

# 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 x 10<sup>10</sup> turns).
- Dustproof and waterjet-proof type
- Totem-pole output that enables cable extension
- Installation using a servo mount convenient for origin adjustment is possible.



### Model Number List

Type	Appearance	Model Number	Output	Pulse Number / Rotation
Dustproof and Waterjet-proof Type 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, 3,000, 3,600, 4,000, 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)

- HMI
- SENSOR
- ENCODER
- COUNTER
- INFORMATION

- Rotary Encoder Lineup
- Selection Guide
- Incremental Type
- Absolute Type

- TRD-MX
- TRD-S/SH
- TRD-2E
- TRD-N/NH
- TRD-J
- TRD-GK

# TRD-GK Series

## Specifications

- PLC
- HMI
- SENSOR
- ENCODER
- COUNTER
- INFORMATION

### 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 <sup>-5</sup> kg·m <sup>2</sup>
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 <sup>10</sup> 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 <sup>2</sup>
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 <sup>2</sup> 11 ms 600 P or more: 294 m/s <sup>2</sup> 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.

- Rotary Encoder Lineup
- Selection Guide
- Incremental Type
- Absolute Type

- TRD-MX
- TRD-S/SH
- TRD-2E
- TRD-N/NH
- TRD-J
- TRD-GK

# TRD-GK Series

## Specifications

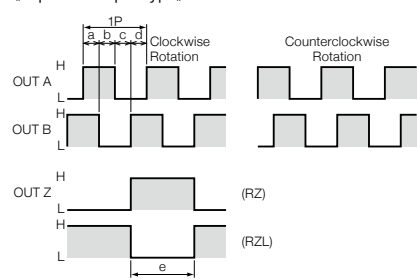
-  HMI
-  SENSOR
-  ENCODER
-  COUNTER
-  INFORMATION

- Rotary Encoder Lineup
- Selection Guide
- Incremental Type
- Absolute Type

### Output Waveform

#### Totem-pole

《2-phase output type》

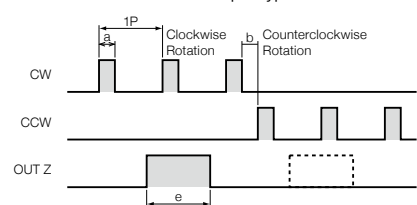


a, b, c, d =  $(1/4 \pm 1/8) P$   
 e: 400 pulses or less 25 to 150%  
 500 pulses or more  $1^\circ \pm 30'$   
 (At 1,800, 3,600, 5000 pulses only: 50 to 150%)

\* 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 OUT A and OUT B differs only for 3600th and 5000th pulse.

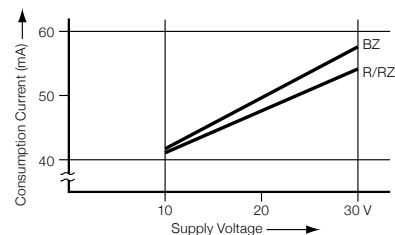
《Direction discrimination output type》



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.

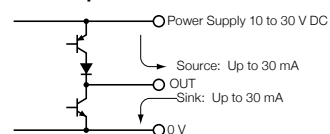
### Electrical Characteristics (Typical)



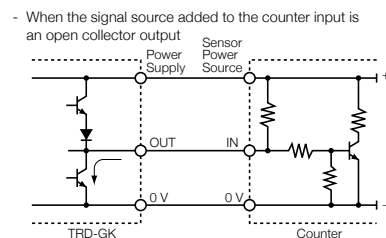
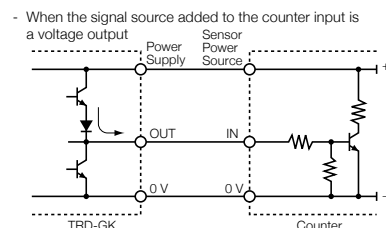
- TRD-MX
- TRD-S/SH
- TRD-2E
- TRD-N/NH
- TRD-J
- TRD-GK

### Output Circuit

#### Totem-pole



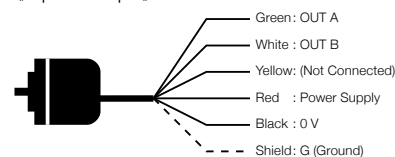
The totem-pole output supports both voltage output and open collector output.



