

# Manual

## IGS Incremental Encoder



### Applications

- Speed and position feedback for high-speed spindles, motors, CNC machines

### General Information

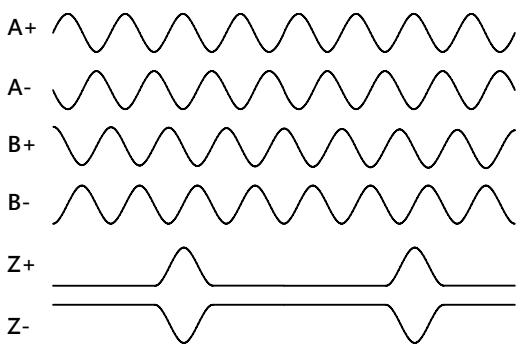
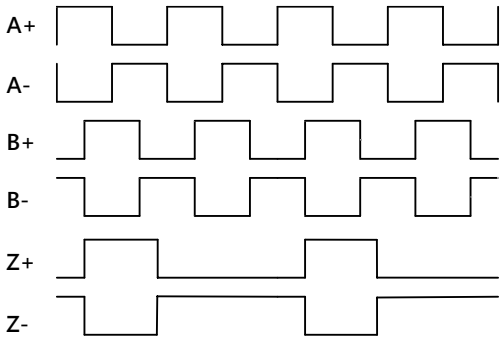
- Contactless scanning of rotating position and speed.
- Compact design for used in limited space.
- Contact free detection without any mechanical wear problem.
- High protecting class IP68.
- Sensing gear wheel from module 0.3 ~ 0.8
- High response, up to 100,000 rpm
- Customized according to dimensions.
- The MIS3 3rd generation sensor added auto-calibration and speed distribution chart function by connecting to the PST-06A Signal Analyzer.

## ■ Specification

| Technical data             | 1 Vpp ( A )                                                                | TTL ( T )              |
|----------------------------|----------------------------------------------------------------------------|------------------------|
| Power supply Vcc (DCV)     | 5 V $\pm$ 5%                                                               | 5 V $\pm$ 5%           |
| Load current (open output) | $\leq$ 60 mA                                                               | $\leq$ 60 mA           |
| VOH (open -output)         | N/A                                                                        | $\geq$ 2.5 V           |
| VOL (open -output)         | N/A                                                                        | $\leq$ 0.5 V           |
| Output signal type         | Differential Analog ( 1 Vpp )                                              | RS 422 ( TTL )         |
| Max. frequency             | 150 KHZ                                                                    | 500 KHZ                |
| Output signal amplitude    | $\geq$ 1 Vpp                                                               | N/A                    |
| A 、 B phase shifting       | $\leq 90 \pm 10^\circ$                                                     | $\leq 90 \pm 25^\circ$ |
| Sensing gap                | 0.15 $\pm$ 0.03 mm                                                         | 0.15 $\pm$ 0.03 mm     |
| Weight (with 1m wire)      | Standard head 110g $\pm$ 5% ;<br>Mini head 90 $\pm$ 5% ; MIS3 105 $\pm$ 5% |                        |

