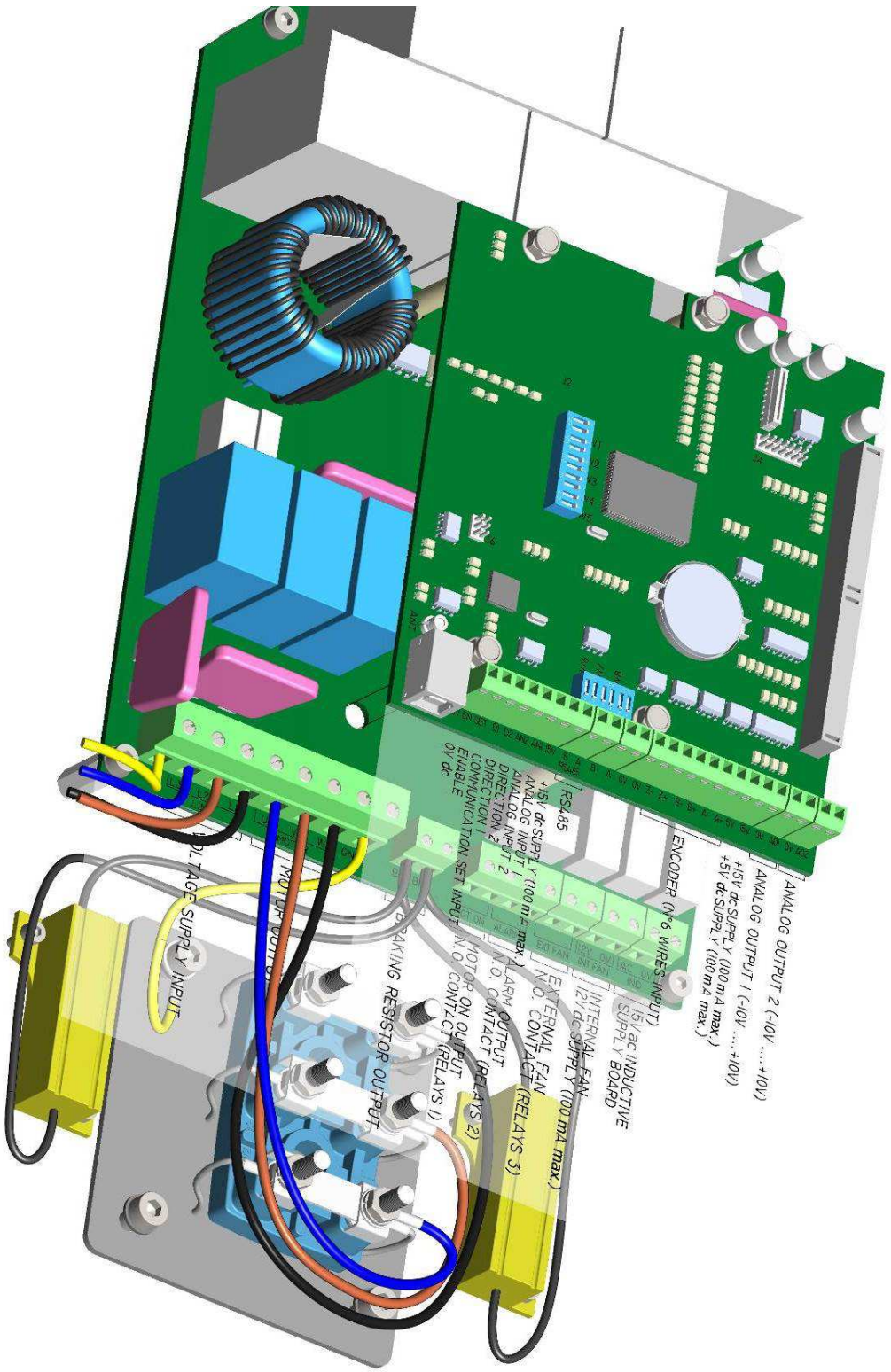
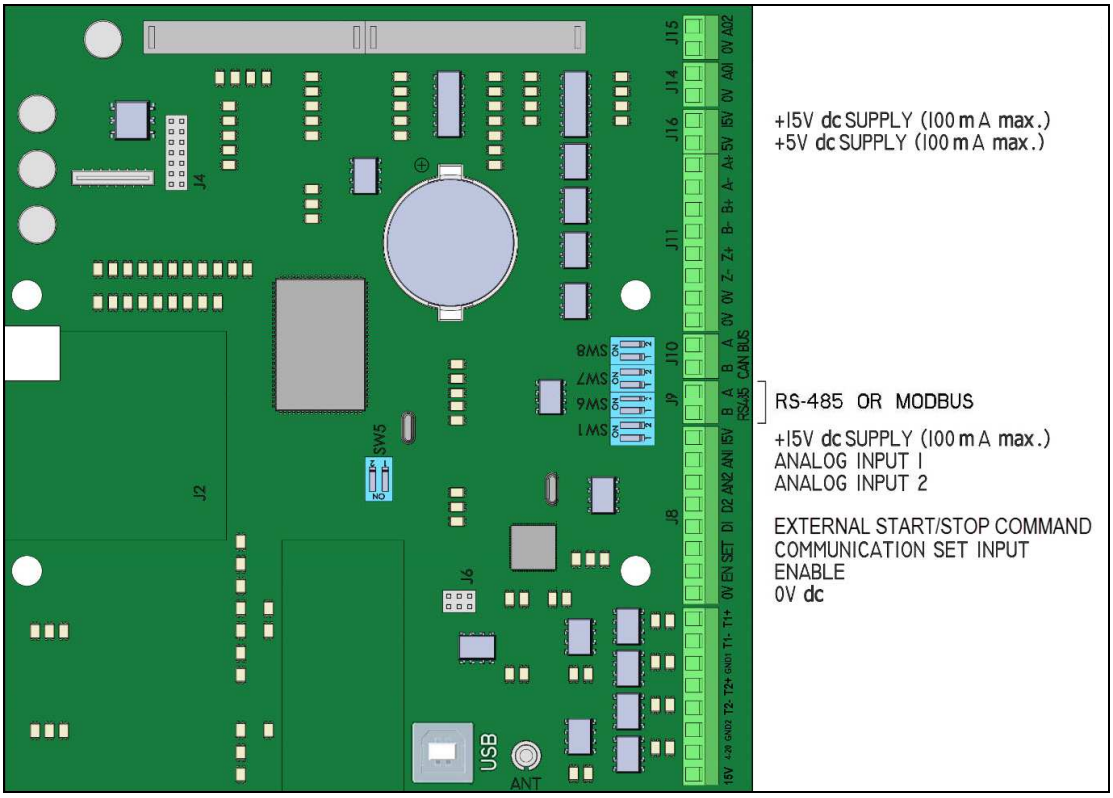
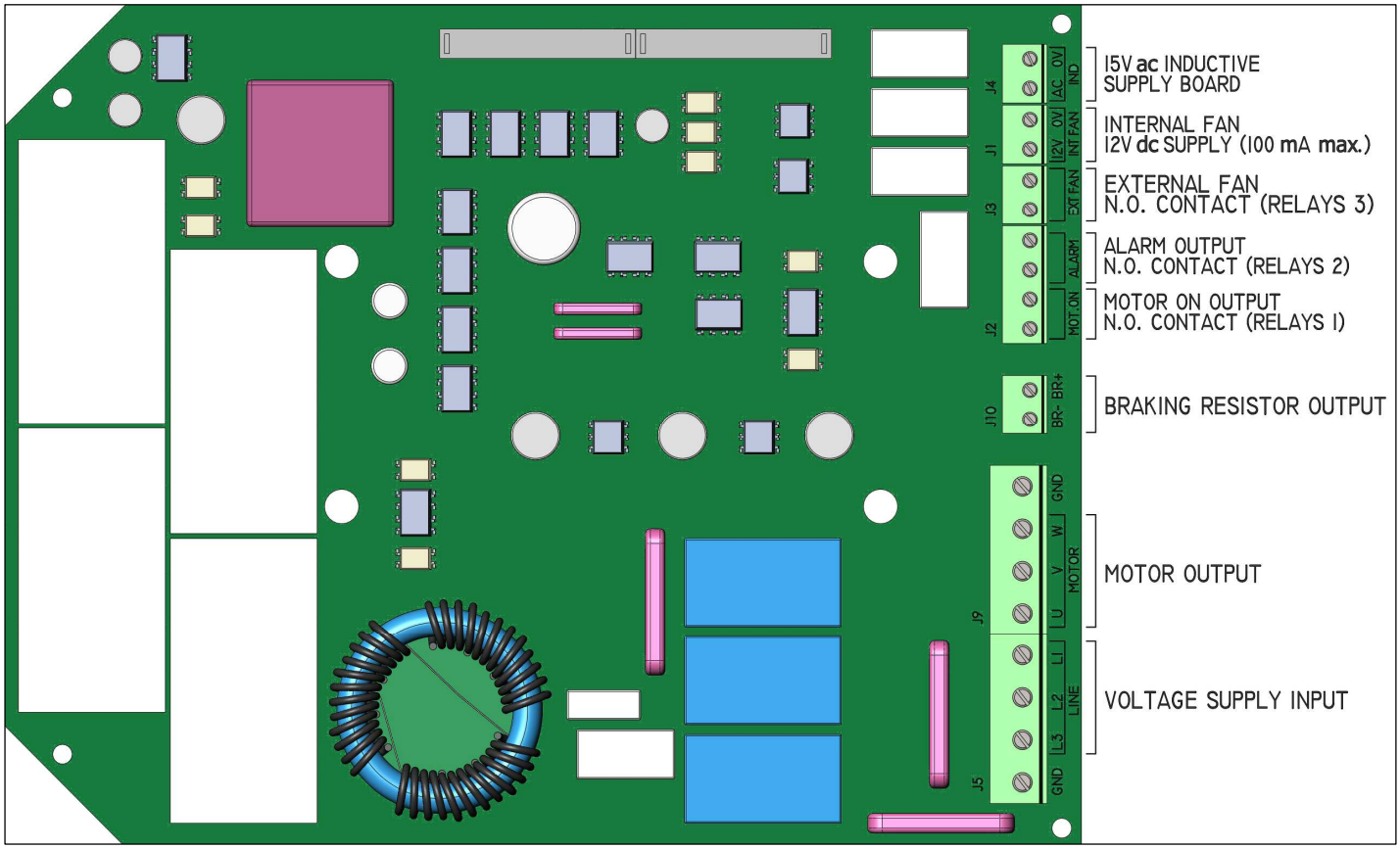


Illustration 13 (11) - Power and Control Module - NEO-PUMP-11


+15V dc SUPPLY (100 mA max.)
+5V dc SUPPLY (100 mA max.)
RS-485 OR MODBUS
+15V dc SUPPLY (100 mA max.)
ANALOG INPUT 1
ANALOG INPUT 2
EXTERNAL START/STOP COMMAND
COMMUNICATION SET INPUT
ENABLE
0V dc
USB
ANT


15V ac INDUCTIVE SUPPLY BOARD
INTERNAL FAN 12V dc SUPPLY (100 mA max.)
EXTERNAL FAN N.O. CONTACT (RELAYS 3)
ALARM OUTPUT N.O. CONTACT (RELAYS 2)
MOTOR ON OUTPUT N.O. CONTACT (RELAYS 1)
BRAKING RESISTOR OUTPUT
MOTOR OUTPUT
VOLTAGE SUPPLY INPUT

NEO-PUMP-11 (Control Module)

Pin	Terminal	Function
AO2	J15	not activated
0V		
AO1	J14	not activated
0V		
15V	J16	15Vdc output (max 100mA)
5V		5Vdc output (max 100mA)
A+	J11	not activated
A-		not activated
B+		not activated
B-		not activated
Z+		not activated
Z-		not activated
0V		ground
0V		ground
A	J10	not activated
B		
A	J9	RS485 Modbus (for Master-Slave group connection)
B		
15V	J8	15Vdc output
AN1		analog input 1 (external signal for speed 0-10Vdc / 4-20mA) (from keypad version 2.05, also 4-20mA→ read advanced functions menu)
AN2		analog input 2 (for ex: external potentiometer)
D2		not activated
D1		digital input for external motor start / stop command
SET		communication channel selection (closing this contact with 0V)
EN		enables the motor operation (closing this contact with 0V) (NOTE: do not connect it to 24Vdc)
0V		0Vdc

USB		PC connection for diagnostic

SW5		not activated
SW1		dip 2 (OFF input AN1 in tension 0-10V; ON input AN1 in current 4-20mA) dip 1 (OFF input AN2 in tension 0-10V; ON input AN2 in current 4-20mA)
SW6		dip 2 (OFF input AN1 in tension 0-10V; ON input AN1 in current 4-20mA) dip 1 (OFF input AN2 in tension 0-10V; ON input AN2 in current 4-20mA)
SW7		Dip 1 and 2 ON for the RS485 load resistors (only for the first and the last of the NEOs in group - putting ON the same dips in the NEOs in the middle there is risk of transmission failure)
SW8		not activated

NEO-PUMP-11 (Power Module)

Pin	Terminal	Function
0V IND	J4	15Vac HF output for induction recharger
AC IND		
0V DC FAN	J1	12Vdc output for internal cooling fan (it closes when the IGBT temperature exceeds 45°C, and re-opens when it returns <40°C)
12V DC FAN		
EXT FAN	J3	normally open contact that closes when the IGBT bridge temperature exceeds 45°C, in order to enable the start of an eventual optional external fan
EXT FAN		
ALARM	J2	normally open contact that closes when there is an alarm, simultaneously shown on the keypad display. It is possible to connect to external devices 5 Ampere max, 250Vac max
ALARM		
MOT ON		normally open contact that closes when the motor starts. It is possible to connect to external devices 5 Ampere max, 250Vac max
MOT ON		
BR+	J10	internal braking resistances connection (opt. External)
BR-		
GND	J9	ground
U		W phase motor connection
V		V phase motor connection
W		U phase motor connection
L3	J5	phase 1 for inverter power supply from net
L2		phase 2 for inverter power supply from net
L1		phase 3 for inverter power supply from net
GND		ground

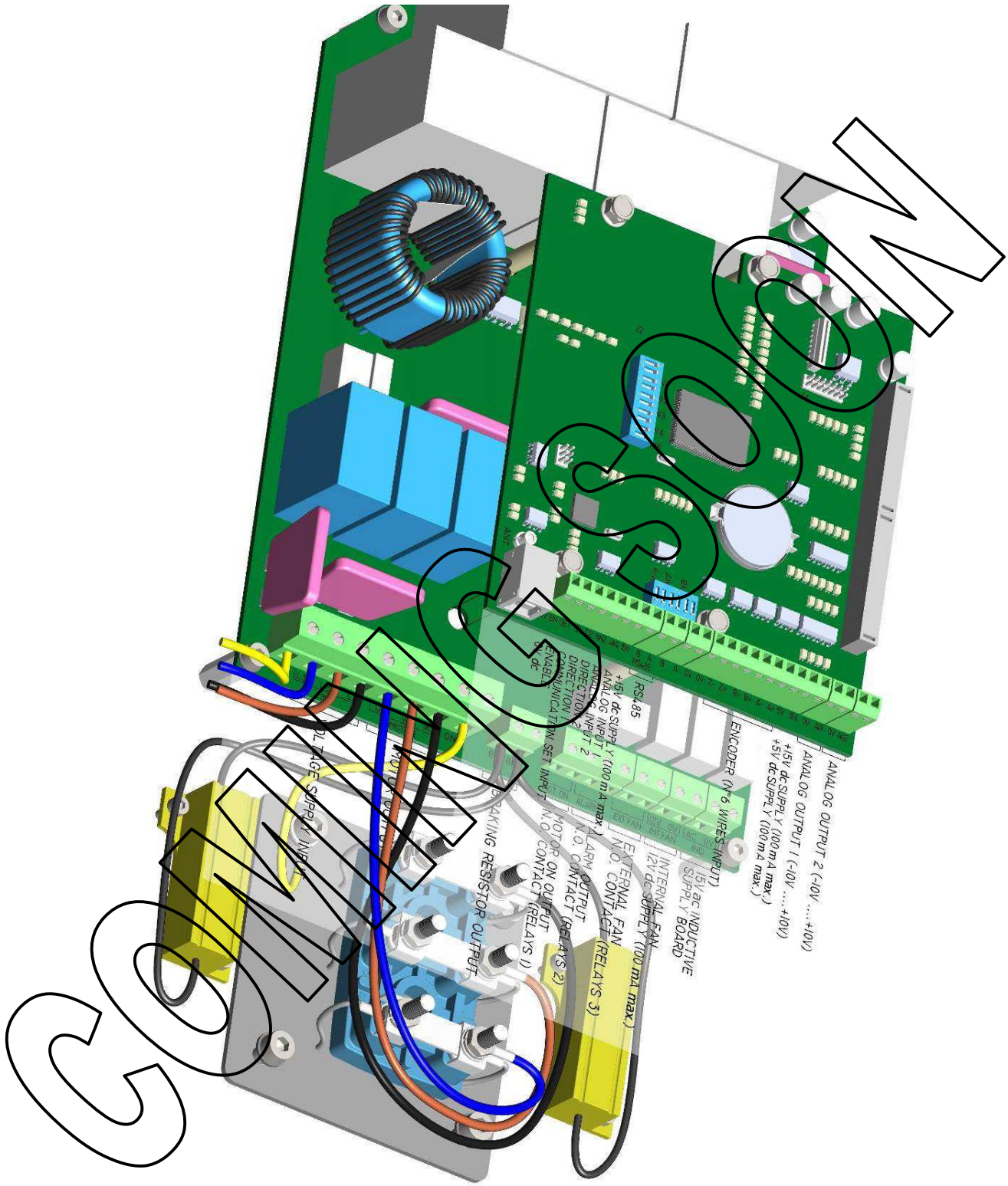
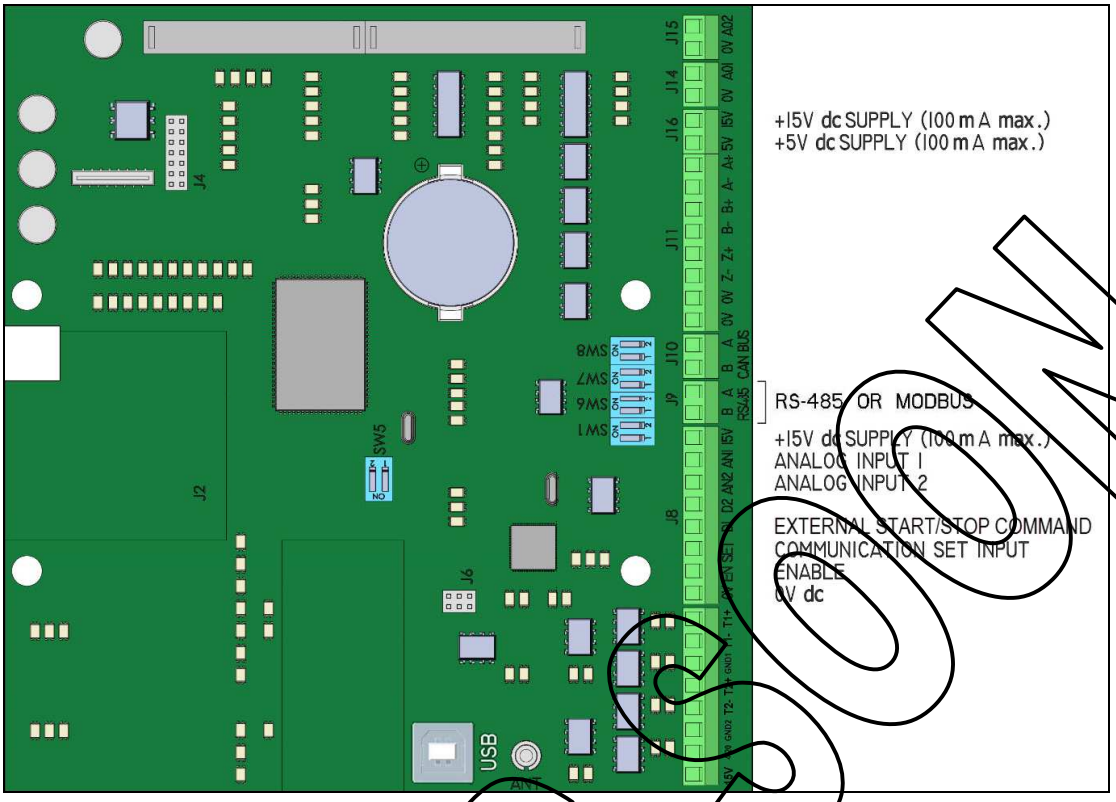
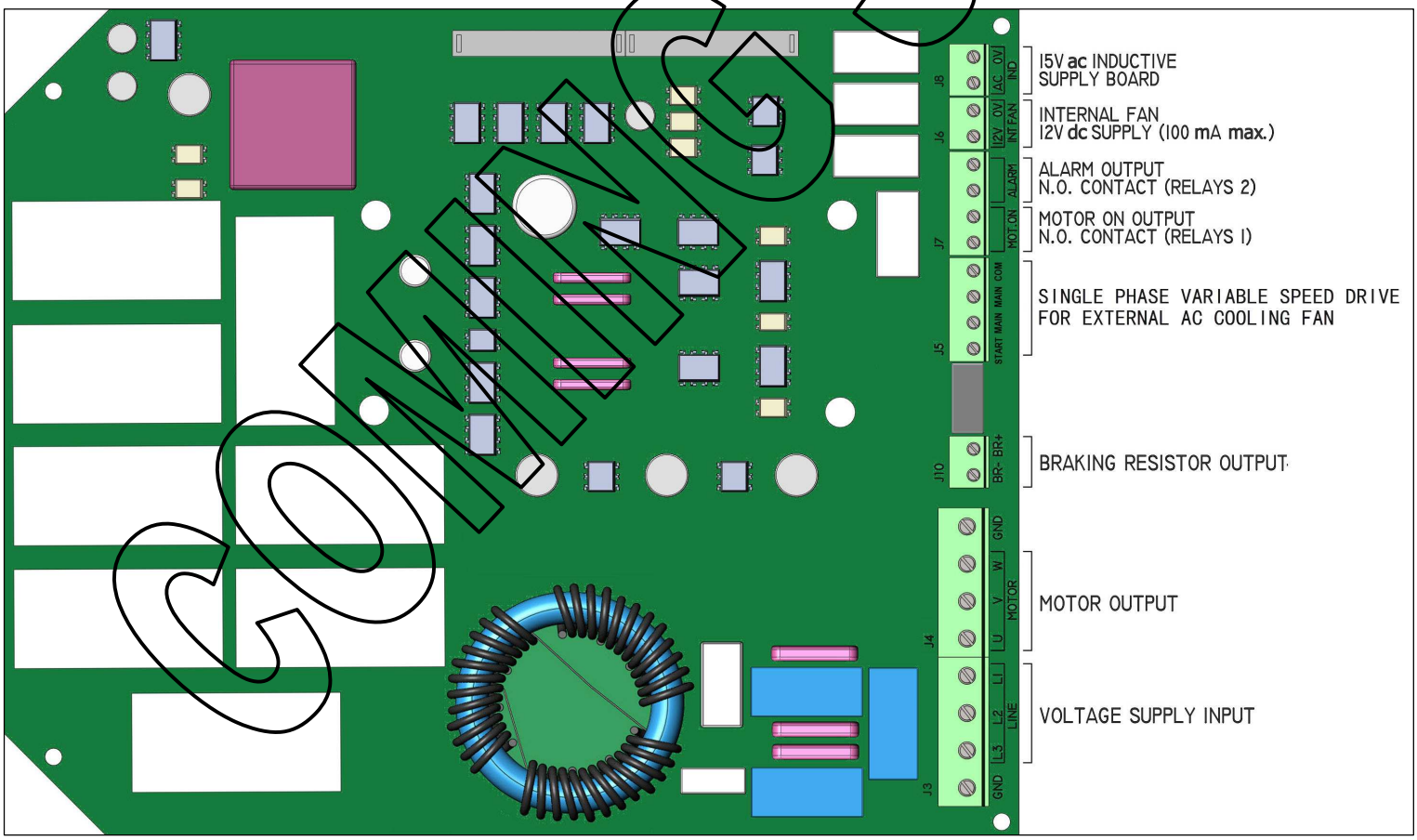


