DRW171368AB

Autonics

ROTARY ENCODER (INCREMENTAL TYPE)
E40 SERIES
INSTRUCTION MANUAL

CE

E40S **E40H** **E40HB**

Thank you for choosing our Autonics product.
Please read the following safety considerations before use.

▣ Safety Considerations

※Please observe all safety considerations for safe and proper product operation to avoid hazards.
※⚠ symbol represents caution due to special circumstances in which hazards may occur.

⚠ Warning Failure to follow these instructions may result in serious injury or death.
⚠ Caution Failure to follow these instructions may result in personal injury or product damage.

⚠ Warning

1. **Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)**
   Failure to follow this instruction may result in fire, personal injury, or economic loss.
2. **Install on a device panel to use.**
   Failure to follow this instruction may result in fire.
3. **Do not connect, repair, or inspect the unit while connected to a power source.**
   Failure to follow this instruction may result in fire.
4. **Check 'Connections' before wiring.**
   Failure to follow this instruction may result in fire.
5. **Do not disassemble or modify the unit.**
   Failure to follow this instruction may result in fire.

⚠ Caution

1. **Use the unit within the rated specifications.**
   Failure to follow this instruction may result in fire or product damage.
2. **Do not short the load.**
   Failure to follow this instruction may result in product damage by fire.
3. **Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
   Failure to follow this instruction may result in fire or explosion.
4. **Do not use the unit near the place where there is the equipment which generates strong magnetic force or high frequency noise and strong alkaline, strong acidic exists.**
   Failure to follow this instruction may result in product damage.

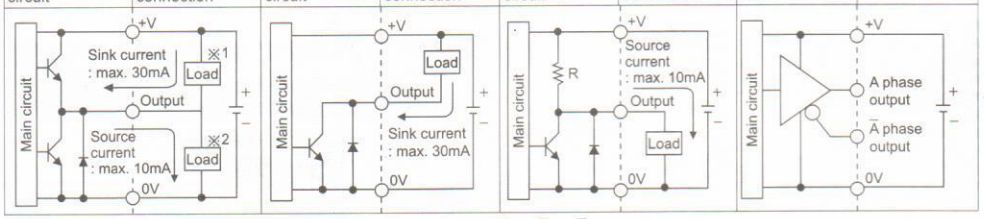
▣ Ordering Information

E40S	6	–	5000	–	3	–	N	–	24	–	

Series	Shaft diameter		Pulses / revolution	Output phase	Control output	Power supply	Cable
Ø40mm Shaft type	External	6: Ø6mm 8: Ø8mm	Refer to resolution	2: A, B 3: A, B, Z 4: A, $\overline{A}$, B, $\overline{B}$ 6: A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$	T: Totem pole output N: NPN open collector output V: Voltage output L: Line driver output	5: 5VDC ±5% 24: 12-24VDC ±5%	No mark : Radial cable type C : Radial cable connector type
Ø40mm Hollow shaft type, Hollow built-in type	Inside	6: Ø6mm 8: Ø8mm 10: Ø10mm 12: Ø12mm					

▣ Control Output Diagram

Totem pole output		NPN open collector output		Voltage output		Line driver output	
Rotary encoder circuit	Load connection	Rotary encoder circuit	Load connection	Rotary encoder circuit	Load connection	Rotary encoder circuit	Load connection



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

※The above specifications are subject to change and some models may be discontinued without notice.
※Be sure to follow cautions written in the instruction manual, and the technical descriptions (catalog, homepage).

