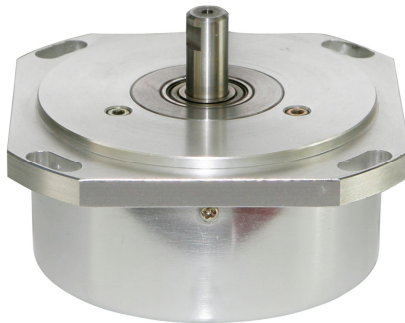




# RA-A High-Precision Angle Encoder (For Angle Measurement)

## Operating Instruction Manual



**Delos Encoder Co., Ltd**

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## **RA-A Angle Encoder**

### **1. Safety Notice**

This instruction manual is to provide guidance for technical personnel participating in installation and commissioning.

Carefully read this instruction manual prior to installing and operating this product.

Warranty will be lost due to unauthorized modification and unallowed utilization.

#### **1.1 Application**

RA-A angle encoder is specially developed by the Nordson Corporation for developing high-precision encoder market. It is mainly used for high-precision angle measurement, with the precision required to be within arc-seconds. At present, high-precision encoder is mainly used in the printing device, telescope, etc. of rotary table of machine tool, oblique joint of machine tool, gear measuring machine and printer.

#### **1.2 Precautions**

Conventional safety codes and regulations must be followed in using this angle encoder. In particular, measures must be taken to ensure that the damage of displacement sensor will not cause danger to personnel or equipment, including installation of safety limit switch emergency stop switch and maintenance of operating environment allowed.

#### **1.3 Effectiveness**

This instruction manual is only applicable to RA-A angle encoder.

Refer to relevant operating instruction manuals for other series of RA-A

## **RA-A Angle Encoder**

encoders.

Nordon Coporation also provides linear scale, encoder, etc. required for other different applications, including:

- Manual-controlled machine tool
- Heavy-duty machine tool
- Hydraulic equipment

Welcome to ask for more information, or visit [www.Delos-Encoder .com](http://www.Delos-Encoder.com).



The displacement sensor complies with 2006/95/EC directive for low-voltage electric apparatus and 2004/108/EC directive for EMC.

Our company has passed the authorization and the audit of ISO9001 Quality System, ISO14001 Environmental System, OHSAS18001 Occupational Health and Safety System.

### 2 Advantages of Angle Encoder

As an angle measuring and inspecting device, the angle encoder is assembled with high-precision bearings and high-precision components, and can achieve a precision within arc-seconds after repeated commissioning and testing of the scanning unit.

Therefore, the angle encoders have become the **high-precision positioning** device for rotary table, gear measuring machine, printing device, telescope, etc.

### 3. Product Structure

RA-A angle encoder uses closed structure: the aluminum alloy housing prevents the internal scanning unit from the influence of dust, chip and cutting fluid. The internal scanning unit has a very small frictional force, and the frictional force is mainly from the bearing ball and the rail.

