

BTF/PRF: Absolute and incremental wire draw encoders for measuring lengths up to 50 m.



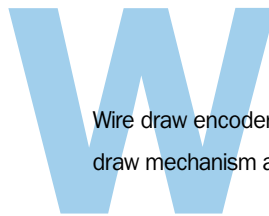
The combination of the wire draw mechanism and absolute or incremental encoders manufactured by SICK-STEGMANN enables made-to-measure solutions for almost any application profile.

To comply with the exacting demands of automation technology, these wire draw encoders offer the correct interface for every application:

- SSI, Profibus, CANopen or DeviceNet field bus technology for absolute encoders
- HTL or TTL interfaces for incremental encoders.

For example, this product can be utilized in many applications including:

- Crane, drilling and excavator systems
- Presses, punching and injection machines
- Weir systems and locks
- High-bay shelving and theatre stages
- Woodworking and stone processing machines
- Machinery construction, medical technology and many other industries.



Wire draw encoders consist of wire draw mechanism and an encoder.

The rotation of the drum is proportional to the length being measured. This movement is counted by an encoder and converted to a measuring signal. This provides high-resolution position or distance information for linear measurement paths, even under difficult ambient conditions.

Precise linear guidance, as required for other length measurement systems, is not necessary.

	<p>Resolution up to 0.025 mm</p> <p>Absolute Wire Draw Encoders</p>
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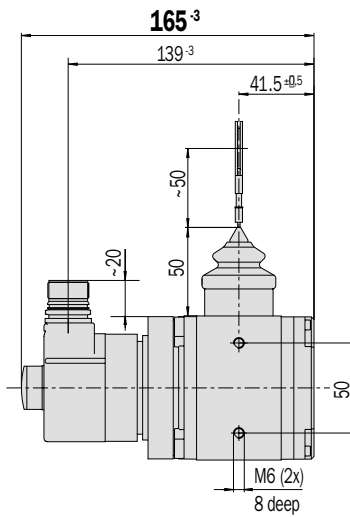
	<p>Resolution up to 0.025 mm</p> <p>Incremental Wire Draw Encoders</p>
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Resolution up to 0.025 mm

Absolute Wire Draw Encoders

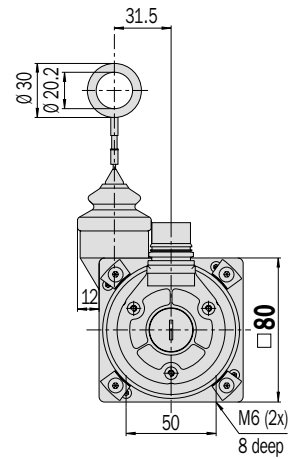
- Linear path measurement using a wire draw mechanism
- High resolution
- Easy to mount
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire
- Dirt remover made of steel

Dimensional drawing wire draw encoder BTF 08 SSI, measuring length 2 m



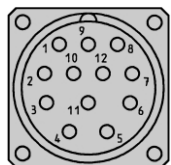
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1 Threaded blind hole for mounting



1

General tolerances to DIN ISO 2768-mk



View of the connector M23 fitted to the encoder body

PIN and wire allocation

PIN	Signal	Wire colours (cable outlet)	Explanation
1	GND	blue	Earth connection
2	Data +	white	Interface signals
3	Clock +	yellow	Interface signals
4	R x D +	grey	RS-422 programming line
5	R x D -	green	RS-422 programming line
6	T x D +	pink	RS-422 programming line
7	T x D -	black	RS-422 programming line
8	U _s	red	Supply voltage
9	SET	orange	Electronic adjustment
10	Data -	brown	Interface signals
11	Clock -	lilac	Interface signals
12	N. C.	orange/black	Not connected
	Screen		Housing potential

Caution! PINs labelled "N. C." must not be connected.

Accessories

Wire draw mechanisms
Mounting systems
Connection systems
Adaptor modules

Technical data		BTF 08	SSI										
			2m										
Drum housing	Anodised Aluminium												
Spring housing	Die-cast zinc												
Measuring wire (stainless)	Highly flexible stranded steel, Ø 1.35 mm												
Measuring length	2 m max.												
Mass	1.8 kg approx.												
Code type	25 bit/Gray												
Code sequence	Increasing in direction of measurement												
Measuring step	0.025 mm												
Linearity	0.05 % typ.												
Repeatability	± 1 measuring step												
Operating speed	4 m/sec.												
Position forming time	0.15 ms												
Spring return force (typ.)													
start/finish ¹⁾	6 N/14 N												
Working temperature range	- 20 ... + 70 °C												
Storage temperature range	- 40 ... + 100 °C												
Life of wire draw mechanism ²⁾	1 million cycles												
EMC ³⁾													
Resistance													
to shocks ⁴⁾	100/6 g/ms												
to vibration ⁵⁾	20/10 ... 2,000 g/Hz												
Protection to IEC 60529	IP 64 (wire draw mechanism)												
	IP 67 (encoder)												
Operating voltage range (U_s)	10 ... 32 V												
Power consumption max.	0.8 W												
Initialisation time ⁶⁾	1,050 ms												
Interface signals													
Clock +, Clock -, Data +, Data - ⁷⁾	SSI max. clock frequency 1 MHz i.e. min. duration LOW level (Clock +): 500 ns												
T x D +, T x D -, R x D +, R x D -	RS 422												
SET (electronic adjustment)	H-active (L ≙ 0 - 4.7 V; H ≙ 10 - U _s V)												

¹⁾ These values were measured at an ambient temperature of 25 °C. The values may be different at other temperatures.

²⁾ Average values, which depend on the loading. At high operating speeds over long lengths, this figure can decrease; at slow operating speeds over short lengths, it can increase.

³⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3

⁴⁾ To DIN EN 60068-2-27

⁵⁾ To DIN EN 60068-2-6

⁶⁾ From the moment the supply voltage is applied, this is the time which elapses before the data word can be correctly read in.

⁷⁾ For higher clock frequencies, choose synchronous SSI.

Order information

BTF 08; U_s 10 ... 32 V; connector M23, 12 pin

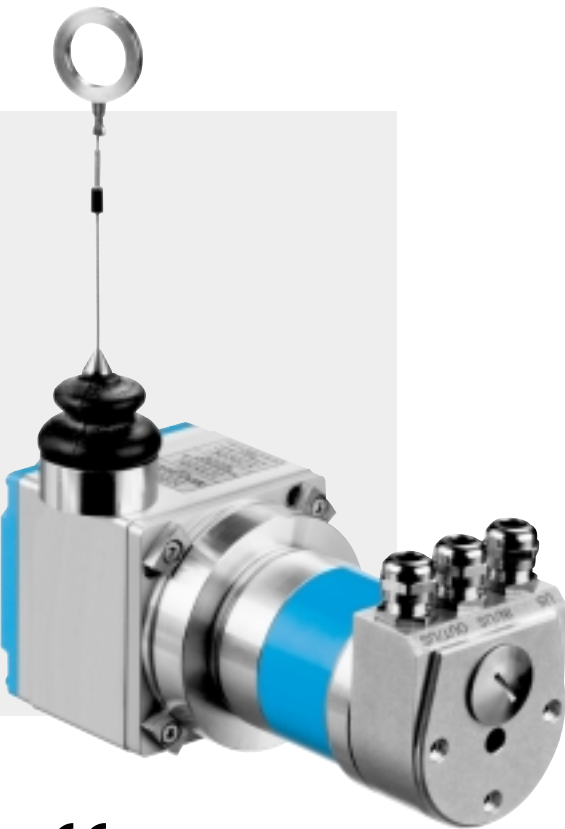
25 bit SSI, Gray-Code, Set = 1,000

Type	Part no.	Description
BTF08-A1AM0240	1 034 299	SSI, measuring length 2 m

Resolution up to 0.025 mm

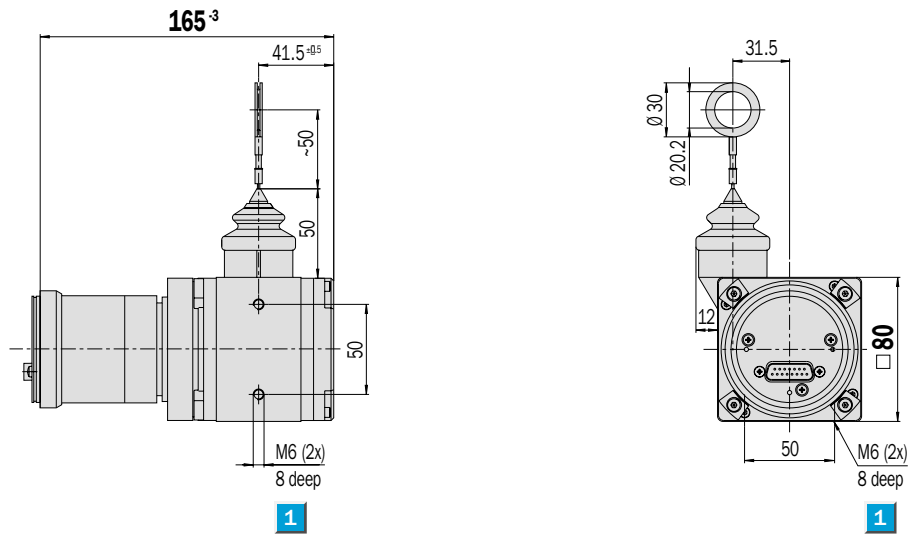
Absolute Wire Draw Encoders

- Linear path measurement using a wire draw mechanism
- High resolution
- Easy to mount
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire
- Dirt remover made of steel



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Dimensional drawing wire draw encoder BTF 08 Profibus, CANopen, DeviceNet, measuring length 2 m



1 Threaded blind hole for mounting

General tolerances to DIN ISO 2768-mk

Accessories
Bus adaptors
Wire draw mechanisms
Mounting systems
Connection systems

Profibus adaptor with PIN and wire allocation see pages 18 / 19
CANopen adaptor with PIN and wire allocation see pages 20 / 21
DeviceNet adaptor with PIN and wire allocation see pages 22 to 24

Technical data		BTF 08	PB 2 m	CO 2 m	DN 2 m						
Drum housing	Anodised Aluminium										
Spring housing	Die-cast zinc										
Measuring wire (stainless)	Highly flexible stranded steel, Ø 1.35 mm										
Measuring length	2 m max.										
Mass	1.9 kg approx.										
Measuring step (recommended)	0.025 mm ¹										
Linearity	0.05 % typ.										
Repeatability	± 1 measuring step										
Operating speed	4 m/sec.										
Position forming time	0.25 ms										
Spring return force (typ.)											
start/finish ¹⁾	6 N/14 N										
Working temperature range	- 20 ... + 70 °C										
Storage temperature range	- 40 ... + 100 °C										
Life of wire draw mechanism ²⁾	1 million cycles										
EMC ³⁾											
Resistance											
to shocks ⁴⁾	100/6 g/ms										
to Vibration ⁵⁾	20/10 ... 2,000 g/Hz										
Protection to IEC 60529	IP 64 (wire draw mechanism)										
	IP 67 (encoder)										
Operating voltage range (U_s)	10 ... 32 V										
Power consumption max.	2.0 W										
Initialisation time ⁶⁾	1,250 ms										
Bus interface											
Electronic adjustment (Number SET)	Via PRESET switch or protocol										
Bus termination ⁷⁾	Via DIP switch										
Electrical connection	Connection adaptor										
Electrical interface ⁸⁾	RS 485										
Electrical interface ⁹⁾	ISO-DIS 11898										
Protocol	Profile for encoders (07 _{hex}) – Class 2										
	Communication Profile DS 301 V4.0										
	Device Profile DSP 406 V2.0										
	DeviceNet Specification, Release 2.0										
Address setting (node no.)	0 ... 127 (DIP switch or protocol)										
Address setting (Node ID)	0 ... 63 (DIP switch or protocol)										
Data transmission rate (Baud rate) ¹⁰⁾	9.6 kBaud ... 12 MBaud										
(DIP switch or protocol)	(10, 20, 50, 125, 250, 500) kB, 1 MB										
(DIP switch or protocol)	(125, 250, 500) kB										
Status information	Running (LED green), bus activity (LED red)										
	2-coloured LED for CAN Controller Status										
	Network status LED (NS), 2-coloured										

¹⁾ These values were measured at an ambient temperature of 25 °C. The values may be different at other temperatures.

²⁾ Average values, which depend on the loading. At high operating speeds over long lengths, this figure can decrease; at slow operating speeds over short lengths, it can increase.

³⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3

⁴⁾ To DIN EN 60068-2-27

⁵⁾ To DIN EN 60068-2-6

⁶⁾ From the moment the supply voltage is applied, this is the time which elapses before the data word can be correctly read in.

⁷⁾ Connection for terminal device only

⁸⁾ To EN 50 170-2 (DIN 19245 parts 1-3), galvanically separated using an opto-coupler

⁹⁾ (CAN High Speed) and CAN specification 2.0 B, galvanically separated

¹⁰⁾ Automatic detection

¹ When the customer configures the encoder to 8,000 steps x 16 revolutions, via the Bus Master. (Factory entry in GSD or EDS file: 8,192 steps x 8,192 revolutions).

Order information

BTF 08; U_s 10 ... 32 V; field buses

Type	Part no.	Description
BTF08-P1HM0241	1 034 305	Profibus, measuring length 2 m
BTF08-D1HM0241	1 034 311	DeviceNet, measuring length 2 m
BTF08-C1HM0241	1 034 317	CANopen, measuring length 2 m

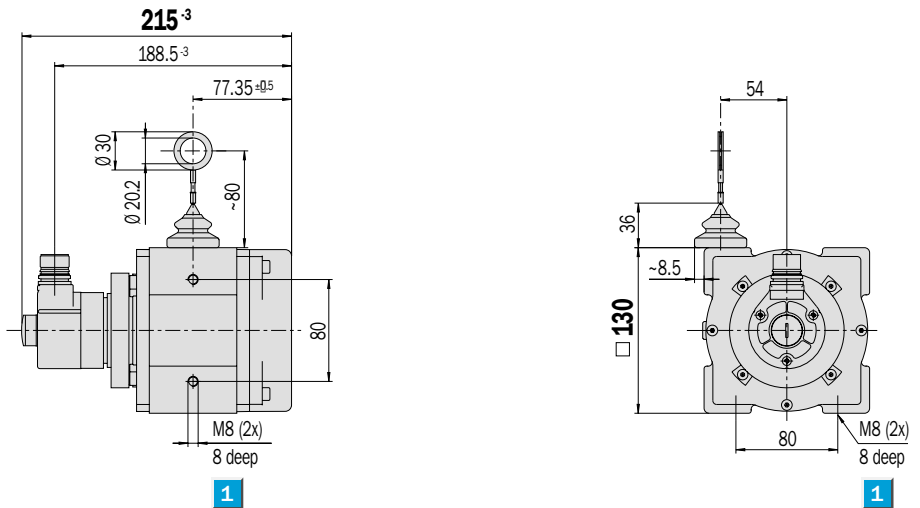
Please note: connection adaptor must be ordered separately (see pages 18 to 24)

Resolution up to 0.025 mm

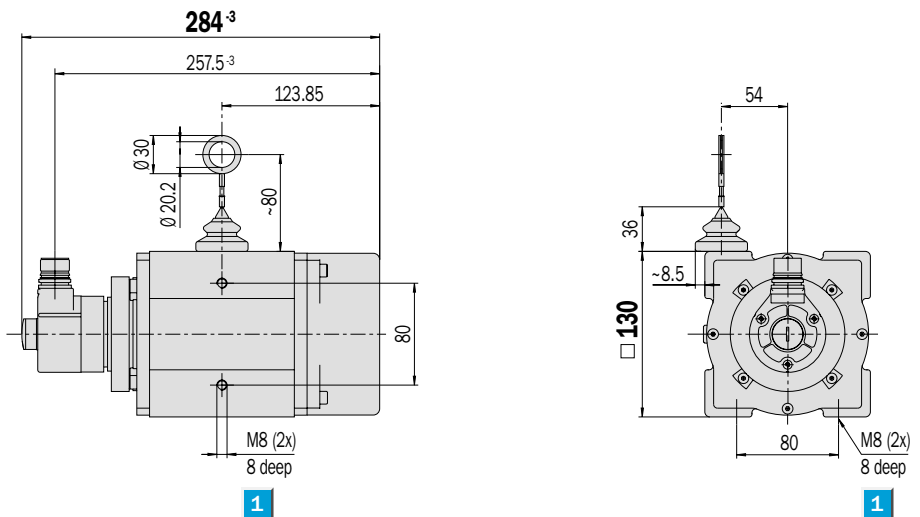
Absolute Wire Draw Encoders

- Linear path measurement using a wire draw mechanism
- High resolution
- Easy to mount
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire
- Dirt remover made of steel

Dimensional drawing wire draw encoder BTF 13 SSI, measuring length 5 m

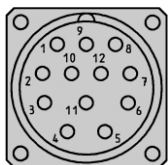


Dimensional drawing wire draw encoder BTF 13 SSI, measuring length 10 m



1 Threaded blind hole for mounting

General tolerances to DIN ISO 2768-mk



View of the connector M23 fitted to the encoder body

PIN and wire allocation

PIN	Signal	Wire colours (cable outlet)	Explanation
1	GND	blue	Earth connection
2	Data +	white	Interface signals
3	Clock +	yellow	Interface signals
4	R x D +	grey	RS-422 programming line
5	R x D -	green	RS-422 programming line
6	T x D +	pink	RS-422 programming line
7	T x D -	black	RS-422 programming line
8	U _s	red	Supply voltage
9	SET	orange	Electronic adjustment
10	Data -	brown	Interface signals
11	Clock -	lilac	Interface signals
12	N. C.	orange/black	Not connected
	Screen		Housing potential

Caution! PINs labelled "N. C." must not be connected.

