



# BTF13-A1AM0520

HighLine

WIRE DRAW ENCODERS

**SICK**  
Sensor Intelligence.



## Ordering information

Type	part no.
BTF13-A1AM0520	1034300

**Included in delivery:** ATM60-A1A0-K19 (1), MRA-F130-105D2 (1)

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



## Detailed technical data

## Safety-related parameters

<b>MTTF<sub>D</sub> (mean time to dangerous failure)</b>	150 years (EN ISO 13849-1) <sup>1)</sup>
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<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 ... 5 m
<b>Encoder</b>	Absolute encoders
<b>Resolution (wire draw + encoder)</b>	0.05 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>	Male connector, M23, 12-pin, radial
<b>Supply voltage</b>	10 V ... 32 V
<b>Power consumption</b>	≤ 0.8 W (without load)

## Mechanics

<b>Weight</b>	3.3 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 (anodised), plastic
<b>Spring return force</b>	15 N ... 20 N <sup>1)</sup>
<b>Length of wire pulled out per revolution</b>	334.1 mm
<b>Life of wire draw mechanism</b>	Typ. 1,000,000 cycles <sup>2) 3)</sup>
<b>Actual wire draw length</b>	5.2 m
<b>Wire acceleration</b>	70 m/s <sup>2</sup>
<b>Operating speed</b>	8 m/s
<b>Mounted encoder</b>	ATM60 SSI, ATM60-A1A0-K19, 1034294
<b>Mounted mechanic</b>	MRA-F130-105D2, 6028626

<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.

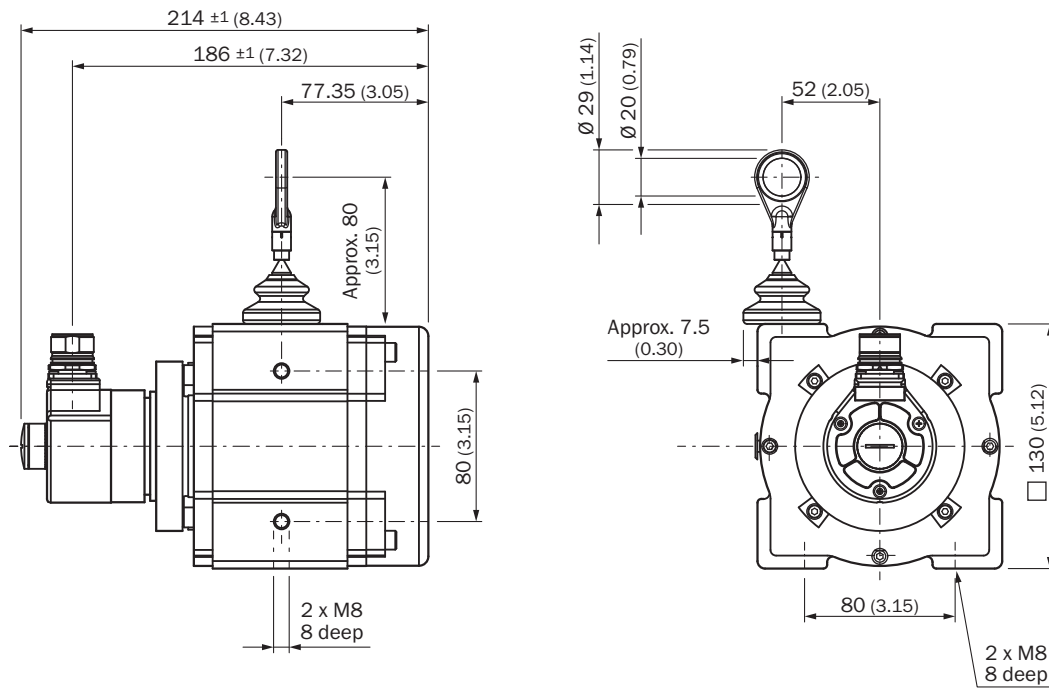
## Ambient data

<b>EMC</b>	According to EN 61000-6-2 and EN 61000-6-3
<b>Enclosure rating</b>	IP64, mounted mechanic
<b>Operating temperature range</b>	-20 °C ... +70 °C

## Classifications

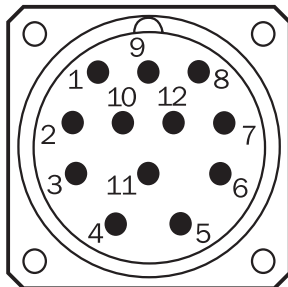
<b>ECLASS 5.0</b>	27270590
<b>ECLASS 5.1.4</b>	27270590
<b>ECLASS 6.0</b>	27270590
<b>ECLASS 6.2</b>	27270590
<b>ECLASS 7.0</b>	27270590
<b>ECLASS 8.0</b>	27270590
<b>ECLASS 8.1</b>	27270590
<b>ECLASS 9.0</b>	27270590
<b>ECLASS 10.0</b>	27270613
<b>ECLASS 11.0</b>	27270503
<b>ECLASS 12.0</b>	27270503
<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)

### 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
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

PIN	Signal	Wire colors (cable connection)	Explanation
12	V/R <sup>2)</sup>	Orange-black	Sequence in direction of rotation
-	Screen	-	Housing potential
SET = This input activates the electronic zero set. If the SET cable is set to U <sub>S</sub> for more than 100 ms, the mechanical position corresponds to the 0 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 rotated 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 counterclockwise (to the left), then this connection must be permanently set to LOW level (GND).			

## 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> 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> 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> Additional brush attachment for wire draw mechanism MRA-F130 (5 m, 10 m, 20 m and 30 m from HighLine series)</li> </ul>	MRA-F130-B	6038562
	<ul style="list-style-type: none"> <li><b>Description:</b> Wire draw deflection pulley for wire draw mechanism MRA-F130 (5m, 10m, 20m and 30m from HighLine series)</li> </ul>	MRA-F130-R	6028631
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

	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, A-coded</li> <li><b>Signal type:</b> HIPERFACE<sup>®</sup>, SSI, Incremental</li> <li><b>Description:</b> HIPERFACE<sup>®</sup>, shielded, Head A: female connector, M23, 12-pin, straight, shielded, for cable diameter 5.5 mm ... 10.5 mm Head B: Operating temperature: -20 °C ... +130 °C SSI Incremental</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> 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>, shielded, M23 male connector SSI Incremental RS-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, angled, A-coded</li> <li><b>Signal type:</b> HIPERFACE<sup>®</sup>, SSI, Incremental</li> <li><b>Description:</b> HIPERFACE<sup>®</sup>, shielded, Head A: female connector, M23, 12-pin, angled, shielded, for cable diameter 4.2 mm ... 6.6 mm Head B: - Operating temperature: -20 °C ... +130 °C SSI Incremental</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> 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>, shielded, Head A: female connector, M23, 9-pin, straight, shielded, for cable diameter 5.5 mm ... 10.5 mm Head B: Operating temperature: -20 °C ... +130 °C SSI Incremental</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</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> 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> 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
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 ... 5 m</li> <li><b>Items supplied:</b> Without encoder</li> </ul>	MRA-F130-105D2	6028626

## 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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