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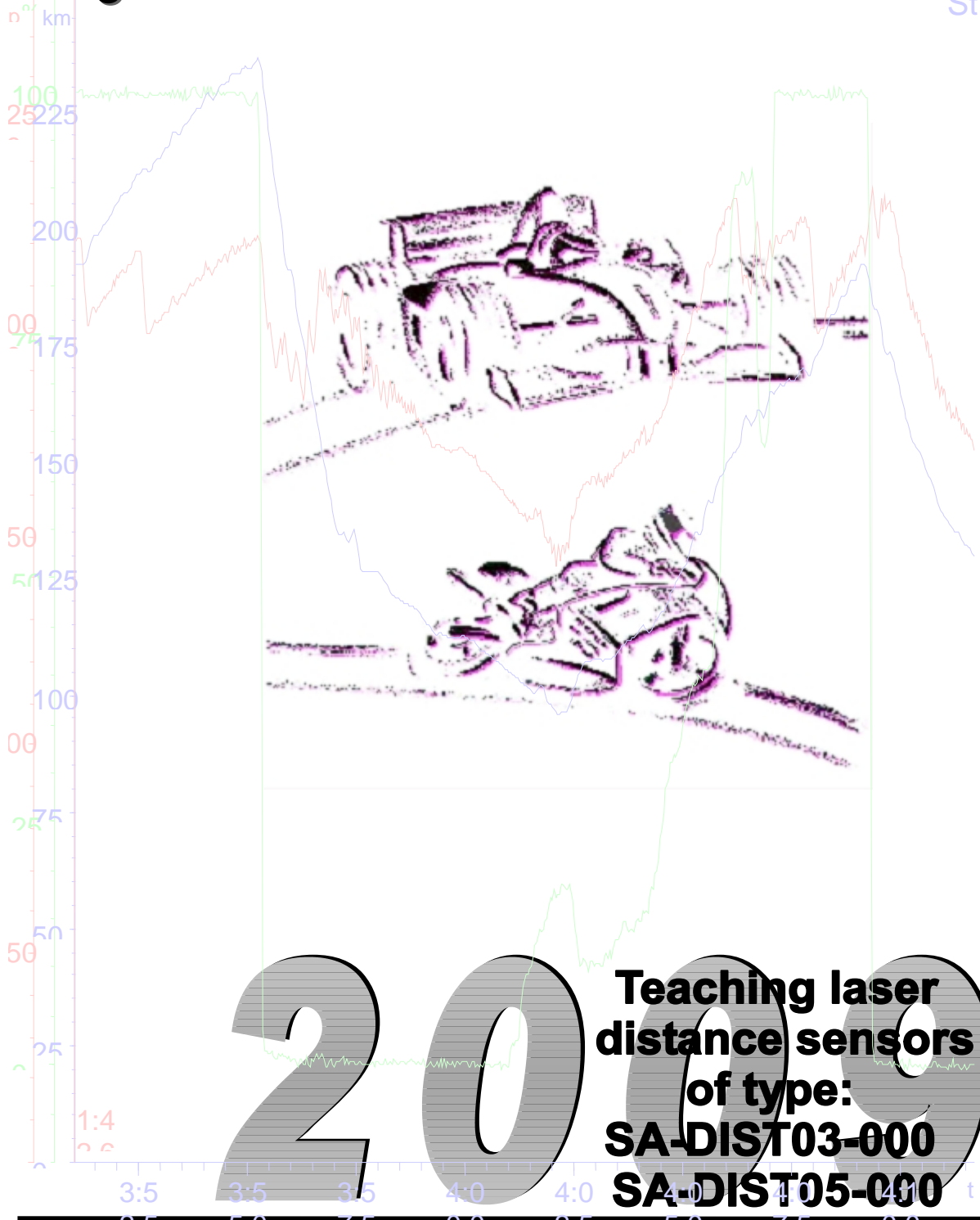


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Symbols used in the text



In the paragraphs highlighted with this symbol, you will find tips and practical advice to work with the 2D Product.