### Connection Diagram

#### Totem-pole

《2-phase output》



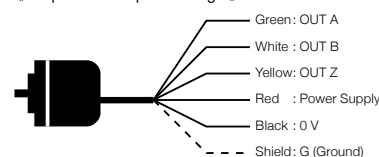
Connector  
 <Pin Assignment Figure>



\* 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》



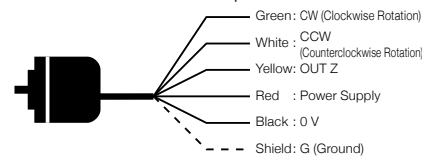
Connector  
 <Pin Assignment Figure>



\* 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

# TRD-GK Series

## Dimensions

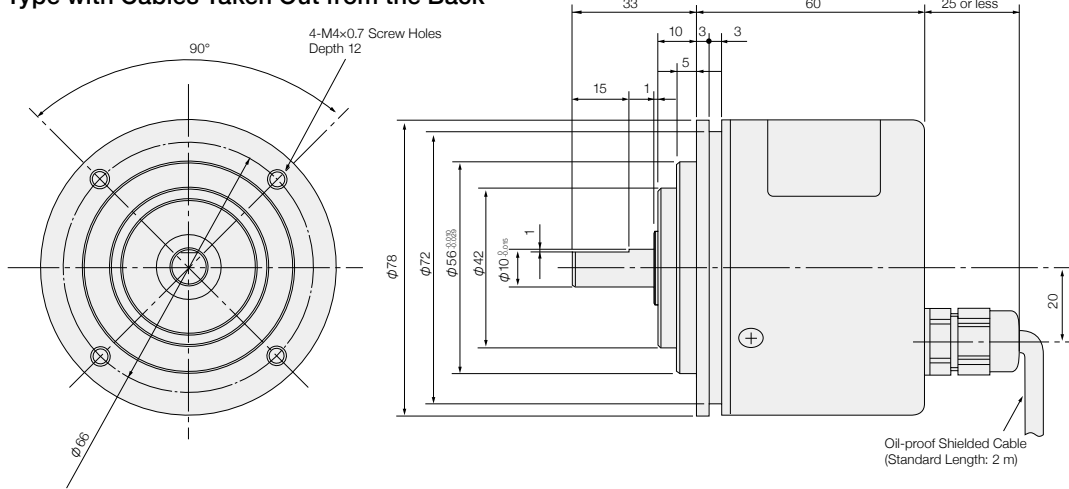
- PLC
- HMI
- SENSOR
- ENCODER**
- COUNTER
- INFORMATION

- Rotary Encoder Lineup
- Selection Guide
