



# ASC3 – FALSE START DETECTION SYSTEM

## USER'S MANUAL

3457.501.02 | Version 1.1 | January 2017



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## Caution and safety precautions

- Never use any other charger than the supplied or a type approved by Swiss Timing. This could destroy the battery, cause damage to unit, and possibly cause personal injury due to fire or/and electrical shock.
- Never bypass a power cord ground lead by breaking off the ground pin, or by using inappropriate extension cords or adapters.
- Never plug a power cord into the AC power source until you have made sure that all installation, cabling and power levels, are proper, and that the applicable procedures in this manual have been followed.
- Protect the equipment against splashing, rain and excessive sun rays.
- Never use the device if it is damaged or insecure.
- Verify the selection of the power distribution.
- Verify that the voltage quoted on the rating plate is the same as your voltage. Connect the appliance only to power sockets with protective earth. The use of incorrect connection voids warranty.
- This program may be modified at any time without prior notification.
- Do not open the case; there is nothing that needs servicing inside it. Nevertheless, if the case must be opened, you must call for some qualified personnel. The power supply cable must be disconnected before opening the case.
- During the transport of all Swiss Timing equipment delivered with a reusable carry case, the said case should be used at all times. This is imperative to limit the damage, such as shocks or vibration that can be caused to the units during transport.
- The same cases should also be used when returning equipment to Swiss Timing for repair. Swiss Timing reserves the right to refuse all guarantees if this condition is not fulfilled.
- If the installation includes a horn, be sure to maintain a sufficient security distance from the public.

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## Environment



This symbol indicates that this product should not be disposed with household waste. It has to be returned to a local authorized collection system. By following this procedure you will contribute to the protection of the environment and human health. The recycling of the materials will help to conserve natural resources.

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# 1 INTRODUCTION

## 1.1 Operation principle

Start monitoring systems are used for athletics events, especially during major competitions.

ASC3 (Automatic Start Control) is suitable for all levels of athletics, and is compatible with timing installations manufactured by Swiss Timing. It enables up to 10 lanes to be monitored simultaneously.

The starting block sensors take in account the physiological response time, i.e. the time elapsed between the starting signal and the thrust of the athlete's foot against the starting block. The system memorizes and prints the reaction times occurring in the interval of 0.3 second before and 0.7 seconds after the starting gunshot. Each athlete's force curve is displayed on the computer screen and can be zoomed for deeper analysis.

In the event of a false start, an acoustic signal is transmitted by the central station to the starter's headphones and to the starting block loudspeakers and the race is recalled automatically.

Online data transfer is made possible via a RS422 serial line to a data handling unit and SCAN'O'VISION units.

An E-GUN transducer for start pistol is included in the set and the starter's headphones are equipped with a microphone.

The instructions given by the starter are amplified and easily understandable by the athletes in their individual loudspeakers mounted on each starting block. The volume of the voice calls and the volume of the false start warning sound can be adjusted individually.

These sturdy starting blocks, made of aluminium and stainless steel, feature an extra-large 153 x 260 mm non-slip adjustable footrest for optimal stability, fully assisting the athlete's performance. The loudspeaker transmits the starter's instructions, the gunshot, and the possible false start signal. The distance between the feet, as well as the foot's starting angle can be freely adjusted.

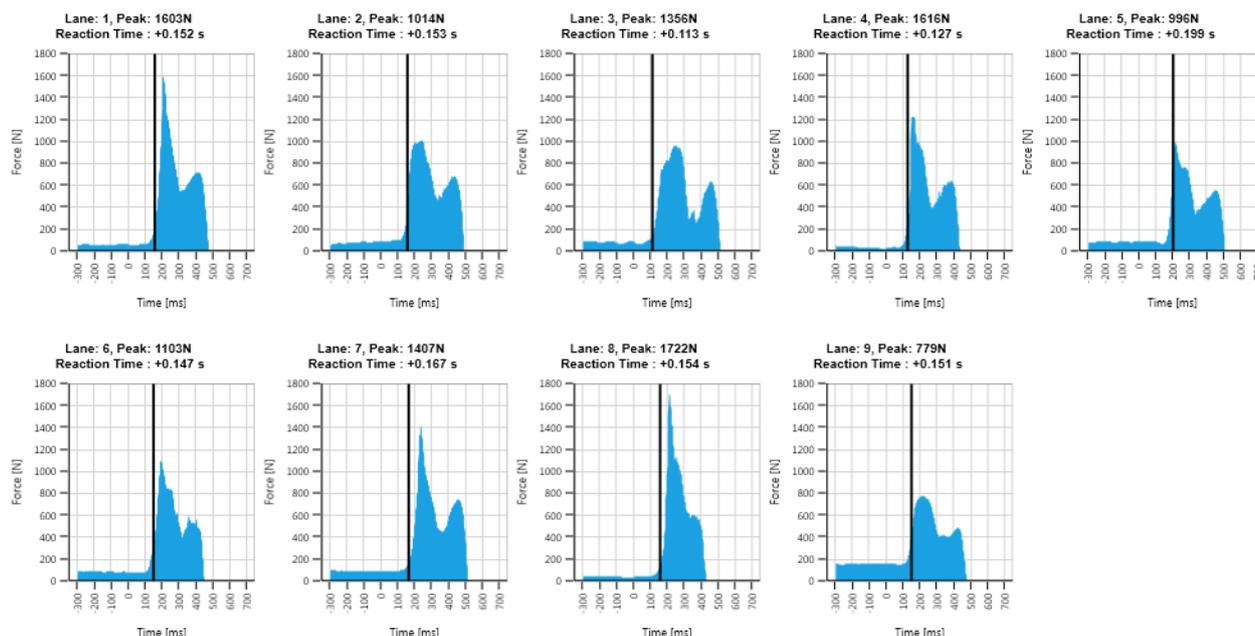
With the new sensor technology, the athletes' starts can be analysed, and thus also serve as an ideal training tool.

The athlete's force [N] is measured before and after the gun shot (at 0 sec) in order to detect a false start. The black line shows the reaction time of the athlete.

At the first attempt, the athlete in lane 3 performed a false start (+0.021F). The illustrated graphs represent the second attempt.

### 12.08.2014 10:19:30 - 100m Men

Close



Attempt	Lane 1	Lane 2	Lane 3	Lane 4	Lane 5	Lane 6	Lane 7	Lane 8	Lane 9	Lane 10
1	+0.156	+0.140	+0.021F	+0.153	+0.138	+0.128	+0.154	+0.161	+0.171	
2	+0.152	+0.153	+0.113	+0.127	+0.199	+0.147	+0.167	+0.154	+0.151	

## 1.2 Starting equipment

1. 1x E-GUN headset (9051.8155)
2. 1x E-GUN Electronic Start Device(3481.704)
3. 1x Transportation case (9072.6001)
4. 1x Cable AC power US (1874.005.US)
5. 1x Cable AC power Euro (1874.005)
6. 1x Cable AC power UK (1874.005.GB)
7. 3x Thermo paper roll (9051.6015)
8. 1x Terminator connector for winder (3457.705)
9. 1x Distribution cable (3448.626)
10. 1x Hex key (9039.8367)
11. 1x Screwdriver (9039.8366)
12. 1x ASC3 software USB (3457.660)
- 1 pcs of the item below per starting block ordered**
13. Cable Tu for 7pMc / 7pFc (3448.645.20)
14. Winder ASC3 (3457.620) contains a 20 m long cable
15. Starting block with loudspeaker (3457.700)



## 2 INSTALLATION

### 2.1 Start connection Battery

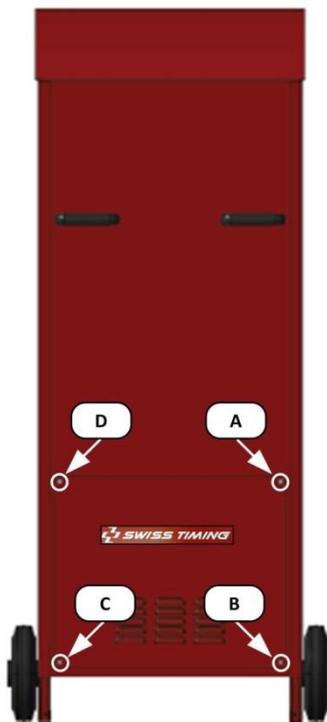


For safety reasons the battery is disconnected during the transport.

Please follow the procedure below before the first use.



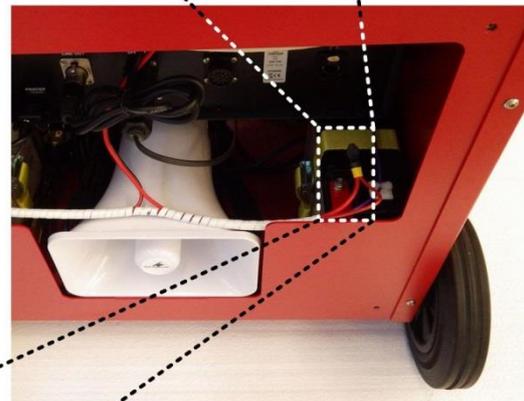
- ① Remove the rear door of the cabinet by unscrewing the 4 screws (A, B, C, D) using the provided Hex key (9039.8367).  
**Warning:** Retain the door by unscrewing the last screw



- ② Unscrewing the screw E using the provided Screwdriver (9039.8366). Remove the black protection sleeve on the crimping cable.  
**Warning:** Do not touch the cabinet with the screwdriver during this operation



- ③ Connect the crimping cable on the red area of the battery with the screw E using the provided Screwdriver (9039.8366).  
**Warning:** Do not touch the cabinet with the screwdriver during this operation



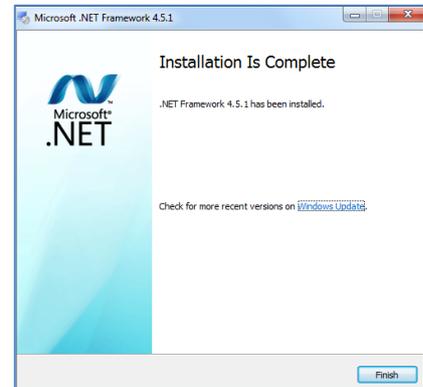
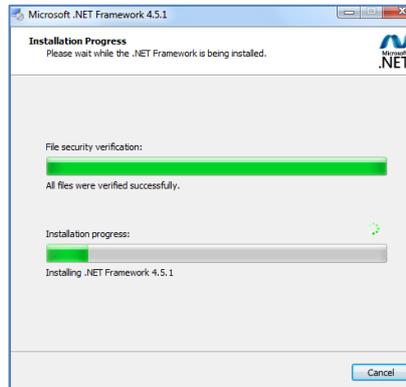
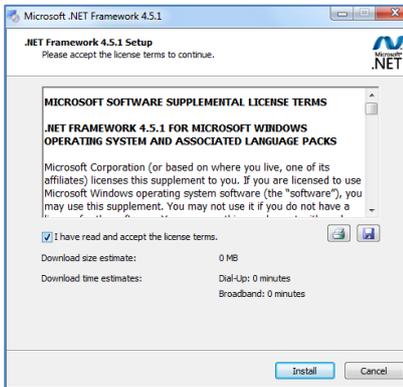
- ④ Put back the rear door of the cabinet by screwing the 4 screws (D,C, B, A) using the provided Hex key (9039.8367).  
**Warning:** Retain the door by screwing the first screw

## 2.2 Software installation

Insert the ASC3 USB software into your computer.

