
DON'T IMPACT

A9. Rotary Encoders

Rotary encoders are used to electronically monitor the position of a rotating shaft by converting shaft rotation into electronic pulses.

A9-1	Incremental	E15 Series	15 mm Diameter Incremental Rotary Encoders
		E18 Series	18 mm Diameter Incremental Rotary Encoders
		E20 Series	20 mm Diameter Incremental Rotary Encoders
		E30 Series	30 mm Diameter Incremental Rotary Encoders
		E40 Series	40 mm Diameter Incremental Rotary Encoders
		E50 Series	50 mm Diameter Incremental Rotary Encoders
		E58 Series	58 mm Diameter Incremental Rotary Encoders
		E60 Series	60 mm Diameter Incremental Rotary Encoders
		E68 Series	68 mm Diameter Incremental Rotary Encoders
		E80 Series	80 mm Diameter Incremental Rotary Encoders
		E88 Series	88 mm Diameter Incremental Rotary Encoders
		E100 Series	100 mm Diameter Incremental Rotary Encoders
		ENA Series	Side Mount Type Incremental Rotary Encoders
		ENC Series	Wheel Type Incremental Rotary Encoders
A9-2	Incremental (Sine Wave)	E18-A Series	18 mm Diameter Sine Wave Incremental Rotary Encoders
		E58-A Series	58 mm Diameter Sine Wave Incremental Rotary Encoders
		E60-A Series	60 mm Diameter Sine Wave Incremental Rotary Encoders
A9-3	Absolute (Single-Turn)	EP50 Series	50 mm Diameter Absolute Single-Turn Rotary Encoders (Optical)
		EP58 Series	58 mm Diameter Absolute Single-Turn Rotary Encoders (Optical)
		ENP Series	60 mm Diameter Absolute Single-Turn Rotary Encoders (Optical)
		MGA50 Series	50 mm Diameter Absolute Single-Turn Rotary Encoders (Magnetic)
		EWLS50 Series	50 mm Wire-Type Linear Scale Absolute Encoders (Optical)
A9-4	Absolute (Multi-Turn)	EPM50 Series	50 mm Diameter Absolute Multi-Turn Rotary Encoders (Optical)
		MGAM50 Series	50 mm Diameter Absolute Multi-Turn Rotary Encoders (Magnetic)
A9-5	Manual Handle	ENH Series	Manual Handle Type Pulse Generators
		ENHP Series	Portable Manual Handle Type Pulse Generators
A9-6	Flexible Coupling	ERB Series	Flexible Shaft Coupling

15 mm Diameter Incremental
Rotary Encoders

E15 Series

Features

- Ultra-compact (Ø 15 mm) housing and ultra-lightweight (14 g) design
- Easy installation in tight or limited spaces
- Low shaft moment of inertia
- Resolution: 36 pulses per revolution
- Power supply:
  5 VDC⎓ ± 5%

Specifications

Model	E15S2-36-2-N-5-R
Resolution	36 PPR
Control output	NPN open collector output
Output phase	A, B
Inflow current	≤ 30 mA
Residual voltage	≤ 0.4 VDC⎓
Response speed 01)	≤ 1 μs
Max. response freq.	10 kHz
Max. allowable revolution 02)	3,000 rpm
Starting torque	≤ 10×10^{-4} N m
Inertia moment	≤ 0.5 g·cm^2 (5×10^{-8} kg·m^2)
Allowable shaft load	Radial: ≤ 200 gf, Thrust: ≤ 200 gf
Unit weight (packaged)	≈ 14 g (≈ 37 g)
Approval	EAC

01) Based on cable length: 1 m, I sink: 20 mA
02) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60 \text{ sec}]$$

Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%)
Current consumption	≤ 50 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 500 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 50 G
Ambient temperature	-10 to 70 °C, storage: -20 to 80 °C (no freezing or condensation)
Ambient humidity	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP50 (IEC standard)
Connection	Axial wiring type
Cable spec.	Ø 3 mm, 4-wire, 500 mm, flexible PVC insulation shield cable
Wire spec.	AWG30 (0.102 mm, 7-core), insulator diameter: Ø 0.71 mm

View product detail

18 mm Diameter Incremental Rotary Encoders

E18 Series

Features

- Ultra-compact (Ø 18 mm) housing and ultra-lightweight (12 g) design
- Easy installation in tight or limited spaces
- Low shaft moment of inertia
- Various resolutions:
  100, 200, 300, 400 pulses per revolution
- Power supply:
  5 VDC⎓ ± 5%

Specifications

Model	E18S□-□-1-N-5-□	E18S□-□-1-V-5-□
Resolution	100 / 200 / 300 / 400 PPR model	
Control output	NPN open collector output	Voltage output
Output phase	A	
Inflow current	≤ 30 mA	-
Residual voltage	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓
Outflow current	-	≤ 10 mA
Response speed [01]	≤ 1 μs	
Max. response freq.	25 kHz	
Max. allowable revolution [02]	6,000 rpm	
Starting torque	≤ 9.8×10^{-4} N m	
Inertia moment	≤ 0.5 g·cm^2 (5×10^{-8} kg·m^2)	
Allowable shaft load	Radial: ≤ 200 gf, Thrust: ≤ 200 gf	
Unit weight (packaged)	Shaft outer diameter Ø 2 mm model: ≈ 12 g (≈ 35.4 g) Shaft outer diameter Ø 2.5 mm model: ≈ 12 g (≈ 34.2 g)	
Approval	CE c UL us EAC	CE c UL us EAC

01) Based on cable length: 1 m, I sink: 20 mA
02) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60 \text{ sec}]$$

Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%)
Current consumption	≤ 50 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 500 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 50 G
Ambient temperature	-10 to 70 °C, storage: -20 to 80 °C (no freezing or condensation)
Ambient humidity	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP50 (IEC standard)
Connection	Axial / Radial cable type model
Cable spec.	Ø 1.28 mm, 3-wire, 150 mm, flat ribbon cable
Wire spec.	AWG26 (0.16 mm, 7-core), insulator diameter: Ø 1.28 mm

View product detail

20 mm Diameter Incremental
Rotary Encoders

E20 Series

Features

- Easy installation in tight or limited spaces
- Low shaft moment of inertia
- Various resolutions:
  100, 200, 320, 360 pulses per revolution
- Various control output options
- Power supply:
  5 VDC⎓ ± 5%, 12 VDC⎓ ± 5%

Specifications

Model	E20□□-□-3-N-□-□	E20□□-□-3-V-□-□	E20□□-□-6-L-5-□
Resolution	100 / 200 / 320 / 360 PPR model		
Control output	NPN open collector output	Voltage output	Line driver output
Output phase	A, B, Z	A, B, Z	A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$
Inflow current	≤ 30 mA	-	≤ 20 mA
Residual voltage	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.5 VDC⎓
Outflow current	-	≤ 10 mA	≤ -20 mA
Output voltage	-	-	≥ 2.5 VDC⎓
Response speed [01]	≤ 1 μs		≤ 0.5 μs
Max. response frequency	100 kHz		
Max. allowable revolution [02]	6,000 rpm		
Starting torque	≤ 5×10^{-4} N m		
Inertia moment	≤ 0.5 g·cm^2 (5×10^{-8} kg·m^2)		
Allowable shaft load	Radial: ≤ 200 gf, Thrust: ≤ 200 gf		
Unit weight	≈ 35 g		
Approval	CE EAC	CE EAC	EAC

01) Based on cable length: 1 m, I sink: 20 mA
02) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution
[max. response revolution (rpm) = $\frac{\text{max. response frequency}}{\text{resolution}} \times 60$ sec]

Model	E20□□-□-3-N-□-□	E20□□-□-3-V-□-□	E20□□-□-6-L-5-□
Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%) / 12 VDC⎓ ± 5% (ripple P-P: ≤ 5%) model		5 VDC⎓ ± 5% (ripple P-P: ≤ 5%)
Current consumption	≤ 60 mA (no load)		≤ 50 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)		
Dielectric strength	Between all terminals and case: 500 VAC~ 50 / 60 Hz for 1 minute		
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours		
Shock	≲ 50 G		
Ambient temp.	-10 to 70 °C, storage: -20 to 80 °C (no freezing or condensation)		
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)		
Protection rating	IP50 (IEC standard)		
Connection	Axial / Radial cable type model		
Cable spec.	Ø 3 mm, 5-wire (Line driver output: 8-wire), 1 m, shield cable		

