

# Heavy Duty Incremental Encoders

## Features

A heavy-duty encoder is the most rugged encoder you can buy. Top-of-the-line bearings allow a service life of 12 billion revolutions. Features include:

- 10 mm standard shaft
- Rugged body with 78 mm diameter and 60 mm depth
- Splash-proof IP65 rating
- Incremental operation from 30 pulses per revolution to 5,000 pulses per revolution
- 100 kHz maximum response frequency
- 10-30 VDC, Totem-pole output



**Standard shaft (TRD-GK) model**

Note: Yellow shaded part numbers are non-stock. Availability may range from four to six weeks.

Heavy Duty Standard Shaft Incremental Encoders				
Model		Pulses per Revolution	Input Voltage	Output
				Body Diameter
TRD-GK30-RZD		30	10-30 VDC	Totem-pole (sink/source)
TRD-GK100-RZD		100		
TRD-GK120-RZD		120		
TRD-GK200-RZD		200		
TRD-GK240-RZD		240		
TRD-GK250-RZD		250		
TRD-GK300-RZD		300		
TRD-GK360-RZD		360		
TRD-GK400-RZD		400		
TRD-GK500-RZD		500		
TRD-GK600-RZD		600		
TRD-GK800-RZD		800		
TRD-GK1000-RZD		1000		
TRD-GK1200-RZD		1000		
TRD-GK1500-RZD		1500		
TRD-GK1800-RZD		1800		
TRD-GK2000-RZD		2000		
TRD-GK2500-RZD		2500		
TRD-GK3600-RZD		3600		
TRD-GK5000-RZD		5000		

Electrical Specifications		
Model		TRD-GKxxx-RZD
Power Supply	Operating Voltage	10 - 30VDC*
	Allowable Ripple	3% rms max.
	Current Consumption	At less than 16VDC: 50 mA max. / at 16VDC or more: 70mA max.
Output Waveform	Output Signal	Two phase + home position
	Duty Ratio	50 ± 25%
	Max. Frequency Response	100kHz max.
	Signal Width at Home Position	At 400P or less: 25 to 150%; at 500P or more: 1° at 30'
	Rise/Fall Time	2µs max. (when cable length is 2m or less)
Output	Output Type	Totem-pole
	Current: Outflow: H	30mA max.
	Voltage: H	(power source voltage - 4V) min.
	Voltage: L	2V max.
	Load Power Voltage	35VDC max.
* To be supplied by Class II source		
Mechanical Specifications		
Starting Torque	Max. 0.1 Nm (.074 ft lbs) max. at 20°C (68°F)	
Max. Allowable Shaft Load	Radial: 100N (22.48 lbs) Axial: 50N (11.24 lbs)	
Max. Allowable Speed	5,000 rpm	
Service Life of Bearing	12 billion revolutions (at max. allowable speed)	
Wire Size	AWG24	
Weight	Approx. 600g (21.16 oz) with 2m cable	
Environmental Specifications		
Ambient Temperature	10 to 70°C; 14 to 158°F	
Storage Temperature	-25 to 85°C; -13 to 185°F	
Operating Humidity	35-85% RH (with no condensation)	
Insulation Resistance	50MΩ min.	
Vibration Resistance	At 500P or less: Durable for one hour along three axes at 10 to 55 Hz with 0.75 mm amplitude At 600P or more: Durable for one hour along three axes at 10 to 55 Hz with 0.35 mm amplitude	
Shock Resistance	At 500P or less: 11 ms with 980 m/s² applied three times along three axes At 600P or more: 11 ms with 294 m/s² applied three times along three axes	
Protection	IP65: dust and splash proof	

# Heavy Duty Incremental Encoders

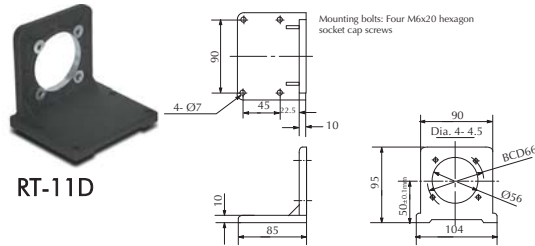
## Accessories

### Couplings

Select a coupling that fits your encoder.  
All couplings are in stock, ready to ship.  
See page 20-16 for more information.

