ALGE-TIMING

Manual
Distance Measuring DMD-Arc5

Important Information

General

Before using your ALGE·TIMING device read the complete manual carefully. It is part of the device and contains important information about installation, safety and its intended use. This manual cannot cover all conceivable applications. For further information or in case of problems that are mentioned not at all or not sufficiently detailed, please contact your ALGE·TIMING representative. You can find contact details on our homepage www.alge-timing.com

Safety

Apart from the information of this manual all general safety and accident prevention regulations of the legislator must be taken into account.
The device must only be used by trained persons. The setting-up and installation must only be executed according to the manufacturer's data.

Intended Use

The device must only be used for its intended applications. Technical modifications and any misuse are prohibited because of the risks involved! ALGE·TIMING is not liable for damages that are caused by improper use or incorrect operation.

Power supply

The stated voltage on the type plate must correspond to voltage of the power source. Check all connections and plugs before usage. Damaged connection wires must be replaced immediately by an authorized electrician. The device must only be connected to an electric supply that has been installed by an electrician according to IEC 60364-1. Never touch the mains plug with wet hands! Never touch live parts!

Cleaning

Please clean the outside of the device only with a smooth cloth. Detergents can cause damage. Never submerge in water, never open or clean with wet cloth. The cleaning must not be carried out by hose or high-pressure (risk of short circuits or other damage).

Liability Limitations

All technical information, data and information for installation and operation correspond to the latest status at time of printing and are made in all conscience considering our past experience and knowledge. Information, pictures and description do not entitle to base any claims. The manufacturer is not liable for damage due to failure to observe the manual, improper use, incorrect repairs, technical modifications, use of unauthorized spare parts. Translations are made in all conscience. We assume no liability for translation mistakes, even if the translation is carried out by us or on our behalf.

Disposal

If a label is placed on the device showing a crossed out dustbin on wheels (see drawing), the European directive 2002/96/EG applies for this device.
Please get informed about the applicable regulations for separate collection of electrical and electronical waste in your country and do not dispose of the old devices as household waste.
Correct disposal of old equipment protects the environment and humans against negative consequences!

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Table of Contents

1 System

1.1 System Components

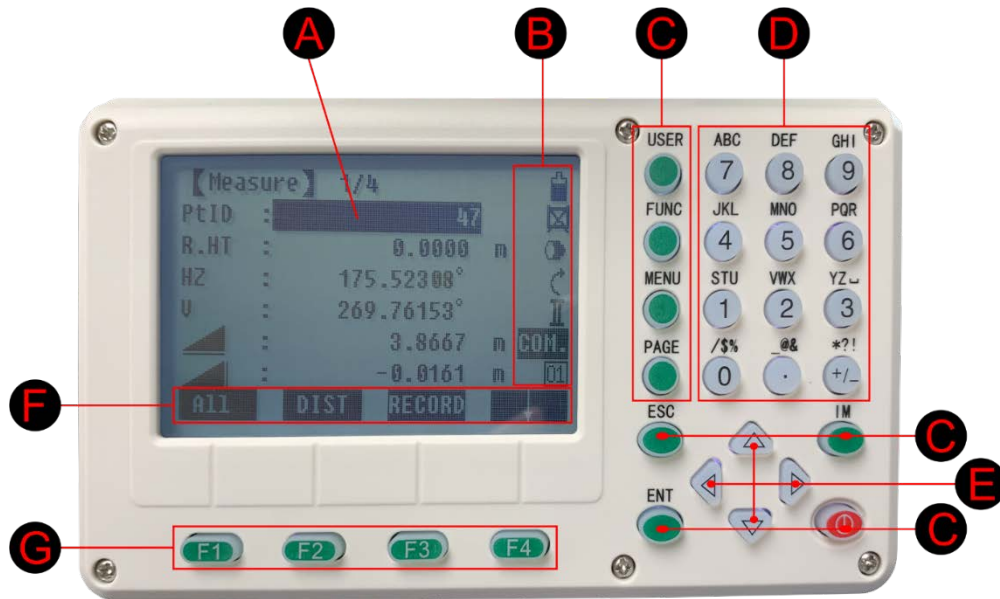The distance measuring system is packed in a case. Additional you get the tripod and the prism with holder.

1.2 Important Parts of the DMD-Arc5

1.........objective lens
2.........handle
3.........eyepiece
4.........collimator
5.........vertical tangent screw
6.........horizontal tangent screw
7.........display
8.........keyboard
9.........leveling screw
10.......tribrach lock
11.......telescope focusing knob
12.......battery

1.3 Display and Keyboard

A .... Focus (actively measured field)
B .... Symbols
C .... Fixed keys (keys with firmly assigned functions)
D .... Alphanumeric keys
E .... Navigation keys (Control of input bar in edit and input mode or control focus bar)
F .... Soft key bar (display functions that can be called up by the soft keys)
G .... Function keys (are assigned to various functions displayed on the bottom of the screen)

1.4 Battery

Two batteries are supplied with the DMD-Arc5. This means that one can always be used for measurements while the other is being charged. A battery should be sufficient for daytime operation at normal temperatures (about 20 h when fully loaded at 20°C).

The left upper corner of the display shows the battery level.

