

TRD-K Series Absolute Encoders

■ Features

- Resolution of up to 10 bits or 1,024
- Strong shaft that supports 100 N/radial and 50 N/thrust using a reinforced spindle
- ø10 mm thick reinforced stainless steel shaft
- Accurate gray code output
- Shock resistant metal slit plate durable at 980 m/s²
- 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-21 connector	With extension cable connector
	TRD-K256-YS	256 (8 bit)			
	TRD-K360-YS	360 (9 bit)		TRD-K360-YCS	TRD-K360-YPS
	TRD-K512-YS	512 (9 bit)		TRD-K512-YCS	TRD-K512-YPS
	TRD-K720-YS	720 (10 bit)		TRD-K720-YCS	TRD-K720-YPS
	TRD-K1024-YS	1024 (10 bit)		TRD-K1024-YCS	TRD-K1024-YPS
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

TRD- **K** - **Y** **C** **S**

- Classification of series
- Resolution (180, 256, 360, 512, 720, 1024)
- Gray code output
- With side cable
- Connection
 - C: With FC-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 × 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 Ω load resistance) max.

■ Mechanical specifications

Initial torque	0.1 N•m (+20°C) max.
Moment of inertia	1 × 10 ⁻⁵ kg • m ²
Allowable load	Radial: 100 N
	Thrust: 50 N
Maximum allowable speed (Note 1)	5000 rpm
Cable	External diameter: ø7.8 mm 12-core oil resistant PVC cable Nominal section area of core: 0.3 mm ²
Weight	Weight with side cable: Approx. 750 g (with 2 m 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)
Voltage withstand	500 VAC at 50/60 Hz for one minute (between terminals and case)
Insulation resistance	10 MΩ (measured with 500 VDC 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 m/s ² applied three times along three axes
Protection	IP65: Dust and splash proofed

Rotary Encoders

Incremental Type

TRD-S/SH

TRD-2E

TRD-N/NH

TRD-J

TRD-GK

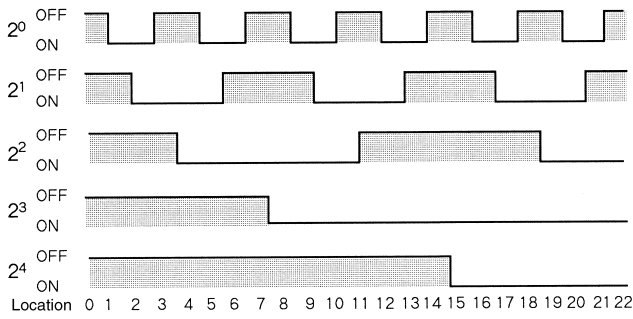
Absolute Type

TRD-NA

TRD-K

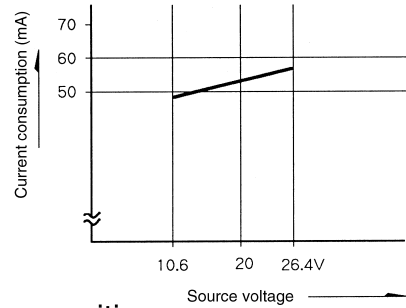
TRD-KL

Channel timing chart

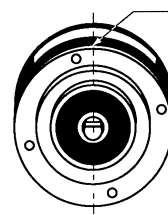


Electrical characteristics

Current consumption



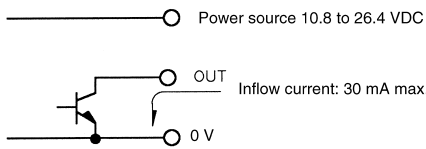
Home position



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

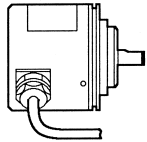
Output circuit

Open collector



Terminal assignment

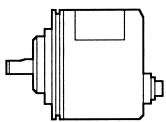
With side cable



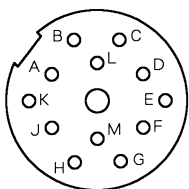
Shielded cable is not connected to the encoder body.

Model number Color of core cable	TRD-K1024-□ TRD-K720-□	TRD-K360-□ TRD-K512-□	TRD-K180-□ TRD-K256-□	
Red	Power source +12/24 V	←	←	
Black	Power source 0 V	←	←	
Brown	Outputs	2 ⁰	←	
Orange		2 ¹	←	
Yellow		2 ²	←	
Green		2 ³	←	
Blue		2 ⁴	←	
Purple		2 ⁵	←	
Gray		2 ⁶	←	
White		2 ⁷	←	
Pink		2 ⁸	←	Not connected
Light blue		2 ⁹	Not connected	Not connected
Shield	GND	←	←	

