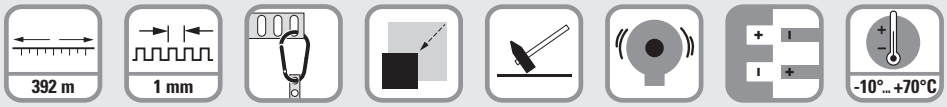
Shaft copying system | Ants LEB02 | Absolute position measurement Measuring range up to 392 m

Ants LEB02 is an extremely robust, compact and contactless measuring system. It uses a contactless measuring principle to measure without any slipping absolute elevator car positions with a resolution of 1 mm and a travel speed of 8 m/s. Additional components such as magnetic switches become superfluous. Especially the easy assembly reduces installation time, thus contributing to overall costs reduction.

cULus RoHS CANopen LIFT SSI RS485



Wide measuring range | Resolution | Easy installation | Compact | Robust | Shock / vibration resistant | Reverse polarity protection | Temperature range

Characteristics

- Absolute position values.
- Measuring length up to 392 m.
- Status LED.
- Extremely robust and compact.
- Stainless steel coded band.
- Simple mounting.
- Contactless measuring principle.

Benefits

- Highest availability - no referencing required in case of power outage.
- 100 % slip-free – absolute position measurement directly at the elevator car.
- Suitable for tightest installation spaces.
- Reduced installation work.
- Elimination of additional components (magnetic sensors, reference sensors).
- Long service life thanks to its robust design.

Order code Sensor

8.LEB02	.	X	1	X	X	.	XX	11
Type		ⓐ		ⓑ	ⓒ		ⓓ	

ⓐ *Type of mounting*
1 = with mounting plate
2 = without mounting plate [1]

ⓑ *Interface / power supply*
2 = CANopen / 10 ... 30 V
3 = RS485 / 10 ... 30 V
4 = SSI / 10 ... 30 V

ⓒ *Type of connection*
1 = cable, 3 m [9.84'], open cable end
2 = cable, 3 m [9.84'], shielded, male connector 9-pin [2]
A = cable, special lengths, shielded, open cable end *)
B = cable, special lengths, shielded, Sub-D male contacts, 9-pin *) [2]

*) Special lengths on request: 5 m, 7 m, 10 m
order code expansion .XXXX = length in dm
ex.: 8.LEB02.112A.2211.**0050** (for cable length 5 m)

ⓓ *Interface profile*
22 = CANopen Lift, DS417 V2.2.8
31 = RS485, 9 Byte,
24 bit position data
41 = SSI, Gray, 25 bit

Order code Coded band, absolute

8.LEX.BA	.	XXXX
Type		ⓐ

ⓐ *Measuring lengths*
XXXX = lengths in meters
(max. length = 392 m)

Standard lengths

0010 = 10 m	0040 = 40 m	0090 = 90 m
0015 = 15 m	0050 = 50 m	0100 = 100 m
0020 = 20 m	0060 = 60 m	0392 = 392 m
0025 = 25 m	0070 = 70 m	Intermediate lengths < 100 m as from 5 pieces,
0030 = 30 m	0080 = 80 m	> 100 m on request

Stock types

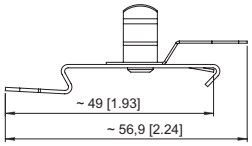
0010 = 10 m	0030 = 30 m
0015 = 15 m	0040 = 40 m
0020 = 20 m	0392 = 392 m
0025 = 25 m	

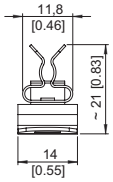
1) T-slot mounting.

2) With interface RS485 (ⓐ = 3) on request.

Shaft copying system | Ants LEB02 | Absolute position measurement Measuring range up to 392 m

Accessories		Order no.
Mounting kit LEB.MK		**8.LEB.MK.0001**
EMC shield terminal	For an EMC-compliant installation of the cable, top-hat rail mounting Clamp: spring steel, galvanized Foot: spring steel Shield diameter 3.0 ... 12.0 mm	**8.0000.4G06.0312**





Technical data

Mechanical characteristics sensor Ants LEB02

Code		absolute, 16 bit
Max. measuring length		392 m
Speed		8 m/s
Resolution		1 mm
Accuracy		± 1 mm
Type of connection		cable 3 m with open end further lengths up to max. 10 m on request
Weight		550 g [19.4 oz]
Housing (material)		aluminum
Dimensions	L x W x H	126 x 55 x 37 mm [4.96 x 2.17 x 1.46"]

Electrical characteristics sensor Ants LEB02

Power supply	10 ... 30 V DC
Reverse polarity protection	yes
Power consumption	max. 100 mA
Interfaces	CANopen Lift, RS485, SSI

Environmental conditions sensor Ants LEB02

Protection acc. to EN 60529	IP54
Humidity	< 90 % (non-condensing)
Working temperature	-10°C ... +70°C [+14°F ... +158°F]
Storage temperature	-20°C ... +80°C [-4°F ... +176°F]
Air pressure (operating altitude)	800 ... 1013 hPA (up to 2000 m above NN)

Interface characteristics CANopen Lift (standard factory setting)

Bitrate	250 kbit/s
Identifier	0x18C
Node ID	0x04
Eventtimer	10 ms
Resolution	1 mm
Heartbeat	500 ms
Terminated	yes

Interface characteristics RS485

Baud rate	19.200
Number of data bits	8 bit
Number of Start bits	1 bit
Number of Stop bits	1 bit
Parity	none
Repetition	150 Hz
Number of bytes / transmission	9 bytes
Resolution position	1 mm
Resolution speed	10 mm/s
Position value	24 bit, binary
Speed value	16 bit, two's complement

Interface characteristics SSI (standard factory setting)

Data transfer	in slave mode double data transmission
Resolution	0.25 mm
Data length	25 bit + 1 power failure bit (Low)
MSB	first
Code	gray
Clock rate	max. 200 kHz
Monoflop time	min. 500 µs

A position value must be read by the SSI master over 52 pulses.
1 ... 25: MSB first absolute position in gray code
26: Data low (PFB)
27 ... 51: Second transmission (see 1-25)
52: Data Low (PFB)

Shaft copying system | Ants LEB02 | Absolute position measurement Measuring range up to 392 m

Standards / Directives / Certificates

Standards	
standards for elevators	EN81-20 / -50
EMC emission	EN12015
EMC immunity	EN12016
vibration resistance	EN60068-2-6
shock resistance	EN60068-2-27
environmental conditions	EN60068-2-14
Directives	
EMC directive	2014/30/EU
elevator directives	2014/33/EU
RoHs directive	2011/65/EU
UL approval	file no. E498900
CE compliant	Yes

Technical data coded band

Material	V2A spring-loaded stainless steel, chamfered edges
Dimensions	16 x 0.4 mm [0.63 x 0.016"]
Max. length	392 m
Weight	50 g / m [1.76 oz/m]
Thermal expansion	16 x 10^{-6} / K between 20°C ... 100°C

Technical data mounting kit LEB.MK

Dimensions	see manual R60205
Material	see manual R60205

Elevator functions	Standard	Base Sensor
Referencing / correction trip	-	√
Top & bottom inspection limitation	EN 81-20	√
Direct drive-in – depending on complete drive module	-	√
Stopping point shift	-	√
Overspeed during inspection	EN 81-20	√

Terminal assignment

Interface	Type of connection	Cable								
2 CANopen Lift (DS417)	1, A	Signal:	+V	0 V / GND	CAN_H	CAN_L	n.c.	n.c.		
		Core color:	BN	WH	GN	YE	GY	PK		

Interface	Type of connection	Cable with Sub-D, male connector 9-pin								
2 CANopen Lift (DS417)	2, B	Signal:	n.c.	CAN_L	0 V / GND	n.c.	shield	0 V / GND	CAN_H	n.c.	+V
		Pin:	1	2	3	4	5	6	7	8	9

Interface	Type of connection	Cable								
3 RS485	1, A	Signal:	+V	0 V / GND	D+	D-	n.c.	n.c.		
		Core color:	BN	WH	GN	YE	GY	PK		

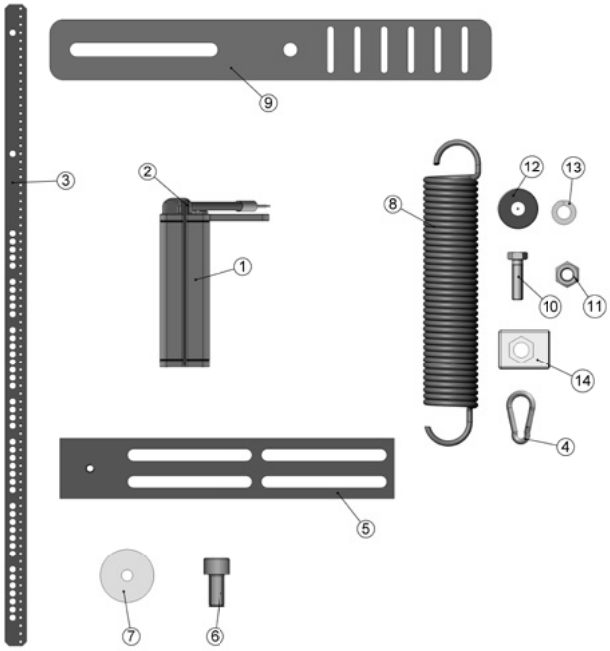
Interface	Type of connection	Cable								
4 SSI	1, A	Signal:	+V	0 V / GND	C+	C-	D+	D-		
		Core color:	BN	WH	GN	YE	GY	PK		

