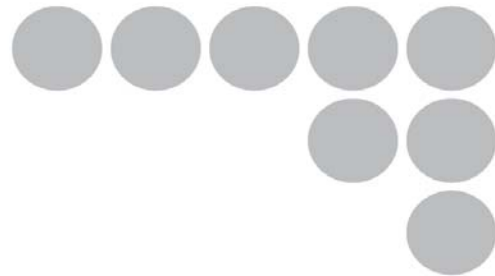# OMRON

Smart Sensors

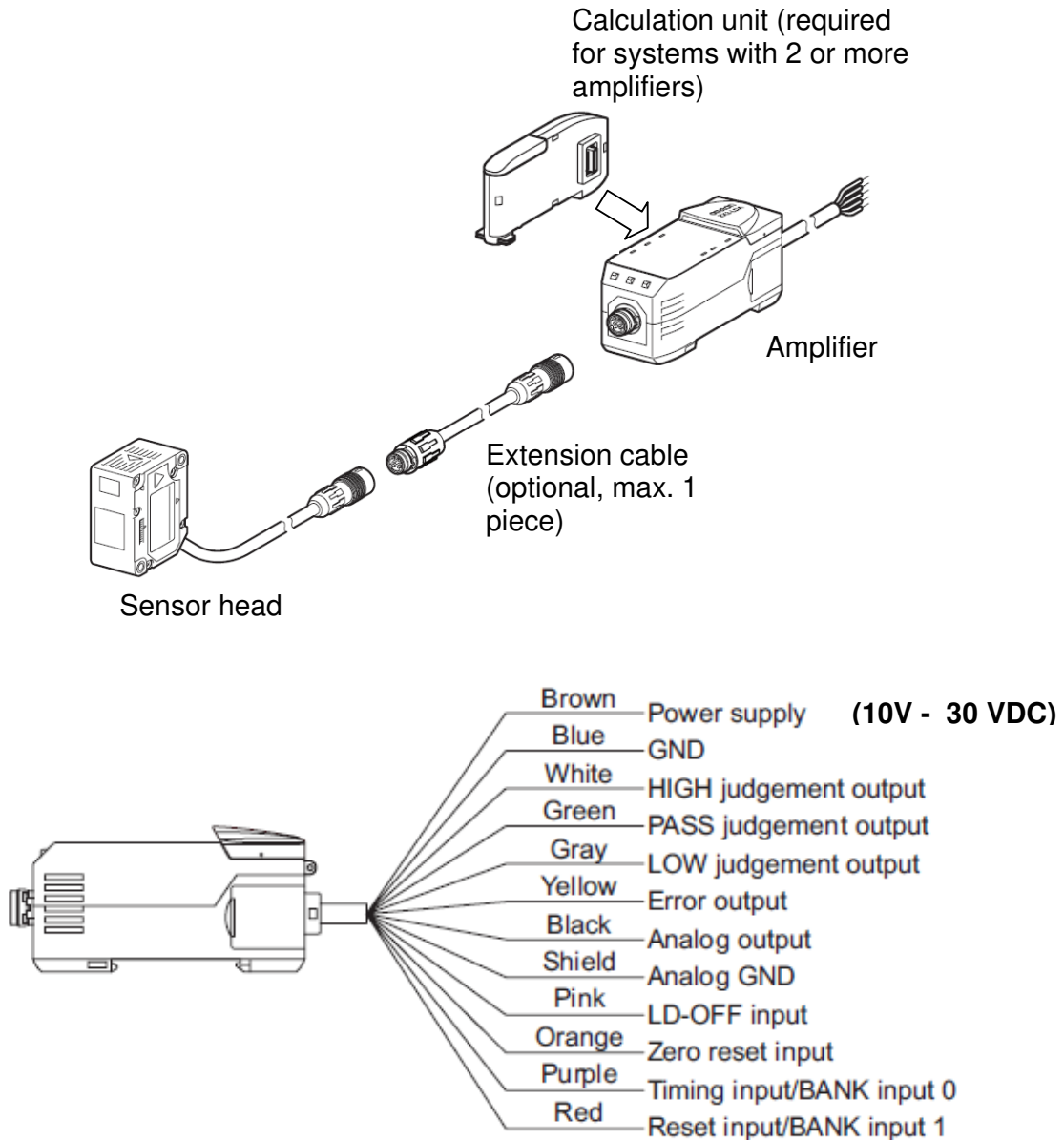### Laser Displacement Sensors CMOS Type

ZX2 Series

Short Manual

1 Safety precautions and correct use

Please refer to the full ZX2 user manual for the detailed explanations of the safety precautions and the correct use.
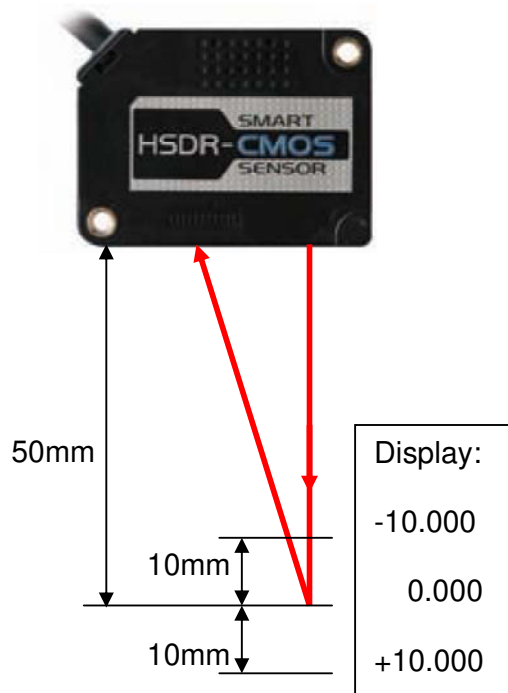
2 Wiring

Calculation unit (required for systems with 2 or more amplifiers)

