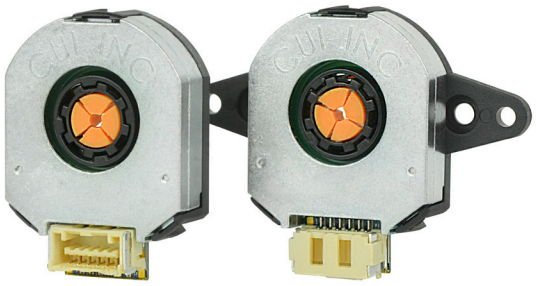
# **SERIES:** AMT23 | **DESCRIPTION:** MODULAR ABSOLUTE ENCODER

### FEATURES

- patented capacitive ASIC technology
- low power consumption
- 12 or 14-bit absolute positon
- Synchronous Serial Interface
- configuration and firmware updates via AMT Viewpoint™ software
- digitally settable zero position
- compact modular package with locking hub for ease of installation
- radial and axial cable connections
- -40 ~ 105°C operating temperature



RoHS

## ELECTRICAL

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| power supply | VDD | 3.8 | 5 | 5.5 | V |
| current consumption | with unloaded output | | 8 | | mA |
| output low level | | | | 0.4 | V |
| output high level | | | 3.3 | | V |

## ABSOLUTE POSITION CHARACTERISTICS

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| resolution | 12 or 14-bit | | | | |
| accuracy | | | 0.2 | | degrees |
| absolute zero position | configurable via AMT Viewpoint™ GUI | | | | |

## MECHANICAL

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| motor shaft length | | 9 | | | mm |
| weight | | | 15.7 | | g |
| axial play | | | | ±0.3 | mm |
| rotational speed | 12-bit position resolution<br>14-bit position resolution | | | 8,000<br>4,000 | RPM<br>RPM |

## ENVIRONMENTAL

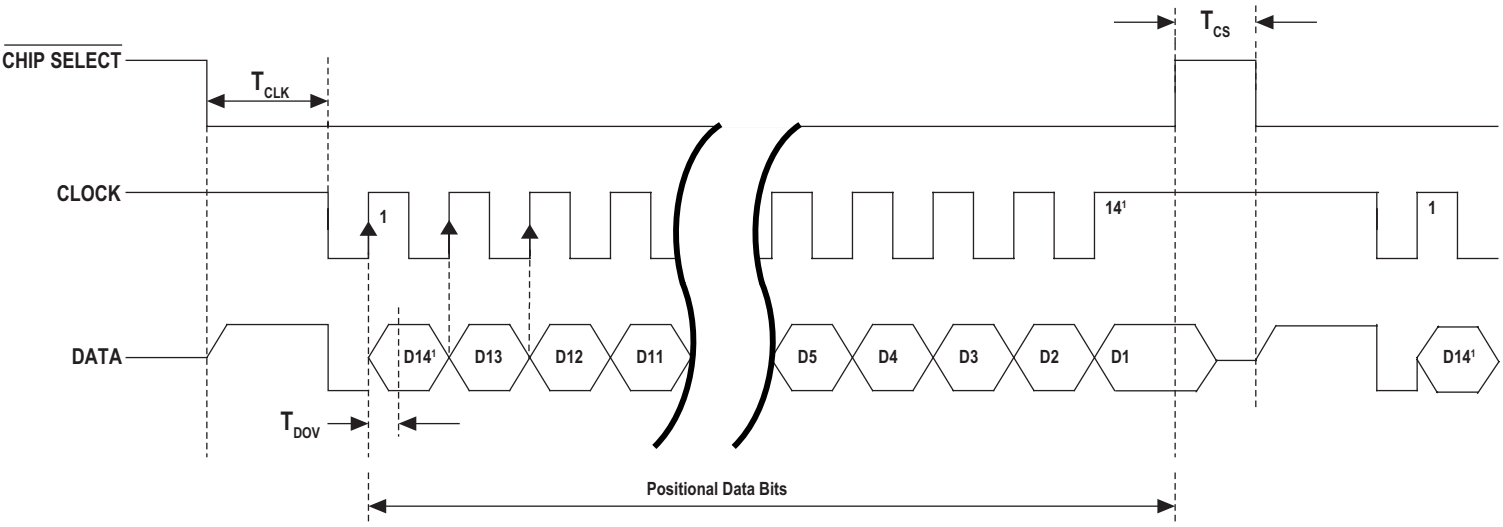
| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| operating temperature | | -40 | | 105 | °C |
| humidity | non-condensing | | | 85 | % |
| vibration | 10~500 Hz, 5 minute sweep, 2 hours on each XYZ | | | 5 | G |
| shock | 3 pulses, 6 ms, 3 on each XYZ | | | 200 | G |
| RoHS | 2011/65/EU | | | | |
| REACH | EC 1907/2006 | | | | |

