

# BTF13-A1ZM30S01

HighLine

**WIRE DRAW ENCODERS** 



# Ordering information

| Туре            | part no. |
|-----------------|----------|
| BTF13-A1ZM30S01 | 1131639  |

Included in delivery: MRA-F130-130D1 (1), AHM36A-S3PZ000S20 (1)

Other models and accessories → www.sick.com/HighLine



#### Detailed technical data

#### **Features**

| Special device            | <b>√</b>                                       |
|---------------------------|--|
| Specialty                 | Integrated encoder: AHM36A-S3PZ000S20, 1131635 |
| Standard reference device | BTF13-A1AM3020, 1034303                        |

## Safety-related parameters

| MTTF <sub>D</sub> (mean time to dangerous failure) | 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

| Measurement range                | 0 m 30 m                 |
|----------------------------------|--------------------------|
| Encoder                          | Absolute encoders        |
| Resolution (wire draw + encoder) | 0.05 mm <sup>1) 2)</sup> |
| Repeatability                    | ≤ 2 mm <sup>3)</sup>     |
| Linearity                        | ≤ ± 2 mm <sup>3)</sup>   |
| Hysteresis                       | ≤ 5 mm <sup>3)</sup>     |

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

#### Interfaces

| Communication interface   | SSI |
|---------------------------|-----|
| Programmable/configurable | ✓   |

## Electronics

| Connection type        | Special version   |
|------------------------|---|
| Connection type Detail | Cable, 8-wire, with male connector, M23, 12-pin, universal, 0.1 m |
| Supply voltage         | 4.5 V 32 V  |
| Power consumption      | ≤ 1.5 W (without load)  |

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

#### Mechanics

| Weight                                   | 6.32 kg   |
|--|---|
| Measuring wire material                  | Highly flexible stranded steel 1,4401 stainless steel V4A |
| Measuring wire diameter                  | 0.81 mm   |
| Weight (measuring wire)                  | 2.6 g/m   |
| Housing material, wire draw mechanism    | Aluminum (anodised), plastic                              |
| Spring return force                      | 10 N 20 N <sup>1)</sup>                                   |
| Length of wire pulled out per revolution | 332.4 mm  |
| Life of wire draw mechanism              | Typ. 1,000,000 cycles <sup>2) 3)</sup>                    |
| Actual wire draw length                  | 30.2 m  |
| Wire acceleration                        | 15 m/s <sup>2</sup>                                       |
| Operating speed                          | 6 m/s   |
| Mounted encoder                          | AHM36 SSI, AHM36A-S3PZ000S20, 1131635                     |
| Mounted mechanic                         | MRA-F130-130D1, 6028629                                   |

 $<sup>^{1)}</sup>$  These values were measred at an ambient temperature of 25  $\,^{\circ}$  C. There may be variations at other temperatures.

#### Ambient data

| EMC                         | According to EN 61000-6-2 and EN 61000-6-3                                       |  |
|-----------------------------|--|--|
| Enclosure rating            | IP64, mounted mechanic<br>IP66, Encoder (IEC 60529)<br>IP67, Encoder (IEC 60529) |  |
| Operating temperature range | -20 °C +70 °C  |  |

#### Certificates

| EU declaration of conformity       | ✓ |
|------------------------------------|---|
| UK declaration of conformity       | ✓ |
| ACMA declaration of conformity     | ✓ |
| Moroccan declaration of conformity | ✓ |
| China RoHS                         | ✓ |

## Classifications

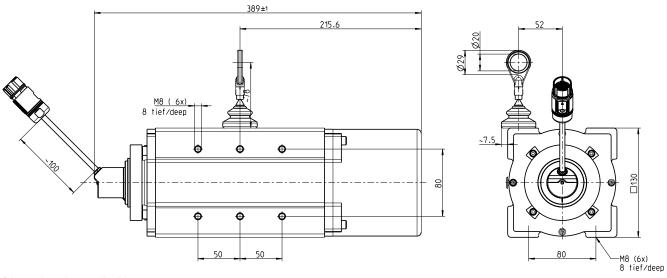
| ECLASS 5.0   | 27270590 |
|--------------|----------|
| ECLASS 5.1.4 | 27270590 |
| ECLASS 6.0   | 27270590 |
| ECLASS 6.2   | 27270590 |
| ECLASS 7.0   | 27270590 |
| ECLASS 8.0   | 27270590 |
| ECLASS 8.1   | 27270590 |
| ECLASS 9.0   | 27270590 |
| ECLASS 10.0  | 27270613 |
| ECLASS 11.0  | 27270503 |
| ECLASS 12.0  | 27270503 |

 $<sup>^{2)}</sup>$  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.

