

## G05D

**SYSTEMS FOR CONTROLLING OR REGULATING NON-ELECTRIC VARIABLES (for continuous casting of metals [B22D 11/16](#) ; valves per se [F16K](#); sensing non-electric variables, see the relevant subclasses of [G01](#); for regulating electric or magnetic variables [G05F](#))**

### Definition statement

*This place covers:*

Systems for controlling or regulating non-electric variables, in particular: position, trajectory, attitude or altitude of a vehicle; position or direction of an object; thickness or size of materials; flow rate; level; quantity ratio; linear or angular speed; force or stress; fluid pressure; torque or mechanical power; vibrations; chemical variables; humidity; temperature; viscosity; and illumination.

"controlling" means influencing a variable in any way, e.g. changing its direction or its value (including changing it to or from zero), maintaining it constant, limiting its range of variation.

"regulation" means maintaining a variable automatically at a desired value or within a desired range of values. The desired value or range may be fixed, or manually varied, or may vary with time according to a predetermined "programme" or according to variation of another variable. Regulation is a form of control.

Merely acting on a variable for the purpose of influencing the state of a system (e.g. acting on the fuel flow rate in an engine for achieving a certain speed), where the value of the variable itself remains irrelevant, should a priori not be considered as controlling or regulating said variable.

### References

#### Limiting references

*This place does not cover:*

Features of general applicability to regulating systems, e.g. anti-hunting arrangements	<a href="#">G05B</a>
Regulating electric or magnetic variables	<a href="#">G05F</a>

#### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Milking machines	<a href="#">A01J 5/007</a>
Welding parameters	<a href="#">B23K 9/095</a>
Copying	<a href="#">B23Q 35/00</a>
Grinding or polishing	<a href="#">B24B 17/00</a> , <a href="#">B24B 49/00</a>
Abrasive blasts	<a href="#">B24C 7/00</a>
Dispensing beverages on draught	<a href="#">B67D 1/12</a>
Electrographic, electrophotographic or magnetographic processes	<a href="#">G03G 21/20</a>
Dynamo-electric motors or generators	<a href="#">H02P 5/00</a> - <a href="#">H02P 9/00</a>

## Special rules of classification

Control systems specially adapted for particular apparatuses, machines or processes are classified in the subclasses for the apparatus, machine or process, provided that there is specific provision for control or regulation relevant to the special adaptation, either at a detailed level, (e.g. [A21B 1/40](#): "for regulating temperature in bakers' ovens") or at a general level, (e.g. [B23K 9/095](#): "for automatic control of welding parameters in arc welding"). Otherwise, classification is made in the most appropriate place in this subclass.

Places where there is specific provision of the kind referred to above at a detailed level have been listed under the main groups of this subclass (see "References relevant to classification in this subclass"). Where the provision is at a general level (e.g. of a kind appropriate to more than one of the main groups specified in the lists, or to main groups [G05D 27/00](#) or [G05D 29/00](#)), the places are listed under this subclass.

A document that can be applied to two or more applications is not specific for any of them and has to be classified in [G05D](#) (for instance a thermostat for heating or air conditioning).

A formulation of the kind "regulator for the application X" should a priori not be considered as specific to said application.

Usually, the subdivisions of the regulation classes in the field of the application are less precise than in [G05D](#), therefore giving a class in [G05D](#) may be useful for search.

When in a document there is mention of several controlled variables, one should try to visualize the block scheme of the regulation. The document is then to be classified in the group of the variable controlled in the outer control loop. In case the regulation in one of the other control loops is of particular interest, it should also be classified in the group(s) of the variable(s) concerned.

Note that the above is without prejudice of the limiting references contained in the titles of the different groups and subgroups in this subclass.

In the main groups of this subclass, remarks found under "Further details of subgroups" are not meant to replace the definitions in the titles, but either give further information about the definitions or mention particular types of documents to be classified in the subgroups or to be excluded from them. In case no remark is made on a given subgroup, the title is considered to be self-explanatory.

In [G05D](#), the hierarchy in classification is generally done according:

- to the physical variable
- Then to the nature of the auxiliary power used, with the following possibilities, not used for all the variables:
  - without auxiliary power (purely mechanical regulation)
  - with auxiliary non-electric power (e.g. pneumatic or hydraulic)
  - characterised by the use of electric means
  - with combination of electric and non-electric auxiliary power
- Then, to the type of sensor used.

## Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Systems	includes self-contained devices such as speed governors, pressure regulators
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## G05D 1/00

Control of position, course or altitude of land, water, air, or space vehicles, e.g. automatic pilot (steering applicable only to other than landborne vehicles, e.g. three-dimensional steering applicable to both aircraft and submarines [B60K](#) ; construction or disposition of steering means on land vehicles [B62](#), on waterborne vessels [B63](#) ; manual or automatic control of aircraft, e.g. using automatic pilot or radiated signal [B64C](#) ; radio navigation systems or analogous systems using other waves [G01S](#))

### Relationships with other classification places

Subclass [G01C](#) covers navigation in general, i.e. determining the position and course of land vehicles, ships, aircraft, and space vehicles.

Subclass [G01S](#) covers radio, sonar or lidar navigation systems, i.e. navigation by use of radio, acoustic or optical waves, or analogue arrangements using other electromagnetic waves.

Subclass [G08G](#) covers navigation systems for traffic control purposes, i.e. systems in which the navigation is not performed autonomously by or in the vehicle, but where the vehicles are guided by instructions transmitted to them.

### References

#### Limiting references

*This place does not cover:*

Linear or angular position control of an object not being a vehicle	<a href="#">G05D 3/00</a>
Control of linear or angular speed or of acceleration	<a href="#">G05D 13/00</a>
Rail vehicles	<a href="#">B61</a>

#### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Agricultural machines or implements	<a href="#">A01B 69/00</a>
Toy vehicles	<a href="#">A63H 17/36</a>
Air-cushion vehicles	<a href="#">B60V 1/11</a>
Driver Assistance Systems for road vehicles	<a href="#">B60W 30/00</a>
Steering controls of motor vehicles or trailers, i.e. means for initiating a change of direction	<a href="#">B62D 1/00</a>
Arrangements for automatically controlling the steering depending on driving conditions	<a href="#">B62D 6/00</a>
Chassis of endless-tracked vehicles	<a href="#">B62D 55/116</a>
Marine steering; control of waterborne vessels	<a href="#">B63H 25/00</a>
Controlling aircraft	<a href="#">B64C 13/00</a> - <a href="#">B64C 15/00</a>
Controlling attitude or direction of aircraft ejector seats	<a href="#">B64D25/11</a>
Cosmonautic vehicles	<a href="#">B64G 1/24</a>
Self-propelled missiles	<a href="#">F41G 7/00</a>
Guided missiles	<a href="#">F42B 15/01</a>

Marine torpedoes	<a href="#">F42B 19/01</a>
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### **Informative references**

Attention is drawn to the following places, which may be of interest for search:

Navigation, i.e. determining the position and course of land vehicles, ships, aircraft, and space vehicles	<a href="#">G01C 21/00</a>
Measuring distance traversed on the ground by vehicles, e.g. using odometers	<a href="#">G01C 22/00</a>
Position-fixing by co-ordinating a plurality of determinations of direction or position lines	<a href="#">G01S 5/00</a>
Determining distance or velocity using waves and not using reflection or reradiation of waves	<a href="#">G01S 11/00</a>
Radar systems specially designed for traffic control	<a href="#">G01S 13/91</a>
Radar systems specially designed for anti-collision purposes	<a href="#">G01S 13/93</a>
Sonar systems specially designed for anti-collision purposes	<a href="#">G01S 15/93</a>
Lidar systems specially designed for anti-collision purposes	<a href="#">G01S 17/93</a>
Traffic control systems for road vehicles	<a href="#">G08G 1/00</a>
Anti-collision traffic control systems	<a href="#">G08G 1/16</a>
Monitoring the location of fleet of vehicles in traffic control systems	<a href="#">G08G 1/20</a>

### **Special rules of classification**

This main group concerns only vehicles.

Documents are classified here in case:

- the stability of the vehicle is obtained or improved by the regulation;
- the sensors are piloting-specific: (i) to follow a predetermined trajectory; (ii) there is an interaction between the position determination and the goal to be achieved (for example there is a camera to recognize the environment and a processor to determine the trajectory);
- the security of the piloting or the control of the piloting is achieved by electronic means;
- of remote control;
- of piloting-specific optimization; or
- of interactions between vehicles.

