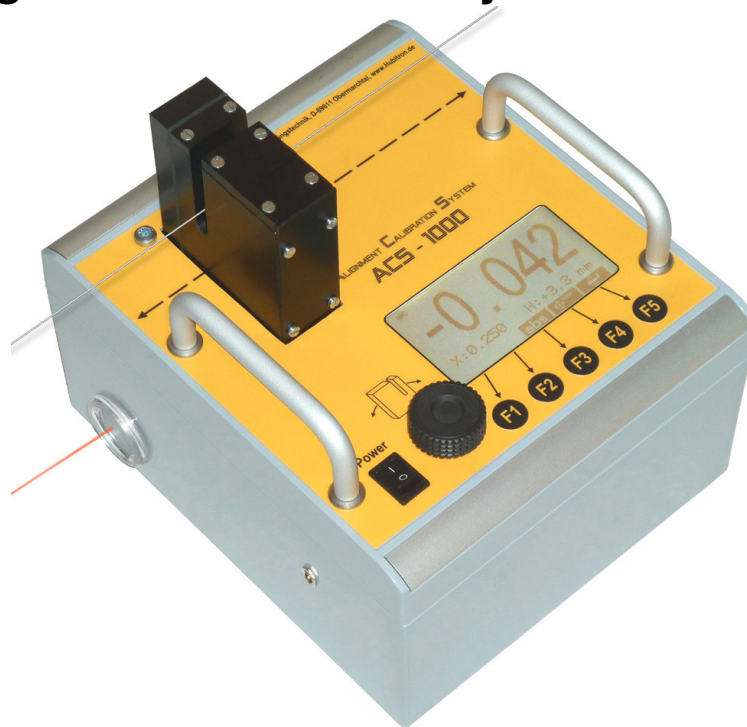


# Operating Manual

## Alignment Calibration System ACS-1000



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# 1. Description

The Alignment Calibration System ACS 1000 is used to measure, data logging and calibrate the alignment between machine table and machine stand through a wire. With the opto electronic sensor the deviation of the wire can be measured and analysed without contact. The integrated distance measuring system allows a compensation of the length, therefore, an exact adjustment of the wire is not required. The height deviation can be calculated additionally with the remote control and the software.

# 2. Technical Data

Dimensions (LxWxH) ..... appr. 240x280x210  
 Weight.....appr. 7400g  
 Power supply ..... 12V lead accu  
 Display ..... LCD, 240 x 128  
 Operating elements .....5 foil keys  
 ..... 1 knurled screw  
 Laser .....class 2, 650nm, < 1mW  
 Running time ..... > 15 Std  
 Measuring range deviation..... ± 3 mm  
 Measuring accuracy deviation..... ± 3 µm  
 Measuring range length .....min. 30 m  
 Measuring accuracy length ..... ± 3 mm  
 Measuring range height ..... ± 5 mm  
 Measuring accuracy height .....± 0,01 mm  
 Radio connection 4 channels, SRD868MHz, <10mW

# 3. Scope of delivery

- 1 Alignment Calibration System ACS-1000 with mounting plate
- 1 Charging unit ACS-1000
- 1 Transport case ACS-1000
- 1 Protector cap for sensor red
- 1 Light protector cap black
- 1 Inbus key SW4

# 4. Optional equipment

## 4.1 Remote control ACS-1000 RC



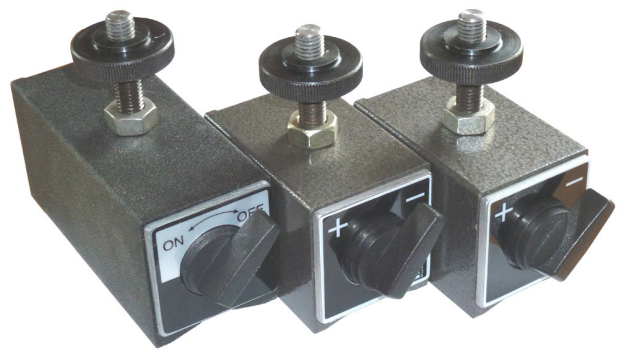
With the remote control ACS-1000 RC all relevant functions can be used within a range of 50 m. In addition a connection to a PC through USB serial interface is possible. With the provided software the measuring data can be logged and a measuring chart is generated.

## 4.2 Clamping set ACS-1000



The clamping set contains 4 levelling feet and a tension belt. With the levelling feet it is possible to mount the Alignment Calibration System on an uneven or rounded surface.

## 4.3 Magnet set ACS-1000



The magnet set contains 3 shiftable magnets with mounting material. A quick mounting of the Alignment Calibration System on an even and magnetic surface is possible.

**ATTENTION: Keep away from storage devices!**

# 5. Environmental conditions

## 5.1 Kind of conditions

The Alignment Calibration System is exclusively constructed for operation in closed working areas and must **not be exposed to direct solar radiation**. Protection class IP44.

## 5.2 Tolerance range

Operating temperature: +5° bis +45 °C  
 Storage temperature: -20° bis +70 °C  
 Max. humidity: 90%, no condensation  
 Temperature deviation during measurement: < 5 °C