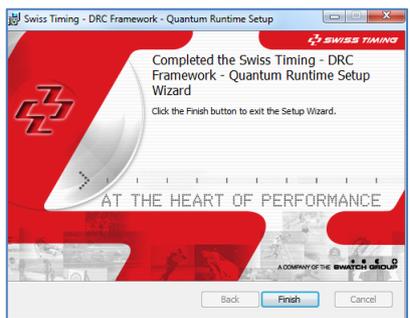
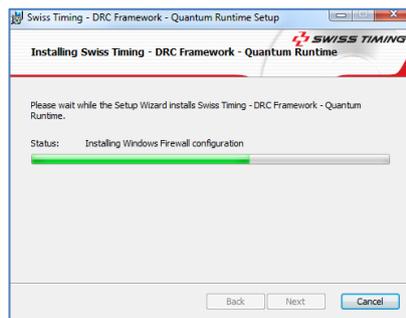
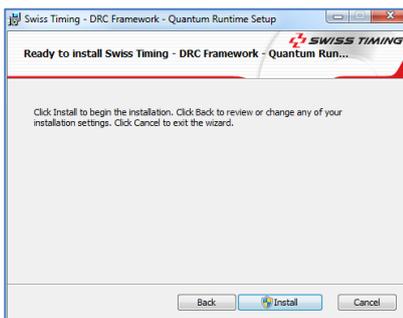
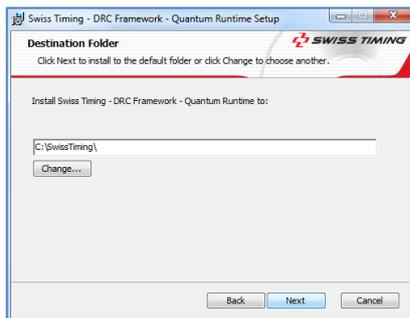
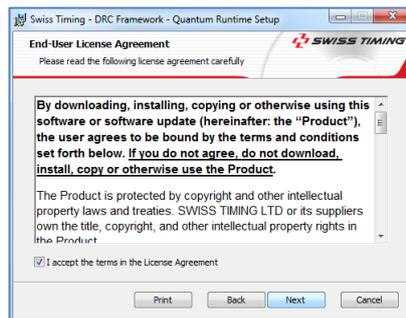
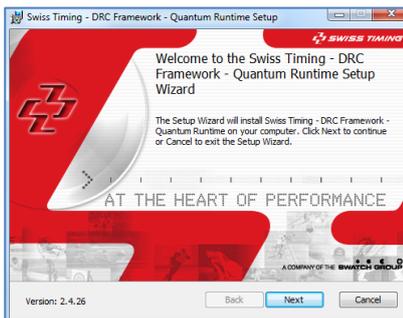
### 2.2.1 Installation Microsoft.NET Framework

Start the USB and install the program *NDP471-KB4033342-x86-x64-AllOS-ENU*



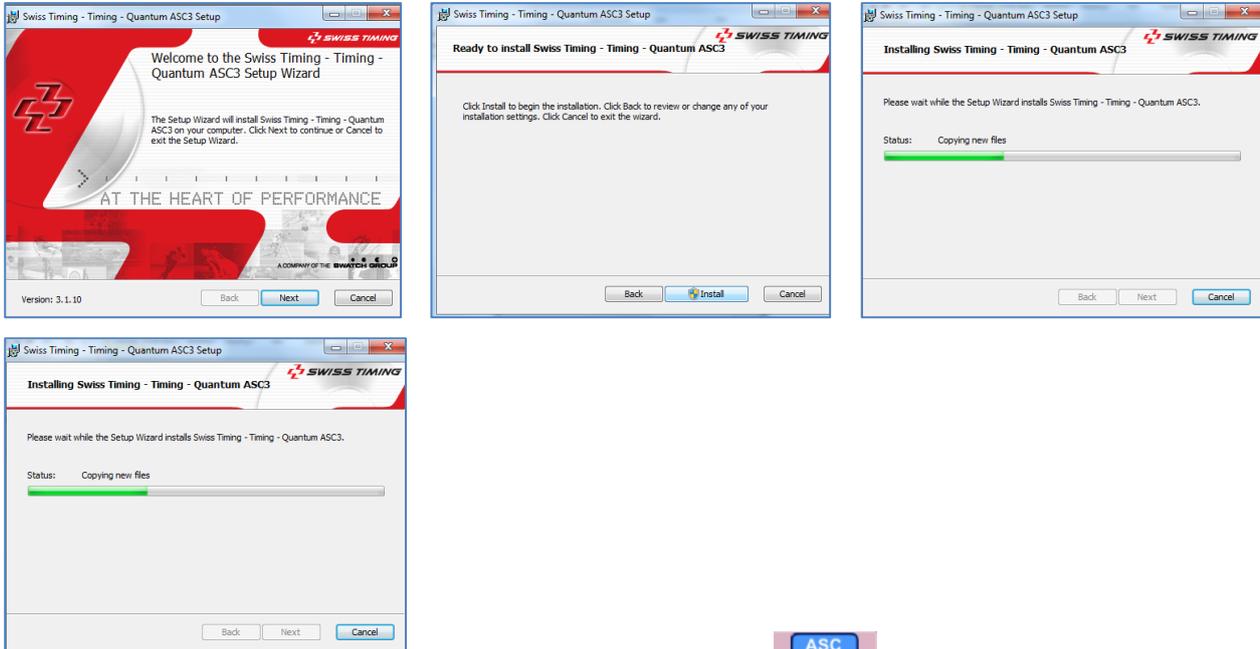
### 2.2.2 Installation DRC Framework

Start the USB and install the program *Swiss Timing - DRC Framework - Quantum Sales*.



### 2.2.3 Installation ASC3 Software

Start the USB and install the program *Quantum ASC3 Setup Sales*.



A shortcut icon ASC3 Quantum appears on your computer desktop.

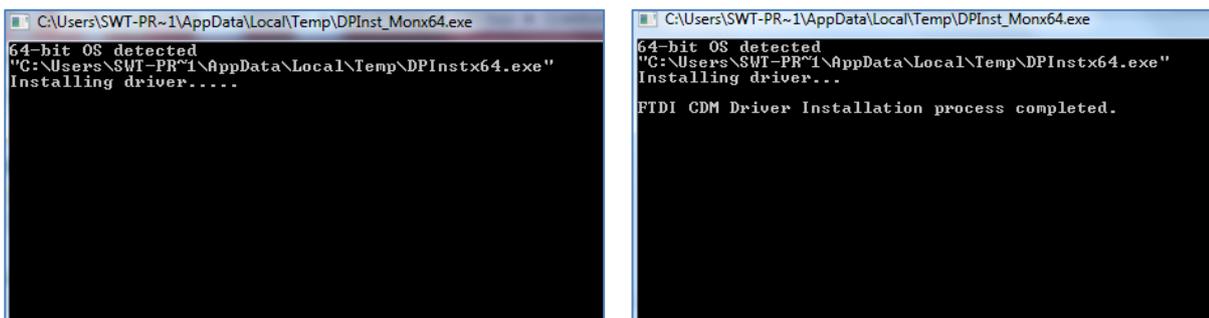


### 2.2.4 Installation FTDI Drivers

Go to the file *CDM20824\_Setup* according to the computer link below.

**C:\SwissTiming\DRCApp\Quantum\FTDI Drivers**

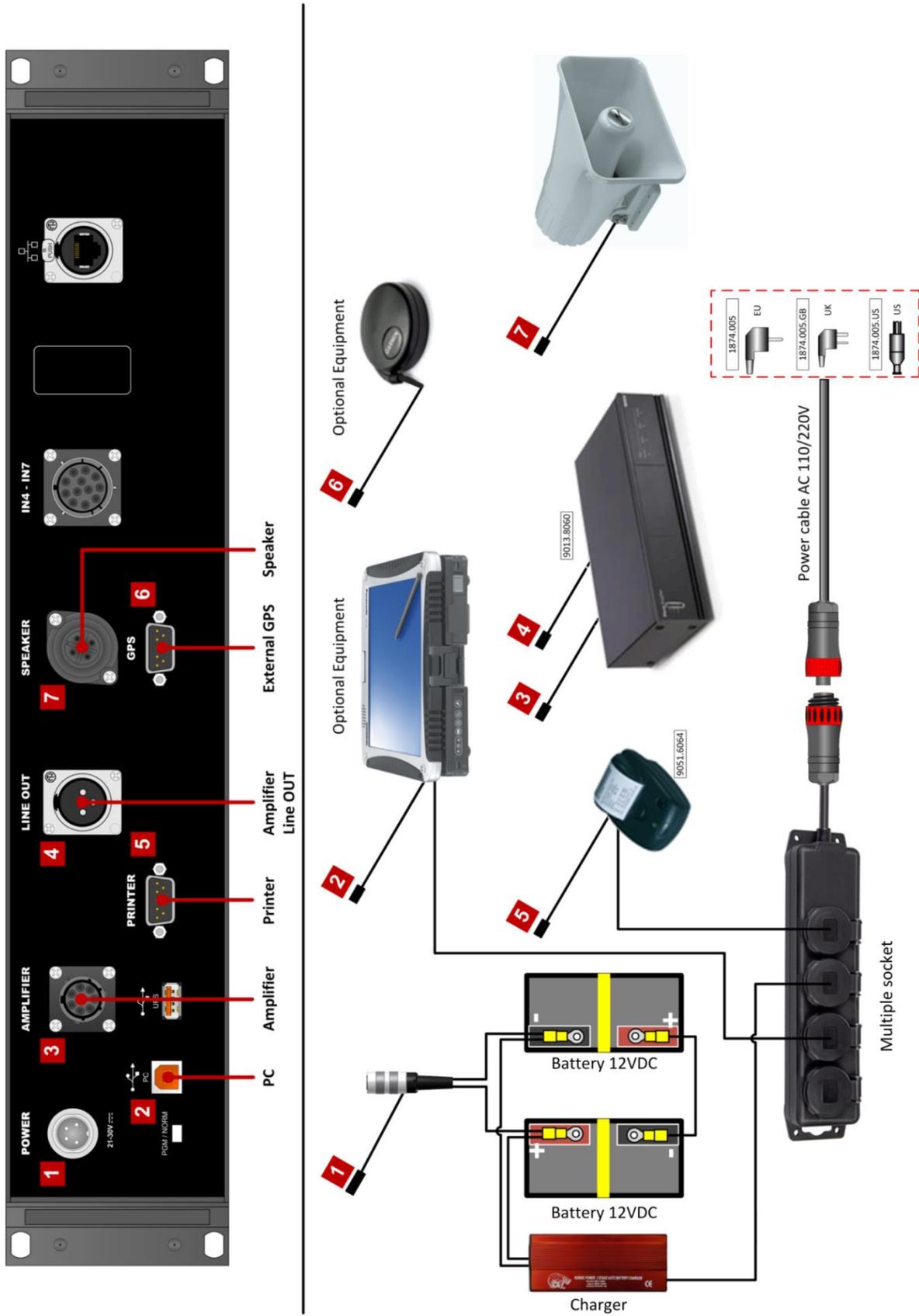
Install the program *CDM20824\_Setup*.



