1. BASIC CONDITIONS FOR RECEIPT

1.1. Handling

DO NOT HANDLE THE MOTOR DURING OPERATION OR WHEN VOLTAGE IS APPLIED.

Electrical machines are an integral part of industrial and electrical power installations. During operation, components subjected to dangerous voltages, and rotating parts may cause serious injury to personnel or property damage if required protections are improperly removed or used, or if required maintenance operations are not performed.

1.2. Technical Personnel

Assembly and installation must be performed by specialized and responsible personnel. Strictly adhere to technical data provided in this catalogue and/or in the specific offer, in addition to assembly and connection conditions, type of environment and degree of protection and motor service duty for proper compliance while installing the motor in a machine.

1.3. Basic Description

MDD motors are designed for industrial installations and comply with European harmonized standards (EN 60034).

Application of motors in enclosures exposed to explosion hazards is prohibited, except when intended for these applications.

Low voltage motors are components designed for incorporation into machines, according to Machine Directive 89/392/EEC. It is prohibited to start a motor before it has been checked to ensure the final product complies with the Directive (see EN60204-1).

MDD SN and SW series motors (complete version) comply with IP 54 degree of protection and, therefore, can be installed in humid and dusty environments. In rotor and stator kit versions, the protection class will depend on the housing.

In all series, unless otherwise indicated, assigned ratings for continuous service (S1) at an ambient temperature between -20º and +40ºC in versions with (IC 410) natural cooling (MDD SN), and a refrigerant temperature (water) between 4º and 35ºC in versions with (IC 97W) liquid cooling (MDD SW), and a maximum elevation of 1000 meters above sea level, apply.

1.4. Shipping and Receiving

Motors shall be shipped in completely sealed packaging with a wood pallet base.

2. SITE

Two eyebolts are installed on the body of the motor for handling. Therefore, never lift the motor by the shaft.

In versions with liquid cooling, plan for input and output circuits for the refrigerant and for corresponding devices to ensure the temperature of the coolant (water) remains within established limits (between 4ºC and 35ºC).

Motors must be mounted on a solid base and be perfectly aligned.

For vertically installed motors, plan for specific bearings to maintain proper operation.

For motors with (IC 410) natural convection cooling (MDD SN), the outside of the motor casing may reach temperatures exceeding 60ºC. Therefore, proper precautions should be taken (indicated by an instruction plate).

3. COUPLING TO THE MACHINE

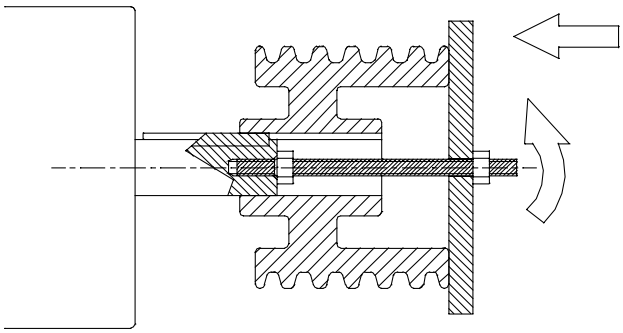
Complete motor versions

Machine coupling must be performed with extreme care, as it significantly affects the life of the motor. For foot-mounting, use 4 screws that match the diameter of the holes in the base. For flange-mounting, remove the anti-rust varnish on the flange before fastening it to the corresponding counterflange. Be sure to use screws with the proper diameter. Remove the shaft protection varnish before mounting the coupling means (direct, pulley, etc.). Adjust tolerances according to the type of motor.

A flexible coupling must be used if motor operation is gearless to compensate for alignment errors and radial forces. If a flexible coupling is not used, the shafts must be perfectly aligned.

