GUBOA

Founded: 1996
1 Factory building approx 1,600 SQ M
1 Office building approx 900 SQ M
Main products:

- **High Speed Sensors**
- **FGS Sensors**
- **High Frequency Cable**
- **Manual Pulse Generators (M.P.G)**
- **Hirschmann Tooling**
- **Control Servicing**
- **Technical services**
- **OEM**

GUBOA Taiwan

Provide full support of their products.

Flexible manufacturing techniques allow quick response to customers requests.

Private Labelling.

Rigidly adhere to Non Disclosure Agreements.

Ensure adequate stock levels for quick delivery.

CE / EMC compliant.

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IGS & MRSM Basic Information

The IGS series of magnetic speed sensors are a highly reliable contact free system of detecting and feedback of rotary or linear speed and position.

General information

- Contactless sensing of rotation position and or speed.
- Contact free detection with zero wear.
- Compact design scanning head.
- High protection class IP 68 designed for use in harsh environments
- Sensing Gear wheel from module 0.4mm and 0.5 mm.
- High response, analog or TTL output (TTL up to 500Khz).

Applications

- Position detection and feedback for Machine Tools.
- AC Motor and spindle speed & position measuring
- Other special mechanical applications or in harsh environment.

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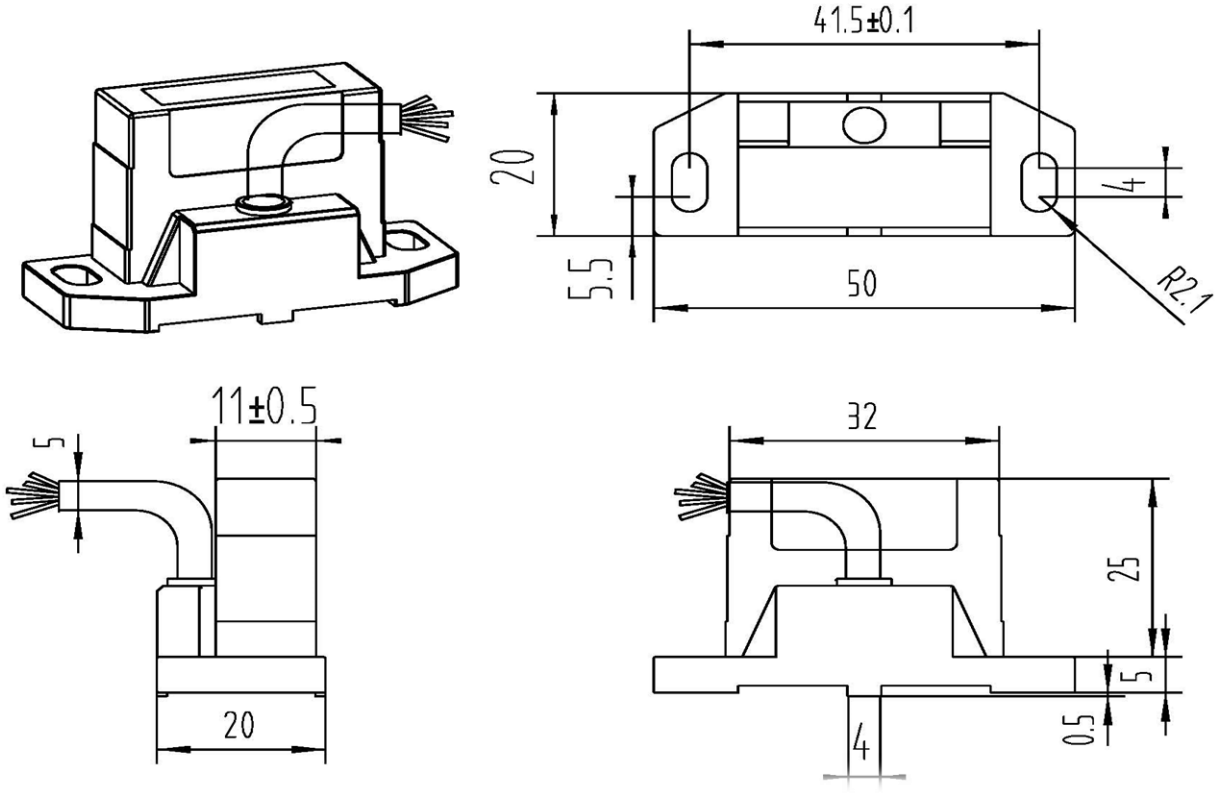
IGS Standard scanning head dimension



Standard scanning head dimension – H30 x W50 x D20 (mm)

