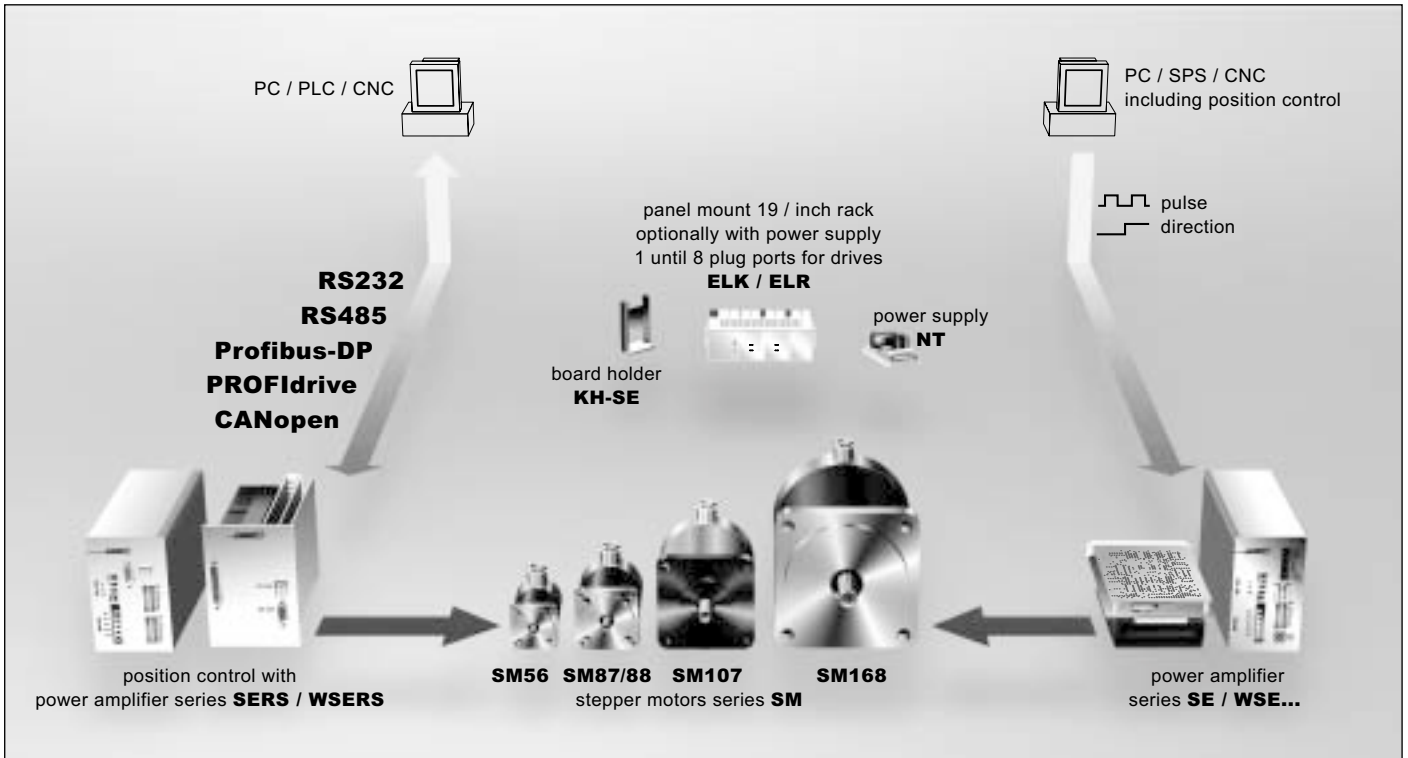


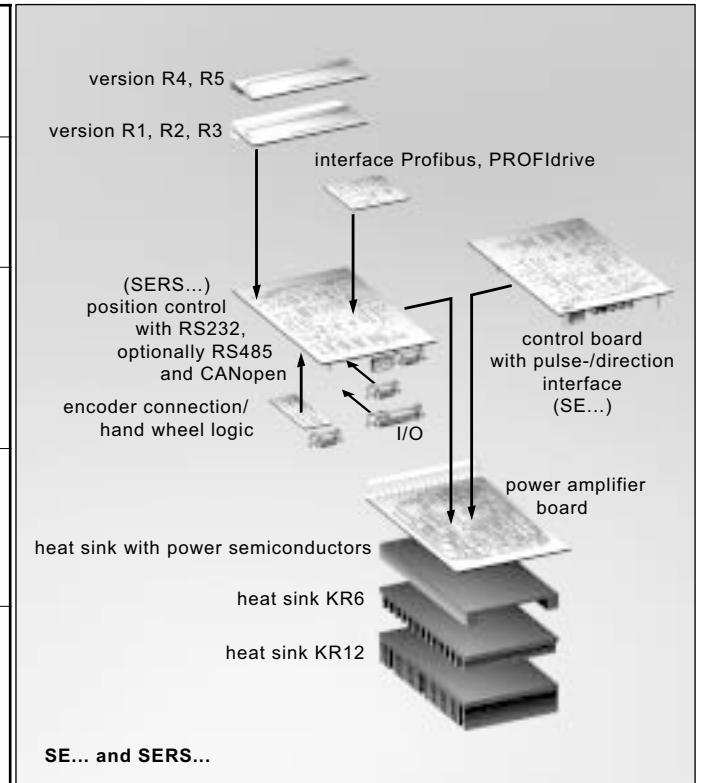
4 General product overview

STÖGRA Stepping motor controls are designed in a modular system, as **STÖGRA Stepping motors** (see catalogue STEPPING MOTORS)



Overview Controls

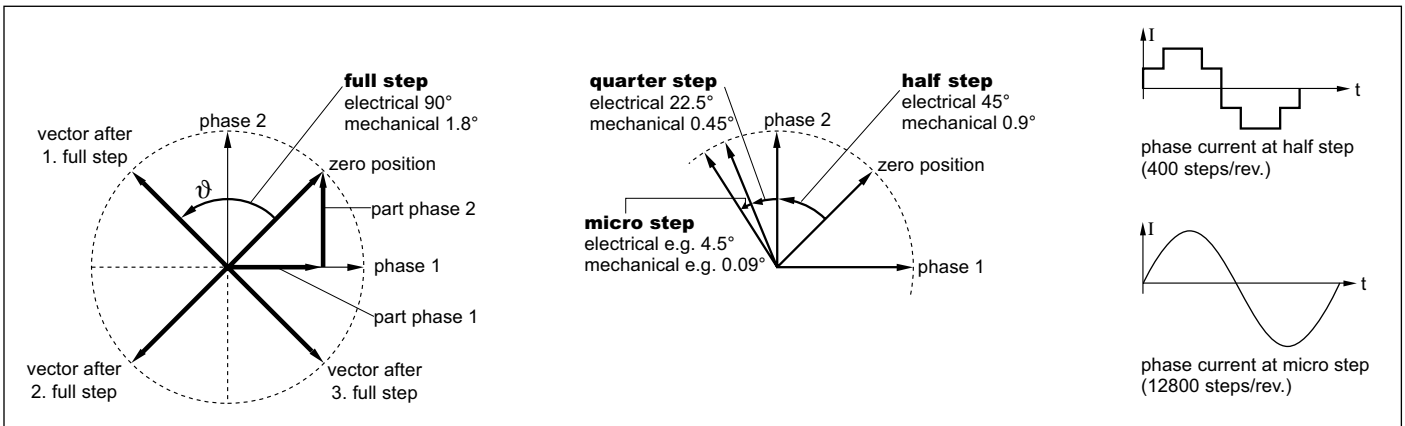
Power amplifier boards in eurocard format Series SE... V31/33 optionally with control of load angle Voltage supply Phase current Step resolution 24 – 240 VDC 0 – 14,5 A/phase 200 – 1000 steps/rev. catalogue pages 6 to 8, housings for SE boards at page 18 to 23		
Microstepping power amplifier boards Series SE P05...V2 Voltage supply Phase current Step resolution 24 – 240 VDC 0 – 14,5 A/phase 200 – 12800 steps/rev. catalogue page 9, housings for SE boards at page 18 to 23		
Power amplifiers in compact housing Series WSE ...230AC V01 and WSE ...80 V01 optionally with control of load angle Voltage supply Phase current Step resolution 20 – 80 VDC 0 – 4 and 8 A/ph. 200 – 12800 steps/rev. 115 VAC and 230 VAC 0 – 4 and 6 A/ph. catalogue pages 10 to 15		
Position controls including power amplifier Series SERS with interface RS232, RS485, Profibus-DP, PROFIdrive, CANopen Voltage supply Phase current Step resolution 24 – 240 VDC 0 – 14,5 A/phase 12800 steps/rev. catalogue pages 24 to 32, housings for SERS boards at page 18 to 23		
Position controls including power amplifier in compact housings Series WSERS...230AC V01 and WSERS ...80 V01 with interface RS232, RS485, Profibus-DP, PROFIdrive, CANopen Voltage supply Phase current Step resolution 20 – 80 VDC 0 – 4 and 8 A/ph. 12800 steps/rev. 115 VAC and 230 VAC 0 – 4 and 6 A/ph. catalogue pages 33 to 35		