Illustration 13 (12) – Power and Control Module - NEO-PUMP-22


+15V dc SUPPLY (100 mA max.)
+5V dc SUPPLY (100 mA max.)
RS-485 OR MODBUS
+15V dc SUPPLY (100 mA max.)
ANALOG INPUT 1
ANALOG INPUT 2
EXTERNAL START/STOP COMMAND
COMMUNICATION SET INPUT
ENABLE
0V dc
USB
ANT


15V ac INDUCTIVE SUPPLY BOARD
INTERNAL FAN
12V dc SUPPLY (100 mA max.)
ALARM OUTPUT
N.O. CONTACT (RELAYS 2)
MOTOR ON OUTPUT
N.O. CONTACT (RELAYS 1)
SINGLE PHASE VARIABLE SPEED DRIVE
FOR EXTERNAL AC COOLING FAN
BRAKING RESISTOR OUTPUT
MOTOR OUTPUT
VOLTAGE SUPPLY INPUT

NEO-PUMP-22 (Control Module)

Pin	Terminal	Function
AO2	J15	not activated
0V		
AO1	J14	not activated
0V		
15V	J16	15Vdc output (max 100mA)
5V		5Vdc output (max 100mA)
A+	J11	not activated
A-		not activated
B+		not activated
B-		not activated
Z+		not activated
Z-		not activated
0V		ground
0V		ground
A	J10	not activated
B		
A	J9	RS485 Modbus (for Master-Slave group connection)
B		
15V	J8	15Vdc output
AN1		analog input 1 (external signal for speed 0-10Vdc / 4-20mA) (from keypad version 2.05, also 4-20mA→ read advanced functions menu)
AN2		analog input 2 (for ex. external potentiometer)
D2		not activated
D1		digital input for external motor start / stop command
SET		communication channel selection (closing this contact with 0V)
EN		enables the motor operation (closing this contact with 0V) (NOTE: do not connect it to 24Vdc)
0V		0Vdc

USB		PC connection for diagnostic

SW5		not activated
SW1		dip 2 (OFF input AN1 in tension 0-10V; ON input AN1 in current 4-20mA) dip 1 (OFF input AN2 in tension 0-10V; ON input AN2 in current 4-20mA)
SW6		dip 2 (OFF input AN1 in tension 0-10V; ON input AN1 in current 4-20mA) dip 1 (OFF input AN2 in tension 0-10V; ON input AN2 in current 4-20mA)
SW7		Dip 1 and 2 ON for the RS485 load resistors (only for the first and the last of the NEOs in group - putting ON the same dips in the NEOs in the middle there is risk of transmission failure)
SW8		not activated

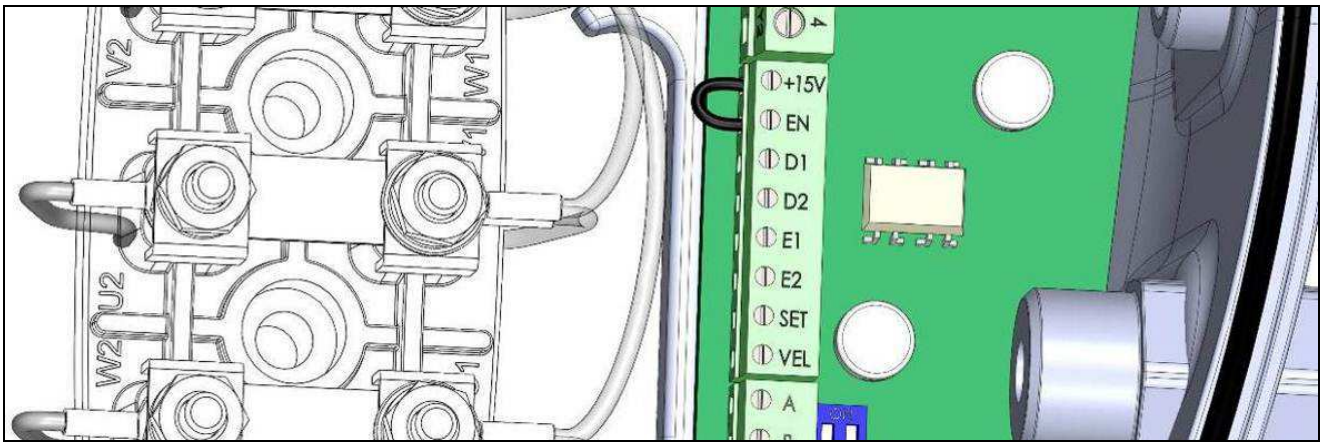
NEO-PUMP-22 (Power Module)

AC IND	J8	15Vac HF output for induction recharger
0V IND		
12V DC FAN	J6	12Vdc output for internal cooling fan (it closes when the IGBT temperature exceeds 45°C)
0V DC FAN		
ALARM	J7	normally open contact that closes when there is an alarm, simultaneously shown on the keypad display. It is possible to connect to external devices 5 Ampere max, 250Vac max
ALARM		
MOTOR ON		relay normally open contact that closes when the motor starts. It is possible to connect to external devices 5 Ampere max, 250Vac max
MOTOR ON		
COM	J5	power supply for eventual induction single/three phase cooling fans
MAIN		
MAIN		
START		
BR+	J11	internal braking resistances connection (opt. External)
BR-		
GND	J4	ground
W		W phase motor connection
V		V phase motor connection
U		U phase motor connection
L1	J3	phase 1 for inverter power supply from net
L2		phase 2 for inverter power supply from net
L3		phase 3 for inverter power supply from net
GND		ground

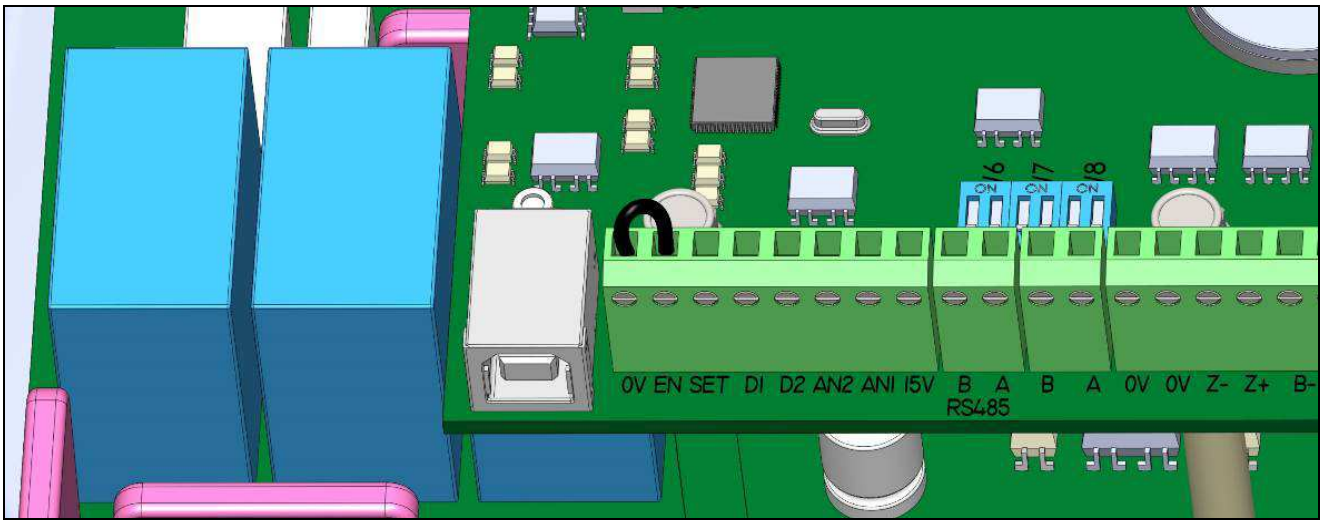
4d1. Enabling contact

The motor can only work if the enabling contact EN is closed at contact +15V in NEO-PUMP-3 and 0V in NEO-PUMP-11 and NEO-PUMP-22; this input can be used, for example, to connect a normally closed float contact.

NEO-PUMP-3



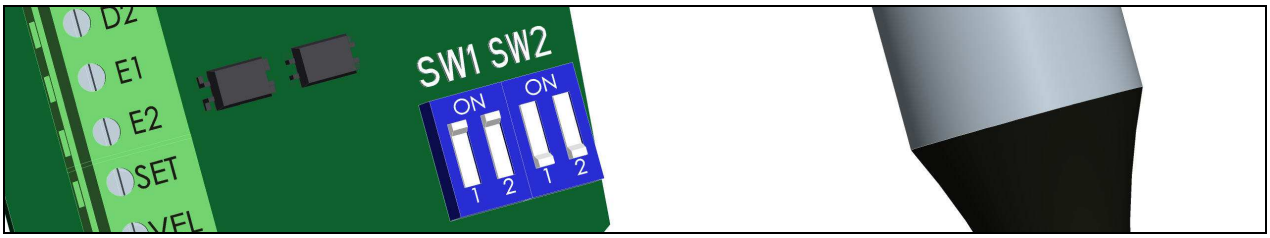
NEO-PUMP-11 / NEO-PUMP-22



4d2. Pressure transducer connection

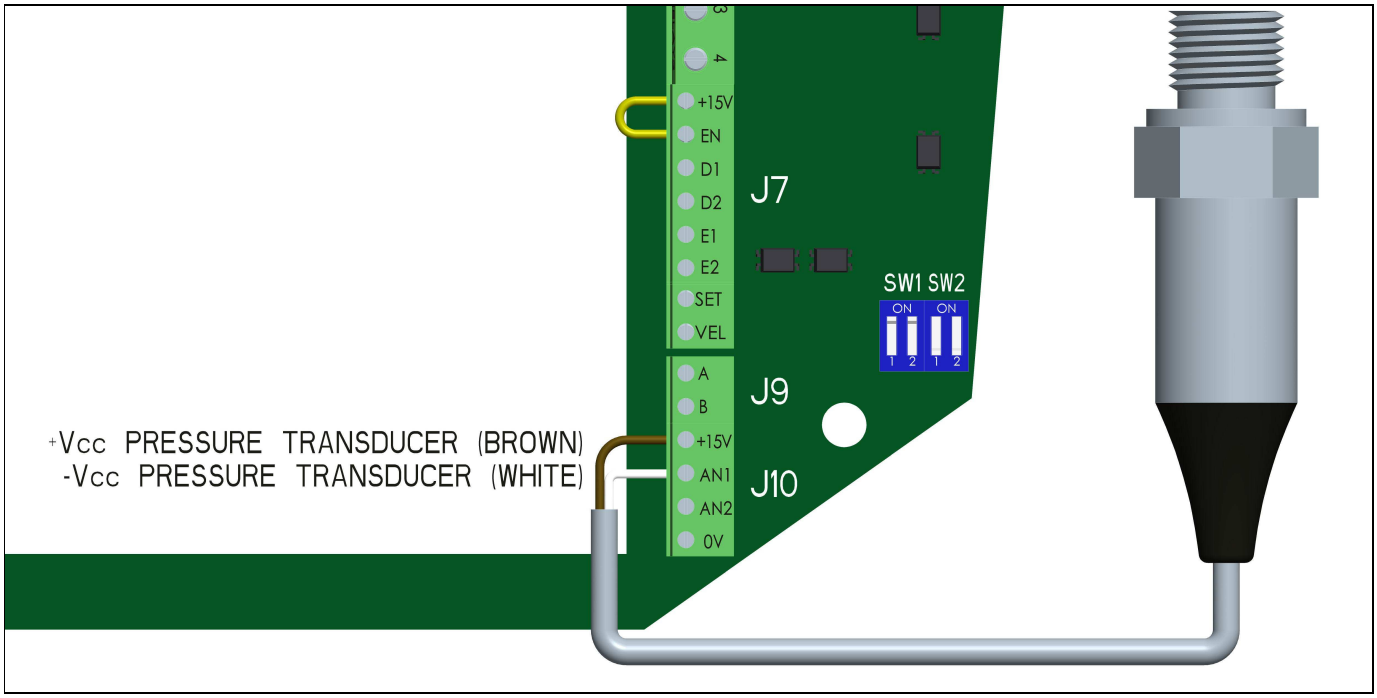
NEO-PUMP-3

The pressure transducer is the 4-20 mA type, such as the K16 model supplied with NEO-PUMP, it must be connected between the +15V poles of J10 (+Vcc of the transducer) and AN1 of J10 (-Vcc transducer); at the same time, the two contacts of the SW1 switch must be set to ON.



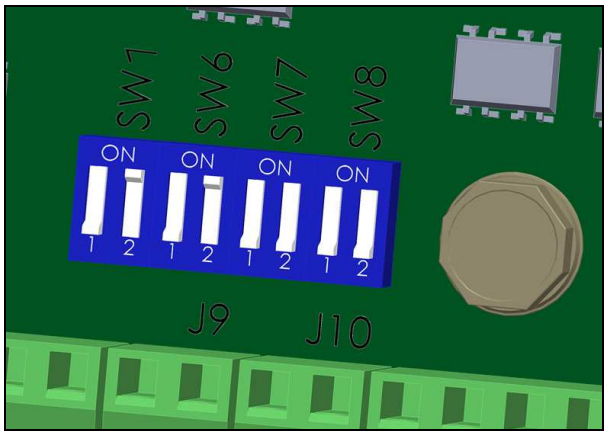
Electrical connections of the K16 pressure transducer (included):

- Brown wire (+Vcc): +15V (of J10);
- White wire (-Vcc): AN1 (of J10).