**Warning:** During the first USB connection to the computer, wait for USB driver installation before starting the ASC3 Quantum application.



## 2.4 Connection rear panel



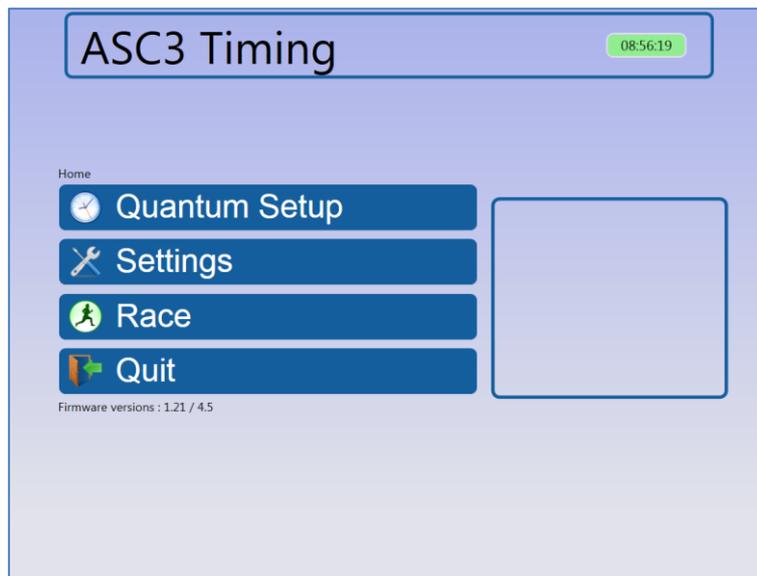
## 2.5 Different start connection

Number of transducers used	Number of Start Line: ASC3 to Timing Room	Start output to timing room	Description
1	1		One start transducer is used. One start connection with the timing room on START1.
2	1		Two start transducers are used. One start connection with the timing room on START1 (mix of the two transducers).

## 3 USER'S SOFTWARE MANUAL

### 3.1 Main Menu

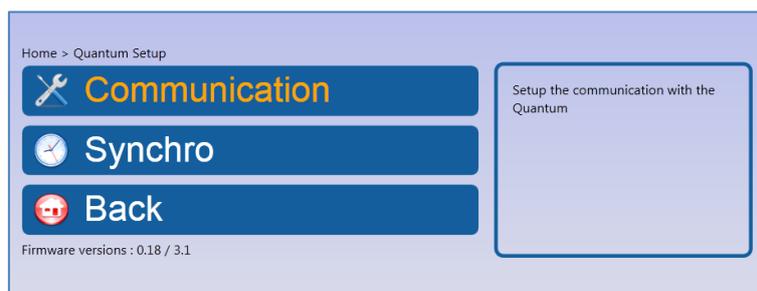
The main screen of the application looks like this:



Description of the menus:

- Quantum Setup: used to connect to the Quantum and to synchronize the Quantum.
- Settings: used to configure some settings (lanes, timings, ...). Can also reprint log files.
- Race: used to enter in test mode or in race mode.
- Quit to exit the application.

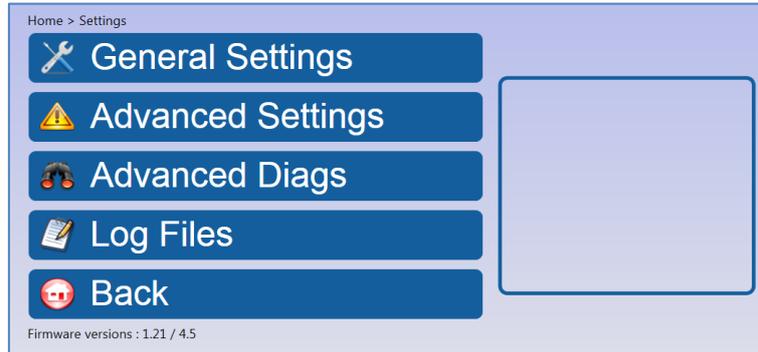
#### 3.1.1 Quantum setup menu



Description of the options:

- Communication: used to connect to the Quantum
- Synchro: used to synchronize the Quantum (with current time, defined time, on a pulse or with a GPS device).

### 3.1.2 Settings menu



Description of the options:

- General Settings: used to configure the lanes, beeps, determine and assign the starting blocks to the lanes.
- Advanced Settings: used to configure more advanced parameters such as timings, curves and serial connections, this menu should normally never be changed.  
**Warning: modifying these values could make the software unusable!**
- Advanced diags: used to monitor the ASC system and the starting blocks main characteristics.

### 3.1.3 Race menu

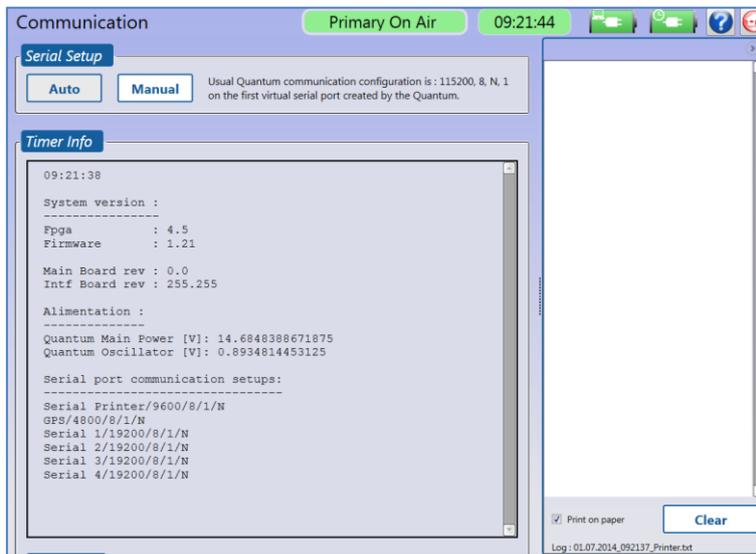


Description of the options:

- Race Short Distances: race mode for distances up to 400m (with starting blocks)
- Race Long Distances: race mode for distances from 800m (without starting blocks)
- Test Mode: enter the test view, used to check the connection with the ASC, the ST4 and the Starting Blocks.

## 3.2 Quantum Setup

### 3.2.1 Communication



The Communication view is used to connect to the Quantum. When the Quantum is not connected, the icon “Timer Link” in the upper right corner is red.

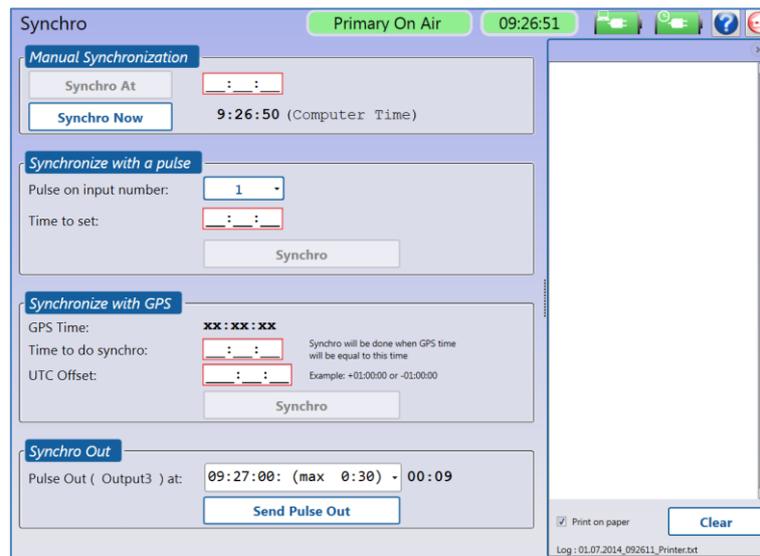
To connect to the Quantum, you can either use the “Auto” button or the “Manual” button:

- Automatic connection works only with a Quantum that has already a serial number written in the USB chip memory. If the connection is not established after a few seconds (max 10), then you have to use the manual connection.
- When clicking on the “Manual” button, a configuration dialog appears. The standard configuration is displayed next to the “Manual” button (standard: 115200, 8, N, 1).

Icons on the top:

Icon	Meaning
	In ASC3, this text should remain green and never change, this is intended to be used with the Quantum64, which has one Primary and Secondary timer in the same case.
	This is the time of the Quantum. Having it in green and moving like a heartbeat means the Quantum is connected and alive.
	Shows the battery level of the computer. The symbol is orange when the computer is not powered to the AC 110/220V.
	Shows the battery level of the ASC3. The symbol is orange when the ASC3 system is not powered to the AC 110/220V.
	Opens this document for reference.
	Quit this view and go back to the menu.