Amplifier

Extension cable (optional, max. 1 piece)

Sensor head

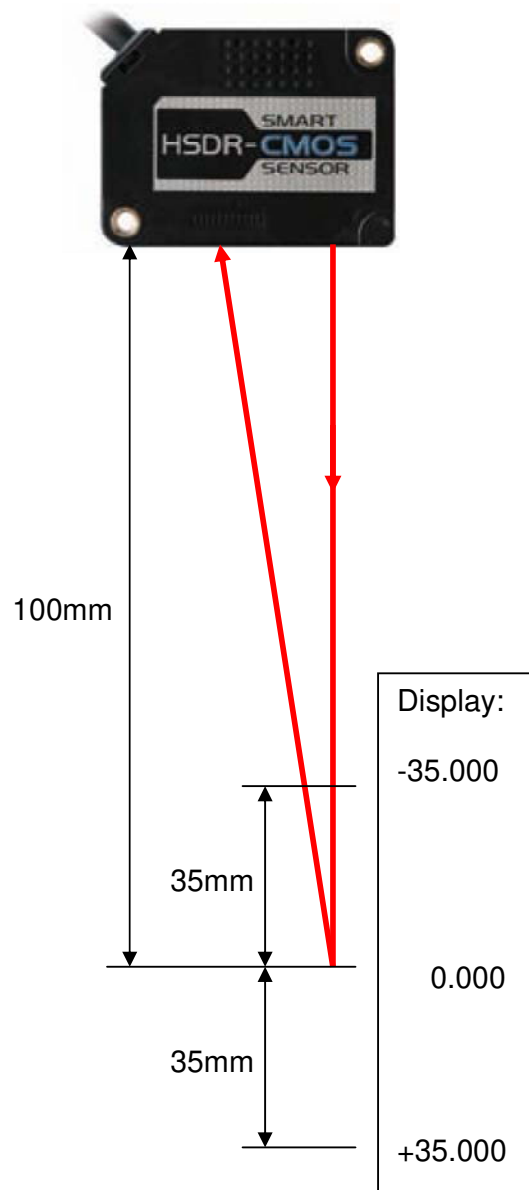| Color	Function
Brown	Power supply (10V - 30 VDC)
Blue	GND
White	HIGH judgement output
Green	PASS judgement output
Gray	LOW judgement output
Yellow	Error output
Black	Analog output
Shield	Analog GND
Pink	LD-OFF input
Orange	Zero reset input
Purple	Timing input/BANK input 0
Red	Reset input/BANK input 1