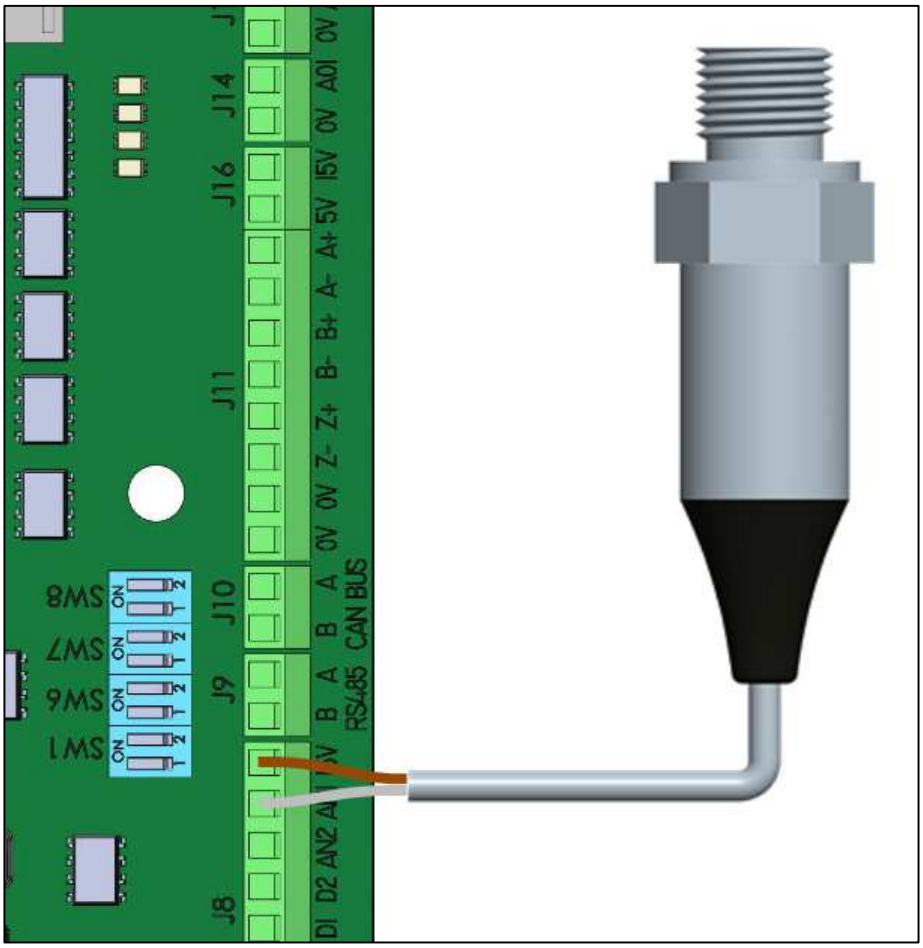
NEO-PUMP-11 / NEO-PUMP-22

The pressure transducer is the 4-20 mA type, such as the K16 model supplied with NEO-PUMP, it must be connected between the +15V poles of J8 (+Vcc of the transducer) and AN1 of J8 (-Vcc transducer); at the same time, the contact 2 of the switches SW1 and SW6 must be set to ON.



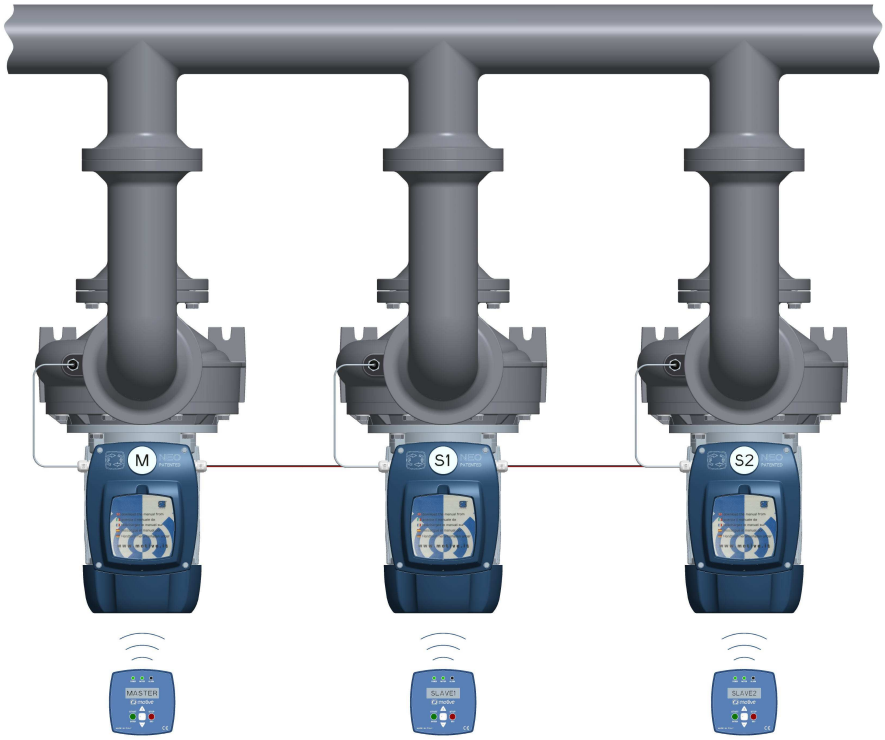
Electrical connections of the K16 pressure transducer (included):

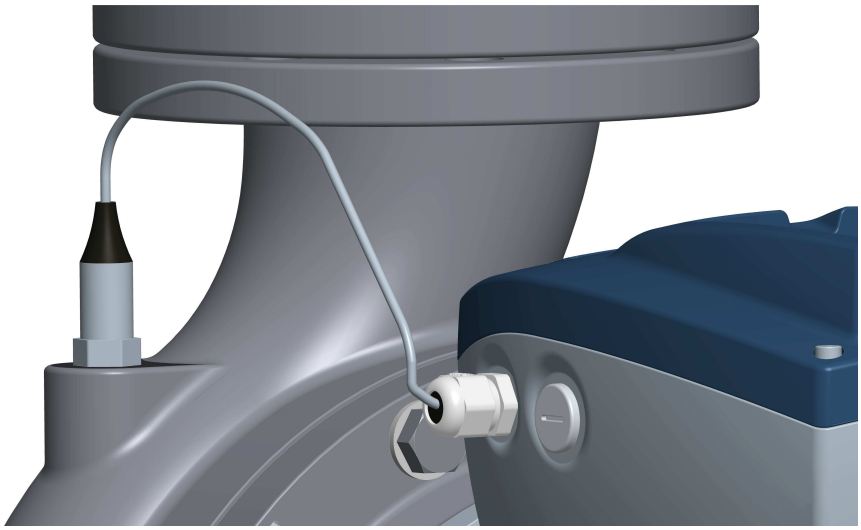
- Brown wire (+Vcc): +15V (of J8);
- White wire (-Vcc): AN1 (of J8).



4d3. Group connection

You can connect two or more NEO-PUMP in groups, communicating via the RS485 serial via a 2-pole cable on A (of J9) and B (of J9). Note: Comply with the polarity in the cable connections on the various NEO-PUMP (A with A and B with B). Set the following in the menu to enable operation in Master Slave group via RS485 serial: ADVANCED FUNCTIONS – CONTROL TYPE - MODE = MASTER SLAVE RS485, also set the Total no. of pumps in the group and the number in sequence of the NEO-PUMP in the group (0 for the master, >0 for the slaves).
It is recommended to use at least two transducers in the group, one connected to the master and one connected to the first slave. This redundancy allows the system to continue to function if a transducer malfunctions.

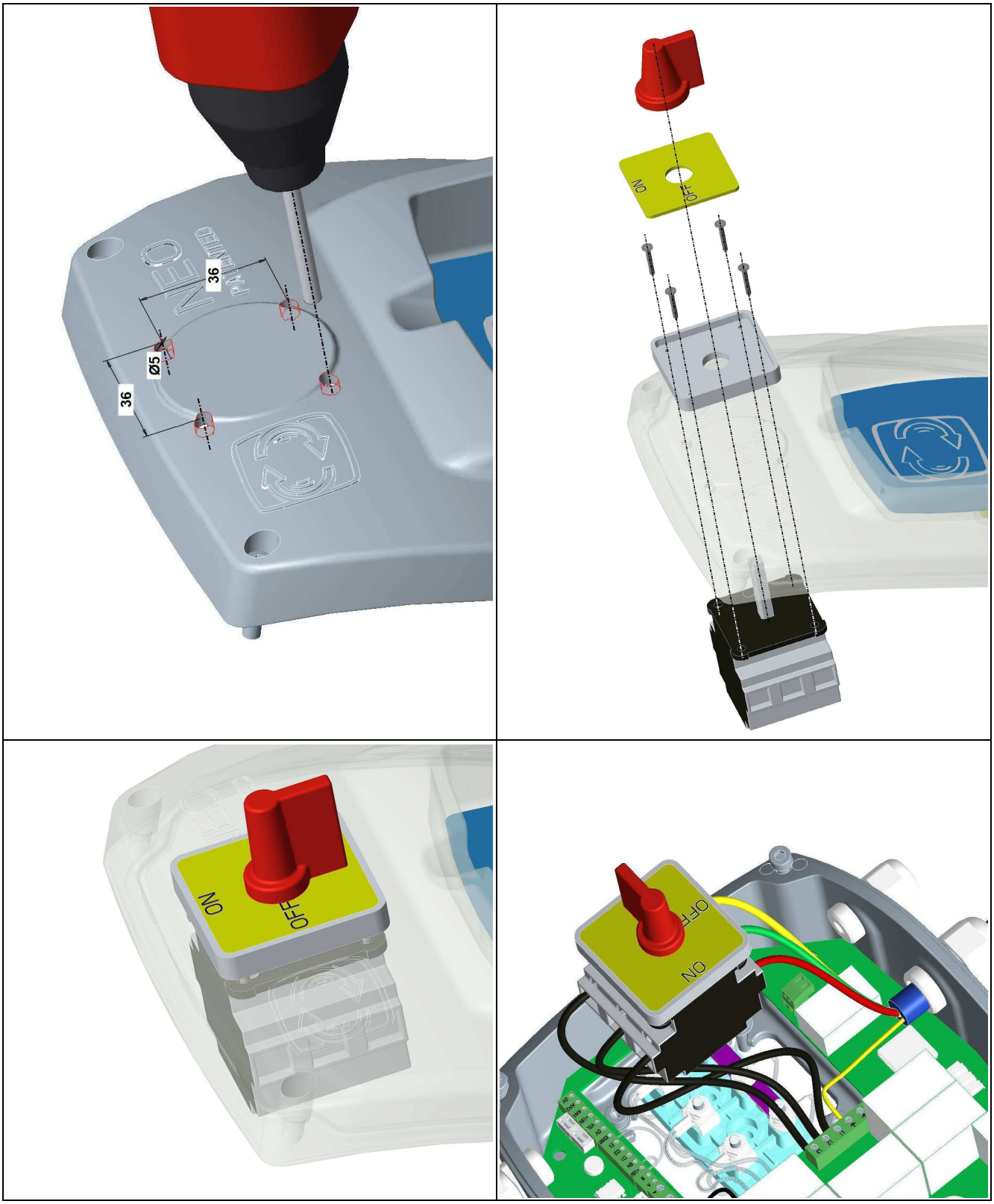




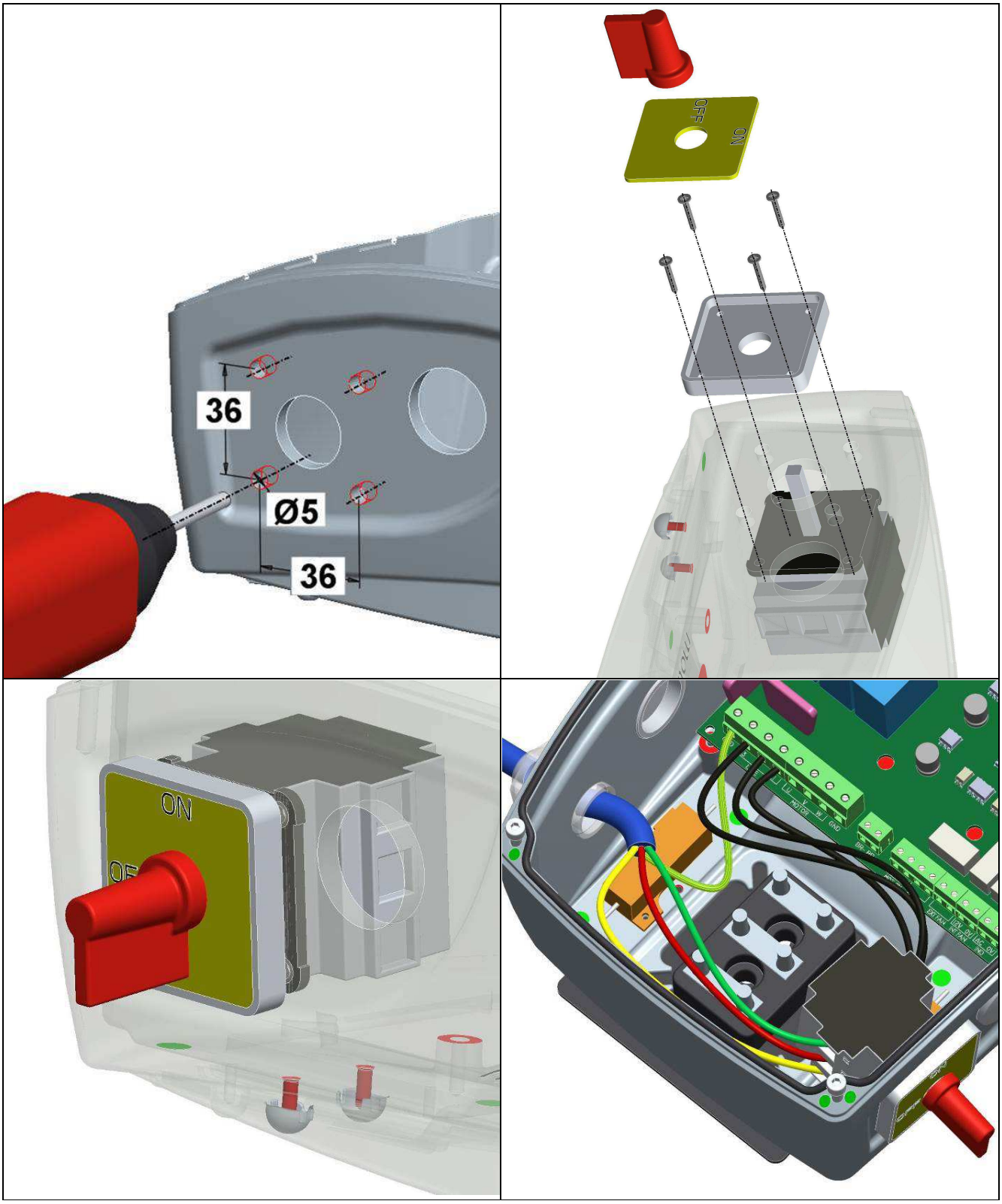
All NEO-PUMP (master and slaves) maintain all their internal protections active one-by-one, including those about temperature.
NOTE: MOD-BUS connection to an external device (PLC, smartphone, tablet, PLC) is not possible in case of master-slave control mode.

4d4. Power knife switch connection (optional)

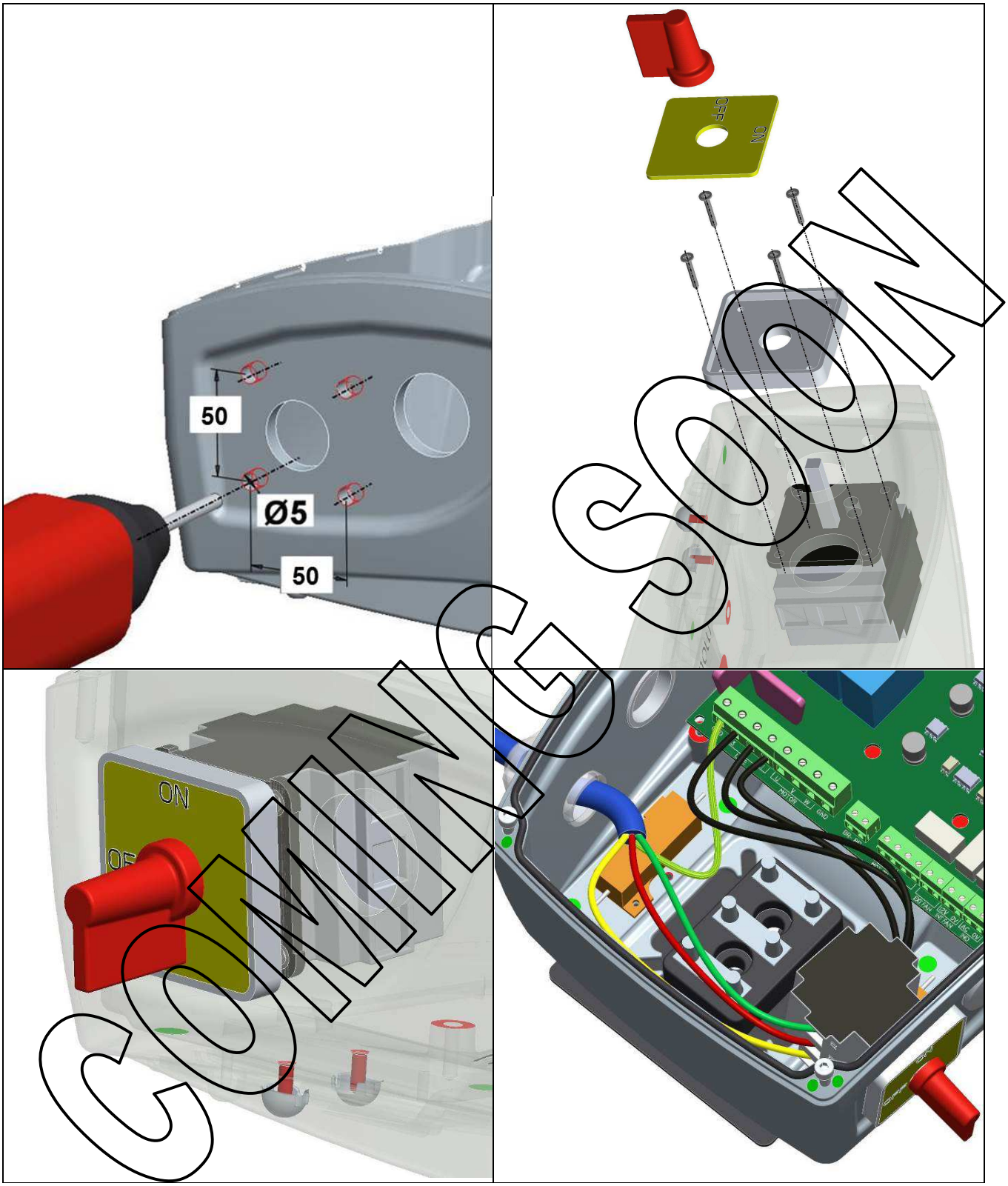
INTEM3X32A + NEO-PUMP-3



INTEM3X32A + NEO-PUMP-11



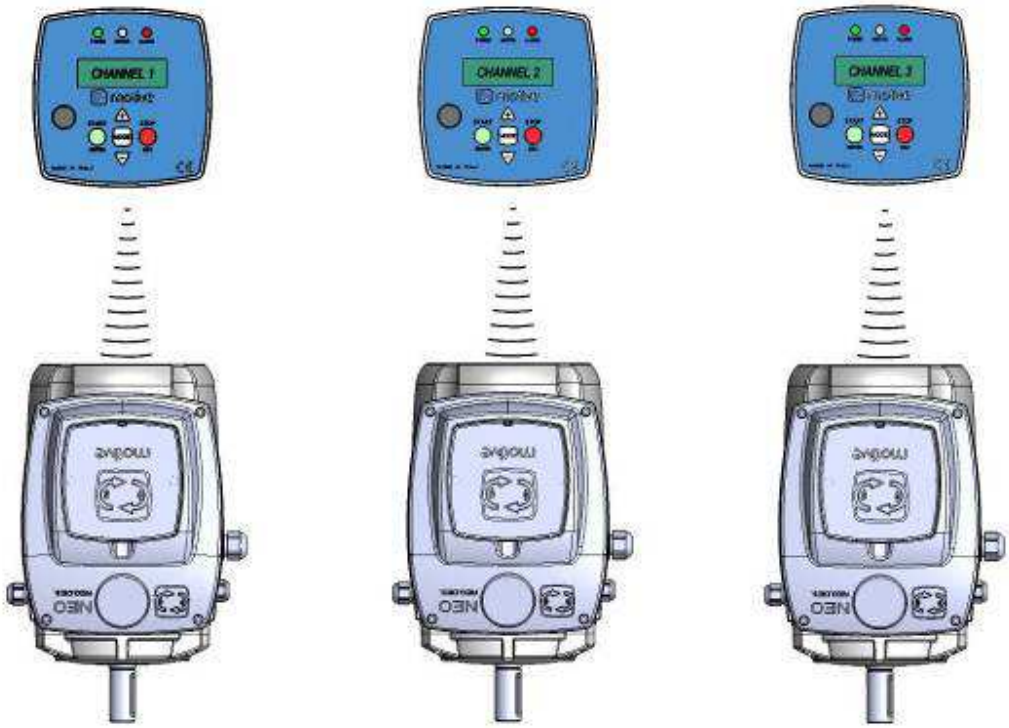
INTEM3X63A + NEO-PUMP-22



5. PROGRAMMING AND USE

The installation, commissioning and maintenance of the device must be carried out only by technically qualified personnel who is aware of the risks that the use of this device involves.