## RA-A Angle Encoder



Figure 1 Product Structure

4. Dimension

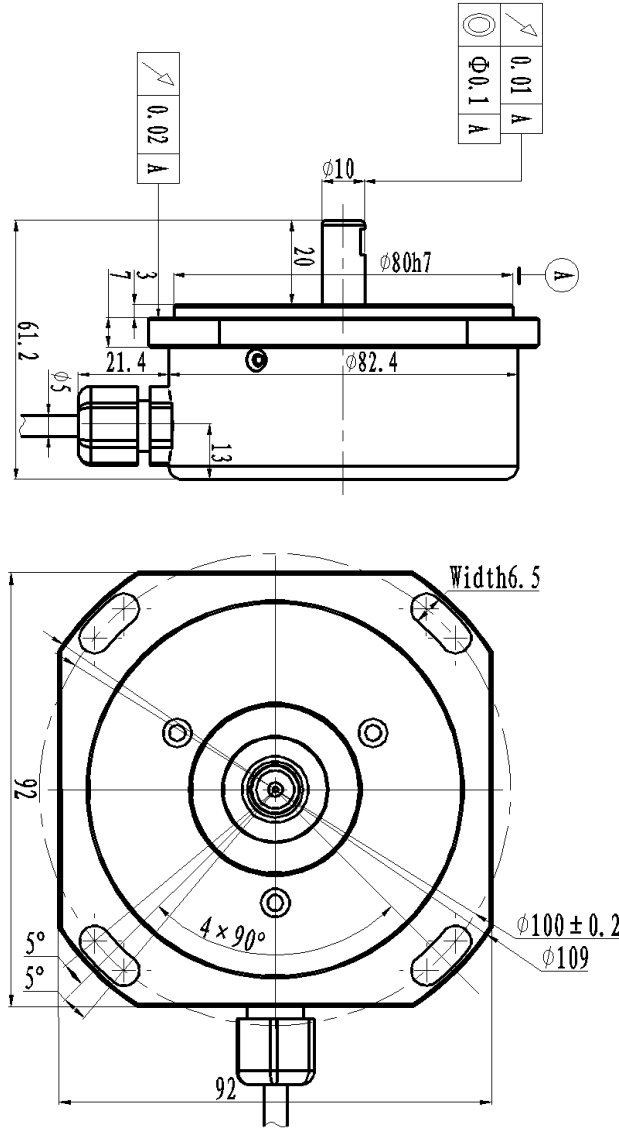
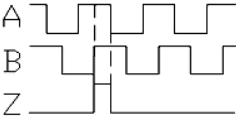
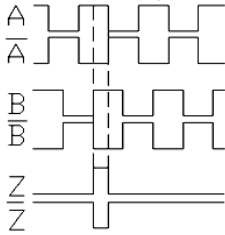


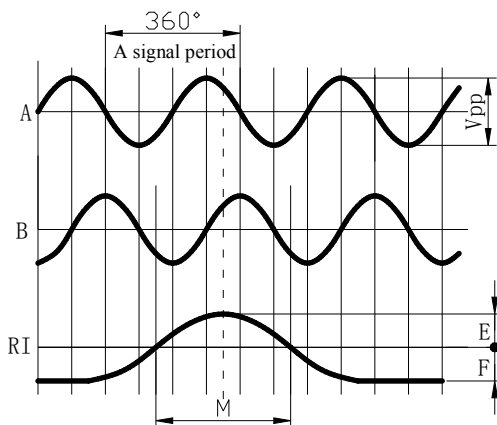
Figure 2 Dimension

## 5. Technical Parameters

Electric Parameters of RA-A High-Precision Angle Encoder	
Number of outgoing lines (L/R)	45000、90000、180000 (Number of lines can also be ordered: 9000、18000、36000、56250、72000、112500、144000、225000、288000、360000、450000)
Reference point	One
Accuracy	$\pm 5''$ , $\pm 8''$ , $\pm 15''$
Operating voltage, current	$5V \pm 5\%$ , 210mA
Allowable electric rotating speed	120 rpm
Output signal frequency	Max. 200KHz
Cable length	1.5m (Special length can be provided according to customer demand.)
Interface	Nine-core plug
Output signal	<ul style="list-style-type: none"><li>● TTL signal</li></ul> 
	<ul style="list-style-type: none"><li>● RS-422 signal</li></ul> 
Output signal	<ul style="list-style-type: none"><li>● Sine wave signal <math>\sim 1V_{pp}</math></li></ul>



**(Continued)**

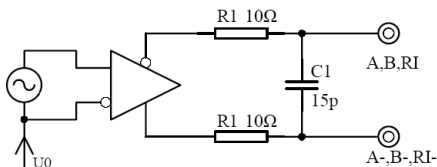

$$V_{PP} : 0.6 \sim 1.2 V_{PP} \text{ (Typical value } 1 V_{PP})$$

DC offset:  $V_{DD} / 2$

E、F :  $\geq 0.4V$

$$M : 360^\circ \pm 180^\circ$$

Output interface circuit:



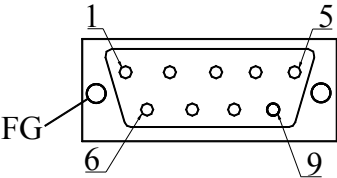
### Mechanical Parameters of RA-A High-Precision Angle Encoder

<b>Allowable mechancial rotating speed</b>	≤10000 rpm
<b>Starting torque</b>	≤0.01 Nm (At 20℃)
<b>Inertia moment</b>	$20 \times 10^{-6} \text{ kgm}^2$
<b>Allowable axle load</b>	Axial: 10N Radial: 10N
<b>Vibration resistance (50~2000Hz)</b>	≤100m/s <sup>2</sup> (IEC 60068-2-6)
<b>Shock resistance (6ms)</b>	≤1000m/s <sup>2</sup> (IEC 60068-2-27)

<b>Protection class IEC60529</b>	IP54
<b>Operating temperature</b>	0~50℃

6. Wiring Table

1) Applicable to TTL signal output.



