

precise position control

SYSTEM-90E



This module is designed for use in setting up position control loops in conjunction with servo motors. Encoders with a synchronous-serial interface are used for position detection.

The axis module features high control quality and extremely short response times.

Up to 10 axes can be driven simultaneously using modules combined in a SYSTEM-90E. This includes the possibility of mixing various types of axes and using a stepper motor indexer or a motion control module in place of a position controller: The programming techniques for all axes are identical.

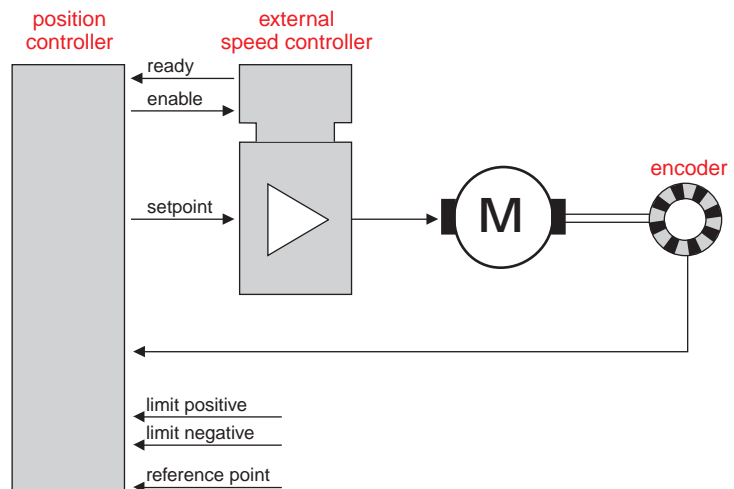
PCS-4

Position control module with absolute position detection

Position control module with absolute position detection:

- **PCS-4**
with SSI interface
16-bit precision D/A converter

This module uses SYSTEM-90E for carrying out an exact position control. Speed control is effected by an external speed controller using an analog velocity command.



➤ Absolute position detection



With absolute position detection, the encoder will supply a signal consisting of several bits and indicating the exact position of the axis with respect to its reference point. With this method it is not necessary to perform a zero point search after switching on the equipment.

The position is relayed by a synchronous-serial SSI interface. In doing so, the individual bits are relayed sequentially from the encoder to the position control module, thus minimizing expenses for wiring.

Since absolute encoders are very different in design, both the number of bits to be transmitted and evaluated as well as the transmission frequency can be set via system parameters.

The PCS-4 module is monitored with regard to the following types of interference:

- Plausibility
- Line break to encoder

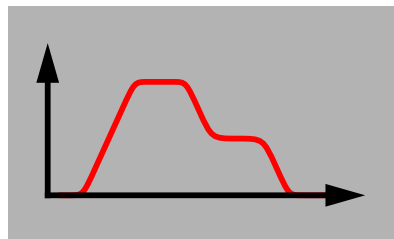
➤ Position control

Driving the axis is done by a digital regulator using an optionally switched on feed forward function.

The position controller works in conjunction with a fast set point computer which enables the power characteristic of the drive to be utilized optimally. This is done by entering the acceleration capacity as well as the jerk control and the permissible velocity and letting the computer calculate the set points.

The set point computer works to ensure that there are harmonic motion patterns and no overshoot when the target position has been reached. This reduces wear on the drive elements and prolongs their lifetime.

A special feature are the short response times. There is only minimal delay time between the initiation of a motion and the start of the axis.



➤ Position control loop monitoring

Since the position controller knows both the desired position and the actual position of the axis, specific monitoring of possible interference can be undertaken. This monitoring is activated, regardless of whether or not the axis is running or stationary.

Any recognized interference is recorded in the diagnosis logbook, so that even at a later time it is possible to tell what type of interference occurred. This is particularly important when finding or eliminating the cause of the interference.

Specifically, position controlled axes are monitored with regard to the following criteria:

- Dynamic deviation
- Blocking and oscillation of the axis
- Reaching of limit switch positions
- Reaching of software position limits
- Drive ready state
- Electrical monitoring of the encoder
- Plausibility of the actual positions

➤ Control signals

The control signals required for operating the axis are all contained in the axis modules, thus eliminating the need for additional components.

- Analog output for the velocity command
- Normally open contact for activating the drive
- Input for drive ready indication
- Inputs for position limit switches
- Inputs for reference point switches

Velocity command

PCS-4

Voltage range	±10 V
Output current	2 mA
Resolution	0,3 mV (16 bit)

Position measurement

Transmission method	Synchronous serial (SSI)
Electrical interface	RS 422
Speed	2×10^6 (measurement steps / sec.)
Transmission frequency	125kHz to 1MHz