



Multifrequenz-Funk- Solarwerk

Multi-frequency radio-controlled
solar movement

J615.84

JUNGHANS - DIE DEUTSCHE UHR

JUNGHANS – THE GERMAN WATCH

Many congratulations on your purchase of a timepiece from Junghans.

What began in 1861 with the founding of the firm in Schramberg quickly developed into one of the most fascinating success stories of the German watchmaking industry. While since that time the demands made of watches may have changed, the Junghans philosophy has always remained the same. Innovative flair and the constant pursuit of precision right down to the smallest detail define how the company works and thinks. You can see and sense this in every watch that carries the Junghans name. For as diverse as the Junghans range may be, it pursues one single goal: to combine traditional craftsmanship with cutting-edge watch technology and exciting design. That makes every watch with the Junghans star unique.

We hope you will enjoy this very special time-keeping instrument.

Yours,
Uhrenfabrik Junghans GmbH & Co. KG

Contents

	Page
1. Radio technology	31
2. Environmentally friendly solar technology	34
3. Automatic time synchronisation	34
4. Functions	37
5. Selectable LC displays	39
6. Reception indicator	39
6.1 Manual time synchronisation (transmitter calls)	40
6.2 Setting the time zone	42
6.3 Quartz mode	42
7. Ready for use	44
8. Charge level indicator on watches using solar power	45
8.1 Restarting after a complete discharge of the power store	46
9. Charging times	47
10. General information	49
11. Technical information	49
12. Impermeability	50

1. Radio technology

The most up-to-date way to keep time.

5,000 years have passed since timekeeping began with sundials. In the interim there have been water clocks, the mechanical clocks of the 13th century and quartz watches. Now we have the Junghans radio-controlled watch. This is a watch that, with good reception, will never go wrong and never need setting. The Junghans radio-controlled watch is absolutely precise, as it is linked via radio technology to the timing control of the most accurate clock in the world, For Europe this is the Caesium Time Base at the Physikalisch-Technischen Bundesanstalt in Braunschweig (Germany's Institute of Natural and Engineering Sciences). For Japan the Caesium Time Base of the National Institute for Information and Communications Technology (NICT), a public administration authority organisation. For North America it is the U.S. Commerce Department's Caesium Time Base at the National Institute of Standards and Technology (NIST) in Boulder, Colorado. These clocks are so accurate that they are expected to deviate by no more than 1 second in a million years.



Your Junghans multi-frequency radio-controlled solar-powered watch is able to automatically pick up time signals from the following transmitters:

- DCF77 in Mainflingen (24km south of Frankfurt am Main) for **Europe**,
- JY40 on Mount Ohtakadoya (near Tokyo in the North East of the country) for **Japan**
- JY60 on Mount Hagane (in south-western Japan) for **Japan** and **South Korea**
- WWVB in Fort Collins, Colorado (USA) for **America**

As a consequence, the Junghans multi-frequency radio-controlled solar watch always displays absolutely precise time in these 4 transmission areas, provided reception is good. The Junghans multi-frequency radio-controlled solar watch synchronises itself daily automatically with the DCF77, JY40, JY60 and WWVB time signal transmitters. In the event of reception being disrupted (e.g. due to storms, electrical devices, light dimmers), the Junghans multi-frequency radio-controlled solar watch restarts an attempt at reception on the following day at the same time. A manual time synchronisation can also be performed via a transmitter call, e.g. at a place with better reception conditions. The most recently received time information is saved in an internal memory. This continues on a highly-accurate 32 kHz quartz basis until the next time synchronisation. The radio-controlled time synchronisation of your Junghans multi-frequency radio-controlled solar watch not only ensures consistently precise time display. The switch from CET to CEST – and reverse – is also performed automatically for the Junghans multi-frequency radio-controlled solar watch where undisturbed reception is available (at night). If you travel to a country with another time zone, the time zone setting of the Junghans multi-frequency radio-controlled solar watch enables the time to be set simply to the respective local time zone.

