KH53

FOR THE HARSHEST CONDITIONS –
THE HEAVY-DUTY LINEAR ENCODER

Linear encoders

SICK
Sensor Intelligence.

FOR THE HARSHEST CONDITIONS - THE HEAVY-DUTY LINEAR ENCODER

Product description

The POMUX KH53 non-contact linear encoder can measure absolute lengths up to 1,700 m. The encoder consists of two main components: The non-contact read head determines the absolute position using a series of measuring elements attached along the measurement path. Each measuring element consists of a number of permanent magnets. Since the distances between the magnets are unique, they can be used to develop an absolute measuring code. No reference run is required due to the absolute position being determined. The read head is passed parallel to these measuring elements at a distance of 25 mm or 55 mm. With a measuring length of up to 1,700 m, the KH53 is ideal for use in cranes, in storage and conveyor systems, and for railed vehicles. Due to the non-contact technology, this system works wear-free even in harsh ambient conditions, so that a long lifetime is ensured.

At a glance

- Non-contact length measurement – maintenance-free, rugged, long service life
- High reproducibility (0.3 mm / 1 mm), high system resolution (0.1 mm)
- SSI and PROFIBUS interfaces
- Determination of absolute position
- Measuring lengths of up to 1,700 m possible
- Can be used in harshest ambient conditions
- High traversing speeds of up to 6.6 m/s
- Distance tolerance between read head and measuring element: up to 55 mm ± 20 mm possible

Your benefits

- After installation, the system is immediately available and completely maintenance-free, which leads to time and cost savings
- Reliable determination of position under harshest ambient conditions such as the effects of dirt, dust, fog, shock, and vibration
- High efficiency and productivity
- Time savings – no reference run necessary on initial commissioning due to absolute position measurement
- Accurate positioning even with high mounting tolerances

CE

Additional information

➜ **www.sick.com/KH53**

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.

Fields of application

- Position determination for container cranes in container terminals
- Positioning of the trolley on cranes
- Positioning of automated guided vehicles in storage and conveyor systems

Detailed technical data

Performance

	KH53	KH53 Advanced
Measuring length	0 m ... 38 m 0 m ... 107 m 0 m ... 354 m 0 m ... 1,700 m	0 m ... 54 m 0 m ... 548 m
Measuring range	38 m 107 m 354 m 1,700 m	54 m 548 m
Resolution	0.1 mm	
Traversing speed [1]	(≤ 6.6 m/s)	
Repeat accuracy	0.3 mm	1 mm
Measurement accuracy [2]	± 1000 + ME (Tu-25° C) Tk µm	± 2000 + ME (Tu-25° C) Tk µm

[1] If the max. traversing speed is exceeded or the read head cannot detect a measuring element, the corresponding error message is output: FF FF FE hex.

[2] If the read head and measuring element are mounted within ± 1 mm of the nominal mounting distance in the N and Y directions. The figures quoted related to the accuracy within a measuring element with reference to the start of that measuring element. ME = length measuring element Tu = Ambient temperature °C.

Interfaces

SSI

Electrical interface	10 V ... 32 V, SSI
Position forming time	+ 0.8 ms
Interface, digital serial	SSI, 24 Bit, gray Sin/Cos 1.0 V_{PP}
Interface for parametrization	RS-422 Default OFF Four wire transmission, asynchrony, full duplex Data format: 1 start bit, 8 data bits, 1 stop bit, no parity Data protocol: ASCII, Baud rate 9600 RS-422

PROFIBUS

Electrical interface [1]	10 V ... 32 V, PROFIBUS DP
Bus interface	RS-485, as per EN 50170-2 (DIN 19245 parts 1–3) electrically isolated by optocoupler
Position forming time	+ 1.1 ms
Address setting	0 ... 127, Hex switches or Protocol
Data protocol	PROFIBUS DP basic functions
Bus termination	Via external switches
Set (electronic adjustment)	Via protocol
Encoder profile	Profile for encoders (07hex) – Class 2
Data transmission rate (baud rate)	9.6 kBaud ... 12 MBaud, Automatic detection
Status information	Operation (green LED) Bus activity (red LED)

[1] As per EN 50170-2 (DIN 19245 parts 1–3) electrically isolated by optocoupler.

Mechanical data

	KH53	KH53 Advanced
Weight		
Read head 38	2.4 kg	–
Read head 107	2.7 kg	–
Read head 354	3.6 kg	–
Read head 1700	5.2 kg	–
Read head 54	–	4.4 kg
Read head 548	–	6.7 kg
Measuring element up to 38 m	0.5 kg, per meter	–
Measuring element up to 54 m	–	0.65 kg, per meter
Measuring element up to 107 m	0.5 kg, per meter	–
Measuring element up to 354 m	Per meter 0.5 kg, per meter	–
Measuring element up to 548 m	–	0.65 kg, per meter
Measuring element up to 1700 m	0.5 kg, per meter	–
Length of measuring element	See dimension and calculation table	
Coefficient of thermal expansion	28 µm/°C/m	
Position tolerance	± 10 mm, see graphic	± 20 mm, see graphic
Material		
Read head	AlMgSiPbF28	
Measuring element	AlMgSi0,5F22	

Ambient data

	KH53	KH53 Advanced
EMC [1]	According to EN 61000-6-2 and EN 61000-6-4	
Enclosure rating		
SSI read head with male connector M23, 12-pin	IP65, with mating connector inserted (IEC 60529)	
SSI read head with cable	IP66 (IEC 60529)	
SSI read head with connector plug PROFIBUS	IP67, with mating connector inserted (IEC 60529)	
Working temperature range	–20 °C ... +60 °C	–30 °C ... +70 °C
Storage temperature range	–40 °C ... +85 °C	
Resistance to shocks		
Read head	30 g, 10 ms (DIN EN 60 068-2-27)	
Measuring element	50 g, 10 ms (DIN EN 61000-2-27)	
Resistance to vibration		
Read head	10 g (20 Hz ... 250 Hz) (EN 60068-2-6)	
Measuring element	30 g (20 Hz ... 250 Hz) (DIN EN 61000-2-6)	

[1] EMC according to the standards quoted is achieved if shielded cables are used.

