

The motors which are the subject of these "instructions" are components designed for use in industrial areas (machines/plants) and therefore cannot be treated as retail goods.

This documentation consequently contains information that is only suitable for use by qualified personnel. It must be used in compliance with the regulations, laws and technical Standards in force and cannot under any circumstances take the place of plant safety procedure or additional regulations, including any which are not legally enforceable, which have been issued with the scope of ensuring safety.

Machines built to customer specifications or with constructional differences may differ in detail from the motors described herein. If you encounter any difficulties please do not hesitate to contact Marelli Motori, specifying:

- the type of motor
- the full motor code number
- the serial number

General safety information



DANGER

Electric rotating machines have dangerous parts: when operating they have live and rotating components.

Therefore:

- improper use
 - the removal of protective covers and the disconnection of protection devices
 - inadequate inspection and maintenance
- can result in severe personal injury or property damage.

The person responsible for safety must therefore ensure that:

- the machine is transported, installed, operated, maintained and repaired by qualified personnel only, that must have:
 - specific training and experience
 - knowledge of applicable standards and laws
 - knowledge of the general safety regulations, national and local codes and plants requirements
 - the skill to recognise and avoid possible danger.

All maintenance and inspection operations must be carried out only with the authorisation of the person responsible for safety, with the machine at a standstill, disconnected from the supply (including the auxiliary circuits such as the anti-condensation heaters)

As the electric machine is a product to be installed in industrial areas, **additional protective measures must be taken and assured by the person responsible for the installation, if stricter protection conditions are required.**

As the electric motor is a component to be coupled to another machine, it is the responsibility of the installing engineer to ensure, during operation, proper protection against the risk of contact with bare rotating parts and to prevent people or things from approaching the machine.

If the machine shows deviations from the normal performance (higher power input, increase in temperature, noise and vibrations) promptly advise the personnel responsible for maintenance.

Description

The machines which are the subject of these instructions are three-phase squirrel-cage motors, fan cooled type for low voltage supply manufactured in compliance with the standards indicated on the name plate.

Motors which are installed with their shafts in the vertical plane require suitable protective measures (fan cowl with cover when the end of the shaft is facing downwards).

Applications in special ambient conditions should be specified when ordering so that the most suitable solutions can be taken (e.g. tropicalisation treatments, requests for protection against direct solar radiation for operation in the open, special fan cowl for the textile industry).

Never exceed the maximum admissible axial and radial loads (see catalogues) and always ask the manufacturer to advise if you are in any doubt.

Never exceed the maximum speed specified for the motor (using control and protection devices if necessary).

Transport and storage

The motors with shaft height of 100, 112, 132 or 160 have two lifting eyes for hoisting and transport.



The lifting eyes are suitable for lifting the motor only and not the unit in which the motor is installed.

When lowering the motor, always make sure that it will rest on safe and stable supports.

Motor weight is indicated in table 1.

If the motor is not to be used immediately, it should be stored in a covered area that is clean, dry and vibration-free.


It is advisable to replace the bearings after the motor has been stored for 4 years in favourable conditions. This time should be halved if the storage conditions are unfavourable.

Installation

Before installing and starting up the motor, make sure that the data shown on the name plate is suitable to the power supply network and to the type of duty and that the installation of the motors complies with the manufacturer's recommendations.

Install the motor in a ventilated room away from sources of heat. Make sure that there are no obstacles close by impeding correct air flow.


Ensure that inspection and maintenance operations can be carried out without difficulty.

 **Pay special attention to providing suitable guards to prevent accidental contact with moving parts and those parts of the frame which reach temperatures in excess of 50°C.**

If thermal cutouts are being used, make sure that the system has been designed to prevent sudden restarts.

Equip the motor with devices providing electrical protection against short circuits, overloads and the reinsertions that can cause overvoltages.

Ex n specification motors.

-  Make sure that the construction and temperature class shown on the nameplate are correct for the ambient conditions (class for place and zone category) and hazardous substances present in the environment.

Balancing and fitting the coupling unit

Unless stated otherwise, the motor's rotor is balanced dynamically using a half-key fitted on the shaft extension in compliance with IEC 34-14 the transmission member should therefore be balanced before fitting using a half-key.

The transmission member should be fitted in a conscientious workmanlike manner without any blows that could damage the bearings.

