

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

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

- L.V.D. 2006/95/EC (Low voltage);
- E.M.C. 2004/108/EC (Electromagnetic compatibility);
- 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:

- CEI EN 55014-1:2008 - E.M.C. Electromagnetic compatibility;
- CEI EN 60034-1:2011 - Rating and performance;
- CEI EN 60034-5:2001 - IP Rating. Degree of body motor protection;
- CEI EN 60204-1:2006 - Safety of machinery.

The motor are composed by electrical and electronic equipment that comply with the RoHS Directive 2011/65/EC (restriction of hazardous substances directive)

!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 its instructions by informed and skilled technicians. 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 standards.

Electric motor installation

1) The electric motor must be run according to the features stated in the name plate and only to those, it must be installed and performed maintenance according to the EU standards.

2) The electric motor is not suitable in areas with substances which burn without oxygen.

3) Before starting up the electric motor, check its overall condition, the shaft, the fan cover, the wear and tear of the mechanical parts. Also check the free rotation of the motor shaft, 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 (with B14 flange pay attention to the depth of the screws and their closure, there is a risk of damaging the electric winding). If the electric motor is connected to other parts of machines, you do not use only the eyebolts of the motor for movements of the machine.

5) Handling of the motor: if the motor has a weight greater than 30 kg, or it is not perfectly handled on safe supports, use machine tools or similar in order to prevent physical injury, conforming to EU directives.

6) Do not start the electric motor with the key inserted on the motor shaft because, due to the centrifugal force, can be ejected and cause a risk factor according to EN 60204-1.

7) Before performing maintenance on the electric motor or near it, visually check that the main power supply has been disconnected, make sure that it is impossible for the motor to restart unexpectedly, make sure also that other masses connected to the crankshaft cannot drag the motion of the same, 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 nameplate, as per EN 60034-5.

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 stored, the environment must be maintained between (0°C +55°C). In any case after 12 months from the storage check the insulation resistance which should be approximately 1 Mohm with DC test voltage of 500 V (for $V_n < 500$ V). If you detect a difference, this may be due to the presence of humidity in the windings, so repeat the test.

12) Make sure that the mechanical protection of the motor's moving parts or parts connected to it, e.g. the pulley belt units, are sufficient as far as safety for persons or animals in accordance with 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 is designed according to the IEC standard 72-1 and has to be operated without shear stress. Shields, flanges, frames and mechanical parts are compliant with IEC 72-1, apart specific requests of the customer.

15) Make sure that the electric motor is not a source of noise pressure levels $L_{pA} > 80$ 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 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 crankcase.

20) If required by particular operating conditions of the electric motor together 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 order confirmation with the manufacturer, or as indicated on the motor plate, and must not have, however, a speed different 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, 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 thermal power trough ($I^2 \Delta t = K^2 S^2$) as per EN 60204-1.

26) When I_g [A] fault current is known at the expected fault point, K and S (cable section mm^2), then calculate the maximum tripping time ΔT [s] of magnetic circuit breakers.

27) Personnel, animals and property must be protected against indirect contact to parts that are not normally subjected to electric voltage 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) The automatic reset of the safety device is strictly prohibited. This may be done only and exclusively by the manual intervention of personnel who are skilled in reset 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 31) and 32) then if not solved, please contact Neri Motori srl for further information.

34) The electric motor must run at < 1000 m.a.s.l. in an area with a range of temperature (-15°C/+40°C) refrigerated air therefore never be over this limit if it is not stated on the name plate of the motor (0°C/+40°C if P_n < 600 W).

! Danger – Mandatory maintenance

35) Make sure that the assembly of the electric motors allows for correct air intake, air circulation and its frame is devoid of encrustation or dust which would worsen the heat exchange with the air coolant as per EN60204-1 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 UE directives.