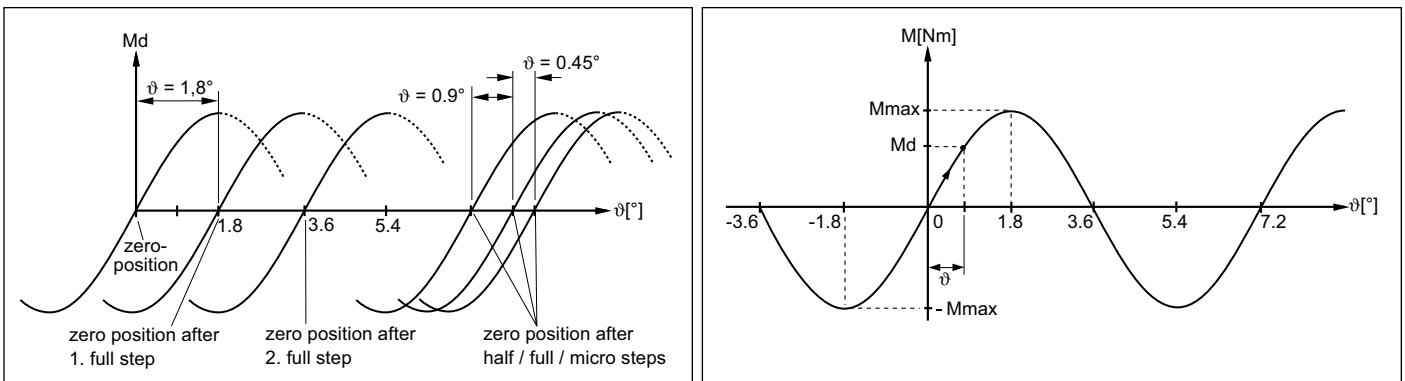
STÖGRA Stepping motor controls are designed as modular system. The power stage with the power-semiconductors is used for the power amplifier boards as well as for the position controls. The different field bus interfaces for the position controls are realized by internal plug boards. This enables a great type variety for the most different requirements and many different control systems. Also it gives the possibility to keep most parts (basic components) on stock and enables cost effective production due to the low quantity of different basic types.

For housings for power amplifier boards and position controls in eurocard format please see our series ELK/ELR (page 18 to 21).

General function principle – Step resolution and max. load angle (accuracy of positioning)



Switching onwards the stator field – shown in a field-vector-diagram



Switching onwards the stator field shown in a load angle-operating torque-diagram

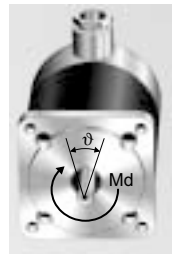
Load angle: Excursion ϑ of the rotor in reference to the zero position determined by the stator field, in case of a torque M_d at the motor shaft

A stepping motor having 50 teeth on the rotor surface (motor with 50 poles) produces every 7.2° (mechanically) a stabile position (zero position) at motor stand still – regardless the number of phases (2, 3 or 5 phases)! The zero position is determined by the stator field.

The stator field is moved from the power amplifier »step by step« and the rotor follows the stator field. In case of big steps (full step – 200 steps/rev., half step – 400 steps/rev.) and low speed the motor is running rough with strong vibrations. Smaller steps result in smoother running. At high step resolutions (e.g. 12800 steps/rev.) there will be a very smooth true running without vibrations.

At motor stand still, in case of a load (torque M_d), the motor shaft will be moved the angle ϑ out of its zero position. The maximum possible movement away from the zero position is -1.8° at $-M_{max}$ and $+1.8^\circ$ at M_{max} **independent of the step resolution and 2, 3 or 5 phases (!!!)** (in case of a rotor with 50 teeth).

In most applications there can be achieved between 0.1° and 0.9° accuracy of positioning (in case of sufficient high step resolution of the control), depending on the mechanics (friction, etc.) and the sizing of the motor in the application.



General specifications of STÖGRA Stepping motor amplifier boards:

- All boards can be configured easily via DIP-switches (e.g. selection of step angle, signals Low/High-Active or activating of phase current reduction at stand still)
- The integrated control of step angle in series SE ... E50 V.. together with a stepping motor with mounted encoder E50 enables to monitor a mechanical overload (synchronous running interrupted) at the stepping motor. Therefore the load angle of the stepping motor is controlled continuously (control pulses and encoder pulses are being compared).
- LEDs enable quick and easy diagnostics of error and status. During operation the status of the phases is displayed by four red LEDs. An electrical error – short circuit (motor phases), over temperature (amplifier) or undervoltage – is displayed by a yellow LED. At series SE ...E50 V3 a mechanical error (exceeding of the max. load angle e.g. in case of mechanical overload at the stepping motor) is displayed by an additional yellow LED.
- Error signals respective a ready signal can be used externally via a potential free output.
- STÖGRA** power amplifier boards are plug compatible to each other, also to former series SE 11 ...60 and SE ...120. Series SE ...E50 V3.. is compatible to the former series SE...E50 and SE...E50D. Series SE...V3.. is compatible to the former standard series SE... (e.g. SE 400.06.60), SE...B2, SE...V11/V13 and SE...V21/V23.