Ordering information

See dimension, calculation table and calculation example

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Measuring range up to 38 meters

System part	Electrical interface	Code type	Connection type	Type	Part no.
Mounting gauge	–	–	–	KHM53-XXX00038	1030057
Read head	PROFIBUS	–	3 x connector M12	KHK53-PXF00038	1036163
	SSI	–	Cable, 1.5 m	KHK53-AXR00038	1030048
			Cable, 10 m	KHK53-AXU00038	1030051
			Cable, 3 m	KHK53-AXS00038	1030049
			Cable, 5 m	KHK53-AXT00038	1030050
			Male connector M23, 12-pin	KHK53-AXB00038	1030052
Measuring element	–	Coded	–	KHT53-XXX00038	1030055
		Universal configurable	–	KHU53-XXX00038	1030056

Measuring range up to 107 meters

System part	Electrical interface	Code type	Connection type	Type	Part no.
Mounting gauge	–	–	–	KHM53-XXX00107	1030067
Read head	PROFIBUS	–	3 x connector M12	KHK53-PXF00107	1036164
	SSI	–	Cable, 1.5 m	KHK53-AXR00107	1030058
			Cable, 10 m	KHK53-AXU00107	1030061
			Cable, 3 m	KHK53-AXS00107	1030059
			Cable, 5 m	KHK53-AXT00107	1030060
			Male connector M23, 12-pin	KHK53-AXB00107	1030062
Measuring element	–	Coded	–	KHT53-XXX00107	1030065
		Universal configurable	–	KHU53-XXX00107	1030066

Measuring range up to 354 meters

System part	Electrical interface	Code type	Connection type	Type	Part no.
Mounting gauge	–	–	–	KHM53-XXX00354	1030077
Read head	PROFIBUS	–	3 x connector M12	KHK53-PXF00354	1036165
	SSI	–	Cable, 1.5 m	KHK53-AXR00354	1030068
			Cable, 10 m	KHK53-AXU00354	1030071
			Cable, 3 m	KHK53-AXS00354	1030069
			Cable, 5 m	KHK53-AXT00354	1030070
			Male connector M23, 12-pin	KHK53-AXB00354	1030072
Measuring element	–	Coded	–	KHT53-XXX00354	1030075
		Universal configurable	–	KHU53-XXX00354	1030076

Measuring range up to 1,700 meters

System part	Electrical interface	Code type	Connection type	Type	Part no.
Mounting gauge	–	–	–	KHM53-XXX01700	1030087
Read head	PROFIBUS	–	3 x connector M12	KHK53-PXF01700	1036166
	SSI	–	Cable, 1.5 m	KHK53-AXR01700	1030078
			Cable, 10 m	KHK53-AXU01700	1030081
			Cable, 3 m	KHK53-AXS01700	1030079
			Cable, 5 m	KHK53-AXT01700	1030080
			Male connector M23, 12-pin	KHK53-AXB01700	1030082
Measuring element	–	Coded	–	KHT53-XXX01700	1030085
		Universal configurable	–	KHU53-XXX01700	1030086

KH53 Advanced

Measuring range up to 54 meters

System part	Electrical interface	Code type	Connection type	Type	Part no.
Mounting gauge	–	–	–	KHM53-XXX00054	1035447
Read head	PROFIBUS	–	3 x connector M12	KHK53-PXF00054	1036167
	SSI	–	Cable, 5 m	KHK53-AXT00054	1035442
			Male connector M23, 12-pin	KHK53-AXB00054	1035443
Measuring element	–	Coded	–	KHT53-XXX00054	1035445
		Universal configurable	–	KHU53-XXX00054	1035446

Measuring range up to 548 meters

System part	Electrical interface	Code type	Connection type	Type	Part no.
Mounting gauge	–	–	–	KHM53-XXX00548	1035453
Read head	PROFIBUS	–	3 x connector M12	KHK53-PXF00548	1036168
	SSI	–	Cable, 5 m	KHK53-AXT00548	1035448
			Male connector M23, 12-pin	KHK53-AXB00548	1035449
Measuring element	–	Coded	–	KHT53-XXX00548	1035451
		Universal configurable	–	KHU53-XXX00548	1035452

Dimensional drawings (Dimensions in mm (inch))

SSI read head
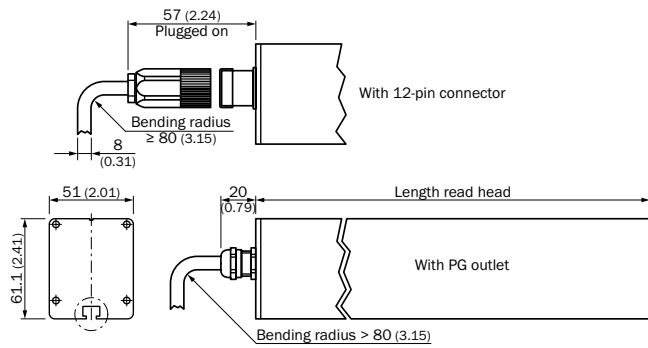
Read head PROFIBUS
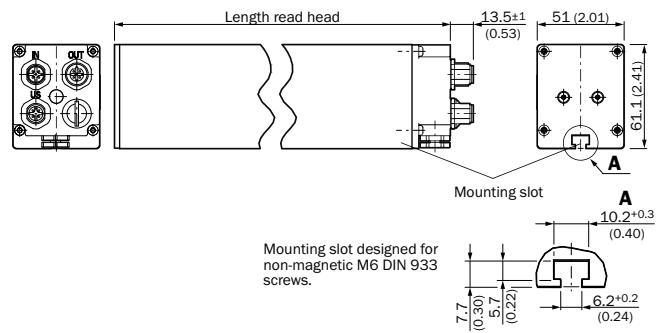
Measuring element
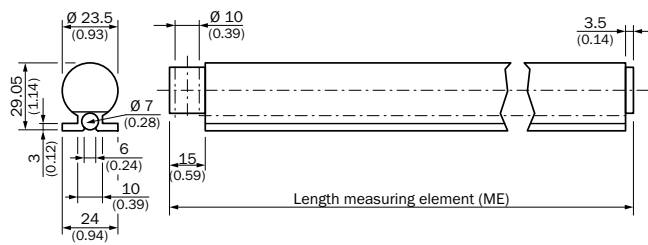
PIN assignment

