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1. DESCRIPTION OF THE FUNCTIONS

TRANSMITTER

To turn on the transmitter, hold down « SET » (4) and press « TEST ».

To turn Off, hold down « SET » (4) and press « BATT ».

RECEIVER
1. DESCRIPTION OF THE FUNCTIONS (Following)

1. INPUT  
Input for timing impulses (Start gate, photocell – working / closing contact). Respect the polarities.

2. OUTPUTS  
Outputs of the timing impulses isolated by opto-coupler (1 to 4 – working / closing contact). Respect the polarities.

3. POWER  
To switch on of the receiver (press during 3 seconds on POWER). The red LED is on. To switch off the receiver, activate SET and press POWER.

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.

5. TEAM  
To check the programmed TEAM. The green LED corresponding to the code A, B, C or D is on. To change the code, activate SET and press TEAM.

6. CHANNEL  
To check the programmed CHANNEL. The green LED corresponding to the CHANNEL 1, 2, 3 or 4 is on. To change the CHANNEL, activate SET and press CHANNEL.

7. TEST  
To test the impulses transmission.

8. BATT  
To check the state of the battery.

9. LEDS  
Control LED of the programmed TEAM or CHANNEL. Allows visualizing the transmitted impulses by the transmitter or received by the receiver.

10. LEDS  
LED to monitor the signal quality of the received impulses / or possible interferences created by other radio signals.

11. ON / OFF  
Transmitter ON/OFF (available since up to 2000 serial number)
2. DESCRIPTION OF THE SYSTEM

- Low power impulses transmission system (10 Mw) which doesn't need any license (free of use) in Europe (ISM Band – 433.56 MHz).

- Each receiver can receive impulses (simultaneously or not) from 4 transmitters identified by the function "CHANNEL" (1 to 4).

- Up to 4 teams can work (train) in the same area without disturbing each others thanks to the function "TEAM" which offers the possibility to code each system (A, B, C, D). It is also possible to use up to 16 transmitters with 4 receivers.

- The transmitter is equipped with a lithium battery insuring autonomy of approximately 3 years. There is no switch ON / OFF.

- The receiver is equipped with an internal accumulator insuring autonomy of at least 24 hours at 20 °C. 8 hours of charging are necessary to obtain the maximum capacity.

- When the receiver is switched on, it is possible that one or more green LED’s are on before that the transmitter(s) start to transmit. This system of detection allows visualizing the quality of the received signal, but also the possible interferences coming from other radio transmission systems. If it is not possible to stop these interferences by moving the receiver, the transmission of impulses cannot be guaranteed.

THE INSTALLATION INCLUDES:

- 1 Plastic case which can contains up to 4 transmitters
- 1 to 4 transmitters
- 1 Receiver
- 2 to 5 antennas and 1 adapter right angle BNC
- 1 Charger 100-240 VAC / 12VDC (HL540-10)
- 1 User manual
- 1 Velcro strap per transmitter

Remark: If the SET that you received contains an antenna longer than the others, it is intended for the receiver.
3. TEST AND FUNCTIONING PRINCIPLE OF THE SYSTEM

- Connect the antennas on the **receiver** and **transmitters**. The antennas must always be positioned vertically. Use the adapter right angle BNC if the **receiver** is placed horizontally.

- Switch ON the **receiver** by pushing approximately 3 seconds on POWER. The red LED is on (see chapter 6).

- Check the programmed “TEAM” (A, B, C or D) on the **receiver** and the **transmitters**. It must be identical for each system. To change it, activate SET and press TEAM.

- Check the programmed channel N° (CHANNEL) on each **transmitter** (1, 2, 3 or 4). This N° corresponds to the OUTPUT N° of the **receiver**. This / or these OUTPUTS are connected to the timing device. To modify the OUTPUT N°, activate SET and press CHANNEL.

- Press TEST on the **transmitter** (transmission test)
  - The green LED of the **transmitter** (1 to 4) corresponding to the selected channel N° is on and a “beep” signal confirms the sending of the impulse.
  
  - The green LED of the **receiver** corresponding to the channel N° of the **transmitter** (1 to 4) is on and a “beep” signal confirms the reception of the impulse which is provided on the corresponding output (1 to 4) to the timing device.
  
  - The 4 green LED’s on the receiver unit allows you to monitor the quality of the signals being received.
    1 led is on   - >  Very weak Signal
    2 led’s are on - >  Weak Signal
    3 led’s are on - >  Signal satisfactory
    4 led’s are on - >  Good Signal
    (see chapter 2. “Description of the system HL 610”)

- **At the end of the test or use of the system, do not forget to switch off the receiver!**
  Activate SET and press POWER
4. INSTALLATION OF THE TRANSMITTERS AND THE RECEIVER

The HL610 must be used in an open environment. Difficult topography (Undulating country), obstacles or trees can significantly decrease the performances of the installation. It is in all the cases recommended to place the transmitters in the highest possible location for a maximum reliability.

Installation methods (Transmitters)

![Optimal installation](image1)
![Satisfactory installation](image2)
![Very good installation](image3)

**WARNING:** the transmitters should always be installed VERTICALLY

To fix the transmitters on wooden-post, skis or photocells, you can use Velcro, Straps, Serflex or quick fixation. Tag Heuer will be able to provide you a specific product during January 2004.

The receiver can be fixed vertically or positioned horizontally using the right angle BNC adapter.

**WARNING !**
The transmitter must be protected from the rain

**WARNING !**
The antennas should not be hidden. They are mounted vertically with a direct view between transmitter and receiver.
5. BATTERY AND ACCUMULATOR CONTROL

TRANSMITTER

Press BATT to check the battery power condition.