2. Environmentally friendly solar technology

Technology that needs no batteries! Light – no matter whether sunlight or artificial – penetrates the solar or light-transparent watch face. This transforms the light into electrical energy, which gets saved in a long-life power store. The power store serves as the source of electricity for your multi-frequency radio-controlled solar-powered movement J615.84.

3. Automatic time synchronisation

The automatic time synchronisation process always takes place at night based on the local time set on your watch:

EU – DCF 77: at c. 2 a.m. and 3 a.m.

JP – JJY40 and JJY60: c. 2 a.m.

US – WWVB: c. 2 a.m.

At the beginning of the synchronisation the LC display switches off automatically and remains off for the entire duration of synchronisation (maximum 9 minutes), or until manual abort. The hands remain still and stay in this position during synchronisation (maximum 9 minutes). Following successful time synchronisation the watch adjusts to the received time.

Automatic time synchronisation can be aborted by pressing any button. Following an abort, the time adjusts to the internally-saved time.

For the USA's WWVB time signal transmitter the following specific feature applies:

After a successful transmitter call or restart, your Junghans multi-frequency radio-controlled solar-powered watch always reads in Pacific Standard Time. Due to the non-uniform changeover from summer to winter time and the differing time zones in the individual US states, you are given the opportunity to adjust winter time, summer time and time zone settings (see 6.2) manually. If, due to where you are, the time zone or summer / winter time that you have set differs from PST, it is nevertheless retained during any subsequent transmitter call or automatic synchronisation.

Pressing T1 displays the transmitter received following successful, automatic time synchronisation. The time signal always changes the date automatically. In leap years the 29th of February gets automatically taken into account. If none of the attempts at picking up a signal lead to clear synchronisation, the reception indicator gets deactivated (see section 6). Thanks to the internal time-memory, your watch will continue to run during any days without time synchronisation with the precision of a quartz watch. The next successful reception of the time signal leads to synchronisation and the reception indicator on the LC display becomes activated.

Recommendation: To ensure the best possible conditions for automatic reception of the time synchronisation signal, the watch should not be worn and, if possible, not left near to any electrical appliances, mobile or cordless phones.

It is also helpful for picking up the signal to set the appropriate time zone for your location, as an attempt at synchronisation always begins at c. 2 a.m. based on the local time set on the watch. If the time zone is wrong, the watch will try to synchronise with the time signal transmitter that was previously set.

For example: You travel from Europe to Japan. Your watch has CET saved and tries to synchronise in line with CET at 10 a.m. in Japan. At that time of day interference is disproportionately greater than when synchronising at night and the chances of optimum reception are thus less.

With the time zone set correctly the appropriate transmitter frequency gets checked as the first priority, thus reducing the length of the transmitter check and power consumption.

Important note:

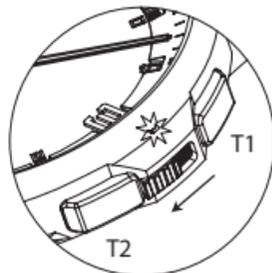
When you travel into a different reception area (e.g. travelling from Germany to Japan), automatic time and transmitter synchronisation does not take place until the watch next picks up a time signal. If the watch fails to pick up a time signal, perform a manual transmitter call (see section 6.1).

4. Functions

Please note: depending on model, your Junghans multi-frequency radio-solar watch is equipped with pushers or correctors embedded into the case. Please use the corrector pin enclosed to operate the embedded correctors.

Key lock (depending on model)

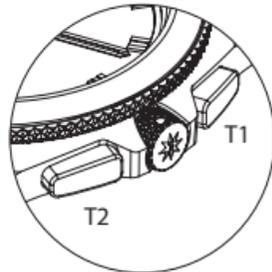
Depending on the model of your Junghans multi-frequency radio-solar watch you have the option of locking the T2 key.