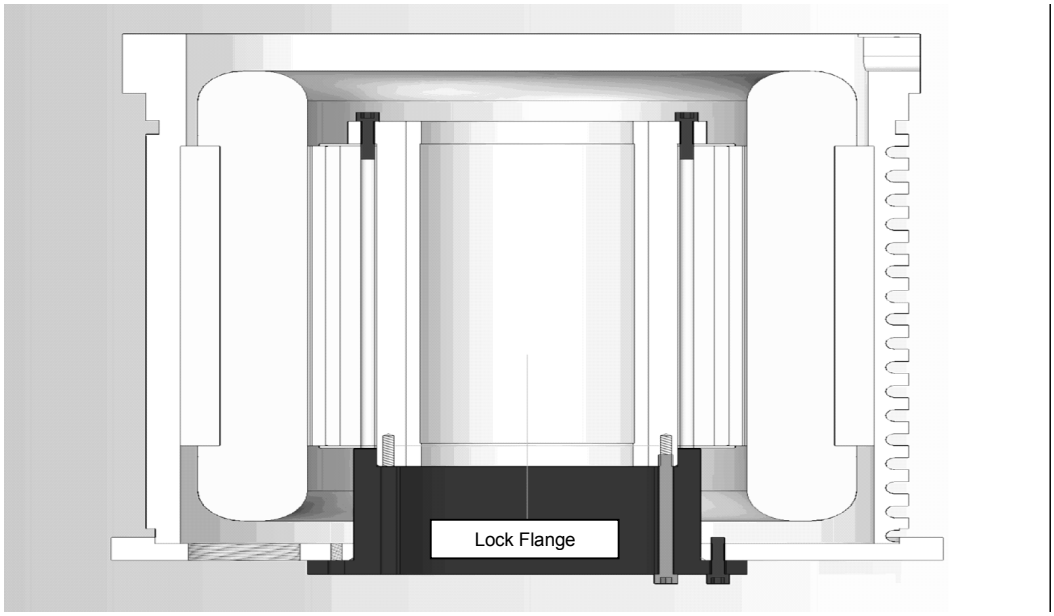
The rotors are dynamically balanced with a half key at the end of the shaft (according to standard 60034-14). The transmission, pulley and coupling must also be balanced in this manner.

Installation and coupling must be performed without any impact. Heat the pulley, pinion or coupling beforehand or use proper tools. (See figure.)

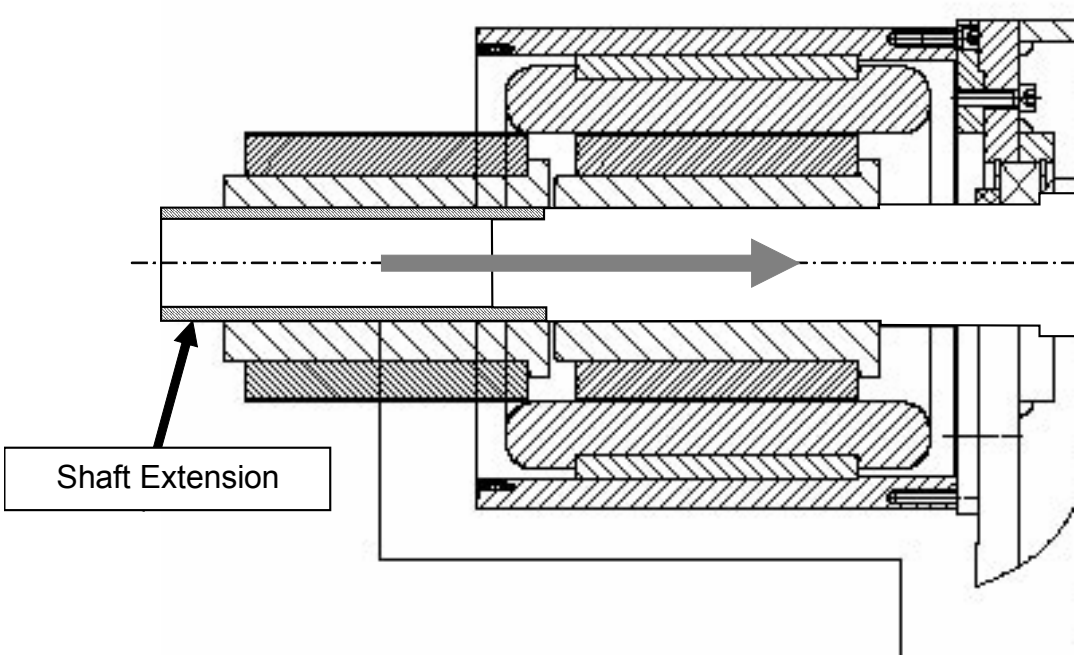


Rotor+stator kit versions

Since the rotor is magnetized, maintain the rotor concentric with the stator during assembly to prevent it from adhering to the stator. If a lock flange (accessory upon request) is supplied with the motor, fasten the rotor and stator to the machine, subsequently freeing the lock flange.



If the rotor and stator are supplied separately, fasten the stator to the base before aligning the rotor in the shaft. Use the shaft extension to aid the process, if necessary.



4. ELECTRICAL INSTALLATION

4.1. Electrical Connection

All work must be performed by qualified personnel. The motor must be completely stopped and isolated from the power network. Always ensure there is NO voltage applied!

Complete motor versions

The motor is equipped with a terminal box with a corresponding terminal strip for electrical connections. Connection hardware appropriate for each motor's current rating is included. Make motor connections using a wire cross-section compatible with the motor's rated current, according to the wiring diagram on the inside of the terminal box cover of each motor.

