

(M) Rotary Encoder

Product Overview _____ M-1

INCREMENTAL TYPE

E30S Series(ϕ 30mm Shaft type) _____ M-4

E40S Series(ϕ 40mm Shaft type) _____ M-6

E40H Series(ϕ 40mm Hollow shaft type) _____ M-6

E40HB Series(ϕ 40mm Hollow shaft built-in type) _____ M-6

E40HBP Series(ϕ 40mm Hollow shaft built-in type) _____ M-9

E50S Series(ϕ 50mm Shaft type) _____ M-12

E50SP Series(ϕ 50mm Shaft type) _____ M-15

E60H Series(ϕ 60mm Hollow shaft type) _____ M-18

E68S Series(ϕ 68mm Shaft type) _____ M-21

E80H Series(ϕ 80mm Hollow shaft type) _____ M-23

E100H Series(ϕ 100mm Hollow shaft type) _____ M-26

ENA Series(Side-mounting shaft type) _____ M-29

ENC Series(Wheel type) _____ M-32

ENH Series(Handle type) _____ M-34

ENHP Series(Portable encoder with handle) _____ M-36

ABSOLUTE TYPE

EP50S Series(ϕ 50mm Shaft type) _____ M-38

ENP Series(ϕ 60mm Shaft type) _____ M-42

Encoder connector cable

CID Series(Encoder connector cable, _____ M-46

General connector cable)

Applications _____ M-47

(A)
Counter

(B)
Timer

(C)
Temp.
controller

(D)
Power
controller

(E)
Panel
meter

(F)
Tacho/
Speed/
Pulse
meter

(G)
Display
unit

(H)
Sensor
controller

(I)
Switching
power
supply

(J)
Proximity
sensor

(K)
Photo
electric
sensor

(L)
Pressure
sensor

(M)
Rotary
encoder

(N)
Stepping
motor &
Driver &
Controller

(O)
Graphic
panel

(P)
Production
stoppage
models &
replacement

ϕ 40mm Hollow
shaft built-in type
E40HBP Series



(Plastic case)

ϕ 50mm Hollow
shaft type
E50SP Series



(Plastic case)

ϕ 60mm Hollow
shaft type
E60H Series



Portable encoder
with handle
ENHP Series



ϕ 40mm Hollow
shaft built-in type
E40HBP Series



(Plastic case)

ϕ 50mm Hollow
shaft type
E50SP Series



(Plastic case)

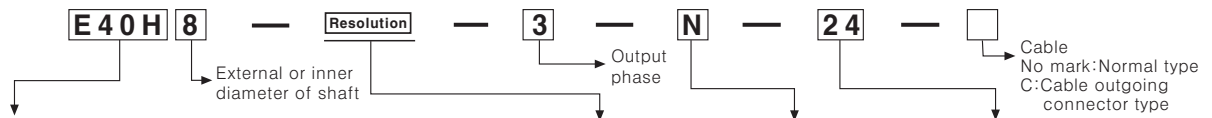
ϕ 60mm Hollow
shaft type
E60H Series

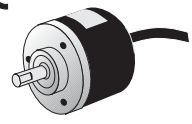
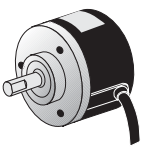

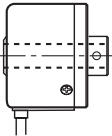

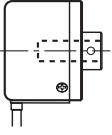

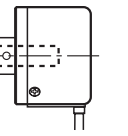


Portable encoder
with handle
ENHP Series



Product Overview(Incremental Type)

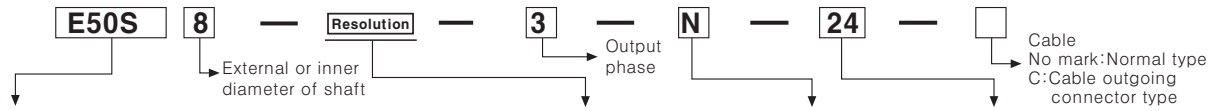


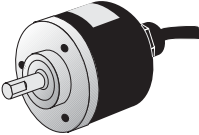


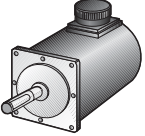

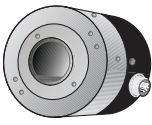
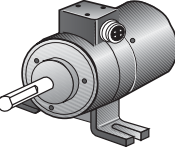
Appearances	Model	Resolution	Control output	Power supply	Page
φ 30mm shaft type 	E30S4 - Resolution - 3 - T - 5, 24 N V 6-L-5	100P/R 200P/R 360P/R 500P/R 1000P/R 1024P/R 3000P/R	T (1) : Totem pole output N (2) : NPN open collector output V (3) : Voltage output L : Line driver output (Not included in CE certification)	5 : 5VDC ±5% 24 : 12-24VDC ±5% (Ripple P-P : Max. 5%) (Note) The output of Line driver is only for 5VDC.	M-4~5 Page
φ 40mm shaft type 	E40S6 - Resolution - 2 - T - 5, 24 (Standard item) N E40S8 (Customizable) V 3-T-5, 24 N V 4-L-5 6	*1P/R *2P/R *5P/R 10P/R *12P/R 15P/R 20P/R 23P/R 25P/R 30P/R 35P/R 40P/R 45P/R 50P/R 60P/R 75P/R			
φ 40mm Hollow shaft type  E40H 	E40H8 - Resolution - 2 - T - 5, 24 (Standard item) N E40H6 V E40H10 3-T-5, 24 E40H12 (Customizable) N V 4-L-5 6	100P/R 120P/R 125P/R 150P/R 192P/R 200P/R 240P/R 250P/R 256P/R 300P/R 360P/R 400P/R 500P/R 512P/R 600P/R 800P/R 1000P/R 1024P/R 1200P/R 1500P/R 1800P/R 2000P/R 2048P/R 2500P/R 3000P/R 3600P/R 5000P/R			M-6~8 Page
φ 40mm Hollow shaft built-in type  E40HB 	E40HB8 - Resolution - 2 - T - 5, 24 (Standard item) N E40HB6 V E40HB10 3-T-5, 24 E40HB12 (Customizable) N V 4-L-5 6	100P/R 120P/R 125P/R 150P/R *12P/R 192P/R 15P/R 200P/R 20P/R 240P/R 23P/R 250P/R 25P/R 256P/R 30P/R 300P/R 35P/R 360P/R 40P/R 400P/R 45P/R 500P/R 50P/R 512P/R 60P/R 600P/R 75P/R			
φ 40mm Hollow shaft built-in type  	E40HB8P - Resolution - 2 - T - 5, 24 N V 3-T-5, 24 N V 4-L-5 6 ※Plastic structure	*1P/R 100P/R *2P/R 120P/R *5P/R 125P/R 10P/R 150P/R *12P/R 192P/R 15P/R 200P/R 20P/R 240P/R 23P/R 250P/R 25P/R 256P/R 30P/R 300P/R 35P/R 360P/R 40P/R 400P/R 45P/R 500P/R 50P/R 512P/R 60P/R 600P/R 75P/R			

※The '*' marked pulse is only for A, B phase in resolution. (Line Driver output is for A, \bar{A} , B, \bar{B} phase.)

※Not indicated pulse in this chart is customizable.

Product Overview(Incremental Type)



Appearances	Model	Resolution	Control output	Power supply	Page
φ 50mm shaft type CE 	E50S8 - Resolution - 2-T-5, 24 (Former name : ENB) N V 3-T-5, 24 N V 4-L-5 6	*1P/R 75P/R 600P/R *2P/R 100P/R 800P/R *5P/R 120P/R 1000P/R 10P/R 125P/R 1024P/R *12P/R 150P/R 1200P/R 15P/R 192P/R 1500P/R 20P/R 200P/R 1800P/R 23P/R 240P/R 2000P/R 25P/R 250P/R 2048P/R 30P/R 256P/R 2500P/R 35P/R 300P/R 3000P/R 40P/R 360P/R 3600P/R 45P/R 400P/R 5000P/R 50P/R 500P/R 6000P/R 60P/R 512P/R 8000P/R	T (1) : Totem pole output	5 : 5VDC ±5%	M-12~14 Page
φ 50mm shaft type 	E50S8P - Resolution - 2-T-5, 24 (Standard item) N E50S6P (Customizable) V 3-T-5, 24 N V 4-L-5 6 ※Plastic structure	*1P/R 40P/R 200P/R *2P/R 45P/R 240P/R *5P/R 50P/R 250P/R 10P/R 60P/R 256P/R *12P/R 75P/R 300P/R 15P/R 100P/R 360P/R 20P/R 120P/R 400P/R 23P/R 125P/R 500P/R 25P/R 150P/R 512P/R 30P/R 192P/R 600P/R 35P/R			
φ 60mm Hollow shaft type 	E60H20 - Resolution - 3-T-5, 24 N V 6-L-5	5000P/R 8192P/R	V (3): Voltage output	(Note) The output of Line driver is only for 5VDC.	M-18~20 Page
φ 68mm shaft type 	E68S15-1024-6-L-5	1024P/R ※Not indicated pulse in this chart is available to customize.			
φ 80mm Hollow shaft type CE 	E80H30 - Resolution - 3-T-5, 24 (Standard item) N E80H32 (Customizable) V 6-L-5	60P/R 100P/R 360P/R 500P/R 512P/R 1024P/R 3200P/R	M-23~25 Page		
φ 100mm Hollow shaft type CE 	E100H35 - Resolution - 3-T-5, 24 N V 6-L-5	512P/R 1024P/R 10000P/R		M-26~28 Page	
Side-mounting type CE 	ENA - Resolution - 2-T-5, 24 N V 3-T-5, 24 N V ※Standard : Output the A, B phase ※Customizable : Output the A, B, Z phase	*1P/R 60P/R 500P/R *2P/R 75P/R 512P/R *5P/R 100P/R 600P/R 10P/R 120P/R 800P/R *12P/R 125P/R 1000P/R 15P/R 150P/R 1024P/R 20P/R 192P/R 1200P/R 23P/R 200P/R 1500P/R 25P/R 240P/R 1800P/R 30P/R 250P/R 2000P/R 35P/R 256P/R 2048P/R 40P/R 300P/R 2500P/R 45P/R 360P/R 3000P/R 50P/R 400P/R 3600P/R 5000P/R	※The number of () is former name.		M-29~31 Page

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

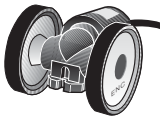


(O) Graphic panel

(P) Production stoppage models & replacement

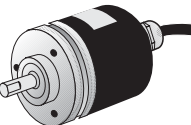
※The '*' marked pulse is only for A, B phase in resolution. (Line Driver output is for A, \bar{A} , B, \bar{B} phase.)

※Not indicated pulse in this chart is customizable.


Product Overview(Incremental, Absolute Type)

Appearances	Model	Resolution	Control output	Power supply	Page
 <p>Measuring wheel type CE</p>	ENC-1- <u>Resolution</u> -T-5, 24 N V	1 : 1mm/Pulse 2 : 1cm/Pulse 3 : 1m/Pulse 4 : 0.01yd/Pulse 5 : 0.1yd/Pulse 6 : 1yd/Pulse	T (1) : Totem pole output	5 : 5VDC ±5%	M-32~33 Page
 <p>Manual handle type</p>	ENH- <u>Resolution</u> -1-T-5, 24 2 1-V-5, 24 2 1-L-5 2	25P/R 100P/R	N (2): NPN open collector output	24 : 12-24VDC ±5% (Ripple P-P : Max. 5%) (Note)The output of Line driver is only for 5VDC.	M-34~35 Page
 <p>Movable encoder with handle</p>	ENHP- <u>Resolution</u> -1-L-5 2	100P/R	V (3): Voltage output		
			L : Line driver output (Not included in CE certification) * The number of () is former name.		

The '' marked pulse is only for A, B phase in resolution. (Sold separately.)
*Not indicated pulse in this chart is customizable.

Appearances	Model	Resolution	Output code	Control output	Power supply	Page
 <p>∅ 50mm shaft type CE</p>	EP50S8- <u>Resolution</u> -1R-P-5, 24 2R 3R 1F 2F 3F EP50S8- <u>Resolution</u> -1R-N-5, 24 2R 3R 1F 2F 3F	*6P/R 90P/R *8P/R 128P/R *12P/R 180P/R *16P/R 256P/R *24P/R 360P/R *32P/R 512P/R *40P/R 720P/R 45P/R 1024P/R 64P/R	1 : BCD 2 : BINARY 3 : GRAY (Customize)	P (1): PNP open collector output N (2): NPN open collector output	5 : 5VDC ±5% 24 : 12-24VDC ±5% (Ripple P-P : Max. 5%)	M-38~41 Page

*Not indicated number of division in this chart is customizable.
The '' marked division is being developed.
*Revolution direction ⇨ R : CCW as viewed from the shaft, F : CW as viewed from the shaft
*The number of () is former name in control output.

Appearances	Model	Output code	Power supply	Resolution	Control output	Page
 <p>∅ 60mm shaft type</p>	ENP-111R- <u>Resolution</u> -P 111F ENP-101R- <u>Resolution</u> -N 101F ENP-110R- <u>360</u> -P 110F ENP-100R- <u>360</u> -N 100F	1 : BCD Code	1 : 12-24VDC ±5% (Ripple P-P : Max. 5%) 0 : 5-12VDC ±5% (Ripple P-P : Max. 5%)	6P/R 8P/R 12P/R 16P/R 24P/R 360P/R	P (1) : PNP open collector output N (2) : NPN open collector output P (1) : PNP open collector output N (2) : NPN open collector output	M-42~45 Page

*Output ⇨ 0 : Negative logic, 1 : Positive logic
*Revolution direction ⇨ R : CCW as viewed from the shaft, F : CW as viewed from the shaft
*The number of () is former name in control output.

Incremental ϕ 30mm Shaft Type

Diameter ϕ 30mm Shaft type Incremental Rotary encoder

■ Features

- Miniature ϕ 30mm shaft type rotary encoder
- Easy installation at narrow space
- Small inertia moment
- Power supply : 5VDC, 12-24VDC \pm 5%
- Various output types

⚠ Please read "Caution for your safety" in operation manual before using.



■ Ordering information

E30S **4** - **1024** - **3** - **2** - **24** -

Series	Shaft diameter	Pulse/1Revolution	Output phase	Output	Power supply	Cable
Diameter ϕ 30mm, shaft type	ϕ 4mm	Refer to resolution	3:A, B, Z 6:A, \bar{A} , B, \bar{B} , Z, \bar{Z}	T:Totem pole output N:NPN open collector output V:Voltage output L:Line driver output(*)	5 :5VDC \pm 5% 24:12-24VDC \pm 5%	No mark:Normal type (*) 2C:Cable outgoing connector type

*Standard:E30S4-**PULSE**-3-N-24

*Standard:A, B, Z

*The power of Line driver is only for 5VDC

*Cable length:250mm

■ Specifications

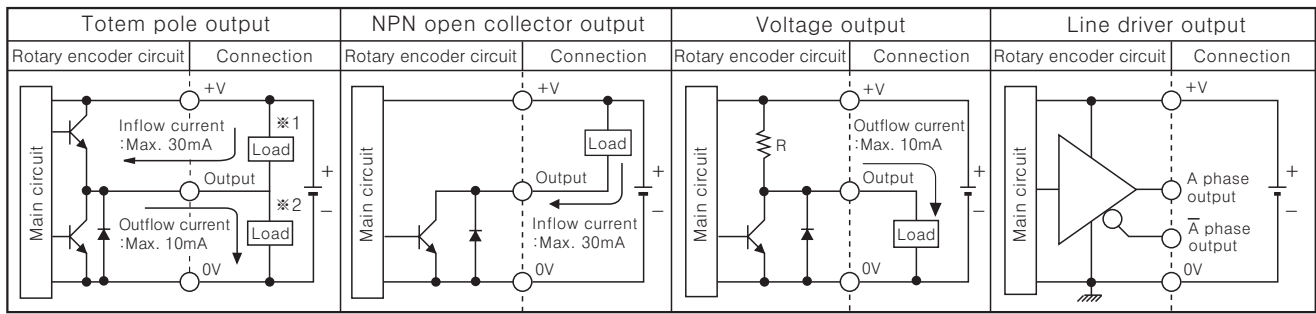
Item		Diameter ϕ 30mm shaft type of Incremental rotary encoder		
Resolution (P/R)		100, 200, 360, 500, 1000, 1024, 3000 (Not indicated type is available to customize)		
Electrical specification	Output phase	A, B, Z phase (Line driver : A, \bar{A} , B, \bar{B} , Z, \bar{Z} phase)		
	Phase difference of output	Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1cycle of A phase)		
	Control output	Totem pole output	<ul style="list-style-type: none"> • Low \Rightarrow Load current : Max. 30mA, Residual voltage : Max. 0.4VDC • High \Rightarrow Load current : Max. 10mA, Output voltage (Power supply 5VDC):Min. (Power supply-2.0)VDC, Output voltage (Power supply 12-24VDC):Min. (Power supply-3.0)VDC 	
		NPN open collector output	Load current : Max. 30mA, Residual voltage : Max. 0.4VDC	
		Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC	
		Line driver output	<ul style="list-style-type: none"> • Low \Rightarrow Load current : Max. 20mA, Residual : Max. 0.5VDC • High \Rightarrow Load current : Max. -20mA, Output voltage : Min. 2.5VDC 	
	Response time (Rise/Fall)	Totem pole output	Max. 1 μ s	
		NPN open collector output	Max. 1 μ s	
		Voltage output	Max. 1 μ s (5VDC:Output resistance 820 Ω), Max. 2 μ s (12-24VDC:Output resistance 4.7k Ω)	
		Line driver output	Max. 0.5 μ s	
	Max. Response frequency	300kHz		
	Power supply	<ul style="list-style-type: none"> • 5VDC \pm5% (Ripple P-P:Max. 5%) • 12-24VDC \pm5% (Ripple P-P:Max. 5%) 		
	Current consumption	Max. 80mA (disconnection of the load), Line driver output:Max. 50mA (disconnection of the load)		
	Insulation resistance	Min. 100M Ω (at 500VDC)		
Dielectric strength	750VAC 50/60Hz for 1 minute (Between all terminals and case)			
Connection	Cable outgoing type, 250mm cable outgoing connector type			
Mechanical specification	Starting torque	Max. 20gf \cdot cm (0.002N \cdot m)		
	Rotor inertia	Max. 20g \cdot cm ² (2 \times 10 ⁻⁶ kg \cdot m ²)		
	Shaft loading	Radial : Max. 2kgf, Thrust : Max. 1kgf		
	Max. allowable revolution	(★Note1) 5000rpm		
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours			
Shock	Max. 50G			
Ambient temperature	-10 ~ 70 $^{\circ}$ C (at non-freezing status), Storage:-25 ~ 85 $^{\circ}$ C			
Ambient humidity	35~85%RH, Storage: 35~90%RH			
Protection	IP50 (IEC standard)			
Cable	ϕ 5mm, 5P, Length:2m, Shield cable (Line driver: ϕ 5mm, 8P)			
Accessory	ϕ 4mm coupling			
Unit weight	Approx. 80g			
Approval	CE (Except for Line driver output)			

* **(★Note1)** Max. allowable revolution \geq Max. response revolution **[**Max. response revolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ **]**

- (A) Counter
- (B) Timer
- (C) Temp. controller
- (D) Power controller
- (E) Panel meter
- (F) Tacho/Speed/Pulse meter
- (G) Display unit
- (H) Sensor controller
- (I) Switching power supply
- (J) Proximity sensor
- (K) Photo electric sensor
- (L) Pressure sensor
- (M) Rotary encoder**
- (N) Stepping motor & Driver & Controller
- (O) Graphic panel
- (P) Production stoppage models & replacement

E30S Series

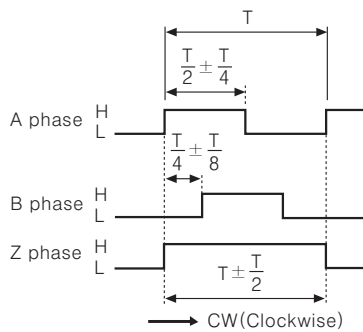
Control output diagram



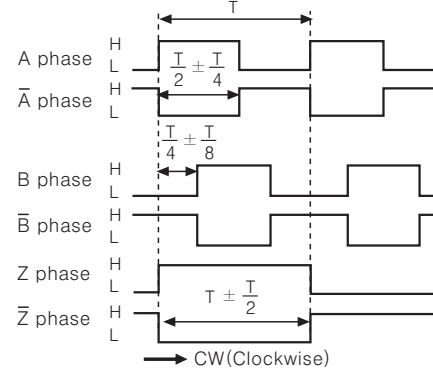
- Totem pole output type can be used for NPN open collector output type (※1) or Voltage output type (※2).
- All output circuits of A, B, Z phase is same. (Line driver output is for A, \bar{A} , B, \bar{B} , Z, \bar{Z})

Output waveform

- Totem pole output / NPN open collector output / Voltage output
- Line driver output



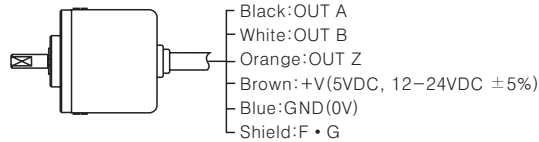
※ CW : As viewed from the shaft



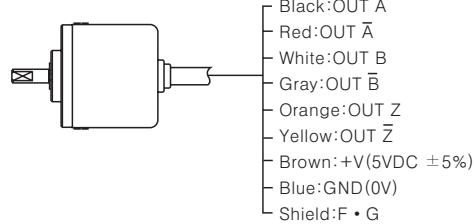
Connections

Normal type

- Totem pole output / NPN open collector output / Voltage output



- Line driver output



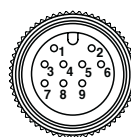
- ※ Unused wires must be insulated.
- ※ The metal case and shield wire of encoder should be grounded (F.G).

Cable outgoing connector type

- Totem pole output / NPN open collector output / Voltage output



- Line driver output

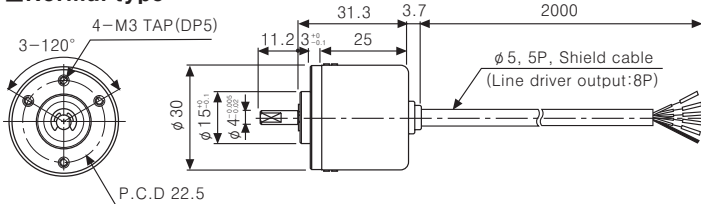


Totem pole output NPN open collector output Voltage output			Line driver output		
Pin No	Function	Cable color	Pin No	Function	Cable color
①	OUT A	Black	①	OUT A	Black
②	OUT B	White	②	OUT \bar{A}	Red
③	OUT Z	Orange	③	+V	Brown
④	+V	Brown	④	GND	Blue
⑤	GND	Blue	⑤	OUT B	White
⑥	F.G	Shield	⑥	OUT \bar{B}	Gray
			⑦	OUT Z	Orange
			⑧	OUT \bar{Z}	Yellow
			⑨	F.G	Shield

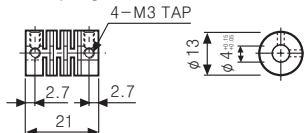
※ F.G(Field Ground): It should be grounded separately.

Dimensions

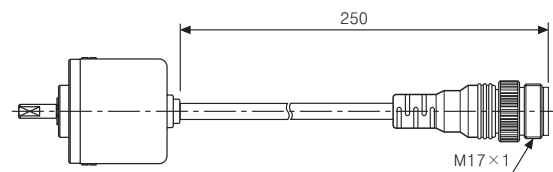
Normal type



- Coupling



Cable outgoing connector type



※ Connector cable is customizable and see M-46 for specifications.

(Unit:mm)

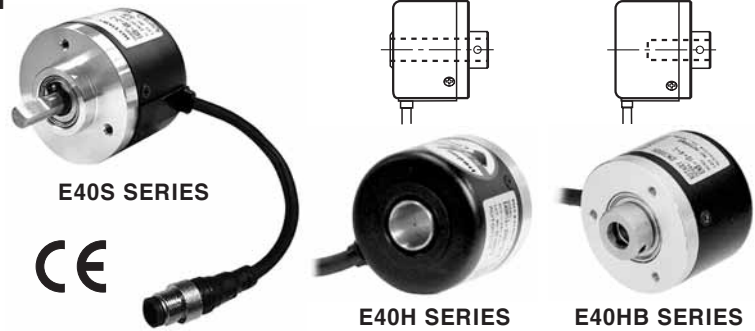
Incremental ϕ 40mm Shaft/Hollow Shaft/Built-in Type

Diameter ϕ 40mm Shaft type/Hollow type/Built-in type Incremental Rotary encoder

Features

- Easy installation at narrow space
- Small rotor inertia
- Power supply :
5VDC, 12-24VDC \pm 5%
- Various output types

! Please read "Caution for your safety" in operation manual before using.



Ordering information

E40 **H** **8** **5000** **3** **N** **24**

Series	Shaft type	Hollow type	Pulse/1 Revolution	Output phase	Output	Power supply	Cable
S: Shaft type H: Hollow type HB: Hollow built-in type	External	Inner	Refer to resolution	2: A, B 3: A, B, Z 4: A, \bar{A} , B, \bar{B} 6: A, A, B, \bar{B} , Z, \bar{Z}	T: Totem pole output N: NPN open collector output V: Voltage output L: Line driver output(*)	5 : 5VDC \pm 5% 24: 12-24VDC \pm 5%	No mark: Normal type (*) C: Cable outgoing connector type
	6: ϕ 6mm 8: ϕ 8mm	6: ϕ 6mm 8: ϕ 8mm 10: ϕ 10mm 12: ϕ 12mm					

*Standard : E40S6-**[PULSE]**-3-N-24
E40H8-**[PULSE]**-3-N-24
E40HB8-**[PULSE]**-3-N-24

*Standard: A, B, Z *The power of Line driver is only for 5VDC

*Cable length : 250mm

Specifications

Item	Diameter ϕ 40mm shaft type of Incremental rotary encoder		
Resolution(P/R)	(Note1) *1, *2, *5, 10, *12, 15, 20, 23, 25, 30, 35, 40, 45, 50, 60, 75, 100, 120, 150, 192, 200, 240, 250, 256, 300, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 1500, 1800, 2000, 2048, 2500, 3000, 3600, 5000 (Not indicated type is available to customize)		
Electrical specification	Output phase	A, B, Z phase (Line driver : A, \bar{A} , B, \bar{B} , Z, \bar{Z} phase)	
	Phase difference of output	Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1 cycle of A phase)	
	Control output	Totem pole output	• Low \Rightarrow Load current: Max. 30mA, Residual voltage : Max. 0.4VDC • High \Rightarrow Load current: Max. 10mA, Output voltage (Power supply 5VDC): Min. (Power supply-2.0)VDC, Output voltage (Power supply 12-24VDC): Min. (Power supply-3.0)VDC
		NPN open collector output	Load current : Max. 30mA, Residual voltage : Max. 0.4VDC
		Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC
		Line driver output	Low \Rightarrow Load current : Max. 20mA, Residual : Max. 0.5VDC High \Rightarrow Load current : Max. -20mA, Output voltage : Min. 2.5VDC
	Response time (Rise/Fall)	Totem pole output	Max. 1 μ s
		NPN open collector output	Max. 1 μ s
		Voltage output	Max. 1 μ s
		Line driver output	Max. 0.5 μ s
	Max. Response frequency	300kHz	
	Power supply	• 5VDC \pm 5% (Ripple P-P: Max. 5%) • 12-24VDC \pm 5% (Ripple P-P: Max. 5%)	
	Current consumption	Max. 80mA (disconnection of the load), Line driver output: Max. 50mA (disconnection of the load)	
Insulation resistance	Min. 100M Ω (at 500VDC mega)		
Dielectric strength	750VAC 50/60Hz for 1 minute (Between all terminals and case)		
Connection	Cable outgoing type, 200mm cable outgoing connector type		
Mechanical specification	Starting torque	Shaft Type : Max. 40gf \cdot cm (0.004N \cdot m), Hole Type : Max. 50gf \cdot cm (0.005N \cdot m)	
	Rotor inertia	Max. 40g \cdot cm ² (4 \times 10 ⁻⁶ kg \cdot m ²)	
	Shaft loading	Radial : Max. 2kgf, Thrust : Max. 1kgf	
	Max. allowable revolution	(Note2) 5000rpm	
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours		
Shock	Max. 50G		
Ambient temperature	-10 ~ 70 $^{\circ}$ C (at non-freezing status), Storage: -25 ~ 85 $^{\circ}$ C		
Ambient humidity	35~85%RH, Storage: 35~90%RH		
Protection	IP50 (IEC standard)		
Cable	ϕ 5mm, 5P, Length : 2m, Shield cable (Line driver output : ϕ 5mm, 8P)		
Accessory	• Shaft type: ϕ 6mm coupling standard, ϕ 8mm coupling (Sold separately) • Hole type : Bracket		
Unit weight	Approx. 160g		
Approval	CE (Except for Line driver output)		

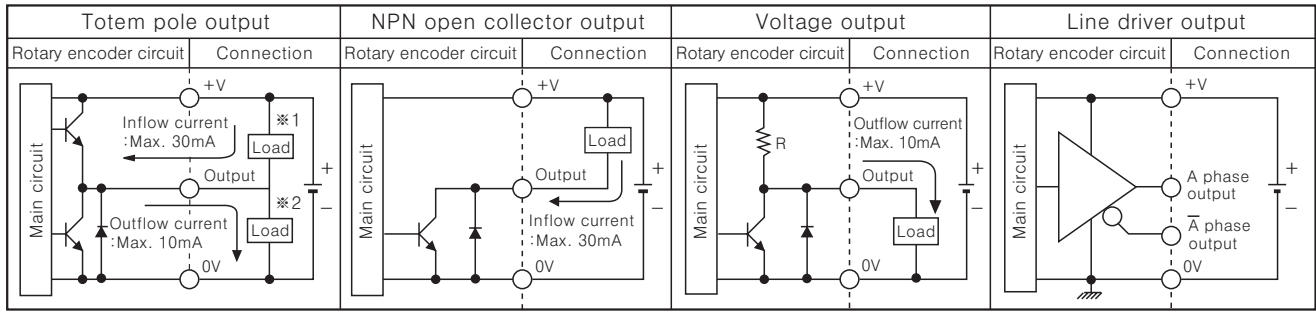
* **(Note1)** '1*' pulse is only for A, B phase (Line Driver output is for A, \bar{A} , B, \bar{B} phase)

* **(Note2)** Max. allowable revolution \geq Max. response revolution [Max. response revolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$]

- (A) Counter
- (B) Timer
- (C) Temp. controller
- (D) Power controller
- (E) Panel meter
- (F) Tacho/Speed/Pulse meter
- (G) Display unit
- (H) Sensor controller
- (I) Switching power supply
- (J) Proximity sensor
- (K) Photo electric sensor
- (L) Pressure sensor
- (M) Rotary encoder
- (N) Stepping motor & Driver & Controller
- (O) Graphic panel
- (P) Production stoppage models & replacement

E40 Series

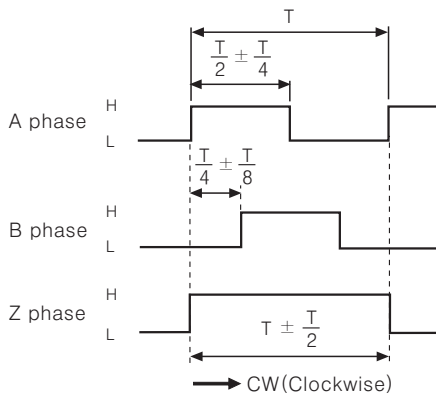
Control output diagram



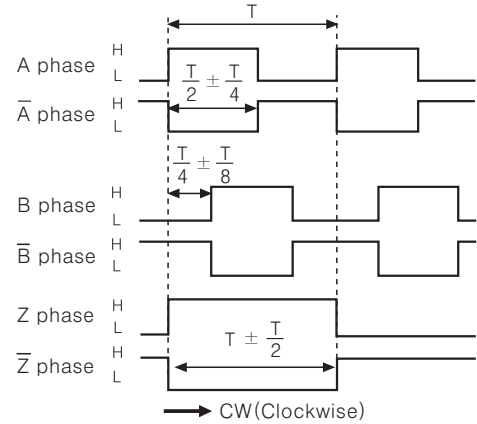
☞ Totem pole output type can be used for NPN open collector output type(*1) or Voltage output type(*2).
 ☞ All output circuits of A, B, Z phase is same. (Line driver output is A, \bar{A} , B, \bar{B} , Z, \bar{Z})

Output waveform

- Totem pole output / NPN open collector output / Voltage output
- Line driver output



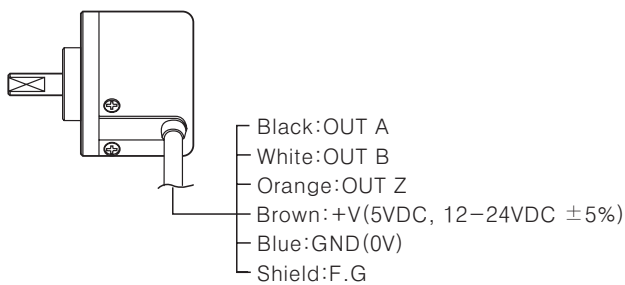
※ CW : As viewed from the shaft



Connections

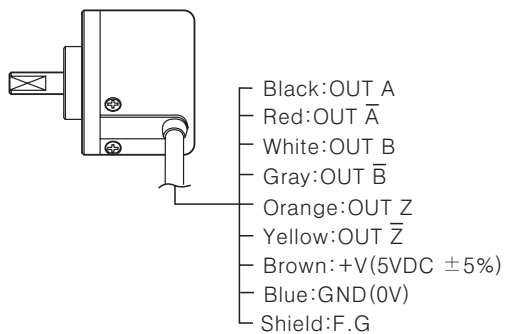
Normal type

- Totem pole output / NPN open collector output / Voltage output



- ※ Unused wires must be insulated.
- ※ The metal case and shield wire of encoder should be grounded(F.G).