### 3.2.2 Synchro



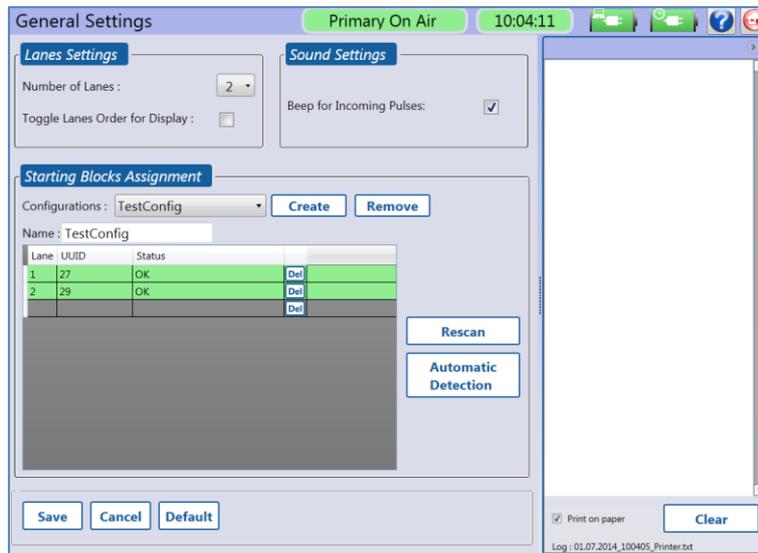
The Synchro view is used to synchronize the Quantum. There are three different ways of synchronizing the time Quantum:

- **Manual Synchronization:** synchronize at the current time or at a given time.
- **Synchronize with a pulse:** synchronize at a given time on the chosen input. Click on the “Synchro” button and wait for the pulse (Enables the EGun and allows to sync using the EGun)
- **Synchronize with GPS:** synchronize with a GPS time. Connect the GPS and wait until a GPS time is displayed. Choose when the synchronization will happen (with UTC offset). Click on the “Synchro” button and wait for the synchronization.

Synchro Out allows sending a pulse at a predefined time to sync all other peripherals in the field. The StartTime V is configured to issue the pulse as if it was a start pulse.

### 3.3 General Settings

This view is used each time the ASC moves from one point to another on the track.



#### 3.3.1 Lane settings

The number of lanes used for the race (between 1 and 10).

The display order of the lanes in the application (to match the physical disposition of the lanes).

UUID is the unique identification number of each starting block (the label with this number is on the starting block).

#### 3.3.2 Sound settings

Check the box to hear a beep for each incoming pulse.

#### 3.3.3 Starting block assignment

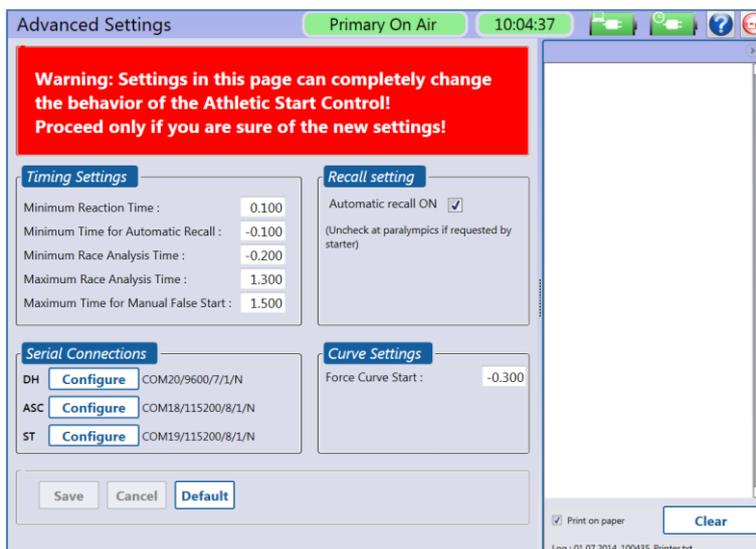
This part allows detecting the starting blocks connected to the system. It also allows configuring and saving different sets of starting blocks (i.e. 100, 200 & 400m).

Click on "Save" to save the settings or "Cancel" to undo the modifications.

"Default" restores the default values and saves them.

### 3.4 Advanced Settings

This gives access to parameters that will normally never be changed during the athletics season.



**Warning: modifying any of these values could make the software unusable!**

Click on "Save" to save the settings or "Cancel" to undo the modifications.

"Default" restores the default values and saves them.

#### 3.4.1 Timing settings

All the parameters to characterize the false start:

- Minimum Reaction Time: reaction times below this value are considered as a false start.
- Minimum Time for Automatic Recall: times below this value are displayed as a false start, but there is no automatic recall of the athletes.
- Minimum Race Analysis Time: minimum reaction time taken into account.
- Maximum Race Analysis Time: maximum reaction time taken into account.
- Maximum Time for Manual False Start: maximum time for a manual false start.

#### 3.4.2 Recall settings

Here you can enable or disable the automatic recall. It should always be ON except for some cases at the Paralympic Games.

#### 3.4.3 Serial connections

Here you can specify which COM ports are used for the different parts of the ASC. These are connected automatically and, except if you are asked to do it, DO NOT CHANGE these settings.

#### 3.4.4 Curves settings

Here you can change when the force curves start to be measured.

### 3.5 Advanced Diags

This view intends to show all the main parameters of the ASC. It is mainly there for monitoring purposes.

The screenshot shows the 'Advanced Diags' window with a status bar at the top indicating 'Primary On Air' and the time '10:05:14'. The main content is divided into two sections:

**Starting Block Status**

Lanes	UID	Connection	Power Supply	Pre-Tension	Synchronization	Configuration	Curve Available	RT Available	Pulse Detected	Pre-Tension Val	Version
1	27	OK	OK	OK	OK	1	-	-	-	538	1.2
2	29	OK	OK	OK	OK	1	-	-	-	487	1.2

**ASC Power Supplies**

Power Supply	Status
5V Global	OK
9V Phone	X
12V Phone	X
12V Timing	OK
12V Start Time	OK
12V GPS	OK
15V Starting Block	OK
12V Misc	OK
12V Sync	OK
5V Out	OK

Buttons: Refresh, Print on paper, Clear. Log: 01.07.2014\_100505\_Printer.txt

In case of unexpected behaviour of the system, you may be asked by an ASC development team member to open this view and check some of these values.

In a normal operating ASC, everything should be OK and green. Here the screenshot shows a system where the phone power supplies are not ok.

### 3.6 Log Files

The screenshot shows the 'Log Files' window with a status bar at the top indicating 'Primary On Air' and the time '10:05:47'. The main content is divided into two sections:

**File list :**

- 30.06.2014
- 01.07.2014

**Race list :**

Buttons: Print Day, Print Race, Force Curves, Print on paper, Clear. Log: 01.07.2014\_100544\_Printer.txt

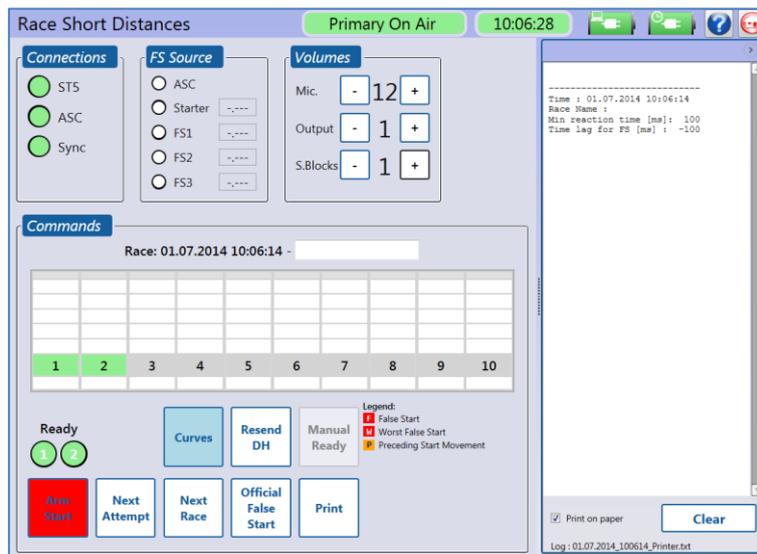
The Log Files view allows the user to reprint previous races. In the File list are displayed all the dates when a race was held. When you select a date, the Race list shows all races of this day, identified by their time of day and their name if you entered one.

It is possible to print a single race with the "Print Race" button or to print a whole day with the "Print Day" button.

The "Force Curves" button allows reading again the curves stored in the file.

Note that there are no force curves for long distance races because starting blocks aren't used.

### 3.7 Race Short Distance



#### 3.7.1 Race view

- **Connections:** displays the status of the ASC, ST5 and Quantum Sync. You can arm the Start only when all the indicators are green. They are automatically updated (if the Quantum was synchronized more than 24h ago, the sync becomes invalid and the status becomes red).
- **FS Source:** indicates the source(s) of a False Start, with the reaction time if available.
- **Volumes:** allows the user to set the different volumes.
- **Commands:** displays the different lanes with the reaction times of the last 5 start attempts. Lanes can be selected by clicking on them. The Ready 1 and 2 indicators become green when the Ready 1 and 2 messages are received. See table below for lanes color meaning.

