



**SERIES:** NEMA17-AMT112S | **DESCRIPTION:** STEPPER SERVO MOTOR

FEATURES

- Same Sky AMT112S encoder + LIN Engineering stepper motor
- stepper motor with encoder for closed-loop mode when paired with a controller
- small, compact NEMA 17 frame size
- up to 110 oz-in (0.77 N-m) holding torque
- patented capacitive encoder ASIC technology
- incremental resolutions up to 4096 PPR
- resolutions programmable with AMT Viewpoint™ PC software
- digitally set zero position



IN PARTNERSHIP WITH  
 **LIN ENGINEERING**  
The Step Motor Specialists  
BACKED BY **MOONS**



MODEL

|                        | step<br>angle | current/<br>phase | resistance/<br>phase<br>typ | inductance<br>/phase<br>typ | max holding<br>torque | max optimal<br>speed | body length   |
|------------------------|---------------|-------------------|-----------------------------|-----------------------------|-----------------------|----------------------|---------------|
|                        | (°)           | [A]               | (Ω±10%)                     | (mH±20%)                    | (oz-in)               | (RPS)                | max<br>(inch) |
| NEMA17-13-04SD-AMT112S | 1.8           | 0.67              | 9.9                         | 12.52                       | 42.0                  | 6                    | 1.34          |
| NEMA17-13-04PD-AMT112S | 1.8           | 1.33              | 2.5                         | 3.09                        | 42.0                  | 11                   | 1.34          |
| NEMA17-16-06SD-AMT112S | 1.8           | 0.70              | 10.8                        | 21.84                       | 63.0                  | 3                    | 1.58          |
| NEMA17-16-06PD-AMT112S | 1.8           | 1.40              | 2.7                         | 5.46                        | 63.0                  | 6                    | 1.58          |
| NEMA17-19-07SD-AMT112S | 1.8           | 1.05              | 1.3                         | 9.36                        | 83.0                  | 5                    | 1.89          |
| NEMA17-19-07PD-AMT112S | 1.8           | 2.10              | 5.2                         | 2.34                        | 83.0                  | 9                    | 1.89          |
| NEMA17-23-01D-AMT112S  | 1.8           | 2.00              | 2.0                         | 2.91                        | 110.0                 | 7                    | 2.34          |

AMT112S ENCODER  
ELECTRICAL

| parameter                    | conditions/description | min     | typ | max | units |
|------------------------------|------------------------|---------|-----|-----|-------|
| power supply                 | VDD                    | 4.5     | 5   | 5.5 | V     |
| start up time                |                        |         | 200 |     | ms    |
| current consumption          | with unloaded output   |         | 16  |     | mA    |
| output high level            |                        | VDD-0.1 |     |     | V     |
| output low level             |                        |         |     | 0.1 | V     |
| output current (per channel) |                        |         |     | 15  | mA    |
| rise/fall time               |                        |         | 8   |     | ns    |

INCREMENTAL CHARACTERISTICS

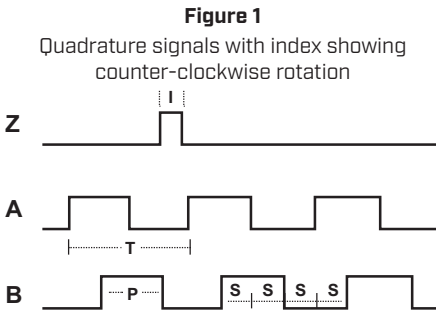
| parameter                           | conditions/description                                                                                            | min | typ | max | units   |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------|-----|-----|-----|---------|
| channels                            | CMOS Voltage: A, B, Z                                                                                             |     |     |     |         |
| waveform                            | CMOS voltage square wave                                                                                          |     |     |     |         |
| phase difference                    | A leads B for CCW rotation (viewed from front)                                                                    |     |     |     |         |
| quadrature resolutions <sup>1</sup> | 48, 96, 100, 125, 192, 200, 250, 256, 360, 384, 400, 500, 512, 768, 800, 1000, 1024, 1600, 2000, 2048, 2500, 4096 |     |     |     | PPR     |
| index <sup>2</sup>                  | one pulse per 360 degree rotation                                                                                 |     |     |     |         |
| accuracy                            |                                                                                                                   |     | 0.2 |     | degrees |
| quadrature duty cycle               |                                                                                                                   |     | 50  |     | %       |

Notes: 1. Resolution programmed with AMT Viewpoint™ PC software. Default resolution set to 400 PPR.  
2. Zero position alignment set with AMT One Touch Zero™ module, AMT Viewpoint™ PC software, or serial commands