Accessories

Wire draw mechanisms
Mounting systems
Connection systems
Adaptor modules

Technical data		BTF 13	SSI 5 m	SSI 10 m								
Drum housing	Anodised Aluminium											
Spring housing	Plastic											
Measuring wire (stainless)	Highly flexible stranded steel, Ø 1.35 mm											
Measuring length	5 m max.											
	10 m max.											
Mass	3.3 kg approx.											
	4.0 kg approx.											
Code type	25 bit/Gray											
Code sequence	Increasing in direction of measurement											
Measuring step	0.05 mm											
Linearity	0.05 % typ.											
Repeatability	± 1 measuring step											
Operating speed	4 m/sec.											
Position forming time	0.15 ms											
Spring return force (typ.)												
start/finish ¹⁾	15 N/20 N											
start/finish ¹⁾	10 N/20 N											
Working temperature range	- 20 ... + 70 °C											
Storage temperature range	- 40 ... + 100 °C											
Life of wire draw mechanism ²⁾	1 million cycles											
EMC ³⁾												
Resistance												
to shocks ⁴⁾	100/6 g/ms											
to vibration ⁵⁾	20/10 ... 2,000 g/Hz											
Protection to IEC 60529	IP 64 (wire draw mechanism)											
	IP 67 (encoder)											
Operating voltage range (U_s)	10 ... 32 V											
Power consumption max.	0.8 W											
Initialisation time ⁶⁾	1,050 ms											
Interface signals												
Clock +, Clock -, Data +, Data - ⁷⁾	SSI max. clock frequency 1 MHz i.e. min. duration LOW level (Clock +): 500 ns											
T x D +, T x D -, R x D +, R x D -	RS 422											
SET (electronic adjustment)	H-active (L ≙ 0 - 4.7 V; H ≙ 10 - U _s V)											

¹⁾ These values were measured at an ambient temperature of 25 °C. The values may be different at other temperatures.

²⁾ Average values, which depend on the loading. At high operating speeds over long lengths, this figure can decrease; at slow operating speeds over short lengths, it can increase.

³⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3

⁴⁾ To DIN EN 60068-2-27

⁵⁾ To DIN EN 60068-2-6

⁶⁾ From the moment the supply voltage is applied, this is the time which elapses before the data word can be correctly read in.

⁷⁾ For higher clock frequencies, choose synchronous SSI.

Order information

BTF 13; U_s 10 ... 32 V; connector M23, 12 pin

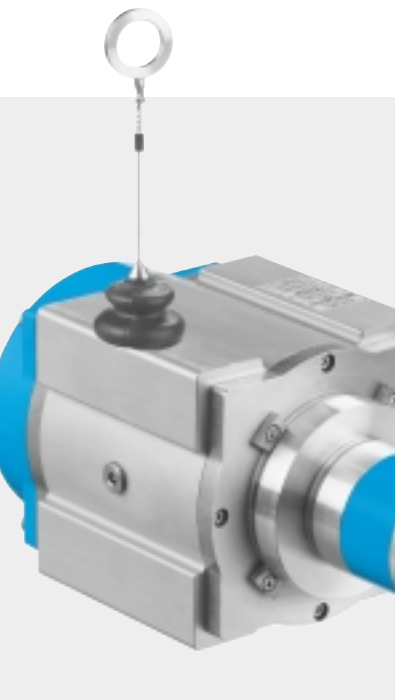
25 bit SSI; Gray-Code, Set = 1,000

Type	Part no.	Description
BTF13-A1AM0520	1 034 300	SSI, measuring length 5 m
BTF13-A1AM1020	1 034 301	SSI, measuring length 10 m

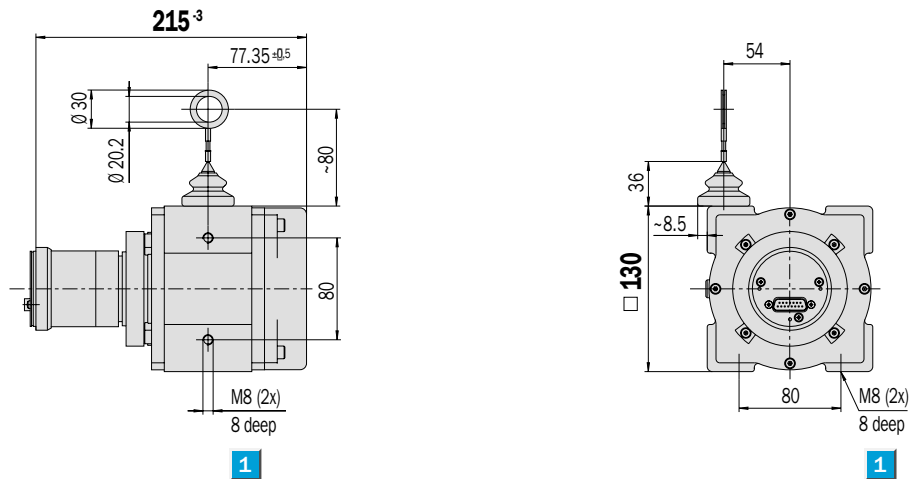
Resolution up to 0.025 mm

Absolute Wire Draw Encoders

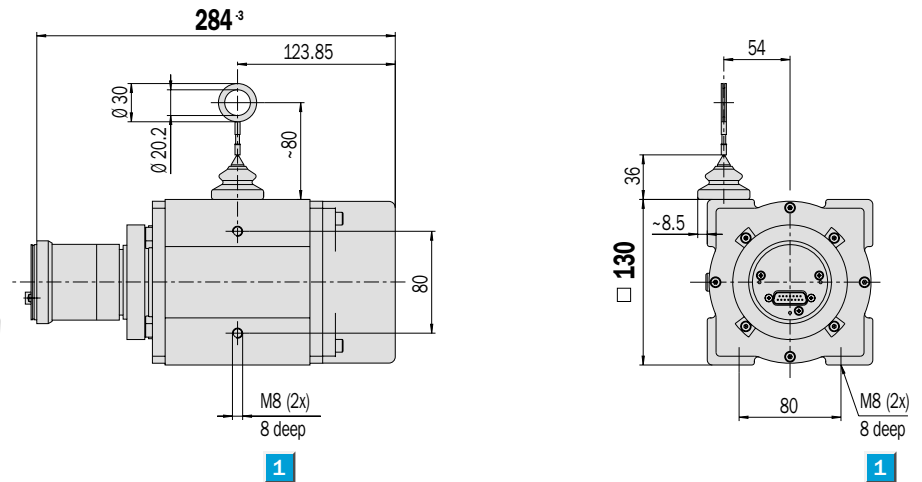
- Linear path measurement using a wire draw mechanism
- High resolution
- Easy to mount
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire
- Dirt remover made of steel



Dimensional drawing wire draw encoder BTF 13 Profibus, CANopen, DeviceNet, measuring length 5 m



Dimensional drawing wire draw encoder BTF 13 Profibus, CANopen, DeviceNet, measuring length 10 m



1 Threaded blind hole for mounting

General tolerances to DIN ISO 2768-mk



Accessories
Bus adaptors
Wire draw mechanisms
Mounting systems
Connection systems

Profibus adaptor with PIN and wire allocation see pages 18 / 19
CANopen adaptor with PIN and wire allocation see pages 20 / 21
DeviceNet adaptor with PIN and wire allocation see pages 22 to 24

Technical data		BTF 13			PB	CO	DN	PB	CO	DN				
					5m	5m	5m	10m	10m	10m				
Drum housing	Anodised Aluminium													
Spring housing	Plastic													
Measuring wire (stainless)	Highly flexible stranded steel, Ø 1.35 mm													
Measuring length	5 m max.													
	10 m max.													
Mass	3.4 kg approx.													
	4.1 kg approx.													
Measuring step (recommended)	0.05 mm 1													
Linearity	0.05 % typ.													
Repeatability	± 1 measuring step													
Operating speed	4 m/sec.													
Position forming time	0.25 ms													
Spring return force (typ.)														
start/finish ¹⁾	15 N/20 N													
start/finish ¹⁾	10 N/20 N													
Working temperature range	- 20 ... + 70 °C													
Storage temperature range	- 40 ... + 100 °C													
Life of wire draw mechanism ²⁾	1 million cycles													
EMC ³⁾														
Resistance														
to shocks ⁴⁾	100/6 g/ms													
to vibration ⁵⁾	20/10 ... 2,000 g/Hz													
Protection to IEC 60529	IP 64 (wire draw mechanism)													
	IP 67 (encoder)													
Operating voltage range (U_s)	10 ... 32 V													
Power consumption max.	2.0 W													
Initialisation time ⁶⁾	1,250 ms													
Bus interface														
Electronic adjustment (Number SET)	Via PRESET switch or protocol													
Bus termination ⁷⁾	Via DIP switch													
Electrical connection	Connection adaptor													
Electrical interface ⁸⁾	RS 485													
Electrical interface ⁹⁾	ISO-DIS 11898													
Protocol	Profile for encoders (07 _{hex}) – Class 2													
	Communication Profile DS 301 V4.0													
	Device Profile DSP 406 V2.0													
	DeviceNet Specification, Release 2.0													
Address setting (node no.)	0 ... 127 (DIP switch or protocol)													
Address setting (Node ID)	0 ... 63 (DIP switch or protocol)													
Data transmission rate (Baud rate) ¹⁰⁾	9.6 kBaud ... 12 MBaud													
(DIP switch or protocol)	(10, 20, 50, 125, 250, 500) kB, 1 MB													
(DIP switch or protocol)	(125, 250, 500) kB													
Status information	Running (LED green), bus activity (LED red)													
	2-coloured LED for CAN Controller Status													
	Network status LED (NS), 2-coloured													

¹⁾ These values were measured at an ambient temperature of 25 °C. The values may be different at other temperatures.

²⁾ Average values, which depend on the loading. At high operating speeds over long lengths, this figure can decrease; at slow operating speeds over short lengths, it can increase.

³⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3

⁴⁾ To DIN EN 60068-2-27

⁵⁾ To DIN EN 60068-2-6

⁶⁾ From the moment the supply voltage is applied, this is the time which elapses before the data word can be correctly read in.

⁷⁾ Connection for terminal device only

⁸⁾ To EN 50 170-2 (DIN 19245 parts 1-3), galvanically separated using an opto-coupler

⁹⁾ (CAN High Speed) and CAN specification 2.0 B, galvanically separated

¹⁰⁾ Automatic detection

1 When the customer configures the encoder to 6,680 steps x 32 revolutions, via the Bus Master. (Factory entry in GSD or EDS file: 8,192 steps x 8,192 revolutions).

Order information

BTF 13; U_s 10 ... 32 V; field buses

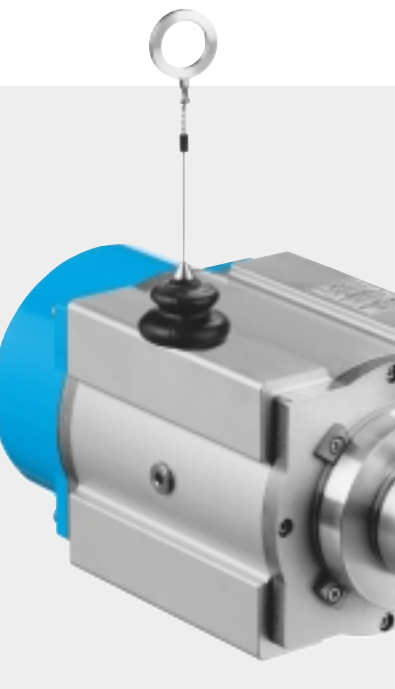
Type	Part no.	Description
BTF13-P1HM0525	1 034 306	Profibus, measuring length 5 m
BTF13-D1HM0525	1 034 312	DeviceNet, measuring length 5 m
BTF13-C1HM0525	1 034 318	CANopen, measuring length 5 m
BTF13-P1HM1025	1 034 307	Profibus, measuring length 10 m
BTF13-D1HM1025	1 034 313	DeviceNet, measuring length 10 m
BTF13-C1HM1025	1 034 319	CANopen, measuring length 10 m

Please note: connection adaptor must be ordered separately (see pages 18 to 24)

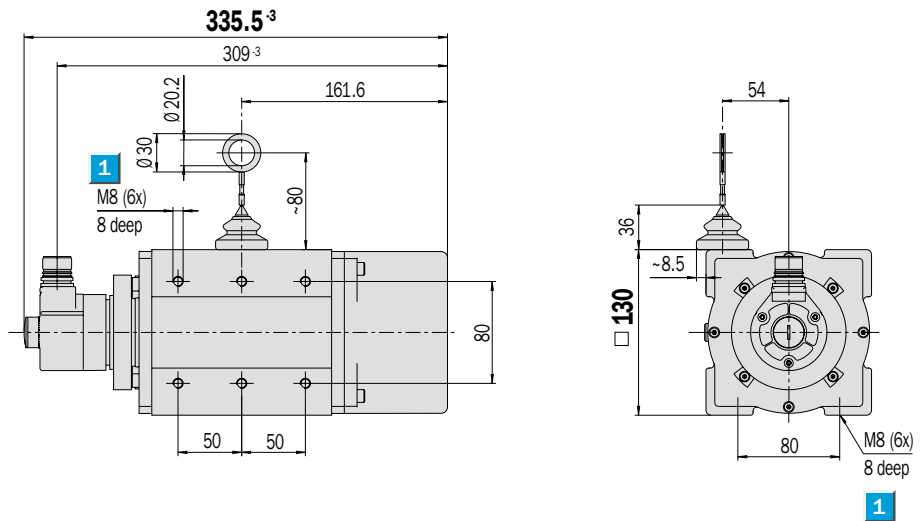
Resolution up to 0.025 mm

Absolute Wire Draw Encoders

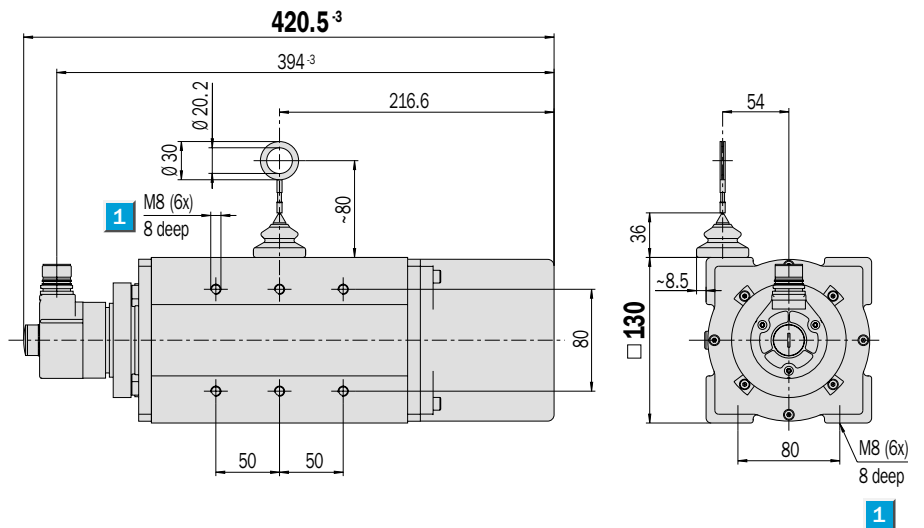
- Linear path measurement using a wire draw mechanism
- High resolution
- Easy to mount
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire
- Dirt remover made of steel



Dimensional drawing wire draw encoder BTF 13 SSI, measuring length 20 m

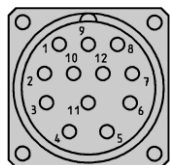


Dimensional drawing wire draw encoder BTF 13 SSI, measuring length 30 m



1 Threaded blind hole for mounting

General tolerances to DIN ISO 2768-mk



View of the connector M23 fitted to the encoder body

PIN and wire allocation

PIN	Signal	Wire colours (cable outlet)	Explanation
1	GND	blue	Earth connection
2	Data +	white	Interface signals
3	Clock +	yellow	Interface signals
4	R x D +	grey	RS-422 programming line
5	R x D -	green	RS-422 programming line
6	T x D +	pink	RS-422 programming line
7	T x D -	black	RS-422 programming line
8	U _s	red	Supply voltage
9	SET	orange	Electronic adjustment
10	Data -	brown	Interface signals
11	Clock -	lilac	Interface signals
12	N. C.	orange/black	Not connected
	Screen		Housing potential

Caution! PINs labelled "N. C." must not be connected.

Accessories

- Wire draw mechanisms
- Mounting systems
- Connection systems
- Adaptor modules

Technical data		BTF 13	SSI 20m	SSI 30m								
Drum housing	Anodised Aluminium											
Spring housing	Plastic											
Measuring wire (stainless)	Highly flexible stranded steel, Ø 0.81 mm											
Measuring length	20 m max.											
	30 m max.											
Mass	5.3 kg approx.											
	6.5 kg approx.											
Code type	25 bit/Gray											
Code sequence	Increasing in direction of measurement											
Measuring step	0.05 mm											
Linearity	0.05 % typ.											
Repeatability	± 1 measuring step											
Operating speed	4 m/sec.											
Position forming time	0.15 ms											
Spring return force (typ.)												
start/finish ¹⁾	10 N/20 N											
Working temperature range	- 20 ... + 70 °C											
Storage temperature range	- 40 ... + 100 °C											
Life of wire draw mechanism ²⁾	1 million cycles											
EMC ³⁾												
Resistance												
to shocks ⁴⁾	100/6 g/ms											
to vibration ⁵⁾	20/10 ... 2,000 g/Hz											
Protection to IEC 60529	IP 64 (wire draw mechanism)											
	IP 67 (encoder)											
Operating voltage range (U_s)	10 ... 32 V											
Power consumption max.	0.8 W											
Initialisation time ⁶⁾	1,050 ms											
Interface signals												
Clock +, Clock -, Data +, Data - ⁷⁾	SSI max. clock frequency 1 MHz i.e. min. duration LOW level (Clock +): 500 ns											
T x D +, T x D -, R x D +, R x D -	RS 422											
SET (electronic adjustment)	H-active (L ≙ 0 - 4.7 V; H ≙ 10 - U _s V)											

¹⁾ These values were measured at an ambient temperature of 25 °C. The values may be different at other temperatures.

