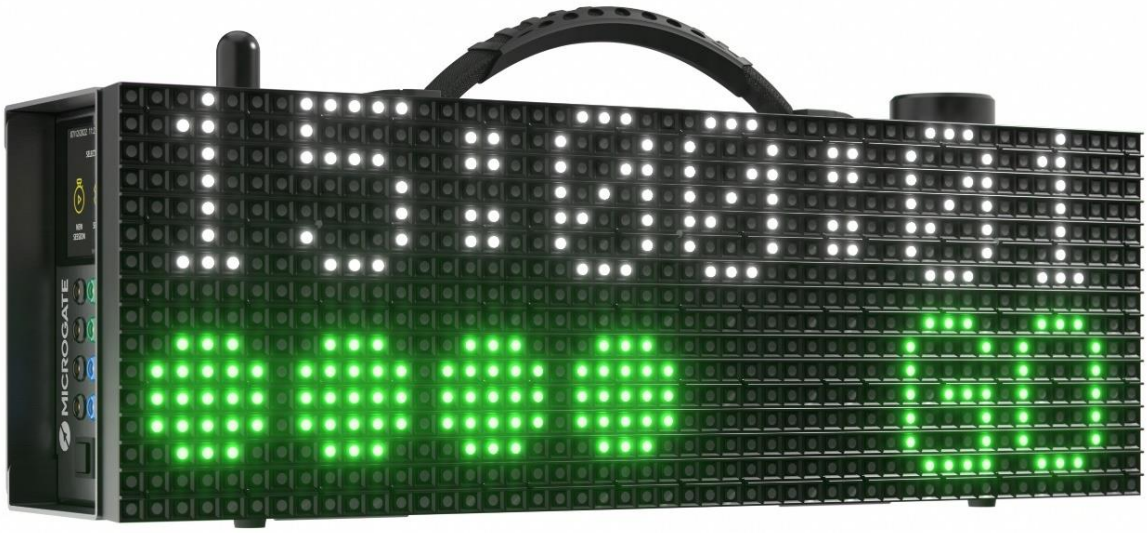
MICROGATE

HICLOCK



User Manual

Firmware Version: 1.2.9

Manual Version: 1.1.0

Release Date: 05/06/2023

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1 HICLOCK GENERAL DESCRIPTION

HiClock is the new Microgate start clock. Using a full colour LED matrix (16x48 pixels with 10mm spacing) it can display different starting sequences flexibly according to the timing requirements. The ability to configure the sequence and repetition time from the side touch display or the ability to load custom sequences from a USB stick enables simple and flexible coverage of even the most insidious requests.

The compact size (480x160x125 mm), limited weight (3.4 kg), connection for a photography type of tripod, extended temperature range (-20°C +60°C), and the temperature-compensated time base of ±1 ppm over the entire temperature range make it the ideal instrument for managing the start sequences in all operating situations. The Li-Ion battery allows the device to operate in a sequence repeated every 30 seconds for longer than 20 hours, and the high-visibility LEDs combined with an outdoor light sensor ensure the device can operate in bright outdoor conditions.

HiClock also has a GPS module with an amplified antenna for synchronizing the time base with the satellite signal for managing starts which can turn it, if necessary, into a synchronizer using one of its external lines.

HiClock can be used either in stand-alone mode or connected to RTPro and ReiPro stopwatches via Bluetooth or WiFi connectivity. When connected with Microgate stopwatches, it behaves as a viewer of the sequences set on the stopwatch. HiClock can be configured (via Bluetooth) to function also as a displayboard to view a competitor's running time, providing previously unthinkable flexibility in the Professional Timing market.

The PC simulator (available for download from timing.microgate.it) also allows you to become familiar with the settings and use HiClock without having the device close at hand.

BASIC CHARACTERISTICS

FULL LED MATRIX	16x48 high-brightness LED and incorporated light sensor
DIMENSIONS (WxHxD)	480 x 160 x 125 mm
TEMPERATURE RANGE	-20°C +60°C
TIME BASE	temperature compensated oscillator + GPS PPS
TIME MEASUREMENT UNITS	selectable down to 1/10,000 of a second
TIME ACCURACY	1/50,000 of a second
CONNECTIVITY	1 USB B device, 2 USB A Host, Ethernet, Bluetooth Low Energy and WiFi
INTERACTION WITH	RTPro, ReiPro
DISPLAY MODE	6 different modes of starting sequence display
REPETITION TIME	configurable repetition time
PRESET TIMES	3 default repetition times can be preset and called up via touch or external keypad

2 INPUTS AND OUTPUTS

2.1 TOUCH DISPLAY

The high-brightness TFT colour graphic display has a viewing area of 59 x 45 mm (2.8”) and a resolution of 320 x 240 pixels. It has excellent visibility in sunlight and is based on capacitive technology. The brightness adjustment is controlled by software.

2.2 INPUTS

The inputs named In1 and In2 on the side panel and identified by the pair of black and green sockets perform the following tasks:

In1

Input In1 is used to connect a photocell or any device that acquires the actual start of the competitor in order to check the advance or delay in relation to the zero of the starting sequence.

In2

Input In2 is for connecting a button acting as a remote control for the following functions:

- A short press pauses the current sequence in progress
- A long press (2 seconds) changes the time of the sequence to the next default value (see chap. 0 for setting the default values).

2.3 OUTPUTS

The outputs named Out1 and Out2 on the side panel and identified by the pair of black and blue sockets provide a starting pulse when the set sequence goes to zero.

2.4 USB CONNECTIONS

On the side panel there is a USB B Device port for connecting to a PC for firmware upgrades and two USB A Host ports for connecting USB sticks or serial adapters.

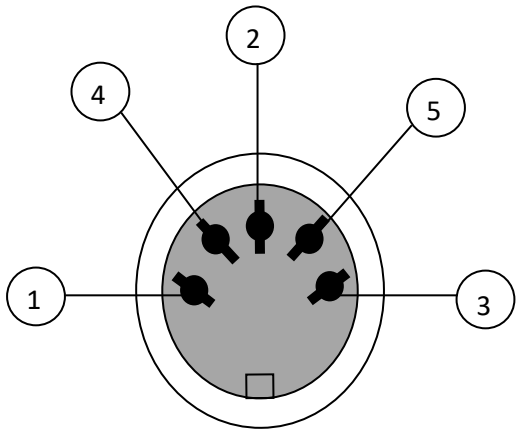
2.5 THE RJ45 ETHERNET CONNECTOR

The RJ45 connector is used to connect HiClock to a LAN network for it to be piloted by the RtPro or ReiPro stopwatches or by a PC via port 21967 of the selected IP address.

2.6 THE AMPHENOL CONNECTOR

The 5-pole Amphenol connector allows HiClock to be powered at a voltage of from 12 to 28 volts in direct current.

DIN 41524 female connector for panel 5 poles 180°

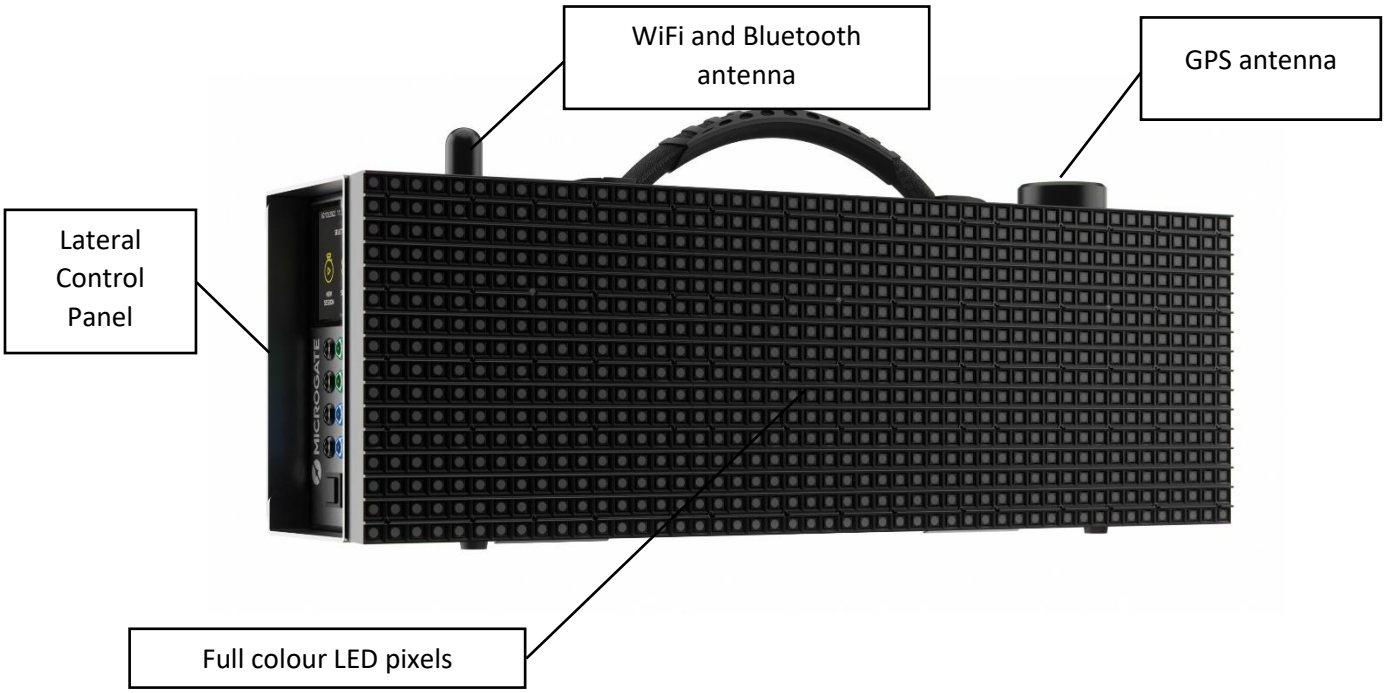


5-pole 180° socket for power supply

1	Ground
2	Not connected
3	Permissible external power input from 12 to 28, maximum power absorption 50 W
4	Ground
5	Permissible external power input from 10 to 28, maximum power absorption 50 W

3 COMMUNICATION

HiClock is equipped with an external amplified GPS antenna for synchronization and a Bluetooth/WiFi antenna for optimum communication with Microgate or PC stopwatches. The full-colour LED matrix then enables optimal starting sequences to be viewed and the external IP67 speaker to be used for sound generation.

