

Tokyo Sokuteikizai Co.,Ltd.

Rotary Switch

RS300	P. 5
RS400	P. 5
RS500	P. 5
MR8A	P. 7

Code Switch

DP	P. 11
MR8C	P. 15

Rotary Encoder

RE29	P. 19
RE25	P. 21
RE24	P. 23
RE23	P. 25

Manual Pulse Genetator

RE45T	P. 29
RE45B	P. 31
RE46	P. 33
RE47	P. 35

Handy Manual Pulse Genetator

HT	P. 39
HC1	P. 43
HM	P. 49
HR	P. 53
HS	P. 57

Trackball

TB36	P. 61
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Tokyo Sokuteikizai Co.,Ltd.

Rotary Switch Catalogue

RS300 _____ P. 03

high blocking voltage model available

RS400 _____ P. 03

compact, shorting / non shorting selectable

RS500 _____ P. 03

various step angles: 15/20/30/45/60 degrees

MR8A _____ P. 05

8mm square tiny rotary switch, waterproof model available

RS300/400/500 Series

Outline

Our RS series embody the manufacturing history of our company. All series are sturdy and solid with high dependability designed for control units of plants, installations, audio equipments, etc.

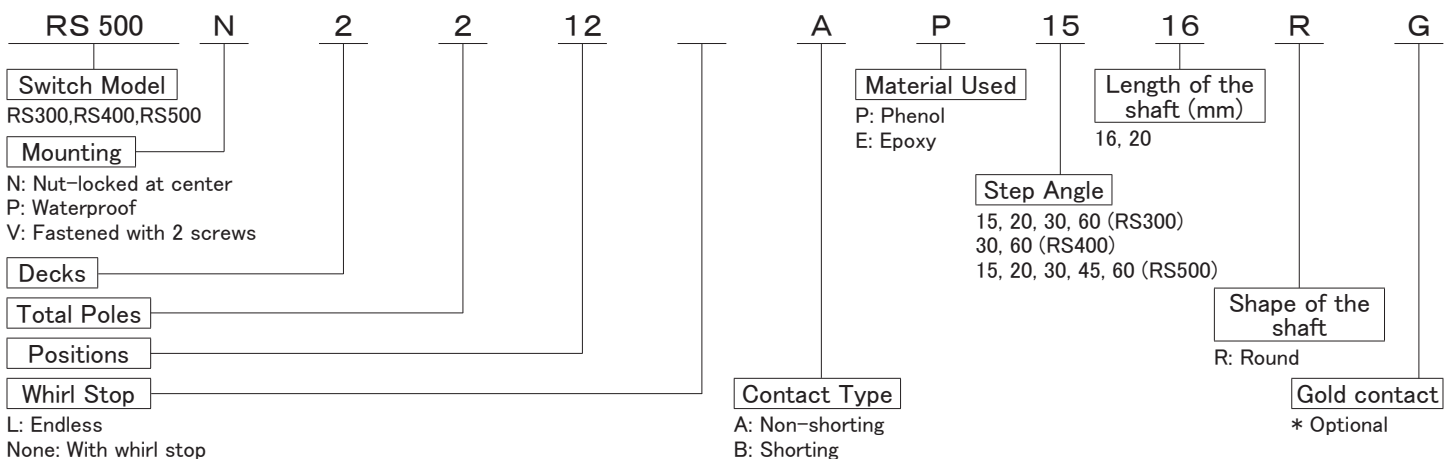
Features

- Free to change the number of switch positions by replacing self-tapping screws
- Various combinations of double shafted model available
- RoHS compliant

Specifications

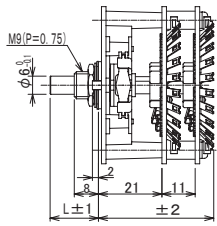
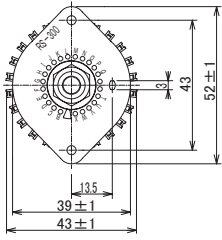
	RS300	RS400	RS500	
Step Angles	15/20/30/60	30/60	15/20/30/45/60	
Switching Mechanism	15/20: Shorting 30/60: Non-shorting	Shorting and Non-shorting selectable	15/20: Shorting 30/45/60: Non-shorting	
Water Proofing	-----	Adapter panel and rubber o-rings provided at requests		
Gold Contacts	Available			
High-Voltage Withstanding	Available (Up to 6,000V)	-----		
Operating Temperature	-20°C +70°C			
Storage Temperature	-40°C +C70°C			
Rotational Torque	0.12N · m ~ 0.35N · m	0.10N · m ~ 0.25N · m		
Terminal Strength	10N			
Nut Tightening Torque	2N · m			
Vibration Resistance	10Hz ~ 55Hz ~ 10Hz/min (vibrated for 1.5mm to each XYZ direction) No defect found under conditions above			
Heat Resistance of Solder	350±10°C , 3 seconds ±1			
Contact Resistance	(1kHz±200Hz of voltage 20mV. 50mA or less)			
	5mΩ max.	15mΩ max.	10mΩ max.	
Insulation Resistance	After 1 min. of 500VDC terminal-terminal 1,000MΩ ≤ terminal-ground 50,000MΩ ≤			
Withstanding Voltage	1,000VAC 1min.	500VAC 1min.		
Rated Value	AC	30V 3.0A/200V 0.5A	30V 1.0A/200V 0.2A	30V 1.5A/200V 0.2A
	DC	20V 3.0A/200V 0.2A	20V 1.0A/200V 0.1A	20V 1.5A/200V 0.1A
Durability	at least 50,000 strokes			

Part Number Designation

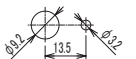


RS300_Dimensions (mm)

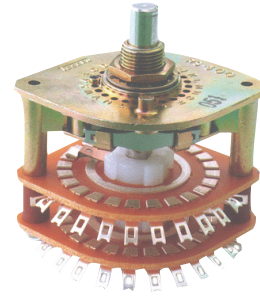
Bushing



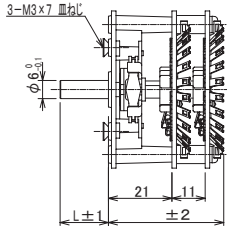
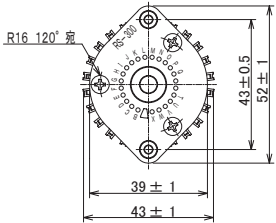
Panel Mounting Hole Dimensions (mm)



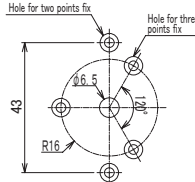
RS300/400/500N accessories
M9 Nut (t=2mm)
M9 Toothed lock washer (t=1mm)
Washer (t=0.5mm)



Two screws fix



Panel Mounting Hole Dimensions (mm)



RS300V accessory
Three M3x7 screws
(for two points fix, with two screws)

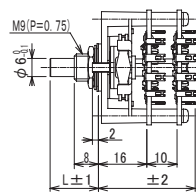
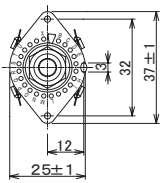
Length

L	Standard shaft length (mm)			
	16	18	20	
Number of Layers (mm)	1	2	3	4
	27	38	49	60

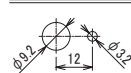
Number of Layers (mm)	1	2	3	4
	27	38	49	60

RS400_Dimensions (mm)

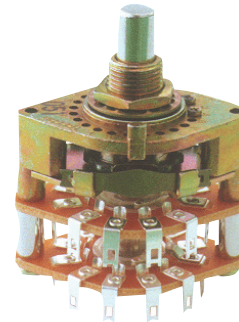
Bushing



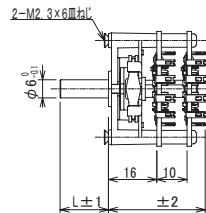
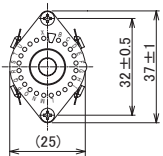
Panel Mounting Hole Dimensions (mm)



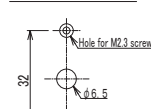
*φ3.2hole not needed for waterproof
RS300/400/500N accessories
M9 Nut (t=2mm)
M9 Toothed lock washer (t=1mm)
Washer (t=0.5mm)



Two screws fix



Panel Mounting Hole Dimensions (mm)



RS400V accessory
Two M2.3x6 screw

Length

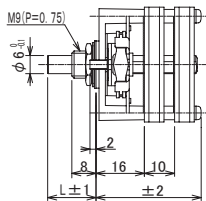
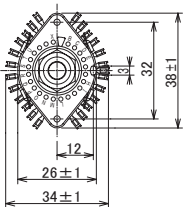
L	Standard shaft length (mm)			
	16	18	20	
Number of Layers (mm)	1	2	3	4
	22(26)	32(41)	42(56)	52(71)

Number of Layers (mm)	1	2	3	4
	22(26)	32(41)	42(56)	52(71)

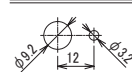
() : for all contacts type

RS500_Dimensions (mm)

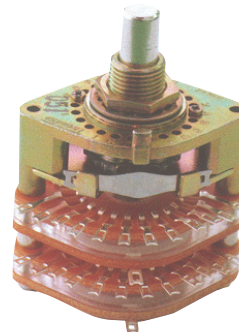
Bushing



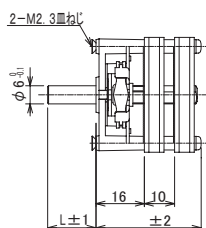
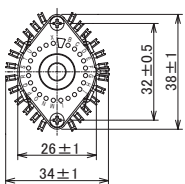
Panel Mounting Hole Dimensions (mm)



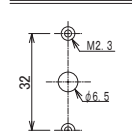
*φ3.2hole not needed for waterproof
RS300/400/500N accessories
M9 Nut (t=2mm)
M9 Toothed lock washer (t=1mm)
Washer (t=0.5mm)



Two screws fix



Panel Mounting Hole Dimensions (mm)



RS500V accessory
Two M2.3x6 screw

Length

L	Standard shaft length (mm)			
	16	18	20	
Number of Layers (mm)	1	2	3	4
	26	36	46	56

Number of Layers (mm)	1	2	3	4
	26	36	46	56

Ultra Compact Rotary Switch



MR8A Series



Outline

MR8A is our tiniest rotary switch designed for compact devices, used for many different equipments which has very limited space inside.

Features

- 8mm square compact (8.0x8.0 mm)
- Gold plated contacts
- Monolithic sealed structure of the terminals to prevent entry of a soldering flux
- RoHS compliant
- Waterproofed model available

Specifications

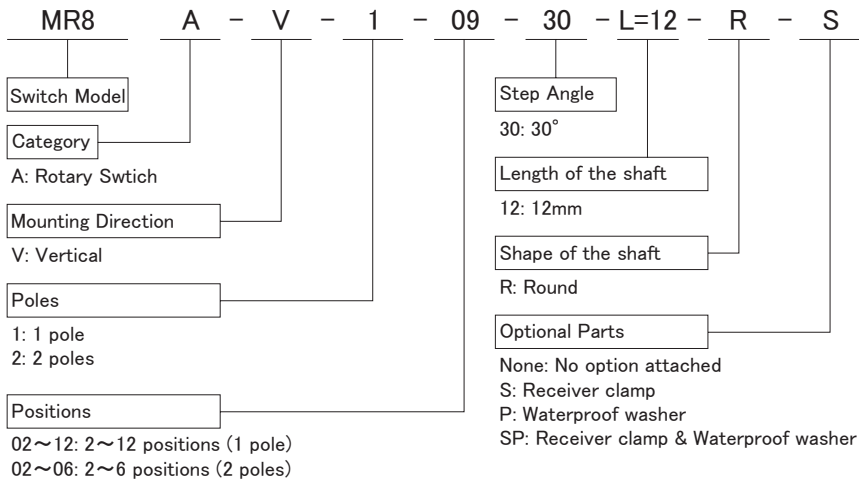
Operating temperature		-20°C ~ +70°C -4F ~ 158F	Keep the body unfrozen
Storage temperature		-40°C ~ +70°C -40F ~ 158F	
Mechanical Specification	Rotational Torque	0.02±0.01N·m	
	Terminal Strength	3N (of static load applied to the tip of the terminal once and in any direction)	
	Rotation Stopper Strength	0.4N·m	
	Panel Nut Tightening Torque	0.8N·m	
	Heat Resistance of Solder	300°C ±10°C , 3±1 sec.	
	Water Resistance	Water resistant through the mounted panel (2m deep in the water for 2h)	
Electrical Specification	Contact Capacity	0.4VA (AC&DC)	
	Maximum Voltage	25V (AC&DC)	
	Working Electric Current	0.1mA ~ 50mA (AC&DC)	
	Contact Resistance	80mΩ max.	

Electrical Specification	Insulation Resistance	500MΩmin. (250VDC): Between terminals		
		1000MΩmin. (500VDC): Between Terminals and Ground		
	Withstanding Voltage	300VAC 1min.: Between terminals		
		300VAC 1min.: Between terminals and ground		
Insulation Resistance		DC100V (1min later)	terminal – terminal	100MΩ ≤
		DC500V (1minLater)	terminal – ground	500MΩ ≤
Weight		5.5g		
Durability		50,000 strokes (Rotational Torque: ±20% the initial value, Contact Resistance: Not more than 100mΩ, Insulation Resistance: After 1min 250VDC electrification)		
Humidity Proof		Temperature : +40 ± 2°C Relative Humidity : 90 ~ 95% (Duration : 48 ± 2h)		

Warranty

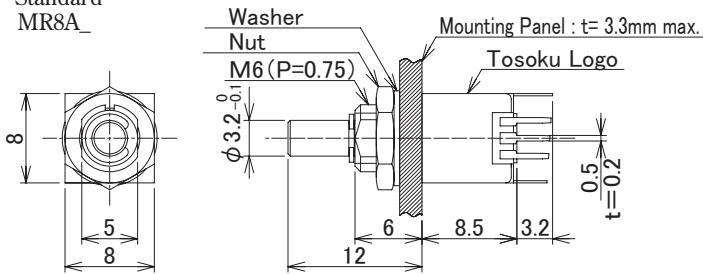
- 1 year from the date of shipment.

Part Number Designation

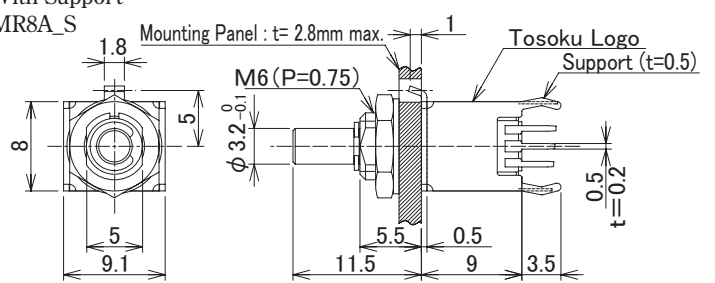


Dimensions (mm)

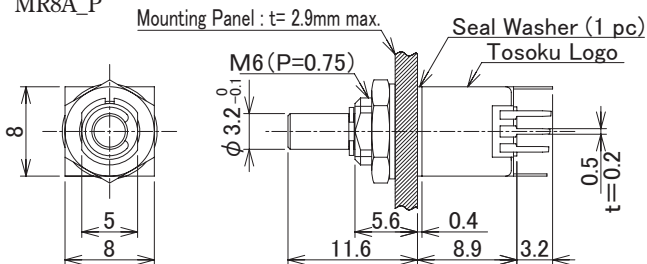
Standard
MR8A_



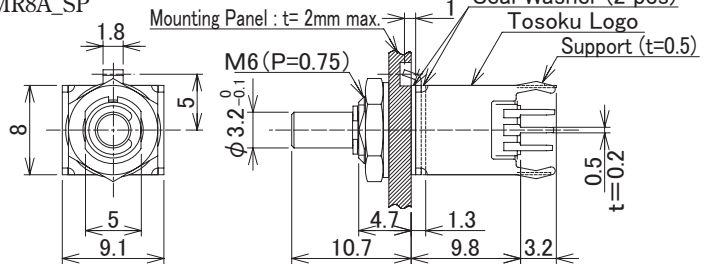
With Support
MR8A_S



With Seal Washer (Front panel seal)
MR8A_P



With Support & Seal Washer (Front panel seal)
MR8A_SP



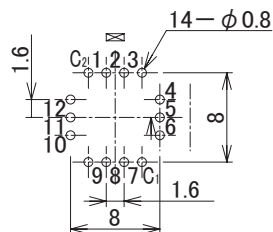
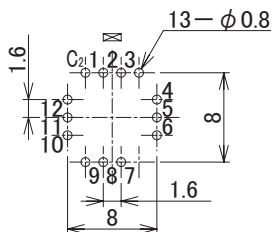
※Use 2 seal washers

PWB Mounting Hole Dimensions (mm)

Standard / With Seal Washer

Seal Washer (2 pcs)

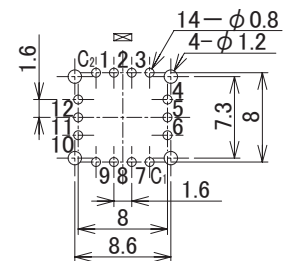
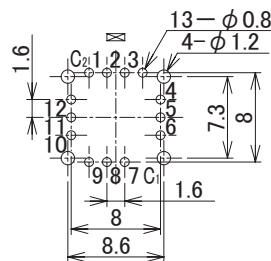
※Use 2 seal washers



With Support (& Seal Washer)

Seal Washer (2 pcs)

※Use 2 seal washers

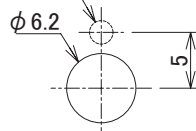
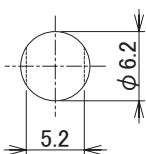


Mounting Hole Dimension (mm)

Standard / With Seal Washer

With Support (& Seal Washer)

※ $\phi 2.1$



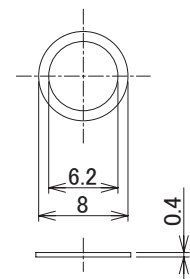
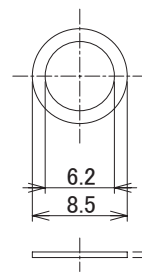
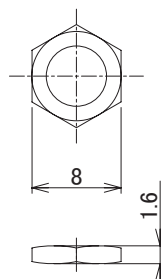
With seal washer,
keep the hole closed.

Accessories

Nut

Washer

Seal Washer (1 pc)



Tokyo Sokuteikizai Co.,Ltd.

Code Switch Catalogue

DP _____ P. 02

hermetically sealed, long life, various opations

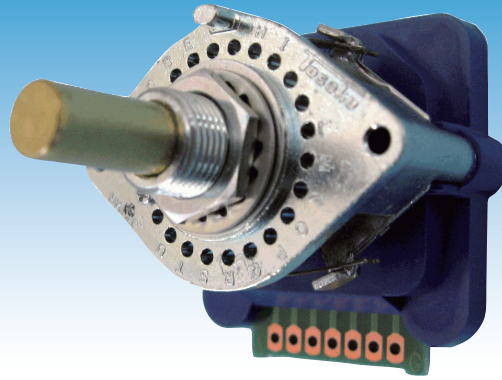
MR8C _____ P. 05

tightly sealed, 2 types of mouting positions

Digital Code Switch



DP Series



Outline

DP – the market leading digital code switch – series are designed for use in wide range of industrial instruments.

