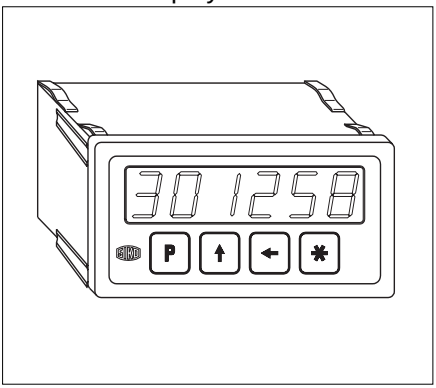
MA47

Electronic Display



ENGLISH

1. Safety 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 respect all warnings and information which are marked either directly on the device or in this document.

• Warranty can only be claimed for components supplied by SIKO GmbH. If display MA47 is used together with other products, the warranty for the complete system is invalid.

• 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 particular type of unit and type number from the identification plate. Type number and the corresponding execution are indicated in the delivery documentation.

e.g. MA47-0023

type number
type of unit

3. Installation

The unit should be used only according to the protection level provided. Protect MA47, if necessary, against environmental influences such as sprayed water, dust, knocks, extreme temperatures.

Built-in housing EG

Push the display into the panel cut-out (1) until the panel clips (2) hold the housing loosely.

Press the lateral centering (3) slightly down and push the housing into the cut-out (1) until the panel clips (2) snap completely.

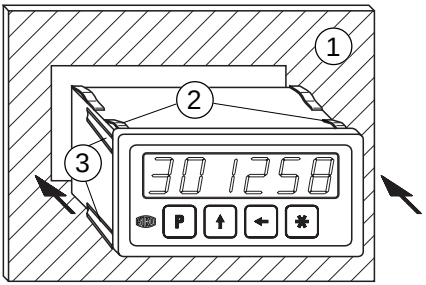


Fig. 1: Installation

Bench housingTG

Remove rubber plugs before fixing the housing.

Attention ! The max. thread depth of 6.5 mm must be absolutely respected!

4. Electrical connection

• Wiring must only be carried out with power off!

• 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 switching power supplies, motors, cyclic controls and contactors).

Necessary steps:

• Only screened cable should be used. Screen should be connected to earth at both ends. Wire cross section is to be at least 0,14 mm², max. 0,5 mm².

• Wiring to the screen and the ground (0V) must be secured to a good point and a large surface area to allow minium 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 via PE terminal (fig. 2).

Power supply

is made via mains connection on rear of the device. The correct supply voltage is indicated in the delivery documentation:

Eg.:

24VDC ±20%

Power consumption

< 2 VA (without encoder)

4.1 Connection, Panel Mounting EG

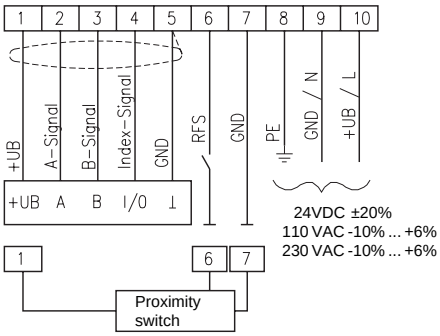


Fig. 2: Connection diagram (type EG)

Instead of mechanical reference value transmitter: proximity switch with NPN-output (ground switching).

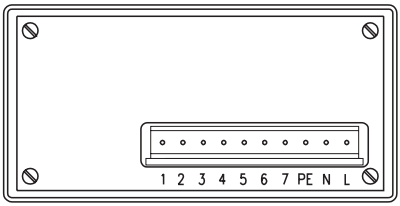


Fig. 3: Rear panel (type EG)

No.	Function **Terminal Strip**
1	$+U_B$ encoder supply
2	Signal A
3	Signal B
4	Index signal (I/O)
5	Earth screen / encoder supply
6	RFS signal for reference point source
7	Earth for reference point source
8	PE protective conductor
9	N/GND
10	L/$+U_B$

4.2 Conn., Bench Top Casing TG

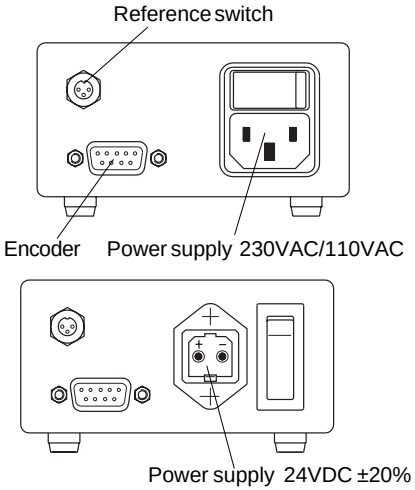


Fig. 4: Rear panel (type TG)

Encoder supply: Via 9 pole SUB-D socket on rear of the unit (see fig. 4).

