

# **DIMETIX**

LASER DISTANCE SENSORS



## **Technical training**

 SWISS PRECISION

9100 Herisau/Switzerland • [www.dimetix.com](http://www.dimetix.com)

# Product comparison

## EDS-C

the simple and economic solution



Measuring range: **0 ... 30 m**  
Accuracy: **± 3 mm**

### Specification

Repeatability: ± 1.5 mm  
Measuring rate: up to 3 Hz  
Operating temperature: -10 °C ... + 50 °C  
Interfaces: 0/4 ... 20 mA

## DLS-C

precise measuring in extreme situations



Measuring range: **0 ... 150 m**  
Accuracy: **± 1.5 mm**

### Specification

Repeatability: ± 0.4 mm  
Measuring rate: up to 6 Hz  
Operating temperature: -40 °C ... + 50 °C  
Interfaces: RS232 / RS422  
0/4 ... 20 mA  
2 Digital outputs

## FLS-C

fast measurements and unique accuracy



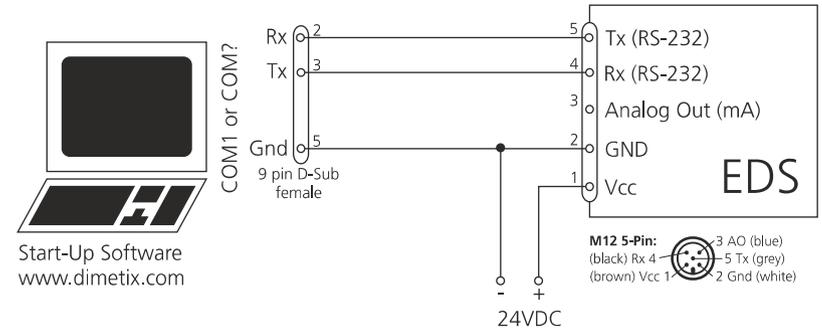
Measuring range: **0 ... 500 m**  
Accuracy: **± 1 mm**

### Specification

Repeatability: ± 0.3 mm  
Measuring rate: up to 250 Hz  
Operating temperature: -40 °C ... + 50 °C  
Interfaces: RS232 / RS422 / SSI  
0/4 ... 20 mA  
2 Digital outputs



# EDS



**EDS Startup**

File Info

Analog Output

Minimum current level 's0vm'  0 mA  4 mA

Current level in error case 's0ve'

Keep last value  Replace value with  mA

Distance corresponding to minimum current level (0 mA or 4 mA) 's0v'  mm

Distance corresponding to maximum current level (20 mA) 's0v'  mm

Sample Time (Set 0 to sample as fast as possible)  sec

Load from Device Set to default **DOWNLOAD TO DEVICE**

Device Info

Interface Software Version 's0sv'  Module Software Version 's0sv'

Serial Number 's0sn'

Get error stack

Clear error stack

#1: lastest error, #15: oldest error

#	Code	Description
1	234	Distance out of range.
2	256	Received signal from target too strong.
3	234	Distance out of range.
4	200	Info: Device Startup.

COM port:

Show COM Trace V1.1.0

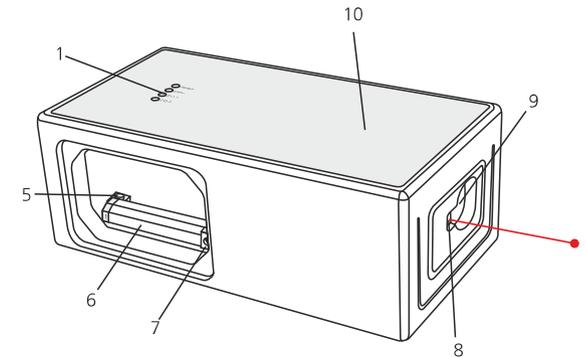
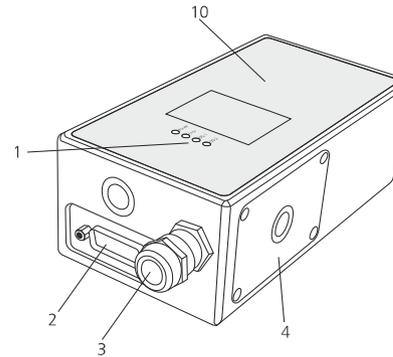
```
Open COM port 1 @ 19200Baud, 7 bit:
s0c
g0?
s0vm+1
g0vm?
s0ve+20
g0ve?
s0v+0+100000
g0v?
s0A+0
g0A?
Close COM port.
Open COM port 1 @ 19200Baud, 7 bit:
s0c
g0?
s0ze
g0ze+234+256+234+200
s0A+0
g0A?
Close COM port.
```

Status: .Getting error stack was successful

Clear Trace



# DLS-C / FLS-C



- |  |  |
|--|--|
| <p><b>1</b> <b>Status LEDs</b><br/>status signaling</p> <p><b>2</b> <b>15-Pin D-Sub connector</b><br/>RS-422, RS-232, SSI , analog,<br/>digital output</p> <p><b>3</b> <b>Cable gland (M16 x 1.5mm)</b><br/>for connection cable insertion</p> <p><b>4</b> <b>Cover</b><br/>provides access to the<br/>screw terminal</p> <p><b>5</b> <b>Reset switch</b><br/>resets the DLS-C(H)/FLS-C(H)<br/>to default settings</p> | <p><b>6</b> <b>Screw terminal</b><br/>RS-422, RS-232, SSI, analog,<br/>digital output</p> <p><b>7</b> <b>ID switch</b><br/>defines the <b>Device ID</b> for<br/>RS-422 operation</p> <p><b>8</b> <b>Laser beam outlet</b></p> <p><b>9</b> <b>Receiver optics</b></p> <p><b>10</b> <b>Product label</b></p> |
|--|--|



