

ENGLISH

1. Warranty information

- In order to carry out installation correctly, we strongly recommend this document is read very carefully. This will ensure your own safety and the operating reliability of the device.
- Your device has been quality controlled, tested and is ready for use. Please observe all warnings and information which are marked either directly on the device or specified in this document.
- Warranty can only be claimed for components supplied by SIKO GmbH. If the system is used together with other products, the warranty for the complete system is invalid.
- The guarantee period is 6 months starting with the date of invoice.
- Repairs should be carried out only at our works. If any information is missing or unclear, please contact the SIKO sales staff.

2. Identification

Please check the particular type of unit and type number from the identification plate. Type number and the corresponding version are indicated in the delivery documentation

z.B. AEA-0023
 _____ version number
 _____ type of unit

3. Installation

For mounting, the degree of protection specified must be observed. If necessary, protect the unit against environmental influences such as sprayed water, dust, knocks, extreme temperatures.

Attention! Systeminformation!

Only when combined with sensor MSA! Before mounting sensor and/or magnetic tape, please read chapter 7 (sensor alignment) and ensure that: the necessary alignment length is available and that sensor and magnetic tape are aligned correctly.

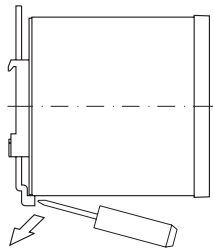


Fig. 1: Installation

The AEA has been designed for mounting on top-hat rails (35x7.5) accord. to DIN 50022. For mounting, snap the retainer onto the rail and ensure that the locking is at the device's bottom side. For dismounting press locking down.

4. Electrical connection

- **Switch power off before any plug is inserted or removed !!**
- If AEA is used in combination with drive systems, you must provide additional safety protection, eg. limit switches or other interlocking systems.
- Wiring must only be carried out with poweroff!
- Provide stranded wires with ferrules.
- Check all lines and connections before switching on the equipment.

Interference and distortion

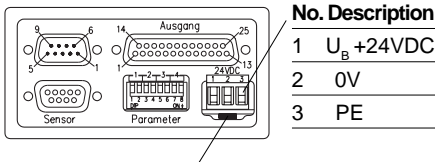
All connections are protected against the effects of interference. **The location should be selected to ensure that no capacitive or inductive interferences can affect the translation module or the connection lines!** Suitable wiring layout and choice of cable can minimise the effects of interference (eg. interference caused by SMPS, motors, cyclic controls and contactors).

Necessary measures:

- Only screened cable should be used. Wire cross section is to be at least 0,14 mm², max. 0,5 mm².
- Wiring to the screen and the ground (0 V) must be secured to a good point and a large surface area to allow minimum impedance.
- The unit should be positioned well away from cables with interference; if necessary a **protective screen or metal housing must be provided**. The running of wiring parallel to the mains supply should be avoided.
- Contactor coils must be linked with spark suppression.
- PE-connection with 2.5 – 4 mm² cable via PE-clamp (accord. to fig. 2 with 6,3x0,8 quick-connect receptacle).

Power supply

Connection is made via 3-pole terminal strip on the front of translation module AEA.



PE-connection point when using cable tag

Fig. 2: Power supply of PE-connection

Sensor connection

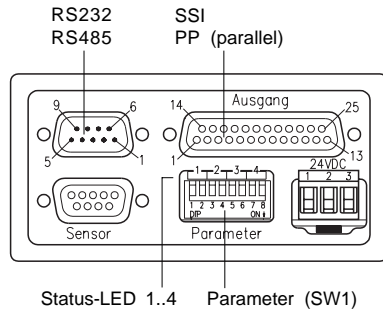
Connection is made via front 9-pole D-SUB socket (marked "SENSOR"). Fixing of the D-SUB plug shall be made by using the screws on the plug. This will guarantee a neat and effective connection.



Attention! No modification of the sensor connection (for example by cable extension) is permitted. Do not exceed the maximum cable length (incl. connector) (see delivery documentation).

5. Outputs and interfaces

25-pole D-SUB socket for SSI or PP parallel, 9-pole D-SUB socket for PB-DP (Profibus-DP). Available options are interfaces RS485 or RS232 with 9 pole D-SUB male plug.



SSI

Pin	Description
1	SSI-Cycle +
2	SSI-Cycle -
3	SSI-Data +
4	SSI-Data -
5	GND
6	Not connected (N.C.)
...	
25	N.C.

Typical monoflop time is 20 to 25µs. The clock rate should be between 62.5 and 500Kbit/s. Data format: data is available either binary or Gray-code, in 24-bit data format, right-aligned and as two's complement. All subsequent bits (25,26 ...) are output as "0". Data signals correspond to RS422. Cycle input is made via opto-coupler and in accordance with RS422.

