# G05B

## CONTROL OR REGULATING SYSTEMS IN GENERAL; FUNCTIONAL ELEMENTS OF SUCH SYSTEMS; MONITORING OR TESTING ARRANGMENTS FOR SUCH SYSTEMS OR ELEMENTS (fluid-pressure actuators or systems acting by means of fluids in general F15B; valves per se F16K; characterised by mechanical features only G05G; sensitive elements, see the appropriate subclass, e.g. G12B, subclass of G01, H01; correcting units, see the appropriate subclass, e.g. H02K)

## Definition statement

*This subclass/group covers:*

Features of control systems or elements for regulating specific variables, which are clearly more generally applicable to any system.

## Relationship between large subject matter areas

In this subclass, details or specific control systems are classified in the group relevant to that system, if not otherwise provided for.

## References relevant to classification in this subclass

*This subclass/group does not cover:*

| | |
|---|---|
| Systems for controlling or regulating non-electric variables | G05D |
| Systems for regulating electric or magnetic variables | G05F |
| Control systems characterised by mechanical features only | G05G |

| | |
|---|---|
| adjustable operating tables, operating chairs or dental chairs | A61G 15/02 |
| positioning tool carriers for forging, pressing or hammering | B21K 31/00 |
| pressure or injection die casting of metals | B22D 17/32 |
| tool or work positioning for boring or | B23B 39/26 |

| | |
|---|---|
| drilling | |
| machines for shearing or similar cutting stock travelling otherwise than in the direction of the cut | B23D 36/00 |
| driving or feeding mechanisms of machine tools | B23Q 5/00 |
| feed movement, cutting velocity or position of machine tools | B23Q 15/00 |
| copying from a pattern or master model for machine tools | B25Q 35/00 |
| position of grinding tool or work | B24B 47/22 |
| manipulators | B25J 13/00 |
| position of cutters in cutting machines | B26D 5/02 |
| shaping techniques for plastic substances | B29C 51/00 |
| presses | B30B 15/16 |
| composing machines | B41B 27/00 |
| printing machines or presses | B41F 33/00 |
| feeding sheets or webs in typewriters | B41J 11/42 |
| apparatus or devices for manifolding, duplicating or printing for commercial purposes | B41L 39/00 |
| addressing machines | B41L 47/56 |
| vehicle suspension | B60G 21/00 |
| vehicle brakes | B60T 15/00 |
| conjoint control of vehicle sub-units | B60W |
| machines for packaging | B65B 57/00 |

| | |
|---|---|
| conveyers | B65G 43/00 |
| sequence of drive operations for dredging or soil-shifting | E02F 3/43 |
| earth drilling operations | E21B 44/00 |
| steam accumulators | F01K 1/16 |
| steam engine plants | F01K 13/02 |
| air intakes for gas-turbine or jet-propulsion plants | F02C 7/05 |
| gas-turbine plants; fuel supply in air-breathing jet-propulsion plants | F02C 9/00 |
| combustion engines | F02D |
| jet pipes or nozzles in jet-propulsion plants | F02K 1/76 |
| jet-propulsion plants | F02K 9/00 |
| positive-displacement machines | F04B 49/00 |
| non-positive displacement pumps, pumping installations or systems | F04D 27/00 |
| external control of clutches | F16D 48/00 |
| suppression of vibrations using fluid means | F16F 15/02 |
| control of gearings | F16H 61/00 |
| steam boilers | F22B 35/00 |
| incineration of waste | F23G 5/50 |
| combustion in combustion apparatus | F23N |
| combustion in open fires using solid fuel | F24B 1/18 |