Connect the ground protection wire to the terminal designed and labeled for this function.

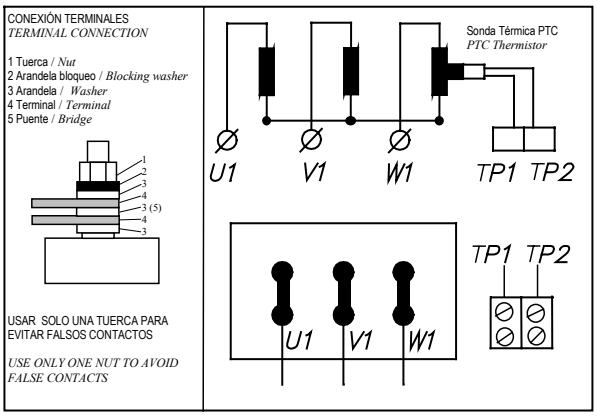
If applicable, connect the encoder according to the wiring diagram inside the terminal box.

Rotor+stator kit versions

Wires corresponding to the three motor phases (U W W) and the temperature probes (TP1, TP2) protrude from the stator. Each wire is identified.

4.2. Motor Wiring Diagram

The motors are internally wired in a star-connection. For versions with the terminal box in the main terminal strip, the wires corresponding to each of the three phases are connected.



5. STARTUP

5.1. Inspection

Initially ensure all connections are correct, including motor, temperature probe and encoder connections. Ensure they coincide with the supply voltages of each component.

Ensure that the flow and temperature of the coolant (in versions with liquid cooling IC97W - MDD SW) are as instructed.

Ensure the motor is securely and correctly fastened to the base.

Check the operation of the brake (if applicable to the specific motor).

Before starting the machine, ensure all installation personnel are advised of the startup.

5.2. Cooling (liquid-cooled versions IC97W – MDD SW)

The recommended coolant is water – preferably deionized – in a closed circuit, with antifreeze – anticorrosive additive (e.g. Tyfocor) in a 20% maximum concentration. For ambient temperatures between –9ºC and –20ºC, increase the concentration of antifreeze additive up to 30%.

In order to prevent medium and long term electrolysis problems, avoid direct contact between cooling jackets and copper, brass or bronze connection fittings. Use polyethylene or stainless steel fittings. The use of polyethylene piping is also recommended.

Filling of the cooling circuit:

a) **In the horizontal position:** Open the air venting cap located on the upper side of the cooling jacket and slowly fill with coolant through one of the bottom coolant inlet / outlet orifices such that the air trapped inside the circuit is purged through this orifice. Once the air has been purged, close the venting cap.

b) **In the vertical position:** Slowly fill with coolant through the lower orifice such that the air present in the circuit is expelled through the upper orifice.

The presence of air in the cooling circuit reduces the motor's performance.

Ensure the coolant flow and temperature is adequate.

The coolant must be circulating for one minute prior to starting the motor and for 10 minutes after shutdown in order to dissipate the residual heat of the motor and prevent overheating the coolant. **Keeping the coolant circulating with the motor shutdown may cause water condensation inside the motor with severe damage to the insulation of the stator windings.**

5.3. Verification

Verify the following during startup:

- The Inverter is configured in accordance with the specifications of the motor selected, including voltage, speed, current and frequency. Consider both maximum and minimum values.
- Proper operation of all protections, both mechanical and electrical.
- There is no noise or excessive heat with the motor unloaded and at low speed.
- There are no excessive temperatures or vibrations in the bearings due to motor alignment defects.
- The motor rotates properly during nominal operation.

6. MAINTENANCE

Cleaning and maintenance work must always be performed while the motor is stopped and no voltage is applied to its terminals. Work must be performed by qualified personnel, and with respect to the safety standards of the machine to which the motor is connected.

6.2. Bearings

Solid shaft versions include closed ball, permanent-lubrication bearings.
Extruder screw versions include an axial taper roller bearing, externally greased.
Hollow shaft versions may be equipped with externally greased bearings according to the diameter of the shaft.

ESSO UNIREX N3 grease, or equivalent, must be used.

Bearings must be replaced after 20,000 hours of operation.

6.2.1. Bearing Replacement

This operation must be performed at a safe and clean location. Proceed in the following manner:

1. Remove accessories (brake and/or encoder, if applicable) from the motor. Use extreme care not to damage them.
2. Remove bearing holder bushings.
3. Remove shields. The operation must be performed without removing the rotor from the stator.
4. Remove the SEEGER circlips from the bearing block.
5. Remove the shaft bearing using an extractor. Use precaution not to damage the shaft or the surrounding windings.
6. Heat the new bearing to approx. 70ºC. This dilates the bearing, facilitating its insertion into the shaft.
7. Insert the new bearing into the shaft. Insert the hot bearing up to the stop, without impact. This operation must be performed as quickly as possible. Do not allow the bearing to cool.
8. Insert the SEEGER lock washers.
9. Install the shields.
10. Insert the bearing holder bushings. The bushings have a conical opening for unhooking the magnetized rotor from the stator for insertion in the shields.
11. Reinstall the accessories to the motor.

