CLASS 323, ELECTRICITY: POWER SUPPLY OR REGULATION SYSTEMS

SECTION I - CLASS DEFINITION

GENERAL STATEMENT OF CLASS SUBJECT MATTER

1. Class Scope

This is the generic class for electrical systems wherein a single electrical source is coupled to a single electrical load circuit and means are provided which control the magnitude or level of the current or voltage of either or both of said circuits and/or the phase angle between the current or voltage of either or both of said circuits.

This is also the generic class for transformer systems, see TRANSFORMER SYSTEMS below.

This is also the generic class for impedance systems, see IMPEDANCE SYSTEMS, below.

2. Voltage Magnitude and Phase Control Systems

In order to be classified in this class, the system must operate to control only (1) the magnitude of the current or voltage and/or (2) the phase angle between the current and voltage of an electric circuit. Where the system operates to perform some other additional function, classification is not herein. For a partial list of the classes which provide for such excluded systems, see the classes listed in the class definition, under "SEARCH CLASS."

3. Load in Output Circuit

This class provides for voltage and/or current magnitude and phase control systems as defined in Class Scope and Voltage Magnitude and Phase Control Systems, above, even though the electric load in the output circuit is recited by its characteristics (e.g., "an inductive load", a load having a negative current-resistance characteristic, etc.).

Systems wherein a particular load device is recited in the output circuit are classified with the particular art even though the load device is recited by name only (e.g., "a motor", "an electric furnace", etc.). For a partial list of such art systems, see classes listed in the class definition, under "SEARCH CLASS."

This class does not provide for systems having plural load circuits whether the plural load circuits are in different output circuits (see Voltage Magnitude and Phase Control Systems Having Plural Input and/or Plural Output Circuits below) or in the same circuit, except where the plural loads in a single output circuit are similar type loads that are not excluded by the paragraph above. Therefore, if there are a plurality of diverse loads in the same output circuit even though recited only by their characteristics (e.g., a highly inductive load and a low inductive load), then the system is excluded from this class.

4. Voltage Magnitude and Phase Control Systems Having Plural Input and/or Plural Output Circuits

This class excludes systems having a plurality of either electrical source (input) circuits or output circuits. Where the system including the plurality of input and/or output circuits comprises or is part of an art device, classification is with the art device. See References to Other Classes, below.

5. Regulating or Control Device Structure

This class provides for the electrical system as distinguished from the structure of the devices which may be used in or as part of the system. For the structure of such regulating and control devices, see the class definition, under "SEARCH CLASS."

SYSTEMS HAVING PLURAL DIVERSE TYPE MEANS USED FOR CONTROL PURPOSES

Where the system includes a plurality of different types of devices which form the basis of the principal subdivision of the class, that is, a dynamoelectric system, and/or an electronic tube, and/or a transformer, and/or an impedance, the original classification is in the first occurring (lowest numbered) subclass which has a definition that will include one or more of such types of devices.

DYNAMOELECTRIC MACHINES

This class provides for voltage and/or current magnitude and/or phase control systems as defined in GENERAL STATEMENT OF CLASS SUBJECT MATTER above, where the means interposed between the source circuit and the load circuit for controlling the voltage and/or current magnitude and/or phase includes a dynamoelectric machine, excepting the following:

1. Motor-Generator Sets

This class does not take those systems wherein an elec-

trical source energizes an electric motor which drives a generator whose output supplies an electric load circuit. This organization is considered to be an electric motor driven generator system classified elsewhere. See References to Other Classes, below)"SEARCH CLASS" reference to single generator systems,

2. Dynamoelectric Machine Conversion Systems

This class does not take dynamoelectric machine conversion systems wherein the input electrical energy is converted into output electrical energy whose character differs from the input energy. For a partial list of such systems, see classes listed in the class definition, under "SEARCH CLASS."

ELECTRONIC TUBE SYSTEMS

This class provides for voltage and/or current magnitude control systems as defined in the class definition where the means interposed between the electrical source circuit and the load circuit for controlling the voltage and/or current magnitude includes an electronic tube. An electronic tube may be a vacuum tube, a gas tube, a vapor tube, or an open gap.

Where the electronic tube system operates to perform any function not provided for in this class, or any function in addition to the functions provided for by this class (e.g., rectification, phase conversion, frequency conversion), classification is not herein. For a partial list of such systems, see classes listed in the class definition, under "SEARCH CLASS."

See Lines With Other Classes, below, for the line between this class and other classes providing for electronic tube systems.

TAP-CHANGING SYSTEMS

This is the generic class for tap-changing systems, that is, systems for changing by electric switch means the connection of a circuit from one point to another point on a winding or for changing by electric switch means one value of impedance to another value of impedance of a system.

Where the tap-changing system is applied to a particular art, classification is with the art device, e.g., a tap-changing system for changing the connection of a generator armature circuit from one point on the generator field winding to another point on the field winding is classified elsewhere (see References to Other Classes, below).

This class also provides for tap changing wherein a tap-changing system is part of a significant system for which provision is made in the class, (e.g., see Subclasses References to the Current Class, below.)

Usually, but not necessarily, the current flowing to or from the circuit from or to the winding or impedance is not interrupted during the tap-changing operation.

TRANSFORMER SYSTEMS

This class takes subject matter under the class definition, wherein the means interposed between the electrical source and the electrical load circuit for controlling the voltage and/or current magnitude and/or phase comprises a transformer. Systems within the class definition are included herein even though the transformer is recited by name only.

This is the generic class for transformer systems, that is, systems in which a transformer supplies an output circuit, or in which a load device not otherwise classified is supplied with electricity by a transformer.

This class will therefore take any system of supply to a transformer if no other class provides for the subject matter claimed. Many classes have systems specialized for the purposes of such class with a transformer system as a part of the combination.

This class excludes systems where a plurality of electrical source circuits are coupled to one or more output circuits, or where a plurality of output circuits are coupled to one or more source circuits.

This excludes systems where a plurality of distinct transformers which are coupled to a single source have their outputs coupled in current and/or voltage adding or subtracting relation. Likewise, systems having a single transformer with plural primary windings are excluded if the connection of the primary windings to the source is diverse; that is, if one primary winding circuit contains different circuit elements or has different circuit characteristics than another. Likewise, systems having a single transformer with plural secondaries connected to supply output circuits are excluded from this class.

1. Polyphase Systems

Although this class excludes systems wherein a plurality of electrical source circuits are coupled to one or more output circuits, systems wherein the energy of a single polyphase source is transferred by a polyphase trans-

former to a single polyphase output circuit having the same number of phases as the input circuit for energizing a single polyphase load circuit are considered to be systems having a single source and a single load circuit within the definition of this class.

2. Tuning Systems and Coupling Systems Involving Frequency Characteristics

This class excludes tuning systems wherein the combination of transformer and impedance is used to control the resonant characteristics of the system with respect to a particular impressed frequency. For systems having the combination of a transformer and capacitance element connected in such a manner as to form a variable tuned circuit, the mean resonant frequency of which is adjustable, see the reference to Tuners under "SEARCH CLASS" below.

This class excludes coupling systems which are effective over predetermined frequency ranges or wherein frequency characteristics are controlled or varied. For such systems, see Wave Transmission Lines and Networks in "SEARCH CLASS" below.

IMPEDANCE SYSTEMS

This class takes subject matter under the Class Definition wherein the means interposed between the electrical source and the electrical load circuit for controlling the voltage and/or current magnitude and/or phase consists of one or more impedances.

This is the generic class for impedance systems, that is, systems in which there is an impedance between a single source and single output circuit, or in which a load device per the GENERAL STATEMENT OF CLASS SUBJECT MATTER, "Load in Output Circuit," above, combined with an impedance in the single circuit supplying the same. Many other classes provide for systems where the output of the system is defined as having an impedance connected in the output.

1. Turning Systems and Coupling Systems Involving Frequency Characteristics

This class excludes tuning systems where the impedance means is used to control the resonant characteristics of the system with respect to a particular impressed frequency and coupling systems using impedances which are effective over a predetermined frequency range or where frequency characteristics are controlled or varied. For the excluded systems, see the reference to: Wave Transmission Lines and Networks; and Tuners, under "SEARCH CLASS" below.

VOLTAGE MAGNITUDE CONTROL SYSTEMS INVOLVING CIRCUIT INTERRUPTION

This class takes those systems wherein the voltage, current, or power are regulated or controlled by the interruption of the circuit carrying the load current except where a claimed load would cause classification elsewhere.

CONVERSION SYSTEMS

This class excludes systems where the input energy is converted into output energy whose characteristics differ from the input energy, such as converting direct current to alternating current or vice versa, changing the number of phases of polyphase current, or changing the frequency.

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

CLASSES FOR ELECTRONIC TUBE SYSTEMS

The lines between this class (323) and Class 327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses, and Class 315, Electric Lamp and Discharge Devices: Systems, are as follows:

Class 315 provides for systems which include a gas vapor type electronic tube and means for supplying electric current and/or potential to the tube where the tube is the sole ultimate load device and where the result of the system is to merely cause a discharge to take place or to merely regulate the discharge in the tube. Also included in subclass 94 of Class 315 are systems for merely supplying heating current to the cathode or cathode heater of any type of electronic tube, which systems may also include the anode supply for the tube without being excluded from the class. Merely claiming an output circuit does not exclude the system from Class 315 as long as no load device in the output circuit is claimed, or as long as no other circuit elements which limit the system to use in supplying current and/or potential to another load device are claimed. The limitations on Class 315 will therefore not exclude a system from Class 315 where the operation of the discharge device is controlled so as to maintain the discharge voltage and/or current at a predetermined value or to vary the discharge current and/or voltage from one value to

another even though such regulation of the discharge device results in regulating the current and/or voltage in the output circuit.

Class 323 provides for systems where the sole function of the electronic tube system is to control the magnitude of the electric current and/or voltage supplied to a circuit, either to maintain the current and/or voltage at a predetermined value or to vary the current and/or voltage at a predetermined value or to vary the current and/or voltage from one value to another.

Class 327 is a miscellaneous place to classify electronic tube systems, and as among these three classes takes any such system excluded from the other classes. In Class 327 will be found miscellaneous systems including an electronic tube and having means for supplying current and/or potential to the electronic tube (power supply systems). Among the other types of electronic tube systems classified in Class 327 are wave shaping systems, plus producing systems and switching systems (electronic tubes utilized to connect an input circuit to an output circuit in the manner of a circuit maker or breaker).