Line driver output



Cable outgoing connector type

- Totem pole output
- Line driver output
- NPN open collector output
- Voltage output



Totem pole output NPN open collector output Voltage output			Line driver output		
Pin No	Function	Cable color	Pin No	Function	Cable color
①	OUT A	Black	①	OUT A	Black
②	OUT B	White	②	OUT \bar{A}	Red
③	OUT Z	Orange	③	+V	Brown
④	+V	Brown	④	GND	Blue
⑤	GND	Blue	⑤	OUT B	White
⑥	F.G	Shield	⑥	OUT \bar{B}	Gray
			⑦	OUT Z	Orange
			⑧	OUT \bar{Z}	Yellow
			⑨	F.G	Shield

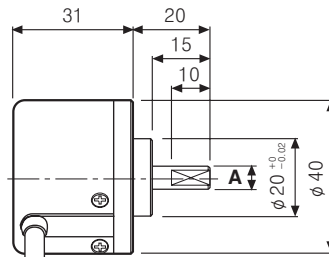
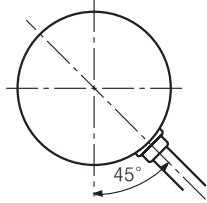
※ F.G(Field Ground): It should be grounded separately.

Incremental $\phi 40\text{mm}$ Shaft/Hollow Shaft/Built-in Type

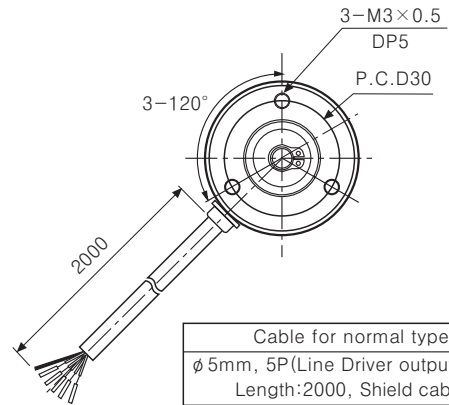
Dimensions

Normal type

Shaft type



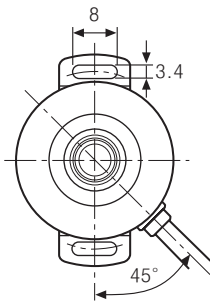
A	Tolerance
$\phi 6$	-0.01 -0.015
$\phi 8$	-0.01 -0.02



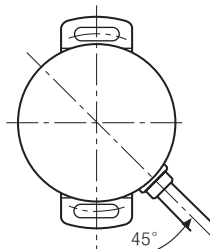
Cable for normal type
 $\phi 5\text{mm}$, 5P (Line Driver output : 8P),
 Length: 2000, Shield cable

(Unit:mm)

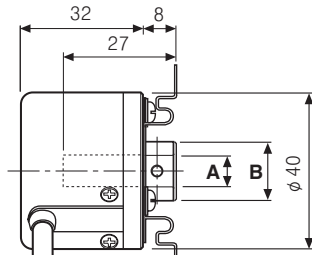
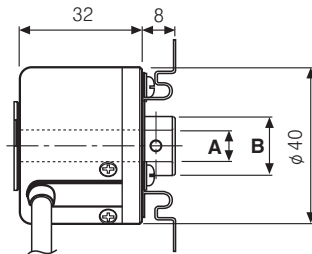
Hollow shaft / Hollow shaft built-in type



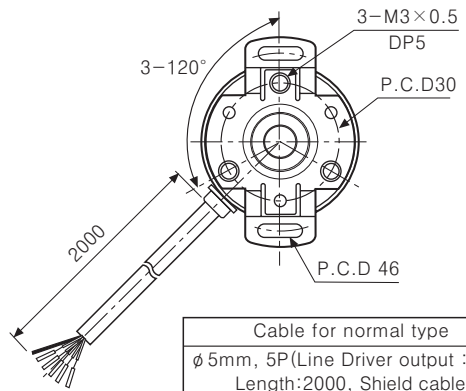
E40H



E40HB

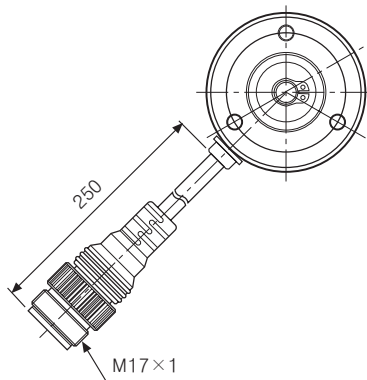


A	$\phi 6$	$\phi 8$	$\phi 10$	$\phi 12$
B		$\phi 15$	$\phi 17$	
Tolerance			+0.015 -0	



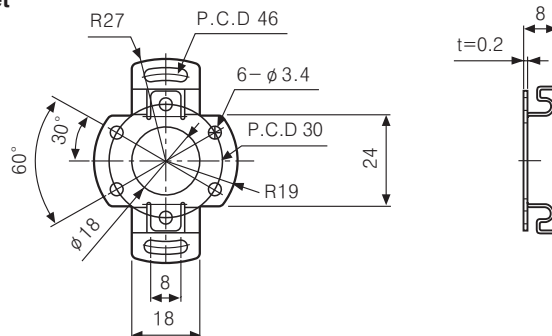
Cable for normal type
 $\phi 5\text{mm}$, 5P (Line Driver output : 8P),
 Length: 2000, Shield cable

Cable outgoing connector type



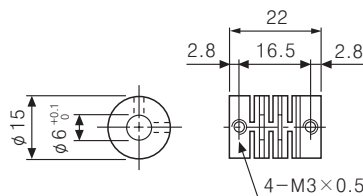
※ Connector cable is customizable and see M-46 for specifications.

Bracket

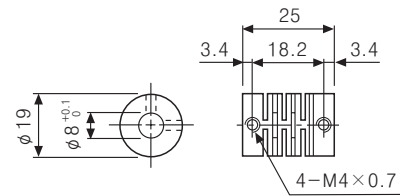


Coupling (E40S)

$\phi 6$ Coupling



$\phi 8$ Coupling



(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

E40HBP Series

Diameter ϕ 40mm Hollow shaft built-in type Incremental Rotary encoder

Features

- Light plastic body
- Easy installation at narrow space
- Small rotor inertia
- Power supply : 5VDC, 12–24VDC \pm 5%
- Various output types

⚠ Please read "Caution for your safety" in operation manual before using.



Ordering information

E40HB	8	P	600	3	N	24	
Series	Inside	External material	Pulse/1Revolution	Output phase	Control output	Power supply	Cable
Diameter ϕ 40mm HB : Hollow shaft built-in type	ϕ 8mm	Plastic	Refer to resolution	2 : A, B 3 : A, \bar{B} , Z 4 : A, \bar{A} , B, \bar{B} 6 : A, \bar{A} , B, \bar{B} , Z, \bar{Z}	T:Totem pole output N:NPN open collector output V:Voltage output L:Line driver output(*)	5 : 5VDC \pm 5% 24 : 12–24VDC \pm 5%	No mark:Normal type (*) C:Cable outgoing connector type

*Standard:E40HB8P–[PULSE]–3–N–24

*Standard:A, B, Z

*The power of Line driver is only for 5VDC

*Cable length:250mm

Specifications

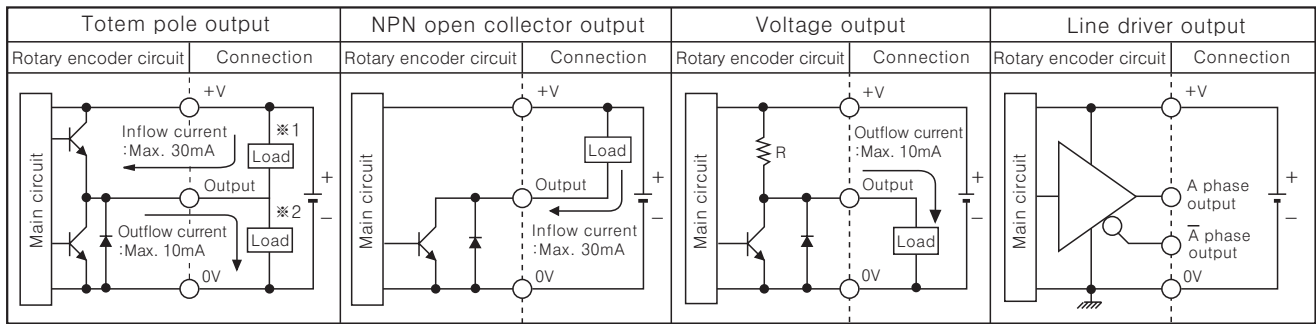
Item		Diameter ϕ 40mm Hollow shaft built-in type of Incremental rotary encoder		
Resolution(P/R)		(Note1) *1, *2, *5, 10, *12, 15, 20, 23, 25, 30, 35, 40, 45, 50, 60, 75, 100, 120, 125, 150, 192, 200, 240, 250, 256, 300, 360, 400, 500, 512, 600		
Electrical specification	Output phase		A, B, Z phase(Line driver : A, \bar{A} , B, \bar{B} , Z, \bar{Z} phase)	
	Phase difference of output		Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1cycle of A phase)	
	Control output	Totem pole output	<ul style="list-style-type: none"> • Low \Rightarrow Load current:Max. 30mA, Residual voltage : Max. 0.4VDC • High \Rightarrow Load current:Max. 10mA, Output voltage(Power supply 5VDC):Min. (Power supply–2.0)VDC, Output voltage(Power supply 12–24VDC):Min. (Power supply–3.0)VDC 	
		NPN open collector output	Load current : Max. 30mA, Residual voltage : Max. 0.4VDC	
		Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC	
		Line driver output	Low \Rightarrow Load current : Max. 20mA, Residual : Max. 0.5VDC High \Rightarrow Load current : Max. –20mA, Output voltage : Min. 2.5VDC	
	Response time (Rise/Fall)	Totem pole output	Max. 1 μ s	
		NPN open collector output	Max. 1 μ s	
		Voltage output	Max. 1 μ s	
		Line driver output	Max. 0.5 μ s	
	Max. Response frequency		180kHz	
Power supply		<ul style="list-style-type: none"> • 5VDC \pm5%(Ripple P–P:Max. 5%) • 12–24VDC \pm5%(Ripple P–P:Max. 5%) 		
Current consumption		Max. 80mA (disconnection of the load)		
Insulation resistance		Min. 100M Ω (at 500VDC mega between all terminals and case)		
Dielectric strength		750VAC 50/60Hz for 1 minute(Between all terminals and case)		
Connection		Cable outgoing type, 200mm cable outgoing connector type		
Mechanical specification	Starting torque		Max. 50gf \cdot cm(0.005N \cdot m)	
	Rotor inertia		Max. 40g \cdot cm ² (4 \times 10 ^{–6} kg \cdot m ²)	
	Shaft loading		Radial : Max. 3kgf, Thrust : Max. 0.5kgf	
	Max. allowable revolution		(Note2) 3000rpm	
Vibration		1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours		
Shock		Max. 50G		
Ambient temperature		–10 ~ 70 $^{\circ}$ C (at non–freezing status), Storage:–25 ~ 85 $^{\circ}$ C		
Ambient humidity		35~85%RH, Storage: 35~90%RH		
Protection		IP50(IEC standard)		
Cable		ϕ 5mm, 5P, Length : 2m, Shield cable(Line driver output : ϕ 5mm, 8P)		
Accessory		Bracket		
Unit weight		Approx. 130g		

* **(Note1)** '1' pulse is only for A, B phase(Line Driver output is for A, \bar{A} , B, \bar{B} phase)

* **(Note2)** Max. allowable revolution \geq Max. response revolution **[**Max. response revolution(rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ **]**

Incremental ϕ 40mm Hollow Shaft/Built-in Type

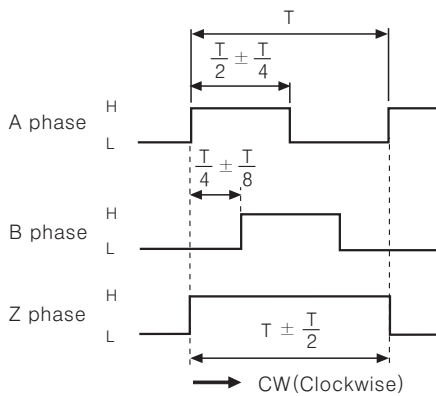
Control output diagram



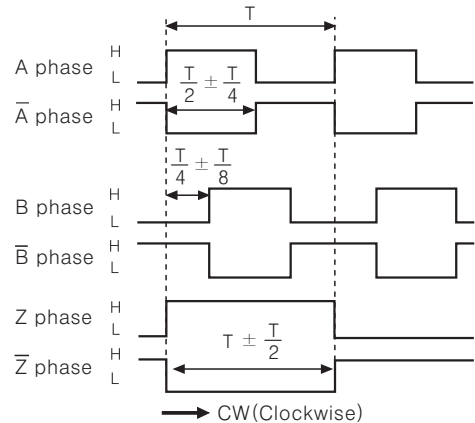
⇒ Totem pole output type can be used for NPN open collector output type(※1) or Voltage output type(※2).
 ⇒ All output circuits of A, B, Z phase is same. (Line driver output is for A, \bar{A} , B, \bar{B} , Z, \bar{Z})

Output waveform

- Totem pole output / NPN open collector output / Voltage output
- Line driver output



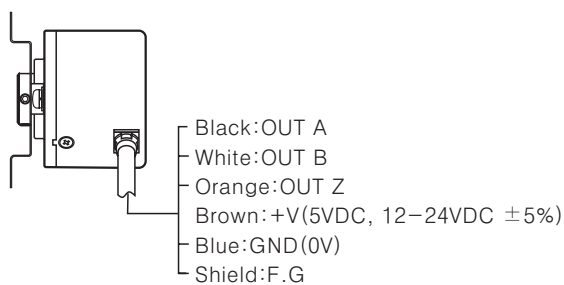
※CW : As viewed from the shaft



Connections

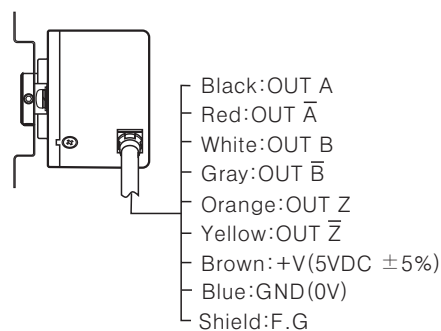
Normal type

- Totem pole output / NPN open collector output / Voltage output



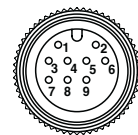
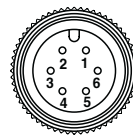
※Unused wires must be insulated.

- Line driver output



Cable outgoing connector type

- Totem pole output
- NPN open collector output
- Voltage output
- Line driver output



Totem pole output NPN open collector output Voltage output			Line driver output		
Pin No	Function	Cable color	Pin No	Function	Cable color
①	OUT A	Black	①	OUT A	Black
②	OUT B	White	②	OUT \bar{A}	Red
③	OUT Z	Orange	③	+V	Brown
④	+V	Brown	④	GND	Blue
⑤	GND	Blue	⑤	OUT B	White
⑥	F.G	Shield	⑥	OUT \bar{B}	Gray
			⑦	OUT Z	Orange
			⑧	OUT \bar{Z}	Yellow
			⑨	F.G	Shield

※F.G(Field Ground):It should be grounded separately .

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

(O) Graphic panel

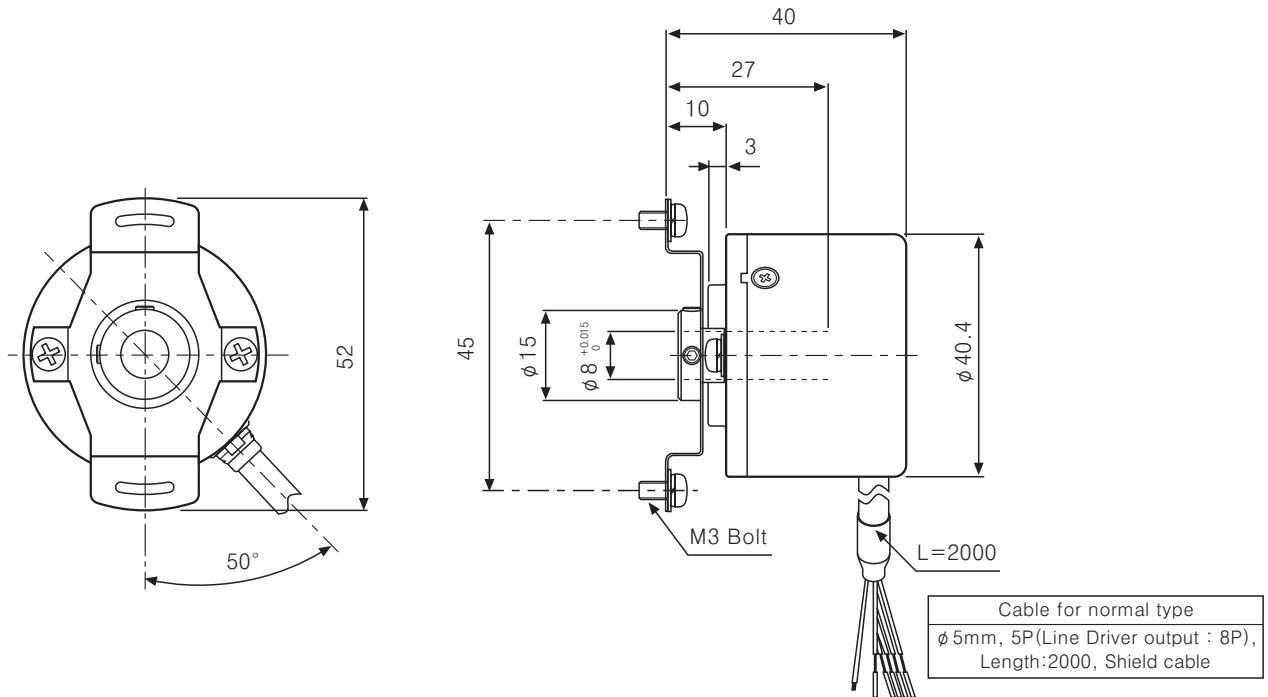
(P) Production stoppage models & replacement

E40HBP Series

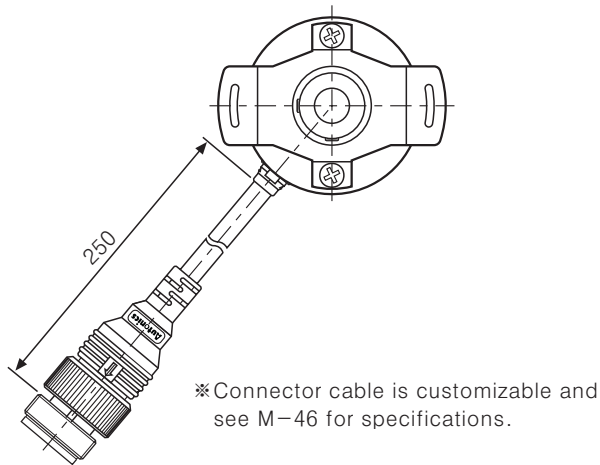
Dimensions

Normal type

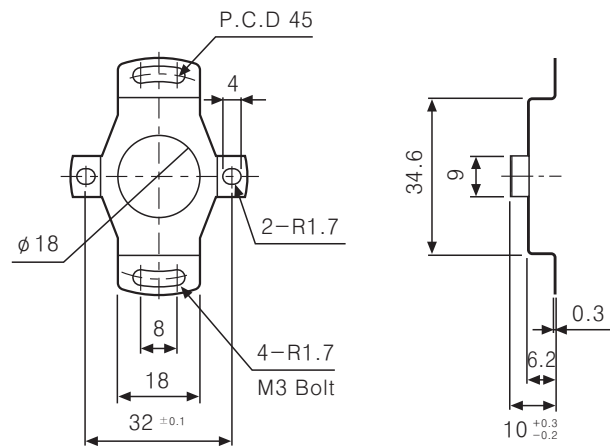
(Unit:mm)



Cable outgoing connector type



Bracket



Incremental ϕ 50mm Shaft Type

Diameter ϕ 50mm Shaft type Incremental Rotary encoder

■ Features

- Suitable for measuring Angle, Position, Revolution, Speed, Acceleration and Distance
- Power supply : 5VDC, 12-24VDC \pm 5%
- Cost-effective

■ Applications

- Various tooling machinery, packing machine and general industrial machinery etc.

⚠ Please read "Caution for your safety" in operation manual before using.



■ Ordering information (Former name : ENB)

E50S	8	-	5000	-	3	-	2	-	24	-	
------	---	---	------	---	---	---	---	---	----	---	--

Series	Shaft diameter	Pulse/1Revolution	Output phase	Output	Power supply	Cable
Diameter ϕ 50mm, shaft type	ϕ 8mm	Refer to resolution	2:A, B 3:A, B, Z 4:A, \bar{A} , B, \bar{B} 6:A, \bar{A} , B, \bar{B} , Z, \bar{Z}	T:Totem pole output N:NPN open collector output V:Voltage output L:Line driver output(*)	5 :5VDC \pm 5% 24:12-24VDC \pm 5%	No mark:Normal type C:Cable outgoing connector type(*) CR:Rear side outgoing connector integrated type CS:Side outgoing connector integrated type

*Standard:E50S8-PULSE-3-N-24

*Standard:A, B, Z

*The power of Line driver is only for 5VDC

*Cable length:250mm

■ Specifications

Item		Diameter ϕ 50mm shaft type of Incremental rotary encoder		
Resolution(P/R)		(Note1) *1, *2, *5, 10, *12, 15, 20, 23, 25, 30, 35, 40, 45, 50, 60, 75, 100, 120, 125, 150, 192, 200, 240, 250, 256, 300, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 1500, 1800, 2000, 2048, 2500, 3000, 3600, 5000, 6000, 8000 (Not indicated type is available to customize)		
Electrical specification	Output phase	A, B, Z phase (Line driver : A, \bar{A} , B, \bar{B} , Z, \bar{Z} phase)		
	Phase difference of output	Output between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1cycle of A phase)		
	Control output	Totem pole output	<ul style="list-style-type: none"> • Low \Rightarrow Load current:Max. 30mA, Residual voltage : Max. 0.4VDC • High \Rightarrow Load current:Max. 10mA, Output voltage(Power supply 5VDC):Min. (Power supply-2.0)VDC, Output voltage(Power supply 12-24VDC):Min. (Power supply-3.0)VDC 	
		NPN open collector output	Load current : Max. 30mA, Residual voltage : Max. 0.4VDC	
		Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC	
		Line driver output	<ul style="list-style-type: none"> • Low \Rightarrow Load current : Max. 20mA, Residual : Max. 0.5VDC • High \Rightarrow Load current : Max. -20mA, Output voltage : Min. 2.5VDC 	
	Response time (Rise/Fall)	Totem pole output	Max. 1 μ s	
		NPN open collector output	Max. 1 μ s	
		Voltage output	Max. 1 μ s	
		Line driver output	Max. 0.5 μ s	
	Max. Response frequency	300kHz		
	Power supply	<ul style="list-style-type: none"> • 5VDC \pm5% (Ripple P-P:Max. 5%) • 12-24VDC \pm5% (Ripple P-P:Max. 5%) 		
Current consumption	Max. 80mA (disconnection of the load), Line driver output:Max. 50mA (disconnection of the load)			
Insulation resistance	Min. 100M Ω (at 500VDC mega between all terminals and case)			
Dielectric strength	750VAC 50/60Hz for 1 minute (Between all terminals and case)			
Connection	Cable outgoing type, 200mm cable outgoing connector type, Connector integrated type (Rear, Side)			
Mechanical specification	Starting torque	(Note2)	Max. 70gf \cdot cm (0.007N \cdot m)	
	Rotor inertia		Max. 80g \cdot cm ² (8 \times 10 ⁻⁶ kg \cdot m ²)	
	Shaft loading		Radial : Max. 10kgf, Thrust : Max. 2.5kgf	
	Max. allowable revolution	(Note3)	5000rpm	
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours			
Shock	Max. 75G			
Ambient temperature	-10 ~ 70 $^{\circ}$ C (at non-freezing status), Storage: -25 ~ 85 $^{\circ}$ C			
Ambient humidity	35~85%RH, Storage: 35~90%RH			
Protection	IP50, Customizable as IP64, Connector integrated type:IP65 (IEC standard)			
Cable	ϕ 5mm, 5P, Length : 2m, Shield cable (Line driver output : ϕ 5mm, 8P)			
Accessory	ϕ 8mm coupling bracket			
Unit weight	Approx. 275g, Connector integrated type:180g			
Approval	CE (Except for Line driver output)			

* **(Note1)** * pulse is only for A, B phase (Line Driver output is for A, \bar{A} , B, \bar{B} phase). It can be produced under 1000P/R for connector integrated type.

* **(Note1)** Lower torque than the rated value, it can be customizable.