²⁾ Average values, which depend on the loading. At high operating speeds over long lengths, this figure can decrease; at slow operating speeds over short lengths, it can increase.

³⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3

⁴⁾ To DIN EN 60068-2-27

⁵⁾ To DIN EN 60068-2-6

⁶⁾ From the moment the supply voltage is applied, this is the time which elapses before the data word can be correctly read in.

⁷⁾ For higher clock frequencies, choose synchronous SSI.

Order information

BTF 13; U_s 10 ... 32 V; connector M23, 12 pin

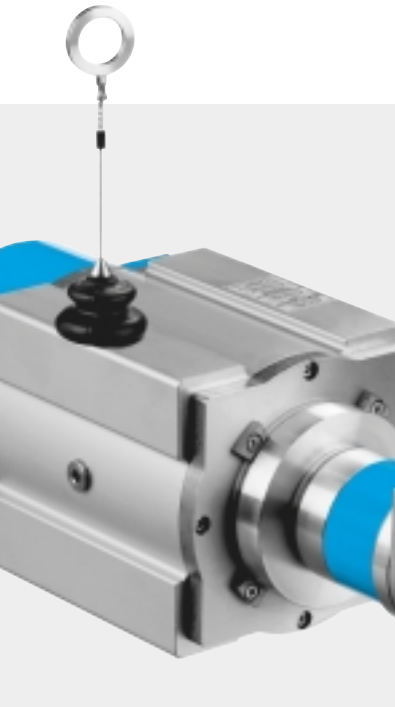
25 bit SSI; Gray-Code, Set = 1,000

Type	Part no.	Description
BTF13-A1AM2020	1 034 302	SSI, measuring length 20 m
BTF13-A1AM3020	1 034 303	SSI, measuring length 30 m

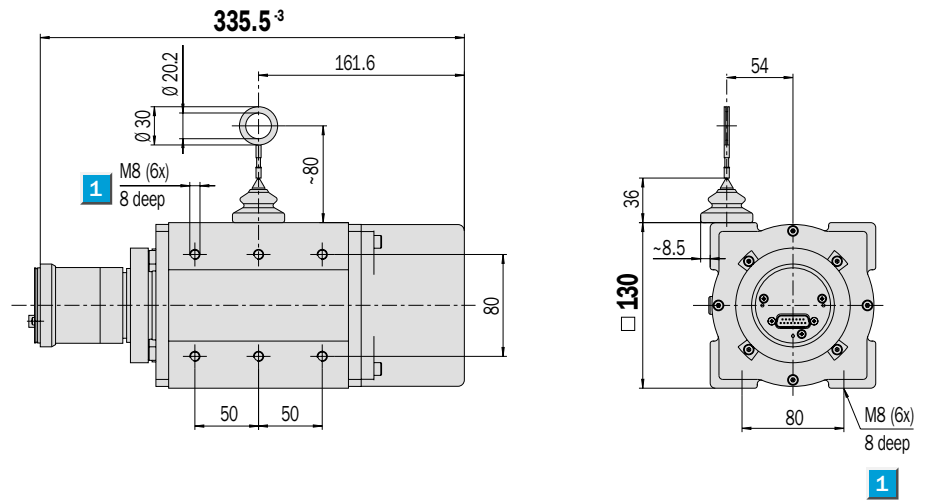
Resolution up to 0.025 mm

Absolute Wire Draw Encoders

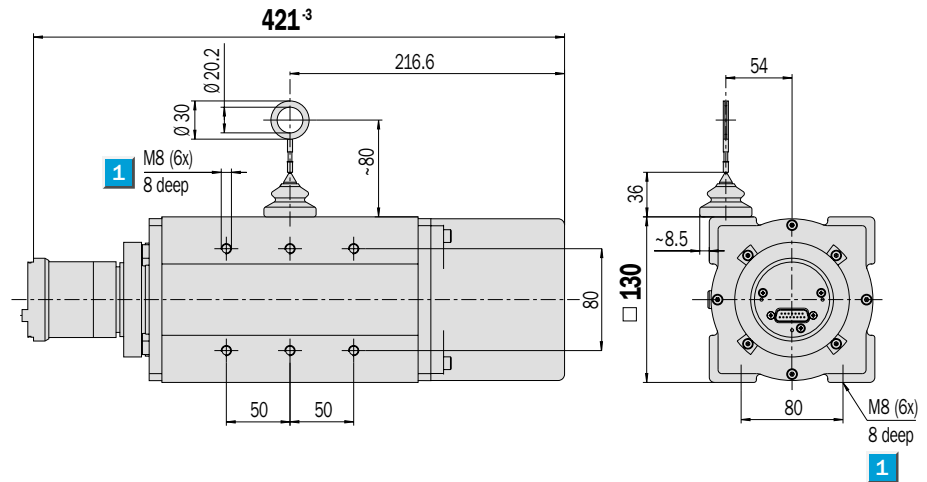
- Linear path measurement using a wire draw mechanism
- High resolution
- Easy to mount
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire
- Dirt remover made of steel



Dimensional drawing wire draw encoder BTF 13 Profibus, CANopen, DeviceNet, measuring length 20 m



Dimensional drawing wire draw encoder BTF 13 Profibus, CANopen, DeviceNet, measuring length 30 m



1 Threaded blind hole for mounting

General tolerances to DIN ISO 2768-mk



Accessories
Bus adaptors
Wire draw mechanisms
Mounting systems
Connection systems

Profibus adaptor with PIN and wire allocation see pages 18 / 19
CANopen adaptor with PIN and wire allocation see pages 20 / 21
DeviceNet adaptor with PIN and wire allocation see pages 22 to 24

Technical data		BTF 13			PB	CO	DN	PB	CO	DN				
					20m	20m	20m	30m	30m	30m				
Drum housing	Anodised Aluminium													
Spring housing	Plastic													
Measuring wire (stainless)	Highly flexible stranded steel, Ø 0.81 mm													
Measuring length	20 m max.													
	30 m max.													
Mass	5.4 kg approx.													
	6.6 kg approx.													
Measuring step (recommended)	0.05 mm 1													
Linearity	0.05 % typ.													
Repeatability	± 1 measuring step													
Operating speed	4 m/sec.													
Position forming time	0.25 ms													
Spring return force (typ.)														
start/finish ¹⁾	10 N/20 N													
Working temperature range	- 20 ... + 70 °C													
Storage temperature range	- 40 ... + 100 °C													
Life of wire draw mechanism ²⁾	1 million cycles													
EMC ³⁾														
Resistance														
to shocks ⁴⁾	100/6 g/ms													
to vibration ⁵⁾	20/10 ... 2,000 g/Hz													
Protection to IEC 60529	IP 64 (wire draw mechanism)													
	IP 67 (encoder)													
Operating voltage range (U_s)	10 ... 32 V													
Power consumption max.	2.0 W													
Initialisation time ⁶⁾	1,250 ms													
Bus interface														
Electronic adjustment (Number SET)	Via PRESET switch or protocol													
Bus termination ⁷⁾	Via DIP switch													
Electrical connection	Connection adaptor													
Electrical interface ⁸⁾	RS 485													
Electrical interface ⁹⁾	ISO-DIS 11898													
Protocol	Profile for encoders (07 _{hex}) – Class 2													
	Communication Profile DS 301 V4.0													
	Device Profile DSP 406 V2.0													
	DeviceNet Specification, Release 2.0													
Address setting (node no.)	0 ... 127 (DIP switch or protocol)													
Address setting (Node ID)	0 ... 63 (DIP switch or protocol)													
Data transmission rate (Baud rate) ¹⁰⁾	9.6 kBaud ... 12 MBaud													
(DIP switch or protocol)	(10, 20, 50, 125, 250, 500) kB, 1 MB													
(DIP switch or protocol)	(125, 250, 500) kB													
Status information	Running (LED green), bus activity (LED red)													
	2-coloured LED for CAN Controller Status													
	Network status LED (NS), 2-coloured													

¹⁾ These values were measured at an ambient temperature of 25 °C. The values may be different at other temperatures.

²⁾ Average values, which depend on the loading. At high operating speeds over long lengths, this figure can decrease; at slow operating speeds over short lengths, it can increase.

³⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3

⁴⁾ To DIN EN 60068-2-27

⁵⁾ To DIN EN 60068-2-6

⁶⁾ From the moment the supply voltage is applied, this is the time which elapses before the data word can be correctly read in.

⁷⁾ Connection for terminal device only

⁸⁾ To EN 50 170-2 (DIN 19245 parts 1-3), galvanically separated using an opto-coupler

⁹⁾ (CAN High Speed) and CAN specification 2.0 B, galvanically separated

¹⁰⁾ Automatic detection

1 When the customer configures the encoder to 6,646 steps x 128 revolutions, via the Bus Master. (Factory entry in GSD or EDS file: 8,192 steps x 8,192 revolutions).

Order information

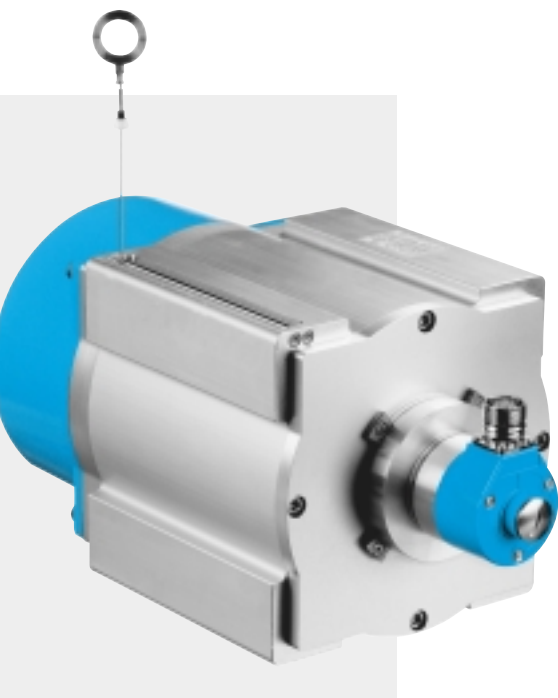
BTF 13; U_s 10 ... 32 V; field buses

Type	Part no.	Description
BTF13-P1HM2025	1 034 308	Profibus, measuring length 20 m
BTF13-D1HM2025	1 034 314	DeviceNet, measuring length 20 m
BTF13-C1HM2025	1 034 320	CANopen, measuring length 20 m
BTF13-P1HM3025	1 034 309	Profibus, measuring length 30 m
BTF13-D1HM3025	1 034 315	DeviceNet, measuring length 30 m
BTF13-C1HM3025	1 034 321	CANopen, measuring length 30 m

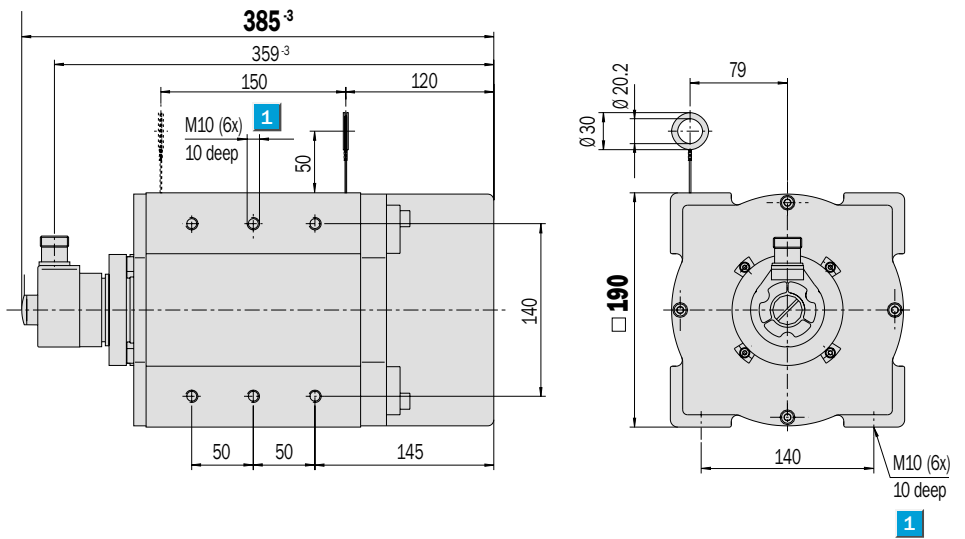
Please note: connection adaptor must be ordered separately (see pages 18 to 24)

 **Resolution up to 0.025 mm**
Absolute Wire Draw Encoders

- Linear path measurement using a wire draw mechanism
- High resolution
- Easy to mount
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire

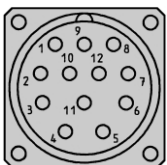


Dimensional drawing wire draw encoder BTF 19 SSI, measuring length 50 m



1 Threaded blind hole for mounting

General tolerances to DIN ISO 2768-mk



View of the connector M23 fitted to the encoder body

PIN and wire allocation

PIN	Signal	Wire colours (cable outlet)	Explanation
1	GND	blue	Earth connection
2	Data +	white	Interface signals
3	Clock +	yellow	Interface signals
4	R x D +	grey	RS-422 programming line
5	R x D -	green	RS-422 programming line
6	T x D +	pink	RS-422 programming line
7	T x D -	black	RS-422 programming line
8	U _s	red	Supply voltage
9	SET	orange	Electronic adjustment
10	Data -	brown	Interface signals
11	Clock -	lilac	Interface signals
12	N. C.	orange/black	Not connected
	Screen		Housing potential

Caution! PINs labelled "N. C." must not be connected.

Accessories

Wire draw mechanisms
Mounting systems
Connection systems
Adaptor modules

Technical data		BTF 19	SSI										
			50m										
Drum housing	Anodised Aluminium												
Spring housing	Die-cast zinc												
Measuring wire (stainless)	Highly flexible stranded steel, Ø 1.35 mm												
Measuring length	50 m max.												
Mass	16.8 kg approx.												
Code type	25 bit/Gray												
Code sequence	Increasing in direction of measurement												
Measuring step	0.1 mm												
Linearity	0.05 % typ.												
Repeatability	± 1 measuring step												
Operating speed	4 m/sec.												
Position forming time	0.15 ms												
Spring return force (typ.)													
start/finish ¹⁾	18 N/37 N												
Working temperature range	- 20 ... + 70 °C												
Storage temperature range	- 40 ... + 100 °C												
Life of wire draw mechanism ²⁾	1 million cycles												
EMC ³⁾													
Resistance													
to shocks ⁴⁾	100/6 g/ms												
to vibration ⁵⁾	20/10 ... 2,000 g/Hz												
Protection to IEC 60529	IP 31 (wire draw mechanism)												
	IP 67 (encoder)												
Operating voltage range (U_s)	10 ... 32 V												
Power consumption max.	0.8 W												
Initialisation time ⁶⁾	1,050 ms												
Interface signals													
Clock +, Clock -, Data +, Data - ⁷⁾	SSI max. clock frequency 1 MHz i.e. min. duration LOW level (Clock +): 500 ns												
T x D +, T x D -, R x D +, R x D -	RS 422												
SET (electronic adjustment)	H-active (L ≙ 0 - 4.7 V; H ≙ 10 - U _s V)												

¹⁾ These values were measured at an ambient temperature of 25 °C. The values may be different at other temperatures.

²⁾ Average values, which depend on the loading. At high operating speeds over long lengths, this figure can decrease; at slow operating speeds over short lengths, it can increase.

³⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3

⁴⁾ To DIN EN 60068-2-27

⁵⁾ To DIN EN 60068-2-6

⁶⁾ From the moment the supply voltage is applied, this is the time which elapses before the data word can be correctly read in.

⁷⁾ For higher clock frequencies, choose synchronous SSI.

