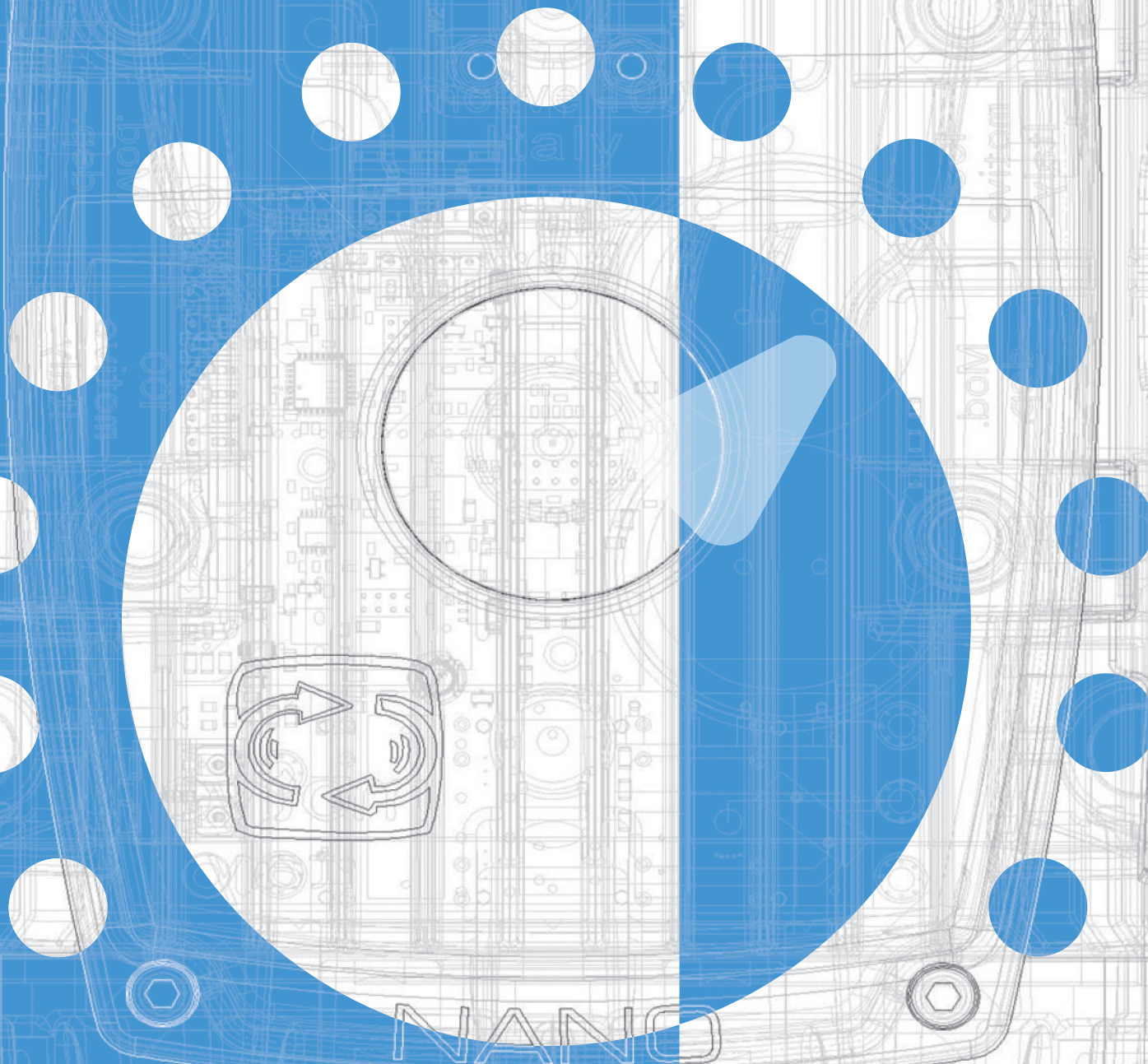
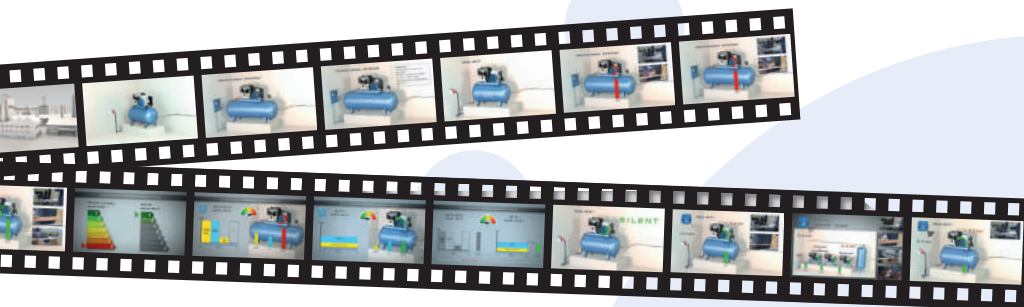