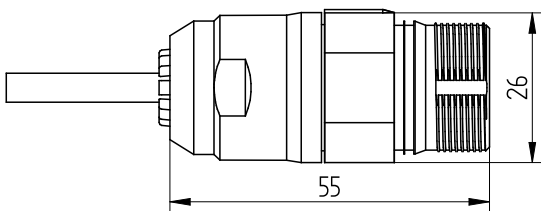
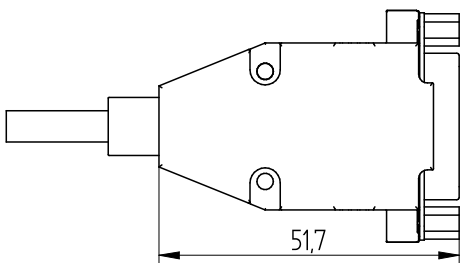
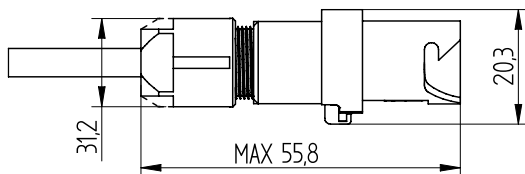
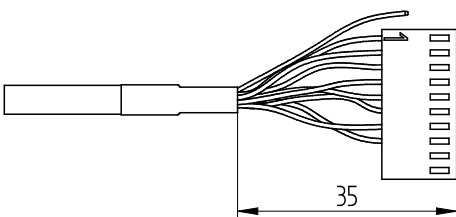
| Electrical testing    |                                                             |
|-----------------------|-------------------------------------------------------------|
| EMC/EMI               | EN 61000-6-1 ; EN 61000-6-2<br>/EN 61000-6-3 ; EN 61000-6-4 |
| Protection            | IP 68 (IEC 60529)                                           |
| Vibration             | 200 m/ s <sup>2</sup> , 55Hz to 2000Hz (EN 60068-2-6)       |
| Shock                 | 2000 m/ s <sup>2</sup> , 6ms (EN 60068-2-27)                |
| Operating temperature | -20°C ~ 85 °C                                               |

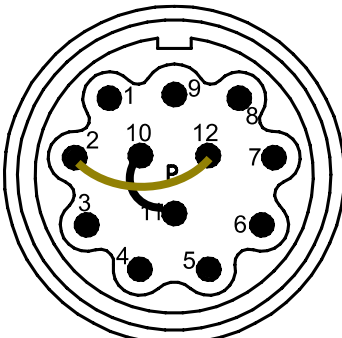
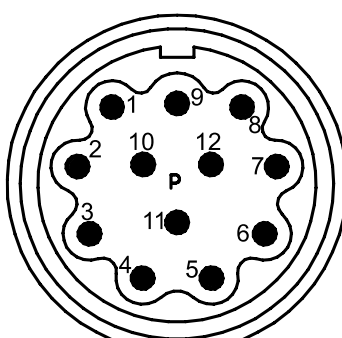
## ■ Signal diagram

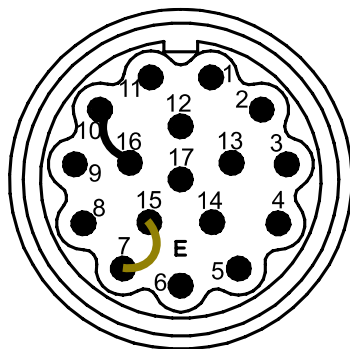
| 1 Vpp ( A )                                                                                                                                                                                                                                                                                                                                                                                                                        | TTL ( T )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Diagram showing differential analog signals for 1 Vpp (A). The signals are A+, A-, B+, B-, Z+, and Z-. A+ and A- are differential signals with a peak-to-peak amplitude of 1 Vpp. B+ and B- are differential signals with a peak-to-peak amplitude of 1 Vpp. Z+ and Z- are differential signals with a peak-to-peak amplitude of 1 Vpp.</p> |  <p>Diagram showing differential digital signals for TTL (T). The signals are A+, A-, B+, B-, Z+, and Z-. A+ and A- are differential signals with a peak-to-peak amplitude of 1 Vpp. B+ and B- are differential signals with a peak-to-peak amplitude of 1 Vpp. Z+ and Z- are differential signals with a peak-to-peak amplitude of 1 Vpp.</p> <p>2, 4, 8, 16 interpolation Ex. 4 folds<br/>interpolation sensor head with 256T sensor<br/>gear : 1024 pulses TTL signal</p> |

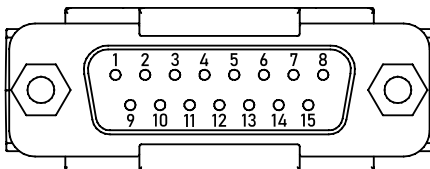
## ■ Dimension & Installation

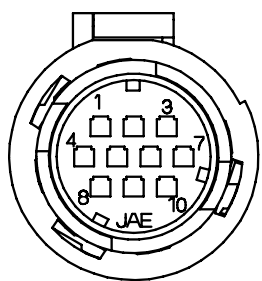
|                   | Standard (SI) | Mini (MI)                   |
|-------------------|---------------|-----------------------------|
| Encoder Dimension |               |                             |
| Installation      |               |                             |
| Cable Outlet      | <p>Axial</p>  | <p>Axial      Right (R)</p> |