| | |
|---|---|
| solar heating | F24J 2/40 |
| drying processes of solid materials or objects | F26B 25/22 |
| steam or vapour condensers | F28B 11/00 |
| heat-exchange apparatus with intermediate heat-transfer medium in closed tubes passing into or through conduit walls, in which the medium condenses and evaporates | F28D 15/06 |
| heat-exchanges or heat-transfer apparatus in general | F28F 27/00 |
| measurement in general | G01 |
| computers | G06F 11/00 |
| traffic | G08G |
| indicating devices using static means to present variable information | G09G |
| driving, starting or stopping of record carriers | G11B 19/00 |
| nuclear reaction | G21C 7/00 |
| nuclear-power plant | G21D 3/00 |
| electron-beam or ion-beam tubes used for localised treatment of objects | H01J 37/30 |
| Processes or apparatus adapted for the manufacture or treatment of semiconductor or solid state devices | H01L 21/00 |
| Circuit arrangements for ac mains or ac distribution networks | H02J 3/00 |
| electric motors, generators, or dynamo-electric converters | H02P |

## Informative References

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

| | |
|---|---|
| Fluid-pressure actuators or systems acting by means of fluids in general | F15B |
| Valves per se | F16K |
| Characterised by mechanical features only | G05G |
| Sensitive elements, see the appropriate subclass, e.g. | G12B, |
| Correcting units, see the appropriate subclass, e.g. | H02K |

## Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

| | |
|---|---|
| automatic controller | means a system, circuit, or device in which a signal from the detecting element is compared with a signal representing the desired value and which operates in such a way as to reduce the deviation. The automatic controller generally does not include the sensitive element, i.e. that element which measures the value of the condition to be corrected, or the correcting element, i.e. that element which adjusts the condition to be corrected |
| electric | includes "electromechanical", "electrohydraulic" or "electropneumatic" |

## Synonyms and Keywords

In patent documents the following abbreviations are often used:

| | |
|---|---|
| NC | Numerical Controller |
| PLC | Programmable Logic Controller |

## G05B 1/00

### Comparing elements, i.e. elements for effecting comparison directly or indirectly between a desired value and existing or anticipated values (comparing phase or frequency of two electric signals H03D13/00 )

### Definition statement

*This subclass/group covers:*

Structural elements used to compare the actual with the desired value of a variable that needs to be controlled in a control or regulation system.

### Relationship between large subject matter areas

The actual measurement of a signal should be classified in the appropriate class of G01.

### References relevant to classification in this subclass/group

*This subclass/group does not cover:*

| | |
|---|---|
| comparing phase or frequency of two electric signals | H03D 13/00 |

### Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

| | |
|---|---|
| actual value | the measured or estimated value of the variable to be controlled |
| reference | the desired value of the variable being controlled |
| error | the difference between the actual value of a variable and the reference |

## G05B 5/00

### Anti-hunting arrangements

### Definition statement

*This subclass/group covers:*

Arrangements in a control or regulation system to avoid a "hunting" effect.

The "hunting" effect appears when a lag between the actual value and the reference of a variable to be controlled leads to overcompensation of the error and/or unstable behaviour of the system being controlled.

### Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

| | |
|---|---|
| overswing, overshoot | situation in which the error between the actual and desired values of a variable is overcompensated |
| damping | technique used to reduce or eliminate the overcompensation of an error |

## G05B 6/00

### Internal feed-back arrangements for obtaining particular characteristics, e.g. proportional, integral, differential (in automatic controllers G05B11/00 )

### Definition statement

*This subclass/group covers:*

Internal feed-back arrangements for obtaining particular characteristics, e.g. proportional, integral, differential

### References relevant to classification in this subclass/group

*This subclass/group does not cover:*

| | |
|---|---|
| P, PI and PID responses in automatic controllers | G05B 11/00 |

## G05B 7/00

### Arrangements for obtaining smooth engagement or disengagement of automatic control

### Definition statement

*This subclass/group covers:*

Systems with several controller modes or phases, in which the problem is related to switching between controller modes without provoking unnecessary oscillations or instability in the response of the system.

One of these modes or phases could be the absence of control, and then the problem would be related to obtaining a smooth response of the system during a starting transition.