View product detail

Shaft Type

Blind Hollow Shaft Type

30 mm Diameter Incremental Rotary Encoders

E30 Series

Features

- Compact Ø 30 mm housing, Ø 4 mm solid shaft
- Easy installation in tight or limited spaces
- Low shaft moment of inertia
- Various resolutions: up to 3000 pulses per revolution
- Various control output options
- Power supply:
  5 VDC⎓ ± 5%, 12 - 24 VDC⎓ ± 5%

Specifications

Model	E30S4-□-3-T-□-□	E30S4-□-3-N-□-□	E30S4-□-3-V-□-□	E30S4-□-6-L-5-□
Resolution	100 / 200 / 360 / 500 / 1,000 / 1,024 / 3,000 PPR model			
Control output	Totem pole output	NPN open collector output	Voltage output	Line driver output
Output phase	A, B, Z	A, B, Z	A, B, Z	A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$
Inflow current	≤ 30 mA	≤ 30 mA	-	≤ 20 mA
Residual voltage	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.5 VDC⎓
Outflow current	≤ 10 mA	-	≤ 10 mA	≤ -20 mA
Output voltage (5 VDC⎓)	≥ (power supply -2.0) VDC⎓	-	-	≥ 2.5 VDC⎓
Output voltage (12 - 24 VDC⎓)	≥ (power supply -3.0) VDC⎓	-	-	-
Response speed [01]	≤ 1 µs		≤ 1 µs [02] ≤ 2 µs [03]	≤ 0.5 µs
Max. response freq.	300 kHz			
Max. allowable revolution [04]	5,000 rpm			
Starting torque	≤ 0.002 N m			
Inertia moment	≤ 20 g·cm^2 (2 × 10^{-6} kg·m^2)			
Allowable shaft load	Radial: ≤ 2 kgf, Thrust: ≤ 1 kgf			
Unit weight	≈ 80 g			
Approval	CE EAC	CE EAC	CE EAC	EAC

01) Based on cable length: 2 m, I sink: 20 mA
02) Based on power supply: 5 VDC⎓, output resistance: 820 Ω
03) Based on power supply: 12 - 24 VDC⎓, output resistance: 4.7 kΩ
04) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max.response revolution (rpm)} = \frac{\text{max.response frequency}}{\text{resolution}} \times 60 \text{ sec}]$$

Model	E30S4-□-3-T-□-□	E30S4-□-3-N-□-□	E30S4-□-3-V-□-□	E30S4-□-6-L-5-□
Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%) / 12-24 VDC⎓ ± 5% (ripple P-P: ≤ 5%) model			5 VDC⎓ ± 5% (ripple P-P: ≤ 5%)
Current consumption	≤ 80 mA (no load)			≤ 50 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)			
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute			
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours			
Shock	≲ 50 G			
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)			
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)			
Protection rating	IP50 (IEC standard)			
Connection	Axial cable type / cable connector type model			
Cable spec.	Ø 5 mm, 5-wire (Line driver output: 8-wire), shield cable cable type: 2 m, cable connector type: 250 mm			
Wire spec.	AWG24 (0.08 mm, 40-core), insulator diameter: Ø 1 mm			
Connector spec.	M17 6-pin socket type			M17 9-pin socket type

View product detail

40 mm Diameter Incremental
Rotary Encoders

E40 Series

Features

- Ø 40 mm housing incremental rotary encoders
- Shaft, hollow shaft, blind hollow shaft models available
- Easy installation in tight or limited spaces
- Low shaft moment of inertia
- Various resolutions:
  1 to 5000 pulses per revolution
- Various control output options
- Power supply:
  5 VDC⎓ ± 5%, 12 - 24 VDC⎓ ± 5%

Specifications

Model	E40□□-□-□-T-□-□	E40□□-□-□-N-□-□	E40□□-□-□-V-□-□	E40□□-□-□-L-□-□
Resolution	1 / 2 / 5 / 12 PPR [01] 10 to 5,000 PPR model			
Control output	Totem pole output	NPN open collector output	Voltage output	Line driver output
Output phase	A, B, Z	A, B, Z	A, B, Z	A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$
Inflow current	≤ 30 mA	≤ 30 mA	-	≤ 20 mA
Residual voltage	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.5 VDC⎓
Outflow current	≤ 10 mA	-	≤ 10 mA	≤ -20 mA
Output voltage (5 VDC⎓)	≥ (power supply -2.0) VDC⎓	-	-	≥ 2.5 VDC⎓
Output voltage (12 - 24 VDC⎓)	≥ (power supply -3.0) VDC⎓	-	-	≥ (power supply -3.0) VDC⎓
Response speed [02]	≤ 1 μs			≤ 0.5 μs
Max. response freq.	300 kHz			
Max. allowable revolution [03]	5,000 rpm			
Starting torque	E40S: ≤ 0.004 N m E40H, E40HB: ≤ 0.005 N m			
Inertia moment	≤ 40 g·cm^2 (4 × 10^{-6} kg·m^2)			
Allowable shaft load	Radial: ≤ 2 kgf, Thrust: ≤ 1 kgf			
Unit weight	≈ 120 g			
Approval	CE EAC	CE EAC	CE EAC	EAC

01) Depending on the control output, only A, B or A, $\overline{A}$, B, $\overline{B}$ are output.
02) Based on cable length: 2 m, I sink: 20 mA
03) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60 \text{ sec}]$$

View product detail

Shaft Type

Hollow Shaft Type

Blind Hollow Shaft Type

50 mm Diameter Incremental Rotary Encoders

E50 Series

Features

- Ø 50 mm housing, Ø 8 mm solid shaft
- Accurate measurement of angle, position, revolution, speed, acceleration, and distance
- Cable type, cable connector type, axial / radial connector types available
- Various resolutions: 1 to 8000 pulses per revolution
- Various control output options
- Power supply: 5 VDC⎓ ± 5%, 12 - 24 VDC⎓ ± 5%

Specifications

Model	E50S8-□-□-T-□-□	E50S8-□-□-N-□-□	E50S8-□-□-V-□-□	E50S8-□-□-L-□-□
Resolution	1 / 2 / 5 PPR [01] 10 to 8,000 PPR model			
Control output	Totem pole output	NPN open collector output	Voltage output	Line driver output
Output phase	A, B, Z	A, B, Z	A, B, Z	A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$
Inflow current	≤ 30 mA	≤ 30 mA	-	≤ 20 mA
Residual voltage	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.5 VDC⎓
Outflow current	≤ 10 mA	-	≤ 10 mA	≤ -20 mA
Output voltage (5 VDC⎓)	≥ (power supply -2.0) VDC⎓	-	-	≥ 2.5 VDC⎓
Output voltage (12 - 24 VDC⎓)	≥ (power supply -3.0) VDC⎓	-	-	≥ (power supply -3.0) VDC⎓
Response speed [02]	≤ 1 µs			≤ 0.5 µs
Max. response freq.	300 kHz			
Max. allowable revolution [03]	5,000 rpm			
Approval	CE EAC	CE EAC	CE EAC	CE EAC

01) Depending on the control output, only A, B or A, $\overline{A}$, B, $\overline{B}$ are output.
02) Based on cable length: 2 m, I sink: 20 mA
03) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60 \text{ sec}]$$

Connection	Axial cable type	Axial cable connector type	Axial connector type	Radial connector type
Starting torque	≤ 0.007 N m		≤ 0.078 N m	
Inertia moment	≤ 80 g·cm^2 (8 × 10^{-6} kg·m^2)		≤ 400 g·cm^2 (4 × 10^{-5} kg·m^2)	
Allowable shaft load	Radial: ≤ 10 kgf, Thrust: ≤ 2.5 kgf			
Unit weight (packaged)	≈ 275 g (≈ 363 g)		≈ 180 g (≈ 268 g)	

Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%) / 12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%) model
Current consumption	Totempole, NPN open collector, Voltage output: ≤ 80 mA (no load) Line driver output: ≤ 50 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 75 G
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	Axial cable type / cable connector type: IP50 (IEC standard) [01] Axial / Radial connector type: IP64 (IEC standard)
Cable spec.	Ø 5 mm, 5-wire (Line driver output: 8-wire), shield cable cable type: 2 m, cable connector type: 250 mm
Wire spec.	AWG24 (0.08 mm, 40-core), insulator diameter: Ø 1 mm
Connector spec.	Totempole, NPN open collector, Voltage output: M17 6-pin socket type Line driver output: M17 9-pin socket type