Electrical connection

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	M5 x 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)

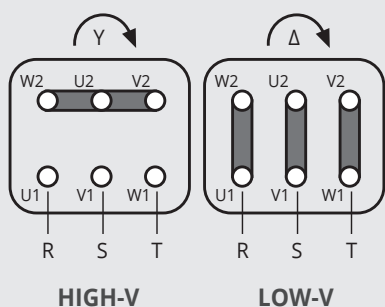
- STAR CONNECTION right rotation DE side = (W2+U2+V2) and supply to (U1/V1/W1) with RST line;
- DELTA CONNECTION right rotation DE side = (W2+U1) / (U2+V1) / (V2+W1) and supply to (U1/V1/W1) with RST line;
- ENCODER = Refer to dwg ENCODER CONNECTION inside electrical connection box motor.
- Accessories = Refer to dwg INSIDE ELECTRICAL CONNECTION BOX MOTOR.

41) FOR ANY DOUBT PLEASE CONTACT NERI MOTORI SRL, see the General Catalogue or website www.nerimotori.com, any other operation not indicated involves the immediate termination of any warranty.

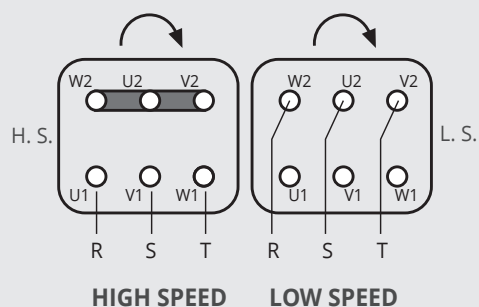
Connection diagram

Asynchronous three-phase motor

three-phase 1 speed

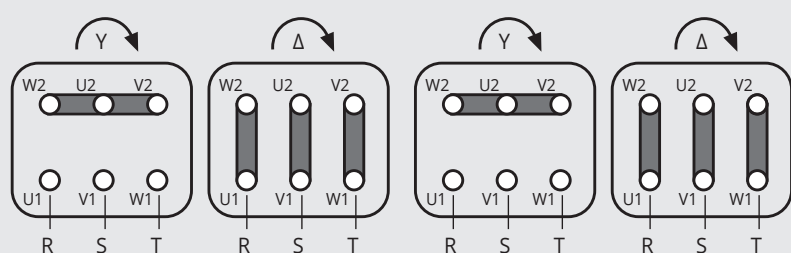


2 speed



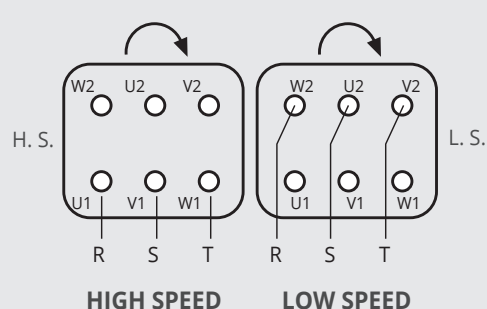