- The HIGH judgement output is switched on if the measurement value is bigger than the HIGH Threshold value.
- The LOW judgement output is switched on if the meansurement value is smaller than the LOW Threshold value.
- The PASS judgement output is switched on if the measurement value is between the the Low and High Threshold values.

3 Default Measurement range

ZX2-LD50(L)

ZX2-LD100(L)

50mm

10mm

10mm

Display:

-10.000

0.000

+10.000

100mm

35mm

35mm

Display:

-35.000

0.000

+35.000

The analog output line can be set to following default ranges (see p.11 and p.12 for additional settings):				
ZX2-LD50	ZX2-LD100	-5…5V	1V…5V	4mA…20mA
-10	-35	-5V	+1V	4mA
+10	+35	+5V	+5V	20mA

4 Display in RUN mode

Orange subdisplay

Displays the selected bank

Press right or left button

Displays the High Threshold

H

Displays the Low Threshold

L

Displays either the current or voltage at the analog output

Displays the current resolution

Displays the current measurement value

5 Functions in RUN mode:

ZERO LED turns on ⌐→

Set the current value to ZERORESET

Press the "down arrow" button for 3 seconds. In order to switch off again, press the up- and down arrow simultaneously for 3 seconds.

Activate the Key Lock.

Press both "arrow left" and "arrow right" buttons simultaneously for 3 seconds to activate or deactivate the Key Lock function.

Activate "Smart Tuning"

See page 9 for details!

Press the SMART button for 1 second to activate the Single Smart Tuning function, 2 seconds to activate the Multi Smart Tuning function and 5 seconds to activate the Active Smart Tuning function.
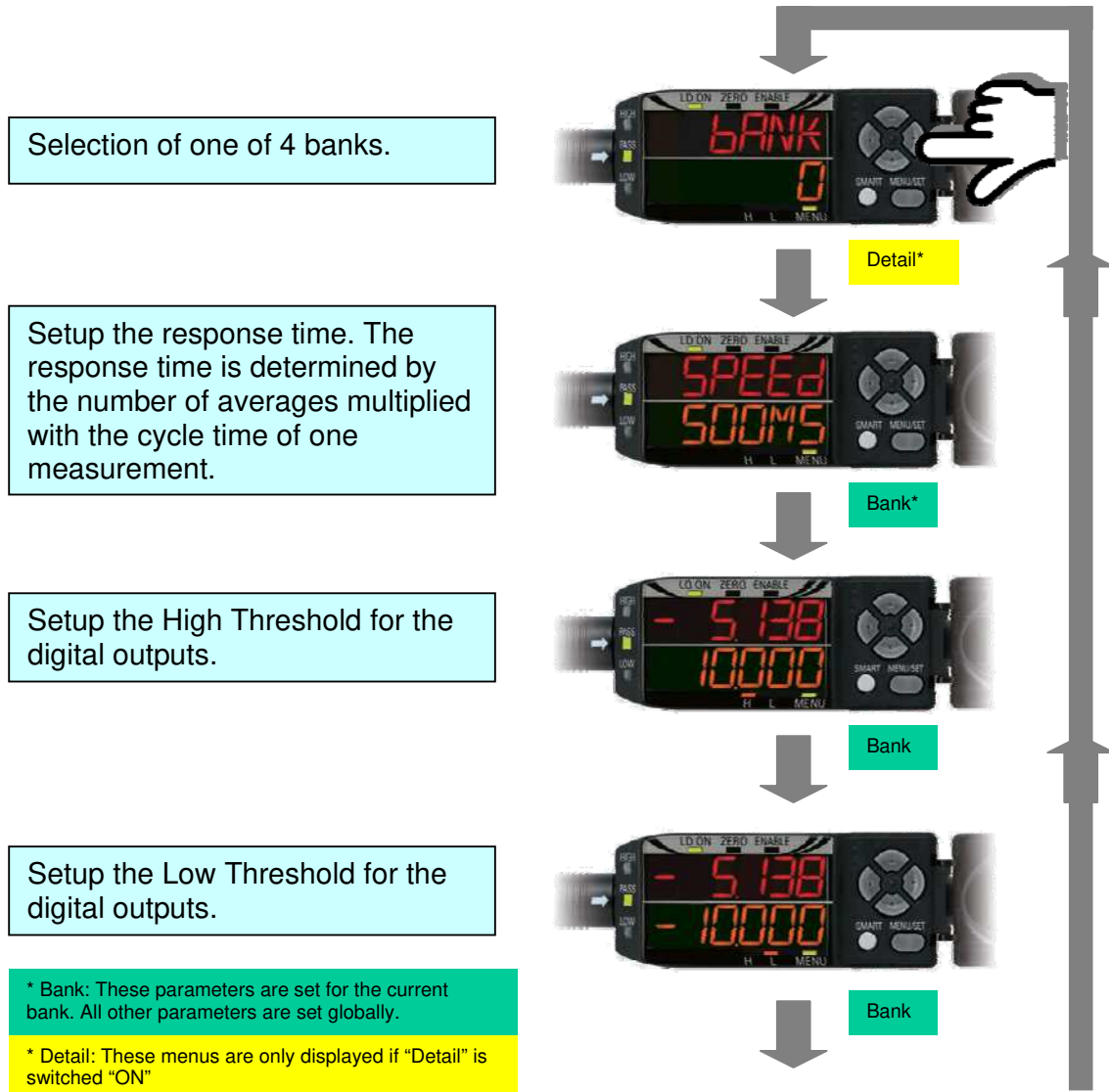
6 Setup mode

