

# SMD3 Stepper Motor Drive

Single-axis bipolar stepper motor controller

The SMD3 Stepper Motor Drive is a single-axis bipolar stepper motor driver that is engineered to drive vacuum-compatible stepper motors with maximum performance and minimal heat. It is optimised for use with AML UHV-compatible motors.

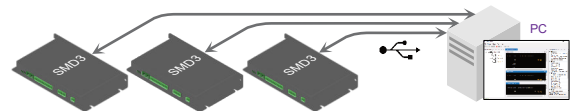
Powerful software is supplied with the SMD3 that enables you to control and configure multiple SMD3 devices simultaneously, in a single user-friendly graphical interface.



- Single-channel UHV stepper motor driver optimised for vacuum use, ideally suited for use with our range of UHV stepper motors
- Advanced low-power drive techniques for minimum motor temperature rise, minimum outgassing and maximum operating time
- Holding torque can be controlled independently of dynamic torque under program control, to reduce power
- Up to 256x micro-step resolution (stops on full-step positions only, micro-stepping used for control of resonance and smoother step transition)
- Continuous monitoring of motor temperature with automatic shutdown if motor temperature exceeds tolerable levels
- Current adjustable from 0 A to 1 A RMS in approx. 30 mA steps, with dynamic set-points for acceleration, running and hold currents
- 2 x configurable limit inputs with homing functionality
- Opto-coupled step, direction and enable interface
- Control via USB
- Comprehensive configuration and control software supplied, or interface to your own application. C# API is available

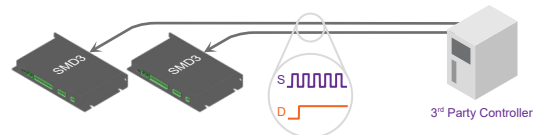
## OPERATING MODES

### USB Remote Control



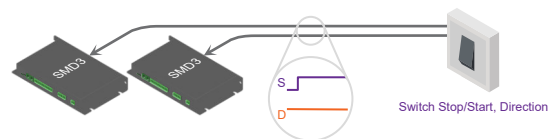
Accepts commands from host PC or PLC; powerful software supplied, control and configure multiple axes at once

### Step and direction



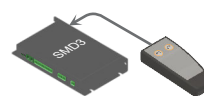
Opto-isolated step, direction enable; configurable rising or rising/falling edge; up to 256x interpolation

### Step and direction triggered



Start/stop using step signal, CW/CCW according to direction signal; configurable velocity profile

### Joystick



Ideal for basic movement during commissioning; press for one step, press and hold for slew; latching mode option

## SPECIFICATIONS

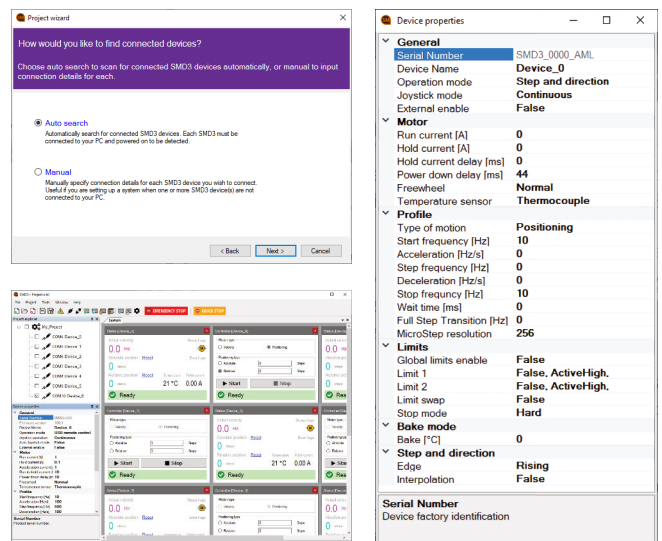
General	
Interface	USB Type-C (appears as virtual COM port on PC)
Dimensions	180 mm x 105 mm x 26 mm
Weight	0.6 kg
Protection class	IP 20
Temperatures	Operation 10°C to 60°C, Storage -10°C to 85°C
Power supply	External 15 Vdc to 67 Vdc power supply required
Power consumption	28 W maximum
Motor	
Suitable types	2 phase bipolar stepper motor with 4 leads
Phase current	Up to 1 A RMS, adjustable in 30 mA steps
Source voltage	As supply voltage, 67 Vdc maximum
Resolution	8, 16, 32, 64, 128, 256 micro-stepping
Protection	Short to ground and phase to phase
Operating modes	
<ul style="list-style-type: none"> <li>• Remote, via USB interface</li> <li>• SDE interface using an external motion controller</li> <li>• Trigger movement via SDE interface</li> <li>• Joystick</li> <li>• Bake</li> <li>• Homing (drive to limit switches)</li> </ul>	

