Autonics ROTARY ENCODER(Absolute Type) **EPM50 SERIES**



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

Caution for your safety

XPlease keep these instructions and review them before using this unit.

XPlease observe the cautions that follow

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

XThe following is an explanation of the symbols used in the operation manual. △Caution: Injury or danger may occur under special conditions.

⚠ Warning

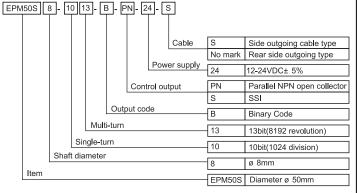
 In case of using this unit with machinery (Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device

It may cause a fire, human injury or damage to property.

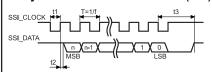
⚠ Caution

- 1. Do not drop water or oil on this unit.
- It may cause damage or miscontrol due to malfunction 2. Please observe voltage rating.
- It may shorten the life cycle or damage to the product.
- 3. Please check the polarity of power and wrong wiring
- 4. Do not short circuit the load.
- It may cause damage to this unit.

Ordering information

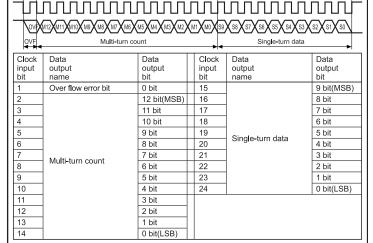


Synchronous serial interface (SSI) Output Timing diagram

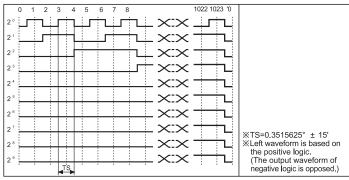


Clock Frequency f	100 to 1MHz
Т	T: 1 ~ 10us
	0.5us < t1 < 5us
Time lag t2	T2 < 0.3us
Monoflop Time t3	15us < t3 < 30us

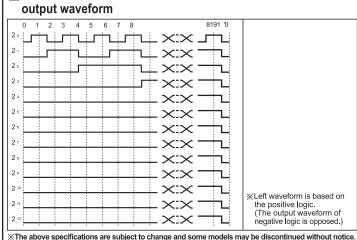
Synchronous serial interface (SSI) Data Output



Parallel Interface 1024 division single-turn data output waveform



Parallel Interface 8192 revolution multi-turn count data



Speicifications

Typ		Tomoutio	ø 50mm Multi-turn absolute encod	er		
Model			EPM50S8-1013-B-S-24 EPM50S8-1013-B-PN-24			
		Single-turn	1024 division(10Bit)			
Resolution Multi-turn Rotation limit when power is off		1 —	8192 revolution(13Bit)			
1 100		Output code	24bit, Binary 2 code	Binary 2 code		
		Output Interface	SSI(Synchronous Serial Interface)	Parallel		
		Output type	Line driver	NPN open collector output		
		Output signal	Single-turn data, Multi-turn count, OVF alarm*2			
	Output -	Line driver output	-Low: Sink current - max. 20mA, Residual voltage - max. 0.5VDC -High: Sink current - max20mA, Output voltage - max. 2.5VDC	-		
		NPN open collector output	-	Sink current : Max. 32mA, Residual voltage : Max. 1VDC		
		Logic	-	Negative logic output		
		Response time	-	Max. 1μs(Cable: 2m, I sink = 32mA)		
_		Input signal	Single-turn data reset *3, Multi-turn count reset *4, Direction, Clear			
tio			-	Latch		
Electrical specification		Input level	High: 5-24VDC, Low: 0-1.2VDC			
ecit		Input logic	Low Active *5, HIGH or OPEN for	common use		
Sp	ll		Direction : Over 100ms			
g	Input	Input time	Single-turn data reset : Over 100ms			
ctri			Multi-turn count reset : Over 100ms			
믑			Clear: Over 100ms			
			No Latch function	Latch : Over 500μs		
		SSI Clock Input Frequency	100kHz~1MHz	_		
	Max. Response frequency			50kHz		
	Power supply		12-24VDC ± 5%(Ripple P-P : Max. 5%)			
	Current consumption		Max. 150mA(Disconnection of the load) Max. 100mA(Disconnection of the load)			
	Insulat	tion resistance	Min. 100MΩ (At 500VDC between all terminals and case)			
	Dielectric strength		750VAC 50/60Hz for 1 minute(Between all terminals and case)			
	Conne	ection	Cable outgoing type(Cable gland)			
Starting torque		Starting torque	Max. 40gf·cm(0.004N·m)			
Med	chanical	Moment of inertia	Max. 40g·cm²(4× 10 ⁻⁸ kg·m²)			
spe	cification	Shaft loading	Radial: 10kgf, Thrust : 2.5kgf			
	Max. revolution		3000rpm*6			
Vibration			1.5mm amplitude at frequency of 10 to 55Hz (for one minute cycle) in each of X, Y, Z direction for 2 hours			
Sh	ock		Max, 50G			
Ambient temperature		emperature	-10 to 70°C, Storage: -25 to 85°C			
Ambient humidity			35 to 85%RH, Storage: 35 to 90%RH			
Protection			IP64(IEC standard), Side outgoing cable type: IP50(IEC standard)			
Cable			ø 6mm 10P, Length: 2m, Shield cable (AVVG 28, Thickness of core wire : 0.08mm, Number of core wire : 19 , Insulation diameter: ø 0.8mm)	ø 6mm 17PX2, Length: 2m, Shield cable (AWG 28, Thickness of core wire : 0.08mm, Number of core wire : 17 , Insulation diameter: ø 0.8mm)		
Aco	cessori	es	Mounting bracket, coupling			
Apı	proval		C€			
Unit weight			Approx. 322g Approx. 475g			
×1:	It calib	orates the multi-	turn counts by comparing single-turn	data before/after power off without		

