

KH-SIQ-02FVS3

DIRECTION SERIES SPECIFICATION

1.General

1-1.Scope

This specification applies to 10mm size low-profile rotary encoder(incremental type) for microscopic current circuits , used in electronic equipment.

1-2.Standard atmospheric conditions

Unless otherwise specified ,the standard range of atmospheric conditions for making measurements and test is as following limits:

Ambient temperature : 5°C to 35°C

Relative humidity : 20% to 85%

Air pressure :86kpa to 106kpa

If doubt arises on the decision based on the measured values under the above-mentioned conditions, the following conditions shall be employed:

Ambient temperature : 20±2°C

Relative humidity : 60% to 70%

Air pressure :86kpa to 106kpa

1-3.Operating temperature range : -20°C to+60°C

1-4.Storage temperature range : -30°C to+70°C

2.Construction

2-1.Dimensions

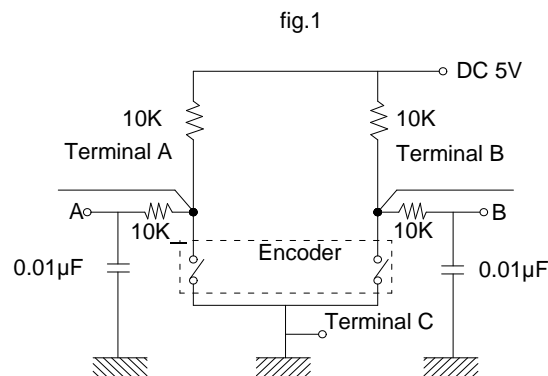
Refer to attached drawing

3.Rating

3-1.Rated voltage:DC 5V

3-2.Maximum operating current (resistive load)

Each lead: 0.5mA(Max 5mA;Min 0.5mA)
Common lead:1mA(Max 10mA;Min 0.5mA)



4.Application Notes

4-1. Avoid storing the products in a place at high temperature,high humidity and in Corrosive gases.Please use this product as soon as possible with 6 months limitation.If any remainder left after packing is opened,please store it with proper moistureproofing,gasproofing etc.

4-2. The encoder pulses count method should be designed with taking operating speed,samplingtime and esign of the microcomputer software into cosideration.

4-3. At design of the pulse count process.Using the C/R filter circuit is Recommended.(fig .1)

4-4.Care must be taken not to expose this product to water or dew to prevent possible problem in pluses output waveform.

KH-SIQ-02FVS3

DIRECTION SERIES SPECIFICATION

5.Electrical Characteristics			
ITEM	CONDITIONS	SPECIFICATIONS	
5-1.Output signal format	2 Phase-different signals (signal A,signal B) Details shown in<fig.2>		
	Knob rotational direction	Signal	
	C.W	A(TerminalA-C)	
		B(TerminalB-C)	
C.C.W	A(TerminalA-C)		
	B(TerminalB-C)		
5-2.Resolutio	Number of pulses in 360°rotation.	15pulses/360°	
5-3.Phase difference	<p>Measurement shall be made under the condition which the Knob is rotated at 360°/s.</p>	<p>T1、 T2、 T3、 T4 ≥ 5ms</p> <p>(fig.3)</p>	
5-4.Switching characteristics	<p>Measurement shall be made under the condition as follows.</p> <p>Knob rotational speed : 360°/S Test circuit : (fig.3)</p>	<p>Code-OFF area :The area which the voltage is 3.5V or more(fig.4).</p> <p>Code-ON area : The area which the voltage is 1.5V or less(fig.4).</p>	

KH-SIQ-02FVS3

DIRECTION SERIES SPECIFICATION

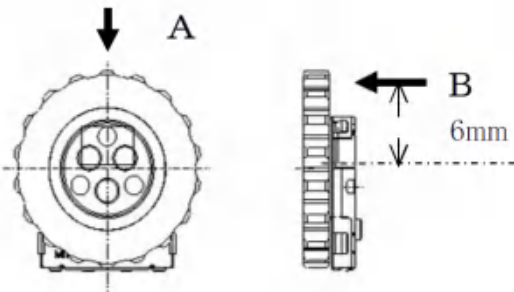
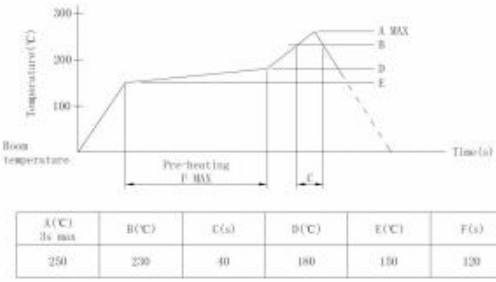
ITEM	CONDITIONS	SPECIFICATIONS
5-4-1.Chattering	Specified by the signals passage time from 1.5V to 3.5V of each switching position(code OFF~ON or ON~OFF)	$t1、t3 \leq 3ms$
5-4-2.Sliding noise (Bounce)	Specified by the time of voltage change exceed 1.5V in code-ON area . When the bounce has code-ON time less than 1mS between chattering ($t1$ or $t3$)the voltage change shall be regarded as a part of chattering.When the code-ONtime between 2 bounces is less than 1mS.They are regarded as 1 linked boune.	$t2 \leq 2mS$
5-5.Contact resistance	Measurement shall be stable condition which a output signal is ON.	1 Max

