7. Power/torque transmission and shafts

Every EMRAX motor has a serially included standard shaft. In this case the power/torque must be transmitted by using flanged shaft on the front motor side. All shafts for EMRAX motors are hollow. Therefore EMRAX motors have trough-shaft mounting and stacking capability.

The motor power/torque transmission can be made from the front side and/or back side of the motor:

- If the power/torque transmission is from front side of the motor, then the Flanged Shaft with Inner splines (FSI) is needed. It can be ordered from the EMRAX Company or the customer provides it in case custom made splines are needed (inner, outer etc.). The shaft is mounted on the front motor side on six screws (M6/M8/M10 – depends on the motor size).
- If the power/torque transmission is from back side of the motor the customer needs the Extended motor Shaft with Outer splines (ESO). It can be ordered from the EMRAX Company. If the custom made shaft is needed, the customer can provide it. In this case the extended motor shaft from back motor side must be sent to the EMRAX Company before the motor assembly (this shaft has to be made precisely for EMRAX motors according to drawings, which are sent to customer by email). Before sending the shaft the customer must contact the EMRAX Company.

  !Note: If the extended shaft from back motor side is used the six screws (M6/M8/M10 – depending on the motor size) must be screwed down into the rotor on the front side of the motor, because they carry the torque from the rotor disks to the extended shaft. Screws must be screwed down in the rotor as it is described in Item 6.

  !Note: If the power/torque transmission is from the back motor side ESO should be mounted in the motor during motor assembly. Possibilities for mounting the sensors in case of ESO:

  - Resolver / encoder should be mounted on the front motor side by a special bracket, which can be ordered at EMRAX Company.

  - Resolver / encoder can be mounted on the tailored elongated shaft (adapter shaft), which is added to ESO. Resolver / encoder is mounted after drive wheel (for pulley, chain etc.) at the end of adapter shaft by tailor made bracket, which has to be provided by a customer.

  - A special resolver / encoder with bigger internal diameter of the rotor can be mounted on the ESO. This special sensor* has to be provided by a customer.

  - Instead of resolver / encoder hall sensors can be used.

  * Resolvers / encoders with bigger inner diameter of the rotor are bigger and a lot more expensive. These bigger sensors also need more space for mounting.

- If the motor power/torque transmission is from the front and back motor side, then the motor needs a flanged shaft with 6 inner splines (FSI) from the front motor side and an extended motor shaft (ESO) from back motor side. These shafts can be ordered from the EMRAX Company. If custom made shafts are needed, the customer can be provided with them – in this case the extended motor shaft from back motor side must be send to the EMRAX Company before the motor assembly (this shaft has to be made precisely for our motors according to drawings that are sent to the customer). Before sending the shaft the customer must contact the EMRAX Company.

  !Note: If the power/torque transmission is from front and back motor side ESO should be mounted during motor assembly and FSI should be mounted afterwards on the front motor side.
  Possibilities for mounting the sensors in case of ESO and FSI:

  - Hall sensors should be used.

  - Resolver / encoder is mounted at the end of tailored elongated shaft (adapter shaft) after the drive wheel (for pulley, chain etc.) on the back or front motor side (on the FSO or ESO) by using a tailor made bracket. This adapter shaft and bracket have to be provided by a customer.

  - A special resolver / encoder with bigger internal diameter of the rotor can be mounted on the ESO. This special sensor* has to be provided by a customer.

* Resolvers / encoders with bigger inner diameter of the rotor are bigger and a lot more expensive. These bigger sensors also need more space for mounting.

