

# BTFO8-A1ZM02S01

HighLine

**WIRE DRAW ENCODERS**

**SICK**  
Sensor Intelligence.

### Ordering information

| Type            | part no. |
|-----------------|----------|
| BTF08-A1ZM02S01 | 1133019  |

**Included in delivery:** MRA-F080-102D2 (1), AHM36A-S3PZ000S21 (1)

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



### Detailed technical data

#### Features

|                                  |                                                                               |
|----------------------------------|-------------------------------------------------------------------------------|
| <b>Special device</b>            | ✓                                                                             |
| <b>Specialty</b>                 | BTF08-A1AM0240 successor:<br>Encoder AHM36A-S3PZ000S21, 1132998 pre-assembled |
| <b>Standard reference device</b> | BTF08-A1AM0240, 1034299                                                       |

#### Safety-related parameters

|                                                          |                                          |
|----------------------------------------------------------|------------------------------------------|
| <b>MTTF<sub>D</sub> (mean time to dangerous failure)</b> | 230 years (EN ISO 13849-1) <sup>1)</sup> |
|----------------------------------------------------------|------------------------------------------|

<sup>1)</sup> This product is a standard product and does not constitute a safety component as defined in the Machinery Directive. Calculation based on nominal load of components, average ambient temperature 40 °C, frequency of use 8760 h/a. All electronic failures are considered hazardous. For more information, see document no. 8015532.

#### Performance

|                                         |                          |
|-----------------------------------------|--------------------------|
| <b>Measurement range</b>                | 0 m ... 2 m              |
| <b>Encoder</b>                          | Absolute encoders        |
| <b>Resolution (wire draw + encoder)</b> | 0.03 mm <sup>1) 2)</sup> |
| <b>Repeatability</b>                    | ≤ 1 mm <sup>3)</sup>     |
| <b>Linearity</b>                        | ≤ ± 2 mm <sup>3)</sup>   |
| <b>Hysteresis</b>                       | ≤ 2 mm <sup>3)</sup>     |

<sup>1)</sup> The values shown have been rounded.

<sup>2)</sup> Example calculation based on the BTF08 with PROFINET: 200 mm (wire draw length per revolution - see Mechanical data): 262,144 (number of steps per revolution) = 0.001 mm (resolution of wire draw + encoder combination).

<sup>3)</sup> Value applies to wire draw mechanism.

#### Interfaces

|                                  |     |
|----------------------------------|-----|
| <b>Communication interface</b>   | SSI |
| <b>Programmable/configurable</b> | ✓   |

#### Electronics

|                               |                                                                   |
|-------------------------------|-------------------------------------------------------------------|
| <b>Connection type</b>        | Special version                                                   |
| <b>Connection type Detail</b> | Cable, 8-wire, with male connector, M23, 12-pin, universal, 0.1 m |
| <b>Supply voltage</b>         | 4.5 V DC ... 32 V                                                 |

|                          |                        |
|--------------------------|------------------------|
| <b>Power consumption</b> | ≤ 1.5 W (without load) |
|--------------------------|------------------------|

## Mechanics

|                                                 |                                                           |
|-------------------------------------------------|-----------------------------------------------------------|
| <b>Weight</b>                                   | 1.62 kg                                                   |
| <b>Measuring wire material</b>                  | Highly flexible stranded steel 1,4401 stainless steel V4A |
| <b>Measuring wire diameter</b>                  | 1.35 mm                                                   |
| <b>Weight (measuring wire)</b>                  | 7.1 g/m                                                   |
| <b>Housing material, wire draw mechanism</b>    | Aluminum (anodized), aluminum die cast (nickel-plated)    |
| <b>Spring return force</b>                      | 6 N ... 14 N <sup>1)</sup>                                |
| <b>Length of wire pulled out per revolution</b> | 200 mm                                                    |
| <b>Life of wire draw mechanism</b>              | Typ. 1,000,000 cycles <sup>2)</sup> <sup>3)</sup>         |
| <b>Actual wire draw length</b>                  | 2.2 m                                                     |
| <b>Wire acceleration</b>                        | 40 m/s <sup>2</sup>                                       |
| <b>Operating speed</b>                          | 8 m/s                                                     |
| <b>Mounted encoder</b>                          | AHM36 SSI, AHM36A-S3PZ000S21, 1132998                     |
| <b>Mounted mechanic</b>                         | MRA-F080-102D2, 6028625                                   |

<sup>1)</sup> These values were measured at an ambient temperature of 25 °C. There may be variations at other temperatures.

