

# TRD-KL Series Absolute Encoders

Rotary Encoders

## ■ Features

- Side cable and connector for minimum space
- Dust and splash proofed for operation not affected by water or oil
- $\phi 10$  mm strong stainless shaft and aluminum die-cast casing
- Accurate gray code output
- Shock resistant metal slit plate durable at  $980 \text{ m/s}^2$
- Servo mounting is available for easy installation



## ■ List of model numbers

With cable			With connector		
Model number	Resolution	Cable length	Model number	Resolution	Cable length
TRD-KL180-Y	180 (8 bit)	2 m	TRD-KL180-YC2	180 (8 bit)	-
TRD-KL250-Y	250 (8 bit)		TRD-KL250-YC2	250 (8 bit)	
TRD-KL256-Y	256 (8 bit)		TRD-KL256-YC2	256 (8 bit)	
TRD-KL360-Y	360 (9 bit)		TRD-KL360-YC2	360 (9 bit)	
TRD-KL500-Y	500 (9 bit)		TRD-KL500-YC2	500 (9 bit)	
TRD-KL512-Y	512 (9 bit)		TRD-KL512-YC2	512 (9 bit)	
TRD-KL720-Y	720 (10 bit)		TRD-KL720-YC2	720 (10 bit)	
TRD-KL1000-Y	1000 (10 bit)		TRD-KL1000-YC2	1000 (10 bit)	
TRD-KL1024-Y	1024 (10 bit)		TRD-KL1024-YC2	1024 (10 bit)	

## ■ Model numbering system

TRD- **KL**   - **Y**  

- Series
- Resolution (180, 250, 256, 360, 500, 512, 720, 1000, 1024)
- Connection  
Blank : With cable  
C2 : With connector
- Gray code output

## ■ Electrical specifications

Power source	Power source voltage	10 to 30 VDC
	Allowable ripple	3% rms max.
	Current consumption	70 mA max.
Output code		Gray binary
Max. response frequency		20 kHz
Precision		$(360/\text{resolution} \times 2)^\circ$
Direction		Output code increments in normal direction
Output	Output type	NPN open collector output
	Output logic	Negative (Low active)
	Residual voltage	0.4 V max.
	Inflow current	30 mA max.
	Load power voltage	30 VDC max.
Rise/Fall time		2.0 $\mu\text{s}$ (at 1 k $\Omega$ load resistance) max.

## ■ Mechanical specifications

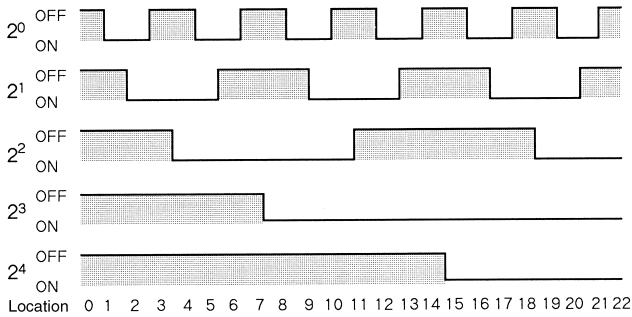
Initial torque	0.1 N•m (+20°C) max.
Moment of inertia	$1 \times 10^{-5} \text{ kg} \cdot \text{m}^2$
Allowable load	Radial: 70 N
	Thrust: 40 N
Maximum allowable speed (Note 1)	5000 rpm
Cable	External diameter: $\phi 7.8$ mm 12-core oil resistant PVC cable Nominal section area of core: $0.3 \text{ mm}^2$
Weight	With side cable: Approx. 700 g (with 2 m cable) With connector: Approx. 450 g

Note 1: Highest speed that can support mechanical integrity of the encoder

## ■ Environmental requirements

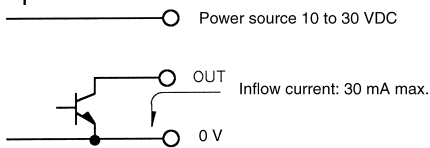
Ambient temperature	-10 to +60°C
Storage temperature	-25 to +80°C
Operating humidity	35 to 85% RH (with no dewing)
Voltage withstand	AC 500 V at 50/60 Hz for one minute (between terminals and case)
Insulation resistance	10 M $\Omega$ (measured with DC 500 V Megger) min.
Vibration resistance	Durable for one hour along three axes at 10 to 55 Hz with 0.75 mm amplitudes
Shock resistance	11 ms with $980 \text{ m/s}^2$ applied three times along three axes
Protection	IP65: Dust and splash proofed

■ Channel timing chart



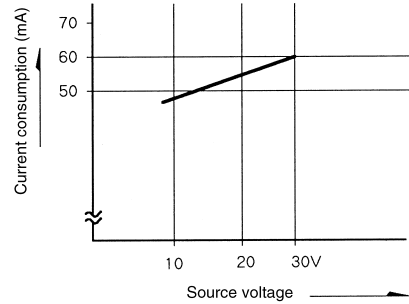
■ Output circuit

Open collector

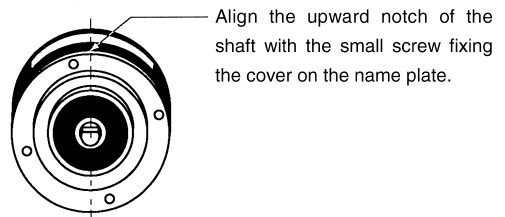


■ Electrical characteristics

Current consumption



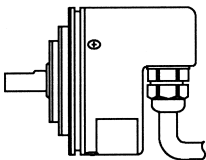
■ Home position



■ Terminal assignment

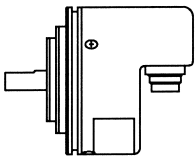
Shielded cable is not connected to the encoder body.