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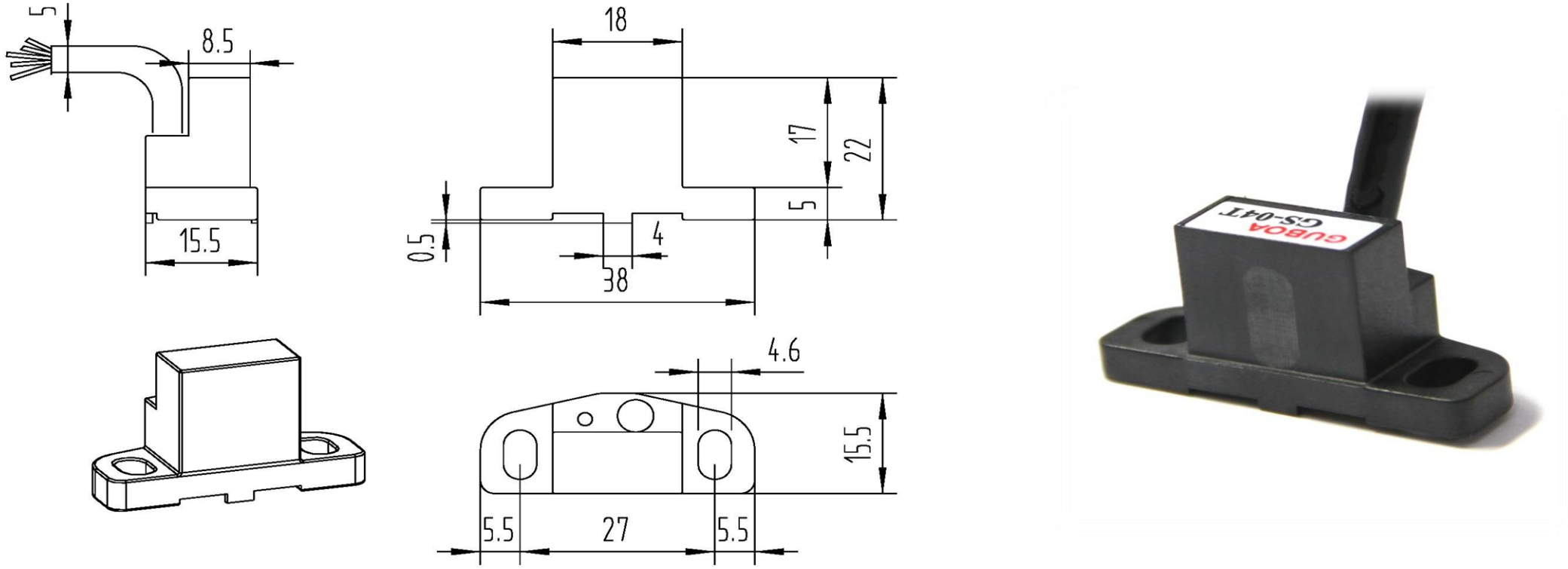
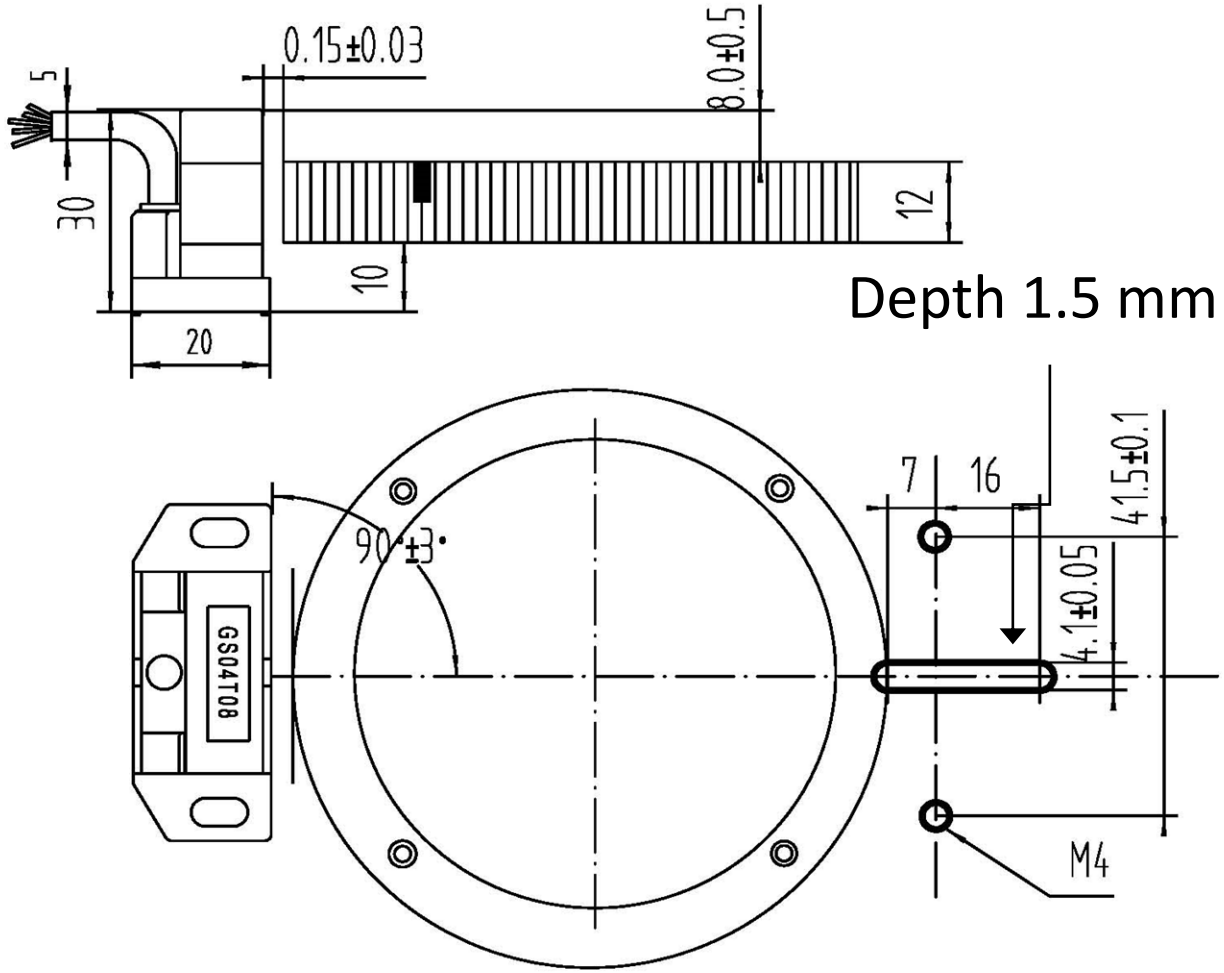
IGS Mini scanning head dimension

