

In an effort to constantly improve our products, AMCI has replaced older versions of our stepper motors with new, more powerful motors. Some of these newer motors had different current requirements, wiring, and shaft sizes than their older counterparts.

The following tables list all of the Stepper Motors ever carried by AMCI and show the current requirements and the motor's shaft size.

Wiring Information

- When operating, the case of a stepper motor may reach 100°C.
- Because there are several versions of the SM23 stepper motors that used the same part numbers, please use the wire colors and cable length to determine exactly which version of the stepper motor that you have.
- The “xy” in the motor part number can blank for a single shaft motor, “D” for a double shaft motor, or “DE” for a double shaft motor with a 1000 line incremental encoder.
- All of the wiring connections shown are for the SD17063, SD17040, SD17060, SD17080, or the SD17098IX stepper drivers.
- On all of these drivers, it is also necessary to have a wire connecting the two INTERLOCK terminals at the top and bottom of the motor connector. The driver will indicate a FAULT condition if this wire is not present.
- For the drivers short circuit protection to operate correctly, you must also connect a drain wire from the case of the motor to the Earth Ground terminal of the driver.
- Even though it is possible to extend the cable length up to forty feet, AMCI recommends installing the driver as close as possible to the motor. This will decrease the chance of forming a ground loop and has the added benefit of limiting the amount of power loss in the motor cable. If you must extend the cable, you should use a cable with twisted pairs 18AWG or larger and an overall shield. The Beldin 9552 (four wire) and the Beldin 9554 (six wire) meet this requirement.
- The SD8055 and SD3520 stepper drivers do not have Ctap terminals. When connecting a series wired motor to these drivers, it will be necessary to use a wire nut to hold the motor's leads together. In addition, for CW increasing readings, looking at the flange of the motor, it will be necessary to reverse the wiring to the B- and B+ terminals. Operate motors below 100 C.

The following two tables list eight lead SM23 motors that have 12-inch solid color pigtail wires. These motors have the following wire colors.

Black, Orange, Yellow, Green, Red, Blue, White, and (Purple or Brown)

Motor	Series Current (Amps)	Parallel Current (Amps)	Shaft Size (inches)
SM23-130xy	2.0	4.0	0.25 (with flat)
SM23-240xy	2.0	4.0	0.25 (with flat)

Driver Connections	12 inch pigtail (Series)	12 inch pigtail (Parallel)
BCTap	Orange & Yellow	NC
B-	Black	Yellow & Black
B+	Green	Orange & Green
A-	Red	Red & (Purple or Brown)
A+	Blue	White & Blue
ACTap	White & (Purple or Brown)	NC

The following two tables list the eight lead SM23 motors that have 12-inch solid color pigtail wires. These motors have the following wire colors.

Orange, Brown, White, Black, Yellow, Blue, Gray, and Red

Motor	Series Current (Amps)	Parallel Current (Amps)	Shaft Size (inches)
SM23-130xy	2.0	4.0	0.25 (with keyway)
SM23-240xy	2.0	4.0	0.25 (with keyway)

Driver Connections	12 inch pigtail (Series)	12 inch pigtail (Parallel)
BCtap	Brown & white	NC
B-	Orange	Orange & White
B+	Black	Black & Brown
A-	Yellow	Yellow & Gray
A+	Red	Blue & Red
ACTap	Blue & Gray	NC

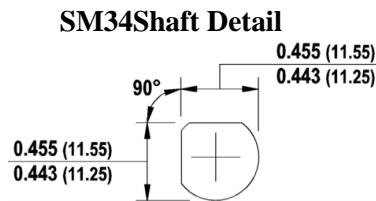
The following two tables list the four lead SM34 motors that have 12-inch solid color pigtail wires. These motors have the following wire colors.

Pink, Blue, Yellow, and Red

Motor	Motor Current (Amps)	Shaft Size (inches)
SM34-450xy	4.0	0.5
SM34-850xy	4.0	0.5
SM34-1100xy	4.0	0.5

Driver Connections	Motor Wire Color
BCtap	No Connection
B-	Blue
B+	Pink
A-	Yellow
A+	Red
ACTap	No Connection

These four lead SM34 motors listed above have the following shaft detail.



The following two tables list the six lead SM34 motors that have 12-inch solid color pigtail wires. These motors have the following wire colors.

Red, Black, Yellow, Blue, White, and Orange

Motor	Series Current (Amps)	Center Tap Current (Amps)	Shaft Size (Millimeters)
SM34-300xy	2.8	4.0	12
SM34-600xy	2.8	4.0	12
SM34-900xy	2.8	4.0	12

Driver Connections	12 inch pigtail (Series)	12 inch pigtail (Center Tap)
BCTap	Black	Yellow
B-	Red	Red
B+	Yellow	Black
A-	Blue	White
A+	Orange	Orange
ACTap	White	Blue

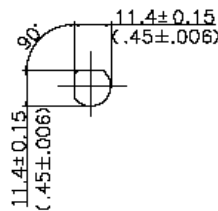
The following two tables list the four lead SM34 motors that have 12-inch solid color pigtail wires.