Battery Level

Full

Halve

Empty
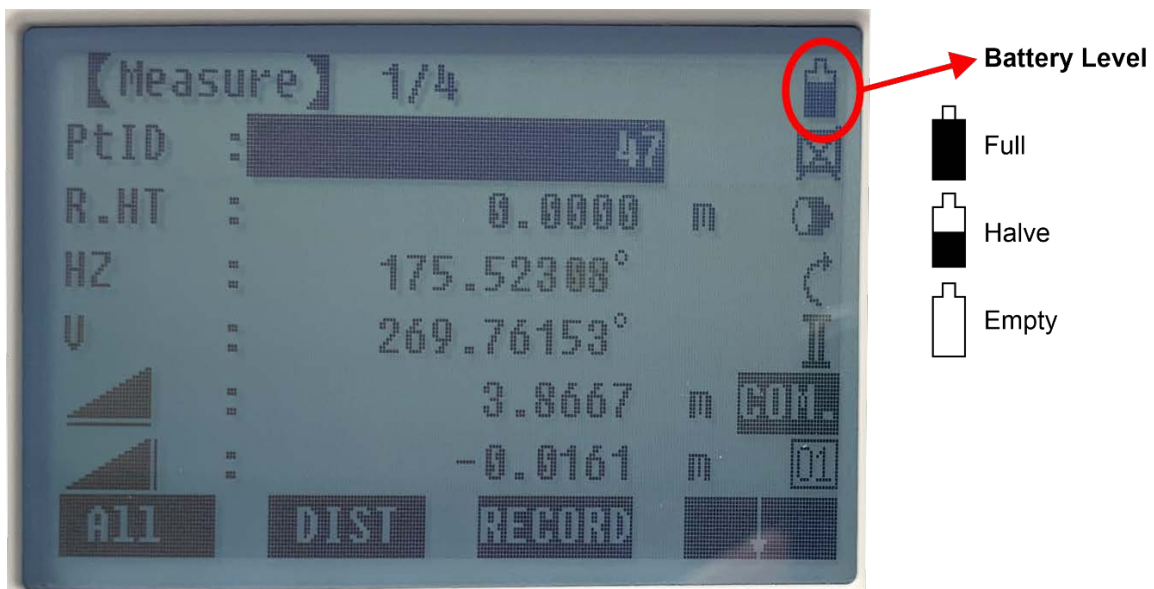
1.5   Prism with Holder

The prism is required for the measurement. The prism is aimed precisely at the measurement with the distance measuring device. During the measurement, the lower part of the prism must be at ground level, i.e. if you take a measurement in the lawn, the tip is inserted into the lawn as far as it will go.

The prism and the tip are in a small orange protective cover, the screwable rod that goes with it is in a larger orange protective cover.

- The bar is first screwed together from the individual parts.
- The bar is screwed onto the prism so that the level built into the prism can be seen from above.
- The tip is screwed to the bottom of the prism when measuring in the lawn. If measurements are made on solid ground where the tip cannot be inserted, it is left out.
- When measuring, the bar must be horizontal (spirit level in the middle).

Attention: the lens cover must be removed from the prism for the measurement!

Prism with Lenscover
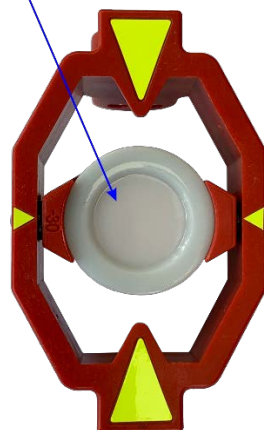
Prism without Lenscover
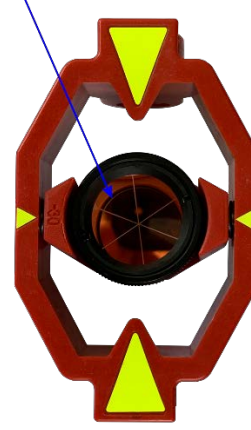
1.6   Settings of the Menu

When you switch on the DMD-Arc5, it automatically shows the dialog for levelling the instrument. After levelling the instrument, you have to make the following settings so that the device works with our distance measuring software on your computer.

Open the settings of the tachymeter by pressing the button 'menu'. For using this tachymeter with your track and field distance measuring application, you have to adjust some settings. Depending on the menu point, several pages are shown which you can scroll through by using the button 'page'.

The available menu has two pages:

1	programs	5	adjustments
2	settings	6	comm parameters
3	EDM settings	7	data transfer
4	file management	8	system information

1.6.1   Programs

No adjustment is required.

1.6.2   Settings

This menu item has four pages. Please set the parameters as follows:

Contrast:	11	Auto-Off:	Off
TriggerKey:	All	AngleReading:	0.00001
User Key:	Level	AngleUnit	deg
V-Setting:	Zenith	DisReading	0.1
Tilt Crn.:	2-axis	Dist.Unit:	Meter
Coll.Crn.:	On	Temp.Unit:	°C
Sector Beep:	Off	PressUnit:	hPa
Beep:	On	GSI 8/16:	GSI16
Hz<=>:	Right Angle	Mask1/2:	Mask2
Facel Def.:	VK-Left	Coord Mask:	Y/N X/E
DataOutput:	Bluetooth	NEH/ENH:	NEH

1.6.3   EDM Settings

This menu item has one page. Please set the parameters as follows:

EDM Mode:	Fine [2]
Reflect:	Prism
PrismConst:	-30.0mm

1.6.4   File Management

No setting is required here.

1.6.5   Adjustments

No setting is required here.

1.6.6   COM Settings

Baud Rate:	38400	Parity:	None	Stop Bits:	1
Data Bits:	8	Endmark:	CR/LF		

### 1.6.7   Data Transfer

No setting is required here.

### 1.6.8   System Information

No setting is required here.

2 Levelling of Distance Measuring Device DMD-Arc5

- Set the tripod up that it stands stabile
    1. First extend the legs of the tripod to a suitable length.
    2. Make the tripod head approximately parallel to the ground and tighten screws of the legs.
    3. Step on the tripod to make sure if it is well stationed on the ground.
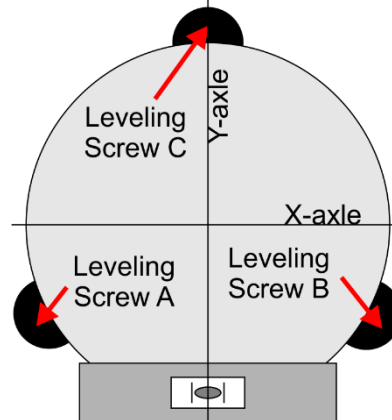
- Mount the DMD-Arc5 on the tripod
    1. Put the instrument carefully on the tripod head and slightly tighten it to the tripod.
- Roughly level the instrument
    1. Adjust the instrument roughly by changing the length of the tripods feet so the circular level is looking fine.
- Precise levelling by the electronic level
   1. Push the button „USER" to enter the level menu.
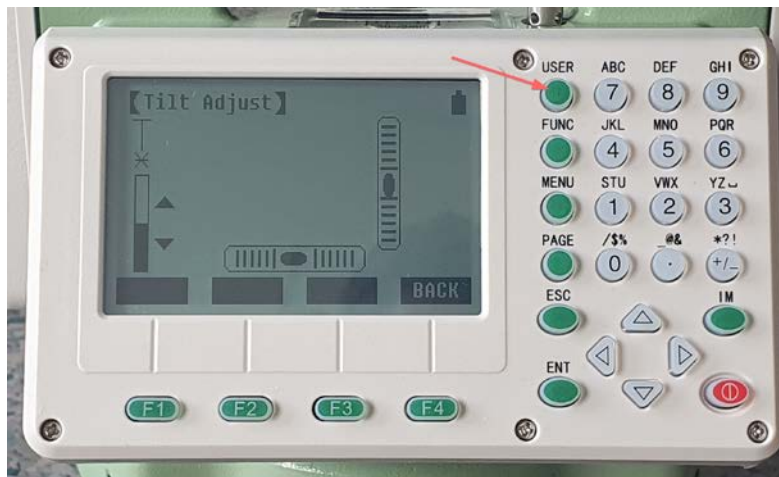
    2. Rotate the instrument so that the horizontal level (display) is in line with the 2 levelling screws A and B.
    3. With the level screw A and B you can now level the X-axis.
    4. Now you can level the Y-axis with the level screw C.
    5. Both electronic levels should be within the marking now.
    6. With the button ESC you can exit the level menu.