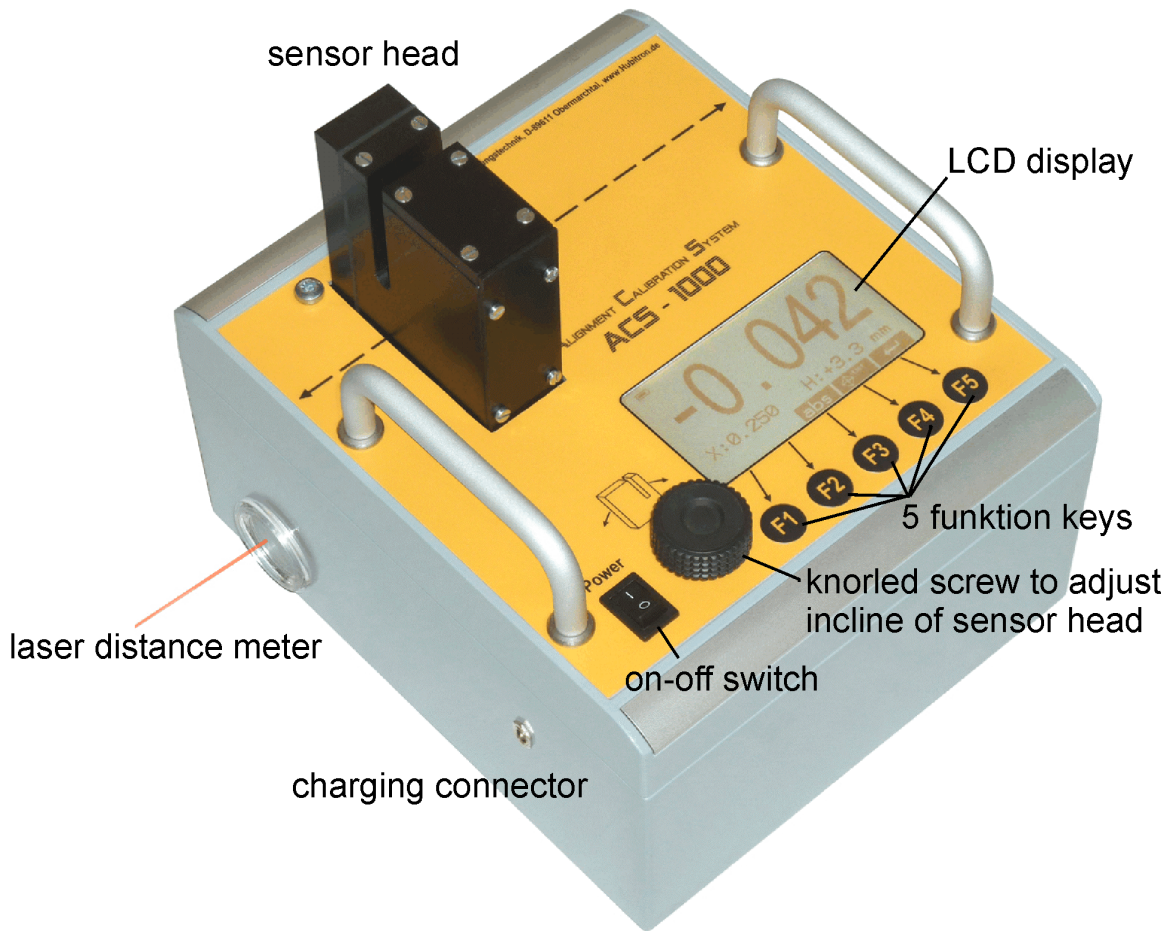
# 6. Safety instruction

**ATTENTION**

	<b>Laser radiation</b> <b>Do not look directly into the laser beam</b>
	650nm / Power < 1mW <b>CLASS 2 LASER</b> IEC 60825-1: 2007

## 7. Operation

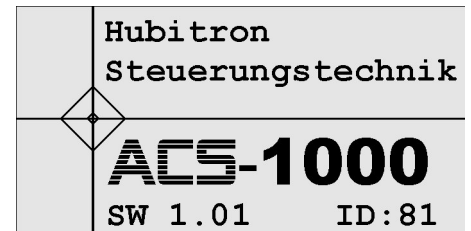
### 7.1 Operating elements



### 7.2 Menu guide

#### 7.2.1 Starting display

This display appears for appr. 2 seconds when the unit is switched on. The SW version and the ID for the remote control is displayed



#### 7.2.2 Main menu

On the bottom the assignment of the function keys is displayed:

<b>Start</b>	start measurement
<b>Compens</b>	select compensation menu
<b>Set</b>	select set up
	batterie status
	radio connection active



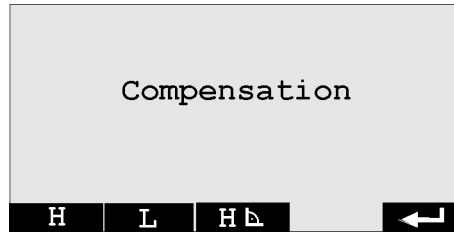
#### 7.2.3 Set up menu

<b>Contr.</b>	adjustment of the display contrast
<b>PM1</b>	parameter menu 1 - for service only
<b>PM2</b>	parameter menu 2 - for service only
	back to the main menu



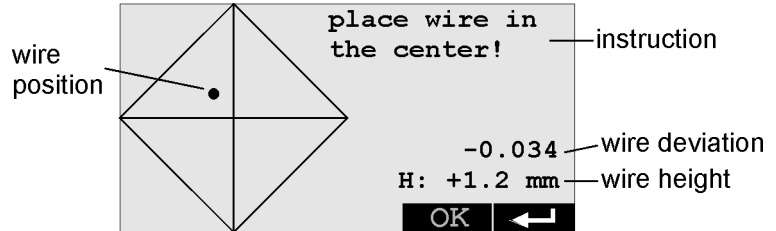
### 7.2.4 Compensation menu

- H** start compensation of height
- L** start compensation of length
- H ▾** easy compensation of height /  
incline of sensor head
- ←** back to the main menu



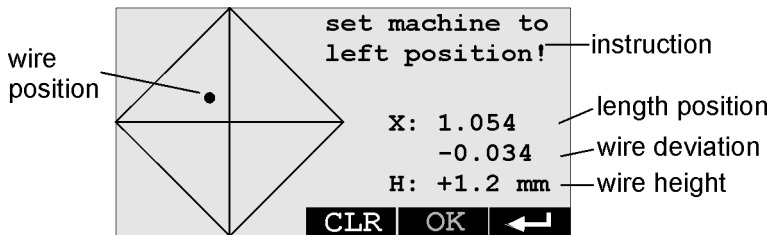
#### Menu height compensation

- OK** is displayed when the instruction is carried out. After confirmation the next instruction will follow.
- ←** back to the compensation menu



#### Menu length compensation

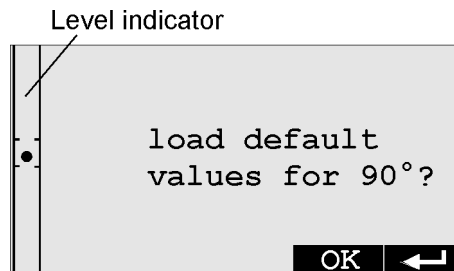
- CLR** delete saved compensation data
- OK** is displayed when the instruction is carried out. After confirmation the next instruction will follow.
- ←** back to the compensation menu



#### Easy compensation of the height / incline of sensor head

With the knorled scew place the dot of the level indicator between the marks.

