

## MODEL ZR - C-FACE ENCODER WITH NPN OPEN COLLECTOR OUTPUT



- THRU-SHAFT DESIGN FOR EASY MOUNTING
- EXCELLENT CHOICE FOR VECTOR MOTOR DRIVE CONTROL
- DESIGNED FOR INDUSTRIAL ENVIRONMENTS
- QUADRATURE OUTPUT
- POSITIVE INDEX PULSE
- C-FACE GASKET KIT INCLUDED

### GENERAL DESCRIPTION

The Model ZR C-face encoder is a rugged, high resolution, high temperature (100°C) encoder designed to mount directly on NEMA C-face motors. The ZR contains a precision bearing and internal coupling that virtually eliminates inaccuracies induced by motor shaft runout. This encoder is ideal for applications using high performance AC vector motors.

The thru-shaft design allows fast and simple mounting of the encoder directly to the accessory shaft or to the drive shaft of the motor, using the standard motor face (NEMA sizes 56C, 143TC, 145TC, 182C, 184C). The tough anodized aluminum housing with thru-shaft design resists the vibration and hazards of an industrial environment. In addition, a C-face gasket kit is included free for motor shaft protection and enclosure.

### Open Collector Output Wiring

The ZR series of 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 (40 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.

### SPECIFICATIONS

#### ELECTRICAL SPECIFICATIONS

1. **SUPPLY:** 4.75 to 28 VDC, 40 mA current draw typical, 100 mA maximum.
2. **OUTPUT:** NPN Open Collector transistor,  $V_{OH} = 40$  VDC max.; 100 mA max. current. Incremental - two square waves in quadrature with A leading B for clockwise rotation. Positive pulse index.
3. **CYCLES PER REVOLUTION:** 256 or 1024  
*Note: Review the max. input rate of the RLC counter being used. The high output rate of the 1024 version will quickly reach the max. input capability of RLC quadrature counters. At 1024 PPR, high pulse rates are reached at low RPM.*
4. **MAX. FREQUENCY:** 200 KHz
5. **NOISE IMMUNITY:** Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DENV 50141; DENV 50204; BS EN55022; BS EN61000-6-2; BS EN50081-2
6. **SYMMETRY:** 180° ( $\pm 18^\circ$ ) electrical
7. **QUAD PHASING:** 90° (+22.5) electrical
8. **MIN EDGE SEP:** 67.5° electrical
9. **RISE TIME:** Less than 1 microsecond

#### MECHANICAL SPECIFICATIONS

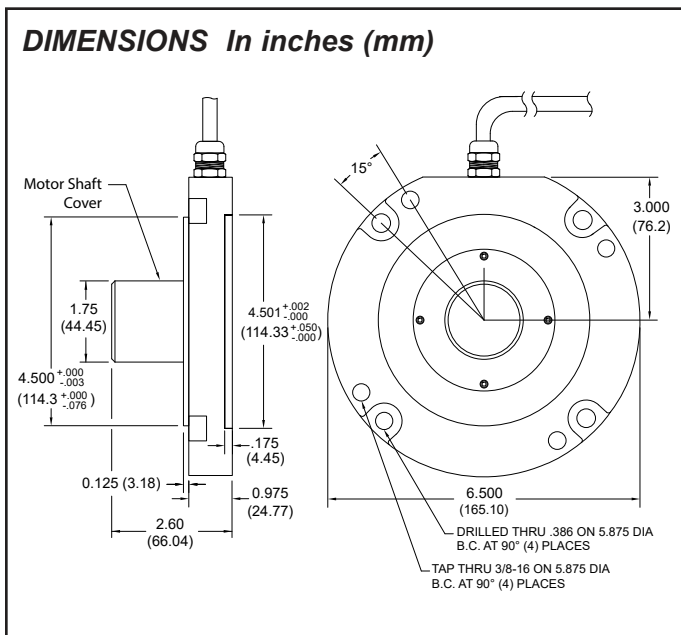
1. **MAX MECHANICAL SPEED:** 6000 RPM
2. **BORE DIAMETER:** 0.625" or 1.0"
3. **BORE TOLERANCE:** +0.0015"/-0.000"
4. **MOMENT OF INERTIA:**  $3.3 \times 10^{-3}$  oz-in-sec<sup>2</sup> typical
5. **USER SHAFT TOLERANCES:**  
 Radial Runout: 0.005"  
 Axial Endplay:  $\pm 0.015$ "
6. **ELECTRICAL CONNECTION:** 36" (914.4 mm) cable. 24 AWG foil and braid shield.

FUNCTION	WIRE COLOR
+ VDC	RED
COMMON	BLACK
DATA A	WHITE
DATA B	GREEN
INDEX Z	ORANGE

7. **HOUSING:** All metal construction.
8. **MOUNTING:** NEMA 56C to 184C when proper bore size is selected
9. **WEIGHT:** 2.60 lb. (1.18 Kg) typical

#### ENVIRONMENTAL CONDITIONS

1. **OPERATING TEMPERATURE:** 0 to +100°C @ 4.75 to 24 VDC  
 0 to +70°C @ 4.75 to 28 VDC
2. **STORAGE TEMPERATURE:** -25 to +100°C
3. **HUMIDITY:** 98% RH non-condensing
4. **VIBRATION:** 10 g @ 58 to 500 Hz
5. **SHOCK:** 50 g @ 11 msec duration
6. **SEALING:** IP65 with included shaft cover and gaskets installed.