PP (Push-Pull), parallel

Pin	Description
1	D0
2	D1
...	
19	D18
20	D19
21	N.C.
22	N.C.
23	N.C.
24	GND
25	GND

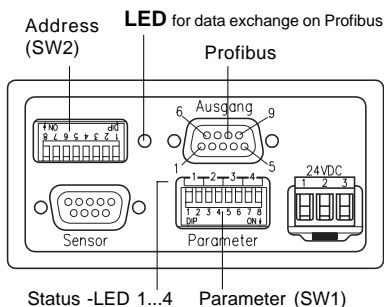
Data is available as two's complement at the outputs which can be loaded with up to 20mA per channel. At a load current of 20mA the residual voltage is ≤1V.

If the gap between magnetic strip and sensor is greater than 1 mm (see cap. 7 function of LED3), the output value is exactly 520000 (in the according to the selected code; see DIP SW1/4).



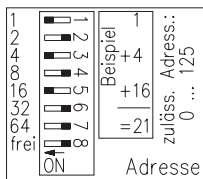
RS 485 (Option)		RS 232 (Option)	
Pin	Description	PIN	Description
3	DÜA	2	RXD
5	GND	3	TXD
8	DÜB	5	GND

PB, Profibus



Pin	Description
3	B-Line
4	RTS
5	2M
6	2P5
8	A-Line

Profibus SW2 address programming



The bus address of Profibus DP is set via DIP-switches SW 2/1 to SW 2/7. Address range 0 to 125.

Termination of the PROFIBUS DP

The first and last bus stations must be terminated by 3 resistors. They should be connected as follows:

390 Ohm between PIN6 and PIN3

390 Ohm between PIN8 and PIN5

220 Ohm between PIN3 and PIN8

If connectors with an integrated line termination are used, then they should be switched on at the first and last bus station.

6. Parameter programming SW1

The following parameters can be modified by means of the DIP-switches:

- sensor alignment
- upper range limit
- calibration (zeroing)
- counting direction
- output code
- resolution

Further parameters (see 'List of commands / service operation') can be read out and modified via the optionally available interface. Change of parameters 'resolution', 'output code' and 'counting direction' via DIP-switches can be blocked through the interface by using the remote flag!

7. Commissioning

When connected correctly and switched on, translation module AEA will light all 4 status LEDs (for approx. 1,5s).

Subsequently the translation module can be programmed to adapt it to the customer's application.

Functions of status LED and parameter switch (SW1)

Yellow LED 1: is lit to request alignment.

Green LED 2: blinks during alignment; is permanently lit when alignment has been correctly carried out.

Red LED 3: blinks, if gap between sensor and tape is too big; dark if distance is correct.

Yellow LED 4: is lit when the calibration switch is active.

SW 1/1: activates alignment when switching from OFF to ON.

SW 1/2: determines the upper range limit

SW 1/3: calibration input; see also LED 4; when switching from OFF to ON.

SW 1/4: output code (OFF=Gray code, ON=binary code).

SW 1/5: counting direction (OFF=positive counting direction, ON=negative counting direction).

SW 1/6 - SW 1/8 resolution:

SW1/6	SW1/7	SW1/8	Resolution
0	0	0	0 =10 mm
1	0	0	1 =1 mm
0	1	0	2 =0,1 mm
1	1	0	3 =0,01 mm
0	0	1	4 =1 inch

1	0	1	5 =0,1 inch
0	1	1	6 =0,01 inch
1	1	1	7 =0,001 inch

0 = switch position OFF
1 = switch position ON



Note: The position of SW1/4 to SW1/8 is read in only once, ie. when the unit is switched on. If the remote flag is activated (see chapter 11) the position of the DIP switches will be ignored (see above).

7.1 Sensor alignment MSA



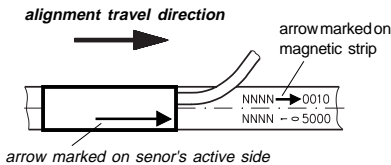
Must be carried out before the first use of the system on the machine. A later system alignment will only be necessary if the originally mounted magnetic tape or sensor or AEA were replaced.

When translation module AEA is used for the first time, LED 1 is active and LED 2 is dark.

1. Mount system correctly; especially observe tolerances for gap between sensor and magnetic strip. When mounting, please remember that the arrows on the sensor must point to the same direction as the arrows on the magnetic strip (see fig. below).

2. SW1/1 shortly on and off again. LED 1 is active, LED 2 blinks.

3. **Move the sensor with a max. speed of 1 cm/ sec. in the direction of the arrow . Alignment will be completed after a few millimeters (< 20 mm) ie. as soon as LED 2 is lit permanently and LED 1 is dark.**



4. By actuating SW1/5 the counting direction can be selected.

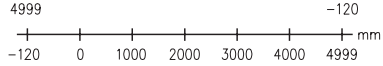
5. By actuating (OFF – ON) SW1/3 the system can be calibrated (zeroed) at any position of the magnetic strip. From this zero position a travel distance of +500 cm in positive direction and of 12 cm in negative direction will now be available.

