

# Hybrid Stepping Motor with Hall Sensor

► Combination of two-phase hybrid stepping motor and hall sensor (6 pulse/revolution).



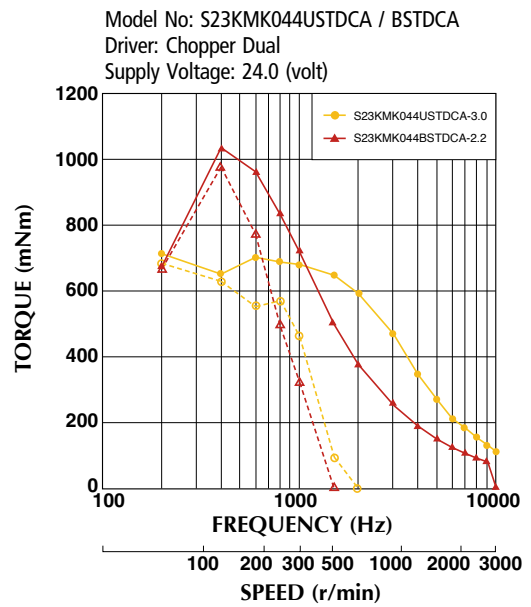
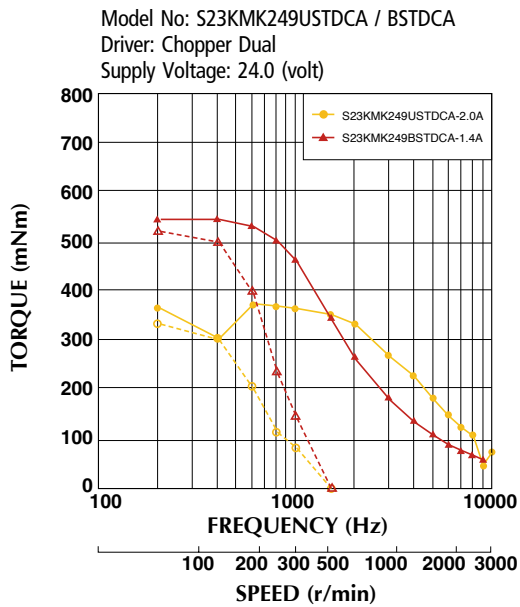
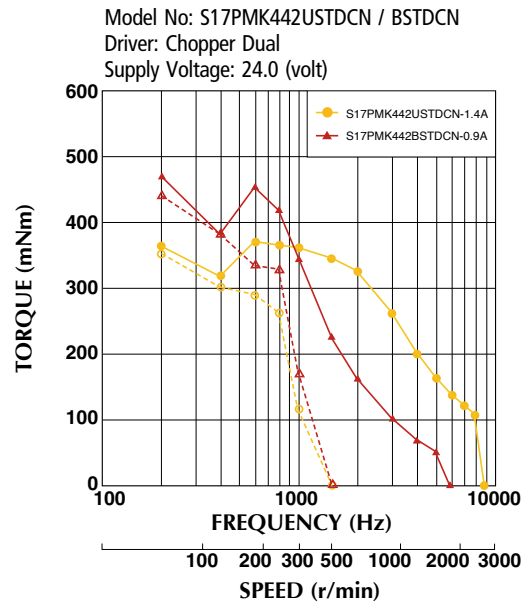
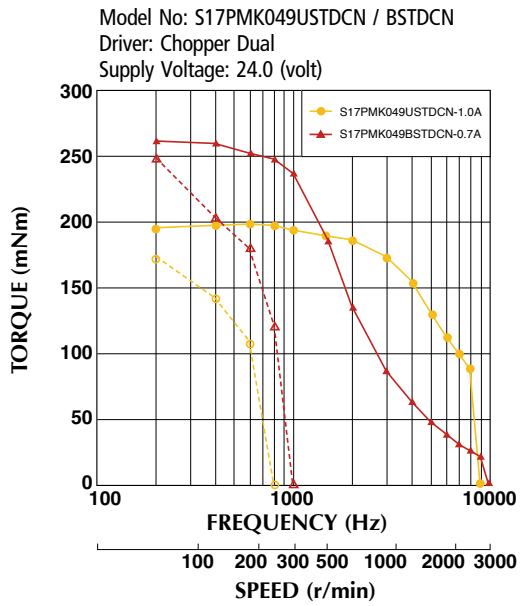
## Lineup