VARIABLE SPEED DRIVE NANO

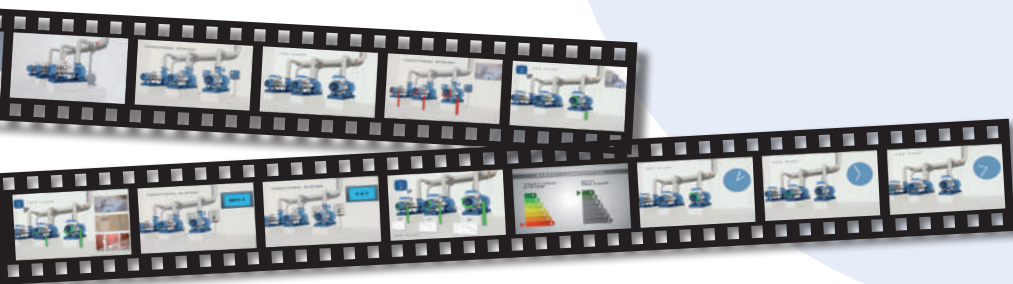


the brothers:



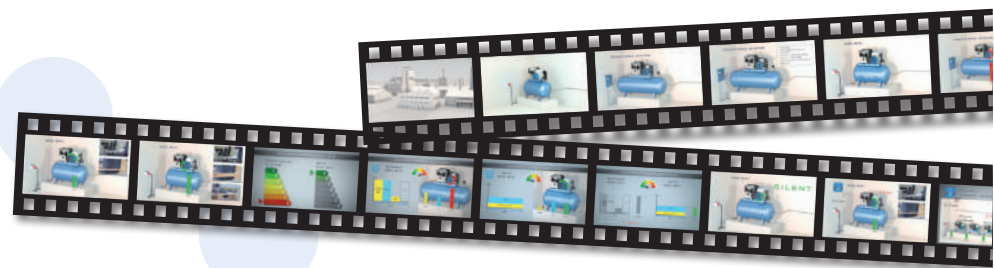
NEO-COMP

<https://www.youtube.com/watch?v=yByHVdYIRKA>



NEO-PUMP

<https://www.youtube.com/watch?v=7y1J4rFUVy8>



NEO-WIFI
tutorial

https://www.youtube.com/watch?v=hUXJ47P_Qxo&feature=youtu.be



NEO-VENT

<https://www.youtube.com/watch?v=dBcVtzZGyAM&feature=youtu.be>



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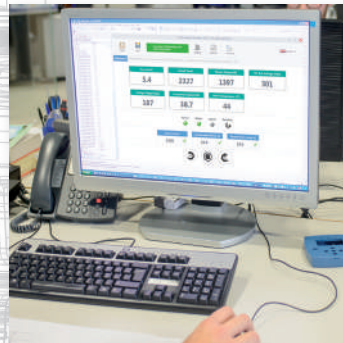
Technical manual



DESCRIPTION



NANO is for single phase supply, three phase motors. This permits NANO to add to the well known power saving of variable speed drives, the possibility to replace the single phase motors (technically losing lot of power) with the higher efficiency IE2 and IE3 three phase motors.



Setting and command can also be made by a PC, thanks to the free PC interface program "Motive Motor Manager"



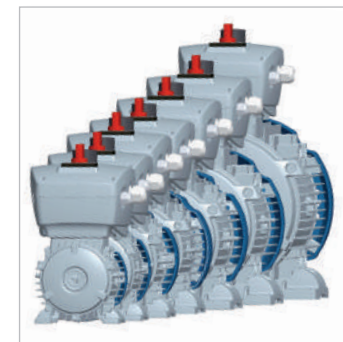
Thanks to BLUE, motive bluetooth trasnsmmitter for NANO and NEO, and to the free App NANO, you can make the setting or command NANO via tablets or smartphones.



