M15 Modular Encoder Assembly Instructions

Parts List

Standard Components - See Fig. 1

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>M15 Encoder</td>
<td>1</td>
</tr>
<tr>
<td>M15 Encoder Wheel</td>
<td>1</td>
</tr>
<tr>
<td>Alignment Tool</td>
<td>1</td>
</tr>
<tr>
<td>Air Gap Shim 0.635mm (0.025 in.) for resolution 100-1280</td>
<td>1</td>
</tr>
<tr>
<td>Air Gap Shim 0.127mm (0.005 in.) for resolution 2000 &amp; 2048</td>
<td>1</td>
</tr>
</tbody>
</table>

Optional Components - See Fig. 2

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen Wrench – 1.5 mm (0.059 in.)</td>
<td>1</td>
</tr>
<tr>
<td>M2.5 X 6 Screw Kit</td>
<td>2</td>
</tr>
<tr>
<td>#2-56 X 1/4 Screw Kit</td>
<td>2</td>
</tr>
<tr>
<td>Cover With/Without Through-hole</td>
<td>1</td>
</tr>
<tr>
<td>Connecting Cable 0.5 m (1.64 ft.)</td>
<td>1</td>
</tr>
</tbody>
</table>

Part 1: Installation Instructions – Encoder to Motor

1. Make sure the encoder mounting surface is flat and clean.

   The Timken M15 Modular Encoder's base allows for some flexibility when mounting to motors with bearing caps and bosses. If the Timken M15 Modular Encoder does not sit flat, the installer must provide a flat surface for proper installation.

2. Using either of the available mounting locations, loosely fasten the M15 Encoder to the motor using Timken-supplied optional hardware or customer-supplied hardware. DO NOT TIGHTEN! The use of an anaerobic sealer, like Loctite 222, is suggested for mounting fasteners. See Fig. 3 for mounting locations and dimensions.

   The Timken M15 Modular Encoder will accept fasteners up to 2.9 mm (0.114 in.) in diameter with head sizes ranging from 4.5 mm (0.177 in.) to 5.0 mm (0.200 in.) in diameter. A captive washer is suggested.

3. Slide the Alignment Tool down the motor shaft into the Timken M15 Modular Encoder as shown in Fig. 4.

   The use of an anaerobic sealer is suggested for mounting the M15 Encoder Wheel. Apply a small amount of anaerobic sealer, like Loctite 641, to the gap between the top of the M15 Encoder Wheel and the motor shaft. See Fig. 6.

4. Rotate the Timken M15 Modular Encoder as needed, center the encoder by lightly pushing the Alignment Tool into the center hub and tighten mounting screws to a suggested torque of 1.5 kgf-cm (22 ozf-in).

   For easy alignment, the Timken M15 Modular Encoder allows for up to ±9º of rotation around its base plane.

5. Remove the Alignment Tool.

6. Position the Air Gap Shim so it is covering the Timken Magnetic Encoder ASIC as shown in Fig. 5.

7. Note the Set Screw location on the M15 Encoder Wheel. Slide the Encoder Wheel down the motor shaft until it is resting on the Air Gap Shim.

   NOTE
   DO NOT FORCE the M15 Encoder Wheel onto the Air Gap Shim as this could damage the Timken M15 Modular Encoder.

Fig. 1

Fig. 2

Cover

Allen Wrench – 1.5 mm
(0.059 in.)

Connecting Cable – 5 m
(1.64 ft.)

Screw Kit

Fig. 3

32.5 mm
(1.300 in.)

40 mm
(1.590 in.)

Fig. 4

Fig. 5

Air Gap Shim

Set Screw

Anaerobic Sealer

Index line

Fig. 6

8. Align the Set Screw of the M15 Encoder Wheel with the Index line on the Timken M15 Modular Encoder as shown in Fig. 6.