Key lock via security cover:

Slide the security cover between T1 and T2 downwards (in the direction of T2) until it clicks into place and the red marking is visible.

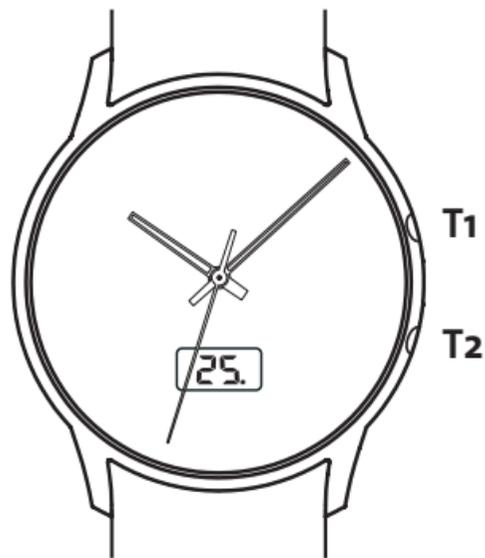
Sliding the security cover back up (in the direction of T1) means that all functions of T2 are available again.



Key lock via crown:

Rotate the crown until it clicks into place and the red marking is visible, as in the illustration on the left.

Rotate the crown halfway and all functions of T2 are available again.



- Analogue display: hours, minutes, seconds
- LC display: date, reception indicator, charge level indicator
- Button T1: press briefly: reception indicator
press for > 3 seconds: transmitter call
- Button T2: time-zone settings

5. Selectable LC displays

The LC display is showing the date. By briefly pressing button T1, you can activate the reception indicator. After 3 seconds, the display switches back to the date.

If the charge level is low, the LC display shows the seconds (flashing alternately with [L0]). The second hand stops at the 12 o'clock position.

6. Reception indicator

The reception indicator shows you whether synchronisation has taken place with one of the time signal transmitters. It can display the four following codes:

[EU] = DCF 77 (Europe)

[JP] = JJY 40 (Japan)

[JP.] = JJY 60 (Japan)

[US] = WWVB (USA)

If a time signal transmitter is shown on the LC display, the watch has picked up the signal during the overnight automatic time synchronisation. If all that is shown on the LC display is two bars, poor reception conditions have resulted in no automatic synchronisation taking place. After the next successful synchronisation, the relevant time signal transmitter will once again be indicated.

Please note that no time synchronisation occurs in quartz mode (see chapter 6.3).

6.1 Manual time synchronisation (transmitter calls)

To perform manual time synchronisation, called making a 'transmitter call', press button T1 for longer than 3 seconds. The second hand begins to move and positions itself at 12 o'clock. Minute and hour hands remain at the time last displayed. The signal reception phase starts as soon as the indicator on the LC display goes out. While the signal is being received, please keep your watch still or put it down.

If synchronisation is not possible with the time signal transmitter shown, all other transmitters get checked for possible reception of the time signal. As soon as the time signal has been picked up, the hands automatically move to the time signal transmitter's local time and the date gets shown on the LC display. By pressing button T1 you can see which transmitter has been picked up. Should you be in a time zone different to that of the time signal transmitter that the watch picked up, you will need to set the applicable local time for that location (see section 6.2) once synchronisation has been successfully completed.

The time zones displayed when picking up the signal from the respective transmitters are as follows:

Transmitter	Time transmitted
[EU] DCF77 (Europe)	CET or CEST
[JP] JJY40 (Japan)	Japanese local time
[JP.] JJY60 (Japan)	Japanese local time
[US] WWVB (North America)	Pacific Standard Time

If you wish, you can interrupt the manual time synchronisation process, as soon as the second hand has moved to the 12 o'clock position. To do so, briefly press button T1 or T2. The second hand resets itself to the original time. Please note that manual time synchronisation is not possible if the [L0] symbol is being shown on the LC display.