3 Aiming Prism

Aiming at the prism takes some practice and the right technique. The system is equipped so that you can easily find the target even at great distances.
Do not forget to remove the cover from the prism and the objective. Otherwise you will not be able to measure anything

- Aim at the prism through the collimator (1 or 2).
- Tighten the locking screw 3 (inclination) and 4 (rotation) slightly to thus fasten the DMD-Arc5 measuring head.
- Look through the eyepiece and aim precisely at the prism by turning button 5 (up and down) and (6) (left and right).
- With the button F1 (All) or with the red button on the side you start the measuring on the DMD-ARC5.
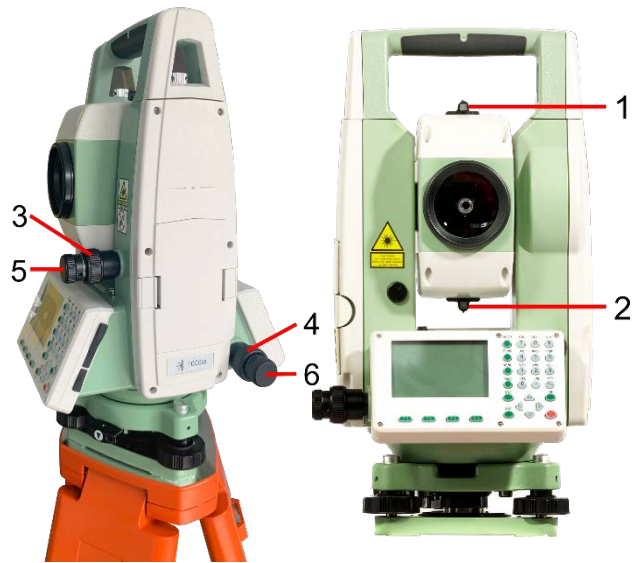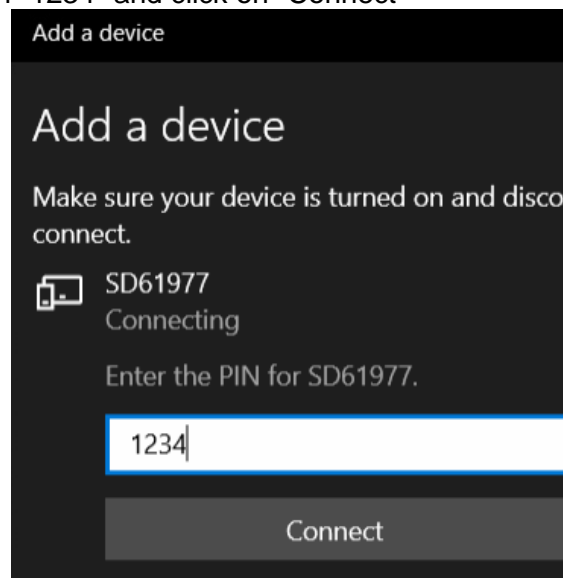

Hint: Fasten the horizontal and vertical locking screw just as much as you can still rotate in both directions with little resistance. By doing this you can keep the locking screws always the same for manual and fine alignment.

4 Connection to the PC

With older models, a USB-RS232 connection to the PC is possible. With newer models, only a Bluetooth connection to the PC is possible. This significantly reduces the risk of tripping and is therefore recommended.

First of all you have to couple the DMD-Arc5 with the PC.
1. Switch on the DMD-ARC5
2. Start "Bluetooth and other devices settings"
3. Click on "Add Bluetooth or other device"
4. Click on "Bluetooth"
5. Click on "SDxxxxx" (Serial number from tachymeter)
6. Now enter the pin "1234" and click on "Connect"

Add a device

Add a device

Make sure your device is turned on and disco connect.

SD61977
Connecting
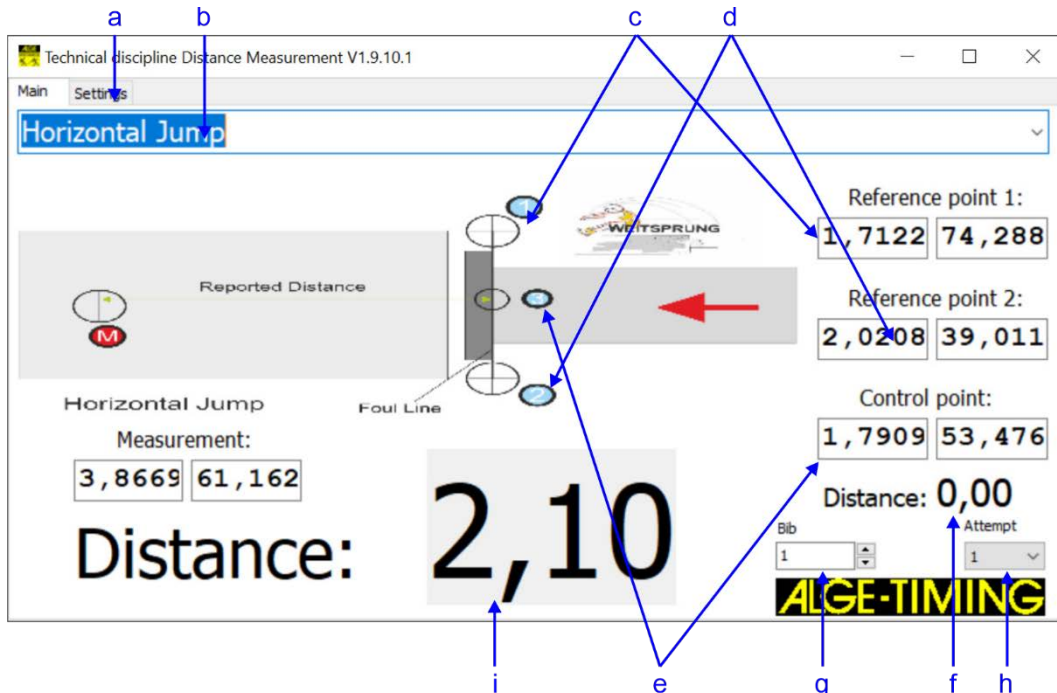
Enter the PIN for SD61977.

1234

Connect

The DMD-Arc5 and the PC are now coupled. As soon as the DMD-Arc5 is switched on, it tries to connect to the PC via Bluetooth.
Two additional COM interfaces are then displayed in the device manager.
Please select the first of these two connections as COM interface in the settings of the PC software.

