Kübler

Manual
Ants LEB02 (Linear Encoder Base)

english

RS485 SSI

■■■ *pulses for automation*

Legal notice

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1. General Information

Please read this manual carefully before working with Ants LEB02, mounting it or starting it up. This manual guides the technical personnel of the machine manufacturer or of the machine operator for safe assembly, electrical installation, commissioning and operation of the Ants LEB02. Moreover, the planning and use of safe sensors in the complete elevator system requires further technical knowledge that is not provided in this document Basically, the official and legal provisions must be complied with when operating the Ants LEB02.

1.1 Target Group

Ants LEB02 may only be mounted, commissioned, tested, serviced and operated by authorized persons. Authorized persons

- are persons who possess a suitable technical training and
- have been instructed in the operation by the machine operator and
- have been instructed in the relevant safety directives and
- have access to this manual.
- In case of electrical equipment for explosive atmospheres, the specialized personnel needs knowledge about the ignition protection category concept.

1.2 Abbreviations Used

Ants LEB02	Ants LEB02 (Linear Encoder Base, generation 2)

1.3 Symbols Used / Warnings and Safety Instructions

Particularly important information is marked as follows in this manual:

⚠ DANGER	**Classification** This symbol, together with the signal word **DANGER**, warns against immediately imminent threat to life and health of persons. The non-compliance with this safety instruction will lead to death or severe injuries.

⚠ WARNING	**Classification** This symbol, together with the signal word **WARNING**, warns against a potential danger to life and health of persons. The non-compliance with this safety instruction may lead to death or severe injuries.

⚠ CAUTION	**Classification** This symbol, together with the signal word **CAUTION**, warns against a potential danger to life and health of persons. The non-compliance with this safety instruction may lead to slight or minor injuries.

ATTENTION	**Classification** The non-compliance with the **ATTENTION** note may lead to material damage.

NOTICE	**Classification**
	Additional information relating to the operation of the product, and hints and recommendations for efficient and trouble-free operation.

1.4 Transport

Inspect the delivery immediately upon receipt for possible damages due to the transport. Report such damages immediately to the transport company. If necessary, commissioning of the device must be precluded. If you do not mount the device immediately, store it at a dry and dust-free location, preferably in its transport package.

1.5 Storage

The device is to be stored as follows:
• Dry and dust-free
• Avoid mechanical shocks
• Do not store outdoors
• Do not exceed the temperature and humidity limits (see technical data)

1.6 Other Applicable Documents

All technical data, as well as the mechanical and electrical characteristics, are specified in the corresponding data sheets of the Ants LEB02.
Refer to the operating instructions of the Ants LEB02 (document no. R60745.0009).

The above mentioned documents, the original declarations of conformity and the relevant certificates can be downloaded from our homepage: www.kuebler.com/dokufinder.

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2. Technical Description

The technical data of the Ants LEB02 is described below.
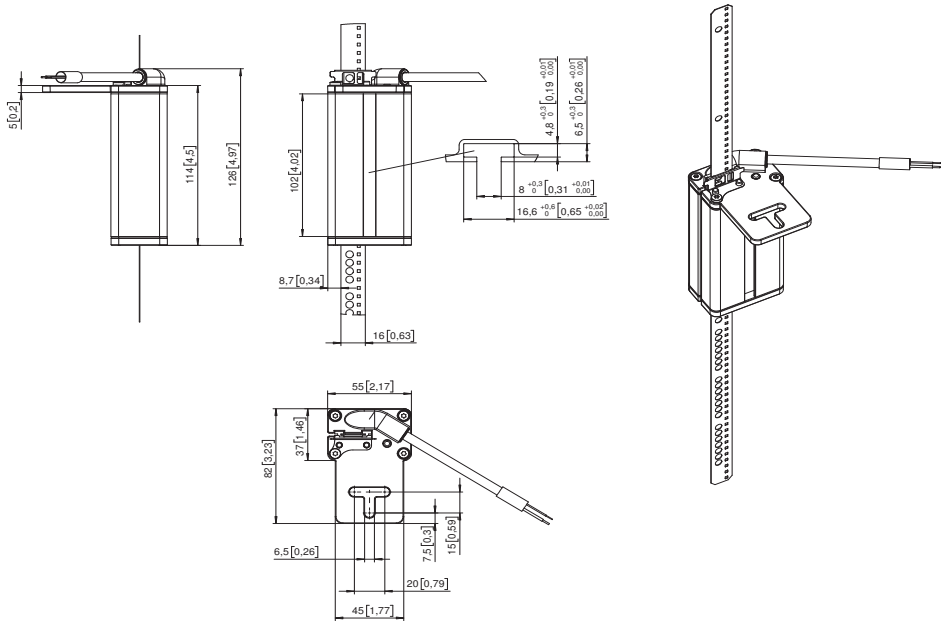
2.1 Ants LEB02 Sensor Data

