

SERIES: M223X000X
DESCRIPTION: M223 with AMT103 kit

AMT SPECIFICATIONS

| | |
|--------------------------------------|---|
| output phase difference | 90° ±45° |
| frequency response | 0 ~ 250 kHz |
| output current | 0 ~ 5 mA max. |
| output waveform | square wave |
| output signals | A, B, Z phase |
| current consumption | 6 mA typ., 10 mA max. |
| supply voltage | 3.6 ~ 5.5 V dc |
| output resolution (ppr) ¹ | 48, 96, 100, 125, 192, 200, 250, 256, 384, 400, 500, 512, 800, 1000, 1024, 2048 |
| time constant | 0.2 ms (at 48, 96, 100, 125, 200, 250, 256, 512 ppr) 0.4 ms (at 192, 384, 400, 500, 800, 1000, 1024, 2048 ppr) |
| accuracy | ±15 arcmin (at 192, 384, 400, 500, 800, 1000, 1024, 2048 ppr) ±30 arcmin (at 96, 200, 250, 512 ppr) ±60 arcmin (at 48, 100, 125, 256 ppr) |
| max. rotational speed | 7500 rpm (at 384, 800, 1000, 2048 ppr) 15000 rpm (at 192, 400, 500, 1024 ppr) 30000 rpm (at 48, 96, 100, 125, 200, 250, 256, 512 ppr) |
| operating temp. | -40° ~ 100°C |
| mounting hole options | A) 2 each M1.6 holes on 16 mm (0.63") bolt circle B) 2 each #4 holes on 19.05 mm (0.75") bolt circle C) 2 each M1.6 or M2 holes on 20 mm (0.787") bolt circle D) 3 each M1.6 or M2 holes on 20.9 mm (0.823") bolt circle E) 3 each M1.6 or M2 holes on 22 mm (0.866") bolt circle F) 4 each M1.6 or M2 holes on 25.4 mm (1") bolt circle |

note: 1. All resolutions stated are before quadrature decoding (example: 1000 ppr x 4 = 4000 counts)
2. Some stepper motors may leak a magnetic field causing the AMT index pulse to not function properly.

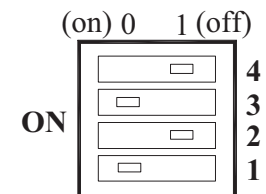
DIP SWITCH SETTINGS

0 = On, 1 = Off

| Resolution (PPR) | Maximum RPM | 4 | 3 | 2 | 1 |
|------------------|-------------|---|---|---|---|
| 2048 | 7500 | 1 | 1 | 1 | 1 |
| 1000 | 7500 | 1 | 1 | 1 | 0 |
| 800 | 7500 | 1 | 1 | 0 | 1 |
| 384 | 7500 | 1 | 1 | 0 | 0 |
| 1024 | 15000 | 1 | 0 | 1 | 1 |
| 500 | 15000 | 1 | 0 | 1 | 0 |
| 400 | 15000 | 1 | 0 | 0 | 1 |
| 192 | 15000 | 1 | 0 | 0 | 0 |
| 512 | 30000 | 0 | 1 | 1 | 1 |
| 250 | 30000 | 0 | 1 | 1 | 0 |
| 200 | 30000 | 0 | 1 | 0 | 1 |
| 96 | 30000 | 0 | 1 | 0 | 0 |
| 256 | 30000 | 0 | 0 | 1 | 1 |
| 125 | 30000 | 0 | 0 | 1 | 0 |
| 100 | 30000 | 0 | 0 | 0 | 1 |
| 48 | 30000 | 0 | 0 | 0 | 0 |

DIP switch:

Example setting: 500

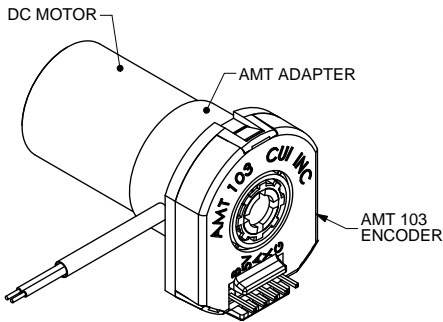
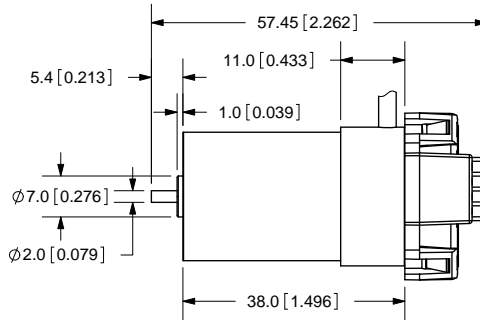
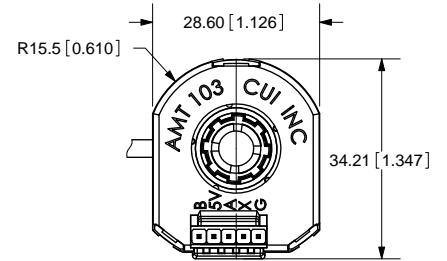
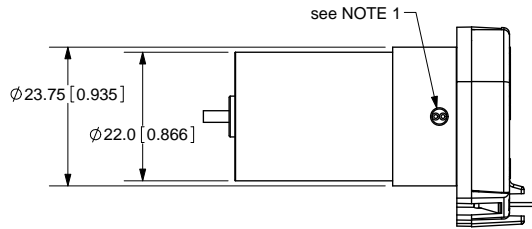
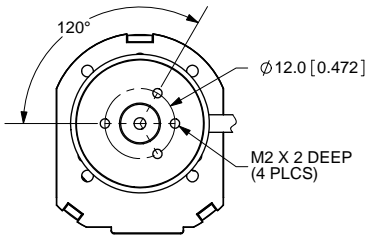


(located on back of encoder)

SERIES: M223X000X
DESCRIPTION: M223 with AMT103 kit
M223X DC MOTOR SPECIFICATIONS


| parameter | conditions/description | min | nom | max | units |
|--------------------------|---|-------|-----------------------|---------------|------------------------------------|
| gear reduction | M223X0002 M223X0003 M223X0004 | | none 1:84 1:231 | | |
| voltage | | | 12 | | V dc |
| winding resistance | | 6.34 | 7.2 | 8.06 | Ω |
| output power | | | | 4.65 | W |
| efficiency | | | | 66 | % |
| no load speed | | 7,400 | 8,400 | 9,400 | rpm |
| no load current | shaft \varnothing 2 mm | 0.03 | 0.06 | 0.09 | A |
| stall torque | | | 21.92 | | mNm |
| friction torque | | | 0.79 | | mNm |
| speed constant | | | 726 | | rpm/V |
| back-EMF constant | | | 1.38 | | mV/rpm |
| torque constant | | | 13.15 | | mNm/A |
| current constant | | | 0.076 | | A/mNm |
| rotor inductance | | | 3,400 | | μ H |
| mechanical time constant | | | 19 | | ms |
| rotor inertia | | | 4.5 | | gcm ² |
| angular acceleration | | | | 49 | 10 ³ rad/s ² |
| thermal resistance | | | 17/22 | | k/W |
| thermal time constant | | | 450 | | s |
| operating temp. | | -10 | | 50 | $^{\circ}$ C |
| shaft bearing | sintered bronze sleeves | | | | |
| shaft load | shaft \varnothing 2 mm: radial at 3,000 rpm (3 mm from bearing) axial at 3,000 rpm axial at standstill (shaft supported) | | | 2 1 294 | N N N |
| shaft play | radial \leq axial \leq | 0.5 | | 0.025 0.45 | mm mm |
| direction of rotation | clockwise, viewed from the front face | | | | |
| speed up to | | | | 10,000 | rpm |
| torque up to | | | | 5,307 | mNm |
| current up to | thermal limits | | | 0.502 | A |