Interface	Type of connection	Cable with Sub-D, male connector 9-pin								
4 SSI	2, B	Signal:	n.c.	C+	shield	D+	0 V / GND	+V	C-	D-	n.c.
		Pin:	1	2	3	4	5	6	7	8	9

+V: Power supply +V DC
0 V: Power supply ground GND (0 V)
C+, C-: Clock signal
D+, D-: Data signal
n.c. : Do not connect

Shaft copying system | Ants LEB02 | Absolute position measurement Measuring range up to 392 m

Scope of delivery Ants LEB02 with LEX.BA and LEB.MK



Proper operation requires the following components

Ants LEB02 (8.LEB02.xxxx.xxxx)

1 1 x sensor
2 2 x sliding plates, mounted

Coded band LEX.BA (8.LEX.BA.xxxx)

3 1 x stainless steel coded band

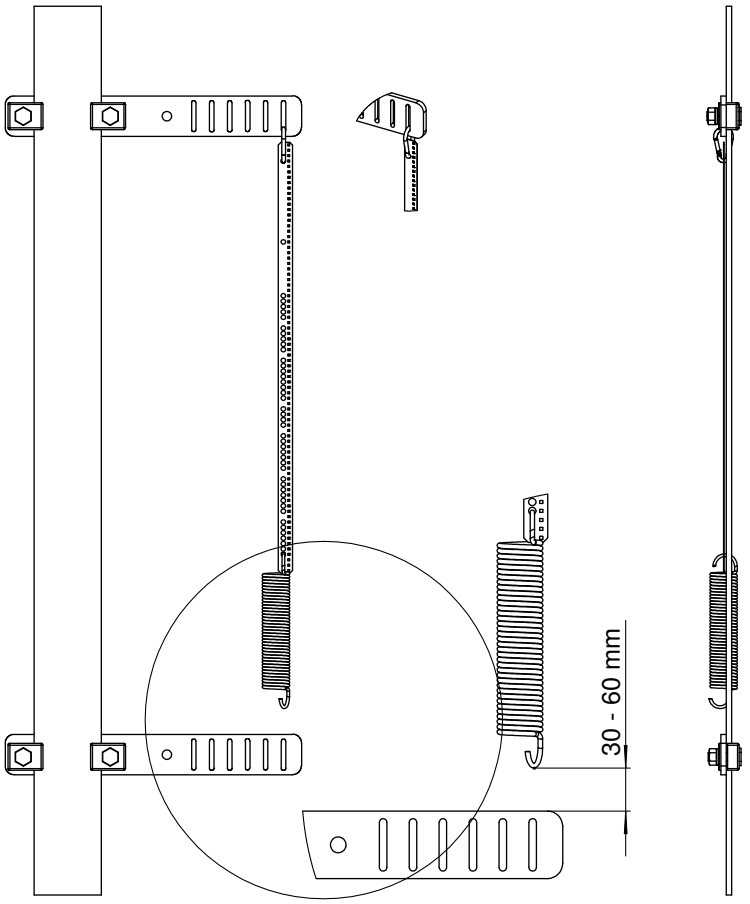
Mounting kit LEB.MK (8.LEB.MK.0001)

4 1 x stainless steel snap hooks
5 1 x sensor cabin fastening plate
6 1 x sensor fastening screw with Polyfleck coating
7 1 x washer
8 1 x spring
9 2 x rail fastening plates
10 4 x M10x30 hexagon head screws
11 4 x M10 hexagon nuts
12 8 x M10 large diameter washers
13 8 x M10 retaining rings
14 4 x clamping plates

Technology in detail

Coded band fastening

Ants LEB02 stands out in particular for its ease of installation. This saves time and costs.

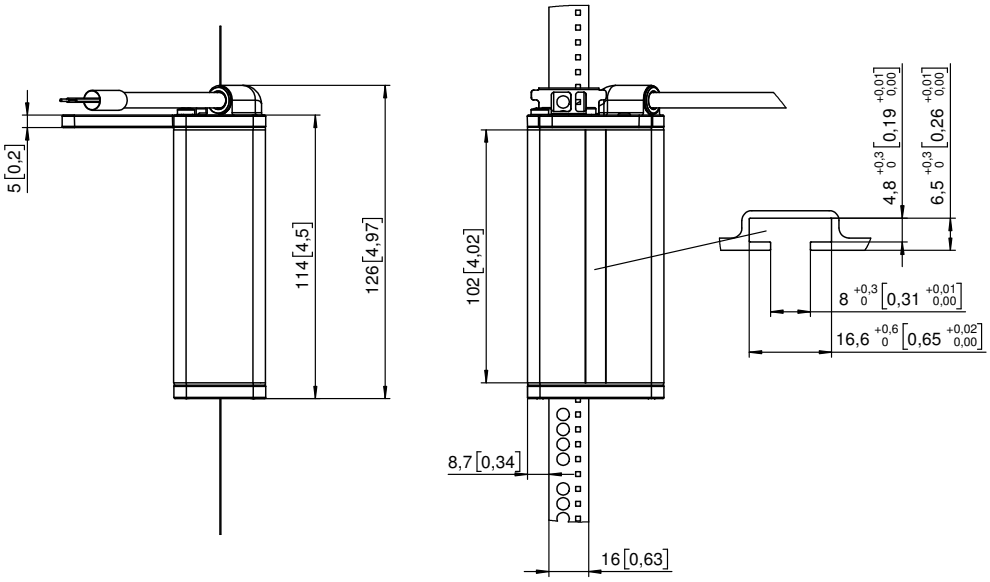


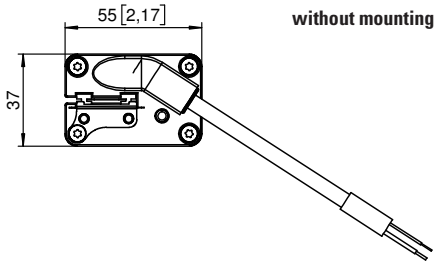
Shaft copying system | **Ants LEB02** | **Absolute position measurement Measuring range up to 392 m**

Dimensions

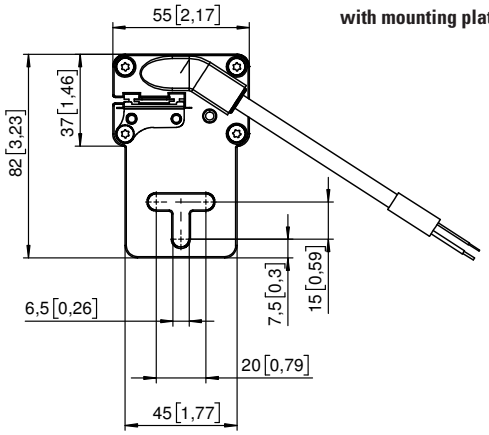
Dimensions in mm [inch]

Sensor





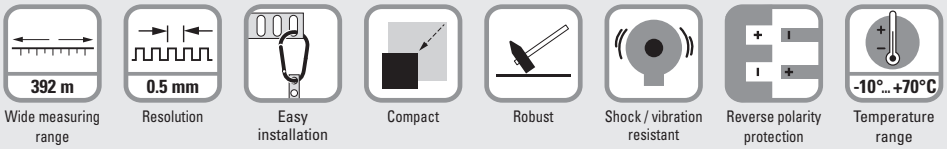
without mounting plate



with mounting plate

Shaft copying system | Ants LES02 | Absolute position measurement, SIL3 Measuring range up to 392 m

Ants LES02 is an extremely robust, compact and contactless measuring system. It uses a contactless measuring principle to measure without any slipping absolute elevator car positions with a resolution of 0.5 mm and a travel speed of 8 m/s. Additional components such as magnetic switches become superfluous. Combined with the PSU02, it allows realizing a wide range of elevator and safety functions.
Especially the easy assembly reduces installation time, thus contributing to overall costs reduction.



Characteristics

- SIL3-certified by TÜV.
- Absolute position values.
- Measuring length up to 392 m.
- Status LED.
- Extremely robust and compact.
- Stainless steel coded band.
- Simple assembly.
- Contactless measuring principle.