##### Buttons:

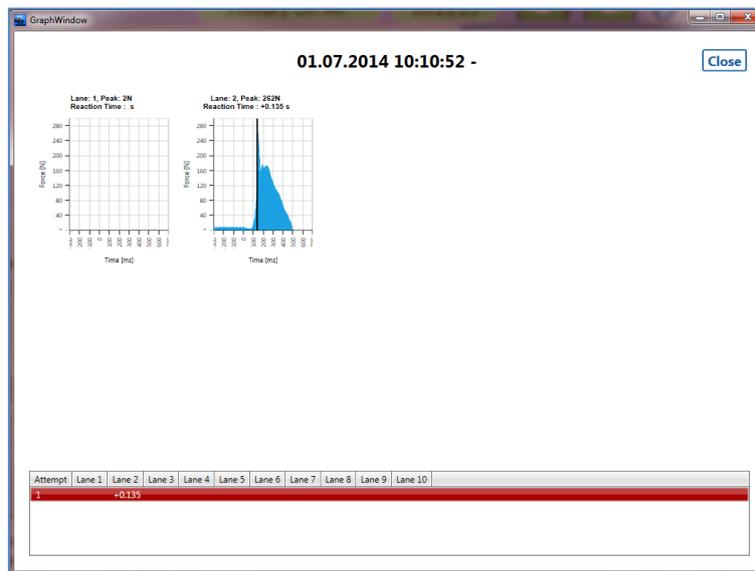
- **Arm Start:** arm/disarm the start. Start can only be armed when both ASC and ST5 indicators are green.
- **Next Attempt:** move to the next attempt.
- **Next Race:** move to the next race.
- **Official False Start:** set the selected lane as Official False Start.
- **Print:** print the current attempt.
- **Curves:** show the received curves for all attempts of the race.
- **Resend DH:** resend current data to the timing room.
- **Manual Ready:** force the Readies manually to operate without the timing room readies (i.e. for testing purposes)

### 3.7.2 Lanes colours meaning

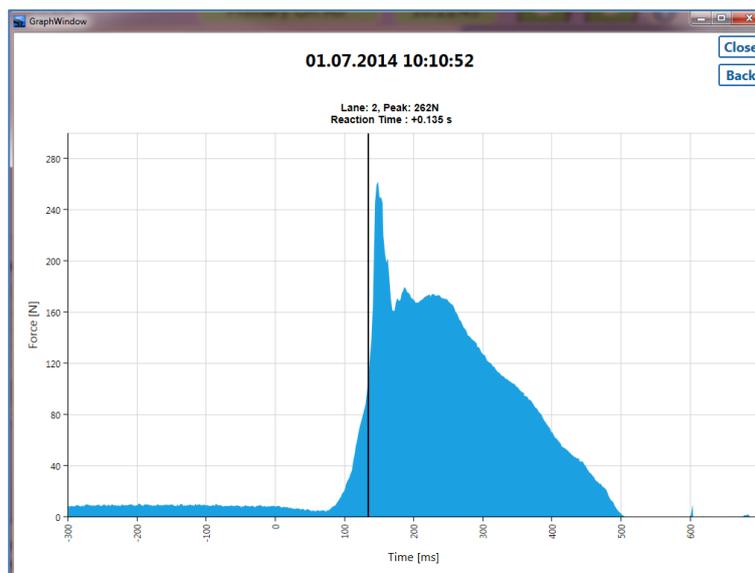
Color	Meaning
Green	Starting block Ok
Orange	Starting block with defects (i.e. pretension too low)
Yellow	Shown when a pulse is received
Red	Starting block not found
Gray	Unused lane

### 3.7.3 Curves

This view shows the received curves for all the attempts of the race. The list at the bottom of the view allows selecting the attempt to display.



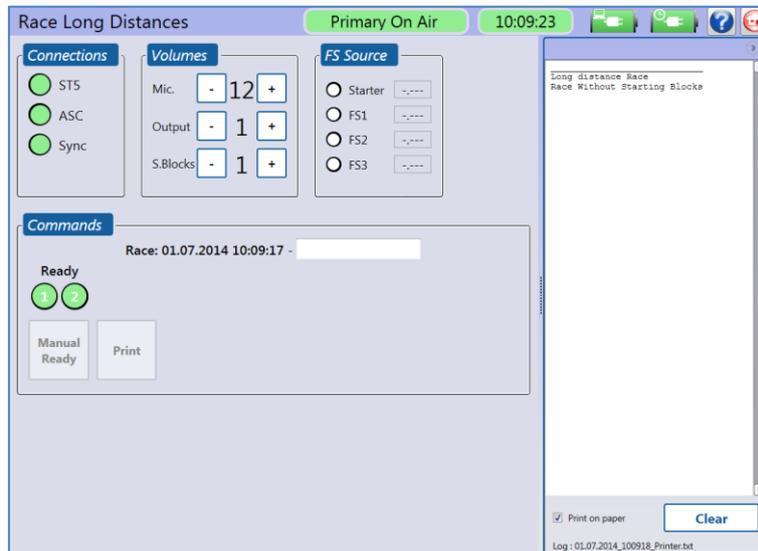
Double-clicking on a curve will show a window containing only this curve, "Back" will come back to the overall view and "Close" will come back to the timing view.



The vertical line shows the reaction time limit.

### 3.8 Race Long Distance

This view is used for all the races without starting blocks, thus the false start information can only come from Starters or Recalls.

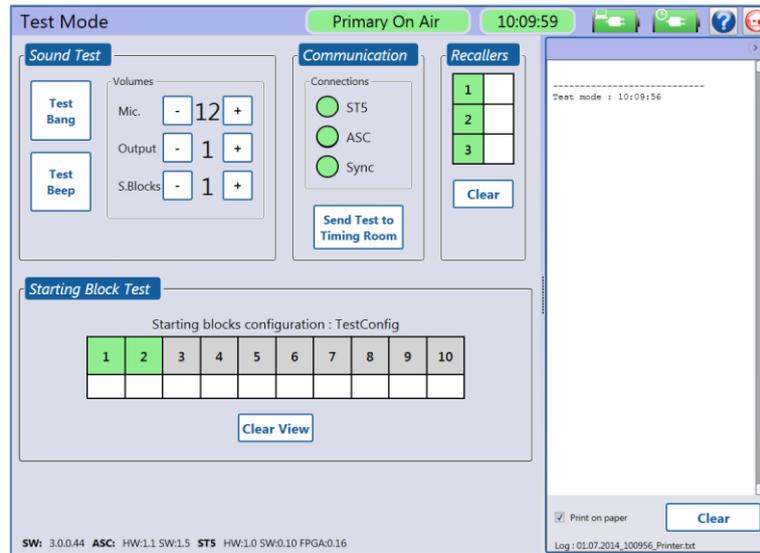


Except for the race name and the volumes, this view is made to work without operator intervention. A new attempt is created each time the readies are received from the timing room.

The Manual Ready is also available for testing purposes to be timing room independent.

The Print button allows reprinting the current attempt, Start time and eventually false start sources.

### 3.9 Test Mode



The Test view is structured like this:

- **Sound Test:** allows the user to set the different volumes and to test the Bang and Beep sounds.
- **Connections:** displays the status of the ASC and ST5. You can also send a set of dummy reaction times to the timing room by clicking "Send Test to Timing room".
- **Recallers:** displays the text "OK" when a pulse is received. The recaller number quickly blinks yellow each time a pulse is received. The "OK" texts can be cleared by clicking on the "Clear" button.
- **Starting Block Test:** displays the different lanes in green if the starting block is connected or in yellow if it is not connected. When connected, if a pulse arrives, the lane blinks yellow quickly and shows the text "OK". All the lanes can be cleared with the button "Clear View". When doing a starting block test, the number of the starting block is played in the starting blocks speakers.
- **Versions:** at the bottom of the view, the versions of the PC software, the ASC (if connected) and the ST5 (if connected) are displayed.

## 4 FORCE CURVES

The starting block measures the total horizontal backwards force on the foot rests. The force is measured in Newton [N]. The absolute value may also depend on the track surface and is not important for the false start analysis. All force curves of a start are identically scaled based on the curve with most force.

The time axis is shown in milliseconds [ms]. Time 0 represents the start signal (begin of the gun-shot).

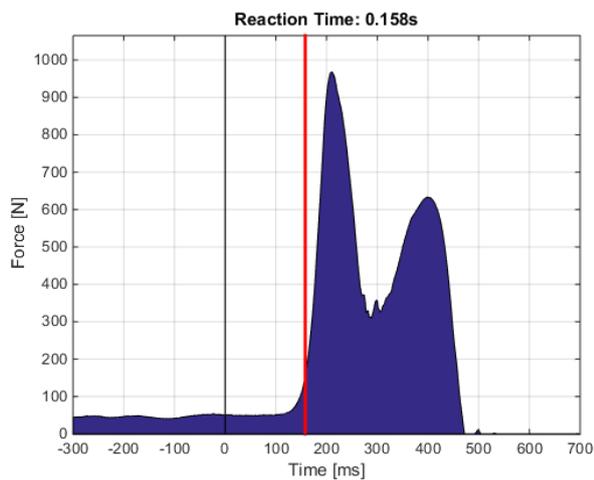
The following sections show examples of force curves recorded by the starting blocks with explanations.

*1N  $\approx$  0.10197kp (kilopond, kilogram-force)  $\approx$  0.22481lbf (pound-force); Thus, the value in Newton divided by 10 equals approximately to kilopond and divided by 5 to pound-force*

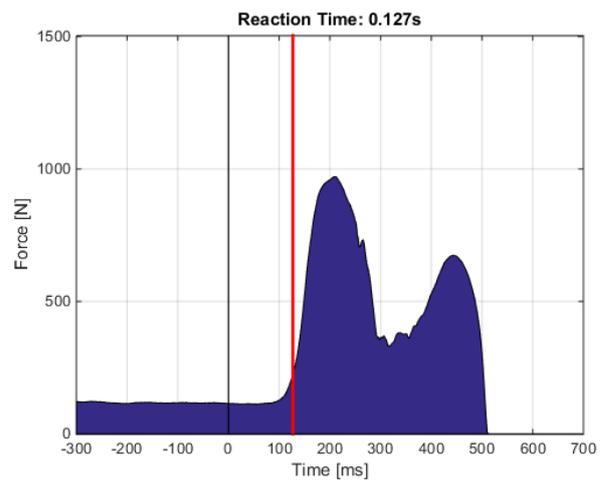
## 4.1 Regular starts

In a curve of a regular start we see a constant force during “set” position. When the athlete starts leaving the block the measured force increases. The first force increase sometimes occurs between 70ms and 100ms after the start. This is ok, as long as the reaction time is above 100ms. The first peak is the maximum push of the hind leg and the second peak the maximum push of the front leg. When the hind leg leaves the footrest some vibrations can often be observed. A spike on top of the first peak (e.g. on example e) is caused by the heel that taps on the footrest.