In general, for electronic tube systems as among these three classes, classification is determined as follows: If restricted to the functions provided for under Class 323, classification is therein unless it is of the special type provided for in Class 315. If the system involves some function not provided for by Class 323, classification is in Class 327, appropriate subclasses, unless it is for a special type provided for in Class 315.

GENERAL NOTE

Subclasses 201 through 371 and 901-911 are the result of a reclassification of the subject matter originally contained in subclasses 1-129, now abolished, of Class 323. In this reclassification, no substantive change has been made in the class definition or the scope of subject matter covered in this class. The reclassification was done for the purpose of rearranging that subject matter in a manner which facilitates efficient searching of the more modern technology and which more obviously delineates the miscellaneous transformer and impedance systems from the control systems. As a result of the delineation noted above, many of the cross-references which were present in the earlier subclasses have been eliminated. Appropriate search notes have been placed throughout the definitions as a guide to other areas containing similar subject matter and as a caution against burdensome cross-referencing between the similar areas.

SECTION III - SUBCLASS REFERENCES TO THE CURRENT CLASS

SEE OR SEARCH THIS CLASS, SUBCLASS:

255, 340, for transformer systems with tap changing.

SECTION IV - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

178, Telegraphy, subclass 43 for space induction telegraph systems (i.e., using spaced transformer coils to transmit the signals by induction); and subclass 64 for telegraph systems using line conductors for the signal transmission and having an induction coil or transformer for coupling the signal current in the local circuit to the main line, or for coupling sections of the main line together.

191, Electricity: Transmission to Vehicles, subclass 10 for space-induction systems for supplying electrical energy to a moving body. These systems usually include a transformer primary along the path to be followed by the body and a secondary mounted upon the moving body.

204, Chemistry: Electrical and Wave Energy, subclass 193 for systems for supplying electrolytic and other electrical and wave energy chemical apparatus with electric current, including current and/or voltage magnitude and/or phase control means. Some of the systems in Class 204 are designed to supply a constant current to the electrical or wave energy chemical apparatus.

219, Electric Heating, appropriate subclasses for electric heating systems which include current and/or voltage magnitude and/or phase control means; see subclasses 600+ for inductive heating, subclasses 678+ for microwave heating, and subclasses 764+ for capacitive dielectric heating; see subclass 108 for transformer-supplied heating systems; note especially subclass 116 where the device to be heated forms the secondary of the transformer; see subclass 130.1 for electric welding and heating systems involving an electric arc as a load which requires substantially constant current energization; and see subclass 482 for the miscella-

neous systems for supplying electric current to electrical heating elements.

246, Railway Switches and Signals, subclass 8, 63, and 194 for railway switch and signaling systems using spaced inductive means (e.g., transformer coils) to transmit the signal energy by space induction.

290, Prime-Mover Dynamo Plants. Current and/or voltage magnitude control systems are found throughout the class as electrical controls for generator systems having a nonelectric prime mover.

307, Electrical Transmission or Interconnection Systems, is the generic class for electric circuit networks of general application and takes systems not otherwise classified, wherein a plurality of circuits are coupled to one or more circuits. The systems may include space discharge devices, transformers, or impedances as coupling means or phase control means. subclass 11 provides for systems having a plurality of output circuits; subclass 43 provides for a plurality of input circuits or sources; and subclass 96 provides for intermittent regulatory interruption of the system. (see the Class Definitions, "Voltage Magnitude and Phase Control Systems Having Plural Input and/or Plural Output Circuits" above)

310, Electrical Generator or Motor Structure, appropriate subclasses for the structure of dynamoelectric converters, generators, dynamotors, metadynes, balancer sets, motors, and synchronous condensers.

314, Electric Lamp and Discharge Devices: Consumable Electrodes, appropriate subclasses for systems for supplying electric current to arc lamps and other consumable electrode type discharge devices which systems include current or voltage magnitude control means. Some of the systems in Class 314 are constant current systems. See subclass 32 for such systems with a transformer in the supply circuit; subclass 64 for electronic tub controlled systems for controlling the feeding of consumable electrode; and subclass 135 for miscellaneous systems with current or voltage regulations.

315, Electric Lamp and Discharge Devices: Systems, provides for some systems which are closely analogous to the systems in this class (323). See ELECTRONIC TUBE SYSTEMS (second paragraph), above for the line between Class 315 and Class 323. subclass 1 is the generic subclass for systems for supplying current and/or potentials to a cathode-ray tube; subclass 32 provides for the structure of electronic tubes which have combined therewith a circuit element, such as an impedance (see subclass 57 for electronic tubes which have a transformer structurally combined therewith); and subclass 58 and the subclasses specified in the search notes thereto provide for electronic tubes which have an impedance combined therewith; subclass 70 provides for the structural combination of an electric lamp and a transformer; subclasses 76 to 363 are the generic subclasses for systems for supplying electric current or potential to an electric lamp or a gas or vapor filled electronic tube for merely causing a discharge to take place within the electronic tube or for regulating the discharge within the tube; subclass 94 is the generic subclass for supplying heating current to the cathode or cathode heater of an electronic tube of any type; subclass 194 provides for systems for regulating the control current of potential applied to the control element of an electronic tube of the gas or vapor filled type by means of phase shifting means; subclass 276 and the subclasses specified in the notes to the definitions thereof provide for systems having transformers in the supply circuit; subclass 291 and the subclasses specified in the notes to the definition thereof provide for regulation systems within the class definition; and subclass 354 and the subclasses specified in the notes to the definition thereof provide for systems having a transformer in the control circuit.

318, Electricity: Motive Power Systems, provide for systems for supplying electricity to one or more motors, which systems include current and/or voltage magnitude and/or phase control systems. For motors systems having means for regulating the motor to maintain the motor current at a predetermined value, see subclass 432 which relates to constant motor current control and subclass 434 which relates to motor current limitation. For motor systems which include electric space discharge device systems for current and/or voltage magnitude control, see subclass 767 for induction motor circuit control by means of electric space discharge devices in the motor primary circuit; subclass 818 for induction motor circuit control by means of electric space discharge devices in the motor secondary circuit; subclass 505 for electric motor armature or primary circuit control by means of electric space discharge devices; and

subclass 532 for electric motor field or secondary circuit control by means of electric space discharge device. For motor systems which include a transformer, and subclass 504 for motor armature voltage control by means of transformers. For motor systems which include an impedance, see the appropriate subclasses, see subclass 508 and the subclasses specified in the notes to the definition of that subclass for impedance-controlled armature or primary circuits; and subclass 533 and the subclasses specified in the notes to the definition of those subclasses for impedance-controlled field or secondary circuits. For motor systems which include phase control means, see subclass 700 for synchronous motor systems which often are used for phase control in addition to driving a mechanical load. Note subclass 438 which provides for power factor control of the armature or line circuit of a motor.

320, Electricity: Battery and Condenser Charging and Discharging, subclass 1 for condenser charging and discharging systems; and subclass 2 for battery charging and discharging systems which include current and/or voltage magnitude control means.

322, Electricity: Single Generator Systems, appropriate subclasses for single generator systems having current or voltage magnitude and/or phase control means. Practically every generator system is a current and/or voltage magnitude control system, and the controls therefor are analogous to the controls for other voltage magnitude control systems. See the class definition for Class 323 for the classification of motor-generator systems. Class 322 provides for systems having an impedance or a transformer recited by name only in the output circuit of the generator even though the impedance or transformer does not control the generator. See subclass 16 and 39 for electric motor driven generator systems; subclass 28 for systems wherein an electric generator supplies a load circuit and the generator is controlled in response to the output current to maintain output current constant; and subclass 71 for generator systems having tapped field windings, see the Class Definition, “Dynamo-Electric Systems: Motor-Generator Sets” and “Tap-Changing Systems”).

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous nonlinear electrical circuitry.

330, Amplifiers, appropriate subclasses for amplifiers of general application wherein the output signal waveform is a substantial replica of the input signal waveform: for transistors amplifiers, search subclass 250; for transistor amplifiers with special power supply means, search subclasses 296 and 297; for saturable reactor amplifiers; for power supply control for series arranged transistors, search subclass 296 and subclass 70 for series arranged vacuum tube amplifiers; for power supply control and power supply circuits, search subclasses 96, 123, and 127; and for power supply circuits, per se, search subclass 199; for thermal impedances, search subclass 143; and for controlled impedance, search subclass 144.

331, Oscillators, appropriate subclasses for oscillator systems with transformer or impedance in the output circuit, particularly subclass 74 for oscillators combined with a particular output coupling network. See also subclass 186 of Class 331 for oscillators provided with a particular regulated source of power or bias.

333, Wave Transmission Lines and Networks, provides for coupling networks which have attenuation and/or delay characteristics over a frequency range for attenuating and/or delaying in a predetermined manner wave energy passing therethrough, including equalizers, delay networks, and filters. This class also provides for passive networks which modify the amplitude characteristics of the wave energy passing therethrough, namely, differentiating or integrating systems, wave shaping systems, and attenuators. See subclass 1 for coupling, differentiating or integrating, wave shaping, and attenuating networks in plural channel systems; subclass 19 for differentiating or integrating systems of the passive type; subclass 20 for wave shaping systems of the passive type; subclass 24 for coupling networks; subclass 28 for equalizers with attenuation or attenuation and phase distortion characteristics over a frequency range; and subclass 81 for attenuators which reduce the intensity of the energy passing therethrough by dissipation, while maintaining substantially constant input and/or output impedance therein.

334, Tuners, appropriate subclasses for tuned networks for use in wave energy apparatus and

comprising inductance and capacitance elements in circuit arrangement to form a resonant circuit and in which structure is provided for adjusting one or both of these elements for changing the means resonant frequency of the circuit. Note especially subclass 59 and 61 for tuned networks where a transformer may be used in the resonant system.

336, Inductor Devices, appropriate subclasses for the structure of transformers and inductive reactors.

338, Electrical Resistors, appropriate subclasses for electrical resistor and rheostat structure.

361, Electricity: Electrical Systems and Devices, subclass 139 for miscellaneous systems for supplying current to an electromagnet, some of those systems being closely analogous to the systems in this class (323). If the ultimate load in the system is an electromagnet, then classification is in Class 361. Search subclass 271 for condensers.

363, Electric Power Conversion Systems, subclass 1 for combined or plural conversion systems; subclass 13 for rectifying or derectifying systems (particularly subclass 50 for such systems provided with protective means; subclass 74 for such systems having automatic voltage and/or current magnitude control; subclass 83 for such systems having line circuit control by an electronic tube; subclass 111 for such systems where the converter is an electronic tube); subclass 151 for phase conversion systems wherein the converter includes an electronic tube; and subclass 166 for frequency conversion systems wherein the converter includes an electronic tube.

