



**SERIES:** NEMA11-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 11 frame size
- up to 16.6 oz-in [0.12 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



**MODEL**

|                       | step angle | current/phase | resistance/phase typ | inductance/phase typ | max holding torque | max optimal speed | body length |
|-----------------------|------------|---------------|----------------------|----------------------|--------------------|-------------------|-------------|
|                       | (°)        | [A]           | (Ω±10%)              | (mH±20%)             | (oz-in)            | (RPS)             | max (inch)  |
| NEMA11-13-01D-AMT112S | 1.8        | 0.67          | 5.6                  | 3.08                 | 9.2                | 16                | 1.26        |
| NEMA11-18-01D-AMT112S | 1.8        | 0.67          | 7.1                  | 4.79                 | 13.7               | 13                | 1.77        |
| NEMA11-18-02D-AMT112S | 1.8        | 1.3           | 1.3                  | 0.63                 | 12.0               | 44                | 1.77        |
| NEMA11-20-01D-AMT112S | 1.8        | 0.67          | 8.6                  | 6.16                 | 16.6               | 11                | 2.01        |
| NEMA11-20-02D-AMT112S | 1.8        | 1.3           | 1.9                  | 1.46                 | 16.6               | 22                | 2.01        |

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

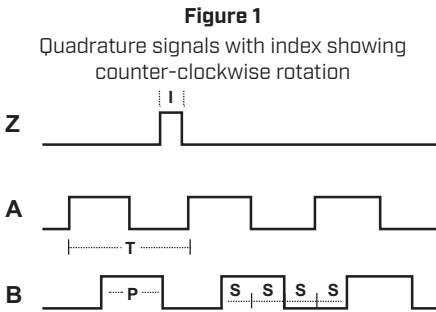
| parameter                           | conditions/description                                                                                            | min | typ | max | units   |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------|-----|-----|-----|---------|
| 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 11                                 |     |       |       |                    |
| 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       | NEMA11-13-01D-AMT112S                        |     | 0.05  |       | oz-in <sup>2</sup> |
|                     | NEMA11-18-01D-AMT112S, NEMA11-18-02D-AMT112S |     | 0.07  |       | oz-in <sup>2</sup> |
|                     | all other models                             |     | 0.10  |       | oz-in <sup>2</sup> |
| max holding torque  | see page 1 for details                       |     |       |       |                    |
| bearing type        | ABEC3                                        |     |       |       |                    |
| front shaft OD      |                                              |     | 5     |       | mm                 |
| front shaft length  |                                              |     | 0.79  |       | inch               |
| max optimal speed   | see page 1 for details                       |     |       |       |                    |
| max axial load      |                                              |     |       | 2.25  | 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

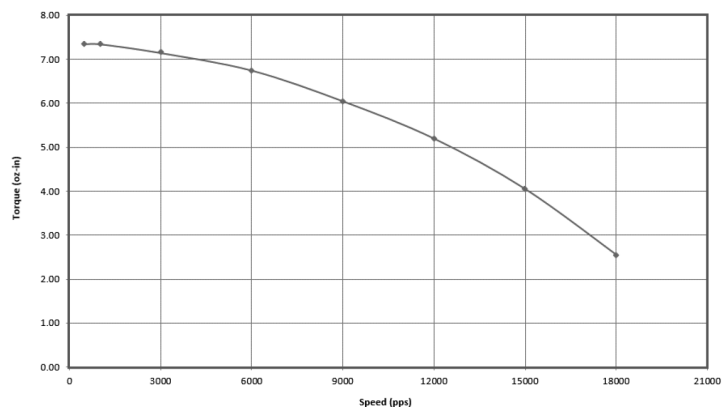
| SWITCHING SEQUENCE                                                                  |      |   |   |   |   |
|-------------------------------------------------------------------------------------|------|---|---|---|---|
| CCW                                                                         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

ENVIRONMENTAL

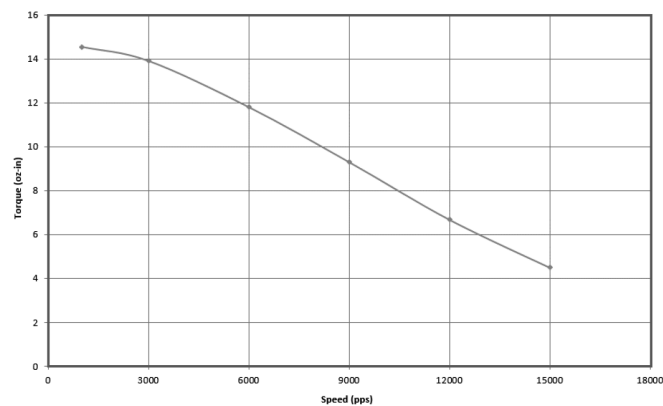
| parameter             | conditions/description                         | min | typ | max | units |
|-----------------------|------------------------------------------------|-----|-----|-----|-------|
| operating temperature |                                                | -20 |     | 50  | °C    |
| 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