SSI interface, view of M23 male device connector
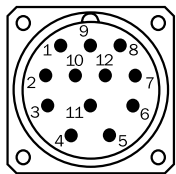
PIN	Signal	Colour of wires (cable outlet)	Explanation
1	GND	Blue	Ground connection
2	Data +	White	Interface signals
3	Clock +	Yellow	Interface signals
4	R x D +	Gray	RS-422 programming lines
5	R x D -	Green	RS-422 programming lines
6	T x D +	Pink	RS-422 programming lines
7	T x D -	Black	RS-422 programming lines
8	U_S	Red	Supply voltage
9	N. C.	Orange	Not assigned
10	Data -	Brown	Interface signals
11	Clock	Violet	Interface signals
12	N. C.		Not assigned

PROFIBUS interface

LED1 red

LED2 green
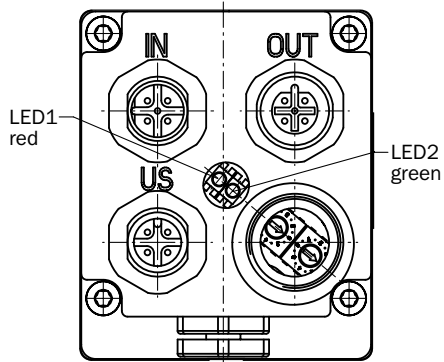
Male connector M12, 4-pin	Male connector M12, 5-pin	Female connector M12, 5-pin	Signal	Explanation
1	-	-	U_S	Supply voltage
3	-	-	GND	Ground connection
-	-	4	B	B-cable PROFIBUS DP (out)
-	-	2	A	A-cable PROFIBUS DP (out)
-	4	-	B	B-cable PROFIBUS DP (in)
-	2	-	A	A-cable PROFIBUS DP (in)
-	-	1	2P5[1]	+ 5 V (potential free)
-	-	3	2M[1]	0 V (potential free)
4	1	-	Not connected	-
2	3	-	Not connected	-
-	5	5	Screen	Housing potential

[1] Use for external bus termination

Implementation
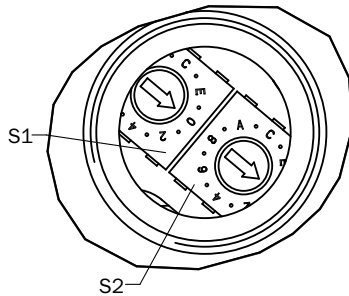
DP Functionalities

According to Profibus DP basic functionalities

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)
- Reading diagnostic data (Slave_Diagnosis)
- Sending configuration data (Set_Param)
- Checking configuration data (Chk_Config

Communication

- Cyclic master-slave data traffic.

Protective mechanisms

- Transfer of data with HD = 4.
- Time monitoring of data traffic.

Configuration

Settings according to encoder profile

- Counting direction (CW, CCW)
- Class 2 functionality (ON, OFF)
- Scaling function (ON, OFF)
- "Activation of SSA-services" [2]
- Selection of the station address [2]

Setting: – Counting direction

- Via hardware via hex switch S2
- Via software via telegram

Counting direction increasing: Movement of the encoder from profile item n in the direction of profile item n+1.

Configuration

Setting the formats (IN/OUT) for the cyclic data interchange

Switch settings

The following settings are possible via hex switches:
- S1/S2 Address setting (0 … 127)
- S2 Counting direction (CW/CCW)

Access is via a screw connection on the side of the read head

through a 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 (0,1m/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 diagnostic (63 bytes according to encoder profile Class 2)

Setting: – PRESET value

The PRESET function is used for commissioning and the allocation of a particular position value to current physical positioning.
The following settings are possible:
- Via software: -- (see Output data)

Setting: – Station Address

- Via hardware via hex switch S1/S2
- Via software via telegram

Setting by software only occurs with prior activation of the "SSA service".
The *.GS_ file is designed for automatic commissioning of the encoder. Within it all the characteristic features of the device are defined.
STEG05F6.GSD German
STEG05F6.GSE English
[1] In accordance with encoder profile
[2] Manufacturer specific function

male connector.
Status Information via LEDs
- LED-1 Bus activity (red)
- LED-2 Operating voltage (green)

General information

The KH53 PROFIBUS is an absolute length measurement system with a resolution of 100 μm. The bus coupling is inside the encoder and is an interface connection as PROFIBUS DP slave according to EN 50170 Vol. 2. Implementation is with the Siemens PROFIBUS ASIC SPC3.

The KH53 PROFIBUS contains all Class 2 functionalities according to the encoder profile (V1.1)

Implementation of the encoder is as a DP slave with the DP basic functions.

Conformity with PROFIBUS DP is ensured by a PNO certified test center.

