



# MWS075-12C111P100500

MWS075

MEASURING WHEEL ENCODERS

**SICK**  
Sensor Intelligence.



Illustration may differ



## Ordering information

| Type                 | part no. |
|----------------------|----------|
| MWS075-12C111P100500 | 1146308  |

**Included in delivery:** DBS50E-S5EP00500 (1), BEF-MWS075-ARM (1), BEF-MR008020R (1)

Other models and accessories → [www.sick.com/MWS075](http://www.sick.com/MWS075)

## Detailed technical data

### Performance

|                                                     |                         |
|-----------------------------------------------------|-------------------------|
| <b>Pulses per revolution</b>                        | 500                     |
| <b>Resolution in pulses/mm</b>                      | 2.5                     |
| <b>Measuring increment (resolution in mm/pulse)</b> | 0.4 <sup>1)</sup><br>2) |
| <b>Repeatability</b>                                | < 0.1 mm <sup>3)</sup>  |

<sup>1)</sup> Calculation example: Measuring wheel circumference / number of steps per revolution = 200 mm / 16384 steps per revolution = 0.012 mm/pulse.

<sup>2)</sup> Value based on measuring wheel circumference. The measuring wheel circumference depends on manufacturing tolerances, wear and tear, the selected spring tensioning force, and the behavior of the measurement wheel surface at different temperatures and on different measurement surfaces. To obtain the most accurate measurement results, we recommend performing a reference run for positioning tasks so that application-specific measuring wheel characteristics can be taken into account.

<sup>3)</sup> Value is based on the mechanics. Backlash of the measuring wheel mechanics, is at a minimum. This enables a precise and repeatable measurement results.

### Interfaces

|                                       |                 |
|---------------------------------------|-----------------|
| <b>Communication interface</b>        | Incremental     |
| <b>Communication Interface detail</b> | HTL / Push pull |

### Electronics

|                                                |                                                                  |
|------------------------------------------------|------------------------------------------------------------------|
| <b>Connection type</b>                         | Cable, 8-wire, with male connector, M12, 8-pin, universal, 0.5 m |
| <b>Supply voltage</b>                          | 7 V ... 30 V                                                     |
| <b>Reverse polarity protection</b>             | ✓                                                                |
| <b>Short-circuit protection of the outputs</b> | ✓ <sup>1)</sup>                                                  |

<sup>1)</sup> The short-circuit rating is only given if Us and GND are connected correctly.

### Mechanics

|                                      |                            |
|--------------------------------------|----------------------------|
| <b>Measuring wheel circumference</b> | 200 mm                     |
| <b>Measuring wheel surface</b>       | O-ring NBR70 <sup>1)</sup> |

<sup>1)</sup> The surface of a measuring wheel is subject to wear. This depends on contact pressure, acceleration behavior in the application, traversing speed, measurement surface, mechanical alignment of the measuring wheel, temperature, and ambient conditions. We recommend you regularly check the condition of the measuring wheel and replace as required.

<sup>2)</sup> Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

<sup>3)</sup> No permanent operation. Decreasing signal quality.

<sup>4)</sup> One cycle corresponds to an upward and downward movement of ± 3 mm from the recommended pretension position.

<sup>5)</sup> When mounted from below, the encoder weight during spring pretensioning must be taken into account.

|                                                                            |                                                          |
|----------------------------------------------------------------------------|----------------------------------------------------------|
| <b>Mounting</b>                                                            | Measuring wheel mounted at the front                     |
| <b>Encoder material</b>                                                    |                                                          |
| Cable                                                                      | PVC                                                      |
| <b>Spring arm mechanism material</b>                                       |                                                          |
| Measuring wheel, spring arm                                                | Aluminum                                                 |
| <b>Start up torque</b>                                                     | + 0.9 Ncm                                                |
| <b>Operating torque</b>                                                    | 0.6 Ncm                                                  |
| <b>Operating speed</b>                                                     | 6,000 min <sup>-1</sup> <sup>2)</sup>                    |
| <b>Maximum operating speed</b>                                             | 8,000 min <sup>-1</sup> <sup>3)</sup>                    |
| <b>Bearing lifetime</b>                                                    | 2.0 x 10 <sup>9</sup> revolutions                        |
| <b>Maximum travel/deflection of spring arm</b>                             | 14 mm at 14 N spring travel                              |
| <b>Recommended pretension</b>                                              | 15 N At 10 mm deflection                                 |
| <b>Max. permissible working area for the spring (continuous operation)</b> | ± 3 mm                                                   |
| <b>Recommended spring deflection</b>                                       | 2 mm ... 13 mm                                           |
| <b>Service life of spring element</b>                                      | > 1.4 million cycles <sup>4)</sup>                       |
| <b>Mounting position relative to the measuring object</b>                  | Preferably from above, from below possible <sup>5)</sup> |
| <b>Moment of inertia of the rotor</b>                                      | 0.65 gcm <sup>2</sup>                                    |
| <b>Mounted encoder</b>                                                     | DBS36/50, DBS50E-S5EP00500, 1068190                      |
| <b>Mounted mechanic</b>                                                    | BEF-MWS075-ARM, 2145180                                  |
| <b>Attached measuring wheel</b>                                            | BEF-MR008020R, 2055223                                   |

