

OPERATION & MAINTENANCE MANUAL

3004/12 en – Ed. 01.2012

SYNCHRONOUS GEARLESS MACHINES
M/T24S-M/T24-T24L



CONTENTS

- 1. SAFETY RULES**
 - 1.1. General safety instructions
 - 1.2. Safety precautions
 - 1.3. Intended use
 - 1.4. Packing and handling
 - 1.5. Storage
- 2. PRODUCT DESCRIPTION**
 - 2.1. Main features
 - 2.2. Traction machine name details
 - 2.3. Technical data
 - 2.4. Feedback encoder
 - 2.5. Holding brake
 - 2.6. Brake drawing 09D8130-0097
 - 2.7. Nameplate data
- 3. INSTALLATION**
 - 3.1 Safety precautions
 - 3.2 Fastening the traction machine
- 4. ELECTRICAL CONNECTIONS**
 - 4.1. General
 - 4.2. Connecting the motor
 - 4.3. Connecting the brake
 - 4.4. Connecting the encoder
 - 4.4.1. Encoder connection diagrams
 - 4.4.2. Replacing the encoder
- 5. TESTING THE BRAKE SYSTEM**
 - 5.1. Overload test
 - 5.2. Component failure test
- 6. MAINTENANCE**
 - 6.1. Maintenance program
 - 6.2. Safety precautions during maintenance
 - 6.3. Troubleshooting
- 7. Declaration of Conformity to standard EN 81-1 Sect.12.4 for KEB Brake**
- 8. EC Declaration of Conformity for KEB Brake**

ANNEXES

- a) EC Declaration of Conformity for Traction Machine
- b) KEB Brake Manual
- c) KEB TÜV certification

The operating instructions in this manual refer to M/T24S, M/T24, T24L gearless traction machines.

LAFERT S.p.A. reserves the right to amend or change the contents of this manual and product details without prior notice.

LAFERT S.p.A. reserves the right to make technical changes improving the product's performance and safety standards without prior notice.

1. SAFETY RULES

1.1 GENERAL SAFETY INSTRUCTIONS

This section explains the symbols used in this manual to describe the possible consequences of failure to observe the safety rules.

Symbols used in this manual



Danger

This symbol means that failure to follow the relative instructions or to take the necessary precautions may lead to death or serious injuries to persons and irreversible damage to property.



Warning

This symbol means that failure to follow the relative instructions or to take the necessary precautions may lead to death or serious injuries to persons and irreversible damage to property.



Caution

This symbol means that failure to follow the relative instructions or to take the necessary precautions may lead to damage to property.



Note

This symbol means that the relative instructions are important for the correct use of the product and that failure to follow them may lead to serious damage.

1.2 SAFETY PRECAUTIONS

These traction machines have been designed and manufactured to be used as lifting gear for lifts and service elevators in compliance with the relative standards (EN 81-1 and subsequent). Any other use should be considered improper and not authorized by Lafert SpA. Additionally, Lafert traction machines should never be used to lift persons or objects on lifting systems that are not built in accordance with the relevant regulations and that failed to pass the required tests.

Lafert traction machines are not delivered ready for use. They may be used only after being installed on the relevant machines or systems and after ensuring their safety by means of safety grids, barriers, construction features or other devices, depending on the application.

Scheduled and/or special maintenance may be carried out only by qualified and authorized personnel. Maintenance should be performed following the instructions given in this manual or provided in any other supporting documentation supplied by LAFERT S.p.A.

The personnel should be adequately instructed on the product's installation, assembly and commissioning.

M/T24S-M/T24-T24L gearless traction machines are designed to work inside close spaces, such as lift wells, where access is allowed only to qualified and authorized personnel.

The instructions contained in this manual or in any other documentation supplied should be followed at all times in order to avoid injuries or damage to persons and/or to the installation.

M/T24S-M/T24-T24L gearless traction machines are not delivered ready for use. They may be used only after being correctly installed and connected to an operating panel.

Before putting the machine into service, make sure that all the conditions for the proper operation of the motor and the brake have been applied.

IT IS EXTREMELY DANGEROUS TO PUT YOUR HANDS near the traction sheave or the lifting ropes.