The following options are available:

• M12 plug connector system

Position tolerance

Start of measuring path
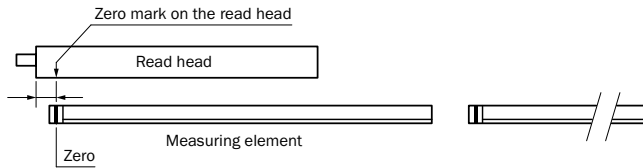
End of measuring path
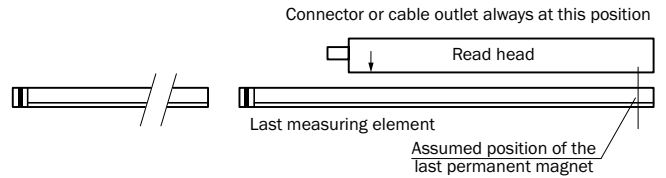
KH53
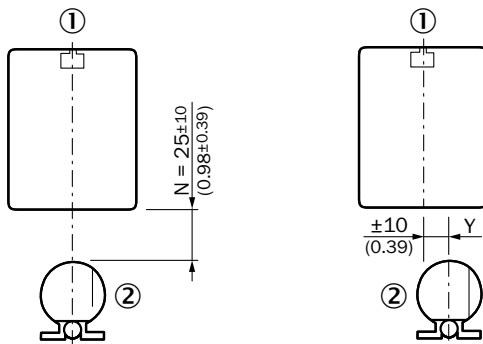
All dimensions in mm (inch)

The operating reliability and accuracy of the measuring system depends on (amongst other things) compliance with the position tolerances. Magnetic or magnetizable materials are not permitted within 80 mm of the encoder or the measuring element.

① Read head
② Measuring element
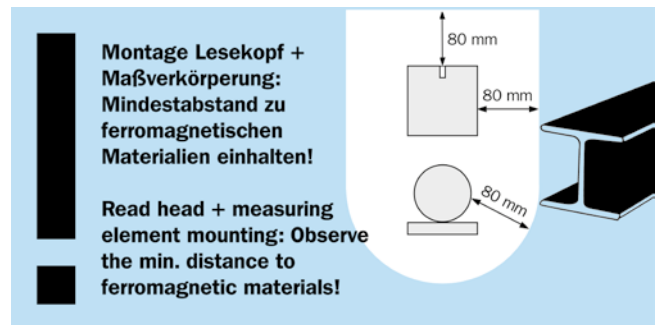
Only use non ferro-magnetic materials for the assembly base of the read head. A separation distance of 80 mm must be observed for ferro-magnetic materials (e.g., iron).

KH53 Advanced
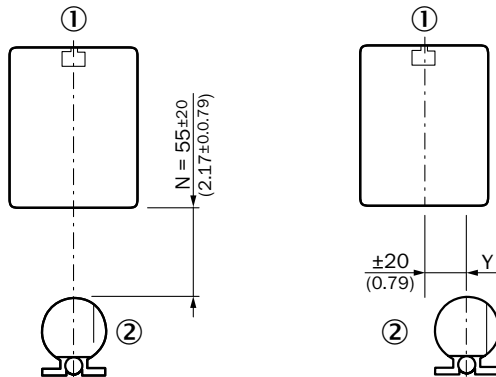
All dimensions in mm (inch)

The operating reliability and accuracy of the measuring system depends on (amongst other things) compliance with the position tolerances. Magnetic or magnetizable materials are not permitted within 80 mm of the encoder or the measuring element.

① Read head
② Measuring element

Dimensions and calculation table

KH53 SSI
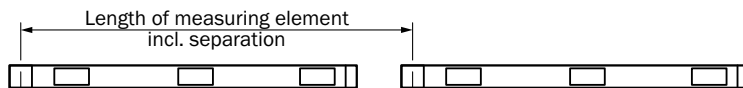
Measring range up to	Read head length	Length of measuring element including distance	Mounting systems per measuring element (suggestion)
39.90 m	0.866 m	2.304 m Identification letters A1 ... ≤ A18	4 clamp holders or 8 mounting brackets
107.40 m	1.051 m	1.8688 m Identification letters B1 ... ≤ B58	3 clamp holders or 6 mounting brackets
351.20 m	1.376 m	2.5088 m Identification letters C1 ... ≤ C141	4 clamp holders or 8 mounting brackets
1676.40 m	2.026 m	1.9072 m Identification letters D1 ... ≤ D880	3 clamp holders or 6 mounting brackets
The dimensions given are slightly rounded.			

KH53 SSI Advanced
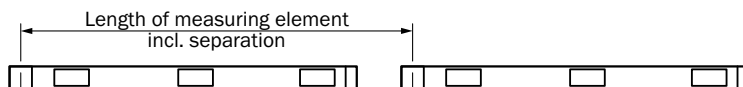
Measring range up to	Read head length	Length of measuring element including distance	Mounting systems per measuring element (suggestion)
53.50 m	1.58 m	1.408 m Identification letters F1 ... ≤ F39	3 clamp holders or 6 mounting brackets
546.40 m	2.506 m	2.3552 m Identification letters G1 ... ≤ G233	4 clamp holders or 8 mounting brackets
The dimensions given are slightly rounded.			

KH53 PROFIBUS

Length of measuring element
incl. separation
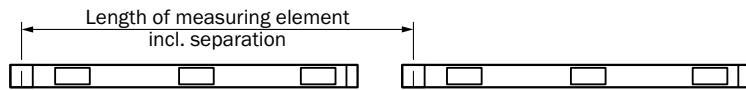
Measring range up to	Read head length	Length of measuring element including distance	Mounting systems per measuring element (suggestion)
39.90 m	0.905 m	2.304 m Identification letters A1 ... ≤ A18	4 clamp holders or 8 mounting brackets
107.40 m	1.070 m	1.8688 m Identification letters B1 ... ≤ B58	3 clamp holders or 6 mounting brackets
351.20 m	1.395 m	2.5088 m Identification letters C1 ... ≤ C141	4 clamp holders or 8 mounting brackets
1676.40 m	2.045 m	1.9072 m Identification letters D1 ... ≤ D880	3 clamp holders or 6 mounting brackets
The dimensions given are slightly rounded.			