01) Protection structure IP64 option is also available to order.
(starting torque: ≤ 0.078 N m, inertia moment: ≤ 400 g·cm^2 (4 × 10^{-5} kg·m^2))

View product detail

58 mm Diameter Incremental
Rotary Encoders

E58 Series

Features

- Ø 58 mm flange incremental rotary encoders
- Accurate measurement of angle, position, revolution, speed, acceleration, and distance
- Shaft, hollow shaft, blind hollow shaft models available
- Cable type, cable connector type, axial / radial connector types available
- Various resolutions:
  1 to 8000 pulses per revolution
- Various control output options
- Power supply:
  5 VDC⎓ ± 5%, 12 - 24 VDC⎓ ± 5%

View product detail

Clamping Shaft Type

Synchro Shaft Type

Hollow Shaft Type

Blind Hollow Shaft Type

Specifications

Model	E58□□-□-□-T-□-□	E58□□-□-□-N-□-□	E58□□-□-□-V-□-□	E58□□-□-□-L-□-□
Resolution	1 / 2 / 5 / 12 PPR [01] 10 to 8,000 PPR model			
Control output	Totem pole output	NPN open collector output	Voltage output	Line driver output
Output phase	A, B, Z	A, B, Z	A, B, Z	A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$
Inflow current	≤ 30 mA	≤ 30 mA	-	≤ 20 mA
Residual voltage	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.5 VDC⎓
Outflow current	≤ 10 mA	-	≤ 10 mA	≤ -20 mA
Output voltage (5 VDC⎓)	≥ (power supply -2.0) VDC⎓	-	-	≥ 2.5 VDC⎓
Output voltage (12 - 24 VDC⎓)	≥ (power supply -3.0) VDC⎓	-	-	≥ (power supply -3.0) VDC⎓
Response speed [02]	≤ 1 μs			≤ 0.5 μs
Max. response freq.	300 kHz			
Max. allowable revolution [03]	5,000 rpm			
Approval	CE EAC	CE EAC	CE EAC	EAC

01) Depending on the control output, only A, B or A, $\overline{A}$, B, $\overline{B}$ are output.
02) Based on cable length: 2 m, I sink: 20 mA
03) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution.
[max. response revolution (rpm) = $\frac{\text{max. response frequency}}{\text{resolution}}$ × 60 sec]

Shaft type	Shaft clamping type	Shaft synchro type	Hollow type	Hollow Built-in type
Starting torque	≤ 0.004 N m		≤ 0.009 N m	
Inertia moment	≤ 15 g·cm^2 (1.5 × 10^{-6} kg·m^2)		≤ 20 g·cm^2 (2 × 10^{-6} kg·m^2)	
Allowable shaft load	Radial: ≤ 10 kgf, Thrust: ≤ 2.5 kgf		Radial: ≤ 2 kgf, Thrust: ≤ 1 kgf	
Unit weight (packaged)	Varies according to connection type			
Cable type, cable connector type	≈ 310 g (≈ 420 g)	≈ 285 g (≈ 395 g)	≈ 270 g (≈ 380 g)	≈ 270 g (≈ 380 g)
Connector type	≈ 230 g (≈ 340 g)	≈ 205 g (≈ 315 g)	-	≈ 200 g (≈ 310 g)

Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%) / 12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%) model
Current consumption	Totempole, NPN open collector, Voltage output: ≤ 80 mA (no load) Line driver output: ≤ 50 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 75 G
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP50 (IEC standard)
Connection	Shaft type, Hollow Built-in type : Axial cable type / Axial cable connector type / Axial connector type / Radial connector type model Hollow type: Radial cable type / Radial cable connector type model
Cable spec.	Ø 5 mm, 5-wire (Line driver output: 8-wire), shield cable cable type: 2 m, cable connector type: 250 mm
Wire spec.	AWG24 (0.08 mm, 40-core), insulator diameter: Ø 1 mm
Connector spec.	Totempole, NPN open collector, Voltage output: M17 6-pin socket type Line driver output: M17 9-pin socket type

60 mm Diameter Incremental
Rotary Encoders

E60 Series

Features

- Ø 60 mm housing, Ø 20 mm hollow shaft
- Accurate measurement of angle, position, revolution, speed, acceleration, and distance
- Various resolutions:
  up to 8192 pulses per revolution
- Various control output options
- Power supply:
  5 VDC⎓ ± 5%, 12 - 24 VDC⎓ ± 5%

Specifications

Model	E60H20-□-3-T-□-□	E60H20-□-3-N-□-□	E60H20-□-3-V-□-□	E60H20-□-6-L-□-□
Resolution	100 / 1,024 / 5,000 / 8,192 PPR model			
Control output	Totem pole output	NPN open collector output	Voltage output	Line driver output
Output phase	A, B, Z	A, B, Z	A, B, Z	A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$
Inflow current	≤ 30 mA	≤ 30 mA	-	≤ 20 mA
Residual voltage	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.5 VDC⎓
Outflow current	≤ 10 mA	-	≤ 10 mA	≤ -20 mA
Output voltage (5 VDC⎓)	≥ (power supply -2.0) VDC⎓	-	-	≥ 2.5 VDC⎓
Output voltage (12 - 24 VDC⎓)	≥ (power supply -3.0) VDC⎓	-	-	≥ (power supply -3.0) VDC⎓
Response speed [01]	≤ 1 µs			≤ 0.5 µs
Max. response frequency	300 kHz			
Max. allowable revolution [02]	6,000 rpm			
Starting torque	≤ 0.0147 N m			
Inertia moment	≤ 110 g·cm^2 (11 × 10^{-6} kg·m^2)			
Allowable shaft load	Radial: ≤ 5 kgf, Thrust: ≤ 2.5 kgf			
Unit weight (packaged)	≈ 300 g (≈ 397 g)			
Approval	CE EAC	CE EAC	CE EAC	EAC

01) Based on cable length: 2 m, I sink: 20 mA
02) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)}] = \frac{\text{max. response frequency}}{\text{resolution}} \times 60\ \text{sec}]$$

Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%) / 12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%) model
Current consumption	Totempole, NPN open collector, Voltage output: ≤ 80 mA (no load) Line driver output: ≤ 50 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 100 G
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP50 (IEC standard)
Connection	Radial cable type / Cable connector type model
Cable spec.	Ø 5 mm, 5-wire (line driver output: 8-wire), shield cable cable type: 2 m, cable connector type: 250 mm
Wire spec.	AWG24 (0.08 mm, 40-core), insulator diameter: Ø 1 mm
Connector spec.	Totempole, NPN open collector, Voltage output: M17 6-pin socket type Line driver output: M17 9-pin socket type

View product detail

68 mm Diameter Incremental
Rotary Encoders

E68 Series

Features

- Ø 68 mm housing, Ø 15 mm solid shaft
- High-strength shaft
  (radial load: 20 kgf, thrust load: 10 kgf)
- 180 kHz response frequency
- Radial connector type
- Various resolutions:
  500, 600, 1024 pulses per revolution
- Power supply:
  5 VDC⎓ ± 5%
- IP65 protection structure (IEC standard)

Specifications

Model	E68S15-□-6-L-5
Resolution	500 / 600 / 1,024 PPR model
Control output	Line driver output
Output phase	A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$
Inflow current	≤ 20 mA
Residual voltage	≤ 0.5 VDC⎓
Outflow current	≤ -20 mA
Output voltage	≥ 2.5 VDC⎓
Response speed [01]	≤ 0.5 μs
Max. response freq.	180 kHz
Max. allowable revolution [02]	6,500 rpm
Starting torque	≤ 0.15 N m
Allowable shaft load	Radial: ≤ 20 kgf, Thrust: ≤ 10 kgf
Unit weight	≈ 550 g
Approval	EAC

01) Based on cable length: 1 m, I sink: 20 mA
02) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60\ \text{sec}]$$

Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%)
Current consumption	≤ 50 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 50 G
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP65 (IEC standard)
Connection	Radial connector type
Connector spec.	1-1/4-18UNEF-2A socket type