* **(Note3)** Max. allowable revolution \geq Max. response revolution **[Max. response resolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$]**

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

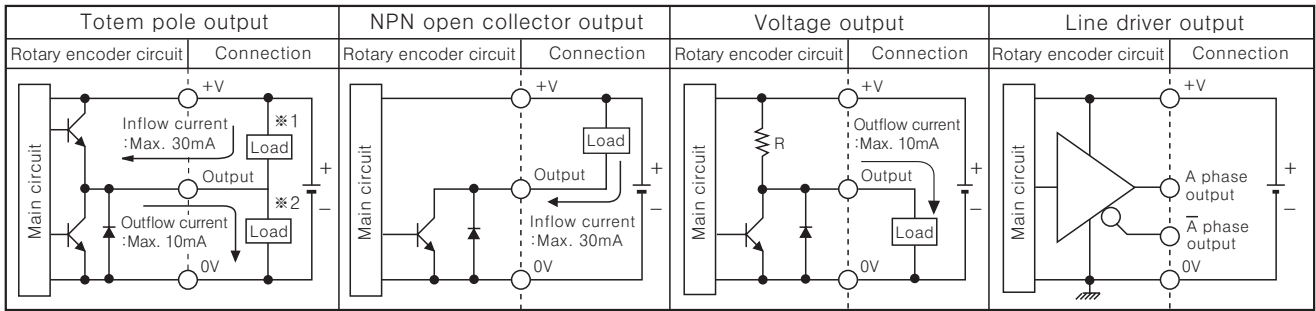
(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

E50S Series

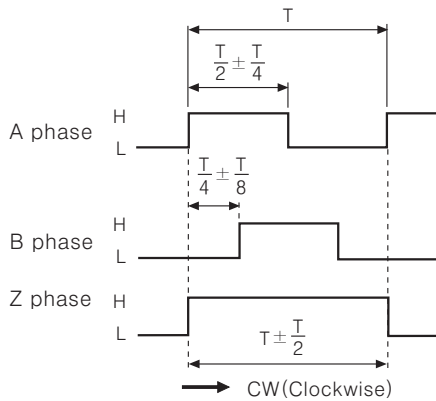
Control output diagram



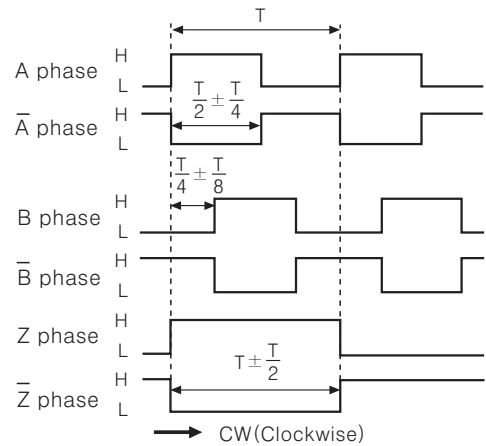
☞ Totem pole output type can be used for NPN open collector output type(*1) or Voltage output type(*2).
 ☞ All output circuits of A, B, Z phase is same. (Line driver output is for A, \bar{A} , B, \bar{B} , Z, \bar{Z})

Output waveform

- Totem pole output / NPN open collector output / Voltage output
- Line driver output



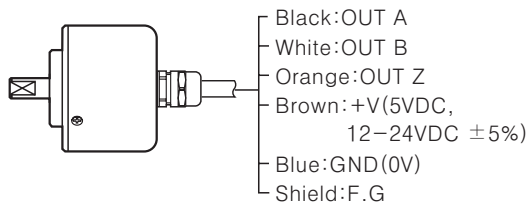
*CW : As viewed from the shaft



Connections

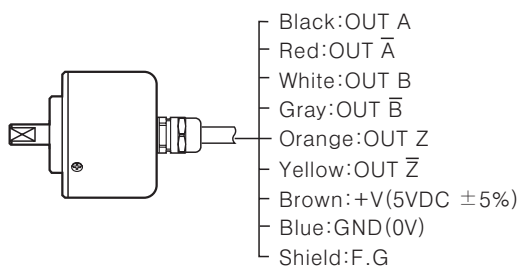
Normal type

- Totem pole output / NPN open collector output / Voltage output



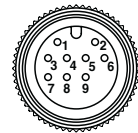
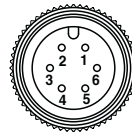
- ※ Unused wires must be insulated.
- ※ The metal and shield cable of encoder should be grounded(F.G)

- Line driver output



Cable outgoing connector/ Connector integrated type

- Totem pole output
- Line driver output
- NPN open collector output
- Voltage output



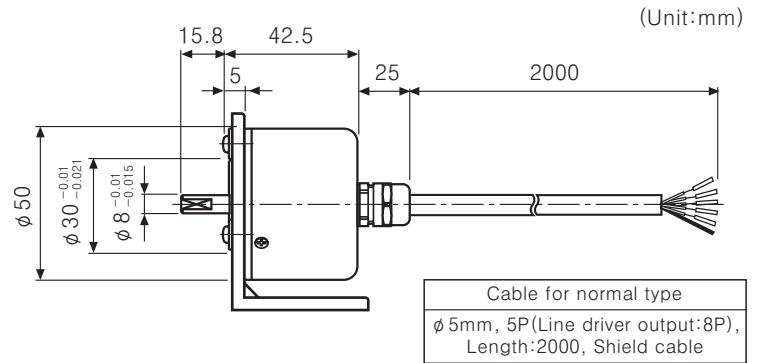
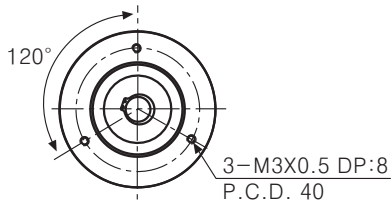
Totem pole output NPN open collector output Voltage output			Line driver output		
Pin No	Function	Cable color	Pin No	Function	Cable color
①	OUT A	Black	①	OUT A	Black
②	OUT B	White	②	OUT \bar{A}	Red
③	OUT Z	Orange	③	+V	Brown
④	+V	Brown	④	GND	Blue
⑤	GND	Blue	⑤	OUT B	White
⑥	F.G	Shield	⑥	OUT \bar{B}	Gray
			⑦	OUT Z	Orange
			⑧	OUT \bar{Z}	Yellow
			⑨	F.G	Shield

*F.G(Field Ground):It should be grounded separately.

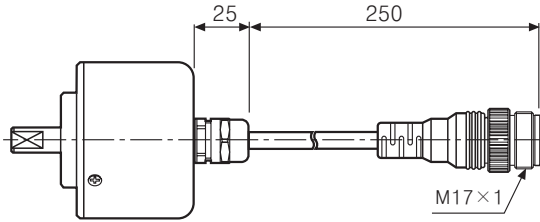
Incremental $\phi 50\text{mm}$ Shaft Type

Dimensions

Normal type

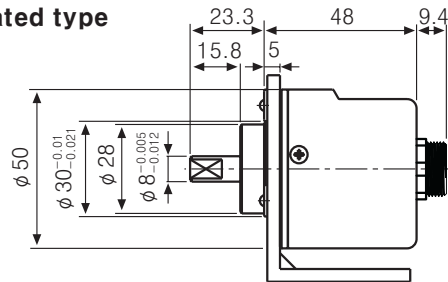
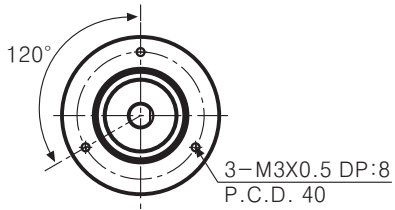


Cable outgoing connector type

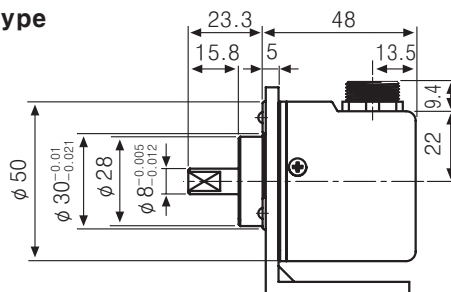
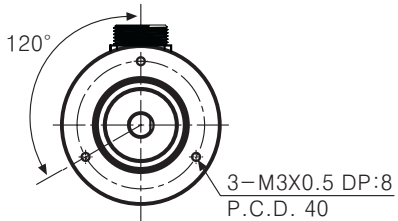


*Connector cable is customizable and see M-46 for specifications.

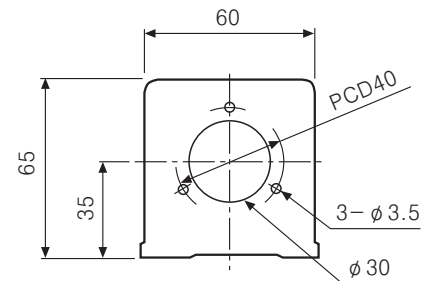
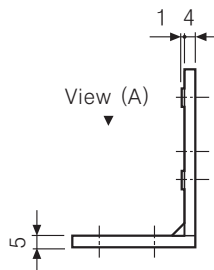
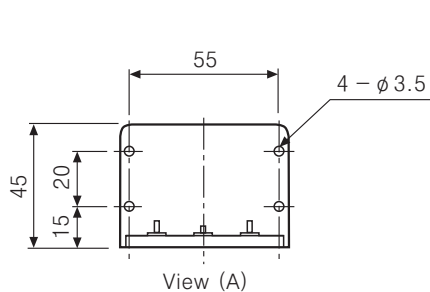
Rear side outgoing connector integrated type



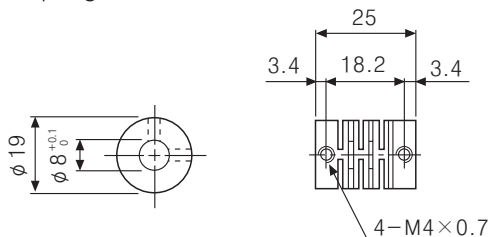
Side outgoing connector integrated type



Bracket



Coupling



- (A) Counter
- (B) Timer
- (C) Temp. controller
- (D) Power controller
- (E) Panel meter
- (F) Tacho/Speed/Pulse meter
- (G) Display unit
- (H) Sensor controller
- (I) Switching power supply
- (J) Proximity sensor
- (K) Photo electric sensor
- (L) Pressure sensor
- (M) Rotary encoder
- (N) Stepping motor & Driver & Controller
- (O) Graphic panel
- (P) Production stoppage models & replacement

E50SP Series

Diameter ϕ 50mm Shaft type Incremental Rotary encoder

■ Features

- Light plastic body
- Suitable for measuring Angle, Position, Revolution, Speed, Acceleration and Sensing distance
- Power supply : 5VDC, 12–24VDC \pm 5%
- Cost-effective

■ Applications

- Various tooling machinery, packing machine and general industrial machinery etc.



⚠ Please read "Caution for your safety" in operation manual before using.

■ Ordering information (Former name : ENB)

E50S	8	P	—	600	—	3	—	N	—	24	—	
Series	Shaft diameter	External material	Pulse/1Revolution	Output phase	Control output	Power supply	Cable					
Diameter ϕ 50mm, shaft type	6 : ϕ 6mm 8 : ϕ 8mm	Plastic	Refer to resolution	2:A, B 3:A, B, Z 4:A, \bar{A} , B, \bar{B} 6:A, \bar{A} , B, \bar{B} , Z, \bar{Z}	T:Totem pole output N:NPN open collector output V:Voltage output L:Line driver output(※)	5 :5VDC \pm 5% 24:12–24VDC \pm 5%	No mark:Normal type (※) C:Cable outgoing connector type					

※Standard: E50S8P-**PULSE**-3-N-24

※Standard : A, B, Z ※The power of Line driver is only for 5VDC

※Cable length : 250mm

■ Specifications

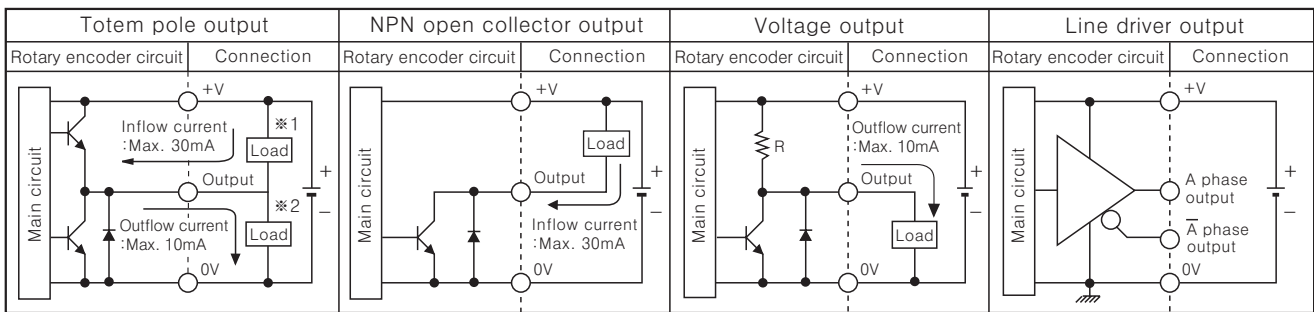
Item	Diameter ϕ 50mm shaft type of Incremental rotary encoder		
Resolution(P/R)	(Note1) *1, *2, *5, 10, *12, 15, 20, 23, 25, 30, 35, 40, 45, 50, 60, 75, 100, 120, 125, 150, 192, 200, 240, 250, 256, 300, 360, 400, 500, 512, 600		
Electrical specification	Output phase	A, B, Z phase(Line driver : A, \bar{A} , B, \bar{B} , Z, \bar{Z} phase)	
	Phase difference of output	Output between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1cycle of A phase)	
	Control output	Totem pole output	• Low \Rightarrow Load current:Max. 30mA, Residual voltage : Max. 0.4VDC • High \Rightarrow Load current:Max. 10mA, Output voltage(Power supply 5VDC):Min. (Power supply-2.0)VDC, Output voltage(Power supply 12-24VDC):Min. (Power supply-3.0)VDC
		NPN open collector output	Load current : Max. 30mA, Residual voltage : Max. 0.4VDC
		Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC
		Line driver output	• Low \Rightarrow Load current : Max. 20mA, Residual : Max. 0.5VDC • High \Rightarrow Load current : Max. -20mA, Output voltage : Min. 2.5VDC
	Response time (Rise/Fall)	Totem pole output	Max. 1 μ s
		NPN open collector output	Max. 1 μ s
		Voltage output	Max. 1 μ s
		Line driver output	Max. 0.5 μ s
	Max. Response frequency	180kHz	
Power supply	• 5VDC \pm 5% (Ripple P-P:Max. 5%) • 12-24VDC \pm 5% (Ripple P-P:Max. 5%)		
Current consumption	Max. 80mA (disconnection of the load), Line driver output:Max. 50mA (disconnection of the load)		
Insulation resistance	Min. 100M Ω (at 500VDC mega between all terminals and case)		
Dielectric strength	750VAC 50/60Hz for 1 minute (Between all terminals and case)		
Connection	Cable outgoing type, 200mm cable outgoing connector type		
Mechanical specification	Starting torque	Max. 100gf \cdot cm (0.01N \cdot m)	
	Rotor inertia	Max. 40g \cdot cm ² (4×10^{-6} kg \cdot m ²)	
	Shaft loading	Radial : Max. 2kgf, Thrust : Max. 1kgf	
	Max. allowable revolution	(Note2) 5000rpm	
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours		
Shock	Max. 75G		
Ambient temperature	-10 ~ 70 $^{\circ}$ C (at non-freezing status), Storage:-25 ~ 85 $^{\circ}$ C		
Ambient humidity	35~85%RH, Storage: 35~90%RH		
Protection	IP50 (IEC standard)		
Cable	ϕ 5mm, 5P, Length : 2m, Shield cable (Line driver output : ϕ 5mm, 8P)		
Accessory	ϕ 8mm coupling standard, ϕ 6mm coupling (Sold separately), Bracket		
Unit weight	Approx. 235g		

※ **(Note1)** * pulse is only for A, B phase (Line Driver output is for A, \bar{A} , B, \bar{B} phase)

※ **(Note2)** Max. allowable revolution \geq Max. response revolution $\left[\text{Max. response resolution (rpm)} = \frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec} \right]$

Incremental ϕ 50mm Shaft Type

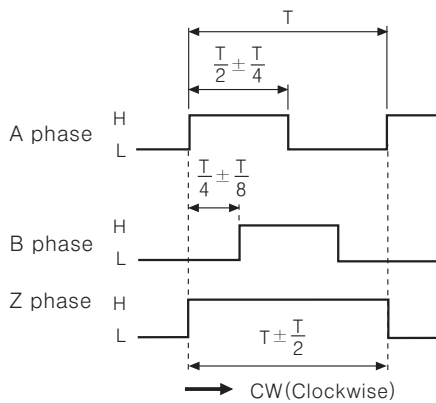
Control output diagram



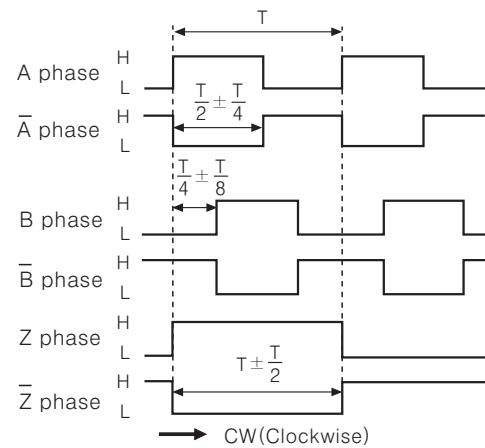
⇒ Totem pole output type can be used for NPN open collector output type(*1) or Voltage output type(*2).
 ⇒ All output circuits of A, B, Z phase is same. (Line driver output is for A, \bar{A} , B, \bar{B} , Z, \bar{Z})

Output waveform

- Totem pole output / NPN open collector output / Voltage output
- Line driver output



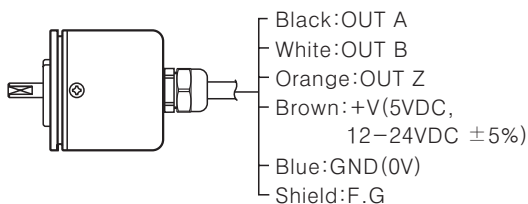
*CW : As viewed from the shaft



Connections

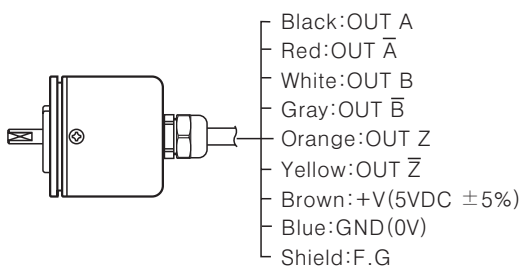
Normal type

- Totem pole output / NPN open collector output / Voltage output



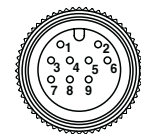
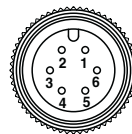
*Unused wires must be insulated.

- Line driver output



Cable outgoing connector type

- Totem pole output
- Line driver output
- NPN open collector output
- Voltage output



Totem pole output NPN open collector output Voltage output			Line driver output		
Pin No	Function	Cable color	Pin No	Function	Cable color
①	OUT A	Black	①	OUT A	Black
②	OUT B	White	②	OUT \bar{A}	Red
③	OUT Z	Orange	③	+V	Brown
④	+V	Brown	④	GND	Blue
⑤	GND	Blue	⑤	OUT B	White
⑥	F.G	Shield	⑥	OUT \bar{B}	Gray
			⑦	OUT Z	Orange
			⑧	OUT \bar{Z}	Yellow
			⑨	F.G	Shield

*F.G(Field Ground):It should be grounded separately.

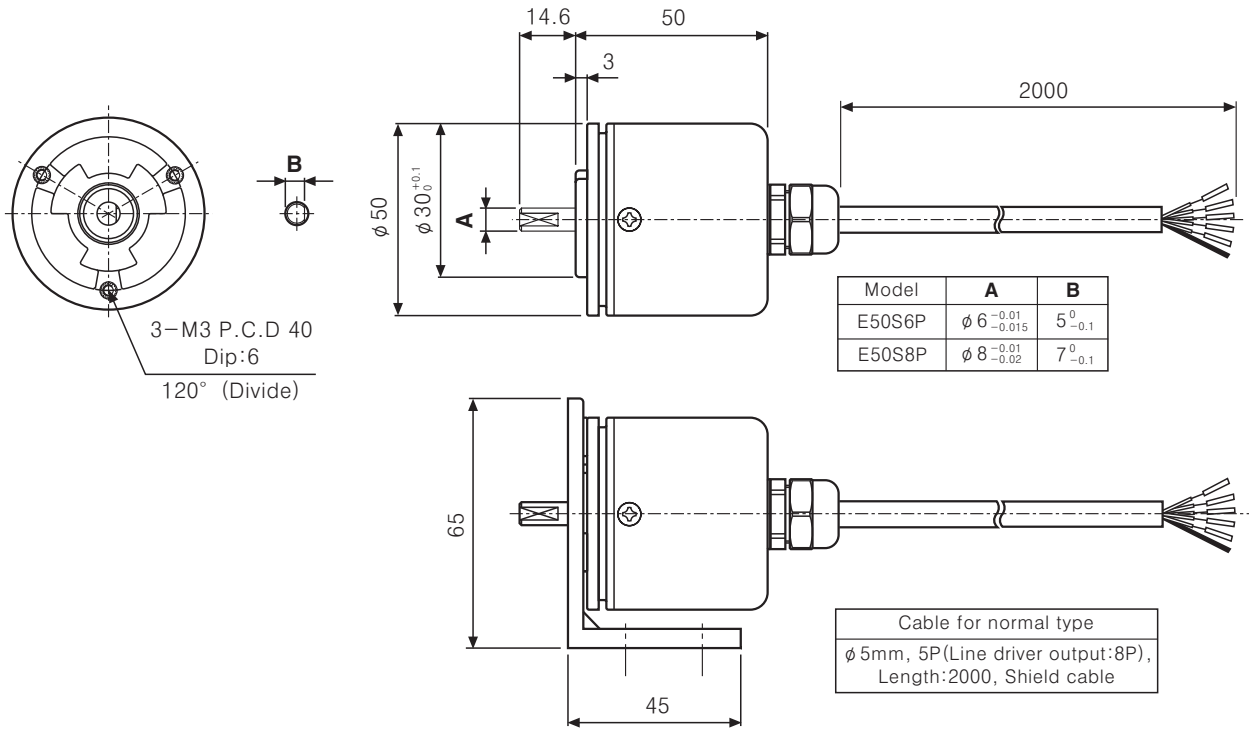
- (A) Counter
- (B) Timer
- (C) Temp. controller
- (D) Power controller
- (E) Panel meter
- (F) Tacho/Speed/Pulse meter
- (G) Display unit
- (H) Sensor controller
- (I) Switching power supply
- (J) Proximity sensor
- (K) Photo electric sensor
- (L) Pressure sensor
- (M) Rotary encoder
- (N) Stepping motor & Driver & Controller
- (O) Graphic panel
- (P) Production stoppage models & replacement

E50SP Series

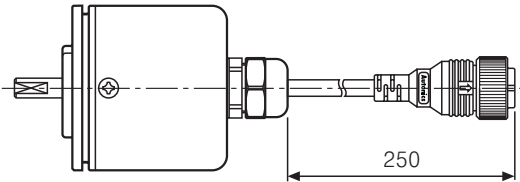
Dimensions

Normal type

(Unit:mm)

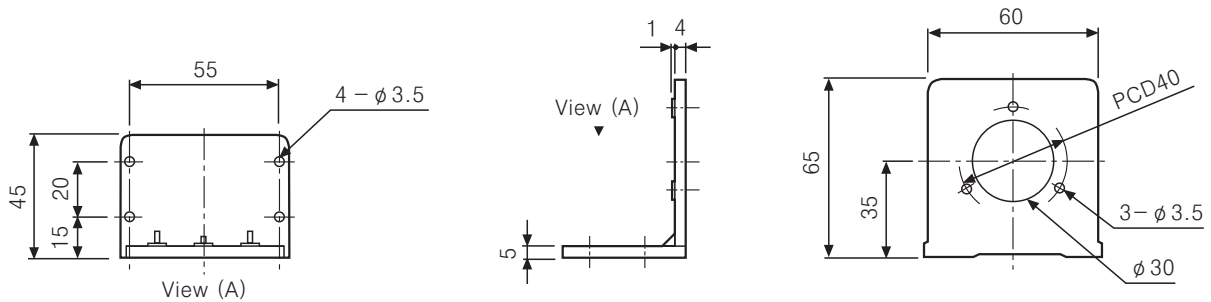


Cable outgoing connector type



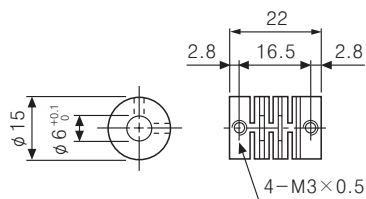
*Connector cable is customizable and see M-46 for specifications.

Bracket

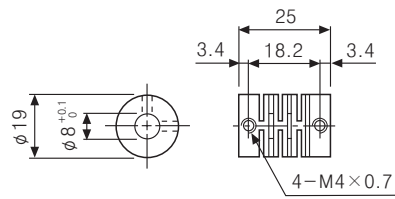


Coupling

• $\phi 6$ coupling



• $\phi 8$ coupling



Incremental ϕ 60mm Hollow Shaft Type

Diameter ϕ 60mm Hollow shaft type Incremental Rotary encoder

■ Features

- External diameter ϕ 60mm, inner diameter of shaft ϕ 20mm
- Easy installation at narrow space
- Suitable for measuring Angle, Position, Revolution, Speed, Acceleration and distance
- Power supply : 5VDC, 12–24VDC \pm 5%
- Various output types



⚠ Please read "Caution for your safety" in operation manual before using.

■ Ordering information

E60H	20	–	8192	–	3	–	N	–	24	–	
Series	Shaft diameter		Pulse/1 Revolution		Output phase		Output		Power supply		Cable
Diameter ϕ 60mm, hollow shaft type	ϕ 20mm		5000, 8192		3 : A, B, Z 6 : A, \bar{A} , B, \bar{B} , Z, \bar{Z}		T : Totem pole output N : NPN open collector output V : Voltage output L : Line driver output(※)		5 : 5VDC \pm 5% 24 : 12–24VDC \pm 5%		No mark:Normal type (※) C:Cable outgoing connector type

※Standard : E60H20–[PULSE]–3–N–24

※The power of Line driver is only for 5VDC

※Cable length :250mm

■ Specifications

Item		Diameter ϕ 60mm hollow shaft type of Incremental rotary encoder		
Resolution(P/R)		5000, 8192		
Electrical specification	Output phase	A, B, Z phase (Line driver output A, \bar{A} , B, \bar{B} , Z, \bar{Z} phase)		
	Phase difference of output	Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1cycle of A phase)		
	Control output	Totem pole output	<ul style="list-style-type: none"> • Low \Rightarrow Load current:Max. 30mA, Residual voltage : Max. 0.4VDC • High \Rightarrow Load current:Max. 10mA, Output voltage (Power supply 5VDC):Min. (Power supply–2.0) VDC, Output voltage (Power supply 12–24VDC):Min. (Power supply–3.0) VDC 	
		NPN open collector output	Load current : Max. 30mA, Residual voltage : Max. 0.4VDC	
		Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC	
		Line driver output	<ul style="list-style-type: none"> • Low \Rightarrow Load current : Max. 20mA, Residual : Max. 0.5VDC • High \Rightarrow Load current : Max. –20mA, Output voltage : Min. 2.5VDC 	
	Response time (Rise/Fall)	Totem pole output	Max. 1 μ s	<ul style="list-style-type: none"> • Measuring condition \Rightarrow Cable length : 2m, I sink = Max. 20mA
		NPN open collector output	Max. 1 μ s	
		Voltage output	Max. 1 μ s	
		Line driver output	Max. 0.5 μ s	
	Max. Response frequency	300kHz		
	Power supply	<ul style="list-style-type: none"> • 5VDC \pm5% (Ripple P–P:Max. 5%) • 12–24VDC \pm5% (Ripple P–P:Max. 5%) 		
	Current consumption	Max. 80mA (disconnection of the load), Line driver output:Max. 50mA (disconnection of the load)		
Insulation resistance	Min. 100M Ω (at 500VDC mega between all terminals and case)			
Dielectric strength	750VAC 50/60Hz for 1 minute (Between all terminals and case)			
Connection	Cable outgoing type, 200mm cable outgoing connector type			
Mechanical specification	Starting torque	Max. 150gf \cdot cm (0.015N \cdot m)		
	Rotor inertia	Max. 110g \cdot cm ² (11 \times 10 ^{–5} kg \cdot m ²)		
	Shaft loading	Radial : 5kgf, Thrust : 2.5kgf		
	Max. allowable revolution	(Note1)	6000rpm	
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours			
Shock	Max. 100G			
Ambient temperature	–10 ~ 70 $^{\circ}$ C (at non–freezing status), Storage : –25 ~ 85 $^{\circ}$ C			
Ambient humidity	35–85%RH, Storage : 35–90%RH			
Protection	IP50 (IEC standard)			
Cable	ϕ 5mm, 5P, Length : 2m, Shield cable (Line driver output : ϕ 5mm, 8P)			
Accessory	Bracket			
Unit weight	Approx. 300g			

※ **(Note1)** Not indicated type is customizable.