Features

- High reliability with double gold-plated sliding contacts.
- Eco friendly:
 - 1) Low cost and lesser parts by VA design
 - 2) RoHS compliant
- Step angles: 13.85°, 15°, 20°, 27.69°, 30°
- Various types of codes: real binary, complementary binary, real gray, complementary gray (either inhibit and/or parity circuit enclosed in all codes for safety). Special codes also available.
- Duration of over 50000 switching cycles
- Waterproofed model available

Specifications

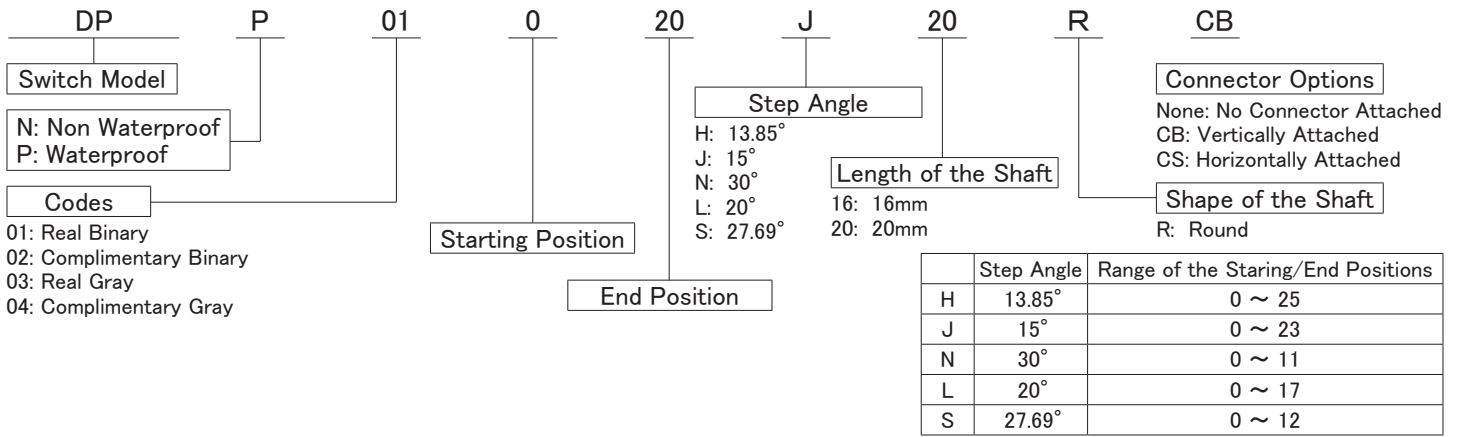
Items	Rated Value	
Operating temperature	-20°C ~ +70°C (-4F ~ 158F)	Keep the body unfrozen
Storage temperature	-40°C ~ +70°C (-40F ~ 158F)	
Rotational torque	0.1N ~ 0.2N	
Terminal strength	3N	
Panel nut tightening torque	2N · m	
Stopper strength	3N · m	
Vibration Durability	Range 10 ~ 55 ~ 10Hz/min	
	No defect found after 2h of vibration stroke for 1.5mm to each XYZ direction	
Contact resistance	≤ 100mΩ	

Insulation resistance	DC250V/ After 1min	Terminal to terminal	500MΩ ≤
	DC500V/ After 1min	Terminal to ground	5000MΩ ≤
Withstanding voltage	AC250/1min	Terminal to terminal	
	AC1500V/1min	Terminal to ground	
Load resistance	AC	5V 0.5A/ 48V 0.05A	
	DC	5V 0.25A/ 25V 0.05A	
Durability	Rotational	Over 50000 times rotations	
	Contact resistance	≤ 150mΩ	
	Insulation resistance	DC250V/50mΩ ≤ , (Over a min)	

Warranty

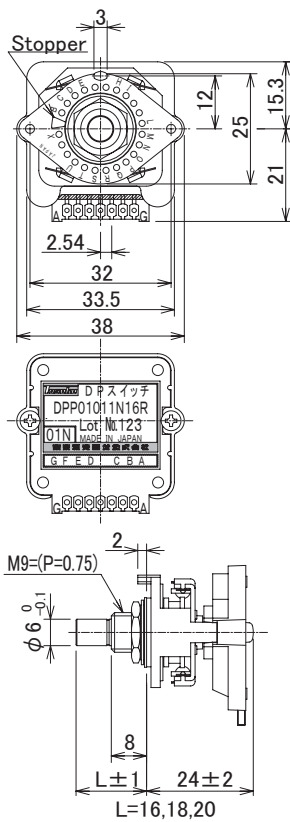
- 1 year from the date of shipment

Part Number Designation

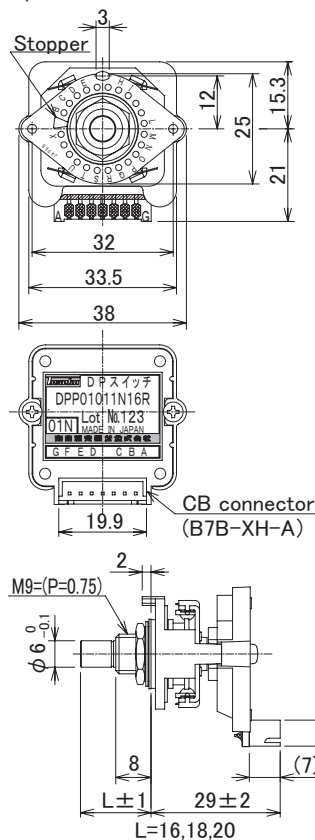


Dimensions (mm)

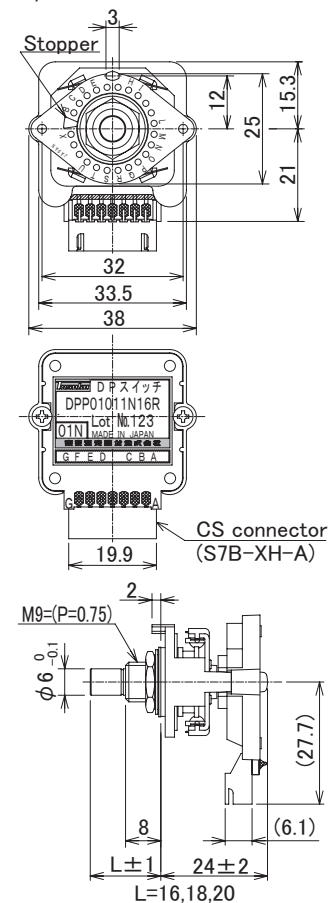
DPN/DPP



DPN/DPP with Connector CB

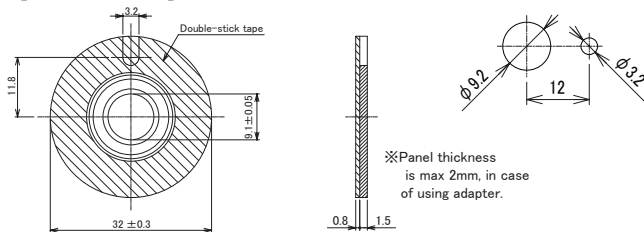


DPN/DPP with Connector CS

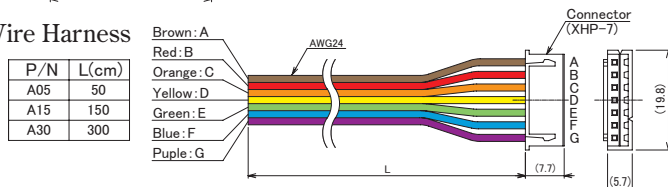


DP Accessory

Adapter (for waterproof)



Wire Harness



Precautions

How to connect panel

1. Peel double-sided tape off.
2. Stick double-sided tape to the panel (Pay attention to direction of adapter)
3. Use M9nut, toothed lock washer and washer to tighten panel and adapter.
4. M9 nut tightening torque shall be up to 2N.m.
5. Use double-sided tape under clean condition.

PLEASE NOTE

1. Panel thickness shall be up to 2mm (to use adapter)
2. Panel thickness shall be up to 4mm (without adapter)

Mounting hole dimensions

1. Make φ9.2 dimensions hole at the panel (to use adapter)
2. Check out left example to use without adapter

Code and Truth Tables

1. Angle of throw(H):13.85° (26-position)

Code : 01 BCD Real Code(with inhibit)

Terminal No.	Code Output	Switch Position																										
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
A	1	●																										
F	2		●																									
B	4			●																								
E	8				●																							
C	16					●																						
G	Inhibit	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Dot(●) indicates terminal to common(D) connection.

6. Angle of throw(L):20° (18-position)

Code : 03 Gray Real Code(with parity)

Terminal No.	Code Output	Switch Position																	
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A			●																
F				●															
B					●														
E						●													
G	Parity	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Dot(●) indicates terminal to common(D) connection.

2. Angle of throw(H):13.85° (26-position)

Code : 03 Gray Real Code(with parity)

Terminal No.	Code Output	Switch Position																										
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
A		●	●																									
F			●	●																								
B				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
E					●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
C						●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
G	Parity	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Dot(●) indicates terminal to common(D) connection.

7. Angle of throw(N):30° (12-position)

Code : 03 Gray Real Code(with parity)

Terminal No.	Code Output	Switch Position																	
		0	1	2	3	4	5	6	7	8	9	10	11						
A			●	●															
F				●	●	●													
B					●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
E						●	●	●	●	●	●	●	●	●	●	●	●	●	●
C	Parity	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Dot(●) indicates terminal to common(D) connection.

3. Angle of throw(J):15° (24-position)

Code : 01 BCD Real Code(with inhibit)

Terminal No.	Code Output	Switch Position																									
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
A	1	●																									
F	2		●																								
B	4			●																							
E	8				●																						
C	16					●																					
G	Inhibit	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Dot(●) indicates terminal to common(D) connection.

8. Angle of throw(N):30° (12-position)

Code : 01 BCD Real Code(with inhibit and parity)

Terminal No.	Code Output	Switch Position																				
		0	1	2	3	4	5	6	7	8	9	10	11									
A	1		●																			
F	2			●																		
B	4				●																	
E	8					●																
C	Parity	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
G	Inhibit	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Dot(●) indicates terminal to common(D) connection.

4. Angle of throw(J):15° (24-position)

Code : 03 Gray Real Code(with parity)

Terminal No.	Code Output	Switch Position																									
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
A		●	●																								
F			●	●																							
B				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
E					●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
C						●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
G	Parity	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Dot(●) indicates terminal to common(D) connection.

9. Angle of throw(S):27.69° (13-position)

Code : 01 BCD Real Code(with inhibit and parity)

Terminal No.	Code Output	Switch Position																				
		0	1	2	3	4	5	6	7	8	9	10	11	12								
A	1		●																			
F	2			●																		
B	4				●																	
E	8					●																
C	Parity	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
G	Inhibit	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Dot(●) indicates terminal to common(D) connection.

5. Angle of throw(L):20° (18-position)

Code : 01 BCD Real Code(with inhibit)

Terminal No.	Code Output	Switch Position																	
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A	1	●																	
F	2		●																
B	4			●															
E	8				●														
C	16					●													
G	Inhibit	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Dot(●) indicates terminal to common(D) connection.

10. Angle of throw(S):27.69° (13-position)

Code : 03 Gray Real Code(with parity)

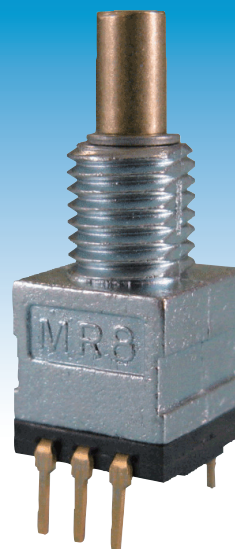
Terminal No.	Code Output	Switch Position																				
		0	1	2	3	4	5	6	7	8	9	10	11	12								
A			●																			
F				●																		
B					●																	
E						●																
C	Parity	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Dot(●) indicates terminal to common(D) connection.

Ultra Compact Code Switch



MR8C Series



Outline

MR8C is an ultra compact rotary code switch with resin enclosure designed especially for – but not limited to - usage in devices with limited space for switch units inside.

Features

- 8mm square compact (8.0x8.0 mm)
- Two different step angles; (22.5°, 30)
- Gold plated contacts
- Monolithic sealed structure of the terminals to prevent entry of a soldering flux
- RoHS compliant
- Dripproofed model available

Specifications

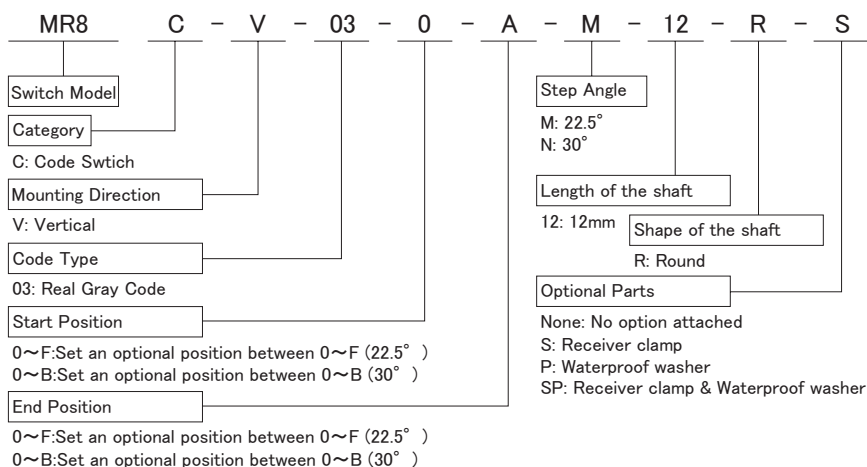
Operating temperature		-20°C ~ +70°C -4F ~ 158F	Keep the body unfrozen
Storage temperature		-40°C ~ +70°C -40F ~ 158F	
Mechanical Specification	Rotational Torque	0.02±0.01N·m	
	Terminal Strength	5N (of static load applied to the tip of the terminal once and in any direction)	
	Rotation Stopper Strength	0.4N·m	
	Panel Nut Tightening Torque	0.6N·m	
	Heat Resistance of Solder	350°C ±10°C , 3±1 sec.	
	Water Resistance	Water resistant through the mounted panel (1m deep in the water for 2h)	
Electrical Specification	Contact Capacity	0.2VA (AC&DC)	
	Maximum Voltage	15V (AC&DC)	
	Working Electric Current	0.1mA ~ 20mA (AC&DC)	
	Contact Resistance	200mΩ max.	

Electrical Specification	Insulation Resistance	100MΩ minimum (100VDC 1min.): Between terminals
		500MΩ minimum (500VDC 1min.): Between Terminals and Ground
	Withstanding Voltage	100VAC 1min.: Between terminals
		500VAC 1min.: Between terminals and ground
Weight		3.5g
Durability		30,000 strokes (Rotational Torque: ±50% the initial value, Contact Resistance: Not more than 1Ω, Insulation Resistance: After 1min 100VDC electrification)
Humidity Proof		Temperature : +40 ± 2°C Relative Humidity : 90 ~ 95% (Duration : 48 ± 2h)

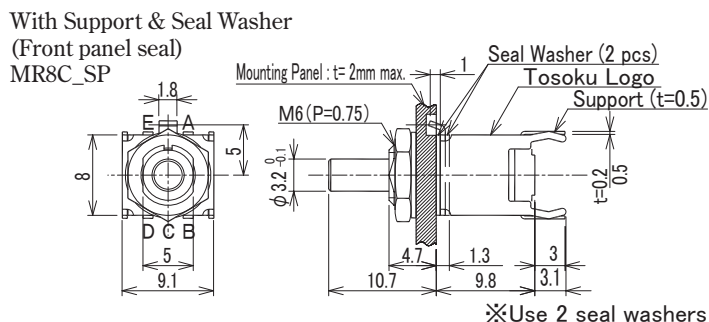
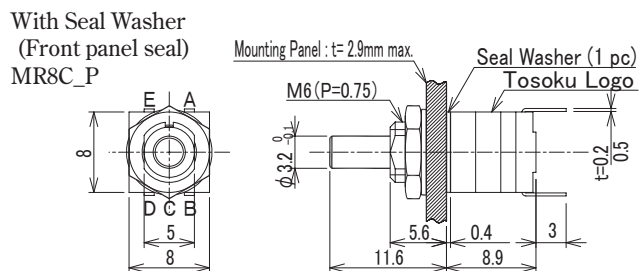
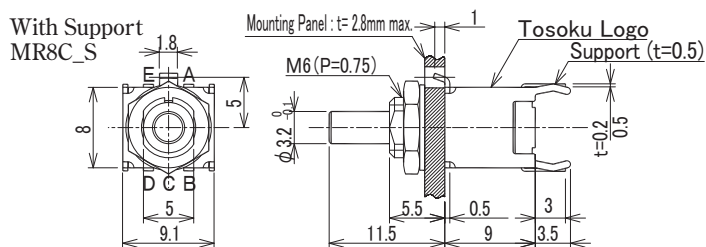
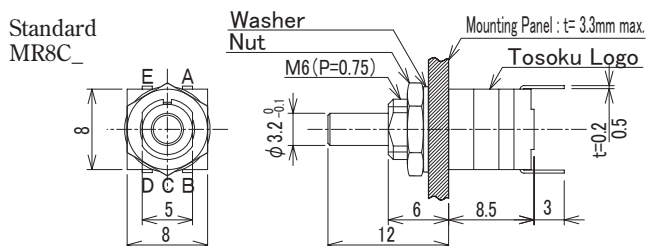
Warranty

- 1 year from the date of shipment

Part Number Designation

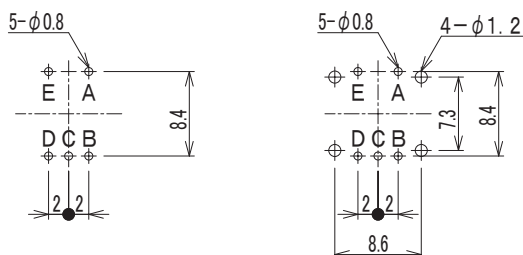


Dimensions (mm)



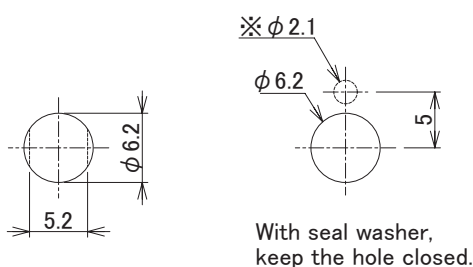
PWB Mounting Hole Dimensions (mm)

Standard / With Seal Washer With Support (+ Seal Washer)



Mounting Hole Dimension (mm)

Standard / With Seal Washer With Support (+ Seal Washer)



Code table

22.5° Step angle

Code Type 03 (Real gray code) ● indicates terminal connection to common

Terminal No.	Bit No.	Switch Position															
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
A	1		●														
E	2			●													
B	4				●												
D	8					●											
C	common																

30° Step angle

Code Type 03 (Real gray code) ● indicates terminal connection to common

Terminal No.	Bit No.	Switch Position											
		0	1	2	3	4	5	6	7	8	9	A	B
E	1		●										
A	2			●									
B	4				●								
D	8					●							
C	common												

Code Type 01 (Real binary code) ● indicates terminal connection to common

Terminal No.	Bit No.	Switch Position											
		0	1	2	3	4	5	6	7	8	9	A	B
D	1		●										
B	2			●									
E	4				●								
A	8					●							
C	common												

Attention: Terminal A and E of 30° is reverse to 22.5°

Tokyo Sokuteikizai Co.,Ltd.

Rotary Encoder Catalogue

RE29 _____ P. 02

thin, lightweight, resin shaft / case

RE25 _____ P. 04

waterproof model available, operated at 3.3V/5V

RE24 _____ P. 06

dual (inner/outer) shaft: inner for push button, outer for rotation

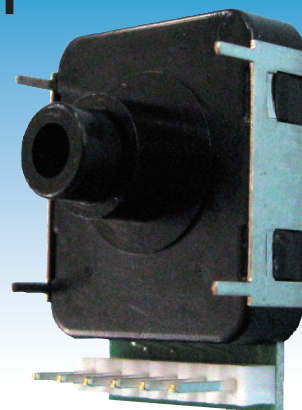
RE23 _____ P. 08

push button function added to the rotating shaft, low price

Ultra Slimline Rotary Encoder with Push Switch



RE29 Series



Outline

RE29 series pack compact rotary encoder with dual-functional resin shaft into the space-saving resin enclosure. RE29 is recommended for wide range of machines including measurement components, medical and telecommunication devices.