# Applications



Distance monitoring



Height measurement



Level measuring



Diameter gauging



Feed measuring



Steel industry



Collision prevention



Length measurement



Crane positioning



Storage technology



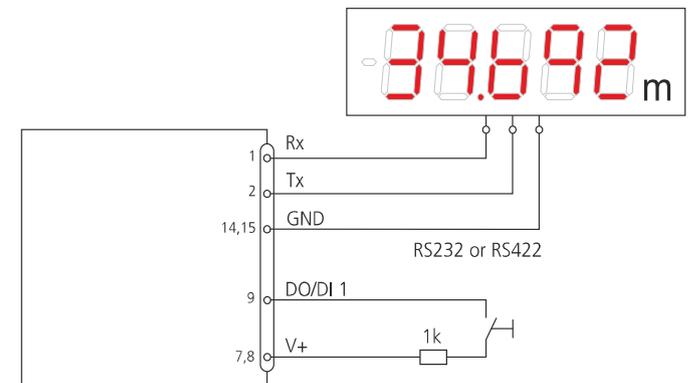
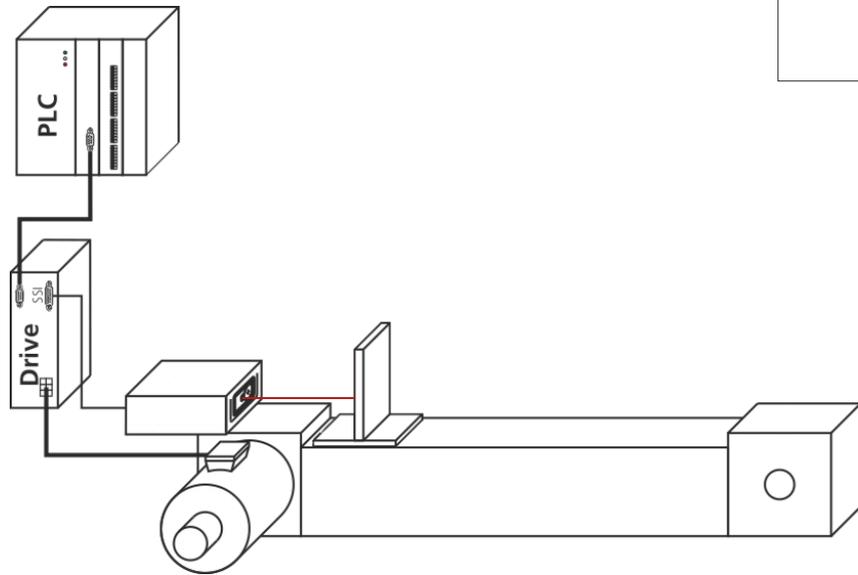
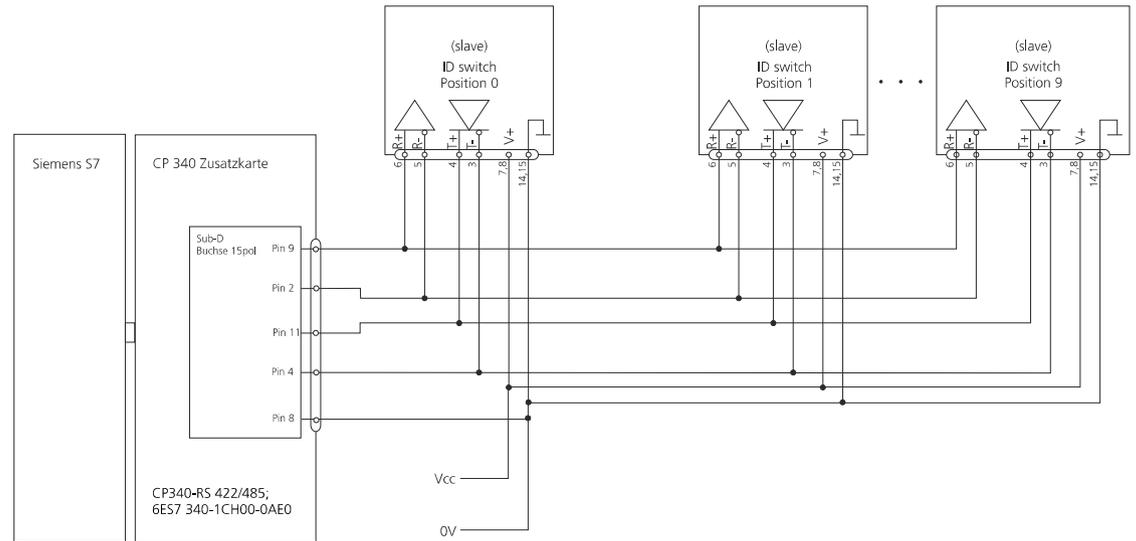
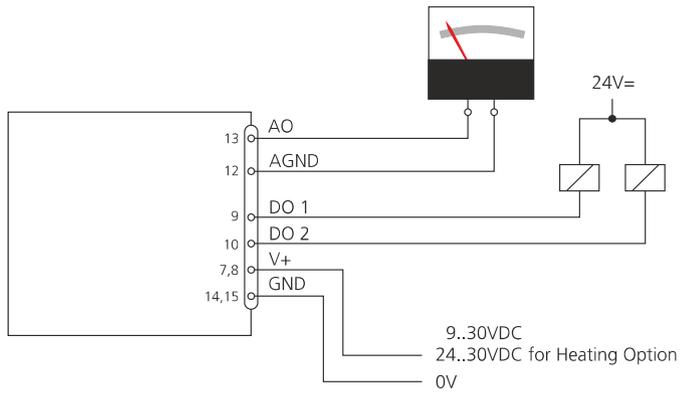
Elevator positioning



Surveying applications



# System integration examples



# Technical training

## measurement performance



# Measurement performance

## Influence factors

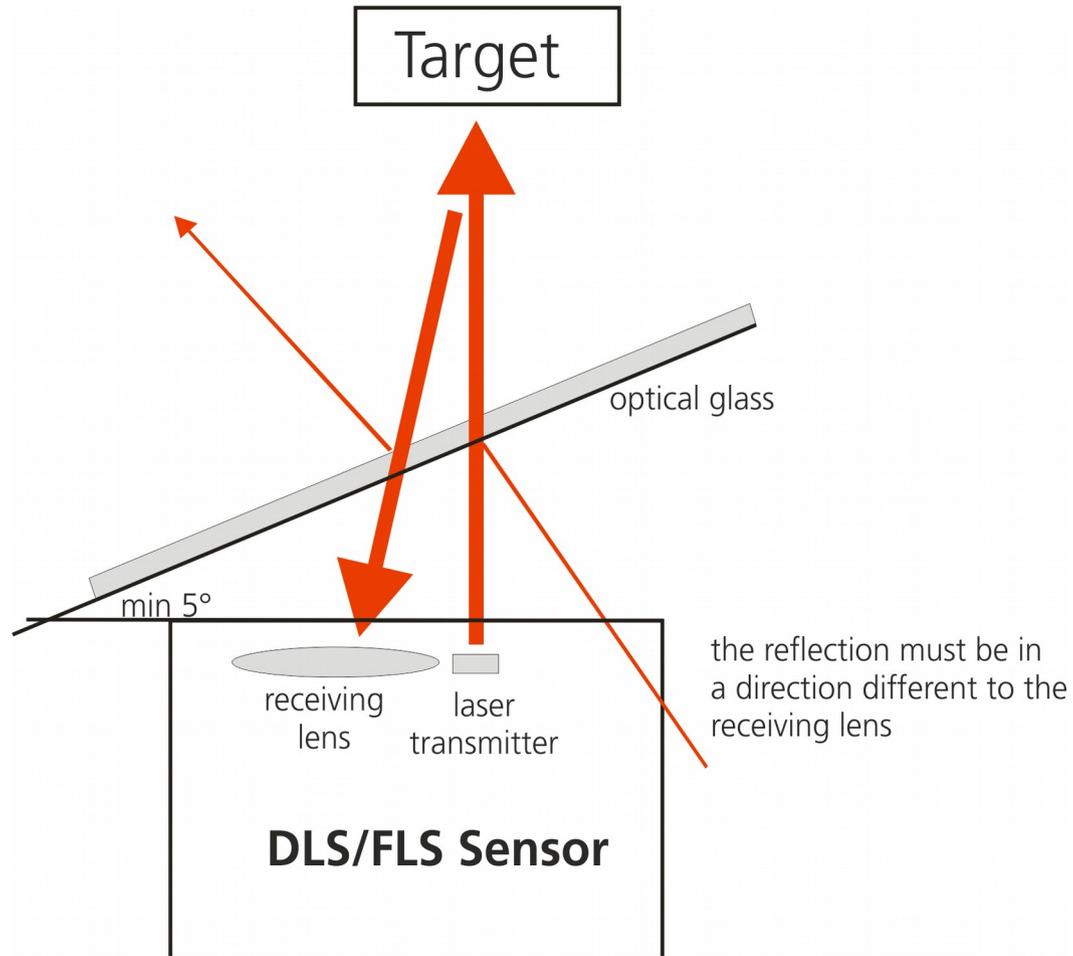
Key	Factors increasing range / speed	Factors reducing range / speed
Target surface	Bright and reflective surface such as the target plates (See accessories)	Matt and dark surfaces
Aiborne particles	Clean air	Dust, fog, heavy rainfall, heavy snowfall
Sunshine	Darkness	Bright sunshine on the target

## Critical measurement situations

- Rough surfaces
- Transparent surfaces
- Wet, smooth or high gloss surfaces
- Inclined, round surfaces
- Multiple reflections