Pressing and holding the "MENU/SET" button for 3 seconds changes the mode of the amplifier to the setting mode (pressing again for 3s moves back to RUN mode):

MENU LED Indicates
setup mode

Press for 3 seconds

Below you see the navigation through all menus (Details switched on, all other options switched off) by pressing the left/right arrow button. You change the options by pressing the up and down arrow buttons and confirm with the Menu/Set button:

Selection of one of 4 banks.

Detail*

Setup the response time. The response time is determined by the number of averages multiplied with the cycle time of one measurement.

Bank*

Setup the High Threshold for the digital outputs.

Bank

Setup the Low Threshold for the digital outputs.

Bank

* Bank: These parameters are set for the current bank. All other parameters are set globally.

* Detail: These menus are only displayed if "Detail" is switched "ON"

Setup the Hysteresis.

| | HYS |
| | 0.000 |

Detail | Bank

Setup the scale of the display and analog output value. (All settings (S1/S2) for the scaling are stored in the bank data. See p. 11.)

| | SCALE |
| | OFF |

Detail | Bank

Setup the Hold function. See p. 10.

| | HOLd |
| | OFF |

Detail

Setup of the analog output either voltage or current and the output range.

| | A-OUt |
| | 4.20MA |

Setup the behavior of the analog output in the case that the sensor is in error state (resp. not able to obtain a measurement value. Display: E-dark). See p. 12.

| | RStOUt |
| | KEEP |

Detail

Setup the clamp value for the analog output (only valid if RStOUT is set to "Clamp").

| | CLAMP |
| | MAX |

Detail

Setup the on-delay of the digital outputs. See the full user manual for details.

ONtIM
0MS

Detail

Setup the off-delay of the digital outputs. See the full user manual for details.

OFFtIM
0MS

Detail

Setup the way how the zero-reset value is stored (permanently or volatile).

ZRMEM
OFF

Detail

Setup the zero-reset value for the zero-reset function.

