

CPC COOPERATIVE PATENT CLASSIFICATION

G PHYSICS (NOTES omitted)

INSTRUMENTS

G05 CONTROLLING; REGULATING (NOTES omitted)

G05F SYSTEMS FOR REGULATING ELECTRIC OR MAGNETIC VARIABLES (regulating the timing or recurrence frequency of pulses in radar or radio navigation systems [G01S](#); regulation of current or voltage, specially adapted for use in electronic time-pieces [G04G 19/02](#); closed-loop systems for regulating non-electric variables by electric means [G05D](#); regulating power supply of digital computers [G06F 1/26](#); for obtaining desired operating characteristics of electromagnets with armatures [H01F 7/18](#); regulating electric power distribution networks [H02J](#); regulating the charging of batteries [H02J 7/00](#); regulation of the output of static converters, e.g. switching regulators [H02M](#); regulation of the output of electric generators [H02N](#), [H02P 9/00](#); controlling transformers, reactors or choke coils [H02P 13/00](#); regulating frequency response, gain, maximum output, amplitude or bandwidth of amplifiers [H03G](#); regulating tuning of resonant circuits [H03J](#); regulating characteristics of transmission lines [H04B](#); controlling electric light sources [H05B 39/04](#), [H05B 41/36](#), [H05B 45/10](#), [H05B 45/20](#), [H05B 47/10](#); electric control of X-ray apparatus [H05G 1/30](#))

NOTES

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

WARNINGS

- The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

G05F 3/28	covered by	G05F 3/26
G05F 5/02	covered by	G05F 5/00
G05F 5/04	covered by	G05F 5/00
G05F 5/06	covered by	G05F 5/00
G05F 5/08	covered by	G05F 5/00
- In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

1/00	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	1/10	. Regulating voltage or current (G05F 1/02 takes precedence; for electric railways B60M 3/02)
		1/12	. . wherein the variable actually regulated by the final control device is ac (G05F 1/625 takes precedence)
1/02	. Regulating electric characteristics of arcs (arrangements for feeding electrodes B23K 9/12 , H05B 7/109 , H05B 31/18 ; automatic control of power for heating by discharge H05B 7/148)	1/13	. . . using ferroresonant transformers as final control devices
1/04	. . by means of saturable magnetic devices	1/14	. . . using tap transformers or tap changing inductors as final control devices
1/06	. . by means of discharge tubes	1/147 with motor driven tap switch
1/08	. . by means of semiconductor devices	1/153 controlled by discharge tubes or semiconductor devices
		1/16 combined with discharge tubes or semiconductor devices

