Autonics

ROTARY ENCODER(INCREMENTAL TYPE)
E20 SERIES

M A N U A L

Thank you very much for selecting Autonics products.
For your safety, please read the following before using.

▣ Caution for your safety

※Please keep these instructions and review them before using this unit.

※Please observe the cautions that follow;

⚠Warning Serious injury may result if instructions are not followed.

⚠Caution Product may be damaged, or injury may result if instructions are not followed.

※The following is an explanation of the symbols used in the operation manual.
⚠caution:Injury or danger may occur under special conditions.

⚠ Warning

1. If this unit is used to control machineries (Medical equipment, vehicle, train, airplane, combustion apparatus, entertainment, processing and transportation equipment, elevator and various safety device etc.) enabling to effect on human or property, it is required to install fail-safe device.
It may cause a fire, serious human injury and damage on property.

⚠ Caution

1. It should be protected from water or oil.
It may cause damage or miscontrol due to malfunction.
2. Please observe the voltage range.
It may shorten the life cycle or damage to the product.
3. Please check the polarity of power and wrong wiring.
It may result in damage to this unit.
4. Do not short circuit the load.
It may result in damage to this unit.

▣ Outline

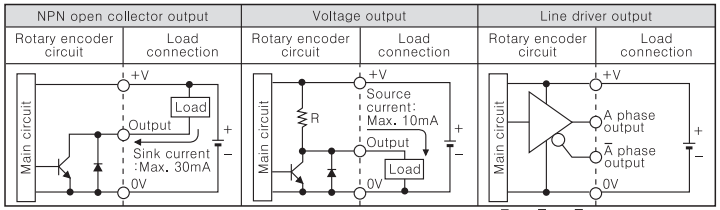
It is a optical incremental type of rotary encoder useful to control length, angle and position by convert rotation amount of rotation axis into the number of pulse and output.

▣ Ordering information

E20 S — 2 — 360 — 3 — N — 12 — R

Series	Shaft diameter	Pulse/ Revolution	Output phase	Output type	Power supply	Cable outgoing direction
E20S Diameter φ20mm, Shaft type	φ2mm	100, 200, 320, 360	3 : A, B, Z 6 : A, B, Z, Ā, B̄, Z̄	N : NPN open collector output V : Voltage output L : Line driver output ※The power of Line driver is only for 5VDC.	5 : 5VDC±5% 12 : 12VDC±5%	R : Rear S : Side
E20HB Diameter φ20mm, Built-in type	φ2mm, φ2.5mm, φ3mm					

▣ Control output diagram



☞ The output circuit of A, B, Z phase are the same. (Line driver output is A, Ā, B, B̄, Z, Z̄)

※ The above specifications are subject to change and some models may be discontinued without notice.

▣ Specifications

Item			φ20mm Shaft type Incremental Rotary Encoder	φ20mm Built-in type Incremental Rotary Encoder
Model			E20S2-□-3-N-□-R, S E20S2-□-3-V-□-R, S E20S2-□-6-L-5-R, S	E20HB□-□-3-N-□-R, S E20HB□-□-3-V-□-R, S E20HB□-□-6-L-5-R, S
Resolution(P/R)			100, 200, 320, 360 (Not indicated pulse and output type is customzable.)	
Electrical specification	Output phase		A, B, Z phase (Line driver output A, Ā, B, B̄, Z, Z̄ 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	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)	NPN open collector output	Max. 1㎲	• Measuring condition ☞ Cable length : 1m, I sink=Max. 20mA
		Voltage output	Max. 1㎲	
		Line driver output	Max. 0.5㎲	
	Max. Response frequency		100kHz	
	Power supply		• 5VDC ±5% • 12VDC ±5%	
	Current consumption		Max. 60mA(disconnection of the load), Line driver output:Max. 50mA(disconnection of the load)	
	Insulation resistance		Min. 100MΩ(at 500VDC between all terminals and case)	
	Dielectric strength		500VAC 50/60Hz for 1 minute(Between all terminals and case)	
	Connection		Outgoing cable type(Rear / Side)	
Mechanical specification	Starting torque		Max. 5gf • cm(5×10⁻³N • m)	
	Moment of inertia		Max. 0.5g • cm² (5×10⁻⁵kg • m²)	
	Shaft loading		Radial : 200gf, Thrust : 200gf	
	Max. allowable revolution		**(Note1)** 6000rpm	
Vibration			1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours	
Shock			Max. 50G	
Ambient temperature			−10 to 70℃(at non-freezing status), Storage : −20 to 80℃	
Ambient humidity			35 to 85%RH, Storage : 35 to 90%RH	
Protection			IP50(IEC standard)	
Cable			φ3mm, 5P(Line driver output : 8P), Length:1m, Shield cable	
Accessory			φ2mm Coupling(Shaft type), Bracket(Built-in type)	
Approval			CE (Except Line driver output)	
Unit weight			Approx. 35g	

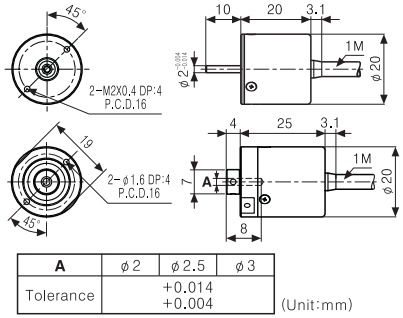
※**(Note1)**Max. allowable revolution ≧ Max. response revolution

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

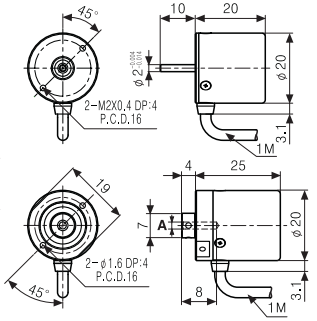
Please select the resolution to make lower max. revolution than max. allowable revolution.

