

***TECHNICAL
INFORMATION***

CITIZEN QUARTZ

Cal. No. 893※※

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§1. OUTLINE



This watch has been developed to follow the Cal. No. 892-series watches of multi-function "Ana-Digi" which are precedently marketed with good success. It features a thin-gage structure plus a dressy design. The display screen forms mainly the analog dial with a minimum necessary space secured for the digital display. And the handling is easy and simple with operation of the crown.

§2. FEATURES

- 1) An electronic quartz crystal watch for gentlemen with LC (liquid crystal) display plus the analog center second.
- 2) A small-size and thin-gage structure has been realized for the movement with a smaller number of component parts and smaller size of each element compared with the Cal. No. 892-series watches.

As shown below, the size of the movement is nearly identical to the Cal. No. 7930E which has the standard thin-gage structure of movement among Citizen's analog watches.

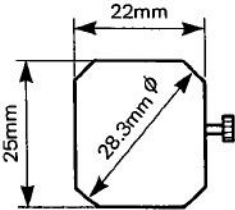
Outer dia. (mm)

Case dia.: . 28.3 ϕ x 22 x 25

Maximum dia.: 29 ϕ x 23.2 x 26.2

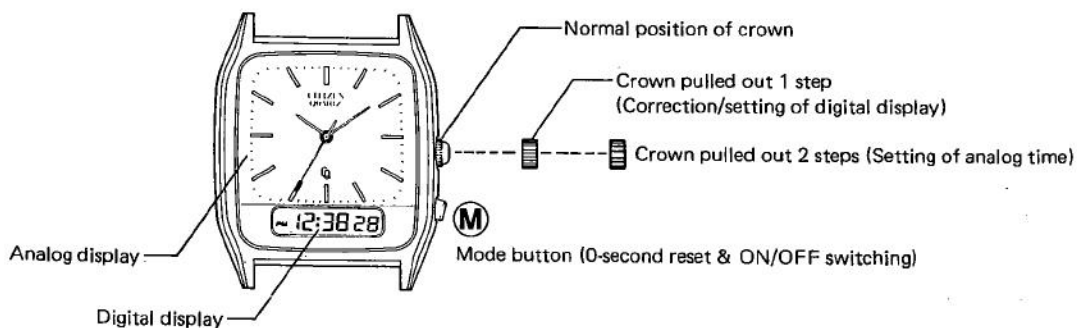
- 3) Easy and simple handling with the crown and a push-button.
Analog: The time is set by pulling out the crown by 2 steps and then turning it clockwise or counterclockwise.
Digital: The time is corrected with the addition/subtraction method and by pulling out the crown by 1 step and turning it clockwise or counterclockwise.
- 4) A dressy design is possible with a small-size and thin-gage LC display panel. Owing to such compact structure of the LC display panel, a simultaneous display is possible for both the analog and digital watches on the same dial.

§3. SPECIFICATIONS

Cal. No.	8930-20	
Movement		Thickness: 2.28mm (Power cell part: 2.7mm)
Accuracy	±15 sec./month at normal temperatures	
Oscillation	32,768 Hz	
Display system	Analog: 3 hands with 1-second step movement Digital: FE twist-type nematic LC with 2-division multiplex driving	
Digital display		
Time	[AM/PM, hour, minute, second] (12-hour display) [Hour, minute, second] (24-hour display)	
Calendar	[Month, date, day] [month, date, year] at correction/setting	
Alarm	[AM/PM, hour, minute, AL] (12-hour display) [Hour, minute, AL] (24-hour display) Alarm ON: Display of "Set time AL" Alarm OFF: Display of "OFF AL"	
Chime	Chime ON: Display of ":00 CH" Chime OFF: Display of "OFF CH"	
Time setting/correction method	Operation of the crown plus push-button	
Converter	Bipolar step motor	
Effective temperature range	±0°C ~ +55°C (32°F ~ 131°F)	
Integrated circuit	C/MOS-LSI (1 unit)	
Additional devices	<ul style="list-style-type: none"> ● Power saving switch (Crown pulled out 2 steps) ● Power cell life indicator <ul style="list-style-type: none"> Analog: 2-second step movement of second hand Digital: Flashing of colon on display screen (At the moment of drop of voltage) ● Fully automatic calendar (1980 ~ 2019) ● Alarm monitor 	
Power cell (Silver oxide cell)	Parts No. : 280-51 Cell code : SR920W Lifetime : About 2 years (Alarm once and chime 24 times a day) Capacity : 39mAH Nominal voltage: 1.55V Size : 9.5 φ x 2.1 mm	