In the paragraphs highlighted with this symbol, you will find additional information and it is very important that you follow the instructions given.

2D Debus & Diebold

Meßsysteme GmbH
Alte Karlsruher Straße 8
76227 Karlsruhe
Tel.: +49(0)721 94485-0
Fax: +49(0)721 94485-29
EMAIL: mail@2D-datarecording.com
Homepage: <http://www.2D-Datarecording.com>
Homepage: <http://www.2D-Kit-System.com>

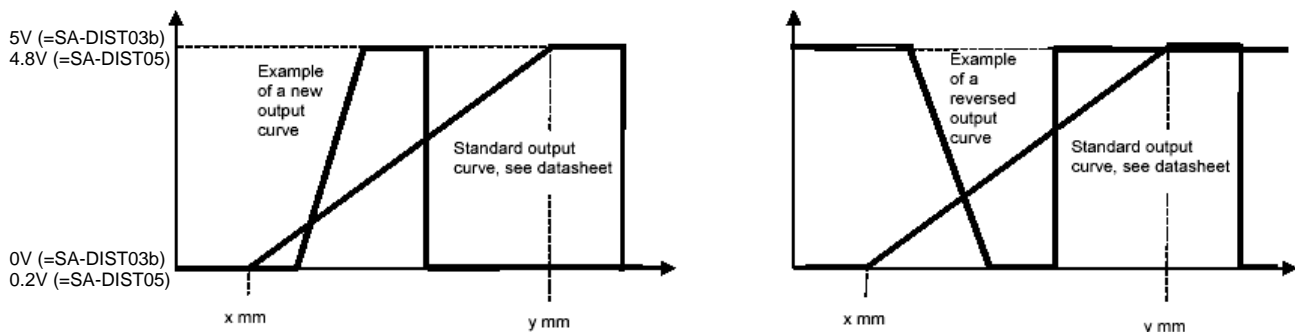
1. Teaching laser distance sensors of type: SA-DIST03b / SA-DIST05



This feature was designed to choose a smaller range within the nominal measuring range of the sensor. The output voltage adapts to the new range.

Two positions must be taught:

- First, the distance that will be =0V (using SA-DIST03b) or =0.2V (using SA-DIST05) than the distance that will be =5V (using SA-DIST03b) or =4.8V (using SA-DIST05).
- These teach positions are always just the border of the new range
- The sensor may be taught at least 10,000 times within its lifetime
- The sensor can always be reset back to the factory settings
- The sensor may be taught using the cable (=Teach input)



The LED on top side of the sensor normally indicates if an object is within the measuring range. During the teach function, the red LED indicates the various steps during the teaching procedure.

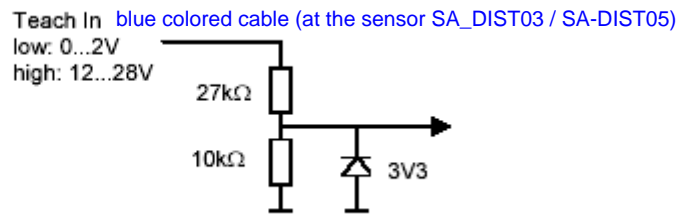
2. Wiring example of the external teach input



Laser distance sensors of type SA-DIST03b | SA-DIST05 have no body integrated teach button.

For using the teach function it is necessary (by the user) to connect the input (=“Teach IN”) with the following wiring example.