View product detail

80 mm Diameter Incremental
Rotary Encoders

E80 Series

Features

- Ø 80 mm housing,
  Ø 30 mm / Ø 32 mm hollow shaft
- Install directly on motors or rotating shaft.
  Couplings not required.
- Various resolutions:
  up to 3200 pulses per revolution
- Various control output options
- Power supply:
  5 VDC⎓ ± 5%, 12 - 24 VDC⎓ ± 5%

Specifications

Model	E80H□-□-3-T-□-□	E80H□-□-3-N-□-□	E80H□-□-3-V-□-□	E80H□-□-6-L-5-□
Resolution	60 / 100 / 360 / 500 / 512 / 1,024 / 3,200 PPR model			
Control output	Totem pole output	NPN open collector output	Voltage output	Line driver output
Output phase	A, B, Z	A, B, Z	A, B, Z	A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$
Inflow current	≤ 30 mA	≤ 30 mA	-	≤ 20 mA
Residual voltage	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.5 VDC⎓
Outflow current	≤ 10 mA	-	≤ 10 mA	≤ -20 mA
Output voltage (5 VDC⎓)	≥ (power supply -2.0) VDC⎓	-	-	≥ 2.5 VDC⎓
Output voltage (12 - 24 VDC⎓)	≥ (power supply -3.0) VDC⎓	-	-	≥ (power supply -3.0) VDC⎓
Response speed [01]	≤ 1 µs			≤ 0.5 µs
Max. response freq.	200 kHz			
Max. allowable revolution [02]	3,600 rpm			
Starting torque	≤ 0.02 N m			
Inertia moment	≤ 800 g·cm^2 (8 × 10^{-5} kg·m^2)			
Allowable shaft load	Radial: ≤ 5 kgf, Thrust: ≤ 2.5 kgf			
Unit weight	≈ 560 g			
Approval	CE EAC	CE EAC	CE EAC	EAC

01) Based on cable length: 2 m, I sink: 20 mA
02) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60\ \text{sec}]$$

Model	E80H□-□-3-T-□-□	E80H□-□-3-N-□-□	E80H□-□-3-V-□-□	E80H□-□-6-L-5-□
Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%) / 12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%) model			
Current consumption	Totempole, NPN open collector, Voltage output: ≤ 80 mA (no load) Line driver output: ≤ 50 mA (no load)			
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)			
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute			
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours			
Shock	≲ 75 G			
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)			
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)			
Protection rating	IP50 (IEC standard)			
Connection	Radial cable type / cable connector type model			
Cable spec.	Ø 5 mm, 5-wire (Line driver output: 8-wire), shield cable cable type: 2 m, cable connector type: 250 mm			
Wire spec.	AWG24 (0.08 mm, 40-core), insulator diameter: Ø 1 mm			
Connector spec.	Totempole, NPN open collector, Voltage output: M17 6-pin socket type Line driver output: M17 9-pin socket type			

View product detail

88 mm Diameter Incremental
Rotary Encoders

E88 Series

Features

- Ø 88 mm housing / Ø 30 mm hollow shaft
- Install directly on rotating shafts of elevator winding machines. No couplings required.
- Power supply:
  5 VDC⎓ ± 5%, 12 - 24 VDC⎓ ± 5%
- Output types: complementary, line driver

Specifications

Model	E88H30-1024-2-15	E88H30-1024-2-L-5
Resolution	1,024 PPR	
Control output	Complemental output	Line driver output
Output phase	A, B	A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$
Inflow current	≤ 15 mA	≤ 20 mA
Residual voltage	≤ 2.0 VDC⎓	≤ 0.5 VDC⎓
Outflow current	≤ 15 mA	≤ -20 mA
Output voltage	≥ 10 VDC⎓	≥ 2.5 VDC⎓
Response speed	≤ 1 μs [01]	≤ 0.5 μs [02]
Max. response freq.	150 kHz	
Max. allowable revolution [03]	3,600 rpm	
Starting torque	≤ 0.06 N m	
Inertia moment	≤ 800 g·cm^2 (8 × 10^{-5} kg·m^2)	
Allowable shaft load	Radial: ≤ 5 kgf, Thrust: ≤ 2.5 kgf	
Unit weight	≈ 1.45 kg (≈ 1.49 kg)	
Approval	CE EAC	EAC

01) Based on cable length: 8 m, load resistance: 1 kΩ
02) Based on cable length: 8 m, I sink: 20 mA
03) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60 \text{ sec}]$$

Model	E88H30-1024-2-15	E88H30-1024-2-L-5
Power supply	15 VDC⎓ ± 5% (ripple P-P: ≤ 5%)	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%)
Current consumption	≤ 60 mA (no load)	≤ 50 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)	
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute	
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours	
Shock	≲ 100 G	
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)	
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)	
Protection rating	IP50 (IEC standard)	
Connection	Radial cable type	
Cable spec.	Ø 6 mm, 6-wire (Line driver output: 8-wire), 8 m, shield cable	
Wire spec.	AWG24 (0.16 mm, 11-core), insulator diameter: Ø 1 mm	AWG24 (0.08 mm, 40-core), insulator diameter: Ø 1 mm

View product detail

100 mm Diameter Incremental Rotary Encoders

E100 Series

Features

- Ø 100 mm housing, Ø 35 mm hollow shaft
- Ideal for application in elevator systems
- Various resolutions:
  512, 1024, 10000 pulses per revolution
- Various control output options
- Power supply:
  5 VDC⎓ ± 5%, 12 - 24 VDC⎓ ± 5%

Specifications

Model	E100H35-□-3-T-□	E100H35-□-3-N-□	E100H35-□-3-V-□	E100H35-□-6-L-□
Resolution	512 / 1,024 / 10,000 PPR model			
Control output	Totem pole output	NPN open collector output	Voltage output	Line driver output
Output phase	A, B, Z	A, B, Z	A, B, Z	A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$
Inflow current	≤ 30 mA	≤ 30 mA	-	≤ 20 mA
Residual voltage	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.5 VDC⎓
Outflow current	≤ 10 mA	-	≤ 10 mA	≤ -20 mA
Output voltage (5 VDC⎓)	≥ (power supply -2.0) VDC⎓	-	-	≥ 2.5 VDC⎓
Output voltage (12 - 24 VDC⎓)	≥ (power supply -3.0) VDC⎓	-	-	≥ (power supply -3.0) VDC⎓
Response speed [01]	≤ 1 µs			≤ 0.5 µs
Max. response freq.	300 kHz			
Max. allowable revolution [02]	3,600 rpm			
Starting torque	≤ 0.03 N m			
Inertia moment	≤ 800 g·cm^2 (8 × 10^{-5} kg·m^2)			
Allowable shaft load	Radial: ≤ 5 kgf, Thrust: ≤ 2.5 kgf			
Unit weight	≈ 1130 g (≈ 1400 g)			
Approval	CE EAC	CE EAC	CE EAC	EAC

01) Based on cable length: 2 m, I sink: 20 mA
02) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)}] = \frac{\text{max. response frequency}}{\text{resolution}} \times 60\ \text{sec}$$

Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%) / 12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%) model
Current consumption	Totempole, NPN open collector, Voltage output: ≤ 80 mA (no load) Line driver output: ≤ 50 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency or 300 m/s^2 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 75 G
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP50 (IEC standard)
Connection	Radial connector type
Cable spec.	Ø 5 mm, 5-wire (line driver output: Ø 6 mm, 8-wire), 2 m, shield cable
Wire spec.	AWG24 (0.08 mm, 40-core), insulator diameter: Ø 1 mm
Connector spec.	Totempole, NPN open collector, Voltage output: SCN-16-7P Line driver output: SCN-20-10P

View product detail

Side Mount Type Incremental
Rotary Encoders

ENA Series

Features

- Die-cast external housing provides excellent immunity to impact
- Designed to mount directly onto frames
- Various resolutions:
  1 to 5000 pulses per revolution
- Various control output options
- Power supply:
  5 VDC⎓ ± 5%, 12 - 24 VDC⎓ ± 5%