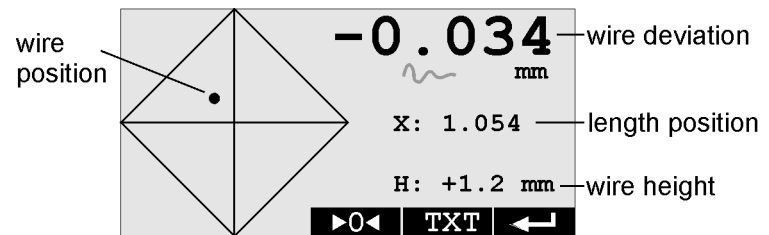
- OK** loads the values for 90° position
- ←** back to the compensation menu



### 7.2.5 Starting menu

#### Graphic display

- 0** set display data to 0
- abs** set display data to absolut
- TXT** switch to text display
- ←** back to the compensation menu
- ~** wire vibrates, measurement inaccurate



#### Text display

- 0** set display data to 0
- abs** set display data to absolut
- ↔ -1.101** switch to graphic display
- ←** back to the compensation menu
- ~** wire vibrates, measurement inaccurate



## 8. Measuring procedure

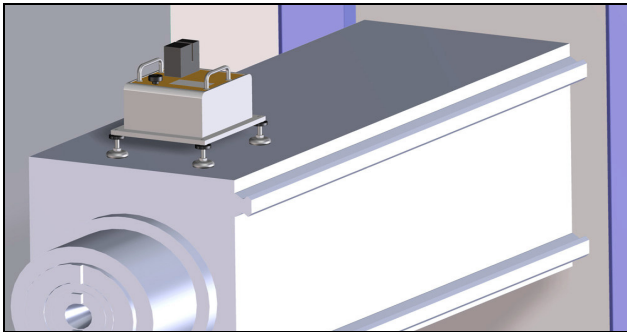
To receive an exact measurement, the following steps need to be followed:

- mount the ACS-1000 and arrange
- span the wire and arrange
- compensate the height
- compensate the length

### 8.1 Installation and arrangement

#### 8.1.1 Installation

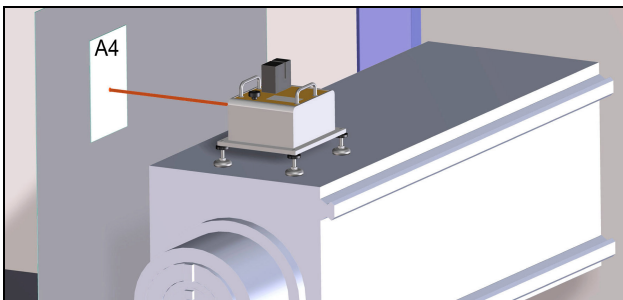
For installation we recommend the clamping set for uneven surfaces or the magnet set for even, magnetic surfaces.



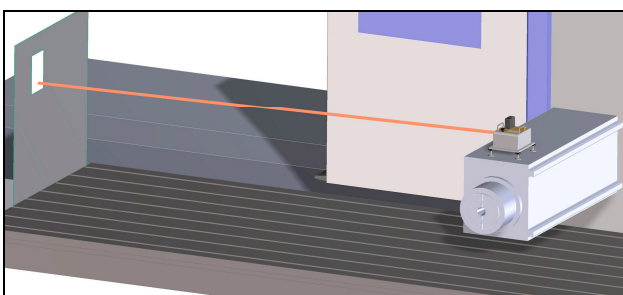
The ACS-1000 must be mounted level on the machine slide. Best, check the levelness with a mason's level.

#### 8.1.2 Arrangement

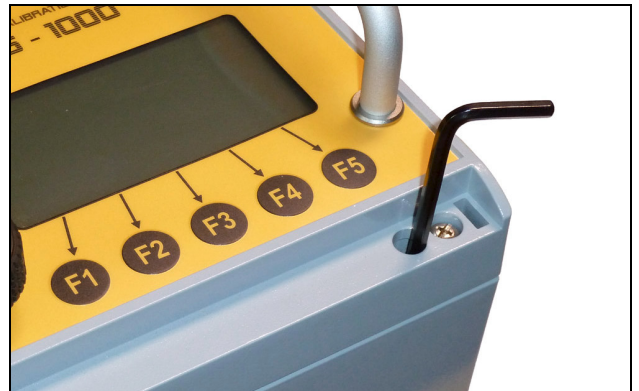
- delete compensation data:  
switch on the unit  
main menu - **Compens** - **L** - **CLR**
- activate laser:  
in the main menu push **Start**
- position machine at the left outer stop
- set up reflection area (i.e. white sheet of paper DIN A4)



- position machine at the right outer stop
- arrange ACS-1000 that the laser beam remains within the reflection area



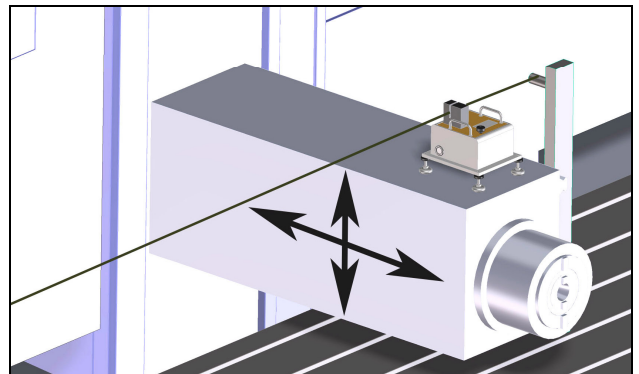
A sideways deviation can be corrected by turning the ACS-1000 on the mounting plate. The 4 screws underneath the housing blinds have to be loosened with the provided pin spanner SW4.



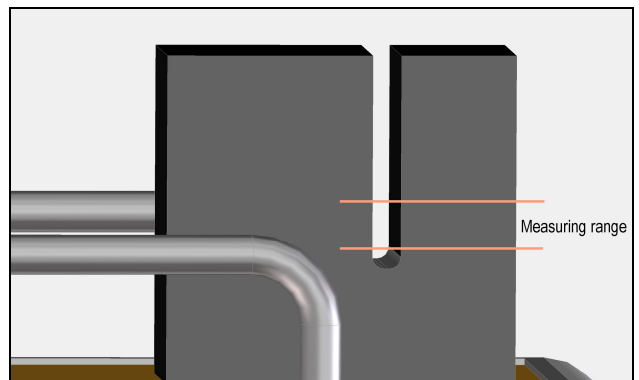
### 8.2 Wire spanning and arranging

For measuring we recommend an erode wire with a diameter of 0.2 to 0.3 mm.