Plug pin number	1	2	3	4	5	6	7	8	9
signal	Blank	<i>OV</i>	Blank	Blank	Blank	<i>A</i>	+5V	<i>B</i>	<i>Z</i>
Wire color	—	Black	—	FG	—	Green	Red	Orange	White

FG: Shielded wire connected to the metal housing.

2) Applicable to RS-422 signal and sine wave signal output.

Plug pin number	1	2	3	4	5	6	7	8	9
signal	$\overline{A}$	<i>OV</i>	$\overline{B}$	Blank	$\overline{Z}$	<i>A</i>	+5V	<i>B</i>	<i>Z</i>
Wire color	Green / Black	Black	Orange / Black	FG	White / Black	Green	Red	Orange	White

FG: Shielded wire connected to the metal housing.

7. Installation

7.1 Protection

In order to prevent the encoder and nine-core connector from being directly

sprinkled and scoured by fluids such as oil water, keep it away from the splashing fluid or add sufficient protection to the encoder and nine-core connector when installing the encoder.

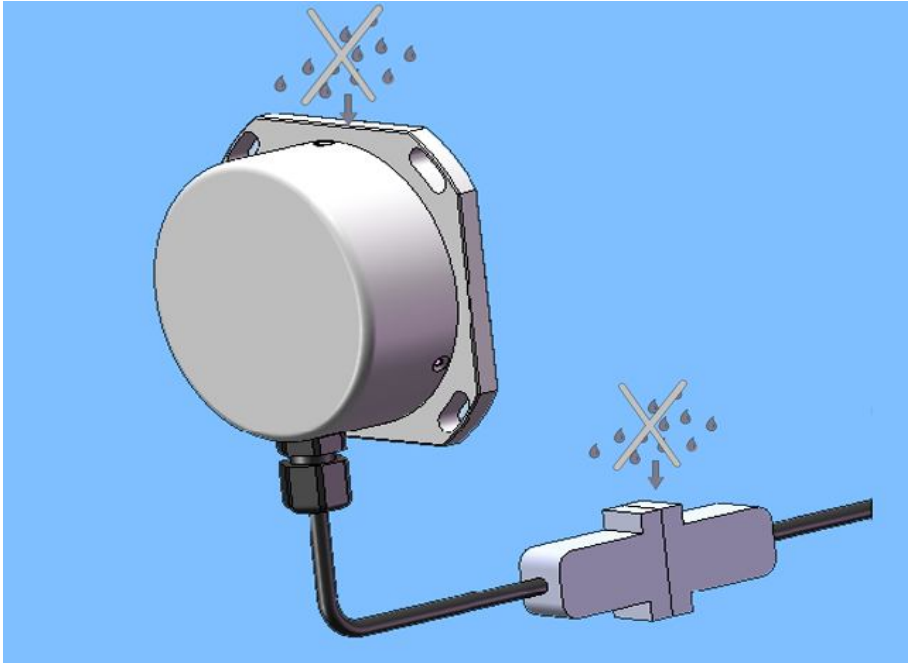


Figure 3 Installation Requirements

## 7.2 Principle of priority in installation

1. In order to ensure the measurement accuracy, make sure that the encoder spindle is concentric with the rotation center of the rotary table or instrument to the greatest extent.
2. The installation of encoder should not hinder the operation of the machine tool or instrument, and not reduce the original functions of the machine tool or instrument.
3. The encoder should not be liable to be impacted after installation. For