Benefits

- Fulfills safety functions in compliance with EN 81-20/-21/-50 (combinable with Kübler PSU02).
- Eliminates components required until now such as limit switches, door zone magnets, ...
- Highest availability - no referencing required in case of power failure.
- 100% slip-free thanks to absolute position measurement directly on the elevator car.
- Suitable for tight installation spaces.
- Reduced installation work.

Order code Sensor

8.LES02 . X 1 1 X . XX 11
Type | a | b | c | d

a *Type of mounting*
1 = with mounting plate
2 = without mounting plate [1)]

b *Interface / power supply*
1 = CAN / 10 ... 30 V

c *Type of connection*
1 = cable, 3 m [9.84'], open cable end
A = cable, special lengths, shielded, open cable end *)

*) Special lengths on request: 5 m, 7 m, 10 m
order code expansion .XXXX = length in dm
ex.: 8.LES02.111A.1111.**0050** (for cable length 5 m)

d *Interface profile*
11 = CAN proprietary, V1.0.0

Order code Coded band, absolute

8.LEX.BA . XXXX
Type | a

a *Measuring lengths*
XXXX = lengths in meters (max. length = 392 m)

Standard lengths

0010 = 10 m	0040 = 40 m	0090 = 90 m
0015 = 15 m	0050 = 50 m	0100 = 100 m
0020 = 20 m	0060 = 60 m	0392 = 392 m
0025 = 25 m	0070 = 70 m	Intermediate lengths < 100 m as from 5 pieces,
0030 = 30 m	0080 = 80 m	> 100 m on request

Stock types

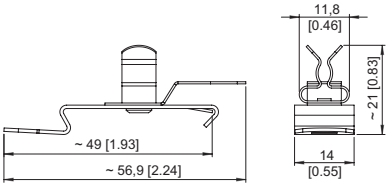
0010 = 10 m	0030 = 30 m
0015 = 15 m	0040 = 40 m
0020 = 20 m	0392 = 392 m
0025 = 25 m	

1) T-slot mounting.

Shaft copying system | **Ants LES02** | **Absolute position measurement, SIL3**
Measuring range up to 392 m

Accessories

		Order no.
Mounting kit LES.MK		**8.LES.MK.0001**
EMC shield terminal	For an EMC-compliant installation of the sensor cable, top-hat rail mounting Clamp: spring steel, galvanized Foot: spring steel Shield diameter 3.0 ... 12.0 mm	**8.0000.4G06.0312**



Technical data

Mechanical characteristics sensor Ants LES02

Code		absolute, 16 bit
Max. measuring length		392 m
Speed	certified	8 m/s [1]
	functional	12 m/s [2]
Resolution	certified	1 mm
	functional	0.5 mm
Accuracy		±1 mm
Type of connection		cable 3 m with open end further lengths up to max. 10 m on request
Weight		550 g [19.4 oz]
Housing (material)		aluminum
Dimensions	L x W x H	126 x 55 x 37 mm [4.96 x 2.17 x 1.46"]

Electrical characteristics sensor Ants LES02

Power supply	10 ... 30 V DC
Reverse polarity protection	yes
Power consumption	max. 100 mA
Interfaces	CAN proprietary, V1.0.0

Environmental conditions sensor Ants LES02

Protection acc. to EN 60529	IP54
Humidity	< 90 % (non condensing)
Working temperature	-10°C ... +70°C [+14°F ... +158°F]
Storage temperature	-15°C ... +80°C [+5°F ... +176°F]
Air pressure (operating altitude)	800 ... 1013 hPA (up to 2000 m above NN)

Technical data coded band LEX.BA

Material	V2A spring-loaded stainless steel, chamfered edges
Dimensions	16 x 0.4 mm [0.63 x 0.016"]
Max. length	392 m
Weight	50 g / m [1.76 oz/m]
Thermal expansion	16 x 10^{-6} / K between 20°C ... 100°C

Technical data mounting kit LES.MK

Dimensions	see manual R60205
Material	see manual R60205

Standards / Directives / Certificates

Standards	standards for elevators	EN 81-20/-50
	EMC emission	EN 12015
	EMC immunity	EN 12016
	vibration resistance	EN 60068-2-6 / EN 81-50, 5.6.3.1
	shock resistance	EN 60068-2-27 / EN 81-50, 5.6.3.1
	environmental conditions	EN 60068-2-14 / EN 81-50, 5.6.3.2
Directives	EMC directive	2014/30/EU
	elevator directives	2014/33/EU
	RoHs directive	2011/65/EU
UL approval		file no. E498900
CE compliant		Yes

Safety characteristics

Classification	SIL3
PFH_d value	< 10^{-8} h^{-1}
Mission time / Proof test interval	20 years

Terminal assignment Ants LES02

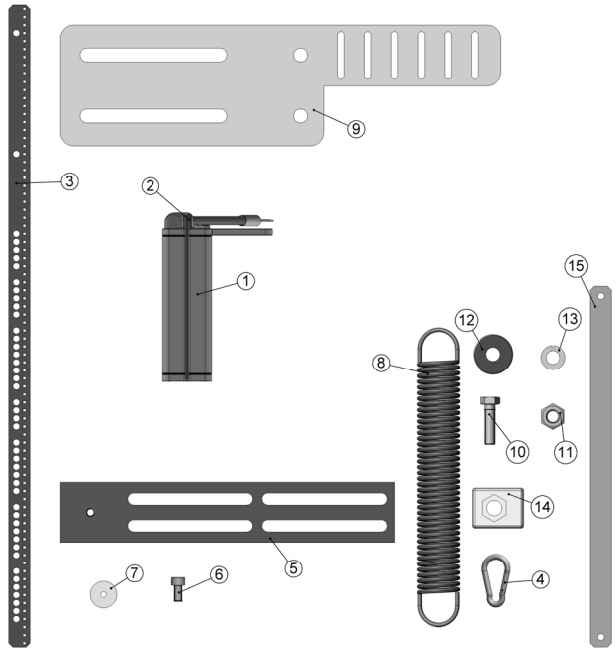
Interface	Type of connection	Cable				
1 CAN	1, A	Signal:	+V	0 V / GND	CAN_H	CAN_L
		Core color:	BN	WH	GN	YE

+V: Power supply +V DC
0 V: Power supply ground GND (0 V)

1) Reference is the nominal speed of the elevator facility.
2) The sensor switches to error mode for speeds > 12 m/s.

Shaft copying system | **Ants LES02** | **Absolute position measurement, SIL3**
Measuring range up to 392 m

Scope of delivery Ants LES02 with LEX.BA and LES.MK



The following components included in the SIL3 certification are required for proper operation.

Ants LES02 (8.LES02.xxxx.xxxx)

1 1 x sensor
2 2 x sliding plates, mounted

Coded band LEX.BA (8.LEX.BA.xxxx)

3 1 x stainless steel coded band

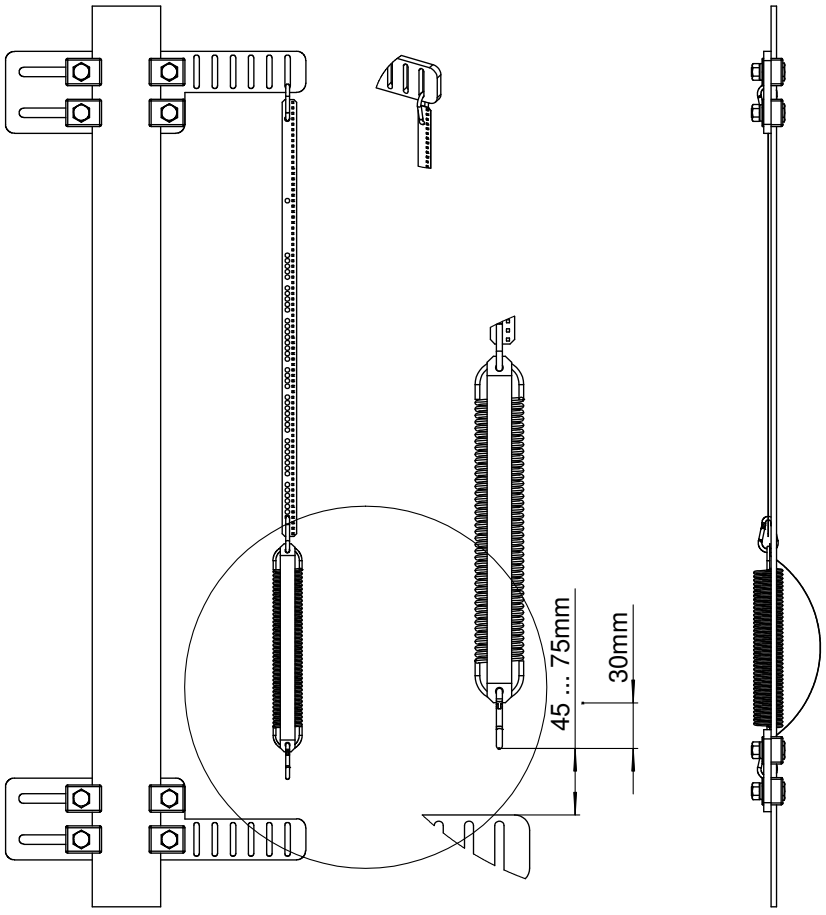
Mounting kit LES.MK (8.LES.MK.0001)

4 3 x stainless steel snap hooks
5 1 x sensor cabin fastening plate
6 1 x sensor fastening screw with Polyfleck coating
7 1 x washer
8 1 x spring
9 2 x rail fastening plates
10 8 x M10x30 hexagon head screws
11 8 x M10 hexagon nuts
12 8 x M10 large diameter washers
13 8 x M10 retaining rings
14 8 x clamping plates
15 1 x securing band

Technology in detail

Coded band fastening

Ants LES02 stands out in particular for its ease of installation. This saves time and costs.