- fix the wire on both machine ends in about the same height
- position machine slide that the wire runs through the sensor head and a value within  $\pm 1$  mm is displayed

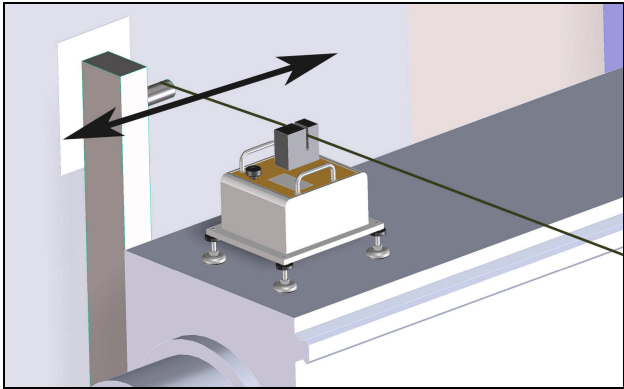


The measuring range of the sensor head lays in the bottom quarter:



- set display data to 0 (**▶0◀**)

- position machine slide on the left outer stop
- adjust wire sideways until the deviation is < 1mm

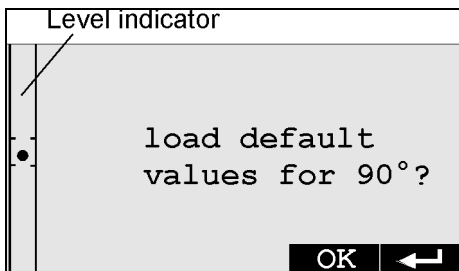


### 8.3 Height compensation

In order to avoid a measurement mistake through the wire slag, a compensation of the height is absolutely required. You can choose between the easy and the high accuracy compensation. With the easy height compensation the measuring accuracy increases to  $\pm 4 \mu\text{m}$ .

#### 8.3.1 Easy height compensation

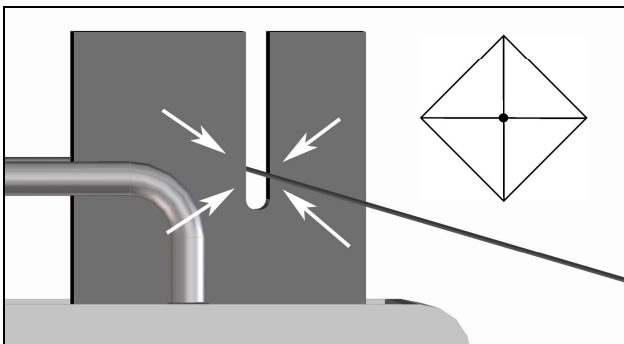
- start height compensation:  
main menu - **Compens** - **H**



- with the knurled scw place the dot of the level indicator between the marks.
- confirm with **OK**

#### 8.3.2 High accuracy height compensation

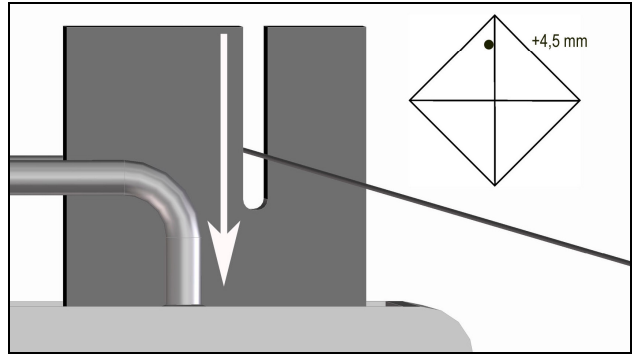
- start height compensation:  
main menu - **Compens** - **H**  
follow the instructions on the display
- arrange machine slide that the wire is in the center and **OK** is displayed



- confirm with **OK**

**ATTENTION:**  
Now do not move the Z axis anymore!

- move machine slide up until  $H = +4.5 \text{ mm}$  and **OK** is displayed

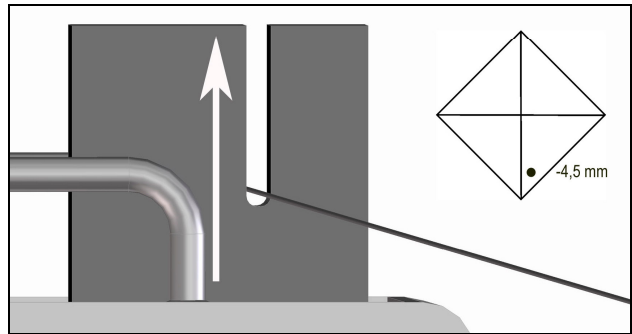


- confirm with **OK**

#### NOTE:

Is the deviation larger 0.1 mm, the incline of the sensor head must be corrected with the knurled screw (see 8.3.3). The compensation starts automatically again at the beginning.

- move machine slide down until  $H = -4.5 \text{ mm}$  and **OK** is displayed



- confirm with **OK**

#### NOTE:

Is the deviation larger 0.1 mm, the incline of the sensor head must be corrected with the knurled screw (see 8.3.1). The compensation starts automatically again at the beginning.

#### 8.3.3 Adjustment of incline

When doing the height compensation it is possibly necessary to adjust the incline of the sensor head. To adjust use the knurled screw.

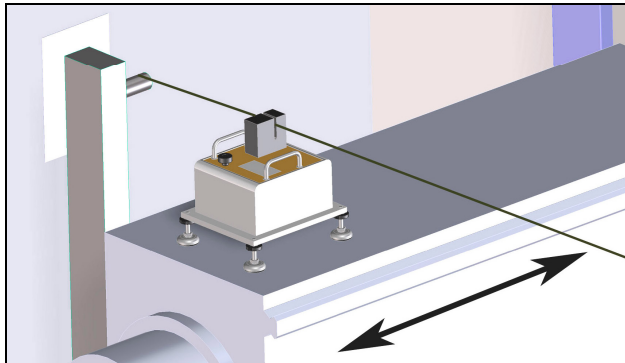
In the menu **Kompens** - **H** the setting is displayed.

