MODEL ZMH - HEAVY DUTY LENGTH SENSOR

- HEAVY DUTY INDUSTRIAL CONSTRUCTION
- QUADRATURE OUTPUT
- BUILT-IN SPRING TENSIONING
- VERTICAL, HORIZONTAL, OR UPSIDE-DOWN MOUNTING
- EASY INSTALLATION
- VARIOUS MEASURING WHEELS AVAILABLE
- VARIOUS MOUNTING CONFIGURATIONS

DESCRIPTION
Designed for heavy duty sensing applications, the Heavy Duty Length Sensor, Model ZMH, is versatile and easy-to-use.

It features a built-in spring-loaded torsion arm that provides a simple-to-adjust torsion load, allowing the unit to be mounted in almost any orientation, including upside down. Using a properly selected wheel, the ZMH can be used on almost any surface, while operating at speeds up to 3000 feet per minute. Whether you need to measure speed, position, or distances, the Model ZMH is the ideal solution.

Open Collector Output Wiring
The ZMH sensors have open collector outputs. An open collector output brings the uncommitted collector of the encoder switching device to the external world. Because the collector element is not associated with the sensor supply voltage, the sensor output collector may be “pulled up” to external voltages different than the encoder supply voltage (30 VDC maximum). NPN open collector outputs are current sinking devices. An output signal will not be generated unless a pull-up resistor is connected from the open-collector to the positive side of an external supply. The same supply can be used for powering the unit and for the pull-up resistor.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PPR</th>
<th>PART NUMBER</th>
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<tbody>
<tr>
<td>ZMH *</td>
<td>Heavy Duty Length Sensor with Quadrature Output</td>
<td>250</td>
<td>ZMH0250B</td>
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<tr>
<td></td>
<td></td>
<td>500</td>
<td>ZMH0500B</td>
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<td>2500</td>
<td>ZMH2500B</td>
</tr>
<tr>
<td>MBZM</td>
<td>Mounting Bracket and Shaft</td>
<td>N/A</td>
<td>MBZM0001</td>
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<tr>
<td></td>
<td>Double Wheel Pivot Mount and Shaft</td>
<td>N/A</td>
<td>MBZM0002</td>
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</tbody>
</table>

* Mounting shaft not included.

LENGTH SENSOR MEASUREMENT ACCURACY
Factors which affect measurement accuracy include Measuring Wheel accuracy and wear, and material conditions. Ideally, materials which are hard, thin and strong provide good readings, conversely, soft, thick and elastic materials can present problems in obtaining true readings. Where this effect is consistent, Counter or Rate Indicators with “input scaling” can compensate for Measuring Wheel wear and material elastic and compliance errors. In addition, English/Metric conversions may also be accomplished.

SAFETY SUMMARY
All safety related regulations, local codes and instructions that appear in the literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

SPECIFICATIONS

ELECTRICAL SPECIFICATIONS
1. INPUT VOLTAGE: 4.75 to 28 VDC.
2. INPUT CURRENT: 100 mA max (65 mA typical) with no output load
3. OUTPUTS: NPN Open Collector Transistor, \( V_{OH} = 30 \text{ VDC max.} \); 20 mA max. current. Incremental - Two square waves in quadrature with A leading B for clockwise rotation, as viewed from the wheel side.
4. MAX FREQUENCY: 200 KHz
5. NOISE IMMUNITY: Tested to BS EN61000-6-2; BS EN50081-2; BS EN61000-4-2; BS EN61000-4-3; BS EN61000-4-6, BS EN50081-4
6. SYMMETRY: 180° (+18°) electrical

DIMENSIONS  In inches (mm)

Note: All dimensions are in inches with a tolerance of +0.01" unless otherwise specified.
7. QUAD. PHASING: 90° (±22.5°) electrical
8. MIN. EDGE SEP: 67.5° electrical
9. ACCURACY: Within 0.017° mechanical or 1 arc-minute from true position.
   (for PPR>189)

MECHANICAL SPECIFICATIONS
1. MAXIMUM MECHANICAL SPEED: 3000 RPM
2. SHAFT MATERIAL: Stainless Steel
3. SHAFT SIZE: 0.375"
4. RADIAL SHAFT LOAD: 10 lb. max. controlled by spring torsion.
5. STARTING TORQUE: 1.0 oz-in typical
6. ELECTRICAL CONNECTION: 2 meter Cable, (foil and braid shield, 24 AWG conductors).

