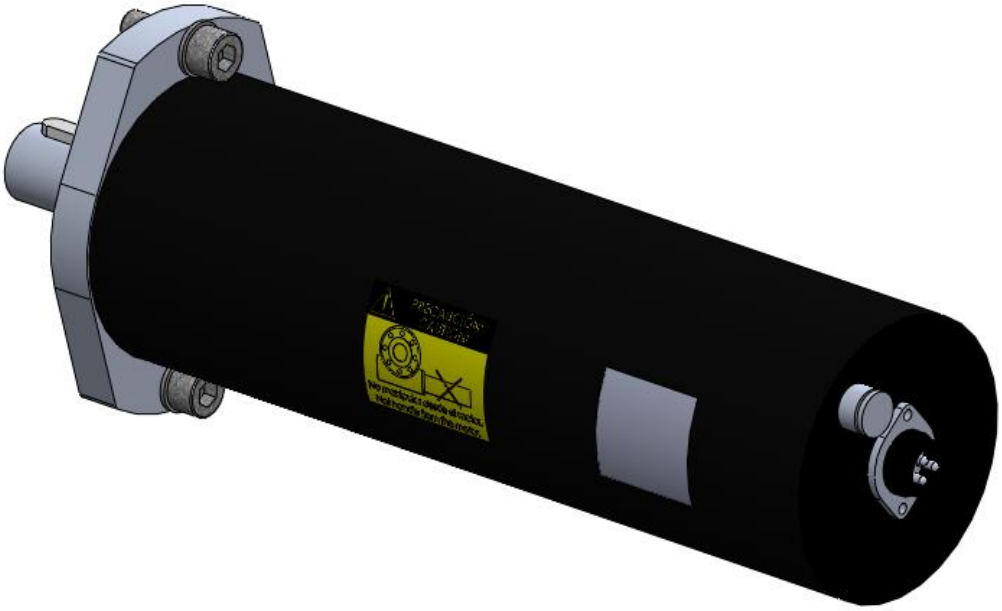
TGB
GROUP TECHNOLOGIES

Solar DC Motors

Installation Manual



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1. Security

This section provides an overview of relevant safety aspects to ensure the protection of personnel as well as safe and trouble-free operation. Non-compliance with the operating instructions and safety guidelines provided in this manual may result in significant risks.

- **Trained:**
  Ensure that the personnel involved have adequate knowledge of safety procedures, necessary tools and working protocols.

- **Personal Protective Equipment (PPE):**
  Before starting any assembly or maintenance activity, personnel must wear appropriate personal protective equipment. This includes safety glasses, resistant gloves, hard hat, and safety footwear. Proper use of PPE helps prevent injuries and protects personnel from potential hazards.

- **Energy blocking:**
  Before carrying out any work on the motor, make sure that all power sources are properly locked. This avoids the risk of accidental start-up during assembly or maintenance. Check that all switches are in the off position and fit locking devices to prevent unintentional activation.

  The slew drives provide self-locking when the efficiency of the gearbox is less than 50%.
  ⚠ **It is imperative to lock the load supported by the slew drive to ensure the immobilisation of the system.**
  TGB shall not be liable for any damage or injury resulting from non-compliance with the previous point.

- **Visual inspection:**
  Before carrying out any work, perform visual inspection of the motor to identify possible damage, wear, or loose parts. If any anomalies are detected, such as cracks, corrosion or worn components, corrective action must be taken before proceeding with assembly or maintenance.

- **Appropriate tools:**
  Ensure that tools are in good condition and are used in accordance with the manufacturer's instructions. Use of unsuitable tools may damage the equipment or cause injury.

- **Safe loading and unloading:**
  During assembly and disassembly of motor, use appropriate equipment and follow safe loading and unloading practices. Ensure that equipment is properly balanced and secured to prevent accidental falling or shifting that could cause injury or damage to the equipment.

- **Periodic maintenance:**
  Establish a regular maintenance schedule for the motors according to the manufacturer's recommendations. This includes, inspection of components, tightening of bolts and any other

necessary maintenance tasks. Fulfil with the maintenance schedule helps prevent failures and ensure safe and reliable operation.