# Measuring through glass



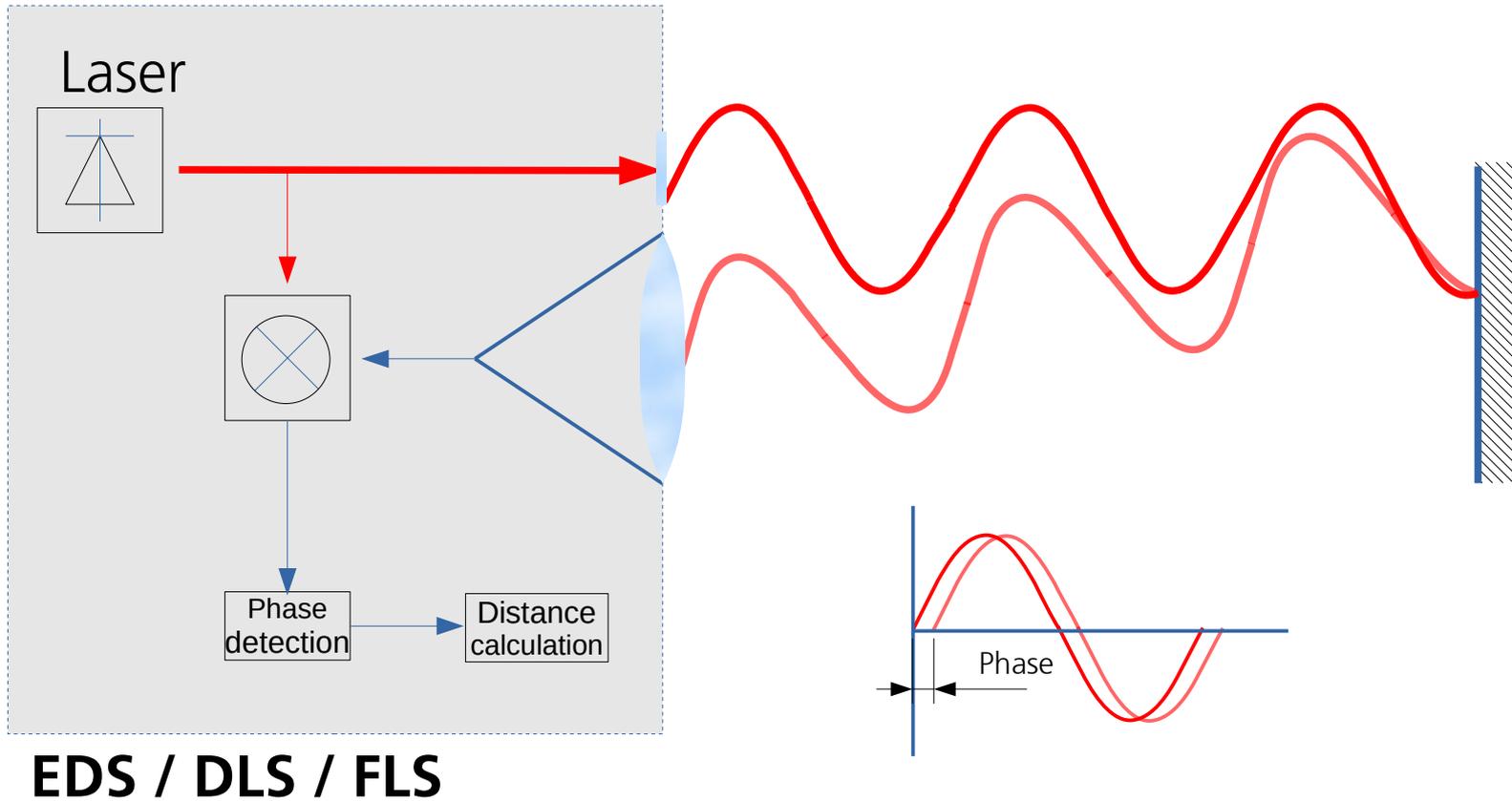
# Technical training

## measuring core

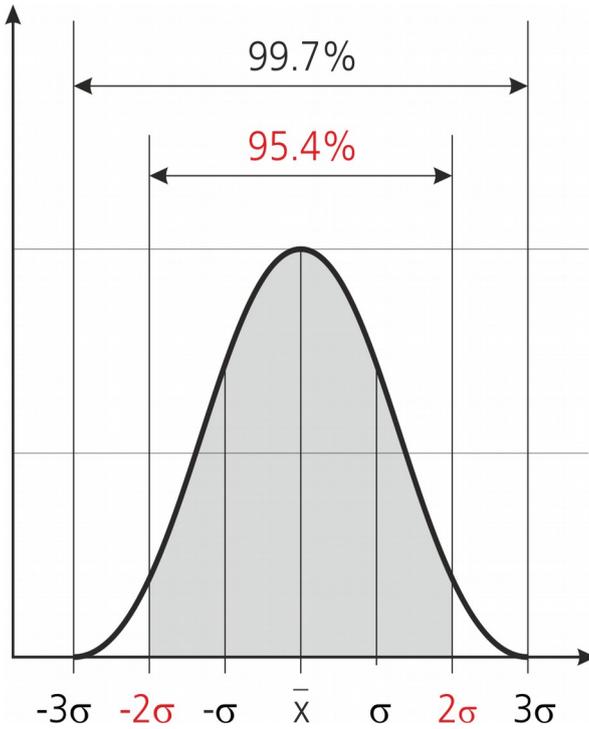


# Measurement principle

## Phase shift measurement



# Accuracy



## The typical accuracy at $2\sigma$ :

$\pm 1$  mm for the FLS-C(H) 10

$\pm 1.5$  mm for the DLS-C(H) 15

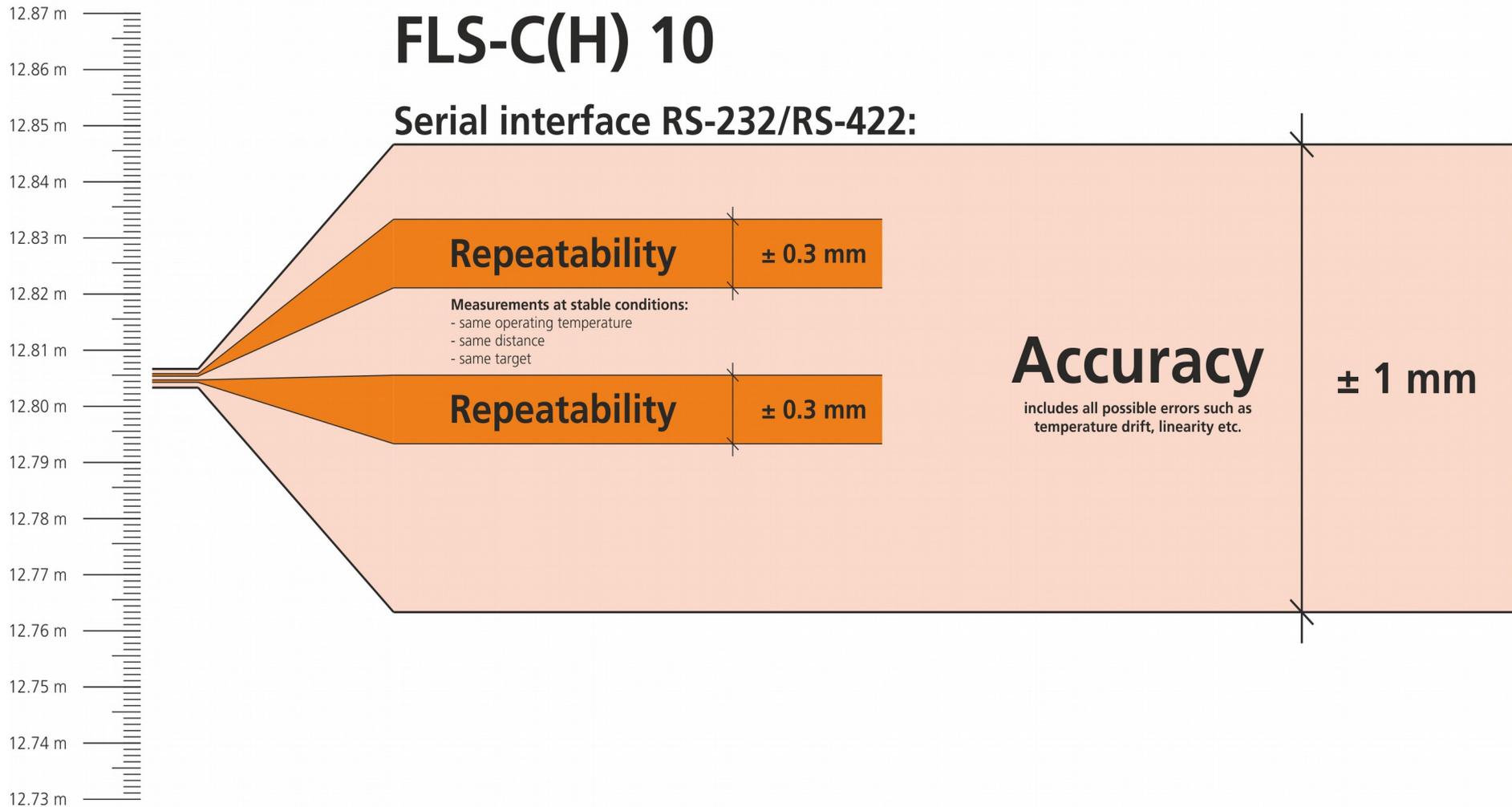
$\pm 3.0$  mm for the DLS-C(H) 30 / FLS-C(H) 30



The specified errors always contains all possible errors such as temperature drift, linearity etc. Furthermore, they're independent of the type of target, it's color and the measuring distance.