2. Schematic diagram for installation

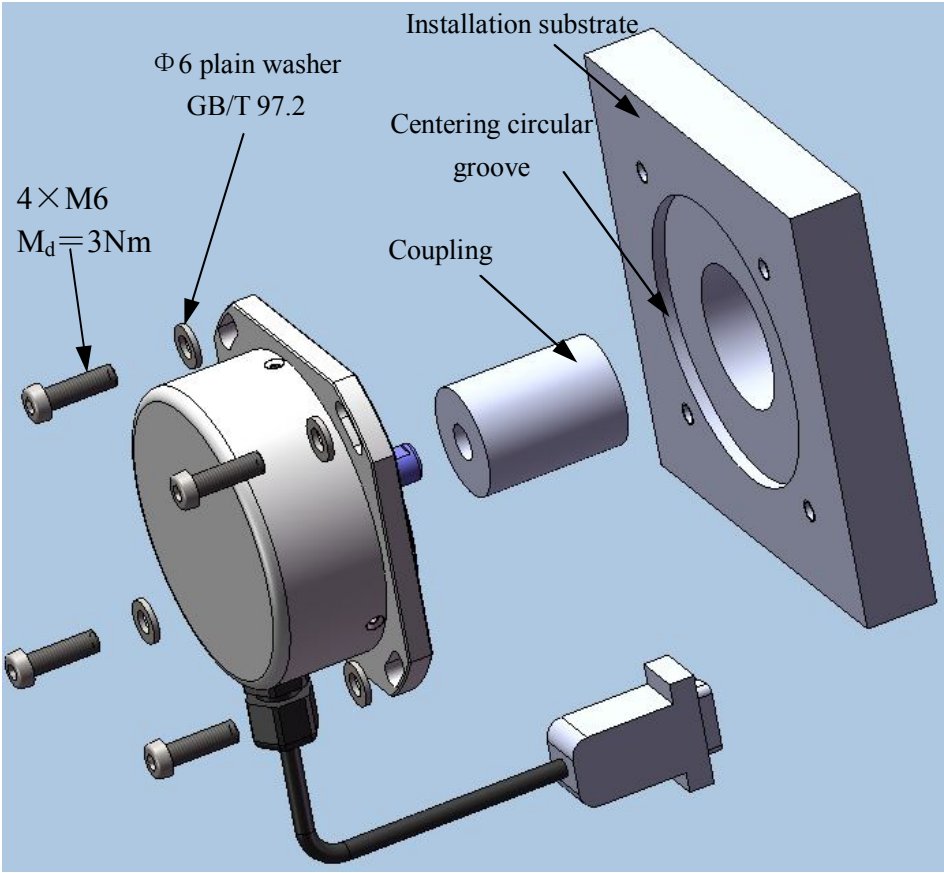


Figure 5 Schematic Diagram for Installation

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### 3. Installation example

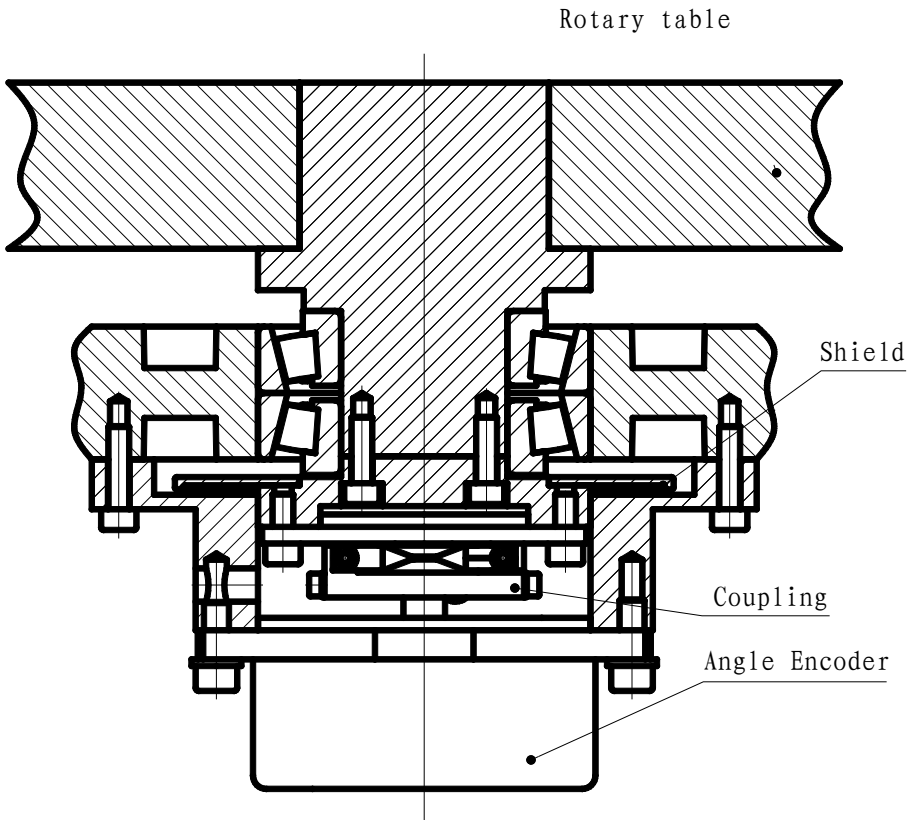
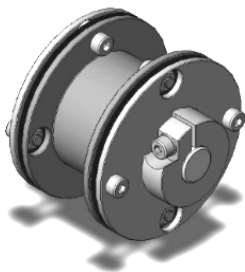


