

## G04C

**ELECTROMECHANICAL CLOCKS OR WATCHES (mechanical parts of clocks or watches in general G04B; electronic time-pieces with no moving parts, electronic circuitry for producing timing pulses G04G)**

### Definition statement

*This subclass/group covers:*

- The "electromechanical timepieces" in a strict sense, namely timepieces in which the time reference (signal) is obtained by electromechanical means, that is by the cooperation of mechanically moving parts and electric/electronic/electromagnetic elements (e.g. a mechanical oscillator whose frequency is regulated by the use of coils), and
- electronic timepieces comprising mechanically moving parts (see [G04G](#) for the definition of electronic timepiece).

One has, in any case, to bear in mind that in the recent decades, a distinction between an electronic and an electromechanical timepiece has become more and more pointless, in some case even useless. For this reason, [G04C](#) is nowadays used to classify electromechanical aspects of clocks or watches in general, without putting an excessive stress on the nature of the timepiece as a whole (for more info, see "Overlapping with external fields" below).

### Relationship between large subject matter areas

Although an explicit link to [G04B](#) is present in the title of [G04C](#), documents concerning mechanical parts of electromechanical timepieces could still be classified in [G04C](#), especially if these mechanical parts cooperate to actuate or implement electronic and/or electromechanical functions.

A typical example of such a document involves a setting crown wherein a mechanical rotation (of the crown) is transformed into a sequence of electronic pulses.

The major overlaps of [G04C](#) are found with [G04G](#). This depends on the fact that a clear distinction between the two has become less and less possible and also less and less important. To a certain extent, [G04C](#) and [G04G](#) should be regarded as two complementary classifications, or somehow like two sides of the same coin. For these reasons, some common aspects of these two subclasses shall be discussed here.

The following 1-to-1 correspondence between [G04C](#) and [G04G](#) subclasses is to be noted:

- [G04C 9/00IS](#) defined in parallel with [G04G 5/00](#); - [G04C 11/00IS](#) defined in parallel with [G04G 7/00](#);

- [G04C 17/00IS](#) defined in parallel with [G04G 9/00](#);
- [G04C 19/00IS](#) defined in parallel with [G04G 11/00](#);
- [G04C 21/00IS](#) defined in parallel with [G04G 13/00](#);
- [G04C 23/00IS](#) defined in parallel with [G04G 15/00](#).

In all of the above subclasses, documents can be found which could belong to their corresponding parallel subclass. For example, documents could be found in [G04C 9/00](#) which could also be in [G04G 5/00](#) and vice-versa.

When classifying, a lot is left to the common sense of the classifier. If a document describes relevant electromechanical aspects of a timepiece, this document will usually receive at least a classification symbol in [G04C](#). The "real life" situation is such that most often documents receive a double classification (both in [G04C](#) and in [G04G](#)). Definitely, in cases of doubt, giving a classification symbol in both [G04C](#) and [G04G](#) is a preferred solution to choosing only one of them.

A typical example is given by the pair [G04C 23/00](#)- [G04G 15/00](#). Here, timed switches, e.g., devices to execute a timed programme of switching on/off the heating system of a household are typically classified. A document showing mechanical jumpers to set the time-on and time-off, together with details concerning the mechanical connections of the jumpers with other parts of the mechanism is usually classified in [G04C 23/00](#). Similarly, a document showing a fully programmable CPU-based thermostat with wireless connection to the main heater is typically classified in [G04G 15/00](#).

### **Special rules of classification within this group**

No document concerning radio-controlled timepieces should be classified in [G04C](#), unless other technical aspects of the documents deserve a classification therein (for further details, see the corresponding paragraph in [G04G](#)).

## **G04C 1/00**

**Winding mechanical clocks electrically (winding mechanically G04B3/00 [N: electrical winding of spring driven arrangements for gramophones G11B19/20 ])**

### **Definition statement**

*This subclass/group covers:*

Documents showing internal electric and/or electromechanical means to wind a mechanical energy source such as a mainspring or a (free-falling) weight. The typical device classified here is a wall clock, pendulum clock or the like. The field has not been particularly active in the last three decades.