6.Mechanical Characteristics

ITEM	CONDITIONS	SPECIFICATIONS
6-1.Total rotational angle		360°(Endless)
6-2.Detent torque	Only suitable for C.C,equipment.	1~40mN.m.
6-3.Number and position of detent	Only suitable for C.C,equipment.	15detents Step angle: $24^{\circ} \pm 2^{\circ}$
6-4.Switch circuit and number of pulse		Single pole and single throw (push ON)
6-5.Travel of switch		$0.5 \pm 0.2mm$
6-6.Operatio fore of switch	Push static load to the Knob in the axial direction	2~6N
6-7.Terminal strength	A static load of 1N (102gf) be applied to the tip of Without damage or excessive terminals for 10sec in any direction.	looseness of terminals. terminal bend is permitted.

KH-SIQ-02FVS3

FORWARD DIRECTION SERIES SPECIFICATION

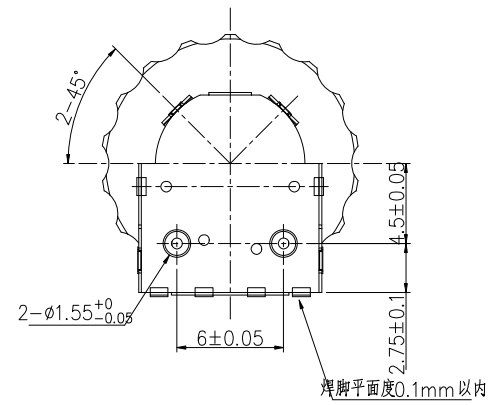
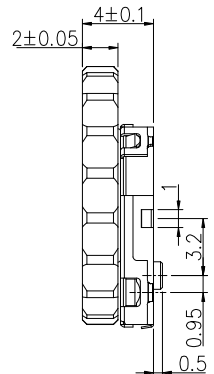
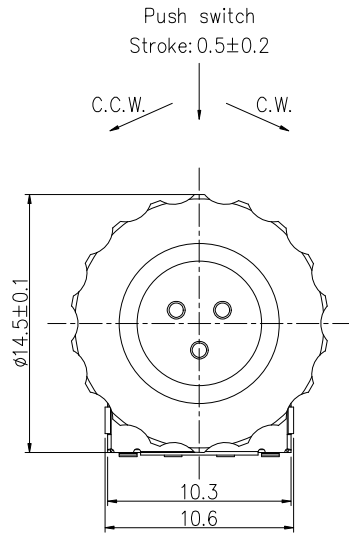
ITEM	CONDITIONS	SPECIFICATIONS												
<p>6-8.Push strength of knob</p>	<p>Push static load of 30N(3.06kgf) shall be applied to the knob in the direction "A" for 10 sec. And push static load of 5N (510gf) shall be applied to the knob in the direction "B" for 10 sec. (After installing)</p> 	<p>Must fulfill the electrical Specif_x005f cations. No damage on the body.Nor significant looseness.</p>												
<p>6-9.Resistance to Soldering heat</p>	<p>Manual soldering. Bit temperature of soldering iron:350°C less than Application time of soldering iron:within 3S.</p> <p>Reflow soldering. Reflow soldering conditions:250±5°C or less Immersion time:within 3S</p>  <table border="1" data-bbox="375 1529 877 1597"> <thead> <tr> <th>A(°C) 1/s max</th> <th>B(°C)</th> <th>C(s)</th> <th>D(°C)</th> <th>E(°C)</th> <th>F(s)</th> </tr> </thead> <tbody> <tr> <td>250</td> <td>230</td> <td>40</td> <td>180</td> <td>150</td> <td>120</td> </tr> </tbody> </table> <p>(1)The condition mentioned above is the temperature on the mounting surface of a PC board There are cases where the PC board s temperature greatly differs from that of the encoders depending on the PC boards material, size shall also apply to encoders surfa,thickness, etc. The above-stated conditions ace temperatures.</p> <p>(2)Soldering conditions differ depending on reflow soldering machines. Prior verification of soldering condition is highly recommended.</p>	A(°C) 1/s max	B(°C)	C(s)	D(°C)	E(°C)	F(s)	250	230	40	180	150	120	<p>Electrical characteristics shall be satisfied No mechanical abnormality.</p>
A(°C) 1/s max	B(°C)	C(s)	D(°C)	E(°C)	F(s)									
250	230	40	180	150	120									

