XPS-D

Universal High-Performance 1-8 Axis Motion Controller and Driver

The XPS-D is a high-performance, easy to use, integrated motion controller/driver with high-speed communication through 10/100/1000 Base-T Ethernet, outstanding trajectory accuracy and powerful programming functionality. With its user-friendly web interface, it is easy to setup advanced trajectory and synchronization features to precisely control from the most basic to the most complex motion sequences. With advanced compensation algorithms in the servo loop for linear error, backlash, positioner error mapping (including XY and XYZ error mapping) positioning accuracy in the nanometer range can be achieved. It also has multiple digital and analog I/O's, triggers and supplemental encoder inputs that provide users with additional data acquisition, synchronization and control features that can improve the most demanding motion applications.

The XPS controller is capable of driving up to 8 axes of most Newport positioners using driver cards that slide through the back of the chassis. These factory-tested drives are powered by a dedicated internal 750 W power supply, which is independent of the controller power supply. When used with Newport ESP stages, the configuration of the driver cards and the associated stage is easy using the auto-configuration utility software. Advanced users can also manually develop their own configuration files optimized for specific applications. The new XPS-DRV11 universal driver module allows the XPS-D to drive any bipolar stepper, DC brush, and direct drive motor stages. Although the XPS-D is

Product Features

- Up to 8 axes universal motion controller
- High-speed 10/100/1000 Base-T Ethernet TCP/IP communication
- User-friendly web interface w/ multi user capabilities
- Real-time Processing and Multitasking
- Wide variety of motion modes from basic to complex PVT trajectories
- Up to 20 kHz servo loop with advanced variable PID's
- Supports quadrature incremental and Sin/Cos analog encoders
- Low noise encoder interpolation for nanometer MIM
- Extensive Analog and Digital I/O Capability
- High speed Position Compare Output (PCO) for up to 4-Axis
- ESP Plug-and-Play Compatibility

High precision multi-axis motion for applications such as:

- ***Semiconductor:*** inspection, Wafer bonding
- ***Advanced Industrial:*** Test and inspection, Display Manufacturing, Laser Processing
- ***Advanced Industrial:*** Test and inspection, Display Manufacturing, Laser Processing
- ***Fundamental and Applied Research:*** Quantum, Energy
- ***Silicon Photonics:*** Fiber Alignment
- ***Life & Health science:*** Ophthalmic surgery, imaging

backward compatible with the older DRV0x cards, it is highly recommended to use the XPS-DRV11. By using the XPS-DRV00P pass-through drive module, the XPS can use external amplifiers/drives through step/direction or analog signals to operate third party motors. XPS-DRVP1 can control Newport's Nano positioning piezo stack devices. All driver modules must be purchased separately. For more information please visit our drive module webpage: https://www.newport.com/f/xps-controller-driver-modules