### References relevant to classification in this group

*This subclass/group does not cover:*

| | |
|---|---|
| smooth engagement of gears in automatic transmission systems | F16H 61/04 |

### Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

| | |
|---|---|
| switchover | change from a first control mode to a second control mode |

## G05B 9/00

### Safety arrangements (G05B7/00 takes precedence; safety arrangements in programme-control systems G05B19/048, G05B19/406; safety valves F16K17/00; emergency protective circuit arrangements in general H02H)

### Definition statement

*This subclass/group covers:*

Arrangements to assure the correct working of a control system in case of failure, for example, redundant control systems.

Arrangements to prevent damage to personnel or to equipment as a result of the control action.

## Relationship between large subject matter areas

Group G05B9 covers the safety aspects of the control of a system, not of the system as such. This means that aspects related to the safe use of a product or device should be classified in the corresponding application places, unless it involves decisions related to the control of the process, product or device, in which case this group would be the appropriate one.

## References relevant to classification in this group

*This subclass/group does not cover:*

| | |
|---|---|
| anti-hunting arrangements | G05B 5/00 |
| arrangements for obtaining smooth engagement or disengagement of automatic control | G05B 7/00 |
| safety arrangements in programme-control systems other than numerical control | G05B 19/0428 |
| safety arrangements in programme-control systems using programmable logic controllers (PLC) | G05B 19/058 |
| safety arrangements in programme-control systems | G05B 19/048 |
| safety arrangements in numerical control systems (NC) | G05B 19/406 |
| monitoring of control system, i.e. detection of failures in the control action and response to those failures | G05B 23/00 |
| emergency protective circuit arrangements in general | H02H |

## Informative references

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

| | |
|---|---|
| safety for robotic manipulators | B25J 9/1674 |
| safety valves | F16K 17/00 |

| | |
|---|---|
| safety devices acting in conjunction with the control or operation of a machine | F16P 3/00 |
| light barriers for detection of intrusion of a machine in a safety zone | G01V 8/10 |

## Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

| | |
|---|---|
| intrinsic safety | safe operation of control in explosive or hazardous environments |

# G05B 11/00

## Automatic controllers (G05B13/00 takes precedence)

## Definition statement

*This subclass/group covers:*

Non-adaptive automatic controllers, i.e., the controller does not adjust itself as a result of the system response to its control action.

## References relevant to classification in this group

*This subclass/group does not cover:*

| | |
|---|---|
| adaptive control systems | G05B 13/00 |
| programme-control systems | G05B 19/00 |

# G05B 13/00

## Adaptive control systems, i.e. systems automatically adjusting themselves to have a performance which is optimum according to some preassigned criterion (G05B19/00 takes precedence; details of the computer G06F15/18 )

## Definition statement

*This subclass/group covers:*

Adaptive automatic controllers, i.e., the controller adjusts itself as a result of the system response to its control action, in order to obtain an optimum performance according to some criterion.

## References relevant to classification in this group

*This subclass/group does not cover:*

| | |
|---|---|
| learning machines in digital computing systems when not applied to control | G06F 15/18 |
| programme-control systems | G05B 19/00 |

## Informative references

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

| | |
|---|---|
| creation of a mathematical model of the system to be controlled | G05B 17/00 |

## Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

| | |
|---|---|
| knowledge base | a set of representations of facts about the system to be controlled and its environment |
| knowledge-based agent | a software module that uses a knowledge base to implement control decisions |
| expert system | a type of intelligent control system which can emulate the reasoning procedures of a human expert in order to generate the necessary control action |
| learning sytem | an automatic control in which the nature of control parameters and algorithms is modified by the actual experience of the system |

| | |
|---|---|

## G05B 15/00

### Systems controlled by a computer (G05B13/00, G05B19/00 take precedence; automatic controllers with particular characteristics G05B11/00; computers per se G06)

### Definition statement

*This subclass/group covers:*

Systems controlled by a computer not provided by other classes.

