# 4 Project Planning for Drives

## 4.1 Additional documentation

In addition to the information in this manual, SEW-EURODRIVE offers extensive documentation covering the entire topic of electrical drive engineering. These are mainly the publications in the "Drive Engineering – Practical Implementation" series as well as the manuals and catalogs for electronically controlled drives. You will find additional links to a wide selection of our documentation in many languages for download on the SEW-EURODRIVE homepage (http://www.sew-eurodrive.com). The list below includes other documents that are of interest in terms of project planning. You can order these publications from SEW-EURODRIVE.



***Drive Engineering – Practical Implementation***

- Project Planning for Drives
- Controlled AC Drives
- EMC in Drive Engineering
- Explosion-Proof Drives to EU Directive 94/9/EC
- SEW Disk Brakes

***Electronics documentation***

- "Decentralized Installation" system folder (MOVIMOT®, MOVI-SWITCH®, communication and supply interfaces)
- "MOVITRAC® B" system manual
- "MOVIDRIVE® MDX60/61B" system manual

## 4.2 Drive selection data

In order to be able to precisely define the components for your drive, certain data is required. These are:

| Drive selection data | | | Your entry |
|---|---|---|---|
| $n_{amin}$ | Minimum output speed | [1/min] | |
| $n_{amax}$ | Maximum output speed | [1/min] | |
| $P_a$ at $n_{amin}$ | Output power at minimum output speed | [kW] | |
| $P_a$ at $n_{amax}$ | Output power at maximum output speed | [kW] | |
| $M_a$ at $n_{amin}$ | Output torque at minimum output speed | [Nm] | |
| $M_a$ at $n_{amax}$ | Output torque at maximum output speed | [Nm] | |
| $F_R$ | Overhung loads acting on the output shaft. Force application in center of shaft end is assumed. If, specify the exact application point giving the application angle and direction of rotation of the shaft for recalculation. | [N] | |
| $F_A$ | Axial load (tension and compression) on the output shaft | [N] | |
| $J_{Last}$ | Mass moment of inertia to be driven | [$10^{-4}$ kgm$^2$] | |
| **R, F, K, S, W M1 - M6** | Required gear unit type and mounting position (→ Sec. Mounting positions, churning losses) | - | |
| **IP..** | Required degree of protection | - | |
| $\vartheta_{Umg}$ | Ambient temperature | [°C] | |
| **H** | Installation altitude | [m above sea level] | |
| **S.., ..% cdf** | Duty type and cyclic duration factor (cdf) or exact load cycle can be entered. | - | |
| **Z** | Starting frequency; alternatively, exact load cycle can be specified | [1/h] | |
| $f_{line}$ | Line frequency | [Hz] | |
| $U_{Mot}$, $U_{Bremse}$ | Operating voltage of motor and brake | [V] | |
| $M_B$ | Required braking torque | [Nm] | |
| **For inverter operation: Required control type and setting range** | | | |

***Determining the motor data***

First, in order to select the correct drive, you require the data (mass, speed, setting range, etc.) of the machine to be driven.

These data help determine the required power, torque and speed. Refer to the "Drive Engineering – Practical Implementation, Drive Planning" publication or the PRODRIVE® project planning software for assistance.

***Selecting the proper drive***

The appropriate drive can be determined with the calculated power and speed and with other mechanical requirements taken into account.

## 4.3 Project planning procedure

***Example***

The following flow diagram illustrates the project planning procedure for a positioning drive. The drive consists of a gearmotor that is powered by an inverter.

**Necessary information regarding the machine to be driven**
- Technical data and environmental conditions
- Positioning accuracy
- Speed setting range (rotational accuracy)
- Travel cycle calculation

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**Calculation of the relevant application data**
- static, dynamic, and regenerative power
- Speeds
- Torques
- Travel diagram

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**Gear unit selection**
- Definition of gear unit size, gear unit reduction ratio and gear unit type
- Check the positioning accuracy
- Check the gear unit utilization ($M_{o\ max} \geq M_{o\ (t)}$)

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**System selection depending on**
- Positioning accuracy
- Setting range
- Control

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**Inverter operation**
- Voltage-controlled inverter without and with speed control
- Voltage-controlled, vector-controlled inverter without and with speed control
- Current-controlled, vector-controlled inverter

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**Motor selection**
- Maximum torque
- For extremely low output speeds: Limit motor power according to $M_{a\ max}$ of the gear unit
- For dynamic drives: Effective torque at medium speed
- Maximum speed
- For dynamic drives: Torque curves
- Thermal load (setting range, cyclic duration factor)
- Selection of the correct encoder
- Motor equipment (brake, plug connector, TF temperature monitoring, etc.)

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**Brake selection**
- Determine the braking torque
- Determine the working capacity
- Determine the brake size
- Select the brake control

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**Select the inverter**
– Motor/inverter assignment
– Continuous power and peak power in voltage-controlled inverters
– Continuous current and peak current in current-controlled inverters

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**Select the braking resistor**
– Based on the calculated regenerative power and cdf

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**Options**
– EMC measures
– Operation/communication
– Additional functions

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**Make sure that all requirements have been met.**