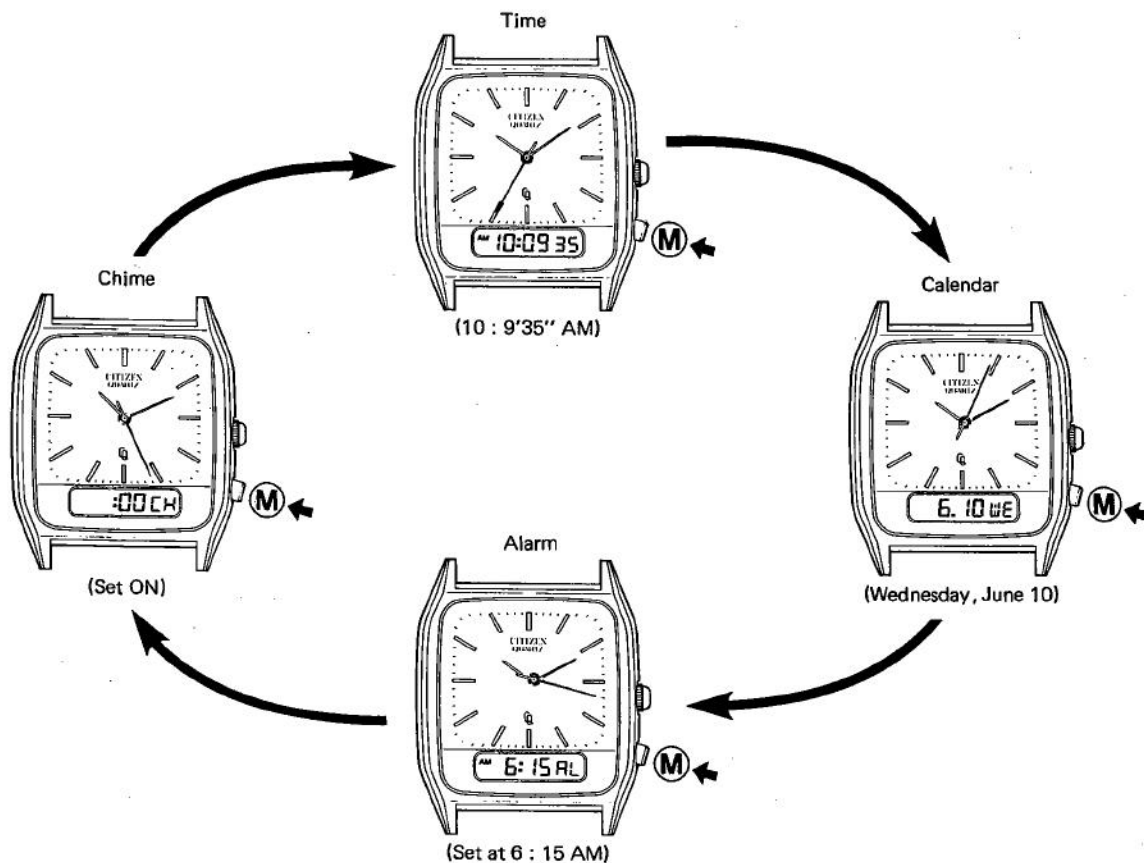
§4. HANDLING INSTRUCTIONS (The areas of flashing are indicated by ○.)

1) Nomenclature (with functions)



2) Switching of display

The mode of display changes with every push of (M) button as follows.



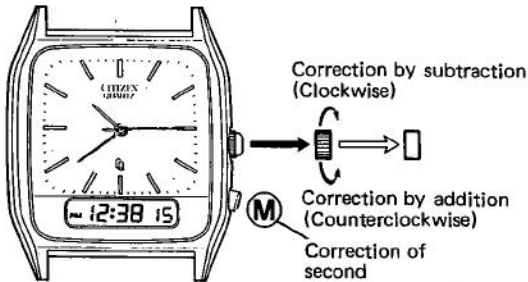
*Alarm monitor

With a continuous push of (M) button about 2 seconds the time display is secured with the function of alarm monitor actuated. And a switching is given between the 12- and 24-hour displays in the time display mode.

3) Setting/correction

The digital correction must be done first, and then the analog setting is carried out. The analog second hand is regulated by the digital zero-resetting action. Thus a synchronization is always secured for the display of second between the analog and digital watches after once a coincidence is given between the digital "second display" and the analog "second hand".

Digital correction



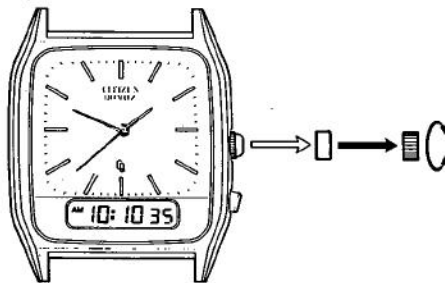
The digital correction mode is secured with a flashing given at the area to be corrected by pulling out the crown 1 step. With turning the crown, the "minute" is corrected. And at the same time, both the "hour" and "AM/PM" can be corrected in coupling. The flashing discontinues while the correction is given.

