



Aerospace | Medical | Industrial | Scientific | Microelectronics



# ABSOLUTE ROTARY ENCODERS

*High Accuracy | Hollow Shaft | Low Profile | Non-contact*

# Designed to meet the most demanding requirements

SENSNA absolute rotary encoder utilizes techniques of inductive and magnetic, having hollow shaft, high precision, high reliability, and non-contact features. The ultra-high precision and high-end functions of the electric encoder makes it integrated with modern motion control applications, meeting the strict requirements.

SENSNA absolute rotary encoder offers a variety of diameters, models, communication interfaces, and connection options. All models are compatible with a wide range of controllers and drives, covering all fields of precision motion control from aerospace and defense, harsh environment, to industrial, medical and automotive applications.



## Typical applications

- Rotary joints & gimbals
- Actuator servos & motor encoders
- Electro-optical & infra-red camera systems
- Heliostats & solar equipment
- Robotic arms & CNC machine tools
- Test & calibration equipment
- Light & heavy calibre weapons systems
- Targeting systems & range finders
- Antenna pointing devices & telescopes
- Packaging & laboratory automation
- Medical scanners & surgical equipment
- Cranes & telescopic manipulators

# Inductive Angle Encoders

SENSNA inductive encoder adopts an inductance technique to measure precise angle. They have two main parts, each shaped like a flat ring, a stator and a rotor. The stator is powered and the rotor is passive. The stator contains the electronics to receive power and generates an output signal. The output signal from the stator shows the true absolute angular position of the rotor relative to the stator without the need of any motion at power up.

Non-contact makes it easy to achieve high precision, high reliability angle measurement in harsh environments. The hollow shaft and low profile allow easy integration with through-shafts, slip-rings, direct drive motors, optical-fibres, pipes or cables. Installation does not require precisely machined mounting components or couplings.

The encoders are equipped with BiSS, Asynchronous serial (UART), SSI communication interfaces and offer a range of binary resolutions up to 20 bits per revolution. Providing customized extension options when there are more special requirements to meet.

SENSNA absolute rotary encoder can be widely used in intelligent robots, medical equipment, mechanical automation, aerospace and other fields, providing innovative product combinations and solutions for customers in various industries such as environmental detection, emergency safety, life sciences, semiconductors, chemicals, energy, etc.



**Low Profile**



**Hollow Shaft**



**High Precision**



**Durability**



**Immunity to  
Magnetic Fields**

## Features and benefits

- Pre-calibrated to reduce non-linearity
- Low-profile form factor and large bore
- Rugged and insensitive to foreign matter
- Multiple sizing and mounting formats
- Duplex mechanical format
- Higher system pointing accuracies
- More compact and lightweight systems
- Systems can operate in extreme environments
- Optimized system design
- Enables systems to meet higher safety levels



Defense



Aerospace



Medical

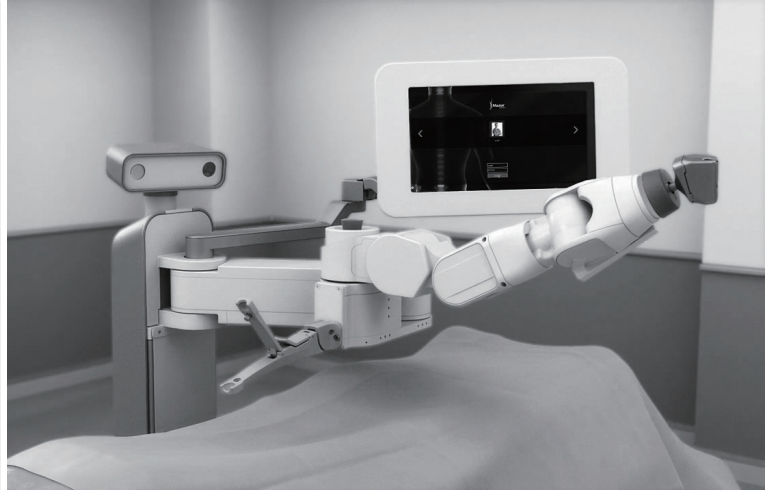


Semiconductor



Collaborative Robots

# IAS- Sleeve Embedded Series



## IAS- Sleeve Embedded Inductive Encoder for Industry

True absolute position, no instrument motion is required at power up

A wide range of diameters with a large through hole from 16mm to 170mm

Alloy housed meet the most exact of industrial environmental conditions

No bearings, no coupling required for installation, no precision installation requirements

