Symbol	Typ	Titel
G	**Sektion**	**SECTION G — PHYSICS**
G05	**Klasse**	**CONTROLLING; REGULATING**
G05B	**Unterklasse**	**CONTROL OR REGULATING SYSTEMS IN GENERAL; FUNCTIONAL ELEMENTS OF SUCH SYSTEMS; MONITORING OR TESTING ARRANGEMENTS FOR SUCH SYSTEMS OR ELEMENTS (fluid-pressure actuators or systems acting by means of fluids in general F15B; valves per seF16K; characterised by mechanical features only G05G; sensitive elements, see the appropriate subclasses, e.g. G12B, subclasses of G01, H01; correcting units, see the appropriate subclasses, e.g. H02K)**
G05B 1/00	**Hauptgruppe**	**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 H03D 13/00)**
G05B 1/01	1-Punkt Untergruppe	. electric [2]
G05B 1/02	2-Punkt Untergruppe	. . for comparing analogue signals [2]
G05B 1/03	2-Punkt Untergruppe	. . for comparing digital signals [2]
G05B 1/04	2-Punkt Untergruppe	. . with sensing of the position of the pointer of a measuring instrument
G05B 1/06	3-Punkt Untergruppe	. . . continuous sensing
G05B 1/08	3-Punkt Untergruppe	. . . stepwise sensing
G05B 1/11	1-Punkt Untergruppe	. fluidic [2]
G05B 5/00	**Hauptgruppe**	**Anti-hunting arrangements**
G05B 5/01	1-Punkt Untergruppe	. electric
G05B 5/04	1-Punkt Untergruppe	. fluidic [2]
G05B 6/00	**Hauptgruppe**	**Internal feedback arrangements for obtaining particular characteristics, e.g. proportional, integral, differential (in automatic controllers G05B 11/00)**
G05B 6/02	1-Punkt Untergruppe	. electric
G05B 6/05	1-Punkt Untergruppe	. fluidic [2]
G05B 7/00	**Hauptgruppe**	**Arrangements for obtaining smooth engagement or disengagement of automatic control**
G05B 7/02	1-Punkt Untergruppe	. electric [2]
G05B 7/04	1-Punkt Untergruppe	. fluidic [2]
G05B 9/00	**Hauptgruppe**	**Safety arrangements (G05B 7/00 takes precedence; safety arrangements in programme-control systems G05B 19/048, G05B 19/406; safety valves F16K 17/00; emergency protective circuit arrangements in general H02H)**
G05B 9/02	1-Punkt Untergruppe	. electric
G05B 9/03	2-Punkt Untergruppe	. . with multiple-channel loop, i.e. redundant control systems [2]
G05B 9/05	1-Punkt Untergruppe	. fluidic [2]
G05B 11/00	**Hauptgruppe**	**Automatic controllers (G05B 13/00 takes precedence)**
G05B 11/01	1-Punkt Untergruppe	. electric
G05B 11/06	2-Punkt Untergruppe	. . in which the output signal represents a continuous function of the deviation from the desired value, i.e. continuous controllers (G05B 11/26 takes precedence)

Symbol	Typ	Titel
G05B 11/10	3-Punkt Untergruppe	. . . the signal transmitted being dc
G05B 11/12	3-Punkt Untergruppe	. . . the signal transmitted being modulated on an ac carrier
G05B 11/14	2-Punkt Untergruppe	. . in which the output signal represents a discontinuous function of the deviation from the desired value, i.e. discontinuous controllers (G05B 11/26 takes precedence)
G05B 11/16	3-Punkt Untergruppe	. . . Two-step controllers, e.g. with on/off action
G05B 11/18	3-Punkt Untergruppe	. . . Multi-step controllers
G05B 11/26	2-Punkt Untergruppe	. . in which the output signal is a pulse-train
G05B 11/28	3-Punkt Untergruppe	. . . using pulse-height modulation; using pulse-width modulation
G05B 11/30	3-Punkt Untergruppe	. . . using pulse-frequency modulation
G05B 11/32	2-Punkt Untergruppe	. . with inputs from more than one sensing element; with outputs to more than one correcting element
G05B 11/36	2-Punkt Untergruppe	. . with provision for obtaining particular characteristics, e.g. proportional, integral, differential
G05B 11/38	3-Punkt Untergruppe	. . . for obtaining a proportional characteristic
G05B 11/40	3-Punkt Untergruppe	. . . for obtaining an integral characteristic
G05B 11/42	3-Punkt Untergruppe	. . . for obtaining a characteristic which is both proportional and time-dependent, e.g. P. I., P. I. D.