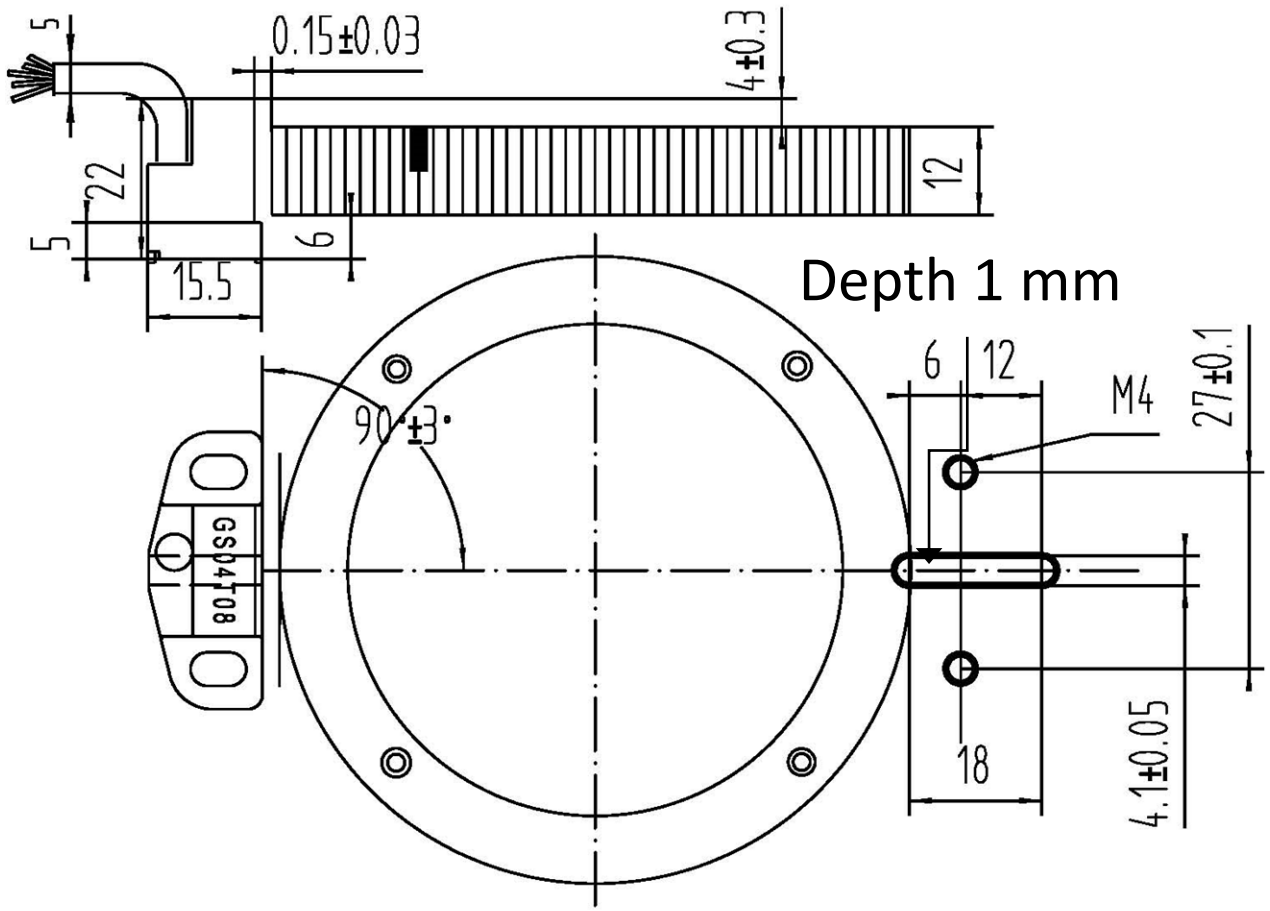


Mini scanning head dimension – H22 x W38 x D15.5 (mm)

GUBOA IGS Layout of Scanning head and Gear Wheel – standard head



GUBOA IGS Layout of Scanning head and Gear Wheel—mini head



GUBOA IGS **Scanning Head specification**

Item	GS-T	GS-A
Supply voltage Vcc (DVC)	5 V ± 10%	5 V ± 10%
Power consumption (without Load)	≦60 ma	≦60 ma
VOH (open-output) (RL=120Ω)	≧ 2.5V	----
VOL (open-output) (RL=120Ω)	≦ 0.5V	----
Output signal	TTL (Line Driver)	Different analog (~ 1Vpp)
Max. phase shift	≦90° ± 25°	≦ 90°±10°
Max. response	≧500Khz	≧150Khz
Sensing gap	0.15± 0.03 mm	0.15 ± 0.03 mm
Operating temperature	-20 ~ 100 °C	-20 ~ 100 °C
Weight of Reading Head	Standard head 35 g / Mini Head 25 g	
Scanning head dimension (mm)	Standard head H30 ×W60 ×D20 mini Head H22 ×W38 ×D15	

GUBOA IGS Pin Assignment

D-sub 15 Pin (male)		GS - A	GS - T	Open end cable
Pin 1	Vcc	Power +5V	Power +5V	brown
Pin 2	GND	power 0v	power 0v	white
Pin 3	A+	A+	A+	green
Pin 4	A-	A-	A-	yellow
Pin 6	B+	B+	B+	blue
Pin 7	B-	B-	B-	red
Pin 10	Z+	Z+	Z+	gray
Pin 12	Z-	Z-	Z-	pink
	Outer case	screening	screening	screening

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MRSM20 Magnetic Ring Encoder – Scanning Head specification

Item	MRSM20T
Power supply Vcc (DCV)	5 V±5%
Power consumption (open output)	≦50 ma
VOH (open-output)	≧ 2.5V
VOL (open-output)	≦ 0.5V
Output signal type	TTL(RS 422A)
Max. output signal frequency	400 KHz
A、B phase shifting	≦90± 25°
Sensing gap	0.2 ± 0.1 mm
Operating temperature	-20 ~ 100 °C
Protection class (scanning head)	IP67
Weight scanning head Weight Magnetic Ring (MR20-64-03C) Weight Magnetic Ring (MR16-64-03D)	25± 5 (g) 84± 5 (g) 45± 5 (g)

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Calculations

OD of the Gear Wheel
(N+2) x Zmm
Z = Module (pitch) 0.4mm or 0.5mm
N = Tooth Count
Example: 128 tooth gear, 0.4 Module.
128+2=130 x 0.4=52mm

To calculate frequency Analog 1vpp
Tooth Count x RPM x 1/60 x 1/1000
Example 256 x 10,000=2,560,000 x 1/60=42,666.6 x 1/1000=42.6 kHz

To calculate frequency TTL
Pulse Per Revolution (PPR) x RPM x 1/60 x 1/1000
Example 512 x 60,000=30,720,000 x 1/60=512,000 x 1/1000 = 512khz

PPR = Tooth Count x Interpolation Factor
Example 256 x 8 = 2048 Pulse Per Revolution

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IGS Scanning Head Selection Guide

Cable length : S = 1M L = 3 M

MI :Mini type reading head
SI : Standard type reading head

01 : without interpolation
02 : 2 fold interpolation, TTL output
04 : 4 fold interpolation, TTL output
08 : 8 fold interpolation, TTL output

A : analog output ~ 1Vpp
T : TTL output

04 : **for detect 0.4 mm module**
05 : **for detect 0.5 mm module**

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IGS Gear Wheel

There are several types of gear modules, the outside diameter of gear wheel can be calculated as follows.

Z : module of gear in mm

N : Teeth of gear Wheel

OD : outer diameter of Gear wheel (mm)

OD = (N + 2) x Z mm

For example:

128 teeth Gear wheel in 0.4 mm module	OD = (128 + 2) x 0.4 = 52 mm
128 teeth Gear wheel in 0.5 mm module	OD = (128 + 2) x 0.5 = 65 mm
256 teeth Gear wheel in 0.4 mm module	OD = (256 + 2) x 0.4 = 103.2 mm
256 teeth Gear wheel in 0.5 mm module	OD = (256 + 2) x 0.5 = 129 mm

