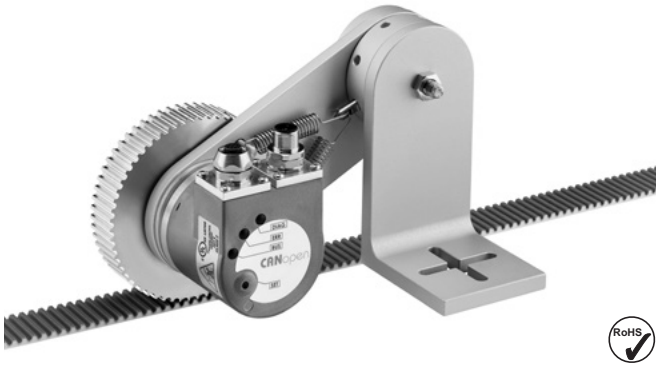
Length measuring kit with spring encoder arm | **Limes Kit TB1** | **Standard measuring length up to 100 m [1] Application-specific adaptation**



Limes Kit TB is a flexible length measuring kit for the measurement of positions and speeds. The complete system is easy to mount and compensates unevennesses and mounting tolerances in the application.

The length measuring kit is available in many variants and can be adapted for the specific requirements of your application. Moreover, our Sendix encoder portfolio offers the suitable interface for every application. Both incremental and absolute encoders can be used.

Versatile

- Large measuring range (standard measuring length up to 100 m [1]).
- Usable for linear and rotary movements.
- Incremental or absolute measurement.
- All usual interfaces/field buses.
- Application-specific adaptation of the spring encoder arm (adjustable pressing force).
- Compensation of application tolerances.

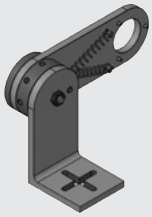
Robust and cost-efficient

- Simple mounting.
- Steel-reinforced plastic belt.
- Robust Sendix encoders.
- Wide temperature range of -25°C ... +80 °C.
- High traversing speed up to 5 m/s.

Single components Limes Kit TB1:

Spring encoder arm

8.0010 . 7000 . 0010



Encoder

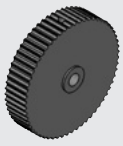
(See the table of recommended encoders)

All incremental or absolute Sendix encoders with clamping flange (centering collar 36 mm) and 10 mm shaft diameter (shaft 10x20 mm) can be used.

Pulley

8.0000 . A X X 1 . XXXX
(a) (b) (c)

Preferred types with short delivery time are shown in **bold underlined**



(a) *Material*
1 = aluminum
2 = plastic

(b) *Width*
1 = 10 mm [0.39"]
2 = 20 mm [0.79"]

(c) *Pitch circumference*
0360 = 360 mm

(c) *Other pitch circumferences on request*
0300 = 300 mm
0240 = 240 mm
0220 = 220 mm
0150 = 150 mm
0120 = 120 mm
0100 = 100 mm

Toothed belt

8.0000 . B 1 X 1 . XXXX
(a) (b)

Preferred types with short delivery time are shown in **bold underlined**

(a) *Width*
1 = 10 mm [0.39"]
3 = 25 mm [0.94"]
4 = 50 mm [1.97"]

(b) *Length [in dm] [1], ex.:*
0010 = 1 m [3.28´]
0020 = 2 m [6.56´]
...
1000 = 100 m [328´]

Optional on request:
length > 100 m

1) Yard ware (1 m, 2 m, ... 100 m), lengths > 100 m on request.

Length measuring kit with spring encoder arm | **Limes Kit TB1** | **Standard measuring length up to 100 m Application-specific adaptation**

Recommended encoders, incremental

Encoder	Interface	Power supply	Type of connection	Pulley circumference [mm]	Recommended encoder resolution (pulse number)	mm / pulse	Order no.
Sendix 5000	push-pull with inverted signal	10 ... 30 V DC	1 x radial M12 connector	360	3600	0.1	8.5000.8354.3600
				300	3000	0.1	8.5000.8354.3000
				240	240	1.0	8.5000.8354.0240
				220	2500	0.088	8.5000.8354.2500
				150	1500	0.1	8.5000.8354.1500
				120	1200	0.1	8.5000.8354.1200
				100	1000	0.1	8.5000.8354.1000