MECHANICAL

| parameter                             | conditions/description                                                          | min | typ  | max  | units |
|---------------------------------------|---------------------------------------------------------------------------------|-----|------|------|-------|
| weight                                |                                                                                 |     | 15.7 |      | g     |
| rotational speed (at each resolution) | 48, 96, 100, 125, 192, 200, 250, 256, 384, 400, 500, 512, 800, 1000, 1024, 2048 |     |      | 8000 | RPM   |
|                                       | 360, 768, 1600, 2000, 4096                                                      |     |      | 4000 | RPM   |
|                                       | 2500                                                                            |     |      | 2500 | RPM   |

ENCODER WAVEFORMS



The following parameters are defined by the resolution selected for each encoder, where R = resolution.

| Parameter | Description     | Expression | Units              |
|-----------|-----------------|------------|--------------------|
| T         | period          | 360/R      | mechanical degrees |
| P         | pulse width     | T/2        | mechanical degrees |
| I         | index width     | P/2        | mechanical degrees |
| S         | A/B state width | P/2        | mechanical degrees |

STEPPER MOTOR SPECIFICATIONS

| parameter           | conditions/description                         | min | typ   | max   | units              |
|---------------------|------------------------------------------------|-----|-------|-------|--------------------|
| motor frame size    | NEMA Size 17                                   |     |       |       |                    |
| step angle          |                                                |     | 1.8   |       | °                  |
| rated current/phase | see page 1 for details                         |     |       |       |                    |
| rated voltage       |                                                |     | 24-48 |       | Vdc                |
| resistance/phase    | see page 1 for details                         |     |       |       |                    |
| inductance/phase    | see page 1 for details                         |     |       |       |                    |
| connection type     | bipolar                                        |     |       |       |                    |
| rotor inertia       | NEMA17-13-04SD-AMT112S, NEMA17-13-04PD-AMT112S |     | 0.18  |       | oz-in <sup>2</sup> |
|                     | NEMA17-16-06SD-AMT112S, NEMA17-16-06PD-AMT112S |     | 0.28  |       | oz-in <sup>2</sup> |
|                     | NEMA17-19-07SD-AMT112S, NEMA17-19-07PD-AMT112S |     | 0.37  |       | oz-in <sup>2</sup> |
|                     | NEMA17-23-01D-AMT112S                          |     | 0.56  |       | oz-in <sup>2</sup> |
| max holding torque  | see page 1 for details                         |     |       |       |                    |
| bearing type        | ABEC3                                          |     |       |       |                    |
| front shaft OD      |                                                |     | 5     |       | mm                 |
| front shaft length  |                                                |     | 0.94  |       | inch               |
| max optimal speed   | see page 1 for details                         |     |       |       |                    |
| max axial load      |                                                |     |       | 6     | lb                 |
| radial play         | at 1 lb load                                   |     |       | 0.001 | inch               |
| end play            | at 2 lbs load                                  |     |       | 0.003 | inch               |
| shaft run out       |                                                |     | 0.002 |       | inch TIR           |
| dielectric strength |                                                |     | 500   |       | V                  |
| EMI/EMC             | EN 55014-1:2007                                |     |       |       |                    |

SWITCHING SEQUENCE

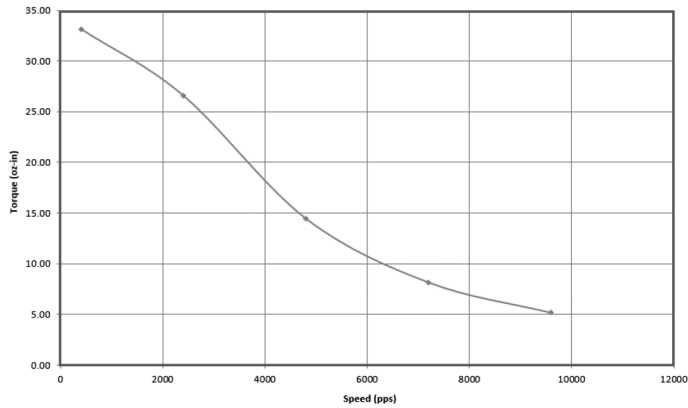
| SWITCHING SEQUENCE                                                                  |      |   |   |   |   |
|-------------------------------------------------------------------------------------|------|---|---|---|---|
| CCW                                                                                 | STEP | A | A | B | B |
|  | 1    | + | - | + | - |
|                                                                                     | 2    | + | - | - | + |
|                                                                                     | 3    | - | + | - | + |
|                                                                                     | 4    | - | + | + | - |
|                                                                                     | 1    | + | - | + | - |
| Motor Rotation Viewed from Front Shaft End                                          |      |   |   |   |   |