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>CABLE WIRE COLOR</th>
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<tbody>
<tr>
<td>VDC</td>
<td>Red</td>
</tr>
<tr>
<td>Com</td>
<td>Black</td>
</tr>
<tr>
<td>A</td>
<td>White</td>
</tr>
<tr>
<td>B</td>
<td>Green</td>
</tr>
<tr>
<td>Shield</td>
<td>Bare</td>
</tr>
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7. MOUNTING: 5/8" diameter thru hole with clamp
8. HOUSING: powder coated aluminum.
9. WEIGHT:
   ZMH: 2.15 lb. (0.975 Kg)
   MBZM0001: 1.5 lb. (0.68 Kg)
   MBZM0002: 0.15 lb. (68.04 g)

ENVIRONMENTAL SPECIFICATIONS
1. OPERATING TEMPERATURE: -20°C to 85°C
2. STORAGE TEMPERATURE: -25°C to +85°C
3. HUMIDITY: 98% RH non-condensing
4. VIBRATION: 10 g @ 58 to 500 Hz
5. SHOCK: 80 g @ 11 msec duration
6. SEALING: IP50

DOUBLE WHEEL PIVOT MOUNT - MBZM0002
This accessory allows the unit to rotate freely to maintain equal pressure on both wheels, accommodating uneven/angled surfaces and mounting misalignment. Pivot mounting shaft included with MBZM0002. For installation of unit, use the mounting bracket and shaft included with MBZM0001.
When the desired output of a length sensor and wheel combination is either in feet or inch units, selection of the proper combination is relatively straightforward. For example, with a 1-foot wheel circumference, a 1 PPR Rotary Pulse Generator will deliver 1 pulse/ft, 12 PPR would deliver 12 pulses/ft (1 pulse/inch); 100 PPR would yield 100 pulses/ft; and 120 PPR would permit measuring to 1/10th of an inch (1/120th of a foot).

SELECTING APPROPRIATE WHEEL SIZE & PPR (Pulses Per Rev.) OF ROTARY PULSE GENERATOR

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WHEEL CODE | CIRCUMFERENCE | TOLERANCE | PART NUMBER
--- | --- | --- | ---
OR | 1 foot (1/3 yd) | ±0.40% | WF1000OR
| 1/3 meter | ±0.40% | WM0333OR
| 4/10ths yard | ±0.40% | WY0400OR
| 4/10ths meter | ±0.40% | WM0400OR

OF | 1 foot (1/3 yd) | ±0.35% | WF1000OF
| 1/3 meter | ±0.30% | WM0333OF
| 4/10ths yard | ±0.30% | WY0400OF
| 4/10ths meter | ±0.30% | WM0400OF

BF (Balanced) | 1 foot (1/3 yd) | ±0.40% | WF1000BF

Note: After installation of measuring wheels, ensure guards, shields or other devices are in place to protect personnel from rotating equipment.

ZMH INSTALLATION

**INSTALLATION:**
1. Slide ZMH over a fixed Ø5/8" (Ø0.625 ±0/-0.005") shaft. The optional ZMH Mounting Bracket (MBZM0001) is shown in the picture.
2. While rotating the ZMH clamp to apply a spring load, securely tighten the two clamp bolts with a 5/32" (supplied) or 4 mm hex "L" key.

Note 1: A 1/2 – 20 bolt can be threaded into the end of the clamp to aid in loading the spring as shown. If a 1/2 – 20 bolt is not handy, then a Ø0.45" or smaller rod, bolt, screwdriver etc. works as well.

Note 2: The spring should not be preloaded too much or it may come in contact with the spring limit pins and the ZMH will not have sufficient travel to accommodate variations in the surface height of the material being measured. For most applications, the spring setting in its mid-range (5-6 lbs.) is sufficient.
**LIMITED WARRANTY**

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.

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**DOUBLE WHEEL PIVOT INSTALLATION (MBZM0002):**

Note: It is recommended that double wheel ZMH’s be installed with the optional Double Wheel Pivot. The pivot allows the unit to rotate freely to maintain equal pressure on both wheels, accommodating uneven/angled surfaces and mounting misalignment.

1. Thread the pivot clamp into the end of the ZMH’s clamp by hand until the threads just bottom out then back out approximately 1 revolution to allow for rotation after installation.
2. Slide the pivot clamp over a fixed Ø5/8" (Ø0.625 +0/-0.005") shaft. The optional ZMH Mounting Bracket (MBZM0001) is shown in the picture.
3. While applying a load to the spring, securely tighten the two clamp bolts with a 5/32" (supplied) or 4mm hex “L” key.

**CONNECTOR EXIT ORIENTATION ADJUSTMENT:**

1. Slide the ZMH over a Ø5/8" (Ø0.625 +0/-0.005") shaft and tighten the clamp bolts with the supplied 5/32" hex “L” key.
2. Remove the measuring wheel(s) using the supplied 3/32" hex “L” wrench to loosen the set screws.
3. Remove 6 screws (3 on each side) from the side plates using the supplied 7/64" hex “L” key.
4. Rotate body of encoder to desired orientation, aligning bolt pattern with one of six unique positions (see inset drawing).
5. Replace side plate screws and measuring wheel(s), making sure to tighten screws securely.

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