Dust and splash proofed with connector



Pin out of connector



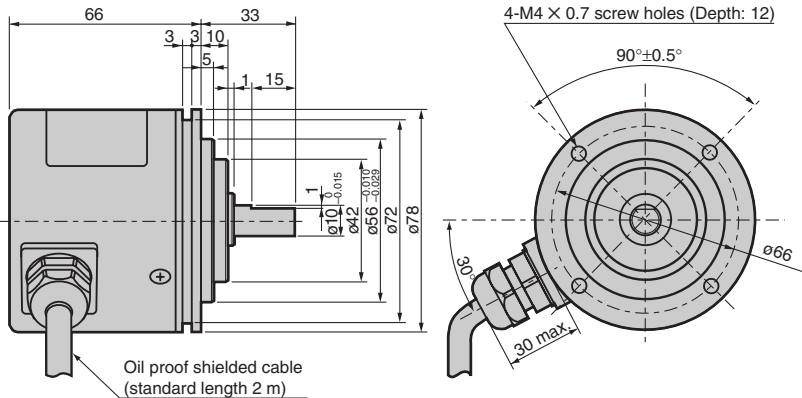
* Rear view

Model number Pin number	TRD-K1024-□ TRD-K720-□	TRD-K360-□ TRD-K512-□
A	Power source +12/24 V	←
B	Outputs	2 ⁰
C		2 ¹
D		2 ²
E		2 ³
F		2 ⁴
G		2 ⁵
H		2 ⁶
J		2 ⁷
K		2 ⁸
L		2 ⁹
M	Power source 0 V	←

External Dimensions

(in mm)

● With side cable (TRD-K □ -YS)



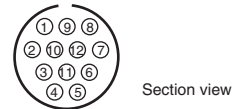
Pin out of connector

● FC-21 connector



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

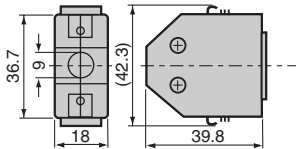
● Extension cable connector



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

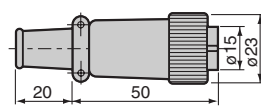
FC-21 connector (TRD-K □ -YCS)

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



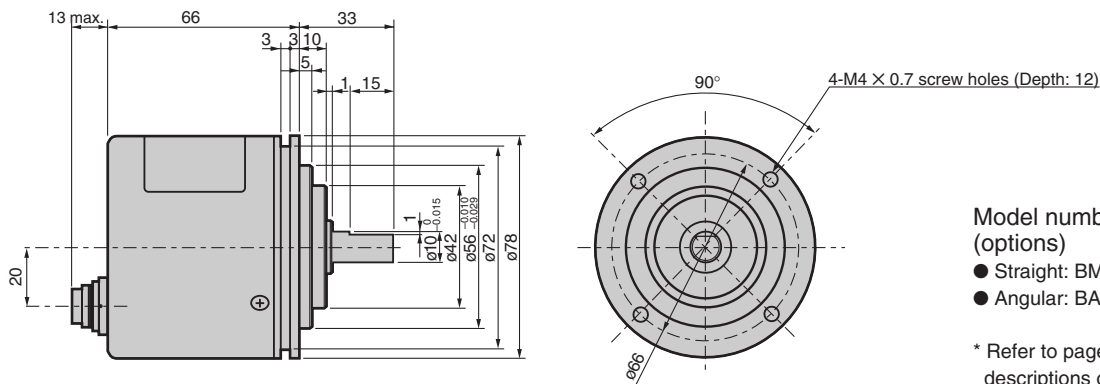
Extension cable connector (TRD- □ -YPS)

Model: Made by Hirose RM15TPD-12P



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

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

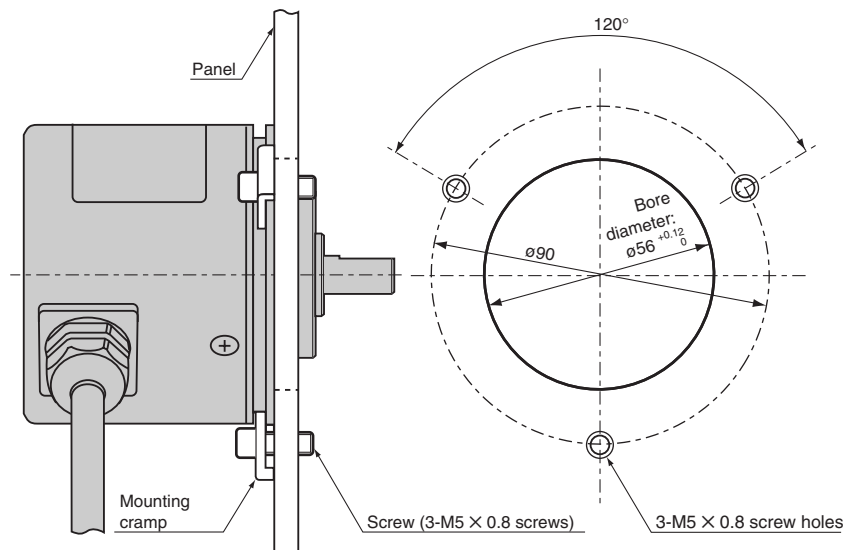


Model numbers of connectors (options)

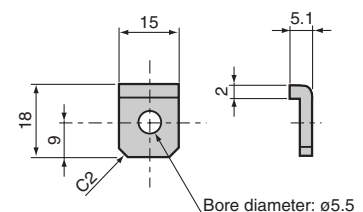
- Straight: BMCC-12
- Angular: BAFC-12

* Refer to page 38 for detailed descriptions of the options.

Servo mount metal fixture



KM-9 servo mount metal fixture (supplied)



Rotary Encoders

Incremental Type

TRD-S/SH

TRD-2E

TRD-N/NH

TRD-J

TRD-GK

Absolute Type

TRD-NA

TRD-K

TRD-KL