NANO can be commanded by analog controls or MODBUS.

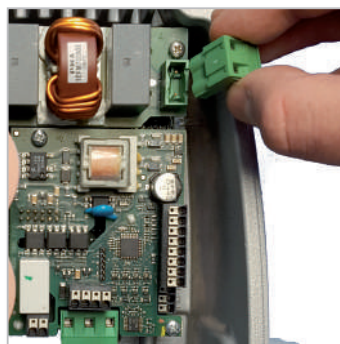


Any NANO can be fixed to a wide range of motors of different power and size.





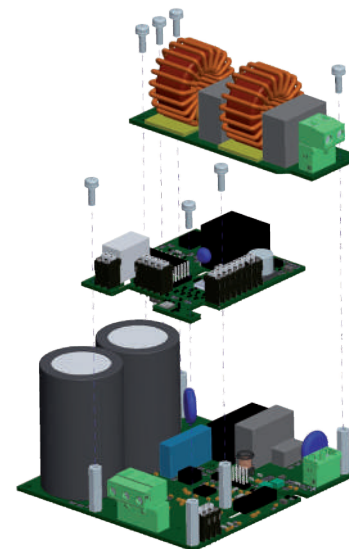
A flashing led shows you from far the good working or the presence of an alarm event.



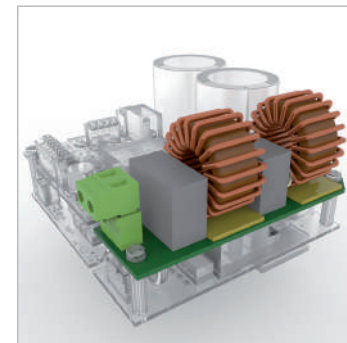
Extractable terminals simplify the wiring.



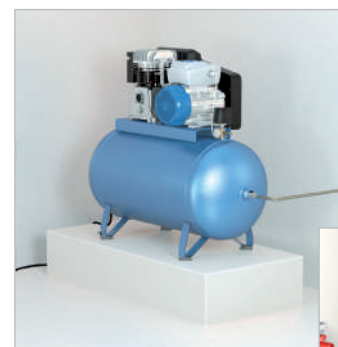
A voltage booster guarantees a stable torque Nm at very slow speed too.



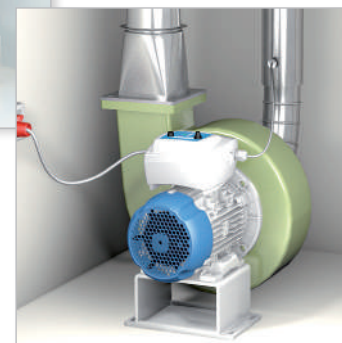
NANO is modular, for a better adaptation to the specific needs of each application.



The EMC filter makes NANO compatible not just with industrial environment, but also with light industrial, commercial end residential environments.



NANO is also offered in the versions "NANO-COMP", "NANO-VENT" and "NANO-OLEO", with a SW specifically modified for the automatic speed+power adaptation to the required pressure and variable flow rate of air compressors, fans, pumps, hydraulic power packs.



MAIN DATA



Physical dimension	Symbol	U.O.M	NANO-0.75	NANO-2.2
Inverter protection degree*	IP		IP65*	
Inverter input voltage	V_{1n}	V	$1 \times 110(-10\%) \div 240(+10\%)$	
Inverter input frequency	f_{1n}	Hz	50/60 ($\pm 5\%$)	
Maximum output voltage of NANO	V_2	V	$0,95 \cdot V_{1n}$	
Inverter output frequency	f_2	Hz	$200\% f_{1n} (f_2 0 \div 100\text{Hz with } f_{1n} 50\text{Hz})$	
Rated input inverter current	I_{1n}	A	5	10
Rated output inverter current (to the motor)	I_{2n}	A	4	9
Maximum output current of NANO	I_2	A	$I_{2n} + 5\%$	
Maximum Starting torque / Rated torque ratio	C_s/C_n	Nm	150%	
Maximum Starting current (kept for 3 seconds)	I_{2max}	A	$200\% I_2$	
Storage temperature	T_{stock}	°C	$-20 \dots +70$	
Environment al operating temperature	T_{amb}	°C	$0 \dots +40$	
Maximum relative humidity		% (40°C)	$5 \dots 85$ without condensation	