One method is to heat the part to be mounted (if possible) or mount it on the shaft extension using the threaded hole (Fig. 2).

If it subsequently needs to be removed, this should be done using an extractor.

The motor and machine it drives should be carefully aligned to prevent damaging vibration.

Insulation testing

Before starting up the machine and after it has not been used for long periods or been kept in storage, measure the insulation resistance between the windings and to earth using a suitable direct current instrument (500 V).

-  Never touch the terminals during and after measurement since they are live.



The insulation resistance, measured with the winding at a temperature of 25°C, should never be below:

- 10 MΩ for a new winding


- 1 MΩ for a winding on a motor which has been in operation for some time.

Lower values normally indicate the presence of moisture in the windings. If this is the case dry them.

Electrical connection

-   Work on electric machines should be carried out with the machine stopped and disconnected from the power supply (including auxiliary circuits, such as anti-condensation heaters).

The standard specification version adopts the main motor connections shown in the connection diagram in Fig. 6.

-  The potential-equalizing connections to the earth terminals on the casing and in the terminal box must be sized with a suitable cross-section area and made in compliance with the Standards in force.

The connections contact surfaces must be clean and protected against corrosion.

Use power supply cables with a suitable cross-section area that is suitable for withstanding the maximum current absorbed by the motor, avoiding overheating and/or voltage drops.

Prevent the transmission of mechanical stresses to the motor terminals.

Check that the terminal nuts are tightened firmly and that the seals are in perfect condition, also making sure that any unused cable holes are blanked off to ensure the terminal box achieves the protection class shown on the rating plate.

-  Ex n specification motors.
Make the connections to the terminals as shown in Fig. 3. Make sure the safety distances between bare live parts are respected.



Connecting up the auxiliary circuits (if present).

- **Thermal protection devices.** Check the type of protective device before connecting it up. Thermistors require a suitable trip relay.

- **Anti-condensation heaters.** The anti-condensation heaters must be powered by separate lines. They must never under any circumstances be powered when the motor is running.

- **Auxiliary ventilation fan.** Connect the power supply to the electric fan separately from of the main motor. Incorporate a device which only enables operation of the main motor when the auxiliary fan is on.

Maintenance

-   Any operation whatsoever on the motor must only be carried out with the machine stopped and disconnected from the power supply.

At regular intervals check if the motor is operating correctly and within its specifications with no abnormal noise or vibration and that the ventilation air inlet is not blocked.

The inspection and maintenance intervals depend on the actual operating conditions (loads, number of starts, etc.) and the ambient conditions (dust, etc.). As a result no more than general guidelines can be supplied.

The normal specification version of MAA motors feature double-sealed life-lubricated bearings of the size shown in table 2.

The type of bearing used can change in special versions of the motors. You can check which type of bearing has been used from the code stamped on the side edge of the outer ring of the bearing itself.

The bearings used on the standard version are life-lubricated maintenance-free designs.

Under normal operating conditions the grease packed in the bearings is sufficient for several years.

It is good practice to change the bearings every 3 years.

Use an extractor to remove the bearings (Fig. 4).

Heat the bearings (to approximately 80°C) to make them easier to fit. Never hit the bearings with a hammer to avoid damaging them.

When changing the bearings it is good practice to also change any seal rings on the shaft, lightly greasing the slip zone of the seal lip.

The seal ring must be fitted on the shaft as shown in Fig. 5.

The fan is held on the shaft using an elastic ring inserted in the hub. To remove the fan, this ring must be opened out using the special pliers for this purpose (available from specialist dealers) and simultaneously extracted along the motor axis.

Make sure that the various different parts are assembled in the correct order when disassembling and reassembling the motor (marking the different parts during disassembly if necessary).

Pay particular care to avoid damaging the windings when sliding the rotor out from the stator.

Spare parts

Always specify the code and type of motor indicated on the rating plate when ordering any spare parts.

The standardised components are available from specialist dealers.