<sup>2)</sup> Average values, which depend on the application.

<sup>3)</sup> The service life depends on the type of load. This is influenced by environmental conditions, the installation location, the measuring range in use, the traversing speed, and acceleration.

## Ambient data

|                                    |                                                                                  |
|------------------------------------|----------------------------------------------------------------------------------|
| <b>EMC</b>                         | According to EN 61000-6-2 and EN 61000-6-3                                       |
| <b>Enclosure rating</b>            | IP64, mounted mechanic<br>IP66, Encoder (IEC 60529)<br>IP67, Encoder (IEC 60529) |
| <b>Operating temperature range</b> | -30 °C ... +70 °C                                                                |

## Certificates

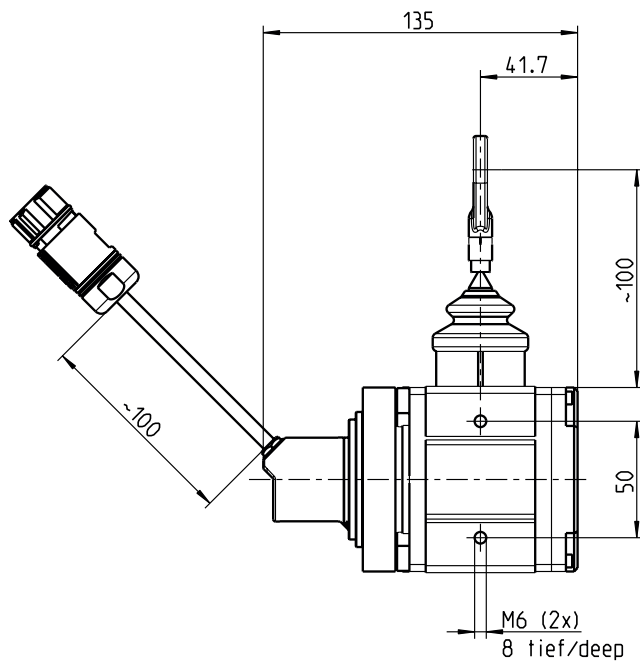
|                                           |   |
|-------------------------------------------|---|
| <b>EU declaration of conformity</b>       | ✓ |
| <b>UK declaration of conformity</b>       | ✓ |
| <b>ACMA declaration of conformity</b>     | ✓ |
| <b>Moroccan declaration of conformity</b> | ✓ |
|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

## Classifications

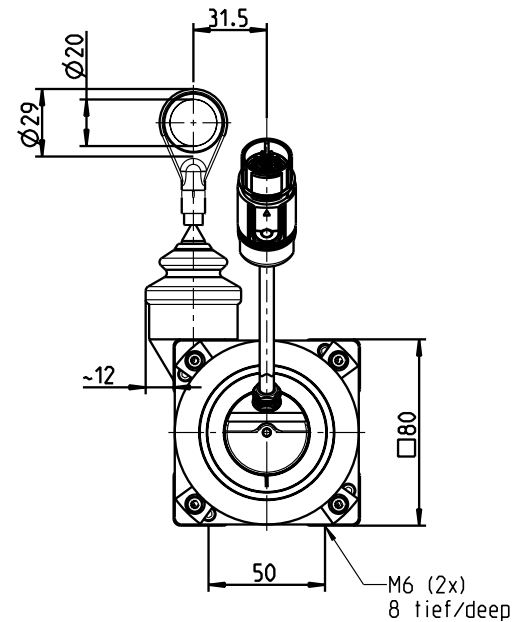
|                     |          |
|---------------------|----------|
| <b>ECLASS 5.0</b>   | 27270590 |
| <b>ECLASS 5.1.4</b> | 27270590 |
| <b>ECLASS 6.0</b>   | 27270590 |
| <b>ECLASS 6.2</b>   | 27270590 |
| <b>ECLASS 7.0</b>   | 27270590 |
| <b>ECLASS 8.0</b>   | 27270590 |
| <b>ECLASS 8.1</b>   | 27270590 |
| <b>ECLASS 9.0</b>   | 27270590 |
| <b>ECLASS 10.0</b>  | 27270613 |