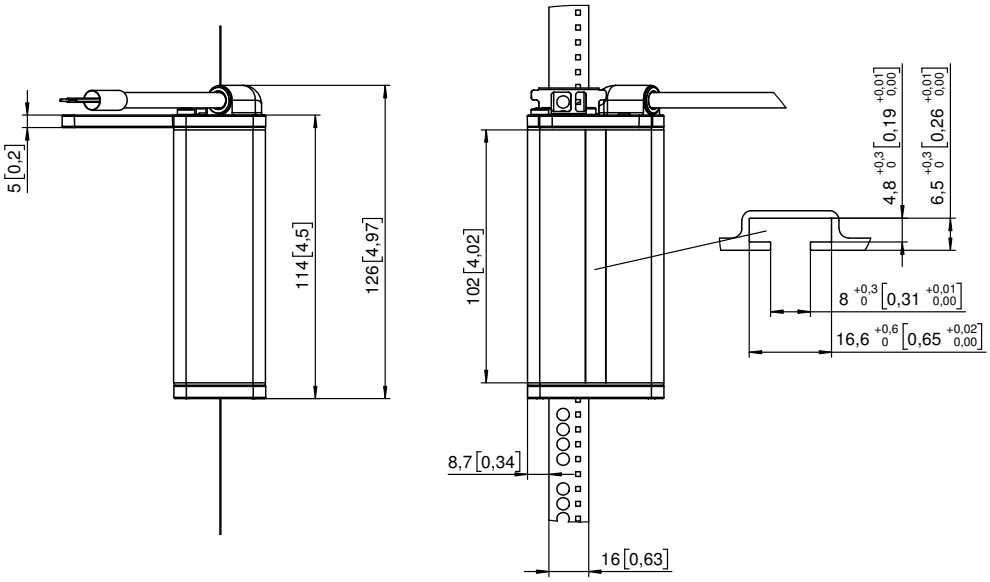


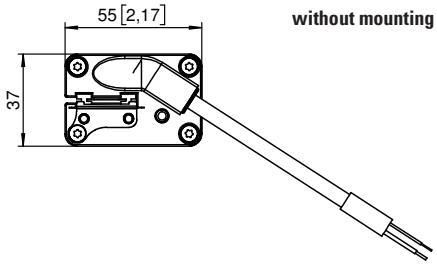
Shaft copying system | **Ants LES02** | **Absolute position measurement, SIL3**
Measuring range up to 392 m

Dimensions

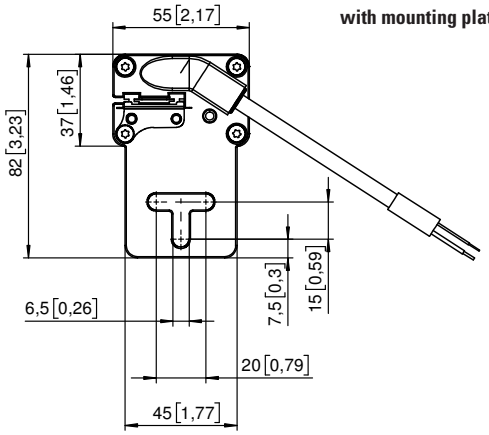
Dimensions in mm [inch]

Sensor





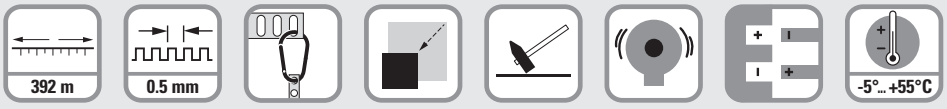
without mounting plate



with mounting plate

Shaft copying system | PSU02 | Safe System, SIL3 Measuring range up to 392 m

The PSU02 is combined with the Ants LES02 sensor to realize elevator and safety functions in compliance with EN 81-20/-21/-50. The Ants LES02 measures the absolute car position 100% slip-free. The PSU02 evaluates the safe position feedback and triggers by means of safety relays, jointly with the elevator control, the required safety functions.
Therefore, the safe system, besides installation and maintenance time, allows above all saving costs.



Characteristics

- Safe position values and evaluation.
- SIL3-certified by TÜV.
- Integrated UCM function.
- Extremely robust and compact.
- Stainless steel coded band.
- Simple assembly.
- Contactless measuring principle.

Benefits

- Realization of elevator and safety functions in compliance with EN 81-20/-21/-50.
- Replaces existing components such as limit switches, inspection limit switches, magnetic sensors and door zone magnets.
- Reduces installation and maintenance time.
- Accurate car positioning.
- 100% slip-free thanks to absolute position measurement directly on the elevator car.
- Suitable for tight installation spaces.
- Highest availability.

Order code PSU02

8.PSU02	.	1	1	2	1	.	22	11
Type		a	b	c			d	

a *Type of mounting*
1 = top-hat rail mounting

b *Sensor*
1 = Can be combined with Ants LES02 [1]

c *Interface / power supply*
2 = CANopen / 24 V

d *Interface profile*
22 = CANopen Lift, DS417 V2.2.8

Order code Sensor

8.LES02	.	X	1	1	X	.	XX	11
Type		a		b	c		d	

a *Type of mounting*
1 = with mounting plate
2 = without mounting plate [1]

b *Interface / power supply*
1 = CAN / 10 ... 30 V

c *Type of connection*
1 = cable, 3 m [9.84'], open cable end
A = cable, special lengths, shielded, open cable end *)

*) Special lengths on request: 5 m, 7 m, 10 m
order code expansion .XXXX = length in dm
ex.: 8.LES02.111A.1111.**0050** (for cable length 5 m)

d *Interface profile*
11 = CAN proprietary, V1.0.0

1) The sensor Ants LES02 is not a component of the PSU02 and must be ordered separately.
Each of these two components is SIL3-certified.
2) T-slot mounting.

Shaft copying system	PSU02	Safe System, SIL3 Measuring range up to 392 m

Order code
Coded band, absolute

8.LEX.BA . XXXX
Type | ⓐ

ⓐ *Measuring lengths*
XXXX = lengths in meters (max. length = 392 m)

Standard lengths

0010 = 10 m	0040 = 40 m	0090 = 90 m
0015 = 15 m	0050 = 50 m	0100 = 100 m
0020 = 20 m	0060 = 60 m	0392 = 392 m
0025 = 25 m	0070 = 70 m	Intermediate lengths < 100 m as from 5 pieces,
0030 = 30 m	0080 = 80 m	> 100 m on request

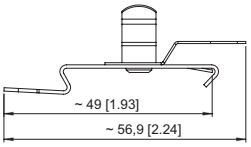
Stock types

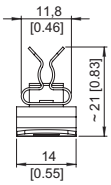
0010 = 10 m	0030 = 30 m
0015 = 15 m	0040 = 40 m
0020 = 20 m	0392 = 392 m
0025 = 25 m	

Accessories

	Order no.
Mounting kit LES.MK	**8.LES.MK.0001**

EMC shield terminal





For an EMC-compliant installation of the sensor cable, top-hat rail mounting
Clamp: spring steel, galvanized
Foot: spring steel
Shield diameter 3.0 ... 12.0 mm

8.0000.4G06.0312

Technical data

Mechanical characteristics evaluation unit PSU02

Max. number of floors		200
Connection		picoMAX® eCOM 3.5
Switch-off time / System reaction time		< 25 ms (incl. relay switching time)
Housing (material)		plastic
Dimensions	L x W x H	116 x 96 x 31 mm [4.55 x 3.78 x 1.21“]

Electrical characteristics evaluation unit PSU02

Power supply	24 VDC ±10 %, low voltage PELV
Power	< 10 W
Internal interface (between Ants LES02 and PSU02)	CAN proprietary, V1.0.0
External interface (between PSU02 and control)	CANopen Lift, DS417 V2.2.8

Environmental conditions evaluation unit PSU02

Protection acc. to EN 60529	IP00 (min. IP20 when mounted in cabinet)
Humidity	< 90 % (non condensing)
Working temperature	-5°C ... +55°C [+23°F ... +131°F]
Storage temperature	-10°C ... +70°C [+14°F ... +158°F]
Air pressure (operating altitude)	800 ... 1013 hPA (up to 2000 m above sea level)

Mechanical characteristics sensor Ants LES02

Code		absolute, 16 bit
Max. measuring length		392 m
Speed	certified functional	8 m/s [1] 12 m/s [2]
Resolution	certified functional	1 mm 0.5 mm
Accuracy		±1 mm
Type of connection		cable 3 m with open end further lengths up to max. 10 m on request
Weight		550 g
Housing (material)		Aluminium
Dimensions	L x W x H	126 x 55 x 37 mm [4.96 x 2.17 x 1.46“]

Electrical characteristics sensor Ants LES02

Power supply	10 ... 30 V DC
Reverse polarity protection	yes
Power consumption	max. 100 mA
Interfaces	CAN proprietary, V1.0.0

Environmental conditions sensor Ants LES02

Protection acc. to EN 60529	IP54
Humidity	< 90 % (non condensing)
Working temperature	-10°C ... +70°C [+14°F ... +158°F]
Storage temperature	-15°C ... +80°C [+5°F ... +176°F]
Air pressure (operating altitude)	800 ... 1013 hPA (up to 2000 m above NN)

1) Reference is the nominal speed of the elevator facility.
2) The sensor switches to error mode for speeds > 12 m/s.