## SERIAL INTERFACE

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| protocol | Serial Synchronous Interface (SSI) | | | | |
| data rate | | | 1 | 2 | MHz |
| $T_{CLK}$ | data shifted to output buffer | | | 500 | ns |
| $T_{DOV}$ | time before data is valid | | | 250 | ns |
| $T_{CS}$ | time between reads | 1 | | | µs |

## TIMING CHARACTERISTICS

**Figure 1**




Notes: 1. For 12-bit resolution, clock line is toggled only 12 times.

## PART NUMBER KEY

For customers that prefer a specific AMT23 configuration, please reference the custom configuration key below.

**AMT23 X X - XXXX - X**

- Base Number
- Orientation:
  2 = Radial
  3 = Axial
- Absolute Type:
  A = 12-bit
  B = 14-bit
- Sleeve Bore Diameter:
  2000 = 2 mm
  3000 = 3 mm
  3175 = 3.175 mm (1/8”)
  4000 = 4 mm
  4760 = 4.76 mm (3/16”)
  5000 = 5 mm
  6000 = 6 mm
  6350 = 6.35 mm (1/4”)
  8000 = 8 mm
  SKIT = 8 sleeve kit
- Mounting Base:
  S = Standard
  W= Wide

## AMT23-V KITS

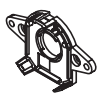
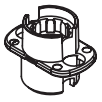
In order to provide maximum flexibility for our customers, the AMT23 series is provided in kit form standard. This allows the user to implement the encoder into a range of applications using one sku#, reducing engineering and inventory costs.

### ORDERING GUIDE

**AMT23XX-V**

- Orientation:
  2 = Radial
  3 = Axial
- Absolute Type:
  A = 12-bit
  B = 14-bit

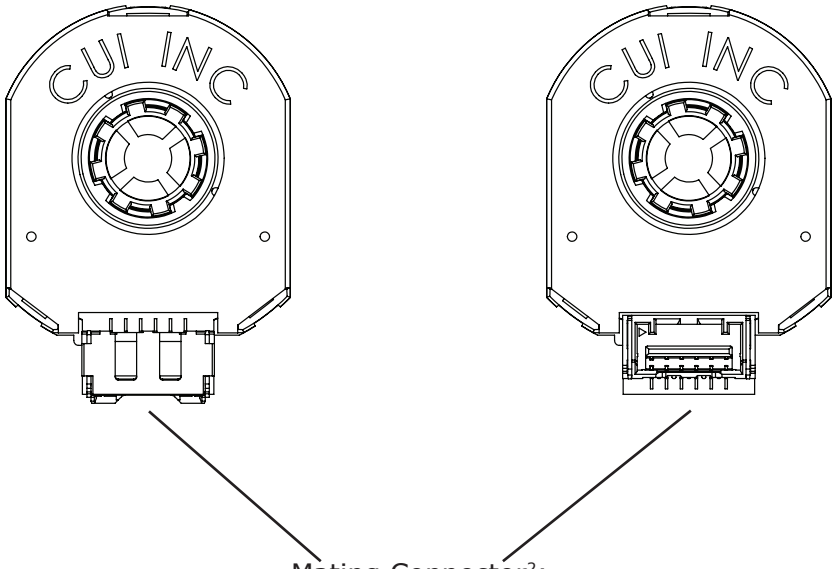
| SLEEVES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| 2mm | 3mm | 1/8 inch (3.175mm) | 4mm | 3/16 inch (4.76mm) | 5mm | 6mm | 1/4 inch (6.35mm) | 8mm |
| Light Sky Blue | Orange | Purple | Gray | Yellow | Green | Red | Snow | Blue |

