



# Application Note AN2001

## **D-Series**

## Numeric digital display 500215

V 2.07 Please check <u>www.dimetix.com</u> for the latest version

#### Abstract

This application shows how to display a measured distance value on a standard external numeric digital display. Description of the wiring and sensor configuration are included as well as two samples are given.

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

File: AN2001\_NumericDigitalDisplay V207.odt



## Table of content

1	Document scope	3
2	Safety instructions	3
3	Description	4
	3.1 Requirements	4
4	Wiring	4
5	Sensor configuration	5
6	Simple application – Example 1	5
	6.1 User output protocol configuration	5
	6.2 Autostart with serial output configuration	6
7	Advanced application - Example 2	7
	7.1 User output protocol configuration	7
	7.2 Autostart configuration	8



### 1 Document scope

This document covers an Application Note written for the Dimetix D-Series laser distance sensors. The following topics are discussed:

- Safety instructions
- Application Note descriptions

## 2 Safety instructions



This Application Note is written for qualified system integrators to help doing an application specific sensor configuration.

Before using the D-Series sensor also the safety related information in the D-Series Technical Reference Manual must be consider.



#### Looking into the laser beam may be hazardous to the eyes.

• Do not look into the laser beam. Make sure the laser is aimed above or below eye level. (particularly with fixed installations, in machines, etc.).



# Take precaution against electrostatic discharge (ESD) when the D-Series laser distance sensors exchangeable cover is open.

- Generally the sensor with removed exchangeable cover is a sensitive device and can be damaged by electrostatic discharge.
- Only handle the device properly grounded and with care.
- No warranty will be granted on improper handling and / or ESD caused problems.



## **3 Description**

With the appropriate configuration of Dimetix sensors, numeric displays can be connected directly to the sensor without the need of any additional controller. This Application Note shows how to connect such a display and describes the required configuration steps with the help of two examples.

#### 3.1 Requirements

- D-Series sensor or others (please check the sensor manual for this display feature)
- Numeric digital display (Dimetix part no. 500512)
- Computer with an USB or RS-232 interface
- The free software "Laser Sensor Utility"

## 4 Wiring

Figure 1 shows the connection of the components, while in figure. 2 the wiring diagram can be found.

Use a shielded twisted pair cable with at least 4 poles to connect the display to the sensor. 24 VDC is used to power the display and the sensor. Take into account, that there is a significant voltage drop over the cable if the cable is long and the cross section is small.



Fig. 2: Wiring diagram



## **5** Sensor configuration

The easiest way for an application specific sensor configuration is to use our free "Laser Sensor Utility" software. The download is provided on our website <u>www.dimetix.com/products/software</u>.

For the configuration process, connect the sensor over USB or RS-232 interface to the PC. More details can also be found in the Technical Reference Manual of the sensor.

## 6 Simple application – Example 1

This is a simple application that directly shows the measured distance on the numeric digital display. No calculations (gain or offset) with the measured distance will be done before displaying it.

#### 6.1 User output protocol configuration

Unit and resolution of the displayed measurement result can be configured via the Laser Sensor Utility software. In this example the unit is configured to cm and the resolution to 1 mm. This results in one digit after the decimal point.

Do the following steps with the "Laser Sensor Utility" software:

Steps	Description
1	Connect the laser 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 ( <u>www.dimetix.com/UtilitySW</u> ).
2	Choose the "Configuration" tab and the "User output protocol" sub tab
3	Define the display value and resolution
4	Press the "Download to device" button to send and save the chosen configuration to the laser sensor

👯 Laser Sensor Utili	ty	Connec	ted with: D-Series			_ <b>D</b> X
<u>F</u> ile Tools Info						
Connection	Controlled Stand- Mode Mod	alone le Configuration			COM trace	DIMETIX
Measurement characteristics Filter	User output protocol sNu Display settings C Unit and resolution Unit		C Manual	point	-> dg <- g0dg+084+07 -> s0dac <- g0dac+00000007 -> s0mc <- g0mc+00000000 -> s0mc+1 <- g0mc?	
Analog output Digital output	Resolution Output display	1 mm 7 Number of dig	its total (decimal point and sign included)	surement	-> s0mc+0 <- g0mc? -> s0sv <- g0sv+00400118 -> s0sn	
SSI User output protocol	Gain and offset	output value	e=(measured distance+offset)* gain d	numerator lenominator	-> s0c <- g0? -> s0uc+117 <- g0uo? -> s0uga+1+10	
Device ID	▼]+  I Gain  ▼+  I Gain	Den	Gain 1 Offset + DOWNLOAD T	0 mm	<pre>&lt;- gOuga? -&gt; s0s &lt;- gOs? -&gt; s0uof+0 &lt;- gOuof? -&gt; s0s &lt;- gOs?</pre>	
Status: DOWNL	OAD OK			RESET	Clear tra	ce