373, Industrial Electric Heating Furnaces, appropriate subclasses for electric furnace control systems which include current or voltage magnitude control means and/or phase control means. Class 373 includes transformer supplied and transformer-controlled electric furnaces, and impedance controlled electric furnaces.

378, X-Ray or Gamma Ray Systems or Devices, subclass 101, for X-ray systems which include power supplies and regulators.

379, Telephonic Communications, subclass 55 for telephone systems using spaced transformer inductive means (e.g., transformer coils) to transmit the signal by space induction.

388, Electricity: Motor Control Systems, art collections 913 for motor control systems including a space discharge device.

399, Electrophotography, subclass 37 for diagnostics of power supplied to an electrophotos:graphic device, subclasses 88+ for machine operations with power supply, and subclasses 168+ for charging a photoconductive member.

455, Telecommunications, provides for radio receiving and transmitting systems in combination with their power supplies, which power supplies may include voltage magnitude and/or phase control means.

505, Superconductor Technology: Apparatus, Material, Process, subclasses 150+ for high temperature (T_c 30 K) superconducting devices, and particularly subclasses 166+ for motors or generators, or 211+ for electrical energy storage devices, inductors, transformers, magnetic switches, etc.

600, Surgery, subclasses 9+ for magnetic fields applied to the body for therapeutic purposes.

SECTION V - GLOSSARY

AUTOMATIC CONTROL

Includes means for sensing the existence of, the magnitude or level of, or a deviation of a predetermined condition (e.g., the existence, magnitude of change of temperature, voltage, etc.) combined with means for initiating the operation of a control means to perform a control function on the system upon the occurrence of the predetermined condition.

CONTROL

Includes either the maintenance of a condition at a predetermined value or the variation of a condition from one value to another.

ELECTRICAL SOURCE CIRCUIT

The input terminals which are to be connected to a source of electrical energy.

ELECTRONIC TUBE

An apparatus which is intended to have an electric current flow between two spaced electrodes, at least part of the current path being constituted by a gas, vapor, or vacuum, “Electronic Tube” is used as the name for an electric space discharge device in this class. Included are discharge devices which operate in the open, i.e., not in an enclosed envelope.

FINAL CONTROL DEVICE

That element or group of elements which ultimately produces the controlled output of a system. This excludes any condition sensors or control signal processing circuitry.

IMPEDANCE

Includes an inductance, a capacitance, or a resistance or any combination thereof and excluding any source of electric energy. Inductances are usually grouped with transformers in the subclasses that follow.

INPUT CIRCUIT

Is the same as electrical source circuit.

LOAD CIRCUIT

The output terminals which are to be connected to a device which is to be supplied with electrical energy.

MAGNITUDE OR LEVEL CONTROL

Includes controlling either the amplitude of the current or voltage or controlling the average or effective value of the current or voltage, even through the amplitude is not controlled.

OUTPUT CIRCUIT

Is the same as load circuit.

PHASE CONTROL

Includes the maintenance of a predetermined value of or the predetermined variation of the value of the phase angle between the current and voltage of a circuit or of the phase angle of the current or voltage of a circuit with respect to itself or to the current or voltage of another circuit.

THREE OR MORE TERMINAL SEMICONDUCTIVE DEVICES

A transistor, semiconductor-controlled rectifier or other such controllable solid-state device.

TRANSFORMER

An electrical device which transfers electric energy from one circuit to another circuit at the same frequency solely by electromagnetic induction.

SUBCLASSES

201 INCLUDING A DYNAMOELECTRIC MACHINE:

This subclass is indented under the class definition. Subject matter including a dynamoelectric machine as the final control device within a power supply or regulation system.

(1) Note. This subclass does not include those systems wherein the electrical source energizes an electric motor which drives a generator whose output supplies a load circuit. This organization is considered to be an electric motor-driven generator system (see the Search Notes below)

SEE OR SEARCH CLASS:

322, Electricity: Single Generator Systems, see subclass 16 for electric motor-driven generator systems having combined control of the motor and generator; subclass 25 for electric generator systems wherein the generator or the generator driving means is controlled in response to the generator current and voltage; subclass 27 for electric generator systems wherein the generator or the generator driving means is controlled in response to the generator current; and subclass 39 for electric generator systems having control means for the generator driving means.

202 Balancer sets:

This subclass is indented under subclass 201. Subject matter wherein the controlling means comprises a plurality of dynamoelectric machines electrically connected in series with their rotors mechanically connected together.

(1) Note. Such plurality of dynamoelectric machines is known in the art as a balancer set.

(2) Note. A common connection of the systems in this subclass is with the plurality of dynamoelectric machines connected in series across the source of supply and

the load circuit connected across a fewer number of dynamoelectric machines.

SEE OR SEARCH CLASS:
310, Electrical Generator or Motor Structure, subclass 112 for plural dynamoelectric machines which are structurally united, such as in a motor generator set.

203 With plural sets of slip rings or brushes:
This subclass is indented under subclass 201. Subject matter wherein the controlling means comprises a dynamoelectric machine having a plurality of commutators or a plurality of sets of brushes or a plurality of sets of slip rings.

(1) Note. A dynamotor (a machine which combines both motor and generator action in one magnetic field, either with two armatures or with one armature having two separate windings) is an example of a dynamoelectric machine having plural commutators.

SEE OR SEARCH CLASS:
310, Electrical Generator or Motor Structure, subclass 127 for plural collector type dynamoelectric machines.
322, Electricity: Single Generator Systems, subclass 53 for single generator systems wherein the generator is of the third brush type; and subclass 92 for single generator systems wherein the generator is provided with at least two sets of brushes cooperating with a single commutator and one of the sets is short-circuited.

204 Condition responsive:
This subclass is indented under subclass 201. Subject matter wherein the dynamoelectric machine is controlled in response to a condition of the system.

SEE OR SEARCH CLASS:
322, Electricity: Single Generator Systems, subclass 17 for automatic control of generator or driving means.

205 FOR REACTIVE POWER CONTROL:
This subclass is indented under the class definition. Subject matter which includes the control, elimination, or compensation for power having a difference in phase between voltage and current.

SEE OR SEARCH THIS CLASS, SUBCLASS:
212, for systems which control the phase of voltage or current within one circuit with respect to the phase of voltage or current in a different circuit.

206 Using saturable inductor:
This subclass is indented under subclass 205. Subject matter wherein the element which produces the compensation for the difference in phase is an inductor having a controllably saturable core.

SEE OR SEARCH THIS CLASS, SUBCLASS:
214, for saturable inductors used in phase shift systems.
249, for saturable transformers used in output level responsive voltage or current regulators.
302, for saturable inductors used in input level responsive voltage or current regulators.
310, for saturable transformers used in self-regulating systems.
329, for saturable transformers used in external or operator controlled regulators.

SEE OR SEARCH CLASS:
336, Inductor Devices, appropriate subclasses for structural features of inductor devices, per se.

207 Using converter:
This subclass is indented under subclass 205. Subject matter including an A.C. to D.C.. to A.C. converter.

SEE OR SEARCH CLASS:
363, Electric Power Conversion Systems, subclass 34 for A.C. to D.C.. to A.C. converters, per se.

208 Using impedance:
This subclass is indented under subclass 205. Subject matter wherein the element which produces the compensation for the difference in phase is impedance (e.g., capacitive or inductive).

SEE OR SEARCH THIS CLASS, SUBCLASS:

218, for impedances used in phase shift systems.

233, 293, 304, and 352, for impedances used in voltage or current regulators.

209 Switched impedance:

This subclass is indented under subclass 208. Subject matter wherein the impedance is connected to the main power circuit through a switch which is controllably operable.

210 Static switch:

This subclass is indented under subclass 209. Subject matter where the switch is a controllable electronic tube or semiconductive device.

211 Digitally controlled:

Subject matter under subclasses 210 wherein the circuitry which controls the static switch contains logic elements which process a signal having discrete states.

SEE OR SEARCH THIS CLASS, SUBCLASS:

241, 283 and 322, for digital control of various voltage or current regulators.

SEE OR SEARCH CLASS:

326, Electronic Digital Logic Circuitry, appropriate subclasses for digital logic devices.

212 FOR PHASE SHIFT OR CONTROL:

This subclass is indented under the class definition. Subject matter including means to maintain a predetermined value or deviation in the value of the phase angle between the voltage or current of the output circuit with respect to a standard or with respect to the voltage or current of the input circuit.

SEE OR SEARCH THIS CLASS, SUBCLASS:

205, for systems which control the phase relationship between voltage and current within the same circuit.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 141+ for phase synchronizing and subclasses 231+ for a phase shift of less than an input signal period.

213 By splitting and combining:

This subclass is indented under subclass 212. Subject matter including means which develop multiple phases from a single input and sums these phases in such proportion that a desired resultant phase is produced.

214 Using saturable inductor:

This subclass is indented under subclass 212. Subject matter wherein the element which produces the shift in phase is an inductor having a controllably saturable core.

SEE OR SEARCH THIS CLASS, SUBCLASS:

206, and the subclasses noted in the definition thereof for saturable inductances used in other systems.

215 Using transformer:

This subclass is indented under subclass 212. Subject matter wherein the element which produces the shift in phase is a transformer.

SEE OR SEARCH THIS CLASS, SUBCLASS:

247, 305 and 328, for transformers used in voltage or current regulators.

355, for miscellaneous transformer systems.

SEE OR SEARCH CLASS:

336, Inductor Devices, for transformers, per se.

216 With movable structure or winding:

This subclass is indented under subclass 215. Subject matter wherein the transformer includes at least one movable element, the movement thereof producing the shift in phase.

SEE OR SEARCH THIS CLASS, SUBCLASS:

264, and 347, for transformers with movable elements used in voltage or current regulators.

SEE OR SEARCH CLASS:

336, Inductor Devices, subclass 115 and 130 for transformers with movable elements.

217 Using a three or more terminal semiconductive device:

This subclass is indented under subclass 212. Subject matter wherein the element which produces the shift in phase is a transistor or semiconductor controlled rectifier.

SEE OR SEARCH THIS CLASS, SUBCLASS:

223, 265, 311, and 349, for solid-state devices used as final control elements in voltage or current regulators.

218 Using impedance:

This subclass is indented under subclass 212. Subject matter wherein the device which produces the shift in phase includes a capacitor, resistor, or inductor or combinations thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

208, and the subclasses noted in the definition thereof for impedances used in other systems.

219 In bridge:

This subclass is indented under subclass 218. Subject matter wherein the impedance is connected in a bridge circuit.