Features

- Extremely thin (6.6mm) and lightweight (7g)
- Multi-functional with 2 way acting – push switch function and rotating function – shaft
- Eco friendly:
 - 1) Low cost and lesser parts by VA design
 - 2) RoHS compliant
- Designed to be soldered to printed circuit board

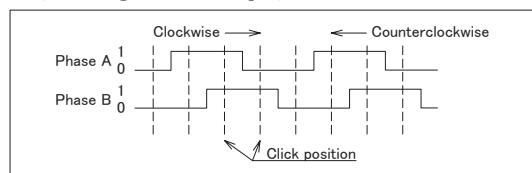
Specifications

1. Electrical and Mechanical specifications			
Items		Rated Value	
Rotary Encoder	Number of Pulses	6 PPR	
	Number of Clicks	24 Clicks	
	Supply Voltage	DC3.3V \pm 5% \leq 20mA 6mA TYP	
		DC5V \pm 5% \leq 10mA 4mA TYP	
	Output Signals	Channel A/B: Square Wave CMOS chip	
	Output Voltage	High	(Supply Voltage – 2.5V) \leq
		Low	\leq 0.5V
Response Frequency	100Hz		
Rotational Torque	4 \pm 2 mN · m		
Push switch	Rating of contact	\leq DC12V 0.1 ~ 10mA (Resistance load)	
	Travel of switch	0.2 \pm 0.1 mm	
	Operational Force	5 \pm 2 N	
Weight		7g	

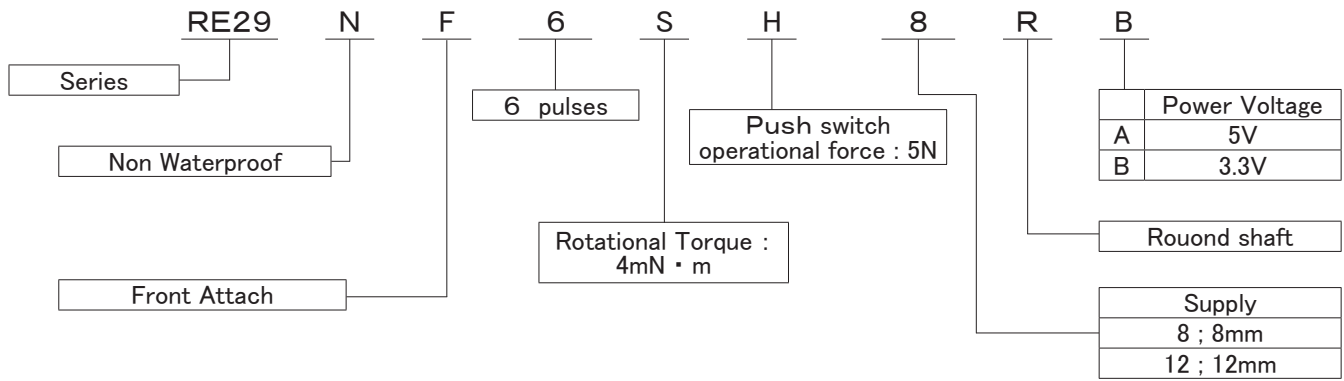
2. Reliability and Environmental Specifications		
Items		Rated Value
Durability of operating area	Thrust direction	100N
	Push Pull	50N
	Radial	1N · m
Rotational durability		1 million strokes (No load)
Screw Torque		Not more than 1N · m
Heat resistance of solder	Solder bit temp.: MAX 350°C	Within 3 seconds for each terminal
Operating temperature		-0°C ~ +55°C 32F ~ 131F
Storage temperature		- 40°C ~ +85°C - 40F ~ 185F

Output Waveform

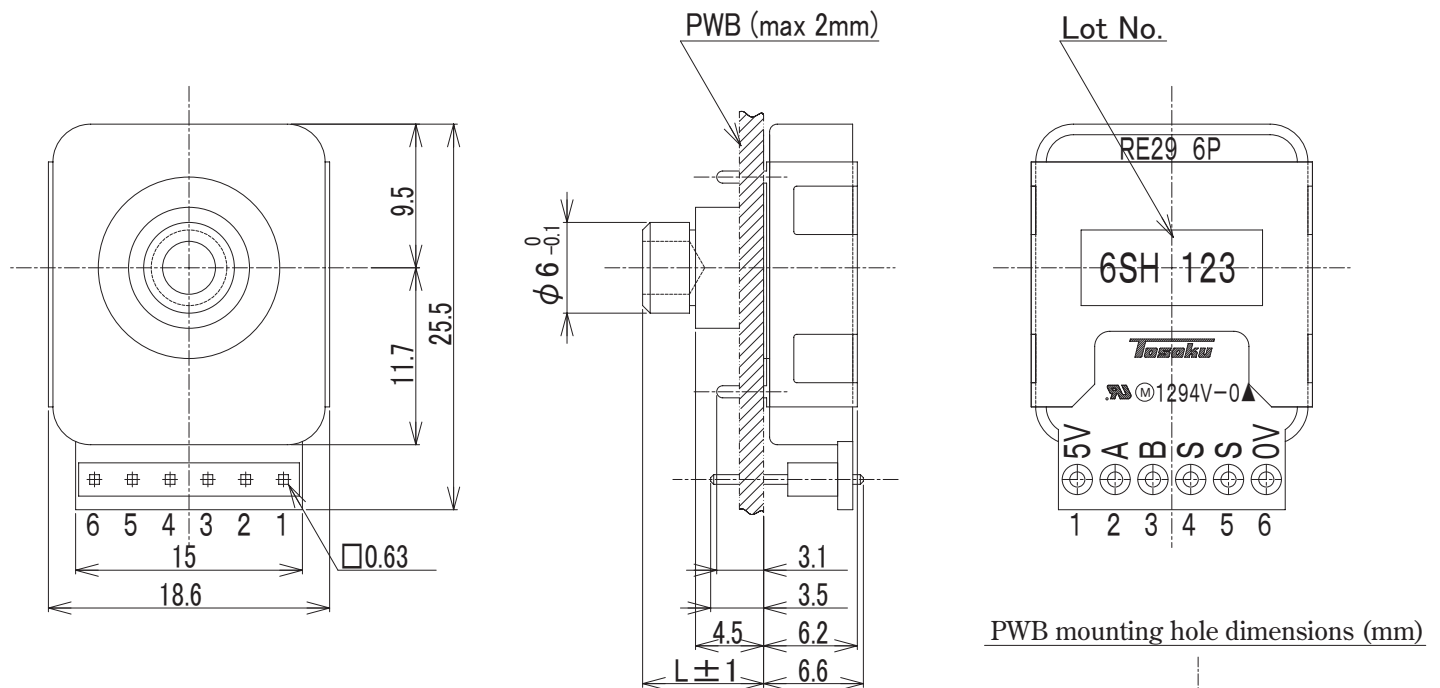
- 1) Turning the shaft clockwise will generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise will generate the signal A when the signal B outputs a high voltage(1);
- 3) Either signal A or B switches from 0→1 or 1→0 for every single click (Quad edge evaluation spec).



Part Number Designation

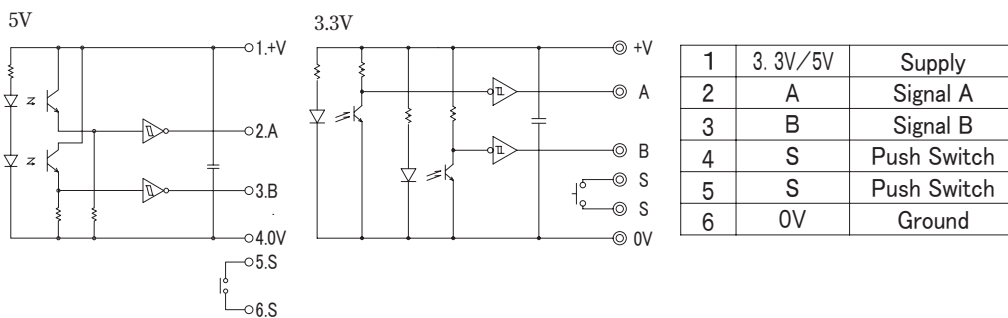


Dimensions (mm)



PWB mounting hole dimensions (mm)

Circuitry



Precautions

Wiring	Use buffering amplifier when extending lead wire over 30cm.
Soldering	Do not put a load on the terminal area during and immediately after soldering.
Operation	Do not use flow/reflow soldering machines.
Power	Use under specified power voltage and connect properly.

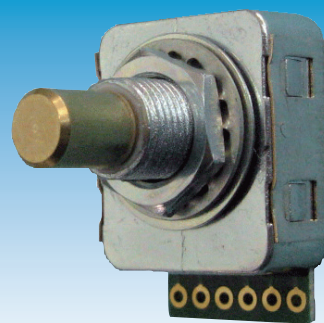
Warranty

- 1 year from the date of shipment

Optical Rotary Encoder



RE25 Series



Outline

RE25 is a VA designed eco friendly – power-saving and low cost with lesser parts – rotary encoder. Its size, mounting procedures and inner-structures have been designed for a wide-array of uses; measurement devices, medical equipments, industrial machineries, telecommunication devices and machine tools.

Features

- Eco friendly:
 - 1) Power-saving
 - 2) Low cost and lesser parts by VA design
 - 3) RoHS compliant
- Thin-line (18.8x25.5x8.9mm) and lightweight (18g)
- Various types of models with options: lead wire with or without connector, clamp for horizontal/vertical mounting
- Long-lasting without “contact chatter” due to its optical switching function
- Waterproofed model available

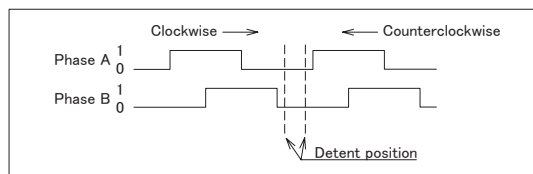
Specifications

1. Electrical and Mechanical specifications		
Items	Rated Value	
Number of pulses	16PPR, 25PPR	
Supply voltage	3.3V±10%	5V±10%
	20mA	10mA
Output signals	Channel A/B: Square Wave CMOS chip	
Output voltage	High	Supply Voltage(3.3V): $-0.3V \leq$, (5V): $-0.5V \leq$
	Low	$\leq 0.4V$
Response frequency	200Hz	
Rotational Torque	Light: S	$4 \pm 1mN \cdot m$
	Standard: C	$6 \pm 2mN \cdot m$
	Medium: M	$10.5 \pm 3.5mN \cdot m$
	High: H	$16 \pm 5mN \cdot m$
Weight	18g	

2. Reliability and Environmental specifications			
Items	Rated Value		
Durability of operating area	Thrust direction	Push	100N
		Pull	50N
	Radial		$1N \cdot m$
Rotational durability	Light: S		1 million strokes (No load)
	Standard: C		
	Medium: M		
	High: H		100 thousand strokes (No load)
Screw Torque	Not more than $1N \cdot m$		
Heat resistance of solder	Solder bit temp.: MAX 350°C	Within 3 seconds for each terminal	
Operating temperature	0°C ~ +55°C 32F ~ 131F		
Storage temperature	- 40°C ~ +85°C - 40F ~ 185F		

Output Waveform

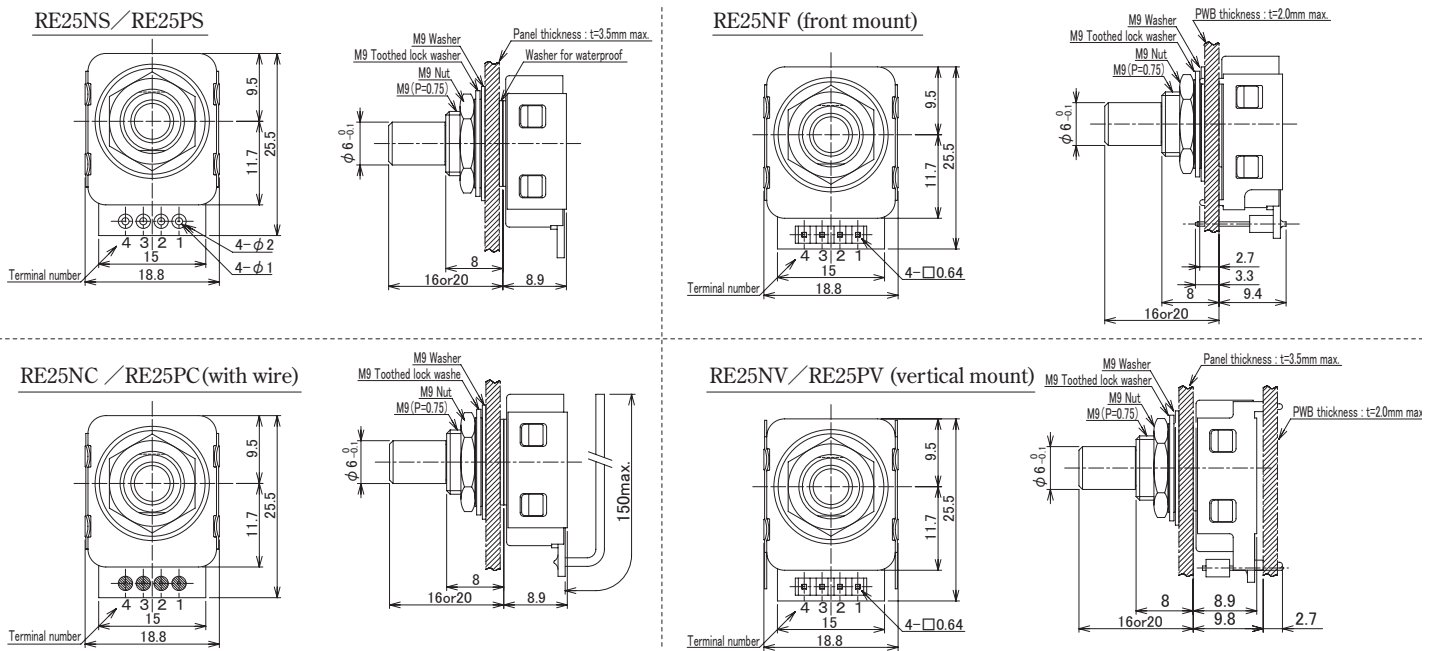
- 1) Turning the shaft clockwise will generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise will generate the signal A when the signal B outputs a high voltage (1);
- 3) Detent positions are where both signal A and B are low (0).



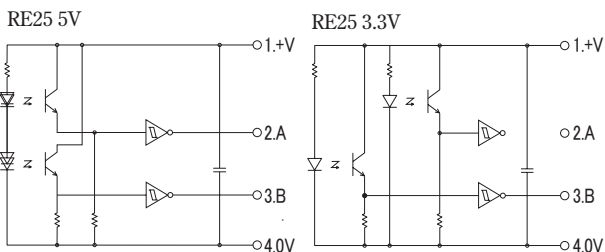
Part Number Designation

Series	RE25	N	S	25	C	20	R	A	
	Waterproof			Pulse				Power Voltage	
N	No			16	16PPR			A	5V
P	Yes			25	25PPR			B	3.3V
	Wiring				Ckick	Rotation Torque			Shaft Shape
S	Standard			S		4mN · m		R	Round
C	With wire			C	With	6mN · m			Shaft length
F	Front Mount			M		10.5mN · m		16	16mm
V	Vortical Mount			H		16mN · m		20	20mm
				Non	W/O	$\leq 4mN \cdot m$			

Dimensions (mm)



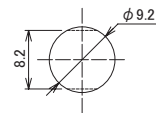
Circuitry



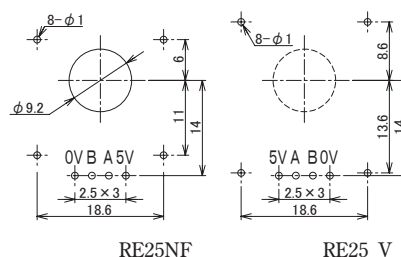
Terminal number

1	3.3V/5V	Supply
2	A	Signal A
3	B	Signal B
4	0V	Ground

Mounting hole dimensions (mm)



PWB mounting hole dimensions (mm)



Precautions

Wiring	Use buffering amplifier when extending lead wire over 30cm.
Soldering	Do not put a load on the terminal area during and immediately after soldering.
Operation	Do not use flow/reflow soldering machines.
Power	Use under specified power voltage and connect properly.
Waterproofing	Do not fasten tighter with the torque of more than 1.5N · m.

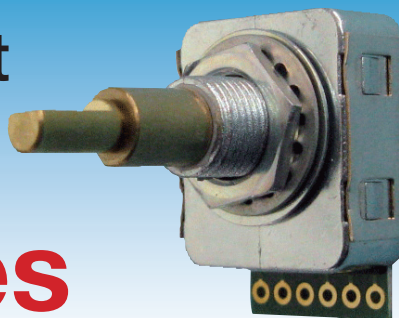
Warranty

- 1 year from the date of shipment.

Rotary Encoder with Dual Functional Shaft



RE24 Series



Outline

RE24 rotary encoder series contain unique mechanism for its shaft; its rotational outer axis for rotary encoder and the inner axis for push switch. RE24 is designed for use in various industrial areas: measurement component, medical equipment, industrial machinery, telecommunication device and machine tool.

Features

- Dual inner/outer axes mechanism to help prevent misoperation
- Eco friendly:
 - 1) Low cost and lesser parts by VA design
 - 2) RoHS compliant
- Thin-line (18.8x25.5x8.9mm) and lightweight (18g)
- Long-lasting without “contact chatter” due to its optical switching function
- Specially designed knob (GG60) available

Specifications

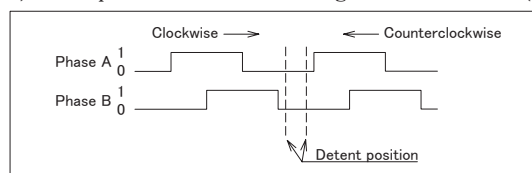
1. Electrical and Mechanical specifications		
Items		Rated Value
Number of pulses		16PPR, 25PPR
Supply voltage	3.3V±10%	5V±10%
	20mA	10mA
Output signals		two square wave output (A/B), CMOS chip
Output voltage	High	(Supply Voltage - 0.5V) ≤
	Low	≤ 0.5V
Response frequency		200Hz
Rotational torque	Light: S	4±1mN · m
	Standard: C	6±2mN · m
	Medium: M	10.5±3.5mN · m
	High: H	16±5mN · m
Push switch	Rating of contact	
	≤ DC12V 0.1 ~ 10mA	
	Travel of switch	
	0.2±0.1mm	
Operational Force	S	3.2±1N
	M	4.0±1N
	H	5.0±1N
Weight		18g

Note : In case Rotational Torque M or H, Operational Torque should be either M or H.

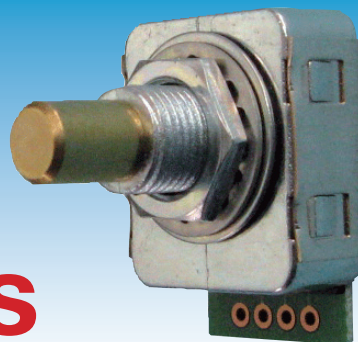
2. Reliability and Environmental specifications		
Items		Rated Value
Durability of operating area	Thrust direction	Push: 100N
		Pull: 50N
	Radial	1N · m
Rotational durability	Light: S	1 million strokes (No load)
	Standard: C	
	Medium: M	
	High: H	100 thousand strokes (No load)
Screw Torque		Not more than 1N · m
Heat resistance of solder	Solder bit temp.: MAX 350°C	Within 3 seconds for each terminal
Operating temperature		0°C ~ +55°C 32F ~ 131F
Storage temperature		- 40°C ~ +85°C - 40F ~ 185F

Output Waveform

- 1) Turning the shaft clockwise will generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise will generate the signal A when the signal B outputs a high voltage (1);
- 3) Detent positions are where both signal A and B are low (0).



Optical Rotary Encoder with Push Switch



RE23 Series

Outline

RE23 series are optical rotary encoders with dual functions of pushing and rotating on its shaft. Its size, mounting procedures and inner-structures have been designed for a wide-array of uses; measurement devices, medical equipments, industrial machineries, telecommunication devices and machine tools.

Features

- Multi-functional with 2 way acting – pushing and rotating – shaft
- Eco friendly:
 - 1) Low cost and lesser parts by VA design
 - 2) RoHS compliant
- Thin-line (18.8x25.5x8.9mm) and lightweight (18g)
- Various types of models with options: lead wire with or without connector, clamp for horizontal/vertical mounting
- Long-lasting without “contact chatter” due to its optical switching function

Specifications

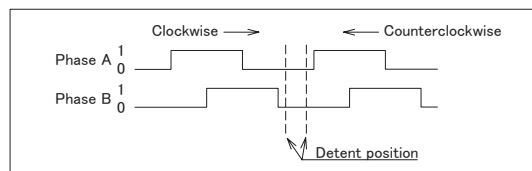
1. Electrical and Mechanical specifications		
Items		Rated Value
Number of pulses		16PPR, 25PPR
Supply voltage		3.3V±10%
		5V±10%
		20mA
		10mA
Output signals		Channel A/B: Square Wave CMOS chip
Output voltage	High	(Supply Voltage - 0.5V) ≤
	Low	≤ 0.5V
Response frequency		200Hz
Rotational torque	Light: S	4±1mN · m
	Standard: C	6±2mN · m
	Medium: M	10.5±3.5mN · m
	High: H	16±5mN · m
Push switch	Rating of contact	
	≤ DC12V 0.1 ~ 10mA	
	Travel of switch	
	0.2±0.1mm	
Operational Force	S	3.2±1N
	M	4.0±1N
	H	5.0±1N
Weight		18g

Note : In case Rotational Torque M or H, Operational Torque should be either M or H.