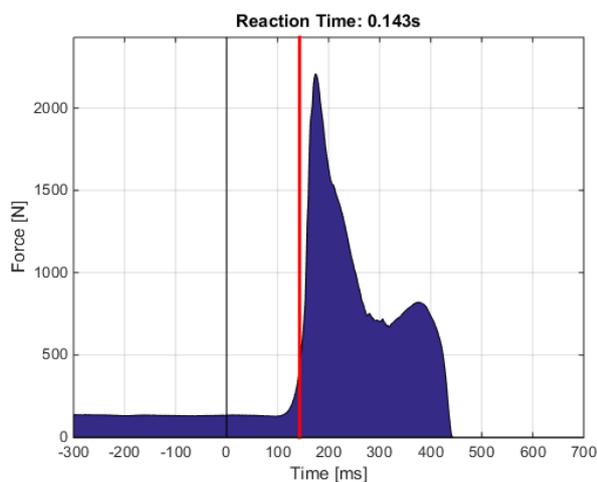
a)



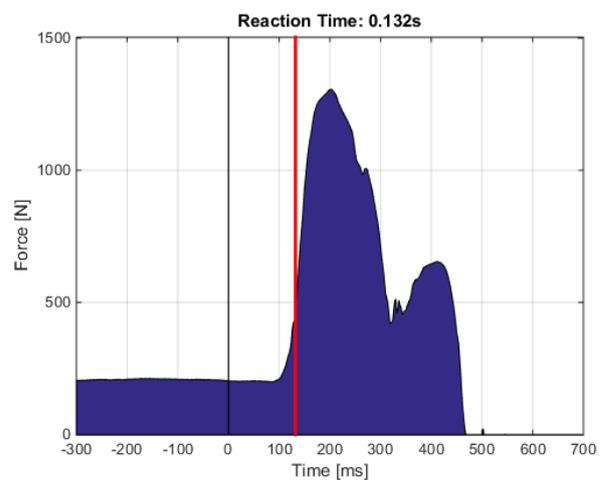
b)



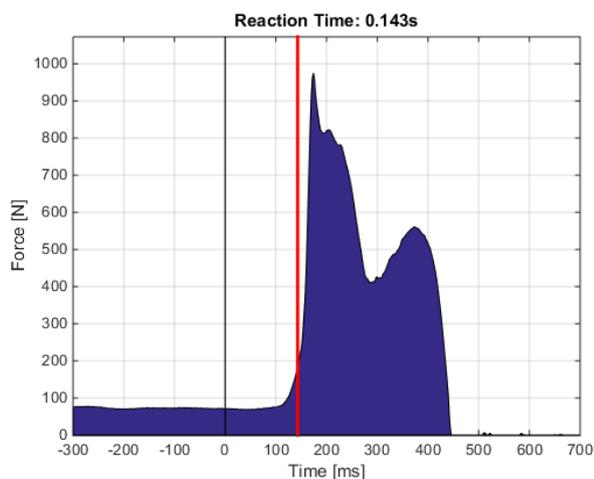
c)



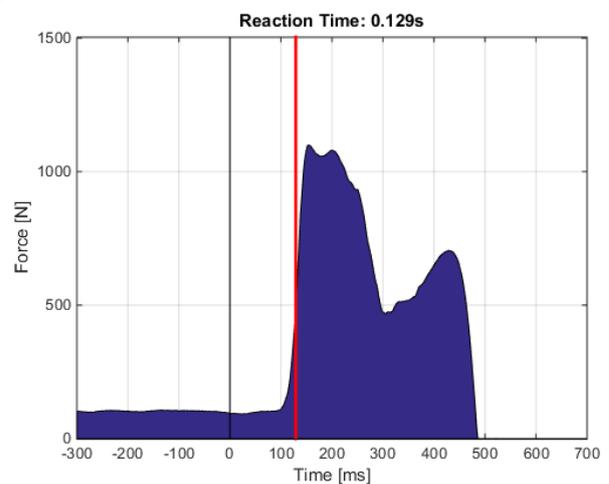
d)



e)



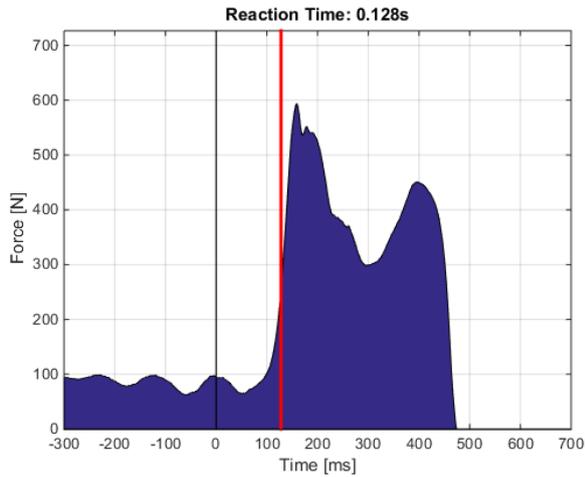
f)



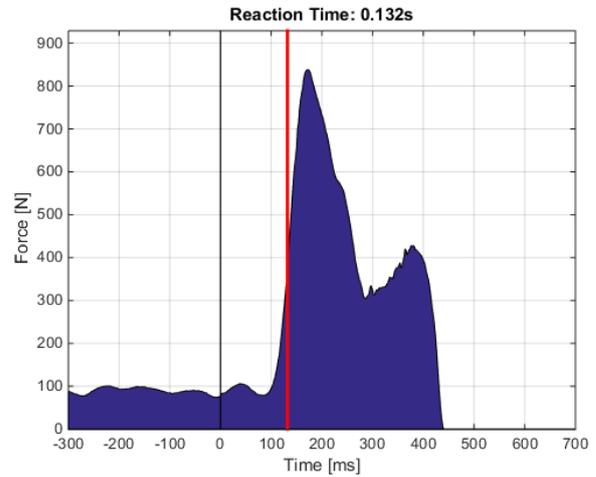
## 4.2 Regular starts with Trembling

A lot of athletes tremble in “set” position. The following curves are examples of athletes that visibly trembled on the block. Trembling is a fast repetitive movement (approximately 100ms period) that may cause amplitudes of up to 50N. Trembling will never trigger a reaction time measurement.

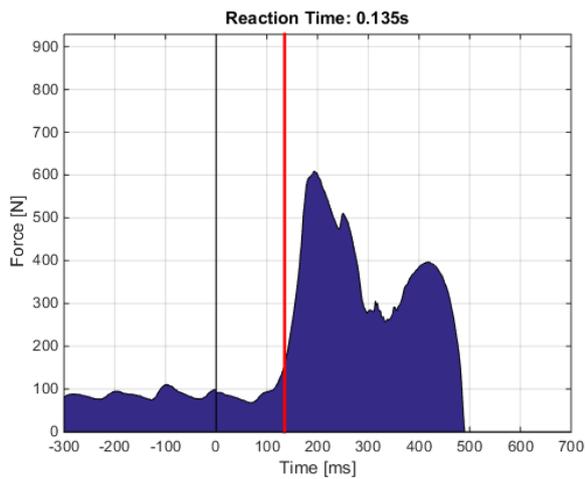
a)



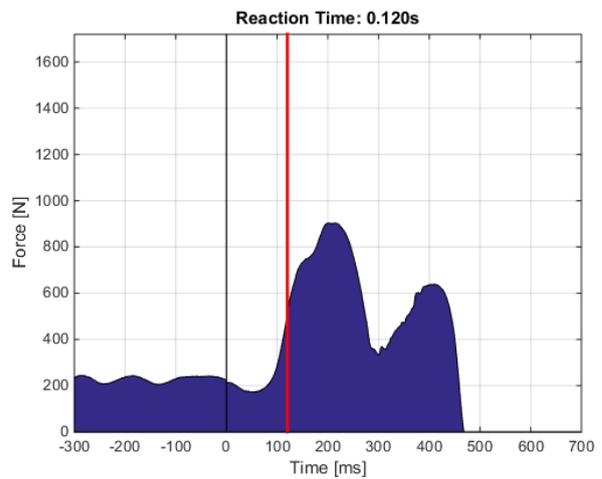
b)



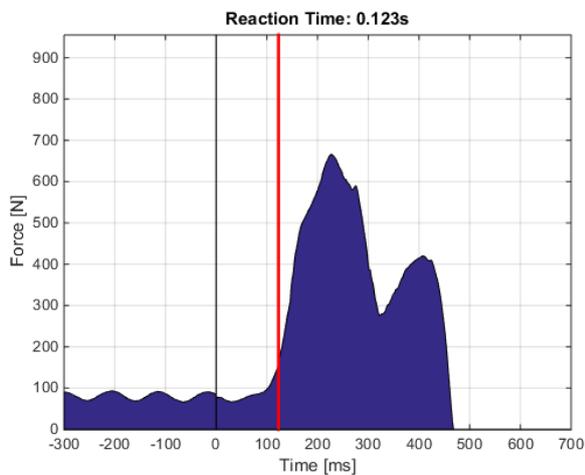
c)



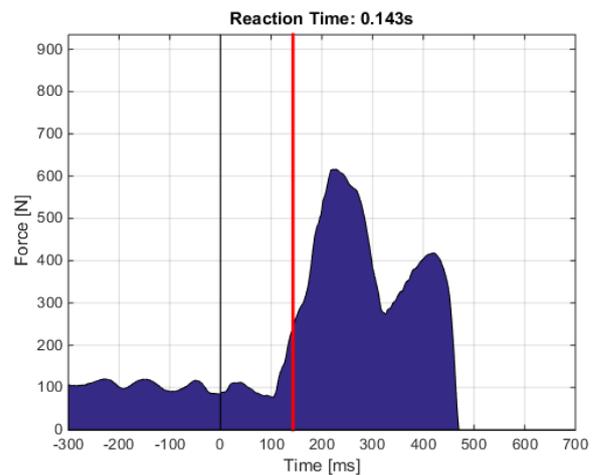
d)



e)



f)

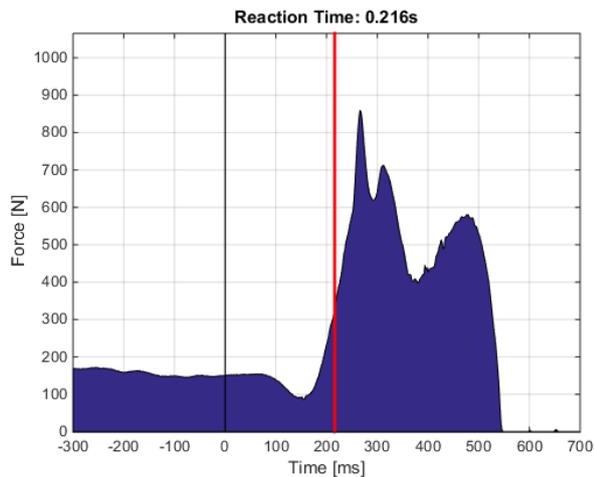


### 4.3 Regular starts with weakening force before leaving

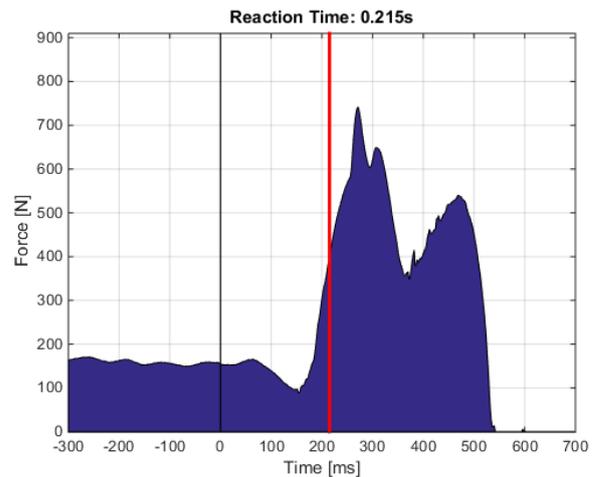
Few athletes weaken the force on the starting block before leaving. It can be seen by a movement of the hip. Although this movement belongs to the start movement of the athlete and is a reaction on the start sound it is not detected by the starting block (it detects only positive force changes). Thus, it does not trigger the reaction time. The reaction time is only triggered by the positive force change afterwards. Therefore, such starts normally have quite high reaction times.