Designed for a broad range of industrial automation applications and motion control

Product	OD / ID / Height	Weight	Resolution	Accuracy	Max. operational speed	Rotor inertia
IAS-16	16/4/9 mm	5 g	15-17 bit	0.05°	4000 rpm	0.005 kg·mm <sup>2</sup>
IAS-25	25/6/7 mm	10 g	15-17 bit	0.025°	4000 rpm	0.042 kg·mm <sup>2</sup>
IAS-37	37/10/8 mm	15 g	16-18 bit	0.02°	4000 rpm	0.197 kg·mm <sup>2</sup>
IAS-40	40/10/10 mm	25 g	16-18 bit	0.02°	4000 rpm	0.197 kg·mm <sup>2</sup>
IAS-58	58/20/10 mm	40 g	17-19 bit	0.015°	4000 rpm	0.684 kg·mm <sup>2</sup>
IAS-70	70/30/10 mm	55 g	17-19 bit	0.015°	3000 rpm	3.338 kg·mm <sup>2</sup>
IAS-90	90/50/10 mm	70 g	18-20 bit	0.01°	1500 rpm	8.723 kg·mm <sup>2</sup>
IAS-130	130/90/10 mm	120 g	18-20 bit	0.01°	1500 rpm	39.669 kg·mm <sup>2</sup>
IAS-170	170/120/11.5 mm	260 g	18-20 bit	0.01°	1500 rpm	219.237 kg·mm <sup>2</sup>

Supply voltage	Electrical interface	Communication	Operating temp.	Protection
5-30V	RS-422 Shielded cable	SSi, BiSS-C, UART	-20°C - +60°C	IP 67

## CAS- Sleeve Embedded Series



### CAS- Sleeve Embedded Inductive Encoder for Harsh Environment

Higher system pointing accuracies

Offering up to  $\leq 36$  arc-seconds accuracy and 20-bits resolution

Non-contact technique for high reliability in extreme environments

Highly resistant to shock and vibration, immunity to magnetic fields

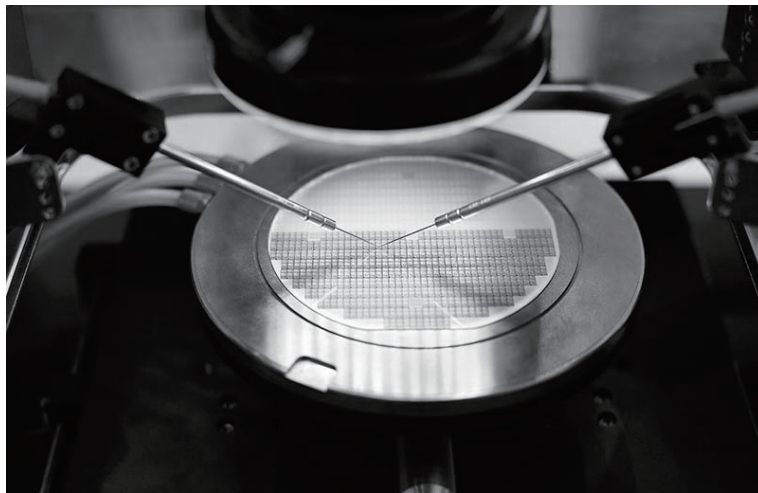
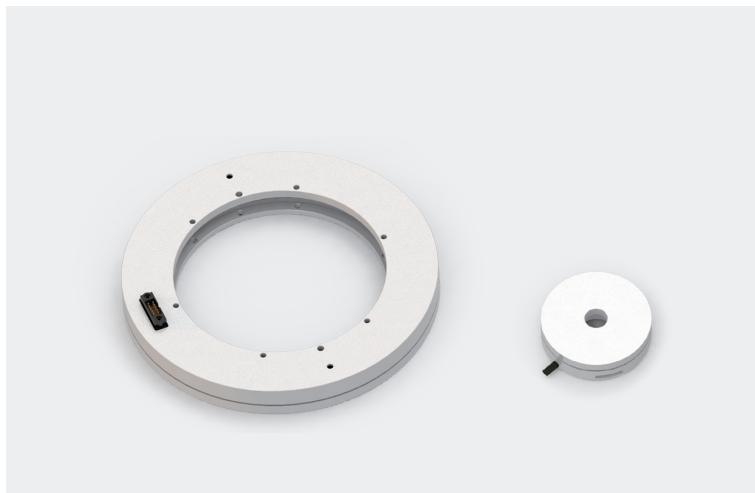
A broad range of aerospace and defense applications