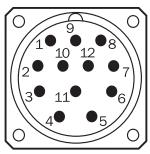
| ETIM 5.0       | EC001486 |
|----------------|----------|
| ETIM 6.0       | EC001486 |
| ETIM 7.0       | EC001486 |
| ETIM 8.0       | EC001486 |
| UNSPSC 16.0901 | 41112113 |

# Dimensional drawing



Dimensions in mm (inch)

## view of M23 male device connector on encoder



view of M23 male device connector on encoder

| PIN | Signal  | Wire colors (cable connection) | Explanation              |
|-----|---------|--------------------------------|--------------------------|
| 1   | GND     | Blue                           | Ground connection        |
| 2   | Data +  | White                          | Interface signals        |
| 3   | Clock + | Yellow                         | Interface signals        |
| 4   | R x D + | Gray                           | RS-422 programming lines |
| 5   | R x D - | Green                          | RS-422 programming lines |
| 6   | T x D + | Pink                           | RS-422 programming lines |
| 7   | T x D - | Black                          | RS-422 programming lines |

| PIN | Signal            | Wire colors (cable connection) | Explanation                       |
|-----|-------------------|--------------------------------|-----------------------------------|
| 8   | U <sub>S</sub>    | Red                            | Operating voltage                 |
| 9   | SET <sup>1)</sup> | Orange                         | Electronic adjustment             |
| 10  | Data -            | Brown                          | Interface signals                 |
| 11  | Clock -           | Purple                         | Interface signals                 |
| 12  | V/R <sup>2)</sup> | Orange-black                   | Sequence in direction of rotation |
| -   | Shielding         | -                              | Housing potential                 |

SET = This input activates the electronic zero set. If the SET cable is set to  $U_S$  for more than 100 ms, the mechanical position corresponds to the O value, i.e., the predetermined SET value.

V/R = Forwards/Reverse: This input programs the counting direction for the encoder. When it is not connected, this input is set to HIGH. If the encoder shaft is rotat-ed clockwise (to the right) as viewed when facing the shaft, it counts in ascending order. If it should count in ascending order when the shaft is rotated counterclock-wise (to the left), then this connection must be permanently set to LOW level (GND).

#### Recommended accessories

Other models and accessories → www.sick.com/HighLine

|                  | Brief description  | Туре   | part no. |  |
|------------------|--|--|----------|--|
| Mounting systems |  |  |          |  |
|                  | <ul> <li>Description: Flange adapter for HighLine wire draw mechanisms, adaption of face mount flange with centering hub 20 mm to 50 mm servo flange</li> <li>Material: Aluminum</li> <li>Details: Aluminum</li> <li>Items supplied: Including 3 countersunk screws M3 x 10</li> </ul> | BEF-FA-020-050WDE                                | 2073776  |  |
| 0                | • <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.  | Joint protection<br>for wire rope<br>BTF/PRF/MRA | 5318683  |  |
|                  | Description: Compressed air attachment for MRA-F080 and MRA-F130 HighLine wire draw mechanism  | MRA-F-P  | 6073769  |  |
|                  | Description: Additional brush attachment for wire draw mechanism MRA-F130 (5 m, 10 m, 20 m and 30 m from HighLine series)  | MRA-F130-B                                       | 6038562  |  |
|                  | Description: Wire draw deflection pulley for wire draw mechanism MRA-F130 (5m, 10m, 20m and 30m from HighLine series)  | MRA-F130-R                                       | 6028631  |  |