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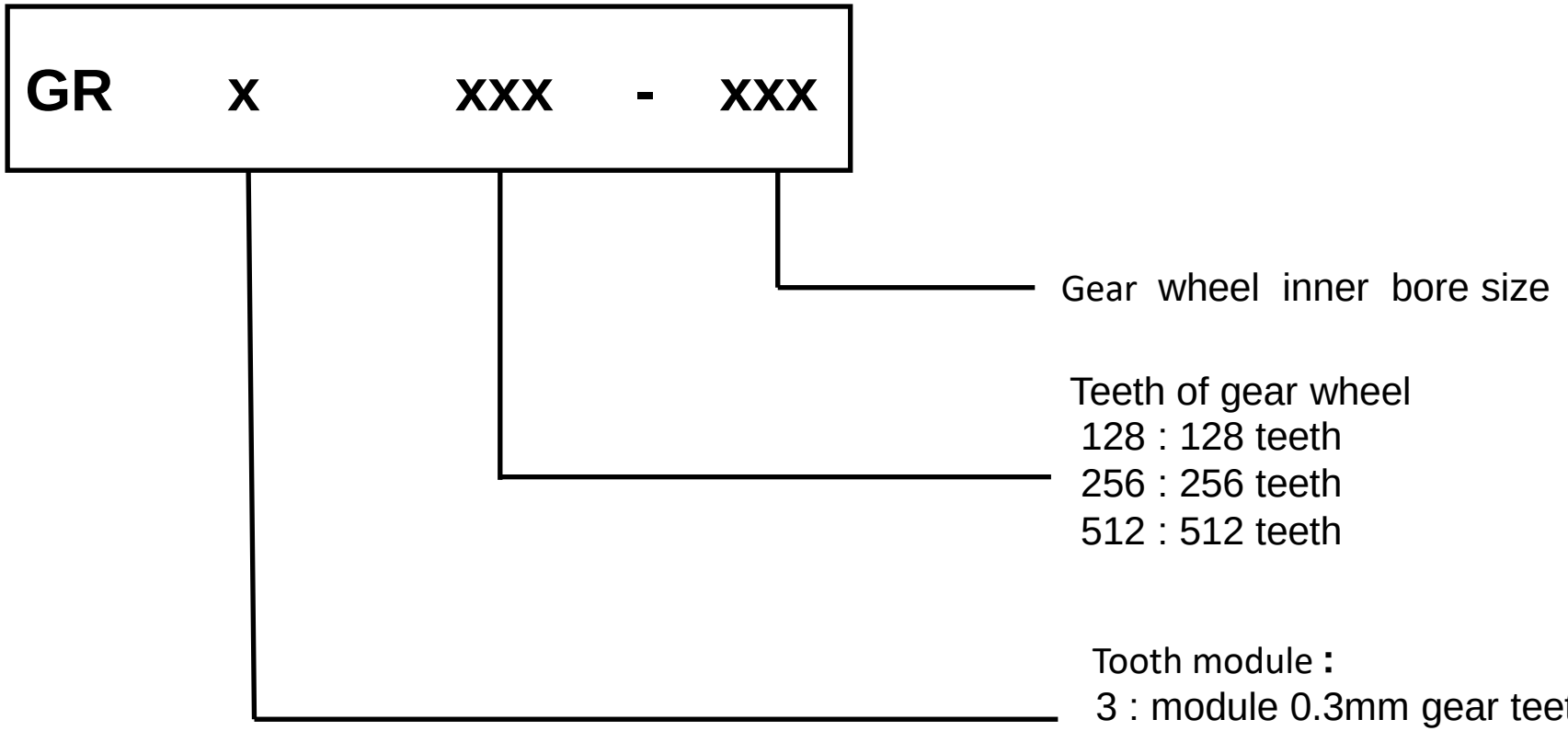
IGS Gear Wheel code guide



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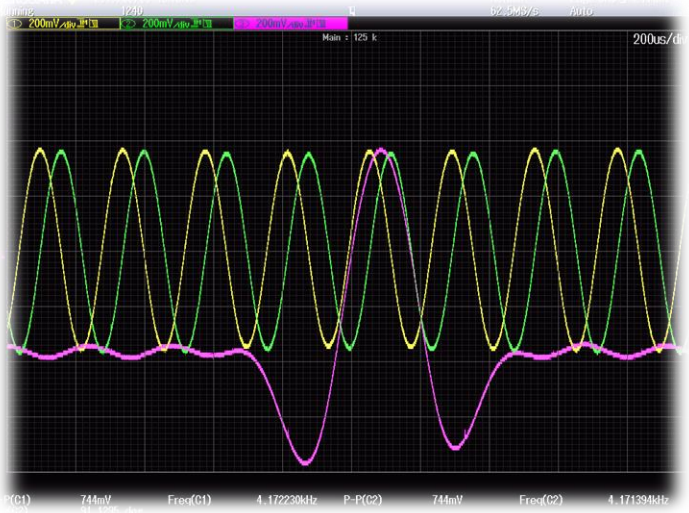
Signal wave form- analog



This is for a scanning head 04A for gear 0.4 mm module. for different gear wheel are :

256 teeth x 10000 rpm = 42.6 KHZ

128 teeth x 24000 rpm = 51.2 KHZ

64 teeth x 60000 rpm = 64 KHZ

The output frequency was consider when using in H.F spindle. The output frequency calculation as below.

teeth number **X** spindle rpm **X** 1/60 **X** 1/1000 = frequency (KHz)

when select 128 teeth wheel for 15000 rpm application the output frequency would be

128 **X** 15000 **X** 1/60 = 64,000 (Hz) **X** 1/1000 = 32KHZ

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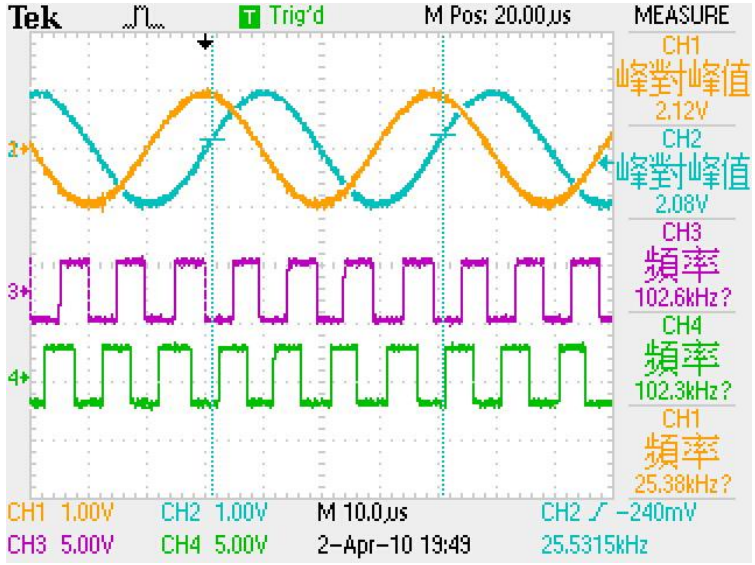
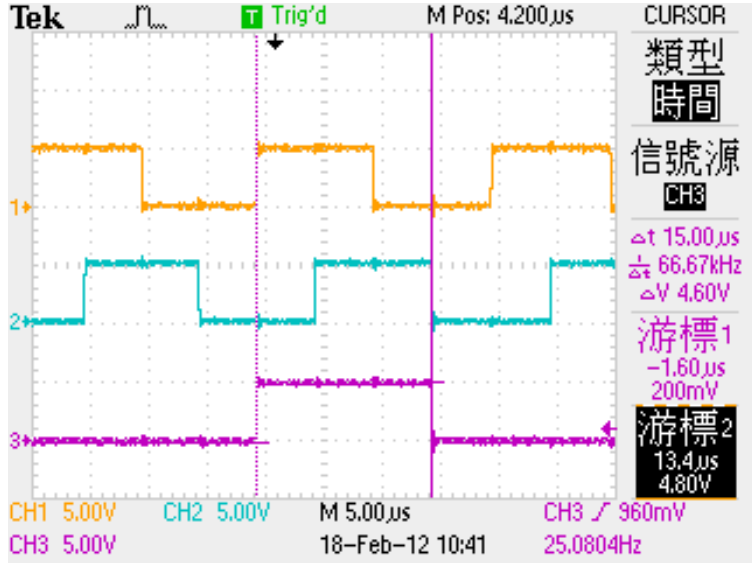
Signal wave form- TTL