● With cable

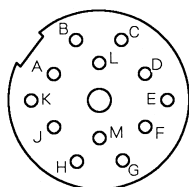


Model number Color of core cable	TRD-KL1024-Y TRD-KL1000-Y TRD-KL720-Y	TRD-KL512-Y TRD-KL500-Y TRD-KL360-Y	TRD-KL256-Y TRD-KL250-Y TRD-KL180-Y	
Red	Power source +12/24 V	←	←	
Black	Power source 0 V	←	←	
Brown	Outputs	2 <sup>0</sup>	←	
Orange		2 <sup>1</sup>	←	
Yellow		2 <sup>2</sup>	←	
Green		2 <sup>3</sup>	←	
Blue		2 <sup>4</sup>	←	
Purple		2 <sup>5</sup>	←	
Gray		2 <sup>6</sup>	←	
White		2 <sup>7</sup>	←	
Pink		2 <sup>8</sup>	←	Not connected
Light blue		2 <sup>9</sup>	←	←
Shield	GND	←	←	

● With connector



Pin out of connector



\* Rear view

Model number Pin number	TRD-KL1024-YC2 TRD-KL1000-YC2 TRD-KL720-YC2	TRD-KL512-YC2 TRD-KL500-YC2 TRD-KL360-YC2	TRD-KL256-YC2 TRD-KL250-YC2 TRD-KL180-YC2	
A	Power source +12/24 V	←	←	
B	Outputs	2 <sup>0</sup>	←	
C		2 <sup>1</sup>	←	
D		2 <sup>2</sup>	←	
E		2 <sup>3</sup>	←	
F		2 <sup>4</sup>	←	
G		2 <sup>5</sup>	←	
H		2 <sup>6</sup>	←	
J		2 <sup>7</sup>	←	
K		2 <sup>8</sup>	←	Not connected
L		2 <sup>9</sup>	←	←
M	Power source 0 V	←	←	

Rotary Encoders

Incremental Type

TRD-S/SH

TRD-2E

TRD-N/NH

TRD-J

TRD-GK

Absolute Type

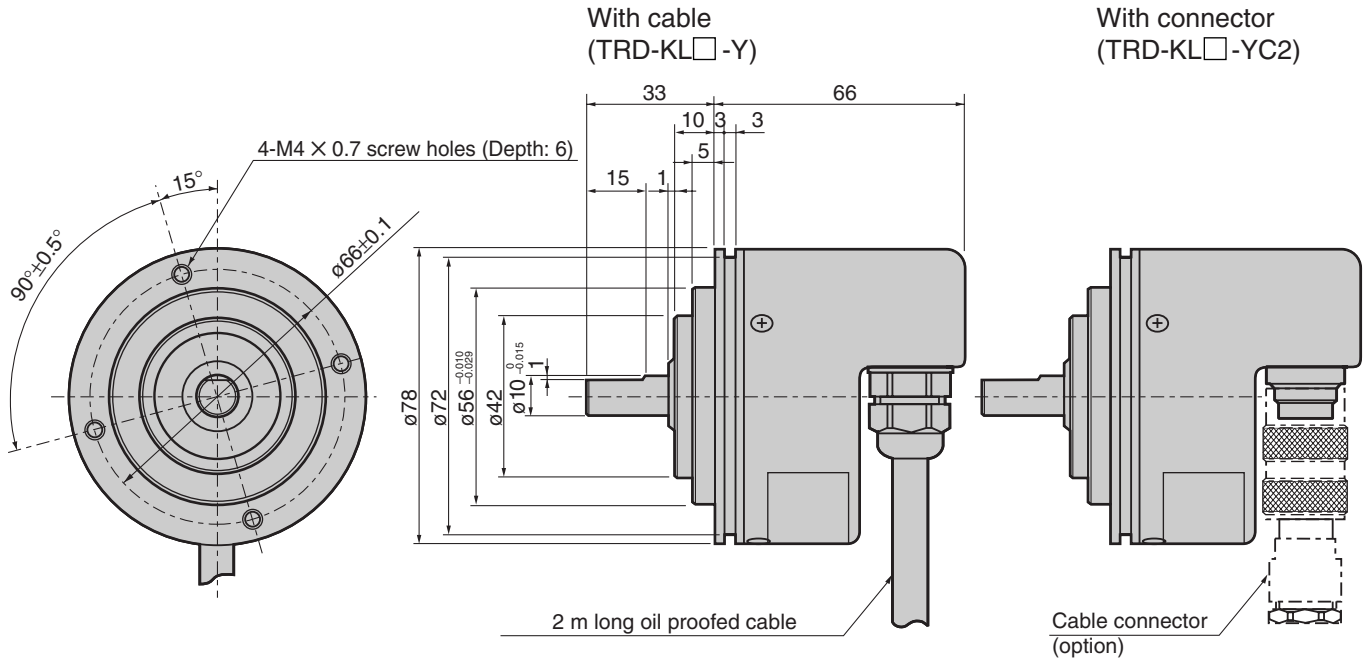
TRD-NA

TRD-K

TRD-KL

External Dimensions

(in mm)



Servo mount metal fixture