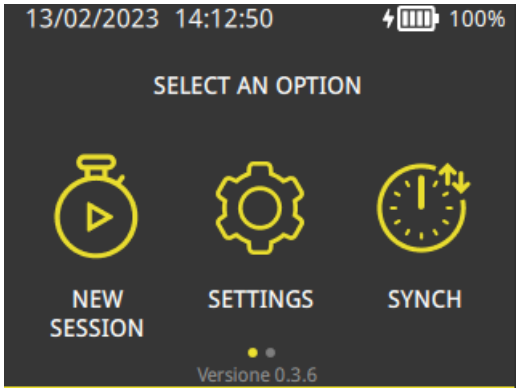


4 MANAGEMENT SOFTWARE

Once the system is turned on using the ON/OFF button, the home screen gives us the following options:

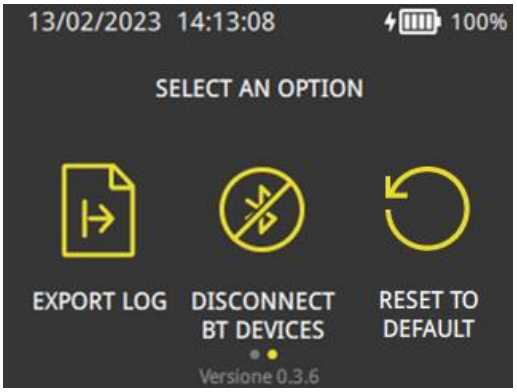
Page 1

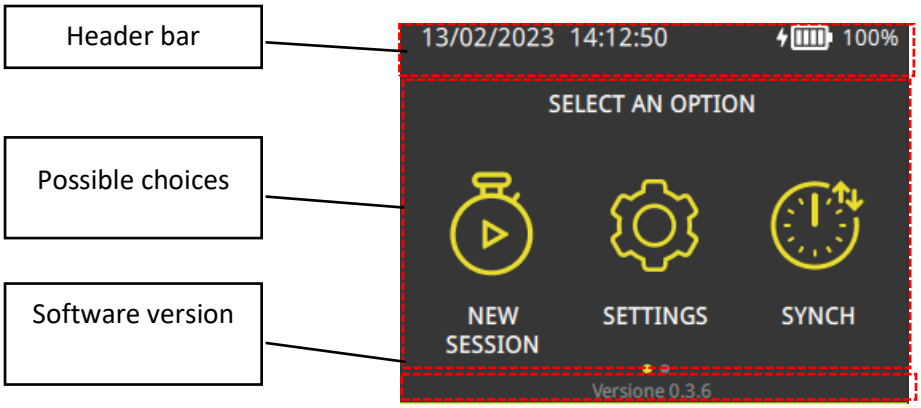
1. Start a new session
2. Settings
3. Sync



Page 2

4. Export Log
5. Disconnect BT devices
6. Reset to default





The header bar contains the following information:

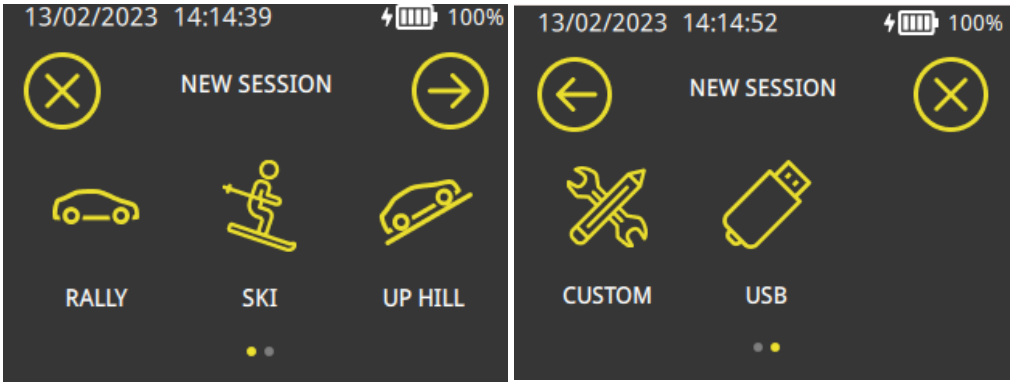
- the time of day
  - Red if not synchronized
  - White if the system has been synchronized
- the Bluetooth symbol
  - Only present when connected to another device
- the satellite symbol
  - White if not used
  - Red if enabled and a valid signal for synchronization has not yet been received
  - Green if enabled and a valid synchronization signal has been received
- the battery symbol with the marks for the current charge

Icons for the available choices are displayed in the middle area and, if there is an additional viewing page, dots are displayed representing the number of available pages.

At the bottom of the screen there is the version number of the management software.

4.1 NEW SESSION

Once you are in the New HiClock Session menu, you can select the type of session you want to use.



The available sequences:

- Rally
  - Rally 1
  - Rally 2

Rally 1	Time in seconds	Light	Tone	False start window
	-10	Red	Long Boop	No False
	-5	Yellow Pixel	Beep	No False
	-4	Yellow Pixel	Beep	No False
	-3	Yellow Pixel	Beep	No False
	-2	Yellow Pixel	Beep	No False
	-1	Yellow Pixel	Beep	No False
	0	Green	Long Beep	False
	21	Off	Silent	No False

Rally 2	Time in seconds	Light	Tone	False start window
	-10	Red	Long Boop	No False
	-5	Yellow	Beep	No False
	-4	Yellow	Beep	No False
	-3	Yellow	Beep	No False
	-2	Yellow	Beep	No False
	-1	Yellow	Beep	No False
	0	Green	Long Beep	False
	31	Off	Silent	No False

- Up Hill
  - Up Hill 1
  - Up Hill 2

Up Hill 1	Time in seconds	Light	Tone	False start window
	-10	Red	Long Boop	No False
	0	Green	Long Beep	False
	20	Off	Silent	No False

Up Hill 2	Time in seconds	Light	Tone	False start window
	-10	Red	Long Boop	No False
	-5	Yellow	Beep	No False
	-4	Yellow	Beep	No False
	-3	Yellow	Beep	No False
	-2	Yellow	Beep	No False
	-1	Yellow	Beep	No False
	0	Green	Long Beep	False
	11	Off	Silent	No False

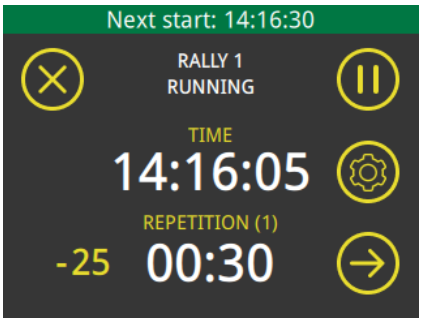
- Skiing
  - Alpine Skiing
  - Nordic Skiing

Alpine Skiing	Time in seconds	Light	Tone	False start window
	-10	Red	Long Boop	No False
	-5	Green	Beep	False
	-4	Green	Beep	False
	-3	Green	Beep	False
	-2	Green	Beep	False
	-1	Green	Beep	False
	0	Green	Long Beep	False
	5	Red	Silent	No False
	10	Off	Silent	No False

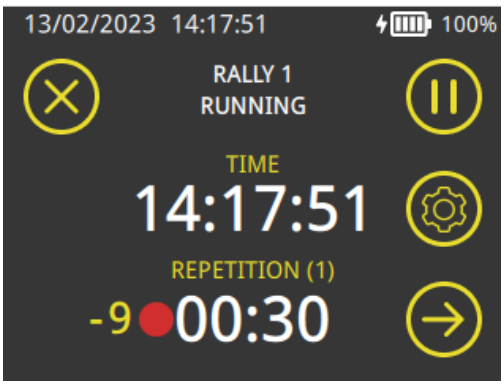
Nordic Skiing	Time in seconds	Light	Tone	False start window
	-10	Red	Long Boop	No False
	-5	Red	Beep	No False
	-4	Red	Beep	False
	-3	Green	Beep	False
	-2	Green	Beep	False
	-1	Green	Beep	False
	0	Green	Long Beep	False
	3	Red	Silent	False
	10	Off	Silent	No False

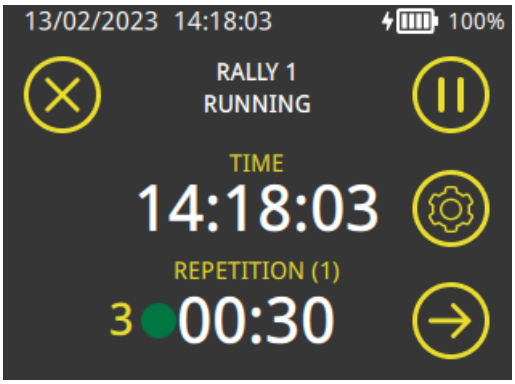
Once we have selected the desired sequence we have to choose at what time and with what repetition time the starting sequence will be performed.

