



Datasheet of the Easy Servo Motor

ES-M Series



Stepper Motor with Encoder, 0.9 - 8 N.m

Version 1.4

<http://www.leadshine.com>

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1 Descriptions

Leadshine's ES-M series easy servo motors, or stepper motors with encoders, are designed to work with Leadshine's easy servo drives including the ES-D508, ES-D808 and ES-D1008. They are currently available from NEMA23 to NEMA34 with holding torque from 1 N.m to 8 N.m. All those easy servo motors are integrated with 1,000-line optical incremental encoders.

2 Part Number

ES-M 2 34 80 - S - -

1
 2 3 4 5 6 7 8 9

- 1 Easy Servo Motor Series
- 2 Motor Voltage
Blank: low voltage motor H: high voltage motor
- 3 Motor Type
2: 2-phase 3: 3-phase
- 4 Motor Size
23: NEMA23(57mm) 24: NEMA24 (60mm)
34: NEMA34(86mm) 42: NEMA42(110mm)
- 5 Holding Torque
09: 0.9N.m 80: 8.0N.m 120: 12N.m
- 6 Speciality
Blank: standard B: brake P1/P2: P1- IP54 P2- IP67
- 7 Shaft diameter
Blank: standard S: inch size
- 8 Encoder Line
Blank: 1000 line E2: 2500 line E5: 5000 line
- 9 Customerized Code
Blank: standard

3 Electric Specification

3.1 Encoder Specifications

| Parameter | Min | Typical | Max | Unit |
|----------------------------|-----|---------|-----|------|
| Supply Voltage | 4.5 | 5 | 5.5 | VDC |
| Output Current per Channel | -1 | - | 5 | mA |
| Low Level Output Voltage | - | - | 0.4 | VDC |
| High Level Output Voltage | 2.4 | - | - | VDC |
| Count Frequency | - | - | 100 | kHz |

3.2 Motor Specifications

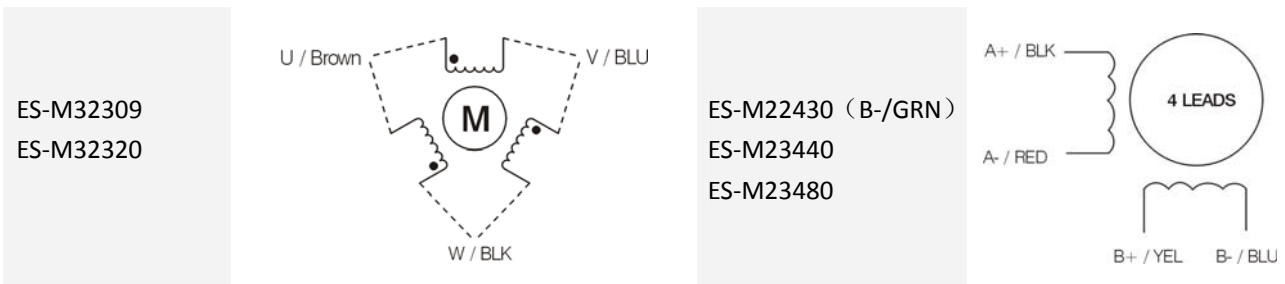
| Part Number | Step Angle (°) | Motor length (mm) | Holding Torque (N.m) | Phase Current (A) | Phase Resistance (Ohm) | Phase Inductance (mH) | Rotor Inertia (kg.cm ²) | Weight (Kg) | Shaft Diameter (mm) | Match Drive |
|-------------|----------------|-------------------|----------------------|-------------------|------------------------|-----------------------|-------------------------------------|-------------|---------------------|-------------------|
| ES-M32309 | 1.2 | 73 | 0.9 | 3.4 | 0.44 | 1.0 | 0.3 | 0.95 | 8 | ES-D508 |
| ES-M32320 | 1.2 | 93 | 2.0 | 3.4 | 0.70 | 1.9 | 0.55 | 1.35 | 8 | ES-D508 |
| ES-M22430 | 1.8 | 103 | 3.0 | 5.0 | 0.45 | 2.0 | 0.69 | 1.5 | 8 | ES-D808 |
| ES-M23440 | 1.8 | 101 | 4.0 | 5.5 | 0.46 | 4.0 | 1.95 | 2.7 | 14 | ES-D808/E S-D1008 |
| ES-M23480 | 1.8 | 119 | 8.0 | 6.0 | 0.53 | 3.9 | 2.8 | 4.0 | 14 | ES-D808/E S-D1008 |
| ES-M32309-S | 1.2 | 73 | 0.9 | 3.4 | 0.44 | 1.0 | 0.3 | 0.95 | 6.35 | ES-D508 |
| ES-M32320-S | 1.2 | 93 | 2.0 | 3.4 | 0.70 | 1.9 | 0.55 | 1.35 | 6.35 | ES-D508 |
| ES-M23440-S | 1.8 | 101 | 4.0 | 5.5 | 0.46 | 4.0 | 1.95 | 2.7 | 12.7 | ES-D808/E S-D1008 |
| ES-M23480-S | 1.8 | 119 | 8.0 | 6.0 | 0.53 | 3.9 | 2.8 | 4.0 | 12.7 | ES-D808/E S-D1008 |
| ES-M32320B | 1.2 | 131 | 1.5 | 5.2 | 0.6 | 2.0 | 0.5 | 1.65 | 8 | ES-D508 |