| REV. | DESCRIPTION | DATE |
|------|-------------|----------|
| A | NEW DRAWING | 8/3/2009 |



TOLERANCE:
 $\pm 0.3\text{mm}$ UNLESS OTHERWISE
 SPECIFIED



20050 SW 112th Ave.
 Tualatin, OR 97062
 Phone: 503-612-2300
 800-275-4899
 Fax: 503-612-2383
 Website: www.cui.com

| | | |
|-----------------------------|--------------------|------------|
| TITLE: M223 WITH AMT103 KIT | | REV: A |
| PART NO: M223X0002 | UNITS: MM [INCHES] | |
| DRAWN BY: ZRJ | APPROVED BY: | SCALE: 1:1 |

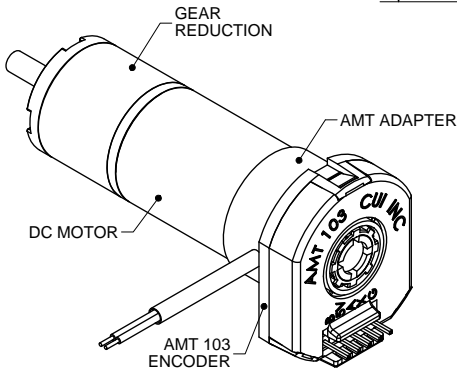
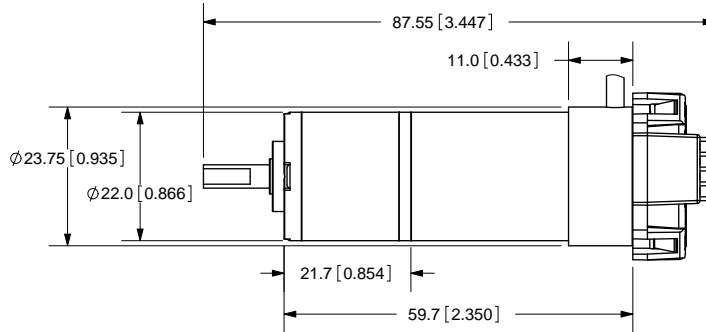
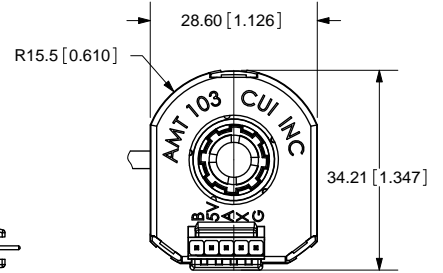
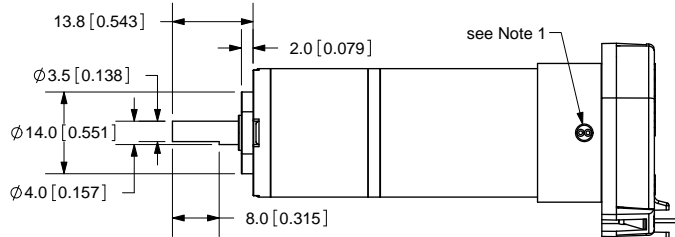
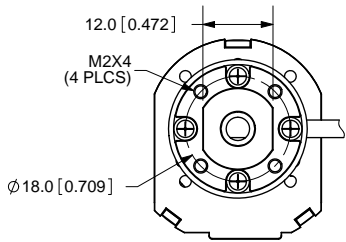
SPECIFICATIONS:

NOTE 1: 4mm opening for 24AWG power leads to be covered with heat shrink, power leads to be tied into 50mm diameter bundle.