G05B 11/44	1-Punkt Untergruppe	. pneumatic only
G05B 11/46	2-Punkt Untergruppe	. . without auxiliary power
G05B 11/48	2-Punkt Untergruppe	. . with auxiliary power
G05B 11/50	3-Punkt Untergruppe	. . . in which the output signal represents a continuous function of the deviation from the desired value, i.e. continuous controllers
G05B 11/52	3-Punkt Untergruppe	. . . in which the output signal represents a discontinuous function of the deviation from the desired value, i.e. discontinuous controllers
G05B 11/54	4-Punkt Untergruppe	. . . . Two-step controllers, e.g. with on/off action
G05B 11/56	4-Punkt Untergruppe	. . . . Multi-step controllers
G05B 11/58	2-Punkt Untergruppe	. . with inputs from more than one sensing element; with outputs to more than one correcting element
G05B 11/60	1-Punkt Untergruppe	. hydraulic only
G05B 13/00	**Hauptgruppe**	**Adaptive control systems, i.e. systems automatically adjusting themselves to have a performance which is optimum according to some preassigned criterion (G05B 19/00 takes precedence; details of the computer G06F 15/18) [3]**
G05B 13/02	1-Punkt Untergruppe	. electric
G05B 13/04	2-Punkt Untergruppe	. . involving the use of models or simulators [3]
G05B 15/00	**Hauptgruppe**	**Systems controlled by a computer (G05B 13/00, G05B 19/00 take precedence; automatic controllers with particular characteristics G05B 11/00; computers per seG06) [3]**
G05B 15/02	1-Punkt Untergruppe	. electric
G05B 17/00	**Hauptgruppe**	**Systems involving the use of models or simulators of said systems (G05B 13/00, G05B 15/00, G05B 19/00 take precedence; analogue computers for specific processes, systems or devices, e.g. simulators, G06G 7/48) [3]**
G05B 17/02	1-Punkt Untergruppe	. electric

Symbol	Typ	Titel
G05B 19/00	**Hauptgruppe**	**Programme-control systems (specific applications, see the relevant places, e.g. A47L 15/46; clocks with attached or built-in means operating any device at a preselected time interval G04C 23/00; 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 H01H 43/00)**
G05B 19/02	1-Punkt Untergruppe	. electric
G05B 19/04	2-Punkt Untergruppe	. . Programme control other than numerical control, i.e. in sequence controllers or logic controllers (G05B 19/418 takes precedence; numerical control G05B 19/18)
G05B 19/042	3-Punkt Untergruppe	. . . using digital processors (G05B 19/05 takes precedence) [6]
G05B 19/045	3-Punkt Untergruppe	. . . using logic state machines, consisting only of a memory or a programmable logic device containing the logic for the controlled machine and in which the state of its outputs is dependent on the state of its inputs or part of its own output states, e.g. binary decision controllers, finite state controllers [6]
G05B 19/048	3-Punkt Untergruppe	. . . Monitoring; Safety [6]
G05B 19/05	3-Punkt Untergruppe	. . . Programmable logic controllers, e.g. simulating logic interconnections of signals according to ladder diagrams or function charts [5]
G05B 19/06	3-Punkt Untergruppe	. . . using cams, discs, rods, drums, or the like (mechanical programme-control apparatus G05G 21/00)
G05B 19/07	3-Punkt Untergruppe	. . . where the programme is defined in the fixed connection of electrical elements, e.g. potentiometers, counters, transistors [6]
G05B 19/08	3-Punkt Untergruppe	. . . using plugboards, cross-bar distributors, matrix switches, or the like
G05B 19/10	3-Punkt Untergruppe	. . . using selector switches