5a Change of the Keypad-Inverter communication (for group)



When there are multiple NEO-PUMP inverters in the same place each keypad shall be programmed with a separate channel from 1 to 15.

- It is not possible to have more than one keypad that controls a single inverter.

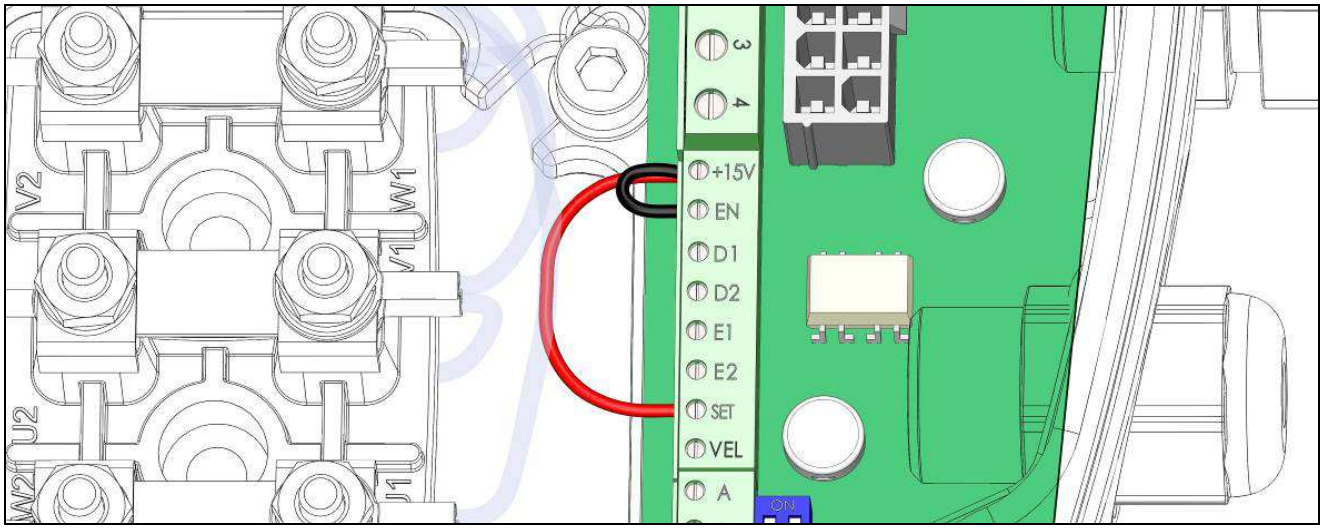
In fact, there is a continuous communication between the keypad and the inverters, communication that is not only a return of data to the display, but is also a synchronization of the behaviour of the inverter compared to what is pre-set and controlled from the keypad.

- It is not possible to have more than one keypad that controls a single inverter. They would conflict

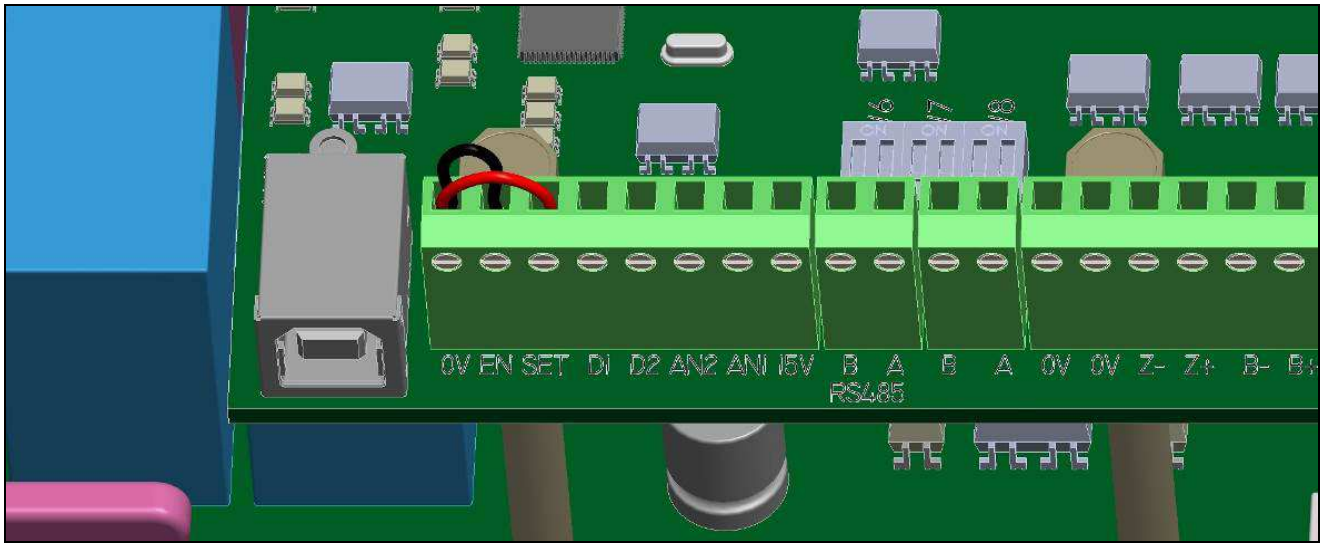
FOLLOWING POINTS TO BE READ ONLY IF YOU NEED TO MODIFY THE WIFI KEYPAD COMMUNICATION CHANNEL OR FREQUENCY (to be done in case that more than one NEO-WiFi are in the same place):

Close the contact to +15V- SET (NEO-3) / 0V-SET (NEO-11/22) terminals (III.X) to enable the selection of the communication channel (1-15) or the communication frequency 860..879 MHz

NEO-PUMP-3

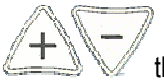


NEO-PUMP-11 / NEO-PUMP-22



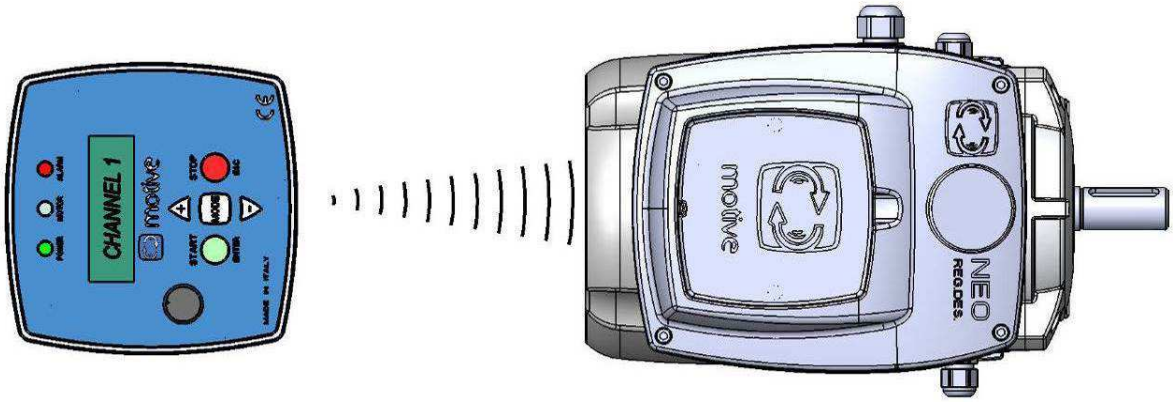
1. To modify the communication channel, press 

and go to *Communication* > *Auto tuning (set).*
Automatically it will scan the MHz frequency and then shows the channel *Code Motor:1 Radio MHz:870* set by default by Motive.

Once established the communication, the POWER led on the keypad will light on. Select with 

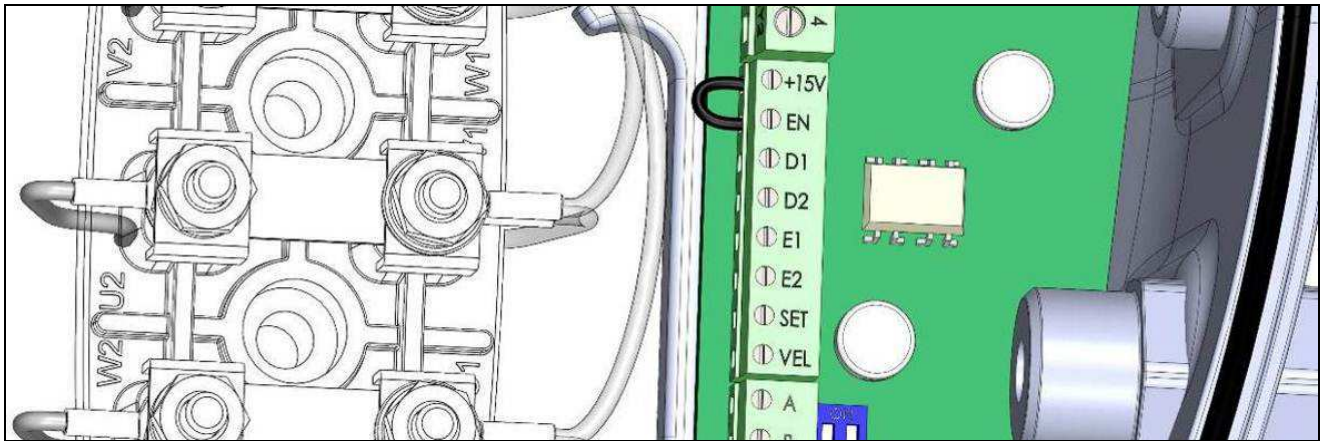
the wanted new channel between 1 and 15 and the radio frequency between 860 and 879MHz (ex. 

), then press ENTER  to confirm and 3 times in rapid sequence the ESC button  to exit and save the data that will be confirmed by the display of the keypad (DATA SAVED).

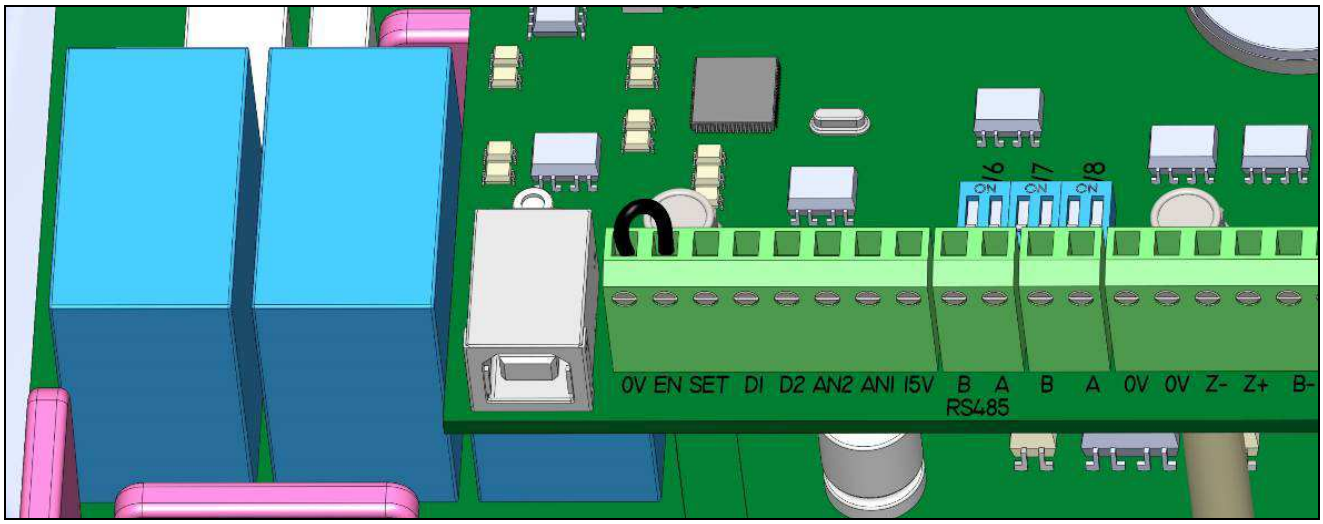


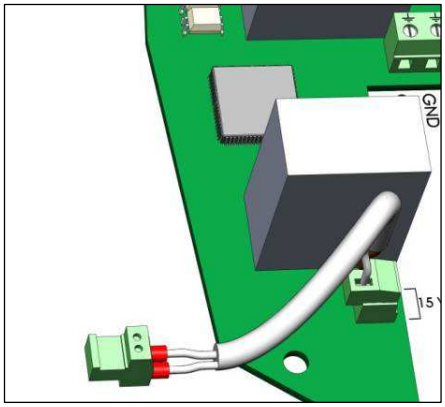
2. Only after that you modified the communication channel or frequency, remove jumper +15V- SET (NEO-3) / 0V-SET (NEO-11/22) (III.Y)

NEO-PUMP-3

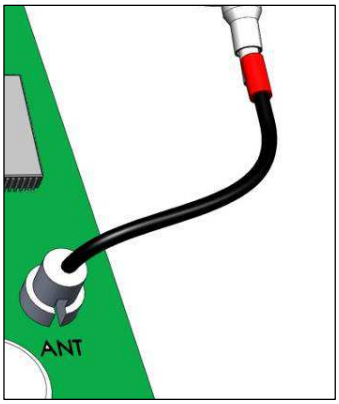


NEO-PUMP-11 / NEO-PUMP-22





3. Close the lid, carefully repositioning the connections of inductive power supply and antenna.

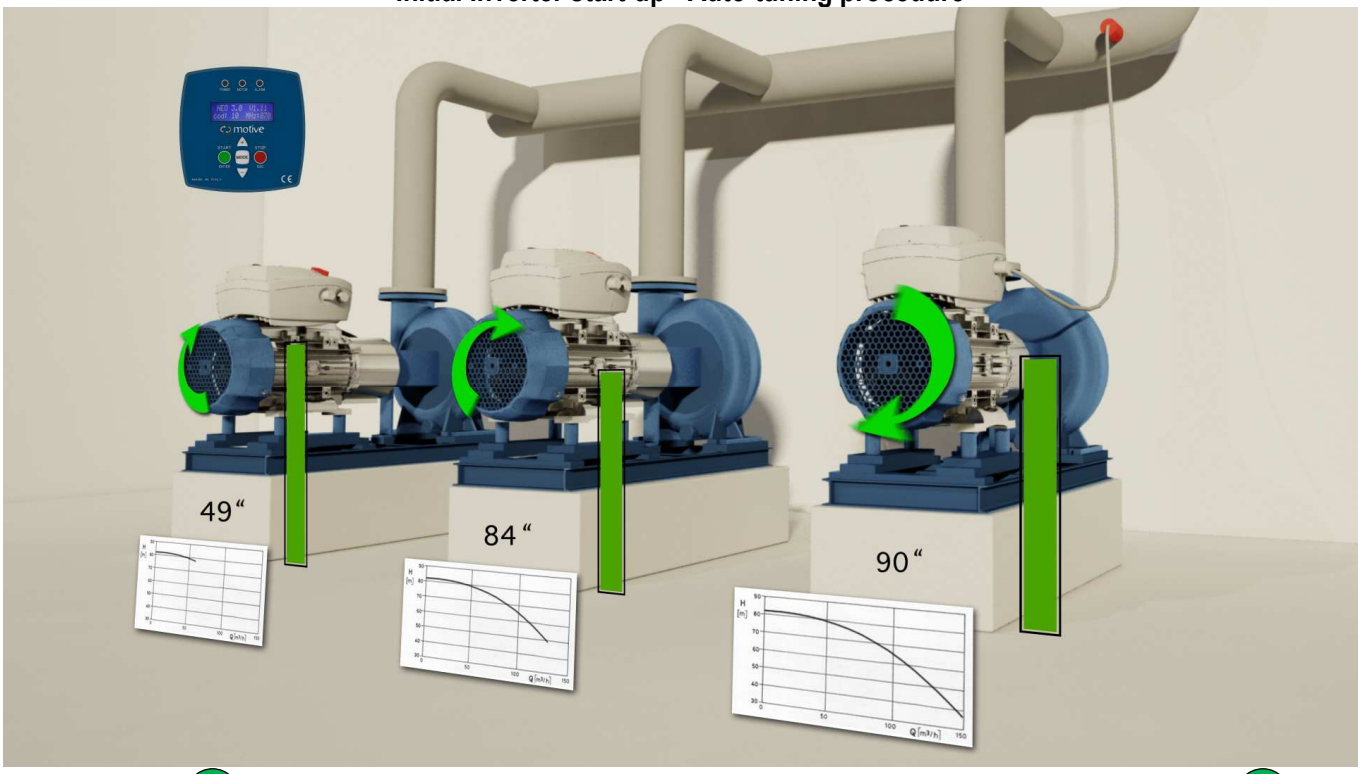


COAXIAL CABLE CONNECTOR ON THE POWER BOARD: When connecting the coaxial cable to the power board, do not use metal tools that may damage the surrounding SMD electrical components that are extremely delicate.

5b. Put in service

Make sure the pump is fully loaded with water. The pump cannot run dry; operating in these conditions (even for a short time) causes irreparable damage to the pump itself. NEO-PUMP intervenes after 40 seconds when running dry in order to protect the pump (default time, usually enough for the pump impellers to be loaded during the initial commissioning) by stopping the pump and displaying a warning as described in the list of ALARMS in this manual. Switch the system back on by opening the supply and bleeding the air.

Initial Inverter start-up - Auto-tuning procedure



- Press START and set the rated current “I NOMINAL” absorbed by the motor and confirm by pressing ENTER ;
- Use the + and - keys to move rated voltage “V NOMINAL” of the motor, set it and confirm by pressing ENTER;
- If the default data are not what you want, change any other data of the pump and the operation required as described in the "functions menu"
- Exit the menu by pressing ESC repeatedly. "Data saved" will appear and then the word "direction"
- Upon the direction request, verify that the direction of rotation is correct. In addition to reading the instructions of the pump manufacturer, this check can also be performed by reading the data of frequency, power and pressure displayed during the procedure:
- press START for as long as the pump is to rotate, and use the arrows to select the correct direction of rotation (0/1). Release the ENT button and press ESC; the auto-tuning procedure is then activated
- Close the water supply completely;
- Press START again to automatically start the self-tuning; the following message will appear on the display during self-tuning: “EXECUTING CHECK”; at the end of the self-tuning, the "CHECK EXECUTED" message will appear. The pump can start working normally.