Tabella 1. / Table 1 / Tableau 1 / Tabelle 1 / Tabla 1

Peso max dei motori / Max motor weight / Poids max des moteurs / Max Gewicht der Motoren / Peso max de motores								
Grandezza / Size / Hauteur d'axe / Baugröße / Tamaño	63	71	80	90	100	112	132	160
kg	5	8	12	19	29	34	65	100

Tabella 2. / Table 2 / Tableau 2 / Tabelle 2 / Tabla 2

Cuscinetti dei motori normali / Bearings on normal motors / Roulements des moteurs normaux / Lager der normalen Motoren / Cojinetes de motores normales								
	63	71	80	90	100	112	132	160
Lato D / Side D / Côté D / Seite D / Lado D	6201 - 2Z	6202 - 2Z	6204 - 2Z	6205 - 2Z	6206 - 2Z	6306 - 2Z	6308 - 2Z	6309 - 2Z
Lato N / Side N / Côté N / Seite N / Lado N	6201 - 2Z	6202 - 2Z	6204 - 2Z	6205 - 2Z	6206 - 2Z		6208 - 2Z	6309 - 2Z

Denominazione componenti
Rif. fig. 1

Part name
Ref. fig. 1

Dénomination composants
Réf. fig. 1

Pos. Denominazione

No. Name

Pos. Dénomination

100 Cassa con pacco statore
111 Piedi

200 Rotore con albero
211 Linguetta
300 Scudo IMB3
301 Scudo IMB5
302 Scudo IMB14
310 Cuscinetto lato D
318 Anello di tenuta lato D
400 Scudo lato N
410 Cuscinetto lato N
419 Molla
510 Ventola
511 Copriventola IMB3
512 Copriventola IMV1
610 Scatola morsetti
611 Coperschio scatola morsetti
612 Guarnizione
620 Morsettiere
630 Pressacavo
631 Tappo di chiusura entrata cavi

100 Stator frame with core and windings
111 Feet

200 Rotor with shaft
211 Key
300 Endshield, IMB3
301 Endshield, IMB5
302 Endshield, IMB14
310 Bearing, D-end
318 Seal ring, D-end
400 Endshield, N-end
410 Bearing, N-end
419 Preload washer
510 Fan
511 Fan cowl, IMB3
512 Fan cowl, IMV1
610 Terminal box
611 Terminal box cover
612 Gasket
620 Terminal board
630 Cable gland
631 Plug for cable - entry opening

100 Carcasse avec paquet stator
111 Pieds

200 Rotor avec arbre
211 Langnette
300 Flasque-palier IMB3
301 Flasque-palier IMB5
302 Flasque-palier IMB14
310 Roulement côté D
318 Anneau d'étanchéité côté D
400 Flasque-palier côté N
410 Roulement côté N
419 Ressort
510 Ventilateur
511 Cache-ventilateur IMB3
512 Cache-ventilateur IMV1
610 Boîte à bornes
611 Couverture boîte à bornes
612 Joint
620 Plaque à bornes
630 Presse-cable
631 Bouchon de fermeture entrée cables

1) Solo su richiesta

320 Anello elastico bloccaggio cuscinetto lato D
418 Anello di tenuta lato N

1) Only upon request
320 Retaining ring, D-end
418 Seal ring, N-end

1) Sur demande seulement
320 Anneau élastique de blocage roulement côté D
418 Anneau d'étanchéité côté N

Lato D = lato comando
Lato N = lato opposto comando

D-end = drive end
N-end = non-drive end

Côté D = côté commande
Côté N = côté opposée à la commande

Bezeichnung der Komponenten
Ref. Abb. 1

Denominación de los componentes
Ref. fig. 1

Pos. Bezeichnung

Pos. Denominación

100 Gehäuse mit Statorpaket
111 FüÙe

200 Rotor mit Welle
211 Patzfeder
300 Lagerschild, IMB3
301 Lagerschild, IMB5
302 Lagerschild, IMB14
310 Lager, Seite D
318 Dichtring, Seite D
400 Lagerschild, Seite N
410 Lager, Seite N
419 Feder
510 Lüfter
511 Lüfterschutz, IMB3
512 Lüfterschutz, IMV1
610 Klemmenkasten
611 Deckel
612 Dichtung
620 Klemmenleiste
630 Kabelinführung
631 Verschlussstopfen

100 Carcasa con paquete estator
111 Pies

200 Rotor con eje
211 Chaveta
300 Escudo IMB3
301 Escudo IMB5
302 Escudo IMB14
310 Cojinete lado D
318 Anillo de retén lado D
400 Escudo lado N
410 Cojinete lado N
419 Muelle
510 Ventilador
511 Cubreventilador IMB3
512 Cubreventilador IMV1
610 Caja de bornes
611 Tapa de caja de bornes
612 Junta
620 Placa de bornes
630 Prensacable
631 Tapón de cierre entrada cables