One turn of the knurled screw changes the incline by appr. 0.025 mm at a height of 4.5 mm.

### 8.4 Length compensation

So the wire has not to be exactly aligned on both sides, you can compensate the wire deviation through the length.

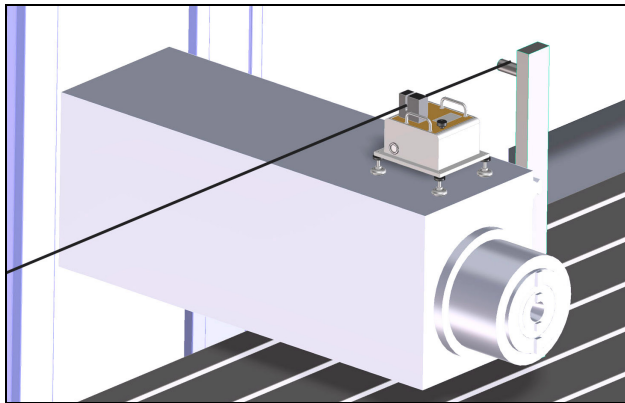
- start length compensation:  
main menu - **Compens** - **L**  
follow the instruction on the display
- position machine slide on the left side
- the sideways deviation can be max. 1 mm. If necessary correct the Z axis until **OK** is displayed



- confirm with **OK**
- position machine slide on the right side

**NOTE:**

Is the sideways deviation larger 1 mm, the position of the wire must be corrected. The compensation starts automatically again at the beginning.



- confirm with **OK**

#### 8.4.1 Delete compensation data

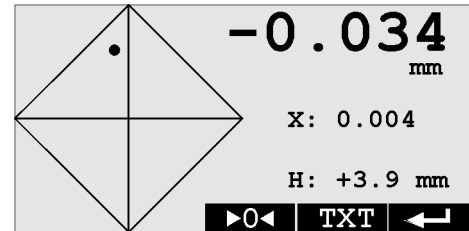
Is the length compensation not needed, the last compensation data must be deleted:

- start length compensation:  
main menu - **Compens** - **L**
- delete data with **CLR**

### 8.5 Start measurements

Is the ACS-1000 arranged and compensated the measuring can start:

- start measuring: main menu - **Start**
- position machine slide to the left
- adjust machine slide that the wire is located at a height of appr. 4 mm and a deviation < 0.1 mm



- set display data to 0 (**0**)
- measure machine at different length positions (i.e. 0.5 m spacing)

## 9. Additional settings

### 9.1 Change language

The languages German and English are available:

- shut off the ACS-1000
- push and hold the function keys F3+F4
- turn on the ACS-1000



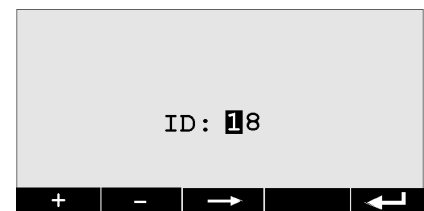
With **+** or **-** choose the language and confirm with **↵**

0 = German, 1 = English

### 9.2 Change ID

For the radio communication between the ACS-1000 and the remote control ACS-1000 RC both units must have the same ID.

- shut off the ACS-1000
- push and hold the function keys F1+F3
- turn on the ACS-1000




With **+** or **-** change marked field.

With **→** change field.

Confirm change with **↵**

## 10. Error solutions

Error	possible cause	solution
display:"no wire!"	- wire outside measuring range - incidence of extraneous light - wire too thin - wire slag too big	check and correct wire position use black light protector cap use wire with 0.2 – 0.3 mm Ø adjust wire tension
 blinking	accu nearly empty	charge accu
no radio connection to the ACS-1000 RC	ID is not matching with the ACS-1000	check and change ID
no display of length position	- out of range - reflection area too dark - too much foreign light on the reflection area - sight glas dirty	divide measurements in sections use brighter reflector (white) install light protectors (i.e. window blinds) clean sight glass
measured values not plausible	- incidence of extraneous light - system not compensated - too much dirt on sensor head - system focus out of alignment  - accu is loading	use provided black light protector cap run compensation send unit for service check position of machine slide (see chapter 8.5) during the loading process there are larger voltage fluctuations, which can distort the measurements
display remains dark	- accu empty or defect - fuse defect - unit defect	charge accu resp. have accu changed change fuse (chapter 12.1) send unit for service
display non-readable	altered contrast	Readjust contrast

## 11. Activity to avoid interruptions

1. If the unit is not in use cover the sensor head with the red protector cap to minimize pollution
2. During operation cover the sensor head with the black protector cap to avoid strong exposure to light and pollution
3. During measurements protect the ACS-1000 from exposure to direct solar radiation and high temperature fluctuations
4. For safekeeping store the ACS-1000 in the provided transport case when not used

### 11.1 Service address

Hubitron Steuerungstechnik  
Hauptstr. 4/1  
89611 Obermarchtal / Germany  
Tel: 07375/92 20 66  
Fax: 07375/92 20 77  
Email: info@Hubitron.de  
Internet: www.Hubitron.de

## 12. Maintenance and care

For a continuous and safe operation of the ACS-1000 comply with the following steps:

- After use clean the unit with a clean and damp cloth. **Do not use compressed air!**
- Before each new measuring operation clean sight glas with a clean and damp cloth.
- Charge the accu every 6 months, even if not in use at the time.
- Protect sensor head with the provided red protector cap from pollution when not in use.
- Store the ACS-1000 always in the provided transport case.

### 12.1 Change fuse

Should the ACS-1000 not function anymore, the fuse might be defect. Installed is a microfuse 5x20 with 2AT.

- shut off unit
- take off the aluminum blinds of the housing
- loosen the 4 outer screws
- flip cover to the side
- check and possibly change the fuse on the board



## 12.2 Charge accu

To charge the accu, the provided charging unit type ALCS2-24A must be used.

- shut off the ACS-1000
- connect the charging unit with the connector of the ACS-1000
- connect the charging unit with the electrical network

Now the green LED (12V) and the red LED (Charge) should shine.

If the red LED (Charge) goes off, the charging process is finished.