<sup>1)</sup> The surface of a measuring wheel is subject to wear. This depends on contact pressure, acceleration behavior in the application, traversing speed, measurement surface, mechanical alignment of the measuring wheel, temperature, and ambient conditions. We recommend you regularly check the condition of the measuring wheel and replace as required.

<sup>2)</sup> Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

<sup>3)</sup> No permanent operation. Decreasing signal quality.

<sup>4)</sup> One cycle corresponds to an upward and downward movement of ± 3 mm from the recommended pretension position.

<sup>5)</sup> When mounted from below, the encoder weight during spring pretensioning must be taken into account.

## Ambient data

|                                    |                                                      |
|------------------------------------|------------------------------------------------------|
| <b>EMC</b>                         | According to EN 61000-6-2 and EN 61000-6-3 (class A) |
| <b>Enclosure rating</b>            | IP65                                                 |
| <b>Operating temperature range</b> | -20 °C ... +85 °C                                    |
| <b>Storage temperature range</b>   | -40 °C ... +100 °C, without package                  |

## Certificates

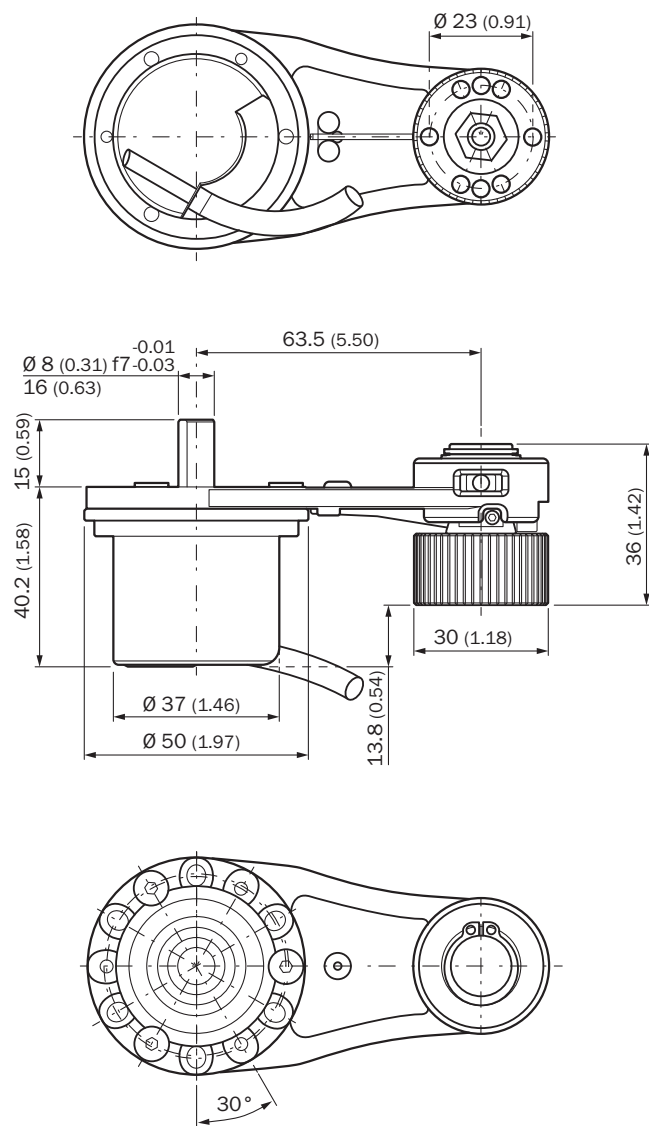
|                                       |   |
|---------------------------------------|---|
| <b>EU declaration of conformity</b>   | ✓ |
| <b>UK declaration of conformity</b>   | ✓ |
| <b>ACMA declaration of conformity</b> | ✓ |
| <b>China-RoHS</b>                     | ✓ |