2. Reliability and Environmental specifications		
Items		Rated Value
Durability of operating area	Thrust direction	Push
		Pull
		Radial
		100N
		50N
		1N · m
Rotational durability	Light: S	1 million strokes (No load)
	Standard: C	
	Medium: M	
	High: H	100 thousand strokes (No load)
Screw Torque		Not more than 1N · m
Heat resistance of solder	Solder bit temp.: MAX 350°C	Within 3 seconds for each terminal
Operating temperature		0°C ~ +55°C 32F ~ 131F
Storage temperature		- 40°C ~ +85°C - 40F ~ 185F

Output Waveform

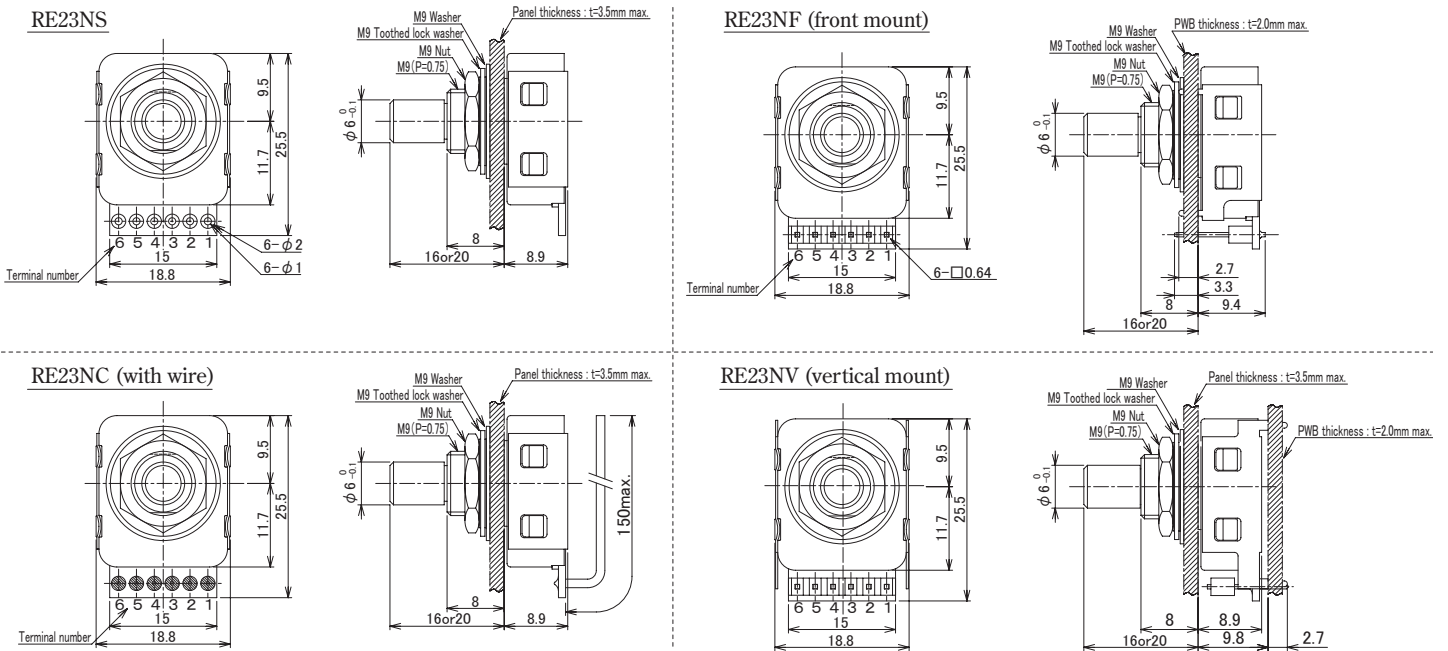
- 1) Turning the shaft clockwise will generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise will generate the signal A when the signal B outputs a high voltage (1);
- 3) Detent positions are where both signal A and B are low (0).



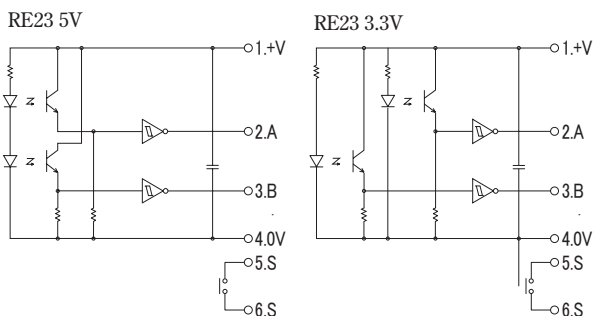
Part Number Designation

Series	RE23	N	S	25	C	S	20	R	A		
Waterproof	N	No									
Wiring	S	Standard	C	With wire	F	Front Mount	V	Vortical Mount			
Pulse	16	16PPR	25	25PPR							
Push Switch Force	S	3.2N	H	5N							
Ckick	S		C		M		H				
Rotation Torque	S	4mN · m	C	6mN · m	M	10.5mN · m	H	16mN · m	Non	W/O	$\leq 4mN \cdot m$
Power Voltage	A	5V	B	3.3V							
Shaft Shape	R	Round									
Shaft length	16	16mm	20	20mm							

Dimensions (mm)



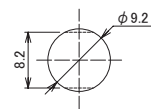
Circuitry



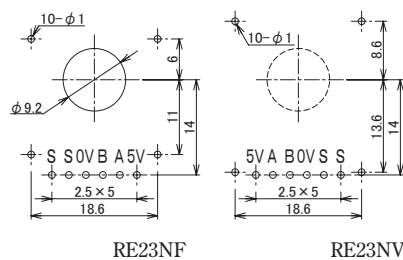
Terminal number

1	3.3V/5V	Supply
2	A	Signal A
3	B	Signal B
4	0V	Ground
5	S	Push Switch
6	S	Push Switch

Mounting hole dimensions (mm)



PWB mounting hole dimensions (mm)



Precautions

Wiring	Use buffering amplifier when extending lead wire over 30cm.
Soldering	Do not put a load on the terminal area during and immediately after soldering.
Operation	Do not use flow/reflow soldering machines.
Power	Use under specified power voltage and connect properly.
Waterproofing	Do not fasten tighter with the torque of more than 1.5N · m.

Warranty

- 1 year from the date of shipment.

Tokyo Sokuteikizai Co.,Ltd.

Manual Pulse Generator Catalogue

RE45T/V ————— P. 03

thin (8.5mm), hermetically sealed

RE45B ————— P. 05

long life, various options

RE46 ————— P. 07

large wheel, yet thin

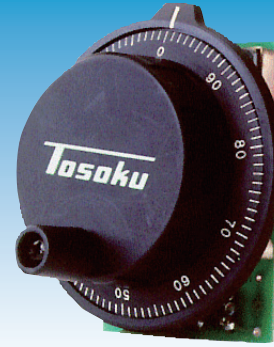
RE47 ————— P. 09

most compact and thin

Manual Pulse Generator



RE45T series



Outline

RE45T/V series are compact optical manual pulse generators that allow accurate and smooth manual motion for NC machine tools, industrial machines etc.

Features

- Eco friendly: RoHS compliant
- Various Options
 - terminal block mounted type/direct moulding type
 - output circuit: CMOS, open collector, line driver
- Enclosed structure design
- Protection from flux
- 100PPR, 25PPR available
- Long life use

Specifications

Model	RE645T***5	RE45T***1	RE45T***D	RE45***T2
	RE45V***5			
Application	5V input	12V input	Differential line	Photo coupler
Power Voltage	DC5V±10%	DC12V±10%	DC5V±10%	DC10.8Vto 26.4V
Current Power	≤ 80mA	≤ 60mA	≤ 150mA (90mA typ)	≤ 60mA
Current Power (Open collector)	≤ 30mA	≤ 40mA		
Out put	CMOS (45T) 330Ωpull-up or open collector	2.2KΩpull-up or open collector	RS-422A (Line driver) Receiver's terminator : 100Ω for each signal	Open collector (Current out put type)
Out put voltage	level 1: (Power voltage -0.5V) ≤			level 1: TR is ON
Out put voltage (Pull up)	level 0: ≤ 0.4V (No-load)			level 0: TR is OFF
Collector voltage (Open collector)	not more than DC30V or 50mA			not more than DC30V or 50mA
Pulse per revolution	100pulse/100Click or 25Pulse/100Click			
Click torque	S: (Soft torque) 8 ~ 16mN.m C: (Standard) 32 ~ 64mN.m			
Rotational Durability	Over a million times			
Protection against water	2m water resistant (2h) (Do not push or rotate under the water)			
Operating Temperature	-10℃ 14F		~	60℃ 140F

Part number designation

RE45T 1 C M 1 B 1
① ② ③ ④ ⑤ ⑥

- ① Number of pulses
1: 100PPR
2: 25PPR
- ② Click
C: Standard
S: Soft
Blank: without click
- ③ Output
M: CMOS
O: Open Collector
D: Line Driver
R: Pull up
- ④ Supply Voltage
1: 12V
2: 24V
5: 5V
- ⑤ Dial Knob
B: 15mm, with Tosoku logo
C: 15mm, without logo
D: 15mm, with customer logo
H: 25mm with Tosoku logo
J: 25mm without logo
K: 25mm, with customer logo
- ⑥ Dial base / Shaft length
Blank: W/O dial base, 16mm
0: W/O dial base, 18mm
1: With dial base, 18mm

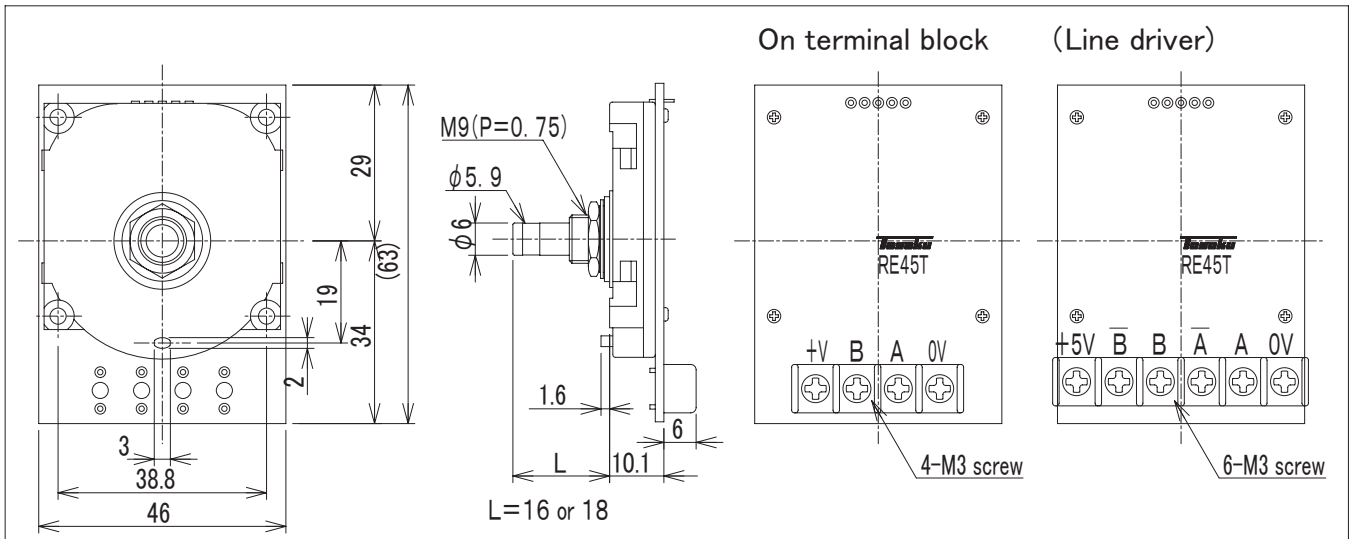
Models	Supply	Out-put	Pulse Per Revolution	
RE45T1_M5	5V	5V	100PPR	Standard Model for 5V
RE45T1_R1	12V	12V	100PPR	Standard Model for 12V
RE45T1_O5	5V	OC	100PPR	
RE45T1_O1	12V	OC	100PPR	
RE45T1_O2	24V	OC*	100PPR	12V ~ 24V input, photo coupler only
RE45T1_D5	5V	Differential Line*	100PPR	Special model for noise resistance
RE45T2_M5	5V	5V	25PPR	
RE45T2_M1	12V	5V*	25PPR	12V input, 5Voutput
RE45T2_O1	12V	OC	25PPR	
RE45T2_O2	24V	OC*	25PPR	12V ~ 24V input, photo coupler only
RE45T2_D5	5V	Differential Line*	25PPR	Special model for noise resistance

*Differential Line: Connect with terminating resistance 100Ω (Based on RS-422 line receiver).

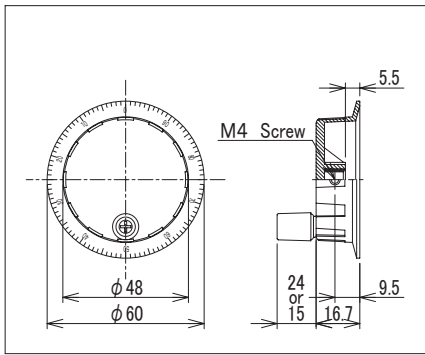
*5V: power voltage = 12V. Output voltage = 5V

*OC (For photo coupler): Out put voltage/0level=transistor /OFF=Current/0

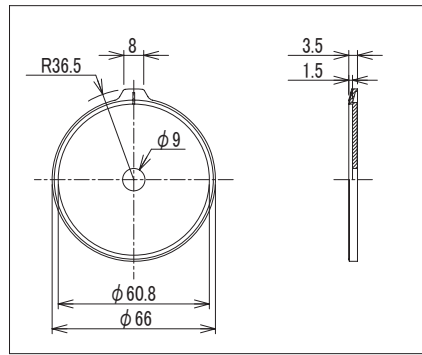
Dimensions (mm)



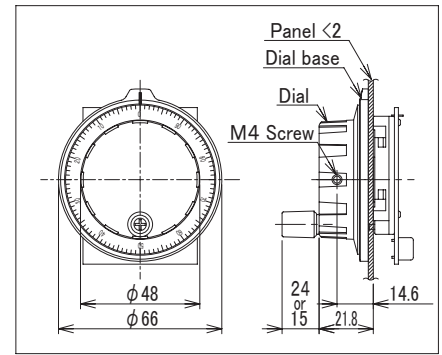
■ Dial



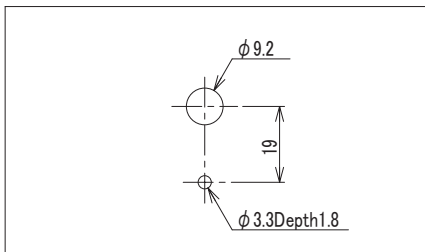
■ Dial base



■ Dial attached on the dial base



■ Mounting hole dimensions (mm)



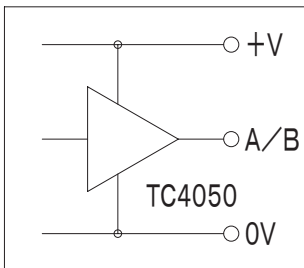
Precautions

Soldering	Temperature	Time
Manual Soldering	Up to 350°	Within 3 seconds for each terminal
Flow soldering	Up to 260°	Within 5 seconds for each terminal

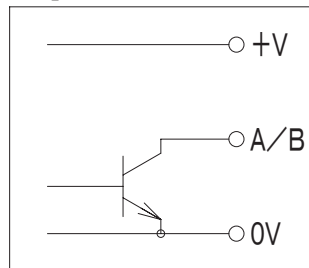
NOTE: Do not put pressure on terminal during heating or soon after.

■ Circuitry

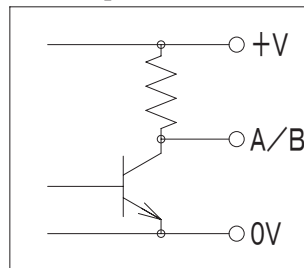
● CMOS (M)



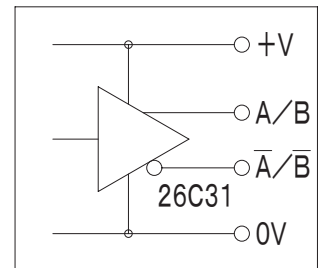
● Open Collector (O)



● Pull up (R)

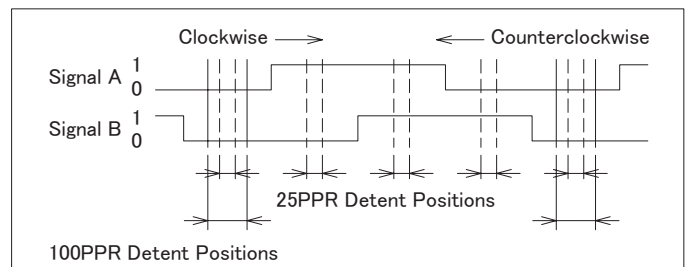


● Line driver (D)



■ Output Waveform

- Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- Rotating the shaft counter-clockwise would generate the signal A when the signal B outputs a high voltage (1);



Manual Pulse Generator



RE45B series



Outline

RE45B series are optical manual pulse generator developed for NC machine tools

Features

- Eco friendly: RoHS compliant
- Comfortable wide knob
- Various Options
- Printing Logo type on the wheel cover upon request
- Long life use

Specifications

Application	5V input	2V input	Differential line	Photo coupler
Power Voltage	DC5V±10%	DC12V±10%	DC5V±10%	DC10.8V to 26.4V
Current power (pull up)	≤ 80mA	≤ 60mA	≤ 150mA (90mA typ)	≤ 60mA
Current power (Open collector)	≤ 30mA	≤ 40mA		
Output	330Ω Pull-up or Open collector	2.2KΩ Pull-up or Open collector	RS-422A (Line driver) Terminating resistor at receiver :100Ω/phrase	Open collector (Current output type)
Output voltage	1 level: (Power voltage -0.5V) ≤			1 level: Transistor/ON
Output voltage (pull up)	0 level: ≤ 0.4V (No-load)			0 level: Transistor/OFF
Collector voltage	≤ DC30V			≤ 30V
Collector voltage (Open collector)	≤ 40mA			≤ 50mA
Pulse per revolution	100pulse/100Click or 25pulse/100Click			
Click torque	A,B,C : 8 ~ 16mN.m D: 32 ~ 64mN.m			
Rotational Durability	Over a million rotations			
Water resistance	D type only: 2m water resistant (2h) (Do not push or rotate under the water)			
Operating Temperature	-10°C		~	60°C
	14F			140F

Part number designation

RE45B A 1 R 5 B
 ① ② ③ ④ ⑤

① Type

A: With φ 80 dial / mounted by 3 nuts
C: With φ 66 dial / mounted by 1 nut
D: Without Dial

② Number of pulses

1: 100PPR
2: 25PPR

③ Output

R: Voltage Output
O: Open Collector
D: Line Driver

④ Supply Voltage

5: 5V
1: 12V
2: 24V

⑤ Dial Knob (color:black)

B: 15mm, with Tosoku logo
C: 15mm, without logo
D: 15mm, with customer logo
H: 24mm with Tosoku logo
J: 24mm without logo
K: 24mm, with customer logo

Models	Supply		Pulse Per Revolution
RE45B_1R5	5V	5V	100PPR
RE45B_1R1	12V	12V	100PPR
RE45B_1O5	5V	OC	100PPR
RE45B_1O1	12V	OC	100PPR
RE45B_1O2	24V	OC*	100PPR
RE45B_1D5	5V	Differential Line*	100PPR
RE45B_2R5	5V	5V	25PPR
RE45B_2R1	12V	5V*	25PPR
RE45B_2O5	12V	OC	25PPR
RE45B_2O1	12V	OC	25PPR
RE45B_2O2	24V	OC*	25PPR
RE45B_2D5	5V	Differential Line*	100PPR

*Differential Line: Connect with terminating resistance 100Ω (Based on RS-422 line receiver).