SEE OR SEARCH THIS CLASS, SUBCLASS:

365, for miscellaneous impedance systems including bridge arrangements.

220 IN SHUNT WITH SOURCE OR LOAD:

This subclass is indented under the class definition. Subject matter including a final control device which is in parallel with the source circuit or the load circuit and functions to controllably divert at least part of the source's energy away from the load.

(1) Note. Transformers which function to controllably couple a source to a load, although they may appear to be connected in shunt with the source or load, are not classified here since they do not function to divert energy.

(2) Note. Although not specifically included within each of the following definitions, shunt regulators usually include: (a) some means which produces a control signal which could be indicative of the input, output, or some condition external to the regulator, (b) some processing circuit which makes use of the control signal, and (c) a final control device which is controlled by the output of the processing circuit thus producing a controlled output of the system.

221 Photo responsive:

This subclass is indented under subclass 220. Subject matter wherein the final control device or an element within its control circuit is responsive to light.

SEE OR SEARCH THIS CLASS, SUBCLASS:

902, for optical coupling between a semiconductive device and another element.

SEE OR SEARCH CLASS:

250, Radiant Energy, subclasses 200 through 239 for photocell systems.

222 Using choke and switch across source:

This subclass is indented under subclass 220. Subject matter wherein an inductor is connected across a source through a switch which is intermittently operated and it is the duty cycle of the switch which determines the amount of energy which is diverted from the load.

(1) Note. The switch may take the form of mechanically operated contacts, a transistor, a SCR, a saturable reactor or other such on-off type devices.

SEE OR SEARCH THIS CLASS, SUBCLASS:

232, for shunt regulators using inductors (usually saturable) as the final control device.

282, and 351, for nonshunt switching regulators.

SEE OR SEARCH CLASS:

363, Electric Power Conversion Systems, subclass 15 and 124 for D.C.. to A.C. to D.C.. converters.

223 Using a three or more terminal semiconductive device:

This subclass is indented under subclass 220. Subject matter wherein the final control device within the shunt circuit is a transistor or semiconductor controlled rectifier.

SEE OR SEARCH THIS CLASS, SUBCLASS:

265, 311 and 349, for semiconductive devices as final control devices in nonshunt regulators.

224 With additional series regulator:

This subclass is indented under subclass 223. Subject matter wherein an additional stage of regulation is provided in the form of a series regulator.

225 Plural devices:

This subclass is indented under subclass 223. Subject matter wherein the shunt regulator is made up of more than one semiconductive device acting as the final control device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

268, and 350, for plural final control devices in series regulators.

226 Linearly acting:

This subclass is indented under subclass 223. Subject matter wherein the semiconductive device is operated within its linear range.

SEE OR SEARCH THIS CLASS, SUBCLASS:

273, 303 and 349, for series regulators which include linearly acting final control devices.

227 Using electronic tube:

This subclass is indented under subclass 220. Subject matter wherein the final control device within the shunt circuit is an electric space discharge device.

228 With additional series regulator:

This subclass is indented under subclass 227. Subject matter wherein an additional stage of regulation is provided in the form of a series regulator.

229 Using diode:

This subclass is indented under subclass 220. Subject matter wherein the final control device within the shunt circuit is a diode.

230 Inverse parallel:

This subclass is indented under subclass 229. Subject matter wherein a pair of diodes are connected in parallel but opposite directions to act as the final control device.

231 Zener:

This subclass is indented under subclass 229. Subject matter wherein the diode is a zener diode.

232 Using inductor:

This subclass is indented under subclass 220. Subject matter wherein the final control device within the shunt circuit is an inductor.

SEE OR SEARCH THIS CLASS, SUBCLASS:

222, for shunt regulators using an inductor and a switch across the source.

247, 305 and 328, for inductors used in nonshunt regulators.

233 Using impedance:

This subclass is indented under subclass 220. Subject matter wherein the final control device within the shunt circuit is an impedance.

SEE OR SEARCH THIS CLASS, SUBCLASS:

208, and the subclasses noted in the definition thereof for impedances used in other systems.

234 OUTPUT LEVEL RESPONSIVE:

This subclass is indented under the class definition. Subject matter which maintains an output at a desired level through the use of means which responds to deviation in the output level and produces a change in the output which is opposite to the deviation.

(1) Note. Although not specifically included within each of the following definitions, output level responsive systems usually include (a) some means which produces a signal indicative of a condition of the load which is dependent on the output level of the system or the output level of the system itself, (b) some processing circuit which makes use of the signal mentioned above, and (c) a final control device which is controlled by the output of the processing circuit thus producing a controlled output of the system.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 535+ for regulators of this type which may have a semiconductive device as the claimed load.

235 Zero switching:

This subclass is indented under subclass 234. Subject matter wherein the input is alternating current and the final control device is a switch which is caused to change to its conductive state at or about the zero axis crossing of the input waveform.

(1) Note. Usually, the average power applied to the load is controlled by varying the number of half or full cycles of input waveform that is permitted to flow to the load.

SEE OR SEARCH THIS CLASS, SUBCLASS:

319, for external or operator controlled systems of this type.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 451+ for semiconductor controlled rectifiers which are involved in zero point switching.

236 Nonelectrical condition sensing:

This subclass is indented under subclass 235. Subject matter wherein the means which responds to the output is a sensor which measures a nonelectrical condition (such as heat) of the system or its load, the condition being dependent upon the output of the system.

SEE OR SEARCH THIS CLASS, SUBCLASS:

245, for phase controlled switching devices with nonelectrical condition sensors.

SEE OR SEARCH CLASS:

219, Electric Heating, subclass 482 for power supply means with nonelectrical condition sensing having a heating system as the load.

237 Phase controlled switching using electronic tube or a three or more terminal semiconductive device:

This subclass is indented under subclass 234. Subject matter wherein the input is alternating current and the final control device is an electronic tube or three or more terminal semiconductive device which is caused to change to its conductive state at a controllable point following the zero axis crossing of the input waveform.

SEE OR SEARCH THIS CLASS, SUBCLASS:

300, for input level responsive phase controlled switching systems.

320, for external or operator controlled phase controlled switching systems.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 447+ for semiconductor controlled rectifiers which are involved in phase switching.

238 With soft start:
This subclass is indented under subclass 237. Subject matter wherein at the time of start up of the system, the output is gradually increased over a plurality of cycles from zero to the desired level.

SEE OR SEARCH THIS CLASS, SUBCLASS:
321, for soft start of external or operator controlled systems.

239 Including single unidirectional element with bidirectional pass:
This subclass is indented under subclass 237. Subject matter wherein the final control device is capable of carrying current in only one direction but the circuit is arranged in such fashion that both polarities of the input are passed or controlled.

(1) Note. The unidirectional element may be a tube or semiconductive device connected within a diode bridge circuit so as to pass both polarities of the alternating current or a tube or a semiconductive device bridged by a single diode whereby one polarity of the applied A.C. is controlled and the other polarity is uncontrolled.

SEE OR SEARCH THIS CLASS, SUBCLASS:
324, for external or operator controlled devices of this type.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 448 for A.C. gating SCR's in a bridge.

240 Including saturable inductor in trigger circuit:
This subclass is indented under subclass 237. Subject matter including a signal shaping circuit between the means responsive to the output and the final control element, that signal shaping circuit including a saturable inductor.

(1) Note. The trigger circuit may be a magnetic amplifier having an output winding coupled to the control electrode of a tube or semiconductive device.

241 With digital control:
This subclass is indented under subclass 237. Subject matter including a signal processing circuit between the means responsive to the output and the final control device, that signal processing circuit including logic elements which process signals having discrete states.

SEE OR SEARCH THIS CLASS, SUBCLASS:
211, and the subclasses noted in the definition thereof for digitally controlled systems.

242 Including ramp generator or controlled capacitor charging:
This subclass is indented under subclass 237. Subject matter including circuitry which produces a gradually changing signal which is ultimately proportional to the output of the device.

(1) Note. The changing signal may take the form of a sawtooth with a repeating ramp and return to an initial value. Controlled capacitor charging involves charging a capacitor to some predetermined value at which value a controllable device such as a transistor, unijunction transistor, or programmable unijunction transistor, goes into another state of conduction or exerts a controlling influence on another device.

SEE OR SEARCH THIS CLASS, SUBCLASS:
288, and 326, for other systems including ramp generators or controlled capacitor charging circuits.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 131+ for a miscellaneous ramp or sawtooth waveform generator.

243 As input to comparator:
This subclass is indented under subclass 242. Subject matter wherein the gradually changing signal is applied to a circuit which compares it to another signal (usually a standard).

244 With synchronization:
This subclass is indented under subclass 237. Subject matter including means which detects a time characteristic of the input waveform, such as its zero crossing point, and produces a signal indicative thereof which is used to properly time the action of the final control device.

245 With nonelectrical condition sensing:
This subclass is indented under subclass 237. Subject matter wherein the means which responds to the output is a sensor which measures a nonelectrical condition such as heat of the system or its load, the condition being dependent upon the output of the system.

SEE OR SEARCH THIS CLASS, SUBCLASS:
236, for zero switching devices with nonelectrical condition sensors.

SEE OR SEARCH CLASS:
219, Electric Heating, subclass 482 for power supply means with nonelectrical condition sensing having a heating system as the load.

246 With plural condition sensing:
This subclass is indented under subclass 237. Subject matter including means for sensing a condition of the system or its load, such means being in addition to the means responsive to deviation in the output of the system.

(1) Note. This subclass includes sensing combinations of voltage, current, power factor, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:
275, for devices of this type wherein the final control device is a linearly acting three or more terminal semiconductive device.

247 Using a transformer or inductor as the final control device:
This subclass is indented under subclass 234. Subject matter wherein the device within the systems which is the ultimate controller of the output is a transformer or inductor.

SEE OR SEARCH THIS CLASS, SUBCLASS:
301, for transformers or inductors used in input level responsive devices.
305, for transformers or inductors used in self-regulating devices.
328, for transformers or inductors used in external or operator controlled devices.
355, for miscellaneous transformer or inductor devices.

SEE OR SEARCH CLASS:
336, Inductor Devices, appropriate subclasses for transformer or inductor structure.
361, Electricity: Electrical Systems and Devices, subclass 35 for transformer protection, and subclass 93.6 for abnormal current condition protection including transformer sensor.

248 Ferroresonant:
This subclass is indented under subclass 247. Subject matter wherein the transformer is associated with elements which causes it to resonate.