Within this main group, the possible applications of a land vehicle are also classified in [G05D 2201/02](#).

Within [G05D 1/021](#) and its subgroups, an invention is classified in the subgroups of all the sensors that are essential for the invention. Sensors that are either optional or not directly involved in the invention are classified as additional information.

#### **Further details of subgroups**

[G05D 1/0005](#)

This subgroup covers control systems where the trajectory of an aircraft or satellite is optimized.

[G05D 1/0077](#)

Redundant control systems in general are classified only in [G05B 9/03](#).

[G05D 1/0083](#)

This subgroup covers control of an aircraft while on the ground, i.e. while accelerating before taking-off, braking after touching down or taxiing.

[G05D 1/02](#) and subgroups

This subgroup covers control systems where the position determination or the position evolution takes place on a two-dimensional space. If the nature of the vehicle is specified, then it is classified in the corresponding subgroup.

[G05D 1/0202](#) and subgroup

This subgroup covers two-dimensional navigation of an aircraft while in flight.

[G05D 1/021](#) and subgroups

This subgroup covers control systems to define a trajectory for a land vehicle, and to take suitable actions to make the vehicle follow said trajectory.

Aspects of navigation systems that are important per se should also be classified in the relevant groups of [G01C](#).

Aspects of radio, sonar or lidar navigation systems that are important per se should also be classified in the relevant groups of [G01S](#).

Aspects of navigation systems for traffic purposes that are important per se should also be classified in the relevant groups of [G08G](#).

[G05D 1/0236](#)

This subgroup also covers control systems using barcode readers for positioning.

[G05D 1/0261](#)

This subgroup also covers control systems using RFID tags for positioning.

[G05D 1/0295](#)

This subgroup covers control systems where one of the vehicles sends orders to the others.

## **G05D 3/00**

**Control of position or direction ([G05D 1/00](#) takes precedence)**

### **References**

#### **Limiting references**

*This place does not cover:*

Position control of a vehicle	<a href="#">G05D 1/00</a>
Control of linear or angular speed or of acceleration	<a href="#">G05D 13/00</a>
Control of machine tools	<a href="#">B23Q</a>
Programme-controlled manipulators	<a href="#">B25J 9/00</a>
Programme-control systems	<a href="#">G05B 19/00</a>

**Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Footwear manufacture	<a href="#">A43D 119/00</a>
Tool carriers in forging or pressing	<a href="#">B21K 31/00</a>
Pattern-controlled boring or drilling tools	<a href="#">B23B 39/26</a>
Planing or slotting machines controlled by copying device	<a href="#">B23D 1/30</a> , <a href="#">B23D 3/06</a> , <a href="#">B23D 5/04</a>
Electrode to workpiece spacing in electric discharge and electrochemical machining	<a href="#">B23H 7/18</a>
Workpiece in laser welding or cutting	<a href="#">B23K 26/02</a>
Workpiece in welding	<a href="#">B23K 37/04</a>
Molten metal in welding	<a href="#">B23K 37/06</a>
Spindles in machine tools	<a href="#">B23Q 5/20</a>
Tool or work position in machine tools	<a href="#">B23Q 15/00</a> , <a href="#">B23Q 16/00</a>
Tools controlled by pattern or master model	<a href="#">B23Q 35/00</a>
Grinding controlled by patterns, drawings, magnetic tape or the like	<a href="#">B24B 17/00</a>
Starting position in grinding	<a href="#">B24B 47/22</a>
Actuating members in presses	<a href="#">B30B 15/24</a>
Chassis of tracked vehicles	<a href="#">B62D 55/116</a>
Web-advancing mechanisms	<a href="#">B65H 23/18</a>
Dippers or buckets in dredgers	<a href="#">E02F 3/43</a>
Fluid-pressure servomotors with follow-up action	<a href="#">F15B 9/00</a>
Tracking of solar heat collectors	<a href="#">F24S 50/20</a>
Photomechanical production of patterned or textured surfaces	<a href="#">G03F 9/00</a>
Rotating heads in information storage systems	<a href="#">G11B 5/588</a>
Movement of control elements in nuclear reactors	<a href="#">G21C 7/12</a>