4 fold interpolation



TTL A/ B/ Z output

This combination is for a scanning head with a 0.4 mm module and TTL output with 4 fold interpolation with the 0.4 mm module 256 teeth gear wheel. With this selection we can get 1024 output TTL signal

256 **X** 4 = 1024 ppr Pulse/per revolution

The output frequency calculation as below. With 10000 rpm spindle rpm, the output frequency = 170.7 KHZ

PPR **X** spindle RPM **X** 1/60 **X** 1/1000 = frequency (KHz)

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MRSM20 Magnetic Ring Encoder

MRSM20T1024 : 1024 PPR line driver output

- Contact free detect speed and position
- Magnetic sensor with separate magnetic ring
- Max. rpm up to 25,000 rpm
- Standard Output : TTL (RS422 line driver)

  1024ppr, 0~400Khz Response
- High protection grade for Harsh environment

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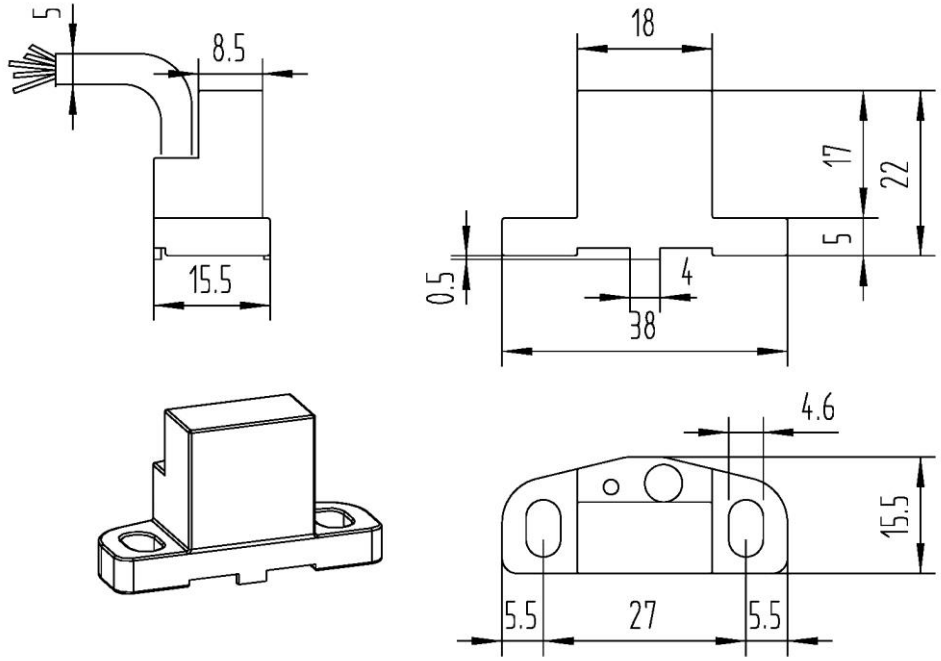
MRSM20 Magnetic Ring Encoder



Scanning head drawing

A strong magnetic field could cause demagnetizing and damage magnetic ring.

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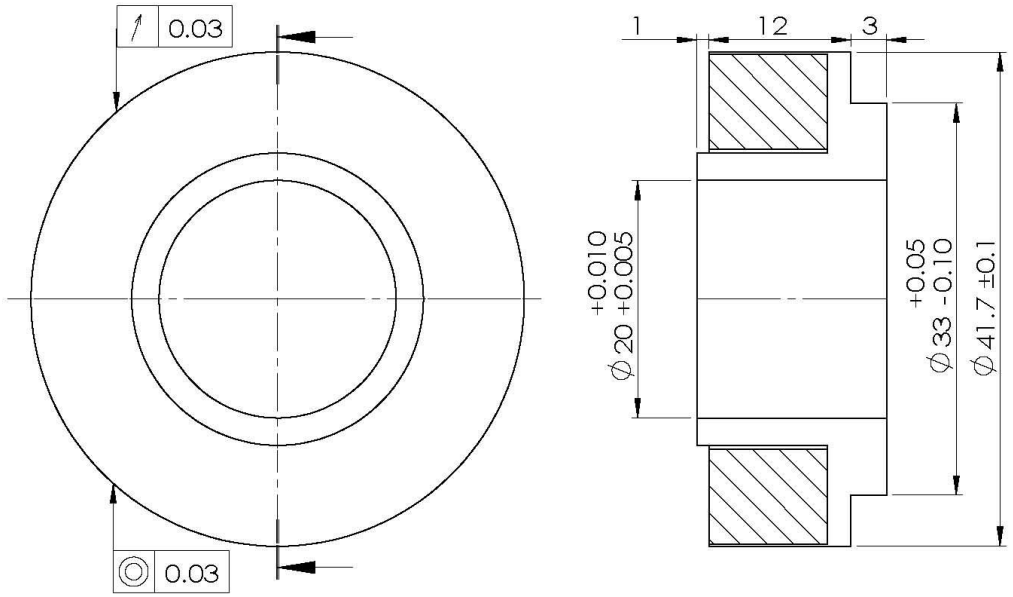
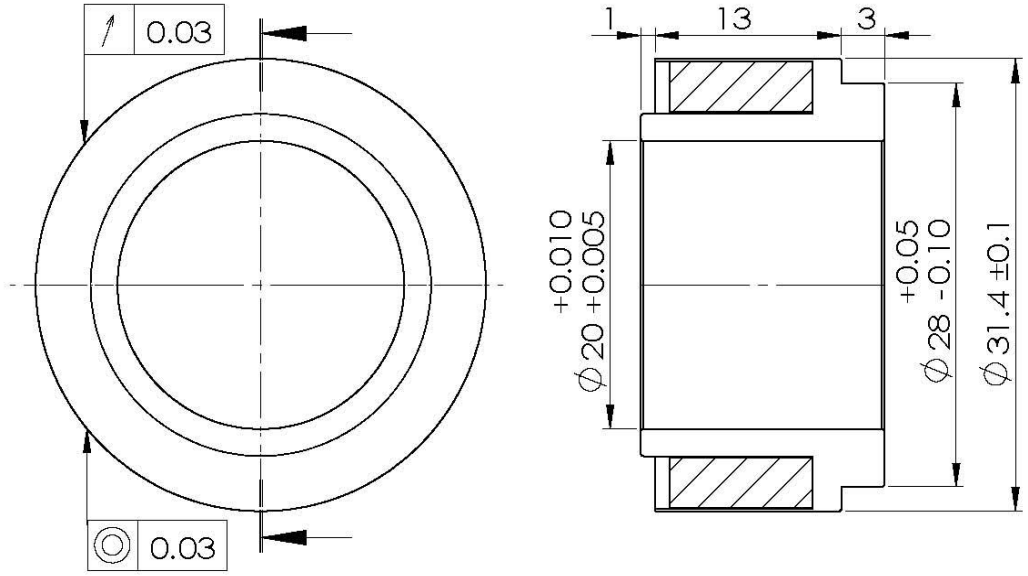
MRSM20 Magnetic Ring Encoder