Some parts of the machine can become very hot during operation (70/80°C). Therefore, it is MANDATORY to ensure that nobody can accidentally touch these parts for maintenance or repairs before a period of time sufficient for the parts to cool down to temperatures suitable for direct contact.

During installation, inspection or maintenance work, DO NOT WEAR necklaces, bracelets or loose items of clothing, such as scarves or wide-sleeved shirts, that might get caught in moving parts.



Danger



Warning

Repairs may only be carried out by LAFERT personnel.

Unauthorized opening or tampering may result in serious damage to persons and/or to the machine itself.

M/T24S-M/T24-T24L gearless traction machines are not designed to be powered directly from the mains. They must be connected to a frequency regulator. Connecting the traction machine directly to the power mains may destroy the machine.

High voltages are present on the connection terminals when the motor is running.

1.3 INTENDED USE

The M/T24S-M/T24-T24L is a state-of-the-art traction machine developed in compliance with the latest technical standards and safety regulations. It may be used only in accordance to the instructions in this manual and with all the relevant safety devices described.

LAFERT S.p.A. shall not accept any warranty or liability claims for personal injury or property damage resulting from the following causes:

- Improper use of the M/T24S-M/T24-T24L traction machine
- Improper installation, operation and/or maintenance of the M/T24S-M/T24-T24L traction machine
- Operation of the M/T24S-M/T24-T24L traction machine without the relative protection and safety devices
- Using the product not in accordance with the instructions given in this manual
- Unauthorized changes made to the M/T24S-M/T24-T24L traction machine
- Insufficient monitoring of parts subject to wear or failure to perform scheduled maintenance
- Emergencies or situations caused by external forces or force majeure

1.4 PACKING AND HANDLING

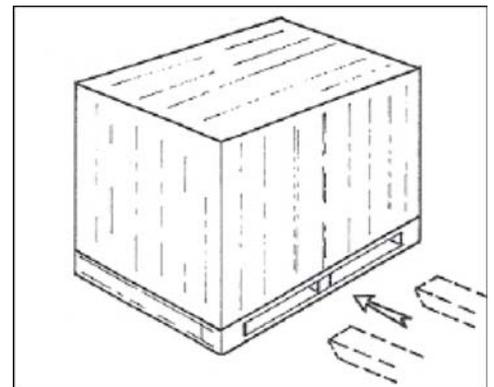
When handling the traction machine, only the methods described below may be used. Always make sure that the rated capacity of the transport and lifting apparatus is sufficient to carry the weight of the machine and its packing.

- Transport on pallet.
- Transport without pallet, lifting by hook.

The personnel in charge of handling the machine must wear safety gloves and shoes. Clear the operating area before lifting or moving the machine or any part of it. Also, provide an adequate safety margin around the working area to prevent damages to nearby persons or property.

The machine is delivered wrapped in thermoplastic material to protect all machine parts. If requested, the machine can be packed in a wooden box or crate for additional protection against bumps or external agents. Use a forklift to lift the machine (see figure).

Follow the instructions printed on the packing before moving or opening the crate. To lift the machine use the eyebolts provided. Their location is indicated on the machine. Do not attach anything to the motor. Observe all the precautions that apply to "suspended loads".



Warning

When moving the machine, follow all the relevant safety rules and regulations, taking into account the load's weight and its proper balancing.

Two eyebolts are provided to facilitate handling. The eyebolts are designed to carry the weight of the M/T24S-M/T24-T24L traction machine only. Additional loads are not allowed.

