

PLC

HMI

SENSOR

ENCODER

COUNTER

INFORMATION

TRD-GK Series

Features

φ78 Incremental Type

- A stronger spindle means high axial load (radial 100 N / thrust 50 N) and a long service-life (bearing life 1.2×10^{10} turns).
- Dustproof and waterjet-proof type
- Totem-pole output that enables cable extension
- Installation using a servo mount convenient for origin adjustment is possible.

Rotary Encoder
Lineup

Selection Guide

Incremental
Type

Absolute Type

Model Number List

Type	Appearance	Model Number	Output	Pulse Number / Rotation
Dustproof and Waterjet-proof Type with Cables Taken Out from the Back		TRD-GK□-R	2-phase output	10, 12, 15, 50, 60
		TRD-GK□-RZ	Output with 2-phase origin (Origin direct action □□)	30, 100, 120, 200, 240, 250, 300, 360, 400, 500, 600, 800, 1,000, 1,200, 1500, 1,800, 2,000, 2,500, 3,600, 5,000
		TRD-GK□-RZL	Output with 2-phase origin (Origin reverse action □□)	30, 100, 120, 200, 240, 250, 300, 360, 400, 500, 600, 800, 1,000, 1,200, 1500, 1,800, 2,000, 2,500, 3,000, 3,600, 4,000, 5,000
		TRD-GK□-BZ	Direction discrimination output Output with origin (Origin direct action □□)	30, 60, 100, 120, 200, 240, 250, 300, 360, 400, 500, 600, 800, 1,000, 1,200, 1500, 1,800, 2,000, 2,500, 3,000, 3,600, 4,000, 5,000
Dustproof and Waterjet-proof Type Connector Type		TRD-GK□-RC2	2-phase output	10, 12, 15, 50, 60
		TRD-GK□-RZC2	Output with 2-phase origin (Origin direct action □□)	30, 100, 120, 200, 240, 250, 300, 360, 400, 500, 600, 800, 1,000, 1,200, 1500, 1,800, 2,000, 2,500, 3,600, 5,000
		TRD-GK□-RZC2L	Output with 2-phase origin (Origin reverse action □□)	30, 100, 120, 200, 240, 250, 300, 360, 400, 500, 600, 800, 1,000, 1,200, 1500, 1,800, 2,000, 2,500, 3,600, 5,000
		TRD-GK□-BZC2	Direction discrimination output Output with origin (Origin direct action □□)	30, 60, 100, 120, 200, 240, 250, 300, 360, 400, 500, 600, 800, 1,000, 1,200, 1500, 1,800, 2,000, 2,500, 3,000, 3,600, 4,000, 5,000

TRD-GK □ - RZ C2 L - □

- Series classification

- Pulse number

- Signal format

R : 2-phase output**RZ** : Output with 2-phase origin (Origin direct action)**BZ** : Direction distinction circuit

- Connection form

Blank: Type with cables taken out from the back

C2 : Connector type

- Origin reverse action symbol

If the signal type is RZ, models with "L" produce the origin reverse action.

- (Special specifications products)

TRD-MX

TRD-S/SH

TRD-2E

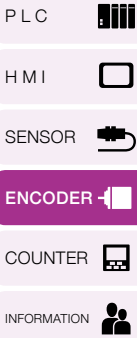
TRD-N/NH

TRD-J

TRD-GK

TRD-GK Series

Specifications



Rotary Encoder Lineup

Selection Guide

Incremental Type

Absolute Type

TRD-MX

TRD-S/SH

TRD-2E

TRD-N/NH

TRD-J

TRD-GK

Pulse and Frequencies

Pulse Number per Rotation	10	12	15	30	50	60	100	120	200	240	250	300	360	400	500	600	800	1,000	1,200	1,500	1,800	2,000	2,500	3,000	3,600	4,000	5,000
Maximum Response Frequency (kHz)*	0.83	1	1.25	2.5	4.17	5	8.33	10	16.7	20	20.8	25	30	33.3	41.7	50	66.7	83.3	100	100	100	100	100	100	100	100	100
Applicable Models	TRD-GK□-R□	●	●	●		●	●																				
	TRD-GK□-RZ□				●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●		●
	TRD-GK□-BZ□				●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

* The electric maximum response frequency is specified by resolution (pulse number) and the maximum number of revolutions.