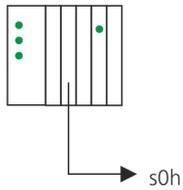
# Accuracy / Repeatability



# Operation modes

## How to start measuring

### controlled mode



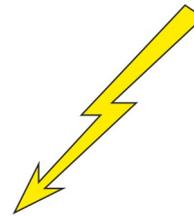
use serial interface to control the device

commands

sNg                    sNug  
sNh                    sNuh  
sNf (sNg)          sNuf (sNuq)

### Stand-alone mode

#### Auto start



Start measuring after power on

commands

sNA                    sNuA

#### Manual start



Start measuring depending on signal at digital input

commands

sNDI1



# Measuring characteristics

Measuring characteristic	Measuring rate	Typical accuracy @ 2σ		Description	Available in DLS-C(H)					
		FLS-C(H) 10	FLS-C(H) 30		Available in FLS-C(H)	Error behavior	User Command	Normal Commands		
<b>Normal</b> (factory setting)	max. 10 Hz	±1 mm	±3 mm	Measuring range on natural surface: typical 65 m Configuration command: sNuc+0+0	✓	✓	A	✓	✓	
<b>Fast</b>	max. 20 Hz	±2 mm	±6 mm	Increased measuring rate up to 20 Hz. Configuration command: sNuc+0+1	✓	✓	A	✓	✗	
<b>Precise</b>	max. 6 Hz	~±0.8 mm	~±2.4 mm	Increased accuracy of ±0.8 mm Surveying applications, short range applications etc. Configuration command: sNuc+0+2	✓	✓	A	✓	✗	
<b>Natural surface</b>	max. 6Hz, can drop to 0.25Hz @ up to approx. 80m	~±5 mm @ up to approx. 80m	~±15 mm @ up to approx. 80m	Increased measuring range on natural surfaces: typical 80 meters Measuring against far away natural surfaces or bad reflective surfaces such as black synthetic granules, etc. Configuration command: sNuc+0+3	✓	✓	A	✓	✓	
<b>Timed</b>	user programmed	variable	variable	The device does not check the signal condition to ensure the specified accuracy is reached, a measurement value is transferred to the output at a defined measuring rate. This mode serves for applications where the accuracy is not important but the reaction time is critical Configuration command: sNuc+1+1	✗	✓	A	✓	✓	
<b>Moving Target</b>	250Hz fix, SSI can poll with up to 200Hz	±1 mm	±3 mm	The device measures to a continuously moving target and the distance changes without any jumps. This measurement characteristic supervises the max speed, checks for distance jumps and includes a special filter to eliminate errors occurring for only a very short time. Configuration command: sNuc+2+0 <sup>4)</sup> (with error freezing) sNuc+2+1 <sup>4)</sup> (without error freezing)	✓	✓	B	✓	✗	



# DLS-C / FLS-C Output update

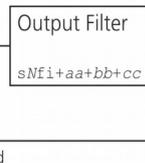
## Normal, Fast, Precise, Natural surface

Measuring type	Measuring commands		output type
	standard	special user	
single	sNg	sNug	→
tracking	sNh	sNuh	
	sNf (sNq)	sNuf (sNuq)	↻
	sNA	sNuA	

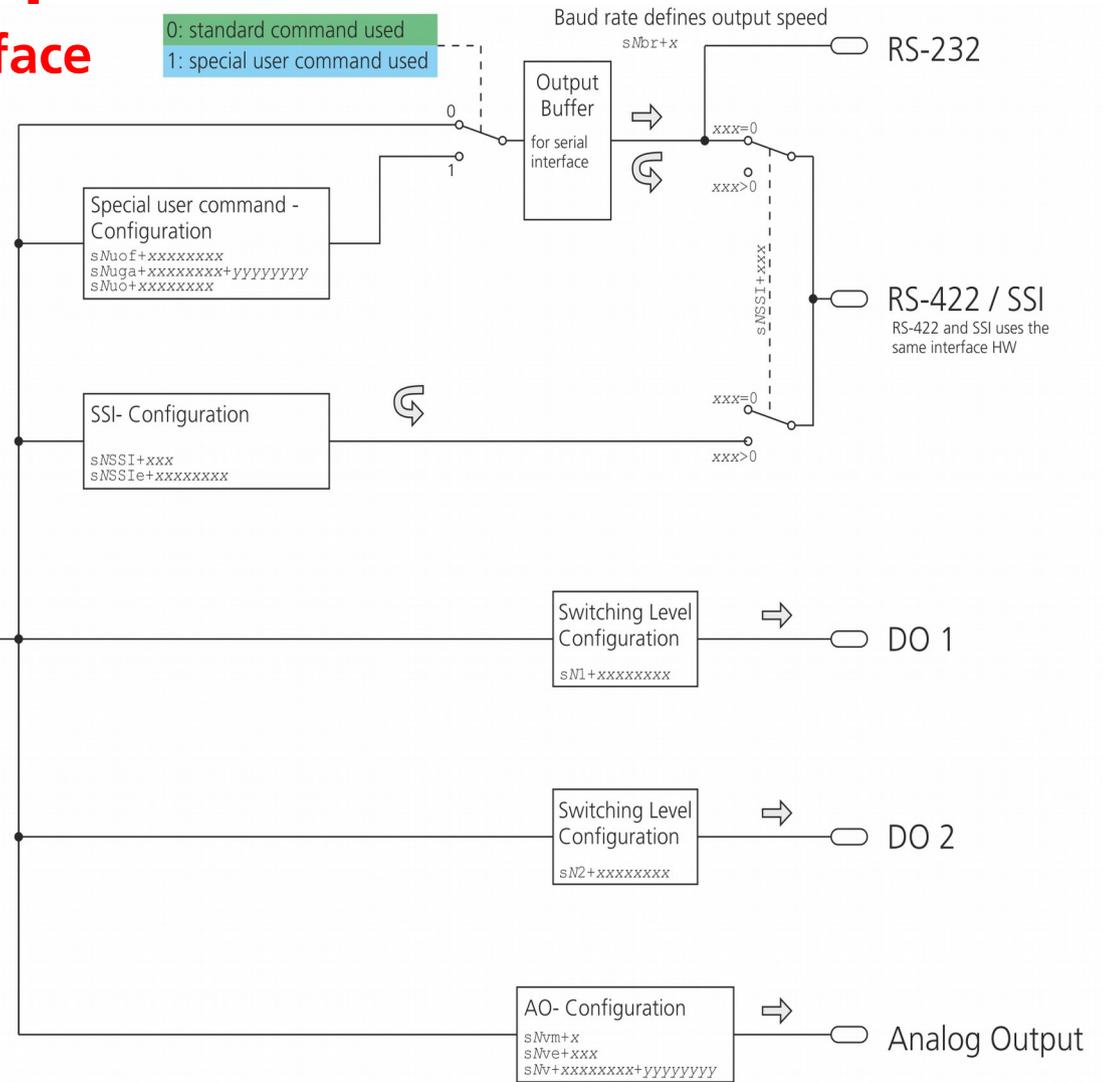
Measuring machine	
Measuring characteristic	
Normal	sNuc+0+0
Fast	sNuc+0+1
Precise	sNuc+0+2
Natural surface	sNuc+0+3
Measuring type	
single	tracking

