

Autonics ROTARY ENCODER (INCREMENTAL TYPE) E58 SERIES INSTRUCTION MANUAL



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

- 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 personal injury, economic loss or fire.
- 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 explosion or fire.
- Install on a device panel to use.**
Failure to follow this instruction may result in fire.
- Do not connect, repair, or inspect the unit while connected to a power source.**
Failure to follow this instruction may result in fire.
- Check 'Connections' before wiring.**
Failure to follow this instruction may result in fire.
- Do not disassemble or modify the unit.**
Failure to follow this instruction may result in fire.

⚠ Caution

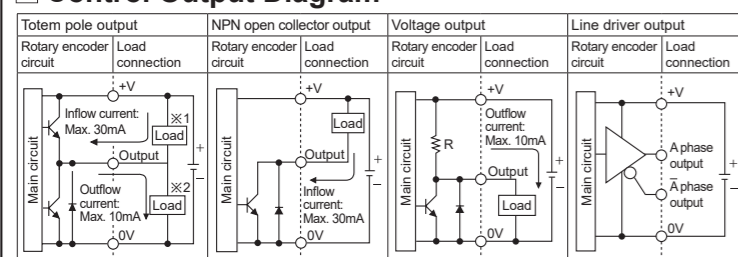
- Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
- Do not short the load.**
Failure to follow this instruction may result in fire.
- Do not use the unit near the place where there is the equipment which generates strong magnetic force or high frequency noise and strong alkaline, strong acidic exists.**
Failure to follow this instruction may result in product damage.

■ Ordering Information

E58SC		10	-	8000	-	3	-	N	-	24	-
Series	Diameter Ø58mm	Shaft diameter	Pulses/Revolution	Output phase	Control output	Power supply	Cable*1				
SC	Shaft Clamping	External	10	Ø10mm	2: A, B 3: A, B, Z 4: A, A, B, B 6: A, A, B, B, Z, Z	5: 5VDC ±5%	No mark: Axial/Radial cable type				
SS	Shaft Synchro	6	Ø6mm	Refer to resolution	N: NPN open collector output V: Voltage output L: Line driver output	24: 12-24VDC ±5%	C: Axial/Radial cable connector type CR: Axial connector type CS: Radial connector type				
H	Hollow	Inner	12	Ø12mm							
HB	Hollow Built-in										

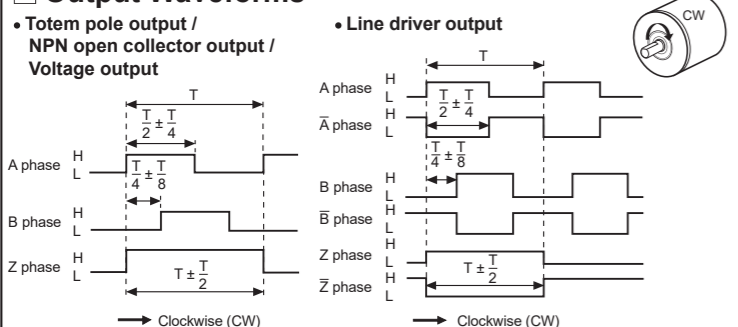
※1: Please refer to 'connection' in the specifications for the detailed information about cable.

■ Control Output Diagram



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

■ Output Waveforms



※ 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

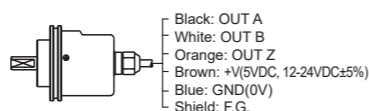
Item	Diameter Ø58mm incremental rotary encoder	
Model	Totem pole output: E58□□-□□-3-T-□□	
	NPN open collector output: E58□□-□□-3-N-□□	
	Voltage output: E58□□-□□-3-V-□□	
	Line driver output: E58□□-□□-3-L-□□	
Resolution (PPR)*1	*1, *2, *5, 10, *12, 15, 20, 23, 25, 30, 35, 40, 45, 50, 60, 75, 100, 120, 125, 150, 192, 200, 240, 250, 256, 300, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 1500, 1800, 2000, 2048, 2500, 3000, 3600, 5000, 6000, 8000	
Output phase	A, B, Z phase (line driver output: A, A, B, B, Z, Z phase)	
Phase difference of output	Output between A and B phase: $\frac{T}{4} \pm \frac{T}{8}$ (T=1 cycle of A phase)	
Electrical specification	Totem pole output	
	NPN open collector output	
	Voltage output	
	Line driver output	
Response time (rise, fall)	Max. 1µs (cable length: 2m, I sink = 20mA)	
Max. response frequency	300kHz	
Power supply	• 5VDC ±5% (ripple P-P: max. 5%) • 12-24VDC ±5% (ripple P-P: max. 5%)	
Current consumption	Max. 80mA (disconnection of the load), Line driver output: max. 50mA (disconnection of the load)	
Insulation resistance	Over 100MΩ (at 500VDC megger between all terminals and case)	
Dielectric strength	750VAC 50/60Hz for 1 min (between all terminals and case)	
Mechanical specification	Connection	
	Starting torque	
	Moment of inertia	
	Shaft loading	
Max. allowable revolution*2	5,000rpm	
Vibration	1.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours	
Shock	Approx. max. 75G	
Environment	Ambient temp.	-10 to 70°C, storage: -25 to 85°C
	Ambient humid.	35 to 85%RH, storage: 35 to 90%RH
Protection structure	IP50 (IEC standard)	
Cable	Ø5mm, 5-wire (line driver output: 8-wire), 2m, Shield cable (AWG24, core diameter: 0.08mm, number of cores: 40, insulator out diameter: Ø1mm)	
Accessory	Coupling (SC type: Ø10mm, SS type: Ø6mm), Fixing bracket	
Approval	CE (except for line driver output)	
Weight *3	Cable type, Cable connector type	• SC type: approx. 420g (approx. 310g), SS type: approx. 395g (approx. 285g), H type: approx. 380g (approx. 270g), HB type: approx. 380g (approx. 270g)
	Connector type	• SC type: approx. 340g (approx. 230g), SS type: approx. 315g (approx. 205g), HB type: approx. 310g (approx. 200g)