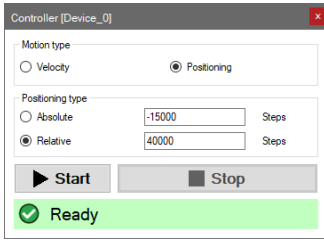
Limits	
Quantity	2
Compatible switch types	Mechanical NO or NC (polarity selectable)
Protection	Withstands continuous short to 12 V maximum
Miscellaneous	Source current < 1 mA
Motor temperature measurement	
Type	Selectable PT100 RTD or K-Type thermocouple
Range	-200°C to 240°C
Accuracy	±5%
Fault detection	RTD: Open and short-circuit Thermocouple: Open circuit only
SDE (step, direction enable) interface	
Type	Optocoupled, bi-directional LED
Levels	3.3 Vdc to 5 Vdc maximum
Maximum frequency	2 MHz at 50% duty
Joystick	
Connection	Front panel mounted 4P4C jack
Input type	Active low, short to ground to activate function
Miscellaneous	Open circuit voltage 3.3 V, source current < 3.5 mA
Software	
Compatibility	Windows 7 or later

## SOFTWARE & SCRIPTING

Included with the SMD3 is a powerful software package that allows you to easily configure and control multiple SMD3 devices simultaneously.

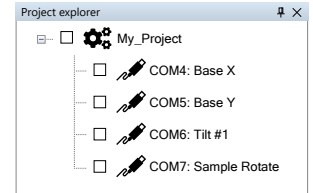
View or modify the configuration of attached SMD3 devices using the straightforward graphical user interface. Key figures including motor temperature, position and current are displayed on the device status window. Configure device options such as operation mode, motor currents and limits using the device properties window. Once configured, the SMD3 can be operated standalone, without needing to be connected to a PC.



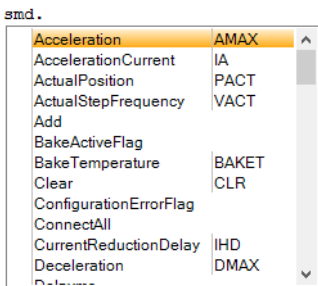


Movements can be commanded with the click of a button, using the device controller window; easily toggle between velocity and absolute or relative positioning modes. Sequences can be programmed and executed on multiple connected SMD3 devices using the user-friendly scripting editor.

Manage multiple SMD3 devices. Custom labels can be assigned to each device, for example, the different axes of a goniometer can be referenced (e.g. 'Base X', 'Base Y', 'Tilt #1', 'Sample Rotate'). Devices can be added and removed from a project easily. Connected devices are automatically recognised by the connection wizard.



The SMD3 software includes an easy to use script editor, that allows for sequences to be programmed and executed on multiple connected SMD3 devices, as well as system level operations such as adding and removing SMD3 devices from the project.



The scripting language used is JavaScript; this is powerful, easy to use and extensively documented. A global 'smd' object is made available from which you perform all interactions with the SMD3s. Type 'smd.' and an auto completion popup appears, showing all available commands, as well as help documentation for each. Press the enter key to select an option, then provide any arguments required.