Red, Yellow, Orange, and Blue

Motor	Current (Amps)	Shaft Size (Millimeters)
SM34-900revA	4.0	See the following diagram

Driver Connections	12 inch pigtail
BCTap	No Connection
B-	Blue
B+	Orange
A-	Yellow
A+	Red
ACTap	No Connection

SM34-900revA Shaft Detail



The following table shows the four lead SM42 motors. All of these motors are wired in series.

Driver Connections	SM42-1125xy (6 Amps) 10 foot cable	SM42-1250xy (6 Amps) 10 foot cable	SM42-1800xy (6 Amps) 12 inch pig tails
BCtap	NC	NC	NC
B-	Green	Green	Blue
B+	White	White	Orange
A-	Black	Black	Yellow
A+	Red	Red	Red
ACtap	NC	NC	NC

Most of the motors in the following two tables had a 10-foot cable with eight solid color wires. However, a few had eight 12-inch pigtail wires with both solid colors and a white wire with a colored stripe. The following tables provide the wiring information for both of these configurations.

Motor	Series Current (Amps)	Parallel Current (Amps)	Shaft Size (inches)
SM23-A69xy	1.0	2.0	0.25
SM23-90xy	1.4	2.8	0.25
SM23-A112xy	1.2	2.5	0.25
SM23-130xy	1.4	2.8	0.25
SM23-A160xy	1.7	3.5	0.25
SM23-240xy	2.0	2.8	0.25
SM34-A150xy	2.4	4.8	0.375
SM34-250xy	2.2	4.3	0.375
SM34-A316xy	3.5	7.0	0.375
SM34-425xy	3.2	6.4	0.375
SM34-A472xy	4.1	8.3	0.375
SM34-650xy	3.9	7.7	0.375

Driver Connections	10 foot cable (Series)	10 foot cable (Parallel)	12 inch pig tail (Series)	12 inch pig tail (Parallel)
BCtap	Brown & Orange	NC	White/Red & White/Yellow	NC
B-	Green	Green & Orange	Red	Red & White/Yellow
B+	White	White & Brown	Yellow	Yellow & White/Red
A-	Yellow	Black & Yellow	Black	Black & White/Orange
A+	Blue	Blue & Red	Orange	Orange & White/Black
ACtap	Black & Red	NC	White/Orange & White/Black	NC

The wire colors denoted by (White/Color) indicate a white wire with a colored stripe.

Double Shaft Stepper Motor Encoder Specifications

A 1000 line encoder can be added to all of AMCI double shaft SM23, SM34, and SM42 motors. The following information shows both the encoder's wiring and its specifications.

Note: There are two possible wiring configurations, depending on when you purchased your motor / encoder combination. Newer motors will have an encoder with an 18-inch cable while older motors will have an encoder with a 10-foot cable.

The wiring information for both the older and newer wiring configurations are shown below.

Please note that using the wrong wiring configuration will not damage the encoder, however, it will not operate correctly.

Function	Wire Color 18 inch cable
+5vdc	Red
GND	Black
CH A	Brown
CH A NOT	White
CH B	Blue
CH B NOT	Green
INDEX	Orange
INDEX NOT	Yellow

Function	Wire Color 10 foot cable
+5vdc	Red
GND	Black
CH A	White
CH A NOT	Yellow
CH B	Green
CH B NOT	Blue
INDEX	Orange
INDEX NOT	Brown

ELECTRICAL SPECIFICATIONS:

Output: square -wave, two channel quadrature with index (gated with A 180° + or - 45°)

Supply Voltage: 5 Vdc

Nominal Power Requirements: 135 mA @ 5 Vdc

Output Sinks & Sources: 20mA

Output Circuit : AM26LS31

Output Frequency: Up to 200 KHz

Flutter: 1% max

Resolution: 1000

ENVIRONMENTAL SPECIFICATIONS:

Operating Temperature : -10°C to +100°C

Storage Temperature: -30°C to +110°C

Shock: 50 G's for 11ms duration

Vibration: 5-2000Hz @ 10 G's

Humidity: 90% relative (non-condensing)

A Beldin 8304 or equivalent is recommended to extend the encoder's cable

Revision History

4/15/05: Initial release of document

9/7/05: Revision A: The +B and +A parallel motor wiring shown in the table on page 1 was reversed to match the SM23 spec sheet.

9/6/06: Revision B: Added the SM34-900revA motor information, a note about maximum case temperature when operating, and a footer to the document.

3/7/07: Added the new version SM34-450, SM34-850, and SM34-1100

6/24/10: The size 23 motors from Three Men will now come with a brown wire in place of the purple wire and the document was changed to show both options. Also added the wiring of the double shaft encoder to the document.