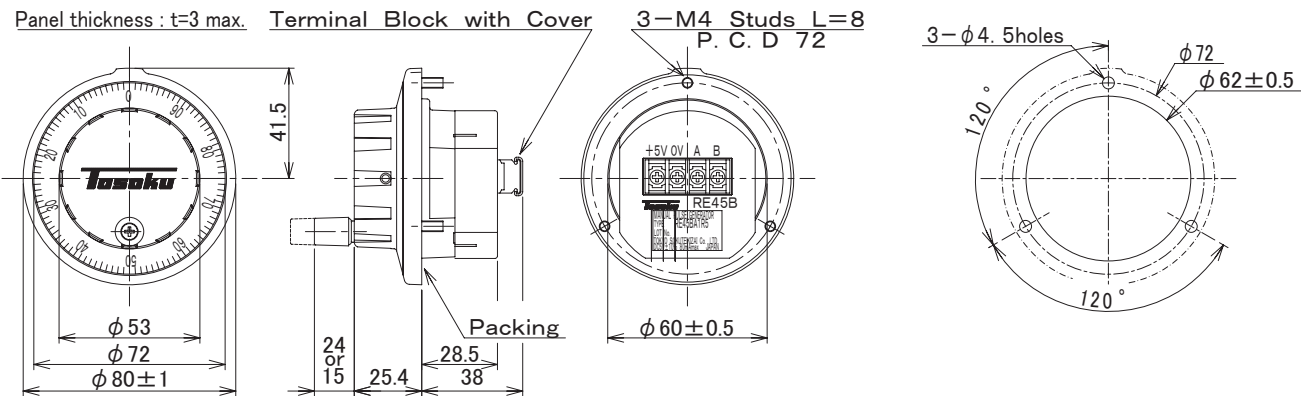
*5V: Supply voltage=12V, Output voltage=5V

*OC: For photo coupler only, Supply voltage 12 ~ 24V

Dimensions (mm)

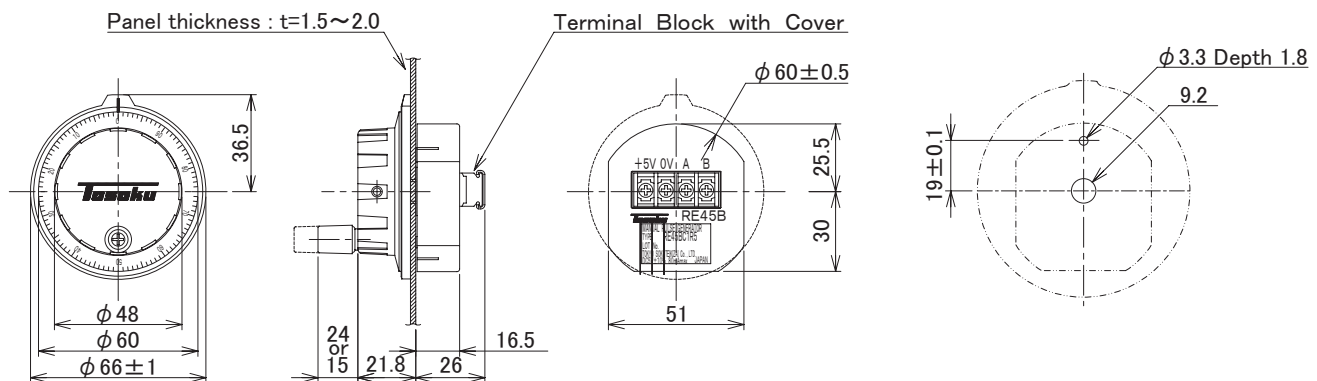
● Type A (with 80 ϕ dial / mounted by 3 nuts)

■ Type A, Mounting hole dimensions (mm)

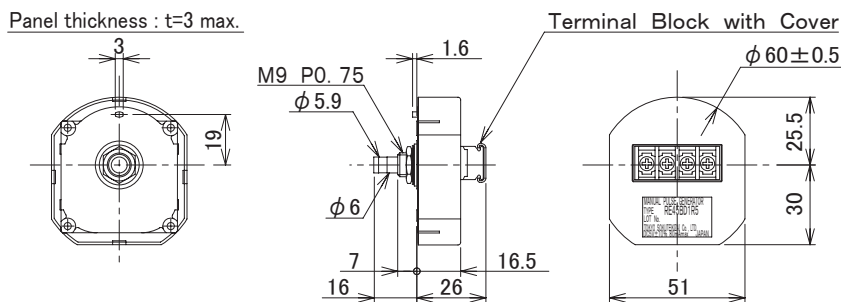


● Type C (with 66 ϕ dial / mounted by 1 nut)

■ Type C,D, Mounting Hole Dimension (mm)

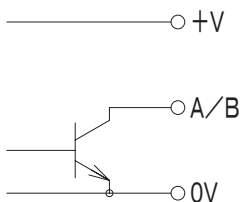


● Type D (without dial)

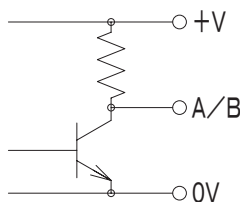


■ Circuitry

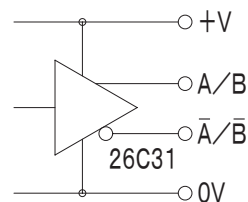
● Open collector (code:O)



● Voltage Output (code:R)

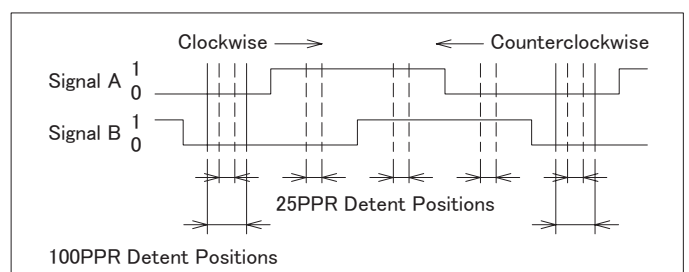


● Line Driver (code:D)



■ Output Waveform

- 1) Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise would generate the signal A when the signal B outputs a high voltage(1);



Manual Pulse Generator



RE46 series



Outline

RE46 series are incremental optical manual pulse generators developed for NC machine tools. The depth of the surface-bottom is mere 8mm which allows you to save space behind the panel.

Features

- Eco friendly: RoHS compliant
- Fine operability with a large wheel and a weight inside
- Various Options of the input/output circuit: CMOS, open collector, line driver
- Chattering-free and long-life use with optical unit
- Original logos available on the wheel cover

Specifications

Application	5V input	12V input	Differential line	Photo coupler(12 ~ 24V)
Power Voltage	DC5V±10%	DC12V±10%	DC5V±10%	DC10.8V to 26.4V
Current power (pull up)	≤ 80mA	≤ 60mA	≤ 150mA (90mAtyp)	≤ 60mA
Current power(Open collector)	≤ 30mA	≤ 40mA		
Output	330ΩPull-up or Open collector	2.2KΩPull-up or Open collector	RS-422A (Line driver) Terminating register at receiver :100Ω/phrase	Open collector (Current output type) 1level:Transistor/ON 0level:Transistor/OFF
Output voltage (pull up)	1 level:(Power voltage -0.5V) ≤ 0 level: ≤ 0.4V (No-load)			≤ 30V ≤ 50mA
Collector voltage (Open corrector)	≤ DC30V ≤ 50mA			
Pulse per revolution	100pulse/100Click or 25pulse/100Click			
Click torque	32 ~ 64mN.m (320 ~ 640gf.cm)			
Rotational Durability	Over a million rotations			
Operating Temperature	-10℃ ~ 60℃ (14F ~ 140F)			
Weight	220g			

Part number designation

<u>RE46</u>	<u>A</u>	<u>1</u>	<u>C</u>	<u>R</u>	<u>5</u>	<u>B</u>
	①	②	③	④	⑤	⑥
① Type				⑤ Supply Voltage		
② Number of Pulses				5: 5V		
1: 100PPR				1: 12V		
2: 25PPR				2: 12 ~ 24V		
③ Click				⑥ Dial Knob (color black)		
C: Standard				B: 15mm with Tosoku logo		
				C: 15mm without logo		
				D: 15mm customer logo		
④ Output				H: 24mm with Tosoku logo		
R: Voltage Output				J: 24mm without logo		
O: Open Collector				K: with customer logo		
D: Line Driver						

Models	Supply		Pulse Per Revolution
RE46A1CR5_	5V	5V	100PPR
RE46A1CR1_	12V	12V	100PPR
RE46A1CO5_	5V	OC	100PPR
RE46A1CO1_	12V	OC	100PPR
RE46A1CO2_	24V	OC*	100PPR
RE46A1CD5_	5V	Differential Line*	100PPR
RE46A2CR5_	5V	5V	25PPR
RE46A2CR1_	12V	5V*	25PPR
RE46A2CO5_	5V	OC	25PPR
RE46A2CO1_	12V	OC	25PPR
RE46A2CO2_	24V	OC*	25PPR
RE46A2CD5_	5V	Differential Line*	25PPR

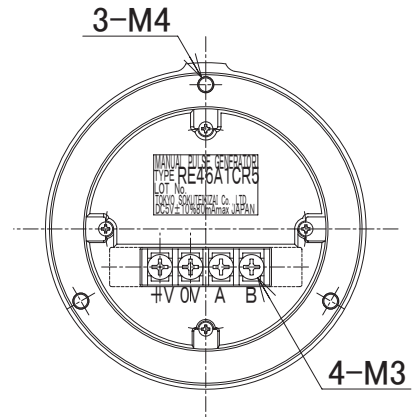
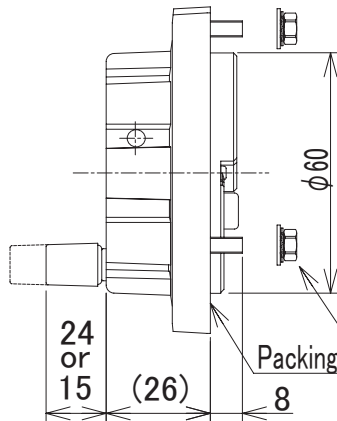
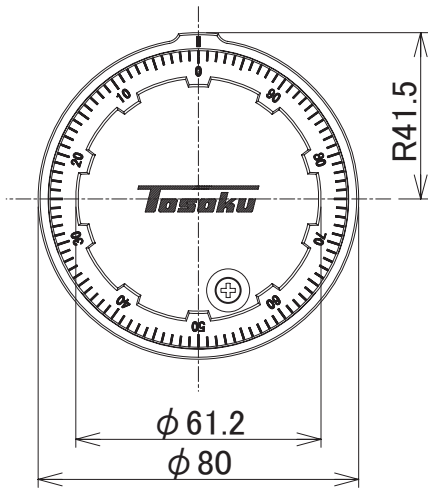
*Differential Line: Connect with terminating resistance 100Ω(Based on RS-422 line receiver).

*5V:Supply voltage=12V, Output voltage=5V

*OC:For photo coupler only, Supply voltage 12 ~ 24V

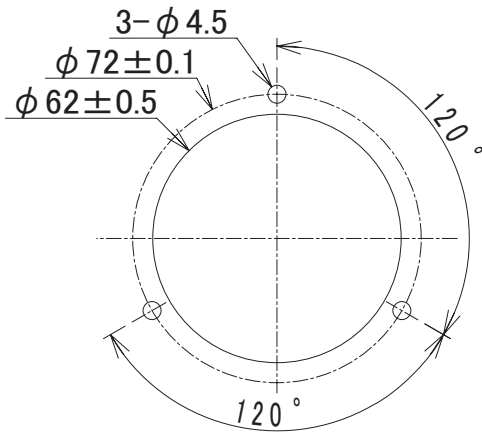
Dimensions (mm)

* Line Driver is in the drawing below

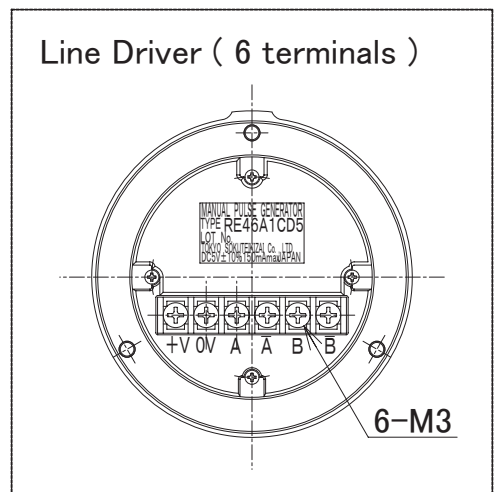


Accessories
 M4 Nut : t=3.2mm
 M4 Teeth Washer : t=0.9mm
 M4 Washer : t=0.8mm

Panel Mounting Hole

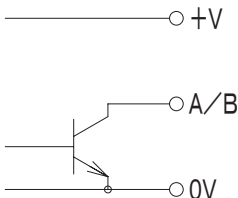


Thickness of the Panel : ≤ 3 mm
 Recommended Torque for fastening the nut
 : 0.4 ~ 0.5 N·m (4~5 Kgf·cm)

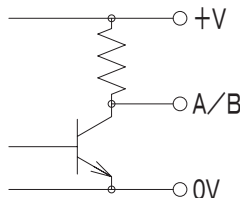


■ Circuitry

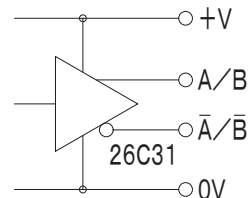
● Open collector (code:O)



● Voltage Output (code:R)

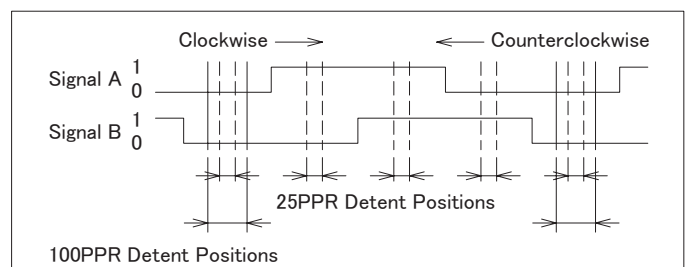


● Line Driver (code:D)



■ Output Waveform

- Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- Rotating the shaft counterclockwise would generate the signal A when the signal B outputs a high voltage (1);



Manual Pulse Generator



RE47 series



Outline

RE47 is an incremental optical manual pulse generator developed mainly for NC machine tools. The series are most compact of all MPGs on our line-up and universally compatible with various sorts of compact MPGs.

Features

- Eco friendly: RoHS compliant
- ϕ 60mm diameter
- Less than 10mm in depth (from surface-to-bottom) allows you to save space behind the panel
- Fine operability with a weight inside of the dial.
- Various Options of the input/output circuit: CMOS, open collector, line driver
- Chattering-free and long-life use with optical unit
- Original logos available on the dial

Specifications

Application	5V input	12V input	Differential line	Photo coupler(12 ~ 24V)
Power Voltage	DC5V \pm 10%	DC12V \pm 10%	DC5V \pm 10%	DC10.8V to 26.4V
Current power (pull up)	\leq 80mA	\leq 60mA	\leq 150mA (90mAtyp)	\leq 60mA
Current power(Open collector)	\leq 30mA	\leq 40mA		
Output	330 Ω Pull-up or Open collector	2.2K Ω Pull-up or Open collector	RS-422A (Line driver) Terminating register at receiver :100 Ω /phrase	Open collector (Current output type)
Output voltage (pull up)	1 level:(Power voltage -0.5V) \leq 0 level: \leq 0.4V (No-load)			1level:Transistor/ON 0level:Transistor/OFF
Collector voltage (Open corrector)	\leq DC30V \leq 50mA			\leq 30V \leq 50mA
Pulse per revolution	100pulse/100Click or 25pulse/100Click			
Panel water resistance	IP54			
Click torque	8 ~ 16mN.m (80 ~ 160gf.cm)			
Rotational Durability	Over a million rotations			
Operating Temperature	-10 $^{\circ}$ C ~ 60 $^{\circ}$ C (14F ~ 140F)			
Weight	85g			

Part number designation

<u>RE47</u>	<u>A</u>	<u>1</u>	<u>S</u>	<u>R</u>	<u>5</u>	<u>B</u>
	①	②	③	④	⑤	⑥
① Type				⑤ Supply Voltage		
				5: 5V		
② Number of Pulses				1: 12V		
1: 100PPR				2: 12 ~ 24V		
2: 25PPR						
③ Click				⑥ Dial Knob (color black)		
S: Soft				B: 15mm with Tosoku logo		
				C: 15mm without logo		
				D: 15mm customer logo		
④ Output						
R: Voltage Output						
O: Open Collector						
D: Line Driver						

Models	Supply		Pulse Per Revolution
RE47A1SR5_	5V	5V	100PPR
RE47A1SR1_	12V	12V	100PPR
RE47A1SO5_	5V	OC	100PPR
RE47A1SO1_	12V	OC	100PPR
RE47A1SO2_	24V	OC*	100PPR
RE47A1SD5_	5V	Differential Line*	100PPR
RE47A1SR5_	5V	5V	25PPR
RE47A1SR1_	12V	5V*	25PPR
RE47A1SO5_	5V	OC	25PPR
RE47A1SO1_	12V	OC	25PPR
RE47A1SO2_	24V	OC*	25PPR
RE47A1SD5_	5V	Differential Line*	25PPR

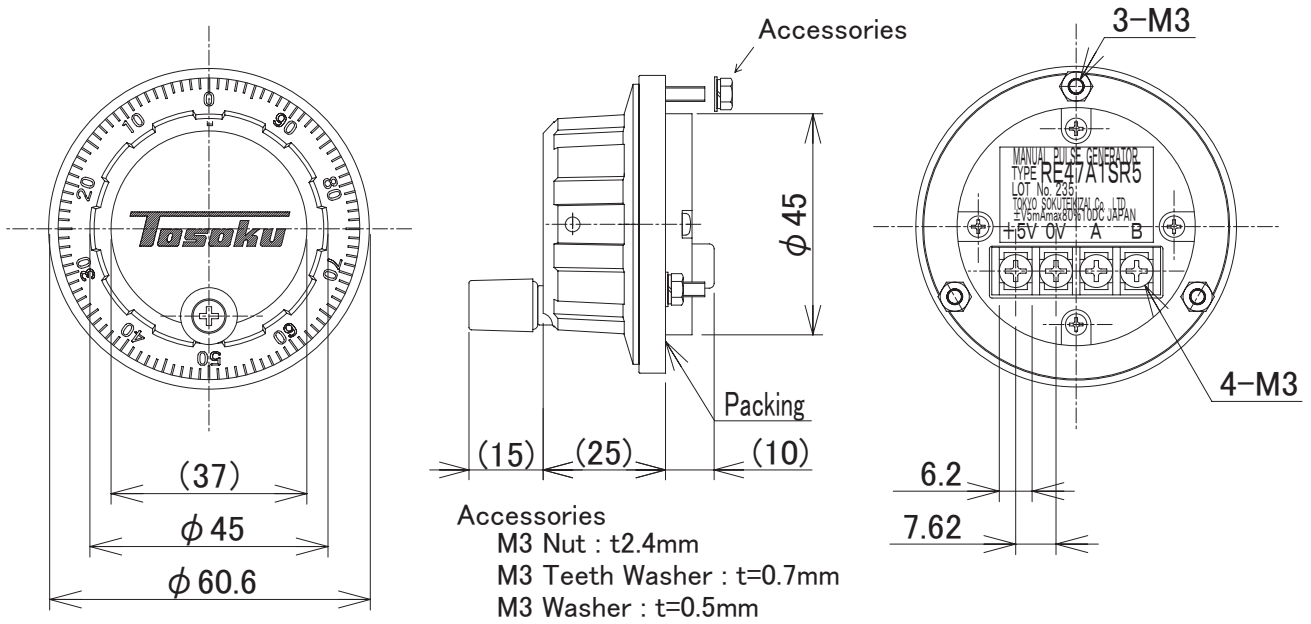
*Differential Line: Connect with terminating resistance 100 Ω (Based on RS-422 line receiver).