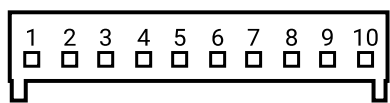
| Connector type         | code      |                                                                                      |
|------------------------|-----------|--------------------------------------------------------------------------------------|
| M23<br>12 Pin / 17 Pin | E12 / E17 |    |
| D-SUB<br>15 Pin        | D         |   |
| JAE 10 Pin             | P         |  |
| Open-end               | N         |  |

| M23 12 Pin                                                                        |       |          |           |                                                                                     |
|-----------------------------------------------------------------------------------|-------|----------|-----------|-------------------------------------------------------------------------------------|
| 1Vpp ( A )                                                                        | Pin   | Signal   | Color     | TTL ( T )                                                                           |
|  | 1     | B-       | red       |  |
|                                                                                   | 2     | sensor + | -         |                                                                                     |
|                                                                                   | 3     | Z+       | grey      |                                                                                     |
|                                                                                   | 4     | Z-       | pink      |                                                                                     |
|                                                                                   | 5     | A+       | green     |                                                                                     |
|                                                                                   | 6     | A-       | yellow    |                                                                                     |
|                                                                                   | 7     | -        | -         |                                                                                     |
|                                                                                   | 8     | B+       | blue      |                                                                                     |
|                                                                                   | 9     | -        | -         |                                                                                     |
|                                                                                   | 10    | 0V       | white     |                                                                                     |
|                                                                                   | 11    | sensor - | -         |                                                                                     |
|                                                                                   | 12    | + 5V     | brown     |                                                                                     |
|                                                                                   | cover | GND      | shielding |                                                                                     |

| M23 17 Pin                                                                          | Pin   | Signal   | Color     |
|-------------------------------------------------------------------------------------|-------|----------|-----------|
|  | 1     | A+       | green     |
|                                                                                     | 2     | A-       | yellow    |
|                                                                                     | 3     | Z+       | grey      |
|                                                                                     | 4     | -        | -         |
|                                                                                     | 5     | -        | -         |
|                                                                                     | 6     | -        | -         |
|                                                                                     | 7     | 0V       | white     |
|                                                                                     | 8     | -        | -         |
|                                                                                     | 9     | -        | -         |
|                                                                                     | 10    | + 5V     | brown     |
|                                                                                     | 11    | B+       | blue      |
|                                                                                     | 12    | B-       | red       |
|                                                                                     | 13    | Z-       | pink      |
|                                                                                     | 14    | -        | -         |
|                                                                                     | 15    | sensor - | -         |
|                                                                                     | 16    | sensor + | -         |
|                                                                                     | 17    | -        | -         |
|                                                                                     | cover | GND      | shielding |

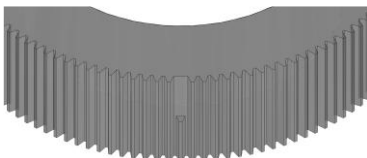
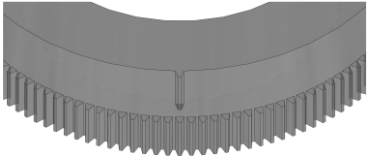
| D-SUB 15 Pin                                                                      | Pin   | Signal | Color     |
|-----------------------------------------------------------------------------------|-------|--------|-----------|
|  | 1     | + 5V   | brown     |
|                                                                                   | 2     | 0V     | white     |
|                                                                                   | 3     | A+     | green     |
|                                                                                   | 4     | A-     | yellow    |
|                                                                                   | 5     | -      |           |
|                                                                                   | 6     | B+     | blue      |
|                                                                                   | 7     | B-     | red       |
|                                                                                   | 8     | -      |           |
|                                                                                   | 9     | -      |           |
|                                                                                   | 10    | Z+     | grey      |
|                                                                                   | 11    | -      |           |
|                                                                                   | 12    | Z-     | pink      |
|                                                                                   | 13    | -      |           |
|                                                                                   | 14    | -      |           |
|                                                                                   | 15    | -      |           |
|                                                                                   | cover | GND    | shielding |