| Model           | Motor Size (mm) | Step Angle (deg) | Drive Sequence | Rated Current (A) | Resistance (Ohms) | Holding Torque (mNm) | Inductance (mH) | Rotor Inertia (g · cm <sup>2</sup> ) | Detent Torque (mNm) | Mass (g) |
|-----------------|-----------------|------------------|----------------|-------------------|-------------------|----------------------|-----------------|--------------------------------------|---------------------|----------|
| S17PMK049USTDCN | □42×34          | 1.8              | UNI-POLAR      | 1.0               | 3.2               | 200                  | 3.2             | 37                                   | 11                  | 200      |
| S17PMK442USTDCN | □42×48          | 1.8              | UNI-POLAR      | 1.4               | 2.8               | 400                  | 3.4             | 75                                   | 16.7                | 350      |
| S17PMK049BSTDCN | □42×34          | 1.8              | BI-POLAR       | 0.7               | 6.4               | 270                  | 12.8            | 37                                   | 11                  | 200      |
| S17PMK442BSTDCN | □42×48          | 1.8              | BI-POLAR       | 0.9               | 5.6               | 500                  | 13.6            | 75                                   | 16.7                | 350      |
| S23KMK249USTDCA | □56×42          | 1.8              | UNI-POLAR      | 2.0               | 1.3               | 420                  | 1.9             | 120                                  | 20                  | 470      |
| S23KMK044USTDCA | □56×54          | 1.8              | UNI-POLAR      | 3.0               | 0.85              | 760                  | 1.8             | 200                                  | 34                  | 680      |
| S23KMK249BSTDCA | □56×42          | 1.8              | BI-POLAR       | 1.4               | 2.4               | 540                  | 7.7             | 120                                  | 20                  | 470      |
| S23KMK044BSTDCA | □56×54          | 1.8              | BI-POLAR       | 2.2               | 1.7               | 1000                 | 7.2             | 200                                  | 34                  | 680      |

## General Specifications

|                           |                                     |
|---------------------------|-------------------------------------|
| Step Accuracy             | ±5%                                 |
| Temperature Rise          | 80°C MAX                            |
| Ambient Temperature Range | -10°C ~ +50°C                       |
| Insulation Resistance     | 100M Ω MIN. DC 500V                 |
| Dielectric Strength       | AC 500V 1min                        |
| Radial Play               | 20 μm MAX. (at 4.4N {450gf} [Load]) |
| End Play                  | 80 μm MAX. (at 4.4N {450gf} [Load]) |

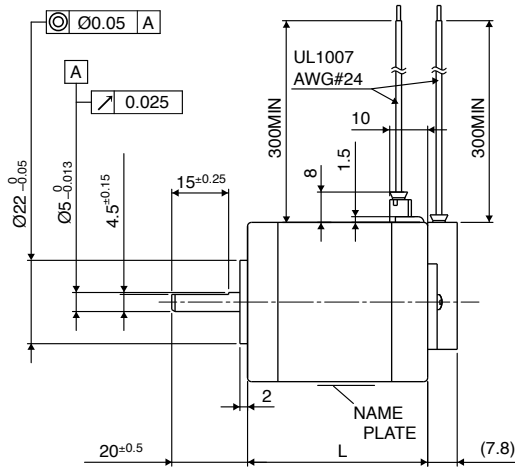
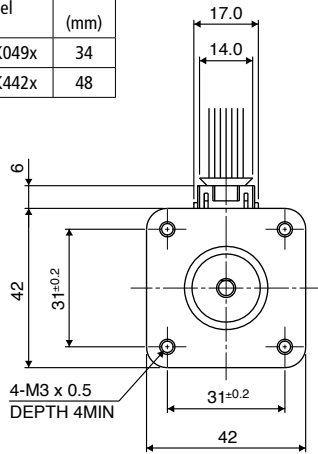
**Torque/Speed Characteristics**



— : PULL OUT  
 - - - : PULL IN

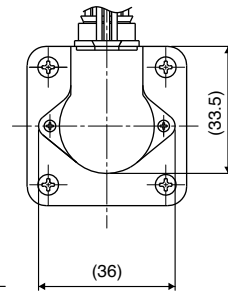
Torque/Speed characteristics are for reference only and it may change when operated at different drive conditions.

| Model      | "L"<br>(mm) |
|------------|-------------|
| S17PMK049x | 34          |
| S17PMK442x | 48          |