Product	OD / ID / Height	Weight	Resolution	Accuracy	Max. operational speed	Rotor inertia
CAS-16	16/4/9 mm	5 g	15-17 bit	0.05°	4000 rpm	0.005 kg·mm <sup>2</sup>
CAS-25	25/6/7 mm	10 g	15-17 bit	0.025°	4000 rpm	0.042 kg·mm <sup>2</sup>
CAS-37	37/10/8 mm	15 g	16-18 bit	0.02°	4000 rpm	0.197 kg·mm <sup>2</sup>
CAS-40	40/10/10 mm	25 g	16-18 bit	0.02°	4000 rpm	0.197 kg·mm <sup>2</sup>
CAS-58	58/20/10 mm	40 g	17-19 bit	0.01°	4000 rpm	0.684 kg·mm <sup>2</sup>
CAS-70	70/30/10 mm	55 g	17-19 bit	0.01°	3000 rpm	3.338 kg·mm <sup>2</sup>
CAS-90	90/50/10 mm	70 g	18-20 bit	0.01°	1500 rpm	8.723 kg·mm <sup>2</sup>
CAS-130	130/90/10 mm	120 g	18-20 bit	0.01°	1500 rpm	39.669 kg·mm <sup>2</sup>
CAS-170	170/120/11.5 mm	260 g	18-20 bit	0.01°	1500 rpm	219.237 kg·mm <sup>2</sup>

Supply voltage	Electrical interface	Communication	Operating temp.	Storage temp.	Protection
5-30V	RS-422 Shielded cable	SSi, BiSS-C, UART	-40°C - +85°C	-50°C - +100°C	IP 67



# IAC- Alloy Two-plate Series



## IAC- Alloy Two-plate Inductive Encoder for Industry

True absolute position, no instrument motion is required at power up

No contact, Inductive technique, robust and easy to install

A wide range of diameters with a large through hole from 37mm to 200mm

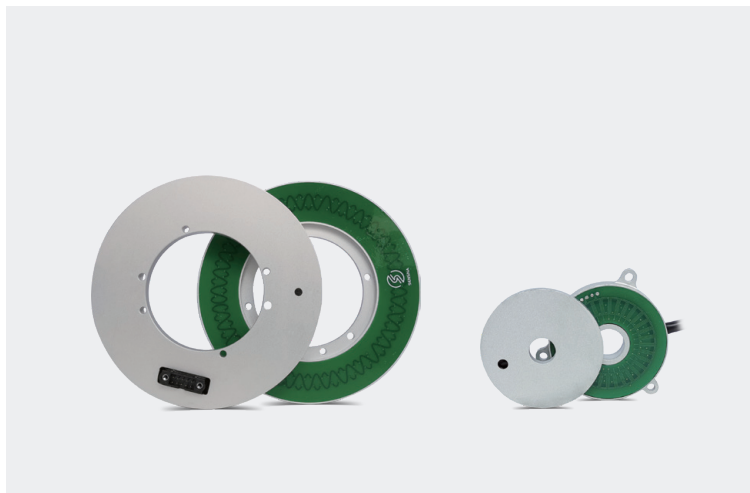
Alloy housed, meet the most exact of industrial environmental conditions

Multiple communication protocols and connections, providing customized extension options