Order information

BTF 19; U_s 10 ... 32 V; connector M23, 12 pin

25 bit SSI, Gray-Code, Set = 1,000

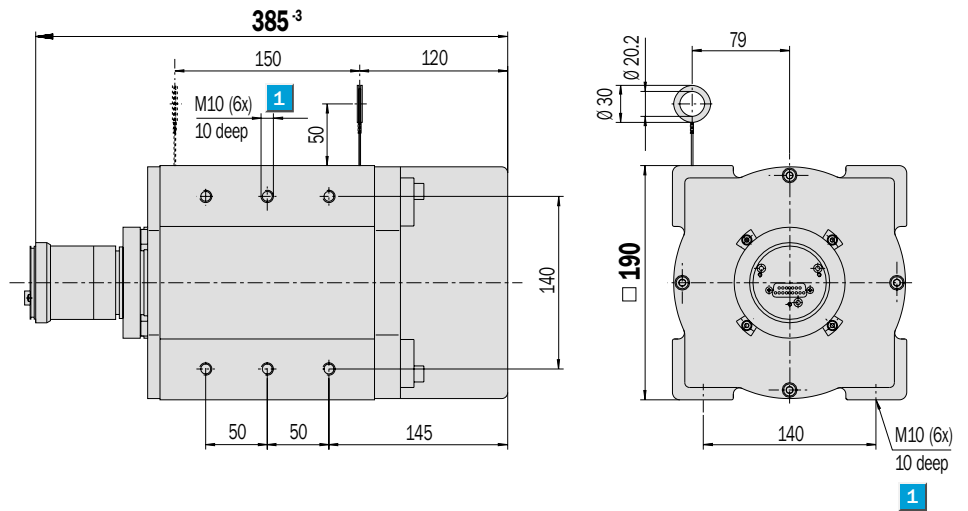
Type	Part no.	Description
BTF19-A1AM5010	1 034 304	SSI, measuring length 50 m

Resolution up to 0.025 mm

Absolute Wire Draw Encoders

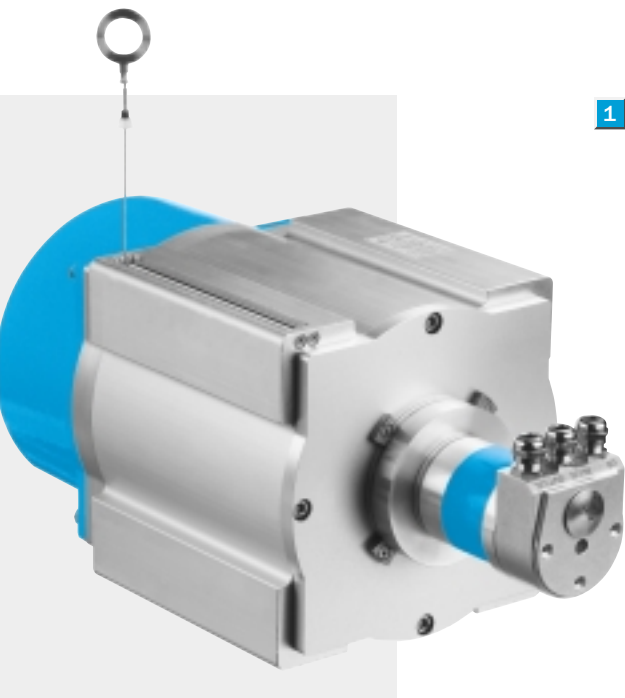
- Linear path measurement using a wire draw mechanism
- High resolution
- Easy to mount
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire

Dimensional drawing wire draw encoder BTF 19 Profibus, CANopen, DeviceNet, measuring length 50 m



1 Threaded blind hole for mounting

General tolerances to DIN ISO 2768-mk



Accessories
Bus adaptors
Wire draw mechanisms
Mounting systems
Connection systems

Profibus adaptor with PIN and wire allocation see pages 18 / 19
CANopen adaptor with PIN and wire allocation see pages 20 / 21
DeviceNet adaptor with PIN and wire allocation see pages 22 to 24

Technical data		BTF 19	PB 50m	CO 50m	DN 50m						
Drum housing	Anodised Aluminium										
Spring housing	Die-cast zinc										
Measuring wire (stainless)	Highly flexible stranded steel, Ø 1.35 mm										
Measuring length	50 m max.										
Mass	16.9 kg approx.										
Measuring step (recommended)	0.1 mm 1										
Linearity	0.05 % typ.										
Repeatability	± 1 measuring step										
Operating speed	4 m/sec.										
Position forming time	0.25 ms										
Spring return force (typ.)											
start/finish ¹⁾	18 N/37 N										
Working temperature range	- 20 ... + 70 °C										
Storage temperature range	- 40 ... + 100 °C										
Life of wire draw mechanism ²⁾	1 million cycles										
EMC ³⁾											
Resistance											
to shocks ⁴⁾	100/6 g/ms										
to vibration ⁵⁾	20/10 ... 2,000 g/Hz										
Protection to IEC 60529	IP 31 (wire draw mechanism)										
	IP 67 (encoder)										
Operating voltage range (U_s)	10 ... 32 V										
Power consumption max.	2.0 W										
Initialisation time ⁶⁾	1,250 ms										
Bus interface											
Electronic adjustment (Number SET)	Via PRESET switch or protocol										
Bus termination ⁷⁾	Via DIP switch										
Electrical connection	Connection adaptor										
Electrical interface ⁸⁾	RS 485										
Electrical interface ⁹⁾	ISO-DIS 11898										
Protocol	Profile for encoders (07 _{hex}) – Class 2										
	Communication Profile DS 301 V4.0										
	Device Profile DSP 406 V2.0										
	DeviceNet Specification, Release 2.0										
Address setting (node no.)	0 ... 127 (DIP switch or protocol)										
Address setting (Node ID)	0 ... 63 (DIP switch or protocol)										
Data transmission rate (Baud rate) ¹⁰⁾	9.6 kBaud ... 12 MBaud										
(DIP switch or protocol)	(10, 20, 50, 125, 250, 500) kB, 1 MB										
(DIP switch or protocol)	(125, 250, 500) kB										
Status information	Running (LED green), bus activity (LED red)										
	2-coloured LED for CAN Controller Status										
	Network status LED (NS), 2-coloured										

¹⁾ These values were measured at an ambient temperature of 25 °C. The values may be different at other temperatures.

²⁾ Average values, which depend on the loading.
At high operating speeds over long lengths, this figure can decrease; at slow operating speeds over short lengths, it can increase.

³⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3

⁴⁾ To DIN EN 60068-2-27

⁵⁾ To DIN EN 60068-2-6

⁶⁾ From the moment the supply voltage is applied, this is the time which elapses before the data word can be correctly read in.

⁷⁾ Connection for terminal device only

⁸⁾ To EN 50 170-2 (DIN 19245 parts 1-3), galvanically separated using an opto-coupler

⁹⁾ (CAN High Speed) and CAN specification 2.0 B, galvanically separated

¹⁰⁾ Automatic detection

1 When the customer configures the encoder to 4,900 steps x 128 revolutions, via the Bus Master. (Factory entry in GSD or EDS file: 8,192 steps x 8,192 revolutions).

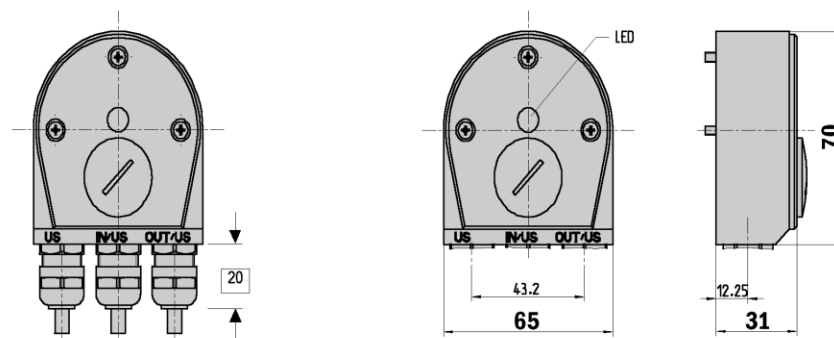
Order information		
BTF 19; U _s 10 ... 32 V; field buses		
Type	Part no.	Description
BTF19-P1HM5017	1 034 310	Profibus, measuring length 50 m
BTF19-D1HM5017	1 034 316	DeviceNet, measuring length 50 m
BTF19-C1HM5017	1 034 322	CANopen, measuring length 50 m

Please note: connection adaptor must be ordered separately (see pages 18 to 24)

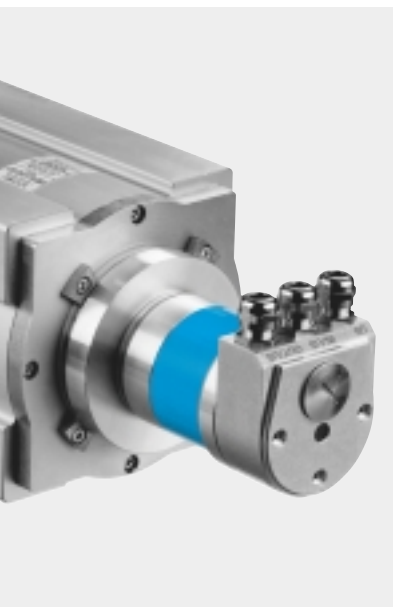
Resolution up to 0.025 mm
Absolute Wire Draw Encoders

- Linear path measurement using a wire draw mechanism
- High resolution
- Easy to mount
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire
- Dirt remover made of steel

Dimensional drawing Profibus adaptor KA3



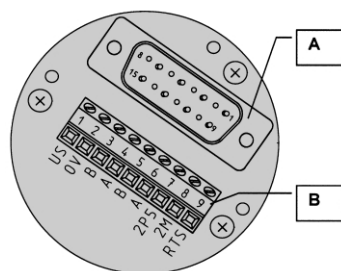
General tolerances to DIN ISO 2768-mk



Order information		
BTF Profibus adaptor		
Type	Part no.	Description
AD-ATM60-KA3PR	2 029 225	Bus adaptor KA3, 3 x PG

1 PIN and wire allocation for Profibus adaptor

Terminal strip	Signal	Explanation
1	U _s (24 V)	Supply voltage 10 ... 32 V
2	0 V (GND)	Ground (0 V)
3	B	Profibus DP B line (out)
4	A	Profibus DP A line (out)
5	B	Profibus DP B line (in)
6	A	Profibus DP A line (in)
7	2P5 ¹⁾	+ 5 V (DC isolated)
8	2M ¹⁾	0 V (DC isolated)
9	RTS ²⁾	Request To Send



A Internal plug connection to the encoder
B External connection to the bus

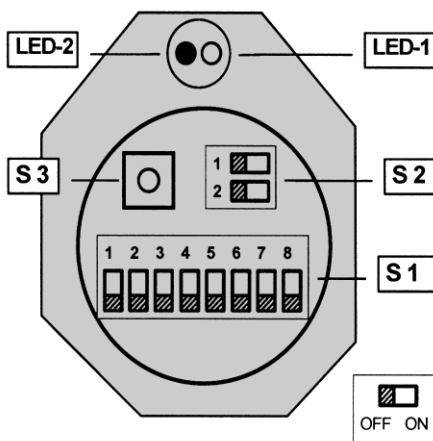
¹⁾ Use for external bus termination or to supply the transmitter/receiver of an optical transmission link.

²⁾ Signal is optional, used to detect the direction of an optical connection.

1 Encoders with a Profibus adaptor have a terminal strip for connecting the bus and supply lines. In order to connect the lines, the Profibus adaptor is unscrewed from the complete device. The figure shows the pin allocation within the bus connection.



Switch settings

**Switch settings**

Access to the switches is gained by opening the removable screw cap (PG) on the rear of the bus adaptor. Use of the following elements.

S 1 (1-7)	Address setting (0 ... 127)
S 1 (8-8)	Counting direction (CW/CCW)
S 2	Bus termination
S 3	Preset push button (Number SET)

Status information via LEDs

LED-1	Operating voltage (green)
LED-2	Bus activity (red)

Implementation

DP Functionalities

in accordance with the Profibus DP basic functions

DP services

- Data interchange (Write_Read_Data)
- Address allocation (Set_Slave_Address)
- Control commands (Global_Control)
- Read the inputs (Read_Inputs)
- Read the outputs (Read_Outputs)
- Read diagnostic data (Slave_Diagnosis)
- Send configuration data (Set_Param)
- Check configuration data (Chk_Config)

Communication

- Cyclic master – slave data traffic

Protective mechanisms

- Data transfer with HD = 4
- Time monitoring of the data traffic

Configuration

Settings in accordance with Encoder Profile

- Counting direction (CW, CCW)
- Class-2 functionality (ON, OFF)
- Scaling function (ON, OFF)
- Steps per turn (1 ... 8192)
- Total resolution (GA) -- 1 ... 67,108,864 steps, with $GA = 2^n \times SpU$. -- ($n=0 \dots 13$)
- "Activation of SSA-service" ²⁾
- Selection of the station address ²⁾

Configuration

Setting the formats (IN/OUT) for the cyclic data interchange via configuration byte (K-1)

2 words IN/OUT data (I-1/O-1) ¹⁾

4 words IN/OUT data (I-1, I-2, I-3/O-1) ²⁾

Data interchange: - Input Data (IN)

I-1	Position value ¹⁾	4 bytes
I-2	Speed (rev/min) ²⁾	2 bytes
I-3	Time stamp ²⁾	2 bytes

Data interchange: - Output data (OUT)

O-1	PRESET Value ¹⁾	4 bytes
-----	----------------------------	---------

Diagnostic information

- Station-related diagnosis (63 bytes in acc. with Encoder Profile Class 2)

Setting: - PRESET value

The PRESET function is used for set into operation and to allocate a specific position value to the current physical angular position.

The following settings are possible:

- by hardware (PRESET push button: S3)
- by software: -- (see Output data)

Setting: - Counting direction

- by hardware via DIP switch S1-(8)
- by software via Telegram

Counting direction increasing:

Rotation of the shaft in the clockwise direction (CW) as viewed on the shaft

Setting: - Station address

- by hardware via DIP switch S1
- by software via Telegram

The setting by software is carried out only if the "SSA-service" has been previously activated.

Setting: - Bus termination

The 2-way DIP switch (S2) permits an internal bus termination to be switched in and out (ON/OFF).

If the bus is terminated externally, switch S2 must be in the OFF position.

Device-specific file (GS.)

For the purpose of automatic set into operation of the encoder, use is made of the GS file.

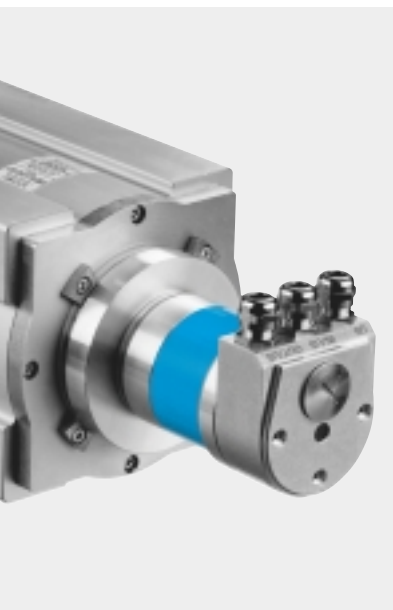
All the characteristic features of the device are defined in it.
 STEG 5952.GSD German
 STEG 5952.GSE English

¹⁾ As per Encoder Profile

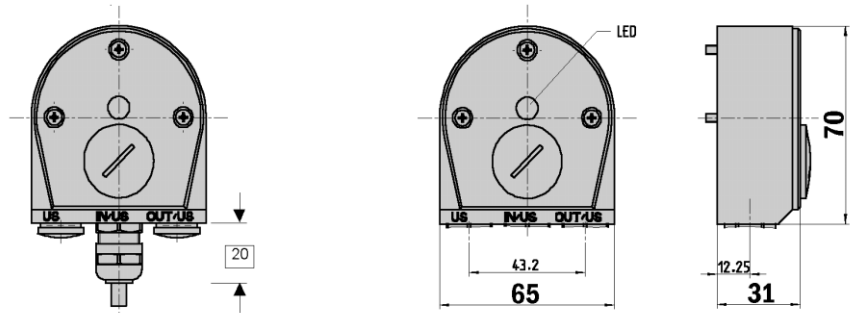
²⁾ Manufacturer specific function

Resolution up to 0.025 mm
Absolute Wire Draw Encoders

- Linear path measurement using a wire draw mechanism
- High resolution
- Easy to mount
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire
- Dirt remover made of steel

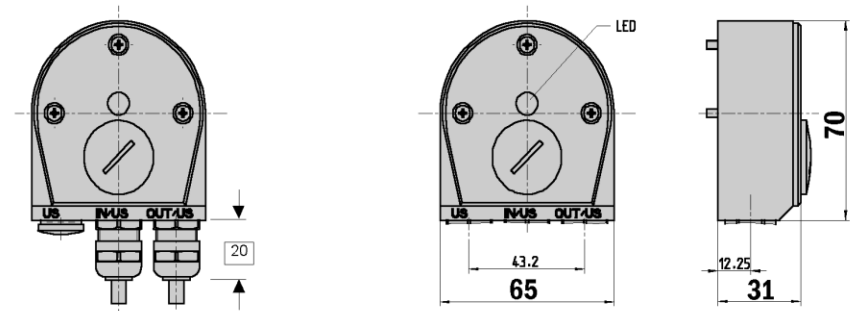


Dimensional drawing CANopen adaptor KR1



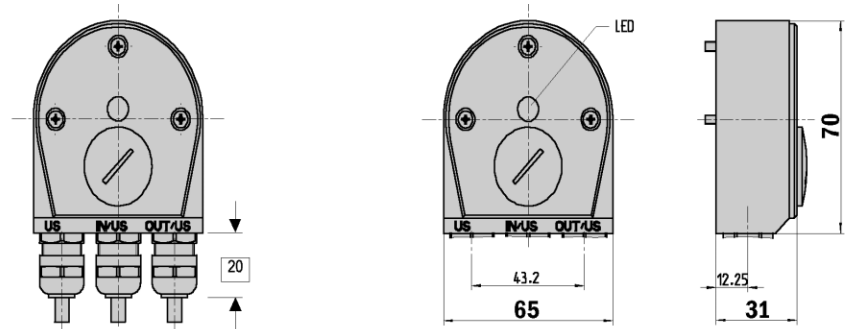
General tolerances to DIN ISO 2768-mk

Dimensional drawing CANopen adaptor KR2

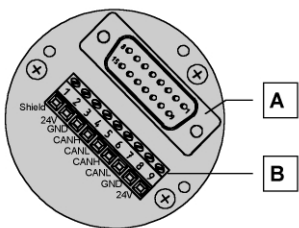


General tolerances to DIN ISO 2768-mk

Dimensional drawing CANopen adaptor KR3



General tolerances to DIN ISO 2768-mk



A Internal plug connection to the encoder
B External connection to the bus

1 Encoders with a CANbus adaptor have a terminal strip for connecting the bus and supply lines. In order to connect the lines, the CANbus adaptor is unscrewed from the complete device. The figure shows the pin allocation within the bus connection.

