

# ROTARY ENCODERS

## TRD-K Series Absolute Encoders



### Features

- Resolution of up to 10 bits or 1,024
- Strong shaft that supports 100N/radial and 50 N/thrust using a reinforced spindle
- ø10 mm thick reinforced stainless shaft
- Accurate gray code output
- Shock resistant metal slit plate durable at 980 m/s<sup>2</sup>
- Servo mounting is available for easy installation

### List of Model Numbers

Type	Model Number	Resolution	Cable Length	Notes	
Dust and splash proof side cable	TRD-K180-YS	180 (8 bit)	2 m	With FC-20/21 connector	With extension cable connector
	TRD-K256-YS	256 (8 bit)		TRD-K360-YCS	TRD-K360-YPS
	TRD-K360-YS	360 (9 bit)		TRD-K512-YCS	TRD-K512-YPS
	TRD-K512-YS	512 (9 bit)		TRD-K720-YCS	TRD-K720-YPS
	TRD-K720-YS	720 (10 bit)		TRD-K1024-YCS	TRD-K1024-YPS
	TRD-K1024-YS	1024 (10 bit)			
Dust and splash proof rear connector	TRD-K360-YC2	360 (9 bit)	N /A		
	TRD-K512-YC2	512 (9 bit)			
	TRD-K720-YC2	720 (10 bit)			
	TRD-K1024-YC2	1024 (10 bit)			

### Model Numbering System



- Classification of series
- Resolution (180, 256, 360, 512, 720, 1024)
- Gray code output
- With side cable
- Connection
  - C: With FC-20/21 connector
  - P: With extension cable connector
  - C2: Dust and splash proofed with rear connector

### Electrical Specifications

Power source	Power source voltage	DC 10.8 to 26.4 V
	Allowable ripple	3% rms max.
	Current consumption	70 mA max.
Output code	Gray binary	
Max. response frequency	20 kHz	
Precision	(360 / resolution x 2)°	
Direction	Output code increments in normal direction (CW)	
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 μs (at 1 kΩ load resistance) max.	

### Mechanical Specifications

Initial torque	0.1N·m (+20°C) max.
Moment of inertia	1 x 10 <sup>-6</sup> kg·m <sup>2</sup>
Allowable load	Radial: 100N
	Thrust: 50N
Maximum allowable speed (Note 1)	5000 rpm
Cable	External diameter ø7.8 mm
	12-core oil-proofed shielded vinyl chloride cable Nominal section area of core: 0.3 mm <sup>2</sup>
Weight	Weight with side cable: Approx. 750 g (with 2m cable)
	With connector: Approx. 500 g

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

### Environmental Requirements

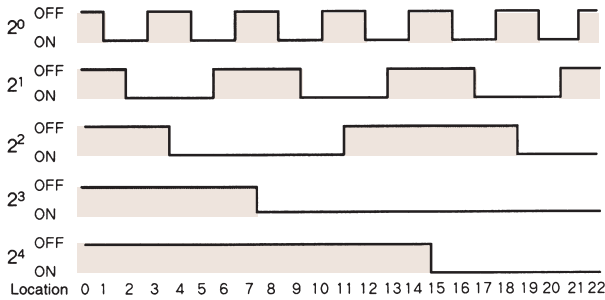
Ambient temperature	-10 to +50°C
Storage temperature	-25 to +80°C
Operating humidity	35 to 85% RH (with no condensation)
Withstand voltage	500VAC at 50/60Hz for 1 minute (between terminals & case)
Insulation resistance	10 MΩ (measured with 500 VDC Megger) min.
Vibration resistance	Durable for 1 hour along 3 axes at 10 to 55 Hz with 0.75mm amplitudes
Shock resistance	11 ms with 980 m/s <sup>2</sup> applied 3 times along 3 axes
Protection	IP65: Dust and splash proofed