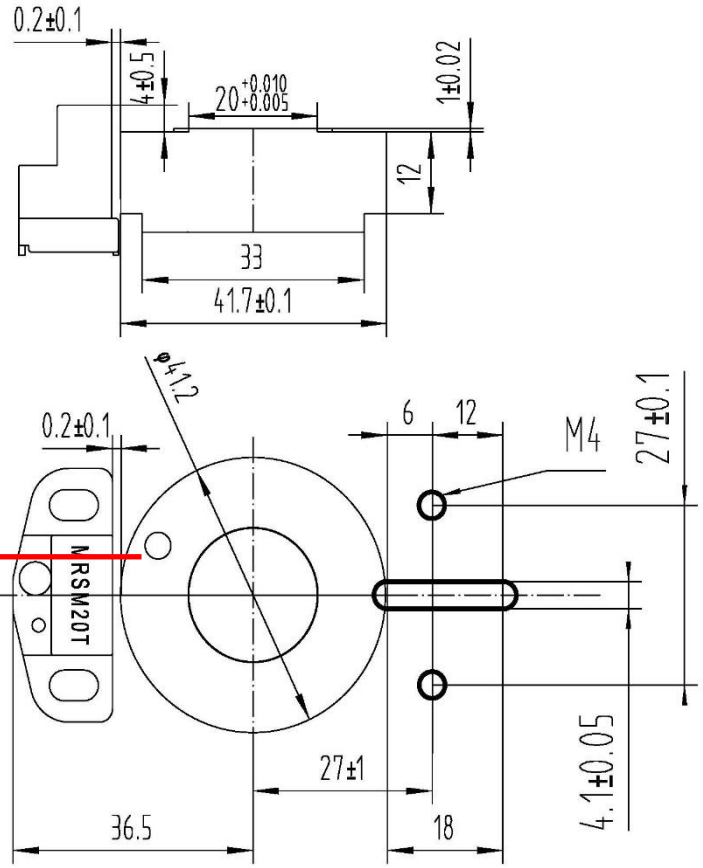
magnetic ring MR20-64-03C



magnetic ring MR20-64-03D

A strong magnetic field will cause demagnetizing and damage magnetic ring.

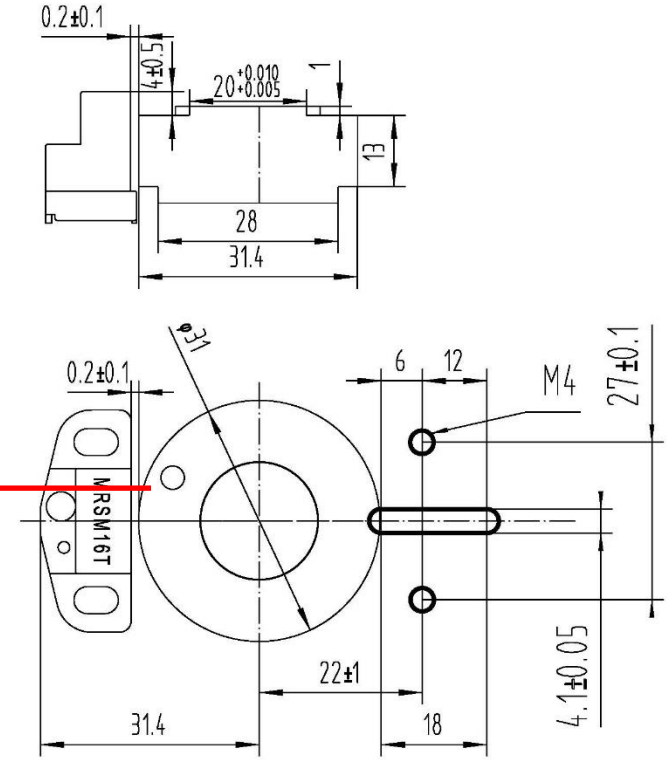
GUBOA MRSM20 Magnetic Ring Encoder – Scanning head mounting hole pattern



Reference mark label

The reference mark label on magnetic ring face up same as Scanning head.
Mounting Gap 0.2 mm

GUBOA MRSM16 Magnetic Ring Encoder – Scanning head mounting hole pattern



Reference mark label

The reference mark label on magnetic ring face up same as Scanning head.
Mounting Gap 0.2 mm

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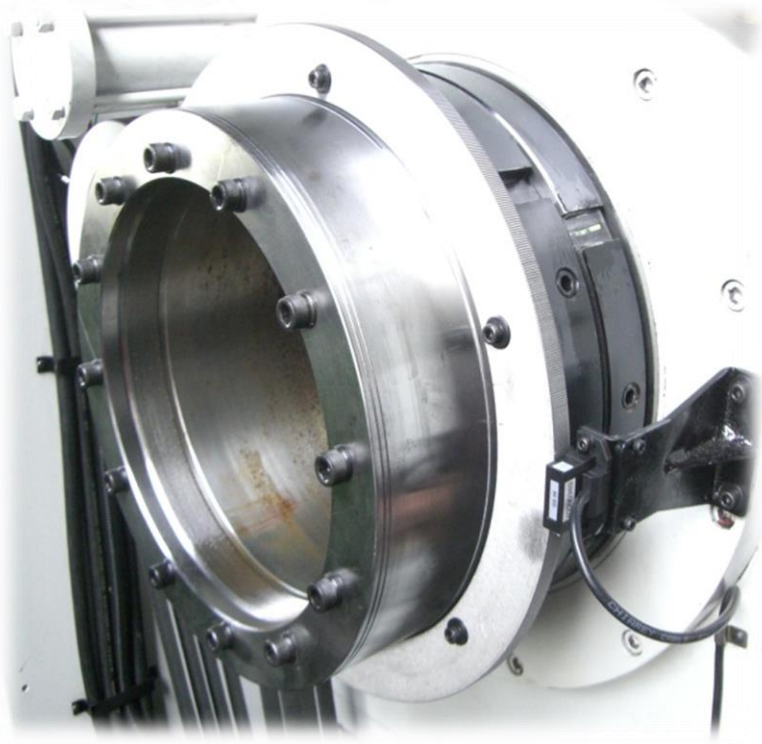
MRSM20 Magnetic Ring Encoder – output connection