KH-SIQ-02FVS3

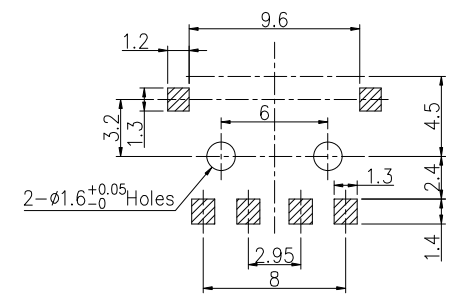
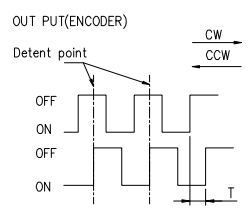
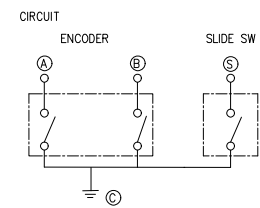
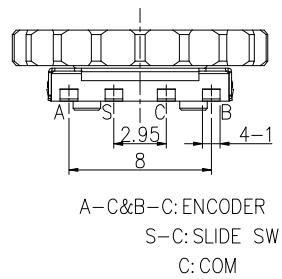
DIRECTION SERIES SPECIFICATION

7 Endurance Characteristics					
ITEM	CONDITIONS			SPECIFICATIONS	
7-1.Rotational life	The Knob of encoder shall be rotated at a speed of 50,000±200cycles; 500cycles/H without electrical load,after with measurements shall be made.			50,000±200 cycles. Shall not deviate from the previously specified value.	
7-2.Switch life	The Knob of encoder shall be slide at a speed of 500cycles/H without electrical load,after with measurements shall be made.			50,000±200 cycles: Shall not deviate from the previously specified value.	
7-3.Damp heat	The encoder shall be stored at temperature of40±2℃with relative humidity of 90% to95% for96±4H in a thermostatic chamber.And the encoder shall be subjected to standard atmospheric conditions for 1.5H,After which measurements shall be made.			Contact resistance 200 Max; Switch Contact resistance: 200m or less, Rotation torque change rate shall be within ±40% against initial value; Operation Force of Switch change rate Shall be within±30% against initial value;	
7-4.Dry heat	The encoder shall be stored at a temperature of 60±2℃for 96±4H in a thermostatic chamber.And then the encoder.shall be subjected to standardatmospheric conditions for 1.5H,After which measurements shall be made.				
7-5.Cold	The encoder shall be stored at a temperature of -20±2℃for 96±4H in a thermostatic chamber.And then the encoder.shall be subjected to standardatmospheric conditions for 1.5H, After which measurements shall be made.				
Document No	Revision	Date	Designed	Check	Approved
		2024.3.2	Hongxin Li	Shengcai Lin	Jinbao Yang
File No					
SIQ-02FVS3					
VERSION: A0					

ZONE	EC.N.O.	DESCRIPTION	DRAWING	DATE
A		INITIAL	林生財	2024.03.12



- 1. ELECTRICAL CHARACTERISTICS**
- 1-1. Rated Parameters: 0.5 mA / 5 V DC
 - 1-2. Contact Resistance: 10
 - 1-3. Insulation Resistance: 10 M
 - 1-4. Withstand Voltage: 50 V AC for 1 minute
- 2. MECHANICAL CHARACTERISTICS**
- 2-1. Operating Force: 3–6 N (Slider Component)
 - 2-2. Rotational Torque: 5 mN·m (49 gf·cm for Rotary Encoder)
 - 2-3. Life Cycles:
 - Slider Component: 50,000 cycles
 - Rotary Encoder: 50,000 cycles



P.C.B.MOUNTING DETAIL

Shenzhen Kinghelm Electronics Co., Ltd.		www.kinghelm.net			DRAWING:	DATE:	2024.03.12	SCALE:	1:1
					CHECK:	DATE:	2024.03.12	MATERIAL:	*
PART NAME	Micro Switch Encoder	TOLERANCE UNLESS	0.0±0.25	0.1±2'	APPROVAL:	DATE:	2024.03.12	DWG. NO.	
		OTHERWISE SPECIFIED:	0.00±0.15 0.000±0.05	0.0±1' 0.00±0.5'		UNIT:	mm	KH-SIQ-02FVS3	