※1: "*" pulse is only for A, B phase. (line driver output is for A, A, B, B phase)
(In case of hollow shaft type, 6000, 8000 PPR excluded) Not indicated resolutions are customizable.
※2: Make sure that Max. response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.
[Max. response revolution (rpm) = $\frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$]
※3: The weight includes packaging. The weight in parenthesis is for unit only.
※ Environment resistance is rated at no freezing or condensation.

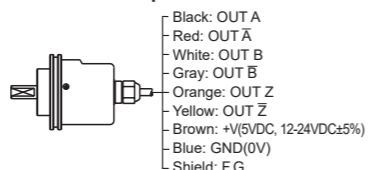
■ Connections

○ Axial/Radial Cable type

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



• Line driver output



※ Unused wires must be insulated.
※ The metal cable and shield cable of encoder should be grounded (F.G.)
※ Do not apply tensile strength over 30N to the cable.

○ Axial/Radial cable connector type / Axial/Radial connector type

- Totem pole output / NPN open collector output / Voltage output
- Line driver output

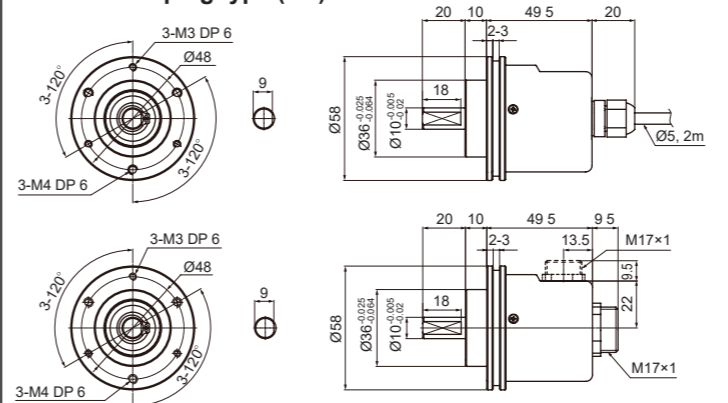


Pin No.	Function	Cable color	Pin No.	Function	Cable color
1	OUT A	Black	1	OUT A	Black
2	OUT B	White	2	OUT A-bar	Red
3	OUT Z	Orange	3	+V	Brown
4	+V	Brown	4	GND	Blue
5	GND	Blue	5	OUT B	White
6	F.G.	Shield	6	OUT B-bar	Gray
			7	OUT Z	Orange
			8	OUT Z-bar	Yellow
			9	F.G.	Shield

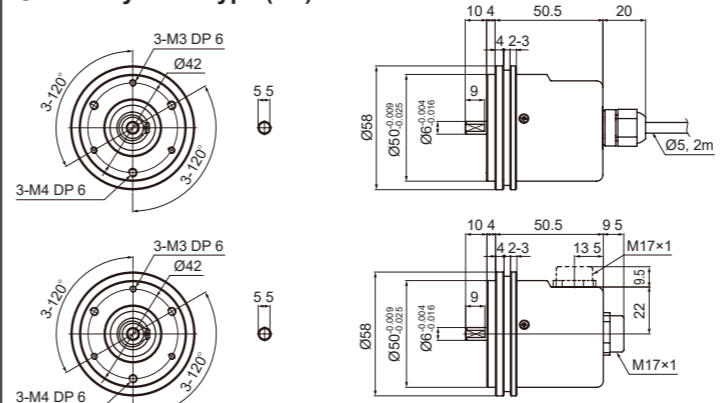
※ F.G. (field ground): t should be grounded separately.