KH53 PROFIBUS Advanced
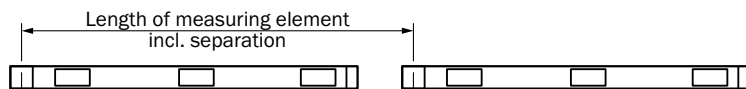
Length of measuring element
incl. separation

Measring range up to	Read head length	Length of measuring element including distance	Mounting systems per measuring element (suggestion)
53.50 m	1.599 m	1.408 m Identification letters F1 ... ≤ F39	3 clamp holders or 6 mounting brackets
546.40 m	2.525 m	2.3552 m Identification letters G1 ... ≤ G233	4 clamp holders or 8 mounting brackets
The dimensions given are slightly rounded.			

Calculation example regarding the KH53 SSI

Calculation example for a measurement distance of 100 m

Selected system with measuring range up to 107 m
Number of measuring elements required = measurement path + length of the read head / length of measurement element (measurement and calculation table)

- Number of measuring elements required = 101.051 m / 1.8688 m = 54.07
- Ordering amount therefore 55 measuring elements and 55 * 3 = 165 clamp holders
- If two separate measurement paths are to be implemented, then please order 2 x 55 measuring elements (not 110 measuring elements)

Attention! For position determination, the read head must not travel beyond the last measuring element.

Accessories

Mounting systems

Mounting brackets and plates

Mounting brackets

Figure	Brief description	Type	Part no.
	Mounting bracket for KH53 measuring elements, without mounting hardware for the background	BEF-WK-KHT53	2029159

Dimensional drawings ➜ **page 15**

Terminal and alignment brackets

Terminal brackets

Figure	Brief description	Type	Part no.
	Spacer for KH53, without mounting hardware for the background	BEF-KHA-KHT53	2042468

Dimensional drawings ➜ **page 15**

Connection systems

Plug connectors and cables

Cables (ready to assemble)

Figure	Brief description	Type	Part no.
	Head A: cable Head B: cable Cable: PROFIBUS DP, drag chain use, PUR, shielded	LTG-2102-MW	6021355
	Head A: cable Head B: cable Cable: SSI, drag chain use, PUR, halogen-free, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 2 x 0.14 mm², Ø 7.8 mm	LTG-2512-MW	6027531
	Head A: cable Head B: cable Cable: SSI, drag chain use, PUR, halogen-free, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 2 x 0.14 mm², Ø 7.8 mm, UV and saltwater-resistant	LTG-2612-MW	6028516

Connecting cables with female connector

Figure	Brief description	Cable length	Type	Part no.
Illustration may differ	Head A: female connector, M12, 4-pin, straight Head B: cable Cable: PVC, unshielded, Ø 5 mm	5 m	DOL-1204-G05M	6009866
	Head A: female connector, M12, 5-pin, straight, B-coded Head B: cable Cable: PROFIBUS DP, twisted pair, drag chain use, PUR, halogen-free, shielded, 2 x 0.34 mm², Ø 7.6 mm	5 m	DOL-1205-G05MQ	6026006
		10 m	DOL-1205-G10MQ	6026008
		12 m	DOL-1205-G12MQ	6032636
		15 m	DOL-1205-G15MQ	6032637
		20 m	DOL-1205-G20MQ	6032638
		30 m	DOL-1205-G30MQ	6032639
		50 m	DOL-1205-G50MQ	6032861

Figure	Brief description	Cable length	Type	Part no.
	Head A: female connector, M23, 12-pin, straight Head B: cable Cable: SSI, RS-422, drag chain use, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0,5 mm² + 2 x 0.14 mm², Ø 7.8 mm	3 m	DOL-2312-G03M-MA1	2029201
		5 m	DOL-2312-G05M-MA1	2029202
		10 m	DOL-2312-G10MMA1	2029203
		1.5 m	DOL-2312-G1M5MA1	2029200
		20 m	DOL-2312-G20M-MA1	2029204
		30 m	DOL-2312-G30M-MA1	2029205

Connecting cables with male connector

Figure	Brief description	Cable length	Type	Part no.
	Head A: male connector, M12, 5-pin, straight, B-coded Head B: cable Cable: PROFIBUS DP, drag chain use, twisted pair, PUR, halogen-free, shielded, 2 x 0.34 mm²	5 m	STL-1205-G05MQ	6026005
		10 m	STL-1205-G10MQ	6026007
		12 m	STL-1205-G12MQ	6032635

Female connectors (ready to assemble)

Figure	Brief description	Type	Part no.
	Head A: female connector, M12, 4-pin, straight Head B: - Cable: unshielded	DOS-1204-G	6007302
	Head A: female connector, M12, 5-pin, straight, B-coded Head B: - Cable: PROFIBUS DP, shielded	DOS-1205-GQ	6021353
	Head A: female connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE®, SSI, Incremental, shielded	DOS-2312-G	6027538
	Head A: female connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE®, SSI, Incremental, PBT UL 94-V0, shielded	DOS-2312-G02	2077057
	Head A: female connector, M23, 12-pin, angled Head B: - Cable: HIPERFACE®, SSI, Incremental, shielded	DOS-2312-W01	2072580

Male connectors (ready to assemble)