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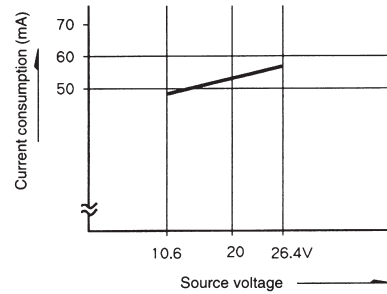
## TRD-K Series

### Output Signal Timing Chart



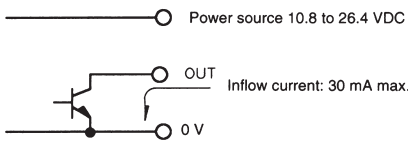
### Electrical Characteristics

#### Current consumption



### Output Circuit

#### Open collector



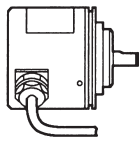
### Home Position



Align the upward notch of the shaft with the small screw fixing the cover on the name plate.

### Terminal Assignment

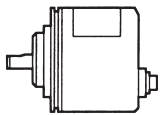
#### ● With side cable



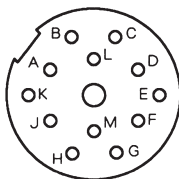
Shielded cable is not connected to the encoder body.

Model Number	TRD-K1024-□ TRD-K720-□	TRD-K360-□ TRD-K512-□	TRD-K180-□ TRD-K256-□
Color of core table			
Red	Power source +12/24 V	←	←
Black	Power source 0 V	←	←
Brown	Outputs	←	←
Orange		←	←
Yellow		←	←
Green		←	←
Blue		←	←
Purple		←	←
Gray		←	←
White		←	←
Pink		←	←
Light Blue	←	←	←
Shield	GND	←	←

#### ● Dust and splash proofed with connector



#### Pin out of connector



\* Rear view

Model Number	TRD-K1024-□ TRD-K720-□	TRD-K360-□ TRD-K512-□
Pin Number		
A	Power source +12/24 V	←
B	Outputs	←
C		←
D		←
E		←
F		←
G		←
H		←
J		←
K		←
L	←	Not connected
M	Power source 0 V	←

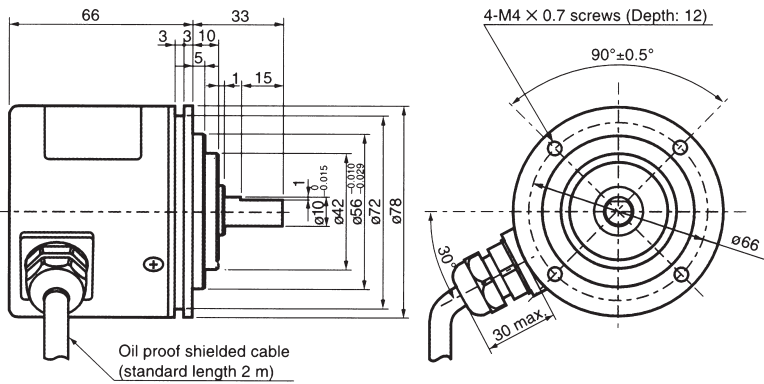
# ROTARY ENCODERS

## TRD-K Series

### External Dimensions

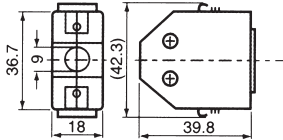
(in mm)

- With side cable (TRD-K □ -YS)



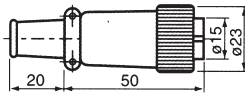
#### FC-20/21 connector (TRD-K □ -YCS)

Model: Honda MR-16L/MR-16M



#### Extension cable connector (TRD- □ -YPS)

Model: Hirose RM15TPD-12P



\* Connector is not equipped with the cable for TRD-K □ -YS

#### Pin out of connector

- FC-20/21 connector



Section view

Pin number	Color	Signal name	Pin number	Color	Signal name
1	Purple	2 <sup>5</sup>	9	White	2 <sup>7</sup>
2	Blue	2 <sup>4</sup>	10	Gray	2 <sup>6</sup>
3	Green	2 <sup>3</sup>	11	Red	Vcc
4	Yellow	2 <sup>2</sup>	12		N.C.
5	Orange	2 <sup>1</sup>	13		N.C.
6	Brown	2 <sup>0</sup>	14		N.C.
7	Light blue	2 <sup>9</sup>	15	Black	0V
8	Pink	2 <sup>8</sup>	16	Shield	GND