- Open the delivery 

During auto-tuning the pump can reach a speed equal to the rated speed with maximum pressure; if you want to use it at a pressure lower than its maximum, after the auto-tuning, enter the menu and limit the maximum operating pressure (Pump Data)

If the pump is changed, you can RESET and repeat the self-tuning procedure RESET:
press "STOP" and "–" simultaneously for 5 seconds (wait for message "reset executed").

The reset procedure does not interfere with the settings of the frequency and communication channels.

In a master-slave group, every single NEO-PUMP requires a single auto-tuning procedure.

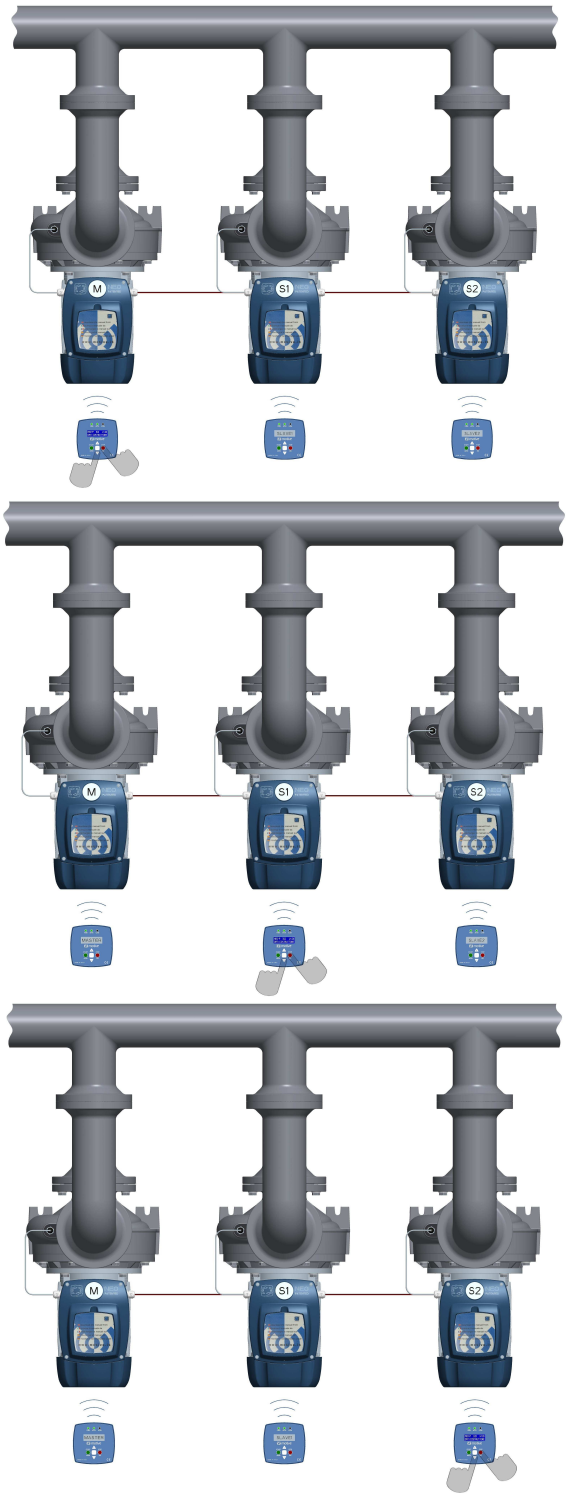
Auto-tuning of a NEO-PUMP in a group can also occur during the auto-tuning of the other units of the group.

During auto-tuning the various NEO-PUMP must not yet be interconnected.

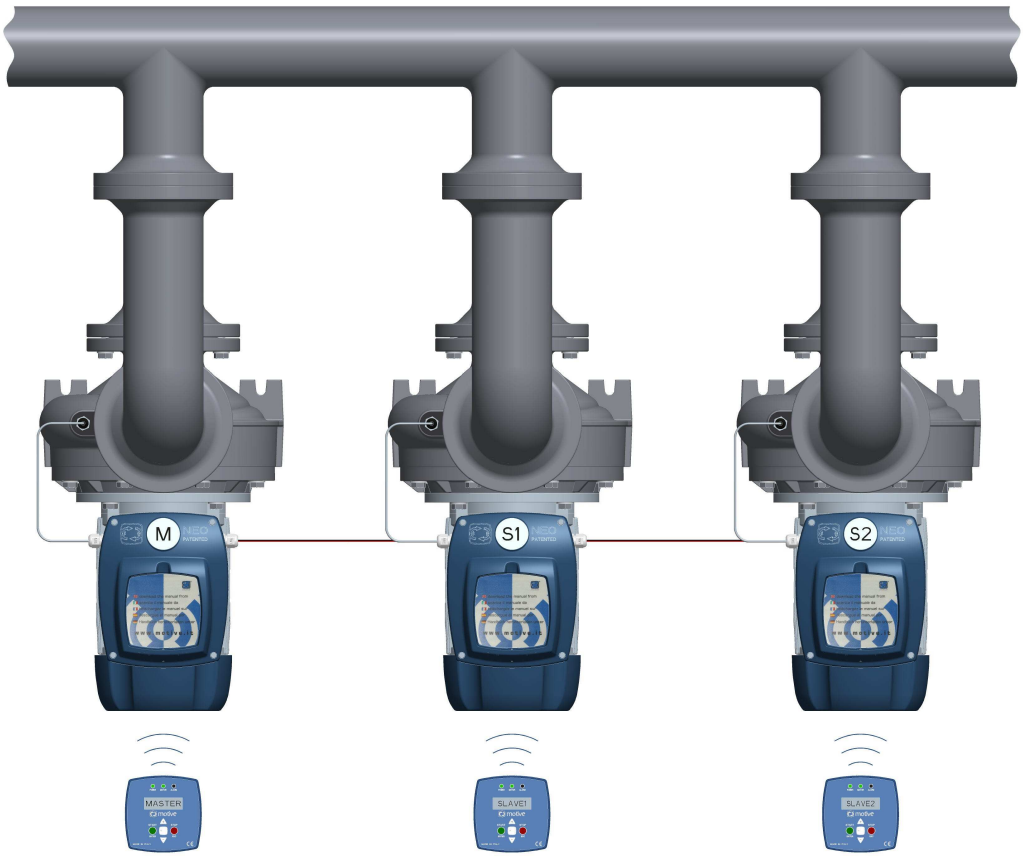
Each NEO-PUMP of the group must have its own keypad with its own separate radio communication channel. This allows:
- the values of the electrical and hydraulic variables of each unit to be checked from its keypad during operation
- the inverters to be verified that they are working effectively in a group if the master malfunctions
- the system not to be stopped if a pump, a transducer, a NEO-PUMP or a keypad malfunctions.

During auto-tuning, each NEO-PUMP must be directly connected to a pressure transducer. During normal work, it's then enough that the master transducer is there. However, providing each slave with a transducer will permit to have a safety redundancy, thanks to which if anything (pump, motor, NEO. Transducer) of the master or another slave malfunctions the system will keep on working

EXAMPLE OF AUTO-TUNING WITH SLAVE INVERTER WITHOUT TRANSDUCERS, USING THE TRANSDUCER OF THE MASTER ON THE OTHER NEO-PUMP



AFTER THE AUTO-TUNING THE IMAGE BELOW SHOWS THE MASTER SLAVE OPERATION:



Important checks to be carried out after the auto-tuning:

- **Verifying that the pump stops with closed supply:** Upon the first start-up, open the valve on the pump supply, press START, wait a few seconds for the system to reach the set pressure, then slowly close the valve and verify that the motor stops (after a few seconds) indicating " MINIMUM FLOW ". If the motor does not stop you must go to the MOTOR DATA> MINIMUM FLOW PROTECT function and set a higher value than the default (103%).

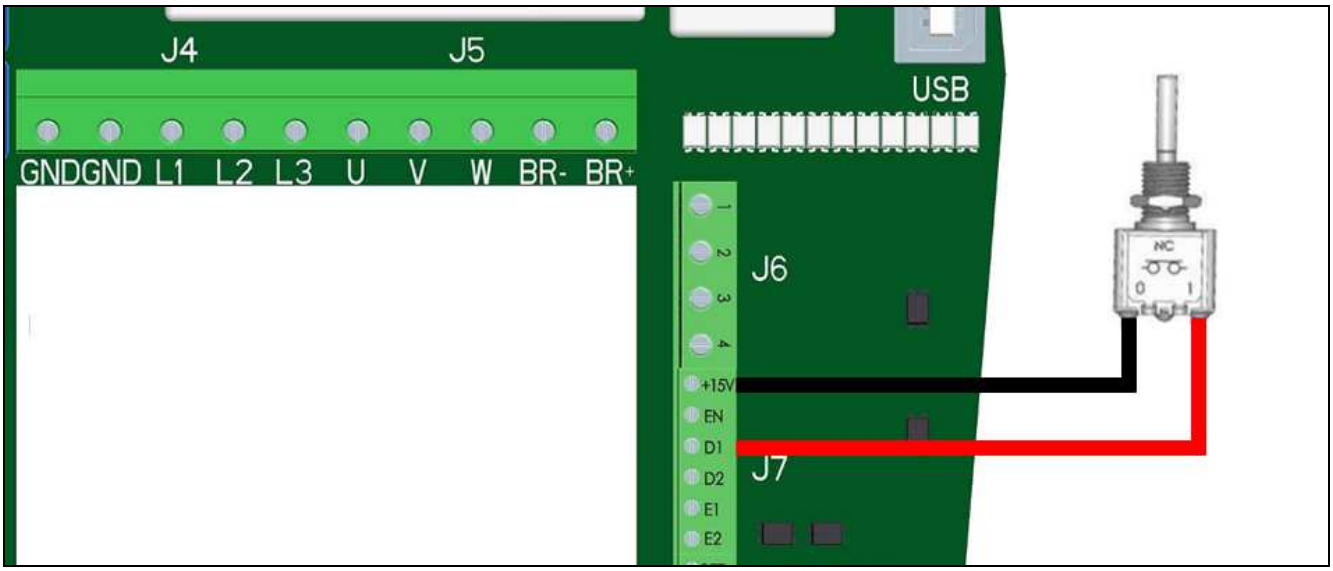
- **Verifying that the pump stops when running dry:** After the installation, if possible, close the water on the pump suction and let the pump run dry; after about 40 seconds (or the different delay possibly set in the PRESSURE CONTROL>DRY WORKING STOP DELAY), the pump should stop and indicate "DRY OPERATION". If after this time the pump has not stopped, go to the ADVANCED FUNCTIONS>PRESSURE CONTROL - set a higher value than the " FILLING PRESSURE LIMIT " parameter (by default set to 0.50), or increase the value of the DRY OPERATION POWER PROTECT (default 80%) in the MOTOR DATA..

5c. Optional connections

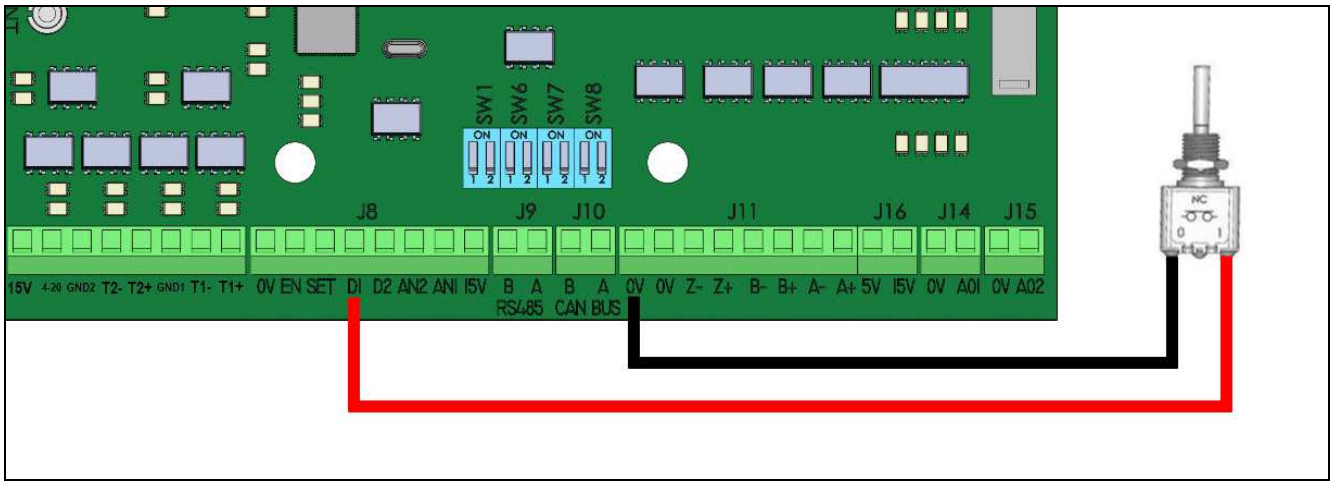
To control the running of the pump it is possible to connect external auxiliary commands, such as selectors or PLC, between contacts + 15V and D1 for NEO-PUMP-3 and between contacts 0V and D1 for NEO-PUMP-11 / NEO-PUMP-22 .
The commands are enabled by setting in menu **ADVANCED FUNCTIONS > CONTROL TYPE > START/STOP COMMANDS > REMOTE**

Example: ON-OFF selector (1 = Start pump - 0 = Stop pump)

NEO-PUMP-3



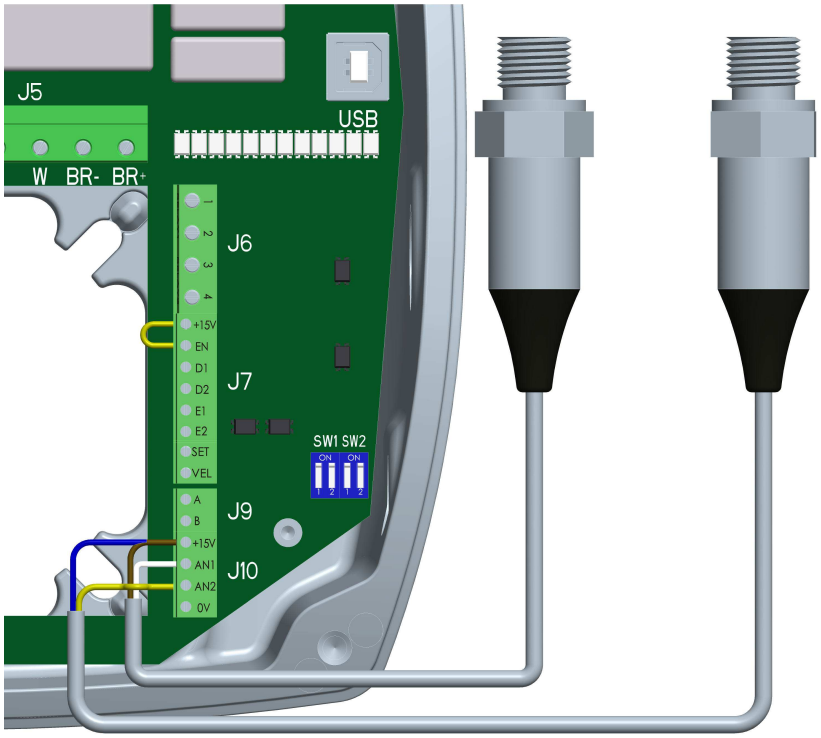
NEO-PUMP-11 / NEO-PUMP-22

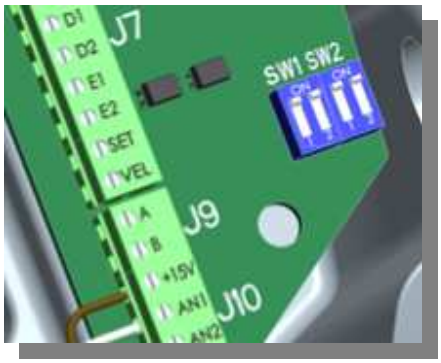


It is possible to connect to external devices (max 5 Amps, 250Vac) the two MOTOR ON signal outputs (potential-free contact between 1 and 2 of J6, closed when the motor is running) and/or ALARM (contacts 3 and 4 of J6, closed in presence of an alarm).

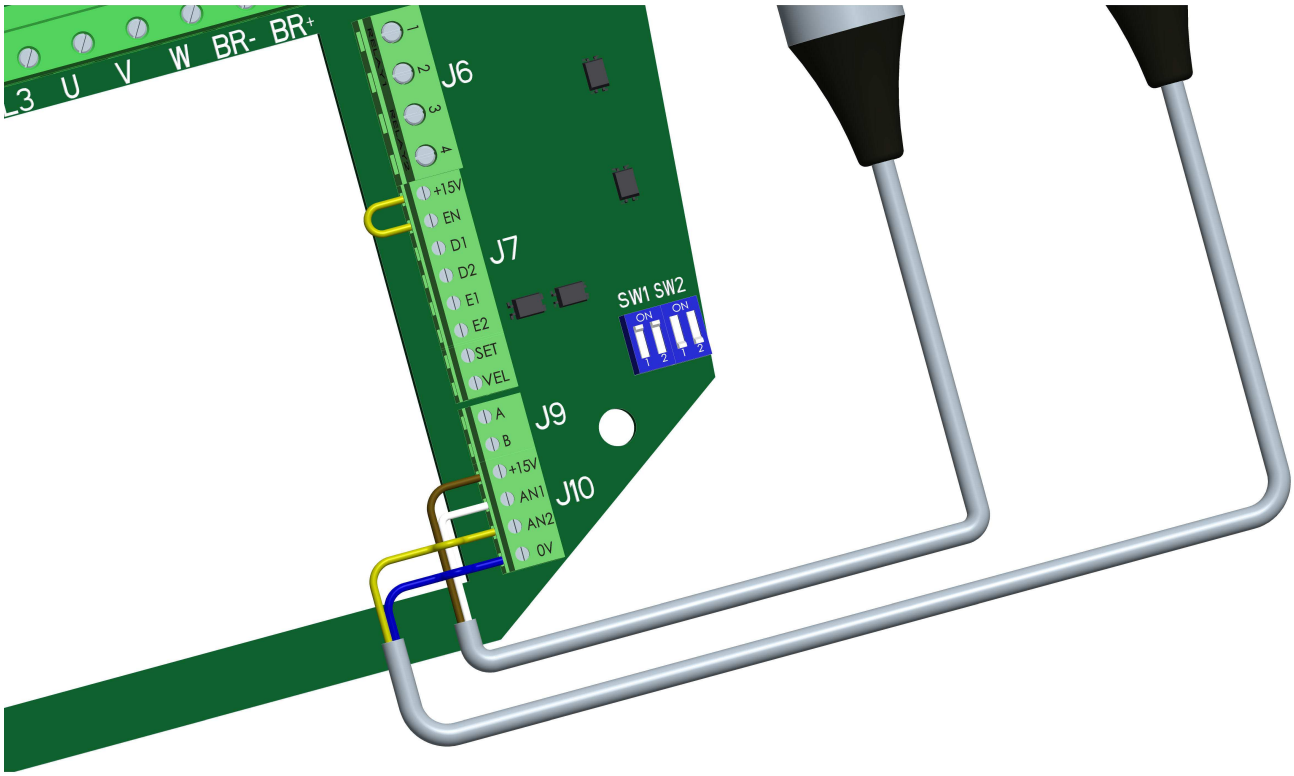
Connecting an auxiliary additional 4-20 mA pressure transducer:
After having set in the menu **ADVANCED FUNCTIONS > CONTROL TYPE > PRESSURE REFERENCE INPUT > SIGNAL 4-20 mA AN2**, connect the auxiliary 4-20mA transducer on the +15V inputs (of J10) and AN2 (of J10); set the selectors of SW2 to ON.