2.3. TECHNICAL DATA

All M/T24S-M/T24-T24L traction machines are equipped with 24-pole permanent-magnet motors. The main technical details of the traction machine* are summarized in the table below:

Type	Max payload [kg]	Roping	Rated torque [Nm]	speed [m/s]	Traction sheave Ø mm	Max ropes nr x Ø mm
M24S.240.06	240	2 : 1	140	0,6	240	6 x 6,5
M24S.240.10	240	2 : 1	140	1	240	6 x 6,5
M24S.210.06	240	2 : 1	140	0,6	210	6 x 6,5
M24S.210.10	240	2 : 1	140	1	210	6 x 6,5
M24S.240.06	320	2 : 1	140	0,6	240	6 x 6,5
M24S.240.10	320	2 : 1	140	1	240	6 x 6,5
T24S.240.10	320	2 : 1	140	1	240	6 x 6,5
T24S.240.16	320	2 : 1	140	1,6	240	6 x 6,5
T24S.210.10	320	2 : 1	140	1	210	6 x 6,5
T24S.210.16	320	2 : 1	140	1,6	210	6 x 6,5
T24.240.10	480	2 : 1	200	1	240	6 x 6,5
T24.240.16	480	2 : 1	200	1,6	240	6 x 6,5
T24.210.10	550	2 : 1	200	1	210	6 x 6,5
T24.210.16	550	2 : 1	200	1,6	210	6 x 6,5
T24L.210.10	630	2 : 1	250	1	210	10 x 6,5
T24L.210.16	630	2 : 1	250	1,6	210	10 x 6,5
T24L.240.10	630	2 : 1	250	1	240	10 x 6,5
T24L.240.16	630	2 : 1	250	1,6	240	10 x 6,5
T24L.210.10	710	2 : 1	250	1	210	10 x 6,5
T24L.210.16	710	2 : 1	250	1,6	210	10 x 6,5
T24.210.10D	320	210	200	1	210	6 x 6,5
T24.210.16D	320	210	200	1,6	210	6 x 6,5
T24L.240.10D	320	240	250	1	240	10 x 6,5
T24L.240.16D	320	240	250	1,6	240	10 x 6,5
T24L.210.10D	400	210	250	1	210	10 x 6,5
T24L.210.16D	400	210	250	1,6	210	10 x 6,5

*For motor data please refer to the attached data sheet

The resistance and inductance details of the specific motor installed, which are used for setting the drive correctly, are shown on the machine's nameplate (see Par. 2.7).

2.4. FEEDBACK ENCODER

All M/T24S-M/T24-T24L traction machines are equipped with one of the following encoders:

Encoder	Description
Heidenhain ECN413	Absolute encoder EnDat 2.1
Heidenhain ERN487	Encoder SinCos 2048
Heidenhain ERN421	Incremental encoder TTL 4096 pulses/rev.
Heidenhain ERN431	Incremental encoder HTL 4096 pulses/rev.

See Par. 3.3 for information on electrical connections.

2.5. HOLDING BRAKE

All M/T24S-M/T24-T24L traction machines are equipped with a holding brake having the following features:

Type	Max. braking torque [Nm]	Standby voltage [Vdc]	Standby power [W]	Opening overvoltage [Vdc]	Microswitch
09D8130-0097	2x280	105	85	200	2 (2x3 wires)

The traction machine is supplied with the brake locked by 4 M10x80 hex screws (see drawing, Par. 2.6).

See Par. 3.4 for information on the brake's electrical connections.

Upon request, the brake can be supplied with release levers (optional)

2.7. NAMEPLATE DATA

In compliance with the Machinery Directive, M/T24S-M/T24-T24L traction machines are provided with a nameplate with details of the basic information required for the use of the motor.

The table below shows the nameplate's layout and the more important data

Machine type	LAFERT SPA Via Kennedy 43 – I 30027 S. Donà di Piave (VE)			Made in Italy N° 716941	Serial no.
Rated current	Type	M24.210.06	3ph Mot.	Mn = 200 Nm	Rated torque
	Th. Cl.F	IP44	S3-40%	Freq = 23 Hz	Rated frequency
	In = 9.4 A	2.2 kW	Speed = 115 min ⁻¹	200/105 Vdc	
	Brake = Type 09D8		2 x 280 Nm	Kt = 18.0 Nm/Amp	
	R _{f-f} = 6.1 Ω		L _{f-f} = 60 mH	Ke = 10.4 Vs	Weight
				Weight = 120 kg	

- R_{f-f} = resistance on winding terminals (phase-to-phase) [Ω]
L_{f-f} = inductance on winding terminals (phase-to-phase) [mH]
K_e = voltage coefficient [Vs]
K_t = torque coefficient [Nm/Amp]

3. INSTALLATION

3.1. SAFETY PRECAUTIONS



Danger

Make sure that all the prescribed safety measures have been applied before installing the traction machine.