XPS-D rear panel shown without driver cards

XPS-D driver cards easily slide in

XPS-D8 rear panel shown with driver cards installed

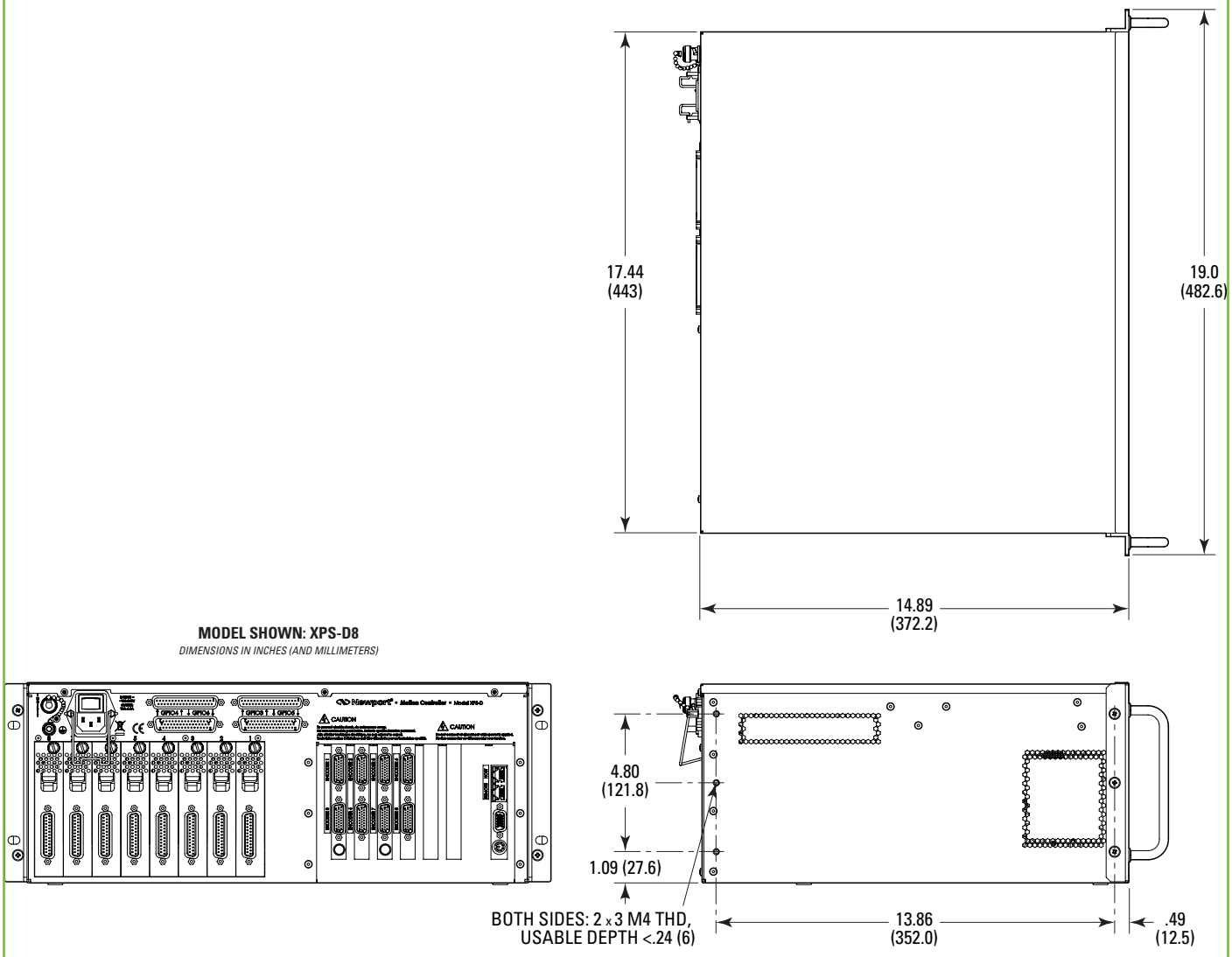
Order Information

XPS-D2	2-axis High performance Universal Motion Controller
XPS-D4	4-axis High performance Universal Motion Controller
XPS-D6	6-axis High performance Universal Motion Controller
XPS-D8	8-axis High performance Universal Motion Controller

Specifications

Number of Axes	• 1 to 8 axes of stepper, DC brush, DC brushless or linear motors using internal drives: XPS-D2: 2-axis; XPS-D4: 4-axis; XPS-D6: 6-axis; XPS-D8: 8-axis.
Communication Interfaces	• Internet protocol TCP/IP • One Ethernet 10/100/1000 Base-T (RJ45 connector) with fixed IP address and DHCP server for local communication • One Ethernet 10/100/1000 Base-T (RJ45 connector) for networking, dynamic addressing with DHCP and DNS
Firmware Features	• Powerful and intuitive, object-oriented command language • Native user-defined units (no need to program in encoder counts) • Real-time execution of custom tasks using TCL scripts • Multi-user capability • Concept of sockets for parallel processes • Time & position spaced trigger output pulses, 0.05 Hz to 20 MHz, 5 ns accuracy • Data gathering at servo rate, up to 1,000,000 data entries (depending on servo rate) • Auto-configuration, auto-tuning and auto-scaling
Motion	• Jogging mode including on-the-fly changes of speed and acceleration • Synchronized point-to-point • Spindle motion (continuous motion with periodic position reset) • Line-arc mode (linear and circular interpolation incl. continuous path contouring) • Splines (Catmull-Rom type) • PT trajectories (continuous, multidimensional motion path) • PVT trajectories (complex trajectory based on position, velocity and time coordinates) • Analog tracking (using analog input as position or velocity command) • Master-slave including single master-multiple slaves and custom gear ratio
Compensation	• Linear error, Backlash, positioner error mapping • XY and XYZ error mapping • All corrections are taken into account on the servo loop
Servo Rate	• Adjustable up to 20 kHz
I/O	• 40 TTL inputs and 40 TTL outputs (open collector) • 8 synch. analog inputs ±10 V, 16 bits • 8 synch. analog outputs ±5 V, ±10 V or ±12.288 V (configurable), 16 bits
Control Loop	• Open loop, PI position, PIDFF velocity, PIDFF acceleration, PIDDualFF voltage • Variable PID's (PID values depending on distance to target position) • Derivative cut-off filter; 2 user-defined notch filters
Trigger In	• Hardware latch of all positions and all analog I/O's (on servo rate) • <50 ns latency on positions • <125 µs time jitter on analog I/O's
Trigger Out	• One high-speed position compare output only for axes 1, 2, 5 and 6 that can be either configured for position synchronized pulses or for time synchronized pulses: 5 ns accuracy, <700 ns latency (from real stage position to pulse generation), 5 MHz max frequency • Position Compare Output (PCO): – interpolation ×65536 – compensated
Dedicated Inputs Per Axis	• RS-422 differential inputs for A, B and I, Max. 25 MHz, over-velocity and quadrature error detection • 1 Vpp analog encoder input up to ×65536 interpolation used for servo; amplitude, phase and offset correction and synchronization • Low noise encoder interpolator board for nanometer MIM • Forward and reverse limit, home, error input
Dedicated Outputs Per Axis (when using external drives)	• 2 channel 16-bit, ±10 V D/A • Drive enable, error output
Drive Capability	• 750 W (@ 230 VAC) total available power
AC Power Requirements	• 100–240 VAC 60/50 Hz 10 A– 4.2 A

XPS-D Drawing



www.mks.com
DS-062001 XPS-D (08/25)