Control of whole Building Automation Systems as e.g. domotics.

### References relevant to classification in this group

*This subclass/group does not cover:*

If the control relates to a specific application, then it should be classified in the proper application or control classes

| | |
|---|---|
| automatic controllers | G05B 11/00 |
| adaptive control systems | G05B 13/00 |
| programme-control systems | G05B 19/00 |
| computers per se | G06 |

### Informative references

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

| | |
|---|---|
| control of air-conditioning and HVACs | F24F 11/00 |
| home automation networks | H04L 12/2803 |
| control of lighting | H05B 37/02 |

## G05B 17/00

### Systems involving the use of models or simulators of said

**systems (G05B13/00, G05B15/00, G05B19/00 take precedence; analogue computers for specific processes, systems, or devices, e.g. simulators G06G7/48 )**

## Definition statement

*This subclass/group covers:*

Use of a model or simulator to control a system.

Use of detailed representations of real systems to facilitate control of a system.

Creation and adaptation of the mathematical model used to control a system.

## References relevant to classification in this group

*This subclass/group does not cover:*

| | |
|---|---|
| analogue computers for specific processes, systems, or devices, e.g. simulators | G06G 7/48 |

## Informative references

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

| | |
|---|---|
| adaptive control systems | G05B 13/00 |
| systems controlled by a computer | G05B 15/00 |
| programme-control systems | G05B 19/00 |

## Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

| | |
|---|---|
| first-principles knowledge | a fundamental understanding of the process or system to be controlled, expressed in the form of a mathematical model |

# G05B 19/00

**Programme-control systems (specific applications see the relevant places, e.g. A47L15/46; clocks with attached or built-in means operating any device at a preselected time interval G04C23/00; marking or sensing record carriers with digital information G06K; information storage G11; time or time-programme switches which automatically terminate their operation after the programme is completed H01H43/00 )**

## Definition statement

*This subclass/group covers:*

Programme control in sequence or logic controllers, e.g. simulating logic interconnections of signals according to ladder diagrams or function charts.

Programme control in controllers using digital processors, or using logic state machines, or using cams, discs, rods, drums, or where the programme is defined in the fixed connection of electrical elements, e.g. potentiometers, counters, transistors, or using plugboards, cross-bar distributors, matrix switches, or using selector switches or using record carriers.

Numerical control (NC), i.e. automatically operating machines, in particular machine tools, e.g. in a manufacturing environment, so as to execute positioning, movement or co-ordinated operations by means of programme data in numerical form

Total factory control, i.e. centrally controlling a plurality of machines, e.g. direct or distributed numerical control (DNC), flexible manufacturing systems (FMS), integrated manufacturing systems (IMS), computer integrated manufacturing (CIM)

Recording and playback systems, i.e. in which the programme is recorded from a cycle of operations, e.g. the cycle of operations being manually controlled, after which this record is played back on the same machine

## References relevant to classification in this group

*This subclass/group does not cover:*

| | |
|---|---|
| Programme-control of manipulators | B25J 9/16 |
| Control of speed of electric motors | H02P |
| CAD system | G06F 17/50 |

## Informative references

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

| | |
|---|---|
| domestic washing or cleaning | A47L15 |
| programmed medicine dispensers | A61J 7/04 |
| disinfection or sterilising | A61L 2/24 |
| heart pace-makers | A61N 1/36 |
| centrifuges | B04B 13/00 |
| thickness of work produced by metal-rolling mills | B21B 37/24 |
| bending metal rods, profiles, or tubes | B21D 7/12 |
| boring or drilling machines | B23B 39/08, B23B 39/24 |
| electrical discharge or electromechanical machining | B23H 7/20 |
| assembling of parts to compose units | B23P 21/00 |
| series of individual steps in grinding a workpiece | B24B 51/00 |
| manipulators | B25J 9/00 |
| presses | B30B 15/26 |
| sequence of operations in printing machines or presses | B41F 33/16 |
| feeding sheets or webs in typewriters | B41J 11/44 |
| sequence of operations in apparatus or devices for manifolding, duplicating or printing for commercial purposes | B41L 39/16 |
| selecting text or image to be printed in addressing machines | B41L 47/64 |
| traction motor speed of electrically-propelled vehicles | B60L 15/20 |
| piling articles | B65H 31/24 |