Before proceeding to install the machine, check the installation base and make sure it is adequately sized.

If it is not, do not install the machine.



Warning

The traction machine may be installed and electrically connected only by qualified and trained technical personnel. Bear in mind that M/T24S-M/T24-T24L traction machines are designed to be installed at the top of the lift well, where the space is restricted and working conditions are not comfortable.



Note

The encoder is located at the back of the machine; leave enough working space between the machine and the wall to replace the encoder.

3.2. FASTENING THE TRACTION MACHINE



Note

- Fasten the machine to the base using 4 M16 bolts having strength class 12.9.
- The tightening torque for this class is 300Nm.
- In order to reduce vibrations, place a rubber mat between the machine and the base.
- The maximum allowed deviation from planarity for the supporting surface is 0.2mm.
- Make sure the base is solid and adequately sized. If it is not, do not install the traction machine.
- The load applied by the ropes on the traction machine should have no lateral components in order not to apply a shearing stress on the fastening bolts. The maximum allowed deviation from verticality is 10°.
- Place the ropes on the traction sheave only after fastening the machine and engaging the brake.
- The traction machine is equipped with a rope slip-off guard. After placing the ropes, set the guard at a distance from the rope of no more than 1.5mm.



Danger

4. ELECTRICAL CONNECTIONS

4.1. GENERAL



Danger

The traction machine may be electrically connected only by qualified personnel.

After connecting the machine and before using it in any way, check the electrical insulation of the terminal box and the operating panel.

Before making any connections, make sure that:

The connection cables are suitable for their specific application in terms of voltages and currents.

The cables are correctly installed and not susceptible to twisting, tensile or shearing strains that might affect their characteristics.

The protective conductor has Protection Class 1 and is properly connected to the earthing system.

There is no foreign matter or dirt inside the terminal box.

The terminal box is properly sealed and the cable passages prevent the entry of dirt or dust.

The motor insulation system is adequately sized for connection to frequency regulators by DC bus having a maximum voltage of 800V.

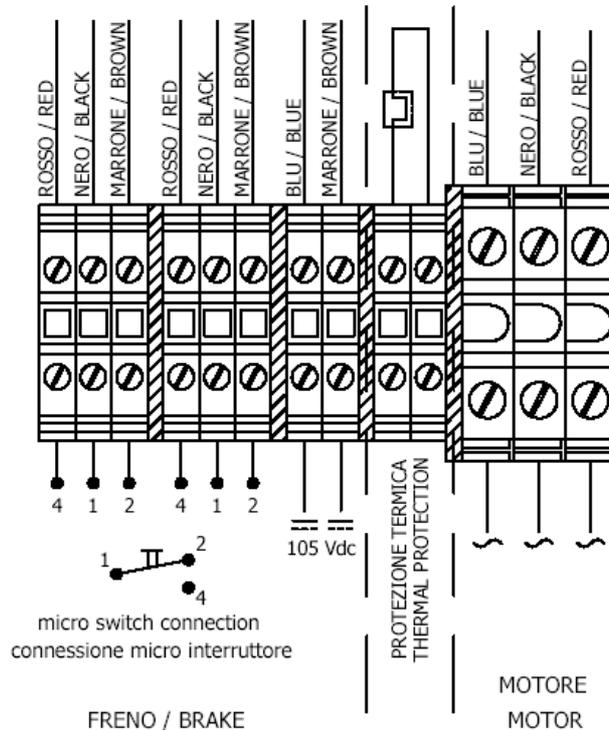
The maximum acceptable rate of voltage rise (dU/dt) for the motor is 4kV/us. In case that value is exceeded, suitable reactors should be introduced in the inverter-motor connection.

The maximum acceptable overvoltage at the machine's terminals is 1.3kV.



Note

The figure below shows the general wiring diagram of the motor, the PTC thermal circuit-breaker and the brake. These connections are made in the terminal box after removing the terminal box cover. Inside the terminal box cover there is a figure of the connection diagram shown below. The earthing connection is made to either of the two screws located in the terminal box cover.