※ **(Note2)** Max. allowable revolution \geq Max. response revolution 【Max. response revolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ 】

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

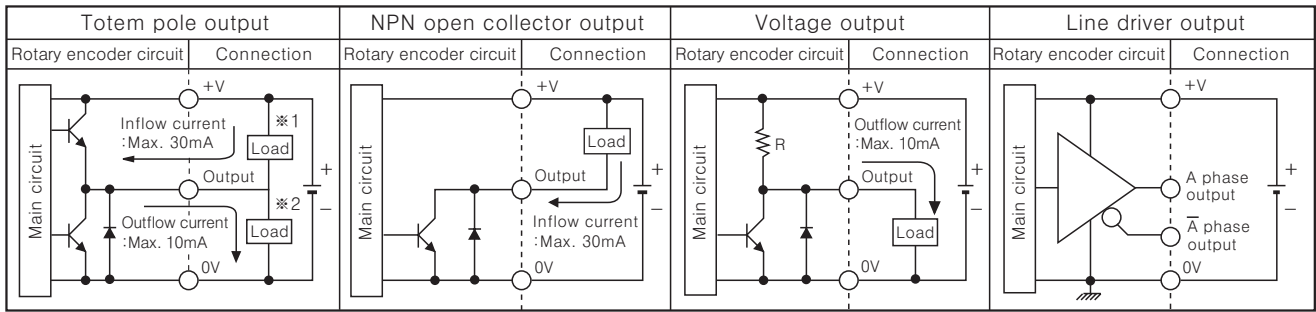
(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

E60H Series

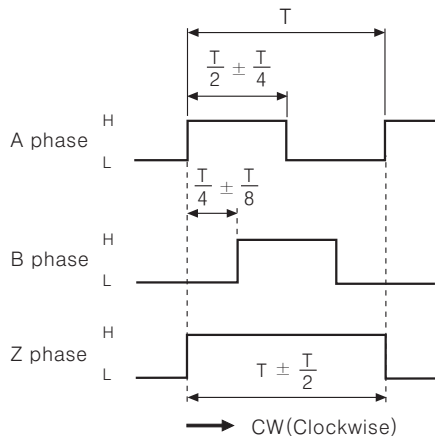
Control output diagram



※ Totem pole output type can be used for NPN open collector output type(※1) or Voltage output type(※2).
 ※ All output circuits of A, B, Z phase is same.(Line driver output is A, \bar{A} , B, \bar{B} , Z, \bar{Z})

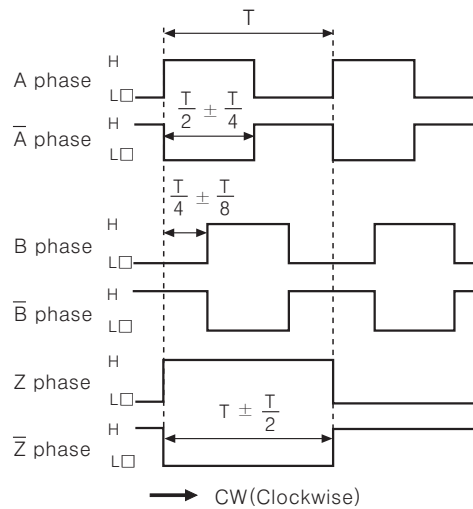
Output waveform

- Totem pole output / NPN open collector output / Voltage output



※ CW : As viewed from the shaft.

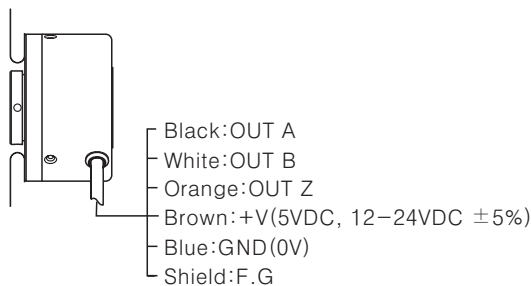
- Line driver output



Connections

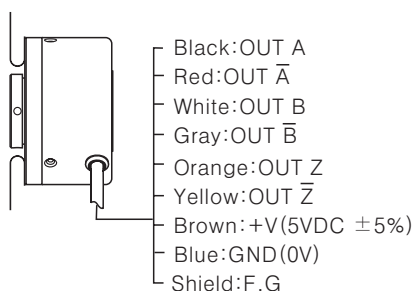
Normal type

- Totem pole output / NPN open collector output / Voltage output



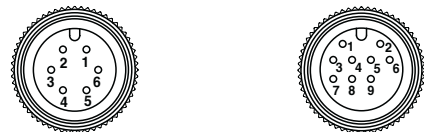
※ Unused wires must be insulated.
 ※ The metal case and shield cable of encoder should be grounded(F.G).

- Line driver output



Cable outgoing connector type

- Totem pole output / NPN open collector output / Voltage output
- Line driver output



Totem pole output NPN open collector output Voltage output			Line driver output		
Pin No	Function	Cable color	Pin No	Function	Cable color
①	OUT A	Black	①	OUT A	Black
②	OUT B	White	②	OUT \bar{A}	Red
③	OUT Z	Orange	③	+V	Brown
④	+V	Brown	④	GND	Blue
⑤	GND	Blue	⑤	OUT B	White
⑥	F.G	Shield	⑥	OUT \bar{B}	Gray
			⑦	OUT Z	Orange
			⑧	OUT \bar{Z}	Yellow
			⑨	F.G	Shield

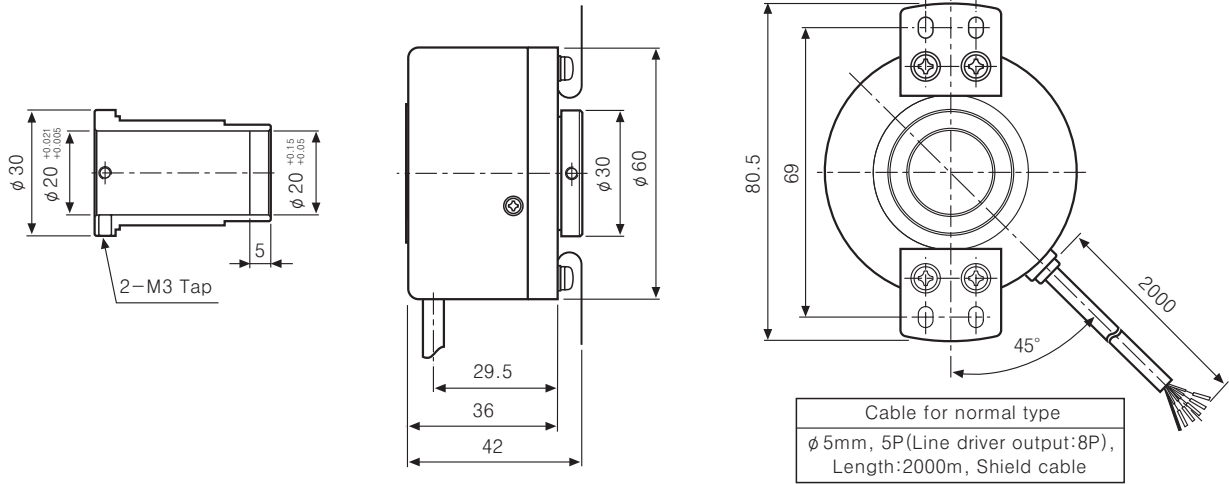
※ F.G(Field Ground):It should be grounded separately.

Incremental $\phi 60\text{mm}$ Hollow Shaft Type

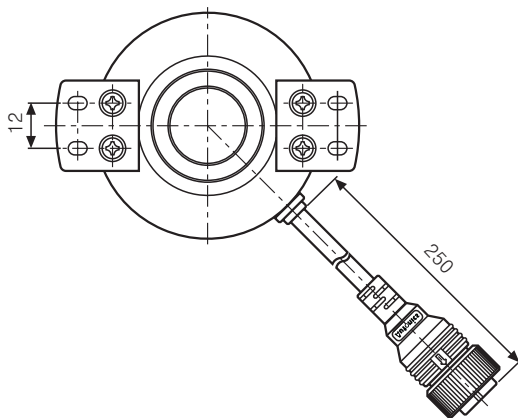
Dimension

Normal type

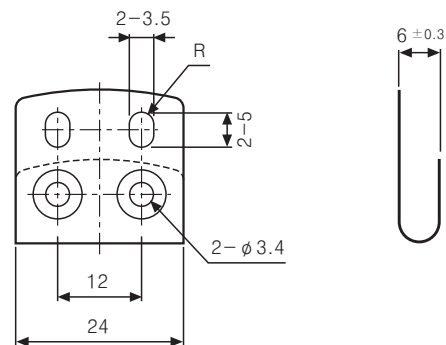
(Unit:mm)



Cable outgoing connector type



Bracket



*Connector cable is customizable and see M-46 for specifications.

- (A) Counter
- (B) Timer
- (C) Temp. controller
- (D) Power controller
- (E) Panel meter
- (F) Tacho/Speed/Pulse meter
- (G) Display unit
- (H) Sensor controller
- (I) Switching power supply
- (J) Proximity sensor
- (K) Photo electric sensor
- (L) Pressure sensor
- (M) Rotary encoder**
- (N) Stepping motor & Driver & Controller
- (O) Graphic panel
- (P) Production stoppage models & replacement

E68S Series

Diameter ϕ 68mm Shaft type Incremental Rotary encoder

■ Features

- Diameter ϕ 68mm, Shaft ϕ 15mm
- High speed response frequency : 180kHz
- Connector type
- Suitable for tooling machinery
- IP64 structure (Partial waterproof, Oil proof)
- High shaft loading capabilities (Allowable load weight 10kgf)



⚠ Please read "Caution for your safety" in operation manual before using.

■ Ordering information

E68S	15	1024	6	L	5
Series	Shaft diameter	Pulse/1 Revolution	Output phase	Output	Power supply
Diameter ϕ 68mm, shaft type	ϕ 15mm	1024 P/R	6 : A, \bar{A} , B, \bar{B} , Z, \bar{Z}	L : Line driver output	5VDC \pm 5%

■ Specifications

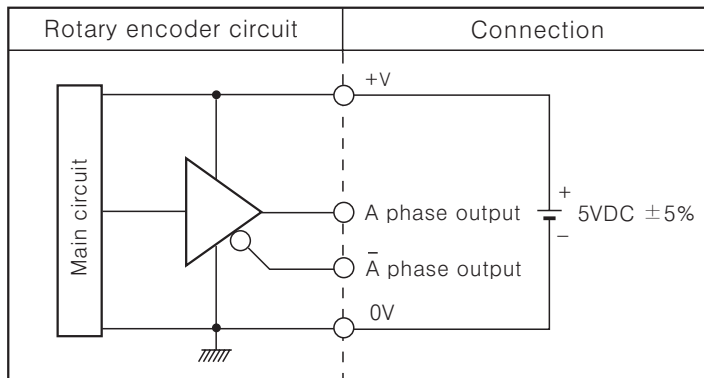
Item	Diameter ϕ 68mm shaft type of Incremental rotary encoder	
Resolution(P/R)	(Note1)	1024
Electrical specification	Output phase	A, \bar{A} , B, \bar{B} , Z, \bar{Z} pahse
	Phase difference of output	Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1cycle of A phase)
	Output Duty ratio	• A, B phase Duty ratio : $\frac{T}{2} \pm \frac{T}{8}$ • Z phase Duty ratio : $T \pm \frac{T}{4}$
	Control output	• Low \Rightarrow Load current : Max. 20mA, Residual voltage : Max. 0.5VDC • High \Rightarrow Load current : Max. -20mA, Output voltage : Min. 2.5VDC
	Response time(Rise/Fall)	Max. 0.5 μ s (Cable:1m, I sink = 20mA)
	Power supply	5VDC \pm 5% (Ripple P-P : Max. 5%)
	Max. Response frequency	180kHz
	Current consumption	Max. 50mA
	Insulation resistance	Min. 100M Ω (at 500VDC mega between all terminals and case)
	Dielectric strength	750VAC 50/60Hz for 1 minute (Between all terminals and case)
Connection	Connector type (MS3102A20-29P)	
Mechanical specification	Starting torque	1.5kgf \cdot cm (Max. 0.15N \cdot m)
	Shaft loading	Radial : 20kgf, Thrust : 10kgf
	Max. allowable revolution	(Note2) 6,500rpm
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours	
Shock	Max. 50G	
Ambient temperature	-10 ~ 70 $^{\circ}$ C (at non-freezing status), Storage: -25 ~ 85 $^{\circ}$ C	
Ambient humidity	35~85%RH, Storage: 35~90%RH	
Protection	IP64 (IEC standard)	
Unit weight	Approx. 550g	

※ **(Note1)** Not indicated type is customizable.

※ **(Note2)** Max. allowable revolution \geq Max. response revolution **[Max. response revolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$]**

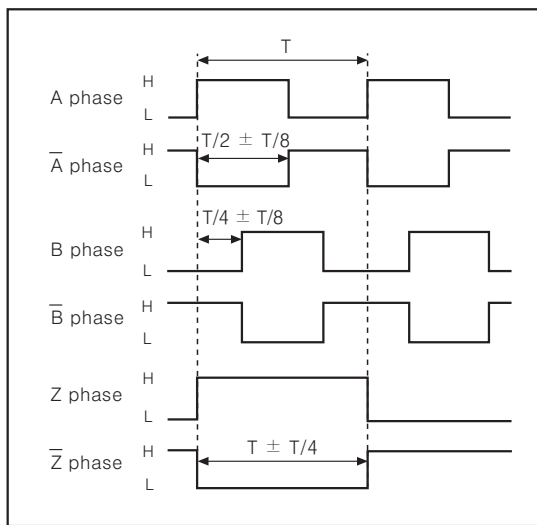
Incremental ϕ 68mm Shaft Type

Control output diagram



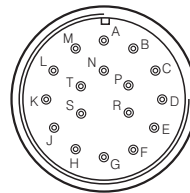
※All output circuit of A, \bar{A} , B, \bar{B} , Z, \bar{Z} phase is the same.

Output waveform



※CW : As viewed from the shaft

Connections

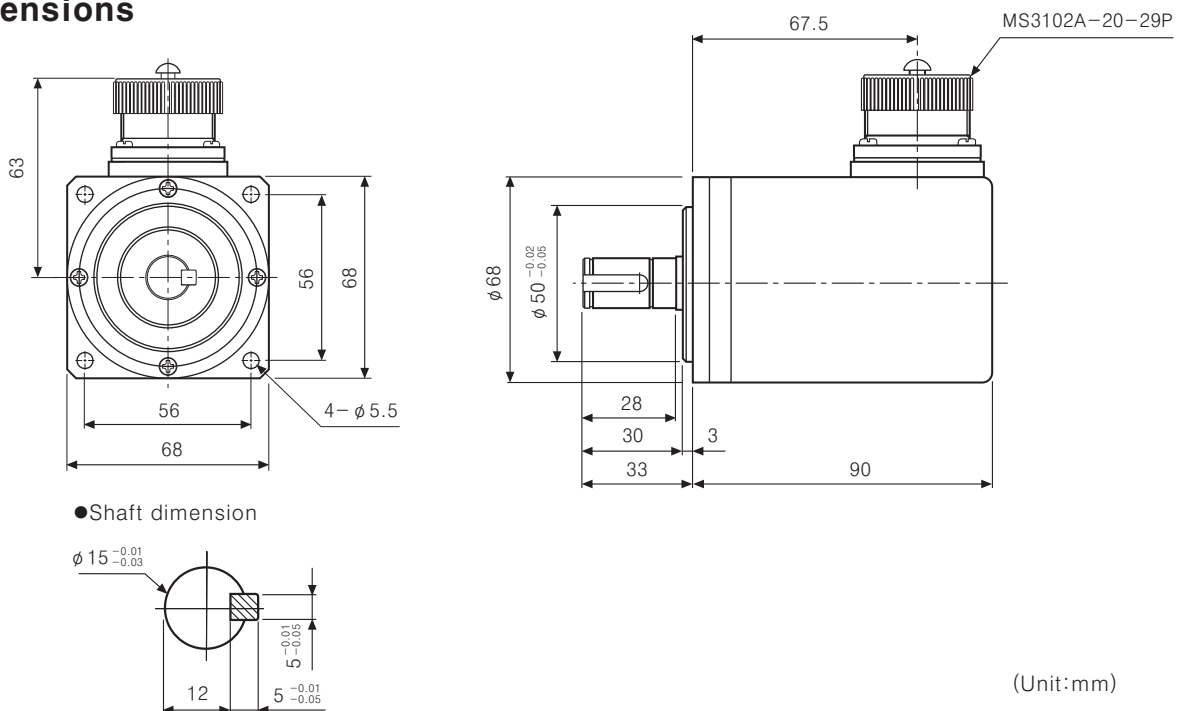


Pin No.	Cable color	Pin No.	Cable color
A	A phase	K	0V
B	Z phase	L	NC
C	B phase	M	0V
D	NC	N	\bar{A} phase
E	5VDC	P	\bar{Z} phase
F	NC	R	\bar{B} phase
G	NC	S	NC
H	5VDC	T	Shield(F.G)
J	NC	—	—

※N.C : Not Connected.

※Terminals E and H, K and M are connected internally.

Dimensions



(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

E80H Series

Diameter ϕ 80mm Hollow shaft type Incremental Rotary encoder

■ Features

- External diameter ϕ 80mm, Inner diameter of shaft ϕ 30mm, ϕ 32mm (Customizable)
- Able to install directly at motor or machinery without coupling
- Power supply : 5VDC, 12–24VDC \pm 5%
- Various output types



⚠ Please read "Caution for your safety" in operation manual before using.



■ Ordering information

E80H	30	3200	3	N	24	
Series	Shaft diameter	Pulse/1 Revolution	Output phase	Output	Power supply	Cable
Diameter ϕ 80mm, hollow shaft type	ϕ 30mm ϕ 32mm	60, 100, 360, 500, 512, 1024, 3200	3 : A, B, Z 6 : A, \bar{A} , B, \bar{B} , Z, \bar{Z}	T : Totem pole output N : NPN open collector output V : Voltage output L : Line driver output(*)	5 : 5VDC \pm 5% 24 : 12–24VDC \pm 5%	No mark: Normal type (*) C: Cable outgoing connector type

⇒ Shaft inside diameter ϕ 32mm is customizable.

*The power of Line driver is only for 5VDC

*Cable length : 250mm

■ Specifications

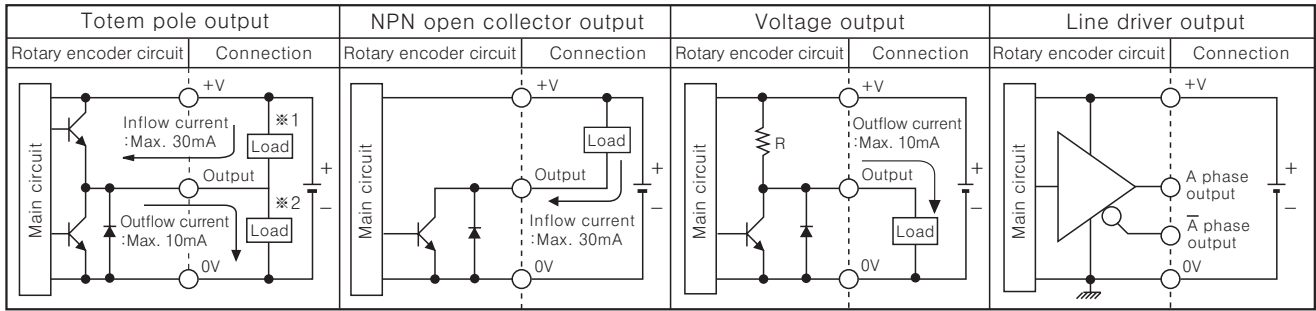
Item	Diameter ϕ 80mm hollow shaft type of Incremental rotary encoder		
Resolution (P/R)	(Note1) 60, 100, 360, 500, 512, 1024, 3200		
Electrical specification	Output phase	A, B, Z phase (Line driver output A, \bar{A} , B, \bar{B} , Z, \bar{Z} phase)	
	Phase difference of output	Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1 cycle of A phase)	
	Control output	Totem pole output	• Low ⇒ Load current: Max. 30mA, Residual voltage : Max. 0.4VDC • High ⇒ Load current: Max. 10mA, Output voltage (Power supply 5VDC): Min. (Power supply–2.0) VDC, Output voltage (Power supply 12–24VDC): Min. (Power supply–3.0) VDC
		NPN open collector output	Load current : Max. 30mA, Residual voltage : Max. 0.4VDC
		Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC
		Line driver output	• Low ⇒ Load current : Max. 20mA, Residual : Max. 0.5VDC • High ⇒ Load current : Max. –20mA, Output voltage : Min. 2.5VDC
	Response time (Rise/Fall)	Totem pole output	Max. 1 μ s
		NPN open collector output	Max. 1 μ s
		Voltage output	Max. 1 μ s
		Line driver output	Max. 0.5 μ s
	Max. Response frequency	200kHz	
	Power supply	• 5VDC \pm 5% (Ripple P–P: Max. 5%) • 12–24VDC \pm 5% (Ripple P–P: Max. 5%)	
	Current consumption	Max. 80mA (disconnection of the load), Line driver output: Max. 50mA (disconnection of the load)	
	Insulation resistance	Min. 100M Ω (at 500VDC mega between all terminals and case)	
Dielectric strength	750VAC 50/60Hz for 1 minute (Between all terminals and case)		
Connection	Cable outgoing type, 200mm cable outgoing connector type		
Mechanical specification	Starting torque	Max. 200gf • cm (0.02N • m)	
	Rotor inertia	Max. 800g • cm ² (8 \times 10 ^{–5} kg • m ²)	
	Shaft loading	Radial : 5kgf, Thrust : 2.5kgf	
	Max. allowable revolution	(Note2) 3600rpm	
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours		
Shock	Max. 75G		
Ambient temperature	–10 ~ 70°C (at non-freezing status), Storage : –25 ~ 85°C		
Ambient humidity	35~85%RH, Storage : 35~90%RH		
Protection	IP50 (IEC standard)		
Cable	ϕ 5mm, 5P, Length : 2m, Shield cable (Line driver output : ϕ 5mm, 8P)		
Accessory	Spring bracket		
Unit weight	Approx. 560g		
Approval	CE (Except for Line driver output)		

* **(Note1)** Not indicated type is customizable.

* **(Note2)** Max. allowable revolution \geq Max. response revolution **[**Max. response revolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ **]**

Incremental ϕ 80mm Hollow Shaft Type

Control output diagram

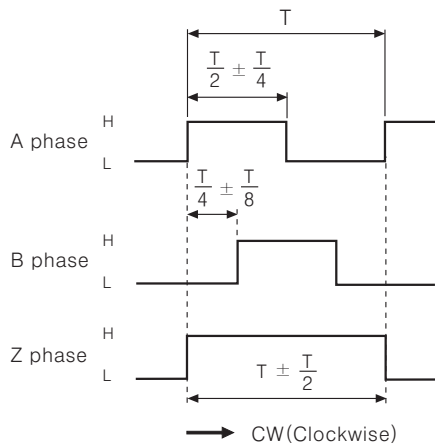


※ Totem pole output type can be used for NPN open collector output type(※1) or Voltage output type(※2).

※ All output circuits of A, B, Z phase is same. (Line driver output is for A, \bar{A} , B, \bar{B} , Z, \bar{Z})

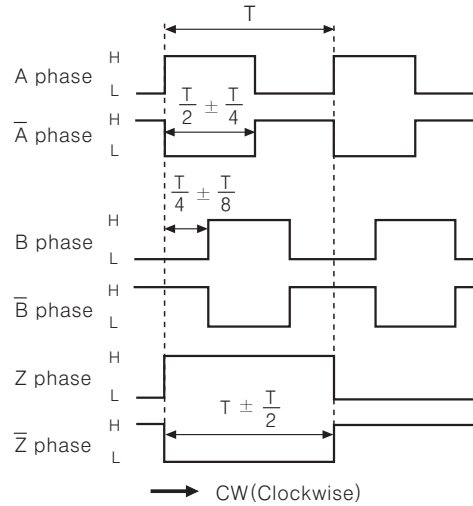
Output waveform

● Totem pole output / NPN open collector output / Voltage output



※ CW : As viewed from the shaft

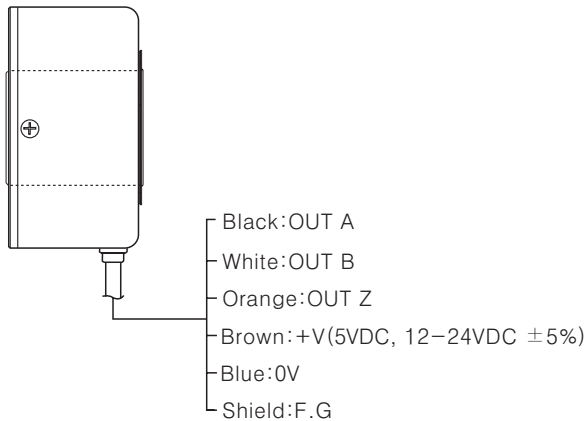
● Line driver output



Connections

Normal type

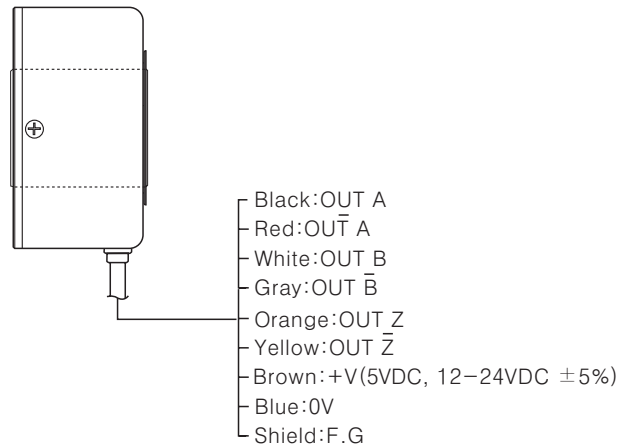
● Totem pole output / NPN open collector output / Voltage output



※ Unused wires must be insulated.

※ The metal case and shield cable should be grounded(F.G).

● Line driver output



(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

(O) Graphic panel

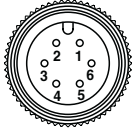
(P) Production stoppage models & replacement

E80H Series

■ Connection

■ Cable outgoing connector type

- Totem pole output / NPN open collector output / Voltage output



- Line driver output



Totem pole output NPN open collector output Voltage output			Line driver output		
Pin No	Function	Cable color	Pin No	Function	Cable color
①	OUT A	Black	①	OUT A	Black
②	OUT B	White	②	OUT \bar{A}	Red
③	OUT Z	Orange	③	+V	Brown
④	+V	Brown	④	GND	Blue
⑤	GND	Blue	⑤	OUT B	White
⑥	F.G	Shield	⑥	OUT \bar{B}	Gray
			⑦	OUT Z	Orange
			⑧	OUT \bar{Z}	Yellow
			⑨	F.G	Shield

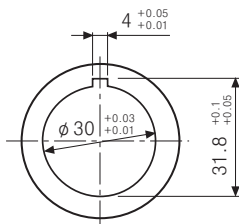
※F.G(Field Ground):It should be grounded separately.

■ Dimensions

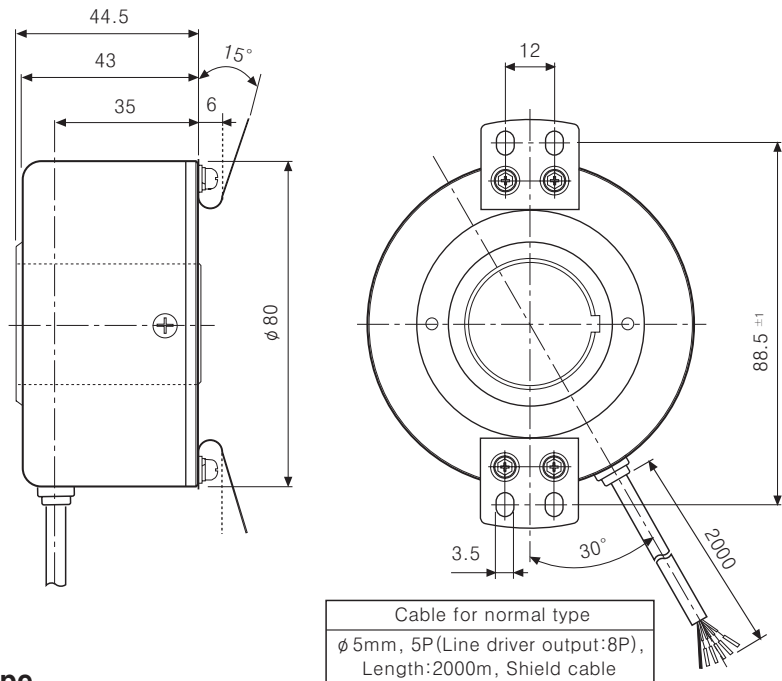
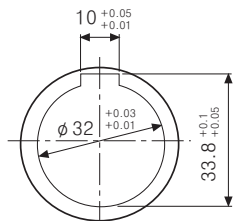
■ Normal type

(Unit:mm)

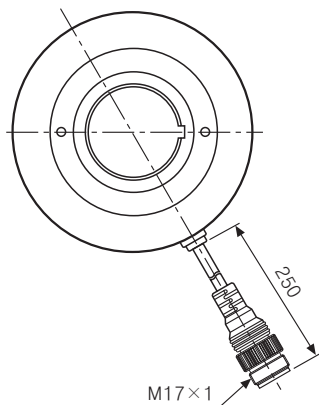
- Inner diameter of shaft(Standard)



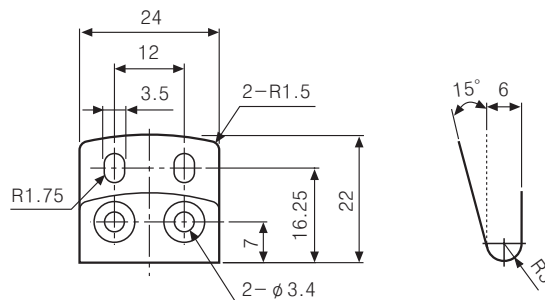
- Inner diameter of shaft(Customizable)



■ Cable outgoing connector type



- Bracket



※Connector cable is customizable and see M-46 for specifications.

