## S38 INCREMENTAL

1. S38 Incremental Optical Encoder (Blind shaft/through shaft)
1.1 Introduction:

S38 is a small economic universal design, compact, sturdy, high safety, and commonly used in industrial automations.
1.2 Feature:

- Encoder external diameter $\varnothing 38 \mathrm{~mm}$, thickness 28 mm ,
diameter of shaft up to $\varnothing 6 \mathrm{~mm}$;
- Ring locking structure;
- Adopt non-contact photoelectric principle;
- Reverse polarity protection;
- Short circuit protection;
- Multiple electrical interfaces available;
- Resolution per turn up to 32768PPR.
1.3 Application:

Textile, packaging, motor, elevator, CNC and other automation control fields.
1.4 Connection:

- Radial cable (standard length 1000 mm )
- Axial cable (standard length 1000 mm )
1.5 Protection:

IP50 \& IP65
1.6 Weight:
about 120 g
2. Model Selection Guide
2.1 Model composition(select parameters)

2. 2 Note
(1)(3)(b)7. Resolution selection is recommended below 5000PPR, $Z$ signal is low level active.
(2)(4)(5). Resolution selection is recommended below 5000PPR, $Z$ signal is high level active.
(9). Axial cable connection is not an option.
(10). $I P=50$; Cable length 1 m , if you need to change the length $C+$ number, max 100 m (indicated by C 100 ), please refer to page 2 for the specific length used for the output circuit.

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## 3. Output mode

| Electrical interface | Output circuit | Output wave form |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| OC NPN open collector circuit |  |  |  |  |  |
| OC PNP open collector circuit |  |  |  |  |  |
| Push-pull |  |  |  |  |  |
| Voltage |  |  |  |  |  |
| TTL (DC5V) <br> HTL (DC8-30V) |  |  |  |  |  |

## 4. Electrical Characteristics

|  |  |  | OC | Voltage | Push-pull | TTL | HTL |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Supply voltage |  |  | $\mathrm{DC}+5 \mathrm{~V} \pm 5 \%$; DC8V-30V $\pm 5 \%$ |  |  | DC $+5 \mathrm{~V} \pm 5 \%$ | DC8-30V $\pm 5 \%$ |
| Consumption current |  |  | 100mA Max |  |  | 120mA Max |  |
| Allowable ripple |  |  | $\leq 3 \% \mathrm{rms}$ |  |  |  |  |
| Top response frequency |  |  | 100 KHz |  |  | 200 KHz | 300 KHz |
|  | Output | Input | $\leq 30 \mathrm{~mA}$ | Load resistance$2.2 \mathrm{~K}$ | $\leq 30 \mathrm{~mA}$ | $\leq \pm 20 \mathrm{~mA}$ | $\leq \pm 50 \mathrm{~mA}$ |
|  |  | Output | - |  | $\leq 10 \mathrm{~mA}$ |  |  |
|  | Output voltage | "H" | - | - | $\begin{aligned} & \geq[\text { (Supply voltage) } \\ & -2.5 \mathrm{~V}] \end{aligned}$ | $\geq 2.5 \mathrm{~V}$ | $\geq \mathrm{Vcc}-3 \mathrm{Vdc}$ |
|  |  | "L" | $\leq 0.4 \mathrm{~V}$ | $\begin{aligned} & \leq 0.7 \mathrm{~V}(\text { less than } \\ & 20 \mathrm{~mA}) \end{aligned}$ | $\leq 0.4 \mathrm{~V}(30 \mathrm{~mA})$ | $\leq 0.5 \mathrm{~V}$ | $\leq 1 \mathrm{~V}$ Vdc |
|  | Load voltage |  | SDC30V | - |  | - |  |
| Rise \& Fall time |  |  | Less than 2us(cable length: 2 m ) |  |  | $\leq 100 \mathrm{~ns}$ Less | (Cable length: 2 m ) |
| Insulation strength |  |  | AC500V 60s |  |  |  |  |
| Insulation resistance |  |  | $10 \mathrm{M} \Omega$ |  |  |  |  |
| Mark to space ratio |  |  | 45\% to 55\% |  |  |  |  |
| Reverse polarity protection |  |  | $\checkmark$ |  |  |  |  |
| Short-circuit protection |  |  | - |  | $\boldsymbol{\sim}$ (1) |  |  |
| Phase shift between A \& B |  |  | $90^{\circ} \pm 10^{\circ}$ ( frequency in low speed) |  |  |  |  |
|  |  |  | $90^{\circ} \pm 20^{\circ}$ ( frequency in high speed) |  |  |  |  |
| GND |  |  | Not connect to encoder |  |  |  |  |

