

EPM50S Series Ø50mm Shaft Multi-Turn Absolute Type

Diameter Ø50mm Shaft Type Multi-Turn Absolute Rotary Encoder

■ Features

- Total 23-bit resolution (8388608-division) of 10-bit single-turn (1024-division) and 13-bit multi-turn (8192-revolution)
- Compact size of diameter Ø50mm
- Parallel data/SSI data transmission type
- Easy zero adjustment using single-turn/multi-turn data separated reset function
- Memorizing revolution data up to $\pm 90^\circ$ after blackout without memory back up function
- Possible CW/CCW direction setting with direction function
- Maximizing users convenience with clear, over flow alarm (OVF) function
- Protection structure IP64 (IEC standard) (dust-proof, oil-proof)
- Provides Latch function (parallel output model only)

■ Applications

- Precision machine tool, Fabric machinery, Robot, Parking system

⚠ Please read "Caution for your safety" in operation manual before using.



Radial cable type



Axial cable type

■ Ordering Information

EPM50S	8	–	10	13	–	B	–	PN	–	24	–	
Series	Shaft diameter	Single-turn	Multi-turn	Output code	Control output		Power supply		Cable			
Diameter Ø50mm Shaft type	Ø8mm	10-bit (1024- division)	13-bit (8192- revolution)	Binary Code	PN: Parallel NPN open collector output S: SSI Line driver output		12-24VDC±5%		No mark: Axial cable type S: Radial cable type			

■ Specifications

Type			Diameter Ø50mm shaft type multi-turn absolute rotary encoder		
Model			EPM50S8-1013-B-S-24	EPM50S8-1013-B-PN-24	
Resolution	Single-turn	1024-division (10-bit)			
	Multi-turn	8192-revolution (13-bit)			
Rotation limit when power off ※1			±90°		
Electrical specification	Output	Output code	24-bit, Binary 2 code	Binary 2 code	
		Control output	SSI (Synchronous Serial Interface) Line driver [Low] - Sink current: Max. 20mA, Residual voltage: Max. 0.5VDC [High] - Sink current: Max. -20mA, Output voltage: Min. 2.5VDC	Parallel NPN open collector output Sink current: Max. 32mA, Residual voltage: Max. 1VDC	
		Output signal	Single-turn data, Multi-turn count, Over flow alarm (OVF)※2		
		Output logic	—	Negative logic output	
		Response time (rise, fall)	—	Max. 1μs (cable: 2m, I sink = 32mA)	
	Input	Input signal	Single-turn data reset ※3, Multi-turn count reset ※4, Direction, Clear		
			— Latch		
		Input level	0-1VDC (high active: 5-24VDC)		
		Input logic	Low Active※5, Open or High for common use		
		Input time	Single-turn data reset※3, Multi-turn count reset※4, Direction, Clear: Over 100ms		
			— Latch: Over 500μs		
		SSI clock input	Input level	5VDC±5%	
	Input frequency		100kHz to 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)	
Insulation resistance			Over 100MΩ (at 500VDC megger between all terminals and case)		
Dielectric strength			750VAC 50/60Hz for 1 minute (between all terminals and case)		
Connection			Axial/Radial cabel type (cable gland)		

※1: 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 $\pm 90^\circ$ from the position when power is off.

※2: OVF alarm is ON when multi-turn count is out of counting range (0 to 8191 revolutions).

※3: Single-turn data will be reset as 「0」 when single-turn data reset is input.

※4: Multi-turn count will be reset as 「0 revolution」 when multi-turn count reset is input.

※5: High Active is optional.

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) Door/Area Sensors

(D) Proximity Sensors

(E) Pressure Sensors

(F) Rotary Encoders

(G) Connectors/ Connector Cables/ Sensor Distribution Boxes/Sockets

(H) Temperature Controllers

(I) SSRs / Power Controllers

(J) Counters

(K) Timers

(L) Panel Meters

(M) Tacho / Speed / Pulse Meters

(N) Display Units

(O) Sensor Controllers

(P) Switching Mode Power Supplies

(Q) Stepper Motors & Drivers & Controllers

(R) Graphic/ Logic Panels

(S) Field Network Devices

(T) Software

EPM50S Series

Specifications

Type	Diameter Ø50mm shaft type multi-turn absolute rotary encoder	
Model	EPM50S8-1013-B-S-24	EPM50S8-1013-B-PN-24
Mechanical specification	Starting torque	Max. 40gf·cm (0.004N·m)
	Moment of inertia	Max. 40g·cm ² (4×10 ⁻⁶ kg·m ²)
	Shaft loading	Radial: Max. 10kgf, Thrust: Max. 2.5kgf
	Max. revolution ^{※6}	3,000rpm
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. 50G	
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	Axial cabel type: IP64 (IEC standard), Radial cabel type: IP50 (IEC standard)	
Cable	Ø6mm, 10-wire, 2m, Shield cable (AWG28, core diameter: 0.08mm, number of cores: 19, insulation diameter: Ø0.8mm)	Ø6mm, 17-wire×2, 2m, Shield cable (AWG28, core diameter: 0.08mm, number of cores: 17, insulation diameter: Ø0.8mm)
Accessory	Bracket, coupling	
Approval	CE	
Weight ^{※7}	Approx. 409g (approx. 324g)	Approx. 560g (approx. 475g)

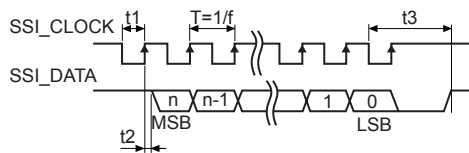
※6: In case of Parallel type model, Make sure that Max. response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

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

※7: The weight includes packaging. The weight in parentheses is for unit only.

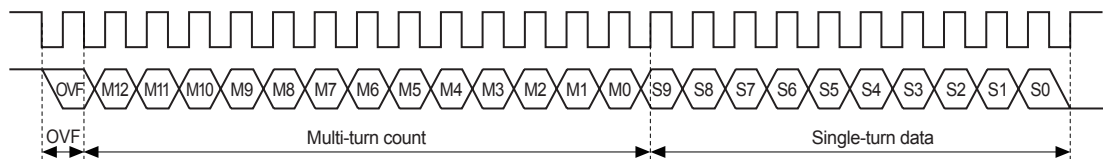
※Environment resistance is rated at no freezing or condensation.

Synchronous Serial Interface (SSI) Output Timing Diagram



Clock Frequency f	100kHz to 1MHz
T	T: 1 to 10μs
Time lag t2	t2 < 0.3μs
Monoflop Time t3	15μs < t3 < 30μs

Synchronous Serial Interface (SSI) Data Output



Clock input bit	Data output name	Data output bit	Clock input bit	Data output name	Data output bit
1	Over flow alarm bit	0-bit	15	Single-turn data	9-bit (MSB)
2	Multi-turn count	12-bit (MSB)	16		8-bit
3		11-bit	17		7-bit
4		10-bit	18		6-bit
5		9-bit	19		5-bit
6		8-bit	20		4-bit
7		7-bit	21		3-bit
8		6-bit	22		2-bit
9		5-bit	23		1-bit
10		4-bit	24		0-bit (LSB)
11		3-bit			
12		2-bit			
13		1-bit			
14		0-bit (LSB)			