Product	OD / ID / Height	Weight	Resolution	Accuracy	Max. operational speed	Rotor inertia
IAC-37	37/8/11.25 mm	20/6 g	17-19 bit	0.025°	4000 rpm	1.185 kg·mm <sup>2</sup>
IAC-58	58/12.7/16.4 mm	80/45 g	17-19 bit	0.015°	3000 rpm	12.972 kg·mm <sup>2</sup>
IAC-75	75/25/16.4 mm	82/50 g	17-19 bit	0.015°	3000 rpm	39.203 kg·mm <sup>2</sup>
IAC-90	90/40/16.4 mm	105/60 g	17-19 bit	0.01°	1500 rpm	78.262 kg·mm <sup>2</sup>
IAC-100	100/50/16.4 mm	115/70 g	17-19 bit	0.01°	1500 rpm	115.612 kg·mm <sup>2</sup>
IAC-125	125/75/16.4 mm	140/90 g	17-19 bit	0.01°	1500 rpm	258.795 kg·mm <sup>2</sup>
IAC-150	150/100/16.4 mm	170/110 g	18-20 bit	0.01°	1500 rpm	490.238 kg·mm <sup>2</sup>
IAC-175	175/125/16.4 mm	220/140 g	18-20 bit	0.01°	1500 rpm	831.821 kg·mm <sup>2</sup>
IAC-200	200/150/16.4 mm	260/160 g	18-20 bit	0.01°	1500 rpm	1302.948 kg·mm <sup>2</sup>

Supply voltage	Electrical interface	Communication	Operating temp.	Protection
5-30V	RS-422 Shielded cable	SSi, BiSS-C, UART	-20°C - +60°C	IP 67

## CAC- Alloy Two-plate Series



### CAC- Alloy Two-plate Inductive Encoder for Harsh Environment

Hollow shaft, high precision, high reliability, and non-contact features

Offering up to  $\leq 36$  arc-seconds accuracy and 20-bits resolution

A wide range of diameter options to meet your specification needs

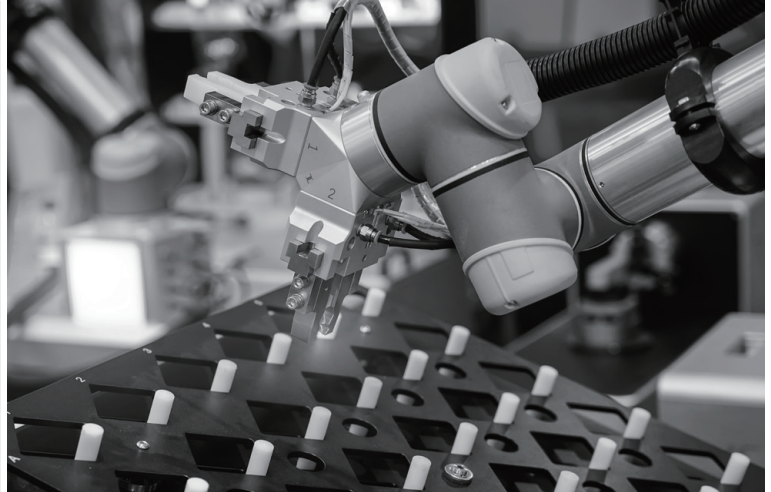
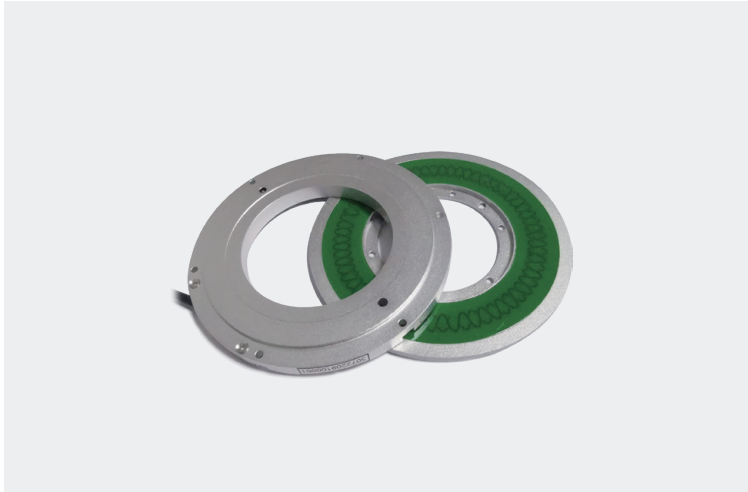
Robust and easy to install, achieving high-precision and reliable angle measurement in harsh environments