Characteristics	Value
Reference standards	EN81-20, EN81-50
Measuring principle	Absolute
Resolution	1 mm
Accuracy	±1 mm (3%, additional temperature-driven dependence on length)
Housing material	Aluminum
Housing dimensions	126 mm(H) x 55 mm(L) x 37 mm(W)
Max. measuring length	392 m gross
Max. measuring speed	8 m/s
Operating ambient temperature	from -10°C to +70°C
Storage temperature	from -20°C to +80°C
Air humidity	< 90 % (non-condensing)
Air pressure	800-1013 hPa (up to 2000 m above sea level)
Protection degree	IP54
Supply voltage	10 ... 30 VDC, SELV or PELV low voltage

Current consumption	max. 100 mA
Sensor cable	Supplied: 3 m, twisted pair 0.25 mm², with shield
Permissible sensor oscillation in transverse direction (elevator car oscillations normal to the travel direction)	10 mm

2.2 Ants LEB02 Code Band Data

Characteristics	Value
Material	V2A spring-tensioned stainless steel
Dimensions	16 mm x 0.4 mm
Max. length	392 m
Thermal expansion coefficient	$16 * 10^{-6}$ / K, between 20-100 degrees Celsius.

2.3 Ants LEB02 Mounting Kit
2.3.1 Sensor Cabin Fastening Plate
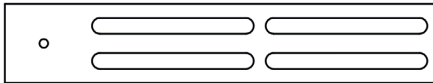
Characteristics	Value
Material	Galvanized steel

2.3.2 Carabiners
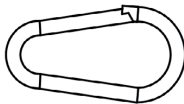
Characteristics	Value
Material	AISI 316 stainless steel
Dimensions	4 x 40 mm
Breaking load	590 kg (acc. to data sheet)

2.3.3 Rail Fastening Plates

Characteristics	Value
Material	Galvanized steel
Dimensions	330 mm (L) x 90 mm (W)
Material thickness	6 mm

2.3.4 Clamping Plates
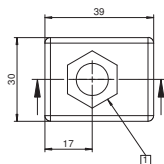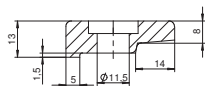
1 = suitable for hexagonal screws DIN 601/933

The clamping plates are similar to DIN 15313 with hexagon socket.

Characteristics	Value
Material	Galvanized steel
Nominal size	M10
Through hole	11.5
Permissible force	20 kN
Permissible component force	10.74 kN
Clamping surface force	4.68 kN
Counter surface force	6.06 kN
Required tightening torque	40 Nm

2.3.5 Spring with Open Hooks

Characteristics	Value
Material	Galvanized spring steel wire, strength class SH
Dimensions	Diameter 3.20 mm External diameter 29 mm Untensioned length 170 mm
Hooks external diameter	29 mm
Operating data	Length 320 mm Load 263.26 N Spring travel 150 mm

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3. Protocol Descriptions

3.1 SSI
3.1.1 Specifications
Data transmission occurs in Slave mode.

Standard SSI factory setting:

Resolution setting	0.25 mm
Data length:	25 bits + 1 Power Failure bit (Low)
	MSB first
Coding:	Gray code
	Double data transmission
Max. clock frequency:	200 kHz
Min. pause between queries	500 µs

3.1.2 Cable Connection
Open cable end:

Brown:	10-30VDC power supply
White:	0V / GND
Gray:	Data +
Pink:	Data -
Yellow:	Clock -
Green:	Clock +
Terminated:	yes

3.1.3 Protocol Description SSI
A position value must be read out by the SSI master over 52 cycles.

1-25:	MSB first absolute position in Gray code,
26:	Data low (PFB),
27-51:	Second transmission (see 1-25),
52:	Data Low (PFB)

For customized adaptations, please contact the manufacturer.

3.2 CANopen Lift (DS-417)
3.2.1 Specifications
As standard, the Ants LEB02 is provided with the following configuration:

Bit rate:	250 kbit/s
Identifier:	0x18C
Node ID:	0x04
Event timer:	10 ms
Resolution:	1 mm
Heartbeat:	500 ms
Terminated:	yes

This information only serves as a quick overview. For more detailed information please refer to the CiA homepage.

3.2.2 Cable Connection

Open cable end:

Brown: Power supply 10 ... 30 VDC
White: 0V / GND
Green: CAN HIGH
Yellow: CAN LOW
Shield: PE

Only connect the shield on the machine side.

3.2.3 Operating Modes

Sends position data in the interval: Caution: applies to all Slaves.