The + and - icons are used to set the sequence start time and the repetition time and the up arrows to advance through the settings.



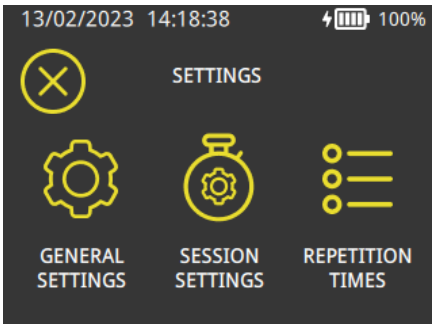
From this point on, the semaphore will start with the selected sequence and repetition time. The touchscreen summarizes the remaining time at zero with a countdown and the semaphore status (dot with the colour of the semaphore)





5 SETTINGS

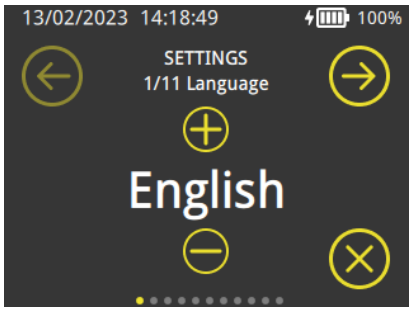
In the SETTINGS menu we have three main sections for complete system configuration



5.1 GENERAL SETTINGS

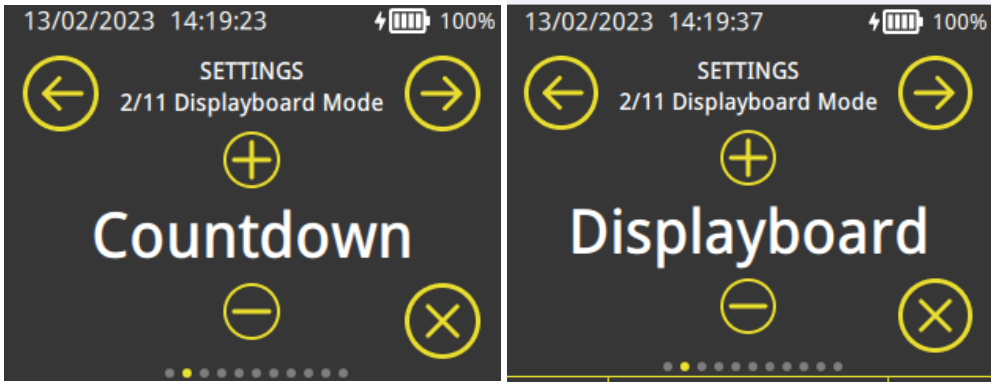
The general settings enable configuring HiClock for the following functions. The pages are scrolled through using the → or ← arrows highlighted on the Touchscreen and the different options can be selected using the + and - buttons; the X button takes you back to the main menu.

5.1.1 Language



The languages you can select are Italian and English

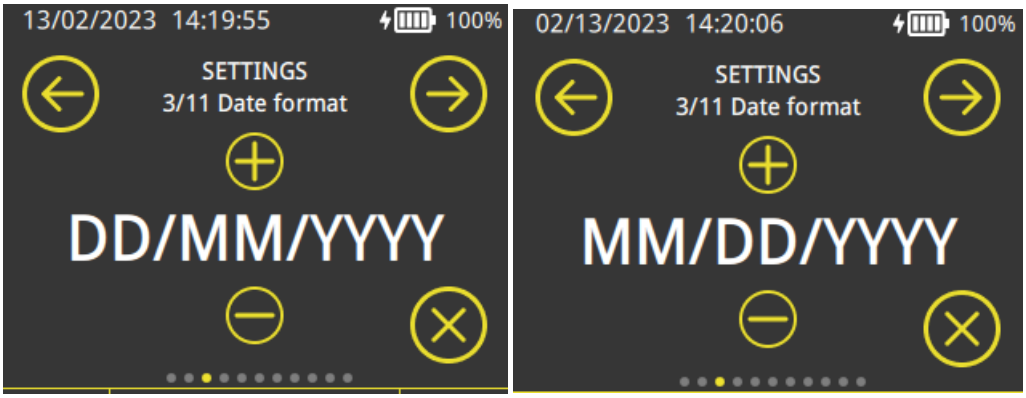
5.1.2 Displayboard mode



The selectable modes are:

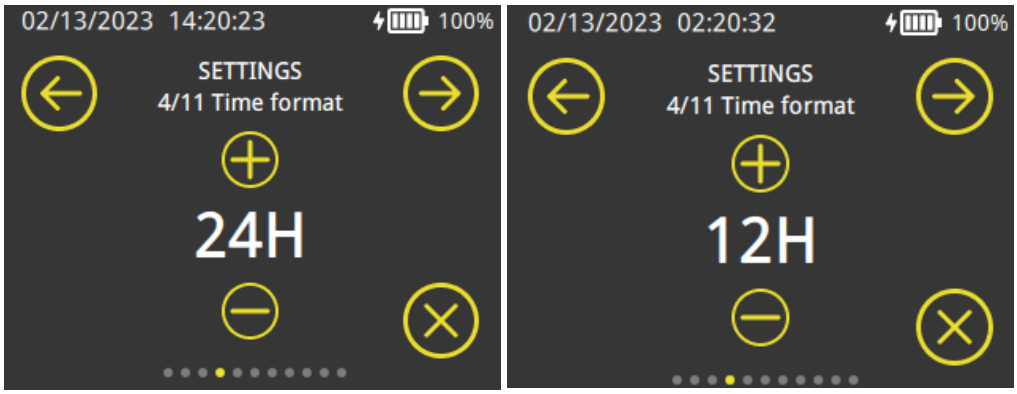
- Countdown: in this mode, HiClock functions as the start semaphore
- Displayboard: in this mode, HiClock functions as a displayboard for displaying the running time driven by RTPro or ReiPro via Bluetooth

5.1.3 Date format



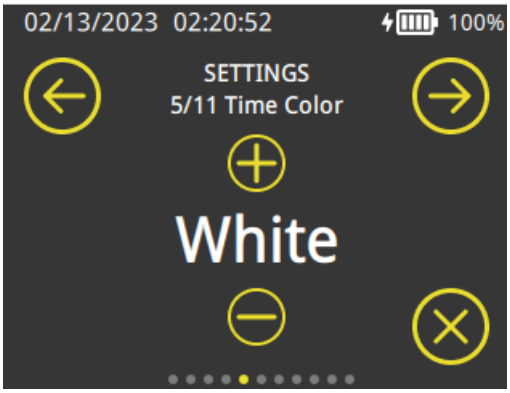
HiClock accepts both European DD/MM/YYYY and American MM/DD/YYYY formats

5.1.4 Time format



HiClock accepts both the European 24H time format and the American 12H AM/PM time format.

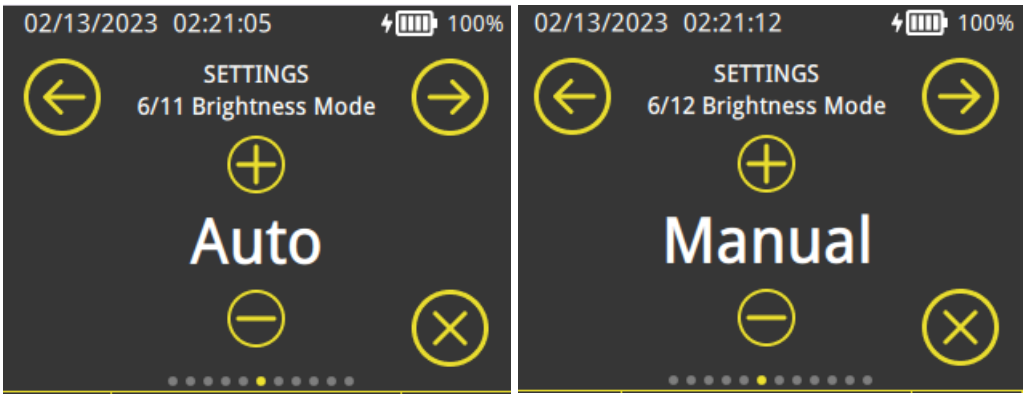
5.1.5 Time colour (time of day)



The selectable colours for the time of day are:

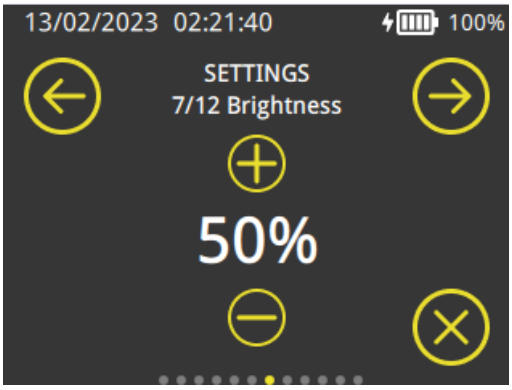
- White
- Red
- Green
- Yellow
- Blue

5.1.6 Brightness mode



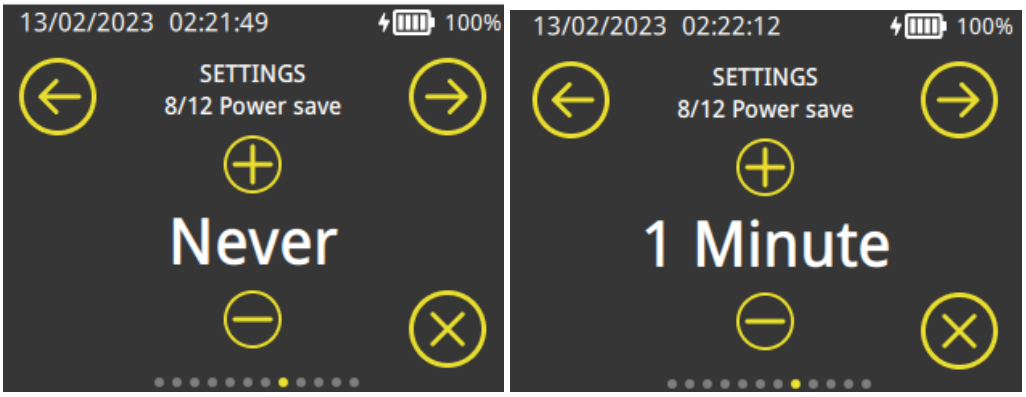
When Manual mode is selected the next menu will give the option of setting the LED intensity from 10% to 100%. When Auto mode is selected, the intensity of the displayboard is adjusted automatically according to the external brightness measured by a specific sensor.