The use of an anaerobic sealer is suggested for mounting the M15 Encoder Wheel. Apply a small amount of anaerobic sealer, like Loctite 641, to the gap between the top of the M15 Encoder Wheel and the motor shaft. See Fig. 6.

www.bearing.sg
Part 3: M15 Modular Encoder Technical Specifications

1. Scope - M15 Specifications and Requirements

2. Mechanical Specifications

2.1 See Fig. 9

2.2 Mounting Requirements see Fig. 9

2.3 Mounting Screw (Thread Locker Suggested) M3 Set Screw

2.4. Termination, see Table 1

2.5 Hub Bore Size, see Table 2

2.6 Allowable Shaft End Play ≤ .010 in (.254 mm)

2.7 Shipping Weight 1.0 ozs (28 g)

2.8 Hub Material: Steel with Flash Nickel, (ROHS Compliant)

2.9 Magnet Material: Nitrile Bonded Ferrite

2.10 Moment of Inertia see Fig. 8

2.11 Vibration Specification: 30-2000 Hz

2.12 Rotational Adjustment of Alignment: ± 8°

3. Electrical Specifications

3.1 Code: Incremental with Commutation and once around Index Pulse Marker

3.2 Counts Per Revolution see Table 3

3.3 Supply Voltage

3.3.1 Single 5.0V ± 0.25V

3.3.2 Multiple ± 5.0V ± 0.25V

3.4 Current see Table 1

3.5 Output Formats: see Fig. 9

3.5.1 Output Format: Logic Levels:

- 3.5.1.1 Logic “1” 2.5 VDC Min.
- 3.5.1.2 Logic “0” 0.5 VDC Max.

3.5.2 Output Type:

- 3.5.2.1 Line Driver: 20mA Sink/Source
- 3.5.2.2 Open Collector 10mA Sink Max

3.5.3 Output Format Commutation: see Fig. 9

3.5.3.1 / 2 / 4 Pole Motor = 2 Commutation Cycles/360°

3.5.3.2 / 6 Pole Motor = 3 Commutation Cycles/360°

3.5.3.3 / 8 Pole Motor = 4 Commutation Cycles/360°

3.5.4 /8 = 12 Pole Motor = 6 Commutation Cycles/360°

3.6 Operating RPM

3.6.1 10,000 RPM MAX

4. Environment Specifications

4.1 Operation Temperature

- 4.1.1 -40°C - 85°C

4.2 Storage Temperature

- 4.2.1 -55°C - 125°C

4.3 Humidity: 85% Relative (Non-Condensing)

4.4 IP Rating: IP40 with Cover

5. Compliance

5.1 UL: 508, 1584, 1585

5.2 CSA: C22.1 (Non-Condensing)

5.3 CE: EN 60034-21 (Non-Condensing)

5.4 Asia: EN 60034-21 (Non-Condensing)

6. M15 Cover can be ordered with various through-holes allowing the motor shaft to protrude.

Tighten the M15 Encoder Wheel's set screw to a maximum torque of 3.9 kgf-cm (55 ozf-in).

Gently remove the Air Gap Shim

While gently push down on the shaft to seat the shaft as far back into the motor as possible, tighten the M15 Encoder Wheel's set screw to a maximum torque of 3.9 kgf-cm (55 ozf-in).

Part 2: Installation Instructions – Electrical Connections

NOTE

System power must be OFF before making any electrical connections.

Refer to all applicable NEC regulations.

1. Connect the optional M15 Connecting Cable to customer-supplied motor controller and feedback systems using the suggested terminations in Table 1.

NOTE

Timken suggests that the installer should attach the cable shield to electrical ground. Unshielded encoder signals must be individually isolated and under no circumstances in contact with grounding voltage sources or other signal lines.

2. Attach the optional M15 Connecting Cable to the Timken M15 Modular Encoder as shown in Fig. 8. Refer to Timken Document Number C-79641 for cable diagram, available at www.timken.com/motion control

3. Timken suggests anchoring the M15 Connecting Cable no more than 152.4mm (6.0 in.) from the Timken M15 Modular Encoder.

Table 1 - Cable/Pin Functions

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Table 2

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Table 3

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Every reasonable effort has been made to ensure the accuracy of the information contained in this writing, but no liability is accepted for errors, omissions or for any other reason.