6. If the application's zero point is to be set in a way that the travel distance in negative direction exceeds 12 cm, the travel range can be shifted by setting the (upper) range limit. Push the

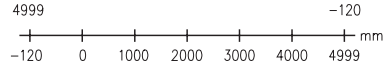
sensor head to the remotest position which can be reached in positive counting direction. Briefly activate SW1/2 to store this position as upper range limit.

Example:

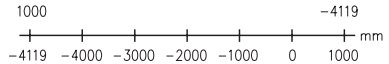
Initial situation (default condition):



Situation after zero setting (zero point has moved)



Situation after setting the upper limit value (e.g. 1000)



By new sensor alignment the upper range limit can be removed

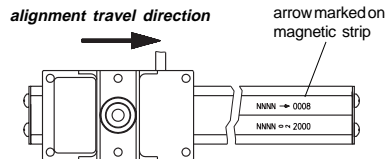
7. Point 5 can be ignored, if measurement is - starting from the zero point - is made in positive counting direction only.

7.2 Sensor alignment LSA200

If re-alignment is required for technical reasons (eg.: after replacement of one system component), a re-alignment is required, please proceed as follows:

1. Switch SW1/1 shortly on and off again. LED 1 is active, LED 2 blinks.

2. **Now the sensor must be moved at a speed of max. 1 mm/s in the direction of the cable outlet. Sensor alignment will be completed after approx. 20mm, ie. As soon as LED2 (green) is lit permanently and LED1 (yellow) is dark.**



3. By actuating (OFF – ON) SW1/3 the system can be calibrated (zeroed) at any position of the magnetic strip. From this zero position a travel distance of +1000 mm in positive direction and of 24 mm in negative direction will now be available.

4. If the application's zero point is to be set in a

way that the travel distance in negative direction exceeds 24 mm, the travel range can be shifted by setting the (upper) range limit. Push the sensor head to the remotest position which can be reached in positive counting direction. Briefly activate SW1/2 to store this position as upper range limit.

Example: If this end position in positive counting direction 50cm away from the zero point, a rail with 1 metre length would provide a measuring range of -23,99 mm to + 1000 mm. By a new system alignment the upper range limit can be removed.

5. Point 4 can be ignored, if measurement is - starting from the zero point - is made in positive counting direction only.

8. Reset function (calibration)

Activate (OFF – ON) SW1/3 to set the output value to the calibration value (see "System alignment").



Note: The calibration value can be modified only via the interface.

9. Device profile (Profibus DP)

The functionality of SIKO-AEA-DP-Interface is based on the PROFIBUS profile for encoder class 1 (version 1.1, May 1997).

9.1 Device database file and configuration

A device database file (GSD) named **SIKO0734.GSD** exists for SIKO-AEA-DP-Interface. This file can be integrated into the device library by means of the configuration tool used, e.g. COMPROFIBUS of Siemens (for the procedure, please refer to the documentation of the configuration tool).

9.2 Configuration

In the project phase, the AEA-DP-Interface is configured the device database file. When selecting the slave **AEA-Profibus** from the library, **4** consistent input bytes for transferring the preset value and **4** consistent output bytes for transferring the position value are reserved.

9.3 Parameterization

In the parameterization step during system initialization, user parameter bytes (octets 8 and 9) are transferred to the WK50/1-PB 2. Octets 1..7 are supplied from the device database file. They cannot be changed by the user. Based on the information contained in the device database

file, the content of octet 8 is determined by the configuration tool. The counting direction can be switched over via bit B0 in octet 9.

Meaning of the numerals:

0: increasing position values for **clockwise** direction of rotation.

1: increasing position values for **counter-clockwise** direction of rotation.

9.4 Telegram setup in the DATA-EXCHANGE status

During operation, 4 bytes input data and 4 bytes output data are exchanged cyclically between a master and the AEA-DP-Interface (slave).

9.4.1 Input parameters of preset value

4 consistent data bytes, integer format 31 bit, MS bit (bit 30) is used as transfer bit for the preset value in bit 30..0 (the MS bit of the preset value is in bit 30).

Bit 31 = 0: Normal operation, unchanged preset value.

Bit 31 = 1: Preset mode, the value in bit 30..0 is taken as the new preset value and safed power fail-proof.

Afterwards, the position value is set to the preset value taken over.

9.4.2 Output parameters of position value

4 consistent data bytes, integer format 32-Bit, MS bit (bit 31).

9.5 Diagnosis

Besides the 6-byte standard diagnosis information, the AEA-DP interface supplies another 10 bytes extended diagnosis information in accordance with encoder profile class 1.

