Stepper module for Saia PCD®

This low priced module can be plugged into any E/A socket of a PCD1, PCD2 or PCD3. Its purpose is to activate the power stages to two stepper motor axis up to a frequency of 20 kHz.

With the module PCD2/3.H222, the control and monitoring of the movement sequence of a stepper motor with asymmetrical run-up and brake ramps in S or trapezoidal shapes can be carried out completely autonomously. Every module controls two independent axes and supplies a single-phase pulse sequence, which is conveyed to a suitable electronic control unit.

The operating profiles can be synchronously started overarching the module via the configurable TRIG terminal.

There are terminals for the limit and reference switches for both axes, which can be alternatively used as digital inputs.

Features

- 3 inputs (1 reference switch and 2 limit switches) per axis
- A common emergency input
- 3 outputs per axis (PULSE, DIR, MOTEN)
- Parameterisation for S-curve or trapezoid with asymmetrical run-up and brake ramps
- A configurable synchronising input/output per axis

Function-specific data

The following input parameters with the respective ranges and resolutions are available per axis:

- Target position 0…16 777 215 (24 bit)
- Driving direction forwards and backwards
- Start - Stop speed 10…10 000 Hz in 1 Hz steps
- Terminal velocity 20…20 000 Hz in 1 Hz steps
- Average run-up and brake acceleration 1…1000 kHz/s
- Asymmetrical run-up and brake ramps in S or trapezoidal shapes
- Jerk percentage of run-up and brake ramps 0…50% in 1% steps (6 bit)

Read-back parameters

- Target position reached
- Actual position
- Diagnostic and error values

Technical data

Stepper motor processor
- Positioning distance max. 16 777 215 (2^24 – 1) or endless
- Frequency range 10…20 000 Hz
- Acceleration 1…1000 kHz/s

Digital input
- Logic Source operation
- Signal level 24 VDC (Low = 0…5 V, High = 15…32 V)
- Input current 3…5 mA
- Input filter ≤ 2 ms

Digital outputs
- Logic Economy operation
- Signal level 15…32 VDC, corresponding to logic voltage of the power stage
- Directional signal DIR Forwards = 0 V, Backwards = 24 V
- Switching mode Short-circuit-proof
- Voltage drop < 0.5 V bei 20 mA

General data
- Number of modules Max. 63 on PCD2 and PCD3
- Feeding voltage For all outputs: 24 VDC (15…32 VDC)
- Power consumption ~85 mA internally from 5 V Bus
- Power consumption 50 VDC between PCD and the Input/Outputs
- Ambient temperature Operation: 0…+55 °C without forced ventilation, storage: –20…+85 °C

Typical application areas

- Automatic handling and assembly machines
- Pick-and-place functions
- Low-priced palleting and assembly drives
- Automatic angular control, e.g. of cameras,
- headlights, antennas, etc.
- Positioning of static axes (set-up)
- Conveyor belt
Wiring diagram

Terminals X-axis
0: EMSTOP (for both axes)
1: LS1_X
2: LS2_X
3: REF_X
4: TRIG_X
5: MOTEN_X
6: DIR_X
7: PUL_X
8: PGND (internally connected)
9: +24V (internally connected)

Terminals Y-axis
0: Not used
1: LS1_Y
2: LS2_Y
3: REF_Y
4: TRIG_Y
5: MOTEN_Y
6: DIR_Y
7: PUL_Y
8: PGND (internally connected)
9: +24V (internally connected)

Signal description

LED 0: Voltage in input REF X
LED 1 (red): Voltage in input LS1
LED 1 (green): Voltage in input LS2
LED 2 (red): Voltage in output MOTEN and output DIR
LED 2 (green): Voltage in output MOTEN and 0 V in output DIR
LED 3: Voltage in input REF Y
LED 4 (red): Voltage in input LS1
LED 4 (green): Voltage in input LS2
LED 5 (red): Voltage in output MOTEN and output DIR
LED 5 (green): Voltage in output MOTEN and 0 V in output DIR
LED 6: Voltage in input EMSTOP
LED 7: Visualisation of errors

Block diagram

Typical velocity profile

The velocity profile can be set from a trapezoid to an S-curve. S-curves reduce jerky motions and thus permit the use of higher accelerations without making the motor go wild.

Ordering Information

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCD2.H222</td>
<td>Pulse output module for 2 independent stepper motor axes</td>
<td>27 g</td>
</tr>
<tr>
<td>PCD3.H222</td>
<td>Pulse output module for 2 independent stepper motor axes (2 connectors type K included)</td>
<td>70 g</td>
</tr>
</tbody>
</table>

Accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 405 5048 0</td>
<td>Plug-in spring terminal block, 2 × 5-pole up to 1.0 mm² (orange block), labelled 0 to 9, connector type &quot;K&quot;</td>
<td>6 g</td>
</tr>
</tbody>
</table>