Master → for all Slaves:

	ID HEX	DLC	DATA_HEX	
Operational	00	2	01	00
PRE-Operational	00	2	80	00
STOP mode	00	2	02	00

3.2.4 Programming

NOTICE	There must always be a coded band in the sensor during the programming.

3.2.5 Layer Setting Services (LSS)

The Ants LEB02 must be in STOP mode. Switchover to the configuration mode:

Master → Slave:

	ID HEX	DLC	DATA_HEX							
LSS mode	7e5	8	04	01	00	00	00	00	00	00

3.2.6 Baud rate setting

The Ants LEB02 must be in Pre-Operational mode or in Operational mode.

Master → Slave:

	ID HEX	DLC	DATA_HEX							
new baud rate	7e5	8	13	00	XX	00	00	00	00	00
XX = 1->800kb2->500kbit, 3->250kbit, 4->125kbit, 6->50kbit,7->20kbit										

Slave → Master:

	ID HEX	DLC	DATA_HEX							
new baud rate ok	7e5	8	13	00	00	00	00	00	00	00

To save and change, please follow the instructions in "LSS Save".

3.2.7 Node ID Setting

The Ants LEB02 must be in Pre-Operational mode or in Operational mode.

Master → Slave:

	ID HEX	DLC	DATA_HEX						
new Node ID	7e5	8	11	XX	00	00	00	00	00	00
XX = 01-7F // Default CANopenLift : 04									

Slave → Master:

	ID HEX	DLC	DATA_HEX						
new Node ID ok	7e4	8	11	00	00	00	00	00	00	00

To save and change, please follow the instructions in "LSS Save".

3.2.8 Saving the LSS Values

For permanent saving of baud rate and Node ID.
Changes made become only effective after a new start.

Master → Slave:

	ID HEX	DLC	DATA_HEX						
save baud rate+Node ID	7e5	8	17	00	00	00	00	00	00	00
XX = 01-7F // Default CANopenLift : 04									

Slave → Master:

	ID HEX	DLC	DATA_HEX						
Baud rate+Node ID ok	7e4	8	17	00	00	00	00	00	00	00

Restart the Ants LEB02.

3.2.9 Permanent Data Saving

Permanent saving of the parameters:
• Heartbeat interval
• Position data interval
The Ants LEB02 must be in Pre-Operational mode or in Operational mode.

Master → Slave:

	ID HEX	DLC	DATA_HEX						
	600+Node ID	8	23	10	10	01	73	61	76	65
save	604	8	23	10	10	01	73	61	76	65

Slave → Master:

	ID_HEX	DLC	DATA_HEX							
	580+Node ID	8	60	10	10	01	00	00	00	00
save ok	584	8	60	10	10	01	00	00	00	00

3.2.10 Heartbeat Interval Setting
The Ants LEB02 must be in Pre-Operational mode or in Operational mode.

Master → Slave:

	ID HEX	DLC	DATA_HEX							
	600+Node ID	8	2b	17	10	00	LSB	MBS	00	00
set 500ms	604	8	2b	17	10	00	f4	01	00	00

Slave → Master:

	ID_HEX	DLC	DATA_HEX							
	580+Node ID	8	60	17	10	00	00	00	00	00
500ms ok	584	8	60	17	10	00	00	00	00	00

3.2.11 Position Interval Setting
The Ants LEB02 must be in Operational mode to obtain position data.
The Ants LEB02 must be in Pre-Operational mode or in Operational mode.

Master → Slave:

	ID HEX	DLC	DATA_HEX							
	600+Node ID	8	2b	06	19	05	LSB	MBS	00	00
set 10ms	604	8	2b	06	19	05	0a	00	00	00

Slave → Master:

	ID_HEX	DLC	DATA_HEX							
	580+Node ID	8	60	06	19	05	00	00	00	00
10ms ok	584	8	60	06	19	05	00	00	00	00

3.3 RS485
3.3.1 Specifications

Baud rate:	19,200
Number of data bits:	8 bits
Number of start bits:	1 bit
Number of stop bits:	1 bit
Parity:	none
Repetition rate:	150 Hz
Number of bytes/transmission:	9 bytes
Position resolution:	1 mm
Velocity resolution:	10 mm/s
Position value:	24 bits, binary
Velocity value:	16 bits, two's complement

3.3.2 Cable Connection
Open cable end:

Brown:	10-30VDC power supply
White:	0V / GND
Green:	Data +
Yellow:	Data –

3.3.3 Protocol Description RS485

1	2	3	4	5	6	7	8	9
STX	MSB	…	LSB	MSB	LSB	ETX	NUL	CR
02h	position	position	position	speed	speed	03h	00h	0Dh

- Communication is unidirectional
- Ants LEB02 is the only participant
- Data transmission (9 bytes) takes place all 6.6 ms (150 Hz)
- Transmission is continuous
- Position value FFFFFFh indicates that no band is installed

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