# USER MANUAL FOR START CLOCK HL 920



**There are many new
Innovative features on this
Start Clock that uses a
special 3-motor analogue
movment developed
entirely by TAG Heuer**

# START CLOCK PRESENTATION

- The operation of the start clock is based on a microprocessor that checks the exact position and alignment of the clock hands every minute to ensure a total precision and reliability of the Official Time.

- Digital "Count-down" display for every start accompanied with acoustic "beeps" and the color changes of a rotating disk that indicates valid start periods (red, green and yellow available depending on sport regulations).

- Complete control by the operator for start interval changes during the competition.

- START / STOP function for start processes.

- An Input for timing signals (from start gates or photocells) allows the HL 920 to take and memorize every start time in sequential order.

- An RS 232 serial data port can be used to connect a dedicated printer (such as the PTB Printer) to print in hard copy all recorded start times as they happen. The differences between the start times and the ideal times are also printed.

- The RS 232 data port also serves as a way to control the function parameters of the HL 920 start clock.

- A supplementary output provides control signals for signal lights or additional loud speaker.

- Rechargeable batteries assure excellent operational duration down to – 25° C.

- The start clock can be suspended or mounted on tripod.

## OPTIONS

Automated Time Setting is assured by a built-in time management system where the accuracy is contolled by GPS or other (DCF 77) synchronization signals.
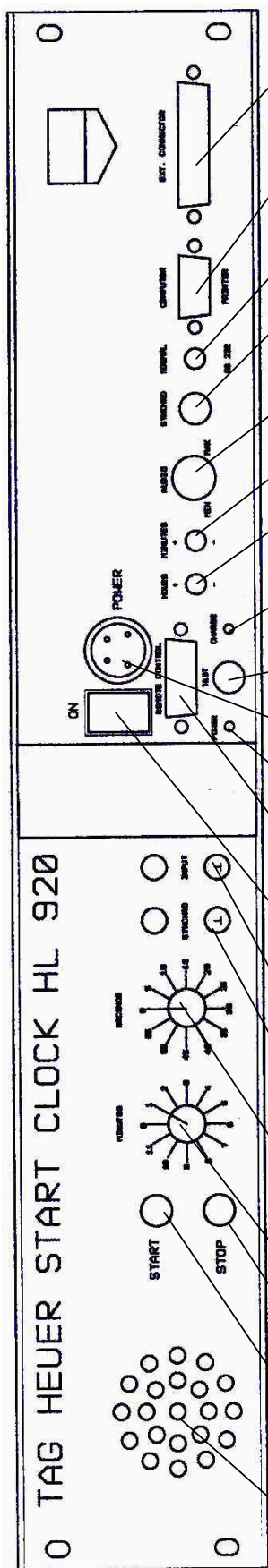
Remote Control

## AVAILABLE VERSIONS

**For Ski**         Start validation from **–** 5 seconds to **+** 5 seconds with the ideal starting time

**For Rally**       Start validation at the ideal starting time

Note that from autumn 2000, it will be possible to programme the HL 920 form a PC (RS 232)

**TAG HEUER START CLOCK HL 920**

| № | Description |
|---|---|
| 20 | **25-pin connector for external signals** |
| 19 | **9-pin connector for printer or PC** |
| 18 | **Switch RS 232 "NORMAL" or "IN"** |
| 8 | **Manual SYNCHRO** |
| 12 | **"BEEPS" volume adjustment** |
| 7 | **Positioning of the MINUTES hand.** |
| 6 | **Positioning of the HOURS hands** |
| 2 | **LED for battery condition (ON)** |
| 3 | **Control the charging of the rechargeable batteries** |
| 4 | **4-pin connector for charger or external power** |
| 5 | **LED external power** |
| 17 | **15-pin connector for remote control** |
| 1 | **Switch to power ON or OFF** |
| 16 | **Input for start impulses** (working contact) |
| 15 | **Input for external synchronisation** |
| 10 | **Selection of intervals between start "SECONDS"** |
| 9 | **Selection of intervals between start "MINUTES"** |
| 14 | **Stop of the starting process** (count-down) |
| 11 | **Validation for the start count-down** |
| 13 | **Loudspeaker for "BEEPS"** |