*5V:Supply voltage=12V, Output voltage=5V

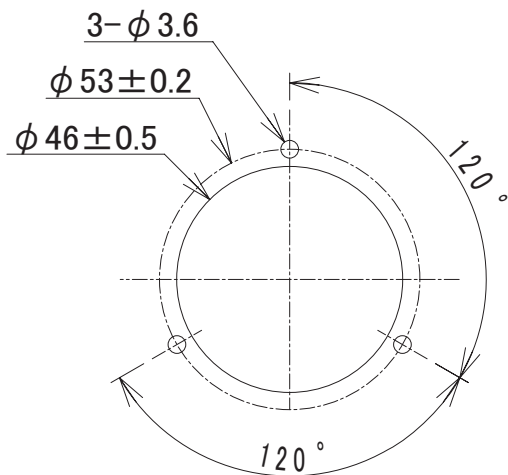
*OC:For photo coupler only, Supply voltage 12 ~ 24V

Dimensions (mm)

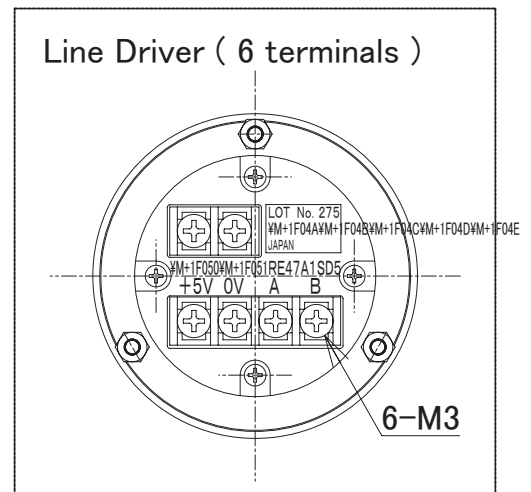
* Line Driver is in the drawing below



Panel Mounting Hole

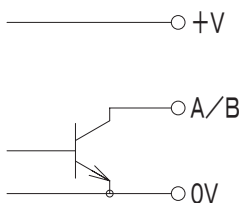


Thickness of the Panel : ≤ 3 mm
 Recommended Torque for fastening the nut : $0.4 \sim 0.5$ N·m (4~5 Kgf·cm)

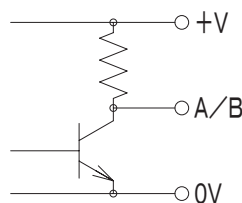


■ Circuitry

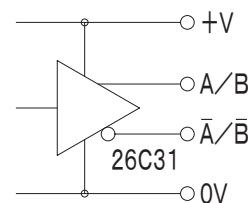
● Open collector (code:O)



● Voltage Output (code:R)

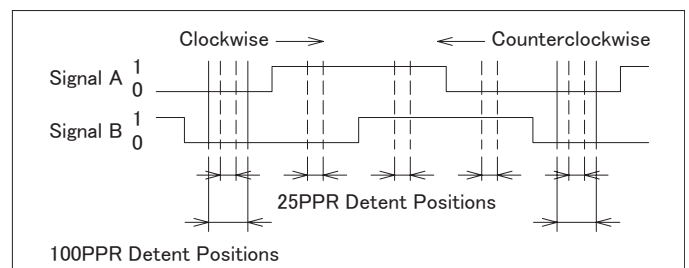


● Line Driver (code:D)



■ Output Waveform

- Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- Rotating the shaft counter-clockwise would generate the signal A when the signal B outputs a high voltage (1);



Tokyo Sokuteikizai Co.,Ltd.

Handy Manual Pulse Generator Catalogue

HT	_____	P. 02
thin-line, 3 position enabling switch available		
HC1	_____	P. 05
compact, light		
HM	_____	P. 11
compact, emergency stop button/enabling switch available		
HR	_____	P. 14
3 position enabling switch available		
HS	_____	P. 17
resin box, free-to-design		

Metal holders are provided for all Handy MPGs. Magnets are optionally provided.

Original company logos can beprinted on the dials.

Handy Manual Pulse Generator



HT Series



Outline

HT series are easy-to-handle and compact Handy MPGs which put a premium on safety with 3-position enabling switches and emergency stop buttons.

Features

- Ergonomically designed and compact to be held with one hand
- 3-position (off-on-off) enabling switch available on either side
- Upper part is free to design and allows various kinds of switches (including emergency stop button) to be set
- RoHS compliant
- On the middle part: either MR8A - the rotary switch series or MR8C - the digital code switch series selectable
- Strong plate magnets available on back side (as option)
- Various types of curl cords provided along with connectors of all sorts at your request

Specifications

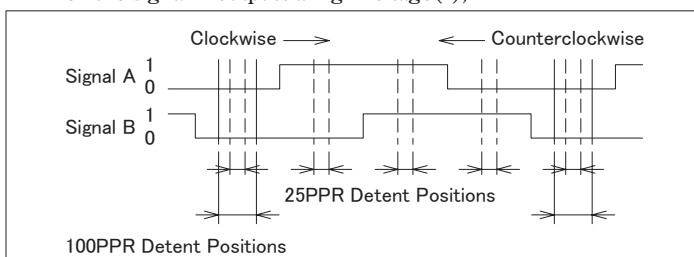
1. Body	
Dimension	170×80×39(mm)
LED light	DC24V Green
Enabling switches	Available on both sides
Logo	Logo available on the wheel cover

2. Mechanical specifications	
2.1 Rotary Encoder Unit	

Output Voltage	DC5V±10%, DC12V±10% or 12~24V
Wheel	100 clicks / rotation 100 pulses or 25 pulses per rotation
Rotational Durability	Over 1,000,000 times

Output Waveform

- 1) Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise would generate the signal A when the signal B outputs a high voltage (1);



* See RE45B catalog for more details

2.2 Selector Switches	
-----------------------	--

MR8A (rotary switch) 25V15mA (AC/DC)
MR8C (code switch) 15V10mA (AC/DC)
* See MR8A/MR8C catalog for more details

3. Curl/Straight Cords	
------------------------	--

Curl Cord	19/25-conductor shielded cable 19-conductor: select from 2m, 3m, 4m, 5m 25-conductor: select from 3m, 5m (We will select either 19 or 25-conductor in accordance with required functions) For further details, please see the catalogues for curl cords
Straight Cord	Also available

5. Connector Unit	
-------------------	--

Connector	Dripproofed connector to be attached on the end of the cord optionally provided (EBSP2119-D/EBSP2119FGS-D by DDK)
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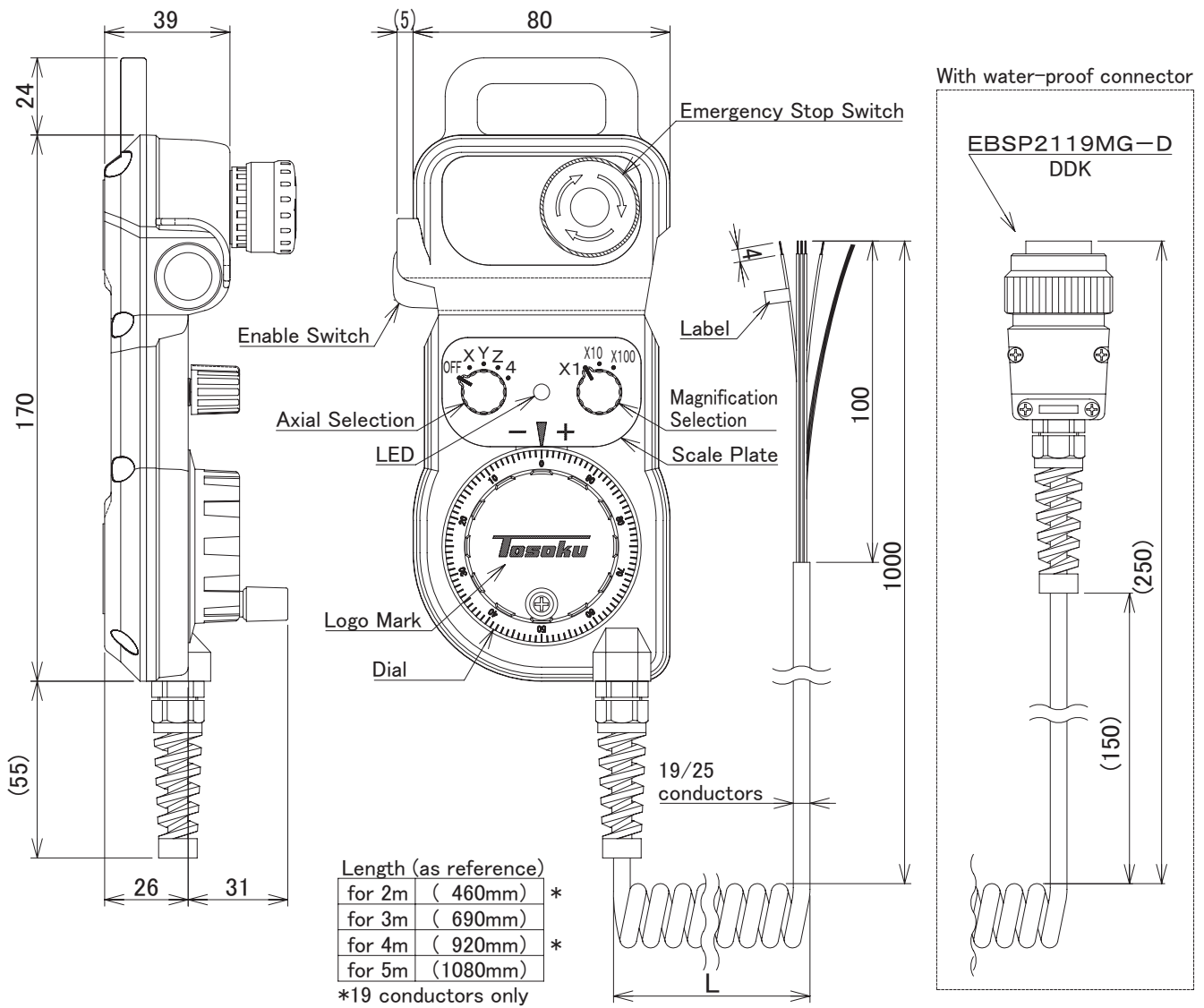
Warranty

- 1 year from the date of shipment.

Dimensions (mm)

HT Unit with curl cord

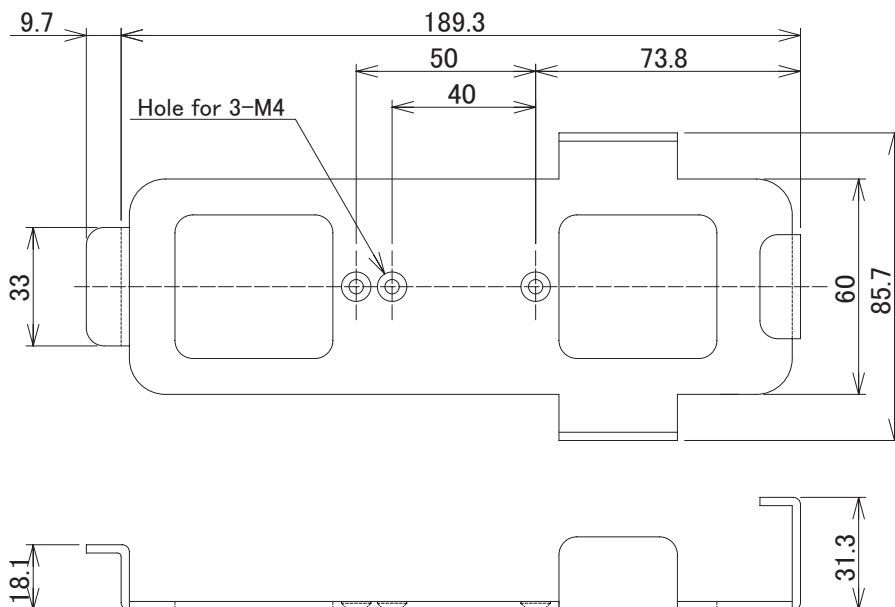
※ This drawing is an example, it may differ according to number of swithes etc.



Original Holder

Material : SPCC

Cathodic Electrodeposition Coating



Handy Manual Pulse Generator



HC1 Series



Outline

HC1 is the most compact model of all our MPG series, developed for usage in numerous industrial areas.

Features

- Compact, thin-line and lightweight (26mm)
- Axis/Multiplication selection can be set according to customers' requirement
- Sealed structured box
- RoHS compliant (box/cord)
- Exclusive easy-to-attach holder as a standard accessory
- Rubber magnet for option
- Logo can be printed on the wheel cover

Specifications

1. Body	
Dimension	124×73×26(mm)*
LED Visible Indicator	DC24V Green
Noise Immunity	EN50082-2 compliant
Other Features	Logo available on the wheel cover

* excluding hook, switch and knob

2. Mechanical specifications	
2.1 Rotary Encoder Unit	

* See RE45B page for details

2.2 Selector Switches	
-----------------------	--

* See MR8A/MR8C page for details

3. Environmental specifications	
Operating temperature	-10℃ ~ +60℃ 14F ~ 140F
Storage temperature	-40℃ ~ +70℃ 40F ~ 158F

4. Curl/Straight Cords	
Curl Cord	19/25-conductor shielded cable 19-conductor: select from 2m, 3m, 4m, 5m 25-conductor: select from 3m, 5m (We will select either 19 or 25-conductor in accordance with required functions) For further details, please see the catalogues for curl cords
	Straight Cord

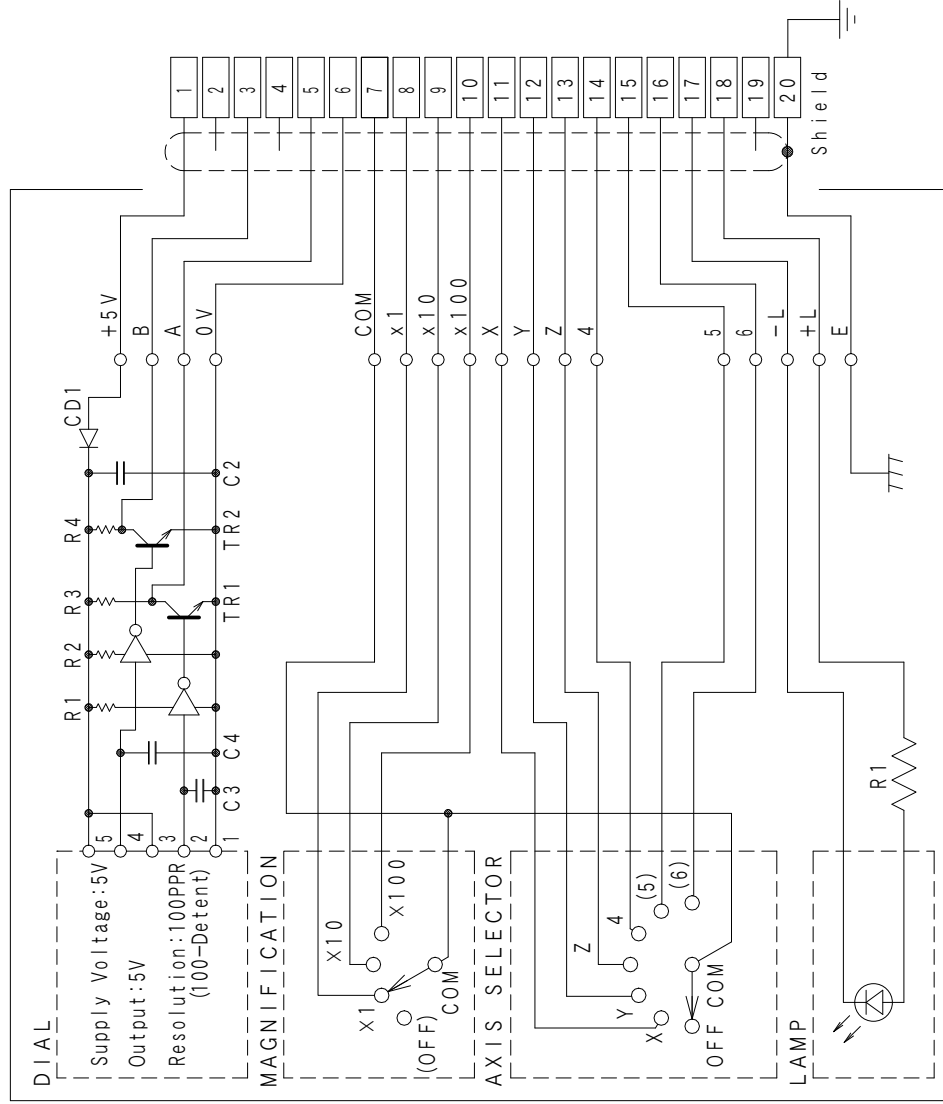
5. Connector Unit	
Connector	Waterproofed connector to be attached on the end of the cord optionally provided

Warranty

- 1 year from the date of shipment.

Circuitry

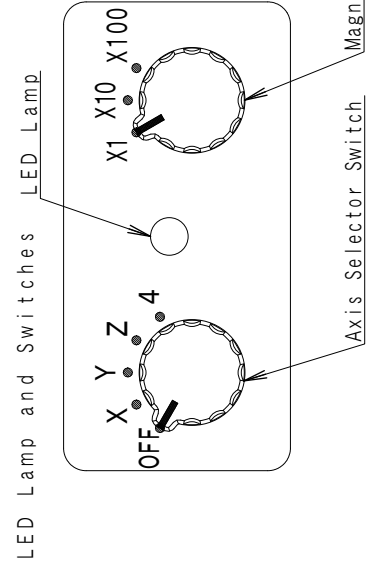
HC115A**



Cur l Code Wiring

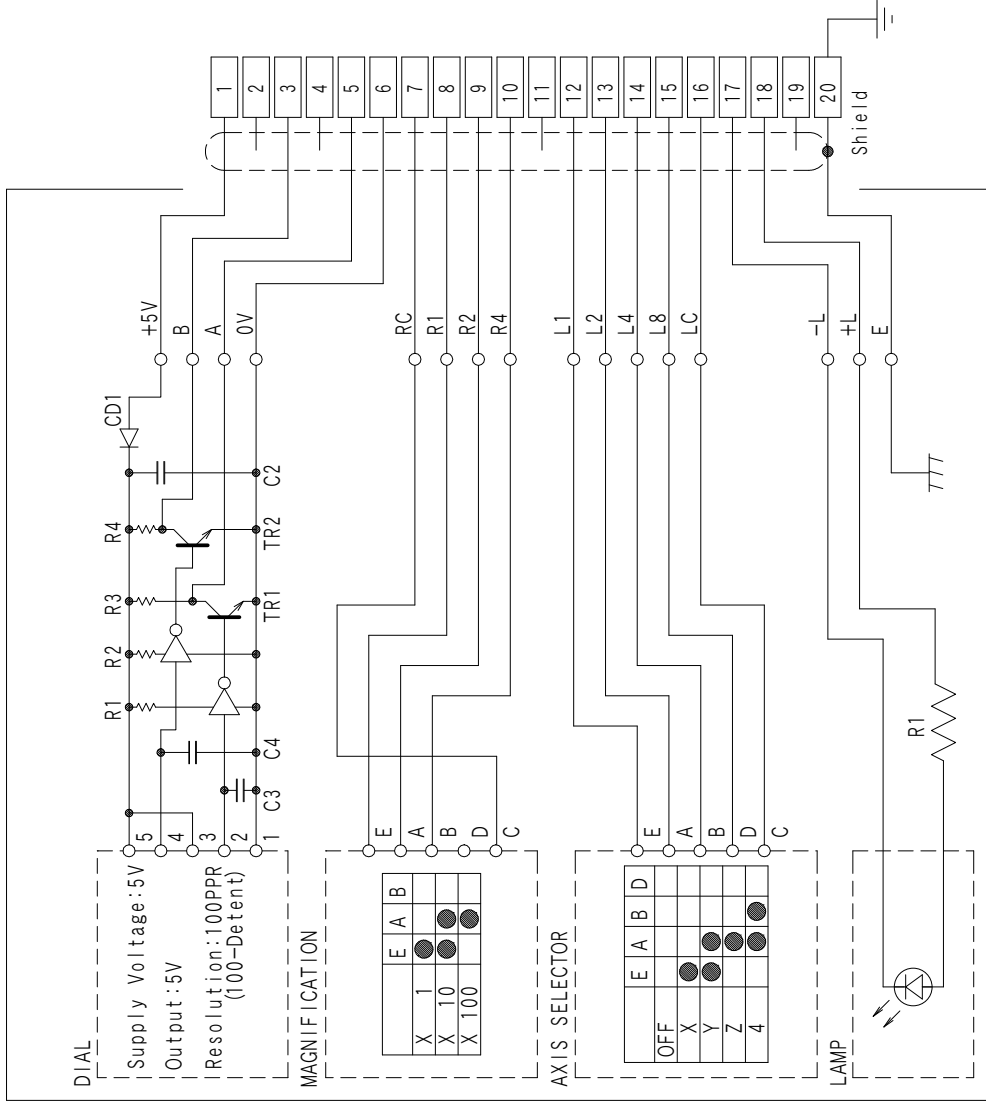
Terminal No.	Terminal symbol	Color of wire	Function
1	+5V	Brown	Dial +5VDC
2	-	Red	
3	B	Orange	Dial Channel B Output (0/5V)
4	-	Yellow	
5	A	Green	Dial Channel A Output (0/5V)
6	0V	Blue	Dial 0VDC
7	COM	Purple	Common Terminal of Multiplication Switch
8	X1	Gray	X1
9	X10	White	X10
10	X100	Black	X100
11	X	Pink	Axis X
12	Y	Light blue	Axis Y
13	Z	Yellow-green	Axis Z
14	4	Light purple	Axis 4
15	5	Color-less	(Axis 5)
16	6	Color-less/BK	(Axis 6)
17	-L	Light blue/BK	LED Lamp (-)
18	+L	Yellow-green/BK	LED Lamp +24VDC
19	-	Light brown	
20	E		Shielding Wire (connect to GND)