## 12.3 Change accu

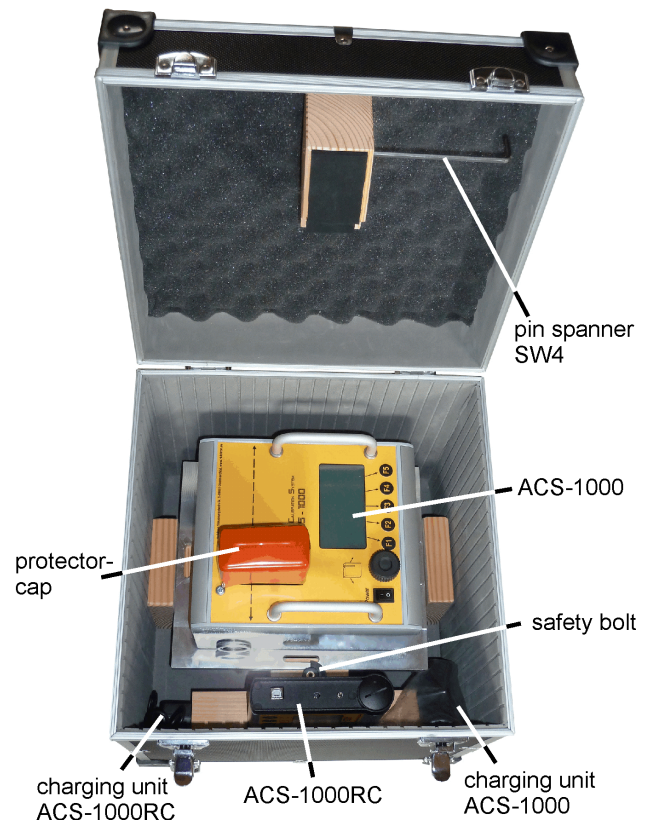
Is the accu running time considerably declining, the accu might be defect and must be changed. For an accu change the unit must be sent to the dealer or service address.

### NOTE:

In accordance with the battery regulations dated. 01.10.98 old batteries & rechargeable batteries must either be returned to the store or given to a communal collecting place. They are not allowed to be discarded in regular garbage!

## 12.4 Packing / Storage

All parts can be stored in the provided transport case. Levelling feet and/or magnets must be mounted on the bottom of the mounting plate. The following picture shows the correct arrangement in the case:



### 13. Remote control ACS-1000 RC

The remote control ACS-1000 RC is available as an optional equipment.

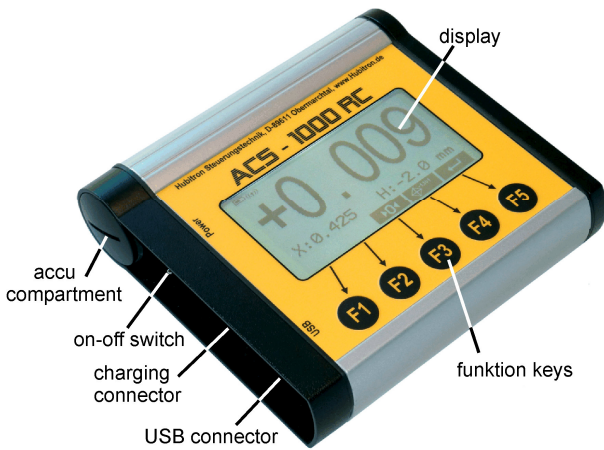
#### 13.1 Technical Data

Dimensions (LxWxH) ..... appr. 143x140x40  
 Weight.....appr. 700g  
 Power supply ..... 4x1,2V NiMh accu, AA  
 Display ..... LCD, 240 x 128  
 Operating elements ..... 5 foil keys  
 Running time ..... > 8 h  
 Radio connection 4 channels, SRD868MHz, <10mW

#### 13.2 Scope of delivery

- 1 remote control ACS-1000 RC
- 1 charging unit ACS-1000 RC
- 1 USB cable
- 1 software CD

#### 13.3 Operating elements

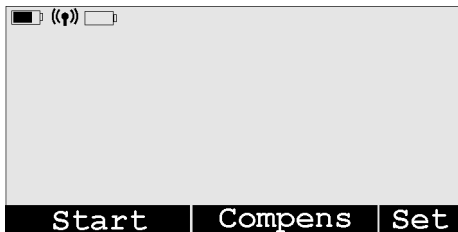


#### 13.4 Operation

- turn on the ACS-1000
- turn on the ACS-1000 RC on the on-off switch

The radio connection now builds up automatically and on the display the same display data shows as on the ACS-1000. Operation and menu guide are identical.

On the display in the upper left corner the accu status, the radio connection and the accu warning of the main unit ACS-1000 is displayed:



#### Symbols:

	accu status
	radio connection activ/disrupted
	accu warning of the ACS-1000

#### 13.5 Charge accu

- connect the provided charging unit, type ACS 110, with the connector of the ACS-1000 RC
- connect charging unit with the electrical network

The red LED (Charge) indicates the charging process. If the green LED (Ready) shines, the charging process is finished.

#### 13.6 Change accu

4 standard NiMh accus size AA feed the power supply of this unit. As replacement we recommend accus from Panasonic with a capacity of min. 2100mAh.

- unscrew accu compartment with a coin
- pull the accu plug
- take out the accu pack and replace accus

#### NOTE:

In accordance with the battery regulations dated. 01.10.98 old batteries & rechargeable batteries must either be returned to the store or given to a communal collecting place. They are not allowed to be discarded in regular garbage!

#### 13.7 Change ID

For the radio communication between the ACS-1000 and the remote control ACS-1000 RC both units must have the same ID.

- shut off the ACS-1000 RC
- push and hold the function keys F1+F3
- turn on the ACS-1000 RC



With or change the marked field.  
 With change the field.  
 Confirm change with .

#### 13.8 PC connection

When the unit is shut off connect with the provided USB cable the USB connector with the PC, than turn on the unit.

A virtual COM port is generated on the PC, through this port the communication is established with the PC.


## 14. PC software ACS-1000

This software serves to log the measuring data and generate a measuring chart.

### 14.1 Installation

To install the Software, .net-Framework from Microsoft is required. If it is not yet installed, it will be automatically downloaded and installed during the installation. Internet connection is required.

