

# Motors & Motion Control

## TOUCHSCREEN CONTROLLERS



### Controller Specifications:

- Velocity or Position Control to 1MHz Step Rate
- Missed step/stall detection when used with compatible motors
- Full-Step Morphing—100% phase currents
  - User settable based on motor velocity
- 4.3" color touchscreen for setup and operation of motion and motor profiles

### Communications:

- Default baud 38400 bps (9600-115200)
- RS485 Standard (USB on Series 3 Units)
  - Optional MODBUS Protocol
  - Control and Setup via simple ASCII commands
- Optional RS232, USB, Ethernet (MODBUS TCP)
- Synchronization via RTOS and "Global" commands

### Set Points:

- 10 user selectable with dedicated acceleration and speed profiles
- Available global commands to enable synchronous movements for all installed axis

### Accessories/Customization:

- Controller I/O, Software, Power, Cables
- See compatible Cable List
- See compatible Motor list
- Remote 4" touchscreen option
- Remote 7" touchscreen option
- Wireless Cloud Connectivity coming soon

## Key Specifications

### Individual Axis Characteristics:

- Firmware Update
- Auto Thermal Shutdown
- Open Load Detection
- Short to ground protection
- 3-Channel Encoder inputs, single ended
  - +5VDC TTL compatible with pullups
- 4 TTL compatible inputs
  - +5VDC, TVS protected, Schmitt Trigger
- 2 TTL outputs (optically isolated)
  - 60VDC, 50mA Drive, sink or source

### Driver Specifications:

- 2A/phase, 3A/phase Option (up to 6A coming soon)
- Max current scalable in 60mA increments
- Auto current reduction after 1 sec. of inactivity
  - scalable in 60mA increments
- Up to 256x Micro-stepping, selectable via software
- Dynamic Torque control when used with compatible motors
- Mid-band resonance compensation
- Noiseless low speed and standstill operation

### Input Power:

- 90-264VAC, 47-63 Hz, 350W peak (200W Convection Cooling)
  - Optional 400W available
  - CE/UL (UL60950-1, TUV EN60950-1 approved)