PC FILE NAME:
 M223X0002

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| REV. | DESCRIPTION | DATE |
|------|-------------|----------|
| A | NEW DRAWING | 8/3/2009 |



TOLERANCE:
±0.3mm UNLESS OTHERWISE
SPECIFIED



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Tualatin, OR 97062
Phone: 503-612-2300
800-275-4899
Fax: 503-612-2383
Website: www.cui.com

| | | |
|-----------------------------|--------------------|------------|
| TITLE: M223 WITH AMT103 KIT | | REV: A |
| PART NO. M223X0003 | UNITS: MM [INCHES] | |
| DRAWN BY: ZRJ | APPROVED BY: | SCALE: 1:1 |

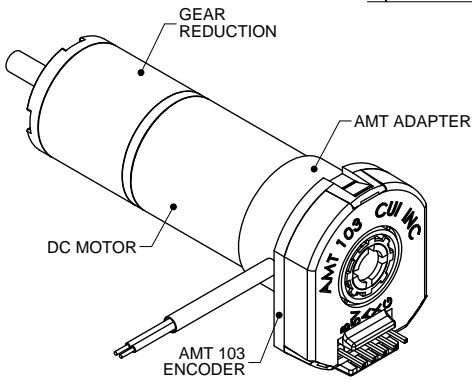
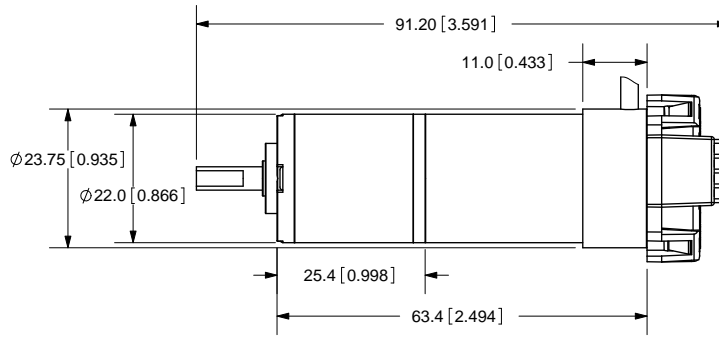
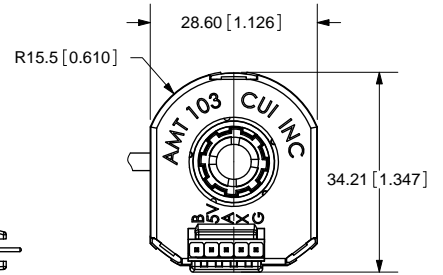
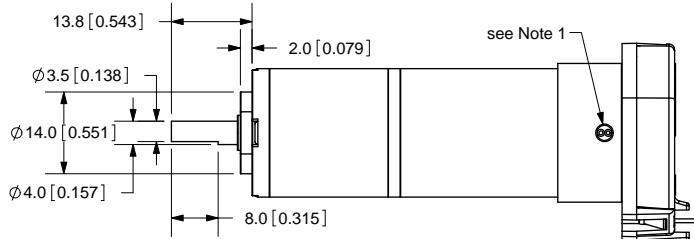
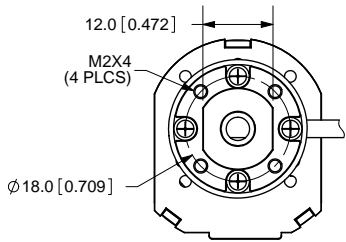
SPECIFICATIONS:

NOTE 1: 4mm opening for 24AWG power leads to be covered with heat shrink, power leads to be tied into 50mm diameter bundle.

PC FILE NAME:
M223X0003

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| REV. | DESCRIPTION | DATE |
|------|-------------|----------|
| A | NEW DRAWING | 8/3/2009 |



TOLERANCE:
±0.3mm UNLESS OTHERWISE
SPECIFIED



20050 SW 112th Ave.
Tualatin, OR 97062
Phone: 503-612-2300
800-275-4899
Fax: 503-612-2383
Website: www.cui.com

| | | |
|-----------------------------|--------------------|------------|
| TITLE: M223 WITH AMT103 KIT | | REV: A |
| PART NO. M223X0004 | UNITS: MM [INCHES] | |
| DRAWN BY: ZRJ | APPROVED BY: | SCALE: 1:1 |

SPECIFICATIONS:

NOTE 1: 4mm opening for 24AWG power leads to be covered with heat shrink, power leads to be tied into 50mm diameter bundle.

PC FILE NAME:
M223X0004

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