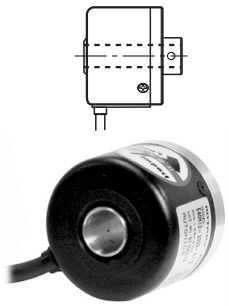
Diameter ϕ40mm Shaft type/Hollow type/Built-in type INCREMENTAL Rotary encoder

▣Features

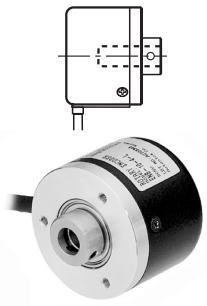
- ●Easy installation at narrow space
- ●Small inertia moment
- ●Wide range of power source : 5VDC, 12-24VDC ±5%
- ●Various output types

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

E40S SERIES



E40H SERIES



E40HB SERIES

▣Ordering information

E40 [H] — 8 — 5000 — 3 — 2 — 24 — [ ]

Series	Shaft type	Hollow type	Pulse/1Revolution	Output phase	Output	Power supply	Cable
S:Shaft type H:Hollow type HB:Hollow built-in type	Outside (※) 6: ϕ6mm 8: ϕ8mm	Inside 6: ϕ6mm 8: ϕ8mm 10: ϕ10mm 12: ϕ12mm	See resolution	2:A, B 3:A, B, Z 4:A, $\overline{A}$, B, $\overline{B}$ 6:A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$	1:Totem pole output 2:NPN open collector output 3:Voltage output L:Line driver output(※)	5 :5VDC ±5% 24:12-24VDC ±5%	No mark:Normal type (※) 2C:Cable outgoing connector type

※Standard : E40S6-[PULSE]-3-2-24
E40H8-[PULSE]-3-2-24
E40HB8-[PULSE]-3-2-24] 12-24VDC

※Standard:A, B, Z

※The power of Line driver is only for 5VDC

※Cable length : 200mm

▣Specifications

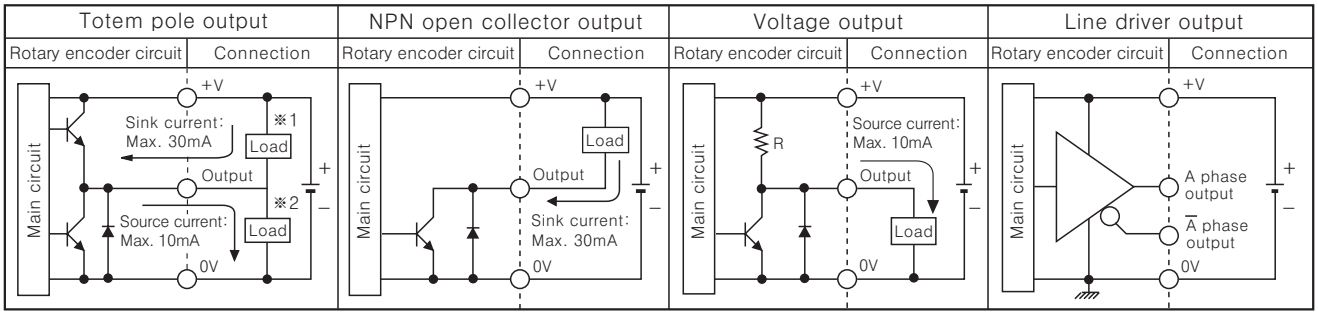
Item			Diameter ϕ40mm shaft type Incremental Rotary encoder	
Resolution(P/R)			**(★Note1)** *1, *2 ,*5, 10, *12, 15, 20, 23, 25, 30, 35, 40, 45, 50, 60, 75, 100, 120, 150, 192, 200, 240, 250, 256, 300, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 1500, 1800, 2000, 2048, 2500, 3000, 3600, 5000 (Not indicated type is available to customize)	
Electrical specification	Phase difference of output		Output between A and B phase : $\frac{T}{4} \pm \frac{T}{8}$ (T=1cycle 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 : Min. (Power supply-1.5)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. 0.5V High ☞ Load current : Max. -20mA, Output voltage : Min. 2.5V	
	Response time (Rise/Fall)	Totem pole output	Max. 1μs	• Measuring condition ☞ Cable length : 2m, I sink = Max. 20mA
		NPN open collector output	Max. 1μs	
		Voltage output	Max. 1μs	
		Line driver output	Max. 0.5μs	
	Max. Response frequency		180kHz	
	Current consumption		Max. 60mA(disconnection of the load), Line driver output:Max. 50mA(disconnection of the load)	
	Insulation resistance		Min. 100MΩ(at 500VDC)	
	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 · cm(0.004N · m), Holl Type : Max. 50gf · cm(0.005N · m)	
	Moment of inertia		Max. 40g · cm² (2×40⁻⁶kg · m²)	
	Shaft loading		Radial : Max. 2kgf, Thrust : Max. 1kgf	
	Deviation of shaft position		Radial : Max. 0.1mm, Thrust : Max. 0.2mm	
	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℃(at non-freezing status), Storage:-25 ~ 85℃	
Ambient humidity			35~85%RH, Storage: 35~90%RH	
Protection			IP50(IEC specification)	
Cable			5P, ϕ5mm, Length : 2m, Shield cable(Line driver output : 8P, ϕ5mm)	
Accessory			ϕ6mm coupling standard, ϕ8mm coupling(Option) [Applied only for shaft type]	
Weight			Approx. 120g	
Approval			CE (Except Line driver output)	