Figure 6 Installation Example

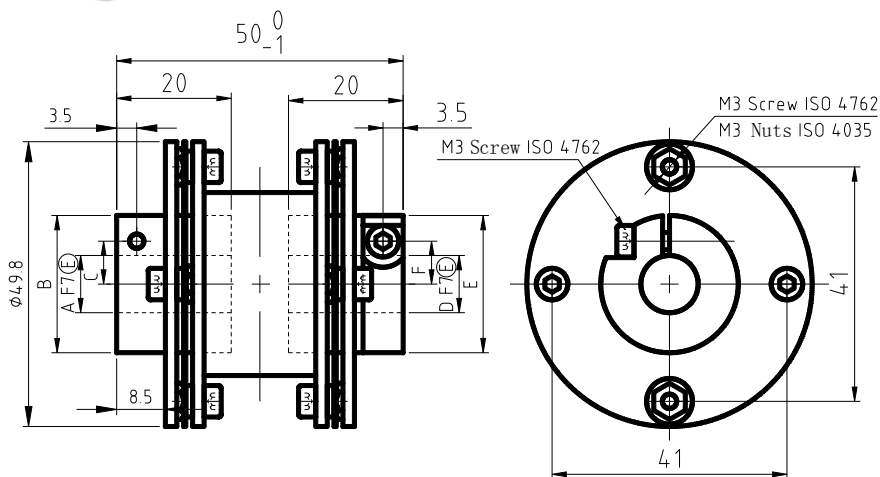
#### Optional fittings: coupling

- **JMJ diaphragm coupling:**

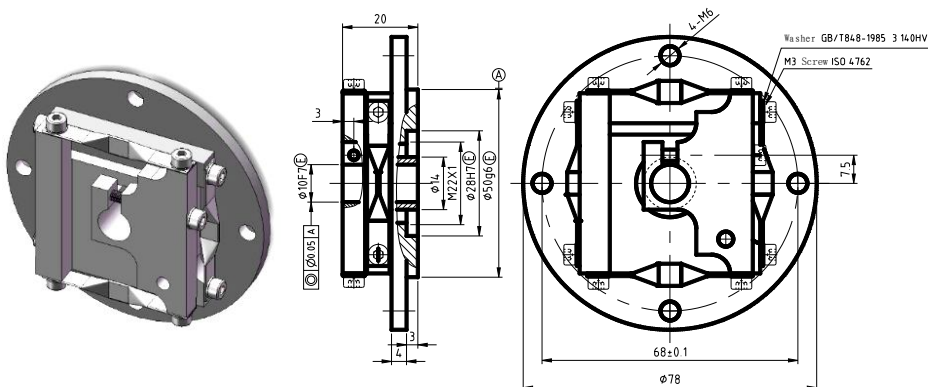
JMJ coupling can be divided into three specifications as follows according to different diameters of connected shafts.



Dimension	1	2	3
A/B/C	10/24/7.5	10/24/7.5	14/28/10
D/E/F	10/24/7.5	14/28/10	14/28/10



● **JTP flat coupling:**



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