*Note: The length of the NEMA34 motor and the motor with protection IP can be chosen, please contact Leadshine for more details.

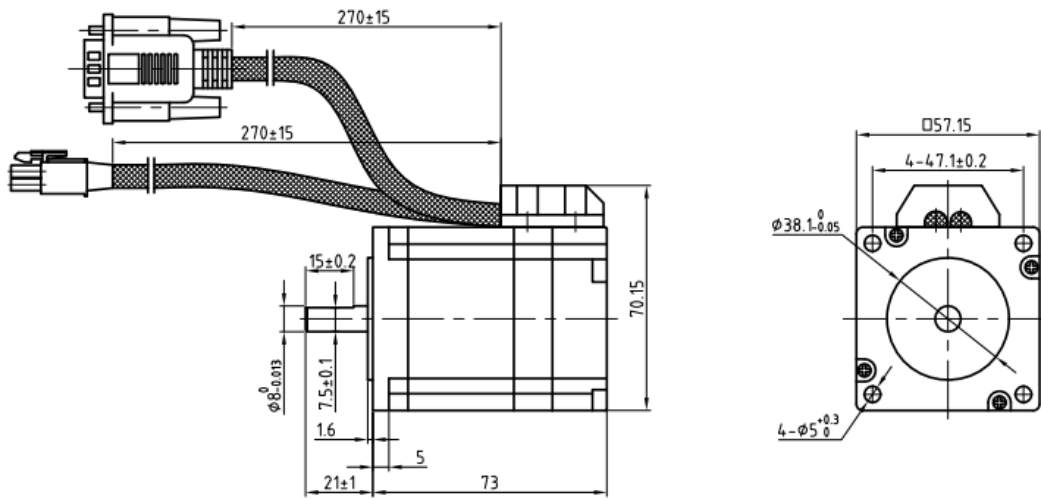
4 Motor Wiring Diagram and Mechanical Dimension