1) Nur auf Anfrage
320 elastischer Sparring Lager Seite D
418 Dichtring Seite N

1) Sólo bajo pedido:
320 Anillo elástico de bloqueo cojinete lado D
418 Anillo de retén lado N

Seite D = Antriebsseite
Seite N = Nichtantriebsseite

Lado D = Lado de mando
Lado N = Lado opuesto al de mando

Fig. 1 / Abb. 1

Costruzione normale

I motori forniti possono differire nei dettagli rispetto a quello illustrato.

Standard design

Delivered motors may differ in details from that illustrated.

Version normale

Certains détails des moteurs fournis peuvent différer par rapport au moteur illustré.

Normalausführung

Die gelieferten Motoren können in einigen Details vom abgebildeten Motor abweichen.

Version normal

Los motores suministrados podrían presentar diferencias en algunos de sus aspectos respecto al ilustrado.

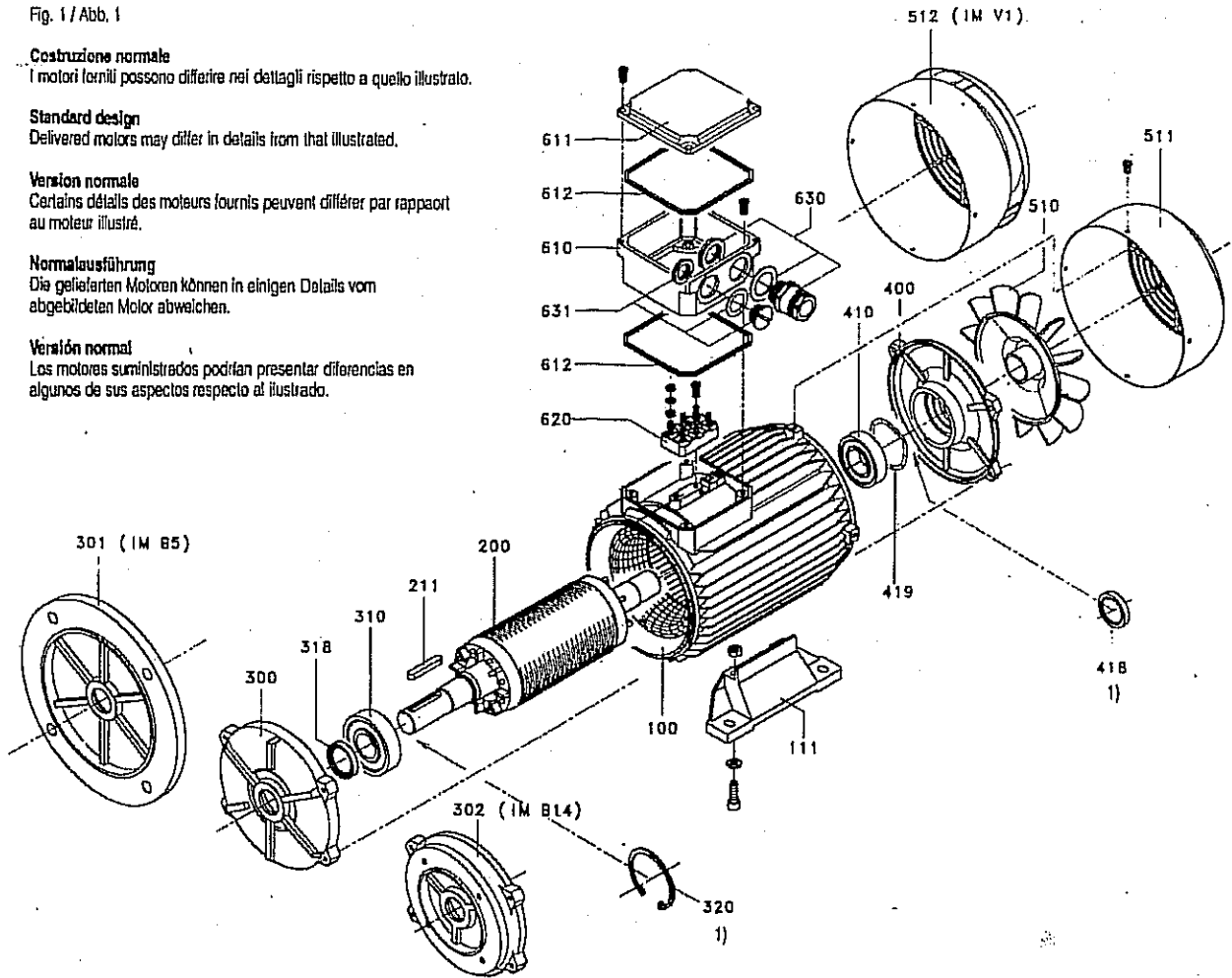


Fig. / Abb. 2

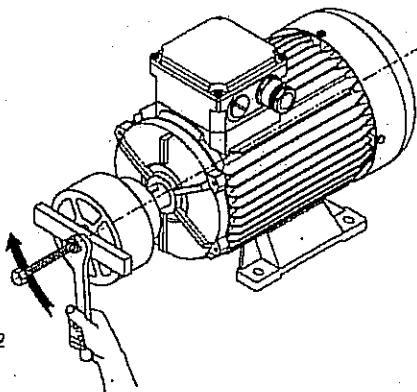


Fig. / Abb. 3

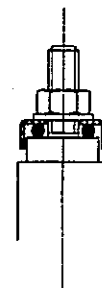


Fig. / Abb. 4

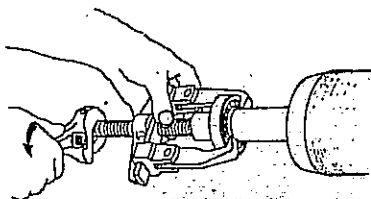


Fig. / Abb. 5

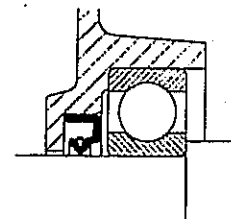
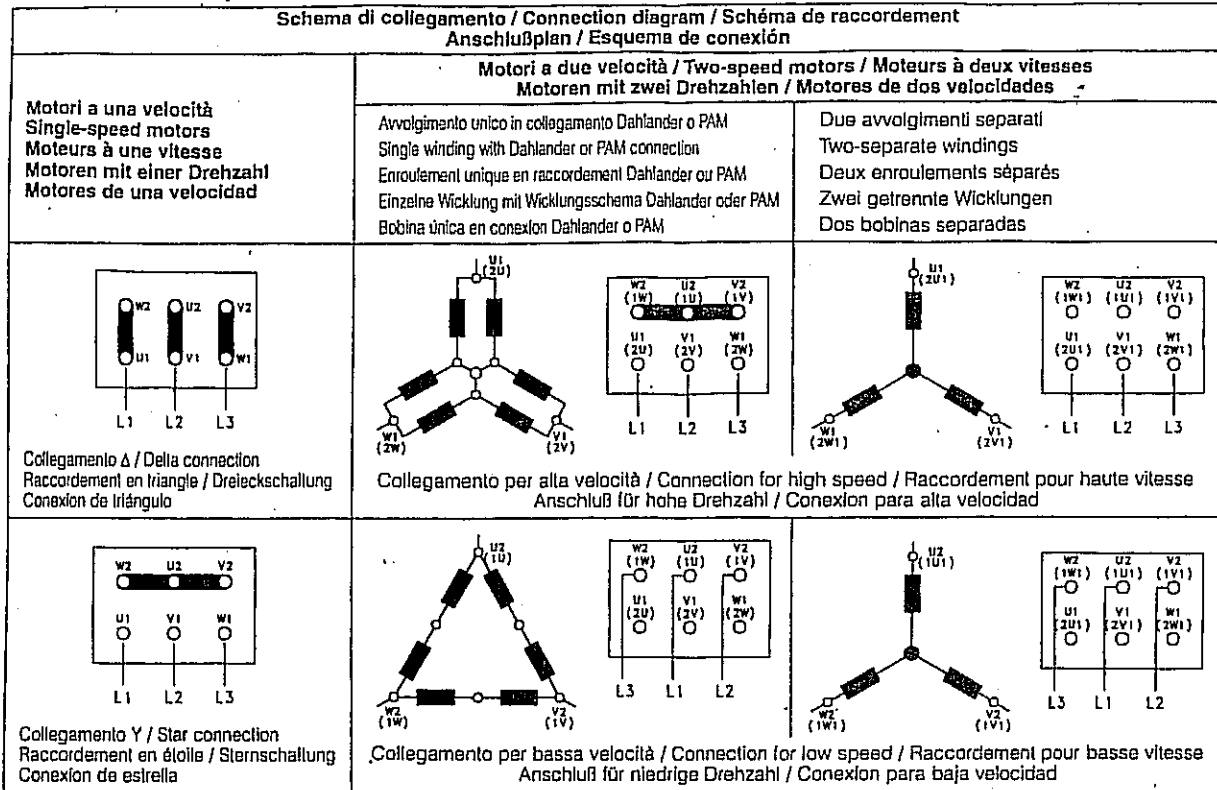