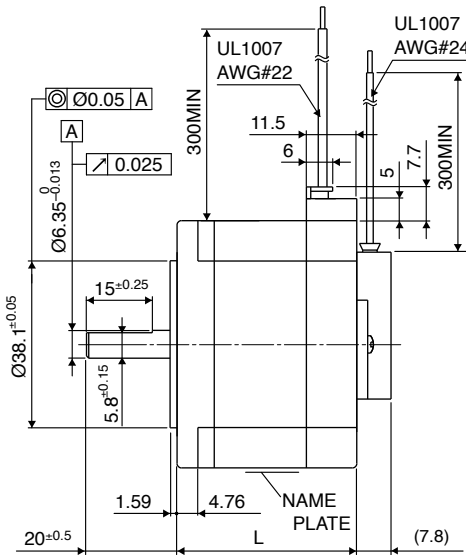
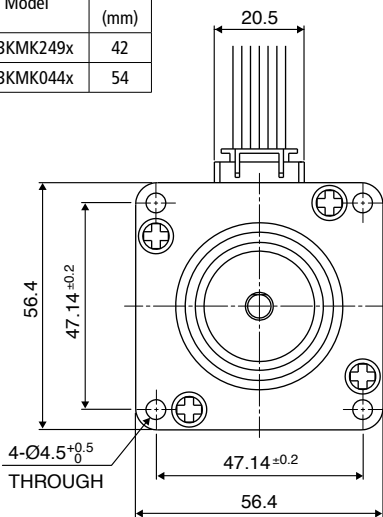


For Hall Sensor

| PIN NO. | SENSOR TERMINAL NO. | SIGNAL | L/W COLOR |
|---------|---------------------|--------|-----------|
| 1       | 2                   | GND    | BLK       |
| 2       | 3                   | OUT    | WHT       |
| 3       | 1                   | Vcc    | RED       |

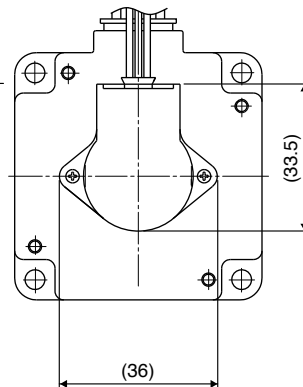


| Model      | "L"<br>(mm) |
|------------|-------------|
| S23KMK249x | 42          |
| S23KMK044x | 54          |



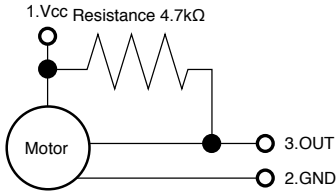
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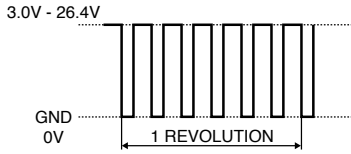


## Hall Sensor Specification

### Circuit configuration



### 6 pulse output signal V out



### (Ta=25°C) Maximum rating (Ta=25°C)

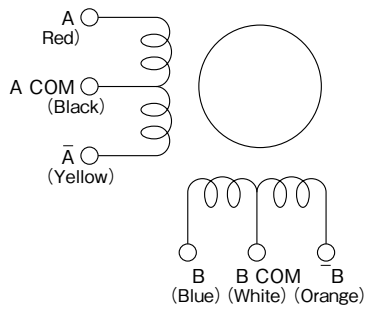
| Item                          | Symbol            | Rating    | Unit |
|-------------------------------|-------------------|-----------|------|
| Supply Voltage                | Vcc               | 18        | V    |
| Output H Voltage              | V <sub>O(H)</sub> | Vcc       | V    |
| Output L Current              | I <sub>sink</sub> | 15        | mA   |
| Operating ambient temperature | T <sub>opr</sub>  | -20 ~ 115 | °C   |
| Storage temperature           | T <sub>stg</sub>  | -40 ~ 125 | °C   |

### (Ta=25°C) Electrical specifications

| Item                               | Symbol            | Measuring condition                          | Min. | Typ. | Max. | Unit |
|------------------------------------|-------------------|--|------|------|------|------|
| Operating voltage range            | Vcc               |  | 4.5  | 12   | 18   | V    |
| Output H → L Magnetic flux density | B <sub>op</sub>   | Vcc = 12V                                    |      |      | 20   | mT   |
| Output L → H Magnetic flux density | B <sub>rp</sub>   | Vcc = 12V                                    | 5    |      |      | mT   |
| Hysteresis error                   | B <sub>h</sub>    | Vcc = 12V                                    | 1.5  |      |      | mT   |
| Saturated output voltage           | V <sub>sat</sub>  | Vcc = 12V, OUT "L", I <sub>sink</sub> = 10mA |      |      | 0.4  | V    |
| Output leakage current             | I <sub>leak</sub> | Vcc = 12V, OUT "H", V <sub>out</sub> = 12V   |      |      | 1    | μA   |
| Power current                      | I <sub>cc</sub>   | Vcc = 12V, OUT "H"                           |      |      | 8    | mA   |

1 [mT] = 10 [Gauss]

## UNI POLAR Wiring Connection Diagram



## BI POLAR Wiring Connection Diagram