- i: It calibrates the multi-turn counts by comparing single-turn data before/after power off without counting multi-turn counts when power is off. It shall be used on the condition that no overrated revolution occurred since proper multi-turn data may not be available if any revolutions occurred over ± 90° from the position when power is off.

 2: OVF alarm is ON when multi-turn count is out of counting range (0–8191 revolution). It shall be initialized by changing the setting of Direction or applying multi-turn count reset or Clear signals.

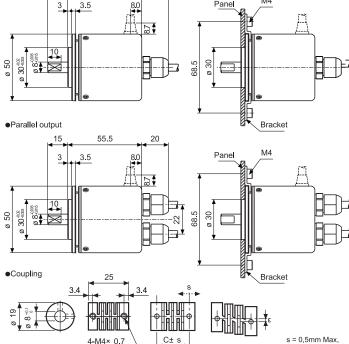
 8: Single-turn data shall be initialized as \(\frac{1}{2} \), when single-turn data reset is input.
- with the country of the country of
- #5: High Active is optional.
 #6: In case of Parallel type model, select the resolution to make max. Response revolution is lower than max. Allowable revolution.

 Max. Allowable Revolution.
- rer than max. Allowable revolution.

 [Max. Response Revolution (rpm) =
 | Max. Allowable Revolution | × 60 sec.]

Resolution Environment resistance is rated at no freezing or condensation

Dimensions (Unit:mm) 4-M4x0.7 DP10 2-M4 Bolt P.C.D 38 11



 $\varepsilon = 0.25$ mm Max. $\theta = 5^{\circ}$ Max. How to use flexible coupling When mounting the coupling to encoder shaft, if there is big eccentricity or bend between rotating encoder shaft and mate shaft, it may cause encoder and coupling's life cycle to shorten.

 Do not load overweight on the shaft.

Functions

SSI output

Single-turn data reset

Single-turn data will be initialized as 「0」 when GND(low level) is input over 100ms on single-turn data reset line. In case of not using single-turn data reset line, connect the line to OPEN or + V(High level). Multi-turn count reset

Multi-turn data will be initialized as 「revolution 0」 when GND(Low level) is input over 100ms on multi-count reset line. In case of not using multi-turn count reset line, connect the line to OPEN or + V(High level). OVF alarm will be initialized with muli-turn count reset input.

Single-turn data will be initialized as 「0」 and multi-count will be also initialized as 「revolution 0」 when GND (Low level) is input over 100ms on Clear line. In case of not using clear line, connect the line to OPEN or + V(High level). OVF alarm will be initialized with clear input.

Direction

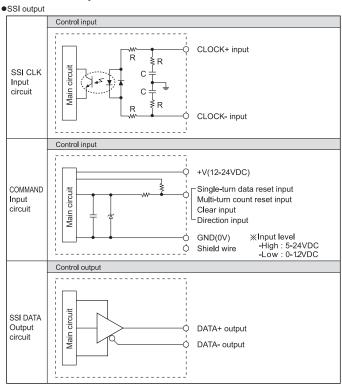
Connect Direction line to OPEN or +V(High level) and turn on the power. Output will increase when rotation direction is CW from shaft axis. In case of connecting to GND(Low level), output will increase when rotation direction is CCW. If direction setting is reset, single-turn data, multi-turn count and OVF will be reset together since direction setting is initial setting which is set

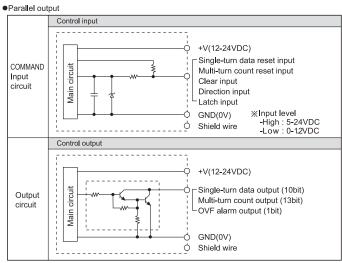
Latch(Parallel output model only)
When connecting latch line to GND(Low level) over 500μs, outputs for single-turn data, multi-turn count and OVF at latch point will be remained. When latch line is connected to OPEN or +V (High level), output will be returned to operating mode output.