Specifications

Model	ENA-□-□-T-□	ENA-□-□-N-□	ENA-□-□-V-□
Resolution	1 / 2 / 5 PPR [01] 10 to 5,000 PPR model		
Control output	Totem pole output	NPN open collector output	Voltage output
Output phase	A, B / A, B, Z output model	A, B / A, B, Z output model	A, B / A, B, Z output model
Inflow current	≤ 30 mA	≤ 30 mA	-
Residual voltage	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓
Outflow current	≤ 10 mA	-	≤ 10 mA
Output voltage (5 VDC⎓)	≥ (power supply -2.0) VDC⎓	-	-
Output voltage (12 - 24 VDC⎓)	≥ (power supply -3.0) VDC⎓	-	-
Response speed [02]	≤ 1 μs		
Max. response freq.	300 kHz		
Max. allowable revolution [03]	5,000 rpm		
Starting torque	≤ 0.007 N m		
Inertia moment	≤ 80 g·cm^2 (8 × 10^{-6} kg·m^2)		
Allowable shaft load	Radial: ≤ 10 kgf, Thrust: ≤ 2.5 kgf		
Unit weight	≈ 345 g		
Approval	CE EAC		

01) Depending on the control output, only A, B are output.
02) Based on cable length: 2 m, I sink: 20 mA
03) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

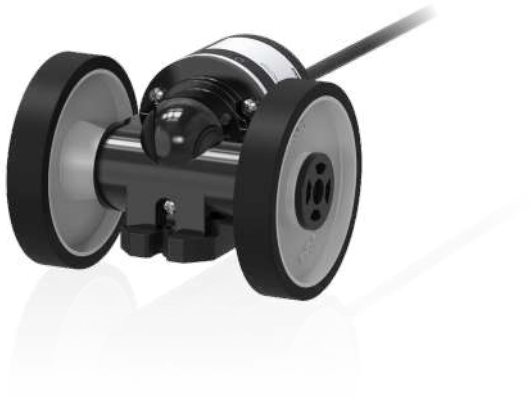
$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60 \text{ sec}]$$

Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%) / 12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%) model
Current consumption	≤ 80 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 75 G
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP50 (IEC standard)
Connection	Radial connector type
Cable spec.	Ø 5 mm, 2 m, shield cable A, B phase output model: 4-wire / A, B, Z phase output model: 5-wire
Wire spec.	AWG24 (0.08 mm, 40-core), insulator diameter: Ø 1 mm
Connector spec.	A, B phase output model: SCN-16-4P socket type A, B, Z phase output model: SCN-16-5P socket type

View product detail

Wheel Type Incremental Rotary Encoders

ENC Series



Features

- Wheel type encoders ideal for measuring length or speed of continuously moving objects
- Output waveform of measured distance is proportional to International Weights and Measures (meters / inches)
- Power supply:
  5 VDC⎓ ± 5%, 12 - 24 VDC⎓ ± 5%

Specifications

Model	ENC-1-□-T-□-□	ENC-1-□-N-□-□	ENC-1-□-V-□-□
Min. measuring unit [/pulse]	1 mm / 1 cm / 1 m / 0.01 yd / 0.1 yd / 1 yd model		
Control output	Totem pole output	NPN open collector output	Voltage output
Output phase	A, B	A, B	A, B
Inflow current	≤ 30 mA	≤ 30 mA	-
Residual voltage	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓
Outflow current	≤ 10 mA	-	≤ 10 mA
Output voltage (5 VDC⎓)	≥ (power supply -2.0) VDC⎓	-	-
Output voltage (12 - 24 VDC⎓)	≥ (power supply -3.0) VDC⎓	-	-
Response speed [01]	≤ 1 μs		
Max. response freq.	180 kHz		
Max. allowable revolution [02]	5,000 rpm		
Starting torque	Dependent on the coefficient of friction		
Unit weight	≈ 494 g		
Approval	CE EAC	CE EAC	CE EAC

01) Based on cable length: 2 m, I sink: 20 mA
02) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)}] = \frac{\text{max. response frequency}}{\text{resolution}} \times 60\ \text{sec}]$$

Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%) / 12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%) model
Current consumption	≤ 80 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 75 G
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP50 (IEC standard)
Connection	Axial cable type / Cable connector type model
Cable spec.	Ø 5 mm, 4-wire, shield cable cable type: 2 m, cable connector type: 250 mm
Wire spec.	AWG24 (0.08 mm, 40-core), insulator diameter: Ø 1 mm
Connector spec.	M17 6-pin socket type

View product detail

18 mm Diameter Sine Wave Incremental Rotary Encoders

E18-A Series

Features

- Ultra-compact (Ø 18 mm) housing and ultra-lightweight (10 g) design
- Easy installation in tight or limited spaces
- Low shaft moment of inertia
- Power supply:
  5 VDC⎓ ± 5%
- No Amp. output

Specifications

Model	E18S□-□-1-A-5-□
Resolution	200 / 300 PPR model
Control output	Quasi-sinusoidal (No Amp. output)
Output phase	A
Output waveform	Quasi-sinusoidal
Output signal amplitude	≥ 150 mV_{P-P}
Output signal amplitude variation	≤ 40%
Max. response freq.	10 kHz
Max. allowable revolution 01)	3,000 rpm
LED optical elements	Current I_F: ≤ 50 mA Reverse voltage V_R: ≤ 5 VDC⎓ Power consumption P_D: ≤ 95 mW
Photo transistor optical elements	C-E voltage V_{CEO}: ≤ 30 VDC⎓ E-C voltage V_{ECO}: ≤ 5 VDC⎓ C current I_C: ≤ 20 mA C power consumption P_C: ≤ 75 mW
Starting torque	≤ 10×10^{-4} N m
Inertia moment	≤ 0.5 g·cm^2 (5×10^{-8} kg·m^2)
Allowable shaft load	Radial: ≤ 200 gf, Thrust: ≤ 200 gf
Unit weight (packaged)	Shaft outer diameter Ø 2 mm model: ≈ 10.1 g (≈ 33.5 g) Shaft outer diameter Ø 2.5 mm model: ≈ 10.1 g (≈ 32.3 g)
Approval	CE cULus EAC

01) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

[max. response revolution (rpm) = $\frac{\text{max. response frequency}}{\text{resolution}} \times 60$ sec]

Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 500 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 50 G
Ambient temperature	-10 to 50 °C, storage: -20 to 80 °C (no freezing or condensation)
Ambient humidity	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP50 (IEC standard)
Connection	Axial / Radial cable type model
Cable spec.	Ø 1 mm, 4-wire, 150 mm, flat ribbon cable
Wire spec.	AWG26 (0.16 mm, 7-core), insulator diameter: Ø 0.98 mm

View product detail

58 mm Diameter Sine Wave Incremental Rotary Encoders

E58-A Series

Features

- Tapered shaft
- Analog sine wave operational amplifier (OP Amp.) output
- Power supply: 5 VDC⎓ ± 5%

Specifications

Model	E58S9.25-2048-10-A-5-□
Resolution	2,048 PPR
Control output	Analog sine wave OP Amp. output
Output phase	A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$, C, $\overline{C}$, D, $\overline{D}$
Output current	≤ 10 mA
Output voltage V_{p-p}	0.5 ± 0.1 VDC⎓
DC OFFSET V_{ref}	2.5 ± 0.3 VDC⎓
Max. response frequency	200 kHz
Max. allowable revolution	6,000 rpm
Shaft	Taper shaft Ø 9.25 mm, Taper 1 : 10
Starting torque	≤ 0.0098 N m
Inertia moment	≤ 15 g·cm^2 (1.5 × 10^{-6} kg·m^2)
Allowable shaft load	Radial: ≤ 10 kgf, Thrust: ≤ 2.5 kgf
Unit weight (packaged)	≈ 930 g (≈ 1.02 kg)
Approval	CE EAC
Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%)
Current consumption	≤ 120 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 100 G
Ambient temp.	-20 to 100 °C, storage: -25 to 100 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP50 (IEC standard)
Connection	Axial / Radial cable type model
Cable spec.	Ø 6 mm, 17-wire, 9 m, shield cable
Wire spec.	AWG28 (0.08 mm, 17-core), insulator diameter: Ø 0.8 mm

View product detail

60 mm Diameter Sine Wave Incremental

Rotary Encoders

E60-A Series

Features

- Ø 60 mm housing, Ø 20 mm hollow shaft
- Analog sine wave operational amplifier (op-amp) output
- Power Supply:
  5 VDC⎓ ± 5%