max measuring rate depend on signal condition

Normal	~10 Hz
Fast	~20 Hz
Precise	~6 Hz
Natural surface	~10 Hz



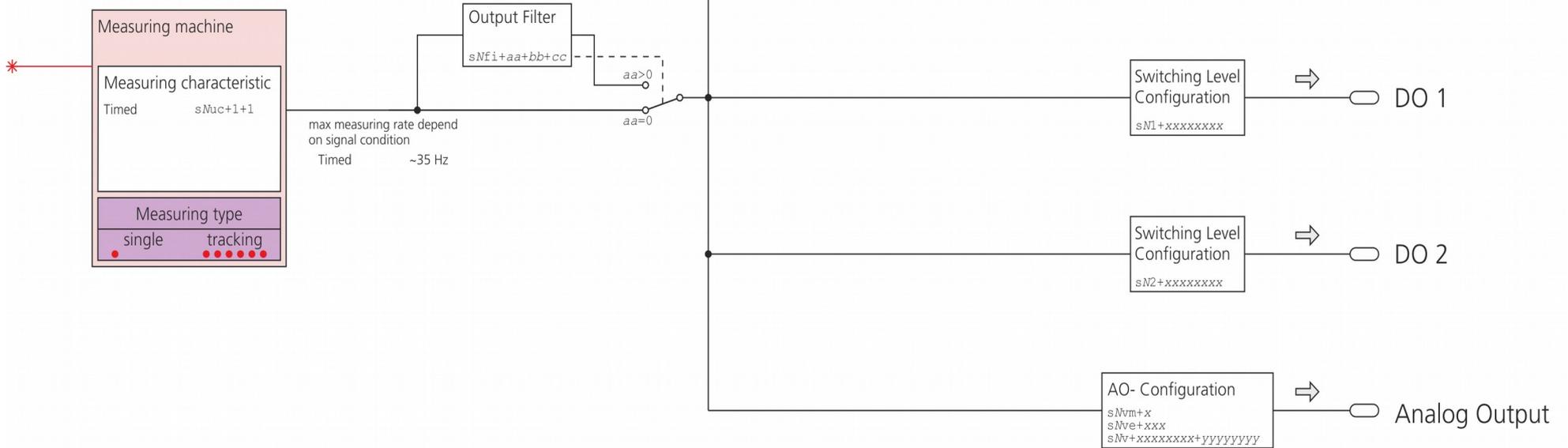
0: standard command used  
1: special user command used



# DLS-C / FLS-C Output update

## Timed characteristic

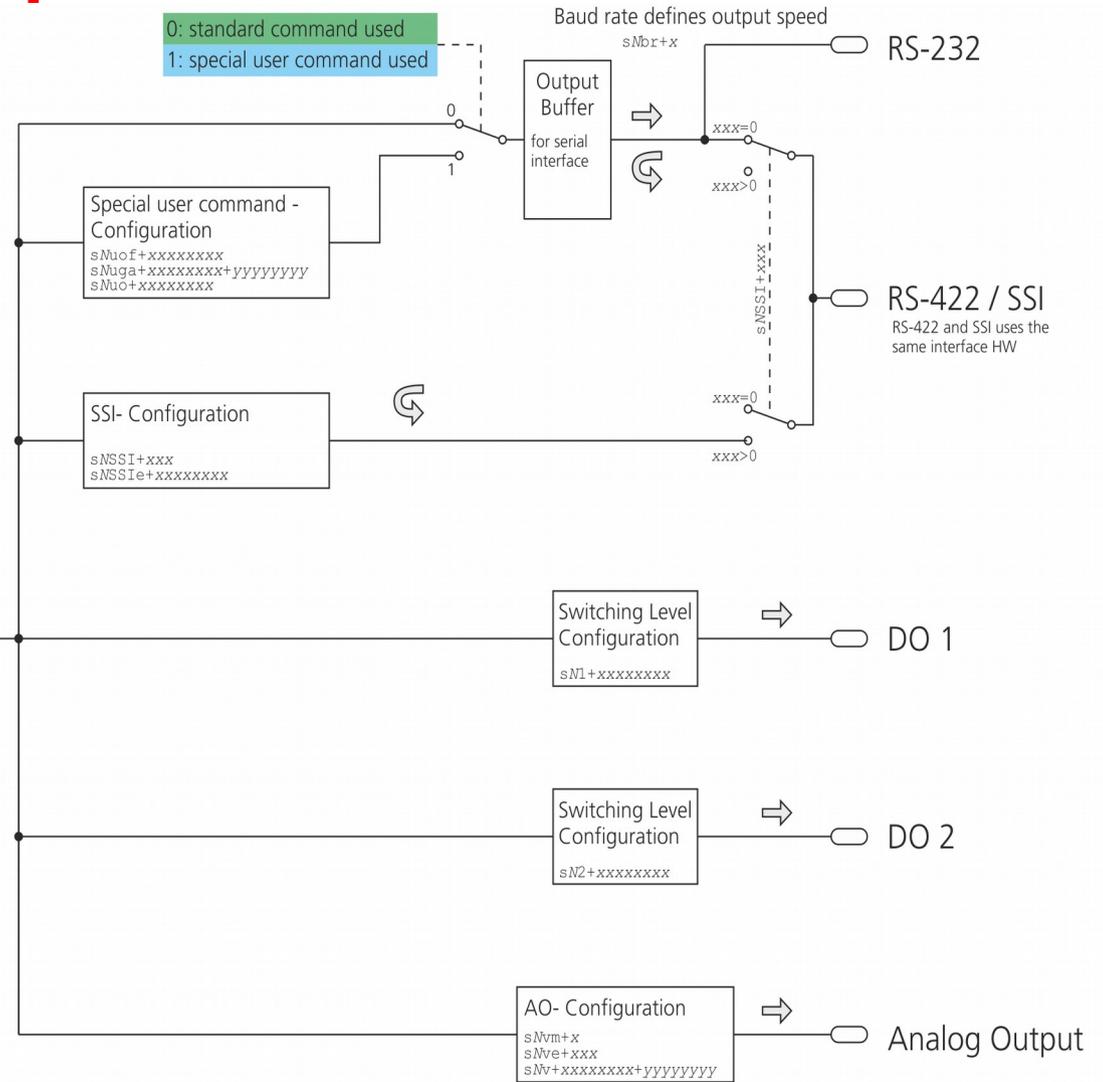
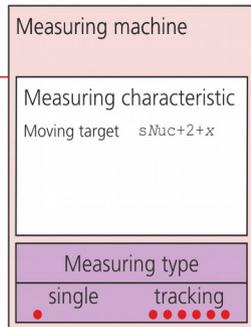
Measuring type	Measuring commands		output type
	standard	special user	
single	sNg	sNug	→
tracking	sNh	sNuh	
	sNf (sNq)	sNuf (sNuq)	↻
	sNA	sNuA	



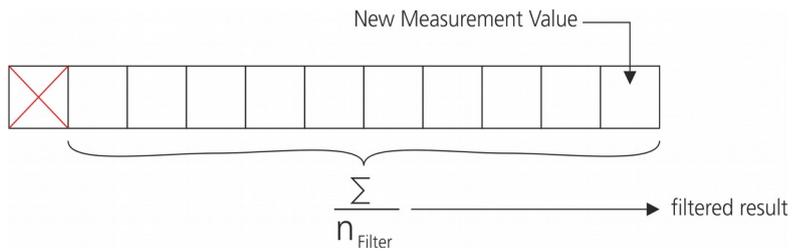
# DLS-C / FLS-C Output update

## Moving target characteristic

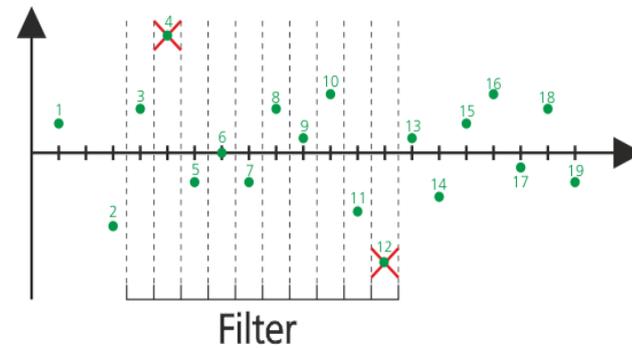
Measuring type	Measuring commands		output type
	standard	special user	
single	sNg	sNug	→
tracking	sNh	sNuh	
	sNf (sNq)	sNuf (sNuq)	↻
	sNA	sNuA	