**G05D 5/00****Control of dimensions of material****Definition statement**

*This place covers:*

Control of thickness or size of material

**References****Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Tobacco cutting	<a href="#">A24B 7/14</a>
Thickness of coating of fluent material on surface	<a href="#">B05C 11/02</a>

Thickness, width, diameter or other transverse dimensions of the products of metal-rolling mills	<a href="#">B21B 37/16</a>
Dimension of glass ribbon	<a href="#">C03B 18/04</a>
Thickness of layer in paper making	<a href="#">D21F 7/06</a>

## G05D 7/00

**Control of flow (level control [G05D 9/00](#) ; ratio control [G05D 11/00](#) ; of media to the human body [A61M 5/168](#) ; weighing apparatus [G01G](#))**

### Definition statement

*This place covers:*

Control of flow of liquids, gases, particulate matter and other fluent materials by action on throttling means and/or flow sources.

### References

#### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Air in hair drying helmets	<a href="#">A45D 20/26</a>
Flow of media to the human body	<a href="#">A61M 5/168</a>
Gases or vapour in electrostatic separators	<a href="#">B03C 3/36</a>
Fluent material in coating devices	<a href="#">B05C 11/10</a>
Dispensing beverages on draught	<a href="#">B67D 1/12</a>
Transferring liquids	<b>B67D5/28</b>
Gas purifiers	<a href="#">C10K 1/28</a>
Flushing boreholes	<a href="#">E21B 21/08</a>
Obtaining liquids from wells	<a href="#">E21B 43/12</a>
Flow in non-positive displacement machines or systems	<a href="#">F01D 17/00</a>
Lubrication arrangements	<a href="#">F01M 1/16</a>
Coolant flow in cooling devices	<a href="#">F01P 7/00</a>
Gas-turbine working fluid	<a href="#">F02C 9/16</a> , <a href="#">F02C 9/50</a>
Throttle passages in pipes	<a href="#">F16L 55/027</a>
Air-flow or supply of heating or cooling fluids in air treatment arrangements	<a href="#">F24F 11/00</a>
Air or gas flow in dryers	<a href="#">F26B 21/12</a>
Continuous flow weighing apparatus	<a href="#">G01G 11/08</a>
Coolant in nuclear power plant	<a href="#">G21D 3/14</a>

Further details of subgroups:

[G05D 7/0113](#)

This subgroup covers valves where the flexible member itself, e.g. a membrane, acts on the valve seat.

[G05D 7/0113](#)

This subgroup covers for example flexible members having the form of a torus.

[G05D 7/014](#)

This subgroup covers valves comprising several pistons sliding one over the other.

[G05D 7/0186](#)

This subgroup covers valves using calibrated orifices for achieving a constant flow.

[G05D 7/0611](#) and [G05D 7/0623](#)

These subgroups cover systems where the target flow is defined in dependence on a specific parameter, e.g. the speed of a vehicle.

[G05D 7/0629](#)

Within this subgroup, an invention is classified in the last appropriate place.

## G05D 9/00

**Level control, e.g. controlling quantity of material stored in vessel (controlling level of liquid-pool electrode in electric discharge tubes and lamps [H01J 1/10](#), [H01J 13/14](#))**

### Definition statement

*This place covers:*

Control of quantity of liquids or particulate matter in a vessel by action on the input and/or the output flow.

### References

#### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Liquid level in sedimentation arrangements	<a href="#">B01D 21/34</a>
Ink level in printing, manifolding or duplicating arrangements	<a href="#">B41L 27/04</a>
Feed water for boilers	<a href="#">F22D 5/00</a>
Liquid pool electrodes in electric discharge tubes or lamps	<a href="#">H01J 1/10</a> , <a href="#">H01J 13/14</a>



## G05D 11/00

**Ratio control (control of chemical or physico-chemical variables, e.g. pH-value [G05D 21/00](#) ; humidity control [G05D 22/00](#) ; control of viscosity [G05D 24/00](#) ; proportioning the ingredients for mixing clay or cement with other substances [B28C 7/00](#))**

### Definition statement

*This place covers:*

Control of the relative ratio of flow rate or of volume of two or more fluent materials by action on throttling means and/or flow sources.