Other characteristics	NANO-0.75	NANO-2.2
Motor control	V / F	
EMC for DOMESTIC, COMMERCIAL AND LIGHT INDUSTRIAL ENVIRONMENT (rif. EN50081-1, part 5)	With optional code NANFILT or with external EMC filter	
EMC for INDUSTRIAL ENVIRONMENT		
Analog/Digital I/O Module	Optional, code NANEXPS	
Power Switch IP65	Optional, code INTEM1X12A	
Potentiometer with Knob and Unit Scale IP65	Optional, code NANPOT	
Bluetooth module for smartphone and tablet control	Optional, code BLUE	
Communication Protocol	MODBUS RS485	

*IP65 degree refers to the inverter case and to the optional components on the cover (Power Switch and Potentiometer).

Table RP: Power range of motors that can be connected (at 230Vac)

KW motor	0.13	0.18	0.25	0.37	0.55	0.55	0.75	1.1	1.5	1.9	2.2
NANO-0.75											
NANO-2.2											

Table RD: Size range of IEC motors that can be connected

IEC Motor	63	71	80	90S	90L	100L	112M	132S
NANO-0.75								
NANO-2.2								

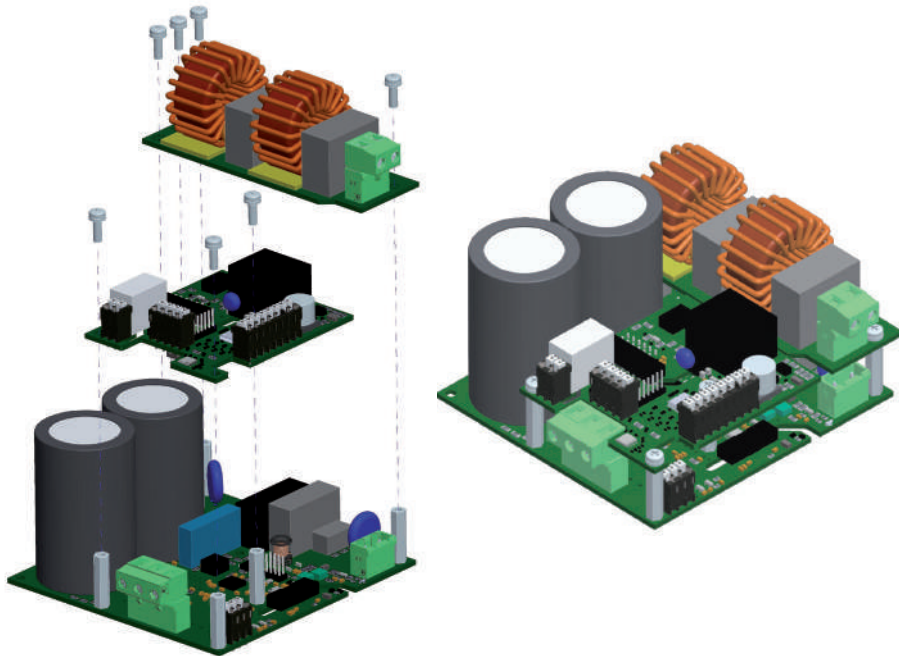
MAIN FUNCTIONS

Section	Characteristic	Range
Motor	Rated Power [kW]	0.13 ÷ 0.75 (NANO-0,75); 0.13 ÷ 2.2 (NANO-2,2)
	Rated Voltage [V]	with input 110Vac single phase: 90 ÷ 110Vac three phase
		with input 230Vac single phase: 90 ÷ 230Vac three phase
	Rated Current [A]	0.1 ÷ 5 (NANO-0,75); 0.1 ÷ 10 (NANO-2,2)
	Rated frequency [Hz]	50 / 60
Motor limits	Rated RPM	350 ÷ 5950
	Maximum speed [% di rpm]	2 ÷ 200
	Minimum speed [% di rpm]	0 ÷ 120
	Acceleration [sec]	0.1 ÷ 99
	Deceleration [sec]	0.1 ÷ 99
	Maximum inrush current [% of rated current]	80 ÷ 200
	Magnetization [%]	70 ÷ 120
