

# Software S02+S04

## ENGLISH

### 1. Operation / Key's function

☒-Key programming from the interface can be made as follows:

1. no function
2. reset to calibration value (active during normal state)
3. incremental measurement
4. display of target value (as long as key is pressed)

If the frontal key is pressed for approx. 30 sec, you enter into address mode where addresses of the different units belonging to the bus system can be allocated within a value range of 1 to 31 (standard address programming is 1). For address setting key programming is to be made to 'reset' (only function 1., 2. or 3.).

### 2. Parameter programming

Page 8 shows a detailed parameter list and allows customer-specific configuration.

A Lithium battery guarantees that the programmed parameters are stored.

The meaning of the different parameters follow below:

**Display per revolution:** Value displayed after one turn of the shaft. The AP09's internal resolution is converted into the display value per revolution which is entered without comma (eg. with 127.8 value 1278 must be entered).

**Counting direction:** Increasing values with counter-clockwise or clockwise shaft rotation.

**Target value:** Value which is to be reached.

**Calibration value:** Value indicated after a reset.

**Positions after the comma:** 0 to 3

**Key's functions:** 4 programming possibilities

Parameter	Value range
Display per revolution:	0 to 9999
Calibration value:	-19999 to 99999
Target value:	-19999 to 99999
Counting direction:	i= clockwise increasing; e= counter-clockwise increasing values
Positions after the comma:	0.; 0.0; 0.00; 0.000
Key's funktion:	without, reset, target value, incremental measurement

### 3. Calibration

AP09/1 is calibrated electronically and irrespective of its mounting position. Calibrating steps:

- approach a mechanically pre-defined limit, zero position on the machine or exactly measure the actual position.
- program AP09/1's calibration value in accordance with above measured value (unless not already pre-programmed ex works, see programming sheet).
- press AP09/1's ☒-key.

Right after calibration the display is indicating the calibration value.

**Note!** The value range is +/-6900 turns; display range from -19999 to +99999. If the counted value is beyond the display range, message "Full" is issued.



### 4. Trouble shooting

AP09/1 recognizes error states and indicates them in the display:

**Message:** Full

**Description:** Display overrun

**Action:** Check parameters and adjust them if necessary.

**Message:** batt

**Description:** Battery flat.

**Action:** Exchange battery.

### 10. Protocol of AP09/1's interface

**Hardware:** RS485, 115200 Baud, EVEN parity, 8 bit, 1 stop bit, no handshake

**Protocol length:** 5 bytes (1 status / address byte, 3 data bytes, 1 byte for check sum)

**Calculation of the check sum:** EXOR-interconnection of all bytes.

The data telegram always consists of 5 bytes:

- 1st byte : status-/ address byte
- 2nd byte : 1st data byte
- 3rd byte : 2nd data byte
- 4th byte : 3rd data byte
- 5th byte : check sum

### 1 . Status-/ address byte

Defines telegram type to be sent, ie. whether the AP09/1's configuration has to be changed or only a positional value is to be read out.

Bit no.	Master -> AP09/1
7	bit=1: program value bit=0: read out value
6 - 5	command number: 00: target value 01: calibration value 10: display after one turn 11: status / single bits (with this command number the data bits have a different significance!)
4 - 0	AP09/1's address

Bit no.	AP09/1 -> Master
7	bit=1: check sum error bit=0: check sum ok
6 - 5	command number: 00: positional value 01: calibration value 10: display after one turn 11: status / single bits (with this command number the data bits have a different significance!)
4 - 0	AP09/1's address

### 2 . Data bytes

Data bytes include numerical values for programming / interrogating the different parameters (positional-, calibration-, display- and target values). These are displayed hexadecimally.

Value 1000 is for example displayed as follows:

1st data byte	2nd data byte	3rd data byte
00	03	E8



**Attention:** If the status / address byte of the command number under bit 5 and 6 is defined as '11', the 3 data bytes do have a different significance .

