**SCHREIBER**
M E S S T E C H N I K

# Inductive displacement sensors

## Models SM41 / SM43

## Scaleable inductive displacement sensors

The analogue measuring data of the inductive displacement sensor is digitized with a 16 bit D/A converter and processed in a microcontroller. The measuring data is corrected by the accuracy tolerances which are filed in the EEPROM. The digital information is processed by a 16bit D/A- converter in norm output signals 0(4) – 20mA or 0 – 5(10) V. The measuring stroke can be scaled by the user.

### Standard measuring stroke:

| Type | Measuring stroke mm (Default setting) | Central position L1 mm | Housing length L2 mm | Scaleable measuring stroke | |
|---|---|---|---|---|---|
| | | | | Max. ca. mm | Min. mm ≤ |
| SM41x.20 | 20 | 40 | 110 | 30 | 5 |
| SM41x.40 | 40 | 50 | 140 | 50 | 8 |
| SM41x.70 | 70 | 65 | 200 | 80 | 13 |
| SM41x.100 | 100 | 80 | 250 | 110 | 18 |
| SM41x.150 | 150 | 105 | 350 | 160 | 26 |
| SM41x.200 | 200 | 120 | 500 | 210 | 34 |
| SM43x.80 | 80 | 70 | 140 | 90 | 15 |
| SM43x.170 | 170 | 115 | 250 | 180 | 29 |
| SM43x.240 | 240 | 150 | 350 | 250 | 40 |
| SM43x.360 | 360 | 210 | 500 | 370 | 60 |

### Standard versions:

| Type | Output | Supply voltage $U_B$ (Reverse battery protected) | Signal ** (scaleable decreasing) | Central position |
|---|---|---|---|---|
| SM4x1 | 0 .. 20 mA * | 10 .. 32 V | increasing | 10 mA |
| SM4x3 | 4 .. 20 mA * | 10 .. 32 V | increasing | 12 mA |
| SM4x7 | 0..10 V | 15 .. 32 V | increasing | 5 V |
| SM4x9 | 0..5 V | 10 .. 32 V | increasing | 2,5 V |

\* working resistance $R_L \le (U_B - 7\,V) / 0,02\,A$
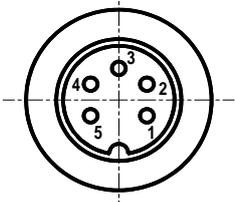** increasing signal by moving the plunger in the direction towards the plug (default setting)

### Technical data:

| Accuracy (at 20°C) | 0,25% optional 0,1% (referring to measuring stroke of the default setting) |
|---|---|
| Resolution | 16 Bit |
| Dependence on $U_B$ | $\Delta I_A / \Delta U_B < 0,02\% / V$ $\Delta U_A / \Delta U_B < 0,02\% / V$ |

Further data according to data sheet SM40 (for SM41) and SM42 (for SM43)

### Electrical connections on plug:

(View to the plug at transducer)

| 5-pol. connector Binder BI723 | PUR-cable (Option .KPx) 5 x 0,34² screened (x = cable-length in metres) |
|---|---|
| 1: $+U_B$ <br> 2: $-U_B$ <br> 3: $I_A / U_A$ (Output) <br> 4: ANF <br> 5: END | Brown    $+U_B$ <br> White    $-U_B$ <br> Green    $I_A / U_A$ <br> Yellow    ANF <br> Grey    END |

**Programming of the measuring stroke:**

**ATTENTION:**
The programming of the measuring stroke is only possible, if the plunger is within the max. measuring stroke and the provided measuring stroke does not fall below the minimal measuring stroke.

The displacement sensor, which is connected to the supply voltage, is scaled by bringing the connections ANF bzw. END with $+U_B$ in contact for at least 2 seconds. A successful scaling is signalized by a short time change of the output signal to the central position (1 second).
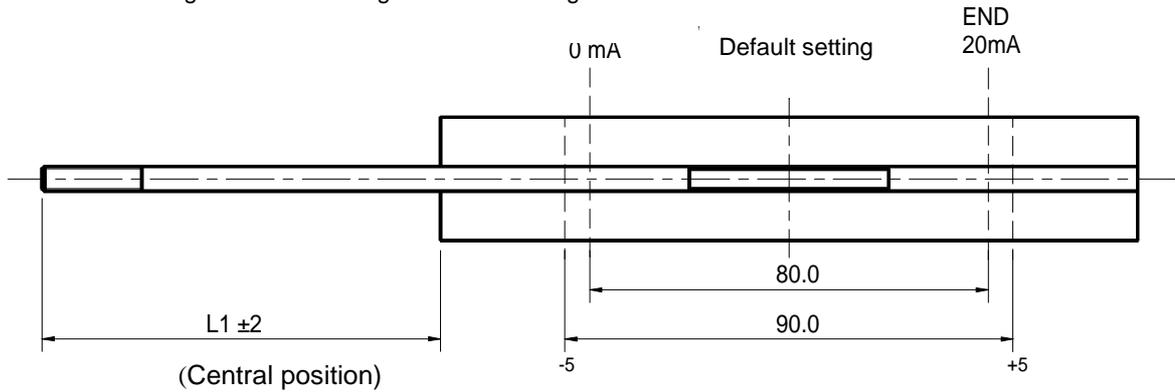
After each single programming step a break of at least 2 seconds is to be made ! ( Connect ANF and END with $-U_B$ or leave open)