# START CLOCK MODE

| | | |
|---|---|---|
| **1** | **ON** | Switch to power ON or OFF the start clock |
| **2** | **CHARGE** | LED for battery condition<br>LED flashes when battery is discharged (see autonomy) |
| **3** | **TEST** | Control key for the charging of the batteries |
| **4** | **POWER** | 4-pin connector for the charger or for external power (12V battery)<br>(12 ÷ 24 VDC, see pin-out) |
| **5** | **POWER** | LED external power. |
| **6** | **HOURS** | Switch for the positioning of the hours hand. (Forwards **+** / Backwards **-**) |
| **7** | **MINUTES** | Switch for the positioning of the minutes hand. (Forwards **+** / Backwards **-**) |
| **8** | **SYNCHRO** | Manual contact for synchro. |
| **9** | **MINUTES** | Selection of intervals between Starts "MINUTES" (From 0 to 11 minutes) |
| **10** | **SECONDS** | Selection of intervals between starts "SECONDS" (From 0 to 55 seconds) |
| **11** | **START** | Validation key for the starts count-down |
| **12** | **AUDIO** | "BEEPS" volume adjustment |
| **13** | | Loudspeaker for "BEEPS" Start |
| **14** | **STOP** | Stop of the starting process (count-down) |
| **15** | **SYNCHRO** | Input for external synchronisation (working contact) |
| **16** | **INPUT** | Input for start impulses (working contact) |
| **17** | **REMOTE CONTROL** | 15 pin connector for the remote control. |
| **18** | **NORMAL / RS 232** | **-** Switch "IN / OUT" RS 232.<br>**-** On NORMAL position to print times on the PTB printer or to transmit times to the PC.<br>**-** The position on RS 232 "IN" allows the programming or the control of the Start clock from a PC. |
| **19** | **COMPUTER / PRINTER** | **-** 9-pin connector for the printer or the PC |
| **20** | **EXT. CONNECTOR** | **-** 25-pin connector for external signals.<br>**-** Control for external starting lights (5 lights-Type F1)<br>**-** Control for external lights RED – YELLOW – GREEN (same as the disk)<br>**-** Audio line (for external loudspeaker)<br>**-** TOP SECONDE / TOP MINUTES / TOP ZERO (TOP OF THE |

START)

# OPERATING INSTRUCTIONS

**1** POWER ON by the switch ( **1** ) **"ON"**

- All the hands are moving to "zero" (at 12 o'clock).

- In the meantime the digits indicate "88".

- The rotating disk does one rotation and stops on the RED position.

- The light "CHARGE" is on and should not flash (see autonomy).

> **After having switched OFF the Start clock, you should wait 5 seconds before switching it ON again.**

**2** TIME - OF - DAY SYNCHRONISATION

- Positioning the hands at the desired time.

- Hours with the switch ( **6** ) Forwards **+** or Backwards **-**

- Minutes with the switch ( **7** ) Forwards **+** or Backwards **-**

**3** SYNCHRONISATION AT THE EXACT DAY TIME

- Manually, by pressing on the contact ( **8** ) SYNCHRO (Starting time).

- By the Input ( **15** ) SYNCHRO (yellow and black "banana plugs") for a synchronisation with several start clocks in parallel or other timing devices

- We recommand to use a manual contactor (HL 18) for this operation.

- If other devices have to be synchronised we recommend the use of our impulse distributors with HL 553.

## 4.0    CONTROL OF START INTERVALS

- Select the interval with the MINUTES ( **9** ) and SECONDS ( **10** ) switches
- In any case, <u>the first countdown will be of 30 seconds for the first start</u>
- To activate the first countdown, press START  **11**  between 45 and 30 seconds before the start.
- While you press on START, the coloured disk does 1 rotation (Starts validation)

***Example:***

60''

45''           15''

30''       ✳
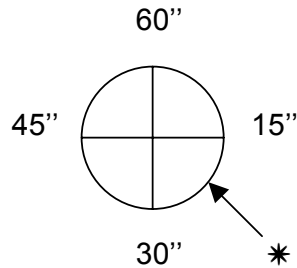
✳ START is pressed between 15" and 30".
The count-down will begin at 30" for a start at 60".

- After the the first start, the selected interval time will be activated.


## 4.1    COUNT-DOWN of the display before starts

30" for the 1st start
  5" for intervals of 10 seconds
10" for intervals of 15 seconds
15" for intervals of 20 to 55 seconds
30" for intervals of 1 minute and more

Intervals could be set from 10" to 11' 55" by steps of 5"


## 4.2    CHANGE OF INTERVALS during the race

Execute the change before that the last competitor who have the former interval is starting (or, if possible, during the count-down)

***Example:***

| Intervals programmed at 30" until | 12h 06' 00'' |
|---|---|
| New interval programmation of 15" from | 12h 06' 00'' |
| The interval should be changed between | 12h 05' 30'' |
| and | 12h 06' 00'' |


## 4.3    STOP OF THE STARTING PROCESS (Race interruption on)

- Press STOP (**14**) during 2 seconds minimum
  (Blanking of the display and rotating disk on RED position)

- New starts can be decided as you wish respecting the previous rules.