Shaft copying system | PSU02 | Safe System, SIL3 Measuring range up to 392 m

Technical data coded band LEX.BA

Material	V2A spring-loaded stainless steel, chamfered edges
Dimensions	16 x 0.4 mm [0.63 x 0.016“]
Max. length	392 m
Weight	50 g / m [1.76 oz/m]
Thermal expansion	16 x 10^{-6} / K between 20°C ... 100°C

Technical data mounting kit LES.MK

Dimensions	see manual R60205
Material	see manual R60205

Standards / Directives / Certificates

Standards	elevator standard	EN 81-20/-21/-50
	EMC emission	EN 12015
	EMC immunity	EN 12016
	vibration resistance	EN 60068-2-6 / EN 81-50, 5.6.3.1
	shock resistance	EN 60068-2-27 / EN 81-50, 5.6.3.1
	environmental conditions	EN 60068-2-14 / EN 81-50, 5.6.3.2
Directives	EMC directive	2014/30/EU
	elevator directives	2014/33/EU
	RoHs directive	2011/65/EU
CE compliant		yes

Safety characteristics

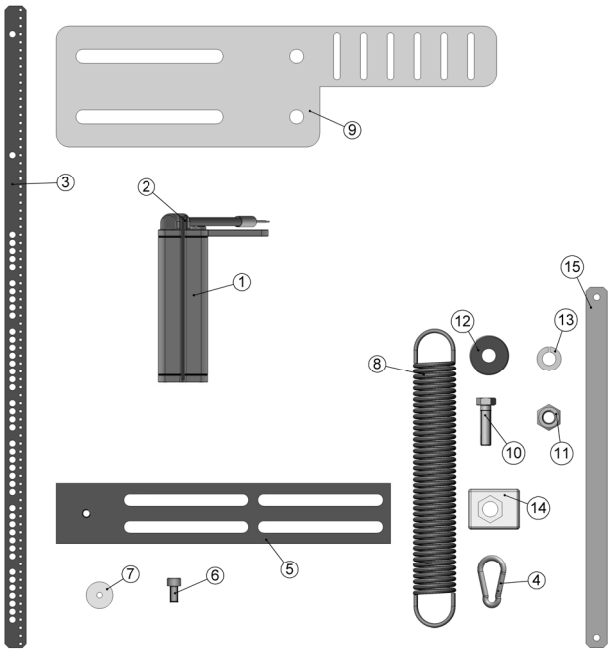
Classification	SIL3
PFH_d value	< 10^{-8} h^{-1}
Mission time / Proof test interval	20 years

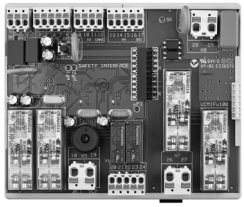
Terminal assignment Ants LES02

Interface	Type of connection	Cable				
1 CAN	1, A	Signal:	+V	0 V	CAN_H	CAN_L
		Core color:	BN	WH	GN	YE

+V: Power supply +V DC
0 V: Power supply ground GND (0 V)

Scope of delivery PSU02 with Ants LES02, LEX.BA and LES.MK





17

The following components included in the SIL3 certification are required for proper operation.

Ants LES02 (8.LES02.xxxx.xxxx)

1 1 x sensor
2 2 x sliding plates, mounted

Coded band LEX.BA (8.LEX.BA.xxxx)

3 1 x stainless steel coded band

Mounting kit LES.MK (8.LES.MK.0001)

4 3 x stainless steel snap hooks
5 1 x sensor cabin fastening plate
6 1 x sensor fastening screw with Polyfleck coating
7 1 x washer
8 1 x spring
9 2 x rail fastening plates
10 8 x M10x30 hexagon head screws
11 8 x M10 hexagon nuts
12 8 x M10 large diameter washers
13 8 x M10 retaining rings
14 8 x clamping plates
15 1 x securing band

Evaluation unit PSU02

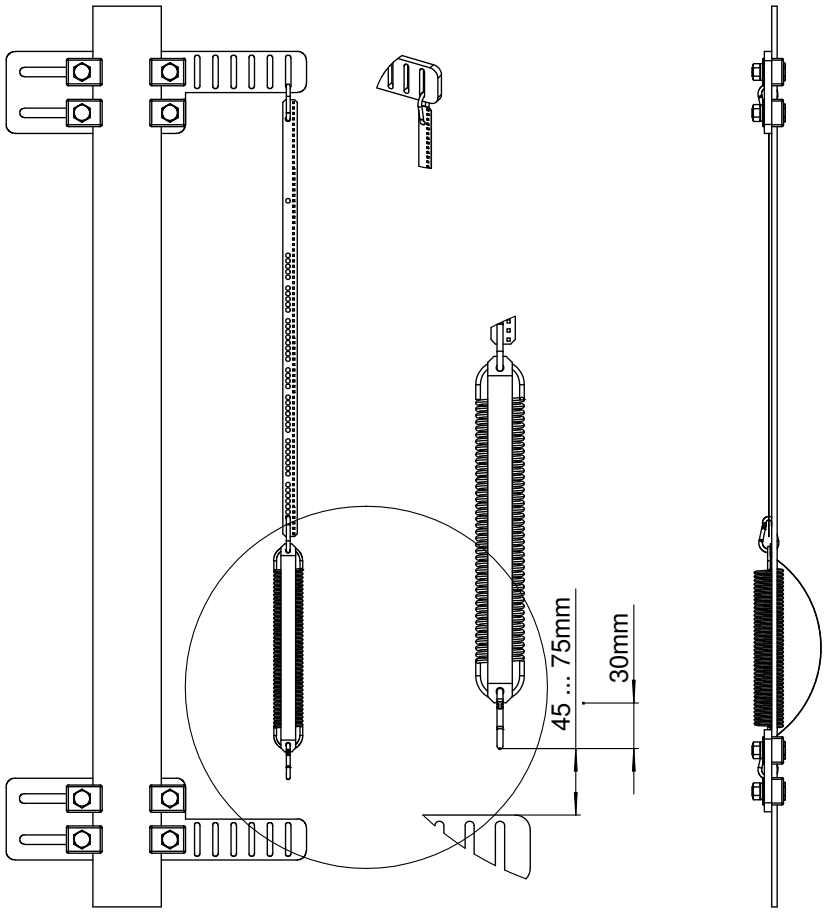
17 1 x evaluation unit

Shaft copying system	PSU02	Safe System, SIL3 Measuring range up to 392 m

Technology in detail

Coded band fastening

Ants LES02 stands out in particular for its ease of installation. This saves time and costs.