5.1.7 Brightness (only when Manual mode is selected)



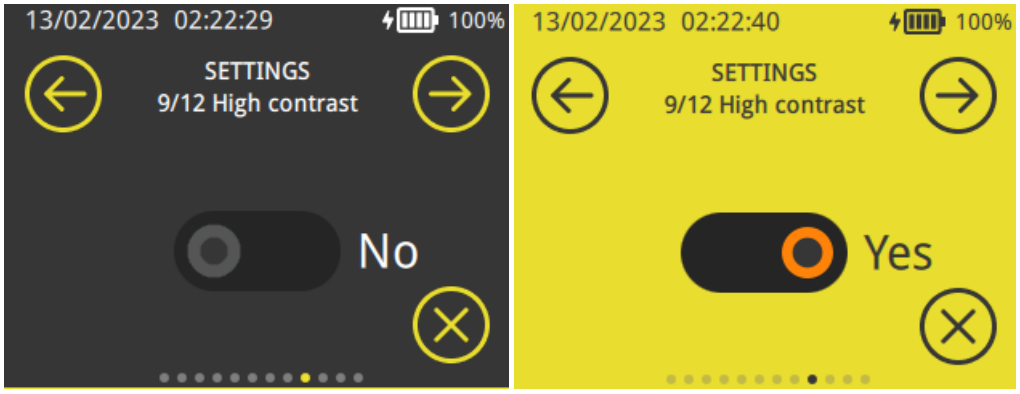
The selectable values range from 10% to 100%.

5.1.8 Battery saver



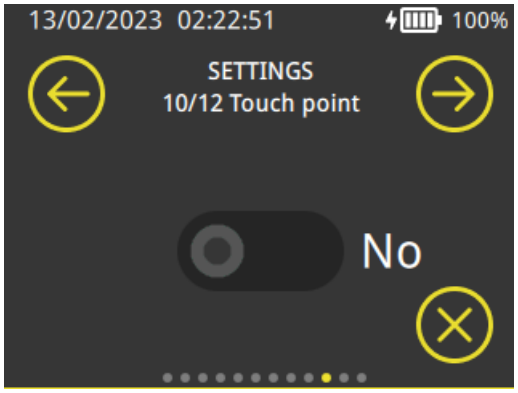
This setting defines after how long the touch display will be turned off. The selectable values are from Never (always on) to 30min. The display is reactivated with a single tap.

5.1.9 High contrast



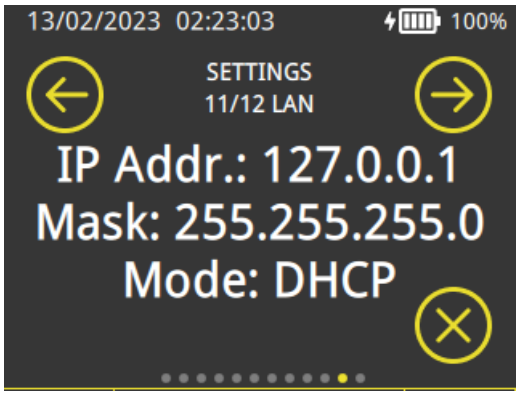
In very bright ambient light conditions, High Contrast mode can be selected, which makes the options easier to read.

5.1.10 Touch point



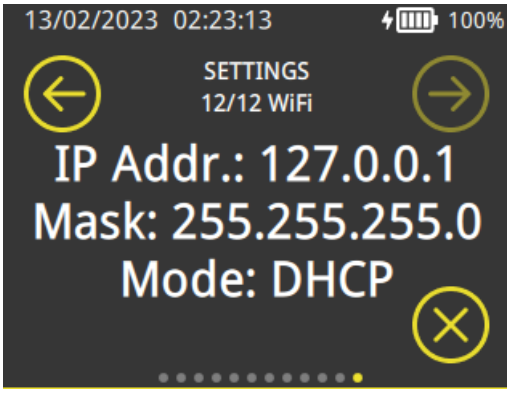
This setting provides visual feedback with a point of visual persistence on the display that helps you see more clearly where you touched the display.

5.1.11 LAN



This section lets you view the LAN settings. The LAN settings can only be made with the Configuration App.

5.1.12 WiFi

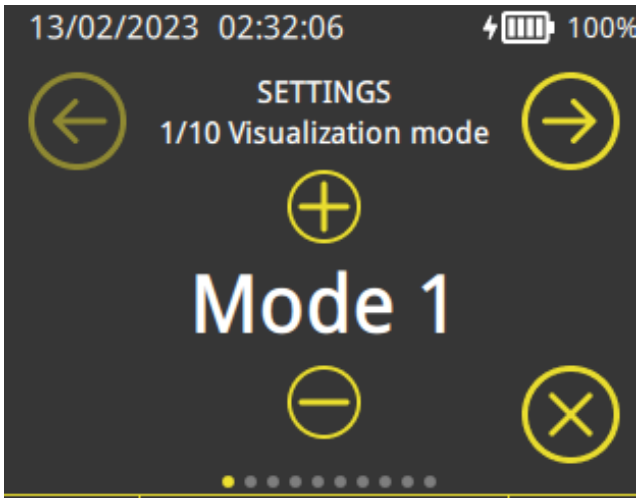


This section lets you view the WiFi settings. The WiFi settings can only be made with the Configuration App.

5.2 SESSION SETTINGS

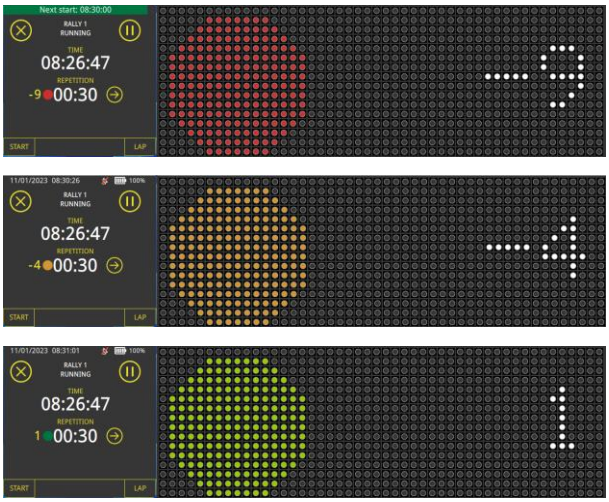
This section configures the parameters used by the current session and can also be set within a sequence.

5.2.1 Display mode



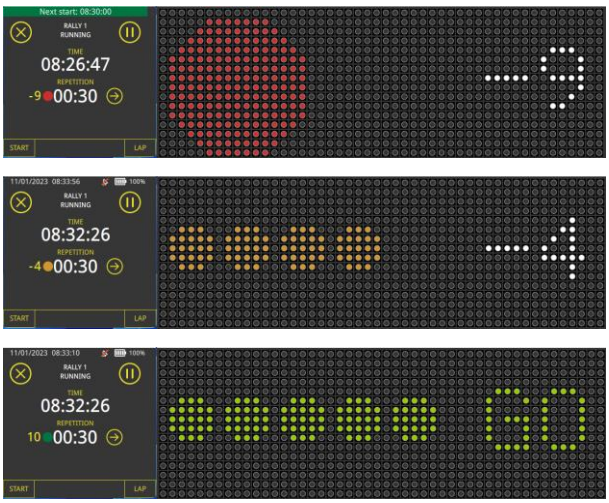
HiClock can show starting sequences with six different display modes. The following are examples of the views available for a Rally-Rally1 sequence with the information displayed next to it on the touchscreen. Each display can, depending on the chosen configuration, show the time of day at the top of the semaphore.