Pin no.	Function
1	$+U_B$
2	A-Signal
3	B-Signal
4	I-Signal
5	GND
6	N.C.
7	N.C.
8	N.C.
9	N.C.

Connection of reference switch: via rear socket and in accordence with the connection diagram below (fig. 4).

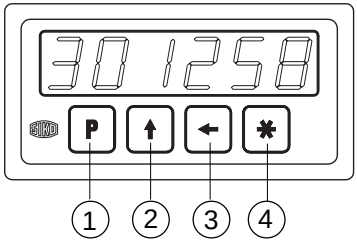
Pin no.	Function
1	RFS
2	GND
3	$+U_B$

5. Commissioning

The four membrane keys are used for operating and programming display MA47.

Key functions

The keys' functions depend upon the operating mode (see description 'Programming mode' and 'Input mode'). The keys are pressed singly or in pairs (two together).



1. Programming
2. Select 'value'
3. Select 'digit'
4. Store value

Fig. 5: Key functions

When switched on

When switched on and correctly connected:

- all LED segments are displayed
(for approx. 1.5 s)
- the software version (eg.: 1.00) is displayed

Subsequently the specific parameters of the machine can be programmed.

Operational modes

There are two operational modes accessible via the keyboard:

1. Programming mode: to program the display at initial installation.

2. Input mode: to enter parameters/select functions used during standard operation.

6. Programming mode

Display MA47 is pre-programmed to standard values at our works. If the order defines customer-specific parameters, these will be pre-programmed at SIKO. For parameter modification enter into programming mode. Normally programming is only necessary at initial installation. Parameters can be modified and checked at any time. They are stored in a non-volatile memory. Each parameter's designation, function and value range is shown on the following pages.

To enter into programming mode:
Press key [P] for at least 5 s

To leave programming mode:
Automatically, if no key has been pressed during approx. 30 s or press key [✱] until the end of the parameter list is reached.

To scroll through the parameters:
Press key [✱]

To change parameters:
Use keys [↑] and [←]

To store parameters:
Press key [✱] ; the parameters will scroll automatically.

List of parameters

Designation	Display	Value range	Fixed programming if combined with MSK01, MSK02	
			Angle display with MRI01	Linear display with MB320
Display after one revolution:	***_APU_***	0...59 999	3600	100
Display divisor:	***_Adl_***	1; 10; 100; 1000	1	1
Encoder pulses per rev.:	***_Str_***	0...59 999	512 (number of poles x 8 eg. 64 poles x 8=512)	25
Counting direction:	***_drEh_***	I, E		
Type of index signal:	***_Ind_***	I, O		
Positions after the comma:	***_dP_***	0. ... 0.000	0.0	0.0
Offset value:	***_oFF_***	-199999...999999		
Type of reference switch:	***_rFS_***	Schl, oEFF, hAnd	hAnd	hAnd
Referencevalue:	***_rEF_***	-199 999...999 999		
Increm. measurement enable:	***rEL_F***	EIn, AUS (on, off)		
Ref. value input enable:	***rEF_F***	EIn, AUS		
Offset input enable:	***oFF_F***	EIn, AUS		
Reset enable:	***SEt_F***	EIn, AUS	EIn (on)	EIn (on)

Parameter description

Display "Choice"	Designation/ description
APU	**Display after 1 revolution:** Value by which the display increases / decreases after 1 revolution of the encoder. This value corresponds eg. to the spindle pitch.
Adl	**Display divisor:** Divisor by which the display accuracy is reduced compared to the measuring acuracy. *Example:* Due to an odd ratio, the measuring resolution is programmed to 1/1000 mm. The display, however, needs a resolution of 1/10 mm only. -> The display divisor is programmed to 100.
Str	**Encoder pulses per revolution:** Increments of the connected encoder.
drEh	**Counting direction:** Counting direction of the system:
"I"	clockwise increasing value
"E"	counter-clockwise increasing values
Ind	**Type of index signal:** Reference mark on the encoder disk; appears only once per revolution; for defined reference point marking.
"O"	Signal shape "O"; square signal with positive logic
"I"	Signal shape "I": square signal with inverted logic
_dP_	**Positions after the comma:** Determination of the decimal point position
oFF	**Offset value:** Determination of a correction value (offset).
rFS	**Type of reference switch:** type of reference value transmitter; can either be a mechanical contact or a proximity switch.
"Schl"	Closing contact, which is normally open; only active, if encoder has index pulse.
"oEFF"	Opening contact, which is normally closed; only active, if encoder has index pulse.
"hAnd"	Manual reset of the counter by activating input RFS (closing function).
rEF	**Reference value:** Absolute datum point (reference point) of the measuring system. This value is either set after system calibration or zeroed by activating the external reset input RFS.
rEL_F	**Increm. measurement enable:** For programming section 2 (input mode) via key ⇧ and ⇦ incremental measurement can be:
"EIn"	- released
"AUS"	- blocked
rEF_F	**Reference value input enable:** for programming section 2 (input mode) reference value correction via key ⇧ :
"EIn"	- released
"AUS"	- blocked
oFF_F	**Offset input enable:** for programming section 2 (input mode): offset value correction via key ⇦ .
"EIn"	- released
"AUS"	- blocked
SEt_F	**Reset enable:** for programming section 2 (input mode) release reset via key ✱ :
"EIn"	- released
"AUS"	- blocked

7. Input mode

Incremental measurement function

Press keys ⇧+⇦. to switch to incremental measurement function.