| | |
|---|---|
| crane drives | B66C 13/48, B66C 23/58 |
| dispensing, delivering or transferring liquids | B67D 7/14 |
| sewing machines | D05B 19/00, D05B 21/00 |
| embroidering machines | D05C 5/04 |
| operations in washing machines | D06F 33/00 |
| combustion engines | F02D 27/02, F02D 28/00 |
| supply of combustible mixture or its constituents to combustion engines | F02D 41/26 |
| fluid-pressure actuator systems | F15B 21/02 |
| combustion in combustion apparatus | F23N 5/20, F23N 5/22 |
| weighing apparatus | G01G 19/38 |
| electromechanical clocks or watches | G04C 23/08, G04C 23/34 |
| mechanically operating digital computers | G06C 21/00 |
| control units for electric digital data processing | G06F 9/00 |
| peripheral devices for electric digital data processing | G06F 13/10 |
| electrically operating digital computers | G06F 15/00 |
| electrically or magnetically operating analogue computers | G06G 7/06 |
| Marking or sensing record carriers with digital information | G06K |
| electrically-operated teaching apparatus or devices | G09B 7/04, G09B 7/08, G09B 7/12 |

| | |
|---|---|
| Information storage | G11 |
| Clocks with attached or built-in means operating any device at a preselected time interval | H01H 43/00 |
| electron-beam or ion-beam tubes used for localised treatment of objects | H01J 37/30 |
| electronic switching or gating | H03K 17/296 |
| selecting arrangements in electric communication technique | H04Q 3/54 |

## Special rules of classification within this group

The classification must be done using also the associated Indexing Code scheme.

Indexing Code orthogonal classification:

In addition to one or more EC symbols relating to the invention information, where appropriate, one or more Indexing Code symbols relating to orthogonal classification, i.e. covering aspects which are spanning over one or more groups, should be allocated .

G05B 2219/00 Program-control systems

relates to problems specific to groups from G05B 19/04 till 19/42

G05B 2219/10 . Plc systems

relates to problems specific to programmable logic controllers only (G05B 19/05)

G05B 2219/11 . . Plc I-O input output

G05B 2219/12 . . Plc mp multi processor system

G05B 2219/13 . . Plc programming

G05B 2219/14 . . Plc safety

G05B 2219/15 . . Plc structure of the system

G05B 2219/16 . . Plc to applications

G05B 2219/20 . Pc systems

relates to problems specific to microprocessor-based controllers (except PLC), i.e. specific to groups from G05B 19/04 till 19/16 (except G05B 19/05)

G05B 2219/11 . . Pc I-O input output

G05B 2219/12 . . Pc mp multi processor system

G05B 2219/13 . . Pc programming

G05B 2219/14 . . Pc safety

G05B 2219/15 . . Pc structure of the system

G05B 2219/16 . . Pc to applications

G05B 2219/30 . Nc systems

relates to problems specific to Numerical Control of machines (G05B 19/18 till G05B 19/42)

G05B 2219/31 . . Computer integrated manufacturing (G05B 19/418)

G05B 2219/33 . . NC Controller

G05B 2219/35 . . Input / Output

G05B 2219/37 . . Measuring problems

G05B 2219/39 . . Numerical Control of manipulators

G05B 2219/41 . . Servo-Controller

G05B 2219/43 . . Control of Speed in NC systems

G05B 2219/45 . . Special applications

## G05B 21/00

### Systems involving sampling of the variable controlled (G05B13/00 to G05B19/00 take precedence; transmission systems for measured values G08C; electronic switching or gating H03K17/00 )

### Definition statement

*This subclass/group covers:*

Decision on the rate of sampling of the variable to be controlled.