Figure	Brief description	Type	Part no.
	Head A: male connector, M12, 5-pin, straight, B-coded Head B: - Cable: PROFIBUS DP, shielded	STE-1205-GQ	6021354
	Head A: male connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE®, SSI, Incremental, RS-422, shielded	STE-2312-G	6027537
	Head A: male connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE®, SSI, Incremental, PBT UL 94-V0, shielded	STE-2312-G01	2077273
	Head A: male connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE®, SSI, Incremental, shielded	STE-2312-GX	6028548

Other connectors and cables

Figure	Brief description	Type	Part no.
	Head A: male connector, M12, 4-pin, straight, B-coded Cable: PROFIBUS DP, terminal resistor	STE-END-Q	6021156

Further accessories

Programming and configuration tools
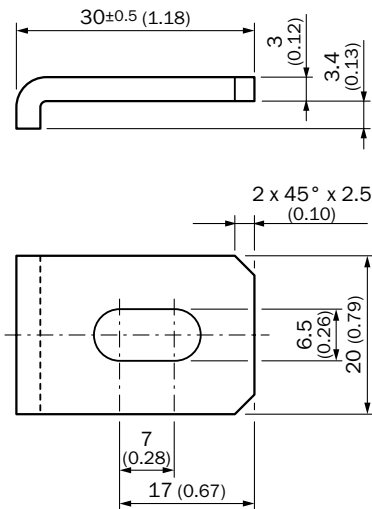
Figure	Brief description	Type	Part no.
	Programming tool for ATM60, ATM90, and KH53	PGT-01-S	1030111

Dimensional drawings for accessories (Dimensions in mm (inch))

Mounting brackets and plates
BEF-WK-KHT53

Terminal and alignment brackets
BEF-KHA-KHT53
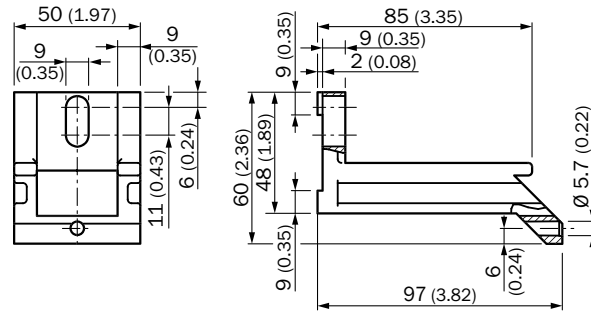
Plug connectors and cables
DOL-1204-G05M
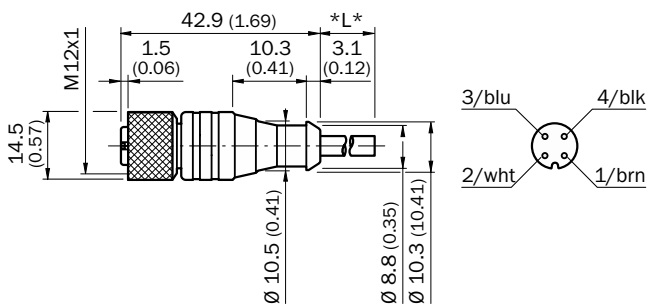
DOL-1205-GxxMQ
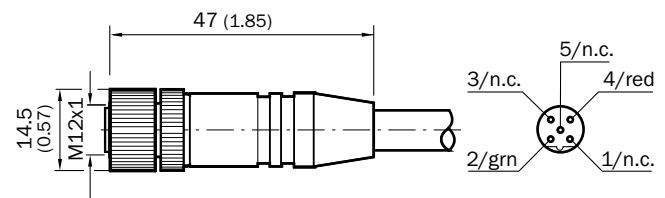
DOL-2312-G03MMA1
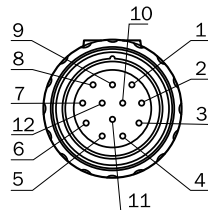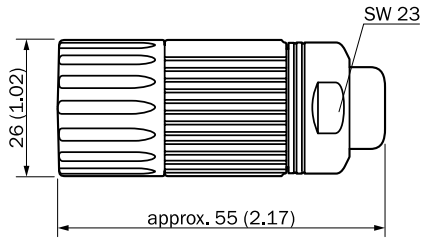
① Blue
② White
③ Yellow
④ Gray
⑤ Green
⑥ Pink
⑦ Black
⑧ Red
⑨ Orange
⑩ Brown
⑪ Purple
⑫ Orange/black

DOL-2312-G05MMA1
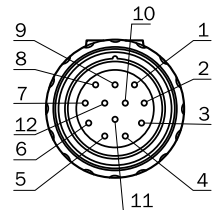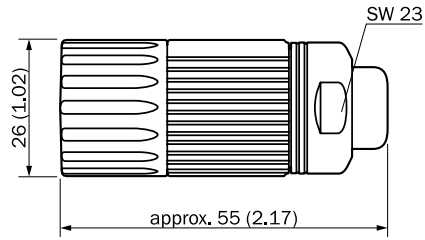
① Blue
② White
③ Yellow
④ Gray
⑤ Green
⑥ Pink
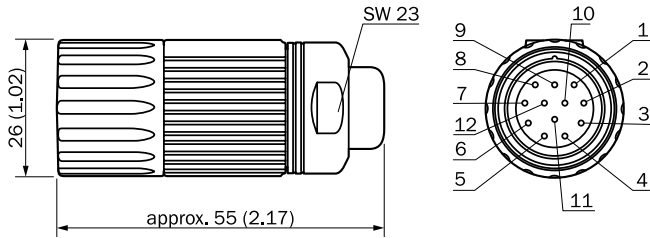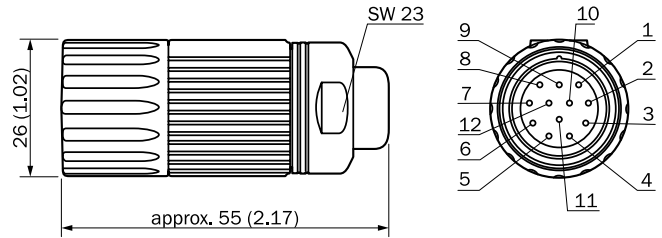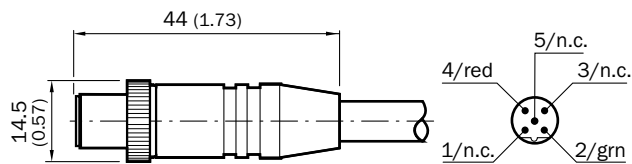⑦ Black
⑧ Red
⑨ Orange
⑩ Brown
⑪ Purple
⑫ Orange/black