- Incremental Type**
- Absolute Type

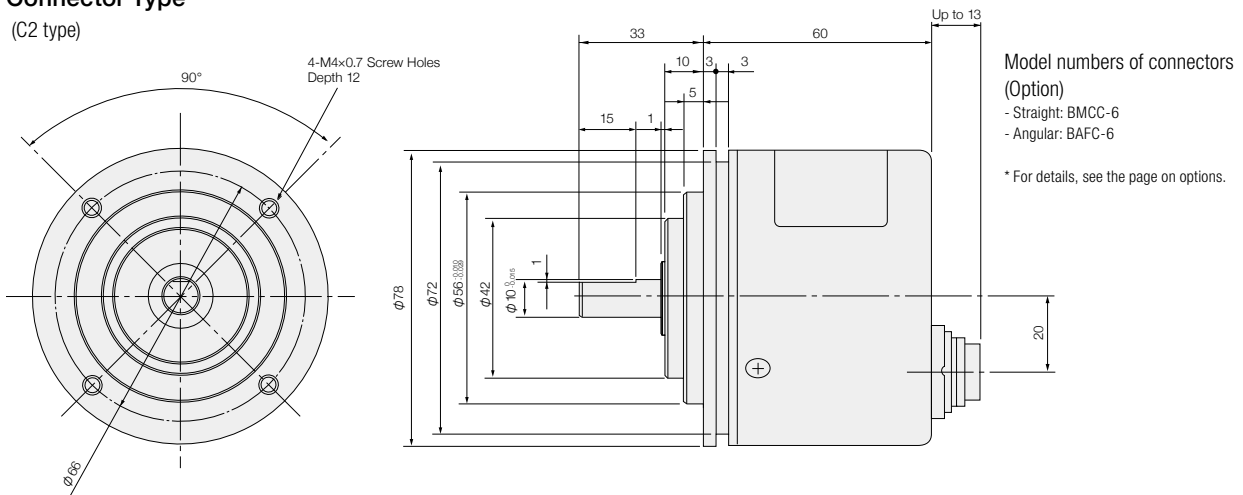
- TRD-MX
- TRD-S/SH
- TRD-2E
- TRD-N/NH
- TRD-J
- TRD-GK**

### Dimensions (Unit: mm)

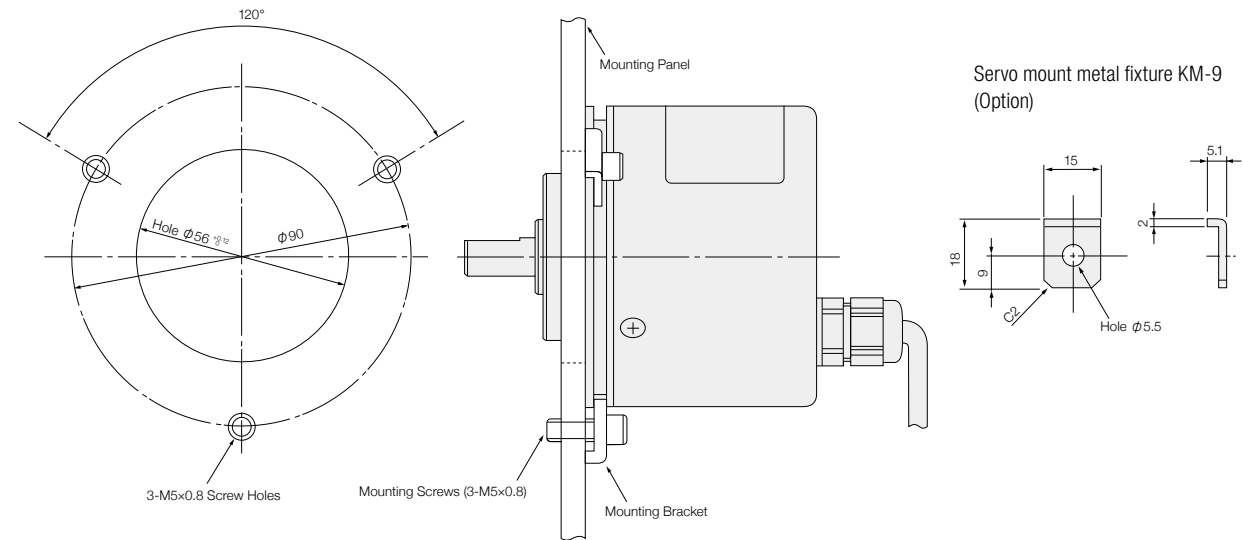
#### Type with Cables Taken Out from the Back



#### Connector Type (C2 type)



#### Servo Mount Metal Mounting State Diagram



The specifications and prices described in this catalog were valid when the catalog was issued. For the latest information, contact our sales persons or see our website.