## 5   DO NOT FORGET TO ADJUST THE VOLUME AUDIO 12

1 "BEEP" 10" before the start and the 5 last seconds with a sharper BEEP for the start.

5 "BEEPS" for the last 5 seconds with a high-pitchd BEEP for the start.


## 6   THE ROTATING DISK

Indicates valid start periods with 3 colours (red green and yellow)

**SKI**       The disk is RED between starts.
The disk becomes GREEN 5 seconds before the ideal starting time and return to RED after 5 seconds.

**RALLYE**       The disk is RED between starts.
The disk becomes YELLOW 5 seconds before the ideal starting time (Attention, start) and GREEN for start validation when the display indicates 0. The disk returns to the RED position after 5 seconds.


## 7   AUTONOMY

The HL 920 has an excellent autonomy.
Of course, it depends on the state and on the maintenance of the rechargeable batteries.

With battery well charged and well maintained we can guarantee the following values with 1 Start per minute and maximum volume of the Loudspeaker.

24 hours at   20° C
15 hours at    0° C
10 hours at –20° C
 8 hours at –30° C

- The LED CHARGE ②  flashes when the rechargeable battery is partially discharged (~50%)

- At this moment, we recommend to use an external power supply or to recharge the Start clock

- You can control the state of charge of the battery pressing TEST ③ during 5 seconds.

- If the LED ② is not flashing, it means that the start clock batteries are guaranteed for several hours

- When the LED ② is flashing, the key TEST should not be used.

- An additional security allows you to save the timing when the capacity of the battery is low.
    - The two digits display will indicate "LO", the rotating disk and the start "BEEPS" will stop working
    - The official time of the start clock will continue to be correct carry during ~1 hour

## 8  FIXATION

- The start clock can be fixed on a tripod (3/8" camera thread), mounting ball, or support

- We recommend to use a high quality tripods to assure the stability

- In case of strong wind, we recommend to secure or stabilise the tripod with additional weight fixed on his base.


## 9  USE AND FONCTIONS OF THE CHARGER

- Connect the charger HL 920-3 to a normal household ac current receptacle

- Connect the charger to power ( **4** )


- **RED LED Flashing** ⇒ **Very fast**
  The red LED is flashing faster than one flash per second.
  **Batteries are totally DISCHGARGED**

- **RED LED ON** ⇒
  The LED is continually red
  **Batteries are CHARGING**

- **RED LED Flashing** ⇒
  The red LED is flashing every second.
  **Batteries are totally CHARGED**


*REMARQUE:*

The Charger is also an external power supply when the start clock is working.


## 10  WARNING

- **Do <u>not</u> clean the plexiglas with a dry or dirty cloth**
  You must clean it with a wet cloth and a sweet cleaning product. (Soap and water)

- If the start clock is OFF, the LED CHARGE ( **2** ) is not active when you plug the charger.


## 11  COMPLETE SET HL 920

- 1 transport case HL 920-7

- 1 charger 110 / 220 VAC (Type of plug to be confirmed USA / Europe) HL 920-3

- 1 Intermediate fixation  HL 920-4 depending on the tripod type

- 1 operating instruction

# TECHNICAL SPECIFICATIONS

**General**
- The HL 920 is a multi-function start clock that is very precise and reliable
- separate stepping motors make up this sophisticated movement to control the hours,minutes and seconds hands.
- In addition to the analogue movement, two seven-segment numeric indicators countdown the remaining seconds to each start interval.
- Further, another indicator comprised of a rotating red, green and yellow disk provides information on start validity.
- An acoustic signal rounds out the battery of indicators that serve this start clock

**Start Intervals**
- From 10 seconds to 11 min 55 sec in 5 second increments

**Time Setting**
- From internal RTC clock or manually

**Time Base**
- 16 MHz Thermocompensated Quartz Crystal
- +/– 0,5 ppm at 20° C
- +/– 2,5 ppm from –30° to 75° C

**Inputs**
- Timing Impulses
- Synchronization
- Remote Control

**Outputs**
- 1 RS 232 Data output for computer or printer at 9'600 bds
- 25 Pin Connector with multiple outputs of timing signals for lights, additional audio systems or other visual indicators

**Temperature Range**
- 25° C to + 75° C (without heating)

**Power Supply**
- Internal : 12V DC rechargeable battery
- External : 12-18V DC source

**Autonomy**
- 18 hours at 20° C
- 8 hours at – 20° C

**Housing**
Hot lacquered black aluminum case

**Dimensions/Weight**
- 7,3 kg
- 320 x 500 x 115 mm
- Clock face diameter : 270 mm
- digit height : 100 mm