Figure 1: EMRAX transmission shafts

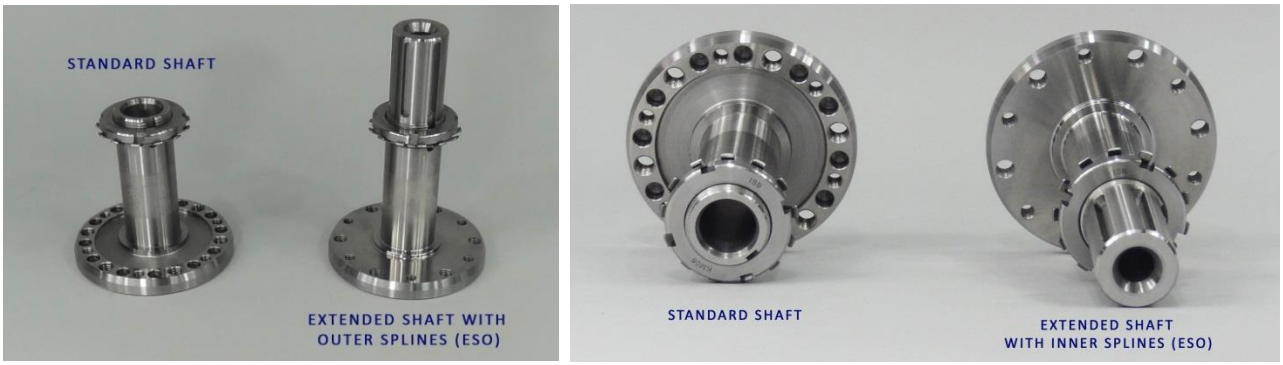
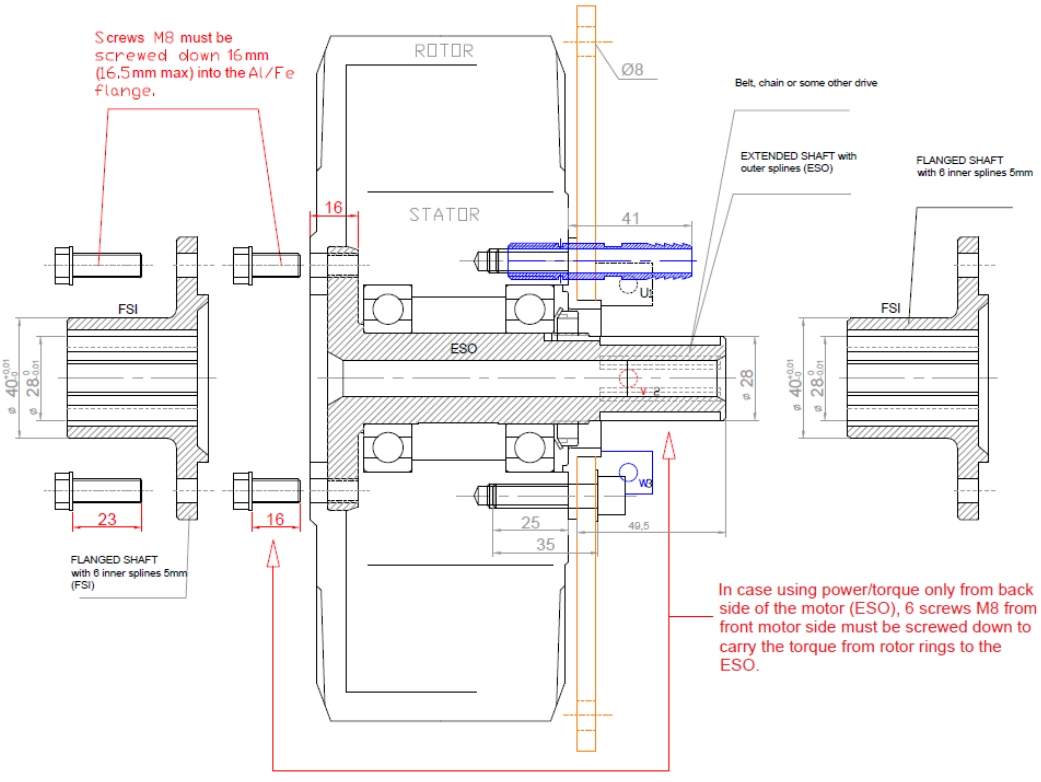


Figure 2: Standard motor shaft vs. extended shaft with outer splines (ESO)

Figure 3: ESO and FSI

Figure 4: Standard motor shaft vs. EMRAX 268 VHML shaft

Figure 5: FSI



EMRAX with Extended Shaft with Inner splines (ESO) and/or with Flanged Shaft with Inner splines (FSI)