Flat form with a large through hole conveniently accommodates through-shafts, slip rings, and pipes or cables

Product	OD / ID / Height	Weight	Resolution	Accuracy	Max. operational speed	Rotor inertia
CAC-37	37/8/11.25 mm	20/6 g	17-19 bit	0.025°	4000 rpm	1.185 kg·mm <sup>2</sup>
CAC-58	58/12.7/16.4 mm	80/45 g	17-19 bit	0.015°	3000 rpm	12.972 kg·mm <sup>2</sup>
CAC-75	75/25/16.4 mm	82/50 g	17-19 bit	0.015°	3000 rpm	39.203 kg·mm <sup>2</sup>
CAC-90	90/40/16.4 mm	105/60 g	17-19 bit	0.01°	1500 rpm	78.262 kg·mm <sup>2</sup>
CAC-100	100/50/16.4 mm	115/70 g	17-19 bit	0.01°	1500 rpm	115.612 kg·mm <sup>2</sup>
CAC-125	125/75/16.4 mm	140/90 g	17-19 bit	0.01°	1500 rpm	258.795 kg·mm <sup>2</sup>
CAC-150	150/100/16.4 mm	170/110 g	18-20 bit	0.01°	1500 rpm	490.238 kg·mm <sup>2</sup>
CAC-175	175/125/16.4 mm	220/140 g	18-20 bit	0.01°	1500 rpm	831.821 kg·mm <sup>2</sup>
CAC-200	200/150/16.4 mm	260/160 g	18-20 bit	0.01°	1500 rpm	1302.948 kg·mm <sup>2</sup>

Supply voltage	Electrical interface	Communication	Operating temp.	Storage temp.	Protection
5-30V	RS-422 Shielded cable	SSi, BiSS-C, UART	-40°C - +85°C	-50°C - +100°C	IP 67

## IAF- Low Profile Alloy Two-plate Series



### IAF- Low Profile Alloy Two-plate Inductive Encoder for Industry

High accuracy, low profile, easy integration into OEM assemblies

Integrated angle calculation circuit on the stator, achieving low power consumption and integrating multiple high-speed digital interfaces

A big bore and low axial height allows easy integration with through-shafts, slip-rings, direct drive motors, pipes or cables

Proven in demanding applications including medical devices, industrial robotics as well as CNC machines

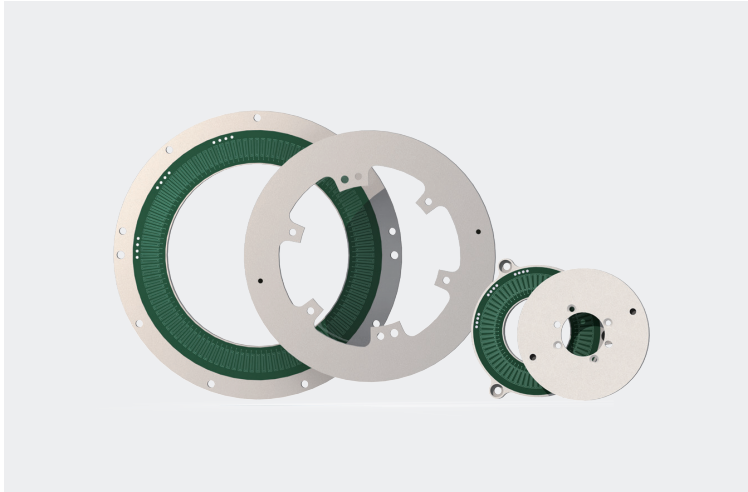
Multiple communication protocols and connections, providing customized extension options