4.1 Wiring Diagram

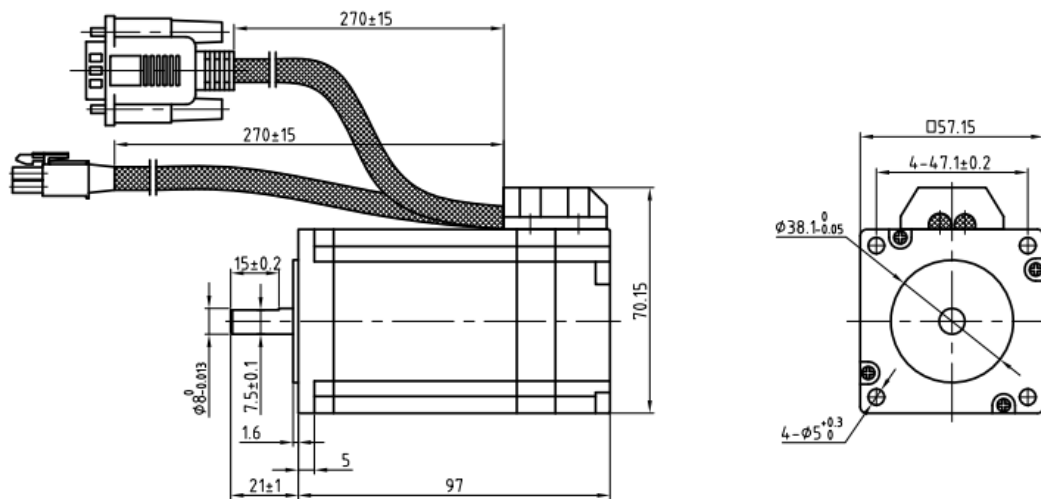
Note: Please contact Leadshine for the wiring diagrams for other motors..