Note: You must keep the standard 4-20mA pressure transducer connected on AN1.

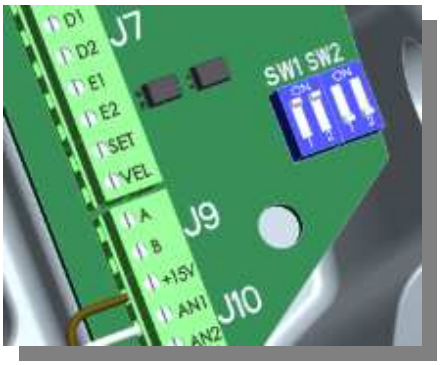




Connecting an auxiliary additional 0-10Vdc pressure transducer:
After having set **ADVANCED FUNCTIONS > CONTROL TYPE > PRESSURE REFERENCE INPUT > SIGNAL 0-10V AN2**, connect the auxiliary 0-10V transducer on the AN2 inputs (of J10) and 0V (of J10).



Set the contacts of dip switch SW2 to OFF.



You must keep the standard 4-20mA pressure transducer connected on AN1.
The motor speed can be measured at any time via the output 0-10Vdc between the VEL (of J7) and 0V (of J10) poles. The signal will be proportional to the motor speed between speed 0 (0V) and the maximum speed, defined within the motor limits (10V).

5d. Keypad buttons

Button	Description
	To enter the function menu
START  ENTER	To start the engine / to access the sub-menu or to enter the function and change its values
	Allows you to scrolls up through the menu items or change in positive the values of the variables; at the end of the change press ENTER. During operation also allows to increase the BAR / RPM, which is saved automatically after 10 seconds from the change
	Allows you to scroll down through the menu items or change in negative the values of the variables; at the end of the change press ENTER. During operation also allows to increase the BAR / RPM, which is saved automatically after 10 seconds from the change
STOP  ESC	To stop the engine / to exit from the sub-menu (by entering the main menu); to exit from the main menu enabling the motor controls and automatically saving the set data if pressed in a rapid sequence (at the end it must show the writing “DATA SAVED”).

Tab 3: Buttons

5e. Keypad leds

Led	Descrizione
Power ON	Green - signals the presence of mains voltage on the feed
Motor ON	Green - Motor functioning
Alarm	Red – signals an anomaly (see list of Alarms) when turned on

Table 4: Led description

5f. Functions menu

Main menu

Menu	Sub-menu	Description
Language		Italian / English
Communication	1. Code Motor	1. from 1 to 15
	2. Radio frequency This function is enabled only if pins +15V and SET (for NEO3) / 0V and SET (for NEO11/22) are connected by a cable bridge.	2. from 860 to 879 MHz
Reference Pressure (irrelevant setting if you set the control type mode on “speed”)	Each Set Point is an input that defines the reference pressure in force; the Set Point value depends on the status of the two set digital inputs (see the table of IN/OUT inverter connections). For all the 4 Set Points: range 0.5 .. Pmax (value set in the pump data)	
	1. SetP1	1. from 0.5 to 16 bar
	2. SetP2	2. from 0.5 to 16 bar
	3. SetP3	3. from 0.5 to 16 bar
	4. SetP4	4. from 0.5 to 16 bar

By setting the digital inputs (D2 and E2 for NEO3, A+ and B+ for NEO11/22) you can set up to a maximum of 4 reference pressure Set Points (Reference pressure menu), with the default values shown below:

Set Point	A+ (N°1 – J11)	B+ (N°3 – J11)	Valore default	Note
P1	0	0	3.00 Bar	Standard configuration, with contact D2 and E2 simultaneously open (NEO-3) Standard configuration, with contact A+ and B+ simultaneously open (NEO-11/22)
P2	0	1	2.00 Bar	Contact E2 closed on 15V (NEO3) - Contact B+ closed on 0V (NEO11/22)
P3	1	0	1.50 Bar	Contact D2 closed on 15V (NEO3) - Contact A+ closed on 0V (NEO11/22)
P4	1	1	1.00 Bar	Contact D2 and E2 simultaneously closed on 15V (NEO3) Contact A+ and B+ simultaneously closed on 0V (NEO11/22)

All Set Points can always be changed directly from the + and - buttons on the keypad, while the NEO-PUMP runs, and they are automatically saved.

Motor data (See motor plate)	1. Rated voltage [V]	1. from 180 to 460
	2. Rated frequency [Hz]	2. from 50 to 140
	3. Rated current [A]	3. 0.6 ÷ 7A (NEO-3); 0.6 ÷ 22.0A (NEO-11); 0.6 ÷ 45.0A (NEO-22)
	4. Rated RPM	4. from 1400 to 8300
	5. Power factor cosφ	5. from 0.60 to 0.93
	6. Rotation	6. 0=clockwise, 1=counter clockwise
	7. Minimum flow protection [%]	7. from 50 to 127
	8. Dry working power protection [%]	8. from 10 to 100
Pump data	1. Pressure max [bar]	1. To limit the maximum pressure from 1 to 50 bar
	2. Check [ON/OFF]	2. With Check=ON , the auto-tuning Check is run upon the next Start-up.
Pressure transducer	1. min [mA; V]	1. minimum pressure sensor threshold from 0.6mA / 0.15V to 16mA / 4V
	2. max [mA; V]	2. maximum pressure sensor threshold from 4mA / 1V to 22mA / 5,5V
	3. range [bar]	3. flow rate: sensor proportional reading field from 1 to 50 bar
Advanced function	Access to the advanced functions sub-menu	To access enter numeric access Password (number pre-assigned by Motive: 1).
Saving/Reset	Yes save: the changes made are saved	Save the changed data, or restore the default values
	Not save: returns to the values preceding the changes	NOTE: auto-saves every time you exit the from function menu
	Factory data: resets the factory values	CAUTION: Reset is enabled without the presence of the bridge +15V-SET (NEO-3) / 0V-SET (NEO-11/22) (Ill. X)
	Communication reset	Communication Reset is enabled only in the presence of the bridge +15V- SET (NEO-3) / 0V-SET (NEO-11/22) (Ill. X)

Table 5: Main menu

Advanced function menu

Advanced Function Menu	Sub-menu	Description
Motor limits	1. Maximum speed [% di rpm]	1. from 90 to 110%
	2. Minimum speed [% di rpm]	2. from 20 to 80%
	3. Acceleration [s]	3. from 0.1 to 99.9
	4. Deceleration [s]	4. from 0.1 to 99.9
	5. Maximum current [%]	5. 80 ÷ 150 (NEO-3) 80 ÷ 200 (NEO-11) 80 ÷ 150 (NEO-22)
Pressure control (irrelevant setting if you set the control type mode on “speed”)	1. Pressure hysteresis [Bar]	1. Hysteresis pressure control - from 0.10 to 3.00 Bar If for example the value of reference pressure is set on 3.0 Bar amd Hysteresis is set on 0.2 Bar, the pump will restart working when the pressure go down to 2.8 Bar
	2. Dry working stop delay [s]	2. Delay before the dry operation alarm warning – from 10 to 300 sec
	3. Dry working restart delay [min]	3. Restart attempts interval after dry operation alarm; after 5 restart attempts: block with manual reset - from 0.3 to 99.9 min
	4. Pipe filling delay [s]	4. Duration at minimum speed (motor limits) during start-up, when the pressure is less than the completed filling limit pressure; this delay is excluded in the minimum flow restart - from 0 to 999 sec
	5. Filling pressure limit [Bar]	5. Limit pressure below which the motor maintains the minimum speed upon start-up for the time set in the previous point - from 0.1 to 16 Bar
	6. Minimum flow stop delay [s]	6. Waiting time before switch-off due to Closed Supply - from 4 to 120 sec
	7. Minimum flow restart delay [s]	7. Restart time after switch-off due to Closed Supply - from 4 to 120 sec
	8. Emergency restart delay [s]	8. Waiting time before the restarting after motor switch-off due to an emergency - from 5 to 120 sec
	9. Dry working Power Factor cosφ limit	9. When cosφ drops below this value dry operation is indicated (with insufficient intake or air) - from 0.0 to 0.9 cosφ
	10. Alternating time [min]	10. Time of working alternation between pumps and the other for the translation of the first low – from 2 to 999 min

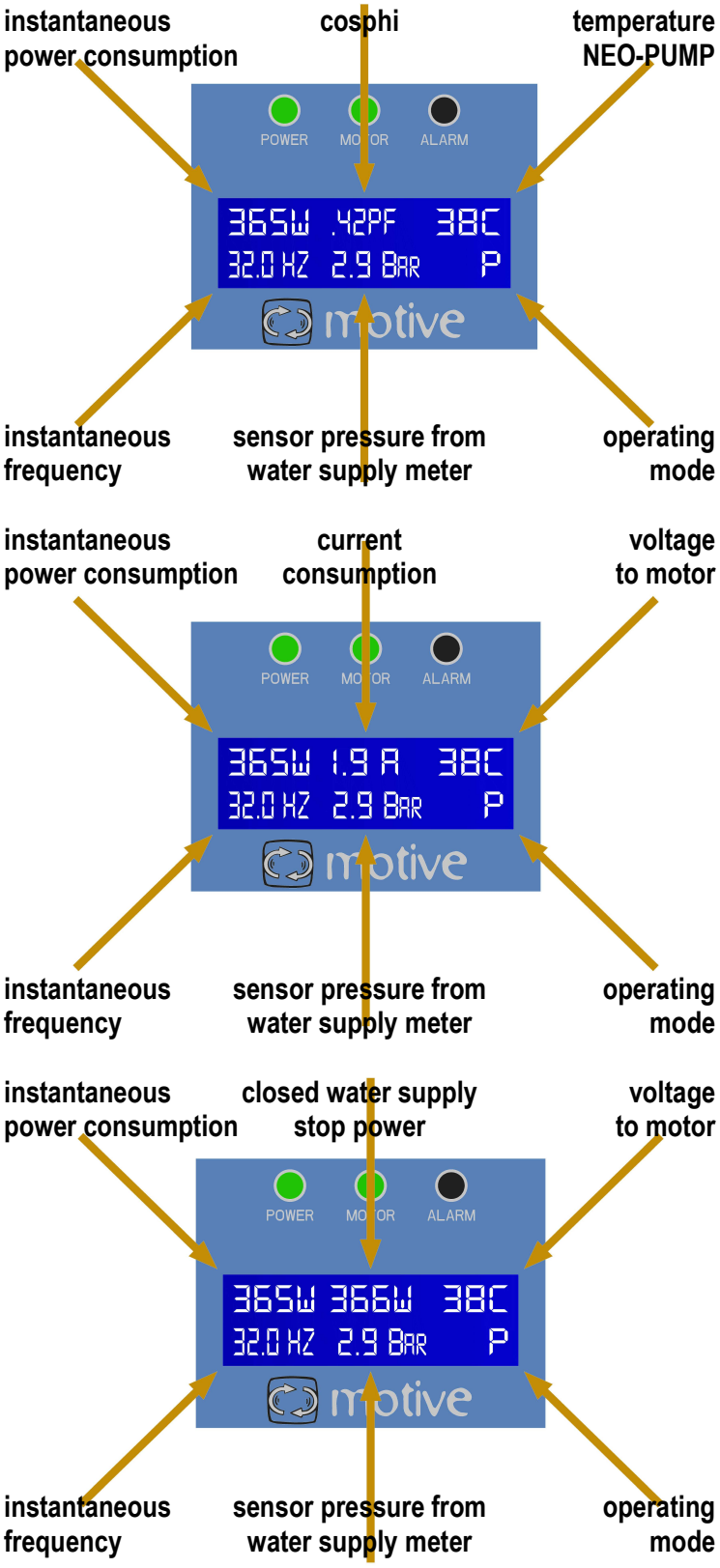
Control type	1. Mode: · Master-Slave RS485 · Pump pressure · Speed	1. Control mode (Default: Pump Pressure): - Master-Slave with pump pressure mode: group operation with other inverters connected by an RS485 serial cable. (in Speed mode is not possible in master-slave mode); - Pump pressure: pressure for single pump retroactive control (requires the pressure transducer); - Speed: directly regulates the speed even without the pressure sensor (safety stop due to dry operation/closed supply with manual reset).
	2. Number of pumps	2. Number of pumps running in a group - from 2 to 8
	3. Code (0÷7)	3. Code 0 for Master; ≥1 for each Slave
	4. Speed reference [RPM]	4. Speed reference in speed control mode - from 600 to 8300
	5. Start/Stop input	5. · keypad · external remote wired control
	4. Pressure reference input	4. · keypad · signal 0-10V on AN2 · signal 4-20mA on AN2
	5. Preheating temperature in stand-by [°C]	5. In case of wide thermal excursions, in order to avoid the condensation of water drops inside enclosure which could take to oxidation and/or to short circuit, the internal braking resistors are used to keep a minimum internal temperature (0÷50°C, default 25°C). NEO-WIFI shall remain powered and the internal resistors must remain connected.
P.I.D. Factors		For speed control in feedback
	1. K Proportional factor	1. $K_{proportional}$: 1-100. Multiplies the error of the reference quantity
	2. K Integral factor	2. $K_{integral}$: 1-100. Multiplies the integral of the error
	3. Ramp pressure [bar / s]	3. Pressure Ramp: rising speed of the pressure reference – from 0.01 to 1.27
Date adjournment (function based on the battery clock, which is there only on NEO-11 and NEO-22; not there on NEO-3)	Date and hour setting: to unlock the clock, modify the SECONDS value. The estimated duration of the clock battery type CR2430 is 6-8 years. After its replacement you must reset the clock and modify the seconds to unlock it.	Year: XX Month: XX Day: XX Hour: XX Minute: XX Second: XX
Starts timer (Function based on the battery clock, which is there only on NEO-11	Timer ON/OFF	When the Timer is ON, you can set up to 5 programs (consecutive starts/stops) insde 24 hours, which will be repeated every day. Every day of the week will be the same, and you cannot set different programs for different week days:

and NEO-22; not there on NEO-3)		· P1: XX (Start HOUR 1), YY (Start MIN 1); A1: ZZ (Stop HOUR 1); WW (Stop MIN 1); · P2: XX (Start HOUR 2), YY (Start MIN 2); A1: ZZ (Stop HOUR 2); WW (Stop MIN 2); · P3: XX (Start HOUR 3), YY (Start MIN 3); A1: ZZ (Stop HOUR 3); WW (Stop MIN 3); · P4: XX (Start HOUR 4), YY (Start MIN 4); A1: ZZ (Stop HOUR 4); WW (Stop MIN 4); · P5: XX (Start HOUR 5), YY (Start MIN 5); A1: ZZ (Stop HOUR 5); WW (Stop MIN 5).
RS485/MODBUS (vedi par. 6h)	1. MB comm.	1. OFF= modbus disabled; ON= programming and working only by MODBUS ON+KEY = Prggramming by MODBUS and working by keypad (including further remote wired commands and speed signals)
	2. Baude Rate	2. 4800 – 9600 (default) – 14400 – 19200. It shows the bits speed transmission in bits/second. The transmitted bits include start bits, data bits and parity bits (if used), and stop bits. However, only data bits are memorized.
	3. Modbus code	3. From 1 to 127 (default = 1).
Alarm history	List of alarms recorded	View in chronological order (from first to last) all the last 99 Alarm events (chap. 9) recorded during the life of the inverter. The same data is saved in the memory and is made available for analysis from the PC by means of a USB connection for the technical support and repair service (ATTENTION: only with inverter not powered).

Table 6: Advanced functions menu

NOTE: The keypad automatically recognizes if it is connected to a NEO-3 or NEO-11, and changes the enabled limits and functions of the menu according to that

5g. Display views



*The **Volts** to the motor are never as much as the Volts into the inverter from the net. The first stage in which any inverter rectifies the input voltage from ac to dc reduces about 8% the Volts. At a frequency lower than 100% of the net, such 8% effect disappears gradually, but it remains the following further falls of voltage. In fact, any inverter has further internal voltage falls of about 5-6V for diodes, IGBT bridge, and the inductance filter. So, with an input of 400V into an inverter, the voltage to the motor is about 362V at 100% frequency. The motor works anyway without any trouble because the inverter sets the magnetic flux according to such real voltage.

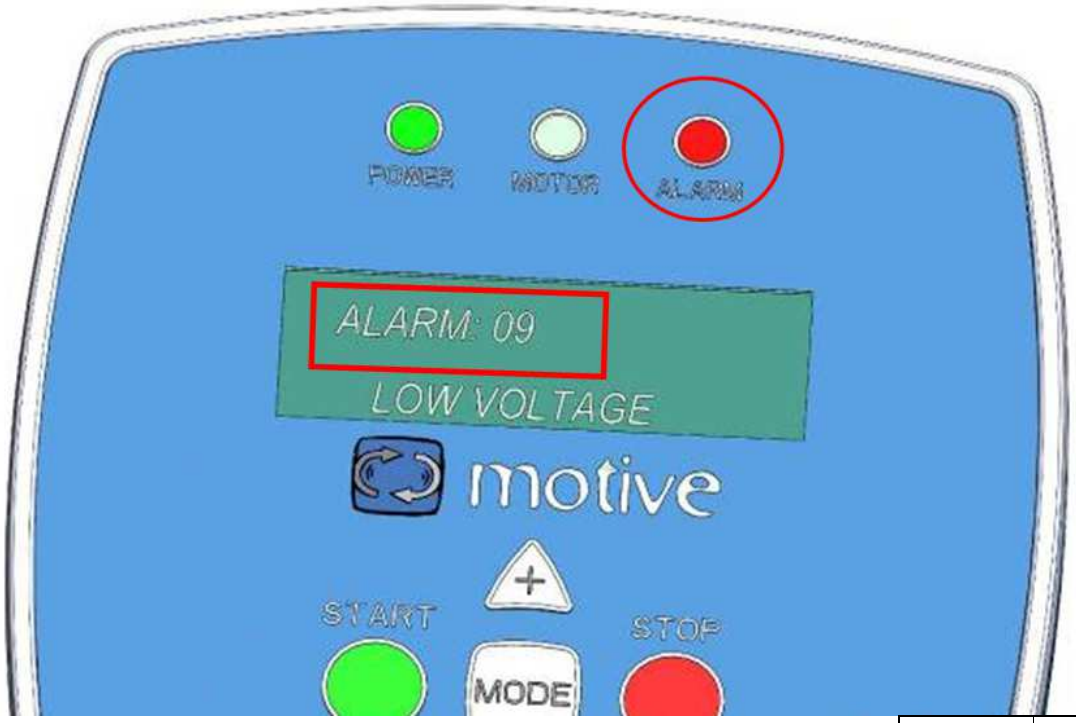
****Hertz** **: In speed or pressure control NEO chases the RPM speed or the BAR pressure not the frequency Hz. If for example the motor torque increases, NEO tends to compensates such higher resistance by increasing the Hz to the motor in order to maintain constant RPM. This is true both with and without encoder (in the latter case less accurately calculated).

for 2 seconds when you switch the keypad on) it is possible to see the battery charge.