ENVIRONMENTAL

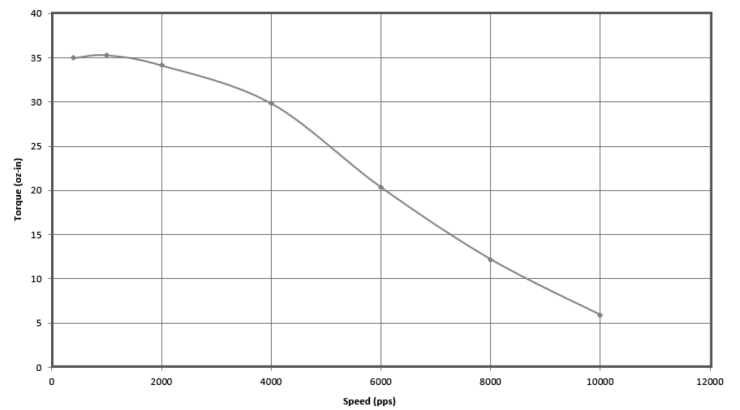
| parameter             | conditions/description                         | min | typ | max | units |
|-----------------------|------------------------------------------------|-----|-----|-----|-------|
| operating temperature |                                                | -20 |     | 50  | °C    |
| storage temperature   |                                                | -20 |     | 100 | °C    |
| humidity              | non-condensing                                 |     |     | 85  | %     |
| vibration             | 10~500 Hz, 5 minute sweep, 2 hours on each XYZ |     |     | 5   | G     |
| shock                 | 3 pulses, 6 ms, 3 on each XYZ                  |     |     | 200 | G     |
| RoHS                  | yes                                            |     |     |     |       |

## TORQUE CURVES

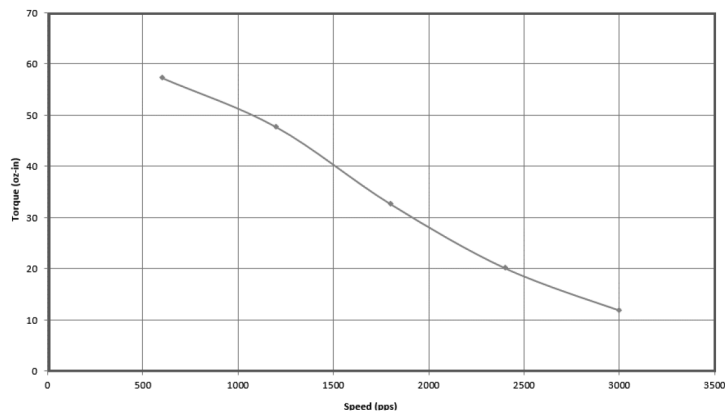
Same Sky P/N NEMA17-13-04SD-AMT112S  
Lin Engineering P/N WD-4118S-04S (1.8 Step Motor)  
24 Vdc, 0.67 Amp/Phase, IB463, 1/2 Stepping



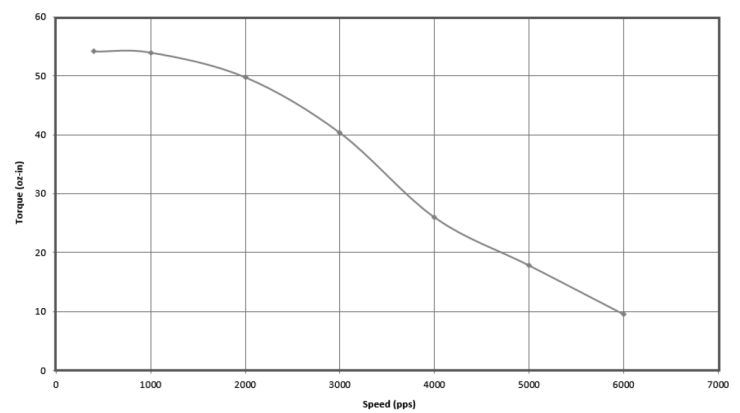
Same Sky P/N NEMA17-13-04PD-AMT112S  
Lin Engineering P/N WD-4118S-04P (1.8 Step Motor)  
24 Vdc, 1.33 Amp/Phase, IB462, 1/2 Stepping



Same Sky P/N NEMA17-16-06SD-AMT112S  
Lin Engineering P/N WD-4118M-06S (1.8 Step Motor)  
24 Vdc, 0.7 Amp/Phase, R208, 1/2 Stepping