5 Operation

a.........adjustments for the software (COM-interface for DMD-Arc5 and display board or language)
b.........infield discipline (e.g. long jump)
c.........reference point 1
d.........reference point 1
e.........control point
f..........deviation of control point
g.........ID-number of the competitor
h.........attempt of the competitor
i..........calculated distance (width in Metre)

- Switch on the DMD-Arc5 and level it with the menu LEVEL.
  For more information about levelling your device, refer to the DMD-Arc5 manual. For an optimal alignment enter the level menu by pressing the button USER and exactly adjust the electronic level.
- Connect the distance measurement device to the PC.
- Choose the serial port where the device connects to the computer.
- Choose the used discipline, for example, horizontal jump is for long jump and triple jump.
- Each time you choose a discipline, you have to measure the reference points and then the control point. After that, the system is ready for measuring.
- With the button F1 (All) or with the red button on the side you start the measuring on the DMD-ARC5.

5.1 Set Reference- and Control Points

In athletics, the width or height is always measured from a reference point. This reference point is located in the middle of the competition zone and is specified by the rules. Therefore, the measuring device cannot stand exactly at the reference point, but stands somewhere closed to it.

**The DMD-Arc5 is always placed at a protected place next to the throwing circle or take-off bar.**

To set up the reference point for the measurements, the discipline must be selected and then two control points and the reference point are measured.

The correct discipline must be selected for an accurate distance measurement. For example, it is not possible to use another similar competition (e.g. discus instead of a shot put). The diameter of the circle is taken into account in the calculation and it must be correct.
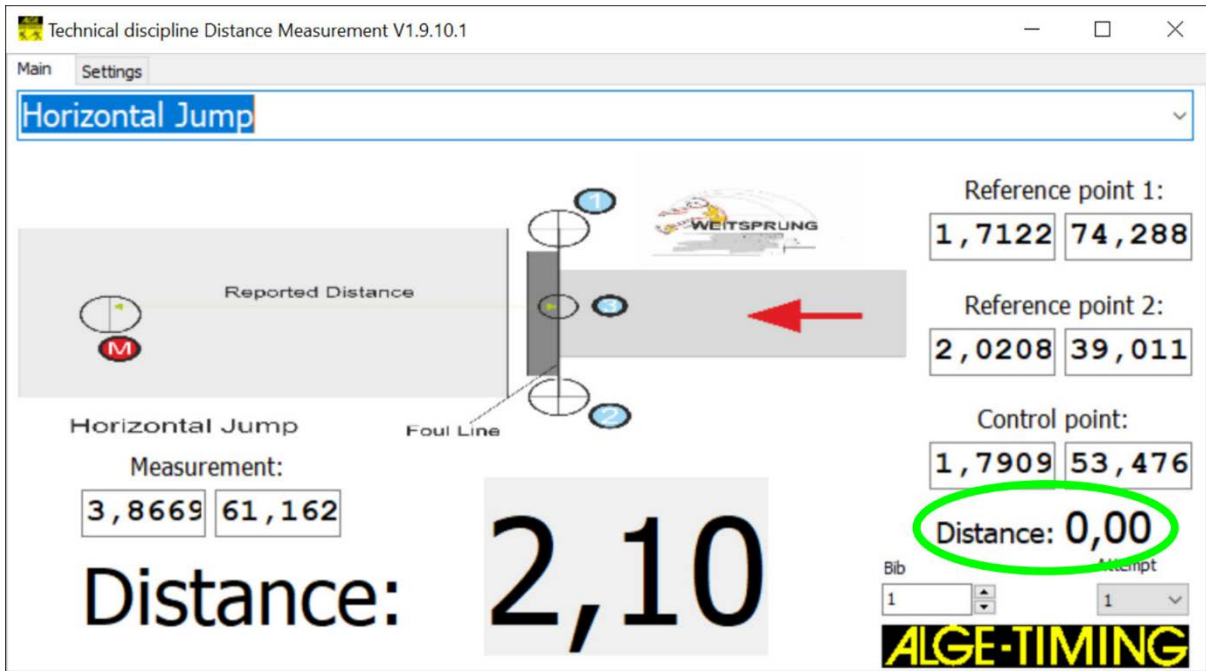
Example Shot Put:
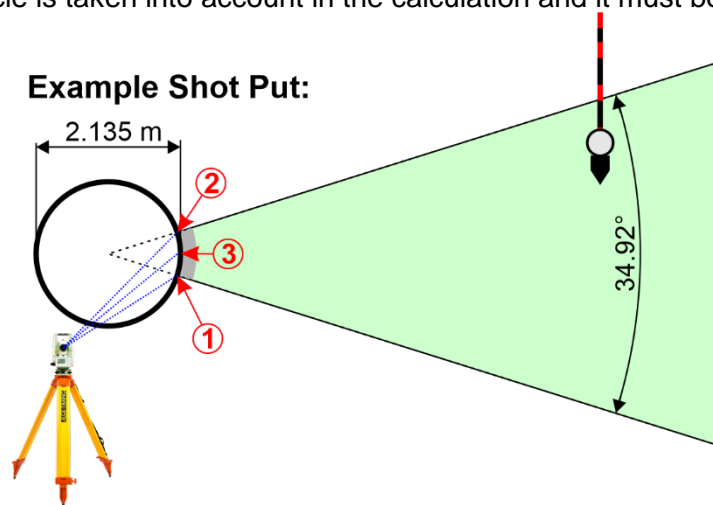
1. Measure reference point 1.
2. Measure reference point 2.
3. Measure control point 3.
4. Check the „distance" shown under the three measuring results. If you measured correct and the dimensions of the facility are correct it should show zero.
5. If it shows zero you can start to measure the distance of the first athletes. If it does not show zero you might have to do the measurement again

The adjustment of the reference points and the control point ensures that the software always calculates the distance from the reference point to the prism correct and does not use the actual measured distance from the measuring device to the prism.

Example Shot Put:
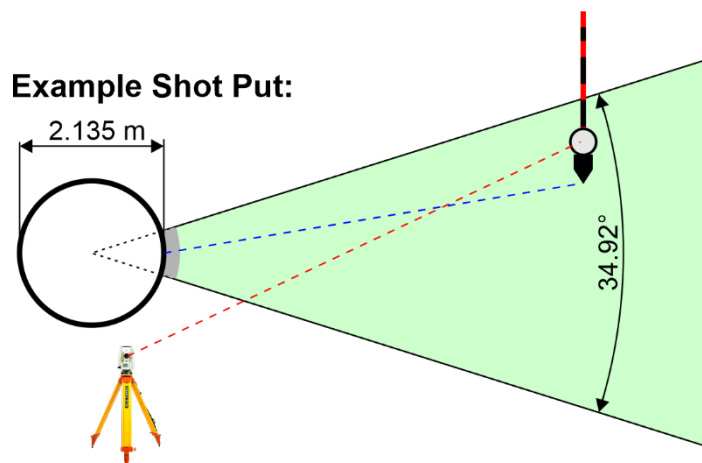
- - - Distance measured by measuring device
- - - Calculated measuring distance for athlete

The following picture shows the software that has been set for the long jump and the control point has been correctly measured (deviation 0.00 m).