Accurate sampling of the variable to be controlled by, for example, adding a timestamp to the signal.

## References relevant to classification in this group

*This subclass/group does not cover:*

| | |
|---|---|
| electronic switching or gating | H03K 17/00 |

## Informative references

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

| | |
|---|---|
| adaptive control systems | G05B 13/00 |
| programme-control systems | G05B 19/00 |
| systems controlled by a computer | G05B 15/00 |
| transmission systems of control signals | G08C |

# G05B 23/00

### Testing or monitoring of control systems or parts thereof (monitoring of programme-control systems G05B19/048, G05B19/406 )

## Definition statement

*This subclass/group covers:*

Detection of faults in the control of a process or device. A fault is a departure from an acceptable range of an observed variable or a calculated parameter associated with a process. Process fault detection comprises three main steps:

A. Configuration of a monitoring or supervisory system, when this system is used to monitor or test the control of a system.

B. Detection of an existing (usually called "diagnostics") or incipient (usually called "prognostics") fault in the control of a system.

C. Reaction to the detection of an existing or incipient fault in the control of a system.

## Relationship between large subject matter areas

Group G05B23 covers the monitoring (or testing) of the control of a system, not of the system as such. This means that testing the quality of a process,

product or device should be classified in the corresponding application classes, unless it involves decisions related to the control or monitoring of the process, product or device, in which case this group would be the appropriate one.

## References relevant to classification in this group

*This subclass/group does not cover:*

| | |
|---|---|
| process diagnostics in road vehicle drive control systems | B60W 50/00 |
| safety or indicating devices for abnormal conditions | F02D 41/22 |
| testing vehicle engines | G01M 15/00 |
| testing of electronic circuits | G01R 31/28 |
| testing dynamo-electric machines | G01R 31/34 |
| Monitoring of programme-control systems | G05B 19/048, G05B 19/406 |
| monitoring tool breakage, life or condition, including wear of a machine tool | G05B 19/4065 |
| data acquisition during manufacturing | G05B 19/4183 |
| control of the quality of the end product in a manufacturing process | G05B 19/41875 |
| generation of clock signal, power supply for computers (including related diagnostics and monitoring aspects) | G06F 1/00 |
| error detection concerning software (i.e. debugging) usually applied to computers used in an office, non-industrial environment | G06F 11/36 |
| detecting defective computer hardware, usually applied to computers used in an office, non-industrial environment | G06F 11/267 |

| | |
|---|---|
| image analysis for industrial inspection or for determining position or orientation of objects | G06T 7/0002, G06T 7/004 |
| error checking in memories | G11C 29/00 |
| fault management of packet-switched data network or network elements | H04L 12/2419 |
| monitoring/testing of packet-switched data network or network elements | H04L 12/2602, H04L 12/2697 |

## Informative references

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

| | |
|---|---|
| adaptation of model in model-based fault detection systems | G05B 17/02 |
| Systems involving sampling of the variable controlled | G05B 21/02 |
| registering or indicating the condition of working machines or other apparatus, i.e. testing whether the machine is in good condition | G07C 3/00 |
| communication of monitoring information, if the problem is related only to the communication of that information | H04L 29/00 |

## Special rules of classification within this group

When classifying a document in group G05B 23/00, one should, as a general rule, avoid giving more than one classification in each subgroup; i.e. a maximum of one classification under G05B 23/0208, one classification under G05B 23/0218, and one classification under G05B 23/0259 should be assigned. Attention should be paid to which of the above-mentioned steps A-C is given detail and appropriate classification should be assigned for that step.