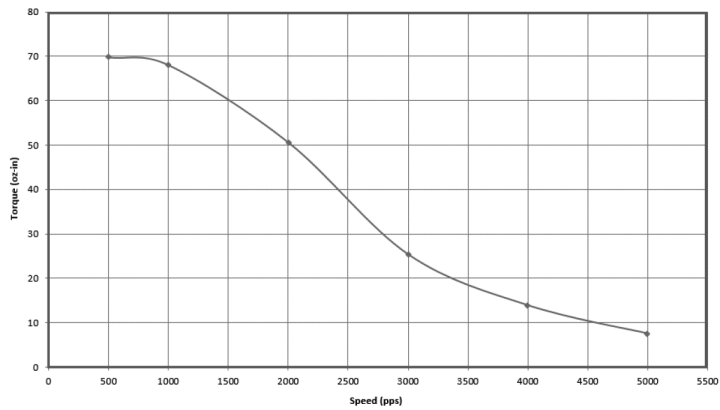


Same Sky P/N NEMA17-16-06PD-AMT112S  
Lin Engineering P/N WD-4118M-06P (1.8 Step Motor)  
24 Vdc, 1.4 Amp/Phase, IB462, 1/2 Stepping

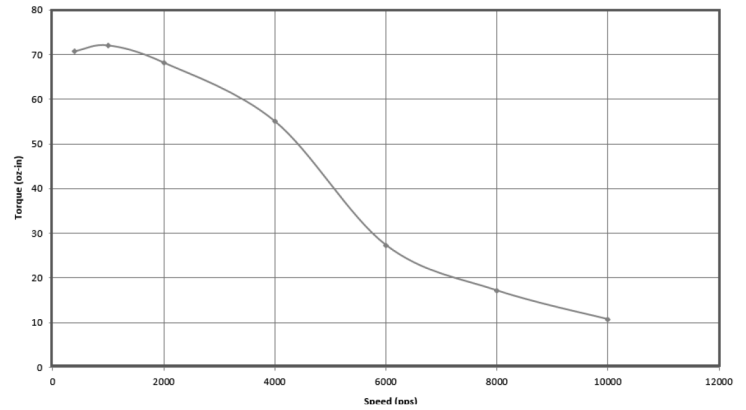


## TORQUE CURVES (CONTINUED)

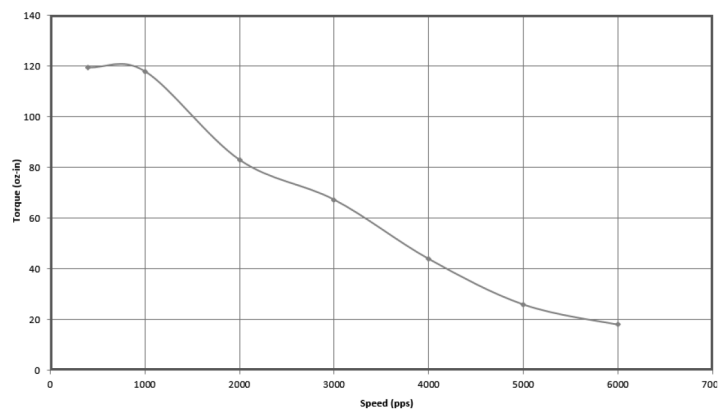
Same Sky P/N NEMA17-19-07SD-AMT112S  
Lin Engineering P/N WD-4118L-07S (1.8 Step Motor)  
24 Vdc, 1.05 Amp/Phase, IB462, 1/2 Stepping



Same Sky P/N NEMA17-19-07PD-AMT112S  
Lin Engineering P/N WD-4118L-07P (1.8 Step Motor)  
24 Vdc, 2.1 Amp/Phase, IB463, 1/2 Stepping