Recommended encoders, absolute

Encoder	Interface	Power supply	Type of connection	Resolution / Protocol	Option	Order no.
Sendix M5861	analog, 4 ... 20 mA	10 ... 30 V DC	1x radial M12 connector	12 bit (4096)	scalable with limit switch function	8.M5861.3534.3312
	analog, 0 ... 10 V	10 ... 30 V DC	1x radial M12 connector	12 bit (4096)	scalable with limit switch function	8.M5861.3544.4312
	analog, 0 ... 5 V	10 ... 30 V DC	1x radial M12 connector	11 bit (2048)	scalable with limit switch function	8.M5861.3544.5312
Sendix M5863	SSI	10 ... 30 V DC	1x radial M12 connector	4096 ppr / SSI Gray code	–	8.M5863.3524.G222
Sendix M5868	CANopen	10 ... 30 V DC	1x radial M12 connector	CANopen encoder profil DS406 V4.0	–	8.M5868.3524.2122

Further encoders, absolut

Encoder	Interface	Power supply	Type of connection	Resolution / Protocol	Option	Order no.
Sendix F5863	SSI	10 ... 30 V DC	1x radial M12 connector	4096ppr / SSI Gray code	SET button + status LED	8.F5863.1226.G223
Sendix 5863	SSI	10 ... 30 V DC	1x radial M12 connector	4096ppr / SSI Gray code	SET button + status LED	8.5863.1226.G233
Sendix F5868	CANopen	10 ... 30 V DC	1x radial M12 connector	CANopen encoder profil DS406 V3.2	SET button	8.F5868.122E.2123
Sendix 5868	CANopen	10 ... 30 V DC	2x radial M12 connector	CANopen encoder profil DS406 V3.2	SET button	8.5868.1222.2123
Sendix 5868	PROFIBUS	10 ... 30 V DC	3x radial M12 connector	Profibus-DP V0 encoder profil class 2	SET button	8.5868.1232.3113
Sendix 5868	EtherCAT	10 ... 30 V DC	3x radial M12 connector	EtherCAT with CoE 3.2.10	-	8.5868.12B2.B212
Sendix 5868	PROFINET IO	10 ... 30 V DC	3x radial M12 connector	PROFINET encoder profil version 4.1	-	8.5868.12C2.C212
Sendix F5868	EtherNet/IP	10 ... 30 V DC	3x radial M12 connector	EtherNet/IP	-	8.F5868.12AN.A222

Length measuring kit with spring encoder arm | Limes Kit TB1 | Standard measuring length up to 100 m Application-specific adaptation

Technical data

Total system

Temperature range	-25°C ... +80°C [-13°F ... +176°F]
Max. traversing speed	5 m/s
IP protection	depends on the encoder used (refer to the encoder data sheet)

Spring encoder arm

Material	aluminum
Spring force = maximum pressing force on the toothed belt	max. 40 N
Minimum pressing force of the pulley on the toothed belt	min. 20 N (ca. 20 N = 1 notch/position)

Encoder

Technical data	depends on the encoder used (refer to the encoder data sheet)
Flange type	All encoders with clamping flange (centering collar 36 mm) and 10 mm shaft can be used

Pulley

Material	aluminum or plastic (POM-C)
Width	10 / 20 mm
Pitch circumference	100 ... 360 mm
Number of teeth	20 ... 72
Toothing type	HD60 – 5M
Pitch	5 mm

Toothed belt

Material		steel-reinforced PU with polyamide fabric on the teeth side
Adhesive basis		Modified acrylate
Toothing type		RTD 5M
Tooth strength		37.8 N/cm belt width
Bend radius		min. 30 mm
Width		10 mm, 25 mm, 50 mm (others on request)
Height		3.8 mm
Length tolerance		± 0.8 mm/m
Width tolerance		± 0.5 mm
Weight	10 mm width	40 g/m
	25 mm width	100 g/m
	50 mm width	195 g/m