### References

#### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Density in sedimentation arrangements	<a href="#">B01D 21/32</a>
Mixers	<a href="#">B01F 15/04</a>
Abrasive blasts	<a href="#">B24C 7/00</a>
Mixtures of clays or cements	<a href="#">B28C 7/00</a>
Bulk material conveyors	<a href="#">B65G 53/66</a>
Flow ratio in jet-propulsion plants	<a href="#">F02K 3/075</a>

Further details of subgroups:

#### [G05D 11/005](#)

This subgroup also covers systems using interconnected pistons

#### [G05D 11/006](#)

This subgroup covers systems comprising venturi aspirators.

#### [G05D 11/008](#)

This subgroup covers systems where the motor of the pump acting on the feeding of a fluid is operated by another fluid.

#### [G05D 11/03](#)

Subgroups [G05D 11/001](#) - [G05D 11/008](#) are used in preference to [G05D 11/03](#), also for flow ratio control systems without auxiliary power.

#### [G05D 11/16](#)

Systems aiming at regulating a temperature by mixing hot and cold water are only classified in [G05D 23/13](#) and subgroups.

## G05D 13/00

**Control of linear speed; Control of angular speed; Control of acceleration or deceleration, e.g. of a prime mover (synchronising telegraph receiver and transmitter [H04L 7/00](#))**

### References

#### Limiting references

*This place does not cover:*

Arrangements for synchronising receiver with transmitter	<a href="#">H04L 7/00</a>
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#### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Drum speed in metal drawing	<a href="#">B21C 1/12</a>
Cutting velocity of tool or work	<a href="#">B23Q 15/00</a>
Ram speed in presses	<a href="#">B30B 15/20</a>
Setting or limiting speed of vehicles	<a href="#">B60K 31/00</a>
Electrically-propelled vehicles	<a href="#">B60L 15/00</a>
Road vehicle cruise control	<a href="#">B60W 30/00</a>
Cruising speed of aircraft	<a href="#">B64D 31/08</a>
Feed rate in manufacture of artificial filaments, threads, fibres, bristles or ribbons	<a href="#">D01D 1/09</a>
Carding machines	<a href="#">D01G 15/36</a>
Warping, beaming or leasing machines	<a href="#">D02H 13/14</a>
Cyclically varying speed of looms	<a href="#">D03D 51/16</a>
Speed of fluid carrier in chemical analysis	<a href="#">G01N 30/32</a>
Record carriers or heads for such carriers in information storage systems	<a href="#">G11B 15/46</a> , <a href="#">G11B 19/28</a>

## G05D 15/00

**Control of mechanical force or stress; Control of mechanical pressure**

### References

#### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Portable percussive tools	<a href="#">B25D 9/26</a>
Ram pressure in presses	<a href="#">B30B 15/22</a>
Tension in webs, tapes, filamentary material	<a href="#">B65H 23/00</a> , <a href="#">B65H 59/00</a>
Tension in filamentary material	<a href="#">B65H 59/00</a>
Rope, cable or chain tension	<a href="#">B66D 1/50</a>

Tension in looms	<a href="#">D03D 49/04</a>
Tension in sewing machines	<a href="#">D05B 47/04</a>
Pressure in paper-making machines	<a href="#">D21F 3/06</a>
Drying fabrics	<a href="#">F26B 13/12</a>
Pressure in dryers	<a href="#">F26B 21/10</a>
Record carrier tension in information storage arrangements	<a href="#">G11B 15/43</a>

## G05D 16/00

**Control of fluid pressure (control of pressure in electric discharge tubes or lamps [H01J](#), e.g. [H01J 7/14](#) ; control of pressure in electric incandescent lamps [H01K 1/52](#))**

### References

#### Limiting references

*This place does not cover:*

Valves per se	<a href="#">F16K</a>
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#### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Tyre pressure	<a href="#">B60C 23/00</a>
Air within diving suit	<a href="#">B63C 11/08</a>
Aircraft air-pressure	<a href="#">B64D 13/00</a>
Bulk material conveyors	<a href="#">B65G 53/66</a>
Manufacture of artificial filaments, threads, fibres, bristles or ribbons	<a href="#">D01D 1/09</a>
Flushing boreholes	<a href="#">E21B 21/08</a>
Lubrication arrangements	<a href="#">F01M 1/16</a>
Pressure of fluid carrier in chemical analysis	<a href="#">G01N 30/32</a>
Pressure in electric discharge tubes or lamps	<a href="#">H01J 7/14</a>
Pressure in electric incandescent lamps	<a href="#">H01K 1/52</a>

Further details of subgroups

#### [G05D 16/0602](#)

This subgroup covers valves in series or in cascade, where the output of one valve is the input of another one.