### Output Power:

- 24VDC, 8.3A RMS
- Temp, over-voltage, and overload protection

### Environmental:

- 0-65C @ 0-95% humidity, non-condensing

### Reliability:

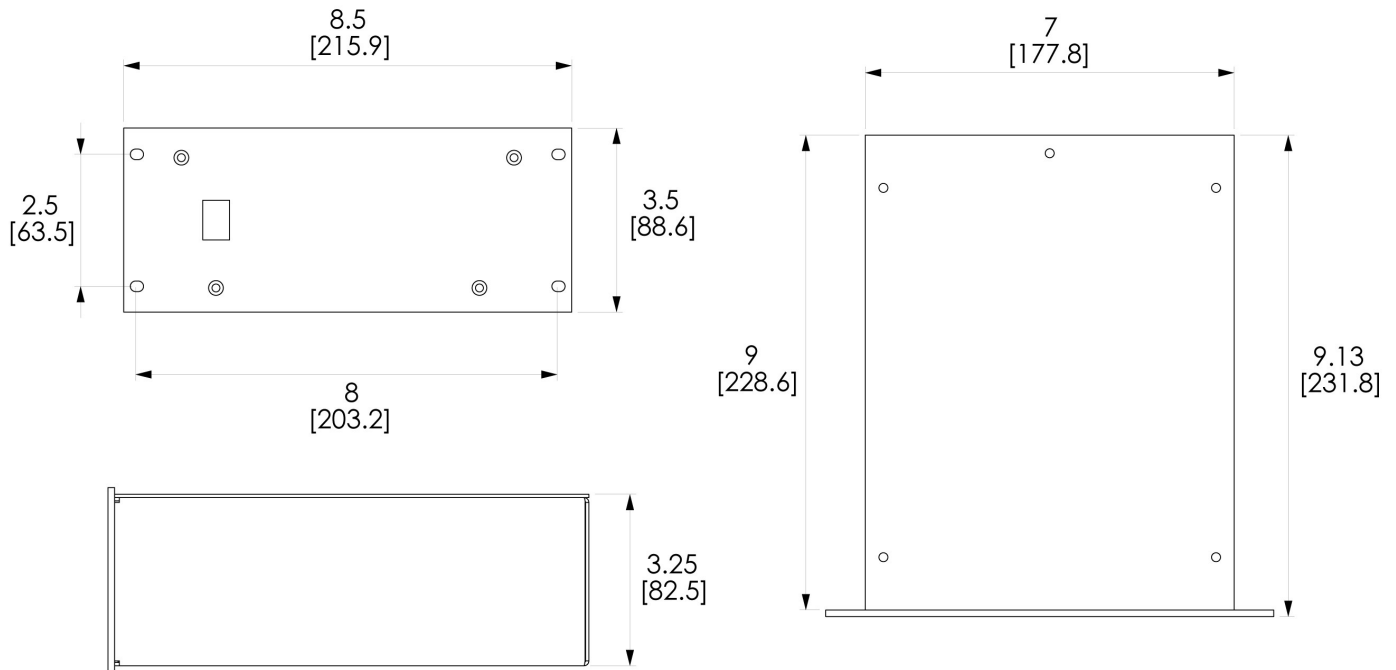
- >10,000 Hours MTBF

### Approvals (Axis):

- CE Standard for Process Equipment
- EMC Directive 2004/108/EC
- Low Voltage Directive 2006/95/EC
- EN61000-6-2:2005
- EN61000-6-3:2007
- EN61010-1:2001



### Dimensions:



DIMENSIONS  
= inch [mm]

### Ordering Guide:

Part Number	Description	Compatibility
92-01-9904	Controller, Single-Axis, 90-264VAC @ 125W, RS485 w/Touch	81XXX + Legacy Motors
92-02-9904	Controller, Dual-Axis, 90-264VAC @ 200W, RS485 w/Touch	81XXX + Legacy Motors
92-03-9904	Controller, Triple-Axis, 90-264VAC @ 200W, RS485 w/Touch	81XXX + Legacy Motors

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### Hybrid Stepping Motors

- NEMA 23 with encoder options
- NEMA 34 with encoder options
- Universal 3-channel incremental encoder
  - Additional absolute output (RS485)
- Low cost SSI absolute encoder model
- Absolute position with multi-turn capabilities
- 1.8° per Step Standard
- 0.9° per Step Upon Request
- Bi-polar 4-wire motors

### General Specifications:

#### NEMA 34

Step Accuracy	±5%
Resistance Accuracy	±10%
Inductance Accuracy	±20%
Temperature Rise	80°C MAX
Ambient Temperature Range	-20°C~ +50°C
Storage Temperature Range	-30°C~ +60°C
Insulation Resistance	100M Ω MIN. 500V DC
Dielectric Strength	820VAC, 1s, 3mA
Radial Play	0.02mm MAX. (450g Load)
End Play	0.08mm MAX. (450g Load)
Max. radial force	220N
Max. axial force	60N

#### NEMA 23

Step Accuracy	±5%
Resistance Accuracy	±10%
Inductance Accuracy	±20%
Temperature Rise	80°C MAX
Ambient Temperature Range	-20°C~ +50°C
Storage Temperature Range	-30°C~ +60°C
Insulation Resistance	100M Ω MIN. 500V DC
Dielectric Strength	500V AC 1min
Radial Play	0.02mm MAX. (450g Load)
End Play	0.08mm MAX. (450g Load)
Max. radial force	75N
Max. axial force	15N

### Part Number Guide:

<b>8</b>	<b>1</b>	<b>201</b>
Motor Series	Interface/Technology	Base Stepper Motor

### Technology/Interface

#### Universal Motor + Encoder Series

Advanced Hybrid Stepper-motors with encoders, offering precision and flexibility for critical positioning applications. Options for incremental + absolute with a variety of interfaces to enable integration in many applications with and without NC controllers.

#### Advanced Absolute Encoder Series

Advanced Hybrid Stepper Motors with absolute encoders for high-speed and precision applications requiring multi-turn capabilities.