▣ Dimension

◎**Rear side outgoing cable type**



◎**Side outgoing cable type**

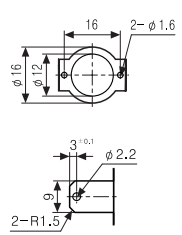


A	φ2	φ2.5	φ3
Tolerance	+0.014 +0.004		

(Unit:mm)

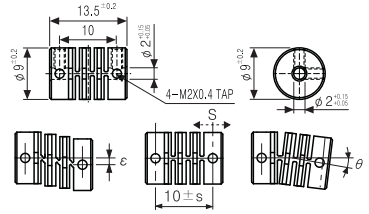
▣ Accessory

◎**E20HB Bracket**



◎**Coupling**

(Unit:mm)

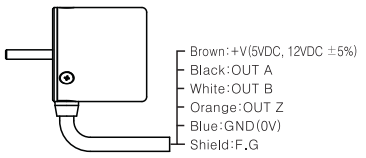


s = 0.2mm Max.
ε = 0.15mm Max.
θ = 2° Max.

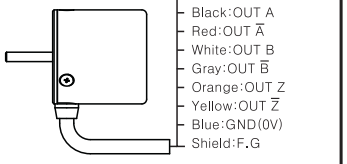
●When combine the coupling to encoder shaft, if there is big eccentricity or bend between rotating encoder shaft and mate shaft, it will make the life cycle of encoder and coupling shorten.
●Do not add too much load on rotation axis.

▣ Connections

●NPN open collector output/Voltage output

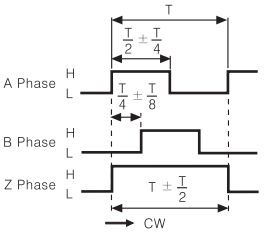


●Line driver output



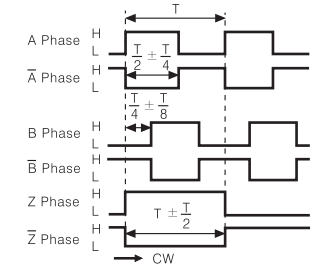
▣ Output waveform

●NPN open collector output/Voltage output



※CW(Clockwise):As viewed from the shaft

●Line driver output



▣ Caution for using

1. Installation
   ①This unit is consisted of precision components. Therefore please treat this product carefully.
   ②For the installation, please check the assembly dimension of counterpart, then try not to occur the offset between shaft hole and the object. It might shorten the life cycle of the product.
   ③Do not put strong impact when insert coupling into shaft.
   ④Fix the unit or coupling by wrench under 0.15N • m of torque.
2. For using
   ①Please connect shield wire to F.G terminal. (Encoder+Motor+Panel F.G.)
   ②Do not connect and cut circuit off during power on. It may result in damage to this unit.
   ③When the power source is a Switching Power, please install the surge absorber in power line and wire should be short in order not to be influenced by noise.
   ④Please apply 5VDC to encoder when use Line Driver type.
3. Environment
   Please do not use this unit with below environment, it results in malfunction.
   ①Place where this unit or component may be damaged by strong vibration or impact.
   ②Place where there are lots of flammable or corrosive gases.
   ③Place where strong magnet field or electric noise are occurred.
   ④Place where is beyond of rating temperature or humidity.
   ⑤Place where strong acids or alkali near by.
4. Vibration and Impact
   ①When the strong impact loads on this unit, the error pulse may occur as if the slit is revolving.
   ②Please fix this unit firmly when mount it in order to avoid malfunction by residual vibration.
5. Wire connection
   ①Do not pull out the unit after connection with over the rated force(15N).
   ②If use the cable of encoder and high voltage line or power cable in the same conduit, it may cause a malfunction or mechanical trouble. Please wire separately or use separated conduit.
   ③Please check wire and response frequency when extend wire because of distortion of waveform or residual voltage increment etc by line resistance or capacity between lines.

※It may cause malfunction if above instructions are not followed.

▣ Major products

- Photoelectric sensors
- Fiber optic sensors
- Door sensors
- Door side sensors
- Area sensors
- Proximity sensors
- Pressure sensors
- Rotary encoders
- Connector/Sockets
- Switching mode power supplies
- Control switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper motors/drivers/motion controllers
- Graphic/Logic panels
- Field network devices
- Laser marking system(Fiber, CO_2, Nd:YAG)
- Laser welding/soldering system
- Temperature controllers
- Temperature/Humidity transducers
- SSR/Power controllers
- Counters
- Timers
- Panel meters
- Tachometer/Pulse(Rate)meters
- Display units
- Sensor controllers

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