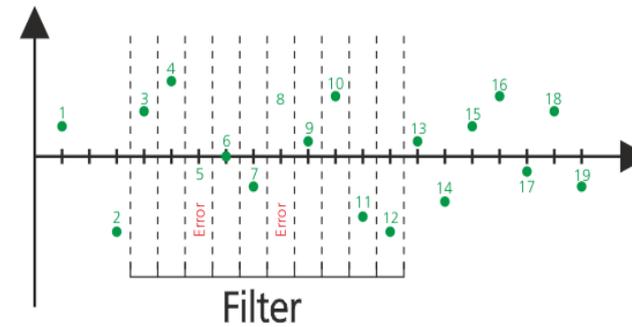
# Output value filter



## Spike suppression



## Error suppression

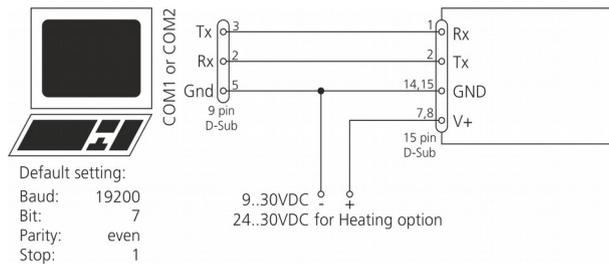


# Technical training interfaces

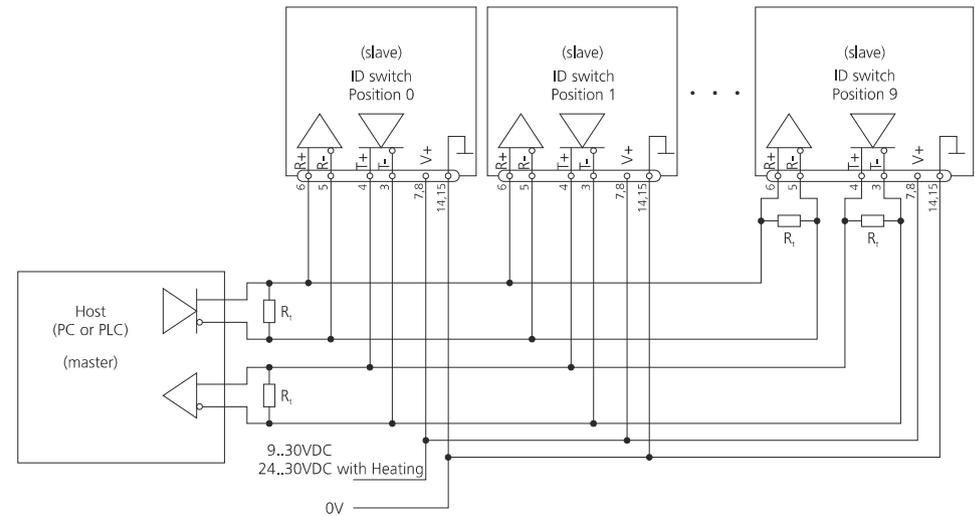


# Serial interfaces

## RS-232



## RS-422



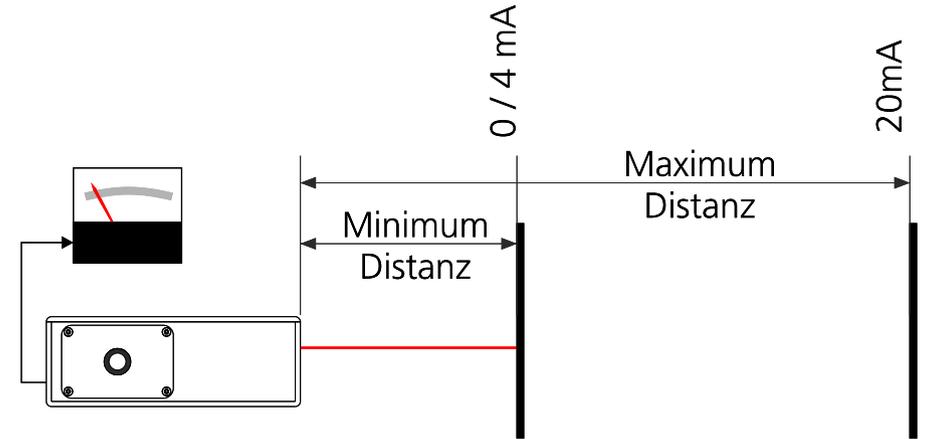
- Device configuration
- Office only

- Industrial environment
- Use twisted pair, shielded

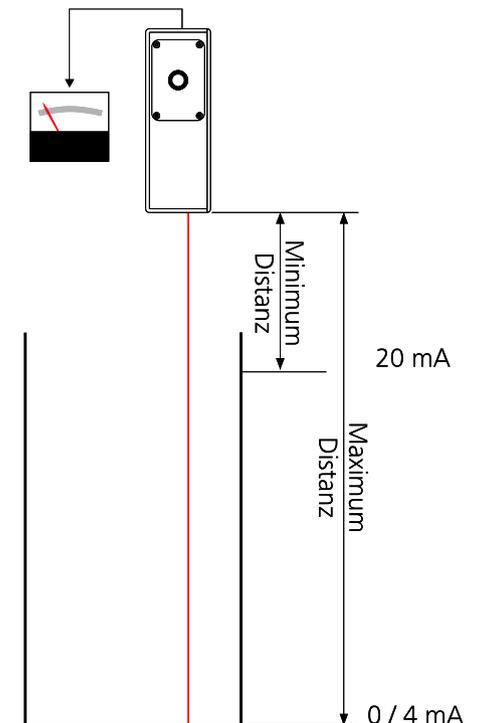


## Analog output

- Stand-Alone operation
- Configurable range
- Error replacement value
- High precision (0.1%)

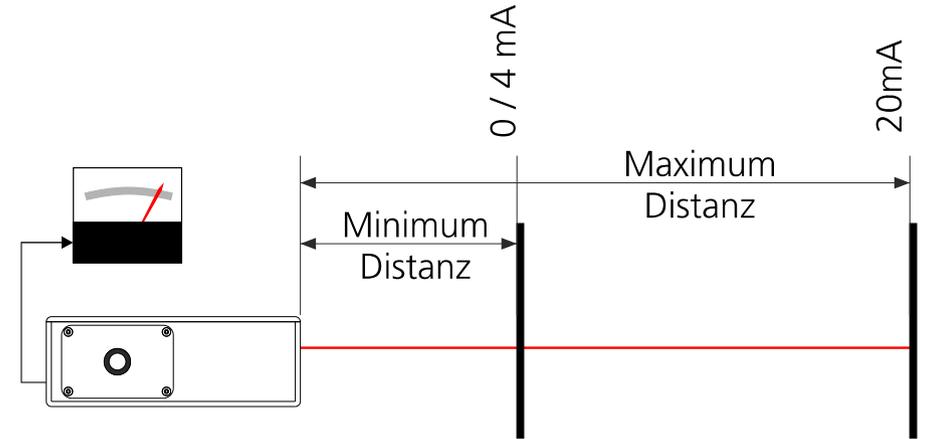


- The accuracy depends on the configuration
- RS-232, RS-422 or SSI are always more accurate

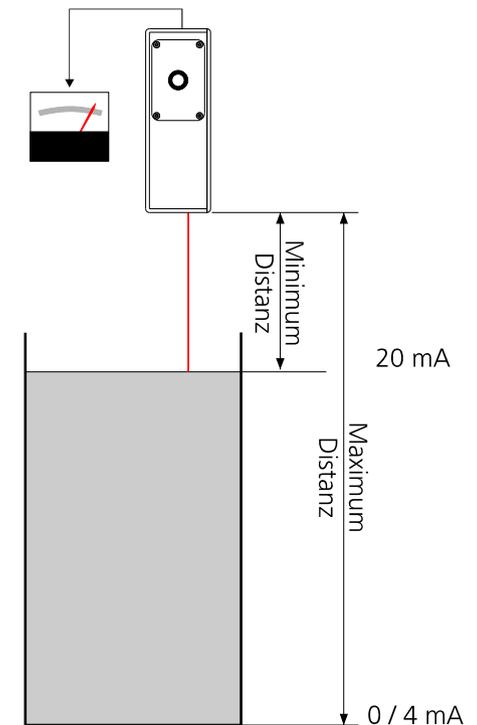


## Analog output

- Stand-Alone operation
- Configurable range
- Error replacement value
- High precision (0.1 %)