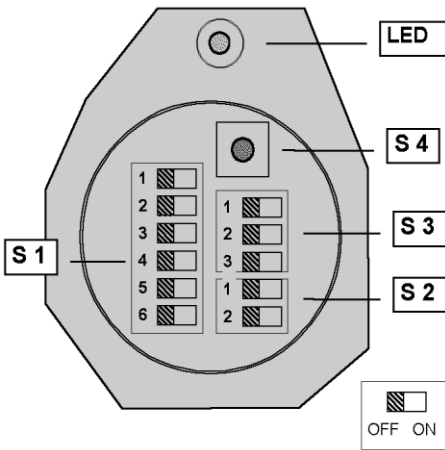
Order information

BTF CANopen adaptor		
Type	Part no.	Description
AD-ATM60-KR1CO	2 029 230	Bus adaptor KR1, 1 x PG
AD-ATM60-KR2CO	2 029 231	Bus adaptor KR2, 2 x PG
AD-ATM60-KR3CO	2 029 232	Bus adaptor KR3, 3 x PG

1 PIN and wire allocation for CANopen adaptor

Terminal Strip	Signal	Explanation
1	Shield	Screen
2	U _s (24 V)	Supply voltage 10 ... 32 V
3	GND (COM)	0 V (Gnd)
4	CAN _H	CAN-Bus signal HIGH
5	CAN _L	CAN-Bus signal LOW
6	CAN _H	CAN-Bus signal HIGH
7	CAN _L	CAN-Bus signal LOW
8	GND (COM)	0 V (Gnd)
9	U _s (24 V)	Supply voltage 10 ... 32 V

Switch settings



Switch settings

Access to the switches is gained by opening the removable screw cap (PG) on the rear of the bus adaptor. Use of the following elements.

- S 1 Address setting (Node ID)
- S 2 Bus termination
- S 3 Baud rate setting (Data Rate)
- S 4 Preset push button (Number zero SET)

Status information via LED

- LED 2-colour red/green
- CAN Controller status

Implementation

CANopen Functionality

Predefined Connection Set

- Sync Object
- Emergency Object
- NMT Network Object (Error Control services, Boot-Up service)
- One Service Data Object (SDO)
- Two Process Data Object (PDO)

I/O-Operating Modes

- Synchronous: -- Depends on Sync Object
- Asynchronous. -- No reference to Sync Object. Triggered by "Timer" (Cyclic) or by event (COS)
- Remote Transmission (RTR)

Encoder Parameters

according the Device Profile for Encoders:

- Code direction (CW, CCW)
- Scaling function (ON, OFF)
- PRESET value
- Steps per revolution (CPR) - 1 ... 8,192
- Total resolution (TR) -- 1 ... 67,108,864 steps, with TR = 2ⁿ x CPR -- (n=0 ... 13)
- Limits for the working range
- Cycle Timer for asynchronous PDOs
- 8 programmable cams with HIGH/LOW limits and hysteresis
- General Diagnostic parameters (Offset Value, Alarms, Warnings, version of profile and software)

Manufacturer specific Profile:

- Node commissioning. -- Location and values for Node-ID and Baud rate
- Hysteresis to position change required for Async PDOs with COS mode
- Limits and display format for the speed and acceleration values

PDO Data Mapping

Mapping of up to four data objects to each of the two Transmit PDOs. The resulting data length within one PDO is limited to 8 Byte.

- (1) Object 1/Pos Val¹⁾ I-1
- (n) Object 2 ... Object 4 I-1 to I-7

Input Data Objects

- I-1 Position value [Pos Val] 4 Byte
- I-2 Status of cam 1 Byte
- I-3 Status of working range 1 Byte
- I-4 Alarms 1 Byte
- I-5 Warnings 1 Byte
- I-6 Speed value 4 Byte
- I-7 Acceleration value 4 Byte

Setting: - Address (Node ID)

0 to 63 by Hardware (DIP Switch) or EEPROM

Setting: - Baud rate

10kb, 20kb, 50kb, 125kb, 250kb, 500kb, 1 MB by Hardware (DIP Switch) or EEPROM

Setting: - Bus Termination

The DIP-Switch (S2) is used to switch on/off an internal bus termination (ON/OFF). Not used (OFF) in case of using an external termination of the network

Setting: - PRESET Value

The Preset function supports adaptation of the encoder zero point to the mechanical zero point of the encoder system. The factory PRESET value is zero [0]

The adjustment is carried out in 2 ways:

- by Hardware (PRESET push button)
- by Software (CANopen Protocol)

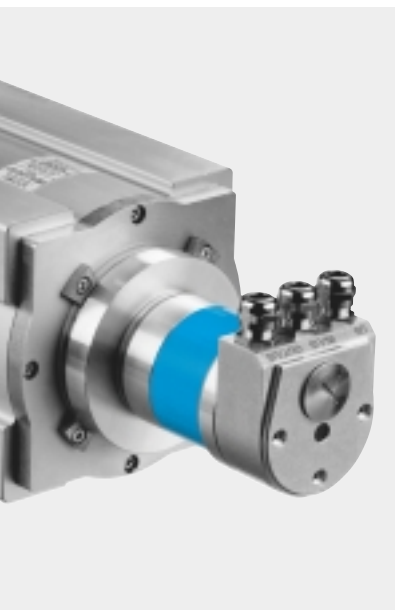
Equipment Configuration

Configuring parameters of the encoder can be achieved by a configuration tool in conjunction with an EDS file (Electronic Data Sheet). It contains all the characteristics of the encoder.

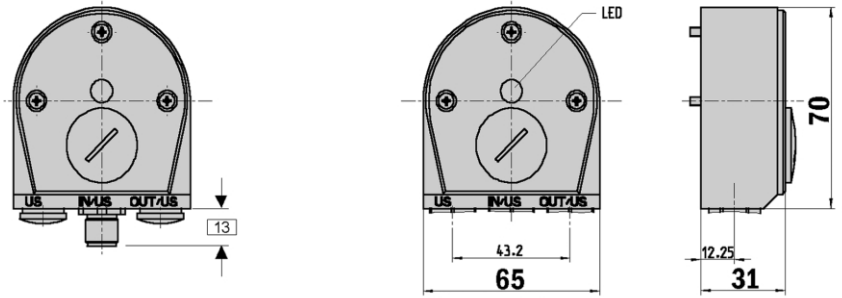
¹⁾ Setting cannot be changed

Resolution up to 0.025 mm
Absolute Wire Draw Encoders

- Linear path measurement using a wire draw mechanism
- High resolution
- Easy to mount
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire
- Dirt remover made of steel

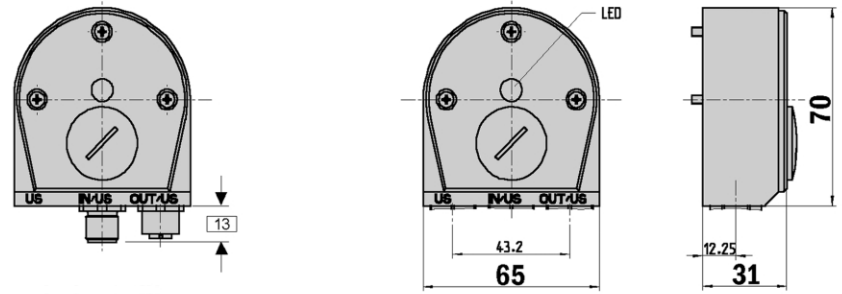


Dimensional drawing DeviceNet adaptor SR1



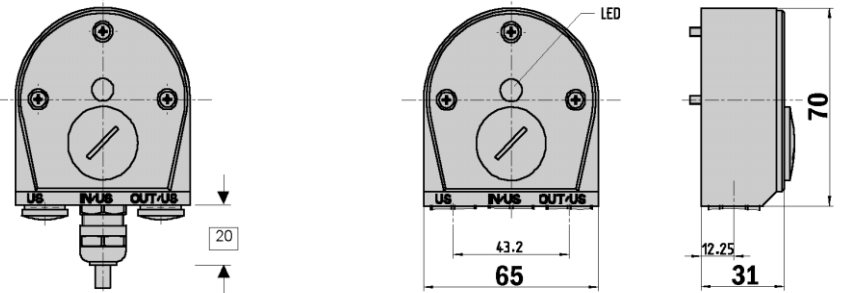
General tolerances to DIN ISO 2768-mk

Dimensional drawing DeviceNet adaptor SR2



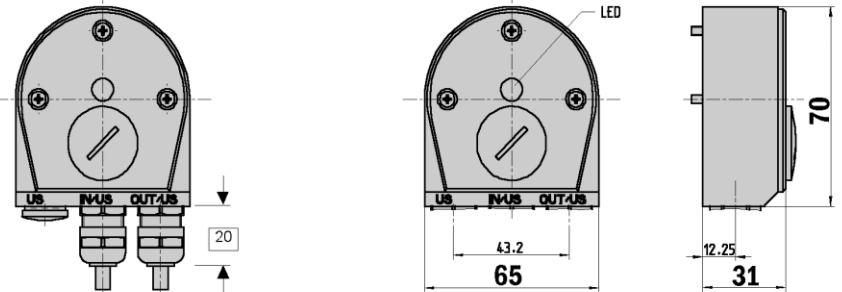
General tolerances to DIN ISO 2768-mk

Dimensional drawing DeviceNet adaptor KR1



General tolerances to DIN ISO 2768-mk

Dimensional drawing DeviceNet adaptor KR2



General tolerances to DIN ISO 2768-mk

Order information

BTF DeviceNet adaptor

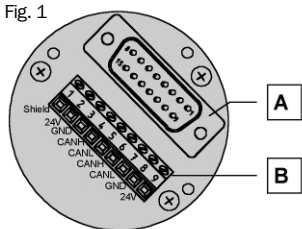
Type	Part no.	Description
AD-ATM60-SR1DN	2 029 226	Bus adaptor SR1, 1 x M12, 5 pin
AD-ATM60-SR2DN	2 029 227	Bus adaptor SR2, 1 x M12, 5 pin
AD-ATM60-KR1DN	2 029 228	Bus adaptor KR1, 1 x PG
AD-ATM60-KR2DN	2 029 229	Bus adaptor KR2, 2 x PG



1 PIN and wire allocation for DeviceNet adaptor

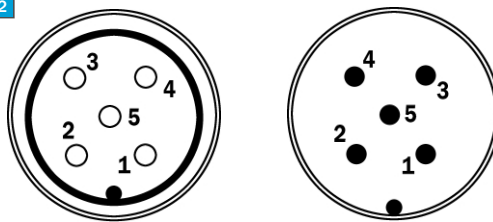
Terminal Strip	Connector	Signal	Explanation
1	1	Shield	Screen
2	2	U _s (24 V)	Supply voltage 10 ... 32 V
3	3	GND (COM)	0 V (Gnd)
4	4	CAN _H	CAN-Bus signal HIGH
5	5	CAN _L	CAN-Bus signal LOW
6		CAN _H	CAN-Bus signal HIGH
7		CAN _L	CAN-Bus signal LOW
8		GND (COM)	0 V (Gnd)
9		U _s (24 V)	Supply voltage 10 ... 32 V

Fig. 1



A Internal plug connection to the encoder
B External connection to the bus

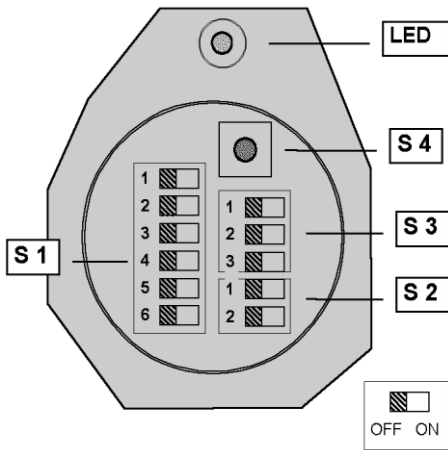
2



OUT/U_s (female) IN/U_s (male)
 Connector M12 (Bus adaptor)

1 Encoders with a DeviceNet adaptor have a terminal strip for connecting the bus and supply lines. In order to connect the lines, the DeviceNet adaptor is unscrewed from the complete device. The figure shows the pin allocation within the bus connection.

Switch settings



Switch settings

Access to the switches is gained by opening the removable screw cap (PG) on the rear of the bus adaptor. Use of the following elements.

S 1	Address setting (Node ID)
S 2	Bus termination
S 3	Baud rate setting (Data Rate)
S 4	Preset push button (Number zero SET)

Status information (NS) via LED

LED	2-colour red/green
	Network communication status

Implementation

DN Functionality

Object model

- Identity Object
- Message Router Object
- DeviceNet Object
- Assembly Object
- Connection Object
- Acknowledge Handler Object
- Encoder Object

I/O-Operating Modes

- Polling
- Change of State/Cyclic
- Bits Strobe

Encoder Parameters

according the Device Profile for Encoders:

- Code direction (CW, CCW)
- Scaling function (ON, OFF)
- PRESET value
- Hysteresis to position change of required for COS communication
- Steps per revolution (CPR) - 1 ... 8,192
- Total resolution (TR) -- 1 ... 67,108,864 steps, with TR = 2ⁿ x CPR -- (n=0 ... 13)
- Limits for the working range (software limit switches)
- Limits and display format for the speed and acceleration values
- 8 programmable cams with HIGH/LOW limits and hysteresis
- General Diagnostic parameters (Offset Value, Alarms, Warnings, version of profile and software)

Manufacturer specific parameters:

- Assignment of the I/O Data Assembly to the different I/O operating modes
- Diagnostic data indicating the current maximum results of the encoder
- Device-specific data

I/O Data Assembly

1)	Pos Val (Position Value) ¹⁾	I-1
2)	Pos Val + Flag	I-1, I-2
3)	Pos Val + Speed	I-1, I-3
4)	Pos Val + Status of Cam	I-1, I-4

Input Data Objects

I-1	Position value [Pos Val]	4 Byte
I-2	Flag (Alarm, Warning)	1 Byte
I-3	Speed	4 Byte
I-4	Status of cam	1 Byte

Setting: - Address (Node ID)

0 to 63 by Hardware (DIP Switch)

Setting: - Baud rate

125kb, 250kb, 500kb by Hardware (DIP Switch)

Setting: - Bus Termination

The DIP Switch (S2) is used to switch on/off an internal bus termination (ON/OFF). Not used (OFF) in case of using an external termination of the network

Setting: - PRESET Value

The Preset function supports adaptation of the encoder zero point to the mechanical zero point of the encoder system. The factory PRESET value is zero [0]

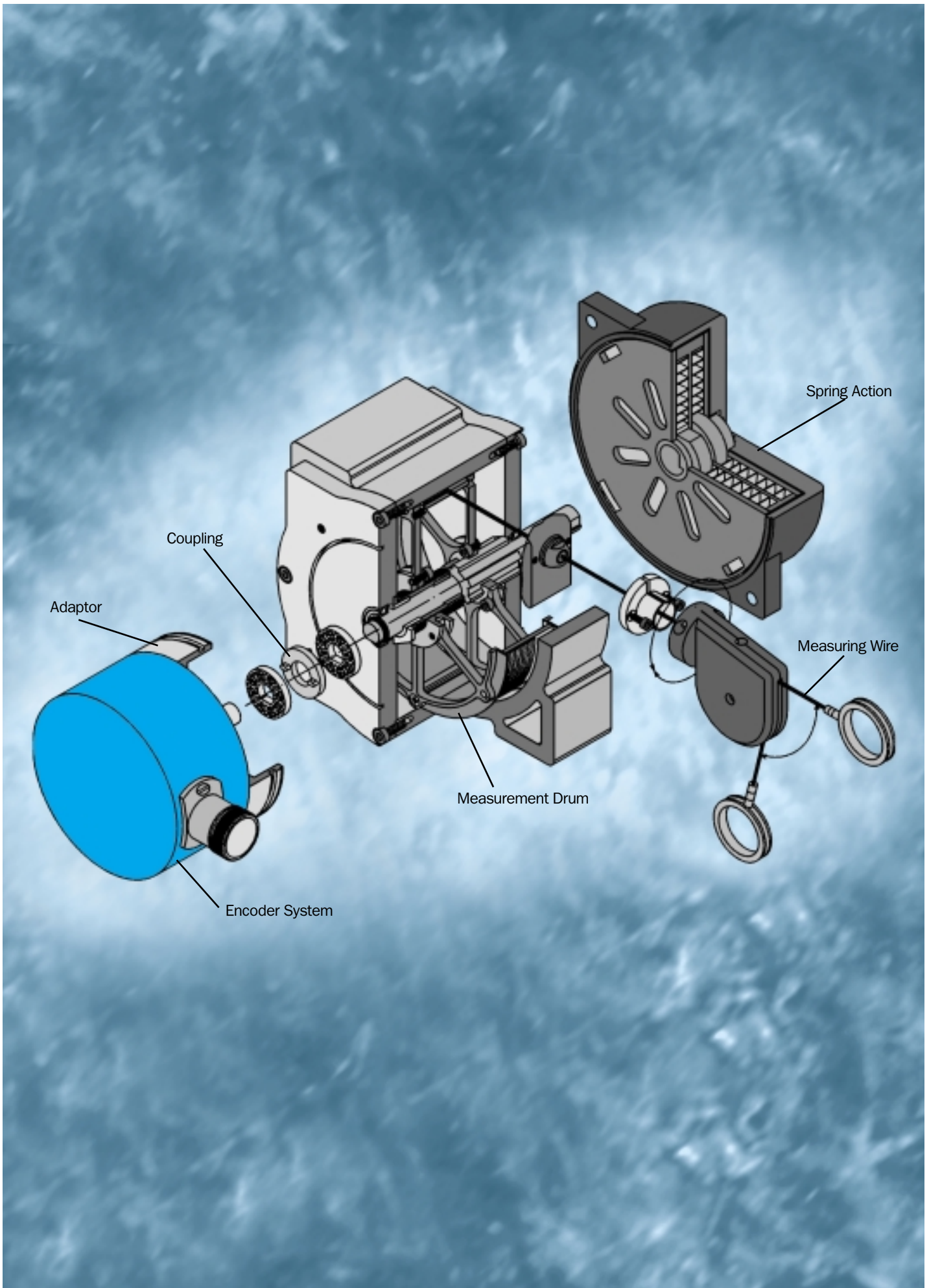
The adjustment is carried out in 2 ways:

- by Hardware (PRESET push button)
- by Software (DeviceNet Protocol)

Equipment Configuration

Configuring parameters of the encoder can be achieved by a configuration tool in conjunction with an EDS file (Electronic Data Sheet). It contains all the characteristics of the encoder.