The following picture shows the software that was set up for the shot put and the control point was measured incorrectly (deviation 0.44 m).

Probably a wrong measurement was made or the wrong sport was set. For example, if hammer throwing is measured, but shot put is set, then the radius of the circle is incorrect in relation to the reference points. In there is such a deviation in the distance from the control point, the entire distance measuring system must be set up again.
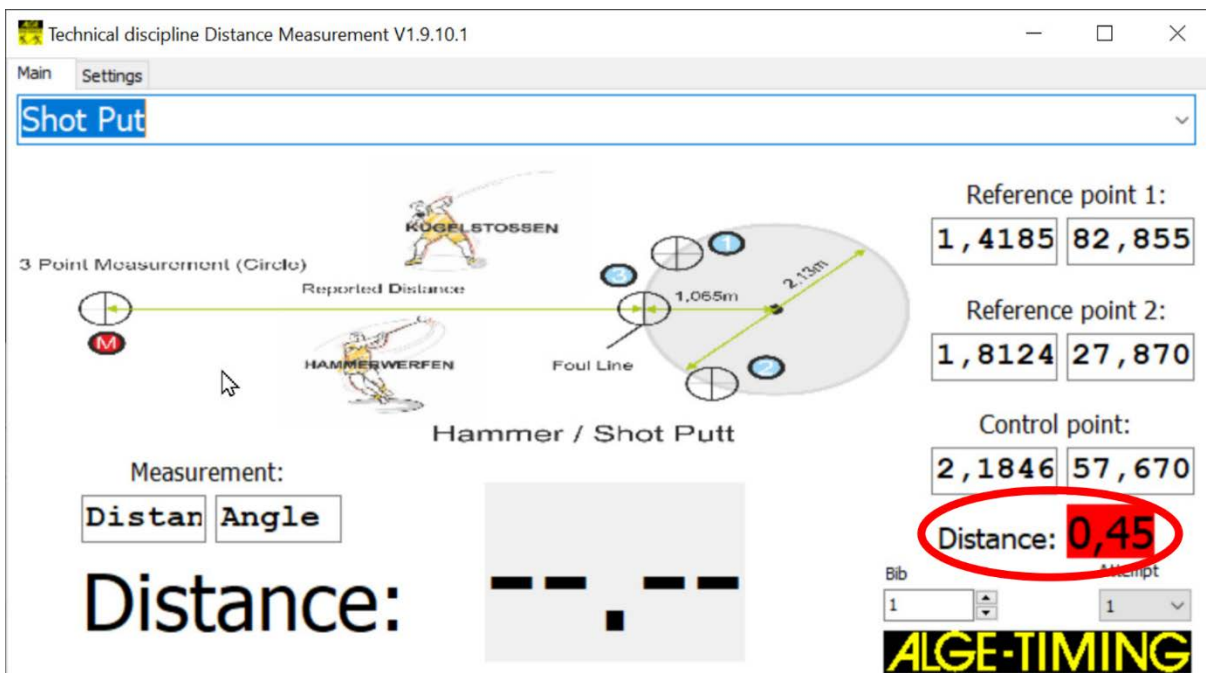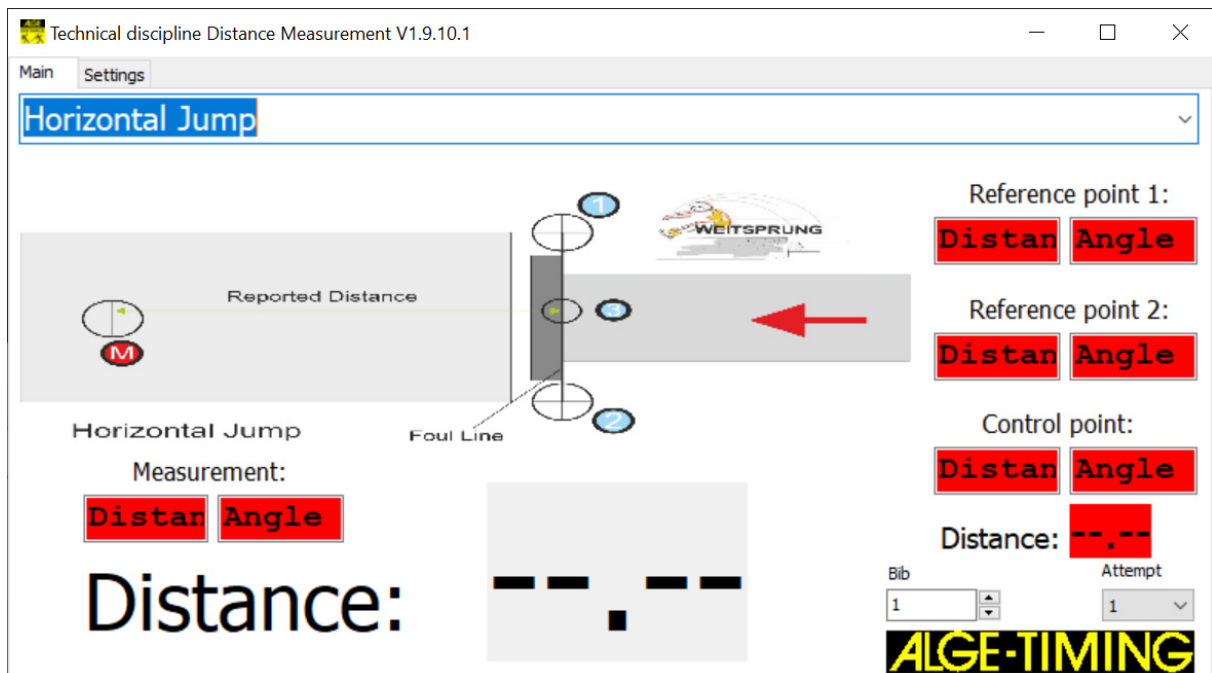
### 5.1.1 Application example for long jump