|                       |          |
|-----------------------|----------|
| <b>ECLASS 11.0</b>    | 27270503 |
| <b>ECLASS 12.0</b>    | 27270503 |
| <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 |

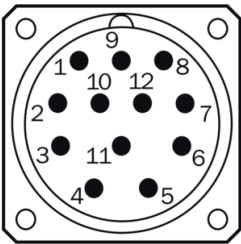
### Dimensional drawing



Dimensions in mm (inch)



Anschlussbelegung



| PIN | Signal | Explanation                       |
|-----|--------|-----------------------------------|
| 1   | GND    | Ground connection                 |
| 2   | Data+  | Interface signal                  |
| 3   | Clock+ | Interface signal                  |
| 4   | n/c    | Not connected                     |
| 5   | n/c    | Not connected                     |
| 6   | n/c    | Not connected                     |
| 7   | n/c    | Not connected                     |
| 8   | Us     | Operating voltage                 |
| 9   | SET    | Electronic adjustment             |
| 10  | Data-  | Interface signal                  |
| 11  | Clock- | Interface signal                  |
| 12  | V/R    | Sequence in direction of rotation |
| -   | Screen | Housing potential                 |

### Recommended accessories

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

|                                                                                    | Brief description                                                                                                                                                                                                                                                                                                                                | Type                                       | part no. |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|----------|
| Mounting systems                                                                   |                                                                                                                                                                                                                                                                                                                                                  |                                            |          |
|   | <ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter for HighLine wire draw mechanisms, adaption of face mount flange with centering hub 20 mm to 50 mm servo flange</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> <li><b>Items supplied:</b> Including 3 countersunk screws M3 x 10</li> </ul> | BEF-FA-020-050WDE                          | 2073776  |
|   | <ul style="list-style-type: none"> <li><b>Description:</b> Joint ball for later insertion in wire end ring with 20 mm diameter. The use of this joint ball enables movement in multiple levels of freedom.</li> </ul>                                                                                                                            | Joint protection for wire rope BTF/PRF/MRA | 5318683  |
|   | <ul style="list-style-type: none"> <li><b>Description:</b> Compressed air attachment for MRA-F080... and MRA-F130... HighLine wire draw mechanism</li> </ul>                                                                                                                                                                                     | MRA-F-P                                    | 6073769  |
|   | <ul style="list-style-type: none"> <li><b>Description:</b> Additional brush attachment for wire draw mechanism MRA-F080 (2 m and 3 m from HighLine series)</li> </ul>                                                                                                                                                                            | MRA-F080-B                                 | 6045341  |
|  | <ul style="list-style-type: none"> <li><b>Description:</b> Wire draw deflection pulley for wire draw mechanism MRA-F080 (2m and 3m from HighLine series)</li> </ul>                                                                                                                                                                              | MRA-F080-R                                 | 6028632  |