4.2 Mechanical Dimension

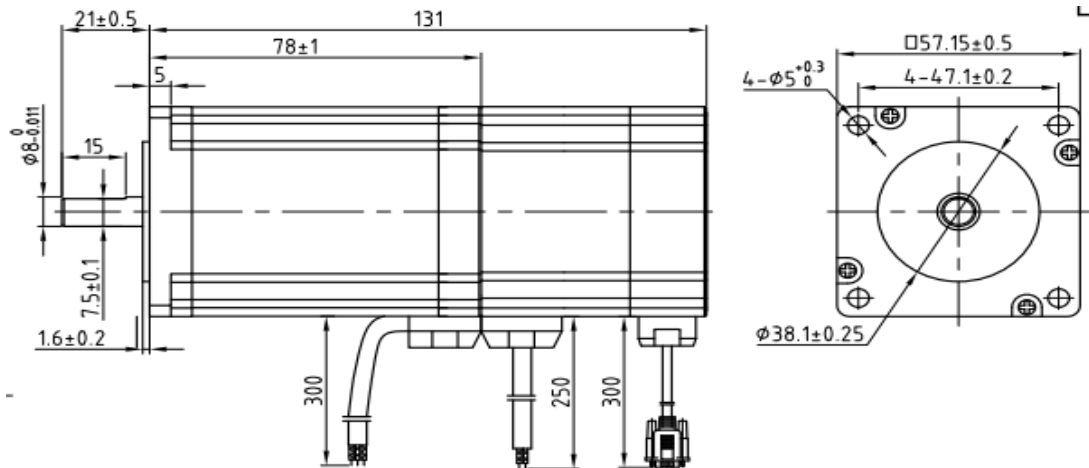


Mechanical Specification of ES-M32309



Mechanical Specification of ES-M32320

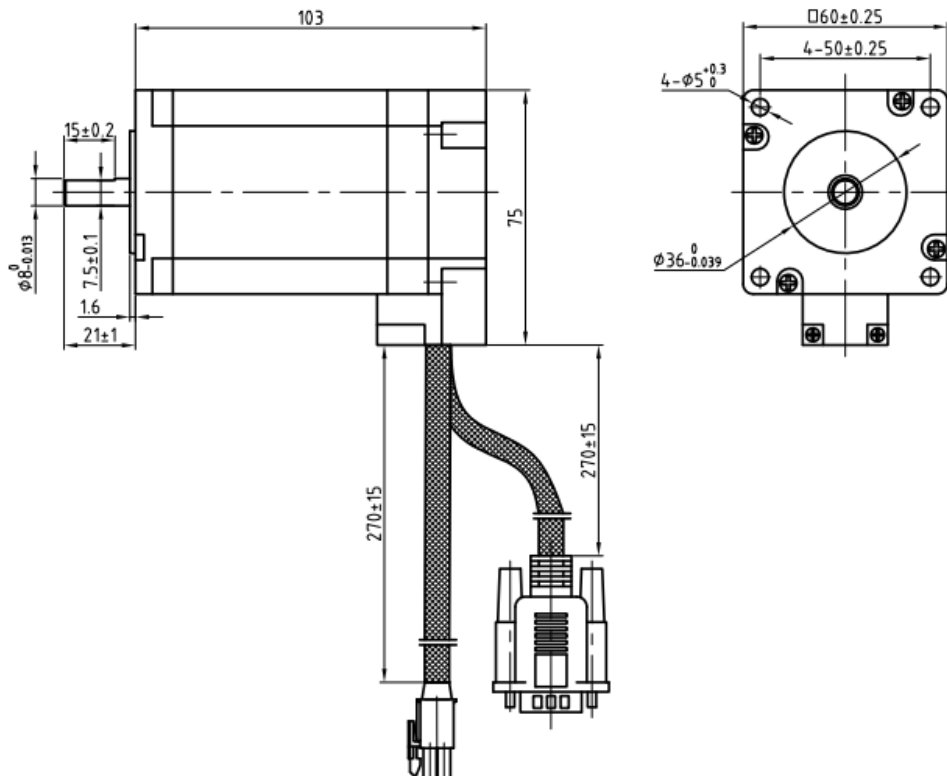
*Note: The Mechanical Specification of ES-M32309-S and ES-M32320-S are the same as ES-M32309 and ES-M32320 respectively, but the shaft diameter of ES-M32309-S and ES-M32320-S are all 6.25mm.



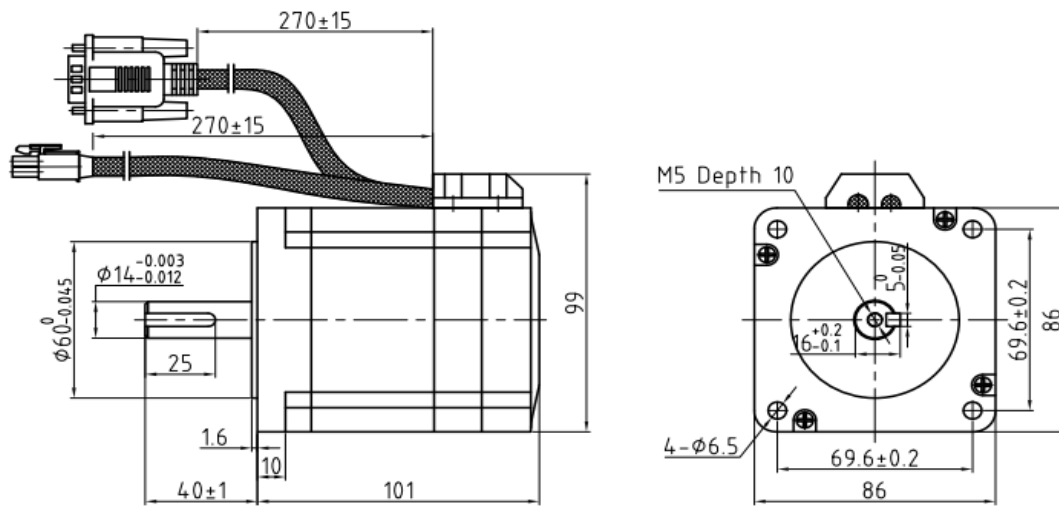
Brake Specification:

| | |
|-----------------|-------|
| Voltage | 24Vdc |
| Friction torque | 1N·M |

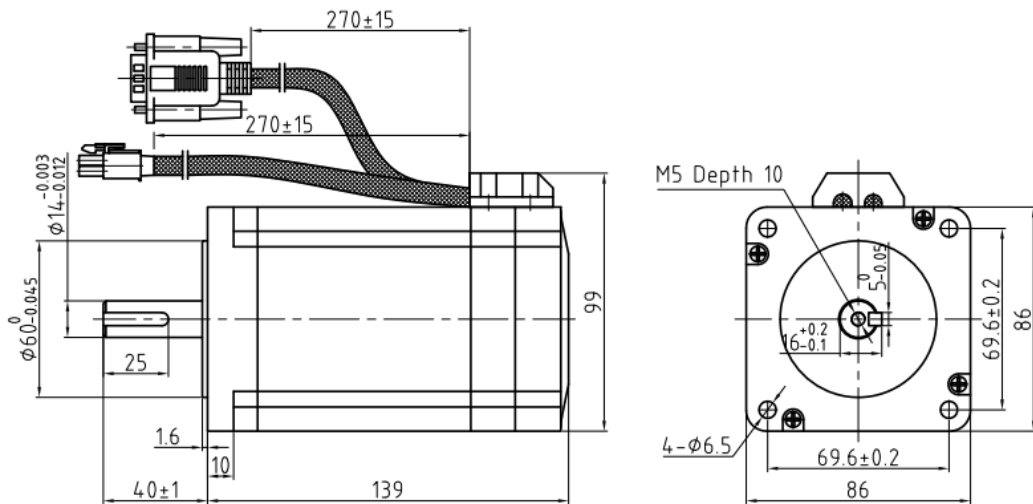
Mechanical Specification of ES-M32320B



Mechanical Specification of ES-M22430



Mechanical Specification of ES-M23440



Mechanical Specification of ES-M23480

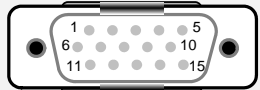
*Note: The Mechanical Specification of ES-M23440-S and ES-M23480-S are the same as ES-M23440 and ES-M23480 respectively, but the shaft diameter of ES-M23440-S and ES-M23480-S are all 12.7mm.

5 Motor Cable

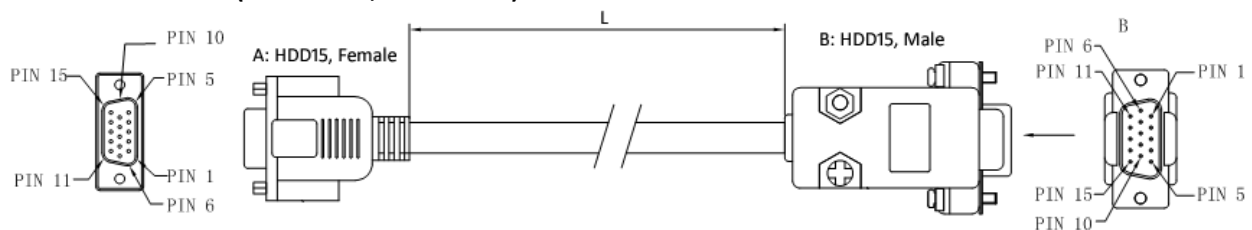
| Part Number | Power Cable | Power Extension Cable | Encoder Cable | Encoder Extension Cable |
|-------------|-------------|---|--------------------------|-------------------------|
| ES-M32309 | 270±15mm | 3.0m / CABLEH-RZ3M0 5.0m / CABLEH-RZ5M0 10.0m / CABLEH-RZ10M0 | 270±15mm (HDD15 Male) | 3.0m / CABLEG-BM3M0 |
| ES-M32320 | | | | 8.0m / CABLEG-BM8M0 |
| ES-M22430 | | | | 10.0m / CABLEG-BM10M0 |
| ES-M23440 | | | | 12.0m / CABLEG-BM12M0 |
| ES-M23480 | | | | |

