

# 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 over-arching 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

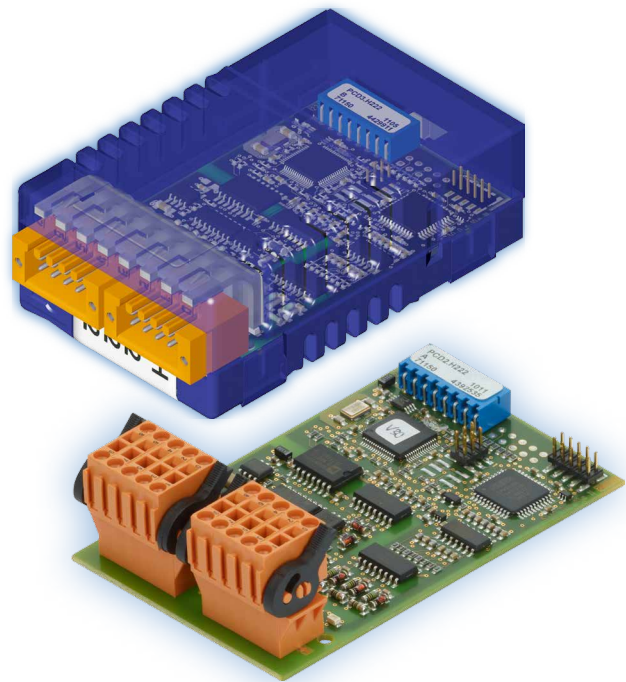
## Function-specific data

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 <sup>24</sup> -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

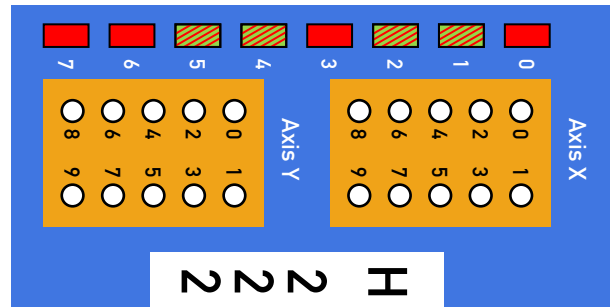
- 0: Not used
- 1: LS1\_Y
- 2: LS2\_Y
- 3: REF\_Y
- 4: TRIG\_Y
- 5: MOTEN\_Y
- 6: DIR\_Y
- 7: PUL\_Y
- 8: PGND (internally connected)
- 9: +24V (internally connected)

Axis X			
0	EMSTOP	LS1	1
2	LS2	REF	3
4	TRIG	MOTEN	5
6	DIR	PUL	7
8	0V	24V	9

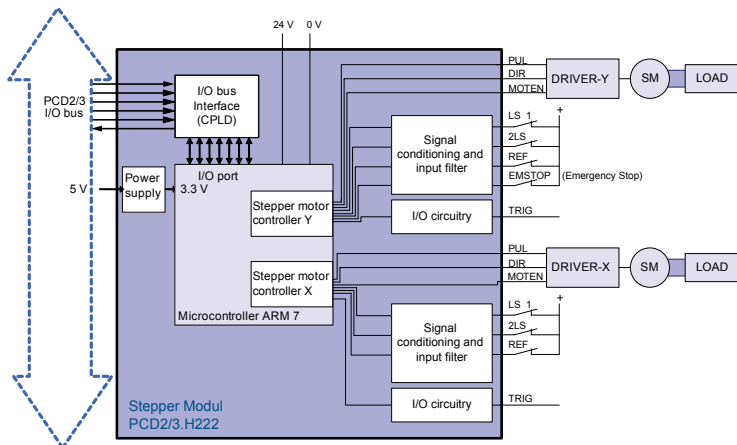
Axis Y			
0		LS1	1
2	LS2	REF	3
4	TRIG	MOTEN	5
6	DIR	PUL	7
8	0V	24V	9

## 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



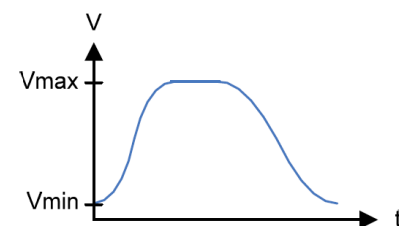
## Block diagram



## 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

Type	Description	Weight
PCD2.H222	Pulse output module for 2 independent stepper motor axes	27 g
PCD3.H222	Pulse output module for 2 independent stepper motor axes (2 connectors type K included)	70 g

## Accessories

Type	Description	Weight
4 405 5048 0	Plug-in spring terminal block, 2 x 5-pole up to 1.0 mm <sup>2</sup> (orange block), labelled 0 to 9, connector type "K"	6 g

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