



## MWS075-14M2AQC114x12

MWS075

MEASURING WHEEL ENCODERS

**SICK**  
Sensor Intelligence.



Illustration may differ



## Ordering information

| Type                 | part no. |
|----------------------|----------|
| MWS075-14M2AQC114x12 | 1152901  |

**Included in delivery:** AHM36A-SCQC014x12 (1), BEF-FA-20-30-MWS075 (1), BEF-MWS075-ARM (1), BEF-MR10200AP (1)

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

## Detailed technical data

### Performance

|   |                                  |
|---|----------------------------------|
| <b>Max. resolution (number of steps per revolution x number of revolutions)</b> | 14 bit x 12 bit (16,384 x 4,096) |
| <b>Resolution in pulses/mm</b>  | 82                               |
| <b>Measuring increment (resolution in mm/pulse)</b>                             | 0.012 <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>        | IO-Link      |
| <b>Communication Interface detail</b> | IO-Link V1.1 |
| <b>Programmable/configurable</b>      | ✓            |

### Electronics

|                                    |                                       |
|------------------------------------|---------------------------------------|
| <b>Connection type</b>             | Male connector, M12, 4-pin, universal |
| <b>Supply voltage</b>              | 18 V ... 30 V                         |
| <b>Reverse polarity protection</b> | ✓                                     |

### Mechanics

|                                      |                                      |
|--------------------------------------|--------------------------------------|
| <b>Measuring wheel circumference</b> | 200 mm                               |
| <b>Measuring wheel surface</b>       | Smooth polyurethan <sup>1)</sup>     |
| <b>Mounting</b>                      | Measuring wheel mounted at the front |
| <b>Start up torque</b>               | < 1 Ncm                              |
| <b>Operating torque</b>              | < 1 Ncm                              |

<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> One cycle corresponds to an upward and downward movement of  $\pm 3$  mm from the recommended pretension position.

<sup>3)</sup> When mounted from below, the encoder weight during spring pretensioning must be taken into account.

|  |  |
|--|--|
| <b>Operating speed</b>   | $\leq 6,000 \text{ min}^{-1}$                            |
| <b>Bearing lifetime</b>  | $3.6 \times 10^8 \text{ revolutions}$                    |
| <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> | $\pm 3 \text{ mm}$                                       |
| <b>Recommended spring deflection</b>                                       | 2 mm ... 13 mm   |
| <b>Service life of spring element</b>                                      | $> 1.4 \text{ million cycles}^2)$                        |
| <b>Mounting position relative to the measuring object</b>                  | Preferably from above, from below possible <sup>3)</sup> |
| <b>Moment of inertia of the rotor</b>                                      | $2.5 \text{ gcm}^2$                                      |
| <b>Mounted encoder</b>   | AHS/AHM36, AHM36A-SCQC014X12, 1101537                    |
| <b>Flange plates</b>   | BEF-FA-20-30-MWS075, 2145868                             |
| <b>Mounted mechanic</b>  | BEF-MWS075-ARM, 2145180                                  |
| <b>Attached measuring wheel</b>  | BEF-MR10200AP, 4084738                                   |

<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> One cycle corresponds to an upward and downward movement of  $\pm 3 \text{ mm}$  from the recommended pretension position.

<sup>3)</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, EN 61000-6-3 and EN 61131-9 |
| <b>Enclosure rating</b>            | IP66 (IEC 60529)<br>IP67 (IEC 60529)                   |
| <b>Operating temperature range</b> | -40 °C ... +85 °C                                      |
| <b>Storage temperature range</b>   | -40 °C ... +100 °C, without package                    |