#### [G05D 16/0605](#)

This subgroup covers valves having their inputs and/or outputs connected together.

#### [G05D 16/106](#)

This subgroup covers valves comprising several pistons sliding one over the other.

[G05D 16/14](#) and subgroups

This subgroup covers non-electric pilot valves.

[G05D 16/2086](#)

This subgroup covers valves where the electric energy is used for adjusting the set point of an otherwise purely mechanical regulator.

[G05D 16/2093](#)

This subgroup covers electromagnetic pilot valves.

**G05D 17/00****Control of torque; Control of mechanical power****Definition statement**

*This place covers:*

Regulation of the torque of tightening tools, control of the torque or power of electric motors, combustion engines and the like when the control is not specific of the particular drive.

**References****Limiting references**

*This place does not cover:*

Torque limiters in tools	<a href="#">B25B 23/14</a>
Propulsion units in vehicles	<a href="#">B60K</a>
Control of combustion engines	<a href="#">F02D</a>
Control of electric motors	<a href="#">H02P</a>

**G05D 19/00****Control of mechanical oscillations, e.g. of amplitude, of frequency, of phase (generating or transmitting mechanical vibrations [B06B](#) ; control of electric motors [H02P](#))****Definition statement**

*This place covers:*

Control of mechanical oscillations or vibrations in machines or structures, either by generating oscillations, or by damping oscillations, other than suppression of vibrations.

**References****Limiting references**

*This place does not cover:*

Musical instruments; acoustics	<a href="#">G10</a>
Loudspeakers or like acoustic electromechanical transducers	<a href="#">H04R</a>

**Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Portable percussion tools	<a href="#">B25D 9/26</a>
Jigging conveyors	<a href="#">B65G 27/32</a>
Suppression of vibrations in systems	<a href="#">F16F 15/002</a>

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Generating or transmitting mechanical vibrations	<a href="#">B06B</a>
Control of electric motors	<a href="#">H02P</a>

**G05D 21/00****Control of chemical or physico-chemical variables, e.g. pH value****Definition statement**

This place covers:

Regulation of chemical composition, concentration, pH or the like in a chemical process when the regulation is not specific of the particular process.

**References****Limiting references**

This place does not cover:

Ratio control	<a href="#">G05D 11/00</a>
Humidity control	<a href="#">G05D 22/00</a>
Control of viscosity	<a href="#">G05D 24/00</a>

**Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Density in sedimentation arrangements	<a href="#">B01D 21/32</a>
Treating gases or vapours	<a href="#">B01D 53/30</a>
Composition of fluid carrier in chemical analysis	<a href="#">G01N 30/34</a>

**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Physical or chemical processes in general	<a href="#">B01J</a>
Treatment of water	<a href="#">C02F</a>

**G05D 22/00****Control of humidity (of tobacco products [A24B 9/00](#) ; air conditioning [F24F](#))****References****Application-oriented references**

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Watering gardens, fields, sports grounds or the like	<a href="#">A01G 25/16</a>
Poultry incubators	<a href="#">A01K 41/04</a>
Tobacco products	<a href="#">A24B 9/00</a>
Moistening in air treating devices of vehicles	<a href="#">B60H 3/02</a>
Air conditioning	<a href="#">F24F 11/00</a>
Dryers	<a href="#">F26B 21/08</a>

**G05D 23/00****Control of temperature (automatic switching arrangements for electric heating apparatus [H05B 1/02](#) ; controlling induction heating [H05B 6/06](#) ; regulating temperature of anode of X-ray tube [H05G 1/36](#))****References****Application-oriented references**