Figure 6: EMRAX with ESO and FSI

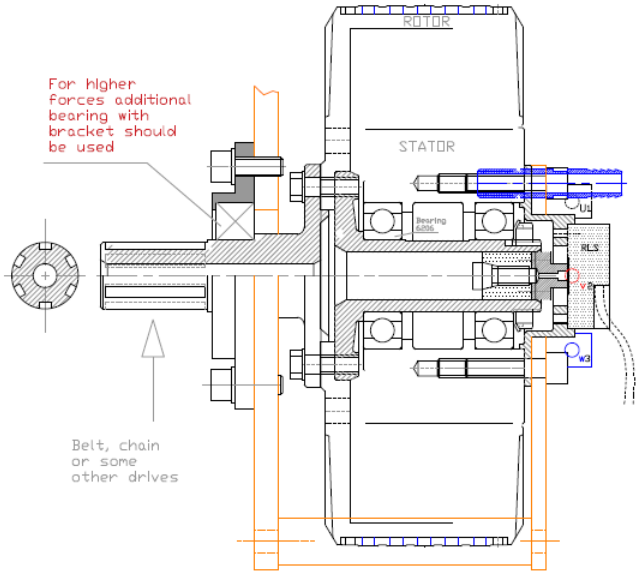


Figure 7: Power/torque transmission from front motor side

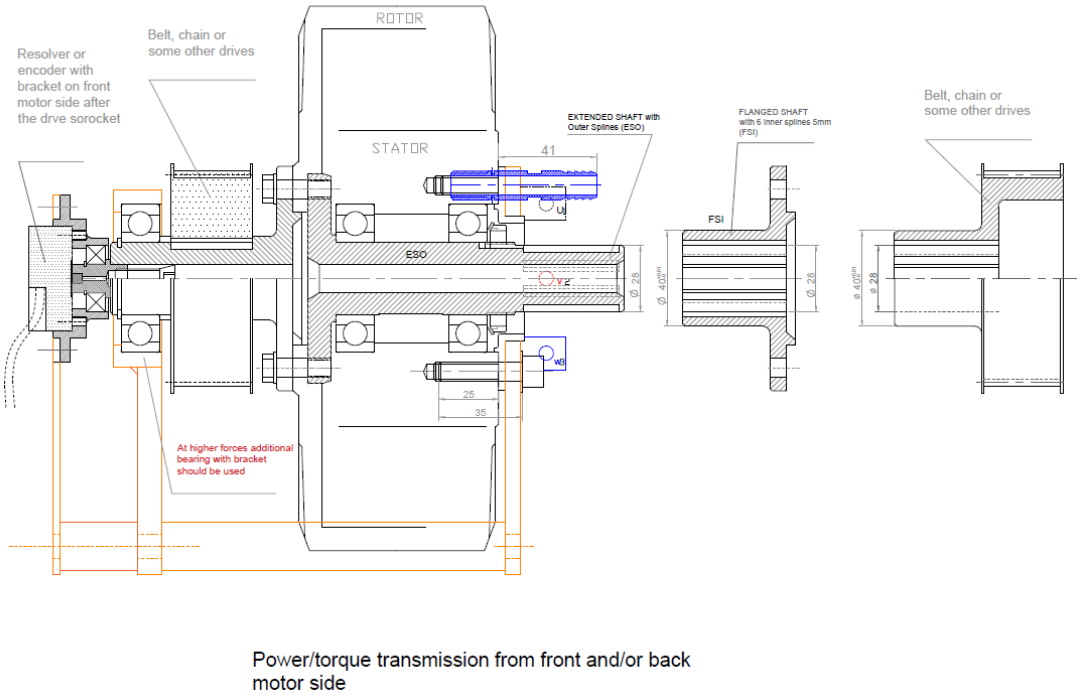


Figure 8: Power/torque transmission from front (FSI) and/or back motor side (ESO)