ZRdISP
0.000

Detail

Setup the function of the 2 input terminals. Either timing and reset inputs or bank select inputs.

EXt-IN
tIMRSt

Detail

Setup the menu between simple ("Off") and detailed ("On"). If "Detail" is switched to "On" all menu items are displayed.

dEtAIL
ON

Reset the sensor to the factory defaults. All user defined settings are deleted.

INIt
CANCEL

7 Smart Tuning

Smart Tuning sets the optimum parameters for the chosen response time ("Speed" setting) and the measurement object automatically. The ZX2 has 3 different Smart Tuning modes:
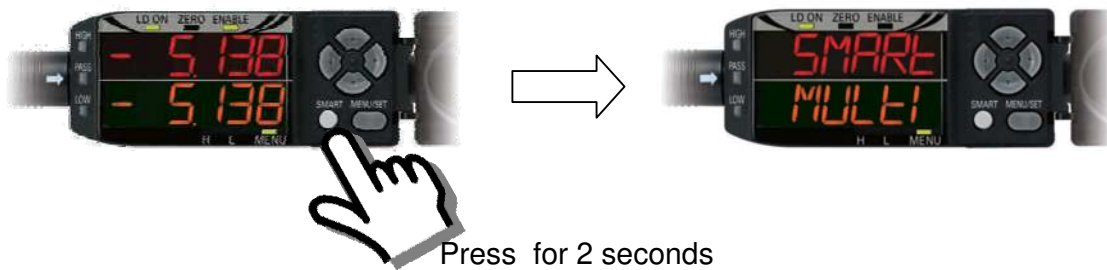
Single Smart Tuning:

Single Smart Tuning is used if the objects in the final application always have the same surface characteristic. Place the measurement object in front of the sensor and press the "Smart" button for 1s:


Press for 1 second
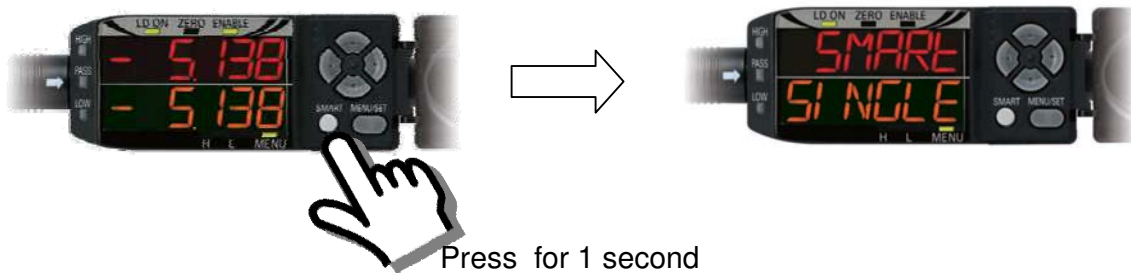
Multi Smart Tuning:

Multi Smart Tuning is used if there are a couple of different objects in the final application which are varying in the surface characteristics. Place one after another of the measurement objects in front of the sensor and press each time the "Smart" button for 2s:

Press for 2 seconds
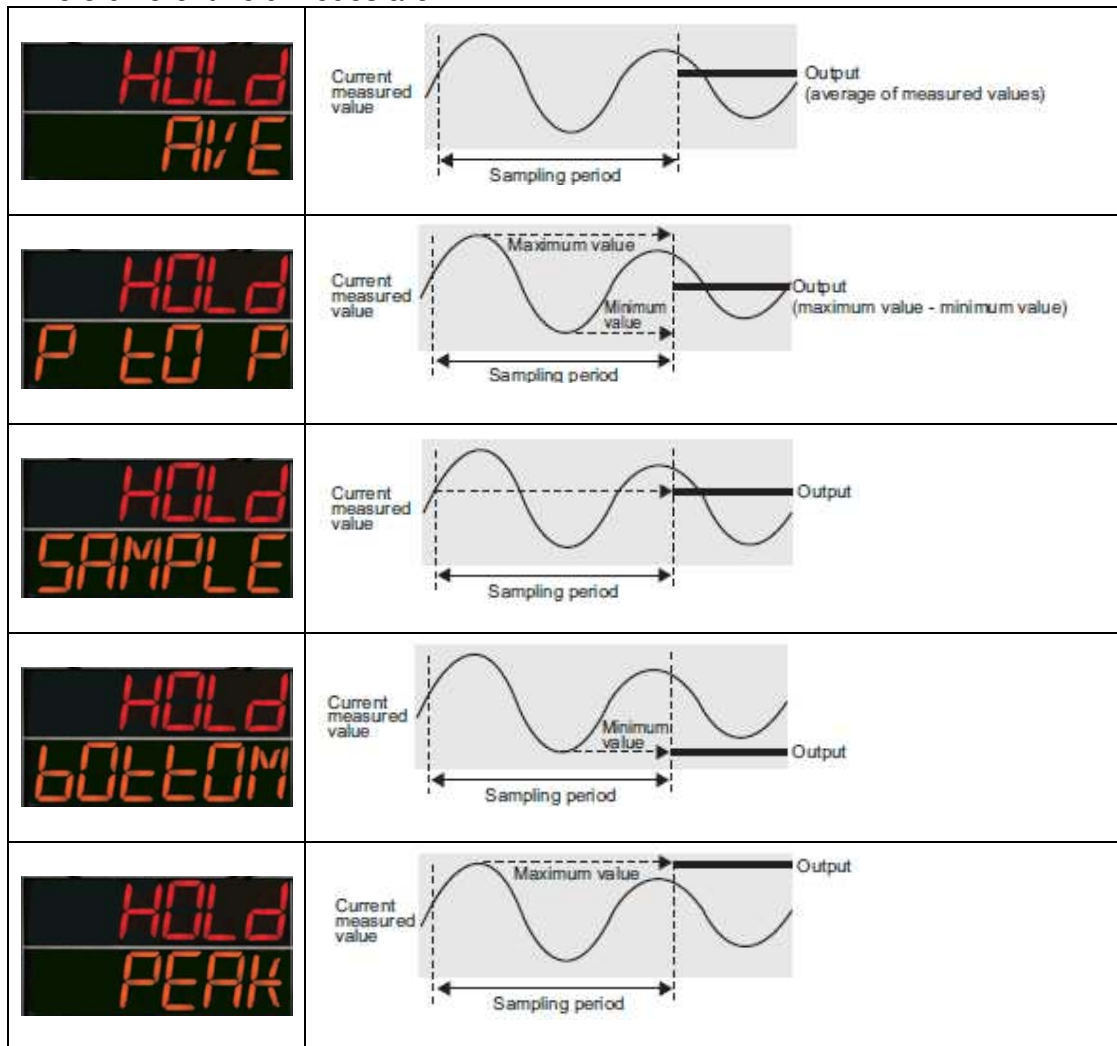
Active Smart Tuning:

Active Smart Tuning is used if the object(s) is (are) moving in the final application. The Smart Active tuning is activated by pressing the Smart button for 5s then the object(s) is (are) passed by in front of the sensor and finally the Smart button is again pressed for 5s in order to stop the tuning process.

Press for 5 seconds
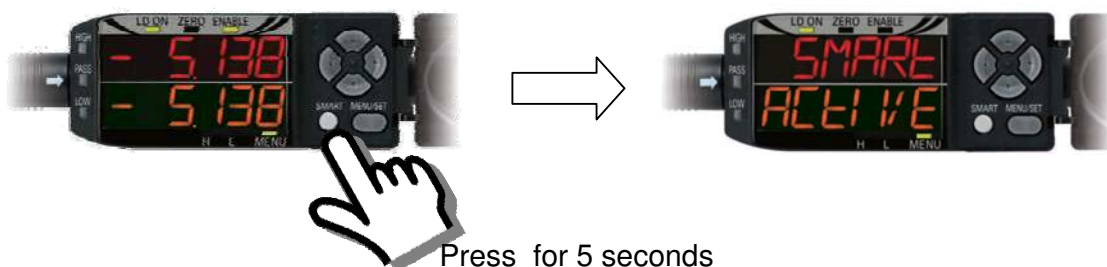
8 Hold (=trigger) functions