#### 81xxx Series



##### Universal Motor

NEMA 17/23 Stepper Motors  
Incremental + Absolute  
Programmable Resolution  
RS485 Interface  
14-Bit Absolute Resolution  
MODBUS™ RTU Option (2Mb)

Compatible with Legacy NC Controllers

-Incremental Only

Compatible with 9-1XX Controllers

-Incremental + Absolute

#### 83xxx Series



##### High Speed Absolute

NEMA 17/23/34 Stepper Motors  
High Speed SSI Interface - 2MHz  
15-Bit Absolute Encoder  
16:16 Format: Angle:Turns  
RJ45 Encoder Interface  
Compatible with 9-2XX Controllers

#### 82xxx Series



##### Low Cost Absolute

NEMA 17/23 Stepper Motors  
2MHz SSI Interface  
15-Bit Absolute Encoder  
Single 16-Bit Frame: 15 + 1  
18-Bit Frame with Parity  
RJ45 for Encoder Interface

Compatible with 9-2XX Series Controllers

#### 84xxx Series



##### Multi-Turn Absolute

NEMA 17/23/34 Stepper Motors  
12-Bit Absolute Encoder  
-45 Turns  
-Completely Solid State - No Gears  
-No Battery Required  
12:6 Format: Angle:Turns  
NEMA 17/23/34 Stepper Motors  
High Speed SSI Interface - 2MHz