The following pages provide specifications for the bearings used in each type of MDD motor.

6.2.2. Bearings in MDD Motors, solid shaft version

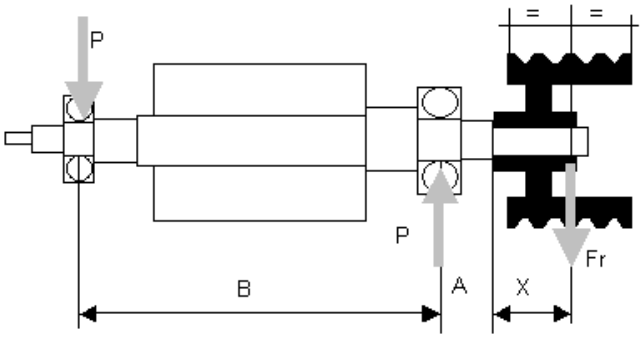
VASCAT

Rodamientos en los motores MDD
Bearings in MDD Motors
Versión eje saliente / *Solid shaft version*

Tipo de motor *Motor Type*	Rodamiento *Bearing*		n max rpm	n rpm	L10h h	C N	P max N	A mm	B mm	Xmax mm	Fr max N
MDD SN/SW 132	*D.E.*	*6310ZZC3*	*6300*	1500	20000	*61800*	5080	36,5	310,5	110	2800
	N.D.E.	*6208ZZC3*	*8500*	1500	20000	*30700*	2524	36,5	310,5	110	4300
MDD SN/SW 180	*D.E.*	*6220ZZC3*	*5300*	1000	20000	*122000*	11481	20	330	80	7000
	N.D.E.	*6310ZZC3*	*6300*	1000	20000	*61800*	5816	20	330	80	15400
MDD SN/SW 250	*D.E.*	*6224ZZC3*	*4500*	800	20000	*146000*	14800	20	390	80	9400
	N.D.E.	*6312ZZC3*	*5000*	800	20000	*81500*	8262	20	390	80	25800

DE = Delantero / *Drive end* ; N.D.E. = Trasero / *Non Drive End*

n max	Velocidad maxima / *Maximum speed*
n	Velocidad de trabajo / *Working Speed*
L10h	Vida util del rodamiento, en h / *Bearing Life in hours*
C	Carga dinámica nominal del rodamiento / *Rated Dynamic Load*
Pmax	Carga radial admisible en el rodamiento para L10h y n / *Max. Radial load on the bearing for L10h and n*
Fr max	Esfuerzo radial máximo en la polea / *Maximum radial load on the pulley*



6.2.3. Bearings in MDD Motors, extruder screw version

VASCAT

Rodamientos en los motores MDD
Bearings in MDD Motors
Versión extrusoras / *Extruder screw version*

Tipo de motor *Motor Type*	Rodamiento *Bearing*		n max rpm	n rpm	L10h h	C N	P max N	A mm	B mm	Xmax mm	Fr max N	Fa max N
MDD SN/SW 180	*D.E.*	***29414E***	***3000***	500	20000	***490000***	58096	40	390	0		58096
		6215C3	***4500***	500	20000	***146000***	17310	40	390	0	12600	
	N.D.E.	***6310ZZC3***	***6300***	500	20000	***61800***	7327	40	390	0	57200	
MDD SN/SW 250	*D.E.*	***29414E***	***3000***	500	20000	***490000***	58096	40	390	0		58096
		6215C3	***4500***	500	20000	***146000***	17310	40	390	0	12600	
	N.D.E.	***6312ZZC3***	***5000***	500	20000	***81500***	9663	40	390	0	75400	

DE = Delantero / *Drive end* ; N.D.E. = Trasero / *Non Drive End*

n max	Velocidad maxima / *Maximum speed*
n	Velocidad de trabajo / *Working Speed*
L10h	Vida util del rodamiento, en h / *Bearing Life in hours*
C	Carga dinámica nominal del rodamiento / *Rated Dynamic Load*
Pmax	Carga radial admisible en el rodamiento para L10h y n / *Max. Radial load on the bearing for L10h and n*
Fr max	Esfuerzo radial máximo/ *Maximum radial load*
Fa max	Esfuerzo axial máximo / *Maximum axial load*