- Select the discipline to be measured (e.g. long jump)
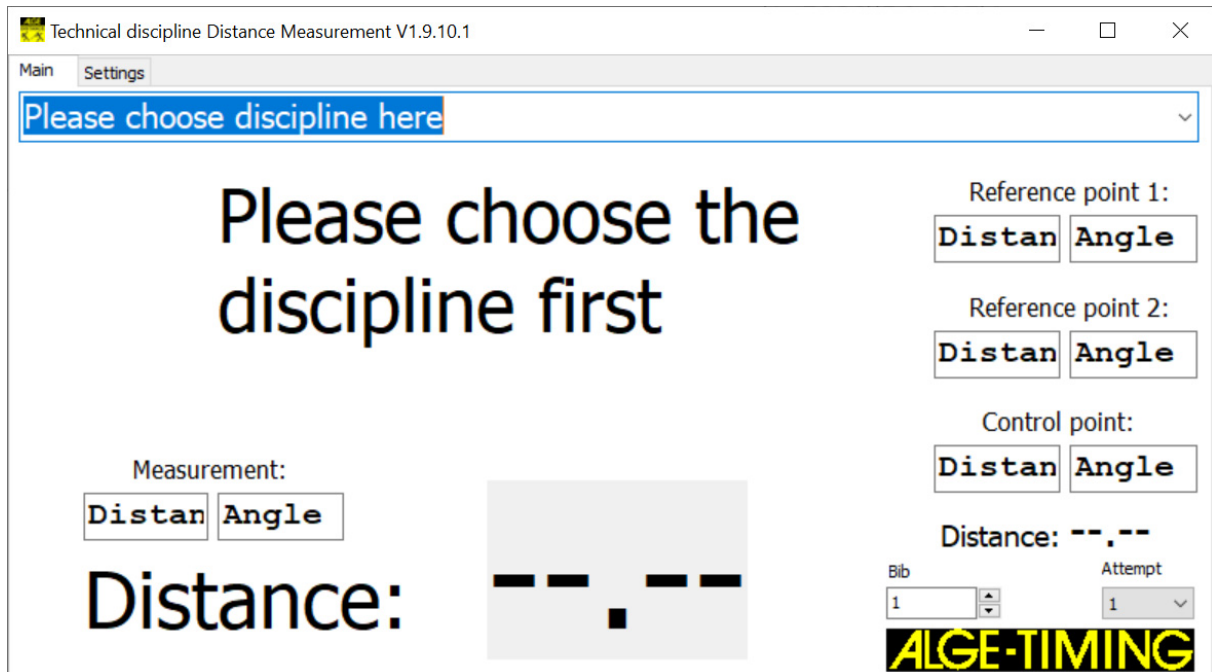
- Hold the prism at the left edge of the take-off bar (limit from the valid to the invalid jump).
- Aim at the prism with the viewfinder, focus and aim it precisely with the adjusting screws.
- The DMD-Arc5 is ready to measure reference point 1.

- Press F1 on the device keyboard for the measurement. The device beeps 3 times after the successful measurement and enters the reference point 1 in the software.
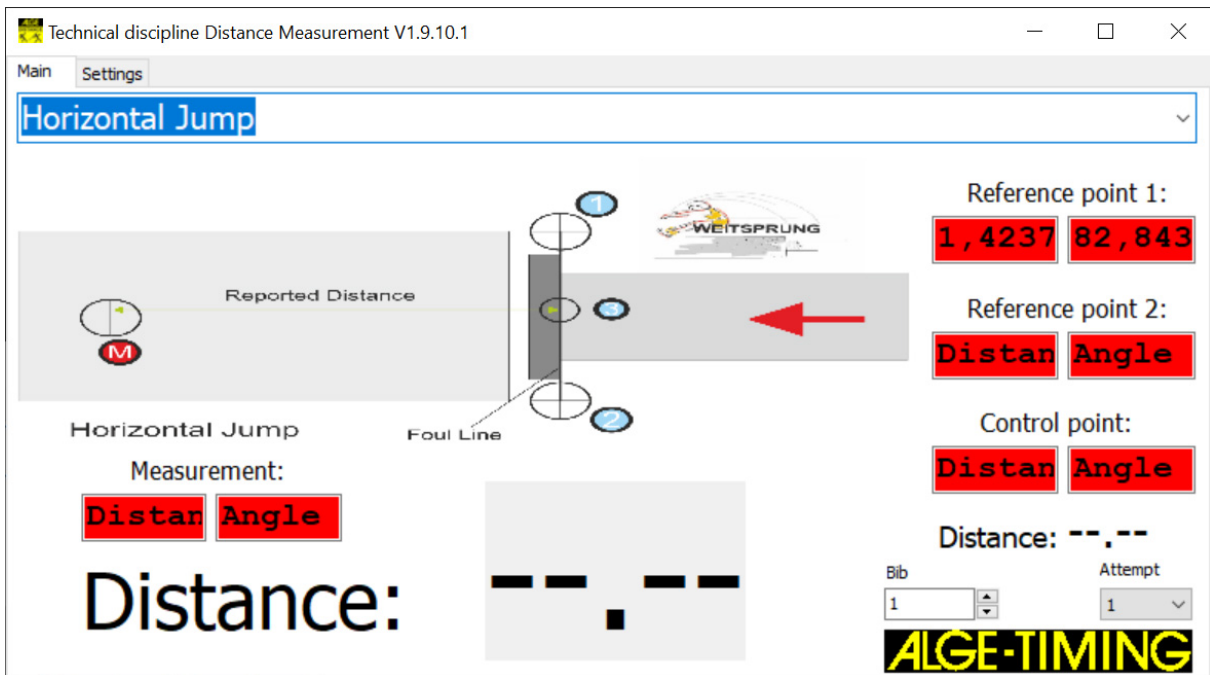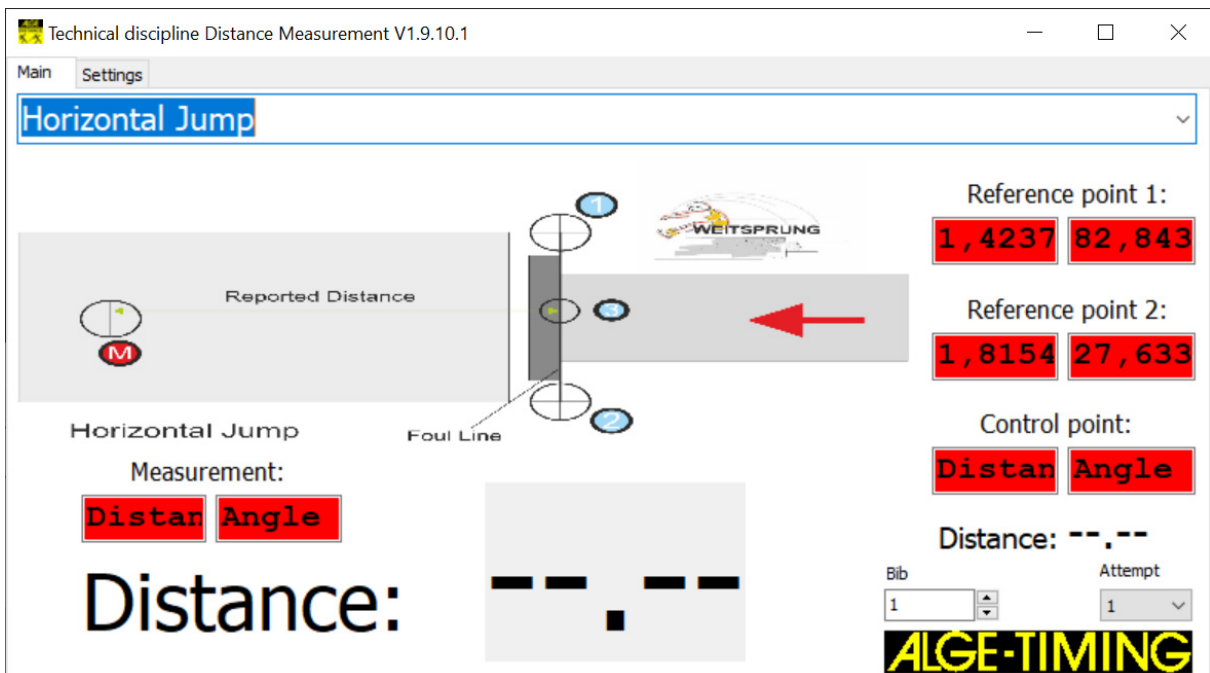