6.2 Setting the time zone

The Junghans multi-frequency radio-controlled solar watch receives the signal of DCF77, JY40, JY60 and WWVB. This means that the watch reliably displays summer and winter time in the transmission areas (exception WWVB, see chapter 3.).

In other time zones without radio reception the local time can be set manually by pressing button T2 in hourly steps.

By holding down the T2 button you can fast forward to set the local time. The hands run parallel to the setting. The date is also adjusted automatically during the setting process.

If you wish to return the time display to the original time, press button T2 until the original time is reached again.

6.3 Quartz mode

In order to set the time manually, press both buttons for longer than 3 seconds (or until the indicator on the LC display goes out). After the hands have reached the 12 o'clock position, press button T1. The watch is now in quartz mode. Quartz mode is indicated by the display showing the year, e.g. [99]. Every time you press the T2 button the display advances by one year. Holding down button T2 scrolls through the years quickly.

Once you have entered the current year, confirm this with a brief press of button T1. The LC display now switches to showing the month setting [12]. This is again adjusted via the T2 button. Confirm again the month you have set by briefly pressing button T1.

- Perform the following settings using the procedure described above:
- Set the date – the LC display switches to [31] (or the final day in the month)
 - Set the hour – the LC display switches to [23]
 - Set the minutes – the LC display switches to [59]

Note: to achieve a time display accurate to the second in the LC display set the next full minute and set using button T1 on 60 seconds, using a reference watch or clock.

After the minutes have been set and subsequently confirmed by pressing button T1, the hands of the multi-frequency radio-controlled solar-powered watch move to the programmed time. The LC display shows the date. The programmed time can be corrected by holding down button T2 for longer than 3 seconds.

Please note: The manual setting procedure must be fully completed before the watch is ready for further operation.

In quartz mode the watch does not perform any automatic attempt to pick up a time signal. A manual transmitter call can be made at any time. A successful transmitter call will overwrite the time set manually and the watch then performs automatic time synchronisation again.

7. Ready for use

In order to keep your Junghans multi-frequency radio-controlled solar-powered watch ready for use, it should be kept in a very well lit place. Please ensure that the solar watch face does not get covered for any prolonged period by items of clothing as this may impair the watch's operational functionality.

If the power reserves have run out, hold your watch in bright light to recharge it. How long it takes to charge up is dependent on the intensity of the light source and the design of the solar watch face. The times given in the table on page 43 serve as a guide.

8. Charge level indicator on watches using solar power

With the power store fully charged, the Junghans J615.84 multi-frequency radio-controlled solar-powered movement has power reserves to last up to 21 months. The LC display provides information on the power status:

- [0 1] The date or the reception indicator is being shown. The watch is fully operational.
- [0 1] The date is shown, flashing alternately with [L 0]. The watch needs light / energy. Please charge up the power store until the display stops flashing.
- [1 1] The two bars flash at 10-second intervals. The watch is already charging, but not yet operational. Continue to expose the watch to a light source (see 8.1 and 9.2).
- [] No display: after 72 hours without light intake the multi-frequency radio-controlled solar watch has activated sleep mode. To start up the watch expose the solar dial briefly to a light source or press one of the buttons. As the watch will not attempt reception during sleep mode, the time will be set back to the quartz movement basis – the hands revert to this time. To receive the current radio time again the multi-frequency radio-controlled solar watch will commence automatic reception with the next full minute.
- [] No display, hands are stopped: the energy store of the multi-frequency radio-controlled solar watch is completely discharged, please place the watch in a light source (see chapter 8.1).

8.1 Restarting after a complete discharge of the power store

Following a complete discharge of the energy store the Junghans multi-frequency radio-controlled solar watch must be placed in a source of light in order to recharge the energy store. During the charging process two bars flash in the LC display [--]. A restart is carried out automatically as soon as the charging process is completed. The hands move to the 12:00 position and the watch begins to receive the time signal. The display goes off in the LC display. In the case of successful reception the watch automatically adjusts to the correct time after a few minutes.