|               | Brief description   | Туре                 | part no. |  |  |
|---------------|---|----------------------|----------|--|--|
| connectors an | connectors and cables   |                      |          |  |  |
| -             | <ul> <li>Connection type head A: Female connector, M23, 12-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: SSI, RS-422, TTL, HTL</li> <li>Cable: 3 m, 12-wire, PUR, halogen-free</li> <li>Description: SSI, shielded, RS-422, TTL, HTL</li> </ul>   | DOL-2312-<br>GO3MMA1 | 2029201  |  |  |
|               | <ul> <li>Connection type head A: Female connector, M23, 12-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: SSI, RS-422, TTL, HTL</li> <li>Cable: 5 m, 12-wire, PUR, halogen-free</li> <li>Description: SSI, shielded, RS-422, TTL, HTL</li> </ul>   | DOL-2312-<br>G05MMA1 | 2029202  |  |  |
|               | <ul> <li>Connection type head A: Female connector, M23, 12-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: SSI, RS-422, TTL, HTL</li> <li>Cable: 1.5 m, 12-wire, PUR, halogen-free</li> <li>Description: SSI, shielded, RS-422, TTL, HTL</li> </ul> | DOL-2312-<br>G1M5MA1 | 2029200  |  |  |
|               | <ul> <li>Connection type head A: Female connector, M23, 12-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: SSI, RS-422, TTL, HTL</li> <li>Cable: 10 m, 12-wire, PUR, halogen-free</li> <li>Description: SSI, shielded, RS-422, TTL, HTL</li> </ul>  | DOL-2312-<br>G10MMA1 | 2029203  |  |  |
| -             | <ul> <li>Connection type head A: Female connector, M23, 12-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: SSI, RS-422</li> <li>Cable: 20 m, 12-wire, PUR, halogen-free</li> <li>Description: SSI, shielded, RS-422</li> </ul>                      | DOL-2312-<br>G20MMA1 | 2029204  |  |  |
| -             | <ul> <li>Connection type head A: Female connector, M23, 12-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: SSI, RS-422</li> <li>Cable: 30 m, 12-wire, PUR, halogen-free</li> <li>Description: SSI, shielded, RS-422</li> </ul>                      | DOL-2312-<br>G30MMA1 | 2029205  |  |  |
|               | Connection type head A: Female connector, M23, 9-pin, straight, A-coded Signal type: HIPERFACE®, SSI, Incremental Description: HIPERFACE®, shieldedSSIIncremental Connection systems: Solder connection   | DOS-2309-G           | 6028533  |  |  |
|               | Connection type head A: Female connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE®, SSI, Incremental Description: HIPERFACE®, shieldedSSIIncremental Connection systems: Solder connection  | DOS-2312-G           | 6027538  |  |  |
|               | Connection type head A: Female connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE®, SSI, Incremental Description: HIPERFACE®, shieldedSSIIncremental Connection systems: Solder connection  | DOS-2312-G02         | 2077057  |  |  |
| (F)-()        | Connection type head A: Female connector, M23, 12-pin, angled, A-coded Signal type: HIPERFACE®, SSI, Incremental Description: HIPERFACE®, shieldedSSIIncremental Connection systems: Solder connection  | DOS-2312-W01         | 2072580  |  |  |
|               | Connection type head A: Male connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE®, SSI, Incremental, RS-422 Description: HIPERFACE®, shieldedSSIIncrementalRS-422 Connection systems: Solder connection  | STE-2312-G           | 6027537  |  |  |
|               | Connection type head A: Male connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE®, SSI, Incremental Description: HIPERFACE®, shieldedSSIIncremental Connection systems: Solder connection  | STE-2312-GX          | 6028548  |  |  |
|               | Connection type head A: Male connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE®, SSI, Incremental Description: HIPERFACE®, shieldedSSIIncremental Connection systems: Solder connection  | STE-2312-G01         | 2077273  |  |  |
|               | <ul> <li>Connection type head A: Female connector, M23, 12-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: SSI, RS-422, TTL, HTL</li> </ul>   | DOL-2312-G05MHA1     | 2059786  |  |  |

|              | Brief description   | Туре           | part no. |
|--------------|---|----------------|----------|
|              | Cable: 5 m, 12-wire, PUR, halogen-free     Description: SSI, shielded, RS-422, TTL, HTL   |                |          |
| Wire draw me | echanism  |                |          |
|              | <ul> <li>Product segment: Wire draw mechanism</li> <li>Product family: Wire draw mechanism for wire draw encoders</li> <li>Description: HighLine wire draw mechanism for servo flange with 6 mm shaft, measuring range 0 m 30 m</li> <li>Items supplied: Without encoder</li> </ul> | MRA-F130-130D1 | 6028629  |

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