4.2. CONNECTING THE MOTOR

The electrical connections to the motor phases and the connection to the winding temperature sensor (PTC 140°C) are shown inside the terminal box.

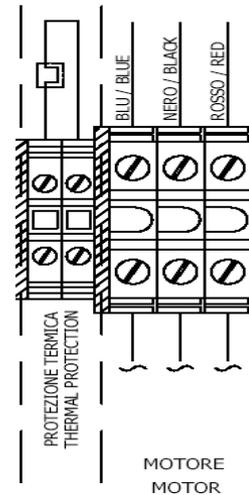
The connection cable for the phases and the protective conductor must have a cross-section suitable for the rated current of the machine as outlined in the table below.

Cross-section [mm ²]	Max. rated current S3-40%
1	20
1,5	24
2,5	35
4	42



DATA REFERRED TO PVC SHIELDED CABLES AT MAX. AMBIENT TEMPERATURE OF 40°C.

We recommend using oil-resistant, flame-resistant, shielded power cables for brushless motors, with PVC sheathing and designed for fixed laying.



The motor cable must be a shielded cable with 3 poles + earth + shielding.

Make sure the cable terminations are fitted with the right terminals for connecting to the terminal box.

Make sure the U, V, W connection order on the motor is the same as on the inverter output.

If this order is not respected the traction machine will not operate correctly, causing inverter failure.

For safety reasons it is very important to properly connect the earth cable.



Caution

4.3. CONNECTING THE BRAKE

The traction machine is delivered without a separate power supply for the brake. The power supply for the brake must be provided by the user/installer.

The over-excitation voltage should be 205 Vdc for a period of about 2 sec.

The brake's standby voltage is 105 Vdc.

The maximum voltages and currents allowed on the microswitch terminals are as follows:

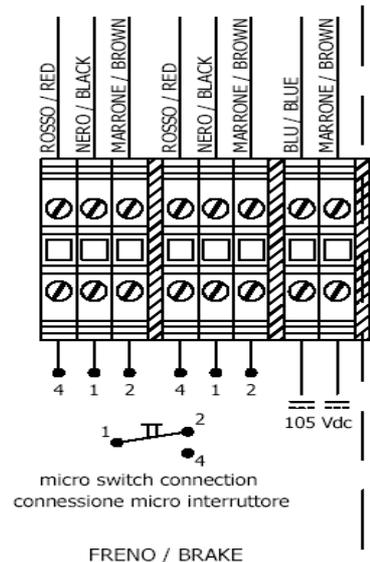
- AC power supply, 250 Volt / 5 Amp.
- DC power supply, 30 Volt / 5 Amp.

See the relative section in the brake manual for further details.



Note

The electrical connections for the brake's power supply and the two microswitches are shown inside the terminal box.



FRENO / BRAKE

Make sure the cable terminations are fitted with the right terminals for connecting to the terminal box.

See the relative section in the brake manual for further details.



Caution

4.4. CONNECTING THE ENCODER

M/T24S-M/T24-T24L traction machines are equipped with one of the following encoders:

- 1) Heidenhain Encoder ECN413 (EnDat 2.1)
- 2) Heidenhain Encoder ERN487 (SinCos)
- 3) Heidenhain Encoder ERN421 (TTL 4096 pulses/rev.)
- 4) Heidenhain Encoder ECN431 (TTL 4096 pulses/rev.)



Note

The encoder connection cable is located at the back of the traction machine.

The encoder connection cable is supplied without the connector.

Make sure that the encoder cable does not pass close to the motor connection cable, in order to avoid disturbances that would interfere with the position measuring system.

Due to the nature of permanent-magnet synchronous machines, the absolute position of the encoder relative to the pulley shaft must be individually determined on each traction machine. For further details please refer to the Commissioning Manual of the drive system installed.

The encoder is the most delicate part of the traction machine. Be careful not to bump the encoder against hard objects during handling, fastening or commissioning.



Warning

When positioning the traction machine, bear in mind that the encoder can be accessed only from the back of the machine. Be sure to leave enough space to service or replace the encoder.