**Good battery:** 2 « BEEPS » will be heard and 4 green LED’s are on.

**Rather good battery:** 2 « BEEPS » will be heard and 3 green LED’s are on.

**Acceptable battery:** 2 « BEEPS » will be heard and only 2 green LED’s are on.

It is possible by low temperature (-10°C or 14° F) to find this situation. The power of the Battery decreases and can make believe that this one is out of use.

**Bad battery:** 3 « BEEPS » will be heard and only 1 green LED is on. You must replace the battery, a normal use is no more guaranteed.

**Discharged battery:** 3 « BEEPS » will be heard and no green LED is on. The system is out of use.

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**WARNING !**

If the battery of the transmitter is out of order or defective, we recommend to contact your local TAG Heuer Timing Agent. At the same time, you will have the opportunity to control the accumulators of the receiver.

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RECEIVER

When the receiver is switched on, the control of the accumulator’s conditions is ensured by the red LED POWER.

**Accu charged:** The red LED is on.

**Accu slightly Discharged:** The red LED flashes each second.

**Accu discharged:** The red LED flashes very fast (more than 1 per second)

The good functioning of the system is no more guaranteed.

To recharge the receiver, use the original charger AC/DC provided by TAG Heuer. The use of another charger can seriously damage or destroy the device.

- Switch off the receiver to recharge the accumulators (POWER OFF).
- Connect the charger to a normal household ac current receptacle.
- Connect the jack of the Charger to the receiver.
- The red LED POWER flashes during the charging.
- **WARNING : always recharge the receiver at temperatures higher than 0°C**

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**WARNING !** The recharge time is automatically stopped after 8 hours (internal clock). This is the necessary space of time to recharge the device when LED POWER is flashing.

**Don’t charge the battery if not necessary (see autonomy) to guarantee a better long life of them.**

**Remark:** It is possible to use the charger during the timekeeping with the receiver switched on. However, no particular message will be given by the LED POWER.
6. REPLACEMENT OF THE BATTERY – HL610 TRANSMITTER

Battery: type AAA

Procedure:
1. With the point of a knife or a “cutter”, remove the two small black stoppers located on both sides of the green connection at the bottom of the transmitter.
2. With a screw driver “torx n°9” unscrew both screws.
3. Remove the cover gently. Caution is required with the connections.
4. With a pair of plastic tweezers remove the battery.
   Warning do not short-circuit the battery with a metallic tool.
   If plastic tweezers are unavailable then insulate a pair of metal tweezers.
5. Replace the battery in the same position taking notice of the polarity.
6. Re-assemble and replace the cover gently.
   Do not over-tighten the screws.
7. Replace the black stoppers in their location.

7. TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Type of emission:</th>
<th>ISM Band – 433.5 6MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code:</td>
<td>4 differentiated Channels (A, B, C, D)</td>
</tr>
<tr>
<td>Radiated Power Output:</td>
<td>10 mW</td>
</tr>
<tr>
<td>Range:</td>
<td>Superior to 2 km under optimal conditions, direct view</td>
</tr>
<tr>
<td>Antenna:</td>
<td>Multiflex 1/4</td>
</tr>
<tr>
<td>Timing Impulse Inputs:</td>
<td>Open Working contact. Respect the polarities (Black = Ground)</td>
</tr>
<tr>
<td>Timing Outputs:</td>
<td>4 opto-isolated independent outputs</td>
</tr>
<tr>
<td>Precision:</td>
<td>Fixed delay of 100ms +/- better than 1/10,000th second.</td>
</tr>
<tr>
<td>Signal Transmission Evidence:</td>
<td>By audible tone (buzzer) and LED (1, 2, 3, 4)</td>
</tr>
<tr>
<td>Signal Reception Evidence:</td>
<td>By audible tone (buzzer) and LED (1, 2, 3, 4)</td>
</tr>
<tr>
<td>Signal Reception Monitoring:</td>
<td>By 4 LED’s. Control of the quality of the reception and of eventual disturbances.</td>
</tr>
<tr>
<td>Battery Condition Monitoring:</td>
<td>By red LED (POWER)</td>
</tr>
<tr>
<td>On</td>
<td>well charged</td>
</tr>
<tr>
<td>Flashing</td>
<td>to be recharged</td>
</tr>
<tr>
<td>Power Supply:</td>
<td>By internal battery (lithium) for the transmitter and by internal rechargeable accumulator for the receiver</td>
</tr>
<tr>
<td>Charger:</td>
<td>AC/DC Adapter</td>
</tr>
<tr>
<td></td>
<td>100 – 240 VAC / 12VDC – 400 mA</td>
</tr>
<tr>
<td></td>
<td>Polarity: positive at the center of the plug</td>
</tr>
<tr>
<td>Autonomy:</td>
<td>Approximately 2 years for the transmitter</td>
</tr>
<tr>
<td></td>
<td>Approximately 24 Hours for the receiver at 20°C</td>
</tr>
<tr>
<td>Operating Temperature Range:</td>
<td>-20°C à + 60 °C</td>
</tr>
<tr>
<td>Mounting:</td>
<td>By Velcro or Serflex strap</td>
</tr>
<tr>
<td>Dimensions &amp; weight</td>
<td>Transmitter : 147 x 57 x 32 mm / weight of 225 gr.</td>
</tr>
<tr>
<td></td>
<td>Receiver : 185 x 82 x 32 mm / weight of 425 gr.</td>
</tr>
</tbody>
</table>

Guaranty: One year 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
- If the device was open without factory authorization