Incremental ϕ 100mm Hollow Shaft Type

Diameter ϕ 100mm Hollow shaft type Incremental Rotary encoder

Features

- Great environmental resistance
- High stability of output
- Specially using in Elevator

⚠ Please read "Caution for your safety" in operation manual before using.



Ordering information

E100H	35	-	10000	-	6	-	2	-	5
Series	Shaft diameter		Pulse/1Revolution		Output phase		Output		Power supply
Diameter ϕ 100mm Hollow shaft type	ϕ 35mm		512 1024 10000		3 : A, B, Z 6 : A, \bar{A} , B, \bar{B} , Z, \bar{Z}		T : Totem pole output N : NPN open collector output V : Voltage output L : Line driver output(※)		5 :5VDC \pm 5% 24:12-24VDC \pm 5%

※The power of Line driver is only for 5VDC

Specifications

Item	Diameter ϕ 100mm Hollow shaft type of Incremental rotary encoder		
Resolution(P/R)	(Note1) 512, 1024, 10000		
Electrical specification	Output phase	A, B, Z phase (Line driver output A, \bar{A} , B, \bar{B} , Z, \bar{Z} phase)	
	Phase difference of output	Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1cycle of A phase)	
	Control output	Totem pole output	• Low \Rightarrow Load current:Max. 30mA, Residual voltage : Max. 0.4VDC • High \Rightarrow Load current:Max. 10mA, Output voltage(Power supply 5VDC):Min. (Power supply-2.0)VDC, Output voltage(Power supply 12-24VDC):Min. (Power supply-3.0)VDC
		NPN open collector output	Load current : Max. 30mA, Residual voltage : Max. 0.4VDC
		Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC
		Line driver output	• Low \Rightarrow Load current : Max. 20mA, Residual : Max. 0.5VDC • High \Rightarrow Load current : Max. -20mA, Output voltage : Min. 2.5VDC
	Response time (Rise/Fall)	Totem pole output	Max. 1 μ s
		NPN open collector output	Max. 1 μ s
		Voltage output	Max. 1 μ s
		Line driver output	Max. 0.5 μ s
	Max. Response frequency	300kHz	
	Power supply	• 5VDC \pm 5% (Ripple P-P:Max. 5%) • 12-24VDC \pm 5% (Ripple P-P:Max. 5%)	
	Current consumption	Max. 80mA (disconnection of the load), Line driver output:Max. 50mA (disconnection of the load)	
	Insulation resistance	Min. 100M Ω (at 500VDC mega between all terminals and case)	
Dielectric strength	750VAC 50/60Hz for 1 minute (Between all terminals and case)		
Connection	Cable outgoing type		
Mechanical specification	Starting torque	Max. 300gf \cdot cm (0.03N \cdot m)	
	Rotor inertia.	Max. 800g \cdot cm ² (8 \times 10 ⁻⁵ kg \cdot m ²)	
	Shaft loading	Radial : 5kgf, Thrust : 2.5kgf	
	Max. allowable revolution	(Note2) 3600rpm	
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours		
Shock	Max. 75G		
Ambient temperature	-10 ~ 70 $^{\circ}$ C (at non-freezing status), Storage:-25 ~ 85 $^{\circ}$ C		
Ambient humidity	35~85%RH, Storage:35~90%RH		
Protection	IP50 (IEC standard)		
Cable	ϕ 5mm, 5P, Length:5m, Shield cable (Line driver output: ϕ 6mm, 8P)		
Accessory	Spring bracket 2EA		
Unit weight	Approx. 1200g		
Approval	CE (Except for Line driver output)		

※(★Note1)Not indicated type is customizable.

※(★Note2)Max. allowable revolution \geq Max. response revolution 【Max. response revolution(rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ 】

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

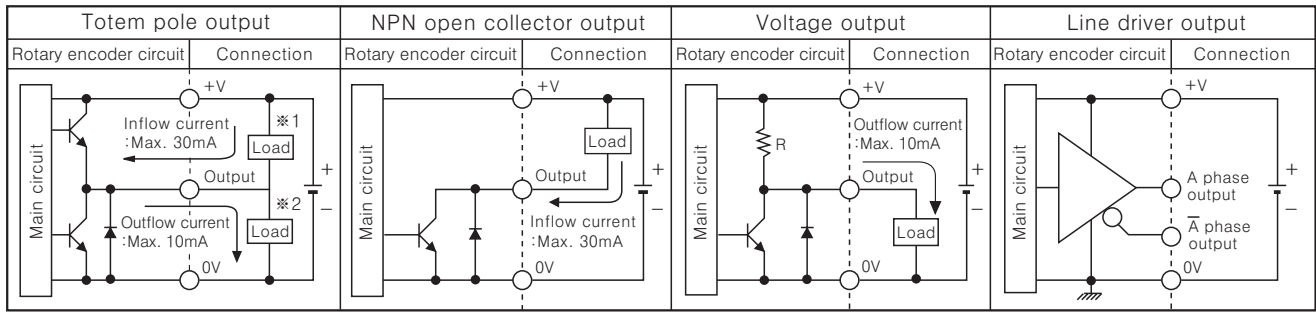
(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

E100H Series

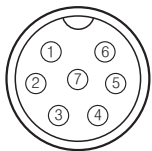
Control output diagram



- ☞ Totem pole output type can be used for NPN open collector output type(※1) or Voltage output type(※2).
- ☞ All output circuits of A, B, Z phase is same. (Line driver output is for A, \bar{A} , B, \bar{B} , Z, \bar{Z})

Connections

- Totem pole output / NPN open collector output / Voltage output

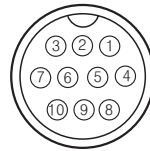


SCN-16-7P

Pin No.	Function	Cable color
①	+V	Brown
②	GND	Blue
③	OUT A	Black
④	OUT B	White
⑤	OUT Z	Orange
⑥	F.G	Shield
⑦	N.C	N.C

- ※ Unused wires must be insulated.
- ※ The metal case and shield cable should be grounded(F.G).

- Line driver output



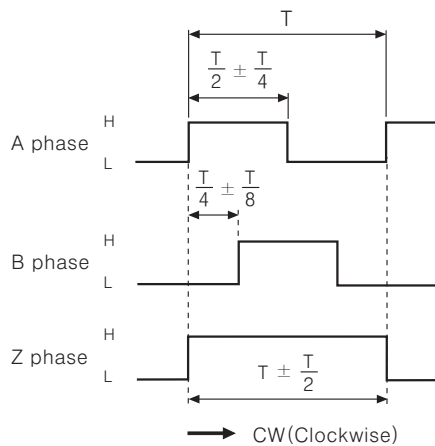
SCN-20-10P

Pin No.	Function	Cable color
①	+V	Brown
②	GND	Blue
③	OUT A	Black
④	OUT \bar{A}	Red
⑤	F.G	Shield
⑥	OUT B	White
⑦	OUT \bar{B}	Gray
⑧	OUT Z	Orange
⑨	OUT \bar{Z}	Yellow
⑩	N.C	N.C

※ N.C(Not Connected)

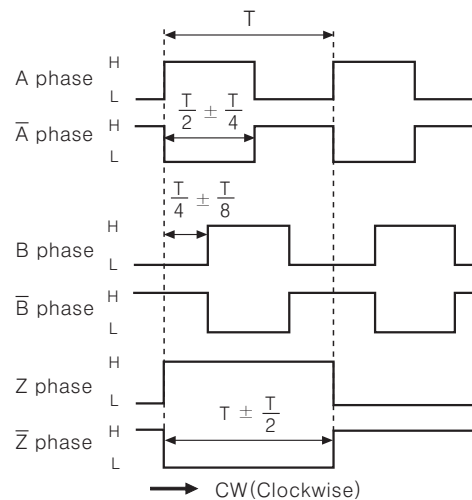
Output waveform

- Totem pole output / NPN open collector output / Voltage output



※ CW : As viewed from the shaft

- Line driver output

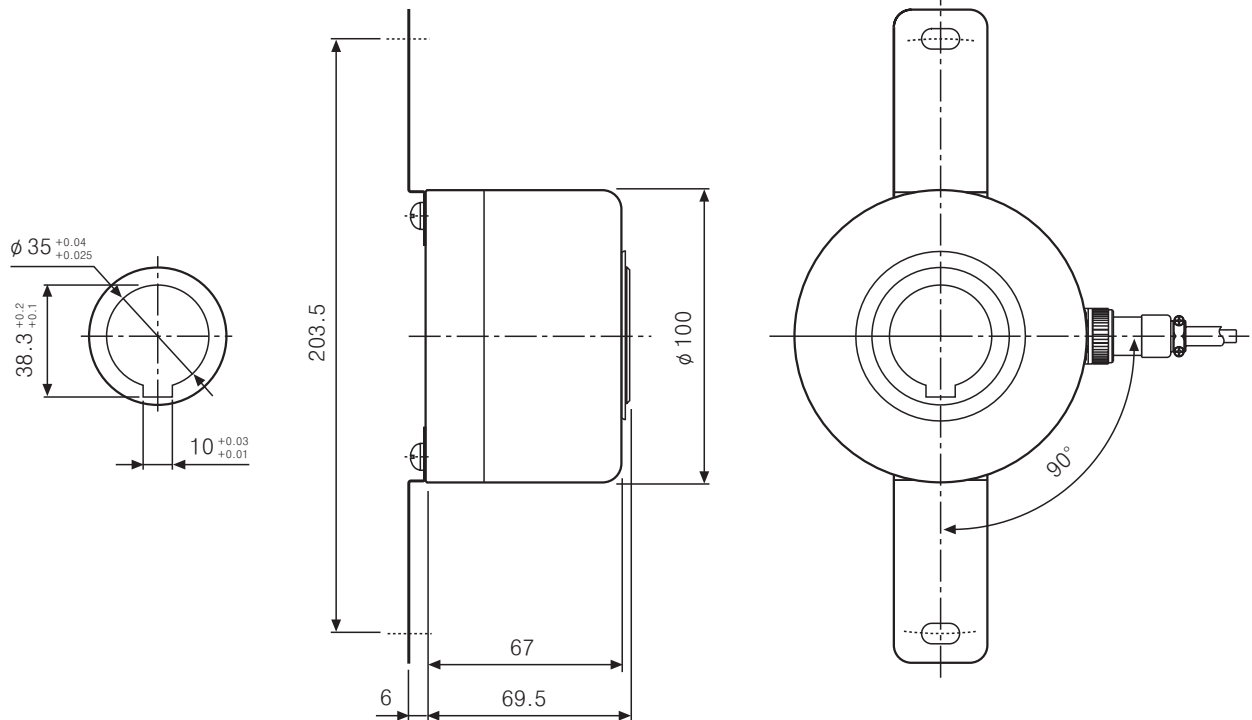


※ CW(Clockwise)

Incremental ϕ 100mm Hollow Shaft Type

■ Dimensions

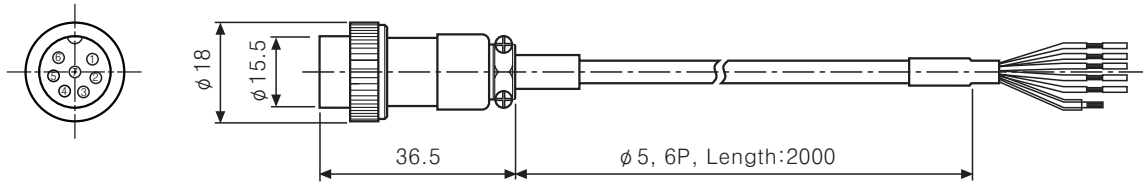
(Unit:mm)



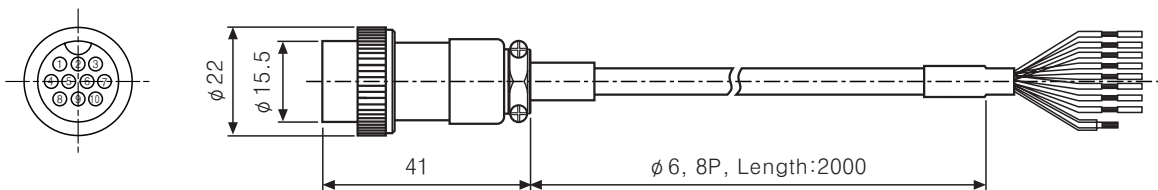
(A)	Counter
(B)	Timer
(C)	Temp. controller
(D)	Power controller
(E)	Panel meter
(F)	Tacho/ Speed/ Pulse meter
(G)	Display unit
(H)	Sensor controller
(I)	Switching power supply
(J)	Proximity sensor
(K)	Photo electric sensor
(L)	Pressure sensor
(M)	Rotary encoder
(N)	Stepping motor & Driver & Controller
(O)	Graphic panel
(P)	Production stoppage models & replacement

◎ Connector cable

- Totem pole output / NPN open collector output / Voltage output



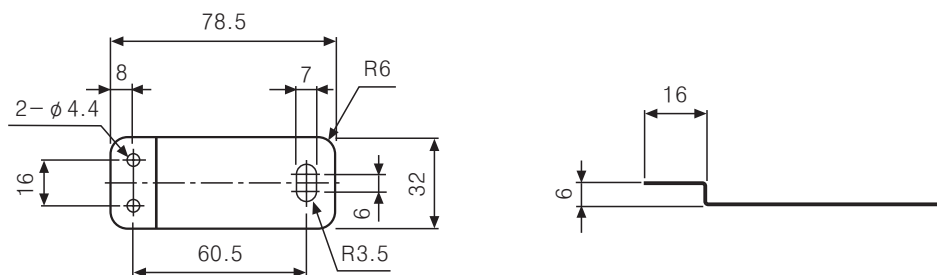
- Line driver output



※ 10m Connector cable is customizable.

※ Cable outgoing type is customizable.

- Bracket



ENA Series

Side-mounting Shaft type Incremental Rotary encoder

■ Features

- Strong die cast structure against external impact
- Convenient structure for direct mounting on the frame
- Connector type
- Power supply : 5VDC, 12-24VDC ±5%



⚠ Please read "Caution for your safety" in operation manual before using.



■ Ordering information

ENA	5000	2	N	24
Series	Pulse/1 Revolution	Output phase	Output	Power supply
Shaft type to be mounted at the side (External diameter of shaft : ϕ 10mm)	Refer to resolution	2 : A, B 3 : A, B, Z	T : Totem pole output N : NPN open collector output V : Voltage output	5 : 5VDC ±5% 24 : 12-24VDC ±5%

*Standard : ENA-□-2-N-24

*Standard : A, B

■ Specifications

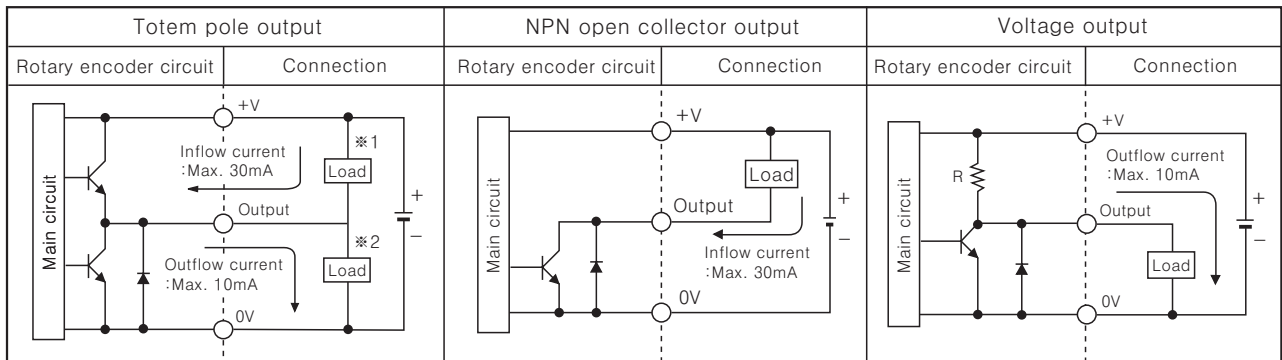
Item		Shaft type of encoder to be mounted at the side(Incremental)		
Resolution(P/R)		(Note1) *1, *2, *5, 10, *12, 15, 20, 23, 25, 30, 35, 40, 45, 50, 60, 75, 100, 120, 150, 192, 200, 240, 250, 256, 300, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 1500, 1800, 2000, 2048, 2500, 3000, 3600, 5000		
Electrical specification	Output phase	A, B phase (Option : A, B, Z phase)		
	Phase difference of output	Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1cycle of A phase)		
	Control output	Totem pole output	<ul style="list-style-type: none"> • Low \Rightarrow Load current:Max. 30mA, Residual voltage : Max. 0.4VDC • High \Rightarrow Load current:Max. 10mA, Output voltage (Power supply 5VDC):Min. (Power supply-2.0)VDC, Output voltage (Power supply 12-24VDC):Min. (Power supply-3.0)VDC 	
		NPN open collector output	Load current : Max. 30mA, Residual voltage : Max. 0.4VDC	
		Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC	
	Response time (Rise/Fall)	Totem pole output	Max. 1 μ s	<ul style="list-style-type: none"> • Measuring condition \Rightarrow Cable length : 2m, I sink = Max. 20mA
		NPN open collector output	Max. 1 μ s	
		Voltage output	Max. 1 μ s	
	Max. Response frequency	300kHz		
	Power supply	<ul style="list-style-type: none"> • 5VDC ±5% (Ripple P-P:Max. 5%) • 12-24VDC ±5% (Ripple P-P:Max. 5%) 		
Current consumption	Max. 80mA (disconnection of the load)			
Insulation resistance	Min. 100M Ω (at 500VDC mega between all terminals and case)			
Dielectric strength	750VAC 50/60Hz for 1 minute (Between all terminals and case)			
Connection	Connector type			
Mechanical specification	Starting torque	Max. 70gf \cdot cm (0.007N \cdot m)		
	Rotor inertia	Max. 80g \cdot cm ² (8 \times 10 ⁻⁶ kg \cdot m ²)		
	Shaft loading	Radial : 10kgf, Thrust : 2.5kgf		
	Max. allowable revolution	(Note2)	5000rpm	
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours			
Shock	Max. 75G			
Ambient temperature	-10 ~ 70 $^{\circ}$ C (at non-freezing status), Storage : -25 ~ 85 $^{\circ}$ C			
Ambient humidity	35~85%RH, Storage : 35~90%RH			
Protection	IP50 (IEC standard)			
Cable	ϕ 5mm, 5P, Length : 2m, Shield cable			
Accessory	ϕ 10mm coupling			
Unit weight	Approx. 345g			
Approval	CE (Except for Line driver output)			

* **(Note1)** Not indicated type is customizable.

* **(Note2)** Max. allowable revolution \geq Max. response revolution 【Max. response revolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ 】

Incremental Side-Mounting Type

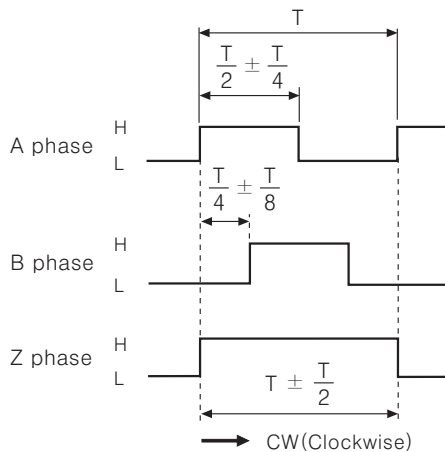
Control output diagram



- ☞ The output circuit of A, B phase (Option : A, B, Z phase) are same.
- ☞ Totem pole output can be used for NPN open collector type (*1) or voltage output type (*2).

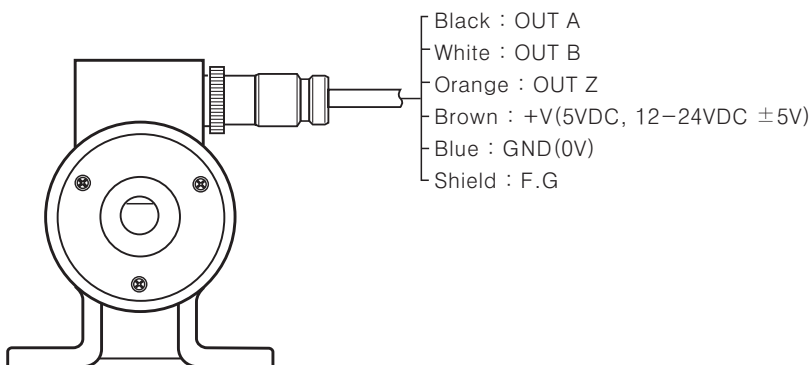
Output waveform

- Totem pole output / NPN open collector output / Voltage output



- ※ Z phase output is customizable.
- ※ CW : As viewed from the shaft

Connections



- ※ Z phase output is customizable.
- ※ Unused wires must be insulated.
- ※ The metal case and shield cable of encoder should be grounded (F.G.).

Pin No	Function	Cable color
①	A phase	Black
②	B phase	White
③	+V	Brown
④	0V	Blue
①	A phase	Black
②	B phase	White
③	Z phase	Orange
④	+V	Brown
⑤	0V	Blue

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

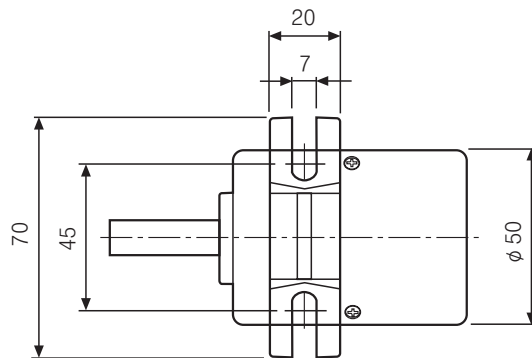
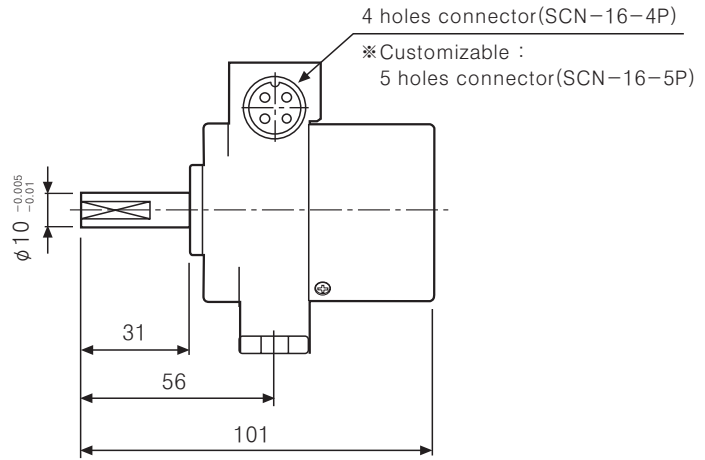
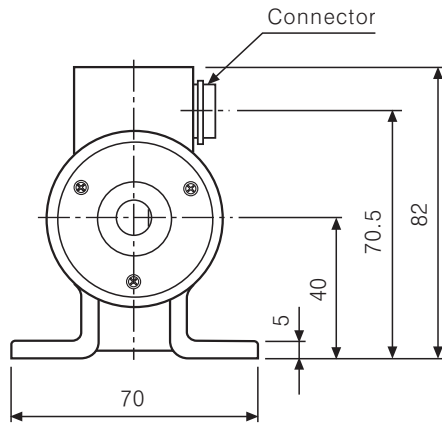
(O) Graphic panel

(P) Production stoppage models & replacement

ENA Series

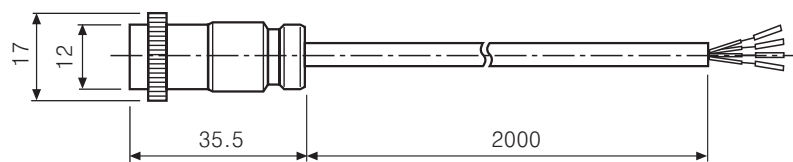
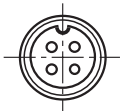
Dimension

(Unit:mm)

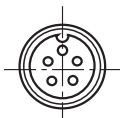


◎Connector cable (Sold separately)

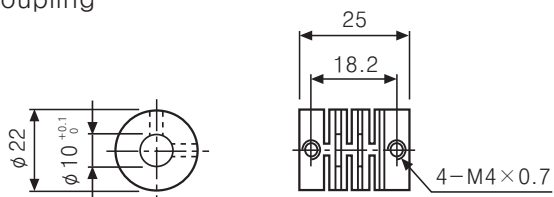
- ENA-□ - 2 - □ (Standard)



- ENA-□ - 3 - □ (Customizable)



◎Coupling



ENA Series

Side-mounting Shaft type Incremental Rotary encoder

Features

- Strong die cast structure against external impact
- Convenient structure for direct mounting on the frame
- Connector type
- Power supply : 5VDC, 12-24VDC \pm 5%



⚠ Please read "Caution for your safety" in operation manual before using.



Ordering information

ENA	5000	2	N	24
Series	Pulse/1 Revolution	Output phase	Output	Power supply
Shaft type to be mounted at the side (External diameter of shaft : ϕ 10mm)	Refer to resolution	2 : A, B 3 : A, B, Z	T : Totem pole output N : NPN open collector output V : Voltage output	5 : 5VDC \pm 5% 24 : 12-24VDC \pm 5%

*Standard : ENA-□-2-N-24

*Standard : A, B

Specifications

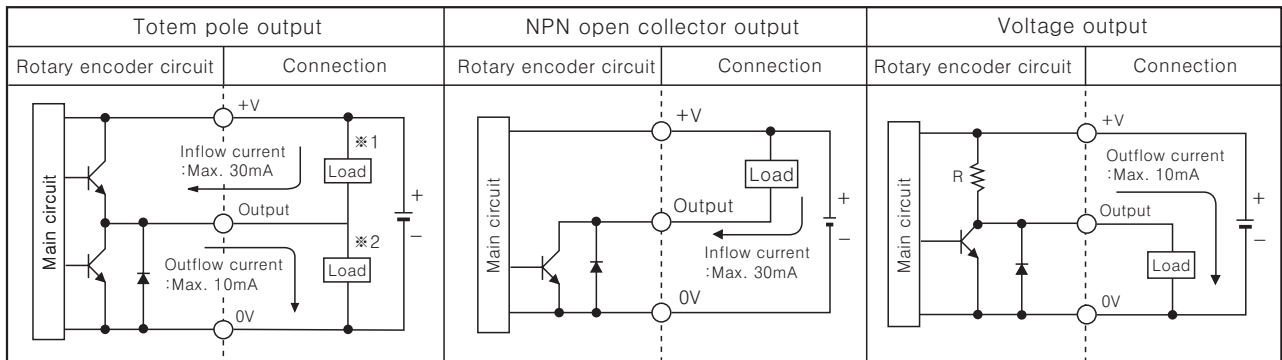
Item	Shaft type of encoder to be mounted at the side(Incremental)		
Resolution(P/R)	(Note1) *1, *2, *5, 10, *12, 15, 20, 23, 25, 30, 35, 40, 45, 50, 60, 75, 100, 120, 150, 192, 200, 240, 250, 256, 300, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 1500, 1800, 2000, 2048, 2500, 3000, 3600, 5000		
Electrical specification	Output phase	A, B phase (Option : A, B, Z phase)	
	Phase difference of output	Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1cycle of A phase)	
	Control output	Totem pole output	• Low \Rightarrow Load current:Max. 30mA, Residual voltage : Max. 0.4VDC • High \Rightarrow Load current:Max. 10mA, Output voltage (Power supply 5VDC):Min. (Power supply-2.0)VDC, Output voltage (Power supply 12-24VDC):Min. (Power supply-3.0)VDC
		NPN open collector output	Load current : Max. 30mA, Residual voltage : Max. 0.4VDC
		Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC
	Response time (Rise/Fall)	Totem pole output	Max. 1 μ s
		NPN open collector output	Max. 1 μ s
		Voltage output	Max. 1 μ s
	Max. Response frequency	300kHz	
	Power supply	• 5VDC \pm 5% (Ripple P-P:Max. 5%) • 12-24VDC \pm 5% (Ripple P-P:Max. 5%)	
Current consumption	Max. 80mA (disconnection of the load)		
Insulation resistance	Min. 100M Ω (at 500VDC mega between all terminals and case)		
Dielectric strength	750VAC 50/60Hz for 1 minute (Between all terminals and case)		
Connection	Connector type		
Mechanical specification	Starting torque	Max. 70gf \cdot cm (0.007N \cdot m)	
	Rotor inertia	Max. 80g \cdot cm ² (8 \times 10 ⁻⁶ kg \cdot m ²)	
	Shaft loading	Radial : 10kgf, Thrust : 2.5kgf	
	Max. allowable revolution	(Note2)	5000rpm
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours		
Shock	Max. 75G		
Ambient temperature	-10 ~ 70 $^{\circ}$ C (at non-freezing status), Storage : -25 ~ 85 $^{\circ}$ C		
Ambient humidity	35~85%RH, Storage : 35~90%RH		
Protection	IP50 (IEC standard)		
Cable	ϕ 5mm, 5P, Length : 2m, Shield cable		
Accessory	ϕ 10mm coupling		
Unit weight	Approx. 345g		
Approval	CE (Except for Line driver output)		

* **(Note1)** Not indicated type is customizable.

