# 3 Project Planning for Drives

## 3.1 Additional documentation

In addition to the information in this catalog, 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***

- Drive Planning
- Controlled AC Drives
- Servo Drives
- Electromagnetic Compatibility (EMC) in Drive Engineering
- Explosion-Proof Drives to EU Directive 94/9/EC

***Electronic documentation***

- "Decentralized Installation" system manual (MOVIMOT®, MOVI-SWITCH®, communication and supply interfaces)
- "MOVITRAC® 07" system manual
- "MOVIDRIVE® MDX60/61B" system manual

***Mechanical brakes***

- "Brakes and Accessories" manual

## 3.2 Drive selection data

Certain data are essential to specify the components for your drive precisely. These are:

| Data for drive dimensioning | | | 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 load on output shaft. Assumes force application in center of shaft end. If not, please specify the exact application point giving the application angle and direction of rotation of the shaft for a check calculation. | [N] | |
| $F_A$ | Axial load (tension and compression) on output shaft | [N] | |
| $J_{load}$ | 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 enclosure | - | |
| $\vartheta_{amb}$ | Ambient temperature | [°C] | |
| **H** | 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] | |
| $f_{mains}$ | Supply frequency | [Hz] | |
| $V_{mot}$, $V_{brake}$ | Operating voltage of motor and brake | [V] | |
| $M_B$ | Required braking torque | [Nm] | |
| **For inverter operation: Required control mode and setting range** | | | |

***Determining the motor data***

It is first necessary to have data on the machine to be driven (mass, speed, setting range, etc.) to design the drive correctly.

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 correct drive***

The appropriate drive can be selected once the power and speed of the drive have been calculated and with regard to other mechanical requirements.

## 3.3 Project planning process

***Example***

The following flowchart displays a schematic view of the procedure for planning a project incorporating a positioning drive. The drive consists of a gearmotor that is powered by an inverter.

**Necessary information about the machine to be driven**
- Technical data and environmental conditions
- Positioning accuracy
- Speed setting range (rotational accuracy)
- Calculation of the travel cycle

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

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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 for gear unit utilization ($M_{a\ max} \geq M_{a\ (t)}$)

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

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

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**Motor selection**
- Maximum torque
- In dynamic drives: effective torque at medium speed
- Maximum speed
- In dynamic drives: torque curves
- Thermal loading (setting range, cyclic duration factor)
- Selection of the correct encoder
- Motor equipment (brake, plug connector, TF temperature monitoring, etc.)

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**Inverter selection**
- 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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**Selecting 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.**