※**(★Note1)**'*' pulse is only for A, B phase(Line Driver output is A, $\overline{A}$, B, $\overline{B}$ phase)

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

Please select the resolution to make lower max. revolution than max. allowable revolution.

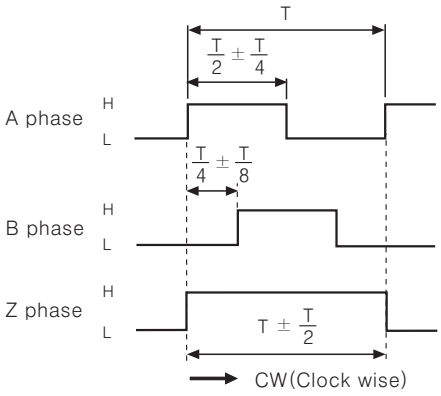
▣Control output diagram



☞ Totem pole output type can be used for NPN open collector output type(※1) or Voltage output type(※2).
☞ All output circuits are the same A, B, Z phase(Line driver output is A, Ā, B, B̄, Z, Z̄)

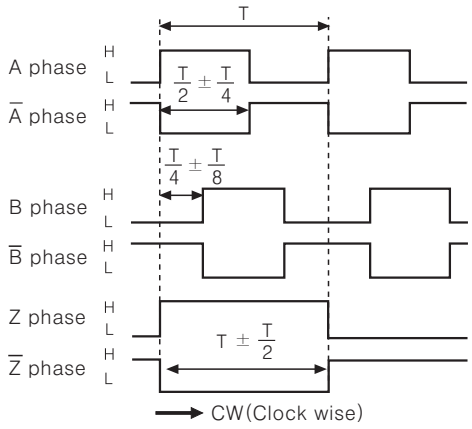
▣Output waveform

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



※Inverse type of Z phase is optional.