* **(Note2)** Max. allowable revolution \geq Max. response revolution 【Max. response revolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ 】

Incremental Side-Mounting Type

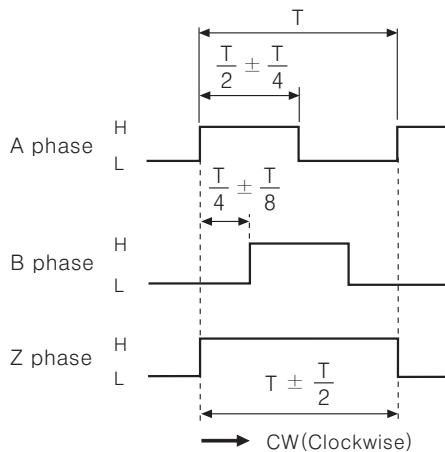
Control output diagram



- ☞ The output circuit of A, B phase (Option : A, B, Z phase) are same.
- ☞ Totem pole output can be used for NPN open collector type (*1) or voltage output type (*2).

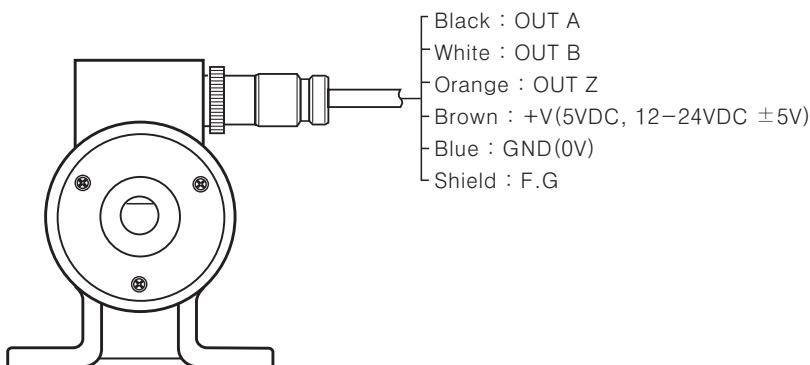
Output waveform

- Totem pole output / NPN open collector output / Voltage output



- ※ Z phase output is customizable.
- ※ CW : As viewed from the shaft

Connections



Pin No	Function	Cable color
①	A phase	Black
②	B phase	White
③	+V	Brown
④	0V	Blue
①	A phase	Black
②	B phase	White
③	Z phase	Orange
④	+V	Brown
⑤	0V	Blue

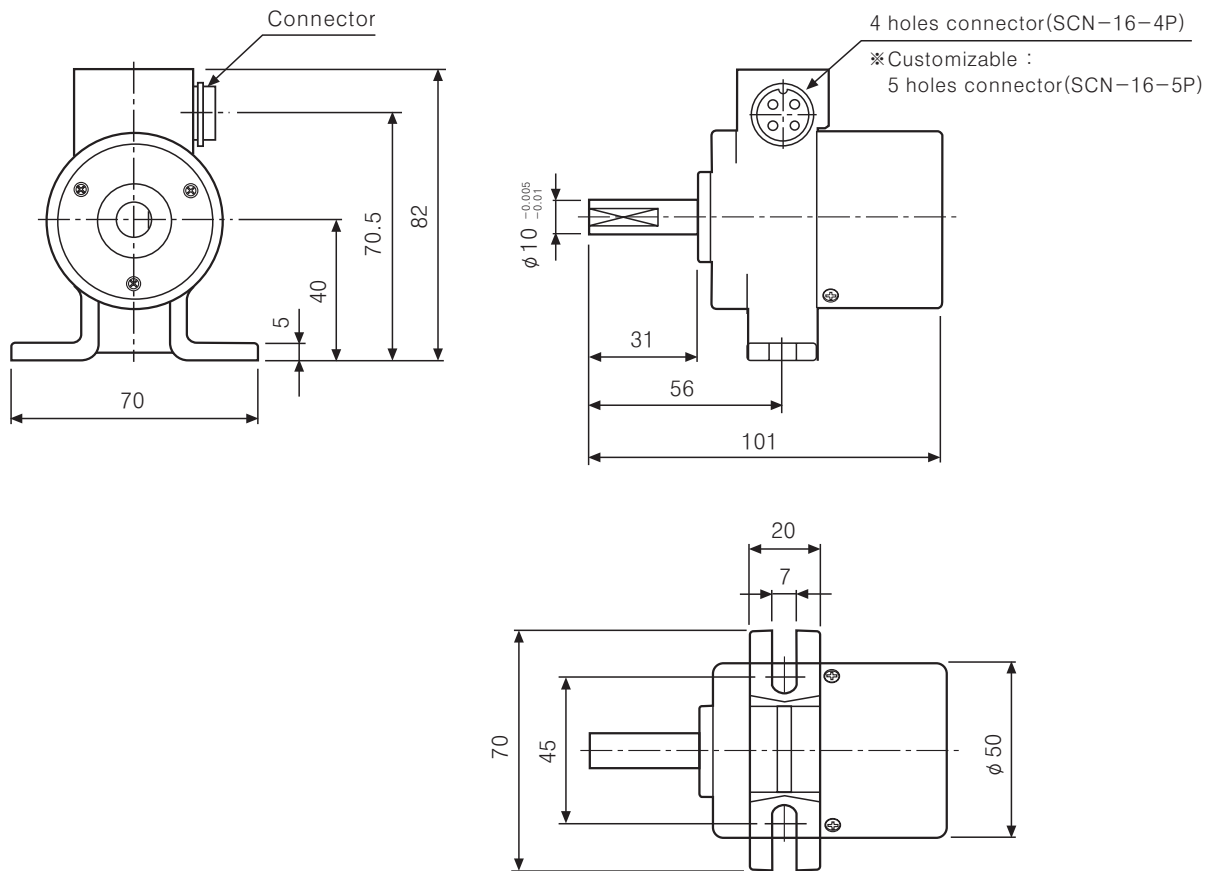
- ※ Z phase output is customizable.
- ※ Unused wires must be insulated.
- ※ The metal case and shield cable of encoder should be grounded (F.G).

- (A) Counter
- (B) Timer
- (C) Temp. controller
- (D) Power controller
- (E) Panel meter
- (F) Tacho/ Speed/ Pulse meter
- (G) Display unit
- (H) Sensor controller
- (I) Switching power supply
- (J) Proximity sensor
- (K) Photo electric sensor
- (L) Pressure sensor
- (M) Rotary encoder
- (N) Stepping motor & Driver & Controller
- (O) Graphic panel
- (P) Production stoppage models & replacement

ENA Series

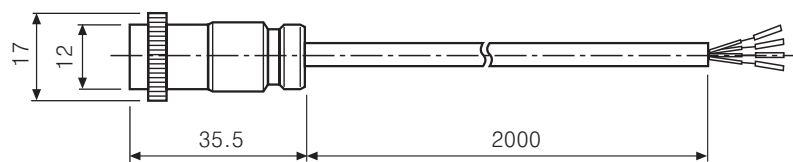
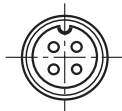
Dimension

(Unit:mm)

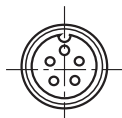


◎Connector cable (Sold separately)

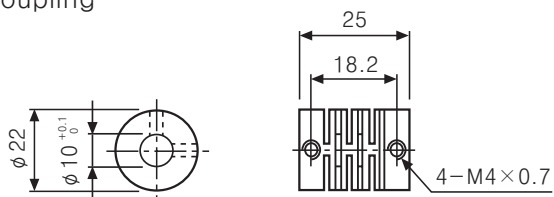
- ENA-□ - 2 - □ (Standard)



- ENA-□ - 3 - □ (Customizable)



◎Coupling



Incremental Measuring Wheel Type

Incremental measuring wheel type Rotary encoder

■ Features

- Suitable for measuring the length or speed of target moving successively by wheel type
- The output waveform is proportional to the unit of International Measurement type (Meter or inch)
- Power supply : 5VDC, 12–24VDC ±5%

■ Application

- Packing machine, Sheet manufacturing , Textile machinery and General industrial plants.



⚠ Please read "Caution for your safety" in operation manual before using.



■ Ordering information

ENC	1	1	N	24	2C
Series	Output phase	Min. measuring unit	Output	Power supply	Cable
Wheel type	1 : A, B phase	1 : 1mm 2 : 1cm 3 : 1m 4 : 0.01yd 5 : 0.1yd 6 : 1yd	T : Totem pole output N : NPN open collector output V : Voltage output	5 : 5VDC ±5% 24 : 12–24VDC ±5%	No mark: Normal type (*) C: Cable outgoing connector type

*Cable length: 250mm

■ Specifications

Item		Incremental measuring wheel type of Rotary encoder		
Resolution (P/R)		Refer to resolution (Next page)		
Electrical specification	Output phase	A, B phase		
	Phase difference of output	Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1 cycle of A phase)		
	Control output	Totem pole output	<ul style="list-style-type: none"> • Low \Rightarrow Load current : Max. 30mA, Residual voltage : Max. 0.4VDC • High \Rightarrow Load current : Max. 10mA, Output voltage (Power supply 5VDC) : Min. (Power supply – 2.0)VDC, Output voltage (Power supply 12–24VDC) : Min. (Power supply – 3.0)VDC 	
		NPN open collector output	Load current : Max. 30mA, Residual voltage : Max. 0.4VDC	
		Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC	
	Response time (Rise/Fall)	Totem pole output	Max. 1 μ s	
		NPN open collector output	Max. 1 μ s	
		Voltage output	Max. 1 μ s	
	Max. Response frequency	180kHz		
	Power supply	5VDC ±5% (Ripple P–P: Max. 5%), 12–24VDC ±5% (Ripple P–P: Max. 5%)		
	Current consumption	Max. 80mA (disconnection of the load)		
	Insulation resistance	Min. 100M Ω (at 500VDC mega between all terminals and case)		
	Dielectric strength	750VAC 50/60Hz for 1 minute (Between all terminals and case)		
Connection	Cable outgoing type, 250mm cable outgoing connector type			
Mechanical specification	Starting torque	Depend on coefficient of friction		
	Max. allowable revolution	(Note1) 5000rpm		
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours			
Shock	Max. 75G			
Ambient temperature	–10 ~ 70°C (at non-freezing status), Storage: –25 ~ 85°C			
Ambient humidity	35~85%RH, Storage: 35~90%RH			
Cable	ϕ 5mm, 5P, Length: 2m, Shield cable			
Protection	IP50 (IEC standard)			
Unit weight	Approx. 495g			
Approval	CE			

※ (★Note1) Max. allowable revolution \geq Max. response revolution **[**Max. response revolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ **]**

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

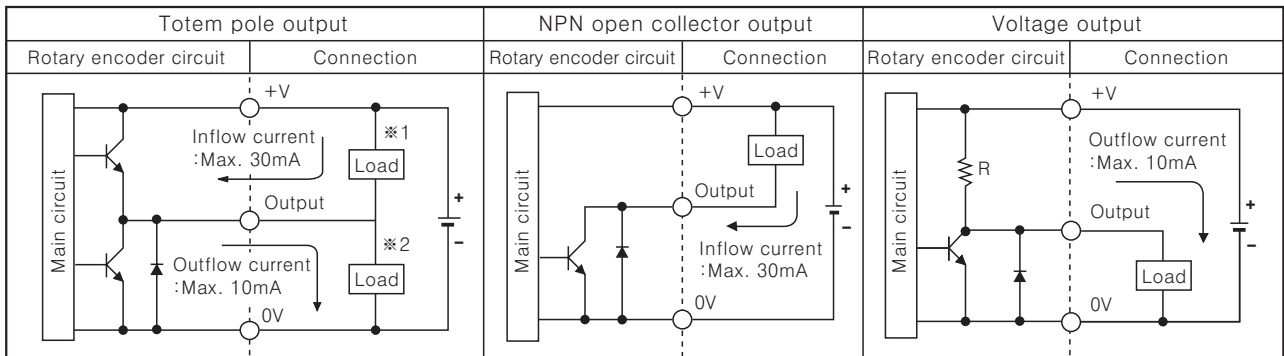
(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

ENC Series

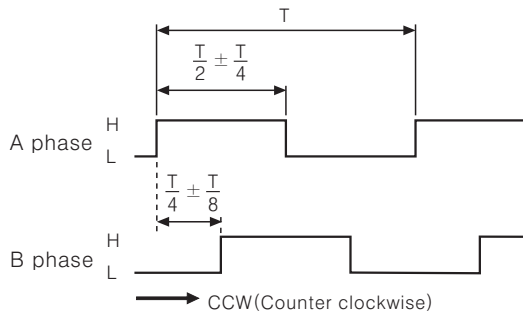
Control output diagram



☞ The output circuit of A, B phase are same.

☞ Totem pole output can be used for NPN open collector type(*1) or voltage output type(*2).

Output waveform



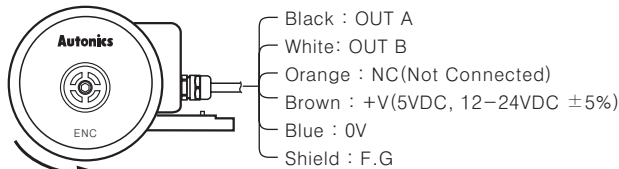
※CCW: Same revolution direction with connection F.G as below.

Resolution

No	Min. measuring unit	Moving distance per 1pulse	Gear ratio	Wheel circumference	SLIT(P/R)
1	1mm	1mm/Pulse	2 : 1	250mm	500Pulse
2	1cm	1cm/Pulse	4 : 1	250mm	100Pulse
3	1m	1m/Pulse	4 : 1	250mm	1Pulse
4	0.01yd	0.01yd/Pulse	4 : 1	228.6mm (0.25/yd)	100Pulse
5	0.1yd	0.1yd/Pulse	4 : 1	228.6mm (0.25/yd)	10Pulse
6	1yd	1yd/Pulse	4 : 1	228.6mm (0.25/yd)	1Pulse

Connections

Connector type



CCW(Counter clockwise)

※Unused wires must be insulated.

※The metal case and shield wire of encoder should be grounded(F.G)

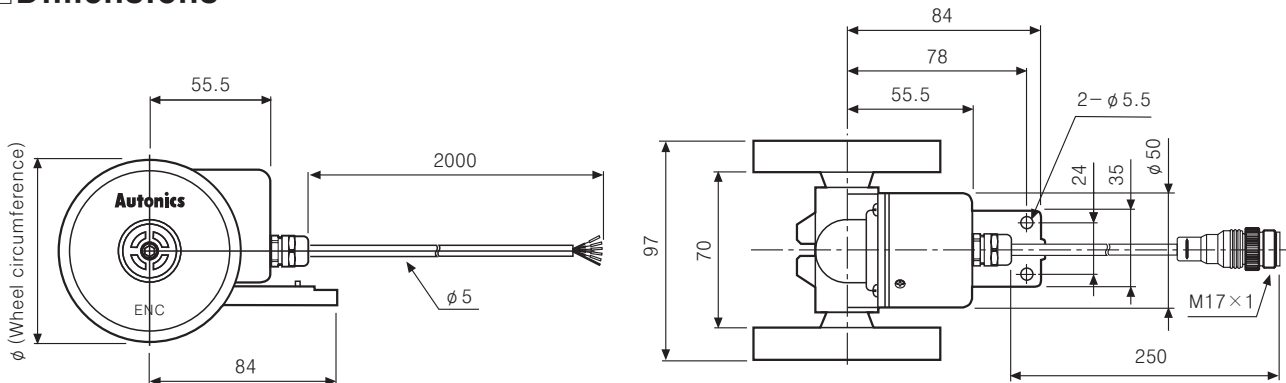
Cable outgoing connector type



Pin No	Function	Cable color
①	OUT A	Black
②	OUT B	White
③	NC	Orange
④	+V	Brown
⑤	GND	Blue
⑥	F.G	Shield

※F.G(Field Ground) : It should be grounded separately.

Dimensions



※The wheel circumference is changed according to model(ϕ), please refer to resolution chart.

※Connector cable is customizable and see M-46 for specifications.

(Unit:mm)

Incremental Manual Handle Type

Incremental manual handle type Rotary encoder

■ Features

- Suitable for manual pulse input type such as numerically controlled or Milling machinery
- Terminal connection type
- Power supply : 5VDC ±5%, 12–24VDC ±5%



■ Application

- Industrial tooling machinery

⚠ Please read "Caution for your safety" in operation manual before using.

■ Ordering information

ENH	100	1	1	24
Series	Pulse/1Revolution	Clickstopper position	Control output	Power supply
Handle type	25 100	1 : Normal "H" 2 : Normal "L"	T : Totem pole output V : Voltage output L : Line driver output(※)	5 : 5VDC ±5% 24 : 12–24VDC ±5%

※The power of Line driver is only for 5VDC

■ Specifications

Item	Incremental manual handle type of rotary encoder	
Resolution(P/R)	(Note1) 25, 100	
Output phase	A, B phase (Line driver output A, \bar{A} , B, \bar{B} phase)	
Phase difference of output	Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1cycle of A phase)	
Control output	Totem pole output	<ul style="list-style-type: none"> • Low \Rightarrow Load current:Max. 30mA, Residual voltage : Max. 0.4VDC • High \Rightarrow Load current:Max. 10mA, Output voltage (Power supply 5VDC):Min. (Power supply–2.0)VDC, Output voltage (Power supply 12–24VDC):Min. (Power supply–3.0)VDC
	Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC
	Line driver output	<ul style="list-style-type: none"> • Low \Rightarrow Load current : Max. 20mA, Residual : Max. 0.5V • High \Rightarrow Load current : Max. –20mA, Output voltage : Min. 2.5V
Response time (Rise/Fall)	Totem pole output	Max. 1 μ s
	Voltage output	Max. 1 μ s
	Line driver output	Max. 0.2 μ s
Power supply	<ul style="list-style-type: none"> • 5VDC ±5% (Ripple P–P : Max. 5%) • 12–24VDC ±5% (Ripple P–P : Max. 5%) 	
Current consumption	Max. 40mA (disconnection of the load), Line driver output:Max. 50mA (disconnection of the load)	
Max. Response frequency	10kHz	
Insulation resistance	Min. 100M Ω (at 500VDC mega between all terminals and case)	
Dielectric strength	750VAC 50/60Hz for 1 minute (Between all terminals and case)	
Connection	Terminal block type	
Mechanical specification	Starting torque	Max. 1kgf • cm (0.098N • m)
	Shaft loading	Radial : 2kgf, Thrust : 1kgf
	Max. allowable revolution	(Note2) Max. 200rpm (Normal), 600rpm (Peak)
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours	
Shock	Max. 50G	
Ambient temperature	–10 ~ 70°C (at non-freezing status), Storage:–25 ~ 85°C	
Ambient humidity	35~85%RH, Storage: 35~90%RH	
Unit weight	Approx. 300g	

※ **(Note1)** Not indicated type is customizable.

※ **(Note2)** Max. allowable revolution \geq Max. response revolution **[Max. response revolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$]**

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

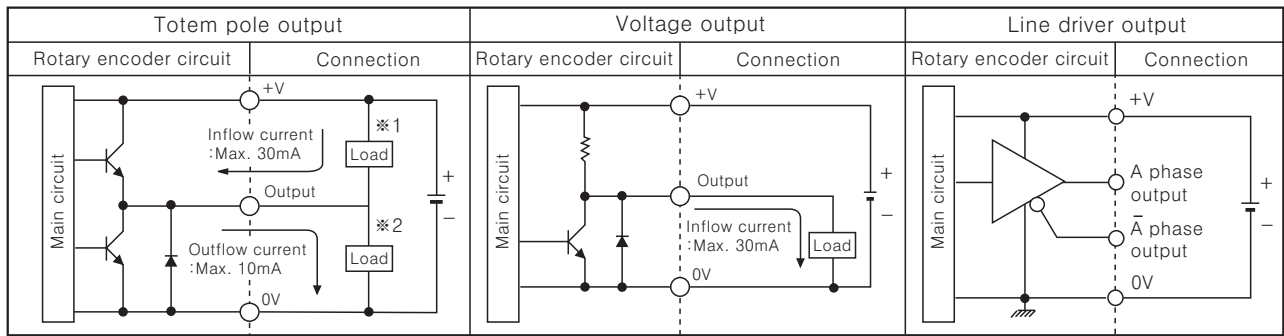
(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

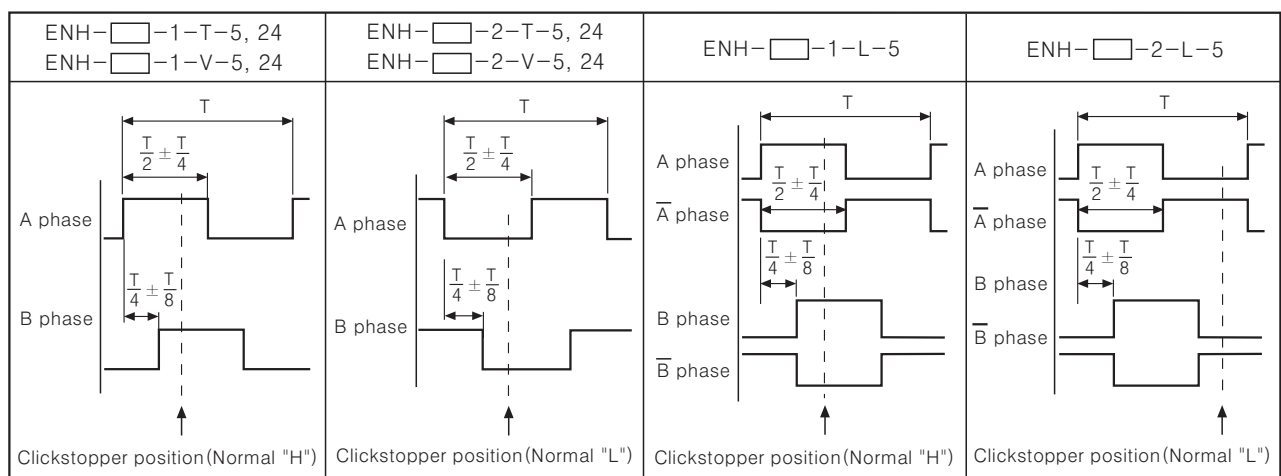
ENH Series

Control output diagram



- The output circuit of A, B phase (Line driver output is A, \bar{A} , B, \bar{B} phase) are same.
- Totem pole output can be used for NPN open collector type (*1) or voltage output type (*2).

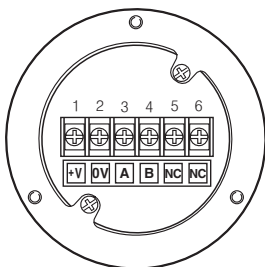
Output waveform



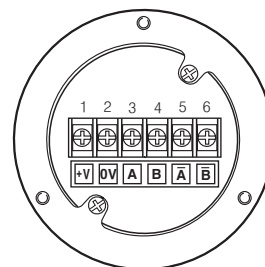
*Clickstopper position Normal "H" or Normal "L": It shows the waveform when the handle is not stopped.

Connections

●Totem pole output / Voltage output

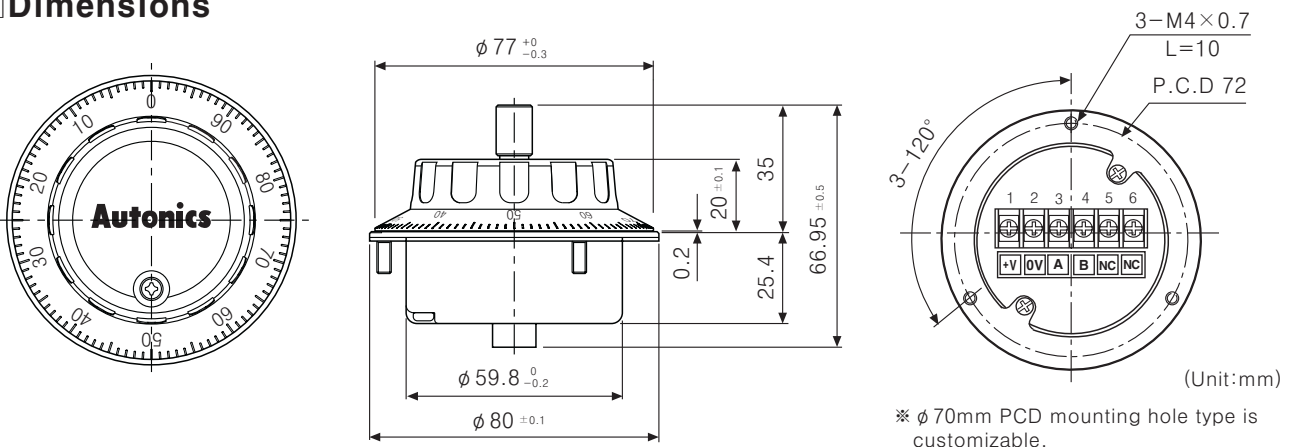


●Line driver output



*Do not use terminal No. 5, 6.

Dimensions



Portable Incremental Type with Handle

Portable incremental type of Rotary encoder with handle

■ Features

- Suitable for manual pulse input type such as Numerically controlled or Milling machinery
- Emergency ground switch, enable switch are available
- Rotary switch for 6 Position, 4 Position

■ Application

- Industrial tooling machinery

⚠ Please read "Caution for your safety" in operation manual before using.



■ Ordering information

ENHP	100	1	L	5
Series	Pulse/1 Revolution	Clickstopper position	Control output	Power supply
Portable encoder with handle	100	1 : Normal "H" 2 : Normal "L"	L : Line driver output	5 : 5VDC ±5%

■ Specifications

Item		Portable incremental type of Rotary encoder with handle
Resolution (P/R)		(Note1) 100P/R
Electrical specification	Output phase	A, \bar{A} , B, \bar{B}
	Phase difference of output	Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1 cycle of A phase)
	Rotary switch output	BCD Code output • Axis (X, Y, Z, A, B) • Rate (R1, R2, R3)
	Control output	• Low \Rightarrow Load current : Max. 20mA, Residual : Max. 0.5V • High \Rightarrow Load current : Max. -20mA, Output voltage : Min. 2.5V
	Line driver output	
	Response time (Rise/Fall)	Max. 0.5 μ s (Measuring condition \Rightarrow I sink = Max. 20mA)
	Power supply	5VDC \pm 5% (Ripple P-P : Max. 5%)
	Current consumption	Max. 50mA (disconnection of the load)
	Max. Response frequency	10kHz
	Insulation resistance	Min. 100M Ω (at 500VDC mega between all terminals and case)
Dielectric strength	750VAC 50/60Hz for 1 minute (Between all terminals and case)	
Connection	25Pin D-SUB of connector type	
Mechanical specification	Starting torque	Max. 1kgf \cdot cm (0.098N \cdot m)
	Shaft loading	Radial : 2kgf, Thrust : 1kgf
	Max. allowable revolution	(Note2) Max. 200rpm (Normal), 600rpm (Peak)
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours	
Shock	Max. 50G	
Ambient temperature	-10 ~ 70 $^{\circ}$ C (at non-freezing status), Storage: -25 ~ 85 $^{\circ}$ C	
Ambient humidity	35~85%RH, Storage: 35~85%RH	
Protection	IP67 (IEC standard)	
Cable	ϕ 5mm, 18P, Length : 8m, Spring code cable	
Unit weight	Approx. 730g	

※ **(Note1)** Not indicated type is customizable.

※ **(Note2)** Max. allowable revolution \geq Max. response revolution 【Max. response revolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ 】

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

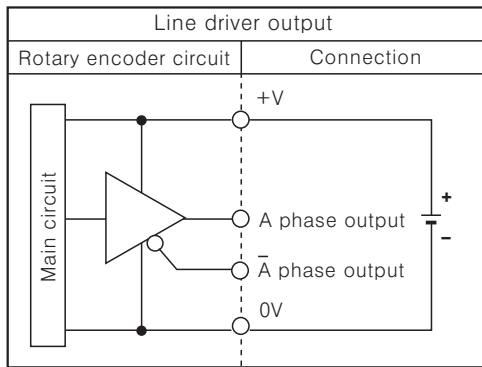
(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

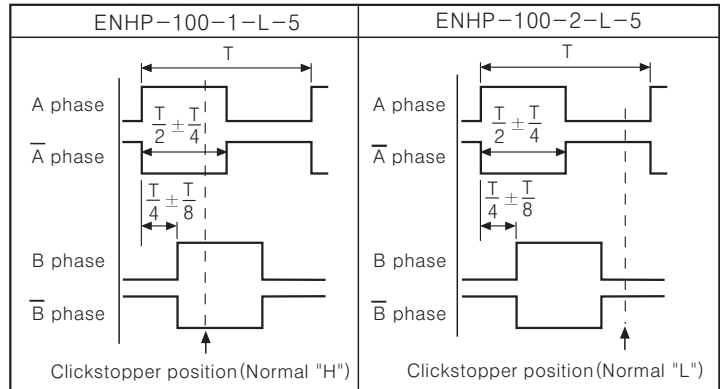
ENHP Series

Control output diagram



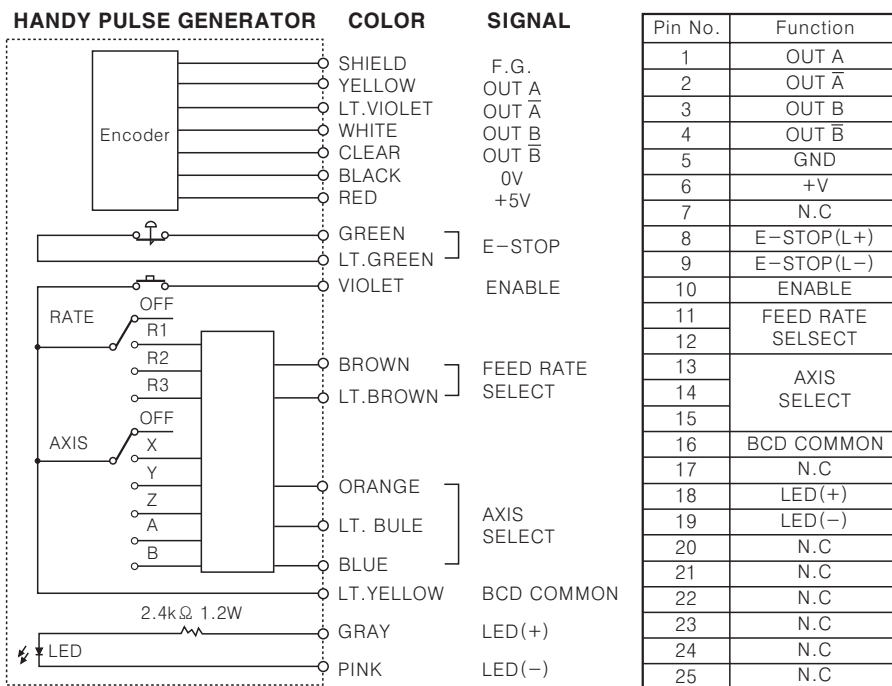
※The output circuit of A, \bar{A} , B, \bar{B} phase is same.