It is an alarm function providing output when multi-turn count is out of rotation ranges(0 to 8191 revolutions). OVF will be initialized through direction setting change, multi-turn count reset or clear input.

■ Control output I/O Circuit







Output of each bit is the same circuit ※Overload or short may cause circuit break

Connections

SSI output

Cable							
Cable color	Description	Cable color	Description				
Brown	CLOCK+	Gray	Single-turn data reset				
Red	CLOCK-	Blue	Multi-turn count reset				
Orange	DATA+	Purple	Clear				
Yellow	DATA-	Green	Direction				
White	+V (12-24VDC)						
Black	GND (0V)						
Shield wire	Signal shield cable(F.G)						

Parallel output

(Sheath color: Black)			(Sheath color	(Sheath color: Gray)		
Cable color	Description		Cable color	Description		
Brown	Multi-turn count	20	Brown		2º	
Red		2 ¹	Red	Single-turn data	2 ¹	
Orange		2 ²	Orange		2 ²	
Yellow		2 ³	Yellow		2 ³	
Green		24	Green		2 ⁴	
Blue		2 ⁵	Blue		2 ⁵	
Purple		2 ⁶	Purple		2 ⁶	
Gray		27	Gray		2 ⁷	
Pink		2 ⁸	Pink		2 ⁸	
Clear		2 ⁹	Clear		2 ⁹	
Light brown		2 ¹⁰	Light brown	No connection		
Light yellow		2 ¹¹	Light yellow	Direction		
Light green		2 ¹²	Light green	Latch		
Light blue	OVF Multi-turn count reset +V(12-24VDC)		Light blue	Clear		
Light purple			Light purple	Single-turn data reset		
White			White	+V(12-24VDC)		
Black	GND(0V)		Black	GND(0V)		
Shield wire	Signal shield cable(F.G)		Shield wire	Signal shield cable(F.G)		

XDo the wiring properly.
XEncoder's metal case and shield cable must be grounded (F.G.).
XDo the wiring with care for short since dedicated Driver IC is used for I/O circuit.
XAs for Parallel output, it is recommended to connect +V and GND of both multi-turn count cable and

Caution for using

1. Installation

 Mandle the unit with care since it consists of precision components.
 Be careful not to make eccentricity and deflection angle larger, it may shorten the life cycle.
 not put strong impact when insert coupling into shaft. 2. For using

Please connect shield wire to F.G terminal.

②Do not connect and cut circuit during power on, or it may cause damage to the unit.
 ③When use switching power, install the surge absorber on power line and make the wire as short as possible to avoid noise.

3. Environment

Please do not use this unit with below environment, it may cause malfunction. Place where this unit or component may be damaged by strong vibration or impact.
 Place where there are lots of flammable or corrosive gases.
 Place where strong magnet field or electric noise occurs.

⑤Place where strong acids or alkali near by.

4. Vibration and Impact

When the strong impact loads on this unit, it may cause an error.
 Please use Bracket for more stable unit mounting.
 Please use metallic coupling when the application needs severe acceleration or

deceleration frequently.

5. Wire connection

①Do not draw the wire with over strength 30N after wiring.
②If wire encoder cable with high voltage line or power cable in the same conduit, it may cause a malfunction or mechanical problem. Please wire it separately or use separated conduit.

XIt may cause malfunction if above instructions are not followed.

Major products

Photoelectric sensors Temperature controllers
Fiber optic sensors Temperature flumidity tran
Door sensors SSR/Power controllers
Door side sensors SSR/Power controllers
Area sensors Timers
Pressure sensors Pranel meters
Pressure sensors Pranel meters
Rotary encoders
Connector/Sockets Display units
Connector/Sockets Sensor controllers
Switching mode power supplies
Switching mode power supplies
Switching mode power supplies
Signaphiologic panels
I/O Terminal Blocks & Cables
Stepper motors/drivers/motion controllers
Graphiol-Logic panels
Field network devices
Laser marking system(Fiber, Co., Nd:YAG)

■ Laser marking system(Fiber, CO₂, Nd:YAG)
■ Laser welding/soldering system

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