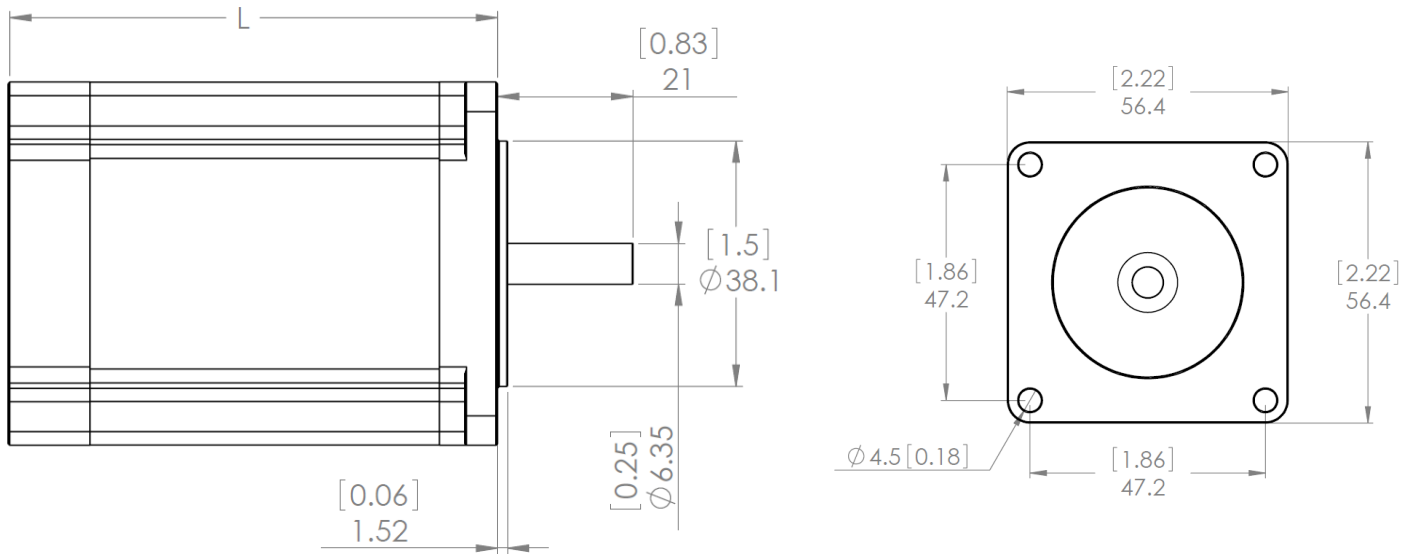
High Speed BiSS-C Interface - 10MHz

RJ45 Encoder Interface

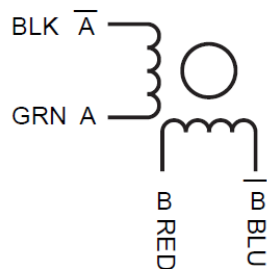
Compatible with 9-2/3XX Controllers

### NEMA 23 Base Motor

Base Motor	Length (L)	Rated Current (A)	Phase Resistance ( $\Omega$ )	Inductance (mH)	Holding Torque (N. cm)	Detent Torque (N. cm)	Rotor Inertia (g. cm <sup>2</sup> )	Motor Weight
201	45mm	0.62	12	26	80	2.8	190	520
202	56mm	1.5	3.6	13.8	110	3.5	280	680
212	56mm	2.5	1.2	4.8	110	3.5	280	680
222	64mm	2.5	1.5	4.5	150	5	380	850
203	76mm	1.5	3.9	14.1	180	6	440	1050
213	76mm	2.5	1.8	6.5	180	6	440	1050

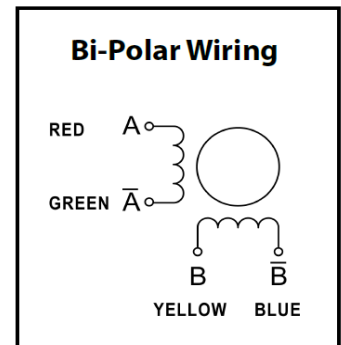
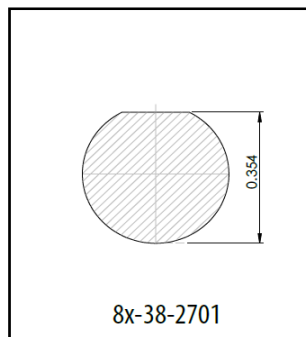
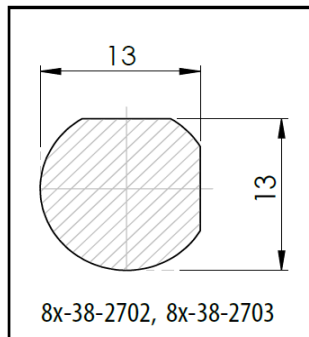
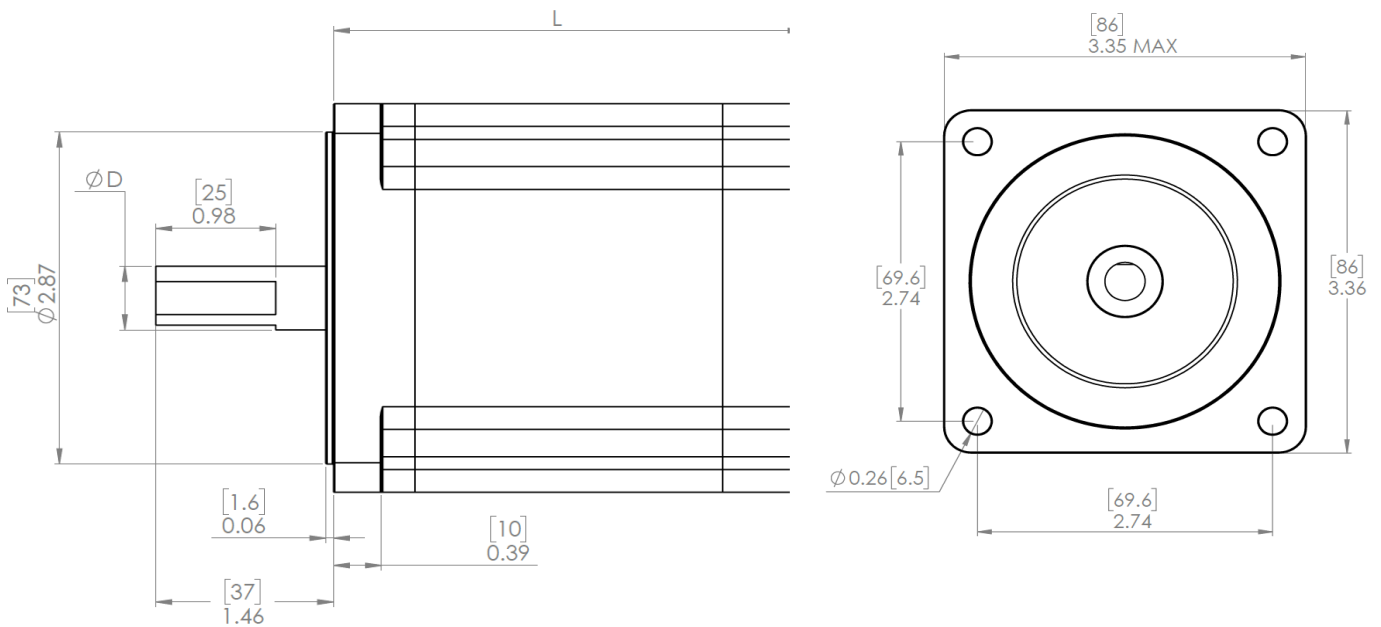