¹⁾ Setting cannot be changed

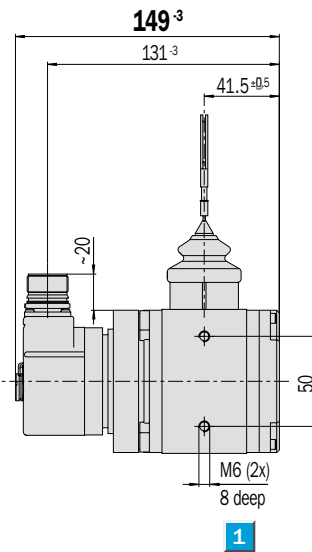


 **Resolution up to 0.025 mm**
Incremental Wire Draw Encoders

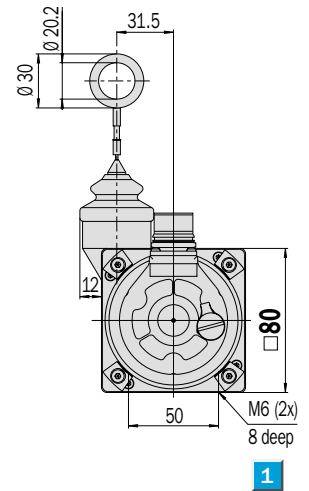
- Linear path measurement using a wire draw mechanism
- High resolution
- Easy to mount
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire
- Dirt remover made of steel



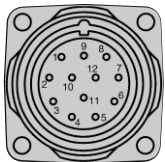
Dimensional drawing wire draw encoder PRF 08 TTL, HTL, measuring length 2 m



1 Threaded blind hole for mounting



General tolerances to DIN ISO 2768-mk



View of the connector M23 fitted to the encoder body

PIN and wire allocation

PIN	Signal	Wire colours (cable outlet)	Explanation
1	\bar{A}	black	Signal line
2	Sense +	grey	Connected internally to U_s
3	Z	lilac	Signal line
4	\bar{Z}	yellow	Signal line
5	B	white	Signal line
6	\bar{B}	brown	Signal line
7	N. C.		Not connected
8	A	pink	Signal line
9	Screen		Housing potential
10	GND	blue	Earth connection
11	Sense -	green	Connected internally to GND
12	U_s	red	Supply voltage ¹⁾

¹⁾ Volt-free to the housing
N. C. = Not connected

Accessories

- Wire draw mechanisms
- Mounting systems
- Connection systems

Technical data		PRF 08	TTL 2m	TTL 2m	HTL 2m						
Drum housing	Anodised Aluminium										
Spring housing	Die-cast zinc										
Measuring wire (stainless)	Highly flexible stranded steel, Ø 1.35 mm										
Measuring length	2 m max.										
Mass	1.6 kg approx.										
Electrical Interfaces	TTL/RS 422, 6 channels										
	HTL/push-pull, 6 channels										
Measuring step	0.025 mm 1										
Reference signal	Number: 1/position 90°										
Linearity	0.05 % typ.										
Repeatability	± 1 measuring step										
Operating speed	4 m/sec.										
Spring return force (typ.)											
start/finish ¹⁾	6 N/14 N										
Working temperature range	- 20 ... + 70 °C										
Storage temperature range	- 40 ... + 100 °C										
Life of wire draw mechanism ²⁾	1 million cycles										
EMC ³⁾											
Resistance											
to shocks ⁴⁾	50/11 g/ms										
to vibration ⁵⁾	20/10 ... 150 g/Hz										
Protection to IEC 60529	IP 64 (wire draw mechanism)										
	IP 65 (encoder)										
Operating voltage range (U_s)											
load	TTL/RS 422, 4.5 ... 5.5 V 20 mA max.										
current	TTL/RS 422, 10 ... 32 V 20 mA max.										
	HTL/push-pull, 10 ... 32 V 60 mA max.										
Operating current, no load											
at 5 V	120 mA typ.										
at 10 ... 32 V	100 mA typ.										
Operating Set button ⁶⁾	≥ 100 ms										
Initialisation time after power on	40 ms										

¹⁾ These values were measured at an ambient temperature of 25 °C. The values may be different at other temperatures.

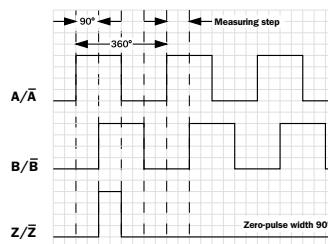
²⁾ Average values, which depend on the loading. At high operating speeds over long lengths, this figure can decrease; at slow operating speeds over short lengths, it can increase.

³⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3

⁴⁾ To DIN EN 60068-2-27

⁵⁾ To DIN EN 60068-2-6

⁶⁾ For stationary shaft only.



1 Based on the control/counter evaluating the flanks of the A+B pulses.

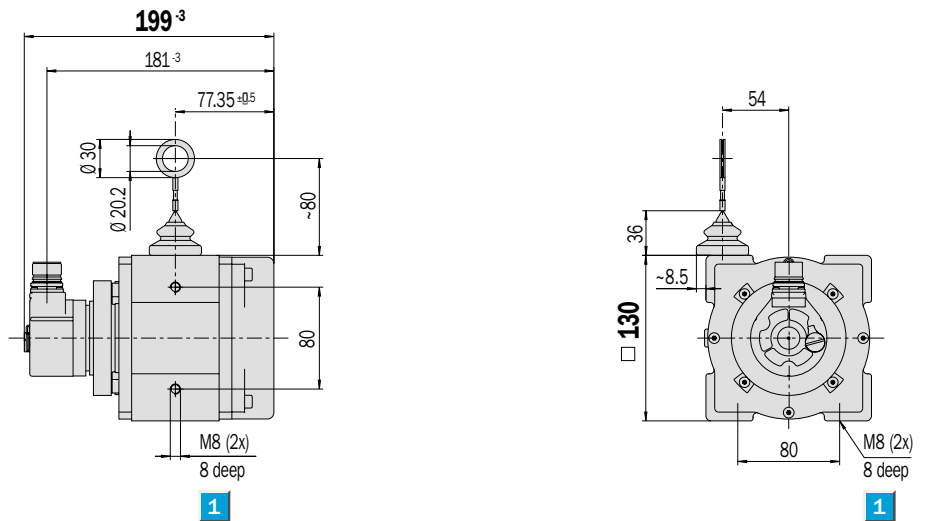
Order information		
PRF 08; connector M23, 12 pin		
Type	Part no.	Description
PRF08-A1AM0240	1 034 323	TTL 4.5 ... 5.5 V; measuring length 2 m
PRF08-C1AM0240	1 034 329	TTL 10 ... 32 V; measuring length 2 m
PRF08-E1AM0240	1 034 335	HTL 10 ... 32 V; measuring length 2 m

 **Resolution up to 0.025 mm**
Incremental Wire Draw Encoders

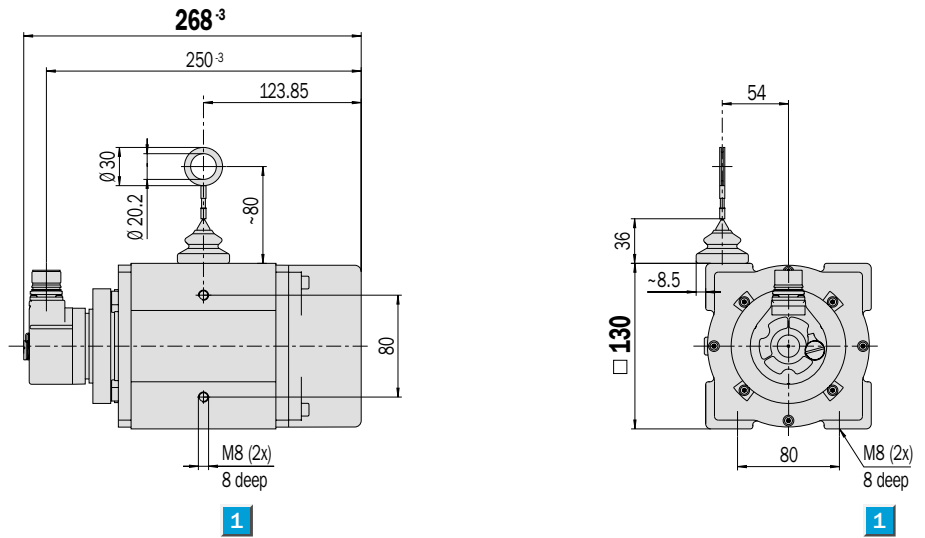
- Linear path measurement using a wire draw mechanism
- High resolution
- Easy to mount
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire
- Dirt remover made of steel



Dimensional drawing wire draw encoder PRF 13 TTL, HTL, measuring length 5 m

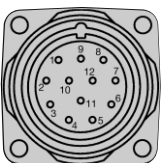


Dimensional drawing wire draw encoder PRF 13 TTL, HTL, measuring length 10 m



1 Threaded blind hole for mounting

General tolerances to DIN ISO 2768-mk



View of the connector M23 fitted to the encoder body

PIN and wire allocation

PIN	Signal	Wire colours (cable outlet)	Explanation
1	\bar{A}	black	Signal line
2	Sense +	grey	Connected internally to U_s
3	Z	lilac	Signal line
4	\bar{Z}	yellow	Signal line
5	B	white	Signal line
6	\bar{B}	brown	Signal line
7	N. C.		Not connected
8	A	pink	Signal line
9	Screen		Housing potential
10	GND	blue	Earth connection
11	Sense -	green	Connected internally to GND
12	U_s	red	Supply voltage ¹⁾

¹⁾ Volt-free to the housing
N. C. = Not connected

Accessories
Wire draw mechanisms
Mounting systems
Connection systems

Technical data		PRF 13	TTL 5m	TTL 5m	HTL 5m	TTL 10m	TTL 10m	HTL 10m				
Drum housing	Anodised Aluminium											
Spring housing	Plastic											
Measuring wire (stainless)	Highly flexible stranded steel, Ø 1.35 mm											
Measuring length	5 m max.											
	10 m max.											
Mass	3.1 kg approx.											
	3.8 kg approx.											
Electrical Interfaces	TTL/RS 422, 6 channels											
	HTL/push-pull, 6 channels											
Measuring step	0.05 mm ¹											
Reference signal	Number: 1/position 90°											
Linearity	0.05 % typ.											
Repeatability	± 1 measuring step											
Operating speed	4 m/sec.											
Spring return force (typ.)												
start/finish ¹⁾	15 N/20 N											
start/finish ¹⁾	10 N/20 N											
Working temperature range	- 20 ... + 70 °C											
Storage temperature range	- 40 ... + 100 °C											
Life of wire draw mechanism ²⁾	1 million cycles											
EMC ³⁾												
Resistance												
to shocks ⁴⁾	50/11 g/ms											
to vibration ⁵⁾	20/10 ... 150 g/Hz											
Protection to IEC 60529	IP 64 (wire draw mechanism)											
	IP 65 (encoder)											
Operating voltage range (U_s)												
load	TTL/RS 422, 4.5 ... 5.5 V	20 mA max.										
current	TTL/RS 422, 10 ... 32 V	20 mA max.										
	HTL/push-pull, 10 ... 32 V	60 mA max.										
Operating current, no load												
at 5 V		120 mA typ.										
at 10 ... 32 V		100 mA typ.										
Operating Set button ⁶⁾		≥ 100 ms										
Initialisation time after power on		40 ms										

¹⁾ These values were measured at an ambient temperature of 25 °C. The values may be different at other temperatures.

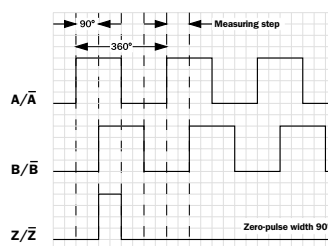
²⁾ Average values, which depend on the loading.
At high operating speeds over long lengths, this figure can decrease; at slow operating speeds over short lengths, it can increase.

³⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3

⁴⁾ To DIN EN 60068-2-27

⁵⁾ To DIN EN 60068-2-6

⁶⁾ For stationary shaft only.



¹ Based on the control/counter evaluating the flanks of the A+B pulses.

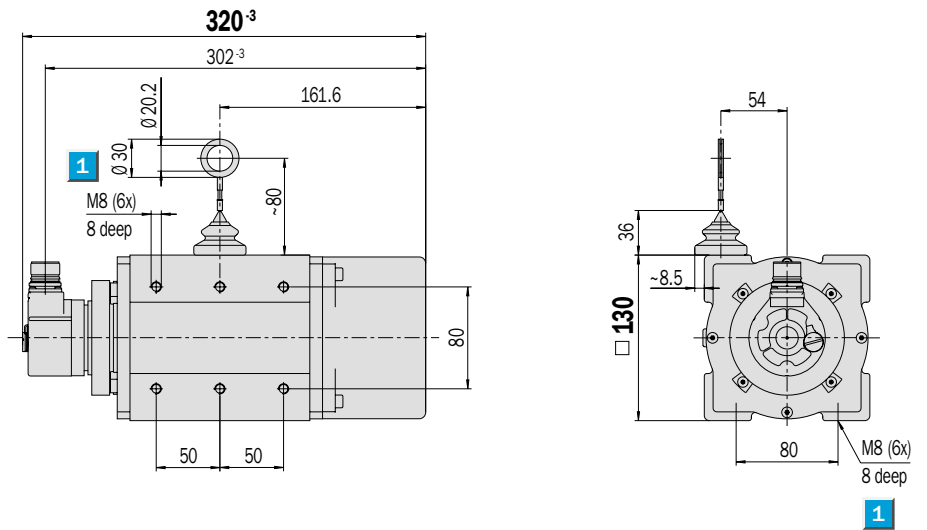
Order information		
PRF 13; connector M23, 12 pin		
Type	Part no.	Description
PRF13-A1AM0520	1 034 324	TTL 4.5 ... 5.5 V; measuring length 5 m
PRF13-C1AM0520	1 034 330	TTL 10 ... 32 V; measuring length 5 m
PRF13-E1AM0520	1 034 336	HTL 10 ... 32 V; measuring length 5 m
PRF13-A1AM1020	1 034 325	TTL 4,5 ... 5,5 V; measuring length 10 m
PRF13-C1AM1020	1 034 331	TTL 10 ... 32 V; measuring length 10 m
PRF13-E1AM1020	1 034 337	HTL 10 ... 32 V; measuring length 10 m

 **Resolution up to 0.025 mm**
Incremental Wire Draw Encoders

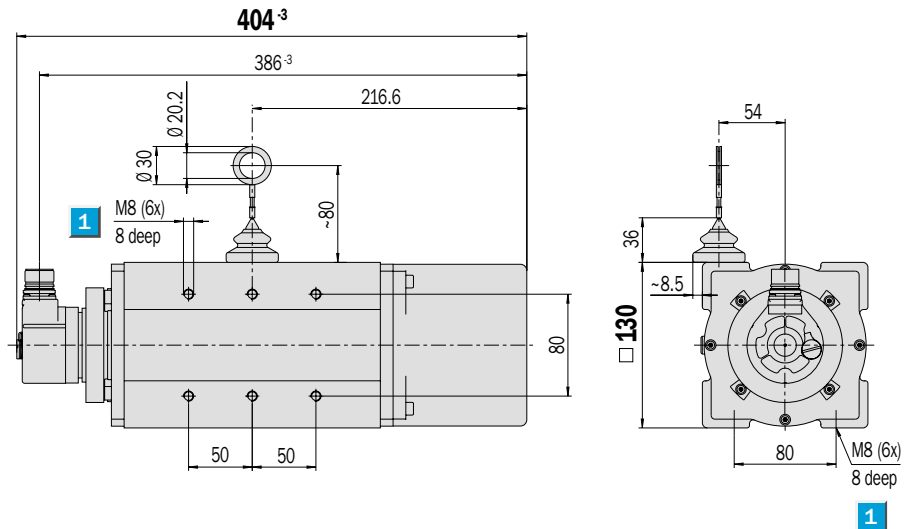
- Linear path measurement using a wire draw mechanism
- High resolution
- Easy to mount
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire
- Dirt remover made of steel



Dimensional drawing wire draw encoder PRF 13 TTL, HTL, measuring length 20 m

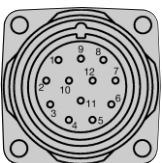


Dimensional drawing wire draw encoder PRF 13 TTL, HTL, measuring length 30 m



1 Threaded blind hole for mounting

General tolerances to DIN ISO 2768-mk



View of the connector M23 fitted to the encoder body

PIN and wire allocation

PIN	Signal	Wire colours (cable outlet)	Explanation
1	\bar{A}	black	Signal line
2	Sense +	grey	Connected internally to U_s
3	Z	lilac	Signal line
4	\bar{Z}	yellow	Signal line
5	B	white	Signal line
6	\bar{B}	brown	Signal line
7	N. C.		Not connected
8	A	pink	Signal line
9	Screen		Housing potential
10	GND	blue	Earth connection
11	Sense -	green	Connected internally to GND
12	U_s	red	Supply voltage ¹⁾

¹⁾ Volt-free to the housing
N. C. = Not connected

Accessories

- Wire draw mechanisms
- Mounting systems
- Connection systems

Technical data		PRF 13	TTL 20m	TTL 20m	HTL 20m	TTL 30m	TTL 30m	HTL 30m				
Drum housing	Anodised Aluminium											
Spring housing	Plastic											
Measuring wire (stainless)	Highly flexible stranded steel, Ø 0.81 mm											
Measuring length	20 m max.											
	30 m max.											
Mass	5.3 kg approx.											
	6.5 kg approx.											
Electrical Interfaces	TTL/RS 422, 6 channels											
	HTL/push-pull, 6 channels											
Measuring step	0.05 mm ¹											
Reference signal	Number: 1/position 90°											
Linearity	0.05 % typ.											
Repeatability	± 1 measuring step											
Operating speed	4 m/sec.											
Spring return force (typ.)												
start/finish ¹⁾	10 N/20 N											
Working temperature range	- 20 ... + 70 °C											
Storage temperature range	- 40 ... + 100 °C											
Life of wire draw mechanism ²⁾	1 million cycles											
EMC ³⁾												
Resistance												
to shocks ⁴⁾	50/11 g/ms											
to vibration ⁵⁾	20/10 ... 150 g/Hz											
Protection to IEC 60529	IP 64 (wire draw mechanism)											
	IP 65 (encoder)											
Operating voltage range (U_s)												
load	TTL/RS 422, 4.5 ... 5.5 V	20 mA max.										
current	TTL/RS 422, 10 ... 32 V	20 mA max.										
	HTL/push-pull, 10 ... 32 V	60 mA max.										
Operating current, no load												
at 5 V		120 mA typ.										
at 10 ... 32 V		100 mA typ.										
Operating Set button ⁶⁾		≥ 100 ms										
Initialisation time after power on		40 ms										

¹⁾ These values were measured at an ambient temperature of 25 °C. The values may be different at other temperatures.