| BASE | WIDE BASE | TOP COVER | SHAFT ADAPTER | TOOL A | TOOL C |
|---|---|---|---|---|---|
| |  | | | |  |

## ENCODER INTERFACE

| PINOUT CONNECTOR | |
|---|---|
| **#** | **Function** |
| 1 | +5 V |
| 2 | DATA |
| 3 | CLOCK |
| 4 | GND |
| 5[1] | MODE |
| 6 | CHIP SELECT |

**AMT232** **AMT233**



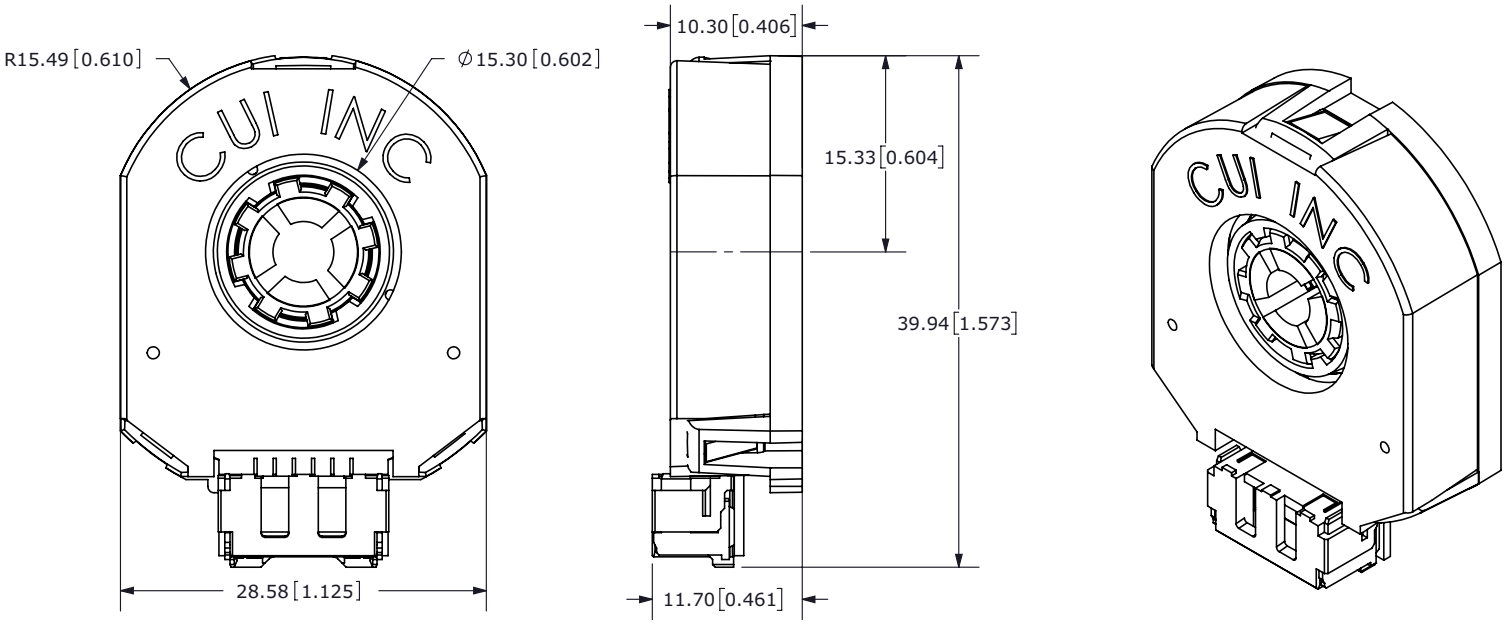

Mating Connector[2]:
Molex 502578-0600

Notes: 1. Mode pin is used by AMT Viewpoint™ for configuring the encoder and should be left open during normal operation.
2. Compatible with prototype cable AMT-06C-1-036 and programming cable AMT-06C-1-036-USB.

