

# Installation, use and maintenance technical manual for CE and/or UL and/or CSA electric asynchronous motors

Neri Motori declares that the electrical material quoted in this technical manual complies with the following EU Directives:

- L.V.D. 2006/95/EC (Low voltage);
- EMC 2004/108/EC (Electromagnetic compatibility);
- ROHS 2002/95/EC (Dangerous substances);
- M.D. 2006/42/EC (Machine directive) and modifications – Annex IIB, **THE MOTOR MUST NOT RUN BEFORE BEING ASSEMBLED in a CE MACHINE.**

The material complies with the main European Standards:

- EN - 55014 Standards (1994) EMC;
- CEI EN 60034-1 - Rating and performance (2000);
- CEI EN 60034-5 - IP Rating, Degree of body motor protection;
- CEI EN 60204 -1 - Safety of machinery.

## !Warning

0) Before operating the electrical material read this manual which has been provided with the electric motors (from this point on the term electric motor will be used instead of L.V. electrical material) and the instructions stated therein. The instructions are to be fully and duly complied with before skilled personnel and qualified technicians start up the electric motor. Bear in mind that this manual does not exempt anyone from applying all those technical standards envisaged in the specific sector of electric motors or those general standards associated with the safety of persons, animals or property set forth by the EU.

## Electric motor installation

1) The electric motor must be run according to the features stated in the NAME PLATE and ONLY to THESE and must be installed and maintenance carried out according to EUROPEAN STANDARDS.

2) The electric motor is not suitable for use near substances that will set on fire without oxygen.

3) Before starting up the electric motor, check its overall condition, the shaft, the fan cover, and the wear and tear of the mechanical parts. Also check that the motor shaft turns freely, that the gasket and cable inlet have been mounted correctly and TIGHTENED. Check that all the electrical terminals are wired in the terminal strip and the motor plate values correspond to the network which will power it.

## !Danger

**If parts of the motor are damaged and/or the values reported on the motor's rating plate do not EXACTLY match those of the mains that will power it, or the ENVIRONMENTAL CONDITIONS ARE DIFFERENT, do not start the electric motor.**

4) Fix the motor into its seat using suitable fastening equipment (**B14 flange attention to screw length and closure, risk of damage for the electrical winding**), and AVOID using the electric motor's eyebolt if it is connected to other machine parts.

5) Handling the motor: if it is very heavy, over 30kg or it cannot be perfectly handled because it is not placed on a safe support, use machine tools or similar in order to prevent physical injury, conforming to EU directives.

6) Do not start the electric motor if the key is fixed on the motor shaft as this could cause the key to be expelled owing to centrifugal force, see risk factors associated with EN 60204-1.

7) Before performing any type of maintenance operations to the electric motor itself or in the vicinity of it, visually check that it has been disconnected from the mains power supply and make sure that it is impossible for the motor to restart unexpectedly and that other masses which have been connected to the motor shaft cannot pull the motor; in accordance to EN 60204-1.

**! 8) WAIT UNTIL THE MOTOR IS AT ROOM TEMPERATURE BEFORE OPENING THE PROTECTION to avoid EXPLOSIONS DUE TO THE TEMPERATURE OR ELECTRICAL CHARGE.**

9) It is forbidden to use the motor in environmental conditions which differ from the IP ratings specified on the plate, as per EN 60054-5.

10) Connect the motor's frame to earth using the appropriate equipotential terminal identified by the symbol as per EN 60204-1.

11) If the electric motor is to be stored, the temperature of the room should be from 0°C to +55°C. After it has been stored for 12 months, check the insulation resistance which should be approximately 1Mohm with continuous test voltage of 500V for  $V_n < 500V$ . Should any differences in the value be noticed this might be due to the presence of humidity in the windings which should be dried; the test should then be repeated.

- 12) Make sure that the mechanical protection of the motor's moving parts or parts connected to it, for instance the pulley belt units, are sufficient as far as safety for personnel, animals or property are concerned, as per EN 60204-1.
- 13) Check that the alignment between motor shaft and rotating parts keyed to the motor is correct or that they are statically and dynamically balanced in order to prevent undesired moments, as per EN 60204-1.
- 14) The shaft of the electric motor has been designed and finished conforming to IEC 72-1 and is to be operated without any shear stress. Shield flange frames and mechanical parts conform to IEC 72-1 standards as far as mechanics are concerned, apart from instances when specific Client requirements have been adhered to.
- 15) Make sure that the electric motor is not a source of noise pressure levels  $L_{pA} > 80\text{dBA}$  as set forth by EU directives. In such cases the unit must be silenced or workers must protect themselves with individual acoustic protective equipment.
- 16) Make sure that the hot parts of the electric motor are adequately protected against touching by personnel, animals or property and **THE GASKET AND CABLE INLET ARE CLOSED CORRECTLY.**
- 17) All risk situations must be adequately indicated with visual signs such as for instance voltage excessive noise or temperature.
- 18) In B14 flanges close the unused connecting holes and do not use too long screws that might cause severe electric dangers (**DO NOT exceed the length of the flange thread**).