Electrical maximum number of revolutions = ((Maximum response frequency/Resolution) x 60)

Therefore, if the encoder rotates at a speed greater than the electrical maximum number of revolutions, the signals do not electrically follow.

Electrical Specifications

Model Number			TRD-GK□-R□/-RZ□	TRD-GK□-BZ□
Power Supply	Supply Voltage		10 to 30 V DC	10 to 30 V DC
	Allowable Ripple		3% rms or less	3% rms or less
	Consumption Current (No Load)		Below 16 V DC: 50 mA or lower / 16 V DC or higher: 70 mA or lower	Below 16 V DC: 50 mA or lower / 16 V DC or higher: 70 mA or lower
Output Waveform	Signal Format		R: 2-phase output/RZ: 2-phase output + home position	Direction discrimination output + home position
	Duty Ratio		50±25%	10 to 60% (2001P or more: 50±25%)
	Signal Width at Home Position		400 P or lower : 25 to 150% / 500 P or higher: 1°±30°* (However, 1,800P, 3,600P, 5,000P: 50 to 150%)	400 P or lower : 25 to 150% / 500 P or higher: 1°±30' (However, 60P, 3,600P: 100 to 300% 1,800P: 50 to 150%)
Output	Rise / Fall Time		Not larger than 3 μs (Cable length 2 m or less, maximum load)	Not larger than 3 μs (Cable length 2 m or less, maximum load)
	Output Form		Totem-pole output	Totem-pole output
	Output Current	Source "H"	Up to 30 mA	Up to 30 mA
		Sink "L"	Up to 30 mA	Up to 30 mA
	Output Voltage	"H"	[(Supply Voltage) - 4 V] or more	[(Supply Voltage) - 4 V] or more
		"L"	2 V or lower	2 V or lower
Load Supply Voltage		35 V DC or lower	35 V DC or lower	

* There is no origin signal for the R type

Mechanical Specifications

Starting Torque	0.1 N·m or less (+20°C)
Moment of Inertia	1 x 10 ⁻⁵ kg·m ²
Shaft Allowable Load	Radial: 100 N
	Thrust: 50 N
Maximum Allowable Number of Revolutions (Note 1)	5,000 rpm
Bearing Life	1.2 x 10 ¹⁰ rounds (Calculated value at the maximum load)
Cable	Outside diameter φ6 mm 5-core shielded oil-resistant vinyl chloride cable Core wire nominal cross-sectional area: 0.3 mm ²
Weight	Type with cables taken out from the back: Approx. 600 g or less (With 2 m cable) Connector type: Approx. 500 g

Note 1: Maximum number of revolutions that can be mechanically endured

Environmental Requirements

Use Ambient Temperature	-10 to +70°C
Storage Ambient Temperature	-25 to +85°C
Use Ambient Humidity	35 to 85% RH (No condensation)
Withstand Voltage	500 V AC 1 minute*
Insulation Resistance	50 MΩ or higher*
Vibration Resistance (Endurance)	Displacement half amplitude: 10 to 55 Hz 500 P or less: 0.75 mm 600 P or more: 0.35 mm 3 axial directions, each 1 h
Impact Resistance (Endurance)	500 P or less: 980 m/s ² 11 ms 600 P or more: 294 m/s ² 11 ms Each 3 times in 3 axial directions
Protective Structure	IP65 (Dustproof and waterjet-proof type)

* The power supply, signal lines, and shield between the cases are excluded.