DOL-2312-G10MMA1
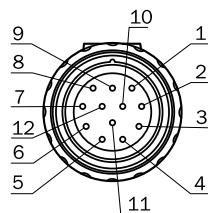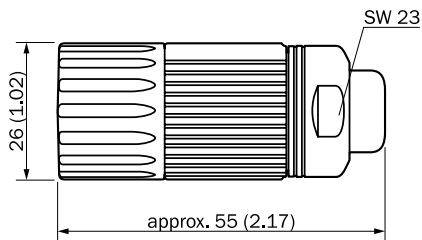
① Blue
② White
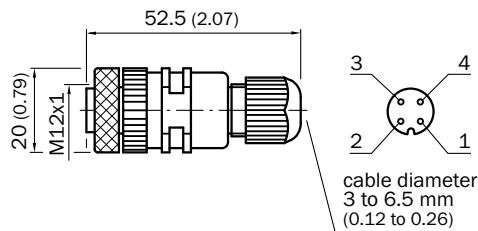③ Yellow
④ Gray
⑤ Green
⑥ Pink
⑦ Black
⑧ Red
⑨ Orange
⑩ Brown
⑪ Purple
⑫ Orange/black

DOL-2312-G1M5MA1
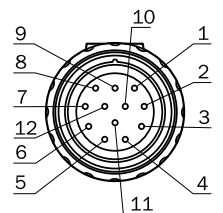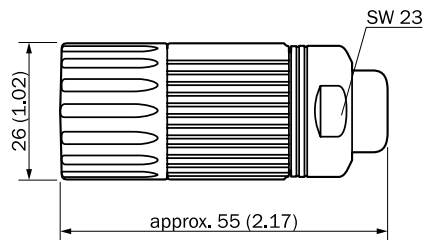
① Blue
② White
③ Yellow
④ Gray
⑤ Green
⑥ Pink
⑦ Black
⑧ Red
⑨ Orange
⑩ Brown
⑪ Purple
⑫ Orange/black

DOL-2312-G20MMA1
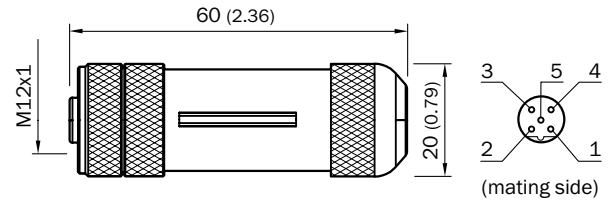
SW 23

26 (1.02)

approx. 55 (2.17)

9 10 1
8 2
7 3
12
6 4
5
11
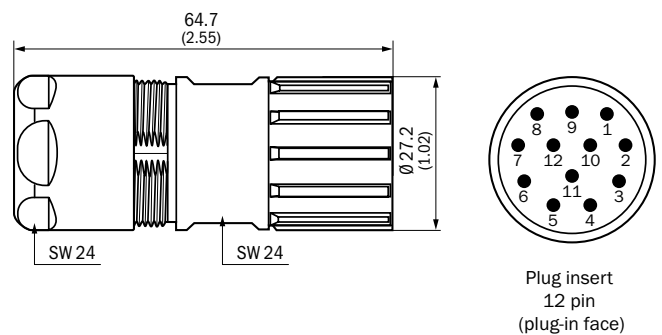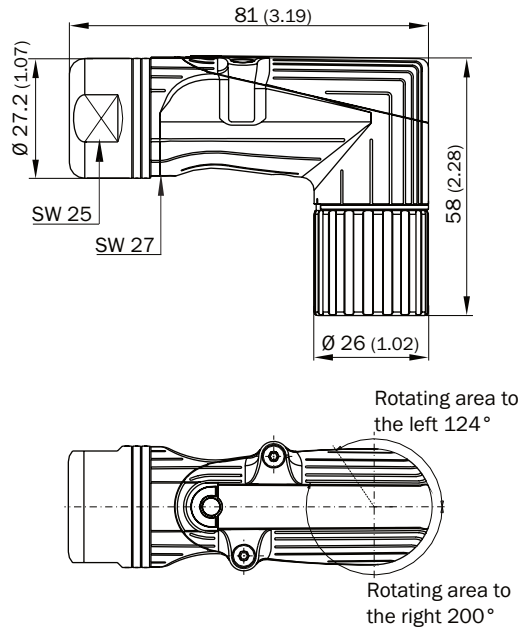
① Blue
② White
③ Yellow
④ Gray
⑤ Green
⑥ Pink
⑦ Black
⑧ Red
⑨ Orange
⑩ Brown
⑪ Purple
⑫ Orange/black

DOL-2312-G30MMA1

SW 23

26 (1.02)

approx. 55 (2.17)

9 10 1
8 2
7 3
12
6 4
5
11

① Blue
② White
③ Yellow
④ Gray
⑤ Green
⑥ Pink
⑦ Black
⑧ Red
⑨ Orange
⑩ Brown
⑪ Purple
⑫ Orange/black

STL-1205-GxxMQ
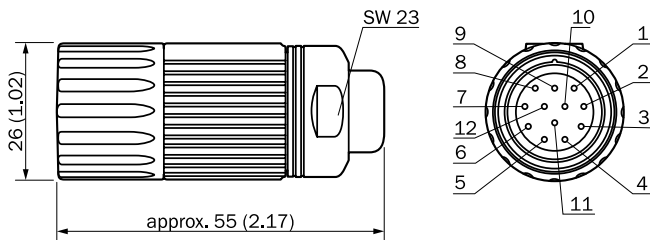
44 (1.73)

14.5 (0.57)

5/n.c.
4/red   3/n.c.