## References relevant to classification in this group

*This subclass/group does not cover:*

Devices for electrically and/or electromechanically winding the mainspring (or the like) of mechanical timepieces	<a href="#">G04D 7/009</a> , <a href="#">G04B 3/006</a>
Winders for automatic watches	<a href="#">G04D 7/009</a>
The watch winders for manually wound watches	<a href="#">G04B 3/006</a>

## Special rules of classification within this group

In particular, although the heading of [G04D 7/009](#) is not appropriate, the winders for automatic watches are classified in that group and not the [G04B 5/00](#).

## G04C 3/00

**Electromechanical clocks or watches independent of other time-pieces and in which the movement is maintained by electric means [N: Synchronisation G04C11/00 ]**

### Definition statement

*This subclass/group covers:*

- Position sensitive switches integrated in timepieces ([G04C 3/001](#) and subgroups);
- electrically driven timepieces comprising electromechanical regulators (up to [G04C 3/08](#) and subgroups);
- three sub-groups (/14, /16 and /18) dealing with different technical possibilities to drive the display.

## Relationship between large subject matter areas

There could be overlap between [G04C 3/001](#) and subgroups and [G04C 9/00](#). Hence consider this when searching [G04C 3/001](#) and subgroups. For more details concerning this overlap, see the section concerning [G04C 9/00](#).

## Special rules of classification within this group

When searching in [G04C 3/06](#) and subgroups or [G04C 3/08](#) and subgroups consider whether it is the case to extend the search in [G04C 5/00](#) (electromagnetic escapements).

For practical reasons, [G04C 3/14](#) and subgroups comprises also documents concerning step-motors per se, if these motors are used nowhere else than in timepieces. Therefore, a natural overlap with [H02K 37/00](#) (general group for step motors) does exist. When searching in [G04C 3/14](#) and subgroups, this overlap has to be considered, on a case-by-case level.

The same applies to [G04C 3/12](#) and subgroups, the general group for piezoelectric actuators being [H01L 41/00](#) and piezoelectric actuators being also found in [H02K 33/16](#).

## **G04C 5/00**

**Electric or magnetic means for converting oscillatory to rotary motion in time-pieces, i.e. electric or magnetic escapements (regulators G04C3/00 )**

## **G04C 9/00**

**Electrically-actuated devices for setting the time-indicating means (of slave clocks G04C13/03; [N: of synchronous clocks G04C15/0072]; mechanical setting devices G04B27/00) [N: electronic setting devices G04G5/00, e.g. G04C5/02 ]**

### **Definition statement**

*This subclass/group covers:*

Documents dealing with setting the time (and/or the date) in an electromechanical timepiece or, by electromechanical means, in an electronic timepiece. With the exception of [G04C 9/02](#), the key element of [G04C 9/00IS](#) a setting crown.

### **Special rules of classification within this group**

[G04C 9/02](#) contains still many radio controlled timepieces (which are nevertheless all double classified and shall be soon removed from here) and, in addition, it contains documents showing systems allowing to test/correct the running precision of a timepiece by establishing a wireless communication between the timepiece and an external control device. Typically these control devices are available in the timepiece manufacturing site or by retailer shops, to perform calibration or re-calibration of some (otherwise inaccessible) of the timepiece elements.

Documents classified in the rest of [G04C 9/00](#) should, as a general rule, contain details concerning the operations that a user needs to perform in order to set the time. On the contrary, if a document merely contains hardware

details concerning the electromechanical setting element (the crown, most typically), then classification in [G04C 3/001](#) and subgroups should be considered. In the past, this has not always been the strict policy, therefore an overlap still exists and should be always considered.

## **G04C 10/00**

**Arrangements of electric power supplies in time pieces [N: (circuits G04G19/00; mounting, assembling of components of electromechanical watches G04C3/008, of electronic watches G04G17/00 )]**

### **Definition statement**

*This subclass/group covers:*

Documents showing details of the power supply of timepieces. These details generally concern:

- The mechanical positioning of the power supply with respect to the remaining elements of the timepiece;
- mechanical modifications which other parts of the timepiece have to undergo in order to fit/cope with the power supply (e.g. special dials to cooperate with solar cells mounted there under);
- power supply details of "automatic electromechanical" (also known as Kinetic) watches.