The weakening of the force may start between 70ms and 100ms. However, this can be considered as normal, like first force increase in this time window.

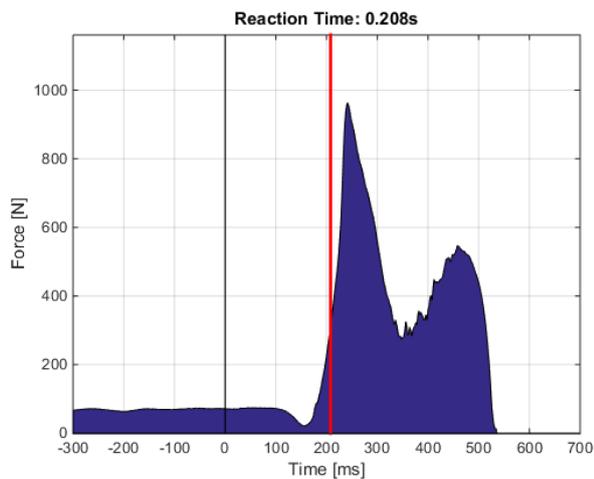
a)



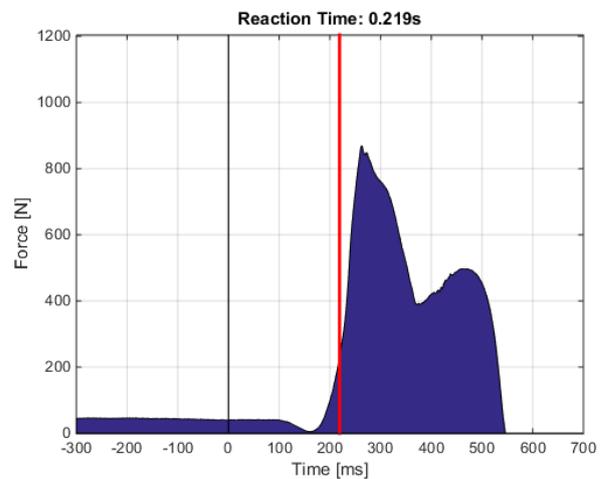
b)



c)



d)



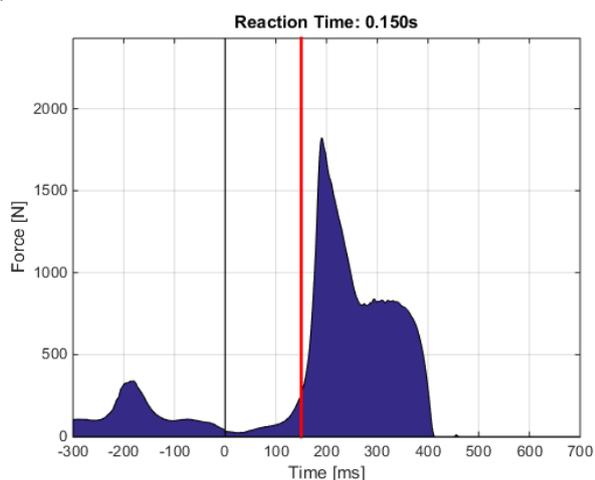
#### 4.4 Regular starts with weakening force before leaving

Twitching is a single movement that occurs during “set” position. In the force curve it is seen as a single peak during the steady phase of set position. According to the IAAF rules, such movement is not a false start, but the starter may give a warning to the athlete for not being steady in “set” position.

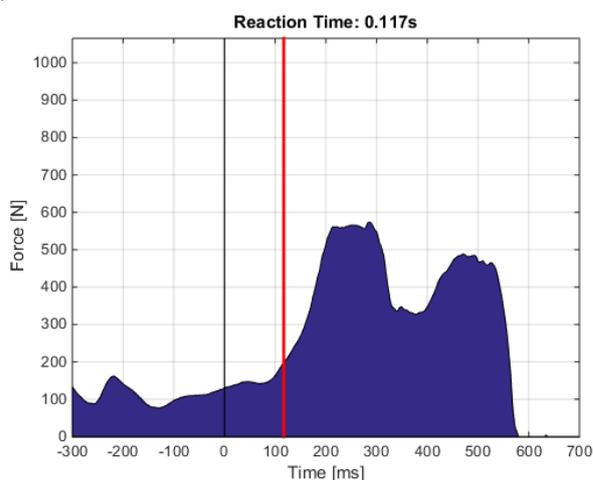
Twitching is normally filtered by the starting block and does not trigger a reaction time. However, if the twitching occurs quite late and starts overlapping with the starting movement (examples *g* and *h*) or if it is very strong and long (example *i*) the filter may fail and a reaction time is triggered.

It is the starter’s decision to determine whether examples *g* and *h* are considered as false starts or not.

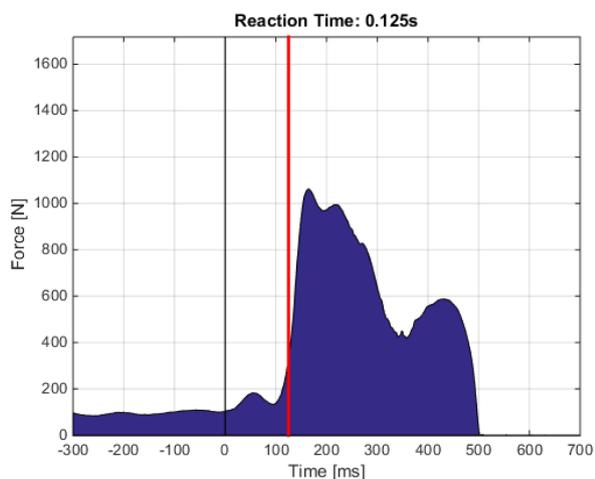
a)



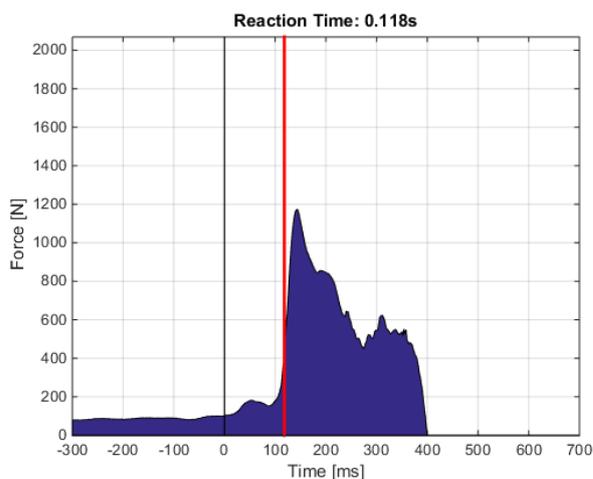
b)



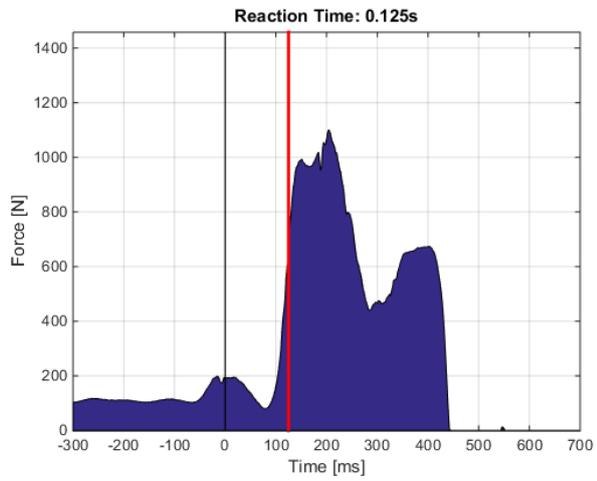
c)



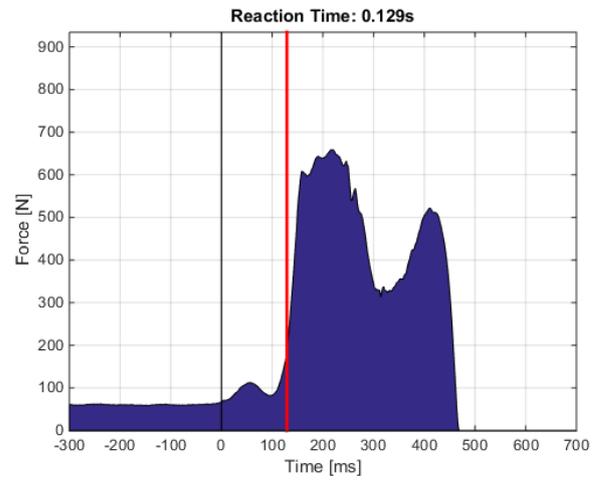
d)



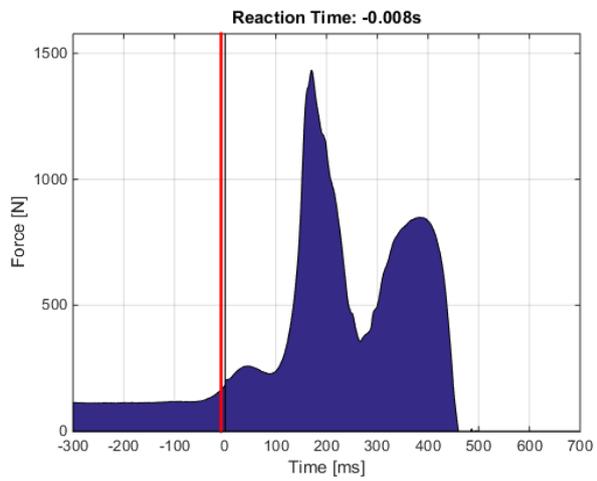
e)