5.2.1.1 Mode 1



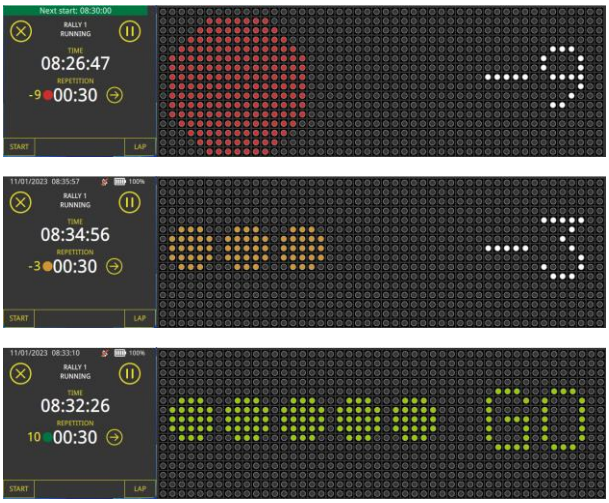
5.2.1.2 Mode 2

This display mode, starting -5 seconds from the start, displays a decreasing sequence of orange pixels and then displays GO with 5 green pixels.



5.2.1.3 Mode 3

This display mode, starting -5 seconds from the start, displays an increasing sequence of orange pixels and then displays GO with 5 green pixels.



5.2.1.4 Mode 4

Displays the current status with a “solid” semaphore compared to the two “hollow” semaphores

5.2.1.5 Mode 5

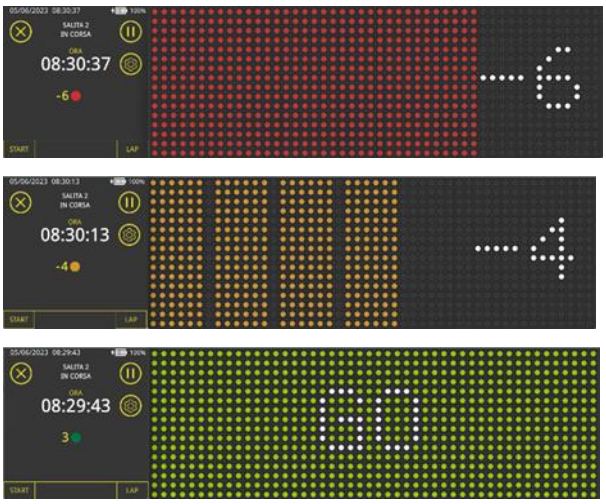
This display mode, starting -5 seconds from the start, displays a decreasing sequence of red rectangles and then displays 5 green rectangles.

5.2.1.6 Mode 6

In mode 6, a consecutive number (starting bib) is displayed on the left of the semaphore and then the sequence with the pixels in the colour assigned to the phase of the sequence.

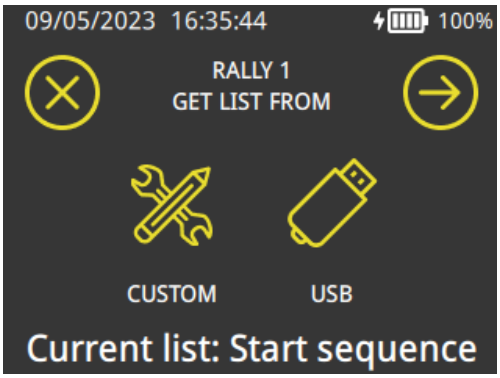
5.2.1.7 Mode 7

This display mode, starting -5 seconds from the start, displays a decreasing sequence of orange rectangles and then displays a green rectangle with GO.



5.2.1.8 Mode 1 displaying the time of day

The “Auto start” mode takes the starting time from the ReiPro / RTPro chronometer or a file. Once the new session has started and the sequence has been chosen, the app will ask for the location containing the starting list.



The available options are:

- Personal: If it is downloaded from the ReiPro / RTPro chronometer. The command to send the starting list is found in the menu voice Starting List of the chronometer.
- USB: if it is downloaded from a USB stick the file can be in two formats:

    - Excel: the file has to be constructed with the following columns: Number and time (HH:MM: SS)

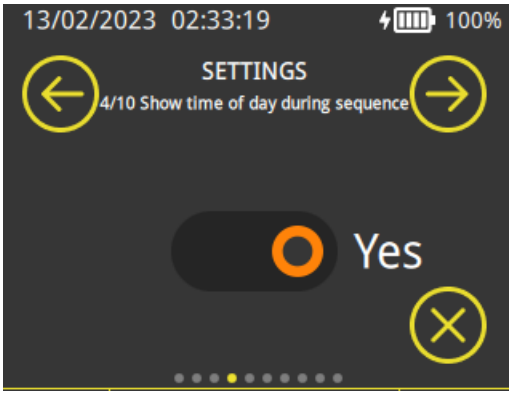
    Example:

	A	B	C
1	1	16:09:00	07/04/2023
2	2	16:09:30	
3	3	16:10:00	
4	4	16:10:30	
5			

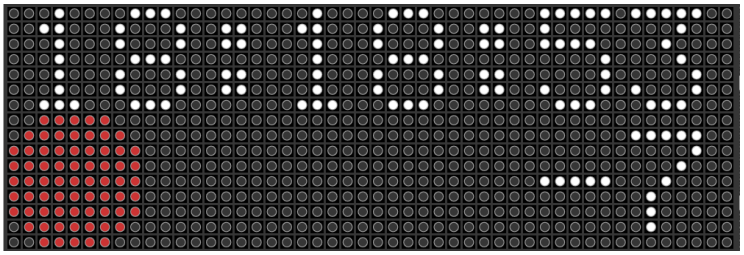
    - Json: Refer to the instruction manual for Communication Protocol for the format's structure.

If a starting list has already been set, then the name of the sequence chosen will be displayed at the bottom of the page.

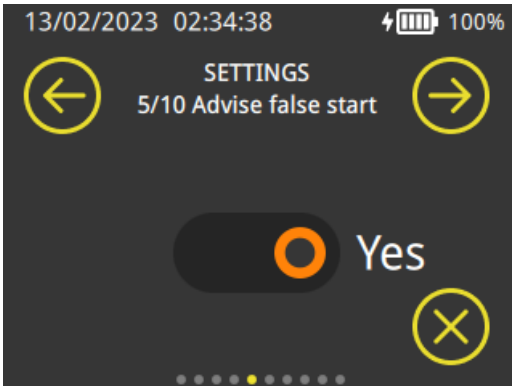
5.2.2 Show time of day during sequence



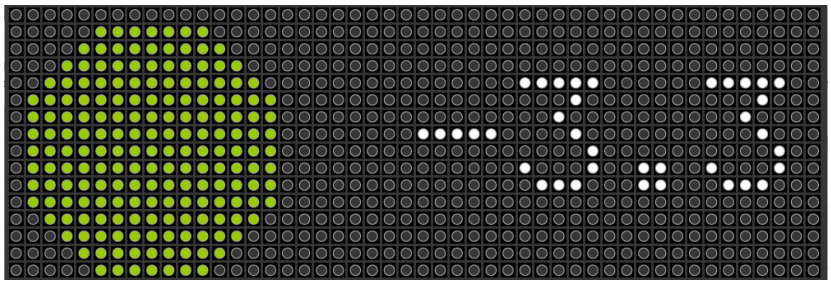
If this setting is activated during the sequence, the time of day is displayed at the top of the displayboard



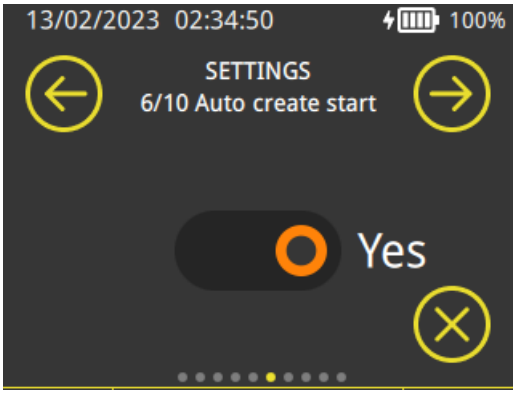
5.2.3 Advise false start



If this setting is activated, the advance or delay in relation to zero of the pulse (e.g. a photocell) received on input IN1 is displayed during the execution of the sequence.

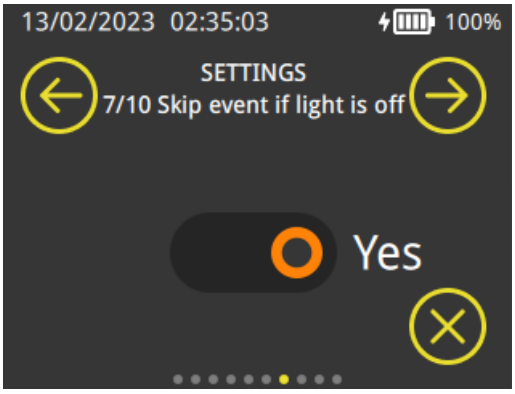


5.2.4 Auto create start



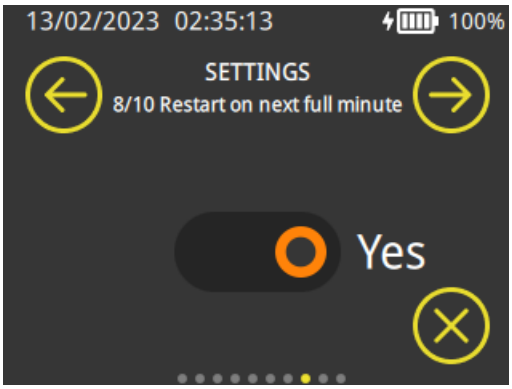
If this setting is activated, a start pulse with the relevant time of day is created in the memory of the device during the execution of the sequence.