Fig. 3: Display settings



### 6.2 Autostart with serial output configuration

The sensor must be configured to automatically start measuring after power on and to send the measurement results over the serial interfaces (RS232, RS422/485 and USB)

This works only if the interface board firmware version is V1.17 or higher. Contact us, if you need a firmware update (<u>service@dimetix.com</u>).

Steps	Description
5	Choose the "Stand-alone Mode" tab and then the "Auto start configuration" sub tab
6	Select "Autostart configuration sNA" $\rightarrow$ Select "ON" check box
7	Select "Activate output via serial interface" $\rightarrow$ Select check box
8	Click "Download to device"
9	Switch +24V off and on again

Laser Sensor Util le Tools Info	lity		Connected with: D-Series			-	- 🗆 X
Connection	Controlled Mode	Stand-alone Mode	Configuration			COM trace	DIMETIX
Auto start configuration Manual start configuration	Auto start conf ON Activate (Serial output Manual read ou REAL Measurements Distance: New value	iguration sNA — e output via serial i active after power of tt sNqSa DOUT	Sample time: 1 sec interface ycle) mpled read out sNq START STOP @ mm NO	0: as fast as possible DOWNLOAD Sample time: □ □ cm □ m	e TO DEVICE	-> s0c <- g0? -> s0um+2 <- g0um? -> s0A+00001000 <- g0A?	
Status: DOWNL	OAD OK				RESET	Clear trac	e

Fig. 4: Settings "Autostart with serial output"



## 7 Advanced application - Example 2

In this example an element of different length is to be cut off by a saw. The following shows how to use a laser sensor together with an external display to show the millimeter precise length of the piece before it get cut.

Since the length of the cut-off piece can not be measured directly, some calculation have to be carried out before the length can be displayed. The Dimetix laser sensor is able to do this calculations, hence no additional controller is necessary. This sample shows the necessary steps to configure the sensor.



#### 7.1 User output protocol configuration

This configures the displayed unit and the resolution. In this sample the value is displayed in cm with a resolution of 1 mm. Furthermore it configures the gain and offset for the application.

Do the following steps with the "Laser Sensor Utility" software:

Steps	Description
1	Connect the laser 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 ( <u>www.dimetix.com/UtilitySW</u> ).
2	Choose the "Configuration" tab and the "User output protocol" sub tab
3	Define the display value and resolution



7 Advanced application - Example 2

Connection	Controlled Stand-alon Mode Mode	e Configuration		COM trace	DIMET
leasurement haracteristics	User output protocol sNuo		]	-> s0mc+0 <- g0mc? -> s0sv	
Filter	<ul> <li>Unit and resolution</li> <li>Unit</li> </ul>	•	C Manual	<- g0sv+00400118 -> s0sn <- g0sn+70630134 -> s0c	
nalog output	Resolution 1	▼ mm		<- g0? -> s0DI1+00000003	
)igital output	Output display 🕂	7 Number of dig	its total (decimal point and sign included)	<- g0DI1? -> s0s <- g0s? -> s0c	
SSI		3.	Get measurement	<- g0? -> s0uo+117	
User output protocol	Gain and offset	output value	e =(measured distance + offset)* gain numerator gain denominator	<pre>&gt; s0uga-1+100 &lt;- g0uga? -&gt; s0s &lt;- g0a2</pre>	
Device ID	▼+ 10 GainDen		Gain -0.1 Offset - 3500 mm	<- g03? -> s0uof-35000 <- g0uof?	
			DOWNLOAD TO DEVICE	-> s0s <- g0s? -> s0a	

Fig. 6: Autostart with serial output

Steps	Description
4	Activate the gain and offset check field
5	Configure the offset and gain for the application
6	Press the "Download to device" button to send and save the chosen configuration to the laser sensor

#### 7.2 Autostart configuration

The configuration steps are the same as in the first example and are described chapter 6.2 Autostart with serial output configuration.