single winding (**DAH - PAM**) *

2 speed



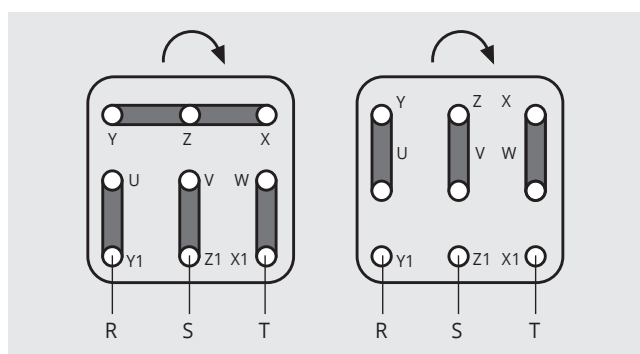
double tension / double winding

2 speed

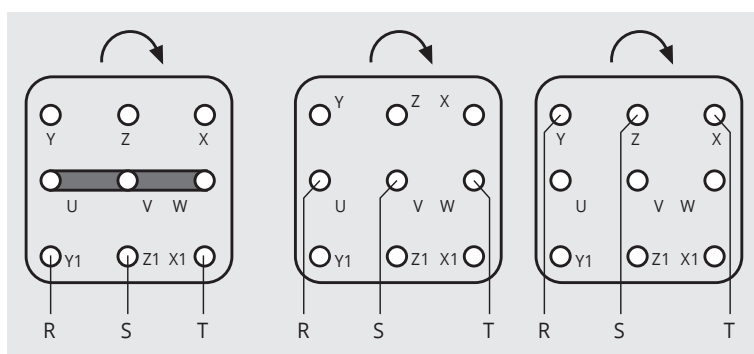


single tension / double winding
(**DAV**)

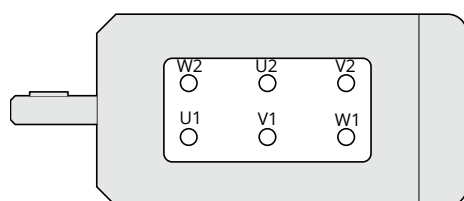
*** 9 clips three-phase motors
220/440 V**



*** 3 speed motor
TP series**



Terminal box set up



Legend:

DAV = double winding

DAH = single winding in DAHLANDER connection (multiple poles)

PAM = single winding, 4/6 poles

EN 60034-30-1

IE1 = standard efficiency level

IE2 = high efficiency level

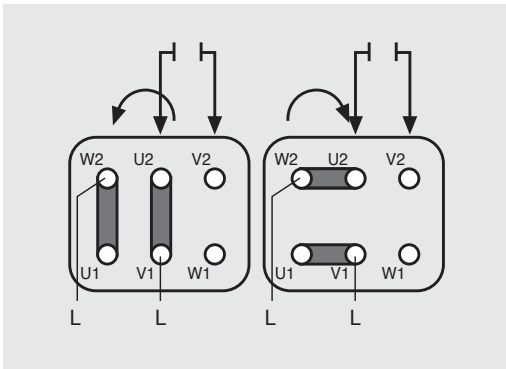
IE3 = premium efficiency level

↻ rotation sense understood from drive end suggested

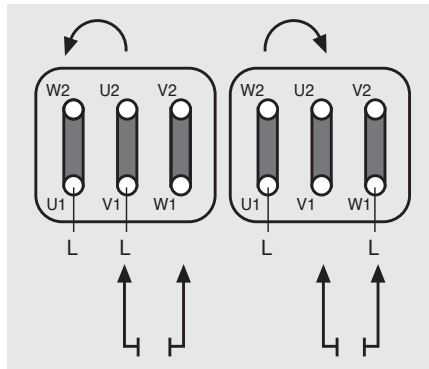
N.B. rotation sense even supplied on request

Asynchronous single-phase motor

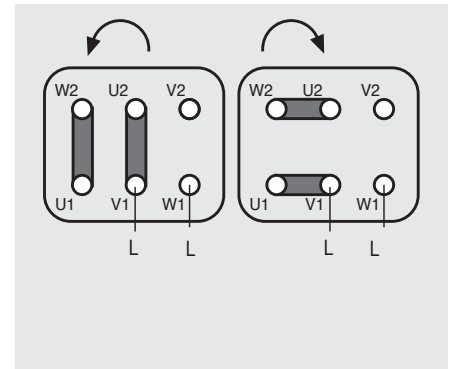
* Standard single-phase winding M - MC - ME series