Product	OD / ID / Height	Weight	Resolution	Accuracy	Max. operational speed	Rotor inertia
IAF-60	60/30/10.1 mm	45 g	17-19 bit	0.015°	3000 rpm	9.9 kg·mm <sup>2</sup>
IAF-100	100/57/11.5 mm	130 g	17-19 bit	0.01°	1500 rpm	73.411 kg·mm <sup>2</sup>
IAF-150	150/110/13.6 mm	300 g	17-19 bit	0.01°	1500 rpm	476.702 kg·mm <sup>2</sup>

Supply voltage	Electrical interface	Communication	Operating temp.	Protection
5-30V	RS-422 Shielded cable	SSi, BiSS-C, UART	-20°C - +60°C	IP 67



## CAF- Low Profile Alloy Two-plate Series



### CAF- Low Profile Alloy Two-plate Inductive Encoder for Harsh Environment

High accuracy, low profile, easy integration into OEM assemblies

Offering up to  $\leq 36$  arc-seconds accuracy and 20-bits resolution

Robust and easy to install, achieving high-precision and reliable angle measurement in harsh environments

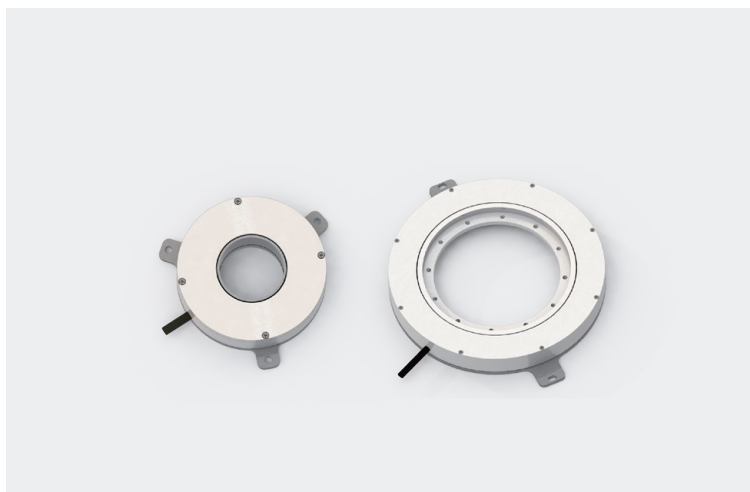
Not affected by condensation or dust, resistant to impact and vibration, and suit for a wide working temperature range

A broad range of aerospace and defense applications

Product	OD / ID / Height	Weight	Resolution	Accuracy	Max. operational speed	Rotor inertia
CAF-60	60/30/10.1 mm	45 g	17-19 bit	0.015°	3000 rpm	9.9 kg·mm <sup>2</sup>
CAF-100	100/57/11.5 mm	130 g	17-19 bit	0.01°	1500 rpm	73.411 kg·mm <sup>2</sup>
CAF-150	150/110/13.6 mm	300 g	17-19 bit	0.01°	1500 rpm	476.702 kg·mm <sup>2</sup>

Supply voltage	Electrical interface	Communication	Operating temp.	Storage temp.	Protection
5-30V	RS-422 Shielded cable	SSi、BiSS-C、UART	-40°C - +85°C	-50°C - +100°C	IP 67