#### Bi-Polar Wiring



### NEMA 34 Base Motor

Type	Length (L)	Shaft Dia. (D)	Rated Current (A)	Phase Resistance ( $\Omega$ )	Inductance (mH)	Holding Torque (N. cm)	Detent Torque (N. cm)	Rotor Inertia ( $g. cm^2$ )	Motor Weight (lbs)
-301	66mm	3/8"	2.0	2.9	6.6	310	5.5	850	4.4
-302	66mm	3/8"	2.7	1.2	3.5	310	5.5	850	4.4
-301	98mm	14mm	2.7	1.9	8.6	691	9.5	1550	6.6
-303	126mm	14mm	2.7	2.5	12.5	902	18.5	2200	9.9
-304	150mm	14mm	2.7	2.9	17.5	1198	24.5	2500	11



### Motor Ordering Guide:

Part Number	Description	Compatible Cables
81201	Stepper Motor, Universal Encoder, NEMA 23, 45mm, 80 Ncm	71001/71002
81202	Stepper Motor, Universal Encoder, NEMA 23, 56mm, 110 Ncm	71001/71002
81212	Stepper Motor, Universal Encoder, NEMA 23, 56mm, 110 Ncm	71001/71002
81222	Stepper Motor, Universal Encoder, NEMA 23, 64mm, 150 Ncm	71001/71002
81203	Stepper Motor, Universal Encoder, NEMA 23, 76mm, 180 Ncm	71001/71002
81213	Stepper Motor, Universal Encoder, NEMA 23, 76mm, 180 Ncm	71001/71002
82201	Stepper Motor, Absolute Encoder, NEMA 23, 45mm, 80 Ncm	71001/71003
82202	Stepper Motor, Absolute Encoder, NEMA 23, 56mm, 110 Ncm	71001/71003
82212	Stepper Motor, Absolute Encoder, NEMA 23, 56mm, 110 Ncm	71001/71003
82222	Stepper Motor, Absolute Encoder, NEMA 23, 64mm, 150 Ncm	71001/71003
82203	Stepper Motor, Absolute Encoder, NEMA 23, 76mm, 180 Ncm	71001/71003
82213	Stepper Motor, Absolute Encoder, NEMA 23, 76mm, 180 Ncm	71001/71003
83201	Stepper Motor, MT Absolute Encoder, NEMA 23, 45mm, 80 Ncm	71001/71003
83202	Stepper Motor, MT Absolute Encoder, NEMA 23, 56mm, 110 Ncm	71001/71003
83212	Stepper Motor, MT Absolute Encoder, NEMA 23, 56mm, 110 Ncm	71001/71003
83222	Stepper Motor, MT Absolute Encoder, NEMA 23, 64mm, 150 Ncm	71001/71003
83203	Stepper Motor, MT Absolute Encoder, NEMA 23, 76mm, 180 Ncm	71001/71003
83213	Stepper Motor, MT Absolute Encoder, NEMA 23, 76mm, 180 Ncm	71001/71003

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