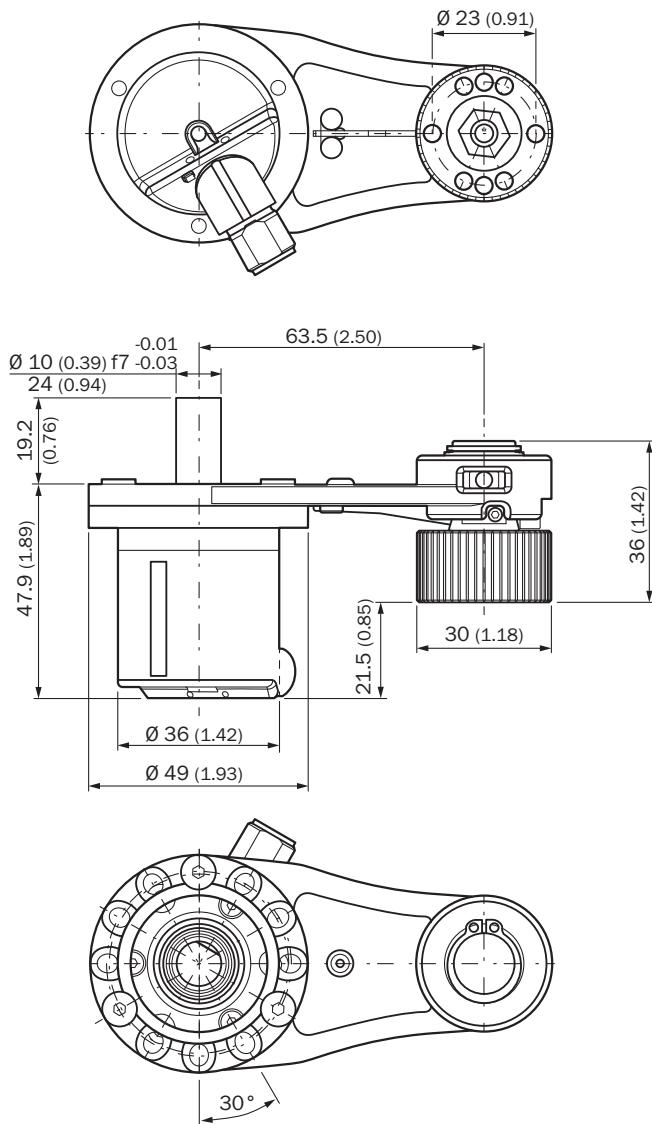
## Certificates

|                                       |   |
|---------------------------------------|---|
| <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 |
| <b>ECLASS 6.2</b>   | 27270590 |
| <b>ECLASS 7.0</b>   | 27270501 |
| <b>ECLASS 8.0</b>   | 27270501 |
| <b>ECLASS 8.1</b>   | 27270501 |
| <b>ECLASS 9.0</b>   | 27270501 |
| <b>ECLASS 10.0</b>  | 27270790 |
| <b>ECLASS 11.0</b>  | 27270707 |
| <b>ECLASS 12.0</b>  | 27270504 |

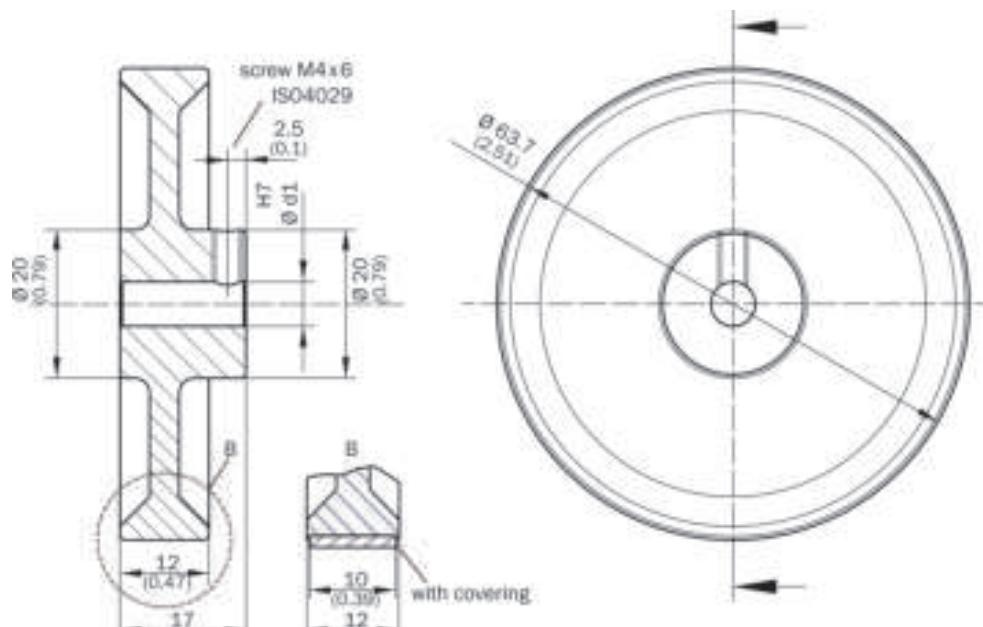
|                       |          |
|-----------------------|----------|
| <b>ETIM 5.0</b>       | EC001486 |
| <b>ETIM 6.0</b>       | EC001486 |
| <b>ETIM 7.0</b>       | EC001486 |
| <b>ETIM 8.0</b>       | EC001486 |
| <b>UNSPSC 16.0901</b> | 41112113 |