Only if the document deals with several aspects of a sub-group, then more than one class could be assigned, although in that case the classifier should

consider whether assigning a more general class (even the sub-group) would better describe the document being classified.

Groups G05B 23/02 and G05B 23/0202 should no longer be used (these groups stopped being used on June 1st, 2011).

## Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

| | |
|---|---|
| based on process history | in this methods, only the availability of large amount of historical process data is assumed, i.e. no fundamental understanding of the process is assumed. |
| diagnostics | this term can be ambiguous, as sometimes it will mean detection of a failure, and sometimes it will mean detection of cause or root of failure |
| fault detection | detection of both existing and incipient failures |
| fault isolation | estimation of cause or root of failure |
| model-based | a fundamental understanding of the process using first-principles knowledge, that is, an explicit or implicit relationship between the observations (symptoms) of a process and the faults. |
| prognostics | detection of an incipient failure |
| qualitative | rule based decisions; if-then relations between variables |
| quantitative | only mathematical relationships between the variables used in the fault detection and isolation |

## Synonyms and Keywords

In patent documents the following abbreviations are often used:

| | |
|---|---|
| PCA | Principal Component Analysis |
| PLS | Partial Least Square |
| abnormal, failure, malfunction | fault |

## G05B 23/0208

### [N: characterised by the configuration of the monitoring system]

### Definition statement

*This subclass/group covers:*

Problems that deal with the configuration of a fault detection system previous to its application for detecting faults.

### References relevant to classification in this group

*This subclass/group does not cover:*

An important exception in this sub-group is the generation of a model of a system. As such a model is important for both control and monitoring, this kind of documents should be classified in G05B 17/02 (for general controls) or in G05B 13/04 (in case of adaptive controls).

## G05B 23/0218

### [N: characterised by the fault detection method dealing with either existing or incipient faults]

### Definition statement

*This subclass/group covers:*

Preprocessing and preparation of observation values so that they may be used in the fault detection process.

Model based fault detection.

Process history based fault detection.

Injection of test monitoring signals and analysis of the control response.

### Special rules of classification within this group

This is the main problem dealt with in group G05B 23/00.

In case of doubt, i.e. a document so general that it does not give much detail about any problem, and if we are confident that the document belongs to G05B 23/00, then at least one class of this subgroup should be assigned to the document, preferably G05B 23/0224 or G05B 23/0243, as deciding whether the document deals with fault detection using a model of the system being monitored or process history of that system should be obvious.

## G05B 23/0259

### [N: characterised by the response to fault detection]

### Definition statement

*This subclass/group covers:*

Confirmation of fault detection

Control of logging system used to store observation and/or fault values.

Communication of fault detection results to operators.

Fault Isolation and Identification.

Predictive Maintenance. This means monitoring the control of a system and, based on the results of this monitoring, adapting the maintenance schedule of the monitored process or device.

Modifications of the monitored process or device to prevent an incipient fault or to reduce the severity of an occurring fault.

Modifications of the monitoring system as a result of the fault detection.

### References relevant to classification in this group

*This subclass/group does not cover:*

| | |
|---|---|
| preventive maintenance, i.e. planning maintenance according to the available resources without monitoring the system | G06Q 10/00C |
| repair maintenance, i.e. repairing a broken or failed process or system | appropriate application groups, such as:A47L15 B23B 39/08 B23B 39/24 B25J 9/16 B60W50 F02D 27/02 F02D 41/22 G01M15 G01R31 G05B 19/406G06F11 |

## G05B 24/00

### Open-loop automatic control systems not otherwise provided for

#### References relevant to classification in this group

*This subclass/group does not cover:*

| | |
|---|---|
| open loop control of positioning, e.g. using step motors | G05B 19/40 |

## G05B 99/00

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

#### Definition statement

*This subclass/group covers:*

Subject matter not provided for in other groups of this subclass.