PROFESSIONAL TIMING

IMPULSES RADIO TRANSMISSION SYSTEM
HL 610

OPERATING INSTRUCTIONS

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1. DESCRIPTION OF THE FOUNCTIONS

TRANSMITTER

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 optocoupler (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 to visualize the transmitted impulses by the **transmitter** or received by the **receiver**.

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

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 to16 **transmitters** with 4 **receivers.**

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

- The **receiver** is equipped with an internal accumulator insuring an autonomy of at least 24 hours at 20 °C. Approximately 10 hours of charging may be 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 to visualize 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 / 9VDC
- 1 User manual

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

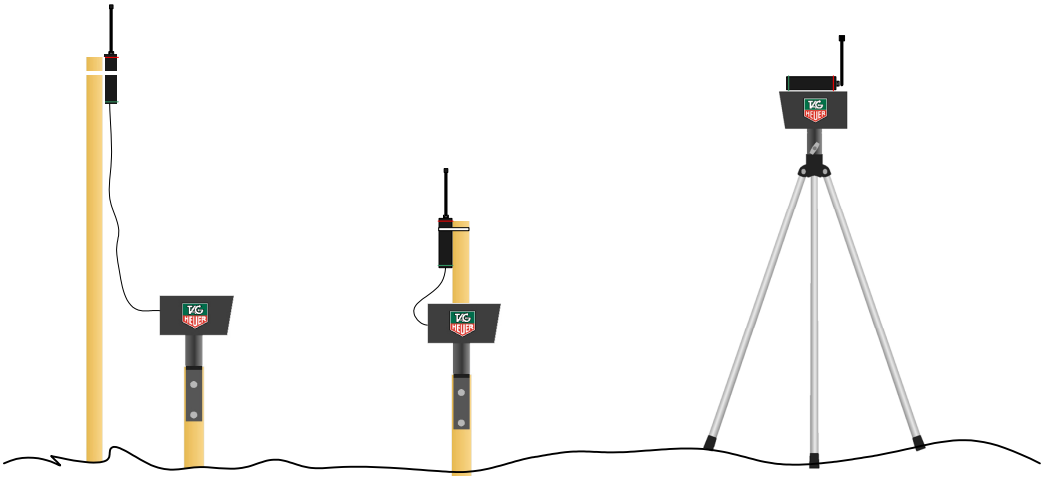
    (see chapter 2. “Description of the system HL 610”)

- **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 HL 610 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 **Satisfactory** **Very good**

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 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 huge cold (-10°C/ -15°C) 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.

ATTENTION !

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**.

RECEIVER

When the **receiver** is switched on, the control of the accumulators 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.
- 10 hours can be required to fully recharge the **receiver** if this one was totally discharged.

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. TECHNICAL SPECIFICATIONS

Type of emission :	ISM Band – 433.5 6MHz
Code :	4 differentiated Channels (A, B, C, D)
Radiated Power Output :	10 mW
Range :	Superior to 2 km under optimal conditions, direct view
Antenna :	Multiflex 1/4
Timing Impulse Inputs:	Open Working contact. Respect the polarities (Black = Ground)
Timing Outputs:	4 opto-isolated independent output
Precision :	Fixed delay of 100ms +/- better than 1/10,000th second.
Signal Transmission Evidence:	By audible tone (buzzer) and LED (1, 2, 3, 4)
Signal Reception Evidence:	By audible tone (buzzer) and LED (1, 2, 3, 4)
Signal Reception Monitoring :	By 4 LED's. Control of the quality of the reception and of eventual disturbances.
Battery Condition Monitoring:	By red LED (POWER) On -> well charged Flashing -> to be recharged
Power Supply :	By internal battery (lithium) for the **transmitter** and by internal rechargeable accumulator for the **receiver**
Charger :	AC/DC Adapter 100 – 240 VAC / 9VDC – 550 mA Polarity : positive at the center of the plug
Autonomy :	Approximately 3 years for the **transmitter** Approximately 24 Hours for the **receiver** at 20°C
Operating Temperature Range:	-20°C à + 60 °C
Mounting:	By Velcro or Serflex strap
Dimensions & weight	**Transmitter** : 100 x 57 x 32 mm / weight of 175 gr. **Receiver** : 100 x 82 x 32 mm / weight of 380 gr.
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