The connection to the encoder depends on the type of encoder used, according to the following connection diagrams.

4.4.1. ENCODER CONNECTION DIAGRAMS

Follow the connection diagram relative to the encoder actually installed on the traction machine. The 3 relevant connection diagrams are shown below:

- HEIDENHAIN ENCODER ECN413 (EnDat 2.1)

Pin layout for ECN 413

	Power supply					Inside shield	Incremental signals				Absolute position values			
	Up	Sensor Up	0V	Sensor 0V			A+	A-	B+	B-	DATA	DATA	CLOCK	CLOCK
	Brown/ Green	Blue	White/ Green	White	/	Green/ Black	Yellow/ Black	Blue/ Black	Red/ Black	Gray	Pink	Violet	Yellow	

Shield on housing; **Up** = power supply voltage

Sensor: The sensor line is connected internally with the corresponding power line.

Vacant pins or wires must not be used!

- HEIDENHAIN ENCODER ERN487 (SinCos)

Pin layout for ERN 487

	Power supply					Incremental signals					
	Up	Sensor Up	0V	Sensor 0V	Inside shield	A+	A-	B+	B-	R+	R-
	Brown/ Green	Blue	White/ Green	White	/	Green/ Black	Yellow/ Black	Blue/ Black	Red/ Black	Red	Black

	Other signals			
	C+	C-	D+	D-
	Gray	Pink	Yellow	Violet

Shield on housing; **Up** = power supply voltage

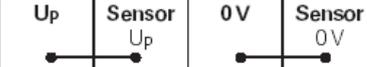
C, D = commutation signals for sinusoidal commutation

Sensor: The sensor line is connected internally with the corresponding power line.

Vacant pins or wires must not be used!

- HEIDENHAIN ENCODER ERN421 (TTL 4096 pulses/rev.) AND HEIDENHAIN ENCODER ECN431 (HTL 4096 pulses/rev.)

Pin layout for ERN 421

	Power supply				Incremental signals						Other signals	
	U _p	Sensor U _p	0V	Sensor 0V	U _{a1}	\overline{U}_{a1}	U _{a2}	\overline{U}_{a2}	U _{a0}	\overline{U}_{a0}	\overline{U}_{aS}	Vacant
	Brown/ Green	Blue	White/ Green	White	Brown	Green	Gray	Pink	Red	Black	Violet	Yellow

Shield on housing; U_p = power supply voltage

Sensor: The sensor line is connected internally with the corresponding power line.
Vacant pins or wires must not be used!

4.4.2. REPLACING THE ENCODER



Warning

Replace the encoder only if absolutely necessary due to an encoder fault or malfunction.

When installing a new encoder, the offset value needs to be adjusted with a specific procedure that depends on the type of inverter.

The encoder can be accessed only from the back of the machine.

To gain access to the encoder housing, unscrew the cable gland on the plastic protective cover through which the cable passes and remove the cover.

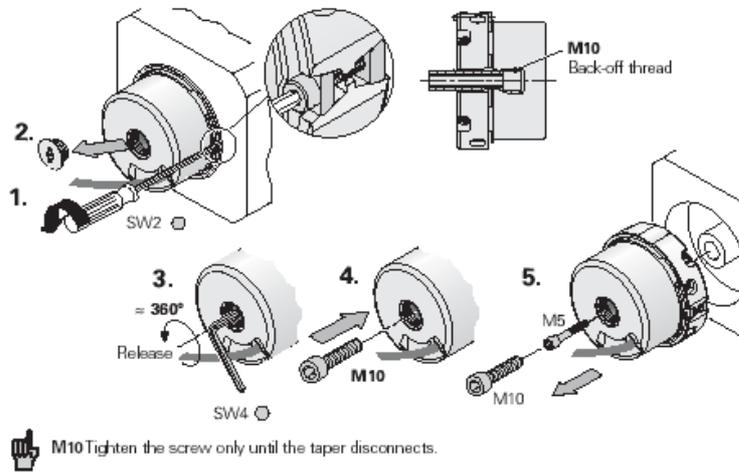
The encoder cable is fixed to the encoder. On encoders of the ERN4xx series the cable cannot be detached from the encoder.

