

ECLA EUROPEAN CLASSIFICATION

G04F

TIME-INTERVAL MEASURING (measuring pulse characteristics G01R, e.g. [G01R29/02](#); in radar or like systems G01S; masers [H01S1/00](#); generation of oscillations H03B; generation or counting of pulses, frequency dividing, analogue/digital conversion H03K) [N: time fuzes [F42C9/00](#)]

[N: **WARNING**

The following IPC groups are not used in the internal ECLA classification scheme. Subject matter covered by these groups is classified in the following ECLA groups:

[G04F10/08](#) covered by [G04F5/16](#)
]

Note

This subclass covers:

- apparatus for measuring-off predetermined time intervals;
- apparatus for producing such intervals as timing standards, e.g. metronomes;
- apparatus for measuring unknown intervals, e.g. precision systems for short time interval measurement.

G04F1/00

Apparatus which can be set and started to measure-off predetermined or adjustably-fixed time intervals without driving mechanisms, e.g. egg timer (electric time and time-programme switches [H01H43/00](#))

G04F1/00B

- . [N: using electronic timing, e.g. counting means (pulse time delay arrangements [H03K5/13](#); modifications of electronic switches for introducing a time delay before switching [H03K17/28](#))]

G04F1/02

- . by consuming prefixed quantities of materials, e.g. by burning candle

G04F1/04

- . by movement or acceleration due to gravity

G04F1/06

- . . by flowing-away of a prefixed quantity of fine-granular or liquid materials, e.g. sand-glass, water-clock

G04F1/06B

- . . . [N: using acoustic signalling]

G04F1/06C

- . . . [N: using electrical contact device]

G04F1/08

- . . by a body falling a prefixed distance in air or in a viscous material

G04F3/00

Apparatus which can be set and started to measure-off predetermined or adjustably-fixed time intervals with driving mechanisms, e.g. dosimeter with clockwork (electric time or time-programme switches [H01H43/00](#))

G04F3/02

- . with mechanical driving mechanisms

G04F3/02B

- . . [N: using mechanical signalling device]

G04F3/02C

- . . [N: mechanically actuated (cigar or cigarette receptacles or boxes with means for limiting the frequency of smoking [A24F15/00B](#))]

G04F3/02D

- . . [N: using electrical contacts, e.g. for actuating electro-acoustic device]

- G04F3/04 . . Additional arrangements in connection with ordinary non-electric clocks for this purpose
- G04F3/06 . with electric driving mechanisms
- G04F3/08 . . Additional arrangements in connection with ordinary electric clocks for this purpose

G04F5/00 **Apparatus for producing preselected time intervals for use as timing standards**
(generating clock signals for electric digital computers [G06F1/04](#); regulating frequency in general [H03C](#), [H03L](#))

- G04F5/02 . Metronomes [N: periodic signalisation by acoustic signals in general [G04B21/00B](#)]
- G04F5/02B . . [N: Mechanic metronomes]
- G04F5/02C . . [N: Electronic metronomes [N: rhytem generation for electrophonic musical instruments [G10H1/36](#)]
- G04F5/02D . . [N: using electro-mechanical driving e.g. of optical scanned recordings (electrophonic musical instruments in which tones are generated by electromechanical means e.g. by using pick-up means for reading recorded waves [G10H3/00](#))]
- G04F5/04 . using oscillators with electromechanical resonators [N: producing electric oscillations or timing pulses]
- G04F5/06 . . using piezoelectric resonators
- G04F5/06B . . . [N: Constructional details (details of resonators in general [H03H9/02](#))]
- G04F5/06B2 [N: Trimmer condensators (capacitors in general [H01G](#))]
- G04F5/08 . . using magnetostrictive resonators
- G04F5/10 . using electric or electronic resonators ([G04F5/14](#) takes precedence)
- G04F5/12 . using fluidic devices
- G04F5/14 . using atomic clocks
- G04F5/14C . . [N: using Coherent Population Trapping] [N0512]
- G04F5/16 . using pulses produced by radioisotopes

G04F7/00 **Apparatus for measuring unknown time intervals by mechanical means**

- G04F7/02 . by measuring the distance of fall or the final velocity of a falling body
- G04F7/04 . using a mechanical oscillator
- [N: **WARNING** [N1102]
The subgroups of G04F/04 are not complete pending reclassification; see also this group
]
- G04F7/06 . . running only during the time interval to be measured, e.g. stop-watch
- G04F7/06B . . . [N: with reset mechanisms] [N1102]
- G04F7/06D . . . [N: with start-stop control arrangements] [N1102]
- G04F7/06D2 [N: with a single push-button or actuation member for start-stop and reset]

N1102]