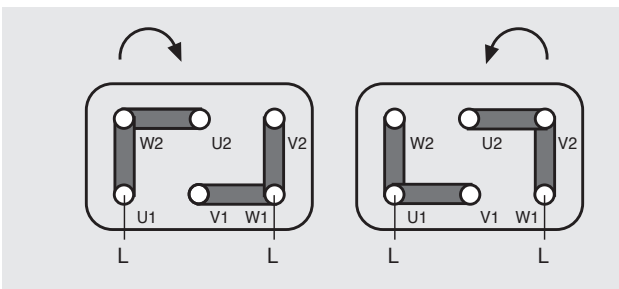
* Balanced winding



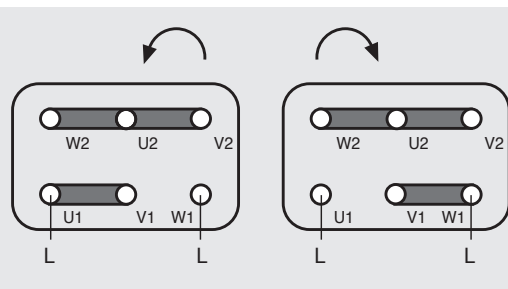
* MA Series (KLIXON)



MV Single-phase double voltage 115 V

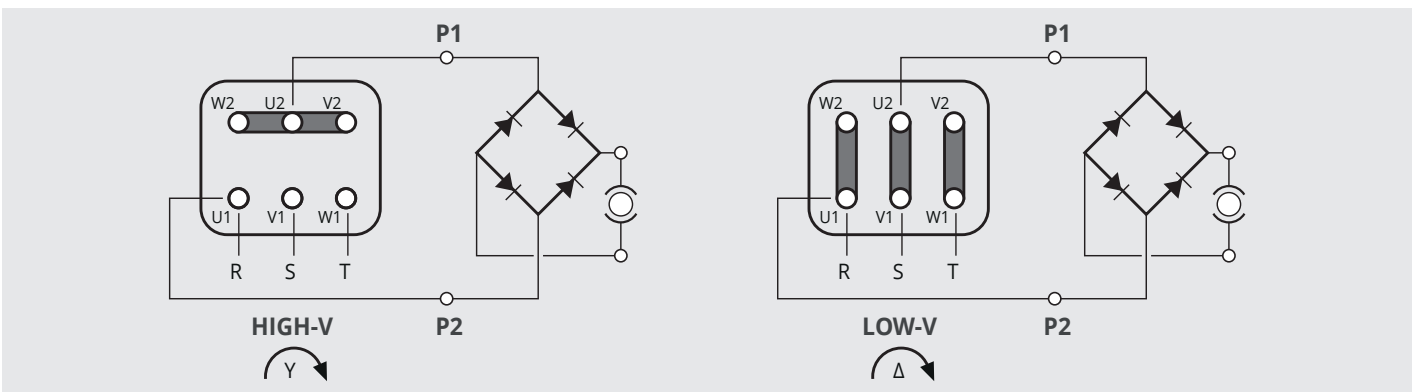


MV Single-phase double voltage 230 V



Self (DC) brake three-phase motor

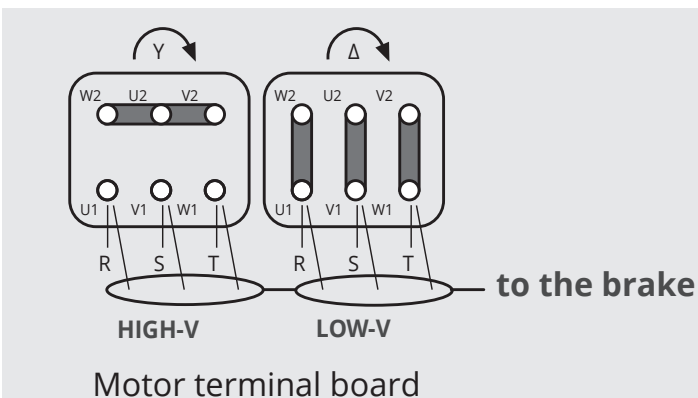
Direct supply:



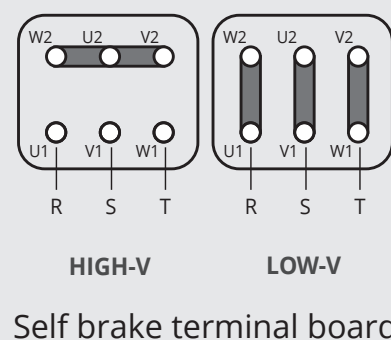
Separate supply: connect directly the supply to the terminals P1 and P2

Self (AC) brake three-phase motor

Direct supply:

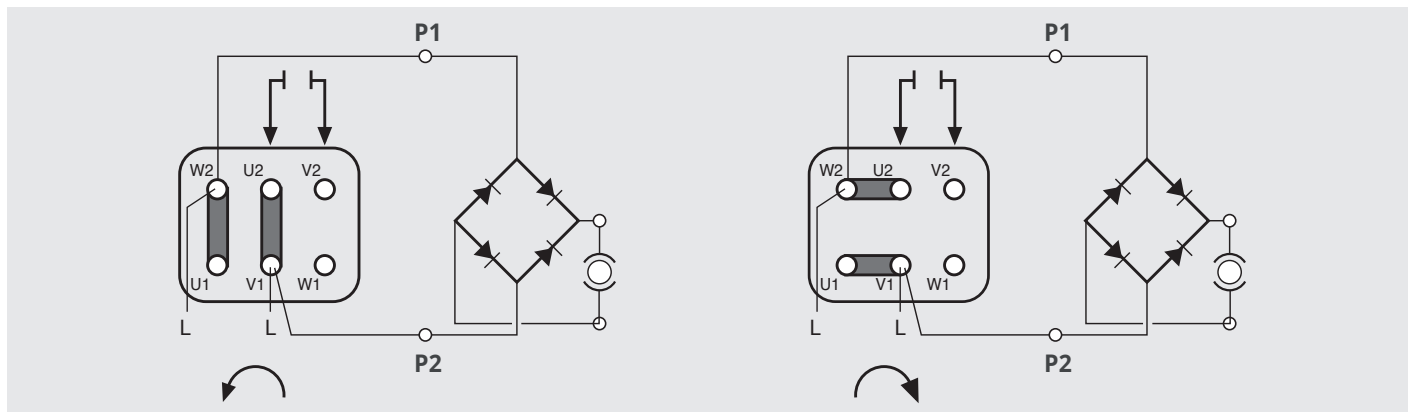


Separate supply:



Self (DC) brake single-phase motor

Direct supply:



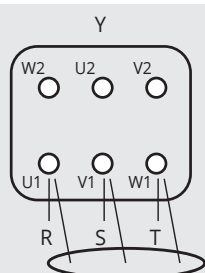
Separate supply: connect directly the supply to the terminals P1 and P2.

Auxiliary cooling-type three-phase motor IC416

N.B.: the following drawings concern only the self cooling terminal board

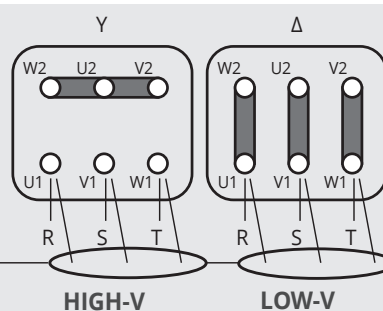
Separate supply:

CE standard:



to the cooling

UL/CSA standard:



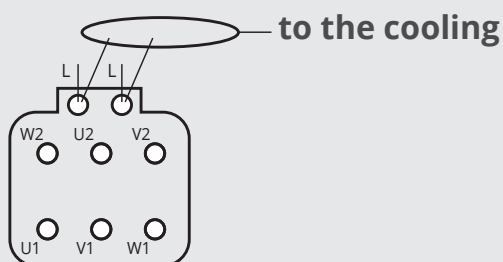
HIGH-V

LOW-V

Auxiliary cooling-type single-phase motor IC416

Separate supply:

CE and UL/CSA standard:



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