Technic in detail

Overview belt pulley

Number of teeth	Pitch [mm]	Diameter in mm ["]	Pitch diameter [1] in mm ["] (pitch x no of teeth) / π	Pitch circumference in mm (pitch x no of teeth) or (Pitch diameter x π)	Order no. B = pulley width x = material (1 = aluminum, 2 = plastic)	
					B = 10 mm	B = 20 mm
72	5	113.45 [4.47]	114.59 [4.51]	360	8.000.Ax11.0360	8.000.Ax21.0360
60	5	94.35 [3.71]	95.49 [3.76]	300	8.000.Ax11.0300	8.000.Ax21.0300
48	5	75.25 [2.96]	76.39 [3.01]	240	8.000.Ax11.0240	8.000.Ax21.0240
44	5	68.89 [2.71]	70.03 [2.76]	220	8.000.Ax11.0220	8.000.Ax21.0220
30	5	46.61 [1.84]	47.75 [1.88]	150	8.000.Ax11.0150	8.000.Ax21.0150
24	5	37.06 [1.46]	38.19 [1.50]	120	8.000.Ax11.0120	8.000.Ax21.0120
20	5	30.69 [1.21]	31.83 [1.25]	100	8.000.Ax11.0100	8.000.Ax21.0100

Resolution examples with encoder (incremental / absolut)

Incremental encoder Sendix 5000		
Pitch circumference [mm]	360	360
Pulses / revolution [ppr]	360	3600
Pulses / mm	1	10
Resolution	1	0.1

Absolut encoder Sendix 5863 (12 bit ST) or M5868 (12 bit ST, programmable via bus)		
Pitch circumference [mm]	360	
Pulses / revolution [ppr]	4096	
Pulses / mm	~ 11.5	
Resolution	~ 0.088	

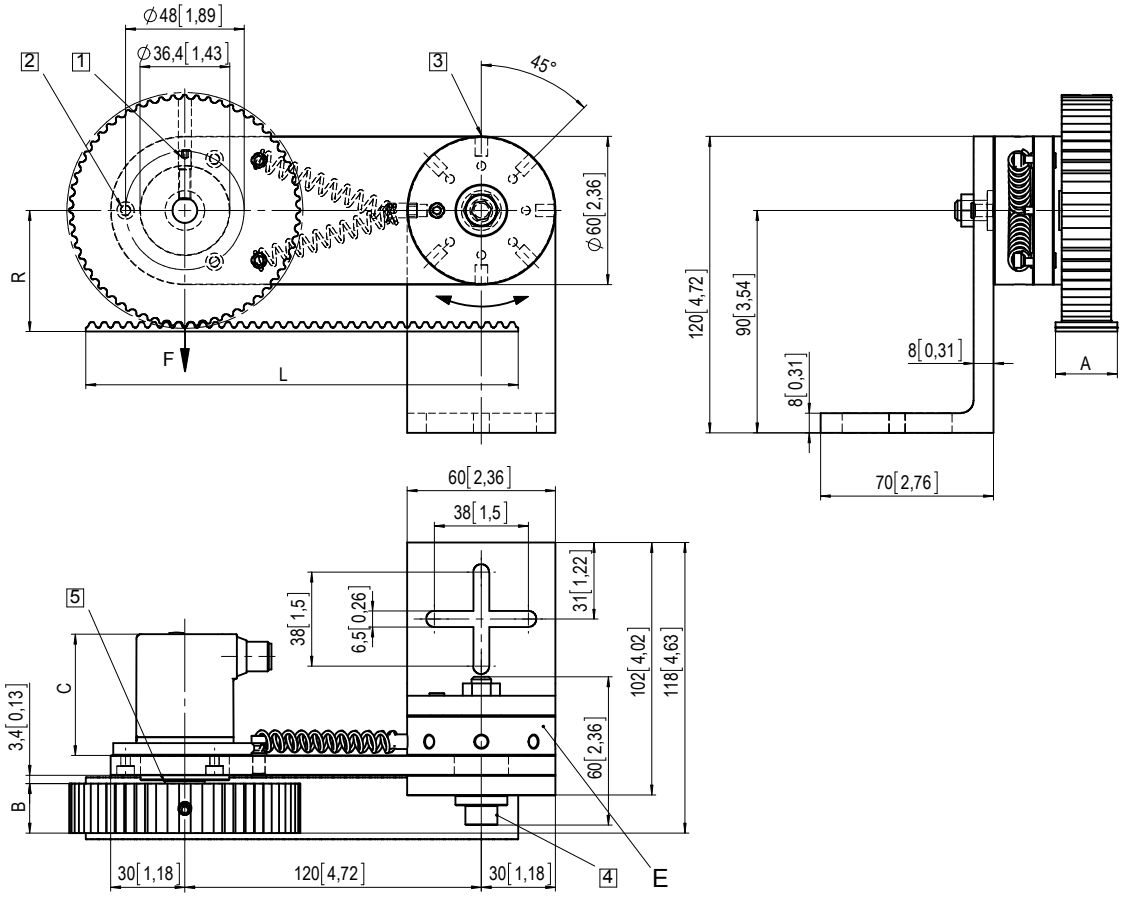
1) The pitch diameter of the pulley is always larger than the diameter of the pulley, as the height of the belt must be considered