- G04F7/08 . . Watches or clocks with stop devices, e.g. chronograph
- G04F7/08B . . . [N: with reset mechanisms] [N1102]
- G04F7/08B2 [N: with single hammers, i.e. one hammer acts on each counter] [N1102]
- G04F7/08B4 [N: with double hammer , i.e. one hammer acts on two counters] [N1102]
- G04F7/08B6 [N: with triple hammer, i.e. one hammer acts on three counters] [N1102]
- G04F7/08C . . . [N: with couplings between the chronograph mechanism and the base movement] [N1102]
- G04F7/08C2 [N: acting in the plane of the movement] [N1102]
- G04F7/08C4 [N: acting perpendicular to the plane of the movement] [N1102]
- G04F7/08C6 [N: involving a tilting movement] [N1102]
- G04F7/08D . . . [N: with start-stop control mechanisms] [N1102]
- G04F7/08D2 [N: with column wheel] [N1102]
- G04F7/08D4 [N: with member having a rotational two-way movement, e.g. navette] [N1102]
- G04F7/08D6 [N: with single push-button or actuation member for start-stop and reset] [N1102]
- G04F7/08D8 [N: actuated by other than push-buttons, e.g. bezel or lever] [N1102]
- G04F7/08S . . . [N: Special arrangements] [N1102]
- G04F7/08S2 [N: with multiple chronograph functions, i.e. to count multiple running times (alternate time counting G07C)] [N1102]
- G04F7/08S4 [N: Split-time function e.g. rattrapante] [N1102]
- G04F7/08S6 [N: with display of fraction of seconds, e.g. foudroyante] [N1102]
- G04F7/08S8 [N: Modular constructions involving interchangeability with one or more chronograph modules on a single base movement] [N1102]
- G04F7/08S10 [N: indicating measured time by other than hands; e.g. numbered bands, drums, discs or sheet (current time indication other than by hand [G04B19/20](#))] [N1102]
- G04F7/08S12 [N: with a separate barrel for the chronograph functions (barrel in a separable module [G04F7/08S08](#))] [N1102]

- G04F7/10 . . Means used apart from the time-piece for starting or stopping same [N: see provisionally too : [G04F8/08](#)]

G04F8/00 Apparatus for measuring unknown time intervals by electromechanical means

- G04F8/00B . . [N: using continuously running driving means]
- G04F8/00C . . [N: running only during the time interval to be measured, e.g. stop-watch]
- G04F8/02 . . using an electromechanical oscillator [N: [G04F5/00](#), [G04F10/00](#) take precedence]
- G04F8/04 . . using a piezoelectric oscillator [N: not used]
- G04F8/06 . . using a magnetostrictive oscillator [N: not used]
- G04F8/08 . . Means used apart from the time-piece for starting or stopping same

G04F10/00 Apparatus for measuring unknown time intervals by electric means [N: timing devices for clocks or watches for comparing the rate of the oscillating member with a

standard [G04D7/12](#); radar systems, analogous systems [G01S7/00](#); measuring frequency [G01R23/00](#); measuring phase angle [G01R25/00](#)]

- G04F10/00T
- [N: Time-to-digital converters [TDC] (analog-to-digital converters with intermediate conversion to time or phase [H03M1/50](#), [H03M1/60](#))] [N1103]
- [N: **WARNING**This group is not complete pending reclassification; see also groups [G04F10/04](#) and [G04F10/06](#) [N1103]]
- G04F10/02
- using oscillators with passive electric resonator, e.g. lumped LC [N: [G04F10/04](#), [G04F10/06](#) and [G04F10/10](#) take precedence]
- G04F10/04
- by counting pulses or half-cycles of an alternating current [N: ([G04F10/00T](#) takes precedence)] [C1103]
- G04F10/06
- by measuring phase [N: ([G04F10/00T](#) takes precedence)] [C1103]
- G04F10/10
- by measuring electric or magnetic quantities changing in proportion to time
- G04F10/10B
- . [N: with conversion of the time-intervals]
- G04F13/00**
- Apparatus for measuring unknown time intervals by means not provided for in groups [G04F5/00](#) to [G04F10/00](#)**
- G04F13/02
- using optical means
- G04F13/02B
- . [N: using cathode-ray oscilloscopes (circuits for inserting reference time markers for cathode-ray oscilloscopes [G01R13/30B](#))]
- G04F13/02C
- . [N: Measuring duration of ultra-short light pulses, e.g. in the pico-second range; particular detecting devices therefor (non-linear optics [G02F1/35](#); monitoring arrangements for lasers in general [H01S3/00D](#); photometry, radiation pyrometry [G01J1/00](#), [G01J5/00](#))]
- G04F13/04
- using electrochemical means
- [N: **WARNING**
Not complete, see also [G04F10/00](#)
]
- G04F13/06
- using fluidic means
- [N: **WARNING**
Not complete, see also [G04F10/00](#)
]