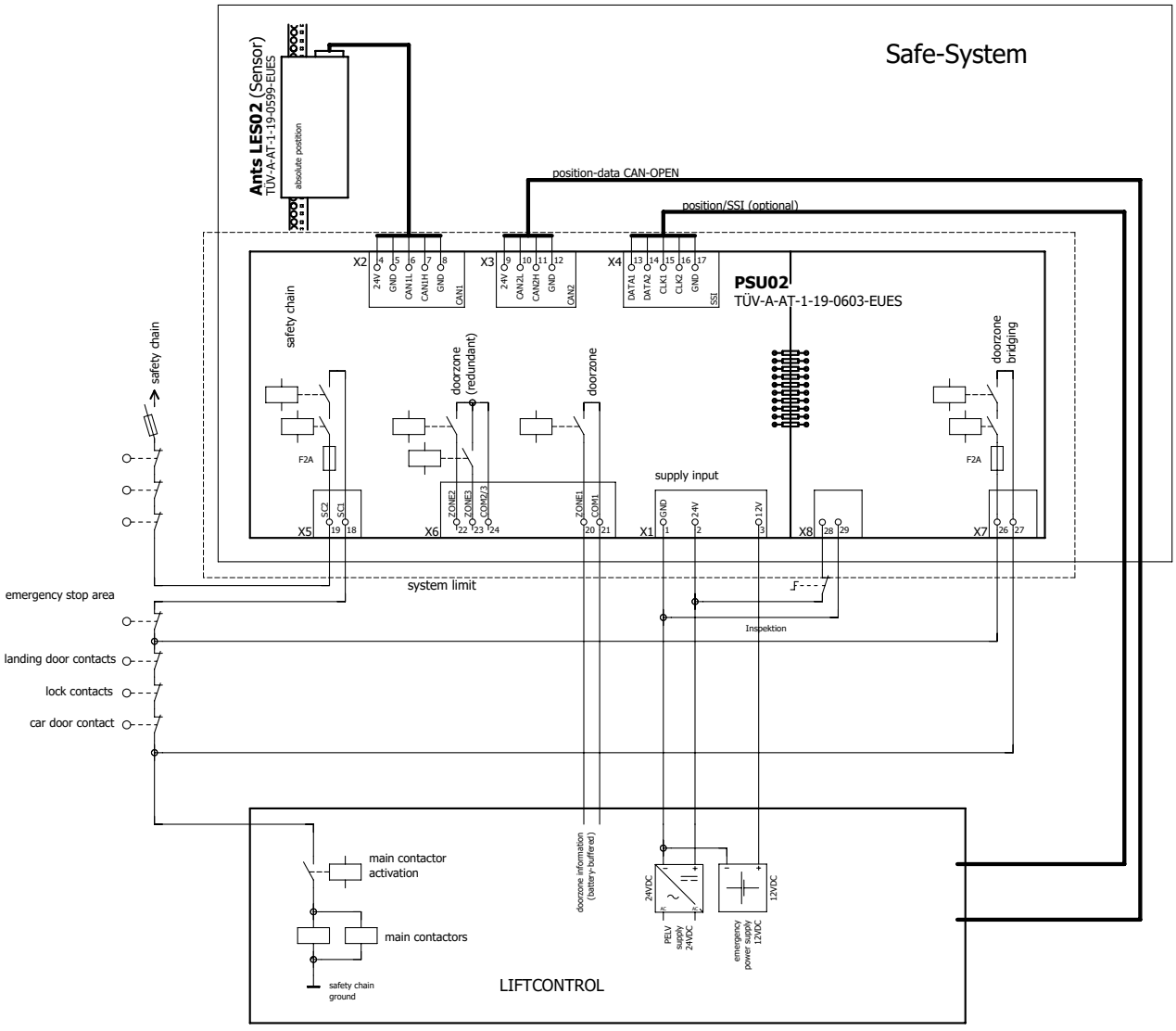


Shaft copying system	PSU02	Safe System, SIL3 Measuring range up to 392 m

Realizable elevator and safety functions

No.		*Standard notes in the sections of EN 81-20 / EN 81-50 / EN 81-21*	*SIL acc. to EN 81-20*
1	**Emergency limit switch**	5.12.2.3.1 b)	1
2	**Unintended movement (UCM)**	5.6.7.7	2
3	**Delay control (pre-tripping)**	EN 81-20 : 5.12.1.3	3
4	**Overspeed teach-in (1.0 m/s)**	No standard note	3
5	**Inspection limit switch for reduced shaft head and pit**	EN 81-21 : 5.5.3.4, 5.7.3.4	2
6	**Overspeed inspection (0.6 m/s)**	No standard note	2
7	**Overspeed (pre-tripping +15%)**	No standard note	Functional
8	**Door bypass**	EN 81-20 : 5.12.1.4 a), b), c), 2), d)	2
9	**Two independent redundant signals for the door zones to drive an additional UCM device**	EN 81-20 : 5.11.2.5 EN 81-50 : 5.6.3.1.1	No SIL

Wiring diagram Safe-System

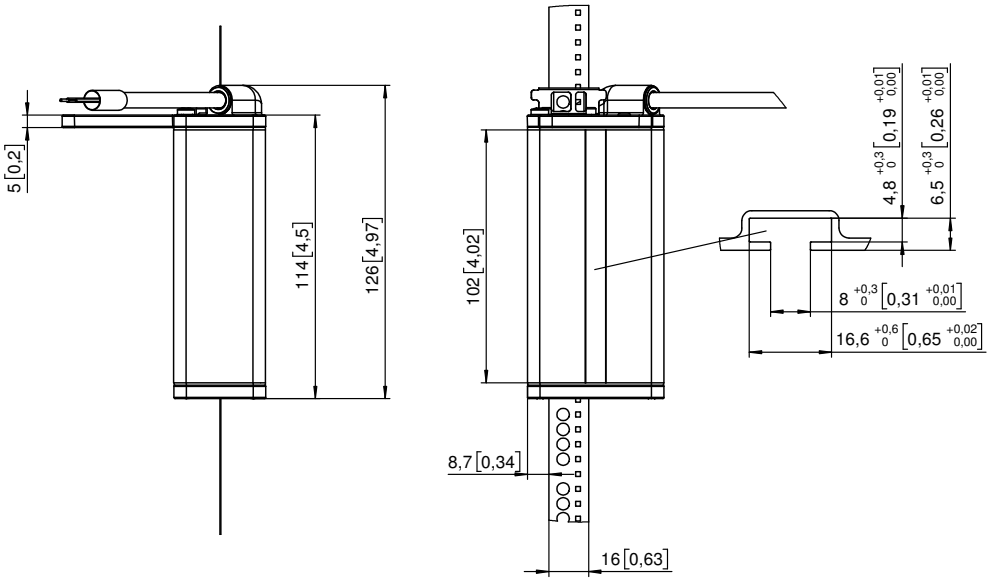


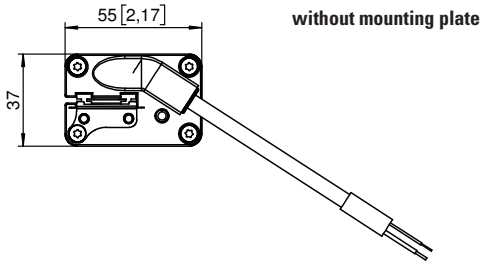
Shaft copying system	PSU02	Safe System, SIL3 Measuring range up to 392 m

Dimensions

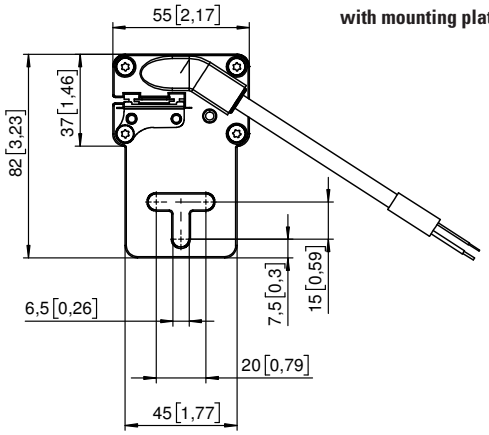
Dimensions in mm [inch]