Specifications

Model	E60H20-2048-10-A-5-□
Resolution	2,048 PPR
Control output	Analog sine wave OP Amp. output
Output phase	A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$, C, $\overline{C}$, D, $\overline{D}$
Output current	≤ 10 mA
Output voltage V_{P-P}	0.5 ± 0.1 VDC⎓
DC OFFSET $V_{DC⎓}$	2.5 ± 0.3 VDC⎓
Max. response frequency	200 kHz
Max. allowable revolution	6,000 rpm
Starting torque	≤ 0.02 N m
Inertia moment	≤ 110 g·cm^2 (11 × 10^{-6} kg·m^2)
Allowable shaft load	Radial: ≤ 5 kgf, Thrust: ≤ 2.5 kgf
Unit weight (packaged)	≈ 720 g (≈ 750 g)
Approval	CE EAC
Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%)
Current consumption	≤ 120 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 100 G
Ambient temp.	-20 to 100 °C, storage: -25 to 100 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP40 (IEC standard)
Connection	Axial / Radial cable type model
Cable spec.	Ø 6 mm, 17-wire, 9 m, shield cable
Wire spec.	AWG28 (0.08 mm, 17-core), insulator diameter: Ø 0.8 mm

View product detail

50 mm Diameter Absolute Single-Turn Rotary Encoders

(Optical)

EP50 Series

Features

- Ø 50 mm housing, Ø 8 mm solid shaft
- Various output code options:
  BCD, binary, Gray code
- Various resolutions:
  up to 10-bit (1024 divisions)
- IP64 protection structure (IEC standard)

Specifications

Model	EP50S8-□-□□-N-□	EP50S8-□-□□-P-□
Resolution [01]	≤ 1024 division	
Output code	BCD / Binary / Gray code model	
Control output	NPN open collector output	PNP open collector output
Inflow current	≤ 32 mA	-
Residual voltage	≤ 1 VDC⎓	-
Outflow current	-	≤ 32 mA
Output voltage	-	≥ (power supply -1.5) VDC⎓
Response speed [02]	T_{on} ≤ 800 nsec, T_{off} ≤ 800 nsec	
Max. response freq.	35 kHz	
Max. allowable revolution [03]	3,000 rpm	
Starting torque	≤ 0.0069 N m	
Inertia moment	≤ 40 g·cm^2 (4 × 10^{-6} kg·m^2)	
Allowable shaft load	Radial: 10 kgf, Thrust: 2.5 kgf	
Unit weight (packaged)	≈ 398 g (≈ 482 g)	
Approval	CE EAC	

01) Refer to resolution in 'Output Phase / Output Angle'.
02) Based on cable length: 2 m, I sink = 32 mA
03) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60\ \text{sec}]$$

Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%) / 12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%) model
Current consumption	≤ 100 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 50 G
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP64 (IEC standard)
Connection	Axial cable type (cable gland)
Cable spec.	Ø 7 mm, 15-wire, 2m, shield cable
Wire spec.	AWG28 (0.08 mm, 40-core), insulator diameter: Ø 0.8 mm

View product detail

58 mm Diameter Absolute Single-Turn Rotary Encoders

(Optical)

EP58 Series

Features

- Ø 58 mm flange single-turn absolute rotary encoders
- Shaft, blind hollow shaft models available
- Various output codes available: BCD, binary, Gray code
- Various resolutions: up to 10-bit (1024 divisions)
- Power supply: 5 VDC⎓ ± 5%, 12 - 24 VDC⎓ ± 5%

Specifications

Model	EP58□-□-□□-N-□	EP58□-□-□□-P-□
Resolution [01]	≤ 1024 division	
Output code	BCD / Binary / Gray code model	
Control output	NPN open collector output	PNP open collector output
Inflow current	≤ 32 mA	-
Residual voltage	≤ 1 VDC⎓	-
Outflow current	-	≤ 32 mA
Output voltage	-	≥ (power supply - 1.5) VDC⎓
Response speed [02]	T_{ON} ≤ 800 nsec, T_{OFF} ≤ 800 nsec	
Max. response freq.	35 kHz	
Max. allowable revolution [03]	3,000 rpm	
Approval	CE EAC	

01) Refer to resolution in 'Output Phase / Output Angle'
02) Based on cable length: 2 m, I sink = 32 mA
03) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60 \text{ sec}]$$

Shaft type	Shaft clamping type	Shaft synchro type	Hollow Built-in type
Starting torque	≤ 0.004 N m		≤ 0.009 N m
Inertia moment	≤ 15 g·cm^2 (1.5 × 10^{-6} kg·m^2)		≤ 20 g·cm^2 (2 × 10^{-6} kg·m^2)
Allowable shaft load	Radial: ≤ 10 kgf, Thrust: ≤ 2.5 kgf		Radial: ≤ 2 kgf, Thrust: ≤ 1 kgf
Unit weight (packaged)	≈ 435 g (≈ 545 g)	≈ 415 g (≈ 525 g)	≈ 410 g (≈ 520 g)

Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%) / 12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%) model
Current consumption	≤ 100 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 50 G
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP50 (IEC standard)
Connection	Axial cable type (cable gland)
Cable spec.	Ø 7 mm, 15-wire, 2 m, shield cable

View product detail

Clamping Shaft Type

Synchro Shaft Type

Hollow Shaft Type

Blind Hollow Shaft Type

60 mm Diameter Absolute Single-Turn Rotary Encoders

(Optical)

ENP Series

Features

- Ø 60 mm housing, Ø 10 mm solid shaft
- Output code: BCD code
- Various resolutions: up to 360 divisions
- Power supply:
  5 VDC⎓ ± 5%, 12 - 24 VDC⎓ ± 5%

Specifications

Model	ENP-1□□□-□-N	ENP-1□□□-□-P
Resolution [01]	≤ 360 division	
Output code	BCD code	
Control output	NPN open collector output	PNP open collector output
Inflow current	≤ 32 mA	-
Residual voltage	≤ 1 VDC⎓	-
Outflow current	-	≤ 32 mA
Output voltage	-	≥ (power supply - 1.5) VDC⎓
Response speed [02]	T_{ON} ≤ 800 nsec, T_{OFF} ≤ 800 nsec	
Max. response freq.	20 kHz	
Max. allowable revolution [03]	3,600 rpm	
Starting torque	≤ 0.05 N m	
Inertia moment	≤ 300 g·cm^2 (3 × 10^{-5} kg·m^2)	
Allowable shaft load	Radial: 10 kgf, Thrust: 2.5 kgf	
Unit weight (packaged)	≈ 400 g (≈ 478 g)	
Approval	EAC	

01) Refer to resolution in 'Output Phase / Output Angle'.
02) Based on cable length: 1 m, I sink = 32 mA
03) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60 \text{ sec}]$$

Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%) / 12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%) model
Current consumption	≤ 100 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 75 G
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP50 (IEC standard)
Connection	Axial cable type
Cable spec.	Ø 8 mm, 12-wire, 1 m, double shield cable
Wire spec.	AWG24 (0.08 mm, 40-core), insulator diameter - power wire: Ø 1.5 mm, signal wire: Ø 1 mm

View product detail

50 mm Diameter Absolute Single-Turn Rotary Encoders

(Magnetic)

MGA50 Series

Features

- High accuracy in harsh environments including shock, vibration, dust, and humidity (compared to optical encoders)
- Longer service life compared to optical encoders
- Various output code options: BCD, binary, Gray
- Various resolutions: up to 10-bit (1024 divisions)
- Power supply: 5 VDC⎓ ± 5%, 12 - 24 VDC⎓ ± 5%
- IP50 protection structure (IEC standard)

Specifications

Model	MGA50S8-□-□□-N-□
Resolution [01]	≤ 1024 division
Output code	BCD / Binary / Gray code model
Control output	NPN open collector output
Inflow current	≤ 32 mA
Residual voltage	≤ 1 VDC⎓
Output logic	Negative logic output
Response speed [02]	≤ 1 μs
Max. response freq.	30 kHz
Max. allowable revolution [03]	3,000 rpm
Starting torque	≤ 0.007 N m
Inertia moment	≤ 80 g·cm^2 (8 × 10^{-6} kg·m^2)
Allowable shaft load	Radial: 10 kgf, Thrust: 2.5 kgf
Unit weight (packaged)	≈ 270 g (≈ 400 g)
Approval	CE EAC