## CAB- Alloy Encapsulated Shaft Series



### CAB- Alloy Encapsulated Shaft Absolute Encoder

Absolute encoder with integrated alloy structure, with solid or hollow shaft

True absolute position, using inductive or magnetic technique

Robust and easy to install, no precision installation requirements

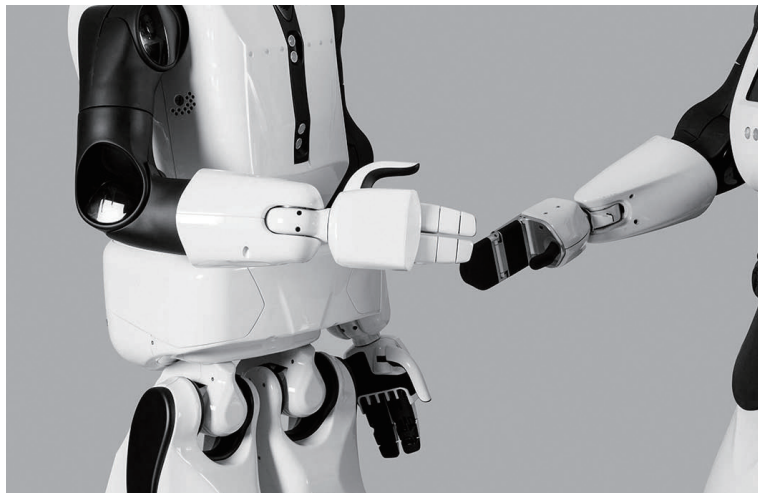
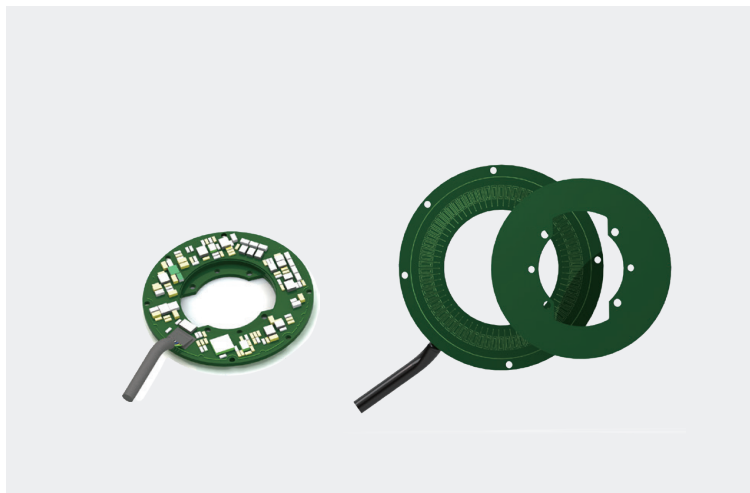
Not affected by condensation or dust, resistant to impact and vibration, and suitable for a wide working temperature range

Customized expansion options are provided for dimensions, shaft, communication protocols, and connections

Product	OD / ID / Height	Weight	Resolution	Accuracy	Max. operational speed	Rotor inertia
CAB-65	65/28/16.2 mm	160 g	17-19 bit	0.015°	3000 rpm	11.067 kg·mm <sup>2</sup>
CAB-70	70/22/20 mm	190 g	17-19 bit	0.015°	3000 rpm	12.428 kg·mm <sup>2</sup>
CAB-85	85/29/26 mm	220 g	17-19 bit	0.015°	3000 rpm	12.314 kg·mm <sup>2</sup>
CAB-90	90/36/27 mm	295 g	17-19 bit	0.015°	3000 rpm	36.617 kg·mm <sup>2</sup>
CAB-112	112/50/28 mm	530 g	17-19 bit	0.01°	1500 rpm	109.754 kg·mm <sup>2</sup>
CAB-123	123/71.5/16 mm	350 g	17-19 bit	0.01°	1500 rpm	117.192 kg·mm <sup>2</sup>

Supply voltage	Electrical interface	Communication	Operating temp.	Storage temp.	Protection
5-30V	RS-422 Shielded cable	SSI, BiSS-C, UART	-40°C - +85°C	-50°C - +100°C	IP 67

## IAP- Unencapsulated Kit Series



### IAP- Unencapsulated Kit Inductive Encoder

Economically efficient and easy integration into OEM assemblies

Non-contact, high precision, hollow shaft and true absolute position features

Using both for position feedback and for optimizing the commutation of the frameless motor

Ultra compact structure, perfect for installation in robot joints or multi axis automation applications

Multiple communication protocols and connections, providing customized extension options