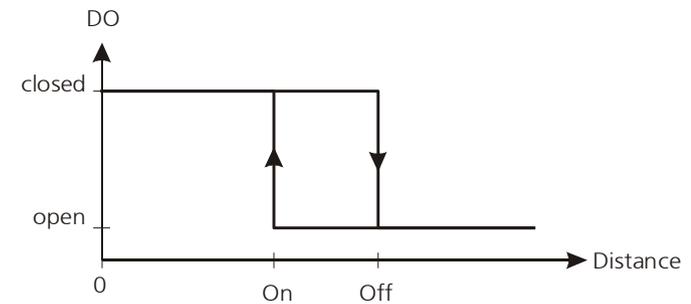
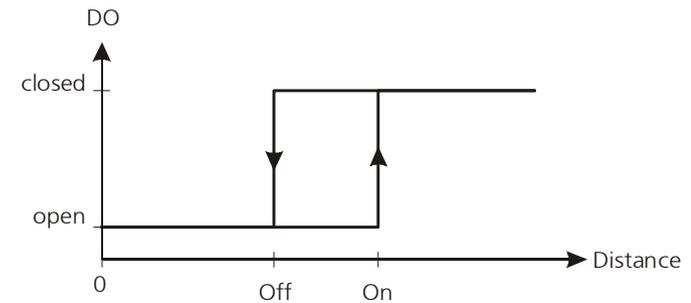
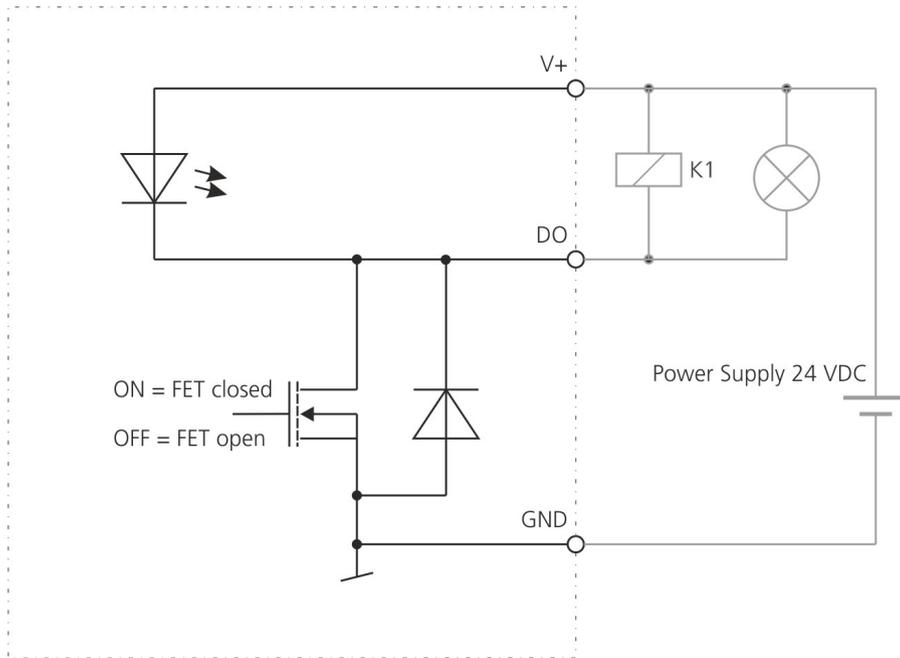


- The accuracy depends on the configuration
- RS-232, RS-422 or SSI are always more accurate

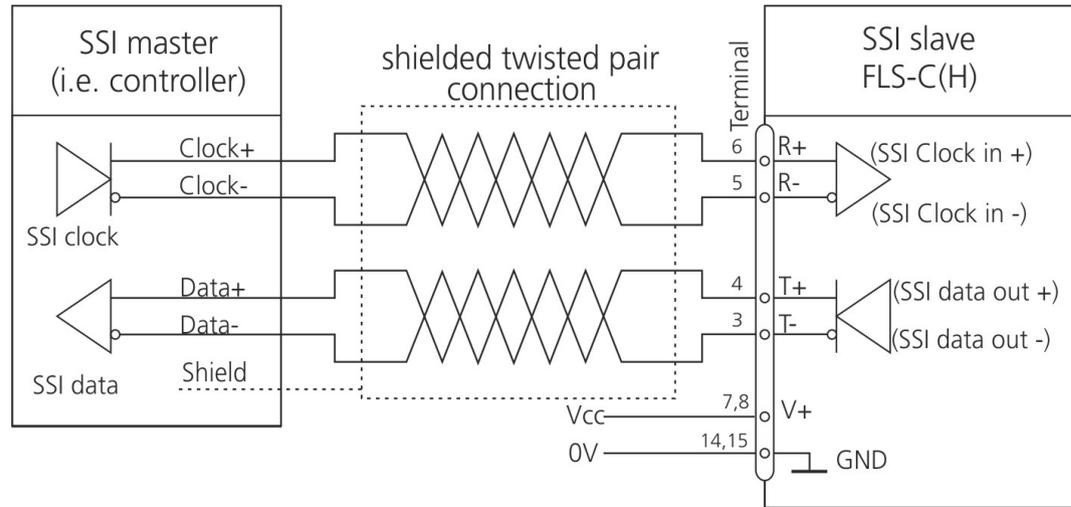


# Digital outputs

- 2 configurable outputs
- 1 error output
- DO1 also usable as input



# SSI interface



- SSI slave
- Not usable simultaneous with RS-422
- Configurable output in case of an error
- SSI only on FLS-C(H)

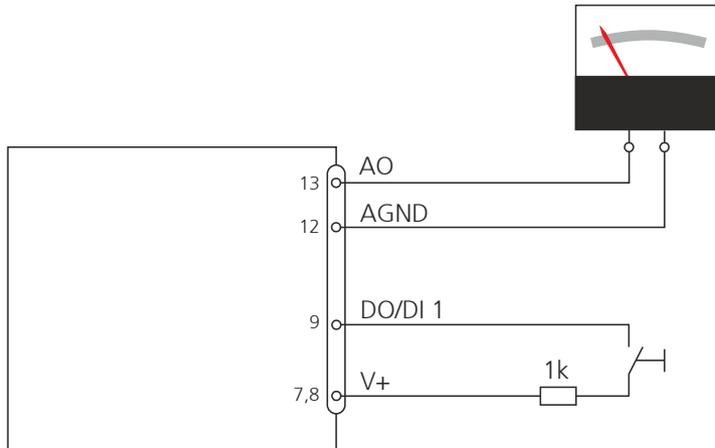


# Technical training application notes



# External trigger

The DLS/FLS includes the option of triggering measurements with an external switch or push button on Digital Input 1 (DI 1). Using the Digital input DI 1 disables the Digital Output DO 1



## 8.4.1 Configure digital input (sNDI1)

The digital output 1 of the DLS-C can also be used as digital input. Its state can be read or trigger a configurable action. Use the following command to configure the behavior of the digital input.