*Correction of second

A correction is given to the analog time in coupling to the digital 0-second reset with push of **(M)** button.

(In case no coincidence is secured between the analog and digital time displays, i.e., with an error of N seconds, the analog second hand always receives a coupled correction with the error of N seconds.)

Analog setting

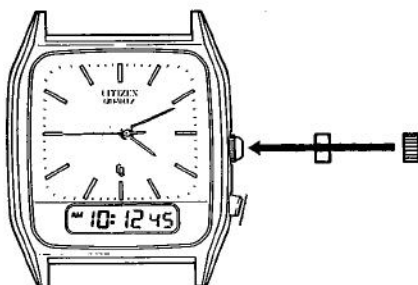


The setting method is identical to other conventional analog watches with center second. The time can be set with the crown pulled out 2 steps. In this moment, the second hand stops its movement to secure the power saving mode. The digital part of switched automatically to the time display.

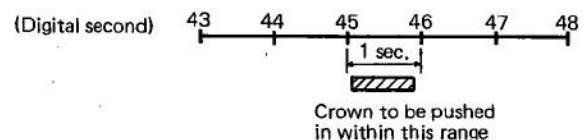
① Setting of analog time


The analog second hand is synchronized with the digital second time after the analog watch is set at the desired time (with the hour and minute hands).

● Setting of analog second hand



For instance, the second hand stops at 45 seconds when the crown is pulled out 2 steps. In that case, the crown is pushed again into the normal position after confirming that the digital time shows 45 seconds.



Never fail to push in the crown within the range of  (45 ~ 46 sec.).

② Correction of normal gains/losses

For correction of the normal gains/losses (± 30 sec.), the analog time is regulated to 0 second in coupling to the digital 0-second reset.

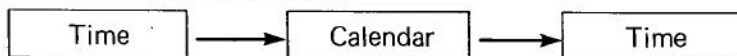
(A coincidence must be secured previously between the analog second hand and the digital second time.)

The change occurs to the analog time and the digital time each as shown in the chart below, when the 0-second reset is given at N seconds.

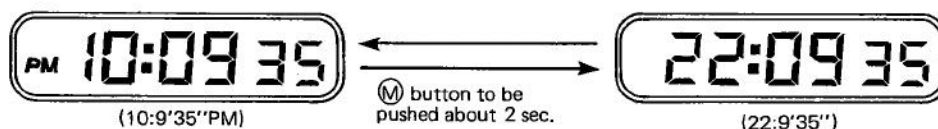
Before 0-reset	After 0-reset	
	Digital	Analog
$0 \leq N \leq 29$	"00" sec. with no change of minute	Waiting for N-sec. count
$30 \leq N \leq 59$	"00" sec. with carry of 1 minute	(60 - N) sec. quick setting (32 Hz)

③ Switching between 12-/24-hour displays

The following switch is given among the displays when the (M) button is pushed for about 2 seconds in the time display mode.

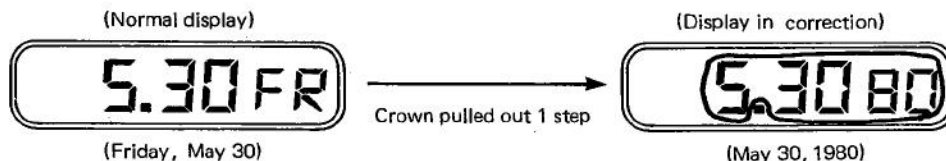


And the switching is carried out between the 12 and 24-hour displays as follows.



4) Correction of calendar

The (M) button is pushed to secure the calendar display mode, and the calendar can be corrected by pulling out the crown by 1 step. And the display switches as follows.



The "day" is corrected by turning the crown clockwise and counterclockwise in the correction mode. At the same time, both the "month" and "year" are corrected in coupling. After correction, the crown is pushed into its normal position.

An automatic setting is secured for the "day of the week" displayed at that moment.

(Note) Setting of "day of the week"

It sometimes occurs that the "day of the week" displayed when the power cell is set does not show the correct day. In such case, the calendar correction mode is set, and the crown is turned in either direction regardless of the addition or subtraction to once switch the "year". After this, the "month", "day" and "year" are set again. Thus the correct "day of the week" is displayed in the normal display mode.

