

SECTION G — PHYSICS

G05 CONTROLLING; REGULATING

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; regulating 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; controlling generators of electronic oscillations or pulses H03L; regulating characteristics of transmission lines H04B; controlling electric light sources H05B 37/02, H05B 39/04, H05B 41/36; electric control of X-ray apparatus H05G 1/30) **[4, 5]**

Note(s) [4]

- 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 essential characteristic resides in the combination.
- This subclass does not cover elements per se, which are covered by the relevant subclasses.

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, 2006.01]	1/22	• • • •	combined with separate magnetic control devices having a controllable degree of saturation [1, 2006.01]
		1/24	• • •	using bucking or boosting transformers as final control devices [1, 2006.01]
		1/247	• • • •	with motor in control circuit [4, 2006.01]
1/02	• Regulating electric characteristics of arcs (arrangements for feeding or moving of electrodes for spot or seam welding or cutting B23K 9/12; arrangements for feeding electrodes for electric heating or electric lighting H05B 7/109, H05B 31/18; automatic control of power for heating by discharge H05B 7/148) [1, 2, 2006.01]	1/253	• • • •	the transformers including plural windings in series between source and load (G05F 1/247 takes precedence) [4, 2006.01]
		1/26	• • • •	combined with discharge tubes or semiconductor devices [1, 2006.01]
		1/30	• • • •	semiconductor devices only [1, 2006.01]
1/04	• • by means of saturable magnetic devices [1, 2006.01]	1/32	• • •	using magnetic devices having a controllable degree of saturation as final control devices [1, 2006.01]
1/06	• • by means of discharge tubes [1, 2006.01]			
1/08	• • by means of semiconductor devices [1, 2006.01]	1/325	• • • •	with specific core structure, e.g. gap, aperture, slot, permanent magnet [4, 2006.01]
1/10	• Regulating voltage or current (G05F 1/02 takes precedence; for electric railways B60M 3/02) [1, 2006.01]	1/33	• • • •	with plural windings through which current to be controlled is conducted [4, 2006.01]
		1/335	• • • •	on different cores [4, 2006.01]
1/12	• • wherein the variable is actually regulated by the final control device is ac (G05F 1/625 takes precedence) [1, 4, 2006.01]	1/34	• • •	combined with discharge tubes or semiconductor devices [1, 2006.01]
1/13	• • • using ferroresonant transformers as final control devices [4, 2006.01]	1/38	• • • •	semiconductor devices only [1, 2006.01]
1/14	• • • using tap transformers or tap changing inductors as final control devices [1, 4, 2006.01]	1/40	• • •	using discharge tubes or semiconductor devices as final control devices [1, 2006.01]
		1/42	• • • •	discharge tubes only [1, 2006.01]
1/147	• • • • with motor driven tap switch [4, 2006.01]	1/44	• • • •	semiconductor devices only [1, 2006.01]
1/153	• • • • controlled by discharge tubes or semiconductor devices [4, 2006.01]	1/445	• • • •	being transistors in series with the load [3, 2006.01]
1/16	• • • • combined with discharge tubes or semiconductor devices [1, 2006.01]	1/45	• • • •	being controlled rectifiers in series with the load [3, 2006.01]
1/20	• • • • semiconductor devices only [1, 2006.01]	1/455	• • • •	with phase control [3, 2006.01]