●Line driver output

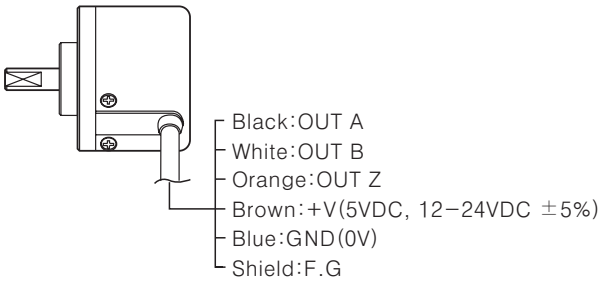


※CW : In a view of shaft

▣Connections

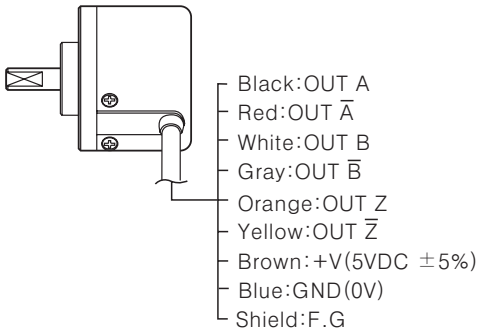
■Normal type

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



※Unused wires must be insulated.
※The body of encoder is connected to a shield.

●Line driver output



■ Cable outgoing connector type

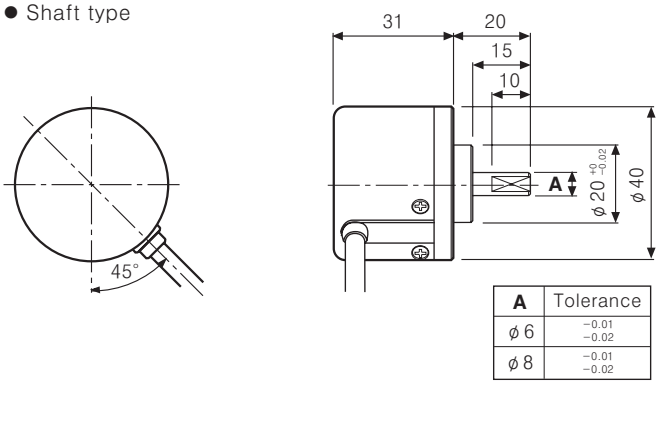
Pin No.	Cable color	Totem pole output NPN open collector output Voltage output	Line driver outut
①	Black	OUT A	OUT A
②	Red	N.C	OUT Ā
③	Brown	+V	+V
④	Blue	GND	GND
⑤	White	OUT B	OUT B
⑥	Gray	N.C	OUT B̄
⑦	Orange	OUT Z	OUT Z
⑧	Yellow	N.C	OUT Z̄
⑨	Shield	F.G	F.G
⑩	Purple	N.C	N.C

※N.C(Not Connected)
※F.G(Field Ground)