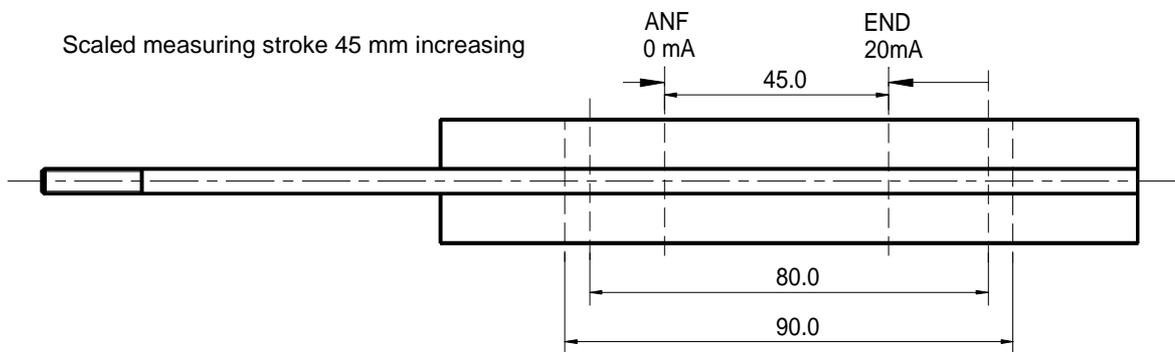| Programming step | Designation | What to do ? | Confirmation output signall | Error message |
|---|---|---|---|---|
| 1 | Programming of default setting | Connect ANF and END simultaneously with $+U_B$ (2 sec.) | Central position (1 sec.) then measuring value | **Warning, if plunger is outside the max. measuring stroke:** ¼-position (1 sec.) default setting is programmed nevertheless |
| 2 | Setting of the measuring stroke starting point | Adjust plunger mechanically to the measuring stroke starting point | | |
| 3 | Programming of the measuring stroke starting point | Connect ANF with $+U_B$ (2 sec.) | Central position (1 sec.) then initial value | **If plunger is outside the max. measuring stroke:** ¼-position (1 sec.) measuring stroke starting point is set to the nearest edge of the max. measuring stroke |
| 4 | Setting of the measuring stroke end point | Adjust plunger mechanically to the measuring stroke end point | | |
| 5 | Programming of the measuring stroke end point | Connect END with $+U_B$ (2 sec.) | Central position (1 sec.) then final value | **If remaining under the min. measuring stroke:** ¾ - position (1 sec.) No programming ! |
| | | | | **If plunger is outside the max measuring stroke:** ¼-position (1 sec.) measuring stroke staring point is set to the nearest edge of the max. measuring stroke |

During normal operation it is recommended to connect ANF and END with $-U_B$.

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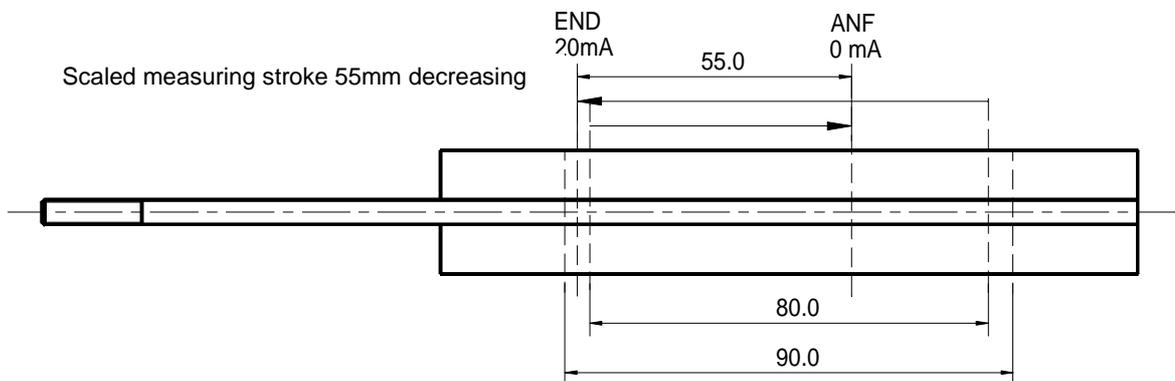M E S S T E C H N I K

## Example SM431.80 :

Default setting 80mm measuring stroke increasing

0 mA    Default setting    END 20mA

80.0

L1 ±2

90.0

(Central position)

-5    +5

Scaled measuring stroke 45 mm increasing

ANF 0 mA    END 20mA

45.0

80.0

90.0

Scaled measuring stroke 55mm decreasing

END 20mA    ANF 0 mA

55.0

80.0

90.0

## Order code

SM41 3 . 40 . 1 . T
Version
Accuracy 1: 0.25%, 0: 0.1%
Measuring stroke (default setting)
Current or voltage output
Series
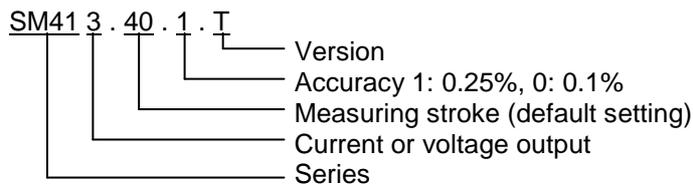
Order codes for customer specified versions will be named at plant.

**e.g. SM413.40.1.T**
Displacement sensor Serie 41, output 4-20 mA , 40mm
measuring stroke , accuracy 0,25%, gauge