* /BK:with Black line



Circuitry

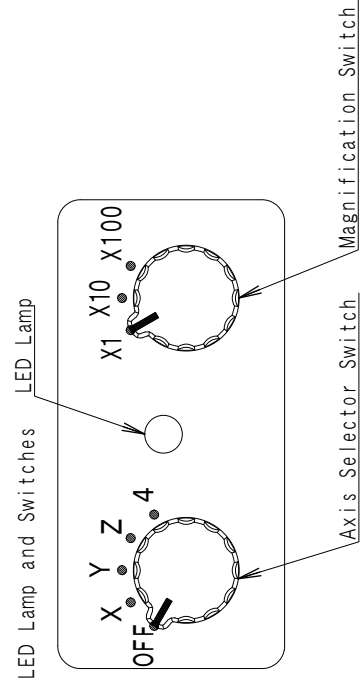
HC115A**03



Curl Code Wiring

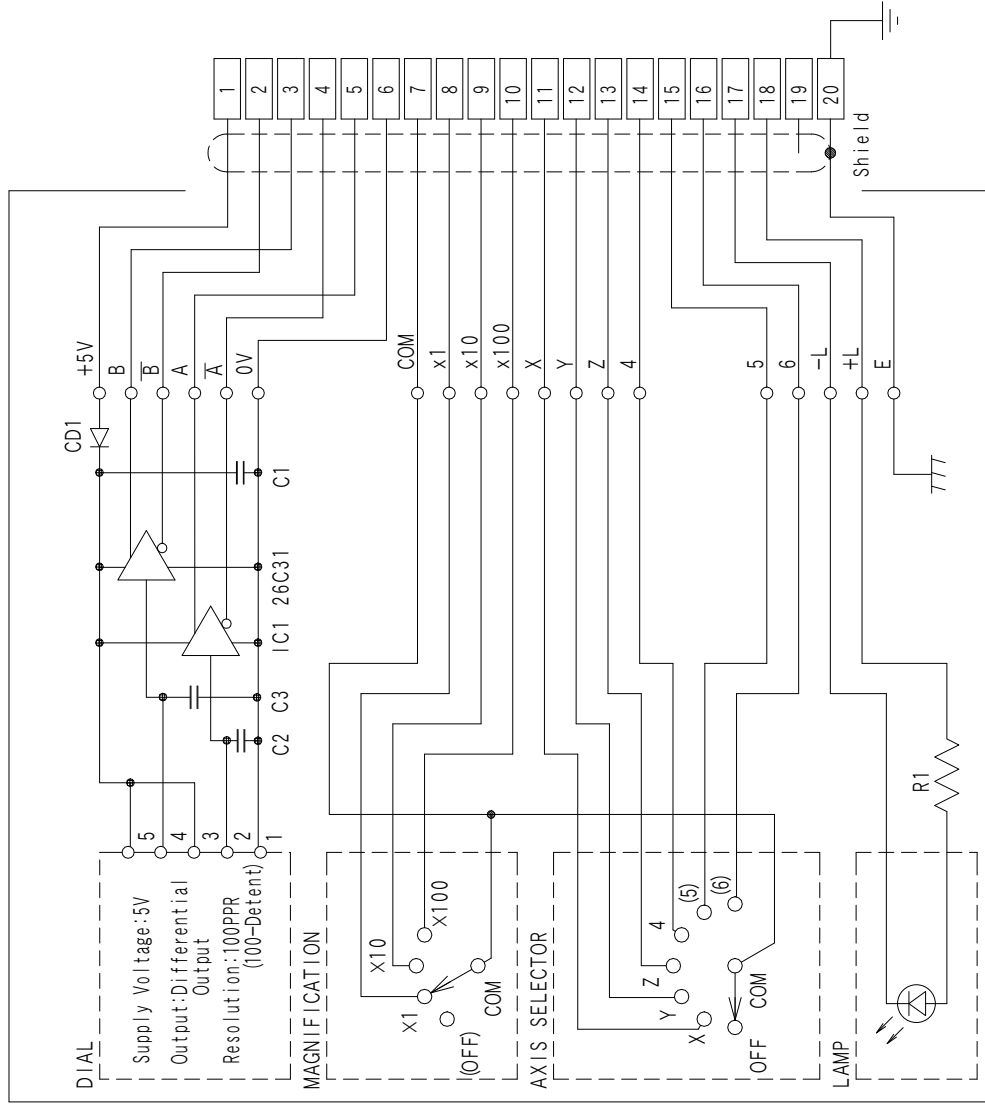
Terminal No	Terminal symbol	Color of wire	Function
1	+5V	Brown	Dial +5VDC
2	-	Red	
3	B	Orange	Dial Channel B Output (0/5V)
4	-	Yellow	
5	A	Green	Dial Channel A Output (0/5V)
6	0V	Blue	Dial 0VDC
7	RC	Purple	Common Terminal of Multiplication Switch
8	R1	Gray	Terminal E
9	R2	White	Terminal A
10	R4	Black	Terminal B
11	-	Pink	
12	L1	Light blue	Terminal E
13	L2	Yellow-green	Terminal A
14	L4	Light purple	Terminal B
15	L8	Color-less	Terminal D
16	LC	Color-less/BK	Common Terminal of Axis Selector Switch
17	-L	Light blue/BK	LED Lamp (-)
18	+L	Yellow-green/BK	LED Lamp +24VDC
19	-	Light brown	
20	E		Shielding Wire (connect to GND)

* /BK:with Black line



Circuitry

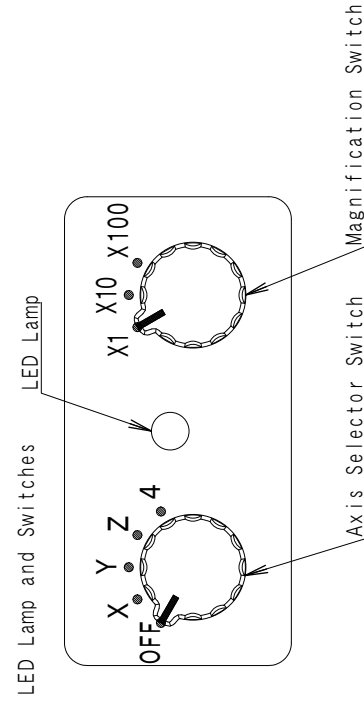
HC11DA**



Curl Code Wiring

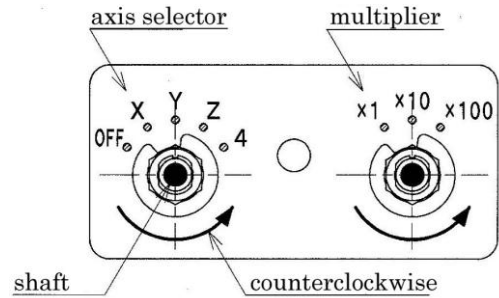
Terminal No	Terminal symbol	Color of wire	Function
1	+5V	Brown	Dial +5VDC
2	B	Red	Dial Channel B Inverting Output
3	B-bar	Orange	Dial Channel B Output
4	A	Yellow	Dial Channel A Inverting Output
5	A-bar	Green	Dial Channel A Output
6	0V	Blue	Dial 0VDC
7	COM	Purple	Common Terminal of Multiplication Switch
8	X1	Gray	X1
9	X10	White	X10
10	X100	Black	X100
11	X	Pink	Axis X
12	Y	Light blue	Axis Y
13	Z	Yellow-green	Axis Z
14	4	Light purple	Axis 4
15	5	Color-less	(Axis 5)
16	6	Color-less/BK	(Axis 6)
17	-L	Light blue/BK	LED Lamp (-)
18	+L	Yellow-green/BK	LED Lamp +12~+24VDC
19	-	Light brown	
20	E		Shielding wire (connect to GND)

* /BK:with Black line

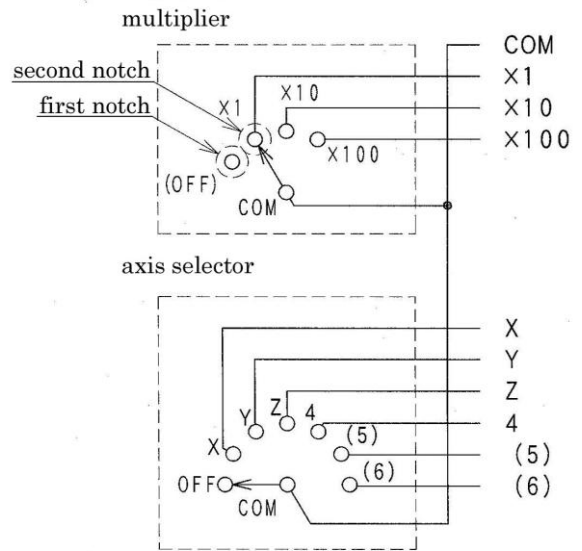


How to mount knobs for selector switches (HC1/HM/HT series)

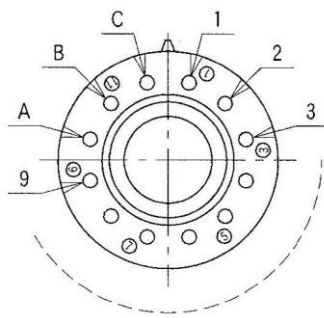
1. All switches select OFF circuits (position no.1) when fully turned counterclockwise. 1 click/2 clicks clockwise will make a connection of position no.2/no.3 with COM which feeds a signal for each.
2. If the indications on the plate begin with "OFF", "0" or any other indication to render disconnection, confirm that the shaft is turned fully counterclockwise to the end, then screw the knob on to it within 5kgf.cm of torque.
If the indications begin with "X", "x1" or any other indication to render connection, 1) turn 1 click clockwise from the very left end, 2) adjust the white line on the knob with the indication, then 3) tighten the screw of the knob (cf. picture 2. multiplier switch).
3. The standard wiring diagrams indicated do not necessarily be consistent with the actual delivered products. Confirm the diagrams on the specifications when mounting the knobs.
4. When the knob is turned, it will stop where stopper-pin is inserted. To alter the position to stop, refer to picture 3 and 4, then re-insert the pin into the designated position.



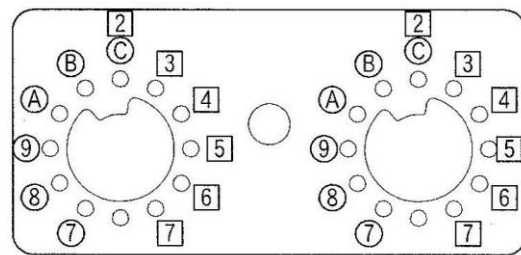
Picture 1. plate



Picture 2. Indications and wiring



Picture 3. The back of the knob
(holes for stopper-pins)



Numbers and alphabets with ○ show positions to start, and those with □ show positions to stop. Select the appropriate position from the picture 4 and insert the pins into the correspondent positions.

e.g. The plate shown in the picture 1 will be set as follows.

Axis Selector: A, 4/ Multiple Selector: B, 3.

Picture 4. Correspondent Positions of the Pins

Handy Manual Pulse Generator



HM Series



Outline

HM series have a variety of switches which can be customized according to your requests. The model is compact and lightweight, which is perfect for accurate and smooth manual operation.

Features

- Various switches available : Emergency switch (2 positions), side mounted (right/left) enabling switches, 2 rotary switches (as axis and multiplication selector etc.)
- Compact, thin-line and lightweight.
- Strong plate magnets available on back side. (optional)
- RoHS compliant (box/cord)
- Various types of curl cords provided along with connectors of all sorts at your request.

Specifications

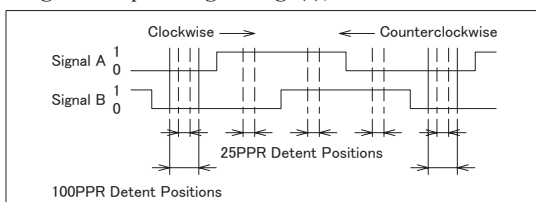
1. Body	
Dimension	145×73×35(mm)
LED light	DC24V Green
Enabling Switch	Available on both sides
Logo	Logo available on the wheel cover

2. Mechanical specifications	
2.1 Rotary Encoder Unit	

Output Voltage	DC5V±10%, DC12V±10%
Wheel	100 clicks / rotation 100 pulses or 25 pulses per rotation
Rotational Durability	Over 1,000,000 times

Output Waveform

- 1) Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise would generate the signal A when the signal B outputs a high voltage (1);



* See RE45B page for details

2.2 Selector Switches

MR8A (Rotary switch) 25V15mA (AC/DC)
MR8C (Code switch) 15V10mA (AC/DC)
* See MR8A/MR8C pages for details

3. Curl/Straight Cords

Curl Cord	19/25-conductor shielded cable 19-conductor: select from 2m, 3m, 4m, 5m 25-conductor: select from 3m, 5m (We will select either 19 or 25-conductor in accordance with required functions) For further details, please see the catalogues for curl cords
Straight Cord	Also available

4. Connector Unit

Connector	Dripproofed connector to be attached on the end of the cord optionally provided
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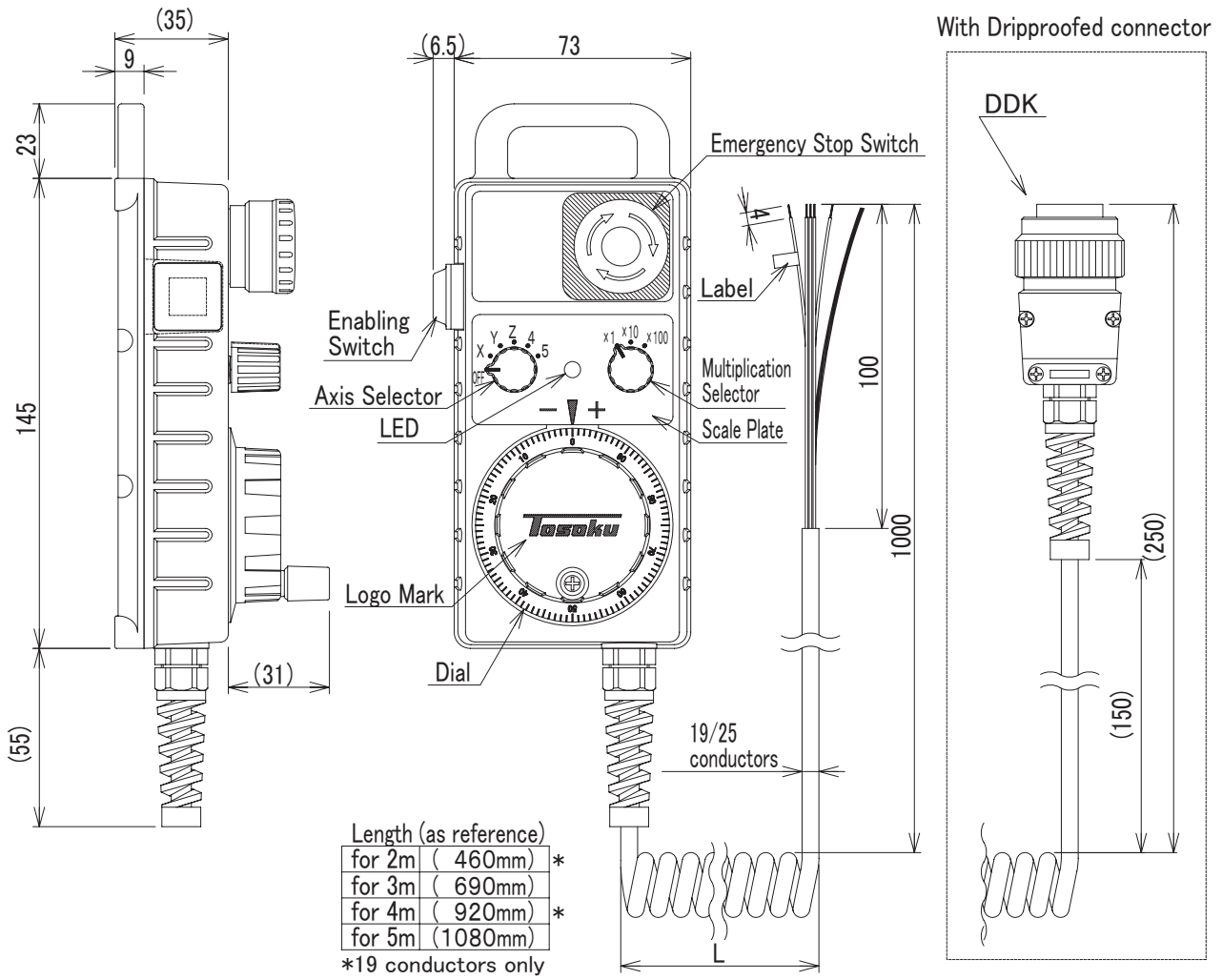
Warranty

- 1 year from the date of shipment.

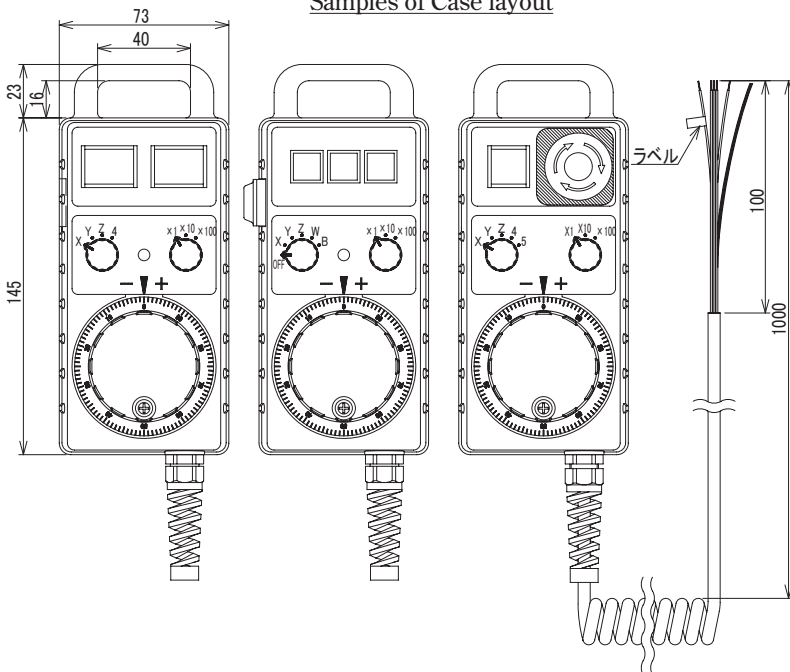
Dimensions (mm)

HM Unit with curl cord

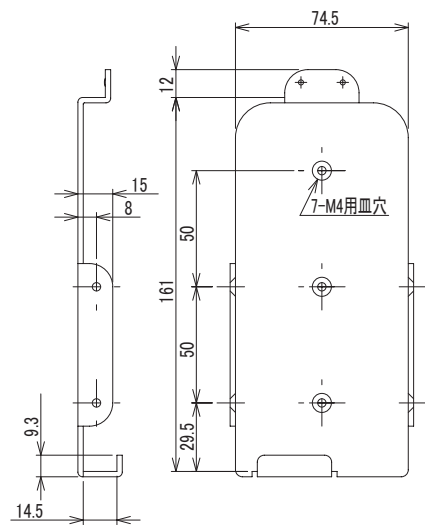
※ This drawing is an example, it may differ according to number of swithes etc.



Samples of Case layout



Original Holder



H M series Order Sheet (Print out this page for sending orders.)

We'll hand in to you a drawing in accordance with your order. The drawing shall be approved before starting in on production.

1) Select one from each spec table and fill blank spaces with " ".

Pulses/Rev.	
<input type="checkbox"/>	100PPR
<input type="checkbox"/>	25PPR

* 25PPR and yet 100 Clicks/Revolution

Power Supply	Output
<input type="checkbox"/> 5V	5V (330Ω Pull Up)
<input type="checkbox"/> 5V	Open Collector
<input type="checkbox"/> 5V	(for Line Driver)
<input type="checkbox"/> 12V	5V (2.2kΩ Pull Up)
<input type="checkbox"/> 12V	12V (2.2kΩ Pull Up)
<input type="checkbox"/> 12V	Open Collector
<input type="checkbox"/> 12V- 24V	for Photocoupler (Open Collector)

* Transistor will be "OFF" at every clicked positions.
(For other open collector output models, transistors will be "ON" at every clicked positions.)

Logo on the dial	
<input type="checkbox"/>	None
<input type="checkbox"/>	with "TOSOKU" logo
<input type="checkbox"/>	with an original logo()

2-Position Enabling Switch	
<input type="checkbox"/>	None
<input type="checkbox"/>	One on the left
<input type="checkbox"/>	On both sides

Emergency Switch (contacts)	
<input type="checkbox"/>	None
<input type="checkbox"/>	Mounted ()

* 1 for (NO), 4 for (NC) maximum (1A/4B). Maximum of 4 contacts in total (1A3B or 4B).