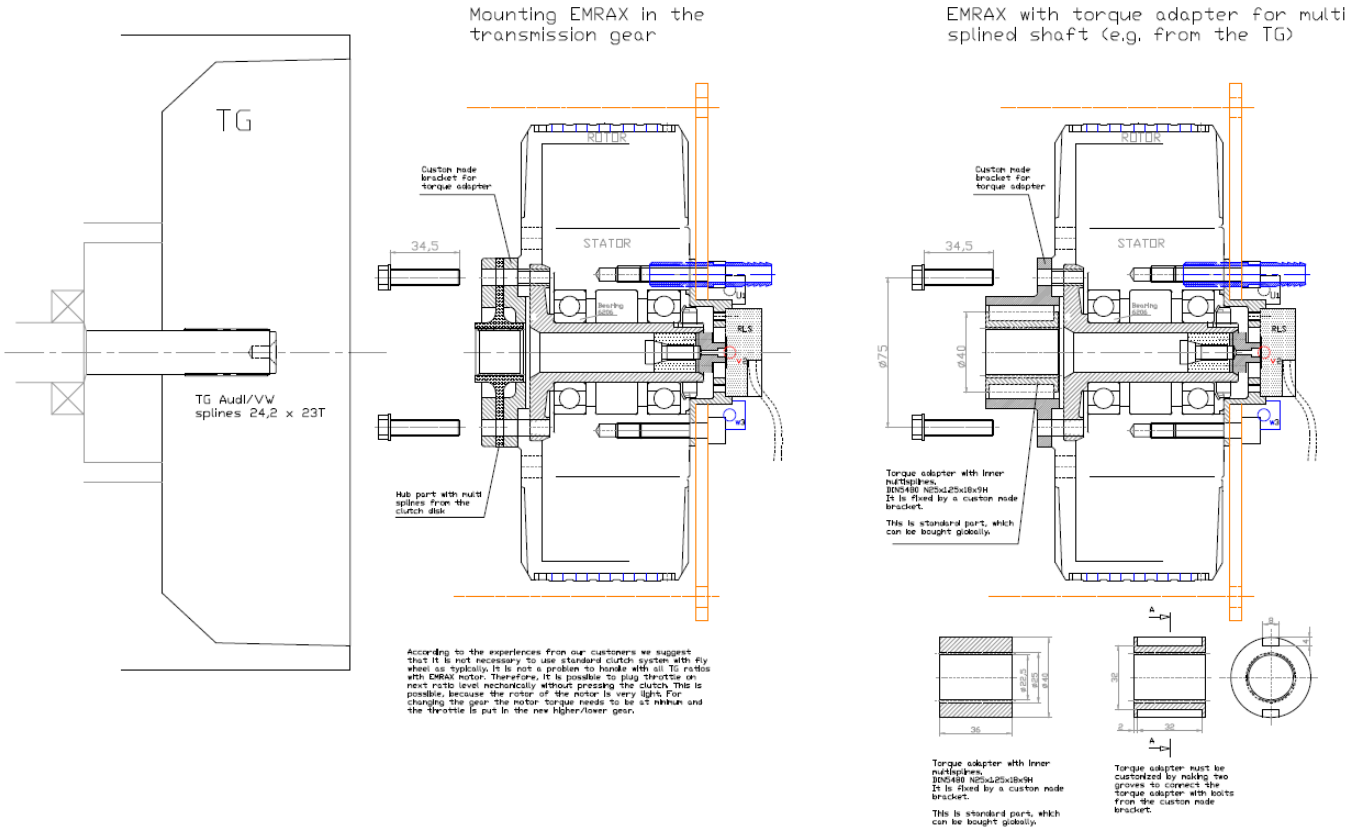


Figure 9: Power/torque transmission from front motor side to the transmission gear

The extended motor shaft and the standard motor shaft cannot be replaced once the motor is assembled.

Our shafts are made from hardened steel (42CrMo4).

If custom made shafts are needed, customer can provide a shaft, which must be made precisely according to EMRAX drawings. The customer can provide a motor shaft or an extended motor shaft. The shaft dimensions must be discussed with the EMRAX Company before sending the shaft and mounting it in the motor during assembly. The customer can also make a special flanged shaft for the motor (e.g. with special splines). Another option is to use standard torque adapter (globally available) and mount it in on the front side of the motor by using special brackets.

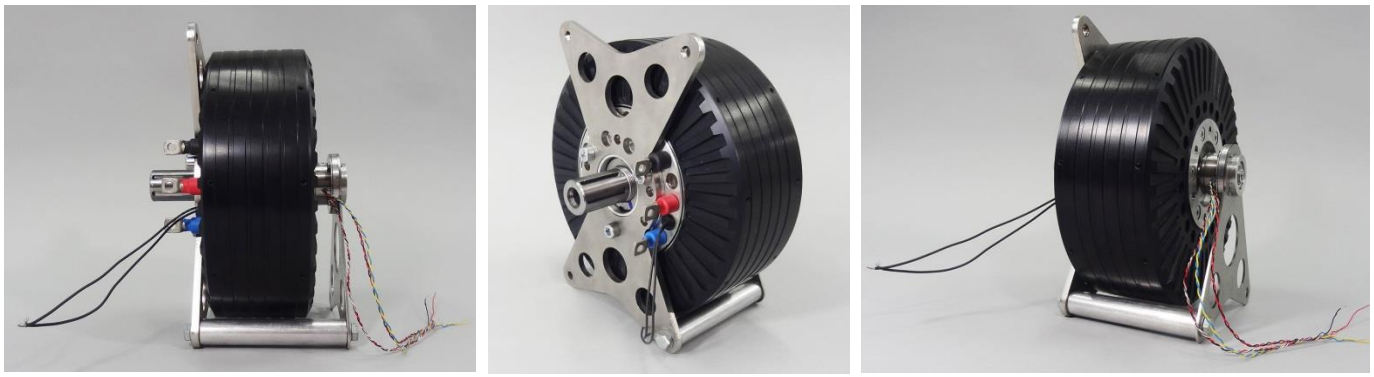


Figure 10: Motor with extended shaft from back motor side