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Bakers' ovens	<a href="#">A21B 1/40</a>
Hair curlers	<a href="#">A45D 6/20</a>
Metal extruding	<a href="#">B21C 31/00</a>
Tyre temperature	<a href="#">B60C 23/00</a>
Cosmonautic vehicles	<a href="#">B64G 1/50</a>
Float baths in glass making	<a href="#">C03B 18/18</a> , <a href="#">C03B 18/22</a>
Manufacture of artificial filaments, threads, fibres, bristles or ribbons	<a href="#">D01D 1/09</a>
Knitting machines	<a href="#">D04B 35/30</a>
Hand irons	<a href="#">D06F 75/26</a>
Paper-making machines	<a href="#">D21F 5/06</a>
Lubricant in lubrication arrangements	<a href="#">F01M 5/00</a>
Arrangements for supplying oil or unspecified lubricant from a reservoir	<a href="#">F16N 7/08</a>
Steam superheat	<a href="#">F22G 5/00</a>
Dryers	<a href="#">F26B 21/10</a>
Temperature of fluid carrier in chemical analysis	<a href="#">G01N 30/30</a>
Electric storage cells	<a href="#">H01M 10/60</a>
Automatic switching arrangements for electric heating apparatus	<a href="#">H05B 1/02</a>

Dielectric, induction or microwave heating	<a href="#">H05B 6/06</a> , <a href="#">H05B 6/50</a> , <a href="#">H05B 6/68</a>
Anode of X-ray tube	<a href="#">H05G 1/36</a>

### Special rules of classification

Within subgroups [G05D 23/01](#) - [G05D 23/32](#), an invention is classified in the last appropriate place in the absence of an indication of the contrary.

#### Further details of subgroups:

[G05D 23/022](#), [G05D 23/025](#) and [G05D 23/123](#)

These subgroups cover valves controlling the flow of a fluid as a function of the temperature of said fluid.

[G05D 23/023](#), [G05D 23/026](#) and [G05D 23/125](#)

These subgroups cover valves controlling the flow of a fluid as a function of the temperature of an external sensor, e.g. thermostat for radiator.

[G05D 23/024](#) and subgroups

These subgroups cover memory shape alloys working as a sensing element.

[G05D 23/028](#)

This subgroup covers systems where the fusing of an element irreversibly releases a cooling fluid.

[G05D 23/128](#)

This subgroup covers valves controlling the flow of fuel to a burner as a function of the temperature of a controlled space.

[G05D 23/1333](#)

This subgroup covers valves distributing the flow of a fluid among two conduits as a function of the temperature of said fluid, e.g. refrigerating systems.

[G05D 23/1353](#)

This subgroup covers not only valves where the flow is regulated, but also where it is just set by the user.

[G05D 23/185](#) and subgroups

These subgroups cover valves similar to the corresponding subgroups in [G05D 23/01](#), but further comprising the use of auxiliary pneumatic or hydraulic energy.

[G05D 23/19](#) and subgroups

In [G05D 23/19](#) documents are classified in [G05D 23/20](#), [G05D 23/22](#), [G05D 23/24](#), [G05D 23/26](#), [G05D 23/27](#), or [G05D 23/275](#) and their subgroups according to the nature of the main temperature sensor used. Documents are also classified in the CPC subgroups related to control features directly under [G05D 23/19](#), if one or more of them apply. In case the nature of the temperature sensing element is not mentioned or is irrelevant for the invention, documents are classified only in [G05D 23/19](#) and its directly dependent subgroups.

[G05D 23/20](#) and subgroups

This covers inventions where the sensing element has a variation of electric or magnetic properties other than defined in [G05D 23/22](#), [G05D 23/24](#) or [G05D 23/26](#), e.g. a semiconductor, an ionized gas or a capacitor.

[G05D 23/1902](#), [G05D 23/20](#), [G05D 23/22](#), [G05D 23/24](#), [G05D 23/26](#), [G05D 23/27](#), and [G05D 23/275](#)

These subgroups cover inventions relating to the input means of the reference value.

[G05D 23/1904](#), [G05D 23/20](#), [G05D 23/22](#), [G05D 23/24](#), and [G05D 23/275](#)

These subgroups cover systems where a temperature profile is defined as a function of time.