- **Moving parts:**
  ⚠ Do not insert hands and/or other body parts into moving parts during operation. Rotating components and/or components with linear movements can cause serious injury.

2. Transport, handling, and storage provision

- Avoid possible knocks and impacts on any part of the motor. Such impacts could cause the sealing parts to become damaged.
- Wear work gloves and be careful when handling the motor.
- ⚠ If a motor is already installed, do not handle the assembly from the motor. This may cause small components that are not designed to support the full weight of the slew drive, become loose or damaged, damaging the sealing of the motor.

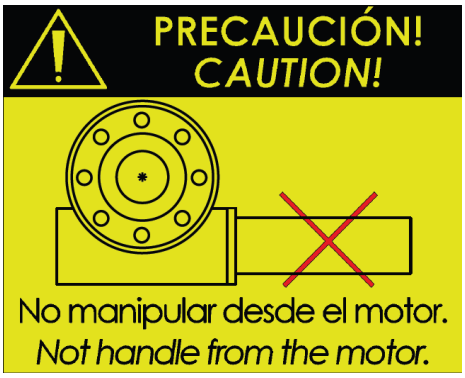

Fig. 1: Indications of do not manipulate from the motor.

- ⚠ Store in closed or covered spaces protected from rain and/or flooding.

3. Installation

3.1. Previous checks

- ⚠ Check the motor for physical damage.
- Check that the motor turns smoothly. In case the motor does not turn, please check whether there is impediment, or check connection power to be sure it is properly in supply.
- Check the plugs are properly closed.

4. Motor DC installation procedure

4.1. Slew drive with motor installed

- TGBgroup in some models the motor is pre-installed at 180º from the working position. The client must turn the motor 180º to get the work position.

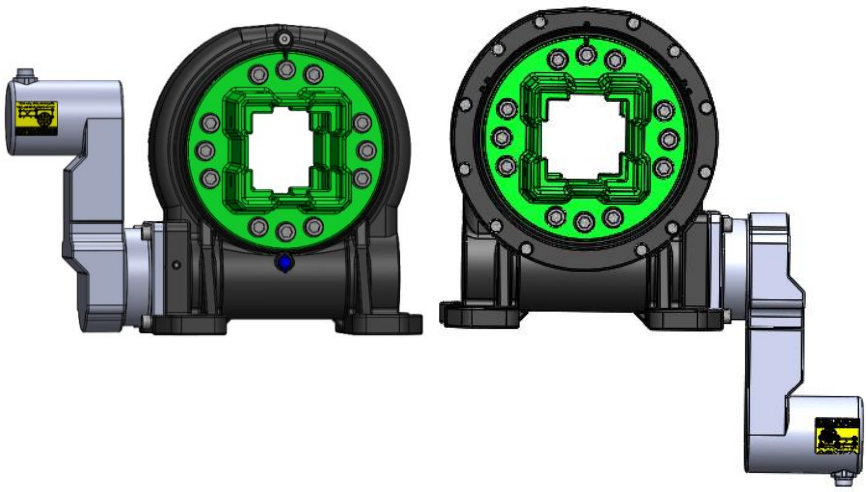

Fig. 2: Sales position (left); Work position (right)

- Before using,
    a. Check that motor is not damaged.
    b. Confirm that motor voltage is correct.
    c. Motor wiring has to be correct and according to the voltage and current.
- Before install, repair or dismantle the motor, power must be disconnected.
- When the motor is working, rated current cannot exceed continuous current value shown up in the nameplate.
- Use an allen key to completely unscrew both bolts. A higher torque is needed to unscrew the bolts because of the Loctite. If is not a preinstalled motor throw the bolts and the washers. If it is a preinstalled motor, the bolts and washers could be reused.