Sensor Ants LES02





without mounting plate



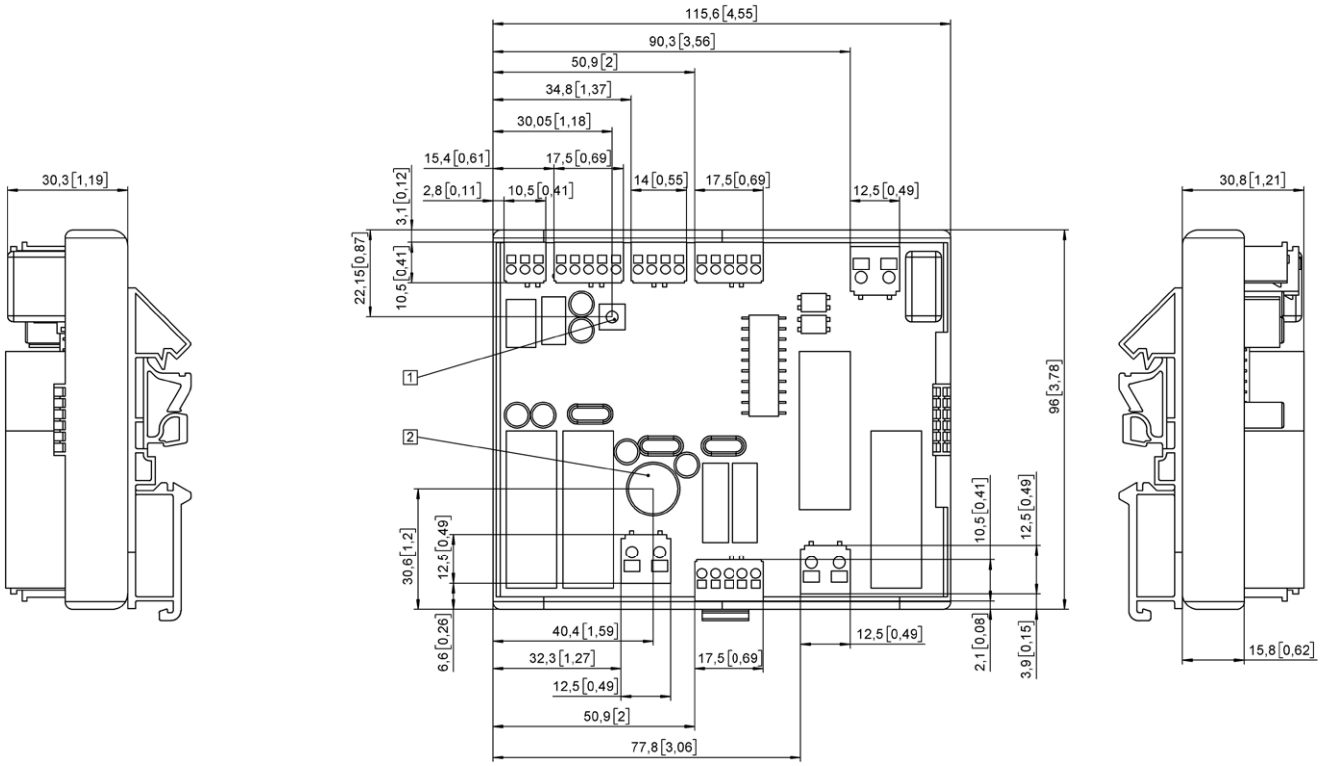
with mounting plate

Shaft copying system	PSU02	Safe System, SIL3 Measuring range up to 392 m

Dimensions

Dimensions in mm [inch]

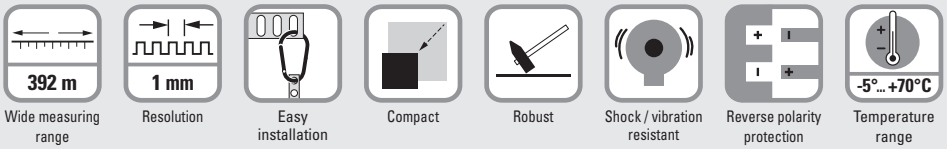
Evaluation unit PSU02
(Installation on all DIN EN top hat rails)



1 Pushbutton
2 Signal generator

Absolute shaft copying system | LEB01 | Measuring range up to 392 m Absolute position measurement

LEB01 is an extremely robust, compact and non-contact measuring system. Elevator car absolute position values are measured slip-free with a resolution of 1 mm and a traverse speed of 5 m/s. Additional components such as magnetic switches are no longer needed. Especially the easy mounting reduces installation time, thus contributing to overall costs reduction.



Characteristics

- Absolute position measurement.
- Measuring length up to 392 m.
- Extremely robust and compact.
- Stainless steel code tape.
- Simple mounting.
- Non-contact measuring system.

Benefits

- 100% slip-free thanks to absolute position measurement directly on the elevator car.
- Elimination of additional sensors in the elevator shaft (magnetic switches).
- Highest elevator availability - no referencing required in case of power failure.
- Costs reduction thanks to lower installation and maintenance requirements.
- Suitable for tight installation spaces.
- Robust design for long service life.

Order code Sensor

8.LEB01	.	X	11	X
Type		ⓐ		ⓑ

ⓐ *Interface*
3 = CANopen LIFT (DS417)
4 = SSI

ⓑ *Type of connection*
1 = cable, 5 m [16.40'], 4-pin, shielded, open cable end (for CANopen)
3 = cable, 5 m [16.40'], 6-pin, shielded, open cable end (for SSI)

Optional on request
- other interfaces

Stock type
8.LEB01.3111

Order code Code tape, absolute

8.LEX.BA	.	XXXX
Type		ⓐ

ⓐ *Measuring lengths*
XXXX = lengths in meters
lengths from 30 m available in 10 m steps, max. 392 = 0392
lengths < 30 m – only standard lengths or stock types can be ordered

Standard lengths
0010 = 10 m
0020 = 20 m
0030 = 30 m
0050 = 50 m
0070 = 70 m
0100 = 100 m

Stock types
0010 = 10 m
0015 = 15 m
0020 = 20 m
0025 = 25 m

Accessories		Order no.
Mounting kit, absolute shaft copying system	for LEB01	**8.LEB.MK.0001**

Absolute shaft copying system | LEB01 | Measuring range up to 392 m Absolute position measurement

Technical data

Mechanical characteristics sensor LEB01

Code		absolute, 16 bit
Max. measuring length		392 m
Speed		5 m/s
Resolution		1 mm
System accuracy		±1 mm
Repeat accuracy / relative accuracy		±1 mm
Type of connection		cable 5 m with open end
Max. acceleration		49.1 m/s² (5 G)
Weight		500 g [17.64 oz]
Housing (material)		aluminum
Dimensions	L x W x H	135 x 45 x 33 mm [5.31 x 1.77 x 1.30“]

Electrical characteristics sensor LEB01

Power supply	10 ... 30 V DC ±10%
Reverse polarity protection	yes
Interfaces	SSI, CANopen Lift DS417 (other on request)

Environmental conditions sensor LEB01

Protection acc. to EN60529	IP30
Humidity	< 90 % (non condensing)
Working temperature	-5°C ... +70°C [+23°F ... +158°F]
Storage temperature	-10°C ... +70°C [+14°F ... +158°F]
Air pressure (operating altitude)	800 ... 1013 hPA (up to 2000 m above NN)

Technical data tape LEX.BA

Material	V2A spring-loaded stainless steel, chamfered edges
Dimensions	16 x 0.4 mm [0.63 x 0.016“]
Max. length	392 m
Weight	50 g / m [1.76 oz/m]
Thermal expansion	16 x 10^{-6} / K between 20°C ... 100°C

Technical data mounting kit LEB.MK

Dimensions	see manual
Material	see manual

Standards / Directives / Certificates

Standards		
	safety rules for elevators	EN81.20, EN81.50
	EMV emission	EN12015
	EMV immunity	EN12016
	vibration resistance	EN60068-2-6
	shock resistance	EN60068-2-27
	environmental conditions	EN60068-2-14
Directives		
	low voltage directive	2014/35/EU
	EMV directive	2014/30/EU
	elevator directives	2014/33/EU
	RoHs directive	2011/65/EU
CE compliant		Yes

Interface characteristics CANopen Lift (standard factory setting)

Bitrate	250 kbit/s
Identifier	0x18C
Node ID	0x04
Eventtimer	10 ms
Resolution	1 mm
Heartbeat	500 ms
Terminated	yes

Interface characteristics SSI (standard factory setting)

Data transfer	in slave mode double data transmission
Resolution	0.25 mm
Data length	25 bit + 1 power failure bit (Low)
MSB	first
Code	gray
Clock rate	max. 200 kHz
Monoflop time	min. 500 µs

A position value must be read by the SSI master over 52 pulses.
1 ... 25: MSB first absolute position in gray code
26: Data low (PFB)
27 ... 51: Second transmission (see 1-25)
52: Data Low (PFB)

Absolute shaft copying system | LEB01 | Measuring range up to 392 m Absolute position measurement

Terminal assignment

Interface	Type of connection	Cable				
3 CANopen Lift (DS417)	1	Signal:	+V	0 V / GND	CAN_H	CAN_L
		Core color:	BN	WH	GN	YE

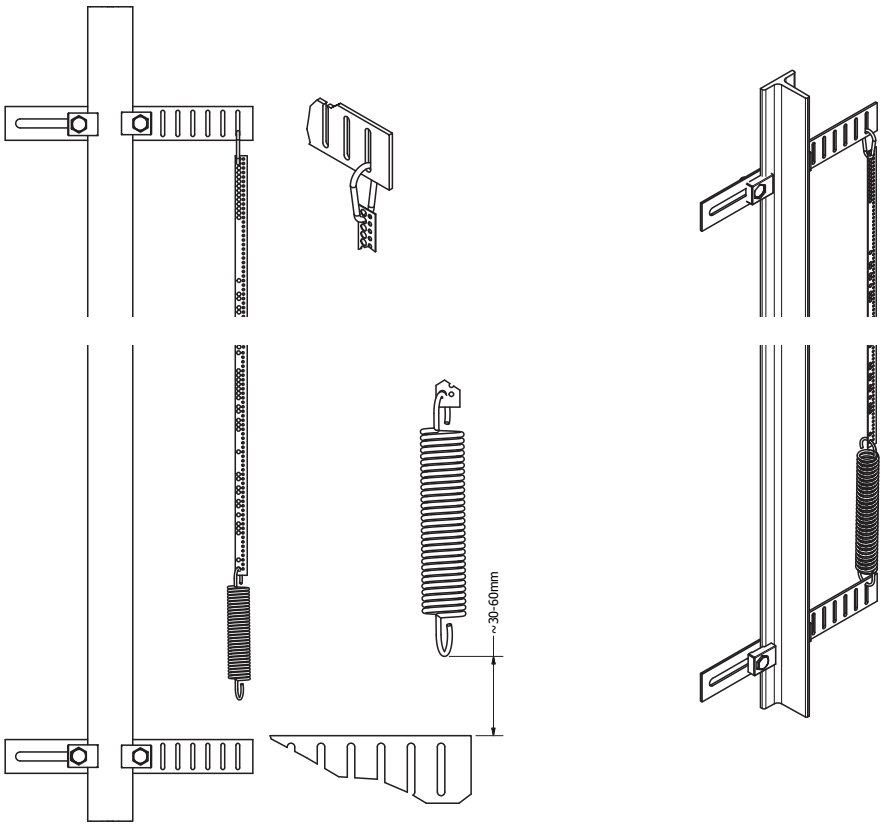
Interface	Type of connection	Cable						
4 SSI	3	Signal:	+V	0 V / GND	C+	C-	D+	D-
		Core color:	BN	WH	GN	YE	GY	PK

