

ECLA**EUROPEAN CLASSIFICATION****G05F****SYSTEMS FOR REGULATING ELECTRIC OR MAGNETIC VARIABLES**

(regulating the timing or recurrence frequency of pulses in radar or radio navigation systems G01S; closed-loop systems for regulating non-electric variables by electric means G05D; regulating power supply of digital computers [G06F1/26](#); regulating electric power distribution networks H02J; regulating the charging of batteries [H02J7/00](#); regulation of the output of static converters, e.g. switching regulators H02M; regulation of the output of electric generators H02N, [H02P9/00](#), H03L; controlling transformers, reactors or choke coils [H02P13/00](#); regulating frequency response, gain, maximum output, amplitude or bandwidth of amplifiers H03G; regulating tuning of resonant circuits H03J; regulating characteristics of transmission lines H04B; electric control of X-ray apparatus [H05G1/30](#))

[N: **WARNING** [C1208]

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:

[G05F3/28](#) covered by [G05F3/26](#)

[G05F5/02](#) " " [G05F5/00](#)

[G05F5/04](#) " " [G05F5/00](#)

[G05F5/06](#) " " [G05F5/00](#)

[G05F5/08](#) " " [G05F5/00](#)

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Notes

1. This subclass covers:

- systems only;
- use of hydraulic, pneumatic, mechanical, and electrical motors for varying electric characteristics of devices which restore the quantity regulated;
- the combination of static converters and current or voltage regulators, if the invention resides in the combination.

2. This subclass does not cover elements per se, which are covered by the relevant subclasses.

G05F1/00

Automatic systems in which deviations of an electric quantity from one or more predetermined values are detected at the output of the system and fed back to a device within the system to restore the detected quantity to its predetermined value or values, i.e. retroactive systems

G05F1/02

- Regulating electric characteristics of arcs ([arrangements for feeding electrodes B23K9/12](#), [H05B7/109](#), [H05B31/18](#); automatic control of power for heating by discharge [H05B7/148](#))

G05F1/04

- . by means of saturable magnetic devices

G05F1/06

- . by means of discharge tubes

G05F1/08

- . by means of semiconductor devices

G05F1/10

- Regulating voltage or current ([G05F1/02](#) takes precedence; for electric railways [B60M3/02](#))

- G05F1/12 . . wherein the variable actually regulated by the final control device is ac ([G05F1/625 takes precedence](#))
- G05F1/13 . . . using ferroresonant transformers as final control device
- G05F1/14 . . . using tap transformers or tap changing inductors as final control device
- G05F1/147 with motor driven tap switch
- G05F1/153 controlled by discharge tubes or semiconductor devices
- G05F1/16 combined with discharge tubes or semiconductor devices
- G05F1/20 semiconductor devices only
- G05F1/22 combined with separate magnetic control devices having a controllable degree of saturation
- G05F1/24 . . . using bucking or boosting transformers as final control devices
- G05F1/247 with motor in control circuit
- G05F1/253 the transformers including plural windings in series between source and load ([G05F1/247 takes precedence](#))
- G05F1/26 combined with discharge tubes or semiconductor devices
- G05F1/30 semiconductor devices only
- G05F1/32 . . . using magnetic devices having a controllable degree of saturation as final control devices
- G05F1/325 with specific core structure, e.g. gap, aperture, slot, permanent magnet
- G05F1/33 with plural windings through which current to be controlled is conducted
- G05F1/335 on different cores
- G05F1/34 combined with discharge tubes or semiconductor devices
- G05F1/38 semiconductor devices only
- G05F1/40 . . . using discharge tubes or semiconductor devices as final control devices
- G05F1/42 discharge tubes only
- G05F1/44 semiconductor devices only
- G05F1/445 being transistors in series with the load
- G05F1/45 being controlled rectifiers in series with the load
- G05F1/45A [N: with pulse-burst modulation control]
- G05F1/455 with phase control
- G05F1/46 . . wherein the variable actually regulated by the final control device is dc ([G05F1/625 takes precedence](#))
- G05F1/46A . . . [N: using an operational amplifier as final control device]
- G05F1/46B . . . [N: as a function of the requirements of the load, e.g. delay, temperature, specific voltage/current characteristic]
- G05F1/46B1 [N: Sources providing an output which depends on temperature] [N9510]
- G05F1/46B3 [N: Internal voltage generators for integrated circuits, e.g. step down generators] [N9510]
- G05F1/46B5 [N: Sources with reduced influence on propagation delay] [N9510]
- G05F1/46B7 [N: Sources with noise compensation] [N9510]
- G05F1/46C . . . [N: characterised by reference voltage circuitry, e.g. soft start, remote shutdown]
- G05F1/52 . . . using discharge tubes in series with the load as final control devices
- G05F1/54 additionally controlled by the unregulated supply