	Braking voltage [V]	0 ÷ 200 Electronic control that allows the motor inertia to be braked quickly by a DC voltage injection into the windings. The duration of the braking is adjustable from 1msec to 60sec.
Control	Boost voltage [V]	0 ÷ 50 Command that allows increasing the motor torque at low speeds through an additional voltage.
	Start/Stop command	· from controls wired to the I/O Module · from modbus
	Input reference	· internal (modbus parameter 19) · modbus (modbus parameter 106) · analogic signal 0-10V (I/O Module) · analogic signal 4-20mA (I/O Module)
Feedback (only for Ventilation, Air Compressor, Hydraulic power pack)	Mode	· Open loop speed · Ventilation · Air compressor · Oleodynamic pump
	Transducer range	0 ÷ 16000 (Bar,Psi,Pascal)
	Pressure reference	0 ÷ 16000 (Bar,Psi,Pascal)
P.I.D.Factors	Pressure hysteresis	1 ÷ 16000 (Bar,Psi,Pascal)
	K Proportional Factor	1 ÷ 100 Multiplies the error of the reference
RS485 Modbus	K Integral Factor	1 ÷ 100 Multiplies the integral of the error
	Communication	ON= Program and control only from modbus ON+KEY= Control from the I/O Module, reference value from modbus OFF= Control only from the I/O Module
	Baude Rate [bit/sec]	4800, 9600, 14400, 19200.
RS485 Modbus	Modbus address	1 ÷ 127

ELECTRICAL ASSEMBLY

NANO-0.75 and NANO-2.2

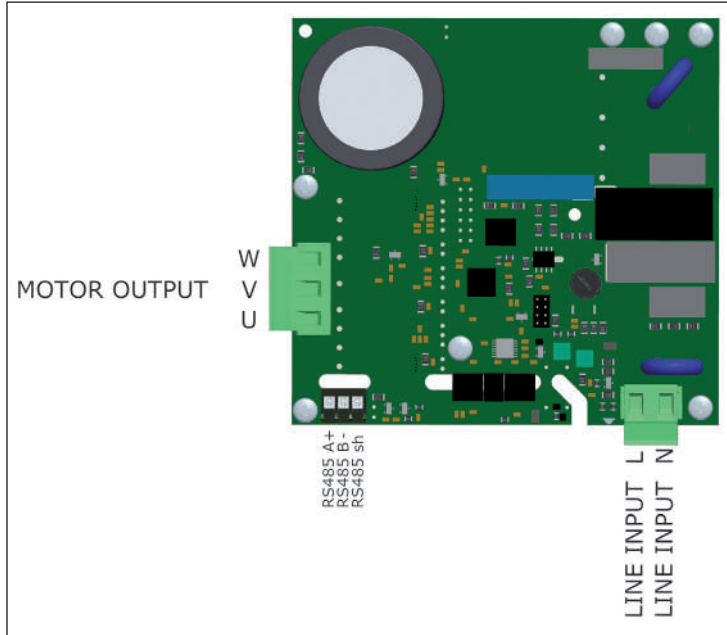
Terminal	Function
L	Supply inverter phase.
N	Supply inverter neutral phase.
U	U phase motor connection.
V	V phase motor connection.
W	W phase motor connection.
A+	High signal ModBus RS485.
B-	Low signal ModBus RS485.
sh	Ground for Modbus RS485 cable shield.