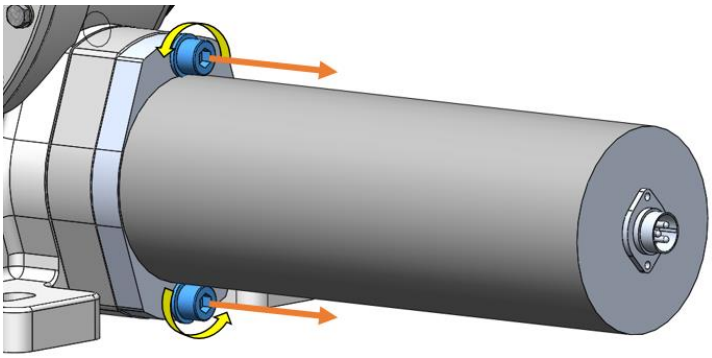

Fig. 3: Bolts and washers extraction.

- Manually extract the motor. Maybe the motor is difficult to extract by hand. You can help with the nylon hammer. Hit the lateral surface, trying to turn it and unstuck the motor (make sure that the slew drive is free to move and could turn, because if you turn the motor the screw worm also turns).

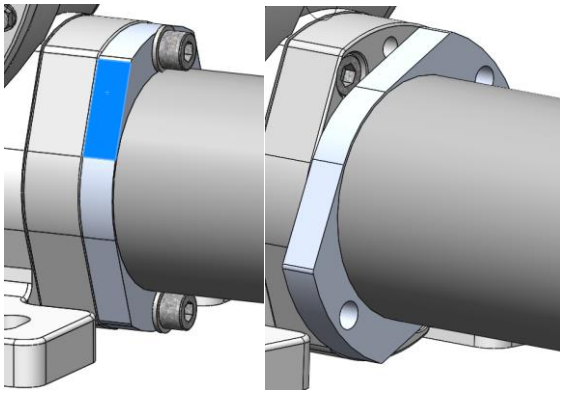

Fig. 4: Motor extraction.

- Clean the surface of the motor cap of possible remaining sealant (the centering and flat surface where the motor flange contact). Clean all the visible grease on this zone. (grease is added on the shaft to protect it from rust).

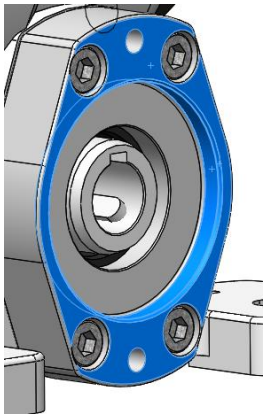

Fig. 5: Surface to be claned.

4.2. Slew drive without motor

- Get the DC Motor. Plug it and check it works properly.

Fig. 6: DC Motor.

- Put gasket sealant around the centering diameter of the motor.

Fig. 7: Gasket sealant on the motor centering.

- Put the paper gasket on the sealant. The holes, and the geometry must match (for example: oval & square flanges).

Fig. 8: Paper gasket fitting.

- Add gasket sealant on the paper gasket around the centering diameter of the motor.

Fig. 9: Gasket sealant on the paper gasket.

- Insert the adapter shaft to the slew drive and turn it with the socket wrench. The aim of this step is to make the shaft of the slew drive match with the shaft of the motor. Otherwise the motor could be connected to move the motor shaft.