Projects and scripts can be saved to file; quickly reconfigure the system by loading different projects. The default layout of the software is shown below. Panels can be dragged and repositioned. The position of windows and panels is saved within the project file.

**Toolbar**

Buttons for common management actions, such as load and save project, emergency motor stop. Open windows to display in the 'System work area', such as a 'Controller' window, which lets you command motor movements.

**Project explorer**

Add, remove, and select SMD3 devices.

Right click on system or device to access additional functions, for example open a status window for the device.

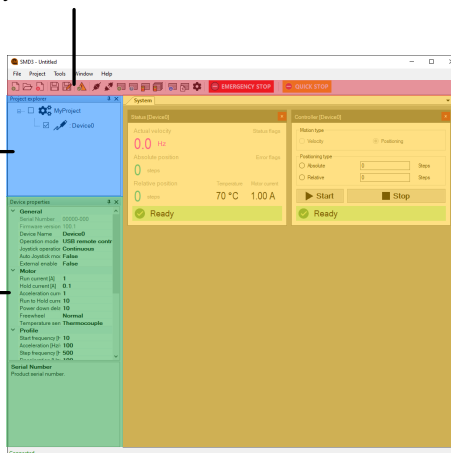
**Device properties**

View and edit configuration for device(s) selected in the 'Project explorer'.

**System work area**

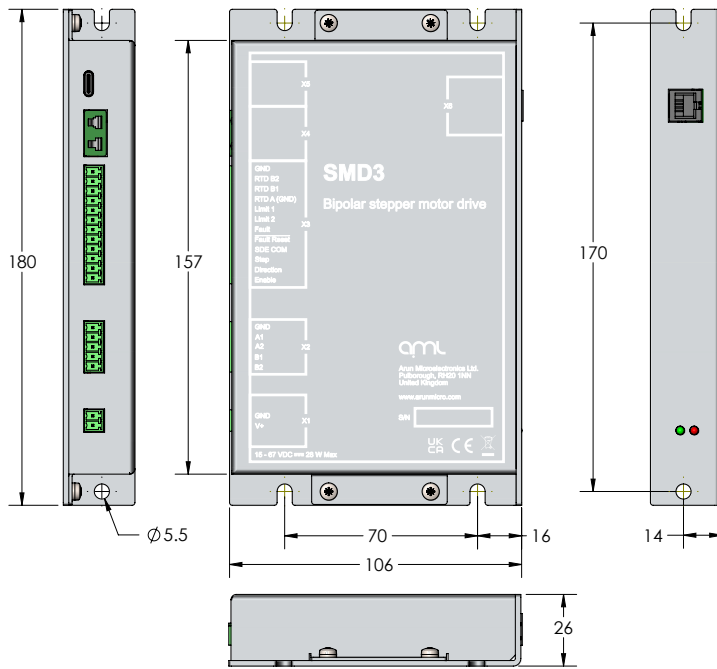
Status and controller windows for each device will appear here.

Use the right click context menu available on each device in the 'Project explorer', or use the buttons in the toolbar to open device status and controller windows.



The fully-featured version of our SMD3 software is free to download from our website.

## MECHANICAL DATA



### Notes

All dimensions are in millimetres.

## ACCESSORIES

AML supplies a range of ultra-high vacuum compatible stepper motors, specifically designed for maximum performance and minimum heat. A joystick and power supply is available to use in conjunction with the SMD3 Stepper Motor Drive.



UHV Stepper Motors



Joystick



Power Supply

## ORDERING INFORMATION

Order Code	
SMD3	Stepper Motor Drive

Related Products	
SMD3JOY	Joystick
SPSU48V	48 Vdc, 60 W Power Supply
MLF18F	Feedthrough. 18-way NW70CF
MLF18AC	Air-side bakeable connector, 18-way
MLF18SMD3	Lead, Feedthrough to SMD3



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AML pursues a policy of continuous improvement and reserves the right to make detail changes to specifications without consultation. E and OE.