On the CD are 2 paths:

-  Deutsch
-  Englisch

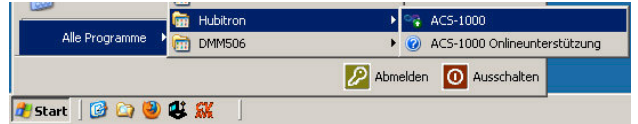
According to the desired language the file setup.exe with the corresponding path must be installed.

### 14.2 Start program

Before starting the program the remote control ACS-1000 RC must be connected with the PC and turned on (chapter 13.8).

**Start:**

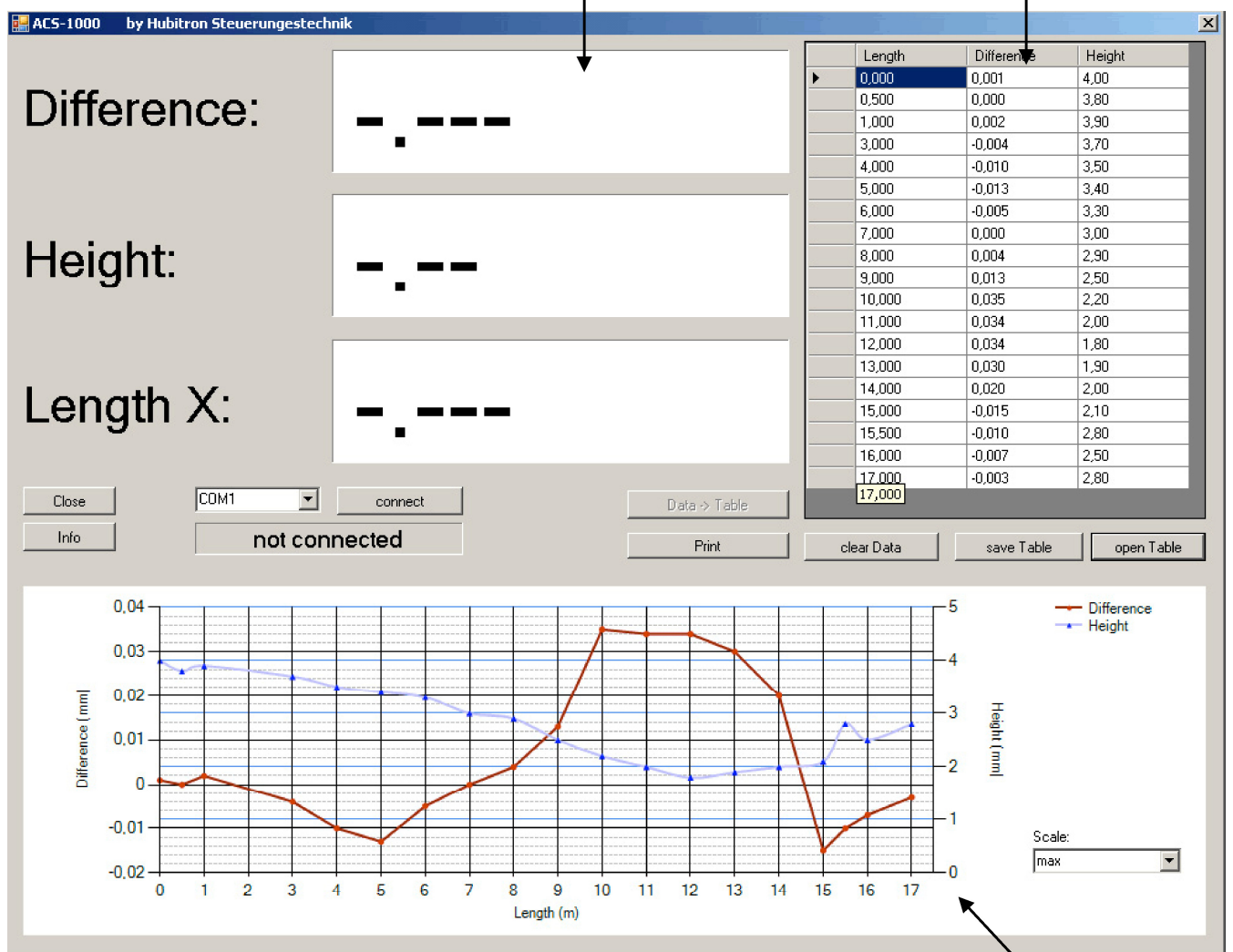
Start -> Alle Programme -> Hubitron -> ACS-1000



The exact functions of the software can vary according to the software version. They are described in the help file, press the F1 key.

### 14.3 Program Operation

actual values
value table



The software interface displays three data series: Difference, Height, and Length X. Each series is represented by a bar chart and a corresponding data table. The 'actual values' label points to the bar charts, and the 'value table' label points to the data table.

Length	Difference	Height
0,000	0,001	4,00
0,500	0,000	3,80
1,000	0,002	3,90
3,000	-0,004	3,70
4,000	-0,010	3,50
5,000	-0,013	3,40
6,000	-0,005	3,30
7,000	0,000	3,00
8,000	0,004	2,90
9,000	0,013	2,50
10,000	0,035	2,20
11,000	0,034	2,00
12,000	0,034	1,80
13,000	0,030	1,90
14,000	0,020	2,00
15,000	-0,015	2,10
15,500	-0,010	2,80
16,000	-0,007	2,50
17,000	-0,003	2,80

The 'graphic diagram' label points to the line graph at the bottom of the interface, which plots Difference (mm) and Height (mm) against Length (m). The graph shows two data series: Difference (red line) and Height (blue line with markers). The x-axis represents Length (m) from 0 to 17, and the y-axis represents both Difference (mm) from -0,02 to 0,04 and Height (mm) from 0 to 5. A 'Scale: max' dropdown is visible on the right side of the graph.

**1. Establish connection**

- 1. choose port
- 2. connect



connection status

The following displays are possible for the connecting status:

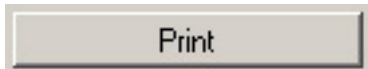
- not connected: no connection
- connected: connection established
- Timeout: connection disrupted

**2. Transmit data record to table**

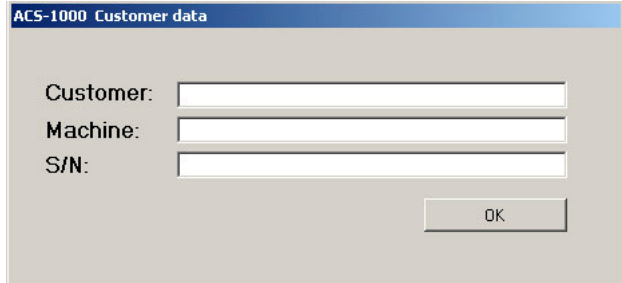


On the chosen measuring points each data record must be transmitted to the table.

