SSI Output Multi-turn Absolute Encoder Series KEM-40MS6-SSI

Operation Manual

Thank you for purchasing the KEM-40MS6 series SSI Output Multi-turn Absolute Encoder. Please read this Operation Manual carefully before applying this product.

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JELWX-M8581C-E

Safety Consideration

This indicates contents which can cause large accidents Warning leading to loss of life or severe injury when the indication is disregarded and wrong handling is executed.

This indicates contents which can cause injury or !\Caution material damage when the indication is disregarded and wrong handling is executed.

Explanation of the pictograms

This symbol indicates a general prohibition.

This symbol indicates a compulsory item or an instruction.

[Operating environment and conditions]

Warning

- Do not use in a combustible or explosive atmosphere. Otherwise personal injury or fire may be caused.
- Do not use this product for applications related to human safety. Use is assumed in an application where an accident or incorrect use will not immediately cause danger to humans.

[Operating environment and conditions]

Caution

- Use and store the equipment within the scope of the environment (vibrations, impact, temperature, humidity, etc.) specified in the specifications
- Otherwise fire or product damage may be caused.
- Understand the product first before use it.

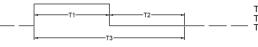
[Installation and wiring]

Warning

- Use only with the power supply voltage listed in the specifications. Otherwise fire, electric shock, or accidents may be caused.
- Use only with the wiring and layout specified in the specifications. Otherwise fire, electric shock, or accidents may be caused.
- Do not apply any kind of stress to the wires. Otherwise electric shock or fire may be caused.

Connection

Wire color	Item	Function	Note		
Brown	5V	Dower cumby	*1 The yellow wire is used to set the zero position.		
Blue	0V	Power supply	1). When the encoder is operating normally, the zero		
White	Clock+	The clock pulse signal outputs to the	position setting wire should be connected to the 0V power wire. 2). Zero position setting steps: first rotate the encoder to the desired zero position, then connect the zero position setting wire to the 5V power		
Gray	Clock-	encoder			
Black	Data+	The position data outputs from the			
Purple	Data-	encoder			
Yellow	Zero	Zero position setting wire *1	wire .Zero position setting requires two steps of T1		
			and T2,as shown in the figure below.		



T1:zero position setting time ≥ 50ms (high level)

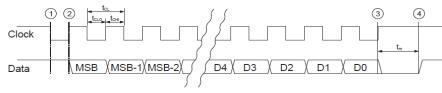
T2:exit time after zero position setting ≥ 50ms (low level) T3:total time ≥ 100ms

Mechanical specifications ■ **Environmental requirements**

Starting torque)	≤ 0.01N • m (+20°C)		
Shaft moment of inertia			ertia	3×10 ⁻⁷ kg⋅m²		
Max. allowable R		Radial	30N			
shaft load		Т	hrust	20N		
Max. allowable speed			eed	3000rpm		
Cable	Material		rial	Oil resistant PVC cable		
	Outer diameter			Approx. φ 5mm (8 cores)		
	Length		gth	Decided by the product type		
	Specification		ation	Nominal cross-sectional area is 0.14mm², AWG26		
		Standard Shaft type: about 160g (2m cable)				
Weight			Long Shaft type: about 110g (0.3m cable)			

	. 0	itai roquiromonto		
Ambient	Operation	-25~+85°C		
temperature	Store	-30∼+90℃		
Ambient	humidity	$35{\sim}85\%$ RH (non-condensing)		
Withstan	d voltage	AC500V (50/60Hz) for 1 min		
Insulation r	esistance	min. 20MΩ		
Vibration re	esistance	10 to 55Hz with 0.75mm amplitude durable for 1h along 3 axes		
Shock re	esistance	11ms with 490m /s ² applied 3 times 3 axes		
Protection co	onstruction	IP54		

