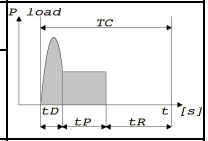
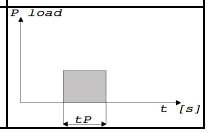
ISO 7010-W001	Before performing the maintenance actions on the motor and before installation and/or commission of a new motor into the oil tank, please consult our "**Operating Instructions**" (available on www.elmoitaly.com website) which enclose even the "**Important Safety Instructions**". Ignore the safety instructions could cause injury. The maintenance operations **may only be performed by qualified service personnel!** The relevant regulations, operating and safety instructions must be observed!

If the cause of damage is:		Check and perform this action:
Always when the motor is replaced (A5, A6)	ISO 7000-1415	**Check oil's features!** If it is necessary clean/change the oil and/or clean the filters and/or the bottom of the tank. In case of **burn-out** it is always necessary clean or change the oil and clean the filters, because generally the burn-out of a part-component of the motor, like the stator, the integrated thermal protection (A3), the leads (A7), produce solid particles which could even lead the replacing new-motor at burn-out again.
	IEC 60417-5575	If the oil/fluid is dirty/contamined or in case of metallic chips/foreign bodies into oil/fluid it is necessary to clean/change the oil/fluid and/or clean the filters and/or the bottom of the tank. About the contamination by solid particles (undissolved matter) the **new** oil/fluid should be at least in contamination class **ISO 17/14** or **NAS 8/9.** Instead, the **in-operation** oil/fluid (normal unfiltered) should be at least in contamination class **ISO 18/15** or **NAS 9/10** (see ISO 4406 and NAS 1638). Furthermore, the oil should be free from chemical agents which may be aggressive against copper, aluminum, steel and the insulation materials. We recommend to use the oil indicated in our "**Operating Instructions**" (see www.elmoitaly.com).
Anyway, A2 over-heating	ISO 7000-(1850+0011)	The motor must be always submerged below the minimum oil level (elevator cabin on highest floor). In case the minimum oil level is too low the motor can be overheated (A2).
A4	800 ppm ISO 7000-0536	Check the presence of water inside/around the oil tank and in case remove it. Detect the origin/source of the water, and If it is possible remove it. The maximum water (moisture) content into oil, expressed in **p**art **p**er **m**illion is **800 ppm**. If it is necessary change the oil/fluid.
Anyway	ISO 7000-0421	Check the data marked on nameplate fixed to motor! Consult the wiring diagram supplied with the motor.
A1, A2, A3	PTC or NCC ISO 7000-0182	The motors are equipped with integrated thermal protections: the temperature sensors (thermistors PTC or bimetal detectors break type NCC) which are located into the windings, they **must be connected!** The connection must be **made and correctly managed**: -for PTCs via thermistor's control unit (motor protection relay). The operating voltage at the PTC terminals should be **2.5 V_{DC}** (maximum 30 V_{DC}). -for NCCs directly via contactors, within the limits of **250 V_{ACmax} and 1.6 A_{max}**.
A1, A2, A3	ISO 7000-0160	The motor thermal protections must be properly connected and **their operativeness has to be fully checked before starting the motor**.
Anyway, A2 locked rotor	ISO 7000-0015	The motor shaft/axis must be accurately **aligned** with the pump one, when they are coupled each other. This is the reason why, from the ELMO side, a particular attention is paid to **squareness** between the flange and the axis of the motor. Check the alignment with the pump, and the corrected rotation of the pump.
Anyway	ISO 7000-0937	Check the direction of the rotation: the correct direction is **counterclockwise** direction watching the motor front flange. With the tank closed, pay particular attention to unusual sounds at the first starting of the motor. To change the direction, interchange two phases between the three phases.

A2 over-heating due to overload of the torque

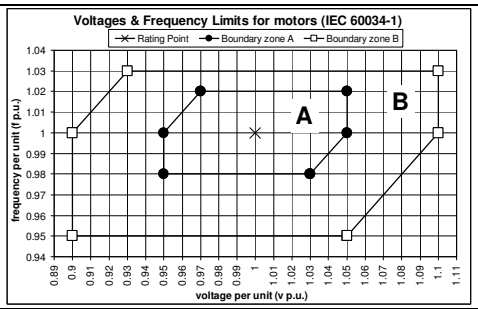
The motor have to operate only within the ranges defined on the nameplate! **The nominal output power** indicated on the nameplate is the one provided at the mechanical shaft of the motor when loaded with the **nominal torque T_N** (net of the hydraulic losses). The nominal parameters (current, RPM, etc.) are those tested when the motor works (**without flywheel!**) submerged into oil at **45 °C** with the nominal output power/voltage/frequency.
According to standard **IEC 60034-1** standard ELMO motors (thermal Class F) are designed to be submitted to an max 40 % intermittent periodic duty with starting (duty type S4), while CSA ELMO motors (thermal Class F) are designed to be submitted to a duty type S2. The oil temperature **must not exceed 70 °C!** If necessary chill the oil.

Duty Type Ref.	Starting time, t_D	Constant Load		start /hour	
		Load	t_P		
S4 standard	<1 s	T_N		60	
S4 max	<1 s	1.3*T_N	Max 45 s	60	
S2 max (CSA motors)		T_N	30 min		

For the motor supplied with **nominal** voltage/frequency, the **occasional overload torques** in table are guaranteed. The oil temperature **must not exceed 70 °C!** If necessary, chill the oil.

Occasional operation	Initial Temp. Oil	Overload	Test Time
Set-up over pressure valve	≤30 °C	1.45*T_N	Max 15 s
Breakdown torque test	≤45 °C	1.80*T_N	< 5 s

According to **IEC 60034-1**, about the voltage and frequency variations during the operation, the motor must be operate at its **rating point**. However the motor is capable of performing its rated torque continuously within **zone A** and **zone B**, but it could not comply fully its performance at rated voltage and frequency, and could exhibit some deviations. In particular, the overload torques are not more guaranteed. Temperature rises may be higher than rated voltage and frequency (both the deviations and the rises are higher in zone B than in zone A). Extended operation at the boundary of zone B is not recommended!



A1	Check electric panels and the eventual Y-Δ switching circuit or *soft starter*.
A7, A8	ELMO Submersible Motors are packed at the factory to comply with the relevant regulations. Transport the motors in the original packing or using the transport fixtures provided (attachments for lifting, see EN-81-20/50) in conjunction with suitable and approved lifting equipment (see EN-81-20/50). For transport/storage details see at Point 2 of the our "**Operating Instructions**" (www.elmoitaly.com).
A9, A8, A7	**Do not modify machine unless authorized by manufacturer.** For any other questions concerning the use of our products, please contact: info@elmoitaly.com.