(1) Note. A ferroresonant transformer usually includes a saturable core and a capacitor (usually termed a ferrocapacitor) connected to one of the windings thereof.

(2) Note. Also included in this subclass are parametric transformers.

SEE OR SEARCH THIS CLASS, SUBCLASS:
306, for self-regulating systems using ferroresonant transformers.

249 Controllably saturable:
This subclass is indented under subclass 247. Subject matter wherein the transformer or inductor includes a core, the level of saturation thereof being controllable.

SEE OR SEARCH THIS CLASS, SUBCLASS:
302, for input level responsive devices of this type.

310, for self-regulating devices of this type.
329, for external or operator controlled devices of this type.

SEE OR SEARCH CLASS:
330, Amplifiers, subclass 8 for magnetic amplifiers.
336, Inductor Devices, subclass 155 for inductive regulators with no moving parts.

250 With specific core structure (e.g., gap, aperture, slot, permanent magnet):
This subclass is indented under subclass 249. Subject matter wherein the core includes a gap, aperture, or slot therein or a permanent magnet associated therewith.

251 With plural power windings:
This subclass is indented under subclass 249. Subject matter wherein the saturable transformer includes a plurality of windings through which the voltage or current which is to be controlled is conducted.

SEE OR SEARCH THIS CLASS, SUBCLASS:
332, for external or operator controlled devices of this type.

252 In bridge configuration or in bridge arm:
This subclass is indented under subclass 251. Subject matter wherein the plural power windings are parts of a bridge circuit.

SEE OR SEARCH THIS CLASS, SUBCLASS:
333, for external or operator controlled devices of this type.

253 On different cores:
This subclass is indented under subclass 251. Subject matter wherein each of the power windings is on a different core of a multicore transformer arrangement.

SEE OR SEARCH THIS CLASS, SUBCLASS:
335, for external or operator controlled devices of this type.

254 With electronic tube or a three or more terminal semiconductive device in control circuit:
This subclass is indented under subclass 249. Subject matter wherein the control circuit includes at least one electronics tube or three or more terminal semiconductive device connected to the control winding of the transformer.

SEE OR SEARCH THIS CLASS, SUBCLASS:
339, for external or operator controlled devices of this type.

255 Having a variable length winding (e.g., tapped) as the final control device:
This subclass is indented under subclass 247. Subject matter wherein at least one of the windings of the transformer includes at least one contact intermediate the end contacts of the winding and means is provided to select between the several contacts.

SEE OR SEARCH THIS CLASS, SUBCLASS:
340, for external or operator controlled devices of this type.

SEE OR SEARCH CLASS:
200, Electricity: Circuit Makers and Breakers, subclass 11 for tap changing switches, per se.
336, Inductor Devices, subclass 137 for transformers with tap changing switches.

256 With motor driven tap switch:
This subclass is indented under subclass 255. Subject matter wherein the means to select between the several contacts is operated by a motor.

SEE OR SEARCH THIS CLASS, SUBCLASS:
341, for external or operator controlled devices of this type.

257 Including an electronic tube or a three or more terminal semiconductive device in control circuit:
This subclass is indented under subclass 256. Subject matter including a signal processing circuit between the means responsive to the output and the motor, the signal processing circuit including at least one electronic tube or three or more terminal semiconductive device.

258 With electronic tube or a three or more terminal semiconductive device as tap switch:
This subclass is indented under subclass 255. Subject matter wherein at least one of the several contacts is connected to the output through an electronic tube or a three or more terminal semiconductive device.

(1) Note. Devices in this subclass may include mechanical tap changers having a tube or semiconductive device associated therewith, usually for the purpose of arc suppression.

259 Having a winding in series with the source and load (e.g., buck-boost):
This subclass is indented under subclass 247. Subject matter wherein the load current is conducted from the source to the load through a winding of the transformer.

SEE OR SEARCH THIS CLASS, SUBCLASS:
344, for external or operator controlled devices of this type.

260 With motor in control circuit:
This subclass is indented under subclass 259. Subject matter including a signal processing circuit between the means responsive to the output level and the final control device, the signal processing circuit including a motor.

SEE OR SEARCH THIS CLASS, SUBCLASS:
256, and 341, for motor-driven tap changers used in devices having variable length windings as final control devices.

261 With saturable reactor in control circuit:
This subclass is indented under subclass 259. Subject matter including a signal processing circuit between the means responsive to the output and the final control device, that signal processing circuit including a saturable reactor.

262 Plural windings in series:
This subclass is indented under subclass 259. Subject matter wherein the final control device includes a plurality of windings in series between the source and the load.

263 With electronic tube or a three or more terminal semiconductive device in control circuit:
This subclass is indented under subclass 259. Subject matter including a signal processing circuit between the means responsive to the output and the final control device, the signal processing circuit including at least one electronic tube or three or more terminal semiconductor device.

264 Having movable structure or winding:
This subclass is indented under subclass 247. Subject matter wherein the transformer includes movable magnetic shunts, shield, windings, or other such structure and it is the positioning of such structure that determines the ultimate output.

SEE OR SEARCH THIS CLASS, SUBCLASS:
347, for external or operator controlled devices of this type.

265 Using a three or more terminal: semiconductive device as the final control device:
This subclass is indented under subclass 234. Subject matter wherein the final control device within the output level responsive system is a transistor or semiconductor controlled rectifier.

SEE OR SEARCH THIS CLASS, SUBCLASS:
223, for shunt regulators.
311, for self-regulating devices.
349, for external or operator controlled devices all using three or more terminal semiconductive devices as final control devices.

SEE OR SEARCH CLASS:

219, Electric Heating, subclass 501 for devices of this type having electric heating devices as a load.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 438+ and 530+ for subcombinations of systems using semiconductive devices as final control devices.

266 Including pre or post regulation:

This subclass is indented under subclass 265. Subject matter wherein the system includes two stages of regulation, at least one of which is responsive to the output level.

SEE OR SEARCH THIS CLASS, SUBCLASS:

224, for plural stage regulators wherein one of the stages is in shunt with the source or load.

267 Including plural loads commonly controlled:

This subclass is indented under subclass 265. Subject matter wherein the system supplies several loads through commonly controlled devices.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, subclass 11 for plural load systems which are responsive to each load individually.

268 Including plural final control devices:

This subclass is indented under subclass 265. Subject matter wherein the system includes a plurality of transistors or semiconductor controlled rectifiers, each contributing to the final control of the output.

SEE OR SEARCH THIS CLASS, SUBCLASS:

225, for shunt regulators with plural final control devices.

350, for external or operator controlled devices of this type.

269 Linearly acting parallel connected:

This subclass is indented under subclass 268. Subject matter wherein the plural devices are connected in parallel and are operated in their linear range.

270 Linearly acting series connected:

This subclass is indented under subclass 268. Subject matter wherein the plural devices are connected in series and are operated in their linear range.

271 Switched (e.g., on-off control):

This subclass is indented under subclass 268. Subject matter wherein the plural devices are operated such that they are either conductive or nonconductive.

272 Parallel connected:

This subclass is indented under subclass 271. Subject matter wherein the plural devices are connected in parallel.

273 Linearly acting:

This subclass is indented under subclass 265. Subject matter wherein the system includes a single final control device which is operated in its linear range.

274 With threshold detection:

This subclass is indented under subclass 273. Subject matter wherein the system includes means which responds within a predetermined range or the means abruptly changes its conductive state at a predetermined level of the output.

SEE OR SEARCH THIS CLASS, SUBCLASS:

284, for switching regulators with threshold detection.

275 With plural condition sensing:

This subclass is indented under subclass 273. Subject matter including means for sensing a condition of the system or its load, such means being in addition to the means responsive to deviation in the output of the system.

(1) Note. This subclass includes sensing combinations of voltage, current, power factor, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

246, for devices of this type wherein the final control device is a phase controlled switch.

285, for switching regulators with plural condition sensing.

276 For protection system:

This subclass is indented under subclass 275. Subject matter including means to detect conditions which could cause possibly destructive failure of the system, its components or the load and means to prevent such failure.

SEE OR SEARCH CLASS:

361, Electricity: Electrical Systems and Devices, subclass 1 and 18 for protective systems, per se.

277 With current sensor:

This subclass is indented under subclass 276. Subject matter including means to sense the load current.

SEE OR SEARCH CLASS:

361, Electricity: Electrical Systems and Devices, subclasses 93.1+ for abnormal current sensors in protective systems.

278 Having base-emitter of transistor coupled across sensor:

This subclass is indented under subclass 277. Subject matter wherein the current sensor includes an impedance connected in series with the load and the base-emitter junction of a transistor is connected across the impedance.

279 Including final control device parameter:

This subclass is indented under subclass 275. Subject matter wherein the additional condition is a parameter of the final control device such as its temperature, the current it is carrying, or the voltage across it.

280 With a specific feedback amplifier (e.g., integrator, summer):

This subclass is indented under subclass 273. Subject matter including a signal processing circuit between the means responsive to the output level and the final control device, the signal processing circuit including an amplifier in a feedback path, the amplifier including such elements as cascaded stages, summing junctions, or additional feedback circuitry.

SEE OR SEARCH CLASS:

330, Amplifiers, appropriate subclasses for amplifiers, per se.

281 With reference voltage circuitry:

This subclass is indented under subclass 273. including a signal processing circuit between the means responsive to the output level and the final control device, the signal processing circuit including means to develop a standard voltage which is used as a reference in the signal processing circuit.

SEE OR SEARCH THIS CLASS, SUBCLASS:

313, for self-regulating devices which derive a voltage reference.

282 Switched (e.g., switching regulators):

This subclass is indented under subclass 265. Subject matter wherein the system includes a single final control device which is operated in such manner that it is either conductive or nonconductive.

(1) Note. The most common devices found herein are regulators wherein a switch such as a transistor is operated in a closed or open state. When closed an inductor typically stores energy, and when open, a flyback or catch diode will continue the flow of current or release of energy through the inductor to the load.

SEE OR SEARCH THIS CLASS, SUBCLASS:

222, for shunt type switching regulators.

351, for external or operator controlled switching regulators.

SEE OR SEARCH CLASS:

363, Electric Power Conversion Systems, subclass 15 and 124 for D.C.. to A.C. to D.C.. converters.

283 Digitally controlled:

This subclass is indented under subclass 282. Subject matter including a signal processing circuit between the means responsive to the output and the final control device, that signal

processing circuit including logic elements which process a signal having discrete states.

SEE OR SEARCH THIS CLASS, SUBCLASS:
211, and the subclasses noted in the definition thereof for digitally controlled systems.