Product	OD / ID / Height	Weight	Resolution	Accuracy	Max. operational speed	Rotor inertia
IAP-40	40/10/6.5 mm	10 g	17-19 bit	0.015°	3000 rpm	0.213 kg·mm <sup>2</sup>
IAP-60	60/25/6.5 mm	15 g	17-19 bit	0.015°	3000 rpm	1.947 kg·mm <sup>2</sup>
IAP-63	63/29/8 mm	15 g	17-19 bit	0.015°	3000 rpm	0.647 kg·mm <sup>2</sup>
IAP-100	100/48/7.5 mm	40 g	17-19 bit	0.01°	1500 rpm	15.781 kg·mm <sup>2</sup>
IAP-180	180/120/7.5 mm	100 g	17-19 bit	0.01°	1500 rpm	191.601 kg·mm <sup>2</sup>

Supply voltage	Electrical interface	Communication	Operating temp.	Protection
5-30V	RS-422 Shielded cable	SSI, BiSS-C, UART	-20°C - +60°C	IP 67

# Unencapsulated Kit Magnetic Encoders

IAM series are non-contact high-performance absolute magnetic rotary encoders, using hall magnetic sensing units and magnetic rings to complete angle detection. The product is compact and can be integrated into applications with limited space. At the same time, the characteristics of hollow shaft, absolute position and high-speed operation make it suitable for more applications.

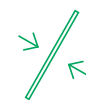
The IAM series magnetic encoders are equipped with BiSS, Asynchronous serial (UART), SPI, ABZ or SSI communication interfaces and offer a range of binary resolutions up to 20 bits per revolution. The working temperature is from -30 °C to +85 °C.

The IAM series magnetic encoders have a built-in advanced self-monitoring function, which can provide functional feedback through the onboard LED indicator, making it convenient for installation and use.

The IAM series magnetic encoders can be used both for position feedback and for optimizing the commutation of the frameless motor, it is very suitable for systems with limited space, such as robot joints, universal joints, and agricultural automation.



**Small Size**



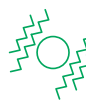
**Low Profile**



**Light Weight**



**Hollow Shaft**



**Durability**

## Features and benefits

- True absolute system
- Custom magnetic sensor ASIC
- Self-calibration option
- No hysteresis
- Resolution up to 20 bits
- Multiturn counter option
- High speed operation
- Low profile, non-contact
- Integrated status LED
- High repeatability



Collaborative Robots



AGVs



Gimbals



Robotic Joints



Agricultural Automation

# IAM- Unencapsulated Kit Magnetic Series



## IAM- Unencapsulated Kit Magnetic Encoder

Non contact, Low profile, lightweight, and compact, making it more suitable for integration into devices with limited space

Hollow shaft, absolute position, and high-speed operation to meet more applications

No hysteresis, high dynamic characteristics, resolution up to 20 bit, compatible with multiple communication interfaces

Built in advanced self-monitoring function with the on-board LED

Multiple communication protocols and connections, providing customized extension options

Product	OD / ID / Height	Weight	Resolution	Accuracy	Max. operational speed	Rotor inertia
<b>IAM-22</b>	A: 28.5/6/7.6 mm B: 32/6/7.6 mm	8 g	17 bit	0.1°	6000 rpm	0.29 kg·mm <sup>2</sup>
<b>IAM-29</b>	A: 38/10/8 mm B: 38/15/8 mm	11 g	17-18 bit	0.1°	6000 rpm	0.69 kg·mm <sup>2</sup>
<b>IAM-39</b>	54/20/8 mm	15 g	17-19 bit	0.1°	6000 rpm	2.58 kg·mm <sup>2</sup>
<b>IAM-49</b>	59/25/8 mm	18 g	17-19 bit	0.1°	6000 rpm	5.45 kg·mm <sup>2</sup>
<b>IAM-55</b>	67/35/8.6 mm	22 g	17-20 bit	0.1°	3000 rpm	11.39 kg·mm <sup>2</sup>
<b>IAM-64</b>	75/45/8.6 mm	25 g	17-20 bit	0.1°	3000 rpm	18.88 kg·mm <sup>2</sup>
<b>IAM-84</b>	96/65/8.6 mm	30 g	17-20 bit	0.1°	3000 rpm	46.48 kg·mm <sup>2</sup>

Supply voltage	Electrical interface	Communication	Operating temperature
5-30V	RS-422 Shielded cable	SSi、BiSS-C、UART、SPI、ABZ	-30°C - +85°C





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