1/n.c.   2/grn

DOS-1204-G

52.5 (2.07)

20 (0.79)
M12x1

3   4

2   1

cable diameter
3 to 6.5 mm
(0.12 to 0.26)

DOS-1205-GQ

60 (2.36)

M12x1

20 (0.79)

3   5   4

2   1

(mating side)

DOS-2312-G

SW 23

26 (1.02)

approx. 55 (2.17)

9 10 1
8 2
7 3
12
6 4
5
11

① Blue
② White
③ Yellow
④ Gray
⑤ Green
⑥ Pink
⑦ Black
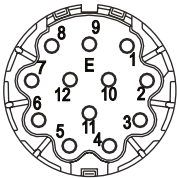⑧ Red
⑨ Orange
⑩ Brown
⑪ Purple
⑫ Orange/black

DOS-2312-G02

64.7
(2.55)

Ø 27.2
(1.02)

SW 24   SW 24

8   9   1
7   12   10   2
6   3
5   11   4

Plug insert
12 pin
(plug-in face)

DOS-2312-W01

81 (3.19)

Ø 27.2 (1.07)

58 (2.28)

SW 25

SW 27

Ø 26 (1.02)

Rotating area to the left 124°

Rotating area to the right 200°

Main dimensions
Plug

Contact arrangement
Mating view

STE-END-Q

47.5 (1.87)

Ø 14.5 (0.57)

M12×1

STE-1205-GQ

M12×1

Ø 1 (0.04)

65 (5.56)

20 (0.79)

4 5 3

1 2

(mating side)

STE-2312-G

25 (.98)

58 (2.28)

1 10 9
2 8
3 7
12
6
4 5
11

STE-2312-G01
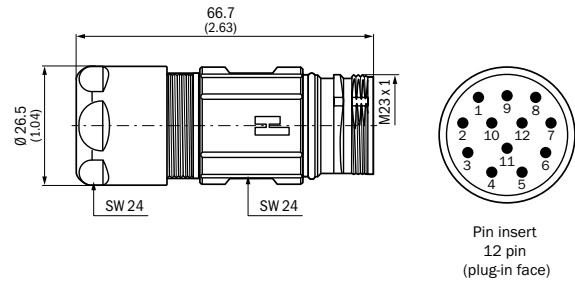STE-2312-GX

66.7 (2.63)

Ø 26.5 (1.04)

M23×1

SW 24 SW 24

1 9 8
2 10 12 7
3 11 6
4 5
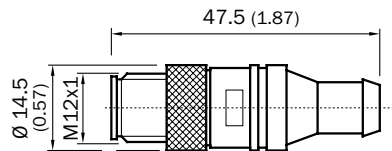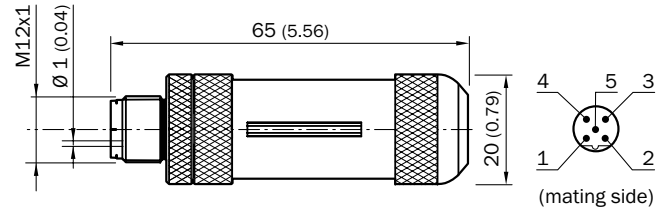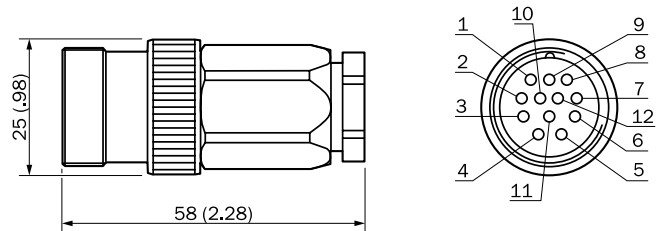
Pin insert
12 pin
(plug-in face)

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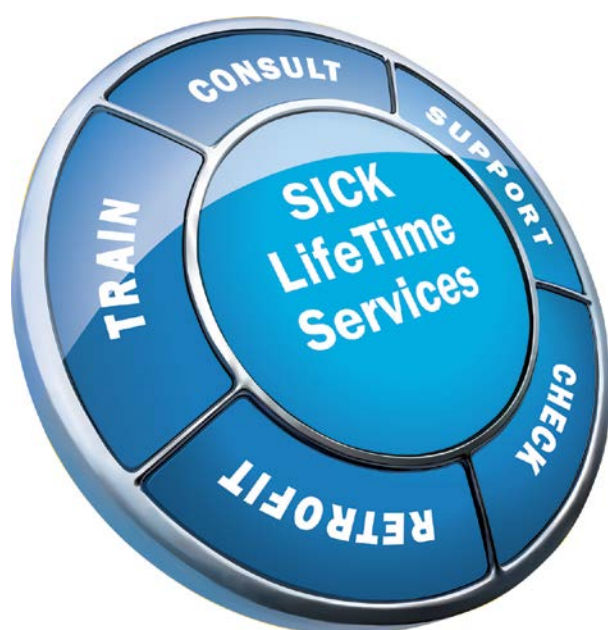
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