5.1 Encoder Cable

5.1.1 Encoder Cable Connector

| Pin | Name | Wire Color | I/O | Description | Connector |
|-----|------|------------|-----|-------------------|---|
| 1 | EA+ | Black | O | Channel A+ Output |  <p>HDD15 Male</p> |
| 2 | VCC | Red | I | +5V Power Input | |
| 3 | GND | White | GND | Ground | |
| 4 | NC | - | - | No Connection | |
| 5 | NC | - | - | No Connection | |
| 6 | NC | - | - | No Connection | |
| 7 | NC | - | - | No Connection | |
| 8 | NC | - | - | No Connection | |
| 9 | NC | - | - | No Connection | |
| 10 | NC | - | - | No Connection | |
| 11 | EB+ | Yellow | O | Channel B+ Output | |
| 12 | EB- | Green | O | Channel B- Output | |
| 13 | EA- | Blue | O | Channel A- Output | |
| 14 | NC | - | - | No Connection | |
| 15 | NC | - | - | No Connection | |

➤ CABLEG-BMXMX (ES-M32309, ES-M32320)

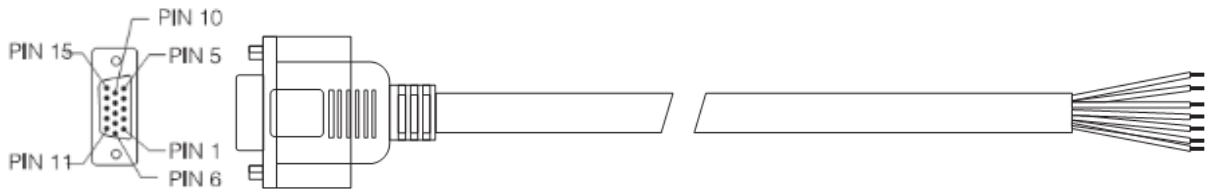


➤ CABLEG-BMXMX Pin Assignments

| A: HDD15 Female | Wire Color | B: HDD15 Male | Name | Description |
|-----------------|------------|---------------|------|-------------|
| Pin | | Pin | | |
| 1 | Black | 1 | EA+ | Channel A+ |

| | | | | |
|----|--------|----|-----|-----------------|
| 2 | Red | 13 | VCC | +5V power input |
| 3 | White | 3 | GND | +5V GND |
| 11 | Yellow | 2 | EB+ | Channel B+ |
| 12 | Green | 12 | EB- | Channel B- |
| 13 | Blue | 11 | EA- | Channel A- |

➤ **CABLEH-BMXMX (ES-M22430, ES-M23440, ES-M23480)**



➤ **CABLEH-BMXMX Pin Assignments**

| Wire Color | Name | Description | Pin | Wire Color | Name | Description |
|------------|------|-------------|-----|------------|------|-----------------|
| Yellow | EB+ | Channel B+ | 13 | Blue | EA- | Channel A- |
| Green | EB- | Channel B- | 2 | Red | VCC | +5V power input |
| Black | EA+ | Channel A+ | 3 | White | GND | +5V GND |