5.2.5 Skip event if light is off



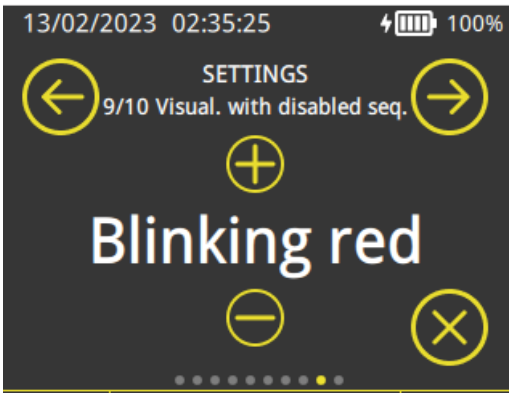
If this setting is activated, events acquired with the light off are not stored in the memory of the device.

5.2.6 Restart on next full minute



If this setting is activated, the sequence will start the first time at the next full minute of the reference time.

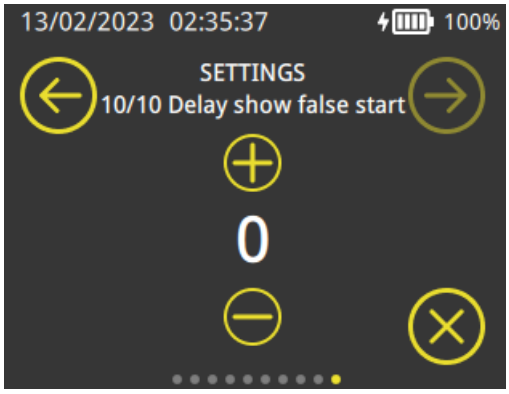
5.2.7 Visualization with disabled sequence



When you pause the display sequence we can decide what to show on the displayboard.

- Blinking red
- All on
- All off
- Only Red

5.2.8 Delay show false start

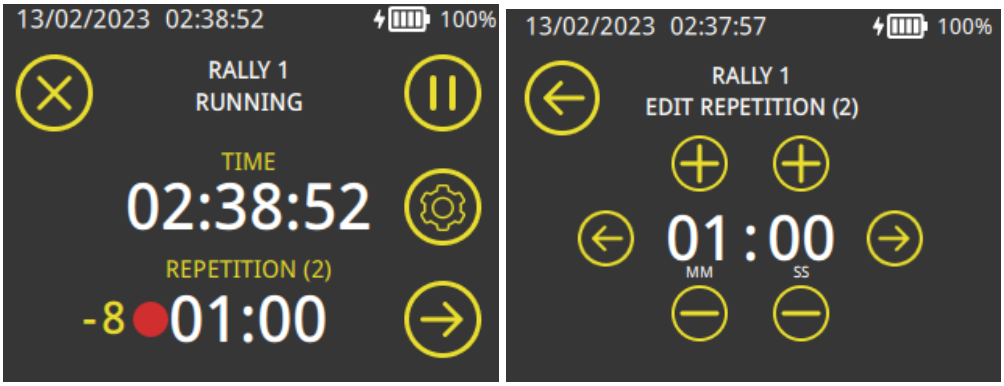


The value entered is the delay, given in seconds, with which the advance or delay of the start pulse acquired on IN1 will be shown on the displayboard.

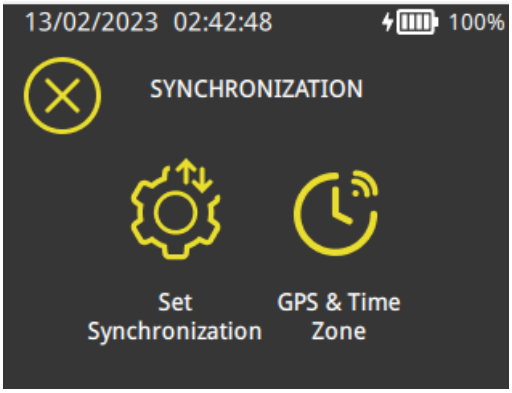
5.3 REPETITION TIME

In this section of the HiClock configurations you can preset 3 sequence repetition time defaults. “Time#1” will be offered as a standard option when you choose the sequence repetition time. “Time#2” and “Time#3” can be selected when defining the repetition time by simply scrolling with the side arrows to the time.

During the execution of the sequence it is easy to switch from one repetition time to the next one by means of a prolonged pulse on line IN2 or by selecting it from the main menu using the arrow next to the repetition time.



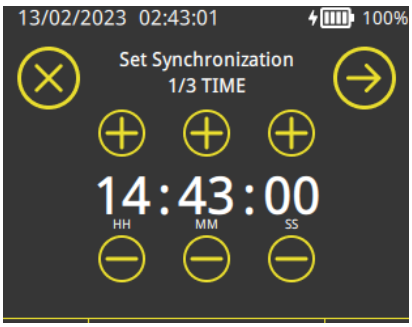
6 SYNCHRONIZATION MENU

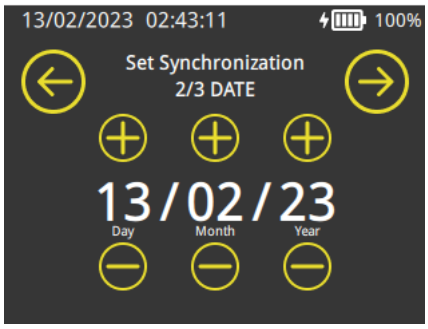


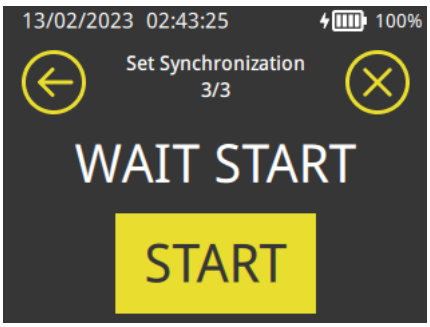
There are two possibilities in the synchronization menu:

6.1.1 Set Synchronization

This section allows HiClock to be synchronized with the time and date defined by a pulse on line IN1 or by pressing the “START” button.



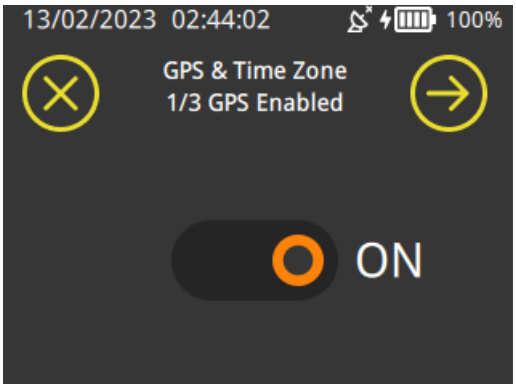




6.1.2 GPS and Time Zone

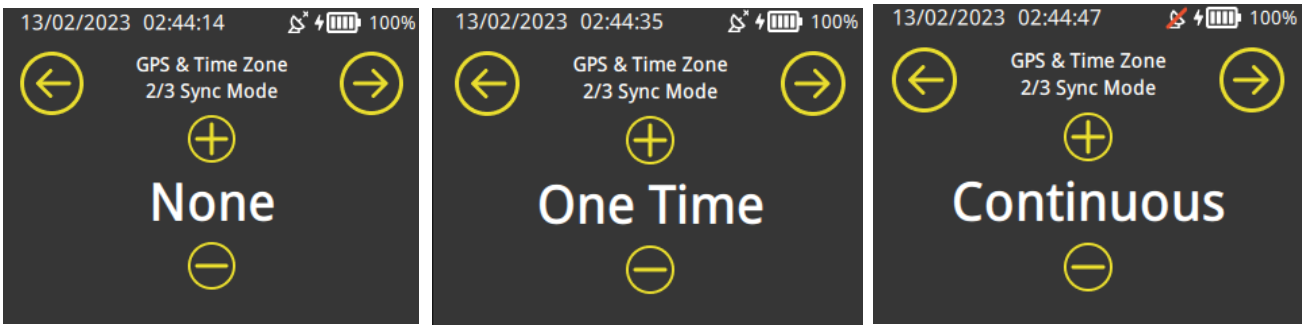
HiClock can be synchronized by the GPS signal. The following settings allow managing the various options.

6.1.2.1 GPS Enabled



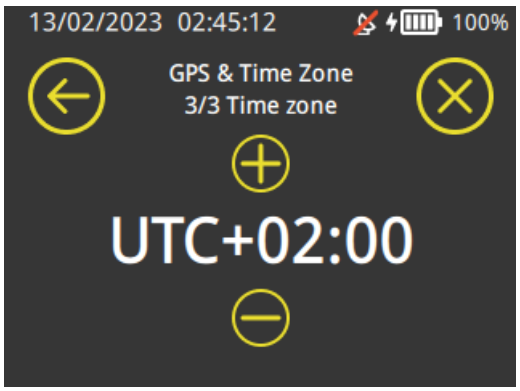
If the setting is activated, the HiClock GPS module is switched on.

6.1.2.2 GPS Synchronization mode



If the “None” parameter is selected, HiClock does not actually use the GPS synchronization even if the module is powered on and functioning. If “One Time” is selected, HiClock takes the GPS synchronization (PPS pulse) and then continues with the internal timebase. If “Continuous” is selected, HiClock is kept coupled to the GPS timebase “re-synchronizing” the internal time base every second using the PPS signal.

6.1.2.3 Time Zone



This parameter is used to select the current time zone.

7 BATTERY CHARGING AND OPERATING TIME

HiClock can be charged with the supplied charger delivering 12VDC with 2000mA maximum current and with a 5-pole Amphenol connector. HiClock can be supplied with any voltage from 12 to 28 VDC with at least 2000mA current with a cable by following the pin out of the Amphenol connector.

