



# TAGHeuer

PROFESSIONAL TIMING

## IMPULSE RADIO TRANSMISSION SYSTEM HL 615

### Operating Instruction

Version 03/2015



## 1. Generality

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This new Radio HL615, is the next logical step in impulses transmission by TAG Heuer Timing. It offers high quality performance, due to the technical choices made.

The Power of transmission is 100mW linked to a frequency in the range of 869 MHz offers incomparable comfort and reliability.

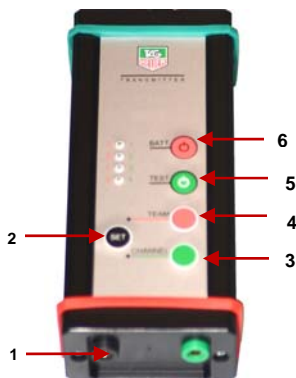
Each **Receiver** can receive impulses (simultaneously or not) from 4 **Transmitters** identified by the function "**CHANNEL**" (1 to 4), with a precision of 0.13 ms.

The delay of transmission is 200 ms and the distance in good condition, up to 1000 m.

## 2. Presentation

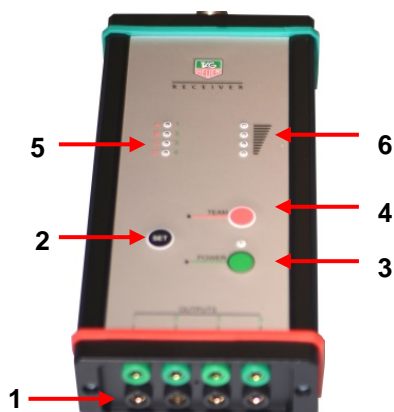
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### 2.1. Transmitter



1. Input Impulse – Banana plug
2. Function SET
3. Function Channel (chapter
4. Function Team (chapter
5. Function Test and ON (Set + Test)
6. Function BATT and OFF (Set + Batt)

### 2.2. Receiver



1. Output Impulse – Banana Plug (1 to 4)
2. Function SET
3. Function Power (ON) / OFF = Set + Power
4. Function Team (Chapter
5. LED Team / Channel
6. LED Reception signal (Chapter

### 3. Description of the system

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#### 3.1. Switch ON

When you switch ON the radio (Transmitter / Receiver) will display the battery level (refer to chapter 3.8 – BATT).

##### 3.1.1. Transmitter

The transmitter works with a battery of 3V (type CR123A).

The transmitter operates permanence and therefore consumes.

To save the battery, it is recommended to switch the transmitter off when not used.

In all cases, without pulse for more than 30h, the transmitter will automatically shut off.

To switch ON, hold button **SET** and press **TEST** 

To switch OFF, hold button **SET** and press **BATT** 

##### 3.1.2. Receiver

The receiver is powered with a LiPo battery.

It is strongly recommended to insure a full charge (minimum 8 hours) before using, with the power supply delivered with the kit (HL540-1).

To switch ON the receiver, press 3 seconds the button «**POWER** ». A red LED is switching ON.

To switch OFF the receiver, press together button **SET** and **POWER**

#### 3.2. INPUT (Transmitter)

Input for timing impulses (start gate, photocells – working /closing contact).

**Respect the polarities**

#### 3.3. OUTPUTS (Receiver)

Output of the timing impulses isolated by opto-coupler (1 to 4 – working / closing contact).

**Respect the polarities**

#### 3.4. SET

To program the **TEAM** (A, B, C, D) or **CHANNEL** (1, 2, 3, 4) and to switch OFF the receiver. Maintain **SET** pressed during the changes.

#### 3.5. TEAM

The selection of **TEAM** allows to get several system (4 transmitters / 1 receiver) in the same localisation sector.

It is important that the Transmitter and Receiver are set with the same **TEAM**.

To visualise the team set, press button **TEAM**

To change team, press together the button **SET** and **TEAM**.

#### 3.6. CHANNEL (Transmitter)

Set the channel of transmitter used (1, 2, 3 or 4).

It is related to the Receiver **OUTPUT** (banana output)

To visualise the team set, press button **CHANNEL**

To change team, press together the button **SET** and **CHANNEL**.

#### 3.7. TEST (Transmitter)

The button **TEST** allows to transmit an impulse to verify the communication.

### 3.8. BATTERY

To check the state of the battery.

For Transmitter :    4 Led + 2 Beep : > 75 %  
                              3 Led + 2 Beep : > 50-75 %  
                              2 Led + 3 Beep : > 25-50 %  
                              1 Led + 3 Beep : < 25 %                    **warning case / change the battery.**

For receiver :        4 Led : > 75 %  
                              3 Led : > 50-75 %  
                              2 Led : > 25-50 %  
                              1 Led : < 25 %                    **warning case / charge the battery**

The state of the battery is also available when switching ON

## 4. Receiver charge

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The receiver works with a LiPoL battery of 3.7V / 2200mAh  
Use our 12V power supply (HL540-1) with 500mA minimum.

The LED Power show the charge state

<b>Receiver OFF:</b>	Charge active :	Slow flashing LED
	Charge Finished:	Led OFF
<b>Receiver ON:</b>	Charge active :	Fast flashing LED
	Charge Finished:	Led ON

The full charge could take up to 4 hours.

The autonomy is up to 48h (with impulses every 10 secs = 6900 impulses)

The receiver is automatic switching in Stand-by if any impulses is detected during 24h.