Octet	Data type	Value (dec.)	Value (hex)	Meaning
7	Octet string	10	0A	Extended Diagnostics header (block length)
8	Octet string	0 od.1	00 od.01	0: no alarm, 1: Position error (e.g. sensor head is not placed on magnetic strip, connection with sensor head is interrupted).
9	Octet string	0 od.1	00 od.01	Counting direction, as described under 7) Parameterization
10	Octet string	08	08	Encoder type: Absolute linear with cyclical coding

11-14 Un- signed 32	setup-dependent	Resolution in 0,001mm (e.g.: 100000 = 0.1mm)
15,16 Un- signed 16	1	1
Number of revolutions (only for rotary encoders)		

text
0/10 10 mm
1/1 1 mm
2/ 0.1 1/10 mm
3/0.01 1/100 mm
4/ 1i 1 inch
5/ 0.1i 1/10 inch
6/0.01i 1/100 inch
7/0.001i 1/1000 inch
8/ frei free factor

14. Trouble shooting

Message: LED 1 on.

Description: Missing sensor alignment

Remedy: Carry out sensor alignment

Message: LED 3 is blinking.

Description: Faulty or missing sensor signal.

Remedy: Check distance between magnetic sensor and magnetic strip. Check sensor connection.

Description: Jumping position value.

Remedy: Align sensor accord. to chapter 7.

Description: The output value is 520000 and does not change, even if you move the sensor over the magnetic strip.

Remedy: Check strip/sensor gap.

15. List of commands / service operation

Parameters: 4800 Baud, no parity, 8bit,
1 stop bit, no handshake

Data code: ASCII / hexadecimal

Value range: 2/3 Byte: 0 to 65535 / 0...±2²³

Com.	Length	Reply	Description
Ax			unit type / software version
		MSA:	
	2/5	"AEA>"	x=0: hardwareversion
	2/7	"V1.00>"	x=1: softwareversion
	2/5	"PAR"	x=2: output circuit
		LSA200:	
	2/12	"AEA_LSA200>"	x=0: hardwareversion
	2/7	"V1.00>"	x=1: softwareversion
	2/5	"SSI"	x=2: output circuit
B	1/8	"±xxxxxxx>"	absolute value (uncalibrated, without calibration value and without factor)
Ey	2/10	"±xxxxxxx>"	Transmit 3-byte value y=address (0 to 3) xxxxxx =dec. value y=0: position value y=1: zero position value y=2: calibration value y=3: range limit
Fy±xxxxx	9/2	">"	Enter 3-byte value y=address (2) xxxxxx=dec. value y=2: calibration value
G	1/9	"y/xxxxx>"	Transmit resolution y=value (0 to 7) / xxxxx=

Hy	2/2	">"	Enter resolution y= value (0 to 8) Value: see commands "G", "I" and "J"
I	1/8	"x.xxxxx>"	Send free factor
Jx.xxxxx	7/2	">"	Enter free factor form: "X.XXXXX" range: 0.00001 to 2.99999
K	1/0	""	Software reset
L	1/2	">"	Zero-setting (calibration) of the device
M	1/6	"0xy>"	Transmit state of DIP-switches yy=Hex-value
Nx	2/2	">"	Determine output code x=0: Gray code x=1: binary code
Oy	2/10	"±xxxxxxx>"	Transmit ADC-limit values (diagnosis) y=0: adc_0_max y=1: adc_0_min y=2: adc_1_max y=3: adc_1_min
P	1/4	"ab>"	Transmit operating mode a: mode b: calibration flag
Q	1/8	"xxxxxx>"	output baud rate baud 300 ...115200
Rx	2/2	">"	Set/unset remote-flag x=0: unset remote flag x=1: set remote flag
		MSA:	
S	1/2	">"	Zero-setting (basicstate)
		LSA200:	
Sxxxxx	6/2	">"	restore ex-works programming x=11100 (alignment data do not go lost)
Tx	2/2	">"	Counting direction x=0: upward x=1: downward
Vxxxxx	7/2	">"	input baud rate bau d 300 ...115200
W	1/3	"xyz"	Binary position value xyz=3 byte in two's complement MSB...LSB
Z	1/10	"±xxxxxxx>"	Issue position value



Note: Any confirmation ">" of the AEA will be extended by "CR" (0x0d); therefore, under ">" the telegram length is indicated as 2.

As parameters *resolution*, *output code* and *counting direction* can either be modified via the DIP-switches or serial interface, access rights are determined under the remote flag which is part of the flag register and therefore non-volatilely stored. If the remote flag is not set, the above-mentioned parameters have to be programmed via the DIP-switches. If it is set however, position of DIP-switches 4 to 7 is ignored and parameter programming is to be made via the serial interface.

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