If the device is turned off, when the power cord is plugged in the display will switch on briefly and then the status LED will light up. During charging the LED is amber, when charging is complete the LED will show a steady GREEN light.

If on the contrary you want to charge the device while it is on, the external power supply symbol will appear at the top right of the display and the battery symbol will show the charging bars and percentage.

The battery life is approximately 22 hours, calculated with a sequence repeated every minute and displaying the time of day.

To perform a hardware reset, with HiClock turned on, press and hold the power button for at least 10 seconds until it turns off.

The chargers must comply with IEC/EN 61010-1. In this case, they can alternatively comply with IEC/EN 62368-1 provided that their environmental conditions are compatible with those of the device.

8 THE TRIPOD FIXING SYSTEM

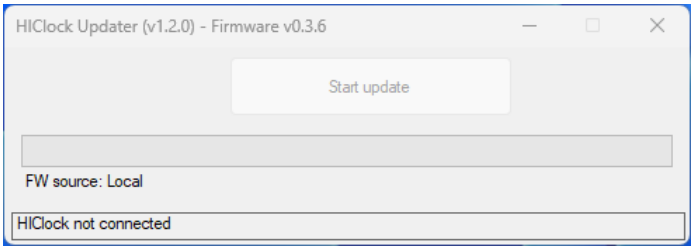
On the back of HiClock there is a 5/8 inch pitch thread that allows the device to be mounted on a tripod with a photography attachment.

9 FIRMWARE UPDATE

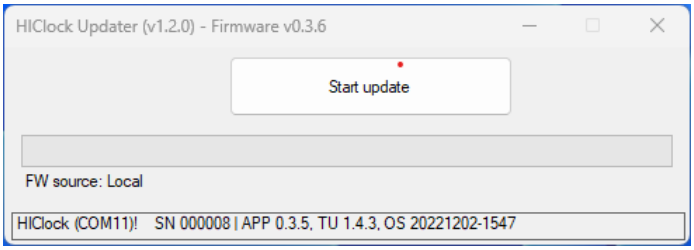
The latest HiClock firmware can be freely downloaded from https://timing.microgate.it in the Support section.

After downloading the .exe file, double-click on the file.

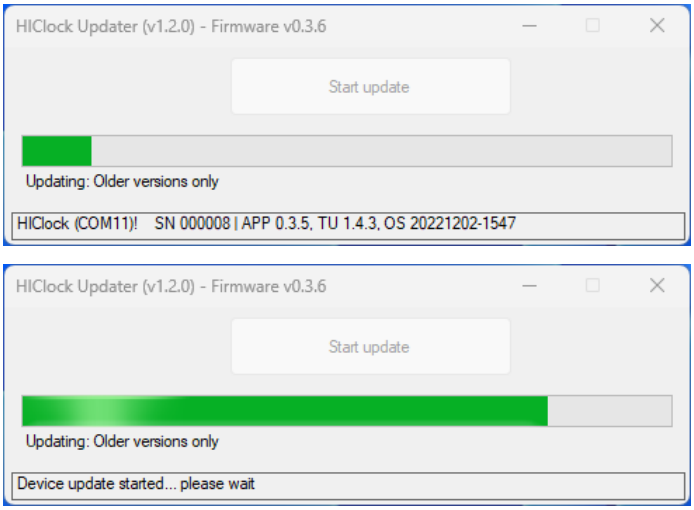
The HiClock Updater program starts by showing the following information



Once HiClock is connected to the PC via a USB-A cable (PC side) USB-B cable (HiClock side), the system recognizes the device and shows the information of the connected device



Press the Start Update button



Wait for the “Update completed successfully” message. You can now switch on HiClock updated to the latest version.

If, for any reason, you are unable to follow these steps, you can force HiClock to go into “Recovery mode” (a mode in which you can run an update) by following these instructions:

- Switch HiClock off
- Insert the tip of a paper clip or something similar into the hole near the status LED and press the small button inside
- Switch HiClock on with the button pressed
- The display will show “Recovery mode”
- Proceed with programming as described at the beginning of the chapter

10 TECHNICAL SPECIFICATIONS

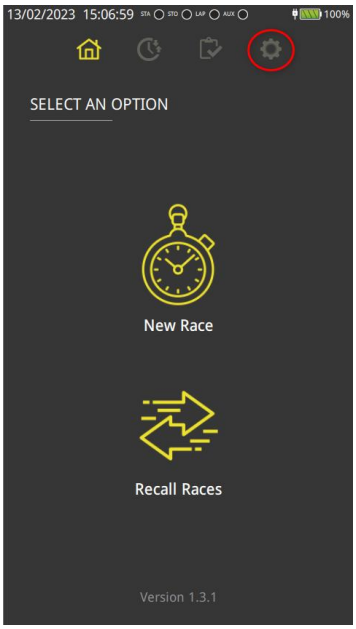
GENERAL	
Weight	3422 g
Dimensions	480 x 160 x 125 mm
Operating temperature	–20°/+60°C
TIMING	
Time measurement unit	Selectable between 1s - 1/10s - 1/100s - 1/1000s; -1/10000s
Measurement resolution	20 x 10-6s (1/50000s)
Time base	19.2 MHz VCTCXO oscillator, stability ±1 ppm from -30° to +85°C (ageing in first year ±1ppm)
Accuracy	±0.0864 s/day for temperatures from -20° to +60°C
POWER SUPPLY	
Power supply	External DC power supply 12–28V; Internal Li-ion batteries
Battery recharging	Built-in smart recharging device
Uptime	> 22 ore
USER INTERFACE	
Button	Power ON/OFF button
Matrix	High-brightness colour LED, resolution 48 x 16 LED excellent/good visibility in sunlight, software brightness adjustment or automatic adjustment with built-in light sensor
Display	High-brightness colour TFT graphical display, visual area 59 x 45 mm (2.8”), resolution 320 x 240 Pixel, excellent/good visibility in sunlight, capacitive touchscreen, software brightness adjustment
Processing unit	Architecture based on two processors – General CPU and Timing Unit: General CPU • Dual 1 GHz Cortex-A7 Timing Unit • 200 MHz Cortex-M4
Audio	Integrated mono audio amplifier + speaker
CONNECTIONS	
Supply	1 x Amphenol socket • Connection for external power supply
Input/output timing	2 x Ø 4 mm Sockets (Green) • Timing inputs 2 x Ø 4 mm Sockets (Blue) • Timing outputs
Host USB	2 x USB A ports • USB 2.0 connection to Host devices
Device USB	1 x USB B port • USB 2.0 to devices
Ethernet	1 x Ethernet ports • 10/100/1000 Mbps Ethernet connection
WiFi+BT	1 x Integrated WIFI/BT + Antenna module • WiFi: 802.11 ac/a/b/g/n • Bluetooth: 4.2/BLE
GNSS	1 x Integrated GNSS + active antenna module • Simultaneous reception of GPS, Galileo, GLONASS, BeiDou

11 CONNECTION TO THE REIPRO AND RTPRO STOPWATCHES

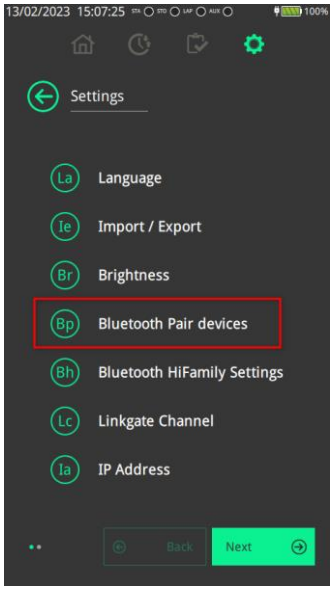
11.1 RTPRO- HICLOCK CONNECTION VIA BLUETOOTH

In the case of a Bluetooth connection for a new device, the first time (after which you no longer need to do this) HiClock must be connected to the RTPro stopwatch by following the steps below:

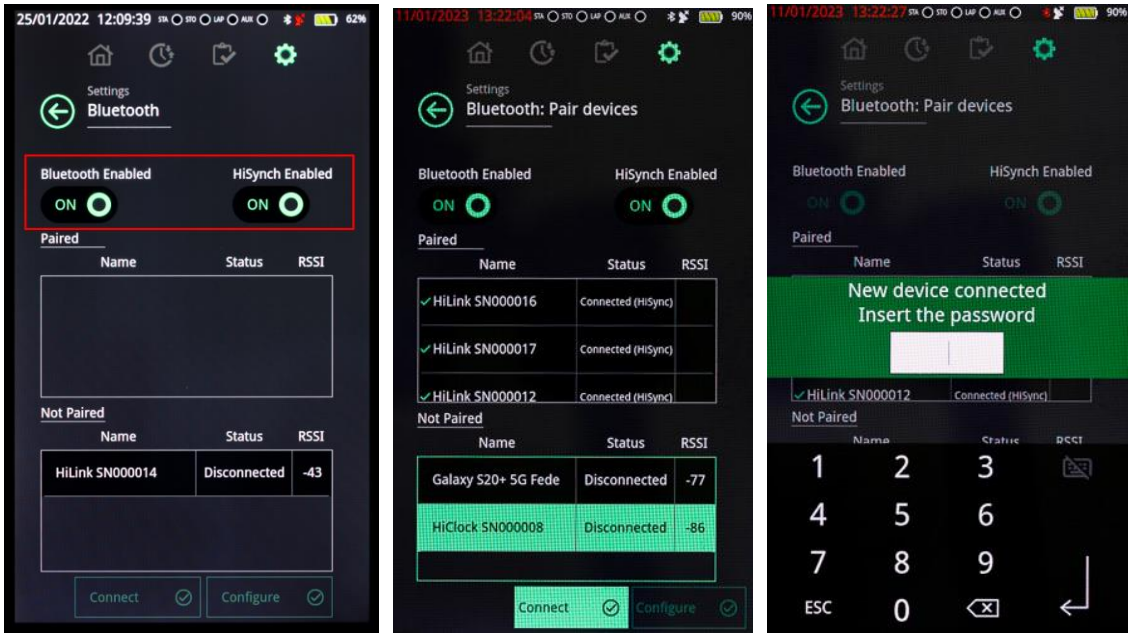
1. From the RTPro main screen, click on the settings icon