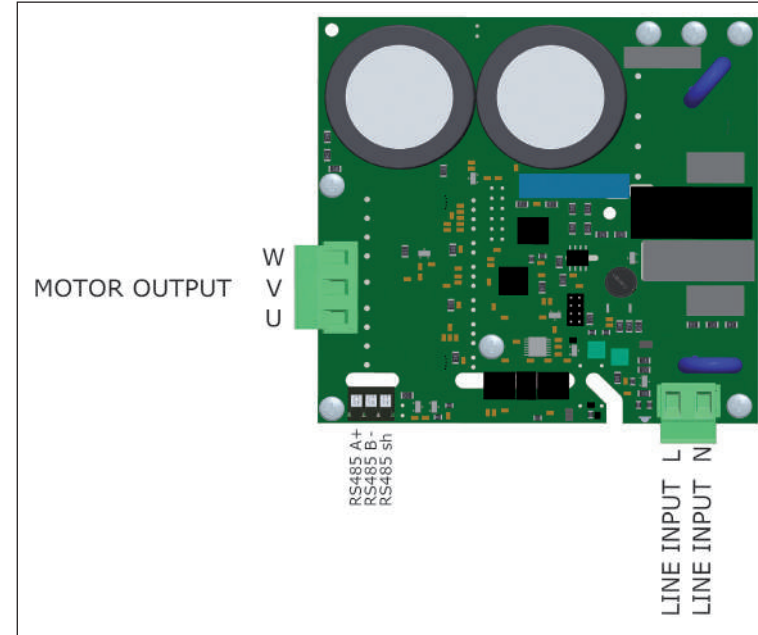
Analog/Digital I/O Module (optional code NANEXPS)

0V	0Vdc supply.
12Vdc	12Vdc supply for all the electronic Inputs (analogic e digital) and DO1 Digital Output.
FAN+	12Vdc supply (max 1A) for inverter ventilation.
FAN -	It's automatically enabled when the IGBT module starts to overheat.
AIO	Analog Input 0, programmable in the following functions: <ul style="list-style-type: none"> • speed reference with potentiometer; • speed reference with external signal; • current limit reference; • PID feedback (for example: connection of a transducer). The type of input signal can be in voltage (0-10V) or in current (4-20mA).
AI1	Analog Input 1, programmable in the following functions: <ul style="list-style-type: none"> • speed reference with potentiometer; • speed reference with external signal; • current limit reference; • PID feedback (for example: connection of a transducer). The type of input signal can be in voltage (0-10V) or in current (4-20mA).
A00	Analog Output 0, programmable in the following functions: <ul style="list-style-type: none"> • 0-12V motor speed reference (from 0% to the maximum speed value set); • 0-12V motor current absorbed reference (from 0% to the maximum absorption set).
0V	0Vdc supply for A00 Analogic Output.
DI0	Digital Input 0, programmable in the following functions: <ul style="list-style-type: none"> • Start/Stop motor command clockwise direction (1=Start, 0=Stop); • Start/Brake motor command (1=Start, 0=Brake); • reverse motor command (it works only when Start/Stop motor command is set to a Digital Input with value=1) • brake motor command (can also be used as an inverter enable or as an emergency stop); • Start/Stop motor command counter-clockwise direction (1=Start, 0=Stop).
DI1	Digital Input 1, programmable in the following functions: <ul style="list-style-type: none"> • Start/Stop motor command clockwise direction (1=Start, 0=Stop); • Start/Brake motor command (1=Start, 0=Brake); • reverse motor command (it works only when Start/Stop motor command is set to a Digital Input with value=1) • brake motor command (can also be used as an inverter enable or as an emergency stop); • Start/Stop motor command counter-clockwise direction (1=Start, 0=Stop).
DI2	Digital Input 2, programmable in the following functions: <ul style="list-style-type: none"> • Start/Stop motor command clockwise direction (1=Start, 0=Stop); • Start/Brake motor command (1=Start, 0=Brake); • reverse motor command (it works only when Start/Stop motor command is set to a Digital Input with value=1) • brake motor command (can also be used as an inverter enable or as an emergency stop); • Start/Stop motor command counter-clockwise direction (1=Start, 0=Stop).
DO0	Digital Output 0 N.O. contact, programmable in the following functions: <ul style="list-style-type: none"> • signaling when the motor is running; • signaling of the motor rotation sense (0=clockwise, 1=counter-clockwise); • signaling maximum speed reached; • motoinverter fault; • signaling when the motor is stopped; • load/unload electric valve control (air compressor mode).
DO1	Digital Output 1, programmable in the following functions: <ul style="list-style-type: none"> • signaling when the motor is running; • signaling of the motor rotation sense (0=clockwise, 1=counter-clockwise); • signaling maximum speed reached; • motoinverter fault; • signaling when the motor is stopped; • load/unload electric valve control (air compressor mode). When is enabled, DO1 Digital Output supplies 0Vdc signal: this signal can be used to drive a relay (use the 12Vdc supplied by the inverter).