Loosen the screw that holds the encoder retaining ring and remove the screw that functions as a protection cap (steps 1 and 2 in the figure below).

Carry out steps 3, 4 and 5 as shown in the figure below.



Note



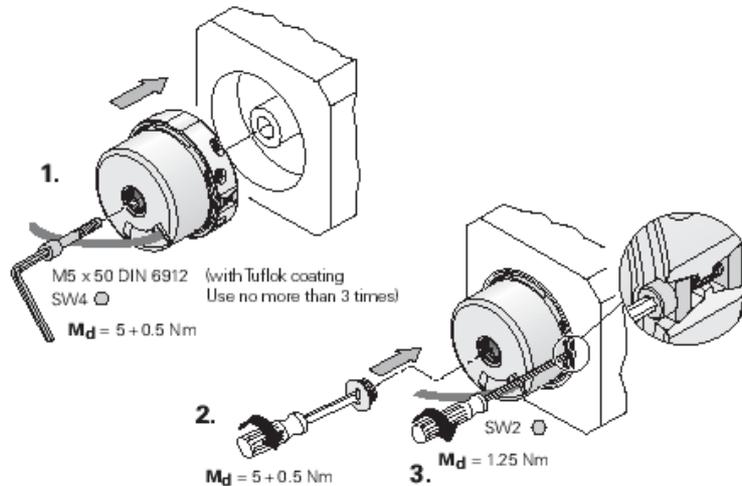
Before installing the replacement encoder make sure it is entirely interchangeable with the previous one.

To correctly install the encoder perform steps 1 to 3 shown in the figure below.

To ensure the encoder's proper installation and operation, it is essential to apply the tightening torques shown in the figure below (use a torque wrench).



Note



Once the encoder is installed, put back the plastic protective cover.



Warning

When installing a new encoder, the offset value needs to be adjusted with a specific procedure that depends on the type of inverter.

5. TESTING THE BRAKE SYSTEM (in accordance with standard EN 81-1)

When testing the brake the car should be placed at approximately half the height of the lift well.

Before testing the brake, remove any device that can short-circuit the traction machine, so to test the brake's effect only.

5.1 OVERLOAD TEST

STANDARD 81-1 "This brake on its own shall be capable of stopping the machine when the car is travelling downward at rated speed and with the rated load plus 25%. In these conditions the retardation of the car shall not exceed that resulting from operation of the safety gear or stopping on the buffer."

Test the brake in the following conditions:

- 1) Load in the car equal to 125% the rated load.
- 2) Downward travel.
- 3) Travelling at rated speed.

In these conditions, interrupting the power supply to the traction machine should cause the brake to drop and slow down the car with a retardation not exceeding that resulting from operation of the safety gear or stopping on the buffer.

5.2 COMPONENT FAILURE TEST

STANDARD 81-1 "All the mechanical components of the brake which take part in the application of the braking action on the drum or disk shall be installed in two sets. If one of the components is not working, a sufficient braking effort to slow down the car, travelling downwards at rated speed and with rated load shall continue to be exercised."

Test the brake in the following conditions:

- 4) Load in the car equal to rated load.
- 5) Downward travel.

6) Travelling at rated speed.

In these conditions, by dropping only one mobile keeper a braking effect should continue to be exercised on the sheave sufficient to slow down a car travelling downward and carrying the rated load.

This test is usually performed by mechanically blocking one mobile keeper and verifying that the other one is capable on its own of holding the car loaded with the rated load still at the floor.

This test may be performed only by qualified specialist personnel and in strict accordance with EC directives and national regulations and with particular reference to standard EN 81-1 and any other relevant regulation.

6. MAINTENANCE

The rules concerning inspections and maintenance, in accordance with EC directives and national regulations, with particular reference to standard EN 81-1, and other relevant regulations, must be strictly followed.



Warning

The operator is responsible for the proper installation of the traction machine and for the full application of the rules concerning safety, inspections and maintenance.

In particular, inspections and maintenance must be carried out only by qualified, specialist personnel trained on working with this kind of traction machine, especially considering its intended use.

Any replacement on the traction machine must be done following the instructions and making sure that any nuts and bolts are replaced with parts belonging to the same strength class.

