φ40 Body Standard / Hollow Shaft Type

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**

CE

▣ 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 (※) No mark: 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 } 12−24VDC
E40HB8−[PULSE]−3−2−24

※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 voltage−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 (Rese/Fall)	Totem pole output	Max. 1μs
		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) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$】
Please select the resolution to make lower max. revolution than max. allowable revolution.

• Measuring condition ☞ Cable length : 2m, I sink = Max. 20mA

(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) Proximity sensor
(J) Photo electric sensor
(K) Pressure sensor
(L) Rotary encoder
(M) 5−Phase stepping motor & Driver & Controller

E40 Series

▣ Control output diagram

| Totem pole output		NPN open collector output		Voltage output		Line driver output	
Rotary encoder circuit	Connection	Rotary encoder circuit	Connection	Rotary encoder circuit	Connection	Rotary encoder circuit	Connection
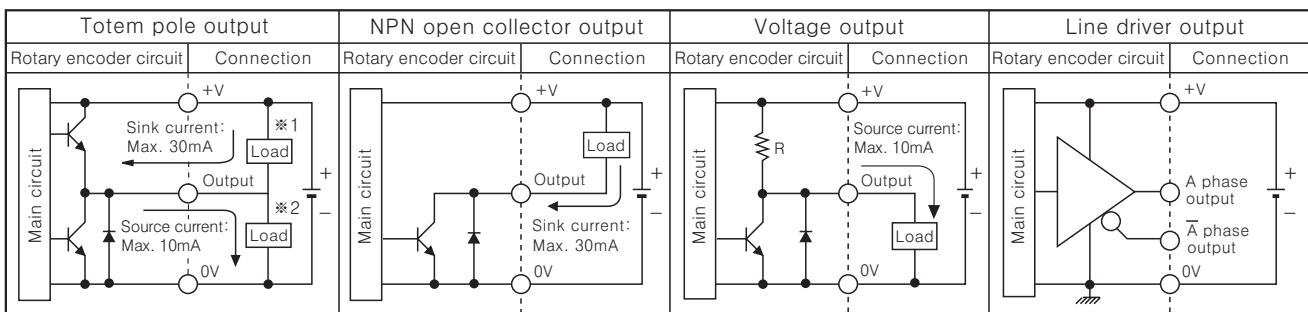
☞ Totem pole output type can be used for NPN open collector output type(※1) or Voltage output type(※2).
☞ All output circuits are the same A, B, Z phase(Line driver output is A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$)

▣ Output waveform

● Totem pole output / NPN open collector output / Voltage output
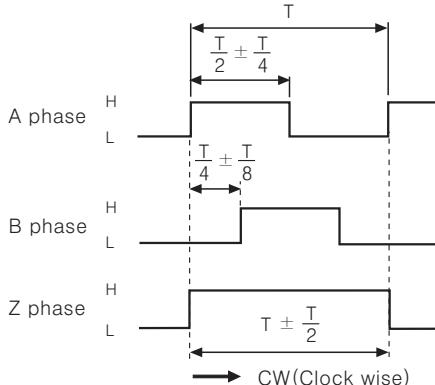
※Inverse type of Z phase is optional.

● Line driver output
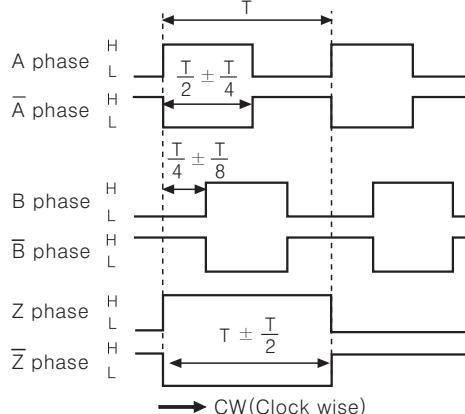

※CW : In a view of shaft

▣ Connections

■ Normal type

● Totem pole output / NPN open collector output / Voltage output
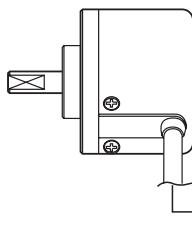
Black:OUT A
White:OUT B
Orange:OUT Z
Brown:+V(5VDC, 12−24VDC ±5%)
Blue:GND(0V)
Shield:F.G

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

● Line driver output
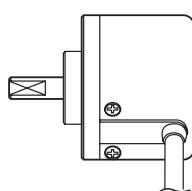
Black:OUT A
Red:OUT $\overline{A}$
White:OUT B
Gray:OUT $\overline{B}$
Orange:OUT Z
Yellow:OUT $\overline{Z}$
Brown:+V(5VDC ±5%)
Blue:GND(0V)
Shield:F.G

■ 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 $\overline{A}$
③	Brown	+V	+V
④	Blue	GND	GND
⑤	White	OUT B	OUT B
⑥	Gray	N.C	OUT $\overline{B}$
⑦	Orange	OUT Z	OUT Z
⑧	Yellow	N.C	OUT $\overline{Z}$
⑨	Shield	F.G	F.G
⑩	Purple	N.C	N.C