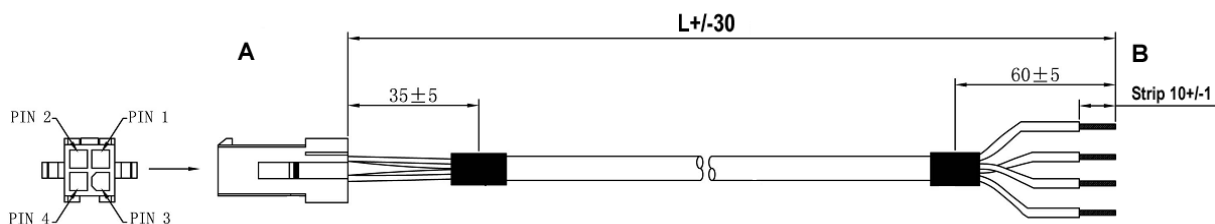
5.1.2 Encoder Extension Cable

| Part Number | L | Matching Motor |
|---------------|-------|--|
| CABLEG-BM3M0 | 3.0m | ES-M32309, ES-M32320 |
| CABLEG-BM8M0 | 8.0m | (Note: The encoder extension cable must be connected between the ES-M3 motor and the ES-D508. You can not connect the motor's encoder cable to the ES-D508 directly.) |
| CABLEG-BM10M0 | 10.0m | |
| CABLEG-BM12M0 | 12.0m | |
| CABLEH-BM3M0 | 3.0m | ES-M22430, ES-M23440, ES-M23480 (Note: The encoder extension cable must be connected between the ES-M2 motor and the ES-D drive. You can not connect the motor's encoder cable to the ES-D808 / ES-D1008 directly.) |
| CABLEH-BM5M5 | 5.5m | |
| CABLEH-BM8M0 | 8.0m | |
| CABLEH-BM10M0 | 10.0m | |
| CABLEH-BM13M0 | 13.0m | |

5.2 Power Cable

5.2.1 Power Cable Connector

➤ **CABLEH-RZXXMX (ES-M32309, ES-M32320, ES-M22430, ES-M23440, ES-M23480)**



➤ **CABLEH-RZXM Pin Assignments and Drive Connections**

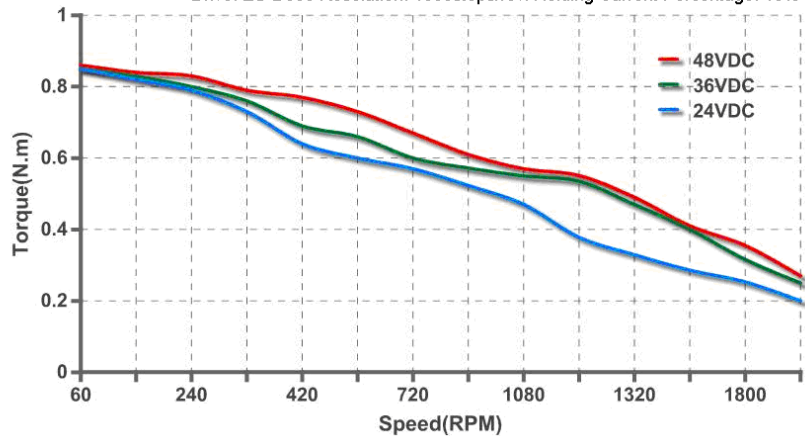
| A | B | ES-D508 | ES-D808, ES-D1008 |
|-----|----------------|-----------------|-------------------|
| Pin | Wire Color | Motor Connector | |
| 1 | Blue | V | B- |
| 2 | Red | U | A- |
| 3 | Black | W | A+ |
| 4 | Yellow / Green | NC | B+ |

5.2.2 Power Extension Cable

| Part Number | L | Matching Motor |
|---------------|-------|---|
| CABLEH-RZ3M0 | 3.0m | ES-M32309, ES-M32320, ES-M22430, ES-M23440, ES-M23480 |
| CABLEH-RZ5M0 | 5.0m | |
| CABLEH-RZ10M0 | 10.0m | |

