Stepper and Servo Motor Drives

NI MID-7604, NI MID-7602

- High-efficiency, bipolar chopper stepper drives
- User-selectable microstepping and peak current
- Integrated power supply
- CE approved and UL recognized

NI MID-7654, NI MID-7652

- High-efficiency servo amplifiers
- User-selectable peak current and continuous current
- Integrated power supply
- CE approved and UL recognized

Overview and Applications

The National Instruments MID-760x integrated stepper motor power drives and MID-765x integrated DC-brush servo motor power drives offer reliable, easy-to-connect drive solutions for National Instruments motion controllers. The NI MID-760x provides stepper motor control from the NI 7330, 7340, and 7350 controllers. The MID-7650 provides DC-brush servo motor control from NI 7340 and 7350 controllers. Because the MID-760x and the MID 7650 have all the required motion drive and motion I/O signals, they offer all the features of a universal motion interface wiring module with the enhancements of a powered motor drive in a single product. The NI MID power drives connect to motion controller boards through a single-shielded cable that transfers all motor commands, as well as motion I/O control and feedback signals.

The MID-7604 and MID-7602 are 4-axis and 2-axis stepper motor drive units, respectively. The MID-7654 and MID-7652 are 4-axis and 2-axis DC-brush servo motor drive units, respectively.

These compact, well integrated drives incorporate per-axis amplifiers, motor-power DC bus supplies, low-voltage motion I/O supplies, and pluggable screw terminal connectivity in a single rugged metal enclosure. This optimized system wiring design simplifies motion component selection.

High-Efficiency Architecture

The MID-760x power drives incorporate an efficient bipolar chopper architecture that converts step and direction control signals into winding currents for 2-phase stepper motors. The MID-765x power drives incorporate an efficient servo amplifier architecture that converts analog control signals into winding currents for DC-brush motors. The pulse width modulation driver technology in the MID-765x accurately controls motor winding current, while reducing motor heating, lowering ripple current, and improving overall motor performance. Active fan cooling provides optimal motion power drive operation.

Model	Stepper	Servo	NI 7330	NI 7350 NI 7340	(V)	Motor Drive (A)	Compact Current/Axis Diagnostic LEDs	Front Panel Enclosure and Microstepping	Front Panel Selectable Peak Current	Selectable Axes
MID-7604	✓	–	✓	✓	24	0.2 to 1.4	✓	✓	✓	4
MID-7602	✓	–	✓	✓	24	0.2 to 1.4	✓	✓	✓	2
MID-7654	–	✓	–	✓	48	0.8 to 5 continous 10 peak	✓	–	✓	4
MID-7652	–	✓	–	✓	48	0.8 to 5 continous 10 peak	✓	–	✓	2

Figure 1. Stepper and Servo Motor Drive Features

Stepper and Servo Motor Drives

Ordering Information

NI MID-7604 (4-axis stepper).....777936-0P
NI MID-7602 (2-axis stepper).....778003-0P
NI MID-7654 (4-axis servo).....778005-0P
NI MID-7652 (2-axis servo).....778004-0P
Cables
Refer to the cable guide on page 645.

Accessories
Rack-Mount Kit
MID-760x.....777665-01
MID-765x.....187374-01
Strain-Relief Bar for MID-76xx.....187407-01
Panel-Mount Kit.....187243-01

BUY ONLINE!
Visit ni.com/info and enter mid7602, mid7604, mid7652, and/or mid7654.

Specifications

The specifications below apply to only the MID-76xx. Please refer to your controller specifications to determine overall system specifications.

Some signals define compatibility as pass-through. This means the MID 76xx may have passive filtering on these signals, but the signals do not affect the voltage range. Consult your motion controller specifications to determine allowable voltage range and logic level compatibility of the signal.

MID-7604, MID-7602 Stepper Motor Drives

Driver type..... IM481H modular hybrid, bipolar chopper
Chopping operating frequency..... 20 kHz
Motor bus voltage..... 24 VDC nominal
Current per phase..... 0.2 to 1.4 A_{peak} (0.14 to 1 A_{rms})
(factory setting is 0.2 A_{peak})
Microstepping selections..... x2, 4, 8, 16, 32, 64, 128, 256
x5, 10, 25, 50, 125, 250

Power Supply
Input voltage..... 90-138 VAC/204-264 VAC, 47-63 Hz
Input fuse..... 1.5 A, 230 VAC
3 A, 115 VAC
Input fuse dimensions..... 5 x 20 mm

Host Bus Voltage Interlock
PC bus host voltage monitoring range..... 5 VDC

Physical
Dimensions..... 30.6 by 25.4 by 4.4 cm (12.1 by 10.0 by 1.7 in.)
Weight..... 4.5 kg (10 lb)

MID-7654, MID-7652 Servo Motor Drives

Driver type..... Elmo Motion Control VIO 10/100
Peak current limit..... 1.7 to 10 A (default 1.7 A)
Continuous current limit..... 0.8 to 5 A (default 0.5 A)
DC-bus motor voltage..... 48 VDC nominal
Continuous power (all axes combined)..... 400 W at 25% duty cycle

Power Supply
Input voltage..... 90-132 VAC/198-264 VAC, 47-63 Hz
Input fuse..... 6 A, 230 VAC, 8 A, 115 VAC
Input fuse dimensions..... 0.25 by 1.25 in.

Host Bus Voltage Interlock
PC bus host voltage monitoring range..... 5 VDC ±5%

Physical
Dimensions..... 30.6 by 25.4 by 8.8 cm (12.0 by 10.0 by 3.5 in.)
Weight..... 10.2 kg (22.5 lb)

General (All MID 76xx drives)

Encoder Interface (Each Axis)
Inputs..... Quadrature, incremental
Differential input threshold..... ±0.3 V (typical)
Single-ended input threshold..... TTL/CMOS
Voltage range..... 0 to 5 VDC
Maximum quadrature frequency..... 20 MHz

Inhibit, Limit, and Home Switch Inputs (Each Axis)
Voltage range..... 0 to 12 VDC
Compatibility..... Signal pass-through

Trigger Input
Noise filter (RC time constant)..... 100 ns
Compatibility..... Signal pass-through

Breakpoint Output
Compatibility..... Signal pass-through

Analog Input
Noise filter (RC time constant)..... 10 µs
Compatibility..... Signal pass-through

Analog Output
Compatibility..... Signal pass-through

Safety
Installation category II, pollution degree 2

Environment
Operating temperature..... 0 to 50 °C for 765x, 0 to 45 °C for 760x
Storage temperature..... -20 to 70 °C
Relative humidity..... 10% to 90% (noncondensing)