■ Dimensions

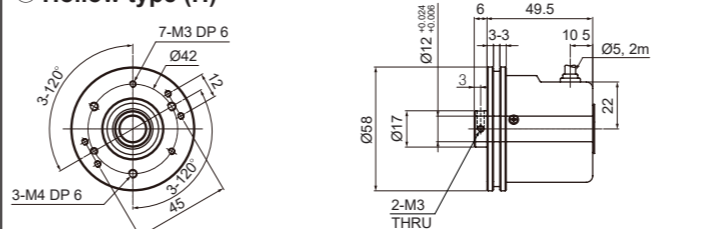
○ Shaft clamping type (SC)



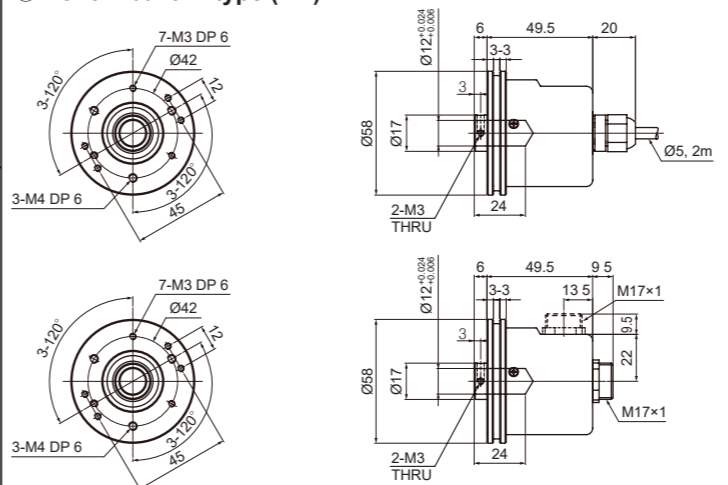
○ Shaft synchro type (SS)



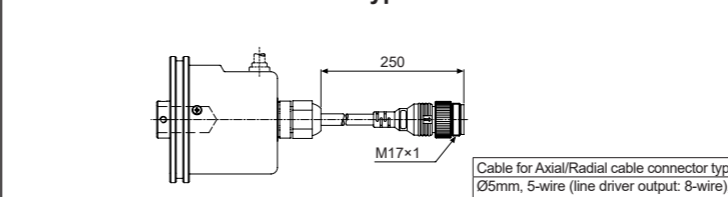
○ Hollow type (H)



○ Hollow built-in type (HB)

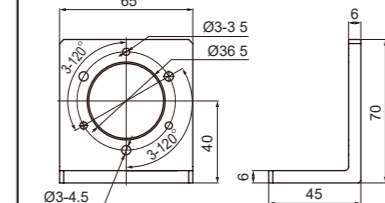
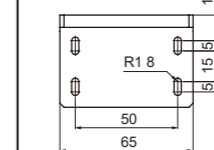


• Axial/Radial cable connector type



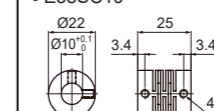
○ Bracket

• SC type

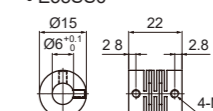


○ Coupling

• E58SC10



• E58SS6



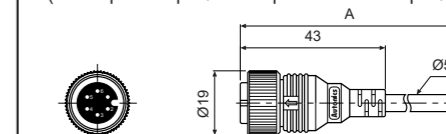
- Parallel misalignment: max. 0.25mm
- Angular misalignment: max. 5°
- End-play: max. 0.5mm

※ Do not load overweight on the shaft.
※ For flexible coupling (ERB series) information, refer to catalogue.
※ 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.

○ Connector cable (sold separately)

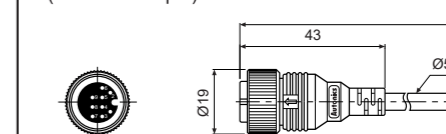
• CID6S-2, CID6S-5, CID6S-10

(Totem pole output / NPN open collector output / Voltage output)



• CID9S-2, CID9S-5, CID9S-10

(line driver output)



Model	Cable length
CID6S-2	2m
CID6S-5	5m
CID6S-10	10m
CID9S-2	2m
CID9S-5	5m
CID9S-10	10m

■ Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- 5VDC, 12-24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- For using the unit with the equipment which generates noise (switching regulator, inverter, servo motor, etc.), ground the shield wire to the F.G. terminal.
- Ground the shield wire to the F.G. terminal.
- When using switching mode power supply, frame ground (F.G.) terminal of power supply should be grounded.
- Wire as short as possible and keep away from high voltage lines or power lines, to prevent inductive noise.
- For Line driver unit, use the twisted pair wire which is attached seal and use the receiver for RS-422A communication.
- Check the wire type and response frequency when extending wire because of distortion of waveform or residual voltage increment etc by line resistance or capacity between lines.
- This unit may be used in the following environments.
 - Indoors (in the environment conditioned rated in 'Specifications')
 - Altitude max. 2,000m
 - Pollution degree 2
 - Installation category II

■ 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, CO₂, Nd: YAG)
- Laser Welding/Cutting System
- Temperature Controllers
- Temperature/Humidity Transducers
- SSRs/Power Controllers
- Counters
- Timers
- Panel Meters
- Tachometer/Pulse (Rate) Meters
- Display Units
- Sensor Controllers