+V: Power supply +V DC
0 V: Power supply ground GND (0 V)
C+, C-: Clock signal
D+, D-: Data signal

Technology in detail

Code tape fastening

LEB01 stands out in particular for its ease of installation. This saves time and costs.



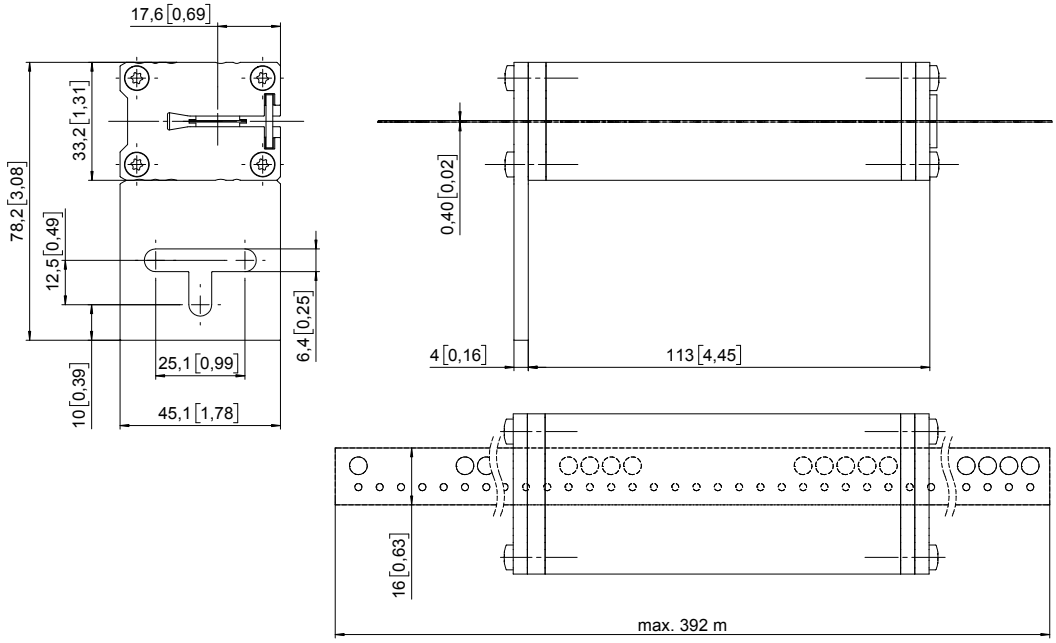
Elevator functions	Standards	Base sensor
Calibration trip	-	√
Inspection operation switch (top & bottom)	EN 81-20	√
Direct drive in - depending on complete drive module / frequency converter	-	√
Switchover or shutoff points definition	-	√
Overspeed inspection drive	EN 81-20	√

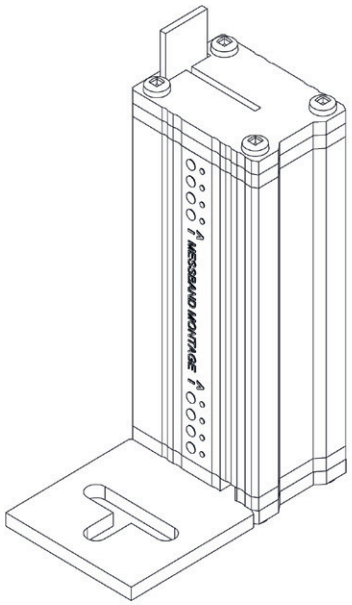
Absolute shaft copying system	LEB01	Measuring range up to 392 m Absolute position measurement

Dimensions

Dimensions in mm [inch]

Sensor





Elevator Measuring System for Shaft-copying | Encoder mounting fixture, guided-belt, LM3 | max. height 28 m

System for shaft-copying, with complete mechanical kit in proven toothed belt technology.

A smooth-running toothed belt and a vibration-resistant encoder mounting fixture ensure quiet operation. The belt pulley can be mounted directly on the encoder shaft. With the guided-belt system, the encoder mounting fixture and the measuring wheels are located on the elevator car.

Ideal for use in passenger elevators, freight elevators, automatic storage systems.

Complete System

- Quick, easy mounting with accessories from a single source
- Reduced load on encoder bearings due to separate belt pulley-bearings
- Non-slip
- Tensioning rollers with belt guide

Minimal noise generation

- Smooth-running toothed-belt ensures extremely quiet operation
- Vibration-free operation

Order-No. 8.LM3.01

Encoder mounting fixture with measuring wheels for fixing on the elevator car

consists of:

- Encoder mounting fixture
- Measuring wheel
- Belt guide
- Belt fixing and tensioning set
- Screws and other small components

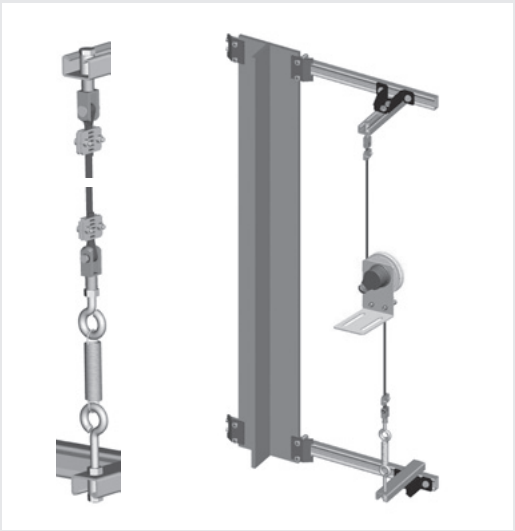
suitable encoders:

- Incremental encoder: 8.5000.83XX.XXXX

  Calculation of pulse rate PPR =

  $$\frac{300\ \text{mm}}{\text{Resolution, e.g. 0.5 mm}} = 600$$

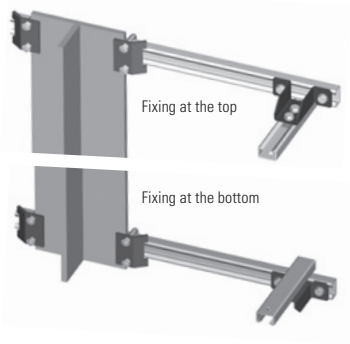
- Absolute encoders:
  SSI: 8.5863.12XX.XXXX
  CANopen: 8.5868.12XX.XXXX



Elevator Measuring System for Shaft-copying | Encoder mounting fixture, guided-belt, LM3 | max. height 28 m

Accessories for encoder mounting fixture LM3

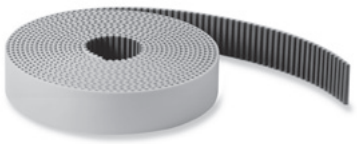
Fixing kit



Complete kit consists of:
- C-rails, 700 mm
- Bracket
- Screws
- Other small components

8.BLM2.01

Toothed belt



- Width 10 mm
- Polyurethane, with single parallel steel cords.
- Low belt-stretch
- High resistance to abrasive wear
- Resistant to the effects of UV radiation
- Maintenance-free
- Resistant to ageing
- Temperature range -10°C…+80°C

Calculation of the required length of toothed belt = Elevator height + approx. 5 m
(depending on the distance between top and bottom fixing)

05.ZAR1.XXX

XXX = Length in metres
Standard delivery lengths:
20 m, 25 m, 30 m, 35 m, 40 m, 45 m, 50 m, 55 m, 60 m, 70 m, 80 m, 90 m, 100 m, 120 m, 250 m, 300 m
Other lengths on request

General technical data

Resolution in the shaft	depends on the resolution of the encoder (e.g. incremental encoder with 3000 PPR = 0.1 mm; absolute encoder 12 x 12 bit < 0.1 mm)
Elevator car speed	max. 1.6 m/s
Max. height of elevator	28 m
Effective circumference of belt pulley	300 mm

Dimensions