Output waveform



※Clickstopper position Normal "H" or Normal "L" : shows the waveform when the handles is not stopped.

Connections



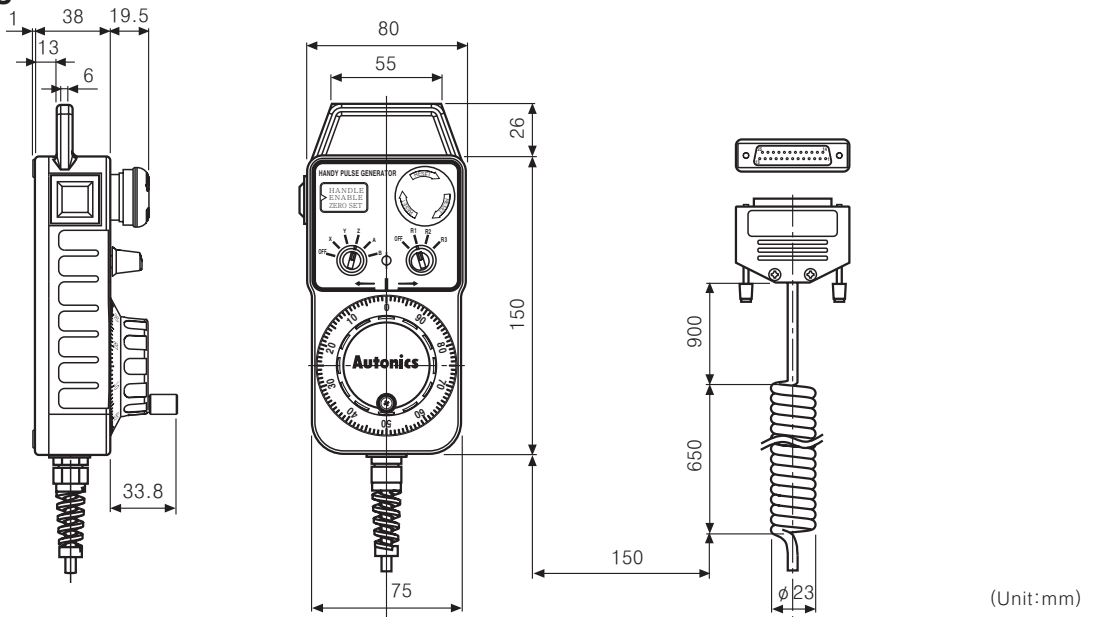
AXIS SELECT

AXIS	OUTPUT		
	15	14	13
OFF	0	0	0
X axis	0	0	1
Y axis	0	1	0
Z axis	0	1	1
A axis	1	0	0
B axis	1	0	1

FREE RATE SELECT

RATE	OUTPUT	
	12	11
OFF	0	0
R1	0	1
R2	1	0
R3	1	1

Dimensions



(Unit:mm)

∅ 50mm Shaft Absolute Type


Diameter ∅ 50mm Shaft type Absolute Rotary encoder

■ Features

- Compact size of external diameter 50mm
- Various output code: BCD, Binary, Gray Code (Customizable)
- Various and high resolution (720, 1024 divisions)
- IP 64 (Partial waterproof, Oil proof)

■ Applications

Precision machine tool, Fabric machinery, Robot, Parking system

 Please read "Caution for your safety" in operation manual before using.




■ Ordering information

EP50S	8	–	1024	–	1	–	R	–	P	–	24
Series	Inside		Pulse/1Revolution		Output code		Revolution direction		Control output		Power supply
Diameter ∅ 50mm shaft type	∅ 8mm		Refer to revsolutions		1 : BCD Code 2 : Binary Code 3 : Gray Code		F : Output value increase at CW direction R : Output value increase at CCW direction		P : PNP open collector output N : NPN open collector output		5 : 5VDC ±5% 24 : 12–24VDC ±5%

* Gray code is customizable.

■ Specifications

Item	Diameter ∅ 50mm shaft type of Absolute rotary encoder		
Resolution	(Note1)	*6, *8, *12, *16, *24, *32, *40, 45, 60, 64, 90, 128, 180, 256, 360, 512, 720, 1024	
Electrical specification	Output code/Output angle	Refer to "Output waveform"	
	Control output	PNP open collector output	Output voltage : Min. (Power supply–1.5)VDC, Load current : Max. 32mA
		NPN open collector output	Load current : Max. 32mA, Residual voltage : Max. 1VDC
	Response time (Rise/Fall)	Ton=800nsec, Toff=Max. 800nsec (Cable length:2m, I sink=32mA)	
	Max. Response frequency	35kHz	
	Power supply	• 5VDC ±5% (Ripple P–P : Max. 5%) • 12–24VDC ±5% (Ripple P–P : Max. 5%)	
	Current consumption	Max. 100mA (disconnection of the load)	
	Insulation resistance	Min. 100MΩ (at 500VDC mega between all terminals and case)	
	Dielectric strength	750VAC 50/60Hz for 1 minute (Between all terminals and case)	
	Connection	Cable outgoing type (Cable gland)	
Mechanical specification	Starting torque	Max. 40gf • cm (0.004N • m)	
	Rotor inertia	Max. 40g • cm ² (4 × 10 ⁻⁶ kg • m ²)	
	Shaft loading	Radial : 10kgf, Thrust : 2.5kgf	
	Max. allowable revolution	(Note2)	3000rpm
Vibration	1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours		
Shock	Max. 50G		
Ambient temperature	–10 ~ 70°C (at non-freezing status), Storage: –25 ~ 85°C		
Ambient humidity	35~85%RH, Storage: 35~90%RH		
Protection	IP64 (IEC standard)		
Cable	∅ 7mm, 15P, Length : 2m, Shield cable		
Accessory	Fixing bracket, Coupling		
Unit weight	Approx. 380g		
Approval			

* **(Note1)** "*" Marked division in resolution is being developed. Not indicated type is customizable.

* **(Note2)** Max. allowable revolution ≥ Max. response revolution $\left[\text{Max. response revolution (rpm)} = \frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec} \right]$

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

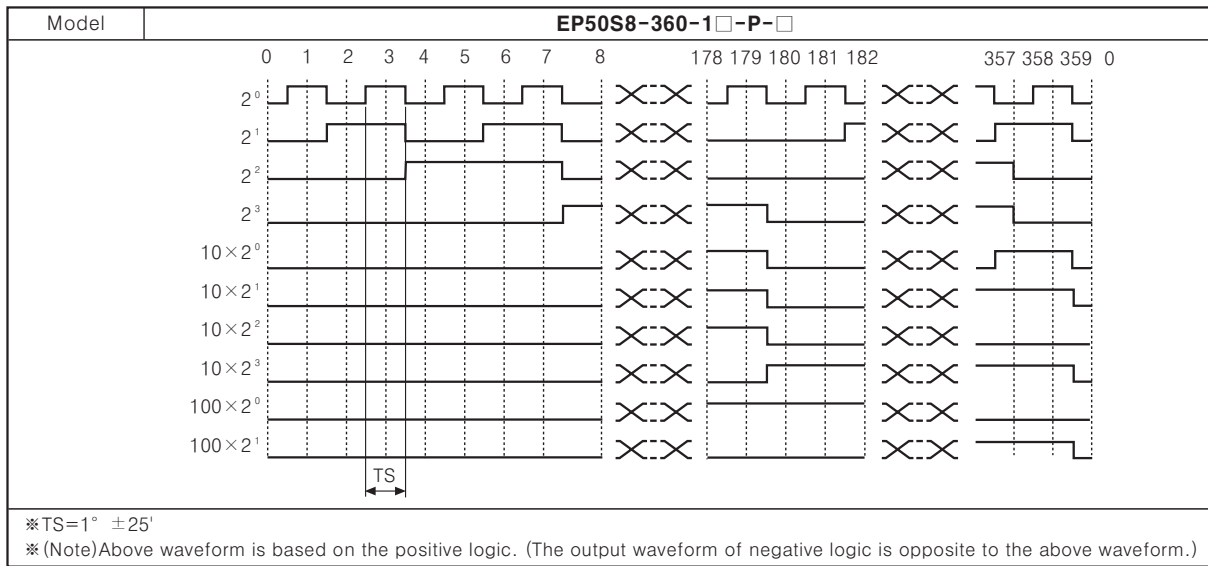
(O) Graphic panel

(P) Production stoppage models & replacement

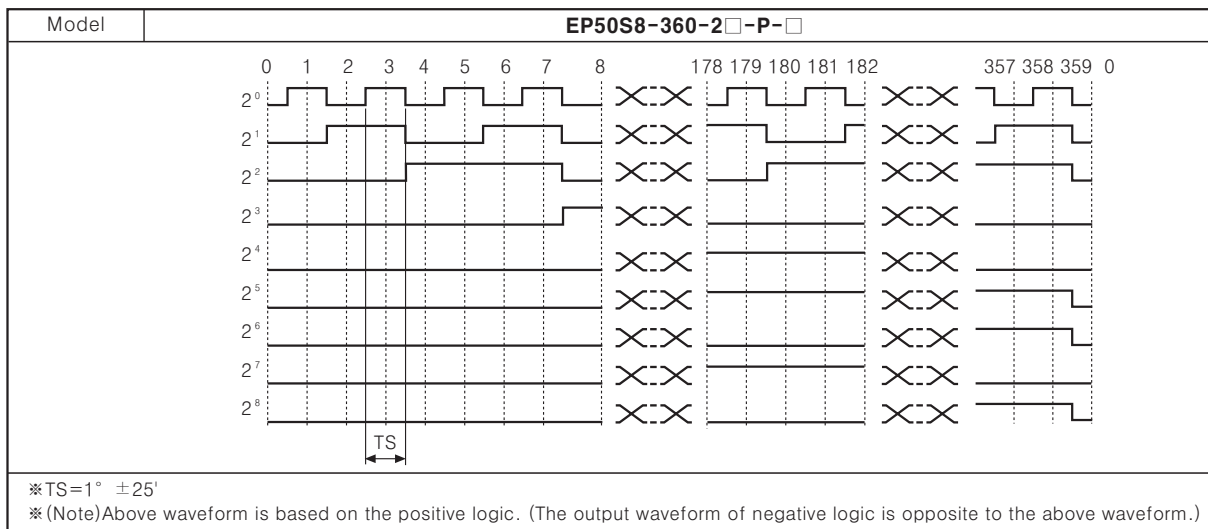
EP50S Series

Output waveform

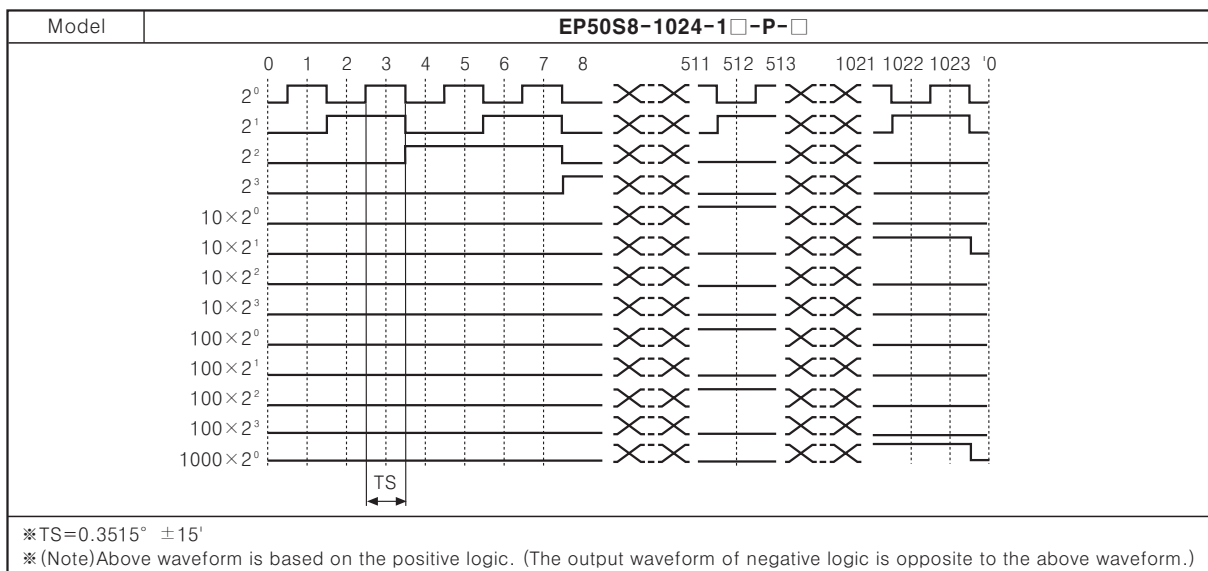
●360 division (BCD CODE output)



●360 division (BINARY CODE output)



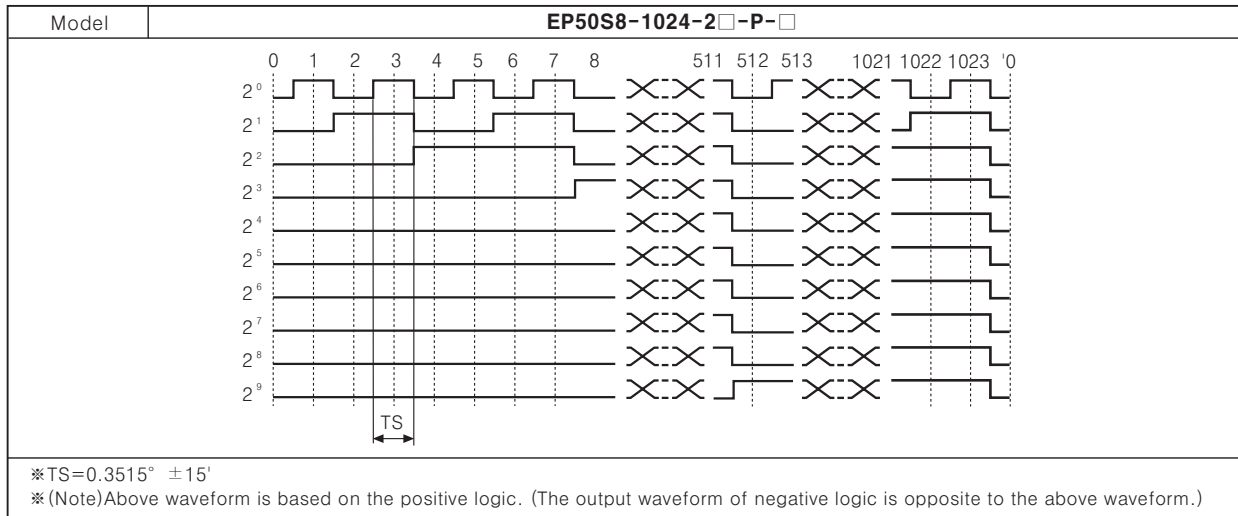
●1024 division (BCD CODE output)



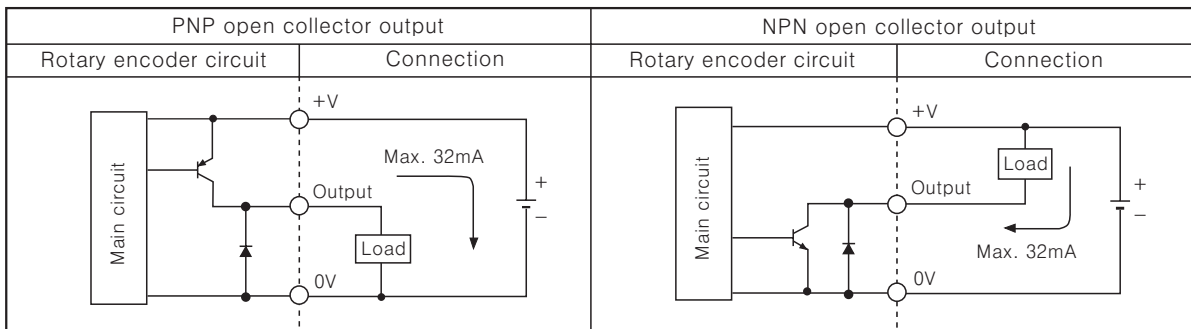
∅ 50mm Shaft Absolute Type

Output waveform

1024 division (BINARY CODE output)



Control output diagram



*Output circuit of all phases is same.

Connections

BCD Code

Resolution	6	8	12	16	24	32	40	45	60	64	90	128	180	256	360	512	720	1024			
Color	division	division	division	division	division	division	division	division	division	division	division	division	division	division	division	division	division	division			
Power	White	+V																			
	Black	GND(0V)																			
Output	Brown	TP1	TP1	TP1	TP1	TP1	TP1	TP1	2°	2°	2°	2°	2°	2°	2°	2°	2°	2°	2°		
	Red	TP2	TP2	TP2	TP2	TP2	TP2	TP2	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹		
	Orange	2°	2°	2°	2°	2°	2°	2°	2°	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	
	Yellow	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	
	Blue	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	
	Purple	EP		2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	
	Gray	NC		(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	(2°×10)	
	White/Brown	NC		EP	EP	(2 ¹ ×10)	(2 ¹ ×10)	(2 ¹ ×10)	NC			(2 ³ ×10)	(2 ³ ×10)	(2 ³ ×10)	(2 ³ ×10)	(2 ³ ×10)	(2 ³ ×10)	(2 ³ ×10)	(2 ³ ×10)	(2 ³ ×10)	
	White/Red	NC				EP	EP	EP	NC				(2°×100)	(2°×100)	(2°×100)	(2°×100)	(2°×100)	(2°×100)	(2°×100)	(2°×100)	
	White/Orange	NC												(2 ¹ ×100)	(2 ¹ ×100)	(2 ¹ ×100)	(2 ¹ ×100)	(2 ¹ ×100)	(2 ¹ ×100)	(2 ¹ ×100)	(2 ¹ ×100)
	White/Yellow	NC															(2 ² ×100)	(2 ² ×100)	(2 ² ×100)	(2 ² ×100)	
	White/Blue	NC																			
	White/Purple	NC																			
Shielded wire	F.G																				

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

EP50S Series

■ Connections

● Binary code

Resolution	6	8	12	16	24	32	40	45	60	64	90	128	180	256	360	512	720	1024	
Color	division	division	division	division	division	division	division	division	division	division	division	division	division	division	division	division	division	division	
Power	White	+V																	
	Black	GND(0V)																	
Output	Brown	TP1	TP1	TP1	TP1	TP1	TP1	TP1	2°	2°	2°	2°	2°	2°	2°	2°	2°	2°	
	Red	TP2	TP2	TP2	TP2	TP2	TP2	TP2	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	
	Orange	2°	2°	2°	2°	2°	2°	2°	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	
	Yellow	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ¹	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	2 ³	
	Blue	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ²	2 ⁴	2 ⁴	2 ⁴	2 ⁴	2 ⁴	2 ⁴	2 ⁴	2 ⁴	2 ⁴	2 ⁴	
	Purple	EP	EP	2 ³	2 ³	2 ³	2 ³	2 ³	2 ⁵	2 ⁵	2 ⁵	2 ⁵	2 ⁵	2 ⁵	2 ⁵	2 ⁵	2 ⁵	2 ⁵	
	Gray	NC		EP	EP	2 ⁴	2 ⁴	2 ⁴	NC			2 ⁶	2 ⁶	2 ⁶	2 ⁶	2 ⁶	2 ⁶	2 ⁶	
	White/Brown	NC				EP	EP	2 ⁵	NC				2 ⁷	2 ⁷	2 ⁷	2 ⁷	2 ⁷	2 ⁷	
	White/Red	NC						EP	NC						2 ⁸	2 ⁸	2 ⁸	2 ⁸	
	White/Orange	NC																2 ⁹	2 ⁹
	White/Yellow	NC																	
	White/Blue	NC																	
	White/Purple	NC																	
	Shielded wire	F.G																	

※ Unused wires must be insulated.

※ The metal case and shield wire of encoder should be grounded(F.G).

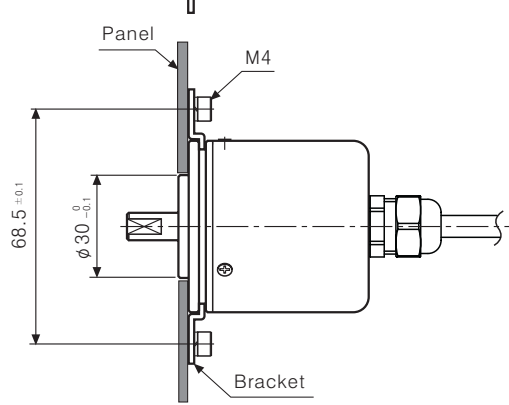
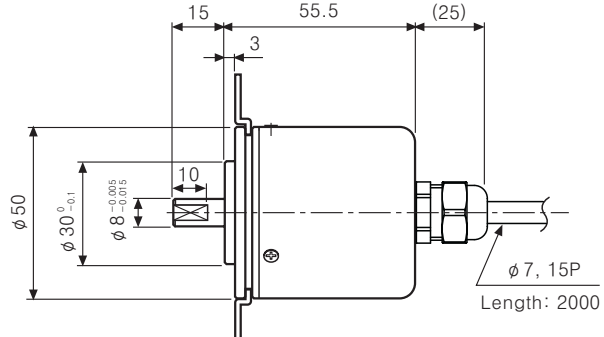
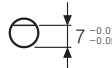
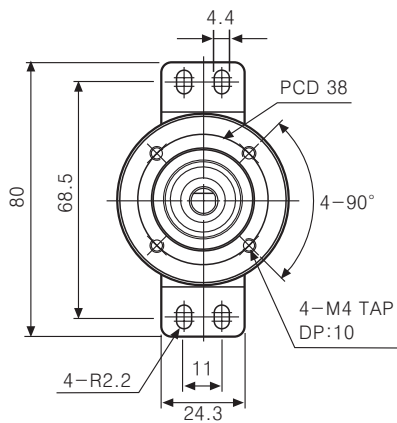
※ NC : Not Connected.

※ TP1/TP2 : It is an enablement signal to decide signal recognition for output easily because, output signal cycle is long in low resolution model.

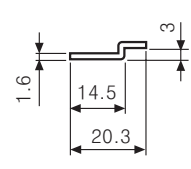
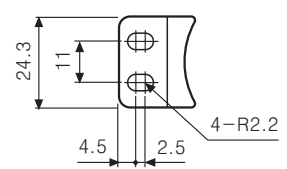
※ Ep : It is a parity signal to be outputted as odd number of parity.

※ Output cable must not be short-circuited, because Driver IC is used in output circuit.

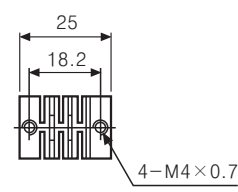
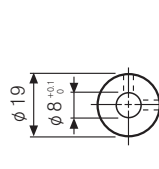
■ Dimensions



● Bracket



● Coupling



(Unit:mm)

∅ 60mm Shaft AbsoluteType

Diameter ∅ 60mm Shaft type Absolute Rotary encoder

■ Features

- Able to measure absolute variable angle with BCD code.
- Strong against external impact.
- Memorize the absolute position when power is cut.

■ Application

- Precision numerical control machine for industrial plant.

⚠ Please read "Caution for your safety" in operation manual before using.

■ Ordering information

ENP	-	1	-	1	-	1	-	R	-	360	-	1
Series	Output code	Output	Power supply	Revolution direction	Revolution/1Pulse		Control output					
Diameter ∅ 60mm shaft type (External diameter : ∅ 8mm)	1:BCD code	0:Negative logic 1:Positive logic	0:5-12VDC ±5% 1:12-24VDC ±5%	F:Output value increase at CW direction R:Output value increase at CCW direction	006:6 division 008:8 division 012:12 division	016:16 division 024:24 division 360:360 division	P:PNP open collector output N:NPN open collector output					

*Since the output type is related with control output, please select the model name in specification when ordering the item.

■ Specifications

Item		Diameter ∅ 60mm shaft type of Absolute rotary encoder							
Model	PNP open collector output	ENP-111□-006-P	ENP-111□-008-P	ENP-111□-012-P	ENP-111□-016-P	ENP-111□-024-P	ENP-110□-360-P		
	NPN open collector output	ENP-101□-006-N	ENP-101□-008-N	ENP-101□-012-N	ENP-101□-016-N	ENP-101□-024-N	ENP-100□-360-N		
Resolution		6 division	8 division	12 division	16 division	24 division	360 division		
Electrical specification	Output phase	TP(Timing Pulse) : 2bit TS(Signal Pulse) : 4bit(BCD, EP)	TP(Timing Pulse) : 2bit TS(Signal Pulse) : 5bit(BCD, EP)	TP(Timing Pulse) : 2bit TS(Signal Pulse) : 6bit(BCD, EP)	TP(Timing Pulse) : 2bit TS(Signal Pulse) : 6bit(BCD, EP)	TP(Timing Pulse) : 2bit TS(Signal Pulse) : 7bit(BCD, EP)	TS(Signal Pulse) : 10bit(BCD)		
	Output of phase differences	TP1:53° ± 30' TP2:15° ± 30' P:60° ± 30' TS:56° ± 30'	TP1:39° ± 30' TP2:15° ± 30' P:45° ± 30' TS:42° ± 30'	TP1:3° ± 30' TP2:15° ± 30' P:30° ± 30' TS:26° ± 30'	TP1:2° ± 30' TP2:11.25° ± 30' P:22.5° ± 30' TS:19.5° ± 30'	TP1:8° ± 30' TP2:3° ± 30' P:15° ± 30' TS:11° ± 30'	TS:1° ± 30'		
	Control output	PNP open collector output	Output voltage : Min. (Power supply-1.5)VDC, Load current : Max. 32mA						
		NPN open collector output	Load current : Max. 32mA, Residual voltage : Max. 1VDC						
	Response time (Rise & Fall)	PNP open collector output	TON=500ns, TOFF=Max. 2.5μs (Cable length:1m, I sink =32mA)						
		NPN open collector output	TON=400ns, TOFF=Max. 1.5μs (Cable length:1m, I sink =32mA)						
	Max. Response frequency		20kHz						
	Power supply		12-24VDC ± 5% (Ripple P-P:Max. 5%)					5-12VDC ± 5% (Ripple P-P: Max. 5%)	
	Current consumption		Max. 150mA (disconnection of the load)				Max. 200mA (disconnection of the load)		
	Insulation resistance		Min. 20MΩ (at 500VDC mega between all terminals and case)						
Dielectric strength		500VAC 50/60Hz for 1 minute (Between all terminals and case)							
Connection		Cable outgoing type							
Mechanical specification	Starting torque	Max. 500gf · cm (0.05N · m)							
	Rotor inertia	Max. 300g · cm ² (3 × 10 ⁻⁵ kg · m ²)							
	Shaft loading	Radial : 10kgf, Thrust : 2.5kgf							
	Mechanical revolution	(Note1)		3600rpm					
Vibration		1.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 2 hours							
Shock		Max. 75G							
Ambient temperature		-10 ~ 60°C (at non-freezing status), Storage: -25 ~ 85°C							
Ambient humidity		35~85%RH, Storage : 35~90%RH							
Protection		IP50(IEC standard)							
Cable		∅ 8mm, 12P, Length : 1m, Double shield cable							
Accessory		Fixing bracket, Coupling							
Unit weight		Approx. 577g					Approx. 690g		

※(★Note1)Max. allowable revolution ≥ Max. response revolution 【Max. response revolution(rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$ 】