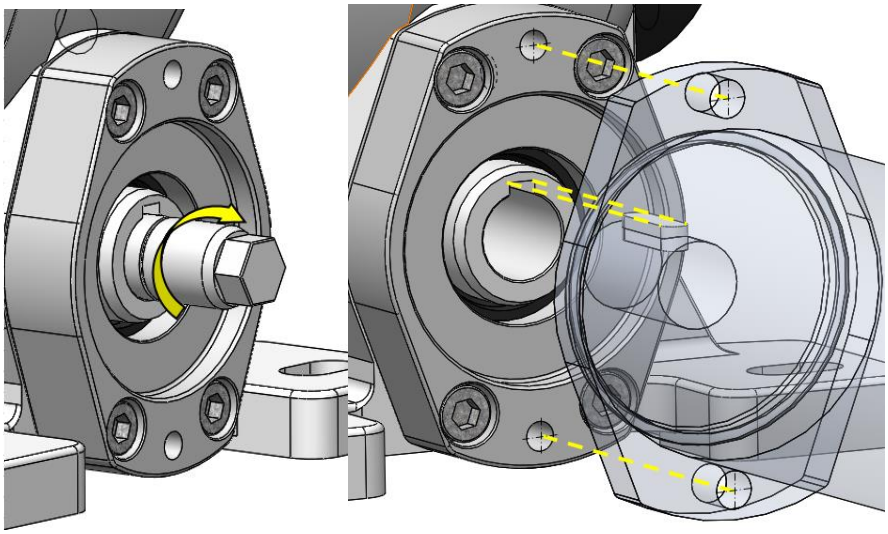

Fig. 10: Matching holes between motor flange and slew drive.

- Insert the motor to the slew drive by hand. The holes of the motor flange must match with the holes of the slew drive.

Fig. 11: Fitting DC motor.

- Prepare the allen bolts with the washer and apply "*Loctite 263*" threadlocker to at least 3 last fillets. Use all the bolts depending on the motor flange and connection.

Fig. 12: Allen bolts with the washer ready to be screwed.

- Screw the prepared allen bolts with the allen key to help the motor fit inside slew drive centering.

Fig. 13: Screw the bolts.

- Set the torque wrench to 40Nm (for M10 bolts A2-70 or A4-70). Use it in combination of the extender to tighten the bolts to the proper torque. (The special tool is required because there is not enough space for the torque wrench on the motor side).

Fig. 14: Bolts tighten to required torque.

- Drawing a torque warning line on the bolts (use a visible color and has to be different of yellow).

Fig. 15: Torque warning line.

- Keep the plug properly closed to prevent water ingress. Only open the plug when connecting the cable.

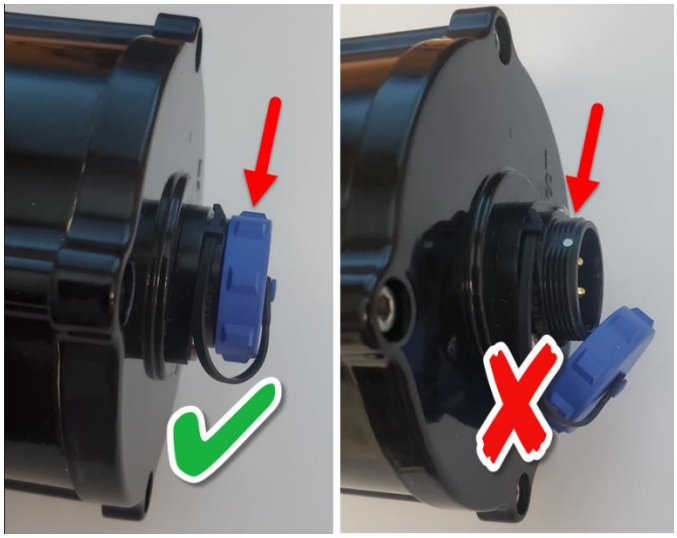

Fig. 16: Motor plug detail (closed & opened).

5. General information

- About electrical motor connection tips, check the "*TGB Slew Drives (Solar) - TVR (Vertical Series) - Installation & Maintenance Manual".*
- Ensure all parts and transmissions are fixed before starting the motor.
- These motors are designed specifically for solar tracking drives, being adaptable to environments from -40ºC to +80ºC.
- Protection grade IP65 (except on the flange face connection and if the Weipu connector opened).
- Motors are short-time working systems.
- It's necessary to regularly check wire's status. A damaged wire could be the cause of water leaking inside the motor. It will also be necessary to check air plugs due to the wire could damage the plugs when moving.
- If installation, maintenance, or operations are not done in a proper way, it's possible to cause the motor a serious damage. In that case, the user will be the only responsible of any possible damage.
- The required technical and electrical specifications for a correct motor behaviour are those that are marked in the motor drawing.