| JAE 10 Pin<br>Model: JN1HS10PL3                                                     | Pin | Signal | Color     |
|-------------------------------------------------------------------------------------|-----|--------|-----------|
|  | 1   | B+     | blue      |
|                                                                                     | 2   | B-     | red       |
|                                                                                     | 3   | GND    | shielding |
|                                                                                     | 4   | + 5V   | brown     |
|                                                                                     | 5   | A+     | green     |
|                                                                                     | 6   | A-     | yellow    |
|                                                                                     | 7   | 0V     | white     |
|                                                                                     | 8   | Z+     | grey      |
|                                                                                     | 9   | Z-     | pink      |
|                                                                                     | 10  | -      |           |

| Open-end                                                                            | Pin | Signal | Color  |
|-------------------------------------------------------------------------------------|-----|--------|--------|
|  | 1   | A+     | green  |
|                                                                                     | 2   | A-     | yellow |
|                                                                                     | 3   | + 5V   | brown  |
|                                                                                     | 4   | 0V     | white  |
|                                                                                     | 5   | B+     | blue   |
|                                                                                     | 6   | B-     | red    |
|                                                                                     | 7   | Z+     | grey   |
|                                                                                     | 8   | Z-     | pink   |
|                                                                                     | 9   | -      |        |
|                                                                                     | 10  | -      |        |

■ Gear model

| Sensing gear code                                  |                                                                                           |
|----------------------------------------------------|-------------------------------------------------------------------------------------------|
| M    X    XXX - XXX - XXX<br>(1)   (2)   (3)   (4) |                                                                                           |
| (1)                                                | <b>Module:</b><br>3 : module 0.3<br>4 : module 0.4<br>5 : module 0.5                      |
| (2)                                                | <b>Teeth:</b><br>128 : 128 teeth<br>256 : 256 teeth<br>384 : 384 teeth<br>512 : 512 teeth |
| (3)                                                | <b>Inner diameter ( mm )</b><br>Ex. 125                                                   |
| (4)                                                | <b>Reference mark:</b><br>STD : gap<br>FR : flag                                          |

| Reference mark | Image                                                                                |
|----------------|--------------------------------------------------------------------------------------|
| STD            |  |
| FR             |  |

## Encoder model

| Encoder type code                                                                  |                                                                                                                                                                          |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GS    XX - X - XX - XX - X - X - X - XX - X<br>(1) (2) (3) (4) (5) (6) (7) (8) (9) |                                                                                                                                                                          |
| (1)                                                                                | <b>Module</b><br>03 : 0.3 ; 04 : 0.4 ; 05 : 0.5 ; 08 : 0.8                                                                                                               |
| (2)                                                                                | <b>Signal type</b><br>A : 1 Vpp<br>T : TTL / RS422                                                                                                                       |
| (3)                                                                                | <b>Interpolation</b><br>01 : 1 , For 1 Vpp & TTL      02 : 2 , For TTL only<br>04 : 4 , For TTL only          08 : 8 , For TTL only<br>11 : 1 , For 1 Vpp signal control |
| (4)                                                                                | <b>Encoder Dimension</b><br>MI : Mini<br>SI : Standard                                                                                                                   |
| (5)                                                                                | <b>Cable Lenth</b><br>S : 1 m<br>L : 3 m                                                                                                                                 |
| (6)                                                                                | <b>Functional version</b><br>- : Signal measurement<br>3 : Signal measurement, Auto-calibration, Speed distribution chart<br>(1 Vpp output type only)                    |
| (7)                                                                                | <b>Connectors</b><br>E12 : M23 12 Pin      E17 : M23 17 Pin<br>P : JAE 10 Pin          D : D-sub 15 Pin<br>N : open-end                                                  |
| (8)                                                                                | <b>Reference mark of gear</b><br>STD : gap<br>FR : flag                                                                                                                  |
| (9)                                                                                | <b>Cable outlet</b><br>- : Axial<br>R : Right (Mini type only)                                                                                                           |

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