**On active digital input, the digital output function of DO1 is deactivated**

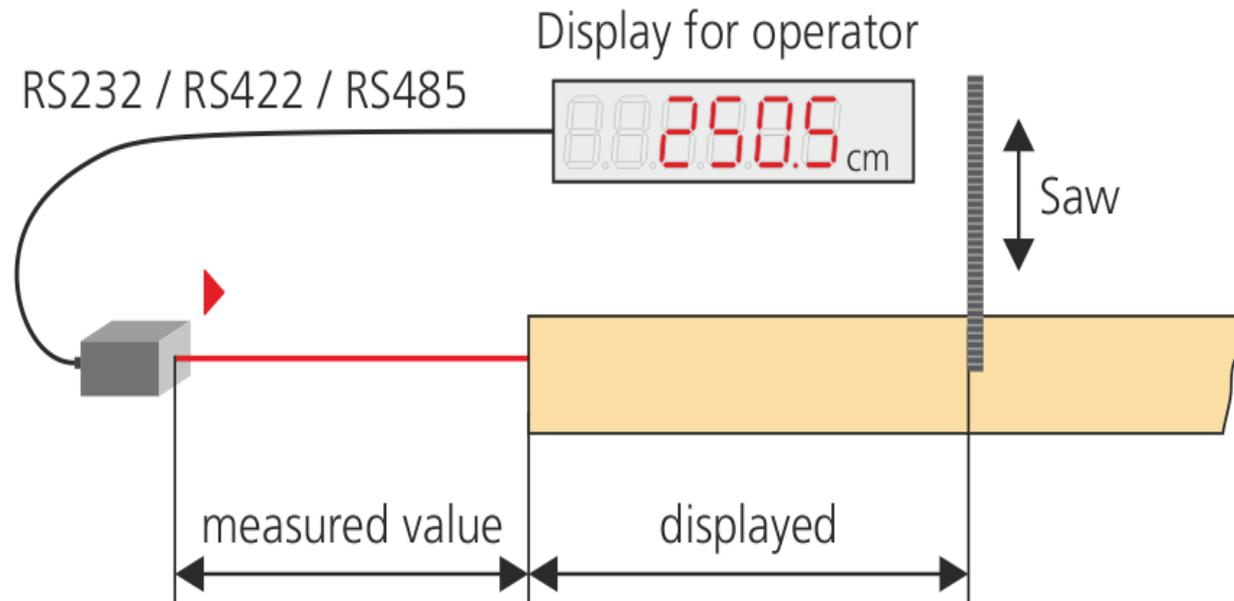
	Set Command	Get Command
Command	sNDI1+xxxxxxx<trm>	sNDI1<trm>
Return successful	gNDI1?<trm>	sNDI1+xxxxxxx<trm>
Return Error	gN%Ezzz<trm>	gN%Ezzz<trm>
Parameters	N Module number (0..9) xxxxxxxx 0: Digital input inactive (DO1 active) 1: activate the digital input to read out its state with the command 8.4.2 Read digital input (sNRl). 2: Trigger Distance measurement (sNg) 3: Start/Stop Single sensor Tracking (sNh) 4: Start/Stop Tracking with buffering (sNf) zzz Error code	

Detailed information for this mode can be found in the manual.



# External display

If display mode is enabled, the DLS-C(H) formats the measured distance as ASCII string. It will be issued automatically on the serial interface and might be displayed on an external display.

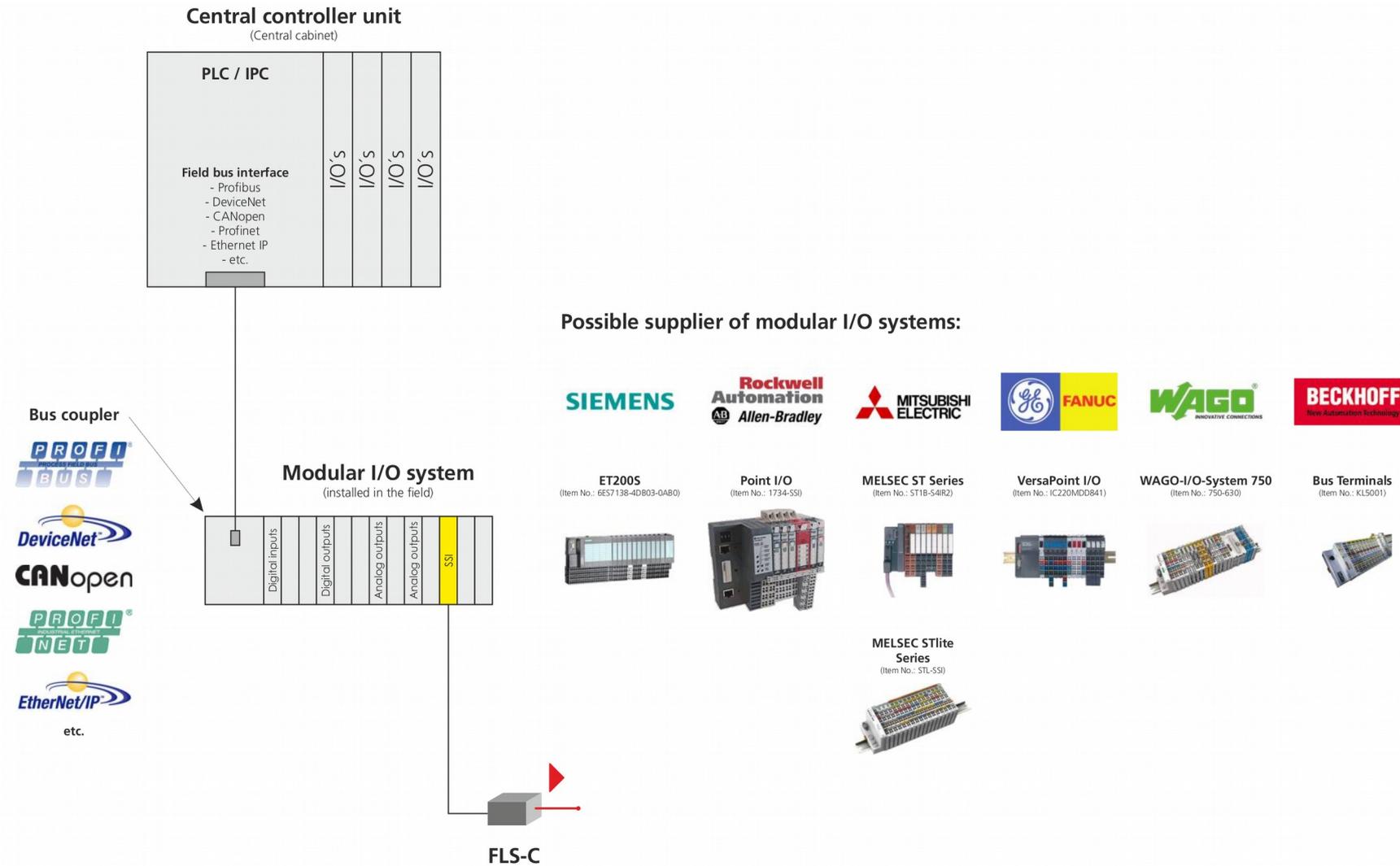


For detailed description see

- Application note 'AN1003\_External display\_Applicationnote\_EN\_V02.pdf'
- Manual 'AN1003\_External display\_Manual\_EN\_V03.pdf'



# FLS-C system integration via SSI



# Service procedure



# Service and repair procedure

For our repair service the following procedure has to be observed.

1. Execute a **reset** as described in the manual of the device.
2. If the problem still persist, fill in the **RMA request form** and send the form to Dimetix.
3. Dimetix will inform you how to proceed.
4. In case Dimetix instructs you to send the unit back, Dimetix will carry out a function test of the device.
5. Dimetix will send you a corresponding quote for a repair/exchange of the unit.

Transport costs for the shipment of defective measuring devices have to be paid by the customer. Please record our RMA-number on your shipping documents in order to ensure a clear identification of your unit.

Guarantee starts with the date of invoice and will last for one (1) year.

## RMA Request Form

RMA No.: \_\_\_\_\_

### Before returning the sensors, check the following:

- execute a reset with the device (as described in the manual and in the Utility Software)
- check power supply
- check / change RS-232 cable or use a different PC / COM-Port
- clean outer side of lenses (small and big glass)
- call DIMETIX to sort out simple problems by telephone: +41 71 353 00 00

### For each returning sensor fill out one form:

<b>Contact information:</b>			
Company name:		Phone no.:	
Contact person:		e-mail:	
Reference no.:		Shipping date:	
More notes:			

<b>Sensor identification:</b>	
Product name:	Serial no.:

<b>Detailed fault- / problem description:</b>

<b>Conditions when the problem occurred:</b>				
Used interface type:	<input type="checkbox"/> RS-232	<input type="checkbox"/> RS-422	<input type="checkbox"/> analog output	<input type="checkbox"/> digital outputs
	<input type="checkbox"/> SSI	<input type="checkbox"/> Profibus	<input type="checkbox"/> _____	
Mode of operation:	<input type="checkbox"/> single measurement	<input type="checkbox"/> tracking mode	<input type="checkbox"/> automatic mode	
Tracking speed:	<input type="checkbox"/> fast tracking	<input type="checkbox"/> ca. _____ measurements/minute; _____ hours a day		
Frequency of fault:	<input type="checkbox"/> always	<input type="checkbox"/> sometimes if _____		
Operation condition:	<input type="checkbox"/> operation temperature from _____ °C to _____ °C			
Important infos:	<input type="checkbox"/> _____			

<b>Application of the sensor:</b>