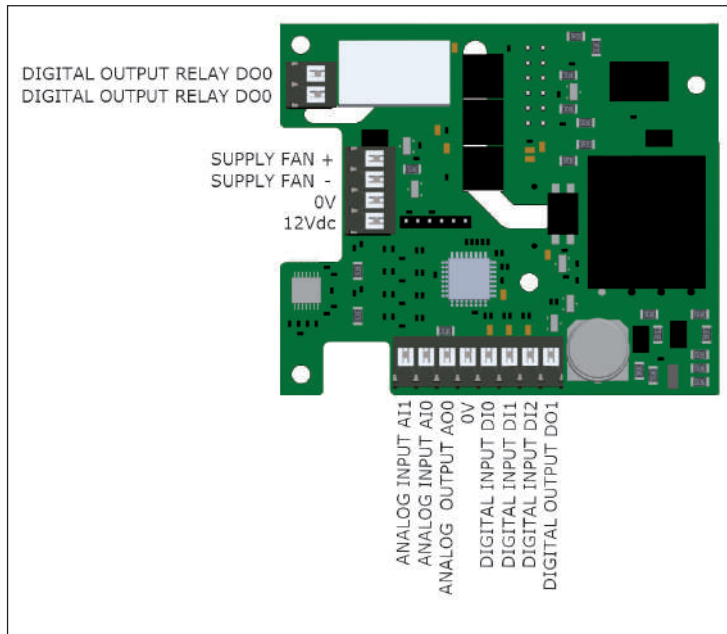
ELECTRICAL ASSEMBLY



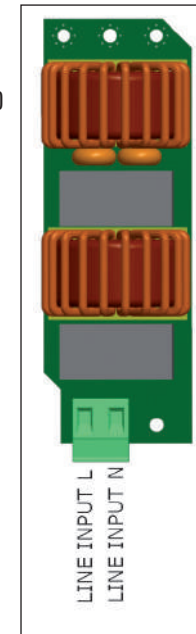
Power Module layout
NANO-0.75



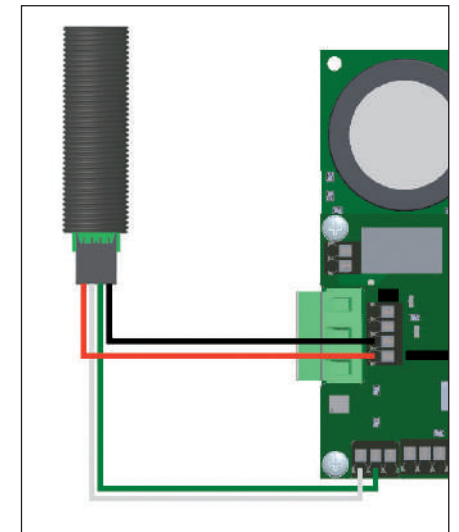
Power Module layout
NANO-2.2



Analog/Digital I/O
Module layout
(optional, code NANEXPS)



EMC filter layout
(optional, code NANFILT)



Bluetooth module for
smartphone and tablet control
(optional, code BLUE)



Motive s.r.l.
Via Le Ghiselle, 20
25014 Castenedolo (BS)
Tel.: +39 030 2677087
Fax: +39 030 2677125
motive@e-motive.it
www.motive.it



Declaration of conformity

Motive srl with seat in Castenedolo (BS) - Italy
declares, under its exclusive responsibility,
that its range of "NANO" 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 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 60335-1. Safety of household and similar electrical appliances
- 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 61000-6-4. Electromagnetic compatibility (EMC): Part 6-4: Generic standards - Emission standard for industrial environments
- EN 50178. Electronic equipment for use in power installations.

as required by the Directives

- Low Voltage Directive (LVD) 2014/35/EEC
- Electromagnetic Compatibility Directive (EMC) 2014/30/EEC
- EMC for DOMESTIC, COMMERCIAL AND LIGHT INDUSTRIAL ENVIRONMENT
- EMC for INDUSTRIAL ENVIRONMENT
- Ecodesign Directive for energy related products 2009/125/EEC

With NANFILT or
external EMC filter

NB: the Machinery Directive (MD) 2006/42/EC expressly excludes from its scope electric motors (Art. 1, paragraph 2)

Castenedolo, 1 January 2018
The Legal Representative

Giorgio Basso



To know more about NANO, download the manual here:
<http://www.motive.it/manuali/manuale-NANO-eng.pdf>



NANO
Technical Manual



TERMS OF SALE AND GUARANTEE

ARTICLE 1 GUARANTEE

1.1 Barring written agreements, entered into between the parties hereto each time, Motive hereby guarantees compliance with specific agreements.