(1) Short-circuit to another channel or GND permitted for max.30s.

## 5．Mechanical Characteristics

| Diameter of shaft | $\varnothing 5 \mathrm{~mm} ; \varnothing 6 \mathrm{~mm}$（D型口，不锈钢材质） |
| :--- | :--- |
| Starting torque | Less than $4.4 \times 10^{-3} \mathrm{~N} \cdot \mathrm{~m}$ |
| Inertia moment | Less than $1.5 \times 10^{-6} \mathrm{~kg} \cdot \mathrm{~m}^{2}$ |
| Shaft load | Radial $30 \mathrm{~N} ;$ Axial 20 N |
| Slew speed | $\leq 6000 \mathrm{rpm}(I P 50) ; \leq 4000 \mathrm{rpm}(I P 65)$ |
| Bearing Life | $1.5 \times 10^{9}$ revs at rated load（100000hrs at 2500 RPM$)$ |
| Shell | Aluminium alloy |
| Weight | about 120 g |

## 6．Environmental Specifications

| Environmental temperature | Operating：$-20 \sim+90^{\circ} \mathrm{C}$（repeatable winding cable：$-10^{\circ} \mathrm{C}$ ）；Storage：$-25 \sim+95^{\circ} \mathrm{C}$ |
| :--- | :--- |
| Environmental humidity | Operating and storage： $35 \sim 85 \% \mathrm{RH}$（noncondensing） |
| Vibration（Endurance） | Amplitude $0.75 \mathrm{~mm}, 5 \sim 55 \mathrm{~Hz}, 2 \mathrm{~h}$ for $\mathrm{X}, \mathrm{Y}, \mathrm{Z}$ direction individually |
| Shock（endure） | $490 \mathrm{~m} / \mathrm{s}^{2} \quad 11 \mathrm{~ms}$ three times for $\mathrm{X}, \mathrm{Y}, \mathrm{Z}$ direction individually |
| Protection | IP50 \＆IP65 |

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## 7. Wiring table

7.1 OC/Voltage/Push-pull (Wiring table for cable connection)

|  | Supply voltage |  | Incremental signal |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Wire color | Red | Black | White | Green | Yellow |
| Function | Up | OV | A | B | Z |

7.2 TTL/HTL (Wiring table for cable connection)

|  | Supply voltage |  | Incremental signal |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Wire color | Red | Black | White | White/BK | Green | Green/BK | Yellow | Yellow/BK |
| Function | Up | OV | A+ | A- | B+ | B- | Z+ | Z- |
| Twisted-paired cable |  |  |  |  |  |  |  |  |

Up=Supply voltage.
Shield wire is not connected to the internal circuit of encoder.

## Cable connection



## 8. Basic Dimensions

8.1 Dimensions

8.2 Assembling requirement


Notice : The radial runout of motor shaft should be less than 0.03 mm , and the angle shoud be less than $1.0^{\circ}$.

Unit: mm


R = Shaft rotation direction of the signal output
R. 1 = Radial cable(standard length 1000)
R. 2 = Axial cable (standard length 1000, no through shaft option)

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## 9．Accessories（推荐选购）



[^0]
[^0]:    About vibration
    Vibration act on encoder always cause wrong pulse，so we should pay attention to working place．More pulse per revolution，narrower groovy spacing of grating，more effect to encoder by vibration，when rev is low or stop，vibration act on shaft or main body would cause grating vibrating，so encoder might make wrong pulse．