**3. Print chart**



A window appears for customer and machine data:



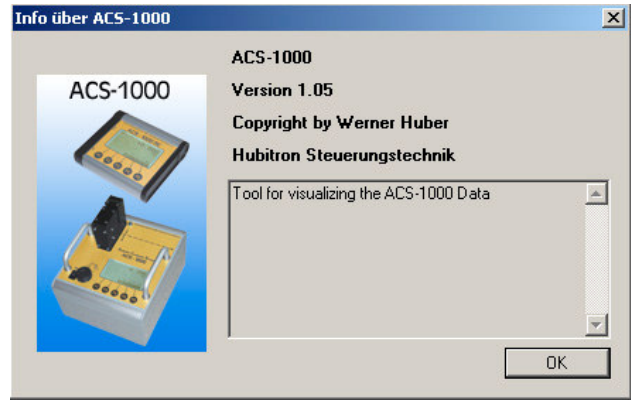
Enter the customer and machine data and confirm with OK.

After that the measuring chart can be printed. Example is attached.

**14.3.1 Other functions**

clear Data	delete all data in the table
save Table	save active table
open Table	load saved table
Close	close program
Info	shows the information window

Information window:



**14.3.2 Delete individual records**

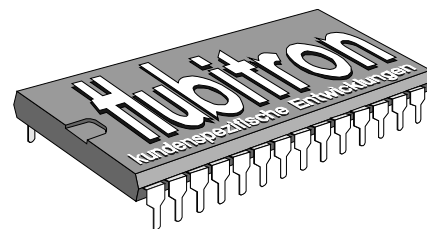
In the table mark data record with a mouse click:

	4,488	-0,058	-4,00
	4,986	-0,066	-4,20
	5,486	-0,050	-4,34
	5,986	-0,055	-4,43
	6,485	-0,061	-4,45
	6,982	-0,072	-4,43

delete with DEL

## 15. EG Declaration of Conformity

(Article 4 § 2 EG Regulation 2006/42/EG)



Hubitron Steuerungstechnik

Hauptstr. 4/1

89611 Obermarchtal

Tel. 07375/92 20 66

Fax 07375/92 20 77

Mobil: 0178/2310073

Werner Huber

eMail: Info@Hubitron.de

www.Hubitron.de

02.08.2012

**Manufacturer:** Hubitron Steuerungstechnik  
Hauptstr. 4/1  
89611 Obermarchtal  
Germany

**Product:** Alignment Calibration System ACS-1000  
and Remote Control ACS-1000 RC

We herewith confirm the conformity of the above products with the

as well as Low voltage regulation 2006/95/EG  
EMV regulation 2004/108/EG.

especially EN 55022:2010  
EN 61000-4-3:2006  
EN 61000-4-8:2006

Issuer: Hubitron Steuerungstechnik

Place, Date: Obermarchtal, 02.08.2012

Signature:   
( Werner Huber )

This declaration does not include any guarantee of property rights.

# Attachment – Measuring chart

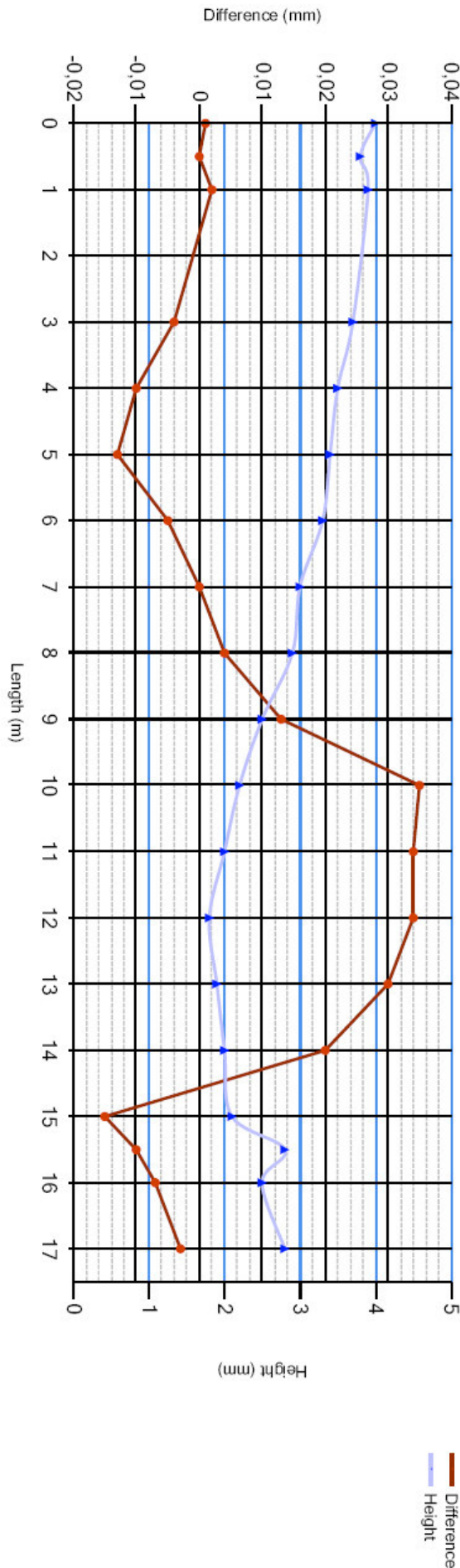
Measurement report ACS-1000

Customer: Mustermann GmbH

Machine: FX 11000

S/N: 0815-12876

23.08.2012



## Measurement data

Length:	Difference:	Height:	Length:	Difference:	Height:
0	0,001	4	10	0,035	2,2
0,5	0	3,8	11	0,034	2
1	0,002	3,9	12	0,034	1,8
3	-0,004	3,7	13	0,03	1,9
4	-0,01	3,5	14	0,02	2
5	-0,013	3,4	15	-0,015	2,1
6	-0,005	3,3	16	-0,007	2,8
7	0	3	17	-0,003	2,8
8	0,004	2,9			
9	0,013	2,5			