01) Refer to resolution in 'Output Phase / Output Angle'.
02) Based on cable length: 2 m, I sink = 32 mA
03) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60 \text{ sec}]$$

Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%) / 12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%) model
Current consumption	≤ 60 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 75 G
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP50 (IEC standard)
Connection	Axial (cable gland)
Cable spec.	Ø 6 mm, 17-wire, 2 m, shield cable
Wire spec.	AWG28 (0.08 mm, 17-core), insulator diameter: Ø 0.8 mm

View product detail

50 mm Wire-Type Linear Scale

Absolute Encoders

(Optical)

EWLS50 Series

Features

- Resolution: 0.1 mm
- Maximum measurement range: 512 mm
- Various output code options:
  Binary, Gray code

Specifications

Model	EWLS50-512-B-PN-24	EWLS50-512-G-PN-24
Measuring range	512 mm	
Max. output pulse	5,120 division / 512 mm	
Min. resolution	0.1 mm	
Accuracy	± 0.1 / 100 mm	
Response speed	≤ 500 mm / sec	
Wire movement limit when power is OFF 01)	≤ ± 20 mm	
Output code	Binary	Gray
Output signal	Data, Overflow alarm (OVF)	
Control output	Parallel NPN open collector output	
Inflow current	≤ 32 mA	
Residual voltage	≤ 1 VDC⎓	
Output logic	Negative logic output	
Response speed 02)	≤ 1 μs	
Input signal	Reset signal input (Reset)	
Input level	H: 5 - 24 VDC⎓, L: 0 - 1.2 VDC⎓	
Input logic	Low Active, OPEN or HIGH for common use	
Input time	≥ 100 ms	
Max. response freq.	50 kHz	
Wire tensile force	0.5 to 4 N (50 to 400 g·f)	
Unit weight	≈ 450 g	
Approval	CE EAC	

01) The product cannot process data when the power is OFF. It calibrates the data comparing values of before and after power ON status. It shall be used on the condition that wire movement limit because proper data may not be available if any wire movement occurred over ±20mm from the position when power is off.
02) Based on cable length: 2 m, I sink = 32 mA

Power supply	12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%)
Current consumption	≤ 150 mA (no load)
Insulation resistance	≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 50 G
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Connection	Axial cable type (cable gland)
Cable spec.	Ø 6 mm, 17-wire, 2 m, shield cable
Wire spec.	AWG28 (0.08 mm, 19-core), insulator diameter: Ø 0.8 mm
Material	Cap: SPCD, Body: A2024, Wire: SUS303

View product detail

50 mm Diameter Absolute Multi-Turn Rotary Encoders

(Optical)

EPM50 Series

Features

- Ø 50 mm housing, Ø 8 mm solid shaft multi-turn absolute rotary encoders
- Output interface options: Parallel, SSI (Synchronous Serial Interface)
- 23-bit (8,388,608) total resolution
  - 10-bit single-turn (1,024 divisions)
  - 13-bit multi-turn (8,192 revolutions)
- Zero-point reset with single-turn data reset and multi-turn count reset functions
- Position memory backup
- CW / CCW direction setting function
- Overflow alarm (OVF) function
- Latch function (Parallel output type only)
- IP64 protection structure (IEC standard)

View product detail

Specifications

Model	EPM50S8-1013-B-PN-24-□	EPM50S8-1013-B-S-24-□
Resolution	• Single-turn: 1024 division, 10 bit • Multi-turn: 8192 revolution, 13 bit	
Rotation limit when power OFF [01]	± 90°	
Output code	Binary 2 code	24 bit, Binary 2 code
Output signal	Single-turn data, Multi-turn count, Overflow alarm (OVF) [02]	
Control output	Parallel NPN open collector output	SSI (Synchronous Serial Interface) Line driver output
Inflow current	≤ 32 mA	≤ 20 mA
Residual voltage	≤ 1 VDC⎓	≤ 0.5 VDC⎓
Outflow current	-	≤ -20 mA
Output voltage	-	≥ 2.5 VDC⎓
Output logic	Negative logic output	-
Response speed [03]	≤ 1 μs	-
Single-turn data reset [04] **Multi-turn count reset** [05] **Direction Clear**	Input level: 0 - 1 VDC⎓ Input logic: Low Active, OPEN or HIGH in common use Input time: ≥ 100 ms	
Latch	Input level: 0 - 1 VDC⎓ Input logic: Low Active, OPEN or HIGH in common use Input time: ≥ 500 μs	-
Clock	-	Input level: 5 VDC⎓ ± 5% Input frequency: 100 kHz to 1 MHz
Max. response freq.	50 kHz	-
Max. allowable revolution [06]	3,000 rpm	
Starting torque	≤ 0.0069 N m	
Inertia moment	≤ 40 g·cm^2 (4 × 10^{-6} kg·m^2)	
Allowable shaft load	Radial: 10 kgf, Thrust: 2.5 kgf	
Unit weight (packaged)	≈ 475 g (≈ 560 g)	≈ 324 g (≈ 409 g)
Approval	CE EAC	

01) It calibrates the multi-turn count by comparing single-turn data before/after power off without counting multi-turn count when power off. Correct multi-torn count cannot be obtained if a rotating operation exceeding ± 90° is performed at the rotation position when power off.
02) Outputs when multi-turn count is out of counting range (0 to 8191 revolution).
03) Based on cable length: 2 m, I sink = 32 mA
04) If the single-turn data reset signal is applied, the single-turn data will be initialized to 0.
05) If the multi-turn count reset signal is applied, the multi-turn count will be initialized to 0.
06) For parallel model Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60\ \text{sec}]$$

Power supply	12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%)
Current consumption	Parallel NPN open collector output: ≤ 100 mA (no load) SSI Line driver output: ≤ 150 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 50 G
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	Axial cable type: IP64 (IEC standard), Radial cable type: IP50 (IEC standard)
Connection	Axial / Radial cable type model (cable gland)
Cable spec.	Ø 6 mm, 2 m, shield cable Parallel NPN open collector output: 17-wire × 2, SSI Line driver output: 10-wire
Wire spec.	AWG28 (0.08 mm), insulator diameter: Ø 0.8 mm Parallel NPN open collector output: 17-core, SSI Line driver output: 19-core

50 mm Diameter Absolute Multi-Turn Rotary Encoders

(Magnetic)

MGAM50 Series

Features

- High accuracy in harsh environments including shock, vibration, dust, and humidity (compared to optical encoders)
- Longer service life compared to optical encoders
- Output code: binary
- Output interface options: Parallel, SSI (Synchronous Serial Interface)
- 23-bit (8,388,608) total resolution
  - 10-bit single-turn (1024 divisions)
  - 13-bit multi-turn (8192 revolutions)
- Power supply:
  12 - 24 VDC⎓ ± 5%
- Overflow alarm (OVF) function
- IP50 protection structure (IEC standard)

View product detail

Specifications

Model	MGAM50S8-1013-B-F-PN-24	MGAM50S8-1013-B-F-S-24
Resolution	• Single-turn: 1024 division • Multi-turn: 8192 revolution	
Rotation limit when power OFF [01]	± 90°	
Hysterisis	± 0.1°	
Positioning error [02]	± 1 bit (LSB: Least Significant Bit)	
Output code	Binary 2 code	24 bit, Binary 2 code
Output signal	Single-turn data, Multi-turn count, Overflow alarm (OVF) [03]	
Control output	Parallel NPN open collector output	SSI (Synchronous Serial Interface) Line driver output
Inflow current	≤ 20 mA	≤ 20 mA
Residual voltage	≤ 1 VDC⎓	≤ 0.5 VDC⎓
Outflow current	-	≤ -20 mA
Output voltage	-	≥ 2.5 VDC⎓
Output logic	Negative logic output	-
Response speed [04]	≤ 1 μs	-
Multi-turn count reset	Input level: 0 - 1 VDC⎓ Input logic: Low Active, Open for common use Input time: ≥ 100 ms	
Clock	-	Input level: 5 VDC⎓ ± 5% Input frequency: 100 kHz to 1 MHz
Max. response freq.	30 kHz	-
Max. allowable revolution [05]	3,000 rpm	
Starting torque	≤ 0.0069 N m	
Inertia moment	≤ 80 g·cm^2 (8 × 10^{-6} kg·m^2)	
Allowable shaft load	Radial: 10 kgf, Thrust: 2.5 kgf	
Unit weight (packaged)	≈ 393 g (≈ 523 g)	≈ 261 g (≈ 391 g)
Approval	CE	