5) Operation of alarm

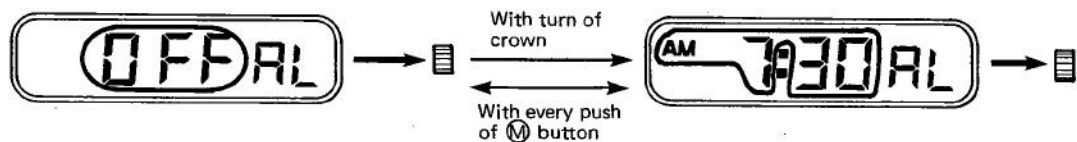
The (M) button is pushed to secure the alarm display mode. In this case, either one of the following two displays is given.



- The switch between the 12-/24-hour displays of the alarm mode is carried out in coupling to the 12-/24-hour periods of the time display mode. (An independent switch is impossible in the alarm display mode between the 12- and 24-hour displays.)
- The alarm rings 30 seconds at the moment when a coincidence is obtained between the time of watch and an "exact minute" of the set time. The way of ringing differs between the first 20 seconds and the rest 10 seconds respectively. And the ring of alarm is stopped with push of (M) button.

① ON/OFF switching

The crown is pulled out 1 step to secure the correction mode.



② Setting of alarm time

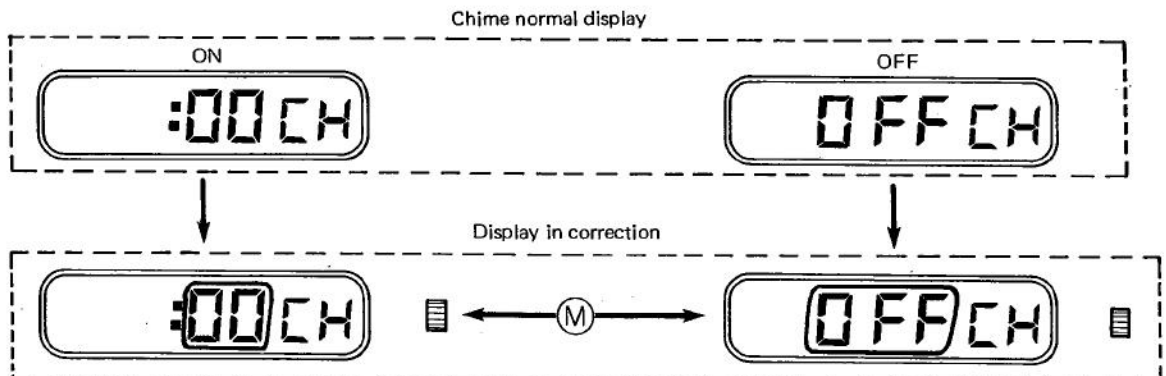
The crown is pulled out 1 step to secure the correction mode.

Then the crown is turned clockwise or counterclockwise to set the "minute", and at the same time both the "hour" and "AM/PM" can be set in coupling.

In this case, the setting is possible with either of the "set time" and "OFF" which is displayed first.

6) Setting of chime

The (M) button is pushed to secure the chime display mode, and the crown is pulled out 1 step to set the chime. The ON and OFF are switched alternately with every push of (M) button.



In the ON state, the chime rings twice at every hour on the hour.

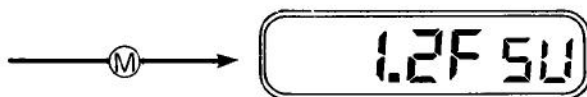
7) Notes on handling of watch

① Display when setting power cell

Phenomenon:

A phenomenon like the break of segment occurs rarely in the calendar display mode and when the power cell is set into the movement.

(Ex.)



Treatment:

The crown is pulled out 1 step (correction mode) and then turned. Thus the normal state of display can be obtained again. This must always be done in the calendar mode. The normal state is never obtained in other display modes than the calendar.

② Actuation of power cell life indicator when setting power cell

Phenomenon:

It rarely occurs that the power cell life indicator is actuated when the power cell is set into the movement.

(Actuation of power cell life indicator)

Analog: 2-second step movement of second hand

Digital: Flashing of colon on display screen

Treatment:

The normal state is secured again for the power cell life indicator when the digital "second" passes "00". After this, the power cell life indicator has the normal actuation with no deterioration at all.

③ Skip of second hand when turning hands

Phenomenon:

It rarely occurs that the second hand skips about 2 ~ 10 seconds when the hands are turned (quickly in particular) after pulling out the crown by 2 steps.

In this caliber, the conventional brake lever or the like is not used to prevent the rotation of the 4th wheel and pinion which is caused when the hands are turned. And thus the rotation of the 4th wheel is prevented in this caliber by securing an engagement between the rotor and the 5th wheel and pinion (See the diagram below).

In this connection, the second hand stops at the moment when the crown is pulled out 2 steps to make it impossible to move forcibly the second hand.

Thus the above-mentioned skip of the second hand is caused due to the timing between the hand turning speed and the engagement of gears. Accordingly, this phenomenon never arises when the hands are turned in a low speed.