- Hold the prism at the right edge of the take-off bar (limit from the valid to the invalid jump).
- Aim at the prism with the viewfinder, focus and aim it precisely with the adjusting screws.
- The DMD-Arc5 is ready to measure reference point 2.
- Press F1 for the measurement on the device. The device beeps 3 times after the successful measurement and enters the reference point 1 in the software.

- Hold the prism in the middle of the take-off bar (limit from the valid to the invalid jump).
- Aim at the prism with the viewfinder, focus and aim it precisely with the adjusting screws.

- The DMD-Arc5 is ready to measure reference point 3.
- Press F1 for the measurement on the device. The device beeps 3 times after the successful measurement and enters the reference point 1 in the software.
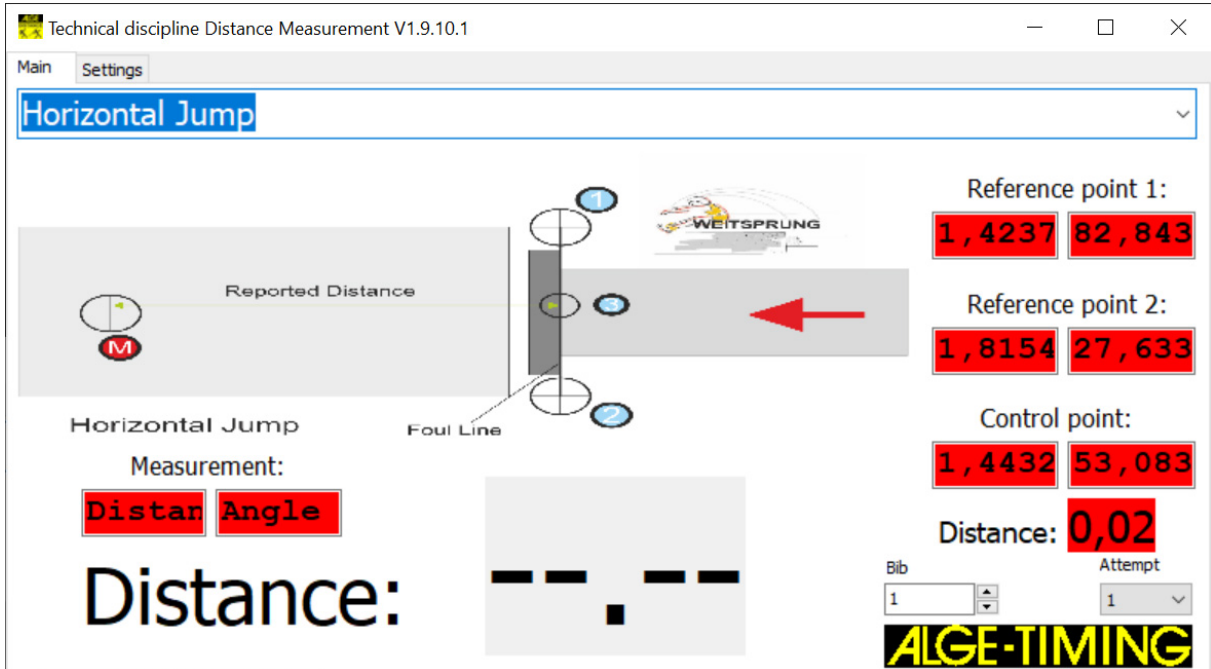
- The distance to the control point is displayed. This should be at 0.00.
- If another value is displayed, the result appears in "RED". The setting should be started all over again.
- If the value is displayed as 0.00, the competition can now begin.
- The start number and the attempt should be entered for each participant.
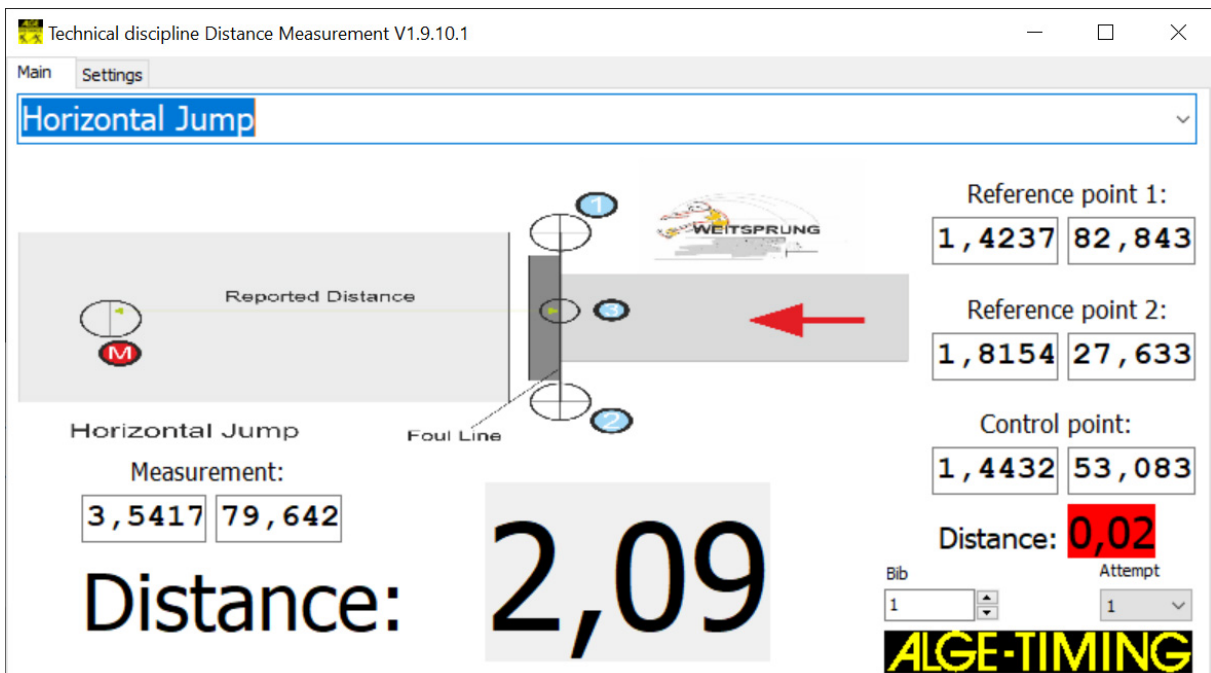
6 Technical Data