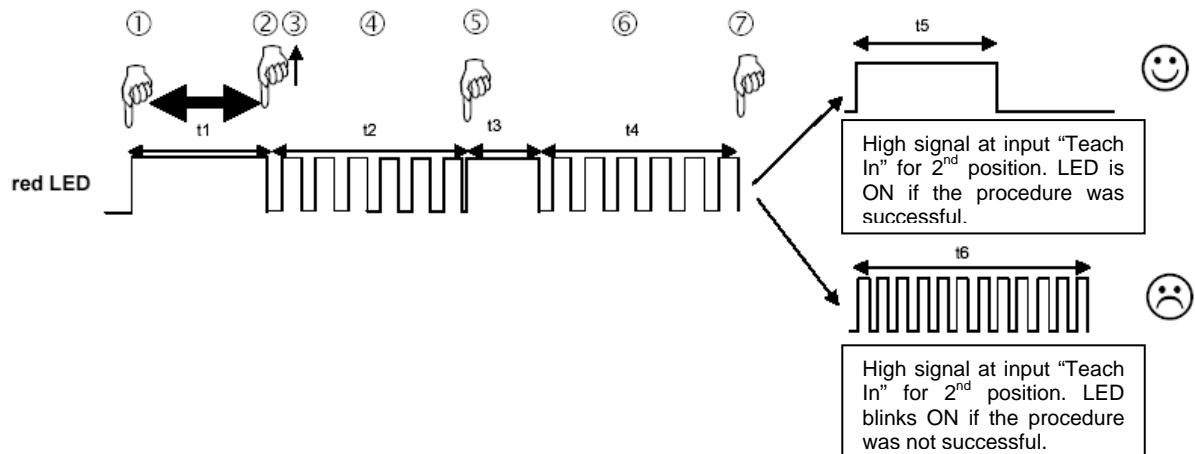
Input circuit:




[Using the teaching procedure in the next chapter 2.1 to teach a new range](#)

2.1 Use the following procedure to teach a new range

①	High signal at input "Teach In" (>30ms). The red LED will turn on, if the sensor can be taught.
②③	There is <u>no time limit</u> . The sensor may be taught at any time.
④	Place a target at the first new position of the measuring range. This is the position, that will later produce =0V (using SA-DIST03b) or =0.2V (using SA-DIST05)
⑤	High signal at input "Teach In" again (>30ms). The LED will stop blinking and will stay on for about 3 sec to indicate that the first position has been stored. Then the LED will blink again.
⑥	Now place the target at the second position (the other end of the new range) which will produce =5V (using SA-DIST03b) or =4.8V (using SA-DIST05).
⑦	High signal at input "Teach In" again (>30ms). The LED will stop blinking and will stay on for about 3 sec to indicate that the second position has been stored. The LED will then turn off and blink once more. Now the sensor is ready to measure. The new, smaller operating range is now set. The red LED now indicates whether an object is within the new range (=LED off) or not (=LED ON)



 If one of the new borders of the range was outside the standard range or the two positions were too close to each other, then the new settings are not valid. The sensor will respond with an extended blinking at the end of the teach procedure. The previous settings are still valid, the new settings are lost.

2.2 Adapt the formula to the new measuring range (after teaching)



Decreasing the measuring range by teaching causes a change of the formula. The Formula is needed to calculate the physical values.

Therefore do not forget to adapt the formula to the changed measuring range !!!



Use the following formulas. Replace the placeholder "MRAT" by the (new) Measuring Range After Teaching



SA-DIST03b-000:

			Multiplicator				Offset
12 Bit A/D	Measuring range [mm]	=	*MRAT-12 / 4095	*	Digits	+	12
16 Bit A/D	Measuring range [mm]	=	*MRAT-12 / 65535	*	Digits	+	12
Voltage	Measuring range [mm]	=	*MRAT-12 / 5	*	Volt	+	12



SA-DIST05-000:

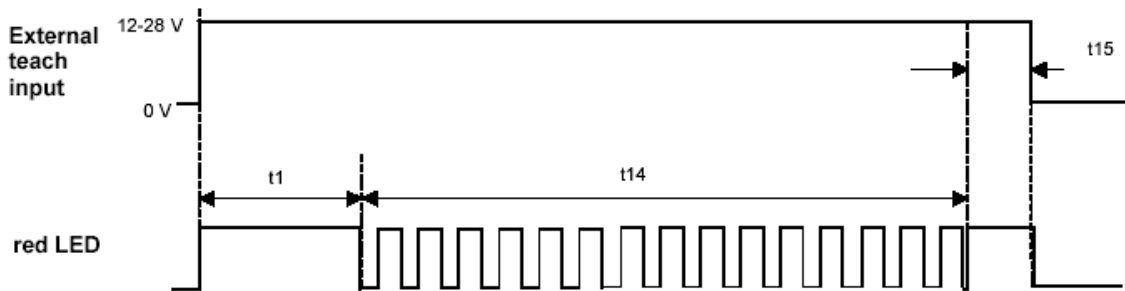
			Multiplicator				Offset
12 Bit A/D	Measuring range [mm]	=	*MRAT-50 / 4095	*	Digits	+	50
16 Bit A/D	Measuring range [mm]	=	*MRAT-50 / 65535	*	Digits	+	50
Voltage	Measuring range [mm]	=	*MRAT-50 / 4.6	*	Volt	+	50

*M.R.A.T = (New) Measuring range after teaching

3. How to reset the factory settings using the external teach input



Teaching the sensor via the external teach input. There is **no** time limit. The sensor may be taught at any time.

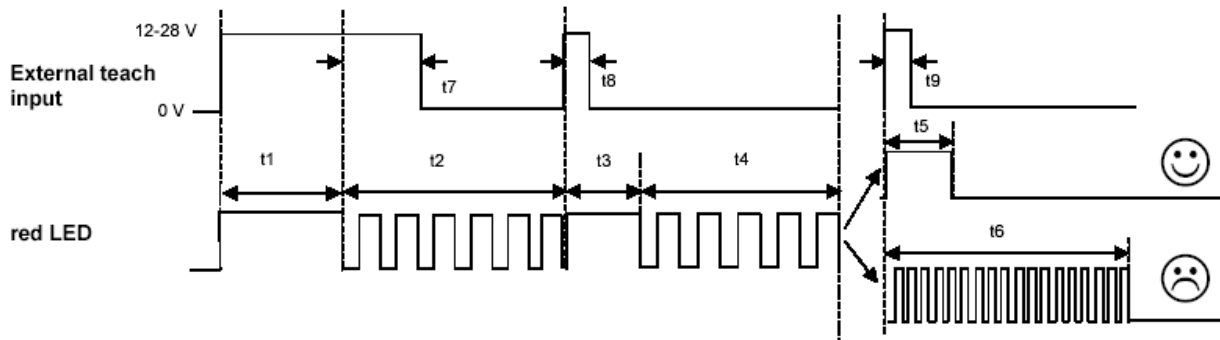


t1	=	Minimum time (=High signal at input "Teach In") to enter teach mode. This value must be $\geq 5s$!
t14	=	Minimum blinking time for the reset to factory settings with external teach input. This value must be $\geq 10s$!
t15		Minimum high time (=Low signal at input "Teach In") of the external teach input after the LED stops blinking for reset to factory settings. This value must be $\geq 0.2s$!

4. Description of Timing Functions



Teaching the sensor via the external teach input. There is **no** time limit. The sensor may be taught at any time.



Time	Description of Timing Functions	Value	Comment
t1	Minimum hold time to enter teach mode	5s	Using the external teach input, it may be used at any time.
t2	Maximum waiting time after teaching the first position.	60s	If no "High signal at Teach input" during this interval, the sensor will leave the teach mode without any changes.
t3	LED on as response for the first position.	approx. 3s	
t4	Maximum waiting time after teaching the second position.	60s	If no "High signal at Teach input" during this interval, the sensor will leave the teach mode without any changes.
t5	LED on and "OK" response after the second position.	approx. 3s	
t6	LED Blinking for "NOT OK response" after teaching the second position.	approx. 5s	
t7	Maximum hold time after LED starts blinking for teaching a new range.	8s	
t8	Minimum pulse lengths on external teach input for first position.	30ms	
t9	Minimum pulse lengths on external teach input for second position.	30ms	
t14	Minimum blinking time for the reset to factory settings with external teach input.	10s	
t15	Minimum high time of the external teach input after the LED stops blinking for reset to factory settings.	0.2s	