Brief description of SSI PROTOCOL

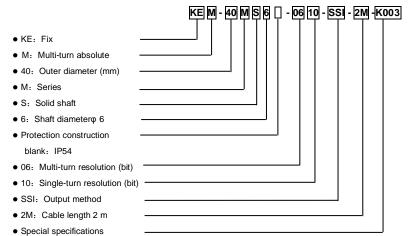


SSI timing diagram with monoflop timeout

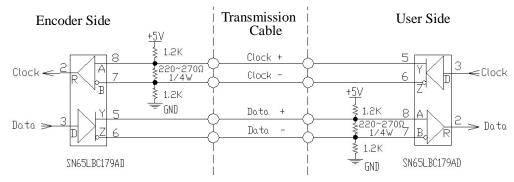
The users obtain the current position data by sending a continuous clock signal to the encoder. At the first falling edge (position ①), the encoder stores the current location information. At the first rising edge (position ②), the most significant bit of data is outputted through the data line (Data). At each subsequent rising edge of the clock signal, the next bit of data is outputted through the data line (Data). While reading the data, the t_{CHI} and t_{CLO} should be less than t_{mMin} . After reading a complete position data (point ③), the data line (Data) outputs low.

Parameter	Symb	Min.	Max.	Unint	Note
Clock start	t_{start}	1.1	10	μS	
Clock period	t_{CL}	0.5	10	μS	Cable length:
Clock high	t _{CHI}	0.2	6	μS	
Clock low	t _{CLO}	0.2	6	μS	2m
Monoflop time	t _m	15	25	μS	

Composition of model number



Reference output circuit



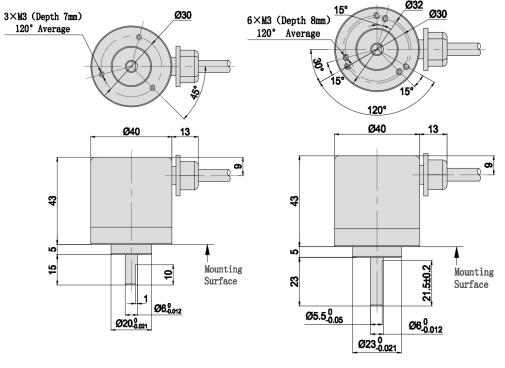
Electrical specifications

K003: Long Shaft type

None: Standard Shaft type

er	Allo	cuit rating voltago wable ripple		Line 5V±0.2	driver	SN65LBC179 or equivalent
-	Allo			5V±0.2	25V DC	
-		wable ripple			-0 1 00	
oly	Curro			Max. 3%rms		
	Current consumption			Max. 100mA		
Output code				binary code		SSI serial output
Clock start time				1.1µs~10µs		
Clock frequency			100kHz~2MHz			
,	Item			Min.	Max.	
ut Ole	- 1	Voltage	V _{IH}	2.1V	V _{CC}	The clock pulse signal outputs to the encoder.
ai Cio	CK		V _{IL}		0.9V	encoder.
		Voltage	V _{OH}	2.0V	V _{cc}	
			V _{OL}		0.5V	The position data outputs from the encoder.
aı		Current	Lo		15mA	onodor.
) c	t Clo	Clock start Clock frequent t al Clock ut Data	Clock start time Clock frequency Item Clock Voltage Ut Data	Clock start time Clock frequency Item Clock Voltage V IIII Voltage V OH Voltage V OH Voltage V OH Voltage V OH	Clock start time	Clock start time

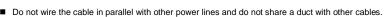
External dimensions and mounting



Standard Shaft type product

Long Shaft type product (K003)

Cautions for use



■ Do not wire the cable in parallel with other power lines and do not share a duct with other cables Use capacitors or surge absorption elements to remove the sparks caused by relays and switches in the control panel as far as possible

■ Be sure to connect all wires properly, as wrong wiring can damage the internal circuitry.

- Erroneous data may be caused at the time of power ON and power OFF. After power ON, wait for at least 0.5 sec. before use.
- Do not disassemble the product. Do not expose the product for a long time to water, even if it is a dust-resistant, jet-proof type. Wipe off any water getting onto the product.
- As the rotary encoder is composed of precision parts, its parts will be impaired when it is subjected to shocks. Use sufficient care for handling and mounting.