**Dimensional drawing**

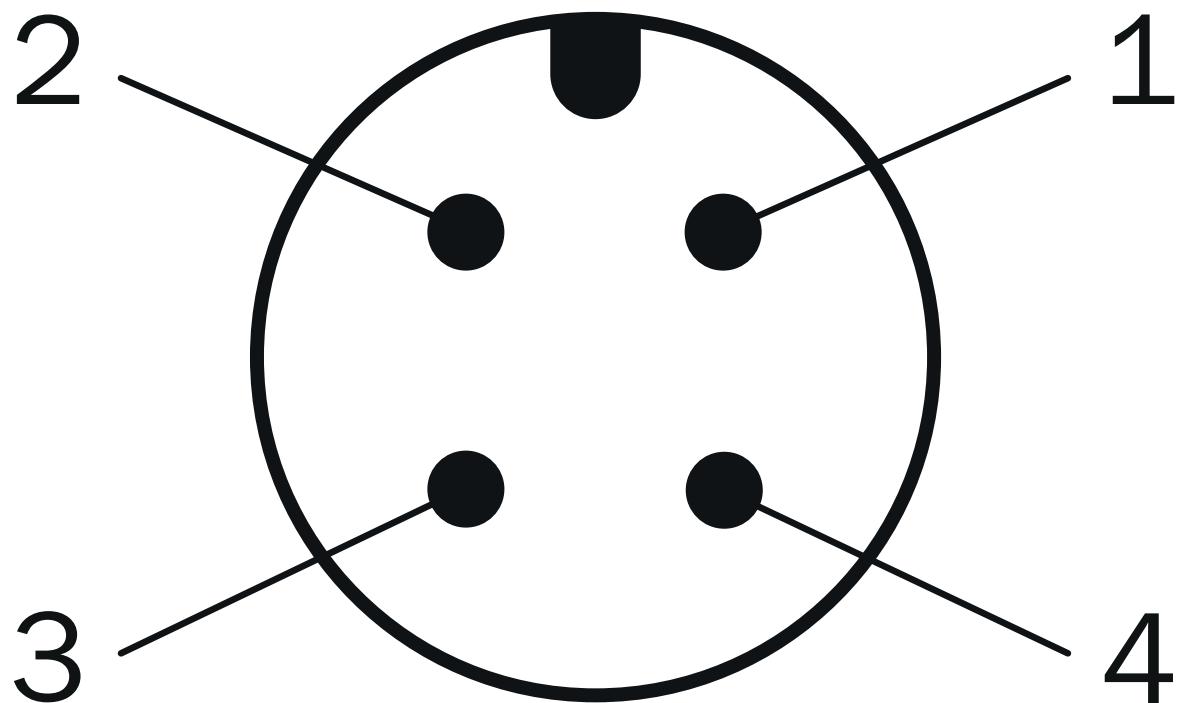
Dimensions in mm (inch)

