

## Application Note

### AN2007

## D-Series

# Additional measurement filter - Distance jump detection

V1.01

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### Abstract

The D-Series laser distance sensors provide a wide range of configuration possibilities. This document shows how to configure the distance jump detection feature. This feature works like a plausibility check of the measured distance. A typical use cases can be positioning applications e.g. in the logistics.

This Application Note is provided as is without any warranty for any problems this sample may cause.



## Table of content

1 Description .....	3
2 Application example .....	4
3 Configuration .....	5
3.1 Configuration steps.....	5
3.2 Commands.....	5



# 1 Description

Many applications demand the detection of blocking objects in the laser beam (see figure 1 and 2 for details). For this, an additional measurement filter has been implemented in the D-Series laser distance sensor. Available for firmware V1.17 or newer. This filter performs a plausibility check of the measured distance by detecting sudden not allowed distance changes. The sensor signals this error condition by sending the error code @E261. This error code will be present until the tracking distance measurement is stopped and restarted.

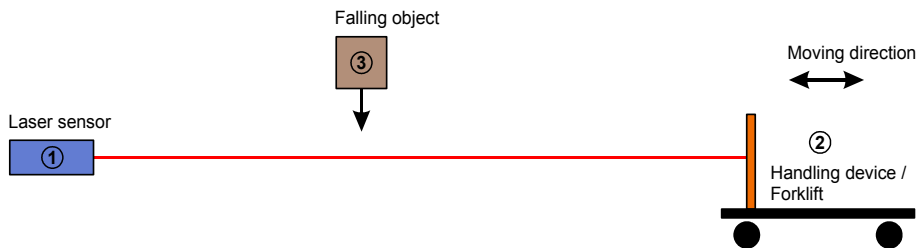


Figure 1: Example of a critical situation where the sensor is fix installed and the measuring target is moving.

1 → Laser distance sensor (fix), 2 → Handling device / Forklift with measuring target (moving), 3 → Falling object (may block laser beam)

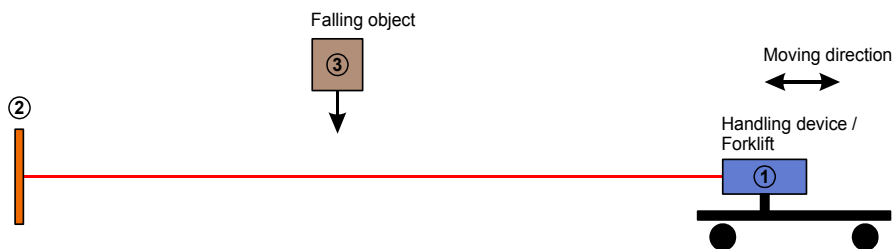


Figure 2: Example of a critical situation where the sensor is moving and the measuring target is fix installed.

1 → Laser distance sensor on handling device / forklift (moving), 2 → Measuring target (fix), 3 → Falling object (may block laser beam)



## 2 Application example

The following table shows an application example according to figure 2 (laser sensor on the moving handling device). The max. allowed distance change / jump is configured to  $\pm 0.5$  m.

Time	Actions	Measured distance	Check of distance change (plausibility check)	Sensor output	Comment
↓	Start tracking measurement	10.0 m	Pass	10.0 m	It must be ensured that the sensor is measuring on the right target at the starting phase.
		10.0 m	Pass	10.0 m	
	Handling device starts moving	10.1 m	Pass	10.1 m	
		10.2 m	Pass	10.2 m	
		10.5m	Pass	10.5m	
		10.6 m	Pass	10.6 m	
	Cardboard box is falling in the laser beam	5.3 m	Fail	@E261	Distance change (jump) > 0.5 m. The laser sensors plausibility check failed. => PLC has to stop handling device immediately => After removing the blocking object, tracking measurement must be stopped and restarted to reset error @E261 of laser sensor.
		5.3 m	Fail	@E261	
	Cardboard box removed	10.7m	Fail	@E261	
		10.7m	Fail	@E261	
		10.7m	Fail	@E261	
	Stop tracking measurement	-	-	-	
	Restart tracking measurement	10.7 m	Pass	10.7 m	It must be ensured that the sensor is measuring on the right target at the starting phase.
		10.7 m	Pass	10.7 m	
	Handling device starts moving	10.8 m	Pass	10.8 m	
	11.0 m	Pass	11.0 m		
....	....	....	....		

## 3 Configuration

The sensor behavior has to be configured according the configuration steps in the following chapter 3.1. The used sensor commands are described in chapter 3.2.

### 3.1 Configuration steps

Please do the following steps to configure the sensor for the new additional measurement feature / filter possibilities. Note, the configuration can be saved permanently in the laser distance sensor. Like this, the configuration process has to be done only once.

Steps	Description
1	Connect the D-Series sensor over USB or RS-232 to the PC, start the Laser Sensor Utility software and check the connection. Download and install the latest "Laser Sensor Utility" software ( <a href="http://www.dimetix.com/UtilitySW">www.dimetix.com/UtilitySW</a> ).
2	Check the right firmware version of the D-Series interface board: V1.17 (or newer). Otherwise update the sensor firmware according firmware update instructions on the Dimetix knowledge base. <a href="https://dimetix.com/en/services/knowledge-base/#how-can-the-sensor-firmware-be-updated">https://dimetix.com/en/services/knowledge-base/#how-can-the-sensor-firmware-be-updated</a>
3	Run the manual command input. "Laser Sensor Utility" → "Tools" → "Manual command input"
4	Use the command <code>sNafi</code> (for details see chapter 3.2.1) to configure the max. allowed distance change / "jump" between two distance measurements. This value is application specific and must be determined by the application designer. The max. possible moving speed, the measuring rate of the sensor and other influential factors have to be considered. <b>Remark:</b> Checking of max. distance changes / "jumps" are only possible for tracking measurement. Error code <code>@E261</code> is present until the measurement is restarted.
5	Do other configurations if needed.
6	With command <code>sNs</code> the configuration can be saved permanently. Otherwise all configurations are volatile and the sensor must be reconfigured after every power cycle.
7	Start tacking measurement (distance plausibility check is active).

## 3.2 Commands

### 3.2.1 Set/Get additional measurement filter configuration (sNafi)

This command allows additional measurement filter / feature configurations.

	<i>Set command</i>	<i>Get command</i>
Command	<code>sNafi+a+bbbbbbbb&lt;CrLf&gt;</code>	<code>sNafi+a&lt;CrLf&gt;</code>
Return successful	<code>gNafi+a?&lt;CrLf&gt;</code>	<code>gNafi+a+bbbbbbbb&lt;CrLf&gt;</code>
Return error	<code>gN@Ezzz&lt;CrLf&gt;</code>	<code>gN@Ezzz&lt;CrLf&gt;</code>
Parameters	<i>N</i> <i>a</i>  <i>bbbbbbbb</i> <i>zzz</i>	Device ID Additional filter / feature number: 1 → Max. allowed distance change / jump configuration Other → Not used Max. allowed distance change / jump in 1/10 mm Error code
Example	<code>s0afi+1+5000&lt;CrLf&gt;</code>	The max. allowed distance change is set to 50 cm (for sensor with device ID 0)

**Remark:** All configurations are volatile, use the save configuration command `sNs` to save configuration permanently.

For more information about available configurations see the Technical Reference Manual of the D-Series laser distance sensor.