Length measuring kit with spring encoder arm	Limes Kit TB1	Standard measuring length up to 100 m Application-specific adaptation

Dimensions

Dimensions in mm [inch]

Spring encoder arm



1 Set screw M5 DIN913 (SW2,5)
recommended tightening torque 2.0 Nm

2 3 M3x8 DIN912 (SW2.5) screws
recommended tightening torque 2.0 Nm (attached)

3 Setting with a screwdriver
size 0 or 1

4 M8x60 DIN912 (SW6) screws

5 Spacer disk

Proceed as follows to adjust the required pressing force **F** (pulley / toothed belt):

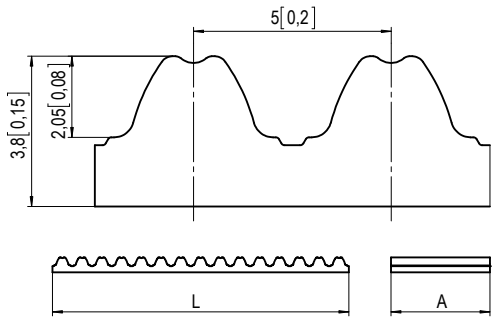
1. Loosen screw 4 (SW6) on the spring encoder arm.
2. Adjust the required angle of the spring encoder arm.
3. Turn adjusting wheel **E** to set the required pressing force **F** (max. 2 positions ≙ 40 N).
4. Tighten screw 4 (SW6) on the spring encoder arm (recommended torque 20 Nm).

Length measuring kit with spring encoder arm | **Limes Kit TB1** | **Standard measuring length up to 100 m Application-specific adaptation**

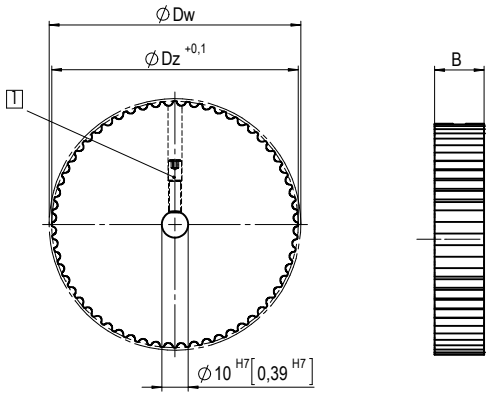
Dimensions

Dimensions in mm [inch]

Toothed belt



Pulley



1 Set screw M5 (SW.5)
recommended tightening torque 2.0 Nm

Width toothed belt A	Width pulley B	No of teeth	Pitch diameter ø Dw	Tooth geometry øDz +0,1	Distance to toothed belt R ±1
10 [0.39] 25 [0.98] 50 [1.97]	10 [0.39] 20 [0.79]	72	114.59 [4.51]	113.45 [4.47]	58.6 [2.31]
		60	95.49 [3.76]	94.35 [3.71]	49.0 [1.93]
		48	76.39 [3.01]	75.25 [2.96]	40.9 [1.61]
		44	70.03 [2.76]	68.89 [2.71]	36.3 [1.43]
		30	47.75 [1.88]	46.61 [1.84]	25.1 [0.99]
		24	38.19 [1.50]	37.06 [1.46]	20.4 [0.80]
		20	31.83 [1.25]	30.69 [1.21]	17.2 [0.68]

C = see encoder data sheet

L = yard ware (1 m, 2 m, ... 100 m)
other lengths > 100 m on request