### Electromechanical safety of the electric motor (EN 60204-1)

- 19) Envisage a safety device against overload for power supplied  $> 500\text{W}$  in thermal service S1. This can be achieved with a thermal relay and a contactor. It is advisable to fit a thermal safety device in scarcely ventilated places such as the inside of chain guards.
- 20) If required by particular operating conditions of the electric motor in synchronism with other machines, envisage the application of a minimum voltage relay and contactor as per EN 60204-1.
- 21) Variable speed applications are not allowed **unless expressly agreed upon at the time the order is being prepared with the manufacturer or as indicated on the motor plate**, and must not, however, differ from the rated rotating speed as per EN 60204-1.
- 22) If the speed range is agreed upon with the manufacturer thus increasing the risk factor involved a suitable safety device should be used as per EN 60204-1.
- 23) A safety device must be envisaged against electric motor over currents by means of magnetic relay and contactor or fuses as per EN 60204-1.
- 24) The sizing of the electric motor power supply cables and the admissible voltage % drop must conform to EN 60204-1.
- 25) Cables are to be thermally sized considering the through power ( $I^2 \cdot \Delta t = K^2 \cdot S^2$ ) as per EN 60204-1.
- 26) When  $I_g$  [A] fault current is known at the expected fault point K and S (cable section  $\text{mm}^2$ ) calculate the maximum tripping time  $\Delta T$  (seconds) of magnetic circuit breakers.
- 27) Personnel, animals and property must be protected against indirect contact to parts that are not usually subjected to electric potential but that might be subjected to it in the case of malfunction. Therefore fit a differential relay and contactor with  $I_d < 30\text{mA}$  as per EN 60204-1.
- 28) If the turning direction of the motor shaft has been set to one only such direction, this must be clearly indicated with an arrow as per EN 60204-1.
- 29) In the event that the motor brakes electrically by means of the inversion of two power supply wires, the motor must not be restarted in the opposite direction as per EN 60204-1.
- 30) **Rearming a safety device is strictly prohibited.** This may be done only and exclusively by the manual intervention of personnel who are skilled in rearming operations as per EN 60204-1.
- ! 31) SELF BRAKE MOTOR: follow the technical information on the name plate motor IP = 2 digit + A=ac or D=DC + brake supply = 3 digit + Nm + brake manufacturer ( 1 digit ).**
- ! 32) DO NOT USE LUBRICATION ON THE SELF BRAKE MOTOR. Use only compressed air to clean if wet or dusty.**
- ! 33) SELF BRAKE MOTOR: after a period of braking, if the braking is not right or if too long, check according to numbers 30) and 31) then if not solved, please contact Neri Motori srl for further information.**
- 34) The electric motor must run  $< 1000\text{msl}$  in an area with a range of temperature  $(-15^\circ\text{C} / +40^\circ\text{C})$  REFRIDGERATED AIR therefore NEVER GO OVER THIS LIMIT if it is not stated on the name plate of the motor ( **$0^\circ\text{C}/+40^\circ\text{C}$  if  $P_n < 600\text{W}$** ).

### ! Danger – Mandatory maintenance

- 35) Make sure that the assembly of the electric motors allows for correct air intake, circulation and its frame is devoid of encrustation or dust which would worsen the heat exchange with the air coolant as per EN 60204-1 which would entail faulty over heating risk, **ONLY COMPRESSED AIR MUST BE USED TO CLEAN.**
- 36) The components of the motor are in weight approximately 5% inorganic – iron 55% - copper 30% - aluminium 10% - and are to be disposed of conforming to EEC directives.

**37) 6 PINS TERMINAL BOARD**

Motor Size	Terminal Board Size	Pin Size	Torque of Pin (suggested but not granted)
mm	mm	mm	[Nm]
50	40 x 25	M4 x 12	2
56/63/71	44 x 27	M4 x 12	2
80	50 x 32	M4 x 15	2
90	50 x 32	M4 x 15	2
100	56 x 36	M5 x 15	3
112	56 x 36	M5x 15	3
132	70 x 45	M6 x 20	4
160	95 x 60	M8 x 24	5
180	95 x 60	M8 x 24	5
200	95 x 60	M8 x 24	5

**38) 8 PINS TERMINAL BOARD**

Motor Size	Terminal Board Size	Pin Size	Torque of Pin (suggested but not granted)
mm	mm	mm	[Nm]
56	50 x 43	M4 x 12	2
63	50 x 43	M4 x 12	2
71	50 x 43	M4 x 12	2
80	50 x 43	M4 x 12	2
90	50 x 43	M4 x 12	2
100	50 x 43	M4 x 12	2
112	50 x 43	M4 x 12	2

**39) CABLE PRESS SIZE**

Motor Size	Size Cable Press	Hole for Cable Inlet
mm	mm	mm
50	M16 x 1,5	5 - 10
56	M16 x 1,5	5 - 10
63	M16 x 1,5	5 - 10
71	M16 x 1,5	5 - 10
80	M20 x 1,5	7 - 12
90	M20 x 1,5	7 - 12
100	M20 x 1,5	7 - 12
112	M20 x 1,5	7 - 12
132	M32 x 1,5	13 - 18
160	M32 x 1,5	13 - 18
180	M32 x 1,5	13 - 18
200	M32 x 1,5	13 - 18

**40) ELECTRICAL SUPPLY****Motor Series T / AT (see marking on terminal board motor)**

- STAR CONNECTION right rotation DE side =  $(W2+U2+V2)$  and supply to (U1/V1/W1) with RST line;
- DELTA CONNECTION right rotation DE side =  $(W2+U1) / (U2+V1) / (V2+W1)$  and supply to (U1/V1/W1) with RST line;
- SEPARATE SUPPLY BRAKE / PTC / HEATER = supply to P1/P2.
- Blower 3ph IC416 = Supply as per motors Series T / AT;
- ENCODER = Refer to dwg ENCODER CONNECTION inside electrical connection box motor.
- Accessories = Refer to dwg INSIDE ELECTRICAL CONNECTION BOX MOTOR.

**41) IF IN DOUBT PLEASE CONTACT NERI MOTORI SRL, see the General Catalogue or website [www.nerimotori.com](http://www.nerimotori.com), any other operation not indicated involves the immediate termination of any warranty.**

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**NERI MOTORI SRL**