Definition	Color	MRSM-20T
Vcc	brown	DC+5V
GND	white	DC 0V
A+	green	A
A-	yellow	/A
B+	blue	B
B-	red	/B
Z+	gray	Z
Z-	pink	/Z
Shielding		Cable screen

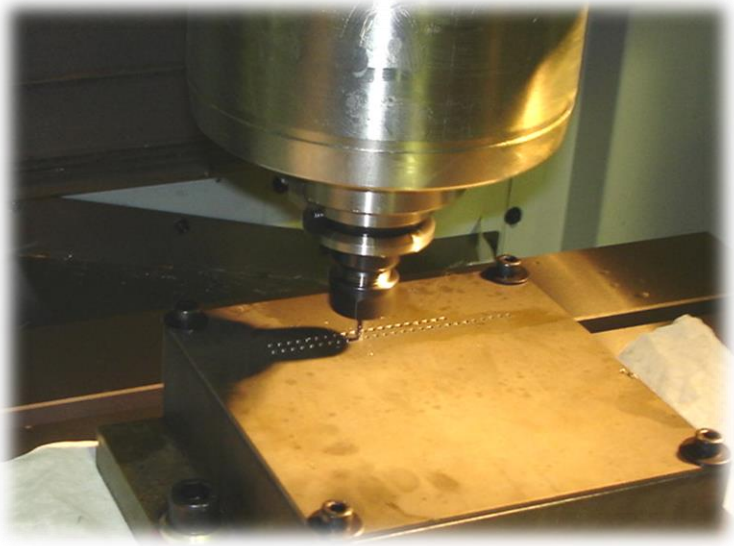
Standard delivery with 1M open end cable OD 5.0mm((0.14mm²x2C)x4) with coverage screen

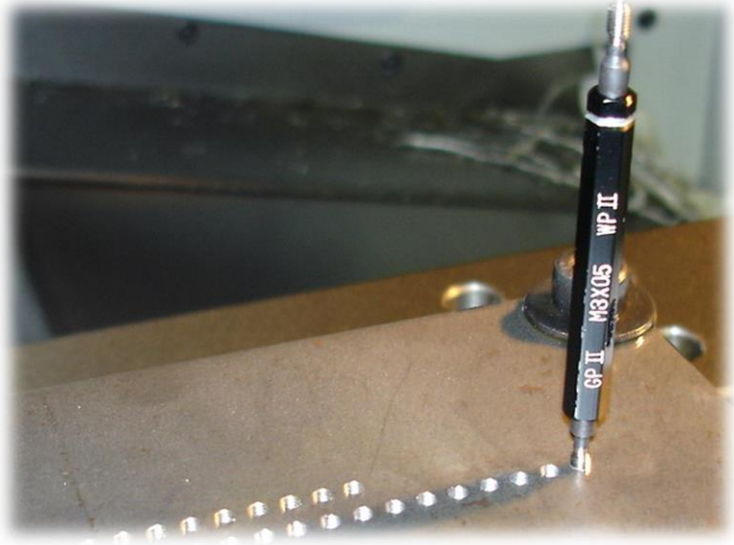
IGS Applications - 「SIS 05T01 + GR1024 for lathe machine」

- Gear wheel could made for easy mounting and assembly by machine builder.
- Scanning head made for easy mounting.
- Contact free detection reduce kinetic error and increases machining accuracy.
- Less parts, space saving.
- Direct feedback spindle speed and position.