For that, keep MODE 

pressed for min 1 second (16 squares = fully charged);

5h. Alarms



			NEO-3	NEO-11	NEO-22
1	Current peak	Immediate intervention for short circuit Self-resetting; blocks after 10 consecutive interventions	√	√	√
2	Overvoltage	Normally due to a fast voltage fluctuation. Self-resetting; blocks after 10 consecutive interventions	√	√	√
3	Inverter temperature	Exceeding the temperature limit on the electronic board (86°C). Self-resetting al calare della temp. di 10°C, senza limiti nel numero di interventi.	√	√	√
4	Motor heating	Motor thermal protection (it works on the same principle of thermal magnetic circuit breakers: the current) Self-resetting; blocks after 10 consecutive interventions	√	√	√
5	Encoder problem	Not active	×	×	×
6	Enable Off	Enable contact EN-C open; motor cannot work when this contact is open.	√	√	√
7	Locked rotor	Not active	×	×	×
8	IN-OUT inversion	Possible inversion error of the input and output cables of motor and line	√	√	√
9	Undervoltage	Voltage value insufficient to keep the engine running at a given load condition Self-resetting; blocks after 10 consecutive interventions	√	√	√
10	Communication error	Radio communication error between keypad and inverter	√	√	√
11	IGBT overcurrent	High current at low speed, overload. Self-resetting; blocks after 10 consecutive interventions	√	√	√
12	microprocessor temperature	Intervention for microprocessor overheat protezione attiva soltanto per le versioni NEO da 11kW e oltre.	×	√	√

13	phase U overcurrent	current overload on NEO-PUMP output to/by the motor on phase U	×	√	√
14	phase V overcurrent	current overload on NEO-PUMP output to/by the motor on phase V	×	√	√
15	phase W overcurrent	current overload on NEO-PUMP output to/by the motor on phase W	×	√	√
16	Braking peak	Overcurrent into the terminals BR+/BR-	×	√	√
17	Read error I1	current I1 read error, on phase U	×	√	√
18	Read error I2	current I2 read error, on phase V	×	√	√
19	Read error I3	current I3 read error, on phase W	×	√	√
20	Current imbalance	high imbalance between the currents in the three phases (>15% on RMS value) Self-resetting; stop after 10 consecutive interventions	×	√	√
21	phase U current peak	Short circuit protection localized on phase U	×	√	√
22	phase V current peak	Short circuit protection localized on phase V	×	√	√
23	phase W current peak	Short circuit protection localized on phase W	×	√	√
24	current leakage	protection in case of a high earth leakage current (> 5A). Warning: this is not a replacement of the differential switch.	×	√	√
25	Fan 2 current peak	Not active	×	×	×
26	Fan 1current peak	Not active	×	×	×
27	Fan overcurrent	overcurrent output from the auxiliary ventilation terminals of the inverter	×	×	√
28	AN2 out of limits	Signal <3mA if set to 4-20mA in Type of Control - Pressure remote reference input on AN2 at 4-20mA	×	√	√
29	Dry operation	No water in suction or the presence of air; Self-resetting; Blocks after 5 consecutive interventions	√	√	√
30	Problem with the pressure transducer	Problem with the pressure sensor Self-resetting; Blocks after 10 consecutive interventions	√	√	√
31	Minimum flow	Pump switch-off due to the minimum water flow limit being reached; although it is present in the list of alarms **it is a normal operating condition** of the system (no supply water request) Self-resetting with no limit on the number of interventions	√	√	√

Tab 7: Alarm menu

√ = activated alarm

× = not activated alarm

The restart after alarm must be preceded by a verification of the system, in order to find the reason of the alarm. Unconditioned restarts can lead to the product destruction and to a risk for the safety of the connected machines and the users.
The alarm can be reset by using the button STOP. If it returns, contact the technical service.

5i. MODBUS

NOTE:Not all the variables can be modified. In the column “Type” the letter R means “read only” and R/W means “Read and Write”

NEO-Pump modbus Variables

Indice N°	Tipo	Definizione variabile	u.d.m	Limite min	Limite max.	Default	Note
0	R	inverter power	KW*10	30	220		Default: 30 for ITTP3.0M-NEO-3kW; 110 for ITTP11M-NEO-11kW; 220 for NEO-22kW
1	R	Software version					
2	R	last revision	days	0	0xffff		
3	R	nominal motor power	KW*100	9	2200		Values calculated by the inverter according to the set values of Vn, In, cosfin
4	R/W	machine code radio communication		1	127	1	
5	R/W	radio frequency 860	Mhz-860	0	19	10	
6	R/W	target pressure 1	Bar*100	50	max limit pressure	300	
7	R/W	target pressure 2	Bar*100	50	max limit pressure	200	
8	R/W	target pressure 3	Bar*100	50	max limit pressure	150	Only for ITTP3.0M-NEO-3kW
9	R/W	target pressure 4	Bar*100	50	max limit pressure	100	Only for ITTP3.0M-NEO-3kW
10	R/W	nominal motor frequency	Hz	50	140	50	
11	R/W	nominal motor rpm	rpm	1400	8300	2800	
12	R/W	nominal motor cosfi	*100	50	95	80	
13	R/W	sense of motor rotation		0	1	0	
14	R/W	Power shutdown for minimum flow	%	50	127	103	
15	R/W	Power off for dry operation	%	50	100	80	
16	R/W	max pressure limit	Bar*100	100	5000	1600	

17	R/W	Enable Self-learning check		0	1	1	0=OFF, 1=ON
18	R/W	maximum speed	%	90	110	100	set 100% as default and not 102%
19	R/W	minimum speed	%	20	80	50	
20	R/W	acceleration	s*10	10	999	30	
21	R/W	deceleration	s*10	10	999	30	
22	R/W	Maximum inrush current	%In	80	150	110	maximum % current on In
23	R/W	enable timer		0	1	0	0=OFF, 1=ON
24	R	enable restart		0	1	0	When push START it turns 1 ; when push STOP goeas back to 0.
25	R/W	pressure hysteresis	Bar*100	10	300	30	
26	R/W	prime time	s	10	300	40	
27	R/W	dead time after dry operation stop	minutes*10	3	999	150	Minimum restart time after motor stop.
28	R/W	dead time after minimum flow stop	s	4	120	12	
29	R/W	restart after minimum flow stop	s	1	120	1	Minimum restart time after motor stop.
30	R/W	dead time after alarm	s	5	120	10	
31	R/W	limit min cosfi dry switch off	*100	0	90	50	
32	R/W	Switching time work as a group	minutes	1	999	60	
33	R/W	control type		0	2	1	0=speed, 1=pressure, 2=group
34	R/W	total number pumps in group		2	8	2	
35	R/W	pump code in group		0	7	0	0=Master; >0=Slaves
36	R/W	speed reference	RPM	1400	8300	2800	speed setting with type of control = 0
37	R/W	baud rate (0=4800, 1=9600, 2=14400, 3=19200 bit/s)	bit/s	0	3	3	
38	R/W	input start stop (0=keypad, 1=remote)		0	1	0	
39	R/W	input pressure reference (0=keypad, 1= 4-20mA on AN2, 2= 0-10V on AN2)		0	2	0	
40	R/W	proportional factor pressure control / speed		1	100	25	
41	R/W	Integral control pressure / speed factor		1	100	25	
42	R/W	motor rated voltage	V	180	460	400	
43	R/W	motor rated current	A*10	6	450		Default: 70 for ITTP3.0M-NEO-3kW; 230 for ITTP11M-NEO11-kW; 450 for ITTP22M-NEO-22kW
44	R/W	ramp up and down pressure	Bar*100 /s	1	127	100	
45	R	hour meter switch on [0]	seconds*0x10000	0	0xffff		bottom time in seconds (hexadecimal) feeded inverter
46	R	hour meter switch on [1]	seconds*0x10000	0	0xffff		upper time in seconds (hexadecimal) feeded inverter
47	R	hour counter [0]	seconds*0x10000	0	0xffff		bottom time in seconds (hexadecimal) motor on
48	R	hour counter [1]	seconds*0x10000	0	0xffff		upper time in seconds (hexadecimal) motor on
49	R	last registered alarm		0	6539		sequential number of the last recorded alarm
50	R/W	enable modbus		0	2	1	0=OFF, 1=ON+Key (ON with keypad command), 2=ON (ON with Modbus command)
51	R/W	slave modbus code		1	127	1	
52	R/W	minimum threshold sensor	mA*10	6	160	40	

53	R/W	maximum threshold sensor	mA*10	40	220	200	
54	R/W	field pressure reading	Bar*10	10	500	160	
55	R/W	off-switch moment [0]	minutes	0	1439		
56	R/W	off-switch moment [1]	minutes	0	1439		
57	R/W	off-switch moment [2]	minutes	0	1439		
58	R/W	off-switch moment [3]	minutes	0	1439		
59	R/W	off-switch moment [4]	minutes	0	1439		
60	R/W	off-switch moment [5]	minutes	0	1439		
61	R/W	off-switch moment [6]	minutes	0	1439		
62	R/W	off-switch moment [7]	minutes	0	1439		
63	R/W	off-switch moment [8]	minutes	0	1439		
64	R/W	off-switch moment [9]	minutes	0	1439		
65	R	maximum pressure reached during check	Bar*100	100	5000	1600	
66	R	speed reached during check	rpm	2097	29360	10486	speed calculated according to formula: Hz*256*4096/5000
67	R/W	pipe filling time					
68	R/W	pipe filling pressure					
69	R/W	save parameters		0	65535		saves input parameters by writing 1, then 541 (to confirm receipt go back to 0)
70	R/W	reset parameters	s*0x10000	0	65535		resets default parameters by writing 1, then 541 (to confrim receipt go back to 0)
71	R	minimum power flow [10]	W	0	65535		in Watts power values recorded as a function of frequency, measured during check
72	R	minimum power flow [11]	W	0	65535		
73	R	minimum power flow [12]	W	0	65535		
74	R	minimum power flow [13]	W	0	65535		
75	R	minimum power flow [14]	W	0	65535		
76	R	minimum power flow [15]	W	0	65535		
77	R	minimum power flow [16]	W	0	65535		
78	R	minimum power flow [17]	W	0	65535		
79	R	minimum power flow [18]	W	0	65535		
80	R	minimum power flow [19]	W	0	65535		
81	R	minimum power flow [20]	W	0	65535		
82	R	minimum power flow [21]	W	0	65535		
83	R	minimum power flow [22]	W	0	65535		
84	R	minimum power flow [23]	W	0	65535		
85	R	minimum power flow [24]	W	0	65535		
86	R	minimum power flow [25]	W	0	65535		
87	R	minimum power flow [26]	W	0	65535		
88	R	minimum power flow [27]	W	0	65535		
89	R	minimum power flow [28]	W	0	65535		
90	R	minimum power flow [29]	W	0	65535		
91	R	minimum power flow [30]	W	0	65535		
92	R	minimum power flow [31]	W	0	65535		
93	R	minimum power flow [32]	W	0	65535		
94	R	minimum power flow [33]	W	0	65535		
95	R	minimum power flow [34]	W	0	65535		
96	R	minimum power flow [35]	W	0	65535		

97	R	minimum power flow [36]	W	0	65535		
98	R	minimum power flow [37]	W	0	65535		
99	R	minimum power flow [38]	W	0	65535		
100	R	minimum power flow [39]	W	0	65535		
101	R	minimum power flow [40]	W	0	65535		
102	R	minimum power flow [41]	W	0	65535		
103	R	minimum power flow [42]	W	0	65535		
104	R	minimum power flow [43]	W	0	65535		
105	R	minimum power flow [44]	W	0	65535		
106	R	minimum power flow [45]	W	0	65535		
107	R	minimum power flow [46]	W	0	65535		
108	R	minimum power flow [47]	W	0	65535		
109	R	minimum power flow [48]	W	0	65535		
110	R	minimum power flow [49]	W	0	65535		
111	R	minimum power flow [50]	W	0	65535		
112	R	minimum power flow [51]	W	0	65535		
113	R	minimum power flow [52]	W	0	65535		
114	R	minimum power flow [53]	W	0	65535		
115	R	minimum power flow [54]	W	0	65535		
116	R	minimum power flow [55]	W	0	65535		
117	R	minimum power flow [56]	W	0	65535		
118	R	minimum power flow [57]	W	0	65535		
119	R	minimum power flow [58]	W	0	65535		
120	R	minimum power flow [59]	W	0	65535		
121	R	minimum power flow [60]	W	0	65535		
122	R	minimum power flow [61]	W	0	65535		
123	R	minimum power flow [62]	W	0	65535		
124	R	minimum power flow [63]	W	0	65535		
125	R	minimum power flow [64]	W	0	65535		
126	R	minimum power flow [65]	W	0	65535		
127	R	minimum power flow [66]	W	0	65535		
128	R	minimum power flow [67]	W	0	65535		
129	R	minimum power flow [68]	W	0	65535		
130	R	minimum power flow [69]	W	0	65535		
131	R	minimum power flow [70]	W	0	65535		
132	R	minimum power flow [71]	W	0	65535		
133	R	minimum power flow [72]	W	0	65535		
134	R	minimum power flow [73]	W	0	65535		
135	R	minimum power flow [74]	W	0	65535		
136	R	minimum power flow [75]	W	0	65535		
137	R	minimum power flow [76]	W	0	65535		
138	R	minimum power flow [77]	W	0	65535		
139	R	minimum power flow [78]	W	0	65535		
140	R	minimum power flow [79]	W	0	65535		
141	R	minimum power flow [80]	W	0	65535		
142	R	minimum power flow [81]	W	0	65535		
143	R	minimum power flow [82]	W	0	65535		
144	R	minimum power flow [83]	W	0	65535		
145	R	minimum power flow [84]	W	0	65535		

146	R	minimum power flow [85]	W	0	65535		
147	R	minimum power flow [86]	W	0	65535		
148	R	minimum power flow [87]	W	0	65535		
149	R	minimum power flow [88]	W	0	65535		
150	R	minimum power flow [89]	W	0	65535		
151	R	minimum power flow [90]	W	0	65535		
152	R	minimum power flow [91]	W	0	65535		
153	R	minimum power flow [92]	W	0	65535		
154	R	minimum power flow [93]	W	0	65535		
155	R	minimum power flow [94]	W	0	65535		
156	R	minimum power flow [95]	W	0	65535		
157	R	minimum power flow [96]	W	0	65535		
158	R	minimum power flow [97]	W	0	65535		
159	R	minimum power flow [98]	W	0	65535		
160	R	minimum power flow [99]	W	0	65535		
161	R	minimum power flow [100]	W	0	65535		
162	R	minimum power flow [101]	W	0	65535		
163	R	minimum power flow [102]	W	0	65535		
164	R	minimum power flow [103]	W	0	65535		
165	R	minimum power flow [104]	W	0	65535		
166	R	minimum power flow [105]	W	0	65535		
167	R	minimum power flow [106]	W	0	65535		
168	R	minimum power flow [107]	W	0	65535		
169	R	minimum power flow [108]	W	0	65535		
170	R	minimum power flow [109]	W	0	65535		
171	R	minimum power flow [110]	W	0	65535		
172	R	minimum power flow [111]	W	0	65535		
173	R	minimum power flow [112]	W	0	65535		
174	R	minimum power flow [113]	W	0	65535		
175	R	minimum power flow [114]	W	0	65535		
176	R	minimum power flow [115]	W	0	65535		
177	R	minimum power flow [116]	W	0	65535		
178	R	minimum power flow [117]	W	0	65535		
179	R	minimum power flow [118]	W	0	65535		
180	R	minimum power flow [119]	W	0	65535		
181	R	minimum power flow [120]	W	0	65535		
182	R	minimum power flow [121]	W	0	65535		
183	R	minimum power flow [122]	W	0	65535		
184	R	minimum power flow [123]	W	0	65535		
185	R	minimum power flow [124]	W	0	65535		
186	R	minimum power flow [125]	W	0	65535		
187	R	minimum power flow [126]	W	0	65535		
188	R	minimum power flow [127]	W	0	65535		
189	R	minimum power flow [128]	W	0	65535		
190	R	minimum power flow [129]	W	0	65535		
191	R	minimum power flow [130]	W	0	65535		
192	R	minimum power flow [131]	W	0	65535		
193	R	minimum power flow [132]	W	0	65535		
194	R	minimum power flow [133]	W	0	65535		

195	R	minimum power flow [134]	W	0	65535		
196	R	minimum power flow [135]	W	0	65535		
197	R	minimum power flow [136]	W	0	65535		
198	R	minimum power flow [137]	W	0	65535		
199	R	minimum power flow [138]	W	0	65535		
200	R	minimum power flow [139]	W	0	65345		
201	R	minimum power flow [140]	W	0	65535		
202	R/W	time [0]	s	0	65535		Current time hexadecimal (byte lower part)
203	R/W	time [1]	s	0	65535		Current time hexadecimal (byte upper part)
204	R	N registered alarm		0	4079		Incremental alarm sequence number
205	R	Type of registered alarm		0	28		Total N°28 types of alarm
206	R	intervention watch [0]	s	0	65535		lower part alarm (clock + data now only on NEO-11kW, hour meter to 3kW)
207	R	intervention watch[1]	s	0	65535		Upper part of alarm (date + time clock only on NEO-11kW, hour meter to 3kW)
208	R	intervention tensions [0]	V	0	65535		V12-line voltage measured during the security operation (alarm)
209	R	intervention tensions [1]	V	0	65535		phase voltage V23 measured during the security operation (alarm)
210	R	intervention tensions [2]	V	0	65535		phase voltage V13 measured during the security operation (alarm)
211	R	current intervention [0]	A rms	0	65535		I1 current measured during the security operation (alarm)
212	R	current intervention [1]	A rms	0	65535		I2 current measured during the security operation (alarm)
213	R	current intervention[2]	A rms	0	65535		I3 current measured during the security operation (alarm)
214	R	intervention power	kW*10	0	65535		power measured during the security operation (alarm)
215	R	BUS DC intervention tension	V	0	1000		Tension in the downstream of the diode bridge capacitors (DC bus) during the operation of Protection
216	R	frequenza intervento	Hz*10	0	1400		motor frequency during the operation of Protection
217	R	intervention pressure	Bar*100	0	500		Pressure measured during the security operation (alarm)
218	R	intervention cosfi	*100	0	99		Power factor measured during the intervention of the alarm (alarm)
219	R	intervention rpm	RPM	0	8300		motor speed measured during the security operation (alarm)
220	R	IGBT intervention temperature	°C	0	255		IGBT temperature measured during the security operation (alarm)
221	R	rpm	RPM	0	8300		average value measured over the last 0.5s
222	R	power	W	0	65535		average value measured over the last 0.5s
223	R	I rms	A*10	0	65535		average value measured over the last 0.5s
224	R	Vrms	V	0	65535		average value measured over the last 0.5s