284 With threshold detection:
This subclass is indented under subclass 282. Subject matter wherein the system includes means which responds within a predetermined range of the output or the means abruptly changes its conductive state at a predetermined level of the output.

SEE OR SEARCH THIS CLASS, SUBCLASS:
274, for linearly acting regulators with threshold detection.

285 With plural condition sensing:
This subclass is indented under subclass 282. Subject matter including means for sensing a condition of the system or its load, such means being in addition to the means responsive to deviation in the output of the system.

(1) Note. This subclass includes sensing combinations of voltage, current, power factor, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:
246, for devices of this type wherein the final control device is a phase controlled switch.
275, for devices of this type wherein the final control device is a linearly acting three or more terminal semiconductive device.

286 Including filter sensing:
This subclass is indented under subclass 285. Subject matter wherein the additional condition is a condition of a filter used to smooth the output of the switched final control device.

(1) Note. The filter is typically a diode, choke, capacitor arrangement and the sensor is usually associated with the choke element.

287 In flyback path:
This subclass is indented under subclass 286. Subject matter wherein the filter includes a diode (typically termed flyback, catch, or freewheeling diode) and the sensor is disposed in the diode path.

288 With ramp generator or controlled capacitor charging:
This subclass is indented under subclass 282. Subject matter including circuitry which produces a gradually changing signal which is ultimately proportional to the output of the device.

(1) Note. The changing signal may take the form of a sawtooth with a repeating ramp and return to an initial value. Controlled capacitor charging involves charging a capacitor to some predetermined value at which value a controllable device such as a transistor, unijunction transistor, or programmable unijunction transistor goes into another state of conduction or exerts a controlling influence on another device.

SEE OR SEARCH THIS CLASS, SUBCLASS:
242, and 326, for other systems including ramp generators or controlled capacitor charging circuits.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 131+ for a miscellaneous ramp or sawtooth waveform generator.

289 With base drive control dissipation:
This subclass is indented under subclass 282. Subject matter including means connected to the base of a switching transistor to minimize the dissipation of power within the transistor at its turn-on and turn-off times.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 579 and 585 for miscellaneous devices concerning minority carrier storage.

290 With inductor in control circuit:
This subclass is indented under subclass 282. Subject matter including a signal processing circuit between the means responsive to the output level and the final control device, the signal processing circuit including an inductor.

291 Using an electronic tube as the final control device:
This subclass is indented under subclass 234. Subject matter wherein the final control device within the output level responsive system is an electric space discharge device such as a vacuum or gas tube.

292 With a three or more terminal semiconductive device in control circuit:
This subclass is indented under subclass 291. Subject matter including a signal processing circuit between the output level responsive means and the final control device, the signal processing circuit including a transistor or semiconductive controlled rectifier.

293 Using an impedance as the final control device:
This subclass is indented under subclass 234. Subject matter wherein the final control device within the output level responsive system is an impedance such as a resistor, capacitor, or diode.

(1) Note. Inductors are not included herein. See search notes below.

SEE OR SEARCH THIS CLASS, SUBCLASS:
208, and the subclasses noted in the definition thereof, for impedances used as final control devices in other systems.
247, for inductors.

294 Hall effect device, magnetoresistor or thermistor:
This subclass is indented under subclass 293. Subject matter wherein the impedance is a Hall effect device or a resistor which changes its resistance in accordance with the strength of a magnetic field or temperature.

295 Pressure sensitive resistor:
This subclass is indented under subclass 293. Subject matter wherein the impedance is a resistor which changes its resistance in accordance with the pressure applied thereto.

296 Liquid contact resistor:
This subclass is indented under subclass 293. Subject matter wherein the impedance is a resistor which changes its resistance in accordance with the degree of contact with a conductive liquid.

297 Plural selective resistors:
This subclass is indented under subclass 293. Subject matter wherein a plurality of individual resistors are connected in a circuit which allows each resistor or a combination of resistors to be used as the final control device.

298 Variable resistor:
This subclass is indented under subclass 293. Subject matter wherein different portions or a combination of portions of a single resistance element may be used as the final control device.

299 INPUT LEVEL RESPONSIVE:
This subclass is indented under the class definition. Subject matter which maintains an output at a desired level through the use of control means responsive to the input level.

(1) Note. Although not specifically included within each of the following definitions, input level responsive systems usually include (a) some means which produces a signal indicative of the input level of the system, (b) some processing circuit which makes use of the signal mentioned above, and (c) a final control device which is controlled by the output of the processing circuit, thus producing a controlled output of the system.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 538+ for regulators of this type having a semiconductive device as the claimed load.

300 Phase controlled switching using electronic tube or a three or more terminal semiconductive device:

This subclass is indented under subclass 299. Subject matter wherein the input is alternating current and the final control device is an electronic tube or three or more terminal semiconductive device which is caused to change to its conductive state at a controllable point following the zero axis crossing of the input waveform.

SEE OR SEARCH THIS CLASS, SUBCLASS:

237, for output level responsive phase controlled switching systems.

320, for external or operator controlled phase controlled switching systems.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 453+ for semiconductor controlled rectifiers which are involved in phase switching.

301 Using a transformer or inductor as the final control device:

This subclass is indented under subclass 299. Subject matter wherein the device within the system which is the ultimate controller of the output is a transformer or inductor.

SEE OR SEARCH THIS CLASS, SUBCLASS:

247, for transformers or inductors used in output level responsive devices.

305, for transformers or inductors used in self-regulating devices.

328, for transformers or inductors used in external or operator controlled devices.

355, for miscellaneous transformer or inductor devices.

SEE OR SEARCH CLASS:

336, Inductor Devices, appropriate subclasses for transformer or inductor structure.

361, Electricity: Electrical Systems and Devices, subclass 35 for transformer protection, and subclass 93.6 for abnormal current condition protection including transformer sensor.

302 Saturable:

This subclass is indented under subclass 301. Subject matter wherein the transformer or inductor includes a core, the level of saturation thereof being controllable.

SEE OR SEARCH THIS CLASS, SUBCLASS:

249, for output level responsive devices of this type.

310, for self-regulating devices of this type.

329, for external or operator controlled devices of this type.

SEE OR SEARCH CLASS:

330, Amplifiers, subclass 8 for magnetic amplifiers.

336, Inductor Devices, subclass 155 for inductive regulators with no moving parts.

303 Using a linearly acting final control device:

This subclass is indented under subclass 299. Subject matter wherein the final control device is operated within its linear range.

304 SELF-REGULATING (E.G., NONRETROACTIVE):

This subclass is indented under the class definition. Subject matter which maintains an output at a desired level through the use of means which exhibit inherent limiting characteristics.

(1) Note. Example of means which exhibit inherent limiting characteristics are zener diodes and neon tubes.

305 Using a transformer or inductor as the final control device:

This subclass is indented under subclass 304. Subject matter wherein the device within the system which is the ultimate controller of the output is a transformer or inductor.

SEE OR SEARCH THIS CLASS, SUBCLASS:

247, for transformers or inductors used in output level responsive devices.

301, for transformers or inductors used in input level responsive devices.

328, for transformers or inductors used in external or operator controlled devices.
355, for miscellaneous transformer or inductor devices.

SEE OR SEARCH CLASS:
336, Inductor Devices, appropriate subclasses for transformer or inductor structure.
361, Electricity: Electrical Systems and Devices, subclass 35 for transformer protection, and subclass 93.6 for abnormal current condition protection including transformer sensor.

306 Ferroresonant:
This subclass is indented under subclass 305. Subject matter wherein the transformer is associated with elements which causes it to resonate.

(1) Note. A ferroresonant transformer usually includes a saturable core and a capacitor (usually termed a ferrocapacitor) connected to one of the windings thereof.

(2) Note. Also included in this subclass are parametric transformers.

SEE OR SEARCH THIS CLASS, SUBCLASS:
248, for output level responsive systems using ferroresonant transformers.

307 With plural cores:
This subclass is indented under subclass 306. Subject matter wherein the ferroresonant transformer has at least two cores.

308 With core having an air gap or magnetic shunt:
This subclass is indented under subclass 306. Subject matter wherein the core of the ferroresonant transformer includes an air gap within one of the legs thereof or a magnetically permeable leg which bridges the core.

309 Including a ferrocapacitor across a tertiary winding:
This subclass is indented under subclass 308. Subject matter wherein the ferroresonant transformer has at least three windings and a capacitor is connected in a series closed circuit with one of the windings.

310 Controllably saturable:
This subclass is indented under subclass 305. Subject matter wherein the transformer includes a core, the level of saturation thereof being controllable.

SEE OR SEARCH THIS CLASS, SUBCLASS:
249, for output level responsive devices of this type.
302, for input level responsive devices of this type.
329, for external or operator controlled devices of this type.

SEE OR SEARCH CLASS:
330, Amplifiers, subclass 8 for magnetic amplifiers.
336, Inductor Devices, subclass 155 for inductive regulators with no moving parts.

311 Using a three or more terminal semiconductive device as the final control device:
This subclass is indented under subclass 304. Subject matter wherein the final control device within the self-regulating system is a transistor or semiconductor controlled rectifier.

SEE OR SEARCH THIS CLASS, SUBCLASS:
223, for shunt regulators.
265, for output level responsive devices.
349, for external or operator controlled devices, all using three or more terminal semiconductive devices as final control devices.

SEE OR SEARCH CLASS:
219, Electric Heating, subclass 501 for devices of this type having electric heating devices as a load.
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 438+ and 530+ for subcombinations of systems using semiconductive devices as final control devices.

312 For current stabilization:
This subclass is indented under subclass 311. Subject matter wherein the system functions to regulate current therethrough.

313 To derive a voltage reference (e.g., band gap regulator):
This subclass is indented under subclass 312. Subject matter wherein the current within the device is stabilized for the purpose of producing a stabilized reference voltage at its output.

(1) Note. Devices herein generate a reference potential related to an inherent property such as the band gap potential of a semiconductor material such as silicon. The band gap potential is the difference in energy between the energy level of the bottom of the conduction band and the energy level of the top of the valence band.

314 With additional stage:
This subclass is indented under subclass 313. Subject matter wherein an additional controlled device is connected between the final control device circuit and the ultimate output.

315 Including parallel paths (e.g., current mirror):
This subclass is indented under subclass 312. Subject matter wherein at least two stabilized current paths are in parallel with each other, usually the currents bearing a predetermined relation to each other.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 530+ for semiconductor device bias supplies of this type.
330, Amplifiers, subclass 288 for current mirror amplifiers.

316 With amplifier connected to or between current paths:
This subclass is indented under subclass 315. Subject matter wherein an additional controlled device is connected between the stabilized current paths or as an output to at least one of the paths.