## MECHANICAL DRAWING

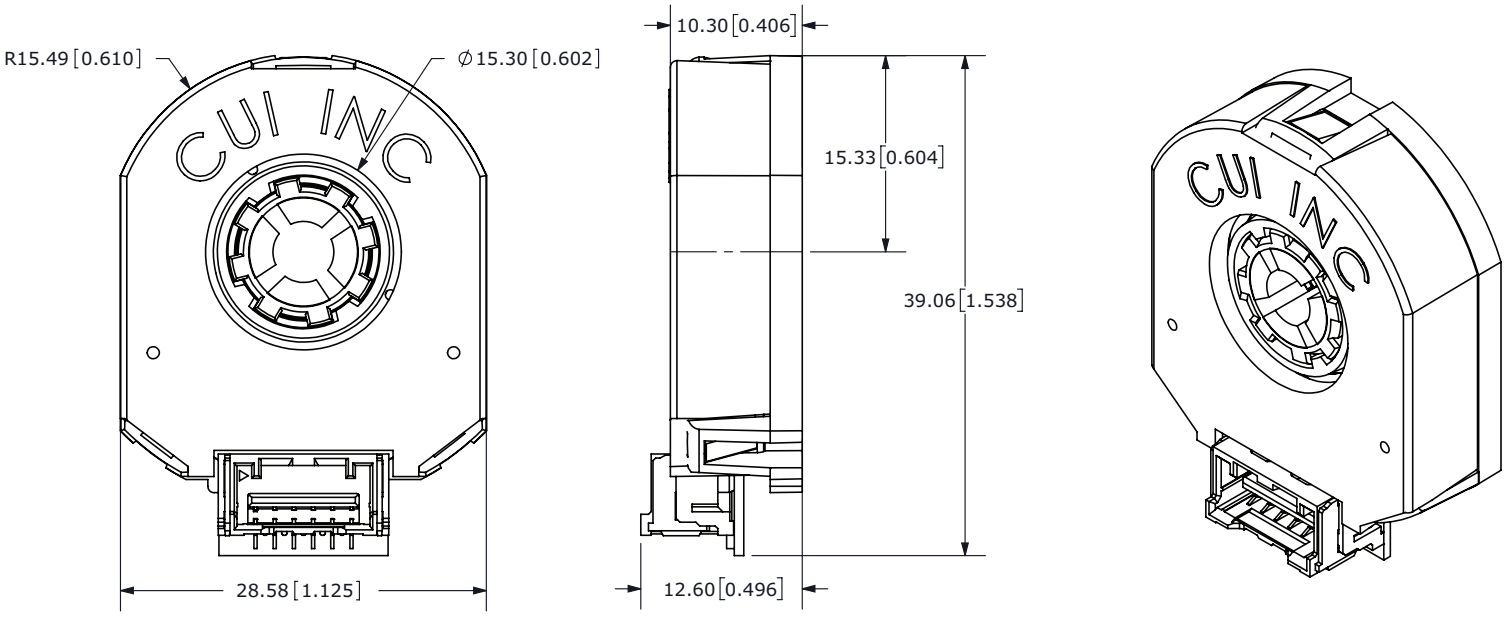
### AMT232

units: mm
tolerance: ±0.1




### AMT233

units: mm
tolerance: ±0.1

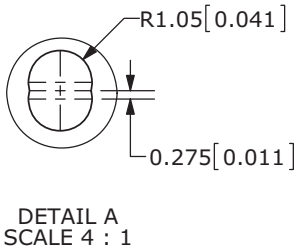


# MECHANICAL DRAWING (CONTINUED)

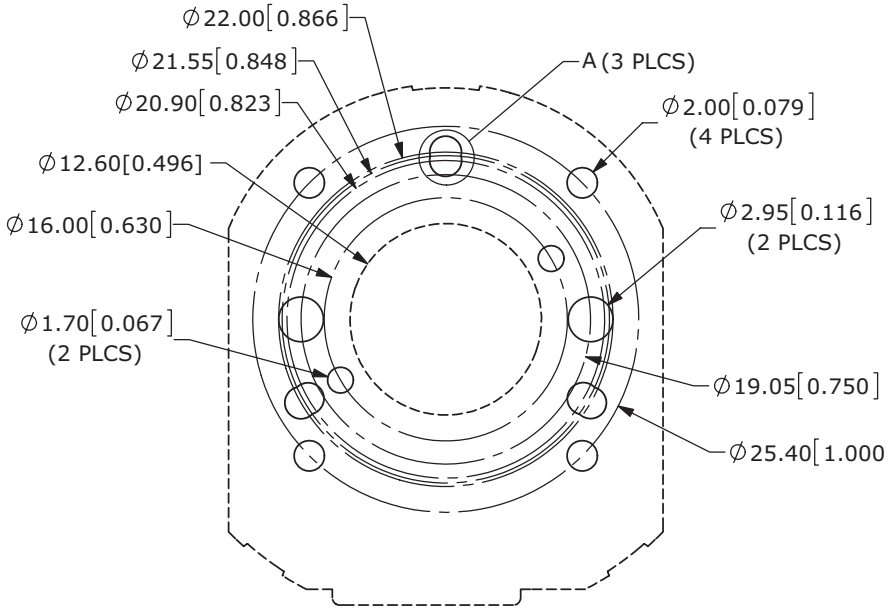
## MOUNTING HOLE PATTERNS

### STANDARD BASE

units: mm[inch]
tolerance: ±0.1

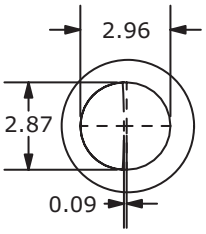



DETAIL A
SCALE 4 : 1

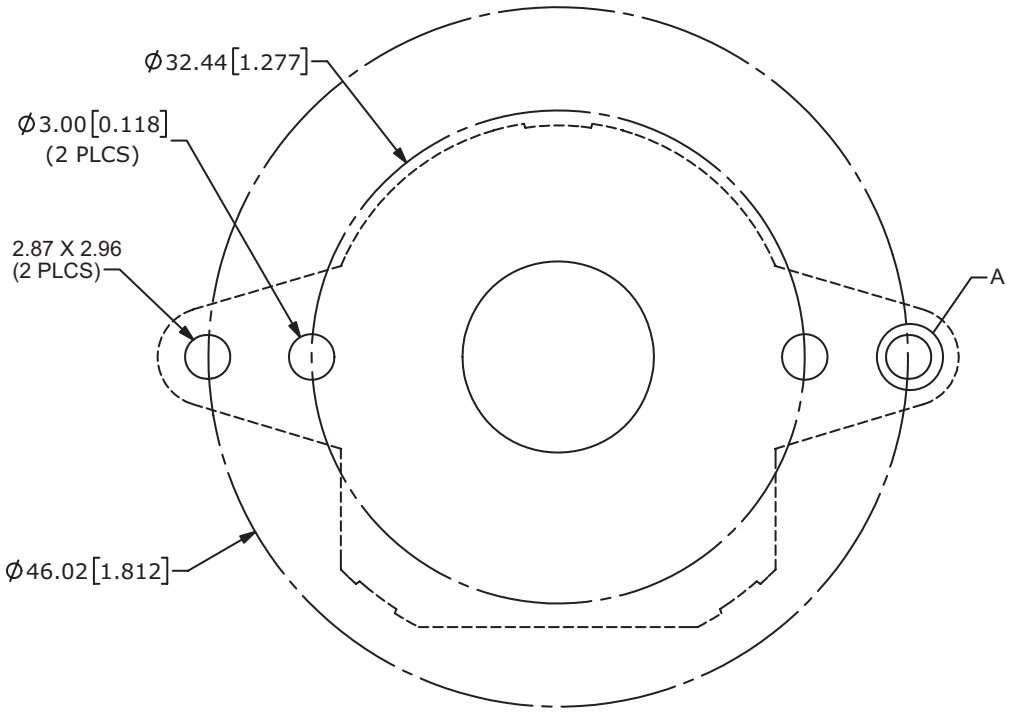



### WIDE BASE

units: mm[inch]
tolerance: ±0.1

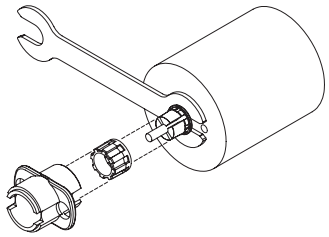



DETAIL A
SCALE 4 : 1



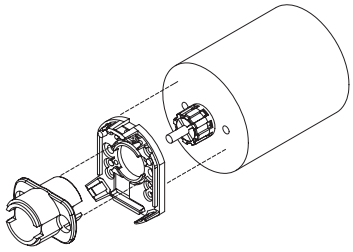
## ASSEMBLY PROCEDURE

### STEP 1



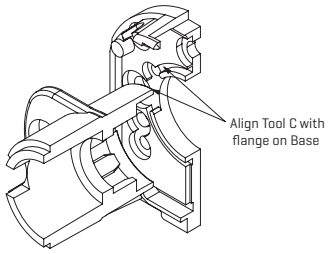