6.1 MAINTENANCE PROGRAM

Description and frequency of operations to perform in order to maintain the traction machine at full efficiency:

OPERATION	INTERVAL
Check the brake air gap	Every 6 months
Check the functioning of the brake and of the brake monitoring switches	Every 6 months
Check the bearing noise	Every 6 months
Check the conditions of the grooves on the sheave	Every 6 months
Check the strength class and conditions of the screws and bolts on the sheave and the base	Every 6 months
Check the conditions of the electric cables and wires	Every 6 months
Check the rope slip-off guard	Every 6 months
Check the general safety devices installed	Every 6 months
Clean the outer surface of the machine and the brake	As necessary

6.2 SAFETY PRECAUTIONS DURING MAINTENANCE

The following are the main precautions to take when carrying out maintenance on the machine:

- Disconnect the power supply before removing any protective panel or replacing any component.
- Do not wear rings, watches, chains, bracelets, etc., when performing maintenance.
- Always wear personal protective equipment (gloves and shoes).
- Do not use open flames, pins or sharp objects for cleaning.
- Do not smoke.
- Some parts of the machine can become very hot during operation (70/80°C). Therefore, it is MANDATORY to ensure that nobody can accidentally touch these parts for maintenance or repairs before a period of time sufficient for the parts to cool down to temperatures suitable for direct contact.
- IT IS EXTREMELY DANGEROUS TO PUT YOUR HANDS near the traction sheave or the car lifting ropes when unprotected.

6.3 TROUBLESHOOTING

FAULT/MALFUNCTION	POSSIBLE CAUSE	POSSIBLE REMEDY
Motor doesn't start, does not respond, develops no torque.	<p>Applied incorrect phase connection order (U, V, W) between motor and drive.</p> <p>Encoder not properly connected.</p> <p>Incorrect inverter parameterization (e.g., number of poles, etc.).</p> <p>Electromagnetic interferences with encoder cables.</p> <p>Incorrect encoder offset angle set on inverter.</p> <p>Faulty encoder.</p>	<p>Connect motor correctly.</p> <p>Connect encoder correctly.</p> <p>Check inverter parameterization.</p> <p>Check connection of cable shielding and earth terminal as required by inverter manual. Avoid running power cables next to encoder cable for long tracts.</p> <p>Check offset angle set on the inverter; if necessary, readjust offset value following the required procedure (this operation depends on the type of inverter installed, and should be carried out with no ropes on the sheave and the brake released).</p> <p>Replace encoder, readjust offset on machine and update offset value on machine.</p>
Motor noise.	<p>Faulty or worn bearings.</p> <p>Incorrect inverter parameterization.</p> <p>Faulty encoder.</p>	<p>Contact customer service.</p> <p>Check inverter parameterization.</p> <p>Replace encoder after checking conditions of connection cable.</p>
Brake does not release.	<p>Brake is not powered.</p> <p>Brake is mechanically blocked.</p> <p>Faulty overexcitation.</p> <p>Supply voltage too low.</p>	<p>Check electrical connection.</p> <p>Contact customer service.</p> <p>Replace brake power-supply module.</p> <p>Check brake supply voltage.</p>
Delay in brake release.	<p>Faulty overexcitation.</p>	<p>Replace brake power-supply module.</p>
Delay in engaging of the brake.	<p>Missing recirculation diode on brake power supply, or AC supply.</p>	<p>Restore power supply specifications as required by Commissioning Manual.</p>
Brake makes loud noise when switching	<p>Air gap too large.</p>	<p>Can be caused to abnormal wear of brake lining due to non-coordination between brake dropping time and torque release time. Check air gap, adjust brake operating times.</p>
Braking torque too low.	<p>Dirt, grease or oil on friction surfaces.</p> <p>Foreign bodies inside the brake.</p> <p>Load torque too high.</p> <p>Brake non completely de-energized.</p>	<p>Clean and dry friction surfaces.</p> <p>Remove foreign bodies.</p> <p>Restore system unbalance and torque to allowable values.</p> <p>Check zero voltage on brake terminals; check electrical connection.</p>