317 With switched final control device:
This subclass is indented under subclass 315. Subject matter wherein the controlling device within at least one of the paths is operated in a switching mode.

SEE OR SEARCH THIS CLASS, SUBCLASS:
272, for parallel connected, switched final control devices in output level responsive systems.

318 EXTERNAL OR OPERATOR CONTROLLED:
This subclass is indented under the class definition. Subject matter including means for controlling an output through the action of an externally generated signal or the adjustment of an element within the system by an operator of the system.

SEE OR SEARCH THIS CLASS, SUBCLASS:
234, for systems which are controlled in response to the output level of the system.
299, for systems which are controlled in response to the input level of the system.
304, for systems which are controlled by the inherent characteristics of the elements which make up the system.

319 Zero switching:
This subclass is indented under subclass 318. Subject matter wherein the input is alternating current and the final control device is a switch which is caused to change to its conductive state at or about the zero axis crossing of the input waveform.

(1) Note. Usually, the average power applied to the load is controlled by varying the number of half or full cycles of input waveform that is permitted to flow to the load.

SEE OR SEARCH THIS CLASS, SUBCLASS:
235, for output level responsive systems of this type.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 451+ for semiconductor controlled rectifiers which are involved in zero point switching.

320 Phase controlled switching using electronic tube or a three or more terminal semiconductive device:
This subclass is indented under subclass 318. Subject matter wherein the input is alternating current and the final control device is an electronic tube or three or more terminal semiconductive device which is caused to change to its conductive state at a controllable point following the zero axis crossing of the input waveform.

SEE OR SEARCH THIS CLASS, SUBCLASS:
237, for output responsive phase controlled switching systems.
300, for input responsive phase controlled switching systems.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 447+ for semiconductor controlled rectifiers which are involved in phase switching.

321 With soft start:
This subclass is indented under subclass 320. Subject matter wherein at the time of start up of the system, the output is gradually increased over a plurality of cycles from zero to the desired level.

SEE OR SEARCH THIS CLASS, SUBCLASS:
238, for output responsive systems of this type.

322 With digital control:
This subclass is indented under subclass 320. Subject matter including a control signal processing circuit which includes logic elements which process a signal having discrete states.

SEE OR SEARCH THIS CLASS, SUBCLASS:
211, for reactive power systems which are digitally controlled.
241, for digitally controlled phase controlled switching systems.
283, for output responsive digitally controlled solid-state systems.

SEE OR SEARCH CLASS:
326, Electronic Digital Logic Circuitry, appropriate subclasses for digital logic circuits.

323 With interval timer:
This subclass is indented under subclass 320. Subject matter which includes means for predetermining the length of time of operation of the system or a part thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:
319, for zero switching devices which may include interval timers.

324 Using single unidirectional element with bidirectional pass:
This subclass is indented under subclass 320. Subject matter wherein the final control device is capable of carrying current in only one direction but the circuit is arranged in such fashion that both polarities of the input are passed or controlled.

(1) Note. The unidirectional element may be a tube or semiconductive device connected within a diode bridge circuit so as to pass both polarities of the alternating current, or a tube or a semiconductive device bridged by a single diode whereby one polarity of the applied A.C. is controlled and the other polarity is uncontrolled.

SEE OR SEARCH THIS CLASS, SUBCLASS:
239, for output responsive systems of this type.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 448 for miscellaneous gating SCR's in a bridge.

325 With a three or more terminal semiconductive device in trigger circuit:

This subclass is indented under subclass 320. Subject matter including a control signal shaping circuit between the controlling input and the final control element, the shaping circuit including at least one transistor or SCR device.

326 Including ramp generator or controlled capacitor charging:

This subclass is indented under subclass 325. Subject matter including circuitry which produces a gradually changing signal (usually by controlling the rate of charge of a capacitor) which is then used in the trigger circuit to produce the controlling input to the final control element.

(1) Note. The changing signal may take the form of a sawtooth with a repeating ramp and return to an initial value. Controlled capacitor charging involves charging a capacitor to some predetermined value at which value a controllable device such as a transistor, unijunction transistor, or programmable unijunction transistor goes into another state of conduction or exerts a controlling influence on another device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

242, and 288, for ramp generators used in output level responsive systems.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 131+ for a miscellaneous ramp or sawtooth waveform generator.

327 With passive element only in trigger circuit:

This subclass is indented under subclass 320. Subject matter including a control signal shaping circuit between the controlling input and the final control element, the shaping circuit including passive elements such as resistors and capacitors only.

328 Using a transformer or inductor as the final control device:

This subclass is indented under subclass 318. Subject matter wherein the device within the system which is the ultimate controller of the output is a transformer or inductor.

SEE OR SEARCH THIS CLASS, SUBCLASS:

247, for systems of this type which are responsive to the output level of the system.

301, for transformers or inductors used in input level responsive devices.

305, for transformers or inductors used in self-regulating devices.

355, for miscellaneous transformer or inductor devices.

SEE OR SEARCH CLASS:

336, Inductor Devices, appropriate subclasses for transformer or inductor structure.

361, Electricity: Electrical Systems and Devices, subclass 35 for transformer protection, and subclass 93.6 for abnormal current condition protection including transformer sensor.

329 Controllably saturable:

This subclass is indented under subclass 328. Subject matter wherein the transformer includes a core, the level of saturation thereof being controllable.

SEE OR SEARCH THIS CLASS, SUBCLASS:

249, for output level responsive devices of this type.

302, for input level responsive devices of this type.

310, for self-regulating devices of this type.

SEE OR SEARCH CLASS:

330, Amplifiers, subclass 8 for magnetic amplifiers.

336, Inductors Devices, subclass 155 for inductive regulators with no moving parts.

330 With permanent magnet:
This subclass is indented under subclass 329. Subject matter which includes a permanent magnet as part of or in addition to the saturable core.

331 With core having a gap, aperture, or slot:
This subclass is indented under subclass 329. Subject matter wherein the core includes a gap, aperture, or slot therein.

332 With plural power windings:
This subclass is indented under subclass 329. Subject matter wherein the saturable transformer includes a plurality of windings through which the voltage or current which is to be controlled is conducted.

SEE OR SEARCH THIS CLASS, SUBCLASS:
251, for output level responsive devices of this type.

333 In bridge configuration or in bridge arm:
This subclass is indented under subclass 332. Subject matter wherein the plural power windings are parts of a bridge circuit.

SEE OR SEARCH THIS CLASS, SUBCLASS:
252, for output level responsive devices of this type.

334 On different legs of single core:
This subclass is indented under subclass 332. Subject matter wherein each of the power windings is on a different leg of a multilegged core.

335 On different cores:
This subclass is indented under subclass 332. Subject matter wherein each of the power windings is on a different core of a multicore transformer arrangement.

SEE OR SEARCH THIS CLASS, SUBCLASS:
253, for output level responsive devices of this type.

336 Multistage:
This subclass is indented under subclass 335. Subject matter wherein the output of all but the last transformer is connected as the input of the succeeding transformer.

337 Push-pull:
This subclass is indented under subclass 335. Subject matter wherein the different cores of the transformer arrangement operate on different polarities of the voltage or current to be treated.

338 With plural cores:
This subclass is indented under subclass 329. Subject matter wherein a single power winding is wound about plural adjacent cores.

339 Including an electronic tube or a three or more terminal semiconductive device in control circuit:
This subclass is indented under subclass 329. Subject matter wherein the control circuit includes at least one electronic tube or three or more terminal semiconductive device connected to the control winding of the transformer.

SEE OR SEARCH THIS CLASS, SUBCLASS:
254, for output level responsive devices of this type.

340 Having a variable length winding (e.g., tapped) as the final control device:
This subclass is indented under subclass 328. Subject matter wherein at least one of the windings of the transformer includes at least one contact intermediate the end contacts of the winding and means is provided to select between the several contacts.

SEE OR SEARCH THIS CLASS, SUBCLASS:
255, for output level responsive devices of this type.

SEE OR SEARCH CLASS:
200, Electricity: Circuit Makers and Breakers, subclass 11 for tap changing switches, per se.

336, Inductor Devices, subclass 137 for transformers with tap changing switches.

341 With motor driven tap switch:
This subclass is indented under subclass 340. Subject matter wherein the means to select between the several contacts is operated by a motor.

SEE OR SEARCH THIS CLASS, SUBCLASS:
256, for output level responsive devices of this type.

342 With other transformer:
This subclass is indented under subclass 340. Subject matter wherein the system includes a transformer in addition to the tapped transformer.

343 With a three or more terminal semiconductive device:
This subclass is indented under subclass 340. Subject matter including a transistor or SCR as part of a control circuit within the device or having a switching means connected to each tap, the switching means being a transistor or SCR.

SEE OR SEARCH THIS CLASS, SUBCLASS:
258, for transistors or SCRs used as tap switches in output level responsive devices.

344 Having a winding in series with the source and load (e.g., buck-boost):
This subclass is indented under subclass 328. Subject matter wherein the load current is conducted from the source to the load through a winding of the transformer.

SEE OR SEARCH THIS CLASS, SUBCLASS:
259, for output level responsive devices of this type.

345 Having a switch in series with winding:
This subclass is indented under subclass 328. Subject matter wherein at least one of the windings of the transformer has a switch in series therewith and it is the relative lengths of the on and off times of the switch that determines the ultimate output.

SEE OR SEARCH THIS CLASS, SUBCLASS:
222, for shunt regulators having a choke and switch connected across the source circuit.

346 Having series-parallel connectable windings:
This subclass is indented under subclass 328. Subject matter wherein the transformer includes a plurality of windings which are arranged in such fashion that they may be selectably connected in series or parallel or a combination series-parallel circuit.

347 Having movable structure or winding:
This subclass is indented under subclass 328. Subject matter wherein the transformer includes movable magnetic shunts, shields, windings, or other such structure and it is the positioning of such structure that determines the ultimate output.

SEE OR SEARCH THIS CLASS, SUBCLASS:
264, for output level responsive devices of this type.

SEE OR SEARCH CLASS:
340, Communications: Electrical, subclass 195 for inductive telemetering transmitters having movable structure or windings.

348 Including rotary motion:
This subclass is indented under subclass 347. Subject matter wherein the structure or winding is movable about an axis.

349 Using a three or more terminal semiconductive device as the final control device:
This subclass is indented under subclass 318. Subject matter wherein the device which ultimately controls the level of the output is a transistor or SCR.

SEE OR SEARCH THIS CLASS, SUBCLASS:
223, for shunt regulators.
265, for output level responsive devices.