The guarantee for defects shall be restricted to product defects following design, materials or manufacturing defects leading back to Motive.

The guarantee shall not include:

- * Faults or damages ensuing from transport. Faults or damages ensuing from installation defects; incompetent use of the product, or any other unsuitable use.
- * Tampering or damages ensuing from use by non-authorised staff and/or use of non-original parts and/or spare parts;
- * Defects and/or damages ensuing from chemical agents and/or atmospheric phenomena (e.g. burnt out material, etc.); routine maintenance and required action or checks;
- * Products lacking a plate or having a tempered plate.

1.2 Returns to credit or replace will be accepted only in exceptional cases; however returns of goods already used to credit or replace won't be accepted in any case.

The guarantee shall be effective for all Motive products, with a term of validity of 12 months, starting from the date of shipment.

The guarantee shall be subject to specific written request for Motive to take action, according to statements, as described at

the paragraphs herein below. By virtue of aforesaid approval, and as regards the claim, Motive shall be bound at its discretion, and within a reasonable time-limit, to alternatively take the following actions:

- a) To supply the Buyer with products of the same type and quality as those having proven defective and not complying with agreements, free ex-works; in aforesaid case, Motive shall have the right to request, at Buyer's charge, early return of defective goods, which shall become Motive's property;
- b) To repair, at its charge, the defective product or to modify the product which does not comply with agreements, by performing aforesaid action at its facilities; in aforesaid cases, all costs regarding product transport shall be sustained by the Buyer.
- c) To send spare parts free of charge: all costs regarding product transport shall be sustained by the Buyer.

1.3. The guarantee herein shall assimilate and replace legal guarantees for defects and discrepancies, and shall exclude any other eventual Motive liability, however caused by supplied products; in particular, the Buyer shall have no right to submit any further claims. Motive shall not be liable for the enforcement of any further claims, as of the date the guarantee's term of validity expires.

ARTICLE 2 CLAIMS

2.1. Claims, regarding quantity, weight, gross weight and colour, or claims regarding faults and defects in quality or compliance, and which the Buyer may discover on goods delivery, shall be submitted by a max. 7 days of aforesaid discovery, under penalty of nullity.

ARTICLE 3 DELIVERY

3.1. Any liability for damages ensuing from total or partial delayed or failed delivery, shall be excluded.

3.2. Unless differently communicated by written to the Client, the transport terms have to be intended ex-works.

ARTICLE 4 PAYMENT

4.1. Any delayed or irregular payments shall entitle Motive to cancel ongoing agreement, including agreements which do not regard the payments at issue, as well as entitling Motive to claim damages, if any. Motive shall, however, have the right, as of payment's due date and without placing in arrears, to claim interest for arrears, to the extent of the discount rate in force in Italy, increased by 12 points. Motive shall also have the right to withhold material under repair for replacement. In the case of failed payment, Motive shall have the right to cancel all guarantees of materials, as regards the insolvent Client.

4.2. The Buyer shall be bound to complete payment, including cases whereby claims or disputes are underway.

ALL DATA HAVE BEEN WRITTEN AND
CHECKED WITH THE
GREATEST CARE.
WE DO NOT TAKE ANY RESPONSIBILITY
FOR POSSIBLE ERRORS OR
OMISSIONS.
MOTIVE CAN CHANGE THE
CHARACTERISTIC OF THE SOLD
ITEMS ON HIS FIRM OPINION AND
IN EVERY MOMENT.

WATCH OUR FURTHER CATALOGUES:



Motive s.r.l.

Via Le Ghiselle, 20

25014 Castenedolo (BS) - Italy

Tel.: +39.030.2677087 - Fax: +39.030.2677125

web site: www.motive.it

e-mail: motive@motive.it



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