G05B 19/12	3-Punkt Untergruppe	. . . using record carriers
G05B 19/14	4-Punkt Untergruppe	. . . . using punched cards or tapes
G05B 19/16	4-Punkt Untergruppe	. . . . using magnetic record carriers
G05B 19/18	2-Punkt Untergruppe	. . 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 (G05B 19/418 takes precedence) [6]
G05B 19/19	3-Punkt Untergruppe	. . . characterised by positioning or contouring control systems, e.g. to control position from one programmed point to another or to control movement along a programmed continuous path [3, 6]
G05B 19/21	4-Punkt Untergruppe	. . . . using an incremental digital measuring device [3]
G05B 19/23	5-Punkt Untergruppe	. . . . . for point-to-point control [3]
G05B 19/25	5-Punkt Untergruppe	. . . . . for continuous-path control [3]
G05B 19/27	4-Punkt Untergruppe	. . . . using an absolute digital measuring device [3]
G05B 19/29	5-Punkt Untergruppe	. . . . . for point-to-point control [3]
G05B 19/31	5-Punkt Untergruppe	. . . . . for continuous-path control [3]
G05B 19/33	4-Punkt Untergruppe	. . . . using an analogue measuring device [3]
G05B 19/35	5-Punkt Untergruppe	. . . . . for point-to-point control [3]
G05B 19/37	5-Punkt Untergruppe	. . . . . for continuous-path control [3]
G05B 19/39	4-Punkt Untergruppe	. . . . using a combination of the means covered by at least two of the preceding groups G05B 19/21, G05B 19/27 and G05B 19/33 [3]

Symbol	Typ	Titel
G05B 19/40	4-Punkt Untergruppe	. . . . Open loop systems, e.g. using stepping motor [3]
G05B 19/401	3-Punkt Untergruppe	. . . characterised by control arrangements for measuring, e.g. calibration and initialisation, measuring workpiece for machining purposes (G05B 19/19 takes precedence) [6]
G05B 19/402	3-Punkt Untergruppe	. . . characterised by control arrangements for positioning, e.g. centring a tool relative to a hole in the workpiece, additional detection means to correct position (G05B 19/19 takes precedence) [6]
G05B 19/404	3-Punkt Untergruppe	. . . characterised by control arrangements for compensation, e.g. for backlash, overshoot, tool offset, tool wear, temperature, machine construction errors, load, inertia (G05B 19/19, G05B 19/41 take precedence) [6]
G05B 19/406	3-Punkt Untergruppe	. . . characterised by monitoring or safety (G05B 19/19 takes precedence) [6]
G05B 19/4061	4-Punkt Untergruppe	. . . . Avoiding collision or forbidden zones [6]
G05B 19/4062	4-Punkt Untergruppe	. . . . Monitoring servoloop, e.g. overload of servomotor, loss of feedback or reference [6]
G05B 19/4063	4-Punkt Untergruppe	. . . . Monitoring general control system (G05B 19/4062 takes precedence) [6]
G05B 19/4065	4-Punkt Untergruppe	. . . . Monitoring tool breakage, life or condition [6]
G05B 19/4067	4-Punkt Untergruppe	. . . . Restoring data or position after power failure or other interruption [6]
G05B 19/4068	4-Punkt Untergruppe	. . . . Verifying part programme on screen, by drawing or other means [6]
G05B 19/4069	4-Punkt Untergruppe	. . . . Simulating machining process on screen (G05B 19/4068 takes precedence) [6]
G05B 19/408	3-Punkt Untergruppe	. . . characterised by data handling or data format, e.g. reading, buffering or conversion of data [6]
G05B 19/409	3-Punkt Untergruppe	. . . characterised by using manual data input (MDI) or by using control panel, e.g. controlling functions with the panel; characterised by control panel details, by setting parameters (G05B 19/408, G05B 19/4093 take precedence) [6]