|                                                                                     | Brief description                                                                                                                                                                                                                                                                                                                                      | Type             | part no. |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------|
| connectors and cables                                                               |                                                                                                                                                                                                                                                                                                                                                        |                  |          |
|    | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> SSI, RS-422, TTL, HTL</li> <li><b>Cable:</b> 3 m, 12-wire, PUR, halogen-free</li> <li><b>Description:</b> SSI, shielded, RS-422, TTL, HTL</li> </ul>   | DOL-2312-G03MMA1 | 2029201  |
|    | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> SSI, RS-422, TTL, HTL</li> <li><b>Cable:</b> 5 m, 12-wire, PUR, halogen-free</li> <li><b>Description:</b> SSI, shielded, RS-422, TTL, HTL</li> </ul>   | DOL-2312-G05MMA1 | 2029202  |
|    | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> SSI, RS-422, TTL, HTL</li> <li><b>Cable:</b> 1.5 m, 12-wire, PUR, halogen-free</li> <li><b>Description:</b> SSI, shielded, RS-422, TTL, HTL</li> </ul> | DOL-2312-G1M5MA1 | 2029200  |
|    | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> SSI, RS-422, TTL, HTL</li> <li><b>Cable:</b> 10 m, 12-wire, PUR, halogen-free</li> <li><b>Description:</b> SSI, shielded, RS-422, TTL, HTL</li> </ul>  | DOL-2312-G10MMA1 | 2029203  |
|    | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> SSI, RS-422</li> <li><b>Cable:</b> 20 m, 12-wire, PUR, halogen-free</li> <li><b>Description:</b> SSI, shielded, RS-422</li> </ul>                      | DOL-2312-G20MMA1 | 2029204  |
|    | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> SSI, RS-422</li> <li><b>Cable:</b> 30 m, 12-wire, PUR, halogen-free</li> <li><b>Description:</b> SSI, shielded, RS-422</li> </ul>                      | DOL-2312-G30MMA1 | 2029205  |
|  | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 9-pin, straight, A-coded</li> <li><b>Signal type:</b> HIPERFACE<sup>®</sup>, SSI, Incremental</li> <li><b>Description:</b> HIPERFACE<sup>®</sup>, shieldedSSIIncremental</li> <li><b>Connection systems:</b> Solder connection</li> </ul>                 | DOS-2309-G       | 6028533  |
|  | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight, A-coded</li> <li><b>Signal type:</b> HIPERFACE<sup>®</sup>, SSI, Incremental</li> <li><b>Description:</b> HIPERFACE<sup>®</sup>, shieldedSSIIncremental</li> <li><b>Connection systems:</b> Solder connection</li> </ul>                | DOS-2312-G       | 6027538  |
|  | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, angled, A-coded</li> <li><b>Signal type:</b> HIPERFACE<sup>®</sup>, SSI, Incremental</li> <li><b>Description:</b> HIPERFACE<sup>®</sup>, shieldedSSIIncremental</li> <li><b>Connection systems:</b> Solder connection</li> </ul>                  | DOS-2312-W01     | 2072580  |
|  | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Male connector, M23, 12-pin, straight, A-coded</li> <li><b>Signal type:</b> HIPERFACE<sup>®</sup>, SSI, Incremental, RS-422</li> <li><b>Description:</b> HIPERFACE<sup>®</sup>, shieldedSSIIncrementalRS-422</li> <li><b>Connection systems:</b> Solder connection</li> </ul>    | STE-2312-G       | 6027537  |
|  | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> SSI, RS-422, TTL, HTL</li> <li><b>Cable:</b> 5 m, 12-wire, PUR, halogen-free</li> <li><b>Description:</b> SSI, shielded, RS-422, TTL, HTL</li> </ul>   | DOL-2312-G05MHA1 | 2059786  |
| Wire draw mechanism                                                                 |                                                                                                                                                                                                                                                                                                                                                        |                  |          |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Wire draw mechanism</li> <li><b>Product family:</b> Wire draw mechanism for wire draw encoders</li> <li><b>Description:</b> HighLine wire draw mechanism for servo flange with 6 mm shaft, measuring range 0 m ... 2 m</li> <li><b>Items supplied:</b> Without encoder</li> </ul>       | MRA-F080-102D2   | 6028625  |

|                                                                                   | Brief description                                                                                                                                                                                                                                                                                                   | Type     | part no. |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|
| programming devices                                                               |                                                                                                                                                                                                                                                                                                                     |          |          |
|  | <ul style="list-style-type: none"><li>• <b>Product segment:</b> Programming devices</li><li>• <b>Product family:</b> PGT-01-S</li><li>• <b>Description:</b> Programming tool for ATM60, ATM90, and KH53</li><li>• <b>Items supplied:</b> Power supply, interface, link cable, encoder cable, and software</li></ul> | PGT-01-S | 1030111  |

## SICK AT A GLANCE

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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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