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

Autonics

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■Dimensions

■Normal type

● Shaft type

31 20 15 10

ϕ20 $^{+0}_{-0.02}$ ϕ40

A

45°

2000

3−M3×0.5
DP5

3−120°

P.C.D30

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
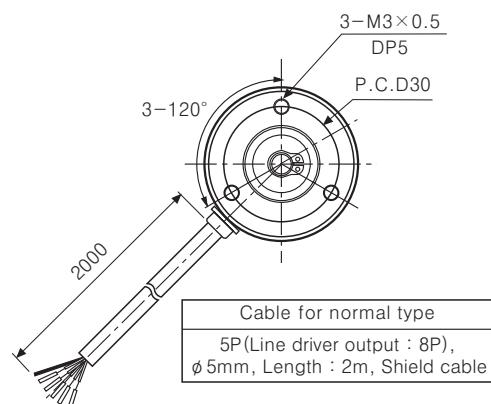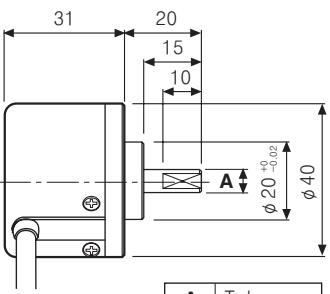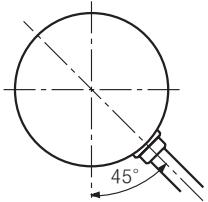
● Hollow shaft / Hollow shaft built−in type

32 8

A B ϕ40

45°

E40H

32 27 8

A B ϕ40

45°

E40HB

3−M3×0.5
DP5

3−120°

P.C.D30

2000

P.C.D 46

Cable for normal type
5P(Line driver output : 8P), ϕ5mm, Length : 2m, Shield cable
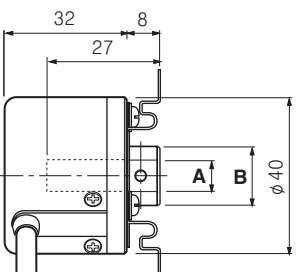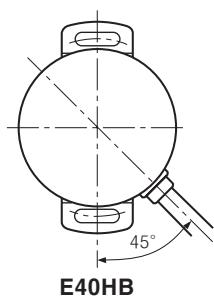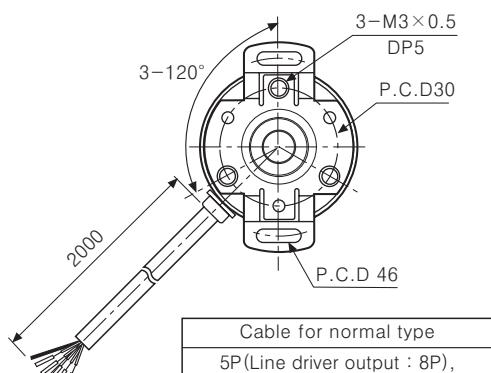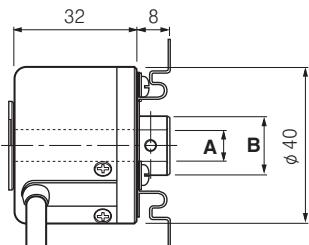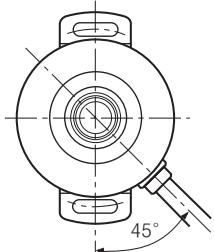
A	ϕ6	ϕ8	ϕ10	ϕ12
B	ϕ15		ϕ17	
Tolerance	$^{+0.015}_{-0}$			
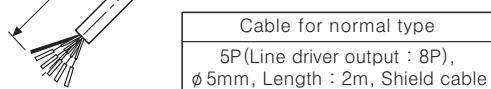
■ Cable outgoing connector type

●Connector cable(Accessory)

2000(5000,10000)

42

ϕ19

ϕ5mm

200

M17×1
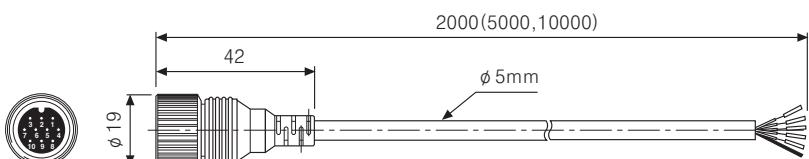
Connector cable model	
Line driver output	EC8-2(Standard), EC8-5, EC8-10
Etc.	EC5-2(Standard), EC5-5, EC5-10

Connector cable model
EC 5 - 2

Cable length(m)
The number of cables
Connector cable of Encoder

※A cable length is optional.
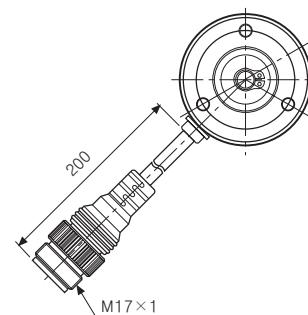
● Coupling(E40S)

[ϕ6 Coupling]

22 2.8 16.4 2.8

ϕ15 ϕ6 $^{+0.1}_{0}$

4−M3×0.5

[ϕ8 Coupling]

25 3.4 18.2 3.4

ϕ19 ϕ8 $^{+0.1}_{0}$

4−M4×0.7
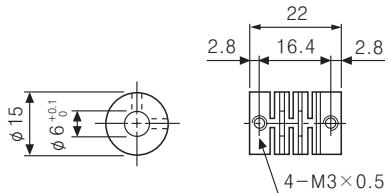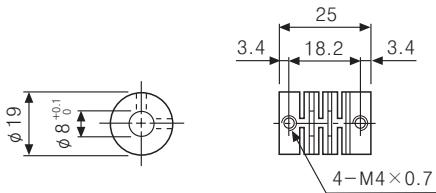
Unit:mm

(A) Counter

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