## Classifications

|                     |          |
|---------------------|----------|
| <b>ECLASS 5.0</b>   | 27270501 |
| <b>ECLASS 5.1.4</b> | 27270501 |
| <b>ECLASS 6.0</b>   | 27270590 |

|                |          |
|----------------|----------|
| ECLASS 6.2     | 27270590 |
| ECLASS 7.0     | 27270501 |
| ECLASS 8.0     | 27270501 |
| ECLASS 8.1     | 27270501 |
| ECLASS 9.0     | 27270501 |
| ECLASS 10.0    | 27270790 |
| ECLASS 11.0    | 27270707 |
| ECLASS 12.0    | 27270504 |
| ETIM 5.0       | EC001486 |
| ETIM 6.0       | EC001486 |
| ETIM 7.0       | EC001486 |
| ETIM 8.0       | EC001486 |
| UNSPSC 16.0901 | 41112113 |

## Dimensional drawing



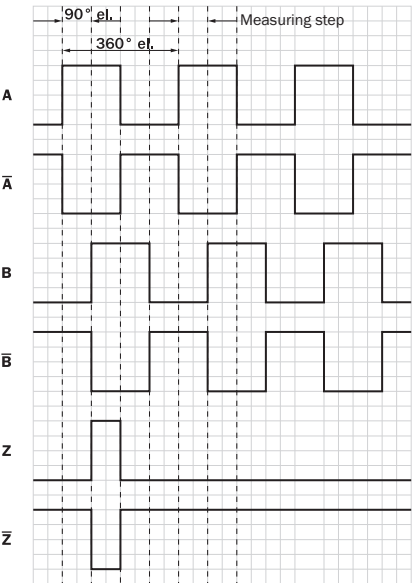
Dimensions in mm (inch)

Please refer to the dimensional drawings in the respective data sheet for the installed encoder.

A diagram of a cross-section of a flower with eight numbered labels pointing to different parts: 1 points to a petal, 2 points to a sepal, 3 points to a stamen, 4 points to an anther, 5 points to a pollen grain, 6 points to the ovary, 7 points to the style, and 8 points to the stigma.

| Wire colors (cable connection) | Male connector M12, 8-pin | Male connector M23, 12-pin | TTL/HTL 6-channel signal | Explanation       |
|--------------------------------|---------------------------|----------------------------|--------------------------|-------------------|
| Brown                          | 1                         | 6                          | A-                       | Signal wire       |
| White                          | 2                         | 5                          | A                        | Signal wire       |
| Black                          | 3                         | 1                          | B-                       | Signal wire       |
| Pink                           | 4                         | 8                          | B                        | Signal wire       |
| Yellow                         | 5                         | 4                          | Z-                       | Signal wire       |
| Purple                         | 6                         | 3                          | Z                        | Signal wire       |
| Blue                           | 7                         | 10                         | GND                      | Ground connection |
| Red                            | 8                         | 12                         | +U <sub>s</sub>          | Supply voltage    |
| -                              | -                         | 9                          | Not assigned             | Not assigned      |
| -                              | -                         | 2                          | Not assigned             | Not assigned      |
| -                              | -                         | 11                         | Not assigned             | Not assigned      |
| -                              | -                         | 7                          | Not assigned             | Not assigned      |

Diagrams Signal outputs for electrical interfaces TTL and HTL



Cw with view on the encoder shaft in direction "A", compare dimensional drawing.