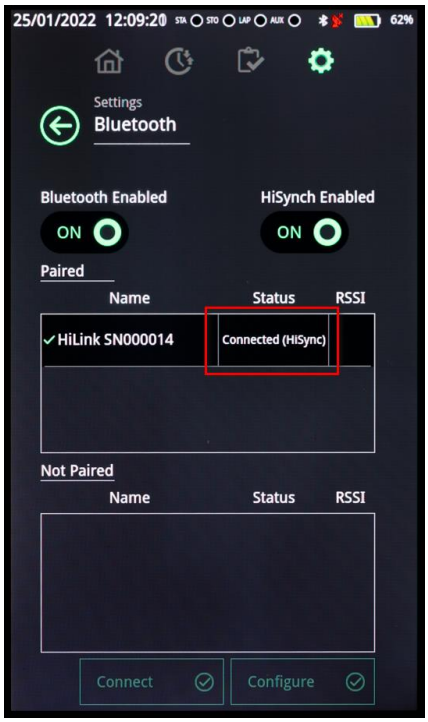
2. Select the “Bluetooth Pair devices” menu



3. Make sure that the HiClock you want to use is turned on.
4. Verify that the Bluetooth functions on RTPRO are enabled
5. Select that device from the list of available devices and press connect.



6. Enter the numeric password that is shown on the HiClock display

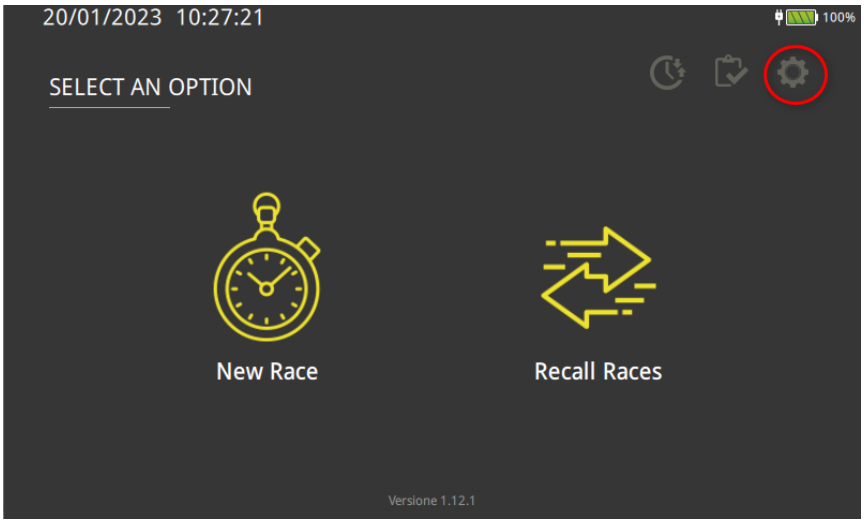


7. Wait until the device status is “Connected”

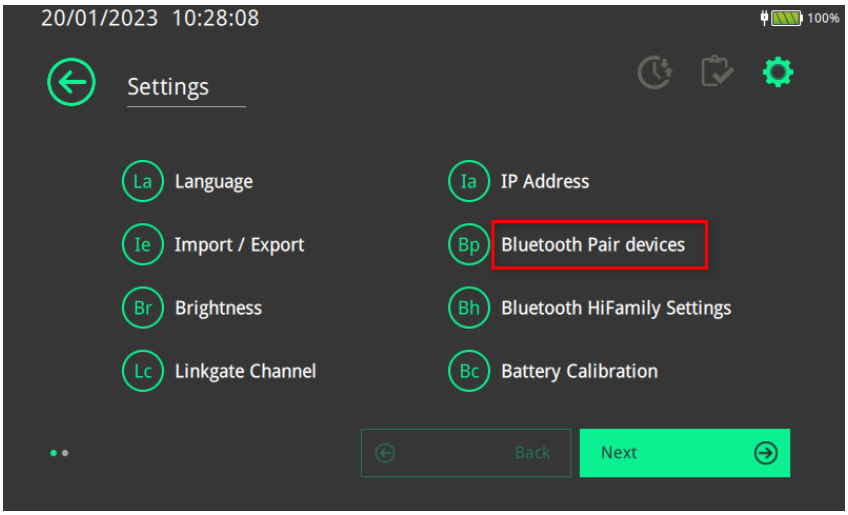
11.2 REIPRO- HICLOCK CONNECTION VIA BLUETOOTH

In the case of a Bluetooth connection for a new device, the first time (after which you no longer need to do this) HiClock must be connected to the ReiPro stopwatch by following the steps below:

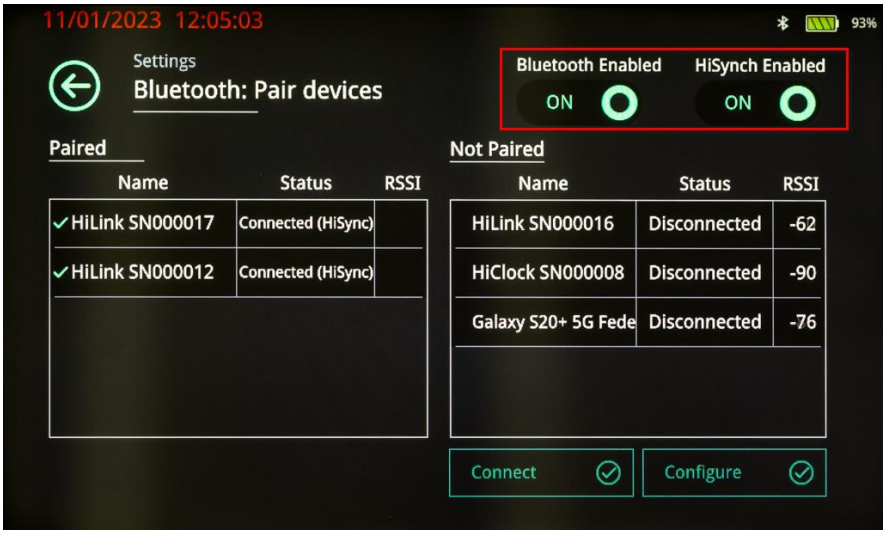
1. From the ReiPro main screen, click on the settings icon



2. Select the “Bluetooth Pair devices” menu



3. Make sure that the HiClock you want to use is turned on.
4. Verify that the Bluetooth functions and on ReiPRO are enabled
5. Select that device from the list of available devices and press connect.



6. Enter the numeric password that is shown on the HiClock display

7. Wait until the device status is “Connected”

12 METHOD OF USE

Environmental conditions of use of HiClock devices:

- use: indoor and outdoor
- max altitude 3000m
- operating temperature: -20°C +60°C
- relative humidity: max. 90%
- pollution degree: 2

If the devices are used outside the specified environmental limits or in a manner not specified by the manufacturer, the protection provided by the device may be impaired.

13 CLEANING THE DEVICES

We understand that customers may have questions about cleaning and disinfection options for their Microgate products. The following applies to all Microgate products.

1. Disposable gloves are recommended when cleaning and disinfecting surfaces.
2. Turn off the device you want to clean and disconnect the AC power supply. Never clean a product while it is turned on or plugged in.
3. Do not spray liquids directly onto the product.
4. Moisten a microfibre cloth with a mixture of 70% isopropyl alcohol and 30% water. The cloth has to be moist, but not wet. If wet, wring the cloth thoroughly before wiping the product.
5. Gently wipe the moist cloth over the surfaces to be cleaned.
6. When cleaning the screen, gently wipe in one direction from the top of the screen downwards.
7. The surfaces must be completely dry before switching on the device after cleaning. The product surfaces must not show any trace of moisture before the product is turned on or connected to the power supply.
8. After cleaning or disinfecting a glass surface, it can be cleaned again using a specifically formulated glass cleaner for the surfaces of the display and following the instructions for that specific cleaner. Glass cleaning products containing ammonia should be avoided.
9. Dispose of used disposable gloves after each cleaning. Wash hands immediately after removing and disposing of gloves.

The use of the following chemicals or products containing these chemicals should be avoided:

- Any chlorine based cleaner, such as bleach
- Peroxides (including hydrogen peroxide)
- Solvents such as acetone, paint thinner, benzene, methylene chloride or toluene
- Ammonia (e.g. products for glass)
- Ethyl alcohol

Using any of the chemicals listed above will cause permanent damage to some product surfaces. By following the steps described in this document, you can minimize the risk of damage.

14 TECHNICAL SUPPORT

For any technical Support, please contact directly:

Microgate s.r.l.

Via Waltraud Gebert Deeg 3E

39100 Bolzano

Italy

https://microgate.it

info@microgate.it