Magnet on the backside	
<input type="checkbox"/>	None
<input type="checkbox"/>	Mounted

Axis Selector/Multiplication Selector Switches	
<input type="checkbox"/>	MR8C type (Gray code switch)
<input type="checkbox"/>	MR8A type (Selection switch)

Indications for Axis Selector (left)

e.g.	OFF, X, Y, Z, 4, 5
<input type="checkbox"/>	

Indications for Multiplication Selector (right)

e.g.	x1, x10, x100
<input type="checkbox"/>	

Curl Cord Length	
<input type="checkbox"/>	2m Curl Cord (for only 19-conductor cord)
<input type="checkbox"/>	3m Curl Cord
<input type="checkbox"/>	4m Curl Cord (for only 19-conductor cord)
<input type="checkbox"/>	5m Curl Cord

* We will select either 19-conductor cord or 25-conductor cord to cover your requested specs

Waterproofed Connector (for curl cord)	
<input type="checkbox"/>	None
<input type="checkbox"/>	Male connector (EBSP2119MG-D, DDK)
<input type="checkbox"/>	Female connector (EBSP2119FGS-D, DDK)

* Fill in both spaces to order both connectors.

2) Other options

Other options to request	
(e.g.)	Switches with LED illumination x 2
	2 contact selector switch x 1



Rotary Encoders
Pulse Generators
Rotary Switches

Code Switches
Lever Switches
Trackballs

Handy Manual Pulse Generator



HR Series

Outline

HR series provide you comfort in long time use and safety with various options of switches.

Features

- Ergonomically designed to be held with one hand
- 3-position (off-on-off) switch available on both sides
- RoHS compliant (box/cord)
- Upper part is free to design and allows various kinds of switches (including emergency stop button) to be set
- HR series also provide you various line-up of switches to be set on the middle part:
DP - the digital code switch series, RS400 - the rotary switch series etc.
- Strong plate magnets available on back side. (optional)
- Various types of curl cords provided along with connectors by all sorts of your request

Specifications

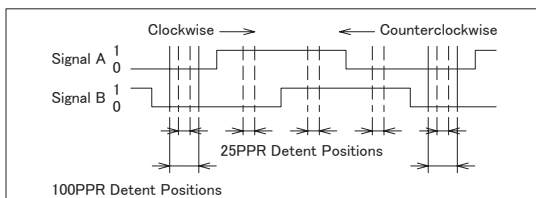
1. Body	
Dimension	190×100×50.5(mm)
Enabling Switch	Available on both sides
Other Features	Logo available on the wheel cover

2. Mechanical specifications	
2.1 Rotary Encoder Unit	

Output Voltage	DC5V±10%, DC12V±10%
Wheel	100 clicks / rotation 100 pulse or 25 pulses per rotation
Rotational Durability	Over 1,000,000 times

Output Waveform

- 1) Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise would generate the signal A when the signal B outputs a high voltage(1);



* See RE45B page for details

2.2 Selector Switches

* See RS400/DP pages for details

3. Curl/Straight Cords	
Curl Cord	19/25-conductor shielded cable 19-conductor: select from 2m, 3m, 4m, 5m 25-conductor: select from 3m, 5m (We will select either 19 or 25-conductor in accordance with required functions) For further details, please see the catalogues for curl cords
Straight Cord	Also available

4. Connector Unit	
Connector	Dripproofed connector to be attached on the end of the cord optionally provided

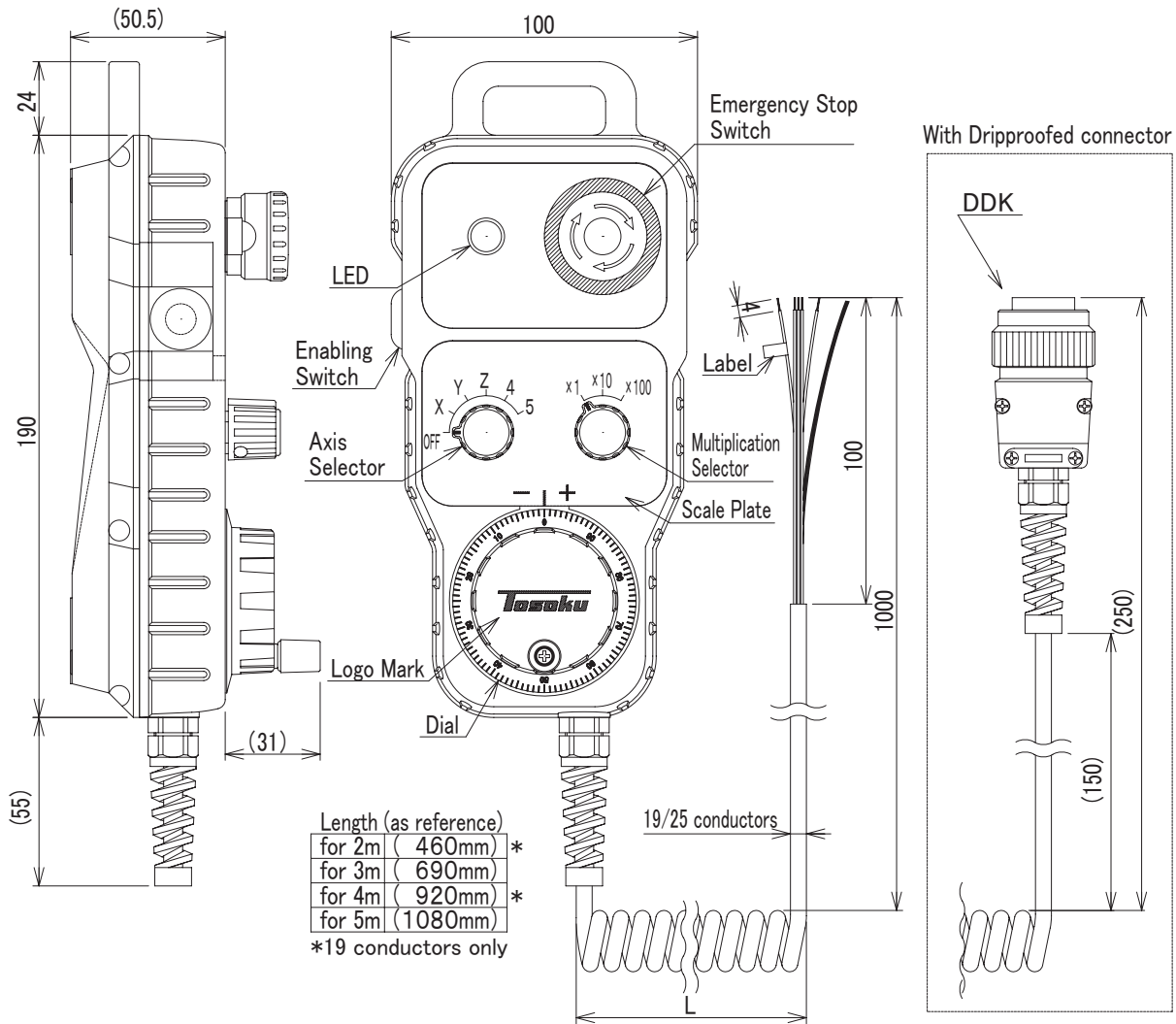
Warranty

- 1 year from the date of shipment.

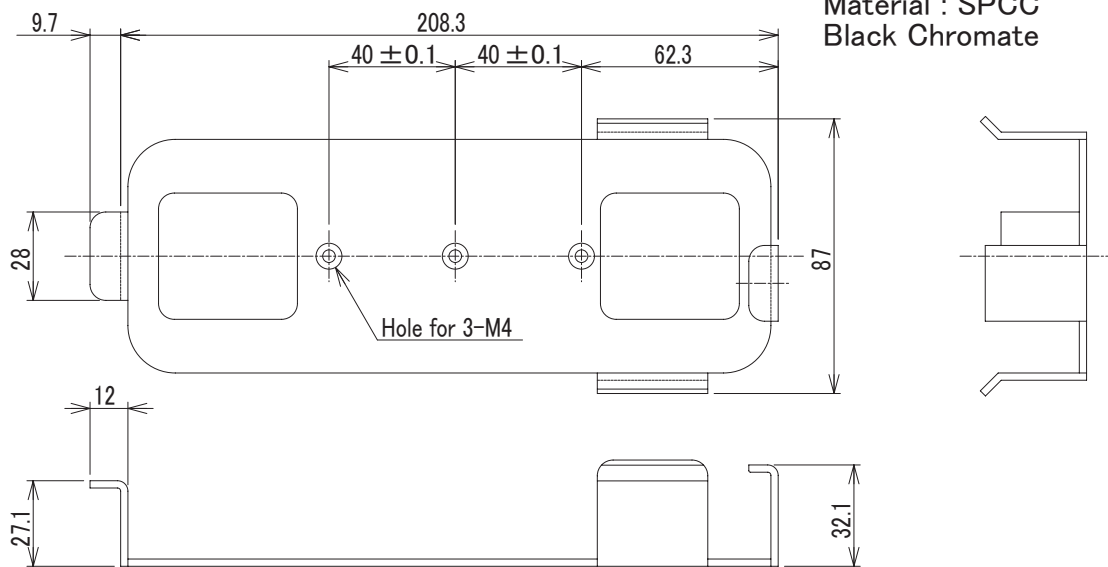
Dimensions (mm)

HR Unit with curl cord

※ This drawing is an example, it may differ according to number of swithes etc.



Original Holder



Handy Manual Pulse Generator



HS Series

Outline

HS is a free-to-design handheld manual pulse generator which allows wide variety of switches laid out at your service.

Features

- Optional layout of switches
- 3-position (off-on-off) switch available on both sides
- RoHS compliant (box/cord)
- Emergency stop button also available
- Holder provided
- Strong plate magnet as an additional accessory. (optional)
- Various types of curl cords provided along with connectors by all sorts of your request

Specifications

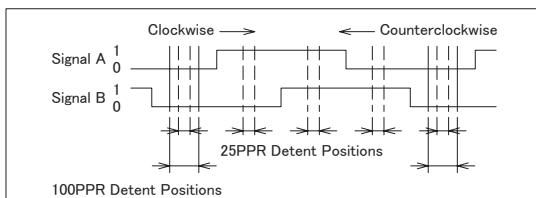
1. Body	
Dimension	180×96×50(mm)
Enabling Switch	Available on both sides
Other Features	Logo available on the wheel cover

2. Mechanical specifications	
2.1 Rotary Encoder Unit	

Output Voltage	DC5V±10%, DC12V±10%
Wheel	100 clicks / rotation 100 puluse or 25 pulses per rotation
Rotational Durability	Over 1,000,000 times

Output Waveform

- 1) Turning the shaft clockwise would generate the signal A when the signal B outputs a low voltage (0);
- 2) Rotating the shaft counter-clockwise would generate the signal A when the signal B outputs a high voltage(1);



* See RE45B page for details

2.2 Selector Switches	
-----------------------	--

RS400 (Rotary switch)
AC 30V1.0A / 200V0.2A
DC 20V1.0A / 200V0.1A (Resistance Load)
DP (Code switch)
AC 5V0.5V/50V0.05A
DC 5V0.25A / 25V0.05A (Resistance Load)

* See RS400/DP pages for details

3. Curl/Straight Cords	
------------------------	--

Curl Cord	19/25-conductor shielded cable 19-conductor: select from 2m, 3m, 4m, 5m 25-conductor: select from 3m, 5m (We will select either 19 or 25-conductor in accordance with required functions) For further details, please see the catalogues for curl cords
Straight Cord	Also available

4. Connector Unit	
-------------------	--

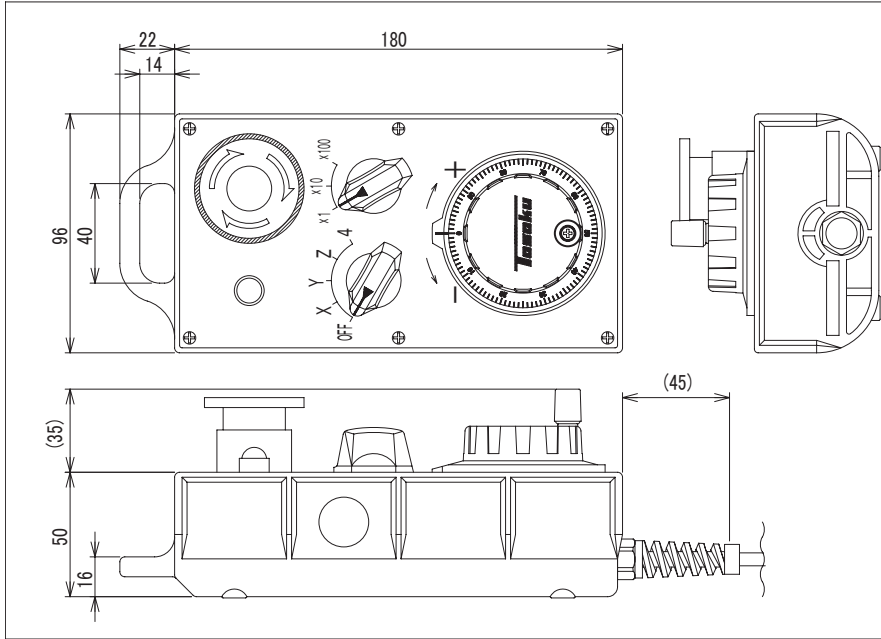
Connector	Dripproofed connector to be attached on the end of the cord optionally provided
-----------	---

Warranty

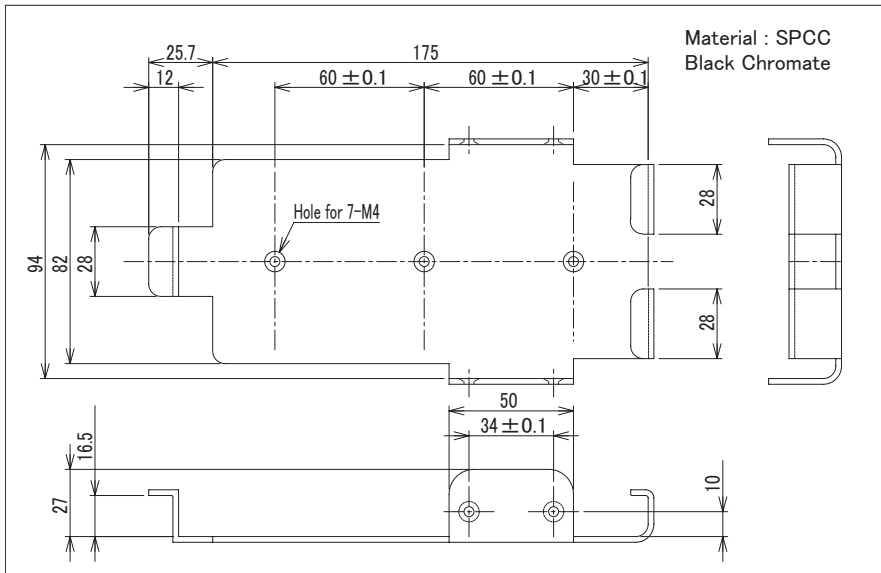
- 1 year from the date of shipment.

Dimensions (mm)

HS Main unit ※ This drawing is an example, it may differ according to number of swithes etc.



HS Original holder



HS Layout examples



Tokyo Sokuteikizai Co.,Ltd.

Trackball Catalogue

Trackball TB36 ————— P. 02

designed for usage in numerous kinds of devices and equipments

Track ball



TB36 Series



Outline

TB36 series are high-spec trackballs for various sorts of professional use: for medical devices (e.g. ultrasonic reflectoscope, specular microscope), mixing units of audio devices, factory automation systems etc.

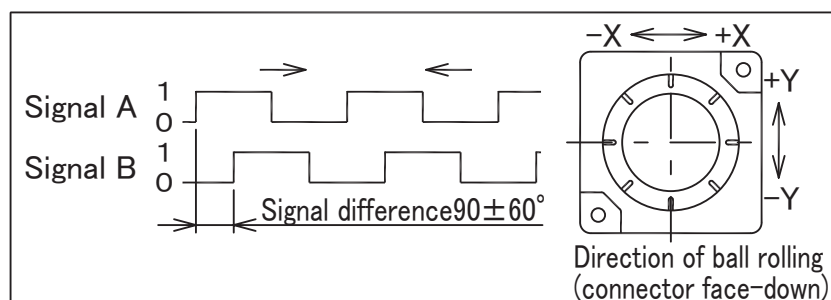
Features

- Low Cost
- RoHS compliant
- Translucent ball with LED option
- Easy Maintenance
- Long life use
 - Over 3million ball revolutions.

Specifications

Operating temperature	0°C to +45°C 32F to 113F
Supply voltage	DC5V±5% no more than 30mA
Ball	S φ 36mm/1.4inch
Output axes	2way axes (X, Y)
Pulse	216 pulses per ball generation (±10%)
Out put signals	Two square wave signals: CMOS (TTL)
Ball driving force	15±10mN
Life time	Over 3million ball revolutions
Ball load	200N maximum downward pressure
Mounting position	Horizontal to 30°

Output Wave form

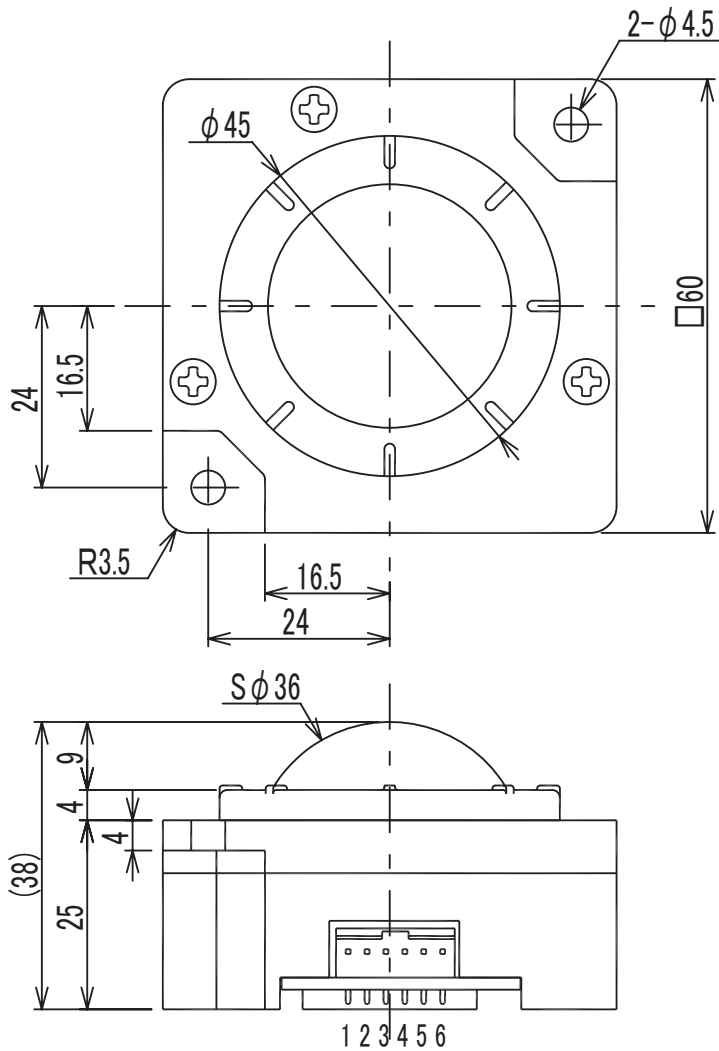


Part Number Designation

TB36 L S W
 ① ② ③ ④

- ① 38mm Track
- ② Operational torque : Light
- ③ Output signal: Two square wave output (A/B)
- ④ Color :
 W: Ivory white
 T: Transparent

Dimensions (mm)



Connection

Pin No.	Function
1	+5V Input
2	0V Common return
3	XA Signal output
4	XB Signal output
5	YA Signal output
6	YB Signal output

Connector :
 IL-6PS3FP2-1 (JAE)

Precautions

● Maintenance

Pick up ball:

-Turn the ring counterclockwise by approx. 40°.

-Set the idler on the arrow position.

Bring back ball:

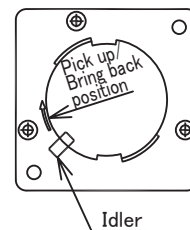
-Set the idler on the arrow position, and turn the ring clockwise.

● Cleaning:

-XY axis sensor, Idler: Wipe with cotton buds.

-Ball: Wipe with dry cloth.

: If balls are still unclean, use ethyl alcohol or neutral detergent (grit, alkaline are not included)



NOTE: 1) Any shock or vibration may cause malfunctions.

2) TB36 series are not waterproof.