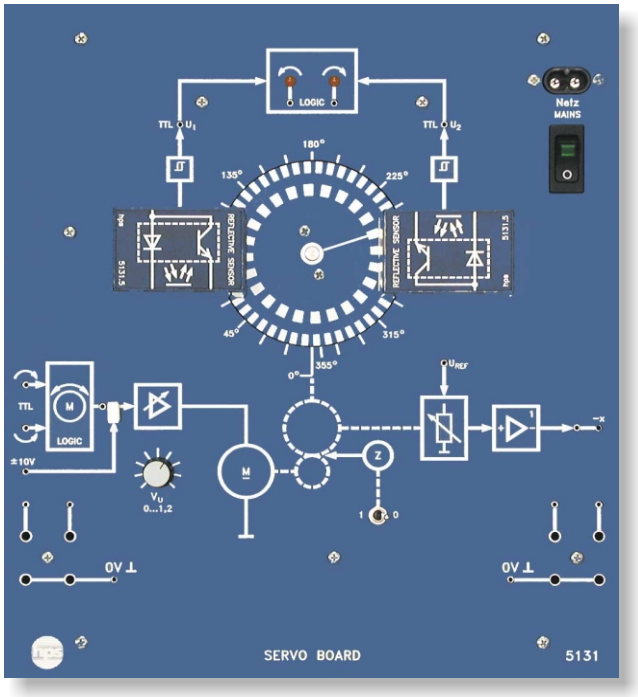
Control Engineering

SERVO BOARD

Type 5131



SERVO BOARD (Type 5131)

- **Universal positioning controlled system**
- **Analog angle acquisition**
- **With switchable disturbance variable (gear play)**
- **With reflective sensors for digital angle acquisition (incremental)**
- **Acquisition of digital speed and direction of rotation**
- **Digital control inputs for both directions of rotation**

With the SERVO BOARD, hps SystemTechnik offers a controlled system which can be used both in analog control engineering (PID BOARD) and in digital control engineering.

The SERVO BOARD contains a DC motor which is coupled to a potentiometer by a gear.

The potentiometer is used for analog position location. To protect the potentiometer, the wiper is decoupled through an amplifier. The actual value is inverted at the output.

The motor of the SERVO BOARD can be controlled digitally in both directions of rotation by TTL inputs and a series-circuited logic.

This makes digital control of the SERVO BOARD possible.

A pre-circuited amplifier is used to match the input signal of -10 V ... +10 V to the 12 V motor voltage.

The unit also has a digital encoder.
This consists among other things of an encoder disk which contains two encoder tracks with a different resolution for digital data acquisition and further processing of speed, angle of rotation and direction of rotation.

A reflective sensor is plugged in to measure the speed and angle of rotation (incremental). Its output signal is fed through a Schmitt trigger.

The reflective sensor can be plugged in two positions in order to examine different resolutions.

An additional reflective sensor can be plugged for digital data acquisition of the direction of rotation. Its output signal has a phase shift of 90°.

If the encoder disk turns to the right, the left-hand reflective sensor is always switched first in relation to the right-hand one because it is reached first by a marker (U_1 before U_2). If the encoder disk turns to the left, the opposite procedure is the case (U_2 before U_1).

A digital logical circuit evaluates the chronologically different signals and provides them to U_1 and U_2 as TTL signals. The states are indicated additionally by LEDs.

A disturbance variable can also be switched to the controlled system. This is the mechanical play of the drive (dead time) which is realised electronically in the SERVO BOARD.

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Reflective Sensor (Type 5131.5)

Plug-in module with built-in LED photo Darlington transistor.

- Dimensions without plugs: 37 x 56 x 35 mm (w x d x h)
- Weight: approx. 50 g

2 Connection Fields

(4 mm jacks)

For inserting the reflective sensors (Type 5131.5) via the encoder disk.
Two plugging positions each are possible for acquiring the different resolutions.

Adapter Fields

Are used for adapting 4 mm plugging in adapters to 2 mm connectors and for (BNC jacks → 4 mm plugs).

Mechanical Data

The front panel of the SERVO BOARD is made of 5 mm thick laminate, matt blue in colour with white printing representing the built-in function groups.

The rear of the Board is protected with a grey plastic cover. Its shape allows the Board to be placed at an ergonomically favourable angle for example on a table.

Accessories Included

- 2 Reflective Sensors (Type 5131.5)

Technical Data

Mains connection
- Voltage: 230 V AC / 115 V AC (110 V AC); 50 ... 60 Hz; 20 VA;

Motor
- Rated voltage: 12 V
- Current consumption: max. 0.4 A

Encoder disk
- Speed: 125 min^{-1}
- Resolution 1: 24 lines / rev.
- Resolution 2: 48 lines / rev.

DC amplifier
- Input voltage: 0 ... +/-10 V
- Amplification factor: v = 1.2
- Output current: max. 0.5 A

Motor control logic
- Input above: TTL level, log. 1 ≙ right-hand rotation
- Input below: TTL level, log. 1 ≙ left-hand rotation

Disturbance variable (switchable)
Mechanical play in the drive (realised electronically)

Actual value measurement (By potentiometer)
- Resistance: 5 k (+/-15 %)
- Mechanical range of rotation: 320° without stop
- Linearity tolerance: +/-1.5 %

Actual value output
Decoupled through amplifier and inverted for protection of motor Potentiometer
- Output voltage: 0 ... 10 V
- Output resistance: 200

2 outputs (U_1 / U_2)
Output voltage:
TTL, 90° offset, decoupled by TTL component. The output signals are incremental and only available when the reflective sensors are plugged in (Type 5131.5).

Decoding logic
Indicated by two LEDs for right- and left-hand rotation.
The logical 1 or 0 states can be tapped additionally at 2 mm jacks; TTL signal; decoupled by TTL component.
The signals are available when both reflective sensors are plugged (Type 5131.5).

Dimensions / weight
- 266 x 297 x 95 mm (w x d x h) / approx. 2.1 kg

Subject to technical modification.