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

Dimensional drawing



PIN assignment



| PIN | Wire color | Signal | Function                             |   |                             |
|-----|------------|--------|--------------------------------------|---|-----------------------------|
| -   | -          | -      | Basic                                | Advanced  | Advanced Smart Task         |
| 1   | Brown      | L+     | Encoder supply voltage 18-30 V (+Us) |   |                             |
| 2   | White      | I/Q    | Not connected - no function          | Multifunctional pin (configurable as switching input or switching output) |                             |
| 3   | Blue       | L-     | Encoder supply voltage 0 V (GND)     |   |                             |
| 4   | Black      | C/Q    | IO-Link communication                |   | Switching output (SIO mode) |
|     |            | -      | -                                    |   |                             |

## 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  |
|  | <ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter, adapts face mount flange with 20 mm centering collar to 36 mm servo flange</li> <li><b>Items supplied:</b> Flange adapter, screws for encoder mounting (3 pcs. M3 x 14 cylinder head)</li> </ul> | BEF-FA-020-036 | 2072298  |

|   | 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 10 mm solid shaft, circumference 200 mm</li></ul>             | BEF-MR010020R  | 2055224  |
|    | <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 10 mm solid shaft, circumference 300 mm</li></ul>             | BEF-MR010030R  | 2049278  |
|    | <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 10 mm solid shaft, circumference 500 mm</li></ul>                       | BEF-MR010050R  | 2055227  |
|   | <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 10 mm solid shaft, circumference 200 mm</li></ul>       | BEF-MR10200AK  | 4084737  |
|  | <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 10 mm solid shaft, circumference 200 mm</li></ul> | BEF-MR10200AP  | 4084738  |
|  | <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 10 mm solid shaft, circumference 200 mm</li></ul> | BEF-MR10200APG | 4084740  |
|   | <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></ul>   | BEF-MR10200APN | 4084739  |

|   | <b>Brief description</b>  | <b>Type</b>     | <b>part no.</b> |
|---|---|-----------------|-----------------|
|   | <ul style="list-style-type: none"> <li><b>Description:</b> Aluminum measuring wheel with studded polyurethane surface for 10 mm solid shaft, circumference 200 mm</li> </ul>  |                 |                 |
|    | <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 10 mm solid shaft, circumference 300 mm</li> </ul>  | BEF-MR10300AK   | 2115703         |
|    | <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 10 mm solid shaft, circumference 300 mm</li> </ul>  | BEF-MR10300AP   | 2118512         |
|    | <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 10 mm solid shaft, circumference 300 mm</li> </ul>  | BEF-MR10300APG  | 2118496         |
|   | <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 10 mm solid shaft, circumference 300 mm</li> </ul>   | BEF-MR10300APN  | 2118494         |
|  | <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 10 mm solid shaft, circumference 500 mm</li> </ul>  | BEF-MR10500AK   | 4084733         |
|  | <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 solid shaft 10 mm, circumference 500 mm +/-0,2 mm (circumferential tolerance at 20 °C. Circumferential tolerance depends on the temperature coefficient of the material)</li> </ul> | BEF-MR10500AK-A | 2125732         |
|  | <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 10 mm solid shaft, circumference 500 mm</li> </ul>  | BEF-MR10500AP   | 4084734         |
|  | <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 10 mm solid shaft, circumference 500 mm</li> </ul>  | BEF-MR10500APG  | 4084736         |
|  | <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 10 mm solid shaft, circumference 500 mm</li> </ul>   | BEF-MR10500APN  | 4084735         |