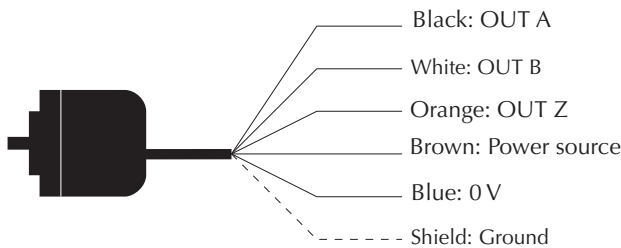
### Mounting bracket

RT-11D metal mounting bracket for all TRD-GK encoders.



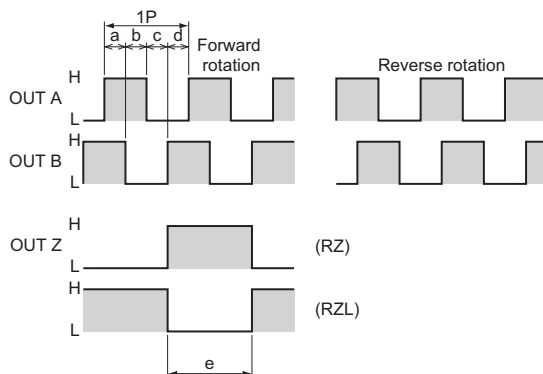
RT-11D

## Wiring diagram



*Cable shield is not connected to the encoder body; enclosure is grounded through the 0V wire*

## Channel timing chart



a, b, c, d =  $(1/4 \pm 1/8) P$

e: 400 P or less: 25 to 150%

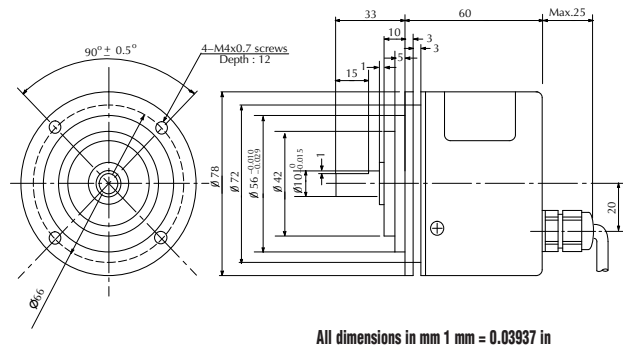
500 P or more:  $1 \pm 30'$

(At 1,800, 3,600, 5000 pulses only: 50 to 150%)

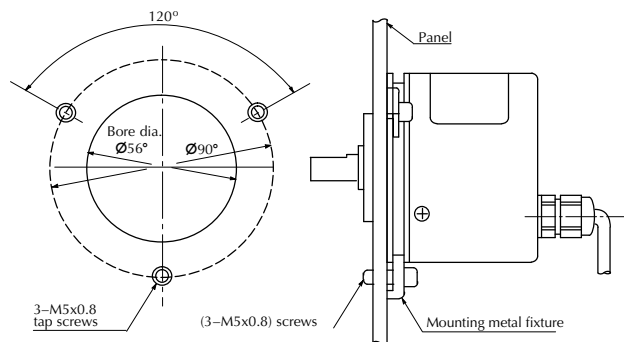
OUT Z generates home position in both directions.

## Dimensions

### External dimensions



### Servo mounting



## How to read the timing charts

### Open Collector Models

Out A and Out B are 90 degrees out of phase. Like any quadrature encoder, four unique logic states are created internal to the encoder. This is based on the rising edge to rising edge (one cycle) on channel A or B that indicates that one set of bars on the internal encoder disk has passed by the optical sensor.

OUT Z is the absolute reference added to an incremental encoder and is also known as home position. It signifies a full rotation of the encoder disk.

PLC  
Overview

DL05/06  
PLC

DL105  
PLC

DL205  
PLC

DL305  
PLC

DL405  
PLC

Field I/O

Software

C-more  
HMI's

Other HMI

AC Drives

Motors

Steppers/  
Servos

Motor Controls

Proximity  
Sensors

Photo  
Sensors

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Encoders

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Relays/  
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TB's &  
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Enclosures

Appendix

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