### **Special rules of classification within this group**

Due to the non-existence of a corresponding group in [G04G](#), many documents concerning details of power supplies of purely electronic timepieces can still be found in [G04C 10/00](#) and/or in [G04G 17/04](#). This should be borne in mind when searching these groups.

Similarly, if a document contains details of power supply circuits, it may be classified only in [G04G 19/00](#), even if it concerns an electromechanical timepiece or an electronic timepiece with mechanically moving parts.

## **G04C 11/00**

**Synchronisation of independently-driven clocks; [N: Synchronisation between master and slave pendulums G04C13/028; Synchronisation of electronic oscillators in general H03L7/00 ]**

## **G04C 13/00**

## Driving mechanisms for clocks by master-clocks

### Definition statement

*This subclass/group covers:*

Master-slave clock systems wherein, as a general rule, the slave clocks are not autonomous clocks and they constantly need driving signals issued by the master clock in order to deliver time information.

## G04C 13/04

### Master-clocks

### Definition statement

*This subclass/group covers:*

Details of the master clock part.

## G04C 13/08

### Slave-clocks actuated intermittently

### Definition statement

*This subclass/group covers:*

Details concerning slave clocks.

## G04C 15/00

### Clocks driven by synchronous motors

## G04C 17/00

indicating the time optically by electric means (G04C19/00 takes precedence; by mechanical means G04B19/00, G04B19/20 )

### Definition statement

*This subclass/group covers:*

Documents showing electromechanical time displays. The groups/subgroups are defined in terms of the technical features used to display time (bands, flaps, drums, etc).

### Special rules of classification within this group

When searching in [G04C 17/0091](#), extension of the search to [G04G 9/0082](#) is necessary.

[G04C 17/00IS](#) the subclass of [G04C](#) having the highest overlap with [G04B](#). Therefore, extension of the search in corresponding parts of [G04B](#) should always be considered, especially if the search concerns the manufacturing methods of the mechanically moving parts.

## **G04C 19/00**

### **Producing optical time signals at prefixed times by electric means**

#### **Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

This means that countdown timers which would count-down a predetermined time interval independently on the time of the day	<a href="#">G04F 1/00</a> , <a href="#">G04F 3/00</a> .
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#### **Special rules of classification within this group**

The title of this subclass contains the expression "at predetermined times".

This is an important aspect because this subclass contains documents describing timepieces producing a visual action at a predetermined time of the day.

This means that countdown timers which would count-down a predetermined time interval independently on the time of the day are not part of [G04C 19/00](#), but rather [G04F 1/00](#), [G04F 3/00](#).

See [G04C 23/00](#)

## **G04C 21/00**

### **Producing acoustic time signals by electrical means [N: (for mechanical clocks or watches G04B21/08, G04B25/00 )]**

#### **Special rules of classification within this group**

Likewise [G04C 19/00](#), only with acoustic output instead of visual.

This subclass also contains the group [G04C 21/04](#) which features the electromechanical version of the so called "minute repeater" complication.

See [G04C 23/00](#).

## **G04C 23/00**

**Clocks with attached or built-in means operating any device at preselected times or after preselected time-intervals (if restricted to producing acoustic time signals by electrical means G04C21/00; mechanical alarm clocks G04B23/02; apparatus which can be set and started to measure-off predetermined intervals G04F3/06; time or time-programme switches which automatically terminate their operation after the programme is completed H01H43/00 )**

### **Definition statement**

*This subclass/group covers:*

Documents related to timepieces providing an electromechanical action (non visual, nor acoustic) at predetermined times (of the day). It also extends to the possibility to act after the elapse of a predetermined time interval which is nevertheless counted starting from a predetermined time of the day.

### **Special rules of classification within this group**

This subclass completes a triplet with [G04C 19/00](#) and [G04C 21/00](#).

## **G04C 99/00**

**Subject matter not provided for in other groups of this subclass**