

precise position control

SYSTEM-90E



These modules are designed for use in setting up position control loops in conjunction with rotational or linear servo drives. Encoders using square-wave incremental signals are used for position detection.

Both axis modules feature 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.

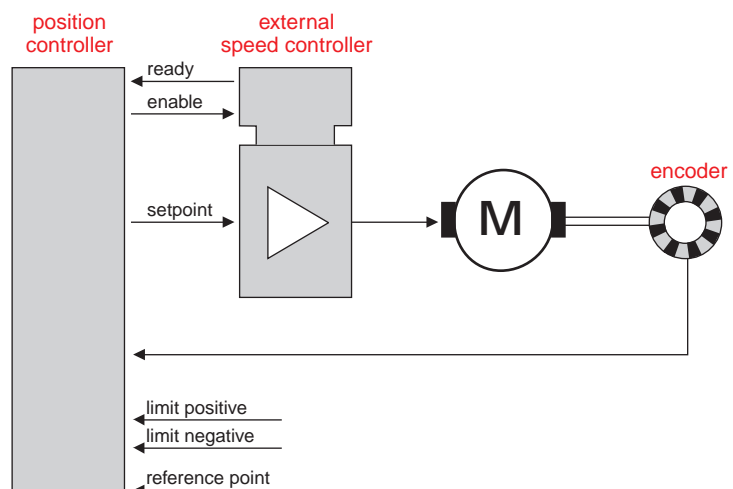
PCQ-3
PCQ-4

Position control modules with incremental position detection

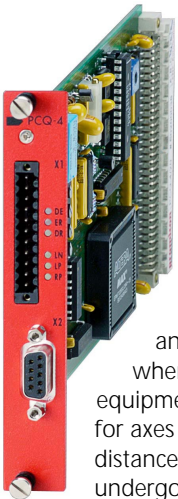
Position control modules with incremental position detection:

- **PCQ-3**
up to 250 kHz
standard 12-bit D/A converter
- **PCQ-4**
up to 2 MHz
16-bit precision D/A converter

Both modules use SYSTEM-90E for carrying out an exact position control. Speed control is effected by an external speed controller using an analog velocity command.



➤ Incremental position detection



While detecting distance incrementally, the encoder will supply a dual-channel signal enabling exact detection of the axis movement.

Since the axis does not yet have any reference point when switching on the equipment, it is necessary for axes with incremental distance detection to undergo a zero point search which enables the reference point to be detected with a high degree of precision.

To achieve a high level of reliability the encoder for module PCQ-4 is monitored to register the following disruptions:

- Monitoring of zero pulse spacing
- Signal headway between the two signal channels
- Line break to encoder
- Interference signal from encoder

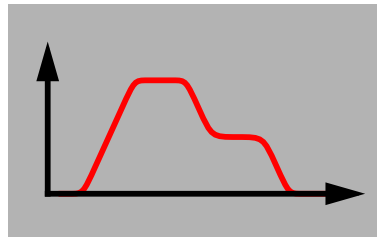
➤ Position control

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 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

➤ 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

	PCQ-3	PCQ-4
Voltage range	±10 V	±10 V
Output current	2 mA	2 mA
Resolution	4,9 mV	0,3 mV

Position measurement

Transmission method	2-channel, 90° phase-shifted, square-wave incremental signals	
Electrical interface	RS 422	RS 422
Speed	250 x 10 ³ (measurement steps / sec.)	2 x 10 ⁶ (measurement steps / sec.)