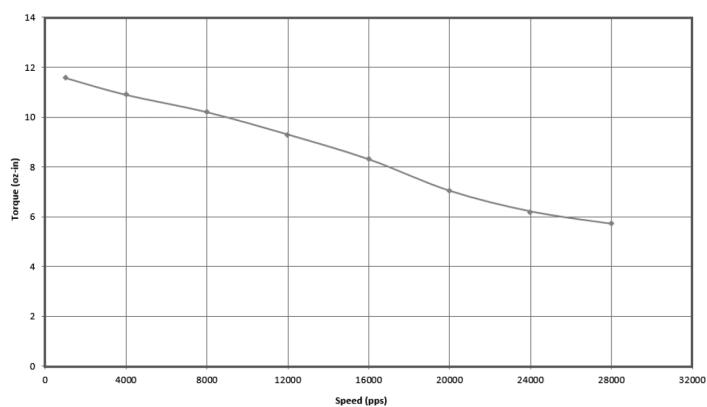
Same Sky P/N NEMA11-13-01D-AMT112S  
Lin Engineering P/N WD-211-13-01 [1.8 Step Motor]  
24 Vdc, 0.67 Amp/Phase, IB462, 1/2 Stepping



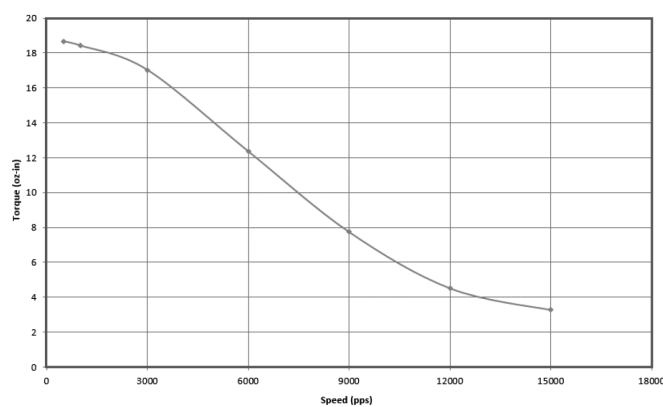
Same Sky P/N NEMA11-18-01D-AMT112S  
Lin Engineering P/N WD-211-18-01 [1.8 Step Motor]  
24 Vdc, 0.67 Amp/Phase, R208, 1/2 Stepping



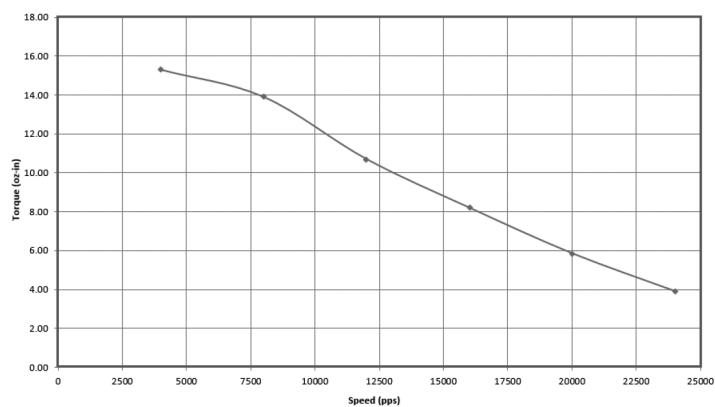
Same Sky P/N NEMA11-18-02D-AMT112S  
Lin Engineering P/N WD-211-18-02 [1.8 Step Motor]  
24 Vdc, 1.3 Amp/Phase, R208, 1/2 Stepping



Same Sky P/N NEMA11-20-01D-AMT112S  
Lin Engineering P/N WD-211-20-01 [1.8 Step Motor]  
24 Vdc, 0.67 Amp/Phase, R208, 1/2 Stepping