Telescope:

Tube Length:	154 mm
Objective Lens Diameter:	Telescope: 45 mm; EDM: 50 mm
Magnification:	30 x
Image:	Erect
Field of View:	1° 30´
Resolving Power:	3"
Min. Focus:	1.0 m

Distance Measurement:

Single Prism:	5000 m
Accuracy Prism Mode:	+/- 2 mm +2 ppm
Measuring Time:	fine: 0.1 s; tracking 0.5 s
Metrologic Correction:	manual input, auto correction
Prism Constant:	manual input, auto correction

Angle Measurement:

Method:	absolute Encoding
Detecting System:	H: 2 sides V: 2 sides
Min. Reading:	0.5"/1"/4"/10"
Accuracy:	2"
Diameter of Circle:	79 mm
Vertical Angle 0°:	Zenith: 0° / Horizontal: 0°
Unit:	360° / 400gon / 6400 mil

Display:

Size:	66 x 42 mm / 240 x 160 dot matrix
No. of Display:	2
Keyboard:	alphanumeric 28 keys

Tilt Correction:

Tilt Sensor:	dual axis
Method:	liquid electric
Range:	+/- 4´
Setting Unit:	1"

Level Sensitivity:

Plate Level:	00" / 2 mm
Circular Level:	10´ / 2 mm

Data Storage Interface:

Storage:	internal memory: 1GB; max. SD-card: 32 GB
Data Interface:	SD-card / mini USB / RS232

Optical or Internal Laser Plummet
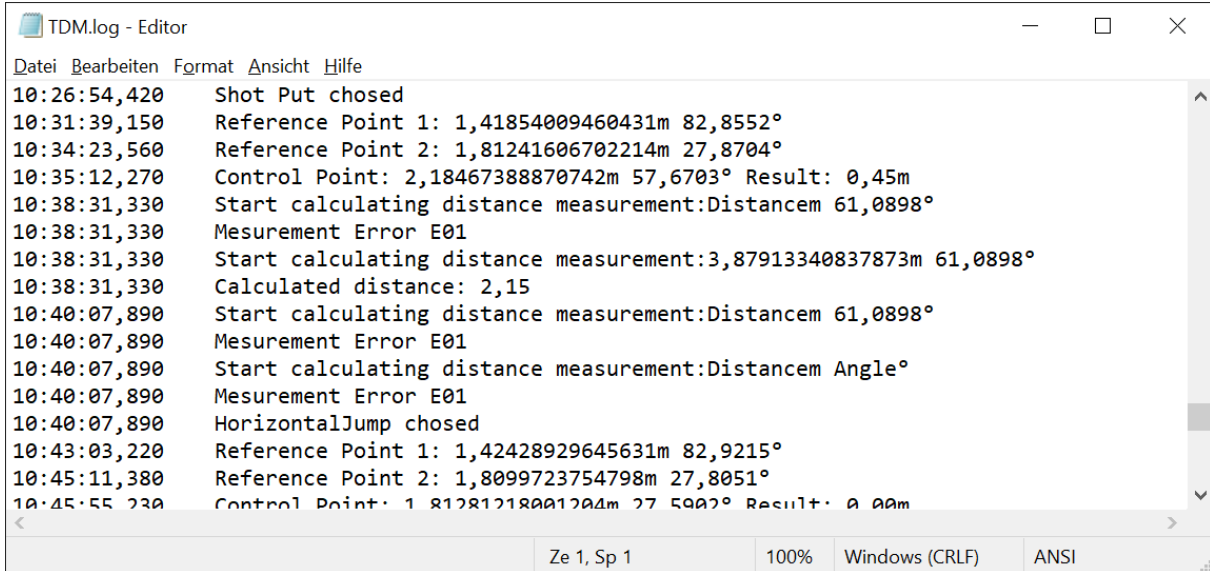
Focusing Range:	0.3 m to endless
Field of View:	5°
Change Laser Intensity:	yes

General:

Laser Class – EDM	Class II
Laser Class - Laser Plummet:	Class II
Working Temperature:	-20°C to 50°C
Battery Type:	Rechargeable Lithium Battery
Battery Voltage:	7.4 VDC
Working Time:	20 h (at 20°C)
Water & Dust Proof:	IP 55

7 Troubleshooting

If the software does not receive results from the DMD-Arc5 measuring device as required or errors appear, you can read exactly what happened in the "TDM.log" file. The log file is stored in the Windows "Documents" folder.

```
TDM.log - Editor                                                    —    □    ×
Datei  Bearbeiten  Format  Ansicht  Hilfe
10:26:54,420    Shot Put chosed                                                    ∧
10:31:39,150    Reference Point 1: 1,41854009460431m 82,8552°
10:34:23,560    Reference Point 2: 1,81241606702214m 27,8704°
10:35:12,270    Control Point: 2,18467388870742m 57,6703° Result: 0,45m
10:38:31,330    Start calculating distance measurement:Distancem 61,0898°
10:38:31,330    Mesurement Error E01
10:38:31,330    Start calculating distance measurement:3,87913340837873m 61,0898°
10:38:31,330    Calculated distance: 2,15
10:40:07,890    Start calculating distance measurement:Distancem 61,0898°
10:40:07,890    Mesurement Error E01
10:40:07,890    Start calculating distance measurement:Distancem Angle°
10:40:07,890    Mesurement Error E01
10:40:07,890    HorizontalJump chosed
10:43:03,220    Reference Point 1: 1,42428929645631m 82,9215°
10:45:11,380    Reference Point 2: 1,8099723754798m 27,8051°
10:45:55,230    Control Point: 1,81281218001204m 27,5902° Result: 0,00m   ∨
<                                                                         >
                                    Ze 1, Sp 1        100%  Windows (CRLF)    ANSI
```

Subject to changes

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