① Interfaces G, P, R only for channels A, B, Z.

| Supply voltage | Output                        |
|----------------|-------------------------------|
| 4.5 V...5.5 V  | TTL/RS422                     |
| 7 V...30 V     | TTL/RS422                     |
| 7 V...30 V     | HTL/Push Pull                 |
| 7 V...27 V     | HTL/push pull, 3 channel      |
| 4.5 V...5.5 V  | Open Collector NPN, 3 channel |
| 4.5 V...30 V   | Open Collector NPN, 3 channel |

Recommended accessories

Other models and accessories → [www.sick.com/MWS075](http://www.sick.com/MWS075)

|                  | Brief description                                                                                                                       | Type          | part no. |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------|----------|
| Mounting systems |                                                                                                                                         |               |          |
|                  | <ul style="list-style-type: none"><li>• <b>Description:</b> Mounting bracket for MWS075</li><li>• <b>Suitable for:</b> MWS075</li></ul> | BEF-WF-MWS075 | 2145906  |

|                                                                                     | Brief description                                                                                                                                                                                                                                                                                                                                                      | Type           | part no. |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------|
| measuring wheels and measuring wheel mechanics                                      |                                                                                                                                                                                                                                                                                                                                                                        |                |          |
|    | <ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminium measuring wheel with O-ring (NBR70) for 8 mm solid shaft, circumference 200 mm</li> </ul>                                                                        | BEF-MR008020R  | 2055223  |
|    | <ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Measuring wheel with O-ring (NBR70) for 8 mm solid shaft, circumference 300 mm</li> </ul>                                                                                  | BEF-MR008030R  | 2055635  |
|    | <ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with cross-knurled surface for 8 mm solid shaft, circumference 200 mm</li> </ul>                                                                  | BEF-MR08200AK  | 4084741  |
|   | <ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with smooth polyurethane surface for 8 mm solid shaft, circumference 200 mm</li> </ul>                                                            | BEF-MR08200AP  | 4084742  |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with ridged polyurethane surface for 8 mm solid shaft, circumference 200 mm</li> </ul>                                                            | BEF-MR08200APG | 4084744  |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with studded polyurethane surface for 8 mm solid shaft, circumference 200 mm</li> </ul>                                                           | BEF-MR08200APN | 4084743  |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel core, with flat, vulcanized smooth PU measurement surface, suitable for encoder with 8 mm solid shaft, circumference 200 mm +/- 0.2 mm</li> </ul> | BEF-MR08200VU  | 2137369  |

|                                                                                     | Brief description                                                                                                                                                                                                                                                                                                                                                                                    | Type             | part no. |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------|
| connectors and cables                                                               |                                                                                                                                                                                                                                                                                                                                                                                                      |                  |          |
|    | <ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental, SSI</li><li>• <b>Cable:</b> 2 m, 8-wire, PUR, halogen-free</li><li>• <b>Description:</b> Incremental, shieldedSSI</li><li>• <b>Connection systems:</b> Flying leads</li></ul>         | DOL-1208-G02MAC1 | 6032866  |
|    | <ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental, SSI</li><li>• <b>Cable:</b> 5 m, 8-wire, PUR, halogen-free</li><li>• <b>Description:</b> Incremental, shieldedSSI</li><li>• <b>Connection systems:</b> Flying leads</li></ul>         | DOL-1208-G05MAC1 | 6032867  |
|    | <ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental, SSI</li><li>• <b>Cable:</b> 10 m, 8-wire, PUR, halogen-free</li><li>• <b>Description:</b> Incremental, shieldedSSI</li><li>• <b>Connection systems:</b> Flying leads</li></ul>        | DOL-1208-G10MAC1 | 6032868  |
|    | <ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental, SSI</li><li>• <b>Cable:</b> 20 m, 8-wire, PUR, halogen-free</li><li>• <b>Description:</b> Incremental, shieldedSSI</li><li>• <b>Connection systems:</b> Flying leads</li></ul>        | DOL-1208-G20MAC1 | 6032869  |
|    | <ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental, SSI</li><li>• <b>Cable:</b> 25 m, 8-wire, PUR, halogen-free</li><li>• <b>Description:</b> Incremental, shieldedSSI</li><li>• <b>Connection systems:</b> Flying leads</li></ul>        | DOL-1208-G25MAC1 | 6067859  |
|  | <ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight, A-coded</li><li>• <b>Signal type:</b> Incremental, SSI</li><li>• <b>Cable:</b> CAT5, CAT5e</li><li>• <b>Description:</b> Incremental, shieldedSSI</li><li>• <b>Connection systems:</b> IDC quick connection</li><li>• <b>Permitted cross-section:</b> 0.14 mm² ... 0.34 mm²</li></ul> | DOS-1208-GA01    | 6045001  |

## SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

## WORLDWIDE PRESENCE:

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