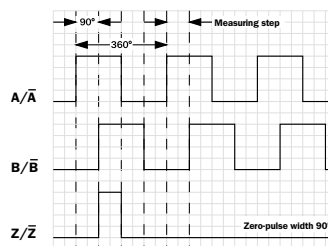
²⁾ Average values, which depend on the loading. At high operating speeds over long lengths, this figure can decrease; at slow operating speeds over short lengths, it can increase.

³⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3

⁴⁾ To DIN EN 60068-2-27

⁵⁾ To DIN EN 60068-2-6

⁶⁾ For stationary shaft only.

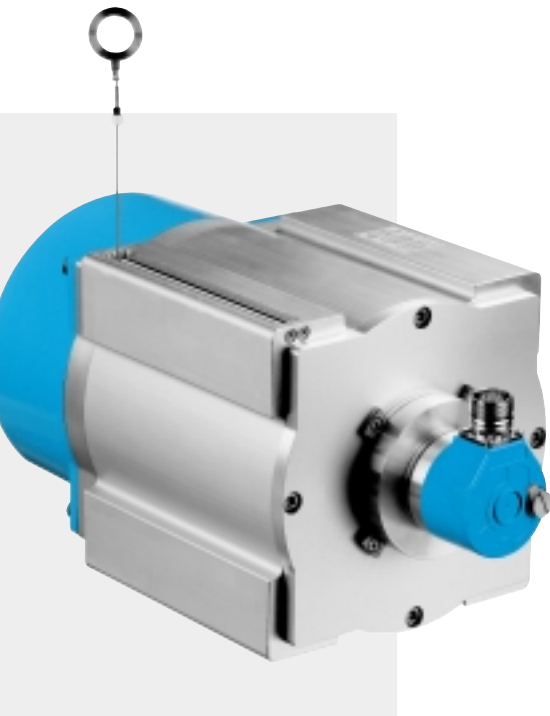


¹ Based on the control/counter evaluating the flanks of the A+B pulses.

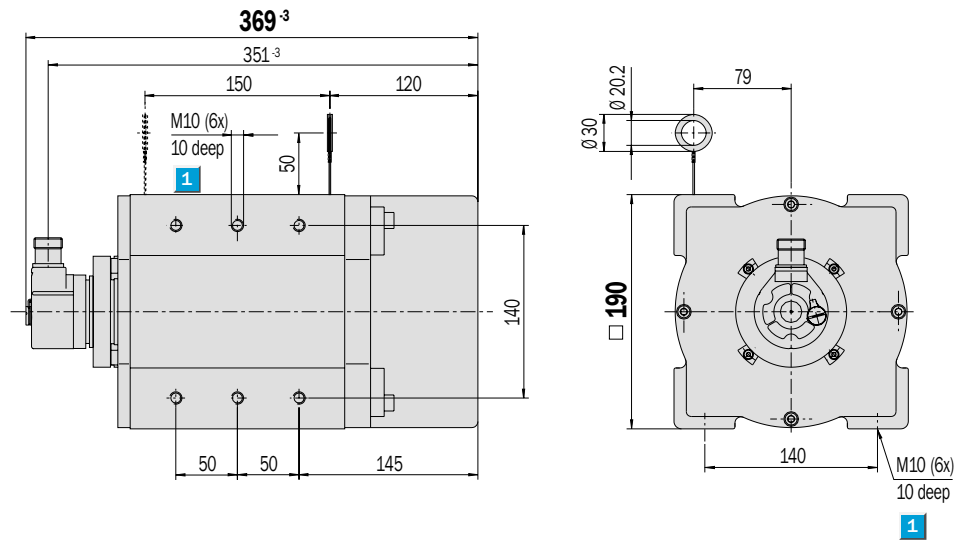
Order information		
PRF 13; connector M23, 12 pin		
Type	Part no.	Description
PRF13-A1AM2020	1 034 326	TTL 4.5 ... 5.5 V; measuring length 20m
PRF13-C1AM2020	1 034 332	TTL 10 ... 32 V; measuring length 20 m
PRF13-E1AM2020	1 034 338	HTL 10 ... 32 V; measuring length 20 m
PRF13-A1AM3020	1 034 327	TTL 4,5 ... 5,5 V; measuring length 30 m
PRF13-C1AM3020	1 034 333	TTL 10 ... 32 V; measuring length 30 m
PRF13-E1AM3020	1 034 339	HTL 10 ... 32 V; measuring length 30 m

 **Resolution up to 0.025 mm**
Incremental Wire Draw Encoders

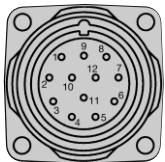
- Linear path measurement using a wire draw mechanism
- High resolution
- Easy to mount
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire



Dimensional drawing wire draw encoder PRF 19 TTL, HTL, measuring length 50 m



1 Threaded blind hole for mounting



View of the connector M23 fitted to the encoder body

PIN and wire allocation

PIN	Signal	Wire colours (cable outlet)	Explanation
1	\bar{A}	black	Signal line
2	Sense +	grey	Connected internally to U_s
3	Z	lilac	Signal line
4	\bar{Z}	yellow	Signal line
5	B	white	Signal line
6	\bar{B}	brown	Signal line
7	N. C.		Not connected
8	A	pink	Signal line
9	Screen		Housing potential
10	GND	blue	Earth connection
11	Sense -	green	Connected internally to GND
12	U_s	red	Supply voltage ¹⁾

¹⁾ Volt-free to the housing
N. C. = Not connected

Accessories

- Wire draw mechanisms
- Mounting systems
- Connection systems

Technical data		PRF 19	TTL 50m	TTL 50m	HTL 50m						
Drum housing	Anodised Aluminium										
Spring housing	Die-cast zinc										
Measuring wire (stainless)	Highly flexible stranded steel, Ø 1.35 mm										
Measuring length	50 m max.										
Mass	16.8 kg approx.										
Electrical Interfaces	TTL/RS 422, 6 channels										
	HTL/push-pull, 6 channels										
Measuring step	0.1 mm ¹										
Reference signal	Number: 1/position 90°										
Linearity	0.05 % typ.										
Repeatability	± 1 measuring step										
Operating speed	4 m/sec.										
Spring return force (typ.)											
start/finish ¹⁾	18 N/37 N										
Working temperature range	- 20 ... + 70 °C										
Storage temperature range	- 40 ... + 100 °C										
Life of wire draw mechanism ²⁾	1 million cycles										
EMC ³⁾											
Resistance											
to shocks ⁴⁾	50/11 g/ms										
to vibration ⁵⁾	20/10 ... 150 g/Hz										
Protection to IEC 60529	IP 31 (wire draw mechanism)										
	IP 65 (encoder)										
Operating voltage range (U_s)											
load	TTL/RS 422, 4.5 ... 5.5 V	20 mA max.									
current	TTL/RS 422, 10 ... 32 V	20 mA max.									
	HTL/push-pull, 10 ... 32 V	60 mA max.									
Operating current, no load											
at 5 V		120 mA typ.									
at 10 ... 32 V		100 mA typ.									
Operating Set button ⁶⁾		≥ 100 ms									
Initialisation time after power on		40 ms									

¹⁾ These values were measured at an ambient temperature of 25 °C. The values may be different at other temperatures.

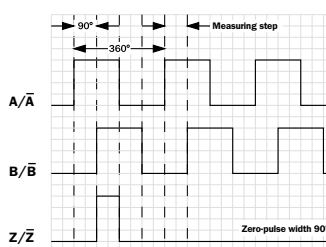
²⁾ Average values, which depend on the loading. At high operating speeds over long lengths, this figure can decrease; at slow operating speeds over short lengths, it can increase.

³⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3

⁴⁾ To DIN EN 60068-2-27

⁵⁾ To DIN EN 60068-2-6

⁶⁾ For stationary shaft only.



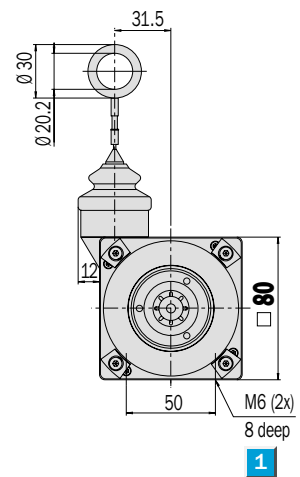
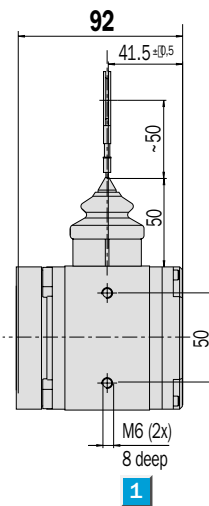
¹ Based on the control/counter evaluating the flanks of the A+B pulses.

Order information		
PRF 19; connector M23, 12 pin		
Type	Part no.	Description
PRF19-A1AM5010	1 034 328	TTL 4.5 ... 5.5 V; measuring length 50 m
PRF19-C1AM5010	1 034 334	TTL 10 ... 32 V; measuring length 50 m
PRF19-E1AM5010	1 034 340	HTL 10 ... 32 V; measuring length 50 m

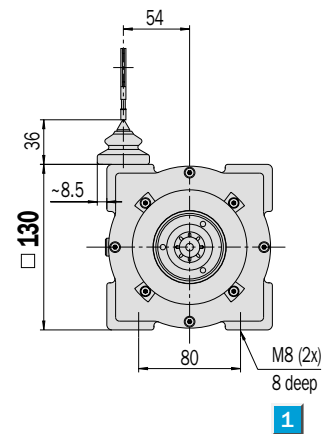
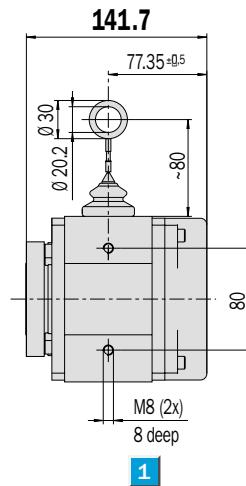
- Linear path measurement using a wire draw mechanism
- Easy mounting of the encoder
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire
- Dirt remover made of steel



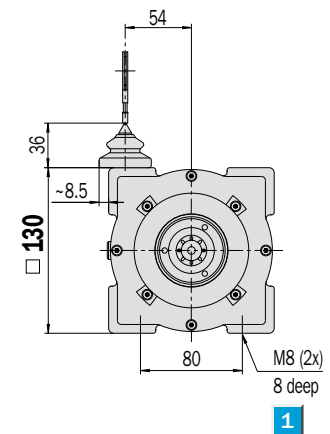
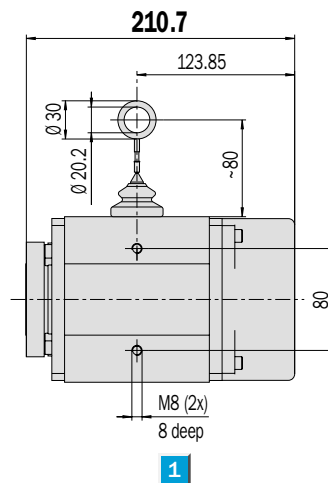
Dimensional drawing wire draw mechanism 2 m; measuring wire \varnothing 1.35 mm



Dimensional drawing wire draw mechanism 5 m; measuring wire \varnothing 1.35 mm



Dimensional drawing wire draw mechanism 10 m; measuring wire \varnothing 1.35 mm



Accessories to suit this unit matching this:
Wire guiding rollers and spare parts kit
(page 38)

1 Threaded blind hole for mounting

General tolerances to DIN ISO 2768-mk

Technical data		Wire draw mechanism	Measuring length												
			2 m	5 m	10 m										
Measuring wire (stainless)	Highly flexible stranded steel, Ø 1.35 mm														
Drum housing	Anodised Aluminium														
Spring housing	Die-cast zinc														
	Plastic														
Drum diameter	62.31 mm														
	105 mm														
Number of turns for full extension	10 approx.														
	15 approx.														
	30 approx.														
Drum precision	0.05 %														
Operating speed	4 m/sec.														
Spring return force (typ.)															
start/finish ¹⁾	6 N/14 N														
start/finish ¹⁾	15 N/20 N														
start/finish ¹⁾	10 N/20 N														
Working temperature range	- 20 ... + 70 °C														
Protection to IEC 60529	IP 64														
Life ²⁾	1 million cycles														
Mass	1.3 kg														
	2.8 kg														
	3.5 kg														

¹⁾ These values were measured at an ambient temperature of 25 °C. The values may be different at other temperatures.

²⁾ Average values, which depend on the loading.
At high operating speeds over long lengths, this figure can decrease;
at slow operating speeds over short lengths, it can increase.

Absolute encoders: determining the matching number of steps of the encoder for the required linear resolution

$$\text{No. of encoder steps per revolution} = \frac{3.1416 \times (\text{drum diameter} + \text{wire diameter})}{\text{Linear resolution per measuring step}}$$

Example: required linear resolution 0.05 mm; wire draw mechanism 5 m

$$\text{No. of encoder steps per revolution} = \frac{3.1416 \times (105 \text{ mm} + 1.35 \text{ mm})}{0.05 \text{ mm}} = 6682$$

Incremental encoders: determining the matching number of pulses of the encoder for the required linear resolution

$$\text{No. of encoder pulses per revolution} = \frac{3.1416 \times (\text{drum diameter} + \text{wire diameter})}{4 \times \text{Linear resolution per measuring step}} \quad 1$$

Example: required linear resolution 0.025 mm; wire draw mechanism 2 m

$$\text{No. of encoder pulses per revolution} = \frac{3.1416 \times (62.31 \text{ mm} + 1.35 \text{ mm})}{4 \times 0.025 \text{ mm}} = 2000$$

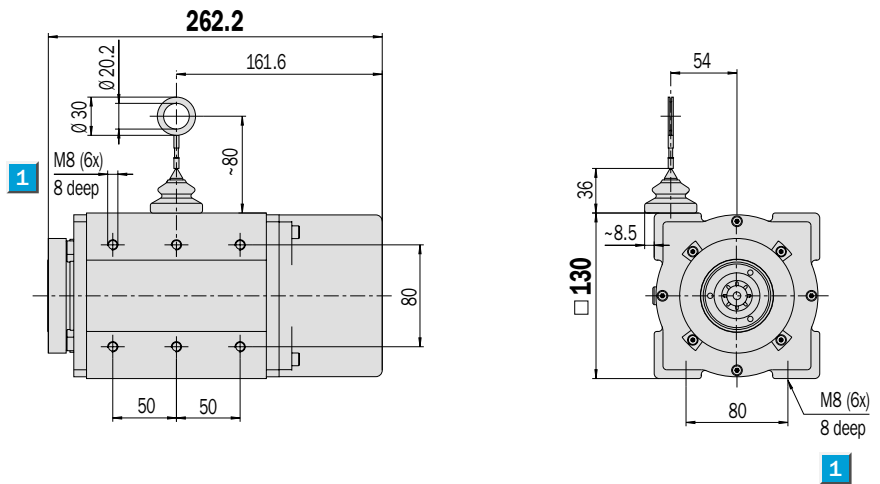
¹⁾ Based on the control/counter evaluating the flanks of the A+B pulses.