▣ Specifications

Item			Diameter Ø40mm shaft type/hollow
Model	Totem pole output		E40S□-□-□-T-□-□
	NPN open collector output		E40S□-□-□-N-□-□
	Voltage output		E40S□-□-□-V-□-□
	Line driver output		E40S□-□-□-L-□-□
Resolution (PPR)※1			*1, *2, *5, 10, *12, 15, 20, 23, 25, 30, 300, 360, 400, 500, 512, 600, 800, 10
Output phase※2			A, B, Z phase (line driver output: A, $\overline{A}$
Electrical specification	Phase difference between output		Output between A and B phase: $\frac{T}{4}\pm\frac{T}{8}$
	Control output	Totem pole output	•[Low] - Load current: max. 30mA, res •[High] - Load current: max. 10mA, Output voltage (power voltag Output voltage (power voltag
		NPN open collector output	Load current: max. 30mA, residual vo
		Voltage output	Load current: max. 10mA, residual vo
		Line driver output	•[Low] - Load current: max. 20mA, res •[High] - Load current: max. -20mA, Output voltage (power voltag Output voltage (power voltag
	Response time (rise/fall)	Totem pole output	Max. 1μs (cable length: 2m, I sink=20
		NPN open collector output	
		Voltage output	
		Line driver output	Max. 0.5μs (cable length: 2m, I sink=2
	Max. response frequency		300kHz
	Power supply		•5VDC⎓ ±5% (ripple P-P: max. 5%)
	Current consumption		Max. 80mA (disconnection of the load
	Insulation resistance		Over 100MΩ (at 500VDC megger bet
	Dielectric strength		750VAC 50/60Hz for 1 minute (betwe
	Connection		Radial cable type, radial cable connec
Mechanical specification	Starting torque		Shaft type: max. 40gf·cm (0.004N·m),
	Moment of inertia		Max. 40g·cm² (4×10⁻⁶ kg·m²)
	Shaft loading		Radial: 2kgf, Thrust: 1kgf
	Max. allowable revolution※3		5,000rpm
Vibration			1.5mm amplitude at frequency of 10 t
Shock			Approx. max. 50G
Environment	Ambient temp.		-10 to 70℃, storage: -25 to 85℃
	Ambient humi.		35 to 85%RH, storage: 35 to 90%RH
Protection structure			IP50 (IEC standard)
Cable			Ø5mm, 5-wire (line driver output: 8-wi (AWG 24, core diameter: 0.08mm, nu
Accessory			Ø6mm coupling, Ø8mm coupling Br
Approval			CE (except for line driver output)
Unit weight			Approx. 120g

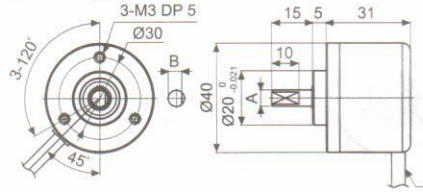
※1: Not indicated resolutions are customizable. ※2: '*' pulse is
※3: Make sure that Max. response revolution should be lower than o

$$[\text{Max. response revolution (rpm)}] = \frac{\text{Max. response frequency}}{\text{Resolution}} \times 6$$

※Environment resistance is rated at no freezing or condensation.

▣ Dimensions

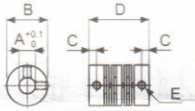
◎ Shaft type



A	Ø6 -0.004 -0.016	Ø8 -0.005 -0.02
B	5	7

Cable for radial cable type
Ø5, 5-wire (Line driver output: 8-wire), Length: 2m, Shield cable
Cable for radial cable connector type
Ø5, 5-wire (Line driver output: 8-wire), Length: 250mm, Shield cable

◎ Coupling (shaft type)



- Parallel misalignment: max. 0.25mm
- Angular misalignment: max. 5°
- End-play: max. 0.5mm

	A	B	C	D	E
E40S6 Ø6mm coupling	Ø6	Ø15	2.8	22	4-M3
E40S8 Ø8mm coupling	Ø8	Ø19	3.4	25	4-M4

※It must not use larger shaft loading than specification.
※Do not put strong impact when insert a coupling into shaft. Failure to follow this instruction may result in product damage.
※Fix the unit or a coupling by a wrench under 0.15 N·m of torque.
※When you install this unit, if eccentricity and deflection angle are larger, it may shorten the life cycle of this unit.