The display is zeroed. The comma blinks.

Press keys ⇧+⇦ again, to block incremental measurement function and to restore display of the absolute position value.

Precondition: Menu point 'Increm. measurement enable' (rEL_F) in programming mode must be programmed to "EIn".

Reference value correction

Press key ⇧ (for at least 3 seconds) to activate reference value correction.

The display shows alternatingly the current reference value and the symbol „rEF“.

Use the arrow keys to enter a new value.

Press key ✱ to confirm and store the new value.

If key ✱ has not been pressed and no value has been entered during approx. 30 seconds, the display returns to display mode without making any value correction.

Precondition: Menu point (rEF_F) in programming mode must be programmed to "EIn".

Offset value correction

Press key ← (for at least 3 seconds) to activate offset value input.

The display shows alternatingly the current reference value and the symbol „oFF“.

Use the arrow keys to enter a new value.

Press key ✱ to confirm and store the new value.

If key ✱ has not been pressed and no value has been entered during approx. 30 seconds, MA47 returns automatically to display mode.

Precondition: Menu point (oFF_F) in programming mode must be programmed to "EIn".

Reset

Press key ✱ to set the display to the programmed reference / offset value.

Any programmed 'incremental dimension' (which is signaled by the blinking comma) will be taken into account.

8. Manual calibration

For setting the display to the reference / offset value either

- press key ✱ or
- briefly activate (by connecting to GND) input RFS (terminal no. 6).

Precondition: Menu point_rFS_in programming mode must have been programmed to "Hand". The display can thus be zeroed, if the reference value was previously programmed to 0.

9. Automatic calibration

Electronic linking of the signals from a reference point transmitter (eg. cam switch or limit switch) with the index pulse (index marker) of the connected encoder will calibrate the measuring display, ie. a start position is defined. During mounting of the reference point transmitter, please adjust the incremental encoder in such a way that the index pulse only appears when the reference point switch is activated.

The contact of the reference switch must only e active for less than one revolution of the encoder (see fig. 7).

Fig. 6 shows the mounting principle.

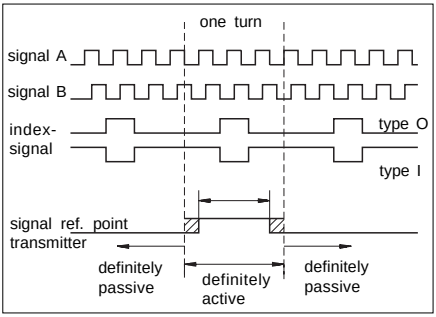


Fig. 6: Signal types for calibration

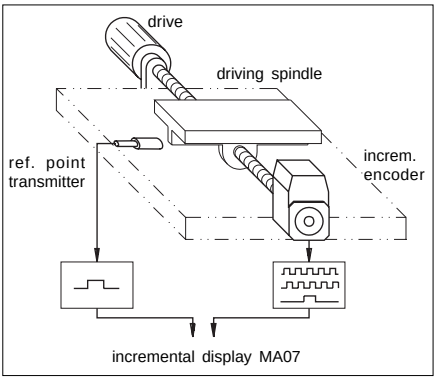


Fig. 7: Calibration setup

Information concerning the setting of the reference point:

Move the spindle exactly to the position which corresponds to the reference value programmed as per chapter 8. The mecanically mounted reference point transmitter must now be definitely active (see fig. 5).

The encoder can be turned without causing any movement of the driving spindle, if you untighten the clamping ring or coupling. You can now search the index signal of the encoder (voltage change) by using for example a voltmeter and carry out the adjustment to the reference point.

When the index and reference point transmitter signals are positioned as described in fig. 5, the clamping ring and the coupling of the incremental encoder are retightened.

10. Trouble shooting

Error states are recognized and shown in the display:

Message: full
Description: display overrun
Elimination: control parameters and adjust them if necessary; calibrate display

Message: blinking display of value 00000
Description: operating voltage too low
Elimination: check voltage supply

Message: blinking decimal point.
Description: MA47 cannot be calibrated to the programmed offset/reference value.
Elimination: MA47 is in 'incremental measurement' mode; press key ✱ to change to absolute measurement.

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