1.4. Specifications

Motor requirements

- Motor type: bipolar stepper motor, DC motor.
- Rated winding current: minimum 100mA.
- Rated winding voltage: minimum 2V DC.

Electric specifications of the controller

- Power supply modes: external and USB.
- Current in each motor winding: up to 3A.
- Maximum encoder pulse frequency: 200 kHz.
- Stabilized 5V DC output (the power supply for encoder and other peripherals): 100mA maximum output current, 5% or better output voltage stability.
- ESD-protection on all pins of the output connectors (e.g., D-Sub 15 pin, mini-USB or power jack).
- Winding-to-ground short circuit protection.
- Winding-to-winding short circuit protection.
- Motor hot-swapping protection.
- Wrong power polarity protection (no more than 1s).
- Voltage overload protection (no more than 1s).
- USB-supplied current limitation.
- External power supply current limitation.
- Motor rotation speed limitation.
- Programmable full winding current with 10mA precision.
- Programmable winding current decrease with 1% precision for the hold mode.

Rotation control features

- Microstep modes: full-step, 1/2, 1/4, 1/8, 1/16, 1/32, 1/64, 1/128, 1/256.
- Noiseless at low speeds.
- Minimum speed is 1/256 of the full step per second.
- Maximum speed is up to 35 000 full steps per second for all microstep modes.
- Minimum shift is 1/256 of the step.
- Maximum shift is 2,147,483,647 full steps for all microstep modes.
- Smooth start/stop mode.
- 40-bit position counter (32 bits for full step and 8 bits for microstep).
- Motion modes: left/right move, move to point, shift on delta, continuous speed, acceleration and deceleration ramps, backlash compensation mode, automatic home position calibration mode.

Additional firmware features

- Automatic HOME calibration at firmware level.
- The nonvolatile memory used for saving/downloading the controller settings.
- Software update via USB interface.

- Automatic position saving according to step counter and encoder with power-off protection.

Additional features available via motor connector

- Processing the signals from one or two limit switches; software configurable.
- The Standa stages recognition and automatic downloading of the configuration file right from the stage if the last one supports this feature.
- The "step loss" detection and position recovery using either a revolution sensor or a quadrature encoder (if the stage supports this feature).
- The position detection using a quadrature encoder. The x4 mode.
- The stepper motor control using master quadrature encoder mode, providing the maximum speed without any step loss. Starting with firmware 4.1.

Additional features available via backplane connector

- USB connector on backplane that duplicates USB input on controller board.
- A serial RS-232 port. TX and RX lines are available. Specifications: 9600 - 921600 baud speed, TTL 3.3V. The Ethernet, Bluetooth, WiFi, ZigBee and other configurations based on the serial port are available by request.
- Synchronization input: once the pulse is received via this pin, the controller starts rotating the motor to predetermined position or by predetermined shift value. The triggering mode, the polarity and duration of the pulse are adjustable by user. Specifications: TTL 3.3V.
- Synchronization output: emit pulse to this pin if rotation is started or finished, or predetermined user-defined shift value is reached. The triggering mode, the polarity and duration of the pulse are adjustable by user. Specifications: TTL 3.3V.
- Left or right buttons. Once the button is pressed, the rotation in corresponding direction starts and the speed increases gradually according to acceleration and other settings. Specifications: TTL 3.3V.
- Joystick pin allowing operation with various joysticks with the voltage range no more than 0–3V.
- Magnetic brake control pin providing control to magnetic brake mounted on the motor shaft. Specifications: TTL 3.3V, 5mA.
- Common analog input pin allowing operation with signals within 0–3V range. Reading frequency is 1kHz. The configuration is programmable.
- Common digital input/output pin. 1kHz update frequency, software configurable. Specifications: TTL 3.3V, 5mA.
- Limit switches indication pins designed for LED direct connection. Specifications: TTL 3.3V, 2mA.
- Digital "Power" and "Status" pins duplicate the status LED and designed for direct connection of LEDs. Specifications: TTL 3.3V, 2mA.
- External driver control interface allowing to control any type of external driver using three signals: enable, direction, clock.
- Multiaxis systems development. The multiaxis systems are created from standard USB hubs, either external or mounted at a special backplane. On the PC a multiaxis system is represented as a set of virtual serial ports, according to the number of connected axes.

Programming the controller

- All the software supplied with controller is compatible with Windows 8, Windows 7, Windows Vista, Windows XP SP3, Linux, Mac OS X, including 64-bit versions.
- Controllers are supplied with cross-platform library and examples which allow rapid development using C++, C#, .NET, Delphi, Visual Basic, gcc, Xcode, Matlab, Java and LabVIEW.
- The XILab user interface is supplied with the controller. It allows to easily control all the functions and features of the device without any programming.
- A scripting language, an EcmaScript language dialect, is integrated into XILab software. It allows easy setting the sequence of actions, including cycles and branches, without compilation or learning any programming language.