**1.** Insert Tool A as a spacer that defines the distance to the mounting surface.
**2.** Slide appropriate sized Sleeve over shaft all the way down to Tool A.
**3.** Slide Shaft Adaptor over Sleeve.
**4.** Use Tool C to press Shaft Adaptor over Sleeve (ensure Shaft Adapter and Tool C spline alignment) until flush with Tool A.

### STEP 2



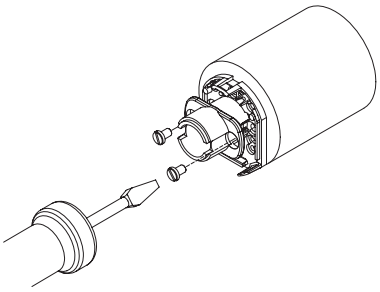
**1.** Remove Tools A and C.
**2.** Place Base on motor, with Tool C used as a centering tool.

### STEP 3



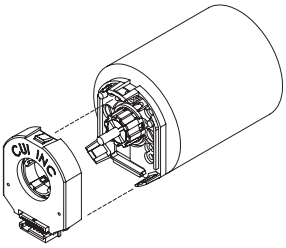

**1.** Align Tool C with flange on Base.
**2.** Slide Base and Tool C onto motor, centering onto the Shaft Adapter.

### STEP 4



**1.** Fasten the Base on the motor (Tool C may need to be rotated to allow for some mounting configurations).
**2.** Remove Tool C.

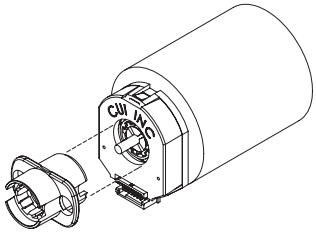
### STEP 5




**1.** Snap the Top Cover onto the Base, carefully observing that the teeth of the Shaft Adaptor align with the grooves in the hub. *

* *We recommend no more than three cycles of mounting and removal of the AMT top cover base. Multiple cycles of mounting and removing the top cover can cause base fatigue over time and affect encoder performance.*

### STEP 6




**1.** Make sure the snaps are fully engaged by pressing on the Hub with the reverse side of Tool C.
**2.** When assembly is finished, the Shaft Adaptor, Sleeve and Rotor Hub should all be flush with the Motor Shaft rotating freely.

## REVISION HISTORY

| rev. | description | date |
|---|---|---|
| 1.0 | initial release | 12/11/2017 |

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

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