**Byte 2 (1st data byte) :** version number (eg. V3.07 = 37 Hex). Version number is only sent from AP09 to master and is irrelevant in case of communication between master and AP09/1.

**Byte 3 (2nd data byte) :** position of the comma (0...3) ie. programming of AP09/1's decimal point.

**Byte 4 (3rd data byte) :** single bits.

Bit no.	Master -> AP09/1
7	no function
6	no function
5, 4	key's function: 00: without function 01: increm. measurement 10: reset 11: display of target value
3	reset
2	activate increm. measurement
1	no function
0	counting direction bit = 0 increas. values with counter-clockwise rotation; bit = 1 increas. values with clock-wise rotation

Bit-no.	AP09/1 -> Master
7	bit = 1: battery flat
6	no function
5, 4	key's function: 00: without function 01: increm. measurement 10: reset 11: display of target value
3	no function
2	no function
1	no function
0	counting direction bit = 0 increas. values with counter-clockwise rotation; bit = 1 increas. values with clock-wise rotation

### 3 . Byte 5 : Check sum

At the end of the telegram a check sum is established to check error-free data transmission. The check sum is an an exclusive-OR-interconnection of the bytes 1 to 4.

Check sum [byte 5] = [byte 1] XOR [byte 2] XOR [byte 3] XOR [byte 4]

The telegram received is checked as follows:

[byte 1] XOR [byte 2] XOR [byte 3] XOR [byte 4] XOR [byte 5] = 0

If the result is not 0, there has probably been a

data transmission error.

**Examples:**

Reading out positional value of AP09/1 with address 12 (eg. positional value = 2045,6 (4FE8 hex)).

	<b>Master -&gt; AP09/1</b>	<b>AP09/1 -&gt; Master</b>
1st byte	0000 1100 (0C)	0000 0000 (00)
2nd byte	0000 0000 (00)	0000 0000 (00)
3rd byte	0000 0000 (00)	0100 1111 (4F)
4th byte	0000 0000 (00)	1110 1000 (E8)
5th byte	0000 1100 (0C)	1010 1011 (AB)

Reading out configuration of an AP09/1 with address 12 (eg. key function.: reset, 1 decimal point, CCW increasing values, software V3.07).

	<b>Master -&gt; AP09/1</b>	<b>AP09/1 -&gt; Master</b>
1st byte	0110 1100 (6C)	0110 1100 (6C)
2nd byte	0000 0000 (00)	0011 0111 (37)
3rd byte	0000 0000 (00)	0000 0001 (01)
4th byte	0010 0000 (20)	0010 0000 (20)
5th byte	0100 1100 (6C)	0111 1010 (7A)

Calibration value programming of address 3 (eg. calibration value = -100 (FF FF 9C hex; AP09/1 receipts with value -100).

	<b>Master -&gt; AP09/1</b>	<b>AP09/1 -&gt; Master</b>
1st byte	1010 0011 (AB)	0010 0011 (23)
2nd byte	1111 1111 (FF)	1111 1111 (FF)
3rd byte	1111 1111 (FF)	1111 1111 (FF)
4th byte	1001 1100 (9C)	1001 1100 (9C)
5th byte	0011 1111 (3F)	1011 1111 (BF)

## Appendix: Parameter list

Designation / value range	Your programming I	Your programming II
Display per revolution: 0 ... 9999		
Calibration value : -19999 ... 99999		
Target value : -199999 ... 999999		
Counting direction : i ; e		
Positions after the comma : 0., 0.0, 0.00, 0.000		
Key's funktion : without, reset, target value, incremental measurement		

**SIKO** GmbH  
DR.-ING. G. WANDRES

Postanschrift / Postal address:

Postfach 1106  
D-79195 Kirchzarten

Werk / Factory:

Weihermattenweg 2  
D-79256 Buchenbach

Telefon / Phone 0 76 61 / 3 94 - 0

Telefax / Fax 0 76 61 / 3 94 - 388

Internet [www.siko.de](http://www.siko.de)