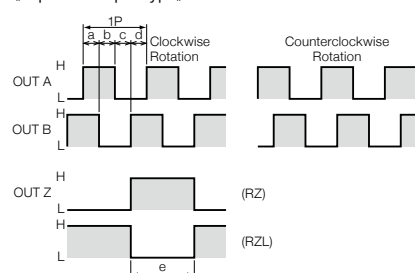
TRD-GK Series

Specifications

Output Waveform

Totem-pole

《2-phase output type》

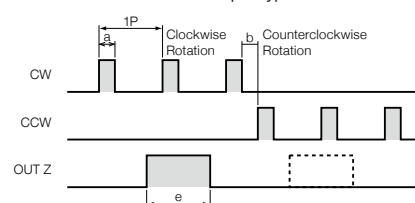


a, b, c, d = $(1/4 \pm 1/8) P$
e: 400 pulses or less 25 to 150%
500 pulses or more $1^\circ \pm 30'$
(At 1,800, 3,600, 5000 pulses only: 50 to 150%)

* OUT Z (origin output) is generated when passing the origin position regardless of rotational direction.
* There is no OUT Z for the R type.

Note: Clockwise rotation when the main body is seen from the axle side is the normal rotation.
Phase advancing of OUTA and OUTB differs only for 3600th and 5000th pulse.

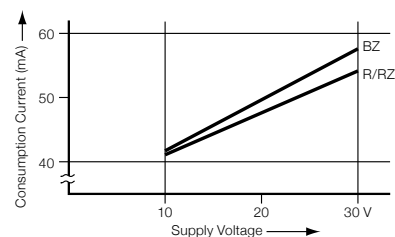
《Direction discrimination output type》



a = $(1/4 \pm 1/8) P$ b $\geq 1/4 P$
e: 400 pulses or less 25 to 150%
500 pulses or more $1^\circ \pm 30'$
(At 60, 3,600 P: 100 to 300%, 1,800 P: 50 to 150%)

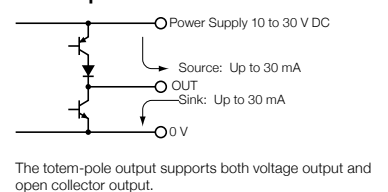
* OUT Z (origin output) is generated when passing the origin position regardless of rotational direction.

Electrical Characteristics (Typical)

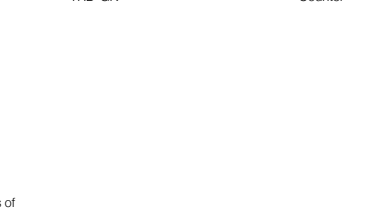
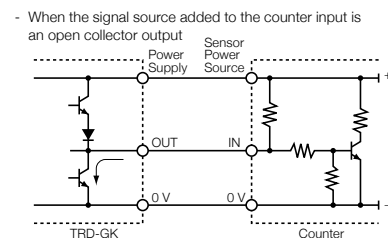
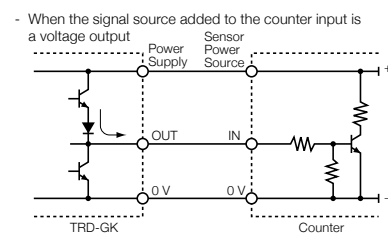


Output Circuit

Totem-pole



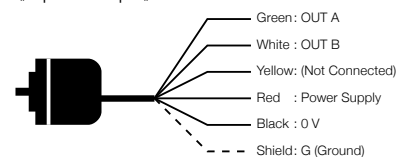
The totem-pole output supports both voltage output and open collector output.



Connection Diagram

Totem-pole

《2-phase output》



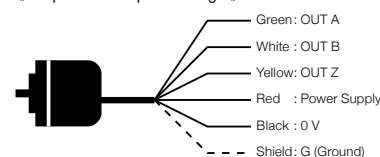
Connector
<Pin Assignment Figure>



* Figure Seen from Wiring Side (Back side)

Pin Code
1: OUT A
2: OUT B
3: (Not Connected)
4: Power Supply
5: 0 V
6: Shield

《Output with 2-phase origin》



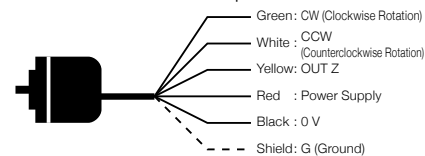
Connector
<Pin Assignment Figure>



* Figure Seen from Wiring Side (Back side)