6 Speed-Torque Curves
ES-M32309

Drive: ES-D508 Resolution: 4000steps/rev. Holding Current Percentage: 40%



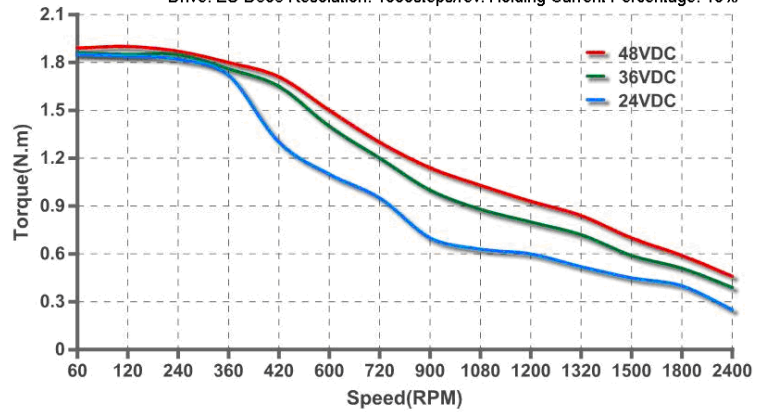
Note: These curves are based on 40% holding torque percentage of ES-D508. If higher torque at high speed is required, you can change the holding torque percentage to 100%. For more details, please refer to the software user manual.

Speed Torque Curve of ES-M32309

ES-M32320

Drive: ES-D508 Resolution: 4000steps/rev. Holding Current Percentage: 40%

Note: These curves are based on 40% holding torque percentage of ES-D508. If higher torque at high speed is required, you can change the holding torque percentage to 100%. For more details, please refer to the software user manual.

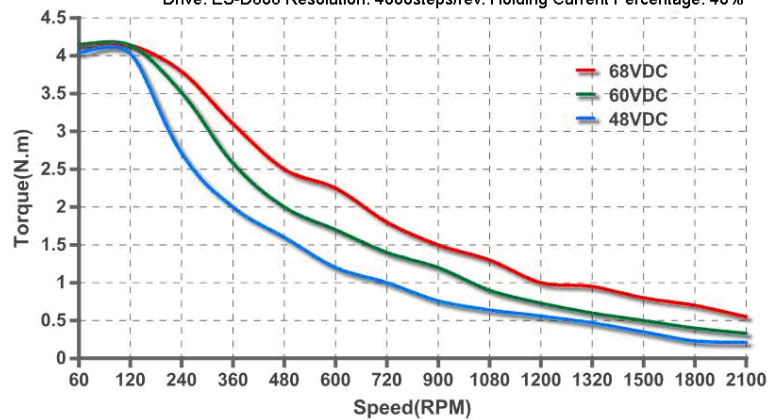


Speed Torque Curve of ES-M32320

ES-M23440

Drive: ES-D808 Resolution: 4000steps/rev. Holding Current Percentage: 40%

Note: These curves are based on 40% holding torque percentage of ES-D808. If higher torque at high speed is required, you can change the holding torque percentage to 100%. For more details, please refer to the software user manual.

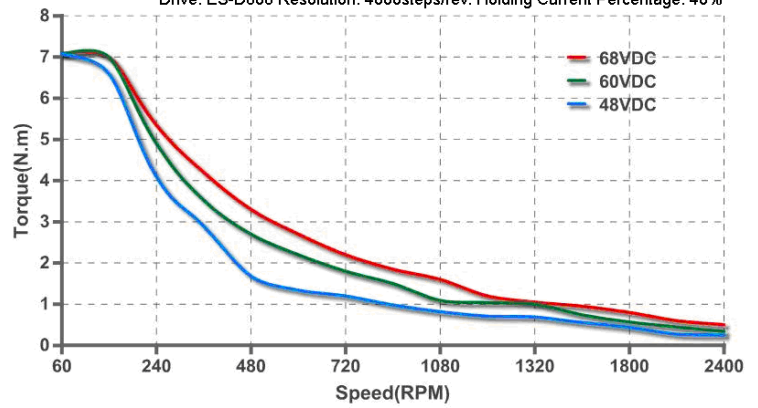


Speed Torque Curve of ES-M23440

ES-M23480

Drive: ES-D808 Resolution: 4000steps/rev. Holding Current Percentage: 40%

Note: These curves are based on 40% holding torque percentage of ES-D808. If higher torque at high speed is required, you can change the holding torque percentage to 100%. For more details, please refer to the software user manual.



Speed Torque Curve of ES-M23480