▣Dimensions

■Normal type

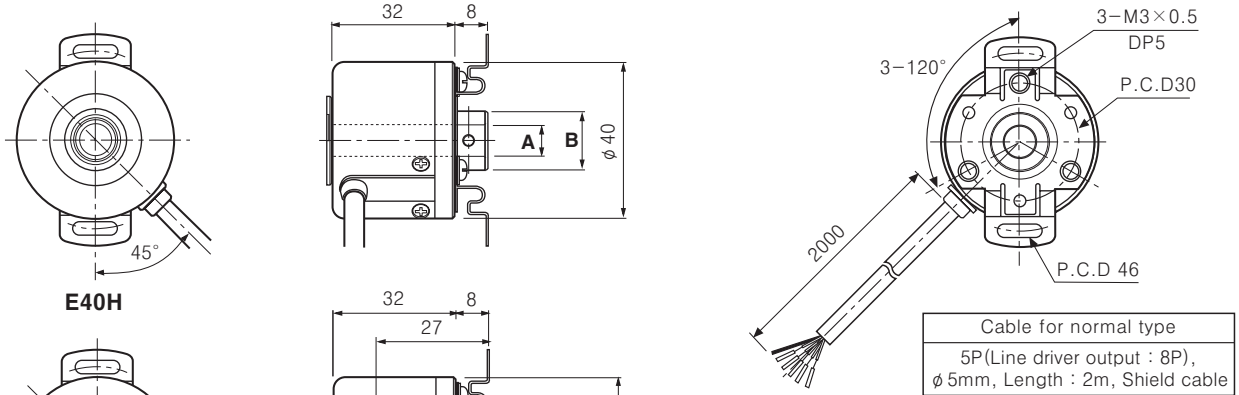
● Shaft type



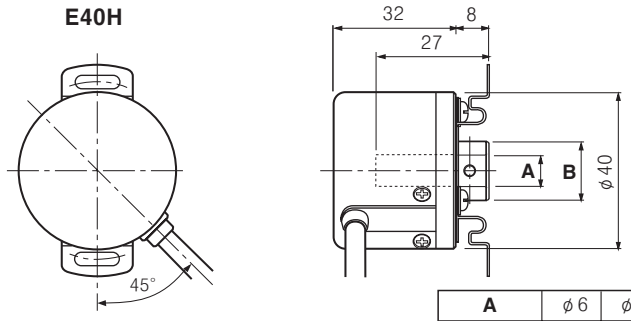
A	Tolerance
ϕ6	−0.01 −0.02
ϕ8	−0.01 −0.02

Cable for normal type
5P(Line driver output : 8P), ϕ5mm, Length : 2m, Shield cable

● Hollow shaft / Hollow shaft built−in type



E40H



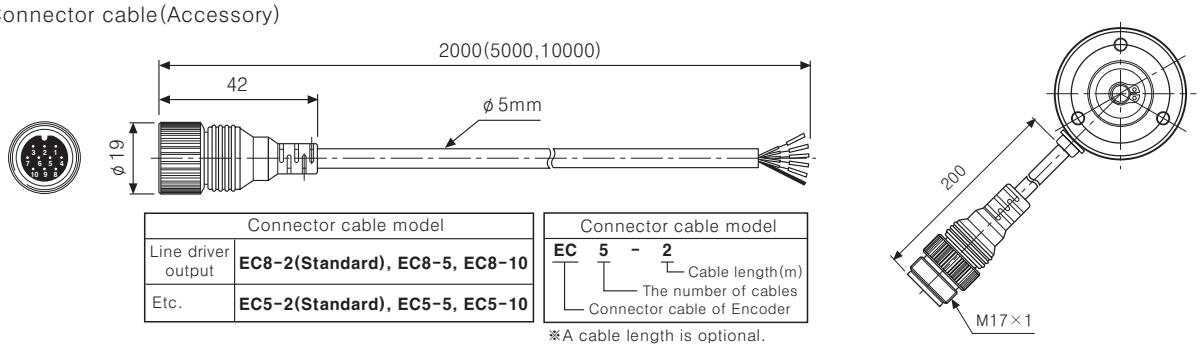
E40HB

Cable for normal type
5P(Line driver output : 8P), ϕ5mm, Length : 2m, Shield cable

A	ϕ6	ϕ8	ϕ10	ϕ12
B	ϕ15		ϕ17	
Tolerance	+0.015 −0			

■ Cable outgoing connector type

●Connector cable(Accessory)



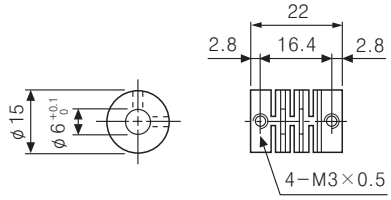
Connector cable model	
Line driver output	**EC8-2(Standard), EC8-5, EC8-10**
Etc.	**EC5-2(Standard), EC5-5, EC5-10**

Connector cable model			
EC	**5**	**-**	**2**
			Cable length(m)
			The number of cables
			Connector cable of Encoder

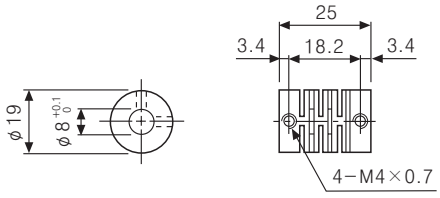
※A cable length is optional.

● Coupling(E40S)

[ϕ6 Coupling]



[ϕ8 Coupling]



Unit:mm