Pin Code
1: OUT A
2: OUT B
3: OUT Z
4: Power Supply
5: 0 V
6: Shield

《Direction discrimination output》



Connector
<Pin Assignment Figure>



* Figure Seen from Wiring Side (Back side)

Pin Code
1: CW
2: CCW
3: OUT Z
4: Power Supply
5: 0 V
6: Shield

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TRD-2E

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TRD-GK

TRD-GK Series

Dimensions

P L C



H M I



SENSOR



ENCODER



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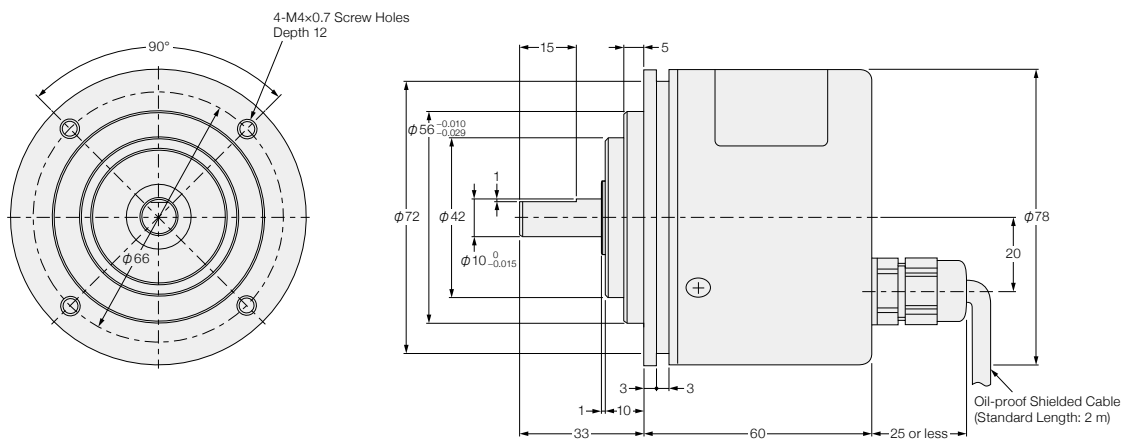
Selection Guide

Incremental
Type

Absolute Type

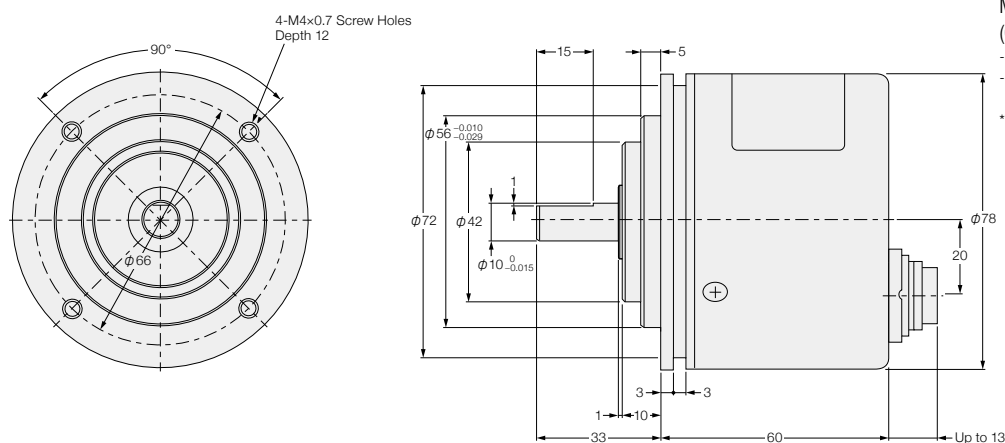
Dimensions (Unit: mm)

Type with Cables Taken Out from the Back



Connector Type

(C2 type)

Model numbers of connectors
(Option)

- Straight: BMCC-6
- Angular: BAFC-6

* For details, see the page on options.

Servo Mount Metal Mounting State Diagram