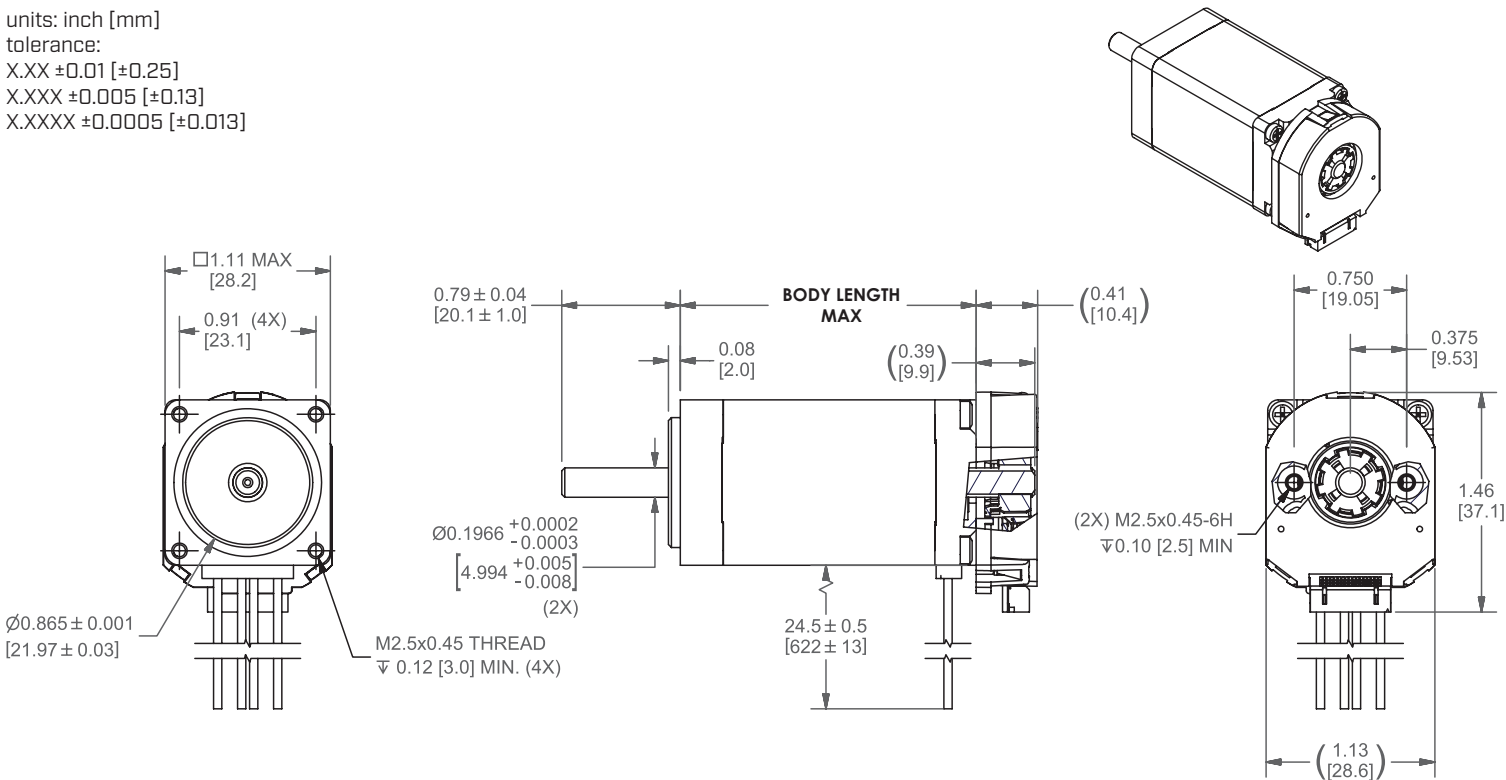


Same Sky P/N NEMA11-20-02D-AMT112S  
Lin Engineering P/N WD-211-20-02 [1.8 Step Motor]  
24 Vdc, 1.3 Amp/Phase, R208, 1/2 Stepping

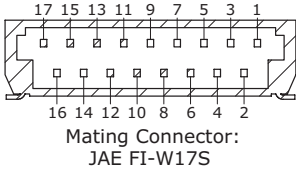


MECHANICAL DRAWING

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



| MOTOR WIRE CONNECTIONS |          |
|------------------------|----------|
| Color                  | Function |
| red                    | A        |
| blue                   | Ā        |
| green                  | B        |
| black                  | Ĕ        |
| 26 AWG, PVC            |          |



| MODEL NO.             | BODY LENGTH (inch) | WEIGHT (lb) |
|-----------------------|--------------------|-------------|
| NEMA11-13-01D-AMT112S | 1.26               | 0.24        |
| NEMA11-18-01D-AMT112S | 1.77               | 0.35        |
| NEMA11-18-02D-AMT112S | 1.77               | 0.35        |
| NEMA11-20-01D-AMT112S | 2.01               | 0.45        |
| NEMA11-20-02D-AMT112S | 2.01               | 0.45        |

| ENCODER CONNECTIONS |          |
|---------------------|----------|
| #                   | Function |
| 1                   | TX_ENC+  |
| 2                   | RX_ENC+  |
| 3                   | N/A      |
| 4                   | GND      |
| 5                   | N/A      |
| 6                   | +5 V     |
| 7                   | N/A      |
| 8                   | B+       |
| 9                   | N/A      |
| 10                  | A+       |
| 11                  | N/A      |
| 12                  | Z+       |
| 13                  | N/A      |
| 14                  | MCLR B   |
| 15                  | N/A      |
| 16                  | N/A      |
| 17                  | N/A      |

REVISION HISTORY

| rev. | description                       | date       |
|------|-----------------------------------|------------|
| 1.0  | initial release                   | 06/26/2018 |
| 1.01 | brand update                      | 02/20/2020 |
| 1.02 | logo, datasheet style update      | 08/05/2022 |
| 1.03 | 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.

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