## MOUNTING INSTRUCTIONS

### Mounting Kit Items Included:

- 4 ea. - 3/8" 16 x 1.0" Length Socket Head Cap Screws, Black Alloy.
- 4 ea. - 3/8" High Collar Spring Lock washer, Steel Zinc.
- 1 ea. 3/32" Hex Allen Wrench, Long arm.

*Note: The ZR encoder can mount to many types of C face devices. In these mounting instructions, we will refer to the device as a motor.*

### Step 1

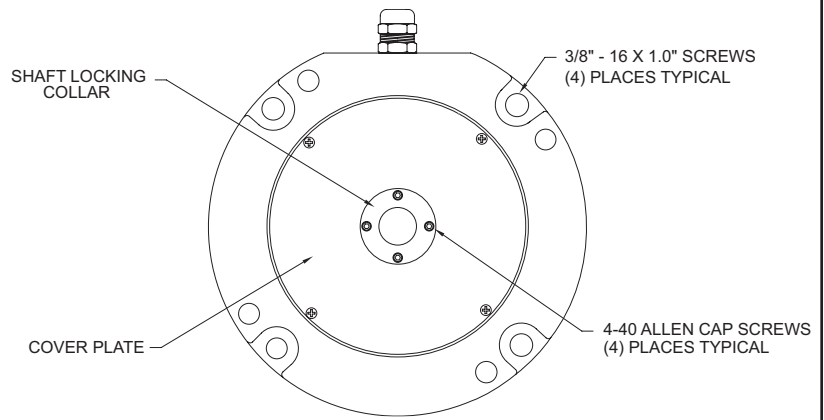
After carefully unpacking the unit, inspect to ensure the motor shaft is the correct size and free of all burrs or aberrations. Slide the ZR Encoder over the motor shaft. **DO NOT USE EXCESSIVE FORCE:** There is a rubber O-ring in the Encoder locking collar that will provide a small amount of resistance as it engages the shaft. If the encoder does not slide easily See Note 1 below.

### Step 2

Install the four 3/8" 16 x 1.0" socket head cap screws with lock washers through the holes in the Encoder C face and tighten securely to the motor.

### Step 3

Ensure the shaft locking collar is flush with the Encoder cover plate. Prevent the motor shaft from turning (See Note 2 for additional information) and tighten the four 4-40 Allen head cap screws in the locking collar evenly in a crossing pattern. See Figure 1. Make sure the screws are securely tightened and the front of the locking collar remains flush with the encoder cover plate. If the collar does not turn true when the motor shaft is rotated, loosen the four screws and repeat the procedure.



### In Case of Difficulty:

**Note 1:** Make sure the four 4-40 Allen head cap screws in the front of the Encoder locking collar are loose and the collar is not cocked or jammed. Clean the shaft of any burrs using fine crocus cloth. The O- ring in the Encoder locking collar may need a small amount of additional lubrication.

**Note 2:** When tightening the screws in the locking collar avoid holding the motor shaft with anything that may scar or burr the shaft.

## ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PPR	BORE SIZE	PART NUMBER
ZR	NEMA C Face Encoder 56C to 184C (Must select proper bore size)	256	0.625	ZRJ0256A
		1024	0.625	ZRJ1024A
		256	1.0	ZRL0256A
		1024	1.0	ZRL1024A

## RED LION CONTROLS TECHNICAL SUPPORT

If for any reason you have trouble operating, connecting, or simply have questions concerning your new product, contact Red Lion's technical support.

Support: [support.redlion.net](http://support.redlion.net)

Website: [www.redlion.net](http://www.redlion.net)

Inside US: +1 (877) 432-9908

Outside US: +1 (717) 767-6511

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## LIMITED WARRANTY

(a) Red Lion Controls Inc. (the "Company") warrants that all Products shall be free from defects in material and workmanship under normal use for the period of time provided in "Statement of Warranty Periods" (available at [www.redlion.net](http://www.redlion.net)) current at the time of shipment of the Products (the "Warranty Period"). **EXCEPT FOR THE ABOVE-STATED WARRANTY, COMPANY MAKES NO WARRANTY WHATSOEVER WITH RESPECT TO THE PRODUCTS, INCLUDING ANY (A) WARRANTY OF MERCHANTABILITY; (B) WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE; OR (C) WARRANTY AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY; WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE.** Customer shall be responsible for determining that a Product is suitable for Customer's use and that such use complies with any applicable local, state or federal law.

(b) The Company shall not be liable for a breach of the warranty set forth in paragraph (a) if (i) the defect is a result of Customer's failure to store, install, commission or maintain the Product according to specifications; (ii) Customer alters or repairs such Product without the prior written consent of Company.

(c) Subject to paragraph (b), with respect to any such Product during the Warranty Period, Company shall, in its sole discretion, either (i) repair or replace the Product; or (ii) credit or refund the price of Product provided that, if Company so requests, Customer shall, at Company's expense, return such Product to Company.

(d) **THE REMEDIES SET FORTH IN PARAGRAPH (c) SHALL BE THE CUSTOMER'S SOLE AND EXCLUSIVE REMEDY AND COMPANY'S ENTIRE LIABILITY FOR ANY BREACH OF THE LIMITED WARRANTY SET FORTH IN PARAGRAPH (a).**

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