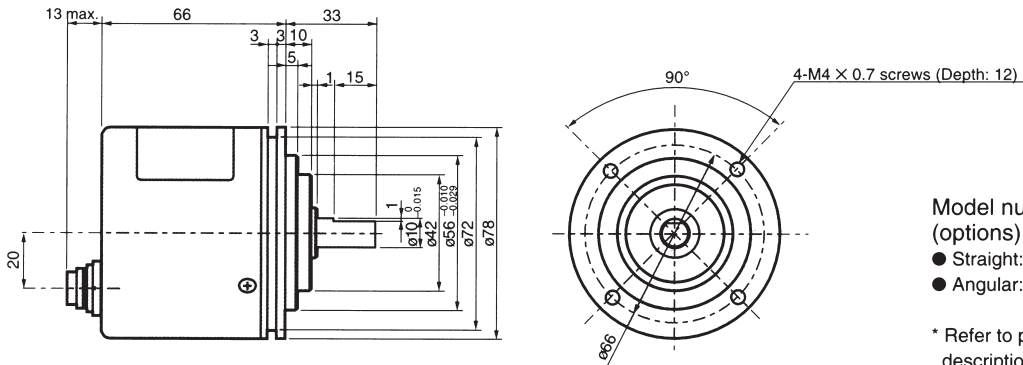
- Extension cable connector



Section view

Pin number	Color	Signal name	Pin number	Color	Signal name
1	Red	Vcc	7	Purple	2 <sup>5</sup>
2	Brown	2 <sup>0</sup>	8	Gray	2 <sup>6</sup>
3	Orange	2 <sup>1</sup>	9	White	2 <sup>7</sup>
4	Yellow	2 <sup>2</sup>	10	Pink	2 <sup>8</sup>
5	Green	2 <sup>3</sup>	11	Light blue	2 <sup>9</sup>
6	Blue	2 <sup>4</sup>	12	Black	0V

- Dust and splash proof side connector (TRD-K □ -YC2)

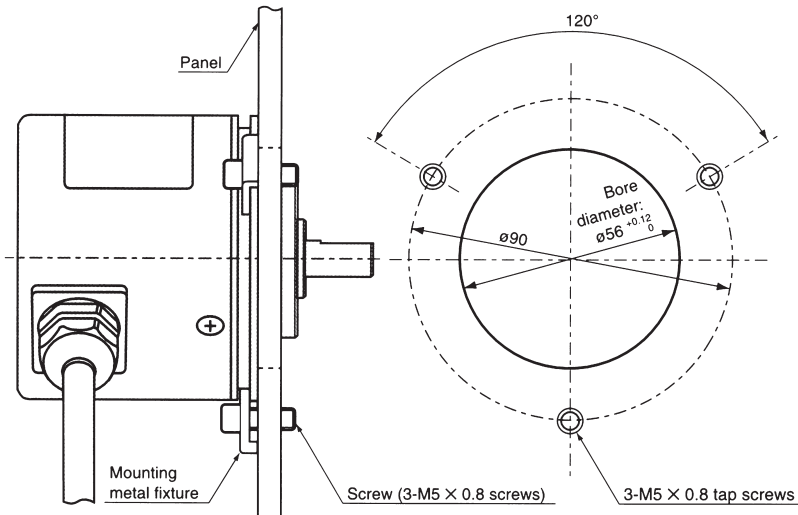


#### Model numbers of connectors (options)

- Straight: BMCC-12
- Angular: BAFC-12

\* Refer to page 32 for detailed descriptions of the options.

### Servo mount metal fixture



#### KM-9 servo mount metal fixture (supplied)