- 1/20 semiconductor devices only
- 1/22 combined with separate magnetic control devices having a controllable degree of saturation
- 1/24 using bucking or boosting transformers as final control devices
- 1/247 with motor in control circuit
- 1/253 the transformers including plural windings in series between source and load ([G05F 1/247 takes precedence](#))
- 1/26 combined with discharge tubes or semiconductor devices
- 1/30 semiconductor devices only
- 1/32 using magnetic devices having a controllable degree of saturation as final control devices
- 1/325 with specific core structure, e.g. gap, aperture, slot, permanent magnet
- 1/33 with plural windings through which current to be controlled is conducted
- 1/335 on different cores
- 1/34 combined with discharge tubes or semiconductor devices
- 1/38 semiconductor devices only
- 1/40 using discharge tubes or semiconductor devices as final control devices
- 1/42 discharge tubes only
- 1/44 semiconductor devices only
- 1/445 being transistors in series with the load
- 1/45 being controlled rectifiers in series with the load
- 1/452 {with pulse-burst modulation control}
- 1/455 with phase control
- 1/46 wherein the variable actually regulated by the final control device is dc ([G05F 1/625 takes precedence](#))
- 1/461 {using an operational amplifier as final control device}
- 1/462 {as a function of the requirements of the load, e.g. delay, temperature, specific voltage/current characteristic}
- 1/463 {Sources providing an output which depends on temperature}
- 1/465 {Internal voltage generators for integrated circuits, e.g. step down generators}
- 1/466 {Sources with reduced influence on propagation delay}
- 1/467 {Sources with noise compensation}
- 1/468 {characterised by reference voltage circuitry, e.g. soft start, remote shutdown}
- 1/52 using discharge tubes in series with the load as final control devices
- 1/54 additionally controlled by the unregulated supply
- 1/56 using semiconductor devices in series with the load as final control devices ([G05F 1/461 takes precedence](#))
- 1/561 {Voltage to current converters (amplifiers [H03F](#))}
- 1/562 {with a threshold detection shunting the control path of the final control device}
- 1/563 including two stages of regulation at least one of which is output level responsive, e.g. coarse and fine regulation
- 1/565 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 ([G05F 1/563 takes precedence](#))
- 1/567 for temperature compensation
- 1/569 for protection
- 1/571 with overvoltage detector
- 1/573 with overcurrent detector
- 1/5735 {with foldback current limiting}
- 1/575 characterised by the feedback circuit
- 1/577 for plural loads
- 1/585 providing voltages of opposite polarities
- 1/59 including plural semiconductor devices as final control devices for a single load
- 1/595 semiconductor devices connected in series
- 1/607 using discharge tubes in parallel with the load as final control devices
- 1/61 including two stages of regulation, at least one of which is output level responsive
- 1/613 using semiconductor devices in parallel with the load as final control devices ([G05F 1/461 takes precedence](#))
- 1/614 including two stages of regulation, at least one of which is output level responsive
- 1/618 using semiconductor devices in series and in parallel with the load as final control devices ([G05F 1/461 takes precedence](#))
- 1/62 using bucking or boosting dc sources
- 1/625 wherein it is irrelevant whether the variable actually regulated is ac or dc
- 1/63 using variable impedances in series with the load as final control devices
- 1/635 being Hall effect devices, magnetoresistors or thermistors
- 1/644 being pressure-sensitive resistors
- 1/648 being plural resistors among which a selection is made
- 1/652 using variable impedances in parallel with the load as final control devices
- 1/656 using variable impedances in series and in parallel with the load as final control devices
- 1/66 Regulating electric power
- 1/67 to the maximum power available from a generator, e.g. from solar cell
- 1/70 Regulating power factor; Regulating reactive current or power
- 3/00 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 {(current generators specially designed for use in phase-locked loops [H03L 7/0891](#))}**
- 3/02 Regulating voltage or current
- 3/04 wherein the variable is ac
- 3/06 using combinations of saturated and unsaturated inductive devices, e.g. combined with resonant circuit
- 3/08 wherein the variable is dc
- 3/10 using uncontrolled devices with non-linear characteristics
- 3/12 being glow discharge tubes

G05F

- 3/16 being semiconductor devices
- 3/18 using Zener diodes
- 3/185 {and field-effect transistors}
- 3/20 using diode- transistor combinations
(G05F 3/18 takes precedence)
- 3/205 {Substrate bias-voltage generators (for static stores G11C 5/146)}
- 3/22 wherein the transistors are of the bipolar type only (G05F 3/26, G05F 3/30 take precedence)
- 3/222 {with compensation for device parameters, e.g. Early effect, gain, manufacturing process, or external variations, e.g. temperature, loading, supply voltage}
- 3/225 {producing a current or voltage as a predetermined function of the temperature}
- 3/227 {producing a current or voltage as a predetermined function of the supply voltage}
- 3/24 wherein the transistors are of the field-effect type only (G05F 3/205, G05F 3/26, G05F 3/30 take precedence)
- 3/242 {with compensation for device parameters, e.g. channel width modulation, threshold voltage, processing, or external variations, e.g. temperature, loading, supply voltage}
- 3/245 {producing a voltage or current as a predetermined function of the temperature}
- 3/247 {producing a voltage or current as a predetermined function of the supply voltage}
- 3/26 Current mirrors
- 3/262 {using field-effect transistors only}
- 3/265 {using bipolar transistors only}
- 3/267 {using both bipolar and field-effect technology}
- 3/30 Regulators using the difference between the base-emitter voltages of two bipolar transistors operating at different current densities (G05F 3/26 takes precedence)

5/00 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

7/00 Regulating magnetic variables (details of apparatus for measuring magnetic variables involving magnetic resonance G01R 33/28)