- G05F1/56 . . . using semiconductor devices in series with the load as final control devices
([G05F1/46A](#) takes precedence)
- G05F1/56C [N: Voltage to current converters (amplifiers [H03F](#))]
- G05F1/56T [N: with a threshold detection shunting the control path of the final control device]
- G05F1/563 including two stages of regulation at least one of which is output level responsive, e.g. coarse and fine regulation
- G05F1/565 sensing a condition of the system or its load in addition to means responsive to deviations in the output of the system, e.g. current, voltage, power factor
([G05F1/563](#) takes precedence)
- G05F1/567 for temperature compensation
- G05F1/569 for protection
- G05F1/571 with overvoltage detector
- G05F1/573 with overcurrent detector
- G05F1/573F {7 dots} [N: with foldback current limiting]
- G05F1/575 characterised by the feedback circuit
- G05F1/577 for plural loads
- G05F1/585 providing voltages of opposite polarities
- G05F1/59 including plural semiconductor devices as final control devices for a single load
- G05F1/595 semiconductor devices connected in series
- G05F1/607 . . . using discharge tubes in parallel with the load as final control devices
- G05F1/61 including two stages of regulation, at least one of which is output level responsive
- G05F1/613 . . . using semiconductor devices in parallel with the load as final control devices
([G05F1/46A](#) takes precedence)
- G05F1/614 including two stages of regulation, at least one of which is output level responsive
- G05F1/618 . . . using semiconductor devices in series and in parallel with the load as final control devices
([G05F1/46A](#) takes precedence)
- G05F1/62 . . . using bucking or boosting dc sources
- G05F1/625 . . wherein it is irrelevant whether the variable actually regulated is ac or dc
- G05F1/63 . . . using variable impedances in series with the load as final control devices
- G05F1/635 being Hall effect devices, magnetoresistors or thermistors
- G05F1/644 being pressure-sensitive resistors
- G05F1/648 being plural resistors among which a selection is made
- G05F1/652 . . . using variable impedances in parallel with the load as final control devices
- G05F1/656 . . . using variable impedances in series and in parallel with the load as final control devices

- G05F1/66 . . Regulating electric power
- G05F1/67 . . to the maximum power available from a generator, e.g. from solar cell
- G05F1/70 . . Regulating power factor; Regulating reactive current or power

G05F3/00 **Non-retroactive systems for regulating electric variables by using an uncontrolled element, or an uncontrolled combination of elements, such element or such combination having self-regulating properties** [N: (current generators specially

designed for use in phase-locked loops [H03L7/089C](#)) [[C9507](#)]

- G05F3/02 . Regulating voltage or current
- G05F3/04 . . wherein the variable is ac
- G05F3/06 . . . using combinations of saturated and unsaturated inductive devices, e.g. combined with resonant circuit
- G05F3/08 . . wherein the variable is dc
- G05F3/10 . . . using uncontrolled devices with non-linear characteristics
- G05F3/12 being glow discharge tubes
- G05F3/16 being semiconductor devices
- G05F3/18 using Zener diodes
- G05F3/18F [[N: and field-effect transistors](#)]
- G05F3/20 using diode- transistor combinations ([G05F3/18](#) takes precedence)
- G05F3/20S [[N: Substrate bias-voltage generators \(for static stores \[G11C5/14P1\]\(#\)\)](#)]
- G05F3/22 wherein the transistors are of the bipolar type only ([G05F3/26](#), [G05F3/30](#) take precedence)
- G05F3/22C {7 dots} [[N: with compensation for device parameters, e.g. Early effect, gain, manufacturing process, or external variations, e.g. temperature, loading, supply voltage](#)]
- G05F3/22C1 {8 dots} [[N: producing a current or voltage as a predetermined function of the temperature](#)]
- G05F3/22C3 {8 dots} [[N: producing a current or voltage as a predetermined function of the supply voltage](#)]
- G05F3/24 wherein the transistors are of the field-effect type only ([G05F3/20S](#), [G05F3/26](#), [G05F3/30](#) take precedence)
- G05F3/24C {7 dots} [[N: with compensation for device parameters, e.g. channel width modulation, threshold voltage, processing, or external variations, e.g. temperature, loading, supply voltage](#)]
- G05F3/24C1 {8 dots} [[N: producing a voltage or current as a predetermined function of the temperature](#)]
- G05F3/24C3 {8 dots} [[N: producing a voltage or current as a predetermined function of the supply voltage](#)]
- G05F3/26 Current mirrors
- G05F3/26A {7 dots} [[N: using field-effect transistors only](#)] [[N9510](#)]
- G05F3/26B {7 dots} [[N: using bipolar transistors only](#)] [[N9510](#)]
- G05F3/26C {7 dots} [[N: using both bipolar and field-effect technology](#)] [[N9510](#)]
- G05F3/30 Regulators using the difference between the base-emitter voltages of two bipolar transistors operating at different current densities ([G05F3/26](#) takes precedence)

- G05F5/00** **Systems for regulating electric variables by detecting deviations in the electric input to the system and thereby controlling a device within the system to obtain a regulated output**

- G05F7/00** **Regulating magnetic variables** (details of apparatus for measuring magnetic variables involving magnetic resonance [G01R33/28](#))