01) It calibrates the multi-turn count by comparing single-turn data before/after power off without counting multi-turn count when power off. Correct multi-torn count cannot be obtained if a rotating operation exceeding ± 90° is performed at the rotation position when power off. Use within the condition of rated rotating operation.
02) When power ON / OFF the unit, ± 1 bit (LSB) can be changed at current position due to hysterisis.
03) Outputs when multi-turn count is out of counting range (0 to 8191 revolution).
04) Based on cable length: 2 m, I sink = 20 mA
05) For parallel model Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60\ \text{sec}]$$

Power supply	12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%)
Current consumption	Parallel NPN open collector output ≤ 100 mA (no load) SSI Line driver output ≤ 150 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours
Shock	≲ 50 G
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)
Protection rating	IP50 (IEC standard)
Connection	Axial cable type (cable gland)
Cable spec.	Ø 6 mm, 2 m, shield cable Parallel NPN open collector output: 17-wire × 2, SSI Line driver output: 10-wire
Wire spec.	AWG28 (0.08 mm), insulator diameter: Ø 0.8 mm Parallel NPN open collector output: 17-core, SSI Line driver output: 19-core

Manual
Handle Type
Pulse Generators

ENH Series

Features

- Ideal for manual pulse input applications including NC machinery and milling machines
- Terminal connection type
- Resolutions: 25, 100 pulses per revolution
- Power supply:
  5 VDC⎓ ± 5%, 12 - 24 VDC⎓ ± 5%

Specifications

Model	ENH-□-□-T-□	ENH-□-□-V-□	ENH-□-□-L-5
Resolution	25 / 100 PPR model		
Control output	Totem pole output	Voltage output	Line driver output
Output phase	A, B	A, B	A, B, $\overline{A}$, $\overline{B}$
Inflow current	≤ 30 mA	-	≤ 20 mA
Residual voltage	≤ 0.4 VDC⎓	≤ 0.4 VDC⎓	≤ 0.5 VDC⎓
Outflow current	≤ 10 mA	≤ 10 mA	≤ -20 mA
Output voltage (5 VDC⎓)	≥ (power supply -2.0) VDC⎓	-	≥ 2.5 VDC⎓
Output voltage (12 - 24 VDC⎓)	≥ (power supply -3.0) VDC⎓	-	-
Response speed [01]	≤ 1 μs	≤ 1 μs	≤ 0.2 μs
Max. response freq.	10 kHz		
Max. allowable revolution [02]	Normal: ≤ 200 rpm, Peak: ≤ 600 rpm		
Starting torque	≤ 0.098 N m		
Allowable shaft load	Radial: ≤ 2 kgf, Thrust: ≤ 1 kgf		
Unit weight (packaged)	≈ 260 g (≈ 330 g)		
Approval	CE EAC	CE EAC	EAC

01) Based on cable length: 1 m, I sink: 20 mA
02) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60\ \text{sec}]$$

Model	ENH-□-□-T-□	ENH-□-□-V-□	ENH-□-□-L-5
Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%) / 12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%) model		5 VDC⎓ ± 5% (ripple P-P: ≤ 5%)
Current consumption	≤ 40 mA (no load)		≤ 50 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)		
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute		
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours		
Shock	≲ 50 G		
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)		
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)		
Protection rating	IP50 (IEC standard)		
Connection	Terminal block type		

View product detail

Portable Manual Handle Type
Pulse Generators

ENHP Series

Features

- Ideal for manual pulse input applications including NC machinery and milling machines
- Emergency stop switch, enable operation switch
- 6-position axis selector switch, 4-position rate selector switch
- Resolution: 100 pulses per revolution
- Power supply: 5 VDC⎓ ± 5%, 12 - 24 VDC⎓ ± 5%

Specifications

Model	ENHP-100-□-T-□	ENHP-100-□-L-5
Resolution	100 PPR	
Control output	Totem pole output	Line driver output
Output phase	A, B	A, $\overline{A}$, B, $\overline{B}$
Rotary switch output	BCD code: Rate select switch (R1, R2, R3, R4) Axis select switch (OFF, X, Y, Z, A, B)	
Inflow current	≤ 30 mA	≤ 20 mA
Residual voltage	≤ 0.4 VDC⎓	≤ 0.5 VDC⎓
Outflow current	≤ 10 mA	≤ -20 mA
Output voltage (5 VDC⎓)	≥ (power supply -2.0) VDC⎓	≥ 2.5 VDC⎓
Output voltage (12 - 24 VDC⎓)	≥ (power supply -3.0) VDC⎓	-
Response speed [01]	≤ 1 μs	≤ 0.5 μs
Max. response freq.	10 kHz	
Max. allowable revolution [02]	Normal: ≤ 200 rpm, Peak: ≤ 600 rpm	
Starting torque	≤ 0.098 N m	
Allowable shaft load	Radial: ≤ 2 kgf, Thrust: ≤ 1 kgf	
Unit weight	≈ 730 g	
Approval	CE EAC	EAC

01) Based on cable length: 1 m, I sink: 20 mA
02) Select resolution to satisfy Max. allowable revolution ≥ Max. response revolution

$$[\text{max. response revolution (rpm)} = \frac{\text{max. response frequency}}{\text{resolution}} \times 60\ \text{sec}]$$

Model	ENHP-100-□-T-□	ENHP-100-□-L-5
Power supply	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%) / 12 - 24 VDC⎓ ± 5% (ripple P-P: ≤ 5%) model	5 VDC⎓ ± 5% (ripple P-P: ≤ 5%)
Current consumption	≤ 40 mA (no load)	≤ 50 mA (no load)
Insulation resistance	Between all terminals and case: ≥ 100 MΩ (500 VDC⎓ megger)	
Dielectric strength	Between all terminals and case: 750 VAC~ 50 / 60 Hz for 1 minute	
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 minute) in each X, Y, Z direction for 2 hours	
Shock	≤ 50 G	
Ambient temp.	-10 to 70 °C, storage: -25 to 85 °C (no freezing or condensation)	
Ambient humi.	35 to 85%RH, storage: 35 to 90%RH (no freezing or condensation)	
Protection rating [01]	IP67 (IEC standard)	
Connection	connector type	
Cable spec.	Ø 5 mm, 18-wire, 8 m, spring code cable	
Wire spec.	AWG28 (0.08 mm, 18-core), insulator diameter: Ø 0.7 mm	
Connector spec.	25-pin D-SUB	

01) It is protection for the back case and the wiring part.

View product detail

Flexible
Shaft Coupling

ERB Series

Features

- Zero backlash
- High-strength aluminum alloy (AL7075-T6), High elasticity
- Alumite treated surface provides high corrosion resistance
- 2 connection types (clamp type, screw type)

Specifications

Model	ERB-A-19C-☐	ERB-A-19S-☐	ERB-A-26C-☐	ERB-A-26S-☐
Connection type	Clamp	Set screw	Clamp	Set screw
Max. revolution	8,000 rpm	20,000 rpm	6,000 rpm	15,000 rpm
Max. torque	1.2 N m		3.0 N m	
Rated torque	0.6 N m		1.5 N m	
Mounting bolt (mounting torque)	M2.5 (1 N m)	M3 (0.7 N m)	M3 (0.7 N m)	M4 (1.7 N m)
Torsional stiffness	140 N m / rad		240 N m / rad	
Inertia moment	6.4×10^{-7} kg·m^2		3.4×10^{-6} kg·m^2	
Max. allowable misalignment	Angular misalignment: ≤ 2.5° Parallel misalignment: ≤ 0.15 mm End-play: ≤ ± 0.3 mm		Angular misalignment: ≤ 2.5° Parallel misalignment: ≤ 0.2 mm End-play: ≤ ± 0.4 mm	
Standard bore diameter (tolerance h7)	Ø 4, Ø 5, Ø 6 mm		Ø 6, Ø 8 mm	
Max. allowable diameter	Ø 4 to 8 mm		Ø 5 to 12 mm	
Material	Aluminum (AL 7075-T6), Alumite surface			
Unit weight (packaged)	≈ 14.4 g (≈ 14.9 g)		≈ 36.7 g (≈ 37.3 g)	

View product detail