Fig. / Abb. 6



Senso di rotazione

I motori in esecuzione standard possono funzionare indifferentemente nei due sensi di rotazione. Se si collega una terna normale destra L1, L2, L3 ai morsetti U, V, W, come indicato nello schema, il senso di rotazione del motore risulta orario guardando dal lato comando. Si può invertire il senso di rotazione invertendo tra loro due terminali (collegamento L1, L2, L3 a V, U, W oppure a U, W, V oppure a W, V, U).

Sens de rotation

Les moteurs en version standard peuvent fonctionner indifféremment dans les deux sens de rotation. Si on raccorde une terna normale dans le sens horaire L1, L2, L3 aux bornes U, V, W comme indiqué sur le schéma, le sens de rotation du moteur est horaire en regardant du côté commande. On peut inverser le sens de rotation en inversant entre elles deux bornes (raccordement L1, L2, L3 à V, U, W ou à U, W, V ou à W, V, U).

Sentido de rotación

Los motores en versión estándar pueden funcionar indistintamente en ambos sentidos de rotación. En caso de conectar una terna normal derecha L1, L2, L3 a los bornes U, V, W, en el modo indicado en el esquema, el sentido de rotación del motor será el de las agujas del reloj, mirando desde el lado de mando. Será posible invertir el sentido de rotación, invirtiendo entre sí dos terminales (conexión L1, L2, L3 a V, U, W o bien a U, W, V o bien a W, V, U).

Direction of rotation

The standard specification motors can operate in either direction of rotation. If a normal right-hand L1, L2, L3 triad is connected to terminals U, V, W as shown in the diagram, the motor will turn in a clockwise direction, looked at from drive end. The direction of rotation can be reversed by swapping the connections to two terminals (connecting L1, L2, L3 to V, U, W or W, V, U).

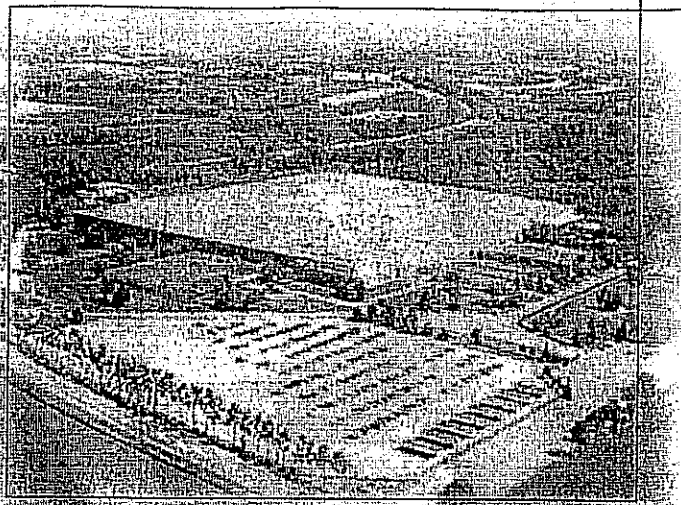
Drehrichtung

Die Motoren in der Standardausführung können in beide Richtungen laufen. Wenn man einen normalen rechtsgängigen Dreiphasenstrom mit den Phasen L1, L2, und L3 an die Klemmen U, V und W wie im Plan gezeigt anschließt, dreht sich der Motor im Uhrzeigersinn, von der Antriebsseite her betrachtet. Man kann die Drehrichtung umkehren, indem man zwei der drei Phasen vertauscht (Anschluß L1, L2, L3 an V, U, W bzw. U, W, V bzw. W, V, U).



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