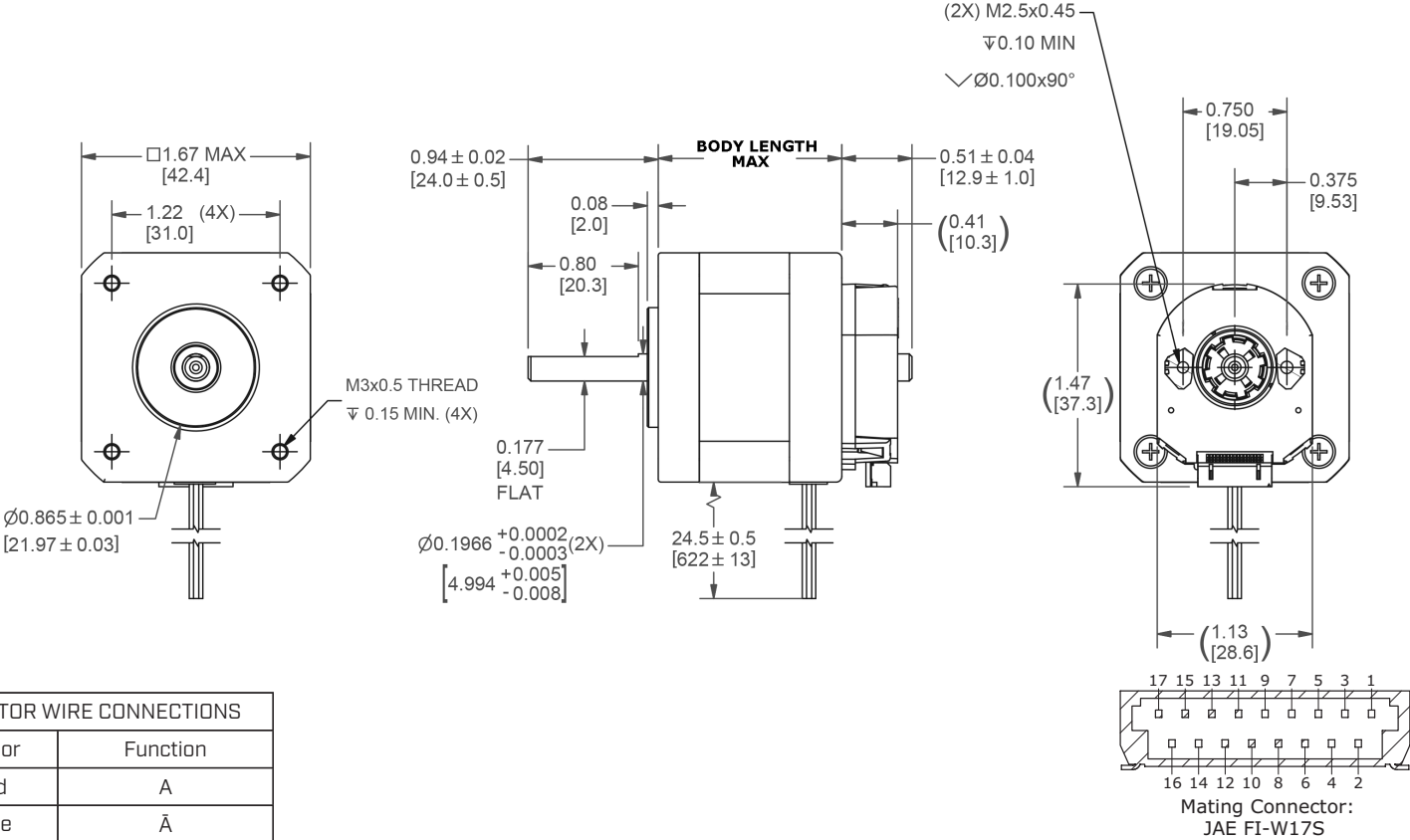


Same Sky P/N NEMA17-23-01D-AMT112S  
Lin Engineering P/N WD-4118C-01 (1.8 Step Motor)  
24 Vdc, 2 Amp/Phase, IB463, 1/2 Stepping



MECHANICAL DRAWING

units: inch [mm]  
tolerance:  
X.XX ±0.01 [±0.25]  
X.XXX ±0.005 [±0.13]  
X.XXXX ±0.0005 [±0.013]



Note 3. NEMA17-19-07PD-AMT112S & NEMA17-23-01D-AMT112S models have 22 AWG wires.

REVISION HISTORY

| rev. | description                       | date       |
|------|-----------------------------------|------------|
| 1.0  | initial release                   | 06/26/2018 |
| 1.01 | corrected datasheet typos         | 08/29/2019 |
| 1.02 | brand update                      | 02/20/2020 |
| 1.03 | logo, datasheet style update      | 08/05/2022 |
| 1.04 | CUI Devices rebranded to Same Sky | 09/12/2024 |

The revision history provided is for informational purposes only and is believed to be accurate.



Same Sky offers a one (1) year limited warranty. Complete warranty information is listed on our website.

Same Sky reserves the right to make changes to the product at any time without notice. Information provided by Same Sky is believed to be accurate and reliable. However, no responsibility is assumed by Same Sky for its use, nor for any infringements of patents or other rights of third parties which may result from its use.

Same Sky products are not authorized or warranted for use as critical components in equipment that requires an extremely high level of reliability. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

**sameskydevices.com**