If the watch has still not received a time signal after 50 minutes, the reception procedure will be discontinued to save energy and repeated every 6 hours. The hands remain in the 12:00 position and two flashing bars are displayed in the LC display [--] every two seconds. To receive a time display in spite of this the watch can be set to the current time manually using the quartz mode. The watch then continues to run with the accuracy of a quartz watch.

To enter the quartz mode press button T1. The watch is now in quartz mode (see chapter 6.3).

9. Charging times

9.1 Daily operation

The following table shows how long the watch needs to be exposed to the light each day in order to generate sufficient electricity for normal, daily operation, without discharging the battery.

Light source	Lux	Daily operation
Sunlight outdoors	approx. 50.000	7 mins.
Sunlight through a window	approx. 10.000	25 mins.
Daylight through a window on a cloudy day	approx. 5.000	40 mins.
Fluorescent lighting	approx. 500	7 hours

Please ensure that the watch is not exposed to temperatures over 50 degrees Celsius during the charging process.

9.2 Following complete discharge

The following table shows you the charging times following complete discharge of the energy store. These charging times are dependent on the intensity of the light source. The guideline values stated in the table are for orientational use only. Please note that the design of the solar dial affects the charging time.

Light source	Lux	Charging time until reception is commenced	Charging time until complete charging of energy store
Sunlight outdoors	approx. 50.000	approx. 1 day	approx. 1 day
Sunlight through a window	approx. 10.000	approx. 4 days	approx. 6 days
Daylight through a window on a cloudy day	approx. 5.000	approx. 8 days	–
Fluorescent lighting	approx. 500	–	–

Please ensure that the watch is not exposed to temperatures over 50 degrees Celsius during the charging process.

During the charging process two bars are displayed [] in the LC display after approximately 1 minute, blinking at 10-second intervals.

10. General information

External influences can affect the watch's waterproof qualities, which may let in moisture. We therefore recommend that you have your watch regularly inspected by your Junghans specialist. Other servicing tasks or wrist strap repairs should also be done by your Junghans specialist. Your watch is fitted with a quality wrist strap that has undergone multiple inspections in our factory. If, however, you decide to change the strap, please fit a new one of the same quality, preferably an original Junghans wrist strap. Watch and wrist strap can be cleaned with a dry or slightly moistened cloth.

NB: Do not use chemical cleaners (e.g. benzine or paint thinners). These may harm the surface.

11. Technical information

Time taken to self-set with good reception	c. 3 -10 minutes
Time zone adjustment range (UTC)	+ /-12 hours
Switching from CET to CEST and vice versa	Automatic
Time comparison with the DCf77 time signal transmitter	2 a.m. and 3 a.m.
Synchronisation with the time signal transmitters JY40, JY60, WWVB	c. 2 a.m.
Operating temperature	0° to + 50° C

No licence fee. Approved by the German Post Office. Subject to technical modifications.

Declaration of conformity

Uhrenfabrik Junghans GmbH & Co. KG herewith declares that this wristwatch conforms to the principle requirements and other relevant stipulations of Directive 1999/5/EC.

A corresponding declaration of conformity can be requested from info@junghans.de.

12. Impermeability

Marking	Instructions for use				
	 Washing, rain, splashes	 Shower	 Bath	 Swimming	 Diving without equipment
No mark	No	No	No	No	No
3 BAR	Yes	No	No	No	No
5 BAR	Yes	No	Yes	No	No
10 BAR	Yes	Yes	Yes	Yes	No

The designation "3–10 BAR" only applies to brand new watches. External influences can affect water resistance. Please have your watch checked regularly.

Uhrenfabrik Junghans GmbH & Co. KG
Postfach 100 · D-78701 Schramberg
www.junghans.de · info@junghans.de