The hold function is used to hold a certain measurement value while a certain sampling period. After the sampling period has passed this value is displayed and applied at the analog output. The possible methods are "Average", "Peak to Peak" (=maximum-minimum), "Sample", "Bottom" and "Peak". The sampling period is determined either by an external signal at the Timing Input (purple wire, and menu setting "Ext-In" set to "TimRSt") or by a period determined by the measurement value while it is below or above a certain threshold level (setting "Trig" to "Self-Up" or "Self-Dn" and the threshold level value under "Self-Level").

The 5 different hold modes are:

HOLd AVE	Current measured value — Output (average of measured values) / Sampling period
HOLd P tO P	Current measured value — Maximum value / Minimum value — Output (maximum value - minimum value) / Sampling period
HOLd SAMPLE	Current measured value — Output / Sampling period
HOLd bOttOM	Current measured value — Minimum value — Output / Sampling period
HOLd PEAK	Current measured value — Maximum value — Output / Sampling period

If you have activated one of the HOLD functions and the digital "Timing" input you can press the "up-arrow" key in "RUN" mode in order to simulate an active signal at the timing input:

9 Scaling

The scaling function is used to both
1. adjust the display value.
2. adjust the analog output value.

With scaling it's possible to set the values for the upper and lower measurement range limits:

The easiest way to understand how the setting is done is using an example:

The default range of the sensor is +/-10 mm (e.g. for the ZX2-LD50).
For the application only the range from 0..5mm is required and the display should be 50..55mm, then you set following values to S1 and S2:

S1-bef	S1-Aft	S2-bef	S2-Aft
0	50	5	55

The Analog output always has the full swing for the values specified for the S1-Aft and S2-Aft values. Here: The analog output is -5V for the display of 50 and +5V for the display of 55 (if the analog output is configured for -5V..5V, for the other ranges 1..5V and 4..20mA this is valid accordingly).

All the values for S1 and S2 are stored in the bank data.

After scaling the threshold values for the High/Pass/Low judgement must be set accordingly to the display values (the stored threshold values remain unchanged when scaling is performed).

10 Setting for the analog output in case of measurement error

If no measurement is possible, e.g. because no object is in front of the sensor inside of the measurement range (display: E-dark), the sensor can be configured for the analog output either to issue:

- a predefined value (Setting: Clamp and Clamp value) or
- the value of the last valid measurement (setting "Keep")

The setting is done in the menus:

or
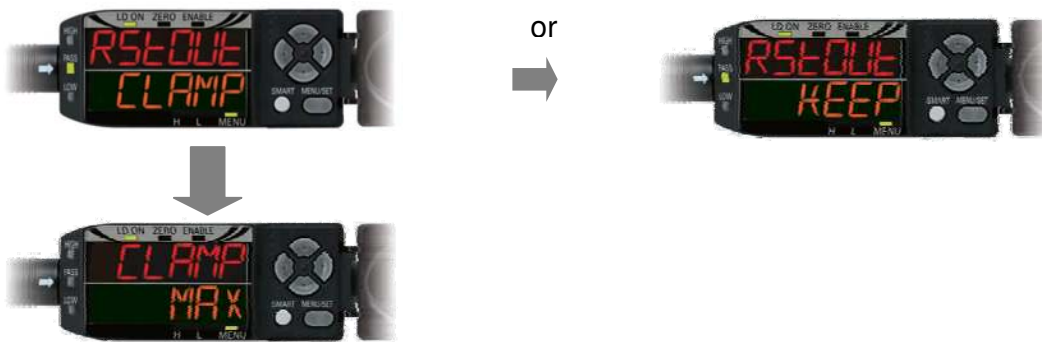
Setting range: -5V..max.
resp. 4mA..max.