311, for self-regulating devices, all using three or more terminal semiconductive devices as final control devices.

SEE OR SEARCH CLASS:
219, Electric Heating, subclass 501 for devices of this type having electric heating devices as a load.
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 438+ and 530+ for subcombinations of systems using semiconductive devices as final control devices.

350 Including plural final control devices:
This subclass is indented under subclass 349. Subject matter wherein the system includes a plurality of transistors or semiconductor controlled rectifiers, each contributing to the final control of the output.

SEE OR SEARCH THIS CLASS, SUBCLASS:
225, for shunt regulators with plural final control devices.
268, for output level responsive devices of this type.

351 Switched (e.g., switching regulators):
This subclass is indented under subclass 349. Subject matter wherein the system includes a single final control device which is operated in such a manner that it is either conductive or nonconductive.

(1) Note. The most common devices found herein are regulators wherein a switch such as a transistor is operated in a closed or open state. When closed an inductor typically stores energy, and when open, a flyback or catch diode will continue the flow of current or release of energy through the inductor to the load.

SEE OR SEARCH THIS CLASS, SUBCLASS:
222, for shunt type switching regulators.
282, for output level responsive switching regulators.

SEE OR SEARCH CLASS:
363, Electric Power Conversion Systems, subclass 15 and 124 for D.C.. to A.C. to D.C.. converters.

352 Using an impedance as the final control device:
This subclass is indented under subclass 318. Subject matter wherein the final control device within the system is an impedance such as a resistor, capacitor, or diode.

(1) Note. Inductors are not included herein. See subclass 328 above.

SEE OR SEARCH THIS CLASS, SUBCLASS:
208, and the subclasses noted in the definition thereof, for impedances used as final control devices in other systems.

353 Resistor:
This subclass is indented under subclass 352. Subject matter wherein the impedance is a resistor.

354 Selective:
This subclass is indented under subclass 353. Subject matter wherein a plurality of individual resistors are connected in a circuit which allows each resistor or a combination of resistors to be used as the final control device.

SEE OR SEARCH THIS CLASS, SUBCLASS:
297, for output level responsive devices of this type.

355 INCLUDING A TRANSFORMER OR AN INDUCTOR:
This subclass is indented under the class definition. Subject matter in which a load device not elsewhere classified is supplied with electricity by a transformer, or the combination of a transformer or inductor with circuitry not elsewhere classifiable.

SEE OR SEARCH THIS CLASS, SUBCLASS:
206, 214, 215, 232, 247, 301, 305, and 328, for transformers or inductors used in various control systems within this class.

SEE OR SEARCH CLASS:
336, Inductor Devices, for transformers or inductors, per se.

356 With compensation:
This subclass is indented under subclass 355. Subject matter wherein the transformer has associated therewith circuitry which corrects for undesired phase shift or other discrepancy between the expected and actual outputs of the transformer.

357 For current transformer:
This subclass is indented under subclass 356. Subject matter wherein the transformer is a current transformer.

(1) Note. See the definition of current transformer in subclass 358 below.

358 Current transformer:
This subclass is indented under subclass 355. Subject matter wherein the transformer is an instrument transformer having its primary winding (which may be a single conductor) connected in series with a circuit carrying the current to be measured.

SEE OR SEARCH CLASS:
324, Electricity: Measuring and Testing, subclass 127 for measuring devices including transformers.

359 Potential transformer:
This subclass is indented under subclass 355. Subject matter wherein the transformer is an instrument transformer having its primary winding connected in parallel with a circuit, the voltage of which is to be measured.

SEE OR SEARCH CLASS:
324, Electricity: Measuring and Testing, subclass 127 for measuring devices including transformers.

360 Superconductive:
This subclass is indented under subclass 355. Subject matter wherein the transformer includes a winding whose resistance is essentially zero.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 527+ for miscellaneous superconductive circuits.

361 Polyphase or plural transformers:
This subclass is indented under subclass 355. Subject matter wherein the transformer arrangement is adapted to handle more than one phase of electric energy or is made up of more than one transformer.

SEE OR SEARCH CLASS:
336, Inductor Devices, subclass 5 for polyphase transformers, per se.

362 With core having permanent magnet or air gap:
This subclass is indented under subclass 355. Subject matter including a permanent magnet associated with the core of the transformer or having a gap in one of the legs thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:
250, 308, 330, and 331, for various devices including transformers with cores of this type.

363 Inductor with or in a bridge:
This subclass is indented under subclass 355. Subject matter including at least one inductor in combination with a bridge circuit.

SEE OR SEARCH THIS CLASS, SUBCLASS:
365, for other impedances in bridge circuits.

364 INCLUDING AN IMPEDANCE:
This subclass is indented under the class definition. Subject matter in which a load device not elsewhere classified is supplied with electricity through an impedance arrangement or a combination of impedances not elsewhere classifiable.

(1) Note. Inductors are not included herein. See subclass 355 above.

SEE OR SEARCH THIS CLASS, SUBCLASS:

208, and the subclasses noted in the definition thereof, for impedances used as final control devices in other systems.

SEE OR SEARCH CLASS:

338, Electrical Resistors, for resistors, per se.

361, Electricity: Electrical Systems and Devices, subclass 271 and 500+ for capacitors, per se.

365 In a bridge:

This subclass is indented under subclass 364. Subject matter wherein the impedance are connected in a bridge configuration.

SEE OR SEARCH CLASS:

236, Automatic Temperature and Humidity Regulation, subclass 69, 74, 78, and 91 for temperature regulating systems which include impedance bridge networks as the control means.

318, Electricity: Motive Power Systems, subclass 663 and 674 for electric motor position servomechanisms which may include an impedance bridge network; subclass 294 for motor reversing systems wherein the armature current reversal means includes an impedance bridge network; and subclass 535 for motor field circuit control systems which include an impedance bridge network.

322, Electricity: Single Generator Systems, subclass 77 for single generator systems where the generator field circuit is controlled by means of an impedance bridge network.

324, Electricity: Measuring and Testing, appropriate subclasses, especially subclass 98, 101, and 600+ for electric testing systems involving impedance bridge arrangements.

330, Amplifiers, subclass 72, 146, and 175 for amplifier systems including, respectively, series arranged tubes with each tube in the arm of a bridge; a bridge with a tube in at least one arm; and a Wheatstone bridge network in a coupling circuit.

331, Oscillators, subclass 110 and 138 for bridge type oscillators wherein the frequency determining element of the oscillator comprises a balanced lattice or similar type network having two pairs of conjugately related terminals.

332, Modulators, subclass 172 for a an amplitude modulator including bridge arrangements.

333, Wave Transmission Lines and Networks, subclass 1 for hybrid type networks which may include Wheatstone bridge impedance arrangements.

340, Communications: Electrical, subclass 510, 563, and 599 for condition responsive systems using a Wheatstone bridge.

363, Electric Power Conversion Systems, subclass 17, 58, 68, 98, 132, and 136 for converters including bridges.

366 Thermistor:

This subclass is indented under subclass 365. Subject matter wherein the bridge includes a thermistor in at least one of its arms.

SEE OR SEARCH THIS CLASS, SUBCLASS:

369, for nonbridge thermistor arrangements.

SEE OR SEARCH CLASS:

374, Thermal Measuring and Testing, subclasses 183+ for similar subject matter controlling an indicator.

367 Resistor only:

This subclass is indented under subclass 365. Subject matter wherein the bridge includes resistance elements only.

368 Hall effect device or magnetoresistor:

This subclass is indented under subclass 364. Subject matter wherein the impedance arrangement includes a device which changes its impedance in accordance with the strength of a magnetic field applied thereto.

SEE OR SEARCH CLASS:

338, Electrical Resistors, subclass 32 for magnetic field responsive resistors, per se.

369 Thermistor or resistor:
This subclass is indented under subclass 364. Subject matter wherein the impedance arrangement includes at least one resistor which may be responsive to temperature.

SEE OR SEARCH CLASS:
374, Thermal Measuring and Testing, subclasses 183+ for similar subject matter controlling an indicator.

370 With capacitor:
This subclass is indented under subclass 369. Subject matter having a capacitor in addition to the resistor.

371 MISCELLANEOUS:
This subclass is indented under the class definition. Subject matter not classifiable above.

CROSS-REFERENCE ART COLLECTIONS

901 STARTING CIRCUITS:
Art collection of disclosures including means to initiate circuit operation or to overcome an initial inoperative state of an element or circuit.

902 OPTICAL COUPLING TO SEMICONDUCTOR:
Art collection of disclosures including light emitting means coupled to a photoresponsive semiconductor.

SEE OR SEARCH CLASS:
250, Radiant Energy, subclass 551 for signal isolators, including optically coupled light emitters and semiconductor light receivers.
257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclasses 80 through 85 for incoherent light emitters coupled to active solid-state device light detector elements, per se.

903 PRECIPITATORS:
Art collection of disclosures including power systems or regulators where the load is an electrostatic precipitator which removes particulate matter such as dirt from a gas, such as air.

904 TOUCH SYSTEMS:
Art collection of disclosures including the sensing of a change in capacitance, temperature, or other condition produced by a person touching or being in the immediate proximity of a part of the system.

905 LAMP DIMMER STRUCTURE:
Art collection of disclosures including an electrical control circuit housed or positioned within structure, such as a wall socket or a lamp socket, related to manually varying or controlling the output of a lamp.

906 SOLAR CELL SYSTEMS:
Art collection of disclosures including regulators having as a power source an array of solar cells and/or battery systems such as those in spacecraft.

907 TEMPERATURE COMPENSATION OF SEMICONDUCTOR:
Art collection of disclosures including semiconductors exhibiting temperature dependencies and means are provided to compensate for or to offset the temperature dependency.

SEE OR SEARCH CLASS:
250, Radiant Energy, subclass 238 for temperature compensated photocells.
257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclass 706, 707, and 712-722 for such devices with cooling means.

908 INRUSH CURRENT LIMITERS:
Art collection of disclosures including a component or circuit to limit, prevent, or lessen the initial surge of current that accompanies equipment turn-on.

909 REMOTE SENSING:
Art collection of disclosures including a power supply or regulator remotely located by long leads, cables, or wires, from a sensor or load.

910 TWO OF THREE PHASES REGULATED:
Art collection of disclosures including a three-phase system having regulating or control means in only two of the three phases.

911 MEDICAL ELECTRONICS:

Art collection of disclosures including a power supply or regulator particularly adapted to medical purposes such as electro-surgical units, body organ analyses, or electro-therapeutic units.

END