G05B 19/4093	3-Punkt Untergruppe	. . . characterised by part programming, e.g. entry of geometrical information as taken from a technical drawing, combining this with machining and material information to obtain control information, named part programme, for the NC machine [6]
G05B 19/4097	3-Punkt Untergruppe	. . . characterised by using design data to control NC machines, e.g. CAD/CAM (G05B 19/4093 takes precedence; CAD in general G06F 17/50) [6]
G05B 19/4099	4-Punkt Untergruppe	. . . . Surface or curve machining, making 3D objects, e.g. desktop manufacturing [6]
G05B 19/41	3-Punkt Untergruppe	. . . characterised by interpolation, e.g. the computation of intermediate points between programmed end points to define the path to be followed and the rate of travel along that path (G05B 19/25, G05B 19/31, G05B 19/37, G05B 19/39, G05B 19/40 take precedence) [3, 6]
G05B 19/4103	4-Punkt Untergruppe	. . . . Digital interpolation [6]
G05B 19/4105	4-Punkt Untergruppe	. . . . Analog interpolation [6]
G05B 19/414	3-Punkt Untergruppe	. . . Structure of the control system, e.g. common controller or multiprocessor systems, interface to servo, programmable interface controller [6]
G05B 19/4155	3-Punkt Untergruppe	. . . characterised by programme execution, i.e. part programme or machine function execution, e.g. selection of a programme [6]
G05B 19/416	3-Punkt Untergruppe	. . . characterised by control of velocity, acceleration or deceleration (G05B 19/19 takes precedence) [6]
G05B 19/418	2-Punkt Untergruppe	. . 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) [6]

Symbol	Typ	Titel
G05B 19/42	2-Punkt Untergruppe	. . 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
G05B 19/421	3-Punkt Untergruppe	. . . Teaching successive positions by mechanical means, e.g. by mechanically-coupled handwheels to position tool head or end effector (G05B 19/423 takes precedence) [6]
G05B 19/423	3-Punkt Untergruppe	. . . Teaching successive positions by walk-through, i.e. the tool head or end effector being grasped and guided directly, with or without servo-assistance, to follow a path [6]
G05B 19/425	3-Punkt Untergruppe	. . . Teaching successive positions by numerical control, i.e. commands being entered to control the positioning servo of the tool head or end effector [6]
G05B 19/427	3-Punkt Untergruppe	. . . Teaching successive positions by tracking the position of a joystick or handle to control the positioning servo of the tool head, master-slave control (G05B 19/423 takes precedence) [6]
G05B 19/43	1-Punkt Untergruppe	. fluidic [3]
G05B 19/44	2-Punkt Untergruppe	. . pneumatic [3]
G05B 19/46	2-Punkt Untergruppe	. . hydraulic [3]
G05B 21/00	**Hauptgruppe**	**Systems involving sampling of the variable controlled (G05B 13/00-G05B 19/00 take precedence; transmission systems for measured values G08C; electronic switching or gating H03K 17/00)**
G05B 21/02	1-Punkt Untergruppe	. electric
G05B 23/00	**Hauptgruppe**	**Testing or monitoring of control systems or parts thereof (monitoring of programme-control systems G05B 19/048, G05B 19/406)**
G05B 23/02	1-Punkt Untergruppe	. Electric testing or monitoring
G05B 24/00	**Hauptgruppe**	**Open-loop automatic control systems not otherwise provided for [2]**
G05B 24/02	1-Punkt Untergruppe	. electric [2]
G05B 24/04	1-Punkt Untergruppe	. fluidic [2]
G05B 99/00	***Hauptgruppe***	***Subject matter not provided for in other groups of this subclass [2006.01]***