- 1/46 • • wherein the variable actually regulated by the final control device is dc (G05F 1/625 takes precedence) [1, 4, 2006.01]
- 1/52 • • • using discharge tubes in series with the load as final control devices [1, 2006.01]
- 1/54 • • • • additionally controlled by the unregulated supply [1, 2006.01]
- 1/56 • • • using semiconductor devices in series with the load as final control devices [1, 2006.01]
- 1/563 • • • • including two stages of regulation, at least one of which is output level responsive, e.g. coarse and fine regulation [4, 2006.01]
- 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) [4, 2006.01]
- 1/567 • • • • • for temperature compensation [4, 2006.01]
- 1/569 • • • • • for protection [4, 2006.01]
- 1/571 • • • • • with overvoltage detector [4, 2006.01]
- 1/573 • • • • • with overcurrent detector [4, 2006.01]
- 1/575 • • • • characterised by the feedback circuit [4, 2006.01]
- 1/577 • • • • for plural loads [4, 2006.01]
- 1/585 • • • • • providing voltages of opposite polarities [4, 2006.01]
- 1/59 • • • • including plural semiconductor devices as final control devices for a single load [4, 2006.01]
- 1/595 • • • • • semiconductor devices connected in series [4, 2006.01]
- 1/607 • • • using discharge tubes in parallel with the load as final control devices [3, 2006.01]
- 1/61 • • • including two stages of regulation, at least one of which is output level responsive [4, 2006.01]
- 1/613 • • • using semiconductor devices in parallel with the load as final control devices [3, 2006.01]
- 1/614 • • • • including two stages of regulation, at least one of which is output level responsive [4, 2006.01]
- 1/618 • • • using semiconductor devices in series and in parallel with the load as final control devices [4, 2006.01]
- 1/62 • • • using bucking or boosting dc sources [1, 2006.01]
- 1/625 • • wherein it is irrelevant whether the variable actually regulated is ac or dc [4, 2006.01]
- 1/63 • • • using variable impedances in series with the load as final control devices [4, 2006.01]
- 1/635 • • • • being Hall effect devices, magnetoresistors or thermistors [4, 2006.01]
- 1/644 • • • • being pressure-sensitive resistors [4, 2006.01]
- 1/648 • • • • being plural resistors among which a selection is made [4, 2006.01]
- 1/652 • • • using variable impedances in parallel with the load as final control devices [4, 2006.01]
- 1/656 • • • using variable impedances in series and in parallel with the load as final control devices [4, 2006.01]
- 1/66 • Regulating electric power [1, 2006.01]
- 1/67 • • to the maximum power available from a generator, e.g. from solar cell [4, 2006.01]
- 1/70 • Regulating power factor; Regulating reactive current or power [3, 2006.01]
- 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 [1, 2006.01]**
 - 3/02 • Regulating voltage or current [1, 2006.01]
 - 3/04 • • wherein the variable is ac [1, 2006.01]
 - 3/06 • • • using combinations of saturated and unsaturated inductive devices, e.g. combined with resonant circuit [1, 2006.01]
 - 3/08 • • wherein the variable is dc [1, 2006.01]
 - 3/10 • • • using uncontrolled devices with non-linear characteristics [1, 4, 2006.01]
 - 3/12 • • • • being glow discharge tubes [1, 2006.01]
 - 3/16 • • • • being semiconductor devices [3, 2006.01]
 - 3/18 • • • • • using Zener diodes [3, 2006.01]
 - 3/20 • • • • • using diode-transistor combinations (G05F 3/18 takes precedence) [3, 2006.01]
 - 3/22 • • • • • wherein the transistors are of the bipolar type only (G05F 3/26, G05F 3/30 take precedence) [4, 2006.01]
 - 3/24 • • • • • wherein the transistors are of the field-effect type only (G05F 3/26, G05F 3/30 take precedence) [4, 2006.01]
 - 3/26 • • • • • Current mirrors [4, 2006.01]
 - 3/28 • • • • • • combined with a non-linear current amplifier [4, 2006.01]
 - 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) [4, 2006.01]
- 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 [1, 2006.01]**
 - 5/02 • Phase controlled switching using electronic tubes or three or more terminal semiconductive devices [4, 2006.01]
 - 5/04 • using a transformer or inductor as the final control device [4, 2006.01]
 - 5/06 • • saturable [4, 2006.01]
 - 5/08 • using a linearly acting final control device [4, 2006.01]
- 7/00 **Regulating magnetic variables** (details of apparatus for measuring magnetic variables involving magnetic resonance G01R 33/28) [1, 5, 2006.01]