[G05D 23/1906](#), [G05D 23/20](#), [G05D 23/22](#), [G05D 23/24](#), [G05D 23/26](#), [G05D 23/27](#), and [G05D 23/275](#)

These subgroups cover systems where the control action is a continuous function of the measured error.

[G05D 23/1913](#), [G05D 23/20](#), [G05D 23/22](#), [G05D 23/24](#), and [G05D 23/275](#)

These subgroups cover systems delivering a series of pulses having a frequency that is a continuous function of the measured error.

[G05D 23/1919](#), [G05D 23/20](#), [G05D 23/22](#), [G05D 23/24](#), [G05D 23/26](#), [G05D 23/27](#), and [G05D 23/275](#)

These subgroups also cover systems using Peltier effect devices.

[G05D 23/1921](#), [G05D 23/20](#), [G05D 23/22](#), [G05D 23/24](#), and [G05D 23/275](#)

These subgroups cover systems where the actuator consists of a heat expanding element being heated electrically in order to act on a valve.

[G05D 23/1923](#), [G05D 23/20](#), [G05D 23/22](#), [G05D 23/24](#), and [G05D 23/275](#)

These subgroups cover control systems for storage heaters.

[G05D 23/1924](#), [G05D 23/20](#), [G05D 23/22](#), [G05D 23/24](#), and [G05D 23/275](#)

These subgroups cover systems using solar energy.

[G05D 23/1931](#), [G05D 23/20](#), and [G05D 23/22](#)

These subgroups cover systems measuring the temperature of the controlled space and of another space in thermal relationship with it, e.g. outdoors.

[G05D 23/1951](#)

This subgroup covers systems where one sensor is used for control after the other, e.g. measuring the input flow temperature of a heating system and later switching to measuring the output flow temperature.



## G05D 25/00

Control of light, e.g. intensity, colour, phase (mechanically operable parts of lighting devices for the control of light [F21V](#) ; optical devices or arrangements using movable or deformable elements for controlling light independent of the light source [G02B 26/00](#) ; devices or arrangements, the optical operation of which is modified by changing the optical properties of the medium of the devices or arrangements for the control of light, circuit arrangements specially adapted therefor, control of light by electro-magnetic waves, electrons or other elementary particles [G02F 1/00](#) ; circuit arrangements for controlling light sources [H01S 3/10](#), [H05B 33/08](#), [H05B 35/00](#) - [H05B 43/00](#))

### Definition statement

*This place covers:*

Regulation of intensity, colour or phase of light other than by acting on the light sources.

### References

#### Limiting references

*This place does not cover:*

Vehicle lighting	<a href="#">B60Q</a>
Operating screening devices	<a href="#">E06B 9/68</a>
Mechanically operable parts of lighting devices for the control of light	<a href="#">F21V</a>
Optical devices or arrangements using movable or deformable elements for controlling light independent of the light source	<a href="#">G02B 26/00</a>
Devices or arrangements, the optical operation of which is modified by changing the optical properties of the medium of the devices or arrangements for the control of light, circuit arrangements specially adapted therefor, control of light by electro-magnetic waves, electrons or other elementary particles	<a href="#">G02F 1/00</a>

#### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Photographic composing machines	<a href="#">B41B 21/08</a>
Lasers and other light sources	<a href="#">H01S 3/10</a> , <a href="#">H05B 33/08</a> , <a href="#">H05B 35/00</a> - <a href="#">H05B 43/00</a>

## G05D 27/00

**Simultaneous control of variables covered by two or more of the preceding main groups**

### Special rules of classification

If there is a double regulation (two independent set points for two corresponding controlled variables, e.g. temperature and humidity, when there are interactions in the control loops), the document is also classified in this group. Thus, this group should be assigned in addition to the groups corresponding to the two or more controlled variables.

## **G05D 29/00**

### **Simultaneous control of electric and non-electric variables**

#### **Special rules of classification**

If there is a double regulation (two independent set points for two corresponding controlled variables, when there are interactions in the control loops), the document is also classified in this group. Thus, this group should be assigned in addition to the groups corresponding to the two or more controlled variables.

## **G05D 99/00**

### **Subject matter not provided for in other groups of this subclass**

#### **Special rules of classification**

This group is not being used.