225	R	IGBT temperature	°C	0	255		average value measured over the last 0.5s
226	R	cosfi	*100	0	99		average value measured over the last 0.5s
227	R	actual sense of rotation		0	1		average value measured over the last 0.5s
228	R	Hz frequency	Hz*10	0	2000		average value measured over the last 0.5s
229	R	status enabled		0	1		
230	R	status relay motor ON		0	1		
231	R	status relay alarm		0	1		
232	R	status relay vent		0	1		output relay fan only ITTP 11M-NEO-11kW
233	R	Remote reference pressure	Bar*100	0	5000		pressure value by the AN 2 signal current or voltage
234	R	pressure read	Bar*100	0	500		Measured instantaneous value
235	R	minimum pressure threshold for dry switch off		50	5000		
236	R	minimum pressure threshold for minimum flow shutdown		50	5000		
237	R	Reference transient pressure		50	5000		reference of transitional pressure during the variation of the set pressure
238	R	status master [0]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run
239	R	status slave[1]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run
240	R	status slave[2]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run
241	R	status slave[3]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run
242	R	staus slave[4]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run
243	R	status slave[5]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run
244	R	status slave[6]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run
245	R	status slave[7]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run
246	R	activates master [0]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run
247	R	activates slave[1]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run
248	R	activates slave[2]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run
249	R	activates slave[3]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run
250	R	activates slave[4]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run
251	R	activates slave[5]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run
252	R	activates slave[6]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run
253	R	activates slave[7]		65	77	65	hexadecimal 65 = 'A' arrest; 77 hex = 'M' run

254	R	pressure read by the master [0]	Bar*100	-250	5000		read pressure, received from the master encoder
255	R	pressure received [1]	Bar*100	-250	5000		read pressure, received from the slave 1
256	R	pressure received [2]	Bar*100	-250	5000		read pressure, received from the slave 2
257	R	pressure received [3]	Bar*100	-250	5000		read pressure, received from the slave 3
258	R	pressure received [4]	Bar*100	-250	5000		read pressure, received from the slave 4
259	R	pressure received [5]	Bar*100	-250	5000		read pressure, received from the slave 5
260	R	pressure received [6]	Bar*100	-250	5000		read pressure, received from the slave 6
261	R	pressure received [7]	Bar*100	-250	5000		read pressure, received from the slave 7
262	R	pressure to control [0]	Bar*100	50	5000		Reference of the master pressure
263	R	pressure to control [1]	Bar*100	50	5000		Pressure reference received from the slave 1
264	R	pressure to control [2]	Bar*100	50	5000		Pressure reference received from the slave 2
265	R	pressure to control [3]	Bar*100	50	5000		Pressure reference received from the slave 3
266	R	pressure to control [4]	Bar*100	50	5000		Pressure reference received from the slave 4
267	R	pressure to control [5]	Bar*100	50	5000		Pressure reference received from the slave 5
268	R	pressure to control [6]	Bar*100	50	5000		Pressure reference received from the slave 6
269	R	pressure to control [7]	Bar*100	50	5000		Pressure reference received from the slave 7
270	R	average rpm read by Master [0]	RPM	0	8300		RPM read by the Master
271	R	Average receipt rpm [1]	RPM	0	8300		RPM read by Slave
272	R	Average receipt rpm [2]	RPM	0	8300		RPM read by Slave
273	R	Average receipt rpm [3]	RPM	0	8300		RPM read by Slave
274	R	Average receipt rpm [4]	RPM	0	8300		RPM read by Slave
275	R	Average receipt rpm [5]	RPM	0	8300		RPM read by Slave
276	R	Average receipt rpm [6]	RPM	0	8300		RPM read by Slave
277	R	Average receipt rpm [7]	RPM	0	8300		RPM read by Slave
278	R	average power read from Master [0]	W	0	65535		Power read by the Master, in group operation
279	R	average received power [1]	W	0	65535		Power measured by the Slave and communicated to the Master
280	R	average received power [2]	W	0	65535		Power measured by the Slave and communicated to the Master
281	R	average received power [3]	W	0	65535		Power measured by the Slave and communicated to the Master
282	R	average received power [4]	W	0	65535		Power measured by the Slave and communicated to the Master
283	R	average received power [5]	W	0	65535		Power measured by the Slave and communicated to the Master
284	R	average received power [6]	W	0	65535		Power measured by the Slave and communicated to the Master

285	R	average received power [7]	W	0	65535		Power measured by the Slave and communicated to the Master
286	R/W	events communication		0	65535		Number of communication events received through the serial Modbus
287	R/W	CRC error counter		0	65535		errors Number of checksum
288	R/W	exception error counter		0	65535		errors Number of type exception (other types)
289	R/W	Counter received messages		0	65535		Number of communication events received without error
290	R/W	Counter messages received no response		0	65535		Number of communication events received without response from the slave
291	R/W	Counter NAK messages		0	65535		Number of unacknowledged received communication events (Ex. Wrong code or address)
292	R/W	Counter messages with busy slave		0	65535		Number of messages received with slave busy and unable to respond to the master
293	R/W	Counter overrun posts		0	65535		Number of messages received over the expected size
294	R/W	Modbus command on / off		0	1		1 = power on, 0 = off
295	R/W	speed Modbus command (with type speed control)	rpm	minimum speed	maximum speed	nominal motor rpm	Default how to set the parameter 11
296	R/W	Modbus command pressure (with type pressure control)	Bar*100	50	max limit pressure		Limited to the value of parameter 13
297	R/W	Modbus command acceleration ramp	seconds*10	10	999		Note: The speed control may slow the ramp set here
298	R/W	Modbus command deceleration ramp	seconds*10	10	999		Note: The speed control may slow the ramp set here
299		Reserve					

6.WARNINGS AND RISKS

These instructions must be read and strictly adhered to by who is doing the final installation and by the user, and they must also be made available to all the personnel that sees to the installation, calibration and maintenance of the device.

Qualification of personnel
The installation, commissioning and maintenance of the device must be carried out only by technically qualified personnel who is aware of the risks that the use of this device involves.

Dangers from non-compliance with safety regulations
Failure to comply with safety requirements, beyond endangering people and damaging the equipment, will void all warranty. The consequences of non-observance of safety requirements can be
- Activation failure of some system functions.
- Danger to people resulting from electrical and mechanical events.

Safety requirements for the user
All the accident prevention regulations must be implemented and complied with.
The keypad must be in a position from which the functioning of the system is visible.

Safety requirements for assembly and inspection
The customer must make sure that the assembly, inspection and maintenance operations are carried out by authorized and qualified personnel who has carefully read these instructions.
Work on the equipment and machinery must be performed on a non-operating machine.

Spare parts
The original parts and the accessories authorized by the manufacturer are an integral part of the safety of the equipment and of the machines. The use of components or accessories that are not original may compromise safety and will void the warranty.
LABELS have been affixed on the boards, on the microprocessors, that are used to trace the inverter model and the production serial number + production date code (Month/Year). Removing this label and/or deleting the writing on them will render the warranty of the inverter or keypad null and void.

Loads with high inertia
The faster the motor slows down, the more the engine is operating under regenerative conditions and returns energy to the inverter. The voltage on the intermediate circuit of the drive can rise to a value beyond which the excess energy must be transferred to an external braking system. The external braking resistances are designed to absorb the energy in excess and to convert it into heat that is dissipated into the environment. The use of external braking resistances (terminals BR+ and BR-) allows for work cycles characterized by long or hard braking, or by very frequent braking.
CAUTION: use additional external braking resistors with a value of 300 ohm ±10% (NEO-PUMP-3); 110 ohm ±10% (NEO-PUMP-11) ; 55 ohm ±10% (NEO-PUMP-22) and power suitable for the application, in the event of braking of motors with loads with high inertia.

The instructions in this manual do not replace, but supplement the current law provisions on safety standards.

NEODYMIUM magnets

Warning

Pacemaker

Magnets could affect the functioning of pacemakers and implanted heart defibrillators.

- A pacemaker could switch into test mode and cause illness.
- A heart defibrillator may stop working.

- If you wear these devices keep sufficient distance to magnets.
- Warn others who wear these devices from getting too close to magnets.

Caution

Magnetic field

Magnets produce a far-reaching, strong magnetic field. They could damage TVs and laptops, computer hard drives, credit and ATM cards, data storage media, mechanical watches, hearing aids and speakers.

- Keep magnets away from devices and objects that could be damaged by strong magnetic fields.

It's forbidden to wash with water pressure

Declaration of conformity

Motive srl based in Castenedolo (BS) – Italy

declares, under its exclusive responsibility, that its range of "**NEO-PUMP**" inverters and motor-inverters

is constructed in accordance with the following international regulations (latest edition)

- **EN 60034-1**. Rotating electrical machines: rating and performance
- **EN IEC 60034-5**. Rotating machines: definition of degrees of protection
- **EN 60034-30**. Rotating electrical machines: efficiency classes of single-speed, three-phase, cage-induction motors
- **EN 55014-2**. Electromagnetic compatibility. Requirements for household appliances, electric tools and similar apparatus. Part 2: Immunity
- **EN 61000-3-2**. Limits for harmonic current emissions (equipment input current <= 16 A per phase).
- **EN 61000-3-3**. Limitation of voltage fluctuations and flicker in low-voltage supply systems, for equipment with rated current <= 16 A
- **EN 61000-3-12**. Limits for harmonic currents produced by equipment connected to public low-voltage systems with rated input current greater than 16 A and <= 75 A per phase
- **EN 61000-6-3**. Electromagnetic compatibility (EMC): Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
- **EN 61000-6-4**. Electromagnetic compatibility (EMC): Part 6-4: Generic standards - Emission standard for industrial environments
- **EN 50178**. Electronic equipment for use in power installations
- **ETSI 301 489-3**. Electromagnetic compatibility standard for radio equipment. Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz

	NEO-PUMP-3 Cat. C1	**NEO-PUMP-11 Cat. C2**
EMC for DOMESTIC, COMMERCIAL AND LIGHT INDUSTRIAL ENVIRONMENT	YES	Optional
EMC for INDUSTRIAL ENVIRONMENT	YES	YES

as required by the Directives

- Low Voltage Directive (LVD) **2014/35/EEC**
- Electromagnetic Compatibility Directive (EMC) **2014/30/EEC**
- Ecodesign Directive for energy related products (ErP) **2019/1781/EEC**

The Legal Representative

Declaration of conformity UKCA

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- **BS EN 61000-6-4**. Electromagnetic compatibility (EMC): Part 6-4: Generic standards - Emission standard for industrial environments
- **BS EN 50178**. Electronic equipment for use in power installations
- **ETSI 301 489-3**. Electromagnetic compatibility standard for radio equipment. Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz

	NEO-PUMP-3 Cat. C1	**NEO-PUMP-11 Cat. C2**
EMC for DOMESTIC, COMMERCIAL AND LIGHT INDUSTRIAL ENVIRONMENT	YES	Optional
EMC for INDUSTRIAL ENVIRONMENT	YES	YES

as required by the Directives

Low Voltage (LVD) **2014/35/EEC**,
UK Electrical Equipment (Safety) **Regulations 2016**

EMC Electromagnetic Compatibility (EMC) **2014/30/EEC**
UK EMC Electromagnetic Compatibility **Regulations 2016**

Eco-design Directive for Energy-related Products (ErP) **2019/1781/EEC**
UK The Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) **Regulations 2019**

The Legal Representative

Declaration de conformite C

La société Motive S.r.l. sise à Castenedolo - BRESCIA (Italie)

déclare sous son entière responsabilité, que toute sa gamme des

variateurs de vitesse "**NEO**"

est réalisée conformément à la normative internationale

- **EN60034-1**. Rotating electrical machines: rating and performance
- **EN60034-30**. Rotating electrical machines: efficiency classes of single-speed, three-phase, cage-induction motors
- **EN 55014-2**, Electromagnetic compatibility. Requirements for household appliances, electric tools and similar apparatus. Part 2: Immunity
- **EN 61000-3-2**, Limits for harmonic current emissions (equipment input current <= 16 A per phase).
- **EN 61000-3-3**. Limitation of voltage fluctuations and flicker in low-voltage supply systems, for equipment with rated current <= 16 A
- **EN 61000-3-12**. Limits for harmonic currents produced by equipment connected to public low-voltage systems with rated input current greater than 16 A and <= 75 A per phase
- **EN61000-6-3.** Electromagnetic compatibility (EMC): Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
- **EN61000-6-4**. Electromagnetic compatibility (EMC): Part 6-4: Generic standards - Emission standard for industrial environments
- **EN 50178**. Electronic equipment for use in power installations

  ETSI 301 489-3 Electromagnetic compatibility standard for radio equipment. Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz

et elle est donc conforme aux arrêtés

LVD Arrêté No. 2573-14
EMC Arrêté No. 2574-14

Le représentant légal : Giorgio Bosio

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Cod.Fisc. e P.Iva: 03580280174

Dott. GIORGIO BOSIO

ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ
ДЕКЛАРАЦИЯ О СООТВЕТСТВИИ

Заявитель Общество с ограниченной ответственностью "ПРИВОД ГРАНД РЕДУКТОР"

Место нахождения и адрес места осуществления деятельности: Российская Федерация, Смоленская область, 214004, город Смоленск, улица Багратиона, дом 4, офис 46, основной государственный регистрационный номер: 1166733076608, номер телефона: +79203158381, адрес электронной почты: privodgrand@gmail.com

в лице Директора Шелеста Александра Иосифовича

заявляет, что Оборудование электротехническое промышленного назначения: Частотные преобразователи (инверторы), модели: NEO-WiFi, NEO-PUMP, NEO-SOLAR, NEO-OLEO, NEO-COMP, NEO-VENT, NANO

изготовитель «Motive Srl». Место нахождения и адрес места осуществления деятельности по изготовлению продукции: Via Le Ghiselle, 20, 25014 Castenedolo BS, Италия.
Продукция изготовлена в соответствии с Директивами 2014/30/EU "О электромагнитной совместимости", 2014/35/EU "По низковольтному оборудованию и системам".
Код ТН ВЭД ЕАЭС 8504409000. Серийный выпуск

соответствует требованиям

Технический регламент Таможенного союза «О безопасности низковольтного оборудования» (ТР ТС 004/2011) , Технический регламент Таможенного союза «Электромагнитная совместимость технических средств» (ТР ТС 020/2011)

Декларация о соответствии принята на основании

Протокола испытаний № 3232О.301120 от 30.11.2020 года, выданного Испытательной лабораторией «ОНИКС», аттестат аккредитации ОНПС RU.04ОПС0.ИЛ02.
Схема декларирования 1д

Дополнительная информация

ГОСТ 12.2.007.0-75 «Система стандартов безопасности труда. Изделия электротехнические. Общие требования безопасности»; ГОСТ 30804.6.2-2013 «Совместимость технических средств электромагнитная. Устойчивость к электромагнитным помехам технических средств, применяемых в промышленных зонах. Требования и методы испытаний», (раздел 8); ГОСТ 30804.6.4-2013 «Совместимость технических средств электромагнитная. Электромагнитные помехи от технических средств, применяемых в промышленных зонах. Нормы и методы испытаний», (раздел 7). Условия хранения продукции в соответствии с ГОСТ 15150-69 "Машины, приборы и другие технические изделия. Исполнения для различных климатических районов. Категории, условия эксплуатации, хранения и транспортирования в части воздействия климатических факторов внешней среды", срок хранения (службы, годности) указан в прилагаемой к продукции товаросопроводительной и/или эксплуатационной документации.

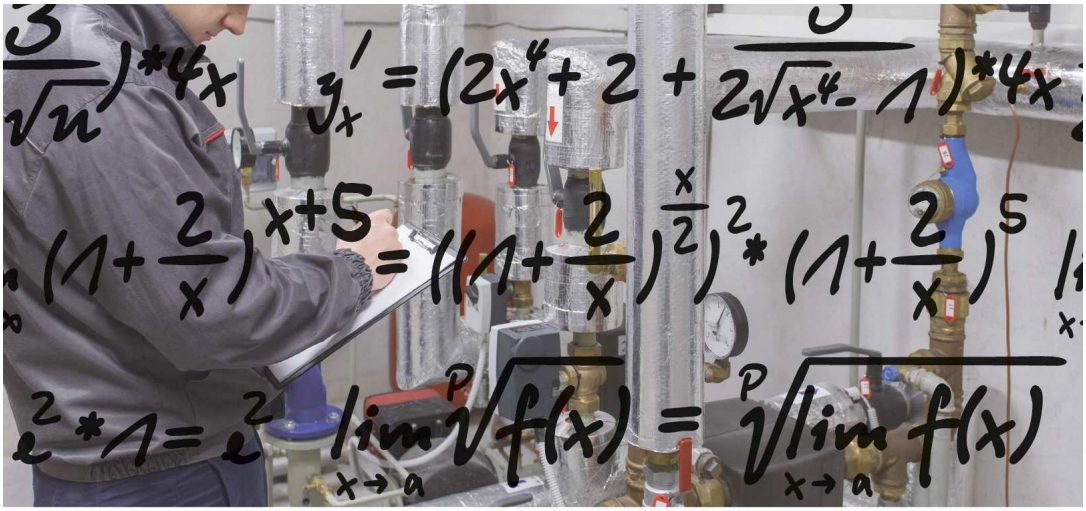
Декларация о соответствии действительна с даты регистрации по 06.12.2025 включительно

(подпись) М. П. Шелест Александр Иосифович
(Ф.И.О. заявителя)

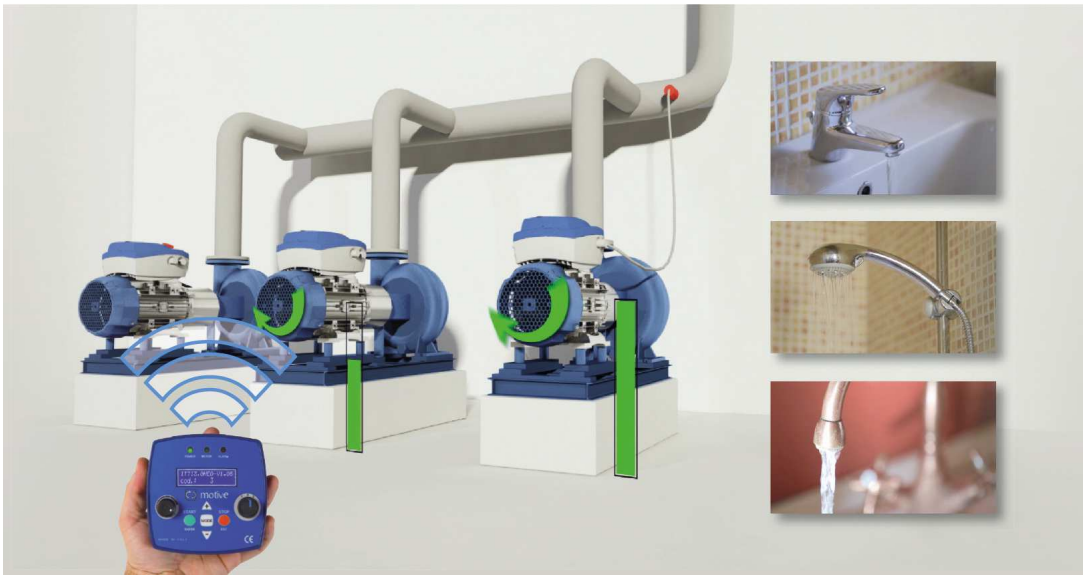
Регистрационный номер декларации о соответствии: ЕАЭС N RU Д-IT.HB54.B.04614/20

Дата регистрации декларации о соответствии: 07.12.2020

ALL THE DATA WAS COMPILED AND CHECKED WITH THE UTMOST CARE.
WE DO NOT HOWEVER ASSUME ANY RESPONSIBILITY FOR ANY ERRORS OR OMISSIONS.
MOTIVE srl MAY AT ITS SOLE DISCRETION CHANGE AT ANY TIME THE CHARACTERISTICS OF THE PRODUCTS SOLD.



with auto-tuning we make it **EASY**



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