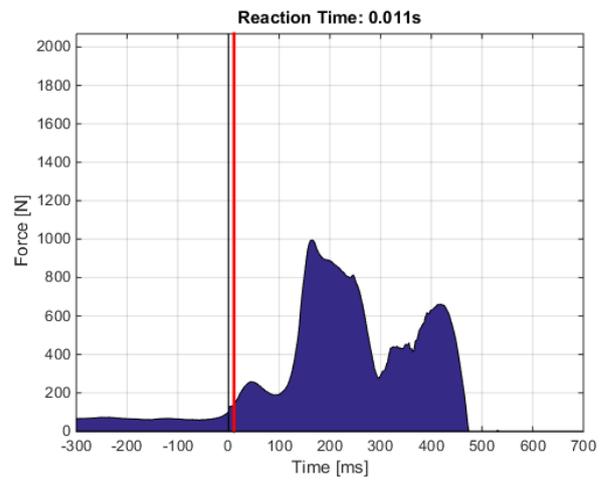
f)



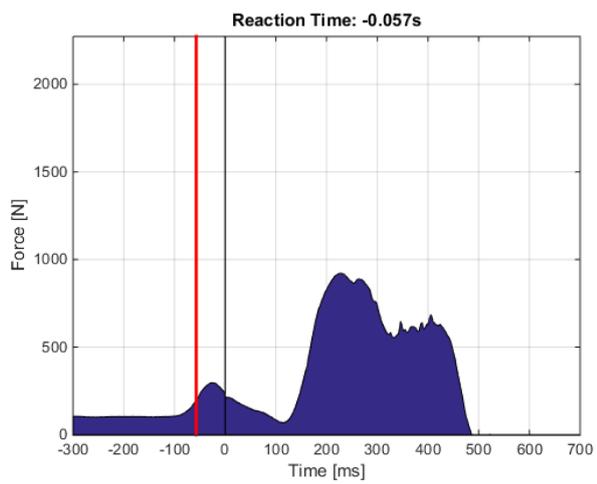
g)



h)



i)

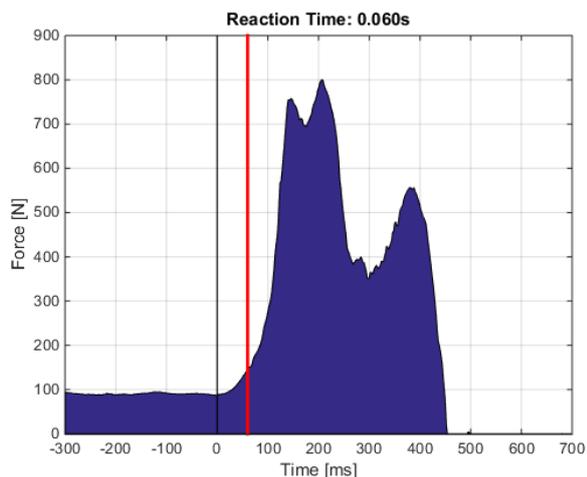


## 4.5 False starts

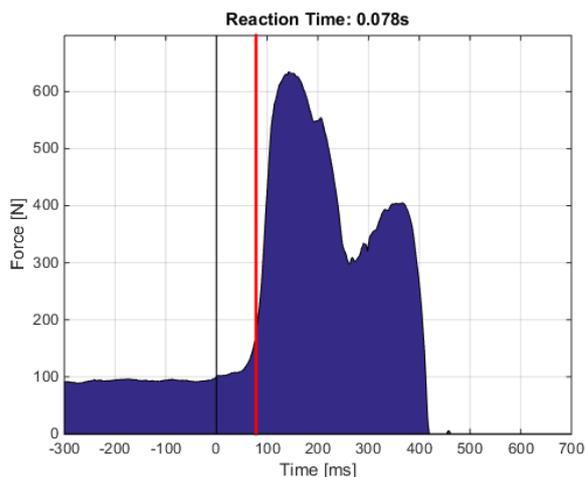
In case of false start we may observe curves with absolutely normal shapes, simply starting too early (examples *a* and *b*). Reaction times of such false starts are normally between 0.050 and 0.099s.

Often athletes realize that they are leaving too early and try to delay the movement already started (examples *c*, *d* and *e*). Reaction times of such false starts are often below 0.050s or even negative. In rare cases the athlete delays that much that it does no longer come out of the block in a normal way (example *f*).

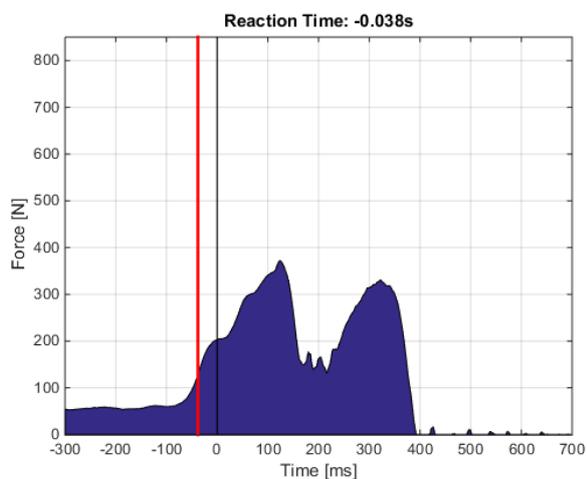
a)



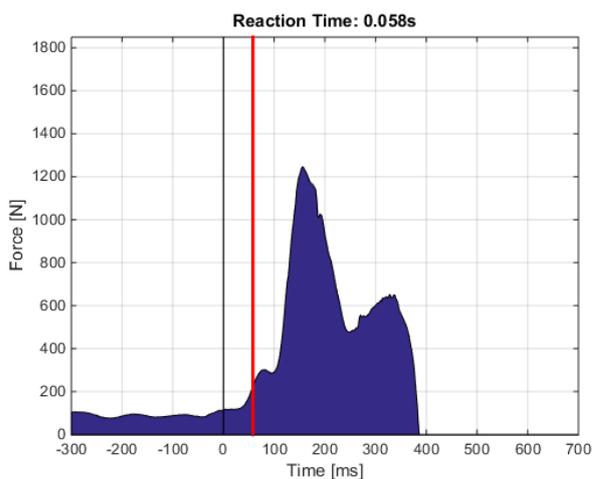
b)



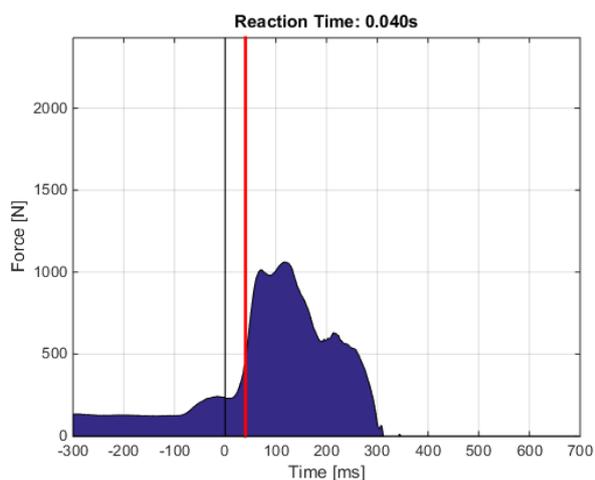
c)



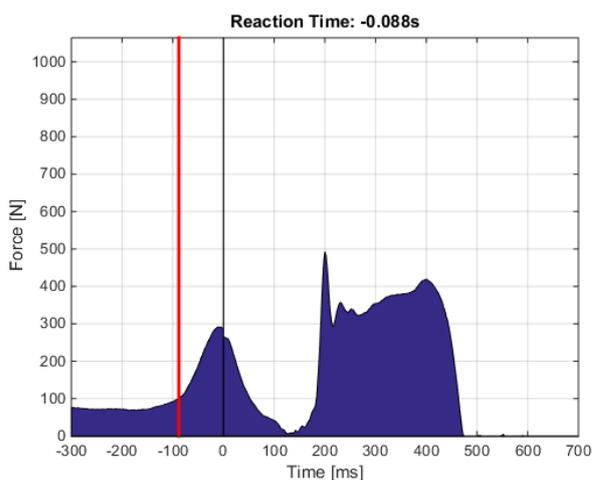
d)



e)



f)



## 5 TROUBLE SHOOTING

The ASC shows all or some lanes in grey with a U after the number although starting blocks are connected and turned on:

- Possible cause: the starting blocks were not connected when turned on.  
Action: turn off and on again the starting blocks using the Starting Block button on the ASC.
- Possible cause: wrong configuration is active.  
Action: go to General Setup, press Automatic Detection or correct the configuration manually, save the configuration and go back to Race View.

Starting block audio does not work:

- Possible cause: battery voltage is below 21V.  
Action: check the battery level on the ASC3 voltmeter software. Charge the battery.



ASC does not start and is not recognized by the PC:

- Possible cause: battery is over-discharged.  
Action: in case of over-discharge, several hours of charging might be necessary before ASC can be started. To start the ASC rack, 9V are required, for correct operation of the audio amplifier, 21V are required.

## 6 TECHNICAL SPECIFICATIONS

### 6.1 ASC3 control cabinet

- Dimensions(LxWxH): 660 x 700 x 1400 mm
- Speaker acoustic signals: 110 dB @ 1m
- Weight: 69 kg
- Cabinet: Aluminum construction, braked carriage, rain-proof casing
- Power supply: 115-230 VAC
- Power consumption: 50 VA (incl. starting blocks)
- Battery: 24VDC 17Ah
- Battery autonomy: 6 hours @ 20°C
- Audio amplifier power: 120 W RMS
- Timing precision: 1 ms
- Data connection: RS422 to timing room
- Operating temperature: 0 to +50°C
- Storage temperature: -10°C to +50°C
- Protection: IP43
- Certifications: CE and RoHS compliant

### 6.2 Starting blocks

- Dimensions (LxWxH): 990 x 410 x 220 to 260 mm (depend to the position of the footrest)
- Weight: 13 kg
- Acoustic signals: False start: 104 dB @ 1m
- Gun shot: 114 dB @ 1m
- Operating temperature: 0 to +50°C
- Storage temperature: -10°C to +60°C
- Protection: IP44
- Certifications: CE and RoHS compliant

### 6.3 UTG 19PFT Timing room connection



Front view

A	TxRx Main -
B	TxRx Main +
C	Not connected
D	Not connected
E	Ready 1 -
F	Start 1 +
G	Start 1 -
H	Ready 1 +
J	Ready 2 -
K	Start 2 +
L	Start 2 -
M	Ready 2 +
N	⏏
P	Not connected
R	Not connected
S	Not connected
T	Not connected
U	Tel +
V	Tel -

**NOTES**



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