**Warning :**

It is forbidden to charge the battery with a temperature lower that 0°C and higher that 40°C

## 5. Transmitter change battery

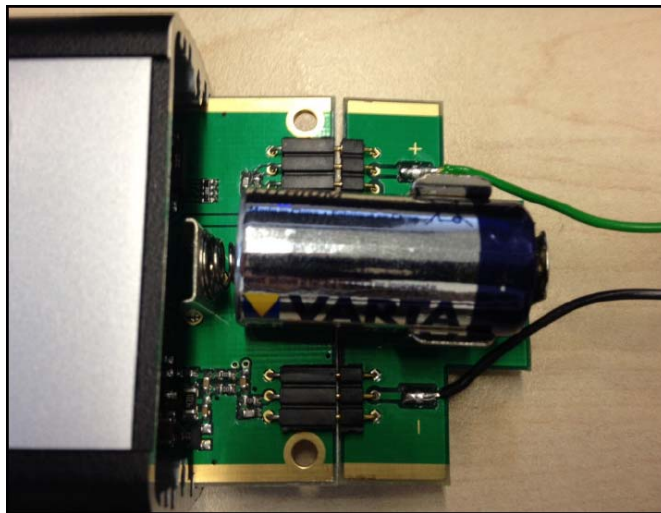
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The transmitter is working with a battery 3V (type CR123A – 1400mAh)  
The button **BATT** allows to check the battery level (see chapter BATT – 3.8)

It is recommended to change the battery when test battery show only 1 LED ON

To change battery.

- 1) Remove the two screws with a torx screwdriver (n°9)
- 2) Remove gently the bottom cover.
- 3) Remove the circuit where the battery is fixed
- 4) Exchange the battery (CR123A) and replace the circuit to the Transmitter. Warning that the 6 connexion pins are well placed.
- 5) Screw back the cover without forcing



Standard autonomy:	Transmitter OFF:	365 days
	Transmitter ON :	45 days (impulses every 10 sec)

Transmitter switches automatically in Stand-by if none impulse during 24h.

## 6. Transmission

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The transmission between Transmitter and Receiver is 200ms, with a precision of +/- 0.13 ms

Once the receiver receives an impulse, the LED of channel (1 to 4) will switching ON during 0.5s  
In same time the LED on right will switch ON to the reception signal power

4 Leds ON	Good	(< -60 dBm)
3 Leds ON	Acceptable	(-60 à -70 dBm)
2 Leds ON	Low	(-70 à -80 dBm)
1 Leds ON	Very low	(> -80 dBm)

Transmitter and Receiver provides a visual (LED) and audio alarm, should an external input remain in short-circuit.

This feature allows you to observe the status of TAG Heuer's new "direct-response" photocells (HL 2-31, HL 2-35 and HL 2-32 – serial number 7000 or higher), and allows the timekeepers to instantly determine if a photocell is out of alignment.

### **WARNING :**

For proper operation it is essential that the transmitters and the receiver are not closer than 2 meters.

### **WARNING :**

It is forbidden to operate transmitter without antennas, it may damage the electronic radio transmitter.

## 7. Installation recommendation

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- For good transmission, it is recommended that antenna are placed 1m above ground
- Transmitter/Receiver should be place vertically and antenna in up direction
- A direct view between Transmitter and Receiver will improve performance
- Protect Transmitter / Receiver in case of rain (with a platic bag) After using the system in high humidy ambience (rain), it is recommended to place them on a warm environment (out in the open air) to prevent any rust or electronics damage

### **Warning :**

Radio systems using a similar range of frequency (869 MHz) can disrupt the transmission.  
It is strongly recommended to test before the race, and have a back-up system.

## 8. Technical specification

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<b>Type of emission:</b>	ISM Band – 869 MHz	
<b>Code :</b>	4 differentiated Channels (A, B, C, D)	
<b>Radiated Power Output :</b>	100 mW	
<b>Range:</b>	1 km under optimal conditions, direct view	
<b>Timing Impulse Inputs:</b>	Open Working contact. Respect the polarities (Black = Ground)	
<b>Precision:</b>	Fixed delay of 200ms +/- better than 0.13 millisecond.	
<b>Signal Transmission Evidence:</b>	By audible tone (buzzer) and LED (1, 2, 3, 4)	
<b>Signal Reception Evidence:</b>	By audible tone (buzzer) and LED (1, 2, 3, 4)	
<b>Signal Reception Monitoring:</b>	By 4 LED's. Control of the quality of the reception and of eventual disturbances.	
<b>Power Supply:</b>	<b>Transmitter:</b>	Battery 3V (CR123A – 1400mAh)
	<b>Receiver :</b>	LiPol battery– 2200mAh charger HL540-1 (12V / 1.25A)
<b>Autonomy :</b>	<b>Transmitter:</b>	365 days / Stand-by 45 days / impulses every 10 sec ( 388'000 impulses)
	<b>Receiver :</b>	48h / impulses every 10 sec (17'280 impulses)
<b>Operating Temperature Range:</b>	-20°C à + 60 °C	
<b>Dimensions &amp; weight</b>	<b>Transmitter</b>	: 147 x 57 x 32 mm / weight of 225 gr.
	<b>Receiver</b>	: 185 x 82 x 32 mm / weight of 425 gr.

**Guaranty:**



Two years starting from the purchase date

**The guaranty is null and void under the following conditions:**

- Accumulators or battery out of use
- Bad maintenance and obvious damages
- Input or Outputs damaged by bad connection



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