Order information		
MRA-F wire draw mechanism without encoder		
Type	Part no.	Description
MRA-F080-102D2	6 028 625	measur. length 2 m
MRA-F130-105D2	6 028 626	measur. length 5 m
MRA-F130-110D2	6 028 627	measur. length 10 m

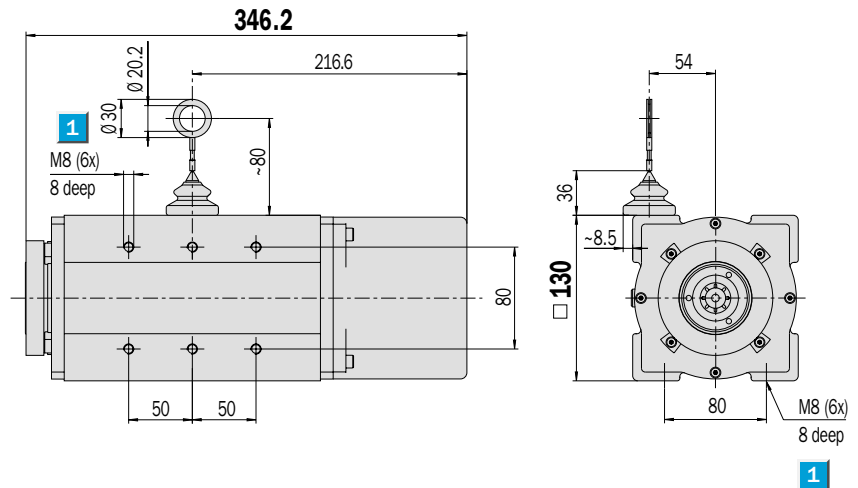
Wire draw mechanisms are prepared exclusively for attaching SICK-STEGMANN encoders with servo flange (or compatible flanges).

- Linear path measurement using a wire draw mechanism
- Easy mounting of the encoder
- High-precision measurement drum
- Extremely stable spring return
- Highly flexible steel wire
- Dirt remover made of steel

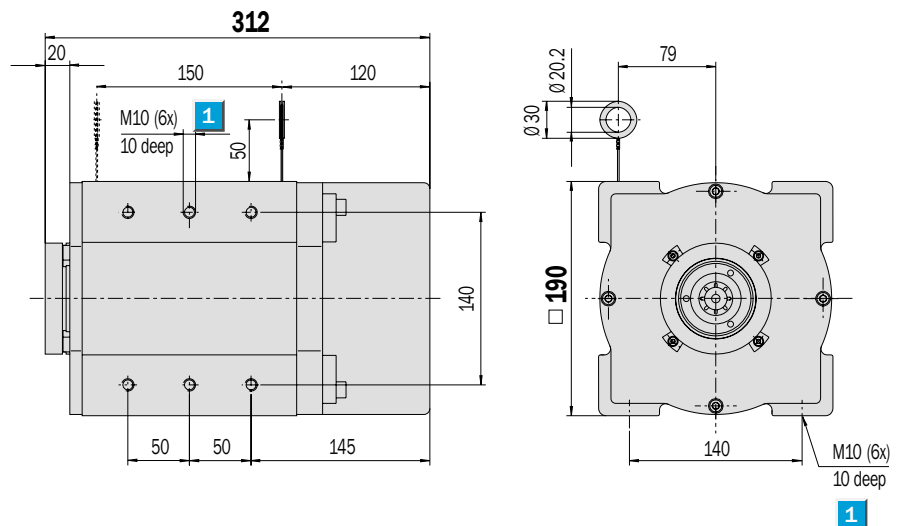
Dimensional drawing wire draw mechanism 20 m; measuring wire Ø 0.81 mm



Dimensional drawing wire draw mechanism 30 m; measuring wire Ø 0.81 mm



Dimensional drawing wire draw mechanism 50 m; measuring wire Ø 0.81 mm



Accessories to suit this unit matching this:
Wire guiding rollers and spare parts kit
(page 38)

1 Threaded blind hole for mounting

General tolerances to DIN ISO 2768-mk

Technical data		Wire draw mechanism	Measuring length												
			20 m	30 m	50 m										
Measuring wire (stainless)	Highly flexible stranded steel, Ø 0.81 mm														
	Highly flexible stranded steel, Ø 1.35 mm														
Drum housing	Anodised Aluminium														
Spring housing	Plastic														
	Die-cast zinc														
Drum diameter	105 mm														
	155.1 mm														
Number of turns for full extension	61 approx.														
	91 approx.														
	102 approx.														
Drum precision	0.05 %														
Operating speed	4 m/sec.														
Spring return force (typ.)															
start/finish ¹⁾	10 N/20 N														
start/finish ¹⁾	18 N/37 N														
Working temperature range	- 20 ... + 70 °C														
Protection to IEC 60529	IP 64														
	IP 31														
Life ²⁾	1 million cycles														
Mass	5.0 kg														
	6.2 kg														
	16.5 kg														

¹⁾ These values were measured at an ambient temperature of 25 °C. The values may be different at other temperatures.

²⁾ Average values, which depend on the loading.
At high operating speeds over long lengths, this figure can decrease;
at slow operating speeds over short lengths, it can increase.

Absolute encoders: determining the matching number of steps of the encoder for the required linear resolution

$$\text{No. of encoder steps per revolution} = \frac{3.1416 \times (\text{drum diameter} + \text{wire diameter})}{\text{Linear resolution per measuring step}}$$

Example: required linear resolution 0.05 mm; wire draw mechanism 30 m

$$\text{No. of encoder steps per revolution} = \frac{3.1416 \times (105 \text{ mm} + 0.81 \text{ mm})}{0.05 \text{ mm}} = 6648$$

Incremental encoders: determining the matching number of pulses of the encoder for the required linear resolution

$$\text{No. of encoder pulses per revolution} = \frac{3.1416 \times (\text{drum diameter} + \text{wire diameter})}{4 \times \text{Linear resolution per measuring step}} \quad 1$$

Example: required linear resolution 0.025 mm; wire draw mechanism 20 m

$$\text{No. of encoder pulses per revolution} = \frac{3.1416 \times (105 \text{ mm} + 0.81 \text{ mm})}{4 \times 0.025 \text{ mm}} = 1662$$

¹⁾ Based on the control/counter evaluating the flanks of the A+B pulses.

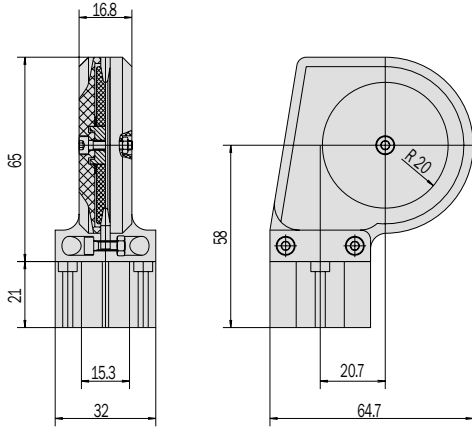
Order information		
MRA-F wire draw mechanism without encoder		
Type	Part no.	Description
MRA-F130-120D1	6 028 628	measur. length 20 m
MRA-F130-130D1	6 028 629	measur. length 30 m
MRA-F190-150D2	6 028 630	measur. length 50 m

Wire draw mechanisms are prepared exclusively for attaching SICK-STEGMANN encoders with servo flange (or compatible flanges).

Dimensional drawings and order information

Wire guiding roller for wire draw mechanism 2 m

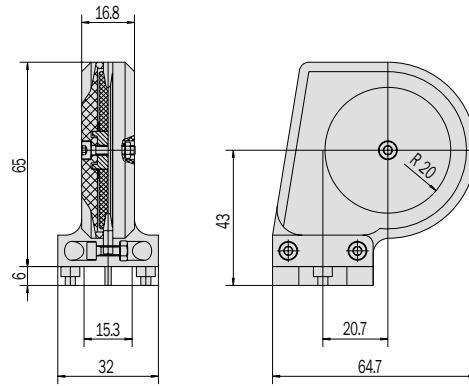
Type	Part no.
MRA-F080-R	6 028 632



General tolerances to DIN ISO 2768-mk

Wire guiding roller for wire draw mechanisms 5 m, 10 m, 20 m and 30 m

Type	Part no.
MRA-F130-R	6 028 631



General tolerances to DIN ISO 2768-mk

Spare parts kit for all versions of wire draw mechanisms

Type	Part no.	Description
MRA-F-K	6 028 633	Assembly fittings: 4 servo clamps + screws, 3 screws M4 x 8, coupling, 2 sealing rings

Dimensional drawings and order information

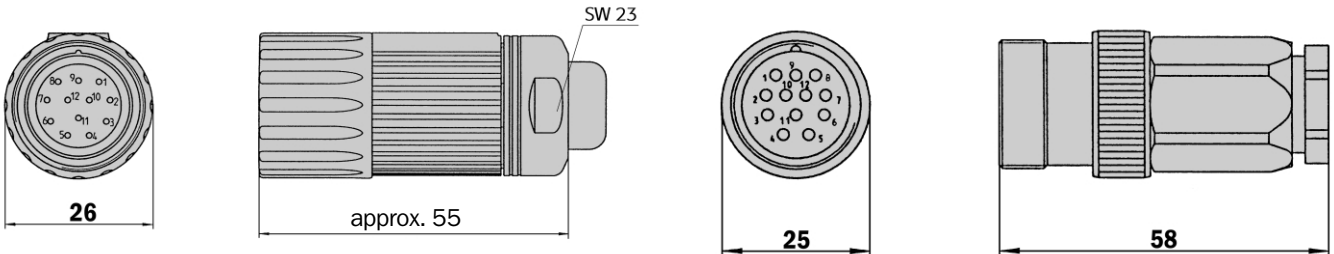
Round screw-in system M23, 12 pin for wire draw encoder BTF with SSI interface

Connector M23 female, 12 pin, straight, screened

Type	Part no.	Contacts
DOS-2312-G	6 027 538	12

Connector M23 male, 12 pin, straight, screened

Type	Part no.	Contacts
STE-2312-G	6 027 537	12



Connector M23 female, 12 pin, straight, cable 12 cores, 4 x 2 x 0.25 + 2 x 0.5 + 2 x 0.14 mm² screened, capable of being dragged, cable diameter 7.8 mm for wire draw encoders BTF with SSI interface

Type	Part no.	Contacts	Cable length
DOL-2312-G1M5MA1	2 029 200	12	1.5 m
DOL-2312-G03MMA1	2 029 201	12	3.0 m
DOL-2312-G05MMA1	2 029 202	12	5.0 m
DOL-2312-G10MMA1	2 029 203	12	10.0 m
DOL-2312-G20MMA1	2 029 204	12	20.0 m
DOL-2312-G30MMA1	2 029 205	12	30.0 m

Cable, 8 core, per metre, 4 x 2 x 0.15 mm² with screen, cable diameter 5.6 mm for wire draw encoder BTF with SSI interface

Type	Part no.	Wires
LTG-2308-MW	6 027 529	8

Cable, 11 cores, per metre, 4 x 2 x 0.25 + 2 x 0.5 + 1 x 0.14 mm² with screen, cable diameter 7.5 mm for wire draw encoder BTF with SSI interface

Type	Part no.	Wires
LTG-2411-MW	6 027 530	11

Cable, 12 cores, per metre, 4 x 2 x 0.25 + 2 x 0.5 + 1 x 0.14 mm² with screen, capable of being dragged, cable diameter 7.8 mm for wire draw encoder BTF with SSI interface

Type	Part no.	Wires	Description
LTG-2512-MW	6 027 531	12	
LTG-2612-MW	6 028 516	12	Resistant to salt water and UV

Dimensional drawings and order information

Adaptor modules for wire draw encoder BTF with SSI interface

Serial Parallel Adaptors

Type	Part no.	Explanation
AD-SSIG-PA	1 030 106	SSI Parallel Adaptor module, in plastic housing
AD-SSI-PA	1 030 107	SSI Parallel Adaptor module, without plastic housing
AD-SSIPG-PA	1 030 108	SSI Parallel Adaptor module, programmable, in plastic housing
AD-SSIPF-PA	1 030 109	SSI Parallel Adaptor module, programmable, without plastic housing, with front plate
AD-SSIP-PA	1 030 110	SSI Parallel Adaptor module, programmable, without plastic housing, without front plate

Programming tool for programmable serial parallel adaptor

Type	Part no.
PGT-02-S	1 030 112

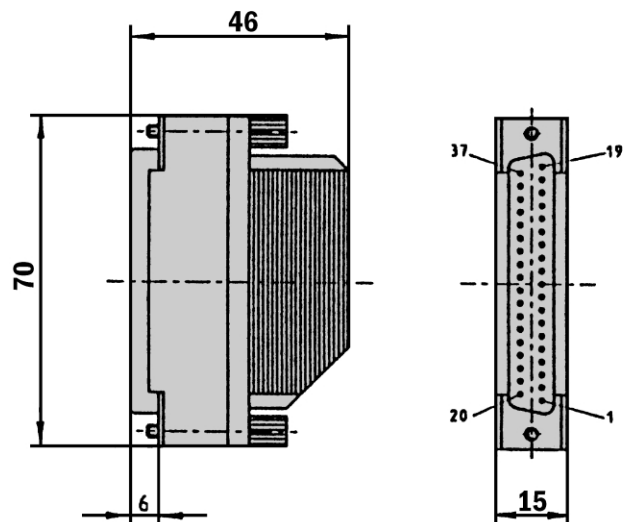
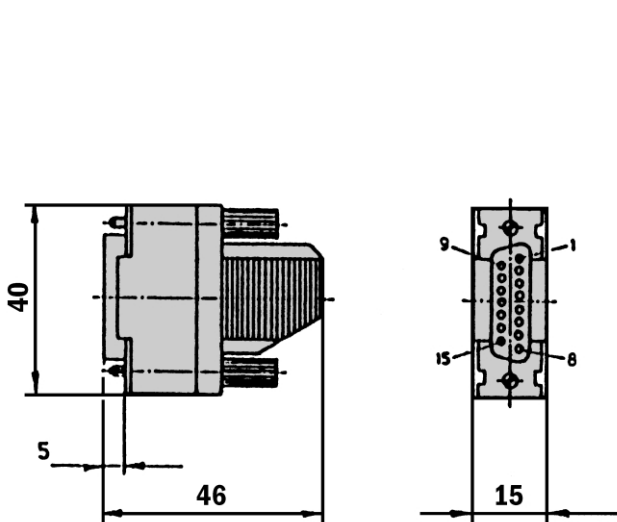
Plug-in system Sub-D connectors for serial parallel adaptor

Cable connector Sub-D male, 15 pin, straight, screened

Type	Part no.	Contacts
STE-0D15-G	2 029 223	15

Cable connector Sub-D female, 37 pin, straight, screened

Type	Part no.	Contacts
DOS-0D37-G	2 029 224	37



General tolerances to DIN ISO 2768-mk

General tolerances to DIN ISO 2768-mk

Dimensional drawings and order information

Round screw-in system M23, 5 pin for wire draw encoder BTF with DeviceNet interface

Cable connector M12 female, 5 pin, straight, screened

Type	Part no.	Contacts
DOS-1205-G	6 027 534	5

Cable connector M12 male, 5 pin, straight, screened

Type	Part no.	Contacts
STE-1205-G	6 027 533	5

Dimensional drawings and order information

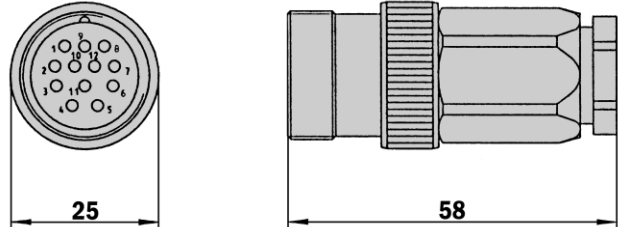
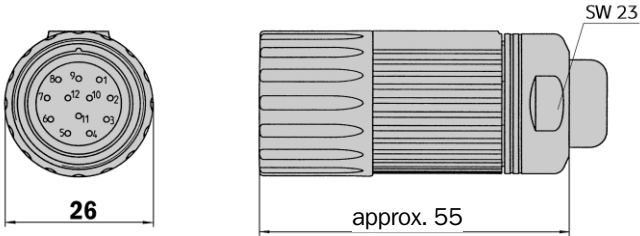
Round screw-in system M23, 12 pin for wire draw encoder PRF with TTL/HTL interface

Cable connector M23 female, 12 pin, straight, screened

Type	Part no.	Contacts
DOS-2312-G	6 027 538	12

Cable connector M23 male, 12 pin, straight, screened

Type	Part no.	Contacts
STE-2312-G	6 027 537	12



Cable connector M23 female, 12 pin, straight, Cable 12 core, 4 x 2 x 0.25 + 2 x 0.5 + 2 x 0.14 mm² with screen, capable of being dragged, cable diameter 7.8 mm for wire draw encoder PRF with TTL/HTL interface

Type	Part no.	Contacts	Cable length
DOL-2312-G1M5MA3	2 029 212	12	1.5 m
DOL-2312-G03MMA3	2 029 213	12	3.0 m
DOL-2312-G05MMA3	2 029 214	12	5.0 m
DOL-2312-G10MMA3	2 029 215	12	10.0 m
DOL-2312-G20MMA3	2 029 216	12	20.0 m
DOL-2312-G30MMA3	2 029 217	12	30.0 m

Cable, 8 core, per metre, 4 x 2 x 0.15 mm² with screen, cable diameter 5.6 mm for wire draw encoder PRF with TTL/HTL interface

Type	Part no.	Wires
LTG-2308-MW	6 027 529	8

Cable, 11 core, per metre, 4 x 2 x 0.25 + 2 x 0.5 + 1 x 0.14 mm² with screen, cable diameter 7.5 mm for wire draw encoder PRF with TTL/HTL interface

Type	Part no.	Wires
LTG-2411-MW	6 027 530	11

Cable, 12 core, per metre, 4 x 2 x 0.25 + 2 x 0.5 + 1 x 0.14 mm² with screen, capable of being dragged, cable diameter 7.8 mm for wire draw encoder PRF with TTL/HTL interface

Type	Part no.	Wires	Description
LTG-2512-MW	6 027 531	12	
LTG-2612-MW	6 028 516	12	Resistant to salt water and UV

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