IGS Applications

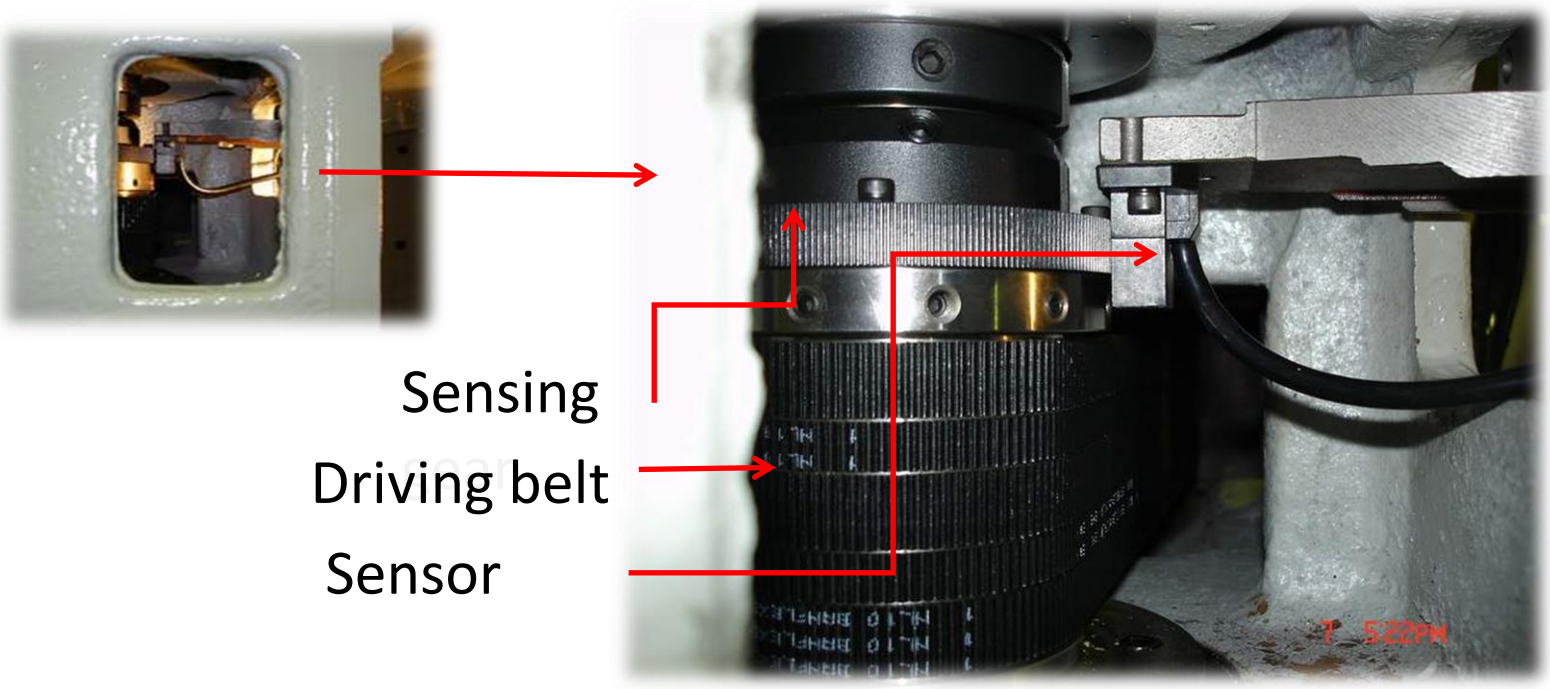




Rigid Tapping in a Vertical Machining Center. When the spindle position is detected directly by a sensor ,the belt gear ratio or backlash between motor and spindle will not affect feedback resolution or accuracy ensuring an accurate and repeatable 1.5 ~ 3 mm Rigid Tapping function.

Spindle Motor 7.5KW /spindle BT40- 12000 rpm in 3mm rigid Tapping.
Using SIS04T04+GR04-256

IGS Applications

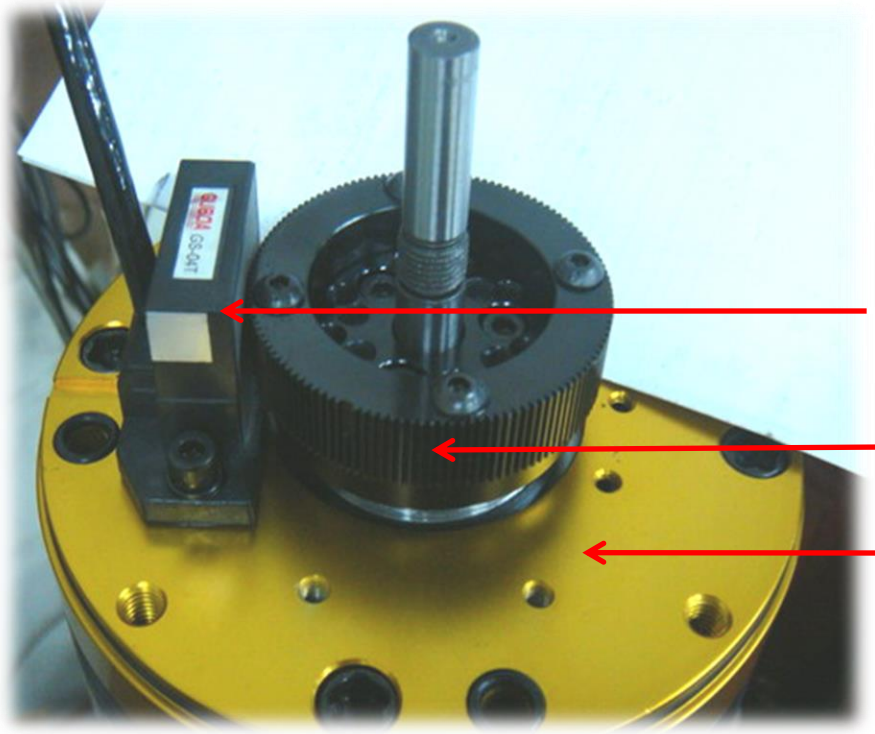


For a Belt-driven VMC. Direct reading spindle position and speed.

High response, no lost motion due to belt wear.

Commanded position by the CNC=Tool position

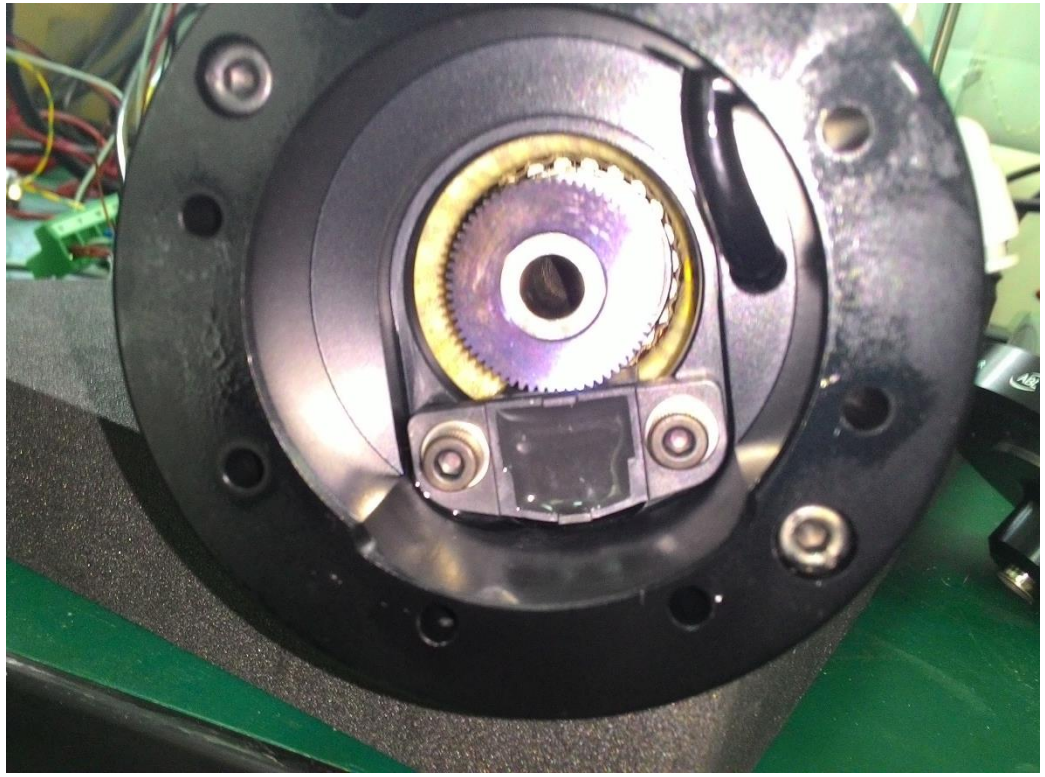
IGS Most Popular combination for H.F spindle…



SIS04T08 + 128T gear = TTL 1024 ppr

HF spindle using IGS (SIS04T08+GR-128) for speed 18000 ~ 30000 rpm

Bench testing of both TTL and Analogue 1Vpp sensors in 80,000 rpm spindles



MIS04T04 + 64T gear = TTL 256 ppr = 341.3 KHz

MIS04A + 64T gear = 85.33 KHz

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