(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

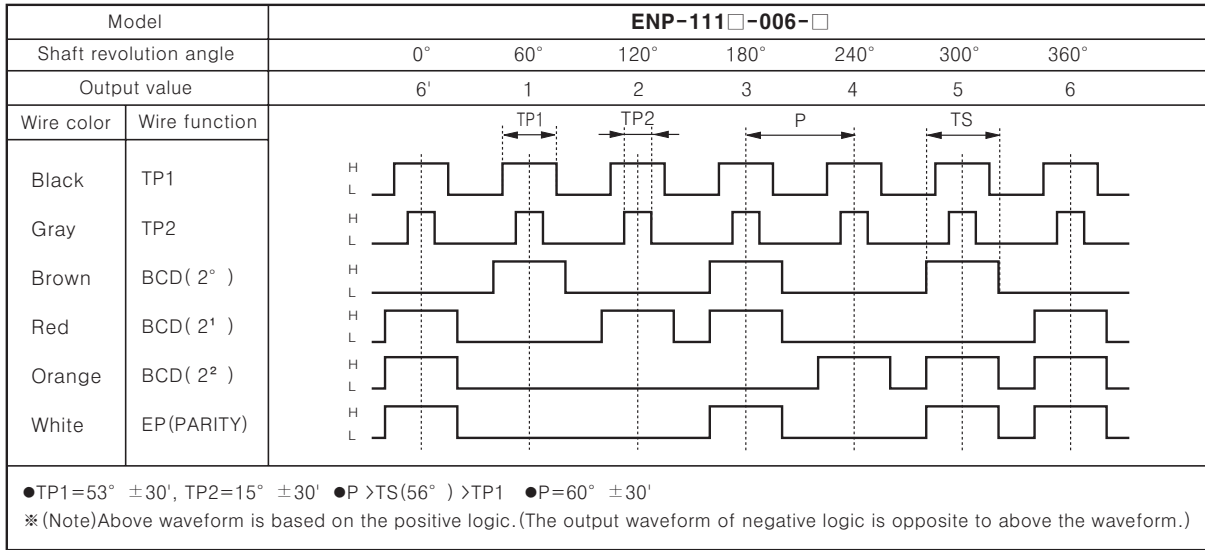
(O) Graphic panel

(P) Production stoppage models & replacement

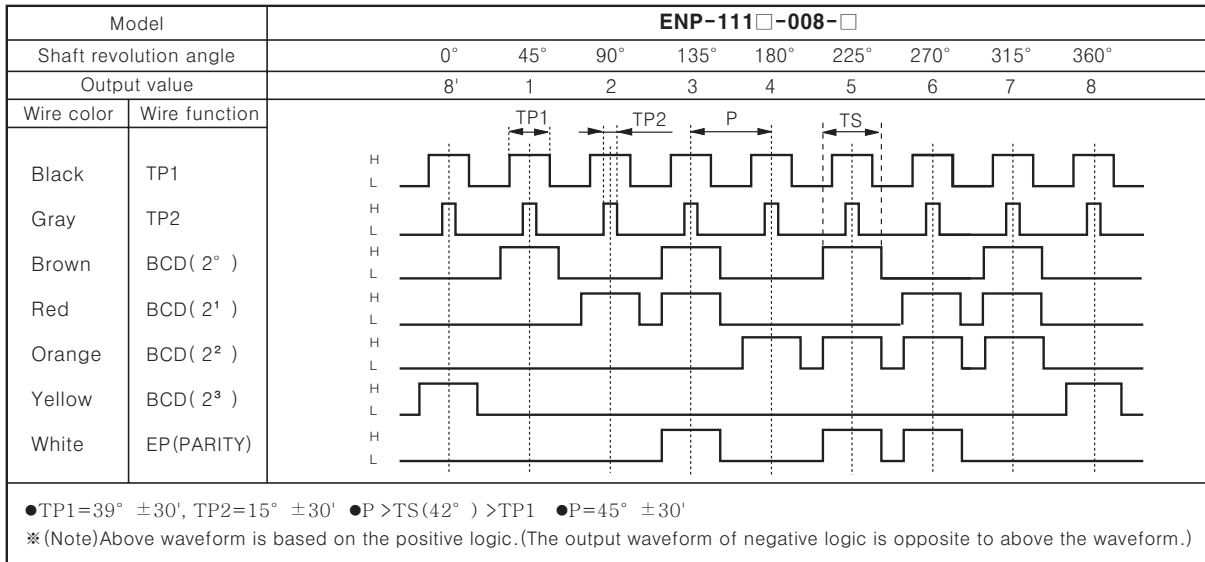
ENP Series

Output waveform

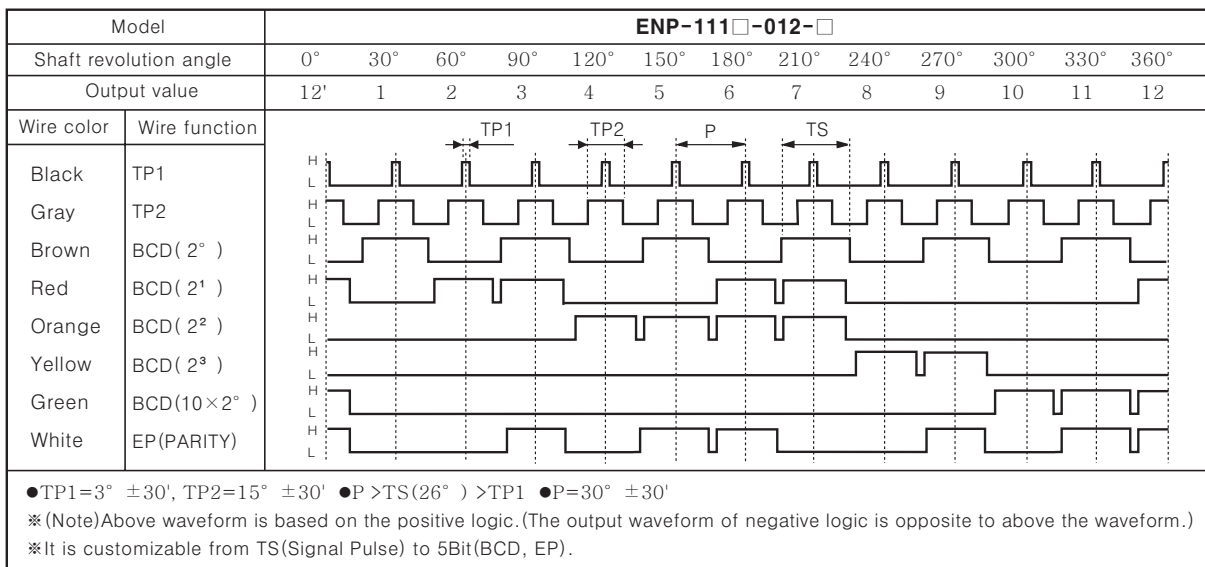
● 6 division



●8 division



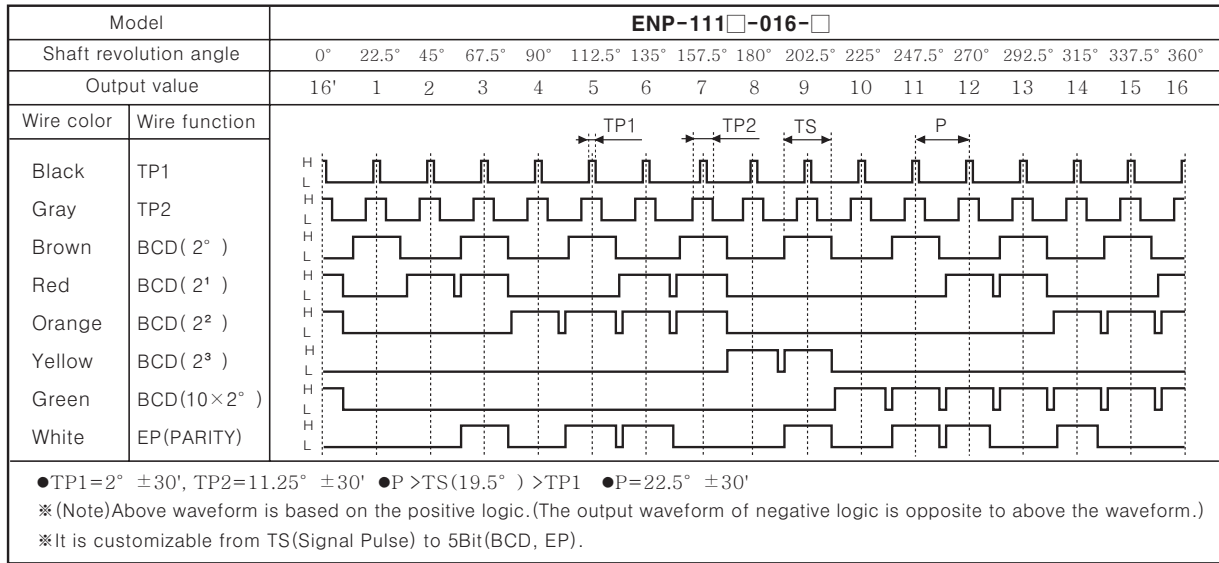
●12 division



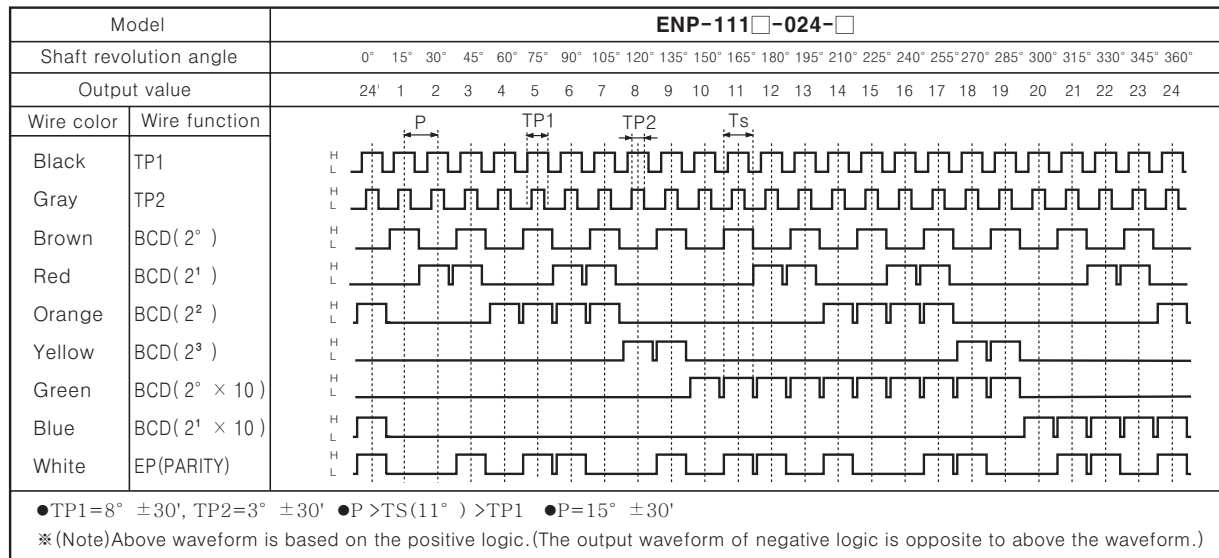
∅ 60mm Shaft Absolute Type

Output waveform

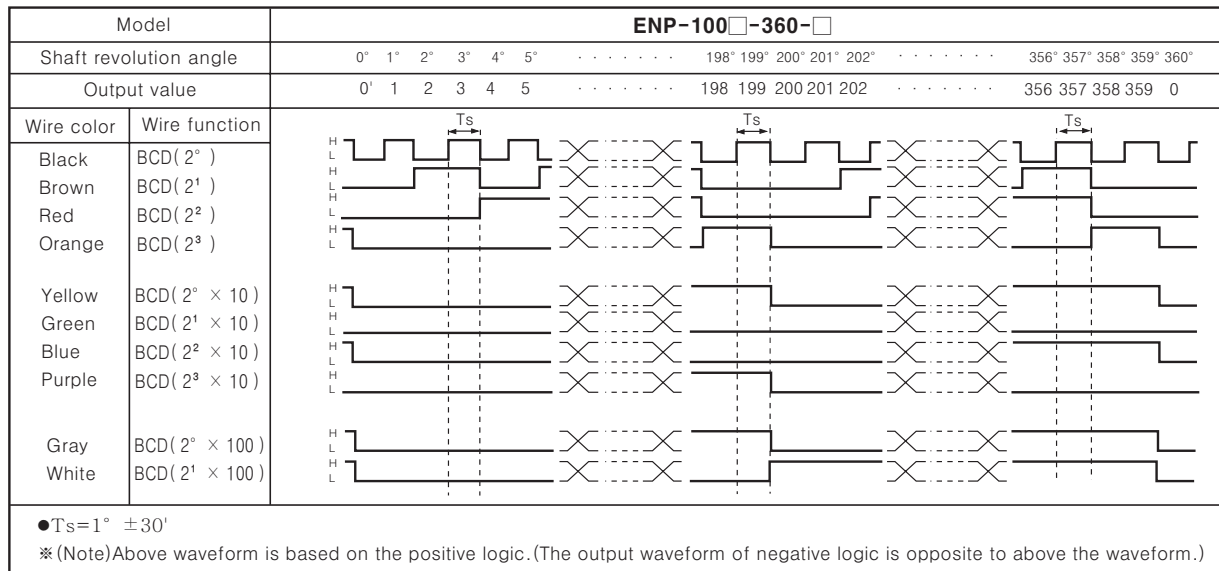
●16 division



●24 division



●360 division



(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

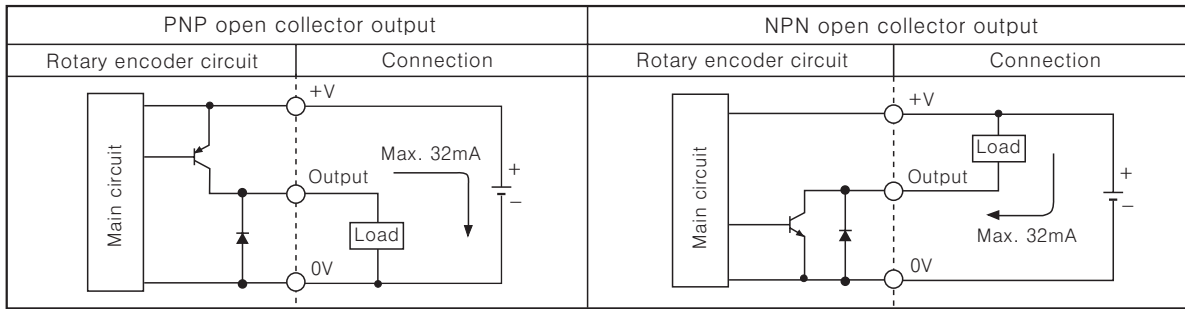
(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Production stoppage models & replacement

ENP Series

Control output diagram



※Output circuit of all phases is same.

Connections

Cable color	6 division	8 division	12 division	16 division	24 division	360 division
1:White	+V					
2:Black	GND(0V)					
3:Shield wire	F.G					
1:Black	TP1					BCD CODE(2°)
2:Brown	BCD CODE(2°)	BCD CODE(2°)	BCD CODE(2°)	BCD CODE(2°)	BCD CODE(2°)	BCD CODE(2°)
3:Red	BCD CODE(2°)	BCD CODE(2°)	BCD CODE(2°)	BCD CODE(2°)	BCD CODE(2°)	BCD CODE(2°)
4:Orange	BCD CODE(2°)	BCD CODE(2°)	BCD CODE(2°)	BCD CODE(2°)	BCD CODE(2°)	BCD CODE(2°)
5:Yellow	NC	BCD CODE(2°)	BCD CODE(2°)	BCD CODE(2°)	BCD CODE(2°)	BCD CODE(2° × 10)
6:Green	NC	NC	BCD CODE(2° × 10)	BCD CODE(2° × 10)	BCD CODE(2° × 10)	BCD CODE(2° × 10)
7:Blue	NC	NC	NC	NC	BCD CODE(2° × 10)	BCD CODE(2° × 10)
8:Purple	NC					BCD CODE(2° × 10)
9:Gray	TP2					BCD CODE(2° × 10)
10:White	EP(PARITY)					BCD CODE(2° × 10)
11:Shield wire	F.G					

※Unused wires must be insulated.

※The metal case and shield wire should be grounded(F.G).

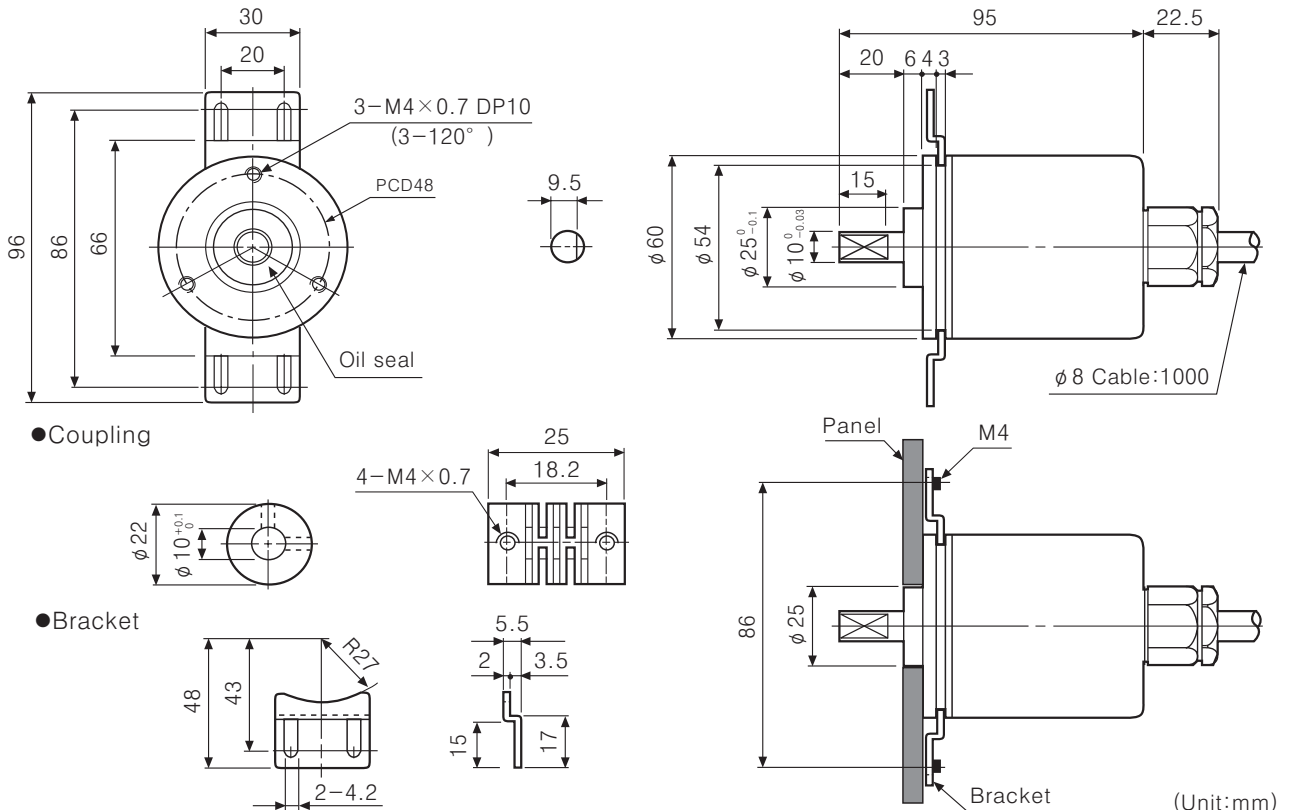
※NC : Not Connected.

※TP1/TP2 : It is an enablement signal to decide signal recognition for output easily because, output signal cycle is long in low resolution model.

※Ep : It is a parity signal to be outputted as odd number of parity.

※Output cable must not be short-circuited, because Driver IC is used in output circuit.

Dimensions

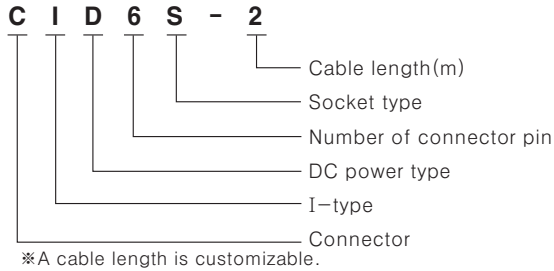


Encoder Connector Cable

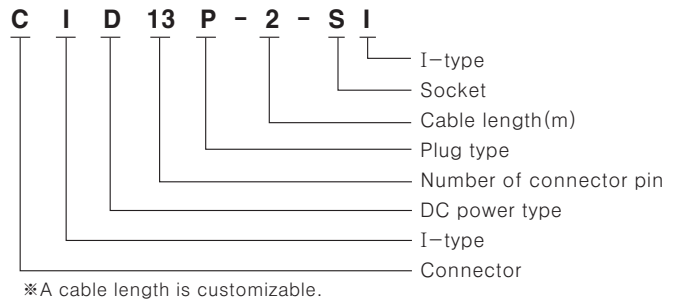
Encoder Connector Cable / General connector cable

Ordering information

◎Socket type



◎Plug-socket type

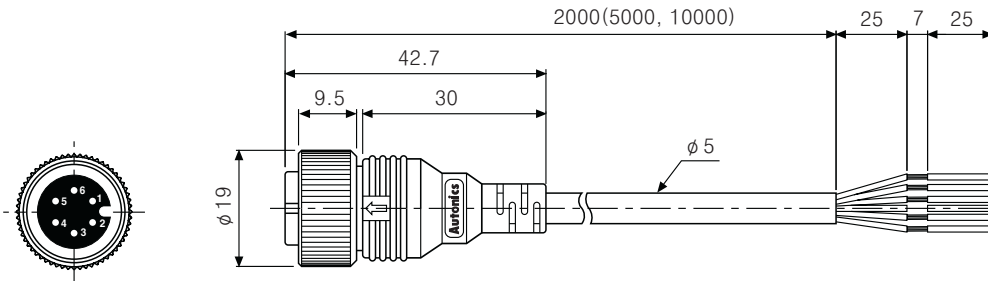


Dimensions

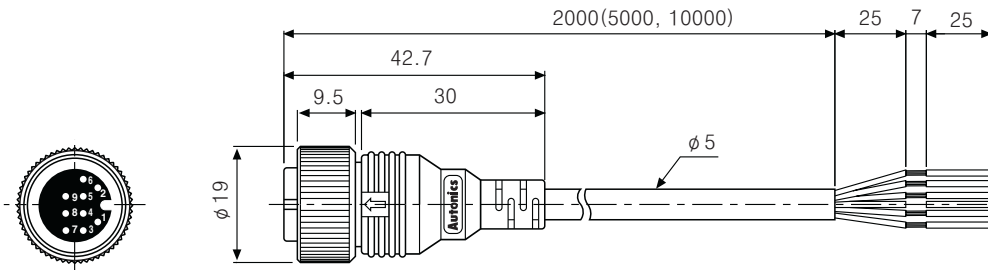
◎Socket type

(Unit:mm)

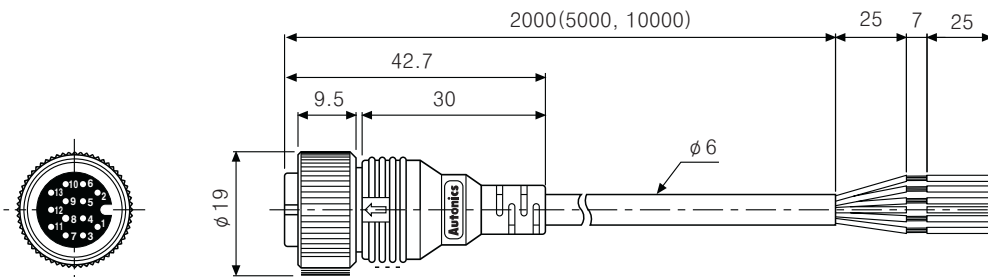
●CID6S-2, CID6S-5, CID6S-10 (Totem pole output / NPN open collector output / Voltage output)



●CID9S-2, CID9S-5, CID9S-10 (Line driver output)

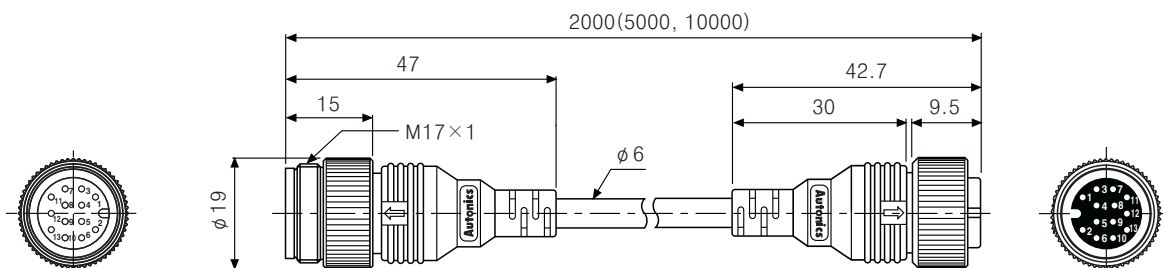


●CID13S-2, CID13S-5, CID13S-10 (For cam positioner)



◎Plug-socket type

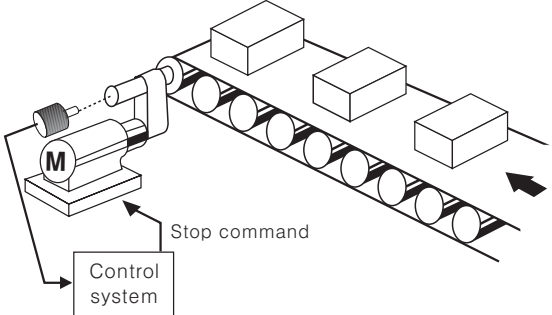
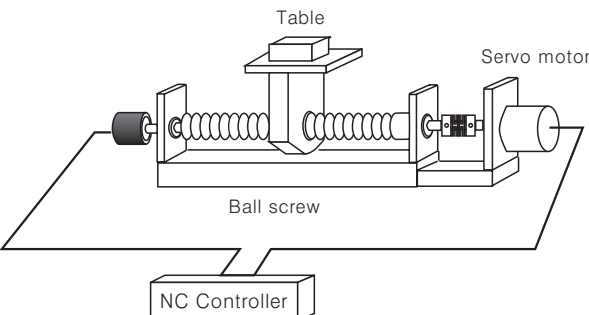
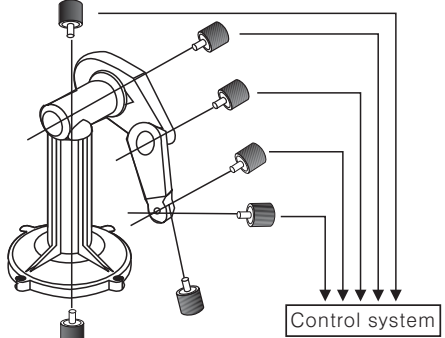
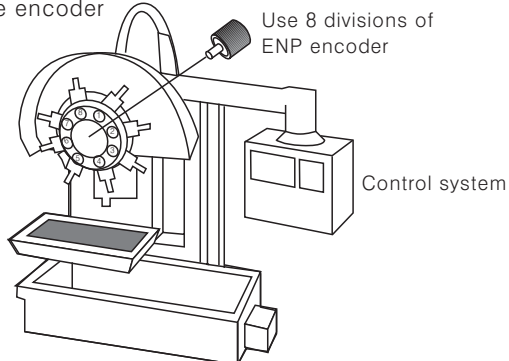
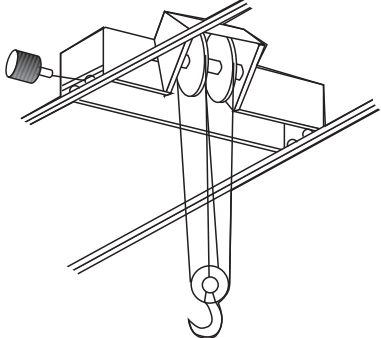
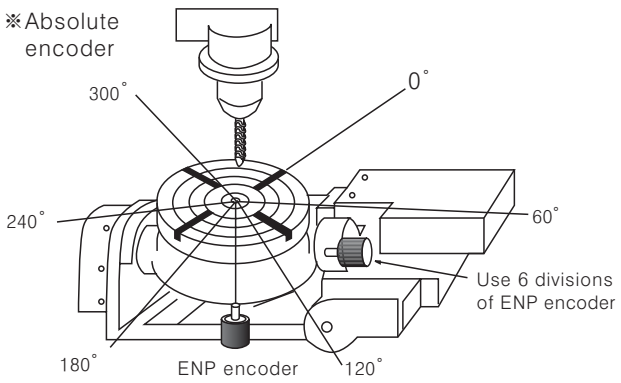
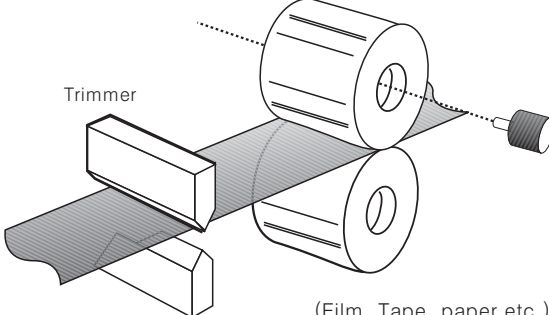
●CID13P-2-SI, CID13P-5-SI, CID13P-10-SI (For cam positioner)



- (A) Counter
- (B) Timer
- (C) Temp. controller
- (D) Power controller
- (E) Panel meter
- (F) Tacho/Speed/Pulse meter
- (G) Display unit
- (H) Sensor controller
- (I) Switching power supply
- (J) Proximity sensor
- (K) Photo electric sensor
- (L) Pressure sensor
- (M) Rotary encoder
- (N) Stepping motor & Driver & Controller
- (O) Graphic panel
- (P) Production stoppage models & replacement

Applications

■ Applications

<p>Stopping the motor at right position</p> <p>※ Incremental encoder</p> 	<p>X, Y table positioning of NC tooling machine</p> <p>※ Incremental encoder</p> 
<p>Measuring of Robot arm's angle and position</p> <p>※ Incremental encoder</p> 	<p>Controlling drill's position of NC machine</p> <p>※ Absolute encoder</p> <p>Use 8 divisions of ENP encoder</p> 
<p>Controlling position of moving crane</p> <p>※ Incremental encoder</p> 	<p>Controlling table's angle of NC machine</p> <p>※ Absolute encoder</p> <p>Use 6 divisions of ENP encoder</p> 
<p>Measuring the length of sheet</p> <p>※ Incremental encoder</p> <p>Trimmer</p>  <p>(Film, Tape, paper etc.)</p>	<p>Controlling entrance and exit of car</p> <p>※ Absolute encoder</p> 