|   | Brief description  | Type                              | part no. |
|---|--|-----------------------------------|----------|
| connectors and cables   |  |                                   |          |
|    | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 4-pin, straight, A-coded</li> <li><b>Connection type head B:</b> Male connector, M12, 4-pin, straight, A-coded</li> <li><b>Signal type:</b> Sensor/actuator cable</li> <li><b>Cable:</b> 2 m, 4-wire, PUR, halogen-free</li> <li><b>Description:</b> Sensor/actuator cable, unshielded</li> <li><b>Application:</b> Uncontaminated zones, Zones with oils and lubricants, Robot, Drag chain operation</li> </ul>  | YF2A14-020UB3M2A14                | 2096000  |
|    | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 4-pin, straight, A-coded</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Sensor/actuator cable</li> <li><b>Cable:</b> 2 m, 4-wire, PUR, halogen-free</li> <li><b>Description:</b> Sensor/actuator cable, unshielded</li> <li><b>Application:</b> Uncontaminated zones, Zones with oils and lubricants, Robot, Drag chain operation</li> </ul>                                   | YF2A14-020UB3XLEAX                | 2095607  |
|    | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 4-pin, straight, A-coded</li> <li><b>Connection type head B:</b> Male connector, M12, 4-pin, straight, A-coded</li> <li><b>Signal type:</b> Sensor/actuator cable</li> <li><b>Cable:</b> 5 m, 4-wire, PUR, halogen-free</li> <li><b>Description:</b> Sensor/actuator cable, unshielded</li> <li><b>Application:</b> Uncontaminated zones, Zones with oils and lubricants, Robot, Drag chain operation</li> </ul>  | YF2A14-050UB3M2A14                | 2096001  |
|    | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 4-pin, straight, A-coded</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Sensor/actuator cable</li> <li><b>Cable:</b> 5 m, 4-wire, PUR, halogen-free</li> <li><b>Description:</b> Sensor/actuator cable, unshielded</li> <li><b>Application:</b> Uncontaminated zones, Zones with oils and lubricants, Robot, Drag chain operation</li> </ul>                                   | YF2A14-050UB3XLEAX                | 2095608  |
|    | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 4-pin, straight, A-coded</li> <li><b>Connection type head B:</b> Male connector, M12, 4-pin, straight, A-coded</li> <li><b>Signal type:</b> Sensor/actuator cable</li> <li><b>Cable:</b> 10 m, 4-wire, PUR, halogen-free</li> <li><b>Description:</b> Sensor/actuator cable, unshielded</li> <li><b>Application:</b> Uncontaminated zones, Zones with oils and lubricants, Robot, Drag chain operation</li> </ul> | YF2A14-100UB3M2A14                | 2096002  |
|   | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 4-pin, straight, A-coded</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Sensor/actuator cable</li> <li><b>Cable:</b> 10 m, 4-wire, PUR, halogen-free</li> <li><b>Description:</b> Sensor/actuator cable, unshielded</li> <li><b>Application:</b> Uncontaminated zones, Zones with oils and lubricants, Robot, Drag chain operation</li> </ul>                                  | YF2A14-100UB3XLEAX                | 2095609  |
|  | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 4-pin, straight, A-coded</li> <li><b>Description:</b> Unshielded</li> <li><b>Connection systems:</b> Screw-type terminals</li> <li><b>Permitted cross-section:</b> ≤ 0.75 mm<sup>2</sup></li> </ul>   | DOS-1204-G                        | 6007302  |
|  | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 4-pin, straight, A-coded</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Sensor/actuator cable</li> <li><b>Cable:</b> 0.6 m, 4-wire, PUR, halogen-free</li> <li><b>Description:</b> Sensor/actuator cable, unshielded</li> <li><b>Application:</b> Uncontaminated zones, Zones with oils and lubricants, Robot, Drag chain operation</li> </ul>                                 | YF2A14-C60UB3XLEAX                | 2145654  |
|  | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 4-pin, straight, A-coded</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Sensor/actuator cable</li> <li><b>Cable:</b> 1 m, 4-wire, PUR, halogen-free</li> <li><b>Description:</b> Sensor/actuator cable, unshielded</li> <li><b>Application:</b> Uncontaminated zones, Zones with oils and lubricants, Robot, Drag chain operation</li> </ul>                                   | YF2A14-010UB3XLEAX                | 2145655  |
|  | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 4-pin, straight, A-coded</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Sensor/actuator cable</li> <li><b>Cable:</b> 3 m, 4-wire, PUR, halogen-free</li> <li><b>Description:</b> Sensor/actuator cable, unshielded</li> <li><b>Application:</b> Uncontaminated zones, Zones with oils and lubricants, Robot, Drag chain operation</li> </ul>                                   | YF2A14-030UB3XLEAX                | 2145656  |
| network devices   |  |                                   |          |
|  |  | IOLA2US-01101<br>(SiLink2 Master) | 1061790  |

## 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."**

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